



# NEPTUNE Canada in 5 minutes

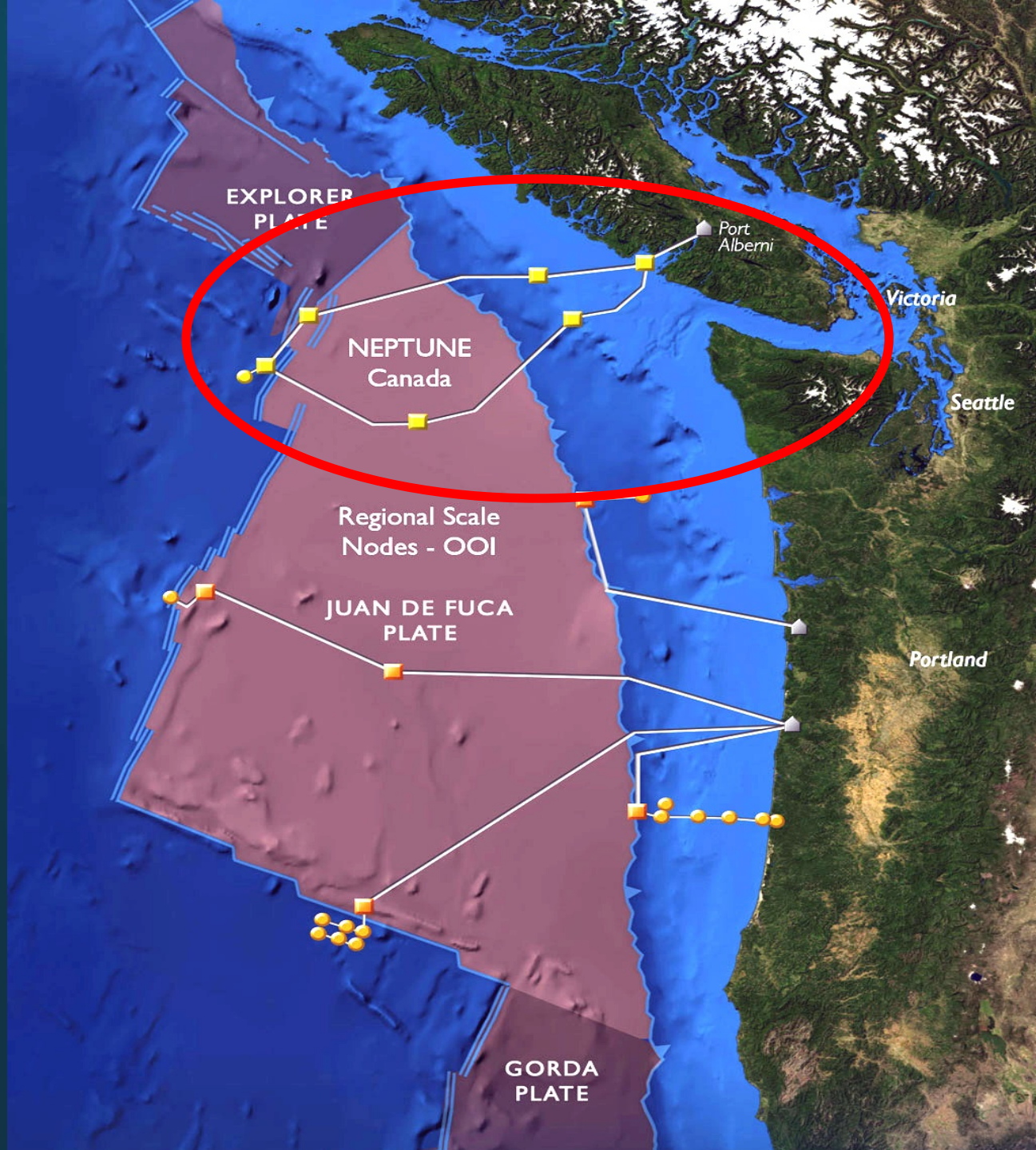
*Available infrastructure and data*

*Martin Heesemann*

*Research Theme Integrator, NEPTUNE Canada*

GeoPRISMS - Cascadia Workshop, Portland, April 2012







# Network Infrastructure

## Networks

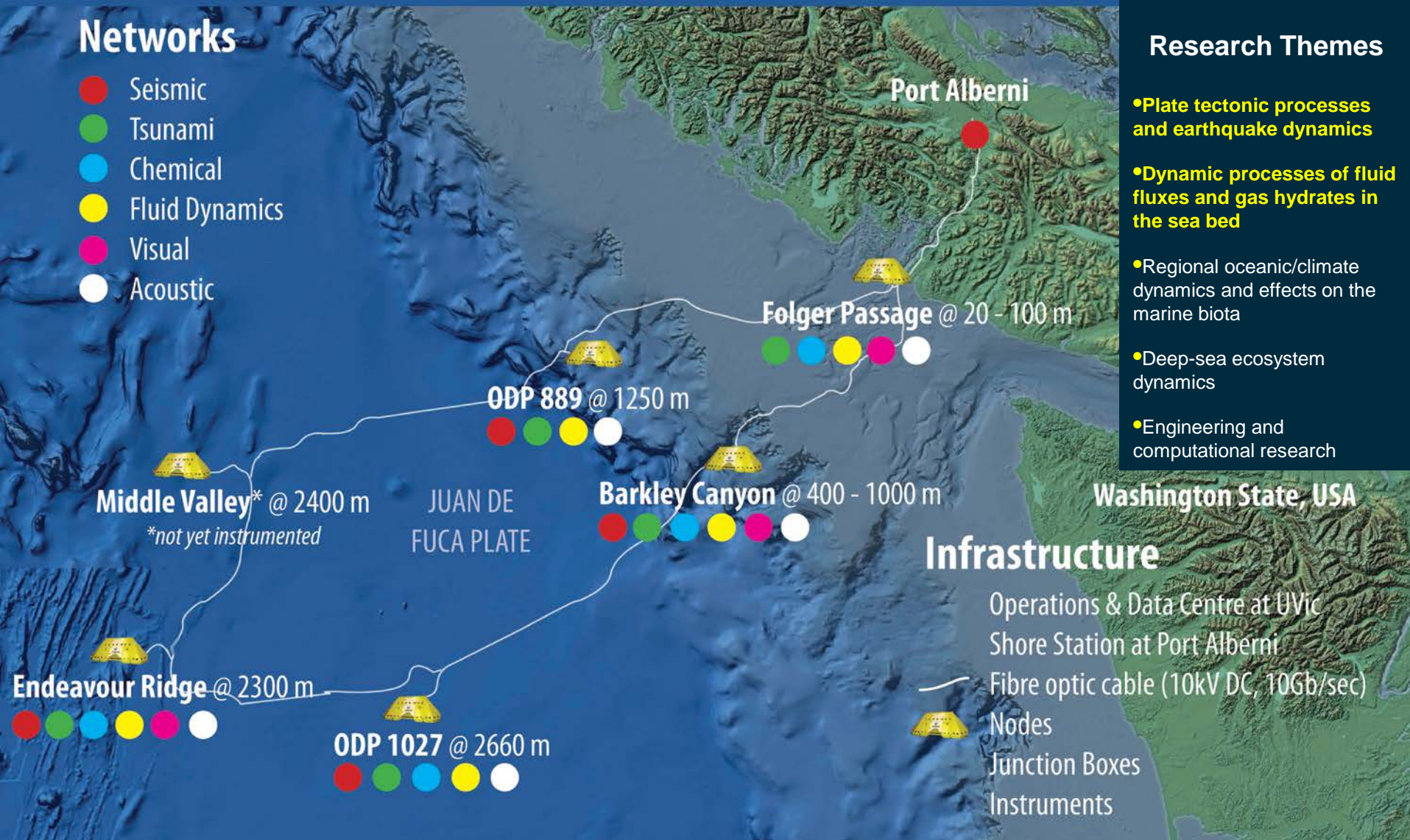
- Seismic
- Tsunami
- Chemical
- Fluid Dynamics
- Visual
- Acoustic

## Research Themes


- Plate tectonic processes and earthquake dynamics
- Dynamic processes of fluid fluxes and gas hydrates in the sea bed
- Regional oceanic/climate dynamics and effects on the marine biota
- Deep-sea ecosystem dynamics
- Engineering and computational research

## Infrastructure

Operations & Data Centre at UVic  
Shore Station at Port Alberni  
Fibre optic cable (10kV DC, 10Gb/sec)  
Nodes  
Junction Boxes  
Instruments



# 2.5 years of data available online



[Data Search](#) [Code Runner](#) [Plotting Utility](#) [SeaTube](#) [Cameras](#) [Projects](#) [More](#) [Tools](#)

**NEPTUNE Canada** Data Search  
Oceans 2.0

Logged in as **Martin Heesemann** | [Profile](#) | [Help](#) | [Logout](#)

Sort by: Location


- North East Pacific
  - Barkley Canyon
  - Endeavour
  - Folger Passage
  - ODP1027
  - ODP889
    - Bullseye\_BBS-IP\_2010-05
      - Nortek Aquadopp Current Meter 2
    - Bullseye\_BPR\_2009-09
      - NRCan Bottom Pressure Recorder 88 - 22503**
    - Bullseye\_CSEM-Receiver\_2009-09
    - Bullseye\_Gravimeter\_2009-09
    - Bullseye\_IP\_2009-09
    - Bullseye\_IP\_2010-05

Connected Datasets


ISDM

Search Templates

- My Search Templates
- Published Search Templates



**NRCan Bottom Pressure Recorder 88 - 22503**  
Category: BPR (bottom pressure recorder)  
[+ Documentation \(Manuals, Photos, Calibration Files...\)](#)  
[+ Device Details](#)

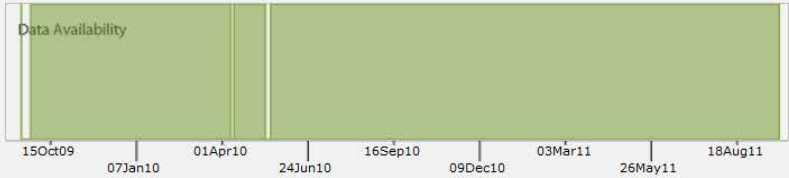


Current Device Location  
Google  
[Map Data - Terms of Use](#)

From: 28-Sep-2011 02:41:04 Last 24 Hours

To: 29-Sep-2011 02:41:04 [Reset Time Fields](#)

☐ Subsample Type: Average Period: Hour

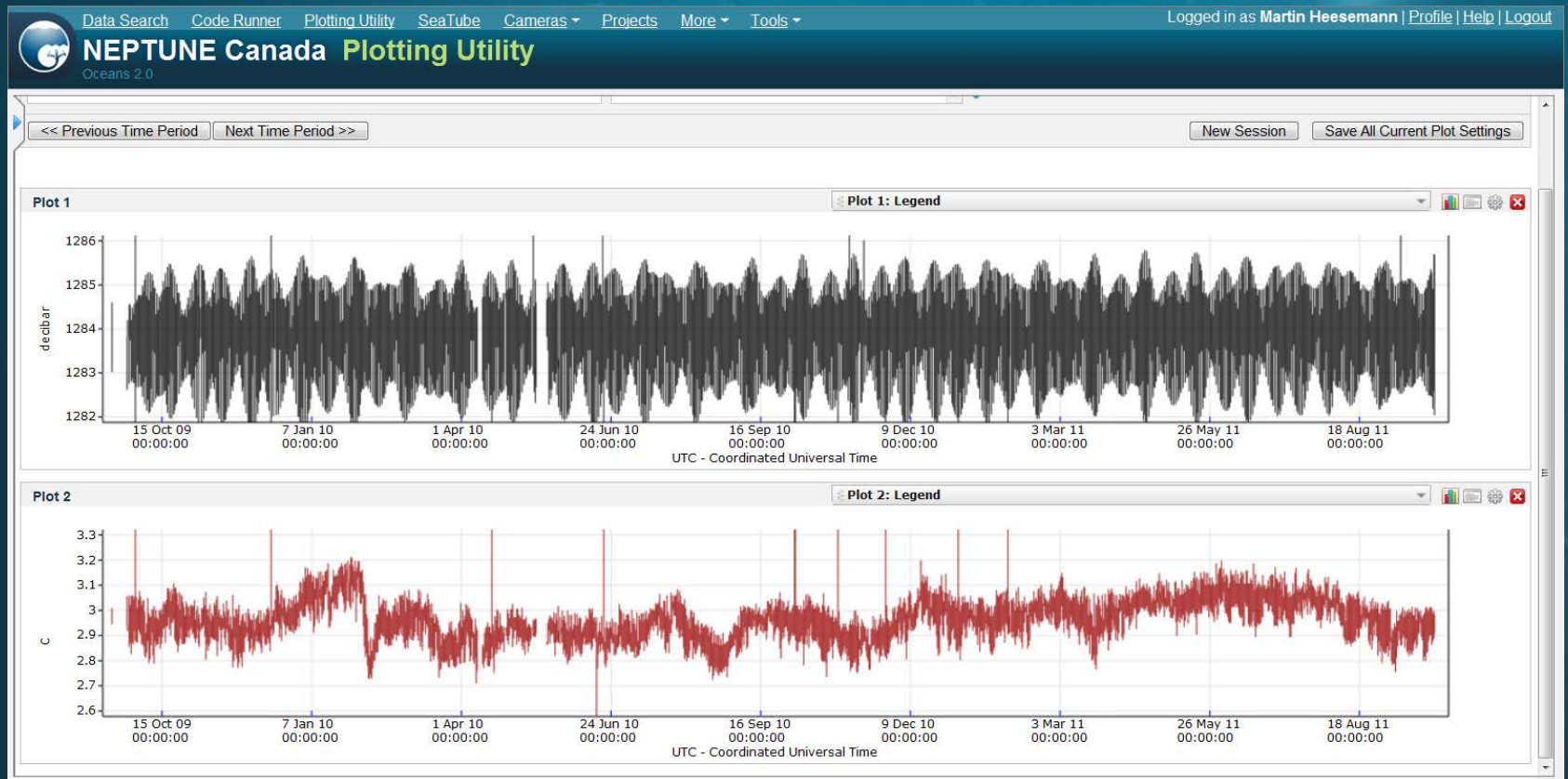


	Time Series Scalar Data	Time Series Scalar Plot	Log File
22503 - NRCan Bottom Pressure Recorder 88 (All Sensors)			
4190 - Housing Temperature			
4191 - Seafloor Pressure			
7715 - Uncompensated Seafloor Pressure			

Generate Results




# 2 years of data available online



# Seismometer data at IRIS DMC

Webpage Screenshot

**IRIS DMC MetaData Aggregator**

Usage

Legend: **R** **A** **R** **P**

## Network summary (1 time span)

Network NV :: Neptune Canada :: [NV Network Map](#)

Start Year 2009

End Year 2500

Stations for NV network to (5 stations)

Station	Site	Latitude	Longitude	Elevation	First start	Last end
<b>R</b> <b>A</b> <a href="#">KEMF</a>	Main Field	47.95	-129.10	-2205	2010/09/30	2599/12/31
<b>R</b> <b>A</b> <a href="#">NC27</a>	Node ODP1027, BC	47.76	-127.76	-2656	2009/09/14	2599/12/31
<b>R</b> <b>A</b> <a href="#">NC89</a>	Node ODP1089, BC	48.67	-126.85	-1258	2009/09/17	2599/12/31
<b>A</b> <a href="#">NCBC</a>	Barkley Canyon, BC	48.43	-126.18	-398	2009/09/07	2599/12/31
<b>R</b> <b>A</b> <a href="#">NCHR</a>	High Rise	47.97	-129.08	-2154	2010/10/04	2599/12/31

Real-time data availability (see [BUD Tools](#) for access)

Earliest	Latest
<b>R</b> 2012/01/29 (029) 00:00:00	2012/04/05 (096) 00:00:00

Archive data availability - [Make a batch request for data \(breq\\_fast\)](#) - ([data access overview](#))

Earliest	Latest
<b>A</b> 2010/10/13 (286) 22:40:46	2012/04/04 (095) 00:00:00

# Talk to me right by the window...



University  
of Victoria

## NEPTUNE Canada Regional Cabled Ocean Network: State of current infrastructure and future plans

Martin Heesemann



### Introduction

The North-East Pacific Time-series Undersea Networked Experiments (NEPTUNE), the world's first regional-scale cabled observatory network, is located off the west coast of Vancouver Island, British Columbia. The network, which extends across the Juan de Fuca plate, gathers live data from a rich constellation of instruments deployed in a broad spectrum of undersea environments. Data are transmitted via high-speed fibre optic communications from the seafloor to an innovative data archival system at the University of Victoria. This system provides live internet access to an immense wealth of data, both live and archived throughout the life of our planned 25-year project.

NEPTUNE Canada provides real-time access to data from more than 4100 instruments and sensors addressing the research themes:

- Ocean climate change and its effects on marine life
- Plate tectonic processes and earthquake dynamics
- Fluids in the ocean crust and gas hydrates
- Dynamics of deep-sea ecosystems
- Engineering and computational science

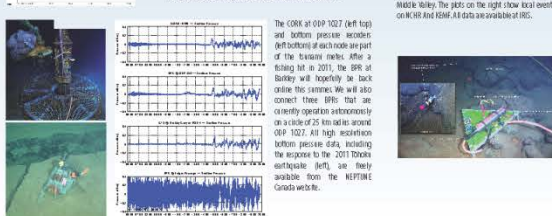
This poster focuses on instrumentation to study plate tectonic processes, earthquake dynamics and hydrothermal vents.

### Timeline



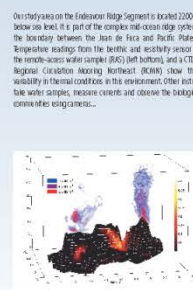
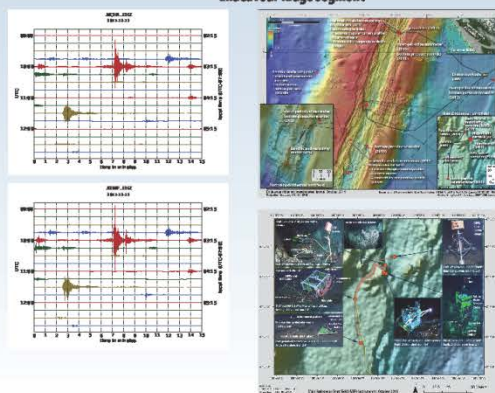
This timeline shows several highlights from the NEPTUNE Canada network during our first years of operation.

### Seismograph Network & West Coast Tsunami-Meter

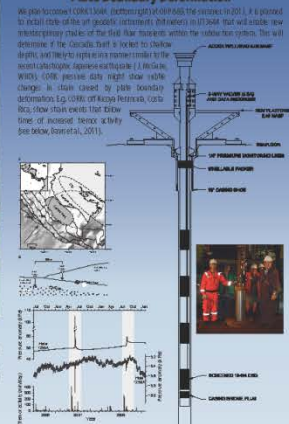


NEPTUNE Canada map showing the cable route, node locations and the types of instruments connected via junction boxes to each node. The seismograph network and the tsunami meter consist of instruments covering the whole footprint of the network in addition to local arrays at ODP 1027 and Endeavour Ridge, respectively. The CORK borehole observatory at ODP Site 1026 is connected to the ODP 1027 node. CORK 1364A and 8570 are now operating autonomous nodes, but are planned to be connected to the 889 and Middle Valley nodes, respectively.

### Endeavour Ridge segment



### Plate Boundary Deformation



### Future Plans

Surrounded by three autonomous BBS at a distance of 25 km, CORK 1026B is the center point of the NEPTUNE Canada tsunami meter array. The BBS will be connected in 2012 and there are plans to replace the western most BBS with a CORK. The mid-plate CORK provide the opportunity to study regional strain and local deformation changes by observations of hydrologic response to seismic and acoustic fault slip. The mid-plate site might become an ideal test bed for CO2 sequestration in deep-sea basalt.

At the 889 Node, CORK 1364A will be connected this summer. Next year, it is planned to install state-of-the-art geodetic instruments (tiltmeters) in U1364A that will enable new interdisciplinary studies of the fluid flow transients within the subduction system. This will determine if the Cascadia Fault is locked to shallow depths, and likely to rupture in a manner similar to the recent catastrophic Japanese earthquake (J. Heesemann, 2011). As part of the IRIS - Canada Gas Hydrate Observatories proposal there are plans to establish and connect three additional boreholes. They will contain long-term and episodic fluid fluxes through the accretionary prism, into the gas hydrate stability zone, and across the sediment-water interface (M. Riedel (NRCan), M. Khatner (UOBC-SQUASH), E. Solomon (University of Washington), H. Jamnash (IMBARD), P. Seargey (Harvard University), T. Collett (USGS)).

At Middle Valley, there is only a gas cable and a towel resistant frame of the actual node module is not yet installed. -> CORK 8570 at Middle Valley was however upgraded with the latest pressure monitoring technology and is fully NEPTUNE Canada ready. The Middle Valley node might be installed in 2013.



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[www.neptunecanada.ca](http://www.neptunecanada.ca)