NOAA Teacher at Sea
Christopher Harvey
Onboard NOAA Ship OSCAR ELTON SETTE
June 5 – July 4, 2006

Date: June 6, 2006
Time: 4:05 PM Hawaii
Speed: 0.0 knots
Depth: 4162.56 m

Entry
We have stopped the ship so that we can take a CTD reading. The CTD reading is a measure of Conductivity, Temperature, and Depth of a water sample between the surface and 500 meters below the surface. I was very interested in this because 1) it is the first time we have stopped the ship since we made our run out of Honolulu and a change of scenery is great when you are on a ship; and 2) the information that comes back from a CTD is very relevant to the information that I cover in my Earth/Space Science class (Mother, you will have to find some answers to questions I will pose, since some of the data contradicted my thoughts of what it should be.)

The data we are collecting is part of a time series, meaning that we are taking the sample at a specific point that has been sampled in the past and will be sampled in the future. Scientists can then use the data over time to make inferences about such things as an approaching El Nino or La Nina, suitable regions for supporting animal populations, and other such conclusions based on our basic oceanographic data. In addition to temperature and depth, the CTD measures the amount of oxygen and chlorophyll in the water, as well as the ocean's salinity. Why is this data important? We'll get to that in a minute.

The CTD is nothing more than a weighted contraption with sensors built into it. It is picked up by a winch and then released at a rate of 60 meters per minute to a maximum depth of 500 meters. For this trip, we are going to take four CTD readings. It is a secondary mission for us, meaning the only reason we are doing it is because we happen to be in the area. As the CTD increases in depth, these are some things I would have expected to see:

1) Temperature should decrease (the deeper it goes, the further it is from sunlight)
2) Chlorophyll count should decrease (Chlorophyll is dependent upon sunlight as well. This is the same chlorophyll that is found in green plants on the solid earth, and is important because it is the most basic form of life for the aquatic food chain. Thus, the more chlorophyll, the greater the chance that an aquatic food chain could be established and supported in a given region of water. No chlorophyll would indicate a region of water that would most likely not be able to sustain life- i.e.- without chlorophyll there would be no plankton.)
3) Salinity should increase (Saline water is more dense than fresh water, so more saline water should be found at greater depths than less saline water)

4) Oxygen should be found in greatest abundance wherever chlorophyll is in greatest abundance. (Remember from Biology 101, chlorophyll takes carbon dioxide and sunlight and converts it to oxygen)

What actually happened was this:

1) Temperature did in fact decrease with depth, though only slightly. We were at a depth of over 4,000 meters and we only sent the CTD down 500 meters. Imagine what would have happened if we sent it down further!
2) The chlorophyll count went from about zero to its maximum at 100 meters, and then returned back to zero by 200 meters depth. This makes sense since most of the sunlight is absorbed by 200 meters.
3) The salinity of the seawater increased at first, then decreased, and ultimately ended up about the same as at the surface. This is the question I pose for you Terry (ask Marge for some assistance!): Why? One of my colleagues, smart-alec Amee, told me that it was because the Coriolis effect was stirring the ocean between depths of 0-500 meters. Is this true? (Remember, Amee is British so I must second-guess ANYTHING and EVERYTHING she says!)
4) Oxygen followed the same suit as I suspected and was at greatest concentration where the chlorophyll was at greatest concentration.

It was very interesting to conduct this investigation because the data that I use in class comes from surveys such as ours. This was another exciting science-geek moment for me because I seem to forget quite often that I am on a NOAA research vessel conducting the research and acquiring the data that many science resources across the world become dependent upon!

On the sociology side of things, our reality show would never cut it back in the States. It seems that we all just get along too darn well! No matter what we seem to say or do to each other, everything seems to come out positive. Imagine having classrooms with environments like this! Imagine communities cooperating like we do! Imagine entire cities or states or countries, or God-forbid, the entire world! The words of John Lennon come to mind: "…Imagine all the people…" I guess I am in a utopia of sorts, where life is different only for the time being. But just imagine!

…you may say that I'm a Dreamer, but I'm not the only one…