Geophysical Research Abstracts
Vol. 15, EGU2013-5375, 2013
EGU General Assembly 2013

Variability of seismic noise sources in North Atlantic

Amandine Sergeant-Boy (1), Éléonore Stutzmann (1), Alessia Maggi (2), Martin Schimmel (3), Fabrice Ardhuin (4), and Mathias Obrebski (4)

(1) Institut de Physique du Globe de Paris, Paris, France (stutz@ipgp.fr), (2) Ecole et Observatoire de Science de la Terre, Strasbourg, France (alessia.maggi@unistra.fr), (3) Institute of Earth Sciences "Jaume Almera" - CSIC, Barcelona, Spain (schimmel@ictja.csic.es), (4) IFREMER, Brest, France (Fabrice.Ardhuin@ifremer.fr)

Seismic noise recorded in the frequency band 0.1 and 0.33 Hz is called secondary microseisms. They are dominantly Rayleigh waves which are generated by the interaction of ocean gravity waves. A statistical analysis of the noise polarization at broadband stations in Greenland (GLISN network), Canada and Europe shows that the detected noise sources are frequency dependent. Stations in Western Canada record low frequency noise generated in the North Atlantic and Pacific oceans and higher frequency noise only from the North Atlantic. Greenland stations do not detect the Pacific sources. Sea ice in the Labrador Sea in winter is well correlated with the decrease of high frequency seismic noise and with the change of the source azimuths. Indeed, in winter the sea ice prevents the generation of noise sources in that area.

We model seismic noise using an oceanographic model that takes into account coastal reflection and show that we are able to accurately model the noise spectra temporal variations and frequency content. The strongest sources are generated in deep ocean close to the mid ocean ridge axis. Sources generated by coastal reflection are negligible along the Western Canada coast and more important along Greenland and European coasts. We further show that the location of the strongest noise sources are consistent with the back azimuths derived for the polarization analysis and that they depend on both, frequency and bathymetry.