Compression Metrics to Seismic Data to Assist Analysts

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The Sliding Information Distance (SLID) metric is a compression based metric that can identify signal arrivals in seismic data. SLID has advantages over existing algorithms that are used for detecting arrival times because it can be used to calculate the certainty of each automated detection and to denote multiple possible arrival times in cases where the detections have low certainty. This information can be used to prioritize detections for analyst review. SLID can also be applied at the event level, using high confidence detections to refine the timing of lower confidence detections at other seismic stations. We present background information about how SLID is applied to seismic data, both at the station and at the event level. We also discuss how the uncertainty information produced by SLID can assist analysts by providing transparency into the algorithm's arrival time picks, refining the timing of automated picks made by SLID or other algorithms, and directing analysts' attention to likely arrival times within a particular waveform. All of these features can assist analysts with triaging and analysing seismic data.

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Promotional text

This work introduces a novel signal processing method to the analysis of seismic data. It meets the SnT2023 objective of identifying opportunities and methods to improve nuclear-test-ban monitoring.

Oral preference format

in-person

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