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Atmospheric Uncertainty and Detection Quality Impacts on Infrasonic Localization

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An event-specific localization for regional infrasonic analysis has recently been developed using a Bayesian statistical framework and time-reversed ray tracing methods. Auxiliary parameters previously introduced to solve the transport equation as well as identify eigenrays are used to map confidence in direction-of-arrival of detected signals into spatial and temporal variances in the ray-based likelihood. Atmospheric uncertainty is quantified in the analysis using an ensemble of possible atmospheric states which can be tuned using recently developed atmospheric statistics methods or obtained from numerical weather prediction systems. The impact of finite detection quality has been investigated and compared with the impact of varying degrees of uncertainty in the atmospheric state. An overview of the method as well as the localization confidence as a function of atmospheric uncertainty and detection quality will be presented.

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