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Revised fault rupture geometry for the 2016 Mw 6.6 Norcia earthquake in central Italy

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The 30th October 2016 Mw 6.6 Norcia earthquake is the largest normal faulting seismic event in Italy and worldwide, observed with an unprecedented set of modern geophysical techniques. This event is the mainshock of the seismic sequence that affected central Italy since 24th August 2016 with the Mw 6.2 Amatrice earthquake. The large amount of high-quality multidisciplinary data, including surface faulting, seismicity distribution and geodetic measurements of deformation can contribute therefore to increase the understanding of the coseismic process.
The bulk of geological, seismological and geodetic data agreed in attributing the 2016-2017 Central Italy seismic sequence to the progressive rupture of the Mt. Gorzano-Mt. Vettore-Mt. Bove normal fault system, that is a major extensional tectonic structure of the central Apennines. As for the Mw 6.6 Norcia event, in particular, the published models define an approximately N150°-160° striking normal fault, whose surface projection corresponds to the trace of the Mt. Vettore-Mt. Bove fault, along which surface faulting indeed occurred.
However, existing models which describe fault geometry and rupture mechanisms, as well as the possible complex interaction between active and inherited faults show some important dissimilarities.
We revisit the 30th October 2016 Mw 6.6 Norcia earthquake, exploring the structures involved in the coseismic dislocation, and we discuss on the feasibility of a simple half-graben dislocation model in reconciling the earthquake dislocation versus the implication of a more complex fault array invoking multi-fault rupture. The porpoise is to obtain a dislocation model that improves the fit to the geodetic data while taking into account the observations of surface faulting and reflecting the trends observed in the aftershock relocations, that all contribute to the complete definition of the earthquake source characteristics.