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Microseism Noise Levels in Ireland

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Ireland is exposed to one of the most active ocean wave climates in the world and consequently enjoys relative high levels of microseisms. We present noise data measured in Ireland with a dense network of broadband seismometers. Specifically we calculate seismic power spectral densities and power density functions to obtain frequency dependent statistics of the noise field. This leads us to present an Irish Noise Model (INM) that can be compared to the global Peterson New High and Low Noise Models and the results of other previously published regional studies. We investigate the seasonal and geographical variation of the noise field, presenting the results as noise maps. In the frequency range typical for secondary microseisms, about 0.1 to 0.2 Hz, we observe relatively smooth spatial changes in noise amplitude, generally increasing from East to West. Further analysis of these changes can assist in determining the temporal and spatial variation in microseism source regions.
The new Irish Noise Model (INM) identifies the amplitude threshold for seismic event detection. In the frequency range of secondary microseisms this threshold is defined by ground vibrations that vary broadly with season and relatively smoothly with distance from the Atlantic coast. For lower and higher frequencies installation dependent site effects become increasingly important. These effects are mainly caused by sensitivity to meteorological parameters and for higher frequencies also anthropogenic activity. Stations with relatively high detection threshold can readily be identified from the noise maps. This information can be used to improve the network sensitivity.