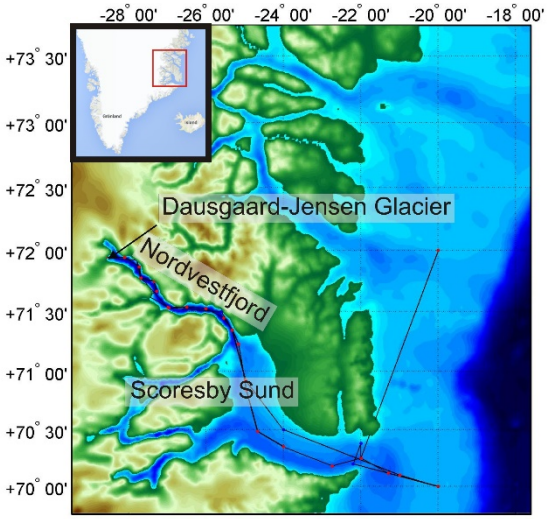
Research vessel Maria S. Merian

Expedition MSM-56; 02.07. - 25.07.2016

Longyearbyen – Reykjavík

**3rd weekly report**

**11.07. - 17.07.2016**




*Scoresby Sound in East Greenland.*

The Scoresby Sound (Greenlandic: Kangertittivaq) is world's largest fjord and the main study area of our expedition. Each day we are impressed by the extend of the fjord system: the width of the mouth of Scoresby Sound is 29 km - more than double of the opening of the Strait of Gibraltar. The fjord system covers an area, which is comparable to the size of Denmark. At the beginning of the week, we started the journey of 350 km from the mouth of the fjord to the inner end of the Nordvestfjord, where the massive Daugaard-Jensen Gletscher terminates, which drains about 4% of the Greenland ice sheet.

In the catchment area of the Scoresby Sound, several glaciers drain down the mountains, which are up to 2000 m high. These glaciers carved the ground and formed the fjords, which are up to 1600 m deep. In addition, this area is a primary birthplace of icebergs. During our transit, we passed giant icebergs, which often reached heights of 40-50 m and lengths of 1 km and more. In bright sunshine, we witnessed several times how they calved and capsized. The highest iceberg density was near the Daugaard-Jensen Gletscher, where we proceeded our station program.

Despite the size of the Scoresby Sound, the number of existing scientific studies addressing the processes in the water of the fjord are very limited. With our sampling, we started a time travel: one of the few well-documented expeditions in the Scoresby Sound was carried out with the German research vessel Polarstern. In September 1990, the study addressed primarily geological research questions. The well-documented data and availability of the results in the database PANGAEA allowed comparing our temperature and salinity profiles with the measurements from 26 years ago. The salinity at depth of the fjord was identical but the temperature showed an increase of almost +0.5°C. From an oceanographic perspective, this is an enormous increase. The observed warming might be

*Maria S. Merian vanishes in between the icebergs, which broke-off from Dausgaard-Jensen Gletscher. These giants commonly exceeded the height of the highest antenna of the ship (33m).*

attributed to the inflow of warmer water from the East Greenland Sea – a hypothesis, which needs to be verified after the cruise.

The large number of glaciers and icebergs and their meltwater contribution changed the salinity along the Nordvestfjord towards its mouth. The meltwater mixes down to 250 m water depth with the underlying salt water. This is important for our research, because we want to learn more about the impact of these salinity changes on the biology and chemistry in the water.

Only few members of the team can evaluate data on board, while most of us have to wait for the results back in the labs at home. Prof. Bente Edvardsen from the University of Oslo and Dr. Mar Fernandez-Mendez from the Norwegian Polar Institute measure growth and determine species of algae. They found large differences between the Kongsfjord, our first study area, and Scoresby Sound. Prof. Rudi Amann and Jörg Wulf from the Max-Planck-Institut for Marine Microbiology in Bremen and Prof. Leigh McCallister from Virginia Commonwealth University study species, number and growth of bacterial cells and also find differences between the fjords.

Although all plans of our cruise worked out perfectly so far, last Friday brought a drop of bitterness: we originally planned for a 2-day time series station during which we aimed at studying diurnal changes in the water column. However, we found only very little chlorophyll in the water so that we had to postpone the time series. Today, on Sunday, the algal production was still low and we decided to shorten the time series to 24h and two tidal cycles at the outlet of the Nordvestfjord. Unfortunately, tomorrow we have to leave this breath-taking place and work our way back to the entry of the Scoresby Sound.

Best wishes from research vessel Maria S. Merian, on behalf of the entire team of MSM 56,

B. Koch

Boris Koch