



Natural Disaster Mitigation and Earth observations (EO): a GEO perspective.

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Francesco Gaetani
GEO Secretariat





**Created in 2005, to develop a coordinated and sustained
Global Earth Observation System of Systems (GEOSS) to
enhance decision making in nine Societal Benefit Areas
(SBAs)**

GEO today:

90 Members

**67 Participating
Organizations**





GEO Objectives

- **Improve and Coordinate (existing) Observing Systems**
- **Provide Easier & More Open Data Access**
- **Foster Use (ST Applications)**
- **Build Capacity for the use of EO data**

GEOSS is being built from the expansion and interlinking of existing observation and information systems and the investments of Members and Participating Organizations in new systems.



GEO Work Plan 2012-2015 Version 2.1

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GEO Ecosystems SBA (coordinator A. Provenzale ISAC CNR)

Leading theme

The changing ecosystems:

from Earth Observations, monitoring and research to open data,
knowledge dissemination and societal benefits

Focus on:

ecosystem health, function, and change

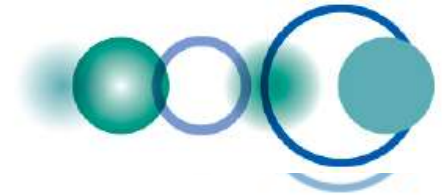
temporal dynamics

biotic/abiotic interactions

climate and environmental change

in addition to data:

analysis tools, empirical models



Two components:

EC-01-C1 - Global Standardized Ecosystem Classification, Map and Inventory (PoC: R. Sayre, USGS)

Standardized global ecosystem maps available for terrestrial, freshwater, and marine environments at 250 m. Standardized continental terrestrial ecosystem maps at 30 or 90 m available for North America, Central America, South America, Africa, Europe, Australia and China.

EC-01-C2 - Operational Monitoring of Key Ecosystems and Related Services (PoC: AP, ISAC-CNR)

Data and information organized in terms of ecosystem types, focus on protected areas. Access to data and models on the state, functions, processes and services for key ecosystem types (including mountains and cold-region ecosystems). Response of key ecosystems to climate and environmental change and related changes in ecosystem services.

Response of ecosystems to environmental change and on projections of ecosystem functions and services to future climate and environmental change scenarios. Activities will be conducted in collaboration with national projects such as the Italian project NextData and with international initiatives and programmes, such as ABCC, SHARE and specific EU projects.



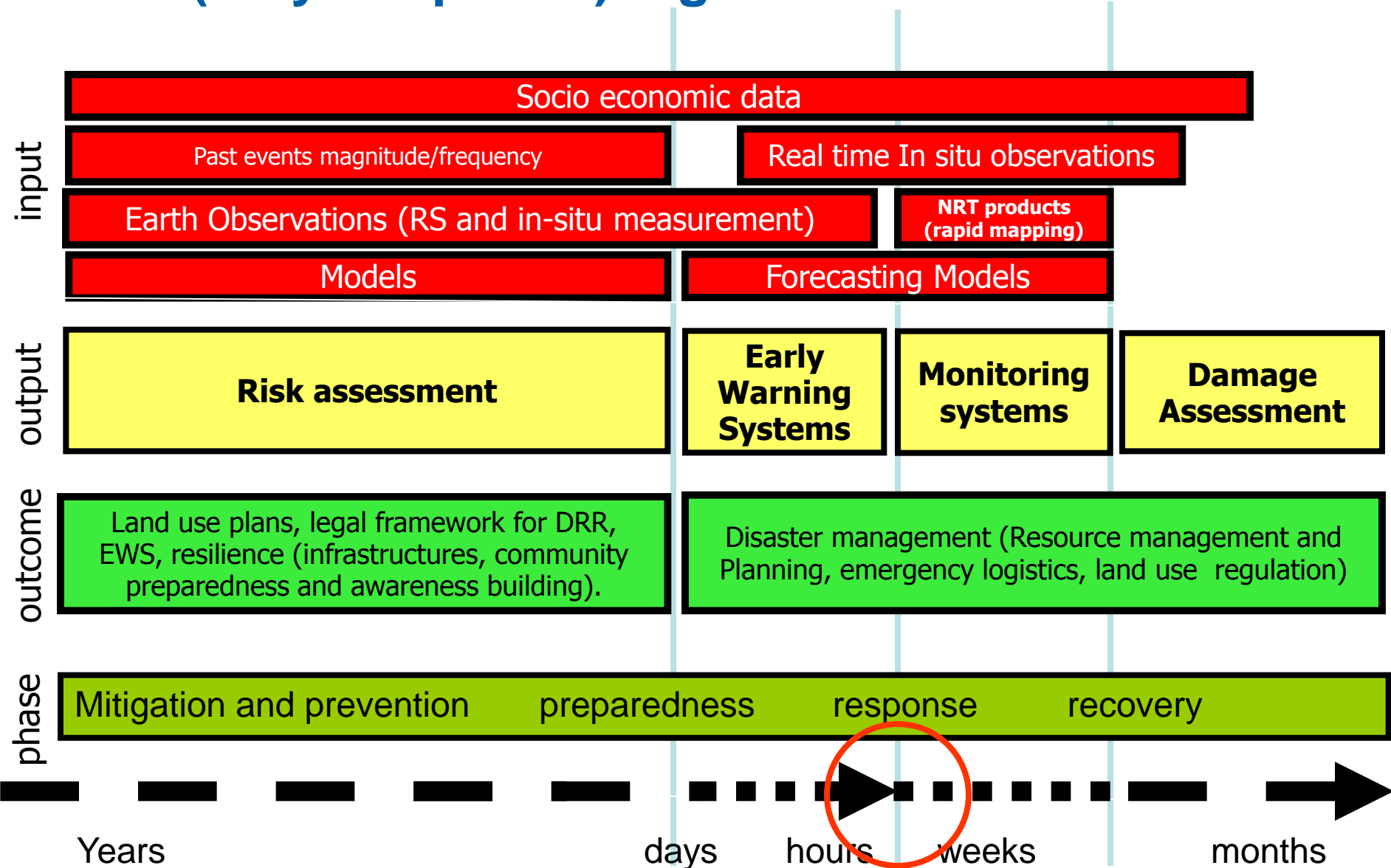
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Main contributions to the Disasters SBA

- **WE-01-C1:** Global Multi-Model Prediction System for High-Impact Weather
- **WE-01-C2:** Easy Access to, and Use of, High-impact Weather Information
- **WA-01-C1:** Integrated Water-cycle Products and Services
- **WA-01-C2:** Information Systems for Hydro-meteorological Extremes (incl. Floods and Droughts)
- **DI-01-C1:** Disaster Management Systems
- **DI-01-C2:** Geohazards Monitoring, Alert, and Risk Assessment
- **DI-01-C3:** Regional End-to-End Systems



A (very simplified) logic model for disasters





Data -> Products -> Services

Preparedness

P

- Early Warning System
- Forecasting/Nowcasting
- Event scenario

Emergency Response

ER

- Disaster extent
- Monitoring
- Damage assessment

Recovery

R

- Damage assessment (ctd)
- Logistics and infrastructure analysis

Mitigation

M

- Hazard assessment
- Exposure mapping
- Vulnerability assessment
- Risk scenarios
- Emergency plans

WE-01-C1:
prediction

WE-01-C2 Access and use of H impact info

WA-01-C1 Integrated Water Cycle

WA-01-C2:
hydrological
extremes

DI-01-C1 DMS

**DI-01-C3 regional
end2end**

**DI-01-C2 Geohaz
monitoring and RA**

hours

First
responders

weeks

Disaster
managers

Local
Authorities

years

National
Decision
makers

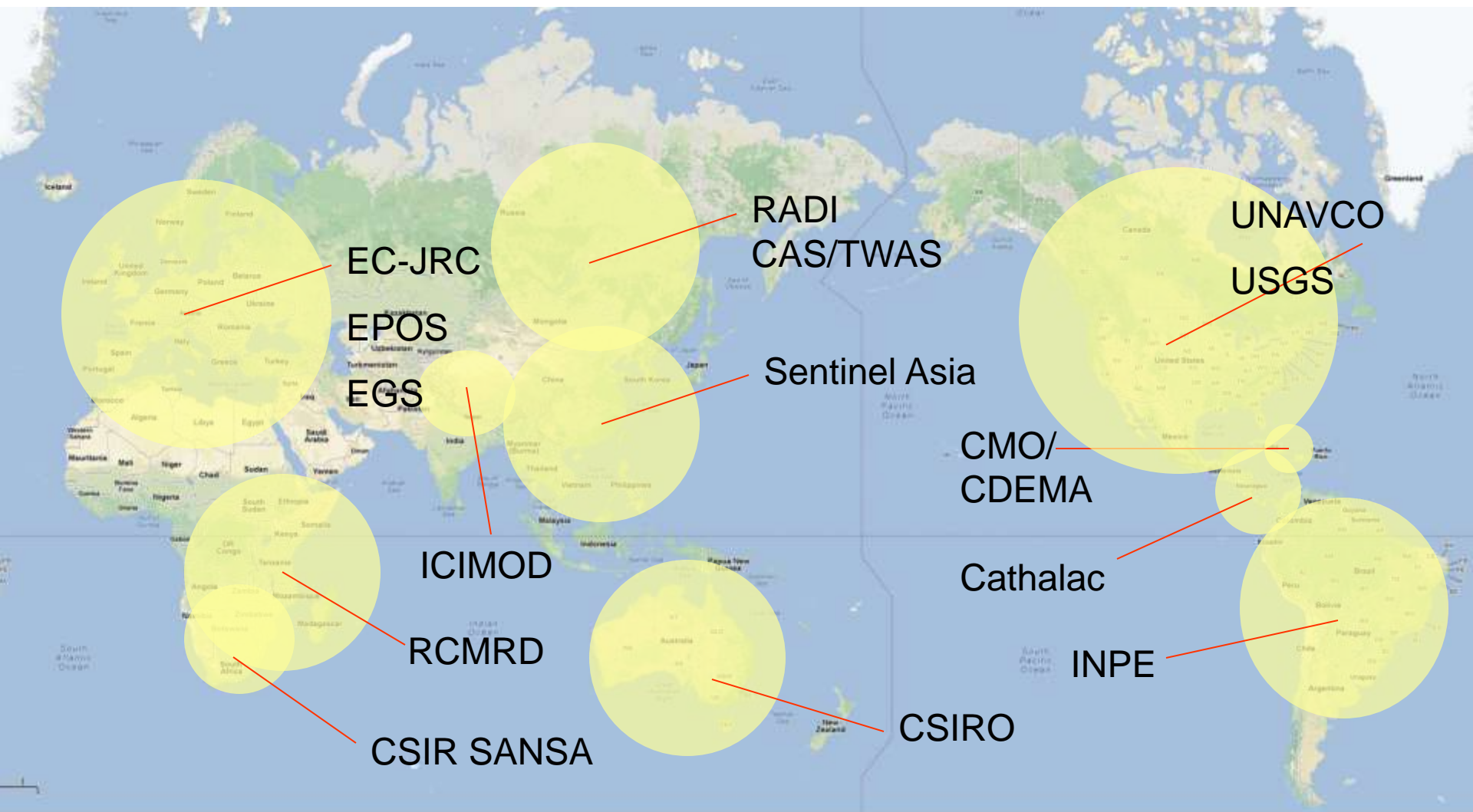
Scientists



GEO at work



GEO Regional stakeholders:





GEO Work Plan 2012-2015 DI-01-C3

The **CEOS *ad hoc* Disaster Team** created **three thematic** teams to develop three thematic pilots (one each relating to **floods, seismic hazards and volcanoes**) and the related components of the CEOS DRM Observation Strategy.

The **pilots** will:

- Acquire data
- Gather in situ data if relevant
- Supply data to Thematic value adders (VA) and/or Users
- Supply Thematic value-adding products to Users
- Gather feedback, validation report, exploitation report
- Assess performance and define service roll out



<http://www.ceos.org/>

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GEO Work Plan 2012-2015 WA-01-C1

GEO is developing a **Water Cycle Integrator (WCI)**, which integrates Earth observations, modeling, data and information, management systems and education systems into a virtual “work bench” for scientific collaboration.

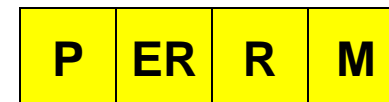
GEO has established the

Asian Water Cycle Initiative (AWCI)

African Water Cycle Coordination Initiative (AfWCCI)

In Latin America, GEOSS water capacity building programs are now on going through **CIEHYC (“Comunidad para la informacion espacial e hidrografia en Latino America y el Caribe”)**.

Through regional, inter-disciplinary, multi-sectoral integration and inter-agency coordination, GEOSS/WCI is now leading to effective actions and public awareness in support of water security and sustainable development.





GEO Work Plan 2012-2015 DI-01-C3

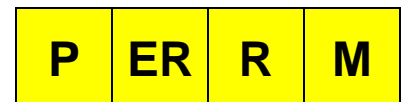
- Caribbean Satellite Disasters Pilot (CSDP)
- Southern African Flood and Health Pilot (SAFHP)

Objectives

To demonstrate the effectiveness of satellite imagery to **strengthen** regional, national and community level capacity **for mitigation, management and coordinated response to natural hazards**

To identify specific satellite-based **products** that can be used for disaster mitigation and response on a regional level

To identify capacity **building activities** that will increase the ability of the region to integrate satellite-based information into disaster management initiatives





GEO Work Plan 2012-2015 WA-01-C2

- **Information Systems for Hydro-meteorological Extremes (incl. Floods and Droughts)**

Development of a **Global Flood Awareness System (GloFAS)** a joint effort of JRC and ECMWF, aimed at providing early warnings for large transnational river flooding at the global scale.

- Development of a **Global Drought Information System** that will integrate global, continental, and regional scale monitoring and forecast information with high enough accuracy to assist in early warning efforts





GEO Work Plan 2012-2015 DI-01-C1

• International Charter Space and Major Disasters

In response to a request from the Group on Earth Observation (GEO) to improve access to the Charter during emergencies, collaboration has started with primary focus on **users from Africa**

Starting in 2009 the Charter has initiated a **formal user consultation** to address how to improve Charter access.

Furthermore, starting from GEO member states of the **Asia Pacific region**, the Charter has established a link to Sentinel Asia users.

Finally in September 2012, the process for the implementation of Universal Access for the Charter has been adopted by the Board.





GEO Work Plan 2012-2015 DI-01-C1

- **SERVIR** (The Regional Visualization and Monitoring System)
Central America 9 countries; **Africa** 18 countries; **Himalaya** 6 Countries
- Support in Extreme Events and Capacity Building in the Use of GIS and Remote Sensing for Disaster Management.



ICIMOD



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FROM THE AMERICAN PEOPLE

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- **GDACS Global Disasters Alert and Coordination System** is a cooperation framework between the United Nations (UNOSAT, UNOCHA), the European Commission (JRC) and disaster managers worldwide to improve alerts, information exchange and coordination in the first phase after major sudden-onset disasters.



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GEO Work Plan 2012-2015 DI-01-C1

- **Global Wildland Fire Information System**

AFIS, a regional fire danger system for southern Africa

European Forest Fire Information System (EFFIS)

Global Early Warning System for Wildland Fire (Global EWS)

Global Fire Information Management System (GFIMS)



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- **The South African Risk and Vulnerability Atlas (SARVA).**

The Atlas is aimed at equipping decision-makers with information on the impact and risk associated with global change in the region.



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- **PREVIEW Global Risk Data Platform.** A multiple agencies (UNEP, UNISDR) effort to share spatial data information on global risk from natural hazards. It was developed as a support to the Global Assessment Report on Disaster Risk Reduction (GAR)



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- **GEM Global Earthquake Model**
GEM is **about uniform open standards**, datasets and tools for worldwide risk assessment. GEM is constructing a global framework (of data, methods and tools), that will enhance risk assessment on local scales and worldwide collaboration. It is a collaborative effort that leverages the knowledge, networks and data of all those that want to part of it.

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GEO Work Plan 2012-2015 DI-01-C2

- **Geohazard Supersites and Natural Laboratories (GSNL)**

Pooling Satellite imagery and terrestrial in-situ data for earthquake and volcano studies.

There are 3 different level of sites: *Permanent Supersite* where integration between in-situ and satellite data is promoted by implementing e-infrastructures; *Post-Event Scientific Forum Supersite* web portal where to collect information, data, modeling results etc.. immediately after a catastrophic event; *Natural Laboratories* Global Network of regional Natural Laboratories.



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Challenges and Issues

- Current focus more on global than regional / local issues. Engaging local disaster managers and responders is a major challenge (What are the real user needs ? How to provide the right and useful information down to the end users ?)
- Improve disaster management by fostering additional multi-hazard approaches.
- Data Infrastructures (data repositories, data processing, data distribution) often not accessible for stakeholders and disaster managers of developing countries (technological divide).

Francesco GAETANI
FGaetani@geosec.org

+41 22 730 8281

<http://www.earthobservations.org>

