



GROUP ON
EARTH OBSERVATIONS



The Geohazard Supersites and Natural Laboratories - GSNL Initiative 2.0: Rapid Uptake of New Science in Disaster Risk Management

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GEO

The **Group on Earth Observations** is a voluntary partnership of governments and organizations aiming to coordinate international efforts in environmental monitoring.

GEO provides a framework for the development and coordination of projects, strategies and investments.

GEOSS and the SBAs

The GEO implementation plan is conceived to build **GEOSS (Global Earth Observation System of Systems)**, contributing to **9 Societal Benefit Areas (SBAs)**:

1. Agriculture
2. Biodiversity
3. Climate
4. **Disasters**
5. Ecosystems
6. Energy
7. Health
8. Water
9. Weather



The GSNL 1.0

- ❑ A partnership between geohazard monitoring agencies and satellite data providers to provide **open data access for science**
- ❑ It focuses on areas showing **strong geohazard** levels and **need for a better understanding** of geohazard processes
- ❑ It exploits coordination with data infrastructures (UNAVCO, EPOS, CEOS) for the **dissemination of satellite and in situ data**
- ❑ Scientists access the data and **do research independently** (no scientific coordination)
- ❑ **No specific policy** for in situ data and scientific products

Active Supersites & Points of Contact

1. **Hawaiian volcanoes** – PoC is at USGS
2. **Icelandic volcanoes** – PoCs are at Univ. of Iceland & IMO
3. **Etna volcano** – PoC is INGV - Catania
4. **Campi Flegrei volcano** – PoC is at INGV - Naples
5. **Western North Anatolian Fault** – PoC is at KOERI
6. **Taupo Volcano** – PoC is at GNS Science
7. **Tungurahua and Cotopaxi volcanoes** – PoC is at Instituto Geofísico, EPN

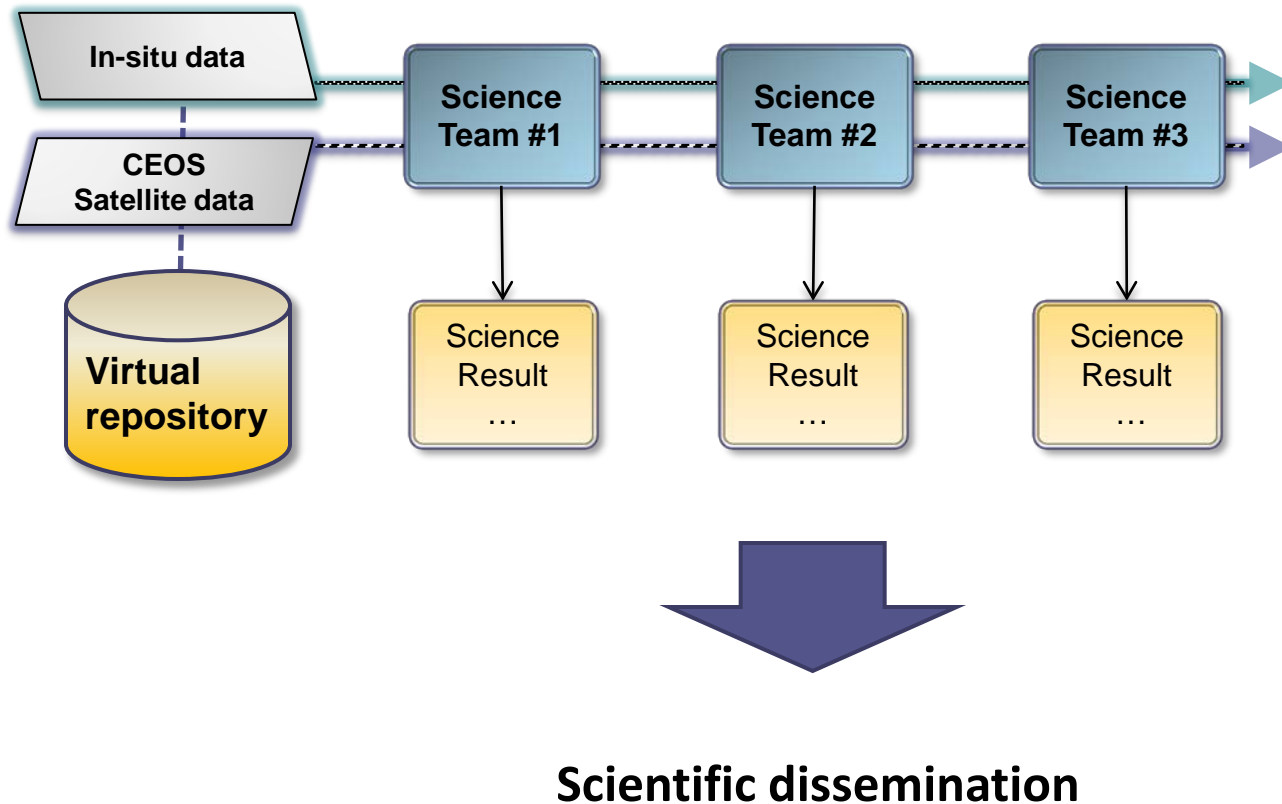
SAR data 2014-2015

	COSMO-SkyMed	TerraSAR X	Radarsat 1	Radarsat 2	ALOS 1	ALOS 2
Hawaii	450	190	500	268	414	50
Iceland	1100	500		320		
Etna	650	260		60		
Vesuvio	650	260		60		
Marmara	800	500		60		
Ecuador	400	260				
New Zealand	400	260		100		

In situ data

- GPS (through Web services)
- Seismic (through Web services)
- Gravity
- Gas emissions
- Geologic maps
- Thermal/VNIR cameras
- Airborne data: UAVSAR, drone measurements, etc.

The GSNL 1.0 value-added chain



Societal benefit at a slow pace

- ❑ Uptake of research findings by risk managers is usually **very slow**
- ❑ Synthesize hazard information from different research findings is difficult **if products are not disseminated in digital form**
- ❑ End-users may not use geohazard science **if not provided by/through an authoritative agency**
- ❑ For local end-users it is **difficult to provide priorities or feedback** to the international scientific community

Uptake delays often imply tragic consequences for the society, especially in developing countries.

Goals of GSNL 2.0

- ❑ Create the conditions for **obtaining scientific advancements in geohazard and risk assessment**
- ❑ Create the conditions for a **more direct uptake of updated scientific information in DRR**, able to benefit the geohazard **prevention** and disaster **response** activities
- ❑ Help to **improve knowledge transfer on hazard and risk assessment** through an international collaborative environment

Shared principle:

Open exchange of data (GEO principles)

- Full and open exchange of data, recognizing relevant international instruments and national policies and legislation;
- All shared data made available with minimum time delay and at minimum cost;
- All shared data to be free of charge or at cost of reproduction for research and education.

However:

We acknowledge that **specific legislation may limit the data sharing**, e.g. during disaster response, or for commercial reasons.

A specific data sharing policy will be agreed among the partners.

Shared principle:

Open exchange of research products

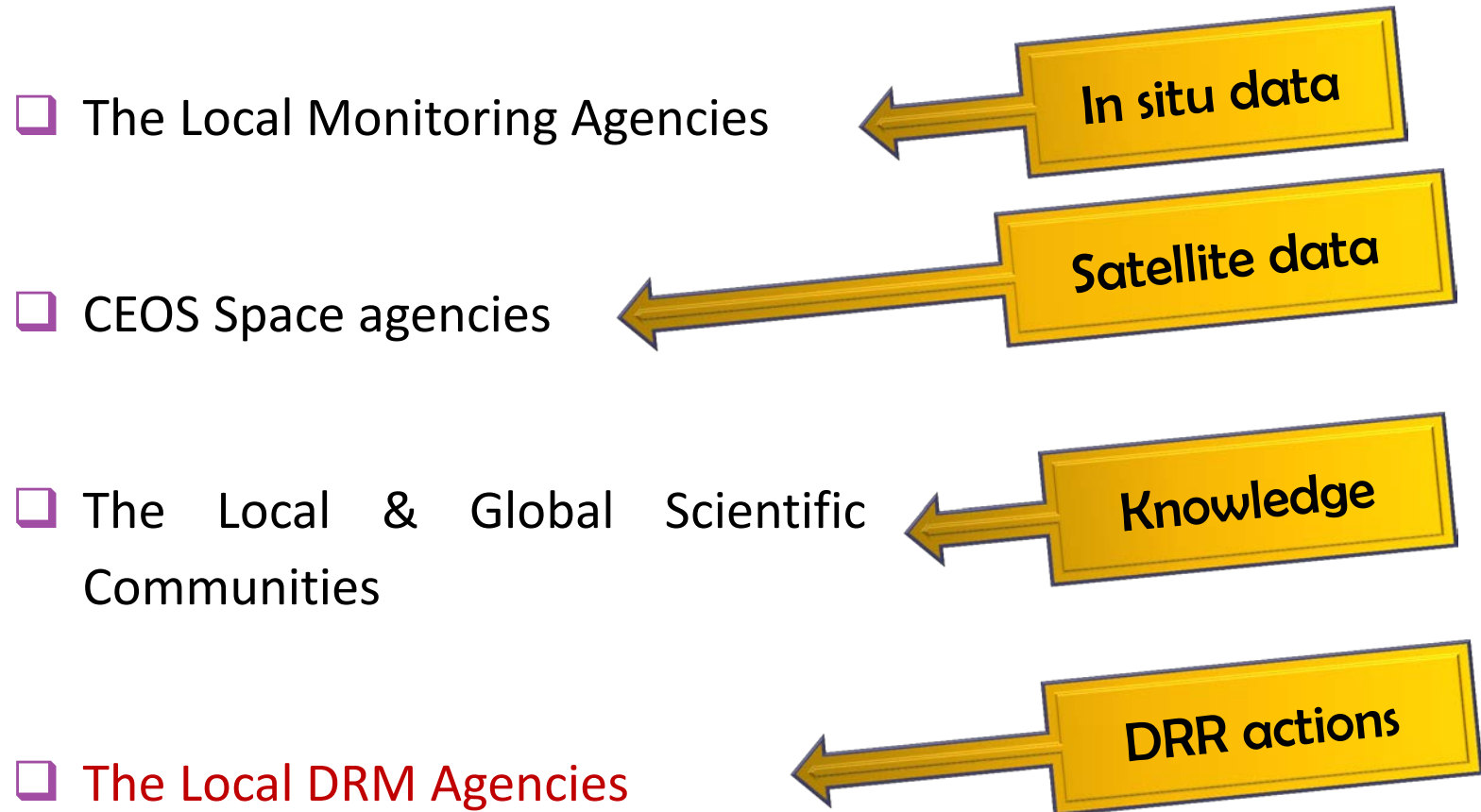
- ❑ Open exchange policy for research products, with license allowing **re-use for non-commercial purposes**.
- ❑ Products will be provided in full **digital format** after publication.
- ❑ During the Disaster Response phase research products could be voluntarily provided before publication, and they will be exploited by end-users **respecting the IPRs of the authors**.

Shared principle:

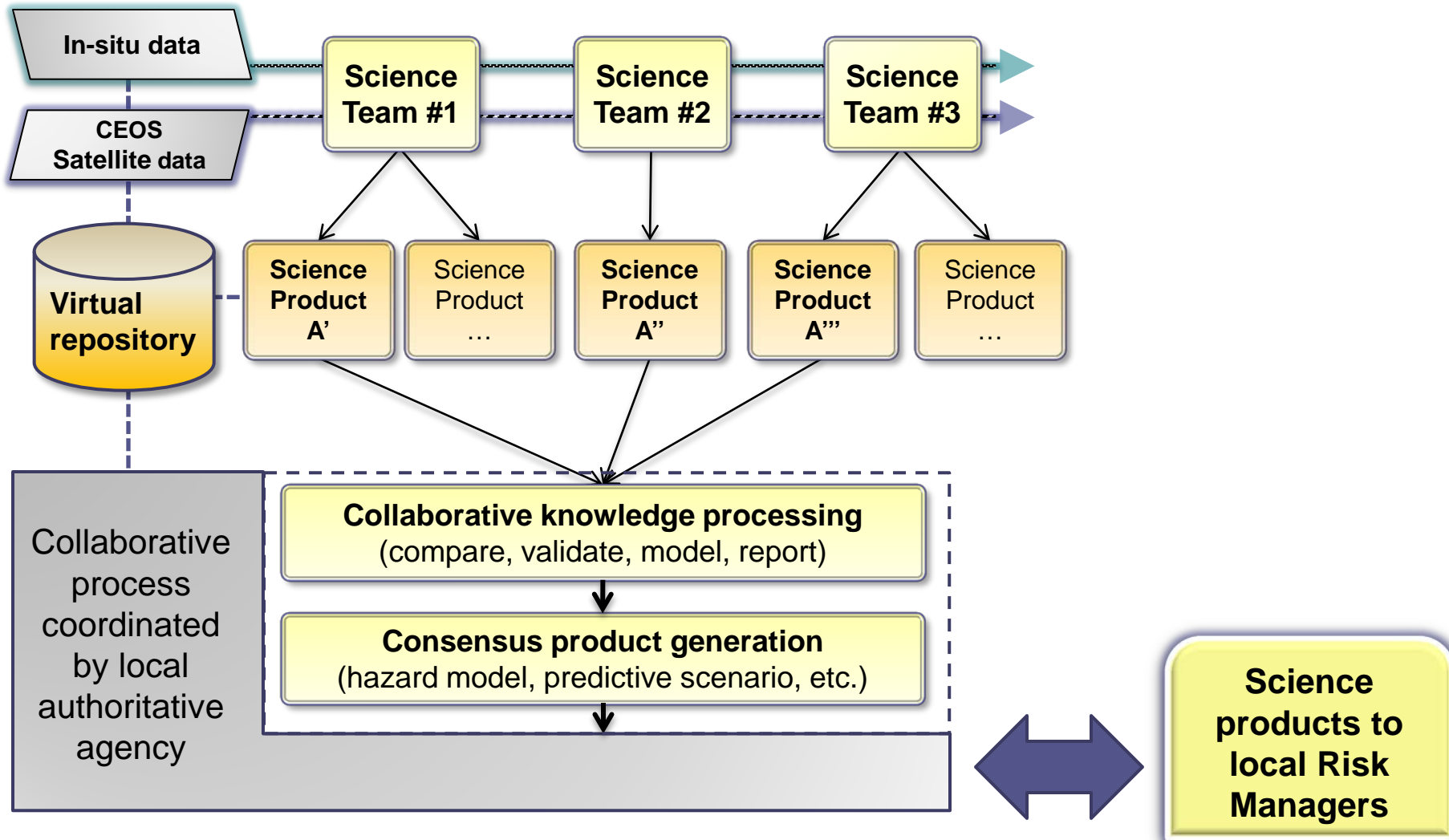
Coordination by local agencies

- ❑ Diffusion of research results which are not well validated and reviewed **may generate confusion** in disaster managers and the public at large, and must be avoided.
- ❑ The science product uptake will be coordinated locally by a national agency responsible for the various geohazards and risk factors.
- ❑ National agencies responsible for the various geohazards (and risk) components will **coordinate the process for the generation of consensus research products**.
- ❑ These national agencies will also **disseminate the products** to the public agencies in charge of DRM at all scales.

The GSNL 2.0 partnership



The GSNL 2.0 process model



Example of Prevention products

- ❑ estimates of fault slip rates,
- ❑ high resolution strain rate maps over faults and volcanoes,
- ❑ earthquake hazard and damage scenarios,
- ❑ models and maps of the volcano plumbing system,
- ❑ scenarios for volcanic hazards, as lava flows, flank collapses, lahars, ash falls, etc.
- ❑ up to date high precision topographic maps,
- ❑ up to date land use and exposure maps

Example of Response products

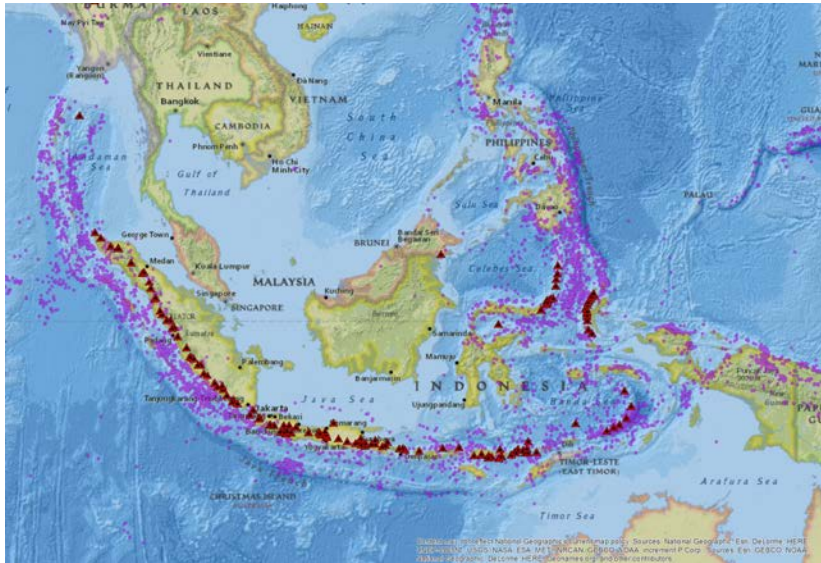
- ❑ maps and parameters of the earthquake source,
- ❑ maps of co-seismic effects on the natural and built environments: fault scarps, ground deformation, triggered landslides, collapsed building, infrastructure damage, etc.
- ❑ identification and characterization of the magma chamber during eruptions,
- ❑ scenarios for mass eruption rate, plume heights, ash fall, etc.
- ❑ maps of the effects of volcanic eruptions, as fractures, collapses, pyroclastic flows, lahars, lava flows, and their interaction with the built environment

Supersites proposals (GSNL 2.0)

- ❑ Submitted by national monitoring (and research) agencies, must be supported by the wider scientific community
- ❑ Commitment to provide access to in situ data
- ❑ Commitment to provide re-usable digital research products
- ❑ Partnership must include local Risk Managers
- ❑ Should address priorities given by local Risk Managers
- ❑ Commitment to provide consensus geohazard (and risk) products through local coordination
- ❑ Evaluated by Supersite Advisory Committee and CEOS based on relevance of scientific problem and capacity to improve DRR

(Yet to be approved by GSNL SAC and CEOS DCT)

Proposal for a South East Asia Natural Laboratory



- ❑ World's highest concentration of geohazards,
- ❑ frequent disasters,
- ❑ need for better monitoring,
- ❑ global impact of some disasters,
- ❑ fast-growing exposure levels,
- ❑ high vulnerability, low resiliency,
- ❑ need for capacity building.

The proposal has been presented at the UN World Conference on Disaster Risk Reduction, and partnership building is under way.

Benefits for the scientific community

- ❑ Better science through **free access to large amounts of data**. For the Sentinels more frequent acquisitions could be requested.
- ❑ Increased international collaboration and **better exchange of knowledge, research results, and capacities**.
- ❑ Possibility to **leverage on the SEANLab framework** to obtain research funds.

An extraordinary opportunity to use your knowledge and capacities to support actual risk Prevention and Disaster Response actions for a safer society.

To submit a Supersite proposal

Write to:

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**GEO Geohazards Supersites and
Natural Laboratories**

<http://www.earthobservations.org/gsnl.php>