

## Questionnaire: Geohazard Supersites and Natural Laboratories

**Component of GEO 2012-2015 work plan:** C2 Geohazards Monitoring, Alert, and Risk Assessment

**Priority action:** Establish Geohazards Supersites and Natural Laboratories

**Area:** DISASTERS (GEO Secretariat, Francesco Gaetani, [FGaetani@geosec.org](mailto:FGaetani@geosec.org))

**Leads** (GEO Member or PO, Entity carrying out the work, contact: e-mail):

Falk Amelung, University of Miami, USA, [famelung@rsmas.miami.edu](mailto:famelung@rsmas.miami.edu)

Massimo Cocco, European Plate Boundary Observatory (EPOS) and INGV, Italy ([massimo.cocco@ingv.it](mailto:massimo.cocco@ingv.it))

John Eichelberger, United States Geological Survey (USGS), USA ([jeichelberger@usgs.gov](mailto:jeichelberger@usgs.gov))

Craig Dobson, Committee of Earth Observation Satellites (CEOS) and NASA ([craig.dobson@nasa.gov](mailto:craig.dobson@nasa.gov)).

### **Purpose of this Questionnaire:**

1. Collect contributions for the development of a global network of Natural Laboratories.
2. Designate Point-of-Contacts for each Natural Laboratory including a Volcano PoC for the establishment of volcano event Supersites.
3. Provide guidance to the Scientific Advisory Committee (SAC) for prioritizing and selecting new Supersites.

### **Who should respond?**

1. Geohazard monitoring agencies interested in participating in the initiative.
2. Scientists with particular interests in specific geohazard regions.

### **What are the selection criteria?**

The selection criteria for new Supersites are (1) the potential for new scientific discoveries at a diverse set of geologic settings, (2) vulnerability to geohazards and (3) commitment to GEO data sharing principles (existing or planned open access to in-situ data). Geohazard monitoring agencies should take note of this window of opportunity. The rationale behind these selection criteria is to incorporate new Supersites using successful pilot studies.

**Selection procedure:** E-mail filled questionnaire to John Eichelberger (Americas), Massimo Cocco (Europe, Africa) or Falk Amelung (elsewhere) with copy to [winsar@unavco.org](mailto:winsar@unavco.org). Proposed Supersites and Natural laboratories will be incorporated into strategic plan (section 10.2, 10.3). The SAC will prioritize proposed sites. Decisions will be taken in collaboration with CEOS, the procedure is still under discussion and may involve more detailed proposals to CEOS.

**Proposed Supersite:** *Tungurahua volcano, Ecuador*.....

**Proposed Natural Laboratory:** ...Northern Andes..... (e.g. Caribbean natural laboratory)

**Point of Contact (PoC):** *Patricia Mothes, Instituto Geofisico, Escuela Politecnica Nacional, Quito,*  
*pmothes@igepn.edu.ec* (name, organization, e-mail)

**Volcano PoC\* (if different)** ..... (name, organization, e-mail)

**Monitoring Agency(s):** *Instituto Geofisico, Escuela Politecnica Nacional, Quito-*  
*Ecuador*..... (acronym and full name)

**Scientist(s) involved:** *Patricia Mothes, Mario Ruiz, Gorki Ruiz, Hugo Yepes, Silvana Hidalgo, Patricio Ramon, J. Ordonez* ..... (name, organization, e-mail)

(\*) to designate event Supersites in the case of volcanic unrest

**Scientific rationale:** 1-2 paragraphs describing the geologic background, hazard, research questions, monitoring goals, expected results (see draft of strategic plan for examples) ...

	<p>Tungurahua Volcano has been erupting since October, 1999. Eruption style is mostly Strombolian to violent Strombolian. In 2006 the volcano produced a VEI 3 eruption which generated pyroclastic flows of 30 Mm<sup>3</sup>. The warning given by IG scientists at the local observatory with the collaboration of local “vigias” adverted many deaths.</p> <p>The volcano is well-monitored with BB and short-period seismic instrumentation, 5 tiltmeters, 4 CGPS, DOAS, AFM’s and live video cameras, as well as permanent on-the-scene monitoring from the Tungurahua Volcano Observatory, located 13 km from the summit. The volcano now erupts with a VEI 1-2 level vulcanian-style event about every 6 months. These episodes are preceded by obvious deformation signals, seismic ramp-up, increasing infrasound values and variable SO<sub>2</sub> output. INSAR would greatly increase the coverage of this steep -sided volcano in order to detect more complete deformation signals, ie from the summit area or inaccessible East flanks. ....</p>
<i>SAR data needs</i>	<p>area to be covered, revisit time, mode (ascending or descending or both), very high resolution (e.g. spotlight) or stripmap</p> <p>As frequent as possible—every 11 days.</p>
<i>Data gaps:</i>	<p>Wishlist. If funding is made available, what are the priorities for in-situ observations and why? (we request this information in the case we are asked to guide future investments) .....</p>
<i>Supporting organizations:</i>	<p>Any organizations who support this site as Supersite (civil protection, etc)?</p> <p>Probably the Secretario de Gestion de Riesgos in Quito would be interested to know that we have greater deformation monitoring capacity.</p>

<i>In-situ observation networks*</i>						
Network (name,type)	# of stations	open data access	archiving organization	Available from global facility (IRIS, Unavco, ISC, other)?	Interest in participating in data sharing demonstrator?*	Technical hurdles for participation in data sharing
CGPS	4	Yes, after 6 month delay.	IGEPN	UNAVCO	yes	The OK from UNAVCO for data storage
Daily, weekly & monthly reports of Activ. Of Tungurhua vol	35 reports perMonth --on all aspects of monitoring-gas,visual, infrasound, tilt,seismic etc.	Yes	IGEPN	IGEPN Website www.igepn.edu.ec	No	
<i>Existing e-infrastructure</i>						

purpose	www.igeqn.edu.ec
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(\*) This information will be used for a global inventory of in-situ data assets in form of a clickable map on the Supersites webpage

(\*\*) may require the installation of front-end web services and/or data streaming into global facility ([http://www.unavco.org/pubs\\_reports/reports/annual/gnac/ROSES-GSAC-review-yr1.pdf](http://www.unavco.org/pubs_reports/reports/annual/gnac/ROSES-GSAC-review-yr1.pdf))

**Others:**

1. How to facilitate better utilization of supersite data by end user (courses) 1./Incorporation in student projects. 2./Have all publications—or abstracts that result from using Supersite data—posted on the Supersite webpage. 2./ Host a Chapman-like supersite meeting to see preliminary results of all supersites.

2. How to measure success and report this back to the data providers?

Show obvious application of the INSAR data—for prognosis of the size of eminent eruptions—and how this information was incorporated into a pre-eruptive model then communicated to authorities and the population.

3. Other comments:

I think that there are many opportunities to learn more about Tungurahua deformation through incorporating SAR.

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Submitted by:  
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