

infrasound propagation modelling using the reflectivity method

A realistic modeling of infrasound propagation is necessary for acoustic event detection and location, and for evaluating models of the state of the atmosphere. Infrasound arrivals are typically predicted using ray-tracing although full-waveform modeling is frequently necessary. The reflectivity method generates synthetic seismograms for point sources in a layered medium. For an accidental explosion in northern Norway, we demonstrate using effective sound speed that reflectivity in a layered model of the atmosphere predicts all the observed phases at 410 km distance. Ray-tracing using the same atmospheric model fails to predict one of these arrivals which, comparing reflectivity and ray-tracing output at closer distances, is demonstrated to be a first bounce stratospheric arrival. We advocate using reflectivity in parallel with ray-tracing for providing a more complete view of the infrasound wavefield including head-waves and shadow zone arrivals.

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