Contribution ID: **253** Contribution code: **P1.1-253** Type: **e-Poster**

Rapid automated detection, association, and location of remote volcanic infrasound using 3D ray-tracing and empirical climatologies

Tuesday, 29 June 2021 11:45 (15 minutes)

Explosive volcanic eruptions produce powerful infrasound signals that are frequently recorded by the International Monitoring System (IMS). We are developing and testing methodologies to detect, locate, and characterize volcanic infrasound globally using data from the IMS. Challenges remain in attributing an infrasound event to a particular volcano, in part because source locations can be offset due to the effect of stratospheric crosswinds. We build on the combined association and location brute-force, grid-search, cross-bearings method of Matoza et al. [2017, 2018], here implementing backazimuth deviation predictions from 3D ray-tracing with empirical climatologies (HWM/MSISE). We are exploring the utility of climatologies rather than operational weather hindcasts for rapid first-order computation (e.g., for near-real-time monitoring, reanalysis of large data archives). With individual event case studies of two similar Volcanic Explosivity Index (VEI) 4 eruptions in Chile (Puyehue-Cordón Caulle volcanic complex on June 4, 2011; and Calbuco volcano on April 22, 2015), and stations up to ~5000 km, we obtain source location improvements of 66 to 89.6%. Here we further test our method using a multi-decadal (2003–2019) dataset of observations of moderate explosive eruptions from volcanoes Yasur, Lopevi, and Ambrym (Archipielago of Vanatu), recorded from 399 to 670 km from I22FR (New Caledonia).

Promotional text

We are building a rapid method to automatically detect, localize, and characterize volcanic infrasound using the IMS network of arrays. In this work we are centered in reducing the source misfit that atmospheric winds introduce on the location method in a robust manner.

Primary author: Mr DE NEGRI, Rodrigo (University of California, Santa Barbara, CA, USA)

Co-authors: Mr MATOZA, Robin (University of California, Santa Barbara, CA, USA); Mr LE PICHON, Alexis (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France)

Presenter: Mr DE NEGRI, Rodrigo (University of California, Santa Barbara, CA, USA)

Session Classification: T1.1 e-poster session

Track Classification: Theme 1. The Earth as a Complex System: T1.1 - The Atmosphere and its Dynamic