



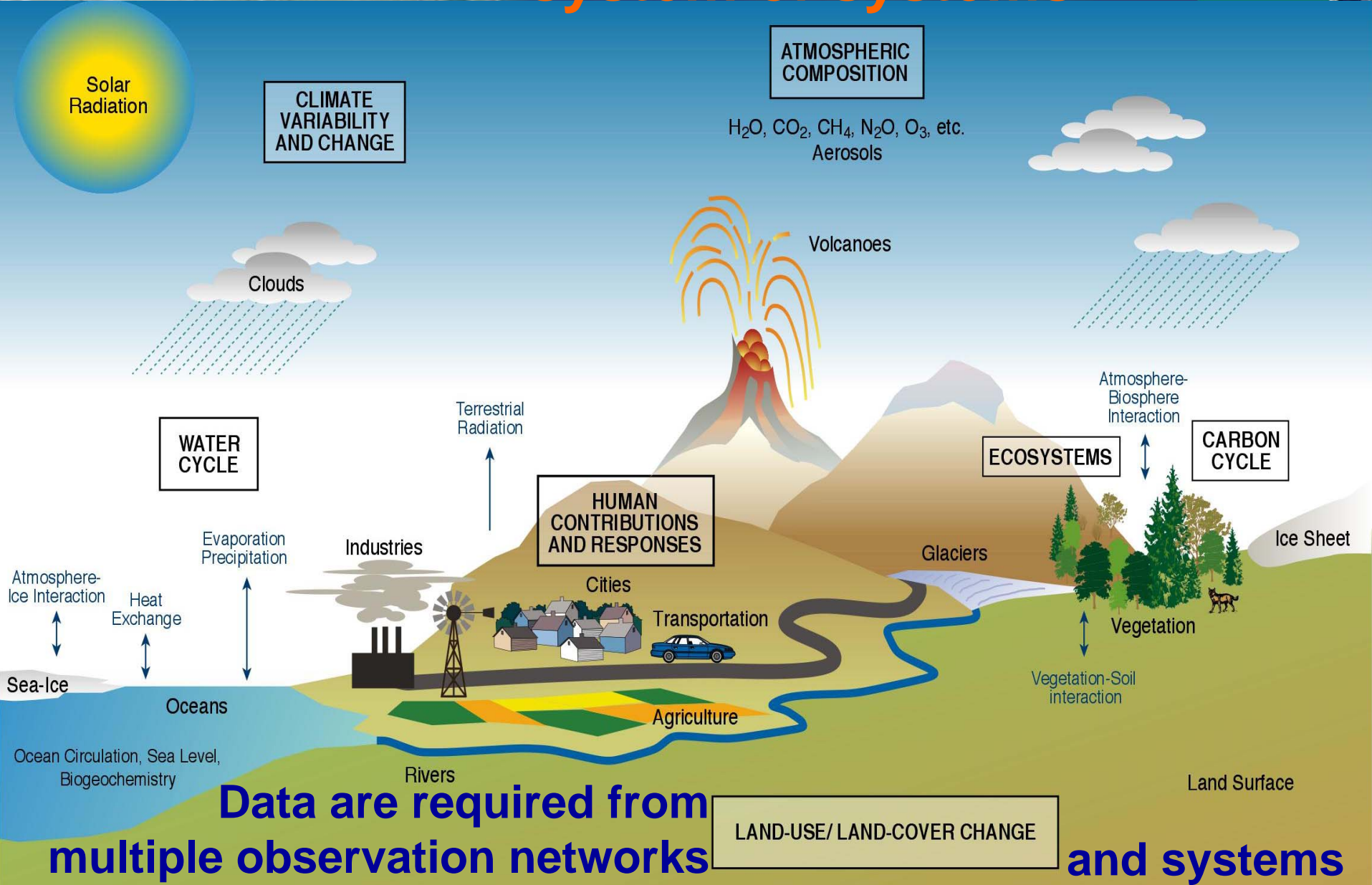
Group on
Earth Observations

The GEO contribution to Cryosphere research and applications and the International Polar Year

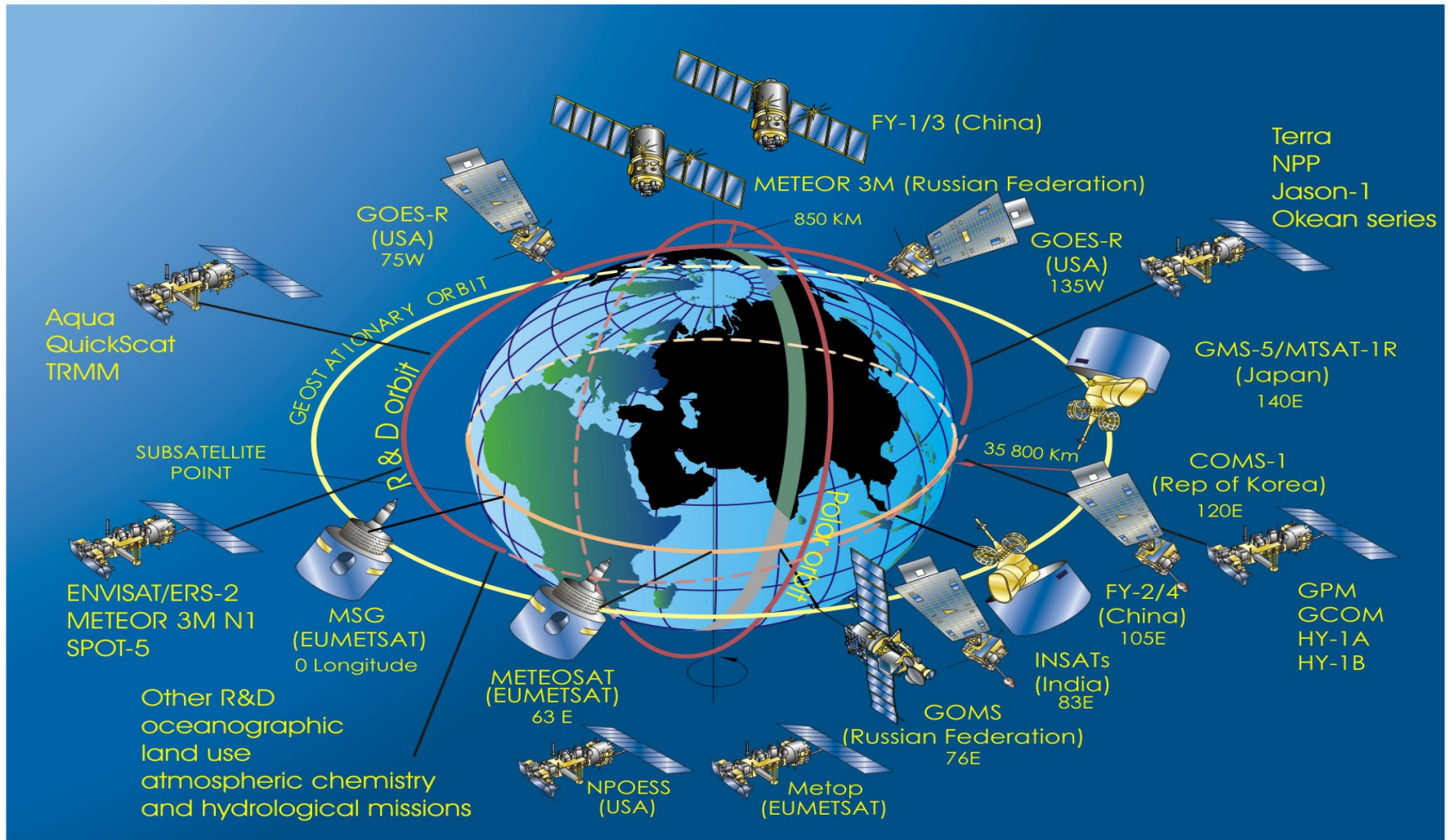
Michael Rast, GEO Secretariat
IGOS Cryosphere Theme Workshop, ESTEC,
October, 2006



The Earth is a complex system of systems

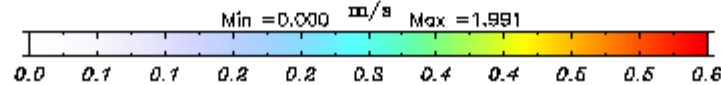
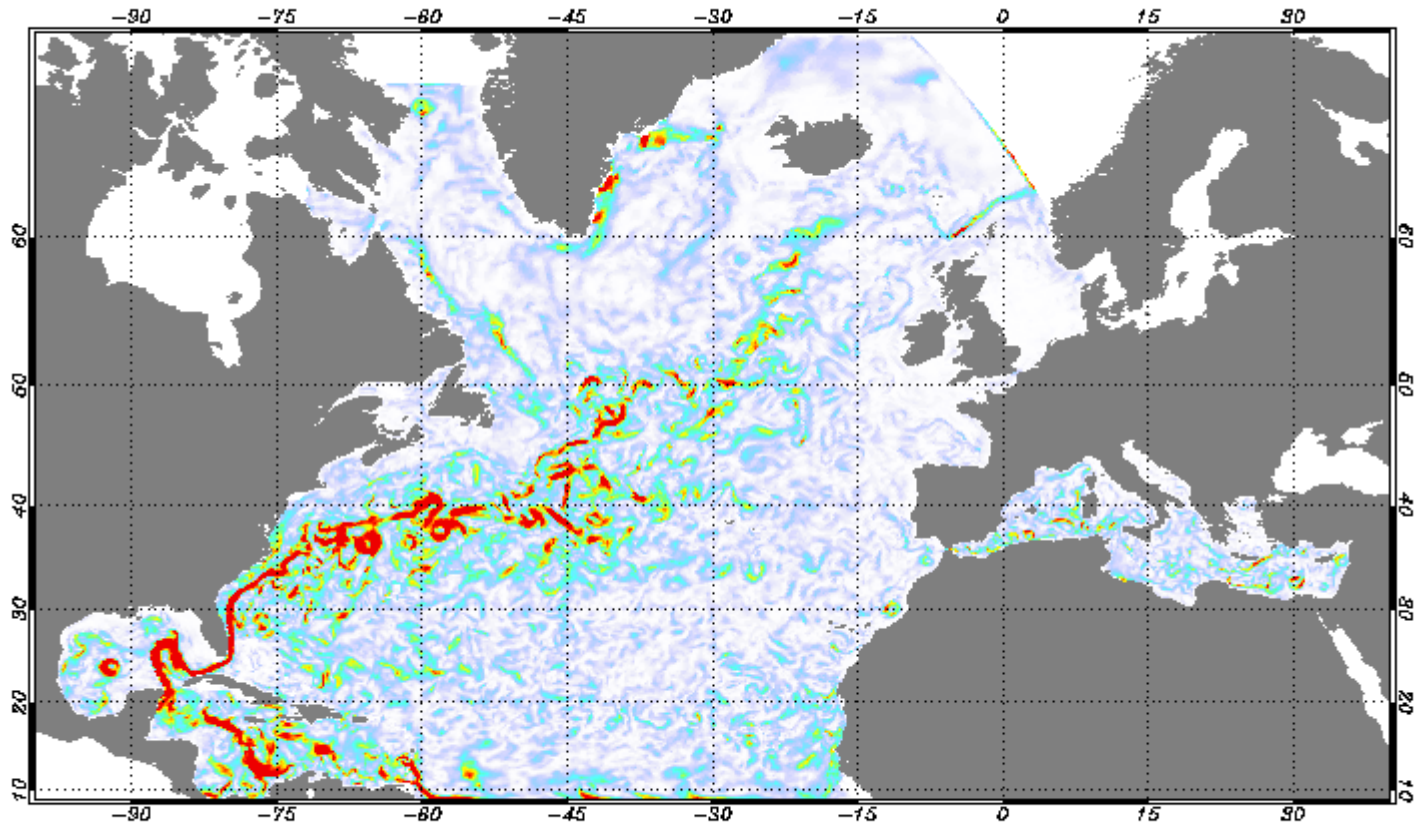


Satellite Observation Systems

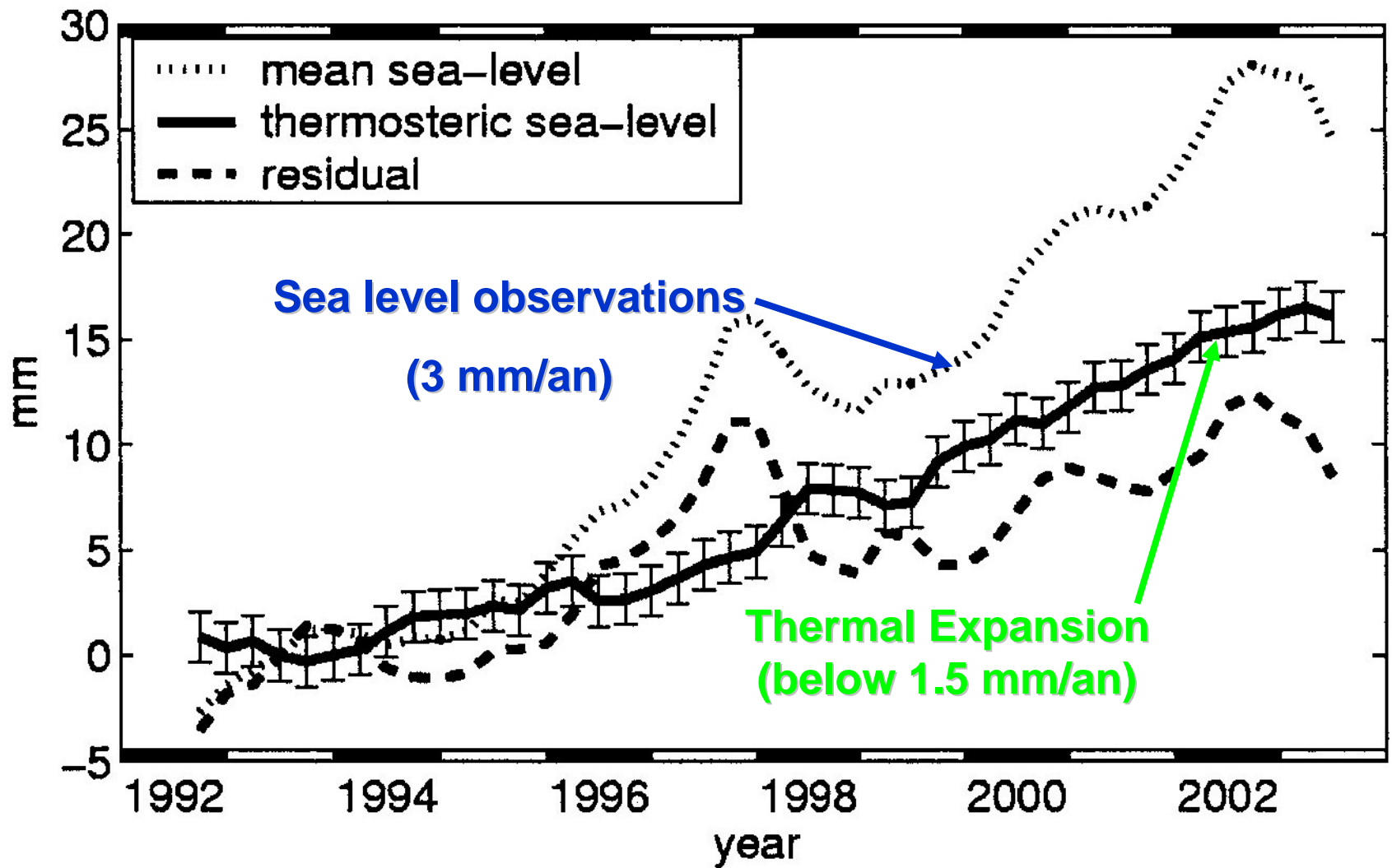


Satellite Observation Systems

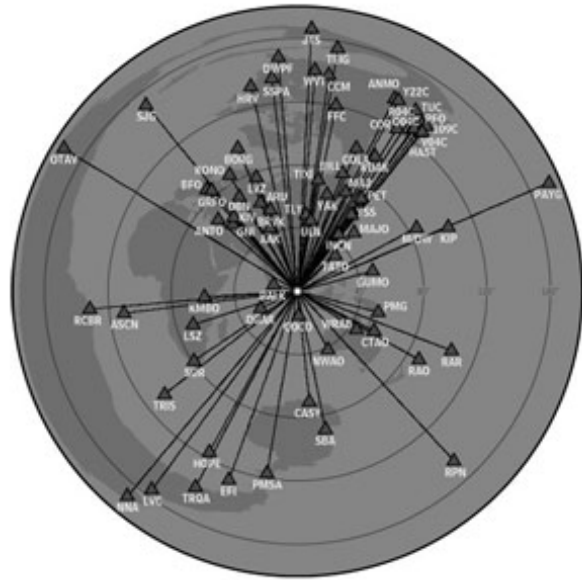
initialised velocity : U on 31-03-2004 near 3m



ENVISAT RA-2 observing the Gulf Stream current velocity



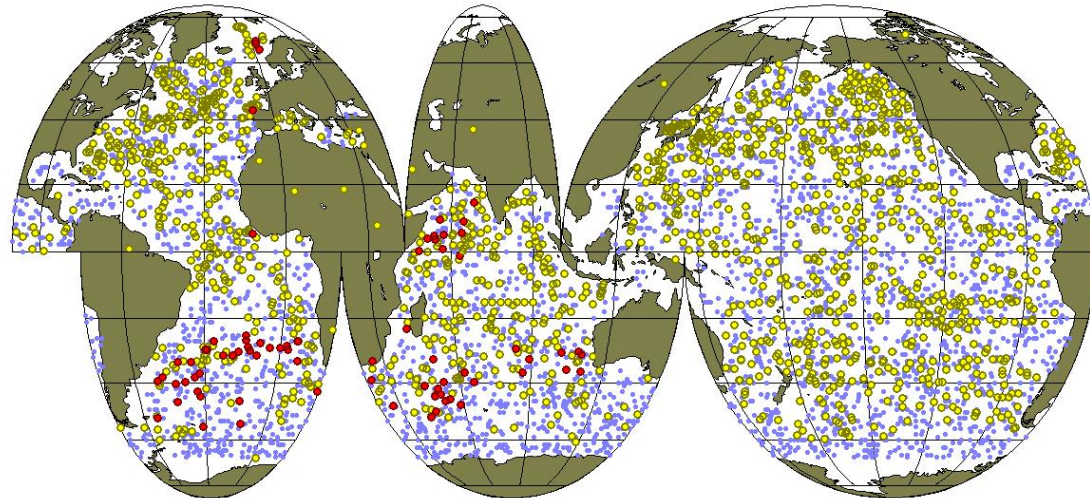
Global In-situ Networks



Seismic Networks

Argo Float Array

Global Argo Float Array (red – Argo UK; yellow – all Argo; blue – proposed array)





Regional and Local In-situ Networks



TEAM

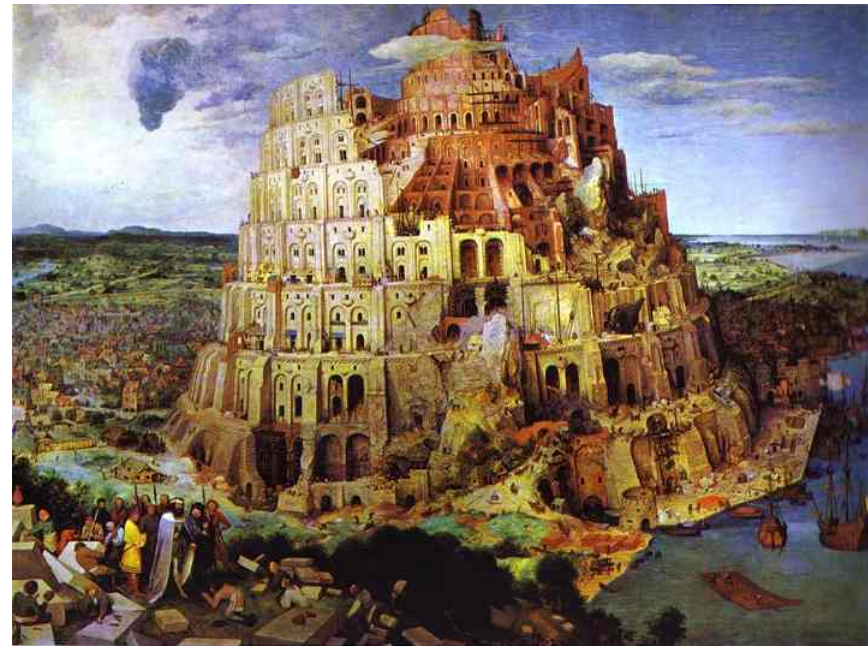
Tropical Ecology Assessment & Monitoring Initiative



There is a Need for a System which Provides Access to all Earth Observation Data in Standard Interoperable Formats

Need for a Portal and Clearinghouse

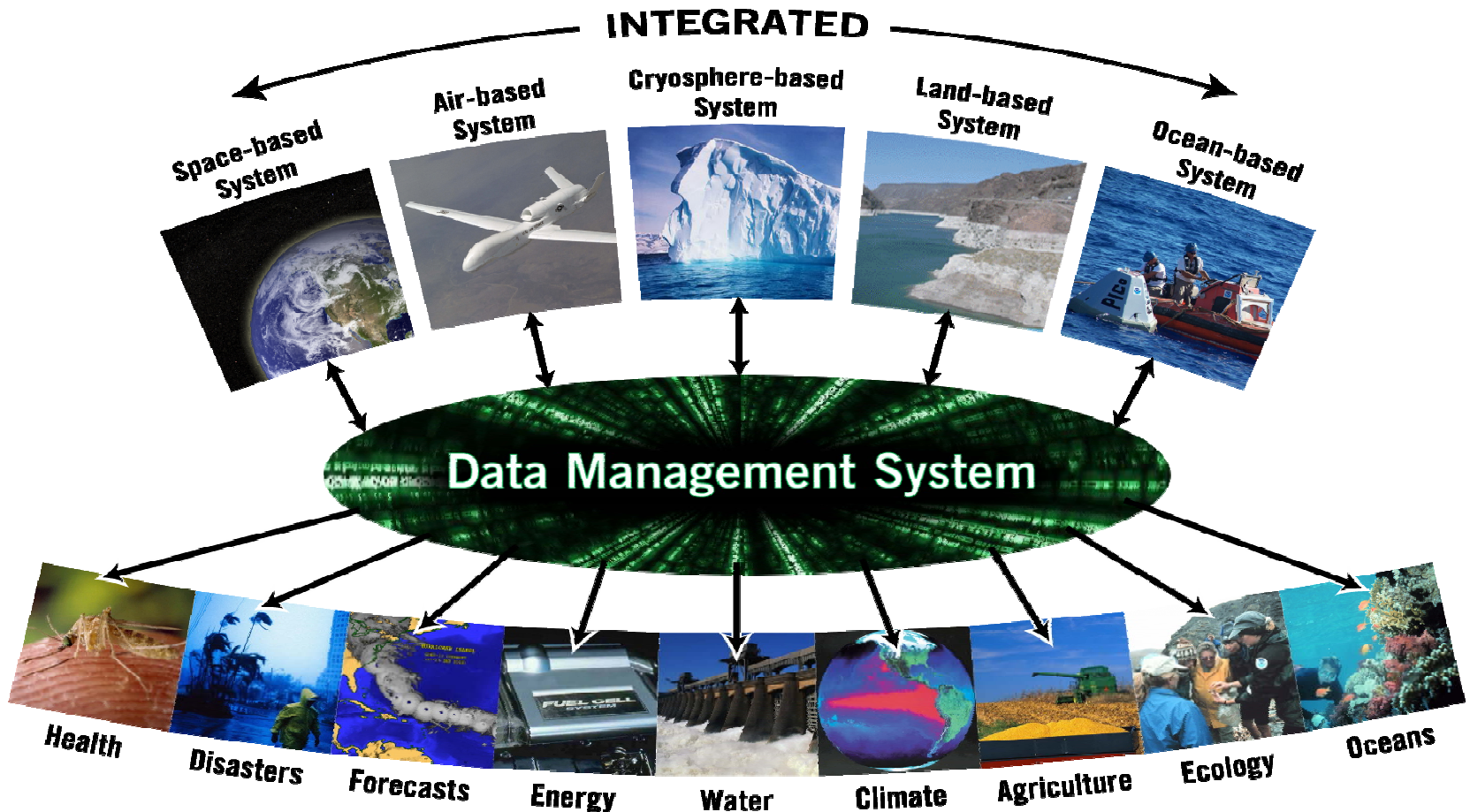
- For Access to all Earth Observation Data
- Based on Existing Portals, Systems and Networks
- Designed to Increase Quality and Accessibility of Information
- Providing Tools



- The Group on Earth Observations **GEO** as Intergovernmental Organization is formally established
- 10-Year Implementation Plan Endorsed
- GEO Secretariat established in Geneva
- the Group on Earth Observations is an Intergovernmental Organization with 65 Member Countries, the European Commission and 43 Participating Organizations
- One Objective: Establish a global, coordinated, comprehensive and sustained system of Earth observing systems, **GEOSS**



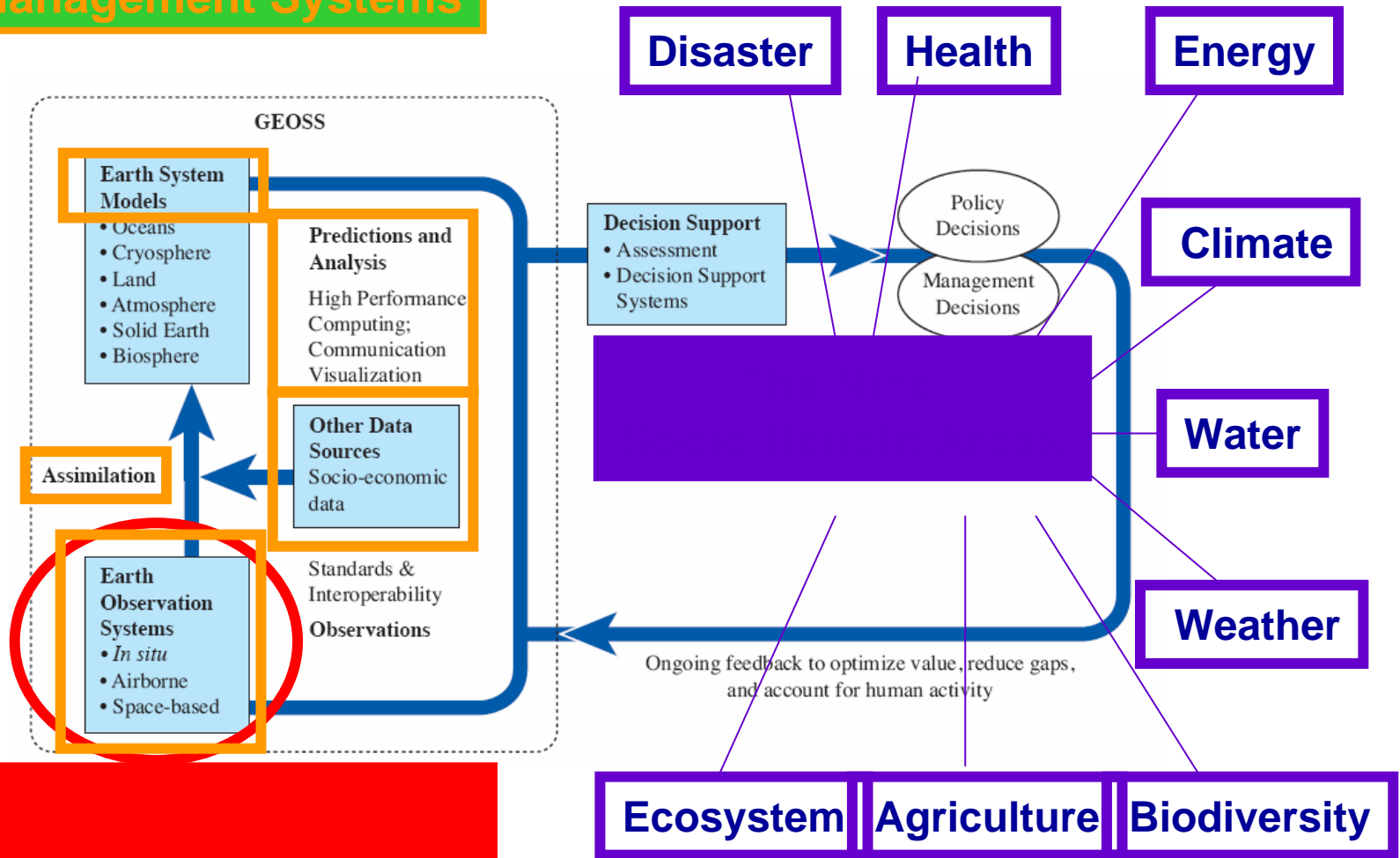
A Global, Coordinated, Comprehensive and Sustained System of Earth Observing Systems





- **Needs-driven** - driven by user needs, supports a broad range of implementation options
- **Scope** - addresses all observations required for participants to make products, forecasts and related decisions
- **Capabilities** - includes observing, processing, and dissemination capabilities, provided by national, regional or international agencies subscribing to GEOSS while retaining their ownership and operational responsibility
- **Data and its exchange and dissemination** - observations and products are to be observed, recorded and stored in clearly defined formats
- **Operation** - secures the future continuity of observations
- **Catalogue** - members and participating organizations and the components they support will be documented in a catalogue that is publicly accessible, network distributed, and interoperable with major Earth observations catalogues

Modeling, and Data Management Systems



A Cross-cutting Approach

GEOSS will serve 9 Societal Benefit Areas

1. Reduction and Prevention of Disasters
2. Human Health and Epidemiology
3. Energy Management
4. Climate Change
5. Water Management
6. Weather Forecasting
7. Ecosystems
8. Agriculture
9. Biodiversity





will Provide Systems Interoperability and Easier and More Open Data Access

Seven shortcomings as target areas for GEOSS:

- 1. Lack of access to data and associated benefits in the developing world**
- 2. Eroding technical infrastructure**
- 3. Large spatial and temporal gaps in specific data sets**
- 4. Inadequate data integration and interoperability**
- 5. Uncertainty over continuity of observations**
- 6. Inadequate user involvement**
- 7. Lack of relevant processing systems to transform data into useful information**

A User-driven Approach

- Improve and Coordinate Observation Systems
- Provide Easier & More Open Data Access
- Foster Use through Science and Applications

to answer Society's need for informed decision making

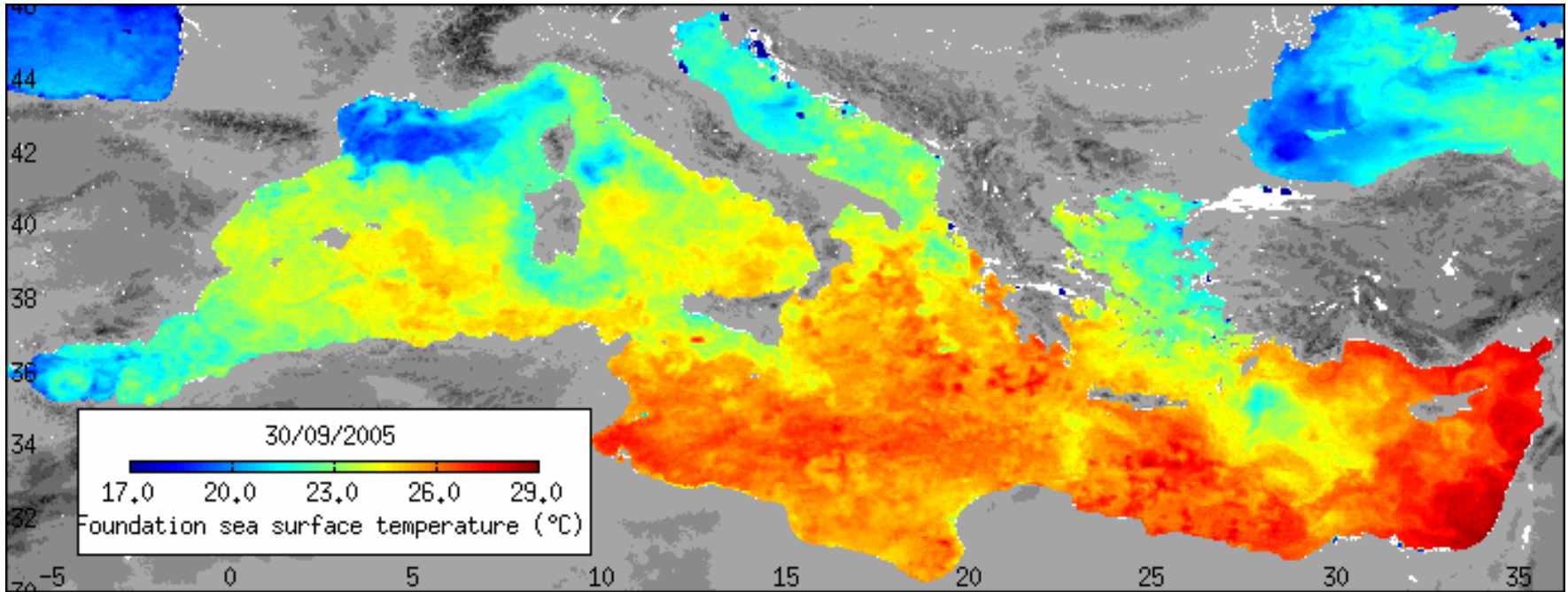
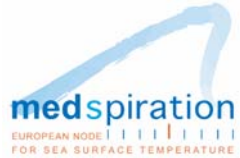
Interoperability Arrangements

“What few things must be the same so that everything else can be different?”

Eliot Christian



Sea Surface Temperature Mediterranean Sea in September 2005



The Medspiration project combines SST data measured independently by different satellites, including Envisat AATSR, into a set of products that represent the best measure of SST, presented in a form that can be assimilated into numerical ocean forecasting models.

<http://www.medspiration.org>

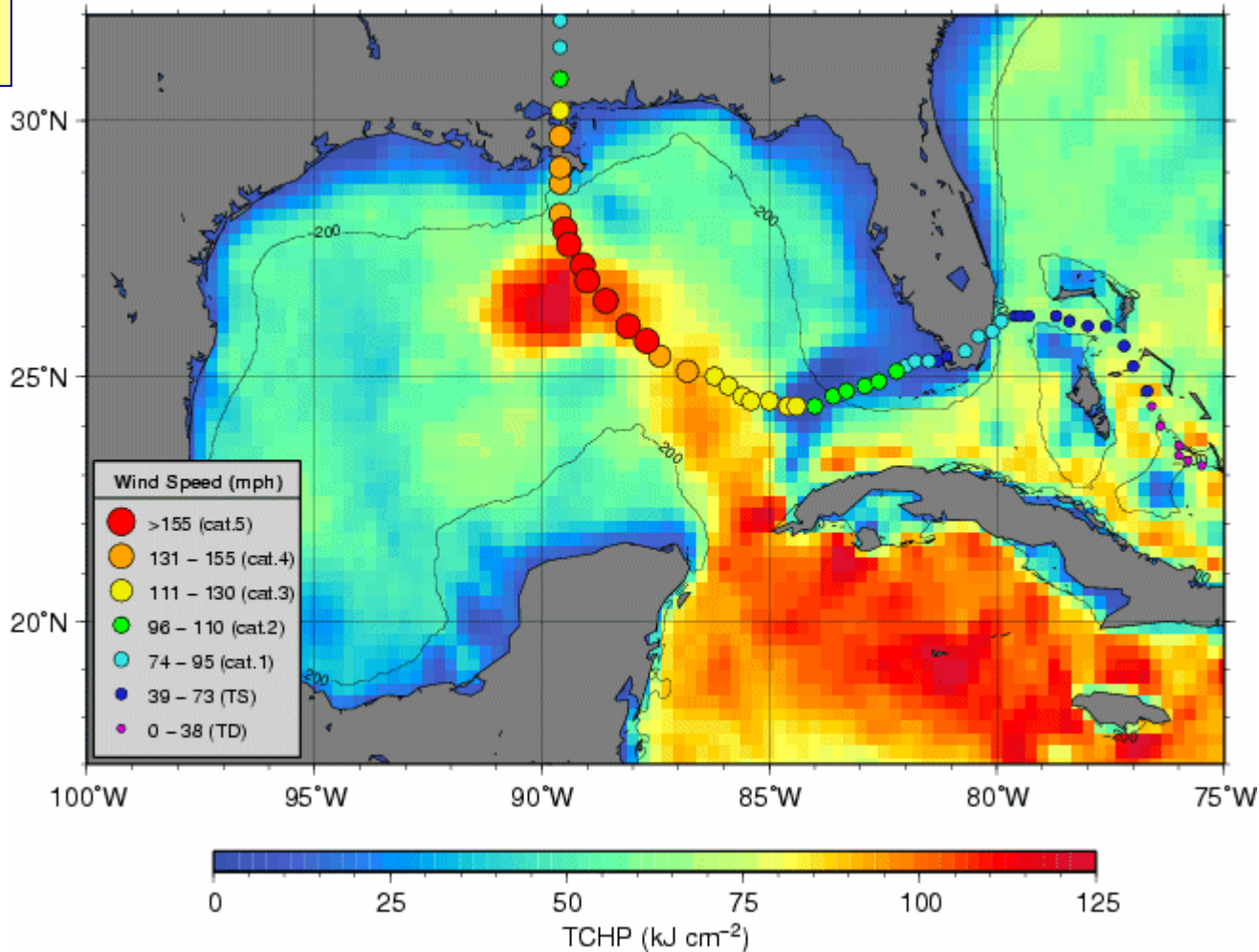


GEO will Support the Development of New Observation Methodologies



Gulf of Mexico – Tropical cyclone heat potential (TCHP) 08/28/2005

Hurricane Katrina

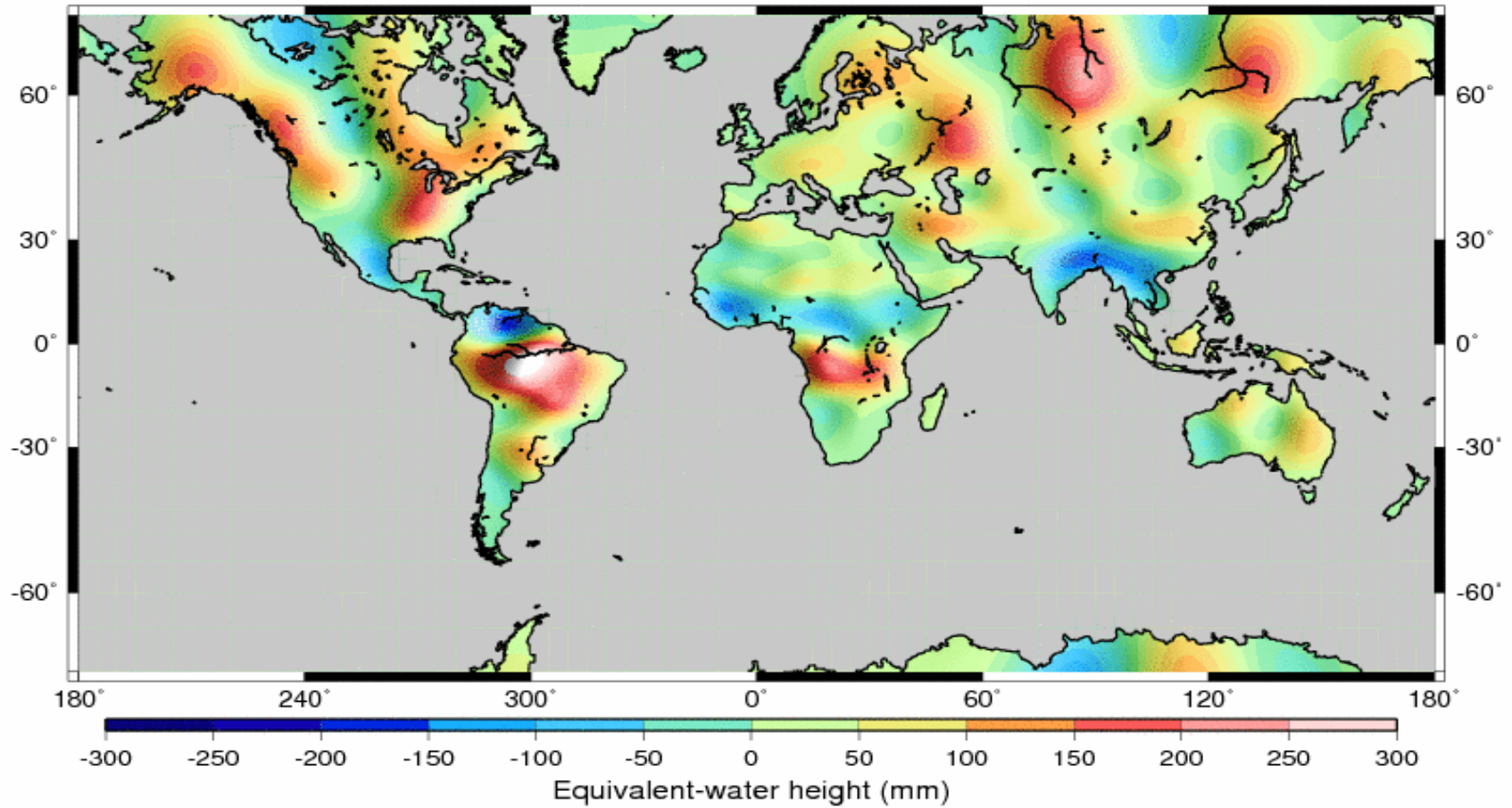


Altimetry data from ESA Envisat, NASA/CNES Topex/Poseidon & Jason-1, US Navy GFO

Figures courtesy of Gustavo Goni, NOAA/OAR/AOML



GRACE LW SOLUTION --- APR MAY 2002 --- DEG=25-30 --- 5 ITERATIONS





GEO will Foster the Implementation of Applications and Services (e.g., Forecasts)

GEOSS will Facilitate Integration of Space and In-situ Observations

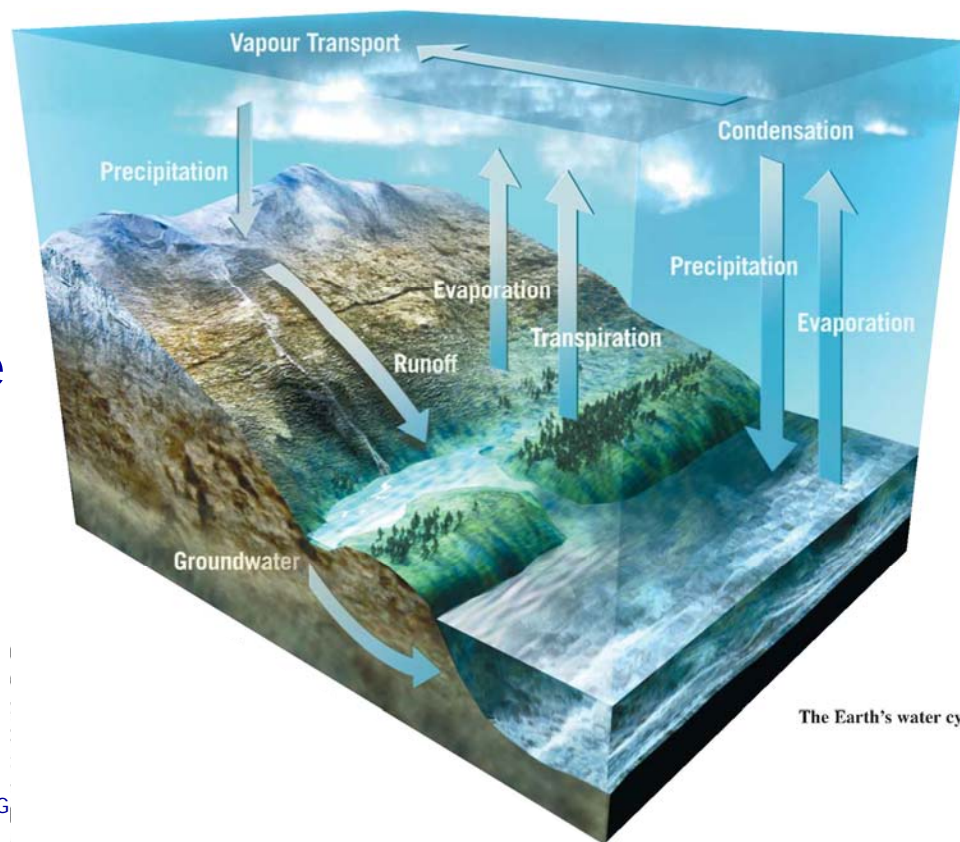


Another Example:

Global Continental Water-Level Observations

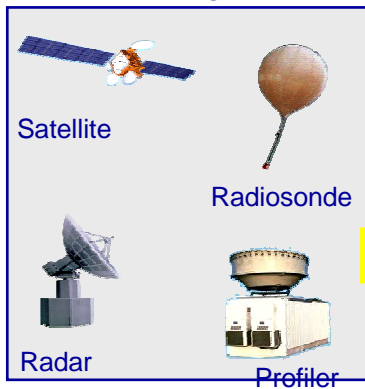
Strengthening satellite and in situ monitoring networks of estuaries, rivers, lakes, reservoirs, and groundwater levels:

- For flood risk management
- For improving water resource management
- For understanding sea-level rise

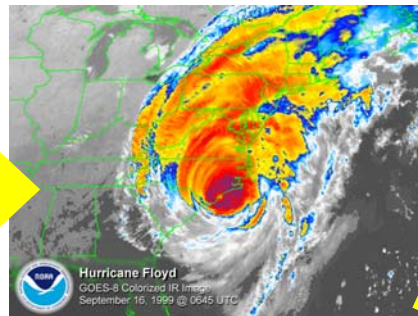




Measurements & Analysis



System Products



Responders' Information

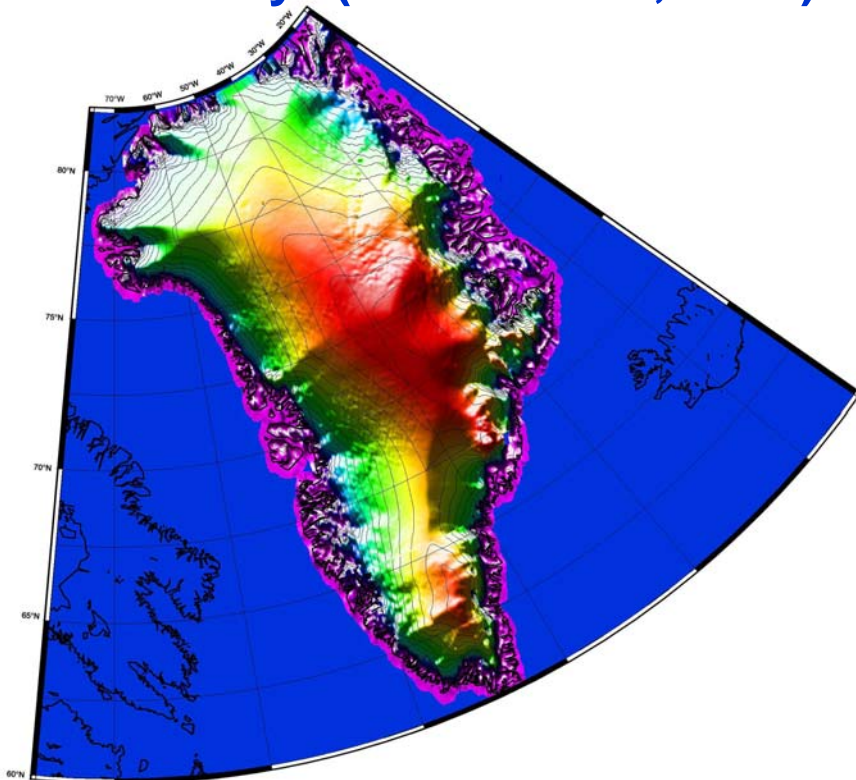


California Pictures

Greenland Topography

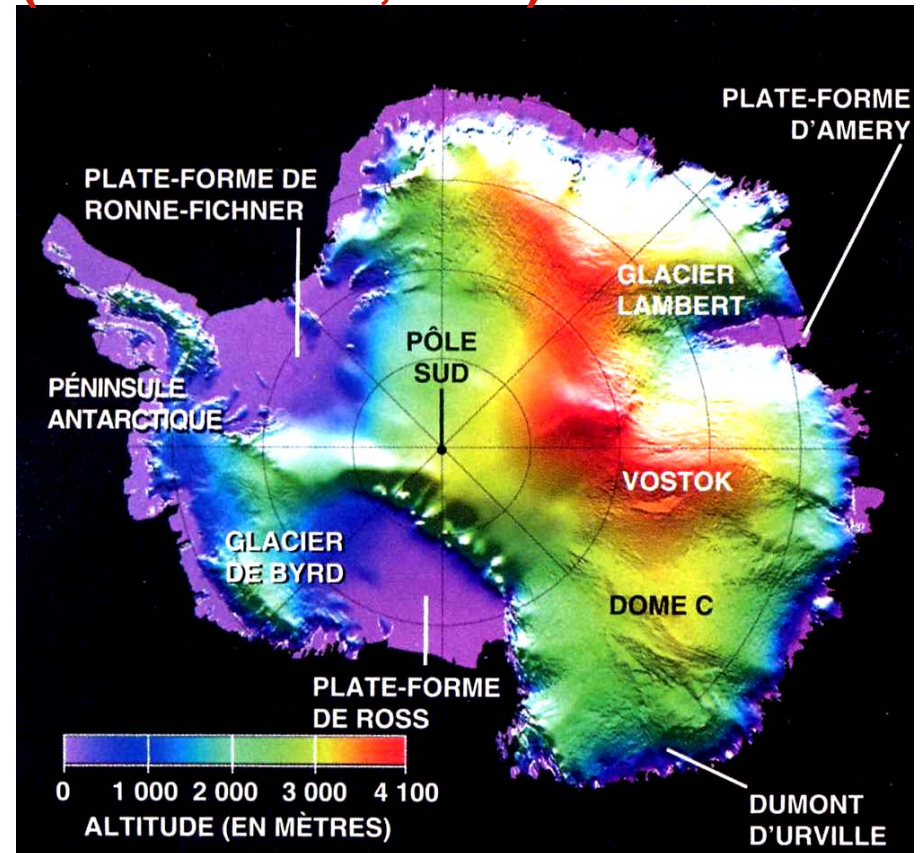
(after ERS-1; F. Remy)

Melting of coastal regions:
0.15 mm/yr (Krabill et al., 2000)



West Antarctica Topography

Melting of 0.2 mm/yr
(Thomas et al., 2004)





Task Climate-2006-05:

Coordinate with the International Polar Year (IPY) to enhance the utilization of Earth observations in all appropriate realms (including, but not limited to, sea and land ice, permafrost, coastal erosion, marine and terrestrial ecosystem change, biodiversity monitoring and impacts of increased resource exploitation and marine transport).



Identify IPY activities and projects most relevant to GEOSS implementation and to which GEO can significantly add value and promote the development of these activities and projects.

Consider projects in line with 2006 GEO Work Plan and that are promoting: data interoperability; open and timely data access; recovery of relevant historical data; improved exploitation of available polar observing systems, logistical assets and infrastructure; development of new technological and logistical capabilities.



Contribute to the development and implementation of the IPY Data Management strategy by supporting the Data Policy and Management subcommittee and the Data and Information Service to ensure that all data collected as part of the IPY 2007-2008 are stored in a user-friendly format and will be accessible via the web in the future and that IPY 2007-2008 leaves in place a system of data and information management that makes it easy for the polar research community to continue to store, find and distribute scientific data collected in the polar regions



Identify and initiate further actions to make IPY project-outcomes durable (e.g. new observing sites & facilities to support polar research and monitoring).

Create a plan to facilitate the transition of relevant observation system component (e.g. forecasting systems) from research to operational status.



Focus on the **legacy of IPY** to:

- **Make the IPY project outcome durable**
- **Ensure sustained flow of data from projects that need continuity to complete or further substantiate findings**
- **Safeguard continued availability of data and results to the community**
- **Support observing sites & facilities established through or within the IPY to continue polar monitoring and research**
- **continue, activities, where necessary to facilitate the transition of relevant observation system component from research to operational status**



It is proposed to hold a Workshop addressing the

“Legacy of IPY”

Organisation: GEO, WMO, CLIC, SCAR, -to be extended-

Date and Venue: **Spring, 2008 at WMO**, Geneva (following a planning meeting in late 2007)

Organising Committee: Members of IPY Joint Committee, the IGOS Cryo-Team, IPY Data-, Observations- and Space Group, WMO and GEO, SCAR, -to be extended-

Prime Objective: Review and **prioritise Projects** selected through IPY that are **“vital” to be continued** and identify potential sponsors per priority activity

- GEO is more than only an opportunity to coordinate consolidate and extend observations in the Cryosphere
- GEO is the appropriate forum to seek advocacy and support for sustaining existing activities and initiating new ones
- More specifically:
 - Data Policy – *GEO data management Tasks*
 - Data acquisition - *GIIPSY*
 - New products – *CLiC etc*
 - Observational Requirements – *IGOS CRYO*
 - In-situ observations – *WCRP (?)*
 - Archives - *GEOSS*
- Process is Always Open to New Participants – GEO IPY Task
 - Point OF Contact, Co-Leads and Contributors

For more information: www.earthobservations.org