category : Oral

Geophysical multidisciplinary investigation of the structure of an unstable flank: the NE sector of Mt. Etna

Alessandro Bonforte[1], Ornella Cocina[2], Agata Siniscalchi[3], Graziella Barberi[4], Francesco Guglielmino[5], Gerardo Romano[6], Simona Sicali[7], Simona Tripladi[8]

[1]Istituto Nazionale di Geofisica e Vulcanologia, [2] Istituto Nazionale di Geofisica e Vulcanologia, [3] Università degli Studi di Bari, [4]Istituto Nazionale di Geofisica e Vulcanologia, [5]Istituto Nazionale di Geofisica e Vulcanologia, [6]Università degli Studi di Bari, [7]Università degli studi di Catania, [8]Università degli Studi di Bari

E-mail : alessandro.bonforte@ct.ingv.it

Mount Etna is characterized by a complex regional tectonics with a N-S compression related to the Africa – Europe convergence that interacts with a WNW-ESE extension associated to the Malta Escarpment. A general eastward motion is present in the eastern flank. Although the existence of these phenomena is overt, the geometry of the sliding sector is still debated.

The non-uniqueness of the geophysical inverse models and the different limitations in resolution and sensitivity of each technique spurred us to undertake, in the frame of the MEDiterranean Supersites Volcanoes (MED-SUV) project, a joint interpretation of independent data in order to better constrain the results.

Seismic data come from the network run by the Istituto Nazionale di Geofisica e Vulcanologia (INGV) – Osservatorio Etneo, Sezione di Catania. The relocated seismicity defines two main seismogenic volumes in the NE sector of the volcano: the first cluster is related to

the known Pernicana Fault system, while the second one is located southwards, beneath the northern wall of the Valle del Bove.

The resistivity models come from a MT survey carried out on the eastern flank of the volcano and consisting of thirty broad-band soundings along N-S and NW-SE oriented profiles. The resistivity modeling of MT profiles reveals three major layers in a resistive-conductive-resistive sequence. A low resistivity volume is clearly identified on the NE flank of the volcano, between The Pernicana fault and the northern wall of the Valle del Bove.

Ground deformation studies (GPS and InSAR) revealed the segmentation of the unstable flank and define the NE sector as the most mobile one; this sector is perfectly bounded by the two seismic clusters and corresponds to the low resistivity volume.

The sliding surface modeled by ground deformation data inversions well matches in depth with a resistivity transition and with two seismogenic layers.

Keywords : flank instability, volcano-tectonics, seismicity, resistivity, ground deformation, faults