The GEO 2010 Baseline Initiative

The World in 2010

GEO Plenary VI
Washington, DC
November 17, 2009

Douglas M. Muchoney, Ph.D.
GEO Secretariat
What is the GEO 2010 Baseline Initiative?

The GEO 2010 Baseline Initiative is a coordinated effort to call on GEO Members and Participating Organizations to assemble interoperable datasets of imagery and derived products to establish a baseline of biological, environmental and physical conditions for the year 2010.

This Baseline would support the mandates of many international mechanisms and agreements, as well as serve the research community, as well as decision-makers, managers and the public.

The 2010 Baseline is cross-cutting, and therefore will support all SBAs, and especially serve inter-disciplinary projects. The Baseline would be the standard for retrospective and future monitoring.
Why is GEO the Place to do This?

- The GEO 2010 Baseline Initiative can be achieved based on on-going GEO activities, such as:
  - Data continuity
  - Data sharing
  - Interoperability
  - Standards development
  - Capacity building
  - Consistency between datasets
  - Dataset validation

- On-going global data Tasks that are contributing to a Baseline.
Are the Datasets Already Available?

There are a number of datasets that:

1) have already been contributed to GEOSS,

2) that are planned and/or in production, and

3) that could be produced given more resources, institutional commitment and coordination.
Overarching Task: Global Datasets (DA-09-03)

Sub Tasks:

- Land Cover and Land Cover Change
- Global Meteorological and Environmental Data
- Digital Geological Map Data
- Global DEM
Other Datasets Planned or in Production

- Temporal Phenology Metrics (US-09-03d)
- GEO Ecosystem Classification and Mapping (EC-09-01a)
- Global Road and Human Settlements Mapping (US-09-02c)
- Socio-economic and Demographic Global Data (US-09-02b)
- Forests (US-09-03b; EC-09-01e)
- Global Soil (US-09-03c)
- Global Soil Moisture (WA-08-01a)
- Hydrology and Precipitation (WA-08-01)
Critical Datasets that are Needed

There are several key datasets that are now technologically feasible that would serve many SBAs:

- A **global 30m validated land cover** for disasters, health, forestry, agriculture. Several global satellite datasets are planned to be acquired including optical and radar which would be supportive.

- A **global coordinated plot/site database** that can be used to calibrate and validate maps of land cover, ecosystems, vegetation, land cover and land use.
Early demonstrations

- Forest and Carbon Tracking (previously presented)
- Species Response to Climate Change – GEOSS Interoperability Pilot
- Phenology and Growing Season
- Ecosystem Classification and Mapping
- Coastal Ecosystems
- GlobCOLOUR
Remote Sensing and Phenology

Phenology: Study of the timing of biological events

- **Human Health**: Early Asthma Warning System
- **Famine Early Warning system (FEWS)**
- **Ecosystem assessment and monitoring**
- **Agriculture**: timing of planting, application of herbicides and fertilizer
- **Climate change**: albedo, NPP
- **Animal migration**
- **Insect hatching**

*Science, June 6, 2003*

**Climate-Driven Increases in Global Terrestrial Net Primary Production from 1982 to 1999**

Ramakrishna R. Nemani,1,4 Charles D. Keeling,2 Hirofumi Hashimoto,1,3 William M. Jolly,7 Stephen C. Piper,2 Compton J. Tucker,4 Ranga B. Myneni,2 Steven W. Running1

Recent climatic changes have enhanced plant growth in northern mid-latitudes and high latitudes. However, a comprehensive analysis of the impact of global climatic changes on vegetation productivity has not before been expressed in the context of variable limiting factors to plant growth. We present a global investigation of vegetation responses to climatic changes by analyzing 18 years (1982 to 1999) of both climatic data and satellite observations of vegetation activity. Our results indicate that global changes in climate have eased several critical climatic constraints to plant growth, such that net primary production increased 6% (3.4 petagrams of carbon over 18 years) globally. The largest increase was in tropical ecosystems. Amazon rain forests accounted for 42% of the global increase in net primary production, owing mainly to decreased cloud cover and the resulting increase in solar radiation.
Coastal Ecosystems and Processes
GlobCOLOUR Products
What International Agreements and Mechanisms will the 2010 Baseline Support?

- Convention on Biological Diversity (CBD) Indicators and Global Biodiversity Outlook
- UNFCCC
- Inter-governmental Panel on Climate Change (IPCC)
- UNEP Global Environmental Outlook (UNEP-GEO)
- FAO Forest Resource Assessment (FAO-FRA)
- The Convention to Combat Desertification (UNCCD)
- Ramsar Wetland Convention
Who Else will Benefit?

- UNEP-World Conservation Monitoring Centre (WCMC): data for monitoring status and trends in protected areas
- UNESCO World Heritage Sites: monitoring status and trends
- Academia: research and applied research
- Nations
- The Public
In Conclusion, the GEO Baseline 2010 Initiative will:

- Provide valuable, shared and inter-operable datasets to support inter-governmental activities, research, analyses, and decision-makers.
- Serve as a rallying point among GEO Members to identify and fill critical gaps in our knowledge of the status of the Earth system and resources.
- Promote public awareness on the need for Earth observation data to understand our changing planet.
- Further the establishment of GEOSS.