ANT XXIII/1 Weekly Report No. 2 20 October - 26 October 2005

After finishing our acoustical tests and our first major tracer station in the Bay of Biscay, we headed southwest for our visit to Vigo, the capital of Galicia in northern Spain. This visit was a tribute to the team of former Spanish crewmembers who have worked on Polarstern since it came into service in 1982. These sailors, many of them from Vigo, were the experts in the deployment of highly varied and continuously evolving instrumentation required by scientists for their investigations of the polar oceans. Most of them are now retired, but one of them, Saturnino Pousada, is still in service and presently on board. On the evening of our arrival, a barbecue party was organized where the sailors were invited with their families. This was a great reunion for all who had worked with them for so many years. There were many children among the visitors who could now see the ship where their grandfather had lived the adventures he certainly had told them about extensively.

The AWI also took this opportunity to promote Spanish-German cooperation in polar research. On Sunday, Polarstern's blue saloon was used as a venue for a meeting of the Spanish SCAR (Scientific Committee on Antarctic Research) delegates. On Monday, there was a press conference followed by a seminar on "Spanish-German cooperation in Polar Research: past, present and future" to which about 50 Spanish scientists had been invited in the lecture room. Afterwards they received a tour of the ship, and for this purpose we had prepared posters and exhibits to show the work we are doing on this expedition. The festive day ended with an official reception on the bridge attended by the German consul in Galicia, a representative of the German embassy, and the harbour captain. An exquisite buffet had been prepared, a worthy completion to our visit. Our visit had attracted extensive interest from the local media. Saturnino was live on TV and there were many reports on the unusual but highly valued visit of an Antarctic icebreaker to the Spanish fishing port.

Vigo also meant a change in participants of our expedition. Captain Pahl was replaced by Captain Schwarze, and with a somewhat changed crew and a group of now 37 scientists we left Vigo early Tuesday morning. We started right away with the underway measurements in surface water, an essential part of our tracer program. In our evening meetings we resumed the lecture program that we had already started before Vigo. The first talk explained the scientific background of the bio-optics program, which has the objective to measure the particle-bound organic carbon in surface waters from space. If we manage to develop this new capability for satellite applications, this can help us to better understand the ocean carbon cycle and its role in climate change. In the early nineteen seventies the first systematic attempts were made to use pictures from aircrafts to determine the distribution of algae in the ocean. It was shown that with a proper selection of colour filters, pictures could be used to determine the amount of chlorophyll in surface waters. After the launch of the first ocean colour satellite in 1978, we were able to obtain the first, albeit not

perfect, worldwide view of algal pigment (chlorophyll) concentration from space. Since then ocean colour science has advanced rapidly and at present several satellite missions provide data continuously over the global ocean. Nevertheless, significant challenges remain because seawater contains a great variety of constituents that influence ocean colour, and these con---stituents vary with time and from place to place. For example, it is often hard to distinguish the contribution of algae and of other suspended particles to ocean colour, especially in turbid coastal waters. And the relationship between the green colour originating from the chlorophyll in algal material and the amount of carbon in suspended particles changes from place to place.

Our bio-optics group measures a wide range of optical parameters in surface waters, like absorption and scattering of light at different colours. They try to find relationships between these optical data and parallel mea---sure--ments of plant pigments (e.g. chlorophyll), the type and amount of sus-pend-ed particles in the surface water, and of the organic carbon content of these particles. The bio-optics stations are carried out around noon when the satellites pass, giving the best opportunity to make a so-called “ground-truth validation” of the satellite information, provided we have a clear sky. For the oceanographer, not only clouds but also all changes of the sunlight in the atmosphere constitute an unpleasant blur in front of the eyes of the satellite, for which corrections have to be made. But for the atmospheric scientists on board, this “atmospheric correction” is the essence of their work as it contains information on the composition of the atmosphere. We still have to learn a lot from each other.

We had some rougher weather when we sailed off Gibraltar heading for the Canary Islands. Apart from the usual stomach problems this brings for some of us, we are all well and send you our best regards

Michiel Rutgers van der Loeff, Chief Scientist ANT XXIII/1