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**A broadband ocean bottom seismograph connected to the
NEPTUNE Canada cabled seafloor observatory**

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Abstract

A broadband ocean bottom seismograph was deployed at a site on the deep ocean bottom west of the Washington state and connected to the NEPTUNE Canada fiber optic cable. The seismic data is transmitted in real time to IRIS from NEPTUNE Canada and is available for all researchers and agencies to use through IRIS. The planned life of NEPTUNE Canada installations is 25 years.

Report

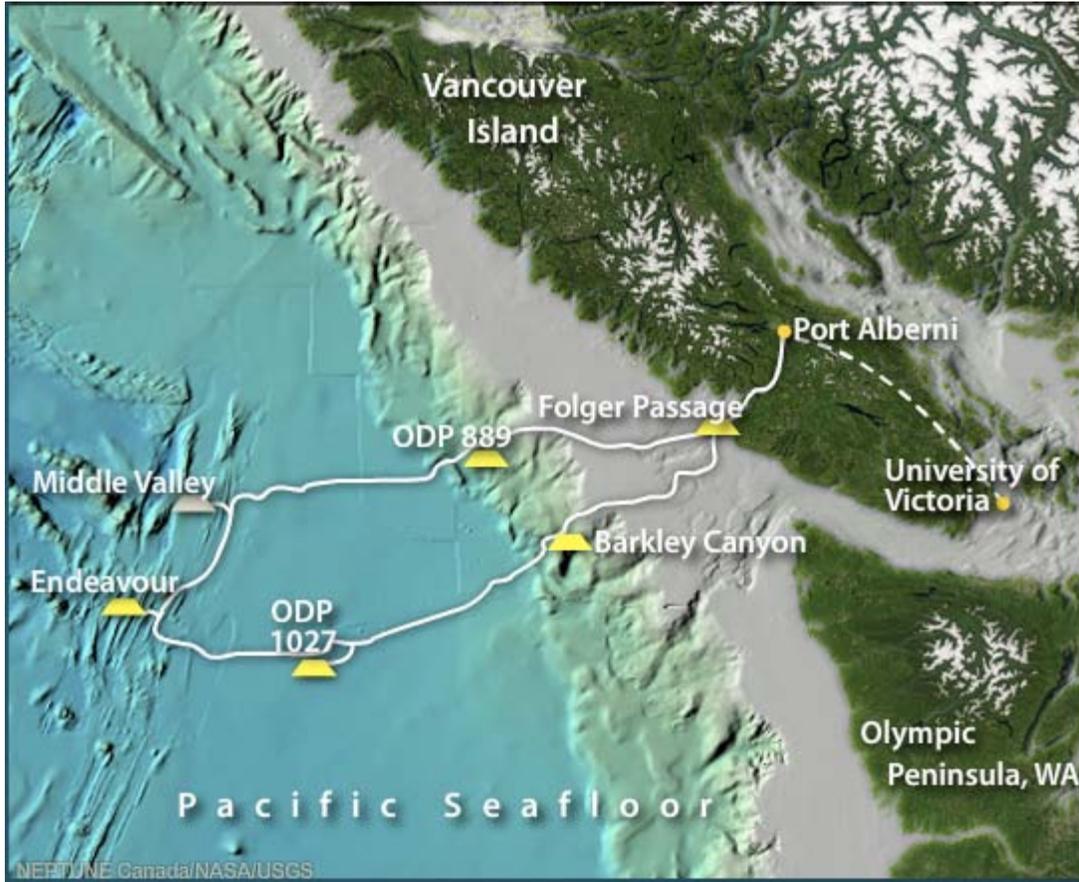


Figure 1. The NEPTUNE Canada cabled seafloor observatory presently consists of 800km of fibre optic cable connected to instruments deployed at five active nodes (yellow triangles) and transmitting real-time data to the University of Victoria. Broadband seismographs are now deployed at 3 of deep water nodes with a fourth to be deployed in 2012.

The NEPTUNE Canada cabled seafloor observatory:

NEPTUNE Canada, a consortium of twelve Canadian universities hosted at the University of Victoria, is building the world's largest cabled seafloor observatory off the west coast of Vancouver Island, British Columbia. The network, which extends across the Juan de Fuca plate, gathers data from a rich constellation of instruments deployed in a broad spectrum of undersea environments. The wide range of instruments allows real-time study of geological, physical, chemical and biological systems in the ocean. Data is transmitted via high-speed fiber optic communications from the seafloor to a shore station at Port Alberni, BC and then to NEPTUNE Canada's processing and data management system (DMAS) at the University of Victoria. NEPTUNE Canada and its partners provide free Internet access to an immense wealth of data, both live and archived throughout the life of this planned 25-year project. A broadband seismograph network is one of NEPTUNE Canada's many multidisciplinary observatory networks.

NEPTUNE Canada Seismograph Network:

The original intent of the NEPTUNE Canada Seismograph Network was to have a broadband ocean bottom seismograph (OBS) at each of the deep water connection nodes. However, increasing costs for the underwater cable infrastructure forced NEPTUNE Canada to cut back on funding available from the start-up grant for deploying scientific instruments, eliminating one of the planned ocean bottom broadband seismograph deployments. Thus, the opportunity existed for interested partners to leverage the \$100,000,000 NEPTUNE Canada infrastructure expenditure by funding the deployment of an additional OBS observatory and creating a more effective offshore broadband network to benefit the international seismological community. Contributions from USGS, the Geological Survey of Canada, IRIS and the University of Washington have raised the OBS deployment budget to make possible four broadband OBS observatories connected to NEPTUNE Canada.

Deployment Results:

A broadband ocean bottom seismograph was deployed at the ODP 1027 site (Figures 1 & 2) on the NEPTUNE Canada deployment/maintenance cruise of September/October, 2010. Digital seismic data from all the deployed OBS instruments began streaming from the ocean floor to IRIS in mid October, 2010 (Figure 3). Shortly thereafter the University of Washington's Pacific Northwest Seismic Network (PNSN) began collecting the real-time seismic data stream from IRIS and using the data from the OBS stations to more accurately locate earthquakes off the US coast. Real time seismic signals flowing from the ocean floor can be seen on the PNSN website at:

http://www.pnsn.org/WEBICORDER/BETTER/pnsn_staweb/

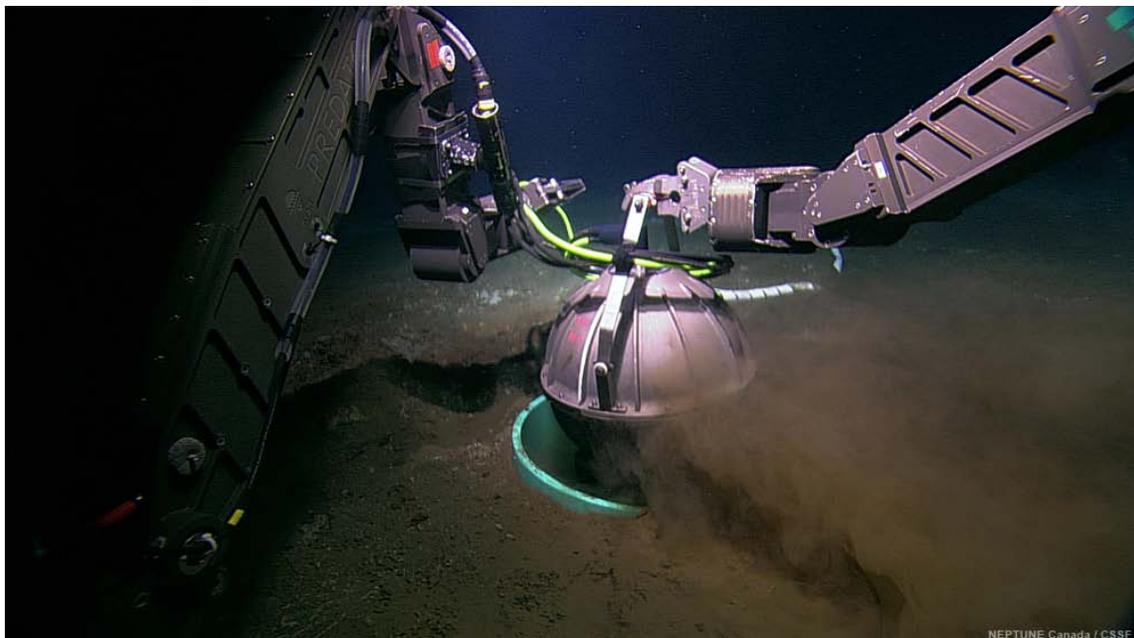


Figure 2. ROPOS deploying broadband seismograph in its ocean bottom vault at ODP 1027 site.

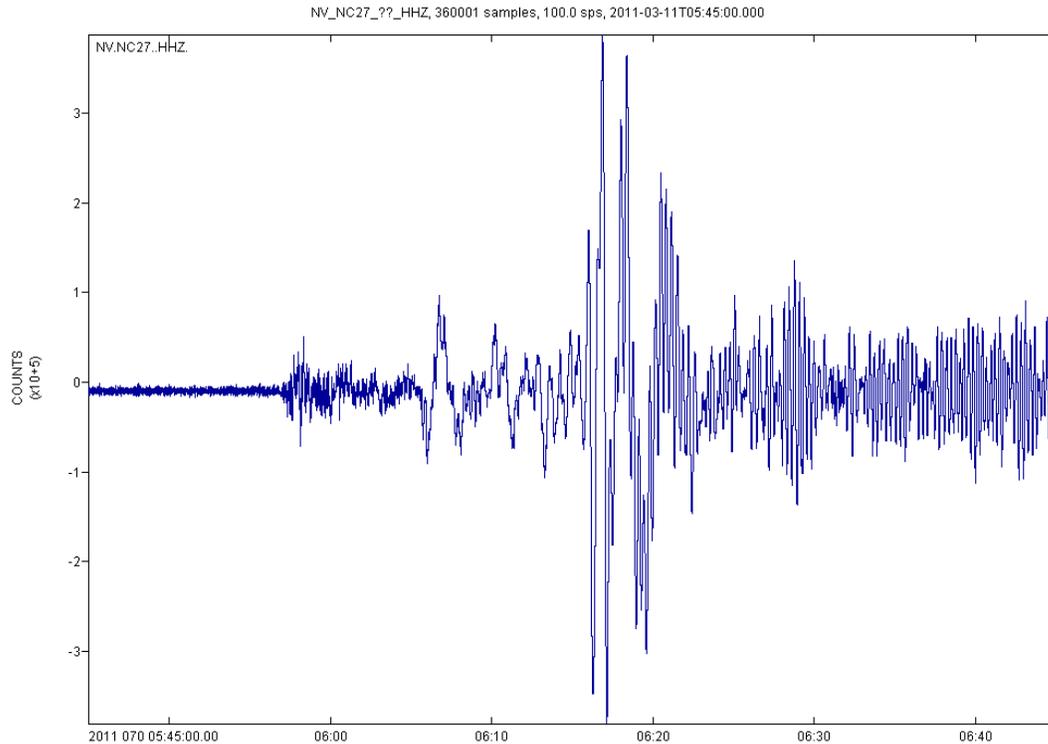


Figure 3. The 11 March 2011 M=9.0 Japanese earthquake recorded on the broadband ocean bottom seismograph at the ODP 1027 site. Data is available from IRIS.

Deployment details:

A broadband OBS was deployed at ODP 1027 to replace an ailing OBS deployed the previous year. The deployment was done using the R/V Thomas G. Thompson and the remotely operating vehicle ROPOS. USGS funds were used to defray the charter costs of the research vessel and ROPOS. A decision was taken to replace the ailing OBS at ODP 1027 and retrieve the instrument for assessment, and repair under warranty if necessary. That instrument is now scheduled for redeployment in the previously prepared vault at the Endeavour site (Figure 1) on the NEPTUNE Canada deployment/maintenance cruise scheduled for May, 2012. Annual deployment/maintenance cruises will be scheduled by NEPTUNE Canada for new deployments and any instrument servicing needs.

Publications:

No publications at this time. More information can be found about NEPTUNE Canada at: <http://www.neptunecanada.ca>