



Characterization of the wave field of seismic noise and earthquakes at Ischia Island (Italy) through the ICA technique and the seismic polarization

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We analyse the wavefield of the seismic noise recorded immediately after the Ischia earthquake of 21 August 2017 with the aim to evidence common features. The period investigated is 25 August - 23 October 2017 and data have been recorded by the INGV-OV seismic network. The Independent Component Analysis (ICA), a decomposition technique based on the fourth-order statistics, is applied in the time domain to several samples allowing the decomposition of the wave field into independent components corresponding to four frequency bands: 0.9-1.2 Hz, 3-4 Hz, 11-12 Hz and 14-15 Hz. Moreover a polarization analysis was performed throughout the data set, highlighting preferential polarization directions. The existence of a correlated noise is a marker of the shallow hydrothermal system and is useful for discriminating signals generated by a seismic and/or volcanic source. The results have been compared with those obtained analyzing the earthquake, located using a recent tomographic model. We discover that the frequency content enhanced in the main shock is already contained in the background noise. This leads us to hypothesize that a unique physical model involving fluid circulation within a solid matrix is at the basis of both the earthquake and correlated noise (tremor).

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