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SITE EFFECTS OF THE 2002 MOLISE EARTHQUAKE: STRONG MOTION, NOISE HVSR AND 2-MODELLING IN SAN GIULIANO

On October 31 and November 1, 2002 the Basso Molise area (Southern Italy) was struck by two moderate magnitude earthquakes (Mw = 5.7 and 5.5). The epicentral area showed a high level of damage, attributable both to the high vulnerability of existing buildings and to site effects caused by the geological and geomorphological setting. The town of S. Giuliano di Puglia showed a very peculiar departure from the local intensity pattern: it reached an intensity two degrees higher than neighbouring towns and also within the same S. Giuliano town the damage varied notably. The site response was initially evaluated by H/V ratios performed on microtremors, while a limited number of strong motion recordings from the most severe aftershocks was also available. Both data sets indicate the simultaneous presence of two amplification effects: one at about 6 Hz (that previous studied attributed to the strong, shallow impedance contrast among landfill/clay and calcarenites), and another at 2 Hz related to first S-wave arrivals and predominant on only one receiver component. A further study performed on weak-motion recordings showed also strong vertical amplification, thus indicating underestimation by HVSR technique. This set of phenomena has been investigated with a 2-D model, whose principal novelty is the geometry of the simulated geological structure consisting of a positive flower structure generated during the late orogenic transpressive regime. The numerical model allows to reproduce the location of occurrence, the amplitude and (partly) the frequency of the observed amplifications.