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2 January 2010 – 9 January 2010

We had used the weather window around New Year's for water and sediment sampling at two stations north of the Polar Front with water depth between 4100m and 3700m. Two sediment cores up to 21m-long were recovered. They document the climate history of the last ca. 1 million years and therefore have a lower temporal resolution than we had expected in this area. Still, we are very happy with them, because in addition to siliceous microfossils (diatoms, radiolaria, silicoflagellates) they also contain calcareous microorganisms (coccoliths, foraminifera) in relatively high concentrations. Using these microfossils the age of the sediments can be determined immediately on the ship, because we have experts onboard for each of the different fossil groups. A first look hints that these cores are ideal to reconstruct the history of cooling of the Antarctic latitudes.

At a third station, the MUC (multi-corer) was deployed to extend our network of surface sediment samples, but bad weather approached quickly. The wind increased to 7-8 Beaufort (70km/h), wave heights reached 4-5m, and the ocean surface was broken by large swatches of seaspray. The MUC deployment was unsuccessful and we cancelled this station to flee south, away from the approaching low-pressure system. Since wind and waves were moving in the same direction as the ship, we were able to 'surf' southward at 12-13 knots (ca. 23km/h). Usually, our fuel efficient speed is 9-11 kn, at which we 'only' use ca. 30 t ship's diesel per day. Despite the bad weather, the ship was relatively stable, and the New Year's Eve party could finally begin (the party on December 32nd).

For 200 miles wind and waves pushed us south- right past an area that we had intended to sample extensively. But we didn't just sit around, we used the time to our advantage. Signals from the Hydrosweep and Parasound systems provided useful information on bathymetry and sediment distribution on the seafloor. On the way we got tantalizing glimpses of what lay thousands of meters below us. As we surfed towards the south we selected potential coring stations for the return trip. On the evening of January 2nd, we decided to turn around. Because of our relatively high speed, we had successfully avoided the worst weather conditions. Waves of 7 m had slipped by us to the north- directly in the path we would have been taking if our meteorologists hadn't warned us of the sea's impending rage. However, even at our southerly location waves were still high, and a return to the north was out of the question for the moment. The ship was 'parked' and turned towards the wind, and for 12 hours we bobbed up and down in the same spot, giving in to the whims of the sea.

Finally, we moved north again, first slowly, then at increasing speed until we reached the Polar Front, where the sea had already calmed down (to 3m swell). Then the crew snapped into action, and one station followed the next. Five locations that had been observed on our way south were selected, and we were able to successfully deploy both the piston and multi-corer. They will allow us to reconstruct changes in sea surface temperature, salinity, sea-ice extent, biological productivity and export of organic matter over the past 160,000 years i.e., since the penultimate glacial period. Together with results from our other transects across the South Pacific, we will obtain a multidimensional picture of climatically relevant parameters. But this required us to play



Work on deck: the CTD (left) is recovered, the piston core is being prepared for the next deployment. (photo S. Fietz)



Steaming in heavy seas (photo: S. Fietz)

'yo-yo' at the Polar Front!

On January 7th we crossed the crest of the Pacific-Antarctic Ridge with water depths of around 3000m and continued our way south towards the Ross Sea. The sea had finally vented its rage, and the surface was calm, almost like a pond. The number of icebergs steadily increased. Among them were giants with tops as flat as a table... a table sitting as much as 70 m above the sea surface! These enormous pieces are probably the tiny crumbs that broke off the Ross Sea ice shelf- a huge mass of ice separating East and West Antarctica and moving slowly, inexorably northward as it is fed by ice from West Antarctica. The edges of this ice shelf creep forward at a rate of up to 2 km per year and is a source for large icebergs that regularly break off and drift northward with the currents, slowly disintegrating as they move into ever warmer waters.



The iceberg cathedral (photo: S. Fietz)

On January 9th, we had our southernmost station at 68°43'S, 164°48'W surrounded by huge icebergs. We had originally hoped to find the sea ice edge in this area, which in previous years in early January was located even further north than our position. On satellite pictures we could see that it had moved south only 1-2 weeks before our arrival. The melting sea ice and the disintegrating icebergs had led to the development of a 50-80m-thick layer of water with low salinity at the surface that showed an abrupt change to higher salinities farther down in the water column. In this surface layer the water was thriving with plankton and our sampling nets were filled with a thick, brown soup.

No wonder a lot of birds were flying around us. They were thoroughly enjoying the bounty the sea was providing! Unfortunately though, seals, penguins and whales were not seen. The arrival at our southernmost location and also the 55th station was celebrated with a barbeque on deck. Meat, meat, meat, in all its wonderful variety was grilled on two big barbeques. Moreover, there were salads and bread, washed down with a beer or a glass of Chilean red wine- all in front of the icy giants drifting lazily by us on their final journey to the north.



Funny companions in the South (photo: S. Fietz)

Don't get jealous...
in the name of all participants!

Rainer Gersonde
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