Cruise News - Back in Black!
Saanich Inlet Node Pod Returns to the Seafloor.

On September 30, 2011 the VENUS team boarded the R/V Thomas G. Thompson for a short maintenance cruise. The Thompson had just finished nearly 3 months of work off-shore, servicing the US Regional Scale Node (OOI) and the NEPTUNE Canada observatory systems. Our principal task on this outing was the re-installation of the Saanich Inlet Node pod, which was recovered in July for scheduled upgrades and enhancements. The Saanich Inlet Node was the first designed and built in 2005, with serial number #001. Initially, the ROV pilots had requested a Node that wouldn’t reflect too much camera light, thus the colour - black. Gradually, we learned how we might improve the workings of an observatory Node, and when the two Nodes for the Strait of Georgia were built in 2007, they were already embracing improved designs and technology, and new colour. In late 2010 and early 2011 we upgraded Nodes 2 and 3 in the Strait of Georgia.

(Continued on page 2)

VENUS submits report to the Cohen Commission

VENUS submitted a report to the Commission of Inquiry into the Decline of Sockeye Salmon in the Fraser River. The report highlighted capabilities of VENUS as a coastal ocean research facility in monitoring and characterizing the marine habitat in the Southern Strait of Georgia. VENUS confirmed its interest in participating with governmental agencies involved in long-term monitoring of the ecosystem and environment. Since 2006, VENUS has been contributing to a variety of ecological initiatives, providing information in near real time related to the changes and properties of the marine habitat.
The Saanich Inlet Node, with the oldest components, would require the most thorough upgrade, and thus was scheduled to be the last of the three Nodes to be refurbished. In all of these Node upgrades, several key features were enhanced. First, the number of standard science ports on each Node was increased from 4 to 8, greatly expanding our capacity for supporting observatory research. A new dedicated Hybrid port (fibre and power) was added to support the UVic’s Ocean Technology Test-Bed (OTTB). In addition, the Pod electronics were completely re-built, now doubling many of the core components and pathways, to provide complete redundancy for power and communications. The final major upgrade was the installation of new operating software, which had also undergone several years of improvements since first implemented in late 2005.

On October 1, 2011 ROPOS clipped into the lifting point of the black Saanich Inlet Node Pod and carried it to the bottom of the Inlet (Photo on page 1). It was easily mated into the original trawl resistant frame (TRF), and within a short time we had confirmation that the sub-sea upgrades were now operational. The Saanich Inlet VENUS Instrument Platform (VIP) was then connected and live data were once again streaming back to the Data archive.

Over the next two days, we also serviced two of our research sites in the Strait of Georgia, including the Central VIP and the Delta Dynamics Laboratory (DDL). We also re-deployed a re-furbished triple hydrophone array at the Strait of Georgia Central (300m) site, complementing the double hydrophone array located at the East site. All five hydrophones are now logging audio signals, accessible from the “Data” tab on www.venus.uvic.ca.

Over the last few months VENUS has released a number of new data-related features requested by our users. All of them are now available via the Download Data page (http://venus.uvic.ca/data/data-archive/).

The new features include:

- 10min and 60min averaging options for scalar data
- Metadata formats in HTML, PDF and XML
- netCDF files for all scalar data
- MATLAB Version 7 mat files, PNG and PDF data plots for ADCP data
- Data Quality Assurance, Quality Control (QAQC) options.

With the Saanich Inlet array back online, data from the location are streaming and available on the website. The array provides the longest times series of VENUS data, more than five years. Log in to check for yourselves at www.venus.uvic.ca/research/state-of-the-ocean. See “About Data” for the averaging technique.

The VENUS Data Team is currently working on:

- Data formats for the Nortek Vector and Vectrino instruments.
- Multi-Variable data products. Multi-Variable capabilities will allow users to request more than one variable at a time. Beginning development of data services for the Phase II initiative (Ferry Systems, CODAR, Buoy Profiler System, AUV etc.).
Using a Sediment Trap for Continuous Monitoring of Phytoplankton Dynamics in Saanich Inlet

Dr. Vera Pospelova (SEOS, UVic)

Phytoplankton is the basis of marine food chain, thus monitoring its dynamics is essential to understand and forecast ecosystem responses to environmental and climate change. Diatoms and dinoflagellates are two principal components of phytoplankton, responsible for the primary production in marine environments. For the past four years, my group (the Paleo-environmental Laboratory at SEOS) has been involved in continuous monitoring program of fossilizable phytoplankton in Saanich Inlet, British Columbia. We use phytoplankton nets for sampling surface waters on a semi-monthly basis, and a sediment trap with an average sampling interval of one week to collect phytoplankton from the entire water column.

To date, dinoflagellate cysts and diatoms have been recovered from nine sediment trap deployments by VENUS in Saanich Inlet. The high-resolution sampling frequency allows for direct comparison between dinoflagellate cyst (fossilizable stage of dinoflagellates) production, biogenic silica flux (proxy for diatom biomass), and environmental parameters. Our initial results covering November 2007 – February 2010 period indicate that dinoflagellate cyst production is significantly affected by sea-surface temperature, salinity, biogenic silica flux and solar insolation (Price and Pospelova, 2011). Further monitoring will answer the question of phytoplankton annual variability, and follow its dynamics in Saanich Inlet during ENSO events.

I have just returned from a four-day R/V Thompson research cruise with the VENUS Team in Saanich Inlet and the Strait of Georgia. After three months of deployment in Saanich Inlet, the sediment trap sediment samples were retrieved (Fig. 1), and the data are being processed in the Lab. Our preliminary results show that the end of July - beginning of August was marked by the increase of phytoplankton biomass. It can be interpreted as a result of transition from a few quite gusty days to the following warm and sunny weather.

During the cruise we also carried out water sampling for phytoplankton analysis. We encountered an extensive bloom of diatoms in the Strait of Georgia (Fig. 2) whereas waters of Saanich Inlet were very clear with no indication of a phytoplankton bloom. This observation highlights the heterogeneity of phytoplankton distribution in estuarine waters. Overall, the cruise was a success, and the trap was redeployed to keep collecting important data.
It has always been an objective of VENUS to provide data and support research into the higher trophic levels of the Salish Sea, none more relevant than the annual salmon migrations to and from the Fraser River. With the re-installation of the Delta Dynamic Laboratory at the base of the Fraser River Slope in May 2011, we are collecting a variety of data that can be used to assess the marine habitat and monitor the presence of marine organisms (from plankton to Orca whales). Both of the active sonar systems mounted on the DDL (300kHz RDI ADCP and 200kHz ASL Zooplankton Acoustic Profiler) are being used to monitor and track salmon near the mouth of the Fraser River. In the Summer 2011 Newsletter, we reported on the use of the ADCPs in tracking fish. This September, the ZAP echo-sounder also picked up backscatter targets that are likely salmon.

The ASL ZAP, located at the base of the slope of the Fraser River Delta (DDL platform), recorded this hourly image of echo-sounder backscatter between 4:00 and 5:00 UTC September 5, 2011 (21:00 – 22:00 PDT September 4, 2011, just after dusk and at rising tide). The image (image above) reveals a dense school of large fish between 10 and 20m depth and many individual fish between 20 and 80m depth. Although we cannot know for sure what the species are, the Pacific Salmon Commission’s troll test-fishing program indicated the presence in the vicinity for that week of both sockeye (\textit{Oncorhynchus nerka}) and pink (\textit{Oncorhynchus gorbuscha}) salmon with a very high proportion of pink salmon. Based on known swimming behaviour, and calibrated target strengths, it is most likely that the shallower concentrated schools (10-20m) are pink salmon, and the deeper individuals are sockeye. These fish were gathering and residing temporarily in the Strait before migrating up the Fraser River. The PSC Mission Hydroacoustic Station located 77km from the VENUS Delta Dynamics Lab site recorded extremely high salmon influx to the lower river a few days later, with approximately 600,000 and 800,000 salmon passing the monitoring site on Sept 7 and 8, respectively.

**Venus, Coastal Network of the ONC Observatory**

**Fraser River Salmon Run**

Yunbo Xie (Pacific Salmon Commission) and Richard Dewey (VENUS)

From Canada Day through Thanksgiving, the Shaw Ocean Discovery Centre hosted “Deep Dive! Deep Discovery!” an exhibit on ocean exploration. With artifacts on loan from Phil Nuytten and a display from VENUS, the Centre showcased a wide range of deep sea topics and items. From a Deep Rover to Deep Flight and from a 1940’s aqualung to an Exosuit, visitors to the Centre learned about both the challenges of ocean exploration and the evolution of deep sea technology. Thousands of scavenger hunts were completed through the summer and proved to be a fun and educational activity for both kids and their parents. For more details on upcoming and ongoing events at the Shaw Ocean Discovery Centre visit [www.oceandiscovery.org/events](http://www.oceandiscovery.org/events).