Title: Remote explosive volcanic eruption detection, location, and characterization using the EarthScope Transportable Array in Alaska.

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The current deployment of the EarthScope Transportable Array (TA) in Alaska affords an unprecedented opportunity to study explosive volcanic eruptions using a relatively dense regional seismo-acoustic network. Active volcanism in the Northern Pacific poses a risk to both regional and international aircraft. Infrasound monitoring has demonstrated utility for the detection and characterization of volcanic explosions, but previous studies have utilized relatively sparse networks of infrasound arrays in comparison to the single sensor stations of the TA in Alaska. Here we present capabilities for the detection, location, and characterization of remote explosive volcanic eruptions using seismic, infrasonic, and ground-coupled airwave phases. We combine data from the TA and additional regional networks, including data from the Alaska Volcano Observatory (AVO) and Alaska Earthquake Center (AEC). We implement a smoothed envelope-based Reverse Time Migration (RTM) technique to primarily locate eruptions in Alaska, with a focus on the recent explosive activity at locally-unmonitored Bogoslof volcano (December 2016 – August 2017). More than 70 eruptive events from Bogoslof provide a unique validation dataset, allowing experimentation and quantitative assessment of different RTM strategies. We also apply the RTM algorithm to eruptions at other volcanoes in Alaska (Cleveland, Pavlof) and Kamchatka (Bezymianny, Shiveluch). We are experimenting with different strategies and parameter choices for the RTM; challenges include varying signal durations and amplitudes, variable and sometimes strong wind-noise levels, source-receiver geometries, and volcanic eruptions most commonly occurring outside the network. We employ Receiver Operating Characteristic (ROC) curves to characterize parameter choices, and investigate coherence weighting of infrasound for signal cleaning and selection. Our methods are useful for both (1) event detection using real-time data and (2) scanning data archives to identify and discriminate volcanic and non-volcanic events.