Geophysical Research Abstracts
Vol. 21, EGU2019-15961, 2019
EGU General Assembly 2019

Acoustic Waveform Inversion of Infrasound signals at Volcan de Fuego, Guatemala during 2018.

Alejandro Díaz-Moreno, Beth-Helen Munkli, Anthony Lamur, and Silvio De Angelis
Department of Earth, Ocean and Ecological Sciences, University of Liverpool, Liverpool, UK

Volcán de Fuego, Guatemala, has been in the spotlight since its catastrophic eruption in June 2018, when deadly pyroclastic flows took the life of over 190 people (nearly 200 still missing) and displaced more than 12000. Since then, continuous international efforts have contributed to improve monitoring at Fuego, and efforts are underway to deploy effective
new early warning and decision-making procedures.
Acoustic infrasound s stands out as a fast a robust method for assessing volcanic eruptions. In particular, acoustic waveform inversion can provide estimates of eruption source parameters such as volumetric flow rate, of great importance to monitor and quantify the intensity of volcanic eruptions, as well as to produce early warnings for civil protection authorities.

Acoustic Infrasound temporary deployments at Volcán de Fuego in May and November 2018 recorded a large database of ash-rich and gas-rich volcanic explosions prior and after the June 2018 eruption. Here, we apply a Finite Difference Time Domain (FDTD) wavefield scheme to model impulse response of both monopole and multipole sources, including the effects of atmosphere and the topography on the acoustic wavefield. Using these numerical Green's functions, we invert the recorded infrasound data in order to retrieve the time-history of erupted volume and assess other relevant parameters such as mass eruption rates and plume height. The analyses of acoustic infrasound are complemented and constrained by a multidisciplinary dataset that includes visual, thermal infrared and multi-spectral imagery.