

Measuring Circulation in Sermilik Fjord, South-East Greenland

27th August – 7th September 2013

Preliminary Report

Swansea University Glaciology Group has gathered data from Sermilik Fjord at least once per year since 2009. To maintain consistency this year the aim was to take measurements from the same locations as in previous years (see Figure 1). Available funding allowed us to charter a local vessel for three and a half days, allowing us a relatively short window to collect the data. Our field campaign this year was carried out during early September allowing some logistics to be shared with another project run from within the Swansea University Glaciology Group. We used a new CTD probe equipped with sensors to measure salinity (via conductivity), temperature, and depth (via pressure). This was lowered off the boat tethered to a 1000m Kevlar rope and allowed to sink under its own weight. This method therefore requires that the boat does not stray too far from its initial position and drag the CTD probe horizontally through the water behind it. As a consequence of this calm weather is essential.

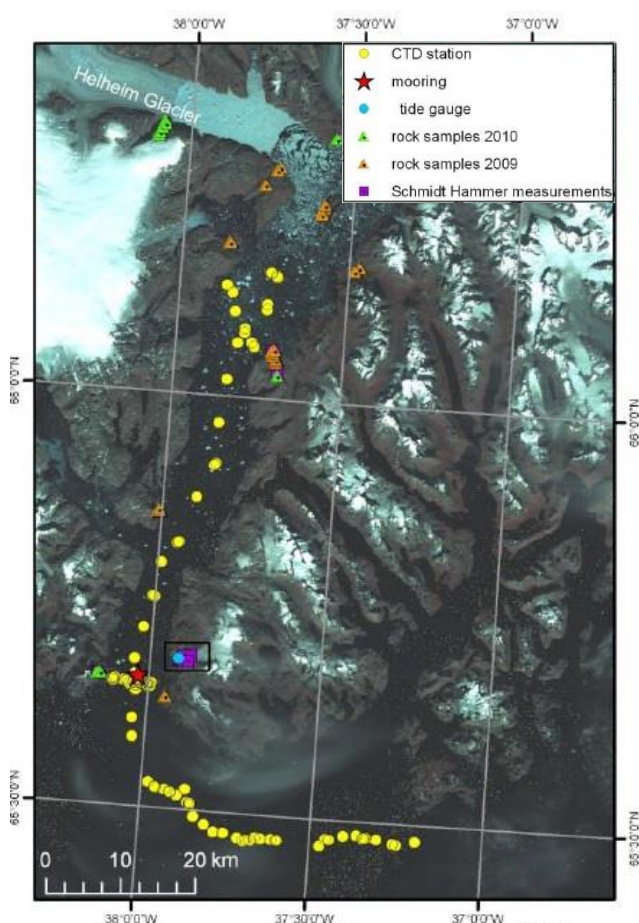


Figure 1: Field data collected by Swansea University during 2010, showing long profile, mouth- and mid-section profiles some of which were repeated during this summer's expedition.

We began at the mouth of the fjord on the first day, initially hoping to repeat the cross section across the mouth, however, the large swell meant that it was too hard to keep the boat in the same position and the CTD dragged behind the boat faster than it was able to sink. We therefore abandoned this attempt and moved further up fjord to repeat a cross-section around the mid-point of the fjord. We managed to complete three casts before it began to get dark and we had to get clear of the larger icebergs and find a sheltered spot to spend the night.

We made an early start the following morning and began on the long-section starting from the top of the fjord. Having noted that the new CTD probe was sinking much slower than the old probe used in previous years, particularly at depths greater than 300m, we added some extra weight; this significantly improved the performance and the speed of the casts. During the afternoon a particularly strong cross-fjord wind picked up quickly, pushing icebergs with it. Due to our position within the ice it

quickly became too difficult to continue taking measurements and dangerous to remain in the ice, so we were forced to move to a more sheltered location. The wind persisted for the rest of the day, which prevented us continuing to take measurements.



Figure 2: Prof. Tavi Murray and Dr Martin O’Leary carrying out a cast with the CTD probe.

Another early morning allowed us to continue the long-section; due to time constraints we abandoned the mid-fjord cross-section in favour of completing the long-section and attempting the mouth cross-section once again. We completed the long-section, however, as we approached the mouth of the fjord the swell gradually built up and the winds returned. After a number of attempts we had to abandon the cross-section and, because of the poor forecast for the next day, the captain decided it would be better to return to Tasiilaq that evening rather than spend another night in the fjord.

Due to a combination of limited funding and poor weather conditions the data we gathered this year was slightly less extensive than in previous years. Despite this, the fjord long-section provides vital continuity in the data series collected by Swansea University Glaciology Group over the past five years. This data series is essential in understanding the long term trends of variations in ocean properties which come into contact with marine terminating glaciers in south-east Greenland and we are currently in the processing the data in order to compare it to previous years.

Joining this expedition has provided me with valuable experience in conducting fieldwork in Greenland. It was also incredibly useful to me to be able to see the area I am studying and understand how the data, which I will be using to validate my model, is collected. This will allow me to more accurately identify any bias and limitations within the data and apply it in a more meaningful way. I would like to thank the Gino Watkins Memorial Fund for providing a grant enabling me taking part in the expedition.