ID: Type: **Oral**

3-D Acoustic Multipole Waveform Inversion at Yasur Volcano, Vanuatu

Well-constrained acoustic waveform inversion can provide robust estimates of explosion source parameters, increasing our ability to monitor anthropogenic and natural explosions. Previous volcanic studies have generally assumed a simple acoustic source (monopole), however more complex source reconstructions can be estimated using a combination of monopole and dipole sources (multipole). We deployed an acoustic network around Yasur volcano, which has eruptions every 1-4 minutes. The deployment included acoustic sensors along a tethered aerostat, allowing us to better constrain the acoustic source in three dimensions. We follow the methods of Kim et al. (2015) using Finite-Difference Time-Domain modeling to obtain the full 3-D Greenâ⊠s functions for each propagation path. We then invert for the location and multipole source-time functions for 80 events to examine the source characteristics of the vents, including an infrasound-derived volume flow rate and dominant dipole direction. We perform the first multipole inversion that accounts for topography and find that a monopole is a good approximation, but a small dipole component remains that is consistent with ballistic trajectories. Furthermore, accounting for topography helps reduce the overestimation of both the monopole and dipole strengths. This inversion method could be extended to anthropogenic explosions and monitoring efforts, potentially in near-real time.

Primary author: IEZZI, Alexandra (University of Alaska Fairbanks)

Presenter: IEZZI, Alexandra (University of Alaska Fairbanks)

Track Classification: Modelling & Network Performance