



Observation of the regional and distant seismicity with BURAR seismic array

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The Bucovina Romanian Seismic Array (BURAR) was deployed in the northern Romania, under a joint effort of the Air Force Technical Applications Center (AFTAC), USA, and the National Institute for Earth Physics (NIEP), Romania. BURAR consists of 10 seismological stations: 9 sites, vertical-component short-period instruments, and one site, three-component broadband sensor, distributed over a 5 km aperture. Since July 2002, BURAR data are continuously recorded and on-line transmitted to the Romanian National Data Centre (RO_NDC), and to the National Data Center of USA (Florida). For on-line data processing, an automatic program using the RONAPP signal analysis software package, kindly supplied by NORSAR, and customized for BURAR, has been implemented at RO_NDC.

BURAR data recorded between January 2005 and December 2008 were analyzed to test the array monitoring capabilities of regional and distant seismicity. For this time interval nearly 35,000 events detected by BURAR and identified in seismic bulletins (Preliminary Determination of Epicenters/PDE) and Romanian Earthquake Catalogue) were investigated using parameters as backazimuth, epicentral distance and magnitude. A remarkably detection capability is emphasized for teleseismic observations (epicentral distance above 20 deg). BURAR onsets could be associated to almost 60% of all events in the teleseismic distance, with a magnitude detection threshold of 4.5 (mb).

For regional events, detection capability decreases to about 16% of all events within regional distance range. The site conditions (crustal structure and high frequency cultural noise) as well as array dimension, affect the signal coherency, and reduce the array detection capability.

For both teleseismic and regional distances a monthly variation of BURAR detection capabilities has been found; the number of events detected during the summer time is diminished by the specific seasonal human activity and atmospheric conditions (thunderstorms). The variation of the regional detection capability per time of day presents a small variation due to the low level of noise at the BURAR site. The relative increase in activity during the day time can be interpreted as caused by the two large Polish mining areas, where small explosions are detonated.

The good detection capability of the BURAR for teleseismic distances in comparison with the observations of the Romanian Real Time Network was proved based on the data analysis in terms of magnitude and epicentral distance. The higher signal detection capability of BURAR is obtained from the array techniques applied in data processing, which enhance the signal-to-noise ratio (SNR). The monitoring performed by the BURAR seismic array provides a good azimuthal coverage of the regional and distant seismicity, by large-scale recording of weak-to-strong events, in a large range of epicentral distances.