



Array Analysis of North Atlantic Microseisms

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Oceans generate persistent low frequency background seismic signals known as microseisms through a mechanical coupling with the Earth's crust. Microseism energy originates as regions of low barometric pressure (depressions) over the oceans where it is transmitted to the sea-floor and propagates as elastic energy in the Earth's crust. Consequently microseisms carry important meteorological information relating to both the atmosphere and the hydrosphere. The significance of microseisms as climate indicators has previously been investigated in several studies (Essen et al., 1999; Aster et al., 2010) and to estimate ocean wave parameters using onshore seismometer data (Bromirski et al., 1999). Also many modern seismological methods make use of microseism signals, for example "noise tomography" (Shapiro et al., 2005); spectral ratio techniques ; and cross-correlation techniques (Wapenaar et al., 2011; Brenguier et al., 2014).

The continental shelf near Ireland is a known generation area for microseisms and an important region for European weather forecasting and climate studies. There has also been seismometers in the region since the 1960s. There is a single station in Valentia observatory in south-west Ireland and a small scale seismic array in Scotland which offer potential climate records for the region. To make use of this information it is first necessary to understand how microseisms recorded in Ireland relate to the local ocean wavefield.

The WAVEOBS project was set established with three primary goals; to get a better fundamental understanding of microseism sources; to investigate the use of ocean generated microseisms as real time ocean wave height data; and to investigate their use as a climate proxy. Using spectral analysis and array methods the microseism wavefield in the North-East Atlantic near Ireland is described with reference to the ocean wavefield.