

Site seismic studies in the damaged area of Visso village after the 24th August 2016, Mw 6.0, earthquake event

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This work presents results coming from a geophysical study and numerical analyses in the damaged area of the Visso village, aiming at discussing factors leading to the observed differential damages after the 24th August 2016 Mw 6.0 earthquake event.

Visso village is located in a morphological depressed area of the Sibillini Mountains, at the Umbria-Marche regional boundary, about 28 km north from the 24th August 2016 epicentre. Following insights from the available geological cartography at 1:10.000 scale, a preliminary geophysical survey has been performed in the damaged area in order to constrain geometries and extent of the subsoil lithotypes. Then, these results have been used to retrieve a Vs profile close to the most heavily damaged buildings. This latter has been used to constrain the geological - geotechnical model for numerical analyses aimed at deriving the motion at the ground level in the study area. In particular, linear equivalent simulations have been performed by means of EERA and QUAD4M codes. The waveforms have been obtained using as input motion the time history recorded during the 24th August mainshock at Spoleto Monteluco (SPM) site.

Preliminary analyses highlights that the local geology and dynamic parameters of uppermost geological layers may have influenced the ground motion, increasing the source effect at the site. Our preliminary results indicate a possible correlation of damaging to the thickness and shape of the geological units. Nevertheless, further analyses are necessary to highlight any 3D and\or non – linear soil behaviour effects in order to compare them to the intrinsic buildings vulnerability, according to the EMS98 guidelines.

Our data can be used for possible correlation of stronger damaging occurred during the 30th October 2016 event (Mw 6.5), which caused the collapses of many buildings.