Tue, Jan 5, 2010 at 9:25 AM

Subject: Scholes Cabin 5: Rose

Dear Stirling,

I promised to tell you about our big CTD bottle sampler, which we tried out for the first time yesterday. By now you know that 'CTD' stands for Conductivity, Temperature and Depth. We have been measuring those things up until now using the underway probe (UCTD) because on the voyage down here the vessel did not stop until we reached the ice. But the one thing the underway probe can't do is bring back water samples from the different depth for us to analyse. For that we need a much bigger instrument - about as tall as me, and 1.5 m in diameter. Its proper name is a rosette sampler. We call it Rose.

In principle it is really simple. We lower Rose down to the deepest level in the ocean that we want to measure. That could be 2 kilometres, but here we are in coastal water only 230 m deep. She has 24 'bottles' (tubes really, with a trapdoor on an elastic at both ends) arranged in a cylinder, with an electronic trigger holding them open. When we send a signal down the cable, the doors on either end of the tubes snap shut, trapping the seawater from that depth inside. We then lift Rose to the next depth, and close another bottle, and continue until we have all the samples we need. At the same time there are all sorts of other instruments attached to the frame, measuring temperature and conductivity (of course!), but also how much sunlight there is for photosynthesis, the oxygen content, and the chlorophyll fluorescence. They are switched on from the moment Rose enters the water, and give us a 'profile' on the way down. That allows us to work out exactly where we want to take samples on the way up: for instance, above and below the thermocline; in the place where the chlorophyll is greatest; at particular light levels or depths. Sandy, the chief oceanographer, does that by just clicking on the screen.

My job, with the other men on the team, is to help Rose out of the door. She is rather heavy, and a bit fat for the hatch in the side of the ship she has to squeeze through. Actually, Rose was bought for the new ship that is being built right now). There is a special crane that slides out, carrying the CTD safely past the side of the ship before lowering it with a powerful winch. Of course, when the door is open, we are outside the ship, in the snow and freezing wind. So we are dressed in our full polar gear, and are attached to the ship with harnesses, because there is nothing between us and the icy ocean. So far we have only done this in calm conditions. It will be much more exciting when we are back in the Southern Ocean!

When Rose comes back up, dripping wet, and is safely inside the ship, the oceanography girls get to work. Each person has a particular analysis to do. They tap water out of the bottles and rush it into the lab, where it gets measured out, filtered and treated with chemicals. We analyse the nitrate, urea, ammonia, phosphate, silicate, iron, oxygen and chlorophyll content of the water in the forward lab (Mom would feel quite at home. It is just like her lab). Samples are stored for more complicated analysis when we get back to Cape Town. We suck the seawater through sieves of different sizes to separate out the different types of organisms. Some of the sieves have very tiny holes - only 2 millionths of a metre. The filter membranes then get dried or frozen, and are taken back to land to see what we caught, and how much, using a scanning electron microscope.

It is nice to be busy again! We have not been able to use Rose up until now, because we were right among the ice while unloading. But now that we are just waiting for the weather to clear, only the bow is against the ice and Rose can take a swim every day.

Thanks for the nice email. It took me ages to learn how to kayak without falling out!

Love,

Dad

PS: Atka Bukta is pronounced just as it is spelled. I sometimes spell it wrongly as Akta. I think it is Norwegian.