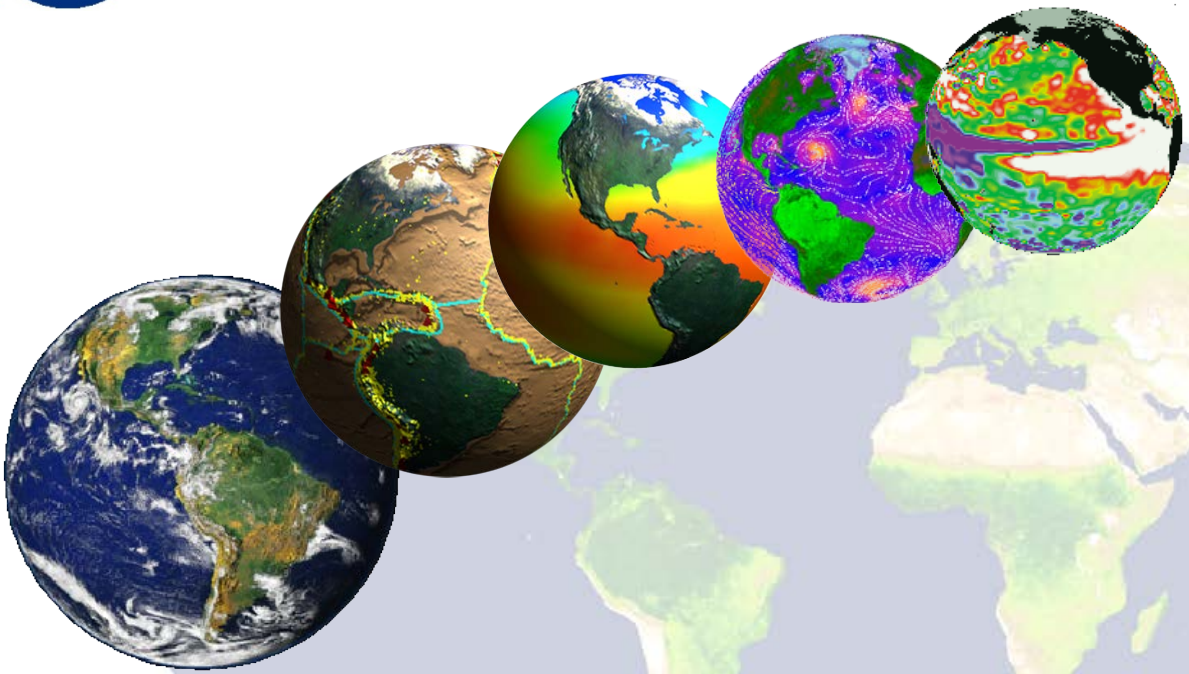
Global Biodiversity Monitoring, Prediction & Reporting

A Future Earth Symposium, Greenberg Conference Center, Yale University



Integration: Networking Networks

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Earth Science Division
NASA Headquarters

May 4, 2015

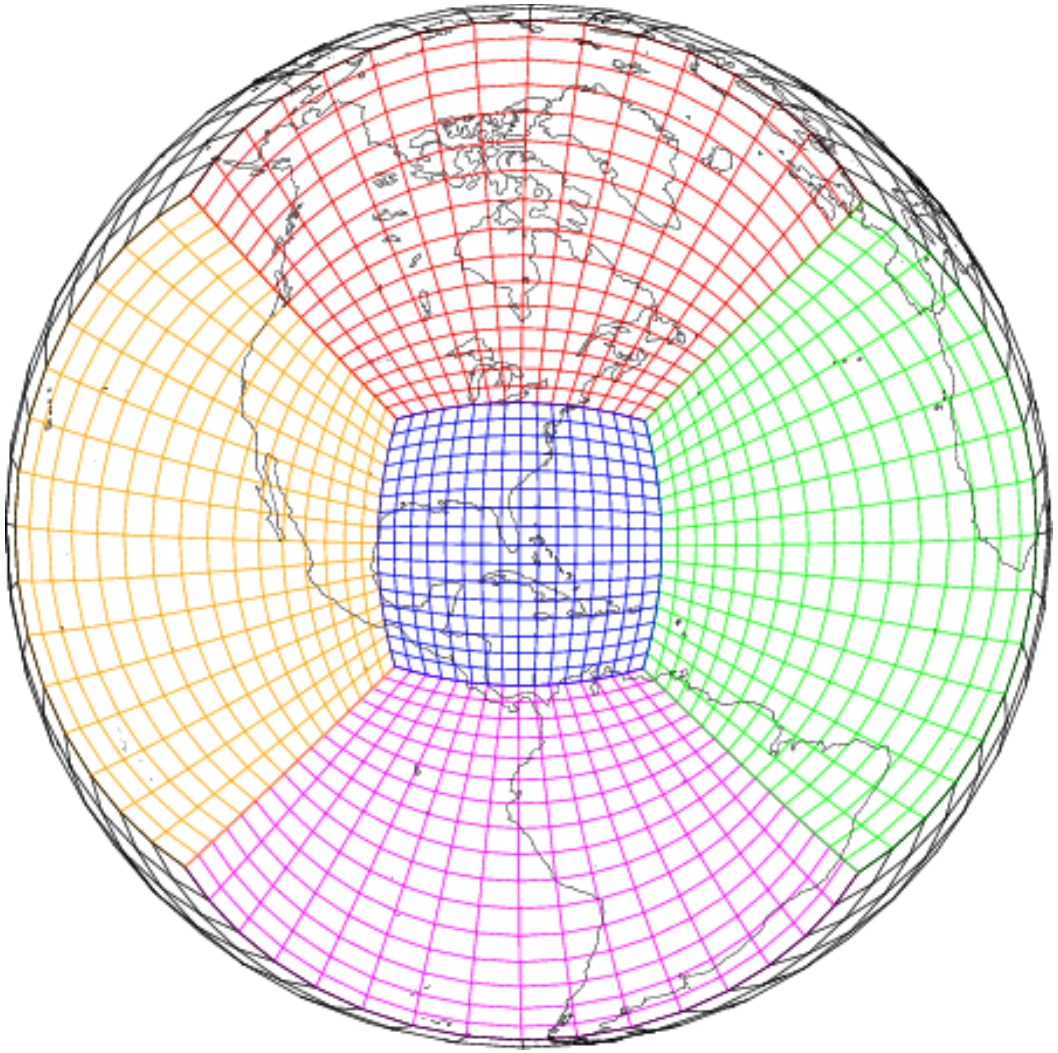
Global Biodiversity Observation

(credit:*NASA/NOAA/GSFC/Suomi NPP/VIIRS/Norman Kuring*)

#globalselfie

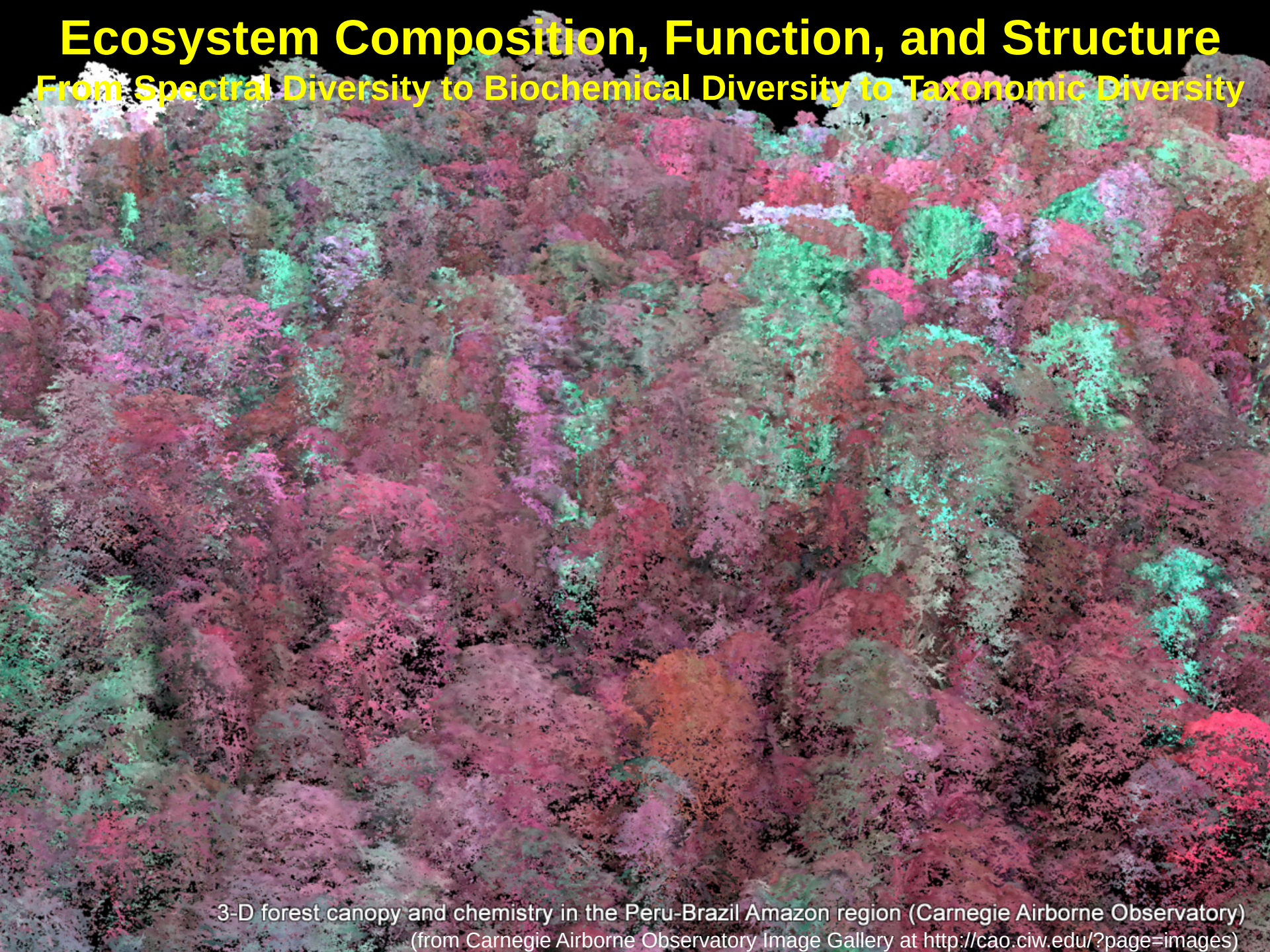
A Climate Example from NOAA GFDL

Grid Stretching in GFDL Atmosphere Dynamical Core



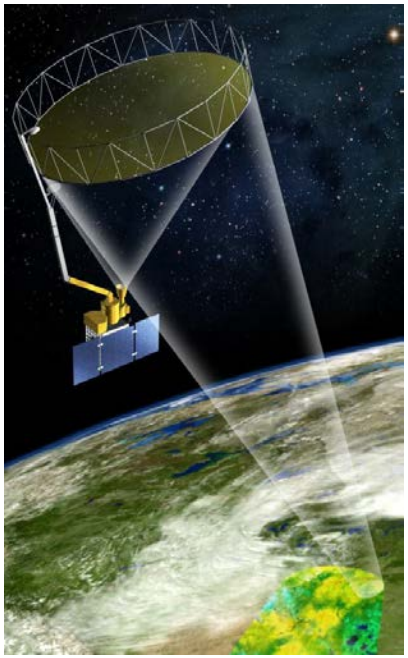
Ecosystem Composition, Function, and Structure

From Spectral Diversity to Biochemical Diversity to Taxonomic Diversity

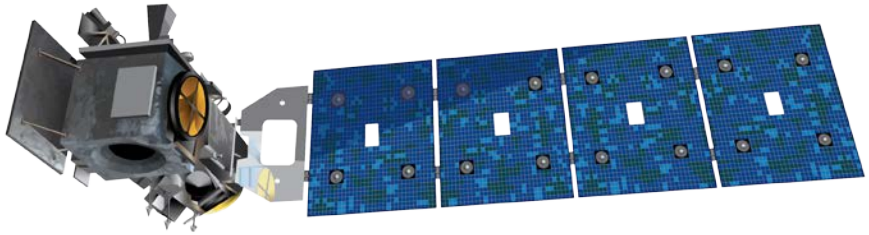


3-D forest canopy and chemistry in the Peru-Brazil Amazon region (Carnegie Airborne Observatory)
(from Carnegie Airborne Observatory Image Gallery at http://cao.ciw.edu/?page=images)

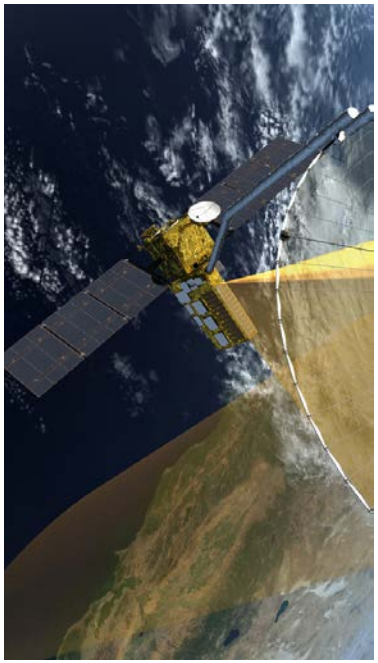
Top Down: Capturing Ecosystem Composition, Function, and Structure *Globally* from Space



Soil Moisture Active Passive (SMAP) Mission 2015



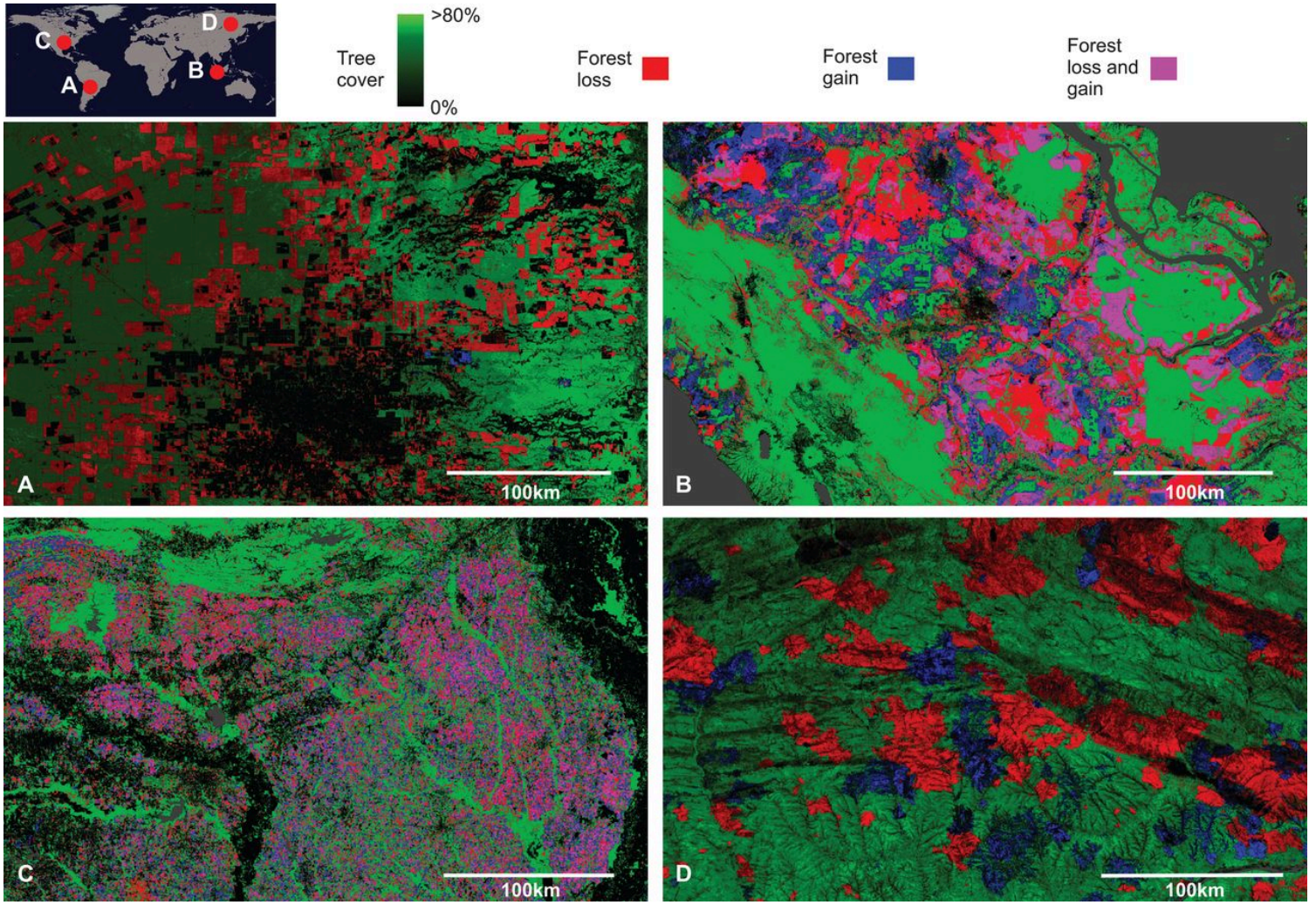
ICESat-2: Atlas Lidar 2017



NASA-ISRO Synthetic Aperture Radar (NISAR) Mission 2020/2021

HyspIRI: VSWIR Spectrometer and Multispectral TIR Imager 20??

Fig. 2 Regional subsets of 2000 tree cover and 2000 to 2012 forest loss and gain.(A) Paraguay, centered at 21.9° S, 59.8° W; (B) Indonesia, centered at 0.4° S, 101.5° E; (C) the United States, centered at 33.8° N, 93.3° W; and (D) Russia, centered at 62.1° N, 123.4° E.



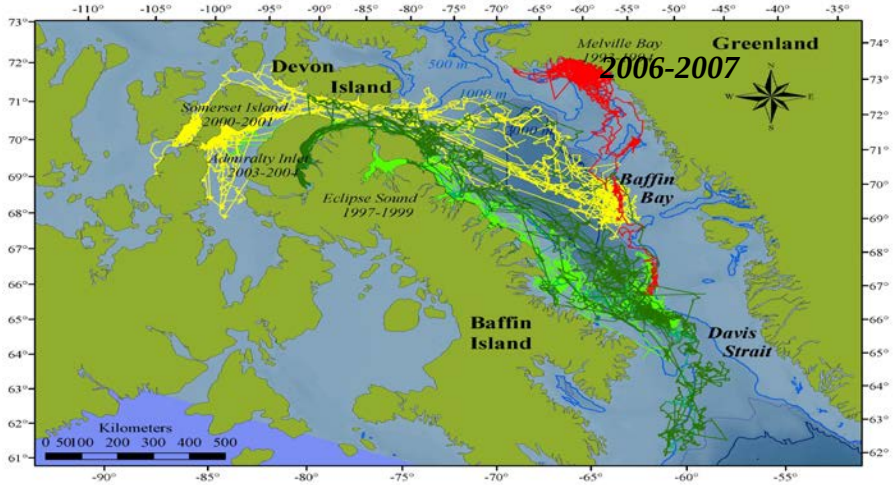
M C Hansen et al. Science 2013;342:850-853

Published by AAAS

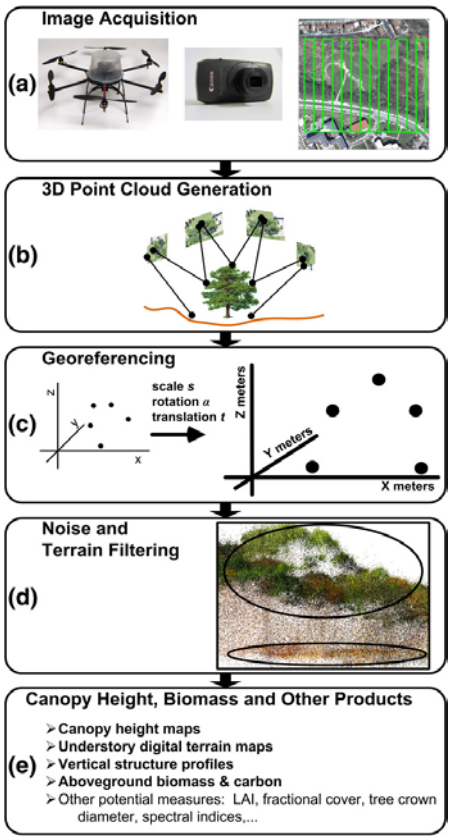
Ubiquitous Smallsats

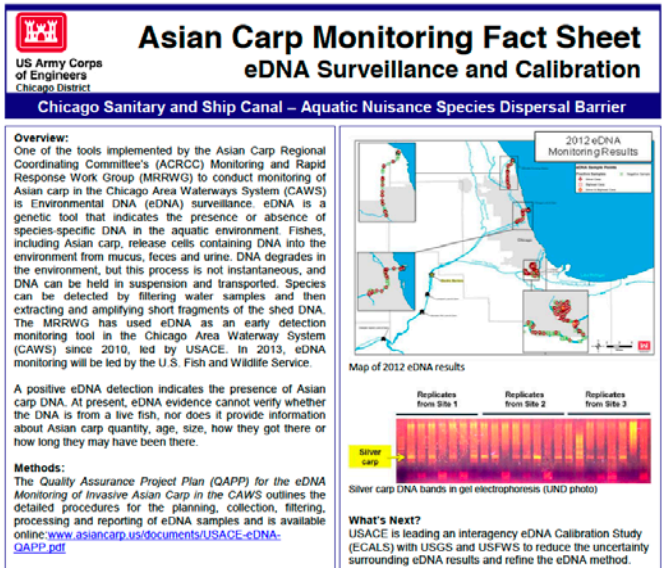
First of Planet Labs Flock Leaves ISS on 11 February 2014

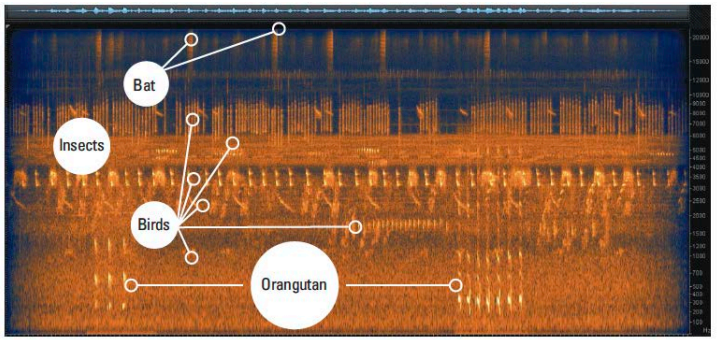
(photo by JAXA astronaut Koichi Wakata)



Bottom Up: *In situ* Observations Expanding—But Need Networking

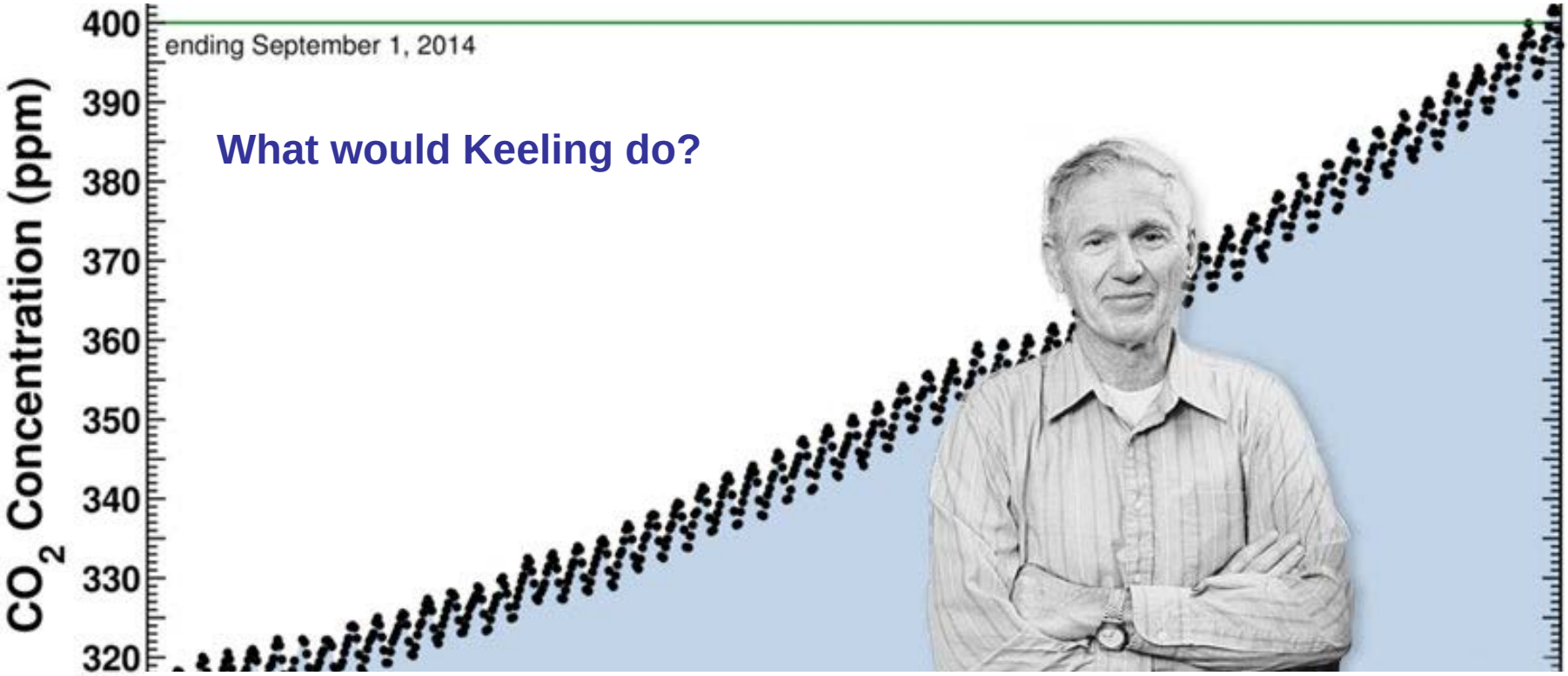






Everything in its place. A recording from the Sumatran rainforest illustrates the acoustic niche hypothesis, in which different kinds of animals utilize different parts of the sound spectrum. Bats, for instance, call at higher frequencies while orangutans use lower frequency sound.

Challenge = Networking Observations



(from: https://scripps.ucsd.edu/news/wendy-and-eric-schmidt-award-500000-grant-keeling-curve)

(*Science* 346:301-302, 10/17/14)

What Type of Network Do We Need?

OR

GEO Biodiversity Observation Network (GEO BON)

GROUP ON EARTH OBSERVATIONS | GEO BON

GEO Home

Biodiversity Community of Practice

GEO BON: Biodiversity Observation Network

- About
- Contributors
- Working Groups
- Meetings
- Essential Biodiversity Variables
- Documents
- Outreach
- Observations
- Links
- Contact

Highlights

Adequacy of Biodiversity Observation Systems

In response to a decision taken last November at the Nagoya conference of the Convention on Biological Diversity, GEO BON has produced and submitted to the CBD a report entitled "Adequacy of Biodiversity Observation Systems to support the CBD 2020 Targets". The report can be read here.

EC JRC launches DOPA, a Digital Observatory for Protected Areas

The Joint Research Centre of the European Commission has launched the Digital Observatory for Protected Areas (DOPA). A GEO BON contribution to the monitoring of biodiversity, the DOPA is designed as set of distributed web services to assess the state of, and pressure on, Protected Areas and to prioritize them accordingly in order to support decision making and fund allocation processes. It is also conceived as a monitoring and ecological forecasting service.

DOPA is supported by the European projects EuroGEOSS and UncertWEB and developed in collaboration with GBIF, UNEP-WCMC, Birdlife International, RSPB and others. Read here a description of the use of DOPA for Africa presented at MapAfrica, 23-25 November 2010, Cape Town, South Africa.

GEO BON

Biodiversity Observation Network

The Group on Earth Observations Biodiversity Observation Network – GEO BON – coordinates activities relating to the Societal Benefit Area (SBA) on Biodiversity of the Global Earth Observation System of Syster (GEOSS). Some 100 governmental, inter-governmental and non-governmental organizations are collaborating through GEO BON to organize and improve terrestrial, freshwater and marine biodiversity observatio globally and make their biodiversity data, information and forecasts more readily accessible to policymakers, managers, experts and other users. Moreover, GEO BON has been recognized by the Parties to t Convention on Biological Diversity.

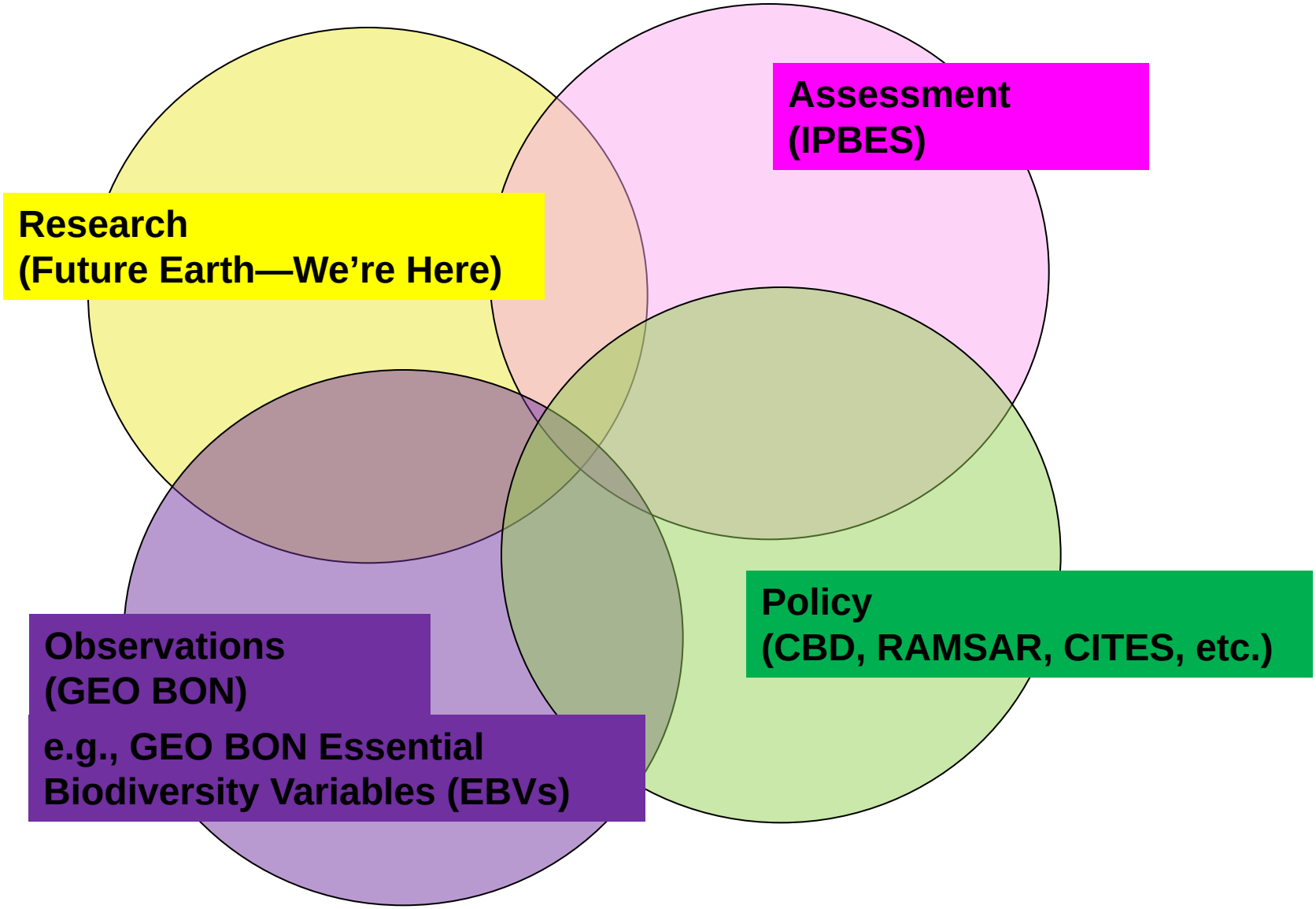
The Biodiversity Observation Network is both a Community of Practice and a Task in the GEO Work Plan. It is a voluntary partnership that is guided by a steering committee comprising the key stakeholders, includi DIVERSITAS, GBIF, IUCN, NASA, UNEP-WCMC and others. GEO BON draws on GEO's work on data-sharing principles to promote full and open exchange of data, and on the GEOSS Common Infrastructure to enab interoperability through adoption of consistent standards.

To assist both holders and users of biodiversity information to engage with GEO BON, this website contains links to information resources, activities and GEO BON documents, meetings and other resources.

Example Essential Biodiversity Variables Candidates

EBV Class	EBV Examples
Genetic composition	Population genetic differentiation
Species populations	Species distribution
	Population abundance
Species traits	Phenology
Community composition	Taxonomic diversity
Ecosystem function	Productivity
	Nutrient retention
Ecosystem structure	Habitat structure
	Extent and fragmentation
	Ecosystem composition by functional type

Global Biodiversity Science-Policy Network



(slide courtesy of DIVERSITAS/Anne Larigauderie)

Let's Go!

- We must monitor *globally*.
- We have many of the tools we need.
- But, we need an integrated global plan to network observations and models on the status and trends of biodiversity. >**Future Earth**
- We need regular scaling workshops and projects to develop and demonstrate our ability to network observations across scales. >**Future Earth**
- We need better model interoperability among ecol. models & between climate & ecol. models. >**F.E.**
- *Tempus fugit*: Windows of opportunity close quickly

Thank You