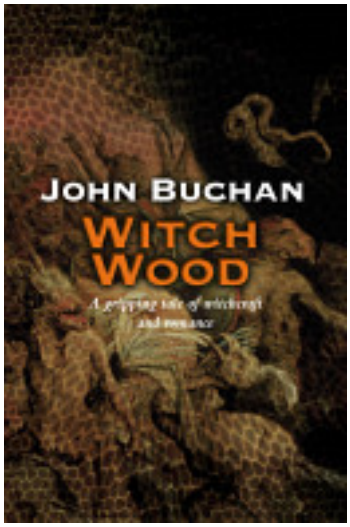

Advanced Primary Maths 4 Stage 2/3: An Accelerated Program Providing Lateral and Vertical Extension, Volume 4, , Harry O'Brien, Greg Purcell, Oxford University Press Australia & New Zealand, 2003, 0725329912, 9780725329914, . Advanced Primary Maths is an accelerated program designed specifically for more able maths students who need to be challenged and have their mathematical learning extended. The program can be used with any syllabus and in any mainstream classroom of students with varying abilities. Contexually interesting problem-solving activitiesWeekly tests for quick assessment Week by week planning guides and reviews.

Addition and Subtraction Grade 1 Math, Martha Palmer, May 1, 1980, , 32 pages. School Zone's step-by-step introduction of math concepts and skills makes learning to add and subtract easy and fun. Your child will learn addition and subtraction facts from 0 ....

Oxford Primary Mathematics Level A Queensland - Year 1 , Pat Lilburn, Pam Rawson, 2005, , 87 pages. .

Queensland Targeting Handwriting , Jane Pinsker, Susan Young, Stephen Michael King, Jan 1, 2001, Penmanship, 64 pages. .

Enrich-e-matics, Book 4 , Anne Joshua, 2006, Mathematics, 92 pages. Enrich-e-matics 3rd Edition combines the best from the highly successful seriesIntroducing Enrich-e-matics and Enrich-e-matics 2nd Edwith new features and content to extend and ....

Addition and Subtraction: Grade 1 , Jennifer Geck, Jennifer Geck Taylor, Jan 1, 2010, Education, 24 pages. A fun, interactive way to practice early literacy and math skills.The Turn & Learn series is designed to provide a fun, interactive way for students to practice early literacy ....

Oxford Primary Mathematics Level D Mental Maths Book, Pat Lilburn, Pam Rawson, 2000, , 84 pages. .

The World of Shakespeare , Anna Claybourne, Rebecca Treays, Felicity Brooks, 2001, , 64 pages. Read about Shakespeare and his enduring tales of love, jealousy, betrayal, revenge, corruption, family feuds, ghosts, witches, and murder..

Primary mathematics 3, Volume 3, Part 1 , Paul Yong, 1997, , 104 pages. .

Everyday Mental Maths and Problem Solving, Book 1 , Rod Cameron, 1996, , 63 pages. First in a series of workbooks for primary-school students, based on the national curriculum statements. Contains 30 sequential projects with activities from the strands ....

Advanced Primary Maths New Edition 6 Stages 3/4: An Accerlerated ..., Volume 6 An Accerlerated Program Providing Lateral and Vertical Extension, Harry O'Brien, Greg Purcell, Jan 1, 2004, , 189

pages. Advanced Primary Maths is an accelerated program designed specifically for more able maths students who need to be challenged and have their mathematical learning extended. The ....

Introducing Addition and Subtraction , Kim Freeman, 2007, Addition, . .

Oxford Primary Mathematics Student Workbook Level G Queensland - Year 7 , Pat Lilburn, 2005, , 143 pages. .

Critical Thinking for Multiple Learning Styles , Karen M. Streeter, 2012, , 176 pages. .

Writing to learn mathematics strategies that work, K-12, Joan Countryman, Apr 16, 1992, Mathematics, 101 pages. Discusses how writing can improve student's reasoning skills..

Oxford Primary Mathematics Level C Blackline Master Book, Pat Lilburn, Pam Rawson, Jul 15, 2000, , 108 pages. .

Charts, Tables & Graphs 30 Skill-building Reproducible Pages That Prepare Kids For Standardized Tests, Michael Priestley Priestley, Mar 1, 2005, , 64 pages. Each page includes an attention-grabbing graph, chart, or table with questions to help kids read and interpret the data. Includes bar and line graphs, circle graphs, schedules ....

Advanced Primary Maths is an accelerated program designed specifically for more able maths students who need to be challenged and have their mathematical learning extended. The program can be used with any syllabus and in any mainstream classroom of students with varying abilities. Contexually interesting problem-solving activitiesWeekly tests for quick assessment Week by week planning guides and reviews

Dodson AM Director, ANU National Centre for Indigenous Studies Professor, ANU College of Law Member of reference are a stipulation that any "options identified should preserve the sovereignty of the Parliament Parliament is not sovereign in Albert Dicey's sense because its legislative powers are limited

ANU MLSS 2010: Data Mining Part 1: Introduction, data mining challenges, and data issues for data mining Data Mining module outline Part 1: Very short introduction to data mining Data mining process Challenges in data mining Data cleaning, integration and pre-processing Part 2: Association rule mining Part

and application of modern biotechnologies are highly sought after by employers in chemical, plant and agricultural such as agricultural and medical biotechnology. Both practical and theoretical skills are learnt in most courses information, please visit chemistry.anu.edu.au/student/bridging. Honours in Biotechnology Students who meet

ANU Graduate Essentials Tertiary Administration Pilot Program Program information and application form Overview The ANU Graduate Essentials Tertiary Administration Pilot Program seeks to: Â· increase and tertiary administration; and Â· deliver enhanced capacity for Colleges and Divisions to meet their strategic

ANU COLLEGE OF LAW Simon Rice OAM Associate Professor Director of Law Reform and Social Justice Program, 2008 Australian Law Reform Commission: o Managing Justice: A review of the federal civil justice justice policy, and make the same recommendations for reform. Rice and Townes O'Brien submission: Senate

The launch of the Gravity Recovery and Climate Experiment (GRACE) space gravity mission opened new horizons to the scientific community for environmental monitoring. Through the provision of estimates of temporal changes in the Earth's gravity field, the products generated from the GRACE mission have enabled studies of mass balance changes in polar regions, deformation

caused by very large earthquakes, glacial isostatic adjustment and quantification of water exchanges through various hydrological processes. International analysis centres provide estimates of the Earth's temporally varying gravity field in the form of spherical harmonic coefficients which are then used to quantify the geophysical processes that have caused the changes in the Earth's gravity field. We have designed an online, publicly available web application that performs the computations to convert the spherical harmonic representations (of the French Groupe de Recherche en Géodesie Spatiale) of the gravity field into estimates of crustal deformation and/or water loads, and provides users with the ability to visualise the estimates. Derived products are also available to download as numerical values for further analysis. This paper describes the scientific basis and technical approaches used by the web portal (grace.anu.edu.au/evasph.php).

A first prototype of the hybrid CPV-T ANU-Chromasun micro-concentrator (MCT) has been installed at The Australian National University (ANU), Canberra, Australia. The results of electrical and thermal performance of the MCT system, including instantaneous and full-day monitoring, show that the combined efficiency of the system can exceed 70%. Over the span of a day, the average electrical efficiency was 8% and the average thermal efficiency was 60%.

thermal desalination and power station. The large amount of low temperature heat that is produced September 2006. Burgess G and Lovegrove K. "Solar thermal powered desalination: membrane versus distillation at supporting and improving the technology has continued within the ANU Solar Thermal Group since then. In 2005

ANU COLLEGE OF ASIA & THE PACIFIC STUDENT OFFICE Bachelor of Asia-Pacific Studies South Asian/Sanskrit) Major: South Asian Studies Language (48 units/8 courses) Major: Sanskrit* Elective (48 units/8 courses) Anything from Anywhere 1:1 ASIA1025: Individual Society in Asia & the Pacific A SKRT1002: Sanskrit 1A

Pinnacle is the ANU's teacher training programme for full time PhD students. The Pinnacle Teacher Training Program provides a mentoring system that aims to equip postgraduate students with the skills and theoretical background that they will need to become high quality lecturers. This article describes Pinnacle, and discusses the assessment of its effectiveness by past Pinnacle participants, using quantitative and qualitative feedback. There were differences in the perceived effectiveness of Pinnacle related to participants' sex and their academic discipline. Overall, the participants found that the opportunity to deliver lectures, to work closely with their mentor, and to reflect on their own teaching philosophy and practice gave them a sense of being confident and competent teachers by the end of the programme. Pinnacle provides an opportunity to reflect on the practice of teaching before habit and academic pressures permanently shape teaching practices. (Contains 2 figures and 1 table.)

that many people might think. In fact they account for about one in ten of all flowering plant species. SomeAT The AusTrAliAn nATionAl universiTy http://sciencewise.anu.edu.au Plant sciences A science Tibetan poppy PlantSciencesSpecial 4 8 20 6 10 23 Why TibeTAn PoPPies hAve The blues Studying the Impact

The more immediate context of the events the author describes in this article is needed in order to identify the policy framework within which the Australian National University (ANU)-Canberra CAE (CCAE) merger was placed as a component of a wider public policy initiative undertaken by John Dawkins. There were four major components in that wider policy shift. The first of these was the creation of the mega-department of Education, Employment and Training, with Dawkins as its first minister. The second was the introduction of direct charges to university students in the form of the Higher Education Contribution Scheme (HECS). The third--and the one under close analysis in this article--was the thrust towards amalgamation to create larger and more cost-efficient organisations in a single Unified National System to replace the binary division between universities and CAEs. The fourth--often not spelled out but well understood by those close to Dawkins--was to enhance the efficiency of the universities as tools of public policy. The aim was to refocus their activities so that they provided a reasonable return for the long-term investment which government and the community had made. This was to be accomplished in part by encouraging greater competitiveness

between universities, initially aimed at servicing an emergent market for overseas students. The issuing of the epoch-making Green and White Papers followed closely on Dawkins' appointment. The Green Paper indicated that a Unified National System was to be established with a set of new ground rules linking size of individual institutions to differential access to public funding. This was accomplished by creating an arbitrary minimum size below which existing institutions would not be able to survive as independent entities funded at the maximum rate. This resulted in pressure on many CAEs (including CCAE) and a few smaller universities (including the ANU) to become part of a larger organisation. In addition, funding formulae and public rhetoric encouraged existing relatively large universities to become even larger. The emergence of the unified tertiary education system in the late 80s and early 90s involved a series of struggles between traditional "real" universities and the merged CAEs that were to make the new system possible. The author was a key actor in one of the bitterest battles. In this article, he recalls the Machiavellian manoeuvring and policy gaffes, and muses on the lessons learned.

In this study we present a systematic comparison between two shallow water numerical models as a function of the earthquake source parameters in near shore propagation and inundation. For the region under analysis, bay of Alvor south of Portugal, we possess a highly detailed topography as well as multi-beam bathymetric dataset that allow the construction of terrain models with a resolution of 10 m. On one hand we have used numerical model AnuGA (Geoscience Australia), a finite volume method for the near shore wave propagation and inundation. For the propagation from source to the near shore a one-way coupling method was used, with models COMCOT (Cornell University) and SWAN (Mader). These models were run separately and the output used as initial conditions to the AnuGA's runs. There were no significant differences in inputting AnuGA with these models, but with the advantage of SWAN requiring a significantly less computational effort. On the other hand, we have used COMCOT to model the tsunami from origin to inundation. A range of source models were used, a first concern was to assure that in both models, AnuGA and COMCOT, a similar wave entered the near shore study area. Afterwards, a comparison of the wave height and form at the -5 m bathymetric contour was performed for selected cases. A comparison of the inundation parameters, run-up and run-in, for the range of source models was made. Results indicate that COMCOT systematically presents higher inundation parameters but the differences between the models just before the shoreline are not significant. The finite volume methods presents more consistent results through out the source model ranges than the finite differences method.

, dentistry, forensic science, physiotherapy or nutrition. Students in this program may also choose to do in the workplace. Professionals discuss their work, career, ethics and legal issues such as liability, and students companies > Office of Gene Technology Regulation > Pathology clinics > Police forensics > Therapeutic Goods

give some semblance of a level playing field for clean energy projects. Failing this, the Committee national and global benefits flowing from clean energy projects. A model for reform exists in national for Climate Law and Policy Canberra ACT 0200 Australia Telephone: +61 2 6125 1689 Facsimile: +61 2 6125 0103

Arts Aspect I, 2008 mid-fired ceramics, low temperature glazes 26 x 25 x 28 cm Photography: Stuart Hay & silversmithing 32 glass 40 painting 54 photography & media arts 84 printmedia & drawing 108 sculpture 126 disciplines - Ceramics, Printmedia and Drawing, Glass, Gold and Silversmithing, Painting, Photography, Digital

in the Lao PDR relating to law reform, human rights, criminal justice, human trafficking, international law of The Australian National University Presented by Law Reform + Social Justice Law, Governance & Development, Ministry of Justice and Constitutional Affairs and also as Senior Advisor, Ministry of Constitutional

programs for computation. Results from the Fortran programs are then passed to either the Generic Mapping precisely using a K/Ka-band microwave system, along with the position of the spacecraft using GPS, non spherical harmonic coefficients (the so-called ``de-striping'' filter (e.g., Swenson and

the People's Bank of China's (PBoC) substantial holdings of US treasuries, China's financial sector had in China compared with Western countries today. The banking sector is dominated by a handful of state, the China Banking Regulatory Commission (CBRC), disaggregates this quota, assigning lending quotas to each

and constrained: (1) firm dividend policy; (2) an index measure derived from results in Kaplan and Zingales (1997 is classified as being financially constrained if: (1) it makes no annual cash dividend payment; (2) it has constrained if it makes no annual cash dividend payment and is unconstrained otherwise; (2) a firm

Sanskrit Southeast Asian Studies Thai Vietnamese Pacific Studies Pacific Language B. Graduate Diploma Indonesian South Asian Studies Hindi Urdu Sanskrit Southeast Asian Studies Thai Vietnamese Pacific Studies Indonesian Thai Vietnamese South Asia India/Pakistan/ Bangladesh Hindi Urdu Sanskrit The Pacific Pacific

We present the preliminary results for an experiment that aims to perform direct measurements of suspension thermal noise. The experiment is based on a niobium flexure membrane approximately 200 μm thickness that is operated as a stable inverted pendulum. A 0.25 g mirror suspended by this flexure membrane is used as the end mirror of a Fabry-Perot test cavity. This test cavity has a length of 12mm and a finesse of about 800. It is mounted at the lowest stage of a quadruple cascaded pendulum suspension, enclosed in a high-vacuum envelope. The length of test cavity is stabilized with 1Hz bandwidth to a Nd:YAG laser, which itself is stabilized with high bandwidth to the length of a suspended Zerodur reference cavity of finesse 6000.

health and safety protocols, etc. Research: practical studio, textual or visual enquiry. For example. In visual art, studio practice is the common methodology. Within studio practice, the aims and subject-RELATED TERMS Appropriate visual, documentary, or written forms: The form called for by the project

Possible Futures 10.15-10.45am Coffee/tea break (HB Centre Atrium) B. Political Update 10.45am-12.45pm, Bangkok Myanmar Remains a Millstone Around Asia's Necks 12.45-1.30pm Lunch break (HB Centre Atrium) C) Impact of International Sanctions on Myanmar/Burma 3.30-4.00pm Coffee/tea break (HB Centre Atrium) D

and what aesthetic and architectural precursors provided templates for imitation? How similar's more general musings about history, religiosity, aesthetics, desire and subjectivity in rural Thailand;3 twenty years prior to 1957, Luang Phor Khom established the architectural foundations of a generic rural

University kee@csl.anu.edu.au, jwl@csl.anu.edu.au, Andrew.Slater@csl.anu.edu.au 1 Introduction This extended for inductive learning. Available at http://csl.anu.edu.au/~jwl, 2001. [Llo01] J.W. Lloyd. Knowledge representation, computation, and learning in higher-order logic. Available at http://csl.anu.edu.au/~jwl, 2001

Smith Growing Up on the Streets of Java: An Alternative Maturation Process Â- Jacinta Spinks Seks in the Time of Reformasi: Reproductive Health and Rights of Young Women in Post Suharto Indonesia Â- Kate in the 21st Century Moving towards Effective Policing in Democratic Indonesia Â- James Cole Credibility

We have used photoluminescence and X-ray absorption spectroscopies to investigate electronic structures and metal-ligand bonding of a series of An02Cl/ ' (An = U, Np, Pu) compounds. Specifically, we will discuss time-resolved near-infrared emission spectra of crystalline Cs2U(An)02C14 (An = Np and Pu) both at 23 K and 75 K, as well as chlorine Kedge X-ray absorption spectra ofCs2An02Cl4 (An = U, Np).

Wilkerson, Marianne P [Los Alamos National Laboratory; Berg, John M [Los Alamos National Laboratory; Clark, David L [Los Alamos National Laboratory; Conradson, Steven D [Los Alamos National Laboratory; Hobart, David E [Los Alamos National Laboratory; Kozimor, Stosh A [Los Alamos National Laboratory; Scott, Brian L [Los Alamos National Laboratory

of facilities services. 4) Build internal/eternal communication promoting stronger relationships. 1 to meet the University's current and future strategic requirements and objectives 5) Capture all. Achievement of the goals set down in the University Environmental Management Plan, as well as meeting our

& Sons, Sydney. 2009. Nesting ecology of the critically endangered Fijian Crested Iguana Brachylophus ecology of the Critically Endangered Fijian Crested Iguana Brachylophus vitiensis a TDF specialist, on the Fijian island of Yadua Taba over two field seasons. In Fiji, the TDF and the endemic Crested Iguanas

Background Recent projections suggest that by the year 2030 depression will be the primary cause of disease burden among developed countries. Delivery of accessible consumer-focused evidenced-based services may be an important element in reducing this burden. Many consumers report a preference for self-help modes of delivery. The Internet offers a promising modality for delivering such services and there is now evidence that automated professionally developed self-help psychological interventions can be effective. By contrast, despite their popularity, there is little evidence as to the effectiveness of Internet support groups which provide peer-to-peer mutual support. Methods/Design Members of the community with elevated psychological distress were randomised to receive one of the following: (1) Internet Support Group (ISG) intervention, (2) a multi-module automated psychoeducational and skills Internet Training Program (ITP), (3) a combination of the ISG and ITP, or (4) an Internet Attention Control website (IAC) comprising health and wellbeing information and question and answer modules. Each intervention was 12 weeks long. Assessments were conducted at baseline, post-intervention, 6 and 12 months to examine depressive symptoms, social support, self-esteem, quality of life, depression literacy, stigma and help-seeking for depression. Participants were recruited through a screening postal survey sent to 70,000 Australians aged 18 to 65 years randomly selected from four rural and four metropolitan regions in Australia. Discussion To our knowledge this study is the first randomised controlled trial of the effectiveness of a depression ISG. Trial registration Current Controlled Trials ISRCTN65657330.

at the content router apply to the content labels for the servers registered there. = Select text:buddhism = List-SocSci-Netlore.cl lists.cl ANU-Thai-Yunnan.cl mailing-lists.cl ANU-ZenBuddhism-Calendar.cl ANU-ZenBuddhism suggests terms related to the user's query term text:buddhism. = Select text:buddhism = Show-values text

In 2004, PHYS3032, Condensed Matter Physics (CMP) was a typical third year physics course at the ANU, with an enrolment of 10 students. In 2005 the enrolment doubled to 20 students, and in 2006 a total of 41 students completed the course, the highest of any third year physics course at the ANU. The course is the only solid-state-physics taught

OF TECHNOLOGY (CIT) Advance Standing for programs in the ANU College of Engineering and Computer Science2009 Advance Standing Reference Guide AUSTRALIAN NATIONAL UNIVERSITY Â- CANBERRA INSTITUTE Diploma in: ANU Normal Duration in Years Advance Standing/ Credit Given (in years) Pre-Requisites Bachelor

Advance Standing Reference Guide AUSTRALIAN NATIONAL UNIVERSITY Â- NANYANG POLYTECHNIC Advance Degree Nanyang Polytechnic Diploma in: ANU Normal Duration in Years Advance Standing/ Credit Given (in years) Time to complete Degree at ANU Pre-Requisites Bachelor of Information Technology IS: Information

It is easy to say “Just float and mount the carbon foils". However learning the art can be more difficult than old masters have shown it to be. In this article we will share our experience of some difficulties we have had at Australian National University (ANU). We also present results from some

in beam endurance testing of foils using carbon supplied by Vacuum Technology (Germany), Micromatter (Canada) and those made at the ANU (Australia).

Background: The case fatality ratio (CFR), the ratio of deaths from an infectious disease to the number of cases, provides an\\u000aassessment of virulence. Calculation of the ratio of the cumulative number of deaths to cases during the course of an\\u000aepidemic tends to result in a biased CFR. The present study develops a simple method to obtain an unbiased

with the Commonwealth Government. They are not entitled to a remission of that debt, except in special circumstances a tuition fee liability and hence a FEE-HELP debt for the course with the Commonwealth Government.officer@anu.edu.au Phone: +61 2 6125 8124 Fax: +61 2 6125 7535 Web: www.anu.edu.au/sas/fees/ Remission of FEE-HELP Debt

|| pA-- - nga shu bA-- -- nga -muni - hrdA Ab-ja- bhrn ga- D- Pds , dp G P P sdpd | S ; ; dg | , r G R || pA-- - nga shu bA-- -- nga -muni - hrdA Ab-ja- bhrn ga- ; - RG , R S sdrs dp D | g r sd rs dp | pg dp gr sr || pA-- - nga shu bA-- -- nga mu-ni- hr-dA Ab-ja- bhrn ga- Charanam 1: vAlAyamugAnu rAnu j

The statistics of sea state duration (persistence) have been found to be\\u000adependent upon the recording interval \\\\Delta t. Such behavior can be explained\\u000aas a consequence of the fact that the graph of a time series of an\\u000aenvironmental parameter such as the significant wave height has an irregular,\\u000a\\

The Australian Meteorology and Oceanography Society (AMOS) has held an annual conference each year since 1994. The venue for the 17th conference in this series was the Australian National University (ANU) in Canberra, Australia's capital city. The conference ran over three days from 27 to 29 January 2010. The conference title was Atmospheres, Oceans, Environment and Society with the conference

A review of the HAXTEL project devoted to the development of a Laue lens telescope for hard X-\\/gamma-ray observation of the\\u000a continuum spectra of celestial sources is presented. Main design properties, open issues, the status of the project and an\\u000a example of multi-lens configuration with sensitivity expectations are discussed.

Roberts, Fiona Wheeler, John Williams 2004 The Ninth Annual Public Law Weekend Dates 5-6 November 2004 in Constitutional Law Convenors Fiona Wheeler and James Stellios 2002 The Seventh Annual Public Law Weekend Dates 1 in Australian Constitutional Law Convenors Deborah Cass, Jennifer Clarke, Fiona Wheeler (ANU), John Williams

A Review of Thin Film Crystalline Silicon for Solar Cell Applications. Part 1 : Native Substrates.mccann@anu.edu.au Abstract Approximately half the cost of a nished crystalline silicon solar module is due to the silicon itself. Com- bining this fact with a high e ciency potential makes thin lm crystalline silicon solar

Professor Director of Law Reform and Social Justice Canberra ACT 0200 Australia Telephone: +61 2 6125 7845 long engagement with law reform and social justice. We first discuss the contribution of the ANU College of Law to law reform and social justice. We then make some observations on committee structure

ourduility of qas turbines for aerospace anu terrestrial dppllCdtions. High. pertUl' OldliCe - illyll .... combustor shapes are being designed to tie slip cast of alpha silicun car- ... the reinforcement of iron-chromium-aluminum-yttrium (FeLry lY) alloys with ... term, silicon nitride or silicon carbide blades/rotors are being design lll ...

Theoretical Physics / Plasma Research Laboratory (PRL), RSPE, ANU 2Theoretical Physics, Princeton PlasmaCritical behaviour in toroidal plasma confinement Mathew McGann1, Robert Dewar1, Stuart Hudson2 1 Physics Laboratory (PPPL), NJ Is resilience to pressure shared between classes of surfaces? Find more

= Lake Baikal Basin, Len = Lena River Basin, Cas = Central Asian Basin, Amu = Amur River Basin, Anu of Alaska, the lower Mackenzie River, and to eastern Saskatchewan; and a `Nahanni' lineage confined to the Nahanni River area of the upper Mackenzie River drainage. Sequence analysis of a portion of the control

OF COMPLEX SOCIALITY IN LIZARDS DAVID G. CHAPPLE 1 School of Botany and Zoology, Australian National ubiq- uitous and easily identifiable lizards (Cogger, 2000; Greer, 1989). Several species of Egernia organization within the genus.1 CORRESPONDENCE:e-mail,David.Chapple@anu.edu.au 145 #12;Understandably, initial

(andrew.kahn@anu.edu.au). Sexual selection is a major force behind the rapid evolution of male genital morphology among species. Most within-species studies have focused on sexual selection on male genital traits; for small males, there was no effect of genital size on female association time. Keywords: Gambusia; genital

A possible resolution of the information loss paradox for black holes is\\u000aproposed in which a phase transition occurs when the temperature of an\\u000aevaporating black hole equals a critical value, T_c, and Lorentz invariance\\u000aand diffeomorphism invariance are spontaneously broken. This allows a\\u000ageneralization of Schr\\\\\\

REVIEW AND SYNTHESIS Do invasive species show higher phenotypic plasticity than native species and *Correspondence: E-mail: amy.davidson@anu.edu.au Abstract Do invasive plant species have greater phenotypic plasticity than non-invasive species? And, if so, how does this affect their fitness relative to native, non-invasive

From untangled graphs and nets to tangled materials Stephen T. Hyde*, Olaf Delgado Friedrichs. * Corresponding author. E-mail address: stephen.hyde@anu.edu.au (S.T. Hyde). Contents lists available at Science.solidstatesciences.2010.10.028 Solid State Sciences xxx (2010) 1e8 Please cite this article in press as: S.T. Hyde, O

.1 commentreviewsreportsdepositedresearchinteractionsinformationrefereedresearch Research Evaluation of differential gene expression during behavioral development in the honeybee. Correspondence: Ryszard Maleszka. E-mail: maleszka@rsbs.anu.edu.au Abstract Background: The honeybee (Apis combined the power of DNA arrays and the availability of distinct behavioral stages in honeybees to explore

the University Medal for Outstanding Service to the Campus Community. The Environmental Management Plan in areas such as water conservation, waste and recycling, energy and greenhouse gas emissions, biodiversity Commended award at the 2003 ACT Landcare Awards. Â· In 2002, the ANU reduced its greenhouse gas emissions

, in Australia, introduced cane toads (Bufo marinus) experience a release from parasites, with 59 helminth and their parasites: the cane toad, Bufo marinus, in Australia. Aust J Ecol 22: 316Â-24. Beckstead J and Parker I M Australia are parasites which transferred from native anu- rans (Barton 1997). Also, introduced toads

Detecting Triaxiality and Figure Rotation in Gaseous Elliptical Galaxies M. Bureau and K. C@mso.anu.edu.au Abstract: We discuss the possibility of detectÂ- ing triaxiality and figure rotation in elliptical galaxies in edgeÂ-on spiral galaxies. 1 #12; 1 Introduction The ellipticity of most (giant) elliptical galaxies

The Cepheid period-luminosity relation is the primary distance indicator used in most determinations of the Hubble constant. The tip of the red giant branch (TRGB) is an alternative basis. Using the new Australian National University (ANU) SkyMapper Telescope, we calibrate the Tully-Fisher relation in the I band. We find that the TRGB and Cepheid distance scales are consistent.

Hislop, Lachlan; Mould, Jeremy [School of Physics, University of Melbourne, Vic 3010 (Australia); Schmidt, Brian; Bessell, Michael S.; Da Costa, Gary; Francis, Paul; Keller, Stefan; Tisserand, Patrick; Rapoport, Sharon; Casey, Andy, E-mail: jmould@unimelb.edu.au, E-mail: brian@mso.anu.edu.au [Research School of Astronomy and Astrophysics, Australian National University, Canberra (Australia)

Observer Localization in Multiverse Theories Marcus Hutter RSISE @ ANU and SML @ NICTA Canberra of theories suggested for our world, from ego- to geo- to helio-centric models to universe and multiverse in this particular solar system is essentially unanswerable. Multiverses. Many modern more speculative cosmological

but at least four major advances of glacier ice during the last 70,000 years. The coldest part of the last ice of glaciers and ice sheets. ANU scientists are using this technique to take a fresh look at the history of the advance and retreat of the ice (a sensitive indicator of climate) can be determined with unprecedented

Body dysmorphic disorder (BDD) is a relatively common and often severe psychiatric disorder in which an individual has an\\u000a excessive preoccupation with an imagined or slight defect in his or her appearance (American Psychiatric Association in Diagnostic and statistical manual of mental disorders. American Psychiatric Association, Washington, 2000). Despite its prevalence in the United States and worldwide, many health care

FOR GAUCHER DISEASE Lakshmanane Premkumar, , Anu R. SawkarÂ§ , Swetlana Boldin-Adamsky* , Lilly TokerÂ¶ , Israel: X-ray structure of acid--glucosidase/cyclohexitol Gaucher disease is an inherited metabolic disorder of mutations in loop 394-399 that cause Gaucher disease by reducing catalytic activity. Moreover, in silico

Universal Artificial Intelligence Marcus Hutter Canberra, ACT, 0200, Australia http://www.hutter1.net/ ANU ETHZ NICTA #12;Marcus Hutter - 2 - Universal Artificial Intelligence Abstract The dream of creating artificial devices that reach or outperform human intelligence is many centuries old. In this talk

. For young queuing subordinates, the breeding female is typically their mother. Because of incest avoidance recent empirical attention to this problem.*Correspondence author. E-mail: andrew.cockburn@anu.edu.au #12 by avoidance of nuclear family incest (Koenig & Haydock 2004). Immediate fitness benefits available during

APPENDIX B: INDIGENOUS EDUCATION STATEMENT 2009 SECTION 1 OBJECTIVES FOR INDIGENOUS HIGHER EDUCATION 1.1 Approach to improve higher education outcomes for Indigenous Australians and how this is being to Indigenous Higher Education in 2009 by launching the ANU Reconciliation Action Plan (RAP) (Appendix 1

Astrophysics. Lilia Ferrario 1 Rick Loy 1 John Lattanzio 2 1 Department of Mathematics, School of Mathematical in theoretical astrophysics have, however, been slow. Over the years, the Departments of Mathematics at Monash University and at the ANU have success- fully introduced some courses in theoretical astrophysics

to the campus community beyond the normal expectations of their position. Professor John Richards Professor Richards is a former Deputy Vice-Chancellor of the University, is the Master of both University House, and improving student representation on the governing bodies. Professor Richards is also a Dean of an ANU

- velopment and deployment of the full range of missile defence weapons at the boost phase, mid & Strategic Studies ANU College of Asia and the Pacific Australian National University Canberra ACT 0200 and empirical study of international and global politics, the political dynamics and developments in the AsiaÂ-Pacific

DNA microarray technology produces large amounts of data. For data mining\\u000a of these datasets, background information on genes can be helpful.\\u000a Unfortunately most information is stored in free text. Here, we present an\\u000a approach to use this information for DNA microarray data mining.

and methods Phosphorus was measured along sliced sections of Porites using the ANU's Helex LA-ICP-MS systems. In conclusion, our contemporaneous LA-ICP-MS and EMPA findings support the continued development of this new by electronprobe microanalysis and LA-ICP-MS J. Mallela Â· J. Hermann Â· R. P. Rapp Â· S. M. Eggins Received: 27

/No-Flash Low-Light Imaging, Multi-flash (gradient camera), Dual Photography Â· Part 4: Computational ProcessingComputational PhotographyComputational Photography CVPR Easter School March 1418th 2011 ANU Kioloa Photography" Â- A hot topic in Computer Vision (and Computer Graphics) Â· Plan: to give you an overview

The authors analyze briefly the known engineering solutions and designs of drilling machines used in long tunneling in rocks,\\u000a as well as validate rock destruction methods and broken rock utilization techniques, and discuss potential assembly of an\\u000a “underground rocket” and its breadboard model for checking and testing different engineering designs.

Background The synthesis of cellulose is among the most important but poorly understood biochemical processes, especially in bacteria, due to its complexity and high degree of regulation. In this study, we analyzed both the production of cellulose by all known members of the Rhizobiaceae and the diversity of Rhizobium celABC operon predicted to be involved in cellulose biosynthesis. We also investigated the involvement in cellulose production and biofilm formation of celC gene encoding an endoglucanase (CelC2) that is required for canonical symbiotic root hair infection by Rhizobium leguminosarum bv. trifolii. Results ANU843 celC mutants lacking (ANU843?C2) or overproducing cellulase (ANU843C2+) produced greatly increased or reduced amounts of external cellulose micro fibrils, respectively. Calcofluor-stained cellulose micro fibrils were considerably longer when formed by ANU843?C2 bacteria rather than by the wild-type strain, in correlation with a significant increase in their flocculation in batch culture. In contrast, neither calcofluor-stained extracellular micro fibrils nor flocculation was detectable in ANU843C2+ cells. To clarify the role of cellulose synthesis in Rhizobium cell aggregation and attachment, we analyzed the ability of these mutants to produce biofilms on different surfaces. Alteration of wild-type CelC2 levels resulted in a reduced ability of bacteria to form biofilms both in abiotic surfaces and in planta. Conclusions Our results support a key role of the CelC2 cellulase in cellulose biosynthesis by modulating the length of the cellulose fibrils that mediate firm adhesion among Rhizobium bacteria leading to biofilm formation. Rhizobium cellulose is an essential component of the biofilm polysaccharidic matrix architecture and either an excess or a defect of this “building material” seem to collapse the biofilm structure. These results position cellulose hydrolytic enzymes as excellent anti-biofilm candidates.

The estimation of potential fields such as the gravitational or magnetic\\u000apotential at the surface of a spherical planet from noisy observations taken at\\u000aan altitude over an incomplete portion of the globe is a classic example of an\\u000aill-posed inverse problem. Here we show that the geodetic estimation problem\\u000ahas deep-seated connections to Slepian's spatiospectral localization problem on\\u000athe

We developed a compartmental model for hantavirus infection in deer mice (Peromyscus maniculatus) with the goal of comparing relative importance of direct and indirect transmission in sylvan and peridomestic environments.\\u000a A direct transmission occurs when the infection is mediated by the contact of an infected and an uninfected mouse, while an\\u000a indirect transmission occurs when the infection is mediated by

We study the control complexity of fallback voting. Like manipulation and\\u000abribery, electoral control describes ways of changing the outcome of an\\u000aelection; unlike manipulation or bribery attempts, control actions---such as\\u000aadding\\/deleting\\/partitioning either candidates or voters---modify the\\u000aparticipative structure of an election. Via such actions one can try to

either\\u000amake a favorite candidate win (\\

Cloud Computing is rising fast, with its data centres growing at an\\u000aunprecedented rate. However, this has come with concerns of privacy, efficiency\\u000aat the expense of resilience, and environmental sustainability, because of the\\u000adependence on Cloud vendors such as Google, Amazon, and Microsoft. Community\\u000aCloud Computing makes use of the principles of Digital Ecosystems to provide a\\u000aparadigm for

Peritubular dentin (PTD), a highly mineralized annular ring surrounding each odontoblastic process within the dentin, is an\\u000a enigmatic component in vertebrate teeth. To characterize its structure and composition, we have coupled in situ scanning electron microscopic (SEM) and time-of-flight secondary ion mass spectrometric (TOF-SIMS) analysis of the surface\\u000a composition of intact bovine coronal dentin with the isolation of intact PTD

A quantitative study is carried of a metal cooling process in aqueous and water-polymer cooling liquids. In the study, an\\u000a original spherical hot probe with a heat-insulated stem is used to simulate the cooling conditions of the operating part of\\u000a the probe and to correspond to the cooling conditions of an isolated sphere. It has been shown that in this

Oxygen-gas burners have become a standard component of modern electric-arc steelmaking furnaces worldwide as a means of increasing\\u000a productivity and reducing electric power consumption. The use of such burners in these furnaces is expedient from both an\\u000a economic and an energy standpoint. On the average, the use of 1 m3 of natural gas to heat the scrap in the furnace

We study, analytically and numerically, reflection and transmission of an\\u000aarbitrarily polarized vortex beam on an interface separating two dielectric\\u000amedia and derive general expressions for linear and angular Goos-Hanchen and\\u000aImbert-Fedorov shifts. We predict a novel vortex-induced Goos-Hanchen shift,\\u000aand also reveal direct connection between the spin-induced angular shifts and\\u000athe vortex-induced linear shifts.

The Shoalhaven region of NSW experiences environmental acidification due to acid sulphate soils (ASS). In order to trial an\\u000a environmental engineering solution to groundwater remediation involving a permeable reactive barrier (PRB), comprehensive\\u000a site characterisation and laboratory-based batch and column tests of reactive materials were conducted. The PRB is designed\\u000a to perform in situ remediation of the acidic groundwater (pH 3)

Calculation of the scattered field of the eccentric scatterers is an old problem with numerous applications. This study considers\\u000a the interaction of a plane compressional sound wave with a liquid-encapsulated thermoviscous fluid cylinder submerged in an\\u000a unbounded viscous thermally conducting medium. The translational addition theorem for cylindrical wave functions, the appropriate\\u000a wave field expansions and the pertinent boundary conditions are

The present paper numerically analyzes a passive cooling system using\\u000acavities with different geometries filled with thermal conductivity-enhanced\\u000aphase change material (PCM). A numerical code is developed using an\\u000aunstructured finite-volume method and an enthalpy-porosity technique to solve\\u000afor natural convection coupled to a solid-liquid phase change. Five geometries\\u000acontaining the same volume of PCM are compared while cooling the

Cross-modal facilitation of response time (RT) is said to occur in a selective attention task when the introduction of an\\u000a irrelevant sound increases the speed at which visual stimuli are detected and identified. To investigate the source of the\\u000a facilitation in RT, we asked participants to rapidly identify the color of lights in the quiet and when accompanied by a

Thiopaq biotechnology for partial sulfide oxidation to elemental sulfur is an efficient way to remove H2S from biogases. However, its application for high-pressure natural gas desulfurization needs

upgrading. Particularly, an\\u000a increase in alkalinity of the scrubbing liquid is required. Therefore, the feasibility of sulfide oxidation into elemental\\u000a sulfur under oxygen limitation was tested at extremely haloalkaline conditions in lab-scale bioreactors

Recent theoretical work has produced quantitatively accurate potential-energy surfaces for water with common gases. These\\u000a pair potentials have been used to calculate second interaction virial coefficients with an accuracy superior to that obtained\\u000a by most experiments. In this work, results for water–nitrogen, water–oxygen, and water–argon are combined to calculate an\\u000a effective second virial coefficient for water with air. The results

An examination has been carried out of the ability of projectiles of three different geometries to perforate plates of an\\u000a age hardened aluminum alloy. It was found that flat-ended projectiles perforate the target with greater ease than projectiles\\u000a with more rounded ends. The results are discussed in terms of the ability of a particular projectile geometry to promote adiabatic\\u000a shear

\\u000a Purpose - Craniostar is a handheld mobile robot designed for the support of surgical craniotomies. The system is designed\\u000a as a means of conveying high precision craniotomy path profiles directly to the patient, with minimum modifications to the\\u000a surgeons workflow, and without the large impact on the Operating Room (OR) of current Surgical Robots. Performed here is an\\u000a assessment on

Personal computing applications are constantly increasing their potential power, thanks to steadily growing hardware capabilities\\u000a and large diffusion of high-quality multimedia output devices. At the same time, mobile communication tools are becoming an\\u000a integral part of our everyday life, with new advanced functionalities offered at an unrestrainable pace. Although the way\\u000a we interact with information machines is substantially the same

It is shown first by Adleman that deoxyribonucleic acid (DNA) strand could be employed towards calculating solution to an\\u000a instance of the NP-complete Hamiltonian Path Problem (HPP). Lipton also demonstrated that Adleman’s techniques could be used\\u000a to solve the satisfiability (SAT) problem. In this paper, it is demonstrated how the DNA operations presented by Adleman and\\u000a Lipton can be used

Novel textile reinforced composites provide an extremely high adaptability and allow for the development of materials whose\\u000a features can be adjusted precisely to certain applications. A successful structural and material design process requires an\\u000a integrated simulation of the material behaviour, the estimation of the effective properties which need to be assigned to the\\u000a macroscopic model and the resulting features of

We report a case of congenital Langerhans cell histiocytosis (LCH), presenting with a generalized varicelliform rash in an\\u000a otherwise well newborn. No signs of organ involvement were found on repeated skeletal radiography, abdominal ultrasonography\\u000a and laboratory studies. A diagnosis of “pure cutaneous” LCH was established. Skin manifestation was unusually severe and recurred\\u000a during the first 20 months of life, but

Online social media are complementing and in some cases replacing\\u000aperson-to-person social interaction and redefining the diffusion of\\u000ainformation. In particular, microblogs have become crucial grounds on which\\u000apublic relations, marketing, and political battles are fought. We introduce an\\u000aextensible framework that will enable the real-time analysis of meme diffusion\\u000ain social media by mining, visualizing, mapping, classifying, and modeling

Since radio sources with Ultra Steep Spectra (USS; alpha <~ -1.30; S ~\\u000anu^alpha) are efficient tracers of high redshift radio galaxies (HzRGs), we\\u000ahave defined three samples of such USS sources using the recently completed\\u000aWENSS, TEXAS, MRC, NVSS and PMN radio-surveys. Our combined sample contains 669\\u000asources with S_1400 > 10 mJy and covers virtually the entire sky

This paper completes the series of three articles devoted to automated forecasting of flash floods [3, 5] and describes an\\u000a effective approach of forecast updating through post-processing operations, which can be useful only in conjunction with such\\u000a fast and efficient real-time re-calibration algorithms as SLS-based methods are. In particular, a proposed methodology is\\u000a aimed to reduce negative consequences of scarce

A systematic approach to computer-aided materials design has formulated a new class of ultratough, weldable secondary hardened\\u000a plate steels combining new levels of strength and toughness while meeting processability requirements. A theoretical design\\u000a concept integrated the mechanism of precipitated nickel-stabilized dispersed austenite for transformation toughening in an\\u000a alloy strengthened by combined precipitation of M2C carbides and BCC copper both at

We argue that there was a link between Indus Valley India and the Mayans of\\u000aCentral America which is brought out by astronomical references. The former\\u000aused a Jovian calendar while the latter had perfected a calendar based on\\u000aVenus. This will be shown to be a significant clue. This also provides an\\u000aexplanation for the as yet unexplained fact

. Regarding the increasing number of GMO, a large amount of different types of data from various sources will be accumulated.\\u000a Expected amount and quality of data emphasises the need for a respective information system to efficiently process and evaluate\\u000a monitoring data. A concept for such an\\u000a Information\\u000a System for the\\u000a MOnitoring of GMOs (ISMO) has been developed for the German

I study the joint effect of dynamical friction, tidal torques and\\u000acosmological constant on clusters of galaxies formation I show that within\\u000ahigh-density environments, such as rich clusters of galaxies, both dynamical\\u000afriction and tidal torques slows down the collapse of low-? peaks producing an\\u000aobservable variation in the time of collapse of the perturbation and, as a\\u000aconsequence, a

\\u000a As a C# programmer, you may choose among numerous tools to build .NET applications. The point of this chapter is to provide\\u000a a tour of various .NET development options, including, of course, Visual Studio 2008. The chapter opens, however, with an\\u000a examination of working with the C# command-line compiler, csc.exe, and the simplest of all text editors, the Notepad application

Astronomical observations were used as a marker for time and the Calendar\\u000afrom ancient times. A more subtle calibration of epochs is thrown up by an\\u000aobservation of the position of the solstices and equinoxes, because these\\u000apoints shift in the sky with the years resulting in the gradual shift of\\u000acelestial longitudes $\\\\lambda$. Chronology based on such observations however

Strain HX2 of Rahnella aquatilis has been previously reported as a potential biological control agent (BCA) of grapevine crown gall. The production of an\\u000a antibacterial substance (ABS) was suggested to be an important factor in the biocontrol process. This study was undertaken\\u000a to determine the antibacterial properties and mode of action of ABS. Isolation and purification of ABS from culture

Summary The report prepared by the Intergovernmental Panel on Climate Change (IPCC) for the Second World Climate Conference contains\\u000a well-weighted assessments of the present-day state of climate studies and of the possible consequences of climate change.\\u000a Since IPCC's report is supposed to be a basis for working out an International Framework Convention on Climate Change, an\\u000a analysis has been made of

A major source of uncertainty in databases is the presence of duplicate items, i.e., records that refer to the same real-world\\u000a entity. However, accurate deduplication is a difficult task and

imperfect data cleaning may result in loss of valuable information.\\u000a A reasonable alternative approach is to keep duplicates when the correct cleaning strategy is not certain, and utilize an\\u000a efficient

In this paper potential active contours are presented as a new method of image segmentation. The concept of potential contour\\u000a is a result of the relationship between active contour techniques and the methods of classifiers' construction. The proposed\\u000a method can be extended by the adaptation mechanism that allows changing the available class of the shapes dynamically. An\\u000a original contribution is

A century of heavy metal mining in the western United States has left a legacy of abandoned mines. While large operations\\u000a have left a visible reminder, smaller one and two-man operations have been overgrown and largely forgotten. We revisited an\\u000a area of northern Idaho that has not had active mining since at least 1932 and probably since 1910. At three

This paper considers the time to extinction for a stochastic epidemic model of SEIR form without replacement of susceptibles.\\u000a It first shows how previous rigorous results can be heuristically explained in terms of the more transparent dynamics of an\\u000a approximating deterministic system. The model is then extended to include a host population structured into patches, with\\u000a weak nearest-neighbour mixing of

The increasingly prevalent use of Internet in schools and homes has resulted in asynchronous online discussion becoming an\\u000a increasingly common means to facilitate dialogue between instructors and students, as well as students and students beyond\\u000a the boundaries of their physical classrooms. This article is organized into two main sections. In the first section, we review\\u000a 50 empirical studies in order

Passing objects from one hand to the other occurs frequently in our daily life. What kind of information about the weight\\u000a of the object is transferred between the holding and lifting hand? To examine this, we asked people to hold (and heft) an\\u000a object in one hand and then pick it up with the other. The objects were presented in

We study the gravitational lensing effects of spiral galaxies by taking a\\u000amodel of the Milky Way and computing its lensing properties. The model is\\u000acomposed of a spherical Hernquist bulge, a Miyamoto-Nagai disc and an\\u000aisothermal halo. As a strong lens, a spiral galaxy like the Milky Way can give\\u000arise to four different imaging geometries. They are (i)

Cancer is the leading cause of death in the United States, outpacing deaths due to heart disease. During the year 2005, an\\u000a estimated 1,372,910 persons in the United States were expected to be diagnosed with cancer, and 570,280 persons were expected\\u000a to die from it—more than 1500 people per day (American Cancer Society, 2005). These estimates do not include noninvasive

Characterization of autocatalytic decomposition reactions is important\\u000a for the safe handling and storage of energetic materials. Isothermal differential\\u000a scanning calorimetry (DSC) has been widely used to detect autocatalytic decomposition\\u000a of energetic materials. However, isothermal DSC tests are time consuming and\\u000a the choice of experimental temperature is crucial. This paper shows that an\\u000a automatic pressure tracking calorimeter (APTAC) can be a

The one-dimensional Hubbard model is integrable in the sense that it has an\\u000ainfinite family of conserved currents. We explicitly construct a ladder\\u000aoperator which can be used to iteratively generate all of the conserved current\\u000aoperators. This construction is different from that used for Lorentz invariant\\u000asystems such as the Heisenberg model. The Hubbard model is not Lorentz\\u000ainvariant,

Motivated by some recent speculative attempts to model the dark energy,\\u000ascalar fields with negative kinetic energy coupled to gravity without a\\u000acosmological constant are considered. It is shown that in the presence of an\\u000aordinary fluid, any solution of the vacuum Einstein

equations with cosmological\\u000aconstant is a solution provided $\\\\rho-P={\\\\Lambda \\\\over 4 \\\\pi G}$. The solutions\\u000acan be

A tip-tilt wavefront (image displacement) corrector has been designed and fabricated to increase the efficiency of direct\\u000a imaging with large-sized CCD cameras. A plane-parallel glass plate tilting in two mutually perpendicular directions at an\\u000a angle large enough to compensate for an image displacement of16? on a telescope with F ? 20 m forms the basis of the device. The device

Traditionally product data and their evolving definitions, have been handled separately from process data and their evolving\\u000a definitions. There is little or no overlap between these two views of systems even though product and process data arc inextricably\\u000a linked over the complete software lifecycle from design to production. The integration of product and process models in an\\u000a unified data model

Fault diagnosis of liquid rocket propulsion systems (LRPSs) is a very important issue in space launch activities particularly\\u000a when manned space missions are accompanied, since the safety and reliability can be significantly enhanced by exploiting an\\u000a efficient fault diagnosis system. Currently, inverse problem-based diagnosis has attracted a great deal of research attention\\u000a in fault diagnosis domain. This methodology provides a

\\u000a Computer intensive applications require efficient monitoring of computer networks. This can be enabled by operational analysis.\\u000a In addition to other parameters, utilization measurement of a local network was carried out for a period of 24 hours by an\\u000a artificially generated continuous workload, and at varying workloads caused by normal and increased use of network applications.\\u000a Regardless of the rather high

We prove a gluing theorem which allows to construct an ample divisor on a\\u000arational surface from two given ample divisors on simpler surfaces. This\\u000atheorem combined with the Cremona action on the ample cone gives rise to an\\u000aalgorithm for constructing new ample divisors. We then propose a conjecture\\u000arelating continued fractions approximations and Seshadri-like constants of line\\u000abundles

An automatic Bayesian Kepler periodogram has been developed for identifying\\u000aand characterizing multiple planetary orbits in precision radial velocity data.\\u000aThe periodogram is powered by a parallel tempering MCMC algorithm which is\\u000acapable of efficiently exploring a multi-planet model parameter space. The\\u000aperiodogram employs an alternative method for converting the time of an\\u000aobservation to true anomaly that enables it

One impediment to the industrial use of enzymes in fat and oil transformations is the higher cost often associated with an\\u000a enzymatic process compared with the corresponding chemical process. Processes that utilize plant enzymes, however, may have\\u000a advantages because of their lower cost and ready availability. One example of such a plant-derived enzyme is Carica papaya latex (CPL), the principal

Practical aspects of improving the efficiency of water electrolysis with anodic depolarization by sulfurous anhydride in an\\u000a electrolyzer with a solid polymeric electrolyte are discussed. Methods of reducing energy outlays for the production of hydrogen,\\u000a for example, by altering the organization of the feed of sulfurous anhydride to the reaction zone, are proposed and implemented.\\u000a This made it possible to

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Forestry in South Africa is sharply divided between commercially driven private enterprise which controls 1.3 million ha of\\u000a plantation forests, and government and nongovernment organizations which promote a variety of social forestry programs.\\u000a \\u000a One area of crossover is that of small-scale (1–2 ha) commercial woodlots being promoted by private timber companies as an\\u000a additional source of fiber for their pulpmills,

Acute coronary syndromes reflect a spectrum of disease related, most commonly, to the sudden reduction in blood flow to a\\u000a portion of myocardium. The underlying pathogenesis of the reduction in coronary flow is related to the sudden rupture of an\\u000a atherosclerotic plaque, with subsequent thrombus formation leading to either vascular occlusion or microembolization. Clinicians\\u000a combat this process with antithrombotic therapy,

Feshbach resonances of trapped ultracold alkali atoms allow to vary the\\u000aatomic scattering length a. At very large values of a the system enters an\\u000auniversal strongly coupled regime in which its properties--the ground state\\u000aenergy, pressure {\\\\it etc.}--become independent of a. We discuss transport\\u000aproperties of such systems. In particular, the universality arguments imply\\u000athat the shear viscosity of

We investigate electronic transport in lithographically patterned graphene\\u000aribbon structures where the lateral confinement of charge carriers creates an\\u000aenergy gap near the charge neutrality point. Individual graphene layers are\\u000acontacted with metal electrodes and patterned into ribbons of varying widths\\u000aand different crystallographic orientations. The temperature dependent\\u000aconductance measurements show larger energy gaps opening for narrower ribbons.\\u000aThe sizes

Lyme disease (LD), the most frequently reported vector-borne disease in the United States, requires that humans, infected\\u000a vector ticks, and infected hosts all occur in close spatial proximity. Understanding the spatial dynamics of LD requires an\\u000a understanding of the spatial determinants of each of these organisms. We review the literature on spatial patterns and environmental\\u000a correlates of human cases of

This paper concerns the mathematical modelling and numerical solution of thermoelectrical phenomena taking place in an axisymmetric\\u000a induction heating furnace. We formulate the problem in a two-dimensional domain and propose a finite element method and an\\u000a iterative algorithm for its numerical solution. We also provide a family of one-dimensional analytical solutions which are\\u000a used to test the two-dimensional code and

The proximate determinants of population aging in China are fundamentally the same as those in any other country. It is an\\u000a inevitable consequence of the process known as the “demographic transition” in which declining fertility together with a rise\\u000a in life expectancy leads to a shift towards an older age structure of the population. Yet, the story of population aging

\\u000a The widespread diffusion of electronic commerce offers a great opportunity for blind people. We describe the results of an\\u000a electronic survey carried out with 22 blind and 22 sighted users in order to understand the difficulties and obstacles they\\u000a experience shopping on-line, and solicit their expectations and suggestions for making the interaction simpler and more satisfying.\\u000a Results show that blind

In this place we regularly published the HWWA Index of World Market Prices which has been computed since the fifties and was\\u000a a comprehensive indicator of the price movements of the major raw materials traded in the world markets. Unavoidably, an,\\u000a index of this kind has to be adjusted from time to time to allow for changes in the pattern

Salmonellae are ubiquitous human pathogens, which pose a danger to the elderly and children. Due to the increased number of outbreaks\\u000a of human illness associated with the consumption of contaminated products in the USA and many other countries, there is an\\u000a urgent need to develop rapid assays to detect common food-borne pathogens. This study demonstrates the

feasibility of using\\u000a a

Zerovalent copper nanoparticles (Cu0) of 12 nm size were synthesized using an inert gas condensation method in which bulk copper metal was evaporated into an\\u000a inert environment of argon with subsequent cooling for nucleation and growth of nanoparticles. Crystalline structure, morphology\\u000a and estimation of size of nanoparticles were carried out by X-ray diffraction and transmission electron microscopy. The antibacterial\\u000a activity of

It is expected that the state of an atom or molecule, initially put into an\\u000aexcited state with an energy below the ionization threshold, relaxes to a\\u000agroundstate by spontaneous emission of photons which propagate to spatial\\u000ainfinity. In this paper, this picture is established for a large class of\\u000amodels of non-relativistic atoms and molecules coupled to the quantized

\\u000a Since the early 1990s, integrated marketing communication (IMC) has become the accepted practice in the marketing field. An\\u000a increasing number of researchers consider the marketing communication strategies of IMC as offering key competitive advantages\\u000a associated with customer relationship management. This paper develops an evaluating model for selecting strategies of IMC\\u000a to solidify relationships with existing customers based on the quality

Consider a multidimensional stochastic differential equation of the form , where (Z\\u000a \\u000a s\\u000a)\\u000a s?0 is a symmetric stable process. Under suitable assumptions on the coefficients, the unique strong solution of the above equation\\u000a admits a density with respect to Lebesgue measure, and so does its Euler scheme. Using a parametrix approach, we derive an\\u000a error expansion with respect to

The bimodal globular cluster (GC) metallicity distributions of many giant\\u000aelliptical galaxies are often cited as evidence for the formation of such\\u000agalaxies through mergers involving gas-rich spirals. In such models, the metal-\\u000arich GCs are assumed to have formed during the merger process. We explore an\\u000aalternative possibility: that these metal-rich clusters represent the galaxy's\\u000aintrinsic GC population and

Quantification of the average and interindividual variation in pharmacokinetic behavior within the patient population is an\\u000a important aspect of drug development. Population pharmacokinetic models typically involve large numbers of parameters related\\u000a nonlinearly to sparse, observational data, which creates difficulties for conventional methods of analysis. The nonlinear\\u000a mixed-effects method implemented in the computer program NONMEM is a widely used approach to

It is believed that language is an innate ability and, therefore, spoken language is acquired naturally and informally. In\\u000a contrast, written language is thought to be an invention and, therefore, has to be learned through formal instruction. An\\u000a alternate view, however, is that spoken language and written language are two forms of manifestations of the same inner language\\u000a and that

The prognosis and management of chronic liver diseases in children largely depend on the extent and progression of liver fibrosis,\\u000a which is often the most important predictor of disease outcome, and thus influences the indication for potential therapy.\\u000a Unfortunately, liver biopsy continues to be the gold standard for the staging and grading of fibrosis. Liver biopsy is an\\u000a invasive and

Summary A mathematical model for the injection of hot water into an oil bearing layer has been made, leading to an interesting partial\\u000a differential equation. In this paper it is shown that the repeated or two-dimensional Laplace transformation represents an\\u000a effective tool for solving such equations. In this case the transformation is carried out with respect to the distance and\\u000a the

We propose that cold dark matter is made of Kaluza-Klein particles and\\u000aexplore avenues for

its detection. The lightest Kaluza-Klein state is an\\u000aexcellent dark matter candidate if standard model particles propagate in extra\\u000adimensions and Kaluza-Klein parity is conserved. We consider Kaluza-Klein gauge\\u000abosons. In sharp contrast to the case of supersymmetric dark matter, these\\u000aannihilate to hard positrons,

Like other coastal zones around the world, the inland sea ecosystem of Washington (USA) and British Columbia (Canada), an\\u000a area known as the Salish Sea, is changing under pressure from a growing human population, conversion of native forest and\\u000a shoreline habitat to urban development, toxic contamination of sediments and species, and overharvest of resources. While\\u000a billions of dollars have been

In this paper, fist-order reliability method (FORM) is used to evaluate the impacts of uncertainties posed by traditional\\u000a deterministic models on the environment in Jining, China. Because of groundwater contamination in shallow aquifer, and an\\u000a increase in water demand, the new wells target the confined aquifer with constant pumping rate of 5,000 m3\\/d. Using Theis equation, the groundwater drawdown is analyzed

Thermal analysis is increasingly being used to obtain kinetic data relating to sample decomposition. In this research differential\\u000a scanning calorimeter (DSC) was used to determine the combustion kinetics of three (an, Himmetoglu and Mengen) oil shale samples\\u000a by ASTM and Roger & Morris methods. On DSC curves two reaction regions were observed on oil shale sample studied except an\\u000a oil

Since ancient times and in every culture, gold has been valued for its beauty as well as for its unique physical and chemical\\u000a properties. Hence it is not surprising that the pseudoscience of alchemy arose almost everywhere from earliest times in an\\u000a attempt to convert base metals into the ‘king of metals.’. The idea of transmutation was based upon observation

In this paper we consider bound state solutions, i.e., normalizable\\u000atime-periodic solutions of the Dirac equation in the exterior region of an\\u000aextreme Kerr black hole with mass M and angular momentum J. It is shown\\u000athat for each azimuthal quantum number k and for particular values of J the\\u000aDirac equation has a bound state solution, and that the

We consider late-time cosmology in a (phantom) scalar-tensor theory with an\\u000aexponential potential, as a dark energy model with equation of state parameter\\u000aclose to -1 (a bit above or below this value). Scalar (and also other kinds of)\\u000amatter can be easily taken into account. An exact spatially-flat FRW cosmology\\u000ais constructed for such theory, which admits (eternal or

The multi-stage coordinated attack (MSCA) bring many challenges to the security analysts due to their special temporal an\\u000a spacial characteristics. This paper presents a two-sided model, Janus, to characterize and analyze the the behavior of attacker\\u000a and defender in MSCA. Their behavior is firstly formulated as Multi-agent Partially Observable Markov Decision Process (MPO-MDP),\\u000a an ANTS algorithm is then developed from

An active acoustic technique for monitoring the whales is proposed. The technique allows one to monitor the whales’ crossing\\u000a of a conventional borderline extending for several tens of kilometers in a shallow-water area. The potentialities of the technique\\u000a are demonstrated in the framework of a numerical experiment by solving the problem of diffraction by model scatterers in an\\u000a acoustic waveguide.

Cold supersonic beams of molecules can be slowed down using a switched\\u000asequence of electrostatic field gradients. The energy to be removed is\\u000aproportional to the mass of the molecules. Here we report deceleration of YbF,\\u000awhich is 7 times heavier than any molecule previously decelerated. We use an\\u000aalternating gradient structure to decelerate and focus the molecules in their

Aqueous two phase systems (ATPSs) have good biocompatibility and special selectivity. Their

phase equilibrium and applications\\u000a in biological analysis have received much attention. Herein, parallel laminar flow (PLF) in the microchannel can provide an\\u000a effective platform to enhance mass transfer and preserve separate phases simultaneously. As fundamentals in feasible and convenient\\u000a sampling of PLF for ATPS, the phase separation methods

At the beginning of a class or meeting an icebreaker activity is often used\\u000ato help loosen the group and get everyone talking. Our motivation is to develop\\u000aactivities that serve the purpose of an icebreaker, but are designed to enhance\\u000aand supplement a science-oriented agenda. The subject of this article is an\\u000aicebreaker activity related to gravitational wave astronomy.

This paper discusses participatory processes in wildland fire management (WFM). Participation is an essential element of both\\u000a the European Sustainable Development (SD) Strategy and the White Paper on Governance. Governance and SD have thus become an\\u000a interconnected challenge to be applied to WFM (as a sub-area in forest policy), amongst other policies. An overspread weakness\\u000a in WFM is lack of

The treatment of severe tetanus with autonomic dysfunction is discussed, with emphasis on the use of magnesium sulphate. An\\u000a exemplary case is reported, describing the inadequate response to magnesium, but the previously unreported and successful\\u000a use of clonidine to control sympathetic overactivity. The properties of clonidine are reviewed. Clonidine is felt to be a\\u000a logical and appropriate drug for the

The resonant optical modes of a high permittivity dielectric prism with an\\u000aequilateral triangular cross section are discussed. Eigenmode solutions of the\\u000ascalar Helmholtz equation with Dirichlet boundary conditions, appropriate to a\\u000aconducting boundary, are applied for this purpose. The particular plane wave\\u000acomponents present in these modes are analyzed for their total internal\\u000areflection behavior and implied mode confinement

Since the realization of Bose-Einstein condensates (BEC) in atomic gases an\\u000aexperimental challenge has been the production of molecular gases in the\\u000aquantum regime. A promising approach is to create the molecular gas directly\\u000afrom an ultracold atomic gas; for example, atoms in a BEC have been coupled to\\u000aelectronic ground-state molecules through photoassociation as well as through a\\u000amagnetic-field

In this paper, an analysis of the schema evolution process in object oriented databases is made using an object oriented data\\u000a model that supports temporal features and versions definition - the Temporal Versions Model. A meta schema structure is defined\\u000a to store information concerning to evolutionary schema states, as well as their classes, attributes and relationships. An\\u000a implementation proposal is

To sustain the upland conversion program (UCP) in China after the government compensation expires, we suggest an establishment\\u000a of a domestic carbon market where forest carbon from the UCP can be traded. Taking southwest China’s Yunnan Province as an\\u000a example, we explored the feasibility of switching the UCP to a carbon offset project. The breakeven carbon price which is\\u000a equivalent

We study the non-archimedean counterpart to the complex amoeba of an\\u000aalgebraic variety, and show that it coincides with a polyhedral set defined by\\u000aBieri and Groves using valuations. For hypersurfaces this set is also the\\u000atropical variety of the defining polynomial. Using non-archimedean analysis and\\u000aa recent result of Conrad we prove that the amoeba of an irreducible variety

Providing students with supplementary course materials such as audio podcasts, enhanced podcasts, video podcasts and other\\u000a forms of lecture-capture video files after a lecture is now a common occurrence in many post-secondary courses. We used an\\u000a online questionnaire to ask students how helpful enhanced podcasts were for a variety of course activities and how important\\u000a having access to the enhanced

Let a classical algorithm be determined by sequential applications of a black\\u000abox performing one step of this algorithm. If we consider this black box as an\\u000aoracle which gives a value F(a) for any query a, we can compute T sequential\\u000aapplications of F on a classical computer relative to this oracle in time T.\\u000a It is proved that

Maternal effects directly and indirectly modify an offspring's phenotype during development, preparing the offspring for an\\u000a environment similar to an environment experienced by the mother. Evolutionarily, this could be adaptive if organisms did not\\u000a experience a large amount of environmental variation across generations. We argue increased anthropogenic changes have led\\u000a maternal effects to be maladaptive in plants. Similar problems in

The problem of determining the electromagnetic and gravitational\\u000a``self-force'' on a particle in a curved spacetime is investigated using an\\u000aaxiomatic approach. In the electromagnetic case, our key postulate is a\\u000a``comparison axiom'', which states that whenever two particles of the same\\u000acharge e have the same magnitude of acceleration, the difference in their\\u000aself-force is given by the ordinary

\\u000a In the context of Intelligent Tutoring Systems, there is a potential for adapting either content or its sequence to student\\u000a as to enhance the learning experience. Recent theories propose the use of team-working environments to improve even further\\u000a this experience. In this paper an effective matching algorithm is presented in the context of peer reviewing applied to an\\u000a educational setting.

We calculate the radial diffusion coefficient for a passive contaminant in an\\u000aaccretion disc which is turbulent due to the action of the magnetorotational\\u000ainstability. Numerical MHD simulations are used to follow the evolution of a\\u000alocal patch of the disc using the shearing box formalism. A separate continuity\\u000aequation for the mass fraction of contaminant is integrated along with

. Chromium(VI) is determined through its direct electrochemical reduction in the bulk of a porous glassy carbon electrode. An\\u000a electrode filled with the acidified sample and Cr(VI) is reduced by means of a constant current whereas the potential of the\\u000a electrode is monitored. The limits of detection and quantification were found to be 1.9 and 6.0?g L?1, resp. The linear range,

Soil decontamination is a difficult, time-consuming and expensive\\u000aoperation, which is stagnating because of the long (legal) procedures and\\u000athe high costs involved. An indirect effect of the stagnation of soil\\u000adecontamination is the stagnation of activities for which soil is an\\u000ainput factor. This study aims at analysing the private and social\\u000aeffects of decontamination of historic soil pollution

We study the mean-field dynamics of a Bose Josephson junction which is\\u000adispersively coupled to a single mode of a high-finesse optical cavity. An\\u000aeffective classical Hamiltonian for the Bose Josephson junction is derived and\\u000aits dynamics is studied in the perspective of phase portrait. It is shown that\\u000athe strong condensate-field coupling does alter the dynamics of the Bose

The Netherlands does not make sufficient use of national strategies or\\u000aaction plans in tackling its public health problems. Lessons from abroad\\u000ateach us that a comprehensive national strategy can contribute to the\\u000acreation of a more systematic body of policy and less fragmented\\u000apreventive measures. This is the conclusion reached by the RIVM in an\\u000ainternational comparative report 'Lessons

The permeability transition pore (PT-pore) is a multi-component protein aggregate in mitochondria that comprises factors in\\u000a the inner as well as in the outer mitochondrial membrane. This complex has two functions: firstly, it regulates the integration\\u000a of oxidative phosphorylation into the cellular energy household and secondly, it induces cell death when converted into

an\\u000a unspecific channel. The latter causes a

Certification of where, when and how fish are caught is emerging as an important fisheries management tool. The history of\\u000a eco-labelling in the fisheries sector is relatively short and actual experiences of eco-labelling are limited, although an\\u000a emerging trend is shaping in European and US markets. Eco-labelling in fisheries gained increased impetus with the development\\u000a of the non-government Marine Stewardship

THERE IS INCREASING INTEREST in creating frameworks for online discussions to improve learning outcomes in higher education\\u000a environments. Many of these frameworks rely on and promote argumentation-based “challenge” models as the primary mode of discourse.\\u000a This study tested one existing framework, created by Gunawardena, Lowe, and Anderson (1997), with four small groups in an\\u000a online higher education environment. Asynchronous discussion

This study analyzes narratives of cyber-porn users and defines major patterns of distress as self-reported by contributors\\u000a to a self-help group in the Internet. It applies narrative analysis methodology to 2000 messages sent by 302 members of an\\u000a Italian self-help Internet community for cyber-porn dependents (noallapornodipendenza). This paper focuses directly on the narratives of cyber-porn dependents, as they define themselves

In this paper, we study ruin probabilities in two generalized\\u000arisk models. The effects of timing of payments and interest on the ruin\\u000aprobabilities in the models are considered. The rates of interest are assumed\\u000ato have a dependent autoregressive structure. Generalized Lundberg inequalities\\u000afor the ruin probabilities are derived by a renewal recursive technique. An\\u000aillustrative application is given

Rather than a document that is being constantly re-written as in the wiki approach, the Living Document (LD) is one that acts\\u000a as a document router, operating by means of structured and organized social tagging and existing ontologies. It offers an\\u000a environment where users can manage papers and related information, share their knowledge with their peers and discover hidden\\u000a associations

://wwwrsphysse.anu.edu.au/~sth110/sth_papers.html> Â·Sebastian C. Kapfer, Stephen T. Hyde, Klaus Mecke, Christoph H. Arns, and Gerd E as Leading Opinion Paper. (2011) (11_4). Â·T Castle, M Evans and S T Hyde, "Entanglement of embedded graphs", Prog Theor Phys, in press (2011). Â·M. Saba, M. Thiel , M.D. Turner, S.T. Hyde, M. Gu, K. Grosse

Woody biomass has long been used to make heat. Recently, there has been a renewed interest in woodfired energy production\\u000a because woody biomass is carbon free and it is an abundant energy source in the world. The past 20 years have witnessed an\\u000a exciting growth in the numbers of wood-fired heating plants, but compared to conventional fossil fuels, its portion

Introduction The effects of platelet-rich plasma (PRP) were monitored by performing a controlled cohort study of patients undergoing an\\u000a anterior spinal fusion. One group was treated with the addition of PRP. The growth factors contained within the blood platelets\\u000a are known to play an important role in the new formation of bone following fractures or the implantation of bone grafts. But

We introduce an analytical approximation scheme to diagonalize parabolically\\u000aconfined two dimensional electron systems with both the Rashba and Dresselhaus\\u000aspin-orbit interactions. The starting point of our perturbative expansion is a\\u000azeroth-order Hamiltonian for an electron confined in a quantum wire with an\\u000aeffective spin-orbit induced magnetic field along the wire, obtained by\\u000aproperly rotating the usual spin-orbit Hamiltonian. We

\\u000a Tropomyosin (Tm) is an essential component in the regulation of striated muscle contraction. Questions about Tm functional\\u000a role have been difficult to study because sarcomere Tm content is not as easily manipulated as Troponin (Tn). Here we describe\\u000a the

method we recently developed to replace Tm-Tn of skeletal and cardiac myofibrils from animals and humans to generate an\\u000a experimental model

The rates of formation and concentration distributions of a dimer reaction showing hysteresis behavior are examined in an\\u000a ab initio chemical reaction designed as elementary and where the hysteresis structure precludes the formation of transition\\u000a states (TS) with pre-equilibrium and internal sub-reactions. It was discovered that the the reactivity coefficients, defined\\u000a as a measure of departure from the zero density

Driven entirely by human curiosity, the effect of the gravitational bending of light has evolved on unforeseen paths, in an\\u000a interplay between shifts in prevailing paradigms and advance of technology, into the most unusual way to study planet populations.\\u000a The confirmation of the bending angle predicted by Einstein with the Solar Eclipse measurements from 1919 marked the breakthrough\\u000a of the

When human umbilical vein endothelial cells (HUVEC) differentiate into capillary-like tubes, there is a five-fold upregulation\\u000a of the mRNA for thymosin ?4 (T?4) (Grant et al. J Cell Sci 1995; 108: 3685–94 [1]) and this endogenous expression plays an\\u000a important role in endothelial cell attachment to and spreading on matrix components. We now show that exogenous addition of\\u000a thymosin ?4

Summary. The standardized extract EGb 761 from the dried green leaves of Ginkgo biloba is a complex mixture of ingredients with an\\u000a uniquely broad spectrum of pharmacological activities on the central nervous system e.g. in memory enhancing properties and\\u000a in the regulation of cerebral glucose\\/energy metabolism. To test these effects on both behavioral and metabolic brain parameters,\\u000a the animal model

Three ice cores recovered from the Himalayas (i.e. the East Rongbuk Glacier and the Far East Rongbuk Glacier at Mt. Qomolangma\\u000a (Everest), and the Dasuopu Glacier at Xixiabangma) show a sharp decline in the accumulation rates since the 1950s, which is\\u000a consistent with the precipitation fluctuation over India and the low northern latitude zone (5°–35°N). Correspondingly, an\\u000a increasing trend is

The Transition Region and Coronal Explorer (TRACE) – described in the companion paper by Handy et al. (1999) – provides an\\u000a unprecedented view of the solar outer atmosphere. In this overview, we discuss the initial impressions gained from, and interpretations\\u000a of, the first million images taken with TRACE. We address, among other topics, the fine structure of the corona, the larger-scale

The electrohydrodynamic and thermal instability development on a conducting liquid surface exposed to a strong electric field\\u000a was studied by methods of two-dimensional numerical modeling. The Navier-Stokes equation was solved and the surface cone heating\\u000a by the field emission current was described. It is demonstrated that the free surface evolution in this system leads to an\\u000a avalanche-like growth in the

Commercially available ultraviolet light-emitting diodes (UV-LEDs) are evaluated in the laboratory as a light source for photolysis\\u000a of atmospheric nitrogen dioxide (NO2) followed by chemiluminescence detection (P-CL) of the resulting nitric oxide (NO). Sensitivity, selectivity, and engineering\\u000a simplicity of three UV-LED sources are compared. The most powerful source uses two 9-W Nichia LED modules and provides an\\u000a NO2 photolysis frequency

Catastrophic events often illustrate a nation’s preparedness in anticipating and preventing the extreme consequences of an\\u000a intentional malicious attack. When terrorists hijacked four commercial aircraft for use as guided missiles against the World\\u000a Trade Center and the Pentagon on September 11, 2001, the world’s population became aware of the human potential to inflict\\u000a destruction and harm, and the vulnerability of

The infectivity rates of Salmonella typhi’s phage was used as a bio-indicator to detect the presence of viable but non cultivable bacteria after irradiation by an\\u000a increasing number of pulsed UV light. Indeed, the combination of a conventional method used to measure colony-forming ability\\u000a of UV-irradiated bacteria, and the study of relationship between host bacteria and a suitable phage can

Measuring knowledge development is a new statistical activity that warrants urgent attention in\\u000athe light of the current Internet explosion. The Internet creates virtual networks by connecting\\u000ainformation nodes, knowledge nexus, people and institutions. The Internet has resulted in an\\u000aunprecedented proliferation of Information, Communication, Knowledge and Entertainment\\u000a(ICKE), which has in turn brought about structural changes in all aspects

Pulmonary mucinous cystadenocarcinoma of the lung is a rare neoplasm which usually presents as a mass lesion. We report an\\u000a interesting case of a 47 year old man with mucinous cystadenocarcinoma, who presented with clinical features of a right sided\\u000a empyema. He was initially diagnosed to have a ruptured and infected cystic lesion in the lower lobe of right lung

We have carried out multicolour imaging of a complete sample of radio-loud\\u000aquasars at 0.6 < z < 1.1 and find groups or clusters of galaxies in the fields\\u000aof at least 8 and possibly 13 of the 21 sources. There is no evidence for an\\u000aevolution in the richness of the environments of radio-loud quasars from other\\u000alow-redshift studies

. In this study, the idealized two-dimensional detonation cells were decomposed into the primary units referred to as sub-cells.\\u000a Based on the theory of oblique shock waves, an analytical formula was derived to describe the relation between the Mach number\\u000a ratio through triple-shock collision and the geometric properties of the cell. By applying a modified blast wave theory, an\\u000a analytical

Emotional deception is a common behaviour that can have major consequences if undetected. For example, the sincerity of an\\u000a offender’s expressed remorse is an important factor in sentencing and parole hearings. The present study was the first to\\u000a investigate the nature of true and false remorse. We examined facial, verbal and body language behaviours associated with\\u000a emotional deception in videotaped

To improve driving safety it is of outmost importance to guarantee that the windshield never starts fogging by means of an\\u000a automatic and reliable procedure. To reach this goal and keeping always in mind comfort and fuel consumption, a fogging condition\\u000a estimation algorithm has been developed. It requires a Mean Radiant Temperature (MRT) sensor and a humidity sensor. The MRT

The synthesis of double-wall carbon nanotubes (DWCNTs) with highly\\u000aunperturbed inner shells is reported using the catalytic vapor deposition\\u000amethod. Temperature dependent and high resolution Raman measurements show an\\u000aenhanced phonon life-time of the inner tubes with respect to the outer ones and\\u000asimilar diameter SWCNTs. This proves that the inner tubes are unperturbed\\u000asimilar to the inner tubes in

Technology Transfer Centres (TTCs) have been analyzed in the last few years by focusing on the relationship between a TTC,\\u000a provider of knowledge-intensive services, and a firm client-receiver. Less attention has been devoted to a more complex relationship\\u000a which involves in the dyadic provider-receiver tie a third relevant body, University. We provide both a theoretical and an\\u000a empirical contribution by

In a recent model Choudhury proposed that a collapsing matter generates an\\u000aadiabatic pressure which can be used to explain the acceleration of the\\u000aphysical universe under certain approximation. In this work we superimpose the\\u000acore pressure generated through the entropy of the blackhole. We have ignored\\u000athe blackhole internal energy change during this process. We have then\\u000acalculated both

An adaptatively coupled continuum-DSMC approach for co-mpressible, viscous gas flows has been developed. The continuum domain\\u000a is described by the unsteady Navier-Stokes equations, solved using a finite volume formulation in compressible form to capture\\u000a the shock. The molecular domain is solved by the Direct Simulation Monte Carlo method (DSMC). The coupling procedure is an\\u000a overlapped Schwarz method with Dirichlet-Dirichlet boundary

?-poly-l-lysine (?-PL) is a homo-poly-amino acid of l-lysine which is used as a safe food preservative. The productivity of ?-PL in currently reported wild type strains is low.\\u000a This study was aimed at finding novel ?-PL producing strains with higher productivity and new fermentative characters. An\\u000a improved detection method was employed using methylene blue as an ?-PL secretion indicator. 137

\\u000a Carbon dioxide can be recovered from the coal gas of an integrated coal gasifier combined cycle power plant (ICGCC). In an\\u000a ICGCC coal is converted to an intermediate coal gas from which the carbon can be recovered in three steps: (i) conversion\\u000a of the carbon monoxide to carbon dioxide, (ii) extraction of the carbon dioxide by a physical absorption process

The Vindhyan Supergroup of India is one of the largest and thickest sedimentary successions of the world. Deposited in an\\u000a intra-cratonic basin, it is composed mostly of shallow marine deposits. It is believed to have recorded a substantial portion\\u000a of Proterozoic time and therefore, likely to contain valuable information on the evolution of the atmosphere, climate, and\\u000a life on our

\\u000a Disease-causing pathogens are only one of a number of potential causes of ill-health in wildlife. Many other factors may have\\u000a harmful effects on animal health and should be considered when investigating an unusual wildlife mortality or health event.\\u000a In addition, infection may take hold of a stressed animal that could otherwise have resisted. This chapter will provide an\\u000a overview of

In the mid 1970s, the available RMs, notably Bowen’s Kale and Orchard Leaves and Bovine liver from National Bureau of Standards\\u000a (NBS), although of great benefit, were overwhelmingly insufficiently representative, in respect of matrix and elemental composition,\\u000a of the wide range of natural products submitted for analysis and in worldwide commerce. To provide additional coverage, an\\u000a RM development project was

Steel surfaces were thermally sprayed with nickel chromium boron (NCB) powder (with and without tungsten carbide) using an\\u000a oxy-acetylene torch. The sprayed (hard) surfaces and substrate were characterized for abrasive wear properties. Test parameters\\u000a such as load and sliding distance were varied. A significant improvement in the abrasive wear resistance (inverse of wear\\u000a rate) was noted for the thermally sprayed

We present a numerical study of the electromagnetic response of the\\u000ametamaterial elements that are usedto construct materials with negative\\u000arefractive index. For an array of split ring resonators (SRR) we find that the\\u000aresonant behavior of the effective magnetic permeability is accompanied by an\\u000aanti-resonant behavior of the effective permittivity. In addition, the\\u000aimaginary parts of the effective permittivity

\\u000a Data integration systems (DIS) are devoted to providing information by integrating and transforming data extracted from external\\u000a sources. Examples of DIS are the mediators, data warehouses, federations of databases, and web portals. Data quality is an\\u000a essential issue in DIS as it concerns the confidence of users in the supplied information. One of the main challenges in this\\u000a field is

The pervasive impact of business computing has made information technology an indispensable part of daily operations and the\\u000a key to success for enterprises. Data mining, as one of the IT services most needed by enterprises, has been realized as an\\u000a important way for discovering knowledge from the data and converting “data rich” to “knowledge rich” so as to assist strategic

The EU is currently modernizing customs legislation and practices. Main pillars in the new vision are an intensive use of\\u000a IT (Customs becomes e-Customs), partnerships between Customs administrations and businesses (G2B), and collaboration between\\u000a national Customs administrations (G2G). But how to design new customs control procedures? Very little theory exists, and an\\u000a inspection of current procedures shows that they are

\\u000a Histogram Equalization (HE) based methods are the commonly used image enhancement techniques to improve the contrast of an\\u000a input image by changing the intensity level of the pixels, based on its intensity distribution. This paper presents a novel\\u000a image contrast and edge enhancement technique using constrained histogram equalization. A new transformation function for\\u000a histogram equalization is devised and a set

Recent observations have allowed the geometry and kinematics of the M87 jet\\u000ato be tightly constrained. We combine these constraints with historical Very\\u000aLong Baseline Interferometry (VLBI) results and the theory of synchrotron\\u000aself-absorbed radio cores in order to investigate the physical properties of\\u000athe jet. Our results strongly suggest the jet to be dominated by an\\u000aelectron-positron (pair) plasma.

\\u000a Nursing homes, where home adaptations - environmental improvements and assistive technology (AT) are provided, represent an\\u000a increasingly attractive means of helping senior citizens maintain their independence and enhance the quality of their life.\\u000a Doctors and specialists are also involved in order to provide elderly people with personalized health care services, in this\\u000a way improving their treatment and life conditions. The

In this paper, we explore the questions of time, locality and causality in\\u000athe framework of covariant open bosonic string field theory. We show that if an\\u000aopen string field is expressed as a certain local function on spacetime--in\\u000aparticular, a function of the lightcone component of the midpoint and the\\u000atransverse center of mass degrees of freedom--that cubic string

A range of issues pertaining to the use of Wilson lines in integrated and\\u000atransverse-momentum dependent (TMD) parton distribution functions (PDF) is\\u000adiscussed. The relation between gauge invariance and the renormalization\\u000aproperties of the Wilson-line integrals is given particular attention. Using an\\u000aanomalous-dimensions based analysis in the light-cone gauge, a generalized\\u000adefinition of the TMD PDFs is proposed, which employs

Epigenetic abnormalities including abnormal histone methyltransferase activity contribute to breast cancer pathogenesis. An\\u000a example is over expression of the polycomb repressive complex (PRC) 2 member enhancer of zeste homolog 2 (EZH2) which is linked\\u000a to epigenetic silencing and poor prognosis. Recent evidence shows that S-adenosylhomocysteine (AdoHcy) hydrolase inhibitors\\u000a (AHI) such as 3-deazaneplanocin A (DZNep) modulate chromatin through indirect inhibition of

Over the last decade, anti-cancer therapies (chemotherapy and radiation, hormonal, neoadjuvant, and combinatorial therapies)\\u000a have prolonged the lives of cancer patients. However, present cancer therapies fail in a high percentage of cases due to an\\u000a incomplete elimination of the tumor cells, resulting in relapse and metastasis of the tumor. The vast majority of cancer-related\\u000a deaths are due to metastatic tumor

Aluminum and copper cylindrical shells were plastically buckled under quasi-static and dynamic loading conditions with an\\u000a Absorption Compression-Torsion Plasticity (ACTP: Patent No. WO 2005090822) combined mechanical testing device. Optical microscopy\\u000a and transmission electron microscopy (TEM) analysis were used to study the microscopic evolutions in the mechanically buckled\\u000a aluminum and copper alloy samples. Optical microscopy showed evidence of the presence of

We present a variable star catalog of an extensive ground-based wide-field variability survey in the globular cluster ! Centauri. Using the ANU 40-inch (1m) telescope at Siding Spring Observatory, the cluster was observed with a 52'×52' (0.75 deg2) field for 25 nights. A total of 187 variable stars were identified in the field, 81 of which are new discoveries. This

Collection and suspended culture of Argopecten purpuratus spat in Japanese-type collectors was undertaken in the Rinconada Marine Reserve (Antofagasta, Chile) to determine growth\\u000a variations between surface and bottom waters. Scallop spat was collected at 16-m depth and grown at 1- and 16-m depths. An\\u000a initial settlement of ca. 13,000 post-larvae per bottom collector (2 cohorts) was observed on 3 February

Plant cyanogenesis means the release of gaseous hydrogen cyanide (HCN) in response to cell damage and is considered as an\\u000a effective defense against generalist herbivores. In contrast, specialists are generally believed not to be affected negatively\\u000a by this trait. However, quantitative data on long-term effects of cyanogenesis on specialists are rare. In this study, we\\u000a used lima bean accessions (Fabaceae:

In the understory of a closed forest, plant growth is limited by light availability, and early leafing is proposed to be an\\u000a important mechanism of plant invasion by providing a spring C “subsidy” when high light is available. However, studies on\\u000a respiration, another important process determining plant net C gain, are rare in understory invasive plants. In this study,\\u000a leaf

The stress analysis on orthotropic composite cylindrical shells with one circular or one elliptical cutout subjected to an\\u000a axial force is carried out by using an analytical and experimental method. The composite cylindrical shell governing equation\\u000a of the Donnell's type is applied to this study and all results are presented by the stress concentration factor. The stress\\u000a concentra-tion factor is

The accurate prediction of solidification cooling rates of droplets in gas atomization is critical to the production of quality\\u000a powders and spray deposits. Despite many sophisticated on-line measuring instruments and numerous mathematical models, an\\u000a experimentally verified analysis of droplet cooling in gas atomization is still lacking. Impulse atomization offers a unique\\u000a single-fluid atomization technique with controlled gas-droplet heat transfer. This

are an introduction to the ANU Library services and include a building tour and virtual tour of the Library catalogue (see text box) 11.30amÂ-12.30pm Campus tour (see text box) 2Â-5pm ASLC Study Smart: develop academic.30Â-11.30am Morning tea (see text box) 11.30amÂ-1pm Civic tours, ISD (see text box) 2Â-3pm Campus tour (see text

Summary A built-in (genetically determined) about-7-day (circaseptan) period comes to the fore as a desynchronized feature of human\\u000a time structure in the urinary excretion of 17-ketosteroids by a clinically healthy man: during several years following an\\u000a endocrine intervention (the self-administration of testosterone suppositories), a circaseptan rhythm (which during the preceding\\u000a decade had revealed a period of precisely 7 days) deviated slightly,

Following the claimed nuclear test in the Democratic People’s Republic of Korea (DPRK) on October 9, 2006, and a reported\\u000a seismic event, a mobile system for sampling of atmospheric xenon was transported to the Republic of South Korea (ROK) in an\\u000a attempt to detect possible emissions of radioxenon in the region from a presumed test. Five samples were collected in

Decrease in lichen diversity is an important biometric tool to assess the prevailing environmental condition in an area. An\\u000a attempt has been made to explore the utility of lichen diversity in the monitoring of air pollution in the city of Pauri and\\u000a Srinagar, Garhwal Himalayas, Uttaranchal. Eighty five lichen species were recorded from Pauri and Srinagar (Garhwal) in June\\u000a 2005.

Online monitoring and in-process control improves machining quality and efficiency in the drive towards intelligent machining.\\u000a It is particularly significant in machining difficult-to-machine

materials like super alloys. This paper attempts to develop\\u000a a tool wear observer model for flank wear monitoring in machining nickel-based alloys. The model can be implemented in an\\u000a online tool wear monitoring system which predicts the

Feces are increasingly used as sources of DNA for genetic and ecological research. This paper describes a new method for isolation\\u000a of DNA from animal feces. This method combines multiple purification steps, including pretreatment with ethanol and TE, an\\u000a inhibitor-absorber made of starch, the CTAB method, the phenol–chloroform extraction method, and the guanidinium thiocyanate-silica\\u000a method. The new method is efficient

Silica and alkali metals in wheat straw limit its use for bioenergy and gasification. Slag deposits occur via the eutectic\\u000a melting of SiO2 with K2O, trapping chlorides at surfaces and causing corrosion. A minimum melting point of 950?C is desirable, corresponding to an\\u000a SiO2:K2O weight ratio of about 3:1. Mild chemical treatments were used to reduce Si, K, and Cl,

New and emerging infectious diseases affect humans, domestic animals, livestock and wildlife and can have a significant impact\\u000a on health, trade and biodiversity. Of the emerging infectious diseases of humans, 75% are zoonotic, with wildlife being an\\u000a increasingly important source of inter-species transmission. Recent animal health emergencies have highlighted the vulnerability\\u000a of the livestock sector to the impact of infectious

Vaccination therapy using dendritic cells (DC) as antigen presenting cells (APC) has shown significant promise in laboratory\\u000a and animal studies as a potential treatment for malignant diseases. Pulsing of autologous DCs with tumor-associated antigens\\u000a (TAA) is a method often used for antigen delivery and choice of suitable antigens plays an important role in designing an\\u000a effective vaccine. We identified two

Commercial poly (vinylidene difluoride) (PVDF)\\/acrylic coatings show minimal gloss loss or bulk chemical change even after\\u000a sustained Florida or accelerated weathering testing. Previously, we showed that “QUV-B” weight loss rates can be used as an\\u000a early predictor of the weatherability of fluoropolymer\\/acrylic blend clearcoats. In this work, we study the microscopic basis\\u000a for differences seen between various blends and pure

\\u000a Nowadays, neither the digital library nor the digital reference service is seen as exotic. Both of them are evolving at an\\u000a amazingly rapid pace. Though they have mutual interests, it has been argued that there is a ‘lack of interaction between the\\u000a digital reference and digital library communities’ (Lankes, 2004, p. 301). However, the fact is that, on the one

Humanity is heading toward the major challenge of having to increase food production by about 50% by 2050 to cater for an\\u000a additional three billion inhabitants, in a context of arable land shrinking and degradation, nutrient deficiencies, increased\\u000a water scarcity, and uncertainty due to predicted climatic changes. Already today, water scarcity is probably the most important\\u000a challenge, and the consensual

The Mediterranean region is undergoing rapid local and global social and environmental changes. All indicators point to an\\u000a increase in environmental and water scarcity problems with negative implications towards current and future sustainability.\\u000a Water management in Mediterranean countries is challenged these pressures and needs to evolve to reach the target of increasing\\u000a population with reliable access to freshwater established by

The goals of this special section are to examine the state-of-the-science regarding race\\/ethnicity and racism as they contribute\\u000a to health disparities and to articulate a research agenda to guide future research. In the first paper, Myers presents an\\u000a integrative theoretical framework for understanding how racism, poverty, and other major stressors relate to health through\\u000a inter-related psychosocial and bio-behavioral pathways. Williams

Polychlorinated biphenyls (PCBs) as ?21 congeners, were investigated in atmospheric bulk

deposition over one year, along a\\u000a northern transect of France, including 5 sites from the Atlantic coast to the east of Paris. Evidence was obtained for an\\u000a easterly rise of the PCB concentrations, from 3 to 76 ng L?1. The PCB patterns were depleted in low chlorinated congeners in

Background Some industrial hygiene studies have assessed occupational exposure to antineoplastic drugs; other epidemiological investigations\\u000a have detected various toxicological effects in exposure groups labeled with the job title. In no research has the same population\\u000a been studied both environmentally and epidemiologically. The protocol of the epidemiological study presented here uses an\\u000a integrated environmental and biological monitoring approach. The aim is to

Massimo Moretti; Roberta Bonfiglioli; Donatella Feretti; Sofia Pavanello; Francesca Mussi; Maria G Grollino; Milena Villarini; Anna Barbieri; Elisabetta Ceretti; Mariella Carrieri; Annamaria Buschini; Massimo Appolloni; Luca Dominici; Laura Sabatini; Umberto Gelatti; Giovanni B Bartolucci; Paola Poli; Laura Stronati; Giuseppe Mastrangelo; Silvano Monarca

Summary. Recent epidemiological and clinico-pathologic data suggest overlaps between Alzheimer disease (AD) and cerebrovascular lesions\\u000a that may magnify the effect of mild AD pathology and promote progression of cognitive decline or even may precede neuronal\\u000a damage and dementia.Vascular pathology in the aging brain and in AD includes: 1. cerebral amyloid angiopathy (CAA) with an\\u000a incidence of 82–98% often associated with

Recognizing the fact that the effective driving force (?K\\u000a eff) determines the fatigue crack propagation (FCP) rate and that the shear strain, which is considered to develop due to an\\u000a occurrence of crack closure, primarily contributes to the plastic deformation, an effort is made here to elucidate the role\\u000a of plastic deformation in FCP by developing a correlation between the

In this study, mohair fibers were treated by air and argon plasma for modifying some properties of fibers. The fibers were\\u000a evaluated in terms of their hydrophilicity, grease content, fiber to fiber friction, shrinkage, dyeing, and color fastness\\u000a properties. The surface morphology was characterized by SEM images. The results showed that the atmospheric plasma has an\\u000a etching effect and increases

. The creation of a good physics department in the newly established Hebrew University in Jerusalem (opened in 1925) was an\\u000a important goal for Chaim Weizmann, President of the Zionist Organization and founder of the University (and chemist, by profession).\\u000a A. H. Fraenkel, the mathematician, and L. S. Ornstein, the physicist from Utrecht, invested a lot of effort in achieving

Numerous studies on the aerodynamics of insect wing flapping were carried out on different approaches of flight investigations,\\u000a model experiments, and numerical simulations, but the theoretical modeling remains to be explored. In the present paper, an\\u000a analytic approach is presented to model the flow interactions of wing flapping in air for small insects with the surrounding\\u000a flow fields being highly

Many people who report paranormal sightings (e.g., Bigfoot and UFO aliens) are apparently sincere. This places many such sightings\\u000a in the category of eyewitness errors, rather than of deliberate deception. Recent research has supported this idea; in an\\u000a earlier paper, we demonstrated that paranormal beliefs are facilitated by tendencies toward attention deficit hyperactive\\u000a disorder, dissociation, and depression. These characteristics predicted

In clinical practice, the neuro-rehabilitation team encounters families that have experienced trauma, turmoil, and significant\\u000a losses. Injuries are generally ill-timed and families are frequently ill-prepared for the length, uncertainty, and challenges\\u000a of the post-injury process. In the literature, much has been written about “caregiver burden” and the stressful impact an\\u000a ABI can have on family systems. There is increasing awareness

Antipseudomonal carbapenems have played a useful role in our antimicrobial armamentarium for 20 years. However, a review of\\u000a their use during that period creates concern that their clinical effectiveness is critically dependent on attainment of an\\u000a appropriate dosing range. Unfortunately, adequate carbapenem dosing is missed for many reasons, including benefit\\/risk misconceptions,\\u000a a narrow therapeutic window for imipenem and meropenem (due

Composite concrete slab and timber flooring systems are commonly used in many parts of the world to exploit the high strength-to-weight\\u000a ratio of timber and the good acoustic separation provided by concrete floor slabs. This paper describes the results of an\\u000a experimental programme that investigated the suitability of a range of connectors to transfer shear between a concrete slab\\u000a and

The Southern Ocean Islands (SOI) have an exceptionally high conservation status, and human activity on the islands is low\\u000a by comparison with more tropical islands. In consequence, overexploitation, pollution and habitat destruction have had little\\u000a influence on the invertebrate biotas of the islands, although overexploitation of pelagic species has the potential for an\\u000a indirect influence via reduction of nutrient inputs

Cranial fibrous dysplasias (FDs) are rare and comprise less than 1% of all primary bone lesions. They may produce cosmetic\\u000a deformities, peripheral compressive cranial neuropathies, and compressive central neurologic manifestations. We describe an\\u000a unusual presentation of a fronto-orbital sphenoethmoidal FD in a 32-year-old woman with conventional radiographic, CBCT, and\\u000a MRI findings. In the head and neck examination, an asymmetry was

Spoilage of food products is due to activity of microorganisms or biochemical and physical changes. Various food preservation\\u000a methods have been developed over the years. Traditionally, chemicals are used to control the activity of microorganisms. An\\u000a increased awareness by the environmental and health agencies and consumers of the harmful chemical residues in food and environment\\u000a led to a restricted use

Moisture absorption of natural fiber plastic composites is one major concern in their outdoor applications. The absorbed moisture\\u000a has many detrimental effects on the mechanical performance of these composites. A knowledge of the moisture diffusivity, permeability,\\u000a and solubility is very much essential for the application of natural fibers as an excellent reinforcement in polymers. An\\u000a effort has been made to

Plant invasions often involve rapid evolutionary change. Founder effects, hybridization, and adaptation to novel environments\\u000a cause genetic differentiation between native and introduced populations and may contribute to the success of invaders. An\\u000a influential idea in this context has been the Evolution of Increased Competitive Ability (EICA) hypothesis. It proposes that\\u000a after enemy release plants rapidly evolve to be less defended

We investigate the potential role of icebergs in the 8.2 ka climate event, using a coupled climate model equipped with an\\u000a iceberg component. First, we evaluate the effect of a large iceberg discharge originating from the decaying Laurentide ice\\u000a sheet on ocean circulation, compared to a release of an identical volume of freshwater alone. Our results show that, on top\\u000a of

Low concentrations (1–5 ?M) of beryllium (Be) salts were weakly mitogenic to mouse spleen cells in vitro as measured by an\\u000a hydroxyurea-sensitive 2–3fold increase in pulse labelled [3H]-thymidine incorporation into lymphocyte DNA. It is proposed the activation may be induced by a direct interaction of Be2+ with the lymphocyte membranes. Higher concentrations of Be2+ (5–20 ?M) produced a gradual loss

Transportation system has contributed significantly to the development of human civilization; on the other hand it has an\\u000a enormous impact on the ambient air quality in several ways. In this paper the air and noise pollution at selected sites along\\u000a three sections of National Highway

was monitored. Pakistan National Highway Authority has started a Highway Improvement\\u000a program for rehabilitations and

. \\u000a More than a hundred years ago William McFadden Orr and Arnold Sommerfeld conceived an\\u000a approach to account for the transition from laminar to turbulent flow in terms of\\u000a hydrodynamic stability theory. But the “turbulence problem”, as this challenge became\\u000a notoriously famous, could not be solved by this method. By 1920, it was widely recognized\\u000a as an outstanding riddle. Although

The results of studiesconducted in the last 5 years in Poland formedthe basis for the assumption that amongst manyneeds an\\u000a individual or a Polish household seeksto satisfy, the need to provide for security inold age takes a prominent position. Determiningthe\\u000a position of this need among other needs asdefined in Schrab's classification (Schrab,1943), was the objective of an empirical\\u000a studyconducted at

Las Tablas de Daimiel National Park (TDNP), recognized as both Biosphere reserve by UNESCO and Ramsar site, is one of the\\u000a last representatives in the Iberian Peninsula of Mediterranean wetlands linked to groundwater dynamics. It constitutes an\\u000a outstanding flora and fauna reserve. The inappropriate agricultural management of the groundwater resources that support the\\u000a system has caused the drying up of

In a recent work [27] it has been proved that any n-dimensional analytic\\u000asemi-Riemannian manifold M has a global analytic isometric embedding into an\\u000aEinstein manifold E of dimension n+d, d >= 1 (Lambda in R). The possible\\u000atopologies of such an E have been studied, calculating its Homotopy which\\u000aproved to split in every dimension.\\u000a In this sequel we

Biofortification through genetic manipulation is the best approach for improving micronutrient content of the staple food\\u000a crops to alleviate hidden hunger, namely, the deficiency of Fe and Zn affecting more than two billion people worldwide. An\\u000a interspecific hybridization was made between T. aestivum line Chinese Spring (CS) and Aegilops kotschyi accession 3790 selected for high grain iron and zinc concentration.

The economic viability of the modern day mine is highly dependent on careful planning and management. Declining trends in\\u000a average ore grades, increasing mining costs and environmental considerations will ensure that this situation will remain in\\u000a the foreseeable future. The operation and management of a large open pit mine having a life of several (5–50) years is an\\u000a enormous and

This paper presents an experimental and CFD numerical study of convective heat transfer in a rotating cascade. Infrared thermography\\u000a was used to measure surface temperature distribution on a rotating hollow blade, heated internally by secondary air. A CFD\\u000a numerical model was made according to the actual test rig geometry and operating conditions. Tests were carried out in an\\u000a iposonic flow

It has been claimed that microbial taxa will not exhibit endemism because their enormous populations remove dispersal as an\\u000a effective constraint on geographical range. Here we review evidence that challenges this ubiquity hypothesis for the most\\u000a speciose group of microbial eukaryotes, the diatoms. Detailed taxonomic inventories using fine-grained morphological characteristics,\\u000a molecular markers, and crossing experiments have revealed that the geographic

The main purpose of this paper is to examine the factors that determine the business policies of private enterprises in the\\u000a People’s Republic of China. Little is known about these private enterprises although these are surpassing the state-owned\\u000a enterprises to become the most important corporate sector in China. The phenomenal growths of these enterprises provide an\\u000a interesting setting to study

The melanocortin system plays a pivotal role in the regulation of appetite and energy balance. It was recognized to play an\\u000a important role in the development of cancer-related cachexia, a debilitating condition characterized by progressive body wasting\\u000a associated with anorexia, increased resting energy expediture and loss of fat as well as lean body mass that cannot be simply\\u000a prevented or

As one of the most powerful tools in biomedical research, DNA sequencing not only has been improving its productivity in an\\u000a exponential growth rate but also been evolving into a new layout of technological territories toward engineering and physical\\u000a disciplines over the past three decades. In this technical review, we look into technical characteristics of the next-gen\\u000a sequencers and provide

Auditory neuropathy (AN) is a disorder characterized by disruption of auditory nerve activity resulting from lesions involving\\u000a the auditory nerve (postsynaptic AN), inner hair cells and\\/or the synapses with auditory nerve terminals (presynaptic AN).\\u000a Affected subjects show impairment of speech perception beyond that expected for the hearing loss, abnormality of auditory\\u000a brainstem potentials and preserved outer hair-cell activities. Furthermore, AN

In contrast to yeast, plant interphase nuclei often display incomplete alignment (cohesion) along sister chromatid arms. Sister\\u000a chromatid cohesion mediated by the multi-subunit cohesin complex is essential for correct chromosome segregation during nuclear\\u000a divisions and for DNA recombination repair. The cohesin complex consists of the conserved proteins SMC1, SMC3, SCC3, and an\\u000a ?-kleisin subunit. Viable homozygous mutants could be selected

Platelets are the primary cell mediator of thrombosis. A deficiency of platelets can result in severe bleeding defects. “Overactive”\\u000a platelets contribute to life-threatening outcomes in diseases such as heart attack, stroke, and cancer. The use of platelet\\u000a inhibitors for thrombosis prevention must therefore seek a delicate balance between inhibiting platelet activation and an\\u000a associated increased bleeding risk. There are currently

\\u000a It seems clear that innovation is a key factor in increasing competitiveness of European enterprises in a global market with\\u000a new players from developing countries. It also seems clear that innovation in organizations must necessarily be based on an\\u000a open concept that allows them to take advantage of ideas, competences and external resources, hence the concept of Collaborative\\u000a Networks. Among

Constructing identification schemes is one of the fundamental problems in cryptography, and is very useful in practice. An\\u000a identity-based identification (IBI) scheme allows a prover to identify itself to a public verifier who knows only the claimed\\u000a identity of the prover and some common information. In this paper, we propose a simple and efficient framework for constructing\\u000a IBI schemes. Unlike

A 6-mo-old female scarlet macaw (Ara macao) was presented after a 2-mo period of anorexia and weakness. The bird\\u000awas reluctant to fly 1wk before referral due to a painful left wing. Physical examination revealed a firm swelling around the left shoulder.\\u000aOn radiographs, the diaphysis and proximal metaphysis of the left scapula were radiolucent. Computer tomography revealed an\\u000aosteolytic

We used remote-sensing-driven models to detect land-cover change effects on forest aboveground biomass (AGB) density (Mg·ha?1, dry weight) and total AGB (Tg) in Minnesota, Wisconsin, and Michigan USA, between the years 1992–2001, and conducted an\\u000a evaluation of the approach. Inputs included remotely-sensed 1992 reflectance data and land-cover map (University of Maryland)\\u000a from Advanced Very High Resolution Radiometer (AVHRR) and 2001

A multi-modal linear mixing model is suggested for simultaneously measured MEG and EEG data. On the basis of this model an\\u000a ICA decomposition is calculated for a combined MEG and

EEG signal vector using the TDSEP algorithm. A single modality demixing\\u000a procedure is developed to classify ICA components to be multi-modality sources detected by EEG and MEG simultaneously or to

Plasma membrane remodeling characterized by phosphatidylserine exposure and consecutive microparticle (MP) shedding is an\\u000a ubiquitous process enabling the clearance of senescent cells and the maintenance of tissue homeostasis. MPs are released as\\u000a fragments from the budding plasma membrane of virtually all eukaryotic cell types undergoing stimulation or apoptosis and\\u000a may be considered a broad primitive response to stress. MP release

Gamma knife radiosurgery is a minimally invasive procedure which can be used for patients with intractable epilepsies as an\\u000a alternative for surgical corpus callosotomy. We report a 13-year-old boy with intractable epilepsy who underwent radiosurgical\\u000a callosotomy. The patient demonstrated significant clinical improvement after gamma knife radiosurgery and was free of seizures\\u000a 10 months after the procedure. However, He developed four

Modification of the eutectic Si in Al-Si foundry alloys by adding strontium or sodium is, unfortunately, accompanied by an\\u000a increase of porosity in the casting. In an attempt to understand the nature of this problem, this study used a sessile-drop\\u000a method to investigate the effect of Sr and Na on surface tension and volumetric shrinkage, two probable causes of porosity

Wind energy will provide a major share of our future energy supply, and, due to the possibility of going offshore, has an\\u000a immense additional potential for power supply. To use wind energy in a reliable way, much research work still has to be done.\\u000a One of these fields is the evaluation of wind energy in terms of sustainability. The results

he burst alert telescope (BAT) is one of three instruments on the\\u000a Swift MIDEX spacecraft to study gamma-ray bursts (GRBs). The BAT first detects the GRB and localizes the burst direction to an\\u000a accuracy of 1–4 arcmin within 20 s after the start of the event. The GRB trigger initiates an autonomous spacecraft slew to\\u000a point the two narrow field-of-view

An exact solution is presented to a model that mimics the crowding effect in\\u000afinancial markets which arises when groups of agents share information. We show\\u000athat the size distribution of groups of agents has a power law tail with an\\u000aexponential cut-off. As the size of these groups determines the supply and\\u000ademand balance, this implies heavy tails in

In a series of five lectures I review inflationary cosmology. I begin with a\\u000adescription of the initial conditions problems of the\\u000aFriedmann-Robertson-Walker (FRW) cosmology and then explain how inflation, an\\u000aearly period of accelerated expansion, solves these problems. Next, I describe\\u000ahow inflation transforms microscopic quantum fluctuations into macroscopic\\u000aseeds for cosmological structure formation. I present in full detail

A chronological summary is given of the various types of grain boundary fracture found in metals. In each case, there is an\\u000a impurity that adsorbs at the new (fracture) surface being formed. For the case of Fe-P alloys, a quantitative argument can\\u000a show that adsorption of phosphorous on the free surface greatly reduces the barrier to void nucleation compared to

This paper discusses a set of recent experimental results in which the mechanical properties of monolayer graphene molecules\\u000a were determined. The results included the second-order elastic modulus which determines the linear elastic behavior and an\\u000a estimate of the third-order elastic modulus which determines the non-linear elastic behavior. In addition, the distribution\\u000a of the breaking force strongly suggested the graphene to

: Vertebral deformation in spinal osteoporosis results in spinal and thoracic deformation, causing pain, disability and an\\u000a overall decrease in quality of life. We sought to determine whether thoracic spinal deformation may lead to impaired pulmonary\\u000a function. We studied expiratory relaxed vital capacity (VC) and forced expiratory volume in 1 s (FEV1) in 34 patients with\\u000a

spinal osteoporotic fractures and

. A theoretical investigation of the linear stability of the flow of a Newtonian fluid through a tube is presented using an\\u000a alternative boundary condition to the standard no-slip condition. The linear stability analysis is based on the classical\\u000a method of infinitesimal axially symmetric harmonic perturbations super-imposed on the steady state solution. In this analysis\\u000a the standard no-slip boundary condition is

We report on recent near-IR observations of V4332 Sgr - the nova-like\\u000avariable that erupted in 1994. Its rapid, post-outburst evolution to a cool M\\u000atype giant\\/supergiant, soon after its outburst, had showed that it was an\\u000aunusual object differing from other eruptive variables like classical\\/symbiotic\\u000anovae or born-again AGB stars. The present study of V4332 Sgr was motivated by

. In this paper an analysis of the Stirling cycle in thermoeconomic\\u000a terms is developed using the entropy generation. In the thermoeconomic optimization of an\\u000a irreversible Stirling heat pump cycle the F function has been\\u000a introduced to evaluate the optimum for the higher and lower sources\\u000a temperature ratio in the cycle: this ratio represents the value which\\u000a optimizes the cycle itself.

The Fedora architecture is an extensible framework for the storage,\\u000amanagement, and dissemination of complex objects and the relationships among\\u000athem. Fedora accommodates the aggregation of local and distributed content into\\u000adigital objects and the association of services with objects. This al-lows an\\u000aobject to have several accessible representations, some of them dy-namically\\u000aproduced. The architecture includes a generic RDF-based

Human users have a tough time remembering long cryptographic keys. Hence,\\u000aresearchers, for so long, have been examining ways to utilize biometric\\u000afeatures of the user instead of a memorable password or passphrase, in an\\u000aeffort to generate strong and repeatable cryptographic keys. Our objective is\\u000ato incorporate the volatility of the user's biometric features into the\\u000agenerated key, so

Although rats have clearly contributed to bird extinctions on islands, their role in plant extinctions is not as clear. Paleoenvironmental\\u000a studies suggest rats were responsible for the demise of several island palm species. French Polynesia’s islands provide an\\u000a opportunity to evaluate “modern” impacts of rats on native flora. Our study shows that 15 threatened taxa (nine families)\\u000a are damaged by

Development, studies, and applications of resistors based on aqueous solutions of salts, acids, and their mixtures are reviewed.\\u000a Aqueous-solution resistors (ASRs) have a number of advantages as compared to resistors of other types: their bulk electric\\u000a strength reaches 300 kV\\/cm for pulses of microsecond duration, their energy dissipation in a unit mass of a solution is an\\u000a order of magnitude

\\u000a Concussions in sports typically arise from a hard blow to the head. In soccer, for example, head-to-head impacts carry a high\\u000a risk for concussion (Withnall et al., Br J Sports Med 39(Suppl 1):i49–i57, 2005). In the National Football League (NFL), an\\u000a injury reconstruction study revealed that a striking player often lines up his head, neck, and torso to deliver maximum

The current studies on power plant technologies suggest that Integrated Gasification Combined Cycle (IGCC) systems are an\\u000a effective and economic CO2 capture technology pathway. In addition, the system in conventional configuration has the advantage of being more “CO2 capture ready” than other technologies. Pulverized coal boilers (PC) have, however, proven high technical performance attributes\\u000a and are economically often most practical

Spasmodic Dysphonia is characterised by action induced involuntary spasms of the laryngeal muscles. The treatment of Spasmodic\\u000a Dysphonia has evolved pari passu with the suspected

underlying aetiological cause. Initially it was considered psychogenic\\u000a in origin but little benefit was gained by psychotherapy, speech therapy and drugs. The condition is now thought to have an\\u000a organic neurological basis, the precise site

An attempt is made to describe the fate and behavior of organic arsenic (As) compounds in the soil environment, based on an\\u000a extensive literature researches. The objective of this review is to provide an overview on the state of knowledge to date\\u000a about the occurrence and potential transformation of organic As, including methylation, degradation, and hydration, in soils\\u000a and their

A combined sedimentation and membrane filtration process was investigated for recycling cellulase enzymes in the biomass-to-ethanol\\u000a process. In the first stage, lignocellulose particles longer than approx 50 ?m were removed by means of sedimentation in an\\u000a inclined settler. Microfiltration was then utilized to remove the remaining suspended solids. Finally, the soluble cellulase\\u000a enzymes were recovered by ultrafiltration. The perm eate

Heavy metal contamination of soils is of widespread occurrence as a result of human, agricultural and industrial activities.\\u000a Among heavy metals, lead is a potential pollutant that readily accumulates in soils and sediments. Although lead is not an\\u000a essential element for plants, it gets easily absorbed and accumulated in Sesbania drummondii, which exhibits a significant level of tolerance to lead.

The astrometric calibration of the Sloan Digital Sky Survey is described. For\\u000apoint sources brighter than r ~ 20 the astrometric accuracy is 45\\u000amilliarcseconds (mas) rms per coordinate when reduced against the USNO CCD\\u000aAstrograph Catalog, and 75 mas rms when reduced against Tycho-2, with an\\u000aadditional 20 - 30 mas systematic error in both cases. The rms errors

Cuba’s political and economic isolation in today’s globalised world demands constant adaptation by its inhabitants. The Cubans’\\u000a capacity to adapt increases their ability to cope with change and to reshape local ecological and social systems, creating\\u000a a more resilient system. Worldwide, home gardens are a community’s most adaptable and accessible land resource and are an\\u000a important component in reducing vulnerability

The Triangle Orientation Discrimination Threshold (TOD) is a new figure of merit for characterizing the performance of an\\u000a infrared imager. In this paper, focusing on a reflective infrared target projector, the TOD curve is measured utilizing four\\u000a alternative forced choice (4AFC) test method. Furthermore, the dominant sources affecting uncertainties in the TOD measure\\u000a values, are analyzed in detail, the effective

Approximately 15-17 species and hybrid swarms of Monarda are native to North America. Monarda didyma is a fragrant herb in the Lamiaceae, which attracts many pollinators. While commonly grown for its flowers, it is also an\\u000a important food, flavoring, and medicinal crop. Most hybrids on the market are derived from intra- and inter-specific crosses\\u000a of M. didyma and M. fistulosa.

Near-critical carbon dioxide shows potential for extraction of free fatty acids, off-odors or flavors from edible fats and\\u000a oils. Deacidification and deodorization of a simulated, roasted peanut oil with dense CO2 was performed at various temperatures, pressures and extraction factors in a pilot-scale, packed extraction column with an\\u000a i.d. of 2.86 cm and a height of 162 cm. Pyrazine and

A module for the ZEUS-2D code is described which may be used to solve the\\u000aequations of radiation hydrodynamics to order unity in v\\/c, in the flux-limited\\u000adiffusion (FLD) approximation. In this approximation, the tensor Eddington\\u000afactor f which closes the radiation moment equations is chosen to be an\\u000aempirical function of radiation energy density. This is easier to implement

The geologic structure of southeastern Australia is a complex accumulation of multiple Palaeozoic orogenic belts that abut the Precambrian Australian craton. A lack of outcrop due to extensive Mesozoic-Cenozoic sedimentary and volcanic cover sequences have limited direct access to much of the Palaeozoic substrate, resulting in a variety of plausible tectonic models that satisfy the available data. Recent high-density short period and broadband experiments conducted by Australian National University (ANU) (e.g. SEAL2, SEAL3, and EVA) canvass southeastern Australia with a station spacing of approximately 50km, thus providing an ample data set to characterize the lithospheric and upper mantle structure of this region with high-resolution body-wave tomography. Here we present a new tomographic inversion method combining the independent relative travel time data sets derived from the individual ANU arrays and preliminary results from the SEAL3 array (Oct 2007-Dec 2008) based in central and southern New South Wales, Australia. Absolute travel times from the ISC catalogue are also included in the dataset to improve raypath coverage and stabilize the inversion. To combine the independent data sets and account for possible lateral velocity heterogeneity between individual arrays, we simultaneously use absolute and relative travel times to invert for P-wave velocities on a single irregular mesh. The model is parameterized using spherical triangle prisms defined by a Delaunay tessellation for each layer in the model where the node distribution is based on raypath density. Future plans are to start building upon the results from the SEAL3 data set and expand the inversion to include data from other similar high-density array datasets collected by ANU within the last decade and more data types such as ambient noise.

Subterranean clover plants possessing two equally infectible and robust lateral root systems (“split roots”) were used in conjunction with several specific mutant strains (derived from Rhizobium trifolii ANU843) to investigate a systemic plant response induced by infective Rhizobium strains. This plant response controls and inhibits subsequent nodulation on the plant. When strain ANU843 was inoculated onto both root systems simultaneously or 24, 48, 72, or 96 h apart, an inhibitory response occurred which retarded nodulation on the root exposed to the delayed inoculum but only when the delay period between inocula was greater than 24 h. Equal numbers of nodules were generated on both roots when ANU843 was inoculated simultaneously or 24 h apart. The ability to infect subterranean clover plants was required to initiate the plant inhibitory response since preexposure of one root system to non-nodulating strains did not retard the ability of the wild-type strain to nodulate the opposing root system (even when the delay period was 96 h). Moreover, the use of specific Tn5-induced mutants subtly impaired in their ability to nodulate demonstrated that the plant could effectively and rapidly discriminate between infections initiated by either the parent or the mutant strains. When inoculated alone onto clover plants, these mutant strains were able to infect the most susceptible plant cells at the time of inoculation and induce nitrogen-fixing nodules. However, the separate but simultaneous inoculation on opposing root systems of the parent and the mutant strains resulted in the almost complete inhibition of the nodulation ability of the mutant strains. We concluded that the mutants were affected in their competitive ability, and this finding was reflected by poor nodule occupancy when the mutants were coinoculated with the parent strain onto a single root system. Thus the split-root system may form the basis of a simple screening method for the ranking of competitiveness of various rhizobia on small seeded legumes. Images

The Australian Meteorology and Oceanography Society (AMOS) has held an annual conference each year since 1994. The venue for the 17th conference in this series was the Australian National University (ANU) in Canberra, Australia's capital city. The conference ran over three days from 27 to 29 January 2010. The conference title was Atmospheres, Oceans, Environment and Society with the conference themes: Weather, ocean and climate forecasting Observing and modelling the integrated earth system Climate trends, variability and extremes: past, present and future Climate impacts and adaptation Antarctic weather, ocean and climate systems Ocean systems and dynamics. Local co-hosts for the conference were the Fenner School of Environment and Society (ANU) and the Research School of Earth Sciences (ANU). The conference organising committee was drawn from the members of the Australian Capital Territory centre of AMOS. The conference was very successful, attracting 300 delegates presenting 160 oral and 68 poster presentations over the three days. In a first for an AMOS National Conference, the organisers decided to produce a refereed Conference Proceedings with all presenters being invited to contribute. Each submitted paper was refereed by two anonymous reviewers selected by the conference editorial committee.

The refereeing process followed the guidelines for the IOP Conference Series: Earth and Environmental Science. The result is the collection of 39 papers in this conference volume. The range of subjects covered in the papers reflects the diversity of the presentations prompted by the conference themes and the broad range of the research interests of the Australian climate, meteorology and oceanographic community. Within the proceedings the editors have presented the papers alphabetically within the theme area in which they were presented at the conference. The editorial committee wish to thank not only the authors for their contributions to this volume but also the reviewers for their timely and thoughtful comments on the manuscripts. Editorial Committee: Barbara A Burns, Clem Davis, Andrew E Kiss and John R Taylor. AMOS_logo

We report the results of a study on topic spotting in\\u000a conversational speech. Using a machine learning approach,\\u000a we build classifiers that accept an audio file of\\u000a conversational human speech as input, and output an\\u000a estimate of the topic being discussed. Our methodology\\u000a makes use of a well-known corpus of transcribed and\\u000a topic-labeled speech (the Switchboard corpus), and\\u000a involves an

The electron-transfer kinetics of the ionic surfactant complex cis-chloro\\/bromo(cetylamine)bis(ethylenediamine)cobalt(III) by iron(II) in aqueous perchlorate medium at ?=1.0 mol?dm?3 ionic strength have been studied at 303, 308 and 313 K by spectrophotometry under pseudo-first-order conditions using an\\u000a excess of the reductant. The effects of [H+], ionic strength and [Fe2+] on the rate were determined. The reaction was found to be second order and

Small-angle X-ray scattering and phase-contrast microscopy experiments were\\u000aperformed to investigate the effect of the osmotic pressure on vesicle\\u000aformation in a dioleoylphosphatidylcholine (DOPC)\\/water\\/NaI system.\\u000aMulti-lamellar vesicles were formed when a pure lipid film was hydrated with an\\u000aaqueous solution of NaI. On the other hand, uni-lamellar vesicles (ULVs) were\\u000aformed when a lipid film mixed with an enough amount

The voltammetric behavior of uric acid (UA) was studied at a carbon-ceramic electrode modified with multi walled carbon nanotubes;\\u000a which was developed via a simple procedure. UA can be effectively oxidized at the surface of the electrode and produced an\\u000a anodic peak at about 0.29 V in pH 6.8 phosphate buffer solutions. The experimental parameters such as pH, accumulation time,\\u000a and amount

previous work by the authors and Peter Downes from Outlook Economics at www.outlookeconomics.com. We thank Peter Downes, Vivek Tulpule for useful conversations and Will Martin and Jean-Pierre Chauffour for comments. Nicole Mies provided helpful research assistance. McKibbin acknowledges support from ARC Discovery Grant DP0664024. The views expressed in the paper are those of the authors and should not be interpreted as reflecting the views of any of the above collaborators or of the Institutions with which the authors are affiliated including the trustees, officers or other staff of the ANU, Lowy Institute or the Brookings Institution.

Objective Some but not all epidemiological studies have reported that high intakes of red and processed meat are associated with an\\u000a increased risk of colorectal cancer. In the UK Dietary Cohort Consortium, we examined associations of meat, poultry and fish\\u000a intakes with colorectal cancer risk using standardised individual dietary data pooled from seven UK prospective studies.\\u000a \\u000a \\u000a \\u000a \\u000a Methods Four- to seven-day food diaries

Elizabeth A. Spencer; Timothy J. Key; Paul N. Appleby; Christina C. Dahm; Ruth H. Keogh; Ian S. Fentiman; Tasnime Akbaraly; Eric J. Brunner; Victoria Burley; Janet E. Cade; Darren C. Greenwood; Alison M. Stephen; Gita Mishra; Diana Kuh; Robert Luben; Angela A. Mulligan; Kay-Tee Khaw; Sheila A. Rodwell

Background Video-assisted thoracoscopic surgery (VATS) through transmediastinal access (TMA) for contralateral thoracic cavity is an\\u000a operative alternative for bilateral pulmonary lesions. Recently, we introduced a novel method of apicoposterior TMA to perform\\u000a simultaneous

VATS bilateral bullectomy (BB) for bilateral spontaneous pneumothorax (BPTX). We retrospectively analyzed ten\\u000a patients on whom this procedure was performed and evaluated the effectiveness of this approach.\\u000a \\u000a \\u000a \\u000a \\u000a Methods From

Gene silencing using short interfering RNA (siRNA) is fast becoming an\\u000a attractive approach to probe gene function in mammalian cells. Although\\u000a there have been some success in the delivery of siRNA using various\\u000a methods, tracking their delivery and monitoring their transfection\\u000a efficiency prove to be hard without a suitable tracking agent.\\u000a Therefore, a challenge lies with the design of an

\\u000a Ever since the discovery of carbon nanotubes (CNTs) in the early 1990s, it was\\u000a anticipated that these nanostructures would have truly remarkable mechanical and\\u000a heat-transport properties, given the strength of the carbon-carbon bond within\\u000a graphene layers in graphite. Nowadays, there is growing evidence, coming from\\u000a both experimental and theoretical studies, that CNTs do indeed have an\\u000a outstandingly high Young’s modulus, high thermal

A 6.5 Tesla superconducting gas-filled solenoid (SOLITAIRE) has been developed at the Heavy Ion Accelerator Facility at the ANU as a reaction product separator. Key features of the device allowing its application for precise measurement of heavy ion fusion cross sections are described. The physical separation of beam particles and the high efficiency (~80%) transport of heavy ion fusion products open up applications in nuclear structure physics, and in materials science. Finally, the developments to allow its application to providing beams of light radioactive isotopes (SOLEROO) are described.

Further to Drake et al. (2010, Atel#2897), we report the discovery of a new bright outburst from spectroscopically confirmed LBV (Supernova Impostor) SN 2009ip (Maza et al. 2009; CBET#1928, Berger et al. 2009, ATEL#2184; Smith et al. 2010; Foley et al. 2011) in images taken by the Siding Spring Survey (anu.edu.au/~rmn/>SSS).

\\u000a In most of the public-key cryptosystems like RSA, ElGamal, etc.; modular exponentiation plays a vital role for performing\\u000a encryption\\/decryption operations. In other public-key cryptosystems like ECC, scalar point multiplication, kP where k is an\\u000a arbitrary integer in the range 1 < k < ord(P) and P is a point in the elliptic curve is the central operation. In cryptographic\\u000a algorithms,

We construct new models of black hole-neutron star binaries in\\u000aquasiequilibrium circular orbits by solving Einstein's constraint equations in\\u000athe conformal thin-sandwich decomposition together with the relativistic\\u000aequations of hydrostationary equilibrium. We adopt maximal slicing, assume\\u000aspatial conformal flatness, and impose equilibrium boundary conditions on an\\u000aexcision surface (i.e., the apparent horizon) to model the black hole. In our\\u000aprevious

We present variability and multi-wavelength photometric information for the\\u000a933 known quasars in the QUEST Variability Survey. These quasars are grouped\\u000ainto variable and non-variable populations based on measured variability\\u000aconfidence levels. In a time-limited synoptic survey, we detect an\\u000aanti-correlation between redshift and the likelihood of variability. Our\\u000acomparison of variability likelihood to radio, IR, and X-ray data is

Translation of fdhF mRNA, encoding formate dehydrogenase H, requires the context-specific insertion of selenocysteine at an\\u000a opal codon. We have cloned the Tn10 insertion previously shown to block fdhF transcription in Salmonella typhimurium and shown that it lies in selD, which encodes phosphoselenate synthetase. A spontaneous mutant of the selD::Tn10 strain that expresses an fdhF::lacZ protein fusion (where lacZ is

An interpretation of the low-temperature absorption spectra of AnF{sub 4} (An=U, Np, Pu) is presented. Using an effective operator Hamiltonian with orthogonalized free-ion operators and

initializing crystal-field parameter values based on a superposition model calculation for An{sup 4+} sites with {ital C}{sub 2} symmetry, good agreement between the model calculations and experimentally observed absorption band structure could be obtained. Correlations with published magnetic and heat capacity measurements are discussed.

We apply a two-zone MHD model to the jet of M87. The model consists of an\\u000ainner relativistic outflow, which is surrounded by a non-relativistic outer\\u000adisk-wind. The outer disk-wind collimates very well through magnetic\\u000aself-collimation and confines the inner relativistic jet into a narrow region\\u000aaround the rotation axis. Further, we show by example, that such models\\u000areproduce very

We study the question whether the pole-model VMD approach to weak radiative\\u000ahyperon decays can be made consistent with Hara's theorem and still yield the\\u000apattern of asymmetries characteristic of the quark model. It is found that an\\u000aessential ingredient which governs the pattern of asymmetries is the assumed\\u000aoff-shell behaviour of the parity-conserving 1\\/2^- 1\\/2^+ gamma amplitudes. It\\u000aappears

We show that, by appropriately tuning physically relevant interactions in\\u000atwo-component nonlinear Schrodinger equations, it is possible to achieve a\\u000aregime with particle-like solitonic collisions. This allows us to construct an\\u000aanalogue of the Newton's cradle and also to create localized collective\\u000aexcitations in solitary-wave chains which are quasi-integrable solitons, i.e.\\u000asupersolitons.\\u000a We give a physical explanation of the phenomenon,

\\u000a We investigate the security of a generalization of HFE (multivariate and odd-characteristic variants). First, we propose an\\u000a improved version of the basic Kipnis-Shamir key recovery attack against HFE. Second, we generalize the Kipnis-Shamir attack\\u000a to Multi-HFE. The attack reduces to solve a MinRank problem directly on the public key. This leads to an improvement of a\\u000a factor corresponding to the

A mass correlation of central black holes and their spheroids ~0.002(within a\\u000afactor of three) is suggested by Hubble Space Telescope (HST) and various\\u000aground-based CCD photometries of early type galaxies. The near-IR images of\\u000aquasar hosts and the emission line measurements of Broad Line Region for bright\\u000aQSOs present a similar correlation, which supports the speculation of an\\u000aevolutionary

The Australian National University's Research School of Astronomy and Astrophysics (RSAA) is "Australia's premier university centre for astronomical research." At the website, visitors can discover how the School is advancing the observational and theoretical frontiers of astronomy. The exciting accomplishments the website addresses include the discovery of the oldest star in our galaxy, the finding that the universe is growing at an accelerating rate, and the modeling of the interstellar medium. The website features the Gemini Observatory and the ANU Planetary Science Institute (PSU) as well as the latest science news, publications, and conferences.

We prove the existence and exponential decay of global in time strong\\u000asolutions to the Boltzmann equation without any angular cut-off, i.e., for\\u000along-range interactions. We consider perturbations of the Maxwellian\\u000aequilibrium states and include the physical cross-sections arising from an\\u000ainverse-power intermolecular potential $r^{-(p-1)}$ with $p>3$, and more\\u000agenerally, the full range of angular singularities $s=\\\

ANUGA is an open source and free software developed by the Australian National University (ANU) and Geoscience Australia (GA). This software is a hydraulic numerical model used to solve the two-dimensional shallow water equations. The numerical method underlying it is a finite volume method. This paper presents some validation results of ANUGA with respect to exact solutions to shallow water flow problems. We identify the strengths of ANUGA and comment on future work that may be taken into account for ANUGA development.

A flow injection system is proposed for the rapid and sensitive determination of trace concentrations

of silver(I) based\\u000a on its catalytic effect on the oxidation of gallocyanine by peroxodisulphate in the presence of 1,10-phenanthroline as an\\u000a activator with spectrophotometric detection. Silver can be determined in the range of 0.002–0.700??g with a limit of detection\\u000a of 0.001??g. The relative standard deviation

The performance is described of a label-free Faradaic impedimetric immunosensor based on immobilized monoclonal IgM antibodies\\u000a to blood group antigen A (anti–A) for blood typing. Anti–A was directly immobilized onto gold electrodes modified with an\\u000a amine-reactive self assembled monolayer of dithiobis(succinimidylundecanoate). The alteration of the interfacial features\\u000a of the electrodes due to different modification or recognition steps was probed by

We say that a graph is intrinsically non-trivial if every spatial embedding\\u000aof the graph contains a non-trivial spatial subgraph. We prove that an\\u000aintrinsically non-trivial graph is intrinsically linked, namely every spatial\\u000aembedding of the graph contains a non-splittable 2-component link. We also show\\u000athat there exists a graph such that every spatial embedding of the graph\\u000acontains either

\\u000a In this paper we report GISM{\\\\cal GISM}, a constraint-based and object-oriented language for modelling and designing agent-based intelligent systems, including an\\u000a introduction to the theory behind, the essence of the language, the control mechanisms for intelligent systems modelled in\\u000a GISM{\\\\cal GISM}, and an application example. The language is quite general, declarative, high level, and naturally concurrent supported.\\u000a It takes advantages

In what respect chronic discoid lupus erythematosus\\u000ais related to systemic lupus erythematosus is still uncertain.\\u000aIn discoid lupus the lupus-erythematosus (L.E.) phenomenon\\u000ais negative, and the history does not suggest\\u000avascular lesions or involvement of serous membranes.\\u000aIn both diseases the pathogenesis of the skin lesions is\\u000aunknown, but they are probably the result of an\\u000aautoimmune mechanism.

. Hot arid and semi-arid zones are characterized by an\\u000a \\u000a abundance of temporary ponds. Most of these depend on rain for their\\u000a \\u000a existence. These habitats are distinguished by fluctuating and unpredictable\\u000a \\u000a changes in their hydrological regime and of physical and chemical conditions.\\u000a \\u000a They contain a uniquely-adapted fauna that copes in different ways with\\u000a \\u000a changing and often extreme temperatures, oxygen levels,

The Info-Quality-L mailing list was established in March 1996 by the Coombs Computing Unit, Research School of Social Sciences, ANU (Australian National University) to provide a world-wide communications vehicle and a central electronic archive for exchange of information dealing with the criteria, guidelines, standards and operational procedures for evaluation, development and management of high quality online, especially Web, information resources. The forum is an integral part of the Information Quality WWW Virtual Library, which has subscription information and a link to the Info-Quality-L archive (wais database).

The main results obtained at the author’s laboratory over the recent five years with respect to optical in-vivo skin assessment are reviewed. The exploited optical properties of human skin are briefly regarded, with following description of the newly developed methods and prototype devices. In particular, six non-invasive diagnostic and monitoring technologies based on skin autofluorescence photobleaching, diffuse reflectance spectrometry, multispectral skin imaging, and remission photoplethysmography have been proposed, experimentally implemented, and clinically tested. Sniegts p?rskats par autora laboratorij? p?d?jo piecu gadu laik? ieg?tajiem in-vivo ?das optisk? nov?rt?juma svar?g?kajiem rezult?tiem. ?sum? apl?kotas dz?vas ?das optisk?s ?paš?bas, turpin?jum? aprakstot jaunrad?t?s metodes un prototipa ier?ces. Pied?v?tas, eksperiment?li realiz?tas un kl?niski p?rbaud?tas sešas neinvaz?vas diagnostikas un monitoringa tehnolo?ijas, kas balst?tas uz ?das autofluorescences fotoizbal?šanu, dif?z?s refleksijas spektrometriju, multispektr?lu ?das att?lošanu un remisijas fotopletizmogr?fiju.

The effect of soiling in flat PV modules has been already studied, causing a reduction of the electrical output of 4% on average. For CPV's, as far as soiling produces light scattering at the optical collector surface, the scattered rays should be definitively lost because they cannot be focused onto the receivers again. While the theoretical study becomes difficult because soiling is variable at different sites, it becomes easier to begin the monitoring of the real field performance of concentrators and then raise the following question: how much does the soiling affect to PV concentrators in comparison with flat panels?' The answers allow to predict the PV concentrator electrical performance and to establish a pattern of cleaning frequency. Some experiments have been conducted at the IES-UPM and CSES-ANU sites, consisting in linear reflective concentration systems, a point focus refractive concentrator and a flat module. All the systems have been measured when soiled and then after cleaning, achieving different increases of I{sub SC}. In general, results show that CPV systems are more sensitive to soiling than flat panels, accumulating losses in I{sub SC} of about 14% on average in three different tests conducted at IES-UPM and CSES-ANU test sites in Madrid (Spain) and Canberra (Australia). Some concentrators can reach losses up to 26% when the system is soiled for 4 months of exposure. (author)

Crustal deformation in Fennoscandia is associated with the glacial isostatic adjustment (GIA) process that is caused by ongoing stress release of the mantle after removal of the Late Pleistocene ice sheet by ˜10 cal ka BP. With an earth model of defined structure and rheology and an ice-sheet model of known melting history, the GIA process can be simulated by geophysical models, and the surface deformation rates can be calculated and used to compare with global positioning system (GPS) observations. Therefore, the crustal deformation rates observed by GPS in Fennoscandia provide constraints on the geophysical models. On the basis of two ice sheet models (ANU-ICE and ICE-5G) reconstructed independently by the Australian National University (ANU) and University of Toronto, we use the GPS-derived deformation rates to invert for lithosphere thickness and mantle viscosity in Fennoscandia. The results show that only a three-layer earth model can be resolved from current GPS data, providing robust estimates of effective lithosphere thickness, upper and lower mantle viscosity. The earth models estimated from inversion of GPS data with two different ice sheet models define a narrow range of parameter space: the lithosphere thickness between 93 and 110 km, upper mantle viscosity between 3.4 and 5.0 × 1020 Pa s, and lower mantle viscosity between 7 × 1021 and 13 × 1021 Pa s. The estimates are consistent with those inverted from relative sea-level indicators.

This paper describes the Wide Field Spectrograph (WiFeS) under construction at the Research School of Astronomy and Astrophysics (RSAA) of the Australian National University (ANU) for the ANU 2.3 m telescope at the Siding Spring Observatory. WiFeS is a powerful integral field, double-beam, concentric, image-slicing spectrograph designed to deliver excellent throughput, wavelength stability, spectrophotometric performance and superb image quality along with wide spectral coverage throughout the 320 950 nm wavelength region. It provides a 25×38 arcsec field with 0.5 arcsec sampling along each of twenty five 38×1 arcsec slitlets. The output format is optimized to match the 4096×4096 pixel CCD detectors in each of two cameras individually optimized for the blue and the red ends of the spectrum, respectively. A process of “interleaved nod-and-shuffle” will be applied to permit quantum noise-limited sky subtraction. Using VPH gratings, spectral resolutions of 3000 and 7000 are provided. The full spectral range is covered in a single exposure at R=3000, and in two exposures in the R=7000 mode. The use of transmissive coated optics, VPH gratings and optimized mirror coatings ensures a throughput (including telescope atmosphere and detector) >30% over a wide spectral range. The concentric image-slicer design ensures an excellent and uniform image quality across the full field. To maximize scientific return, the whole instrument is configured for remote observing, pipeline data reduction, and the accumulation of calibration image libraries.

Overlapping subclones from the Rhizobium trifolii symbiosis plasmid pRt843a were generated by using in vivo and in vitro methods. Subclones were assayed for symbiotic phenotype by introducing them into a derivative of R. trifolii ANU843 cured of its symbiosis plasmid and testing the transconjugant strains for the ability to induce nitrogen-fixing nodules on clover. One subclone spanning 32 kilobase pairs (kb) of DNA from pRt843a was found to restore nitrogen fixation ability. This subclone included all known nodulation genes of R. trifolii ANU843 and the nitrogenase

structural genes nifHDK. In addition, regions homologous to fixABC, nifA, nifB, nifE, and nifN genes of other nitrogen-fixing bacteria were identified in this 32-kb subclone by DNA-DNA hybridization. Transposon mutagenesis of this subclone confirmed that regions containing these nif and fix genes were required for induction of nitrogen-fixing nodules on clover. In addition, a region located 5 kb downstream of the nifK gene was found to be required for induction of nitrogen-fixing nodules. No homology to known nif and fix genes could be detected in this latter region.

Early stages in the infection of leguminous plants by Rhizobium spp. are restricted at low pH and are further influenced by the presence of Ca and Al ions. In the experiments reported here, transcriptional and translational fusions of the Escherichia coli lacZ gene to Rhizobium leguminosarum biovar trifolii nodulation (nod) genes were used to investigate the effects of pH and of Ca and Al ions on nod gene expression. The regulatory nodD gene in R. leguminosarum biovar trifolii was constitutively expressed at a range of pH levels between 4.8 and 6.5, and expression was not affected by the addition of 22.5 ?M Al or 1,250 ?M Ca. Induction of expression of nodA, nodF, and region II nodulation genes in the presence of 5 × 10?7 M 7,4?-dihydroxyflavone was restricted at a pH of <5.7 and was extremely poor at pH 4.8. Induction of nodA expression was further restricted by 22.5 ?M Al over a range of pH levels but was increased in the presence of Ca. The addition of Ca, however, only slightly alleviated the Al-mediated inhibition of nodA induction. Induction of expression of nodA was equally sensitive to low pH in three strains of R. leguminosarum biovar trifolii (ANU845, ANU815, and ANU1184), which exhibited contrasting growth abilities in solution culture at a pH of <5.0. Aluminum, however, differentially affected the induction of nodA in these three strains, with the most Al-tolerant strain for growth being the most Al-sensitive strain for nod gene induction. Poor induction of expression of nodulation genes in R. leguminosarum biovar trifolii was considered to be an important factor contributing to the acid-sensitive step of legume root infection. Images

The Australian National University (ANU) and the University of South Australia (UniSA) have embarked on Federally-funded project to collaborate in the design, development and delivery of a range of undergraduate and postgraduate courses in engineering. The collaboration investigates new ways to bring together the strengths and discipline expertise of each institution to the students of both universities, utilising blended teaching and learning approaches. The collaboration brings much change--at the organisational level in the blending of programs, at the staff level in their approaches to teaching and at the students' level in their approaches and engagement with cross-institutional blended learning. This paper focuses on how change management principles were used to guide a systematic approach to engaging students into the learning culture associated with the Engineering Hubs and Spokes Project's theme--"Advanced Collaboration for Excellence". (Contains 3 figures and 1 table.)

The joint ANSTO/ANU 36Cl program has now measured more than 700 samples from many different locations. During the course of this work, a variety of contamination problems have affected a small number of results which have provided valuable information on the effects of ion source cross-talk, sample preparation and storage procedures and sources of high-36Cl material. A sample of Weeks Island halite is processed along with every batch of field samples and the observed ratio provides a clear distinction between normal batches and those subject to contamination. Over three years, the long-term average ratio of 36Cl/Cl for normal halite samples is (1 +/- 1) × 10-15. The sample handling procedures developed during the course of this work provide a useful guide to the techniques that must be used to achieve the sensitivity limits which are potentially available using AMS.

Two floors of the W. K. Hancock Library at the Australian National University (ANU) were refurbished in 2011 as part of a cooperative project between the library and the College of Science. The refurbishment, costing $5 million, was part of a much larger exercise involving the construction of four new science buildings around the Hancock Library. The project was designed to add small group teaching rooms to the university's stock, as well as student learning and network spaces, together with group and individual study areas, laptop facilities, and videoconferencing rooms. Emphasis was given to flexibility in use of the space, a mix of study areas and furniture, use of "milling" space, ease of access, and security.

CICADA (Young et al. 1997) is a multi-process, distributed application for the control of astronomical data acquisition systems. It comprises elements that control the operation of, and data flow from CCD camera systems; and the operation of telescope instrument control systems. CICADA can be used to dynamically configure support for astronomical instruments that can be made up of multiple cameras and multiple instrument controllers. Each camera is described by a hierarchy of parts that are each individually configured and linked together. Most of CICADA is written in C++ and much of the configurability of CICADA comes from the use of inheritance and polymorphism. An example of a multiple part instrument configuration -- a wide field imager (WFI) -- is described here. WFI, presently under construction, is made up of eight 2k x 4k CCDs with dual SDSU II controllers and will be used at Siding Spring's ANU 40in and AAO 3.9m telescopes.

In the paper, the problem of voltage imbalance in supercapacitor bank caused by different capacitances and leakage resistances is considered. The authors propose capacitance balancing in combination with passive resistor voltage balancing as an efficient method for decreasing the cell voltage imbalance and increasing the effective energy capacity of supercapacitor bank. The efficiency of the method is demonstrated theoretically and verified experimentally on eight supercapacitor cells. Rakst? pied?v?ta kapacit?šu balans?šana kop? ar nopl?des str?vu balans?šanu k? efekt?va metode, lai samazin?tu superkondensatoru baterijas veidojošo kondensatoru spriegumu disbalansu, t?dej?di ?aujot palielin?t baterijas efekt?vo ener?ijas ietilp?bu. Pied?v?t?s metodes efektivit?te demonstr?ta teor?tiski, k? ar? p?rbaud?ta eksperiment?li, izmantojot 8 superkondensatorus.

A hybrid concentrator PV-Thermal (CPV-T) system for delivery of electricity and 150°C hot fluid in a structure suitable for roof-top installation on domestic, commercial, and industrial buildings is being developed by ANU in collaboration with the University of New South Wales, CSIRO, and industry partners. A first design based on beam-splitting utilising liquid-absorption filters is being analysed, with a study of the most suitable candidate fluids. An initial selection of four liquids was conducted; with the liquids subjected to accelerated tests to analyse their long-term performance and possible optical and chemical degradation. Some of the fluids showed optical changes after high temperature test and UV exposure, leading to slight yellowing.

Yet another resource from online Asian Studies-guru T. Matthew Ciolek of the Australian National University, this dedicated search engine accesses "major Asian Studies' research resources recorded by the HotBot database." The engine covers the Websites of ten established Asian Studies organizations (asianart.com; coombs.anu.edu.au; iias.leidenuniv.nl; menic.utexas.edu; sun.sino.uni-heidelberg.de; www.aasianst.org; www.asian.gu.edu.au; www.asiasociety.org; www.ciolek.com; and www.ias.berkeley.edu), and search returns include brief annotations. The page also provides links to sixteen Asian Pacific country-specific search engines. Asia Pacific Research Online, Ciolek's main page, offers links to his array of online information resources and special projects.

The aluminium distribution between the major cell compartments of human neuroblastoma cells grown in culture has been determined using 21Al and accelerator mass spectrometry (AMS). Cells (IMR-32) were grown for eight days in a culture medium containing Al-EDTA (0.2mM) spiked with 26Al, harvested, and fractionated by standard biochemical techniques. 26Al in fractions after ashing to Al2O3 was determined by AMS using the 14UD accelerator at ANU Canberra. The cytoplasmic and nuclear cell compartments appeared to have reached diffusive equilibrium with the culture medium. Whilst 26Al was retained by the nuclear proteins and nuclear sap, 26Al did not appear to bind to the nucleic acids (DNA/RNA).

Research at the Australian National University (ANU) in Canberra into the physics and chemistry of minerals is being actively carried out by a number of different research groups within the Research School of Earth Sciences (RSES), the Research School of Chemistry (RSC), and the Department of Geology. The research schools form part of the Institute of Advanced Studies, which is a national center for research and postgraduate training established by the Australian Government in 1946. The Institute of Advanced Studies seeks to ensure flexibility in its approach to research by

maintaining an unusually high ratio (>1) of nontenured to tenured staff. Two types of nontenured appointment are available: postdoctoral fellowships of 1-2 yr duration and research fellowships tenable for 3-5 yr. The Department of Geology, as part of the Faculty of Science, is responsible for the provision of undergraduate education in geology, in addition to its role in research and postgraduate training.

This paper discusses access to Asian serials (i.e., Asian and Western language titles, including publications from Asia, as well as serials about Asia produced elsewhere) in Australian libraries. Background is provided on the development of Asian collections since the 1950s. Results of a 1994 national survey of Asian materials are summarized. Efforts to coordinate Australia's Asian collections are described, including the National Chinese, Japanese, and Korean (CJK) Service and the Indonesian Acquisitions Project. A survey of users of Korean materials is reported, as well as a panel on information needs of Asian studies academics. Other topics include: a collecting agreement for Chinese statistical yearbooks between the National Library and the Australian National University (ANU); World Wide Web sites for major Asian collections in Australia; serial indexing; and backlogs of uncataloged Asian serials. (MES)

The Australian National University (ANU), in collaboration with Chromasun Inc., is developing a new hybrid CPV-Thermal (CPV-T) micro-concentrator (MCT) system for concentration ratios up to 30X and producing both thermal and electrical energy. The system design and reliability testing have been integrated as concurrent processes, enabling early and continual optimisation of the concentrator system receiver design. The key feature of this integrated design-test procedure is that carefully selected sets of simple tests can be conducted concurrently with the design of the concentrator module without introducing extensive time delays in the receiver module design phase. Test results provide valuable information that significantly informs the design process and helps to avoid future failures.

Measurements of {sup 14}C/{sup 13}C ratios were made on samples of Oxalic Acid and {sup 14}C dead materials spanning the mass range from 10 {micro}g to {approximately} 1 mg. These measurements have allowed the determination of both the amount, and the {sup 14}C content, of the contaminant carbon introduced during sample processing in the laboratory. These data were used to correct measured {sup 14}C/{sup 13}C ratios obtained from ANU Sucrose and {approximately} one-half-life old test samples for the influence of the contaminant. The test samples spanned the 10 {micro}g to {approximately} 1 mg mass range and the corrections were made using three different formulae. The results obtained from these calculations allow the accuracy of these background correction formulae to be evaluated.

A 52'X52' field in the Lupus Galactic plane was observed with the ANU 1m telescope for 53 nights during 2005 and 2006 in a search for transiting Hot Jupiter planets. A total of 2200 images were obtained. We have sampled 120,000 stars via differential photometry, of which ~26,000 have sufficient photometric accuracy ((Lupus-TR-1) with the 4m AAT telescope. The third candidate, Lupus-TR-3 (P=3.914d, V~16.5), is a particularly strong case for a giant planet of 1.0-1.2RJ orbiting a solar-like primary star with a near central transit. Further observations are planned to determine its nature.

Redshift surveys constitute one of the prime tools of observational cosmology. Imaging surveys of the whole sky are now available at a wide range of wavelengths, and provide a basis for the new generation of massive redshift surveys currently in progress. The very large datasets produced by these surveys call for new and sophisticated approaches to the analysis of large-scale structure and the galaxy population. These issues, and some preliminary results from the new redshift surveys, were discussed at the second Coral Sea Cosmology Conference, held at Dunk Island on 24-28 August 1999. This is a summary of the conference; the full conference proceedings are on the WWW at http://www.mso.anu.edu.au/DunkIsland/Proceedings.

The discovery of the Ti-in-zircon thermometer (Watson and Harrison, 2005) has wide ranging implications for investigating crystallisation temperatures of rocks from differing geologic settings. We have simultaneously measured 49Ti relative to silicon oxide (44 amu) on the ANU SHRIMP II

multicollector, thereby both reducing analysis times to just a few minutes and normalising many potential fractionation effects. The isotope 49Ti is chosen to avoid potential interferences from atomic species as well as doubly charged Zr atoms. Results indicate SiO/49Ti ratios can be measured consistently in both natural zircons and synthetic glasses down to at least 1 ppm Ti. Analytical precision for NIST glass is better than 0.5% at 1 ppm, and better than 0.2% at 40 ppm Ti. External precision based on replicate SiO/49Ti ratios in a 6 ppm Ti natural zircon standard (SL13) is ca. 0.5% for a single analytical session (24 hrs). We have determined the Ti concentrations in natural zircons from many different thermal regimes, in both igneous and metamorphic rocks. While Ti temperatures for metamorphic zircons are consistent with independent estimates from other thermometers, derived temperatures for igneous zircons are often lower than expected and have unsuspected structure within individual grains. Using the ANU SHRIMP-RG at high resolution, we have measured the concentrations of Sc (a proxy for tri-valent trace element substitution) and Ti in standard zircon Temora 2. Sc and Ti concentrations are strongly correlated and correspond to cathodoluminescence zones. These domains demonstrably grew together under the same temperature regime. While the Ti contents of igneous zircons appear to be broadly controlled by temperature, processes which are responsible for the incorporation of other trace elements into the zircon lattice also operate for Ti.

A major dust storm transgressed over southeastern Australia in September 2009 and continued as far as northern Queensland [to the north], New Zealand and New Caledonia [to the east] . We analysed samples of the dust for organic compounds, its microbiological composition, pollen, trace and rare earth elements as well as Sr and Nd isotopes. Grain size analysis was also performed on some of the samples. We also obtained information on the meteorological conditions that led to the large dust plume and its pathway. Our geochemical fingerprinting allowed us to determine the origin of the dust, and this was confirmed by meteorological observations and satellite imagery. As the pathway of the dust plume went over the city of Canberra, located to the southwest of Sydney, we were able to collect samples of dust that fell with rain, and the surprise was that the geochemical composition of the dust varied with time [and dust fall], identifying that as the dust plume transgressed over the landscape, it picked up additional material that was compositionally different from its point of origin. We also compared our data with those obtained from another major dust event that affected Canberra in October 2002, and a number of important differences are noted, particularly with respect of the microbiological composition of the dust, and its chemical composition. Collaborators on this project are: Chris Munday and Gwen Allison [microbiology]: Research School of Biology, ANU; Jochen Brocks and Janet Hope [organic chemistry] and Marc Norman [inorganic geochemistry]: Research School of Earth Sciences, ANU; Tadhg O'Loingsigh and Nigel Tapper [meteorology, satellite imagery] and Sander van der Kaars [palynology]: Geography and Environmental Science, Monash University; and J.-B. Stuut [grain size analysis], NIOZ.

Rhizobium leguminosarum bv. trifolii is the bacterial symbiont which induces nitrogen-fixing root nodules on the leguminous host, white clover (Trifolium repens L.). In this plant-microbe interaction, the host plant excretes a flavone, 4',7-dihydroxyflavone (DHF), which activates expression of modulation genes, enabling the bacterial symbiont to elicit various symbiosis-related morphological changes in its roots. We have investigated the accumulation of a diglycosyl diacylglycerol (BF-7) in wild-type R. leguminosarum bv. trifolii ANU843 when grown with DHF and the biological activities of this glycolipid bacterial factor on host and nonhost legumes. In vivo labeling studies indicated that wild-type ANU843 cells accumulate BF-7 in response to DHF, and this flavone-enhanced alteration in membrane glycolipid composition was suppressed in isogenic nodA::Tn5 and nodD::Tn5 mutant derivatives. Seedling bioassays performed under microbiologically controlled conditions indicated that subnanomolar concentrations of purified BF-7 elicit various symbiosis-related morphological responses on white clover roots, including thick short roots, root hair deformation, and foci of cortical cell divisions. Roots of the nonhost legumes alfalfa and vetch were much less responsive to BF-7 at these low concentrations. A structurally distinct diglycosyl diacylglycerol did not induce these responses on white clover, indicating structural constraints in the biological activity of BF-7 on this legume host. In bioassays using aminoethoxyvinylglycine to suppress plant production of ethylene, BF-7 elicited a meristematic rather than collaroid type of mitogenic response in the root cortex of white clover. These results indicate an involvement of flavone-activated nod expression in membrane accumulation of BF-7 and a potent ability of this diglycosyl diacylglycerol glycolipid to

perform as a bacterial factor enabling R. leguminosarum bv. trifolii to activate segments of its host's symbiotic program during early development of the root nodule symbiosis. Images

Background Disappointing results from clinical trials of disease-modifying interventions for Alzheimer's dementia (AD), along with reliable identification of modifiable risk factors in mid life from epidemiological studies, have contributed to calls to invest in risk-reduction interventions. It is also well known that AD-related pathological processes begin more than a decade before the development of clinical signs. These observations suggest that lifestyle interventions might be most effective when targeting non-symptomatic adults at risk of AD. To date, however, the few dementia risk-reduction programs available have targeted individual risk factors and/or were restricted to clinical settings. The current study describes the development of an evidence-based, theoretically-driven multidomain intervention to reduce AD risk in adults at risk. Method The design of Body Brain Life (BBL) is a randomized controlled trial (RCT) to evaluate a 12-week online AD risk-reduction intervention. Eligible participants with several modifiable risk factors on the Australian National University (ANU) AD Risk Index (ANU-ADRI) are randomly allocated to an online only group, an online and face-to-face group, or an active control group. We aim to recruit 180 participants, to undergo a comprehensive cognitive and physical assessment at baseline, post-intervention, and 6-month follow-up assessment. The intervention comprises seven online modules (dementia literacy, risk factor education, engagement in physical, social, and cognitive lifestyles, nutrition, and health monitoring) designed using contemporary models of health behavior change. Discussion The BBL program is a novel online intervention to reduce the risk of AD in middle-aged adults at risk. The trial is currently under way. It is hypothesized that participants in the intervention arms will make lifestyle changes in several domains, and that this will lead to a reduction in their AD risk profile. We also expect to show that health behavior change is underpinned by changes in psychological determinants of behavior. If successful, the findings will contribute to the development of further dementia risk reduction interventions, and thus contribute to the urgent need to lower dementia risk factors in the population to alter future projections of disease prevalence. Longer follow-up of BBL participants and replications using large samples are required to examine whether reduction in AD risk factors will be associated with reduced prevalence. Trial registration Reg. no. ACTRN12612000147886

Soil bacteria of the genera Azorhizobium, Bradyrhizobium, and Rhizobium liberate morphogenetic lipochitin-oligosaccharides (Nod factors) into legume rhizospheres. Nod factors, which are synthesized by the products of rhizobial nodulation (nod) genes, vary in core length as well as in the number and type of substitutions. In Rhizobium sp. NGR234, the N-acylated pentamers of N-acetyl-D-glucosamine carry an O-methylfucose group on the reducing terminus that is substituted, on a mutually exclusive basis, with either an acetyl or a sulfuryl group. A sulfotransferase encoded by noeE is required for adjunction of activated sulfate donated by 3'-phosphoadenosine 5'-phosphosulfate (PAPS). Here we show that when expressed in NGR234 cured of its symbiotic plasmid (= ANU265) or when purified as a fusion protein (MBP-NoeE), NoeE transfers sulfate from PAPS to fucosylated lipochitin-oligosaccharides. Enzyme assays showed that sulfotransferase activity is dependent on the presence of an acyl group (stearic and vaccenic acids were tested) since no activity was detected when fucosylated oligochitins (oligomers of two to six N-acetyl-D-glucosamine units) were used as substrates. Thus, NoeE is unique in that it is the only characterized sulfotransferase that is specific for fucosylated Nod factors. It probably acts after NodA, which acylates the amino-sugar backbone. PMID:9650293

On May 14-15, 1985, 63 discerning geomagnetists flocked to Canberra to attend the Geomagnetic Workshop coorganized by the Australian Bureau of Mineral Resources (BMR) and the Research School of Earth Sciences, Australian National University (ANU). With an aurorally glowing cast that included an International Association of Geomagnetism and Aeronomy (IAGA) president, former president, and division chairman, the Oriental Magneto-Banquet (which was the center of the meeting), was assured of success. As a cunning ploy to mask the true nature of this gastronomic extravagance from the probings of income tax departments, a presentation of scientific papers on Australian geomagnetism in its global setting was arranged.The Australian region, including New Zealand, Papua New Guinea, Indonesia, and a large sector of the Antarctic, covers one eighth of the Earth's surface and historically has played an important role in the study of geomagnetism. The

region contains both the south magnetic and geomagnetic poles, and two Australian Antarctic stations (Casey and Davis) are situated in the region of the south polar cusp (see Figure 1).

A method for coupling virtual globes with geophysical hydrodynamic models is presented. Virtual globes such as GoogleTM Earth can be used as a visualization tool to help users create and enter input data. The authors discuss techniques for representing linear and areal geographical objects with KML (Keyhole Markup Language) files generated using computer codes (scripts). Although virtual globes offer very limited tools for data input, some data of categorical or vector type can be entered by users, and then transformed into inputs for the hydrodynamic program by using appropriate scripts. An application with the AnuGA hydrodynamic model was used as an illustration of the method. Firstly, users draw polygons on the Google Earth screen. These features are then saved in a KML file which is read using a script file written in the Lua programming language. After the hydrodynamic simulation has been performed, another script file is used to convert the resulting output text file to a KML file for visualization, where the depths of inundation are represented by the color of discrete point icons. The visualization of a wind speed vector field was also included as a supplementary example.

We report total cross-section (TCS) results for low-energy positron scattering from the noble gas xenon. A comparison with previous measurements shows a good level of accord with the recent results of the ANU group (2011 New J. Phys. 13 125004). Very good qualitative agreement is also found with the convergent close-coupling (CCC) calculation of Fursa and Bray (2012 New J. Phys. 14 035002) over most of the common energies. By using the shape of the CCC results as a guide, we also extrapolate our measured cross sections to very low energy. With the aid of the CCC theory, we therefore derive the first experimental estimate for the positron-xenon scattering length of a = -99.2 ± 18.4 au. This value is found to be consistent with the CCC-based estimate and also with those of some other theories. This result supports the existence of a positron-xenon virtual state at a positron energy ? = (1.4 ± 0.6) × 10-3 eV.

The strain ANU 6277 was isolated from laterite soil and identified as Streptomyces sp. closely related to Streptomyces albidoflavus cluster by 16S rRNA analysis. The cultural, morphological and physiological characters of the strain were recorded. The strain exhibited resistance to chloramphenicol, penicillin and streptomycin. It had the ability to produce enzymes such as amylase and chitinase. A bioactive compound was isolated from the strain at stationary phase of culture and identified as 3-phenylpropionic acid (3-PPA) by FT-IR, EI-MS, 1H NMR and 13C NMR spectral studies. It exhibited antimicrobial activity against different bacteria like Bacillus cereus, B. subtilis, Escherichia coli, Klebsiella pneumoniae, Proteus vulgaris, Pseudomonas aeruginosa, P. flourescens, Staphylococcus aureus and some fungi including Aspergillus flavus, A. niger, Candida albicans, Fusarium oxysporum, F. udum and Penicillium citrinum. The antifungal activity of 3-PPA of the strain was evaluated in in vivo and in vitro conditions against Fusarium udum causing wilt disease in pigeon pea. The compound 3-PPA is an effective antifungal agent when compared to tricyclozole (fungicide) to control wilt caused by F. udum, but it exhibited less antifungal activity than carbendazim. PMID:18062653

The GPRIME (Group PRIMEr design) programs examine aligned sets of gene sequences to discover homologous regions to be targeted in diagnostic tests. The core program moves a 'window' over the aligned sequences and calculates, at each window position, a 'redundancy value', namely the number of sequences that would represent all permutations of the variable sequence positions within that window. Regions with minimal redundancy values may then be targeted in diagnostic tests based on oligonucleotide hybridisation. The likely specificity of tests targeting such regions can be assessed by searching the international databases with those regions using FASTA. The GPRIME programs, which include programs for designing primers to distinguish between two sub-sets of a group of aligned sequences, can be obtained from http://life.anu.edu.au/software.html. We have used GPRIME to design redundant primers for RT-PCR tests to detect all potexviruses and tobamoviruses, and then used these, together with a previously reported pair of primers for the Potyviridae, to screen some Australian orchid collections. Two orchid viruses previously reported from Australia were found; cymbidium mosaic potexvirus was common, but odontoglossum ringspot tobamovirus was not. In addition the recently described ceratobium mosaic potyvirus was found to

be common, and three other novel potyviruses were also found. PMID:9763130

This paper summarizes our current efforts in developing numerical methods for the study of non-equilibrium, high-enthalpy plasma. We describe the general approach used in the model development, some of the problems to be solved and benchmarks showing current capabilities. In particular, we review the recent development of a collisional-radiative model coupled with a single-fluid, two-temperature convection model for the transport of shock-heated argon along with extensions to krypton and xenon. The model is used in a systematic approach to examine the effects of the collision cross sections on the shock structure, including the relaxation layer and subsequent radiative-cooling regime. We review recent results obtained and comparisons with previous experimental results obtained at the Uni- versity of Toronto's Institute of Aerospace Studies (UTIAS) and the Australian National University (ANU), which serve as benchmarks to the model. We also show results when unsteady and multi- dimensional effects are included, highlighting the importance of coupling between convective transport and kinetic processes in nonequilibrium flows. We then look at extending the model to both nozzle and external flows to study expansion regimes.

This report describes the results of the ANU's (Applied Meteorology Unit) Short-Range Statistical Forecasting task for peak winds. The peak wind speeds are an important forecast element for the Space Shuttle and Expendable Launch Vehicle programs. The Keith Weather Squadron and the Spaceflight Meteorology Group indicate that peak winds are challenging to forecast. The Applied Meteorology Unit was tasked to develop tools that aid in short-range forecasts of peak winds at tower sites of operational interest. A 7 year record of wind tower data was used in the analysis. Hourly and directional climatologies by tower and month were developed to determine the seasonal behavior of the average and peak winds. In all climatologies, the average and peak wind speeds were highly variable in time. This indicated that the development of a peak wind forecasting tool would be difficult. Probability density functions (PDF) of peak wind speed were calculated to determine the distribution of peak speed with average speed. These provide forecasters with a means of determining the probability of meeting or exceeding a certain peak wind given an observed or forecast average speed. The climatologies and PDFs provide tools with which to make peak wind forecasts that are critical to safe operations.

The rhizobia-legume, root-nodule symbiosis provides the most efficient source of biologically fixed ammonia fertilizer for agricultural crops. Its development involves pathways of specificity, infectivity, and effectivity resulting from expressed traits of the bacterium and host plant. A key event of the infection process required for development of this root-nodule symbiosis is a highly localized, complete erosion of the plant cell wall through which the bacterial symbiont penetrates to establish a nitrogen-fixing, intracellular endosymbiotic state within the host. This process of wall degradation must be delicately balanced to avoid lysis and destruction of the host cell. Here, we describe the purification, biochemical characterization, molecular genetic analysis, biological activity, and symbiotic function of a cell-bound bacterial cellulase (CelC2) enzyme from Rhizobium leguminosarum bv. trifolii, the clover-nodulating endosymbiont. The purified enzyme can erode the noncrystalline tip of the white clover host root hair wall, making a localized hole of sufficient size to allow wild-type microsymbiont penetration. This CelC2 enzyme is not active on root hairs of the nonhost legume alfalfa. Microscopy analysis of the symbiotic phenotypes of the ANU843 wild type and CelC2 knockout mutant derivative revealed that this enzyme fulfils an essential role in the primary infection process required for development of the canonical nitrogen-fixing R. leguminosarum bv. trifolii-white clover symbiosis. PMID:18458328

We present for the first time metallicity maps generated using data from the Wide Field Spectrograph on the ANU 2.3 m of 10 luminous infrared galaxies (LIRGs) and discuss the abundance gradients and distribution of metals in these systems. We have carried out optical integral field spectroscopy (IFS) of several LIRGs in various merger phases to investigate the merger process. In a major merger of two spiral galaxies with preexisting disk abundance gradients, the changing distribution of metals can be used as a tracer of gas flows in the merging system as low-metallicity gas is transported from the outskirts of each galaxy to their nuclei. We employ this fact to probe merger properties by using the emission lines in our IFS data to calculate the gas-phase metallicity in each system. We create abundance maps and subsequently derive a

metallicity gradient from each map. We compare our measured gradients to merger stage as well as several possible tracers of merger progress and observed nuclear abundances. We discuss our work in the context of previous abundance gradient observations and compare our results to new galaxy merger models that trace metallicity gradient. Our results agree with the observed flattening of metallicity gradients as a merger progresses. We compare our results with new theoretical predictions that include chemical enrichment. Our data show remarkable agreement with these simulations.

God's response to prayers and placebo leads to a question. How does He respond deterministically? He may be controlling at least one of the two variables of the uncertainty principle by extending His invisible soul to each body particle locally. Amazingly, many Vedic verses support this answer. One describes the size of the soul as arithmetically matching the size of the nucleons as if a particle is a soul. One gives a name meaning particle soul (anu-atma), consistent with particle's indeterministic behavior like that of (soulful) bird’s flying in any directions irrespective of the direction of throw. One describes souls as eternal consistent with the conservation of baryon number. One links the souls to the omnipresent (param- atma) like Einstein Rosen bridges link particles to normal spacetime. One claims eternal coexistence of matter and soul as is inflationary universe in physics/0210040 V2. The implicit scientific consistency of such verses makes the relationship of particle source of consciousness to the omnipresent Supreme analogous to the relationship of quantum source of gravitons in my gr-qc/0507130 to normal spacetime This frees us from the postulation of quantum wormholes and quantum foam. Dr. Hooft's view in ``Does God play dice,'' Physicsword, Dec 2005 seems consistent with my progressive conference presentations in Russia, Europe, India, and USA (Hindu University) in 2004/05. I see implications for nanoscience.

Uruk (Tell Warka) is one of the most famous sites for the early cultural development at Mesopotamia. The Sumerian city state was also important for the origin of writing and Uruk was the scene of action of mans oldest epic, the famous Epic of Gilgamesh (2600 B.C). During the time of the Sassanides, 400 A.D. the city was given up completely. Today the ruin is dominated by shallow hills and wadis, covered by pottery, mudbricks and slags. The area is totally free of modern buildings and far away from the modern village of Warka. Therefore it is an ideal place for uncompensated cesium magnetometry. The most sensational find was the discovery of a canal system inside the city. Furthermore the magnetogram shows the remains of buildings of the Babylonian type as well as garden structures, a middle Babylonian graveyard and the so called "New Years Temple" of the God Anu or Godess Ischtar. The city wall, which we prospected in a length of more than one kilometer, includes a water gate and is nearly 40 meters broad. From magnetometry it is evident that it was build by burned mudbricks as it was described by the Epic. In the west of the "New Years Temple" in the middle of the former Euphrates river we detected the remains of a building which may be interpreted as a burial. But if this building is the grave of the famous King Gilgamesh as it was described by the Epic of Gilgamesh it must remain speculative.

This paper reviews the experiences of a collaborative approach to the intense educational development involved in the transition to a successful technology-facilitated off-campus study program. Drawing on a history of many years of collaboration between the Australian National University (ANU) educational development center (CEDAM) and the Legal Workshop (LW) group in the Faculty of Law, the project spanned a 12-month academic year development period in 2001. The study program is a Graduate Diploma in Legal Practice (GDLP), taken by more than 150 students per year from all over Australia as well as overseas, many of whom are employed in a wide range of work environments. There are some 15 separate courses of study. The institutional context is highly research intensive and gives emphasis to an on-campus education. Recently, however, the University has begun actively exploring distributed and flexible approaches in niche settings, which permit it to better meet changing national and student needs. This paper highlights some of the lessons learned from the experience of undertaking one particular program level change, and in supporting academic and other staff during the transition to a technology-facilitated curriculum. (Author)

Using an observationally derived model of optical turbulence profile, we have investigated the performance of adaptive optics (AO) at Siding Spring Observatory, Australia. The simulations cover

the performance for AO techniques of single-conjugate adaptive optics (SCAO), multi-conjugate adaptive optics (MCAO), and ground-layer adaptive optics (GLAO). The simulation results presented in this paper predict the performance of these AO techniques as applied to the Australian National University (ANU) 2.3-m and Anglo-Australian Telescope (AAT) 3.9-m telescopes for astronomical wavelength bands J, H, and K. The results indicate that the AO performance is best for the longer wavelengths (K band) and in the best seeing conditions (sub 1 arcsec). The most promising results are found for GLAO simulations (field of view of 180 arcsec), with the field RMS for encircled energy 50% diameter (EE50d) being uniform and minimally affected by the free-atmosphere turbulence. The GLAO performance is reasonably good over the wavelength bands of J, H, and K. The GLAO field mean of EE50d is between 200 and 800 mas, which is a noticeable improvement compared with the nominal astronomical seeing (870-1 700 mas).

There has been interest lately in updated thesaurus data for astronomy. Both AIP and IOP independently initiated efforts to revise their comprehensive physics thesauri, and ADS and the IVOA have been working on similar projects. The impetus for all of this is semantic enrichment of the existing corpuses that these organizations hold. Earlier in 2012, AIP and IOP decided to combine forces on a physics thesaurus, and they engaged Access Innovations, a company with expertise in thesaurus constr uction, to help them. The team at ADS expressed interest in the project, and both publishers ag reed that they would release the astrophysics portion of the new combined thesaurus to the astronomical community. We are in the process of assigning its ownership to the AAS, although the thesaurus will be stewarded by staff affiliated with the CfA library, and the development will continue to be done under ADS guidance. All these combined efforts are being referred to as the Unified Astronomy Thesaurus (UAT). Previously, the IAU endorsed a thesaurus that was assembled in the early 1990s by Robyn and Robert Shobbrook at ANU. It was released in print, and was subsequently turned into a website. See the subsequent article for details about the UAT.

Plasma-surface interactions are crucial to determining the success of ITER and the ultimate viability of generating fusion power under steady state conditions. The first walls of magnetic fusion reactors must sustain large particle and heat fluxes and present a major challenge to achieving fusion power. To answer fundamental questions about the science of plasma-surface interactions at the complex fusion boundary a new purpose-built linear plasma device, the prototype MAGnetized Plasma Interaction Experiment (MAGPIE), has been constructed at The Australian National University (ANU) to develop novel diagnostics and test materials under aggressive plasma conditions. In this work we employ optical emission spectroscopy, electrostatic probes and fast imaging to characterize the plasma environment and its interaction with various materials. It will be shown that a well-collimated plasma is created in the downstream region with a diameter of about 2 cm. High-energy electrons are observed along the axis of the discharge and the power deposition region is transferred to where the magnetic field maximum occurs in the downstream region. These findings indicate that efficient non-collisional heating occurs downstream of the plasma source.

This paper offers observations from an Association of University Administrators (AUA) study visit to Australia at a time of considerable hostility by some Vice-Chancellors towards the radical reforms implemented by John Howard's conservative Government. The team of ten senior managers, led by Ian Creagh of the AHUA/AUA International Committee, visited eight universities from the research powerhouse Australian National University (ANU) to Darwin in the Northwest Territory; it also visited the Australian Vice-Chancellors' Committee (AVCC, renamed Universities Australia in May 2007) and IDP Education Pty Ltd, a global company part-owned by thirty-eight Australian universities which represents all education sectors and offers student recruiting and testing services around the globe. The team focused on three themes: (1) variable student fees funded against credit; (2) internationalization; and (3) governance. Lessons for the UK are offered, particularly in relation to the removal of any distinction between part-time and full-time students, the establishment of robust IT systems to recover student loans, the Education Services for Overseas Students (ESOS) Act 2000 kite mark, and the high profile institutional leadership of international activities. (Contains 4 footnotes and 2 tables.)

We report the discovery of 34 stars in the Hamburg/ESO Survey for metal-poor stars and the Sloan Digital Sky Survey that have [Fe/H] <~ -3.0. Their median and minimum abundances are [Fe/H] =

-3.1 and -4.1, respectively, while 10 stars have [Fe/H] < -3.5. High-resolution, high signal-to-noise spectroscopic data—equivalent widths and radial velocities—are presented for these stars, together with an additional four objects previously reported or currently being investigated elsewhere. We have determined the atmospheric parameters, effective temperature (T eff), and surface gravity (log g), which are critical in the determination of the chemical abundances and the evolutionary status of these stars. Three techniques were used to derive these parameters. Spectrophotometric fits to model atmosphere fluxes were used to derive T eff, log g, and an estimate of E(B - V); H?, H?, and H? profile fitting to model atmosphere results provided the second determination of T eff and log g; and finally, we used an empirical T eff-calibrated H? index, for the third, independent T eff determination. The three values of T eff are in good agreement, although the profile fitting may yield systematically cooler T eff values, by ~100 K. This collective data set will be analyzed in future papers in the present series to utilize the most metal-poor stars as probes of conditions in the early universe. This paper includes data obtained with the ANU 2.3 m Telescope at Siding Spring Observatory, Australia; the Magellan Clay Telescope at Las Campanas Observatory, Chile; the Keck I Telescope at the W. M. Keck Observatory, Hawaii, USA; and the VLT (Kueyen) of the European Southern Observatory, Paranal, Chile (proposal 281.D-5015).

Colless, Matthew; Dalton, Gavin; Maddox, Steve; Sutherland, Will; Norberg, Peder; Cole, Shaun; Bland-Hawthorn, Joss; Bridges, Terry; Cannon, Russell; Collins, Chris; Couch, Warrick; Cross, Nicholas; Deeley, Kathryn; De Propris, Roberto; Driver, Simon P.; Efstathiou, George; Ellis, Richard S.; Frenk, Carlos S.; Glazebrook, Karl; Jackson, Carole; Lahav, Ofer; Lewis, Ian; Lumsden, Stuart; Madgwick, Darren; Peacock, John A.; Peterson, Bruce A.; Price, Ian; Seaborne, Mark; Taylor, Keith

Background Health management is impeded when consumers do not possess adequate knowledge about their illness. At a public health level, consumer knowledge about depression is particularly important because depression is highly prevalent and causes substantial disability and burden. However, currently little is known about the information needs of people with depression. This study aimed to investigate the explicit and implicit information needs of users of an online depression support forum. Methods A sample of 2680 posts was systematically selected from three discussion forums on an online depression bulletin board (blueboard.anu.edu.au). Data were examined for evidence of requests for information (reflecting explicit needs) and reports of past or current problems (implicit needs). Thematic analysis was conducted using a data-driven inductive approach with the assistance of NVivo 7, and instances of questions and people reporting particular types of problems were recorded. Results A total of 134 participants with personal experience of depression contributed to the data analysed. Six broad themes represented participant queries and reported problems: Understanding depression; disclosure and stigma; medication; treatment and services; coping with depression; and comorbid health problems. A variety of specific needs were evident within these broad thematic areas. Some people (n = 46) expressed their information needs by asking direct questions (47 queries) but the majority of needs were expressed implicitly (351 problems) by the 134 participants. The most evident need for information related to coping with depression and its consequences, followed by topics associated with medication, treatment and services. Conclusions People with depression have substantial unmet information needs and require strategies to deal with the difficulties they face. They require access to high quality and relevant online resources and professionals; thus, there is a need to rectify current gaps in the provision of information and limitations of dissemination. Greater knowledge about depression and its treatment is also needed at the general community level.

The results of a coordinated space-based photometric and ground-based spectroscopic observing campaign on the enigmatic ?-ray binary LS 5039 are reported. 16 d of observations from the MOST satellite have been combined with high-resolution optical echelle spectroscopy from the 2.3-m ANU Telescope in Siding Spring, Australia. These observat ions were used to measure the orbital parameters of the binary and to study the properties of stellar wind from the O primary. We found that any broad-band optical photometric variability at the orbital period is below the 2 mmag level, supporting the scenario that the orbital eccentricity of the system is near the 0.24 ± 0.08 value implied by our spectroscopy, which is lower than values previously obtained by other workers. The low amplitude optical variability also implies the component masses are at the higher end of estimates based on the primary's O6.5V((f)) spectral type with a primary mass of ˜26 M&sun; and a

mass for the compact star of at least 1.8 M&sun;. The mass-loss rate from the O primary was determined to be 3.7 to 4.8 × 10-7 M&sun; yr-1. Based on data from the MOST satellite, a Canadian Space Agency mission, jointly operated by Microsat Systems Canada Inc. (MSCI, formerly the space division of Dynacon Inc.), the University of Toronto Institute for Aerospace Studies and the University of British Columbia, with the assistance of the University of Vienna.

Accelerator Mass Spectrometry (AMS) measures the ratio of extremely small amounts of a radioactive isotope in the presence of ~ 1015 times more stable ones. The isotopes are injected sequentially over a repeated period and observed at the exit of the accelerator. so any fluctuations in ion source output or transmission through the accelerator over a time comparable to the measurement time, will reduce the accuracy of such measurements. This compromise in accuracy can be lessened by reducing the switching time between isotopes from several seconds to a few milli-seconds. New AMS systems accomplish fast switching by modifying the beam energy though the 90 injection magnet by pulsing the voltage by several kV on the flight tube in the magnet. That requires that the flight tube be electrically insulated which competes with having the flight tube as large as possible. At the ANU, insulating the magnet flight tube would not only have reduced the acceptance of the injection system, but conflicted with a beam chopper attached to the flight tube, that would also have had to be insulated from the ground. This was not practical so the novel alternative of pulsing the voltage on the high voltage ion source deck is being implemented. Beam optics calculations have been performed and beam tests conducted that demonstrated that, in addition to pulsing the voltage on the 150 kV ion source deck, a pulsed Einzel lens in front of the following electrostatic quadrupole triplet lens is required to maintain isotope-independent transmission through the 14UD Pelletron accelerator. The high voltage rise time performance of the components of the system has been shown to be satisfactory.

Healthcare whistle blowing, despite the benefits it has brought to healthcare systems in many developed countries, remains generally regarded as a pariah activity by many of the most influential healthcare professionals and regulatory institutions. Few if any medical schools or law department health law and bioethics classes, teach whistle blowing in a formal sense. Yet without exception, public inquiries initiated by healthcare whistle blowers have validated their central allegations and demonstrated that the whistle blowers themselves were sincere in their desire to implement the fundamental virtues and principles of medical ethics, bioethics and public health law. In many jurisdictions, the law, this time remarkably in advance of professional opinion, has offered legislative protection for reasonable allegations of whistleblowers made in good faith and in the public interest concerning a substantial and imminent threat to public safety. One reason for this paradoxical position, explored here, is that healthcare whistle blowing lacks a firm virtue-based theoretical bioethical and jurisprudential foundation. The hypothesis discussed is that the lack of this bioethical and jurisprudential substrate has contributed to a situation where healthcare whistle blowing suffers in terms of institutional support due to its lack of academic legitimacy. This article commences the process of redressing this imbalance by attempting to lay the theoretical foundations for healthcare whistle blowing. As a case study, this article concludes by discussing the Personal and Professional Development course at the ANU Medical School where healthcare whistle blowing is a formal part of a virtue-based curriculum that emphasises the foundational importance of conscience. Illustrative elements of that program are discussed. PMID:15688511

Following (iso)flavonoid induction, nodulation genes of the symbiotic nitrogen-fixing bacterium Rhizobium sp. strain NGR234 elaborate a large family of lipooligosaccharidic Nod factors (NodNGR factors). When secreted into the rhizosphere of compatible legumes, these signal molecules initiate root hair deformation and nodule development. The nonreducing glucosamine residue of NodNGR factors are N acylated, N methylated, and mono- or biscarbamoylated, while position C-6 of the reducing extremity is fucosylated. This fucose residue is normally 2-O methylated and either sulfated or acetylated. Here we present an analysis of all acetylated NodNGR factors, which clearly shows that the acetate group may occupy position C-3 or C-4 of the fucose moiety. Disruption of the flavonoid-inducible nolL gene, which is preceded by a nod box, results in the synthesis of NodNGR factors that lack the 3-O- or 4-O-acetate groups. Interestingly, the nodulation capacity of the mutant NGR?nolL is not impaired, whereas introduction of the nod box::nolL construct into the related strain Rhizobium fredii USDA257 extends the host range of this bacterium to Calopogonium caeruleum,

Leucaena leucocephala, and Lotus halophilus. Nod factors produced by a USDA257(pnolL) transconjugant were also acetylated. The nod box::nolL construct was also introduced into ANU265 (NGR234 cured of its symbiotic plasmid), along with extra copies of the nodD1 gene. When permeabilized, these cells possessed acetyltransferase activity, although crude extracts did not.

The term massartu is well attested in letters in cuneiform to and from the Neo-Assyrian court, written in the main in the 7th century BC. In itself, massartu is a general Akkadian term, meaning "watch, guard", but in the early 1st millennium BC it takes on two interesting semantic specializations, both of which are tied to the practical and political needs of the Assyrian empire. In astrological-astronomical terms, massartu denotes the wake, vigil, or watch for astronomical observations on the part of the court specialists: such a wake was required by the Assyrian king on a nightly basis, for the subsequent consultation of the vast compilation of omens called En?ma Anu Enlil, and the drawing of conclusions relating to the state of the empire and of the royal dynasty. Many interesting texts show us the workings of the massartu in the capital city Nineveh or in other cities of Mesopotamia. But massartu had also a wider meaning, "vigilance", which denoted the requirement, on the part of all the subjects of the king of Assyria, to keep their eyes and ears open, so as to be able to report to the king if anything untoward was taking place, whether in the capital city or in the most remote military outpost of the empire. Thus, in a way, the astrologers were expected to perform no more and no less than the collective duty of "vigilance" on behalf of the king-but with their eyes trained on the heavens, and in await for signs ultimately sent from the gods.

Rhizobium sp. strain NGR234 produces a large family of lipochitooligosaccharide Nod factors carrying specific substituents. Among them are 3-O- (or 4-O-) and 6-O-carbamoyl groups, an N-methyl group, and a 2-O-methylfucose residue which may bear either 3-O-sulfate or 4-O-acetyl substitutions. Investigations on the genetic control of host specificity revealed a number of loci which directly affect Nod factor structure. Here we show that insertion and frameshift mutations in the nodZ gene abolish fucosylation of Nod factors. In vitro assays using GDP-L-fucose as the fucose donor show that fucosyltransferase activity is associated with the nodZ gene product (NodZ). NodZ is located in the soluble protein fraction of NGR234 cells. Together with extra copies of the nodD1 gene, the nodZ gene and its associated nod box were introduced into ANU265, which is NGR234 cured of the symbiotic plasmid. Crude extracts of this transconjugant possess fucosyltransferase activity. Fusion of a His6 tag to the NodZ protein expressed in Escherichia coli yielded a protein able to fucosylate both nonfucosylated NodNGR factors and oligomers of chitin. NodZ is inactive on monomeric N-acetyl-D-glucosamine and on desulfated Rhizobium meliloti Nod factors. Kinetic analyses showed that the NodZ protein is more active on oligomers of chitin than on nonfucosylated NodNGR factors. Pentameric chitin is the preferred substrate. These data suggest that fucosylation occurs before acylation of the Nod factors. PMID:9260950

We have selected a sample of local E+A galaxies from the Sloan Digital Sky Survey (SDSS) Data Release 7 for follow-up integral field spectroscopy with the Wide Field Spectrograph (WiFeS) on the Australian National University's (ANU) 2.3-m telescope. The sample was selected using the H? line in place of the [O II] ?3727 line as the indicator of ongoing star formation (or lack thereof). This allowed us to select a lower redshift sample of galaxies than available in the literature since the [O II] ?3727 falls off the blue end of the wavelength coverage in the SDSS for the very lowest redshift objects. This low-redshift selection means that the galaxies have a large angular to physical scale which allows us to resolve the central ˜1 kpc region of the galaxies; the region where stellar population gradients are expected. Such observations have been difficult to make using other higher redshift samples because even at redshifts z˜ 0.1 the angular to physical scale is similar to the resolution provided by ground-based seeing. Our integral field spectroscopy has enabled us to make the first robust detections of Balmer line gradients in the centres of E+A galaxies. Six out of our sample of seven, and all the galaxies with regular morphologies, are observed to have compact and centrally concentrated Balmer line absorption. This is evidence for compact young cores and stellar population gradients which are predicted from models of mergers and tidal interactions which funnel gas into the galaxy core. Given the generally isolated nature of our sample, this argues for the galaxies being seen in the late stage of a merger where the progenitors have already coalesced.

Australia's Earth Observation Program has downlinked and archived satellite data acquired under

the NASA Landsat mission for the Australian Government since the establishment of the Australian Landsat Station in 1979. Geoscience Australia maintains this archive and produces image products to aid the delivery of government policy objectives. Due to the labor intensive nature of processing of this data there have been few national-scale datasets created to date. To compile any Earth Observation product the historical approach has been to select the required subset of data and process "scene by scene" on an as-needed basis. As data volumes have increased over time, and the demand for the processed data has also grown, it has become increasingly difficult to rapidly produce these products and achieve satisfactory policy outcomes using these historic processing methods. The result is that we have been "drowning in a sea of uncalibrated data" and scientists, policy makers and the public have not been able to realize the full potential of the Australian Landsat Archive and its value is therefore significantly diminished. To overcome this critical issue, the Australian Space Research Program has funded the "Unlocking the Landsat Archive" (ULA) Project from April 2011 to June 2013 to improve the access and utilization of Australia's archive of Landsat data. The ULA Project is a public-private consortium led by Lockheed Martin Australia (LMA) and involving Geoscience Australia (GA), the Victorian Partnership for Advanced Computing (VPAC), the National Computational Infrastructure (NCI) at the Australian National University (ANU) and the Cooperative Research Centre for Spatial Information (CRC-SI). The outputs from the ULA project will become a fundamental component of Australia's eResearch infrastructure, with the Australian Landsat Archive hosted on the NCI and made openly available under a creative commons license. NCI provides access to researchers through significant HPC supercomputers, cloud infrastructure and data resources along with a large catalogue of software tools that make it possible to fully explore the potential of this data. Under the ULA Project, Geoscience Australia has developed a data-intensive processing workflow on the NCI. This system has allowed us to successfully process 11 years of the Australian Landsat Archive (from 2000 to 2010 inclusive) to standardized well-calibrated and sensor independent data products at a rate that allows for both bulk data processing of the archive and near-realtime processing of newly acquired satellite data. These products are available as Optical Surface Reflectance 25m (OSR25) and other derived products, such as Fractional Cover.

Strontium isotope ratios (87Sr/86Sr) are used as a geochemical tracer in a wide range of fields including archaeology, ecology, soil, food and forensic sciences. These applications are based on the principle that strontium isotopic ratios of materials reflect the geological sources of the strontium, which were available during its formation. Geologic regions with distinct strontium isotope ranges, which depend on their age and composition, can be differentiated. A major constraint for current studies is the lack of robust reference maps to evaluate the strontium isotope ratios measured in the samples. The aim of the IRHUM (isotopic reconstruction of human migration) database is to provide a reference map of bioavailable strontium isotope ratios for continental France. The current dataset contains 400 sample locations covering the major geologic units of the Paris and Aquitaine Basin, the Massif Central, and the Pyrenees. At each site soil and plant samples have been collected to cover the whole range of strontium ratios at a specific location. The database is available online at www.rses.anu.edu.au/research-areas/archaeogeochemistry and contains the bioavailable strontium isotope data as well as major and trace element concentrations for soil and plant samples. Strontium isotopes were analysed using a Neptune multi-collector inductively-coupled plasma mass spectrometer (MC-ICP-MS) and elemental concentrations with a Varian Vista Pro Axial ICP-AES (inductively-coupled plasma atomic emission spectrometer). In addition, IRHUM provides spatial context for each sample, including background geology, field observations and soil descriptions. This metadata allows users to evaluate the suitability of a specific data point for their study. The IRHUM database fills an important gap between high resolution studies from specific sites (e.g. archaeological sites), to the very broad geochemical mapping of Europe. Thus it provides an excellent tool to evaluate the regional context of a sample and complement more closed spaced studies. New results will be added to the database continuously with the aim of covering all major geologic units of France within the next year.

Unique identification of metamorphic zircon in river sands and clastic rocks using any of composition, morphology or internal structure is difficult but in two situations we can confidently identify zircon associated with metamorphism: discrete overgrowths on older cores, and wide zones of Pb loss (diffusion). The former may be associated with partial melting but marks the age and

culmination of metamorphism. Routine U-Th-Pb dating and analysis of low abundance trace elements of thin zircon overgrowths was unavailable until our laser rim-piercing technique was developed at ANU where we have an Excimer laser (193 nm wavelength; long focal length) attached to an Agilent 7500S Q-ICP-MS. We fasten HCl-washed but otherwise unprepared zircons onto adhesive tape and in a sample chamber carrying He+Ar we ablate 32 micron wide holes about 25 micron deep into the zircon. The ablated material is carried into the ICP. The impact of the technique is clear from an example of the Ganges River sand. If mounted in the traditional way with zircons embedded in epoxy and polished to expose cores, and using a shallow spot U-Pb dating method, knowledge of the significant adjacent Himalayan orogeny could only ensue if dozens to hundreds of analyses were undertaken and discordia were constructed from many grains. Discordia must be fit to those grains with the same inherited age, a challenge for a river sand sample. Using the rim-piercing technique gives us indication of the Himalayan event in about 5 to 10 percent of all analysed grains. In 60 seconds, a metamorphic rim, Pb loss region, and inherited core can be analysed. If the rim is wider than 5 microns a precise age can be measured. Moreover, even if the rim is not preserved, and the core not encountered, the Pb loss zone if wide enough (~15 mcirons) can be used to construct a discordia on that single grain with moderately precise lower and upper intercept ages. In several zircons from sediments drained from high-grade metamorphic terranes, we have encountered zones where 206Pb/238U changes continuously over 25 microns while the 207Pb/206Pb remains constant. This result strongly suggests Pb diffusion over broad areas in high-grade metamorphic zircons that do not appear metamict.

The identification and retrieval of a large population of ancient zircons (>4 Ga; Hadean) is of utmost priority if models of the early evolution of Earth are to be rigorously tested. We have developed a rapid and accurate U-Pb zircon age determination protocol utilizing a fully automated multi-collector ion microprobe, the ANU SHRIMP II, to screen and date these zircons. Unattended data acquisition relies on the calibration of a digitized sample map to the Sensitive High Resolution Ion MicroProbe (SHRIMP) sample-stage co-ordinate system. High precision positioning of individual grains can be produced through optical image processing of a specified mount location. The focal position of the mount can be optimized through a correlation between secondary-ion steering and the spot position on the target. For the Hadean zircon project, sample mounts are photographed and sample locations (normally grain centers) are determined off-line. The sample is loaded, reference points calibrated, and the target positions are then visited sequentially. In SHRIMP II multiple-collector mode, zircons are initially screened (ca. 5 s data acquisition) through their 204Pb corrected 207Pb/206Pb ratio; suitable candidates are then analyzed in a longer routine to obtain better measurement statistics, U/Pb, and concentration data. In SHRIMP I and SHRIMP RG, we have incorporated the automated analysis protocol to single-collector measurements. These routines have been used to analyze over 100,000 zircons from the Jack Hills quartzite. Of these, ca. 7%, have an age greater than 3.8 Ga, the oldest grain being 4372 +/- 6 Ma (2[sigma]), and this age is part of a group of analyses around 4350 Ma which we interpret as the age when continental crust first began to coalesce in this region. In multi-collector mode, the analytical time taken for a single mount with 400 zircons is approximately 6 h; whereas in single-collector mode, the analytical time is ca. 17 h. With this productivity, we can produce significant numbers of zircons for statistically limited studies including correlations between age and morphology, mineral-inclusion paragenesis, as well as isotopic studies including Hf and O isotopic compositions, Pu-Xe, and Sm-Nd isotopes.

Although torsional oscillation methods have been intensively used in seismic-frequency laboratory studies of shear mode viscoelasticity, much less attention has been paid to the relaxation of the bulk modulus. However, the dissipation of compressive energy and associated partial relaxation of the bulk modulus are potentially vitally important in those parts of the Earth containing a relatively compressible fluid phase (aqueous fluid or melt) or coexisting low- and high-pressure crystalline phases. This phenomenon is also experimentally accessible with forced-oscillation methods - involving either alternating compression and extension (as in Li and Weidner’s recent work) or flexure. Here we will describe progress in the development of flexural oscillation methods for use alongside the established torsional mode capability of our ANU laboratory. Our experimental assembly is a cylindrical beam comprising sections of varying cross-section fabricated from steel and polycrystalline alumina, along with the rock specimen, assembled in series within a close-fitting metal sleeve. In flexure, the beam functions as a propped cantilever, driven by an

electromagnetically applied time-varying bending moment, and the resulting flexure is measured at two locations within the beam by parallel-plate capacitance displacement transducers sensitive to the local angle of flexure. The polarity of the drivers and of the capacitance displacement transducers can be reconfigured to allow the same experimental assembly to be studied in either torsional or flexural oscillation. Preliminary experimental results for flexural oscillation of a fused silica specimen, under conditions of room temperature and high pressure within an argon gas-charged pressure vessel, are closely consistent with expectations from exploratory modelling with a crude finite-difference approximation, in which the role of shear stress is neglected. Further progress in development of the flexural mode capability will be reported, including finite-element modelling of the stiffening effect of shear stress; assessment and minimisation of the role played by the longitudinal frictional force at the propped end of the cantilever, by progressively reducing the normal force associated with the lateral constraint; understanding and modelling the perturbing influence of interaction between the oscillating specimen assembly (especially the capacitance displacement transducers) and the dense argon pressure medium; and development of a practical strategy for inversion of the relative amplitudes and phase of the measured angles of flexure to infer the complex Young's modulus of the viscoelastic (or poroelastic) specimen.

The EWENT project addresses the European Union (EU) policies and strategies related to climate change, with a particular focus on extreme weather impacts on the EU transportation system. This project is funded by the Seventh Framework Programme (Transports, call ID FPT7-TPT-2008-RTD-1). EWENT Work Package 1 (WP1) focuses particularly on identification and definition of extreme weather events within the European transport system. In the context of the EWENT project, the following definition for extreme weather events related to transport systems was used: "Extreme events are generally rare events. The events cause the exceeding of maximum values and/or pre-existing (measured) high (low) thresholds of certain weather parameters and generate impacts that are harmful to any part of the transport system (infrastructures, operations, vehicles, passengers or cargo)". Weather has major impacts on transportation. EWENT WP1 used three different approaches to assess the impacts and consequences extreme weather phenomena cause to the transport system. Firstly, an extensive traditional review of the professional literature has been carried out. Secondly, media mining has been done in order to obtain more empirical data and assess which transport modes in different parts of Europe seem to be most affected. Thirdly, a compilation of specific case studies on past extreme incidents has been prepared, helping to assess the specific consequences of certain phenomena. EWENT WP1 introduces a review of extreme weather phenomena and identifies their impacts and consequences on European transport system. All modes of transport are covered. Critical threshold values for most relevant weather phenomena that affect different transport modes have been established. The related impacts and consequences result in deterioration in the service level of transportation system. A dozen different impact mechanisms have been charted. The collaborators in the team for this part of the EWENT Project are: Pekka Leviäkangas, Anu Tuominen, Riitta Molarius, Heta Kojo, Jari Schabel, Sirra Toivonen, Jaana Keränen, Johanna Ludvigsen, Andrea Vajda, Heikki Tuomenvirta, Ilkka Juga, Pertti Nurmi, Jenni Rauhala, Frank Rehm, Thomas Gerz, Thorsten Muehlhausen, Juha Schweighofer, Silas Michaelides, Matheos Papadakis, Nikolai Dotzek (†), Pieter Groenemeijer.

In the last years various remote sensing techniques have been employed to estimate the current mass balance of the Greenland ice sheet (GIS). In this regards GRACE, laser and radar altimetry observations, employed to constrain the mass balance, consider the glacial isostatic adjustment (GIA) a source of noise. Several GIA models have been elaborated for the Greenland but they differ from each other for mantle viscosity profile and for time history of ice melting. In this work we use the well know ICE-5G (VM2) ice model by Peltier (2004) and two others alternative scenarios of ice melting, ANU05 by Lambeck et al. (1998) and the new regional ice model HUY2 by Simpson et al. (2009) in order to asses the amplitude of the uncertainty related to the GIA predictions. In particular we focus on rates of vertical displacement field, sea surface variations and sea-level change at regional scale. The GIA predictions are estimated using an improved version of SELEN code that solve the sea-level equation for a spherical self-gravitating, incompressible and viscoelastic Earth structure. GIA uncertainty shows a highly variable geographic distribution across the Greenland. Considering the spatial pattern of the GIA predictions related to the three ice models, the western sector of the Greenland Ice Sheets (GrIS) between Thule and Upernavik and around the area of

Paamiut, show good agreement while the northeast portion of the Greenland is characterized by a large discrepancy of the GIA predictions inferred by the ice models tested in this work. These differences are ultimately the consequence of the different sets of global relative sea level data and modern geodetic observations used by the authors to constrain the model parameters. Finally GPS Network project (GNET), recently installed around the periphery of the GrIS, are used as a tool to discuss the discrepancies among the GIA models. Comparing the geodetic analysis recently available, appears that among the GPS sites the northern portion of the GrIS is sensitive to the GIA component of vertical deformations in contrast with the remaining area that undergoes the elastic deformation related to the present-day ice melting of the GrIS.

The interaction between Rhizobium lipopolysaccharide (LPS) and white clover roots was examined. The Limulus lysate assay indicated that Rhizobium leguminosarum bv. trifolii (hereafter called R. trifolii) released LPS into the external root environment of slide cultures. Immunofluorescence and immunoelectron microscopy showed that purified LPS from R. trifolii 0403 bound rapidly to root hair tips and infiltrated across the root hair wall. Infection thread formation in root hairs was promoted by preinoculation treatment of roots with R. trifolii LPS at a low dose (up to 5 micrograms per plant) but inhibited at a higher dose. This biological activity of LPS was restricted to the region of the root present at the time of exposure to LPS, higher with LPS from cells in the early stationary phase than in the mid-exponential phase, incubation time dependent, incapable of reversing inhibition of infection by NO3- or NH4+, and conserved among serologically distinct LPSs from several wild-type R. trifolii strains (0403, 2S-2, and ANU843). In contrast, infections were not increased by preinoculation treatment of roots with LPSs from R. leguminosarum bv. viciae strain 300, R. meliloti 102F28, or members of the family Enterobacteriaceae. Most infection threads developed successfully in root hairs pretreated with R. trifolii LPS, whereas many infections aborted near their origins and accumulated brown deposits if pretreated with LPS from R. meliloti 102F28. LPS from R. leguminosarum 300 also caused most infection threads to abort. Other specific responses of root hairs to infection-stimulating LPS from R. trifolii included acceleration of cytoplasmic streaming and production of novel proteins. Combined gas chromatography-mass spectroscopy and proton nuclear magnetic resonance analyses indicated that biologically active LPS from R. trifolii 0403 in the early stationary phase had less fucose but more 2-O-methylfucose, quinovosamine, 3,6-dideoxy-3-(methylamino)galactose, and noncarbohydrate substituents (O-methyl, N-methyl, and acetyl groups) on glycosyl components than did inactive LPS in the mid-exponential phase. We conclude that LPS-root hair interactions trigger metabolic events that have a significant impact on successful development of infection threads in this Rhizobium-legume symbiosis. Images

This paper describes an overview of our "Bioinspired Engineering of Exploration Systems for Mars" ("BEES for Mars") project. The BEES approach distills selected biologically inspired strategies utilizing motion cues/optic flow, bioinspired pattern recognition, biological visual and neural control systems, bioinspired sensing and communication techniques, and birds of prey inspired search and track algorithmic systems. Unique capabilities so enabled, provide potential solutions to future autonomous robotic space and planetary mission applications. With the first series of tests performed in September 2003, August 2004 and September 2004, we have demonstrated the BEES technologies at the El Mirage Dry Lakebed site in the Mojave Desert using Delta Wing experimental prototypes. We call these test flyers the "BEES flyer", since we are developing them as dedicated test platform for the newly developed bioinspired sensors, processors and algorithmic strategies. The Delta Wing offers a robust airframe that can sustain high G launches and offers ease of compact stowability and packaging along with scaling to small size and low ReynOld's number performance for a potential Mars deployment. Our approach to developing light weight, low power autonomous flight systems using concepts distilled from biology promises to enable new applications, of dual use to NASA and DoD needs. Small in size (0.5 -5 Kg) BEES Flyers are demonstrating capabilities for autonomous flight and sensor operability in Mars analog conditions. The BEES project team spans JPL, NASA Ames, Australian National University (ANU), Brigham Young University(BYU), DC Berkeiey, Analogic Computers Inc. and other institutions. The highlights from our recent flight demonstrations exhibiting new Mission enabling capabilities are described. Further, this paper describes two classes of potential new missions for Mars exploration: (1) the long range exploration missions, and (2) observation missions, for real time imaging of critical ephemeral phenomena, that can be enabled by use of BEES flyers. For example, such flyers can serve as a

powerful black-box for critical descent and landing data and enablers for improved science missions complementing and supplementing the existing assets like landers and rovers by providing valuable exploration and quick extended low-altitude aerial coverage of the sites of interest by imaging them and distributing instruments to them. Imaging done by orbiters allows broad surface coverage at limited spatial resolution. Low altitude air-borne exploration of Mars offers a means for imaging large areas, perhaps up to several hundred kilometers, quickly and efficiently, providing a close-up birds-eye view of the planetary terrain and close-up approach to constrained difficult areas like canyons and craters. A novel approach to low-mass yet highly capable flyers is enabled by small aircraft equipped using sensors and processors and algorithms developed using BEES technology. This project is focused towards showing the direct impact of blending the best of artificial intelligence attributes and bioinspiration to create a leap beyond existing capability for our future Missions.

Strontium isotope ratios (87Sr/86Sr) can be used for the reconstruction of human and animal migrations across geologically different terrains. Sr isotope ratios in rocks are a product of age and composition and thus vary between geologic units. From the eroding environment Sr is transported into the soils, plants and rivers of a region. Humans and animals incorporate Sr from their diet into their bones and teeth, where it substitutes for calcium. Tooth enamel contains Sr isotope signatures acquired during childhood and is most resistant to weathering and overprinting, while the dentine is often diagenetically altered towards the local Sr signature. For the reconstruction of human and animal migrations the tooth enamel 87Sr/86Sr ratio is compared to the Sr isotope signature in the vicinity of the burial site and the surrounding area. This study focuses on the establishment of a comprehensive reference map of bioavailable 87Sr/86Sr ratios for France. In a next step we will compare human and animal teeth from key archaeological sites to this reference map to investigate mobility. So far, we have analysed plant and soil samples from ~200 locations across France including the Aquitaine basin, the western and northern parts of the Paris basin, as well as three transects through the Pyrenees Mountains. The isotope data, geologic background information (BRGM 1:1M), field images, and detailed method descriptions are available through our online database iRhum (http://rses.anu.edu.au/research/ee). This database can also be used in forensic studies and food sciences. As an archaeological case study teeth from 16 adult and 8 juvenile individuals were investigated from an early Bell Beaker (2500-2000 BC) site at Le Tumulus des Sables, south-west France (Gironde). The teeth were analysed for Sr isotope ratios using laser ablation ICP-MS. Four teeth were also analysed using solution ICP-MS, which showed a significant offset to the laser ablation results. This requires further detailed investigation. Nevertheless, the teeth showed clear differences between enamel and diagenetically overprinted dentine, which suggests mobility. Unfortunately, the sandy sediment units in the close vicinity of Le Tumulus des Sables show large variations in their 87Sr/86Sr ratios so it is currently not possible to distinguish between migration from outside of the Médoc region from mobility within the region based solely on Sr isotope ratios. The case study illustrates the importance of detailed reference maps, which are required for any isotope studies used for the reconstruction of migrations. Other isotope data, such as O and Pb, will complement the investigation at Tumulus de Sables and may enable us to tie down the range of mobility of the humans that were buried at Le Tumulus des Sables.

Context. Knowledge of the total population of symbiotic stars in the Galaxy is important for understanding basic aspects of stellar evolution in interacting binaries and the relevance of this class of objects in the formation of supernovae of type Ia. Aims: In a previous paper, we presented the selection criteria needed to search for symbiotic stars in IPHAS, the INT H? survey of the Northern Galactic plane. IPHAS gives us the opportunity to make a systematic, complete search for symbiotic stars in a magnitude-limited volume. Methods: Follow-up spectroscopy at different telescopes worldwide of a sample of sixty two symbiotic star candidates is presented. Results: Seven out of nineteen S-type candidates observed spectroscopically are confirmed to be genuine symbiotic stars. The spectral type of their red giant components, as well as reddening and distance, were computed by modelling the spectra. Only one new D-type symbiotic system, out of forty-three candidates observed, was found. This was as expected (see discussion in our paper on the selection criteria). The object shows evidence for a high density outflow expanding at a speed ?65 km s-1. Most of the other candidates are lightly reddened classical T Tauri stars and more highly reddened young stellar objects that may be either more massive young stars of HAeBe type or classical Be stars. In addition, a few notable objects have been found, such as three new

Wolf-Rayet stars and two relatively high-luminosity evolved massive stars. We also found a helium-rich source, possibly a dense ejecta hiding a WR star, which is surrounded by a large ionized nebula. Conclusions: These spectroscopic data allow us to refine the selection criteria for symbiotic stars in the IPHAS survey and, more generally, to better understand the behaviour of different H? emitters in the IPHAS and 2MASS colour-colour diagrams. Based on observations obtained at; the 2.6 m Nordic Optical Telescope operated by NOTSA; the 2.5 m INT and 4.2 m WHT telescopes of the Isaac Newton Group of Telescopes in the Spanish Observatorio del Roque de Los Muchachos of the Instituto de Astrofísica de Canarias; the 2.3 m ANU telescope at Siding Spring Observatory, Australia; the Asiago 1.82 m telescope of the INAF Astronomical Observatory of Padova, Italy; and the 2.1 m telescope at San Pedro Martir, Mexico. Some of the INT spectra incorporated into this paper were obtained as part of a CCI International Time Programme awarded to the IPHAS collaboration. This publication makes use of data products from the Two Micron All Sky Survey, which is a joint project of the University of Massachusetts and the Infrared Processing and Analysis Center/California Institute of Technology, funded by the National Aeronautics and Space Administration and the National Science Foundation. This research has also made use of the SIMBAD database, operated at CDS, Strasbourg, France.

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The Norwegian Ocean Observatory Network (NOON) is led by the University of Tromsø and collaborates with the Universities of Oslo and Bergen, UniResearch, Institute of Marine Research, Christian Michelsen Research and SINTEF. It is supported by the Research Council of Norway and oil and gas (O&G) industries like Statoil to develop science, technology and new educational programs. Main topics relate to ocean climate and environment as well as marine resources offshore Norway from the northern North Atlantic to the Arctic Ocean. NOON's vision is to bring Norway to the international forefront in using cable based ocean observatory technology for marine science and management, by establishing an infrastructure that enables real-time and long term monitoring of processes and interactions between hydrosphere, geosphere and biosphere. This activity is in concert with the EU funded European Strategy Forum on Research Infrastructures (ESFRI) roadmap and European Multidisciplinary Seafloor Observation (EMSO) project to attract international leading research developments. NOON envisions developing towards a European Research Infrastructure Consortium (ERIC). Beside, the research community in Norway already possesses a considerable marine infrastructure that can expand towards an international focus for real-time multidisciplinary observations in times of rapid climate change. PIC The presently established cable-based fjord observatory, followed by the establishment of a cable-based ocean observatory network towards the Arctic from an O&G installation, will provide invaluable knowledge and experience necessary to make a successful larger cable-based observatory network at the Norwegian and Arctic margin (figure 1). Access to large quantities of real-time observation from the deep sea, including high definition video, could be used to provide the public and future recruits to science a fascinating insight into an almost unexplored part of the Earth beyond the Arctic Circle. More information about NOON is available at NOON's web site www.oceanobservatory.com. PIC

Recommendations of the Integrated Ocean Observing System (IOOS) and Ocean Research Interactive Observatory Networks (ORION) education communities for coordination of ocean observing education efforts include collaborations with existing ocean and coastal educational networks. The ocean observing systems provide a focus around which the efforts of various federally-funded ocean education networks can be coordinated. This paper explores the connections that exist

Ocean observatories are collections of networks of sensors that are deployed to sample the ocean physics, chemistry, and biology. The goal of these networks is to overcome chronic undersampling of the oceans by providing sustained measurements in space and time. The data collected by these networks are used to address a range of basic and applied research questions, hindered by a lack of data. The ocean observatories represent collections of platforms capable of collecting data over a

range of scales. The platforms include ships, satellites, radars, and a range of Lagrangian systems. Data from the individual platforms are aggregated by sophisticated cyberinfrastructure software systems, which when combined with global communications allow for two-way communication between the shoreside personnel and the networks that can be deployed anywhere in the world. This two-way communication allows the networks to be adaptively configured to improve sampling of specific processes. The maturation of these systems comes at a fortuitous time as the oceans are increasingly showing evidence of changes in the physics, chemistry, and biology over the last few decades. Understanding those changes will require the data collected by the ocean observatories.

This paper discusses the importance of taking a systems engineering approach when designing undersea networks, ocean observatories and offshore communications backbones. A design that utilizes modular components and systems, and places diligence in modeling and testing communications, power and data bandwidth requirements is essential for sustained operation and economic feasibility. An example is the modular seafloor communications network described -

The Oceanic Microbial Observatory is a project run jointly by Dr. Craig Carlson of the University of California-Santa Barbara, and Dr. Stephen Giovannoni of Oregon State University. Centered on the Bermuda Atlantic Time-series Study site, the "goal of this microbial observatory project is to understand the cell biology and biogeochemical activities of the major bacterioplankton groups-SAR11, SAR86, SAR202 and SAR116, marine actinobacteria, SAR324, and SAR406, by applying new high throughput technologies for cell culturing, and studying the metabolism of these organisms in nature and their interactions with organic matter in the oceans." The Microbial Observatory website contains links to downloadable publications, public data sets, and poster presentations. The site also offers links to a number of other microbial observatories; and connects to the Bermuda Biological Station for Research as well.

An ocean observatory that consists of an array of moored sensor platforms, telemetry, and data collection and dissemination software was designed for monitoring the biogeochemistry and physical dynamics of coastal and estuarine ecosystems. The Land-Ocean Biogeochemical Observatory (LOBO) consists of robust moorings that can withstand tidal currents and weather. The moorings are highly configurable, can be deployed in waters as

A long-term oceanographic moored array has been operated since 1997 to measure the ocean water column properties and oceanic advective fluxes through Fram Strait. While the mooring line along 78°50'N is devoted to monitoring variability of the physical environment, the AWI Hausgarten observatory, located north of it, focuses on ecosystem properties and benthic biology. Under the EU DAMOCLES and ACOBAR projects, the oceanographic observatory has been extended towards the innovative integrated observing system, combining the deep ocean moorings, multipurpose acoustic system and a network of gliders. The main aim of this system is long-term environmental monitoring in Fram Strait, combining satellite data, acoustic tomography, oceanographic measurements at moorings and glider sections with high-resolution ice-ocean circulation models through data assimilation. In future perspective, a cable connection between the Hausgarten observatory and a land base on Svalbard is planned as the implementation of the ESONET Arctic node. To take advantage of the planned cabled node, different technologies for the underwater data transmission were reviewed and partially tested under the ESONET DM AOEM. The main focus was to design and evaluate available technical solutions for collecting data from different components of the Fram Strait ocean observing system, and an integration of available data streams for the optimal delivery to the future cabled node. The main components of the Fram Strait integrated observing system will be presented and the current status of available technologies for underwater data transfer will be reviewed. On the long term, an initiative of Helmholtz observatories foresees the interdisciplinary Earth-Observing-System FRAM which combines observatories such as the long term deep-sea ecological observatory HAUSGARTEN, the oceanographic Fram Strait integrated observing system and the Svalbard coastal stations maintained by the Norwegian ARCTOS network. A vision of this modular underwater observatory network in Fram Strait will be presented.

NEPTUNE Canada completed the installation and is now operating an 800 km, 5-node, regional cabled ocean network that spans the northern Juan de Fuca tectonic plate and continental

shelf/slope in the northeastern Pacific. The NEPTUNE Canada network is part of the Ocean Networks Canada Observatory. Public data flow started in 2009 and interactive instruments continue to be added to this technically advanced system which provides continuous power and high bandwidth for enabling the collection of real-time physical, chemical, geological, and biological oceanographic data at resolutions relevant for furthering our understanding of the dynamics of the earth-ocean system. Here we present an overview and some initial results of the early installed real-time experiments, developed through workshops and international competitions, at five offshore locations. Inshore at Folger Passage, Barkley Sound, observations are focused on understanding biological productivity and the effects that marine processes have on fish and marine mammals. Experiments around Barkley Canyon allow quantification of changes in benthic activity with nutrient and sediment transport. There and north along the mid-continental slope near ODP Site 889, instruments are monitoring changes in the distribution, structure, related biotas and venting of gas hydrates. A Circulation Obviation Retrofit Kit (CORK) at our mid-plate site (ODP 1026) monitors real-time changes in crustal temperature and pressure, particularly related to events such as earthquakes, tsunamis, hydrothermal convection; these data are also important for understanding regional plate strain. At Endeavour on the Juan de Fuca Ridge, complex interactions among volcanic, tectonic, hydrothermal and biological processes are being observed. Across the NEPTUNE Canada network, high resolution acoustic and seismic monitoring elucidates tectonic processes such as earthquakes, and a tsunami detection system allows for the determination of open ocean tsunami amplitude, propagation direction, and speed. With the installation successfully and almost entirely completed and the first phase of experiments now operational for two years, NEPTUNE Canada plans to expand the network with additional sensors and experiments developed through international collaborations; and will work especially in collaboration with the U.S. Regional Scale Nodes and Cyberinfrastructure groups in OOI.

The Ocean Observatories Initiative (OOI) is an environmental observatory covering a diversity of oceanic environments, ranging from the coastal to the deep ocean. The physical infrastructure comprises a combination of seafloor cables, buoys and autonomous vehicles. It is currently in the final design phase, with construction planned to begin in mid-2010 and deployment phased over five years. The Consortium for Ocean Leadership manages this Major Research Equipment and Facilities Construction program with subcontracts to Scripps Institution of Oceanography, University of Washington and Woods Hole Oceanographic Institution. High-level requirements for the CI include the delivery of near-real-time data with minimal latencies, open data, data analysis and data assimilation into models, and subsequent interactive modification of the network (including autonomous vehicles) by the cyberinfrastructure. Network connections include a heterogeneous combination of fiber optics, acoustic modems, and Iridium satellite telemetry. The cyberinfrastructure design loosely couples services that exist throughout the network and share common software and middleware as necessary. In this sense, the system appears to be identical at all scales, so it is self-similar or fractal by design. The system provides near-real-time access to data and developed knowledge by the OOI's Education and Public Engagement program, to the physical infrastructure by the marine operators and to the larger community including scientists, the public, schools and decision makers. Social networking is employed to facilitate the virtual organization that builds, operates and maintains the OOI as well as providing a variety of interfaces to the data and knowledge generated by the program. We are working closely with NOAA to exchange near-real-time data through interfaces to their Data Interchange Facility (DIF) program within the Integrated Ocean Observing System (IOOS). Efficiencies have been emphasized through the use of university and commercial computing clouds.

Investments in next-generation facilities to achieve a permanent, interactive telepresence throughout remote or hostile environments can empower a broad spectrum of autonomous sensornet facilities through the NSF Major Research Equipment and Facililties Construction Ocean Observatories Initiative (OOI). These systems must involve powerful suites of generic cyberinfrastructure tools designed to optimize access and benefits to a large academic and public user base. Many future research and educational efforts focused throughout the ocean basins, especially within heavily populated coastal regions, will be empowered by these new systems. Our project LOOKING (Laboratory for the Ocean Observatory Knowledge Integration Grid) is developing prototype CI for the OOI to achieve these goals. In the case of ocean observatory networks, it is

essential to establish powerful network infrastructures linking the wet or subsea portion, with a host of shore station facilities. These components in turn must seamlessly communicate with an ensemble of data repositories, and relevant computer and visualization resources designed to serve a widely diverse ocean science community with real time, broadband access to all observatory system data, products, and metadata. This infrastructure must be secure, reliable, and resilient. It must meet the potentially ambitious latency, bandwidth, and performance requirements demanded by a set of evolving autonomous sensor platforms over a period of decades. This Grid environment must seamlessly interconnect all relevant national and international research and education nets accessible through high speed, next generation communication networks. The primary components of LOOKING are remote services that fulfill the CI needs of the ocean observatory community. These services arise from overarching science and education requirements: 1) Instrument Services operate at the sensor end of an ocean observatory, and are dominantly but not exclusively wet. 2) Infrastructure Services operate within the ocean observatory itself, providing data, time distribution, and power functions to instruments; 3) Data Services interface the ocean observatory to users, whether human beings or modeling programs. In an appropriately designed and functioning system, none can stand alone, nor can they be developed in isolation. These services and associated middleware layers must be designed from the outset to interact seamlessly and transparently.

The Division of Ocean Sciences of the American National Science Foundation (NSF) plans to initiate construction of an integrated observatory network that will provide the oceanographic research and education communities with a new mode of access to the ocean. This observatory system will have three elements: 1) a regional cabled network consisting of interconnected sites on the seafloor spanning several geological and oceanographic features and processes, 2) several relocatable deep-sea buoys that could also be deployed in harsh environments such as the Southern Ocean, and 3) new construction or enhancements to existing facilities leading to an expanded network of coastal observatories. The primary infrastructure for all components of the Ocean Observatories Initiative (OOI) consists of an array of seafloor junction boxes connected to cables running along the seafloor to individual instruments or instrument clusters. These junction boxes include undersea connectors that provide not only the power and two-way communication needed to support seafloor instrumentation, but also the capability to exchange instrumentation in situ when necessary for conducting new experiments or for repairing existing instruments. Depending upon proximity to the coast and other engineering requirements, the junction box will be either terminated by a long dedicated fiber-optic cable to shore, or by a shorter cable to a surface buoy that is capable of two-way communications with a shore station. The scientific problems driving the need for an ocean observing system are broad in scope and encompass nearly every area of ocean science including: ecological characterizations; role of the ocean in climate; fluids, chemistry, and life in the oceanic crust; dynamics of the oceanic lithosphere and imaging of the earth’s interior; seafloor spreading and subduction; organic carbon fluxes; turbulent mixing and biophysical interaction; and coastal ocean processes. Thirty years ago, NSF leadership helped establish the system of support for the U.S academic research fleet accessible to all investigators that enabled the spatial exploration of our oceans. In the same manner, this initiative will start building a network of ocean observatories that will facilitate the collection of long time-series data streams needed to understand the dynamics of biological, chemical, geological and physical processes and facilitate the 'temporal' exploration of the oceans.

The National Science Foundation's (NSF) Ocean Observatories Initiative (OOI) will implement the construction and operation of an interactive, integrated ocean observing network. This research-driven, multi-scale network will provide the broad ocean science community with access to advanced technology to enable studies of fundamental ocean processes. The OOI will afford observations at coastal, regional, and global scales on timeframes of milliseconds to decades in support of investigations into climate variability, ocean ecosystems, biogeochemical processes, coastal ocean dynamics, circulation and mixing dynamics, fluid-rock interactions, and the sub-seafloor biosphere. The elements of the OOI include arrays of fixed and re-locatable moorings, autonomous underwater vehicles, and cabled seafloor nodes. All assets combined, the OOI network will provide data from over 45 distinct types of sensors, comprising over 800 total sensors distributed in the Pacific and Atlantic oceans. These core sensors for the OOI were determined through a formal process of science requirements development. This core sensor array will be integrated

through a system-wide cyberinfrastructure allowing for remote control of instruments, adaptive sampling, and near-real time access to data. Implementation of the network will stimulate new avenues of research and the development of new infrastructure, instrumentation, and sensor technologies. The OOI is funded by the NSF and managed by the Consortium for Ocean Leadership which focuses on the science, technology, education, and outreach for an emerging network of ocean observing systems.

These observatories will track changes in biology, chemistry, and physics in the ... is the impact of increased nutrient pollution on the coastal oceans. ... fresh and salt water. Just like plants on ... light penetration through the water to submerged aquatic vegetation .... games, that can be used to control OASIS or a track can be ...

The planetary sciences are in a transformational period. New approaches made possible by a confluence of technological advances are enabling the examination of entire systems in space and time. These emerging capabilities are fostering a revolution in the exploration, discovery, and understanding of complex, interacting natural processes. The response within the ocean sciences has been the development of initiatives in several countries to create ocean observatories at global, regional, and coastal scales. Regional-scale ocean observatories have a specific and vital role in integrating across the boundaries of coastal and global observatories. To accomplish this integration, regional observatories must 1) span coastal to global systems thereby linking all processes; 2) document variability over many scales of space and time; 3) expand surface (satellite) and point (mooring) coverage to an entire volume; 4) archive data so as to enable modeling and data assimilation; 5) maximize the scientific return from the investment in a regional facility; and, 6) maintain optimal flexibility and expandability to operate for many decades. One example of a regional observatory design is the NEPTUNE facility that will be located in the northeast Pacific Ocean. NEPTUNE is intended to deliver a long-term, real-time, full-ocean presence by providing high-bandwidth communications, abundant power, robotic systems, extensive in situ networks, and real-time control for interactivity. Its 3,000-km heavily instrumented network of fiber-optic/power cables will encircle and cross the Juan de Fuca tectonic plate, enabling observations of and experiments with the volume of water above the plate, the seafloor, and the sub-seafloor. By combining earth, ocean, and atmospheric science capabilities and spanning the interface between the highly variable near shore environment and more ponderous deep sea processes NEPTUNE will offer unparalleled opportunities to a broad range of scientific, educational, and public outreach communities.

Geophysical networks are defined not only by their technical specifications, but also by the characteristics and needs of the communities that use them. Growing populations supported by more elaborate urban infrastructure with its fine-grained socio-economic interdependencies and relying on global and regional connections for sustainability make new demands for natural hazard risk management. Taking advantage of advances in the underlying science to provide society with accurate risk assessments often requires higher fidelity measurements, entirely new types of observations, and an evolutionary sense of data products and information management. Engineering a high-tech system to address stakeholder needs is difficult, and designing for unpredictable developments requires an emphasis on adaptation. Thus, it is essential to promote formation of organizations or communities that can support evolution of a technological system, imagine new uses, and develop the societal relationships that sustain operations and provide capital for improvement. The owners must have a deep understanding of why the system works in particular ways and how to manage data products for the benefits of stakeholders. To be effective, community promotion must be sustained over a longer period of time than required to build a network and should be aimed at integrating the community into worldwide partnerships. Practices that can promote community formation if they are sustained include repeated training and scientific exchange workshops, extended visits by experts and staff at all levels to and from countries where networks are installed, mechanisms that make timely upgrades realistically possible, and routine exchange and wide dissemination of data in all directions. The combination of international research and educational collaborations, supported by open data exchange, with regionalized and specific assessments of local stakeholder needs and concerns, provides a sustainable model for geophysical observation.

The U.S. National Science Foundation's Ocean Observatories Initiative (OOI) is constructing an integrated network to provide the oceanographic research and education communities with continuous, interactive access to the oceans. The program will build permanent science-focused infrastructure that will enable geoscientists to simultaneously study multiple phenomena in the oceans over time scales from milliseconds to decades, and over spatial scales from sub-meter to global. An integrative computer architecture or cyberinfrastructure will allow researchers to communicate with and configure globally situated experiments in near-real time, forming virtual observatories by designing customized data streams readily incorporated into adaptive models. The project, approved for planning activities by the National Science Board in 2000, will undergo its Preliminary Design Review for readiness in December 2007 and is expected to receive the first installment of a total anticipated capital investment of $330M in 2008. Specific assets include autonomous platforms at high-latitude sites in the northern and southern hemispheres, a submarine ackbone cable spanning the seafloor of the Juan de Fuca tectonic plate, and moorings and mobile assets studying the coastal ocean continental shelf and slope in the Middle Atlantic Bight and offshore the Pacific Northwest. With its global dimension and unifying cyberinfrastructure, the OOI is expected to catalyze new understanding of the oceans in a way that ship-based measurements and experiments, with their shorter observation window and inherent limitations on power and bandwidth, are unable to accomplish.

This paper presents science potential of a deep ocean antineutrino observatory under development at Hawaii. The observatory design allows for relocation from one site to another. Positioning the observatory some 60 km distant from a nuclear reactor complex enables precision measurement of neutrino mixing parameters, leading to a determination of neutrino mass hierarchy. At a mid-Pacific location the observatory measures the flux and ratio of uranium and thorium decay neutrinos from earth's mantle and performs a sensitive search for a hypothetical natural fission reactor in earth's core. A subsequent deployment at another mid-ocean location would test lateral heterogeneity of uranium and thorium in earth's mantle.

We present a virtual ocean observatory (VOO) that supports climate and ocean science as addressed in the NRC decadal survey. The VOO is composed of an autonomous software system, in-situ and space-based sensing assets, data sets, and interfaces to ocean and atmosphere models. The purpose of this observatory and its output data products are: 1) to support SWOT mission planning,

We summarize the science opportunity, design elements, current and projected partner observatories, and anticipated science returns of the Astrophysical Multimessenger Observatory Network (AMON). AMON will link multiple current and future high-energy, multimessenger, and follow-up observatories together into a single network, enabling near real-time coincidence searches for multimessenger astrophysical transients and their electromagnetic counterparts. Candidate and high-confidence multimessenger transient events will be identified, characterized, and distributed as AMON alerts within the network and to interested external observers, leading to follow-up observations across the electromagnetic spectrum. In this way, AMON aims to evoke the discovery of multimessenger transients from within observatory subthreshold data streams and facilitate the exploitation of these transients for purposes of astronomy and fundamental physics. As a central hub of global multimessenger science, AMON will also enable cross-collaboration analyses of archival datasets in search of rare or exotic astrophysical phenomena.

Virtual Global Magnetic ObservatoryVirtual Global Magnetic Observatory Network in Africa:Network in Africa: Capacity Building for ElectronicCapacity Building for Electronic Geophysical YearGeophysical Year.NET: A Component of the Electronic Geophysical Year Initiative #12;Geomagnetic Studies in AfricaGeomagnetic Studies

This website provides a place of exchange for ocean information, education and public discourse about the future of the ocean and its implication for human survival. Topic areas consist of the Cultural Ocean; content with a social perspective (history, art, literature, etc.); and the Physical Ocean; content with a scientific perspective (the United Nations Atlas of the Oceans, NOAA's Ocean

Explorer, UNESCO's intergovernmental Oceanographic Commission, etc.). There is also the World Ocean Directory, a searchable directory of ocean-related organizations (log-in and password are required) and 'Breaking Waves', a digest of ocean news articles. 'The Ocean Classroom' consists of online educational resources (lesson plans, activities, references) organized by theme: fresh water and sanitation, marine biology, ocean energy, coastal issues, the law of the sea, and many others.

The Ocean Observatories Initiative (OOI) is an environmental observatory covering a diversity of oceanic environments, ranging from the coastal to the deep ocean. It recently passed final design review. Construction is planned to begin in mid-2010 with deployment phased over five years. The key integrating element of the OOI is a comprehensive cyberinfrastructure whose design is based on loosely coupled distributed services, and whose elements are expected to reside throughout the OOI observatories, from seafloor instruments to deep sea moorings to shore facilities to computing and archiving infrastructure. There are six main components to the design comprising the core capability container, consisting of four elements providing services for users and distributed resources and two infrastructural elements providing core services. The sensing and acquisition component provides capabilities to acquire data from and manage distributed seafloor instrument resources, including their interactions with each other and with the infrastructure power, communication and time distribution networks. It includes services to publish instrument data and a repository for instrument behaviors and processes. The data management component provides capabilities to distribute and archive OOI data, including cataloging, versioning, metadata management, and attribution and association services. A core component will be an OOI-standard data/metadata model. The analysis and synthesis element provides a wide range of services to users, including control and archival of models, event detection services, quality control services, and collaboration capabilities to enable the creation of virtual laboratories and classrooms. The planning and prosecution element gives the ability to plan, simulate and execute observation missions using taskable instruments, and is the cyberinfrastructure component that turns the OOI into an interactive observatory. The remaining elements are the common operating infrastructure (COI) and the common execution infrastructure (CEI). The COI provides core services to manage distributed, shared resources in a policy-based framework, including a distributed service infrastructure for the secure, scalable and fault tolerant operation and federation of the operational domains of authority comprising the OOI. It includes capabilities to manage identity and policy, manage the resource life cycle, and catalog/repository services for observatory resources. It also manages interactions with resources on an end-to-end basis. The CEI provides an elastic computing framework to initiate, manage and store processes that may range from initial operations on data at a shore station to the execution of a complex numerical model on the national computing infrastructure.

The NSF Ocean Observatories Initiative (OOI) began a five-year construction period in October 2009. The Consortium on Ocean Leadership (COL) manages the overall program with Implementing Organizations for Coastal/Global Scale Nodes (CGSN) at Woods Hole, Oregon State and Scripps; the Regional Cabled Network (RCN) at U of Washington and Cyberinfrastructure (CI) at UCSD and more than ten subcontractors. The NSF has made a commitment to support the observatory operations and maintenance for a 30-year period; a minimal period of time to measure physical, chemical and biological data over a length of time possibly sufficient to measure secular changes associated with climate and geodesy. The CI component is a substantial departure from previous approaches to data distribution and management. These innovations include the availability of data in near-real-time with latencies of seconds, open access to all data, analysis of the data stream for detection and modeling, use of the derived knowledge to modify the network with minimal or no human interaction and maintenance of data provenance through time as new versions of the data are created through QA/QC processes. The network architecture is designed to be scalable so that addition of new sensors is straightforward and inexpensive with costs increasing linearly at worst. Rather than building new computer infrastructure (disk farms and computer clusters), we are presently exploiting Amazon's Extensible Computing Cloud (EC2) and Simple Storage System (S3) to reduce long-term commitments to hardware and maintenance in order to minimize operations and maintenance costs. The OOI CI is actively partnering with other organizations (e.g. NOAA's IOOS) to integrate existing data systems using many of the same technologies to improve broad access to existing and planned observing systems, including those that provide critical climate data. Because

seasonal and annual variability of most measureable parameters is so large, the measurement of small secular variations requires sensors with little or no drift over many annual cycles as well as absolute timing between globally distributed sensors that exceeds current practice by orders of magnitude.

Award-winning tourist attraction in St. Thomas, Virgin Islands, focuses completely on Caribbean reef and island life. Aquarium exhibits include: Underwater Observatory built into the fringing reef; predators tank with sharks, barracuda, moray eels and tarpon; Caribbean Reef Encounter offering interpretive programs; tanks housing smaller reef fishes and invertebrates; as well as touch pool, shark shallows, stingray and turtle pools. Nature walks highlight native plant life and iguanas. Water sports available. Admission fees apply.

The Global Lake Ecological Observatory Network (GLEON; www.gleon.org) is a grassroots network of limnologists, information technology experts, and engineers who have a common goal of building a scalable, persistent, international network of lake ecology observatories. Data from these observatories will help us to better understand key issues such as the effects of climate and landuse change on lake function, the role of episodic events such as typhoons or mixing events in resetting lake dynamics, and carbon cycling within lakes. The observatories consist of instrumented platforms capable of sensing key limnological variables and moving the data in near-real time, often through wireless networks, to web-accessible databases. A common web portal is being developed to allow easy access to data and information by researchers and the public. A series of web services supported by this portal are being developed to allow automation of processes associated with instrument management and data quality assurance/quality control, and to allow computation of metrics based on the high frequency data. Such metrics include, for example, estimates of rates of important processes such as gross primary production and respiration, or physical stability of the water column. Lakes from the following locations are currently in the network: Australia, Canada, China, Finland, Israel, New Zealand, South Korea, Taiwan, United Kingdom and the US. A global network of dozens or even hundreds of automated lake observatories, each collecting and transferring data in near real time, is within our grasp in the next decade, and will offer new opportunities in scientific collaboration and understanding of lake processes.

The National Science Foundation has funded the Ocean Observatories Initiative (OOI), which over the next five years will deploy infrastructure to expand scientist's ability to remotely study the ocean. The deployed infrastructure will be linked by a robust cyberinfrastructure (CI) that will integrate marine observatories into a coherent system-of-systems. OOI is committed to engaging the ocean sciences community during the construction pahse. For the CI, this is being enabled by using a "spiral design strategy" allowing for input throughout the construction phase. In Fall 2009, the OOI CI development team used an existing ocean observing network in the Mid-Atlantic Bight (MAB) to test OOI CI software. The objective of this CI test was to aggregate data from ships, autonomous underwater vehicles (AUVs), shore-based radars, and satellites and make it available to five different data-assimilating ocean forecast models. Scientists used these multi-model forecasts to automate future glider missions in order to demonstrate the feasibility of two-way interactivity between the sensor web and predictive models. The CI software coordinated and prioritized the shared resources that allowed for the semi-automated reconfiguration of assett-tasking, and thus enabled an autonomous execution of observation plans for the fixed and mobile observation platforms. Efforts were coordinated through a web portal that provided an access point for the observational data and model forecasts. Researchers could use the CI software in tandem with the web data portal to assess the performance of individual numerical model results, or multi-model ensembles, through real-time comparisons with satellite, shore-based radar, and in situ robotic measurements. The resulting sensor net will enable a new means to explore and study the world's oceans by providing scientists a responsive network in the world's oceans that can be accessed via any wireless network.

Oceanic crust comprises the largest hydrogeologic reservoir on Earth, containing fluids in thermodynamic disequilibrium with the basaltic crust. Little is known about microbial ecosystems that inhabit this vast realm and exploit chemically favorable conditions for metabolic activities. Crustal samples recovered from ocean drilling operations are often compromised for microbiological

assays, hampering efforts to resolve the extent and functioning of a subsurface biosphere. We report results from the first in situ experimental observatory systems that have been used to study subseafloor life. Experiments deployed for 4 years in young (3.5?Ma) basaltic crust on the eastern flank of the Juan de Fuca Ridge record a dynamic, post-drilling response of crustal microbial ecosystems to changing physical and chemical conditions. Twisted stalks exhibiting a biogenic iron oxyhydroxide signature coated the surface of mineral substrates in the observatories; these are biosignatures indicating colonization by iron oxidizing bacteria during an initial phase of cool, oxic, iron-rich conditions following observatory installation. Following thermal and chemical recovery to warmer, reducing conditions, the in situ microbial structure in the observatory shifted, becoming representative of natural conditions in regional crustal fluids. Firmicutes, metabolic potential of which is unknown but may involve N or S cycling, dominated the post-rebound bacterial community. The archaeal community exhibited an extremely low diversity. Our experiment documented in situ conditions within a natural hydrological system that can pervade over millennia, exemplifying the power of observatory experiments for exploring the subsurface basaltic biosphere, the largest but most poorly understood biotope on Earth.

The mission of the U.S. Geological Survey's Geomagnetism Program is to monitor the Earth's magnetic field. Using ground-based observatories, the Program provides continuous records of magnetic field variations covering long timescales, ranging from seconds to over a century. The Program disseminates magnetic data to various governmental, academic, and private institutions; it conducts research into the nature of geomagnetic variations for purposes of scientific understanding and hazard mitigation. The Program is an integral part of the U.S. Government's National Space Weather Program. In this presentation, we summarize recent operational accomplishments of the USGS Geomagnetism Program, including the addition of a real-time one-second data product, development of quasi-definitive data from selected observatories, and improvements to the magnetic observatory network in Alaska.

NEPTUNE Canada is installing a regional cabled ocean observatory across the northern Juan de Fuca Plate in the northeastern Pacific. When installation of the first suite of instruments and connectivity equipment is completed in 2009, this system will provide the continuous power and bandwidth to collect integrated data on physical, chemical, geological, and biological gradients at temporal resolutions relevant to the dynamics of the earth-ocean system. The building of this facility integrates hardware, software, and people networks. Hardware progress to date includes: installation of the 800km powered fiber-optic backbone in the Fall of 2007; development of Nodes and Junction Boxes that are currently being manufactured; acquisition/development and testing of Instruments; development of mobile instrument platforms such as a) a Vertical Profiler which has completed FAT and will be delivered in the Fall of 2008 and b) a Crawler (University of Bremmen) field tested in June 2008 for investigation of exposed hydrate deposits. An integrated test platform is being deployed on the operational VENUS observatory in September 2008, which includes a module developed by Ifremer. In parallel, software and hardware systems are built to acquire, archive, and deliver the continuous real-time data - already in operation for VENUS. A web environment to combine this data access with analysis and visualization, collaborative tools, interoperability, and instrument control is under construction. Finally, a network of scientists and technicians are contributing to the process in every phase. Initial experiments were planned through a series of workshops and international proposal competitions. At inshore Folger Passage, Barkley Sound, understanding controls on biological productivity will help evaluate the effects that marine processes have on fish and marine mammals. Experiments around Barkley Canyon will allow quantification of changes in biological and chemical activity associated with nutrient and cross-shelf sediment transport around the shelf/slope break and through the canyon to the deep sea. There and north along the mid-continental slope, exposed and shallowly buried gas hydrates allow monitoring of changes in their distribution, structure, and venting, particularly related to earthquakes, slope failures and regional plate motions. Circulation obviation retrofit kits (CORKs) at mid-plate ODP 1026-7 will monitor in realtime changes in crustal temperature and pressure, particularly as they relate to events such as earthquakes, hydrothermal convection or regional plate strain. At Endeavour Ridge, complex interactions among volcanic, tectonic, hydrothermal and biological processes will be quantified at the western edge of the Juan de Fuca plate. Across the network, high resolution seismic information will elucidate tectonic processes such as earthquakes, and a tsunami

system will allow determination of open ocean tsunami amplitude, propagation direction, and speed. The infrastructure has further capacity to allow experiments to expand from this initial suite. Further information and opportunities can be found at http://www.neptunecanada.ca NEPTUNE Canada will transform our understanding of biological, chemical, physical, and geological processes across an entire tectonic plate from the shelf to the deep sea (17-2700m). Real-time continuous monitoring and archiving allows scientists to capture the temporal nature, characteristics, and linkages of these natural processes in a way never before possible.

Las Cumbres Observatory Global Telescope Network (LCOGTN) features a comprehensive science research program and an innovative astronomy-education program featuring state-of-the-art instructional materials appropriate for students at all levels, from elementary school through postsecondary. LCOGTN operates two research-class robotic telescopes, the Faulkes Telescope North, located in Maui, Hawaii, and the Faulkes Telescope South, located in Australia at Siding Spring Observatory. These telescopes are available to teachers to use as part of their curricular or extracurricular activities, and are supported by a range of educational materials and a team of educators and professional astronomers. Additional telescopes in Mississippi, Texas, California, and the United Kingdom will further broaden the Network's scope. Real-time observation and still images available.

The soft computing technique of neural network is being extensively used across all disciplines of ocean engineering, namely, offshore, coastal, and deep-ocean engineering including marine engineering. This paper takes a stock of the research studies reported so far in these areas. It is found that, in general, neural networks provide a better alternative, either substitutive or complementary, to traditional computational

An ocean observatory—consisting of a real-time, cabled array in the Sea of Oman and an internally recording, autonomous mooring array recently upgraded to a cabled array in the northern Arabian Sea—celebrated more than 2500 days of continuous operation in July 2012. The observatory, which measures a range of properties, such as water current velocities, temperature, salinity, pressure, dissolved oxygen, and turbidity, is part of the Lighthouse Ocean Research Initiative (LORI) project [du Vall et al., 2011], which was designed as a pilot project and installed in 2005 in the region off Abu Bakara (Figures 1a and 1b). The initial goal of the project was to prove that an in situ, cabled ocean observatory can return high-quality scientific data on a real-time basis over longer time periods than conventional moored systems. That same year, an autonomous array was deployed off Ras al Hadd and on Murray Ridge in the Arabian Sea (Figure 1a).

The NSF Major Research Equipment and Facilities Construction project termed the Ocean Observatories Initiative seeks to develop a Global Scale Observatory to support a sustained presence in a variety of deep-water areas of the world ocean. The observatory will sample different physical, geodynamic, biogeochemical, and ecosystem regimes. The infrastructure is transformative in supporting the observation of transient and emergent phenomena and in making simultaneous, real-time measurements of atmospheric, physical, biogechemical, ecological and geodynamic observations with interactive control. One of the proposed platforms is an Extendable Draft Platform (EDP), which couples spar buoy behavior with a self-installing approach to mooring. The platform provides real-time telemetry capability to shore via satellite, continuous telemetry and power supply to the water column and seafloor, and substantial power on board the buoy. The platform is not occupied except for annual servicing and can be towed to site with a large UNOLS vessel. Larger-scale versions of the EDP are attractive for hydrocarbon recovery in the deep sea. Scripps Institution of Oceanography and Technip have partnered in the design, construction, and testing of the first of these platforms prior to the platform's use in the OOI in the mid- Atlantic.

As part of the NSF-funded EarthScope Plate Boundary Observatory, UNAVCO will install and operate 103 borehole seismic stations throughout the western United States. These stations continuously record three- component seismic data at 100 samples per second, using Geo-Space HS-1-LT 2-HZ geophones in a sonde developed by SONDI and Consultants (Duke University). Each seismic package is connected to an uphole Quanterra Q330 data logger and Marmot external buffer, from which UNAVCO retrieves data in real time. UNAVCO uses the Antelope software suite

from Boulder Real-Time Technologies (BRTT) for all data collection and transfer, metadata generation and distribution, and monitoring of the network. The first stations were installed in summer 2005, with 19 stations installed by September 2006, and a total of 28 stations expected by December 2006. In a prime example of cooperation between the PBO and USArray components of EarthScope, the USArray Array Network Facility (ANF), operated by UC San Diego, handled data flow and network monitoring for the PBO seismic stations in the initial stages of network operations. We thank the ANF staff for their gracious assistance over the last several months. Data flow in real time from the remote stations to the UNAVCO Boulder Network Operations Center, from which UNAVCO provides station command and control; verification and distribution of metadata; and basic quality control for all data. From Boulder, data flow in real time to the IRIS DMC for final quality checks, archiving, and distribution. Historic data are available from June 2005 to the present, and are updated in real time with typical latencies of less than ten seconds. As of 1 September 2006, the PBO seismic network had returned 60 GB of raw data. Please visit http://pboweb.unavco.org for additional information on the PBO seismic network.

Ocean Networks Canada operates two advanced cabled networks on the west coast of British Columbia. VENUS, the coastal network consisting of two cabled arrays with four Nodes reaching an isolated fjord (Saanich Inlet) and a busy shipping corridor near Vancouver (the Strait of Georgia) went into operation in February 2006. NEPTUNE Canada is the first operational deep-sea regional cabled ocean observatory worldwide. Since the first data began streaming to the public in 2009, instruments on the five active nodes along the 800 km cable loop have gathered a time-series documenting three years in the northeastern Pacific. Observations cover the northern Juan de Fuca tectonic plate from ridge to trench and the continental shelf and slope off Vancouver Island. The cabled systems provide power and high bandwidth communications to a wide range of oceanographic instrument systems which measure the physical, chemical, geological, and biological conditions of the dynamic earth-ocean system. Over the years significant challenges have been overcome and currently we have more than 100 instruments with hundreds of sensors reporting data in real-time. Salient successes are the first open-ocean seafloor to sea-surface vertical profiling system, three years of operation of Wally—a seafloor crawler that explores a hydrate mound, and a proven resilient cable design that can recover from trawler hits and major equipment meltdown with minimal loss of data. A network wide array of bottom mounted pressure recorders and seismometers recorded the passage of three major tsunamis, numerous earthquakes and frequent whale calls. At the Endeavour segment of the Juan de Fuca ridge high temperature and diffuse vent fluids were monitored and sampled using novel equipment, including high resolution active acoustics instrumentation to study plume dynamics at a massive sulfide hydrothermal vent. Also, four deep sea cabled moorings (300 m high) were placed in the precipitous bathymetry of the 2200 m deep axial valley. Close to shore, a three-dimensional imaging system monitors the growth of a sponge complex on the 20 m deep Folger pinnacle in the wave zone offshore Vancouver Island. Instruments monitoring the delta and estuarine dynamics of the Fraser River that empties into the eastern edge of the Strait of Georgia complete the picture of this northeast Pacific dynamic ocean system from an active spreading ridge, down to the abyss, along the hydrate-rich slope, and up to the coast. While the installation of the first phase of experiments is nearing completion, the cabled networks still provide ample opportunity for expansion and scientists from all over the world are invited to join our community and advance science by using the data that is publicly available at http://www.oceannetworks.ca/.

Earthquake locations and source mechanisms play a key role in studying plate tectonics and seafloor spreading processes. T-phases are earthquake signals that have propagated, at least partially, in the ocean sound channel. T-phase hydrophone networks detect much smaller earthquakes over basin scales than land-based networks and they detect many more earthquakes than comparable regional scale seismic land networks. Furthermore since T-phases travel at lower velocities than seismic phases, they result in much more precise locations of events given the same timing accuracy. T-phases are typically spread over 10's of seconds and a common problem is precisely identifying the arrival time of an event. T-phase stations usually consist of single hydrophones moored near the sound channel axis and the depth dependence within the water column of the T-phase envelope and frequency content is rarely studied. In the North Pacific Ocean, from 2004 to 2005, ambient noise and earthquakes were observed at an ocean acoustic

observatory, in 5,000m water depth, consisting of a vertical hydrophone array (from about 750m above the seafloor to 375m from the surface) and three co-located ocean bottom seismometers. This data set provides a unique opportunity to observe earthquake signals and their characteristics throughout the water column and on the seafloor. In at least one case, a T-phase from a distant earthquake was readily observed even at the seafloor, well below the conjugate depth.

The National Office for Integrated and Sustained Ocean Observations is responsible for the planning, coordination and development of the U.S. Integrated Ocean Observing System, IOOS, which is both the U.S. contribution to GOOS as well as the ocean component of GEOSS. The IOOS is comprised of global observations as well as regional coastal observations coordinated so as to provide environmental information to optimize societal management decisions including disaster resilience, public health, marine transport, national security, climate and weather impact, and natural resource and ecosystem management. Data comes from distributed sensor systems comprising Federal and state monitoring efforts as well as regional enhancements, which are managed through data management and communications (DMAC) protocols. At present, 11 regional associations oversee the development of the observing System components in their region and are the primary interface with the user community. The ocean observatories are key elements of this National architecture and provide the infrastructure necessary to test new technologies, platforms, methods, models, and practices which, when validated, can transition into the operational components of the IOOS. This allows the IOOS to remain "state of the art" through incorporation of research at all phases. Both the observatories as well as the IOOS will contribute to the enhanced understanding of the ocean and coastal system so as to transform science results into societal solutions.

In the Nankai trough south western Japan, mega thrust earthquakes are occurring with an interval of 100-200 years. Therefore, research projects such as ocean floor observatories, boreholes observatories, seismic experiments, drillings and simulations have been carried out focusing on the Nankai trough seismogenic zones. In previous simulation researches based on a detailed structure model, the result of recurrence cycle simulation indicates the difference patterns and intervals of mega thrust earthquake recurrences in each cycle around the Nankai trough. These results are consisted with recent historical mega thrust earthquakes in 1854, 1944/46 around the Nankai trough. However, only this simulation model is not yet enough to understand of the next mega thrust earthquakes around the Nankai trough. So, we are developing ocean floor network observatories (DONET?Dense Oceanfloor Network for Earthquakes and Tsunamis) and borehole observatories to estimate crustal activities in seismogenic zone precisely around the Nankai trough. In DONET system, 20 observatories are deployed and multi kinds of sensors such as an accelerometer, a broad band seismometer, a pressure gauge, a differential pressure gauge and a thermometer are equipped in each observatory. With these precise sensors, we could observe broad band phenomena such as strong motions, slow earthquakes and ocean?floor crustal deformations around the Nankai trough. Using these sensors, we can detect earthquakes and tsunamis very early rather than the land stations. This advantage is very important for a disaster reduction of earthquakes and tsunamis. Furthermore, data of broad band phenomena around seismogenic zone are very useful and significant to understand mega thrust earthquake recurrence system around the Nankai trough. Especially, vertical components of ocean floor crustal deformations obtained from pressure gauges are very significant to study the coupling between plate boundaries. Using these data, we could improve the recurrence cycle simulation model with higher reliabilities. Especially, the estimation of recurrence cycle between the Tonankai and Nankai earthquake is very important for disaster preventions in Japan. Furthermore, to understand the seismic linkage around the Nankai trough seismogenic zones, we are carrying out dense seismic surveys, broad band observations and developing advanced simulation researches. This project for seismic linkage on mega thrust earthquakes around the Nankai trough and DONET project are entrusted by MEXT. Finally, we will integrate seismic research results and data from observatories to elucidate the mechanism of recurrence cycle of mega thrust earthquakes, and to estimate seismic hazard damages precisely. We will explain new research projects for the next Nankai trough mega thrust earthquake seismogenic zones in details.

A major new planetary-scale research thrust can only be addressed with interactive, next-generation ocean-observatory capabilities. These new research opportunities arise from the possibility that

input into the ocean of chemosynthetically derived microbial biomass from below the seafloor rivals the biomass from primary photosynthetic productivity near the top of the ocean. All three types of plate boundaries and many plate interiors vent microbe-bearing fluids into the deep ocean continuously AND episodically. Unpredicted episodes increase nutrient output and venting volume by as much as a factor of 100 for weeks to months at a time (Lilley et al.,2003, Nature). Because of the highly non-linear nature of these fluxes, quantification of such processes represents essential, but unconstrained, variables in equations for carbon budgets and bio-flux in the deep ocean. Triggering events and their induced fluxes must be detected, located, responded to, and quantified before their relative importance to the global-ocean system can be evaluated. Addressing these issues requires an essential new capability in the ocean sciences. High-power and high-bandwidth cabled systems will enable remote and long-term experimentation with processes via thousands of stationary and/or mobile sensor platforms on, below, and above the seafloor. The Ocean Research Interactive Observatory Networks (ORION) program is currently working with NEPTUNE Canada to produce a plate-tectonic-scale, regional cabled ocean observatory (RCO), an ideal platform for adaptive surveillance and quantitative response to fluid-flux generating events at the margins and interior of the Juan de Fuca (JdF) Plate. The W. M. Keck Foundation is supporting a pre-NEPTUNE exploration of the linked processes involved in the deformation-fluid/microbial flux concept. Thirteen seismometers (3 broadband, 10 short-period) and 45 fluid-movement/chemical sensors are co-deployed on three different, but adjacent, plate boundaries at the northern end of the JdF Plate: the Endeavour spreading segment, the Nootka transform fault, and the convergent margin at the toe of the Cascadia subduction complex. All sensors are capable of measuring time-varying behavior for a year. A novel deep-sea remote sensor capable of autonomous detection of microbial output at the seafloor will be added to the existing ensemble in 2005-6. These instrument systems will be phased into NEPTUNE, scheduled to come on line in 2007-8. As of September 2004, we also have a live satellite-mooring link from a seismometer and flow meter at a cold-seep site near the intersection of the Nootka transform and the Cascadia prism. The ultimate goal is to utilize the power of NEPTUNE-like installations to quantitatively assess the regional, and eventually, the global, fluxes and biodiversity associated with this newly recognized tectonically-generated phenomenon of subseafloor microbial productivity. Fully characterizing this planetary-scale process requires establishing a permanent presence on the seafloor to continuously observe, document, and interact with co-varying processes driving fluid expulsion, the chemical consequences, and the microbial responses. Similar phenomena may operate on other planets; we might even export approaches learned on earth. *The Keck Team includes more than 25 scientists and engineers from the Monterey Bay Aquarium Research Inst., Scripps Inst. of Oceanography, Woods Hole Oceanographic Inst., Univ. of Victoria, Inst. of Ocean Sciences in Sidney, BC, and Univ. of Washington.

MOBB (Monterey bay Ocean floor Broad Band project) is a collaborative project between the Monterey Bay Aquarium Research Institute (MBARI) and the Berkeley Seismological Laboratory (BSL). Its goal is to install and operate a permanent seafloor broadband station as a first step towards extending the on-shore broadband seismic network in northern California, to the seaside of the North-America/Pacific plate boundary, providing improved azimuthal coverage for regional earthquake and structure studies. The MOBB station was installed on the seafloor in Monterey Bay, 40 km offshore, and at a depth of 1000m from the sea surface, in April 2002, and is completely buried under the seafloor level. The installation made use of MBARI's Point Lobos ship and ROV Ventana and the station currently records data autonomously. Dives are scheduled regularly (about every three months) to recover and replace the recording and battery packages. Some data were lost in the first half of 2003 due to hardware and software problems in the recording system. The ocean-bottom MOBB station currently comprises a three-component seismometer package (Guralp CMG-1T), a current-meter, a digital pressure gauge (DPG), and recording and battery packages. The seismometer package is mounted on a cylindrical titanium pressure vessel 54cm in height and 41 cm in diameter, custom built by the MBARI team and outfitted for underwater connection. Since the background noise in the near-shore ocean floor environment is high in the band pass of interest, for the study of regional and teleseismic signals, an important focus of this project is to develop methods to a posteriori increase signal to noise ratios, by deconvolving contributions from various sources of noise. We present results involving analysis of correlation of background noise with tide, ocean current and pressure records, combining data from MOBB and regional land based stations

of the Berkeley Digital Seismic Network (BDSN). We also present preliminary results of modeling of the signal generated noise due to reverberation in the near surface sedimentary pile. The experience gained in MOBB will be valuable, in particular, for future long term or temporary deployments of buried broad-band seismometers such as are envisaged in the context of the Ocean Mantle Dynamics Initiative.

We present a virtual ocean observatory (VOO) that supports climate and ocean science as addressed in the NRC decadal survey. The VOO is composed of an autonomous software system, in-situ and space-based sensing assets, data sets, and interfaces to ocean and atmosphere models. The purpose of this observatory and its output data products are: 1) to support SWOT mission planning, 2) to serve as a vanguard for fusing SWOT, XOVWM, and in-situ data sets through fusion of OSTM (SWOT proxy) and QuikSCAT (XOVWM proxy) data with in-situ data, and 3) to serve as a feed-forward platform for high-resolution measurements of ocean surface topography (OST) in island and coastal environments utilizing space-based and in-situ adaptive sampling. The VOO will enable models capable of simulating and estimating realistic oceanic processes and atmospheric forcing of the ocean in these environments. Such measurements are critical in understanding the oceans' effects on global climate. The information systems innovations of the VOO are: 1. Development of an autonomous software platform for automated mission planning and combining science data products of QuikSCAT and OSTM with complementary in-situ data sets to deliver new data products. This software will present first-step demonstrations of technology that, once matured, will offer increased operational capability to SWOT by providing automated planning, and new science data sets using automated workflows. The future data sets to be integrated include those from SWOT and XOVWM. 2. A capstone demonstration of the effort utilizes the elements developed in (1) above to achieve adaptive in-situ sampling through feedback from space-based-assets via the SWOT simulator. This effort will directly contribute to orbit design during the experimental phase (first 6-9 months) of the SWOT mission by high resolution regional atmospheric and ocean modeling and sampling. It will also contribute to SWOT science via integration of in-situ data, QuikSCAT, and OSTM data sets, and models, thus serving as technology pathfinder for SWOT and XOVWM data fusion; and will contribute to SWOT operations via data fusion and mission planning technology. The goals of our project are as follows: (a) Develop and test the VOO, including hardware, in-situ science platforms (Seagliders) and instruments, and two autonomous software modules: 1) automated data fusion/assimilation, and 2) automated planning technology; (b) Generate new data sets (OST data in the Hawaiian Islands region) from fusion of in-situ data with QuikSCAT and OSTM data; (c) Integrate data sets derived from the VOO into the SWOT simulator for improved SWOT mission planning; (d) Demonstrate via Hawaiian Islands region field experiments and simulation the operational capability of the VOO to generate improved hydrologic cycle/ocean science, in particular: mesoscale and submesoscale ocean circulation including velocities, vorticity, and stress measurements, that are important to the modeling of ocean currents, eddies and mixing.

This paper addresses the design of mobile sensor networks for optimal data collection. The development is strongly motivated by the application to adaptive ocean sampling for an autonomous ocean observing and prediction system. A performance metric, used to derive optimal paths for the network of mobile sensors, defines the optimal data set as one which minimizes error in a model

NEPTUNE is an innovative facility, a deep-water cabled observatory, that will transform marine science. MARS and VENUS are deep and shallow-water test bed facilities for NEPTUNE located in Monterey Canyon, California and in southern British Columbia, respectively; both were funded in 2002. NEPTUNE will be a network of over 30 subsea observatories covering the 200,000 sq. km Juan de Fuca tectonic plate, Northeast Pacific. It will draw power via two shore stations and receive and exchange data with scientists through 3000 km of submarine fiber-optic cables. Each observatory, and cabled extensions, will host and power many scientific instruments on the surrounding seafloor, in seafloor boreholes and buoyed through the water column. Remotely operated and autonomous vehicles will reside at depth, recharge at observatories, and respond to distant labs. Continuous near-real-time multidisciplinary measurement series will extend over 30 years. Free from the limitations of battery life, ship schedules/ accommodations, bad weather and delayed access to data, scientists will monitor remotely their deep-sea experiments in real time on the Internet, and routinely command instruments to respond to storms, plankton blooms,

earthquakes, eruptions, slope slides and other events. Scientists will be able to pose entirely new sets of questions and experiments to understand complex, interacting Earth System processes such as the structure and seismic behavior of the ocean crust; dynamics of hot and cold fluids and gas hydrates in the upper ocean crust and overlying sediments; ocean climate change and its effect on the ocean biota at all depths; and the barely known deep-sea ecosystem dynamics and biodiversity. NEPTUNE is a US/Canada (70/30) partnership to design, test, build and operate the network on behalf of a wide scientific community. The total cost of the project is estimated at about U.S. 250 million from concept to operation. Over U.S. 50 million has already been funded for design, development, and the test beds. NEPTUNE will be among the first of many such cabled ocean observatories. Much is to be gained by being among the scientific and industrial pioneers. The multidisciplinary data archive will be an amazing, expanding resource for scientists and students. The public will share in the research discoveries of one of the last unexplored places on earth through an extensive education/outreach program.

Oceanic crust comprises the largest hydrogeologic reservoir on Earth, containing fluids in thermodynamic disequilibrium with the basaltic crust. Little is known about microbial ecosystems that inhabit this vast realm and exploit chemically favorable conditions for metabolic activities. Crustal samples recovered from ocean drilling operations are often compromised for microbiological assays, hampering efforts to resolve the extent and functioning of a

For the past 30 years there has been a strong consensus within the international scientific community in favor of sending a network of geophysical landers to Mars to characterize the near-surface weather and climate, determine the large-scale atmospheric dynamics and explore the interior structure and composition. Despite this scientific support, there has been an unbroken string of proposed missions over the past fifteen years which have failed for programmatic reasons to progress beyond the design stage (Mars Network Mission, MESUR, Marsnet, InterMarsnet, NetLander). In this presentation, we review the scientific rationale and technical requirements for such a mission, and discuss current activities aimed toward its implementation.

Data from drifting buoys deployed in April, 2002, as part of the North Pole Environmental Observatory project have been analysed to estimate ocean heat flux in the time period from 1 May 2002 to 11 Mar 2003. Prior to late January, the observatory remained in deep water, but subsequently drifted directly over the Yermak Plateau, a relatively shallow feature north of Svalbard. While over deep water, heat flux was dominated by storage and release of solar energy in the ocean boundary layer during summer. The most likely annual average value for 2002 was 2.6 W m-2, less than previous determinations in the western Arctic. Over Yermak Plateau, heat flux at the interface came from mixing of warmer water into the boundary layer from below. When the observatory was in water with depths less than 1200 m, the average heat flux was around 22 W m-2.

This report is the first attempt by the seismological community to rationalize and optimize the distribution of earthquake observatories across the United States. The main aim is to increase significantly our knowledge of earthquakes and the earth's dynamics by providing access to scientifically more valuable data. Other objectives are to provide a more efficient and cost-effective system of recording and distributing earthquake data and to make as uniform as possible the recording of earthquakes in all states. The central recommendation of the Panel is that the guiding concept be established of a rationalized and integrated seismograph system consisting of regional seismograph networks run for crucial regional research and monitoring purposes in tandem with a carefully designed, but sparser, nationwide network of technologically advanced observatories. Such a national system must be thought of not only in terms of instrumentation but equally in terms of data storage, computer processing, and record availability.

Responding to an increased demand for reliable, accurate time on the Internet and Milnet, the U.S. Naval Observatory Time Service has established the network time servers, tick.usno.navy.mil and tock.usno.navy.mil. The system clocks of these HP9000\\/747i industrial work stations are synchronized to within a few tens of microseconds of USNO Master Clock 2 using VMEbus IRIG-B interfaces. Redundant time code is

The United States operates a network of, at present, 13 ground-based magnetic observatories. Continuous, one-minute digital vector and scalar geomagnetic field values have been recorded for the last decade, and extend about five years further back for several stations. Periodic, 3-component absolute measurements of the magnetic field are made to provide baseline reference data with which to determine calibrated field

The needs for a network of ocean observing systems cross many applied and research areas of earth and marine science. Many of the science areas that can be examined using such systems have direct impacts on societal health and well being and our understanding of ocean function in a shifting climate. The European Seas Observatory NETwork (ESONET) Network of Excellence has been evaluating ocean observatory design requirements, data management needs, standardization and interoperability concerns, social implications, outreach and education, as well as financial and legal aspects of developing such a system. ESONET has great potential to address a growing set of Earth science questions that require a broad and integrated network of ocean and seafloor observations. ESONET activities are also importantly integrating researchers in the European Community, as well as internationally. There is now wide recognition that research addressing science questions of international priority, such as understanding the potential impacts of climate change or geohazards like earthquakes and tsunamis should be conducted in a framework that can address questions across adequate temporal and spatial scales. We will present the relevant science priorities in the four interconnected fields of geoscience, physical oceanography, biogeochemistry, and marine ecology, and some of the practical ways in which these questions can be addressed using ESONET. Several key questions persist that will require comprehensive interdisciplinary approaches including: How can monitoring of factors such as seismic activity, fluid pore chemistry and pressure, improve seismic, slope failure, and tsunami warning? To what extent do seabed processes influence ocean physics, biogeochemistry, and marine ecosystems? How are physical and biogeochemical processes that occur at differing scales related? What aspects of physical oceanography and biogeochemical cycling will be most sensitive to climate change? What will the important feedbacks of potential ecological change be on biogeochemical cycles? What are the factors that control the distribution and abundance of marine life and what will the influence of anthropogenic change be? We will outline a set of science objectives and observation parameters to be collected at all ESONET sites, as well as a set of rather specific objectives and thus parameters that might only be measured at some sites. We will also present the preliminary module specifications now being considered by ESONET. In a practical sense the observatory design has been divided into those that will be included in a so called ‘generic' module and those that will be part of science-specific modules. Outlining preliminary module specifications is required to move forward with studies of observatory design and operation. These specifications are importantly provisional and can be updated as science needs and feasibility change. A functional cleavage not only comes between aspects that are considered generic or specific, but also the settings in which those systems will be used. For example, some modules will be on the seabed and some will be moored in the water column. In order to address many of the questions posed above ESONET users will require other supporting data from other programs from local to international levels. Examples of these other data sources include satellite oceanographic data, climatic data, air-sea interface data, and the known distribution and abundances of marine fauna. Thus the connection of ESONET to other programs is integral to its success. The development of ESONET provides a substantial opportunity for ocean science to evolve in Europe. Furthermore, ESONET and several other developing ocean observatory programs are integrating into larger science frameworks including the Global Earth Observation System of Systems (GEOSS) and Global Monitoring of Environment and Security (GMES) programs. It is only in a greater integrated framework that the full potential of the component systems will be realized.

Sep 24, 2012 ... We had spectacular sunset last night and I was reminded of the old ... There, before I finished my freshman year, I fell in love with the Earth ... as far afield as the Labrador Sea, the Antarctic Circumpolar Current, or the Mediterranean Sea. ... Upper Ocean Regional Study (SPURS) | 6 Comments and counting ...

to the development of a regional ocean governance network framework as a model for use by the broader ocean community`STRENGTHENING PRINCIPLED OCEAN GOVERNANCE NETWORKS

- TRANSFERRING LESSONS FROM THE CARIBBEAN TO THE WIDER OCEAN GOVERNANCE COMMUNITY' PROGOVNET The world ocean is changing at what appears

Ocean time-series stations like those at the Hawaii Ocean Time-series (HOT), Bermuda Atlantic Time Series (BATS) and the Monterey Ocean Time-series and Observatory (MOTO) have provided information that has rather clearly established the scientific and societal need for ocean observatories. Here we present a seventeen year time series (1989 - 2005) of shipboard, mooring, and more recently autonomous underwater vehicle (AUV), observations from Monterey Bay, Ca., and highlight diurnal, seasonal, interannual, and long- term variations in physical, chemical, and biological properties. Satellite data provide spatial and large-scale temporal context. Central California is a region of strong coastal upwelling where diatoms dominate biomass during the productive spring and summer months. Upwelling is driven by coastal winds, and this upwelling affects currents, temperature, nitrate, chlorophyll, and primary production. Such variations occur within the larger California Current System (CCS), which includes the California Current, Undercurrent, and Inshore Countercurrent. Encompassed in the time series are the 1992-1993 and 1997-1998 El Niños, events which contribute interannual variability. We have also identified a significant and long-lasting shift in North Pacific physical and ecosystem dynamics in the mid-1990s. Diurnal variability, estimated from high resolution moored measurements, suggest the potential for autonomous long-term measurement of primary production. Based on our experience we provide suggestions for how to overcome the technical challenges of long-term ocean observing.

Climate change and land use changes are the most important factors of global environmental change which have to be managed by the society in the next years. Global changes in terrestrial systems take place on different spatial and temporal scales. In order to address the challenges of global change, interdisciplinary research in terrestrial environmental science is of great importance. Therefore, long-term operated „Global Change Observatories" for monitoring, analyzing and predicting changing state variables and fluxes within different environmental compartments are of special importance. Several environmental research networks have already been established in order to monitor, analyse and predict the impact of global change on different compartments and/or matter cycles of the environment. Typically these environmental research networks have focused on specific research questions, and compartments, such as CarboEurope, FLUXNET and ILTER The infrastructure activity TERENO (Terrestrial Environmental Observatories), a research initiative of the Helmholtz Association, aims to establish a network of observation platforms linking terrestrial observatories in different sensitive and representative regions. The observed system consists of the subsurface environment, the land surface including the biosphere, the lower atmosphere and the anthroposphere. Hydrological units will be used as the basic scaling units in a hierarchy of evolving scales and structures ranging from the local scale to the regional scale for multi-disciplinary process studies. Terrestrial systems are extremely complex. Despite of this complexity, the terrestrial component in most process-based climate and biosphere models is typically represented in a very conceptual and often rudimentary way. Remedying this deficiency is therefore one of the most important challenges in environmental and terrestrial research, and we suggest that terrestrial observatories could be an important step towards a new quality in environmental and terrestrial research. For the first phase three terrestrial observatories in Germany have been identified: the Lower Rhine Basin, the metropolitan area Leipzig-Halle, and the Northern pre-Alps including the long-term research stations Hoeglwald and Scheyern. A fourth Observatory is planned in the German Lowland region. The concept of TERENO is illustrated by the Leipzig-Halle area. A monitoring concept for the Bode catchment - a mesoscale, lower mountain range catchment - will be described. The Bode river catchment is the central site for hydrological observation at the Leipzig-Halle TERENO study site. A integrated monitoring and research concept joining hydrological, atmospherical, biodiversity related, and soil physical research will be implemented during the next two years. This will lead to scale dependent intensive research activities on different spatial scales, allowing the development and evaluation of hydrologic scaling strategies. Hydrological monitoring will range from large scale satellite data to small scale catchment investigations on flow path, matter transport and transformation using advanced monitoring networks ranging from aerial photography and spectral analysis to non invasive geophysical investigations and sensor networks at the point scale (e.g. soil moisture).

The National Ecological Observatory Network (NEON) is an NSF-funded project designed to provide physical and information infrastructure to support the development of continental-scale, quantitative ecological sciences. The network consists of sixty sites located in the continental US, Alaska, Hawaii, and Puerto Rico, each site hosting terrestrial and aquatic sensors and observational apparati that acquire data across multiple ecoclimatic domains. As well, an airborne remote sensing platform provides spectral and LiDAR data, and acquisition of data sets from external agencies allows for land-use studies. Together, this data is ingested, vetted, processed, and curated by a standards-based, provenance-driven, metadata-rich cyberinfrastructure, which will provide not only access to but discovery and manipulation of NEON data, and the construction of integrative data products and inputs for ecological forecasting that address fundamental processual questions in climate change, land use change, and invasive species.

The past decade has seen a growing interest in ocean sensor networks because of their wide applications in marine research, oceanography, ocean monitoring, offshore exploration, and defense or homeland security. Ocean sensor networks are generally formed with various ocean sensors, autonomous underwater vehicles, surface stations, and research vessels. To make ocean sensor network applications viable, efficient communication among all devices and components is crucial. Due to the unique characteristics of underwater acoustic channels and the complex deployment environment in three dimensional (3D) ocean spaces, new efficient and reliable communication and networking protocols are needed in design of ocean sensor networks. In this paper, we aim to provide an overview of the most recent advances in network design principles for 3D ocean sensor networks, with focuses on deployment, localization, topology design, and position-based routing in 3D ocean spaces.

The GEOSCOPE observatory consists of a global seismic network and a data center. The 31 GEOSCOPE stations are installed in 19 countries, across all continents and on islands throughout the oceans. They are equipped with three component very broadband seismometers (STS1 or STS2) and 24 or 26 bit digitizers, as required by the Federation of Seismic Digital Network (FDSN). In

A cabled ocean observatory system that can provide abundant power and broad bandwidth communication for undersea instruments is developed. A 10 kV direct current (kVDC) with up to 10 kW power, along with 1 Gigabit/sec Ethernet communication, can be transmitted from the shore to the seafloor through an umbilical armored cable. A subsea junction box is fixed at a cable terminal, enabling the extension of up to nine connections. The box consists of three main pressure vessels that perform power conversion, power distribution, and real-time communication functions. A method of stacking modules is used to design the power conversion system in order to reduce the 10 kV voltage to levels that can power the attached instruments. A power distribution system and an Ethernet communication system are introduced to control the power supply and transmit data or commands between the terminals and the shore station, respectively. Specific validations of all sections were qualified in a laboratory environment prior to the sea trial. The ocean observatory system was then deployed at the coast of the East China Sea along with three in situ instruments for a 14-day test. The results show that this high voltage-powered observatory system is effective for subsea long-term and real-time observations.

The Aerosol Robotic Network (AERONET) was developed to support atmospheric studies at various scales with measurements from worldwide distributed autonomous sunphotometers [Holben et al. 1998]. AERONET has now extended its support to marine applications through the additional capability of measuring the radiance emerging from the sea with modified sun-photometers installed on offshore platforms like lighthouses, navigation aids, oceanographic and oil towers. The functionality of this added network component called AERONET - Ocean Color (AERONET-OC), has been verified at different sites and deployment structures over a four year testing phase. Continuous or occasional deployment platforms (see Fig. 1) included: the Acqua Alta Oceanographic Tower (AAOT) of the Italian National Research Council in the northern Adriatic Sea since spring 2002; the Martha s Vineyard Coastal Observatory (MVCO) tower of the Woods Hole Oceanographic Institution in the Atlantic off the Massachusetts coast for different periods since spring 2004; the TOTAL Abu-Al-Bukhoosh oil Platform (AABP, shown through an artistic rendition in

Fig. 1) in the Persian (Arabian) Gulf in fall 2004; the Gustaf Dal n Lighthouse Tower (GDLT) of the Swedish Maritime Administration in the Baltic Sea in summer 2005; and the platform at the Clouds and the Earth's Radiant Energy System (CERES) Ocean Validation Experiment (COVE) site located in the Atlantic Ocean off the Virginia coast since fall 2005. Data collected during the network testing phase, confirm the capability of AERONET-OC to support the validation of marine optical remote sensing products through standardized measurements of normalized water-leaving radiance, LWN, and aerosol optical thickness, a, at multiple coastal sites.

Today, the U.S. Naval Observatory (USNO) is best known to most Americans as the location of the vice president's residence. Asked to search their memories, a few may recall that USNO maintains the nation's master clock and is in some way responsible for introducing a ``leap second'' on New Year's eve every few years. Even in the scientific community, the USNO is best known and most highly regarded for its service as the nation's timekeeper. In Sky and Ocean Joined-The U.S. Naval Observatory 1830-2000, Steve Dick points out that the history of the development of ever-more accurate clocks and the dissemination of time closely parallels the general advance of science and technology. In addition, he takes the reader inside USNO to meet some of the more fascinating individuals that drove the events and scientific achievements associated with the work of maintaining the nation's master clock.

The need for improved coordination in ocean observations is more urgent now given the issues of climate change, sustainable food sources and increased need for energy. Ocean researchers must work across disciplines to provide policy makers with clear and understandable assessments of the state of the ocean. With advances in technology, not only in observation, but also communication and computer science, we are in a new era where we can answer questions asked over the last 100 years at the time and space scales that are relevant. Programs like GLOBEC moved us forward but we are still challenged by the disciplinary divide. Interdisciplinary problem solving must be addressed not only by the exchange of data between the many sides, but through levels where questions require day-to-day collaboration. A National Science Foundation-funded Research Coordination Network (RCN) is addressing approaches for improving interdisciplinary research capabilities in the ocean sciences. During the last year, the RCN had a working group for Open Data led by John Orcutt, Peter Pissierssens and Albert Williams III. The teams has focused on three areas: 1. Data and Information formats and standards; 2. Data access models (including IPR, business models for open data, data policies,...); 3. Data publishing, data citation. There has been a significant trend toward free and open access to data in the last few years. In 2007, the US announced that Landsat data would be available at no charge. Float data from the US (NDBC), JCOMM and OceanSites offer web-based access. The IODE is developing its Ocean Data Portal giving immediate and free access to ocean data. However, from the aspect of long-term collaborations across communities, this global trend is less robust than might appear at the surface. While there are many standard data formats for data exchange, there is not yet widespread uniformity in their adoption. Use of standard data formats can be encouraged in several ways: sponsors of observational science programs can encourage or require standard formats for data storage; scientific journals can require that data in support of publication be deposited in a standard format; and finally, communities of scientists can recognize that observational or model-developed data sets are professional contributions deserving citation. Even with standards for exchange, the availability of data and models can limited by cultural and policy issues. Investigators on NSF grants are expected to share with other researchers the primary data, samples, physical collections and other supporting materials created under their grants. Broader approaches to data availability are seen in the model of the human genome project; according to the Bermuda Agreement (1996), the funding agencies required that all scientists working on the human genome make the data quickly and openly available. Is this a model for ocean data? This presentation will examine the steps forward in stimulating interdisciplinary research through data exchange and better addressing the gaps in communication and approaches that are still common across the ocean sciences.

The National Ecological Observatory Network (NEON) is an ambitious National Science Foundation sponsored project intended to accumulate and disseminate ecologically informative sensor data from sites among 20 distinct biomes found within the United States and Puerto Rico over a period of at least 30 years. These data are expected to provide valuable insights into the ecological impacts

of climate change, land-use change, and invasive species in these various biomes, and thereby provide a scientific foundation for the decisions of future national, regional, and local policy makers. NEON's objectives are of substantial national and international importance, yet they must be achieved with limited resources. Sandia National Laboratories was therefore contracted to examine four areas of significant systems engineering concern; specifically, alternatives to commercial electrical utility power for remote operations, approaches to data acquisition and local data handling, protocols for secure long-distance data transmission, and processes and procedures for the introduction of new instruments and continuous improvement of the sensor network. The results of these preliminary systems engineering evaluations are presented, with a series of recommendations intended to optimize the efficiency and probability of long-term success for the NEON enterprise.

The number and quality of seismic stations and networks on Alaskan volcanoes have increased dramatically in the 20 years from 1988 to 2008. Starting with 28 stations on six volcanoes in 1988, the Alaska Volcano Observatory (AVO) now operates 194 stations in networks on 33 volcanoes spanning the 2000 km Aleutian Arc. All data are telemetered in real time to laboratory facilities in Fairbanks and Anchorage and recorded on digital acquisition systems. Data are used for both monitoring and research. The basic and standard network designs are driven by practical considerations including geography and terrain, access to commercial telecommunications services, and environmental vulnerability. Typical networks consist of 6 to 8 analog stations, whose data can be telemetered to fit on a single analog telephone circuit terminated ultimately in either Fairbanks or Anchorage. Towns provide access to commercial telecommunications and signals are often consolidated for telemetry by remote computer systems. Most AVO stations consist of custom made fiberglass huts that house the batteries, electronics, and antennae. Solar panels are bolted to the south facing side of the huts and the seismometers are buried nearby. The huts are rugged and have allowed for good station survivability and performance reliability. However, damage has occurred from wind, wind-blown pumice, volcanic ejecta, lightning, icing, and bears. Power is provided by multiple isolated banks of storage batteries charged by solar panels. Primary cells are used to provide backup power should the rechargable system fail or fall short of meeting the requirement. In the worst cases, snow loading blocks the solar panels for 7 months, so sufficient power storage must provide power for at least this long. Although primarily seismic stations, the huts and overall design allow additional instruments to be added, such as infrasound sensors, webcams, electric field meters, etc. Yearly maintenance visits are desirable, but some stations have operated for more than 10 years with no site visits. In the last five years AVO began upgrading select analog networks by adding telemetered broadband digital seismometers and GPS instruments.

The earth's climate is significantly changing (e.g. IPCC, 2007) and thus directly affecting the terrestrial systems. The number and intensity hydrological extremes, such as floods and droughts, are continually increasing, resulting in major economical and social impacts. Furthermore, the land cover in Europe has been modified fundamentally by conversions for agriculture, forest and for other purposes such as industrialisation and urbanisation. Additionally, water resources are more than ever used for human development, especially as a key resource for agricultural and industrial activities. As a special case, the mountains of the world are of significant importance in terms of water resources supply, biodiversity, economy, agriculture, traffic and recreation but particularly vulnerable to environmental change. The Alps are unique because of the pronounced small scale variability they contain, the high population density they support and their central position in Europe. The Alps build a single coherent physical and natural environment, artificially cut by national borders. The scientific community and governmental bodies have responded to these environmental changes by performing dedicated experiments and by establishing environmental research networks to monitor, analyse and predict the impact of Global Change on different terrestrial systems of the Earths' environment. Several European network infrastructures for terrestrial Global Change research are presently immerging or upgrading, such as ICOS, ANAEE, LifeWatch or LTER-Europe. However, the strongest existing networks are still operating on a regional or national level and the historical growth of such networks resulted in a very heterogeneous landscape of observation networks. We propose therefore the establishment of two complementary networks: The NetwOrk of Hydrological observAtories, NOHA. NOHA aims to promote the sustainable management of water resources in Europe, to support the prediction of hydrological system changes, and to develop and implement tools and technologies for monitoring, prevention and mitigation of environmental risks

and pressures. In addition, NOHA will provide long-term statistical series of hydrological state variables and fluxes for the analysis and prognosis of Global Change consequences using integrated model systems. These data will support the development and establishment of efficient prevention, mitigation and adaptation strategies (E.g. EU-Water Framework Directive) and spur the development and validation of hydrological theories and models. The second network, ALPS, - the Alpine Observing System - will create an unique infrastructure for environmental and climate research and observation for the whole Alpine region, providing a common platform for the benefit of the society in Europe as a whole. The initiative will build on existing infrastructure in the participating countries and on new and emerging technology, allowing an unprecedented coverage of observation systems at affordable cost. ALPS will create a new collaboration between scientists, engineers, monitoring agencies, public and decision makers, with the aim to gain an integrated understanding of complex environmental systems. The ALPS effort will be structured along three major axes: (i) harmonize and strengthen the backbone of permanent measurement infrastructures and complement these with dense deployments of intelligent networks, to improve the recording of environmental parameters overcoming disciplinary and national borders, (ii) link the main data centres to create a distributed cyber-infrastructure with the final aim to enable effective data access and retrieval to all science and society users, and (iii) invest in data assimilation and exploitation toward scientific and practical results in particular with respect to dealing with extreme events and natural hazards. In this presentation, we will focus on the motivation, the concept and the scientific and organizational challenges of ALPS and NOHA.

Lighthouse R&D Enterprises, Inc. installed the first cabled ocean observatory system for the Sultanate of Oman's Ministry of Agriculture and Fisheries Wealth in mid-2005 and a second cabled system in early 2010. The systems are designed to study a range of oceanic phenomena and provide a wealth of data to manage fisheries resources and recreational activities, monitor water quality, and groundtruth regional circulation models used to understand complex circulation patterns and current phenomena in the region. Autonomous moorings were also installed and used off the Omani coast from 2005 to the present to study a range of dynamical processes. Both cabled and moored data systems use state-of-the art oceanographic sensors to measure current speed and direction, salinity, temperature, dissolved oxygen, turbidity, pressure, and acoustic backscatter at hourly intervals. The long-term operational success of the observatories has resulted in a continuous, six year time series of quality controlled oceanic data. The scientific analysis and synthesis of the cabled and moored observational data revealed three major scientific findings. (1) A strong seasonal cycle of hypoxia is seen in dissolved oxygen concentration. Hypoxic conditions on the northern shelf of Oman are believed to be associated with the seasonal migration of the oxygen minimum zone during the monsoonal season. (2) Long term changes in the distribution of myctophid layers and the substantial diel vertical migrations of these layers are observed throughout the record of acoustic backscatter intensity data. (3) The systems recorded the oceanic responses to tropical Cyclone Gonu. After the passage of Cyclone Gonu in June 2007, substantial variability is seen in the hydrographic properties at about 250 m. What is more, even very deep waters - such as those at nearly 3000 m depth - were affected by Cyclone Gonu. To our knowledge, this is the first direct observation of the effect of an extreme weather event on water near the seafloor in the Indian Ocean. The Sea of Oman and Arabian Sea are not well studied and most knowledge thus far is based on surface observations. The breakthrough scientific findings reported here would not have been possible without regular, in-situ sampling over a long time interval and over the entire water column. Time-series data clearly provide a wealth of knowledge on multiple time scales. Our new daily, seasonal, and annual observations, as well as observations on a disruption to the system by a transient event, have substantially improved our understanding of the oceanography in this previously poorly understood region.

The Monterey Ocean Bottom Broadband (MOBB) observatory has been acquiring broadband seismic data and auxiliary channels (differential pressure and current meter) since its installation on the ocean floor in Monterey Bay, at 1000 m water depth and 40 km off-shore. Operating autonomously for almost 7 years, the system was successfully connected to the MARS cable (www.mbari.org/mars) on February 26th, 2009, via a 3.6 km extension cable from the MARS science node. The system works as designed and is currently streaming data from seismic, pressure, and water-current sensors to the Berkeley Seismological Laboratory, where it joins data

from other broadband stations on land and is archived at the Northern California Earthquake Data Center. The availability of real-time MOBB broadband seismic data provides an opportunity for improving earthquake-monitoring capability in central California, particularly near the Santa Cruz Mountains segment of the San Andreas fault, and the San Gregorio fault. While buried in the mud, MOBB is affected by oceanic sources of noise, which are particularly strong in the infragravity wave band, and care must be taken to reduce this background noise in post-processing. We present examples of data analysis and illustrate how MOBB contributes to the determination of source parameters and regional structure.

The National Science Foundation's Ocean Observatories Initiative (OOI) is constructing observational and computer infrastructure that will provide sustained ocean measurements to study climate variability, ocean circulation, ecosystem dynamics, air-sea exchange, seafloor processes, and plate-scale geodynamics over the next ~25-30 years. To accomplish this, the Consortium for Ocean Leadership established four Implementing Organizations: (1) Regional Scale Nodes; (2) Coastal and Global Scale Nodes; (3) Cyberinfrastructure (CI); and (4) Education and Public Engagement (EPE). The EPE, which we represent, was just recently established to provide a new layer of cyber-interactivity for educators to bring near real-time data, images and videos of our Earth's oceans into their learning environments. Our focus over the next four years is engaging educators of undergraduates and free-choice learners. Demonstration projects of the OOI capabilities will use an Integrated Education Toolkit to access OOI data through the Cyberinfrastructure's On Demand Measurement Processing capability. We will present our plans to develop six education infrastructure software modules: Education Web Services (middleware), Visualization Tools, Concept Map and Lab/Lesson Builders, Collaboration Tools, and an Education Resources Database. The software release of these tools is staggered to coincide with other major OOI releases. The first release will include stand-alone versions of the first four EPE modules (Fall 2012). Next, all six EPE modules will be integrated within the OOI cyber-framework (Fall 2013). The last release will include advanced capabilities for all six modules within a collaborative network that leverages the CI's Integrated Observatory Network (Fall 2014). We are looking for undergraduate and informal science educators to provide feedback and guidance on the project, please contact us if you are interested in partnering with us.

with 3 additional patterns required to describe high latitude North Pacific and eastern and western subtropical gyre (e.g. A3, time series below left) and in the western Equatorial Pacific (e.g. P9, below rightIntercomparison of Biogeochemical Properties at Atlantic and Pacific Observatory Sites Using Ocean

Long term deep-sea ocean observatories and the advancement of sensor technologies have greatly improved our ability to understand the dynamic forces affecting the ocean. In order to understand and predict ocean variability, interdisciplinary time series observations on scales from seconds to decades are required. The Bermuda Testbed Mooring (BTM), located southeast of Bermuda (BATS site), and the HALE-ALOHA (H-A) mooring, north of Hawaii (HOT site), are two existing interdisciplinary deep-sea mooring programs. Both moorings are located in approximately 4500 m water depth and provide fundamental measurements of meteorological, physical, and optical variables. The BTM program, funded by NSF and ONR, has served the oceanographic community since 1994; H-A, initially sponsored by NSF in 1997, has been funded by NOPP since 2002. These deep-sea moorings have proven their value in detecting and observing processes that cannot be captured with ship- or satellite-based sampling. BTM and H-A data have been collected during passages of tropical storms, mesoscale eddies, Rossby waves, dust deposition events, rapid shoaling of the mixed layer, phytoplankton bloom events, inertial oscillations, diel and shorter time scale variability in phytoplankton and bio- optical properties, and internal gravity waves. Recently, BTM data was collected during near direct hits by two hurricanes, Fabian (2004) and Florence (2006). BTM and H-A data sets have been used to develop improved models of several upper ocean processes during and in the wakes of extreme wind forcing events. High resolution time series data of these events have led to shifts in our understanding of the forces driving these processes. To facilitate scientific studies requiring high frequency spatial coverage, complementary ship-based, sediment trap mooring, AUV, glider, and satellite data sets have been used along with BTM and H-A data to expand the utility of collective regional scientific research efforts off Bermuda

and Hawaii. These data sets have also been used to calibrate and validate satellite-based ocean observations. Deep-sea mooring programs such as BTM and H-A will continue to provide detailed time series observations of long term oceanographic trends as well as the monitoring of extreme events.

Submarine cabled networks are designed to collect valuable data in geophysics, geochemistry, biology, or oceanography. Unfortunately, the development of such a network is expensive and needs complex subsea infrastructures. Once in place, a cabled network cannot be easily relocated. The current cost of cables and their installation are one of the major obstacles to these networks deployment. On the one

We are entering a new era in genomics–that of large-scale, place-based, highly contextualized genomic research. Here we review this emerging paradigm shift and suggest that sites of utmost scientific importance be expanded into ‘Genomic Observatories’ (GOs). Investment in GOs should focus on the digital characterization of whole ecosystems, from all-taxa biotic inventories to time-series ’omics studies. The foundational layer of biodiversity–genetic variation–would thus be mainstreamed into Earth Observation systems enabling predictive modelling of biodiversity dynamics and resultant impacts on ecosystem services.

We will demonstrate operation of one or more meter-class telescopes devoted to student initiated astronomical research projects. For multiple decades astronomers have promised each other the development of global networks of telescopes. For the last decade, without ever fulfilling the initial promise, we have upped the ante and promised global networks of robotic telescopes. Sometimes the network is to be composed of 20- to 40-cm aperture telescopes; other times the network will include meter-class telescopes. Sometimes the network is exclusive to a select, small group of users; other times the dream is open to any interested parties. Western Kentucky University, the Hands-On Universe project, and NASA's Kepler mission have achieved the first components of a network of telescopes established for educational programs. We will discuss the process used by teachers and students to make use of a substantial fraction of the network's observing time, and to access most of the archived data. Examples of student projects will be shared, along with immediate plans for expanding the network.

The NOAA-led U.S. Integrated Ocean Observing System (IOOS) and the National Science Foundation's Ocean Observatories Initiative (OOI) have been collaborating since 2007 on advanced tools and technologies that ensure open access to ocean observations and models. Initial collaboration focused on serving ocean data via cloud computing-a key component of the OOI cyberinfrastructure (CI) architecture. As the OOI transitioned from planning to execution in the Fall of 2009, an OOI/IOOS team developed a customer-based "use case" to align more closely with the emerging objectives of OOI-CI team's first software release scheduled for Summer 2011 and provide a quantitative capacity for stress-testing these tools and protocols. A requirements process was initiated with coastal modelers, focusing on improved workflows to deliver ocean observation data. Accomplishments to date include the documentation and assessment of scientific workflows for two "early adopter" modeling teams from IOOS Regional partners (Rutgers-the State University of New Jersey and University of Hawaii's School of Ocean and Earth Science and Technology) to enable full understanding of data sources and needs; generation of all-inclusive lists of the data sets required and those obtainable through IOOS; a more complete understanding of areas where IOOS can expand data access capabilities to better serve the needs of the modeling community; and development of "data set agents" (software) to facilitate data acquisition from numerous data providers and conversions of the data format to the OOI-CI canonical form. ?? 2011 MTS.

During June and July of 2005, the Plate Boundary Observatory (PBO) installed eight permanent GPS stations on Akutan Volcano, in the central Aleutian Islands of Alaska. PBO worked closely with the Alaska Volcano Observatory and the Magmatic Systems Site Selection working group to install stations with a spatial distribution to monitor and detect both short and long term volcanic deformation in response to magmatic intrusions at depth and magma migration through the volcano's conduit system. All eight of the GPS stations were installed by PBO field crews with helicopter support provided by Evergreen Helicopters and logistical support from the Trident

Seafood Corporation, the City of Akutan, and the Akutan Corporation. Lack of roads and drivable trails on the remote volcanic island required that all equipment be transported to each site from the village of Akutan by slinging gear beneath the helicopter and internal loads. Each station installed on the volcano consists of a standard short braced GPS monument, two solar panels mounted to an inclined structure, and a six foot high Plaschem enclosure with two solar panels mounted to one of the inclined sides. Each Plaschem houses 24 6 volt batteries that power a Trimble NetRS GPS receiver and one or two Intuicom radios. Data from each GPS receiver is telemetered directly or through a repeater radio to a base station located in the village of Akutan that transmits the data over the internet to the UNAVCO data archive at ftp://data-out.unavco.or/pub/PBO_rinex where it is made freely available to the public.

ESONET is a Multidisciplinary European Network of Excellence (NoE) in which scientists and engineers from 50 partners and 14 countries cooperate in building the infrastructure for a lasting integration of research and development in deep sea observatories in Europe. This NoE aims to develop strong links between regional nodes of a European network of sub sea observatories and to promote multidiciplinarity and transnationality within each node. Essential for these goals is the provision of an effective data and knowledge infrastructure for both, management and archiving of observatory data as well as knowledge and data sharing among network participants. The ESONET data infrastructure roughly consists of four major components: data policies a common agreement on the data management procedures and prerequisites, data acquisition technologies serve to collect data directly from ESONET observatories, data archives care for long term data management of collected ESONET data and data integration and portal tools which ensure harmonisation of collected data and allow access to the data in a common way. Most critical for ESONET was the development of a spatial data infrastructure (SDI) by using standardised protocols to directly access observatory data in its spatial and temporal context. The ESONET SDI provides means to either access data in quasi real time or harvest locally stored data in order to transfer it to a long term data archive. ESONET SDI largely builds upon the OGC Sensor Web Enablement (SWE) suite of standards. Among those, the Sensor Observation Service (SOS), the Observations & Measurements (O&M), Sensor Markup Language (SensorML) are especially important for the integration of observatory data as well as for the contribution of ESONET data to GEOSS.

The microbiology of subsurface, hydrothermally influenced basaltic crust flanking mid-ocean ridges has remained understudied, due to the difficulty in accessing the subsurface environment. The instrumented boreholes resulting from scientific ocean drilling offer access to samples of the formation fluids circulating through oceanic crust. We analyzed the phylogenetic diversity of bacterial communities of fluid and microbial mat samples collected in situ from the observatory at Ocean Drilling Program Hole 896A, drilled into ~6.5 million-year-old basaltic crust on the flank of the Costa Rica Rift in the equatorial Pacific Ocean. Bacterial 16S rRNA gene sequences recovered from borehole fluid and from a microbial mat coating the outer surface of the fluid port revealed both unique and shared phylotypes. The dominant bacterial clones from both samples were related to the autotrophic, sulfur-oxidizing genus Thiomicrospira. Both samples yielded diverse gamma- and alphaproteobacterial phylotypes, as well as members of the Bacteroidetes, Planctomycetes, and Verrucomicrobia. Analysis of ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO) genes (cbbL and cbbM) from the sampling port mat and from the borehole fluid demonstrated autotrophic carbon assimilation potential for in situ microbial communities; most cbbL genes were related to those of the sulfur-oxidizing genera Thioalkalivibrio and Thiomicrospira, and cbbM genes were affiliated with uncultured phylotypes from hydrothermal vent plumes and marine sediments. Several 16S rRNA gene phylotypes from the 896A observatory grouped with phylotypes recovered from seawater-exposed basalts and sulfide deposits at inactive hydrothermal vents, but there is little overlap with hydrothermally influenced basaltic boreholes 1026B and U1301A on the Juan de Fuca Ridge flank, suggesting that site-specific characteristics of Hole 896A (i.e., seawater mixing into borehole fluids) affect the microbial community composition.

EarthScope's Plate Boundary Observatory (PBO) runs a network of 1,100 continuous GPS stations in North America and has the potential to be a major provider of real-time GPS data for scientific research, hazard monitoring and survey control. PBO is planning to implement real time data flow for its three volcanic subnetworks (at Mt. Saint Helens and Alaksa's Akutan and Unimak

Three bottom mounted sonar systems will be described that were built over a span of fifteen years. The complexity of deployment and sophistication of the tasks performed increased with each system. The first system is an autonomous tower with rotating sonar designed to examine backscattering from an area within 50 m radius of the tower. The second is a ship-cabled system that includes a diver movable tower and separate buried array for examining both backscattering and acoustic penetration into sediments. The last is a ship-cabled rail/tower system designed to carry out forward scattering and synthetic aperture backscattering measurements. All three systems are designed to remain deployed for time periods up to a couple of months. After describing the systems, their deployment and some example results, recent efforts will be described that are aimed at transitioning these types of systems to cabled ocean observatories. The overall goal of the talk is to indicate both the level of complexity that can be envisioned for bottom mounted systems as well as the new issues that must be addressed in moving to cabled ocean observatories. [Work supported by ONR.

A Research Coordination Network on Sustainable Oceans in a Changing Climate: forecasting increased oceans for sustainability under the pressure of climate change and other anthropogenic threats significantly with climate change drivers of warming and increased ocean acidification. Despite this increased

Astronomy in grades K-12 is traditionally taught (if at all) using textbooks and a few simple hands-on activities. Teachers are generally not trained in observational astronomy techniques and are unfamiliar with the most basic astronomical concepts. In addition, most students, by High School graduation, will never have even looked through the eyepiece of a telescope. The problem becomes even more challenging in inner cities, remote rural areas and low socioeconomic communities where educational emphasis on topics in astronomy as well as access to observing facilities is limited or non existent. Access to most optical telescope facilities is limited to monthly observing nights that cater to a small percentage of the general public living near the observatory. Even here, the observing experience is a one-time event detached from the process of scientific enquiry and sustained educational application. Additionally, a number of large, "research grade" observatory facilities are largely unused, partially due to the slow creep of light pollution around the facilities as well as the development of newer, more capable telescopes. Though cutting edge science is often no longer possible at these sights, real research opportunities in astronomy remain numerous for these facilities as educational tools. The possibility now exists to establish a network of research grade telescopes, no longer useful to the professional astronomical community, that can be made accessible through classrooms, after school, and community based programs all across the country through existing IT technologies and applications. These telescopes could provide unparalleled research and educational opportunities for a broad spectrum of students and turns underutilized observatory facilities into valuable, state-of-the-art teaching centers. The NASA sponsored Telescopes In Education project has been wildly successful in engaging the K-12 education community in real-time, hands-on, interactive astronomy activities. Hundreds of schools in the US, Australia, Canada, England, and Japan have participated in the TIE program, remotely controlling the 24-inch telescope at the Mount Wilson Observatory from their classrooms. In recent years, several (approximately 20 to date) other telescopes have been, or are in the process of being, outfitted for remote use as TIE affiliates. Global TIE integrates these telescopes seamlessly into one virtual observatory and provides the services required to operate this facility, including a scheduling service, tools for data manipulation, an online proposal review environment, an online "Virtual TIE Student Ap J" for publication of results, and access to related educational materials provided by the TIE community. This presentation describes the Global TIE Observatory data and organizational systems and details the technology, partnerships, operational capabilities, science applications, and learning opportunities that this powerful virtual observatory network will provide.

This paper describes the implementation and analysis of a deep ocean sensor network that utilizes existing, retired, or new telecommunication submarine cables as hosts to sensor nodes. Due to telecom sub-cable high installation costs, quality of service, and 25-year lifetime requirements, addition of instrumentation nodes must have essentially no impact on system reliability, capacity or availability. A sensor node on

The dynamic hydrogeology of subduction zones makes them important regions for geochemical cycling between the major reservoirs: seawater, oceanic crust, continental crust, and the mantle. The distillation and loss of some volatiles and fluid-soluble elements from the shallow slab not only affect reactions and processes within the seismogenic zone, but they also support the deep biosphere and play a central role in the longer-term global cycle of volatiles, such as the return of water and carbon dioxide to the ocean and atmosphere, to the depths of magmatism beneath volcanic arcs, and ultimately the mantle. Examples of key questions that have been addressed at these tectonic regimes through ocean drilling, are: what is the role of fluids in earthquake cycles; what are the global chemical and isotopic fluxes at subduction zones; how does fluid flow in the upper oceanic basement influence these global cycles? Motivated by these questions, sealed borehole hydrologic observatories (CORKs) were developed in 1989, with long-term instrumentation, to record background in-situ values of physical, chemical, and biological properties and transients. Two were deployed at the Costa Rica subduction zone; one in the upper oceanic basement ~0.3 km from the trench, the second along the décollement fault zone ~0.4 km arcward of the prism toe. Both were instrumented to continuously and simultaneously measure formation temperature, pressure, fluid chemistry and flow rate. The results of the first 7 years of deployment (2002-2009) in the oceanic basement, and 2 years in the décollement, constitute the first co-recorded hydrological, chemical, and physical databases and provided the first in-situ fluids from basement. These data have placed constraints on key questions, such as (1) How does fluid flow and chemistry vary spatially and temporally, and how do they change in response to tectonic events; (2) Can in-situ pressure, temperature, fluid flow, and chemistry be used to understand processes occurring within the seismogenic zone and be used to determine the temporal behavior of plate boundary ruptures? The continuous physical and geochemical records at the oceanic basement site show that the uppermost basement is highly permeable. The formation fluid composition, especially, the 87Sr/86Sr ratios, and the nitrate and sulfate concentrations, support mixing between seawater and a subduction zone fluid originating within the forearc, suggesting that the uppermost basement serves as an efficient pathway for fluid expelled from the subduction zone. Slow slip events were recorded at both sites during the monitoring period. These events were recorded both in pressure and flow rate, and the data indicate that they propagate up-dip and terminate at or near the trench.

The study of ground-based geomagnetic observations in Africa dated back to 1840 when data were collected at the Hobart observatory in South Africa. Available literature shows there were a total of thirty-five African stations with available geomagnetic data held at different data centers and institutions around the globe. Rather than an increase in the number of these stations, there has been a decline with some stations going into extinction. As of date, twenty-one (60 percent) of these stations are already closed, eleven are still opened and the status of three stations is unknown. The major problem an average African station faces is the absence of financial support to either install some new equipment or to maintain existing instruments. The Virtual Global Magnetic Observatory Network (VGMO.NET) as the name implies, is a virtual geomagnetic observatory that gives the user the power to have access to geomagnetic data at various data archives over the World Wide Web. It is specifically designed for geomagnetic data analysis and it can simulate a geomagnetic station right on your desktop. This paper examines the deployment of this system under the Electronic geophysical Year (eGY) initiative to some African institutions and the effect it may have in the development of the study of geomagnetism in the continent of Africa.

An isotopic sampling network has been implemented at the Susquehanna Shale Hills Critical Zone Observatory. This research is an attempt to determine oxygen-18 and deuterium signatures in all stores of the watershed, so that they distinguish mobile and immobile flow. The stable isotope network covers all phases of the hydrologic cycle, including precipitation sampled on an event basis with an

This site is a collaboration of US and Canadian research institutions; it proposes an ocean observatory in the NE Pacific. A network of fiber optic cables on the Juan de Fuca plate will support sensors to monitor geological, chemical and biological events and provide shore-based researchers with real-time data. The site is intended to serve learners from K to college with web access to data, curricula and activities, as well as maps, images, videos of deep-sea environments.

The geochemical discriminate diagrams help to distinguish the volcanics recovered from different tectonic settings but these diagrams tend to group the ocean floor basalts (OFB) under one class i.e., as mid-oceanic ridge basalts (MORB). Hence, a method is specifically needed to identify the OFB as normal (N-MORB), enriched (E-MORB) and ocean island basalts (OIB). We have applied Artificial Neural Network (ANN) technique as a supervised Learning Vector Quantisation (LVQ) to identify the inherent geochemical signatures present in the Central Indian Ocean Basin (CIOB) basalts. A range of N-MORB, E-MORB and OIB dataset was used for training and testing of the network. Although the identification of the characters as N-MORB, E-MORB and OIB is completely dependent upon the training data set for the LVQ, but to a significant extent this method is found to be successful in identifying the characters within the CIOB basalts. The study helped to geochemically delineate the CIOB basalts as N-MORB with perceptible imprints of E-MORB and OIB characteristics in the form of moderately enriched rare earth and incompatible elements. Apart from the fact that the magmatic processes are difficult to be deciphered, the architecture performs satisfactorily.

Las Cumbres Observatory Global Telescope Network (LCOGT) is creating a network of telescopes at excellent sites around the world providing 24/7 all sky coverage for astronomical observations. The network of telescopes, ranging in size from 0.4 m to 2.0 m, will be available for both scientific and education users. The LCOGT telescopes are being built quickly and will be deployed soon. The two 2.0 m Faulkes Telescopes, one on Haleakala, Maui (FTN), the other at Siding Spring Observatory, Australia (FTS), are currently in operation. There is also a 0.8 m telescope in the Santa Ynez Valley, California (BOS), which is being used for commissioning and for many local outreach programs. The first 1.0 m telescopes will be heading to Chile and South Africa in 2011 and will each be accompanied by a 0.4 m telescope. Other sites, including Tenerife (Canary Islands, Spain), McDonald Observatory (Texas), Siding Spring (Australia), and Haleakala (Hawaii) will follow, with the possibility of up to two additional sites yet to be selected. The LCOGT education and public outreach effort is transforming into a "Citizen Science" program. Several projects will encompass taking observations through the network, analyzing the data, and sharing the results with other citizen scientists from around the world. The first of these projects, "Agent Exoplanet," will be launched in mid-2011, and will involve analyzing brand-new data to create a light curve of an exoplanet. As the network is not yet complete, this test project will not include actual observing as future ones will. More information about LCOGT and its Citizen Science program can be found online (http://www.lcogt.net). In addition to material to get started in the Citizen Science program, the website also includes resources and content for more hands-on activities using archived data, general astronomy pages, network information, complete access to the public data archive, current news, and recent publications. And don't forget to register for the LCOGT monthly newsletter.

An isotopic sampling network has been implemented at the Susquehanna Shale Hills Critical Zone Observatory. This site has been approved as a node in the IAEA Global Network of Isotopes in Precipitation (GNIP) database. This research is an attempt to determine oxygen-18 and deuterium signatures and time scales in all stores of the watershed. The network covers all phases of the hydrologic cycle, including precipitation sampled on an event basis with an Eigenbrodt NSA-181S wet only collector (four-hour samples), soil water sampled weekly along four transects with suction-cup lysimeters, groundwater sampled daily at two wells with ISCO automatic samplers and weekly at 13 wells, vegetation sampled during the growing season, and stream water sampled daily with an ISCO automatic sampler. The comprehensive sampling of the network is possible because of the DLT-100 liquid water stable isotope analyzer from Los Gatos Research, with a reproducibility of ± 0.2‰ for oxygen-18 and ± 1.0‰ for deuterium, and the capability to run approximately 30 samples per day. The goal of the research is to identify flow paths and time scales of water from precipitation input to the watershed through stream flow output. Although results are preliminary stream water, groundwater and soil water all show a departure from the local meteoric water line. Time series analysis and spatial principal component analysis is used to “classify” dominant modes and processes affecting stable isotope dynamics in the watershed. The stable isotope network, real time hydrologic network, real time soil moisture network, real time groundwater network and sap flow network are being used to quantitatively estimate the mean age and residence time of the water in the watershed.

The National Ecological Observatory Network's Fundamental Instrument Unit (NEON-FIU) is responsible for making automated terrestrial observations at 60 different sites across the continent. FIU will provide data on key local physical, climate and chemical forcings, as well as the biotic responses (CO2, H2O and energy exchanges). The sheer volume of data that will be generated far exceeds that of any other ecological network or agency, (i.e., > 45 Tb/year from 10's of thousands of remotely deployed sensors). We address the question of how to develop and implement a large ecological observatory that can accommodate such a large volume of data while maintaining high quality. Here, we describe our quality assurance and quality control (QA/QC) program to produce quality data while leveraging cyber infrastructure tools and optimizing technician time. Results focus on novel approaches that advance the principles and dataflows used historically (DOE ARM, AmeriFlux, USDA ARS, OK Mesonet) to new state-of-the-art functionality. These automated and semi-automated approaches are also used to inform automated problem tracking to efficiently deploy field. The overarching philosophy relies on attaining the highest levels of accuracy, precision, and operational time, while efficiently optimizing the effort needed to produce quality data products. NEON will define its own standards for QA/QC maintenance by building upon these existing frameworks. Our preliminary results address the challenges associated with automated implementation of sensor command/control, plausibility testing, despiking, and data verification of FIU observations.

UNAVCO has now completed its third year of operation of the 138 continuous GPS stations, 12 tiltmeters and 31 communications relays that comprise the Alaska Region of the Earthscope Plate Boundary Observatory. Working in Alaska has been challenging due to the extreme environmental conditions encountered and logistics difficulties. Despite these challenges we have been able to complete each summer field season with network operation at 95% or better. Throughout the last three years we have analyzed both our successes and failures to improve the quality of our network and better serve the scientific community. Additionally, we continue to evaluate and deploy new technologies to improve station reliability and add to the data set available from our stations. 2011 was a busy year for the Alaska engineering team and some highlights from last year's maintenance season include the following. This spring we completed testing and deployment of the first Inmarsat BGAN satellite terminal for data telemetry at AC60 Shemya Island. Shemya Island is at the far western end of the Aleutian Islands and is one of the most remote and difficult to access stations in the PBO AK network. Until the installation of the BGAN, this station was offline with no data telemetry for almost one year. Since the installation of the BGAN in early April 2011 dataflow has been uninterrupted. This year we also completed the first deployments of Stardot NetCamSC webcams in the PBO Network. Currently, these are installed and operational at six GPS stations in Alaska, with plans to install several more next season in Alaska. Images from these cameras can be found at the station homepages linked to from the UNAVCO website. In addition to the hard work put in by PBO engineers this year, it is important that we recognize the contributions of our partners. In particular the Alaska Volcano Observatory, the Alaska Earthquake Information Center and others who have provided us with valuable engineering assistance and data telemetry in several locations. With their help we have reduced the number of stations that require manual data download to six in the entire Alaska network getting us closer to our goal of 100% auto data archival for the Alaska network.

Small observatories face two major hindrances in teaching astronomy to students: weather and getting students to recognize what they're seeing. The normal astronomy class use of a single telescope with an eyepiece is restricted to good skies, and it allows only one viewer at a time. Since astronomy labs meet at regular times, bad weather can mean the loss of an entire week. As for the second problem, students often have difficulties recognizing what they are seeing through an eyepiece, and the instructor cannot point out the target's features. Commercial multimedia resources, although structured and easy to explain to students, do not give students the same level of interactivity. A professor cannot improvise a new target nor can he adjust the image to view different features of an object. Luckily, advancements in technology provide solutions for both of these limitations without breaking the bank. Astronomical video cameras can automatically stack, align, and integrate still frames, providing instructors with the ability to explain things to groups of students in real time under actual seeing conditions. Using Shawnee State University's Mallincam

on an 8" Cassegrain, our students are now able to understand and classify both planetary and deep sky objects better than they can through an eyepiece. To address the problems with weather, SSU proposes forming a network among existing small observatories. With inexpensive software and cameras, telescopes can be aligned and operated over the web, and with reciprocal viewing agreements, users who are clouded out could view from another location. By partnering with institutions in the eastern hemisphere, even daytime viewing would be possible. Not only will this network aid in instruction, but the common user interface will make student research projects much easier.

Las Cumbres Observatory Global Telescope Network is building a network of telescopes ranging in size from 0.4-m to 2.0-m for scientific and educational uses. Most of the educational time will be on the 0.4-m network, of which there will be about twenty. Observations will be able to take place in either real-time or queued modes. The educational arm of LCOGT will be primarily through our new website (http://www.lcogt.net) where there will be how-to guides, research projects with our astronomers, activities, and more including an online community through forums and groups. Registered users will also be able to add additional resources, comment on and rate existing pages, collaborate in world-wide research projects, and much more. LCOGT education will be a user-driven community, with everyone working together to create a rich website of resources and information. Although the telescopes are not yet available, there is a vast archive of data that is available to the public and combined with all the projects that can be imagined (and many more that can't), there are countless learning opportunities for in and out of the classroom.

The Plate Boundary Observatory (PBO), part of the larger NSF-funded EarthScope project, is completing year 3 of the installation phase of 852 continuously operating GPS stations in the Western United States. Some of these GPS stations are focused specifically on centers of volcanic activity. Mt. St. Helens is one of these volcanic areas of interest in the Pacific Northwest (PNW) region. The PNW region will complete the installation of a 16 station GPS network on Mt. St. Helens during September 2006. This work also includes the co-location and installation of tiltmeters at four of the existing GPS sites. Network upgrades will be completed to handle the increase in data flow from the new GPS stations as well as the data from the tiltmeters and strainmeters. New GPS site installations include six helicopter accessible sites, and three drive to sites on the south flank of the mountain. Higher elevation sites will be outfitted with an eight battery, three solar panel power array to keep the stations operational during winter months. The remaining sites use a four battery, three solar panel array that has proved sufficient at other GPS locations over the past 2 winters. All stations will communicate via one of 2 radio networks set up on the mountain. The northern radio network transmits data for ten stations through a microwave connection at the Johnston Ridge observatory that also provides communications for PBO strainmeter, tiltmeter and CVO equipment. The remaining 10 stations on the south side of the mountain, are relayed through a hub at Washington State University's Vancouver Campus that is also providing data services for CVO. Results from analysis of data from both PBO and USGS GPS stations on the mountain, show a radially inward and downward motion, with the maximum vertical offsets high on the mountain and the maximum horizontal offsets located at distances of 5-10km from the crater. Displacements are small over the 2004-present eruption with a maximum of 3cm of inward movement. Modeling of the data by Lisowski et al. (AGU 2006) only accounts for a volume loss that is one third of the amount of material erupted. GPS stations installed high on the mountain were subjected to severe winter weather and heavy rime ice accumulations over the last year. This ice build-up caused distortion of the GPS antenna phase center, and blocked sun access to the solar panels at several sites. Due to the large battery storage capacity, very few power failures occurred at these stations. However, the build up of ice on the GPS antennas caused cm-level pseudo-displacements that mask the ground movements associated with the eruption.

On August 19, 2004 a prototype Ice-Tethered Profiler (ITP) was deployed from a 4-m-thick ice floe near 77 N, 141 W within the Canada Basin of the Arctic Ocean. The ITP was conceived as a polar complement to the international ARGO program of drifting floats that is returning temperature and salinity profile data from the temperate oceans. Having physical dimensions similar to a profiling float, the ITP, deployed on a weighted, plastic-jacketed wire rope suspended below an ice floe, uses a traction drive system to move up and down the wire on a pre-programmed sampling schedule. At

the completion of each one-way profile, raw 1-Hz Conductivity - Temperature - Depth (CTD) data and engineering information are telemetered in turn from the underwater profiling module to the surface unit via the wire tether using an inductive modem, and from the surface unit to a shoreside data server with over an Iridium satellite telephone link. Status messages from the surface controller (including position information) are also telemetered on an independent schedule. The first ITP was programmed with an accelerated sampling plan of 6 one-way profiles per day between 10 and 750 m depth. Profiling speeds of 26-28 cm/s are being routinely achieved with profile-averaged motor current from the 10.8 V battery supply ranging between 100 and 250 mA. Larger motor currents are observed at times of fast ice floe motion (approaching 25 cm/s on occasion) when we presume that drag on the Profiler and wire are increased. These figures are consistent with our instrument design goal of a three-year lifetime with average sampling rate of 1-2 profiles per day. The CTD profile data so far obtained document interesting spatial variations in the major water masses of the Beaufort Gyre including the low-salinity surface mixed layer, the complex forming the Pacific Halocline Waters characterized by multiple temperature extrema between 40 and 180 m depth indicative of the Alaska Coastal Water, the Summer and Winter Bering Strait Waters and winter shelf waters emanating from Barrow and possibly Herald Canyons, and the temperature maximum around 350 m depth characterizing the Atlantic Water. Additionally, the 1 Hz CTD data resolve well the thermohaline staircase stratification above the Atlantic Layer thought to be caused by double diffusion and the "nested" intrusive structures that incise the Atlantic Water. In addition to results from this prototype instrument, a concept for future deployments of ITP's within a network of Ice-Based Observatories will also be presented.

By the nature of these transient, non-repeating phenomena, observing microlensing events requires a fast, responsive system of telescopes distributed over a range of longitudes. The Las Cumbres Observatory Global Telescope Network currently consists of the 2m Faulkes Telescopes North and South. Over the course of the next few years LCOGT will expand this network to a complement of 44, including 2x2m, 18x1m and 24x0.4m which will be sited in clusters of 3-4 telescopes such that at least one site is in the dark at any given time, enabling us to provide 24hr coverage of any transient event. The telescopes are controlled via a robotic scheduler, allowing a fast response to alerts from eStar or other robotic agents or to manual override. Both 2m telescopes have been engaged in robotically-controlled follow-up of 222 OGLE and MOA alerts during the 2007 Bulge season and intensive observations of 2 events displaying clear anomalies. We summarise here the results to date.

A collection of tools for collaboratively managing a coastal ocean observatory have been developed and used in a multi-institutional, interdisciplinary field experiment. The Autonomous Ocean Sampling Network program created these tools to support the Adaptive Sampling and Prediction (ASAP) field experiment that occurred in Monterey Bay in the summer of 2006. ASAP involved the day-to-day participation of a large group of researchers located across North America. The goal of these investigators was to adapt an array of observational assets to optimize data collection and analysis. Achieving the goal required continual interaction, but the long duration of the observatory made sustained co-location of researchers difficult. The ASAP team needed a remote collaboration tool, the capability to add non-standard, interdisciplinary data sets to the overall data collection, and the ability to retrieve standardized data sets from the collection. Over the course of several months and "virtual experiments," the Ocean Observatory Portal (COOP) collaboration tool was created, along with tools for centralizing, cataloging, and converting data sets into common formats, and tools for generating automated plots of the common format data. Accumulating the data in a central location and converting the data to common formats allowed any team member to manipulate any data set quickly, without having to rely heavily on the expertise of data generators to read the data. The common data collection allowed for the development of a wide range of comparison plots and allowed team members to assimilate new data sources into derived outputs such as ocean models quickly. In addition to the standardized outputs, team members were able to produce their own specialized products and link to these through the collaborative portal, which made the experimental process more interdisciplinary and interactive. COOP was used to manage the ASAP vehicle program from its start in July 2006. New summaries were posted to the COOP tool on a daily basis, and updated with announcements on schedule, system status, voting results from previous day, ocean, atmosphere, hardware, adaptive sampling and coordinated control and forecast. The

collection of standardized data files was used to generate daily plots of observed and predicted currents, temperature, and salinity. Team members were able to participate from any internet-accessible location using common Internet browsers, and any team member could add to the day's summary, point out trends and discuss observations, and make an adaptation proposal. If a team member submitted a proposal, team-wide discussion and voting followed. All interactions were archived and left publicly accessible so that future experiments could be made more systematic with increased automation. The need for collaboration and data handling tools is important for future ocean observatories, which will require 24-hour per day, 7-day a week interactions over many years. As demonstrated in the ASAP experiment, the COOP tool and associated data handling tools allowed scientists to coherently and collaboratively manage an ocean observatory, without being co-located at the observatory. Lessons learned from operating these collaborative tools during the ASAP experiment provide an important foundation for creating even more capable portals.

In 2005-2006 and again in 2006-2007, the Plume-Lithosphere Undersea Melt Experiment (PLUME) deployed successive networks of ocean-bottom seismometers (OBSs) around the Hawaiian Islands. The experiment consisted of a 2-year deployment of broadband land seismometers and two year-long deployments of broadband OBSs, the first with a station spacing of about 75 km centered on the island of Hawaii and the second with larger spacing of about 200 km. PLUME's major objective was to determine the mantle structure beneath the Hawaiian hotspot and swell; however, these unique data are also potentially valuable to the study of small offshore earthquakes. The Hawaiian Islands are marked by significant and continuous seismic activity. In addition to the thousands of microearthquakes that are detected and located by the USGS Hawaiian Volcano Observatory (HVO) seismic network each year, Hawaii also experiences occasional large, damaging earthquakes. Several of these large events occurred in Hawaii's offshore region (e.g., the 1871 Lanai earthquake, the 1938 Maui earthquake, and the 2006 Kiholo Bay earthquake), and such events pose a significant seismic hazard for the state. We assess whether data from the first PLUME OBS deployment and land data can improve the detection and location of offshore microearthquakes around Hawaii. We are particularly interested in whether the PLUME data set may reveal offshore fault zones not detected to date by the HVO seismic network. Initial tests indicate that many offshore earthquakes already in the HVO catalog produce detectable P and S waves on the PLUME three- component seismometers, and earthquake detection rates are improved when seismograms are high-pass filtered above about 5 Hz to reduce the seismic noise from wind-generated waves. Differential pressure gauge data yield far fewer detectable events (with the exception of a swarm of Loihi earthquakes in December 2005) and appear less promising for improving our knowledge of offshore seismicity patterns.

As part of the 2009 American Recovery and Reinvestment Act (ARRA), NSF is investing in onshore-offshore instrumentation to support studies of the Cascadia margin. EarthScope's Plate Boundary Observatory (PBO) will upgrade all 232 of its GPS stations in the Pacific Northwest to high-rate sampling and real-time telemetry and provide streaming data from this network to the public for scientific research, education, and hazard monitoring. This effort expands UNAVCO’s real-time GPS operations beyond its current pilot project of 100 stations to include a comprehensive regional network that spans the states of Washington and Oregon, and extends south into California to the Mendocino triple junction. By blanketing the Pacific Northwest with real-time GPS coverage, the NSF is hoping to create a natural laboratory in an area of great scientific interest and high geophysical hazard in order to spur new volcano and earthquake research opportunities. Streaming high-rate data in real-time will enable researchers to routinely analyze for strong ground motion monitoring and earthquake hazards mitigation. For stations with collocated meteorological instruments, met data will be streamed as well, opening the possibility for combined GPS/met processing in real time by the atmospheric community. Finally, the new funding also expands opportunities for research using high-rate GPS data from a large-aperture network, since 1 Hz streams will be permanently archived and freely available via FTP. PBO will provide 1Hz-streaming data in BINEX, RTCM2.3 and RTCM 3.0 formats via the NTrip protocol, from servers located at UNAVCO headquarters in Boulder, CO. Data latency will vary according to the telemetry deployed at each station, but is expected to range from 0.5~2.0 seconds given recent improvements in PBO's real-time streaming capabilities.

The ALOHA Cabled Observatory (ACO) was installed 6 June 2011, extending power, network communications and timing to a seafloor node and instruments at 4726 m water depth 100 km north of Oahu. The system was installed using ROV Jason operated from the R/V Kilo Moana. Station ALOHA is the field site of the Hawaii Ocean Time-series (HOT) program that has investigated temporal dynamics in biology, physics, and chemistry since 1988. HOT conducts near monthly ship-based sampling and makes continuous observations from moored instruments to document and study climate and ecosystem variability over semi-diurnal to decadal time scales. The cabled observatory system will provide the infrastructure for continuous, interactive ocean sampling enabling new measurements as well as a new mode of ocean observing that integrates ship and cabled observations. The ACO is a prototypical example of a deep observatory system that uses a retired first-generation fiber-optic telecommunications cable. Sensors provide live video, sound from local and distant sources, and measure currents, pressure, temperature, and salinity. Preliminary results will be presented and discussed.

The Conrad Blucher Institute for Surveying and Science (CBI) at Texas A&M University-Corpus Christi operates the Texas Coastal Ocean Observation Network (TCOON.) The network collects near real-time physical oceanographic data at 31 coastal stations along the Texas coast. The data includes water level, wind speed & direction, barometric pressure, water temperature, and air temperature from stations placed in bays and estuaries along the Texas coast. TCOON provides this critical data to many users, including those in the commercial shipping industry, marine construction, legal water-land boundaries, recreational boaters, and those responsible for marine safety and emergency evacuation in the event of a hurricane. Data sets are available in near real time via the Internet and some sets are accessible via voice over the telephone. All data collected since 1991 is available online along with data search tools. TCOON sponsors and developers believe that the more users and uses the system supports, the more valuable the data becomes. The highest scientific standards are used in collection the data as the data often ends up in litigation in the courts. Database software and the online tools used for data downloads are also open source.

The Plate Boundary Observatory is being installed along the Pacific-North America plate boundary and when complete will add 875 new GPS sites and incorporate 209 existing GPS sites into the network. The GPS phase data from all these sites and an additional 40 sites to tie to the North America plate are analyzed by PBO analysis centers (ACs) at the New Mexico Institute of Mining and Technology (NMT) and at Central Washington University (CWU). The results from the two ACs, which use different GPS data processing programs, are combined into PBO GPS products by the Analysis Center Coordinator (ACC) at the Massachusetts Institute of Technology. Three levels of analysis are performed on the data: a "rapid" analysis available with a 1-day latency; a "final" analysis that uses IGS final orbit products and is available with a 6-13 day latency; and a "supplemental" analysis that runs with 12-week latency and adds to the final analysis data from sites with late data retrieval. Results from these analyses in the form of velocity estimates, time series, and Solution Independent Exchange Format (SINEX) files that contain position and full covariance information are all available from http:pboweb.unavco.org/gps_data. The median root-mean-square (RMS) scatter of the daily estimates from currently about 800 stations in a North America fixed reference frame from the final analysis is 1.3 mm horizontal position and 4.0 mm in vertical position. We discuss the results being obtained from the PBO analyses and the methods used to process the GPS data from this network.

EarthScope's Plate Boundary Observatory (PBO) runs a network of 1,100 continuous GPS stations in North America and has the potential to be a major provider of real-time GPS data for scientific research, hazard monitoring and survey control. PBO is planning to implement real time data flow for its three volcanic subnetworks (at Mt. Saint Helens and Alaksa's Akutan and Unimak Islands) to maximize the return of scientifically important data in the event of an eruption that destroys the installations. GPS sites with collocated instruments for meteorological measurement are also targeted for both GPS and met data streaming in the near future. On a larger scale, the USGS and a handful of academic institutions are doing research on integrating GPS into earthquake early warning (EEW) networks. The implementation of GPS- based EEW will involve real time streaming from GPS sites on major faults and in areas of high seismic hazard, and PBO is partnering with the

USGS to help develop the first implementation of this early warning capability. Finally, planning is underway to develop open statewide real time networks to serve surveying communities and the general public, and PBO is positioned to be a key data provider for these efforts as well. PBO has been operating a pilot program to provide real-time GPS streams to the public from 75+ stations from the Salton Sea to Alaska. PBO's streaming data is provided exclusively via the NTrip protocol, from servers located at UNAVCO headquarters in Boulder, CO. The formats supported are BINEX and RTCM 2.3 at 1 second sampling, with RTCM 3.0 to be added in the near future. Access to PBO data streams is currently unrestricted and users are free to rebroadcast these streams provided they do not charge for these services. Our experience with this program indicates that we are technically capable of streaming real time GPS data from most of our network using existing telemetry, although PBO's IT infrastructure would have to be upgraded to support an expansion of the current system.

Las Cumbres Observatory Global Telescope Network (LCOGT) is creating a network of telescopes to be placed around the world providing 24/7 sky coverage of both the Northern and Southern hemispheres. These telescopes will range in size from 0.4 m to 2.0 m and will be available for scientific and educational uses in both real-time and in a queue-scheduler. The educational uses of LCOGT will be primarily online through our website (http://www.lcogt.net) where there will be how-to guides, ideas for activities, opportunities for participating in research projects with our astronomers, full access to the public archive, as well as an online community built through forums and groups. Content will be visible to all, although registered users will have the ability to add resources, post on blogs and forums, comment and rate existing pages and resources, collaborate in world-wide projects, and much more. The current network includes the two 2.0 m Faulkes Telescopes on Haleakala, Maui and at Siding Spring, Australia. A 0.8 m telescope located at Sedgwick Reserve in the Santa Ynez Valley is nearly commissioned and will be used both for local outreach events as well as on the LCOGT network. The first pair of 0.4 m telescopes has been deployed to Maui and are enclosed inside the clamshell dome with Faulkes Telescope North (FTN), but still have some time to go before they are fully commissioned. The site in Chile is currently being prepped for three 1.0 m and two pairs of 0.4 m telescopes with the site in South Africa to follow shortly. Other sites include the Canary Islands, a site in North America, one in Asia, and another site in Australia. The 0.4 m telescopes will be deployed by pair and the 1.0 m telescopes will be deployed in groups of two or three, all with research-grade instrumentation.

Since 2004, NCSA's Cybercollaboratory, which is built on top of the open source Liferay portal framework, has been evolving as part of NCSA's efforts to build national cyberinfrastructure to support collaborative research in environmental engineering and hydrological sciences and allow users to efficiently share contents (sensors, data, model, documents, etc.) in a context-sensitive way (e.g., providing different tools/data based on group affiliation and geospatial contexts). During this period, we provided the CyberCollaboratory to users in CLEANER (Collaborative Large-scale Engineering Analysis Network for Environmental Research, now WATer and Environmental Research Systems (WATERS) network) Project Office and several CLEANER /WATERS testbed projects. Preliminary statistics shows that one in four users (among over 400 registered users) provided contents with many other reading/accessing those contents (such as messages, documents, wikis). During the course of this use, and in evaluation by others including representatives from the CUAHSI (Consortium of Universities for the Advancement of Hydrologic Science) community, we have received significant feedback on issues of usability and suitability to various communities involved in environmental observatories. Much of this feedback applies to collaborative portals in general and some reflect a comparison of portals with newer Web 2.0 style social -networking sites. For example, users working in multiple groups found it difficult to get an overview of all of their activities and found differences in group layouts to be confusing. Users also found the standard account creation and group management processes cumbersome compared to inviting people to be friends on social sites and wanted a better sense of presence and social networks within the portal. The fragmentation of group documents between local stores, the portal document repository and email, and issues of "lost updates" was another significant concern. This poster reviews the usability feedback, identifies key issues that hinder traditional portal-based collaboration environments, and presents design changes made to the Cybercollaboratory to address them. Feedback on the effectiveness of the new design from hydrologists and

environmental researchers and preliminary results from a formal usability study will also be presented.

A magnetic observatory is a specially designed ground-based facility that supports time-series measurement of the Earth’s magnetic field. Observatory data record a superposition of time-dependent signals related to a fantastic diversity of physical processes in the Earth’s core, mantle, lithosphere, ocean, ionosphere, magnetosphere, and, even, the Sun and solar wind.

The Rainwater Observatory, located in French Camp, Mississippi, features astronomy workshops for educators and educational programs for the public. It also hosts an informal astronomical association and an annual amateur astronomers' conference. The educator workshops focus on activities to teach astronomy using robotic telescopes available through the Las Cumbres Global Telescope Network (including the Sangre Telescope at Rainwater Observatory), and on learning hands-on activities that can be used in the classroom to teach concepts of astronomy. The Observatory's web site includes an ask-an-astronomer feature, a virtual tour, information on the Sangre Astronomical Research Telescope (their newest research telescope), and an e-newsletter with information about upcoming programs and events and current headlines in space science.

The National Ecological Observatory Network (NEON) is a planned facility of the National Science Foundation with the mission to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental-scale ecology. Airborne remote sensing plays a critical role by providing measurements at the scale of individual shrubs and larger plants over hundreds of square kilometers. The NEON Airborne Observation Platform is designed to bridge scales from organism and stand scales, as captured by plot and tower observations, to the scale of satellite based remote sensing. Fused airborne spectroscopy and waveform LiDAR is used to quantify vegetation composition and structure. Panchromatic photography at better than 30 cm resolution will retrieve fine-scale information on land use, roads, impervious surfaces, and built structures. NEON will build three airborne systems to allow for regular coverage of NEON sites and the capacity to respond to investigator requests for specific projects. The system design achieves a balance between performance and development cost and risk, taking full advantage of existing commercial airborne LiDAR and camera components. To reduce risk during NEON construction, an imaging spectrometer design verification unit is being developed at the Jet Propulsion Laboratory to demonstrate that operational and performance requirements can be met. As part of this effort, NEON is also focusing on science algorithm development, computing hardware prototyping and early airborne test flights with similar technologies. This paper presents an overview of the development status of the NEON airborne instrumentation in the context of the NEON mission.

The Plate Boundary Observatory (PBO), part of the NSF-funded EarthScope project, is designed to study the three- dimensional strain field resulting from deformation across the active boundary zone between the Pacific and North American plates in the western United States. To meet these goals, UNAVCO will install 880 continuous GPS stations, 103 borehole strainmeter stations, 28 tiltmeters, and five laser strainmeters by October 2008. Such a broad network presents significant logisitical challenges, including moving supplies, equipment, and personnel around 6 million square kilometers, and this requires accurate tracking and careful planning. The PBO logistics chain includes the PBO headquarters at UNAVCO in Boulder, Colorado and five regional offices in the continental United States and Alaska, served by dozens of suppliers spread across the globe. These offices are responsible for building and maintaining sites in their region. Most equipment and supplies first arrive in Boulder, where they are tagged and entered into a UNAVCO-wide equipment database, assembled and quality checked as necessary, and sent on to the appropriate regional office. Larger items which are costly to store and ship from Boulder, such as batteries or long sections of stainless steel pipe and bar required for monuments, are shipped directly from the supplier to each region as needed. These supplies and equipment are also tracked through the ordering, delivery, installation, and maintenance cycle via Earned Value Management techniques which allow us to meet NSF and other Federal procurement rules. Early prototypes and assembly configurations aid the development of material and supply budgets. A thorough understanding of Federal procurement rules at project start up is critical as the project moves forward.

The micro-scale and meso-scale ocean dynamic processes which are nonlinear and have large variability, have a significant impact on the fisheries, natural resources, and marine climatology. A rapid, refined and sophisticated observation system is therefore needed in marine scientific research. The maneuverability and controllability of mobile sensor platforms make them a preferred choice to establish ocean observing networks, compared to the static sensor observing platform. In this study, marine vehicles are utilized as the nodes of mobile sensor networks for coverage sampling of a regional ocean area and ocean feature tracking. A synoptic analysis about marine vehicle dynamic control, multi vehicles mission assignment and path planning methods, and ocean feature tracking and observing techniques is given. Combined with the observation plan in the South China Sea, we provide an overview of the mobile sensor networks established with marine vehicles, and the corresponding simulation results. PMID:22368475

The North Pole Environmental Observatory (NPEO) is a collection of the University of Washington's year-round un-manned scientific platforms in the Central Basin of the Arctic Ocean. Researchers will find images, data, and other information about the three types of measurement systems: Drifting Buoys, Oceanographic Mooring, and Aerial Surveys of Hydrographic Casts. Viewers can find links to the weather and other atmospheric conditions at the observatory. The site also provides links to news coverage pertaining to NPEO. Students can study the circulation patterns of the Freshwater Switchyard of the Arctic Ocean. Everyone can learn about the international research team's yearly expeditions to the observatory.

Seven Centers for Ocean Science Education Excellence were established in 2002 to promote the integration of ocean science research into high-quality education programs aimed at both formal and informal audiences throughout the United States. The network includes Centers in New England, the MidAtlantic region, the Southeast, Florida and the Central Gulf of Mexico as well as two complementary Centers in

LINX and STREON represent large experimental networks to understand the dynamics of stream ecosystems. These inter-site coordinated experiments represent a shift towards research whose goal is to understand how the drivers of ecosystem structure and function change across major continental-scale environmental gradients. LINX consisted of two consecutive, inter-site studies involving 15N-tracer additions to streams to determine rates and mechanisms of nitrogen cycling at the scale of entire stream reaches. The LINX studies, which lasted for a decade, were the first to use the 15N addition approach to determine gross rates of ammonium and nitrate uptake, nitrification, and denitrification under ambient conditions in stream ecosystems across several biomes and many types of land use. The LINX studies documented the important roles of stream hydrology (flow and transient storage zones), chemistry (N concentrations), and biology (in- stream gross primary production and respiration rates) in controlling N uptake and retention. Stream network models based on field results showed that streams are important sites for N retention in the landscape. Although LINX demonstrated the importance of experiments conducted across stream networks, these studies were limited in duration and could not address questions dealing with long-term impacts. STREON, the stream component of the planned National Ecological Observatory Network (NEON), is intended to use long-term observations and experimental nutrient and consumer organism manipulations to understand controls and forecast changes in stream ecosystems. The observations, to be conducted in a network of more than 20 streams across the U.S. and Puerto Rico over 30 years, will involving state-of-the- art in situ sensors and data communication devices as well as periodic sampling and analyses to determine hydrologic, geomorphologic, biogeochemical, and biological properties and processes. The experiments, to be conducted at about 10 sites over at least 10 years, will involve N and P additions and secondary consumer exclosures to provide a better understanding of how eutrophication and consumer extinction and extirpation, two of the most pervasive forms of environmental change, interact to affect stream ecosystems. Together, the STEON observational and experimental studies will provide critical information on effects of such stresses as climate change, land use change, invasive species, and N deposition on stream ecosystems.

The connection between the CORK ("Circulation Obviation Retrofit Kit") borehole observatory monitoring Ocean Drilling Program (ODP) borehole 1026B and the NEPTUNE Canada ocean

network in September of 2009 marks the beginning of a new era of cabled subseafloor observations. The electrical power and real-time data access provided by cables improve the sampling rate, life time, and timing accuracy of existing borehole instrumentation. Cabled observatories also provide the opportunity to deploy advanced instruments that consume more power and produce more data than ever before. Using data from the 1026B CORK, we demonstrate how the higher sampling rate of cabled CORK observatories enables us to study phenomena like ocean weather and hydrologic responses to seismic waves. In an outlook we show how CORKs and new borehole instruments-planned for future connection to the NEPTUNE Canada ocean network-can help to yield critical information on the accumulation of stress and resulting strain of plate-scale crustal movements. In the future, these CORKs and new geodetic borehole instrumentation will provide a time-series of strain signals associated with the Cascadia subduction zone that would not have been possible with remote sensing or land-based monitoring. These CORKs will not only represent a new approach for earthquake research but the high-frequency, real-time data could also directly contribute to earthquake and tsunami early warning systems.

An experimental development of a computer controlled photoelectric ocular system applied for the LaCoste and Romberg G949 gravimeter made the continuous observation of time variation of gravity possible. The system was operated for half a year in the Sopronbánfalva Geodynamical Observatory to test its capabilities. The primary aim of this development was to provide an alternative and self-manageable solution instead of the standard electronic (Capacitive Position Indicator) reading of this type of gravimeter and use it for the monitoring of Earth tide. It, however, turned out that this system is sensitive enough to observe the effect of variable seismic noise (microseisms) due to the changes of ocean weather in the North Atlantic and North Sea regions at microGal level (1 ?Gal = 10-8 m/s2). Up to now not much attention was paid to its influence on the quality and accuracy of gravity observations because of the large distance (>1000 km) between the observation place (generally the Carpathian-Pannonian basin) and the locations (centres of storm zones of the northern hydrosphere) of triggering events. Based on an elementary harmonic surface deformation model the noise level of gravity observations was compared to the spectral characteristics of seismic time series recorded at the same time in the observatory. Although the sampling rate of gravity records was 120 s the daily variation of gravity noise level showed significant correlation with the variation of spectral amplitude distribution of the analysed high pass filtered (cut-off frequency = 0.005 Hz) seismograms up to 10 Hz. Also available daily maps of ocean weather parameters were used to support both the correlation analysis and the parameterization of the triggering events of microseisms for further statistical investigations. These maps, which were processed by standard image processing algorithms, provide numerical data about geometrical (distance and azimuth of the storm centres relative to the observation point) and physical (mass of swelling water) quantities. The information can be applied for characterizing the state of ocean weather at a given day which may help the prediction of its influence on gravity measurements in the future. Probably it is the first attempt to analyse quantitatively the effect of ocean weather on gravity observations in this specific area of the Carpathian-Pannonian region.

The Plate Boundary Observatory (PBO) GPS network is providing accurate and spatially coherent vertical signals that can be interpreted in terms of hydrological loading and poroelastic effects from both natural and anthropogenic changes in water storage. Data used for this analysis are the precise coordinate time series produced on a daily basis by PBO Analysis Centers at New Mexico Institute of Mining and Technology and at Central Washington University and combined by the Analysis Center Coordinator at the Massachusetts Institute of Technology. These products, as well as derived velocity solutions, are made freely available from the UNAVCO Data Center in Boulder. Analysis of secular trends and annual variations in the time series was made using the analysis software of Langbein, 2008. Spatial variations in the amplitude and phase of the annual vertical component of motion allow for identification of anthropogenic effects due to water pumping, irrigation, and reservoir lake variations, and of outliers due to instrumental or other local site effects. Vertical annual signals of 8-10 mm peak-to-peak amplitude are evident at stations in the mountains of northern and central California and the Pacific Northwest. The peak annual uplift is in October and is correlated to hydrological loading effects. Mountainous areas appear to be responding elastically to the load of the water contained in surface soil, fractures, and snow. Vertical signals are highest when the water load is at a minimum. The vertical elastic hydrologic loading signal was

modeled using the 0.25 degree community NOAH land-surface model (LSM) and generally fits the observed GPS signal. Addition comparisons will be made using the Mosaic LSM and the NOAA "Leaky Bucket" hydrologic model. In contrast to mountain stations that are installed principally in bedrock, stations in the valleys of California are installed in sediments. Observations from these stations show greater spatial variability ranging from almost no detectable annual signal to very large, 20-30 mm, vertical amplitudes that reach a maximum in March. Vertical signals in the valleys are the result of poroelastic effects induced by groundwater variations caused by pumping for irrigation or other purposes and are highest when groundwater is at maximum recharge level. Secular trends in the vertical time series show 1-3 mm/yr of subsidence across the western U.S. In areas of groundwater pumping the rates are up to several cm/yr showing subsidence as pumping exceeds annual recharge over a multi-year time period. In the mountainous areas where hydrologic loading is evident in the annual signals, secular trends show uplift of 1-3 mm/yr possibly due to regional drought and decreased overall water volumes that result in less load and vertical uplift. Overall, these results illustrate the potential of using GPS data to constrain hydrological models. In return, accurate hydrologic loading models will be needed to better measure and detect vertical tectonic motions at the mm-level.

A mountain-to-valley virtual hydrologic observatory in Central California provides a focus for data and information in support of hydrologic research, a testbed for prototype measurement systems, and guidance for development of measurement and cyber infrastructure in an actual observatory. The multiple rivers and watersheds making up the 60,000 km2 greater San Joaquin drainage are physically disconnected by mountain-front dams that provide flood control, hydropower, seasonal water delivery and recreation. However, the mountain and valley portions are institutionally connected in multiple ways. For example, each year the winter snowpack and watershed conditions determine the magnitude of annual runoff. Errors in snowpack measurements and runoff forecasts have huge economic implications for valley water users. Second, valley flood control, water quality, irrigation demand and hydropower operations have a very strong interest in influencing mountain watershed management. The broader aim of the Sierra Nevada-San Joaquin Hydrologic Observatory is to build research infrastructure and promote research for improving the knowledge base for sound hydrologic management in the Sierra Nevada, San Joaquin Valley and across the Western U.S. In the Sierra Nevada the current focus is on developing spatially distributed instrument clusters that, when blended with remotely sensed data, will improve water balance closure from hillslope to watershed scales. Five instrument clusters at or just above the rain-snow transition are in place and under development. In the San Joaquin Valley, the focus is on sensor systems for observing fertilizer application rates in agriculture, groundwater-surface water exchanges in rivers, and flow and mixing in the confluence zones between the main stem San Joaquin and tributary Merced Rivers. A common digital library and analysis framework further links the mountain and valley portions of the virtual observatory (see https://eng.ucmerced.edu/dev00/snsjno).

A fundamental goal of the new National Science Foundation (NSF) initiative National Ecological Observatory Network (NEON) is to provide timely and broad access to the ecological data collected at NEON sites. Information management and data collection will be critical components to achieving this goal and a successful NEON implementation. The Southeast Ecological Observatory Network (SEEON) working group recognized the importance of information management and sensor technology in its first planning workshop and recommended that interested parties in the region come together to discuss these subjects in the context of the needs and capabilities of a southeast regional ecological observatory network. In February 2004, 28 participants from 14 organizations including academic institutions, state and federal agencies, private and non-profit entities convened at the Space Life Sciences Laboratory (SLSL) at the Kennedy Space Center, Florida for two days of presentations and discussions on ecological sensors and information management. Some of the participants were previously involved in the first SEEON workshop or other meetings concerned with NEON, but many were somewhat new to the NEON community. Each day focused on a different technical component, i.e. ecological sensors the first day and cyber-infrastructure the second day, and were structured in a similar manner. The mornings were devoted to presentations by experts to help stimulate discussions on aspects of the focal topic held in the afternoon. The formal and informal discussions held during the workshop succeeded in validating some concerns and needs identified in the first SEEON workshop, but also served to bring to light other questions or issues

that will need to be addressed as the NEON planning and design stages move forward. While the expansion of the SEEON community meant that some of the presentation and discussion time was needed to help bring the newcomers up to speed on the goals, objectives and current status of the various NEON efforts, the additional perspectives and technical expertise included in this workshop helped fuel some valuable interdisciplinary discussions that will need to continue to bring SEEON and NEON to fruition. Participants agreed that continued discussions of SEEON are needed , to keep up the momentum and that the southeast region must continue to be represented at the national level. It is vital that the all'the regions continue to push things forward for NEON to succeed.

We have developed an observatory and telescope for automated rapid response observations of Gamma Ray Burst afterglows. The instrument is composed of a Celestron14 on a Paramount ME, with an Apogee U47 CCD, JMI electronically controlled focuser, and a DFM Engineering FW-82 filter wheel. The dome is located off of the Blue Ridge Parkway at Appalachian State University's Dark Sky Observatory. The system is controlled by Skynet, a website that allows queuing for astronomical observations on scientific telescopes world wide via software developed at UNC-Chapel Hill for their PROMPT array at Cerro Tololo. TheSky6 and MaximDL control the telescope movement and imaging, respectively, and are interfaced with Skynet through Terminator, a software program run on-site to control the actions of the telescope and monitor the weather conditions at the observatory. Weather monitoring is provided by online data from a Davis Vantage Pro weather station, a Boltwood cloud sensor, a Seeing Camera, a SBIG All-Sky ("meteor") camera, and, coming soon, a donated CONCAM. One of the more difficult parts in the development was finding a way to power and remotely control our Ash dome. The dome slit is now opened on clear nights with power from solar cells mounted on the side of the dome. Both slit opening/closing and azimuthal movement are controlled using hardware encoders by Observa-Dome Laboratories. Wireless connection with dome control is possible using RF signals which Automadome regulates. When the telescope is not observing GRB afterglows the telescope is available for use by any registered Skynet user for their own scientific research or for teaching astronomy labs to high school and college students. We are grateful for the support provided by the North Carolina Space Grant, the Appalachian State University Research Council, and the National Science Foundation through the awarded grants AST-0520812 and AST-0722491.

The National Ecological Observatory Network (NEON) will be the first observatory network of its kind designed to detect and enable forecasting of ecological change at continental scales over multiple decades. NEON will collect data at sites distributed at 20 ecoclimatic domains across the United States on the impacts of climate change, land use change, and invasive species on natural resources and biodiversity. The NEON Airborne Observation Platform (AOP) is an aircraft platform carrying remote sensing instrumentation designed to achieve sub-meter to meter scale ground resolution, bridging the scales from organisms and individual stands to satellite-based remote sensing. AOP instrumentation consists of a VIS/SWIR imaging spectrometer, a scanning small-footprint waveform LiDAR, and a high resolution airborne digital camera. AOP data will provide quantitative information on land use change and changes in ecological structure and chemistry including the presence and effects of invasive species. A Pathfinder Flight Campaign was conducted over a two week period during late August to early September 2010 in order to collect representative AOP data over one NEON domain site. NASA JPL flew the AVIRIS imaging spectrometer and NCALM flew an Optech Gemini waveform LiDAR over the University of Florida Ordway-Swisher Biological Station and Donaldson tree plantation near Gainesville Florida. The pathfinder data are discussed in detail along with how the data are being used for early algorithm and product development prototyping activities. The data collected during the campaign and prototype products are openly available to scientists to become more familiar with representative NEON AOP data.

Division of Ocean Sciences Fall 2003 Newsletter Ocean Observatory Science by Alexandra Isern (continued on page 4) Ocean Observatory Science..... Cooperative Activities in Environmental Research between the National Science Foundation and the European Commission: Ecology and Oceanography of Harmful Algae (NSF 03-580) Deadline: Oct. 16, 2003 Ocean Observatories Initiative Project Office to Coordinate Ocean Observing Activiities (NSF 03-576) Letter of Intent Due Date (required...

IODP Expedition 319 (“Riser and Riserless Observatory-1”, NanTroSEIZE Stage 2) was the first time in IODP history that scientific riser operations were conducted. As part of this groundbreaking advance in scientific drilling, other technologies and sampling methods were also introduced: scientific mud-gas monitoring, drilling cuttings collection and analysis, MDT, and VSP (walk-away and zero-offset). Although the goals and achievements for Expedition 319 were modest, we will describe the operational portions of these technologies, and also discuss the potential and benefits of future riser drilling operations. JAMSTEC’s Center for Deep Earth Exploration (CDEX), the Japanese Implementing Organization and operator of the riser drillship Chikyu, this year performed the inaugural riser drilling expedition for IODP, as part of NanTroSEIZE Stage 2, Expedition 319, “Riser and Riserless Observatories”. Riser drilling is a typical method of drilling in industry, since it helps prevent loss of petroleum while drilling at sea, and also allows for deeper drilling depths, when compared with the usual non-riser drilling. The system aboard Chikyu is an industrial design riser system, which has just completed drilling operations in the Kumano Basin, drilling and casing a riser hole, Hole C0009A, to 1607.3 mBSF in water 2054 m BSL deep. The riser drilling system maintains a connection between the riser pipe suspended from the drillship to the sea floor blowout preventer (BOP), which makes a seal between the riser pipe and well head, and below to the cased intervals of the borehole below the seafloor. This allows the drilling mud to circulate down through the drillpipe, out the bit, and back up the casing and riser pipe to the drillship. This cools the bit, clears the borehole of cuttings (recovered aboard ship in the shale shakers) and allows real-time mud-gas monitoring. Mud weight can be more carefully controlled and adjusted, improving the quality of mudcake on the borehole wall, and as a result, allows for much deeper drilling than is currently possible with non-riser technology. There are some limitations in using the riser system: 1) it takes a great deal of preparation and set-up time before actual drilling begins, 2) it cannot be used in areas where the sea currents move at speed greater than 3.5 knots, and 3) it cannot be used in water less than 500 meters deep.

An ongoing topic in wireless sensor networks is the aim to save energy. This often requires optimized protocols with a reduced performance and robustness. One currently successful wireless technology with a very strict low-power design is EnOcean. This paper analyzes its protocol performance by deriving an analytical performance analysis model that expresses different protocol aspects and devices' behaviors in various

With increasing population and urban development, societies grow more and more concerned over balancing the need to maintain adequate water supplies with that of ensuring the quality of surface and groundwater resources. For example, multiple stressors such as overfishing, runoff of nutrients from agricultural fields and confined animal feeding lots, and pathogens in urban stormwater can often overwhelm a single water body. Mitigating just one of these problems often depends on understanding how it relates to others and how stressors can vary in temporal and spatial scales. Researchers are now in a position to answer questions about multiscale, spatiotemporally distributed hydrologic and environmental phenomena through the use of remote and embedded networked sensing technologies. It is now possible for data streaming from sensor networks to be integrated by a rich cyberinfrastructure encompassing the innovative computing, visualization, and information archiving strategies needed to cope with the anticipated onslaught of data, and to turn that data around in the form of real-time water quantity and quality forecasting. Recognizing this potential, NSF awarded $2 million to a coalition of 12 institutions in July 2005 to establish the CLEANER Project Office (Collaborative Large-Scale Engineering Analysis Network for Environmental Research; http://cleaner.ncsa.uiuc.edu). Over the next two years the project office, in coordination with CUAHSI (Consortium of Universities for the Advancement of Hydrologic Science, Inc.; http://www.cuahsi.org), will work together to develop a plan for a WATer and Environmental Research Systems Network (WATERS Network), which is envisioned to be a collaborative scientific exploration and engineering analysis network, using high performance tools and infrastructure, to transform our scientific understanding of how water quantity, quality, and related earth system processes are affected by natural and human-induced changes to the environment. This presentation will give an overview of the draft CLEANER program plans for the WATERS Network and next steps.

The Salmonid Rivers Observatory River Project (SaRON) is a multi-year, multi-disciplinary project which has been assessing the state of intact, pristine salmon rivers around the Pacific Rim. The goal of this research is to illuminate the natural ecological functions of these dynamic and diverse systems as well as use the information to describe targets for restoration of impacted rivers. Our research has shown that the Shifting Habitat Mosaic (SHM) of unconstrained floodplain reaches is important in structuring the freshwater and riparian components of salmon ecosystems. The amount and productivity of available habitat in flood plains is a primary control on salmon abundance. Our research around the Pacific Rim has found that channel complexity is correlated with salmon abundance. Juvenile fish density linearly increased, R2=0.95, with a greater number of channel separations and returns. Some rivers with high habitat values had low salmon abundances. For example, the Kitlope River in British Columbia has channel complexity, 0.09 nodes per square km of watershed area, showing high habitat availability. Thus, our model predicted 3.48 fish per square meter but measured values 0.56 fishes per square meter. Paleolimnological study demonstrated a legacy over-harvest in this system, explaining the discrepancy between the actual and reference value. These results will be establishing reference values and ranges in natural variation.

Archival material has revealed milestones and new details in the history of the Norwegian Naval Observatories. We have identified several of the instrument types used at different epochs. Observational results have been extracted from handwritten sources and an extensive literature search. These allow determination of an approximate location of the first naval observatory building (1842) at Fredriksvern. No physical remains exist today. A second observatory was established in 1854 at the new main naval base at Horten. Its location is evident on military maps and photographs. We describe its development until the Naval Observatory buildings, including archives and instruments, were completely demolished during an allied air bomb raid on 23 February 1945. The first director, C.T.H. Geelmuyden, maintained scientific standards at the the Observatory between 1842 and 1870, and collaborated with university astronomers to investigate, develop, and employ time-transfer by telegraphy. Their purpose was accurate longitude determination between observatories in Norway and abroad. The Naval Observatory issued telegraphic time signals twice weekly to a national network of sites, and as such served as the first national time-service in Norway. Later the Naval Observatory focused on the particular needs of the Navy and developed into an internal navigational service.

Teams participating in the 2006 ROV competition organized by the Marine Advanced Technology Education (MATE) Center and the Marine Technology Society's (MTS) ROV Committee experienced first-hand the scientific and technical challenges that many ocean scientists, technicians, and engineers face every day. The competition tasked more than 1,000 middle and high school, college, and university students from Newfoundland to Hong Kong with designing and building ROVs to support the next generation of ocean observing systems. Teaming up with the National Office for Integrated and Sustained Ocean Observations, Ocean. US, and the Ocean Research Interactive Observatory Networks (ORION) Program, the competition highlighted ocean observing systems and the careers, organizations, and technologies associated with ocean observatories. The student teams were challenged to develop vehicles that can deploy, install, and maintain networks of instruments as well as to explore the practical applications and the research questions made possible by observing systems.

Seismological and Volcanological observatories have common needs and often common practical problems for multi disciplinary data monitoring applications. In fact, access to integrated data in real-time and estimation of measurements uncertainties are keys for an efficient interpretation, but instruments variety, heterogeneity of data sampling and acquisition systems lead to difficulties that may hinder crisis management. In Guadeloupe observatory, we have developed in the last years an operational system that attempts to answer the questions in the context of a pluri-instrumental observatory. Based on a single computer server, open source scripts (Matlab, Perl, Bash, Nagios) and a Web interface, the system proposes: an extended database for networks management, stations and sensors (maps, station file with log history, technical characteristics, meta-data, photos and associated documents); a web-form interfaces for manual data input/editing and export (like geochemical analysis, some of the deformation measurements, ...); routine data processing with dedicated automatic scripts for each technique, production of validated data outputs, static graphs

on preset moving time intervals, and possible e-mail alarms; computers, acquisition processes, stations and individual sensors status automatic check with simple criteria (files update and signal quality), displayed as synthetic pages for technical control. In the special case of seismology, WebObs includes a digital stripchart multichannel continuous seismogram associated with EarthWorm acquisition chain (see companion paper Part 1), event classification database, location scripts, automatic shakemaps and regional catalog with associated hypocenter maps accessed through a user request form. This system leads to a real-time Internet access for integrated monitoring and becomes a strong support for scientists and technicians exchange, and is widely open to interdisciplinary real-time modeling. It has been set up at Martinique observatory and installation is planned this year at Montserrat Volcanological Observatory. It also in production at the geomagnetic observatory of Addis Abeba in Ethiopia.

Editorial Introduction to the Autonomous Ocean Sampling Network (AOSN-II) program ``Prediction is very difficult, especially about the future.'' Origin disputed but often attributed to physicist Niels Bohr. Determination of the present and future state of the ocean remains one of the greatest challenges

The USA National Phenology Network (USA-NPN; www.usanpn.org), established in 2007, is a national science and monitoring initiative focused on phenology as a tool to understand how plants, animals and landscapes respond to climatic variability and change. Core functions of the National Coordinating Office (NCO) of USA-NPN are to provide a national information management system including databases, develop and implement internationally standardized phenology monitoring protocols, create partnerships with a variety of organizations including field stations for implementation, facilitate research and the development of decision support tools, and promote education and outreach activities related to phenology and climate change. This presentation will describe programs, tools and materials developed by USA-NPN to facilitate science, management and education related to phenology of plants, animals and landscapes within protected areas at local, regional and national scales. Particular emphasis will be placed on the on-line integrated animal and plant monitoring program, Nature's Notebook, which provides standardized protocols for phenological status monitoring and data management for over 500 animal and plant species. The monitoring system facilitates collection of sampling intensity, absence data, considerable metadata (from site to observation). We recently added functionality for recording estimates of animal abundance and plant canopy development. Real-time raw data for plants (from 2009 to present) and animals (from 2010 to present), including FGDC-compliant metadata and documented methodology, are now available for download from the website. A new data exploration tool premiered in spring 2010 allows sophisticated graphical visualization of integrated phenological and meteorological data. The network seeks to develop partnerships with other organizations interested in (1) implementing vetted, standardized protocols for phenological or ecological monitoring, and (2) using phenology data and information for a variety of modeling applications.

The GEOSCOPE observatory consists of a global seismic network and a data center. The observatory was launched in 1982 by the French National Center of Scientific Research (CNRS/INSU) and progressively 30 stations have been installed across all continents and on islands throughout the oceans. The GEOSCOPE stations are located on 18 countries and equipped with three component very broad-band seismometers (STS1 or STS2) and 24 or 26 bit digitizers, as required by the Federation of Seismic Digital Network (FDSN). In most stations a pressure gauge and a thermometer are also installed. During the last years, 13 stations have been upgraded in order to send data in real or near real time to GEOSCOPE Data Center. In 2008, two new real time stations will be installed in the Indian Ocean: in the South of Madagascar and on Rodrigues island. Four stations in the Carribean region and in South America will also be upgraded to send real time data to GEOSCOPE Data Center and to local tsunami warning centers. Continuous data of all stations are collected in real time or with a delay by the GEOSCOPE Data Center in Paris where they are validated, stored and made accessible to the international scientific community. Users have free and open access to: - real time data from 13 stations. These data are transfered from the stations to the Geoscope Data Center using the seedlink protocol developed by GEOFON. Seedlink also enables to make these data accessible to the Tsunami Warning Centers and to other data center. These data are available to users through the GEOSCOPE web interface. - validated

continous waveforms and meta data of all stations by using the NetDC system (Networked Data Centers). Data can be requested from the GEOSCOPE Data Center and from other networked centers associated to the FDSN. - a selection of seismograms corresponding to large earthquakes via a web interface - the power spectrum estimates of the seismic noise averaged over sequences of 24 hours for each station. The noise levels of the past 10 years of continuous data has been computed and are accessible via the web. The noise level of real time data is computed at day-8. GEOSCOPE data center is now networked to the French virtual data center, FOSFORE, in order to give a unique access to french seismological data. In Europe, GEOSCOPE data center participates in NERIES project (NA3 activity) in order to create a distributed archive and database for all continuous digital waveform recordings of the Euro-Mediterranean region.

Ocean bottom seismometer (OBS) networks represent a tool of opportunity to study fin and blue whales. A small OBS network on the Juan de Fuca Ridge in the northeast Pacific Ocean in ~2.3 km of water recorded an extensive data set of 20-Hz fin whale calls. An automated method has been developed to identify arrival times based on instantaneous frequency and amplitude and to locate calls using a grid search even in the presence of a few bad arrival times. When only one whale is calling near the network, tracks can generally be obtained up to distances of ~15 km from the network. When the calls from multiple whales overlap, user supervision is required to identify tracks. The absolute and relative amplitudes of arrivals and their three-component particle motions provide additional constraints on call location but are not useful for extending the distance to which calls can be located. The double-difference method inverts for changes in relative call locations using differences in residuals for pairs of nearby calls recorded on a common station. The method significantly reduces the unsystematic component of the location error, especially when inconsistencies in arrival time observations are minimized by cross-correlation. PMID:23039436

As part of the 2009 American Recovery and Reinvestment Act (ARRA), NSF is investing in onshore-offshore instrumentation to support geophysical studies of the Cascadia margin. EarthScope's Plate Boundary Observatory (PBO) is contributing to this objective by upgrading 232 of its GPS stations in the Pacific Northwest to high-rate sampling and real-time telemetry to provide streaming data from this large-aperture network to the public. By blanketing the Pacific Northwest with real-time GPS coverage, the NSF is creating a natural laboratory in an area of great scientific interest and high geophysical hazard in order to spur new volcano and earthquake research opportunities. Streaming high-rate GPS data in real-time will enable researchers to routinely analyze for strong ground motion monitoring and earthquake hazards mitigation. As of this fall, all of the 232 proposed Cascadia stations have been equipped with 3G capable modems or high-speed data radios, as well as updated power systems. These stations have been added to PBO's real time network, which is currently providing 1Hz-streaming data from 290 stations in BINEX, RTCM2.3 and RTCM 3.0 formats via the NTrip protocol from servers located at UNAVCO headquarters in Boulder, CO to 385 active connections. All 1Hz streams are also archived and available via FTP. Selected stations have been added to the casters prior to fieldwork in order to provide a baseline data set used to demonstrate improvements in latencies and completeness after upgrades. PBO has also been collecting data with the Trimble VRS3Net software for latency comparisons between various cell carriers and radio network configurations. From the field to the end user, average latencies from cell carriers range from 0.2s to 1.5s, while radio networks range from 0.1s to 2.0s. Analysis of this data allows PBO to implement adjustments to the network that will optimize station and data delivery performance.

The Stratospheric Observatory for Infrared Astronomy (SOFIA) is a joint project between NASA and Deutsches Zentrum fuer Luft- und Raumfahrt (DLR), the German Space Agency. SOFIA is based in a Boeing 747 SP and flown in the stratosphere to observe infrared wavelengths unobservable from the ground. In 2007 Dryden Flight Research Center (DFRC) inherited and began work on improving the plane and its telescope. The improvements continue today with upgrading the plane and improving the telescope. The Observatory Verification and Validation (V&V) process is to ensure that the observatory is where the program says it is. The Telescope Status Display (TSD) will provide any information from the on board network to monitors that will display the requested information. In order to assess risks to the program, one must work through the various threats associate with that risk. Once all the risks are closed the program can work towards improving the

observatory.

Ecological observations, such as those from eddy covariance flux towers that provide direct measurements of the ecosystem exchange of water, carbon and energy, typically are made at small spatial scales but estimates of ecosystem processes at the regional and continental scale are required to diagnose, understand and predict the response of the global water and carbon cycles to a changing environment. The National Ecological Observatory Network (NEON) is a continental-scale facility that will collect ecological data, including eddy covariance flux observations, from 60 sites in the continental US, Alaska, Hawaii, and Puerto Rico over 30 years. However, despite the sample design and unprecedented spatial coverage of this new network, only a very small fraction of the US land area will be directly sampled. In order to meet NEON data product requirements to produce gridded data sets of carbon and water fluxes across the continent an approach is required that will allow spatial extrapolation from NEON sites and make temporal forecasting on decadal timescales possible. We are developing a model-data fusion framework in which NEON data will be combined with the Community Land Model (CLM) using a Bayesian approach to produce optimal solutions for model parameter values, states and fluxes. Here we briefly outline a methodology in which we have developed the Community Earth System Model (CESM) infrastructure to allow an ensemble of multiple instances of CLM to work simultaneously. This has allowed us to develop a model-data fusion framework in which we have coupled CLM with the National Center for Atmospheric Research's Data Assimilation Research Testbed (DART) Ensemble Kalman filter. We then discuss some initial results from an observing system simulation experiment in which we have attempted to optimize a limited subset of CLM parameters that a sensitivity analysis has shown strongly affect vegetation dynamics and land-atmosphere fluxes of carbon and water. We then describe some of the challenges of using this approach with complex land surface models, such as CLM, which require an extended "spin-up" run period to bring large pools of carbon and nitrogen into a quasi-equilibrium state for current climate drivers and model parameterizations. We also highlight the shortcomings of using carbon flux data alone, and the need for multiple types of ecosystem observations to effectively constrain model parameters over a variety of timescales.

This website presents the news, events, and research of one of the UK and Ireland's leading astronomical research institutes, Armagh Observatory. Users can learn about the Observatory's many research projects in topics including stellar astrophysics, solar physics, and climate and meteorology. The site presents the long history of the observatory and its instruments. Educators can discover the outreach programs available at the Armagh Planetarium. Novices can find information on the objects they observe in the night sky. The site offers abstracts and full papers of many of the Observatory's publications from 1995 to the present.

Yoshiyuki Kaneda Katsuyoshi Kawaguchi*, Eiichiro Araki*, Shou Kaneko*, Hiroyuki Matsumoto*, Takeshi Nakamura*, Masaru Nakano*, Shinichirou Kamiya*, Keisuke Ariyoshi*, Toshitaka Baba*, Michihiro Ohori*, Narumi Takakahashi*, and Takane Hori** * Earthquake and Tsunami Research Project for Disaster Prevention, Leading Project , Japan Agency for Marine-Earth Science and Technology (JAMSTEC) **Institute for Research on Earth Evolution, Japan Agency for Marine-Earth Science and Technology (JAMSTEC) DONET (Dense Ocean Floor Network for Earthquakes and Tsunamis) is the real time monitoring system of the Tonankai seismogenic zones around the Nankai trough southwestern Japan. We were starting to develop DONET to perform real time monitoring of crustal activities over there and the advanced early warning system. DONET will provide important and useful data to understand the Nankai trough maga thrust earthquake seismogenic zones and to improve the accuracy of the earthquake recurrence cycle simulation. Details of DONET concept are as follows. 1) Redundancy, Extendable function and advanced maintenance system using the looped cable system, junction boxes and the ROV/AUV. DONET has 20 observatories and incorporated in a double land stations concept. Also, we are developed ROV for the 10km cable extensions and heavy weight operations. 2) Multi kinds of sensors to observe broad band phenomena such as long period tremors, very low frequency earthquakes and strong motions of mega thrust earthquakes over M8: Therefore, sensors such as a broadband seismometer, an accelerometer, a hydrophone, a precise pressure gauge, a differential pressure gauge and a thermometer are equipped with each observatory in DONET. 3) For speedy detections, evaluations

and notifications of earthquakes and tsunamis: DONET system will be deployed around the Tonankai seismogenic zone. 4) Provide data of ocean floor crustal deformations derived from pressure sensors: Simultaneously, the development of data assimilation method using DONET data is very important to improve the recurrence cycle simulation model. 5) Understanding of the interaction between the crust and upper mantle around the Nankai trough subduction zone. We will deploy DONET not only in the Tonankai seismogenic zone but also DONET2 with high voltages in the Nankai seismogenic zone western the Nankai trough: The total system will be deployed to understand the seismic linkage between the Tonankai and Nankai earthquakes: Using DONET and DONET2 data, we will be able to observe the crustal activities and before and after slips at the Tonankai earthquake and Nankai earthquake. And we will improve the recurrence cycle simulation model by the advanced data assimilation method. Actually, we constructed one observatory in DONET and observed some earthquakes and tsunamis. We will introduce details of DONET/DONET2 and some observed data.

This study produced maps of the partial pressure of oceanic carbon dioxide (pCO2sea) in the North Pacific on a 0.25° latitude × 0.25° longitude grid from 2002 to 2008. The pCO2sea values were estimated by using a self-organizing map neural network technique to explain the non-linear relationships between observed pCO2sea data and four oceanic parameters: sea surface temperature (SST), mixed layer depth, chlorophyll a concentration, and sea surface salinity (SSS). The observed pCO2sea data was obtained from an extensive dataset generated by the volunteer observation ship program operated by the National Institute for Environmental Studies. The reconstructed pCO2sea values agreed rather well with the pCO2sea measurements, the root mean square error being 17.6 ?atm. The pCO2sea estimates were improved by including SSS as one of the training parameters and by taking into account secular increases of pCO2sea that have tracked increases in atmospheric CO2. Estimated pCO2sea values accurately reproduced pCO2sea data at several stations in the North Pacific. The distributions of pCO2sea revealed by seven-year averaged monthly pCO2sea maps were similar to Lamont-Doherty Earth Observatory pCO2sea climatology and more precisely reflected oceanic conditions. The distributions of pCO2sea anomalies over the North Pacific during the winter clearly showed regional contrasts between El Niño and La Niña years related to changes of SST and vertical mixing.

Subaru Telescope has recently replaced most equipment of Subaru Telescope Network II with the new equipment which includes 124TB of RAID system for data archive. Switching the data storage from tape to RAID enables users to access the data faster. The STN-III dropped some important components of STN-II, such as supercomputers, development & testing subsystem for Subaru Observation Control System, or data processing subsystem. On the other hand, we invested more computers to the remote operation system. Thanks to IT innovations, our LAN as well as the network between Hilo and summit were upgraded to gigabit network at the similar or even reduced cost from the previous system. As the result of the redesigning of the computer system by more focusing on the observatory operation, we greatly reduced the total cost for computer rental, purchase and maintenance.

The Alaska Lake Ice and Snow Observatory Network (ALISON) was initiated by Martin Jeffries (UAF polar scientist), Delena Norris-Tull (UAF education professor) and Ron Reihl (middle school science teacher, Fairbanks North Star Borough School District). The snow and ice measurement protocols were developed in 1999-2000 at the Poker Flat Research Range (PFRR) by Geophysical Institute, University of Alaska scientists and tested by home school teacher/students in winter 2001-2002 in Fairbanks, AK. The project was launched in 2002 with seven sites around the state (PFRR, Fairbanks, Barrow, Mystic Lake, Nome, Shageluk and Wasilla). The project reached its broadest distribution in 2005-2006 with 22 sites. The schools range from urban (Wasilla) to primarily Alaska native villages (Shageluk). They include public schools, charter schools, home schooled students and parents, informal educators and citizen scientists. The grade levels range from upper elementary to high school. Well over a thousand students have participated in ALISON since its inception. Equipment is provided to the observers at each site. Measurements include ice thickness (with a hot wire ice thickness gauge), snow depth and snow temperature (surface and base). Snow samples are taken and snow density derived. Snow variables are used to calculate the conductive heat flux through the ice and snow cover to the atmosphere. All data are available on the Web site.

The students and teachers are scientific partners in the study of lake ice processes, contributing to new scientific knowledge and understanding while also learning science by doing science with familiar and abundant materials. Each autumn, scientists visit each location to work with the teachers and students, helping them to set up the study site, showing them how to make the measurements and enter the data into the computer, and discussing snow, ice and polar environmental change. A number of 'veteran' teachers are now setting up the study sites on their own. Each summer, a workshop in Fairbanks offers the teachers the opportunity to work and learn together, sharing their ALISON field experiences and transfer to the classroom, testing activities and materials, and adding to their content knowledge. This experiential learning project demonstrates that teachers and students can make scientifically valuable measurements when provided with easy-to-use equipment, clear directions and training. The project also shows that when provided with a stimulating learning opportunity, teachers and students find imaginative ways to extend the experience. For example, a number of students have made videos about their ALISON. Lesson plans using ALISON-related science concepts have been generated by ALISON teachers and others. Several ALISON teachers have published articles about the ALISON experience. ALISON teachers have been awarded prestigious Toyota Tapestry grants in support of their activities.

Data from two broadband, ocean-bottom seismographic stations deployed ~225 km southwest of Oahu, Hawaii during the Ocean Seismic Network Pilot Experiment provide constraints on upper mantle structure beneath the Hawaiian swell. Receiver functions show that the mantle transition zone is thinned by >50 km relative to reference model PA5, which, in the absence of compositional changes, implies excess temperatures of >350 K in the transition zone. The combination of the measurements reported here and the thickness variations reported by Li et al. [2000] imply that the transition zone is thinned by 30 +/- 15 km over an along-swell dimension of at least 700 km. At ~80 km depth, P-to-S converted phases are identified from the Gutenberg discontinuity marking the lid of the oceanic low-velocity zone and the base of the lithosphere. Shear-wave splitting measurements imply that fast-polarization azimuths are intermediate between the absolute plate-motion vector and the fossil spreading direction; multi-event stacked values of ø and ?t are -80° and 1.5 s, respectively.

After his return from further studies in Paris in 1887, the astronomer and meteorologist Milan Nedeljkovi? founded the temporary Astronomical and Meteorological Observatory. Four years later, on May 1, 1891, a building dedicated to this observatory received a permanent building specially designed for this purpose, and the initial house was rented out. The observatory functioned as the head office of the Serbian Network of Meterological Stations. Included are facts regarding the observatory building as well as its owner.

At the end of a 4 year project dedicated to the constitution of a Network of Excellence (NoE) on subsea observatories in Europe, large expectations are still in the agenda. The economical crisis changes the infrastructure construction planning in many ways but the objectives are quite clear and may be reached at European scale. The overall objective of the ESONET NoE was to create an organisation able to implement, operate and maintain a sustainable underwater observation network, extending into deep water, capable of monitoring biological, geo-chemical, geological, geophysical and physical processes occurring throughout the water column, sea floor interface and solid earth below. This main objective of ESONET has been met by creating the network of 11 permanent underwater observation sites together with the "ESONET Vi" Virtual Institute organising the exchange of staff and joint experiments on EMSO large research infrastructure observatories. The development of recommendations on best practices, standardization and interoperability concepts concerning underwater observatory equipment, as synthetized by the so called ESONET Label document has been created. The ESONET Label is a set of criteria to be met by the deep-sea observatory equipment as well as recommended solutions and options to guarantee their optimal operation in the ocean over long time periods. ESONET contributes to the fixed point sustained observatory community which extends worldwide, is fully multidisciplinary and in its way may open a new page in ocean sciences history.

This online article, from Cosmic Horizons: Astronomy at the Cutting Edge, takes an in-depth look at the new generation of astronomy equipment. It provides an overview of the discovery of neutrinos,

subatomic particles, and their role in the developing field of physics, studies that showed that nuclear reactions, including those that power the stars, produce an enormous number of neutrinos, the creation of neutrino observatories deep underground and the stunning and unexpected advances these observatories have already made.

The VENUS (http:\\/\\/venus.uvic.ca\\/) and NEPTUNE Canada (http:\\/\\/neptunecanada.ca\\/) cabled ocean observatories have been envisioned from their inception as underwater extensions of the Internet. Having sensors connected to a network opens up tremendous opportunities, from realtime access to sensor measurements to the interactive control of remote assets. Moreover, with a software system in control, data from all sensors can be managed, archived

This online Hayden Planetarium resource explains the concept of the Virtual Observatory and contains links to the following eight sites: International Virtual Observatory Alliance, National Virtual Observatory, National Virtual Observatory Education and Outreach, Astrophysical Virtual Observatory, Canadian Virtual Observatory, AstroGrid, SkyView, and Theory in a Virtual Observatory.

The Australian Ocean Data Network (AODN) is a rapidly growing distributed data network bringing together marine data collections from Commonwealth Agencies, Universities, State Governments, national programs and private industry. These data are made publicly available through the AODN portal (http://portal.aodn.org.au), an open source information infrastructure itself downloadable from https://github.com/aodn/aodn-portal. Increasingly, the data collections are multi-disciplinary requiring access to multiple layers of information from different sources. This requires rich metadata to enable the appropriate layers to be discovered and integrated. Recently, the Marine Biodiversity Hub of the National Environmental Research Program (NERP), funded by the Australian Government Department of Sustainability, Environment, Water, Population and Communities, has commited to making its data publicly available through the AODN. The next 3-4 years provide a key opportunity to fundamentally change the way we monitor marine biodiversity throughout Australia. The Hub collaborates with the Department and stakeholders to understand ecosystems and biodiversity especially in Northern Australia. Key outcomes will include better methods for measuring ecosystem health and Marine Protected Area (MPA) performance, more management options, and increased understanding of marine biodiversity and ecosystem functioning, leading to improved monitoring and management of marine biodiversity and listed species in Australia. The ability to bring together the wide range of data necessary to fulfil the Marine Biodiversity Hub's aims represents a challenge for the AODN. This will be illustrated through a test case based on marine park requirements.

To deliver high power and broadband communication to the ocean floor requires a number of changes to existing technology developed to bridge oceans from shore to shore. The dry-dry solution is well mastered and although it evolves over time following technological innovations, adapting it to become a dry-wet solution represents a major technical challenge. The cabled observatory system developed for

Because large earthquakes have repeatedly occurred in subduction zones, it is important to observe seismic activities on the sea floor. An ocean bottom cabled seismometers (OBCS) system is the most suitable tool for this purpose since data can be obtained in real-time. Although the existing OBCS systems are useful for the study of seismic activities, the number of stations is limited due to their cost. Therefore, lower cost in both production and installation is desired. We have developed a new OBCS system utilizing IP technologies. IP technologies yield the new OBCS system that are more compact and less expensive, while a large amount of complex hardware is used in the existing OBCS system. System reliability is ensured by using IP network technologies that provide redundancy. The new OBCS system was first installed to observe the Niigata-Kobe tectonic zone in the Japan Sea on September 2010. Although this first OBCS system has a total length of 25km, it has been proven that seismic data can be successfully obtained and that the new OBCS system is effective and useful for the dense observation of seismogenic activities on the sea floor around Japan.

We recently introduced the idea that neural networks may be used to construct catalogues of

geomorphological features, by extrapolating from the characteristics of a set of hand-selected examples (Valentine et al., 2012). These learning algorithms are inspired by the complex pattern identification and recognition capabilities of the human brain and remove the need to develop an a priori model of the feature of interest. In order to demonstrate this approach, and to develop a clearer understanding of its possibilities and pitfalls, we concentrate on the problem of identifying seamounts - isolated topographic highs of volcanic origin - in the world's oceans. The distribution of seamounts in time and space can provide important constraints on the tectonic history and evolution of the Earth and has been studied using several conventional approaches (e.g. Kim & Wessel, 2011). However, these typically perform poorly in the Atlantic, where the slow spreading rate results in a rough 'background' seafloor that produces many false positives. The learning algorithm approach should improve this, as it attempts to encapsulate more complex information about the seamount and its surroundings. We present an overview of our work to date, with a focus on results from a systematic search for seamounts in the Atlantic. We compare the performance of our approach in detecting seamounts in bathymetric, free-air gravity anomaly and vertical gravity gradient (VGG) datasets to examine the particular strengths and weaknesses of each data type and to assess the potential benefits of assimilating information from two or three data types simultaneously. We compare the resulting seamount database with existing catalogues, examining the variations in measures such as total count, height distribution, and spatial and temporal distribution across the Atlantic, and comment on the potential implications for our understanding of the tectonic history of the region. Kim, S.-S. & Wessel, P., 2011. New global seamount census from altimetry-derived gravity data, Geophysical Journal International, 186, pp.615-631. Valentine, A., Kalnins, L. & Trampert, J., 2012. Hunting for seamounts using neural networks: learning algorithms for geomorphic studies, EGU General Assembly, Abstract EGU2012-4560. Valentine, A. & Trampert, J., 2012. Data-space reduction, quality assessment and searching of seismograms: Autoencoder networks for waveform data. Geophysical Journal International, 189, pp.1183-1201.

There exists presently a total of about 20 Fabry-Perot interferometer (FPI) observatories at various national and international locations around the globe dispersed between the polar and equatorial regions. These instruments operate on the principle of measuring the Doppler shifts and Doppler widths of atmospheric spectral lines emitted by metastable atomic species that are sufficiently long-lived in the mesosphere and thermosphere regions for local equilibrium to be attained before emission. Possible sources of these emissions are the layers of nightglow and dayglow emissions which originate from the production of active species as a consequence of the ionospheric chemistry of the upper atmosphere. At high latitudes the aurora generated by precipitating electrons or protons also represents a significant emission source. The determination of zonal and vertical wind components by these FPI observatories represents unique information concerning the dynamics of the upper atmosphere for both regions not available from other instrumental sources utilizing passive remote sensing principles. If these data products of temperature and winds for both regions could be assimilated within a reasonable elapse of time (perhaps one hour), these results would provide valuable constraints upon the bounds of modeling real-time parameters for thermospheric and mesospheric dynamics. The application of information technology can be readily envisioned to achieve the analysis of FPI data required for real time display and through transfer over the Internet network for data assimilation into global modeling codes. This paper would summarize the problems and science yields in achieving the assimilation of such measurements into the modeling framework envisioned.

Great magnetic storms (geomagnetic index C9 is ?8 for St. Petersburg, which can correspond to Kp ? 8 or Dst < -200 nT), registered from 1841 to 1870 at the St. Petersburg, Yekaterinburg, Barnaul, Nerchinsk, Sitka, and Beijing (at the Russian embassy) observatories are analyzed. A catalog of intensive magnetic storms during this period, which includes solar cycles 9-11, has been compiled. The statistical characteristics of great magnetic storms during this historical period have been obtained. These results indicate that high solar activity played a decisive role in the generation of very intense magnetic storms during the considered period. These storms are characterized by only one peak in a solar cycle, which was registered in the years of the cycle minimum (or slightly earlier): the number of great geomagnetic storms near the solar activity maximum was twice as large as the number of such storms during less active periods. A maximum in September-October and an additional maximum in February are observed in the annual distribution of storms. In

addition, the storm intensity inversely depends on the storm duration.

The Large Volume Detector (LVD) in the INFN Gran Sasso National Laboratory, Italy, is a nu observatory mainly designed to study low energy neutrinos from the gravitational collapse of galactic objects. The experiment has been monitoring the Galaxy since June 1992, with increasing larger configurations: in January 2001 it has reached its final active mass M=1 kt. LVD is one of the largest liquid scintillator apparatus for the detection of stellar collapses and, together with SNO and SuperKamiokande, it is part of the SNEWS network.

The ocean's role in modulating the observed 1-7 Pg C yr-1 inter-annual variability in atmospheric CO2 growth rate is an important, but poorly constrained process due to sparse spatio-temporal ocean carbon measurements. Here, we investigate and develop a non-linear empirical approach to predict inorganic CO2 concentrations (total carbon dioxide (CT) and total alkalinity (AT) in the global ocean mixed-layer from hydrographic properties (temperature, salinity, dissolved oxygen and nutrients). The benefit of this approach is that once the empirical relationship is established, it can be applied to hydrographic datasets that have better spatio-temporal coverage, and therefore provide an additional constraint to diagnose ocean carbon dynamics globally. Previous empirical approaches have employed multiple linear regressions (MLR), and relied on ad-hoc geographic and temporal partitioning of carbon data to constrain complex global carbon dynamics in the mixed-layer. Synthesising a new global CT/AT carbon bottle dataset consisting of ~33 000 measurements in the open ocean mixed-layer, we develop a neural network based approach to better constrain the non-linear carbon system. The approach classifies features in the global biogeochemical dataset based on their similarity and homogeneity in a self-organizing map (SOM; Kohonen, 1988). After the initial SOM analysis, which includes geographic constraints, we apply a local linear optimizer to the neural network which considerably enhances the predictive skill of the new approach. We call this new approach SOMLO, or self-organizing multiple linear output. Using independent bottle carbon data, we compare a traditional MLR analysis to our SOMLO approach to capture the spatial CT and AT distributions. We find the SOMLO approach improves predictive skill globally by 19% for CT, with a global capacity to predict CT to within 10.9 ?mol kg-1 (9.2 ?mol kg-1 for AT. The non-linear SOMLO approach is particularly powerful in complex, but important regions like the Southern Ocean, North Atlantic and equatorial Pacific where residual standard errors were reduced between 25-40% over traditional linear methods. We further test the SOMLO technique using the Bermuda Atlantic time-series (BATS) and Hawaiian ocean (HOT) datasets, where hydrographic data was capable of explaining 90% of the seasonal cycle and inter-annual variability at those multi-decadal time-series stations.

Growth in human population and demand for wealth creates ever-increasing pressure on global soils, leading to soil losses and degradation worldwide. Critical Zone science studies the impact linkages between these pressures, the resulting environmental state of soils, and potential interventions to protect soil and reverse degradation. New research on soil processes is being driven by the scientific hypothesis that soil processes can be described along a life cycle of soil development. This begins with formation of new soil from parent material, development of the soil profile, and potential loss of the developed soil functions and the soil itself under overly intensive anthropogenic land use, thus closing the cycle. Four Critical Zone Observatories in Europe have been selected focusing research at sites that represent key stages along the hypothetical soil life cycle; incipient soil formation, productive use of soil for farming and forestry, and decline of soil due to longstanding intensive agriculture. Initial results from the research show that soil develops important biogeochemical properties on the time scale of decades and that soil carbon and the development of favourable soil structure takes place over similar time scales. A new mathematical model of soil aggregate formation and degradation predicts that set-aside land at the most degraded site studied can develop substantially improved soil structure with the accumulation of soil carbon over a period of several years. Further results demonstrate the rapid dynamics of soil carbon; how quickly it can be lost, and also demonstrate how data from the CZOs can be used to determine parameter values for models at catchment scale. A structure for a new integrated Critical Zone model is proposed that combines process descriptions of carbon and nutrient flows, a simplified description of the soil food web, and reactive transport; all coupled with a dynamic model for soil structure and soil aggregation. This approach is proposed as a methodology to analyse data along

the soil life cycle and test how soil processes and rates vary within, and between, the CZOs representing different life cycle stages. In addition, frameworks are discussed that will help to communicate the results of this science into a more policy relevant format using ecosystem service approaches.

Banwart, Steven; Menon, Manoj; Bernasconi, Stefano M.; Bloem, Jaap; Blum, Winfried E. H.; Souza, Danielle Maia de; Davidsdotir, Brynhildur; Duffy, Christopher; Lair, Georg J.; Kram, Pavel; Lamacova, Anna; Lundin, Lars; Nikolaidis, Nikolaos P.; Novak, Martin; Panagos, Panos; Ragnarsdottir, Kristin Vala; Reynolds, Brian; Robinson, David; Rousseva, Svetla; de Ruiter, Peter; van Gaans, Pauline; Weng, Liping; White, Tim; Zhang, Bin

Human impact on the environment has produced measurable changes in the geological record since the late 1700s. Anthropogenic emissions of CO2 today may cause the global climate to depart for its natural behavior for many millenia. CO2 is the primary anthropogenic driver of climate change. The Orbiting Carbon Observatory goals are to help collect measurements of atmospheric CO2, answering questions such as why the atmospheric CO2 buildup varies annually, the roles of the oceans and land ecosystems in absorbing CO2, the roles of North American and Eurasian sinks and how these carbon sinks respond to climate change. The present carbon cycle, CO2 variability, and climate uncertainties due atmospheric CO2 uncertainties are highlighted in this presentation.

The purpose of NASA's Earth Observatory is to provide a freely accessible publication on the Internet where the public can obtain new satellite imagery and scientific information about our home planet. The focus is on Earth's climate and environmental change. The site is divided into six main sections: Data and Images, Features, News, Reference, Missions, and Experiments. The Data and Images, Features, and Reference sections are each subdivided into sections for Atmosphere, Oceans, Land, Life on Earth, and Heat and Energy. The missions section explains all of the current NASA missions, and the Experiments section contains activities related to the topics covered in the other sections. Information provided in these pages includes text, photographs, animations, maps, and datasets. The site also includes a glossary, "ask a scientist" feature, and links to current news stories.

This Web site includes shares the images, stories and discoveries that emerge from NASA Earth science research, including its satellite missions, in-the-field research and climate models. View global maps of NASA data, check out the Image of the Day and images of current events, and read feature articles and blogs. Also includes special collections of NASA images, including the World of Change series, which documents how our planetï¿½s land, oceans, atmosphere and Sun are changing over time.

In 1977 a wide-aperture seismic network of land and ocean bottom stations (OBS) was operated for 6 weeks in the southern New Hebrides island arc. Data on the spatial distribution and mechanisms of small events recorded by this local network were integrated with worldwide observations of moderate to large size New Hebrides earthquakes of the past 17 years to study

We study the effect of mismodelling geophysical processes that lead to non-linear site motions in the analysis of space geodetic data such as GPS. We focus on the effects of non-tidal ocean loading and atmospheric loading on a global set of geodetic stations. We investigate their consequences on estimating the geocenter motion from the geodetic network. Ground displacements at each geodetic site induced by atmospheric and ocean loading are computed by convolving surface mass or pressure variations with Green functions to derive the vertical and horizontal displacement. The displacements resulting from atmospheric loading are computed using the surface pressure variations provided by the European Center for Medium-range Weather Forecasts (ECMWF) model (1.5° spatial and 3h time sampling). The ocean response is taken into account assuming both an inverted barometer and a non-inverted barometer response of the ocean to changes in the atmosphere. The first is derived from the atmospheric model. The latter is computed using the sea surface height variations from the Hydrodynamic Unstructured Grid Ocean global barotropic ocean model (0.25° spatial and 3h time sampling). Following an analysis of the spatial and temporal distribution of the atmospheric and non-tidal ocean deformations spanning a

global network from 2002 to 2011, we compare modelled displacements with existing geodetic time series. We estimate the difference in reduction of the weighted variance of the geodetic time series corrected for the non-tidal ocean loading using the two ocean models. To investigate the effect of neglecting the high frequency site motions caused by non-tidal ocean loading on the determination of geocenter motion, we compute the deformation in both the center of mass and center of figure reference frames. We then compute the time variable translation of the geocenter and subsequently compare this to what is obtained from a six parameter transformation to align our geodetic network to the International Terrestrial Reference Frame.

The US Naval Observatory is the oldest astronomical observatory in the United States, and the oldest continuously operating scientific institution in the US government. Founded in 1830 as a Depot of Charts and Instruments for rating chronometers and maintaining navigational instruments, by 1844 it had become the first national observatory of the United States, analogous to the ROYAL OBSERVATORY I...

Home of the Clark Telescope, the Lowell Observatory's mission is to pursue the study of astronomy, especially the study of our solar system and its evolution, to conduct pure research in astronomical phenomena, and to maintain quality public education and outreach programs to bring the results of astronomical research to the general public. The Steele Visitor Center, the staging area for all daytime tours and evening programs, also houses the interactive exhibit hall, the Giclas Lecture Hall, and more. Known for its solar system research, Lowell astronomers are conducting investigations of near-Earth asteroids, planetary satellites and ring systems, Centaurs, Kuiper Belt objects, and comets. A decades long study of the photometric stability of the Sun also continues. The Discovery Channel Telescope is Lowell Observatoryï¿½s newest project to design and construct a powerful, 4.2-meter telescope. Currently under development, the Discovery Channel Telescope will significantly advance Lowellï¿½s scientific research capabilities while providing opportunities for real-time global broadcasting and educational programming about astronomy and science.

Radio astronomy programs comprise three very-long-baseline interferometer projects, ten spectral line investigations, one continuum mapping in the 0.8 cm region, and one monitoring of variable sources. A low-noise mixer was used in mapping observations of 3C273 at 31 GHz and in detecting of a new methyl alcohol line at 36,169 MHz in Sgr B2. The new Mark 2 VLBI recording terminal was used in galactic H2O source observations using Haystack and the Crimean Observatory, USSR. One feature in W29 appears to have a diameter of 0.3 millisec of arc and a brightness temperature of 1.4 x 10 to the 15th power K. Geodetic baseline measurements via VLBI between Green Bank and Haystack are mutually consistent within a few meters. Radar investigations of Mercury, Venus, Mars, and the Moon have continued. The favorable opposition of Mars and improvements in the radar permit measurements on a number of topographic features with unprecedented accuracy, including scarps and crater walls. The floor of Mare Serenitatis slopes upward towards the northeast and is also the location of a strong gravitational anomaly.

Since 1991, the Ocean Drilling Program (ODP) and Integrated Ocean Drilling Program (IODP) have instrumented 24 holes drilled beneath the seafloor with long-term sealed-hole hydrological observatories called "CORKs." We present a historical summary of the designs of and experiences with the CORK observatories, starting from the 1989 concept sketch on a dinner napkin and continuing through three new installations planned in young Atlantic crust during IODP Expedition 336 during autumn of 2011. Understanding subseafloor hydrology in a variety of type environments has been a prime objective of scientific ocean drilling since the late 1970's. However, early experience indicated that holes that penetrated through marine sediments into underlying oceanic basement often allowed open exchange between formation fluids and ocean water, perturbing if not totally disturbing the in-situ hydrogeological state. This motivated the CORK approach to seal select holes with long-term sensor strings and data loggers, to record the recovery from drilling disturbances to the in-situ state and monitor natural hydrological signals. The original design included a single seal at the seafloor, and later designs have allowed for monitoring multiple zones in a single hole sealed by packers. The sensor strings have always included pressure and temperature monitoring, and many have included self-contained fluid samplers driven by osmotic

pumps ("OsmoSamplers") that can be tuned for a variety of geochemical and microbiological sampling objectives. Typically, data and samplers have been recovered and/or exchanged at average intervals of ~1-3 years using manned or unmanned research submersibles. One CORK is now connected to the NEPTUNE Canada cable network; this allows 1 Hz sampling frequency and eliminates demand on battery power and the need for submersible visits to collect data. Cable connections to other holes are now planned in both the Juan de Fuca and Nankai regions. Nearly all installations to date have been in sedimented young ocean crust or in subduction settings, but the approach can certainly be applied to hydrogeological, geophysical, microbiological, and other monitoring throughout subseafloor hydrological environments explored by scientific ocean drilling.

The Land\\/Ocean Biogeochemical Observatory (LOBO) is an ongoing project designed to quantify the biogeochemical processes of a coastal ecosystem by the development and operation of an in situ sensor network in Elkhorn Slough, California. The primary goal is to design and operate autonomous moorings that measure ambient nutrient concentrations and standard water properties at appropriate spatial and temporal scales to

The first deep-sea ocean observatory offshore of the continental United States has begun operating in the waters off central California. The remotely operated Monterey Accelerated Research System (MARS) will allow scientists to monitor the deep sea continuously. Among the first devices to be hooked up to the observatory are instruments to monitor earthquakes, videotape deep-sea animals, and study the effects of acidification on seafloor animals. ``Some day we may look back at the first packets of data streaming in from the MARS observatory as the equivalent of those first words spoken by Alexander Graham Bell: `Watson, come here, I need you!'," commented Marcia McNutt, president and CEO of the Monterey Bay Aquarium Research Institute, which coordinated construction of the observatory. For more information, see http://www.mbari.org/news/news_releases/2008/mars-live/mars-live.html.

An International Monitoring System (IMS) network or hydrophone- and seismometer-based sensors has been established over a period of ten years by the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) to monitor the global ocean for compliance with the Treaty. Six of the IMS monitoring stations use triplets of hydrophones cabled to shore, designed to provide continuous acoustic data in real-time via satellite data links to an International Data Centre in Vienna, Austria. Maintaining timely data availability is challenging, due to the vulnerability of cabled systems to ship-anchoring and fishing activities nearshore, and to natural events such as underwater landslides. Lead-times of two or more years are required for underwater systems repairs, so the CTBTO is currently exploring possibilities for temporary replacement hydrophone nodes to maintain continuous data availability. It is conceivable that national or international ocean observatories currently being established for scientific purposes could provide auxiliary hydroacoustic data to fill gaps in CTBTO's IMS coverage. Synergistically, it is possible that IMS hydroacoustic stations could act as auxiliary data sources for scientific ocean observatories. This paper presents the current status of the IMS hydroacoustic network, details its performance to date, discusses possible solutions to persistent data outages and proposes a synergistic engagement with the scientific ocean observatory community.

A Virtual Observatory is a platform for launching astronomical investigations: it provide access to huge data banks, software systems with user friendly interfaces for data visualisation and analysis, and even access to computers on which the analysis can be carried out. Virtual observatories the world over are seamlessly networked, and their resources can be accessed over the internet by astronomers regardless of their location, expertise and the level of access to their own advanced computing facilities. Due to their nature, virtual observatories can make an immense impact on the way astronomy is done in the developing world. I will consider in my talk some of the facilities that virtual observatories provide, discuss their possible use by astronomers, and also how even small groups in the developing world can contribute to the setting up of virtual observatories.

Preliminary results of the McDonald Observatory Skycam Project are presented. The Skycam Project couples an inexpensive wide field sky camera with the freely available Wolf wide field image analysis software made by the Night Sky Live Network. The robust software drastically enhances

the utility of the camera. The inexpensive software and hardware combination provides an effective sky imaging solution with very low investment cost. Applications to remote observatories are discussed. This project was conducted in ten weeks during the McDonald Observatory REU program funded under NSF AST-0243745.

The Plate Boundary Observatory (PBO), funded by NSF as part of the Earthscope program and installed and maintained by UNAVCO, includes 75 borehole strainmeters (BSMs), which makes it one of the largest strainmeter arrays in the world. Co-located with seismometers, and embedded within the PBO continuous GPS network, the strainmeters expand the bandwidth of the Observatory enabling the capture of signals with periods of days to minutes. Six years after installation of the first strainmeter, over 70% of the network is in compression and over 85% of the instruments have a strong signal to noise ratio in the M2 tidal band. UNAVCO's BSM engineers ensure the network usually collects over 95% percent of possible data. UNAVCO makes the BSM Level 0 (raw) and Level 2 (processed) data products available to the community via the Northern California Earthquake Data Center (NCEDC), the IRIS DMC and UNAVCO's own web site. Processed BSM data includes gauge, areal, differential and tensor shear strains plus data edits and time series corrections for barometric pressure, earth tides, ocean load and borehole trends. Before strain data can be incorporated into a geophysical model with confidence, however, an instrument response must be found that relates the gauge measurements to the regional strains (i.e., an in-situ calibration is needed). In this presentation we describe the method UNAVCO will use to calibrate PBO strainmeters using earth tides as a reference signal and assuming an anisotropic instrument setting. The calibrated data will be released in a simple delimited ASCII format and will be included with the processed data set that is currently updated every 24 hours. In addition to the 5-minute Level 2 data set, UNAVCO will include the calibrated areal and shear strains at 1-sps for significant events anywhere in the world as part of its Special Event series. In order to meet Earthscope goals of data transparency and processing repeatability, the expanded processed data sets will include a summary of the calibration method, tidal observations, predictions upon which the calibrations are based and the strain matrix used to generate the areal and shear data. This presentation will also describe the new file naming convention that will allow the user to 1.) select a preferred calibration method for their data and 2.) allow UNAVCO the flexibility of including new methods of calibration in the future.

The ability to characterize the response of small marine organisms to each other, and to their environment, is a demanding observational challenge. Small organisms live in a water reference frame, while existing cable or mooring-based observatories operate in an Earth reference frame. Thus repeated observations from a fixed system observe different populations as currents sweep organisms by the sensors. In contrast, mobile systems are typically optimized for spatial coverage rather than repeated observations of the same water volume. Lagrangian drifters track water mass, but are unable to find or reposition themselves relative to ocean features. We are developing a system capable of finding, following and observing discrete populations of marine organisms over time, leveraging a decade and a half investment in the Autonomous Ocean Sampling Network (AOSN) program. AOSN undertook the development of platforms to enable multi-platform coordinated measurement of ocean properties in the late 1990s, leading to the development of a variety of autonomous underwater vehicles (AUVs) and associated technologies, notably several glider systems, now in common use. Efforts by a number of research groups have focused on methods to employ these networked systems to observe and predict dynamic physical ocean phenomena. For example, periodic large scale field programs in Monterey Bay have progressively integrated these systems with data systems, predictive models, and web-based collaborative portals. We are adapting these approaches to follow and observe the dynamics of marine organisms. Compared to physical processes, the temporal and spatial variability of small marine organisms, particularly micro-organisms, is typical greater. Consequently, while multi-platform observations of physical processes can be coordinated via intermittent communications links from shore, biological observations require a higher degree of adaptability of the observation system in situ. This talk will describe the platform capabilities developed for such observations, the onboard intelligence for finding and observing discrete populations, and the cyberinfrastructure employed to understand and coordinate observations from shore.

We present NANO, a system that establishes whether performance degradations that services or clients experience are caused by an ISP’s discriminatory policies. To distinguish discriminationfromother causes of degradation(e.g., overload, misconfiguration, failure), NANO uses a statistical methodto estimate causal effect. NANO aggregatespassive measurements from end-hosts, stratifies the measurements to account for possible confoundingfactors, and distinguisheswhenanISPisdiscriminatingagainstaparticular serviceorgroupofclients. Usingsimulationwedemonstrate the promise of NANO for both detecting discrimination and absolvinganISP whenit isnotdiscriminating. 1.

The Brooks Astronomical Observatory, located at Central Michigan University, was built for research and public use. The website presents the history of the Observatory and its technological capabilities. Users can find a long list of scientific publications based on research performed at the observatory. The numerous astronomical topics researched include asteroids, stellar clusters, occultations, and light pollution. Individuals can view fantastic images of comets, planets, and other space phenomena collected at the Observatory.

This European Southern Observatory website features the La Silla Observatory's latest news, telescopes, and observation reports. Visitors can find sun and moon tables, a meteorological monitor, and satellite maps. Students can learn how the mountain's geologic and geographic features impact observational abilities. Researchers can find out about visiting the Observatory and how to apply to use the observation equipment. Everyone can view amazing images of La Silla's Chilean landscape and the Observatory's facilities.

On August 25 at 10:15 p.m. G.M.T. the first prototype of an underwater tsunami observatory was successfully deployed at 3207 m water depth in the Gulf of Cadiz. The deployment,150 km South of Portugal, was planned within the NEAREST project (Integrated observations from NEAR shore sources of Tsunamis: towards an early warning system - EC, cont. 37110) The observatory is based on the GEOSTAR platform, previously developed by a consortium led by INGV. The ocean bottom equipment includes a broad-band seismometer, hydrophone, gravitymeter and pressure gauge, allowing for cross-checking of the signals. Pre-processing of seismic and pressure data is done underwater. A relay surface buoy, equipped with additional meteorological sensors, is in acoustic link with the seafloor platform and performs satellite real-time transmission to the shore stations, where the integration of the marine with land data from operating networks will improve the reliability of the tsunami detection strategy. Additional sensors can be installed, in a framework of a multi-parameter seafloor observatory, able to characterise earthquake/ tsunami processes and to extend its capacity to a larger set of monitoring strategies. The deployment, performed by the R/V Urania, was supervised by a team of scientists and engineers from the partners in the project. The site of the seafloor observatory was selected according to the available geological and bathymetric data, to maximise proximity to the potential sources; its present position is 36º 21.875'N;09º28.885'W; 3207 m w.d. Data are currently being acquired and processed on an experimental basis and integrated with information from land monitoring networks of: Portugal, Spain and Morocco.This observatory is an important milestone towards a European tsunami warning system - UNESCO IOC resolution of December 2005 to develop the "North East Atlantic and Mediterranean Tsunami Warning System".

Increasingly, hydrologic studies require information on the isotopic composition of natural waters. This report presents stable hydrogen (?2H) and oxygen isotope ratios (?180) of precipitation samples from seven selected sites of the National Oceanic and Atmospheric Administration's Atmospheric Integrated Research Monitoring Network (AIRMoN) collected during the years 1992-1994.

The seafloor observation system becomes increasingly important infrastructure in ocean sciences, which transforms oceanic research from temporal investigation to long term observation. The East China Sea coastal seafloor observatory, located between 30°31'44"N,122°15'12"E and 30°31'34"N,122°14'40"E, is built near the Xiaoqushan island outside the Yangtze River estuary, on the inner East China Sea continental shelf. The East China Sea coastal seafloor observatory is part of the East China Sea seafloor observational network. The observatory consists of a composite

power cable made of optical fiber and extending for more than 1 kilometer and a special junction box, which provide power and signal communication for different instruments. The special junction box, which has various waterproof plugs, connects to three different instruments installed in a trawl preventer. The submarine optical fiber composite power cable is landed on the platform by The East China Sea Branch, State Oceanic Administration of the People's Republic of China, and the power is continuously supplied by the solar panels and solar battery on the top of the platform. The real time data are directly sent through the cable to the platform and are transmitted by CDMA wireless to the receiver at the State Key Laboratory of Marine Geology of Tongji University. Measurements at the observatory have been taken since 26 April, 2009. The observations include current speeds and their directions at different depths, suspended sediment concentration, temperature and salinity nearby the seabed. The more than one year preliminary results show that the current field and fine suspended sediment transport of East China Sea are complex and show considerable seasonal variation affected by the integrated influence of Changjiang diluted water, Taiwan warm current and the Yellow Sea coastal current. The successful establishment of the coastal seafloor observatory is the first step toward future development of the East China Sea seafloor observational network. It not only accumulates experiences in technology and engineering, but also paves the way for performing important sciences using the long term continuous observation platform.

Active volcanic areas in Europe constitute a direct threat to millions of European citizens. The recent Eyjafjallajökull eruption also demonstrated that indirect effects of volcanic activity can present a threat to the economy and the lives of hundreds of million of people living in the whole continental area even in the case of activity of volcanoes with sporadic eruptions. Furthermore, due to the wide political distribution of the European territories, major activities of "European" volcanoes may have a worldwide impact (e.g. on the North Atlantic Ocean, West Indies included, and the Indian Ocean). Our ability to understand volcanic unrest and forecast eruptions depends on the capability of both the monitoring systems to effectively detect the signals generated by the magma rising and on the scientific knowledge necessary to unambiguously interpret these signals. Monitoring of volcanoes is the main focus of volcano observatories, which are Research Infrastructures in the ESFRI vision, because they represent the basic resource for researches in volcanology. In addition, their facilities are needed for the design, implementation and testing of new monitoring techniques. Volcano observatories produce a large amount of monitoring data and represent extraordinary and multidisciplinary laboratories for carrying out innovative joint research. The current distribution of volcano observatories in Europe and their technological state of the art is heterogeneous because of different types of volcanoes, different social requirements, operational structures and scientific background in the different volcanic areas, so that, in some active volcanic areas, observatories are lacking or poorly instrumented. Moreover, as the recent crisis of the ash in the skies over Europe confirms, the assessment of the volcanic hazard cannot be limited to the immediate areas surrounding active volcanoes. The whole European Community would therefore benefit from the creation of a network of volcano observatories, which would enable strengthening and sharing the technological and scientific level of current infrastructures. Such a network could help to achieve the minimum goal of deploying an observatory in each active volcanic area, and lay the foundation for an efficient and effective volcanic monitoring system at the European level.

The solar-cycle-related (SC) variation, present in the annual means of geomagnetic elements recorded at European geomagnetic observatories between 1952-1980, is discussed in terms of magnetic a nd electromagnetic induction in the Earth, produced b y v ariations in the e xternal magnetospheric ring current. The vertical component of the SC variation, in which the e ffect of electromagnetic induction is

The Earth Observatory Glossary defines words from space science, ecology and Earth science. It is part of the NASA Earth Observatory site, which provides new satellite imagery and scientific information about Earth with a focus on climate and environmental change. The new glossary mode allows users to browse the Earth Observatory site with special terms highlighted that, when selected, will take you to the appropriate entry in the glossary.

Metabolism in freshwater ecosystems of terrestrial organic carbon provides a major source of CO2 outgassing to the atmosphere. This contradicts the conventional wisdom that terrestrial organic

carbon is recalcitrant and contributes little to the support of aquatic metabolism. We combine recent progress from geophysics, microbial ecology and organic geochemistry to show how the juxtaposition of geophysical opportunity and microbial capacity enhances the net heterotrophy in streams, rivers and estuaries. We identify hydrologic storage and retention zones that extend the residence time of organic carbon during downstream transport and thus provide opportunities for microorganisms to develop as attached biofilms or suspended aggregates, and to metabolize organic carbon for energy and growth. We consider fluvial networks within a meta-ecosystem context to include the acclimation of microbial communities in downstream ecosystems to exploit energy that "escapes" from upstream ecosystems and thereby increases overall energy utilization at the network level. Our interdisciplinary approach emphasises the coupled physical, chemical and microbial processes across various scales that may serve to enhance the predictability of carbon cycling in fluvial ecosystems.

The Lamont-Doherty Earth Observatory is a research division of Columbia University dedicated to understanding how the planet Earth works. Included in this page are the various areas of research the observatory is conducting. This includes research on the oceans climate and environment, solid Earth, and life/biology. A link to data repositories for each of these areas of study is also included. This includes data on borehole research, core repository, climate data library, earthquake strong motion, and coastal upwelling.

The Maritime Aerosol Network (MAN) has been collecting data over the oceans since November 2006. The MAN archive provides a valuable resource for aerosol studies in maritime environments. In the current paper we investigate correlations between ship-borne aerosol optical depth (AOD) and near-surface wind speed, either measured (onboard or from satellite) or modeled (NCEP). According to our analysis, wind speed influences columnar aerosol optical depth, although the slope of the linear regression between AOD and wind speed is not steep (approx. 0.004 - 0.005), even for strong winds over 10m/s. The relationships show significant scatter (correlation coefficients typically in the range 0.3 - 0.5); the majority of this scatter can be explained by the uncertainty on the input data. The various wind speed sources considered yield similar patterns. Results are in good agreement with the majority of previously published relationships between surface wind speed and ship-based or satellite-based AOD measurements. The basic relationships are similar for all the wind speed sources considered; however, the gradient of the relationship varies by around a factor of two depending on the wind data used

Kanzelhöhe Observatory (KSO; kso.ac.at) located in the South of Austria is part of the Institute of Physics of the University of Graz. Since the early 1940s, the Sun has been observed in various layers and wavelengths. Currently, KSO provides high-cadence full-disk observations of the solar disk in three wavelengths: H-alpha line, Ca II K line, white light. Real-time images are published online. For scientific use, the data is processed, and immediately available to the scientific community after each observing day via the Kanzelhöhe Online Data Archive archive (KODA; kanzelhohe.uni-graz.at). KSO is part of the Global H-Alpha Network and is also one of the contributing stations for the international sunspot number. In the frame of ESA's Space Situational Awareness program, methods are currently under development for near-real image recognition with respect to solar flares and filaments. These data products will give valuable complementary information for the solar sources of space weather.

With the advance of electronics, sound level meters have become more powerful when it comes to analyzing and storing huge amount of measurements. In recent years, these devices have been hooked up to the internet and stream life data. In the IDEA project, the whole concept of a sound observatory is turned upside down by stripping the sensor nodes to their bare essential, and by migrating all logic and data storage to computing centers. This opens new opportunities in particular for long-term environmental sound monitoring and analysis. As unlimited computing power is available, more advanced analysis such as auditory scene analysis can be incorporated. In addition, new analysis methods and indicators can be deployed on the whole network of sound observatories using up-to-date software agent technology. As each observatory is a cheap plug-and-measure device without any buttons or display, participatory sensing becomes easy: citizens plug in their device and data streams to central servers and is displayed on a website of choice for the

community. During the presentation, application cases in urban tranquil area, building site noise, wind turbine noise, and train noise monitoring, as well as noise mapping validation will be shown. PMID:23655965

Table of Contents: The Physical Ocean. The Chemical Ocean. The Biological Ocean. The Geoglogical Ocean. The Metorological Ocean. The Engineer's Ocean. The Global Ocean - Past, Present, and Future. Table 1: Distances, Areas, Volumes, and Weights. Table 2: Some Facts About the Earth and the Ocean. Table 3: Some Properties of Ocean Water. Table 4: Elements Present in Solution in Oceanic Seawater. Table 5: Animal Forms in the Ocean. Glossary. Bibliography. Index.

HartRAO, the only fiducial geodetic site in Africa, participates in VLBI, GNSS, and SLR global networks, among others. This report provides an overview of our geodetic VLBI activities and research during 2007. Further developments regarding the proposed new fundamental space geodetic observatory in the Karoo are presented.

The Sudbury Neutrino Observatory is a 1000 tonne heavy water Cerenkov detector built to observe neutrinos from the sun and from supernovae. It is located deep underground to reduce the cosmic background radiation to negligible levels. The observatory is nearing completion and will commence full data taking early in 1999. Some aspects of its design and construction, and some of

The Royal Observatory at Greenwich, London, founded in 1675, is the location of the Airy Transit Telescope that defines the prime meridian of the world and is the home of the Harrison Chronometers. The Observatory was founded by Charles II with the ultimate purpose of providing an accurate star catalog and model of the Moon's motion, that enabled mariners to

Retrieving the inherent optical properties of water from remote sensing multispectral reflectance measurements is difficult due to both the complex nature of the forward modeling and the inherent nonlinearity of the inverse problem. In such cases, neural network (NN) techniques have a long history in inverting complex nonlinear systems. The process we adopt utilizes two NNs in parallel. The first NN is used to relate the remote sensing reflectance at available MODIS-visible wavelengths (except the 678 nm fluorescence channel) to the absorption and backscatter coefficients at 442 nm (peak of chlorophyll absorption). The second NN separates algal and nonalgal absorption components, outputting the ratio of algal-to-nonalgal absorption. The resulting synthetically trained algorithm is tested using both the NASA Bio-Optical Marine Algorithm Data Set (NOMAD), as well as our own field datasets from the Chesapeake Bay and Long Island Sound, New York. Very good agreement is obtained, with R^2 values of 93.75%, 90.67%, and 86.43% for the total, algal, and nonalgal absorption, respectively, for the NOMAD. For our field data, which cover absorbing waters up to about 6 m?¹, R^2 is 91.87% for the total measured absorption. PMID:21743516

The observing post located on the roof of Strasbourg's 19th-century "Academy" is generally considered as the second astronomical observatory of the city: a transitional facility between the (unproductive) turret lantern at the top of the Hospital Gate and the German (Wilhelminian) Observatory. The current paper reviews recent findings from archives (blueprints, inventories, correspondence, decrees and other documents) shedding some light on this observatory of which virtually nothing was known to this day. While being, thanks to Chrétien Kramp (1760-1826), an effective attempt to establish an actual observatory equipped with genuine instrumentation, the succession of political regimes in France and the continual bidding for moving the university to other locations, together with the faltering of later scholars, torpedoed any significant scientific usage of the place. A meridian instrument with a Cauchoix objective doublet was however recovered by the German observatory and is still existing.

A pilot Coastal Observatory has been established in Liverpool Bay which integrates (near) real-time measurements with coupled models and whose results are displayed on the web. The aim is to understand the functioning of coastal seas, their response to natural forcing and the consequences of human activity. The eastern Irish Sea is an apt test site, since it encompasses a comprehensive

range of processes found in tidally dominated coastal seas, including near-shore physical and biogeochemical processes influenced by estuarine inflows, where both vertical and horizontal gradients are important. Applications include hypernutrification, since the region receives significantly elevated levels of nutrient inputs, shoreline management (coastal flooding and beach erosion/accretion), and understanding present conditions to predict the impact of climate change (for instance if the number and severity of storms, or of high or low river flows, change). The integrated measurement suite which started in August 2002 covers a range of space and time scales. It includes in situ time series, four to six weekly regional water column surveys, an instrumented ferry, a shore-based HF radar system measuring surface currents and waves, coastal tide gauges and visible and infra-red satellite data. The time series enable definition of the seasonal cycle, its inter-annual variability and provide a baseline from which the relative importance of events can be quantified. A suite of nested 3D hydrodynamic, wave and ecosystem models is run daily, focusing on the observatory area by covering the ocean/shelf of northwest Europe (at 12-km resolution) and the Irish Sea (at 1.8 km), and Liverpool Bay at the highest resolution of 200 m. The measurements test the models against events as they happen in a truly 3D context. All measurements and model outputs are displayed freely on the Coastal Observatory website (http://cobs.pol.ac.uk) for an audience of researchers, education, coastal managers and the public.

Two changes in recording the sunspot record have occurred in recent years. First, in 1976, the longer-than-100-yr daily photographic record of the Royal Greenwich Observatory (RGO), used for determination of numbers and positions of sunspot groups and sunspot areas ended, and second, at the end of 1980, after more than 130 years, Zurich s Swiss Federal Observatory stopped providing daily sunspot numbers. To extend the sunspot record beyond 1976, use of United States Air Force/National Oceanic and Atmospheric Administration (USAF/NOAA) sunspot drawing observations from the Solar Optical Observing Network began in 1977, and the combined record of sunspot activity from RGO/USAF/NOAA was made accessible at http://science.nasa.gov/ssl/PAD/SOLAR/greenwch.htm. Also, in 1981, the task of providing daily sunspot numbers was taken up by the Royal Observatory of Belgium s Solar Influences and Data analysis Center, and the combined Zurich/International sunspot number database was made available at http://sidc.oma.be/index.php3. In this study, Rome Observatory 1958-1998 photographic records of sunspot areas, numbers of groups, and derived sunspot numbers are compared against same-day international values to determine relative behaviors and to evaluate whether any potential changes might have been introduced in the overall sunspot record, due to the aforementioned changes.

The New York Harbor Observation and Prediction System (NYHOPS) is a real-time, estuarine and coastal ocean observing and modeling system for the New York Harbor and surrounding waters. Real-time measurements from in-situ mobile and stationary sensors in the NYHOPS networks are assimilated into marine forecasts in order to reduce the discrepancy with ground truth. The forecasts are obtained from the ECOMSED hydrodynamic model, a shallow water derivative of the Princeton Ocean Model. Currently, all sensors in the NYHOPS system are operated in a fixed mode with uniform sampling rates. This technology infusion effort demonstrates the use of Model Predictive Control (MPC) to autonomously adapt the operation of both mobile and stationary sensors in response to changing events that are -automatically detected from the ECOMSED forecasts. The controller focuses sensing resources on those regions that are expected to be impacted by the detected events. The MPC approach involves formulating the problem of calculating the optimal sensor parameters as a constrained multi-objective optimization problem. We have developed an objective function that takes into account the spatiotemporal relationship of the in-situ sensor locations and the locations of events detected by the model. Experiments in simulation were carried out using data collected during a freshwater flooding event. The location of the resulting freshwater plume was calculated from the corresponding model forecasts and was used by the MPC controller to derive control parameters for the sensing assets. The operational parameters that are controlled include the sampling rates of stationary sensors, paths of unmanned underwater vehicles (UUVs), and data transfer routes between sensors and the central modeling computer. The simulation experiments show that MPC-based sensor control reduces the RMS error in the forecast by a factor of 380% as compared to uniform sampling. The paths of multiple UUVs were simultaneously calculated such that measurements from on-board sensors would lead to maximal reduction in the

forecast error after data assimilation. The MPC controller also reduces the consumption of system resources such as energy expended in sampling and wireless communication. The MPC-based control approach can be generalized to accept data from remote sensing satellites. This will enable in-situ sensors to be regulated using forecasts generated by assimilating local high resolution in-situ measurements with wide-area observations from remote sensing satellites.

With the development of robotic telescopes and stable remote observing software, it is currently possible for a small institution to have an affordable astronomical facility for astronomy education. However, a faculty member has to deal with the light pollution (observatory location on campus), its nightly operations and regular maintenance apart from his day time teaching and research responsibilities. While building an observatory at a remote location is a solution, the cost of constructing and operating such a facility, not to mention the environmental impact, are beyond the reach of most institutions. In an effort to resolve these issues we have developed a robotic remote observatory that can be operated via the internet from anywhere in the world, has a zero operating carbon footprint and minimum impact on the local environment. The prototype observatory is a clam-shell design that houses an 8-inch telescope with a SBIG ST-10 CCD detector. The brain of the observatory is a low draw 12-volt harsh duty computer that runs the dome, telescope, CCD camera, focuser, and weather monitoring. All equipment runs of a 12-volt AGM-style battery that has low lead content and hence more environmental-friendly to dispose. The total power of 12-14 amp/hrs is generated from a set of solar panels that are large enough to maintain a full battery charge for several cloudy days. This completely eliminates the need for a local power grid for operations. Internet access is accomplished via a high-speed cell phone broadband connection or satellite link eliminating the need for a phone network. An independent observatory monitoring system interfaces with the observatory computer during operation. The observatory converts to a trailer for transportation to the site and is converted to a semi-permanent building without wheels and towing equipment. This ensures minimal disturbance to local environment.

Measured positions of sunspot groups that differ in format, precision and observing procedure are collected from various data sets: GPR (Greenwich Photoheliographic Results), SOON/USAF/NOAA (Solar Optical Observing Network/United States Air Force/National Oceanic and Atmospheric Administration), as well as from the Kodaikanal and Debrecen observatories. Kanzelh&{uml;o}he and Kandilli Observatory currently provide the digitized sunspot drawings, from which the positions of selected sunspot groups are determined with a special software Sungrabber. The rotation velocities are calculated from the position data. The aim of this work is to compare and to check the precision of the mentioned data sets using the Kanzelh&{uml;o}he Observatory data set as the reference basis of sunspot position measurements. The selected groups (about 40% consist of single sunspots Z&{uml;u}rich types H and J) are from the years 1972 and 1993 belonging to similar declining phases of two solar activity cycles. The occurrence of some systematic differences of the sunspot group positions and rotation velocities suggests the need for a more detailed analysis of the data accumulation procedures.

The W. M. Keck Observatory, located on the summit of Mauna Kea on the island of Hawaii, takes advantage of its high altitude and stable atmospheric conditions to engage in advanced research into the deepest regions of the universe. The observatory's website includes information on its two ten-meter telescopes, their revolutionary segmented mirrors, and some of the research programs currently under way. There is also information on the observatory's research communities and their allocations of observing time; how to apply for time, and information for scheduled observing teams. The site's news and outreach page features archived press releases and links to the observatory's newsletter and "Cosmic Matters" magazine. The educational page includes podcasts of the observatory's astronomers discussing recent discoveries, information on field trips and class visits, and information on the family ASTRO program. Photos of the instruments, the observatory site, and a selection of remote images captured by the telescopes are collected in an image gallery, and there is also a bibliography of articles referencing data collected at the observatory.

Griffith Observatory has been the iconic symbol of the sky for southern California since it began its public mission on May 15, 1935. While the Observatory is widely known as being the gift of Col. Griffith J. Griffith (1850-1919), the story of how Griffith’s gift became reality involves many of the

people better known for other contributions that made Los Angeles area an important center of astrophysics in the 20th century. Griffith began drawing up his plans for an observatory and science museum for the people of Los Angeles after looking at Saturn through the newly completed 60-inch reflector on Mt. Wilson. He realized the social impact that viewing the heavens could have if made freely available, and discussing the idea of a public observatory with Mt. Wilson Observatory's founder, George Ellery Hale, and Director, Walter Adams. This resulted, in 1916, in a will specifying many of the features of Griffith Observatory, and establishing a committee managed trust fund to build it. Astronomy popularizer Mars Baumgardt convinced the committee at the Zeiss Planetarium projector would be appropriate for Griffith's project after the planetarium was introduced in Germany in 1923. In 1930, the trust committee judged funds to be sufficient to start work on creating Griffith Observatory, and letters from the Committee requesting help in realizing the project were sent to Hale, Adams, Robert Millikan, and other area experts then engaged in creating the 200-inch telescope eventually destined for Palomar Mountain. A Scientific Advisory Committee, headed by Millikan, recommended that Caltech Physicist Edward Kurth be put in charge of building and exhibit design. Kurth, in turn, sought help from artist Russell Porter. The architecture firm of John C. Austin and Fredrick Ashley was selected to design the project, and they adopted the designs of Porter and Kurth. Philip Fox of the Adler Planetarium was enlisted to manage the completion of the Observatory and become its temporary Director.

The Chuetsu-Oki Earthquake occurred on July 16, 2007. To understand the mechanism of earthquake generation, it is important to obtain a detailed seismic activity. Since the source region of the 2007 Chuetsu-oki Earthquake lies mainly offshore of Chuetsu region, a central part of Niigata Prefecture, it is difficult to estimate the geometry of faults using only the land seismic network data. A precise aftershock distribution is essential to determine the fault geometry of the mainshock. To obtain the detailed aftershock distribution of the 2007 Chuetsu-oki Earthquake, 32 Ocean Bottom Seismometers (OBSs) were deployed from July 25 to August 28 in and around the source region of the mainshock. In addition, a seismic survey using airguns and OBSs was carried out during the observation to obtain a seismic velocity structure below the observation area for precise hypocenter determination. Seven hundred and four aftershocks were recorded with high spatial resolution during the observation period using OBSs, temporally installed land seismic stations, and telemetered seismic land stations and were located using the double-difference method. Most of the aftershocks occurred in a depth range of 6-15 km, which corresponds to the 6-km/s layer. From the depth distribution of the hypocenters, the aftershocks occurred along a plane dipping to the southeast in the whole aftershock region. The dip angle of this plane is approximately 40°. This single plane with a dip to the southeast is considered to represent the fault plane of the mainshock. The regions where few aftershocks occurred are related to the asperities where large slip is estimated from the data of the mainshock. The OBS observation is indispensable to determine the precise depths of events which occur in offshore regions even close to a coast.

The Coastal Ocean Observatory Laboratory (COOL) Classroom Web site of Rutgers Marine and Coastal Sciences offers several online lessons. The Navigation and Ocean Currents activity provides online and downloadable material such as worksheets, data, and maps to use to complete the activity. Among other things, students are asked to determine the speed of surface currents and calculate the amount of time it would take for a ship to reach a selected end point. Although the activity is a bit difficult to follow, requiring some teacher assistance, the site provides a unique and challenging learning experience that's well worth attempting.

The Dartmouth Flood Observatory produced this website as "a research tool for detection, mapping, measurement, and analysis of extreme flood events world-wide using satellite remote sensing." Users can learn about the Observatory's use of microwave and optical satellite imaging to determine flooding and extreme low flow conditions for various places throughout the world. Students and researchers can discover how the observatory monitors wetland hydrology for various places. Researchers can find archives of large flooding events from 1985 to the present. The web site features a variety of maps and satellite images of floods. This site is also reviewed in the May 28, 2004 _NSDL Physical Sciences Report_.

At this website, the European Commission and six European organizations discuss the creation of

the Astrophysical Virtual Observatory Project (AVO) for European astronomy. Visitors can discover the function of a Virtual Observatory (VO) as "an international astronomical community-based initiative" aimed at allowing "global electronic access to the available astronomical data archives of space and ground-based observatories." Users can learn about the current problems associated with combining astronomical data collected all over the world and how a VO can streamline this data. The website supplies numerous images illustrating galactic scenarios, AVO prototypes, and AVO goals.

An artificial neural network (ANN) based procedure is developed to estimate concentrations of Chlorophyll-a, Suspended Particulate Matter (SPM) and absorption due to chromophoric dissolved organic matter (CDOM) in the seawater from satellite detected normalized water-leaving radiance (nLw) of the IRS-P4 Ocean Colour Monitor (OCM) satellite data. An ocean colour reflectance model was used to generate surface spectral reflectance corresponding to first five bands of IRS-P4 OCM sensor, using three optically active oceanic water constituents as inputs. ANN model making use of reflectance in five visible bands was trained, tested and validated to invert the spectral reflectance for the simultaneous estimation of three optically active constituents. The retrieved chlorophyll-a concentrations from ANN based algorithm were compared with the corresponding chlorophyll-a distribution obtained by global empirical algorithms e.g. Ocean Chlorophyll-4 (OC4) algorithm. ANN derived chlorophyll-a estimates were found to have reduced the over estimation in coastal waters often observed with the use of band ratio algorithms.

The Integrated Ocean Observing System (IOOS??) Regional Associations and Interagency Partners hosted a water quality workshop in January 2010 to discuss issues of nutrient enrichment and dissolved oxygen depletion (hypoxia), harmful algal blooms (HABs), and beach water quality. In 2007, the National Water Quality Monitoring Council piloted demonstration projects as part of the National Water Quality Monitoring Network (Network) for U.S. Coastal Waters and their Tributaries in three IOOS Regional Associations, and these projects are ongoing. Examples of integrated science-based solutions to water quality issues of major concern from the IOOS regions and Network demonstration projects are explored in this article. These examples illustrate instances where management decisions have benefited from decision-support tools that make use of interoperable data. Gaps, challenges, and outcomes are identified, and a proposal is made for future work toward a multiregional water quality project for beach water quality.

The New Millennium Observatory (NeMO) is a seafloor observatory at Axial Seamount, an active underwater volcano located about 250 miles off the coast of the northwest United States. The observatory studies the relationships between submarine volcanic activity, the chemistry of seafloor hotsprings, and the biological communities that depend on them. Materials available at the NeMO web site include updates from observatory expeditions, videos and animations, and an interactive feature that lets users pilot a simulated remotely operated vehicle to explore the seamount. The NeMO curriculum page features a unit, with activities, in which students investigate a swarm of small earthquakes and the disappearance of an instrument. A volcanic eruption occurred at Axial in January 1998, destroying some hydrothermal vent sites and creating new ones. Since then NeMO scientists have been assessing the impact of the eruption and documenting the ongoing changes in Axial's summit caldera.

Gemini Science and User Meeting; San Francisco, California, 17-20 July 2012 More than 100 astronomers gathered in San Francisco to discuss results from the Gemini Observatory and to plan for its future. The Gemini Observatory consists of twin 8.1 meter diameter optical/infrared telescopes located on mountaintops in Hawai'i and Chile. Gemini was built and is operated by an international partnership that currently includes the United States, the United Kingdom, Canada, Chile, Australia, Brazil, and Argentina.

The Pierre Auger Observatory is an international collaboration for the detailed study of the highest energy cosmic rays. It will operate at two similar sites, one in the northern hemisphere and one in the southern hemisphere. The Observatory is designed to collect a statistically significant data set of events with energies greater than 10{sup 19} eV and with equal exposures for the northern and southern skies.

Big Bear Solar Observatory (BBSO) is located at the end of a causeway in a mountain lake more than 2 km above sea level. The site has more than 300 sunny days a year and a natural inversion caused by the lake which makes for very clean images. BBSO is the only university observatory in the US making high-resolution observations of the Sun. Its daily images are posted at http://www.bbso.njit.e...

A suitable sampling technology to identify species and to estimate population dynamics based on individual counts at different temporal levels in relation to habitat variations is increasingly important for fishery management and biodiversity studies. In the past two decades, as interest in exploring the oceans for valuable resources and in protecting these resources from overexploitation have grown, the number of cabled (permanent) submarine multiparametric platforms with video stations has increased. Prior to the development of seafloor observatories, the majority of autonomous stations were battery powered and stored data locally. The recently installed low-cost, multiparametric, expandable, cabled coastal Seafloor Observatory (OBSEA), located 4 km off of Vilanova i la Gertrú, Barcelona, at a depth of 20 m, is directly connected to a ground station by a telecommunication cable; thus, it is not affected by the limitations associated with previous observation technologies. OBSEA is part of the European Multidisciplinary Seafloor Observatory (EMSO) infrastructure, and its activities are included among the Network of Excellence of the European Seas Observatory NETwork (ESONET). OBSEA enables remote, long-term, and continuous surveys of the local ecosystem by acquiring synchronous multiparametric habitat data and bio-data with the following sensors: Conductivity-Temperature-Depth (CTD) sensors for salinity, temperature, and pressure; Acoustic Doppler Current Profilers (ADCP) for current speed and direction, including a turbidity meter and a fluorometer (for the determination of chlorophyll concentration); a hydrophone; a seismometer; and finally, a video camera for automated image analysis in relation to species classification and tracking. Images can be monitored in real time, and all data can be stored for future studies. In this article, the various components of OBSEA are described, including its hardware (the sensors and the network of marine and land nodes), software (data acquisition, transmission, processing, and storage), and multiparametric measurement (habitat and bio-data time series) capabilities. A one-month multiparametric survey of habitat parameters was conducted during 2009 and 2010 to demonstrate these functions. An automated video image analysis protocol was also developed for fish counting in the water column, a method that can be used with cabled coastal observatories working with still images. Finally, bio-data time series were coupled with data from other oceanographic sensors to demonstrate the utility of OBSEA in studies of ecosystem dynamics. PMID:22163931

After more than 6 years of operations, the HiSeasNet satellite communications network continues to provide continuous internet connectivity for oceanographic research ships and platforms throughout the Pacific and Atlantic oceans. With additional bandwidth and ships brought online in 2008, HiSeasNet now supports 15 ships at sea as well as a seismic observatory on South Georgia Island in the Southern Ocean. Employing a variety of networking technologies, HiSeasNet has allowed scientists to conduct videoconference outreach programs, maintain limited long-term real-time data collection, connect campus phones to shipboard phones through the ship's PBX using Voice over IP (VoIP) protocols, and direct multi-ship research from shore and other ships. Standard Internet protocols available include FTP, HTTPS, and SSH. As there are few UNOLS ships that are not HiSeasNet capable, network operations now focus on providing bandwidth flexibility (including short-term increases), operator training, and increased science and operations community resources. With still plenty of unused ship-to-shore bandwidth, online information, and trained technicians, there are many opportunities for science programs to send near-real-time data to shore for both single- cruise and more permanent deployments of equipment. Current real-time data feeds are collected on some ships and transported through NSF Real-time Observatory and Data management Network (ROADNet) Points-of-Presence units.

Using delta C-13 measurements in atmospheric CO2 from a cooperative global air sampling network, we determined the partitioning of the net uptake of CO2 between ocean and land as a function of latitude and time. The majority of delta C-13 measurements were made at the Institute of Arctic and Alpine Research (INSTAAR) of the University of Colorado. We perform an inverse

deconvolution of both CO2 and delta C-13 observations, using a two-dimensional model of atmospheric transport. Also, the discrimination against C-13 by plant photosynthesis, as a function of latitude and time, is calculated from global runs of the simple biosphere (SiB) model. Uncertainty due to the longitudinal structure of the data, which is not represented by the model, is studied through a bootstrap analysis by adding and omitting measurement sites. The resulting error estimates for our inferred sources and sinks are of the order of 1 GTC (1 GTC = 10(exp 15) gC). Such error bars do not reflect potential systematic errors arising from our estimates of the isotopic disequilibria between the atmosphere and the oceans and biosphere, which are estimated in a separate sensitivity analysis. With respect to global totals for 1992 we found that 3.2 GTC of carbon dissolved into the ocean and that 1.5 GTC were sequestered by land ecosystems. Northern hemisphere ocean gyres north of 15 deg N absorbed 2.7 GTC. The equatorial oceans between 10 deg S and 10 deg N were a net source to the atmosphere of 0.9 GTC.

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Service and maintenance of a multiuser cabled ocean observatory like the Monterey Accelerated Research System (MARS), will require interesting new capabilities and innovative solutions. This paper will describe some of the new equipment and techniques currently being developed at the Monterey Bay Aquarium Research Institute (MBARI). The MARS facility will be supported by MBARI's Marine Operations Division and Support Engineering

The Nation uses water-level data for a variety of practical purposes, including nautical charting, maritime navigation, hydrography, coastal engineering, and tsunami and storm surge warnings. Long-term applications include marine boundary determinations, tidal predictions, sea-level trend monitoring, oceanographic research, and climate research. Accurate and timely information concerning sea-level height, tide, and ocean current is needed to understand their impact on coastal management, disaster management, and public health. Satellite altimeter data products are currently used by hundreds of researchers and operational users to monitor ocean circulation and to improve scientists understanding of the role of the oceans in climate and weather. The NOAA (National Oceanic and Atmospheric Administration) National Ocean Service has been monitoring sea-level variations for many years. NOAA s PORTS (Physical Oceanographic Real-Time System) DST (decision support tool), managed by the Center for Operational Oceanographic Products and Services, supports safe and cost-efficient navigation by providing ship masters and pilots with accurate real-time information required to avoid groundings and collisions. This report assesses the capacity of NASA s satellite altimeter data to meet societal decision support needs through incorporation into NOAA s PORTS. NASA has a long heritage of collecting data for ocean research, including its current Terra and Aqua missions. Numerous other missions provide additional important information for coastal management issues, and data collection will continue in the coming decade with such missions as the OSTM (Ocean Surface Topography Mission). OSTM will provide data on sea-surface heights for determining ocean circulation, climate change, and sea-level rise. We suggest that NASA incorporate OSTM altimeter data (C- and Ku-band) into NOAA s PORTS DST in support of NASA s Coastal Management National Application with secondary support to the Disaster Management and Public Health National Applications.

Hydrologic observatories are conceived as major research facilities that will be available to the full hydrologic community, to facilitate comprehensive, cross-disciplinary and multi-scale measurements necessary to address the current and next generation of critical science and management issues. A network of hydrologic observatories is proposed that both develop national comparable, multidisciplinary data sets and provide study areas to allow scientists, through their own creativity, to make scientific breakthroughs that would be impossible without the proposed observatories. The core objective of an observatory is to improve predictive understanding of the flow paths, fluxes, and residence times of water, sediment and nutrients (the "core data") across a range of spatial and

temporal scales across `interfaces'. To assess attainment of this objective, a benchmark will be established in the first year, and evaluated periodically. The benchmark should provide an estimate of prediction uncertainty at points in the stream across scale; the general principle is that predictive understanding must be demonstrated internal to the catchment as well as its outlet. The core data will be needed for practically any hydrologic study, yet absence of these data has been a barrier to larger scale studies in the past. However, advancement of hydrologic science facilitated by the network of hydrologic observatories is expected to focus on a set of science drivers, drawn from the major scientific questions posed by the set of NRC reports and refined into CUAHSI themes. These hypotheses will be tested at all observatories and will be used in the design to ensure the sufficiency of the data set. To make the observatories a national (and international) resource, a key aspect of the operation is the support of remote PI's. This support will include a resident staff of scientists and technicians on the order of 10 FTE's, availability of dormitory, laboratory, workshop space for all scientists, and the awarding of travel support out of observatory funds. The conflicting goals of support for a PI-designed observatory and a network of community-available observatories will be achieved by allocation of resources to assure both goals will be met. It is proposed that these resources be divided into three pools: Core data pool. Data to be collected by the observatory PI's and staff, and where possible, augmented by existing (e.g., USGS) data collection. Design pool. Available to support the designs of observatory PI's. Community pool. Available to non-PI scientists to test cross-observatory hypotheses. Application of these design and operation concepts to the design of the Neuse basin prototype hydrologic observatory is briefly discussed.

Unit from Smithsonian multidisciplinary ocean curriculum. Lesson plan focuses on foods, materials and medicines that comes form marine life, how these resources are harvested and processed and the impacts of fisheries. Students identify and classify consumer goods from the ocean and calculate their cost. Unit includes: background essay; teacher instructions; forms for student activity; discussion questions; all online in PDF format. Resources include online version of Smithsonian Ocean Planet exhibition.

Oceans Alive covers basic information about Earth's oceans, including sections such as: The Water Planet, Oceans in Motion, Life in the Sea, Scientists at Sea and Resources. Topics include physical features of oceans, how the oceans formed, the water cycle, currents and waves, ebbs and tides, ocean plants and animals, and ocean research. The resources section contains links for more information about oceans, as well as class activities to accompany the material on the site.

Why are space observatories important? The answer concerns twinkling stars in the night sky. To reach telescopes on Earth, light from distant objects has to penetrate Earth's atmosphere. Although the sky may look clear, the gases that make up our atmosphere cause problems for astronomers. These gases absorb the majority of radiation emanating from celestial bodies so that it never reaches the astronomer's telescope. Radiation that does make it to the surface is distorted by pockets of warm and cool air, causing the twinkling effect. In spite of advanced computer enhancement, the images finally seen by astronomers are incomplete. NASA, in conjunction with other countries' space agencies, commercial companies, and the international community, has built observatories such as the Hubble Space Telescope, the Compton Gamma Ray Observatory, and the Chandra X-ray Observatory to find the answers to numerous questions about the universe. With the capabilities the Space Shuttle provides, scientist now have the means for deploying these observatories from the Shuttle's cargo bay directly into orbit.

The Integrated Ocean Observing System (IOOS), established through the efforts of the National Office for Integrated and Sustained Ocean Observations (Oceans.US) provides quality controlled data and information on a routine and continuous basis regarding current and future states of the oceans and Great Lakes at scales from global ocean basins to coastal ecosystems. The seven societal goals of IOOS are outlined in this paper. The Engineering and Geosciences Directorates at the National Science Foundation (NSF) are collaborating in planning the WATERS (WATer Environmental Research System) Network, an outgrowth of earlier, separate initiatives of the two directorates: CLEANER (Collaborative Large-scale Engineering Analysis Network for Environmental Research) and Hydrologic Observatories. WATERS Network is being developed by engineers and scientists in the academic community who recognize the need for an observation and research

network to enable better understanding of human-dominated water-environments, their stressors, and the links between them. The WATERS Network model is based on a research framework anchored in a distributed, cyber-based network supporting: 1) data collection; 2) data aggregation; 3) analytical and exploratory tools; and 4) a computational environment supporting predictive modeling and policy analysis on water resource systems. Within IOOS, the U.S. coastal margin is divided into Regional Associations (RAs), organizational units that are conceptually linked through planned data collection and analysis activities for resolving fundamental coastal margin ecosystem questions and addressing RA concerns. Under the WATERS Network scheme, a Coastal Margin Regional Environmental System (RES) for coastal areas would be defined conceptually based on geomorphologic considerations of four major water bodies; Atlantic and Pacific Oceans, Gulf of Mexico, and Laurentian Great Lakes. Within this framework, each coastal margin would operate one or more local environmental field facilities (or observatories). Mutual coordination and collaboration would exist among these coasts through RES interactions based on a cyberinfrastructure supporting all aspects of quantitative analysis. Because the U.S. Ocean Action Plan refers to the creation of a National Water Quality Monitoring Network, a close liaison between IOOS and WATERS Network could be mutually advantageous considering the shared visions, goals and objectives. A focus on activities and initiatives involving sensor and sensor networks for coastal margin observation and assessment would be a specific instance of this liaison, leveraging the infrastructural base of both organizations to maximize resource allocation. This coordinated venture with intelligent environmental systems would include new specialized coastal monitoring networks, and management of near-real-time data, including data assimilation models. An ongoing NSF planning grant aimed at environmental observatory design for coastal margins is a component of the broader WATERS Network planning for collaborative research to support adaptive and sustainable environmental management. We propose a collaborative framework between IOOS and WATERS Network wherein collaborative research will be enabled by cybernetworks to support adaptive and sustainable management of the coastal regions.

Many of the modern observatories are located at remote sites, far from larger cities and away from infrastructure like power grids, water supplies and roads. On-site power generation in island mode is often the only choice to provide electricity to an observatory. During the 2008 petrol price rally, conventional power generation has received special attention and alternatives are being studied now in many organisations to keep energy prices at bay. This paper shall outline the power generation at the ESO VLT/VLTI observatory at Paranal as it is now and a plan for a possible way out of the dependency on fossil fuels in the near future. A discussion of several alternatives including wind energy, solar energy and heat recovery from a conventional power plant shall be analysed and compared. Finally, a project is being proposed to equip the VLT/VLTI with a modern alternative energy supply, based on a novel concept: Solar cooling.

The Northeast corridor of the US is emblematic of the many changes taking place across the nation's and indeed the world's watersheds. Because ecosystem and watershed change occurs over many scales and is so multifaceted, transferring scientific knowledge to applications as diverse as remediation of local ground water pollution, setting State-wide best practices for non-point source pollution control, enforcing regional carbon sequestration treaties, or creating public/private partnerships for protecting ecosystem services requires a new generation of integrative environmental surveillance systems, information technology, and information transfer to the user community. Geographically complex ecosystem interactions justify moving toward more integrative, regionally-based management strategies to deal with issues affecting land, inland waterways, and coastal waterways. A unified perspective that considers the full continuum of processes which link atmospheric forcings, terrestrial responses, watershed exports along drainage networks, and the final delivery to the coastal zone, nearshore, and off shore waters is required to adequately support the management challenge. A recent inventory of NOAA-supported environmental surveillance systems, IT resources, new sensor technologies, and management-relevant decision support systems shows the community poised to formulate an integrated and operational picture of the environment of New England. This paper presents the conceptual framework and early products of the newly-created UNH Earth Systems Observatory. The goal of the UNH Observatory is to serve as a regionally-focused yet nationally-prominent platform for observation-based, integrative science and management of the New England/Gulf of Maine's land, air, and ocean environmental systems.

Development of the UNH Observatory is being guided by the principles set forth under the Global Earth Observation System of Systems and is cast as an end-to-end prototype for GEOSS, targeting the monitoring in near real time of regional ecosystem state. The UNH Earth Systems Observatory consists of five interacting components. These "pillars" include (1) the Observatory data holdings themselves, (2) IT informatics backbone with standards-compliant data and map services, (3) community engagement through User Working Groups (UWGs), (4) an Advisory Board (drawn from local, regional, and national entities), and (5) education and public outreach. The structure is designed to capitalize on "operations-ready" capabilities, to identify emerging opportunities for new data integration, and to use the Observatory as a regional "launchpad" from which data-intensive science and management activities can be tested and implemented operationally.

Following the crash landing of NASA's Orbiting Carbon Observatory (OCO) satellite on 24 February 2008 in the ocean near Antarctica, a 5-member mishap investigation board-led by Rick Obenschain, deputy director at NASA's Goddard Space Flight Center-is looking into the cause of the satellite's launch failure. Preliminary indications are that the payload fairing failed to separate from the rocket. The $273 million satellite was to have collected global measurements of carbon dioxide (CO2) in the Earth's atmosphere to help better forecast changes in CO2 levels and their effect on the Earth's climate. The satellite also would have provided information about sinks that absorb and store CO2.

Liquid water, as far as we know, is an indispensable ingredient of life. Therefore, locating reservoirs of liquid water in extraterrestrial bodies is a necessary prerequisite to searching for life. Recent geological and geophysical observations from the Galileo spacecraft, though not unambiguous, hint at the possibility of a subsurface ocean in the Jovian moon Europa. After summarizing present evidence for liquid water in Europa, we show that electromagnetic and seismic observations made from as few as two surface observatories comprising a magnetometer and a seismometer offer the best hope of unambiguous characterization of the three-dimensional structure of the ocean and the deeper interior of this icy moon. The observatories would also help us infer the composition of the icy crust and the ocean water. PMID:12449858

The National Undergraduate Research Observatory (NURO) at Northern Arizona University and Lowell Observatory "is a consortium of primarily undergraduate institutions which have joined together to provide hands-on training and research experiences for undergraduate students." While the Key Projects link is under construction, users can find out about past student projects at the Undergraduate Research Experiences link. Researchers and students can request observation time and find planning and observing information. The website offers an image gallery and links to the consortium's member schools.

Washington's Mount St. Helens volcano reawakens explosively on October 1, 2004, after 18 years of quiescence. Scientists at the U.S. Geological Survey's Cascades Volcano Observatory (CVO) study and observe Mount St. Helens and other volcanoes of the Cascade Range in Washington, Oregon, and northern California that hold potential for future eruptions. CVO is one of five USGS Volcano Hazards Program observatories that monitor U.S. volcanoes for science and public safety. Learn more about Mount St. Helens and CVO at http://vulcan.wr.usgs.gov/.

The purpose of NASA's Earth Observatory is to provide a freely-accessible publication on the Internet where the public can obtain new satellite imagery and scientific information about our home planet. The focus is on Earth's climate and environmental change. In particular, the site may be useful to public media and educators. Earth scientists and science writers from all NASA centers, as well as all agencies and universities affiliated with NASA's Earth Science Enterprise, are encouraged to submit articles and/or images for publication on the Earth Observatory.

Arecibo Observatory's giant spherical reflector antenna has undergone a massive upgrading over the past 3 years. The surface of the reflector has been replaced with aluminum panels to obtain an accuracy of 3.2 mm r.m.s. over the reflector surface. The superstructure has been stabilized and modified to permit operation at S-band frequencies. A high-power S-band radar transmitter has been added to the existing UHF system. These additions and improvements provide the observatory with new and promising research capabilities in the fields of radio and radar astronomy. PMID:17782009

This Web site describes Lowell Observatory's Planets, Small Solar System Bodies, Astrophysics, and Comets research programs. Visitors can learn about studies of Jupiter's volcanic moon, Io and of Pluto, the planet discovered at Lowell Observatory. The site supplies researchers with Galileo photo polarimeter radiometer (PPR) data as well as an immense amount of asteroid information including plots depicting the position of stars and asteroids within user-specified parameters. Amateur astronomers will find helpful advice from Syuichi Nakano about the equipment to use while making asteroid observations.

This web site is home of the San Salvador Microbial Observatory, a project investigating the anhydrophilic, halotolerant microbial mats of San Salvador, Bahamas. This project has been developed to address the influence water availability has on structural diversification, community composition, production, and carbon sequestration in microbial mats. The web site includes general information about the project, a research description plan, an introduction to microbial mats, links to other microbial observatories and interesting sites, and a collection of photos. This is a helpful resource for those investigating microbial mat communities.

This is the home page for the Kamchatka Microbial Observatory, an international microbial and biogeochemical research program led by Dr. Juergen Wiegel of the University of Georgia (UGA). The project focus is studying hotsprings in Kamchatka, Russia to understand and correlate geochemical and microbial interactions in hydrothermal systems, which in turn can be used as models for early life on earth and for potential extraterrestrial biological systems. The home page includes a menu of links to navigate to the project description, people involved, public outreach, and other research. The public outreach link brings the user to a page of links including Microbial Observatory funded projects and organizations working in Kamchatka.

HiSeasNet is a satellite communications network providing continuous Internet connectivity for oceanographic research ships and platforms throughout the Pacific, Atlantic, and Indian oceans. With the addition of new vessels and satellites in the network, HiSeasNet now uses five satellite beams to extend campus networks out to 13 ships at sea as well as a seismic observatory on South Georgia Island in the Southern Ocean. This year (2007) HiSeasNet has also supported ship operations in the Indian Ocean using a ground station in Germany. Employing a variety of networking technologies, HiSeasNet has allowed scientists to conduct videoconference outreach programs, maintain limited long-term real-time data collection, connect campus phones to shipboard phones through the ship's PBX using Voice over IP (VoIP) protocols, and direct multi-ship research from shore and other ships. Standard Internet protocols available include FTP, https, and ssh. With still more bandwidth available for data, this system can provide new opportunities for enhancing ship-based ocean exploration as well as supporting the long-term data collection projects such as those proposed in the NSF's Ocean Observatories Initiative program. The highest data rate achieved to date was 19 Mbps from the R/V Thomas Thompson off Vancouver. This involved a temporary conversion of the 2.4m shipboard antenna to Ku-Band for relaying HD video from the seafloor to the Internet ashore for real-time imagery of vent activity on the seafloor. The R/V Roger Revelle and R/V Melville include NSF Real-time Observatory and Data management Network (ROADNet) Points- of-Presence aboard ship for buffering and delivering shipboard data to shore continuously and in near-real-time. ROADNet is providing the baseline technology for the OOI Cyberinfrastructure Implementing Organization - the extension of this capability to more of the UNOLS fleet can provide near-real-time data for the OOI for non- proprietary data (e.g. meteorology and acoustic Doppler current profiler) to shore for general access and use.

Since 1995, projects and experiments under Italian coordination addressed to mono- and multi-disciplinary sea floor monitoring, have been undertaken. These initiatives have made use both of standard seismological modules, such as Ocean Bottom Seismometers (OBS) and Hydrophones (OBH), and of new conceived modules specifically developed for multi-parameter deep sea monitoring. In the framework of the Tyrrhenian Deep Experiment (TYDE), in late 2000, a network of standard OBS and OBH made available by GEOMAR and Hamburg University, were deployed in the southernmost sector of the Tyrrhenian basin, in proximity of Aeolian volcanic arc. The network operated for about six months in local data acquisition and provided new insight of the seismic and

volcanic activity of the area. TYDE schedule was also arranged in order to integrate the long-term mission of GEOSTAR multidisciplinary deep sea observatory. GEOSTAR operated at 2000 water depth for over six months, south-west of Ustica island, off-shore the western Sicily, and the seismological data acquired have been analysed together to the TYDE data. A third phase of the GEOSTAR project, named ORION-GEOSTAR 3, has been already funded by the European Commission. As a natural evolution of previous projects, ORION foresees the realization of a seafloor network with GEOSTAR acting as the main node in acoustic communication with other nodes to send commands and transfer data. A surface buoy will allow, as in GEOSTAR long-term mission, the communication to on-shore through satellite link. ORION will be tested at 3200 meter depth, north-east the Marsili underwater volcano (Tyrrhenian). A new observatory, SN-1, was derived from GEOSTAR. SN-1 is presently operating from October 2002 in the Ionian, at 2105 meter water depth, offshore the eastern coast of Sicily, in proximity of the Malta Escarpment. Thanks to an agreement between Istituto Nazionale di Fisica Nucleare and Istituto Nazionale di Geofisica e Vulcanologia, SN-1 will be connected to an specifically already deployed submarine electro-optical cable to be powered and communicate data in real time. The prospective of a such experiment are to be considered also in the light of hazard warning and mitigation of risks. An overview of all the projects will be given and some of the scientific results presented.

The availability of full-disk, high-resolution H images from Big Bear Solar Observatory (USA), Kanzelh¨ ohe Solar Observatory (Austria), and Yunnan Astronomical Ob- servatory (China) allows the continual monitoring of solar activity with unprecedented spatial and temporal resolution. Typically, our Global H Network (GHN) provides almost uninterrupted H images with a cadence of 1-min and an image scale of 1 per

We present the results of the ICOMOS international symposium ``Cultural Heritage of Astronomical Observatories (around 1900) - From Classical Astronomy to Modern Astrophysics'' (Oct. 2008). The objective of the symposium was to discuss the relevance of modern observatories to the cultural heritage of humankind and to select partner observatories which, due to the date of their construction or to their architectural or scientific importance are comparable to Hamburg Observatory, as international cooperation partners for a serial trans-national application.

The continuously operating GPS stations of The Princess of Acadia project, especially the Coast Guard station in Saint John, New Brunswick and the station Digby in Halifax, Nova Scotia, both of which lie in the proximity of highly turbulent waters of Bay of Fundy, are subjected to perpetual movements due to temporally oceanic water mass surface loading of the lithosphere

achromat courtesy of Big Bear Solar Observatory and the diligent efforts of Alan Kiplinger. The new lens: Telescopes & Observing ..... 37 Appendix III: Solar-and-go'' pointing software. The DFM 18-inch telescope is outfitted with a new large-format thermoelectrically cooled

Kamioka Underground Observatoris consist of three different organizations. Super-Kamikande is operated by the Kamioka Observatory, Institute for Cosmic Ray Research (the University of Tokyo) and KamLAND is operated by Research Center for Neutrino Science (Tohoku University). Those experiments in the Kamioka Underground Observatories have discovered neutrino oscillations and also made tremendous contributions on the oscillation studies after the discovery. The discovery of the neutrino oscillations was initially made by using the astrophysical neutrinos, but the experiments using man-made neutrinos from accelerators and nuclear reactors are also carried out. Underground we also have many devices necessary to achieve low-background environments. The Kamioka Satellite (Kavli Institute for the Physics and Mathematics of the Universe, University of Tokyo) provides indispensable devices for low-background experiments. They are commonly used. We also supply Rn-free air and pure water. The number of experiments underground have been increasing recently, including some R&D projects. Nowadays other fields of science like geo-physics are also pursued in the underground observatories. We have a future plan to scale up the Super-Kamiokande further, to be called Hyper-Kamiokande, and there will be a variety of possibilities using the KamLAND detector as a low-background environment. The full scale XMASS will also be an interesting future project.

The database presented here is comprised entirely of observations made utilizing conventional photoelectric photometers and narrowband filters isolating 5 emission species (OH, NH, CN, C3 and C2) and continua. This work was initiated by A'Hearn and Millis in 1976 and includes 2020 observations of 85 comets obtained over 429 nights through the end of 1992. The total number of observations, however, is not evenly distributed over the 85 comets. The median number of observations for a comet is 6, with only a single observation obtained for 14 comets while there were 820 observations of P/Halley. The majority of observations were obtained at either Lowell Observatory or Perth Observatory, however four other observatories were used including an extensive campaign on comet P/Halley from the Cerro Tololo Interamerican Observatory (CTIO). In this archive, results for a subset of 68 comets are presented while the results for P/Halley from this study are archived in the IHW archive.

A report is given on the status of the Sudbury Neutrino Observatory, presently under construction in the Creighton nickel mine near Sudbury, Ontario in Canada. Focus is upon the technical factors involving a measurement of the charged-current and neutral-current interactions of solar neutrinos on deuterium.

submission. Produced by the NASA Center for Aerospace Information (CASI) ... sent a considerable improvement over previous models and will be included ... was delivered and successfully tested at the Harvard College Observatory's field test site in ..... SAO continued its cooperative program with the U. S. Air Force to n ...

Fires along the Rio Xingu, Brazil ... along the Rio Xingu (Xingu River) in the state of Matto Grasso, Brazil. You can read more about this image on the Earth Observatory website. ... Paraná River Floodplain, Brazil ... One of the most famous glaciers in Patagonia periodically cuts off the major southern arm of Lago Argentino.

This Exploratorium site offers an online "tour" of the sites and structures within Chaco Canyon, thought to have once been an ancient solar observatory. The different pages on the tour detail several of the most famous sites where significant solar alignments occur each year. A section called "seasons and solstices" provides further information.

The turret lantern located at the top of the Strasbourg Hospital Gate is generally considered as the first astronomical observatory of the city, but such a qualification must be treated with caution. The thesis of this paper is that the idea of a tower-observatory was brought back by a local scholar, Julius Reichelt (1637-1717), after he made a trip to Northern Europe around 1666 and saw the "Rundetårn" (Round Tower) recently completed in Copenhagen. There, however, a terrace allowed (and still allows) the full viewing of the sky, and especially of the zenith area where the atmospheric transparency is best. However, there is no such terrace in Strasbourg around the Hospital Gate lantern. Reichelt had also visited Johannes Hevelius who was then developing advanced observational astronomy in Gdansk, but nothing of the kind followed in Strasbourg. Rather, the Hospital Gate observatory was built essentially for the prestige of the city and for the notoriety of the university, and the users of this observing post did not make any significant contributions to the progress of astronomical knowledge. We conclude that the Hospital Gate observatory was only used for rudimentary viewing of bright celestial objects or phenomena relatively low on the horizon.

The European Southern Observatory (ESO) is an intergovernmental organization comprised of 14 member countries. Its headquarters are in Germany, but they have three observatories in Chile as well. Their website is loaded with information and visitors shouldn't miss going on the "Virtual Tours", on the far right side of the homepage. The tours are of the three observatories in Chile, and offer almost 360 degree views of beautiful, yet sparse landscapes. The tour of La Silla has two particularly beautiful views, "La Silla Moonlight" and "La Silla Sunset". Visitors interested in seeing a panning of an artist's 3D rendering of the Orion Nebula must go to the "Video" link on the left hand menu on the homepage. There are over 1400 videos to choose from, so for those not into the Orion Nebula, never fear, there are plenty of other video choices. Finally, visitors must go to the "Top 100 Images" link on the right side of the homepage to see amazing and gorgeous images taken from the

ESO's various observatories.

An overall view of the history of the Baksan Neutrino Observatory INR RAS creation is presented. Ground-based and underground facilities used to study cosmic rays, rare nuclear reactions and decays, register solar neutrinos, observe various geophysical phenomena are described. Some main results obtained with these facilities are given.

Space Telescope Programs Hubble Observatory HST-COS FUV PER 11/8/00 FUV Detector System Materials;Space Telescope Programs Hubble Observatory HST-COS FUV PER 11/8/00 Materials and Processes Â· Materials based on Heritage of FUSE/ORFEUS Flight Systems #12;Space Telescope Programs Hubble Observatory HST

A new geophysical observatory dedicated to the study of the aurora borealis will be built 25 km southwest of the town of Athabasca, Alberta, Canada. It is anticipated to see first light in the winter of 2010/2011 and be fully operational in the fall of 2011. Based on the highly successful Athabasca University Geophysical Observatory (AUGO), opened in 2002 at the Athabasca University campus in Athabasca, Alberta, AUGO II will have expanded observational capacity featuring up to eight climate-controlled domed optical observation suites for instrumentation, on-site accommodation for up to six researchers, and most importantly, dark skies free of light pollution from urban development. AUGO II will share the same advantages as its predecessor, one being its location in central Alberta, allowing routine study of the subauroral zone, auroral oval studies during active times, and very rarely of the polar cap. Like the original AUGO, AUGO II will be in close proximity to major highways, be connected to a high bandwidth network, and be within two hour driving distance to the city of Edmonton and its international airport. Opportunities are open for guest researchers in space physics to conduct auroral studies at this new, state-of-the-art research facility through the installation of remotely controlled instruments and/or campaigns. An innovative program of instrument development will accompany the new observatory’s enhanced infrastructure with a focus on magnetics and H-beta meridian scanning photometry.

Three unburied ocean bottom seismometers (OBS) equipped with Trillium 240 s broad-band seismometers recorded spheroidal free oscillations of the Earth out to periods over 1000 s period, for the M = 8.1, April 1, 2007 Solomon Islands earthquake. In contrast to broadband observatories of the global network that operate in quiet continental locations, these instruments were dropped on the several-km thick layer of sediments of the forearc and accretionary wedge of the Lesser Antilles subduction zone. Furthermore, a high ambient noise level due to the ocean surface infragravity waves is expected to cover the frequency band of Earth's normal modes band when recorded at these sites. In spite of these hostile environmental conditions, the frequency of clearly defined peaks of the Earth's normal modes were measured after the earthquake. This suggests that the recording of normal modes and long period waves can be extended to parts of the hitherto inaccessible ocean with currently available OBS technology.

Underwater observatories with real time data and virtually unlimited power transmission capabilities provide scientists with continuous access to the coastal and open ocean. Scientists and engineers at the Woods Hole Oceanographic Institution have recently developed and installed a new cabled seafloor observatory offshore of the south coast of Martha's Vineyard for the purpose of studying coastal atmospheric and oceanographic processes. This observatory has been designed to serve as a cost effective system for the collection of long-term scientific and environmental data, with a simple, upgradeable power and telemetry system and with an instrument interface that is compatible with existing commercial standards. The Martha's Vineyard Coastal Observatory (MVCO) was designed for extended environmental exposure and ease of service in order to avoid high maintenance costs. Most importantly, the observatory is accessible to all potential users, from school students to scientist and engineers. This discussion describes the new facility, and in particular its system architecture, as developed by the Woods Hole Oceanographic Institution with support from the National Science Foundation. >http://www.whoi.edu/science/AOPE/airsea/observatory.htm

Upslope flows caused by mechanical forcing in strong synoptic winds or by buoyant forcing driven

by solar heating under weak synoptic winds can influence the air composition at mountaintop observatories. Using meteorological and trace gas measurements at the PICO-NARE observatory on Pico mountain (Azores Islands, North Atlantic Ocean), the frequency and impact of such orographic flows on a small, volcanic,

What are the different types of mammals that live in the ocean? First, you will need to use the Ocean Mammals Table 1. This website is here for you to learn about ocean mammals. Mammals 2. This website will help you learn about the different mammals that live in the ocean. Ocean Mammals 3. Here is some information about how oil spills effect animal skin in the ocean. Oil Spills 4. This link ...

Steam plume from the 2006 eruption of Augustine volcano in Cook Inlet, Alaska. Explosive ash-producing eruptions from Alaska's 40+ historically active volcanoes pose hazards to aviation, including commercial aircraft flying the busy North Pacific routes between North America and Asia. The Alaska Volcano Observatory (AVO) monitors these volcanoes to provide forecasts of eruptive activity. AVO is a joint program of the U.S. Geological Survey (USGS), the Geophysical Institute of the University of Alaska Fairbanks (UAFGI), and the State of Alaska Division of Geological and Geophysical Surveys (ADGGS). AVO is one of five USGS Volcano Hazards Program observatories that monitor U.S. volcanoes for science and public safety. Learn more about Augustine volcano and AVO at http://www.avo.alaska.edu.

On the base of experience of our Unoversity and Observatory we investigate the seven blocks model of virtual organization for consolidation of resources. This model consists of the next blocks: 1.Population-scientists students robots and agents. 2.Aspiration of population groups. 3.Territory. 4.Production. 5.Ecology and safety. 6.Finance. 7. External relations - input and output flows of population information resources.The world virtual observatory is the virtual world which consists of three groups of variables - appearances essences and structured uncertainty which defines the number and distribution of arbitrary coefficients in equivalent equations. The consolodation of recources permit to create the large telescopes with distributed structure on our planet and cosmos. Virtual instruments can have the best characteristics by means of collective effects which have investigated in our paper.

The National Radio Astronomy Observatory (NRAO) "operates powerful, advanced radio telescopes spanning the western hemisphere." The website is nicely divided into information for the general public, astronomers, and teachers and students. Users can learn all about NRAO's many telescopes located throughout the United States. Researchers can find out about meetings, conferences, software resources, and surveys. Amateur radio astronomers can find links describing how to build antennas and interferometers. Everyone will enjoy the numerous images of astronomical phenomena and NRAO's telescopes and facilities.

This is the homepage of the United States Geological Survey's (USGS) Yellowstone Volcano Observatory. It features news articles, monitoring information, status reports and information releases, and information on the volcanic history of the Yellowstone Plateau Volcanic Field. Users can access monthly updates with alert levels and aviation warning codes and real-time data on ground deformation, earthquakes, and hydrology. There is also a list of online products and publications, and an image gallery.

This site is home of the Salt Plains Microbial Observatory, located in the Salt Plains National Wildlife Refuge in northern Oklahoma. This area has permitted the first extensive study of a non-marine, terrestrial, hypersaline environment. The web site offers information about the extreme environment, images and video clips of its microbial inhabitants, an image-rich summary of research activities, information about summer courses and research opportunities, a list of publications, and links to other informative resources pertaining to hypersaline environments.

The National Radio Astronomy Observatory is located in the small town of Green Bank in eastern West Virginia. The site is the home to many historical artifacts and is itself a part of the culture of radio astronomy as well as a significant player in current radio astronomy research. Photographs of

the site will supplement a verbal description of the on-site activities and tools.

The Sudbury Neutrino Observatory is a second-generation water Cherenkov detector designed to determine whether the currently observed solar neutrino deficit is a result of neutrino oscillations. The detector is unique in its use of D2O as a detection medium, permitting it to make a solar model-independent test of the neutrino oscillation hypothesis by comparison of the charged- and neutral-current interaction

Mount Wilson Observatory, located in the San Gabriel Mountains near Pasadena, California, was founded in 1904 by George Ellery Hale with financial support from Andrew Carnegie. In the 1920s and 1930s, working at the 2.5 m Hooker telescope, Edwin Hubble made two of the most important discoveries in the history of astronomy: first, that `nebulae' are actually island universes—galaxies—each with bil...

The principal projects at Apache Point Observatory at Sunspot, New Mexico, USA, are the 3.5 m telescope, the Sloan Digital Sky Survey and New Mexico State University's 1.0 m telescope. The 3.5 m telescope construction incorporates many innovations: compact and lightweight design, thermal control, multiple instruments and remote observing. The SLOAN DIGITAL SKY SURVEY is generating a three-dime...

The Hawaiian Volcano Observatory (HVO) is part of the Volcano Hazards Program of the U.S. Geological Survey. HVO's origins are rooted in a desire to use scientific methodology to understand the nature of volcanic processes and to reduce their risks to society. The website provides eruption histories and updates of Kilauea, Mauna Loa, Lo' ihi and other Hawaiian volcanoes as well as earthquake hazards, zoning, and seismicity.

We describe new materials available at the Arecibo Observatory for visitors with visual impairments. These materials include a guide in Braille that describes the telescope, explains some basic terms used in radio astronomy, and lists frequently asked questions. We have also designed a tactile model of the telescope. Our interest is in enabling blind visitors to participate in the excitement of visiting the world's largest radio telescope. (Contains 1 table, 5 figures, and 4 notes.)

We report the founding of a new facility for astrophotography and small-telescope science. Sierra Remote Observatories are eight small observatories at 4610' altitude in the Sierra Nevada Mountains of California. The sky brightness during New Moon typically rates 3 on the Bortle scale. Typical seeing is 1.2", with a one-sigma range between 1.0" and 1.6", measured during 2007 June-September. All eight observatories are operated by remote control over the Internet, from as far away as Toronto and South Carolina. The telescopes range in aperture from 106 mm to 16 inches. Color images have so far been published in several magazines (Astronomy, Practical Astronomer, and Sky & Telescope) and on NASA's Astronomy Picture of the Day website. Science programs include time-resolved photometry of cataclysmic variables including the discovery of a 3.22-hour periodicity in the light curve of the nova-like V378 Pegasi, the serendipitous discovery of a previously undesignated spherical bubble in Cygnus, the discovery of three asteroids, and monitoring of Comet Lulin.

At Beijing Observatory both astrometric and gravimetric observations are available to study the non-tidal variations in the deflections of the vertical (or non-tidal plumbline variations, PLVs). From repeated gravimetric observations performed in a network around the observatory, the PLVs at Beijing Observatory during the period 1987.0–1996.0 have been calculated. After comparison with the observational residuals (which also contain the PLV

The Ocean Project is a collaboration of several zoos, aquariums, science museums, and conservation museums/organizations who are committed to providing better education to their respective visitors and the public regarding the importance of the oceans and the role each person plays in conserving the earth's waters. The website offers access to public opinion research, communication strategies, conservation networks, and information and research to informal educators, in order to promote the ocean project's mission of education to these facilities.

Membership in the organization is free.

Data collected by the OSTM could be used to provide a solution for the GNOME DST. GNOME, developed by NOAA?s Office of Response and Restoration Hazardous Materials Response Division, geospatially models oil spill trajectories using wind, current, river flow, and tidal data. Data collected by the OSTM would supply information about ocean currents and wind speeds. This Candidate Solution is in alignment with the Coastal Management, Water Management, Disaster Management, Public Health, Ecological Forecasting, and Homeland Security National Applications and will benefit society by improving the capabilities of emergency responders who evaluate an oil spill?s probable threat.

Network models of frugivory and seed dispersal are usually static. To date, most studies on mutualistic networks assert that interaction properties such as species' degree (k) and strength (s) are strongly influenced by species abundances. We evaluated how species' degree and strength change as a function of temporal variation not only in species abundance, but also in species persistence (i.e., phenology length). In a two-year study, we collected community-wide data on seed dispersal by birds and examined the seasonal dynamics of the above-mentioned interaction properties. Our analyses revealed that species abundance is an important predictor for plant strength within a given sub-network. However, our analyses also reveal that species' degree can often be best explained by the length of fruiting phenology (for plants degree) or by the number of fruiting species (for dispersers degree), which are factors that can be decoupled from the relative abundance of the species participating in the network. Moreover, our results suggest that generalist dispersers (when total study period is considered) act as temporal generalists, with degree constrained by the number of plant species displaying fruits in each span. Along with species identity, our findings underscore the need for a temporal perspective, given that seasonality is an inherent property of many mutualistic networks.

When Thomas Jaggar, Jr., founded the Hawaiian Volcano Observatory in 1912, he wanted to "keep and publish careful records, invite the whole world of science to co-operate, and interest the business man." After studying the disastrous volcanic eruption at Martinique and Naples and the destructive earthquakes at Messina and the Caribbean Ocean, he saw observatories with these goals as a way to understand and mitigate these hazards. Owing to frequent eruptions, ease of access, and continuous record of activity (since January 17, 1912), Kilauea Volcano has been the focus for volcanological study by government, academic, and international investigators. New volcano monitoring techniques have been developed and tested on Hawaiian volcanoes and exported worldwide. HVO has served as a training ground for several generations of volcanologists; many have contributed to volcano research and hazards mitigation around the world. In the coming years, HVO and the scientific community will benefit from recent upgrades in our monitoring network. HVO had the first regional seismic network in the US and it will be fully digital; continuous GPS, tilt, gravity, and strain data already complement the seismic data; an array of infrared and visual cameras simultaneously track geologic surface changes. Scientifically, HVO scientists and their colleagues are making great advances in understanding explosive basaltic eruptions, volcanic gas emission and dispersion and its hazards, and lava flow mechanics with these advanced instruments. Activity at Hawaiian volcanoes continues to provide unparalleled opportunities for research and education, made all the more valuable by HVO's scientific legacy.

The mission of the NSF Division of Ocean Sciences (OCE) is to support basic, curiosity-driven research, using a competitive process based on peer-review to guide selection of grants for financial support. OCE is the leading U.S. government source of ocean science funding for academic institutions. OCE supports research in biological, chemical and physical oceanography, and marine geology and geophysics; ocean technology development; dedicated educational activities; large shipboard equipment and shared-use instruments; the U.S. academic research fleet, submersibles, and scientific ocean drilling (ODP/IODP). In our poster, we describe OCE plans for new infrastructure projects to support research, and some of the new research and education programs being developed. Two large ocean science infrastructure projects -- a drilling vessel conversion and the ocean observatories initiative -- have already been approved for possible inclusion in a future NSF budget request. The drilling vessel will contribute to a new international scientific ocean drilling

program to replace the Ocean Drilling Program (ODP), which ends in 2003. We continue to refine our plan for the Ocean Observatories Initiative (OOI), another large infrastructure program that will provide a continuous ocean presence to advance research and education. We are also working closely with the Office of Naval Research and other agency partners to implement a federal plan to renew the academic fleet. We continue to initiate new research and education programs. Two recent examples are Centers for Ocean Science Education Excellence (COSEE) and Centers for Oceans and Human Health; the latter supported jointly with the National Institute for Environmental Health Sciences. COSEE is building a nationally coordinated effort in ocean science education designed to integrate ocean science research into delivery of high-quality education programs in the ocean sciences. The Centers for Oceans and Human Health program encourages interdisciplinary research teams to conduct innovative studies into the incidence and prevention of disease in humans related to harmful algal blooms and pathogens in marine environments.

Traditionally, the collection, archive, and analysis of ocean observatory data is unique for each particular kind of deployed sensor or instrument. This mode of operation results in a collection of “stovepipe” data processing pipelines impeding the usability and interoperability of observatory data. Furthermore, these traditional data processing techniques typically fail to track the specific origin and processing history of such data. The Monterey Bay Aquarium Research Institute’s Shore Side Data System (SSDS) was developed to address these issues and to provide a scalable operational system for ocean observatory data management. In this paper we describe the SSDS data model, its application framework, and the operational procedures required for collecting good provenance information. The system has been in operation now for over five years and has successfully managed the metadata and data for over 20 moored and cabled observatory deployments. The provenance tracking capability in SSDS provides detailed information with which we produce well described standardized data sets, informing the end user as to the suitability of the data for their use.

We present one of the new generations of observatories, the Stratospheric Observatory For Infrared Astronomy (SOFIA). This is an airborne observatory consisting of a 2.7-m telescope mounted on a modified Boeing B747-SP airplane. Flying at an up to 45,000 ft (14 km) altitude, SOFIA will observe above more than 99 percent of the Earth's atmospheric water vapor allowing observations in the normally obscured far-infrared. We outline the observatory capabilities and goals. The first-generation science instruments flying on board SOFIA and their main astronomical goals are also presented.

This site covers many aspects of the Gemini Observatory. It discusses where it is located, what it observes, what pictures it takes, and certain issues that pertain to it. In addition, it allows users to take a virtual tour of the campus. In a Quicktime format, a 360 degree picture is taken of the observatory and the surrounding landscape. Users can virtually move about and see the impressive, and the impressively beautiful, landscape. The site also provides links to newsletters, press releases and the clips of the observatory in the news. This is a nice look at the different goals and features of a prominent observatory.

Virtual Observatories (VO) are now being established in a variety of geoscience disciplines beyond their origins in Astronomy and Solar Physics. Implementations range from hydrology and environmental sciences to solid earth sciences. Among the goals of VOs are to provide search/ query, access and use of distributed, heterogeneous data resources. With many of these goals being met and usage increasing, new demands and requirements are arising. In particular there are two of immediate and pressing interest. The first is use of VOs by non-specialists, especially for information products that go beyond the usual data, or data products that are sought for scientific research. The second area is citation and attribution of artifacts that are being generated by VOs. In some sense VOs are re-publishing (re-packaging, or generating new synthetic) data and information products. At present only a few VOs address this need and it is clear that a comprehensive solution that includes publishers is required. Our work in VOs and related semantic data framework and integration areas has lead to a view of the next generation of virtual observatories which the two above-mentioned needs as well as others that are emerging. Both of the needs highlight a semantic gap, i.e. that the meaning and use for a user or users beyond the original design intention is very

often difficult or impossible to bridge. For example, VOs created for experts with complex, arcane or jargon vocabularies are not accessible to the non-specialist and further, information products the non-specialist may use are not created or considered for creation. In the second case, use of a (possibly virtual) data or information product (e.g. an image or map) as an intellectual artifact that can be accessed as part of the scientific publication and review procedure also introduces terminology gaps, as well as services that VOs may need to provide. Our supposition is that formalized methods in semantics and semantic web technologies are ideal to meet and solve both of these semantic gaps. In this presentation we highlight both of the emerging needs, and current and emerging semantic web solutions that will enable the next generation of virtual observatories. Our work is funded under NSF/OCI and NASA/ACCESS/ESTO projects to the High Altitude Observatory at the National Center for Atmospheric Research (NCAR) and McGuinness Associates Consulting.

A description is given of the proposed Sudbury Neutrino Observatory based on a 1000 tonne heavy water Cherenkov detector which is being designed. This detector would allow the measurement of neutrinos by the three reactions ..nu../sub e/d ..-->.. ppe, ..nu../sub x/e ..-->.. ..nu../sub x/e and ..nu../sub x/d ..-->.. ..nu../sub x/pn (where ..nu../sub x/ is any left-handed neutrino). The application of the detector to the resolution of the solar neutrino problem is discussed.

This is the homepage of the United States Geological Survey's (USGS) Long Valley Volcano Observatory (LVO). It features a variety of information on the Mono-Inyo Craters volcanic chain in Long Valley Caldera, California. Materials include a current conditions page with status reports, updates and information releases. There is also monitoring data on seismic activity, ground deformation, gases and tree kill, and hydrologic studies. Topical studies include a reference on the most recent eruption in the Inyo chain (about 250 years ago), and information on the Long Valley Exploratory Well. There are also links to USGS fact sheets and other references about the caldera.

Astronomical facilities, both large and small, space- and ground-based, independently create and maintain publication databases that can be used to characterize the scientific productivity and impact of these facilities. This paper will present the results of a new survey that reveals how individual observatories manage bibliographies as well as their motivations behind them. We will examine such factors as: criteria for paper inclusion, metadata collected, staff involved, inter-operability, and other aspects particular to bibliographies. Finally, we learn how these data are analyzed by these facilities. In sum, the survey results characterize methods and motivations currently at work in astronomical facilities.

The advances in technology (telescope design and fabrication, large-scale detector arrays, computing capabilities) are permitting for the first time to explore the Universe in a multi-parameter space. Although this situation should potentially lead to a more complete and less biased understanding of complex astrophysical phenomena, the reality is that the progress in the scientific exploitation is not keeping pace with the exponential growth of data. Two are the major limiting factors: The absence of a real interoperability among astronomical archives and the lack of scalability in the classical methods of retrieving and analyzing astronomical data to tackle the new vast datasets. The Virtual Observatory is an international project aiming to solve this situation by: a) the creation of a federation of astronomical archives that, with the implementation of new technologies and standards, provides an easy and efficient access to the astronomical data (``data grid''). b) the development and implementation of analysis tools by the data centres holding the data (``service grid''). Data mining, as a way to perform an efficient and systematic study of the vast amount of information that will be available from the federation of astronomical archives, constitutes one of the key activities for the Virtual Observatory and where the greatest scientific benefits are expected to come from. Although VO is still an emerging project, it is already considered both from the technical and scientific point of view a basic requirement for the astrophysical research and the framework where to settle in the short-term the astronomical archive-related activities. The biggest data providers (NASA, ESA, ESO, ...) have understood the importance of this initiative and are already displaying their contents under the VO requirements. In this paper I will summarize some of the work areas, both from the technical and scientific point of view, that are being developed in the context of International Virtual Observatory Alliance (http://www.ivoa.net). The last part of this contribution will focus on the Spanish Virtual Observatory and its main lines of research.

The size of a ten-story building, 6800 feet underground at the Creighton mine in Ontario; the Sudbury Neutrino Observatory is a telescope built to study neutrinos and the core of the sun. Students can learn how Cherenkov Radiation is produced and used to detect neutrino properties. Scientists can read the newly published paper dealing with the measurement of Total Active 8B Solar Neutrino Flux using NaCl, as well as other published papers and Conference Proceedings. The site also offers illustrations such as neutrinos striking heavy water and the attractive Double-Ring Event.

This site illustrates the Alaska Volcano Observatory's (AVO) objective to monitor Alaska's volcanoes for the purpose of forecasting volcanic activity and alleviating hazards. AVO's seismometers and satellite imagery allow visitors to obtain current information on selected volcanoes. Because AVO is responsible for volcanic emergencies, people in Alaska can visit the Web site to determine their vulnerability. The site also features AVO's research in geological mapping, modeling of magnetic systems, and development of new instrumentation for predication and interpretation of volcanic unrest. Everyone can appreciate the images of past volcanic eruptions.

This is the homepage of the United States Geological Survey's (USGS) Cascades Volcano Observatory (CVO). The site features news and events, updates on current activity of Cascade Range volcanoes, and information summaries on each of the volcanoes in the range. There are also hazard assessment reports, maps, and a 'Living with Volcanoes' feature that provides general interest information. A set of menus provides access to more technical information, such as a glossary, information on volcano hydrology, monitoring information, a photo archive, and information on CVO research projects.

The ability of the ocean waters off Antarctica to absorb significant amounts of atmospheric carbon dioxide after fertilization with iron has been called into question by researchers who have modeled the dynamics of the process. Using a model calibrated with data on atomic bomb-produced radiocarbon in ocean waters, Wallace S. Broecker, of Columbia University's Lamont-Doherty Geological Observatory, Palisades, N.Y., and

The Alaska Volcano Observatory (AVO) was established in 1988 in the wake of the 1986 Augustine eruption through a congressional earmark. Even within the volcanological community, there was skepticism about AVO. Populations directly at risk in Alaska were small compared to Cascadia, and the logistical costs of installing and maintaining monitoring equipment were much higher. Questions were raised concerning the technical feasibility of keeping seismic stations operating through the long, dark, stormy Alaska winters. Some argued that AVO should simply cover Augustine with instruments and wait for the next eruption there, expected in the mid 90s (but delayed until 2006), rather than stretching to instrument as many volcanoes as possible. No sooner was AVO in place than Redoubt erupted and a fully loaded passenger 747 strayed into the eruption cloud between Anchorage and Fairbanks, causing a powerless glide to within a minute of impact before the pilot could restart two engines and limp into Anchorage. This event forcefully made the case that volcano hazard mitigation is not just about people and infrastructure on the ground, and is particularly important in the heavily traveled North Pacific where options for flight diversion are few. In 1996, new funding became available through an FAA earmark to aggressively extend volcano monitoring far into the Aleutian Islands with both ground-based networks and round-the-clock satellite monitoring. Beyond the Aleutians, AVO developed a monitoring partnership with Russians volcanologists at the Institute of Volcanology and Seismology in Petropavlovsk-Kamchatsky. The need to work together internationally on subduction phenomena that span borders led to formation of the Japan-Kamchatka-Alaska Subduction Processes (JKASP) consortium. JKASP meets approximately biennially in Sapporo, Petropavlovsk, and Fairbanks. In turn, these meetings and support from NSF and the Russian Academy of Sciences led to new international education and research opportunities for Russian and American students. AVO was a three-way partnership of the federal and state geological surveys and the state university from the start. This was not a flowering of ecumenism but was rather at the insistence of the Alaska congressional delegation. Such shared enterprises are not managerially convenient, but they do bring a diversity of roles, thinking, and expertise that would not otherwise be possible. Through AVO, the USGS performs its federally

mandated role in natural hazard mitigation and draws on expertise available from its network of volcano observatories. The Alaska Division of Geological and Geophysical Surveys performs a similar role at the state level and, in the tradition of state surveys, provides important public communications, state data base, and mapping functions. The University of Alaska Fairbanks brought seismological, remote sensing, geodetic, petrological, and physical volcanological expertise, and uniquely within US academia was able to engage students directly in volcano observatory activities. Although this "model" cannot be adopted in total elsewhere, it has served to point the USGS Volcano Hazards Program in a direction of greater openness and inclusiveness.

Overlapping lava flows on Kilauea Volcano illustrate the formation of the Hawaiian Islands. ... 'O'o, and a steady effusion of lava that stretches 10 kilometers (6 miles) to the Pacific Ocean. ... Lavas of different ages cover the surface. ... from many individual eruptions over tens of thousands of years—a blink in geological time.

The program will produce long-term global maps of clouds, land and ocean ... including geosphere (land), atmosphere (air), hydrosphere (water and ice), and ... among the Earth's components in order to explain Earth dynamics, evolution, ... of dissolved oxygen, producing an environment that favors plant over animal life.

Heliophysics is a new science that explores the Sun-Solar System connection and spans the existing domains of solar, heliospheric, magnetospheric and ionospheric physics. Heliophysics influences the environments studied by the planetary and geo-sciences and also has relevance for the astrophysics community. HELIO, the Heliophysics Integrated Observatory, with provide integrated access to metadata from the domains that constitute heliophysics in order to facilitate the search for observations that track phenomena as they propagate through inter planetary space and affect the planetary environments. It will provide services to locate and retrieve the desired observations and return them to the user in the format they require. HELIO is designed around a service-oriented architecture (SAO); many of the resources will be established as stand-alone services that support metadata curation and search, data location and retrievel, data processing and storage. It will be possible to use the services independently or bound into a system through a workflow capability. A semantic-driven approach will be used to describe the relationships between the domains and support the search and data retrieval capabilities. The HELIO Consortium includes twelve groups from the UK, France, Ireland, Italy, Switzerland and the US. The project has a strong Networking component and through this we wish to involve other groups and individuals who can help us achieve our goals. The HELIO proposal was submitted under the EC's 7th Framework Programme.

This report summarizes the activities of the Haystack Correlator during 2011. Highlights include acquisition of new hardware for a DiFX cluster, development and improvement of tools to facilitate DiFX production, more u-VLBI Galactic Center observations, Mark 6 recording system testing, and various other continuing projects. Non-real-time e-VLBI transfers and engineering support of other correlators continued. The Mark IV and DiFX VLBI correlators of the MIT Haystack Observatory, located in Westford, Massachusetts, are supported by the NASA Space Geodesy Program and the National Science Foundation. They are dedicated mainly to the pursuits of the IVS, with a smaller fraction of time allocated to processing radio astronomy observations for the Ultra High Sensitivity VLBI (u-VLBI) project. The Haystack correlators serve as a development system for testing new correlation modes, for hardware improvements such as the Mark 6 system, and in the case of the Mark IV, for diagnosing correlator problems encountered at Haystack and at the identical correlator at the U.S. Naval Observatory. This flexibility is made possible by the presence on-site of the team that designed the Mark IV correlator hardware and software. Some software support is provided to the Max Planck Institute for Radioastronomy (MPI) in Bonn, Germany for DiFX processing of IVS experiments.

In 2001, the U.S. Geological Survey, Yellowstone National Park, and the University of Utah entered into an agreement that effectively established the Yellowstone Volcano Observatory. Some of the objectives of the Observatory are "to provide seismic, geodetic, and hydrologic monitoring that enables reliable and timely warnings of possible renewed volcanism and related hazards" and "to

improve scientific understanding of tectonic and magmatic processes that influence ongoing seismicity and hydrothermal activity." The Web site itself is divided into several major sections that covering collectively all current volcanic and seismic activity in the region, volcanic history in the area, and frequently asked questions. The section dedicated to volcanic monitoring includes real-time and non real-time data on current conditions, along with a monthly summary. The volcanic history section offers a long-form essay (including representative photos) that provides a general overview of the region's turbulent volcanic and seismic history. Finally, the helpful FAQ section covers such topics as the frequency of volcanic eruptions at Yellowstone and the relationship between volcanism and the geysers and hot springs in Yellowstone. [KMG

This page is part of NASA's Earth Observatory website. It features text and a scientific illustration to describe how the ocean interacts with the atmosphere, physically exchanging heat, water, and momentum. It also includes links to related data sets, other ocean fact sheets, and relevant satellite missions.

Operation of the US Virtual Astronomical Observatory shares some issues with modern physical observatories, e.g., intimidating data volumes and rapid technological change, and must also address unique concerns like the lack of direct control of the underlying and scattered data resources, and the distributed nature of the observatory itself. In this paper we discuss how the VAO has addressed these challenges to provide the astronomical community with a coherent set of science-enabling tools and services. The distributed nature of our virtual observatory-with data and personnel spanning geographic, institutional and regime boundaries-is simultaneously a major operational headache and the primary science motivation for the VAO. Most astronomy today uses data from many resources. Facilitation of matching heterogeneous datasets is a fundamental reason for the virtual observatory. Key aspects of our approach include continuous monitoring and validation of VAO and VO services and the datasets provided by the commun...

International Virtual Observatory is a collection of integrated astronomical data archives and software tools that utilize computer networks to create an environment in which research can be conducted. Several countries have initiated national virtual observatory programs that will combine existing databases from ground-based and space-born observatories and make them easily accessible to researchers. As a result, data from all the world's major observatories will be available to all users and to the public. This is significant not only because of the immense volume of astronomical data but also because the data on stars and galaxies have been compiled from observations in a variety of wavelengths: optical, radio, infrared, gamma ray, X-ray and more. Each wavelength can provide different information about a celestial event or object, but also requires a special expertise to interpret. In a virtual observatory environment, all of this data is integrated so that it can be synthesized and used in a given study. The International Virtual Observatory Alliance (IVOA) represents 20 national and international projects working in coordination to realize the essential technologies and interoperability standards necessary to create a new research infrastructure. Russian Virtual Observatory is one of the founders and important members of the IVOA. The International Virtual Observatory project was launched about ten years ago, and its major achievements in science and technology in recent years are discussed in this paper. Standards for accessing large astronomical data sets were developed. Such data sets can accommodate the full range of wavelengths and observational techniques for all types of astronomical data: catalogues, images, spectra and time series. The described standards include standards for metadata, data formats, query language, etc. Services for the federation of massive, distributed data sets, regardless of the wavelength, resolution and type of data were developed. Effective mechanisms for publishing huge data sets and data products, as well as data analysis toolkits and services are provided. The services include source extraction, parameter measurements and classification from data bases, data mining from image, spectra and catalogue domains, multivariate statistical tools and multidimensional visualization techniques. Development of prototype virtual observatory services and capabilities implemented within the existing data centers, surveys and observatories are also discussed. We show that the International Virtual Observatory has evolved beyond the demonstration level to become a real research tool. Scientific results based on end-to-end use of virtual observatory tools are discussed in the paper.

Fin whale calls recorded from 2003 to 2004 by a seafloor seismic network on the Endeavour segment of the Juan de Fuca Ridge were analyzed to determine tracks and calling patterns. Over 150 tracks were obtained with a total duration of ~800 h and swimming speeds from 1 to 12 km/h. The dominant inter-pulse interval (IPI) is 24 s and the IPI patterns define 4 categories: a 25 s single IPI and 24/30 s dual IPI produced by single calling whales, a 24/13 s dual IPI interpreted as two calling whales, and an irregular IPI interpreted as groups of calling whales. There are also tracks in which the IPI switches between categories. Call rates vary seasonally with all the tracks between August and April. From August to October tracks are dominated by the irregular IPI and are predominantly headed to the northwest, suggesting that a portion of the fin whale population does not migrate south in the fall. The other IPI categories occur primarily from November to March. These tracks have slower swimming speeds, tend to meander, and are predominantly to the south. The distribution of fin whales around the network is non-random with more calls near the network and to the east and north. PMID:23464044

Recent oceanographic conditions in the eastern Arctic Ocean show remarkable surface salinization and Atlantic water warming compared with conditions prior to 1990s (e.g., Morison et al., 2002). Such a condition might cause an increase in upward oceanic heat flux, but this has not previously been investigated experimentally. Using the ice-drifting buoy data at the North Pole Environmental Observatory, we examine oceanic heat flux under the multiyear ice in the central Arctic Ocean. Upper ocean current and hydrographic data obtained from JAMSTEC Compact Arctic Drifter (J-CAD) buoys are used to estimate oceanic heat flux through seasonal pycnocline (25-50m) and the cold halocline (80-120m). We find that summer ice-melt water completely prevents oceanic heat flux through seasonal pycnocline. This supports the previous result (McPhee et al., 2003) that nearly all of the heat flux to the ice is derived from insolation during summer. In winter, upward heat flux at 25-50m depth is estimated as 2-3 [W/m2] over the basin. On the other hand, upward heat flux through the cold halocline is estimated at 2-4 [W/m2] all through the year. This suggests that heat from the Atlantic water, which passes through the cold halocline, would reach the multiyear ice only in winter.

The IODP Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) is a multi-expedition drilling program designed to investigate fault mechanics, fault slip behavior, and strain accumulation along subduction megathrusts, through coring, logging, and long-term monitoring experiments. One key objective is the development and installation of a borehole observatory network extending from locations above the outer, presumably aseismic accretionary wedge to the seismogenic and interseismically locked plate interface, to record seismicity and slip transients, monitor strain accumulation, document hydraulic transients associated with deformation events, and quantify in situ pore fluid pressure and temperature. As part of recent NanTroSEIZE operations, borehole instruments have been developed for deployment at two sites: (1) Site C0010, which penetrates a major out-of-sequence thrust fault termed the “megasplay” at ca. 400 mbsf, and (2) Site C0002 in the Kumano forearc basin at a location that overlies both the updip edge of the inferred interseismically locked portion of the plate interface, and clusters of very low frequency thrust and reverse earthquakes located within the accretionary prism and potentially on the megasplay fault. In 2009, Site C0010 was drilled and cased with screens to access the megasplay fault, and a simple pore pressure and temperature monitoring system (a ”smartplug”) was installed. The simple observatory unit includes pressure and temperature sensors and a data logging package mounted beneath a mechanically set retrievable casing packer, and includes two pressure sensors, one in hydraulic communication with the formation through the casing screens below the packer, and the other to the open borehole above the packer to record hydrostatic reference pressure and ocean loading signals. Temperatures are recorded within the instrument package using a platinum thermometer and by a self-contained miniature temperature logger (MTL). In fall 2010, the smartplug will be retrieved and replaced with an upgraded instrument package that also includes an autonomous osmotic geochemical sampling system and microbial colonization experiment. Fall 2010 operations will also drill and case Site C0002 to ca. 1000 m depth and install a newly developed multi-sensor permanent observatory system, which includes a volumetric strainmeter, a broadband seismometer, tiltmeter, thermister string, and multi-level pore-pressure sensors. The strain, seismometer, and tilt sensors will be cemented with the basal mudstones of the Kumano basin, and pore pressure will be monitored within both the underlying accretionary prism and within

the lower basin sediments. The observatory will ultimately be connected to the seafloor fiber-optic cable network DONET. Here, we report on the retrieval of the smartplug, installation and configuration of the new multi-sensor permanent observatory, and preliminary data obtained from the smartplug deployment.

During 2011 we contributed to 38 IVS sessions, including the CONT11 campaign. We used the majority of the sessions that involved both Onsala and Tsukuba to do ultra-rapid dUT1 observations together with our colleagues in Tsukuba. In particular, the whole CONT11 campaign was operated in ultra-rapid mode. Furthermore, we observed one additional one-baseline ultra-rapid dUT1 session, a three-station ultra-rapid EOP-session, the Venus Express space probe, and the RadioAstron satellite.

Presented by the Museum of Science, Boston, the Ocean's Alive Web site takes a look into the fascinating world of oceans. The Water Planet link has information about the physical features of oceans, how they've been created, the water cycle, and ocean profiles. Other links explain ocean currents, winds and waves, tides, life in the sea, and scientists who study the oceans. The site contains good and easy-to-read descriptions, along with unique and interesting illustrations that make it fun to explore and a must-visit for users interested in the subject.

With the intent to publicize information on the National Oceanic and Atmospheric Administration's (NOAA) major ocean exploration efforts, the Ocean Explorer Website provides a platform to follow such explorations in near real-time, learn about ocean exploration technologies, observe remote marine areas through multimedia technology, and review NOAA's 200-year history of ocean exploration. Additional NOAA resources in the Library include related links, historical books and documents, expedition reports, and journal articles significant to NOAA's historical and current ocean exploration activities. The Calendar and Projects sections provide, respectively, a descriptive schedule of upcoming explorations and information on related activities and events.

LAMONT-DOHERTY EARTH OBSERVATORY THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY Faculty Position in Physical Oceanography in the Department of Earth & Environmental Sciences and the Lamont-Doherty Earth Observatory of Columbia University The Department of Earth and Environmental Sciences sof Columbia University

Space Telescope Programs Hubble Observatory HST-COS FUV PER 11/8/00 FUV Detector System Quality Assurance/Configuration Management Mr. Christopher Scholz EAG QA Manager #12;Space Telescope Programs Hubble release for review #12;Space Telescope Programs Hubble Observatory HST-COS FUV PER 11/8/00 EAG COS

Ship-based expeditionary research and satellite observations have provided basic descriptions of ocean processes and their interactions with terrestrial and atmospheric systems. Many critical processes, however, occur at temporal and spatial scales that cannot be effectively sampled or studied with these traditional techniques. Ship-based studies are particularly limited in their ability to investigate the onset and immediate aftermath of episodic events and non-linear processes. Enabled by technological advances and made timely by societal need, a wide range of ocean and earth observing systems are being planned, proposed, deployed and operated within the U.S. These systems will utilize real-time datasets for event detection and adaptive sampling, well-sampled spatial and temporal contexts for limited duration or process-study experiments, and sustained observations to observe long-term trends and capture rare episodic events. Recent developments in sensor technology, cyberinfrastructure, and modeling capabilities will enable scientists to consider an entirely new set of interdisciplinary science questions. In response to the need for long term in situ oceanographic data, the U.S. National Science Foundation has established the Ocean Research Interactive Observatory Networks (ORION) Program within which the Ocean Observatories Initiative (OOI) will provide the essential infrastructure to address high priority science questions outlined in the OOI Science Plan. This infrastructure will utilize electro-optical cables and moored buoys to enable real-time, high bandwidth transmissions of scientific data and images from key scientific sites in the coastal and open ocean. The OOI is an integrated observatory with three elements: 1) a regional cabled network consisting of

interconnected sites on the seafloor spanning several geological and oceanographic features and processes, 2) relocatable deep-sea buoys that could also be deployed in harsh environments such as the Southern Ocean, and 3) new construction or enhancements to existing facilities leading to an expanded network of coastal observatories. The ORION Program will coordinate the science driving the construction of this research observing network as well as the operation and maintenance of the infrastructure; development of instrumentation and mobile platforms and their incorporation into the observatory network; and planning, coordination, and implementation of educational and public outreach activities. A critical integrating element of the seafloor observatory network will be a robust cyberinfrastructure system that can collect large volumes of heterogeneous data. This system is being developed to collect, manage, archive and distribute data; have mechanisms and protocols for rapid data transmission; have protocols for two-way communication with sensors and dynamic control of sensor networks; have access to remote computing resources for processing and visualization of data; have software tools for analysis of multidisciplinary, spatially extended, intermittent datasets; have knowledge representation software to ensure that these data are easily accessible and effortlessly shared across disciplines; have integrity between communications and control systems and data management and archiving systems; and have automated data quality control. The ORION Program will be the most complex initiative that ocean scientists have undertaken within the U.S. and will revolutionize the way that oceanographers study the sea.

The INDian Ocean EXperiment (INDOEX) was an international, multi-platform field campaign to measure long-range transport of air masses from South and South-East-(SE) Asia towards the Indian Ocean. During the dry monsoon season between January and March 1999, local measurements were carried out from ground based platforms and were compared with satellite based data. The objective of this study was to characterise stratospheric and tropospheric trace gas amounts in the equatorial region, and to investigate the impact of air pollution at this remote site. For the characterisation of the chemical composition of the outflow from the S-SE-Asian region, we performed ground based dual-axis-DOAS (Differential Optical Absorption Spectroscopy) measurements at the KCO (Kaashidhoo Climate Observatory) in the Maldives (5.0° N, 73.5° E). The ground based dual-axis-DOAS measurements were conducted using two different observation modes (off-axis and zenith-sky). This technique allows the separation of the tropospheric and stratospheric columns for different trace gases like O3 and NO2. These dual-axis DOAS data were compared with O3-sonde measurements performed at KCO and satellite based GOME (Global Ozone Measuring Experiment) data during the intensive measuring phase of the INDOEX campaign in February and March 1999. From GOME observations, tropospheric and stratospheric columns for O3 and NO2 were retrieved. In addition, the analysis of the O3-sonde measurements allowed the determination of the tropospheric O3 amount. The comparison shows that the results of all three measurement systems agree within their error limits. During the INDOEX campaign, background conditions were observed most of the time, but in a single case an increase of tropospheric NO2 during a short pollution event was observed and the impact on the vertical columns was calculated. In the GOME measurements, evidence was found for large tropospheric contributions to the BrO budget, probably located in the free troposphere and present throughout the year. The latter has been investigated by the comparison of satellite pixels influenced by high and low cloud conditions based on GOME data which allows the determination of the detection limit of tropospheric BrO columns.

Ocean observatories and underwater video surveys have the potential to unlock important discoveries with new and existing camera systems. Yet the burden of video management and analysis often requires reducing the amount of video recorded through time-lapse video or similar methods. It's unknown how many digitized video data sets exist in the oceanographic community, but we suspect that many remain under analyzed due to lack of good tools or human resources to analyze the video. To help address this problem, the Automated Visual Event Detection (AVED) software and The Video Annotation and Reference System (VARS) have been under development at MBARI. For detecting interesting events in the video, the AVED software has been developed over the last 5 years. AVED is based on a neuromorphic-selective attention algorithm, modeled on the human vision system. Frames are decomposed into specific feature maps that are combined into a unique saliency map. This saliency map is then scanned to determine the most salient locations. The candidate salient locations are then segmented from the scene using algorithms

suitable for the low, non-uniform light and marine snow typical of deep underwater video. For managing the AVED descriptions of the video, the VARS system provides an interface and database for describing, viewing, and cataloging the video. VARS was developed by the MBARI for annotating deep-sea video data and is currently being used to describe over 3000 dives by our remotely operated vehicles (ROV), making it well suited to this deepwater observatory application with only a few modifications. To meet the compute and data intensive job of video processing, a distributed heterogeneous network of computers is managed using the Condor workload management system. This system manages data storage, video transcoding, and AVED processing. Looking to the future, we see high-speed networks and Grid technology as an important element in addressing the problem of processing and accessing large video data sets.

Variability of oceanic advective fluxes through Fram Strait, one of the main gateways to the Arctic Ocean, has been monitored since 1997 by the array of 16 moorings and summer hydrographic sections. The main focus is on the inflow of warm Atlantic waters from the Nordic Seas, the only source of heat for the Arctic Ocean, and on the freshwater outflow to the North Atlantic. However, spatial resolution of the moored array, which varies from 10 to 30 km, is not sufficient to resolve the mesoscale variability of the complex, topographically flow through the strait. In the recently established multidisciplinary Fram Strait Observatory a combination of oceanographic observations by moorings and gliders with acoustic tomography measurements and the eddy-resolving numerical model will provide a new tool to assess the contribution of mesoscale dynamics to the variability of oceanic fluxes through Fram Strait. Since 2007, in the framework of the EU DAMOCLES and ACOBAR projects, the long-term moored observations in Fram Strait have been complemented with repeated glider sections. During eight summer and autumn missions the oceanographic data with high spatial resolution were collected down to 1000 m by Seagliders profiling along the moored array. Here we report on the results from five years of gliders measurements and a comparison of glider data to observations from moorings and ship-borne CTD sections. The special attention is paid to measurements in the West Spitsbergen Current, where gliders have to operate in the strong current regime (occasional events up to 1 m/s). Spatially averaged glider data were also applied in the finite element inverse model FEMSECT and preliminary results are presented. Future plans envisage a substitution of the upper part of moored array with repeated glider sections to achieve year-round glider operations in the partially sea-ice covered region. Since 2010 the array of RAFOS sources and tomographic sources providing RAFOS signal with frequency of 260 Hz has been deployed in the Fram Strait Observatory to test ranges of acoustic receptions by Seaglider equipped with the RAFOS hardware. Taking advantage of the ice-capable glider technology developed and provided by APL-UW, we aim for employing the acoustically navigated Seaglider to extend the glider observations into the permanently sea-ice covered western Fram Strait and to permit winter missions in its eastern part.

The Chipper Woods Bird Observatory (CWBO) is a non-profit organization committed to bringing "good science to the conservation of birds and their habitats through scientific research, scientific training and educational programs designed for all age groups." The CWBO website contains a nice variety of bird information and images for budding birders. The siteÂs Bird Photos section provides good quality images and information for an extensive selection of birds including the Peregrine Falcon, Barn Swallow, Tufted Titmouse, Scarlet Tanager, and many more. Various bird-related topics -Â such as migrating geese, owl pellets, West Nile Virus, and Bald Eagle Restoration -Â are covered as well. The CWBO website contains checklists for Indiana birds, mammals, reptiles, and amphibians. The site also offers a banding summary, newsletter, list of publications, and short quiz for kids. The CWBO site is available in Spanish and English.

Located on a limestone plateau in the northern area of the Yucatan peninsula, the dramatic ruins of Chichen Itza stand as a testimony to the ingenuity of the Mayan civilization. Many visitors flock to the area to view these structures, and now it is also possible to view them via this fine exhibition created by the Exploratorium Museum. With substantial funding from the McBean Family Foundation and NASA, this site explores the use of these structures as ancient observatories. Visitors will want to begin by looking through some historical essays on Chichen Itza, then proceed to learn about the expert alignments of the structures that allowed Mayans to observe different celestial bodies. The site also includes fun activities, such as Mayan math exercises and a Mayan

calendar.

The Dartmouth Flood Observatory performs research and collects data on the space-based measurement of surface water "for research, educational, and humanitarian applications." On their homepage visitors are presented with a global map of current flooding, complemented by links to data sets related to historic flood levels from 1985 to the present. Visitors can also click on the "Active Archive of Large Floods" section for additional materials, such as an animation that depicts these mega-events. Moving on, the site also includes a link to the "Space-based Atlas of the Earth's Changing Surface Water". Here visitors can look over sample regional maps, and also look at detailed maps of the Mekong Basin from 2000 to 2006. The site is rounded out with some information about current staff members and a list of their publications.

In keeping with the trend towards global-scale monitoring, NASA has launched this Website to highlight NASA research on "regional and global changes on the planet." The site is comprised of five main sections: Modeling Earth's Land Biosphere, Reckoning With Winds (tropical cyclones), Climate Modeling, El Nino, and Benjamin Franklin (earth science). Each section contains an illustrated summary of related research with links to further information and numerous spectacular color satellite images. The section entitled Observation Deck features a data chart showing all environmental measurements displayed by the Earth Observatory and for which months data are available. Further sections include Laboratory (hurricane research), Study (where scientists report from the field), Library (includes links to data sets), and Newsroom, among others. For those interested in participating in or learning about global-scale monitoring research, this is a solid, user-friendly site.

This is the homepage of the Alaska Volcano Observatory, a joint program of the United States Geological Survey (USGS), the Geophysical Institute of the University of Alaska Fairbanks (UAFGI), and the State of Alaska Division of Geological and Geophysical Surveys (ADGGS). Users can access current information on volcanic activity in Alaska and the Kamchatka Penninsula, including weekly and daily reports and information releases about significant changes in any particluar volcano. An interactive map also directs users to summaries and activity notifications for selected volcanoes, or through links to webcams and webicorders (recordings of seismic activity). General information on Alaskan volcanoes includes descriptions, images, maps, bibliographies, and eruptive histories. This can be accessed through an interactive map or by clicking on an alphabetic listing of links to individual volcanoes. There is also an online library of references pertinent to Quaternary volcanism in Alaska and an image library.

This document is a technical progress report on work performed at the University of Pennsylvania during the current year on the Sudbury Neutrino Observatory project. The motivation for the experiment is the measurement of neutrinos emitted by the sun. The Sudbury Neutrino Observatory (SNO) is a second generation dedicated solar neutrino experiment which will extend the results of our work with the Kamiokande II detector by measuring three reactions of neutrinos rather than the single reaction measured by the Kamiokande experiment. The collaborative project includes physicists from Canada, the United Kingdom, and the United States. Full funding for the construction of this facility was obtained in January 1990, and its construction is estimated to take five years. The motivation for the SNO experiment is to study the fundamental properties of neutrinos, in particular the mass and mixing parameters, which remain undetermined after decades of experiments in neutrino physics utilizing accelerators and reactors as sources of neutrinos. To continue the study of neutrino properties it is necessary to use the sun as a neutrino source. The long distance to the sun makes the search for neutrino mass sensitive to much smaller mass than can be studied with terrestrial sources. Furthermore, the matter density in the sun is sufficiently large to enhance the effects of small mixing between electron neutrinos and mu or tau neutrinos. This experiment, when combined with the results of the radiochemical {sup 37}Cl and {sup 71}Ga experiments and the Kamiokande II experiment, should extend our knowledge of these fundamental particles, and as a byproduct, improve our understanding of energy generation in the sun.

The earliest systematic observance of sunspot activity is known to have been discovered by the Chinese in 1382 during the Ming Dynasty (1368 to 1644) when spots on the sun were noticed by

looking at the sun through thick, forest fire smoke. Not until after the 18th century did sunspot levels become more than a source of wonderment and curiosity. Since 1834 reliable sunspot data has been collected by the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Naval Observatory. Recently, considerable effort has been placed upon the study of the effects of sunspots on the ecosystem and the space environment. The efforts of the Artificial Intelligence Section of the Mission Planning and Analysis Division of the Johnson Space Center involving the prediction of sunspot activity using neural network technologies are described.

There are many types of Ocean Animals, today we wil be going to identify several Ocean Anumals through specific body parts that makeOcean Animals different from one another. To begin examine the links below to see what different types of ocean animals there are and what makes those animals different from one another Beluga Whales- National Geographic Kids Dolphins- Who lives in the sea? Puffer fish- National Geographic Stingrays- National Geographic Kids ...

This ocean-science Web site allows users to learn about many important ocean processes, linked to teaching material and sources of real-time ocean data. The site also has complete college-level and graduate courses and textbook (which can be freely downloaded) in oceanography and physical oceanography.

Ocean Portal is a high-level directory of Ocean Data and Information related web sites. The object of the site is to help scientists and other ocean experts in locating data and information. Sites are listed in a directory with headings that include information, data, scientific topics, agencies and societies, among others.

Improved estimates of near-surface air temperature and air humidity are critical to the development of more accurate turbulent surface heat fluxes over the ocean. Recent progress in retrieving these parameters has been made through the application of artificial neural networks (ANN) and the use of multi-sensor passive microwave observations. Details are provided on the development of an improved retrieval algorithm that applies the nonlinear statistical ANN methodology to a set of observations from the Advanced Microwave Scanning Radiometer (AMSR-E) and the Advanced Microwave Sounding Unit (AMSU-A) that are currently available from the NASA AQUA satellite platform. Statistical inversion techniques require an adequate training dataset to properly capture embedded physical relationships. The development of multiple training datasets containing only in-situ observations, only synthetic observations produced using the Community Radiative Transfer Model (CRTM), or a mixture of each is discussed. An intercomparison of results using each training dataset is provided to highlight the relative advantages and disadvantages of each methodology. Particular emphasis will be placed on the development of retrievals in cloudy versus clear-sky conditions. Near-surface air temperature and humidity retrievals using the multi-sensor ANN algorithms are compared to previous linear and non-linear retrieval schemes.

The description, development history, test history, and orbital performance analysis of the OSO-6 Orbiting Solar Observatory are presented. The OSO-6 Orbiting Solar Observatory was the sixth flight model of a series of scientific spacecraft designed to provide a stable platform for experiments engaged in the collection of solar and celestial radiation data. The design objective was 180 days of orbital operation. The OSO-6 has telemetered an enormous amount of very useful experiment and housekeeping data to GSFC ground stations. Observatory operation during the two-year reporting period was very successful except for some experiment instrument problems.

The coming ocean observing systems provide an unprecedented opportunity to change both the public perception of our oceans, and to inspire, captivate and motivate our children, our young adults and even our fellow adults to pursue careers allied with the oceans and to become stewards of our Planet's last unexplored environment. Education plans for the operational component, the Integrated Ocean Observing System (IOOS), and for the research component, Ocean Research Interactive Observatory Networks (ORION), are designed to take advantage of this opportunity. In both cases, community recommendations were developed within the context of the following assumptions: 1. Utilize research on how people learn, especially the four-pronged model of simultaneous learner-centered, knowledge-center, assessment-centered and community-centered

learning 2. Strive for maximum impact on national needs in science and technology learning 3. Build on the best of what is already in place 4. Pay special attention to quality, sustainability, and scalability of efforts 5. Use partnerships across federal, state and local government, academia, and industry. Community recommendations for 100s and ORION education have much in common and offer the opportunity to create a coherent education effort allied with ocean observing systems. Both efforts focus on developing the science and technology workforce of the future, and the science and technology literacy of the public within the context of the Earth system and the role of the oceans and Great Lakes in that system. Both also recognize that an organized education infrastructure that supports sustainability and scalability of education efforts is required if ocean observing education efforts are to achieve a small but measurable improvement in either of these areas. Efforts have begun to develop the education infrastructure by beginning to form a community of educators from existing ocean and aquatic education networks and by exploring needs and issues associated with using ocean observing information assets in education. Likewise efforts are underway to address workforce issues by a systematic analysis of current and future workforce and educational needs. These activities will be described as will upcoming opportunities for the community to participate in these efforts.

In the western Mediterranean basin, Corsica is at a strategic location for oceanographic and atmospheric studies in the framework of the Mediterranean projects HyMeX and ChArMEx. The development of a multi-site instrumented platform located on this island is the core of the project CORSiCA (Corsican Observatory for Research and Studies on Climate and Atmosphere-ocean environment). Several measurement sites are planned in various places in Corsica, but the main site gathering the largest panel of measurements will be located near Ersa at the northern tip of the island (Cap Corse). This area is relevant for many reasons: it is open to the Gulf of Genoa and is not impacted by local and regional anthropogenic inputs. In the close area of Ersa, five sites are particularly interesting: the Semaphore du Cap Corse belonging to the French Navy, the wind-mill farm on the mountain crest, two sites at Centuri and Tollare, and the Giraglia island. Contacts and partnerships have been established with local partners in Corsica: Departmental Centres of Météo-France (CDM 2B and CDM 2A), OEC (the Corsica environmental office, a regional agency co-funding the CORSiCA observatory), the University of Corsica, Qualitair Corse (the local air quality agency) and STARESO (Station de Recherches Sous-marines et Océanographiques, an oceanographic station located on the west coast of Corsica). CORSiCA will be operated for the HyMEx and ChArMEx Long Observation Period (LOP), Enhanced Observation Period (EOP) and Special Observation Periods (SOP). In addition, this observatory will also be of interest for the MERMEx experiment (Marine Ecosystems Response in the Mediterranean Experiment). Furthermore, it will be supported by the MOOSE network (Mediterranean Ocean Observing System on Environment) to maintain long-term observations of key atmospheric parameters on this site. In the present communication we will expose the scientific objectives and we will describe the type of instrumentation and observations that have been proposed for a deployment at CORSiCA. Updated informations dedicated to the CORSiCA observatory can be found on the web: http://www.aero.obs-mip.fr/spip.php?article658. All atmospheric and oceanographic initiatives in Corsica are welcome to join the project.

The Sudbury Neutrino Observatory (SNO) detector is a 1000 ton heavy water (D2O) Cherenkov detector designed to study neutrinos from the sun and other astrophysical sources. The use of heavy water allows both electron neutrinos and all other types of neutrinos to be observed by three complementary reactions. The detector will be sensitive to the electron neutrino flux and energy spectrum shape and to the total neutrino flux irrespective of neutrino type. These measurements will provide information on both vacuum neutrino oscillations and matter-enhanced oscillations, the MSW effect. In the event of a supernova it will be very sensitive to muon and tau neutrinos as well as the electron neutrinos emitted in the initial burst, enabling sensitive mass measurements as well as providing details of the physics of stellar collapse. On behalf of the Sudbury Neutrino Observatory (SNO) Collaboration : H.C . Evans, G.T . Ewan, H.W. Lee, J .R . Leslie, J .D. MacArthur, H .-B . Mak, A.B . McDonald, W. McLatchie, B.C . Robertson, B. Sur, P. Skensved (Queen's University) ; C.K . Hargrove, H. Mes, W.F. Davidson, D. Sinclair, 1 . Blevis, M. Shatkay (Centre for Research in Particle Physics) ; E.D. Earle, G.M. Milton, E. Bonvin, (Chalk River Laboratories); J .J . Simpson, P. Jagam, J . Law, J .-X . Wang (University of Guelph); E.D . Hallman, R.U. Haq (Laurentian

University); A.L. Carter, D. Kessler, B.R . Hollebone (Carleton University); R. Schubank . C.E . Waltha m (University of British Columbia); R.T. Kouzes, M.M. Lowry, R.M. Key (Princeton University); E.W. Beier, W. Frati, M. Newcomer, R. Van Berg (University of Penn-sylvania), T.J . Bowles, P.J . Doe, S.R . Elliott, M.M. Fowler, R.G.H. Robertson, D.J . Vieira, J .B . Wilhelmy, J .F. Wilker-son, J .M. Wouters (Los Alamos National Laboratory) ; E. Norman, K. Lesko, A. Smith, R. Fulton, R. Stokstad (Lawrence Berkeley Laboratory), N.W. Tanner, N. JCIILY, P. Trent, J . Barton, D.L . Wark (University of Oxford).

HELIO, the Heliophysics Integrated Observatory, is a research infrastructure funded under Capacities programme of the EC's 7th Framework Programme (FP7). The project is creating a collaborative environment where scientists can discover, understand and model the connection between solar phenomena, interplanetary disturbances and their effects on the planets (esp. the Earth) HELIO will provide integrated access to metadata from the domains that constitute heliophysics - solar, heliospheric, magnetospheric and ionospheric physics - in order to track phenomena as they propagate through inter planetary space and affect the planetary environments. It will provide services to locate and retrieve the desired observations and return them to the user. HELIO is designed around a service-oriented architecture (SAO); many of the resources are being established as stand-alone services that support metadata curation and search, data location and retrievel, data processing and storage; it will be possible to use the services independently or bound into a system through a workflow capability. We will describe the architecture of HELIO report on the status of its development, including when individual services will become available and what their capabilities will be. The project has a strong Networking component and through this we wish to involve other groups and individuals who can help us achieve our goals. One of the main ways that we will involve the community is through a series of Coordinated Data Analysis Workshops (CDAWs); we will describe the preparation for the first of these which will be held in November 2010. The HELIO Consortium includes thirteen groups from the UK, France, Ireland, Italy, Switzerland, Spain and the US; the project started in June 2009 and has a duration of 36 months.

The health of the world's oceans and their impact on global environmental and climate change make the development of cabled observing systems vital and timely as a data source and archive of unparalleled importance for new discoveries. The VENUS and NEPTUNE Canada observatories are on the forefront of a new generation of ocean science and technology. Funding of over $100M, principally from the Governments of Canada and BC, for these two observatories supports integrated ocean systems science at a regional scale enabled by new developments in powered sub-sea cable technology and in cyber-infrastructure that streams continuous real-time data to Internet-based web platforms. VENUS is a coastal observatory supporting two instrumented arrays in the Saanich Inlet, near Victoria, and in the Strait of Georgia, off Vancouver. NEPTUNE Canada is an 800 km system on the Juan de Fuca Plate off the west coast of British Columbia, which will have five instrumented nodes in operation over the next 18 months. This paper describes the development and management of these two observatories, the principal research themes, and the applications of the research to public policy, economic development, and public education and outreach. Both observatories depend on partnerships with universities, government agencies, private sector companies, and NGOs. International collaboration is central to the development of the research programs, including partnerships with initiatives in the EU, US, Japan, Taiwan and China.

The CLEANER-Hydrologic Observatory* initiative is a distributed network for research on complex environmental systems that focuses on the intersecting water-related issues of both the CUAHSI and CLEANER communities. It emphasizes research on the nation's water resources related to human-dominated natural and built environments. The network will be comprised of: interacting field sites with an integrated cyberinfrastructure; a centralized technical resource staff and management infrastructure to support interdisciplinary research through data collection from advanced sensor systems, data mining and aggregation from multiple sources and databases; cyber-tools for analysis, visualization, and predictive multi-scale modeling that is dynamically driven. As such, the network will transform 21st century workforce development in the water-related intersection of environmental science and engineering, as well as enable substantial educational and engagement opportunities for all age levels. The scientific goal and strategic intent of the CLEANER-Hydrologic Observatory Network is to transform our understanding of the earth's water cycle and associated

biogeochemical cycles across spatial and temporal scales-enabling quantitative forecasts of critical water-related processes, especially those that affect and are affected by human activities. This strategy will develop scientific and engineering tools that will enable more effective adaptive approaches for resource management. The need for the network is based on three critical deficiencies in current abilities to understand large-scale environmental processes and thereby develop more effective management strategies. First we lack basic data and the infrastructure to collect them at the needed resolution. Second, we lack the means to integrate data across scales from different media (paper records, electronic worksheets, web-based) and sources (observations, experiments, simulations). Third, we lack sufficiently accurate modeling and decision-support tools to predict the underlying processes or subsequently forecast the effects of different management strategies. Water is a critical driver for the functioning of all ecosystems and development of human society, and it is a key ingredient for the success of industry, agriculture and, national economy. CLEANER-Hydrologic Observatories will foster cutting-edge science and engineering research that addresses major national needs (public and governmental) related to water and include, for example: (i) water resource problems, such as impaired surface waters, contaminated ground water, water availability for human use and ecosystem needs, floods and floodplain management, urban storm water, agricultural runoff, and coastal hypoxia; (ii) understanding environmental impacts on public health; (iii) achieving a balance of economic and environmental sustainability; (iv) reversing environmental degradation; and (v) protecting against chemical and biological threats. CLEANER (Collaborative Large-scale Engineering Analysis Network for Environmental Research) is an ENG initiative; the Hydrologic Observatory Network is GEO initiative through CUAHSI (Consortium of Universities for the Advancement of Hydrologic Science, Inc.). The two initiatives were merged into a joint, bi-directorate program in December 2004.

Peru and France are to conclude an agreement to provide Peru with an astronomical observatory equipped with a 60-cm diameter telescope. The principal aims of this project are to establish and develop research and teaching in astronomy. Since 2004, a team of researchers from Paris Observatory has been working with the University of Cusco (UNSAAC) on the educational, technical and financial aspects of implementing this venture. During an international astronomy conference in Cusco in July 2009, the foundation stone of the future Peruvian Observatory was laid at the top of Pachatusan Mountain. UNSAAC, represented by its Rector, together with the town of Oropesa and the Cusco regional authority, undertook to make the sum of 300,000€ available to the project. An agreement between Paris Observatory and UNSAAC now enables Peruvian students to study astronomy through online teaching.

While the mainstream media has provided extensive coverage of El Nino and La Nina -- the warmer and colder phases of a perpetual oscillation in the surface temperature of the tropical Pacific Ocean -- little attention has been paid to deep-water phases. Several recent publications in leading scientific journals (Science and Nature) are adding new dimensions to the link between large-scale ocean circulation patterns and climate. Researchers Dr. Wallace Broecker and researchers at Columbia University's Lamont-Doherty Earth Observatory (see the November 5, 1999 issue of Science and the November 9, 1999 issue of The New York Times) found that deep ocean currents, operating as an oceanic "conveyor belt," may hold clues to climate change. The conveyor belt works by transporting warm, increasingly salty, ocean water from the Pacific to the Atlantic Ocean; eventually, the warm water current runs into a cold water current, causing the warm water to cool quickly and sink, due to greater density. In turn, this creates a "sub-surface countercurrent which carries the cool water back to the Indian and Pacific oceans" (2). In this week's issue of Nature (December 2, 1999), German scientist Carsten Ruhlemann and colleagues provide new evidence that the thermohaline circulation has triggered rapid climate change events in the past, including the last deglaciation. In addition, the current issue of Science Times (December 7, 1999) highlights the connection between thawing Arctic ice sheets and oceanic currents. This week's In The News focuses on ocean circulation patterns and climate change. The seven resources provide background information and specific links to related resources.

Mid-ocean ridges are dynamic systems where the complex linkages between geological, biological, chemical, and physical processes are not yet well understood. Indeed, the poor accessibility to the marine environment has greatly limited our understanding of deep-sea ecosystems. Undersea

cabled observatories offer the power and bandwidth required to conduct long-term and high-resolution time-series observations of the seafloor. Investigations of mid-ocean ridge hydrothermal ecosystem require interdisciplinary studies to better understand the dynamics of vent communities and the physico-chemical forces that influence them. NEPTUNE Canada (NC) regional observatory is located in the Northeast Pacific, off Vancouver Island (BC, Canada), and spans ecological environments from the beach to the abyss. In September-October 2010, NC will be instrumenting its 5th node, including deployment of a multi-disciplinary suite of instruments in two vent fields on the Endeavour Segment of the Juan de Fuca Ridge. These include a digital camera, an imaging sonar for vent plumes and flow characteristics (i.e. COVIS), temperature resistivity probes, a water sampler and seismometers. In 2011, the TEMPO-mini, a new custom-designed camera and sensor package created by IFREMER for real-time monitoring of hydrothermal faunal assemblages and their ecosystems (Sarrazin et al. 2007), and a microbial incubator, will added to the network in the Main Endeavour and Mothra vent fields. This multidisciplinary approach will involve a scientific community from different institutions and countries. Significant experience aids in this installation. For example, video systems connected to VENUS and NC have led to the development of new experimental protocols for time-series observations using seafloor cameras, including sampling design, camera calibration and image analysis methodologies (see communication by Aron et al. and Robert et al.). Similarly, autonomous deployment of many of the planned instruments has informed their adoption to the cabled instrument array at the Endeavour hydrothermal vents. This provides a unique laboratory for researchers to conduct long-term, integrated studies of hydrothermal vent ecosystem dynamics in relation to environmental variability at different temporal scales. In addition to programmed time-series monitoring, the NC infrastructure will also permit manual and automated modification of observational protocols in response to natural events. This will enhance our ability to document how the entire ecosystem reacts to potentially critical but short-lived environmental forces (e.g. seismic events). Sarrazin et al 2007. TEMPO: a new ecological module for studying deep-sea community dynamics at hydrothermal vents. OCEANS’07 IEEE Aberdeen Conference Proceedings

The technical status is reported for the Keck 1 and Keck 2 observatories. The Active Control System cabling to the node boxes, and the boxes themselves, have been installed on the telescope of Keck 2 and are ready for segment installation. Progress continued during this period on the development of adaptive optic and interferometric capabilities. The image quality of the 92 scheduled nights over the last quarter is unsurpassed for any large telescope in its first few years of full operation, a tribute to the care that went into the design for maintaining good thermal conditions inside the dome. However, the images could be much better and will be the focus of future studies. The highlight for the quarter is the discovery of the most distant galaxy ever detected. At 14 billion light years from earth, the discovery pushes back the earliest known time when galaxies were formed to only one billion years after the current estimate for the 'Big Bang' birth of this universe.

The Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) mission will be the first of the new Medium-class Explorer (MIDEX) missions to fly. IMAGE will utilize a combination of ultraviolet and neutral atom imaging instruments plus an RF sounder to map and image the temporal and spatial features of the magnetosphere. The eight science sensors are mounted to a single deckplate. The deckplate is enveloped in an eight-sided spacecraft bus, 225 cm across the flats, developed by Lockheed Martin Missiles and Space Corporation. Constructed of laminated aluminum honeycomb panels, covered extensively by Gallium Arsenide solar cells, the spacecraft structure is designed to withstand the launch loads of a Delta 7326-9.5 ELV. Attitude control is via a single magnetic torque rod and passive nutation damper with aspect information provided by a star camera, sun sensor, and three-axis magnetometer. A single S-band transponder provides telemetry and command functionality. Interfaces between the self-contained payload and the spacecraft are limited to MIL-STD-1553 and power. This paper lists the requirements that drove the design of the IMAGE Observatory and the implementation that met the requirements.

Two experiments now in progress have reported measurements of the flux of high energy neutrinos from the Sun. Since about 1970, Davis and his co-workers have been using a [sup 37]Cl-based detector to measure the [sup 7]Be and [sup 8]B solar neutrino flux and have found it to be at least a factor of three lower than that predicted by the Standard Solar Model (SSM). The Kamiokande

collaborations has been taking data since 1986 using a large light-water Cerenkov detector and have confirmed that the flux is about two times lower than predicted. Recent results from the SAGE and GALLEX gallium-based detectors show that there is also a deficit of the low energy pp solar neutrinos. These discrepancies between experiment and theory could arise because of inadequacies in the theoretical models of solar energy generation or because of previously unobserved properties of neutrinos. The Sudbury Neutrino Observatory (SNO) will provide the information necessary to decide which of these solutions to the solar neutrino problem'' is correct.

Norman, E.B.; Chan, Y.D.; Garcia, A.; Lesko, K.T.; Smith, A.R.; Stokstad, R.G.; Zlimen, I. (Lawrence Berkeley Lab., CA (United States)); Evans, H.C.; Ewan, G.T.; Hallin, A.; Lee, H.W.; Leslie, J.R.; MacArthur, J.D.; Mak, H.B.; McDonald, A.B.; McLatchie, W.; Robertson, B.C.; Skensved, P.; Sur, B. (Queen' s Univ., Kingston, ON (Canada). Dept. of Physics); Bonvin, E.; Earle, E.D.; Hepburn, D.; Milton, G.M. (Atomic Energ

Networking is an information giving and receiving system, a support system, and a means whereby women can get ahead in careers--either in new jobs or in current positions. Networking information can create many opportunities: women can talk about how other women handle situations and tasks, and previously established contacts can be used in clearing the path for subordinates or peers. In addition, networking offers support to other women in a business fashion. They can, for example, help women by informing them about jobs before they are advertised. Several key points can help networking work, including investment of time, the use of business cards, the establishment of an organized, structured system, the maintenance of a card file classifying members by subject categories, the maintenance of social and business contacts, involvement in several different networks, and the demonstration of trust and loyalty to the network. (HOD)

The Stratospheric Observatory for Infrared Astronomy (SOFIA) has recently concluded a set of engineering flights for Observatory performance evaluation. These in-flight opportunities have been viewed as a first comprehensive assessment of the Observatory's performance and will be used to address the development activity that is planned for 2012, as well as to identify additional Observatory upgrades. A series of 8 SOFIA Characterization And Integration flights have been conducted from June to December 2011. The HIPO science instrument in conjunction with the DSI Super Fast Diagnostic Camera (SFDC) have been used to evaluate pointing stability, including the image motion due to rigid-body and flexible-body telescope modes as well as possible aero-optical image motion. We report on recent improvements in pointing stability by using an Active Mass Damper system installed on Telescope Assembly. Measurements and characterization of the shear layer and cavity seeing, as well as image quality evaluation as a function of wavelength have been performed using the HIPO+FLITECAM Science Instrument conguration (FLIPO). A number of additional tests and measurements have targeted basic Observatory capabilities and requirements including, but not limited to, pointing accuracy, chopper evaluation and imager sensitivity. This paper reports on the data collected during these flights and presents current SOFIA Observatory performance and characterization.

Temi, Pasquale; Marcum, Pamela M.; Miller, Walter E.; Dunham, Edward W.; McLean, Ian S.; Wolf, Jurgen; Becklin, Eric E.; Bida, Thomas A.; Brewster, Rick; Casey, Sean C.; Collins, Peter L.; Horner, Scott D.; Jakob, Holger; Jensen, Stephen C.; Killebrew, Jana L.; Lampater, Ulrich; Mandushev, Georgi I.; Meyer, Allen W.; Pfueller, Enrico; Reinacher, Andreas; Rho, Jeonghee; Roellig, Thomas L.; Savage, Maureen L.; Smith, Erin C.; Teufel, Stefan; Wiedemann, Manuel

A better understanding of Astrometry prospects at Córdoba Observatory will be taken out through a historical review and the results recently achieved. The Córdoba Observatory was founded in 1871 in Córdoba City for initiative of President Domingo F. Sarmiento almost simultaneously with National Academy of Science and Meteorological Observatory. Its first director was Benjamin A. Gould. The original name of the observatory was Observatorio Nacional Argentino that has made remarkable contributions to Astrometry specially during its first sixty years after its foundation. The Córdoba Zone of Astrographic Catalog is an example of these contributions. After that period the interest and the activity in Astrometry was slowly decaying up to dissapearing at the end of 70s. This

phenomenon was not exclusive of Córdoba Observatory but it ocurred in many observatories around the world. The period 1871-1979 will be later on referred as "ancient times". However a lot of astrometric plates taken from the begining of the century to the ending of astrometric activity remain unmeasured and not completely exploited. CdC plates for example. In spite of that gradual abandon of Astrometry practice, lectures in Astrometry at undergraduate university level kept going on all the time maintainning the knowing about the importance of this branch of Astronomy and some interest in it, in particular for myself.

NUROV, a small observation class underwater vehicle, is under development at the Hawaii Mapping Research Group (HMRG) of the University of Hawaii. Connected by tether to a Base100T Internet Protocol (IP) network, such as those presently in use or proposed for cabled ocean observatories, it enables control of the vehicle through a web browser virtual control panel, and delivers live video through the same IP network. The vehicle is simple, with two horizontal thrusters and one vertical thruster, and a motorized tilt function for the video camera. Arrays of Light Emitting Diodes (LEDs) are mounted on either side of the camera so its field of view can be illuminated. Thruster motors and LED arrays are oil filled and pressure tolerant. The video camera, motor controller, and network electronics are enclosed in pressure housings; the initial prototype housings are designed for shallow water, but future housings for water depths to 6000 meters are planned. The LED arrays and camera housing window incorporate ultraviolet LEDs to reduce the effects of biofouling. A pressure sensor allows for automatic depth regulation by the motor controller on command from the vehicle pilot. In addition to applications observing near ocean observatory nodes, NUROV may also be used from a ship, using a standard fiber-optic electromechanical cable connected to a fiber to electrical network converter contained in a pressure housing. In fact, with the addition of a network switch, multiple vehicles could be deployed simultaneously on a single cable. Connection of the NUROV network to the Internet would allow users located around the world to pilot the vehicle and observe the IP video; this would be particularly useful for educational outreach.

This resource guide from the Middle School Portal 2 project, written specifically for teachers, provides links to exemplary resources including background information, lessons, career information, and related national science education standards. This guide focuses on the oceans as a part of the Earth system: the link between oceans and climate; tsunamis; life science concepts such as ocean ecosystems, food webs, and biodiversity; real data ï¿½ both sources of and projects that use real data; and related careers. There is also a section on the misconceptions commonly surrounding ocean concepts and finally the National Science Education Standards that these resource connect to. So even though you might not teach a unit called oceans, the oceans can be used as a context within an existing unit, such as ecosystems, energy transfer, systems thinking, or methods in science.

Watch surface currents circulate in this high-resolution, 3D model of the Earth's oceans. Driven by wind and other forces, currents on the ocean surface cover our planet. Some span hundreds to thousands of miles across vast ocean basins in well-defined flows. Others are confined to particular regions and form slow-moving, circular pools. Seen from space, the circulating waters offer a study in both chaos and order. › Download in HD formats

Ocean Portal is a high-level directory of ocean data and information related websites. Links can be searched by category: abstracts and bibliographies, associations, commercial equipment and services, data catalogs, expertise, International Oceanographic Data and Information Exchange Program (IODE) world data centers, meeting and event calendars, ocean libraries, online data servers, projects/agencies/institutes, protected areas and aquariums, publications and communications, research vessels, tools and references, and topical sites and education.

What characteristics do animals have that help them to survive in the ocean? We have enjoyed learning about lots of different ocean animals in class, but there is still so much more to learn! Here are some websites with fun pictures and videos to teach us about the characteristics that help animals survive in the ocean. Beluga whales have been one of our favorite topics ...

The Orbiting Carbon Observatory (OCO) mission was proposed to quantify the sources and sinks of

CO2 by making highly precise measurements of its column abundance. The OCO spectrometers measure absorption of reflected sunlight at the top of the atmosphere (TOA) in three narrowband near infrared (NIR) spectral regions. Since OCO flies over ocean (which is very dark in nadir mode)

Within the EPOS Research Infrastructure initiative, the international European coordination of the seismological research infrastructure is coordinated through ORFEUS (www.orfeus-eu.org) and considerable assistance from EMSC (www.emsc-csem.org). A newly installed EPOS working group 1 ensure a coordinated engagement of all involved seismological research infrastructures. We are working on a comprehensive overview of the seismological observational networks and research infrastructure within Europe and its direct periphery. We will present this overview, its current capabilities and future potential as a coordinated infrastructure. In the past year a number of different projects and initiatives have been launched to investigate new IT developments and its opportunities for improved data services, quality control, data integration and interoperability. Specifically developments include web-services, distributed archives, real-time data exchange software, data curation, data provenance, quality control, etc. EC-projects like NERA, VERCE, EUDAT, ENVRI, COOPEUS, REAKT, but also a large number of national initiatives have obtained funding. We will provide an overview of their activities and their potential impact on the seismological research infrastructure. We will also present the challenges involved in coordinating and implementing these different IT initiatives. The seismological research infrastructure involves a widely diverse set of observational networks; broadband seismic networks, local specialised monitoring networks, mobile deployments, acceleration networks, borehole observations, near source observational networks, etc, divided over many countries. We will present an overview of these networks, and the initiatives and challenges to integrate these data and facilitate access for research. Consequently, we will present a comprehensive overview of the current seismological observatories and research infrastructure within Europe, its developments and its potential. We hope this overview triggers a debate on how to make full advantage of these research infrastructures and where near time development priorities should be.

Sep 18, 2012 ... We have separate trash cans for plastics, foils, and other such material ... He made news with his analysis of the fate of tsunami debris from the 2011 Japan disaster. ... plastic for recycling (even if one could do it without harming marine life). ... “Degradation of plastic carrier bags in the marine environment”.

developed from the ground up. ARENA [1] and ... many projects are well under way before the Requirements are finalized. ... seismic activity even if that activity results in a cable fault. NEPTUNE's ... short interruptions to prevent damages due to surge currents. ... (c) The electric power circuits in the underwater repeaters are ...

Axial Seamount, the most robust volcanic system on the Juan de Fuca Ridge, is a future site of the cabled observatory component of the National Science Foundation's Ocean Observatories Initiative (OOI) (see Delaney et al; Proskurowski et al., this meeting). In 2014, high-bandwidth data, high-definition video and digital still imagery will be streamed live from the cable observatory at Axial Seamount via the Internet to researchers, educators, and the public. The real-time data and high-speed communications stream will open new approaches for the onshore public and scientists to experience and engage in sea-going research as it is happening. For the next 7 years, the University of Washington and the OOI will collaboratively support an annual multi-week cruise aboard the research vessel Thomas G. Thompson. These "VISIONS" cruises will include scientific and maintenance operations related to the cabled network, the OOI Regional Scale Nodes (RSN). Leading up to 2014, VISIONS cruises will also be used to engage students, educators, scientists and the public in science focused at Axial Seamount through avenues that will be adaptable for the live data stream via the OOI-RSN cable. Here we describe the education and outreach efforts employed during the VISIONS'11 cruise to Axial Seamount including: 1) a live HD video stream from the seafloor and the ship to onshore scientists, educators, and the public; 2) a pilot program to teach undergraduates from the ship via live and taped broadcasts; 3) utilizing social media from the ship to communicate with scientists, educators, and the public onshore; and 4) providing undergraduate and graduate students onboard immersion into sea-going research. The 2011 eruption at Axial Seamount (see Chadwick et al., this meeting) is a prime example of the potential behind having

these effective tools in place to engage the scientific community, students, and the public when the OOI cabled observatory comes online in 2014.

Understanding the link between natural and anthropogenic processes is essential for predicting the magnitude and impact of future changes of the natural balance of the oceans. Deep-sea observatories have the potential to play a key role in the assessment and monitoring of these changes. ESONET is a European Network of Excellence of deep-sea observatories that includes 55 partners belonging to 14 countries. ESONET NoE is providing data on key parameters from the subsurface down to the seafloor at representative locations that transmit them to shore. The strategies of deployment, data sampling, technological development, standardisation and data management are being integrated with projects dealing with the spatial and near surface time series. LIDO (Listening to the Deep Ocean environment) is one of these projects and proposes to establish a first nucleus of a regional network of multidisciplinary seafloor observatories contributing to the coordination of high quality research in the ESONET NoE by allowing the real-time long-term monitoring of Geohazards and Marine Ambient Noise in the Mediterranean Sea and the adjacent Atlantic waters. Specific activities address the long-term monitoring of earthquakes and tsunamis and the characterisation of ambient noise, marine mammal sounds and anthropogenic sources. The objective of this demonstration mission will be achieved through the extension of the present capabilities of the observatories working in the ESONET key-sites of Eastern Sicily (NEMO-SN1) and of the Gulf of Cadiz (GEOSTAR configured for NEAREST pilot experiment) by installing new sensor equipments related to Bioacoustics and Geohazards, as well as by implementing international standard methods in data acquisition and management.

Aerosol particle size is one of the fundamental quantities needed to determine the role of aerosols in forcing climate, modifying the hydrological cycle, and affecting human health and to separate natural from man-made aerosol components. Aerosol size information can be retrieved from remote-sensing instruments including satellite sensors such as Moderate Resolution Imaging Spectroradiometer (MODIS) and ground-based radiometers such as Aerosol Robotic Network (AERONET). Both satellite and ground-based instruments measure the total column ambient aerosol characteristics. Aerosol size can be characterized by a variety of parameters. Here we compare remote-sensing retrievals of aerosol fine mode fraction over ocean. AERONET retrieves fine mode fraction using two methods: the Dubovik inversion of sky radiances and the O'Neill inversion of spectral Sun measurements. Relative to the Dubovik inversion of AERONET sky measurements, MODIS slightly overestimates fine fraction for dust-dominated aerosols and underestimates in smoke- and pollution-dominated aerosol conditions. Both MODIS and the Dubovik inversion overestimate fine fraction for dust aerosols by 0.1-0.2 relative to the O'Neill method of inverting AERONET aerosol optical depth spectra. Differences between the two AERONET methods are principally the result of the different definitions of fine and coarse mode employed in their computational methodologies. These two methods should come into better agreement as a dynamic radius cutoff for fine and coarse mode is implemented for the Dubovik inversion. MODIS overestimation in dust-dominated aerosol conditions should decrease significantly with the inclusion of a nonspherical model.

Vanuatu lies on the Pacific 'Ring of Fire'. With 6 active subaerial and 3 submarine (identified so far) volcanoes, monitoring and following up their activities is a considerable work for a national observatory. The Vanuatu Geohazards Observatory is a good example of what can be done from ‘scratch’ to develop a volcanic monitoring capability in a short space of time. A fire in June 2007 completely destroyed the old observatory building and many valuable records leaving Vanuatu with no volcano monitoring capacity. This situation forced the Government of Vanuatu to reconsider the structure of the hazards monitoring group and think about the best way to rebuild a complete volcano monitoring system. Taking the opportunity of the re-awakening of Gaua volcano (North of Vanuatu), the Vanuatu Geohazards section in partnership with GNS Science, New Zealand developed a new program including a strategic plan for Geohazards from 2010-2020, the installation of a portable seismic network with real-time data transmission in Gaua, the support of the first permanent monitoring station installation in Ambrym and the design and implementation of volcano monitoring infrastructure and protocol. Moreover the technology improvements of the last decade and the quick extension of enhanced communication systems across the islands of Vanuatu played

a very important role for the development of this program. In less than one year, the implementation of this program was beyond expectations and showed considerable improvement of the Vanuatu Geohazards Observatory volcano monitoring capability. In response to increased volcanic activity (or unrest) in Ambae, the Geohazards section was fully capable of the installation of a portable seismic station in April 2010 and to follow the development of the activity. Ultimately, this increased capability results in better and timelier delivery of information and advice on the threat from volcanic activity to the National Disaster Management Office and to the population of the volcanic islands.

The expanding needs for ocean resources, together with the design and diffusion of new kinds of deep-ocean and coastal management\\u000a patterns, have changed profoundly in the transition from modern to post-modern society. As a result, the scientific approach\\u000a to the ocean has also undergone profound changes, which have marked the epistemology of disciplines, their logical backgrounds\\u000a and methods. This process

The Mt. Dushak-Erekdag Observatory (Central Asia, Turkmenistan, 58deg E longitude) is located just in the longitudes gap of asteroseismological networks. It is the southernmost observatory of the former Soviet Union, its latitude is +38deg . The sky seeing at the site is one of the best in Central Asia: a low light pollution, high and stable sky transparency, over 200 usable nights per year. The altitude is above 2000 m. Odessa Astronomical Observatory has its 0.8 m telescope with a two-star high-speed photometer there, which frequently participates in international programs and multi-site campaigns. An accuracy of the photometry amounts to 1 mmag. Besides, a 1 m wide-angle telescope and a dual-tube telescope with 0.5 m mirrors are installed at the observatory. The developed infrastructure at the site and the stable economy in Turkmenistan make the Mt. Dushak-Erekdag Observatory very interesting for the WET observations.

Traditionally, observatory bibliographies were maintained to provide insight in how successful a observatory is as measured by its prominence in the (refereed) literature. When we set up the bibliographic database for the Chandra X-ray Observatory (http://cxc.harvard.edu/cgi-gen/cda/bibliography) as part of the Chandra Data Archive ((http://cxc.harvard.edu/cda/), very early in the mission, our objective was to make it primarily a useful tool for our user community. To achieve this we are: (1) casting a very wide net in collecting Chandra-related publications; (2) including for each literature reference in the database a wealth of metadata that is useful for the users; and (3) providing specific links between the articles and the datasets in the archive that they use. As a result our users are able to browse the literature and the data archive simultaneously. As an added bonus, the rich metadata content and data links have also allowed us to assemble more meaningful statistics about the scientific efficacy of the observatory. In all this we collaborate closely with the Astrophysics Data System (ADS). Among the plans for future enhancement are the inclusion of press releases and the Chandra image gallery, linking with ADS semantic searching tools, full-text metadata mining, and linking with other observatories' bibliographies. This work is supported by NASA contract NAS8-03060 (CXC) and depends critically on the services provided by the ADS.

Bermuda may be known as a luxurious vacation destination, but it also houses one of the world's leading institutes for ocean studies, called BIOS. Dr. Tony Knap explains how climate change is causing ocean temperatures to rise, and what impacts it may bring around the world. "Changing Planet" is produced in partnership with the National Science Foundation.

This NASA website is part of Visible Earth, and contains a searchable directory of images of the Earth. This section contains images pertaining to ocean optics, such as ocean color, turbidity and reflectance. Each image is available in a variety of resolutions and sizes, with a brief description, credit, date, and the photographing satellite.

SeaWeb's monthly newsletter summarizing recent news, views and events concerning marine and coastal environments and wildlife. Site also features The Ocean Report, a series of ninety-second radio slots highlighting a wide range of news and issues relating to the ocean, and Give Swordfish a Break, a successful campaign that helped restore depleted North Atlantic swordfish populations.

This radio broadcast reports on ways to put ocean water to work doing everything from running steam engines and providing electricity to providing air conditioning and growing marine life and vegetables. After harnessing the power of the sea, the water is still clean and can be returned to the ocean. The clip is 2 minutes in length.

The oceans play a central role in the maintenance of life on Earth. Oceans provide extensive ecosystems for marine animals and plants covering two-thirds of the Earth's surface, are essential sources of food, economic activity, and biodiversity, and are central to the global biogeochemical cycles. The oceans are the largest reservoir of carbon in the Planet, and absorb approximately one-third of the carbon emissions that are released to the Earth's atmosphere as a result of human activities. Since the beginning of industrialization, humans have been responsible for the increase in one greenhouse gas, carbon dioxide (CO2), from approximately 280 parts per million (ppm) at the end of the nineteenth century to the current levels of 390ppm. As well as affecting the surface ocean pH, and the organisms living at the ocean surface, these increases in CO2 are causing global mean surface temperatures to rise.

In this lesson students discover that measurements from space can tell us the temperature of the ocean, both on an annual average and as measured on any given date. For the annual average the highest ocean temperatures are near the equator, and drop as one moves either northward or southward from the equator. Students will graph each temperature value as a function of latitude and write a linear equation that best fits the points on their graph. They can choose as data points any point at that approximate latitude because the temperature is not uniform for a certain latitude - some areas are hotter and some are cooler. They can also look at today's ocean temperatures via the link provided to see how the seasons affect whether the northern or southern oceans are warmer. Students will take ocean temperature data from a map and plot temperature versus angle from the equator.

The Simple Cabled Instrument for Measuring Parameters In-situ (SCIMPI) is a new seafloor observatory instrument. SCIMPI is designed to take subsurface time series measurements of temperature, pressure and resistivity in the sub-seafloor. This instrument has a battery operational life of approximately two years, which can be replaced with a battery pack using a remotely-operated vehicle, and provides high resolution measurements of physical properties in the sediment. With either periodic battery replacement or connection to a fiber-optic cable, SCIMPI is a long-term observatory for understanding sub-seafloor dynamics. The main advantage of this system is the reduced equipment and installation requirements making this tool an affordable and versatile system for scientific research. The pressure and temperature sensors, integrated into the system, have been successfully used in other marine industrial and scientific applications. Its electrical resistivity sensor, casing, and array assembly are uniquely designed and can be adapted for each mission. SCIMPI is currently in its last phase of testing prior to deployment in an Integrated Ocean Drilling Program borehole. This first SCIMPI is designed for a water depth of 1000 m and a sediment depth up to ~300 m below seafloor. But future assemblies can be tailored for deeper conditions and environments. Here we present the SCIMPI design, deployment options, and its scientific potential in a long-term ocean observatory. Science applications include studies of fluid flow, hydrate formation, and seismically induced pore pressure changes. The cost of this instrument will enable these measurements to become more commonplace, thereby improving our temporal and spatial knowledge of sub-seafloor gas, fluid and pore pressure activity. Most notable of the target deployments for SCIMPI are sub-seafloor gas hydrate sites and sites with biogenic methane. Understanding the dynamics of methane's role in the oceans as climate change proceeds will contribute to a better understanding of Earth's carbon budget.

On the base of 2 Web-servers of the Special astrophysical observatory (Russia): CATS (Astrophysical CATalogues Supporting system: http://cats.sao.ru) and SEDS (Informational System to operate with Spectral Energy distribution: http://sed.sao.ru) and Data Bank of RATAN-600 radio observations we started to design a virtual mini observatory oriented to the radio source study in radio, optics, X-ray and infrared wavelength ranges. Some software packages to operate with continuum spectra in radio and optics wavelength ranges were created. Cross-correlation procedures were designed and are used as standard programmes to obtain information in these

working systems now. The problem of unified FITS-like formats describing different data types was solved. We discuss different problems of the virtual radio observatory to be solved in unification process. This system will be accessible via Internet and will help users to operate with observational data, make spectra fitting and estimate awated fluxes in various wavelength ranges.

ViRBO (Virtual Radiation Belt Observatory) is one of the domain-specific virtual observatories funded under the NASA Heliophysics Data Environment (HPDE) program that began development in 2006. In this work, we report on the search, display, and data access functionality of ViRBO along with plans for interaction with upcoming missions, including Radiation Belt Storms Probes (RBSP). We also describe the relationship between the services and data provided by ViRBO and the general architecture of the HPDE and the plan articulated in the 2010 Senior Review of Data Centers. The lessons learned in the development of ViRBO include issues related to (1) creating a user base given the limits of the types of activities a virtual observatory are charged with supporting and (2) dealing with limitations on existing software and standards when developing data services.

The design studies are under way for the deep ocean anti-neutrino observatory located in the vicinity of the Big Island (Hawaii) with the main goal of measuring geo-neutrino flux from the mantle and core which can exclusively be done in a location far from the continental plates such is Hawaiian Islands chain. Hanohano will also accomplish the definitive measurement of the electron anti-neutrino signal from the core to observe or eliminate a hypothetical natural reactor in the Earth's core.

The Gamma Ray Observatory (GRO) is an Earth orbiting satellite that studies sources of localized, galactic, and extragalactic gamma rays. It will be carried into a near-circular orbit by the Space Shuttle, following which it will be placed in its operational orbit by its on-board hydrazine propulsion system. Formal orbit parameters are 350 km x 450 km x 28.5 degrees with a period of 93 minutes. Deep Space Network coverage will be provided during emergencies that would prevent communications via the normal Tracking and Data Relay Satellite System (TDRSS)-White Sands data link. Emergency support will be provided by the DSN's 26-meter antenna subnetwork. Information is given in tabular form for DSN support, frequency assignments, telemetry, and command.

The oceans are in constant flux. The movement of ocean water is readily observable in the rise and fall of the tides and the continual lapping of waves along the coastlines of continents and islands. Less obvious is the network of currents that constantly circulates ocean water from one side of the globe to another. This map illustrates the network of currents known as the great ocean conveyor belt, or the thermohaline conveyor, and shows which portions are travelled by warm and shallow, or cold and salty, currents. A background essay and discussion questions are included.

A CORK (Circulation Obviation Retrofit Kit) borehole represents all of the basic components required for a seafloor observatory: a stable environment for long-term continuous measurements of earth and ocean phenomena, access to a unique environment below the seafloor under controlled conditions (e.g. hydrologically sealed), and a standard interface for communication. Typically, however, due to power constraints and a limited frequency of data download opportunities, data sampling has been limited to rates on the order of several minutes. For full seismic wave sampling, at least 1 Hz or better is required. While some CORK systems are now being connected to an underwater cable to provide continuous power and real-time data (cf. Neptune network in the Northeast Pacific), there will be locations where cabled observatories are not viable. Another mode of communication is required to enable both high data rate communication and access for data download via more conventional vessels and not limited to those with ROV or submersibles. We here report on technology to enable high data rate download and transfer of data and information using underwater optical communications, which can be accomplished from a surface vessel of opportunity or, in the future, by autonomous underwater vehicle. In 2010, we successfully deployed and tested an underwater optical communication system that provides high data rate communications over a range of 100 meters from a deep sea CORK borehole observatory located in the northeast Pacific at IODP Hole 857D. The CORK is instrumented with a thermistor string and pressure sensors that record downhole formation pressures and temperatures within oceanic

basement and is pressure sealed from the overlying water column. The seafloor Optical Telemetry System (OTS) was plugged into the CORK's existing underwater matable connector to provide an optical and acoustic communication interface and additional data storage and battery power for the CORK to sample at 1 Hz data-rate, an increase over the normal 15 sec data sample rate. A CTD-mounted OTS lowered by wire from a surface ship established an optical communication link at 100 meters range at rates of 1, 5 and 10 Mbps with no bit errors. This mode of communication demonstrates the effectiveness of using a ship-based system to interrogate the system remotely. The OTS was designed to be installed at the seafloor CORK for a year. In 2011, we will revisit the CORK and OTS using the ROV Jason to test the system, download the data collected during this period and to refurbish the batteries for a further year-long deployment period. We will report on the results of those tests at the meeting. As the need to observe oceanic and earth phenomenon over periods not limited to weather windows or cruise schedules increases, the borehole observatory will provide an important venue for gaining access to such timescales. High data-rate underwater communications will be required to make full use of such observatory infrastructure. The use of free water optical communication methods provides a logical way to accomplish these goals in the future.

The Compton Observatory Science Workshop was held in Annapolis, Maryland on September 23-25, 1991. The primary purpose of the workshop was to provide a forum for the exchange of ideas and information among scientists with interests in various areas of high energy astrophysics, with emphasis on the scientific capabilities of the Compton Observatory. Early scientific results, as well as reports on in-flight instrument performance and calibrations are presented. Guest investigator data products, analysis techniques, and associated software were discussed. Scientific topics covered included active galaxies, cosmic gamma ray bursts, solar physics, pulsars, novae, supernovae, galactic binary sources, and diffuse galactic and extragalactic emission.

This is an artist's concept describing the High Energy Astronomy Observatory (HEAO). The HEAO project involved the launching of three unmarned scientific observatories into low Earth orbit between 1977 and 1979 to study some of the most intriguing mysteries of the universe; pulsars, black holes, neutron stars, and super nova. This concept was painted by Jack Hood of the Marshall Space Flight Center (MSFC). Hardware support for the imaging instruments was provided by American Science and Engineering. The HEAO spacecraft were built by TRW, Inc. under project management of the MSFC.

A new control system is currently being developed for the 1.2-meter Mercator Telescope at the Roque de Los Muchachos Observatory (La Palma, Spain). Formerly based on transputers, the new Mercator Observatory Control System (MOCS) consists of a small network of Linux computers complemented by a central industrial controller and an industrial real-time data communication network. Python is chosen as the high-level language to develop flexible yet powerful supervisory control and data acquisition (SCADA) software for the Linux computers. Specialized applications such as detector control, auto-guiding and middleware management are also integrated in the same Python software package. The industrial controller, on the other hand, is connected to the majority of the field devices and is targeted to run various control loops, some of which are real-time critical. Independently of the Linux distributed control system (DCS), this controller makes sure that high priority tasks such as the telescope motion, mirror support and hydrostatic bearing control are carried out in a reliable and safe way. A comparison is made between different controller technologies including a LabVIEW embedded system, a PROFINET Programmable Logic Controller (PLC) and motion controller, and an EtherCAT embedded PC (soft-PLC). As the latter is chosen as the primary platform for the lower level control, a substantial part of the software is being ported to the IEC 61131-3 standard programming languages. Additionally, obsolete hardware is gradually being replaced by standard industrial alternatives with fast EtherCAT communication. The use of Python as a scripting language allows a smooth migration to the final MOCS: finished parts of the new control system can readily be commissioned to replace the corresponding transputer units of the old control system with minimal downtime. In this contribution, we give an overview of the systems design, implementation details and the current status of the project.

Introduction Sustained cooperative action is required to improve the mental health of populations, particularly in low and middle-income countries where meagre mental health investment and

insufficient human and other resources result in poorly performing mental health systems. The Observatory The International Observatory on Mental Health Systems is a mental health systems research, education and development network that will contribute to the development of high quality mental health systems in low and middle-income countries. The work of the Observatory will be done by mental health systems research, education and development groups that are located in and managed by collaborating organisations. These groups will be supported by the IOMHS Secretariat, the International IOMHS Steering Group and a Technical Reference Group. Summary The International Observatory on Mental Health Systems is: 1) the mental health systems research, education and development groups; 2) the IOMHS Steering Group; 3) the IOMHS Technical Reference Group; and 4) the IOMHS Secretariat. The work of the Observatory will depend on free and open collaboration, sharing of knowledge and skills, and governance arrangements that are inclusive and that put the needs and interests of people with mental illness and their families at the centre of decision-making. We welcome contact from individuals and institutions that wish to contribute to achieving the goals of the Observatory. Now is the time to make it happen where it matters, by turning scientific knowledge into effective action for people's health. (J.W. Lee, in his acceptance speech on his appointment as the Director-General of the World Health Organization) [1].

In this activity, students will study data from satellite temperature images and underwater sensors (CTDs) to look for evidence of an upwelling off the coast of New Jersey. Based on their new knowledge, they will use real-time ocean data from the Coastal Ocean Observatory Laboratory (COOLroom) to create their own ocean weather forecast for the local newspaper. Students will discover that using the same satellite, CTD, and meteorological data that they will learn about, scientists at the COOLroom are learning how to forecast ocean weather. During this activity students will form a hypothesis about what affects ocean temperature. They will discover how scientists collect and analyze ocean temperature data and how atmospheric conditions affect ocean temperatures.

In this paper we discuss hypotheses on formation of ocean skeletal structures. These structures entered the ocean together with atmospheric precipitation and were assembled from fragments of skeletal structures present in clouds. We base interpretation of this phenomenon on surface tension forces between fundamental tubular blocks of the investigated structures that may also occur beneath the ocean surface. A capillary model is presented to explain formation of a network of interacting tubes. Data about the nature of ocean skeletal structures can be instrumental in modeling many processes associated with physics of the ocean.

With three levels to choose from on each page - beginner, intermediate or advanced - this site provides a good introduction to the structure of the ocean. Included are excellent graphics and text about patterns of ocean salinity and temperature with depth, as well as surface currents, deep ocean circulation and even the water cycle. Extensive in-text links provide the means for users to explore the content in an open-ended fashion, although some might find the lack of any obvious top-level navigation to be disorienting.

As the Integrated Ocean Observing System (IOOS) Data Assembly Center (DAC), NOAA's National Data Buoy Center (NDBC) collects data from many ocean observing systems, quality controls the data, and distributes them nationally and internationally. The DAC capabilities provide instant interoperability of any ocean observatory with the national and international agencies responsible for critical forecasts and warnings and with the national media. This interoperability is an important milestone in an observing system's designation as an operational system. Data collection begins with NDBC's own observing systems - Meteorological and Oceanographic Buoys and Coastal Stations, the Tropical Atmosphere Ocean Array, and the NOAA tsunameter network. Leveraging the data management functions that support NDBC systems, the DAC can support data partners including ocean observations from IOOS Regional Observing Systems, the meteorological observations from the National Water Level Observing Network, meteorological and oceanographic observations from the National Estuarine Research Reserve System, Integrated Coral Observing Network, merchant ship observations from the Voluntary Observing Ship program, and ocean current measurements from oil and gas platforms in the Gulf of Mexico and from Coastal HF

Radars. The DAC monitors and quality controls IOOS Partner data alerting the data provider to outages and quality discrepancies. After performing automated and manual quality control procedures, the DAC prepares the observations for distribution. The primary means of data distribution is in standard World Meteorological Organization alphanumeric coded messages distributed via the Global Telecommunications System, NOAAPort, and Family of Services. Observing systems provide their data via ftp to an NDBC server using a simple XML. The DAC also posts data in real-time to the NDBC webpages in columnar text format and data plots that maritime interests (e.g., surfing, fishing, boating) widely use. The webpage text feeds the Dial-A-Buoy capability that reads the latest data from webpages and the latest NWS forecast for the station to a user via telephone. The DAC also operates a DODS/OPenDAP server to provide data in netCDF. Recently the DAC implemented the NOAA IOOS Data Integration Framework, which facilitates the exchange of data between IOOS Regional Observing Systems by standardizing data exchange formats and incorporating needed metadata for the correct application of the data. The DAC has become an OceanSITES Global Data Assembly Center - part of the Initial Global Observing System for Climate. Supported by the NOAA IOOS Program, the DAC provides round-the-clock monitoring, quality control, and data distribution to ensure that its IOOS Partners can conduct operations that meet the NOAA definition of: Sustained, systematic, reliable, and robust mission activities with an institutional commitment to deliver appropriate, cost-effective products and services.

The Latin American Network Information Center (LANIC) at the University of Texas (last mentioned in the November 13, 1998 Scout Report) has added a new feature to provide users with quick reference guides to online resources for each of the thirteen presidential or legislative elections in Latin American and Caribbean countries between this month and the end of 2000. The pages for each country are divided into five sections: Electoral Coverage, Electoral Resources, News, Parties and Candidates, and (after the election) Results. Users should note that the number of links contained in each of these sections will vary considerably by country, depending on what is available. Currently, the site has content on four of the thirteen elections (Argentina, Uruguay, Guatemala, and Chile) as well as information on three recent referenda or elections in Guatemala, Venezuela, and Panama.

Detection of radio transients, in particular those transients with time scales of less than a second, provide a window into some of nature's most extreme conditions. There are now several dedicated transient search programs underway or in planning phase around the globe. The Deep Space Network (DSN) with its multitude of antennas spread across three complexes around the globe, offers a unique capability to search for such short-lived events. Additionally, downlink tracks of planetary orbiters offer an opportunity to search for planetary emissions, such as electrostatic discharges. We will describe a prototype system operating at the DSN Goldstone facility and the preliminary results obtained from monitoring Mars during spacecraft downlink tracks. We will discuss the system architecture, detection algorithms, and strategies for vetoing non-astrophysical events. We will also describe our future plans in terms of expansion of the program to other DSN complexes.

MicroObservatory is a network of robotic educational telescopes that can be controlled via the Web. Initially funded by the National Science Foundation and currently operated by NASA's Universe Education Forum at the Harvard-Smithsonian Center for Astrophysics, the network has been widely used in both formal and informal education settings. The system is robust, having delivered images to students every night for nearly 10 years, and is accompanied by a powerful yet easy-to-use FITS image processing package. Field-tested, inquiry-based activities for both classroom and informal settings are available. MicroObservatory is now equipped with a Guest Observer Portal, allowing anyone with an email address to request and obtain images of a wide variety of target objects. This new feature provides effectively unlimited access for learners to take their own astronomical images for educational use. This poster describes MicroObservatory and its Guest Observer Portal, and how the telescope network can be used to support and enhance astronomy education at any level.

At 9:46:23 pm Pacific Time on March 10, 2011 (05:46:23 UTC on March 11), a magnitude 9.0 earthquake occurred 129 km (80 miles) off the coast of Sendai, a city in Honshu, Japan. The T?hoku earthquake triggered a catastrophic tsunami that produced an inundation wave height as

high as 30 m that propagated throughout the entire Pacific Ocean basin. Deep-ocean

The Monterey Bay Ocean Bottom International Seismic Experiment (MOISE) has successfully deployed a suite of geophysical and oceanographic instrument packages on the ocean floor using the Monterey Bay Aquarium Research Institute's (MBARI) Ventana, a tethered Remotely Operated Vehicle (ROV).The goal of this international cooperative experiment is to advance the global Seafloor Observatory effort by developing a prototype suite of instruments and installing them on the western side of the San Andreas fault system offshore of central California. The centerpiece of the instrument suite was a digital broadband seismometer package partially buried within the sediment-covered floor of Monterey Bay, 40 km offshore and 10 km west of the San Gregorio fault at a depth of 1015 m (Figure 1).

At the Rutgers University Coastal Ocean Observation Lab (RU-COOL), we have constructed a shelf-wide ocean observatory to characterize the physical forcing of continental shelf primary productivity in the New York Bight (NYB). The system is anchored by four enabling technologies, which include the international constellation of ocean color satellites, multi-static high frequency long-range surface current radar, real-time telemetry moorings, and long duration autonomous underwater vehicles (AUVs). Operation of the observatory is through a centralized computer network dedicated to receiving, processing and visualizing the real-time data and then disseminating results to both field scientists and ocean forecasters over the World Wide Web. The system was designed to conduct cutting edge research requiring the addition of rapidly evolving technologies, and to serve society by providing sustained data delivered in real-time. Rutgers COOL continues to work closely with Webb Research Corporation (WRC) in testing and development of the Slocum underwater gliders and continues to apply Slocum gliders in field operations spanning the globe. The continued strong collaboration between WRC and Rutgers has led to advances in glider operations and applications. These include deployment/recovery techniques, improvements in durability and reliability, integrated sensors suites, salinity spike removal, and adaptive controls utilized to optimize mission goals and data return. The gliders have gathered numerous data sets including salt intrusions as seen off of New Jersey, plume tracking, biological water sample matching, and operation through Hurricane Ernesto in 2006. This talk will detail recent oceanographic experiments in which the fleet has been deployed and improvements in the operation of these novel robotic vehicles. These experiments, in locations around the world, have resulted in significant new work in operation of underwater gliders and have gathered new and unique data sets. Recent accomplishments include deployment of a glider in Antarctica for LTER, control of a fleet of gliders during the ONR sponsored Shallow Water 06, RIMPAC, LATTE, ASAP, and the continuation of long-term observation at the LEO-15 New Jersey site Endurance Line. To date Rutgers has flown close to 100 glider missions, with over 27,000 km flown over 760 calendar days and 1,350 glider days in the water. Operations around the world are orchestrated remotely from COOL at Rutgers. Computer networking allows for command and control of the glider fleet from the COOL Lab or remotely via the internet. This system has enabled new oceanographic experiments at significantly reduced cost, with increased reliability, and with extended continuous operational deployments in the global oceans since 2003.

Founded in 1894, Lowell Observatory was one of the earliest research institutions established in the Arizona Territory. Funded and led by Percival Lowell, the Observatory soon established itself as a significant center for astronomical research. While Percival's early ideas about intelligent life on Mars were not correct, other investigations he initiated resulted in fundamentally important discoveries. First among these is the discovery by Vesto Slipher, in the second decade of the twentieth century, of the large redshifts of external galaxies. Perhaps better known to the public, is the 1930 discovery of Pluto. Today, the Lowell Observatory employs a staff of 80, of whom 21 hold Ph.D.s in astronomy, planetary science, or physics. The Observatory operates research facilities at 4 sites, with a new 4.2-meter telescope - the Discovery Channel Telescope -- under construction at a fifth. Lowell astronomers use these facilities, in addition to national facilities around the globe, in the air, and in space, to conduct a diverse program of research. Lowell remains today an institution true to the vision of its founder- independent, private, closely connected to the Lowell family, and welcoming to the public.

The Virtual Wave Observatory (VWO): A VxO for Heliophysics. Data. Dr. Shing F. ..... (1) provide community-specific requirements to guide VWO development, ... will provide important support for NASA Strategic Goals 3B, 3C, and 3F pertaining to ..... resolution time-series data for the study of nonlinear waves (Figure 3A).

You can read more about this image on the Earth Observatory website. ... interaction between the cool, dry air in a low-pressure system with a stable layer of warm, moist air. .... Haze and Sediment in Bangladesh and India ..... studied in detail for the past several decades, assessing their long-term trends has been difficult.

Because of their remoteness and the resultant difficulty of visiting the Gemini telescopes on Mauna Kea and Cerro Pachon, a virtual tour of the Gemini Observatory was instigated. This has been developed over the years and has received wide acclaim. This talk illustrates where we are now with the Virtual Tour and gives some examples of topics that have worked

An overview is given of the Gamma Ray Observatory (GRO) mission. Detection of gamma rays and gamma ray sources, operations using the Space Shuttle, and instruments aboard the GRO, including the Burst and Transient Source Experiment (BATSE), the Oriented Scintillation Spectrometer Experiment (OSSE), the Imaging Compton Telescope (COMPTEL), and the Energetic Gamma Ray Experiment Telescope (EGRET) are among the topics surveyed.

The principal act that separates science from engineering is that of discovery. Virtual Observatories are a development with great potential for advancing our ability to do science by enabling us to do research effectively and to do research across disciplines. Access to data is one of the factors that enables discovery. A well-designed VO should enable discovery as well as

This Website offers a review of the surface circulation of Earth's ocean and classroom investigations appropriate for various disciplines at the high school level. Articles and video interviews about ocean current research, interactive data visualizes, news articles, simplified models, teacher and student guides will create resources for diverse audiences who are impacted by ocean surface currents. This site highlights use of data derived from the on-line satellite data of Earth for understanding patterns of ocean surface currents and how they relate to issues of human exploration, commerce, science, weather/climate, and pollution. Classroom-ready, interdisciplinary investigation swill help high school students practice science, mathematics and writing skills matched to national standards and will be keyed to topics covered in the traditional high school curriculum. Each investigation is keyed to the stages of the 5 E's teacher/learning model.

Whether we live on the coast or in a land-locked region, the ocean is our life-supporting system and regulator of the Earth's climate. To recognize the importance of the watery mass covering roughly three-quarters of the planet, the United Nations has declared 1998 as the International Year of the Ocean (IYO). This designation, proposed by the International Oceanographic Commission (IOC), highlights the need for governments and the public to sustain ocean resources by protecting the marine environment. The major aim of the joint efforts during 1998 will be to create awareness and obtain commitments from governments to take action, provide adequate resources, and give priority to the ocean and coastal areas as finite economical assets.

The Great Rift Valley is a huge gash cut into East Africa, extending 3000 kilometers from Malawi in southern Africa to the Red Sea in the north. Beneath the Great Rift Valley, the next new ocean on Earth may be forming. This radio broadcast ptovides interviews with geologists who are studying this part of Africa to learn how new seas appear. The tectonic plates that form the continents drift continuously about the globe as new oceans open up and old ones get closed down. But, occasionally, continents themselves split apart and new ocean floor forms from volcanoes that erupt in the the ensuing rift. It is this event that geologists believe they are witnessing in East Africa. The broadcast discusses Project EAGLE (Ethiopia Afar Geoscientific Lithospheric Experiment), an investigation into how a continental rift turns into a new ocean. The broadcast is 30 minutes in length.

The regulation of the dumping of materials into the ocean is reviewed. Criteria to be applied in reviewing and evaluating permit applications for the transportation and dumping of materials into the ocean are established. A definition of monitoring of dumping sites, the assessment of fees to cover permit processing costs, and a moratorium is placed on the issuance of permits for the disposal of radioactive waste are included.

A variety of classroom activities and lessons that compare the world's oceans. Activities included: The Gulf of Maine, Satellite Comparisons, Design a Fish, What Migrations, Incredible Feasting of Whales, Paddle to the Sea, and Ocean Soundings. Discover why weather at identical latitudes is not always the same, learn the different ways whales eat, and find out the temperature difference between the Gulf Stream and surrounding water. Links to other Aquarium modules.

The NEPTUNE observatory system has introduced a new technology approach, bringing the Internet to subsea cabled science observatory systems. The subsea nodes, providing subsea connection points provisioning data and power, provide a gateway between the permanent infrastructure and the instrumentation. The proven high reliability and long life of the subsea communications equipment offers the opportunity to install permanent observatories for

National Radio Astronomy Observatory Dark Energy: Constraints from Astronomy, Answers from Physics? Jim Condon #12;National Radio Astronomy Observatory UVa/NRAO DE Lunch Talk 2005 Nov. 30 Constraining Radio Astronomy Observatory UVa/NRAO DE Lunch Talk 2005 Nov. 30 Current Expansion Rate H0 = 72 Â± 7 km s

The NOAA-led Integrated Ocean Observing System (IOOS) and the NSF-funded Ocean Observatories Initiative Cyberinfrastructure Project (OOI-CI) are collaborating on a prototype data delivery system for numerical model output and other gridded data using cloud computing. The strategy is to take an existing distributed system for delivering gridded data and redeploy on the cloud, making modifications to the system that allow it to harness the scalability of the cloud as well as adding functionality that the scalability affords. ??2009 MTS.

In a cooperative agreement between Pittsburg State University (PSU) and the Southeast Education Service Center (ESC) at Greenbush, KS, the PSU/Greenbush Astrophysical Observatory has been constructed. The main instrument is a 61 cm f/15 Cassegrainian telescope. Currently in house are a Boller and Chivens spectrograph, a custom-built spectrophotometer, and a single-channel photoelectric photometer. The spectrograph has been modified for use with a CCD detector. The observatory's construction was funded by a local telephone cooperative and thirty-four local school districts. Programs for elementary and secondary students and teachers have been initiated; some of these having been funded by the Kansas Board of Education through the Goals 2000 program. The ESC has spent the last several years interconnecting the schools it serves for interactive distant learning (IDL) capability. The observatory will be connected to this network and the telescope will have multiple live video feeds over fiber optic cable. In addition, the telescope is completely remotely controlled with either direct interaction with a computer via mouse and keyboard or through user-independent voice recognition software. Students in classrooms will be able to perform observing projects remotely over their IDL hookup, live two-way video/audio interaction with observatory personnel. Moreover, on-site use by groups of students, teachers, and members of the general public will be encouraged.

The Sea of Marmara (SoM) is located on the North Anatolian Fault (NAF), a major transform plate bounday between the Eurasian and Anatolian plates. The SoM region is characterized by fast deformation rates (25 mm/a horizontal and 5-6 mm/a vertical), high seismic activity and steep slopes (10-29°). The most active northern branch of the NAF crosses the SoM in an east-west direction and consitutes a seismic gap that is expected to create one or more large (M>7) earthquakes in the next 30 years. Historical records reveal that more than 55 large (Ms>6.8) earthquakes and 30 tsunami events occurred in the past two millennia in the SoM. Most tsunamis in the SoM were probably associated with submarine landslides triggered by large earthquakes. However, the normal faulting south of the Ç?narc?k Basin might have also caused tsunamis. The SoM is therefore is prone to high geohazard risks, including earthquakes, submarine landslides and associated tsunamis. The

SOM is also interesting in terms of its oceanographic setting between the Mediterranean and the Black Sea. It is characterized by two-layer flow system with a a permanent halocline at -25 m. Because of the shallowness of its two outlets (Istanbul and Canakkale Straits) the lower layer waters have restricted circulation and low (1-3 mg/L) oxygen levels. This, together with intense and risky maritime traffic and large input of industrial and municipal pollutants from its drainage area and the Black Sea, makes the SOM environmentally sensitive. The SoM has been selected as an important node of the EC FP6 funded European Seas Observatory Network of Excellence (ESONET NoE) and EC FP7 European Seafloor Observatory infrastructure preparatory phase (EMSO-PP) projects, because of its geotectonic setting with various geohazard and environmental risks and interesting oceanographic setting. The ESONET NoE project is presently funding studies under the ESONET Marmara Demonstration Mission (Marmara-DM) project that has already contributed immensely to our knowledge about the geographic distribution, composition and origin of the fluids venting from the active faults, relations between fluids and seismic activity, and the deep benthic life associated with the fluid activity beneath the SoM. Its high tectonic activity with geohazard risk, as well as its special oceanographic setting as a gateway between the Mediterranean and Black Seas, makes the SOM a natural laboratory for multidisciplinary seafloor observations for geohazard, oceanographic and environmental monitoring. Seafloor observatories in the SoM would therefore offer the earth and ocean scientists to study multiple, interrelated processes over time scales ranging from seconds to decades. An observatory set up with optimized seafloor locations, observatory design and sensors for the SoM will be presented as part of a proposal.

The European research infrastructure EMSO is a European network of fixed-point, deep-seafloor and water column observatories deployed in key sites of the European Continental margin and Arctic. It aims to provide the technological and scientific framework for the investigation of the environmental processes related to the interaction between the geosphere, biosphere, and hydrosphere and for a sustainable management by long-term monitoring also with real-time data transmission. Since 2006, EMSO is on the ESFRI (European Strategy Forum on Research Infrastructures) roadmap and has entered its construction phase in 2012. Within this framework, EMSO is contributing to large infrastructure integration projects such as ENVRI and COOPEUS. The EMSO infrastructure is geographically distributed in key sites of European waters, spanning from the Arctic, through the Atlantic and Mediterranean Sea to the Black Sea. It is presently consisting of thirteen sites which have been identified by the scientific community according to their importance respect to Marine Ecosystems, Climate Changes and Marine GeoHazards. The data infrastructure for EMSO is being designed as a distributed system. Presently, EMSO data collected during experiments at each EMSO site are locally stored and organized in catalogues or relational databases run by the responsible regional EMSO nodes. Three major institutions and their data centers are currently offering access to EMSO data: PANGAEA, INGV and IFREMER. In continuation of the IT activities which have been performed during EMSOs twin project ESONET, EMSO is now implementing the ESONET data architecture within an operational EMSO data infrastructure. EMSO aims to be compliant with relevant marine initiatives such as MyOceans, EUROSITES, EuroARGO, SEADATANET and EMODNET as well as to meet the requirements of international and interdisciplinary projects such as COOPEUS and ENVRI, EUDAT and iCORDI. A major focus is therefore set on standardization and interoperability of the EMSO data infrastructure. Beneath common standards for metadata exchange such as OpenSearch or OAI-PMH, EMSO has chosen to implement core standards of the Open Geospatial Consortium (OGC) Sensor Web Enablement (SWE) suite of standards, such as Catalogue Service for Web (CS-W), Sensor Observation Service (SOS) and Observations and Measurements (O&M). Further, strong integration efforts are currently undertaken to harmonize data formats e.g NetCDF as well as the used ontologies and terminologies. The presentation will also give information to users about the discovery and visualization procedure for the EMSO data presently available.

The Woods Hole Oceanographic Institution (WHOI) completed the initial phase of the Martha's Vineyard Coastal Observatory (MVCO) in July of 2001. The MVCO is being using to monitor coastal atmospheric and oceanic processes. Specifically, the observatory is expected to: - Provide continuous long-term observations for climate studies. - Provide a reliable system and rugged sensors that allow opportunistic sampling of extreme events. - Provide a local climatology for intensive, short duration field campaigns. - Further facilitate regional studies of coastal processes by

providing infrastructure that supports easy access to power and data. This talk provides an example of the last two objectives using the low wind component of the Office of Naval Research's (ONR) Coupled Boundary Layers and Air-Sea Transfer (CBLAST) program. CBLAST-LOW has been designed to investigate air-sea interaction and coupled atmospheric and oceanic boundary layer dynamics at low wind speeds where the dynamic processes are driven and/or strongly modulated by thermal forcing. This effort is being carried out by scientists at WHOI, NPS, NOAA, NRL, Rutgers, UW/APL, JH/APL, OSU, NCAR, and other institutions, and includes observational and modeling components. The MVCO is providing observations and infrastructure in support of several intensive operating periods in the summers of 2001, 2002, and possibly 2003. During these periods, the observational network around the observatory was and will be greatly expanded using traditional oceanographic moorings and bottom mounted instrumentation, innovative 2- and 3-D moored and drifting arrays, survey ships, AUVs, satellite remote sensing, and heavily instrumented aircraft. In addition, the MVCO cabled components will be extended out to the 20-m isobath where we plan to deploy a 35-m tower. The tower will be instrumented from 15-m above the ocean surface to the ocean bottom with instruments capable of directly measuring the momentum, heat, and radiative fluxes in the atmospheric, oceanic, and bottom boundary layers. This tower will be directly connected to shore via the existing node at the MVCO using an additional fiber-optic-power cable. All of these measurements will be combined to obtain direct measurements of vertical fluxes (transfer) of momentum, heat and mass across the coupled boundary layers (CBLs); to map the 3-D structure of the CBLs over a range of spatial and temporal scales; to identify the processes that drive the fluxes and CBL structure; to develop and evaluate parameterizations of the flux-producing processes; and to test the mean and variance budgets for momentum, heat, mass, and kinetic energy. These measurements will also be used to evaluate and improve mesoscale models, large eddy simulations (LES), and direct numerical simulations (DNS) that will, in-turn, provide nowcasts, forecasts, and simulations of these processes to help interpret the observations. >http://www.whoi.edu/science/AOPE/dept/CBLAST/lowwind.html

The CORK ("Circulation Obviation Retrofit Kit") sealed-hole observatory was developed 12 years ago by ODP engineers and scientists to investigate in-situ hydrogeological state and processes, through long-term measurements of in-situ temperatures and pressures and sampling of in-situ fluids. CORK capabilities have been expanded recently to allow monitoring and sampling in multiple isolated horizons. To date, 18 CORK hydrological observatory sites have been established in ridge crest, ridge flank, and accretionary prism settings. Observations at these sites have provided precise constraints on the primary driving forces for, and thermal consequences of, sub-seafloor fluid flow caused by thermal buoyancy and tectonic consolidation. Deep in accretionary prisms, high formation pressures have been observed, confirming that plate boundary faults possess little strength. In young ocean crustal settings, surprisingly low lateral temperature and pressure gradients have been documented, implying that the extrusive upper oceanic crust permits efficient transport of fluid, heat, and solutes over distances of many kilometers. CORK observations have also revealed pressure variations and associated fluid flow resulting from co-seismic plate deformation and from tidal, oceanographic, and barometric loading of the seafloor. The characteristics of the formation response to seafloor loading provide constraints on formation elastic and hydrological properties, and allow quantitative estimates of crustal strain to be made from pressure transients related to tectonic events. Strain events have been observed up to 250 km away from several seismic dislocations along subduction, transform, and seafloor spreading plate boundaries.

One hundred and seventy-nine Lamont Geological Observatory heat-flow measurements in the Atlantic Ocean and the Caribbean Sea are presented; their reliability is carefully estimated. Together with 197 other measurements, they are used to describe the broad regional pattern of heat flow in the Atlantic Ocean. The average heat flow over the mid-Atlantic ridge is within 20% of the heat flow

Building on previous experience in capacity building for ocean observations, the Nippon Foundation (NF) and the Partnership for Observations of the Global Oceans (POGO) have announced a new Centre of Excellence (C of E) at the Bermuda Institute of Ocean Sciences (BIOS). The goals of the C of E are to expand the world-wide capacity and expertise to observe the oceans and to expand capacity-building projects and promote international collaboration and networking in ocean sciences. Over the past 104 years, BIOS has built a global reputation in blue-water oceanography, coral reef

ecology, and the relationships between ocean health and human health coupled with high quality education programmes that provide direct, hands-on experience with BIOS-based research. The C of E at BIOS will build upon this model to establish a new, graduate-level education and training programme in operational oceanography. The 10 month Programme will offer course modules in ocean disciplines with a focus on observatory sciences complemented by hands-on training in observational methods and techniques based on the multi-disciplinary expertise of BIOS and BIOS-affiliated scientists who direct ongoing, ocean observational programmes such as: - Hydrostation S, since 1954; - Bermuda Atlantic Time-series Study, since 1988; - Oceanic Flux Program sediment trap time-series, since 1978; - Bermuda Test-Bed and Science Mooring, since 1994; - Bermuda Microbial Observatory, since 1997; - Bermuda Bio-Optics Program, since 1992; - Atmospheric chemistry and air-sea fluxes, since 1990 Additional areas of BIOS research expertise will be incorporated in the C of E to broaden the scope of education and training. These include the nearshore observational network of the BIOS Marine Environmental Program and the environmental air-water chemistry network of the Bermuda Environmental Quality Program. A key resource of the C of E is the newly acquired 168 ft. research vessel, the RV Atlantic Explorer, which was specifically designed to provide for ocean research and education (e.g., sufficient berths for scientists and the NF- POGO Scholars; an education-specific classroom). The Atlantic Explorer will serve as a unique platform for the NF-POGO Scholars to gain hands-on, at-sea experience as participants on all scheduled research cruises. The NF-POGO Scholars will take courses that focus on the theoretical and policy side of observational oceanography and participate in a Core Skills module that emphasizes numeracy, data analysis, science management, and written and oral scientific communication. There will be one Regional Training Programme for a Developing Country each year, focused on local issues and how to resolve them. The course is open to 10 participants from developing countries (or countries with economies in transition). NF- POGO Scholars must have at least a first degree in science. Preference will be given to applicants who currently hold a position in a research or academic institution in a developing country and anticipate returning to the country after the training period. Candidates must demonstrate immediate relevance of their training to on-going or planned ocean observations in their home country.

The Arctic Ocean's role in global climate - while now widely appreciated - remains poorly understood. Lack of information about key processes within the oceanic, cryospheric, biologic, atmospheric and geologic disciplines will continue to impede physical understanding, model validation, and climate prediction until a practical observing system is designed and implemented. Requirements, challenges and recommendations for Ice-Based Observatories (IBO?s) for the Arctic Ocean were formulated by workshop participants of an international workshop entitled "Arctic Observing Based on Ice-Tethered Platforms" held at the Woods Hole Oceanographic Institution in Woods Hole, Massachusetts, USA, June 28-30, 2004. The principal conclusion from the workshop was that practical, cost-effective and proven IBO designs presently exist, can be readily extended to provide interdisciplinary observations, and should be implemented expeditiously as part of a coordinated Arctic observing system. Ice-based instrument systems are a proven means of acquiring unattended high quality air, ice, and ocean data from the central Arctic during all seasons. Arctic Change is ongoing and measurements need to begin now. An array of approximately 25-30 IBO units maintained throughout the Arctic Ocean is envisioned to observe the annual and interannual variations of the polar atmosphere-ice-ocean environment. An international body will be required to coordinate the various national programs (eliminate overlap, insure no data holes) and insure compatibility of data and their widespread distribution. A long-term, internationally coordinated logistics plan should be implemented as an essential complement to scientific and technical plans for an IBO array. The 25 years of IABP drift trajectories, existing data climatologies and available numerical simulations should be exploited to derive insight to optimal array design, deployment strategies, sampling intervals, and expected performance of an IBO array. IBO designs should provide accommodation for novel sensors, tomographic receivers, and communication and navigation capabilities for free vehicles. Emerging technologies for Arctic observation should be developed within the framework of an integrated Arctic observing system.

HartRAO, the only fiducial geodetic site in Africa, participates in VLBI, GNSS, and SLR global networks, among others. This report provides an overview of our geodetic VLBI activities during 2008. On the 3rd of October 2008, a critical failure of the 26-m radio telescope put a halt to VLBI

observations. 1. Geodetic VLBI at HartRAO Hartebeesthoek is located 65 kilometers northwest of Johannesburg within the World Heritage Site known as the Cradle of Humankind, just inside the provincial boundary of Gauteng, South Africa. The nearest town, Krugersdorp, is 32 km distant. The telescope is situated in an isolated valley which affords protection from terrestrial interference. HartRAO uses a 26-metre equatorially mounted Cassegrain radio telescope built by Blaw Knox in 1961. The telescope was part of the NASA deep space tracking network until 1975 when the facility was converted to an astronomical observatory. The telescope is co-located with an SLR station (MOBLAS-6) and an IGS GNSS station (HRAO). HartRAO joined the EVN as an associate member during 2001. Geodetic VLBI has been allocated 18% of the available telescope time. The allocation for geodetic VLBI was increased from 58 24-hour experiments in 2007 to 65 in 2008 to include the CONT08 campaign.

In the mid 18th century both theoretical and practical astronomy were cultivated in Milan by Barnabites and Jesuits. In 1763 Boscovich was appointed to the chair of mathematics of the University of Pavia in the Duchy of Milan, and the following year he designed an observatory for the Jesuit Collegium of Brera in Milan. The Specola was built in 1765 and it became quickly one of the main european observatories. We discuss the relation between Boscovich and Brera in the framework of a short biography. An account is given of the initial research activity in the Specola, of the departure of Boscovich from Milan in 1773 and his coming back just before his death.

The purpose of NASA's Earth Observatory is to provide a freely-accessible publication on the Internet where the public can obtain new satellite imagery and scientific information about our home planet. The specific focus of this Earth Observatory website is natural hazards. Earth scientists around the world use NASA satellite imagery to better understand the causes and effects of natural hazards. The goal in sharing these images is to help people visualize where and when natural hazards occur, and to help mitigate their effects. Natural hazards that are emphasized include dust and smoke, wildfires, floods, severe storms, and volcanoes. In addition, each week the site highlights major natural hazard events occurring around the globe. Links to satellite imagery and informational text concerning the natural hazard and image interpretation are included. The site also offers a link to unique imagery, such as earthquakes, droughts, and landslides, and features the latest unique imagery events around the globe.

Observatories are the engine room of astronomical outreach. They provide the tools that allow research discoveries to be made in addition to employing many of the research astronomers and public information officers (PIOs). Where accessible, they provide a natural venue for public visits and centres of excellence. They engage in a wide variety of outreach activities in their own right with varying degrees of success, often linked to funding. In all of this, the enthusiasm and high calibre activities of individuals can never be overestimated. We review the above and report the results from a 'health of stock' survey conducted of a large sample of mainly ground-based observatories refl ecting their overall activities and experiences.

In the nearly ten years of a functional Virtual Solar Observatory (VSO), http://virtualsolar.org/, we have made it possible to query and access sixty-seven distinct solar data products and several event lists from nine spacecraft and fifteen observatories or observing networks. We have used existing VSO technology, and developed new software, for a distributed network of sites caching and serving SDO HMI and/or AIA data. We have also developed an application programming interface (API) that has enabled VSO search and data access capabilities in IDL, Python, and Java. We also have quite a bit of work yet to do, including completion of the implementation of access to SDO EVE data, and access to some nineteen other data sets from space- and ground-based observatories. In addition, we have been developing a new graphic user interface that will enable the saving of user interface and search preferences. We solicit advice from the community input prioritizing our task list, and adding to it.

Ocean wave data can be obtained from such active microwave probe techniques as monostatic HF and VHF, bistatic HF, HF synthetic aperture radar, altimeters, satellite and airborne synthetic aperture radar, carrier wave or pulsed dual-frequency radars, and coastal surveillance radar. Approaches to texture analysis of ocean wave imagery are discussed, with attention given to

transform techniques or spatial frequency analysis, and the analysis of second-order gray level statistics. In addition, recommendations are made for further work on the modulation of short gravity waves by longer waves as a function of wind speed and wave direction, and the derivation of transfer functions for the ocean response of dual-frequency radars.

The Arctic Ocean is the smallest of the Earth's four major oceans, covering 14x10(exp 6) sq km located entirely within the Arctic Circle (66 deg 33 min N). It is a major player in the climate of the north polar region and has a variable sea ice cover that tends to increase its sensitivity to climate change. Its temperature, salinity, and ice cover have all undergone changes in the past several decades, although it is uncertain whether these predominantly reflect long-term trends, oscillations within the system, or natural variability. Major changes include a warming and expansion of the Atlantic layer, at depths of 200-900 m, a warming of the upper ocean in the Beaufort Sea, a considerable thinning (perhaps as high as 40%) of the sea ice cover, a lesser and uneven retreat of the ice cover (averaging approximately 3% per decade), and a mixed pattern of salinity increases and decreases.

The design and performance of the Palomar Observatory CCD camera are described. The instrument is a modified version of the PFUEI reimaging camera built as part of the Wide-Field\\/Planetary Camera Project (Gunn and Westphal, 1978) and comprises a Dewar with 24-h holding time; a 12.5-cm-diameter circular board holding video preamplifier, operating-voltage filters, clock drivers, and level translators are mounted inside

This lesson plan is part of the DiscoverySchool.com lesson plan library for grades 6-8. It focuses on oceans currents and their effects. Students do a lab activity to show that temperature is what causes ocean currents. Included are objectives, materials, procedures, discussion questions, evaluation ideas, suggested readings, and vocabulary. There are videos available to order which complement this lesson, an audio-enhanced vocabulary list, and links to teaching tools for making custom quizzes, worksheets, puzzles and lesson plans.

The purpose of the lessons is to teach about ocean acidification, its causes and impacts on marine life especially zooplankton, an essential part of marine food webs. Included in the materials is background information on ocean acidification. There are four different activities included in this document. To do all four you should plan on at least two 45 minute periods. The activities define and explain the process of acidification as well as its impacts on shelled organism. The materials can be adapted and used for grades 5-6 and adding more indepth information makes it suitable for middle and high school students.

The European Geosciences Union has been working on a number of open access journals over the past few years, and Ocean Science is just such an endeavor. The intent of the journal is to publish research articles, review papers, and short communications of all stripes. Visitors can sign up for RSS feeds, look over the "General Information" area, and also learn about their submission guidelines. In the "Online Library OS" area, visitors can view recently revised papers, complete issues, special issues, and also search past works by title or author. Also, visitors are welcome to comment on published works and they can also sign up to receive an email subscription to Ocean Science.

Located in Woods Hole, Massachusetts, WHOI, the largest independent oceanographic institution in the world, is a private, non-profit research facility dedicated to the study of marine science and to the education of marine scientists. Site provides information on graduate programs, undergraduate opportunities, facilities, and more. An abundance of information on the research program and its vessels, including an extensive collection of Deep Submergence Vehicle Alvin material. Also includes downloadable data, photos, and video.

This is an overview of the Woods Hole Oceanographic Institution educational program. The site includes resources at the K-12, undergraduate, graduate and postdoctoral levels. Main K-12 resource page features journals and logs from several WHOI expeditions, including dives to the New England Seamounts. Teacher links include information on curriculum supplements and additional

sites of interest; sites include aquariums, weather, research vessels, marine science careers, and marine mammals to name a few.

The Woods Hole Oceanographic Institution (WHOI) (mentioned in the October 29, 1998 Scout Report for Science & Engineering), one of the world's leading research institutes in oceanography, hosts this page on ocean acoustics research. Hyperlinked project descriptions are accompanied by color graphics and cover four main topics: Acoustic Monitoring of Sediment Transport, Ocean Acoustic Tomography (ocean temperature measurements), Shallow Water Acoustic Propagation and Tomography (acoustic scattering caused by coastal internal waves), and Acoustic Scattering caused by Zooplankton. Also at the site are contact lists for OAL staff and students, and links to FTP-based educational resources (such as the Oceans and CSIRO Seawater toolboxes for Matlab v5). A selection of related links to WHOI's Department of Applied Ocean Physics and Engineering (OAPE) and other Applied Ocean Physics and Engineering departments round out the site. For complete information on WHOI, see the WHOI homepage.

Established in 1930, the Woods Hole Oceanographic Institution is one of the world's most well-regarded research institutions, devoted to the mission of developing a fundamental understanding of the processes and characteristics that govern how the oceans work and how they interact with the earth as a whole. From the site's main page, visitors can develop a general understanding of the Institution's activities by looking through the information provided about their research departments (e.g., biology and marine chemistry); their research groups; and their highly-regarded ocean institutes, which include the Deep Ocean Exploration Institute and the Ocean Life Institute. Students and educators will want to make sure and visit the Dive and Discover section of the site, which allows users to "travel" on the bottom of a number of oceans in a miniature submarine. Divided into six sections, the trip contains a host of information for people who are interested in learning about the variety of life in the Pacific Ocean and about different geological processes, like plate tectonics.

The Scripps Institution of Oceanography (SIO) and the Woods Hole Oceanographic Institution (WHOI) have joined forces with the San Diego Supercomputer Center to build a testbed for multi-institutional archiving of shipboard and deep submergence vehicle data. Support has been provided by the Digital Archiving and Preservation program funded by NSF/CISE and the Library of Congress. In addition to the more than 92,000 objects stored in the SIOExplorer Digital Library, the testbed will provide access to data, photographs, video images and documents from WHOI ships, Alvin submersible and Jason ROV dives, and deep-towed vehicle surveys. An interactive digital library interface will allow combinations of distributed collections to be browsed, metadata inspected, and objects displayed or selected for download. The digital library architecture, and the search and display tools of the SIOExplorer project, are being combined with WHOI tools, such as the Alvin Framegrabber and the Jason Virtual Control Van, that have been designed using WHOI's GeoBrowser to handle the vast volumes of digital video and camera data generated by Alvin, Jason and other deep submergence vehicles. Notions of scalability will be tested, as data volumes range from 3 CDs per cruise to 200 DVDs per cruise. Much of the scalability of this proposal comes from an ability to attach digital library data and metadata acquisition processes to diverse sensor systems. We are able to run an entire digital library from a laptop computer as well as from supercomputer-center-size resources. It can be used, in the field, laboratory or classroom, covering data from acquisition-to-archive using a single coherent methodology. The design is an open architecture, supporting applications through well-defined external interfaces maintained as an open-source effort for community inclusion and enhancement.

Implementing a laser safety program at the Woods Hole Oceanographic Institution (WHOI) presents many challenges and opportunities for improving safety performance. Getting all laser users to take ownership of safety and comply with all laser safety requirements are key ingredients of a successful laser safety program. WHOI's laser safety program includes the following elements: registration of high power lasers, hazard analysis of laser facilities, proper design of laser facilities, selection of hazard controls, laser safe operating procedures, laser safety training for all laser users, and routine inspections of laser facilities. Laser owners are required to sign the high power laser registration form and agree to comply with all applicable requirements. All laser users are required to

sign the laser safe operating procedure that applies to their facility and follow the requirements. Laser users are included in the development of laser safe operating procedures, design of their facilities, review of hazard analysis calculations for their lasers, and in the selection of hazard controls. Laser safety training for new laser users includes a tour of established laser facilities, review of laser safe operating procedure, and a review of basic laser safety information. By engaging the laser users in all elements of the laser safety program, ownership of laser safety at the user level is more easily established and compliance with safety requirements is significantly improved. New laser owners and users are mentored by experienced laser users and are given an opportunity to observe the implementation of laser safety procedures at established laser facilities before operating their own high power lasers. Increased compliance with safety requirements has been demonstrated with fewer non-compliance items noted during annual laser safety inspections, more participation in initial and annual refresher training, and more requests from higher power laser users for assistance with selection and implementation of exposure controls. New laser users are referred to the LSO by the laser owners for initial laser safety training rather than the LSO discovering untrained laser users during laser facility inspections. PMID:23287518

and ``typical'' oceanic intraplate volcano and because it offers unique features that other submarine volcanoes and currently active submarine volcano. Its activity is reflected in seismic events in 1973 and 1995, the lack., and the 1996 Loihi Science Team, Researchers rapidly respond to submarine activity at Loihi Volcano, Hawaii

The WHOI buoy radiometer intercomparison took place during May and June, 2000 at the WHOI facility. The WHOI IMET, JAMSTEC Triton, and NOAA TAO buoy systems were operated from a beach site and the Brookhaven National Laboratory set up two Portable Radiation Package systems (P01 and P02) alongside the WHOI instrumentation on the roof of the Clark Building, about 300 m away. The BNL instruments were named ''P01'' and ''P02'' and were identical. Buoy instruments were all leveled to {+-}1{degree} to horizontal. The purpose of the project was to compare the buoy systems with precision measurements so that any differences in data collection or processing would be evaluated. BNL was pleased to participate so the PRP system could be evaluated as a calibration tool. The Portable Radiation Package is an integral component of the BNL Shipboard Oceanographic and Atmospheric Radiation (SOAR) system. It is designed to make accurate downwelling radiation measurements, including the three solar irradiance components (direct normal, diffuse and global) at six narrowband channels, aerosol optical depth measurements, and broadband longwave and shortwave irradiance measurements.

Developed jointly by members of the Woods Hole Oceanographic Institution (WHOI) and New Hampshire Sea Grant Programs, this website introduces students and others to a variety of information about careers in marine science fields. The website features profiles of people doing a number of jobs including Marine Educator, Chemical Oceanographer, Aquarium Curator, and Ocean Advocate, to name a few. The site also contains concise descriptions of three important marine fields: Marine Biology, Oceanography, and Ocean Engineering. For those curious about financial matters, the site lists potential salaries based on occupational grouping, employment sector, and geographic location. In addition, site visitors will find a solid collection of related links, a Frequently Asked Questions page, and three short slide shows.

Using calculated stress changes to faults surrounding the January 12, 2010, rupture on the Enriquillo Fault, and the current (January 12 to 26, 2010) aftershock productivity, scientists from the U.S. Geological Survey (USGS), Woods Hole Oceanographic Institution (WHOI), and Disaster Prevention Research Institute, Kyoto University (DPRI) have made rough estimates of the chance of a magnitude (Mw)=7 earthquake occurring during January 27 to February 22, 2010, in Haiti. The probability of such a quake on the Port-au-Prince section of the Enriquillo Fault is about 2 percent, and the probability for the section to the west of the January 12, 2010, rupture is about 1 percent. The stress changes on the Septentrional Fault in northern Haiti are much smaller, although positive.

--at most, the upper 200 meters. UV light also penetrates into this region, which may have increasingly, to bathyal depths of 4500 meters--far below the limit of sunlight's penetration. Where

there is light,its red capture and detect low light levels.Living at depths from 200 to 1000 meters,it has ventral (underside

Cafe Thorium, Ken Buesseler's Radiochemistry Group at the Woods Hole Oceanographic Institution, analyzes "marine samples for both natural and artificial radionuclides." Researchers can find out about the group's success using Neutrally Buoyant Sediment Traps (NBST) to collect particles in the ocean. Visitors can learn about the potential link between iron and glaciation. Students can obtain a handy radiation decay calculator as well as a colorful illustration explaining Thorium-234 presence in the ocean. The website offers many downloadable published articles related to the group's work.

Oceanographic Institute at Florida Atlantic University's Marine Mammal Research and Conservation (MMRC) program, working with partner organizations including Georgia Aquarium, is currently conducting its Health, research, education and conservation programs involving marine mammal species from around the world

Things are changing at Scripps Institution of Oceanography. Long renowned for excellence in Earth, ocean, atmospheric and interdisciplinary research as well as graduate student training, the Institution is now being called upon to address a new set of challenges. Opportunities to address diverse societal needs abound, and we at Scripps are prepared to respond. As the problems facing the globe in reconciling human and economic development with the limitations of the Earth system become more and more pressing, the potential impact of Scripps research on society grows. The full value of our work cannot be realized unless we share it with established and future economists, international relations specialists, public policy experts, and business leaders. To help our scientists realize this goal while maintaining their research excellence, Scripps has committed to: 1) expanding its faculty's role in undergraduate teaching; 2) establishment of the Center for Educational Outreach Connections that will enable Scripps scientists to participate in educational outreach efforts locally, regionally, nationally and internationally; 3) pursuing joint education programs with other elements of the UCSD community; and 4) launching a new interdisciplinary Center for Earth Observations and Applications in which scholars from throughout the university will develop new collaborations, new technologies, and new knowledge in many fields affecting the environment. Our ambition is to generate a continuous awareness of how Earth is behaving - an awareness that could be an integral part of all kinds of decisions about the environment. Scripps is not alone in recognizing and responding to societal needs. Funding agencies are increasingly requiring scientists to articulate how their research has impact beyond the academic community. With the establishment of the Centers for Ocean Sciences Education Excellence, NSF has led the way in assembling and leveraging the intellectual and organizational resources to link scientists and educators for the benefit of both groups, as well as society. Scripps is proud to be a part of this growing national network. By stimulating students' interest in the Earth sciences, COSEE-facilitated educational outreach will increase the pool of bright students who pursue advanced degrees and careers in the Earth sciences. NSF funding has also enabled Scripps to launch a new interdisciplinary graduate program in marine biodiversity and conservation involving economics and international relations faculty as well as experts from the San Diego Supercomputer Center. And, recognizing the need for training people with both science and management skills, a collaborative program in ocean science and management is being developed by Scripps and the UCSD Rady School of Management.

The Internet's Whois service allows anyone to type a domain name into a Web interface and then receive the name and contact details of whoever has registered it. Internet Corporation for Assigned Names and Numbers (ICANN) contracts make it mandatory to provide indiscriminate public access to this information. Data protection laws in Europe and other countries conflict with this ICANN

Located in Ft. Pierce, Florida, HBOI is involved in research and education in the marine sciences; biological, chemical, and environmental sciences; marine biomedical sciences; marine mammal conservation; aquaculture; and ocean engineering. Highly interactive site includes information on facilities, including research vessels and submersibles, seminars, courses, and current research. Site also features HBOI at Sea, online expeditions all over the world. Includes links to other educational and research information.

right whales with broken jaws, but scientists have lacked even the most rudimentary knowledge. they will help determine if reducing vessel speeds in critical right whale habitats would reduce the likelihood their interior structure, to gain insights into their capacities. WHOI Right Whale Initiative accelerates

Ocean observatories have already demonstrated their ability to maintain long-term time series, capture episodic events, provide context for improved shipboard sampling, and improve accessibility to a broader range of participants. Communicating Ocean Sciences, an already existing college course from COSEE-California has demonstrated its ability to teach future scientists essential communication skills. The NSF-funded Communicating Ocean Sciences to Informal Audiences (COSIA) project has leveraged these experiences and others to demonstrate a long-term model for promoting effective science communication skills and techniques applicable to diverse audiences. The COSIA effort is one of the pathfinders for ensuring that the new scientific results from the increasing U.S. investments in ocean observatories is effectively communicated to the nation, and will serve as a model for other fields. Our presentation will describe a long-term model for promoting effective science communication skills and techniques applicable to diverse audiences. COSIA established partnerships between informal science education institutions and universities nationwide to facilitate quality outreach by scientists and the delivery of rigorous, cutting edge science by informal educators while teaching future scientists (college students) essential communication skills. The COSIA model includes scientist-educator partnerships that develop and deliver a college course that teaches communication skills through the understanding of learning theory specifically related to informal learning environments and the practice of these skills at aquariums and science centers. The goals of COSIA are to: provide a model for establishing substantive, long-term partnerships between scientists and informal science education institutions to meet their respective outreach needs; provide future scientists with experiences delivering outreach and promoting the broader impact of research; and provide diverse role models and inquiry-based ocean sciences activities for children and families visiting informal institutions. The following COSIA partners have taught the course: Hampton University - Virginia Aquarium; Oregon State University - Hatfield Marine Science Visitor's Center; Rutgers University - Liberty Science Center; University of California, Berkeley - Lawrence Hall of Science; University of Southern California - Aquarium of the Pacific; and Scripps Institution of Oceanography - Birch Aquarium. Communicating Ocean Sciences has also been taught at Stanford, Woods Hole Oceanographic Institute, University of Oregon (GK-12 program), University of Washington, and others. Data from surveys of students demonstrates improvement in their understanding of how people learn and how to effectively communicate. Providing college students with a background in current learning theory, and applying that theory through practical science communication experiences, will empower future generations of scientists to meet the communication challenges they will encounter in their careers.

The British Oceanographic Data Centre (BODC) is a component of the UK Natural Environment Research Council's (NERC) environmental data center network and has designated responsibility for marine data. BODC's mission is to operate a world class data center in support of UK marine science by maintaining and developing the UK's national oceanographic database, developing innovative marine data products and digital atlases, collaborating, on behalf of the UK, in the international exchange and management of oceanographic data, and making high quality oceanographic data readily available to UK research scientists in academia, government and industry.

An expendable oceanographic sensor apparatus is deployed from an airplane or a ship to make oceanographic observations in a profile of the surface-to-ocean floor, while deployed on the floor, and then a second profile when returning to the ocean surface. The device then records surface conditions until on-board batteries fail. All data collected is stored and then transmitted from the surface to either a satellite or other receiving station. The apparatus is provided with an anchor that causes descent to the ocean floor and then permits ascent when the anchor is released. Anchor release is predetermined by the occurrence of a pre-programmed event.

In recent years, considerable effort has been made to improve the visual recording capabilities of

Alvin and ROV Jason. This has culminated in the routine use of digital cameras, both internal and external on these vehicles, which has greatly expanded the scientific recording capabilities of the NDSF. The UNOLS National Deep Submergence Facility (NDSF) archives maintained at Woods Hole Oceanograpic Institution (WHOI) are the repository for the diverse suite of photographic still images (both 35mm and recently digital), video imagery, vehicle data and navigation, and near-bottom side-looking sonar data obtained by the facility vehicles. These data comprise a unique set of information from a wide range of seafloor environments over the more than 25 years of NDSF operations in support of science. Included in the holdings are Alvin data plus data from the tethered vehicles- ROV Jason, Argo II, and the DSL-120 side scan sonar. This information conservatively represents an outlay in facilities and science costs well in excess of \\$100 million. Several archive related improvement issues have become evident over the past few years. The most critical are: 1. migration and better access to the 35mm Alvin and Jason still images through digitization and proper cataloging with relevant meta-data, 2. assessing Alvin data logger data, migrating data on older media no longer in common use, and properly labeling and evaluating vehicle attitude and navigation data, 3. migrating older Alvin and Jason video data, especially data recorded on Hi-8 tape that is very susceptible to degradation on each replay, to newer digital format media such as DVD, 4. improving the capabilities of the NDSF archives to better serve the increasingly complex needs of the oceanographic community, including researchers involved in focused programs like Ridge2000 and MARGINS, where viable distributed databases in various disciplinary topics will form an important component of the data management structure. We report on an archiving effort to transfer video footage currently on Hi-8 and VHS tape to digital media (DVD). At the same time as this is being done, frame grab imagery at reasonable resolution (640x480) at 30 sec. intervals will be compiled and the images will be integrated, as much as possible with vehicle attitude/navigation data and provided to the user community in a web-browser format, such as has already been done for the recent Jason and Alvin frame grabbed imagery. The frame-grabbed images will be tagged with time, thereby permitting integration of vehicle attitude and navigation data once that is available. In order to prototype this system, we plan to utilize data from the East Pacific Rise and Juan de Fuca Ridge which are field areas selected by the community as Ridge2000 Integrated Study Sites. There are over 500 Alvin dives in both these areas and having frame-grabbed, synoptic views of the terrains covered during those dives will be invaluable for scientific and outreach use as part of Ridge2000. We plan to coordinate this activity with the Ridge2000 Data Management Office at LDEO.

The National Oceanographic Data Center (NODC) is an "organization that provides scientific and public stewardship for national and international marine environmental and ecosystem data and information." Their website contains helpful data related to physical, biological and chemical measurements derived from in situ oceanographic observations, satellite remote sensing of the oceans, and ocean model simulations. On the homepage, visitors can use the Access Data area to look for detailed profiles of the world's oceans, along with information on finding archived data sets. One recent feature added to the site is the "Gulf of Mexico Data Atlas." Visitors can use this atlas to toggle various data sets, such as soundings, place names, and so on for a detailed and nuanced understanding of this body of water. Moving on, the Publications area contains links to the NODC's Ocean Climate Laboratory, posters, and the NOAA Photo Library.

The Artistic Oceanographer Program (AOP) was designed to engage elementary school students in ocean sciences and to illustrate basic fifth-grade science and art standards with ocean-based examples. The program combines short science lessons, hands-on observational science, and art, and focuses on phytoplankton, the tiny marine organisms that form the base of the marine food web. This article describes one of the AOP's multidisciplinary lessons that promotes ocean literacy while capturing students' interest.

The Airborne Oceanographic Lidar (AOL), a spatially scanning range-gated device installed on board a NASA C-54 aircraft, is described. The AOL system is capable of measuring topographical relief or water depth (bathymetry) with a range resolution of plus or minus 0.3 m in the vertical dimension. The system may also be used to measure fluorescent spectral signatures from 3500 to 8000 A with a resolution of 100 A. Potential applications of the AOL, including sea state measurements, water transparency assessments, oil spill identification, effluent identification and

crop cover assessment are also mentioned.

This article discusses a mechanism for private industry to access the US Navy Fleet Numerical Oceanographic Center (FNOC) operational real-time meteorological and oceanographic analysis and forecast products. The NODDS uses the FNOC observations as input to meteorological and oceanographic analysis programs such as the Naval Operational Global Atmospheric Prediction System which produces the atmospheric fields; the Global Band wind analysis program; and the Expanded Ocean Thermal System oceanographic horizontal and vertical temperature analyses. Users include the National Weather Service, private environmental forecasting and ship routing companies, oil and gas companies and commercial fishing coopertives.

The National Oceanographic Data Center (NODC) provides scientific stewardship of marine data and information and is one of the National Oceanic and Atmospheric Administration's (NOAA) environmental data centers. The NODC data search is integrated with the National Coastal Data Development Center (NCDDC) and the NOAA Central Library to provide access to the world's most comprehensive sources of marine environmental data and information. NODC data include physical, biological and chemical measurements derived from in situ oceanographic observations, satellite remote sensing of the oceans, and ocean model simulations. Data are gathered on phenomena such as temperature, ocean currents, chlorophyll, waves, nutrients, satellite data, pH, salinity, sea level, oxygen, plankton, snow and ice, biology and ocean profiles. Included are the 2009 World Ocean Atlas, World Ocean Database, Deepwater Horizon Incident (Gulf of Mexico) datasets and interactive maps, Global Ocean Heat Content (1995-2008) analysis, Sea Surface Temperature (SST) pathfinder, and coastal regional ecosystem datasets. Research Divisions within NODC include the Coastal Ocean Laboratory (COL), the Ocean Climate Laboratory (OCL), and the NOAA Central Library.

Gross Domestic Product and sustains over 13 million jobs. Like any infrastructure system, the nation for the US maritime transportation system. The total volume of domestic and international marine trade increases. Center for Operational Oceanographic Products and Services (CO-OPS) Physical Oceanographic Real

The Marine Advanced Technology Education (MATE) Center was funded by National Oceanic and Atmospheric Administrations (NOAA) National Ocean Service (NOS) and Office of Oceanic and Atmospheric Research (OAR) to assess the need for a certification program for oceanographic professionals (CPOP) in this country. This section of their website provides general information on certification for oceanographic professionals.

Intergovernmental Oceanographic Commission technical series 89 Ship-based Repeat Hydrography;#12;Intergovernmental Oceanographic Commission technical series 89 Ship-based Repeat Hydrography: A Strategy.), Ship-based Repeat Hydrography: A Strategy for a Sustained Global Programme. (IOC Technical Series, 89

The salinity driven oceanographic upwelling is maintained in a mariculture device that includes a long main duct in the general shape of a cylinder having perforated cover plates at each end. The mariculture device is suspended vertically in the ocean such that one end of the main duct is in surface water and the other end in relatively deep water that is cold, nutrient rich and relatively fresh in comparison to the surface water which is relatively warm, relatively nutrient deficient and relatively saline. A plurality of elongated flow segregating tubes are disposed in the main duct and extend from the upper cover plate beyond the lower cover plate into a lower manifold plate. The lower manifold plate is spaced from the lower cover plate to define a deep water fluid flow path to the interior space of the main duct. Spacer tubes extend from the upper cover plate and communicate with the interior space of the main duct. The spacer tubes are received in an upper manifold plate spaced from the upper cover plate to define a surface water fluid flow path into the flow segregating tubes. A surface water-deep water counterflow is thus established with deep water flowing upwardly through the main duct interior for discharge beyond the upper manifold plate while surface water flows downwardly through the flow segregating tubes for discharge below the lower manifold plate. During such counterflow heat is transferred from the downflowing warm water to the upflowing cold

water. The flow is maintained by the difference in density between the deep water and the surface water due to their differences in salinity. The upwelling of nutrient rich deep water is used for marifarming by fertilizing the nutrient deficient surface water.

Biospherical Instruments has successfully completed a NASA sponsored SBIR (Small Business Innovational Research Program) project to develop spectroradiometers capable of being deployed in the ocean for long periods of time. The completion of this project adds a valuable tool for the calibration of future spaceborne ocean color sensors and enables oceanographers to extend remote sensing optical techniques beyond the intermittent coverage of spaceborne sensors. Highlights of the project include two moorings totalling 8 months generating extensive sets of optical, biological, and physical data sets in the ocean off La Jolla, California, and a 70 day operational deployment of the resulting commercial product by the ONR and NASA sponsored BIOWATT program. Based on experience gained in these moorings, Biospherical Instruments has developed a new line of spectroradiometers designed to support the oceanographic remote sensing missions of NASA, the Navy, and various oceanographers.

Korea Operational Oceanographic System (KOOS) is a research project funded by the Minister of Land, Transport and Maritime Affairs (MLTM) in Korea and the goal of this project is to develop an integrated operational oceanographic system that will provide nowcasts and forecasts of ocean information around Korean Peninsula to support marine activities for governmental agencies and to mitigate coastal disasters such as storm surge, oil spill, and search and rescue. Since August 2009, KIOST has been leading the project to develop KOOS, which consists of three parts, 1) observing systems, 2) numerical modeling with data management and skill assessment, and 3) practical application systems. In KOOS about 190 real-time coastal/ocean observing platforms such as tidal stations, buoys, off-shore research stations and satellites from various agencies, KIOST, KHOA (Korea Hydrographic and Oceanographic Administration), NFRDI (National Fisheries Research & Development Institute), and KMA (Korea Meteorological Administration) have been used for input data as well as calibration and validation for numerical models. With observing networks, various atmospheric models and ocean models have been set-up and tested. KOOS enables us to forecast tides, waves, storm surges, currents as well as temperature and salinity for 72-hour time period in two time a day. The performance of numerical models is evaluated by the skill assessment system. For practical purposes, KOOS has various application systems such as storm surge, search and rescues, oil spill, and ports and channel prediction system. All ocean information in KOOS is to be presented via web-based GIS, which is an effective tool that is helpful to decision-makers.

A project to objectively analyze a large quantity of oceanographic data for the world ocean is described. Preliminary results are encouraging within the limits of data available. Results are being used in a variety of ways but at present primarily for studies of the ocean's role in the global heat balance. A brief discussion of the data used, the method

Collaboration of fifteen federal agencies to provide leadership and coordination of national oceanographic research and education initiatives. Goals include: an Integrated Ocean Observing System (IOOS); promotion of lifelong ocean education; modernize of ocean infrastructure and enhance of technology development; and foster interagency partnerships. Site has funding announcements and requests for proposals and lists previously funded projects.

The Woods Hole Oceanographic Institution (WHOI) and Dalhousie University conducted a sediment transport study at the LEO-15 observatory maintained by Rutgers University and WHOI engineers off the central New Jersey coast. This study was designed to take advantage of the unique capabilities (power and telemetry) provided at the site. The various sensing systems were attached to a bottom-mounted frame and

DESCRIPTION The XIOM network for oceanographic and coastal meteorological measurements (Xarxa d'Instrumentació Oceanogràfica I Meteorològica) is owned by the Catalan regional government. His deployment is to better understanding of processes that take place in the Spanish Catalan coast, in the NW Mediterranean. The XIOM sea measurement network is formed by the following equipment: 3 directional buoys. 1 scalar buoy. 4 meteo-oceanographical buoys (providing

the currents measurements). 2 tide gauge stations. INSTRUMENTATION Wave buoys sends a HF radio signal to a receiver station at the coast and are equipped with ARGOS allocators to allow recovery in case on drift. The receiver stations area composed by antenna, A/D signal converter and the computer. The signal is processed ant the spectral and statistical parameters are sent through internet connection to the main computer. Meteo-oceanographical buoys sends data by satellite (ORBCOMM system) and it's received by e-mail directly in the main computer. Tidal gauges are locally connected to internet connection and sends the data to a main computer. A vast amount of data is collected. In case of waves the main parameters are Hs (significant wave height) spectral and statistical, Tp (peak period), and mean direction of waves in the peak of spectrum. Another parameters are: Tz (mean period), main directional spread, spectral width, and up to 25 different parameters obtained from spectral moments and statistical calculations. In case of meteo-oceanographical buoys, the parameters are velocity of the current, direction of the current and temperature, all of them at -1 m and -15 m. The buoys are equipped also with a standard meteorological station in its upper part that measures parameters like wind velocity and its direction. Tidal gauges measure sea level and water temperature. DATA FLOW In Xiom network, one ftp server centralizes all the directional and scalar buoy's data. It's located at the UPC (Universitat Politècnica of Catalunya). Then this server makes a simple validation of the data and sends it to another ftp server. So, we use a extended star net topology. This final server makes the upload of data in the RDBMS (sqlserver v.2005) and the data is finally published. On the other hand, the four meteo-oceanographical buoys transmit the data through a satellite system (orbcomm) and the mesurements are received packaged in a email message. One computer (pc windows based), located also in the UPC's offices, reads these mails, prepares the data and upload the data to the DB on the web server. Again, the net topology used in this case is an extended star. Drawbacks and benefits of this approach will be discussed in the full article. DATA AVAILABILITY All the data received from the Xiom's instruments are placed in public domain through the website: www.xiom.cat. or www.boiescat.org, both domains are the same. The non-filtered data of all the instruments are published in real time, hourly. Then, monthly, it's applied a complete filter series on the data, and the filtered data is published. The kind of filter to apply depends on the kind of variable measured. The real time data from the DB is deleted and the new data, called history data, replace the real one through a backoffice section in the web. Web users can obtain the last transmitted data of each instrument in real time. Also, users can select an instrument and date interval, so time series tables of data are provided. Plus, the user can create the graph of any variable of any instrument, one variable at a time, at the moment. The non-registered users can access to one month of data, and the registration for non-profit, scientists or researchers is free. Annual reports, and half-yearly gazettes containing data briefs and graphics in pdf format can be downloaded too in the public web area. We will study this in detail in the complete article.

Content Management Systems (CMSs) provide powerful features that can be of use to oceanographic (and other geo-science) data managers. However, in many instances, geo-science data management offices have previously designed customized schemas for their metadata. The WHOI Ocean Informatics initiative and the NSF funded Biological Chemical and Biological Data Management Office (BCO-DMO) have jointly sponsored a project to port an existing, relational database containing oceanographic metadata, along with an existing interface coded in Cold Fusion middleware, to a Drupal6 Content Management System. The goal was to translate all the existing database tables, input forms, website reports, and other features present in the existing system to employ Drupal CMS features. The replacement features include Drupal content types, CCK node-reference fields, themes, RDB, SPARQL, workflow, and a number of other supporting modules. Strategic use of some Drupal6 CMS features enables three separate but complementary interfaces that provide access to oceanographic research metadata via the MySQL database: 1) a Drupal6-powered front-end; 2) a standard SQL port (used to provide a Mapserver interface to the metadata and data; and 3) a SPARQL port (feeding a new faceted search capability being developed). Future plans include the creation of science ontologies, by scientist/technologist teams, that will drive semantically-enabled faceted search capabilities planned for the site. Incorporation of semantic technologies included in the future Drupal 7 core release is also anticipated. Using a public domain CMS as opposed to proprietary middleware, and taking advantage of the many features of Drupal 6 that are designed to support semantically-enabled interfaces will help prepare the BCO-DMO database for interoperability with other ecosystem databases.

The Spatial-Temporal Oceanographic Query System (STOQS) has been developed at the Monterey Bay Aquarium Research Institute to improve access and visualization of a multi-decadal archive of upper water column observations. STOQS consists of a set of applications, operational procedures, and a geospatial relational database. Borrowing a database schema from the Geographic Information System community we've implemented a database that is tuned for efficient queries across several dimensions of the data model. An Object Relational Mapping (ORM) tool was used to hide the complexity of SQL that results from our highly normalized data model. The Python scripting language is used to write the Extract Translate Load (ETL) programs for populating the database with data from our long-term operational archives. These archives include collections of Climate Forecast convention netCDF files of mooring and autonomous underwater vehicle data and other special purpose relational databases. This poster describes the specific tools and techniques used to implement STOQS. Though still in development the system already provides benefits to users through a Google Earth interface and an ability to conduct fast queries across multiple previously non-interoperable data sets.

The Oceanographic Products and Services Division (OPSD) of the National Oceanic and Atmospheric Administration (NOAA) "collects, analyzes and distributes historical and real-time observations and predictions of water levels, coastal currents and other meteorological and oceanographic data." This wonderful site explains the science behind the tides and changing water levels, gives historical background on tidal predictions and tidal machines (including several fascinating old photographs), and details the challenges of measuring water currents. The combination of engineering, history, and oceanography ensures that students and educators will learn much here. For access to tidal data, a tidal and current glossary, and an interactive tidal prediction page, users may follow links from the OPSD homepage.

This bimonthly contractor progress report covers the operation, maintenance and data management of the Airborne Oceanographic Lidar and the Airborne Topographic Mapper. Monthly activities included: mission planning, sensor operation and calibration, data processing, data analysis, network development and maintenance and instrument maintenance engineering and fabrication.

The design is reported of a dual mode multispectral scanner, capable of satisfying both overland and oceanographic requirements. A complete system description and performance summary of the scanner are given. In addition, subsystem and component descriptions and performance analyses are treated in individual sections. The design of the scanner, with minimum modifications, interfaces to the ERTS spacecraft and the ground data handling system.

Record Search Query: [Parameters: Topic='HUMAN DIMENSIONS', ... Oceanographic data from the Environmental Impact Assessment of the Davis ... environmental information in support of an operational infrastructure project to ... microbiological hazards) as the basis for recommendations on the required ... View entire list ...

, including buoyancy compensators, regulators, wet suits Â· Nikonos underwater cameras and strobes Â· VariousCor LI193SA spherical underwater quantum sensors and LI1400 DataLoggers Â· Phytoplankton nets) Â· Manipulator, cable cutter Marine Maintenance Facility Â· Hydraulic repair and testing equipment Â· Welding

is largely represented by living organisms and in deep waters by intact or partially degraded btogenic ..... The chief reason for this lack of knowledge has to do with the complexity . material that ... Urea may easily react with aldehydes and produce long-chain ..... A full account on the important advances in ruminant nutrition ...

MBARI is funded by the non-profit David and Lucille Packard Foundation, but many agencies and organizations are involved in funding projects. An easy way to find the projects in which DOE is involved is to do a MBARI website search for DOE. Another is to visit the current projects page at http://www.mbari.org/rd/projects/current_projects.html and the jump-off page to past projects from 1998 through 2009.

JOI Learning develops programs and materials based on scientific research expeditions to strengthen students' mathematics, science and analytical skills for a lifetime of learning. Teaching for Science, Learning for Life? plays on the ability of scientific ocean drilling to provide a multidisciplinary approach to earth science education. The site features classroom activities, free posters, special multimedia materials, career profiles, and professional development opportunities.

The National Oceanographic Partnership Program (NOPP) uses drifting buoys to track ocean currents. The Project NOPP Drifters Website contains near real time flow data updates, a deployment log, data products from the Drifting Buoy Data Assembly Center, and ocean images. Data products include trajectories and analyses of drifting buoys, drifter maps and reports, annual mean velocity estimates, and drifting buoy databases. A Year of the Ocean (YOTO) Drifter Tracking Chart is also available for download [.jpg or .ps]. While this remains a useful site for ocean researchers, an educational activities section provides classroom tools as well.

Oceanographic research covers a broad range of science domains and requires a tremendous amount of cross-disciplinary collaboration. Advances in cyberinfrastructure are making it easier to share data across disciplines through the use of web services and community vocabularies. Best practices in the design of web services and vocabularies to support interoperability amongst science data repositories are only starting to emerge. Strategic design decisions in these areas are crucial to the creation of end-user data and application integration tools. We present S2S, a novel framework for deploying customizable user interfaces to support the search and analysis of data from multiple repositories. Our research methods follow the Semantic Web methodology and technology development process developed by Fox et al. This methodology stresses the importance of close scientist-technologist interactions when developing scientific use cases, keeping the project well scoped and ensuring the result meets a real scientific need. The S2S framework motivates the development of standardized web services with well-described parameters, as well as the integration of existing web services and applications in the search and analysis of data. S2S also encourages the use and development of community vocabularies and ontologies to support federated search and reduce the amount of domain expertise required in the data discovery process. S2S utilizes the Web Ontology Language (OWL) to describe the components of the framework, including web service parameters, and OpenSearch as a standard description for web services, particularly search services for oceanographic data repositories. We have created search services for an oceanographic metadata database, a large set of quality-controlled ocean profile measurements, and a biogeographic search service. S2S provides an application programming interface (API) that can be used to generate custom user interfaces, supporting data and application integration across these repositories and other web resources. Although initially targeted towards a general oceanographic audience, the S2S framework shows promise in many science domains, inspired in part by the broad disciplinary coverage of oceanography. This presentation will cover the challenges addressed by the S2S framework, the research methods used in its development, and the resulting architecture for the system. It will demonstrate how S2S is remarkably extensible, and can be generalized to many science domains. Given these characteristics, the framework can simplify the process of data discovery and analysis for the end user, and can help to shift the responsibility of search interface development away from data managers.

Research in oceanography - and other multidisciplinary sciences - proceeds along three major lines: field observation, field and laboratory experimentation, and modeling. Data management and informatics have been an after-thought - if considered at all. More recently, the need for comprehensive scientific understanding, which forms the foundation for ecosystem-based management, has required the integration of oceanographic, fisheries, and other marine environmental data, as well as the development of analysis and assessment tools. Exponential increase in data sources and the proliferation and distributed nature of databases have created a fourth new and important line of marine research. Data management and informatics is now on par with lines of oceanographic research. Research priorities in this new field include approaches to rapid and efficient data acquisition, enhanced data management, more effective data utilization and reuse, and improved data visualization. Also, barriers or structural impediments to the free and open dissemination of data and information must be eliminated wherever possible. A critical proximate

goal is to foster data discovery through enhanced metadata and common vocabularies. An ultimate goal is to create a cyberinfrastructure for oceanography that enables open, transparent, interoperable access to data and information, regardless of their location.

A recent court order that required the Woods Hole Oceanographic Institution (WHOI) to hand over more than 3000 confidential e-mails to the energy company BP in May has led to concerns about the need to protect academic freedom, the deliberative scientific process, and intellectual property. Lawyers representing BP filed the subpoena in December 2011 to seek information from WHOI in relation to a lawsuit brought against BP by the U.S. government and others about damages from the 2010 Deepwater Horizon oil spill in the Gulf of Mexico. WHOI is not a party to the lawsuit.

Diatoms are the most successful group of eukaryotic phytoplankton in the modern ocean and have risen to dominance relatively quickly over the last 100 million years. Recently completed whole genome sequences from two species of diatom, Thalassiosira pseudonana and Phaeodactylum tricornutum, have revealed a wealth of information about the evolutionary origins and metabolic adaptations that have led to their ecological success. A major finding is that they have incorporated genes both from their endosymbiotic ancestors and by horizontal gene transfer from marine bacteria. This unique melting pot of genes encodes novel capacities for metabolic management, for example, allowing the integration of a urea cycle into a photosynthetic cell. In this review we show how genome-enabled approaches are being leveraged to explore major phenomena of oceanographic and biogeochemical relevance, such as nutrient assimilation and life histories in diatoms. We also discuss how diatoms may be affected by climate change-induced alterations in ocean processes. PMID:21141668

In response to climate change, global warming and post “peak oil” fuel scarcity, the oceanographic community should consider reducing its carbon foot print. Why should scientists operate inefficient vessels while lecturing the general public on the need to reduce CO2 emissions? We have already seen curtailment of ship schedules and ship lay-ups, due in part to rising fuel costs, following $140/barrel crude oil. When the global recession ends, upward pressure on oil prices will again commence. Who can forecast how high fuel prices may ultimately rise during the typical 25-30 year lifetime of a research vessel? Are we to curtail future work at sea when oceanic climate research is becoming ever more important? A catamaran research vessel has been designed which can be electrically propelled from by a combination of high efficiency generators, photovoltaic panels and/or sails. Sail produced power is transformed with propellers and motor/generators into electric power which is stored in battery banks. This vessel could operate as the first true hybrid oceanographic research vessel. It could even continue operations without fuel in cases of a severe fuel shortage or fueling denial. Since the power produced by any water turbine increases with the cube of the velocity flowing over its propeller, the low fluid friction and high stability of a catamaran, with reasonably slender hulls, provide an important boost to efficient hybrid operation. The author has chartered a 42’ hybrid catamaran sailboat and found it efficient and extremely easy to operate and control. A 79’ motor sailing catamaran research vessel by Lock Crowther Designs will be presented as one example of a sustainable research vessel with excellent speed and sea-keeping. A center well makes operation as a small drilling/coring ship for coastal climate investigation possible. The center well also supports a host of remote sensing and robotic gear handling capabilities.

This poster will present the national infrastructure for access to oceanographic and marine data and information in The Netherlands, which has been operational since early 2009. It was build in the NODC-i project, which was run by the National Oceanographic Data Committee (NL-NODC) of The Netherlands. The NL-NODC is the national representative in the EU-SeaDataNet project. The NODC-i project was a technical project which resulted in the Dutch node in the SeaDataNet infrastructure. The goals of the NODC-i project were therefore very similar to the goals of the EU-SeaDataNet project, albeit aimed at a national level interconnecting the data centres of the following Dutch institutes: RWS, KNMI, NIOZ, NIOO-CEME, TNO B&O. The distributed data access infrastructure has been operational since early 2009.

The Meteorological Research Institute (MRI) in Japan "is engaged in analyzing and predicting meteorological, geophysical, hydrological and oceanographic phenomena, as well as developing

extensive related technology" in order to further understand global climate and natural disasters. The website features the Institute's nine research departments covering topics such as forecasting, seismology and volcanology, and oceanography. Within each research department, visitors can learn the details about numerous research projects. Users can also view abstracts of the institute's many meteorology and geophysics papers.

Tide gauges can be used in registering vertical movements of the land and also afford possibilities for predicting earthquakes, although much additional work must be done to realize these possibilities. The oceanographic method already makes it possible to detect anomalies in vertical movements of the land of not less than 1-2 cm. An expression has been derived for computing the effective radius of the method. The method can be used in predicting relatively close earthquakes and could probably be effective in predicting earthquakes with M greater than or = 7.0 if the distance between level stations does not exceed 80 km. It is highly important that the observation points be situated as close as possible to the epicentral zone of an anticipated earthquake. Bottom pressure sensors are now available which can measure ocean level distant from its shores with a high degree of accuracy, thereby making it possible to study vertical movements of both the land and ocean floor, in the latter case inaccessible for other observation methods. It is probably possible to detect earthquake precursors in this way. In the Far Eastern region especially, the use of bottom pressure detectors may become an effective method for predicting earthquakes.

Consistency of observed oceanographic salinity data is discussed with respect to contemporary metrological concepts. The claimed small uncertainty of salinity measurement results traceable to the conductivity ratio of a certified IAPSO Standard Seawater reference is not metrologically justified if results are compared on climatic time scales. This applies in particular to Practical Salinity SP, Reference Salinity SR, and the latest estimates of Absolute Salinity using the TEOS-10 formalism. On climate time scales an additional contribution to the uncertainty that is related to unknown property changes of the reference material must be accounted for. Moreover, when any of these measured or calculated quantity values is used to estimate Absolute Salinity of a seawater sample under investigation, another uncertainty contribution is required to quantify the accuracy of the equations relating the actually measured quantity to the Absolute Salinity. Without accounting for these additional uncertainties, such results cannot be used to estimate Absolute Salinity with respect to the International System of Units (SI), i.e. to the unit chosen for the mass fraction of dissolved material in the sample, which is "g kg-1". From a metrological point of view, such deficiencies in the calculations involving other quantities will produce SI-incompatible results. We outline how these problems can be overcome by linking salinity to primary SI measurement standards.

A portion of the broad domestic non-Federal oceanographic community that represents a potential market for satellite remote sensor derived oceanographic data and/or marine environmental information is presented. The overview consists of listings of individuals and/or organizations who have used, or are likely to use such data or information for scientific research, offshore engineering purposes, marine resources exploration and utilization, marine related operational applications, or coastal zone management.

This site is a collaborative effort to organize and distribute Matlab tools for the oceanographic community. Matlab is multi-platform software that provides numeric computation, technical graphics and visualization, and an intuitive programming language for applications in engineering and science. This site provides links to and downloads of code for oceanographic data analysis tools, including time series analysis, numerical modelling, mapping, hydrography, and data interface.

The Naval Oceanographic Office (NAVOCEANO) Glider Operations Center (GOC) supported its first joint-mission exercise during Rim of the Pacific (RIMPAC) 08, a multi-national naval exercise conducted during July 2008 near the Hawaiian Islands. NAVOCEANO personnel deployed four Seagliders from USNS SUMNER for Anti-submarine Warfare (ASW) operations and four Slocum gliders for Mine Warfare (MIW) operations. Each Seaglider was equipped with a Sea-Bird Electronics (SBE) 41cp CTD and Wet Labs, Inc. bb2fl ECO-puck optical sensor. The instrumentation suite on the Slocum gliders varied, but each Slocum glider had an SBE 41cp CTD combined with

one of the following optical sensors: a Wet Labs, Inc. AUVb scattering sensor, a Wet Labs, Inc. bb3slo ECO-puck backscattering sensor, or a Satlantic, Inc. OCR radiometer. Using Iridium communications, the GOC had command and control of all eight gliders, with Department of Defense (DoD) personnel and DoD contractors serving as glider pilots. Raw glider data were transmitted each time a glider surfaced, and the subsequent data flow included processing, quality-control procedures, and the generation of operational and tactical products. The raw glider data were also sent to the Naval Research Laboratory at Stennis Space Center (NRLSSC) for fusion with satellite data and modeled data (currents, tides, etc.) to create optical forecasting, optical volume, and electro-optical identification (EOID) performance surface products. The glider-based products were delivered to the ASW and MIW Reach Back Cells for incorporation into METOC products and for dissemination to the Fleet. Based on the metrics presented in this paper, the inaugural joint-mission operation was a success.

Amy Bower is a physical oceanographer and senior scientist at the Woods Hole Oceanographic Institution (WHOI) in Woods Hole, Massachusetts--she has also been legally blind for 14 years. Through her partnership with the Perkins School for the Blind in Watertown, Massachusetts, the oldest K-12 school for the visually impaired in the United States, students have the unique opportunity to learn from a practicing research scientist who shares their particular disability. This article describes their collaborative project called OceanInsight, which provides visually impaired students with an interactive way to study oceanography, including field trips to Woods Hole and school visits by Bower and other WHOI scientists.

the Aquaculture plate support the development of eco-friendly fish farming for food and stock enhance- ment. Help TO AVOID These are your best seafood choices! These fish are abundant, well managed and caught or farmed, farmed or levels of mercury content. They are however, better choices than items in the "Fish to Avoid

Four sediment cores collected from the Northwind and Mendeleyev ridges, Arctic Ocean, from 1089 m to 1909 m water depth, provide an oceanographic record extending back into the Matuyama reversed polarity chron. Benthic foraminiferal analyses show four prominent assemblage zones: Bolivina arctica, Cassidulina teretis, Bulimina aculeata, and Oridorsalis tener from the upper Matuyama reversed polarity chronozone through the Brunhes normal polarity chronozone. These assemblage zones represent depth-dependent benthic foraminiferal biofacies changes associated with oceanographic events that occurred in the Amerasian basin at ??? 780 and 300 ka, and indicate oceanographic influence from the North Atlantic. Recognition of these benthic assemblage zones in Arctic cores from the Alpha Ridge indicates that the benthic foraminiferal zonations in intermediate to deep water (>1000 m) Arctic cores may be more useful than preexisting lithostratigraphic zonations and should provide important information pertaining to the Quaternary paleoceanographic evolution of the Arctic Ocean.

The GRAVILUCK expedition, conducted in August 2006 on the R/V ATALANTE, was mainly dedicated to the installation of a seafloor geodetic network in the framework of the MoMAR ("Monitoring the Mid-Atlantic Ridge") project, to study active mid-ocean ridge processes along a slow-spreading ridge segment. The chosen site for this integrated "observatory" effort is the Lucky Strike segment (37°N) along the Mid-Atlantic Ridge, South of the Azores Archipelago; it combines both logistic and scientific interests, and has been studied in depth by geologists, geophysicists and biologists for many years. It also presents an intense hydrothermal activity and hosts an axial magma chamber under its center discovered last year during the SISMOMAR cruise. The installation of 9 permanent geodetic benchmarks and the time-zero pressure and gravity measurements were conducting during 19 Nautile dives. Pressure changes measured at a benchmark can be due to environmental variability, to a change in the elevation of the point, or to both. To quantify environmental variations, we monitored water column with full depth CTD prior to each dive, and shallow CTD yoyos down to 500 m during the dives. These oceanographic measurements will allow us to directly model and remove part of the environmental variability and thus increase our capability to detect small vertical motions over several years. Three additional Nautile dives were dedicated to geology and gravity cartography of the central volcano. In addition to the day program, 10 nights were devoted to a geological survey using the TowCam (camera,

magnetometer, wax coring, CTD) to characterize tectonic and magmatic features of the Lucky Strike volcano, their relationship to the magma chamber location, and identification of areas of most recent apparent volcanic activity; 10 other nights were dedicated to studying ocean circulation and induced mixing around the Lucky Strike site. GRAVILUCK cruise Scientific Party: CNRS/IPGP: J. Ammann, V. Ballu, M. Cannat, C. Deplus, J. Escartin, O. Pot, C. Rommevaux-Jestin; IPGP: C. Cadio, S. Deroussi, M. Kitazawa; CNRS/INSU: G. Duveau, C. Marec; Univ. Açores: I. Bashmachnikov; Harvard Univ.: A. Bezos; IGN: MN. Bouin; FSU: E. Howarth, L. St Laurent; CNRS/UBO: M. Maia; LOCEAN: P. Bouruet-Aubertot, A. Lourenço, G. Reverdin; SIO: G. Sasagawa; WHOI: S. A. Soule; LDEO: A. Thurnherr.

Thom Maughan, Jnaneshwar Das, Mike McCann, Danelle Cline, Mike Godin, Fred Bahr, Kevin Gomes, Tom O'Reilly, Frederic Py, Monique Messie, John Ryan, Francisco Chavez, Jim Bellingham, Maria Fox, Kanna Rajan Monterey Bay Aquarium Research Institute Moss Lading, California, United States Many of the coastal ocean processes we wish to observe in order to characterize marine ecosystems have large spatial extant (tens of square km) and are dynamic moving kilometers in a day with biological processes spanning anywhere from minutes to days. Some like harmful algal blooms generate toxins which can significantly impact human health and coastal economies. In order to obtain a viable understanding of the biogeochemical processes which define their dynamics and ecology, it is necessary to persistently observe, track and sample within and near the dynamic fields using augmented methods of observation such as autonomous platforms like AUVs, gliders and surface craft. Field experiments to plan, execute and manage such multitude of assets are challenging. To alleviate this problem the autonomous systems group with its collaborators at MBARI and USC designed, built and fielded a prototype Oceanographic Decision Support System (ODSS) that provides situational awareness and a single portal to visualize and plan deployments for the large scale October 2010 CANON field program as well as a series of 2 week field programs in 2011. The field programs were conducted in Monterey Bay, a known 'red tide' incubator, and varied from as many as twenty autonomous platforms, four ships and 2 manned airplanes to coordinated AUV operations, drifters and a single ship. The ODSS web-based portal was used to assimilate information from a collection of sources at sea, including AUVs, moorings, radar data as well as remote sensing products generated by partner organizations to provide a synthesis of views useful to predict the movement of a chlorophyll patch in the confines of the northern Monterey Bay. The ODSS was used for automated shore-based control of mobile assets and was also used to compute safety bounds for operation of MBARI AUVs and provide projections of drifters advected [1,4] due to surface conditions. Scientist and operations teams use the ODSS during the daily planning meetings for situation awareness and real time access to data to support decisions on sampling strategies and platform logistics. References 1. J.Das, F. Py, T. Maughan, J Ryan , K. Rajan & G. Sukhatme, Simultaneous Tracking and Sampling of Dynamic Oceanographic Features with Autonomous Underwater Vehicles and Lagrangian Drifters, Accepted, Intnl. Symp. on Experimental Robotics (ISER), N. Delhi, India, Dec 2010. 2. S. Jiminez, F. Py & K. Rajan, Learning Identification Models for In-situ Sampling of Ocean features, Working notes of the RSS'10 Workshop on Active Learning for Robotics. Robotics Systems Sciences, Spain. 2010 3. Py, F. , Jiminez, S. , and Rajan, K. "Modeling dynamic coastal ocean features for in-situ identication and adaptive sampling", Journal of Atmospheric and Ocean Technology-Ocean(2010). Submitted, in Review. 4. J. Das, K. Rajan, S. Frolov, J. Ryan, F. Py, D. Caron & G. Sukhatme, Towards Marine Bloom Trajectory Prediction for AUV Mission Planning, ICRA, May 2010, Anchorage

We have developed an operational oceanographic system for the coastal waters of Korea using ROMS. The operational oceanographic modeling system consists of atmospheric and hydrodynamic models coupled with three-dimensional hydrodynamics, wave, sediment transport and water quality modules. We forecast the results two times a day in the 72 hours base including sea surface elevation, currents, temperature, salinity, and wave information etc. for the coastal waters of Korea. The predicted results are exported to the web-GIS based coastal information system for the application of various coastal activities and problems and the real-time dissemination to the public. The modeling system for the coastal waters of Korea uses operational ocean model ROMS coupled with wave model SWAN for the hydrodynamics and waves, meteorological model WRF for the atmospheric surface forcing, regional tide model NAO.99jb for the tides, and eutrophication model CE-QUAL-ICM for the water quality. The predicted results of WRF and ROMS for the Yellow Sae

are nested for the boundary condition of the model. The model ROMS was calibrated with tidal surface data, then the model was verified with current data observed near the coastal waters of Korea with bottom mounted ADCP and AWAC. To validate the operational model we use real-time monitoring data obtained by Buoy, HF-Radar, stationary Satellite, and observatory tower system installed by KORDI and KHOA funded by Korean government for the observation of hydrodynamics in Korea. In this study, we have developed an operational oceanographic system for the coastal hydrodynamics in Korea. The operational model ROMS predicts the information of coastal waters of Korea twice a day for 72 hours. The predicted result is visualized effectively through the web-GIS system to provide predicted coastal hydrodynamics in Korea to the public. This high-resolution coastal operational oceanographic system will be used as a part of the development of Korea Operational Oceanographic System (KOOS) with other operational oceanographic system.

Oregon State University oceanographer Jack Barth in partnership with Oregon Department of Fish and Wildlife is studying marine dead zones in the Pacific Northwest. While seasonal low-oxygen areas are a normal occurrence in deep, offshore waters, it is not typical to find them close to shore. And that's what the oceanographers observed in 2002, and have every year since. For the past four years, Barth and his colleagues have used impressive new tools to monitor those unusual ocean conditions. They are robotic undersea gliders, also known as autonomous underwater vehicles (AUV).

Synchronized seismic and oceanographic data were acquired during the Geophysical Oceanography (GO) project cruise in the Gulf of Cadiz in April-May 2007. The small volume (117 cu-in.) mini GI-gun seismic source used during the GO calibration experiment provided high resolution seismic data, which unveiled new features of the internal structure of the ocean. The seismic acquisition design gave a usable bandwidth of 50-250 Hz with a vertical resolution of 1.25 m, which is similar to that achieved by co-located CTD casts. We focus on the reflections observed on seismic data covering the moorings area. To test the hypothesis that measurable reflections can be generated by suspended sediment, we perform forward modeling of seismic response based on the temperature, salinity, and light attenuation measurements, available from CTD casts. Forward modeling based solely on temperature and salinity profiles show that thermohaline structure does not always explain reflections in water column, but they are consistent with light attenuation measurements. PMID:23654854

The oceanographic environment is a key element in structuring coral reef ecosystems by setting the range of physical and chemical conditions in which coral reef-builders live. A cluster analysis of physical and chemical oceanographic data is used to classify coral habitats in the remote tropical and subtropical Pacific Ocean based on average temperature, temperature seasonal cycle, nutrient levels, salinity, aragonite saturation state, storm frequency, intense hurricane hits, and dissolved oxygen as well as temperature anomalies in degree heating weeks. The resulting seven geographic habitats are stable to perturbations in types of data used in the cluster analysis. Based on recent coral reef survey data in the area, the coral cover was related to the identified geographic regions. The habitats tend to be geographically clustered, and each is characterized by a unique combination of oceanographic conditions. Previous studies suggest coral reef habitats are associated with a uniform array of oceanographic conditions, while our results demonstrate that finer-scale variations in physical variables may control coral reef environments. The results better define the physical environment of remote coral reefs, forming a foundation for future work addressing physical habitat perturbation and anthropogenic impacts on reefs.

Large collections of oceanographic data and other large collections of data published on CD-ROM's in formats facilitating access and analysis. Involves four major steps: preprocessing, premastering, mastering, and verification. Large capacity, small size, commercial availability, long-life, and standard format of CD-ROM's offer advantages over computer-compatible magnetic tape.

The newer oil provinces in the pre-salt regions off the Brazilian Coast have raised the necessity of the creation of monitoring and observational centers, regarding the best comprehension on the ocean and atmosphere dynamics. The relation between industry and university is a concept based on collaboration, and it is an innovative social experiment in Brazil. The sustainability of that

collaboration depends on the balance of mutual interests on private business and public academic institutions. The entrepreneur needs continuous accesses to the new academic researches, and the greatest benefit, for the academy, are funding complementation and personnel qualification. We need to establish a thread of new challenges, some of them based on disruption of paradigms in the Brazilian academic culture, and removal of obstructive clauses from the entrepreneur. Questioning and methods revalidation, in the oceanic environment areas, also requires a collaborative and interdisciplinary effort, congregating the physical aspects along with others compartments of the environmental monitoring. We proposed the creation of a Meteo-oceanographic and Environmental Monitoring Laboratory - LAMMOA (Portuguese acronym), which will be installed in a new facility funded by PETROBRAS (the Brazilian leading oil company) and ruled by USP, UNESP and UNICAMP, the state public universities in Santos (São Paulo State, Brazil). The new facility will be a research center in oil and gas activities, named CENPEG-BS (Portuguese acronym for Research Center of Oil and Gas in the Bay of Santos). Several laboratories and groups will work together, in a highly collaborative environment and so, capable of quickly respond to sudden demands on offshore activities and logistic operations, as well as in contingency situations. LAMMOA will continuous monitor oceanic regions where the pre-salt activities of oil exploitation occur. It will monitor meteo-oceanographic parameters like winds, waves and currents, providing suitable data for offshore and transportation activities. For such, LAMMOA will operate a system of moored acoustic current meters and others environmental sensors, applying analytical and numerical methods for improving comprehension of the oceanic environment. Oceanographic gliders, satellite measurements and newer observational technics should replace expensive hydrographic surveys, and enhance the efforts on the knowledge of oceanographic processes as those that occur in the Brazil Current. We hope these actions create a new culture on continuous monitoring the ocean, along and offshore the 8,000-km Brazilian coast, including its continental shelf and coastal regions.

The NASA Goddard Earth Science Data and Information Services Center (GES DISC) Giovanni system [GES DISC Interactive Online Visualization ANd aNalysis Infrastructure] has significant capabilities for oceanographic education and independent research utilizing ocean color radiometry data products. Giovanni allows Web-based data discovery and basic analyses, and can be used both for guided illustration of a variety of marine processes and phenomena, and for independent research investigations. Giovanni's capabilities are particularly suited for advanced secondary school science and undergraduate (college) education. This presentation will describe a variety of ways that Giovanni can be used for oceanographic education. Auxiliary information resources that can be utilized will also be described. Several testimonies of Giovanni usage for instruction will be provided, and a recent case history of Giovanni utilization for instruction and research at the undergraduate level is highlighted.

Links to a variety of current oceanographic databases. Provides access to in situ and remotely sensed data, models, and a photo library from all over the world. Data available includes temperature, salinity, biological, nutrients, oxygen, and many more. View sea surface temperature animations, sea level changes, and plankton profiles for anywhere in the world. Data, graphs, and more are available on CD and DVD in the online store.

In contrast to the significance of industrial expansion in the Arabian Gulf region, this part of the water body is least understood scientifically. Obtaining a complete spectrum of oceanographic and water quality data is very important for planning and development in the fast growing industries in this region. Several instrumented offshore monitoring stations are established to measure current, temperature,conductivity,wind,DO,PH,and chloride.

The breeding performance of higher predators has often been used to monitor fluctuations in the abundance of important prey\\u000a stocks in marine ecosystems. The development of electronic data-loggers in recent years has also provided the opportunity\\u000a of using wide-ranging marine animals to measure physical oceanographic conditions. In this study, time–depth recorders (TDRs)\\u000a programmed to record temperature were deployed on female

We report the development of Navproc, a new set of software tools for post-processing oceanographic submersible navigation data that exploits previously reported improvements in

navigation sensing and estimation (e.g. Eos Trans. AGU, 84(46), Fall Meet. Suppl., Abstract OS32A- 0225, 2003). The development of these tools is motivated by the need to have post-processing software that allows users to compensate for

Reports of nuisance jellyfish blooms have increased worldwide during the last half-century, but the possible causes remain unclear. A persistent difficulty lies in identifying whether blooms occur owing to local or regional processes. This issue can be resolved, in part, by establishing the geographical scales of connectivity among locations, which may be addressed using genetic analyses and oceanographic modelling. We used landscape genetics and Lagrangian modelling of oceanographic dispersal to explore patterns of connectivity in the scyphozoan jellyfish Rhizostoma octopus, which occurs en masse at locations in the Irish Sea and northeastern Atlantic. We found significant genetic structure distinguishing three populations, with both consistencies and inconsistencies with prevailing physical oceanographic patterns. Our analyses identify locations where blooms occur in apparently geographically isolated populations, locations where blooms may be the source or result of migrants, and a location where blooms do not occur consistently and jellyfish are mostly immigrant. Our interdisciplinary approach thus provides a means to ascertain the geographical origins of jellyfish in outbreaks, which may have wide utility as increased international efforts investigate jellyfish blooms. PMID:23287405

Seasonality and variability of coccolithophore fluxes in response to diverse oceanographic regimes in the Bay of Bengal: sediment trap results. M.V.S. Gupthaa & b, Lina P. Mergulhaoa,*, Daniela Ungerc and V.S.N. Murtyd a National Institute of Oceanography, Dona Paula, Goa - 403 004, India b 62, Sagar Society, Dona Paula, Goa - 403 004, India c Center for Tropical Marine Ecology, Fahrenheitstrasse 6, D 28359 Bremen, Germany d National Institute of Oceanography, 176, Lawsons Bay Colony, Visakhapatnam - 530 017, India

A study on coccolithophores both in shallow and deep sediment trap samples, collected over a period of one year (January 1992 - December 1992) from three trap locations in the Bay of Bengal were used to understand their production and export processes in relation to diverse oceanographic regimes associated with reversing monsoons. A total of 25 species of coccolithophores were identified, which includes some of the important species, Gephyrocapsa oceanica, Umbilicosphaera sibogae, Florisphaera profunda, Umbellosphaera irregularis, Emiliania huxleyi, Oolithotus antillarum, Umbellosphaera tenuis, Helicosphaera carteri and Calcidiscus leptoporus. The total coccolithophore fluxes increased from the northern to southern Bay of Bengal where G. oceanica, U. sibogae¬ and E. huxleyi were dominant species displaying seasonality with peak fluxes occurring during southwest (SW) and northeast (NE) monsoons reflecting their affinity for nutrient-rich waters brought in by river plumes, divergences and cyclonic eddies. U. irregularis, an indicator of oligotrophic/warm water, recorded peak abundance fluxes only during the spring intermonsoon period at all trap locations thus inferring its preference for oligotrophic conditions caused by increased Sea Surface Temperature (SST), stratification and lack of nutrient supply due to weak wind velocities. The deep dwelling species, F. profunda recorded high fluxes during the fall intermonsoon (October/November) in the northern and southern traps and during the spring intermonsoon. The peak fluxes during the spring intermonsoon (April/May) in the central and southern traps indicated the prevalence of a deep nutricline when oligotrophic conditions prevailed at the surface. Interestingly, dissolution was encountered throughout the year evidenced by the presence of corroded coccoliths.

The Canadian Atlantic Storms Program (CASP) is a joint oceanographic and meteorological research program to examine the mesoscale structure and dynamics of winter storms and the associated oceanic response on Canada's east coast. The mesoscale meteorology of these destructive storms is not well understood and presents great challenges to the meteorological forecaster. Likewise, the oceanic response is poorly documented and requires a more complete and quantitative understanding. Atmospheric and oceanic observations made in the Canadian Maritime provinces during the CASP field program, in the winter of 1985-86, are now being analyzed and modeled by investigators at the Bedford Institute of Oceanography (BIO) of the Government of Canada Department of Fisheries and Oceans, the Atmospheric Environment Service (AES) of the Department of the Environment, and several Canadian universities.

The evolution of oceanographic conditions in the upwelling region off northern Chile (18(sup o) - 24(sup o)S) betweeen 1996 and 1998 (including 1997-1998 El Nino) is presented using hydrographic measurements acquired on quarterly cruises of the Chilean Fisheries Institute, sea-surface temperature (SST), sea level, and wind speeds from Arica (18.5(sup o)S), Iquique (20.5(sup o)S), and Antofagasta (23.5(sup o)S), and a time series of vertical temperature profiles off Iquique.

Understanding spatial and temporal variation in water temperatures in the coastal zone is generally limited, as conventional monitoring platforms often prove problematic in these areas, e.g. shallow depths limit access by research vessels, and issues of accuracy and resolution can affect the use of remotely sensed sea-surface temperature data. As a result most currently available data on sea temperature are from offshore waters while coastal areas have remained relatively unexplored. Water temperature is an important parameter to study in these coastal waters, considering its impact and influence on the timing and frequency of harmful algal blooms and their associated impacts on aquaculture. It is a significant factor in the timing of the spring bloom and primary productivity, with consequent influences on the entire marine food web. Advances in bio-logging technologies in recent years have provided opportunities for sensor deployment on a variety of marine animals, including marine mammals, sea birds, fish and turtles, to gather data from inaccessible areas. In this study, we explored the use of telemetry-derived data from instrumented seals in Kenmare Bay in southwest Irish waters to ascertain if seals can be used as sampling platforms in oceanographic studies in the coastal zone and to examine fine scale changes in water temperatures. High spatial and temporal measurements allowed the characterisation of the water dynamics in the estuarine area by the identification of processes such as thermal stratification, up/downwellings and the onset of the thermocline, and provide unique insights into the marine environment in and around the bay, where no previous oceanographic studies have been conducted. Strong correlation between the seal-derived temperature data and in situ temperature recorders and modelled data validates the use of seals as oceanographic platforms on different spatial scales.

GasEx-2001 is a study of air-sea gas exchange in a region of CO2 outgassing. The bulk of the experiment followed a drifting array of near-surface instruments deployed during the second half of February 2001 just south of the equator in the central Pacific Ocean. Physical oceanographic conditions including local currents, the seasonal cycle, Kelvin waves, and tropical instability waves are described using shipboard data and a variety of other data sources to set the large-scale oceanographic context for GasEx-2001. Local physical oceanographic conditions during GasEx-2001 are then analyzed using shipboard data and a simple one-dimensional mixed layer model. The thermocline shoals about 13 m over the 15-day experiment, implying an upwelling rate of 1 × 10-5 m s-1. Zonal velocity is surface-intensified and westward, with vertical shear mostly through the thermocline. Meridional velocity is also strongly sheared with a maximum equatorward flow in the thermocline that is much reduced by 17-m depth. The mixed layer model exhibits more near-surface warming over the course of the experiment than is observed. Prescribing upwelling in the model closes the heat budget within error estimates. Entrainment at the base of the mixed layer plays a limited role in the mixed layer budgets of carbon and other water properties. Vertical shear of horizontal velocity within the mixed layer and slippage of the array through the surface water also have small (but uncertain) roles in these budgets.

The engineering of a comprehensive data acquisition system between remote measuring stations and a central collection station is based on critical selection of options following a realistic consideration of the constraints imposed by the particular application. The appropriate partitioning of functions within the system and a sensible selection of techniques are governed primarily by these constraints and their inevitable economic consequences. The basic system considerations and constraints for an oceanographic data acquisition system are presented and discussed. Various signal transmission and conversion methods are considered.

The Atlantic Oceanographic and Meteorological Laboratory's (AOML) Hurricane Research Division (HRD) discusses its endeavors to better understand the physical aspects of hurricanes and to improve the forecasts of hurricanes and tropical meteorological systems. Researchers can find information on the field program Atlantic and East Pacific hurricane seasons since 1997. The site

supplies the objectives, station documentation, accomplishments and additional information on the numerous projects for the Hurricane Track Forecasting, Hurricane Intensity Change, Climate Variation, and Hurricane Impacts groups. Residents in areas potentially affected by hurricanes can find hurricane awareness materials, current weather conditions, outlooks, and information on shutters. This site is also reviewed in the June 10, 2005 _NSDL Physical Sciences Report_.

Located in Moss Landing, California, MBARI is a non-profit, private oceanographic research institute, dedicated to the development of state-of-the-art equipment, instrumentation, systems and methods for scientific research in the deep waters of the ocean. Site features a wealth of information on current and past research, expeditions, data, and more. Data section includes downloadable data sets, photographs, video, and software. Marine operations section features the MBARI's vessels, vehicles, and moorings.

The ROPME Sea Area (RSA) is one of the most important commercial waterways in the world. However, the number of direct oceanographic observations is small. An international program to study the effect of the Iraqi oil spill on the environment was sponsored by the ROPME, the Intergovernmental Oceanographic Commission, and the National Oceanic and Atmospheric Administration (NOAA).

We measured the bones of extinct great auks Pinguinis impennis that were killed during recent centuries on Funk Island off the northeast coast of Newfoundland. Comparisons of these measurements with those taken elsewhere suggest that great auks from Funk Island, which is situated in a Low Arctic oceanographic region, were larger than conspecifics from Boreal oceanographic regions. This finding is

Monitoring of the marine environment has come to be a field of scientific interest in the last ten years. The instruments used in this work have ranged from small-scale sensor networks to complex observation systems. Among small-scale networks, Wireless Sensor Networks (WSNs) are a highly attractive solution in that they are easy to deploy, operate and dismantle and are relatively inexpensive. The aim of this paper is to identify, appraise, select and synthesize all high quality research evidence relevant to the use of WSNs in oceanographic monitoring. The literature is systematically reviewed to offer an overview of the present state of this field of study and identify the principal resources that have been used to implement networks of this kind. Finally, this article details the challenges and difficulties that have to be overcome if these networks are to be successfully deployed.

Satellite techniques for measurement of sea surface temperature (SST) are reviewed briefly, and a discussion of satellite SST applications and recent research in oceanography is provided. These applications include the areas of climate, mesoscale oceanography, and fisheries. Examples given focus mainly on the Pacific and California Current regions. Satellite SST data are currently used operationally for fisheries applications and, in conjunction with in situ data, are providing new insights into mesoscale oceanographic phenomena. Requirements for sensor precision and calibration accuracy are more stringent in air-sea interaction studies and climate research, thus satellite data have gained only qualified acceptance for these applications. Improvements in future satellite instruments, more comprehensive in situ sensor deployments, and better data management procedures should eventually satisfy most oceanography and climate SST requirements.

Northern fur seals breeding on the Pribilof Islands are characterized by pelagic migrations that begin each fall and last approximately eight months. Previous studies have examined the early phases of the migration with respect to timing, location, and effects of ocean surface currents on movement. We used satellite telemetry and remotely sensed satellite data to examine relationships between oceanographic features and the movements of adult female fur seals in the Bering Sea and North Pacific Ocean during early, middle and late portions of their winter migration. Physical locations of 13 female fur seals were monitored during 2002 2003, and diving data were collected on a subset of the animals. Remotely sensed data were obtained to assess sea-surface temperatures, chlorophyll a concentrations, and sea-surface height anomalies encountered by the fur seals. Data from historical pelagic collection of fur seals also were summarized to describe winter diet and the

distribution of different age and sex classes of the general migration of fur seals to the eastern North Pacific. Seals departed from the Pribilof Islands in November and moved in a southeasterly direction over the continental shelf as they left the Bering Sea. Their travel routes did not follow coastal or bathymetric features as they crossed the North Pacific Ocean, but instead corresponded to complementary water movement of the Alaska Gyre and the North Pacific Current. Winter foraging areas varied geographically and were associated with eddies, the subarctic subtropical transition region, and areas that undergo coastal mixing due to the California Current. The results indicate that fur seals may cue on a variety of oceanographic features that aid in reducing energetic expenditures and optimize foraging opportunities.

, and discover life saving drugs. EXPLORATION The need to know more about our oceans has led Harbor Branch and tour buses welcome! Large groups please call ahead. VISIT THE OCEAN DISCOVERY CENTER Explorers Welcome, instruments, and vehicles for coastal and ocean research, develop sustainable systems for seafood production

Measurements have been made over a period of seven months of currents and mixing near the seabed. The location of the study was in the N. Atlantic approximately midway between the islands of the Azores and Madeira. Currents were measured near the seabed in a water depth exceeding 5000m with moored internally-recording instruments. Maps of near bottom flow have been constructed and the dispersion of particles of water and therefore mixing of a tracer, such as radionuclide has been inferred. The research described in this report is concerned with a small part of the scientific assessment of the feasibility of the disposal of heat generating radioactive waste (HGW) into the deep sea environment.

The explosive growth of dynamical system theory stems in large part from the realization that it is applicable to many natural phenomena. Indeed, much of the theoretical development has been sparked by numerical and laboratory experiments which exhibit ordered sequences of behavior that call for a general framework of interpretation. Five lectures exposed us to elementaty examples of bifurcation and

Recirculating aquaculture systems (RAS,) for both commercial and experimental uses, has been under development in many parts of the world in response to several driving forces. With regards to sites for coastal aquaculture, the scarcity of affordable land has driven aquaculture endeavors for marine ...

Five instrumented moorings were deployed in the nearshore region off Shinnecock, Long Island, during April 1979. Four of the moorings each had four sensor packages at distributed depths recording velocity, conductivity, temperature and pressure over hourly intervals. The fifth mooring had two fluorometers at two depths. Four moorings were recovered and most sensor packages functioned for the entire period. One mooring disappeared and could not be found after a thorough search. Some of the data returned was of questionable quality due to weather related causes, and several gaps in data transmission occurred during storms. The average period of operation was 21 days. The data are shown here through statistics, real time plots, progressive vector diagrams, and stick figures of 4 hourly averaged currents. This mooring deployment was the observational focus of an oceanographic experiment called Meso-Scale Experiment (MESEX). An objective of MESEX was to observe meso-scale (order 10 km) advective fluxes of temperature, salinity and particulate chlorophyll over the inner shelf off Long Island. The supporting observations included the ADVANCE II cruise, the OCEANUS cruise, an air-sea interaction buoy and a drogue experiment. 21 refs., 5 figs.

The need for efficient and effective on line data management is greatly recognized today by the marine research community. The Cyprus Oceanography Center at the University of Cyprus, realizing this need, is continuously working in this area and has developed a variety of data management and visualization tools which are currently utilized for both the Mediterranean and the Black Sea. Bythos, CYCOFOS and LAS server are three different systems employed by the Oceanography Center, each one dealing with different data sets and processes. Bythos is a rich internet application that combines the latest technologies and enables scientists to search, visualize

and download climatological oceanographic data with capabilities of being applied worldwide. CYCOFOS is an operational coastal ocean forecasting and observing system which provides in near real time predictions for sea currents, hydrological characteristics, waves, swells and tides, remote sensing and in-situ data from various remote observing platforms in the Mediterranean Sea, the EEZ and the coastal areas of Cyprus. LAS (Live Access Server) is deployed to present distributed various types of data sets as a unified virtual data base through the use of OpenDap networking. It is first applied for providing an integrated, high resolution system for monitoring the energy potential from sea waves in the Exclusive Economic Zone of Cyprus and the Eastern Mediterranean Levantine Basin. This paper presents the aforementioned technologies as currently adopted by the Cyprus Oceanography Center and describes their utilization that supports both the research and operational activities in the Mediterranean.

In 1961, the Japan Nuclear Ship Research Association made a contract with the Science and Technical Agency of Japanese Government, on the trial design of nuclear powered oceanographic and supply ship as one of the latter's projects for the peaceful use of nuclear power. The association organized a committee to supervise the designing in which the author presided as the chairman. An outline description is given of the design which was completed in July, 1962. The ship has 6,350 gross tonnage and is equipped with a water-cooled, water-moderated pressurized water reactor which has 35 Mw thermal output and produces 10,000 shp. The weight of the trial design was not placed in developing a new type of marine reactor nor in detailing about conventional part of a ship's design. The main object was to study the feasibility of a comparatively small nuclear powered vessel with a proved-type reactor with satisfactory safety and also to find out where would the problems, technological and legal lie if such a ship was constructed in a very near future. (auth)

The CalNex 2010 (Research at the Nexus of Air Quality and Climate Change California) took place in May - June 2010 to quantify the atmospheric processes affecting both air quality and climate change in California and the western pacific region. Among these, aerosol particles are known to have both a detrimental effect on human health and visibility (air quality effects) and complex climate impacts. The WHOI R/V Atlantis was deployed between May 13 and June 10 to characterize the gas and particle phase of air masses within port areas (e.g. Long Beach) and along the coast of California and study the chemical transformations in the polluted marine boundary layer. The Aerodyne Research High Resolution Mass Spectrometer (HR-AMS) and the Soot Particle Aerosol Mass Spectrometer (SP-AMS) were deployed side by side to provide, respectively, complementary chemical information of the non-refractory and refractory component (soot core plus coating) of the bulk submicron particulate. This work focuses on specific time periods when the R/V Atlantis sampled air masses as they moved offshore from Santa Monica and Monterey Bays. Preliminary results show that organics represented most of the coating material around soot particles (SP-AMS) - with nitrate as the second most abundant component - whereas the non refractory particulate was dominated by sulfate. We present several cases of pollution outflow (morning and afternoon) and discuss the similarities and differences. This work shows that the combined information from the HR-AMS and SP-AMS is critical to fully characterize the composition of the ambient aerosol matter.

Live and dead benthic foraminiferal assemblages from the three deep-sea basins of the SE - Atlantic (Cape Basin, Angola Basin, Guinea Basin) were studied in respect to their live mode, biodiversity patterns and fossilisation potential of deep abyssal faunas. From this information possible correlations to environmental parameters such as changes in nutrient availability, chemical water properties and the current systems have been deduced. Multicorer samples of Holocene sediments where studied in 5 and 10 mm slices down to 150 mm sediment depth. This allowed reconstructing the benthic foraminiferal diversity patterns in the study areas as well as the sedimentologic and oceanographic evolution. The inventory of benthic foraminifers has been identified resulting in 69 taxa. Microhabitat preferences of specific foraminiferal taxa have been identified in dependence on test shapes. Nutrient availability is considered to be the major controlling factor on test shape distributions and microhabitat preferences. A general increase in diversity with decreasing latitude can be observed in the foraminiferal fauna. Benthic foraminiferal assemblages were differentiated by means of cluster analyses for each particular basin. The cluster distribution through time clearly reflects changes in surface water bio-productivity. The assemblages were affected by taphonomic processes transforming bio/taphocoenoses into thanatocoenoses.

Both test shapes as well as live mode influence the preservation potential of species and assemblages. Most prominent factors influencing diversity trends and taphonomic processes in the SE - Atlantic abyssal plains are chemical properties of the water masses overlying the sample sites (mainly corrosiveness concerning carbonate) and nutrient supply. Biogeographical distribution of benthic taxa is not obviously influenced by geographical barriers, such as the Walvis Ridge and the Guinea Rise.

We report on recently completed enhancements to the navigation systems employed on the 4500m submersible Alvin and the 6500m ROV Jason 2 and DSL-120A sonar system of the UNOLS National Deep Submergence Facility (NDSF) of the Woods Hole Oceanographic Institution (WHOI). Over the last two years we have significantly improved the accuracy and update rate of the six degree-of-freedom vehicle

For most of my career, I was a research oceanographer. For the past eleven years, I have been a professor, and for the past four years I have been working to improve teaching of the geosciences, especially oceanography at all levels from elementary school through graduate school. My work has centered primarily on improving middle- and high- school curriculum, and on improving teaching at the upper undergraduate and beginning graduate levels. I wish to share the lessons I have learned about improving K-12 education: 1) Teach interesting subjects which build on student interest--this may seem obvious, but few textbooks are built around themes such as global warming, hurricanes, tornados, whales, or earthquakes. 2) Don't limit your work to your particular specialty--think of the geosciences first in their broadest context--after all, global warming involves far more than meteorology or oceanography. 3) Work on a team with educators and students--we may be experts in science, but how much do we know about teaching K-12 students, their vocabulary, and their ability to understand each topic? 4) Work on projects that reach the most teachers and students--this is perhaps best done through NSF-funded, statewide systemic initiatives. 5) Be aware of national and state standards, including but not limited to math and science--the AAAS Project 2061 has published much useful material. 6) Teach special sections of science courses for preservice teachers--teach the way they will teach after they graduate. 7) Build assessment into your work--we think we have good ideas, but we need to prove we are really improving education. 8) Get to know your state education agency--they often seek expert help, and they have great influence on education. Have I made a difference? I think so--10,000 students and teachers visit our web site each month; I have been asked to help review questions on the certification test given all middle-school teachers in the state; and a graduate student who worked with me for three years is now teaching four sections of science methods each semester to preservice teachers. I am assured all her students will be learning about the geosciences.

Delays in seismic P wave are used to make scans or 3D images of the variations in seismic wave speed in the Earth's interior using the techniques of seismic tomography. Observations of such delays are ubiquitous on the continents but rare in oceanic regions. Free-drifting profiling floats that measure the temperature, salinity and current of the upper 2000 m of the ocean are used by physical oceanographers for continuous monitoring in the Argo program. Recently, seismologists developed the idea to use such floats in order to compensate for the lack of seismic delay observations, especially in the southern hemisphere. In project Globalseis, financed by a grant from the European Research Council (ERC), we have developed and tested a prototype of such a seismological sensor using an Apex float from Teledyne Webb Research, a Rafos hydrophone, and electronics developed in collaboration with Osean, a small engineering firm in France. `MERMAID', for `Mobile Earthquake Recorder in Marine Areas by Independent Divers' is approaching its final design and should become available off the shelf in 2012. In the meantime we initiated a collaboration between Globalseis and another ERC project, remOcean, for the acquisition of radiometric, bio-geochemical data and meteorological observations in addition to salinity and temperature (Bio-Argo program). In this collaboration of Geoazur and LOV (Laboratoire d'Océanologie de Villefranche sur mer), two laboratories located at the Observatory of Villefranche, we developed a multichannel acquisition hardware electronics called 'PAYLOAD' that allows commercial floats such as Apex (TWR) and Provor (NKE) to serve multiple observing missions simultaneously. Based on an algorithm using wavelet transforms PAYLOAD continuously analyzes acoustic signals to detect major seismic events and weather phenomena such rain, drizzle, open

sea and ice during drift diving phase. The bio-geochemical and other parameters are recorded and analyzed during ascent. All data are transmitted using the Iridum satellite network in Rudics mode when the floats surface. Two-way communication with Iridium allows us to send new parameters to the float for its next mission. Dual project campaigns are envisaged for next year.

Oceanography is a young science, close to its historical roots, but it's maturing fast as “state-of-the-art” technology and computer-aided numerical modeling play an increasing role. Our ability to obtain, process, and analyze enormous volumes of data would stun an oceanographer of the 1930's. (I hope he would be equally impressed by the quality of modern data.) The Third International Congress on the History of Oceanography and the celebration of the 50th anniversary of the Woods Hole Oceanographic Institution (WHOI) were both held in September 1980 at WHOI; and both events were taken as an opportunity to improve our understanding of the past and present of oceanography, and future of the ocean sciences with the thought that we could thereby better influence future trends.

Collision of the Pacific and North American plates (about 29 Ma) and subsequent birth of the San Andreas transform system led to the rapid formation of a Miocene borderland stretching across 20/sup 0/ of latitude from Baja California, Mexico, to northern California. The resulting complex of basins, ridges, and islands was much larger than the modern borderland off southern California and was astride an unusually dynamic oceanographic and climatic hinge line dominated by the California Current. Studies of borderland basins have generally emphasized the role of tectonism in controlling basin evolution, including aspects of basin stratigraphy. This paper focuses on faunal and lithofacies evidence of the paleo-oceanographic history of this region and the role of global and provincial oceanographic and eustatic events in dictating the strikingly similar stratigraphic pattern expressed throughout the Neogene borderland.

To address the increasing requirements for archiving, preserving and managing digital video, still images, and audio resources, the National Oceanic and Atmospheric Administration's (NOAA) Office of Ocean Exploration (OE) embarked on the Video Data Management System (VDMS) Pilot Project, in collaboration with the National Oceanographic Data Center (NODC), National Coastal Data Development Center (NCDDC), and the NOAA Central Library (NCL).

Data-recording tags applied to marine animals store data for later retrieval and can return valuable information on animal behavior and ecology, including habitat preference, physiology, and movement patterns, as well as environmental data. If properly instrumented, calibrated, and archived, data from these tags can add to the oceanographic datastream for parts of the ocean where data are sparse or lacking.

Ocean currents are expected to be the predominant environmental factor influencing the dispersal of planktonic larvae or spores; yet, their characterization as predictors of marine connectivity has been hindered by a lack of understanding of how best to use oceanographic data. We used a high-resolution oceanographic model output and Lagrangian particle simulations to derive oceanographic distances (hereafter called transport times) between sites studied for Macrocystis pyrifera genetic differentiation. We build upon the classical isolation-by-distance regression model by asking how much additional variability in genetic differentiation is explained when adding transport time as predictor. We explored the extent to which gene flow is dependent upon seasonal changes in ocean circulation. Because oceanographic transport between two sites is inherently asymmetric, we also compare the explanatory power of models using the minimum or the mean transport times. Finally, we compare the direction of connectivity as estimated by the oceanographic model and genetic assignment tests. We show that the minimum transport time had higher explanatory power than the mean transport time, revealing the importance of considering asymmetry in ocean currents when modelling gene flow. Genetic assignment tests were much less effective in determining asymmetry in gene flow. Summer-derived transport times, in particular for the month of June, which had the strongest current speed, greatest asymmetry and highest spore production, resulted in the best-fit model explaining twice the variability in genetic differentiation relative to models that use geographic distance or habitat continuity. The best overall model also included habitat continuity and explained 65% of the variation in genetic differentiation among sites.

PMID:21535280

The REVEL Project (Research and Education: Volcanoes, Exploration and Life) is an NSF-funded, professional development program for middle and high school science teachers that are motivated to use deep-sea research and seafloor exploration as tools to implement inquiry-based science in their classrooms, schools, and districts, and to share their experiences with their communities. Initiated in 1996 as a regional program for Northwest science educators, REVEL evolved into a multi-institutional program inviting teachers to practice doing research on sea-going research expeditions. Today the project offers teachers throughout the U. S. an opportunity to participate and contribute to international, multidisciplinary, deep-sea research in the Northeast Pacific ocean to study the relationship between geological processes such as earthquakes and volcanism, fluid circulation and life on our planet. In addition, the program supports teachers to implement research-based, data-oriented activities in their classrooms, and prepares them to use curriculum that will enhance student learning through the research process. Evaluation for year 2003-2004 of the program reveals that the program is designed as a successful research immersion opportunity during which teachers learn content, process, culture and ethos of authentic research. Qualitative results indicate that teachers who have participated in the program assimilate the scientific process over several years and share their expertise in ways most beneficial for their communities for years to come.

Characteristics of the ocean are considered in terms of U.S. social, scientific and ecomomic priorities and in terms of the measurements that can best be made from a spacecraft. The kinds of information needed to advance the basic ocean sciences, to improve marine transportation and fisheries operations, and to provide information for pollution control are discussed. These information needs were related to sensor concepts and an optimum sensor complement is presented, together with orbital considerations. The data-gathering capabilities of an oceanographic spacecraft were considered in relation to those of terrestrial oceanographic programs, using airborne, surface, and submarine platforms. Data management problems are discussed and are considered to be solvable with current technology.

A summary is presented of the major findings of Outer Continental Shelf Environmental Assessment Program research into physical oceanographic conditions in the northwest Gulf of Alaska. The emphasis is on circulation features, since water circulation plays a major role in the path and dispersal of surface contaminants, a problem of major impetus for the OCSEAP program. Combined with knowledge of the local and regional wind field, this allows at least an approximate predictability of contaminant dispersion and trajectory.

Lighter-than-air platforms (airships and aerostats) have been flown in a variety of research applications for more than a decade. The capabilities offered by these platforms are both unique and complementary to existing oceanographic and atmospheric research platforms. The addition of these platform types to the national aircraft research fleet is envisioned as a multi-agency, multi-user program based on the UNOLS

Interpreting past changes in oceanographic and climatic conditions as they are preserved in deep sea sediments directly hinges on our understanding of the present-day factors influencing the climate proxies used to estimate these past conditions. In this study, sea surface temperatures (SSTs) are estimated using the phytoplankton-derived U^{K'}37 alkenone paleotemperatures obtained from an 11-year time series sediment trap experiment sample

Background: Information on climatic change, ocean acidification, and the melting of polar ice sheets fill today's headlines. Students typically lack experience in finding, collecting, or interpreting real oceanographic or climatic data. They are usually provided with data-sets that are not current or representative of actual environmental conditions, or of interest to current scientific investigations. As a result, most students do not have an appreciation of the scope or impact of environmental changes occurring both in the past and in the present day. The focus of this study included climate change, ocean drilling core data from the Integrated Ocean Drilling Program (IODP), phytoplankton/zooplankton studies, and satellite studies of the Monterey Bay, the Arctic, and areas

of Paleoclimate interest. Methods: Researchers compared student understanding of paleoclimatic concepts, along with present day oceanographic, climatic, and polar phenomena, when taught using authentic data and data analysis with non-inquiry based instruction. Techniques used in the study by students included the visualization of ocean cores and analysis of cataloged ocean core data. Techniques also included the use of Geographic Information Systems (GIS) and Remote Sensing techniques to analyze present day oceanographic, climatic, and polar phenomena. Results: Study results indicate that students gained a greater understanding of paleoclimate and contemporary environmental phenomena when using authentic data-sets when compared with non-current data-sets. Students also performed better in designing investigations and interpreting results.

Biological hot spots in the ocean are likely created by physical processes and have distinct oceanographic signatures. Marine predators, including large pelagic fish, marine mammals, seabirds, and fishing vessels, recognize that prey organisms congregate at ocean fronts, eddies, and other physical features. Here we use remote sensing observations from multiple satellite platforms to characterize physical oceanographic processes in four regions of the North Pacific Ocean that are recognized as biological hot spots. We use data from the central North Pacific, the northeastern tropical Pacific, the California Current System, and the Galápagos Islands to identify and quantify dynamic features in terms of spatial scale, degree of persistence or recurrence, forcing mechanism, and biological impact. The dominant timescales of these processes vary from interannual (Rossby wave interactions in the central North Pacific) to annual (spring-summer intensification of alongshore winds in the California Current System; winter wind outflow events through mountain gaps into the northeastern tropical Pacific), to intraseasonal (high-frequency equatorial waves at the Galápagos). Satellite oceanographic monitoring, combined with data from large-scale electronic tagging experiments, can be used to conduct a census of biological hot spots, to understand behavioral changes and species interactions within hot spots, and to differentiate the preferred pelagic habitats of different species. The identification and monitoring of biological hot spots could constitute an effective approach to marine conservation and resource management.

Precipitation pulses are essential for the regeneration of drylands and have been shown to be related to oceanographic anomalies. However, whereas some studies report increased precipitation in drylands in northern Mexico during El Niño years, others report increased drought in the southern drylands. To elucidate the effect of oceanographic/atmospheric anomalies on moisture pulses along the whole Pacific coast of Mexico, we correlated the average Southern Oscillation Index values with total annual precipitation for 117 weather stations. We also analyzed this relationship for three separate rainfall signals: winter-spring, summer monsoon, and fall precipitation. The results showed a distinct but divergent seasonal pattern: El Niño events tend to bring increased rainfall in the Mexican northwest but tend to increase aridity in the ecosystems of the southern tropical Pacific slope. The analysis for the separated rainfall seasons showed that El Niño conditions produce a marked increase in winter rainfall above 22° latitude, whereas La Niña conditions tend to produce an increase in the summer monsoon-type rainfall that predominates in the tropical south. Because these dryland ecosystems are dependent on rainfall pulses for their renewal, understanding the complex effect of ocean conditions may be critical for their management in the future. Restoration ecology, grazing regimes, carrying capacities, fire risks, and continental runoff into the oceans could be predicted from oceanographic conditions. Monitoring the coupled atmosphere–ocean system may prove to be important in managing and mitigating the effects of large-scale climatic change on coastal drylands in the future.

The Western Edge of the Sub-tropical Convergence of the South-western Atlantic Ocean, called the Front, which is a thermal discontinuity between the Brazil and Falkland Currents, was studied utilizing the Temperature Humidity Infrared Radiometer (THIR) of Nimbus V in the 10.5 to 12.5 micrometers channel and historical oceanographic data. Some important results obtained are: the oceanographic Front could be detected from Nimbus THIR data; oceanographic charts showed that the transition zone where the Brazil and the Falkland Currents meet was the Front detected from satellite data; ocean current speeds calculated with THIR data were of the same order of magnitude as those calculated oceanographically; fisheries statistics for Pargo Roseo showed that the maximum catches were in September of 1973, in the period when the Front was observed most distinctly and clearly. The results showed the great potentiality of satellite data to study surface

thermal structures, surface currents and oceanic fisheries.

Developed under NASA contract, the Fast Repetition Rate (FRR) fluorometer is a computer-controlled instrument for measuring the fluorescence of phytoplankton, microscopic plant forms that provide sustenance for animal life in the oceans. The fluorometer sensor is towed by ship through the water and the resulting printouts are compared with satellite data. The instrument is non-destructive and can be used in situ, providing scientific information on ocean activity and productivity.

The authors consider the motion of a rotating, continuously stratified fluid governed by the hydrostatic primitive equations (PE). An approximate Hamiltonian (L1) model for small Rossby number {var_epsilon} is derived for application to mesoscale oceanographic flow problems. Numerical experiments involving a baroclinically unstable oceanic jet are utilized to assess the accuracy of the L1 model compared to the PE and to other approximate models, such as the quasigeostrophic (QG) and the geostrophic momentum (GM) equations. The results of the numerical experiments for moderate Rossby number flow show that the L1 model gives accurate solutions with errors substantially smaller than QG or GM.

A workshop was held at Boulder, Colo., March 30-April 1, 1987, to consider plans for U.S. research on the physical oceanography of the continental margins. The meeting was convened by R. C. Beardsley (Woods Hole Oceanographic Institution (WHOI), Woods Hole, Mass.) and J. S. Allen (Oregon State University (OSU), Corvallis), with K. H. Brink (WHOI) as facilitator and G. T. Csanady (Old Dominion University, Norfolk, Va.) as rapporteur. A list of those present is given in Table 1. During the first 2 days, the participants presented their views on the current state of knowledge of the various physical processes important in the waters o f the continental margins. These presentations sketched the boundaries of knowledge and illustrated the diversity and vigor of current research on the U.S. margins. The speakers gave their projections of the goals and needs of future research and suggested directions for a national program.

Two research vessels, operated by the Scripps Institution of Oceanography, University of California, San Diego, and Woods Hole Oceanographic Institution, Woods Hole, Mass., are undergoing scientific upgrading and engineering modifications costing $15 million each. The improvements will prepare them to take lead roles in major future ocean research efforts.Research vessel Knorr (operated by WHOI) entered the McDermott Shipyard in Amelia, LA., on February 15. It will receive new engines and a propulsion system, and its length will be increased from 245 to 279 feet. The R/V Melville (operated by SIO) is scheduled for the same 10-month remodeling to begin in mid-November.

This guide introduces educators to the classroom use of oceanographic data from the Monterey Bay Aquarium Research Institute (MBARI). MBARI provides near real-time, quality controlled data on surface and subsurface temperature and salinity; CO2 and O2 concentrations; and relative fluorescence, used by scientists to better understand the Monterey Bay ecosystem and draw parallels to the ocean as a whole. Teaching topics include: topography and plate tectonics of the ocean floor; meteorology; ecology of the Monterey Bay region; geochemical cycles; phytoplankton primary productivity; and marine biodiversity. Students will learn to: understand the relationship between wind and ocean upwelling; interpret maps of oceanographic data; understand the methods used to obtain bathymetric data; and understand the instrumentation used to obtain physical and biological oceanographic data. There are instructions and links for accessing and manipulating the data, links to scientific and educational resource that use this dataset, and links to online resources with related information.

The U.S. Geological Survey (USGS) Oceanographic Time-Series Measurements Database contains oceanographic observations made as part of studies designed to increase understanding of sediment transport processes and associated dynamics. Analysis of these data has contributed to more accurate prediction of the movement and fate of sediments and other suspended materials in the coastal ocean. The measurements were collected by investigators at the USGS Woods Hole Science Center (WHSC) and colleagues, beginning in 1975. Most of the field experiments were

carried out on the U.S. continental shelf and slope. This report describes the instrumentation and platforms used to make the measurements; the methods used to process, apply quality-control criteria, and archive the data; and the data storage format. The report also includes instructions on how to access the data from the on-line database at http://stellwagen.er.usgs.gov/. As of 2008, the database contains about 4,250 files which may include observations of current velocity, ocean temperature, conductivity, pressure, and light transmission at one or more depths over some duration of time.

In species that reproduce into uncertain environments, the relationship between mean reproductive success (the abundance of new recruits) and the variance in reproductive success (whether adults contribute disproportionally more offspring) may not be straightforward because of stochastic environmental processes that create high variance in reproductive success among adults. In this study, we investigated the relationships between oceanography, reproductive success and reproductive variance in the black rockfish, Sebastes melanops, a long-lived temperate reef fish with pelagic larvae. We quantified black rockfish recruitment, genetic diversity and growth rates from otolith microstructure over 5 years (2005-2009) during which oceanographic conditions differed. We used cross-correlations to determine windows of time during which oceanographic variables were significantly correlated with the resulting abundance or genetic diversity of recruits. We found that warmer ocean temperatures were positively correlated with the abundance of recruits, as well as the effective number of breeders. In contrast, the strength of coastal upwelling during settlement was positively correlated with the annual abundance of new recruits, but was negatively correlated with the effective number of breeders. Larval growth rates were explained substantially more by temperature than by upwelling and suggested that temperature affected survival through growth, while upwelling affected survival through transport. Our results indicated that cold ocean temperatures and intense upwelling caused sweepstakes-like processes to operate on black rockfish populations, despite high abundances of recruits. We propose that a decoupling of the mean and variance in reproductive success may be characteristic of organisms that reproduce into uncertain environments. PMID:22978484

Year-long moorings have been in place since August 1989 in Lancaster Sound to measure pack ice properties and oceanographic transports of the Arctic Surface Waters passing through the Canadian Arctic Archipelago (CAA). In addition, ice charts provide a thirty year time series on the inter-annual variability of mobile and land-fast pack ice conditions. The mooring time series data shows large inter-annual variability, but generally has a mayor transport peak in the summer and seasonal low in the late fall, early winter. Regression analysis with the Arctic Ocean wind field has shown that the highest correlation between the transports in Lancaster Sound is with the winds at grid location along Banks Island in the Canadian Beaufort Sea some 1000km from the mooring site. Local winds thus do not cause the variability in transports; instead the far-field winds do. The north-south winds over the shelf at the western entrance to the NW Passage set up the along pressure gradient in Lancaster Sound which in turn cause the variability seen in the observed transports. In contrast, local atmospheric conditions determine the mobile and land-fast sea ice cover variability in Lancaster Sound. Expected atmospheric changes within the CAA due to global warming will increase the length of the mobile ice season, increase the oceanographic transport variability and thereby changing physical environments controlling the biological marine ecosystem of the CAA from an ice-algae driven benthic to a phytoplankton driven pelagic community.

Middle Miocene Monterey Formation cherts are often cyclically interbedded with laminated dolomites. Their co-occurrence is paradoxical because cherts are produced in relatively cold water, whereas dolomite is associated with warm water. Chert and dolomite intervals generally have poor age control, which has hindered further paleo-oceanographic interpretations. Examination of diatom assemblages that are well preserved in the dolomites has resulted in high-resolution age dating and estimation of cycle duration in 200 m of section exposed at Pt. Ano Nuevo, northern California. The age of the section ranges from late Luisian to early Mohnian, at approximately 15-12 Ma. Cycle duration estimates for the Pt. Ano Nuevo section imply that the chert-dolomite cycles may be on the order of 100,000 and 50,000 years. Such durations are consistent with, and were perhaps influenced by, changes in the earth's orbital parameters (Milankovich cycles), namely eccentricity and tilt. Warm and cold cycles have been identified by previous investigators in

nondiagenetically altered middle Miocene sections of the Monterey Formation and in northeastern Pacific DSDP cores. These cycles are recognized and dated by the use of abundance fluctuations of planktonic foraminifera and diatoms. The chert-dolomite cycles are likely time equivalent to the microfossil-based cold-warm cycles and further strengthen the paleo-oceanographic and paleoclimatic interpretation.

Vertical profiles of Cd, Zn, Ni, and Cu have been determined at three stations in the North Pacific and in the surface waters on a transect from Hawaii to Monterey, California. The distributions found are oceanographically consistent and provide a needed confirmation and extension of several recent studies on the marine geochemistries of these metals. Cadmium concentrations average 1.4 pmol/kg in surface waters of the central North Pacific and show a strong correlation with the labile nutrients, phosphate and nitrate, increasing to values of 1.1 nmol/kg at depths corresponding to the phosphate maximum. Zinc is depleted in surface waters of the central gyre to an average value of 0.07 nmol/kg and increases to a deep maximum of 9 nmol/kg exhibiting a strong correlation with the nutrient silicate. Nickel concentrations average 2.1 nmol/kg in surface central gyre waters and increase to a deep maximum of 11 nmol/kg. Nickel is best correlated with a combination of phosphate and silicate. Copper averages less than 0.5 nmol/kg in surface waters of the central North Pacific and increases gradually to values of 5 nmol/kg in bottom waters. The Cu profiles show evidence of intermediate and deep water scavenging. The involvement of these metals in the internal biogeochemical cycles of the sea is responsible for their distributions which are predictable on the basis of oceanographic parameters.

The first results of an oceanographic measurement program being conducted off the southeast corner of Puerto Rico are presented. The study site is a proposed OTEC site and is located about 20 km off Punta Tuna. The objectives of the measurement program are to document the physical oceanography of the site as related to the engineering and environmental factors involved in OTEC design and operation. Oceanographic measurements include: (1) a subsurface mooring instrumented with five current, temperature, and pressure recorders; and (2) quarterly hydrographic cruises to measure salinity, temperature, and depth profiles on a grid of 33 stations in the vicinity of the mooring site. The first cruise, conducted between 16 and 21 June 1980, included the initial mooring deployment and a CTD (conductivity, temperature, and depth) and XBT (expendable bathythermograph) survey. The CTD/XBT measurements are presented. Also included are results of in situ current, temperature, and pressure measurements made during two previous programs. In September 1979, Coastal Marine Research (CMR) deployed a mooring at approximately the same site as the present mooring. Results from three of these instruments are included. The Naval Underwater Systems Center deployed a mooring at this site in February 1979 and partial results from one instrument on this mooring are also presented. (WHK)

The development of new technologies for the aim of enhancing Web Applications with Dynamically data access was the starting point for Geospatial Web Applications to developed at the same time as well. By the means of these technologies the Web Applications embed the capability of presenting Geographical representations of the Geo Information. The induction in nowadays, of the state of the art technologies known as Web Services, enforce the Web Applications to have interoperability among them i.e. to be able to process requests from each other via a network. In particular throughout the Oceanographic Community, modern Geographical Information systems based on Geospatial Web Services are now developed or will be developed shortly in the near future, with capabilities of managing the information itself fully through Web Based Geographical Interfaces. The exploitation of HNODC Data Base, through a Web Based Application enhanced with Web Services by the use of open source tolls may be consider as an ideal case of such implementation. Hellenic National Oceanographic Data Center (HNODC) as a National Public Oceanographic Data provider and at the same time a member of the International Net of Oceanographic Data Centers(IOC/IODE), owns a very big volume of Data and Relevant information about the Marine Ecosystem. For the efficient management and exploitation of these Data, a relational Data Base has been constructed with a storage of over 300.000 station data concerning, physical, chemical and biological Oceanographic information. The development of a modern Web Application for the End User worldwide to be able to explore and navigate throughout HNODC data via the use of an interface with the capability of presenting Geographical representations of the Geo

Information, is today a fact. The application is constituted with State of the art software components and tools such as: • Geospatial and no Spatial Web Services mechanisms • Geospatial open source tools for the creation of Dynamic Geographical Representations. • Communication protocols (messaging mechanisms) in all Layers such as XML and GML together with SOAP protocol via Apache/Axis. At the same time the application may interact with any other SOA application either in sending or receiving Geospatial Data through Geographical Layers, since it inherits the big advantage of interoperability between Web Services systems. Roughly the Architecture can denoted as follows: • At the back End Open source PostgreSQL DBMS stands as the data storage mechanism with more than one Data Base Schemas cause of the separation of the Geospatial Data and the non Geospatial Data. • UMN Map Server and Geoserver are the mechanisms for: Represent Geospatial Data via Web Map Service (WMS) Querying and Navigating in Geospatial and Meta Data Information via Web Feature Service (WFS) oAnd in the near future Transacting and processing new or existing Geospatial Data via Web Processing Service (WPS) • Map Bender, a geospatial portal site management software for OGC and OWS architectures acts as the integration module between the Geospatial Mechanisms. Mapbender comes with an embedded data model capable to manage interfaces for displaying, navigating and querying OGC compliant web map and feature services (WMS and transactional WFS). • Apache and Tomcat stand again as the Web Service middle Layers • Apache Axis with it's embedded implementation of the SOAP protocol ("Simple Object Access Protocol") acts as the No spatial data Mechanism of Web Services. These modules of the platform are still under development but their implementation will be fulfilled in the near future. • And a new Web user Interface for the end user based on enhanced and customized version of a MapBender GUI, a powerful Web Services client. For HNODC the interoperability of Web Services is the big advantage of the developed platform since it is capable to act in the future as provider and consumer of Web Services in both ways: • Either as data products provider for external SOA platforms. • Or as consume

Woods Hole Oceanographic Institute (WHOI) provides this wonderful educational site about discovery and exploration of the deep seafloor. Dive and Discover "brings you right on board" oceanographic research cruises to the Pacific and Indian Oceans. The latest expedition, now underway, is Expedition 4 to the Central Indian Ridge where researchers are looking for new hydrothermal vent organisms. Visitors to Dive and Discover can read daily updates on research activity weather and view color photographs recently taken by the crew of Expedition 4. The "mail buoy" feature even allows folks to email questions to researchers on board the ship! This site gives detailed information about the physical and biological science of hydrothermal vents, oceanographic tools used in the expedition, and plate tectonics. Three past cruises -- to the Guaymas Basin, the East Pacific Rise, and the Galapagos -- are also featured, and the records of their daily logs, photos, etc. are housed here. This is a fabulous resource for science teachers of all levels.

The practical application of space systems is considered in terms of institutional arrangements. The evolution of space systems is examined along with examples of institutional arrangements for space systems uses or applications. An institutional framework developed to assure the widest practicable application of space system is proposed and described. Recommendations are included.

The 1993-1994 Geophysical Institute Biennial Report was published in November 1995 by the Geophysical Institute of the University of Alaska Fairbanks. It contains an overview of the Geophysical Institute, the Director's Note, and research presentations concerning the following subjects: scientific predictions, space physics, atmospheric sciences, snow, ice and permafrost, tectonics and sedimentation, seismology, volcanology, remote sensing, and other projects.

Suspended-sediment transport is a critical element governing the geomorphology of tidal marshes. Marshes rely on both organic material and inorganic sediment deposition to maintain their elevation relative to sea level. In wetlands near the Blackwater National Wildlife Refuge, Maryland, portions of the salt marsh have been subsiding relative to sea level since the early 20th century. Other portions of the marsh have been successful at maintaining elevation. The U.S. Geological Survey performed observational deployments to measure suspended-sediment concentration in the tidal channels in order to understand the magnitude of suspended-sediment concentrations, the sediment-transport mechanisms, and differences between two marsh areas, one that subsided and one that maintained

elevation. We deployed optical turbidity sensors and acoustic velocity meters at multiple sites over two periods in 2011. This report presents the time-series of oceanographic data collected during those field studies, including velocity, depth, turbidity, salinity, water temperature, and pH.

More than 110 radar stations are in operation at the present time in Asia and Oceania countries, which is nearly half of all the existing radar stations in the world, for purposes related to marine safety, oil spill response, tsunami warning, coastal zone management and understanding of ocean current dynamics, depending mainly on each country's coastal sea characteristics. This paper introduces the oceanographic radar networks of Australia, China, Japan, Korea and Taiwan, presented at the 1st Ocean Radar Conference for Asia (ORCA) held in May 2012, Seoul, Korea, to share information about the radar network developments and operations, knowledge and experiences of data management, and research activity and application of the radar-derived data of neighbouring countries. We hope this overview paper may contribute as the first step to promotion of regional collaborations in the radar observations and data usages and applications in order to efficiently monitor the coastal and marginal sea waters along the western Pacific Ocean periphery.

Low-frequency ocean ambient noise is dominated by noise from commercial ships, yet understanding how individual ships contribute deserves further investigation. This study develops and evaluates statistical models of container ship noise in relation to design characteristics, operational conditions, and oceanographic settings. Five-hundred ship passages and nineteen covariates were used to build generalized additive models. Opportunistic acoustic measurements of ships transiting offshore California were collected using seafloor acoustic recorders. A 5–10?dB range in broadband source level was found for ships depending on the transit conditions. For a ship recorded multiple times traveling at different speeds, cumulative noise was lowest at 8?knots, 65% reduction in operational speed. Models with highest predictive power, in order of selection, included ship speed, size, and time of year. Uncertainty in source depth and propagation affected model fit. These results provide insight on the conditions that produce higher levels of underwater noise from container ships.

This study presents the salient results of the oceanographic investigations carried out along the west coast of India to locate a dumping site for the dredged material generated from the capital of the proposed development of the all weather port. Based on the results of movement of disposed material obtained from a 2 dimensional coastal circulation model and considering the possibility of having a navigational channel later on in line with the port, a dumping site is recommended at the 15 m water depth contour with coordinates: Latitude 11 degrees 07.00'; Longitude 75 degrees 45.60', where the environmental impacts on the ecosystem due to dumping operations is considered to be minimum. PMID:15887376

Laser fluorosensing techniques used for the airborne measurement of chlorophyll a and other naturally occurring waterborne pigments are reviewed. Previous experiments demonstrating the utility of the airborne oceanographic lidar (AOL) for assessment of various marine parameters are briefly discussed. The configuration of the AOL during the NOAA/NASA Superflux experiments is described. The participation of the AOL in these experiments is presented and the preliminary results are discussed. The importance of multispectral receiving capability in a laser fluorosensing system for providing reproducible measurements over wide areas having spatial variations in water column transmittance properties is addressed. This capability minimizes the number of truthing points required and is usable even in shallow estuarine areas where resuspension of bottom sediment is common. Finally, problems encountered on the Superflux missions and the resulting limitations on the AOL data sets are addressed and feasible solutions to these problems are provided.

SOAR is a global network of research and volunteer ships that carry global change instrumentation. The primary emphasis for SOAR is solar and IR radiation but some ships cary ceilometers, meteorological instruments, and related equipment. All data are collected in a central data collection computer and the flexible data collection software can be adapted to any other user instrumentation. Currently SOAR is installed pas permanent instrumentation on four ships operating in the western Pacific, eastern tropical Pacific, West Indies, and an oceanographic ship that operates around the

world. In addition, six other system are used on cruises of opportunity. [Taken from SOAR homepage at http://www.gim.bnl.gov/soar/index.html

When an oceanographic vessel is sailing, the currents near the surface of ship hull are rapid, making it hard to meet the environmental requirements of scientific observation equipment. To guarantee the installation space and environmental requirements of the observation equipment, the drop keel system was proposed for the first time for ocean-graphic ships at China, to avoid the traditional "rudder-shaft" type fin keel's disadvantage. The research study will examine the operational mechanism and functions of the drop keel system, the operating conditions of the fin keel to determine the driver method and its arrangement, and the locking method of the fin keel underwater. The research will also provide some general designs for analyzing the best plan for the drop keel system.

A laser fluorosensor, previously studied in the laboratory, was deployed at a pier in lower Chesapeake Bay for field testing. A Q-switched Nd:YAG laser doubled to 532 nm in conjunction with a gated optical multichannel analyzer (OMA) allow spectra with high signal-to-noise ratios to be recorded in full daylight at a distance of 20 m. As a test of the system a study was conducted of the spatial and temporal variations of the phytopigments phycoerythrin and chlorophyll. The phycoerythrin feature was resolved into two components, one attributable to cyanophytes and the other to cryptophytes. A comparison was also made with spectra obtained by the NASA airborne oceanographic lidar (AOL).

The protection of key areas for biodiversity at sea is not as widespread as on land and research investment is necessary to identify biodiversity hotspots in the open ocean. Spatially explicit conservation measures such as the creation of representative networks of marine protected areas (MPAs) is a critical step towards the conservation and management of marine ecosystems, as well as to improve public awareness. Conservation efforts in ecologically rich and threatened ecosystems are specially needed. This is particularly urgent for the Mediterranean marine biodiversity, which includes highly mobile marine vertebrates. Here, we studied the at sea distribution of one of the most endangered Mediterranean seabird, the critically endangered Balearic shearwater Puffinus mauretanicus. Present knowledge, from vessel-based surveys, suggests that this species has a coastal distribution over the productive Iberian shelf in relation to the distribution of their main prey, small pelagic fish. We used miniaturised satellite transmitters to determine the key marine areas of the southern population of Balearic shearwaters breeding on Eivissa and spot the spatial connections between breeding and key marine areas. Our tracking study indicates that Balearic shearwaters do not only forage along the Iberian continental shelf but also in more distant marine areas along the North African coast, in particular W of Algeria, but also NE coast of Morocco. Birds recurrently visit these shelf areas at the end of the breeding season. Species distribution modelling identified chlorophyll a as the most important environmental variable in defining those oceanographic features characterizing their key habitats in the western Mediterranean. We identified persistent oceanographic features across time series available in the study area and discuss our results within the current conservation scenario in relation to the ecology of the species. PMID:22590510

This guide details assumptions underlying oceanographic modeling techniques for calculating the dispersion of radioactive and nonradioactive materials disposed of in the deep sea and identifying those wastes unsuitable for dumping at sea. It also provides information on biological transfer mechanisms and other mechanisms affecting the return of radionuclides from the deep sea to humans.

Coastal populations are often connected by unidirectional current systems, but the biological effects of such asymmetric oceanographic connectivity remain relatively unstudied. We used mtDNA analysis to determine the phylogeographic origins of beach-cast bull-kelp (Durvillaea antarctica) adults in the Canterbury Bight, a 180 km coastal region devoid of rocky-reef habitat in southern New Zealand. A multi-year, quantitative analysis supports the oceanographically derived hypothesis of asymmetric dispersal mediated by the north-flowing Southland Current. Specifically, 92% of beach-cast specimens examined had originated south of the Bight, many drifting north for hundreds

of kilometres, and some traversing at least 500 km of ocean from subantarctic sources. In contrast, only 8% of specimens had dispersed south against the prevailing current, and these counter-current dispersers likely travelled relatively small distances (tens of kilometres). These data show that oceanographic connectivity models can provide robust estimates of passive biological dispersal, even for highly buoyant taxa. The results also indicate that there are no oceanographic barriers to kelp dispersal across the Canterbury Bight, indicating that other ecological factors explain the phylogeographic disjunction across this kelp-free zone. The large number of long-distance dispersal events detected suggests drifting macroalgae have potential to facilitate ongoing connectivity between otherwise isolated benthic populations. PMID:20875065

A digital representation of ocean floor topography is essential for a broad variety of geological, geophysical and oceanographic analyses and modeling. In this paper we present a new version of the International Bathymetric Chart of the Arctic Ocean (IBCAO) in the form of a digital grid on a Polar Stereographic projection with grid cell spacing of 2 × 2 km.

Limnogeologic studies around the Labrador Sea provide insights into a range of important issues, some of which cannot be as well addressed with marine and ice core records, including oceanographic and terrestrial climate change, ice sheet paleogeography, ecosystem variability, and Norse movements. Overall, these studies provide an excellent context in which to compare present and future Arctic environmental changes and

This is the home page of the Smithsonian Institution. The main web site provides access to online exhibits, education resources, library catalogs and archives, and publications. There are also links to each of the Institution's many museums, research centers, and outreach programs. Other materials include links to Smithsonian television programs, podcasts, and blogs.

The Sustainability Institute is a nonprofit organization that provides information, analysis, and practical demonstrations that help promote the development of sustainable systems locally, regionally, and globally. Users can read about recent projects and services that the Sustainability Institute has been involved in .

An integrated system of nested 2D and 3D hydrodynamic models together with real time forcing data asquisition is designed and set up in pre-operational mode in the Gulf of Finland and Gulf of Riga, the Baltic Sea. Along the Estonian coast, implicit time-stepping 3D models are used in the deep bays and 2D models in the shallow bays with ca 200 m horizontal grid step. Specific model setups have been verified by in situ current measurements. Optimum configuration of initial parameters has been found for certain critical locations, usually ports, oil terminals, etc. Operational system in- tegrates also section of historical database of most important hydrologic parameters in the region, allowing use of certain statistical analysis and proper setup of initial conditions for oceanographic models. There is large variety of applications for such model system, ranging from environmental impact assessment at local coastal sea pol- lution problems to forecast of offshore blue algal blooms. Most probable risk factor in the coastal sea engineering is oil pollution, therefore current operational model sys- tem has direct custom oriented output the oil spill forecast for critical locations. Oil spill module of the operational system consist the automatic weather and hydromet- ric station (distributed in real time to internet) and prognostic model of sea surface currents. System is run using last 48 hour wind data and wind forecast and estimates probable oil deposition areas on the shoreline under certain weather conditions. Cal- culated evolution of oil pollution has been compared with some real accidents in the past and there was found good agreement between model and measurements. Graphi- cal user interface of oil spill model is currently installed at location of port authorities (eg. Muuga port), so in case of accidents it could be used in real time supporting the rescue operations. In 2000 current pre-operational oceanographic model system has been sucessfully used to evaluate environmental impacts of three different deep-port construction options in Saaremaa, NW the Baltic Sea. Intensive campaign of field measurements, consisting the high-resolution surveys of thermohaline properties of water masses (CTD) and timeseries as well horisontal structure of currents were in good agreement with model calculations. Model system well simulated the transport of pollution by surface currents originating from potential port locations at NW coast of the Saaremaa. It allowed to choose the optimum location for port and give also some

hindcasts for port construction and exploitation.

Fishery Observing System (FOS) was developed as a first and basic step towards fish stock abundance nowcasting/forecasting within the framework of the EU research program Mediterranean Forecasting System: Toward an Environmental Prediction (MFSTEP). The study of the relationship between abundance and environmental parameters also represents a crucial point towards forecasting. Eight fishing vessels were progressively equipped with FOS instrumentation to collect fishery and oceanographic data. The vessels belonged to different harbours of the Central and Northern Adriatic Sea. For this pilot application, anchovy (Engraulis encrasicolus, L.) was chosen as the target species. Geo-referenced catch data, associated with in-situ temperature and depth, were the FOS products but other parameters were associated with catch data as well. MFSTEP products numerical circulation models provide many of these data. In particular, salinity was extracted from re-analysis data of numerical circulation models. Satellite-derived sea surface temperature (SST) and chlorophyll were also used as independent variables. Catch and effort data were used to estimate an abundance index (CPUE - Catch per Unit of Effort). Considering that catch records were gathered by different fishing vessels with different technical characteristics and operating on different fish densities, a standardized value of CPUE was calculated. A spatial and temporal average CPUE map was obtained together with a monthly mean time series in order to characterise the variability of anchovy abundance during the period of observation (October 2003-August 2005). In order to study the relationship between abundance and oceanographic parameters, Generalized Additive Models (GAM) were used. Preliminary results revealed a complex scenario: the southern sector of the domain is characterised by a stronger relationship than the central and northern sector where the interactions between the environment and the anchovy distribution are hidden by a higher percentage of variability within the system which is still unexplained. GAM analysis showed that increasing the number of explanatory variables also increased the portion of variance explained by the model. Data exchange and interdisciplinary efforts will therefore be crucial for the success of this research activity.

DLTM is the Ligurian Region (north Italy) cluster of Centre of Excellence (CoE) in waterborne technologies, that involves about 120 enterprises - of which, more than 100 SMEs -, the University of Genoa, all the main National Research Centres dealing with maritime and marine technologies established in Liguria (CNR, INGV, ENEA-UTMAR), the NATO Undersea Research Centre (NURC) and the Experimental Centre of the Italian Navy (CSSN), the Bank, the Port Authority and the Chamber of Commerce of the city of La Spezia. Following its mission, DLTM has recently established three Collaborative Research Laboratories focused on: 1. Computational Fluid dynamics (CFD_Lab) 2. High Performance Computing (HPC_Lab) 3. Monitoring and Analysis of Marine Ecosystems (MARE_Lab). The main role of them is to improve the relationships among the research centres and the enterprises, encouraging a systematic networking approach and sharing of knowledge, data, services, tools and human resources. Two of the key objectives of Lab_MARE are the establishment of: - an integrated system of observation and sea forecasting; - a Regional Marine Instrument Centre (RMIC) for oceanographic and metereological instruments (assembled using 'shared' tools and facilities). Besides, an important and innovative research project has been recently submitted to the Italian Ministry for Education, University and Research (MIUR). This project, in agreement with the European Directives (COM2009 (544)), is aimed to develop a Management Information System (MIS) for oceanographic and meteorological data in the Mediterranean Sea. The availability of adequate HPC inside DLTM is, of course, an important asset for achieving useful results; for example, the Regional Ocean Modeling System (ROMS) model is currently running on a high-resolution mesh on the cluster to simulate and reproduce the circulation within the Ligurian Sea. ROMS outputs will have broad and multidisciplinary impacts because ocean circulation affects the dispersion of different substances like oil spills and other pollutants but also sediments, nutrients and larvae. This could be an important tool for the environmental preservation, prevention and remediation, by placing the bases for the integrated management of the ocean.

The Phenomenology Institute at the University of Wisconsin-Madison pursues "a broad range of research in particle physics theory and phenomenology." At this website, users can view concise summaries of its many focuses including in neutrino physics, string theory and extra dimensions, and electroweak physics. Visitors can find links to the homepages of many of the researchers

involved with the Institute. The website features the upcoming and past events held by the Institute such as the Pheno Symposiums. Individuals can examine abstracts and compressed postscripts of the phenomenology preprints since 1994 as well as articles about the newest issues in phenomenology written for the popular press.

The Urban Institute is a Washington DC-based, nonprofit organization devoted to economic and social policy research. Its Website holds a wealth of information featuring in-depth reports on social and economic issues facing the US and abroad. These reports are updated frequently and focus on such issues as American health care reform, child support, and social security. The Research section contains a huge database of Urban Institute reports and can be searched by topic, author, and date. The site also links to Urban Institute special programs including the National Center for Charitable Statistics and The Retirement Project.

Oceanographic lidar profiles measured in an aerial survey were compared with in situ measurements of water optical properties made from a surface vessel. Experimental data were collected over a two-week period in May 2010 in East Sound, Washington. Measured absorption and backscatter coefficients were used with the volume-scattering function in a quasi-single-scattering model to simulate an idealized lidar return, and this was convolved with the measured instrument response to accurately reproduce the measured temporal behavior. Linear depth-dependent depolarization from the water column and localized depolarization from scattering layers are varied to fine tune the simulated lidar return. Sixty in situ measurements of optical properties were correlated with nearly collocated and coincident lidar profiles; our model yielded good matches (±3??dB to a depth of 12 m) between simulated and measured lidar profiles for both uniform and stratified waters. Measured attenuation was slightly higher (5%) than diffuse attenuation for the copolarized channel and slightly lower (8%) for the cross-polarized channel. PMID:23385921

A series of 6 missions were flown with the NASA Airborne Oceanographic Lidar (AOL) in support of the Department of Energy (DOE) funded Shelf Edge Exchange Processes (SEEP) II investigations. SEEP II is the second major SEEP field study. The initial series of experiments, termed SEEP I, were conducted in the New York Bight in 1984. The SEEP II study site is located on the Atlantic Shelf east of the Delmarva Peninsula. SEEP II ship sampling and instrumented mooring activities began in February, 1988 and are scheduled to continue through the 1989 spring phytoplankton bloom. The results described in this report were obtained with the AOL on six flights arranged to span the annual spring phytoplankton bloom on the mid-Atlantic Shelf. The AOL field missions were designed to gather information on the surface layer distribution of the phytoplankton photopigments, chlorophyll and phycoerythrin, and sea surface temperature (SST) over a wide area surrounding the moorings. The flight lines were arranged to provide an assessment of these parameters from the shoreline across shelf and slope waters. On most of the missions, sampling was extended into the western edge of the Gulf Stream.

I evaluated long-term changes in hydrological conditions (temperature, salinity and dissolved oxygen) in Korean sea waters in relation to the regional land climate change (air temperature and precipitation) based on available meteorological and oceanographic data. Regression analyses, spatial patterns and cross-correlations on the climatologic and hydrological factors suggested that industrialization processes and related urban heat-island effects during the past 37 years from 1968 to 2005 in South Korea have increased land surface temperatures by 1.267 degrees C, at least for the urban areas, and subsequently increased sea surface temperatures by 0.975 degrees C and decreased salinities by 0.229. The influence of land surface temperature on the sea water temperature reached at least 75-m depth. Regarding the causality in the land-ocean climate changes, air-temperature changes preceded sea water temperature change by 0-2 months in spring and summer; but the sequence could be reversed, possibly because of potential heat held by the ocean. This study demonstrated that human factors have been driving warming influences on regional sea waters, impacting marine ecosystems and changing dominant fish species in commercial fishery catches of Korea. PMID:19195391

Middle to upper Miocene radiolarian-bearing strata from Baja California, two adjacent islands (Maria Madre and Maria Cleofas), and the Experimental Mohole were interpreted paleo-oceanographically

via radiolarian faunas. Modern distributional and environmental parameters of extant, and paleogeographical and paleoenvironmental reconstruction of extinct radiolarians were used to reconstruct paleotemperatures, paleocirculation, paleo-upwelling, and paleodepth. Results include the recognition that anti-El Nino-like conditions were probably responsible for the pulse of siliceous deposition in Baja California waters during and surrounding the time interval of the Didymocyrtis antepenultima zone (10.1-7.8 Ma). These almost pervasive conditions were interrupted by El Nino conditions around 11-10 Ma and at the top of the Didymocyrtis antepenultima zone (best represented in Tortugas and Arroyo Hondo sections), which might coincide with the 8 and 9 Ma warm events of J.A. Barron and G Keller. Radiolarian evidence from the upper Gulf of California (San Felipe sections) suggests a deep gulf open to the Pacific by 7.8 Ma.

Three large submarine canyons, Oceanographer, Gilbert, and Lydonia, indent the U.S. Atlantic continental shelf and, with four additional canyons, dissect the continental slope in the vicinity of Georges Bank. On the upper rise, these canyons merge at a water depth of approximately 3100 m to form only two valleys. Differences in channel morphology of the canyons on the upper rise imply differences in relative activity, which is inconsistent with observations in the canyon heads. At present, Lydonia Canyon incises the upper rise more deeply than do the other canyons: however, seismic-reflection profiles show buried channels beneath the rise, which suggests that these other six canyons were periodically active during the Neogene. The rise morphology and the thickness of inferred Neogene- and Quaternary-age sediments on the rise are attributed to the presence and activity of the canyons. The erosional and depositional processes and the morphology of these canyons are remarkably similar to those of fluvial systems. Bear Seamount, which has approximately 2000 m of relief on the rise, has acted as a barrier to downslope sediment transport since the Late Cretaceous. Sediment has piled up on the upslope side, whereas much less sediment has accumulated in the "lee shadow" on the downslope side. Seismic-reflection profile data show that Lydonia Canyon has not eroded down to the volcanic rock of Bear Seamount. ?? 1985.

Authentic science research opportunities for classroom teachers, like the NSF-funded ARMADA Project, improves teacher motivation, enables rigor and relevance in the classroom, and provides mentoring to new teachers. This project also facilitates communication between scientists, educators, and the public by connecting scientists to a broader audience through the teacher. In January and February 2009, we participated in a six-week cruise aboard the R/V Knorr studying the oceanographic controls and distribution of subseafloor microbial life in the equatorial Pacific. The international team of scientists employed geophysics, geochemistry, microbiology, and geology to characterize microbial activity. The integrated techniques demonstrate how modern science is not separated by discipline, but relies on the strengths of many to understand the complexities of the natural world. This experience has affected dramatic change in teaching about natural resources, plate tectonics, and climate in Honors Earth Science and ecology, sustainability, and global change in AP Environmental Science. Integrating many different approaches to studying natural phenomenon creates a more challenging and interesting learning environment that both students and parents respect, making them less likely to question more rigorous assignments. The ARMADA Project encourages teachers to journal daily about their experiences, which resulted in real-time web-log of cruise activities that documented how teachers, scientists and crew work together to achieve scientific goals. Finally, the authentic research experience demonstrates that when teachers and scientists work together to communicate research goals and results, both communities benefit, mutual respect is enhanced, and potential long-term collaborations are fostered.

Pelagic ecosystems support a significant and vital component of the ocean's productivity and biodiversity. They are also heavily exploited and, as a result, are the focus of numerous spatial planning initiatives. Over the past decade, there has been increasing enthusiasm for protected areas as a tool for pelagic conservation, however, few have been implemented. Here we demonstrate an approach to plan protected areas that address the physical and biological dynamics typical of the pelagic realm. Specifically, we provide an example of an approach to planning protected areas that integrates pelagic and benthic conservation in the southern Benguela and Agulhas Bank ecosystems off South Africa. Our aim was to represent species of importance to fisheries and species of conservation concern within protected areas. In addition to representation,

we ensured that protected areas were designed to consider pelagic dynamics, characterized from time-series data on key oceanographic processes, together with data on the abundance of small pelagic fishes. We found that, to have the highest likelihood of reaching conservation targets, protected area selection should be based on time-specific data rather than data averaged across time. More generally, we argue that innovative methods are needed to conserve ephemeral and dynamic pelagic biodiversity.

Rhodoliths (free-living coralline red algae) can thrive under a wide range of temperatures, reduced light, and increased nutrient levels, and often form a distinct so-called rhodalgal lithofacies that is an important component of Cenozoic shallow-water carbonates. Global distributions illustrate that from the late-early to early-late Miocene (Burdigalian early Tortonian), rhodalgal facies reached peak abundances and commonly replaced coral-reef environments, accompanied by a decline in other carbonate-producing phototrophs. We argue that the dominance of red algae over coral reefs was triggered in the Burdigalian by enhanced trophic resources associated with a global increase in productivity, as evidenced by a long-term shift toward higher carbon isotope values. Rhodalgal lithofacies expanded further in the middle Miocene when strengthened thermal gradients associated with the establishment of the East Antarctic Ice Sheet led to enhanced upwelling while climate change generated increased weathering rates, introducing land-derived nutrients into the oceans. Globally cooler temperatures following a climatic optimum in the early-middle Miocene contributed to sustain the dominance of red algae and prevented the recovery of coral reefs. The global shift in nearshore shallow-water carbonate producers to groups tolerant of higher levels of trophic resources provides further evidence for increased nutrient levels during that time interval and shows the sensitivity of shallow-water carbonate facies as indicators of past oceanographic conditions.

Show caption HideA screen-shot from Google Earth showing chlorophyll concentrations in the equatorial Pacific. This is the data that students use in the exercise. Details In this activity, students are split into groups and assigned different ocean regions. These include the Arabian Sea, Equatorial Pacific, North Atantic, and Southern Ocean. Each group uses Google Earth to view NASA satellite chlorophyll imagery and the cruise track of data collected as part of the U.S. Joint Global Ocean Flux Study. At three locations along each cruise track, chlorophyll-temperature-depth (CTD) and bottle data collected as part of the study can be downloaded. Students work with the data to identify oceanographic features as a function of depth and then make simple calculations. In the second component of the exercise, monthly mean chlorophyll a satellite imagery is also included and students speculate about the annual cycle of physical and biological processes based on that time series. Students compile the results into a presentation for the class. Each group should have different responses to the questions asked and different results for the calculations because each ocean region is very different. This easily leads into a discussion about the major ecological provinces of the ocean and what factors cause variability.

During summer 2008 and spring 2009, surface oceanographic surveys were carried out around three islands of the Azores archipelago (Terceira, São Miguel and Santa Maria) to assess the phytoplankton distribution and associated physico-chemical processes. The Azores archipelago is a major feature in the biogeochemical North Atlantic Subtropical Gyre (NAST) province although its influence on the productivity of the surrounding ocean is poorly known. Surface phytoplankton was studied by microscopy and HPLC (High Precision Liquid Chromatography). The mean values for biomass proxy Chlorophyll a (Chla) ranged from 0.04 to 0.55 ?g L?1 (Chla maximum = 0.86 ?g L?1) and coccolithophores were the most abundant group, followed by small flagellates, Cyanobacteria, diatoms and dinoflagellates being the least abundant group. The distribution of phytoplankton and coccolithophore species in particular presented seasonal differences and was consistent with the nearshore influence of warm subtropical waters from the south Azores current and colder subpolar waters from the north. The satellite-derived circulation patterns showed southward cold water intrusions off Terceira and northward warm water intrusions off Santa Maria. The warmer waters signal was confirmed by the subtropical coccolithophore assemblage, being Discosphaera tubifera a constant presence under these conditions. The regions of enhanced biomass, either resulting from northern cooler waters or from island induced processes, were characterized by the presence of Emiliania huxleyi. Diatoms and dinoflagellates indicated coastal and regional processes of nutrient enrichment and areas of physical stability, respectively.

This report contains the abstracts and technical papers from the Second International Workshop on Software Engineering and Code Design in Parallel Meteorological and Oceanographic Applications, held June 15-18, 1998, in Scottsdale, Arizona. The purpose of the workshop is to bring together software developers in meteorology and oceanography to discuss software engineering and code design issues for parallel architectures, including Massively Parallel Processors (MPP's), Parallel Vector Processors (PVP's), Symmetric Multi-Processors (SMP's), Distributed Shared Memory (DSM) multi-processors, and clusters. Issues to be discussed include: (1) code architectures for current parallel models, including basic data structures, storage allocation, variable naming conventions, coding rules and styles, i/o and pre/post-processing of data; (2) designing modular code; (3) load balancing and domain decomposition; (4) techniques that exploit parallelism efficiently yet hide the machine-related details from the programmer; (5) tools for making the programmer more productive; and (6) the proliferation of programming models (F--, OpenMP, MPI, and HPF).

The satellite remote sensing on the NOAA Advanced Very High Resolution Radiometer (AVHRR, 1981 to 1986) and the Nimbus7 coastal zone color scanner (CZCS) (1978 to 1986) data sets were used to study the physicobiological characteristics of the East China Sea. The oceanographic dynamics of the East China Sea are greatly influenced by a counterclockwise circulation system that consists of the Kuroshio - Tsushima Current - Yellow Sea Warm Current on the eastern side of the Sea, and the Coastal Current on the western side. The former, coming from tropical open ocean with high temperature and salinity, brings oligotrophic water with very low chlorophyll concentrations; the latter has a low salinity but high nutrient and chlorophyll concentrations. Our analysis demonstrated that variation of the physicobiological features shifted systematically from each subarea to the next, as exemplified by the temperature increase and the pigment decrease from northwest to southeast. This was matched by spatial and seasonal distributions of dissolved oxygen in the East China Sea. We also found that the CZCS pigment images clearly indicated the positions of the biological productivity front in the Changjiang Estuary, which was just beyond the boundary of the turbid zone along the coastal areas of the East China Sea. They also showed the seasonal variation of the direction of the Changjiang River discharge tongue. The ocean color and infrared images complemented each other, and they were very useful in the interpretation of the spatial and monthly variations of the circulation patterns in the East China Sea.

The California Current, the eastern limb of the North Pacific gyre, exhibits the following characteristics common to eastern boundary currents: wide, shallow, slow, diffuse boundaries; common upwelling; great seasonal variation; invasions of water masses from outside the system; and cold, low-salinity waters. Studies on plankton tows and Holocene sediments have correlated components of the siliceous microplankton (radiolarians and some diatoms) with several characteristics, such as the main directions of movement of the invading waters, the provenance of these waters, the presence and degree of upwelling, and seasonality and its impact on the underlying sediments. Certain types of radiolarians are potentially useful in determining fossil anoxic and oxic conditions as well as paleodepth. In this study, the authors analyzed box-core sediment and plankton tow samples from the southern California continental borderland, as well as radiolarian density, diversity, taxonomic makeup, and other features related to oceanographic and environmental conditions. Depositional environments were defined for the sediment samples, and radiolarian indicators for paleoenvironmental interpretation were determined. Several borderland environments were identified, and the anoxic nearshore basin was found to have the best preservational qualities for radiolarians and thus the most representative radiolarian biocoenosis.

The European spiny lobster (Palinurus elephas) is a suitable model organism to study the effects of past history and current oceanographic processes on the genetic diversity and population structure of marine species with a long-lived larval phase. A portion of the COI gene was sequenced in 227 individuals from 11 localities, covering most of the present distribution of the species. Divergence was found between Atlantic and Mediterranean regions, which could be explained by restricted gene flow between populations. Moreover, a principal component analysis detected differences within basins. The existence of genetic differentiation between Brittany and Ireland-Scotland populations could be accounted for by the large effect of the Gulf Stream, while mesoscale processes suffered by the incoming Atlantic waters could be responsible of genetic differentiation within the

Mediterranean. Furthermore, historical processes could be responsible for a reduction on the overall genetic variability of P. elephas. The haplotypic distribution found in P. elephas, with the presence of one abundant haplotype and a large number of closely related haplotypes, is typical of species experiencing reduction in variability and subsequent expansions. Climatic fluctuations related to glacial cycles could explain the present level of variability and nucleotide diversity found. Interestingly, these glacial events do not seem to have the same impact in other species of the same genus. Our results indicate that recent glacial events could have had a lower impact on Palinurus mauritanicus, a congeneric species that presents an overlapping distribution area but is found in cooler waters than P. elephas. PMID:18515152

For many species, there is broad-scale dispersal of juvenile stages and/or long-distance migration of individuals and hence the processes that drive these various wide-ranging movements have important life-history consequences. Sea turtles are one of these paradigmatic long-distance travellers, with hatchlings thought to be dispersed by ocean currents and adults often shuttling between distant breeding and foraging grounds. Here, we use multi-disciplinary oceanographic, atmospheric and genetic mixed stock analyses to show that juvenile turtles are encountered 'downstream' at sites predicted by currents. However, in some cases, unusual occurrences of juveniles are more readily explained by storm events and we show that juvenile turtles may be displaced thousands of kilometres from their expected dispersal based on prevailing ocean currents. As such, storms may be a route by which unexpected areas are encountered by juveniles which may in turn shape adult migrations. Increased stormy weather predicted under climate change scenarios suggests an increasing role of storms in dispersal of sea turtles and other marine groups with life-stages near the ocean surface. PMID:22319111

Sonar is used to remotely investigate the underwater environment and to detect and track vessels therein, either by their own acoustic emissions or through scattering from active transmission. The acoustic signals available to an observer are a function of the transmitter's relative position, course, and signature, and the local environment. In order to make effective use of the received acoustic signals, an observer requires a thorough understanding of the propagation and scattering characteristics of the overall underwater environment as well as the implications of those characteristics on the analysis techniques applied to the received signals. Defense R&D Canadas (DRDC) Rapid Environmental Assessment (REA) Program aims to provide a capability for accumulation and interpretation of environmental information in a tactical timeframe. A main objective of the REA program is to explore the nature of geophysical and oceanographic variability and to quantify its effect on acoutic signals. This effect is analyzed via modeling and through the use of data from the joint DRDC/NURC sea trial BASE 04 (Broadband Acoustic Sonar Experiment 2004). This trial, which took place in May and June of 2004 in the Malta Plateau and Medina Bank areas, included several experiments measuring active sonar propagation in an uncertain environment.

Foreland settings may host tectonically-active basins that are ideal for studying the complex interplay between tectonics, sedimentation, oceanographic processes and landscape shaping. These basins commonly consist of narrow seas characterised by high-sedimentation rates and thick sedimentary units displaying significant lateral variability. The southwestern Adriatic foreland, along the Apennine belt, is a continental margin where high-resolution stratigraphic reconstruction of Quaternary units

The Search for ExtraTerrestrial Intelligence (SETI) Institute has as its mission to explore, understand and explain the origin, nature, prevalence and distribution of life in the universe. The Web site contains the history and makeup of the institute, a science section that details ongoing projects and explains its telescope arrays, an education and outreach area, and other interesting news and facts. The page also links users to external resources on the web pertaining to this type of research.

Foreland settings may host tectonically-active basins that are ideal for studying the complex interplay between tectonics, sedimentation, oceanographic processes and landscape shaping. These basins commonly consist of narrow seas characterised by high-sedimentation rates and thick sedimentary units displaying significant lateral variability. The southwestern Adriatic foreland, along

the Apennine belt, is a continental margin where high-resolution stratigraphic reconstruction of Quaternary units and swath bathymetry (multibeam morpho-bathymetry and sidescan sonar imaging) provide evidence for multi-scale interaction between tectono-sedimentary and oceanographic processes on the continental shelf and slope. The stratigraphic architecture of middle-upper Pleistocene sequences, with stratigraphic surfaces acting as potential weak layers, and the distribution of depocenters relative to the location of tectonically active fault systems (particularly the 150-km-long Gondola Fault Zone) are predisposing factors for sediment failure. We illustrate a variety of styles of shelf-margin geomorphic evolution, alternatively dominated by slope failure at places leading to canyon inception. Downslope, the seafloor morphology is the result of mass failure (slide scars and deposits), tectonic relief (fault scarps and seamounts), deposition from contour and/or turbidity currents (gentle to steep flanked seafloor mounds, scours and moats, and sediment wave fields), and slide deposits. We discuss the possible relationships between the observed variety of geomorphic styles and the variable interplay between long-term (tectonics) and short-term processes (climatic cyclicity affecting sediment flux, sea level and oceanographic regime).

The oceanographic conditions in the north Pacific have shifted to a colder period, Pacific sardine (Sardinops sagax) biomass has declined precipitously in the California Current, the international sardine fishery is collapsing, and mackerel (Trachurus symmetricus and Scomber japonicus) are thriving. This situation occurred in the mid-1900s, but indices of current oceanographic conditions and the results of our acoustic-trawl surveys indicate it likely is recurring now, perhaps with similar socioeconomic and ecological consequences. Also alarming is the repetition of the fishery's response to a declining sardine stock—progressively higher exploitation rates targeting the oldest, largest, and most fecund fish. Furthermore, our data indicate the recent reproductive condition of sardine is poor, and their productivity is below modeled estimates used to derive the current fishery-exploitation rates. Consequently, the sardine population has been reduced to two cohorts that are unlikely to produce an appreciable new cohort. Thus, a near-term recovery of this important stock is unlikely, depending on the return of warmer oceanographic conditions, reduced pressure from mackerel species, and perhaps the adoption of a more precautionary strategy for managing the residual sardine population.

The US Army Corps of Engineers (USACE), San Francisco District, has identified two candidate sites for ocean disposal of material from several dredging projects in San Francisco Bay. The disposal site is to be designated under Section 103 of the Ocean Dumping Act. One of the specific criteria in the Ocean Dumping Act is that the physical environments of the candidate sites be considered. Toward this goal, the USACE requested that the Pacific Northwest Laboratory conduct studies of physical oceanographic and sediment transport processes at the candidate sites. Details of the methods and complete listing or graphical representation of the results are contained in this second volume of the two-volume report. Appendix A describes the methods and results of a pre-disposal bathymetric survey of Site B1B, and provides an analysis of the accuracy and precision of the survey. Appendix B describes the moorings and instruments used to obtain physical oceanographic data at the candidate sites, and also discussed other sources of data used in the analyses. Techniques used to analyze the formation, processed data, and complete results of various analyses are provided in tabular and graphical form. Appendix C provides details of the sediment transport calculations. Appendix D describes the format of the archived current meter data, which is available through the National Oceanographic Data Center. 43 refs., 54 figs., 58 tabs.

The goal of Ocean Planet is to share with the public what recent research has revealed about the oceans and to encourage ocean conservation. Ocean Planet premiered at the Smithsonian Institution's National Museum of Natural History from April 1995 to April 1996. This online companion exhibition contains all of the text and most of the panel designs and images found in the traveling exhibition. Topics include global change, habitat destruction, marine pollution, marine biodiversity, hydrothermal vents, seafarers and how oceans shape their lives, food and services provided by the sea, and heroes of the sea. There are educational materials associated with Ocean Planet, including a set of lessons and marine science activities which adapt several themes of the exhibition for use in middle and high school classrooms. The site also includes profiles of professionals in oceanography and links to oceanographic information on the Internet.

Although incivility and conflict have long plagued community colleges and other educational institutions, recent budget declines have made this situation more critical. In the past, those who disagreed could be bought off and organizations tended to hire layers of people to perform tasks that one person with a personal computer can perform today. For leaders of educational institutions, therefore, it is important that the institutions be transformed and that civility, caring, and respect be infused into the organization. Specifically, traditional singular leadership should be replaced by collective leadership, with traditional middle managers being replaced by management teams, and efforts should be made to include the voices of women, minorities, and other traditionally silenced groups into the organizational dialogue. While deep structural transformation takes time, the following nine, non-linear stages of the transformation process have been identified: (1) understanding the organizational structure; (2) articulating the institution's vision; (3) creating an environment of trust; (4) easing the threat of change; (5) using information to transform institutions; (6) moving away from hierarchical models of management; (7) providing opportunities for faculty and staff development; (8) creating an inclusive environment; and (9) evaluating managers' personal values. (HAA)

Understanding the Dense Shelf Water Cascades (DSWC) role in the oceans is regarded as one of the main drivers of oceanic margins; these dense water pools spill over the shelf edges, flow along topographic feature and mix with ambient waters, playing a crucial role in the Earth's long term climate. During the international collaborative field experiment of Seismic Oceanography ADRIASEISMIC-09, carried out on board the CNR R/V Urania in the southern Adriatic Sea in the period March 3-16, 2009, a mix of classical and innovative sampling methods was tried in order to characterize the details of the North Adriatic Dense Water (NAdDW) mass structures and test the feasibility of the seismic approach in shallow basins. Seismic Oceanography (SO) is particularly well suited for study of the dynamics of bottom-trapped water masses as compared to classic techniques because it measures the full water column at ~10 m horizontal resolution, can acquire remotely and measurements are not hampered by a sloping bottom or concerns of instrument bottom impact, and it can operate successfully over the entire range from 100 m to 1000 m for tracking water-masses evolution down a slope (shown for the first time in this cruise). During ADRIASEISMIC-09 we adopted SO techniques to follow the NAdDW masses flowing southward, testing this approach on a shallow basin with the use of a "light" seismic system that could be deployed quickly, using only two air-guns. The resulting seismic sections were used to image thermal gradients at a scale of several meters, both vertically and horizontally. However, since SO measurements alone are not sufficient to characterize such complex processes, the resulting seismic reflection data were combined with a series of physical oceanography measurements, e.g. classical CTDs, ADCP data, 232 XBT casts and -for the first time- also microstructure measurements acquired via free-falling profiler (101 casts), that allow to estimate how fast water masses are mixing. Together, the direct oceanographic samplings provide a full range of vertical resolutions down to extremely fine detail (order of millimeters) to compliment the high lateral resolution of the seismic image. The high quality data set collected demonstrated that SO campaigns can be carried out from oceanographic vessels of medium size with relatively light equipment, and that the seismic approach can be performed also in relatively shallow basins. This is an important finding, as the use of a large seismic vessel would have prohibited the kind of classic oceanography sampling that is characterizing any study of DSWC. The seismic measurements allowed us to track a cold, thin bottom-boundary layer descending down the slope near Palagruza sill, demonstrating that these complex water pools require very high-resolution sampling near the bottom to be detected and successfully tracked in their intrusions and internal waves. Preliminary results therefore suggest that SO can provide a new and powerful tool for understanding the detailed horizontal structure of DSWC processes.

The mission of the Earth Institute at Columbia University is to help the world achieve sustainability by expanding understanding of the Earth as one integrated system. Through research, education, and the practical application of research to real-world challenges, the Institute addresses nine interconnected global issues: climate and society, water, energy, poverty, ecosystems, public health, food and nutrition, and hazards and urbanization. The Institute's site offers a collection of videotaped events, including the biannual "State of the Planet" conferences, 2002-08, a Distinguished Lecture series, and the Sustainable Development seminar series, as well as e-seminars and e-briefings,

information about funding opportunities, and information about educational opportunities at Columbia.

The goal of the BioFrontiers Institute at the University of Colorado is to "advance human health and welfare by exploring critical frontiers of unknown biology and translating new knowledge to practical applications." The Institute's work includes educating new teams of interdisciplinary scientists and expanding Colorado's leadership in biotechnology. Visitors can browse through eight primary sections, including News, Facilities, and Education, among others. Faculty & Research is a great place to start; it provides information about BioFrontiers's work in large datasets covering genomics, biophysics and imaging, and chemical biology and drug development. The News area features links to an engaging blog, updates about discoveries, and so on. Users can also sign up to receive the latest updates from the Biofrontiers Institute via email.

The Rolling Deck to Repository (R2R) program is developing infrastructure to ensure the underway sensor data from U.S. academic oceanographic research vessels are routinely and consistently documented, preserved in long-term archives, and disseminated to the science community. The entire R2R Catalog is published online as a Linked Data collection, making it easily accessible to encourage discovery and integration with data at other repositories. We are developing the R2R Linked Data collection with specific goals in mind: 1.) We facilitate data access and reuse by publishing the richest possible collection of resources to describe vessels, cruises, instruments, and datasets from the U.S. academic fleet, including data quality assessment results and clean trackline navigation; 2.) We facilitate data citation through the entire lifecycle from field acquisition to shoreside archiving to journal articles and global syntheses, by publishing Digital Object Identifiers (DOIs) for datasets and encoding them directly into our Linked Data resources; and 3.) We facilitate federation with other repositories such as the Biological and Chemical Oceanography Data Management Office (BCO-DMO), InterRidge Vents Database, and Index to Marine and Lacustrine Geological Samples (IMLGS), by reciprocal linking between RDF resources and supporting the RDF Query Language. R2R participates in the Ocean Data Interoperability Platform (ODIP), a joint European-U.S.-Australian partnership to facilitate the sharing of data and documentation across international borders. We publish our controlled vocabularies as a Simple Knowledge Organization System (SKOS) concept collection, and are working toward alignment with SeaDataNet and other community-standard terms using the NERC Vocabulary Server (NVS). http://rvdata.us/

Over the past three decades, the decline and altered spatial distribution of the western stock of Steller sea lions (Eumetopias jubatus) in Alaska have been attributed to changes in the distribution or abundance of their prey due to the cumulative effects of fisheries and environmental perturbations. During this period, dietary prey occurrence and diet diversity were related to population decline within metapopulation regions of the western stock of Steller sea lions, suggesting that environmental conditions may be variable among regions. The objective of this study, therefore, was to examine regional differences in the spatial and temporal heterogeneity of oceanographic habitat used by Steller sea lions within the context of recent measures of diet diversity and population trajectories. Habitat use was assessed by deploying satellite-depth recorders and satellite relay data loggers on juvenile Steller sea lions (n = 45) over a five-year period (2000-2004) within four regions of the western stock, including the western, central, and eastern Aleutian Islands, and central Gulf of Alaska. Areas used by sea lions during summer months (June, July, and August) were demarcated using satellite telemetry data and characterized by environmental variables (sea surface temperature [SST] and chlorophyll a [chl a]), which possibly serve as proxies for environmental processes or prey. Spatial patterns of SST diversity and Steller sea lion population trends among regions were fairly consistent with trends reported for diet studies, possibly indicating a link between environmental diversity, prey diversity, and distribution or abundance of Steller sea lions. Overall, maximum spatial heterogeneity coupled with minimal temporal variability of SST appeared to be beneficial for Steller sea lions. In contrast, these patterns were not consistent for chl a, and there appeared to be an ecological threshold. Understanding how Steller sea lions respond to measures of environmental heterogeneity will ultimately be useful for implementing ecosystem management approaches and developing additional conservation strategies. PMID:19769109

The green sturgeon (Acipenser medirostris), which is found in the eastern Pacific Ocean from Baja California to the Bering Sea, tends to be highly migratory, moving long distances among estuaries, spawning rivers, and distant coastal regions. Factors that determine the oceanic distribution of green sturgeon are unclear, but broad-scale physical conditions interacting with migration behavior may play an important role. We estimated the distribution of green sturgeon by modeling species-environment relationships using oceanographic and migration behavior covariates with maximum entropy modeling (MaxEnt) of species geographic distributions. The primary concentration of green sturgeon was estimated from approximately 41–51.5° N latitude in the coastal waters of Washington, Oregon, and Vancouver Island and in the vicinity of San Francisco and Monterey Bays from 36–37° N latitude. Unsuitably cold water temperatures in the far north and energetic efficiencies associated with prevailing water currents may provide the best explanation for the range-wide marine distribution of green sturgeon. Independent trawl records, fisheries observer records, and tagging studies corroborated our findings. However, our model also delineated patchily distributed habitat south of Monterey Bay, though there are few records of green sturgeon from this region. Green sturgeon are likely influenced by countervailing pressures governing their dispersal. They are behaviorally directed to revisit natal freshwater spawning rivers and persistent overwintering grounds in coastal marine habitats, yet they are likely physiologically bounded by abiotic and biotic environmental features. Impacts of human activities on green sturgeon or their habitat in coastal waters, such as bottom-disturbing trawl fisheries, may be minimized through marine spatial planning that makes use of high-quality species distribution information.

Beginning in 1997, the Environmental Protection Agency (EPA) defined a contaminated section of the Palos Verdes Shelf region in southern California as a Superfund Site, initiating a continuing investigation of this area. The investigation involved the EPA, the U.S. Geological Survey (USGS), Science Applications International Corporation (SAIC), Los Angeles County Sanitation Districts (LACSD) data, and other allied agencies. In mid-2007, the Palos Verdes Shelf project team identified the need for additional data on the sediment properties and oceanographic conditions at the Palos Verdes Superfund Site and deployed seven bottom platforms, three subsurface moorings, and three surface moorings on the shelf. This additional data was needed to support ongoing modeling and feasibility studies and to improve our ability to model the fate of the effluent-affected deposit over time. It provided more detail on the spatial variability and magnitude of resuspension of the deposit during multiple storms that are expected to transit the region during a winter season. The operation began in early December 2007 and ended in early April 2008. The goal was to measure the sediment response (threshold of resuspension, suspended-sediment concentrations, and suspended-sediment transport rates) to bed stresses associated with waves and currents. Other objectives included determining the structure of the bottom boundary layer (BBL) relating nearbed currents with those measured at 10 m above bottom (mab) and comparing those with the long-term data from the LACSD Acoustic Doppler Current Profiler (ADCP) deployments for nearbed current speed and direction. Low-profile tripods with high-frequency ADCPs co-located with two of the large tripods were selected for this goal. This report describes the data obtained during the field program, the instruments and data-processing procedures used, and the archive that contains the data sets that have passed our quality-assurance procedures.

Coastal waters influenced by the Amazon River are highly dynamic and productive environments, although few studies have focused on the seasonal changes in oceanographic processes, except for the Amazon plume. The aim of this paper is to evaluate the effects of short- (daily) and medium-term (seasonal) variations in meteorological and hydrodynamic conditions on hydrological variables in a sub-tidal zone located to the southeast of the Amazon estuary, in an area influenced by other rivers. The study was undertaken between November 2008 and September 2009. The month with the lowest fluvial discharge (November, dry season) was characterized by strong tidal currents and high significant wave heights, the highest salinity and pH, and the lowest dissolved nutrient concentrations and turbidity. During the equinoctial spring tide (March, rainy season), when discharge was increasing, similar significant wave height and tidal current speeds were recorded, with high tide elevations, and the highest concentrations of chlorophyll a and nitrate. The maximum fluvial discharge (June, rainy season) was characterized by the lowest hydrodynamic energy, salinity and pH, but also the highest silicate concentrations. During the other equinoctial spring tide (September, dry season), when discharge was decreasing, tides and tidal currents were similar to

those recorded in March, whereas phosphate and nitrite concentrations were the highest recorded in the study. Overall, coastal circulation and hydrological variables shifted seasonally, responding primarily to atmospheric, hydrographic, and astronomical factors, including winds, waves, fluvial discharge, tides, and tidal currents. The study also confirmed that coastal areas to the southeast of the Amazon plume are highly dynamic and productive.

The Cato Institute is a think tank based on "limited government, free markets, individual liberty, and peace." It's Web site is highlighted by the full text of many of its Briefing Papers, all of its Foreign Policy Briefing Series, over 100 of its Policy Analysis Series, all of its Social Security Privatization Series, and articles from its semi-monthly Cato Policy Reports (under Publications and Broadcasts). In addition, the site offers information about the Institute, its staff, its events, and its other publications.

The Krell Institute, whose name comes from a 1956 science fiction movie "The Forbidden Planet," aims to "provide superior technical resources, knowledge and experience in managing technology-based education and information programs." The InstituteÂs primary activities include offering a fellowship for graduate studies in computational science, educational outreach programs, educational conferences, and a K-12 professional development and curriculum called Adventures in Supercomputing. The Learning Center section provides a wealth of website links to research centers, articles, journals, and web-based courses all relating to computational science.

By putting teachers back into an intense learning and leadership environment, the National Science Foundation (NSF) is embarking on a major effort to improve the mathematics and science education of the nationï¿½s youth. The three-year $5.5 million Teacher Institute project in Park City, Utah, involves middle and high school mathematics teachers from three school districts, including a small system in McAllen, Texas, and larger systems in Cincinnati, Ohio and Seattle, Washington. In summer resident sessions, the institute at Park City will train middle and secondary school teachers to become teacher-leaders.

Institutions formalize the intuitive notion of logical system, including both syntax and semantics. A surprising number of different notions of morphisim have been suggested for forming categories with institutions as objects, and a surprising variety of names have been proposed for them. One goal of this paper is to suggest a terminology that is both uniform and informative to replace the current rather chaotic nomenclature. Another goal is to investigate the properties and interrelations of these notions. Following brief expositions of indexed categories, twisted relations, and Kan extensions, we demonstrate and then exploit the duality between institution morphisms in the original sense of Goguen and Burstall, and the 'plain maps' of Meseguer, obtaining simple uniform proofs of completeness and cocompleteness for both resulting categories; because of this duality, we prefer the name 'comorphism' over 'plain map.' We next consider 'theoroidal' morphisms and comorphisims, which generalize signatures to theories, finding that the 'maps' of Meseguer are theoroidal comorphisms, while theoroidal morphisms are a new concept. We then introduce 'forward' and 'semi-natural' morphisms, and appendices discuss institutions for hidden algebra, universal algebra, partial equational logic, and a variant of order sorted algebra supporting partiality.

Our work focuses on sediment cores that disclose short-term climatic and oceanographic variability in the Okhotsk Sea. During summer, the region is dominated by the SE-Asia monsoon. It transports the vast majority of moisture via precipitation into the drainage basin of the Amur, the only large Siberian river not discharging into the Arctic Ocean and influences the amount of freshwater and sediment discharge into the Okhotsk Sea. The pattern is contrasted by cold, dry continental climate in wintertime, exerting influence on the lateral and temporal extent of the winter sea ice covering the Okhotsk Sea for nearly nine months per year. These two patterns show considerable variability in both strength and lateral extent on multifaceted timescales. Our cores were retrieved at the continental margins off Kamchatka and Sakhalin. The age models were derived from AMS radiocarbon datings, supported by the occurrence of a tephra layer. Maximum sedimentation rates exceed 120cm/kyr during the last 8000 years, decreasing to 20 cm/kyr in older parts of the cores. Accordingly, we achieve an average temporal resolution of 20-200 years between discrete samples, depending on the proxies we use. Content and accumulation rates of biogenic opal reveal

information about short-term changes in primary productivity while minor element distributions derived from XRF core-scanning are taken as indicators for riverine sediment supply. Stable isotope data of benthic and planktic foraminifera supplement our results revealing information about the formation of Okhotsk Sea Intermediate Water, ventilating the mid-depth water masses of the NW-Pacific. Apart from displaying global events as the Terminations Ia and Ib or the Younger Dryas, our results provide evidence for the onset of of permafrost melting in the hinterland and possibly a destabilization of gas hydrates in the Sakhalin margin around 9,000 yr B.P. Besides, during Holocene, we observe high-frequency oscillations in both Amur river discharge and biogenic productivity that can be correlated to oxygen isotope records of the Greenland GISP2 ice core record. We compare these cyclic changes in sediment supply with the GISP2 record and low-latitude reference sites. Spectral analysis reveals several millennial-interdecadal periodicities, with a 940-year cycle in the early Holocene interval of 8500-4000 years BP. In the younger part from 0-4000 years BP, a transition towards a 1200-year cyclicity appears. The occurrence of these cyclic changes within the same frequency spectra in either record substantiate a tight connection between our study area and the climate in the North Atlantic region during the past ca. 8,000 years BP.

The Indonesian Throughflow (ITF), which transfers upper ocean waters from the Pacific to the Indian Ocean, plays an essential role in global ocean circulation and tropical climate regulation. The flow and mixing regimes of the ITF are affected by changes in temperature, winds and upwelling caused by the Asian Monsoon/Intertropical Convergence Zone (AM/ITCZ) and interannual variations in El Niño (EN). Because the ITF is located in the Western Pacific Warm Pool, an area from which the atmosphere derives a large portion of its heat and water budget, changes in the ITF have the potential to perturb atmospheric circulation globally. Despite the importance of this region to global climate, changes in the ocean-atmosphere climate phenomenon affecting the ITF are still poorly understood. Our study used organic geochemical proxies for upwelling in the Makassar Strait to investigate Holocene oceanographic changes in the ITF in response to EN and the AM/ITCZ. A core-top biomarker survey was performed on multi-core samples from the Makassar Strait and surrounding areas. Concentrations of cholesterol (an indicator of integrated primary productivity) were determined by Gas Chromatography-Mass Spectrometry and were then compared with maps of regional July-August SST and determined to accurately reflect regional upwelling. Based on the findings of the core-top survey, a down-core biomarker record was generated from core BJ8-03-70 GGC taken from the West Sulawesi Margin in the Eastern Makassar Strait, an area that experiences seasonal upwelling associated with the boreal summer Asian monsoon. Cholesterol data show a trend towards increasing concentrations (upwelling or thermocline shoaling) in the late Holocene with a considerable increase approximately 6,000 years before present. Additionally, upwelling intensity appears to show more centennial-millennial variability during the late Holocene. Evidence that the summer monsoon has decreased in strength over the course of the Holocene (e.g. Wang et al., 2005) suggests that the increase in cholesterol is not a response to an increase in monsoon-driven upwelling. Because a shallower thermocline is associated with weak trade winds (El Niño-like conditions in the modern ocean), we interpret these results to represent a mid Holocene transition to a more El Niño-like mean Pacific state. This interpretation is consistent with previous evidence (Moy et al., 2002 and Conroy et al., 2008, yet the timing and reason for this transition is not well constrained. Further work should seek to develop a higher-resolution, multi-proxy dataset to explore and explain this change.

A professional development gateway for science educators. Provides face-to-face learning opportunities, as well as on-line courses and web seminars year round. Offerings from several respected institutions cover diverse topics in biology, chemistry, earth and space science, math, science education methods and more. Programs range from 90-minute sessions to 50-hour courses. Continuing education units and graduate credits available for some. Tuition fees apply.

The new pelagic Operational Observatory of the Catalan Sea (OOCS) for the coordinated multisensor measurement of atmospheric and oceanographic conditions has been recently installed (2009) in the Catalan Sea (41°39?N, 2°54?E; Western Mediterranean) and continuously operated (with minor maintenance gaps) until today. This multiparametric platform is moored at 192 m depth, 9.3 km off Blanes harbour (Girona, Spain). It is composed of a buoy holding atmospheric sensors and a set of oceanographic sensors measuring the water conditions over the upper 100 m depth.

The station is located close to the head of the Blanes submarine canyon where an important multispecies pelagic and demersal fishery gives the station ecological and economic relevance. The OOCS provides important records on atmospheric and oceanographic conditions, the latter through the measurement of hydrological and biogeochemical parameters, at depths with a time resolution never attained before for this area of the Mediterranean. Twenty four moored sensors and probes operating in a coordinated fashion provide important data on Essential Ocean Variables (EOVs; UNESCO) such as temperature, salinity, pressure, dissolved oxygen, chlorophyll fluorescence, and turbidity. In comparison with other pelagic observatories presently operating in other world areas, OOCS also measures photosynthetic available radiation (PAR) from above the sea surface and at different depths in the upper 50 m. Data are recorded each 30 min and transmitted in real-time to a ground station via GPRS. This time series is published and automatically updated at the frequency of data collection on the official OOCS website (http://www.ceab.csic.es/~oceans). Under development are embedded automated routines for the in situ data treatment and assimilation into numerical models, in order to provide a reliable local marine processing forecast. In this work, our goal is to detail the OOCS multisensor architecture in relation to the coordinated capability for the remote, continuous and prolonged monitoring of atmospheric and oceanographic conditions, including data communication and storage. Accordingly, time series of measurements for a number of biological parameters will be presented for the summer months of 2011. Marine hindcast outputs from the numerical models implemented for simulating the conditions over the study area are shown. The strong changes of atmospheric conditions recorded in the last years over the area have altered the marine conditions of living organisms, but the dimension of the impact remains unclear. The OOCS multisensor coordinated monitoring has been specifically designed to address this issue, thus contributing to better understand the present environmental fluctuations and to provide a sound basis for a more accurate marine forecast system.

The SETI Institute is dedicated to scientific research, education and public outreach and seeks to explore, understand and explain the origin, nature and prevalence of life in the universe. SETI offers a number of professional development opportunities, curriculum guides, classes, research opportunities and travel excursions with SETI educators. Information on many SETI publications is available, including sample lessons, teaching packages, and reviews of curriculum and publications. The online interactive game, Whoï¿½s Out There, explores the issues facing the search for extraterrestrial intelligence, and the SETI Radio Network offers podcasts of various lectures and forums.

In the past two decades, the understanding of the important large-scale phenomena (El Nin??o, upwelling, California current, etc) that drive physical, chemical, and biological processes along the US West Coast has greatly improved. However, the ability to predict the influence of annual and inter-annual events on a regional scale still remains limited. High-resolution hourly data from 6 National Oceanographic and Atmospheric Administration (NOAA) buoys deployed since the early 1980's off Central California were analyzed to improve our understanding of spatial and temporal variability of oceanographic and meteorologic forcing along the coastline. Seasonal to inter-annual trends in wave height, wave period, sea level barometric pressure, sea-surface temperature, and wind direction were identified, as were significant departures in these trends during El Nin??o and La Nin??a periods. The results suggest there are increasing wave heights and wave periods, decreasing sea level barometric pressures and variability in sea-surface temperatures, and increasingly variable winds off Central California between 1980 and 2002. The impact of these climatic trends on coastal physical, geological and biologic processes will also be addressed. ?? 2007.

Background Understanding the role of seascape in shaping genetic and demographic population structure is highly challenging for marine pelagic species such as cetaceans for which there is generally little evidence of what could effectively restrict their dispersal. In the present work, we applied a combination of recent individual-based landscape genetic approaches to investigate the population genetic structure of a highly mobile extensive range cetacean, the harbour porpoise in the eastern North Atlantic, with regards to oceanographic characteristics that could constrain its dispersal. Results Analyses of 10 microsatellite loci for 752 individuals revealed that most of the sampled range in the eastern North Atlantic behaves as a 'continuous' population that widely

extends over thousands of kilometres with significant isolation by distance (IBD). However, strong barriers to gene flow were detected in the south-eastern part of the range. These barriers coincided with profound changes in environmental characteristics and isolated, on a relatively small scale, porpoises from Iberian waters and on a larger scale porpoises from the Black Sea. Conclusion The presence of these barriers to gene flow that coincide with profound changes in oceanographic features, together with the spatial variation in IBD strength, provide for the first time strong evidence that physical processes have a major impact on the demographic and genetic structure of a cetacean. This genetic pattern further suggests habitat-related fragmentation of the porpoise range that is likely to intensify with predicted surface ocean warming.

Fontaine, Michael C; Baird, Stuart JE; Piry, Sylvain; Ray, Nicolas; Tolley, Krystal A; Duke, Sarah; Birkun, Alexei; Ferreira, Marisa; Jauniaux, Thierry; Llavona, Angela; Ozturk, Bayram; A Ozturk, Ayaka; Ridoux, Vincent; Rogan, Emer; Sequeira, Marina; Siebert, Ursula; Vikingsson, Gisli A; Bouquegneau, Jean-Marie; Michaux, Johan R

J.I. Rodale was into organic farming for many decades before it became a bit more "hip". The Rodale Institute has been doing research on organic farming versus conventional farming for over 60 years, and their website is aimed at farmers, gardeners, and the general public alike. The "New Farm" link is the online incarnation of their print publication that has been providing "farmer-to-farmer resources, articles and personal stories" for over 29 years. Under the "Tools" menu in New Farm, visitors and farmers can find a "Crop Conversion Calculator", "Organic Price Report", and "NewFarm Forums". The Crop Conversion Chart gives five choices of crops, soybeans, oats, corn, wheat, and barley to compare, and shows how many pounds of CO2 will be saved based on the number of acres planted organically, and how many cars would be removed from the world as a result. The "Nutrition" link presents visitors with "Research", "Organic News", and even book reviews. There is also an "Advocacy" heading with a request to support Farm to School funding "to boost health, students, farms".

Over the past two hundred years, water level observations in coastal areas have been used to help mariners navigate oceans and estuaries, cartographers develop nautical charts, government agencies regulate boundaries, and scientists gain a better understanding of various physical processes in the ocean. As technology has progressed the latency in providing these data to the user has been reduced. The National Oceanic and Atmospheric Administration's (NOAA) Center for Operational Oceanographic Products and Services (CO-OPS) provides near real-time oceanographic and meteorological data to support navigation, coastal managers, and storm surge and tsunami warning programs. CO-OPS maintains the National Water Level Observation Network (NWLON), a system of over 200 stations for the coastal United States, Great Lakes, Caribbean islands, and Pacific island territories. CO-OPS also supports the NOAA Physical Oceanographic Real Time Systems° (PORTS), which are currently operating in 21 US ports. With an expanding role in Arctic and Alaska support, CO-OPS has identified a need for a robust and reliable data communications pathway to supplement the existing Geostationary Operational Environmental Systems (GOES) network, which has limitations at high latitudes. Iridium satellite Short Burst Data (SBD) services offer a global coverage, including remote Arctic regions outside of GOES coverage. Previous testing conducted by CO-OPS has shown a great potential for the SBD service including continuous near-real-time 6 minute data transmissions from two CO-OPS test water level stations located in Guam, with >99.9% data return. Also, successful transmissions of hourly wave statistics were demonstrated with a with a test system that employed a Nortek Acoustic Wave and Current (AWAC) instrument in Chesapeake Bay were accomplished. Data transmissions involved a buoy-mounted SIM-less SBD modem. Independent of location, data can be transmitted from a remote instrument platform to Iridium satellites with a latency of just 15 seconds. Successful test demonstrations have led to discussions regarding prospective work to integrate these small modems into CO-OPS current meters that are mounted on United States Coast Guard (USCG) Aid to Navigation (ATON) buoys, improving the reliability of the real-time transmission pathway between data collection and data reporting via PORTS °. Overall, this work has shown that with careful evaluation of data needs, commercial Iridium service can be economically used to accomplish telemetry requirements. It also shows potential for event-driven high frequency data transmission options, for applications such as marine warning systems. CO-OPS efforts to test and evaluate

Iridium communications oceanographic observatories reported on here has been a collaborative endeavor with the United States Army Corp Engineers (USACE) Field Research Facility (FRF) in Duck, NC, the USACE Cold Regions Research Engineering Laboratory (CRREL) in Hanover, NH, NAL Research Inc, Sutron Corporation,and Nortek USA.

The U.S. National Oceanographic Data Center (NODC) provides end to end services for satellite, in situ, model, video and other types of ocean data and information. End to end translates into a) access: development and implementation of tools and technologies that facilitate the discovery and access to the archive; b) archive: translates into monitoring and understanding the ocean user community as well as monitoring the latest technologies, and c) stewardship: translates into the long term preservation of data and information and generation of authoritative long term records. This presentation will discuss how NODC is meeting its challenge to handle complex, high volume ocean data from satellites, high resolution ship and buoy data, autonomous vehicles, and model output. The next generation NODC is taking advantage of our latest technologies to enable discovery of our archives and developing tools to integrate data in a seamless manner for easy access by a variety of users.

Krill (crustaceans of the family Euphausiacea) comprise an important prey field for vast array of fish, birds, and marine mammals in the California Current and other large marine ecosystems globally. In this study, we test the hypothesis that mesoscale spatial organization of krill is related to oceanographic conditions associated with coastal upwelling. To test this, we compiled a climatology of krill distributions based on hydroacoustic surveys off California in May-June each year between 2000 and 2009 (missing 2007). Approximately 53,000 km of ocean habitat was sampled, resulting in a comprehensive geo-spatial data set from the Southern California Bight to Cape Mendocino. We determined the location and characteristics of eight definite and two probable krill "hotspots" of abundance. Directional-dependence analysis revealed that krill hotspots were oriented in a northwest-southeast (135°) direction, corresponding to the anisotropy of the 200-2000 m isobath. Krill hotspots were disassociated (inversely correlated) with three upwelling centers, Point Arena, Point Sur, and Point Conception, suggesting that krill may avoid locations of strong offshore transport or aggregate downstream from these locations. While current fisheries management considers the entire coast out to the 2000 m isobath critical habitat for krill in this ecosystem, we establish here smaller scale structuring of this critical mid-trophic level prey resource. Identifying mesoscale krill hotspots and their oceanographic determinants is significant as these smaller ecosystem divisions may warrant protection to ensure key ecosystem functions (i.e., trophic transfer) and resilience. Furthermore, delineating and quantifying krill hotspots may be important for conservation of krill-predators in this system.

Distribution of Steller Sea Lions, Diet Composition, Prey Biomass Distribution and Oceanographic Properties ti g We also need to know where the fishery would be expected to operate and where Steller sea lions are an effective way to manage fisheries at local scales important to predators such as Steller sea lions. Our long

Partial contents includes the following: Global Oceans, Subtropical Gyres One, Subtropical Gyres Two, The Polar - Subpolar Influence One, Polar - Subpolar Influence Two, Antarctic Intermediate Water: Formation and Influence, Polar - Subpolar Influence Three, Theories of the Antarctic Circumpolar Current, and The Northern Sea.

Fram 2 was a research program conducted from ice stations on drifting pack ice from March 19, 1980 to May 5, 1980. The research concentrated on underwater acoustics, marine geophysics, and physical oceanography in the eastern Arctic Ocean and had the financial support of the Office of Naval Research.Personnel from the Massachusetts Institute of Technology (MIT), Woods Hole Oceanographic Institution (WHOI), Lamont-Doherty Geological Observatory (LDGO), Bedford Institute of Oceanography (BIO), University of Washington (UW), Naval Underwater Systems Center (NUSC), Naval Research Laboratory (NRL), and Polar Research Laboratory, Inc. (PRL), participated in the program. The Fram 2 program had logistic air support by the 317th Tactical Air Wing of the U.S. Air Force, by the Danish Air Force, Greenland Air Charter, Bradley Air, and PolAir. The Polar Science Center of the University of Washington (PSCUW) was responsible for the overall planning

and management of the logistics support.

The Tropical Ocean Global Atmosphere (TOGA) Program is a component of the World Meteorological Organization (WMO)/International Council of Scientific Unions (ICSU) World Climate Research Program (WCRP). One of the objectives of TOGA, which began in 1985, is to determine the limits of predictability of monthly mean sea surface temperature variations in tropical regions. The TOGA program created a raison d'etre for an explosive growth of the tropical ocean observing system and a substantial improvement in numerical simulations from atmospheric and oceanic general circulation models. Institutions located throughout the world are involved in the TOGA-distributed active data archive system. The diverse TOGA data sets for 1985 and 1986, including results from general circulation models, are included on a CD-ROM. Variables on the CD-ROM are barometric pressure, surface air temperature, dewpoint temperature Cartesian components of surface wind, surface sensible and latent heat fluxes,Cartesian components of surface wind stress and of an index of surface wind stress, sea level, sea surface temperature, and depth profiles of temperature and current in the upper ocean. Some data sets are global in extent, some are regional and cover portions of an ocean basin. Data on the CD-ROM can be extracted with an Apple Macintosh or an IBM PC.

This report documents a study conducted by the MSFC working group on Institutes in 1995 on the structure, organization and business arrangements of Institutes at a time when the agency was considering establishing science institutes. Thirteen institutes, ten science centers associated with the state of Georgia, Stanford Research Institute (SRI), and IIT Research Institute (IITRI), and general data on failed institutes were utilized to form this report. The report covers the working group's findings on institute mission, structure, director, board of directors/advisors, the working environment, research arrangements, intellectual property rights, business management, institute funding, and metrics.

Detection and characterization of nepheloid layers, which are often bound to water mass interfaces, and benthic boundary layers are today mostly restricted to sampling and optical measurements allowing quantification of particles at one single location. However, spatial analysis of the lateral variability of suspension clouds would offer remarkable new insight into the dynamics of large scale marine sediment dispersal systems. The understanding of along-slope and down-slope sedimentary processes and their deposits could be significantly improved by mapping of particle layers. Additionally, mapping of particle clouds in time and space would allow inferring on plankton concentrations and their migration in the water column, which would improve the understanding of the biological pump. Whereas spatial measurements using sampling and optical methods are time intensive and therefore, hard to accomplish, new developments in hull-mounted high-resolution hydro-acoustic instruments allow to store and process acoustic data, imaging the water column and thereby offer an easy and time saving alternative. We will present preliminary results of an integrated acoustic approach to image and analyze nepheloid layers and comparable particle clouds. We collected multiple hydro-acoustic data sets including 18 kHz echosounder (PARASOUND) and both 38 and 75 kHz ADCP (RD INSTRUMENTS) data in current controlled and high accumulating sedimentary regimes. Additionally, multibeam echosounder measurements including water column imaging were carried out using the new EM 122 (KONGSBERG). First, we present data off SE-Africa linking the oceanographic and sedimentological framework, in particular the impact of a lee eddy in the source region of the Agulhas Current on contouritic deposits. Secondly, data collected off Mauritania are used to determine the sensitivity of 18, 38 and 75 kHz to particle sizes in relation to optical estimated concentrations. Further, the vertical plankton migration is analyzed during day and night cycles. Thirdly, we show water column data recorded off Galicia using the EM122 multibeam echosounder and will present preliminary estimations on data quality and potential for further analysis. Similar studies are conducted using data collected off northern Argentina/Uruguay and in the Gulf of Cadiz. We will present an overview about all studies to demonstrate that nepheloid layers are frequently triggered and distributed along water mass interfaces due to density contrasts and associated processes (internal waves, tidals, etc). Indirect detection by hydro-acoustic methods would open a new important research field for decoding variability of waters masses and offer new tools for future multidisciplinary research enhancing our understanding of sedimentological, biological and oceanographic processes.

Southward, Alan J; Langmead, Olivia; Hardman-Mountford, Nicholas J; Aiken, James; Boalch, Gerald T; Dando, Paul R; Genner, Martin J; Joint, Ian; Kendall, Michael A; Halliday, Nicholas C; Harris, Roger P; Leaper, Rebecca; Mieszkowska, Nova; Pingree, Robin D; Richardson, Anthony J; Sims, David W; Smith, Tania; Walne, Anthony W; Hawkins, Stephen J

This is a statistical analysis of the oceanographic time series measured across Fram Strait at a latitude of 78{\\deg}50'N. Fram Strait is the deepest passage between the Arctic Ocean and the North Atlantic. There are up to 16 mooring lines with instruments at different depths measuring water temperature and velocity. These variables vary on different time scales and the challenge is to distinguish different spatial flow regimes. For Fram Strait, a temperature criterion is traditionally applied to identify water-masses, i.e. water volumes of similar origin. Interpolation leads to a vertical latitudinal 2D cross-section from which a scalar - the hypothetical area of waters within a certain temperature interval - can be extracted. The scalar is combined with a similar interpolation of the velocities to approximate the volume flows through the gateway. This approach is not only numerically expensive but also incorporates many assumptions. The present study suggest a new network-based approach to discriminate betw...

To determine the influence of oceanographic conditions on silicoflagellate assemblages, sinking fluxes and composition of silicoflagellates were studied from August 1990 to July 1994 at two long-term monitoring sites: Station AB in the Bering Sea (53.5°N, 177°W) and Station SA in the northern subarctic Pacific Ocean (49°N, 174°W). Total silicoflagellate flux (TSF) increased annually in spring and/or fall at both stations. Interannual variation in the timing of the spring TSF increase was probably related to the depth of the mixed layer during winter and to the starting time of stratification. Composition of the silicoflagellate assemblage differed between the two stations. The assemblage at Station AB was composed almost entirely of Distephanus speculum, similar to the assemblage in the Western Subarctic Gyre. The temperate-subtropical genus, Dictyocha, occurred only sporadically. The assemblage at Station SA was more variable, reflecting changes in the climate-ocean relationships indicated by the Pacific Decadal Oscillation Index (PDOI). Dictyocha increased during the positive phase of the PDOI, due to intensification of the Alaskan Stream. In colder water, Distephanus with heptagonal skeletons were more abundant than hexagonal Distephanus. These results will be useful for paleoceanography studies of the area.

The County of Santa Cruz Department of Public Works and the County of Santa Cruz Redevelopment Agency requested the U.S. Geological Survey (USGS) Western Coastal and Marine Geology Team (WCMG) to provide baseline geologic and oceanographic information on the coast and inner shelf at Pleasure Point, Santa Cruz County, California. The rationale for this proposed work is a need to better understand the environmental consequences of a proposed bluff stabilization project on the beach, the nearshore and the surf at Pleasure Point, Santa Cruz County, California. To meet these information needs, the USGS-WCMG Team collected baseline scientific information on the morphology and waves at Pleasure Point. This study provided high-resolution topography of the coastal bluffs and bathymetry of the inner shelf off East Cliff Drive between 32nd Avenue and 41st Avenue. The spatial and temporal variation in waves and their breaking patterns at the study site were documented. Although this project did not actively investigate the impacts of the proposed bluff stabilization project, these data provide the baseline information required for future studies directed toward predicting the impacts of stabilization on the sea cliffs, beach and nearshore sediment profiles, natural rock reef structures, and offshore habitats and resources. They also provide a basis for calculating potential changes to wave transformations into the shore at Pleasure Point.

Physical oceanographic data collected in July 1977 at a proposed Ocean Thermal Energy Conversion (OTEC) site in the Gulf of Mexico are presented. Data reduction techniques for all phases of the cruise are also given. The OTEC Program of the Department of Energy has a requirement for physical oceanographic data as input to the process of selecting suitable sites for the placement of a moored OTEC plant. This report lists all data collected aboard the NOAA Ship RESEARCHER during July 1977 by AOML personnel and other scientists. In addition, some XBT data collected in October and November by both the RESEARCHER and VIRGINIA KEY are

included. Both plots and listings are given for all CSTD, XBT, and Current Meter Profiles. In general, description of the data processing techniques for all data sets is given to familiarize the reader with the methods involved in reducing the raw data series to its final acceptable form.

The prototype Undulating Oceanographic Recorder Mark I is an instrumented towed vehicle which can be programmed to undulate between a minimum depth of 8 m and a selected maximum depth between 15 and 70 m, with an undulation length between 3 and 30 km, at any speed between 7 and 15 knots (3.6 to 7.7 m\\/sec). It takes a continuous

The present document covers activities carried out by and under the auspices of the Joint Panel on Oceanographic Tables and Standards (JPOTS) over the period of 1983-1986. The first part is the report of the Chairman of JPOTS on the activities of the Panel during the period 1983-1985. Two major topics were considered by the Panel: (1) the production of Volume 4 of the International Oceanographic Tables, covering properties derived from the International Equation of State of Seawater (EOS-80); (2) the study of the thermodynamics of the carbon dioxide system in seawater. In addition, matters concerning nomenclature and the updating of information for oxygen saturation calculations were considered. The second part is a summary report of the first meeting of the JPOTS Editorial Panel on the Oceanographic Manual, which took place in Moscow, from 30 June to 4 July 1986. It gives the plans and contents of the proposed "Manual on Processing of Oceanographic Station Data." (Author)

The Oregon Cancer Center was founded at Oregon Health and Science University (OHSU) in 1992. It became an NCI-designated Cancer Center in 1997. In 2001, the name was changed to the OHSU Cancer Institute. It was renamed the Knight Cancer Institute in 2008. The Institute’s mission is to translate discoveries into better ways to diagnose, prevent, and treat cancer.

for Complementary and Alternative Nationallnsitute on Minority Health and Health Disparities for Resea Resources rch Insitute on Minority Health and Health Disparities for Advan Translatio Sciences cing nal Clinical CenterNational Institutes of Health Current National Institute of Arthritis and Musculoskeletal and Skin

Seasonality of hydrographical properties at depth in the western Iberian margin (Eastern North Atlantic) is analysed from a 2003-2010 timeseries of a semi-annual oceanographic section extending ~ 200 nm off Cape Finisterre (43° N). All waters masses down to the whole extent of the permanent thermocline (2000 dbar) show a consistent seasonal signature in their termohaline properties and there is a notable asymmetry between the slope region and the outer ocean (in the surroundings of the Galicia Bank). There is overall cooling and freshening of East North Atlantic Central Waters in summertime, which is larger and deeper-reaching on the slope. In summertime, Mediterranean Water gets tightly attached against the slope and is uplifted, reinforcing its thermohaline signature and diminishing its presence at the outer ocean. In wintertime the situation reverses, MW seems to detach from the slope and spreads out to the open ocean, even developing a secondary branch around the Galicia Bank. Thermohaline seasonality at depth shows values up to 0.4 °C and 0.08 in salinity at the lower MW, of the order of 20 % of the overall interannual variability observed during the whole period. Decomposition of thermohaline changes at isobaric levels to changes along isoneutral surfaces and changes due to vertical displacements helps to analyse the physical processes behind the observed seasonality in terms of (1) the large-scale seasonality of the subtropical gyre in response to the seasonal migration of the subtropical high pressure system and subsequent anomalies in Ekman transport and wind stress curl, (2) the continental slope dynamics, characterized by summer upwelling, winter development of the Iberian Poleward Current and Mediterranean Water spreading and (3) the possible influence of seasonal changes of water mass properties at their formation sources.

Multiple year oceanographic simulations (hindcast) are identified as a priority oceanography product for fisheries and environment studies since they provide a unique continuous long-term dataset allowing integrated assessment of the ocean state and evolution. We performed a 37 year (1972-2008) hindcast run with a coupled physical-biogeochemical model in the Bay of Biscay. The coupled model and the hindcast configuration are described. A model skill assessment is performed

with a large set of in-situ data. Average seasonal currents show major circulation patterns over the shelf. Among tracers, temperature and salinity have the best agreement, ahead of nitrates and silicates, chlorophyll, and finally phosphates and ammonium. For chlorophyll, improved pattern statistics are found when compared to monthly composites of satellite-derived chlorophyll data. From the hindcast, we derived indices related to mesoscale activity (eddies, plumes, fronts, stratification) and production (chlorophyll and primary production). They help characterise the evolution of the environment in a functional way, on both the seasonal and multi-decadal scales. From these indices, first, a multivariate analysis reveals an increasing number of years that deviate from the mean seasonal pattern. Second, we propose interpretations of the simulated increasing trends detected in several of them (temperature, thermocline depth and primary production). We also recommend further developments to confirm these simulated evolutions, from addition of open boundary forcing with a global circulation model, to the improvement of the dynamics of nutrient regeneration and of the seasonal variability of secondary production. As a perspective, we review the different applications made from our hindcast in relation to anchovy life cycle, a species of major interest in the Bay of Biscay.

Known as one of the most important centers for oceanographic research in the world, the Scripps Institution of Oceanography was founded in 1903 as the Marine Biological Association of San Diego. The Institution became part of the University of California in 1912, and this digital collection from the University of California-San Diego offers a wide range of primary and secondary materials that relate the history of this important research institution. On the site, visitors will find documents that detail the history of Scripps, such as the 1966 paper "SIO: First Fifty Years" by Helen Raitt and Beatrice Moulton, along with hundreds of photographs in the Still Image Collection area. Moving on down, the "Panoramas" area contains Quick Time movies of the Scripps campus in 1916 and 1927, along with movie clips of a sea spider and a fangtooth deep-sea fish. Visitors shouldn't miss the audio and video clips, as they can listen to a number of renowned scientists talk about their work at Scripps from the 1950s to the 1990s.

Delayed Fission Neutron (DFN) assay has been applied to the measurement of uranium content in sorbers exposed to natural seawater for the purpose of evaluating advanced ion exchange resins. DFN assay was found to be particularly suitable for such testing because it is selective, nondestructive, yields quantitative results in the submicrogram range, and requires relatively simple sample preparation. Surplus components for a DFN system were obtained from the Lawrence Livermore National Laboratory, modified, re-assembled, and calibrated for use with MIT. Irradiation facilities, following which procedures were developed, evaluated and applied to the experiments at hand. Four experimental ion exchange resins developed by the Rohm and Haas (R and H) Company specifically for uranium-from-seawater applications were evaluated, together with hydrous titanium oxide (HTO), the leading inorganic sorber for this purpose. Two types of tests using natural seawater were employed: batch loading experiments, and fixed-bed column loading experiments using a test facility at the Woods Hole Oceanographic Institute (WHOI). While some qualitatively consistent trends were evident among the various experiments, important quantitative inconsistencies were noted. The WHOI tests most closely approximated true in-service conditions; hence, more importance is assigned to these results. The MIT/WHOI tests confirmed 1.5 mm HTO particle bed uptake of approximately 300 ppM U for a 30 day exposure, in good agreement with the results reported by other laboratories, worldwide. An anion exchange resin employing an amidoxime functional group also achieved this level of performance. Moreover, the resin performance is expected to improve when its properties are optimized for the present application.

Significant advances have been made in sensors and systems to monitor the ocean environment over the last few years. These sensors and systems are becoming increasingly complex. AOSN (autonomous ocean sampling network) is a good example, with a network of cooperating autonomous underwater vehicles sampling a volume rather than a single plane of the ocean. In addition, these sensors and

\\u000a Recent scholarship has demonstrated the power of the rational choice framework for advancing our understanding of institutions\\u000a and institutional change. Stimulated by these developments, the conceptual frameworks employed by scholars studying institutions\\u000a have

also been evolving, as old frameworks have been adapted and new frameworks have emerged to explore how institutions function,\\u000a how they change, and how they affect economic

WISCONSIN ALZHEIMER'S INSTITUTE Administrators: Robert Rancourt Bryan Hoeft Director, Wisconsin Alzheimer's Institute (WAI): Mark A. Sager, MD Associate Directors: Sanjay Asthana, MD Bruce Hermann, PhD Figure 4. Administration of the Wisconsin Alzheimer's Institute Dean, UW School of Medicine & Public

2013 Summer Transportation Institute University of Rhode Island Transportation Center Carlotti.uritc.org Transportation Center See where the Summer Transportation Institute can take you! The University of Rhode Island Transportation Center will host two two-week sessions of the Summer Transportation Institute for students

In this study a marine sequence is analyzed in order to reconstruct the oceanographic and climatic conditions based on geochemical and magnetic data, in centennial to multi-decadal time scales during the past 18 ka in the southern Gulf of California. The gravity core DIPAL III-T2 was recovered in the eastern part of Pescadero Basin, at 577 m depth, in the Pacific Intermediate Water (PIW) and Oxygen Minimum Zone (OMZ), aboard the R/V "El Puma" of the National University of Mexico (UNAM). The core is 262 cm long. This core is characterized by clay sediments. It shows massive and homogeneous sediments from bottom to 200 cm, and from there to the top a well defined laminated structure. Light laminae exhibit high content of biogenic components (mainly diatoms, radiolarian and silicoflagellates remains), whereas dark laminae are formed mostly by terrigenous material. Age model is based on five AMS radiocarbon dating, calibrated applying the CALIB 6.1.0 radiocarbon program. The sedimentation rates estimated range from ~0.1 mm/yr to ~0.3 mm/yr (in the upper part); sedimentary sequence comprises approximately the past 18 ka cal BP. Samples were taken every cm and they were dried and grounded, and elemental chemical concentrations measured using an X-ray fluorescence analyzer (Niton XL3t GOLDD). For magnetic susceptibility, measurements were taken every 0.5 cm with a Bartington Susceptibilimeter with MS2B sensor. A sharp difference in concentrations of Fe, Ti, K, Si, Ca y V, also observed in magnetic susceptibility measurements, marks the transition between Holocene and Pleistocene epochs, suggesting deposition under different conditions of atmospheric and oceanic circulation. In particular, low Ti, Fe and K concentrations at ~ 8 ka cal BP, indicate a decrease in terrigenous input, indicating a decrease in rainfall and river discharges from mainland to the basin, suggesting dry and cold conditions. We propose that this signal correlate with the 8.2 ka cooling event, that characterized similar conditions in other regions of Northern Atlantic Ocean. Vanadium concentrations downcore show low values during Pleistocene, where sediments are massive, and high values during the Holocene, where laminated sediments are preserved. These conditions suggest a decrease in oxygen-levels in the intermediate waters during Holocene, maybe due to productivity increase in surface waters.

Ocean Carbon and Biogeochemistry Short Course on Ocean Acidification; Woods Hole, Massachusetts, 2-13 November 2009; The Ocean Carbon and Biogeochemistry (OCB) program is a coordinating body for the U.S. research community that focuses on the ocean's role in the global Earth system, bringing together research in geochemistry, ocean physics, and ecology. With support from its federal sponsors (U.S. National Science Foundation, NASA, and National Oceanic and Atmospheric Administration (NOAA)) and the European Project on Ocean Acidification (EPOCA), the OCB Project Office coordinated and hosted a hands-on ocean acidification short course at the Marine Biological Laboratory (MBL) and the Woods Hole Oceanographic Institution (WHOI). The OCB Ocean Acidification Subcommittee (http://www.us-ocb.org/about.html), chaired by Joan Kleypas (National Center for Atmospheric Research) and Richard Feely (Pacific Marine Environmental Laboratory, NOAA), provided critical guidance on the course scope, curriculum, and instructors.

The results of an experiment examining the forward propagation of an acoustic signal through a buoyant plume are discussed. Two distinct testing sights were used. One made use of a small fresh water tank in NUWC to provide a controlled plume. The other used a larger salt water tank at Woods Hole Oceanographic Institute (WHOI) to create a more realistic oceanic model. Using the Born and

Rytov approximations, an estimation of the effects of the laminar plume on the propagated signal are shown. As the plume moves from laminar to turbulent, the scintillation index and the Fourier transform of the magnitude square response provide insight into the nature of the transition. Finally, from the turbulent response a model for the scattering function is developed.

The Autonomous Benthic Explorer (ABE) of the Woods Hole Oceanographic Institution (WHOI) collected high-resolution multibeam sonar bathymetry of the Atlantis Massif and the Lost City vent site in May 2003. A Simrad Mesotech SM 2000 multibeam sonar has been fully integrated into the vehicle for this purpose. The challenging topography of the Lost City site demanded careful AUV survey planning, but also afforded the opportunity to try new survey techniques, particularly side-looking surveys along steep slopes. The quality of post-processed navigation has been improved with the addition of a model-based smoother. To aid in processing the large volume of sonar data generated during surveys, we have developed a high-level user interface in the form of a MATLAB GUI that allows users to inspect sonar images and the corresponding bathymetry concurrently. Using these techniques, bathymetric maps gridded on 2 m regular grids are visually free of trackline artifacts.

One way to get data out of a hurricane is to head straight into one. That could involve a white-knuckled flight into the eye of a storm. There is another, safer way though. A team from the Woods Hole Oceanographic Institution (WHOI) and the University of Massachusetts that studies long-term global hurricane patterns is doing it safely at ground level, or just slightly below. For the research, the team travels to coastal areas where a hurricane's storm surge has washed over beaches and left sediment deposits, such as sand, in areas where there normally wouldn't be any. By drilling and studying cores from different points around the Atlantic Ocean, the team has been able to paint a picture of long-term global hurricane activity.

Since inception of oceanographic research at Brookhaven National Laboratory in 1974, over 75 cruises and 150 papers and reports have been completed. In comparison of shelf ecosystems at high, mid, and low latitudes, an understanding of the natural variability of US coastal waters has been derived. Annual carbon and nitrogen budgets suggest that the energy flow is diverted to a pelagic food web in summer-fall and a demersal food web in winter-spring within the Mid-Atlantic Bight. The impact of energy-related perturbations can now be assessed within the context of natural oscillation of the coastal food web.

This report represents the synthesis and analysis of the physical oceanographic and meteorological data on the Continental Shelf and Blake Plateau from Cape Hatteras to Cape Canaveral. Numerous information sources were searched to obtain an analysis of the climatology, wave data, hydrography, and the circulation of the Continental Shelf Waters, which are crucial to platform construction, safety procedures and management decisions. Seasonal variances of air temperature, wind speed and wind direction, cloud cover, cloud ceilings, visibility, precipitation, storms, weather fronts, solar radiation and precipitation run-off are discussed and summarized.

Study results of the nearshore application for ocean thermal energy conversion (OTEC) pilot plant studies in subtropical Hawaiian waters are reported. A three-part oceanographic and socio-economic study complted at Keahole Point, Kona coast, consisted of an extensive literature survey and a field program to characterize the local, physical, chemical, geological, and biological environments. Also conducted was an evaluation of the potential ocean environmental impact that a 20 MW pilot plant located at or just off Keahole Point would have on the local subtropical waters.

Geological understanding of age and horizontal variations of oceanic plates from mid-ocean ridges to deep-sea trenches, including interactive phenomena between continental and oceanic plates, especially in areas transecting trenches, arcs, and back-arc basins was addressed at the 1992 Workshop on the Global Undersea Research Program, held at the Japan Marine Science and Technology Center (JAMSTEC), Tokyo, Japan, from September 2 to 4, 1992. The meeting was held following a proposal at the 1991 International Symposium to commemorate the 20th anniversary of JAMSTEC to hold a workshop on undersea research to discuss the utilization of undersea devices such as manned submersibles and remotely operated vehicles (ROVs).The goals of the September

meeting were to improve research cooperation among organizations using manned submersibles or ROVs; to support more effective research programs by avoiding unnecessary research duplication; and to discuss new technologies, scientific needs, and functional requirements for hardware being developed for manned submersibles and ROVs. About twenty-five scientists participated from the National Science Foundation; National Oceanic and Atmospheric Administration; Woods Hole Oceanographic Institution (WHOI); University of Hawaii; Institut Français de Recherche pour l'Exploitation des Mers (IFREMER), France; Ocean Research Institute, University of Tokyo; Earthquake Research Institute, University of Tokyo; Geological Survey of Japan; Institute of Oceanographic Sciences (IOS), Deacon Laboratory, United Kingdom; and JAMSTEC.

Defining the scale of connectivity among marine populations and identifying the barriers to gene flow are tasks of fundamental importance for understanding the genetic structure of populations and for the design of marine reserves. Here, we investigated the population genetic structure at three spatial scales of the red gorgonian Paramuricea clavata (Cnidaria, Octocorallia), a key species dwelling in the coralligenous assemblages of the Mediterranean Sea. Colonies of P. clavata were collected from 39 locations across the Mediterranean Sea from Morocco to Turkey and analysed using microsatellite loci. Within three regions (Medes, Marseille and North Corsica), sampling was obtained from multiple locations and at different depths. Three different approaches (measures of genetic differentiation, Bayesian clustering and spatially explicit maximum-difference algorithm) were used to determine the pattern of genetic structure. We identified genetic breaks in the spatial distribution of genetic diversity, which were concordant with oceanographic conditions in the Mediterranean Sea. We revealed a high level of genetic differentiation among populations and a pattern of isolation by distance across the studied area and within the three regions, underlining short effective larval dispersal in this species. We observed genetic differentiation among populations in the same locality dwelling at different depths, which may be explained by local oceanographic conditions and which may allow a process of local adaptation of the populations to their environment. We discuss the implications of our results for the conservation of the species, which is exposed to various threats. PMID:21762434

To fully capture the sensitivity of the Antarctic ice sheet to changes in the ocean, coupled numerical models of ocean and marine ice sheets will be needed. If coupled models are to provide accurate predictions of the sea level contribution from the Antarctic ice sheet, they will need careful initialisation, so that the flow speed, rate of thickness change and surface mass balance of floating ice shelves are consistent with the basal mass balance, from melting or freezing, estimated from the oceanographic model. Any inconsistency would cause the forecast of ice thickness to suffer from spurious drift, and this in turn would affect the buttressing and flow of grounded ice in the interior of Antarctica. A sensible first step before proceeding with any coupled simulation is to compare maps of basal melt from the two different sources. Here, a new comprehensive map of basal melt/freeze for all Antarctic ice shelves is derived from a combination of remote sensing and glaciological modelling. In this approach, the viscosity of the floating ice shelves is selected using inverse methods to agree with satellite velocity measurements and the basal rate of melting or freezing is inferred using conservation of mass. Corrections are applied for surface mass balance and for satellite observations of ice shelf thickness change. We compare this map with estimates of basal melt/freeze from oceanographic models.

In 1988, the Swiss Institute for Nuclear Research (SIN) and the Swiss Institute for Reactor Research (EIR) were merged to form the new Paul Scherrer Institute (PSI). It is named after the Swiss physicist Paul Scherrer (1890–1969), a talented experimentalist (X-ray diffraction) and excellent teacher. PSI is located in Villigen-Wurenlingen, Switzerland, midway between Zurich and Basel on both sides of

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This volume is a compendium of articles derived from a Chapman conference entitled “The Role of

Marine Organic Carbon and Carbonate Fluxes in Driving Global Climate Change, Past and Future", which was held at Woods Hole Oceanographic Institution in July, 2005. The conference divided the topic into units as follows: concepts and models, production of particulate matter, fluxes through the water column, and sediment record of past fluxes. The volume follows this 'vertically stratified' approach, and we use the same units to organize the articles. The Chapman conference on which this volume is based was made possible by support from The American Geophysical Union (Chapman Conference Program), the National Science Foundation, The Ocean and Climate Change Institute at Woods Hole Oceanographic Institution, and the Analytical Center for Climate and Environmental Change at Northern Illinois University. We extend special thanks to Terry Joyce at the Ocean and Climate Change Institute for his administrative help. Also, we particularly appreciated the hard work of Andrew Daly at WHOI and Melissa Ficek at AGU who managed the conference details, making it a pleasant event. The articles in this volume benefited from evaluations given by a dedicated, and most helpful, group of reviewers. It was gratifying to reach out to the community and receive such a valuable contribution of thought and expertise. We gratefully acknowledge our reviewers. Finally, we acknowledge the help and advice of John Milliman, editor for Deep-Sea Research II, who helped us attain the high standards of publication with the journal.

The National Aeronautics and Space Administration (NASA) and other leading academic or research organizations have joined together to create the NASA Astrobiology Institute. The institute's objectives are to promote, conduct, and lead integrated astrobiology (study of life in the universe) research and to train young researchers. Sections included at the Website are News & Views, Operations, and Learning Center.

The NYU Cancer Institute (NYUCI) was founded in 1975 and received its NCI designation that year. The Center was named the Rita J. and Stanley H. Kaplan Cancer Center in 1983. In 1991, the NYU Cancer Center in New York City and the Cancer Center at the Nelson Institute of Environmental Medicine merged.

Mar 27, 2004 ... For current information about the NASA Astrobiology Institute, ... The Canadian Institute for Advanced Research - Program in Evolutionary Biology .... In addition, several special short courses to are offered to junior .... Popularization of astrobiology research in Russia (publication astrobiology books in ...

The Salk Institute was founded in 1960 by the late Jonas Salk and to this day researchers there investigate cancer, aging, Alzheimer's, diabetes, and infectious diseases. The Institute's media and press relations team is actively involved with publicizing various works and accomplishments, to which end this site allows public access to videos created at the Institute. The videos here are divided into seven sections, including Diabetes and Metabolism, Plant Biology, and AIDS. Each of these sections includes videos that feature researchers and others talking about everything from new insights into cell aging to how the common cold virus might be used to target and disrupt cancer cells. Perhaps the most remarkable section here is titled Institute Videos. This section includes videos on the relationship between art and science, along with profiles of the glassworks of Dale Chihuly that reside at the Institute.

In the past several decades, a number of policy institutes and think-tanks have been formed to open a substantial dialogue about issues affecting rural communities. The Rural Policy Research Institute is one of these organizations, and involves scientists and policy analysts from Iowa State University, the University of Missouri, the University of Nebraska and other affiliated institutions. The Web site is divided into a number of sections, including a publications area, a section that contains editorials written by Institute fellows and staff members, and an area dedicated to providing information about helpful resources such as basic statistics about rural America. On the left side of the home page, visitors can also browse the Web pages of the Institute's affiliated centers such as the Center for Rural Health Policy Analysis and the Rural Poverty Research Center. Finally, users can elect to sign up for an electronic newsletter that will update them about upcoming events, conferences, and publications related to rural policy issues.

Most visitors to the Smithsonian Institution's museums in Washington, DC may not be aware of the

activities of their Tropical Research Institute, which may have something to do with the fact that it is located in Panama. The Institute's history stretches back to the early years of the 20th century, when one of its prime directives was to survey the flora and fauna of the area for the purpose of controlling diseases such as yellow fever and malaria. In 1946, the Institute came into the fold of the Smithsonian Institution, and since then it has conducted research in the areas of archaeology, behavioral ecology, environmental monitoring, and other topics. On the site, visitors can learn about the institute's diverse research projects, international activities (such as the Center for Tropical Forest Science), and fellowship opportunities. Finally, visitors can also look at the two webcams operated by the Institute, including one that looks over the island (Barro Colorado) where they are located off the coast of Panama.

The Franklin Institute was founded in 1824 by a group of Philadelphians in order to train artisans and mechanics in the fundamentals of science, but has since transformed itself into a science museum and research institute that also awards the Franklin Institute and Bower Awards annually. The Institute's Web site contains a host of information on their current and upcoming exhibits, which include substantial sections devoted to the mechanics and workings of trains, environmental science, and human physiology. The site also features the Inquiry Attic, where visitors can read brief profiles of scientific instruments in the Institute's collection, such as early X-ray machines and a tabulating machine used to conduct the United States Census in the 19th century. Perhaps the best online exhibit on the Institute's Web pages is the one devoted to the Wright Brothers, which features silent film footage of the Bergdoll 1911 Model B Flyer in flight and photographs of the many engineering objects given to the Institute by the Wright Brothers. Visitors can also read another feature, Braindrops, which feature small tidbits of scientific information updated daily.

The New Buildings Institute promotes "energy efficiency in buildings through policy development, research, guidelines and codes." Substantial information about lighting, architecture, and mechanical systems is available on the institute's homepage. The online reports, tools, and suggested practices come from a variety of sources, including the U.S. Environmental Protection Agency, the Pacific Northwest National Laboratory, and the institute itself. A large section of the Web site that can easily be overlooked contains many additional resources about the Public Interest Energy Research (PIER) program. A brief, free registration is required to access certain online publications, such as the 2003 edition of Advanced Lighting Guidelines.

Produced annually by the National Science Foundation's Division of Science Resources Studies (SRS), the Academic Institutional Profiles are based on three surveys: the National Science Foundation (NSF) Survey of Research and Development Expenditures at Universities and Colleges (academic R&D expenditures survey); the NSF-NIH Survey of Graduate Students and Postdoctorates in Science and Engineering (graduate student survey); and the NSF Survey of Federal Science and Engineering Support to Universities, Colleges and Nonprofit Institutions (Federal support survey). Data profiles of individual institutions and rankings for each category are easily accessed via an alphabetical listing or a keyword/ FICE code search engine.

This website presents the Finnish Meteorological Institute's objective "to provide the best possible information about the atmosphere above and around Finland, to ensure public safety relating to atmospheric and airborne hazards, and to satisfy requirements for specialized meteorological products." The site divides the Institute's countless research projects into six main categories: meteorology, air quality, middle and upper atmosphere, space research, climate change, and polar research. Each section contains concise, educational summaries and helpful images. Students can find tutorials about lightning, thunder, northern lights, and temperature. Users who can't seem to find the answers to their meteorological questions can correspond with the Institute's scientists.

The Mobile Media Institute at Santa Barbara City College is "one of the best opportunities for students to develop their core skills for an exciting future in the rapidly growing industry of Mobile Media." The institute has two programs, the first for a Mobile Applications Developer and the second for Mobile Media Design and Developer. On this site, visitors will find the curriculum for both programs, more about the Institute, an illustration of a wireless frequency spectrum, and a glossary of relevant terms. There are also a number of news feeds, on topics from Linux to Content and

Entertainment, for visitors and student to browse.

Founded in March 2002, the Institute for Soldier Nanotechnologies (ISN) is investigating the potential use of nanotechnology to improve the effectiveness of individual soldiers. The US Army is funding the research at the Massachusetts Institute of Technology, which focuses on three main areas: "protection, performance enhancement, and injury intervention and cure." The ISN homepage has overviews of many different projects, including energy absorbing materials and medical technology. With such a diverse range of research topics, seven multidisciplinary teams are needed for the institute. ISN has been featured in many news articles in 2003, and links to five of the stories are given.

The Intergovernmental Oceanographic Commission (IOC) functions within the United Nations Educational, Scientific, and Cultural Organization (Unesco) to promote scientific investigation into the nature and resources of the world's oceans. Summarized in this report are discussions that took place in both preparatory meetings and plenary sessions of the eleventh session of the IOC Assembly, which was held during October and November, 1979. Topics addressed at this meeting included global atmospheric research, marine pollution, regional ocean science programs, monitoring services, data exchange, and training and education in the marine sciences. Appended are abstracts of lectures related to the theme "Marine Environment and Resources in the Ocean." Also among the appended materials are the 39 resolutions adopted at this conference. (WB)

Founded in 1961, the Marketing Science Institute is "a learning organization dedicated to bridging the gap between marketing science theory and business practice." The Institute's work includes academic research on a range of marketing subjects and topics of importance to business. On the homepage, visitors can learn about the Institute via six sections that include News, Research, Events, and Publications. The Publications area is a good place to start, as it includes working papers, conference summaries, and information about recent research projects. Not all of the materials are available for free, but many of them feature basic summaries. Moving on, the Research area contains information about upcoming research projects, along with information on research competitions. The site is rounded out by the News area, which contains updates about the Institute's research associates and upcoming conferences and lectures.

Teachers, higher education administrators and financial planners are well acquainted with the work of TIAA-CREF. The insurance and investment company has been a central player in teacher retirement and financial planning for nearly a century. Twelve years ago, the organization spawned the TIAA-CREF Institute, a research-focused arm that brings together top theorists, administrators and researchers to identify and solve tomorrow's higher education problems. Today, the Institute rests in the capable hands of Stephanie Bell-Rose, who brings a decade of experience as founding president of the Goldman Sachs Foundation. This article presents an interview with new TIAA-CREF Institute Managing Director Stephanie Bell-Rose. In the interview, Bell-Rose discusses the role of the Institute, the importance of proper financial education and the impact of the current economic climate on the public's trust.

Established in 1956 on the campus of Rutgers University, the Eagleton Institute of Politics is dedicated to exploring state and national politics through research, education, and public service. Under the directorship of Professor Ruth B. Mandel, the Institute contains a number of centers and programs, such as the Center for American Women and Politics and the Center for Public Interest Polling. Visitors can peruse the sites of each of these specialized areas, or they may also want to begin by looking over the "Take Note" area on the Institute's home page. Recently featured items in this section include the results of a survey of college students' beliefs about the political system and a full-length report on the state of philanthropy in New Jersey. The site also includes materials about upcoming events at the Institute, along with opportunities for students.

Founded in 1991, the Institute for Justice is concerned with protecting civil liberties around the United States, and is currently involved in a number of projects, including investigating the use and application of eminent domain laws and the issue of free speech in the state of Washington. The Institute's homepage provides a good place to start exploring the content offered within their site, as

visitors can peruse its in-house publications, such as the newsletter, _Liberty & Law_, and a report on eminent domain titled, "Public Power, Private Gain." Of course, visitors can also learn about the Institute's ongoing and completed cases and they may also learn about job opportunities with the Institute and its programs for undergraduates and law students.

A study was conducted to investigate the influence of Asian monsoon on chlorophyll-a (Chl-a) content in Sabah waters and to identify the related oceanographic conditions that caused phytoplankton blooms at the eastern and western coasts of Sabah, Malaysia. A series of remote sensing measurements including surface Chl-a, sea surface temperature, sea surface height anomaly, wind speed, wind stress curl, and Ekman pumping were analyzed to study the oceanographic conditions that lead to large-scale nutrients enrichment in the surface layer. The results showed that the Chl-a content increased at the northwest coast from December to April due to strong northeasterly wind and coastal upwelling in Kota Kinabalu water. The southwest coast (Labuan water) maintained high concentrations throughout the year due to the effect of Padas River discharge during the rainy season and the changing direction of Baram River plume during the northeast monsoon (NEM). However, with the continuous supply of nutrients from the upwelling area, the high Chl-a batches were maintained at the offshore water off Labuan for a longer time during NEM. On the other side, the northeast coast illustrated a high Chl-a in Sandakan water during NEM, whereas the northern tip off Kudat did not show a pronounced change throughout the year. The southeast coast (Tawau water) was highly influenced by the direction of the surface water transport between the Sulu and Sulawesi Seas and the prevailing surface currents. The study demonstrates the presence of seasonal phytoplankton blooms in Sabah waters which will aid in forecasting the possible biological response and could further assist in marine resource managements. PMID:22930185

SkIO is a multidisciplinary research institution within the University System of Georgia and is located on a 700 acre campus on Skidaway Island, 16 miles southeast of Savannah. The Institute sits on the banks of the Skidaway River, with access to a diverse range of estuarine and coastal habitats. Site features a wealth of information regarding SkIO's research and education programs. Data, figures, and more are available in the Research section.

The Board of Trade of Metropolitan Montreal created the Electronic Commerce Institute (ECI) in 1990 in order to promote and foster the growth of ecommerce applications within the Montreal business community. The ECI Website offers basic information about the Institute and about its courses, events, and services. Along with an excellent ecommerce guide for small businesses, Web reference resources and a suppliers directory are provided. Users should be aware that several sections and links are in French.

The National Cancer Institute (NCI) Perspectives this year presented information on the systemic targeted radionuclide therapy (STaRT) research projects: (1) being investigated at the NCI's Intramural Center for Cancer Research; (2) funded by NCI's Radiation Research Program and other extramural programs; and (3) the appropriate National Institutes of Health/NCI funding mechanisms applicable to researchers for obtaining funds for STaRT projects.

Wong, Rosemary S.L. [Radiation Research Program, Radiotherapy Development Branch, National Cancer Institute, National Institutes of Health, Rockville, MD (United States)]. E-mail: rw26f@nih.gov; Brechbiel, Martin W. [Radioimmune and Inorganic Chemistry Section, Radiation Oncology Branch, National Cancer Institute, National Institutes of Health, Rockville, MD (United States)

The Stanford Cancer Institute at Stanford University was founded in 2003 and received its NCI designation in 2007. The Center is a consortium cancer center in formal partnership with the Cancer Prevention Institute of California. The Center’s research efforts are focused on improving the diagnosis, treatment, and outcomes for cancer patients, understanding cancer etiologies among diverse populations, and reducing the incidence of cancer.

Research suggests that institutional commitment to community engagement can be understood by

examining levels of student, faculty, and community involvement in engagement; organizational structure, rewards, and campus publications supporting engagement; and compatibility of an institution's mission with this work (Holland, 1997). Underlying all of these factors is campus financial commitment to engagement and whether engagement is reflected as a budget priority and key component in resource development campaigns. This chapter examines ways in which engaged institutions allocate internal resources to support engagement and how these campuses have reshaped their institutional advancement programs (marketing, branding, and fundraising activities) to leverage financial support for engagement. The authors begin with a brief literature review discussing the relationship between advancement and engagement, followed by a formal investigation of how engaged institutions have approached resource development to support engagement programs. All colleges and universities discussed as engaged institutions in this chapter are recipients of the Carnegie Foundation's elective classification in curricular engagement and outreach and partnerships (Carnegie Foundation for the Advancement of Teaching, 2008). (Contains 1 table.)

Institutional theory and institutionalization improve our understanding of strategic communication, but are largely neglected in communication research. This article discusses the varying perspectives of institutional theory and their benefits for broadening the theoretical foundation of communication management. Institutional theory is no monolithic concept but covers different schools and camps. Three main branches of institutional theory—new institutional economics, historical and political

As part of the Institute of Marine & Coastal Sciences at Rutgers University, Dr. Costantino Vetriani's Deep Sea Microbiology Lab focuses on "the physiology, ecology and evolutionary relationships of deep-sea prokaryotes, with an emphasis on deep-sea hydrothermal vents and cold seepsï¿½." The Microbiology Lab website includes a Publications section which lists book chapters and a number of downloadable, refereed journal articles that have been authored, or co-authored, by Dr. Vetriani. The site also contains a short summary of a current research project, and a listing of oceanographic expeditions dating back to 1995. The site's Deep-Sea Video Clips include some brief, yet interesting coverage of tube worms, zoarcid fish, Pompeii worms, crabs, and more. The site also contains a few intriguing DSML underwater images of microorganisms from hydrothermal vents.

The Green Design Institute is a "major interdisciplinary education and research effort to make an impact on environmental quality through green design." The primary goal of the Institute is to form partnerships with industry, government, and other foundations in order to develop processes that "can improve environmental quality and product quality while enhancing economic development." Located at Carnegie Mellon, the Institute involves faculty, students, and other partners in their efforts to develop practical pollution prevention technologies and lower costs by recycling scarce resources, using fewer raw materials, and creating better products. Visitors to the site may wish to begin by reading the "About Us" section to learn a bit more about the Institute. After getting acquainted with the goals of the Institute, visitors to should visit the "Research" section to learn a bit about on-going projects on sustainable infrastructure, energy and environment, life cycle assessment, and environment. Perhaps the most useful section of the site can be found by clicking on "Education". Here, a link to eiolca.net can be found, which is economic input-output life cycle assessment software. The model allows users to estimate the overall environmental impacts of producing commodities or services in the United States. In addition, courses and course materials on environmental issues are available here.

The Aspen Institute was founded by Walter Paepcke, a Chicago businessman, in 1950 after he was inspired by the natural beauty of Aspen, Colorado. The basic mission of the Institute is "to foster enlightened leadership, the appreciation of timeless ideas and values, and open-minded dialogue on contemporary issues." With locations around the United States and various partner locations in Europe and Japan, the Institute sponsors a number of ongoing seminars, policy programs, and leadership initiatives. While the site does provide information on seminars and the like, most visitors interested in public policy will want to move to the section that describes the Institute's policy programs. Thematically, they include groups devoted to exploring communication and society, the nonprofit sector, and economic opportunities, to name but a few. Within each theme, users can learn about the staff members working on each project, and download a number of working papers

and reports on these respective subjects. The site is rounded out with materials on employment opportunities at the Institute and an online bookstore of publications from the organization.

Andrew Carnegie was known for his philanthropy, and in 1895 he contributed his vast wealth to creating 22 various organizations that still bear his name. In 1901 he created what became known as the Carnegie Institution for Science with an initial gift of $10 million. Over the past century, the Institution has continued to support a wide range of scientific endeavors, and researchers such as Edwin Hubble, Barbara McClintock, and Andrew Fire have been associated with this august organization. On their first-rate site, visitors can browse through sections that profile their various departments (which include embryology and global ecology), read their latest reports, and view an interactive calendar of events sponsored by the Institute. Visitors with a scholarly bent will want to browse on over to the "Publications/Archives" section. Here they will find the Institute's annual report, listings of their books in prints, and a wide selection of online books. The online offerings span the past five decades, and visitors can view everything from "Ceramics for the Archaeologist" to "How Galaxies Rotate". Those persons looking for specific information about the Institution's academic departments would do well to click on through to the "Departments" area to learn more about fellowships, employment opportunities, and recent and forthcoming conferences.

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Created by science teachers for science teachers, the Teacher Institute Podcasts are five-minute podcasts that give educators science facts, science history, and pedagogy tips for new teachers. The podcasts are hosted by the Exploratorium in San Francisco, and support for the project comes from the National Science Foundation, The Noyce Foundation, the Carnegie Corporation of New York, and others. Visitors can browse through the podcast series, and they will find thoughtful and fun suggestions on how to make a straw oboe, how to better manage the classroom, and how to build a Brazilian instrument called the cuica. Also, visitors can read up on the Teacher's Institute's summer institute program for science educators and also sign up to receive new podcasts via iTunes or RSS.

The goal of the University of Southern California's Shoah Foundation Institute is "to overcome prejudice, intolerance, and bigotry-and the suffering they cause-through the educational use of the Institute's visual history testimonies." On their homepage, visitors can watch testimonies from Holocaust survivors and others, along with learning more about their "Featured Resources". These resources include the Education Portal, which brings together lesson plans for teaching about the Holocaust and guidelines for using primary documents in the classroom. Scholars and others will appreciate the "Scholarship & Research" area which includes information on upcoming conferences, research stipends offered through the Institute, and events. Also, it is worth noting that the site also has many resources in other languages, including German, Spanish, French, Italian, Polish, and Russian.

The goal of the New Learning Institute (NLI) is "to harness the excitement and potential of new technologies as tools for learning both inside and outside the classroom." NLI focuses on bringing mobile technologies and digital media practices and tools to classrooms, after-school centers, and museums across the United States. The material on the site is contained within three primary areas: Digital Media Programs, Film Series, and Blog. Visitors might do well to start with the Digital Media Programs area. Here they can learn about NLI's outreach efforts to museums and other institutions, along with demonstrations on how new technologies are used in these settings. Moving on, the Film Series area includes videos that highlight the use of digital media in the classroom and some of the themes of the Institute's work, including social justice and technology. Finally, visitors shouldn't miss the blog, which includes posts on digital learning, digital literacy, and civic engagement.

More and more research institutes are interested in examining how the Internet has reshaped human interaction, governance, and industry, and the Oxford Internet Institute is certainly one that

people will enjoy learning about. The Institute offers several academic degrees, and their site offers up their latest research findings for consideration by the press, scholars, and members of the general public. In the "Research" section, visitors can learn about their various research initiatives and also take in some of their recent publications, such as "The Internet in Britain" and "Reconfiguring Government-Public Engagements: Enhancing the Communicative Power of Citizens". They also have a delightful selection of webcasts from the past several years, including programs on how e-research enables new form of collaboration across the sciences and the humanities. The site is rounded out by their very own extensive blogosphere, which is well developed and definitely worth a look.

The Birmingham Civil Rights Institute takes its visitors on a journey moving from the nation's segregation era to the birth of the Civil Rights Movement. The Institute's historic galleries capture the spirit and courage of countless individuals who dared to confront the "bigotry and racial discrimination of American society." This site provides a range of exhibitions (both permanent and traveling) that will peak the interest of anyone interested in learning more about American history and historical art form during the 1950s and 1960s. The Birmingham Civil Rights Institute is more than an online museum; it is a place that promotes research and provides education and discussion regarding civil and human rights issues in America and around the world.

The Lunar and Planetary Institute (LPI), located in the Universities Space Research Association (USRA), concentrates on research dealing with the current state, evolution, and formation of the solar system. At the website, users can find a technical report about the Forum on the Impact Cratering Process, a summary of the Oxygen in the Solar System Initiative, and other resources regarding the Institute's research foci. Visitors can view the educational Digital Lunar Orbiter Photographic Atlas of the Moon. The site offers materials on upcoming meetings, a schedule of the seminar series, and many of the Institute's publications. Teachers and students should check out the Education link where they can find fun activities and fascinating images about the evolution of the solar system, lunar phases, seasons, and much more.

For those not familiar with its nuances and requirements, legal writing can be a taxing affair at first. Fortunately, the Legal Writing Institute's homepage is a good place to start learning more about the basics of legal writing. First-time visitors can begin by looking over the "About" section, which offers up a host of materials about the Institute, including a most useful FAQ guide and information about their listservs. After that, visitors will want to move to the "Resources" section. Here they will find a collection of syllabi, resources on plagiarism, and an "Idea Bank" which will be quite a boon to legal writing instructors. The site is rounded out by an "Employment Listings" area and information about the Institute's conferences.

For all the attention paid to the fantastic blues music that is often closely associated with Chicago, many people seem to forget that Chicago has also been fertile ground for jazz musicians as well. Some of the many famous musicians produced by the Second City include Gene Ammons, Eddie Harris, Benny Goodman, Von Freeman, Herbie Hancock, and numerous others. Of course, the Jazz Institute of Chicago has never forgotten this legacy, and for the past thirty years, they have been keeping the jazz spirit alive throughout the entire city. Additionally, the Institute has programmed the city's Jazz Festival since it began in 1979. Along with reading about upcoming events sponsored by the Institute and letters from fellow jazz fans, visitors can browse the Jazzgram. The Jazzgram contains interviews with jazz musicians such as Buddy De Franco, commentary on recent recordings, book reviews, and pieces about jazz in Chicago.

The Australian Institute of Criminology hosts this information-rich Website, focusing on crime and criminal justice in Australia. The Institute provides materials to help educate policymakers, journalists, and the interested public. Their publications section features, among other materials, 147 briefs and papers on topical issues of crime and punishment and 13 online papers addressing questions of policy, with another dozen abstracted papers available for ordering. The site also makes available substantial data on crime and justice in Australia, including Australian Crime: Facts and Figures for 1999 and 1998; A Statistical Profile of Crime in Australia; and similarly extensive reports on juvenile crime, firearm use, and homicide. Moreover, annotated links to relevant data and

research sources are provided in addition to annual reports on the Institute's work in the field. Anyone doing research in criminology with a focus on Australia -- or interested in doing internationally comparative work on a particular issue -- will find this site invaluable.

With funding from the Carnegie Corporation, The Joyce Foundation, and The Pew Charitable Trusts, The Campaign Finance Institute is a non-profit institute affiliated with The George Washington University that "conducts objective research and education, empanels task forces and makes recommendations for policy change in the field of campaign finance." Along the top of the homepage, visitors will find thematic sections that include "President", "Congress", and "Interest Groups". Each of these sections includes full reports, press releases, data tables and charts. Additionally, visitors can look for specific materials by using their embedded search engine. Also, visitors can sign up here to receive email updates on the Institute's research and programs. Overall, it's a very useful site for anyone with an interest in campaign finance from a personal or an academic perspective.

The Nordic Volcanological Institute was created by a group of Nordic scientists who sought to increase earth science knowledge by exploring active volcanism and tectonics of Iceland. Researchers can find lengthy lists of publications and find out about upcoming seminars. Students and teachers can obtain colorful, educational materials on the geology, volcanoes, eruptions, and earthquakes of Iceland. The site presents detailed information on the Institute's facilities, summer school programs, and its research in geochemistry and geophysics. Although the Geodesy link is only in Icelandic, all of the other interesting materials are written in English.

This Website, maintained by the Oriental Institute at the University of Chicago, offers comprehensive data on archaeological research sponsored by or affiliated with the Institute. The site features information on "on-going field projects that involve excavations, regional surveys and environmental studies"; analysis of recent field projects; special studies of "published or unpublished data from previous expeditions"; and "synthetic interpretive studies" of ancient Near Eastern civilization. The projects involve studies in archaeozoology, art history, philology, environmental studies, ethnobotany, epigraphy, geomorphology, materials science, and remote sensing.

The biocomplexity institute at Indiana University is a collaborative effort among several academic departments. The institute is active in the areas of research, communication and outreach, software and resources, and training of scientists. This web site provides in-depth information on research projects, bioimaging, bioinformatics, biocomplexity in the curriculum, and more. The site also features CompuCell, a software framework for multimodel simulations of biocomplexity problems. The software is available for downloading. This resource is part of the biocomplexity collection. http://serc.carleton.edu/biocomplexity/

The public face of the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO), the Working for America Institute Website, has recently received a facelift. The Working for America Institute (WAI) is dedicated to supporting union strategies for building strong partnerships between unions and communities around the US. The site features information about the WAI's High Road Partnership program, which links "progressive community groups" and "innovative unions." Also available here are the Working for America journal, funding opportunities, and information on the upcoming WAI conference.

Operating as the nonprofit research campus of the University and Community College System of Nevada, the Desert Research Institute (DRI) conducts more than $27 million in environmental research each year with the help of its approximately 400 research faculty and support staff. The informational research page of the main Web site offers descriptions; publications; links; and other relevant facts from the various arms of the institute, which include the Division of Atmospheric Sciences, Division of Earth and Ecosystem, Division of Hydrologic Sciences, Center for Arid Lands Environmental Management, Center for Watersheds and Environmental Sustainability, and several others.

The New York Institute for Psychohistory sponsors this new Website which features articles from

The Journal of Psychohistory and chapters from Lloyd deMause's, book-in-progress, Childhood and History. Titles such as "The Political Consequences of Child Abuse" by Alice Miller or "The Gulf War as a Mental Disorder" should prove of interest both to those new to psychohistory, "the science of historical motivation," and to those already involved in the field. The site also links to the Institute branches, the International Psychohistorical Association, related links of interest, and PSYCHOHISTORY, a discussion list and chat room (discussed in the September 19, 1997 Scout Report), with archives.

The Steel Recycling Institute (SRI) provides information and statistics on steel recycling; it was founded by a group of steel companies and the American Iron and Steel Institute (AISI). Originally a grassroots effort focused only on the recycling of steel cans, the SRI now promotes the recycling of all steel products. The SRI homepage provides online access to its three publications, The Dockside Recycler, The Recycling Magnet, and The Appliance Recycler. Recycling information is divided into four categories: cans, cars, appliances, and construction material. Users can use the recycling database to find the nearest steel recycling location. Links provides a large list of both commercial and non-commercial steel sites.

The non-profit Karst Waters Institute's (KWI) "mission is to improve the fundamental understanding of karst water systems through sound scientific research and the education of professionals and the public." Users can download a few of karst documents that are part of the Institute's national karst library. Students and educators can find a tutorial about the characteristics and importance of karst landscapes. Researchers can learn about previous and upcoming KWI conference. Students can find out how to apply for the William L. Wilson Scholarship. With its extensive list of links and bibliography of important references, anyone interested in karst and cave geology will find this website helpful.

This site is the home page for The Biotechnology Institute, a national nonprofit organization focusing on education and research about the present and future impact of biotechnology. The site provides a menu of links containing the headings: about us, teacher resources, your world, institute conferences, and news and resources. The "teacher resources" heading provides biotechnology-related links, workshops and programs, career profiles in biotechnology, and classroom activities. The site also provides a link to its biotechnology publication for 7th to 12th grade called "Your World, Biotechnology and You." Teacher subscriptions, downloadable PDF versions of issues, and teacher guides for the biotechnology magazine are provided on site.

The Royal Anthropological Institute in Great Britain and Ireland has collected a multitude of online resources on the topic of anthropology. Of primary interests to educators as well as students, is an online resource called "Discovery Anthropology" under the education section of the site. This resource outlines what anthropology is, what anthropologists do, and then cites countless online resources for different fields and methods of anthropology. In addition to the education section of the site, it also provides a wealth of other resources ranging from a library to photos as well as information about the grants and prizes the institute awards.

NATIONAL INSTITUTES OF HEALTH | National Cancer Institute LABORATORY OF PATHOLOGY National Cancer Institute (NCI) The Laboratory of Pathology, based in the NCI, provides clinical service in anatomic pathology for the National Institutes of Health (NIH) and its Clinical Center, the world's largest hospital

The Institute of Medicine (IOM) of the National Academies was asked by the National Cancer Institute (NCI) to review the Institute’s Clinical Trials Cooperative Group Program; to gather independent, expert perspectives on the state of cancer clinical trials in the United States; and to provide advice about ways to improve the NCI Cooperative Group Program.

Since the inaugural meeting of the Southeastern Association of Community College Research in 1975, the research conducted at community colleges, as well as the issues facing researchers, have remained fairly constant. Research has been consistently understaffed and the themes of research have tended to focus on relating student progress to placement, surveying local communities,

reviewing programs, and conducting student follow-ups. Moreover, the general purposes for conducting institutional research have remained constant in that the first purpose is still public relations. The need to satisfy external agencies has caused the colleges to value anything that makes the school look good and to avoid anything that casts a negative light on the institution. Institutional researchers must also contend with the need for educators to believe what they want to believe. An example of this is the frequently reported study showing that problems with students in the 1990s have profoundly worsened since the 1940s. Even after the study was found to be a hoax, it was continually repeated. Finally, in approaching their task, institutional researchers should consider the following points: (1) make sure that data is readily understandable; (2) understand public relations; (3) employ valid methodology; (4) study important questions; (5) perform repeat studies; (6) make use of external resources; (7) include only the data that is relevant to the research topic; and (8) understand the resistance to outcomes data in higher education. (HAA)

Software Engineering Institute (SEI) is a federally funded research and development center whose objective is to provide leadership in software engineering and in the transition of new software engineering technology into practice. The SEI Information Server provides links to the ongoing research efforts of the ARPA Software and Intelligent Systems Technology Office and an index of information relating to numerous software and computing topics.

The International Computer Science Institute is an independent, nonprofit basic research institute that is affiliated with the University of California, Berkeley. The goal of the Institute is to create "synergy between world-leading researchers in computer science and engineering" by bringing together academic and industrial researchers. Its research currently focuses on Internet research, such as Internet architecture, open-source routing, and network security, as well as Human Language Technology, such as speech and text processing. A significant portion of the Institute's work is in theoretical computer science and projects are chosen for their importance and their compatibility with the strengths its researchers. This website provides links to websites detailing several programs including Algorithm Projects, AI Projects, Networking Projects, and Speech Projects. Other areas of research include a project "to support historically underrepresented ethnic minorities and women in their desire to become leaders in the fields of computer science, engineering and information technology;" the development of a Community of Practice Environment utilizing the Internet for information sharing and collaboration; and a project exploring Robust Video Compression based on Distributed Source Coding techniques. A number of publications, such as conference proceedings, academic journals, technical reports, and some books, are available to search and download free of charge. The _ISCI Gazette_, available in the News section, periodically features a research area. Research in Bioinformatics is discussed in the March 2005 issue.

Visitors to this homepage can learn about the Earth Island Institute and its mission, origins, and purpose. Materials include summaries of projects designed to promote conservation, preservation, and restoration of the Earth, a biography of the organization's founder, news articles, and information for people who wish to become involved in conservation or outreach efforts.

The Natural Heritage Institute (NHI) is non-governmental, non-profit organization, public interest law firm that advocates as an engine for social change. This advocacy is centered on the restoration and protection of the natural functions that support water-dependent ecosystems and the services they provide to sustain and enrich human life.

health, safety, water, energy and sustainability. The Institute for Innovation and Governance Studies and aims to devise new, innovational interventions and solutions to improve people's health and health care. This is helpful when considering solutions in the Dutch context. So, it is not surprising that the SRO Innovation

Some interesting research projects are described on this website from the European Bioinformatics Institute. The site offers a number of data resources on topics such as genomes, macromolecular structures, protein families, and structure analysis. Taxonomy and ontology databases are also linked here, as well as databases of research literature.

Title: Water Inventory and Microbial Habitability of Early Mars During the Late Heavy .... in SF Bay Salt Ponds: Principles Shaping the Future of Life on Earth and Beyond ... Lead Investigator/Home Institution/NAI Team Affiliation: Janet Siefert, Rice Univ. ... Briefly, all known life requires phosphorus (P) in the form of inorganic ...

Michigan Institute for Plasma Science and Engineering Seminar EXPLOSIVE NUCLEOSYNTHESIS STUDIED of heavy elements in stars and supernovae involve many nuclear reactions taking place on short time scales long-lived stable nuclear beams. In this talk, I will describe some of the methods recently developed

The American Institute of Physics is the largest organization of physicists in North America. On this extensive Web site you will find online journals and thousands of pages of free and useful information. The mission of the AIP is to promote the advancement and diffusion of the knowledge of physics and its application to human welfare.

The goals of the Thermal Biology Institute's webpage are to present cutting-edge research focused on the biology of geothermal systems, to promote collaboration among researchers and resource agencies, and to advance public education on the biocomplexity of geothermal environments. Information is organized by topic including hot topics, research, current events, outreach, education, and electronic resources.

Alonzo Kelly Robotics Institute Carnegie Mellon University Pittsburgh, PA 15213-3890, USA alonzo of mobile robotics and ground vehicle localization lack a linearized theory of odometry error propagation--mobile robots, odometry, error propagation, calibration, position estimation, localization, dead reckoning 1

Alonzo Kelly Bryan Nagy Robotics Institute Carnegie Mellon University Pittsburgh, PA 15213 and they can be computed with a straightforward numerical procedure in real time. KEY WORDS--mobile robots, car-like robots, trajectory generation, curve generation, nonholonomic, clothoid, cornu spiral, optimal control 1

Alonzo Kelly Robotics Institute Carnegie Mellon University Pittsburgh, Pennsylvania 15213-3890, USA alonzo@ri.cmu.edu Mobile Robot Localization from Large-Scale Appearance Mosaics Abstract A new practical, high-performance mobile robot localization tech- nique is described that is motivated by the fact

This brief presentation provides an introduction to the Earth Advantage Institute, which is "a nonprofit organization that works with the building industry to help implement sustainable building practices." Information on the history of the organization, its partners, stakeholders and sponsors is included. This document may be downloaded in PDF file format.

A cross-regional econometric analysis suggests that institutional factors in the form of direct democracy (via initiatives and referenda) and of federal structure (local autonomy) systematically and sizeably raise self-reported individual well-being. This positive effect can be attributed to political outcomes closer to voters' preferences, as well as to the procedural utility of political participation. Moreover, the results of \\

The sediment transport group of the U.S. Geologic Survey Coastal Marine Geology Program (USGS CMGP) maintains an archive of more than 4400 NetCDF files collected over the last 30 years (Montgomery et al, 2007). The conventions used in these NetCDF files were determined long before the emerging standard Climate and Forecast (CF) conventions for NetCDF, and web access has been traditionally been limited to simple downloading of the NetCDF files. To take advantage of a growing suite of software that works with CF-compliant data, A combination of NcML and the THREDDS Data Server were used to allow web services access of CF compliant data via the OGC WCS service and OPeNDAP. The primary users of these coastal oceanographic measurements are modelers who are facile with netCDF files and URL references. Other users, however, may prefer to obtain the data in another format or perhaps just plot a variable. To assist both groups of users, we

have evaluated NOAA's Earth Research Division's Data Access Program (ERDDAP) as a potential method of providing a more flexible and powerful interface to the data. This versatile program is able to access data from a variety of web services, including OPeNDAP, and then deliver the data using web services in a very wide variety of formats, from common image formats such as PNG and JPG (pictures of plots), to NetCDF, Matlab, text and spreadsheet formats. Installation and configuration of ERDDAP was straightforward. The software written in Java, and delivered as a War file that runs on a standard Tomcat server. Configuration of the user interface and the dataset list is controlled by XML files. The documentation is well written and much of the XML generation is handled by the supplied autogen function that reads a netCDF file and generates XML based on the file attributes. We are working on a Matlab program that will completely automate the process by interrogating our data holdings and producing the completely formed XML. Our initial assessment is that the ERDDAP server does indeed enable a more versatile way for users to interact with our data. Allowing users to select specific variables, time ranges and plot or data formats is a huge improvement. References Montgomery, E., Martini, M., Lightsom, F.L., and Butman, B., 2008, Documentation of the U.S. Geological Survey Oceanographic Time Series Measurement Database: U.S. Geological Survey Open-File Report 2007- 1194 (http://woodshole.er.usgs.gov/pubs/of2007-1194/) enviro.er.usgs.gov/erddap

As a result of efforts to standardize oceanographic data sets collected since year 2002 in the area of south-east Adriatic, relational data model suitable for storage of meta-data and in situ measurements was designed and implemented. Using combination of customized tools developed for extraction of meta-data and data records from CTD files as well as standard office applications, data were extracted, transformed, processed and unified by attributes and units of measurement. To make those data available for wider scientific community, we have developed web portal able to be used for data retrieval based on various filters (spatial, temporal, by project and/or by sampling instrument). Selected data model proves to be also very efficient for generating of data-exchange formats required by various projects and initiatives (e.g. SeaDataNet) so extended by particular dictionaries it can allow fast implementation of integration services. As a part of Ecoport 8 project, newly available type of data was recently introduced. Real-time data provided by permanent sensors need to be automatically collected and stored into database. Visualization of such data was also required as well as exchange with project data center. To fulfill those requirements, additional data scheme and appropriate B2B services were developed. Additional care was taken about data transfer security as database was not hosted at the same place as workstation used for remote access to sensor equipment. Third section of portal is "Tide Tables", interactive, graphical application that visualize tide predictions for ports of Bar and Kotor, allowing also correction by atmospheric pressure. Developed in Java, based on well known Mike Foreman's Fortran 77 code it can be used as stand-alone product without Internet connection. Last section of portal is Google Earth file containing position of stations as well as some spatial features that can be useful during planning of future oceanographic cruises in this area (e.g. explosives dumping grounds, administrative lines and depth contours). Technically speaking, present level of implementation can provide fast response to any future requirement. However, some administrative issues need to be resolved. Multilateral (or bilateral) data-exchange policies need to be signed by all interested parties before all data can become fully available to wider scientific community.

n this paper we examine when it is that private institutions can be relied on to conserve biodiversity and when, alternatively, public institutions are preferable. Circumstances are also described where regulated private provision or 'club good' institutions are appropriate and where public biodiversity resources should be corporatised by employing private managers who respond to commercial incentives subject to regulation. Institutional

This report outlines the National Space Biomedical Research Institute's (NSBRI) activities during FY 2004, the Institute's seventh year. It is prepared in accordance with Cooperative Agreement NCC 9-58 between NASA's Lyndon B. Johnson Space Center (JSC) and the Institute's lead institution, Baylor College of Medicine.

The Geophysical Institute Magnetometer Array (GIMA) consists of twelve magnetometer stations distributed across Alaska cutting the auroral oval. Each station is equipped with a ring-core, fluxgate

magnetometer, GPS clock and data logger. Data are returned from each station to the Geophysical Institute, University of Alaska where it is verified, archived, and made available to the space science community. The GIMA web page, at http://magnet.gi.alaska.edu/, provides the data from eight stations online in real-time. The GIMA web page also provides limited data access from five Russian magnetometer stations. The GIMA data set available online spans the time period 1995 to the present. This presentation describes the current operation of the array, its capabilities (data collection parameters), the web site, and methods for acessing the data set. Current efforts to improve data access and integrate the data set with online virtual observatories is described.

Dedicated to "keeping the public objectively informed about the Middle East," the Middle East Institute provides a number of resources to this end. Visitors to the site can access the table of contents, abstracts, and some complete articles from The Middle East Journal; read online policy briefs about current events in the region; review descriptions of the Institute's published monographs; and consult an online searchable catalog of over 2,400 scholarly works in Middle Eastern studies published in the 1990s. The XML-based catalog can be searched by keyword, title, author, or any of the cataloged fields. Two online texts are also posted here: An Introduction to Islam (see the September 3, 1999 Scout Report) and, in the rare books section of the library, Mehemet the Kurd and Other Tales by Charles Wells (requires multidoc pro to view TEI (SGML)).

The Aspen Institute sponsors many dozens of events every year, and its website yields an abundance of video. On this site, the Institute brings together recorded events, making it a great place to wander around if you have a few spare moments. There is always a featured video front and center on the homepage, and the other sections on the site include Events in Aspen, Aspen Policy Programs, and Book Talks. Folks with a penchant for the printed word should look over the Book Talks area for conversations with Thomas Frank, Professor David Agus, and Walter Isaacson speaking about his recent biography of Steve Jobs. The "Events in Aspen" area is a delight, and it include dozens of recorded events, including "Philanthropic Transparency: How Public Should Private Philanthropy Be?" and "Is Social Media Sparking Civic Engagement?" Finally, one video that shouldn't be missed is Madeleine Albright's "A Personal Story of Remembrance and War."

Established under the terms of the National Cancer Act of 1937, the National Cancer Institute (NCI) is a component of the National Institutes of Health. The scope of the NCI is extremely broad, and its work includes conducting and supporting research; training; health information dissemination; and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer, rehabilitation of cancer, and the continuing care of cancer patients and the families of cancer patients. First time visitors may want to start by reading the latest NCI Cancer Bulletin, which is available from the homepage. If users find the information therein helpful, they may also elect to subscribe at no charge to the Bulletin. The Quick Links section is also of use, and contains a dictionary of cancer-related terms, funding opportunity notices, and a host of NCI publications. Finally, the site is also available in Spanish.

Founded in 1973, the Higher Education Research Institute (HERI) is located within UCLA's Graduate School of Education & Information Studies. Researchers at the HERI are interested in examining leadership development, institutional transformation, faculty performance, and educational equity. First-time visitors should check out the "Surveys" area first, as it contains information about some of their very well-known longitudinal surveys, such as the Freshmen Year Survey and the College Senior Survey. Most visitors with a general interest in higher education trends will want to look through the "Publications" section, as it contains reports on spirituality in higher education, the gender gap in colleges, and the impact of single-gender high schools on students' transition to college.

The UCLA Asia Institute "promotes Asian Studies at UCLA and fosters greater understanding of Asia through a wide variety of research support, public programs, and community outreach on East Asia, Southeast Asia, and South Asia." On their homepage, visitors can read their monthly newsletter, read about their project announcements, and upcoming conferences, such as the "Asia in LA: Musical Treasures of Asia", which was held in May 2011. Moving along, the "Podcasts" area includes talks from 2006 to the present. Here visitors will find thoughtful presentations titled "South

Asian Entrepreneurs in Uzbekistan: The Silk Road Reborn?" and "Entwinements of Islam Modernity in Central Asia". Scholars in the field won't want to miss the "Joint Research Initiatives" section, which includes synopsis of the Institute's partnerships with the Hong Kong University of Science and Technology and the East China Normal University in Shanghai.

The Institute of Race Relations (IRR) was established as an independent educational charity in 1958 "to carry out research, publish and collect resources on race relations throughout the world." The mission of the IRR changed in 1972 quite dramatically as it began to focus on responding directly to institutionalized racism in Britain and the rest of Europe. Today, interested parties can look over this website to read the Institute's publications, papers, and check out some of their educational resources. In the Publications area, visitors can find briefing papers such as "Islamophobia, Human Rights and the Terrorist Laws" and "Alternative Voices On Integration." The Educational Resources area contains a number of classroom materials designed to be used by teachers seeking to explain racism to their students or explore the history of black communities in Britain.

Marketing in health service has become an indispensable tool for creating and maintaining a positive image of medical institutions which to a great extent determines their success on the market. This process entails not only providing professional, reliable and up-to-date patient care but also establishing good reputation among those who already use it and its potential customers. It should be recognizable also for deliverers, investors, competitors, media and particularly for society and local authorities. The key to success is professionalism of personnel and their identification with the mission of the institution and the direction of changes being implemented there. For a complete success and recognition is essential health care facilities, which affects virtually matched the name and symbol, and communication of people responsible for contact with the media. PMID:22400177

With a long-standing interest and passion for Lincolnania, Lewis Lehrman created The Lincoln Institute, which is dedicated to providing assistance to scholars and groups interested in the study of the life of President Abraham Lincoln. Over the past few years, the website for the Institute has grown to include a number of very fine online exhibits that explore various aspects of Mr. LincolnÂs life. With simple and declarative titles, such as ÂMr. LincolnÂs White HouseÂ, ÂMr. Lincoln and FriendsÂ, and ÂMr. Lincoln and New YorkÂ, these online exhibits provide an entry into understanding LincolnÂs relationships with these places and tropes that dominated his life. The interactive exhibit exploring LincolnÂs time in New York (and with notable New Yorkers) is quite a pip, and it includes a section that allows users to learn about where Lincoln spent his time in this bustling metropolis.

Beyond the immediacy of crime and criminal acts, there is a concern among those involved in the justice system with analyzing and investigating all aspects of criminology and related subjects. The National Institute of Justice (NIJ) as the research, development, and evaluation agency of the U.S. Department of Justice is particularly concerned with these issues. On their website, visitors can learn about the NIJÂs mission, research priorities and their strategic goals. Scholars and the general public will appreciate the rather large database that includes the instituteÂs publications, annual reports, and speeches. Browsing through the publications area is quite easy, and visitors will find such recent reports as ÂDNA Analysis for ÂMinorÂ Crimes: A Major Benefit for Law EnforcementÂ and ÂPredicting a CriminalÂs Journey to CrimeÂ. Finally, visitors also can access the NIJ JournalÂs current issue, as well as browse every issue back to 1995.

Created in 1979, The Media Institute exists to foster three goals: "freedom of speech, a competitive media and communications industry, and excellence in journalism." As part of their work, they publish books and monographs, convene conferences, and also prepare regulatory filings and court briefs. On their homepage, visitors can read their blog, and also look over their "Perspectives" series and "Speaking Freely" opinion papers. Some of the more recent pieces here include "Collapsing Copyright Categories", "Defining Away the First Amendment", and "A Taboo Topic: Government Subsidies for the Media". Also, visitors can view their "Press Releases" area for up-to-the minute news on the Institute's activities and their upcoming conferences and luncheons in Washington, D.C. The site is rounded out by a set of external links to organizations like the Media Coalition and

the Society of Professional Journalists.

The Learning Technology Research Institute, based at the London Metropolitan University, "conducts research into the application of information and communication technologies to augment, support and transform learning." The institute's research focuses on three areas in particular. The first focuses on the design, development and use of learning objects, particularly for instruction in programming. The second theme is the study of learning interaction and networked communities from which they have developed "a range of innovative dialogue systems, interactive web-portals, and models or frameworks for communicative interaction and learning." The third focus is something called "informal eLearning." This research project seeks to provide learning services that will help people to manage their "personal learning goals, projects and informal learning activities" and community collaborations. The website provides a description of each research theme along with several publications and examples of their software and learning objects.

Quinnipiac University's Polling Institute is perhaps one of the best known polling centers in the United States, and their work is frequently cited by major media outlets. Staff members at the Institute are also called upon to offer commentary on the voting habits and preferences of a broad swath of the American public. Visitors to their site can start their journey by clicking on the "Releases by State" area on the left-hand side of the homepage. Here they will find the results of recent polls conducted at the state and national level. From there, visitors will want to visit the "Polling Regional Definitions" where they can learn about how each state is divided up for polling purposes. Also, the site allows users to search all of their press releases by area (such as individual states or "swing states") and timeframe.

This Institutional Plan is divided into three chapters. Chapter 1 provides background information, discusses the purposes of the Plan and the policy guidance for establishing the transportation system, and describes the projected system and the plans for its integrated development. Chapter 2 discusses the major participants who must interact to build the system. Chapter 3 suggests mechanisms for interaction that will foster wide participation in program planning and implementation and provides a framework for managing and resolving the issues related to development and operation of the transportation system. A list of acronyms and a glossary are included for the reader's convenience. Also included in this Plan are four appendices. Of particular importance is Appendix A, which includes detailed discussion of specific transportation issues. Appendices B, C, and D provide supporting material to assist the reader in understanding the roles of the involved institutions.

The Virginia Tech Transportation Institute (VTTI) is the institution's largest university-level research center. The organization is "dedicated to conducting research to save lives, save time, and save money." On their homepage, visitors can read the "Spotlight on VTTI" to get some highlights about their work including focus on transportation and an aging population and other topics as of late. Transportation fanatics won't want to miss the Publications area hosting dozens of papers on technical topics such as map-based navigation, dynamic roadway signage, and military vehicles. Visitors can also read their annual reports, learn about employment opportunities, and check out the Virginia Smart Road, which is their closed, state-of-the-art, test-bed research facility.

Begun in 1984, and known for its generally theoretical and modeling approaches to scientific questions, the Santa Fe Institute (New Mexico) is a private, non-profit, multidisciplinary center dedicated to pursuing novel approaches to research and education in science. Areas of research range from adaptive computation, to ecology, to economics, to the origin of life. Each of the fourteen research areas is annotated. Users can search information on current faculty, postdoctoral fellows, research technicians, and graduate and undergraduate interns, as well as abstracts and/or full texts of several hundred working papers of the institute (in various formats) since 1992. Several Nobel Laureates have worked at the center; top scientists in a number of fields are attracted to its seminar series (abstracts provided at the site).

The Uranium Institute (UI) is an international organization comprised of members who are involved in all "stages of the production of nuclear generated electricity" in the hopes of promoting the use of

nuclear energy to supply energy demands, while minimizing environmental risks. The goals of the Institute are to monitor the outlook for the world's nuclear fuel markets, provide a forum between the nuclear fuel industry and the international organizations concerned with environmental issues as well as energy policy, and to make the public gain a general understanding of the nuclear fuel cycle. Sections are divided into three categories: Features, the UI, and the Industry. Although the site is somewhat news-oriented, it informs users about industries involved with nuclear-generated electricity and how they manage radioactive waste.

The National Preservation Institute (NPI) "offers continuing education and professional training for those involved in the management, preservation, and stewardship of cultural heritage." The NPI website is a treasure trove of material for people interested in such matters, along with information on scholarships, online resources, and the Institute's upcoming seminars. The Resources area includes a set of useful links to Internet resources and a very nice set of tools for cultural resource managers. These tools include technical documents designed to be used in the formal transfer of historic properties, along with key documents about the National Environmental Policy Act. In the Scholarships area, visitors can learn about scholarships offered by the NPI and the National Endowment for the Arts dealing with historic preservation. Additionally, visitors can sign up for the NPI mailing list and learn more about seminars on cultural and natural resources management.

The US FDIC has its Institution Directory available. This searchable database allows users to "obtain demographic data and financial profiles of each FDIC-insured depository institution derived from quarterly reports filed with Federal regulators." Users can search by certificate number, bank, geographic location, charter, chartering agency, federal regulator, primary insurance fund, and asset and deposit size. Retrieval can be sorted by any of 7 variables. Information returned includes balance sheet and income, loan portfolio/asset quality, and balance sheet details. Each report is linked to a glossary of terms. Quarterly and annual data is available back to December 1993. This is a significant addition to a site that already carries a staggering amount of information about United States banking.

The Fuel Cell Institute at Cornell University takes "An Advanced Materials Approach to Fuel Cell Technologies." Materials experts at the Institute are examining ways to improve the efficiency of the main components of a low temperature (< 150 Degrees C) fuel cell and adapt reformer catalysts for low temperature operation. The website reviews some of the basics on fuel cells and identifies the remaining research challenges, including questions regarding the materials used in the main components of a fuel cell, such as the anode, the cathode, membrane assembly and, the reformer. These components and their research approach are described further, along with pictures and diagrams to illustrate the processes. Recent publications are available to download.

Named after ecologist Rachel Carson's landmark book, _Silent Spring_, the Silent Spring Institute (SSI) is a "scientific research organization dedicated to identifying the links between the environment and women's health, especially breast cancer." The SSI website contains descriptions of several research projects including the Cape Cod Breast Cancer and Environment Study, Geographic Information System Exposure Assessment, Groundwater and Drinking Water Initiatives, and Household Exposure Study. SSI also makes a number of downloadable publications available including journal articles and issues of the Institute's own _Silent Spring Review_. The site posts relevant news stories from a variety of sources, and contains a sizeable News Archive as well. In addition, the site offers a great many annotated links, and a glossary with pertinent medical, scientific, and environmental terms.

Since 1983, the Island Institute has employed a wide range of individuals, including photographers, artists, policy experts, and others, all in the name of maintaining the viability of the fifteen year-round island communities in the Gulf of Maine. They have become well-known for their outreach efforts, and their website will be of great value to anyone interested in this region, or how various island communities remain economically, culturally, and ecologically sustainable. Resources located on the Institute's homepage include information about fellowship opportunities and links to full and annual reports on the Atlantic herring spawning project. Visitors who are hoping to get a sense of the flavor of this unique region should definitely peruse their monthly publication, "The Working Waterfront."

Recent articles include opinion pieces on fish hatcheries, the lobster business, and news profiles of local islanders.

This portal, published by the Pembina Institute, provides access to materials related to the threat of climate change caused by greenhouse gas emissions as seen in Canada, and some possible solutions to the problem. There is a science overview that describes the increase in atmospheric Carbon dioxide due to human activity and how it causes Earth's atmosphere to retain heat, and a section on government policy, both worldwide and in Canada, to stabilize or reduce emission of greenhouse gases. There is also an overview of the Institute's work to aid implementation of the Kyoto protocol in Canada and achieve future reductions in GHG emssions. There are also links to additional materials such as publications and news releases, information on renewable energy sources, E-education programs, and teaching tools.

Describes Ice Age glaciers and immense floods of glacial meltwater that swept across the Pacific Northwest (18,000-12,000 years ago and earlier), affecting the landscape from Montana to Washington and Oregon, sculpting the Columbia River Basin, and creating glacial lakes to rival the today's Great Lakes. This non-profit institute promotes scientific education about the floods, their causes and impacts. Proposes an interpretive geologic trail linking significant sites.

The Institute of Physics is a "leading international professional body and learned society with over 37,000 members, which promotes the advancement and dissemination of a knowledge of and education in the science of physics, pure and applied." The site offers news such as a recent article entitled "Gas Molecule Adsorption in Carbon Nanotubes and Nanotube Bundles" and other information on a wide range of topics that any professional working in a related field will find valuable.

The Utah Regional Cancer Center received its NCI designation as a cancer center in 1986. The Center was renamed Huntsman Cancer Institute (HCI) in 1999. Located at the University of Utah, HCI’s mission is to understand cancer from its beginnings, to use that knowledge in the creation and improvement of new treatments, to relieve the suffering of cancer patients, and to provide education about cancer risk, prevention, and care.

Located in Sussex, England, the Institute of Development Studies (IDS) is an international authority on development. IDS serves as a center for research and education on development and offers conferences and workshops, as well as a host of online information about research and publications. Full-text working and discussion papers are available online, as are several special research reports and descriptions of projects on such subjects as Globalization, Governance and Civil Society, and Environment.

The Institute for Molecular Manufacturing (IMM) conducts and supports research on molecular systems engineering and molecular manufacturing (molecular nanotechnology, or MNT). The website provides information on the IMM research projects. Also posted here are IMM's "guidelines for research and development practices that will minimize risk from accidental misuse or from abuse of molecular nanotechnology." Some article preprints are also available to download free of charge.

Located in Bremerhaven, Germany, the Alfred Wegener Institute conducts research in the Arctic, the Antarctic and at temperate latitudes. It coordinates Polar research in Germany and provides both the necessary equipment and the essential logistic back up for polar expeditions. Site provides information current research, ships, field stations, and much more. Resource section provides a wealth of data, information, images, software, and links to additional resources.

This collection of book and chapter summaries, paper and article abstracts, links, and news releases on climate change is provided by the Worldwatch Institute. While some of the items are full text, those that are not offer links to order and purchase hard copies. Topics revolve around the climate change issue, including policy strategies for climate change, global warming, pollution, and energy use. Some resources also examine the human, political, and economic impacts of the climate change issue.

In 1972, the Duke Comprehensive Cancer Center, now known as the Duke Cancer Institute (DCI), was established and designated by NCI as one of the first comprehensive cancer centers. The DCI serves as the focus for all of Duke University's activities in cancer. It is a single entity that integrates and aligns patient care and research with the goals of improving patient outcomes, decreasing the burden of cancer and accelerating scientific progress.

The National Regulatory Research Institute (NRRI) was created to "provide research, educational services and technical services to the state regulatory commissions." At the site visitors can download selected research articles and read the online version of the NRRI Quarterly Bulletin. The site also contains the latest reports on the electric industry restructuring, a data bank of state commission decisions on arbitrated interconnection agreements, and the report on the National Association of Regulatory Utility Commissioners (NARUC) Internet Working Group.

The National Cancer Institute (NCI), Division of Cancer Prevention (DCP) requires a final report that summarizes all work performed and results obtained for the entire contract period of performance. This document presents the format and content required for the Final Report. A draft of the final report shall be submitted to the DCP Project Officer no less than 60 calendar days before the end of the contract period. The Project Officer will return comments within 30 calendar days.

The Foresight Institute is "a nonprofit educational organization formed to help prepare society for anticipated advanced technologies." They offer this comprehensive webpage on nanotechnology, addressing why nanotechnology might be important to you, and providing information for the General Reader, the Technical Reader and other resources on technical issues, jobs, education, policy issues, potential applications of nanotechnology, and the History of the Nanotechnology Idea. Other readings, discussion platforms and websites are also listed.

Informal financial institutions (IFIs), among them the ubiquitous rotating savings and credit associations, are of ancient origin. Owned and self-managed by local people, poor and non-poor, they are self-help organizations which mobilize their own resources, cover their costs and finance their growth from their profits. With the expansion of the money economy, they have spread into new areas and grown

The Georgia Tech Research Institute (GTRI) has been a government and industry partner since 1934 and has branches throughout the United States and Ireland. Visitors will definitely want to click on the "Industry Solutions" on the homepage to get an idea of the industries GTRI works in, such as "Health and Human Systems", "Energy/Environment", and "Information and Communications Technologies". Visitors can click on any of the links to browse case studies in that industry. In "Health and Human Systems", there is a case study of a breath test to detect breast cancer, products made easier to use by people with arthritis and a "purpose-built" law enforcement vehicle. Users of the site interested in reading materials from their historical publication archive, such as "The Research Engineer", published between 1956 and 1961, should click on "Newsroom", to get to the link. There is also a video, called "The Solution Institution" made for GTRI's 75th anniversary, which provides a history of the institution that is "filled with intrigue, innovation, and impact."

The World Policy Institute, located within the New School University since 1991, is concerned with promoting and engaging the public debate and scholarship surrounding international diplomacy and world politics. As such, the Institute seeks to "offer innovative policy proposals for public debate with the goal of developing an internationalist consensus on the measures needed for the management of a world market economy" and "to nurture a new generation of writers and public intellectuals committed to internationalist thinking." From the well-organized home page, users can read current and archived issues of the World Policy Journals (one of WPI's scholarly publications), read about ongoing research projects (including those dealing with the international arms trade and counter-terrorism), and find out about events sponsored by the Institute. Perhaps the highlight of the site is the archive, including lecture and discussion video recordings, which address such topics as "The Democratic Deficit in Latin America" and "Nation Building: Does it Work?" and are viewable in their entirety. [KMG

Based at the graduate school of Education and Information at the University of California, Los Angeles, the Higher Education Research Institute "serves as an interdisciplinary center for research, evaluation, information, policy studies, and research training in postsecondary education." It is also the home of the Cooperative Institutional Research Program (CIRP), a national longitudinal study of the American higher education system. Established in 1966 at the American Council on Education, the CIRP is "the nation's largest and oldest empirical study of higher education, involving data on some 1,700 institutions and over 10 million students." Visitors to the site can access extensive press releases and data summaries of the latest CIRP's of incoming freshmen as well as data from surveys targeting entering students, other classes of college students, and faculty members. The CIRP Archives section offers an extensive annotated bibliography of related conference papers, journal articles, books, dissertations, and reports. The Website also provides information to educators and administrators on ordering more targeted data drawn from specific schools and/or specific comparative profiles.

Created by the National Literacy Act of 1991 by a bipartisan Congressional coalition, the National Institute for Literacy is the response to requests for a federal office whose prime directive would be to engage in work on the issue of literacy in the United States. The primary work of the Institute is "to ensure that all Americans with literacy needs have access to services that can help them gain the basic skills necessary for success in the workplace, family, and community in the 21st century." To that end, the Institute has developed this Web site, which contains information on their programs and services. Persons with an interest in adult literacy and education should find valuable the Equipped for the Future program, which contains content standards for adult education, and the Literacy and Learning Disabilities section, which deals with research into adult learning disabilities. Equally helpful is the literacy directory that contains information about local literacy programs and fact sheets on literacy gleaned from more than 50 research studies.

The REVEL Project (Research and Education: Volcanoes, Exploration and Life) is an NSF-funded, professional and personal development program for K-12 science teachers. REVEL teachers are motivated to use genuine, deep-sea research and seafloor exploration as tools to implement inquiry-based science in their classrooms, schools, and districts, and to share their experiences with their communities. Initiated in 1996 as a regional program for Northwest science educators, REVEL evolved into a multi-institutional program inviting teachers to practice doing research on sea-going research expeditions. Today the project offers teachers throughout the U.S. an opportunity to participate and contribute to multidisciplinary, deep-sea research in the Northeast Pacific Ocean. From the past two years of this program we have conducted intensive research and evaluation of the teachers themselves. Among our key findings: 1) The research experience provided participants with deep content knowledge and the skills not only to do inquiry with students in their classrooms, but to give students ownership over the process of asking and answering their own questions, 2) Participants understood scientists to be resourceful and flexible in their thinking. Participants carried these observations back to their classrooms, encouraging students to believe that they can "be scientists" by overcoming set-backs and complications in doing investigative work, and 3) Most participants shifted their identities from "just a teacher" to "a teacher who does science." Their students, colleagues, and community members looked upon them differently. They also acquire a different status with their peers. We advocate for more rigorous investigations to be conducted on research-partnership professional development programs, specifically on how they influence the thinking, identity, and eventual pedagogy of educators. The body of research available on teacher professional development is extensive but the impact of high-tech, high-communication, fast-paced, collaborative, cutting-edge research on teachers' ability to transfer today's scientific process to students and how this might spark students' interest in science or improve their confidence or their reasoning skills are poorly understood.

Storm surge prediction system, operational search and rescue (SAR) modeling system and oil spill prediction system have been developed as a part of Korea Operational Oceanographic System (KOOS) which produces nowcasts and forecasts of ocean information around the Korean Peninsula. Three application systems rely on the basic inputs from KOOS and can predict up to 72-hour period. Storm surge prediction system in KOOS is 2D depth averaged hydrodynamic model incorporated

with two atmospheric models, typhoon parameter model for typhoon period and WRF for the non-typhoon period. This surge system has been proved the prediction capability on storm surge height and peak arrival time throughout the hindcast of typhoon events. An operational search and rescue (SAR) modeling system in KOOS employs a Monte Carlo ensemble technique to estimate the leeway (motion relative to the wind) of the drifting objects and uses the forcing inputs, wind and currents, from KOOS. Several drifting buoy experiments have been carried out to evaluate the performance of operational SAR model and results showed reasonable agreement. To reduce the damage caused by the spilled oil in the coastal areas around the Korean peninsula, MOHID based oil spill prediction system has been setup and tested. This oil spill prediction system also relies on major inputs such as initial and boundary condition o f temperature and salinity and wind field are from KOOS. For validation of this oil spill system, the Hebei Spirit accident in 2007 was successfully simulated.

The author has identified the following significant results. The wide variety of geological and geophysical phenomena which can be observed in Iceland, and particularly their very direct relation to the management of the country's natural resources, has provided great impetus to the use of ERTS-1 imagery to measure and map the dynamic natural phenomena in Iceland. MSS imagery is being used to study a large variety of geological and geophysical eruptive products, geologic structure, volcanic geomorphology, hydrologic, oceanographic, and agricultural phenomena of Iceland. Some of the preliminary results from this research projects are: (1) a large number of geological and volcanic features can be studied from ERTS-1 imagery, particularly imagery acquired at low sun angle, which had not previously been recognized; (2) under optimum conditions the ERTS-1 satellite can discern geothermal areas by their snow melt pattern or warm spring discharge into frozen lakes; (3) various maps at scales of 1:1 million and 1:500,000 can be updated and made more accurate with ERTS-1 imagery; (4) the correlation of water reserves with snowcover can improve the basis for planning electrical production in the management of water resources; (5) false-color composites (MSS) permitted the mapping of four types of vegetation: forested; grasslands, reclaimed, and cultivated areas, and the seasonal change of the vegetation, all of high value to rangeland management.

In late 2006, the U.S. National Science Foundation (NSF) funded the Biological and Chemical Oceanographic Data Management Office (BCO-DMO) at Woods Hole Oceanographic Institution (WHOI) to work closely with investigators to manage oceanographic data generated from their research projects. One of the final data management tasks is to ensure that the data are permanently archived at the U.S. National Oceanographic Data Center (NODC) or other appropriate national archiving facility. In the past, BCO-DMO submitted data to NODC as an email with attachments including a PDF file (a manually completed metadata record) and one or more data files. This method is no longer feasible given the rate at which data sets are contributed to BCO-DMO. Working with collaborators at NODC, a more streamlined and automated workflow was developed to keep up with the increased volume of data that must be archived at NODC. We will describe our new workflow; a semi-automated approach for contributing data to NODC that includes a Federal Geographic Data Committee (FGDC) compliant Extensible Markup Language (XML) metadata file accompanied by comma-delimited data files. The FGDC XML file is populated from information stored in a MySQL database. A crosswalk described by an Extensible Stylesheet Language Transformation (XSLT) is used to transform the XML formatted MySQL result set to a FGDC compliant XML metadata file. To ensure data integrity, the MD5 algorithm is used to generate a checksum and manifest of the files submitted to NODC for permanent archive. The revised system supports preparation of detailed, standards-compliant metadata that facilitate data sharing and enable accurate reuse of multidisciplinary information. The approach is generic enough to be adapted for use by other data management groups.

2012 School Russell Berrie Nanotechnology Institute Technion - Israel Institute of Technology * * * WHO? Students and postdoctoral fellows engaged in Nanoscience and Nanotechnology. WHY? Nanoscience and nanotechnology research in Israel has been dramatically boosted in recent years, following the establishment

REI is establishing a Renewable Energy Policy Council. The Policy Council will be composed of

senior representatives from a broad range of sectors. This new body will carry forward the policy development process begun by REI's highly successful 1983 Renewable Energy Forum. The 1983 Forum, which was chaired by Robert O. Anderson, Chairman of Atlantic Richfield, convened thirty-five national figures from energy and nonenergy sectors for a two-day program at the Aspen Institute's Wye Plantation. Together with REI's Board of Directors, this group explored some of the key policy matters affecting commercial development of emerging energy technologies. The Forum participants expressed the desire to have the program continued. The Renewable Energy Policy Council is designed to continue and improve upon the 1983 program. Three lessons learned from the Forum are particularly significant for structuring the Institute's Policy Council. First, the 1983 Forum demonstrated that a diversity of corporate and institutional leaders who influence public policy can be assembled on the topic of renewable energy because they continue to perceive energy as an important topic. Therfore, the Policy Council will include high level members from a wide range of sectors. Second, the participation of these leaders in a discussion-format setting can be extremely productive in prioritiaing key policy issues, surfacing new areas for policy concern, and identifying, possible avenues for consensus-building. Consequently, the Policy Council will be structured to emphasize discussion programs rather than lecture oriented conferences. Third, in order for a sizeable group (e.g., thirty-five, as at the Forum) to discuss policy areas in any depth, the agenda must be limited and clearly focused.

The National Institute of Corrections hosts a wealth of information for anyone in criminal corrections, by "providing federal, state, and local corrections agencies with training, technical assistance, information services, and policy/program development assistance." Their left-hand navigation menu makes it easy to find your way through their site. The Training Services & Resources link allows users to find opportunities for learning, whether one is interested in classroom-based learning, or non-traditional studies via the Internet or other avenues. The Research Center hosts site-developed resources as well as links to other websites relevant to corrections.

The Permaculture Research Institute (PRI) describes permaculture as "the harmonious integration of landscape and people providing their food, energy, shelter, and other material and non-material needs in a sustainable way. It is also the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability and resilience of natural ecosystems." In addition to this definition of permaculture, the PRI website contains a collection of related articles, a Discussion Forum, an annotated Photo Gallery, and brief descriptions of several recommended books.

The first installment of this new resource, from the Oriental Institute at the University of Chicago, offers seven Site Maps covering the ancient Near East (Egypt, Sudan, The Levant, Syria, Turkey, Iraq, and Iran), including primary archaeological sites, modern cities, and river courses. Each site map is available in two versions, a 150 dpi image for viewing in a browser, and a 300 dpi image for printing. Future versions of Map Series "will include terrain relief as a background for each of the seven Site Maps, one version colored for elevation and a second version colored for vegetation, as well as latitude and longitude (graticule)."

Located at the Darden School of Business at the University of Virginia, the Batten Institute is "dedicated to the creation of knowledge about the transformative power of entrepreneurship and innovation and to the cultivation of principled, entrepreneurial leaders." They support this mission through sponsoring conferences and other events, along with crafting publications, briefs, and other such works. First-time visitors to the site can click on the "Initiatives" overview section to learn about their key thematic areas, which including health care, sustainability, and emerging markets. Moving on, the "Publications" area includes information about articles and books produced by Batten affiliates, and the "Batten Briefings" offer interesting insights from the world of business.

This report describes in chronological detail the development of the Spaceborne Photonics Institute as a sustained research effort at Hampton University in the area of optical physics. This provided the research expertise to initiate a PhD program in Physics. Research was carried out in the areas of: (1) modelling of spaceborne solid state laser systems; (2) amplified spontaneous emission in solar pumped iodine lasers; (3) closely simulated AM0 CW solar pumped iodine laser and repeatedly

short pulsed iodine laser oscillator; (4) a materials spectroscopy and growth program; and (5) laser induced fluorescence and atomic and molecular spectroscopy.

Carnegie Mellon University's Robotics Institute (RI) is a leading robotics research facility with broad interests in "basic robotics technologies, automation and computer-integrated manufacturing, robotics for hazardous environments, and autonomous mobile robots." Along with information and descriptions of projects, labs and groups, and centers, another highlight of this site is its extensive publications section. The searchable list of publications from 1980 to the present includes many downloadable documents (especially for reports from more recent years). Also, the site provides a special project of the week link, RI jobs section, and contact information, including industrial affiliations.

The Hoover Institution has placed a wide array of multimedia content online for over a decade, and recently they created a site for their "Uncommon Knowledge" program. Hosted by Hoover fellow Peter Robinson, the program features interviews with political leaders, distinguished scholars, and leading journalists. First-time visitors to the site can browse the archives by topic, date, or guest. Currently, the online archive contains programs from 1997 to 2005, along with webcasts from 2006 to the present. Recent conversations added to the site include a discussion with Shelby Steele and a talk with Michael Barone about tax reform and various health-care proposals.

This European Forest Institute (EFI) is "An independent non-governmental organization conducting European forest research." This website provides information about EFI's mission, research goals, strategies and programs. Site users can view information about on-going and completed projects in any of the four EFI research programs which include: Forest Ecology and Management, Forest Products Markets and Socio-Economics, Policy Analysis, and Forest Resources and Information. EFI also provides a search engine for locating specific research projects as well as information about how to propose an EFI project.

The Biotechnology Institute has created these teaching resources to help educators with the task of delivering high-quality material about biotechnology. The materials here are divided into nine sections, including "Biotechnology Facts," "Lesson Plans," and "Biotechnology Timeline." The glossary is a good place to start, as it offers a range of short, well-written definitions about key terms in the field. The "Videos" area offers brief explanations of concepts such as mitosis and recombinant DNA, along with profiles of biotechnology scientists and their work. Moving on, the "Books, Magazines, and Other Resources" area includes links to sites with additional lesson plans, curriculum guides, and online periodicals of note.

Institute of Railway Technology An Institute of Monash University Advancing the Railway Industry through Technology #12;The Institute of Railway Technology (IRT) at Monash University is the premier track and vehicle railway research centre in Australia, and enjoys an international reputation for excellence

The University of Chicago Oriental Institute Virtual Museum has recently opened its doors. The unique aspect of this museum of "history, art and archaeology of the ancient Near East" is that it uses Apple Quicktime VR (available for both Windows and Macintosh platforms from a pointer to the Apple Computer site) to take the visitor on a moving tour through selected parts of the museum. Viewers can move about museum exhibits by simply dragging their mouse to the right or left. At this time only the Egyptian and Assyrian galleries are "open," but soon the Mesopotamian, Persian, Palestinian, and Temporary Exhibits galleries will be open as well. Each exhibit is accompanied by a complete list of artifacts on exhibit, as well as connections to other Oriental Institute sites of interest, including selected photographic archives. At present, the main drawback to the site is that the artifacts are not virtually "labeled"; that is, it is very difficult for the lay user to link the artifacts being viewed to their descriptions. However, this site is a work in progress, and planned enhancements include the embedding of URLs in the QTVR panoramic movie files, and linking text and photographs of individual objects to their images in the panoramic movie. Note that each exhibit is very large (around 900 kilobytes), and that familiarity with QTVR will help in the navigation of the site.

The National Institute on Aging (NIA) is the research arm of the U.S. National Institutes of Health (NIH) that focuses on aging research. Their website is geared both toward researchers and laypeople, particularly seniors. Visitors can click on the links, such as "Publications", "Alzheimer's Disease Information" and "Clinical Trials" next to the "Health Information" heading, on the right side of the homepage. For a brief description of what the links are about, visitors can click on the "Health Information" heading to be taken to the links and their descriptions. The "Clinical Trials" link would be of interest to those seniors who have particular medical conditions that may be being studied by the NIH. To see the numerous publications the NIA has available to order or download free, visitors can click on the "Publications" link on the homepage to browse the categories of publications available, including, "Caregiving", "Conditions & Diseases", "Medications/Supplements" and "Safety". Spanish language versions of the publications, can be found by simply clicking on "Spanish Language Materials" in the same section. For researchers, the "Research Information" heading on the right side of the page leads to the descriptions of the links that are also featured in the middle of the homepage. Two links that are concerned with current research are "Research Conducted at NIA" and "NIA Sponsored Research".

Presaging the movements of political ecology, "smart growth", sustainable development and other trends of the past three decades, R. Buckminster Fuller remains one of the most misunderstood Renaissance individuals of the 20the century. Today, Mr. Fuller is most well known for inventing the geodesic dome, which he hoped would become a model for low-cost housing across the world. Over his life, Mr. Fuller was awarded 47 honorary doctorates, wrote 28 books, and was the recipient of numerous architectural and design awards. As such, it is fitting that this Web site features a great deal of his work, including many of his statements on his conception of "design science," and not surprisingly a great deal of information on the geodesic dome and its uses. Other helpful material on the site includes numerous publications from the Institute, such as their newsletter and environmental news. Overall, a fascinating site that documents the life of Mr. Fuller and the Institute dedicated to keeping his philosophy and principles alive and meaningful.

Founded in 1986, the Economics Policy Institute (EPI) was established to "broaden the discussion about economic policy to include the interests of low- and middle-income workers." In keeping with that particular view, the Institute places a premium on real world analysis and a concern for the living standards of working people. The EPI site serves a clearinghouse for much of its research findings, along with some fine web-only features, such as profiles of economic indicators, the Quarterly Wage and Employment Series (which analyzes wage and employment trends), and a number of online supplemental tables. Much of the material on the site falls into one of the broad themes with which the EPI is primarily concerned -- such as trade and globalization, education, and living standards and labor markets. Finally, the site also contains an audio archive of events and discussions sponsored by the EPI dating back to August 1999, including programs on globalization and most recently, the ongoing debate surrounding the proposed privatization of Amtrak.

The Department of Energy recognizes that the success of its program to develop and implement a national system for nuclear waste management and disposal depends on broad-based public understanding and acceptance. While each program element has its particular sensitivity, the transportation of the waste may potentially affect the greatest number of people, and accordingly is highly visible and potentially issue-laden. Therefore, the Office of Civilian Radioactive Waste Management has developed this Transportation Institutional Plan to lay the foundation for interaction among all interested parties for the purpose of identifying and resolving issues of concern. The Plan is divided into four chapters. Chapter 1 provides bachground information and discusses the purpose of the Plan and the policy guidance for establishing the transportation system. Chapter 2 introduces the major participants who must interact to build both the system itself and the consensus philosophy that is essential for effective operations. Chapter 3 suggests mechanisms for interaction that will ensure wide participation in program planning and implementation. And, finally, Chapter 4 suggests a framework for managing and resolving the issues related to development and operation of the transportation system. A list of acronyms and a glossary are included for the reader's convenience. The Plan's appendices provide supporting material to assist the reader in understanding the roles of the involved institutions. 4 figs.,

1 tab.

We used the Astrophysics Data System (ADS) to measure the productivity of the 38 institutions studied by Abt (1993, PASP, 105, 794) during the period 1985 to 1994. The ADS database contains 84,822 astronomical papers published in Astronomy and Astrophysics, The Astronomical Journal, The Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, and The Publications of the Astronomical Society of the Pacific during this period. For each of these papers we compared the affiliation of each author to a canonical list of ADS affiliations that we had created using automated and manual clustering strategies. We assumed---as did Abt (1993)---that each of the n authors on a paper should result in his or her institution getting credit for n papers. We compared our results to those of Abt (1993) and determined that his results were not strongly affected by having neglected the European journals or by having used papers from only one six-month period in the decade 1985-1994.

(NIDA) acknowledges the contributions made by the representatives of the Community Epidemiology Work Group (CEWG) who prepare the reports presented at the meetings. Appreciation is extended also to other participating researchers who contribute information. This publication was prepared by Masi-Max Resources, Inc., under contract number N01-DA-1-5514 from the National Institute on Drug Abuse. The information presented in this Executive Summary is from the Abstracts and Power-Point slides prepared by 22 CEWG representatives for the CEWG meeting in San Antonio, Texas; tape recordings from the half-day meeting; and the information provided through followup telephone conference calls in February. Data/information supplemental to the meeting presentations and discussions have been included in this report. All material in this volume is in the public domain and may be reproduced or copied without permission from the Institute or the authors. Citation of the source is appreciated. The U.S. Government does not endorse or favor any specific commercial product. Trade or proprietary names appearing in this publication are used only because they are considered essential in the context of the studies reported herein. For more information about the Community Epidemiology Work Group and other research-based publications and information on drug abuse and addiction, visit NIDA’s Web site at

The Institute for International Economics is a "private, nonprofit, nonpartisan research institution devoted to the study of international economic policy." This web site contains short abstracts and press releases of books published by the Institute. Speeches, testimonies and essays by the staff at the Institute on a variety of international economics issues are also available as is a collection of working papers published since 1994.

In addition to serving the National Cancer Institute, the Technology Transfer Center (TTC) is a designated Competitive Service Center (CSC) for technology transfer and offers full technology transfer services to other NIH institutes. Services range from providing consultation to managing all of an Institute's or Center's technology development projects.

A common finding in the literature is that institutional structures have little to no impact on student engagement and development. I argue that theory suggests peer ability (as measured by selectivity), institutional density, the differentiation of the curriculum, and the research orientation of the institution should all affect student engagement. Using the nationally representative Beginning Post-secondary Student survey, a non-linear

When Mary took up her appointment in the Institute's Education Department in June 1997, she indicated that she wished to return to teaching in two or three years. We have just heard that in September she will be joining the staff of the Science Department at Camden Girls' School, London. Mary's departure from the Institute is a great loss to the Department, where she has worked tirelessly, and with great imagination, to support those who teach physics at all secondary levels - and at primary level too when the opportunity presented itself. She has made tremendous contributions to the careers side of the Department's work, supporting careers events, providing informal training for others willing to do the same, helping to develop new careers materials and identifying people whom the Institute could use as role models or as the subject of case studies in print or electronic publications. Mary has been equally happy and willing to support pupils, students

and teachers, and has been a wonderful role model herself, coming from an industrial research background, training for teaching after a career break and willing and able to teach biology, chemistry and design technology as well as physics. Mary has also written and edited Phases virtually single-handed. We are delighted to hear that Mary will continue to support the department's work as one of its teacher `volunteers'. Ilya Eigenbrot We are pleased to report that Ilya Eigenbrot, who will be known to some through his work at the Royal Institution and his appearances at the Christmas Lectures in a technical support role, has agreed to give the IOP Schools (touring) Lecture next year. The subject will be Lasers and this will follow nicely on to Zbig's lecture this year. Resources (print) Physics on Course The tenth issue of the Institute's popular guide to higher education, Physics on Course 2001, will be published early in July and distributed to all schools and colleges in the United Kingdom and the Republic of Ireland. Its pages are brimming with useful information to help sixth-formers and college students who wish to study physics make the very important decision regarding their particular choice of course and university. Under the heading `Summary tables of physics courses' every university listed in the publication has a table which includes all the courses on offer, their entrance requirements, duration and the awards given. Another section of the book entitled `Departmental information' includes data on the teaching and assessment styles of the Physics Department, special facilities plus a contact name and address. These sections, together with an expanded set of case studies of recent students and various other interesting articles, make this publication a must for anyone who is considering studying physics at university. Copies of Physics on Course 2001 will be available from Leila Solomon, Education Department, Institute of Physics, 76 Portland Place, London, W1N 3DH. The Particle Physics Wallchart (PCET) This full-colour chart, with a set of Teachers Notes, was published recently. It has been developed by PCET with Professor Peter Kalmus acting as expert consultant. The cost of the chart and notes is Â£7.75 plus VAT and copies can be purchased from PCET, 27 Kirchen Road, London W13 0UD (fax: 020 8566 5120). Inspire II The second part of Inspire was published in the Spring. It is a highly visual, full-colour leaflet which can be used as a stand-alone item but which was designed to `nest' inside the first four-page spread which was distributed in February. The occupational areas for physicists covered in the second leaflet include the media/leisure, finance and engineering (at technician level) industries. The third of the intended four sheets will be published later this year. (Copies of Inspire II have been included in the Affiliated schools/colleges package; other schools/colleges will be sent copies on request.) Nanotechnology - a technical brief The Industrial Affairs Department of the Institute is working on a series of Technical Briefs to broaden the provi

The Trondheimfjord is located at the west coast of Mid-Norway and is characterized by local environmental and hydrological changes that are linked to regional oceanographic and atmospheric processes in the Norwegian Sea. The North Atlantic Current (NAC) and the Norwegian Coastal Current (NCC), two major northward flowing sea surface/intermediate currents, strongly contribute to the oceanography of the Norwegian Sea and thus, to the hydrological settings of the fjord. Instrumental records indicate that the renewal of the fjord water by Atlantic-derived water masses occurs twice a year and that bottom water temperature and salinity changes reflect NAC variability. Sedimentation rates in the fjord basin exceed several mm/yr. Hence, the Trondheimfjord is an ideal location for high resolution studies of important climate-sensitive parameters such as characteristics of Atlantic-derived waters, freshwater discharge and sedimentary patterns. We measured stable isotope ratios in tests of the benthic foraminifera Melonis barleanus from surface sediments of the Trondheimfjord; ?18O ratios vary according to circulation and stratification patterns in the fjord which are linked to the topography. Based on these surface sediment measurements, as well as previous sediment core studies (Milzer et al, unpublished), we assume that benthic ?18O ratios in sedimentary archives from the Trondheimfjord reflect ocean circulation changes in the Norwegian Sea. In order to examine to which extent physico-chemical characteristics of the prevailing water masses are affecting the benthic signal in the Trondheimfjord, and how these findings can be related to oceanographic changes in the Norwegian Sea, we analyze benthic ?18O ratios from three multi-cores distributed along the fjord axis. According to 210Pb and 137Cs chronology these multi-cores contain undisturbed sedimentary records for the last 10 to 50 years, with sedimentation rates ranging from 2.5 to 7 mm/yr. We perform this analysis by comparing our stable isotope data with instrumental time-series from hydrological stations in the fjord area and over the Norwegian margin. On a decadal scale the variability of the benthic ?18O signal concurs with the temperature

and salinity variability of the bottom water of the Trondheimfjord measured at different stations along the fjord axis. On a multidecadal scale, benthic ?18O variability and the instrumental datasets show different patterns, and point out the peculiarity of each core location in terms of topographic and hydrological settings. In addition, we present dinocyst census counts on the same sedimentary archives as tracers of changes in water mass characteristics induced both by NAC ventilation of the Trondheimfjord and regional climate patterns. The results show characteristic dinocyst assemblages for estuaries including seasonal hydrological variations in the Trondheimfjord which result in changes of food availability as well as mixing of water masses in the fjord.

We present detailed geological mapping of the axial valley floor and ridge flanks of two neighboring but contrasting spreading segments (OH1 and OH3) of the Mid-Atlantic Ridge between Oceanographer and Hayes fracture zones. New in situ observations from the submersible Nautile correlated with swath bathymetry and acoustic backscattering data from these segments reveal that the along-and across-axis volcanic-tectonic variability within second-order segments is larger than commonly acknowledged. Segment OH1 is a long and robust segment with a narrow and shallow axial valley. The most intense magmatic activity is found at the segment center where the thickest crust has been imaged, suggesting focused magma supply. Away from this part of the segment, faulting and sedimentary cover predominate. In contrast, the center of segment OH3 is dominated by extensive sedimentary cover, fissuring, and faulting. Furthermore, the most recent constructional volcanism is located away from the segment center in a region of greater depth and thinner crust. This relocation of volcanism suggests either a recent shift in the magmatic source or the last vestige of a centrally located source fed by lateral dike injection. Segment tip magmatic oscillations are suggested by the distribution of rock types at both segment ends. Serpentinized peridotites and associated dolerites are exposed at the massifs located at the intersection with nontransform offsets (NTOs), whereas only basaltic rocks crop out on the nodal basin floors. We suggest that the combination of low magmatic budget and extension taking place at the NTOs during a segment retreat favors the uplift and exposure of ultramafic massifs.

Established by the National Cancer Act of 1937, the National Cancer Institute (NCI) is one of the preeminent cancer research centers in the world. Over the past seventy years, their work has helped advance human understanding of human physiology, genetics, and cell biology, along with supporting the research efforts of at least twenty Nobel Prize winners. On their homepage, visitors can learn more about the various types of cancer, view their latest NCI Cancer Bulletin, and also read through the "NCI Highlights" section. Along the left-hand side of the homepage, the "Quick Links" area includes a link to their dictionary of cancer terms, the NCI drug dictionary, and information about funding opportunities. Further down on the homepage, there is a handy "Cancer Topics" section which includes fact sheets on "What is Cancer?", "Coping with Cancer", and "Smoking and Cancer". Overall, this site is very well-organized and accessible to both the general public and scholars.

The Scripps Research Institute (TSRI) employs a philosophy emphasizing "the creation of basic knowledge in the biosciences for the application of medical and material discoveries; the pursuit of fundamental scientific advances through interdisciplinary programs and collaborations, and the education and training of researchers preparing to meet the scientific challenges of the next century." TSRI conducts research in the areas of molecular and cellular biology, immunology, virology, autoimmune diseases, neurosciences, cardiovascular diseases, and more. The TSRI website contains links to information about scientific departments, faculty members, centers and programs, consortia, and research services. TSRI also offers a number of downloadable publications, and listings of available employment and postdoctoral opportunities. Note: The main sections of the site are accessible only from the homepage.

The Berkeley Institute of Design (BID) conducts research and educational activities that emphasize an interdisciplinary approach to designing interactive environments. Under the topic of "environments," the website includes "architectural spaces, products, web sites, and other artifacts that support complex human activity." Given the current "era of ubiquitous technologies," the organization's approach combines technical and social/humanist perspectives drawing on psychology, social sciences and art practice. Its goal is to understand human behavior and the

experience that technology should enhance, while remaining committed to social values and critical reflection. Projects include: MultiView Papier-Mï¿½chï¿½, Books with Voices, The Designers' Outpost, Digital Chemistry Project, SUGAR (CAD for MEMS), flexonics editorial, UCWISE, paradoxes in creativity, Organum, and Mobster. This site is also reviewed in the January 14, 2005_NSDL MET Report_.

Founded in 1977 by the noted primatologist Jane Goodall and Genevieve, Princess di San Faustino, the Jane Goodall Institute's primary mission is to "advance the power of individuals to take informed and compassionate action to improve the environment of all living things." Of course, many of its activities center around the importance of increasing overall awareness of primate habitat conservation and this is definitely the focus of this timely website. A fist stop for any visitor to the site should be the "Chimpanzee Central" section, where they may learn about the behavior of these primates, their use of tools, and the various issues surrounding the conservation of their habitats. Another compelling area of the site is the "Roots & Shoots" section, which provides educational information about these service-learning projects that "promote care and concern for animals, the environment, and the human community".

A for-profit enterprise, the Institute of Food Research (IFR), based in the United Kingdom, offers a wealth of public access information regarding food, diet, and nutrition on their Web site. Serving as a clearinghouse for information across a broad spectrum of academic, agricultural, and industrial interests, the site is very user-friendly, with numerous lists of popular topics and terms, as well as drop-down menus of searchable subjects and fields. Potentially useful to professionals, students, and lay people, the information available on the IFR site links to services and databases of many kinds and quality. The site serves as a great starting point for anyone interested in studying something the IFR knows a great deal about -- food.

The Independent Media Institute works to "empower people with independent journalism, information and media tools to change the world." To that end, the organization oversees four related projects, including AlterNet.org and WireTap. Visitors may want to start by browsing through the AlterNet site, as it contains compelling Web-based journalism coverage of a wide variety of newsworthy events, organized through what is termed the "infomediary." The site notes that its role is to serve as a way to sort through the masses of information made available on the internet in a timely manner. Visitors to AlterNet can also peruse the homepage, which contains a number of interesting blogs and opinion pieces. WireTap is also worth a look, as it serves as a place for young people to voice their opinions on a host of topics, including online gambling and the future of higher education.

Over the past 150 years, almost 800 Illinois firefighters have died in the line of duty. This remarkable and thorough online database provides historical background information and digitized images related to this subject. The funding for this project was provided by the Institute of Museum and Library Services (IMLS), and first time visitors can get started by reviewing the online tutorial offered here. After that, they can use the customized search engine to search the records by last name, first name, agency, gender, rank, age range, and year of death. While the information for each firefighter varies, many of the records contain details about the cause of death, the location, and other relevant details. On the right-hand side, users can look at the "Today's Line of Duty Deaths" and check out photographs of the Illinois Firefighter Memorial and provide feedback on their experience using the site.

The Roslin Institute first reported their breakthrough cloning results in Nature (February 27, 1997; volume 385, part 6619, pages 810-813--discussed in the March 7, 1997 Scout Report), presenting possibilities for pharmaceutical purposes in addition to research opportunities. The cloned lamb, Dolly, was created using nuclear transfer technology. This site covers one of the top ten scientific breakthroughs of 1997, compiled in the December 19, 1997 issue of Science. The top scientific breakthrough of 1997 was the cloning of a sheep, resulting in a lamb named Dolly. The nine runners up were: the Pathfinder mission to Mars, synchrotrons, biological clock genes, gamma ray bursts, Neandertal DNA, nanotubes, Europa's ocean, whole genome sequencing, and neurons.

Informatics is a field that is gaining importance around the globe, and the National Institute of Informatics (NII) in Japan seeks "to advance integrated research and development activities in information-related fields, including networking, software, and content." First-time visitors should note that most of the materials in the site can be located in sections such as "Research & Project" and "Services". Before delving into these areas, visitors may wish to take a look at the most recent issue of "NII Today" via the homepage. Afterwards, visitors should look over the "Research" area. Here they will find summaries of research projects, working papers, and information about their international partnerships. The "Services" area is well worth a look as it contains links to additional informatics databases that will be of use to scholars and students within the field.

Founded in 1857, the American Institute of Architects (AIA) has served as the primary professional organization for architects for close to 150 years, and is perhaps best known to the general public for its annual architectural and design awards. On the website, visitors can learn about the career opportunities for those interested in becoming an architect and read about various outreach efforts that the AIA is currently embarking on. The general public will appreciate the "Knowledge Communities" area, which gives access to the wealth of knowledge provided by AIA members in a number of different thematic areas, including historic preservation, religious architecture, and sustainable design. Additionally, visitors to the site can peruse the latest edition of AIAarchitect, which provides timely news to the architectural community throughout the United States.

A number of organizations and think-tanks have taken on the most pressing questions of our day, but relatively few have addressed such quandaries as basic as ÂAre there a core of shared, moral values?Â In 1990, the Institute for Global Ethics started with this crucial inquiry and expanded their scope to work towards understanding these values. From the homepage, visitors can read through their online resources, which include the Ethics Newsline (a weekly electronic newsletter), letters from their president, and a number of topical white papers. Some of these papers have rather compelling titles, such as ÂEthics and the Learned ProfessionsÂ and ÂCorporate Social Responsibility and Peacebuilding: A Case for Action in Israel and the Palestinian TerritoriesÂ. Finally, users of the site may also wish to take a look at their calendar of upcoming seminars and lectures.

Established in 1999, the UNESCO Institute for Statistics (UIS) was designed to meet both the needs of UNESCO Member States and to provide the international community with a wide range of statistical information in order to "analyze the efficiency and effectiveness of their programmes and to inform their policy decisions." The UIC is hosted by the University of Montreal, and performs work around four primary themes, including education, literacy, culture & communication, and science & technology. Overall, the site is a remarkable source of information, including databases, working papers, country profiles, statistical tables, and methodological material about the conduct of their research. Several of these works are featured prominently on their homepage including a working paper on financing the expansion of educational opportunity in Latin America and the Caribbean and an electronic questionnaire on science and technology.

Founded in 2001, the Migration Policy Institute (MPI) evolved from a program at the Carnegie Foundation for International Peace. Since its inception, the MPI has been dedicated to examining the trends and processes associated with the movement of various people worldwide. The homepage offers a wide array of resources for the general public, journalists, and academicians. Looking at the ÂIn FocusÂ area on the homepage, visitors can download new working papers and reports with titles such as ÂThe New ÂBoatÂ PeopleÂ and ÂImmigration Enforcement at the Worksite, Making it WorkÂ. From the homepage, users can also make their way to the Migration Information Source website which contains global migration data, country migration profiles, and a glossary of migration terms. Visitors with specific questions can also view a list of experts in a variety of topics related to migration and email them directly.

Originally created in 1995 by the Texas State Legislature, and moved eight years later from the office of the Attorney General to Sam Houston State University, the Crime Victims' Institute provides studies of crime victims, online local and national resources for crime victims and links to criminal justice education. The "Publications" available on the site can be accessed on the far left hand side

of the menu and include Legislative Briefs, Research Briefs, Survey Reports, and General Information. "Videos", also available on the far left hand side of the menu, include a video entitled "Stalking: Real Fear Real Crime" that is a training tape inspired by a real crime victim. The left hand menu also contains three important categories for all victims: "Victim Compensation", "Victim Impact Statement", and "Victim Rights", which provide links in English and Spanish, as well as victim impact forms. Almost the complete text of the Texas Crime Victim Bill of Rights is also available under the "Victim Rights" link.

Based at the Hoover Institution since 2001, Policy Review has been around for over a century, and is edited by Tod Lindberg. The journal is based in Washington, DC, and visitors with a penchant for dialogues about politics and policy will enjoy browsing through issues here. Visitors can start by looking at the current issue, or they can browse past issues by topic, author, or date. The topical list is quite extensive and it includes such areas as tax policy, terrorism, world leaders, post-secondary education, and gender issues. The site also features a number of web-only articles, such as "Clausewitz in Wonderland" and "Extremism, Terror, and the Future of Conflict". Finally, visitors can also find out which articles have been emailed, printed, and viewed most frequently.

The Visual Math Project was founded in 1975 by Professor Ralph Abraham from the University of California at Santa Cruz. Ralph Abraham, who is now retired, formed a nonprofit organization called the Visual Math Institute (VMI) and continues to maintain its website. In the FAQ section, Abraham explains that Visual Math (VM) "refers to the coordination of multiple modes of intelligence and representation, cognitive styles, for the purpose of communication of mathematics." The FAQ section also includes information on Math Anxiety as well as an overview of mathematics, Euclid, and chaos theory. VMI's research, which is described further in the Research section, "is devoted to visual math research and education, including computation math, computer graphics, and interactive environments." The visual projects on Chaos, Euclid and Kepler provide overviews of related topics, information on useful references, and some visual demonstrations of the topics.

The goals of the World Resources Institute (WRI) are to reverse existing environmental problems and avert future ones, foster active public and private involvement, and make environmental improvement compatible with economic growth. Their Website contains countless documents sorted by (worldwide) geographic location as well as subject area, including sustainable development, biodiversity, climate change, forests, governance, oceans and coasts, and trade. The site also features a news center with news releases, facts and figures, and audio reports (RealAudio); a Library and Information Center with full-text searchable postings of all WRI publications; and a Sustainable Development Information Center with data, maps, facts, and sustainable development publications. This comprehensive site goes beyond the surface of environmental issues facing much of the world today.

The Brookings Institution has a number of centers that specialize in urban policy, the economy, and foreign policy. Their "World" site brings together research, commentary, policy reports, and working papers that deal with a broad set of issues with a global reach. First-time users can browse around some of the "Recent Research and Commentary" area, and they may also wish to sign up for a Brookings account. With this account they can create their own online portfolio that will allow them to receive email updates about different topics and programs. The page also features a "Top Topics" area that brings together papers and op-ed pieces on subjects such as Afghanistan, terrorism, energy security, and Arab-Israeli relations. Additionally, visitors can sign up to receive their RSS feed and their newsletter.

Around the world, policy experts and concerned citizens continue to ask: What can be done about the problems of the world's cities? Of course, the problems of cities differ widely, and simple answers are in short supply, if they are any to be had at all. Based in San Rafael, the Urban Age Institute has been exploring some of these issues over the years, and their website contains some of their various findings and musings on a number of pressing urban matters. On their website, visitors can learn about their various research objectives, some of the events they sponsor, and also consider an extensive list of complementary websites. Finally, clicking on the "Articles" section will take visitors to the current issue of their magazine, "Urban Age". Additionally, visitors can browse

through previous issues at their leisure.

The Institute for Strategic Dialogue (ISD) is an independent think-tank working with leaders in government, media and the private sector. Their goal is to "challenge long-range threats to international and communal peace and to enhance Europe's capacity to act strategically in the global arena." The ISD was started in 1996, and lately their new work has included creating a network of Muslim professionals across Europe and sponsoring scholarships and leadership conferences. Scholars and other policy-types should click on over to the "Publications" area. Here they will find recent works that include "Muslims in the European Mediascape: Integration and Social Cohesion Dynamics" and "Exploring New Vehicles for a Strategic European Engagement with Russia". On the homepage, visitors can find a list of recent events sponsored by the ISD and also watch some media from their talks and conference gatherings.

The Environmental Institute at the University of Massachusetts-Amherst encourages and supports "collaboration across colleges and disciplines in environmental research and education." On the left-hand side of the page, visitors can learn about the different resources, which include "Environmental Analysis Laboratory," "TEI Environmental Lecture Series," "Conferences," and the "Water Resources Research Center." Visitors would do well to click on the "Water Resources Research Center" to learn about their work, publications, and current research projects. One particularly useful set of resources here is provided within the "WRRC Databases" area. They are two interactive databases: "Acid Rain Monitoring Project" and "Stormwater Technologies Clearinghouse." Policy makers and scientists will find both quite useful, and may wish to share them with friends and colleagues. The site is rounded out with information about their recent and upcoming conferences.