Rupture features of the 2016 Mw6.2 Norcia earthquake and its possible relationship with strong seismic hazards

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For analyzing possible reasons for the heavy damage and seismogenic features of the 24 August 2016 Norcia earthquake, we constructed and analyzed its rupture process by incorporating datasets of near-field strong motion, teleseismic and static GPS displacements. The optimized model revealed a relatively compact slip pattern with mainly normal fault components. The maximum slip was around 0.9 m, while the rupture areas extended ~11 km and ~20 km along dip and strike, respectively. The total seismic moment was 2.3×10^{18} Nm, equivalent to Mw 6.2. Most seismic moments were released within 10 s, radiating 3.5×10^{13} J of seismic energy. The rupture history showed asymmetric propagation and is characterized by a relatively high rupture velocity within the first 6 s with a maximum of ~3.2 km/s. The mainshock slip pattern correlated well with the aftershocks distribution, and most of the accumulated strain was released in the east of seismic gap between the nearby 1997 and 2009 earthquake sequences.

Keywords: Norcia earthquake, Rupture features, Joint inversion, Seismic hazards