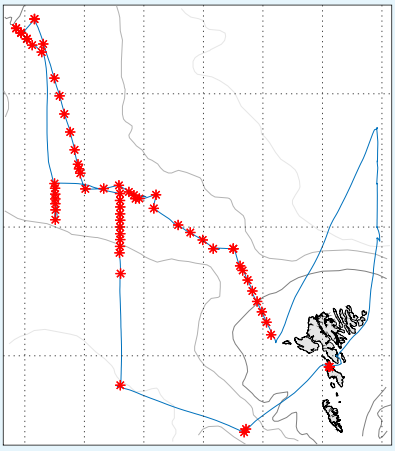
Standard hydrography

Mooring recoveries

Jákup Sverri, cruise nr. 2122
Period: 19-26/5 2021
Responsible PI: Karin Margretha H. Larsen



Objectives: *The objectives of the cruise were firstly to perform hydrographic research on the Iceland-Faroe Ridge, secondly to recover moorings and to monitor hydrographic changes in the ocean around the Faroe Islands. The cruise is part of the regular investigations along standard hydrographic sections. The Cruise is also part of the "FARMON 2020" project and the "Exchanges across the Iceland-Faroe Ridge" project.*

Summary

On the cruise, seven ADCP moorings and one ADCP trawlproof frame were recovered. Two of these were recovered north of the Faroes, four (incl. the frame) on the Iceland-Faroe Ridge (IFR) and two in the Faroe Bank Channel. Two Pressure Inverted Echo Sounders (PIES) were deployed north of the Faroes. A total of 54 CTD stations were occupied along the IFR and south of the Ridge, including standard section R close to Faroes. The last CTD station was occupied north of the Faroe Bank. In Skopunarfjord, three WP2 hauls were performed for comparison with similar contemporary sampling at the nearby aquaculture station in Skopun. Water samples for salinity analysis were sampled approximately every second CTD station and a few samples were also collected from the underway system. At all stations, the CTD measured vertical profiles of temperature, salinity, oxygen and fluorescence. During the whole cruise the underway Thermosalinograph was running as well as various echo sounders and the Ocean Surveyor ADCP.

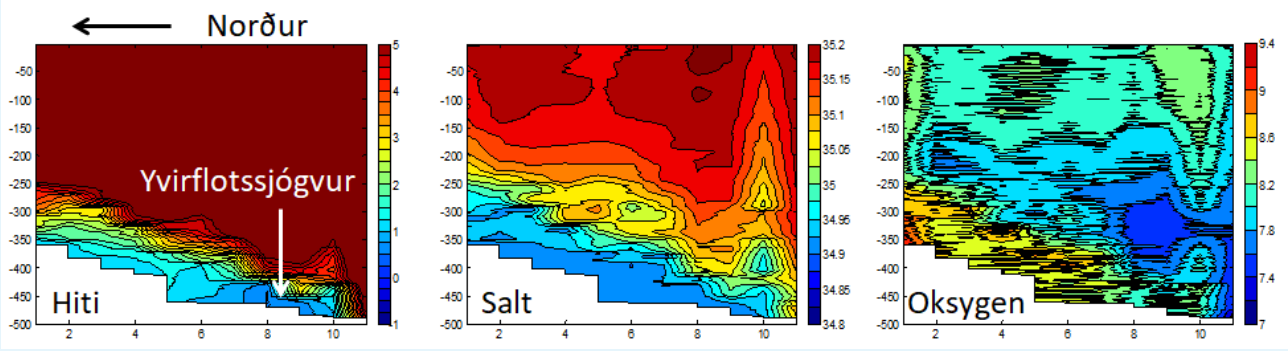


Figure 1. Preliminary results from a CTD section south of the IFR. Left: Temperature (hiti), middle: Salinity (salt) and right: Oxygen (oksygen). In the temperature plot a cold layer of overflow water (Yvirflotssjógvur) can be observed at the bottom. In the upper layers warm and saline Atlantic water is evident, while the high oxygen values close to the bottom at station 1-2 on the top of the Ridge indicate East Icelandic Water that recently has left the surface.

About the cruise

We left Tórshavn harbour on Thursday 20/5 at 1300. The Thermosalinograph was turned on in order to measure underway temperature and salinity. The course was set for the location of site NWNB north of the Faroes, where a mooring was to be recovered. This was Jákup Sverri's first mooring recovery, thus there were some issues in the beginning, but finally the mooring was successfully recovered. Next up was deployment of a PIES at standard station N05. A PIES is a combined pressure sensor and echo sounder, which sits on the bottom measuring the travel time it takes its echo to reach the surface and back. Since the sound velocity varies depending on the temperature in the ocean, the travel time can be used to locate the depth of the interface between the warm upper layer and the cold lower layer. During the deployment of the PIES, the PIES tipped over and was released from its stand, which also holds the anchor weight. Luckily, the PIES went afloat and was soon recovered, while the stand was lost. We now set course for standard station N07 where we were to deploy another PIES. Here, the crane was used for deploying the PIES and this time the PIES was successfully deployed as was the third and final PIES, which was deployed at the location of standard station N08. Now the course was set for site NWNM, where a long mooring was to be recovered. The recovery of the buoy went well, but it took about an hour to recover the mooring line. At the end of the line, four glass flotation buoys were attached and an acoustic releaser, but the flotation did not surface. When they were recovered, we noticed that three glass buoys were missing and large holes were in their plastic covers (Fig. 2). In two of the covers, there was some white powder-like substance. No one onboard was familiar with this, but after consulting a mooring expert in Norway, we learned that these glass buoys can implode if they have some damage. Probably one of them has imploded and has damaged the other two buoys, such that they also imploded.

Figure 2. The deep glass flotation on mooring NWNM. Three glass buoys were destroyed leaving only the plastic cover. Probably they have imploded (the opposite of explode) turning the hard glass into a white powder. The flotation had been deployed at a depth of approximately 2400 meters, but they should be able to resist the pressure at up to 6000 meters.

The work north of the Faroes was now completed and we set course for standard section R west of Mykines. Section R was occupied from the Faroes and westwards and we continued with CTD stations along the Ridge until we reached the location of ADCP moorings IFRD and IFRE. These two moorings were recovered in the afternoon on Saturday 22/05. We

then proceeded with CTD stations along the Ridge towards the Western Valley, which is the westernmost trench close to Iceland. We arrived on Whitsunday around noon and began recovery of two ADCP moorings, that belonged to the University of Hamburg, Germany. They were both successfully recovered and we now set course to the location of a bottom temperature logger, which R/V Merian had deployed on behalf of Havstovan back in 2016. The bottom temperature logger is designed to transmit data acoustically and the data upload from the instrument went well. We then did a CTD section across the Western Valley towards the location of another bottom temperature logger. Once at the location, we tried to upload the data, but we were not able to establish a connection with the logger.

Now we were heading back eastwards. We set course towards the Rosengarten Bank and occupied a CTD section from the top of the Bank and southwards. Next we went to a bank just east of the Icelandic border and occupied a section from the top of this bank and southwards. On this section, we observed a thin layer of overflow water in the southern part of the section (Fig. 1). This section was completed on Monday evening and we now set course further south until we reached more than 1000 m bottom depth. Here we occupied a CTD station in order to adjust the wire guide on the CTD winch. Finally, we set course towards the Faroe Bank Channel, where mooring NWFC and NWFB were recovered around noon on Tuesday 25/05. Then towards Skopunarfjord, where three WP2 hauls were performed. We were back in Tórshavn harbour on Tuesday 25/05 at 1900.

Samples

Table 1. Measurements and samples during the cruise.

Samples / Data	Overview
Underway Thermosalinograph	Surface 20/5 to 25/5
CTD-stations	55 stations (Section R and on the IFR. No samples were taken at station R08)
Salinity samples	Every other station in stable water
WP2 100 µm (50m)	3 stations in Skopunarfjord

Equipment

Sea-Bird 911+ CTD, WP2-net (100, 200 µm), equipment for recoverey of ADCP buoys and trawlproof frame, equipment for water samples (bottles, chemicals, etc) and acoustic equipment for bottom temperature loggers and PIES.

Comments

The wire guide on the CTD winch had to be adjusted a few times during the cruise. At the end of the cruise, a deep station was occupied and here the wire guide was adjusted three times. The issue is, that the wire guide cannot reach the aft side of the drum. Work is planned to solve this issue.

Various alarms occurred on the winch computer. Some times these could only be reset by booting the computer.

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