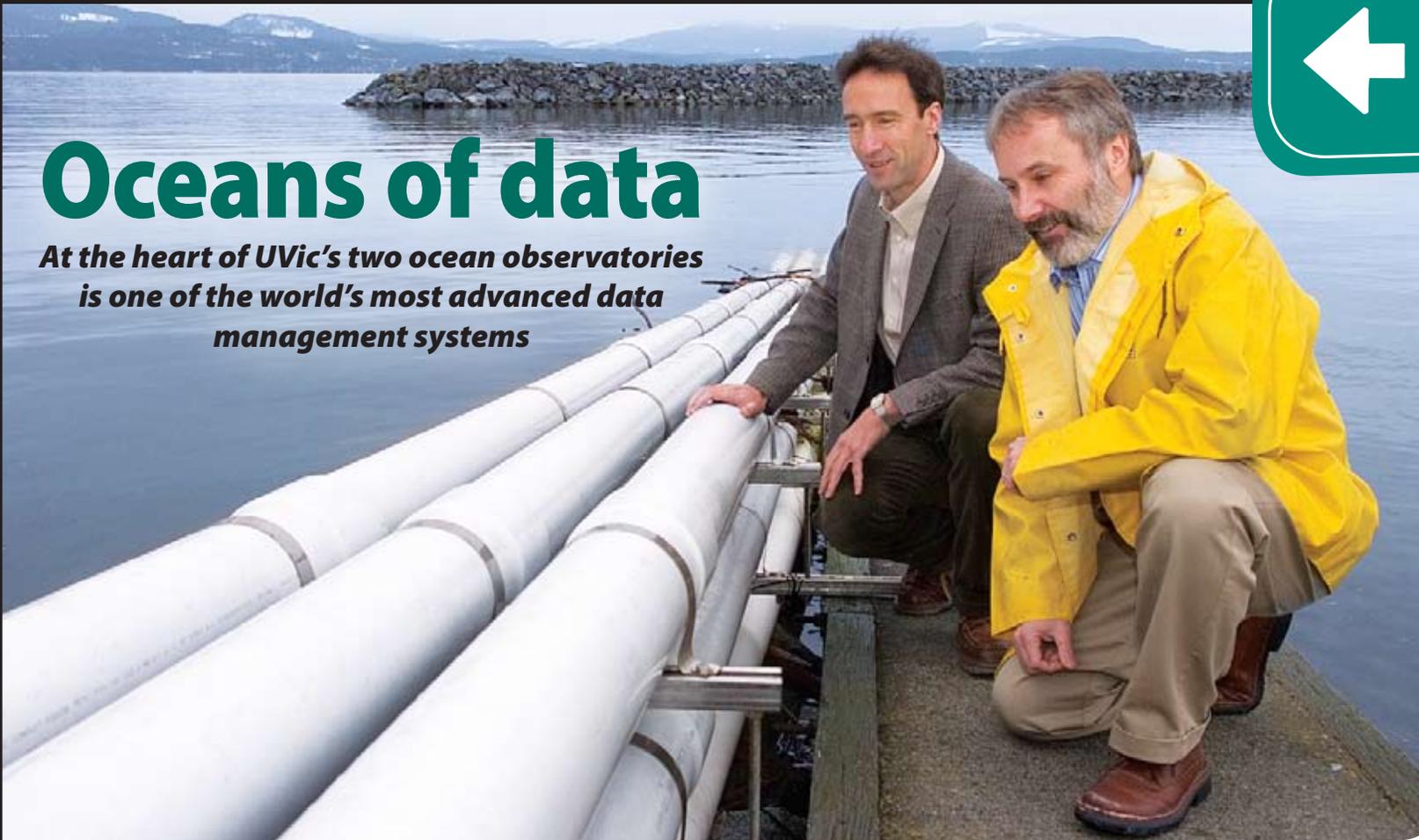




Oceans of data

At the heart of UVic's two ocean observatories is one of the world's most advanced data management systems



DIANA NETHERCOTT

Pirene (left) and Dewey, where the Saanich inlet VENUS cables come ashore.

To most of us, Venus and Neptune are distant planets. But mention them at the University of Victoria and minds will turn to the deep ocean, not deep space.

VENUS (Victoria Experimental Network Under the Sea) and NEPTUNE Canada (North-East Pacific Time-series Undersea Networked Experiments)—both led by UVic—are undersea virtual laboratories. The cabled networks of instruments allow scientists to analyse data that flows 24/7, without getting their feet wet or even leaving their desks.

Since the first leg of VENUS was activated on the floor of Saanich Inlet in February 2006, there has been a steady torrent of information from instruments recording everything from water temperature, pressure and oxygen levels to images, sounds and video.

So far, VENUS instruments from Saanich Inlet and a second leg in the Strait of Georgia have sent half a trillion measurements (and counting) back to UVic and—through the Internet—to scientists and the rest of the world.

“With this incessant gush of data, it’s like trying to drink wine through a fire hose,” says Dr. Richard Dewey, a UVic oceanographer and associate director

of research for VENUS. “It’s rich but it’s almost overwhelming. You can get awfully drunk.”

To handle this fire hose of information, UVic has developed an advanced data management and archiving system (DMAS) that is reading, storing and making the data web-accessible as the two observatories take the pulse of the Pacific Ocean over the next 25 years.

It’s a massive task that involves scientists and a team of information technology specialists. “The information we see today on the VENUS website is just the tip of the iceberg,” says Benoit Pirene, who heads the DMAS team. “Behind the scenes, there is an extensive software and hardware infrastructure designed to collect data from the various instruments and store them for 25 or more years.”

VENUS studies in Saanich Inlet focus on ocean processes and seafloor ecology in a sheltered fjord. Of particular interest is the inlet’s unusual combination of high plankton populations and deep water that is naturally depleted of oxygen for part of the year. This seasonal “dead zone” offers oceanographers a data-rich study site.

“Scientists think of Saanich Inlet as a bellwether indicator of how marine ecosystems are going to

change over time,” says Dewey.

The Strait of Georgia leg of VENUS offers a compromise between a sheltered inlet and the wildness of the deep ocean. Studies in this busy waterway are looking at water mixing, the responses of bottom animals to plankton blooms, sediment and slope dynamics of the Fraser River delta, and acoustic monitoring of whales and deep sea ships.

NEPTUNE Canada, due for completion later this year, will consist of an 800-km ring of cable and instruments along the Juan de Fuca tectonic plate off the west coast of Vancouver Island.

More than 130 instruments at five sites—one as deep as 2,600 metres—will support studies on ocean-climate interactions and their effects on fisheries, seismic and tsunami activity, gas hydrate deposits and seafloor ecology.

Together, NEPTUNE Canada and VENUS could generate up to 50 terabytes of information every year—roughly equal to an iPod filled with 13 million songs.

Data accuracy and accessibility—they’re both keys to the success of VENUS and NEPTUNE Canada where, as Dewey notes, “we’re putting the power of the Internet into the deep ocean.”

EDGEwise

DMAS allows scientists to schedule instrument activity, pre-plan instrument responses to unusual events such as an earthquake, or collaborate with others through Facebook-like features to be known as “Oceans 2.0,” now under development.

Major funders of the DMAS component of VENUS and NEPTUNE Canada are the Canada Foundation for Innovation, the BC Knowledge Development Fund and CANARIE Inc., a national organization that promotes advanced networks and applications.

For more information on these two world-leading ocean observatories, visit www.venus.uvic.ca, www.neptunecanada.ca or Ocean Networks Canada at www.oceannetworks.ca.

UVic researchers were awarded more than \$106 million in outside research grants and contracts in 2007/08. This more than doubles the annual research support of the previous five-year period.



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