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Quantifying multiple synchronous microseismic source regions, in the NE Atlantic, West of Ireland.

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The mechanical coupling between the world's oceans and the Earth's crust produces low frequency seismic noise, which dominates the microseism spectrum. The relationship between the two leads to the possibility of obtaining information on the ocean wave field from seismic records. Microseisms are also used in passive seismic interferometry where it is assumed that when averaged over a sufficiently long time period the wave field is random. Optimization of both these applications requires an understanding of the degree of non-uniformity within the seismic source region, generated by ocean wave activity.

The Atlantic region off the coast of Ireland is considered one of the major source regions for background seismic noise. In order to study this region a seismic network has been deployed along the West coast of Ireland along with two small scale arrays. The presence of an ocean buoy network off the west coast should allow the relationship between the ocean and seismic wave-fields to be studied in detail. Bromirski (1999) developed a transfer function between seismometer amplitudes and ocean wave heights in California. However, this assumes a single source region dominates the ocean noise spectrum. In Ireland this is not the case, several regions can make a significant contribution to ocean noise recorded at any one time. To properly interpret these signals in terms of ocean wave characteristics it is necessary to locate the source of the signals and to be able to distinguish between coincident arrivals from different source regions in the seismic data.

Fk analysis of the array data will be presented which shows the source region(s) are very complex and vary both spatially and temporally across a wide range of scales. We present an array based method that may allow the separation of wavefields associated with individual sources, given some prior information on source location.