Expedition MSM84
St. John's – St. John's, Newfoundland

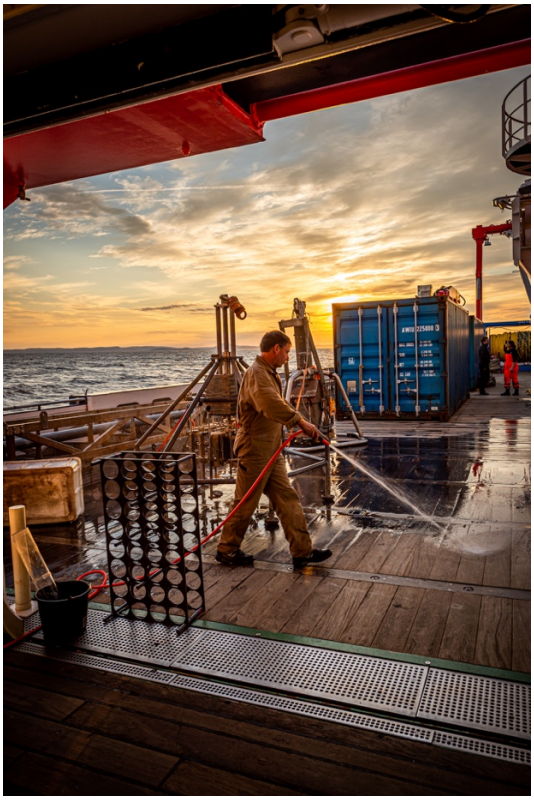
Weekly report no 2
June 24 to 30, 2019

During our transit to the working area, all equipment was installed and tested and finally ready to start. We reached Cartwright Trough in the evening hours of June 19 and immediately started our scientific program. The trough is easily recognized from the nautical charts, and with its u-shaped cross-profile points at a glacial origin; it was excavated from the otherwise rather flat shelf by a former ice stream.
Ice streams, similar to glaciers, leave characteristic marks (for example moraines), and this is exactly what we would like to find on the sea floor. The first days hence were spent with mapping the sea floor and the underlying sediment layers using seismic techniques. A first glance at the seismic data is promising – the geophysicists are working intensely to process their data within the next days, and we will explain more about the technique and results in the next weekly report.


The geologists brought up their first samples from the lake floor.
(Foto: Joan Vollerand)

We finished work in the Cartwright Trough area during the morning hours of June 25. Our second working area is located inside of Lake Melville, a fjord-type inlet that is connected to the ocean by a narrow strait. The ice stream that once excavated Cartwright Trough retreated through the Lake Melville basin at the end of the last ice age, and therefore we expected glacial marks also on the lake floor. In order to find these features, we mapped large areas of the lake using the so-called multibeam system. The multibeam is hull-mounted and uses sound to scan the lake floor topography with a relatively wide swath. In the maps that we generated from the multibeam data, we observed a series of moraines similar to those of today's glaciers.

Moraines indicate that the glacier – or ice stream – did not retreat continuously but rather step-wise. At each halt the glacier would deposite a moraine at the end of its tongue. By dating these moraines, we will be able to reconstruct the history of glacial retreat. To date the moraines, however, we first have to collect moraine samples. Along with the multibeam we also collect sediment echosounder data. The sediment echosounder images the layers below the lake floor and, depending on sediment characteristics, can penetrate up to 100 m. In the image that we collect from the sediment echosounder, we can recognize if the moraines are buried by sediments – and if so, how many meters of younger sediments were deposited on top of the moraines. To retrieve samples from the moraines, we use heavy geological equipment consisting of a sturdy steel pipe equipped with a top weight of 1.5 t. We drop the steel pipe into the subbottom layers and punch out a long piece of sediment. The pipe is then brought back to the water surface, and the punched-out sediment is cut into pieces of 1 m length, labelled and documented carefully. It can then be brought back to our home laboratory for further analyses. We are however not only interested in moraine material, but also in the overlying sediment layers that were deposited since the deglaciation. These sediments contain information about the climate of the past few thousand years, and if we use appropriate analyses, we can read in this sediment archive as in a book.
All in all, we collected more than 100 m of sediment cores during this past week.


Cleaning at sunset. (Foto: Felix Gross)

Saturday evening, we took full advantage of the nice weather and calm sea state and celebrated our “Bergfest” with a yummy BBQ. Bergfest means that half of the expedition is already over!

All participants are cheerful and send home greetings.

Lake Melville, June 30, 2019, 53°39.764’N / 59°30.791’W

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https://www.awi.de/forschung/geowissenschaften/geophysik/expeditionen.html