MONITORING GROUND DEFORMATIONS AT ACTIVE NEAPOLITAN VOLCANOES

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The Neapolitan volcanic area, located in the south sector of the Campanian plain, includes three active volcanoes: Somma-Vesuvio, Campi Flegrei Caldera, and Ischia Islands.

Somma-Vesuvio (last eruption occurred in 1944) is characterized by a low level seismic and ground deformation activity; Campi Flegrei Caldera (last eruption occurred in 1538) is characterized by slow deformation and several bradyseismic events. During the 1969-72 and 1982-84 events, the resurgent Campi Flegrei caldera has been affected by two intense episodes of ground uplift and seismicity, followed by a minor subsidence phase, still active.

Ischia, located SW of Naples, has been characterized by both explosive and effusive volcanic activity, with the last eruption occurred in 1302. Subsequent dynamics has been characterized by seismic activity (strongest events occurred in 1881 and 1883) and by significant subsidence in the S and NW sectors of the island. The presence of the active volcanoes in a very densely area needs continuous monitoring of the dynamics in order to timely detect pre-eruptive processes.

The ground deformation is an important precursor because linked to changing of magma bodies geometry and location, whose intensity and distribution are function of the volcanic system dynamic features.

In particular, the geodetic monitoring system receive an important support by GPS and Precise levelling techniques.

Department of Geodesy of the Osservatorio Vesuviano-INGV installed a GPS network and a precise levelling network in Neapolitan volcanic area. GPS non-permanent network consists of about 100 3D vertices distributed on Neapolitan volcanic area.
Starting from 1999, a GPS permanent network was installed consisting of 20 stations in continuous recording with a sample rate of 30". Besides, some important results derive from precise leveling different surveys on Neapolitan volcanic area). This network consists of 600 benchmarks covering an area of about 450 Km². We describe here the monitoring network and the main results obtained in the last years.