Geophysical Research Abstracts
Vol. 20, EGU2018-16452-1, 2018
EGU General Assembly 2018

Site effect studies following the 2017 Mw 3.9 Ischia earthquake: the Emersito++ Task Force activities

Maurizio Vassallo (1), Danilo Galluzzo (2), Vincenzo Sapia (3), Lucia Nardone (2), Marta Pischiutta (4), Simona Petrosino (2), and the Emersito++ working group

(1) (maurizio.vassallo@ingv.it) Istituto Nazionale di Geofisica e Vulcanologia, INGV, Sezione Roma1-L'Aquila, Viale Francesco Crispi 43, 67100 L'Aquila, Italia, (2) Istituto Nazionale di Geofisica e Vulcanologia, INGV, Sezione di Napoli, Osservatorio Vesuviano, via Diocleziano 328, 80124, Napoli, Italia, (3) Istituto Nazionale di Geofisica e Vulcanologia, INGV, Sezione Roma 2-Roma, Via di Vigna Murata 605, 00143 Roma, Italia, (4) Istituto Nazionale di Geofisica e Vulcanologia, INGV, Sezione Roma 1-Roma, Via di Vigna Murata 605, 00143 Roma, Italia

EMERSITO++ working group: Bobbio Antonella, Cara Fabrizio, Carandente Antonio, Civico Riccardo, Cogliano Rocco, Cultrera Giovanna, Cusano Paola, De Vita Sandro, Di Giulio Giuseppe, Di Vito Mauro, Esposito Roberta, Famiani Daniela, Giannattasio Fabio, Marchetti Marco, Marotta Enrica, Milana Giuliano, Moretti Milena, Napolitano Ferdinando, Pucillo Stefania, Riccio Gaetano, Sepe Vincenzo, Tarabusi Gabriele, Tramelli Anna.

A Mw 3.9 earthquake, occurred on August 21 2017 in Casamicciola Terme (Ischia Island, Southern Italy), caused extremely large damage concentrated in the northern part of the volcanic island, characterized by important topographic variations and landslides and where it was recorded a PGA of 0.27 g. To investigate the possible relation between damage and site effects, the Emersito INGV task force worked in close cooperation with different groups of INGV and University of Salerno and Naples in the framework of the preparatory surveys to seismic microzonation of the villages of Casamicciola Terme and Lacco Ameno. The working group (called Emersito++) carried out several seismological and electromagnetic investigations in the most damaged areas to study the local site effects associated to geological and volcanological settings.
Sixty single station seismic noise measurements were acquired using a Lennartz 5s triaxial velocimetric sensor coupled with Reftek RT130 or Marslite digitizers and, at each site, seismic noise data were recorded at least for one hour. Most of them were concentrated in the damaged areas while sparse measures were carried out in the neighborhood areas. Three seismic arrays in a two-dimensional configuration were installed at Casamicciola Terme, locality of Fango (Lacco Ameno) and in the locality of Gran Sentinella (Casamicciola Terme). The arrays were composed by 16, 15 and 14 seismic stations respectively (equipped with Lennartz 5s sensor coupled with Reftek RT130 digitizer) that acquired simultaneous signals (at 250 sps) for at least 90 minutes. Finally, twelve Time Domain Electro-Magnetic (TDEM) soundings and five capacitive-coupled resistivity profiles (CCR) were acquired in the same areas with the aim to recover 1D and 2D subsurface resistivity distribution, respectively.
The H/V spectral analysis performed on seismic noise acquired in the most damaged areas do not shows important peaks related to local amplification effects. The noise polarization analysis, however, shows peculiar directional trends that could be reasonably related to the geological and volcanological setting of the investigated areas. The 1D shear velocity models obtained by the different arrays dataset inversions are comparable to each other and are characterized by velocity values approximately ranging from 0.4-0.7 km/s in the first 150 m depth up to 2 km/s at 500 m depth. The 1D inversion results of TDEM data show a shallow layer with resistivity between 10 - 100 Ωm with variable thicknesses up to a maximum of 20-30 m which overlay a more conductive layer (resistivity of less than 10 Ωm) with up to a depth of approximately 60 m. CCR results provided us with very near surface resistivity information and confirmed the presence of a moderately to low resistive layer (approximately from 20 to about 100 Ωm) up to a depth of about 8 m.