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Analysis of the ground shaking produced by the M≥4.0 earthquakes of the 2016 Central Italy Seismic sequence

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We use the strong motion data archived and processed in the Engineering Strong Motion DB (http://esm.mi.ingv.it) to make a thorough assessment of the strong ground shaking produced by the main events of the Central Italy earthquake sequence started on August 24, 2016.
Different methodologies are used to estimate and investigate the ground shaking experienced over a large area comprising the source region and extending throughout the whole central Italy. Main target of the analysis is the understanding of the origin of the very diversified strong ground motion observed for the three main shocks, primarily. To this end, we used both absolute, single event, and event-to-event relative measurements type of analysis.
Our results indicate a prevalent amplification of the ground shaking along the NW-SE axis of the Apennines and, in particular, toward the N of the epicentral area in a quadrant spanning from NW to NE, approximately. Notwithstanding local site effects coincident with local basins characterized by soft shallow velocity layers, and that a consistent part of this relative amplification can be attributed to source directivity effects, the observed amplification can be also attributed to velocity/attenuation structural complexities occurring north of the sequence seismic active area.
Overall, we find some strong NW source rupture directivity for the M6.0 event of the August 24, 2016 and for the M5.9 October, 26, 2016 events. On the other hand, it is less clear a pattern of directivity for the M6.5 event of October, 30, 2016. One important feature of the analyzed events is that source directivity seems to be a common and widespread feature of the M≥4.0 events.
In our work, will show the results and their implications for the forecasting of the ground motion in this part of the Italian peninsula.