



ID: P3.5-408

Type: E-poster

## of UMAP and XGBoost to Pg and Lg wave amplitudes, waveform time series, and spectrograms to identify Mining vs. Earthquake Events.

Low magnitude monitoring of explosions is an expanding field of interest, but due to low SNR and station coverage it is difficult to identify them. We hope to explore these limitations by using simple features from regional events and easy to implement machine learning algorithms to classify earthquakes vs explosions. Using the CNRST bulletin, we collected 4542 regional waveforms for both mining and non-mining events occurring around the station MD31. Using these events, we selected 260 mining and 161 non-mining events to conduct this study. We processed these waveforms to construct RMS amplitudes of Pg and Lg in five frequency bands at 4-6, 6-8, 8-10, 6-12 and 8-16Hz, timeseries at the same frequencies, and spectrograms. The high-frequency Pg/Lg amplitude ratios separated the two population quite well. The supervised 80:20 and 50:50 training and testing of data and analysis of the impact factor of the attributes using the XGBoost algorithm illustrated a high level of success in identifying the source types. Using a supervised trained 90:10 model, we could further identify additional source types for about 428 events in the area. We are currently creating models based on the waveform time series and spectrograms for comparison.

### E-mail

kyler.j.goddard@gmail.com

### In-person or online preference

**Primary author:** Mr GODDARD, Kyler (Air Force Technical Applications Center (AFTAC))

**Co-authors:** Mr SAIKIA, Chandan (Air Force Technical Applications Center (AFTAC)); Mr MENZHI, Mohammed (Centre National pour la Recherche Scientifique et Technique (CNRST)); Mr BADRANE, Said (Centre National pour la Recherche Scientifique et Technique (CNRST))

**Presenter:** Mr GODDARD, Kyler (Air Force Technical Applications Center (AFTAC))

**Session Classification:** P3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data

**Track Classification:** Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data