

SOURCE CHARACTERISTICS OF THE EASTERN CARPATHIANS BEND (ROMANIA) 2016 EARTHQUAKE DOUBLET INFERRED FROM FULL WAVEFORM INVERSION AND CORRELATION TECHNIQUES

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The seismic activity in Romania is dominated by the subcrustal seismicity occurred in a very confined volume, placed at the bending of the Eastern Carpathians (Vrancea region). This is one of the most active intracontinental seismic areas in the World characterized by a predominantly compressive stress regime with significant tectonic deformation pointed out by two to four large earthquakes per century, producing hazard over extended areas. Recently, two moderate subcrustal earthquakes (Mw 5.5 and 5.6) occurred on 23 September and 27 December 2016 closely located and similar thrust fault plane solutions with the nodal planes oriented perpendicular to the Eastern Carpathians. This solution is less frequently observed compared with the preferred solution with the nodal planes NE-SV oriented, parallel to the Carpathian Orogen. The study aims to perform a detailed analysis of seismic activity within this region as well as an accurate determination of source parameters for the earthquake doublet (ED). To achieve these goals, we applied a multi-channel waveform correlation detector to the data recorded between July 2016 and February 2017 by a small aperture seismic array installed in the epicentral region while the source parameters were determined by running simultaneous methods based on spectral analysis and full waveforms inversion. Our results showed up to 15% new low magnitude events distributed around the ED indicating possible triggering effects. Possible differences in rupture velocity and stress drop are discussed, since the seismic moment is about 16% larger for the first event than for the second one and the rupture duration is rather similar. Also, how the difference in frequency content among the ED is reflected in fault heterogeneity.

