

September 2018 GSA Luncheon

Speaker

Alex Iezzi, PhD Student, Geophysical Institute, University of Alaska Fairbanks

Title

Combining Infrasound and Atmospheric Modeling to Monitor Volcanic Eruptions in Alaska

Abstract

Alaska's over 50 historically active volcanoes span 2,500 kilometers, and their eruptions pose great threats to the aviation industry and local populations. This makes both prompt observations of explosion onsets and changes in intensity a necessity. Alaskan volcanoes are predominantly monitored by local seismic networks in the best case, and augmented by remote observations including satellite imagery and infrasound arrays. Infrasound (sound waves below 20 Hz) is an important tool for monitoring in locations such as Alaska where volcanoes are both numerous and remote. Due to relatively weak attenuation in the atmosphere at these low frequencies and strong ducts in the atmosphere, infrasound can propagate hundreds to thousands of kilometers under suitable conditions and be detected by infrasound sensors. However, long-range infrasound propagation is greatly affected by winds and temperature gradients in the atmosphere. To accurately constrain volcanic source information and understand the long-range propagation, a detailed characterization of the spatial and temporal variability of the atmosphere is vital.

Alaska Volcano Observatory Ground-to-Space (AVO-G2S) is an open source atmospheric reconstruction model that smoothly characterizes atmospheric conditions using multiple numerical weather prediction models and reanalysis products as well as empirical models for the upper atmosphere. Using a combination of array processing, celerity, and propagation modeling in Alaska can help differentiate between propagation paths and refine interpretations of infrasound detections from volcanic explosions at long-range.

Biography

Alex Iezzi is a PhD student at the University of Alaska Fairbanks Geophysical Institute working with David Fee. Her main area of research is volcano infrasound and seismology and its application for monitoring both in Alaska and abroad. She is currently working on using local infrasound data to invert for the source mechanism of volcanic explosions. Prior to beginning her PhD, she was an intern for the USGS Alaska Volcano Observatory in Anchorage for two summers. Alex obtained her undergraduate degree from Connecticut College, where she was a self-designed major in Geophysics with minors in Mathematics and Physics. While there, she wrote an honors thesis on lahar inundation modeling for Redoubt Volcano, Alaska.