Geophysical Research Abstracts
Vol. 19, EGU2017-9005, 2017
EGU General Assembly 2017

The Imprint of Water Column Resonance in Microseismic Source Spectra

Matthias Meschede (1), Eléonore Stutzmann (1), Véronique Farra (1), Martin Schimmel (2), and Fabrice Ardhuin (3)

(1) Institut de Physique de Globe, Seismology, Paris, France, (2) Institut of Earth Sciences Jaume Almera - CSIC, 08028 Barcelona, Spain, (3) University of Brest, CNRS, IRD, Ifremer, Laboratoire d'Océanographie Physique et Spatiale, IUEM

We have collected day averaged source spectra from five years of secondary microseism body waves observed by arrays in North America. These source spectra have distinct spectral characteristics: In particular, we observe that their dominant frequency is often around 0.13–0.15Hz or 0.19–0.21Hz but rarely in between these two bands. Subdivision of our dataset into clusters of similar sources reveals that the shapes of secondary microseism body wave spectra are clearly tied to distinct geographical regions. Comparison with synthetic spectra that are computed using models based on ocean wave hindcasts shows that we are able to accurately predict these observations. However, modelling is only able to reproduce the observed spectra when resonance effects in the water column are taken into account. The spectral double peak that we have observed can therefore be explained as a consequence of the particular distribution of ocean depths. Our quantitative assessment of secondary microseism P-waves shows that models have reached a quality that allows to invert for diverse parameters of subsurface and ocean state.