

At the beginning of this week a heavy storm welcomed us. Waves up to five meters and above shook us through, but "Polarstern" continued undauntedly its profiling work within this extreme environmental conditions. But of course the gale created a reduction of the ship's speed and thus a reduction of the work progress. Before the storm all members of the expedition had to ensure that all instruments, computers and personal items were fixed sufficiently in order to avoid severe damages. However, as fast as the storm appeared as quickly it vanished. In the middle of the week the swell, reminder of the gale, declined quickly and the so successful helicopter magnetic program was continued.

During this expedition the main goal of the geophysical program is a detailed magnetic and gravimetric surveying and mapping of the Scotia Sea. For this project an area was selected of which the geological and geophysical structures are widely unknown, and thus of special interest. The results of our work will contribute to the development of new models for the opening process of the Drake Passage, which is considered as an ocean gateway between South America and Antarctica.

Detailed geophysical information exist already in the western part of the Scotia Sea, which permit reliable modelling of the geological history for this region. However, for the central Scotia Sea in depth knowledge does not exist. As an example, different ideas about the dating of the sea floor of this region are controversially discussed, which lead to conflicting model assumptions. Magnetic lineations which are oriented orthogonal to each other demonstrate the complex structure within the upper crust in the near vicinity of the anomalies.

The ship-borne magnetometer as well as the gravity meter and the completing helicopter-borne magnetometer are employed to measure the local physical parameters of the Earth's magnetic and gravitational potential fields. The interpretation of these observations will help to define the age and structural parameters of the surveyed area.

During this week 10 helicopter flights over a distance of 2800 km were conducted. Now the total range of magnetic flights is 6841 km. The lines are placed orthogonal to the ship tracks in E-W direction. This line pattern complements the magnetic measurements on Polarstern in optimal form. The results of the combination of both magnetic data sets confirm and even enhance the image of this complex structured upper crust.

The western part is dominated by N-S striking magnetic anomalies, whose amplitudes are obviously decreasing towards north and south. A correlation cannot easily be accomplished. In the southern region we covered with our profiles parts of the E-W striking already published well-pronounced anomalies. However, first helicopter flights in the central part of our investigation area revealed small-scale structures within a major negative

anomaly. Especially in the region where E-W and N-S trending anomalies are next to each other, additional flights and ship profiles are planned in order to understand and interpret the system of magnetic lineations. It is planned to cover this area with a network of flight lines with 5 km spacing. We hope for good weather conditions in the next to weeks to completely cover this area.

The Hydrosweep- and Parasound-Programs are recording continuously. The data is routinely edited and analysed within a day. Accordingly, preliminary maps of the sea floor topography are available for planning or scientific interpretation shortly after acquisition. Meanwhile we have covered an area of 32000 square kilometres with the multibeam sonar system. In the central region we discovered deep-sea graben, which cuts a 1500 m deep trough into the sea floor. The northern and southern limits of the 55 km broad graben are formed by extremely steep cliffs, of which the northern slope has an impressive inclination of more than 30°. From the gently downward sloping eastern limit of the graben it looks like someone has taken out a big portion of the sea floor with a huge shovel. Until now we have surveyed nearly 50% of this impressive submarine feature and are now heading forward to discover new structures and features of the sea floor, using the sonar systems.

On Thursday two stations of piston and multicorer sampling were done which was observed with great interest by the scientists and the crewmembers. Data from Parasound and Multibeam were utilized to select the optimal locations for these sampling sites. The first core taken in the centre of the above-mentioned graben, reached a length of 19.27 m in 3800 m water depth, using the piston corer. At the second site near the southern limit of our investigation area a 23.66 m long core was recovered from 3200 m depth. Multicorer and CTD were also deployed at both sites in order to collect information about the uppermost sediments together with temperature, salinity and pressure in the water column.

The two colleagues on Signy Island are doing very well. The temperature on Signy is now below 0°C, with snow from time to time. However the weather situation is generally good. Occasionally the sunshine invites them to make some short excursions to scout out the vicinity of the station. The new snow on the lichen and moss is a beautiful contrast to the rocks at the foot of the surrounding hills. Sea elephants, fur seals and sea lions, which have organized their wintering quarter near the British research station, stay in good distance to the campsite of our colleagues. These mammals seem to be adapted to nearby human activities, which take place during the austral summer season.

The first half of our expedition ended on Friday this week. We celebrated this date on Saturday evening together with two birthdays. It seems that we are now not as lucky with the weather as the week before. A very strong gale developed quickly and approached our working area. On Saturday we terminated our profile and sailed southward near to the South Orkney Islands.

About the gale and the continuation of the research program I will report next week.

Best regards from everyone on board and the scientific cruise leader  
Hans Werner Schenke