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New insights on classification and location of microseismicity at La Fossa (Vulcano, Italy)

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Earthquakes occurring in the area of Vulcano are associated to fracturing (sporadic swarms of low magnitude shocks) or are related to processes of the geothermal system. The latter represent the seismic background activity and take the form of weak events, which originate at shallow depth under the La Fossa cone. We considered hundreds of micro-earthquakes recorded from August 2005 to October 2006 by the INGV-CT permanent seismic network. Since November 2005, the dataset has been improved thanks to three broadband stations installed on the northern rim of the crater. Using cross-correlation techniques and frequency analyses, we propose a new classification of this seismicity in four classes. Moreover, we observed that inside each class events exhibit from discrete to high degrees of waveform similarity. A better network geometry has allowed improving seismic events location (Montalto, 1994) with two different approaches: - using an improved crustal velocity model with traditional techniques; - using the semblance method able to obtain accurate locations of events with emergent onsets. Our results suggest that, at La Fossa Crater, sources of micro-earthquakes related to geothermal system are shallower than preceding analyses and confined to small volumes.

Montalto A. (1994) Seismic signals in geothermal areas of active volcanism: a case study from La Fossa', Vulcano (Italy) Bulletin of volcanology , 56, 3, 220-227.