

Plate Tectonic Processes and Earthquake Dynamics

Regional Seismology – Juan de Fuca Plate

The NEPTUNE Canada Seismograph Network will provide the scientific community with an observation and research tool to allow the same kind of research that takes place on land to take place within the NEPTUNE Canada footprint on the ocean floor. This includes studying the earthquakes on the Juan de Fuca Ridge due to tectonic, magmatic and hydrothermal processes, earthquakes along the offshore fracture zones, earthquakes within the oceanic plate as it begins to subduct, and mid-plate earthquakes. It also includes studying the structure and properties of the ocean sediments, oceanic lithosphere and asthenosphere below the network by using seismic waves traversing the network from nearby and distant seismic sources, both natural and man made. Data flow from the NEPTUNE Canada Seismograph Network will be integrated in real time with the adjacent land based Canadian National Seismograph Network operated by the Geological Survey of Canada and be available through both NEPTUNE and the GSC.

The backbone seismograph network will consist of 8-10 seismic observatories with a spacing of about 100 kms containing broadband seismometers, accelerographs, hydrophones and pressure sensors to gather a wide range of seismic energy on the ocean floor and in the water column. Where possible they will be sited in bore holes with other scientific observatories. Denser seismometer arrays with spacing of few kilometres will be installed on the Juan de Fuca Ridge and across the Cascadia subducting margin.

Sites of interest include: Nootka Fault, Explorer, Middle Valley, Endeavour, Pacific Plate, ODP 1027, Poseidon Deep, IODP Deep