



New, low magnitude earthquake detections in Ireland and neighbouring offshore basins by waveform template matching

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Earthquake monitoring in intraplate continental interiors requires the detection of low magnitude events in regions that are sometimes poorly instrumented due to low estimated hazard and risk. According to existing catalogues, the seismic activity of Ireland is characterized by low magnitude, infrequent earthquakes. This is expected as Ireland is located several hundred kilometers away from the closest plate boundaries. However, the lack of seismic activity is still surprising in comparison with that of Great Britain, its closest neighbour. Since Ireland's historical seismic station coverage was significantly sparser than that of Great Britain, a possible instrumental bias has been invoked, but recent results obtained from the analysis of waveforms recorded at dense temporary arrays and new permanent stations tend to confirm the relative quiet seismogenic behaviour of Ireland's crust. However, classical detection methods are known to fail if site conditions are too noisy, hence very low magnitude events can still be missed. Such events are of primary importance for seismotectonic studies, so in this work we investigate the possibility of producing new detections by cross-correlating the available continuous waveform data with waveform templates from catalogue earthquakes. Preliminary results show that more than 200 new events can be identified over the past 5 years, which is particularly significant considering the 120 events present in the catalogue for the period 1980-2016. Despite the limitation of the technique to events whose location and source characteristics are close to previously known ones, these results demonstrate that waveform template cross-correlation can successfully be used to lower detection thresholds in a seismically quiet region such as Ireland.