GROUP ON EARTH OBSERVATIONS

Synergies between BEYOND and the GEO Geohazard Supersites initiative

Stefano Salvi

INGV - Chair of the GSNL Scientific Advisory Committee

ONE step BEYOND Workshop, ESA - Frascati,Italy, 15 October 2015

The Geohazards Supersites & Natural Laboratories

A GEO initiative, started in 2011, 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 2.0:

- **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

It all started from the data issue

- In situ data from local seismic and volcanic 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 (the Sentinels) 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

The only guiding GSNL 1.0 principle

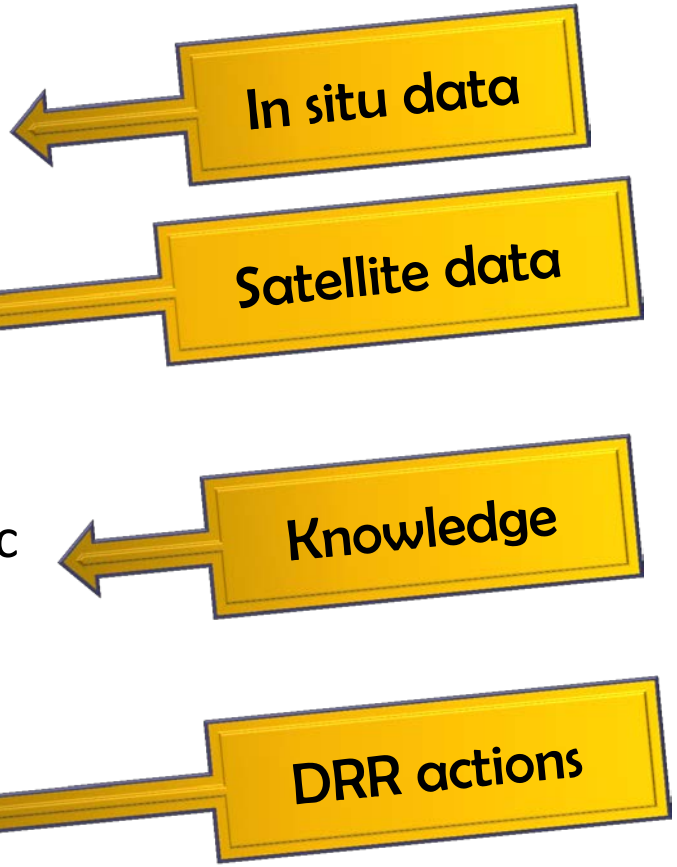
Open data access, with minimum time delay and at minimum cost (free of charge or at cost of reproduction for research and education).

The GSNL 2.0 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. There should be a collaborative process to generate consensus research products for decision makers; this must be coordinated by local scientists

The GSNL 2.0 partnership

- The Local Monitoring Agencies
- CEOS Space agencies
- The Local & International Scientific Communities
- The Local End-users



The Supersite community

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 by space agencies (CEOS)
- Long term open data provision commitments by local agencies (in-situ data) and space agencies (satellite data)

- Supersite progress evaluation every 2 years

Present Supersites

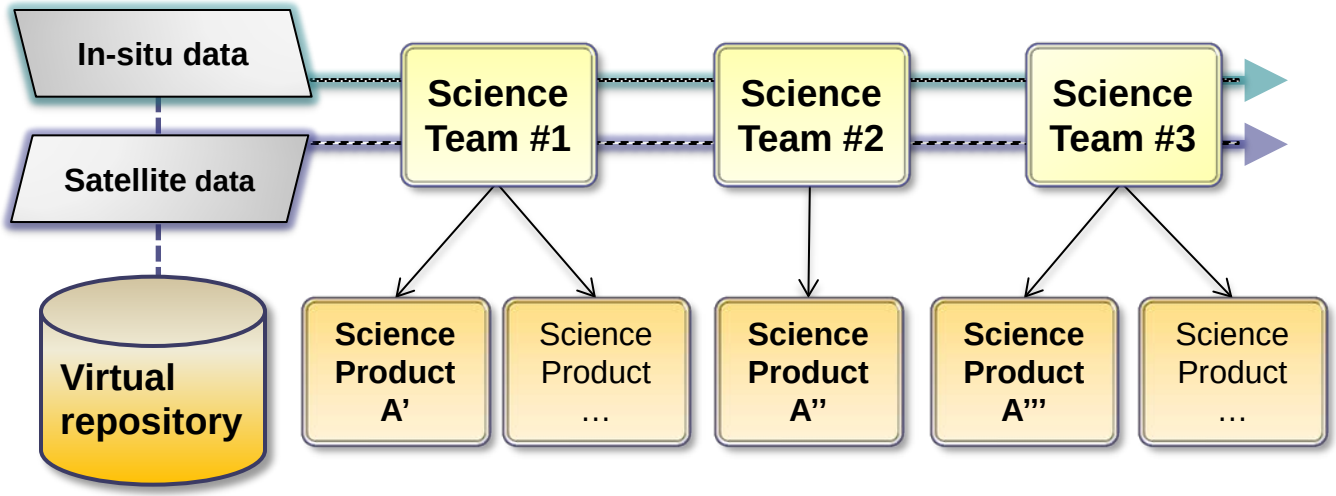
Permanent Supersites

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

Event Supersites

8. **Nepal Event Supersite** – Coordinated by JPL

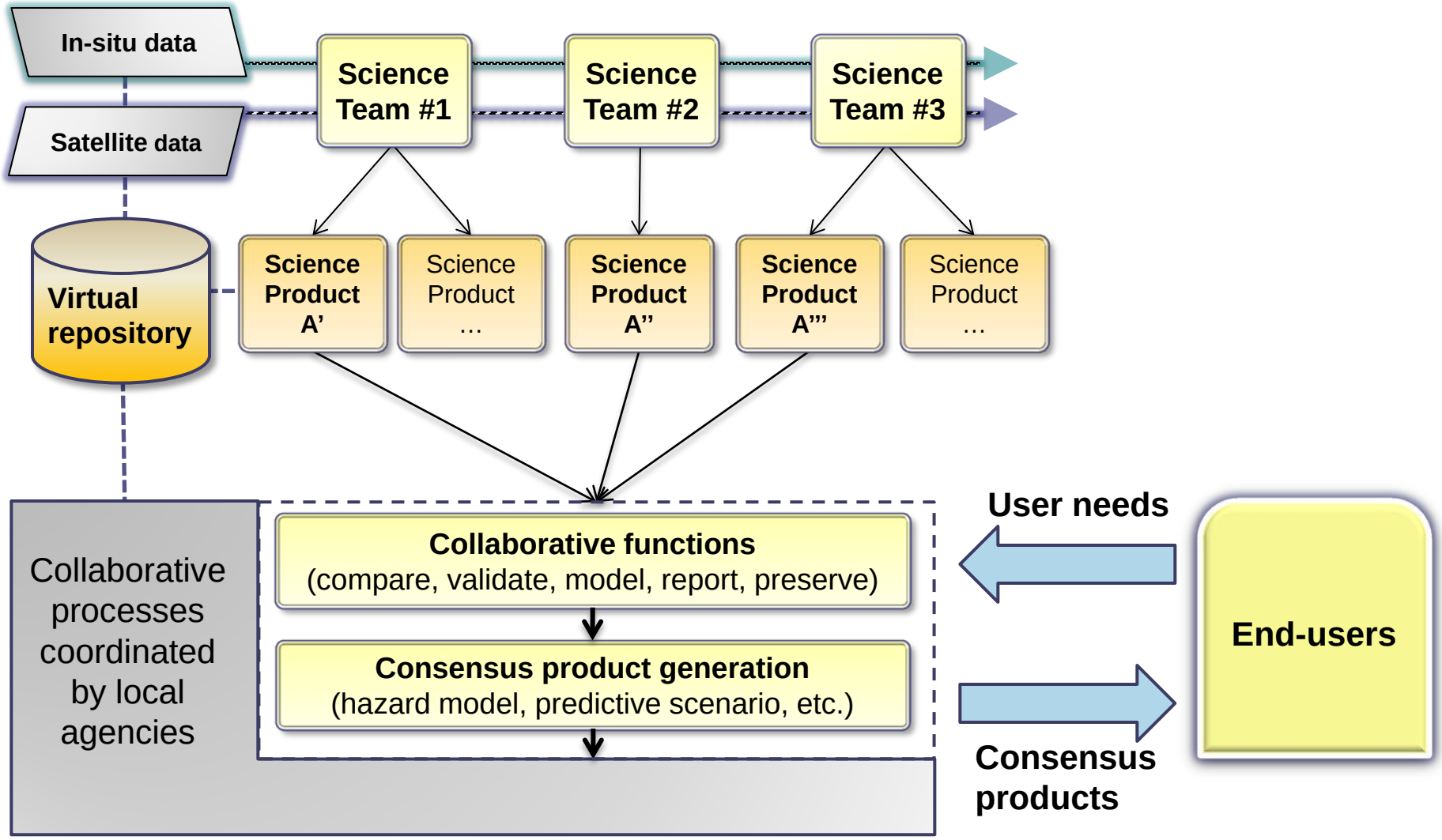
The Supersite 1.0 working model



Work separately, publish separately

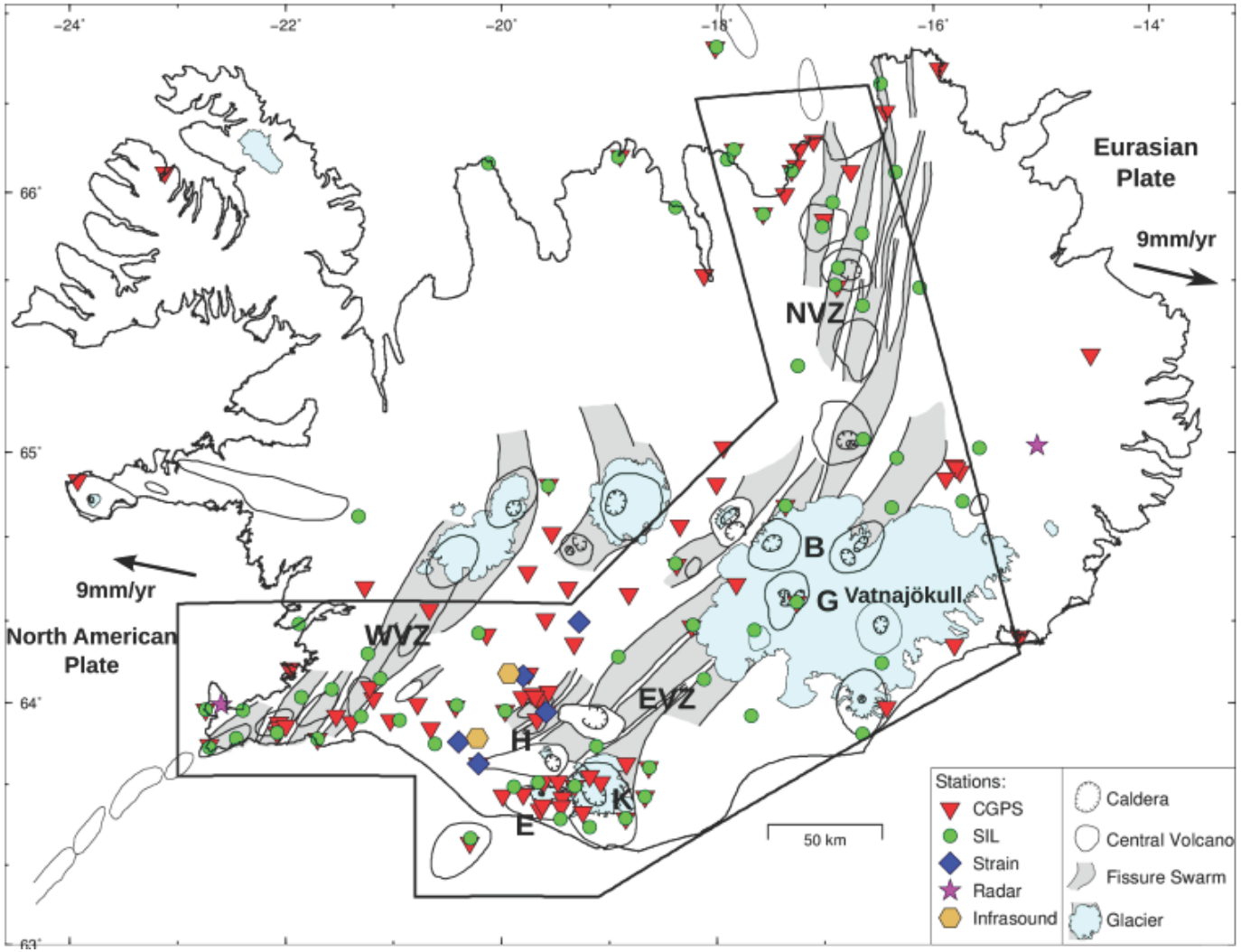
The Supersite 2.0 working model

Collaboration is important!



The Iceland volcano Supersite

Continuous monitoring and hazard mapping on 30 volcanoes



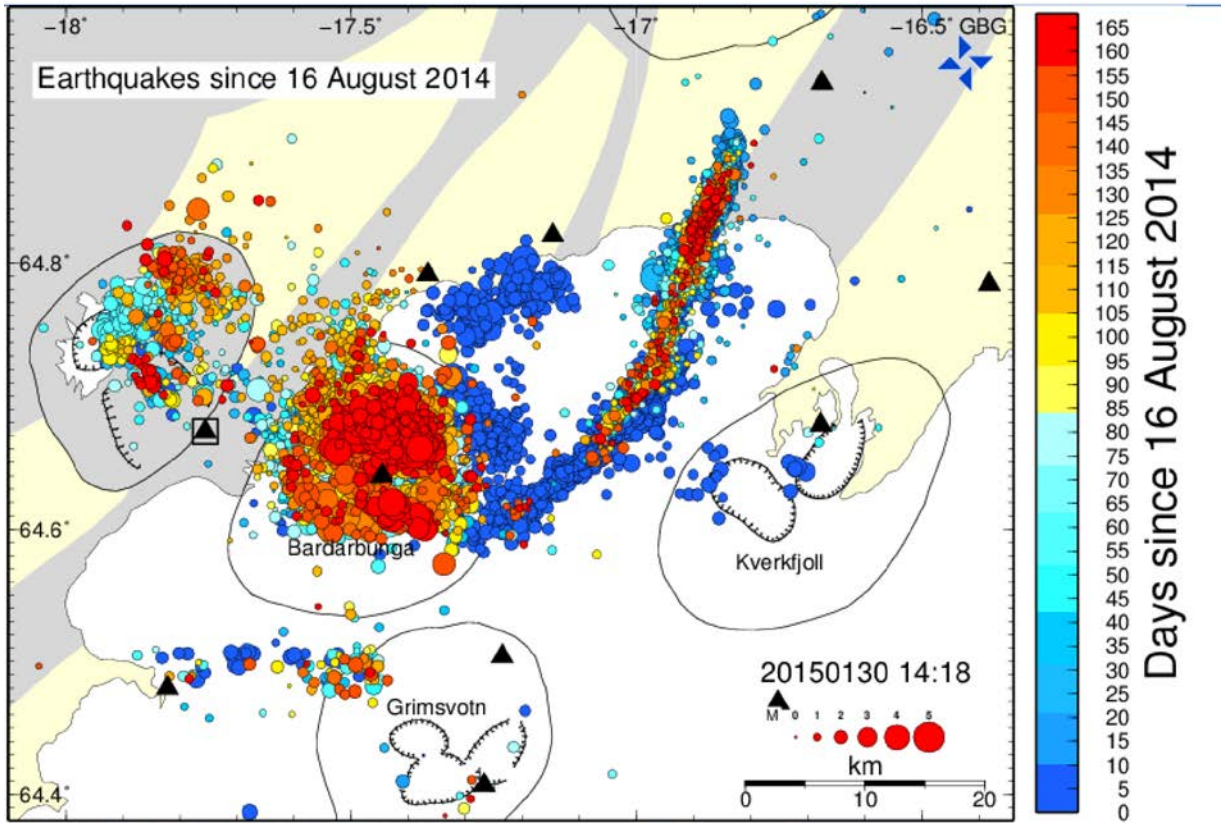
Over 2000 satellite images/year

FUTUREVOLC

www.futurevolc.hi.is

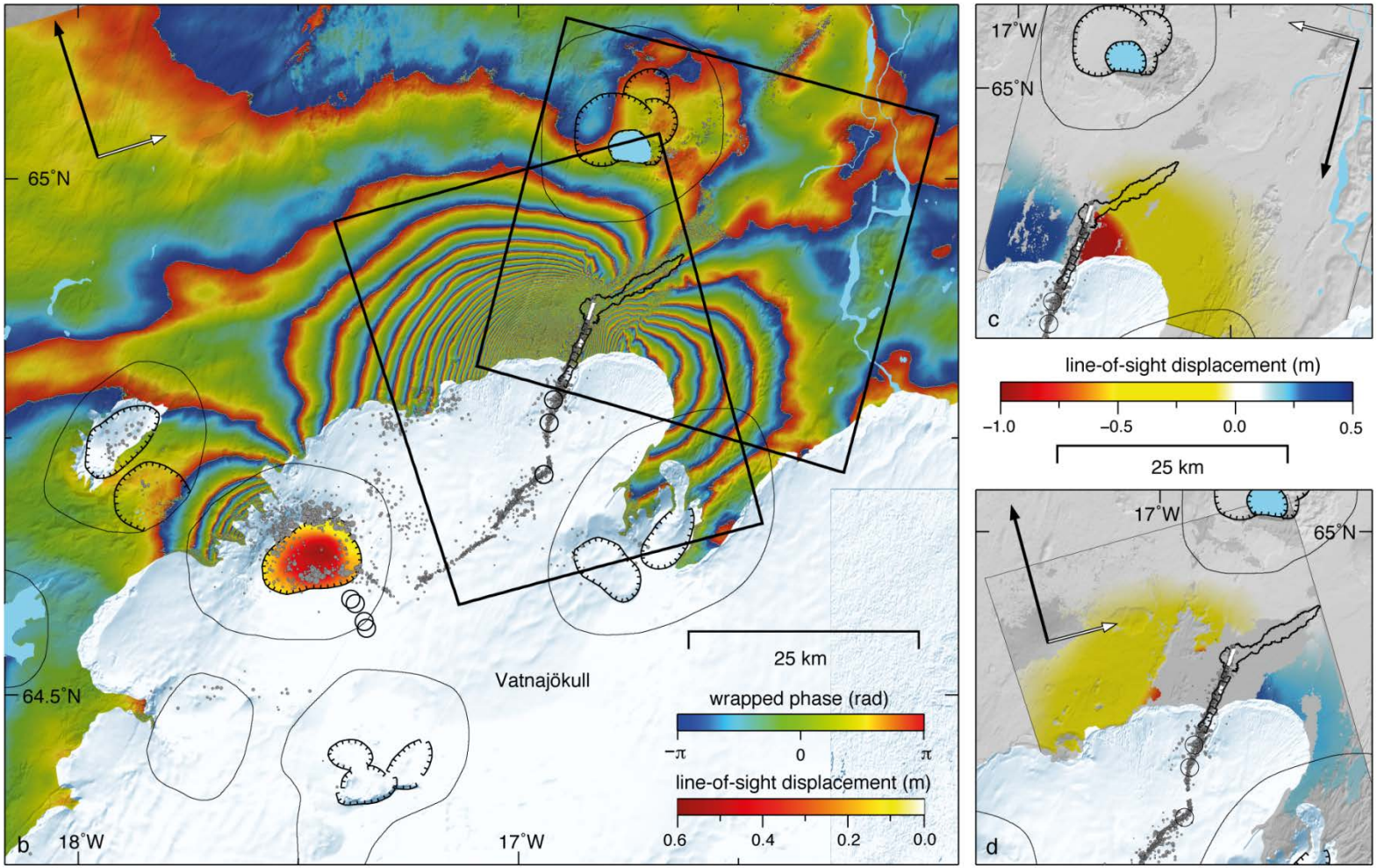
Collaborative scientific investigation during the 2014 Bardabunga eruption

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.

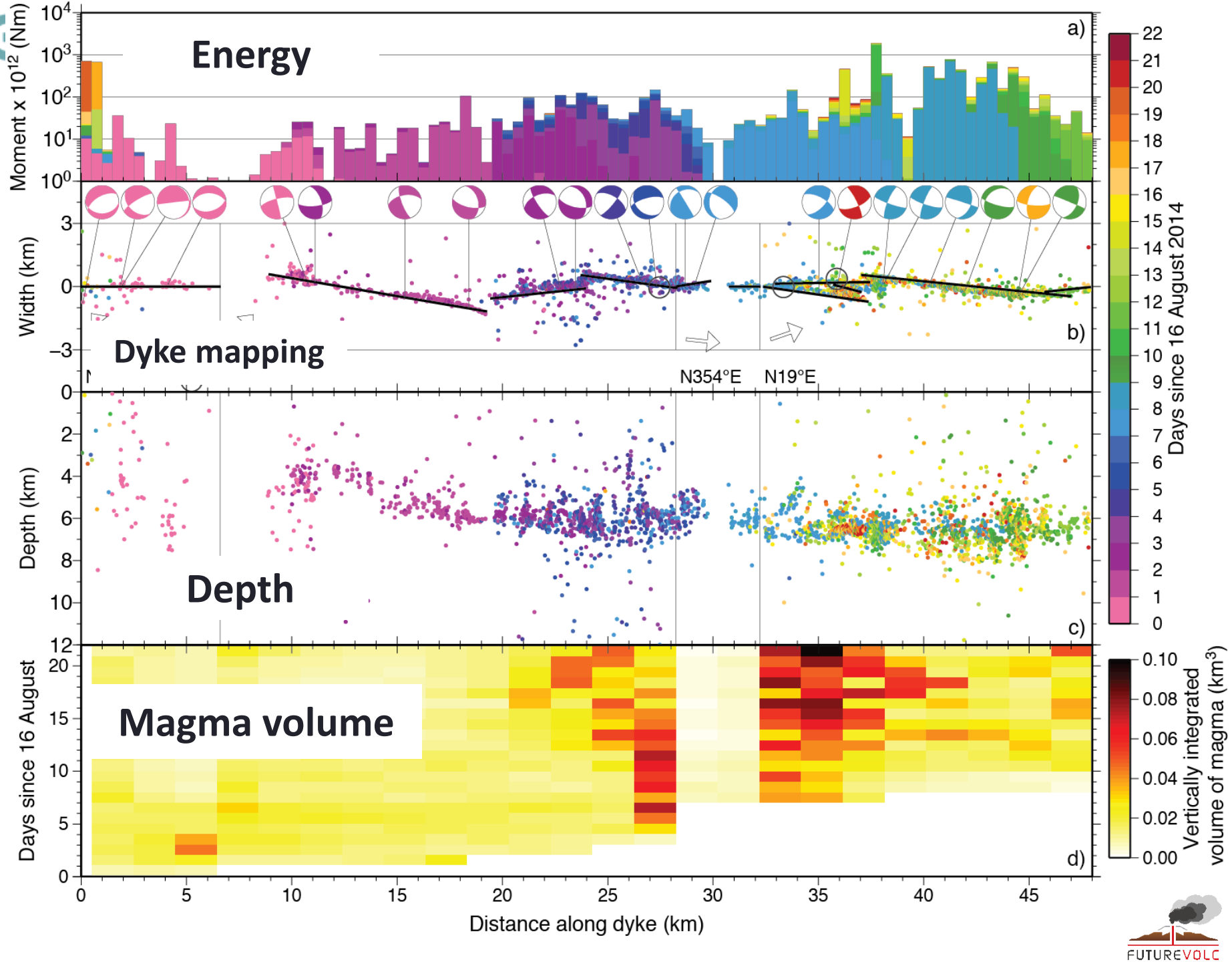


FUTUREVOLC

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



FUTUREVOLC


Energy
a)
Moment x 10^12 (Nm)
Dyke mapping
Width (km)
b)
N354°E
N19°E
Depth
Depth (km)
c)
Magma volume
Days since 16 August
d)
Distance along dyke (km)
Days since 16 August 2014
Vertically integrated volume of magma (km³)

Further developments

- Develop knowledge and capacities thanks to the Geohazard Exploitation Platform of ESA (GEP)
- Provide a Virtual Research Infrastructure to the Supersite community (EVER-EST H2020 project)
- Link with platforms and initiatives to fill the gap with end-users (links with the Charter, Copernicus, RASOR, **BEYOND**)

Synergies with BEYOND: access to EO and in-situ data

- BEYOND researchers can access Supersite datasets (a Greek Supersite has just been proposed)
- BEYOND researchers can join Supersite teams and then provide new requirements for EO data acquisition, if needed
- Supersite scientists can gain from BEYOND experience in Copernicus data access

Synergies with BEYOND: sharing of science products

- BEYOND researchers can share scientific results within the Supersite community (for the Greek Supersite or other ones)

Synergies with BEYOND: collaboration

- BEYOND & Supersite researchers can collaborate, sharing their know-how, experience, knowledge of geohazard processes to produce better science
- BEYOND researchers can be part of the collaborative process to generate consensus products for the Supersite end-users, in Greece or elsewhere

Synergies with BEYOND: capacity building

- BEYOND researchers can use the processing platforms used by the Supersite community (GEP, EVER-EST, RASOR), exploiting other people's software and sharing their own
- BEYOND researchers could train/help Supersite scientists coming from less developed countries and transfer their knowledge and experience in geohazard applications

Synergies with BEYOND: funding opportunities

- BEYOND can exploit the GSNL collaboration framework for new partnerships and projects, in Europe and elsewhere

Thank you for your attention

and to all BEYOND staff for the great workshop !