Geophysical Research Abstracts
Vol. 20, EGU2018-12603, 2018
EGU General Assembly 2018

2016 Italy seismic sequence: fault geometries analysis from geodetic and seismological data

Giuseppe Pezzo, Cristiano Tolomei, Pasquale De Gori, Simone Atzori, Claudio Chiarabba, and Stefano Salvi
Istituto Nazionale di Geofisica e Vulcanologia, Centro Nazionale Terremoti, Roma, Italy

The 2016 Italian seismic sequence was characterized by three main events of Mw 6.1, Mw 5.9 and Mw 6.5 occurred on 2016 August 24th , October 26th and 30th respectively. The shocks occurred along a SW dipping normal fault system associated with the Mount Gorzano-Mount Vettore-Mount Bove alignment. Fault plane solutions for the main events exhibit normal faulting consistent with the direction of active extension of ∼3–4 mm/yr in this sector of the Apennines. Interferometric synthetic aperture radar (InSAR) and GPS measurements highlight a complex deformation pattern, especially for the October events. Indeed, the 2016 August 24th earthquake shows a bi-lobate deformation pattern characterized by two NNW-SSE striking deformation lobes located to the west of the Mount Gorzano-Mount Vettore-Mount Bove alignment, with a maximum negative LOS (line of sight) displacement value of ∼20 cm (moving away from the satellite), having a dominantly vertical component. The SAR-GPS data inversion suggest the activation the Mount Gorzano fault and Mount Vettore one.
Concerning the 2016 October events, ground deformation measurements reveal a complex deformation pattern characterized by a subsidence extending 35 km along the NNW-SSE direction, with a local minimum displacement of ∼30 cm in the northern sector due to the October 26th event, and a maximum of ∼90 cm in the surroundings of Castelluccio, due to the October 30th shock. An uplift of ∼15 cm was observed in the Norcia basin; where also a local maximum in westward movement is present; the absolute maximum in the westward movement is located in the hangingwall, near the fault. SAR and GPS data inversions reveal the activation of two main fault system: the Mount Gorzano-Mount Vettore-Mount Bove normal fault system and a low angle fault in the hanging wall of the Mount Gorzano-Mount Vettore-Mount Bove system.
In this work, we refine the main seismic source geometries using precise aftershock relocations to invert SAR and GPS coseismic displacements, differencing the contributions the main Mount Gorzano-Mount Vettore-Mount Bove fault system with respect to the low angle ones, which could represent the inherited geometries of the thrust fault system, active during the past compressive tectonic phase.