Geophysical Research Abstracts
Vol. 18, EGU2016-10509, 2016
EGU General Assembly 2016

Tracking Ocean Gravity Waves in Real-time: Highlights of Bottom Pressure Data Recorded on Ocean Networks Canada's NEPTUNE observatory

Martin Heesemann (1), Steve Mihaly (1), Johannes Gemmrich (2), Earl Davis (3), Richard Thomson (4), and Richard Dewey (1)

(1) Ocean Networks Canada, University of Victoria, Victoria, British Columbia, Canada (mheesema@uvic.ca), (2) Department of Physics and Astronomy, University of Victoria, Victoria, British Columbia, Canada, (3) Pacific Geoscience Centre, Geological Survey of Canada, Sidney, British Columbia, Canada, (4) Fisheries and Oceans Canada, Institute of Ocean Sciences, Sidney, British Columbia, Canada

Ocean Networks Canada operates two cabled ocean observatories off Vancouver Island on Canada's west coast. The regional NEPTUNE observatory spans the entire Juan de Fuca tectonic plate from the coast across the subduction zone to the hydrothermally active Endeavour Segment of the Juan de Fuca Ridge Segment while the VENUS observatory focuses on coastal processes. Both observatories collect data on physical, chemical, biological, and geological aspects of the ocean over long time periods, supporting research on complex earth processes.

High-precision bottom pressure recorders (BPR) deployed on the NEPTUNE observatory are capable of detecting a wide range of phenomena related to sea level variations. The observatory BPRs provide observations of nano-resolution (with respect to full scale of the instrument) pressure variations which correspond to sub-millimeter scale surface water displacements in several kilometers of water.

Detected signals include tides, tsunamis, infragravity waves, swell, wave-induced microseisms, storm surge, and seismic signals. Spectral analysis reveals many of these phenomena with periods ranging from a few seconds to many hours. Dispersion patterns from distant swells are prominent in the swell and microseism bands. By comparing the difference of arrival times between longer period waves, which arrive first, and shorter period waves we can estimate the distance the swells travelled since they were generated. Using this information, swell can be tracked back to specific storms across the Pacific. The presentation will high-light some examples of the mentioned phenomena in the continuous time-series that in some instances are more than seven years long.