Geophysical Research Abstracts
Vol. 20, EGU2018-10607, 2018
EGU General Assembly 2018

Vp and Vp/Vs tomographic model of the Amatrice-Norcia fault system

Pasquale De Gori (1), Claudio Chiarabba (1), Marco Cattaneo (2), Daniele Spallarossa (3), and Margarita Segou (4)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Roma, Italy (pasquale.degori@ingv.it), (2) Istituto Nazionale di Geofisica e Vulcanologia, Ancona, Italy (marco.cattaneo@ingv.it), (3) Università degli Studi di Genova, Genova, Italy (daniele@dipteris.unige.it), (4) British Geological Survey, Edinburgh, UK (msegou@bgs.ac.uk)

We present the first high resolution Vp and Vp/Vs models of the fault system along which the Amatrice Mw 6.0 (August 24 th 2016) and the Mw 6.5 Norcia (October 30th 2016) main shocks nucleated.
We use data recorded by a dense seismic network consisting of 50 permanent INGV stations and 20 temporary stations deployed soon after the occurrence of the first main shock. An automatic procedure is used to analyze the three component seismograms and to detect P and S waves arrival times on the continuous recordings. We select about 40,000 events to be used in the tomographic inversion. The starting model is parametrized by a grid of nodes spaced 5 km horizontally and 3 km in the vertical direction down to 12 km depth. The starting velocity values are assigned according to a recent 1D velocity model for the region.
The main results of the tomographic model are:
a) a main positive NNW-SSE trending Vp anomaly in the upper crust (3-6 km depth), delineating the architecture of the old compressional system, with the main thrust units (Monti Sibillini and Monti della Laga) thrust over low Vp flysch rocks;
b) the thrust units show different patterns of Vp/Vs: while Monti della Laga exhibit almost weak and negative Vp/Vs anomalies, positive perturbations are found beneath Mt Sibillini, where the bulk of seismicity occurs;
c) the normal faults reactivated and inverted the steep ramps of the thrust system developed during the last Apennines compression stage (late Pliocene). The two large shocks, the August 24th Amatrice M=6.0 and the October 30th, M=6.5 Norcia nucleated on distinct and parallel faults.
d) The irregular geometry of normal faults together with the reactivated ramps feeds in the complexity observed during the co-seismic ruptures and the spatial distribution of aftershocks.