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The OceanSITES program of fixed open-ocean sustained timeseries

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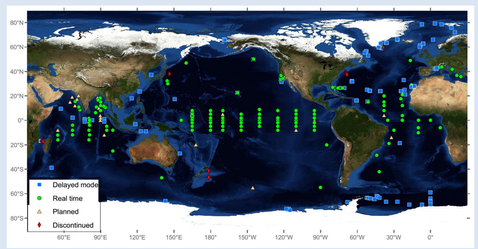
Mission

The mission of OceanSITES is to collect, deliver and promote the use of high-quality data from long-term, high-frequency observations at fixed locations in the open ocean. OceanSITES typically aims to collect multidisciplinary data worldwide from the full-depth water column as well as the overlying atmosphere.

Rationale

Time series observations at critical or representative locations are one essential element of a global ocean observing system to complement a range of other approaches. They can provide: a unique view of the full temporal behavior of a system; accurate reference and long-time baseline data; and the maximum possible range of interlinked variables from the seafloor to the atmosphere while enabling shared resources.

Current inventory of sites which are part of OceanSITES



All sites are or aim to be:
- sustained
- serving multiple disciplines
- open-ocean or relevant for the open ocean
- freely sharing their data

Data System

OceanSITES

- has developed a time series data format based on international standards (netCDF files with CF metadata conventions) which can be used by anybody
- has an active and experienced data management team
- provides a data management system (regional DACs, GDACs, archive) with formatting support, to disseminate data
- freely shares data publicly without delay
- works with scientific user communities e.g. via GOOS, CLIVAR panels, and regional/thematic groups, to engage data users

See also poster Pagnani et al. (EGU2015-11768).

Benefits of joining OceanSITES

A. Be part of a large network of partners which
- enhances your chances of successful funding applications
- facilitates collaboration
- provides technical and scientific assistance
- shares expertise
- provides logistical accesses including ship time

B. Gain access to and enhance usership of infrastructure
- gain access to other OceanSITES moorings, sensors, mooring hardware
- demonstrate value of your own infrastructure by finding additional partners
- act as a RAD (researcher aggregating device)
- added sensors enhance value and quality of your own observations

C. Get assistance for initiating new sustained time series programs
- get scientific endorsement
- get help to find instrumentation for loan during initial phases of development of an observatory
- get access to sensor, engineering, operations expertise
- get access to documentation describing “best practice” and to “user guides”.
- gain visibility for your new effort, including dissemination

D. Gain access to and assistance with
- an internationally recognized and widely used time series data format
- best practices (data QA and QC)
- regional DACs
- other global data sets

E. Through the GDAC mechanism
- satisfy funding agency requirement for public data access
- enhance dissemination and user community of your data
- make your data part of a global data set
- assure long term archive of your data

F. Impacts of your observations:
- contribute to indicators and products resulting from OceanSITES
- become a reference or anchor site for other programs
- increase global awareness of your program and data
- access to measurable data use
- recognition in the international scientific community
- increased recognition in your own country

G. Contribute to or become part of other regional or international programs
- CLIVAR, GOOS, DOOS, IMBER

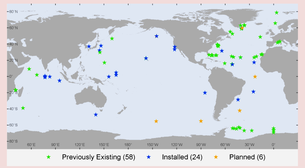
H. Gain access to training and student resources

I. Gain access to OceanSITES leadership opportunities
- Steering Committee, Executive Committee, Chair candidature)

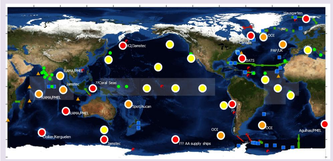
J. Contribute to socioeconomic value/benefits/issues:
- providing ocean health information
- enabling or validation predictive systems
- training next generation earth scientists and observers, engineers
- ecosystem management/services
- products, indicators, hazard warning for agencies, policy makers, public

Making use of existing infrastructure for new needs

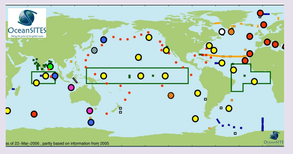
OceanSITES can initiate/organize efforts, sometimes even hardware, for new observations.
Example: Deep Ocean Observing System (DOOS) as part of the JCOMM Framework for Ocean Observing (FOO) has identified need for deep T/S observations.
OceanSITES has responded by collecting existing deep T/S data being measured and adding new deep T/S sensors to existing moorings.
OceanSITES has deep microcats available to allocate for another 10-15 sites.



OceanSITES visions for homogeneous biogeochemical and multi-disciplinary observations at a subset of sites



OceanSITES contribution to a global ocean acidification network



Possible subset of sites which could become a network of identical physical/biogeochemical/ecosystem timeseries sites

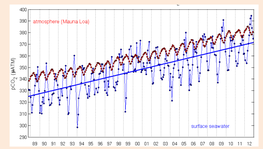
Organization

- Official component of the global ocean observing system, represented in GOOS, JCOMM, etc
- International Steering Committee (made up of representatives of all sites in the system), co-chairs Uwe Send and Bob Weller
- International Data Management Team
- OceanSITES project office at JCOMMOPS Toulouse (Champika Gallaghe) projectoffice@oceansites.org
- Executive Committee
- Two global data centers (GDACs) at Coriolis/Ifremer and at NDBC ftp://ftp.ifremer.fr/ifremer/oceansites/ ftp://data.ndbc.noaa.gov/data/oceansites/
- OceanSITES data format based on NetCDF
- Website www.oceansites.org

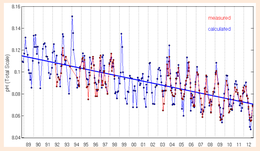
Example timeseries in OceanSITES

OceanSITES includes ship-occupied time series with frequent measurements (and encourages supplementing those with a mooring for higher time resolution). Typically they measure physical, biogeochemical, and ecosystem quantities.

Example: Station ALOHA/Hawaii, over 20 years of biogeochemical data



pCO_2 of surface ocean and overlying atmosphere

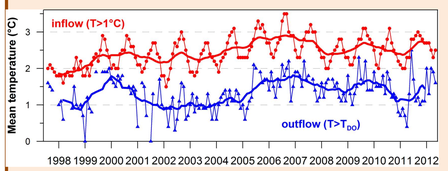


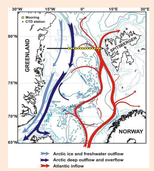
pH of the surface ocean

(R.Lukas/SOEST. D.Dore/MSU)

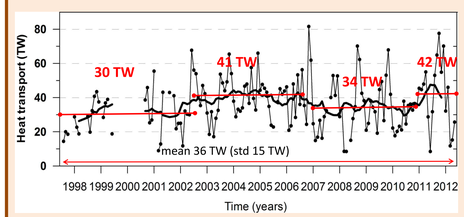
Most OceanSITES time series result from long-term moorings, providing full time resolution to detect fast processes and events. Many of these sites have a more narrow disciplinary focus at present, but OceanSITES seeks to enhance such sites to give them more multi-disciplinary utility.

Example: Fram Strait Observatory, moored arrays and gliders





Temperature of (red) water that is warmer than 1°C and flowing northwards in Fram Strait and (blue) the warmest water that is flowing southwards immediately west of the inflow at the same transport rate.



Heat transport to the Arctic Ocean through the water flowing northwards through Fram Strait (after Schauer and Beszczynska-Möller, 2009)

(E.Fahrbach, U.Schauer, T.Kanzow/AWI, E.Hanson/NPI)

References

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