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infrasound signal-parameter models using a global ground truth data set

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The celerity-range model used for both association and location in the standard automatic and interactive analysis at the International Data Centre (IDC) of the Comprehensive Nuclear-Test-Ban Treaty Organisation, has not been updated for over 10 years. The NET-VISA automatic association algorithm (Arora et al., 2013) currently providing additional information to IDC analysts, is based on prior probability distributions learned from previous interactive analysis results. Improving the IDC model(s) should improve interactive analysis results, and thus over time improve NET-VISA performance for seismo-acoustic events. Whilst numerical acoustic propagation modelling may be used to provide both range and time dependent priors for signal parameters, ground truth data analysis is necessary for model validation. Using software developed to consistently analyse a global ground truth database, empirical models for celerity, backazimuth and duration have been constructed from 312 detections in the 0.32 – 1.28 Hz passband. The probability distribution for backazimuth is consistent with the NET-VISA backazimuth prior derived using seismo-acoustic events. Our results do not support the IDC model increase in stratospheric signal celerity at a distance of 20°; we look to provide a range-dependent model whose uncertainties reflect the lack of observations at these longer ranges.
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Promotional text

Through validating infrasound signal-parameter models using a global ground truth data set, we aim to improve the infrasound data analysis methods used for nuclear test monitoring.
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