Recent development of infrasound monitoring network in Romania

Daniela Ghica, Mihaela Popa, and Constantin Ionescu

National Institute for Earth Physics, National Data Center, Bucharest, Romania (daniela@infp.ro)

The second half of 2016 was marked at National Institute for Earth Physics (NIEP) by a significant development of infrasound monitoring infrastructure in Romania. In addition to IPLOR, the 6-element acoustic array installed at Plostina, in the central part of Romania, since 2009, two other four-element arrays were deployed.

The first one, BURARI infrasound research array, was deployed in late July 2016, under a joint effort of AFTAC, USA and NIEP, in the northern part of Romania, in Bucovina region. The sites, placed in vicinity of the central elements of BURAR seismic array (over 1.2 km aperture), are equipped with Chaparral Physics Model 21 microbarometers and Reftek RT 130 data loggers. The data, used mainly for research purposes within the scientific collaboration project between NIEP and AFTAC, are available to scientific community.

The second one is a PTS portable infrasound array (I67RO) deployed for one year, starting with the end of September 2016, within a collaboration project between NIEP and PTS of the Preparatory Commission for CTBTO. This array is located in the western part of Romania, at Marisel, Cluj County, covering a 0.9 km aperture and being equipped with CEA/DAM MB2005 microbarometers and Reftek RT 130 data loggers. This joint experiment aims to contribute both to advanced understanding of infrasound sources in Central-Europe and to ARISE design study project, as an expansion of the spatial coverage of the European infrasound network.

The data recorded by the three infrasound arrays deployed in Romania, during a same time interval (October - December 2016) were processed into detection arrival bulletins applying CEA/DASE PMCC algorithm embedded in DTK-GPMCC (extended CTBTO NDC-in-a-box) and WinPMCC software applications. The results were plotted and analyzed using DTK-DIVA software (extended CTBTO NDC-in-a-box), in order to assess detectability of each station, as well as the capacity of fusing detections into support of infrasound monitoring activity at NIEP.

We present infrasound signals generated by an impulsive event (accidental explosion of a train carrying liquid petroleum gas in Hitrino, Bulgaria) recorded on these three arrays. The features calculated for the arrivals detected (backazimuth, arrival time, frequency and celerity) are used to associate signals with event and observe individually array performance.