Research vessel Maria S. Merian

Expedition MSM-56; 02.07. - 25.07.2016

Longyearbyen – Reykjavík

**2nd weekly report**

**04.07. - 10.07.2016**

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It is an allegory for the background of our expedition: the geographic coordinates of our first station were adapted to a long-term monitoring station of our Norwegian colleagues. With that, our expedition data can be compared to existing time series. The position on the electronic map, however, was displayed on land. A false conclusion, because it was not land that the station was located on but the former terminus of the Kongsbreen glacier. This illustrates how quickly glacier retreat happens here and in most other glacier regions in the world. On Greenland, for example, approximately 300 cubic kilometres of ice melts every year.

*Large-scale filtration unit to separate phytoplankton into different size fractions (photo: P. Schmitt-Kopplin).*

This week, we completed our entire scientific program in our first study area, Kongsfjorden. Beginning at the inner part of the fjord, at the toe of the enormous Kongsbreen glacier, we sampled, in a three-day-period, four stations per day. The final station of this transect was located on the outer shelf of Svalbard. Our aim is to characterize biogeochemical fluxes in the fjord and their response to glacial meltwater.

The team on board filters large volumes of water for genetic analyses of phytoplankton and bacteria and viruses in the water. Different nets are applied to sample zooplankton and phytoplankton species and biomass. A so-called flow-cytometer can automatically detect and count cells in the samples. Carbon uptake by algae and bacteria (production) is determined in the lab. The fate of this production in the water is assessed by sediment traps, which catch sinking particles to determine amount and sinking velocity of these particles. This process is important because it can transport carbon into the sediments of the fjord. Using an aerosol sampler allows to sample particles from the air onto two filters each day. Finally, various techniques are applied to measure chemical parameters in different water depths: oxygen and carbon dioxide and optical properties of the water are measured directly on board. Later on, back in our home labs, samples will be analysed for nutrients, the chemical composition of the water (trace elements and organic compounds) and the

age of the organic matter. Even the contribution by meltwater can be assessed by chemical analyses of the water (helium concentration and isotopic composition of the water).

Obviously, there is lots to do on each station and sleep was short during these days. The workload got better when we started our transit to Greenland along 75° N latitude. Each day we sampled two stations and characterized water masses according to temperature and salinity, a dataset that will be compared to the results of an expedition with RV Polarstern, during which a transect along 79° N latitude will be sampled almost simultaneously.

*Arrival at Scoresby Sund (East Greenland). At the southern part of the mouth of the fjord, a 500 m tall wall of basalt and icebergs appeared (photo: B. Koch).*

After a fairly stormy passage through the Greenland Sea we reached the mouth of the Scoresby Sund today (July 10th) – our main study area. The ice conditions improved substantially over the last weeks so that we were able to start our sampling in the mouth of the fjord right away.

The whole team is doing well, particularly because we have such an excellent support by the ships technicians, electronics engineers, and navigators. And - last but not least, it is the great food, which keeps us happy and motivated to create new ideas during the meals.

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

B. Koch

Boris Koch