

VENUS



Saanich Inlet

Strait of Georgia

Juan de Fuca Strait

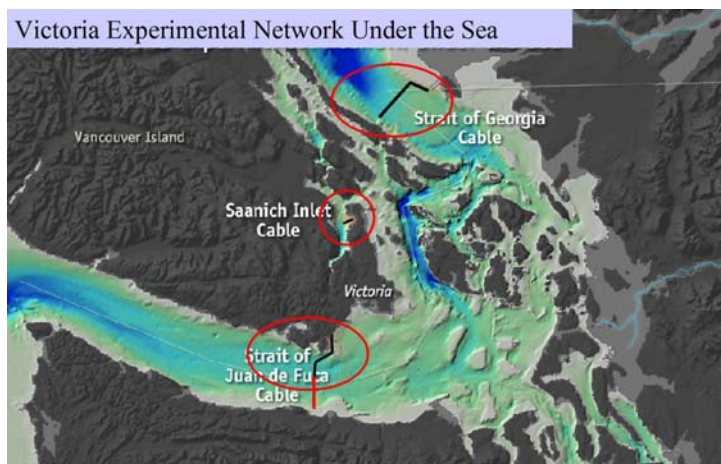


Spring 2004 Newsletter

Project Overview	1
Keeping Current	1
Oceanographic Database Desktop Study	1
BC Science Teacher's Conference.....	2
Saanich Inlet	
Workshop	2
Update	2
Juan de Fuca Strait	
May 12 Workshop	2
Extension Proposal	3
Strait of Georgia	3
Instruments	3
ZAP Deployment.....	4
Vertical Profiler	4
VENUS Team	4

Measurements, images, and sound will be delivered to scientists, managers, the public, and a data archive via fibre-optic cables laid from three landfall sites. These cables will deliver power for instruments, lights, and robots, receive commands for project scientists, and deliver information back on the health of our oceans. The VENUS Project will install interactive laboratories in Saanich Inlet, Strait of Georgia, and the Juan de Fuca Strait support new oceanographic experiments for long-term studies of our coastal waters.

Project Overview



The Victoria Experimental Network Under the Sea (VENUS) is an ambitious project to conduct coastal oceanography in an innovative and informative way in British Columbia waters. VENUS will be a network of instruments dedicated to observing oceanographic processes in our marine environment.

Keeping Current

The VENUS Project has just selected a combined bid from OceanWorks of North Vancouver and Global Marine Systems Ltd. to be its industry partner. The parties will now begin negotiations on the contract for the sub-sea cabled observatory system for the project. This includes the design, engineering, manufacturing, assembly and testing of the underwater infrastructure, shore stations and network operations centre. Global Marine is the world's largest submarine cable maintenance and installation company. It maintains a ship, approximately 50 crew members and a cable depot in Victoria. OceanWorks, located in North Vancouver, currently employs 63 staff. The company is a leading international supplier of specialized sub-sea work systems.

Oceanographic Database Desktop Study

UVic is in the process of awarding a contract to conduct a joint VENUS/NEPTUNE Oceanographic Database desktop study. The study will focus on data transfer from the instruments that have been proposed for VENUS/NEPTUNE and the implications for developing a data management system. In addition, the study will examine current practices, proposed developments in

oceanographic databases and database developments in other disciplines that may prove applicable to VENUS/NEPTUNE. The results of this study will be included in the development framework for the Data Management and Archive System (DMAS).

BC Science Teacher's Conference

At the invitation of the BC Science Teacher's Association, a presentation on VENUS and NEPTUNE was given at the CATALYST conference. The science teachers were an enthusiastic and receptive group that look forward to resources and information becoming available from these projects in the near future. Samples of a new Grade 7 science text book being written for Canada-wide distribution in the fall was available and contained a section on the NEPTUNE Project. VENUS/NEPTUNE has also been contacted by other educational publishers for information.

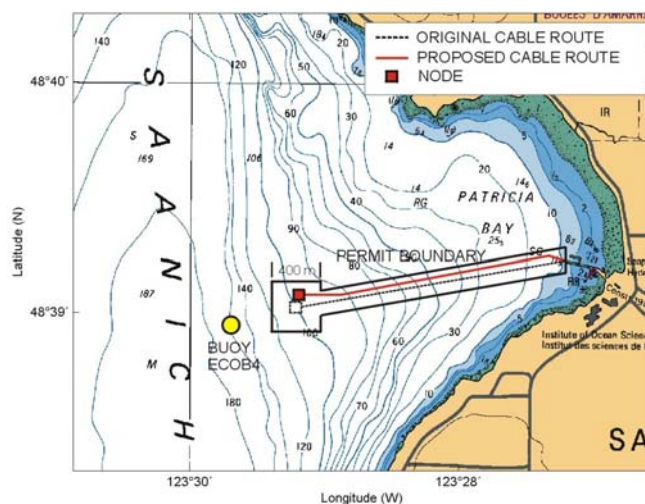
Saanich Inlet Workshop

IOS will be hosting the VENUS Saanich Inlet Workshop on June 22, 2004 from 9:30 to 3 in the main auditorium. Installation of the Saanich Inlet Cable is expected to take place in early Fall. The mandate of the June 22 Saanich Inlet workshop will cover several related objectives including: exploring the broader and long term scientific interests in Saanich Inlet that might be supported by VENUS, system specifications and design issues driven by the instruments that scientists plan to deploy on VENUS, and understanding the current design for the initial suite of community based instruments and sensors and how we will integrate these devices.

Saanich Inlet Update

The Saanich Inlet installation will include the shore station on the IOS dock, the cable out towards the 100m isobath a VENUS node, into which instrument systems will connect, and several initial instruments suites. These "community" based instruments as outlined in the original CFI proposal include a CTD with several dissolved oxygen sensors, a zooplankton acoustic profiler (ZAP) as supplied by ASL Environmental Science Ltd., a camera, and a broadband hydrophone system, that is being developed by the Ocean Acoustics lab at IOS. Additional sensors and instrument needs, and longer term scientific research objectives will

be discussed at our Saanich Inlet Workshop (June 22, 2004 at IOS). The VENUS Users Guide, now posted on the VENUS web page, will provide the information to principal investigators as to how they can conduct research on the VENUS array, including how to plug additional instruments and sensor suites onto the array.

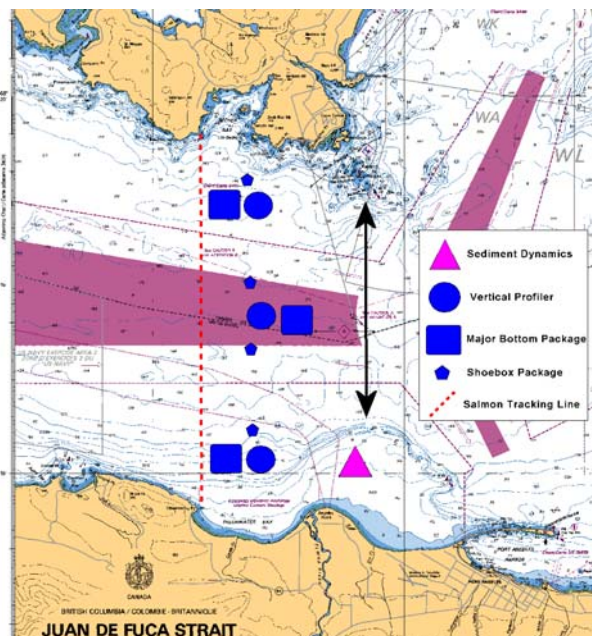


Juan de Fuca Strait – May 12 Workshop

Several activities are on-going with respect to VENUS in Juan de Fuca Strait. On May 12, 2004, VENUS held a workshop at UVic to review and update the scientific objectives and observatory resource allocations in Juan de Fuca, and to re-examine the scientific hypotheses being considered for the National Science Foundation proposal to extend the VENUS array into U.S. waters by our colleagues at the University of Washington.

A full Workshop Summary is available for download on the VENUS web page. The highlights include the regional role Juan de Fuca plays as a conduit between the inland basins of the Strait of Georgia and Puget Sound, and the continental shelf and open Pacific to the west of Vancouver Island, and the ecosystems and processes occurring locally within Juan de Fuca. Long-term measurements of the exchange processes within the Strait, as might be made by a fully extended VENUS array, would provide proxies of transport and material flux into and out of the in-land basins. It was deemed that a minimum of one complete water column station in central Juan de Fuca, and preferably three across the Strait would provide the necessary information to quantify these fluxes. The workshop also identified the need to understand local ecosystems and processes. Very little is known about the

primary production within the Strait and the food chains supported by this production. Juan de Fuca “east” might further provide a location for studying the interaction between water column and benthic communities, as presently planned for Juan de Fuca “west” by the NEPTUNE team. The proximity of the VENUS array to Race Rocks and the vigorous mixing that occurs there every tidal cycle invite measurements which would quantify the rate of turbulent mixing, both for monitoring and model calibration, as well as process-oriented studies to investigate stratified turbulence.



Juan de Fuca Strait – Extension Proposal

Workshop participants reviewed the efforts of our U.S. colleagues, lead by the University of Washington, who are preparing a revised proposal to NSF to seek funds to extend the VENUS array across the entire Strait. In addition to studies of the flux and transport within Juan de Fuca and the ecosystems supported by processes within the Strait, a review of the Elwha River delta and sediment transport were discussed. In 1911, two hydroelectric dams were built on the Elwha River, trapping a majority of the natural sediment load within the reservoirs behind the dams. Plans are underway to remove the dams in 2007-08, restoring the river flow and sediment load to pre-dam conditions. Much of the accumulated sediment will likely flush out during the first few years (2008-2010); dramatically altering the near shore environment. Monitoring and understanding changes in the sediment distribution and transport near the mouth of the Elwha

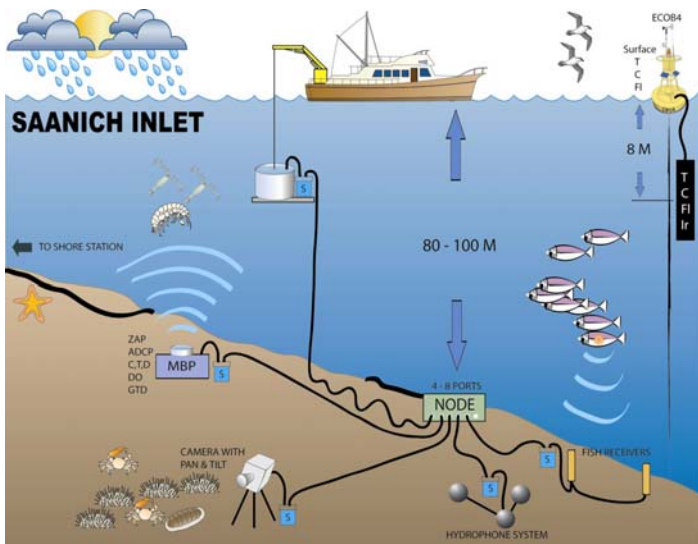
could be accomplished by observatory sensors. A list of proposal hypotheses is included in the Workshop Summary, available online at the VENUS web site.

Strait of Georgia

Some direct and indirect activities are on-going with respect to VENUS’s interests in the Strait of Georgia. Phil Hill, our principal investigator for the Delta Dynamics Laboratory, undertook several transects across the Strait near the proposed cable route, collecting multibeam acoustic data of fine-scale bottom morphology. This data complement a variety of archives that exist for the region. They were summarized in a desk-top study conducted by VENUS Co-op student Brian King under Phil’s supervision. The data clearly show dramatic variations across the Strait from the Fraser River mouth where the sediment separation provides a gradation of bottom types, across the deeper reaches of the Strait where benthic communities are more stable, to the rock western boundary with its ridges and gullies.

Instruments – Profile: Paul Macoun

I have recently come on board the VENUS Project to help with the integration of scientific instrumentation and the network infrastructure to be installed in Saanich Inlet. I am presently determining the specifications for a number of instruments to be purchased by the project and am designing the common platform that will house them. In conjunction with this work, I am developing deployment and recovery protocols that will apply to both initial deployment, and ongoing observatory maintenance. Individuals interested in discussing their instrument needs should feel free to give me a call (Tel: 250-472-5369), or send me an email (pmacoun@uvic.ca). I look forward to working with all of you in the VENUS community.



Vertical Profiler

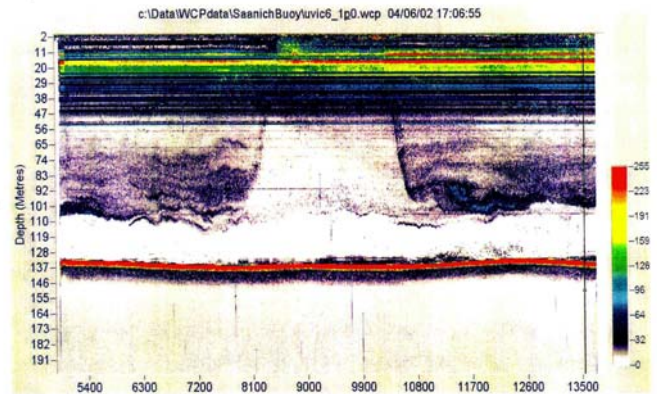
Plans are also underway to begin the design of the Vertical Profiler System, for deployment in both the central regions of the Strait of Georgia and Juan de Fuca Strait. This design work will be conducted primarily through a team effort of the VENUS engineering staff and the mooring groups at IOS. The system must be able to support a variety of sensors, measuring from near the bottom to the surface, in currents which might be as strong as 2 m/s. At the moment, we are considering a buoyancy-winch system, and not a surface float mooring system with “crawler” instrument packages. However, as the profiling platform has broad scientific interest, we encourage anyone with specific profiler needs to contact us (rdewey@uvic.ca) directly. Profiler testing will likely be conducted in the more sheltered and low current regime of Saanich Inlet.

Saanich Inlet - ZAP deployment

Five Zooplankton Acoustic Profilers (ZAPs) were deployed for a two-week period in Saanich Inlet as a joint project of ASL Environmental Sciences (Sidney), IOS and VENUS. The 120 kHz ZAP instruments that were used in this experiment are ASL's, while the 200 kHz ZAPs were purchased by VENUS for future deployment in Saanich Inlet, Juan de Fuca and Strait of Georgia observatories; four have recently been purchased.

Two ZAPs (a 200 kHz and 120 kHz acoustic profilers) were attached to a mooring and deployed from R/V "Strickland". These instruments were recording the acoustic reflection of the water column, while "looking" upward from the bottom towards the surface. These data will be compared to a second suite of acoustic records (same frequencies), concurrently acquired by ZAPs that were attached to the IOS – ECOBUOY. These latter ZAPs were facing the bottom ("downward looking"). A fifth ZAP was horizontally positioned on the mooring, in order to record the changes of the acoustic reflection in a fixed depth a few meters above the bottom.

The ZAPs deployment was accompanied by CTD casts and plankton net tows. Due to the conditions that prevailed in Saanich Inlet at the time of the experiment (the anoxic layer was already established at the vicinity of the bottom, while a phytoplankton bloom was still evident at shallow layers) and the vast sampling efforts, we are expecting an exciting data set and a wonderful opportunity to test a VENUS-like suite of data.



Acoustic backscatter image from early June, 2004 ZAP deployment on the MEOS buoy; the nocturnal migration of the plankton is visible as the white anoxic layer below.

VENUS Team:

Verena Tunnicliffe, Project Director (250) 721-7135
 Adrian Round, Project Manager (250) 472-5364
 Richard Dewey, Science Coordinator (250) 472-4009
 Deborah Smith, Project Coordinator (250) 472-5366
 Paul Macoun, Instrument Engineer (250) 472-5369
 Ruthy Yahel, PDF (250) 472-5367
 Melissa Rotella, Research Assistant (250) 472-5357

venus@uvic.ca
www.venus.uvic.ca