

A scenic view of a beach with waves crashing onto the shore under a cloudy sky. The foreground shows the wet sand of the beach, and the background features a forested hillside.

GGOS Progress Toward an Interaction with IGOS-P

**Hans-Peter Plag,
Nevada Bureau of Mines and Geology and Seismological Laboratory, University of
Nevada, Reno, Nevada, USA**

Overview

The Background: IGOS and IGOS-P

- The Integrated Global Observing Strategy (IGOS)
- IGOS-Partnership (IGOS-P)
- The Theme process

GGOS and IGOS-P

- Towards Partnership
- GGOS and the IGOS-P Themes
- The Earth System Dynamics Theme: A Developing Proposal

The Integrated Global Observing Strategy (IGOS)

Since 1995: Integrated Global Observing Strategy (IGOS) developed.

- Initially for the three Global Observing Systems
- Sustainable, comprehensive monitoring of the Earth system:
 - Long-term stability
 - Operational mode
 - Homogeneity in time
 - Multi-parameter sites
 - Global coverage and participation,
 - Integrated observation and data sets
 - Accessible databases
- Transition from research to operational

June 1998: Integrated Global Observing System-Partnership (IGOS-P) is formed through exchange of Letters of Understanding.

IGOS-Partnership (IGOS-P)

Integrate Global Observing Strategy Partnership (IGOS-P) was created in June 1998

IGOS-P is a partnership of organisations that are concerned with global environmental change issues.



IGFA



GTOS

GOS/GAW



GLOBAL
CHANGE



IGOS-Partnership (IGOS-P)

The Partnership

- provides a comprehensive framework for major space-based and in situ systems for global observations of the Earth.
- provides an over-arching strategy for conducting observations relating to climate and atmosphere, oceans and coasts, the land surface and the Earth's interior.
- builds upon the strategies of existing international global observing programmes, and upon current achievements,
- seeks to improve observing capacity and deliver observations in a cost-effective and timely fashion.
- directs efforts to those areas where satisfactory international arrangements and structures do not currently exist.

The Theme Process

IGOS-P applies a theme approach to define and implement the Integrated Global Observing Strategy, and this is the key activity of IGOS-P.

Goal of IGOS-P is a (small) number of themes with **strong linkages to critical societal issues.**

Currently a number Themes exist or are in the planning:

- Carbon Cycle
- Ocean
- Atmospheric Chemistry
- Geohazards
- The Integrated Global Water Cycle Observation Theme
- Coasts (including Coral reefs)
- Cryosphere
- Land

IGOS-P Theme Process

The IGOS-P Theme Process:

Goal of IGOS-P is a (small) number of themes with **strong linkages to critical societal issues**.

The Process of Theme selection is based on an assessment of the relevant scientific and operational priorities for overcoming deficiencies in information, as well as analysis of the state of development of relevant existing and planned observing systems.

Process of establishing a new theme is long (normally 18-24 months)

IGOS-P Theme Process

The IGOS Themes Process involves:

- **Agreement by the Partners on a Theme proposal** which must respect certain specified criteria (relevance to social benefit areas, overcoming deficiencies in information, state of development of relevant existing and planned observing systems).
- **Establishment of a Theme team** with appropriate leadership and resources.
- **Approval by the Partnership of the Theme Team's report**, including a common set of essential observations and their technical characteristics (such as accuracy and frequency), and commitments from providers of space-based and in-situ observations.
- **Establishment of an Implementation Team** with the responsibility and capacity required for the long-term implementation of the necessary operational networks.
- **A formal declaration of commitment** to Theme Team recommendations by the governments and organizations who actually implement, maintain and operate the relevant observing systems.

GGOS and IGOS-P

Steps so far:

- **June 2004:** First presentation of the theme idea at IGOS-P meeting in Rome (Dynamic Earth Theme)
- **February 2005:** Meeting with Geohazards Theme chairs at UNESCO, Paris
- **Spring 2005:** Document summarizing IAG Services/GGOS and giving rationale for GGOS membership and outlining a theme (Earth system dynamics Theme)
- **May 26, 2005:** IGOS-P meeting in Geneva proposed membership of GGOS and asked all members to confirm
- **November 16, 2005:** IGOS-P meeting in London: Stuart Marsh presented status of Action Items from May 26. UNESCO and the Geohazards Theme supported partnership of GGOS.
- ...

GGOS and IGOS-P

Steps so far:

- ...
- Quote from e-mail of Stuart Marsh: *...The decision taken was therefore: "agreement, in principle, for GGOS to join IGOS as a new observing system, subject to:
 - formal written endorsement from CEOS SIT
 - confirmation by ICSU of IUGG endorsementboth of which should be provided quickly via an email to the IGOS Co-Chairs"*

GGOS will be partner in IGOS-P pending two formal actions

GGOS and IGOS-P

GGOS considers currently two questions:

- How can GGOS link and contribute to existing Themes?
- Should there be a new 'Earth System Dynamics' focused around mass transport in the Earth system and associated dynamics?

Work on two documents for IGOS-P Theme Team Leader Meeting:

- GGOS contribution to IGOS-P Themes
- GGOS ideas for an Earth System Dynamics Theme

How is this done:

- A small writing team is doing this job
- Inclusion of other experts where needed

Initial writing team:

- Hans-Peter Plag
- Srinivas Bettadpur
- Richard Gross
- Ruth Neilan
- Markus Rothacher
- Reiner Rummel

Important goals:

- Document the need for a new Theme.
- Show that there is not substantial overlap with existing themes.

GGOS and the IGOS-P Themes

The Geohazards Theme: Plate tectonics, pre-, co- and post-seismic strain, processes associated with volcanos, early warning for tsunamies, subsidence, precarious rocks, landslides, and local and regional predictions of sea level rise are examples of topics that link this theme to geodetic observations.

The Ocean Theme: Ocean circulation, sea level rise, isostacy, dynamic sea surface topography, are linked to the three geodetic quantities, both for the monitoring and studies of the ocean's variability as well as model validation.

Water Cycle Theme: The geodetic observations provide a unique tool to monitor the global to local scale movememnts of water throught the Earth system and the theme is strongly linked to geodesy.

The Coast Observation Theme: Sea level and ocean circulation are relevant parameters influencing the dynamic processes in the coastal zone and linking the theme to geodesy.

The Cryosphere Theme: Ice mass balance, glacial isostacy, and induced sea level variations all are important parameters, that are directly observed by the geodetic observation techniques.

The Land Theme: Changes in the elevation are directly observed by geodetic techniques.



The Earth System Dynamics Theme

The Dynamics of the Earth system are strongly linked to mass transports in the Earth system:

- mass transport in the atmosphere
- mass transport in the water cycle
- mass transport in the solid Earth

All these processes affect to certain levels:

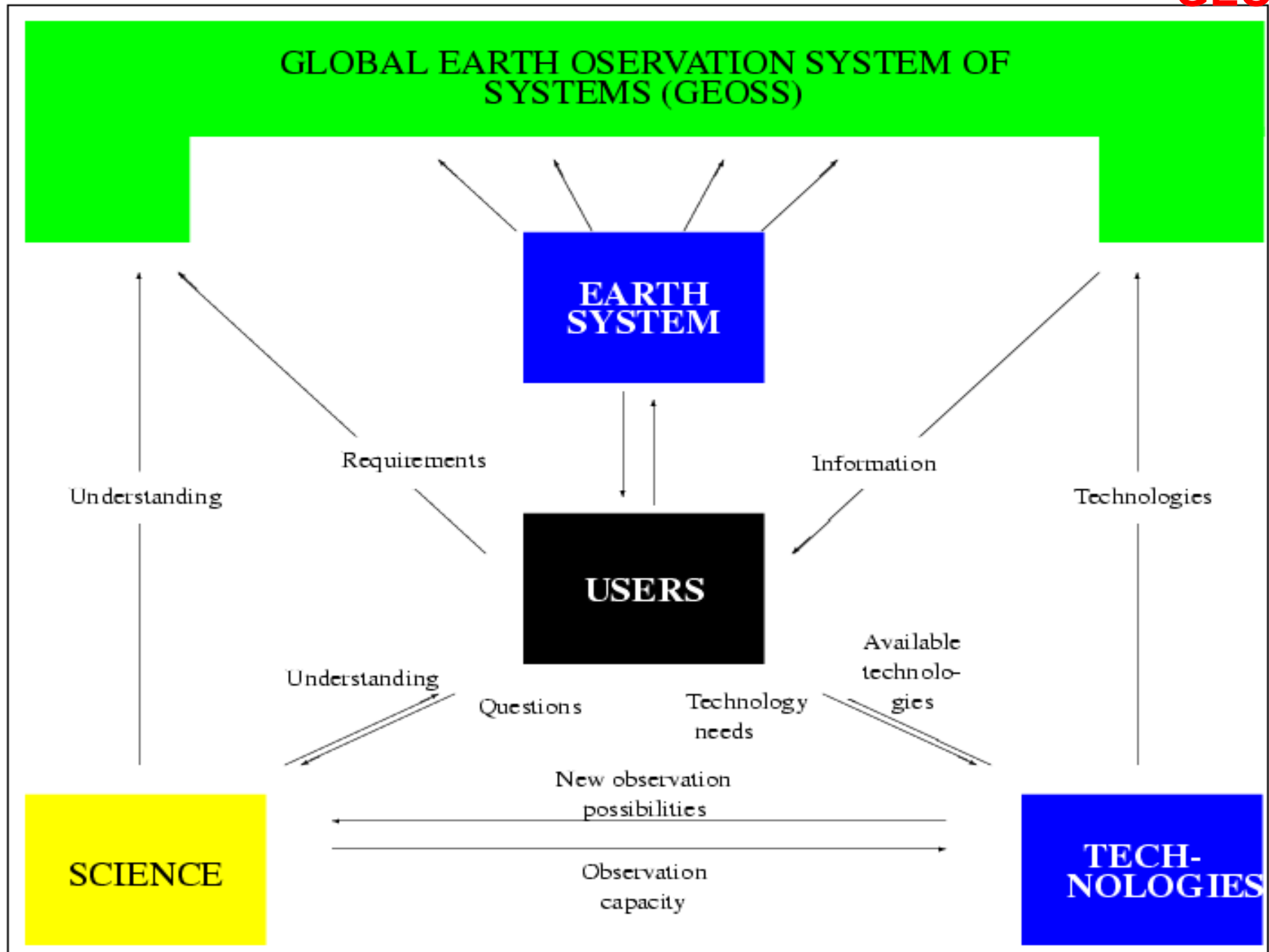
- geometry of the Earth
- gravity field
- Earth rotation

All these processes interact on global and regional scales

Geodetic methods are inherently strong on regional to global scales

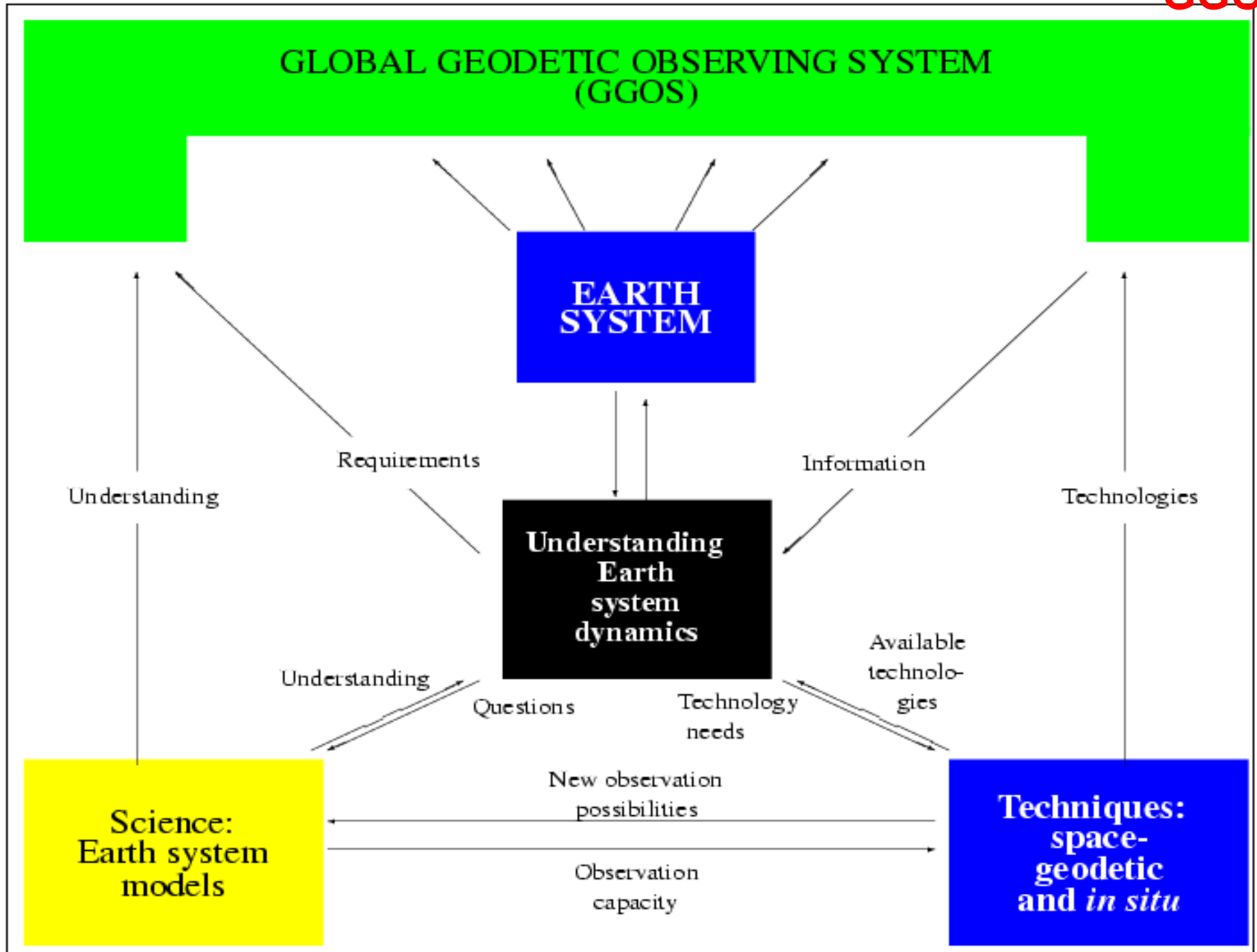
The Earth System Dynamics Theme

GEOSS

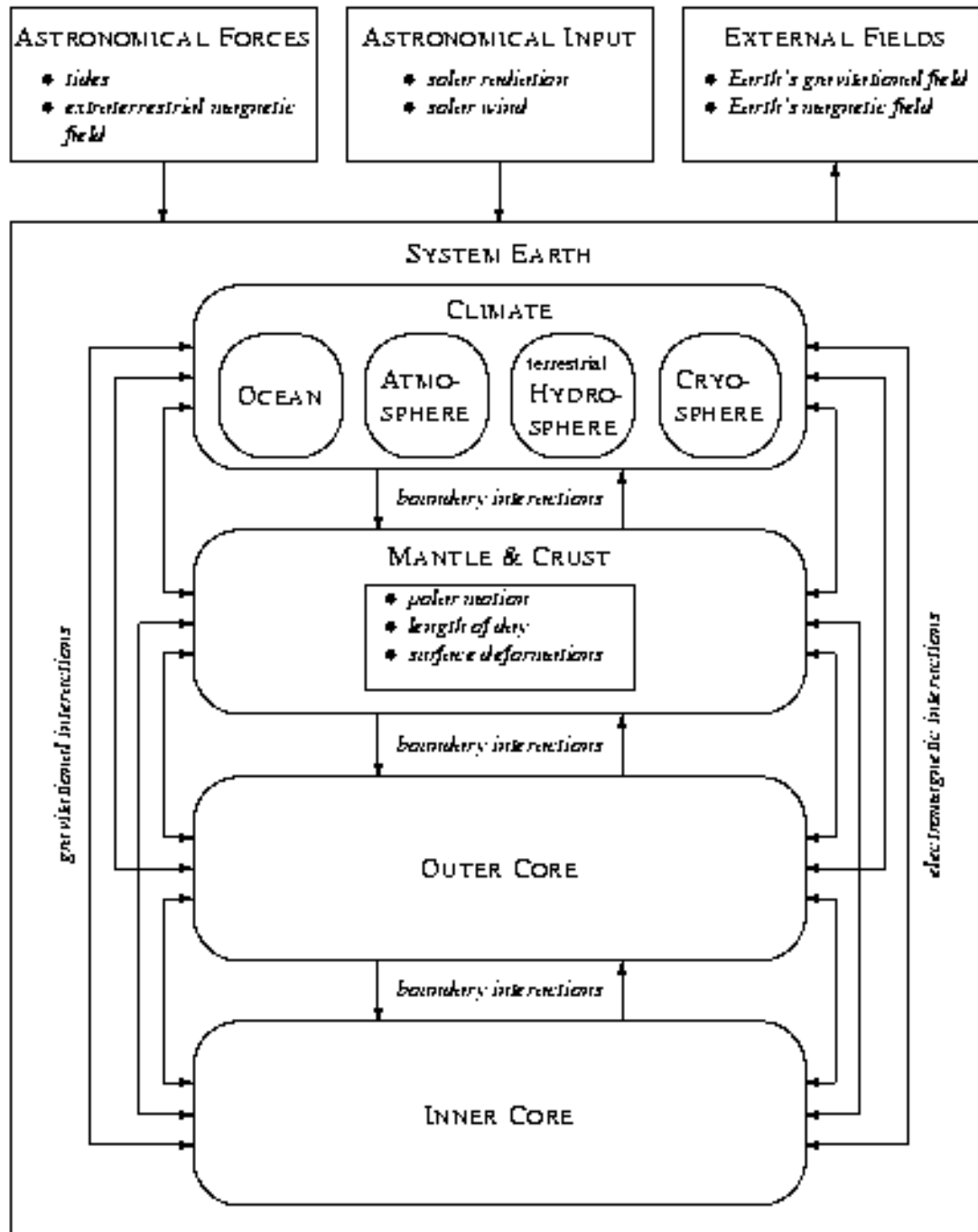


The Earth System Dynamics Theme

GGOS



The Earth System Dynamics Theme



In order to provide the appropriate metrological basis for Earth observation, geodesy needs to account for interaction between the subsystem.

This requires an Earth system approach to modeling.

Earth system models are tools for understanding the processes assessment.

The Earth System Dynamics Theme responds to societal problems of

- climate
- geohazards
- sustainable development