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Finding repeating mining events using waveform cross correlation at seismic and infrasound IMS stations

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Mine blasts are an example of repeating seismic/infrasound events with very close epicenters. In some areas, hundreds of mining blasts per year are measured by the IMS and built by the IDC. Waveform cross-correlation is a natural method to detect repeating signals. The IDC has been testing a prototype WCC-based pipeline to find repeating mining events matching the event definition criteria (EDC) for the Reviewed Event Bulletin (REB). The REB is used as a source of master events with seismic and infrasound waveform templates. Several open-pit mines create intensive acoustic waves detected by the IMS infrasound network and these detections are used to build seismic-infrasound events matching the EDC. The prototype pipeline is processing seismic and infrasound data continuously and we systematically compare the cross-correlation bulletin (XSEL) with the automatic bulletin (SEL3) and the REB. This comparison is used to tune the defining parameters of data processing. Here, we present the overall statistics of the continuous processing in the first half of 2021 and the results of offline testing of several mines in Eurasia and USA and two specific time intervals.

Promotional text

Waveform cross-correlation is a natural method to detect repeating signals. Mine blasts are an example of repeating seismic/infrasound events with very close epicenters. In some areas, hundreds of mining blasts per year are measured by the IMS and built by the IDC.

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