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TITLE: Complementary Methods for Volcanic Seismic Source Discrimination

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SESSION TITLE: V53E. Surveillance of Volcanic Unrest: New Developments in Multidisciplinary Monitoring Methods IV Posters

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ABSTRACT BODY: We explore the success rates of detection and classification algorithms as applied to seismic signals from active volcanoes. The subspace detection method has shown some success in identifying repeating (but not identical) signals from seismic swarm sources, as well as pulling out nonvolcanic long period events within subduction zone tremor. We continue the exploration of this technique as applied to both discrete events and variations within volcanic tremor to determine optimal situations for its use.

We will demonstrate both three-dimensional and subband applications both on raw waveforms and derived features such as skewness and kurtosis. The application can be used in both a supervised (select templates and compare) as well as unsupervised (cross-compare all samples and apply clustering to the matrix of comparisons).

We compare the method to that of the KKAnalysis tool, which uses a self-organizing map approach to unsupervised clustering for feature vectors derived from the seismic waveforms. We will present a comparison of this method as applied to waveform features, spectral features and time-varying higher-order statistics as well as signal polarization, to elucidate the tools which show the best promise for problematic discrimination tasks.

KEYWORDS: [8419] VOLCANOLOGY / Volcano monitoring, [7280] SEISMOLOGY / Volcano seismology, [7290] SEISMOLOGY / Computational seismology.