

ANT XXIII/3 Weekly Report No. 1 January 20, 2006

Research icebreaker Polarstern left Cabo Negro on Saturday evening at 20:00 from the methane terminal just outside Punta Arenas where the ship was getting filled with fuel. On board were 44 crewmembers (4 women) and 43 scientists (19 women). Far away from parity in spite of a noticeable effort from the French side. 9 nations are represented: Germany, France, China, Korea, Netherlands, Austria, Spain, Chile, and Italy.

The evening in the Magellan Strait was delightful: Punta Arenas slowly disappeared in the distance, we turned around Marguerite Island ... and nature organized a welcome party for us: at first the whales, the rorquals commons of which we could see the fountains, then the albatros and finally the Commerson dolphins. These black and white dolphins showed as a ballet by swimming in formation and surfing the waves. Even the sun broke through the clouds.

Why are we here?

The Antarctic Circumpolar Current (ACC), the world largest current, is a key element of the global climate system. This 2000 km broad ring of cold water which encircles the Antarctic continent is pushed eastward by the strong westerly wind belt. The ACC is constricted to its narrowest extent (700 km) in Drake Passage thus a convenient place for observations. Monitoring the ACC transport and water mass characteristics is essential for understanding the coupling of this major current with climate change. It is not an easy matter since the current is concentrated in highly variable narrow bands of swifts currents and energetic eddies of all sizes are numerous. Our experimental set up is designed to use the complementarity between satellite and in situ observations. Satellite altimetry measures the sea level of the ocean along tracks every 10 days with a horizontal resolution of 7 km. The in situ measurements will provide information on the vertical structure of the ocean, information that cannot be obtained by satellites.

The two main tasks of the expedition are the deployment of a currentmeter mooring array along a ground track of Jason altimeter satellite and the realization of a refined array of hydrographic stations with numerous chemical tracers to properly examine the water masses (characteristics, source, age, mixing, modifications since the WOCE A21 1990 cruise, etc)

Sunday was spent looking for the equipment in the containers, emptying the containers, preparing the labs, the CTD rosette, the mooring equipment with a glance from time to time to gorgeous mountainous Tierra de Fuego on starboard. We are amazed by the way the Polarstern is set up with its equipment in terms of cranes, fenwick... The crew is very efficient. Thanks to the efficiency of AWI logistics department, all is on board, so everybody is grateful and happy. The albatros and others which flew restlessly over the ship, hoping for fish nets, probably took us for a very busy floating ant nest. We passed San Diego cap by the end of the afternoon. The

JASON satellite flew over our track around 17:59 at an elevation of 1336 km.

Our work this week was governed by the rhythm of two main activities: the CTD/LADCP/ rosette stations and the mooring deployments. Mooring deployment can only be performed during the day for security reasons. The moorings, that we hope to recover in two years from Polarstern, are made of a cable carrying autonomous instruments, mainly currentmeters, and flotation. They are anchored on the bottom thanks to a weight made of old wheels of German trains. On their head they carry a beacon. We use a parachute to avoid extreme tension on the cable during the fall of the weight to the bottom. Polarstern is equipped with the Posidonia system which enables following the fall of the mooring to its definite place and then be certain of its final position.

CTD/LADCP/rosette stations can be carried out around the clock day and night. Thus, the hydrography people work in shifts. This instrument records vertical profiles of temperature, salinity, oxygen, horizontal velocity, chlorophyll fluorescence and turbidity. It is equipped with 22 bottles of 12-litre capacity that can be closed at desired depths. The water samples are divided up amongst the chemists on board who measure various properties of the water.

On Polarstern after each cast the instrument does not stay on deck outside, rather is entered inside and the people taking samples are comfortably protected.

The first CTD station started at 4 am on Monday and since then the rhythm of one station every 3 hours has been only stopped for mooring deployment. The CTD/LADCP/Rosette has worked perfectly. The crew who is very careful noticed that the cable was damaged. They installed the instrument on another cable. There are two winches for the CTD on Polarstern!

During this first week (Saturday night 14 Jan- Sunday night 22) we have carried out 36 hydrological stations and deployed 7 moorings. Thus, the CTD/LADCP/rosette has gone down and up about 280 km, 8000 l of seawater have been taken on board and about 2000 water samples were taken for chemistry analyses.

The 7 moorings have been swiftly deployed even the two difficult ones over steep topography and in presence of strong currents. The Posidonia system is a great security. All the moorings have been located with accuracy.

Everything went smoothly, peacefully and very efficiently. Much faster than expected. Everyone is very satisfied.

We are very fortunate. The ship is so comfortable that even with 7 Beaufort like Sunday the rear deck does not move at all and people could sit on the benthos in the sun. The members of the crew look after us so well. They are doing their best to make our stay profitable and comfortable. With much

success.

On top of it, the food is delicious and the weather very calm with even sunny days.

We have two bird observers on board very good at sharing their passion for the spectacular and precious fauna. To add to this, it is now planned that the ship calls in two Antarctic bases. After such a spoiling experience we may become picky.

Cultural differences are being overcome: the official time for the evening meeting is 19:30 for the German and 19:15 for the French so that everyone gets in the room at the same time.

With best wishes from a peaceful, highly performing and high spirited ship.

Christine Provost