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What an exciting and rewarding winter cruise this has been! The search for the best way into the ice, the shock of the first severe storm affecting us being as we were still in open water, the painful lessons of trawling in heavy ice, the strong will to reach the ice shielded Antarctic continent, the patience and cleverness to find our way out back north, the exhausting, long stations, the anxiety involved in establishing the ice camp for the diving station at the right location and the very successful accomplishment of this task, the bold decision to sacrify stations in the north in favour of a second attempt towards the continent, the long darkness combined with hard work in the chilling winds, crowned finally by the satisfaction of seeing our results fit together to the picture of a lively and diverse plankton in the winter ocean. We worked to the limits of exhaustion supported by a crew that fulfilled every wish as it arose. It has all worked out perfectly and we also finally got all the stations in the north. We have achieved more than expected in our most wishful dreams and are very pleased. What a wonderful experience!

The LAKRIS winter cruise was the first survey that was able to study the biology of krill, of plankton and of fish in the 600.000 km2 fully ice-covered area of the Lazarev Sea. The activity of organisms, especially those living under the sea-ice, and the number of animals in a reproductive state exceeded our expectations by far. We had concentrated our efforts on the upper 200 m layer and had planned to take only a limited number of CTD profiles down to the bottom during the entire cruise to determine the deep structure of the different water masses structuring the area. However the CTD went down to the bottom at 4,000 or 5,000 m depth 37 times accompanied by 29 trawls of a plankton net to 2000 m and three trawls of the krill net to 3000m. Feeding, growth, and reproduction are prominent features of organisms gathering and living directly under the ice. Microscopic examination and experiments revealed numerous deep-sea species as also being highly productive in winter.

Some research activities in Antarctica are still high-risk enterprises, even in times of satellite communication, complex weather forecast modelling and high-tech equipment. We experience this during our cruise especially when being faced with strong winter storms and wind speeds above 20m/s combined with temperatures below minus 25°C. This results in wind-chill temperatures below minus 50°C where man, equipment and ship are at their limits. Nevertheless we remained confident and the team spirit was excellent. All paid off in amazing scientific results.

One of these astonishing results is the patchy high krill abundance well inside the winter sea-ice area and just below the sea-ice far from any ice edge. At high biomass stations, the krill and its larvae are strongly associated to the sea-ice; larvae in particular crawl in caverns, cracks and gaps between piled ice-flows. Pelagic fishing with the krill nets does

not retrieve comprehensive information about the krill standing stock. Performing surface-under-ice-trawls or diving reveals a much more complete picture.

Adult krill in the Lazarev Sea in winter are concentrated in two areas: the northeast corner between 60°S and 62°S and north and west of Maud Rise. Krill larvae are also abundant between 65°S and 68°S. The clue for un--der---standing this distribution besides pure biology is physical oceanog--raphy, as the current system around Maud Rise obviously determines species occurrence. The adults and juveniles are about 10% smaller compared to the autumn population of 2004 from the same area. Although not as well fed as in summer, adults and larvae are in healthy nutritional state but have reduced metabolisms in relation to summer and autumn values. Starving is not an option especially for the larvae that do not have lipid reserves to sustain long periods. Instead nutrition of krill and its larvae seems to be based on protein, or, in other words, they may feed on the secondary production products (i.e. zooplankton) rather than on primary products (i.e. phytoplankton) as in summer. In fact most of the active zooplankters in winter are carnivores.

Another surprise was the high abundance of mesopelagic fish in the upper 200 m of the water column in the ice covered regions especially the lanternfish (Myctophidae; Electrona antarctica). The specimens had a body length of 30 to 40 and feed mainly on copepods, euphausiid larvae but also on other zooplankton. Other myctophids occur deeper in the water but all overlap in their range of the daily vertical migration.

Among the copepods, we could distinguish two groups – the sleepers and the feeders. Calanoides acutus, Rhincalanus gigas and deep dwelling Metridia comprised to the former group whereas Calanus propinquus and surface Metridia contributed to the second. The metabolic rates of the feeders are only slightly smaller compared to summer values whereas the sleepers show rather reduced activity. The sleepers pass the winter in about 500 to 1500 m water depths. Not moving in the calm environment of the deep-sea is like hiding in the pitch dark, as any move in water creates micro turbulences that can easily be detected by predators.

Mesopelagic chaetognaths and amphipods are such predators. Specimen of both groups hunt for every prey they can find, even their own species. More than 40% of the chaetognaths inhabiting the deep-sea have either full orange guts, brood sacks or well developed reproductive organs (tests or ovaries). Winter seems to be the season for sex and reproduction among these species. The same holds true for some amphipods that were found to carry either eggs or babies carefully protected by the legs of the mother. The amphipods are also aggressive feeders attacking any detectable prey in seconds, as ob----served in shipboard experiments. The offspring are no better than the parents. Some mother’s carapax were found cleaned by the hungry brood.

We are not starving at all. In fact the average weight per scientist

in----creased by about 1 kg. The crews average weight decrease by 0.5 kg per person; that speaks for excellent cooks and for hard workers. These statistics were obtained from weekly measurements in the engine workshop by the weight watchers club run by the ship's engineers. An estimate could be given of the performance for the next week and for each estimate deviating by more than 0.5 kg a penalty of 0.5 € was due. The collected and donated money of 343 € will be given to a children's hospital in Rostock.

Finally in the name of all scientists on board I wish to thank the captain, the officers and all crewmembers for their most skilful, and foreseeing constant help that also was offered in a warm human atmosphere. Some of our work would not be possible without their effort. Many thanks also to those at home that have interestingly watched our expedition into ice and wind and also have accompanied us retrieving data and presenting our first results. We are lucky for having completed our research and that we are on our way back to Cape Town were we dock on 21 August.

We are desperately looking forward to the rest of summer and ongoing nice autumn days and all the other pleasures awaiting us at home.

Perhaps until next time.

Yours Uli Bathmann