

Subspace detection of seismic survey signals observed on the IMS hydroacoustic network

Background hydroacoustic signals resulting from marine air-gun surveys impact the detection capability of the CTBTO hydroacoustic stations and their automated processing (Brouwer et al., 2018). For surveys close to hydroacoustic stations or with favourable coupling into the SOFAR channel, the periodic air-gun shots stand out clearly as a fishbone pattern in the time trace. It is desirable to automatically detect and characterize these survey signals, even when they have a low SNR. The purpose of the automatic detection is to mitigate their impact, to complete the characterization of all hydroacoustic signals, and for those surveys where the location and timing of the sources are available to verify and improve the environmental and propagation models available to the CTBTO. To this end, we developed a subspace detector (Harris, 2006) that can bootstrap from temporally co-located signals. We discuss the means of bootstrapping, the azimuth selectivity, and assess performance relative to ground-truth data. Brouwer, A., Le Bras R., Nielsen P. L., Bittner P., Wang H. Assessing and Mitigating the Impact of Seismic Surveys on CTBTO Hydroacoustic Detections, EGU General Assembly PICO presentation EGU2018-8367. Harris, D. B. (2006). Subspace detectors: Theory. Lawrence Livermore National Laboratory Internal Report UCRL-TR-222758.

Primary author: BROUWER, Albert (International Institute for Applied Systems Analysis)

Presenter: BROUWER, Albert (International Institute for Applied Systems Analysis)

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