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inverse problem approach for acoustic Transmission Loss estimation from the analysis of signals generated by seismic air-gun arrays.

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Offshore seismic surveys with airgun array sources are currently widespread in all the oceans. They constitute one of the most powerful and systematic impulsive noise sources in marine environments. The sound pulses from large airgun arrays generate signals that contain sufficient energy in the 5-60 Hz band to propagate ocean-basin scales at ranges of hundreds to thousands of kilometres. Under favourable propagation conditions they can be received at the CTBT IMS hydroacoustic stations (HA) with high signal to noise ratio. Unlike previous work, our focus is neither to study their effects on marine species nor to investigate the stratified sedimentary structure of the seabed, but to evaluate whether these signals can be used to validate theoretical predictions of propagation models. A sample of recorded signals from seismic surveys obtained from the IMS HA historical data is exhaustively analysed through cepstral, spectral and time-based techniques. Then, based on the known characteristics of the energy source spectral density of airgun arrays below 100 Hz, as published in the literature, some underwater propagation properties are inferred.

Promotional text

Validating sound propagation models in oceans contributes to improve the nuclear test monitoring and verification. The present work is a scientific application of data used for test ban verification with the consequent feedback to the CTBTO and the broader scientific community.

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