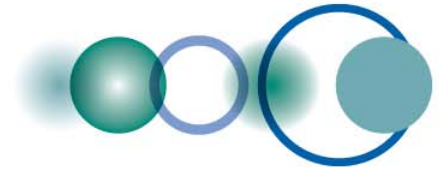


The Geohazard Supersites and Natural Laboratories (GSNL).

Falk Amelung¹, University of Miami
Joern Hoffmann², German Aerospace Center (DLR) and
Committee of Earth Observation Satellites (CEOS)
Francesco Gaetani Group on Earth Observation (GEO), Geneva

- (1) Chair of the Scientific Advisory Committee (SAC)
- (2) Chair CEOS Supersites Coordination Team (SCT)
- (3) Coordinator, GEO Disaster component

ICTP Trieste, Italy, 2nd September 2013



Group on Earth Observations

Intergovernmental Organization with 83 members and 59 participating organization
Construct by 2015: **Global Earth Observation System of Systems (GEOSS)**

**GEO data sharing principles:
open, free access for science**



GEOSS - System of Systems



The Global Earth Observation System of Systems addresses nine areas of critical importance to people and society.

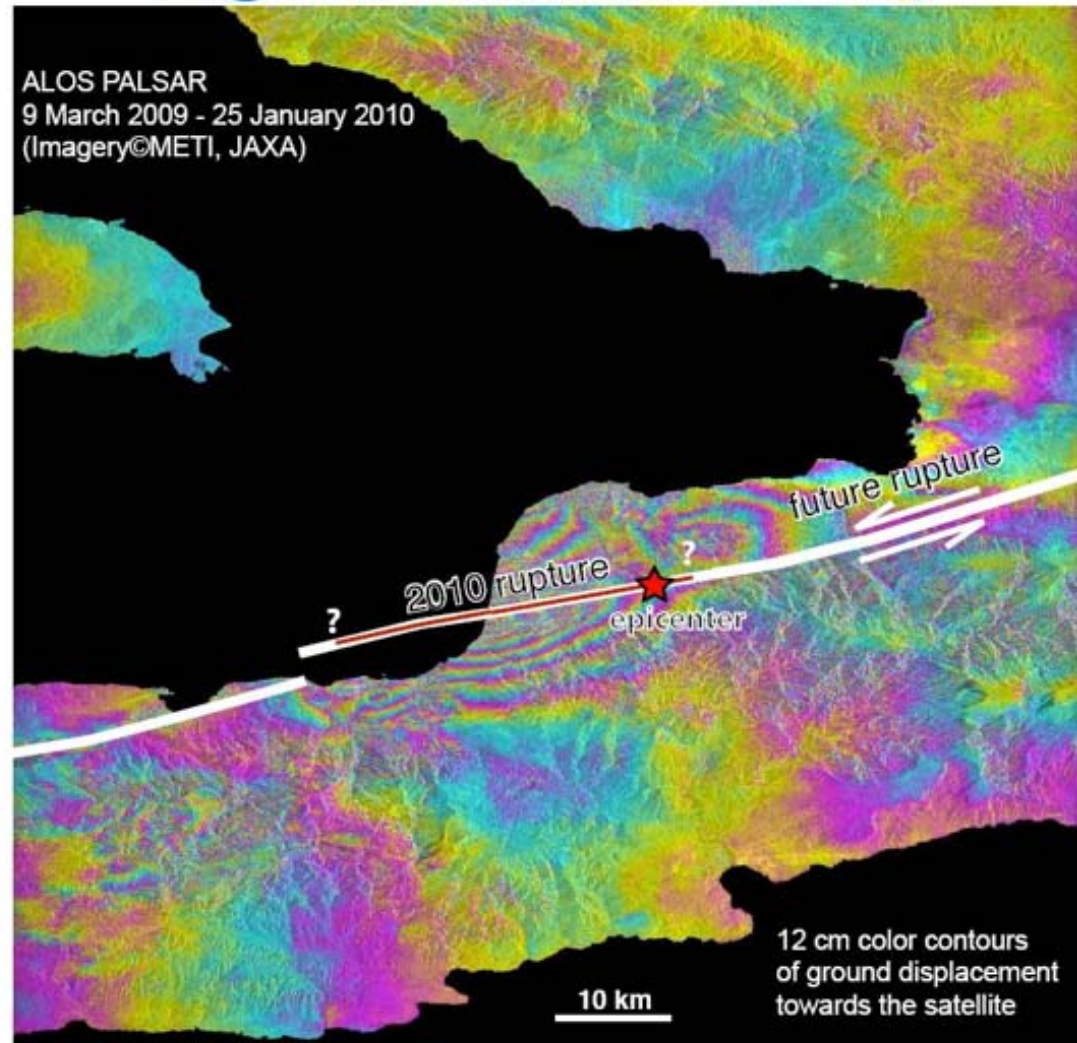
Event Supersite: Haiti earthquake, January 2010

GEO GROUP ON
EARTH OBSERVATIONS



UNIVERSITY OF MIAMI
ROSENSTIEL
SCHOOL OF MARINE &
ATMOSPHERIC SCIENCE
U

Early scientific understanding of quake helped focussing response efforts



Sang-Hoon Hong, Falk Amelung, Tim Dixon, Shimon Wdowinski, Guoqing Lin, Fernando Greene
Rosenstiel School of Marine & Atmospheric Science, University of Miami

Terms and Definitions

- **Permanent Supersites (“Supersites”)**
Seismic, GPS, SAR, optical (e-infrastructure).
- **Candidate Supersites**
Sites that should become permanent Supersites.
Proposal process. Reviewed by SAC, CEOS SST.
- **Natural Laboratories**
Larger geographical regions exposed to geohazards.
- **Event Supersites**
Forum with data access.

Permanent Supersites

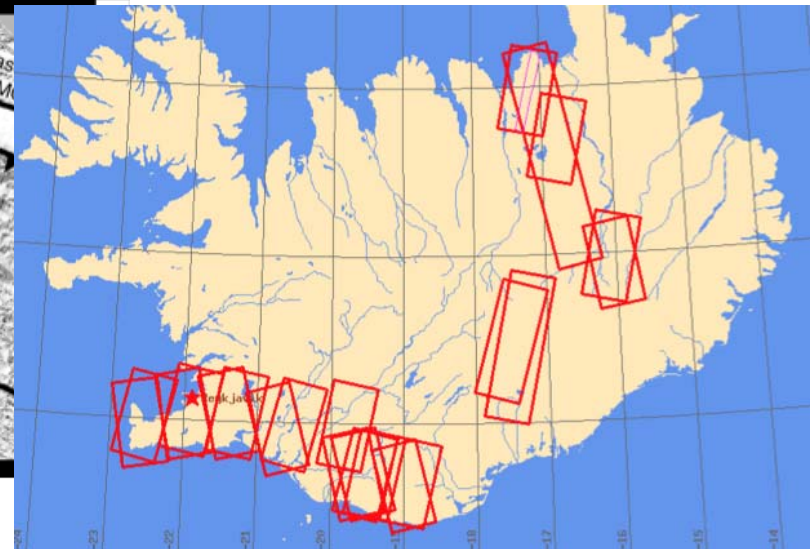
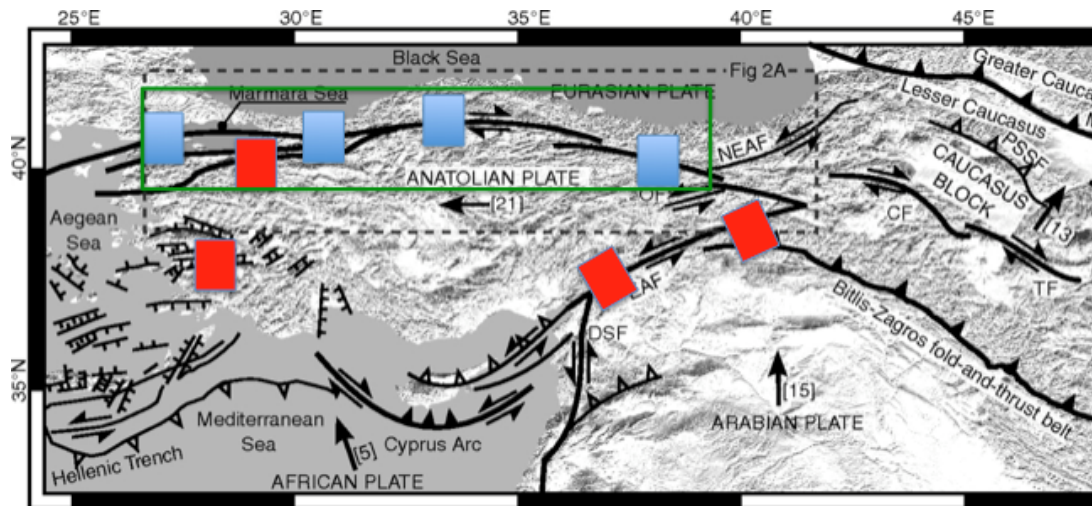


Proposal Process:

- Invitation by Scientific Advisory Committee (SAC)
- Review by SAC

accepted: Hawaii
(Iceland, North Anatolian Fault,
San Andreas Fault almost accepted)

Permanent Supersites



3 European Supersites (6 Mill Euro each)

Candidate Supersites – high priority



Formal interest expressed:

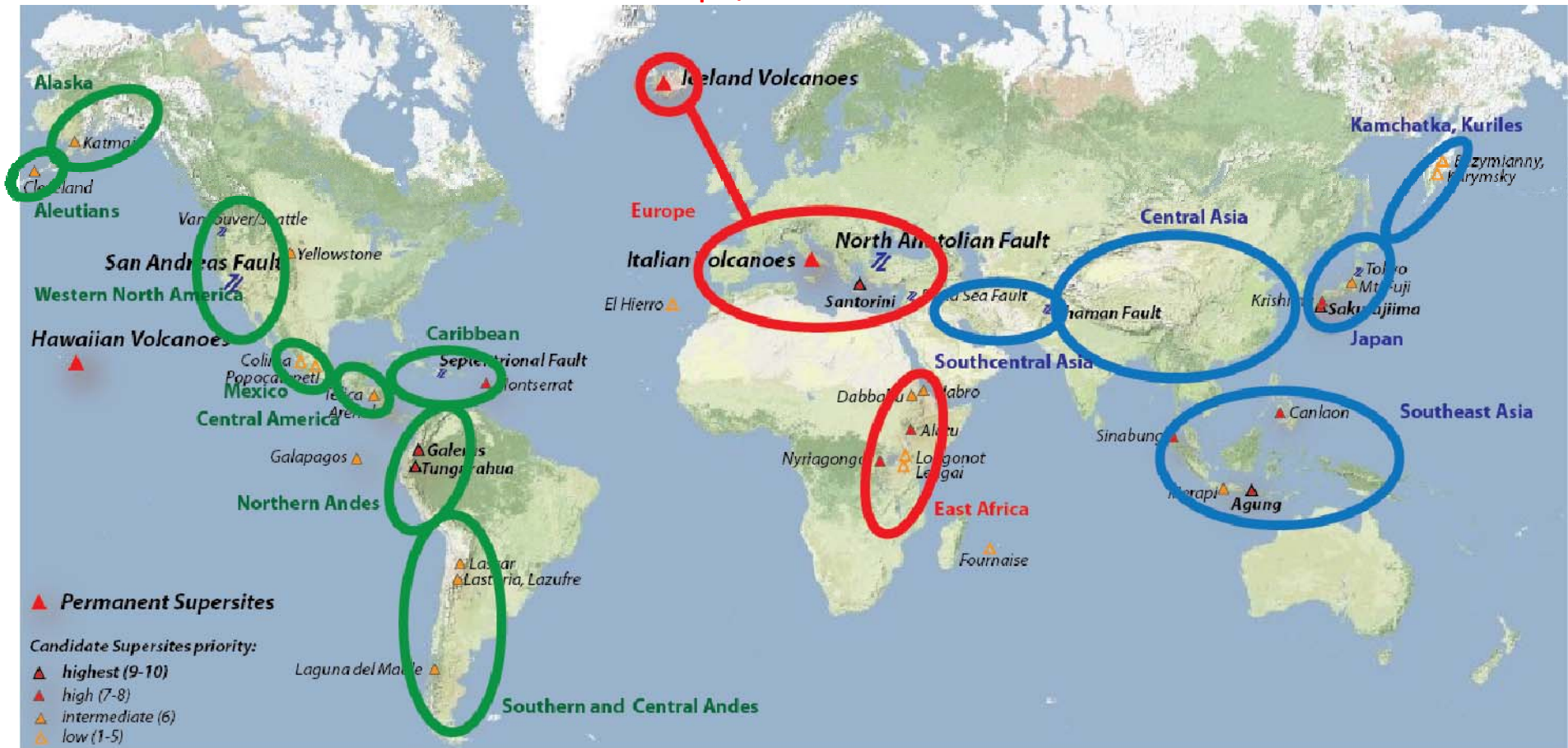
- Tungarahua (Ecuador)
- Yellowstone (U.S.)
- Piton de la Fournaise
- Dead Sea fault
- Galeras (Colombia)

Natural Laboratories

Americas - USGS

Europe/Africa - EPOS

Asia - ?



Hawaii Supersite: data holdings

as of June 7, 2013

<u>COSMO-SkyMed:</u>	409 scenes	3.3 TB
<u>TerraSAR-X:</u>	184 scenes	3.7 TB
<u>ENVISAT:</u>	756 scenes	0.2 TB
<u>RADARSAT-1:</u>	500 scenes	0.2 TB
<u>ALOS-1:</u>	414 scenes	0.2 TB
<u>RADARSAT-2:</u>	250 scenes	1.5 TB
TOTAL HOLDINGS:	2478 scenes	9.1 TB

Issue:
CSK and RSAT-2 not
included into one-stop
shopping.

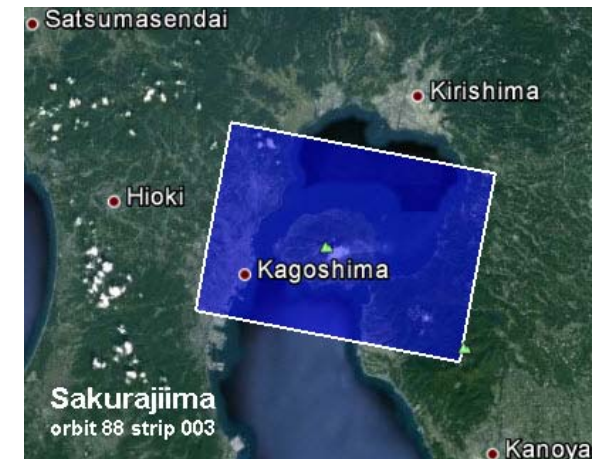
Others:

UAVSAR: 3 overflights

No Supersite (historic reasons):

TanDEM-X: 47 scenes (PI project)

Candidate Supersites: TSX tasking initiated



Next:

Indonesia:

Papandayan
Guntur (Bandung)
Galunggung
Krakatoa
Lokon
Talang

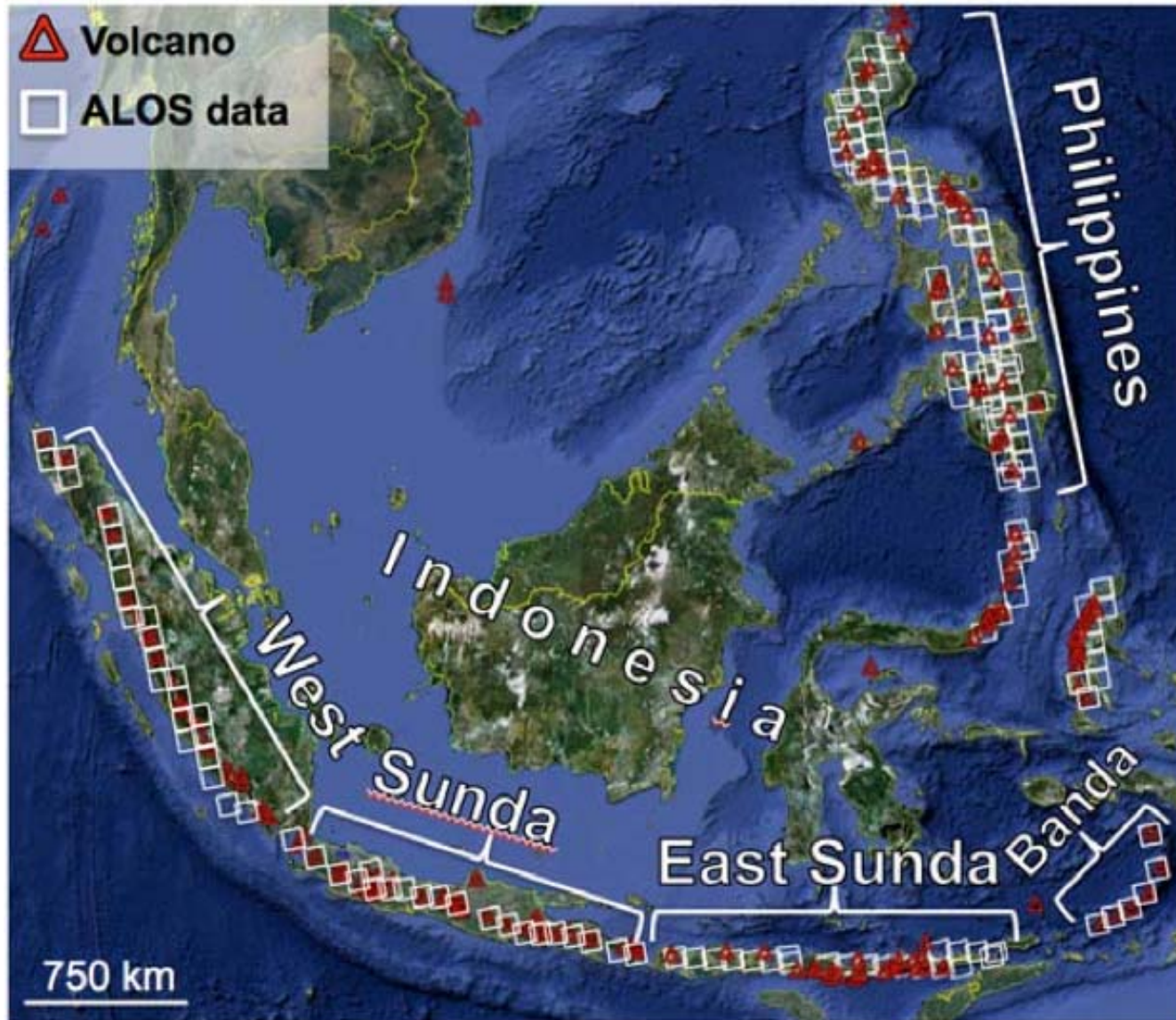
Philippines

Taal
Japan
Fuji
Tokachi-Dake

Ecuador

Cotopaxi

Southeast Asia Geohazard Natural laboratory: Volcano Monitoring



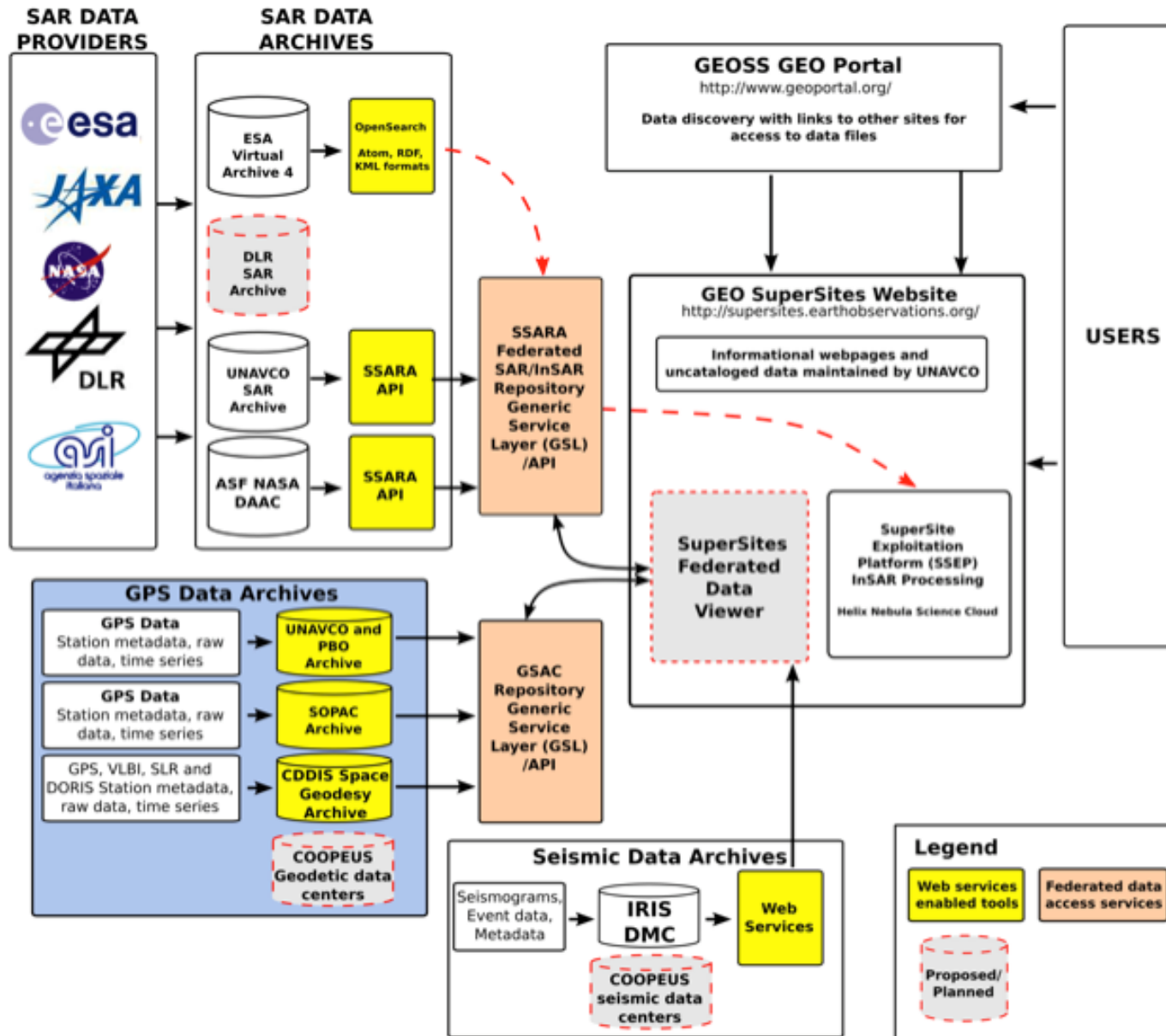
Background monitoring
with Sentinel-1a,b, ALOS-2

High-res imaging of
selected volcanoes with
TerraSAR-X, CSK, others.

In-situ data from PHIVOLCS,
CVGHM

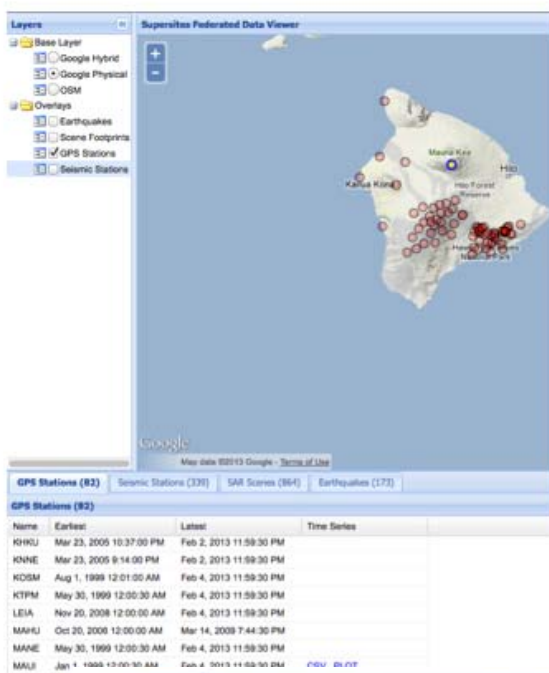
Special Session at
Cities on Volcanoes,
Yogyakarta, 9/2014

Cyberinfrastructure (under development)

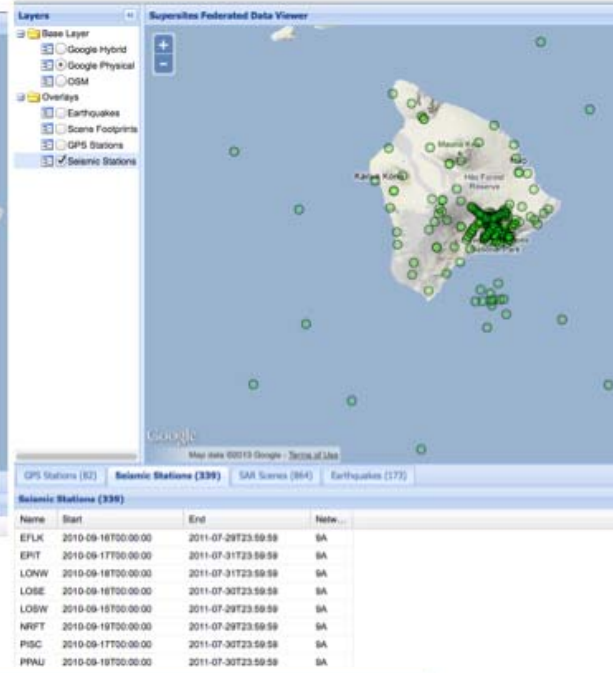


Federated data viewer (under development)

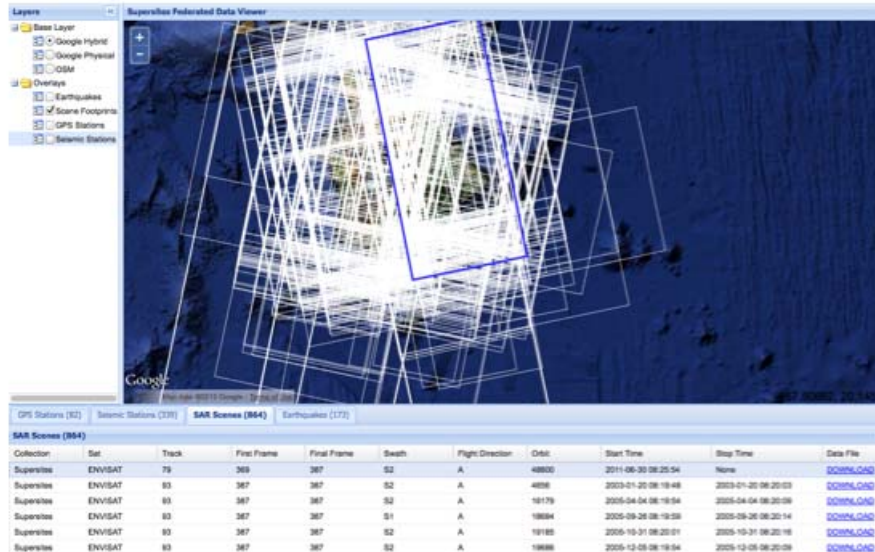
GPS stations



Seismic stations



SAR frames



Display all data,
Initiate processing jobs
on ESA's Science Cloud
(InSAR, GPS, Seismic)

Supersites TerraSAR-X tasking interface

WInSAR
Western North America Interferometric Synthetic Aperture Radar Consortium

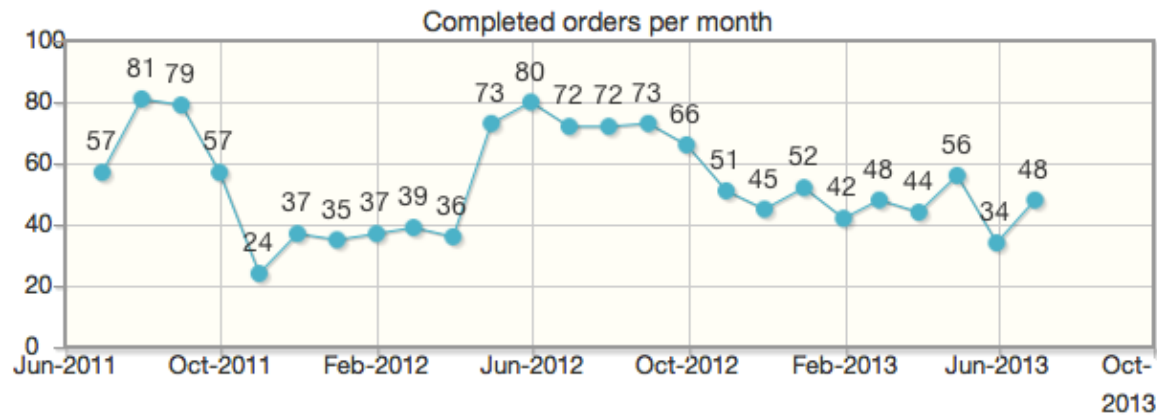
home TSX Task

The screenshot displays a Google Maps interface with a satellite view of the Middle East and surrounding regions. Two red circles highlight specific areas: one around Turkey and another around Pakistan. Several orange vertical bars, representing tasking points, are visible on the map. The map includes labels for various countries and bodies of water, such as the Black Sea, Caspian Sea, Mediterranean Sea, Persian Gulf, and Red Sea. The Google logo and copyright information are visible at the bottom left, and the coordinates 14.19189, 49.99869 are shown at the bottom right.

Acquisition Requests (161)

Only completed tasking orders are counted against the quota

WInSAR Tasking Orders Summary



BeingProcessed	518
BeingCancelled	1181
Completed	1338
Total	3037
Success Rate (%)	44.06

Supersites Tasking Orders Summary

BeingProcessed	601
BeingCancelled	520
Completed	394
Total	1515
Success Rate (%)	26.01

Data Access

Procedures

1. Point-of-Content (PoC): Supersites proposal accepted by CEOS

2. User:

TerraSAR-X: - be added as a Co-I to PoC's proposal

(- write independent proposal to DLR referring to Superites [fees waived])

Cosmo: - be added as Co-I to PoC's proposal

RSAT-2: - same

ERS/Envisat: - register with Virtual Archive 4

ALOS-1, RSAT-2: same

Practical

Use SSARA to search and download all data.

Works for ESA, TSX, ALOS, JERS, RSAT-1

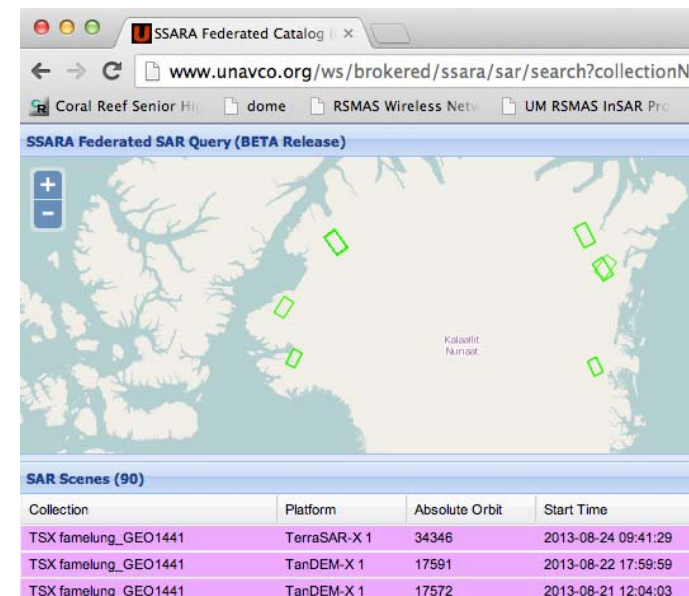
(download of ALOS, JERS for US users only)

Next: DLR archive online in late 2013

Search examples:

[http://www.unavco.org/ws/brokered/ssara/sar/search?processingLevel=L0,L1.0&intersectsWith=POINT\(-77.35+1.22\)&output=map](http://www.unavco.org/ws/brokered/ssara/sar/search?processingLevel=L0,L1.0&intersectsWith=POINT(-77.35+1.22)&output=map)

http://www.unavco.org/ws/brokered/ssara/sar/search?collectionName=TSX%20famelung_GEO1441&processingLevel=SLC&output=map



The screenshot shows a web browser window titled "SSARA Federated Catalog". The address bar displays the URL: www.unavco.org/ws/brokered/ssara/sar/search?collectionName=TSX%20famelung_GEO1441&processingLevel=SLC&output=map. The page content includes a map of the region around Kalaallit Nunaat with several green rectangular markers indicating SAR scenes. Below the map, there is a table titled "SAR Scenes (90)".

Collection	Platform	Absolute Orbit	Start Time
TSX famelung_GEO1441	TerraSAR-X 1	34346	2013-08-24 09:41:29
TSX famelung_GEO1441	TanDEM-X 1	17591	2013-08-22 17:59:59
TSX famelung_GEO1441	TanDEM-X 1	17572	2013-08-21 12:04:03

Data Access

Procedures

COSMO-SkyMed: made available to POC and distributed to registered users

TerraSAR-X: PIs submit proposals to DLR and order/receive data directly

TanDEM-X: currently only available to a small group via a PI project.

Time delay

COSMO-SkyMed: email sent to PoC within 4 hours of data acquisition, interferograms available 2 hours later.

TerraSAR-X: downloaded following acquisition, interferograms available within 1-2 days (since March 2012, only about 1 scene/month owing to TDX operations).

The Hawaiian Volcano Observatory uses data ***for crisis response***.

Conclusions

- Data access procedures well established (politics sorted out).
- Hawaii: ~2500 orbits available
- Infrastructure for 1-stop shopping nearly completed (SSARA).

Next for SSARA:

- CSK
- RSAT-2
- atmosphere models
- JAXA, ASI establish their own SSARA-connected servers

Urgent: PoCs need to submit/finalize Supersite proposals.