ID: Type: **Oral**

# of Infrasound Waveform Inversion: Application to Explosion Yield Estimation

Waveform inversion techniques are widely used to constrain source dynamics of infrasound. The methods exploit full-waveform information and provide further constraints on source parameters than other inversions using only a few observation parameters. Infrasound waveform inversion was recently applied to volcanic eruptions and chemical explosions and showed promising results for source parameter estimations. The method can improve the accuracy of the estimated yield by using full 3-D numerical Green's functions and incorporating the propagation path effects into the inversion. However, the inversion results are often given without any uncertainty estimation, which is critical for quantifying the reliability of the inversion solution. In this study, we present probabilistic framework for waveform inversion method and describe the uncertainty of inversion parameters by the posteriori distribution and the priori data covariance. We apply the method to ground-truth explosion experiments and evaluate the yield estimation errors associated with mismodelling and source uncertainty. The presented probabilistic statements can be generalized for other infrasonic events (e.g., volcanic explosion, bolide explosions) and provides quantifiable uncertainty analysis.

Primary author: KIM, Keehoon (Lawrence Livermore National Laboratory)

Presenter: KIM, Keehoon (Lawrence Livermore National Laboratory)

Track Classification: Modelling & Network Performance