Geophysical Research Abstracts
Vol. 18, EGU2016-8975, 2016
EGU General Assembly 2016

Continuous gravity observations at active volcanoes through superconducting gravimeters

Daniele Carbone and Filippo Greco
INGV - Osservatorio Etneo - Sezione di Catania, Catania, Italy (daniele.carbone@ingv.it)

Continuous gravity measurements at active volcanoes are usually taken through spring gravimeters that are easily portable and do not require much power to work. However, intrinsic limitations dictate that, when used in continuous, these instruments do not provide high-quality data over periods longer than some days.
Superconducting gravimeters (SG), that feature a superconducting sphere in a magnetic field as the proof mass, provide better-quality data than spring gravimeters, but are bigger and need mains electricity to work, implying that they cannot be installed close to the active structures of high volcanoes.
An iGrav SG was installed on Mt. Etna (Italy) in September 2014 and has worked almost continuously since then. It was installed about 6km from the active craters in the summit zone of the volcano. Such distance is normally too much to observe gravity changes due to relatively fast (minutes to days) volcanic processes. Indeed, mass redistributions in the shallowest part of the plumbing system induce short-wavelength gravity anomalies, centered below the summit craters. Nevertheless, thanks to the high precision and long-term stability of SGs, it was possible to observe low-amplitude changes over a wide range of timescales (minutes to months), likely driven by volcanic activity.
Plans are in place for the implementation of a mini-array of SGs at Etna.