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Source parameters of the Vrancea intermediate-depth earthquakes retrieved using a small-aperture array

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The main purpose of the present work is to investigate the possibility to detect and calibrate the source parameters of the Vrancea intermediate-depth earthquakes using a small-aperture array, Bucovina Seismic Array (BURAR). BURAR array was installed in 1999 in joint cooperation between Romania and USA. The array is situated in the northern part of Romania, in Eastern Carpathians, at about 250 km distance from the Vrancea epicentral area. The array consists of 10 stations (nine short period and one broad band instruments installed in boreholes). For our study we selected 30 earthquakes ($3.8 < MD < 6.0$) occurred between 2002 and 2004, including two recent Vrancea events, which are the best ever recorded earthquakes on the Romanian territory: September 27, 2004 (45.70N, 26.45E, h = 166 km, Mw = 4.7) and October 27, 2004 (45.84N, 26.63E, h = 105 km, Mw = 6.0). Empirical Green's function deconvolution and spectral ratio methods are applied for pairs of collocated events with similar focal mechanism. Stability tests are performed for the retrieved source time function using the array elements. Empirical scaling and calibration relationships are also determined. Possible variation with depth along the subducting slab, in agreement with assumed differences in the seismic and tectonic regime between the upper (h = 60-110 km) and lower (h = 110-180 km) lithospheric seismic active segments, and variation in the attenuation of the seismic waves propagating toward BURAR site, are also investigated.