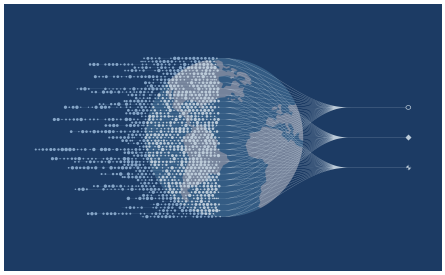

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Seismic Source Characterisation Using P/S Amplitude Ratios at Local and Near-Regional Distances: A United Kingdom Case Study

Characterisation of seismic sources, including earthquakes and explosions, is of interest to the nuclear-test-ban verification community. At local to near-regional distances (≤300km) signals from quarrying, mining and controlled explosions are commonly observed in addition to earthquake seismicity. We investigate the ratio of *P*- to *S*- wave amplitudes as a seismic source discriminant for events located and recorded in the UK. This *P/S* discriminant has previously had mixed results in other regions at local distances (≤200km) (Pyle & Walter, 2019; Wang et al., 2020). We formulate methods to calculate *P/S* ratios from local observations of UK seismic events. Root-mean-square displacement amplitudes are measured at single 3-component stations, corrected for geometrical spreading then averaged across the network, accounting for signal attenuation along the unique source-receiver paths. We observe that network-averaged *P/S* ratios discriminate between UK earthquakes and explosive sources, with higher *P/S* for explosions than earthquakes. The results are in agreement with previous empirical observations from elsewhere and our current understanding of explosion source spectra: explosions generate proportionally less *S*-wave energy than earthquakes. The greater discrimination power at high frequencies (>8Hz) could be in part due to the difference between *S*- and *P*-wave corner frequencies.

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