

**Subject: Scholes Cabin 5 (p): Gale force**

**20 February 2010 0930 UTM -42.5595, 8.6657**

Dear Stirling,

That little dimple on the synoptic weather map turned into a great big hole. We went pretty much through the middle of it, and now it is swinging to stern. The winds have been up to about 90 km/hr, which is strong but not dangerously so. (The winds at SANAE IV can reach 200 km/hr, making it impossible to go outside without being blown away). The swells are probably a bit bigger than they were on the way down, but we are more used to them so nobody on the oceanography team has been ill. All the same, it is quite tricky doing lab work when the beakers keep sliding around.

There is a lot more to keeping the ship stable under these conditions than I had thought. It is a tall ship, and is carrying containers stacked three high on the deck. Those factors both move the centre of gravity upwards, and create a sail area for the wind to operate on. Ships have a centre of buoyancy as well as a centre of gravity. As long as the centre of buoyancy is further from the centreline than the centre of gravity, the ship is self-righting. If the centre of gravity moves beyond the centre of buoyancy, the ship will roll over. So the job of the officer on watch is to continuously adjust the trim of the vessel, as well as its heading into the waves, to keep the rolling within safe limits. The big thing is to keep the period of the ship roll slightly different to the period of the waves. If they match they would be self-reinforcing, and the ship would wobble more and more until we either lost our deck cargo or turned turtle.

The bit that I did not understand until the Third Mate explained it to me: the waves are seldom just a simple set of ridges coming from one direction. For instance, yesterday we had two sets of swells, one from the southwest and one from the northeast. Then on top of that was the 'sea', the lower waves whipped up by the wind. That all makes for a very jumbled pattern, and he has to choose a direction that does not conflict with any of them. They can just glance out of the bridge window and read the sea as if it were a book. To me it still just looks and feels like noise.

Although the wind is howling around the poop deck while we launch the UCTD, it is so much warmer already that frozen fingers are no longer our main concern. Bringing the probe back on board without banging it against the side is a bigger problem.

See you soon. I hope you have fun at the regatta!

Love,

Dad