GEOSS
The Global Earth Observation System of Systems

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GEO
Group on Earth Observations

GEOSS
Global Earth Observation System of Systems
• **GEO** is an Intergovernmental Group
  – 72 Nations
  – European Commission
  – 52 Participating Organizations

• **With a Single Objective: GEOSS**
  – To establish a *global, coordinated, comprehensive and sustained* system of Earth *observation* systems
GEOSS Components

1. OBSERVE
   - In-situ & Airborne
   - Space
   *Requires interoperability for instrumentation and observations planning.*

2. PROCESS
   - Data Processing
   - Data Assimilation & Modelling
   *Requires interoperability for formats, standards etc.*

3. DISTRIBUTE
   - Distribution Networks
   - Data Cataloguing
   - Data Archiving
   *Requires interoperability for exchange of data sets, data catalogue/search protocols.
   Requires interoperability for coordination of networks.*

4. USE
   - Disasters
   - Health
   - Energy
   - Climate
   - Water
   - Weather
   - Biodiversity
   - Agriculture
   - Ecosystems
   - Societal Benefit Area End Users
Why GEOSS?

- Society needs informed decision-making
- Earth is a complex System of Systems
Society needs informed decision-making and GEO will help:

- Improve and **Coordinate** Observation Systems
- Encourage Easier & More Open **Data Access**
- Foster **Use** of Earth observations (products, services)
The Earth is a complex system of systems.
• Any single problem requires many data sets
• A single data set will serve many communities
• Great number of observing systems of different nature and with different purposes

Need for a System which Provides Access to all Earth Observation Data in Standard Interoperable Formats
How?
Building on the “Uniqueness” of GEO

GEO is

- **Global** (72 countries & 52 int’ organisations)
- **X-cutting & user driven** (9 societal areas)
- **High-level** (visibility, connecting people)
GEO is … GLOBAL

(Rotating) Members of the GEO Executive Committee:

– China, Japan, Thailand
– European Commission, Germany, Italy
– South Africa, Morocco
– Russia
– USA, Brazil, Honduras
GEO is... CROSS-CUTTING

9 Societal Benefit Areas

Disasters
- Reducing loss of life and property from natural and human induced disasters.

Energy
- Improving management of energy resources.

Weather
- Improving weather information, forecasting and warning.

Climate
- Understanding, predicting, mitigating and adapting to climate variability and change.

Water
- Improving water resource management through better understanding of the water cycle.

Health
- Understanding environmental factors affecting human health and well being.

Biodiversity
- Understanding, monitoring and conserving biodiversity.

Agriculture
- Supporting sustainable agriculture and combating desertification.

Ecosystems
- Improving the management and protection of terrestrial, coastal and marine ecosystems.
GEO is... HIGH-LEVEL

GEO helps:

Define Common Objectives for Int’ Community

- GEO 2007-2009 Work Plan

Channel individual efforts, reduce duplication

- Work Plan implementation

(with GEO Members & Organisations own resources)

Advocate and Enhance Visibility

- For activities contributing to GEOSS
2007 GEO Ministerial Summit
30 November 2007, Cape Town South Africa

“Earth Observation for Sustainable Growth and Development”

The Summit was an opportunity to:

– Highlight early progress and key achievements of GEO Members Participating Organisations

– Bring emerging priorities to the attention of the Ministers

– Cape Town Declaration…
The Summit Declaration recognises that

“… Sound policymaking for addressing the environment and sustainable development must be based on understanding, describing and predicting a complex and interdependent world, and therefore requires terrestrial, oceanic, in-situ, airborne and space-based Earth observations, data assimilation techniques and Earth-system modelling”
Key GEO Projects for G(R)UAN?
Task: WE-06-01
Benefit Area: Weather

Title: *Surface-based Global Observing System for Weather (Co-Leads: WMO, USA)*

Achieve a complete and stable surface-based (in-situ and airborne, land and possibly ocean) Global Observing System (GOS). High priority should be given to a stable, and as much as possible automated, fully functional World Weather Watch Upper Air Network and the further development of the Aircraft Meteorological Data Relay (AMDAR) programme.
Task: CL-06-02
Benefit Area: Climate

Title: Key Climate Data from Satellite Systems
(Co-Leads: GCOS, CEOS, WMO, USA)

Establish actions securing the provision of key data for climate studies and forecasting from satellite systems.
Task: CL-06-01
Benefit Area: Climate

Title: Sustained reprocessing and reanalysis efforts (Co-Leads: WCRP, GCOS, CEOS)

Ensure the development of international mechanisms to coordinate and maintain sustained climate data reprocessing and reanalysis efforts. With regard to the reprocessing of historical datasets (to obtain consistent long-time series of satellite records), make relevant synergies with Task CL-06-02.
Reanalysis

WCRP 3rd International Conference on Reanalysis

What Goals for the GEO Community?

1. Improve and develop input data for reanalysis
   - Maintain existing observing systems
   - Facilitate access and digitization of historical data sets
     Test case for GEO Data-Sharing Principles?
   - WCRP/GCOS WG on “Observational Data Sets For Reanalysis”

2. Sustain Reanalysis efforts for all climate system components
   Raise the profile of Reanalysis worldwide
   - Europe: ECMWF (interim), what future?
   - USA: NASA (MERRA), NOAA (20th Century Project)
   - Japan: JMA (JRA25)
Task: CL-07-01
Benefit Area: Climate

Title: Seamless Weather and Climate Prediction System
(Co-Leads: WWRP/THORPEX, WCRP)

Support the development of a major initiative on "International Weather, Climate and Earth-system Science", to better address uncertainties associated with climate variability and change, and related societal impacts (e.g. health, water, agriculture, energy).

Promote international multi-disciplinary (physics-biology-chemistry) collaboration on the development of a high-resolution seamless weather/climate global prediction system - including coupled atmosphere-ocean data assimilation.
The Socio-economic and Environmental Benefits of a Revolution in Weather, Climate and Earth-System Analysis and Prediction

Presented at GEO Plenary IV (29 Nov Cape Town)
Increase the capacity of managers and policy makers respond to the societal, economic and environmental vulnerabilities of high-impact weather and climate
PROJECT ELEMENTS

Decision Information to mitigate and adapt to the impact of weather and climate hazards

High-Resolution Models of the atmosphere, ocean, land, biogeochemical and socio-economic processes

Advanced Data-Assimilation Systems that enhance the use of observations from space, land and ice surfaces, and oceans

Science and Technology Transition into operational products and services

Education, Science and Technology Projects to enhance government and public awareness of the value and utilization of weather, climate, environmental and socioeconomic information
REQUIREMENTS

Dedicated High-Performance Computer Facilities - with capacities 10,000-times that of today linked to a global network of research, forecast and early-warning centres

Maintaining and Enhancing Observing Systems - to support present and future prediction, monitoring and early-warning systems

Research - to improve the performance and application of forecast models and user products

Information Systems - with rapid high-band-width data access and visualization of weather, climate events, forecasts, warnings and impacts

National and International Support for the Project development and implementation
A Portal to DATA and SERVICES

Search by theme
- Disaster
- Health
- Energy
- Climate
- Water
- Weather
- Ecosystem
- Agriculture
- Biodiversity

Direct Access To Data & Services

Search by location

About GEO

Capacity Building

GEONETCast
What are GEO and GEOSS?

The Group on Earth Observations (or GEO) is coordinating international efforts to build a Global Earth Observation System of Systems (GEOSS). This emerging public infrastructure is interconnecting a diverse and growing array of instruments and systems for monitoring and forecasting changes in the global environment. This “system of systems” supports policymakers, resource managers, science researchers and many other experts and decision-makers.

Click here to learn more about GEOSS. You can find more details on how GEO functions on the "About GEO page" and in the GEO Information Kit.

Highlights

A global revolution in Earth management

An editorial by the GEO Co-Chairs.

Climate change, the depletion of natural resources, the emergence of new diseases, and the loss of biological diversity are amongst some of the most serious and complex challenges facing the...
History of GEO

• The 2002 World Summit on Sustainable Development (WSSD) stressed the importance of Earth observation systems for protecting people and the planet and identified priority actions for strengthening capacity and collaboration in this field.

• The Earth Observation Summits in Washington in 2003, Tokyo in 2004 and Brussels in 2005 to adopt and carry out the 10-Year Implementation Plan for building GEOSS and to establish the Group on Earth Observations (GEO) to implement this plan;

• The G8 Summits in Evian in 2003, Gleneagles in 2005 and Heiligendamm in 2007 committed to strengthen international cooperation on comprehensive, coordinated and sustainable observation and information systems and affirmed the role of the Global Earth Observation System of Systems (GEOSS).
GEO Data Sharing Principles

• Full and Open Exchange of Data...Recognizing Relevant International Instruments and National Policies and Legislation

• Data and Products at Minimum Time delay and Minimum Cost

• Free of Charge or Cost of Reproduction for Research and Education
GEO Governance

- 10-Year Plan Endorsed by Ministerial Summit
- Plenary (co-chaired by RSA, EC, USA and PRC)
- Executive Committee (12 Members)
- Executive Secretariat (Geneva)
GEOSS Implementation is a Non-binding, Voluntary Process

• Relies on the Goodwill of Members and Participating Organizations
• Efficient for Contribution of Components
• Not a Funding Mechanism