

SAGES PECRE Award Report

Neil Fraser - SAMS

I am a final year PhD student in physical oceanography at SAMS/The University of Edinburgh. In October 2016 I was able to visit the University Centre in Svalbard (UNIS) on a two-week collaborative trip, thanks to funding from a SAGES PECRE award. The purpose of the trip was to work, alongside researchers based at UNIS, on the use of gliders to study the oceanographic properties of an Arctic fjord. As a result of the trip, the study is now ready for submission to a scientific research journal and will constitute a chapter of my PhD thesis.

I had previously visited Svalbard for a UNIS field trip in autumn 2014, where I contributed towards a project using gliders to make oceanographic measurements in Isfjorden, Svalbard. Since then it had been the intention of the course organisers, Ragnheid Skogseth and Frank Nilsen, and I to subsequently improve the study to the standard of a scientific research paper. After spending much of the summer of 2016 writing up the manuscript, I was invited to visit Svalbard in October to collaborate more closely with researchers there. UNIS were able to cover my accommodation fees and I applied to SAGES for £530 to cover my travel and subsistence, which I was kindly awarded.

The visit facilitated increased input from my two co-authors based in Svalbard, who are highly experienced in researching the circulation of Svalbard fjords and have numerous publications on the topic. A week working closely with them boosted confidence that the submitted manuscript was of the high quality required for scientific publication, while their experience of the publishing procedure was beneficial to me as a first time author.

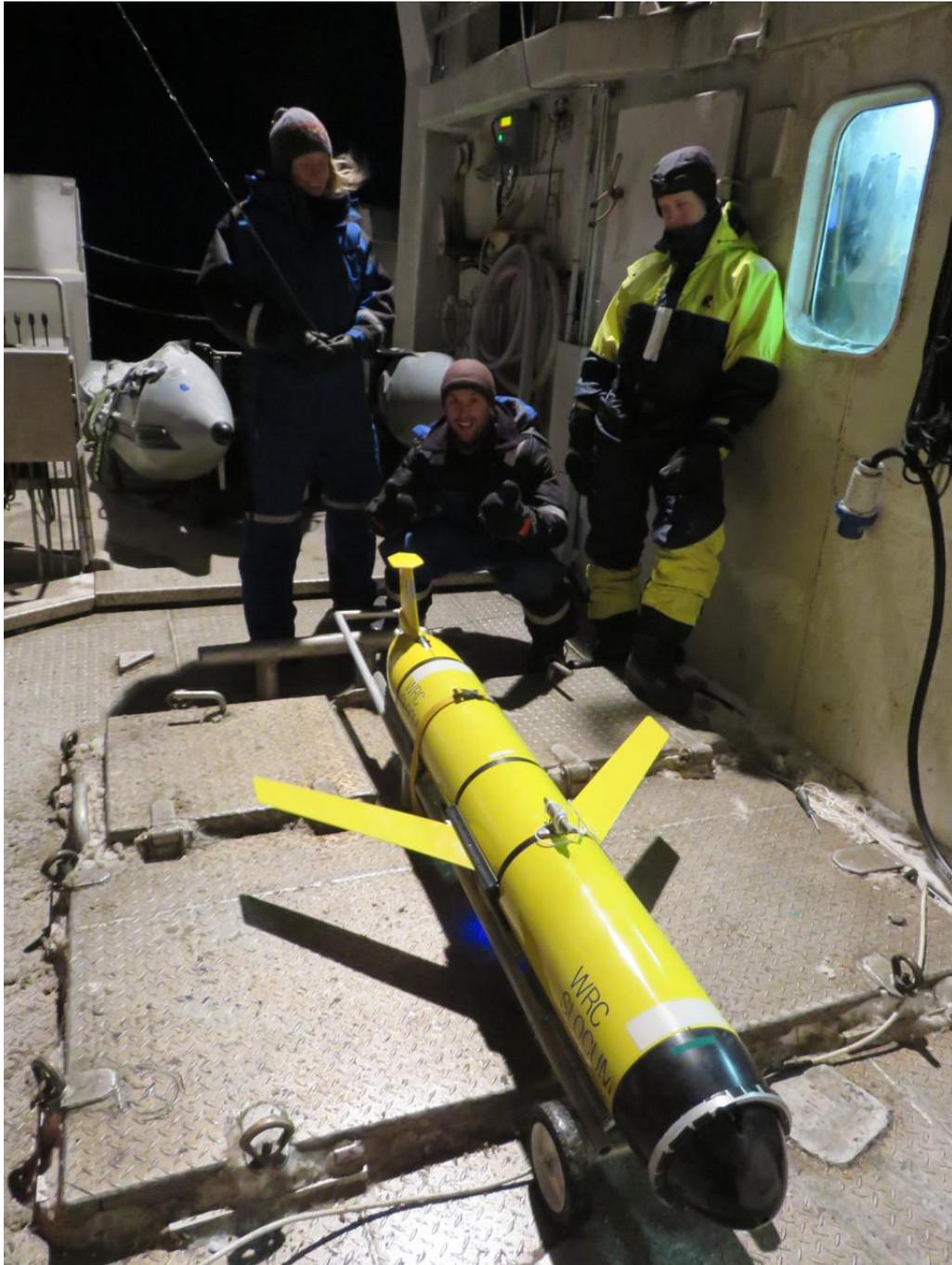
The results provided new insights into the way in which fjord/shelf exchange is governed by along-shelf winds and, in particular, revealed how this is manifested in the fjord interior. As a broad fjord, Isfjorden's circulation was highly influenced by the earth's rotation, allowing for three-dimensional flow patterns with cross-fjord variability. This behaviour had crucial consequences for the way in which inflowing Atlantic Water is distributed throughout the fjord interior.

The technique of using gliders to measure fjord circulation is a novel one, and I believe it will become a powerful tool in future due to the high spatial resolution of the current data it provides. I therefore believe that this study marks a significant step forwards in terms of methodology.

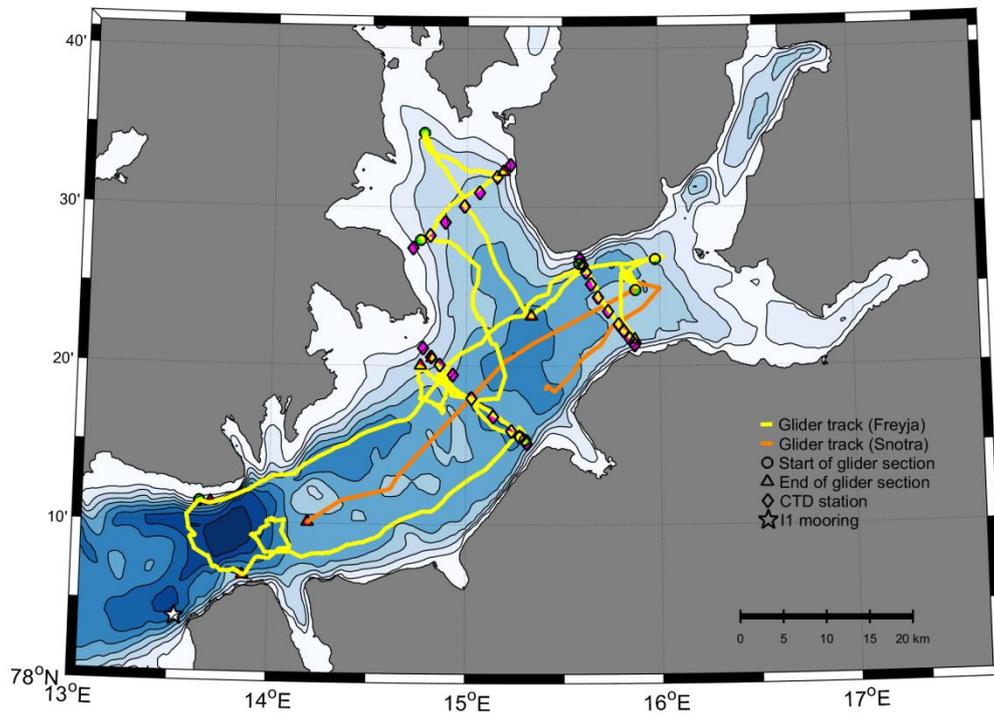
My visit in October 2016 opened up new collaborations in two ways: firstly, using gliders in fjords is a new methodology pioneered by the UNIS group, and one with which I have been able to participate independently; secondly, this visit would allow me to establish my own professional relationship with the UNIS group, and in particular with Ragnheid Skogseth, with whom there has been little direct collaboration until this work. My PhD project has placed me within a relatively small community of scientists studying circulation in Arctic fjords, and I hope to continue working within polar oceanography after I finish. Maintaining a strong working relationship with researchers at UNIS will likely prove invaluable when researching polar environments at postdoctoral level.



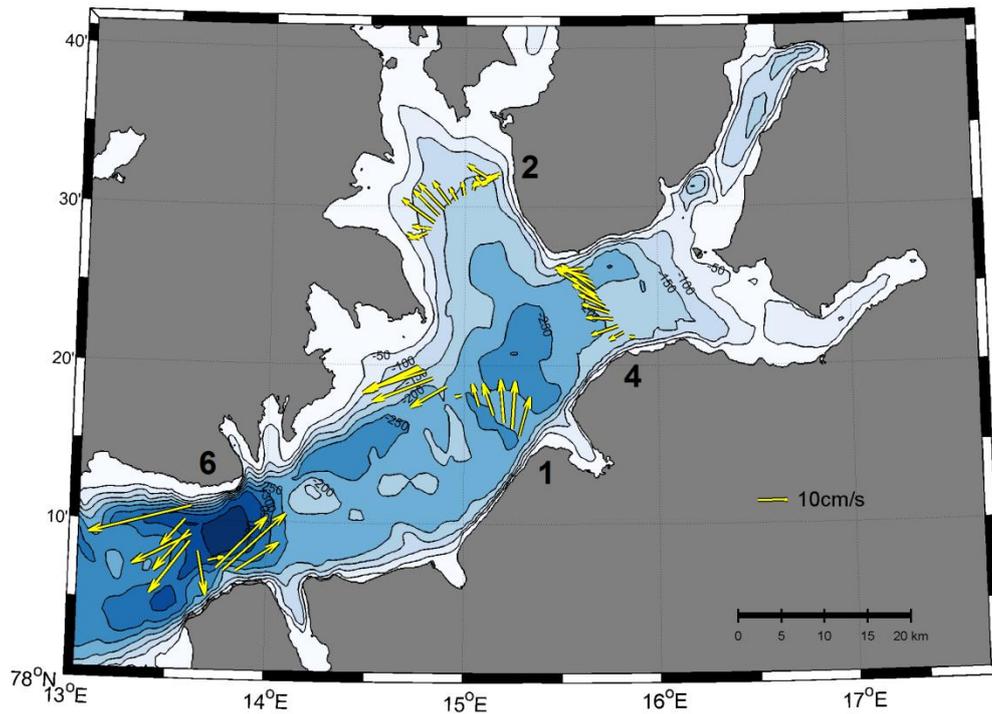
Glider deployment in Isfjorden (photos by Veronica Chan, BAS)



Glider on the deck of the UNIS ship, Viking Explorer (photos by Veronica Chan, BAS)



Route taken in glider survey



Depth-averaged current data from cross-sections of Isfjorden. Notice how the flow into the fjord is on the right, while the outflow is on the left, a behaviour exclusive to broad fjords.