

Subject: Scholes cabin 5: The ocean is lumpy

**10 Dec 2009 1353 UTM 35.2626 S 13.7124 E**

Dear Stirling,

No, I don't mean the waves on the surface, though they do give some clues about what is underneath! By 'lumpy', I mean that the ocean has three-dimensional structure. Most people just think of it as being a big, wet, salty mass, the same in all directions: east-west, north-south, and top to bottom. But it isn't! It is just as variable as the land, but the boundaries move a bit more quickly in the ocean, and there is that important third dimension, depth.

As we sail south, we will cross many of the boundaries. Already we have left the coastal upwelling zone, and are crossing cool, temperate ocean. In a few days we meet the 'Subtropical Front', where suddenly we are in a zone of rough seas and high algae growth. We cross out of it at the Subantarctic Front, and suddenly the water gets really cold. Then we pass the polar Front and start to see icebergs.

We measure the sea surface temperature all the time as we sail. Right now it is 19.76 C. We also measure how the water cools and changes in saltiness with depth. We don't have to stop to do that! We fire off a little 'missile' that trails a wire, and sends back the sea temperature as it sinks, before the wire snaps off after about 30 seconds. It is called an XBT, or an expendable bathy-thermograph. But that is such a waste! So today I learned to use a new toy, a towed Conductivity-Temperature-Depth probe (CTD). You wind a long, very strong rope to it, pull out a pin like on a grenade, and drop the probe off the stern. It sinks deep and far out behind. Then you wind it in, and download the data using Bluetooth. Really cool!

Tomorrow is your last day at primary school. You have done really well, and Mom and I are very proud of you.

Love,

Dad.