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A self-consistent estimate of the CTBT IMS hydrophone locations using scientific airgun data from the CEVICHE trial (Chile)

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The CTBT IMS hydroacoustic sensor network composed of 6 hydrophone stations and 5 T-phase is part of the global CTBT verification regime. The hydrophone stations consist of hydrophone triplets. Each hydrophone is suspended in the ocean at a depth close to the SOFAR channel axis and anchored by a riser cable to the ocean floor. The geometry of the triplets and dedicated data processing allow for estimating the direction of arrival (or back-azimuth) of an incoming signal used for localizing the event. An accurate deployment position of each hydrophone in the triplet is essential to obtain an accurate location of an event by back-azimuth estimation that may originate thousands of kilometers from the triplet. CTBTO has in the past developed an algorithm calculating re-location of hydrophones based on numerous analyst reviewed event locations obtained by the entire CTBT IMS sensor network. In this study, the algorithm is applied to the HA03 hydrophone station to estimate possible corrections to the hydrophone locations. The Progressive Multi-Channel Correlator algorithm is updated with the hydrophone re-location, and a series of signals from a scientific airgun survey recorded during the CEVICHE trial (Chile) demonstrates the improvement in back-azimuth estimates by the hydrophone re-location.

Promotional text

Verification and validation of hydrophone deployment positions are beneficial for maintaining accurate event localization using the CTBT verification technologies.

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