



Contribution ID: 703 Contribution code: P3.6-703

Type: e-Poster

Global Scale Discrimination of Explosions and Earthquakes with Deep Learning

Thursday, 1 July 2021 11:30 (15 minutes)

Discriminating between explosions and earthquakes is necessary for building hazard maps and monitoring applications. Previous studies have used classical ML techniques based on the amplitudes of various phases. More recent methods based on Deep Learning use the full seismic waveform; however, they rely on detections made by nearby stations. These methods are inapplicable for global-scale networks such as those maintained by the International Monitoring System (IMS).

In our work, we perform a study using seismic waveforms of explosions and earthquakes as classified by the International Seismological Center (ISC) for events detected by the International Data Center (IDC). We show a comparison of various Deep Learning techniques on this task and our experiments demonstrate that the discrimination capabilities for events with magnitude between 3-4 mb degrade smoothly with distance between the event and the nearest station.

Promotional text

We present a study of Deep Learning applied to the explosions/earthquakes discrimination problem at a global scale.

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Session Classification: T3.6 e-poster session

Track Classification: Theme 3. Verification Technologies and Technique Application: T3.6 - Artificial Intelligence and Machine Learning