ID: Type: **Poster**

Use of Waveform Cross-Correlation for Detection, Relative Location and Magnitude Estimation of Repeated Mining Blasts: The Jordan Phosphate Mine Eshidiya

We analyze signals measured by stations HRFI, PRNI, EIL, ASF, and MMAI from a long series of repeated blasts at the Eshidiya phosphate mine in Jordan. We estimate the dependence of the cross-correlation coefficient on signal length and frequency band using all pairs of events detected at a given station. A small set of signals having the highest similarity with all other signals are used as waveform templates for detection based on waveform cross-correlation. Three stations lie west of the phosphate quarry and have the same sampling rate. We cross-correlated signals from different events measured at HRFI, PRNI and EIL and found a high level of similarity, which is close to the level of similarity between signals at any one of these stations. For each event detected by three and more stations, we calculated the location and magnitude relative to the selected master events. To characterize the similarity between signals, we applied Principal Component Analysis to waveforms at each station and found that the level of normalized eigenvalues falls to 0.2 and below for the first five to ten components. The PCA eigenvectors corresponding to the highest eigenvalues are successfully used as waveform templates since they can find all signals.

Primary author: YEDLIN, Matthew (University of British Columbia)

Presenter: YEDLIN, Matthew (University of British Columbia)

Track Classification: 3. Advances in sensors, networks and processing