



Calibration of BURAR (Romania) seismic array to estimate location and magnitude for the events occurred in the East and Southeast part of the array

Felix Borleanu (1), Mihaela Popa (1), Mircea Radulian (1), and Shirley Baher (2)

(1) National Institute for Earth Physics (Romania) , (2) Air Force Technical Application Center (USA)

Bucovina seismic array (BURAR), installed as a result of cooperation between Air Force Technical Applications Center (USA) and National Institute for Earth Physics (Romania), has been operating since 2002. The array consists of nine short-period vertical sensors, and a broadband triaxial sensor continuously recording data with 40 samples per second. It is a small array over 25 km², with an aperture of 5 km which is highly effective in detection of events located in the east and southeast part of the station situated at teleseismic and regional distances. This could be explained by the low ambient noise and energy propagation paths.

The goal of this study is to improve the array capability to estimate location and magnitude estimation for the events occurred in the east and southeast part of the array in a distance range between 15 and 35 degrees. We chose a set of events occurred between 2004 and 2010 with high signal to noise ratio in order to determine the appropriate calibration. Direct P waves were used, provided by the waveforms recorded by the short period components, and filtered with a Butterworth band pass filter between 0.8 and 3 Hz. The dominant period of the first arrival at BURAR for all events and all stations ranges between 1.5 and 2.0 Hz. Considering this frequency range we measured the maximum amplitudes around P waves at every station of the array in order to determine the magnitude formula and magnitude corrections that need to be applied to each element. The travel times have also been determined relative to the IASP91 velocity model (Kennett et al., 1991). The theoretical travel time was compared with the picked travel time in order to obtain the static time corrections. In order to determine the ray parameter and back azimuth values the frequency - wave number (f-k) analysis (Capon 1969) was applied, after that these values being corrected relative to the theoretical values and used in locating procedures.