Geophysical Research Abstracts
Vol. 18, EGU2016-13284, 2016
EGU General Assembly 2016


# Assessment of local seismic response of the Stracciacappa maar (Central Italy)

Massimiliano Moscatelli (1), Maurizio Simionato (1), Iolanda Gaudiosi (1), Gianluca Sottili (1), Alessandro Pagliaroli (1), Pietro Sirianni (1), Domenico Pileggi (1), Alessandra Avalle (1), Silvia Giallini (1), Roberto Razzano (1), Marco Mancini (1), Gianluca Vignaroli (1), Sabatino Piscitelli (2), Jessica Bellanova (2), Giuseppe Calamita (2), Angela Perrone (2), and Giuseppe Lanzo (3)

(1) CNR IGAG - Istituto di Geologia Ambientale e Geoingegneria, (2) CNR IMAA - Istituto di Metodologie per l'Analisi Ambientale, (3) SAPIENZA Università di Roma - Dipartimento di Ingegneria Strutturale e Geotecnica

In this work, we face the definition of a subsoil model aimed at the local seismic response assessment of the Stracciacappa maar (Sabatini Volcanic District, central Italy) (e.g., De Rita and Zanetti, 1986; Marra et al., 2014). The pyroclastic succession of Stracciacappa records two main hydromagmatic eruptive phases ended about 0.09 Ma ago (e.g., Sottili et al., 2010). The preserved crater, with a diameter of about 1500 meters and a crater floor of about 30–40 m, hosted a lake until it was drained in AD 1834.
In the framework of the cooperation between CNR IGAG and Italian Department of Civil Protection (DPC) of the Presidency of Council of Ministers (DPC funds 2014), a multidisciplinary approach including detailed stratigraphic and geophysical study has been carried out in the Stracciacappa maar and surrounding areas.
New geological map and cross sections illustrate the complex geometric relationships between the thick pyroclastic surge succession, showing diffuse sandwave structures, and even meter-sized lava ballistic. A composite interdigitation between lacustrine and epiclastic debris sediments fills the crater floor.
A continuous coring borehole was drilled inside the crater, 45 meters deep from the wellhead, with sampling of undisturbed samples. In addition, four MASW and one SCPTU test were carried out, in order to define the velocity profile of the s-waves within the lacustrine deposits. This Vs profile was then extended at higher depths by using the results of four 2D seismic passive arrays. Moreover, in order to define the resonance frequency of sedimentary covers via the HVSR technique, twenty-eight measurements were carried out with digital sensor Tromino® and seven measurements were performed with a Lennartz® Le-3D/5s sensor with Lennartz Marslite® digitizer. Finally, three electrical resistivity tomography tests, with a total length of about 3500 meters, were carried out with the purpose of constraining the subsoil model.
Regarding the non linear properties of soils, the cyclic soil behavior was investigated in laboratory through the Double Specimen Direct Simple Shear device. Particular care was given to organic clays within the lacustrine deposits, which show a stronger linearity and lower damping ratio with respect to inorganic clays of similar plasticity.
The collected geological-geophysical dataset suggests the coalescence of several eruptive centres localized at different depths and laterally distributed within the present-day Stracciacappa maar.
Data are currently processed for subsequent 2D and 3D numerical simulations of site effects.

REFERENCES

De Rita D. and Zanetti G., 1986. I centri esplosivi di Baccano e di Stracciacappe (Sabatini orientali, Roma): analogie e differenze della modellistica esplosiva in funzione del grado di interazione acqua/magma. Memorie della Società Geologica Italiana, 35, 689-697.
Marra F., Sottili G., Gaeta M., Giaccio B., Jicha B., Masotta M., Palladino D.M., Deocampo D.M., 2014. Major explosive activity in the Monti Sabatini Volcanic District (central Italy) over the 800-390 ka interval: geochronological-geochemical overview and tephrostratigraphic implications
Sottili G., Palladino D.M., Marra F., Jicha B., Karner D.B., Renne P., 2010. Geochronology of the most recent activity in the Sabatini Volcanic District, Roman Province, central Italy. Journal of Volcanology and Geothermal Research, 196, 20-30.