Geophysical Research Abstracts
Vol. 19, EGU2017-249-1, 2017
EGU General Assembly 2017


# Integrating passive seismicity with Web-Based GIS for a new perspective on volcano imaging and monitoring: the case study of Mt. Etna

Roberto Guardo (1) and Luca De Siena (2)

(1) Instituto de Investigación en Paleobiología y Geología (CONICET-UNRN), General Roca, Argentina (rguardo@unrn.edu.ar), (2) University of Aberdeen, School of Geosciences, Dept. Geology and Petroleum Geology, Meston Building, King's College, Aberdeen AB24 3UE Scotland, UK.

**Abstract**

The timely estimation of short- and long-term volcanic hazard relies on the existence of detailed 3D geophysical images of volcanic structures. High-resolution seismic models of the absorbing uppermost conduit systems and highly-heterogeneous shallowest volcanic layers, while particularly challenging to obtain, provide important data to locate feasible eruptive centers and forecast flank collapses and lava ascending paths. Here, we model the volcanic structures of Mt. Etna (Sicily, Italy) and its outskirts using the Horizontal to Vertical Spectral Ratio method, generally applied to industrial and engineering settings. The integration of this technique with Web-based Geographic Information System improves precision during the acquisition phase. It also integrates geological and geophysical visualization of 3D surface and subsurface structures in a queryable environment representing their exact three-dimensional geographic position, enhancing interpretation. The results show high-resolution 3D images of the shallowest volcanic and feeding systems, which complement (1) deeper seismic tomography imaging and (2) the results of recent remote sensing imaging. The main novelty with respect to previous model is the presence of a vertical structure that divides the pre-existing volcanic complexes of Ellittico and Cuvigghiuni. This could be interpreted as a transitional phase between the two systems. A comparison with recent remote sensing and geological results, however, shows clear connections between the anomaly and dynamic active during the last 15 years. We infer that seismic noise measurements from miniaturized instruments, when combined with remote sensing techniques, represent an important resource when monitoring volcanic media and eruptions, reducing the risk of loss of human lives and instrumentation.