



Sounds of earthquakes in West Bohemia: analysis of sonic and infrasonic records

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Earthquake sounds are usually observed during the occurrence of small earthquakes. The observations of audible manifestations of earthquakes date back to the ancient age and have been recently analyzed in more detail based both on macroseismic observations and audio recordings. In most cases the earthquake sounds resemble low-frequency underground thundering that is generated by seismic-acoustic conversion of P and SV waves at the earth surface. This is also supported by the fact that earthquake sounds usually precede shaking caused by S-waves. The less frequent are explosion-type sounds whose origin remains unclear.

We analyze the observations of sounds associating the occurrence of earthquake swarms in the area of West Bohemia/Vogtland, Central Europe. Macroseismic data include 250 reports of sounds with 90% thundering and 10% of explosions. Additional data consist of sonic and infrasonic records acquired by microphones and microbarographs at seismic stations in the area. All the sonic and infrasonic records correspond to sounds of the thunder type; no explosions were recorded. Comparison of these records enabled to determine the seismic wave – air pressure transfer function. The measurements using a 3D microphone array confirm that in the epicentral area the sonic wave is propagating subvertically. We also compared the coda of seismograms and sonic records. It turned out that additional to seismo-acoustic coupling, a later acoustic wave of thunder type arrives at the observation site whose arrival time corresponds to sonic propagation from the epicenter. We analyse the possible generation mechanisms of this type of sonic wave.