

3.2-P05. Acoustic-Seismic Coupling of Broadband Signals - Analysis of Potential Disturbances during CTBT On-Site Inspection Measurements

In the framework of the verification of the CTBT the localization of possible underground nuclear explosion sites is important. In order to localize these sites sensitive seismic measurements of so-called aftershocks can be performed, which, however, can be disturbed by different signals. We focus on disturbances caused by airborne sources: When sound of aircraft hits the ground it excites soil vibrations which can mask weak aftershock signals. The research aims to develop recommendations for sensitive seismic measurements during CTBTO on-site inspections to reduce such disturbances. To gain a better understanding of the process of acoustic-seismic coupling we measured sound pressure and soil velocity from various sources e.g. jet aircraft. In the seismic data we observed interference patterns which can be used to estimate the path(s) of propagation of acoustically induced soil vibrations. The frequency-dependent phase offset between different sensors is used to estimate the propagation velocity. Additionally, some sensors were shielded from the incident acoustic waves in order to distinguish between seismic signals excited locally from ones produced at larger distances. The shielding results in a decreased seismic signal amplitude, depending on frequency and depth in the ground, which is, however, much less than the decrease of the acoustic amplitude.

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