Geophysical Research Abstracts
Vol. 17, EGU2015-8668, 2015
EGU General Assembly 2015

Seismo-acoustic analysis of the ocean swell sources observed with Romanian infrasound array and seismic stations

Daniela Ghica, Bogdan Grecu, and Mihaela Popa
National Institute for Earth Physics, National Data Center, Bucharest, Romania (daniela@infp.ro)

Romanian Plostina infrasound array (IPLOR) is deployed in the central part of the country, in Vrancea region. Presently, IPLOR array configuration includes 6 elements equipped with Chaparral Physics sensors and with aperture of about 2.5 km. For the purpose of assessing the IPLOR performance in observing various types of infrasound sources, over five years of data (since June 2009 to present) were processed. Signal interactive analysis was performed using WinPMCC software. The detection results show that the station response was gradually improved, as the number of array elements increased from three to six, and wind noise reduction conditions were enhanced. A larger number of detected signals and a better array resolution at lower frequency were noticed as well.
Microbaroms - the interaction of ocean swell with the atmosphere - represent a relevant type of infrasonic source present in the IPLOR detection plots, for which the signal characterization has been enhanced with the array upgrading process. IPLOR detection capability related to this energetic long-period infrasound waves, which propagate over large distances, shows an alternating behavior, being strongly influenced by the upper atmospheric winds, i.e. seasonally dependent stratospheric winds.
The ocean swell can be considered as a seismo-acoustic source, leaving an imprint on both seismic and infrasonic recordings. The interaction with the atmosphere generates infrasound (microbarom), while the interaction with the sea floor emits seismic signal (microseism). Microbaroms have a sinusoidal wave character with a dominant period of 5 s. Due to low damping at this period in stratospheric wave duct, microbaroms are observed over large distance ranges up to a few thousand kilometres. Microseisms occur as an increasing of seismic background noise between 2 and 20 s; in this range, primary and secondary peaks, at 5 and 14 s, are observed.
Common broad-band seismic data, recorded with Romanian dense seismic network, and infrasound recordings of IPLOR array were used to a detailed event analysis. For the time interval assessed, the analysis has revealed that power spectral noise amplitudes correlate well at the microbarom peak. The main ocean swell sources which can be observed are possibly associated with North Sea, Atlantic Ocean, Black Sea and Pacific Ocean.