

ANT XXIII/6 Weekly Report No. 7 (Cape Town - Cape Town)
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This time we managed to escape from the storm. The decision to start the last transect with the southernmost station was perfectly right. When the storm arrived in this southern part of the Lazarev Sea during the night from Sunday 30th to Monday 31 July, we already had sampled the area and were at 67°30'S, i.e. about 300 nautical miles north off the Antarctic shelf ice barrier and near the rather calm centre of the atmospheric depression system. In total we only lost 8 hours research time due to strong winds, that prevented to deploy the instruments.

Each noon, weather permitting, one helicopter flight is directed north to evaluate the sea ice conditions. As leads with open water between the ice flows are hard to detect from the bridge at night the visual observation reported by the nautical officer after the helicopter flight is very helpful to determine the ships track during darkness. This strategy helped to save ship time that otherwise would have been spent on searching, so that we are ahead of schedule. Thus, we are in a lucky and never expected position for a winter cruise.

Than "Murphy's Law" hit again - in other words: if something can go wrong, it surely does. Four engines power Polarstern, 3500 kW each, that are cooled by running seawater through two heat exchangers. The outlet pipe from the port exchanger is corroded and water splattered through a hole of 5 square centimetres. To seal this hole, the engineers had to shut down both port engines and mantel the pipe by a block of cement, as the proper refit can only be done in a dock at Cape Town. As a consequence, we prolonged our station work on Wednesday 2nd August for 18 hrs to allow the cement to dry before the cooling water could be switched on again.

The divers used this time to sample krill larvae under the sea ice. Two zodiacs were launched, one carried MASMA, the plankton pump, which the divers collected more than 1300 lively krill larvae within 15 minutes with. The larvae were concentrated in dense schools in ice holes and hiding between ice flows searching for food.

The group of physiologists became rather excited, eagerly prepared hundreds of vials and immediately started several experiments with these freshly collected animals. White trays with little plastic gars filled with filtered seawater were stored on every shelf in the cool container. Two glass fibre arms guided cold light from the bright xenon lamp directly to the working platform under the stereomicroscope. Warmly dressed scientists in red fur overalls and warm gloves examined every single organism in detail at minus 1°C for cold and long hours. Some of the larvae showed full guts indicating intense feeding under the ice. Beside ice algae and phytoplankton, other animals seem to be a major food component. In culture krill is even carnivorous. In biological terms this makes a lot of sense as cycling of food helps to maintain the survival of the population and therefore the

survival of the species in the context of the evolution. Other krill specimens had empty guts, a precursor for moulting. So obviously, food is not such a critical issue for those organisms that can harvest the rich sea ice community.

Krill have like all other marine crustaceans a hard outer carapax composed of chitin to stabilise the soft body tissue and to serve as exoskeleton. The disadvantage of such an exoskeleton is that it does not follow the growth of the organisms but keeps its size. In other words, the animal has to moult and form a new and larger outer armour once the soft tissue has filled the old shell as the krill body develops. To determine krill growths, one can simply measure the difference of size between old and new carapax. Several of the krill larvae moulted in the experiments and showed increase in body size. This is another indicator of the favourable environmental conditions for krill under the ice in winter.

The whale observer from the International Whaling Commission scans the horizon and the vast expanse of Southern Ocean for that ever-elusive whale blow. The initiative of collaboration with other Antarctic research programs aims to examine variability in baleen whale distribution and movements in southern waters in relation to their prey, Antarctic krill and sea ice concentrations. At this time of the year they would not expect to see a large number of whale species below 60° south, especially migrating species such as humpback whales. Species such as minke whales and orcas are much more likely to be found in Antarctic waters through this time of the year.

Even though these two last weeks have had scarce light hours and poor visibility conditions, an increase by a factor of 3 has been observed in the average rate of weekly whale sightings. This last week there were 8 whale sightings and even though it does not sound too much compared to sighting numbers from other seasons, it is just amazing to witness the harsh conditions in which these large mammals live. Most sightings have been minke whales in various ice conditions at considerable distances of the vessel. But occasionally we have been lucky enough to see these whales interacting with the ship, bow riding and swimming at very close distances through our transect lines; some were seen feeding in large open Polynjas with high bird abundances.

When whales are not present, it is always interesting to note the blowholes on the ice, as you can assume whales have been travelling through these areas not too long ago. Further wildlife observations such as Emperor and Adelie penguins as well as Crabeater seals are always remarkable events, that fill our data sheets with important biodiversity estimates, and also serve as an indicator of where there may be food and potential habitat for whales.

As we face the last week of sampling, the organisation of transporting personal and equipment back home has started. Today is another bright winter day with several sunshine hours. Picturesque icebergs drift by and Emperor penguins watch carefully the ship on station. We heard that it is

finally raining in northern Europe; that is good for the vegetation, that we miss so much in the midst of the endless palette of the colour white.

Uli Bathmann