Supersite summary

Dear All,

Thank you for attending the USEReSt workshop and for participating in the Supersites discussion. Below a summary of the current status of the initiative and of our discussions.

The Supersite initiative is a community initiative and depends on the contributions of space-based and ground-based data from the community. If any of you can contribute data please send the information to me (famelung@rsmas.miami.edu) and to Amelie Vagner at the Igos Geohazards bureau (a.vagner@brgm.fr). I will compile all the contributions and forward a list to ESA to demonstrate that the community is behind this initiative. The Geohazards bureau will post the information and data sources on the Igos Geohazard website.

As you know, ESA stepped forward and provided the IT infrastructure for a trial of the space-based portion of the initiative. Data have been provided by the community. The Supersite trial starts with the next release of EOLI SA around December 1, 2008. After completing a web form on the Supersite webpage at Igos Geohazards (effectively submitting a Mini Cat-1 proposal), approved inverstigators will receive a password to download Supersite data out of EOLI SA. For the ground-based data the Supersite trial starts whenever contributors have submitted their information to Amelie and the data are accessible.

Critical for this initiative to go forward is that we all actually do what we have promised. By February 10th 2009 ESA will evaluate the trial. If the evaluation is positive the Supersites will become permanent and ESA will make major investments to support this initiative. A scientific advisory committee will be formed to guide future developments and the initiative will be announced to the public in form of an EOS article or similar.

Thank you very much to all of you who are contributing data to this initiative.

best regards

Falk Amelung

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Summary

The Supersite initiative began with the ***"Frascati declaration"*** at the conclusion of the 3rd International Geohazards workshop of the Group of Earth Observation (GEO), held in November 2007 in Frascati, Italy. The recommendation is *"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".* This recommendation is formalized as GEO task DI-09-010 and will be realized by the community with funding provided by the respective governments. The initiative is a contribution to the International Year of Planet Earth launched in February 2008.

The Supersite concept is to facilitate access to space and in-situ data for regional areas exposed to geological threats. The principal objective is to encourage basic research of earthquake, volcano and other hazardous geological processes to reduce the loss of life in geological disasters. The initiative begins with 6 ad-hoc selected SuperSites, three of them for volcano research (Vesuvius/Phlegrean fields, Mt. Etna, Hawaii) and three for earthquake research (Istanbul, Tokyo, Los Angeles). Supersites need to meet at least one of the following criteria:

- populations are exposed to geological threats.
- an event is expected to occur in the near future.
- an appropriate place to stimulate basic research (earthquakes, volcanoes, landslides, relative sea-level rise).

The Supersite project will be managed by IGOS Geohazards. The Supersite website is at http://www.igosgeohazards.org/supersites.asp

Teamwork

The Supersite initiative is based on teamwork within the geohazard community. Geological surveys and other government organizations are expected to provide ground-based data. Space agencies in collaboration with the user community are expected to provide space-based data. The scientific community provides man-power and expertise to develop higher level data products and to conduct the actual research work. The spectrum of possible contributions to the Supersite initiative is wide and listed below.

The policies for data access are given by the data provider. For example, for ESA data the Cat-1 terms and conditions apply and the data will be available through an accepted Cat-1 project managed with Igos Geohazard the Principal Investigator. Open data access is encouraged but Igos geohazards could manage the access to password protected data.

Supersite trial

A Supersite trial begins around January 1 2009 with the next release of EOLI SA, ESA's catalogue tool (probably version 6.1). The procedure to obtain Supersite SAR data is as follows:
0. Uninstall old version of EoliSA (using Uninstaller). Follow install instructions in README.txt
1. Obtain login credentials from Igos Geohazard through completion of a Mini Cat-1 webform.
2. After logging in into EOLI SA click on "Other Collections", "Virtual Archives", "Int. Geohazard Program"
3. Carry out regular data search. Download data using the download button.
4. Inform Igos Geohazard about results and published papers. Igos Geohazard is responsible for the Cat-1 reporting to ESA.

The data available for download are Cat-1 data acquired by members of our community and repatriated to ESA. The ESA Cat-1 terms state that ESA distributes data to scientific users at reproduction costs. The Supersite setup chosen involves data download but no data reproduction. Therefore no new costs incur for the scientific user. In this setup ESA remains the actual distributor of the data as it is mandated to be by the ESA member states.

Preliminary tests showed very rapid download speeds of 30 seconds or better for 1 Envisat scene (200 MB). This speed is possible thanks to the use of Content Delivery Network technology (CDN). It is expected that in a mature systen the download speed will fully scale with the number of downloaded scenes, i.e downloading 50 scenes will take the same time as downloading one scene.

Milestones

The Supersite initiative has been possible because ESA stepped forward and provided the IT infrastucture for a trial period. **There will be an evaluation on February 10, 2009**. If the evaluation is positive ESA can justify the necessary investments to make this a permanent service. The measure of

success is community support. If the community actually contributes the promised data the evaluation will likely be positive.

SAR data repatriation

Unavco/WinSAR handles the data repatriation. After data are uploaded on the server Unavco renames all files according to ESA naming convention and places the data onto the server connected to EOLI-SA.

Procedure:

1. ftp to sar-in.unavco.org
2. login as anonymous using any password (everybody can upload and see files but not download them)
3. create a directory (e.g GalapagosERS_Amelung)
4. upload your data (e.g. using mput *)
5. notify Unavco at insar@unavco.org once your upload is complete for placement on the EOLI-SA server.

The current upload speed is 0.4 MB/second (8 minutes for one frame). Unavco is working on improving the speed. If you don't get this speed please notify Unavco.

The disk space is currently limited. Large contributors (>1000 frames) please contact Unavco prior to upload. The disk space on the EOLI-SA server is also limited and large data volumes (such as the South and North America data) will be uploaded after the end of the trial phase.

Incentives versus Rewards

There were some discussions at the meeting regarding incentives to contribute SAR imagery. It was suggested in particular that ESA waives the costs to task the Envisat satellite or the reproduction costs for SAR imagery. It was made clear that this is not possible because it is not compatible with the current Cat-1 framework and because it is against the spirit of community teamwork. It is recognized, however, that cost waivers could be a valuable reward for active and committed Supersites. Possible vehicles for this are community-driven proposals to European or U.S. funding agencies, or ESA-internal routes that still need to be identified.

A candidate to receive a Supersite reward is Iceland. Iceland could make an excellent supersite because of its unique geological situation, yet in the current framework only 10-20% of the archived SAR imagery would be available because nobody in the community has the entire data set. It is felt that if reasonable efforts are made to make ground-based data available the possibility of a Supersite reward for Iceland should be investigated.

Possible SuperSite contributions:

IT infrastructure
internet data portal
SAR data (L0 and SLC)
GPS data (rinex data and velocity fields)
Precise earthquake relocations
other ground-based data (Gas measurements, seismic waveforms, etc).
atmospheric models
L0 (raw) --> SLC converter
data processing services (SAR and GPS displacement time series)

community organization
links to seismologists
organize SuperSite workshop/session
proposal/report writing

Contributors:

Lengert, ESA	centralized data archive infrastructure (CDN server linked to EOLI-SA)
Vagner, BRGM	SuperSite website, ESA Cat-1 Superuser
Dzurisin, USGS	Hawaii SAR data
Sansosti, IREA Naples	Etna and Vesuvius ERS/Envisat data
Lengert, Laur, ESA	inks to other space agencies (Kompsat-5 already agreed)
Unavco/WinSAR	Data repatriation and renaming services
Unavco	host SuperSite GPS data if necessary
Amelung, U Miami (CSTARS)	Galapagos SAR data
Jonsson, U Zurich (ETH)	Iceland SAR data
Sigmundsson, U Iceland, Reyjavik	Iceland SAR data
Dixon, U Miami	Iceland GPS data (raw data plus velocity field)
Fernandez, CSIC-U Madrid	SAR, GPS, gravity, crustal structure for Canary Islands (possibly also seismicity)
Fernandez, CSIC-U Madrid	Organize Supersite workshop in Canary islands
Paganini, ESA	ESA-funded PostDoc fellowships for SuperSite research
Ganas, National Observatory, Athens	GPS for Gulf of Corinth, Greece
Briole, ENS Paris	SAR and GPS data for Gulf of Corinth, Greece
JAXA/Pixel ?	
CSA ?	
DLR ?	
Martini, INGV Napoli	ground-based data for Vesuvius/C.F. (GPS, seismicity, precise earthquake relocations, Gas)
Sansosti and Lanari, IREA Napoli	SBAS displacement time series
Tim Wright, U Leeds	Dragon Project data (~2000 scenes/year)
Eric Fielding, JPL	Atmospheric models for California
Eric Fielding, JPL	UAV SAR data for Los Angeles Supersite
Frank Marzano, U Sapienza Roma	Atmospheric Models for Etna/Vesuvius-Campi Flegreii
Puglisi, INGV Napoli	GPS data from Etna (raw data + daily solutions)
Puglisi, INGV Napoli	Organize Supersite workshop at Mt Etna.
Borgstrom, INGV Napoli	links to WoVo data for SuperSites
Amelung, U Miami	Geodetic modelling software (geodmod)
Calais, U Purdue	East African Rift GPS (Campaign and continuous)
Walter,Motagh, GFZ Potsdam	SAR data for Turkey, Teheran
Walter, GFZ Potsdam	Link to EU FP7 project "Next generation seismic and multihazard in-situ observatories"
Pritchard, U Cornell	South America Subduction zone SAR data (1000 scenes (300 GB))
Unavco/WinSAR	multi-satellite SAR data for Western North America (10 TB)
Salvi, INGV Rome	Italy SAR data (about 70 % of existing ESA archive)
NASA/NSF	funding for Unavco/WinSAR
ESA	funding for Igos Geohazard

Supersite Selection

There have been been discussions about weather the ad-hoc choice of the first six Supersites was a good one. The selection of volcano Supersites is straightforward because we know where the volcanoes are located. The selection of earthquake Supersites is more difficult because we don't know where the next earthquake will occur. Furthermore, our understanding of earthquake processes is commonly advanced through in-depth studies of past earthquakes and by better characterizing tectonic strain rates and crustal rheologic properties. For example, a better estimation of earthquake hazard in Istanbul requires in-depth studies of strain and stress accumulation along the entire North-Anatolian fault. These kind of studies would not be covered by the current concept of geographically "small" Supersites. We thus should consider different levels of Supersites, such as "small" Supersites including the ground-based data and "large" natural laboratories including only space-based data.

It was felt that we should not be concerned with the Supersite selection during this trial phase. The community is encouraged to make Supersite nominations by contributing SAR and in-situ data.

Supersite summary

Supersites will be selected by a to-be-formed scientific advisory committee taking into consideration the community commitment. All contributed data (for selected and not-selected supersites will be available to the community through similar channels).

1. Selected Supersites:
   - Vesuvius/campi Flegreii
   - Etna
   - Hawaii

   - Istanbul
   - Los Angeles
   - Tokyo

2. Supersite and Natural Laboratories candidates:
   - Iceland
   - Sakurajiima, Miyake-Jiima,
   - Galapagos volcanoes
   - Piton de la Fournaise
   - Yellowstone
   - Cameroon, Nyiragongo
   - Canary Islands
   - Teheran
   - Gulf of Corinth
   - Earthquake Supersite (all past and future imagery for Disaster Charter earthquakes)

   - East-African Rift
   - North-Anatolian Fault
   - San Andreas Fault
   - Tibet
   - Sumatra-Java
   - Western North America (Earthscope region),
   - South-American subduction zone (Andes),