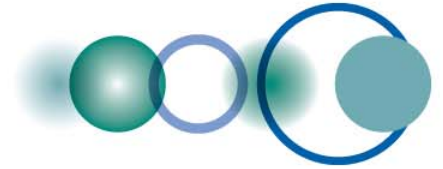


# GEOSS

## The Global Earth Observation System of Systems

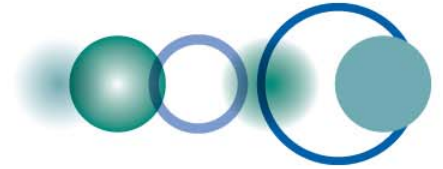
**Alexia C. Massacand**  
*[amassacand@geosec.org](mailto:amassacand@geosec.org)*





## Contents

- **Who is GEO? What is GEOSS?**
- **Why? How?**
- **Key GEO Projects for G(R)UAN**



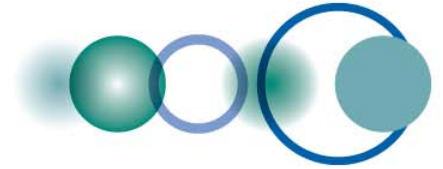
GEO

Group on Earth Observations

GEOSS

Global Earth Observation

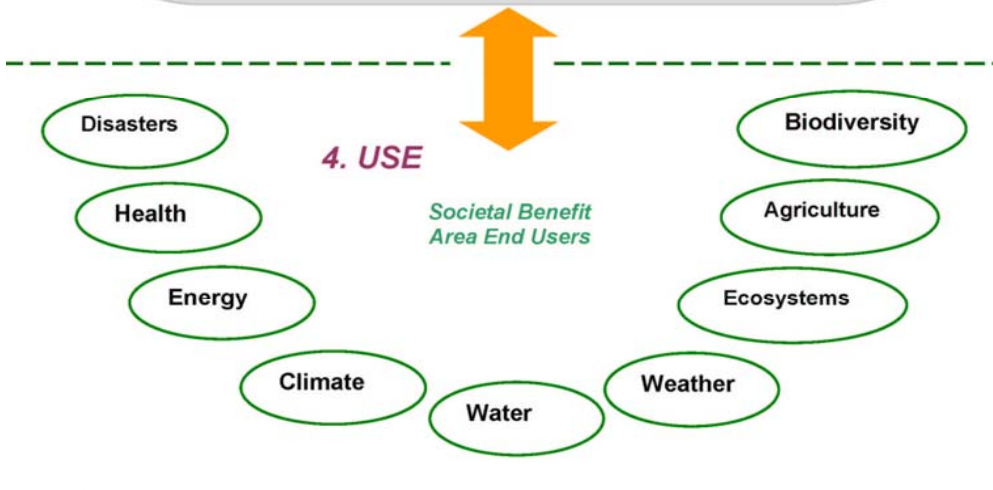
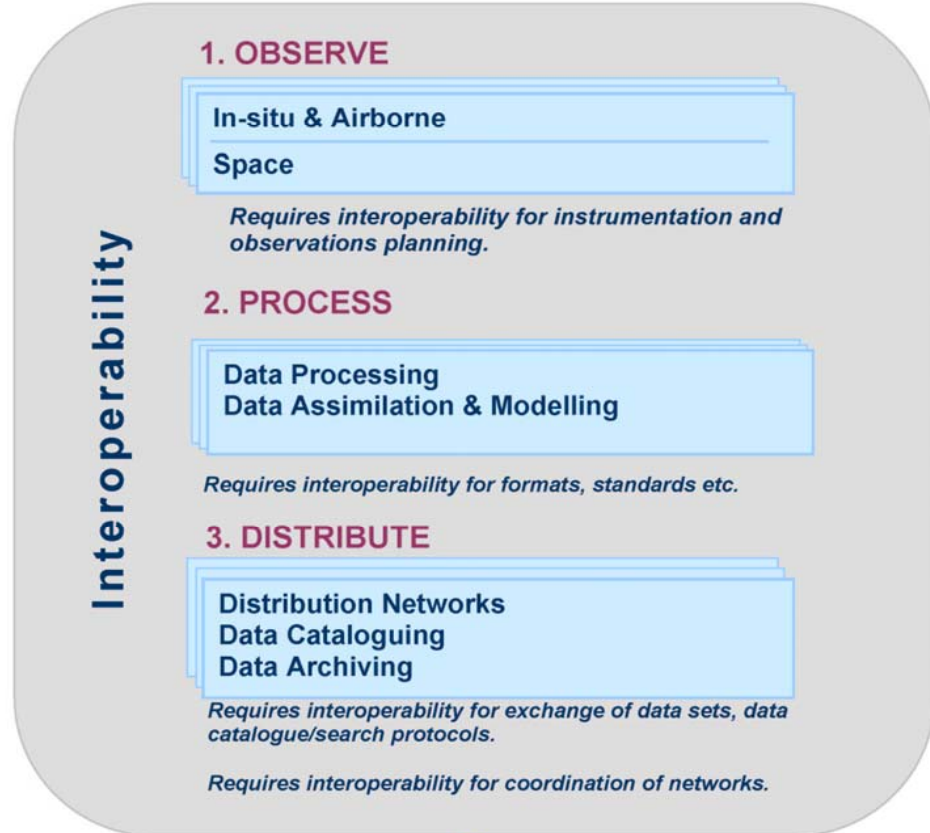
System of Systems



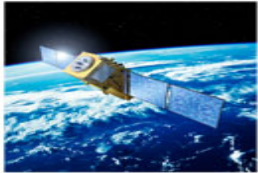
- **GEO is an Intergovernmental Group**
  - 72 Nations
  - European Commission
  - 52 Participating Organizations
- **With a Single Objective: GEOSS**
  - To establish a *global, coordinated, comprehensive and sustained* system of Earth **observation** systems



# GEOS Components



OBSERVING SYSTEMS



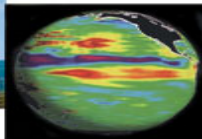
Disasters



Health



Energy



Climate



Water



Weather



Ecosystems

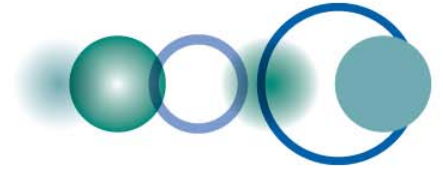


Agriculture



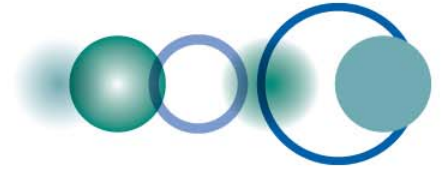
Biodiversity

NINE SOCIETAL BENEFIT AREAS



## Why GEOSS?

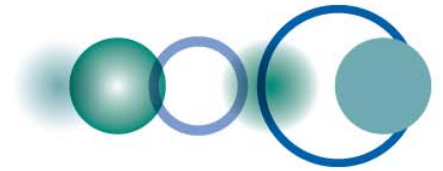
- Society needs informed decision-making
- Earth is a complex System of Systems



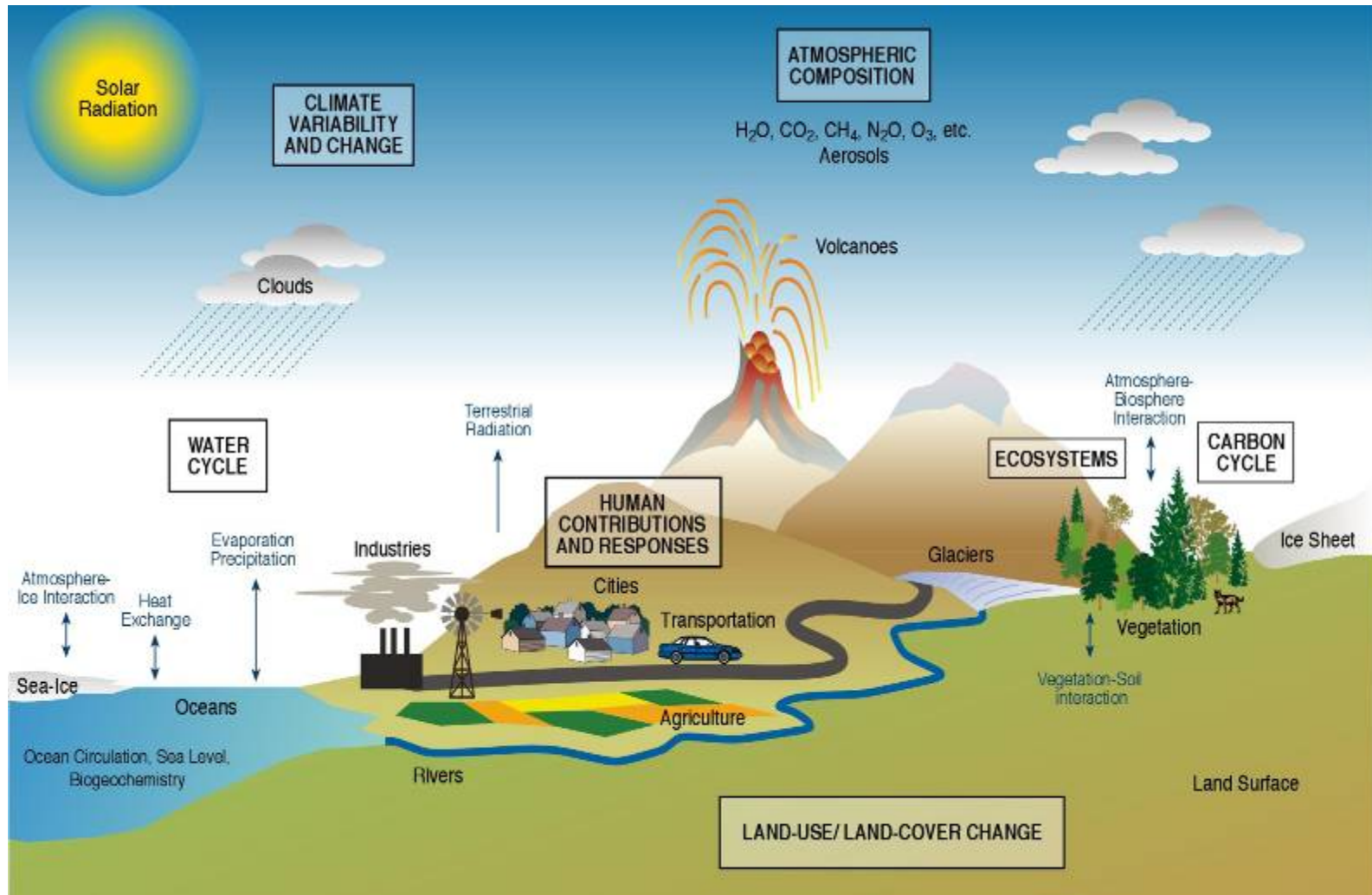
Society needs informed decision-making  
and GEO will help:

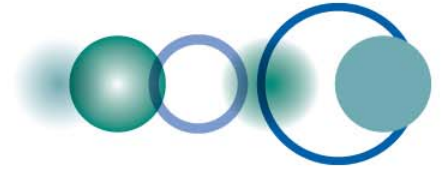
- **Improve and Coordinate Observation Systems**
- **Encourage Easier & More Open Data Access**
- **Foster Use of Earth observations (products, services)**





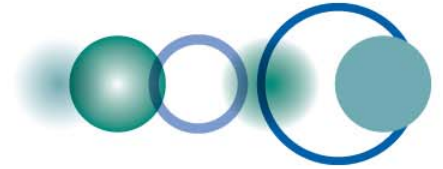
# The Earth is a complex system of systems



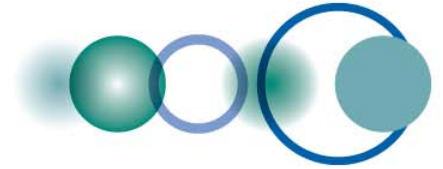


- Any single problem requires many data sets
- A single data set will serve many communities
- Great number of observing systems of different nature and with different purposes

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



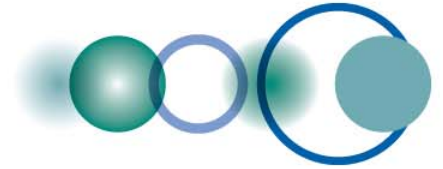
**How?**



## 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**

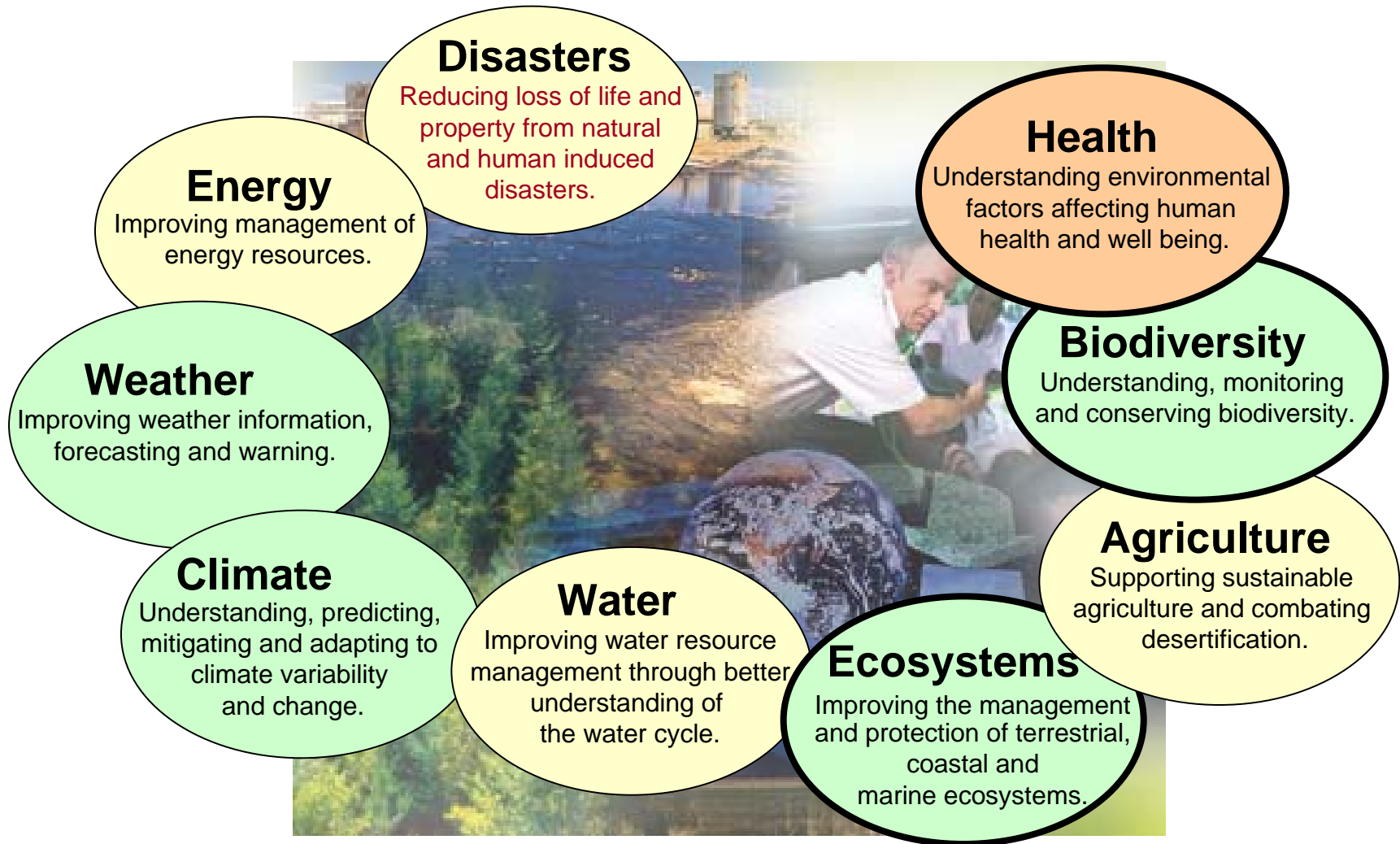
### **(Rotating) Members of the GEO Executive Committee:**

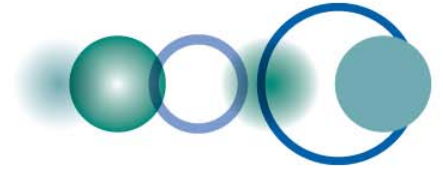
- **China, Japan, Thailand**
- **European Commission, Germany, Italy**
- **South Africa, Morocco**
- **Russia**
- **USA, Brazil, Honduras**



# GEO is... CROSS-CUTTING

## 9 Societal Benefit Areas





## **GEO is... HIGH-LEVEL**

### **GEO helps:**

#### **Define Common Objectives for Int' Community**

- GEO 2007-2009 Work Plan**

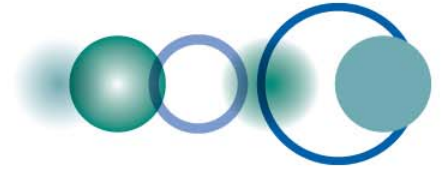
#### **Channel individual efforts, reduce duplication**

- 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

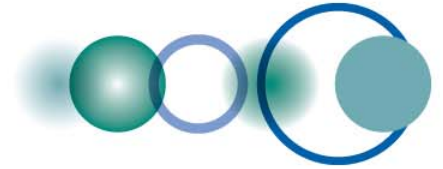
“Earth Observation for Sustainable  
Growth and Development”

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...**

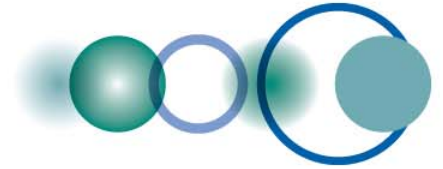




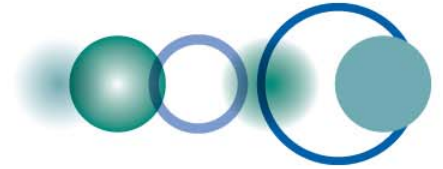


The Summit Declaration recognises that

“ ..... *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 ?

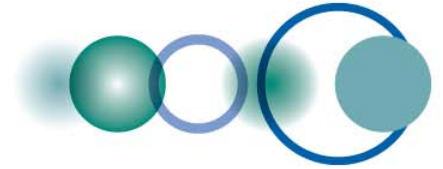


Task: WE-06-01

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.

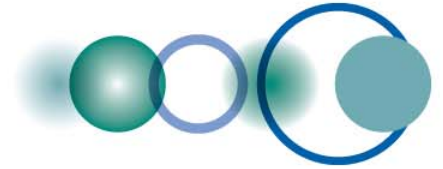


Task: CL-06-02

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*)

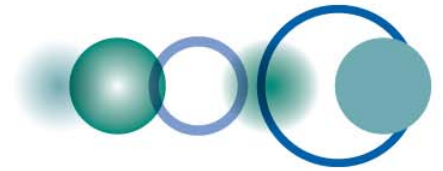
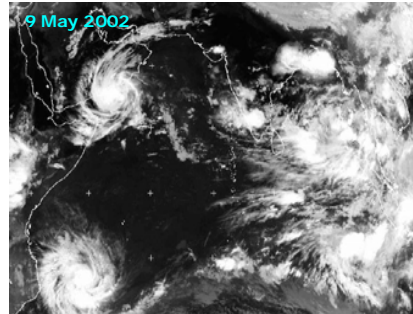
Ensure the development of international mechanisms to coordinate and maintain sustained climate data reprocessing and reanalysis efforts. With regard to the reprocessing of historical datasets (to obtain consistent long-time series of satellite records), make relevant synergies with Task CL-06-02.

# 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)



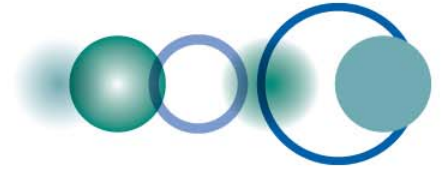
Task: CL-07-01

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

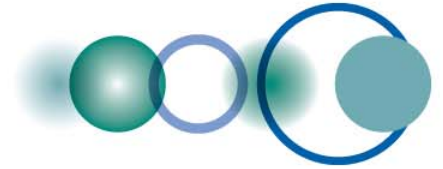
Presented at GEO Plenary IV (29 Nov Cape Town)





*Increase the capacity of managers and policy makers  
respond to the societal, economic and environmental  
vulnerabilities of high-impact weather and climate*





## *PROJECT ELEMENTS*

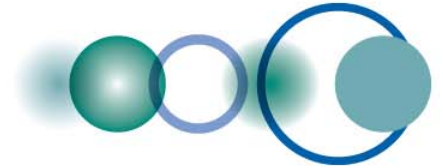
**Decision Information** to mitigate and adapt to the impact of weather and climate hazards

**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**

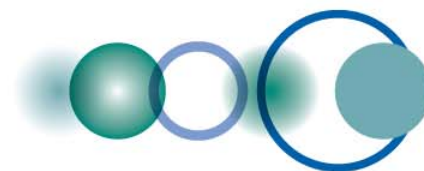
**Dedicated High-Performance Computer Facilities** - with capacities 10,000-times that of today linked to a global network of research, forecast and early-warning centres

**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

**GEO** Group on Earth Observations

## Search by location

**Search by theme**

- Disaster
- Health
- Energy
- Climate
- Water
- Weather
- Ecosystem
- Agriculture
- Biodiversity

**Direct Access To Data & Services**

**About GEO**

**Capacity Building**

**GEONETCast**

December 2000

Leaf Area Index (LAI)

Fraction of Photosynthetically Active Radiation (FPAR)



- Browse Resources by Societal Benefit Areas**
- DISASTERS**
  - HEALTH
  - ENERGY
  - CLIMATE
  - WATER
  - WEATHER
  - ECOSYSTEMS
  - AGRICULTURE
  - BIODIVERSITY
- Resources Provided by**
- Select GEO Member
- GEO Clearinghouse**

**Browse Resources by Location**

Map navigation controls:  Overview Map Select Location

**Breaking News**

Intense rainfall and the rise of the Parana and Gualeguay rivers produced severe flooding in the Santa Fe and Entre Rios provinces, affecting mainly the cities of Santa Fe, Rosario and Gualeguay in Argentina. Three people were killed and the total number of evacuees was estimated at between 30,000 and 40,000.

[more...](#)

**Welcome to GEOportal**

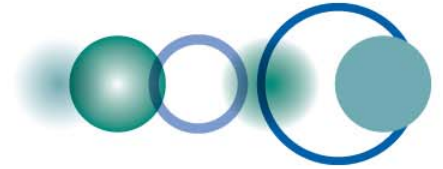
The GEOportal provides an entry point to access remote sensing, geospatial static and in-situ data, information and services. The site is currently under construction with a planned release of the operational ESA contribution to the

**EVENTS**

**IGARSS, 23-27 July 2007, Barcelona, Spain**  
The 27th International Geoscience And Remote

**SHOWCASE**

The Elbe region in Saxony was affected by heavy flooding following strong rainfall in conjunction with snowmelt in the Krkonose



[www.earthobservations.org](http://www.earthobservations.org)



Home > Press Room

### What is GEOSS?

#### GEOSS themes:

- Disasters
- Health
- Energy
- Climate
- Water
- Weather
- Ecosystems
- Agriculture
- Biodiversity

## 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 pages"](#) 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

## What's new?

### Global push to predict weather

(21 February 2008, Courier Mail, Australia)

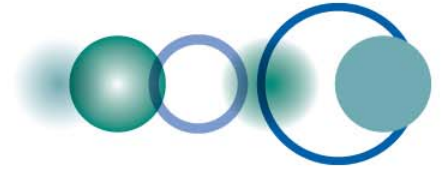


Australia's Governor-General has spoken to the

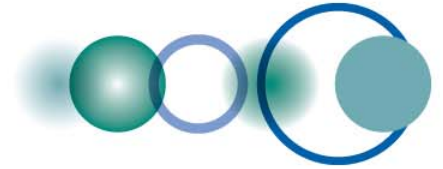
leaders of China, Russia and the US about a joint "space-age" project for more accurate forecasts of floods, drought and weather. This high-level support for strengthening Earth observations highlights the importance of GEO's Project on "The socio-economic and environmental benefits of a revolution in weather, climate and Earth system analysis and prediction".

[Download full text](#)

Related article: [Download excerpt from The Full Picture](#)

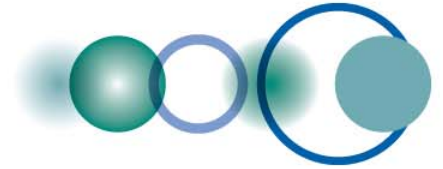






## History of GEO

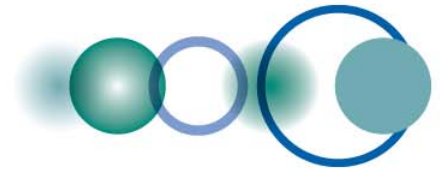
- The 2002 World Summit on Sustainable Development (WSSD) stressed the importance of Earth observation systems for protecting people and the planet and identified priority actions for strengthening capacity and collaboration in this field.
- The Earth Observation Summits in Washington in 2003, Tokyo 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**

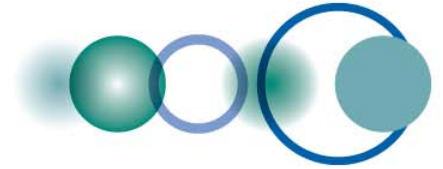




## GEO Governance

- 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**

