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3D velocity model of Ischia island from the inversion of active seismic data

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Eruption scenarios can be constructed based on the detailed knowledge of the volcanic structure, as represented by the elastic/attenuation, thermal, density and other geophysical parameter distribution. The objective of the research is the definition of a 3D crustal model of the Ischia volcanic region, by tomography analysis, and the identification and detection of the possible crustal reservoir of magma feeding. Ischia island, whose last eruption occurred in 1301 A.D., belongs to the Campi Flegrei volcanic area located into the Campania Plain (southern Italy).

Recently, a project (SERAPIS) of active seismic was performed in the Campi Flegrei caldera and surroundings using off-shore seismic energization and data acquisition on the sea-bottom and on land. An area centered on Ischia island have been selected and data recorded at eight seismic stations located on land and four located on sea-bottom have been analyzed. We performed a manual reading of about 10,000 first P wave arrival times on the waveforms band-pass filtered between 5 and 15 Hz.

We have used the tomographic code developed by Benz et al. based on a linearized iterative approach, applied on several areas in the world. The method uses the finite differences technique to compute travel times by solving the Eikonal equation which provides a fast and accurate tool even in highly heterogeneous media. We present preliminary images of the structural model including resolution analysis relative to different model parameterizations.