

A Python Tool for Evaluating Transient Noise on Seismic Array Components

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In explosion monitoring, seismic arrays offer significant signal to noise improvements and enhanced ability to detect and locate important events. This advantage can be significantly degraded, however, in the presence of noise on the array components. For automated processing methods, this may result in a failure to identify an important signal, since many methods use thresholds. For a chronic issue on one channel, it can be eliminated a priori, but intermittent noise is more difficult to isolate.

We are building a tool to perform quality control on seismic arrays over long periods of time, to identify when a channel experiences an intermittent problem and which is the problematic channel. The tool exploits a jackknifing method with running singular value decomposition for time-windowed array data, followed by SVD clustering to isolate an anomalous channel. The underlying tool has a GUI that extracts array waveforms directly from a relational. The GUI will apply high-pass or low-pass filtering of the waveforms before performing the SVD/cluster analysis. Times of channel anomalies are reported in a file written to disk, and can be viewed on screen. Our goal is to enable a user to incorporate the list of times and channels into their automated analysis.

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Promotional text

The work described herein serves to support nonproliferation research by facilitating automated array processing through identification of intermittent channel problems that can compromise such analyses.

Oral preference format

in-person

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