IGOS Geohazards Theme, Geohazards Initiative, and Geohazards Community of Practice

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with input from
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and many other members of the Geohazards Community

Definitions

IGOS Geohazards Theme

- Theme Team originally involved in the IGOS-P Theme processes;
- Some additional members joined after first theme report was published;
- Geohazards Bureau at BRGM, France (ESA, BRGM, CNES);
- Organization of three international Workshop, data initiatives, ...

Geohazards Community of Practice

- Membership: Broad membership on a more *ad hoc* basis;
- No clear boundary to IGOS Geohazards Theme or the International Geohazards Initiative;
- No designated Lead;
- Contribution to GEO Tasks;

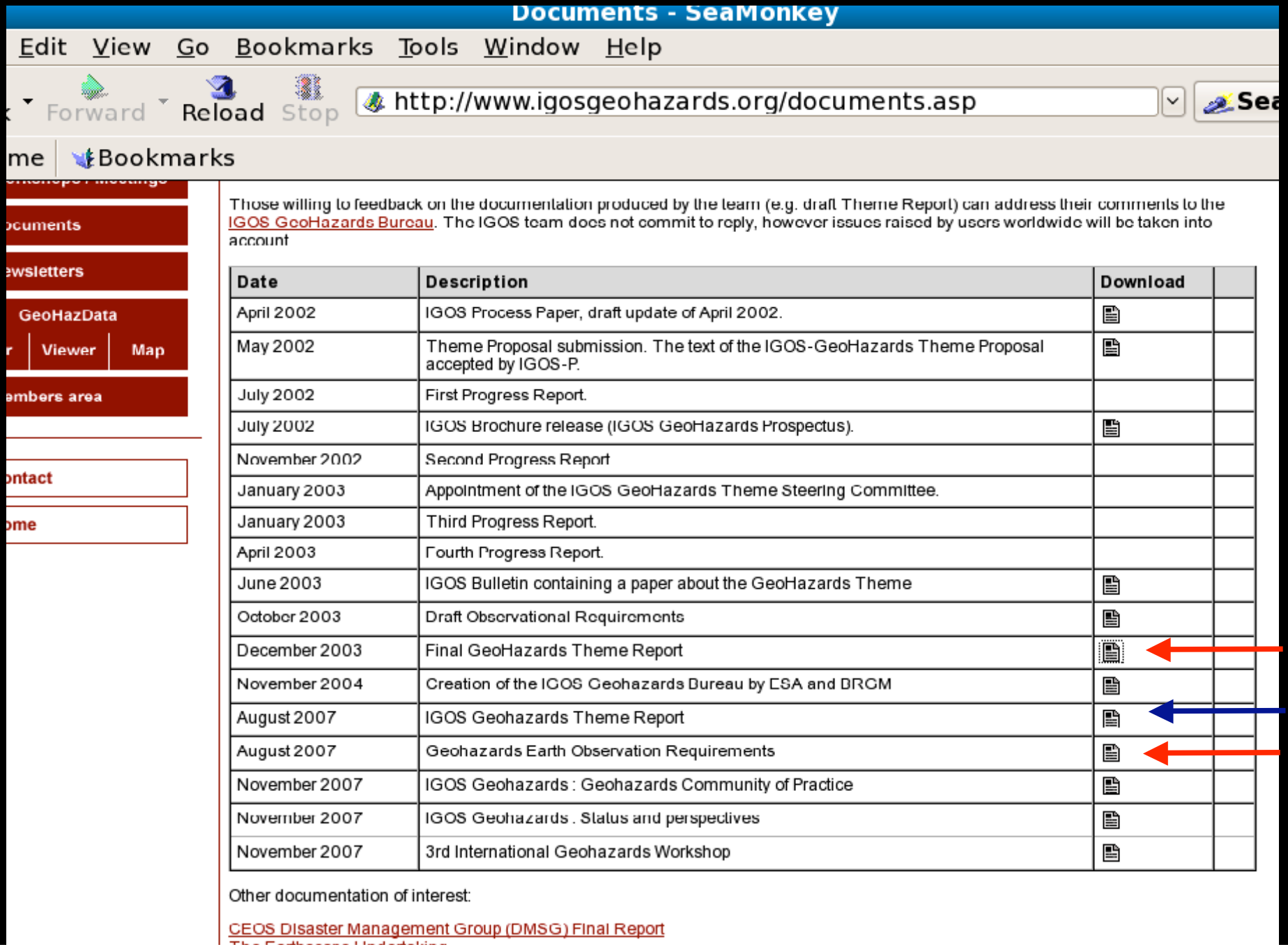
Geohazards Initiative

- Ad hoc group;
- Membership in broad overlap with IGOS Theme and CoP;
- Main activity: supersites initiative (new GEO Task)

IGOS Geohazards Theme, Geohazards Initiative, and Geohazards Community of Practice

- Reminder: IGOS-P Geohazards Theme
- Geohazards Community of Practice
- Frascati Declaration
- IGOS Geohazards transition to GEO Community of Practice
- Geohazards Initiatives and “Supersites”
- Outlook

IGOS Geohazards Theme



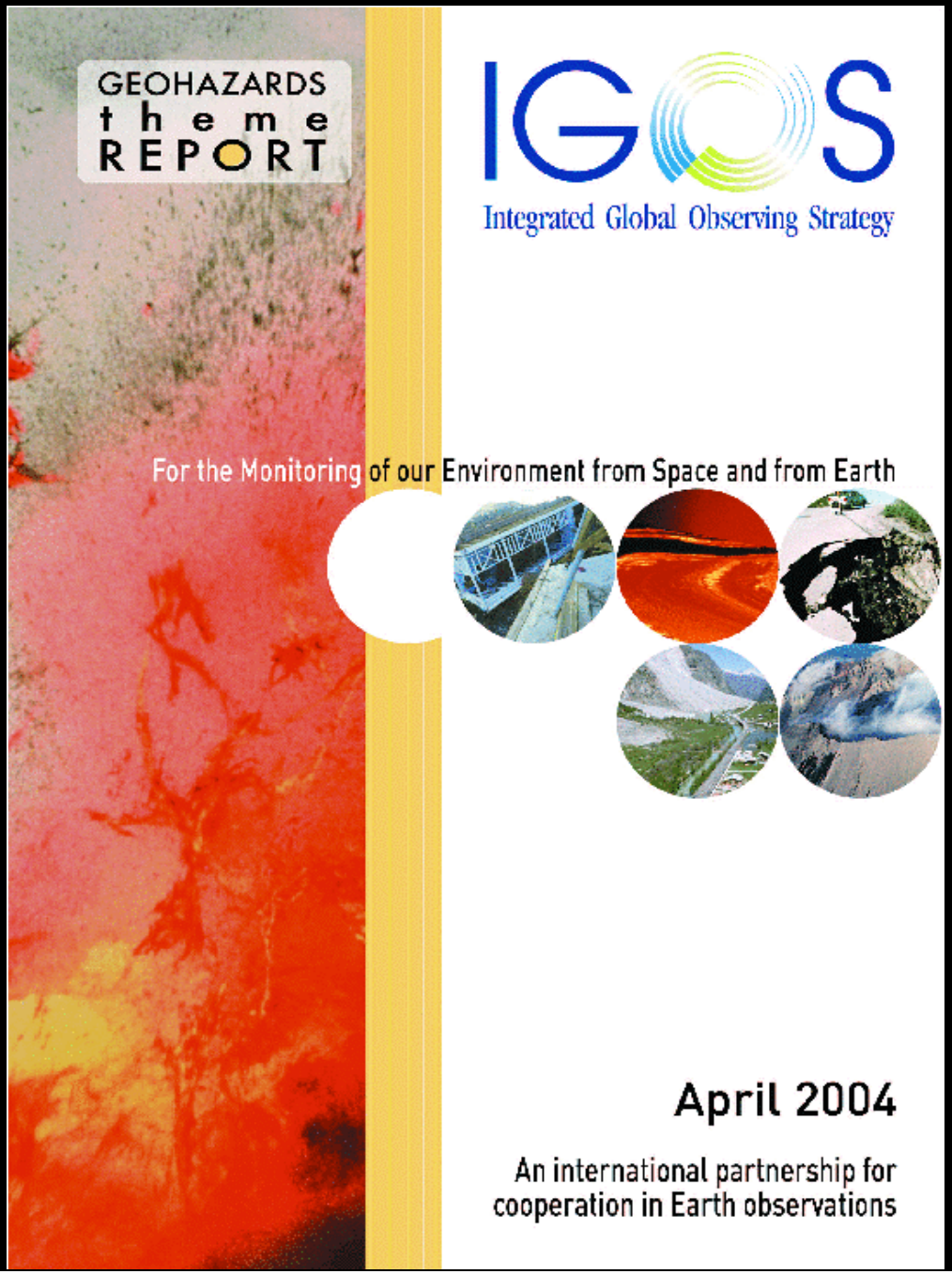
Those willing to feedback on the documentation produced by the team (e.g. draft Theme Report) can address their comments to the IGOS GeoHazards Bureau. The IGOS team does not commit to reply, however issues raised by users worldwide will be taken into account

Date	Description	Download	
April 2002	IGOS Process Paper, draft update of April 2002.		
May 2002	Theme Proposal submission. The text of the IGOS-GeoHazards Theme Proposal accepted by IGOS-P.		
July 2002	First Progress Report.		
July 2002	IGOS Brochure release (IGOS GeoHazards Prospectus).		
November 2002	Second Progress Report		
January 2003	Appointment of the IGOS GeoHazards Theme Steering Committee.		
January 2003	Third Progress Report.		
April 2003	Fourth Progress Report.		
June 2003	IGOS Bulletin containing a paper about the GeoHazards Theme		
October 2003	Draft Observational Requirements		
December 2003	Final GeoHazards Theme Report		
November 2004	Creation of the IGOS Geohazards Bureau by CSA and DRGM		
August 2007	IGOS Geohazards Theme Report		
August 2007	Geohazards Earth Observation Requirements		
November 2007	IGOS Geohazards : Geohazards Community of Practice		
November 2007	IGOS Geohazards . Status and perspectives		
November 2007	3rd International Geohazards Workshop		

Other documentation of interest:

CEOS Disaster Management Group (DMSG) Final Report

IGOS Geohazards Theme



- First Theme Report published April 2004, ESA

IGOS Geohazards Theme

- First Theme Report published April 2004, ESA
- Second Theme Report published August 2007

IGOS Geohazards Theme Report

BRGM/RP-55739-FR

August, 2007

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IGOS Geohazards Theme/GEO CoP/ Geohazards Initiative

- First Theme Report published April 2004, ESA
- Second Theme Report published August 2007
- Newsletters

IGOS Geohazards Theme/GEO CoP/ Geohazards Initiative

- First Theme Report published April 2004, ESA
- Second Theme Report published August 2007
- Newsletters
- Three International Geohazards Workshops;
  last one in November 2007 in Frascati, Italy:
- Frascati Declaration

Frascati Declaration

We, as experts in the field of Geohazards, participating to the 3rd International Geohazards Workshop,

...

recommend

...

- to stimulate an international and intergovernmental effort to monitor and study selected reference sites by establishing open access to relevant datasets according to GEO principles to foster the collaboration between all various partners and end-users

...

- to maintain and build a coordination body to ensure the further development of the Geohazards initiative and Community of Practice

GEO Geohazards Community of Practice

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GEO Community of Practice - SeaMonkey

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brgm esa GEO — GEO GEOHAZARDS COMMUNITY OF PRACTICE — igos GEOHAZARDS

- IGOS Geohazards Initiative
- GEO Community of Practice
- IGOS Geohazards Bureau
- Workshops / Meetings
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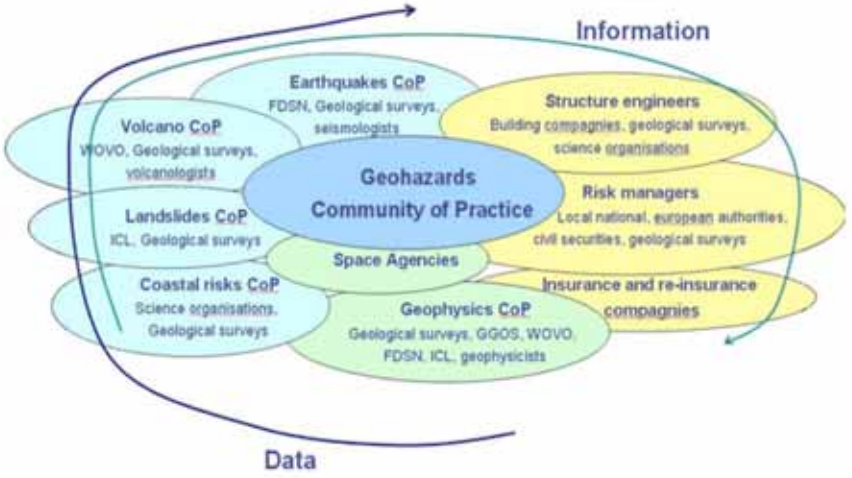
GEO Community of Practice

Since its inception, the IGOS geohazards theme has been a bridge between high level policy makers such as UNESCO and the geohazard community. This role has gained weight through the interaction with the Global Earth Observing System of Systems (GEOSS) currently established by GEO. The GEOSS project helps production and management of observations in a way that benefits environment and humanity. GEOSS is envisioned as a large national and international cooperative effort to bring together existing and new hardware and software, making it all compatible in order to supply data and information at no cost.

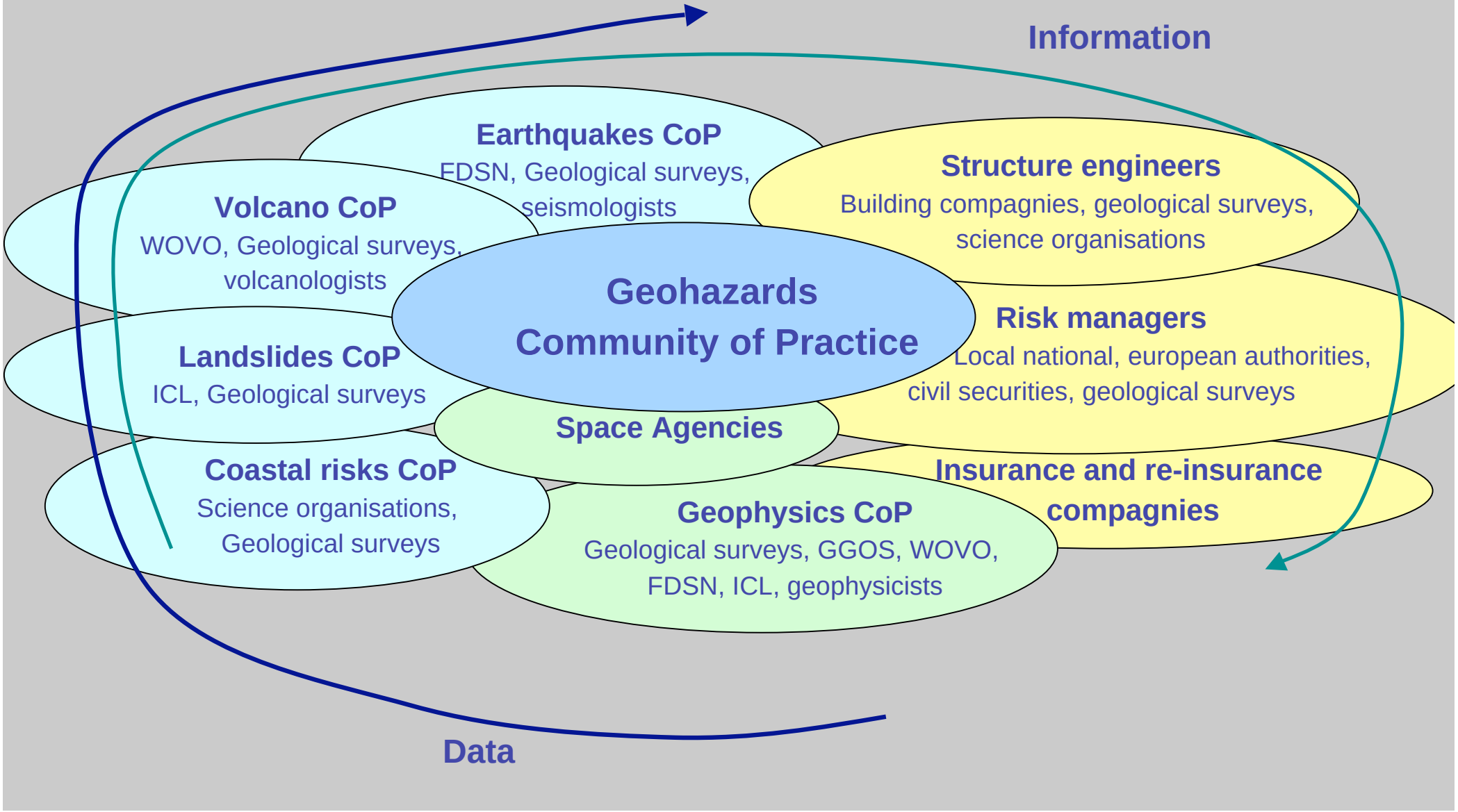
Improving access to Earth observations is one of the main objectives of GEO and complements the IGOS Partnership initiative with larger scopes. GEOSS will be developed in order to respond to the needs of the society for:

- Easier and more open data access;
- Informed decision making;
- A better Earth Observing System.

The Geohazards Communities of Practice (CoP)



GEO Geohazards Community of Practice

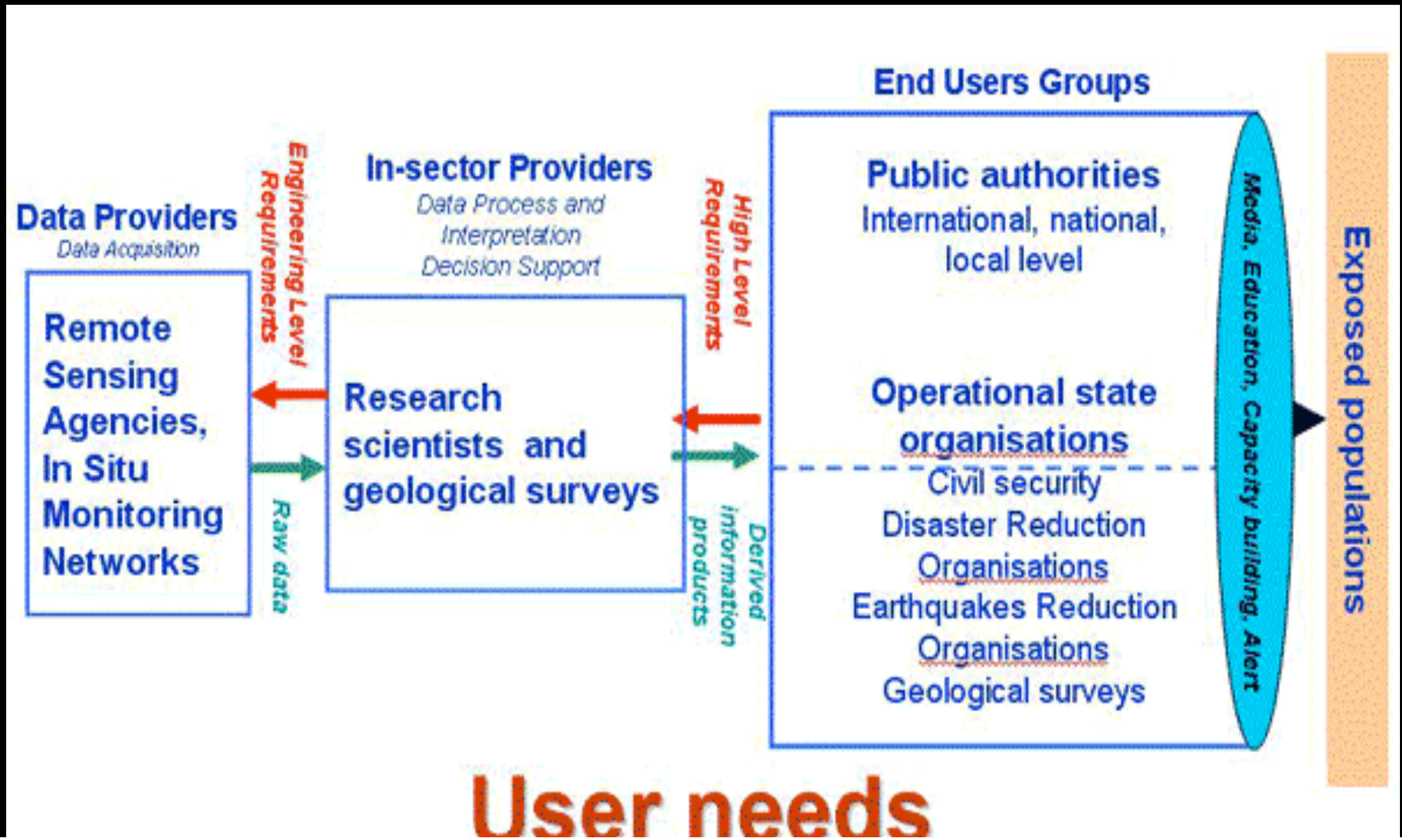


IGOS Geohazards Transition to GEO Community of Practice

IGOS Geohazards Theme:
- participates in GEO since 2005
- provides core for the Geohazards Community of Practice

Geohazards CoP:
- aims at bringing together any person or entity concerned with Geohazards ;
- particular focus on users and beneficiaries, with exposed populations being the main beneficiaries of an improved hazard monitoring;
- federate a community that acts as a bridge between users and exposed populations, which produces efficient alerts, information and education tools to limit consequences of natural disasters (includes media, local authorities, schools and alert system managers);
- three main groups involved in the CoP have been identified.

IGOS Geohazards Transition to GEO Community of Practice



IGOS Geohazards transition to GEO Community of Practice

Recent contribution of the IGOS Geohazards Theme/ GEO Geohazards CoP/Geohazards Initiative to GEO:

- provided IGOS-P and the GEO UIC with Geohazards Earth Observation Requirements in August 2007
- Geohazards Executive Bureau has been leading two tasks:
  > DI-06-07: provides a pilot OGC-compliant catalogue and web service for hazard maps inventory (GeoHazData),
  > DI-06-03: organizes workshops and raises awareness on InSAR and advanced InSAR techniques in the Geohazards CoP.
- contributed to
  > DI-06-02 through user feedback from regional workshops;
  > DI-06-08 through the promotion of an integrated approach;
  > DI-06-09 through identification of geological high risk areas;
  > DI-06-12 through organization of user workshops in Latin America and South East Asia; and
  > AR-06-05 with GeoHazData.

IGOS Geohazards transition to GEO Community of Practice

Contribution to GEO

Published August 2007
- describes geohazards, scenarios, forecasts, and response
- describes data requirements

3.2. MOST REQUIRED OBSERVATIONS FOR EACH TYPE OF GEOHAZARD

3.2.1. Volcanic hazard

REQUIRED OBSERVATIONS	BACKGROUND MONITORING/ASSESSMENT	DURING AND AFTER THE CRISIS
Characterise seismicity of volcano or group of volcanoes (magnitude, 3-D location, and type of earthquake)	Individual volcanoes require at least 3-6 seismometers, ideally with 3-directional sensors, to detect and locate earthquakes of magnitude 0.5, with digital data relayed/processed in real time	Repairs as needed and feasible
	Regional network good enough to detect and locate earthquakes of Magnitude 2.5, data relayed and processed in real time	Additional stations, deployed near or on the volcano, to detect and locate earthquakes of Magnitude 0.5
Characterise deformation of volcanic edifice (horizontal and vertical); monitor changes in gravity; characterise topography; determine location of faults, landslides and ground fractures	EDM and/or permanent GPS network of stations, either continuously transmitting or reoccupied as necessary	Additional GPS stations as needed to capture deformation; more frequent occupation (if data not continuously transmitted)
	Levelling and tilt networks surveyed as needed. Borehole strainmeters (continuous recording). Gravity surveys (1-5 years)	More frequent occupation (if not continuously recorded and transmitted)
	SAR interferometry	Request more frequent tasking plus search data archives for additional possible image pairs
	Map existing geologic structures on volcanoes using high spatial resolution satellite, aerial photography, aerial surveys and geological and geophysical ground surveys as needed.	Request repeat overflights to check for new cracks; possibly install strainmeters across selected cracks
Characterise gas and ash emissions of volcanoes by species (SO_2, CO_2) and flux (tons per day)	COSPEC, LICOR surveys at regular intervals (weekly, monthly or annually).	More frequent surveys, perhaps using small aircraft if plume not accessible by road
	Routine checks through appropriate satellite imagery. (LEO and GEO)	Additional requests tasking for higher-resolution data, check archives for usable Imagery
Characterise and monitor thermal features of volcanoes (their nature, location, temperature, possibly heat flux)	Map and monitor hot springs, fumaroles, summit craters, crater lakes, and fissure systems for temperature variations using ground-based instruments and high spatial resolution satellite data.	More frequent observations, including visible and IR photography and pyrometry as appropriate
	Systematic acquisition and analysis of imagery from airborne digital IR cameras, moderate resolution to higher-resolution resolution satellite imagery for thermal background and thermal flux.	More frequent overflights with digital IR camera; additional requests tasking for higher resolution satellite data, check archives for time series of thermal data
Characterise eruptive style and eruptive history of volcanoes	Characterise, map and date all young eruptive deposits of the volcano	Observe eruption columns, plumes and surface deposits (using overflights with visible and IR photography, video). Monitor their motions (speed, direction, areas covered and threatened), character, and thickness. Update maps

Table 6: Volcanic hazard observations most commonly required and the best available observational systems. (After IGOS Theme report 2004). This table only include data needed for hazards observations. The assessment of dammages through remote sensing means falls within the scope of the International Charter "Space and Major Disasters". Due to the lack of holistic scientific litterature in this field the data requirements for the assessment of vulnerability could not be presented in these users requirement document.

Geohazards Earth Observation Requirements

BRGM/RP 55719-FR
August 2007

Study carried out by the ESA-BRGM jointly funded IGOS Geohazards Bureau

BRGM 2007 PDR04ARN61

ESA ESRIN Contract No. 18349/04/I-IW

G. LeCozannet, J.Salichon, BRGM

Reviewed as part of the Geohazards Theme report by Andy Gibson, BGS,

Geohazards Initiative and Supersites

Concept paper on the International Geohazards Initiative

An international Earth Observation strategy to reduce geological risks and its application to specific regional areas

(Draft Version 2)

The Concept Paper is the roadmap for the international Geohazards Initiative that:

- links research, long-term monitoring and operational programmes, bringing together the producers of global observations and the users that require them;
- responds to the scientific and operational geospatial information needs for the prediction and monitoring of geological hazards;
- builds on the work undertaken under IGOS Geohazards, the Geohazards CoP, and the GEO Geohazards tasks;
- proposes an international cooperation framework to put in place recommendations of the Frascati declaration.

Geohazards Initiative and Supersites

Concept

Objective: to facilitate access to the space and in-situ data of a certain number of regional areas exposed to geological threats

In the long-term, each Supersite should consist of a multinational consortium providing:

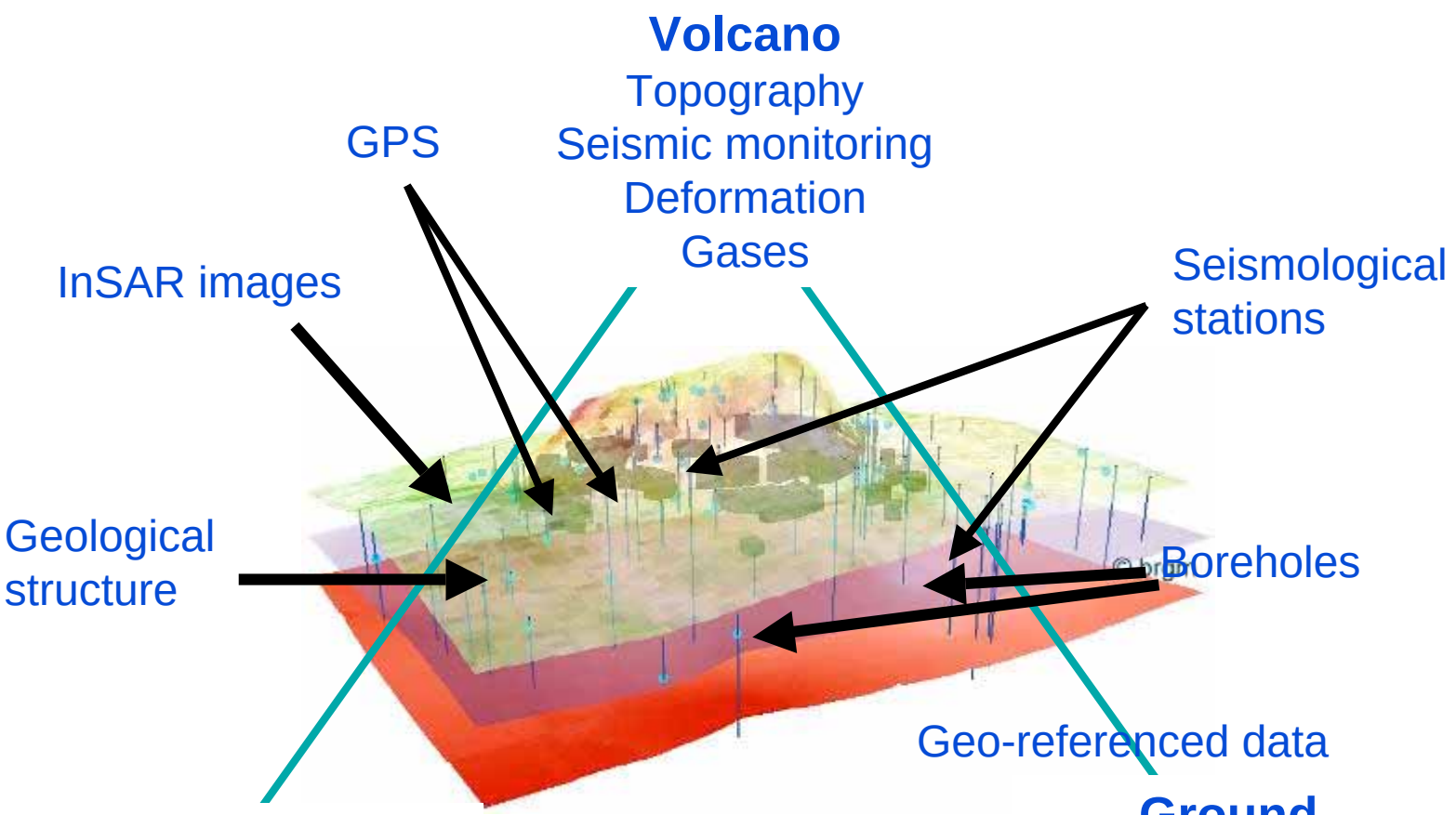
- a regional center of expertise and data analysis focused
- upon the particular region's geohazards
- an overview and guidance in the development and
- operation of the regional research infrastructure, including
- instrument networks **and data systems**

Geohazards Initiative and Supersites

Concept of Supersites contributes to the strategic goal in the Disaster SBA:

8. Enable the global coordination of observing and information systems to support all phases of the risk management cycle associated with hazards (mitigation and preparedness, early warning, response, and recovery).

« Supersites initiative »: Geohazards observations



Geohazards Initiative and Supersites

Examples of sites

Earthquakes: Istanbul (Turkey), Bam (Iran), San Francisco (USA), Eastern African Rift (Africa)

Volcanoes: Hawaï, Yellowstone (USA), Sakurajima (Japan), Etna, Vesuvius (Italy), Mount Cameroun (Cameroun), Nyragongo (Congo), Merapi (Indonesia), Hekla (Iceland)

Landslides: Philipines, Uganda

Hydrogeological processes: Mexico City

Relative sea level rise: TBD

During phase 2, other Supersites will be chosen through an open process across the Geohazards Community of Practice.

Geohazards Initiative and Supersites

Step one:

- Aims at facilitating access to data over a certain number of regional areas ("supersites" or natural "geohazards laboratories").
- Step one should be implemented for a few "Supersites" within 3 years.
- Eligible as a "Supersite" are regional area that meet at least one of the following criteria:
  > populations and elements are exposed to geological threats;
  > an event is expected to occur in the near future, or a slow process is already ongoing;
  > it should be an appropriate place to stimulate basic geohazard research (earthquakes hazards, landslides, volcanoes, hydro-geological processes) and sea level rise.

Geohazards Initiative and Supersites

“Supersite” Task

GEO Work Plan 2009-2011:

DI-09-01: Systematic Monitoring for Geohazards Risk Assessment
Define and implement a unified and integrated approach to geohazards risk assessment. Build upon synergies and integrate data from global insitu seismographic networks and remote sensing. Coordinate multi-level efforts and implement decision-support tools to facilitate and support data access for selected “Supersites” locations.

a) Vulnerability Mapping and Risk Assessment (former DI-06-03 and DI-06-07)
b) Seismographic Networks Improvement and Coordination (former DI-06-02)

Outlook

- The “Supersites initiative” is presently the main contribution of the Geohazards CoP to the current GEO workplan.

- Focus is on the objectives and benefits of the Supersites, and less on the structure of the governing body and organizational aspects.

- Improvement of the CoP:
  > Involvement of funding agencies (OECD, European Community, National Ministries, USAID, World Bank, Islamic Bank or the Asian Development Bank…);
  > work towards participation of national, regional, and local representatives, and land use planers, who are critical in particular for connections to the exposed populations.
  > Integrate private companies that are end users; for example, insurances, re-insurances, infrastructures operators.

Outlook

Questions:

- How can the supersite concept be implemented?
- Bottom-up or top-down (starting, e.g., from CEOS)?
- How could the STC support/be involved in/monitor/contribute to the Supersite Task/Initiative?