



Mt. Etna volcanic activity observed from the SN-1 seafloor observatory: comparison between seismic and gravity data

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The SN-1 multiparameter seafloor cabled observatory has been operating from 2005 in the western Ionian Sea, about 25 km off shore Eastern Sicily, at about 2000 m of depth. The cabled operation was preceded by a stand-alone operation experiment in 2002-2003. Accordingly, a significant time extension of geophysical time series recordings at seafloor is presently available and provides peculiar information also related to the Mt. Etna volcanic activity. In particular, SN-1 makes available the signals acquired by a three-component broad-band seismometer and by a prototype of gravity-meter installed in the observatory. From the comparison of the seismic and gravity signals, some interesting features can be pointed out in relation to the different styles of the Etna volcano activity. The background noise of the seismic and gravity seafloor signals shows evident similarities with the low-frequency signals, identified as volcanic tremor, typically observed on land and related to the volcanic activity.

The spectral analysis performed on the signals acquired during the 2002-2003 Etna eruption, helps to identify the evolution of the eruptive phenomenon in the seafloor recordings, following the variations of the signals both in time and frequency domains. Moreover, for the 2006 Etna eruption, the SN-1 seismometer and gravity-meter recordings unexpectedly show the presence of low-frequency events (LP events), generally observed on land stations especially located near the summit of the volcano. These observations can add important elements for the understanding of the source of low-frequency seismicity of Mt. Etna, possibly considering a higher depth or a larger extension for the dynamic sources.

SN-1 constitutes an important observation station both for the volcano monitoring purposes and to improve the knowledge specially of the deep part of the volcano feeding system.