Geophysical Research Abstracts
Vol. 19, EGU2017-16925, 2017
EGU General Assembly 2017

Rupture complexity of the three main shocks of the 2016 Central Italy seismic sequence

Elisa Tinti, Laura Scognamiglio, Federica Magnoni, Emanuele Casarotti, Alberto Michelini, and Massimo Cocco
Istituto Nazionale Geofisica e Vulcanologia, Rome, Italy (elisa.tinti@ingv.it)

The 2016 Central Italy seismic sequence, started on August 24th, ruptured an almost 60 km long segmented fault system between Amatrice, Norcia and Pieve Torina and is characterized by three main events and more than 45.000 aftershocks. A key feature of the studied sequence is the temporal distribution of the seismic moment release: the largest magnitude event (Mw 6.5, 30th October) occurred two months after the first main shock (Mw 6.0, 24th August) and only four days after the second main event (Mw 5.9, 26th October). All the three main events and most of the aftershocks show NNW–SSE striking focal mechanisms in agreement with the current NE-SW extensional tectonic setting of Central Apennines.
To image the rupture history of the three main events of the sequence, we invert the ground velocity time histories obtained from three-component strong motion accelerometers located within 45 km from the faults, filtered between 0.02-0.5 Hz. To improve the fit between data and synthetics we also test complex source geometries and assume rupture segmentation on a number of distinct fault planes. Overall, the retrieved rupture histories display heterogeneous slip distributions with high peak slip values and directivity effects. These features can explain the localized high values of the peak ground motions.
Finally, to test the inferred source heterogeneity and directivity, and verify how the topography and geological constraints affect the calculated ground motion, we propagate the retrieved kinematic rupture models within a 3D forward simulation and compare the results to the available observations.