Comparison of Detection and Location Capabilities of Surface Microseismic Monitoring Algorithms

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The challenge of the surface microseismic monitoring (MSM) is that small-scale seismic activity which occurs as a result of human activities or industrial processes is often hidden in surface noise on individual seismic records. MSM algorithms must detect and locate signals with average signal-to-noise ratio (SNR) significantly less than 1. To improve SNR MSM algorithms compute cost function over a large set of seismic records. Maximum of such function indicates presence, time, and location of the seismic signal. Other algorithms, such as Phase Robust Statistically Optimal and Diagonal Maximum Likelihood Adaptive algorithms offer accuracy improvements of location and detection in presence of correlated industrial noise. In this paper we use synthetic seismograms and seismic observation to compare accuracy of event locations using several algorithms of surface microseismic monitoring.