



Source characteristics of the recent crustal earthquakes occurred in the Romanian Carpathians

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Seismicity in Romania is dominated by the Vrancea subcrustal earthquakes, located at the SE Carpathians arc bend, with several major shocks of $M \sim 7$ per century. The crustal seismicity is diffusely spread along the entire Carpathians orogen generally consisting in small-to-moderate earthquake sequences. The events considered in the present study are:

- one sequence in the northern part of the East Carpathians (29 events produced on 24 June - 1 July 2011; main shock coordinates: 45.36°N, 25.77°E, $h=15$ km, $M = 4.6$);
- one sequence in the western part of the South Carpathians, close to Tg-Jiu city (40 events produced on December 30, 2011 - January 5, 2012; main shock coordinates: 45.04°N, 23.56°E, $h=14$ km, $M = 4.5$);
- two sequences at the contact between South and West Carpathians (14 events produced on 24-31 March 2011; main shock coordinates: 45.60°N, 22.85°E, $h=1$ km, $M = 4.0$ and 35 events produced on 8-11 September 2013; main shock coordinates: 45.60°N, 22.86°E, $h=4$ km, $M=4.7$);
- one sequence in the South Carpathians (21 events produced on 27-28 February 2013 in Făgăraș-Câmpulung area; main shock coordinates: 45.04°N, 23.56°E, $h=14$ km, $M = 4.0$ and 7 isolated events).

The purpose of the present paper is to apply empirical Green's functions and spectral ratios techniques to determine the source parameters of the study earthquakes and to investigate source scaling properties in connection with the regional seismotectonics. In all cases, for the main shocks we found well-recorded co-located aftershocks with similar focal mechanism (empirical Green's functions). The difference of about 1.0 magnitude unit between the main shock and the largest aftershock is commonly noticed, in agreement with the typical behavior for the aftershock activity in the crustal domain. Despite the relative small size of the events, high-quality waveforms for pairs of co-located events are available for the recording sites of the national seismic network covering the epicentral area. The new results are discussed and interpreted in terms of the seismotectonic features at the scale of the entire Carpathians region in Romania in order to better constrain the seismogenic parameters for seismic hazard assessment.