



Seismic Discrimination between Earthquakes and Quarry Blasts in Ireland

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The vast majority of local seismic events detected in Ireland by the Irish National Seismic Network (INSN) each year are explosions. In addition, several small ($ML < 2$) earthquakes are detected around Ireland and its near off-shore regions. To avoid contamination of earthquake catalogs by man-made seismic events such as quarry and mining blasts, a robust discriminant or set of discriminants is necessary. To date, discrimination of events recorded at the INSN has been done using time and location. The most common technique for discrimination between seismic signals involves comparing the relative amplitude of the P and S phases of the signal. Another technique, the spectral ratio, involves comparing the ratio of the low-frequency to high-frequency regions of the signal amplitude spectrum, usually applied to S-waves. Successful discrimination at local distances has been achieved with both of these techniques in various regions worldwide. We investigate the performance of these discriminants on 1500 local seismic events recorded during the time period 2010-2017, taking advantage of the unprecedented seismic network coverage of Ireland during this period. Our study shows significant overlap at local distances between earthquakes and explosions using the P/S amplitude ratio discriminant, whereas a much higher level of discrimination is achieved by applying the spectral ratio discriminant to S-waves.