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Contribution to uncertainty evaluation associated with on-site infrasound monitoring systems

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In order to contribute to the improvement of the confidence and the quality of measurements produced by regional and international infrasound monitoring networks, this work investigates a methodology of uncertainty evaluation associated with on-site measurement systems. The proposed approach is applied to infrasound signals processed with TDOA (Time Difference of Arrival) propagation model which takes as inputs the wave parameters of the incoming signals (e.g. back-azimuth, horizontal trace velocity) recorded at the array elements. On one hand, relevant input uncertainties are investigated for propagation targeting the incoming signals (loss of coherence, noise), the instrumentation (microbarometers, calibration system, wind noise reduction system, environmental sensitivity) and the propagation model (sampling frequency and frequency band). On the other hand, relevant advanced output quantities of interest based on TDOA outputs are proposed. Statistical tools are then derived to evaluate the main contributions to the uncertainty associated with the advanced output quantities.