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Earthquake sequence in East Vrancea crustal region (Romania): source characteristics and seismotectonics

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The goal of the paper is to investigate the crustal earthquake sequence generated in the East Vrancea crustal zone at the end of 2014 (22 November 2014). The main shock, occurred on 22 November 2014, 19:14 (45.860N, 27.160E, h = 39 km, ML = 5.7), is the greatest instrumentally recorded earthquake produced in this region. The aftershocks are unusually small for the sequences characterizing the Vrancea foredeep area (around 200 events with magnitude below 2). The largest aftershocks were recorded on 7 December 2015 (ML = 4.4) and 19 January 2015 (ML = 3.8). We apply cross-correlation analysis together with empirical Green's function (EGF) deconvolution and spectral ratios techniques to optimise the source parameters determination. At the same time we applied inversion techniques to retrieve the moment tensor solution for the largest shocks. For EGF and spectral ratios applications, we associated to the main event many co-located aftershocks ($2.0 \leq ML \leq 4.4$), selected according to the requirements for empirical Green's functions. The source parameters are estimated as mean values for all the available earthquake pairs. Source scaling properties and focal mechanism are investigated and discussed in terms of the regional seismotectonics and comparatively with the source scaling relationships for the Vrancea intermediate-depth earthquakes.