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Celerity vs Range Models for Regional Event Location Using Dense Seismic Network Recordings

Celerity vs. range models can be used for the association of infrasound automatic detections, for event location and for the validation of acoustic propagation simulations. Signals recorded from ground truth events are used to establish celerity vs. range models, but data coverage is uneven in both space and time. To achieve a high density of regional recordings we use data from USArray seismic stations recording air-to-ground coupled waves from explosions during the summers of 2004-2008 at the Utah Training and Test Range, together with data from 6 microbarograph arrays at regional distances (<2000 km). Our regional celerity vs. range model has 2315 picks; considerably more than global models used at the IDC for event association and location. We have developed a consistent methodology for analysing the infrasound and seismic data, including choosing filter characteristics from a limited group of two-octave wide filter bands and picking the maximum peak-to-peak arrival. We clearly observe tropospheric, thermospheric and stratospheric arrivals, in agreement with regional ray-tracing models (Marcillo et al. in prep). The new model suggests event locations could be improved, particularly for events where stations detect at ranges 120-300km.

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