

WEDNESDAY, SEPTEMBER 7, 2005

Northerly Winds Excite ECOHAB-PNW Scientists

EDDY CENTER

Scientists on the R/V Melville are getting the winds from the north that they've been counting on. These winds will cause an important event along the Pacific Northwest coast called upwelling. Upwelling brings nutrient-rich water to the coast, leading to large blooms of phytoplanktonic algae, including the diatom *Pseudo-nitzschia*.

This swirling phenomenon has a diameter of approximately 20 miles.

Upwelling occurs because of a global phenomenon called the Coriolis effect. In response to the rotation of the Earth, water at this latitude tends to move to the right. When winds blow from the north, this force causes ocean water to move away from the coast. Cold, nutrient-rich water from great depths comes up (upwells) to replace it.



For the first 5 days of the ECOHAB-PNW cruise, southwesterly winds (from the southwest) combined with the Coriolis effect, pushed nutrient-poor water to shore, a "downwelling" effect. Without high levels of nutrients, there have been no large algal blooms.

Finding *Pseudo-nitzschia* blooms is a necessary starting point for the ECOHAB-PNW scientists to address one of the overarching research questions: When and why do *Pseudo-nitzschia* cells produce the toxin domoic acid?

One current hypothesis suggests that an eddy (a body of water that moves in a

circular motion) near southwestern Vancouver Island, called the Juan de Fuca eddy, is the origin of high levels of domoic acid. First reported by scientist Tully in 1942, this swirling phenomenon has a diameter of approximately 20 miles. Algae in this eddy may lack some of the essential micronutrients (such as iron) necessary for photosynthesis. Domoic acid may be released by *Pseudo-nitzschia* to help acquire this micronutrient.

ECOHAB-PNW scientists believe that *Pseudo-nitzschia* cells containing domoic acid from the Juan de Fuca eddy may break away from this region and travel down the Washington coast. Storm winds (downwelling) bring the cells with their toxins to shore where they get into the coastal food chain.

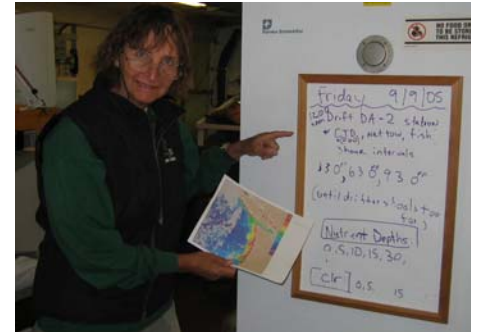
The 3-week cruise will survey the waters around the Juan de Fuca eddy, an area 100 miles in length. By sampling a survey grid of over 120 stations, scientists will better understand the biological, chemical, and physical properties of this region. A long-range prediction of northerly winds creates consistent conditions for sampling. The team will deploy the CTD array of sensors and collection bottles, tow for plankton and extract water sample for micronutrient studies.

The strong, northerly winds mean high seas and a rocky boat for all aboard. Despite the difficulty walking and the potential for seasickness, this is exactly what the scientists have been hoping for.



Chief Scientist Leads the Way

R/V MELVILLE BOAT DECK



Barb Hickey is determined to keep in good shape for her tennis game. She practices on an invisible court with imaginary balls, swinging her racket around the boat deck. "I won again!" she comments at the end of her workout.

Barb is the Chief Scientist on the ECOHAB-PNW cruise. It is her responsibility to watch the weather, juggle the needs of the different science groups, make a plan and communicate with the bridge. Barb is a professor at the University of Washington and an expert on the physical oceanography of the west coast. She draws upon her strengths when making the lead decisions: a good memory to recall details from different sites and the ability to put all the information together.

Barb completed a MA and PhD at Scripps Institute of Oceanography. Her PhD project was on El Niño. "In 1974 there were only 3 papers written on the subject," she reflects. Barb was one of the first women allowed to go to sea on a research cruise. Once, she had to spend a month ashore because she would have been the only woman onboard.

This research cruise is a great example of how times have changed. Over half the scientists are female, including both lead scientists. Thank you Barb for helping lead the way for women to excel in ocean science!