



Infrasound from lightning observed in Romania using seismo-acoustic arrays

Daniela Ghica and Bogdan Grecu

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

Presently, two seismo-acoustic arrays are deployed in Romania. The first one is a 6-element array of 2.5 km aperture, installed by National Institute for Earth Physics (NIEP) in 2009 at Plostina (central Romania) and equipped with 3C-BB CGM40T borehole seismometers and Chaparral Physics Model 25 microbarometers. The second one is a 4-element array of 1.2 km aperture, deployed in Bucovina region (northern Romania) under a joint effort of Air Force Technical Application Center AFTAC (USA) and NIEP, using 1C-SP GS-21 borehole seismometers and Chaparral Physics Model 21 microbarometers.

Infrasound signals radiated by lightning and thunder during thunderstorms passing over the two stations are identified and analyzed using both seismic and acoustic data. Applying two processing methods, PMCC algorithm and f-k analysis, some signal characteristics (slowness, amplitude variation, propagation path, power spectrum of event in frequency range) are described.

Long-duration trains of frequent sharp spikes in the amplitude, observed in the infrasound recordings during thunderstorms are associated with lightning discharges. These acoustic signatures of lightning activity could be observed in the correspondent seismic waveforms as N-shockwave type signals with a dominant frequency between 1 and 5 Hz. Correlations with synoptic charts, regional lightning activity maps and electric field measurements were performed.