"Science Education Asea" follows the events of scientists onboard the R/V Melville.

The SEA Times

Current Location
Latitude 48' 19.8" N
Longitude -125' 20.4" W

MONDAY, SEPTEMBER 5, 2005

Environmental Variables Monitored to understand HABs

LAB GRID LINE – Vancouver Island Coast

The bridge calls down to the main lab, "ETA is 1:35 a.m." The R/V Melville is on course to the next sampling station at a cruising speed of 11 knots.

Five-minutes before the ETA (estimated time to arrival), the CTD crew is ready. Three people stand on deck dressed in steel-toed boots, hard-hats and thick, orange life-vests. A crew member from engineering climbs into the cabin where he operates the winch and crane controls.

The array of scientific equipment attached to the CTD will provide key data to the research teams.

The CTD system is a 5-foot tall, 4-foot diameter, cylindrical metal frame. Equipment that measures a diversity of variables is strapped on with metal brackets and plastic ties. The winch and crane lift the CTD over the side of the ship and lower it into the water to various depths. One person on deck gives directions to the winch operator, two others control the taglines that keep the huge CTD from swinging.

Inside the main lab is "control central" for the CTD. This area is surrounded with video monitors, cables and computer equipment. On one screen, a live video camera shows the starboard deck where the CTD launches and lands; another displays colorful graphs.

The array of scientific equipment attached to the CTD will provide key data to the research teams. In the first three days of the ECOHAB voyage, the CTD has been deployed 30 times, at 30 different stations. This sampling will continue throughout the 3 weeks at sea.

CTD stands for three of measurements the array of equipment can make: conductivity, temperature and depth. Conductivity readings, combined with temperature, give an accurate measure of salinity. (Saltier water conducts electricity better than fresher water.) Temperature is read by a digital thermometer. A pressure sensor measures depth because the weight of water creates more pressure the deeper you go.

One of the most obvious features of the CTD is the 24-bottle "rosette." Triggered by computer, these plastic tubes, or Niskin bottles, snap shut, trapping water and plank-ton from different depths. Scientists collect samples from the bottles by opening spigots on the bottles.

The CTD array also includes:

- An altimeter that measures the distance to the bottom with sonar waves.
- A fluorometer that measures the amount of fluorescence from chlorophyll – an indicator of phytoplankton concentration.
- A transmissometer that measures the clarity of the water (amount of suspended sediment, plankton, marine debris).
- A dissolved oxygen sensor that measures oxygen levels which can indicate biological activity.
- A PAR sensor (Photosynthetically Active Radiation) that measures the amount of light at depth.
- An ISUS (*in situ* Ultraviolet Sensor) that measures nitrate, an important nutrient for phytoplankton.

The CTD sensors help us gather information to better understand the physical and biological oceanography of the Pacific Northwest. The ECOHAB-PNW team hopes to understand this region of the ocean well enough to forecast future toxic algal blooms in order to protect human health.

Salty Dog Research Scientist Onboard

CTD CONTROL CENTER

Jim Postel is the CTD King onboard the R/V Melville. He runs the midnight to noon shift, diligently guiding the winch operator on the starboard deck and manning the computers from "control central" in the main lab. He's a large man whose salt-and-pepper beard and thick bifocals inspire some to call him the "CTD Santa."

Jim is a salty dog; he has lots of experience at sea. He has lost count of the research cruises he has been on, but says the number must be approaching three digits with total days adding up to about 3 years at sea.

Jim has worked with CTDs since 1974 when oceanographers first began to use them. He recalls how data were recorded as holes in paper tape. The amount of data collected was limited by how fast the holes could be punched. "The first CTDs were big, heavy and slow," he says. "Now we can get more readings in the same size package." Jim's face lights up as he describes the modern CTD that give 24 scans of information per second. He believes the CTDs of the future will be unmanned stations where data are sent by cables to scientists on land.

Jim studied Biology at the College of St. Thomas in Minnesota and Biological Oceanography at the University of Washington where he currently works as a Research Scientist, specializing in technical equipment. He explains that oceanography appealed to him because he enjoyed all the sciences: biology, chemistry, physics, and geology. "Oceanography bridges the sciences," he says, "physical and chemical properties influence the biological processes."

Getting his hands wet and feeling the breeze on his face, Jim is perfectly at home on the ship. He says the awe and wonder of life at sea keep him coming back for more.

ECOHAB PNW is a 5-year multi-disciplinary project that is studying the physiology, toxicology, ecology and oceanography of toxic Pseudo-nitzschia *species off the Pacific Northwest coast. For more information, visit the ECOHAB-PNW website at: http://www.ecohabpnw.org.*

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