March 25, 2010 – Week #2: CLIVAR A13.5 Update

There are a number of graduate students participating on the cruise. Three students from SIO (the Scripps Institution of Oceanography, University of California, San Diego) are working as part of the alkalinity and pH measurement programs. In addition, the following five students are assisting with a variety of the scientific programs on the ship:

Benjamin Botwe (University of Ghana)
Ivy Frenger (ETH*)
Maria Hermann (Pennsylvania State University)
Katherine Morrice (Moss Landing Marine Laboratory)
Patrick Boylan (University of Colorado)

This is the first oceanographic cruise for many of the students. They will work together to prepare the next several weekly cruise updates.

Since our last update, we have completed 45 of our scheduled 129 stations and have made our way northward into calmer waters. We have covered nearly 24 degrees of latitude and are currently at about 32 degrees south and 1 degree east. We are making steady progress and have been completing about 3-4 stations a day. The stations have been very deep, averaging somewhere between 4500-5500 meters (about 3-4 miles). It takes about 3.5 hours for the CTD to sample the water column and another 1.5 hours to collect water samples from the CTD package when it returns to deck on the ship

The scientists have slowly been adjusting to their work shifts. We have a day and night shift, which rotate from 11:30 am-11:30 pm to 11:30pm-11:30am. In our spare time, we are keeping entertained with card games, movie nights, and stargazing. Several of the scientists have put together a ship-wide pool of the NCAA college basketball tournament. Bob and Dave are leading the bracket. We also have weekly safety drills and yesterday the fire drill came with special effects. We were all wondering if our eyes were just cloudy or if there was indeed smoke. It took a while for the halls to clear of the "smoke".

The air and water temperatures have increased quite a bit from near freezing at the start of the section to about 20 degrees C. The sun has also started to make an appearance and we've been able to enjoy being outside again. Now that we are in somewhat calmer conditions, we are starting to see more wildlife, including squid, mahi mahi, and other smaller fish that gather at night around the ship as we deploy the CTD. In addition to marine life, we have spotted several other ships as we head closer to regular shipping lanes.

There are 4 carbon system parameters being measured on the cruise: dissolved inorganic carbon (DIC), alkalinity, pH and pCO2 (the partial pressure of carbon dioxide in seawater) by teams from NOAA-PMEL, the Scripps Institution of Oceanography and NOAA-AOML (see attached photos). These measurements will allow us to better determine the ocean's ability to take up carbon dioxide from the atmosphere. The concentration of carbon dioxide in the atmosphere has been increasing rapidly as a result of human activities. This increase has important effects on the earth's climate. The ocean can absorb a significant amount of the carbon dioxide from the atmosphere and the results of our studies on this cruise will help improve estimates of the importance

of this process. As the increasing levels of carbon dioxide in the atmosphere dissolve in the ocean, this also changes the pH of seawater in a process called ‘ocean acidification’. As the ocean becomes more acidic, organisms that use calcium carbonate to build their shells, such as many shellfish, corals and plankton species, may be negatively affected. Our studies on this cruise will be an important component in understanding this process on a global scale.

---

*ETH=Eidgenössische Technische Hochschule Zürich or ‘Swiss Federal Institute of Technology Zurich’. (note: Although ETH cannot brag about having a powerhouse NCAA college basketball program, previous graduates include Albert Einstein and a large number of other Nobel Prize winners in chemistry and physics.)