



RICEN: Repeated InduCed Earthquakes and Noise

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RICEN (Repeated InduCedEarthquakes and Noise) is an active and passive seismic experiment organized in the framework of the European project MEDSUV, whose goal is to study changes in the properties of the medium at small scales through repeated observations over time, using the propagation of seismic waves as a diagnostic tool. Changes in the structure may be related to fluid migration, stress field perturbation or fracturing and produce differences in seismic signals acquired with the same geometry. Decorrelation analysis, time-lapse tomography and seismic noise cross-correlations can be applied for imaging and monitoring time and space variations with the ultimate goal of interpreting effects of resurgence, eruptive unrest and magma motion.

The investigation area is Solfatara, one the forty volcanoes of the Campi Flegrei area. Solfatara is characterized by an intense hydrothermal shallow activity due to the interaction between deep convection and meteoric water. During the last week of September 2013, a pilot experiment was performed in Solfatara with the use of a high-resolution vibrating seismic source. We covered an area of 115 x 90 m² with a regular grid of 240 seismic sensors. Other 53 stations were spread in the whole surface area of Solfatara. Our sensors recorded about 100 sweeps from the source, making up a large database of about 50,000 traces. Moreover, continuous recordings of the ambient seismic noise were performed.

Our main goals are: (1) testing the repeatability of the experiment with time; (2) investigating the quality of the picking and the identification of the various seismic phases on the traces; (3) analysing the resolution of tomographic models based on the source-station geometry. We will finally produce a preliminary velocity model of the structure beneath the Solfatara, based on inversion of first arrival times and ambient noise cross-correlations.