

The second week of our cruise was determined by the physical oceanography programme. We passed the southern boundary of the Antarctic Circumpolar Current and reached the Weddell Gyre. Whereas the Antarctic Circumpolar Current represents a closed current system around Antarctica, the Weddell Gyre is one of the three large subpolar current systems, located south of the Antarctic Circumpolar Current.

The Antarctic Circumpolar Current, earlier named Westwind Drift, is the most extensive ocean current system on earth. In this system 130 to 140 million cubic meters of water per second are transported from west to east around the Antarctic continent. To get an impression of this vast amount of water moving along, please consider that all rivers on earth together carry only about 1 Mio. m<sup>3</sup>/s of water to the oceans. The oceanographers count these tremendous volume transports for the sake of simplicity in Sverdrup (1 Sv = 1 Mio. m<sup>3</sup>/s). The Antarctic Circumpolar Current connects the three basins of the Atlantic, Indian and Pacific Oceans to one unit, the global ocean. This is of great relevance for the contribution of the ocean to climate processes. It is of special interest if climate variability, either by natural or anthropogenic causes, should be understood. Heat storage and heat transport in the ocean are important processes in this context and it is easy to understand that they are strongly affected by ocean currents. It is the aim of our research programme to detect variations in the Antarctic Circumpolar Current and by that, in cooperation with the ocean modellers, quantify the relations between the oceanic and the climate variations.

In the east, the Weddell Gyre carries warm and salty water masses from the Antarctic Circumpolar Current toward the Antarctic coast. In the west, cold water flows back to the north. This clockwise current system extends over more than 2000 km from the Antarctic Peninsula to 30° East and from the mid-ocean ridges at about 55° South to the coast. In this large-scale gyre 50 to 60 Sv of ocean water are turned around.

To measure the water mass properties we carry out vertical profiles with the CTD and the water sampler every 30 nautical miles. The combination of the vertical profiles produces transects which show the distribution of temperature and other water mass properties on a vertical plain. To detect the time variability between the POLARSTERN-cruises, instruments had been moored which we are now recovering and redeploying for the time period to the next cruise. The work progresses to the best of our expectations. The weather is unexpectedly calm and an experienced team of crewmembers and physical oceanographers work hand in hand together which is the key to our success.

On Saturday morning we crossed 60° South and are now in the Antarctic Treaty Area. The planning of the further development of the cruise is very much influenced by the need to transport one of the AWI planes (POLAR 4) from the British Rothera Station to Punta Arenas. After a hard landing it

is not able to take off again. The planning process is still ongoing to find out an optimal solution how to satisfy the logistical needs and affecting as little as possible the sciences programme of our leg. Next Friday we will arrive at Neumayer Station and bring fuel to the station and load material to be brought back to Bremerhaven. Until then we will still have an extensive biology station in the area between Maud Rise and the Antarctic coast as well as ongoing CTD and mooring work. We hope that the good weather will keep so that we will be able to work as successfully as during the past week.

Even on board it is noticeable that there is Carnival season. Saturday night, a Carnival party in Brazilian style with Samba and colourful decoration and make up was celebrated in "Zillertal", the bar on board. The combination of good progress of work and joyful parties during the off hours is a sound basis for good mood on board.

With the best regards from all on board  
Eberhard Fahrback