Geophysical Research Abstracts
Vol. 20, EGU2018-19025, 2018
EGU General Assembly 2018

Estimating current velocities from strumming noise on OBS data

Gerrit Hein (1), Simon C. Stähler (2), Robert Mars (3), Céline Hadziioannou (1), and Mechita C. Schmidt-Aursch (4)

(1) Institut für Geophysik, Universität Hamburg, Hamburg, Germany, (2) Institute for Geophysics, ETH Zürich, Zürich, Switzerland (simon.staehler@erdw.ethz.ch), (3) Leibniz-Institute for Baltic Sea Research, Rostock, Germany, (4) Alfred-Wegener-Institut, Bremerhaven, Germany

Current measurements in the oceans are of importance for understanding the global exchange of water masses and also to verify the output of Earth System Models (ESM). The benthic layer in abyssal depths, which makes up the largest part of the global sea floor, is poorly sampled in this respect, even though the current velocities there are of importance for understanding the global circulation, but also its impact on the benthic fauna.

We show that the noise recorded by a widely used brand of ocean-bottom-seismometers (LOBSTER) between 1 and 10 Hz is highly sensitive to the current velocity. This is due to resonance frequency of the head buoy cable being very close to the Kármán vortex shedding frequency for currents of a few centimeter per second. This creates a clear, harmonic signal, which has been found at deployments of the instrument in various regions in the Atlantic and the Indian Ocean. Since OBS are measuring permanently for a year or more and are deployed over wide areas, this may become a completely novel dataset for physical oceanography.

We tested the proposed relationship by installing three ocean bottom seismometers near an oceanographic measuring pile located at Darss Silt in the south-western Baltic sea. where hourly current records from an acoustic doppler current profiler (ADCP) are available.