Slip behavior of the Campotosto normal fault (central Italy) imaged by high-rate GPS, strong-motion and InSAR observations

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Abstract

In the last decade, the Central Apennines has been struck by two earthquake sequences, the 2009 L'Aquila sequence in the Abruzzi region (mainshock Mw 6.3) and the 2016-2017 Central Italy sequence (mainshocks Mw 6.2, 5.9 and 6.6), that is still affecting a wide sector of the Central Apennines. The area between the northern termination of the 2009 L'Aquila sequence and the southern end of the 2016-2017 Central Italy seismic sequence has been only partially activated by these seismic sequences. In fact, a number of M> 5 normal faulting earthquakes occurred in this area, likely nucleating at the edges of the Campotosto normal fault. In particular, during the 2009 L'Aquila sequence, the southern segment of the Campotosto fault was activated by a series of M> 5 events, releasing only a small amount of the accumulated elastic strain. Finally, on 18th January 2017 four M> 5 earthquakes nucleated along the deeper sector of the north and central segment of the Campotosto fault. The combined analysis of interferometric synthetic aperture radar (InSAR), GPS measurements and near-source strong motion data allowed us to determine how much of the active Campotosto normal fault in Central Italy, ruptured during both the 2009 L'Aquila and the 2016-2017 Central Italy seismic sequences, and to evaluate how these earthquake sequences affected the static stress acting on the Campotosto fault.

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