



Upgrade of the Plostina infrasound array

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Plostina infrasound station (IPLOR) is a large aperture array deployed in the central part of Romania since 2009, by National Institute for Earth Physics (NIEP). The initial set-up consisted of 3 elements (IPH4, IPH5, IPH6); in 2010, a fourth element (IPH7) was added; during 2012, two more sensors were installed in IPH2 and IPH3 sites. All 6 elements are equipped with Chaparral Physics Model 25 sensors.

Upgrading works are currently ongoing at IPLOR, aiming to enhance the station performance in terms of automatic signal detection and characterization in the routine processing using PMCC algorithm. The infrasound data quality is improved through station design optimization and installation of more efficient wind-noise reduction systems. Solutions adopted took in account the recommendations provided by the 2011 Expert Group Meeting for the design of IMS infrasound stations, as well as the knowledge acquired during the NIEP participation, as associated member, to the ARISE design study project.

After upgrading the IPLOR station to a 6-element array, the analysis of the data shows a visibly enhancement of the detection capability by increasing the lower frequency resolution (below 0.5 Hz). The improved array response indicates reducing spatial aliasing of higher frequency signals and increasing the degree of signal correlation between array elements, which are observed in a better characterization of the signal in terms of back-azimuth and horizontal trace velocity.

In September 2013, NIEP started the works to improve the wind-noise reduction conditions at IPLOR station. The pipes and air-inlets installed at IPH4 element were replaced, in order to eliminate the potential points of air leak. The porous hoses at IPH5, IPH6 and IPH7 sites were replaced with new rosette pipe array systems: 20-port rosette design at IPH5 and IPH6, and 19-port rosette design at IPH7. The two circular porous hoses located at the IPH2 and IPH3 sites are scheduled for replacing in 2014. The new wind-noise reduction systems installed at IPLOR array contribute successfully to the enhancing of the signal-to-noise ratio, reducing the influence of wind-generated noise at the station, as is observed in the data recorded.

Performance assessment of the IPLOR infrasound station is made by the analysis of the detection software output on time interval between May 2010 and December 2013. The station response evolution during this period is showed by plotting the number of detections in function of the azimuth, velocity and frequency. Several examples of events detected and identified using infrasonic data recorded with the upgraded IPLOR station are presented.

Finally, we expect that the Plostina upgraded infrasound array will enhance the NIEP contribution to the future ARISE infrastructure.