

B1: Proposal Title:

Event Supersite: Sinabung Volcano, Indonesia.

B2: Persons proposing the Event Supersite

Falk Amelung, University of Miami.

Julie Griswold and John Pallister, USGS

B.3 Event Supersite Point-of-Contact (PoC)

Name: F Amelung

Affiliation: University of Miami

Email: famelung@rsmas.miami.edu

B4: Event Supersite Research Team

The following research groups have expressed interest in the SAR data of the volcano.

Indonesia

- Mohammad Hendrasto, Director, Indonesian Center for Volcanology and Geologic Hazard Mitigation
- Professor H. Abidin, Bandung Institute of Technology

Germany

- Thomas Walter (GFZ Potsdam)

U.K.

- Juliet Biggs (University of Bristol)
- Andy Hooper (Leeds University)

Japan

- Setsuya Nakada and Yosuke Aoki (Earthquake Research Institute, Tokyo)

Italy

- Eugenio Sansosti (National Research Council, CNR)

United States

- Julia Griswold, Mike Poland, John Pallister (USGS)
- Zhong Lu, (Southern Methodist University and USGS)
- Paul Lundgren, Jet Propulsion Laboratory
- Estelle Chaussard (University of California, Berkeley)
- Falk Amelung and Anieri Morales (University of Miami)
- Trish Gregg (Oregon State University)

B5: Event Supersite description and justification

Sinabung is an andesitic volcano in North Sumatra, 25 km north of the Lake Toba Super Volcano. Sinabung was quiescent from ~1600 to 2010. In August 2010 it had its first historic eruption and a new eruptive period started in September 2013.

Dome growth and pyroclastic flows threaten the population in the vicinity of the volcano. About 25,000 people live in the immediate vicinity of the volcano. They have been evacuated repeatedly in the past 3 months. On February 1 2014, 16 people were killed by a pyroclastic flow.

The agency responsible for monitoring the volcano is the Center for Volcanology and Geological Hazard Mitigation (CVGHM) of the Geological Agency of Indonesia. The Volcano Disaster Program (VDAP) of the United States Geological Survey (USGS), is assisting CVGHM in the crises assessment using remote sensing observations available from the International Charter for Space and Major Disasters.

Previous studies showed the value of InSAR imagery to study Sinabung volcano. Chaussard and Amelung (2012) used ALOS InSAR to show that the volcano inflated at a rate of 2-3 cm/yr prior to the 2010 eruption. Chaussard et al. (2013) used ALOS imagery through 2011 to show that the volcano deflated by ~9 cm during the 2010 eruption. It is not known whether the volcano re-inflated after the eruption. The new InSAR data of Sinabung will lead to new knowledge about the inflation-deflation cycle of erupting, andesitic volcanoes.

References:

Chaussard, E. and F. Amelung (2012), Precursory inflation of shallow magma reservoirs at west Sunda volcanoes detected by InSAR, *Geophys. Res. Lett.*, doi:10.1029/2012GL053817.

Chaussard, E., Amelung, F., & Aoki, Y. (2013). Characterization of open and closed volcanic systems in Indonesia and Mexico using InSAR time-series. *Journal of Geophysical Research: Solid Earth*, DOI: 10.1002/jgrb.50288

B6: Current or future use of requested data

Near-real time provision of new imagery is requested. For research aspects also all archived imagery is requested.

B7: Schedule

Data provision should initiate as soon as possible.

B8: Detailed geographic region of interest



B9: Data Requirements

We initially request frequent repeat observations from all available satellites (Cosmo-Skymed, TerraSAR-X and Radarsat-2). The imagery will be used for two objectives. The first objective is to resolve topographic changes in the summit area related to the growth and collapse of the lava dome from the radar backscatter information. The second objective is to obtain measurements of the ground deformation related to summit inflation between eruptive episodes using InSAR or pixel tracking methods.

The data requirement for the first objective is frequent imagery in any viewing geometry, in particular during periods of extreme unrest. The data requirement for the second objective is repeat imagery from the same viewing geometry for several months. The priorities are (1) Cosmo-Skymed observations at every possible cycle for one selected viewing geometry (2) Radarsat-2 wide ultra fine image every 24 days, and (3) TerraSAR-X image every 11 days.

If the crisis continues for another 3 months, the research team will make a recommendation on a continuing observation plan based on the first 3 month of data.

B10: Comments.

1. This event Supersite will jumpstart the development of the Southeast Asia Natural Laboratory for Geohazards, a top priority in international efforts for disaster risk reduction. At the Cities on Volcanoes conference in September 2014 the PoCs convene, a GEO-supported session entitled "Monitoring the volcanoes of Southeast Asia by the Global Earth Observation System of Systems (GEOSS). The associated splinter meeting will produce a White Paper and implementation plan for the planned Natural Laboratory. It is expected that this Natural Laboratory will be inaugurated at the occasion of the Third World Conference for Disaster Risk Reduction to be held in Sendai, Japan, in March 2015.
2. The research teams are well aware that conventional InSAR could be challenging in this environment. It is expected that the SAR observations will lead to the development of new methodologies to study extreme volcanic unrest such as with temporary persistent scatterer and absolute radar ranging methods.