

## Journal 27

### Monday

1. 072200Z February 05
2. Position: Lat: 65-05.2S, LONG: 149-59.8W
3. Course: 180T
4. Speed: 10.4 kts
5. Distance: 109.7 NM
6. Steaming Time: 10H 30M
7. Station Time: 13H 30M
8. Fuel: 3,137 gals
9. Sky: Cu, Ac, St, As 6
10. Wind: 180-T, 22kts
11. Sea: 180-T, 4-6 Ft
12. Swell: 180-T, 4-8 Ft
13. Barometer: 982.2 mb
14. Temperature: Air: 4.5 C, Sea: 0.6 C
15. Equipment Status: Normal
16. Comments: Pinnacle icebergs were sighted at 63-44.7S 150-11.3W (400') at 0417z, 64-18S 150-01W (500'+) at 2210z, and two at 64-22S 149-34W at 2210z. The pinnacle bergs were moving north at 1 knot. Tabular icebergs were sighted at 64-35S 149-59.5W (800'+). The tabular bergs were moving northwest at about 0.7 knots. A large number of pinnacle and tabular bergs (+20) sighted at waters in vicinity of 65S 150W, moving north .5-.7 knots.

MASTER, R/V *ROGER REVELLE*



Captain Dave takes a picture of an iceberg

## Chief Scientist report :

Dear All,

We sailed between 51 and 60 degrees south with relatively few weather delays. The last few days have been calm with 4 knots of wind. The improved weather and sea state conditions has enabled the resumption of Trace Metal and noon optics casts. With the generally good conditions we have continued to make excellent progress south. Currently at Station 100 - 65 S 150 W. The different water chemistry groups are working well with only minor equipment malfunctions or problems.

This week marked the crossing of the Subantarctic Front (53.5-54 S), Polar Front (56.5-57 S) and Southern Antarctic Circumpolar Current (ACC) Front (58.5 S). These fronts collectively comprise the Antarctic Circumpolar Current and mark the transition between water masses of the Subantarctic Zone north of the Subantarctic Polar Front and Antarctic Zone south of the Polar Front. These fronts were all located on the northern flank of the Pacific-Antarctic Ridge. Our shallowest station on the crest of the ridge was 2240 m. The ship-board ADCP (Acoustic Doppler Current Profiler) data showed that the strongest eastward velocities were associated with the Subantarctic Front and Southern ACC Front. The direction of the currents were strongly aligned with the orientation of the ridge and deep fracture zones in the ridge immediately downstream of 150 W. Interestingly the weakest upper ocean velocities of the three fronts was associated with the Polar Front. Increased water mass interleaving was seen as we approached the Subantarctic Front and within the Polar Frontal Zone. The Polar Front was clearly marked by a subsurface temperature minimum. This temperature minimum is remnant last winter mixed layer water that is capped by the seasonal thermocline in austral summer. At the Southern ACC Front there was a dramatic shoaling of isohalines, and increased surface nutrients. High nutrient values were observed within the mixed layer. It appears that at this front nutrients were supplied from upwelling deep water. Increased biological activity was also observed within the region from the fluorometer and transmissometer of the CTD/rosette package. Whales and seabird were also seen in region.

The vertical property sections show a dramatic difference in the water column properties north and south of the ridge. The property difference in the deep water masses are clearly evident in vertical property plots and the potential temperature-salinity diagram. Bottom water of the Amundsen Basin, south of the Pacific-Antarctic Ridge, have a higher oxygen and CFC concentration than bottom water north of the ridge. Surface water south of the Southern ACC Front is cooler and slightly saltier than surface water within the Polar Frontal Zone. Surface pCO<sub>2</sub> was super-saturated north of the Subantarctic Front, under-saturated in the Polar Frontal Zone, and now is again super-saturated in the Antarctic Zone. Many interesting discussion have been held amongst the various members of the science party concerning the dramatic property changes we have seen in the last week.

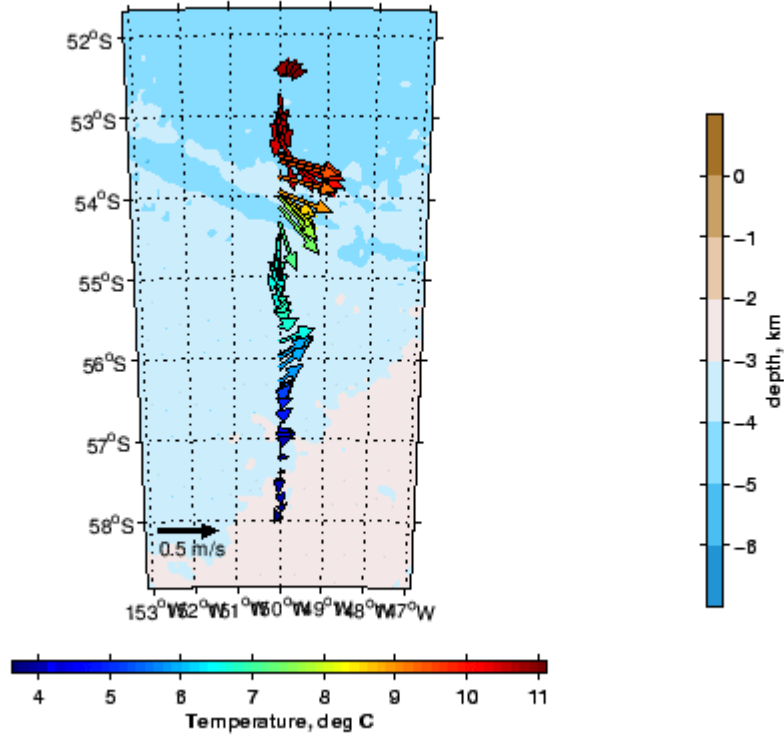
This week we also completed the deployment of the 12 ARGO floats. These floats were deployed for NOAA's Pacific Marine Environmental Laboratory (PMEL). This cruise provided an opportunity to deploy floats in a rarely visited part of the Southern Ocean. All float are working to expectations. This cruise deployed the 100<sup>th</sup> PMEL float that will contribute data to the Argo Project.

Ice bergs, and whale are now commonly sighted. A few penguins have also been seen swimming near the ship. These keep the ships crew and science party grabbing for their cameras. Needless to say the bridge has seen more visitors in the last week than they have all cruise.

Greeting from the sunny south

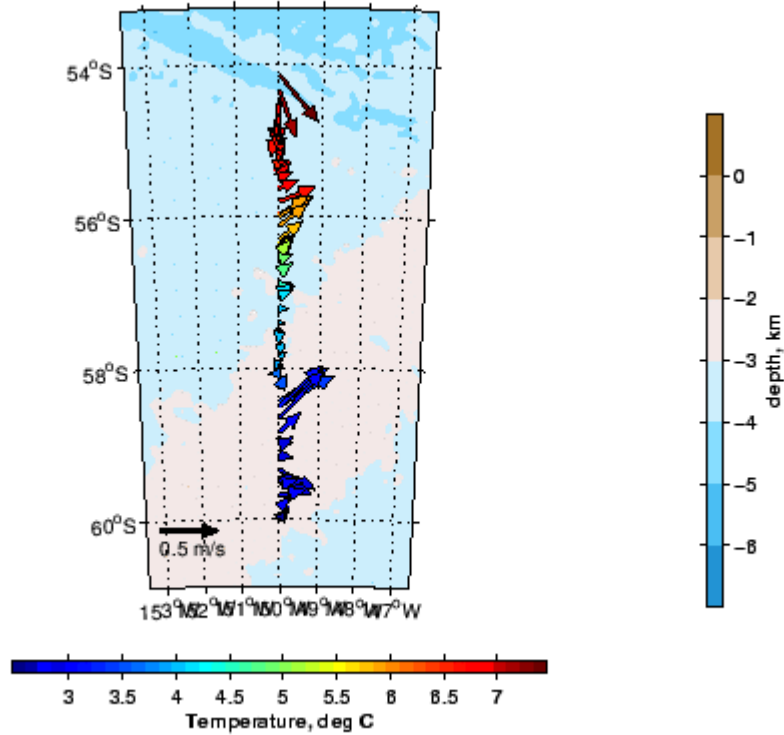
Bernadette Sloyan

P16Sa nb150 (2005/01/31 23:21:40 to 2005/02/03 23:18:12 UTC), 63–100m



preliminary ADCP processing, U niv. Hawaii  
2005/02/03 23:52:49

P16Sa nb150 (2005/02/01 23:21:20 to 2005/02/04 23:18:22 UTC), 63–100m



preliminary ADCP processing, U niv. Hawaii  
2005/02/04 23:53:49