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The source mechanism of the seismic events during the sequence of the moderate-size crustal earthquake of November 22, 2014 of Vrancea region (Romania)

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The moderate-size earthquake (local magnitude 5.7) which occurred on November 22, 2014 in Vrancea region (Romania), is the largest crustal event instrumentally recorded at the bending of the Eastern Carpathians.
Its aftershock sequence lasted around 70 days, 271 earthquakes with local magnitude ≥ 0.1 being localized using the records collected by the Romanian seismic network.
The seismic sequence occurred mainly in the lower crust (depths greater than 25 km), and the epicenter distribution – along a NNE-SSW direction – follows the orientation of the Carpathian arc.
The sequence, located nearby the contact of three important tectonic units: the Scythian Platform, the Moesian Platform and the North Dobrogea Promontory, occurred in the Focsani Basin (part of the Moesian Platform) and is related to the normal fault system associated to the major Peceneaga - Camena fault, which separates the Moesian Platform from the North Dobrogea promontory.
The spatio-temporal distribution of the seismic activity, as well as the seismic energy release during the seismic sequence are analysed in detail, and the focal mechanisms of the largest events – 11 shocks with local magnitude ≥ 2.5 – are determined using the reliable P-wave polarity data available.
Taking into consideration that the moderate-size shock of November 22, 2014 is the strongest instrumentally recorded crustal earthquake in the region, its focal mechanism provides highly relevant seismological information on the deformation field in front of the Carpathian bend. The obtained fault plane solution indicates normal faulting with a dominant dip-slip component; both nodal planes are oriented SE-NW.
The strongest aftershocks – 2 events with local magnitudes 4.5, and 4.2, respectively – display remarkably similar mechanisms as well. The retrieved fault plane solutions of the weaker earthquakes show a certain variability, nevertheless the normal faulting is a common characteristic of most of the shocks with magnitude ≥ 2.5 of the sequence.