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Location of Multiple Coincident Noise Sources in the N.E. Atlantic, offshore Ireland.

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The World's oceans generate persistent low frequency background signals or 'microseisms' through a mechanical coupling with the crust. This can occur through a direct interaction between ocean gravity waves and the crust in shallow water (primary microseisms) or beneath standing waves generated by the interaction of opposing ocean wave fields (secondary microseisms). Secondary microseism sources are not limited to shallow water regions. The relationship between the two leads to the possibility of obtaining information on the ocean wave-field from near coastal seismic records by developing a transfer function between an ocean buoy and a near coastal seismic receiver. However, this assumes that the seismic record is dominated by a source relatively close to the buoy.

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. This places importance on understanding the degree of non-uniformity within the seismic source region.

Both these applications highlight the importance of understanding how the microseism distributions vary both spatially and temporally. Previous studies have identified several regions around the globe that produce strong microseism signals. Here a detailed analysis is carried out on a particular source area in the Atlantic region off the coast of Ireland. Through the use of multiple small-scale arrays and conventional frequency-wavenumber analysis we show that in this region the ocean generated microseism spectrum consists of multiple coincidentally arriving signals with a non-uniform distribution. This data is then used to create detailed spatial density maps showing the most significant source areas in the region.