



# **Federation of partners: The example of Iceland geohazard Supersite within Helix Nebula**

FIM4R Workshop, ESRIN, 24/04/2014

Maryline Lengert, ESA



# A European cloud computing partnership: big science teams up with big business



## Strategic Plan

- ▶ Establish multi-tenant, multi-provider cloud infrastructure
- ▶ Identify and adopt policies for trust, security and privacy
- ▶ Create governance structure
- ▶ Define funding schemes



To support the computing capacity needs for the ATLAS experiment

EMBL



Setting up a new service to simplify analysis of large genomes, for a deeper insight into evolution and biodiversity



To create an Earth Observation platform, focusing on earthquake and volcano research

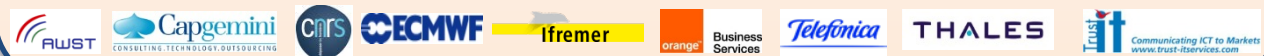


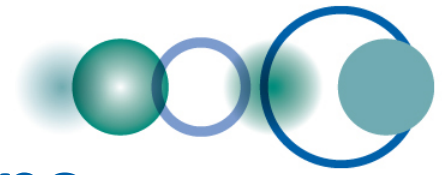
To improve the speed and quality of research for finding surrogate biomarkers based on brain images

## Suppliers



## Adopters



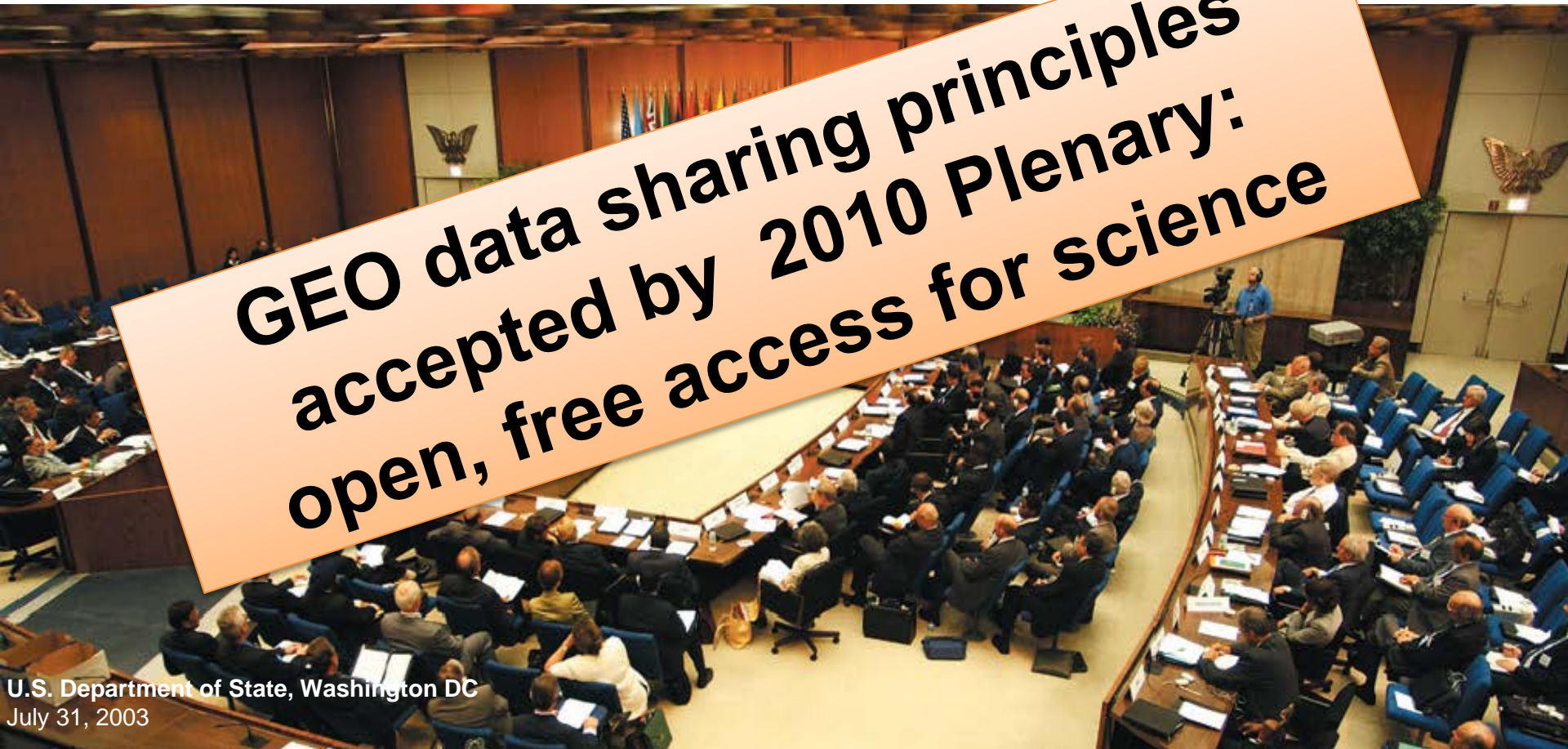


# Group on Earth Observations

Intergovernmental Organization with **86 members** and  
**61 participating organizations**

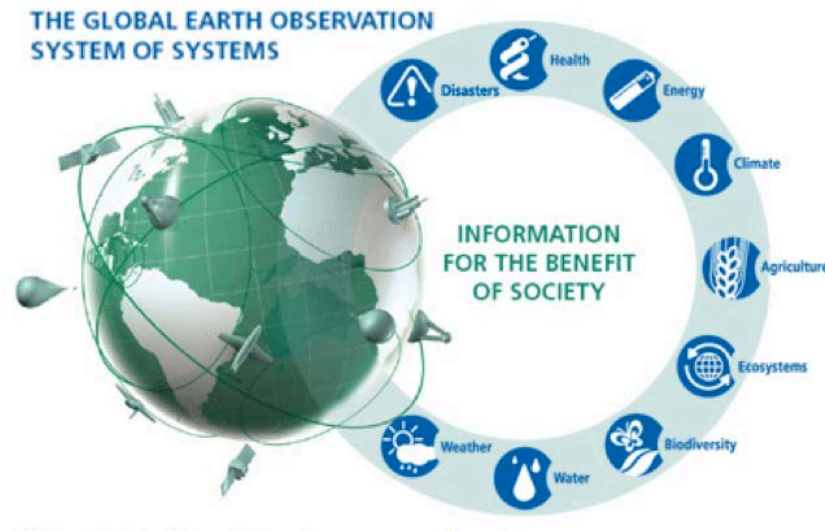
Construct by 2015: **Global Earth Observation System of Systems (GEOSS)**

**GEO data sharing principles  
accepted by 2010 Plenary:  
open, free access for science**



# GEOSS - System of Systems

## What is GEOSS?: The Global Earth Observation System of Systems



The Global Earth Observation System of Systems is simultaneously addressing nine areas of critical importance to people and society. It aims to empower the international community to protect itself against natural and human-induced disasters, understand the environmental sources of health hazards, manage energy resources, respond to climate change and its impacts, safeguard water resources, improve weather forecasts, manage ecosystems, promote sustainable agriculture and conserve biodiversity.

# What are the GEO-hazard Supersites?

## GEO task in Workplan 2009-2011

### DI-09-01: Systematic Monitoring for Geohazards Risk Assessment

#### c) Supersites and Natural Laboratories

- This GEO initiative aims at a better understanding of the geophysical processes causing geohazards (earthquakes and volcanoes).
- **Global partnership of scientists, satellite and in-situ data providers (multi-sensor InSAR, seismic, GPS, complete data sets!)**
- Data can support national authorities and policy makers in risk assessment and mitigation strategies.

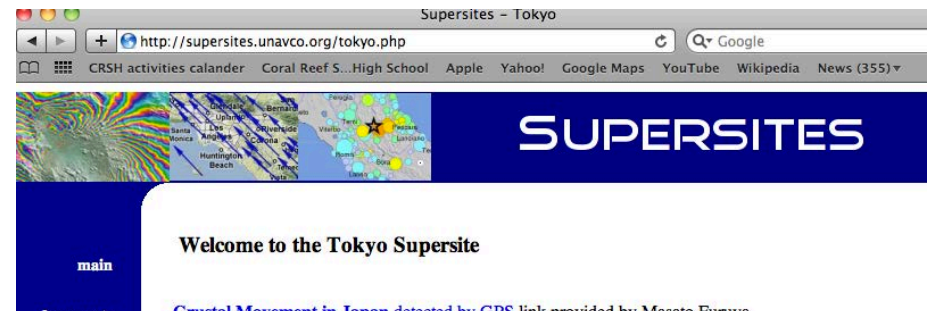


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BULA

THE SCIENCE CLOUD

- volcanoes: time delay for ground-based data as desired by observatory

[illegible]

Maryline Lengert, ESA

# Long-term goal

## ***“Design Global Volcano Observing System (GVOS) as part of GEOSS”.***

### ***Components:***

- ***E-infrastructure (Cloud Computing):*** Virtual connection between
  - volcano observatories, space agencies and scientific community
  - data analysis on Cloud → latest data products, algorithms available to volcano observatories (e.g. InSAR time-series)
- ***Space data (CEOS)***
- ***Ground data: regional plans needed for***
  - ***Europe, Africa (lead: EPOS, INGV)***
  - ***Americas (lead: Earthscope, USGS?) (dedicated workshop 10/2011 in Chile)***
  - ***Asia, Australia (no lead identified)***

Already designed:

Global Forest Observing System (GFOS)  
Global Ocean Observing System (GOOS)  
Global Climate Observing System (GCOS)

...

# Federation needed



FUTUREVOLC

Enter a search term

Go

Home

The project

Partners

Volcanoes/Monitoring

Data

Photos

Publications

Contact

Internal site



Specific example

Welcome to  
FUTUREVOLC

European volcanological supersite in  
Iceland and: a monitoring system and network  
for the future

Iceland supersite

News

Events



**Volcanic plume height correlated with  
magma pressure change at Grímsvötn  
Volcano, Iceland - New paper published in  
Nature Geoscience**

The changes in the height of the volcanic plume  
from the 2011 Grímsvötn Volcano eruption in Iceland  
correlated with changes in ground deformation...



The largest eruption on Earth in the  
last 100 years - Chris Newhall

**28? October:** Artificial ash cloud over Bay of  
Biscay. Experimental test by Fred Prata and  
colleagues of the AVOID sensor.

**23-25 September:** Futuruvolc 1st annual meeting,  
Hótel Hekla, Iceland

**1-13 September:** University of Cambridge servicing  
broad-band seismometers round Vatnajökull

**1-16 August:** UCD fieldwork, Vatnajökull to install 2  
x 7-station seismic arrays

**1-14 July:** University of Cambridge installing

# FUTUREVOLC Data Policy

- All FUTUREVOLC partners agree that **successful integration of space-based and in-situ data** is a timely and important step towards their common goal of improving geohazard monitoring and research.
- Users will gain access to the supersite data sharing facilities through a **one time registration** (similar to GEBCO, the General Bathymetric chart of the Oceans). Data will be stored at the supersite with the sole purpose of sharing it among registered users

## The objectives of the FUTUREVOLC data policy are:

- To **converge** and **harmonize** observation methods and tools, to promote the use of standards and references, inter-calibration and data assimilation.
- To **enhance interoperability** between participating organizations, including production of technical specifications for collecting, processing, storing, and disseminating shared data, metadata and data products.
- To **facilitate data management, information management, and common services**, to promote the data sharing principles of the GEO Plenary, recognizing relevant international organizations,, national policies and legislation.

# Iceland Geo-hazard Supersite

- ESA SSEP is currently federating with Iceland Futurevol. All ERS data covering Iceland will be stored in Iceland using ESA SSO
- Technically federation is being established thanks to GEANT connection
  - tests have achieved performances of some 200 Mb/s up to 1 Gb/s
  - ESA SSO is currently being installed



## Geohazard Supersites and Natural Laboratories GEO - Group on Earth Observations

Search

Found 1644 results in 17 digital repositories

From 1 Jan, 1992 to Apr 22, 2014

Orbits from  to   
Tracks from  to   
Frames from  to   
Paths

About Search My Data

**ERS-2 SAR Image SAR Annotated Raw Data**  
Product Level 0 (ER02\_SAR\_RAW\_OP)  
[Found 5 results]

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ER02\_SAR\_RAW\_OP\_19951006T123228\_19951006T123245\_ESR\_02411

**ERS-2 SAR Image Mode source packets**  
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[Found 1155 results]

(Showing from 0 to 19)  
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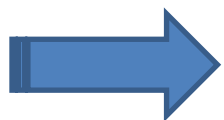
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Map showing Iceland and surrounding regions. Data CC-BY-SA by [OpenStreetMap](#), Terradue Srl. Copyright 2008-11, All Rights Reserved.

1000 km 1000 mi

# FIM on Iceland Geo-hazard Supersite

- The partners:
  - HN Suppliers (currently CloudSigma): login on HNX
  - GEANT, SWITCH (Swiss NREN), NORDUNet
  - UK National flagship Catapults/CEMS and Janet
  - Other NRENs will be involved with HN Suppliers
- ESA SSO is used (Shibboleth) for ESA space data access, GEANT provides carrier functionalities



**To get a global federation, we need to be compatible and trusted by many others.**  
**Each partner will likely have its own SSO.**

## Next steps

- ESA SSEP will be extended to US (NSF & NASA partners), Japan, Australia and Africa
- A functioning FIM is essential for Helix Nebula being an InfoaaS marketplace
- A participant to HN can/will have several sources of resources coming from different parties
- Need for a FIM that allows easy “shopping” across domain using multiple resources

# Thanks !