Summer 2009

The Ocean Online, Real time, Any time

3 years of the VENUS online data portal!

KEEPPING CURRENT

News and Announcements

June 20, 2009 Shaw Ocean Discovery Centre opening on the waterfront in Sidney featuring habitats and animals from the Salish Sea, an eyeball in the sea developed by VENUS and a special exhibit designed by Ocean Networks Canada. Opening officiated by Céline Cousteau.


July 5, 2009 NEPTUNE Canada installation begins.


VENUS is about to Grow with New Funding from CFI!!!

We have just heard that the first part of an $11M request is granted. Last fall, forty-two scientists contributed to a new grant proposal to the Canada Foundation for Innovation with a companion submission for matching funds to the BC Knowledge Development Fund. The peer review through CFI recommended full funding. The Subsea Online Laboratories proposes to expand greatly the scope of VENUS and aid developments in NEPTUNE Canada. The concept was two-fold: one, to develop movable modules to execute comparative studies in different VENUS locations and two, to explore the third dimension through profilers, autonomous vehicles, and instruments on the surface. A major goal is enhancement of data delivery products. While we must wait until matching funds are confirmed, there is no reason not to start planning. Now that our basic infrastructure is operative, we look forward to working with researchers to plan the tools for new adventures in discovery.

CFI funding has also reached further into UVic. The proposal from Kim Juniper and John Dower for a new research vessel was also funded. The concept for a coastal ship capable of supporting the ROV ROPOS will be a great boon for research and observatory servicing.
Using VENUS data yet?

VENUS is designed and built to facilitate ocean research and take the ocean closer to where the marine realm appears remote and in-accessible. With VENUS in the water, virtually everyone can tap into the ocean and explore the coastal ocean of western Canada via the web. There are three ways in which users interact with VENUS:

1) Direct interaction with the VENUS team to determine how to deploy a new instrument or reconfigure a current one. VENUS operates a core set of instruments but has much capacity to integrate user-supplied sensors or to test innovative developments.

2) Any user can download data directly from the VENUS data archive and start using it immediately. The VENUS data archive includes 3+ years of time series data from Saanich Inlet and an extensive collection of multimedia and hydrophone data. In 2008 we added new data streams from two locations in the Strait of Georgia. Downloading data is easy and free. It requires registration, a process that takes a few minutes, after which new users can request any type of data that is available in the archive. VENUS realizes that immediate availability of data from the archive is of great value to students and researchers who need data to support their ongoing research. There are more than 170 registered users who download data from the VENUS data archive for use in theses, research projects and papers.

3) Yet another way to access VENUS data is to view live data plots that are automatically generated and available on the home page at www.venus.uvic.ca under DATA PLOTS. Select the geographic location for which you want to check easy-to-interpret data plots and find out what’s happening in the ocean right now. Find your way to tap into VENUS and start using VENUS data. Log on at venus.uvic.ca

VENUS Data Users 2008 - Location

Denitrification and Oxygen Cycling in Saanich Inlet

Cara Manning, B.Sc. Candidate (University of Victoria)

Timing of renewal events

How do tides, upwelling and freshwater runoff control the timing of renewal events in Saanich Inlet?

Fig. 3a shows CTD data at 96 m in Saanich Inlet from the VENUS Project. This continuous time series pinpoints the timing of most renewal events via changes in temperature, salinity and density. The October renewal did not produce a signal at the Saanich node, but was evident from our CTD profiles and another node in the Strait of Georgia.

Previous investigators (Masson, 2002; LeBlond et al., 1991) have observed that deep water renewal events in the adjacent Strait of Georgia follow weak neap tides, which occur approximately once per month. We observed the same trend in Saanich Inlet. Reduced tidal mixing preserves the high density of bottom waters in the Strait, making these waters available to slide across the sill of Saanich Inlet and renew the basin.

Why doesn’t a renewal occur every month? Upwelling brings dense water to the mouth of the strait, but when the Fraser River freshet peaks in summer, mixing with the fresh surface water reduces the density of the water below (Masson, 2002). Renewal occurs when the water column is stratified (Fig. 3b).

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It has been more than three years since VENUS first deployed a high resolution digital stills camera in Saanich Inlet. The VENUS “Cyclops” camera has been used in numerous and sometimes novel ways. The 8 megapixel resolution has provided imagery for numerous projects including animal behaviour, sediment behaviour, and forensic modelling. The camera is also capable of streaming video, but only at SD resolution (640X480). The analog video from the camera is digitized as an MPEG2 stream, and consumes a maximum bandwidth of 7 Mbps.

Recently, a project that aims to deploy a full HD camera on the seabed in Saanich Inlet was resurrected through additional funding from CANARIE. The original HD camera system and software was collaboratively developed by researchers from McGill’s Undersea Window Project and UVic’s Ocean Technology Laboratory. The introduction of HD video to the existing network is not without technical challenges. In order to use this camera on a system such as VENUS, the excessive video bandwidth requirement needed to be resolved. The solution is a prototype technology from W&W which compresses HD SDI output from the camera (@1 Gbps) into streaming video over IP with an adjustable bandwidth requirement. The camera system is presently set up to output video @ 50 Mbps through the VENUS Node, with undetectable latency and loss of video quality.

A few weeks ago the camera was tested off the Ocean Technology Test Bed in Saanich Inlet. This test will be followed by a full deployment of the camera system by mid-July 2009.

A poster presentation at the Fall AGU meeting in San Francisco in December 2008 was made describing recent water column measurements in Saanich Inlet, including observations from the VENUS Observatory. Excerpts from the poster are presented here and describe seasonal changes in the oxygen and nitrogen cycles, as well as the causes and effects of deep-water renewal. The time series of measurements has been extended through May 2009 and a manuscript for peer review is in preparation.
VENUS Oculus—New Technology for Subsea Visual Monitoring
Paul Macoun, VENUS Project Engineer

After three years of operations at VENUS, it has become clear that visual monitoring of subsea infrastructure is extremely desirable and beneficial in several ways. Installed on the instrument platform, a camera could not only enhance research and be used to corroborate measurements like turbidity (suspended sediments), but also help in diagnosing instrument issues and failures. A camera is also the primary tool for observing biological interactions and is the best way to capture people’s imagination. The principal reason we do not have subsea cameras everywhere on VENUS is the expense of a commercial systems. If one wants to look around (pan and tilt), adjust camera settings, turn lights on and off, and capture pictures and video, the commercial systems are around $50K+. VENUS operates one such subsea camera deployed on its network in Saanich Inlet but it would cost at least $400,000 to outfit all eight seafloor platforms with one; a heavy cost to bear.

Based on this, we have developed the “VENUS Oculus”. The concept is fairly simple: an off the shelf pan and tilt capable security camera with a robust and user friendly web server, integrated into a glass sphere. A custom LED underwater light is connected to the sphere is controlled through the camera web server with the help of some custom electronics from Round Innovations. The sphere is 60 pounds buoyant when immersed in seawater. Rather than mount it to a heavy rigid frame on the seabed, the upper half of the sphere is captured by a ring which is tethered to three anchors on the bottom. The Oculus will first reside in 30 feet of water just off the Shaw Ocean Discovery Centre in Sidney for the summer, where it will provide the public with a chance to “have a peek” at the world below the surface. Provided this deployment is successful and the design proves viable, VENUS will build systems for deployment on many of our underwater structures.

Ocean Discovery Days at the Institute of Ocean Sciences

As part of the community event “Ocean Discovery Days” on the Saanich Peninsula, June 4 to July 4 (http://oceandiscovery.ca/days/schedule.html), IOS celebrated these Days with a public outreach event on June 22 and 23. New permanent displays, reflecting role of IOS as a multidisciplinary ocean research centre - part of Canada’s Three Oceans network - were open and attracting public since early June.

In a series of educational talks held at IOS, the local community learned about the state of the ocean, global climate change, local oceanography, and recent revelations in sea floor mapping. Leading researchers from DFO and NRCan answered questions from the interested public about tsunamis, gas hydrates, sponge reefs, the Arctic and many other research topics covered during the public presentations. Thanks to Terry Curran for planning and coordinating the event.