

# A Virtual Research Infrastructure for the Geohazard Supersites and Natural Laboratories community

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## The Geohazards Supersites & Natural Laboratories

A voluntary partnership aiming to demonstrate in specific areas of the world (the **Supersites**) the advantages of **global collaboration** on geohazard research to provide **visible benefits** for local **Risk Prevention and Response** activities.

### Specific goals of GSNL:

- ☐ **Promote scientific advancements** in geohazard research through open data access and better international collaboration
- ☐ **Promote a more direct uptake of scientific results** in local prevention and response activities for seismic and volcanic risks
- ☐ **Promote knowledge transfer** on geohazard research

# The data issue in Geohazard Science

- In situ data from local monitoring networks or surveys are of difficult access to the global scientific community.
- Satellite EO data are costly and most coverages are not global. New EO satellites do provide open access but do not satisfy all science needs.

But the integration of in situ and EO data is **crucial** for the scientific investigation of **seismic and volcanic processes**

## Three main GSNL principles

1. Open data access, with minimum time delay and at minimum cost (free of charge or at cost of reproduction for research and education). However, specific national legislation may limit the data sharing, e.g. during disaster response
2. Open access to research products (models, maps, etc.) in full digital format
3. The collaborative process to generate consensus research products for decision makers must be coordinated by local scientists

# The GSNL partnership

❑ The Local Monitoring Agencies

**In situ data**

❑ CEOS Space agencies

**Satellite data**

❑ The Local & International Scientific  
Communities

**Knowledge**

❑ The Local End-users

**DRR actions**

## Supersite set up

- Different categories
  - **Permanent Supersites** (single fault or volcano, long-term)
  - **Natural Laboratories** (large areas with important scientific problems)
  - **Event Supersites** (large earthquakes and eruptions, short term)
- Proposals coordinated by local scientific community
- Proposals scientifically evaluated through peer-review process
- Proposals evaluated also by space agencies (CEOS)
- Long term data provision commitments by local agencies (in-situ data) and space agencies (satellite data)
- Supersite must provide **open data access** to **all scientists**
- Evaluation of Supersite results every 2 years

## Present Supersites

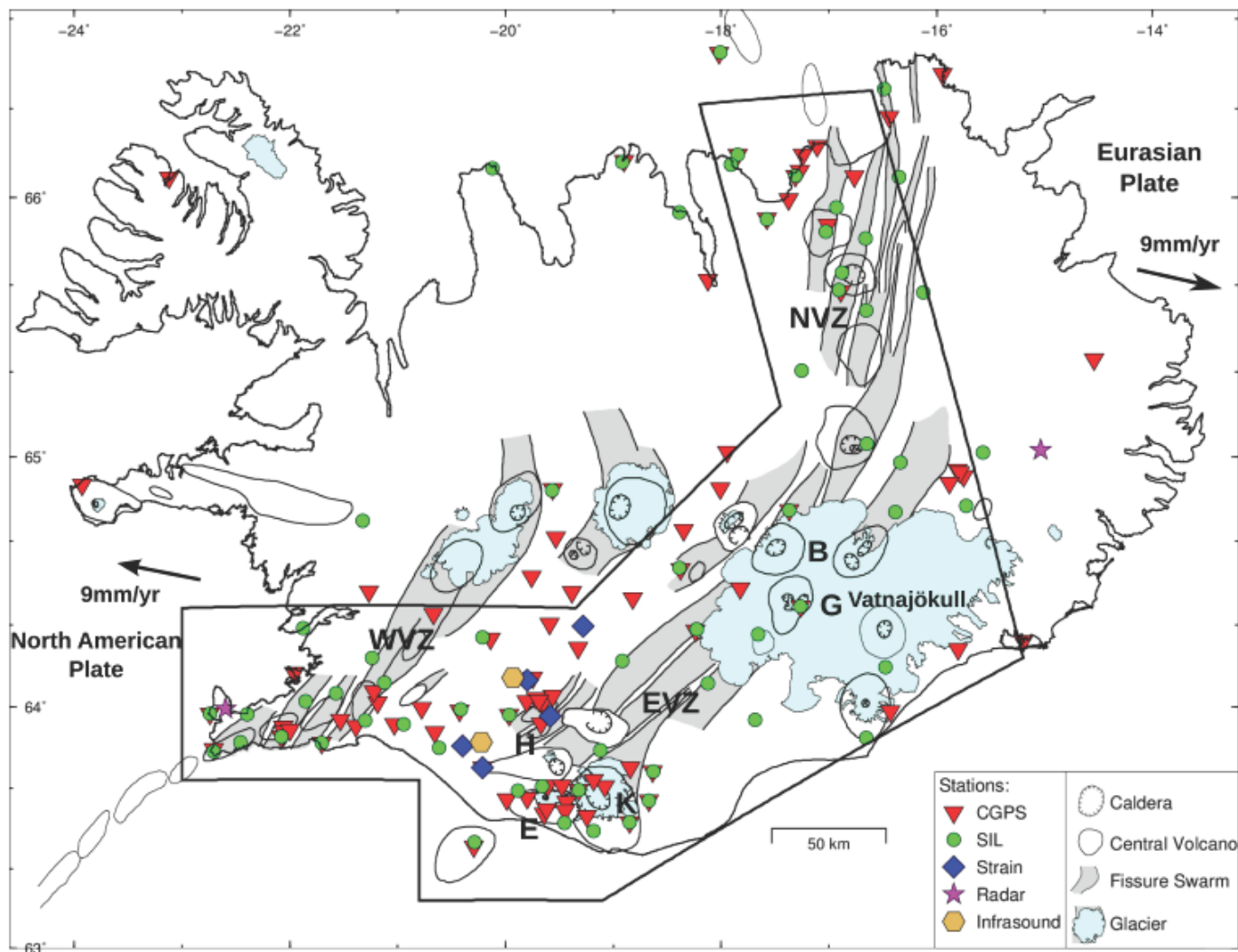
1. **Hawaiian volcanoes** – USGS
2. **Icelandic volcanoes** – Univ. of Iceland & IMO
3. **Etna volcano** – INGV - Catania
4. **Campi Flegrei volcano** – INGV - Naples
5. **Western North Anatolian Fault** – KOERI
6. **Taupo Volcano** – GNS Science
7. **Tungurahua and Cotopaxi volcanoes** – Instituto Geofísico, EPN
8. **Nepal Event Supersite** – Coordinated by JPL

*Permanent  
Supersites*

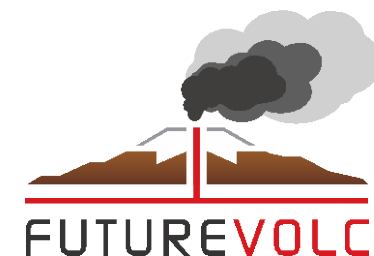
*Event  
Supersites*

# The Iceland volcano Supersite

Continuous monitoring and hazard mapping on 30 volcanoes



Over 2000 satellite images/year

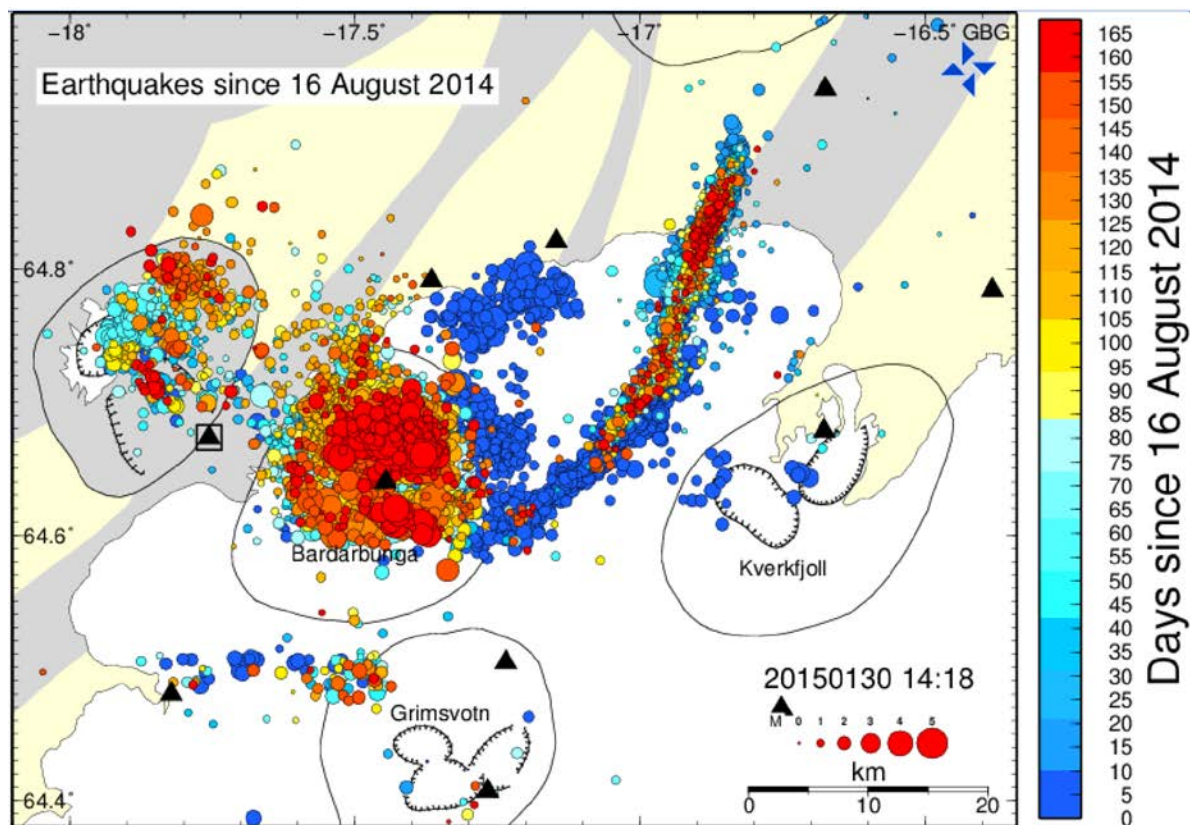


[www.futurevolc.hi.is](http://www.futurevolc.hi.is)

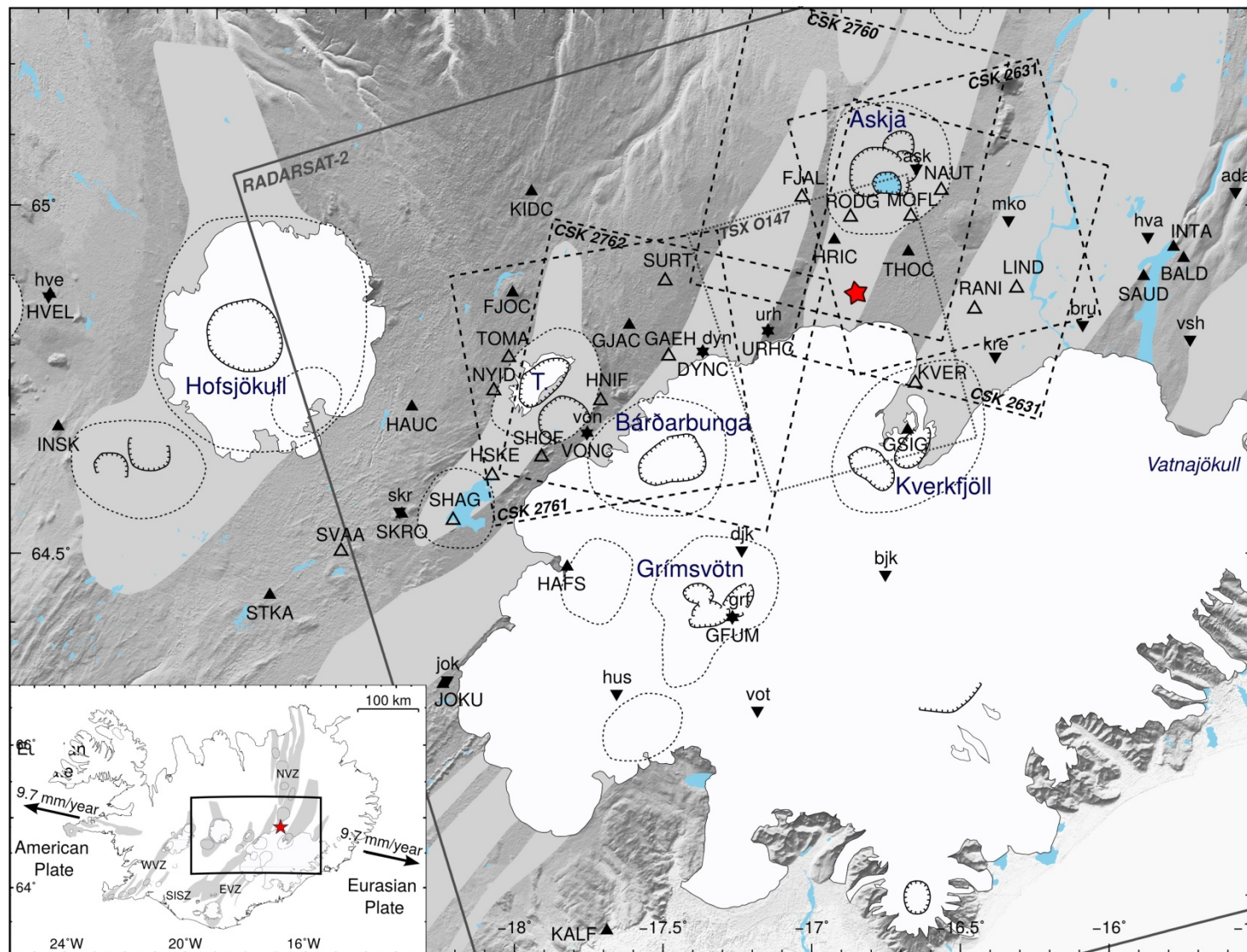


## Collaborative scientific investigation during the 2014 Bardabunga eruption

Analyses of Supersite data by international research teams, coordinated by Iceland scientists, generated consensus science products used to guide decisions by the local Civil Protection.

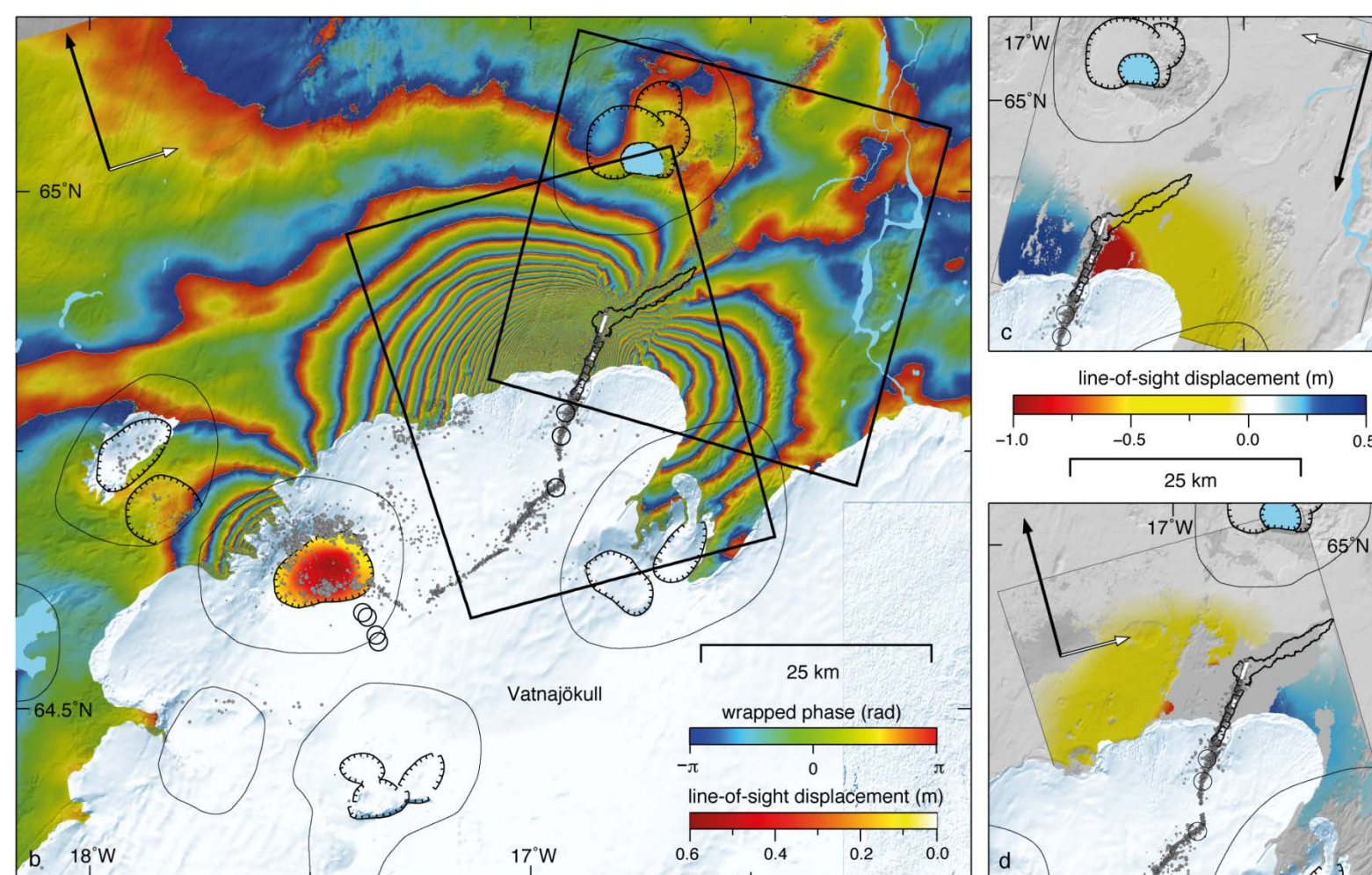


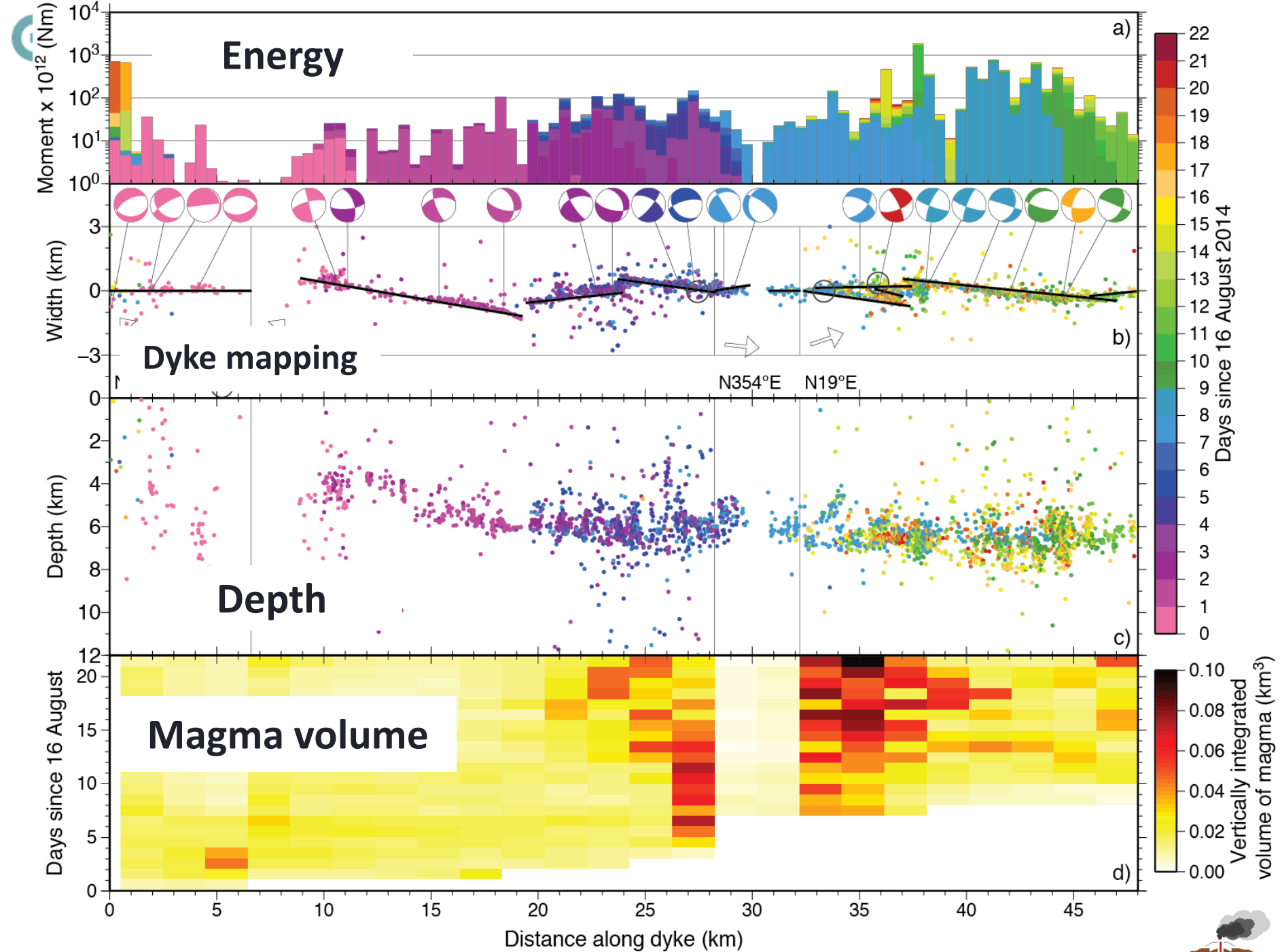
## InSAR coverage through the Supersite





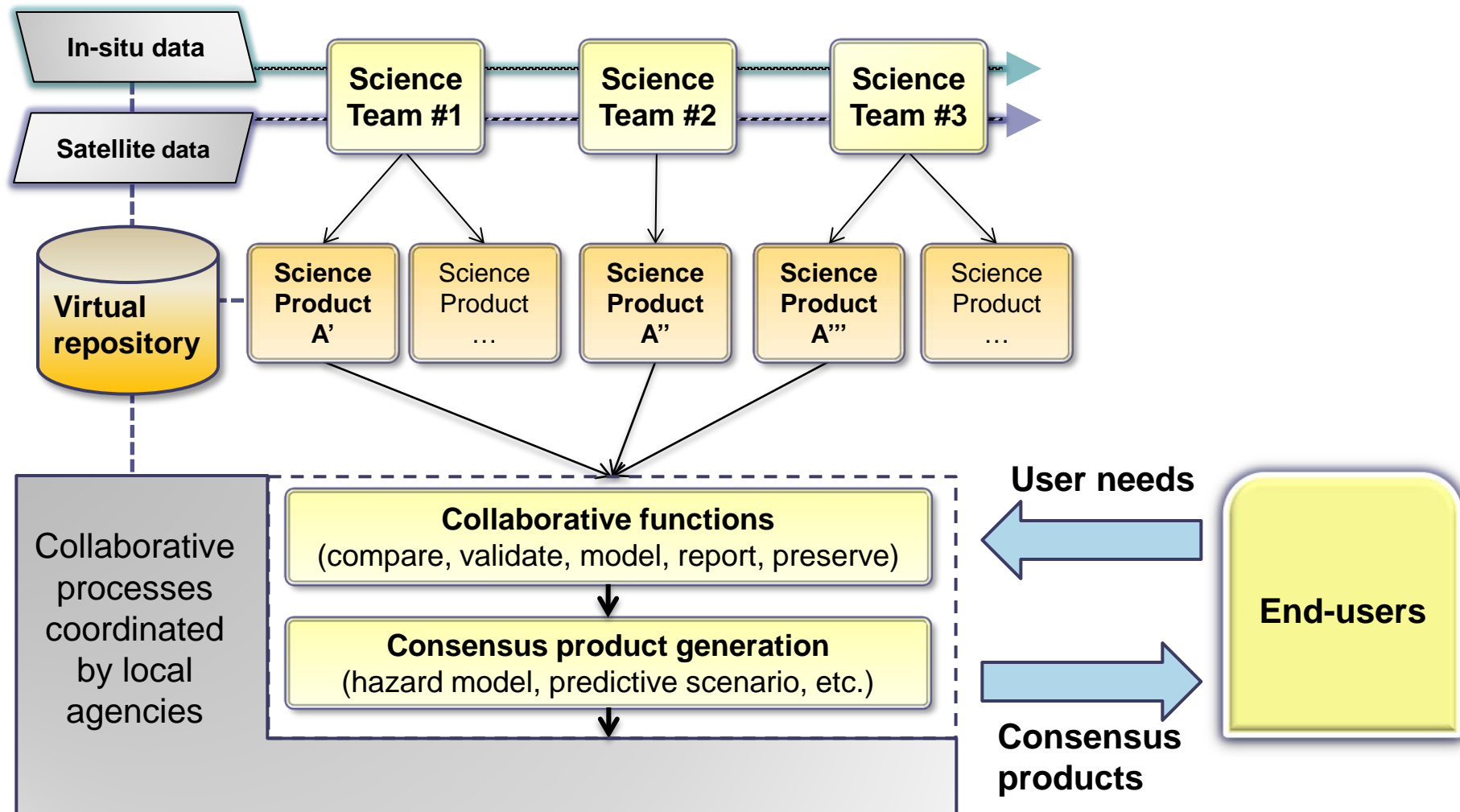
InSAR images shows dyke transferring magma for 45 km out of ice area, reducing impact of eruption





## The ideal Supersite working model

Collaboration is important!



## Why a VRE for the Supersites

1. Collaboration needed to generate consensus hazard products
2. Scientists are distributed globally
3. Need to provide equal access to scientific resources (software, publications, maps, instruments)
4. Need to maintain Supersite specific, long term data archives
5. Need to maintain data bases of science products
6. Need for long term preservation of workflows
7. Need to optimize the scientific investigation during emergencies

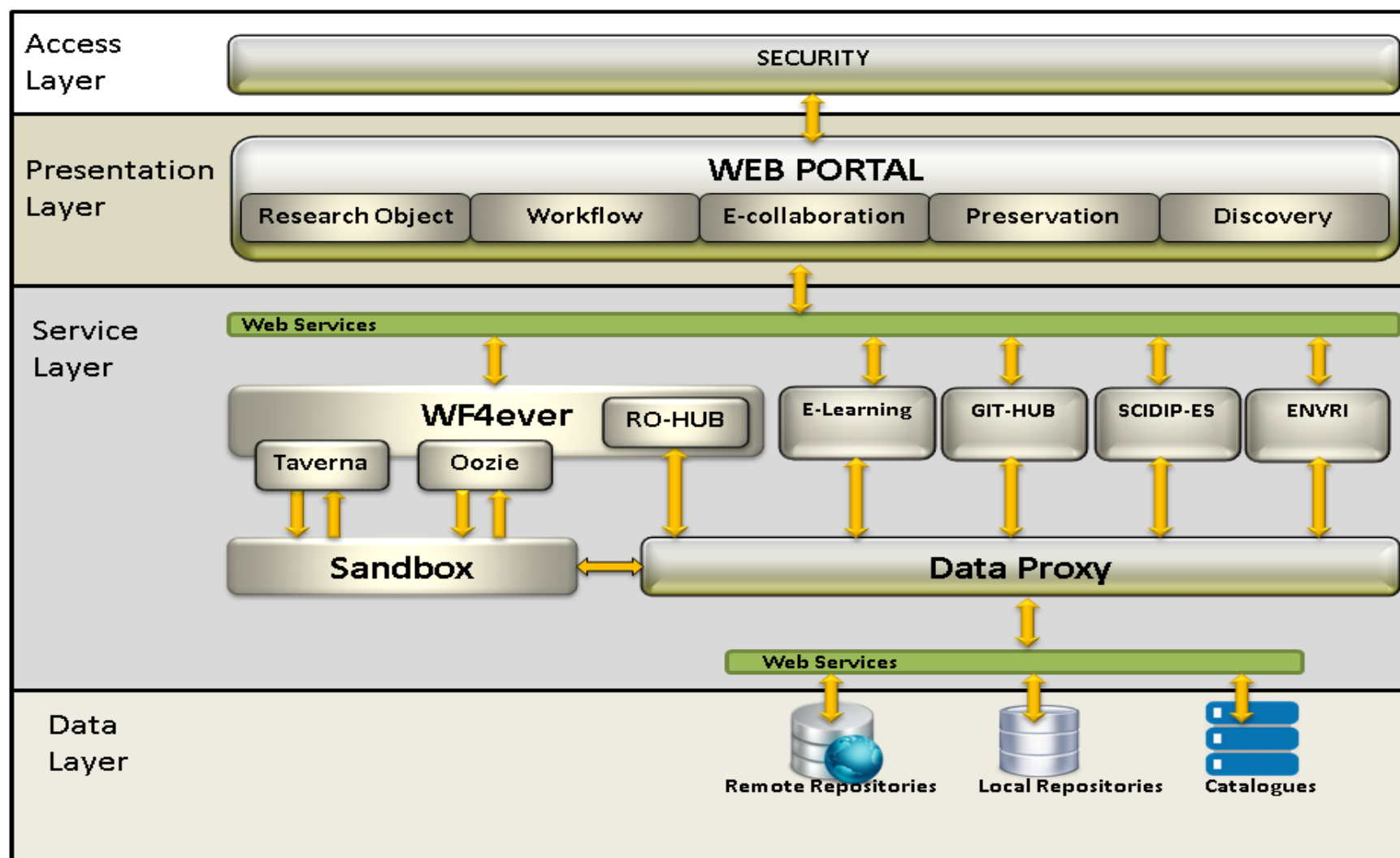
## The EVER-EST project: A Virtual Research Infrastructure for the Earth Sciences

- ❑ A Horizon 2020 project
- ❑ 12 partners (6 industries, 3 research centres, 2 space agencies, 1 information service centre)
- ❑ 3-year duration starting late 2015

### Main goals:

- ❑ Build VRI tailored to the needs of 4 communities: Sea and Land monitoring, Natural hazards, **Geohazard Supersites**
- ❑ Demonstrate the use of the Research Object concept in observational sciences
- ❑ Validate the VRI through real use by the different communities

## The EVER-EST VRI





## The EVER-EST VRI building on previous project results

- ❑ Use of Research Objects to share scientific information (WF4ever)
- ❑ Data discovery and federated catalogue services (ENVRI, GENESIDEC)
- ❑ Workflow editor and engine (WF4ever)
- ❑ Data and product preservation services (SCIDIP-ES)
- ❑ Data processing based on user defined virtual machines run on cloud “sandboxes” (GEOWOW)



Thank you for your attention

More on EVER-EST next year !