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We do hope that everybody back home celebrated a happy Christmas, as we did on board, although some unexpected things occurred. Unfortunately, we had to cancel our diving activities at the beginning of the week. Our dive master stopped the diving because of the frequent sightings of leopard seals. However, the other programmes continued as scheduled.

A large part of the scientific program is concerned with the motion and deformation of the sea ice cover. The ice drifts with velocities between 0.1 to 0.6 knots, driven by the wind and ocean currents. However, the ice drift is not uniform, and therefore there are locations where ice floes diverge, generating open water leads in between, and other regions where the ice converges, leading to ice deformation and subsequent thickening. Observation and computer simulations of these processes are essential for an understanding and prediction of sea ice in future climate scenarios.

To observe ice motion, a buoy array has been deployed over a triangular area 70 km along each side, southwest of the ship. Coordinated by the International Program of Antarctic Buoys, 22 drifting buoys were contributed by 4 different nations (Australia, Finland, USA, and Germany). Each of the buoys returns its position at least hourly, and most transmit this information via the satellite ARGOS system directly to the ship so that we are able to track their movement in real time. By observing the relative differences between the motion of those buoys, strain rates and deformation of the ice pack can be measured, which in conjunction with high resolution satellite data will be used to validate models of sea ice dynamics. Nearly all of the buoys will be recovered at the end of the drift. However, 3 buoys marking the corners of the array will remain, so that we know what happens to our study region after we leave. We are hopeful that these buoys will survive the summer and provide information on the sea ice drift well into 2005. So far, we have observed striking differences between the drift of the western and eastern buoys. In the west the buoys have slowly moved

southward during the 1 month observation period, while the eastern buoys have moved northward by about 20 km, indicating that we are in a shear zone between the central Weddell Sea and the ice on the continental shelf close to the Antarctic Peninsula.

In addition different helicopter-borne measurements of ice thickness, and ice type and concentration are performed over the same area. With the aerial photography program, a time series of high resolution images over the study region is collected. These images are analysed to determine the relative percentages of snow covered ice, new ice and open water, to determine fracture patterns in newly formed leads (relevant to the modelling), and to determine changes in floe size. Two flights 10 days apart showed a significant increase in open water from 2% to 8% along the northern leg of the array, and a small decrease in the western leg. A significant decrease in floe size in the north and east has also been observed. Ice thickness is measured with a towed electromagnetic (EM) sensor, the EM-bird. First results indicate that the ice cover consists of at least three different ice types: 2 m thick second-year ice with 80 cm of snow, and two types of first-year ice 1.6 and 0.8 m thick with 30-40 cm of snow. The results are in nice agreement with radar satellite data. Those radar images revealed that the thick first-year ice has actually been formed in the Filchner Ronne polynya and has drifted as a band with dark radar signatures to our study region. The images also show much stronger deformed ice towards the Antarctic Peninsula. Our thickness measurements indicate a modal and mean ice thicknesses of over 4 m in that region.

During the morning of the 24th three Christmas trees were decorated by different teams and the first Christmas feelings spread around the ship. The celebration in the Blue Saloon in the evening was a real success. Our colleague, being a writer, read a Christmas story of his own with humorous illustrations produced by one of the stewardesses. The satire covered events of our expedition. Our Christmas singing was also superb. Verses of the songs were performed in different languages (English, Finish, Flemish, French, German, Greek, Portuguese, and even Latin). Afterwards our Belgian team, which had planned all the details was strongly

applauded. For some of us the night continued for a long time so that only few people watched our floe to break apart. We decided to evacuate that piece of floe, the ship was anchored to after some crisis meetings. Several programs needed the continuous support of the ship and their areas were now separated by some meters of open water. *Polarstern* moved and was moored to its new position by late afternoon. However, the most important message is: work can continue without interruption and all pieces of our floe can still be reached.

The appearance of the messes changed today. The scientists fulfilled their Christmas present to the ships crew and served all the meals, giving the stewardesses a day off. No complaints were issued in spite of some unusual procedures.

All expedition members wish you a peaceful, healthy, and successful New Year.

Michael Spindler