Date: Mon, Jan 18, 2010 at 6:48 PM

Subject: Scholes cabin 5 (P): Ghost ship

Dear Stirling,

We are in the middle of perhaps one of the emptiest pieces of ocean anywhere on this planet. Now that everyone except the ship's crew, the oceanographers and one meteorologist have left the ship, you can wander the corridors and decks without seeing anyone - especially since half of us are asleep at any given moment, preparing for the night watch or the day watch.

The sea and the sky are just different shades of stormy grey. Every now and again we are in a flurry of snow and there are still occasional icebergs around. It is not bitterly cold - the effect of the thermal inertia of the ocean is to smooth out big variations in temperature, and this is summer, after all - but I need to wrap up warmly when I go outside to do an underway CTD. We crossed the Antarctic Circle going northwards last night, which means that the sun does go down briefly at midnight, not that we can see the sun!

Yet despite the cold and winter darkness, in places this is one of the most productive oceans in the world. When the lack of trace nutrients is overcome - by an upwelling of bottom water, or by being close to an island like South Georgia, a source of iron, silicates and phosphates - there is an explosion of phytoplankton growth. On that foundation is built a many-layered marine ecosystem, with small zooplankton being eaten by larger zooplankton, and the large zooplankton by fish eaten by other fish, with birds and seals and whales at the top. On land it is hard to build more than three 'trophic levels' (grass is eaten by wildebeest which are eaten by lions), whereas here in the ocean you can have up to six. The reason usually given is that the conversion of energy between each layer on land is too inefficient to allow a tall pyramid. Only about 100th of the energy in the grass is turned into wildebeest energy, and a 100th of that into lion energy. But less energy is wasted among the cold-blooded, floating creatures of the sea, so the pile can be taller. I am not sure that is the full answer.

Another argument is that the organisms forming the base of the ocean food-web are tiny. Since it is a fairly consistent rule of nature that you have to be bigger than your prey, that allows plenty of scope for bigger and bigger predators, ending up with whales, the biggest living animals of all. They could not grow that big on land, because their legs would not support them and they would be too slow to be effective hunters.

But as in other ecosystems, a lot of the action is concentrated in a few key organisms. In this case it is a transparent shrimp a few centimetres long, called krill. Someone has calculated that there is more biomass of krill than just about any other animal - billions

and zillions of them (I haven't seen any yet - but occasionally tiny strange beasties survive the passage through the engine-room pump and end up on a filter paper in the lab). Krill is actually what the whales eat, and the krill eat phytoplankton, so effectively the food chain is three links long.

This ocean was once full of whales, but not any more. The whales were hunted to low numbers - some to extinction - in about 100 years. Whales are mostly protected now, and their numbers are recovering slowly. The top predators in this system are now fishing trawlers, which come from all over the world catch the dwindling supply of fish. Chances are, the fish or calamari you ate for supper came from these waters. It is hard to be a policeman in such a lonely place. Since most of the ocean does not belong to any specific country, there are no rules anyway.

Love,

Dad

Date: Mon, Jan 18, 2010 at 5:41 PM

Subject: South Georgia

Dear Friends

To my surprise, South Georgia has its own Government and with it a WEB site, which can be found at

http://www.sgisland.gs/index.php/%28h%29Welcome_to_South_Georgia

There are two WEB cams at the station. One is located on the beach end of Larsen Hut. This camera updates (takes a new image, every three minutes. It probably is not possible to make a date with Bob to have his photo taken, but it is a nice idea anyway!

Best wishes to you all,

Tom Roach

Waterloo, Ontario

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