Geophysical Research Abstracts,
Vol. 11, EGU2009-4529, 2009
EGU General Assembly 2009

Seismic and gravity signature of the Ischia Island Caldera (Italy)

P. Capuano (1,2), R. De Matteis (3), and G. Russo (4)

(1) Dept. Matematica e Informatica, University of Salerno, Fisciano, Italy (pcapuano@unisa.it), (2) Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, Napoli, Italy, (3) Dipt. di Studi Geologici ed Ambientali, University of Sannio, Benevento, Italy, (4) Dipt. di Scienze Fisiche, University "Federico II", Naples, Italy

The Campania (Italy) coasts are characterized by the presence of several volcanoes. The island of Ischia, located at the northwestern end of the Gulf of Naples, belongs to the Neapolitan Volcanic District together with Phlegrean Fields and Vesuvius, having all these Pleistocene volcanoes erupted in historical times, and it is characterized by diffuse hydrothermal phenomena The island represents the emergent part of a more extensive volcanic area developed mainly westward of the island, with underwater volcanoes aligned along regional fault patterns. The activity of Ischia volcano is testified by the occurrence of eruptions in historical times, the presence of intense hydrothermal phenomena, and by seismic activity (e.g. the 1883 Casamicciola earthquake). Ischia is populated by about 50,000 inhabitants increasing, mainly in the summer, due to thriving tourism business, partially due to its active volcanic state. Hazard assessment at active, densely populated volcanoes is critically based on knowledge of the volcanoes past behavior and the definition of its present state. As a contribution to the definition of the present state of the Ischia island volcano, we obtain a model of the shallow crust using geophysical observables through seismic tomography and 3D gravity inversion. In particular we use travel times collected during the Serapis experiment on the island and its surroundings and free air anomaly. A new 3D gravity inversion procedure has been developed to take better into account the shape and the effects of topography approximating it by a triangular mesh. Below each triangle, a sequence of triangular prisms is built, the uppermost prism having the upper face coincident with the triangle following the topography. The inversion is performed searching for a regularized solution using the minimum norm stabilizer.
The main results inferable from the 3D seismic and gravity images are the definition of the caldera rims hypothesize by many authors along the perimeter of the island, with a less evidence on the southern part, and the presence of an high velocity/density area inside the caldera that is consistent with the lateral extension of a resurgent block affecting the most recent dynamic of the island