NANOOS Observer
SPRING 2011
Newsletter of the Northwest Association of Networked Ocean Observing Systems

Engaging Teachers in Using Ocean Observing Data

This is an exciting time to be a science educator. On both the federal and state level of Oregon and Washington there is specific focus on strengthening STEM (Science, Technology Engineering and Math) in the classroom. Such focused efforts are well matched to one of NANOOS's goals for Education and Outreach: to use ocean observing data, products and resources to foster ocean literacy, a literacy that provides an understanding of the ocean's influence on you and your influence on the ocean. Ocean observing systems, such as NANOOS, provide engaging content to be used by educators via our authentic, real-world examples of how we gain understanding of ocean processes through the use of high-tech tools such as buoys, robots and satellites.

However, a challenge for educators in bringing ocean data into their education programs can be the limited opportunities for them to gain familiarity and direct experience obtaining and using ocean data and data products. To bridge this gap, since summer 2010, NANOOS and the Ocean Inquiry Project (OIP), a marine science education non-profit in Puget Sound and NANOOS member, have teamed up with two other education programs, the Edmonds Community College's Learn and Serve Anthropology Field School (LEAF) **www.edcc.edu/leaf** and Service, Education and Adventure (SEA) **www.serviceducationadventure.org**, to provide weekend-long teacher workshops.

Funded by the NOAA Bay Watershed Education and Training program (NOAA BWET), the workshops are held in communities throughout Puget Sound and the Olympic Peninsula and focus on helping teachers bring meaningful watershed educational experiences into their classrooms. Teachers participating in the workshop spend one day out on the water collecting and analyzing various types of ocean observing data and one day gathering resources about the local watersheds and marine environments. While on the boat, NANOOS and OIP instructors lead the teachers through inquiry style activities to derive meaning from the data collected onboard and compare those data to data provided by NANOOS through the NANOOS Visualization System (NVS). In one year these workshops have reached over 130 teachers and there are more planned for this summer.

As a testament to the benefits of this program, Gail Waters, a high school teacher from Everett, WA and BWET workshop participant, had the following to say after using a Conductivity, Temperature and Depth (CTD) sensor on the boat:

> "We headed out to gather some data using the CTD device. After collecting data on turbidity, salinity, oxygen, temperature and depth, we connected it to the computer to download the data. They modeled a great inquiry lesson for us...
>
> *Why did the oxygen peak at this depth and then drop? What patterns do you see between the temperature and the depth, the temperature and the oxygen level, the amount of chlorophyll and other chemical components?*
>
> Not only was the data collection impressive, but also the reminder of how we can be more rigorous in our teaching by using questioning methods."

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. . . Engaging Teachers, cont'd.

In addition to these teacher workshops, the NANOOS education staff connect with educators in the Pacific Northwest through regional educational conferences and provide classroom activities and resources on the NANOOS web portal. The NANOOS Education staff, Sarah Mikulak and Amy Sprenger, welcome comments from educators and are willing to assist educators who want to bring ocean observing data and products into their educational programs.

Many thanks for their contributions: NANOOS Education staff Sarah Mikulak and Amy Sprenger (APL-UW); Fritz Stahr (OIP); Thomas Murphy (Edmonds C.C.); Chris Burt and Susie Richards (SEA); and Gail Waters (Everett School District, **http://blogs.everettsd.org/waltersscience** *). For NANOOS education resources, visit:* **www.nanoos.org/education/introduction/introduction.php**.

Products/Tools

March 2011 Japanese Tsunami Information

Did you catch our coverage on Facebook of the Japanese earthquake-triggered tsunami when it reached our shores? You can find more information supplied by our scientists and partners about the earthquake and tsunami at our Honshu Earthquake and Tsunami 2011 page found at **www.nanoos.org/features/honshu_earthquake_2011/overview.php**.

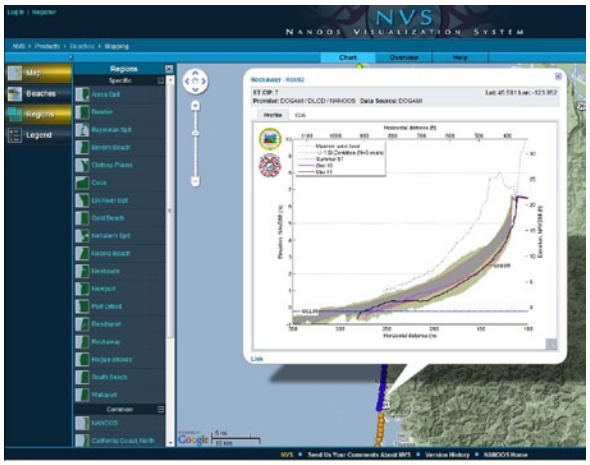
Theme Pages

At the outset of NANOOS, the Governing Council decided on five priority areas to focus NANOOS's efforts: Maritime Operations; Ecosystem Assessment; Fisheries and Marine Biodiversity; Coastal Hazards; and Climate. We are excited to announce that each of these priorities areas now have their own theme page accessible at the top of the NANOOS home page. These theme pages include general information about the topic and provide links to relevant NANOOS data products and member organizations involved in these efforts. Future developments to these pages include additional in-depth information and Special Topics pages, similar to the Ocean Acidification and Hypoxia pages accessible from the Ecosystem Assessment page.

Beach and Shoreline Mapping NVS Product

The beaches and shorelines of the Pacific Northwest are in a constant state of flux. Every year, sand gets moved from beaches to sandbars in deeper water during the winter and back to the beach during the summer. On longer time scales, one beach can be disappearing as sand is eroded from a dune or cliff while another beach can be growing as sand is deposited in a new location. These dynamics are important to document and understand in order to prepare and protect communities from coastal hazards.

NANOOS scientists from the Southwest Washington Coastal Erosion Study and the Oregon Department of Geology and Mineral Industries (DOGAMI) are mapping and monitoring our region's beaches and shorelines using a highly sophisticated GPS system mounted on a backpack, all-terrain vehicle, or personal watercraft. These data are used by scientists and the coastal community to assess coastal stability and hazard risk.



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. . . Products/Tools, cont'd

To improve access to these data, the NANOOS Data Management & Communications Committee (DMAC) and the User Products Committee (UPC) have developed a Beach and Shoreline Mapping portal in the NANOOS Visualization System (NVS). This portal allows users to access beach profiles and contour change plots that show beach changes since 1997 from 119 sites in Oregon. Plans for the portal include integrating beach data from the Washington coast and nearshore bathymetry, or underwater topography, data from the entire length of the PNW coast.

You can access the new Beach and Shoreline Mapping portal at **www.nvs.nanoos.org** by selecting the "Click Here to View Products" button.

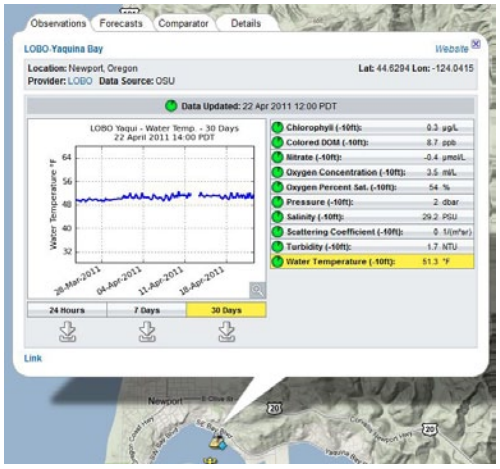
New NVS Features

The most recent NVS versions contain many new overlay assets and the first step in user customization of NVS.

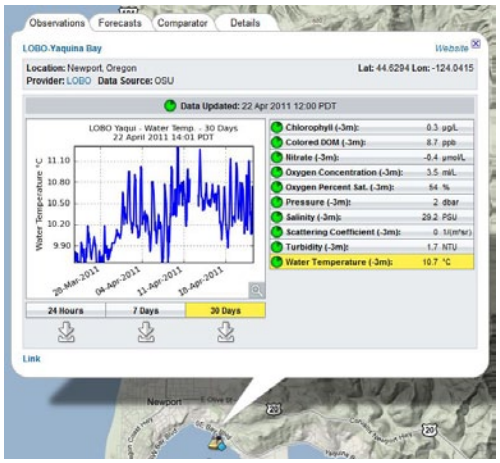
Forecast map overlays that have been available elsewhere via the NANOOS portal from NANOOS partners NOAA, Oregon State University (OSU), and the Center for Coastal Margin Observation & Prediction (CMOP) are now integrated into and available in NVS. These include:

- The NOAA Wavewatch III model providing 7-day forecasts of wind and waves for the North Pacific Ocean.
- The NOAA North American Mesoscale (NAM) model providing 5-day weather forecasts for air temperature, barometric pressure, relative humidity, and wind speed for most of the western US.
- The OSU Regional Ocean Modeling System (ROMS) model developed by NANOOS Principal Investigator (PI) Alexander Kurapov, providing forecasts of surface water temperature and surface currents for the Oregon coast including an optional color scheme specifically designed for tuna fishers.
- The CMOP Columbia Estuary model providing water temperature and salinity forecasts for the lower reaches of the Columbia River to the coastal waters of NW OR and SW WA and into Willapa Bay.

INVS developers have taken initial steps for NVS users to be able to customize their experience in NVS. For NVS users, logging in to NVS via your "myNANOOS" account, will save any setting you have selected in the Settings toolbar to be automatically loaded next time you sign in. Currently two settings can be saved : units expressed in either *Common* (e.g. feet and °F) or *Scientific* (e.g. meters and °C); and the y-axis range for graphs expressed in either the *Global* or *Local* range. The *Global* range is the standard, static y-axis range used throughout NVS, whereas the new *Local* range is a tailored to the specific range of values found for each measurement of a particular asset.



Plot showing the default settings, Common *units and* Global *y-axis range.*



Plot with Scientific *units and a* Local *y-axis range.*

New Capabilities Field/Lab

New Data Streams and Assets in NVS

Emilio Mayorga, the data manager for NVS, is constantly working with NANOOS member and partner organizations to include new data streams in NVS. The most recent additions that his efforts have made available include three groups whose data are being served through NANOOS for the first time: the US Geological Survey (USGS); the NOAA Pacific Marine Environmental Lab (PMEL); and the Pacific Shellfish Institute (PSI). Twenty-nine new USGS river gauges provide near real-time river discharge and stage height data from major rivers in OR and WA. Carbon dioxide data from NOAA PMEL are being collected by two ORCA buoys in Hood Canal and the Chá bă buoy off of La Push, WA. PSI, with support from the Pacific Coast Shellfish Growers Association, is providing water quality data from a site in Willapa Bay, with more sites to come in areas important to the PNW shellfish growers.

Emilio has also worked with King County (WA), the WA Department of Ecology (WA DOE), and the Coastal Data Information Program (CDIP) from the Scripps Institute of Oceanography, to provide data from newly-deployed assets. Joining several King County water quality sensors in Puget Sound is a buoy off of Alki Point in West Seattle and a new moored sensor off of Vashon Island in Quartermaster Harbor. Lastly, CDIP added a mooring to measure waves and water temperature 27 nautical miles west of the Columbia River mouth at Astoria Canyon. All of these new data streams can be found at **www.nvs.nanoos.org**.

Many thanks for their hard work to Emilio and his collaborators: Sylvia Musielewicz (PMEL); Andy Suhrbier (PSI); Kim Stark & Charlie Zeng (King County); Brandon Sackmann & David Mora (WA DOE); Nicholas Lederer (APL-UW); and the NANOOS DMAC and UPC members.

Member Spotlight

The Northwest Aquatic & Marine Educators (NAME)

The Northwest Aquatic & Marine Educators (NAME) has been a proud member of NANOOS since 2008. NAME is a dynamic organization of professionals dedicated to sharing the world of water and using the magic of marine and fresh water places to excite audiences about learning. NAME members include educators, researchers, students, and resource professionals from Oregon, Washington, Idaho, British Columbia, and Alaska. Past–president Linda Maxson, who initially led NAME's membership to NANOOS, conveys, "Becoming an official partner of NANOOS helps NAME in that we can truly become familiar with marine education opportunities that are cutting edge and high tech, while retaining our (low-tech) 'high touch' skills, like leading tidepooling explorations and stream walks." NAME and its members have been active supporters in helping NANOOS reach educators interested in bringing in ocean observing data and other NANOOS resources into their education programs. For more information on NAME visit **www.pacname.org**.

Happenings

The Northwest Aquatic & Marine Educators (NAME)

NAME's annual summer conference will be July 13–16, 2011 on the Olympic Peninsula at the Olympic Park Institute. NANOOS members and staff are actively engaged in planning and presenting during this conference. See **www.pacname.org** for more information.

Ocean Observations: Array off of La Push is in the Water!

Off La Push Washington, the Chá bă buoy was successfully re-deployed and a new subsurface mooring was test deployed, awaiting re-deployment later this summer. A Seaglider was also deployed there, now doing continuous transects across the continental shelf. [*NANOOS and APL-UW*]. Along the Oregon coast, the sum¬mer-versions of the NH-10 and Saturn02 buoys were deployed off Newport and the mouth of the Co¬lumbia River, respectively, and will stay in the water until fall. [*NANOOS, OSU and CMOP*].

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