

## 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:** .....

**Proposed Natural Laboratory:** Northern Andes Lab

**Point of Contact (PoC):** Hector Mora-Paez, Colombian Geological Survey,  
[hmora@ingeominas.gov.co](mailto:hmora@ingeominas.gov.co)

**Volcano PoC\* (if different)** Marta Calvache, Colombian Geological Survey,  
[mcalvache@ingeominas.gov.co](mailto:mcalvache@ingeominas.gov.co)

**Monitoring Agency(s):** Colombian Geological Survey, CGS  
Southwestern Seismological and Geophysical Observatory, Universidad del Valle

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

<i>Scientific rationale:</i>	<p>Seismic sources that affect the southwestern part of Colombia are diverse. During the 20th century a four (4) large sequence and great subduction related earthquakes occurred. The first and largest event occurred in 1906 (<math>M_w=8.8</math>) and ruptured a 500 km length of the subduction interface on the Colombia-Ecuador trench between Manta, Ecuador and Buenaventura, Colombia (Kelleher, 1972, Kanamori and McNally, 1982). Kanamori and McNally (1982) report that three smaller events in 1942 (<math>M_w = 7.9</math>), 1958 (<math>M_w =7.8</math>) and 1979 (<math>M_w =8.2</math>) re-ruptured most of the thrust fault plate boundary segment that ruptured during the 1906 event. These earthquakes are shallow (&lt; 50 km) on the subduction interface. Other deeper earthquakes also occur that seem to be associated with deeper segments of the subduction interface. A third source of earthquakes is intraplate and occurs on faults in the shallow crust. These earthquakes have been most recently exemplified by the January 25, 1999 (<math>M_w =6.1</math>), Armenia earthquake and pose the greatest threat of damage to the populated areas of the Cauca Valley (south western of Colombia) and environments.</p> <p>In addition, the Galeras that is proposed as the volcano to be studied, is a stratovolcano in the southwestern part of Colombia, and is one of the South American country's most active volcanoes. Historic records of eruptions at Galeras date back to the 16th century, and the active cone is part of a volcanic complex that has been erupting for more than one million years. Galeras is only a few kilometers from the city of Pasto, and poses an immediate threat to the more than 400,000 people who live there.</p>
<i>SAR data needs</i>	<p>Southwestern zona of Colombia (Colombia-Ecuador boundary, subduction zone)</p> <p><b>We do not have experience in using this type of data</b></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>

<u><i>In-situ observation networks</i></u> *						
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
National Seismic Network	32	Yes	Colombian Geological Survey	No yet	yes	Protocols
National GPS Network for geodynamics	36	Partial	Colombian Geological Survey	Unavco	yes	Research
Southwestern Seismic Network	3 in operation + 5 potential stations	Yes	Universidad del Valle	No	Yes	New network

*Existing e-infrastructure*

purpose	<a href="http://www.ingeominas.gov.co">www.ingeominas.gov.co</a> <a href="http://geored.ingeominas.gov.co">http://geored.ingeominas.gov.co</a> (for inclusion into the Appendix of the strategic plan)
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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/gsac/ROSES-GSAC-review-yr1.pdf](http://www.unavco.org/pubs_reports/reports/annual/gsac/ROSES-GSAC-review-yr1.pdf))

**Others:**

1. How to facilitate better utilization of supersite data by end user (courses,...)?

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

3. Other comments:

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Submitted by: Héctor Mora-Paez, GEORED Project (National GPS Network for geodynamics studies)