Hi OCN 201 students:

Greetings from 87˚ 31'N, 179˚E in the Arctic Ocean. (picture 1)
We are now a little more than 3 weeks into our research cruise and mostly we are settled into shipboard routines.

The cruise I am on is the US GEOTRACES Arctic cruise, part of the International GEOTRACES program and a component of a co-ordinated effort by several countries to cover the Arctic Basin during the same summer season. Canadian and German icebreaker research vessels are sampling other parts of the Arctic at the same time as us.
The goal of the International GEOTRACES program is to study a particular group of trace elements and isotopes simultaneously in many parts of the world's oceans to understand the distributions and develop a series of proxies that can be used to understand contemporary oceanic processes as well as paleo conditions as recorded by these same proxies in the sediments. The program started at sea sampling about 5 years ago in the Atlantic, and now we are focused on the Arctic.

One of the main goals of our cruise is to get water samples at various depths at particular points along our cruise track so that we can measure a variety of chemicals in each sample. From this data we can build up a large-scale picture of those chemical distributions within the ocean. As I will cover in one of the recorded lectures later, the way that certain chemicals are distributed in the ocean can tell us a lot about how the ocean is operating, things like where the water is coming from, how the plants are growing and many other things as well. It is important to understand how these chemical distributions that we can measures are connected to those processes in the ocean because these same chemical signals are also found in the sediments at the bottom of the ocean. When we understand how ocean processes properly then we can then use those preserved sedimentary signals to tell how the ocean operated when the sediments were formed, which can be tens of thousands to tens of millions of years ago. This is just one of the ways that earth scientists piece together the history of our planet, so that we can understand how climate has changed over very long periods of time.

We collect the water samples using a rosette which is a metal frame that has a lot of bottles arranged around its outside (picture 2). This rosette, with all the bottles open, is lowered over the side of the ship on a metal cable down close to the bottom of the ocean. Then we start to wind the cable back in and bring the rosette back up to the surface. We stop every so often and take a sample by sending an electrical signal down the cable which then closes the top and bottom of one of the bottles enclosing some seawater at that depth. We keep doing this until the rosette is back at the surface and we have closed all of the bottles. This way we will have water samples from a lot of different depths.

However, some of the chemicals we want to measure, like the aluminium, manganese and iron that we are measuring in our van, are easily contaminated so

we have to use a special sampling system that has almost no metal parts. Picture 3 shows this special rosette which has 24 bottles and is on a frame that is coated in plastic and is lowered using a cable that is also made from plastic fibres rather than metal. Soon we will get some samples from one of these and will start to make measurements in our van, I will tell you more about that next time.
Finally, here is a picture of a Polar Bear (picture 4) that came to visit us while we were on a station a few days ago. You can see her in this picture (#4) taken by Bill Schmoker, who is on board as our Polar TREC teacher.
Bye for now,
Chris Measures