Introducing Surface Topography Effects and the 3D Velocity Structure to Refine the Kinematic Source Inversion Models. Application to the Norcia, Mw 6.5, 30 October 2016, Central Italy Earthquake.

Casarotti, E. ; **Tinti, E.** ; **Scognamiglio, L.** ; **Magnoni, F.**

Kinematic finite fault inversion procedures of strong motion data are usually managed by calculating Green's functions for 1D layered seismic velocity models with flat surface topography. However, many regions in the world are characterized by significant topography and complex geological models. In these cases, the lack of adoption of more complex seismic wave propagation models and surface topography during finite fault kinematic inversions can significantly impact on the retrieved source parameters.

We have modified the non-negative least-square inversion method of Dreger et al. [2005] for taking into account Green's functions generated by SPECFEM3D for a 3D velocity model including topography. The computation of Green's functions for such model is very expensive, for this reason we have decided to assume a fixed fault geometry, allowing only for rake variation and inverting for rupture velocity, rise time and slip distribution. We have applied the new procedure for the finite fault inversion of the 2016 Mw 6.5 Norcia earthquake, for which none of the several studies in literature have adopted 3D layered seismic velocity models or have taken into account the significant topography of this area. We have finally compared the slip model retrieved with this procedure to the model from Scognamiglio et al. (2018) obtained with same data and fault geometry but 1D velocity model and no topography.

Publication:	American Geophysical Union, Fall Meeting 2019, abstract #S51E-0449
Pub Date:	December 2019
Bibcode:	2019AGUFM.S51E0449C
Keywords:	7209 Earthquake dynamics; SEISMOLOGY; 7215 Earthquake source observations; SEISMOLOGY; 7230 Seismicity and tectonics; SEISMOLOGY; 7290 Computational seismology; SEISMOLOGY