

R1/12

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FRV *SCOTIA*

Cruise 1407S

REPORT

2 – 16 October

Loading: Aberdeen

Unloading: Aberdeen

Personnel

G Slesser in charge

D Lichtman

N Collie

M Rose

M Geldart

D Watson

D Mayor Aberdeen University

E Gontikaki Aberdeen University

J Dunn 2 - 9 October

Gear

SeaBird CTDs, ADCPs, Current Meters, SonoBuoys, Acoustic Releases, Recovery Trawl, Maxicorer.

Objectives

1. To perform hydrographic surveys along the JONSIS standard section in the northern North Sea.
2. To perform hydrographic surveys along the standard Faroe Shetland Channel sections.
3. To service two ADCP moorings in the Faroe Shetland Channel.
4. To recover and redeploy two current meter moorings E of Shetland.
5. To perform CTD hydrographic surveys E of Shetland.
6. To take core samples for deep sea sediment carbon cycling in the Faroe Shetland Channel
7. To carry out CTD hydrographic on the shelf edge.

Out-Turn Days per Project: 15 days: Ae11r0

Narrative

Scotia sailed from Aberdeen at 0930 (all times are GMT) on Tuesday 2 October for the start of

the JONSIS standard section. On route a test dip of the 911+ CTD was performed. CTD measurements and water sampling commenced at 2335 on Tuesday 2 October. During the sampling of this line the CTD cable required re-terminating resulting in a 3 hour stoppage. The line was completed at 1206 on Wednesday 3 October (Stns.401 - 412).

Scotia then made passage to the start of the Fair Isle – Munken standard section for CTD measurements and water sampling. Work commenced at 1850 on Wednesday 3 October and the line was worked till 2128 to allow the recovery and redeployment of the ADCP moorings NWSD and NWSE the following morning.

Passage was made overnight to the ADCP mooring position NWSE (60 16.61'N 004 20.11'W). Despite receiving communications from the acoustic release that this mooring had been released it failed to surface. Interrogating the acoustic release showed that it was still attached to the anchor. It was decided to make passage to ADCP mooring NWSD (60 26.96'N 004 22.54'W) and recover this mooring. Mooring NWSD was duly recovered at 0840 on Thursday 4 October and the data downloaded. Passage was then made back to mooring NWSE to attempt to make recovery using a creeper and the recovery trawl. Despite several hours trying to dislodge the mooring from its anchor it failed to surface. This recovery operation was abandoned due to low light conditions early evening. Two Fair Isle – Munken stations were sampled and then passage was made to mooring position NWSD for deploying the following morning. Mooring NWSD (60 26.97'N 004 22.50'W) was deployed at 0726 on Friday 5 October. Due to worsening weather conditions it was decided to abandon further attempts to recover mooring NWSE meantime and continue with sampling the remaining stations of the Fair Isle - Munken section.

The remaining Fair Isle – Munken stations were completed at 2345 on Friday 5 October (Stns. 413 – 426). Passage was then made to Torshavn to make delivery of a thermosalinograph to Faroese scientific personnel for installation to the ferry Norona. *Scotia* lay off Torshavn until Faroese scientists came out by small boat to the *Scotia* to take delivery of the thermosalinograph. The instrument was transferred at 0745 on Saturday 6 October. *Scotia* then proceeded to the start of the Nolso – Flugga Standard section. During the passage a further re-termination of the CTD cable was carried out. Slippage of the CTD cable through the fastening safety device caused kinking and fraying of the cable during the last three stations of the Fair Isle – Munken section. The Nolso - Flugga section commenced at 1002 on Saturday 6 October. The section was worked until 1255 on Sunday 7 October when a break was made at Nolso – Flugga station 4 to allow the grabbing work to take place. Given the poor weather conditions it was decided that it was unsafe to use the corer, work commenced using the day grab at 1330 on Sunday 7 October. Unfortunately this was unsuccessful and no samples were taken. The Nolso – Flugga line was resumed and completed at 0055 on Tuesday 8 October (Stns. 427 - 442).

Passage was made to the current meter mooring East Shetland 2 (60 28.50'N 000 08.04'W). Work then commenced to recover this mooring and the outermost mooring East Shetland 1 (60 34.42'N 000 38.01'W). During recovery operations of both of these moorings, messages transmitted from the acoustic releases at both moorings indicated that the moorings had been released. However, the moorings remained in position. Both these moorings required a creeper weight dragged around both positions to nudge the moorings free of the anchor weight. Both moorings were successfully recovered undamaged and redeployed (60 34.40'N 000 38.05'W, 60 28.51'N 000 08.30'W). Investigations will continue to find the cause of the moorings failing to surface when apparently released from the mooring anchor.

Scotia then made passage to the start of the middle (60 30.00'N) of three CTD lines, East of Shetland Mooring Line. Work commenced at 1448 on Tuesday 8 October until 2049 of the same day when the *Scotia* made passage to Lerwick to allow scientific staff to disembark for a flight to Aberdeen the following morning.

Scotia berthed at 0830 and departed at 1030 on Tuesday 9 October making passage for the

start of East Shetland line 3. This line commenced at 1522 on Tuesday 9 October and was followed by completing the remaining part of East Shetland Mooring line and finishing with sampling East Shetland line 1 at 0209 on Thursday 11 October (Stns. 443-477). Passage was then made to NWSE mooring in poor weather conditions for a further recovery attempt.

Arriving on site in the early hours of Friday 12 October the *Scotia* proceeded to use the recovery trawl and creeper trying to recover the NWSE mooring. During the final attempt of the day the mooring was released from its anchor but surfaced in low light conditions at approximately 1745. Contact was lost with the mooring. Test CTD dips and grabbing stations were carried out overnight along the Fair Isle – Munken line and then passage was made back to the vicinity of the NWSE mooring position to make an attempt to recover the drifting mooring at first light.

A search pattern was set to try to locate the drifting mooring unfortunately with no success. During this time contact was made with Marine Laboratory and Faroese staff in an attempt to get positional readings of the mooring, these being transmitted via satellite to the ground station by the Argos transmitter attached to the mooring. Meanwhile passage was made to the coring position at Nolso – Flugga station for a further attempt to take grab samples and this work began at 2330 on Friday 12 October. Unfortunately this also proved to be unsuccessful. It had been estimated that during this period the drifting mooring would be transported towards this general area. At first light a search pattern was set up to look for the drifting mooring along the shelf edge. Again this proved unsuccessful.

Finally before departing for Aberdeen a thermosalinograph survey across the shelf edge was carried out prior to returning to Aberdeen, where *Scotia* berthed at 0500 on Tuesday 16 October.

On the return passage to Aberdeen the *Scotia* received Argos positions of the drifting ADCP mooring. The mooring was indeed within our search area of the previous day. At 0504 on Monday 15 October the mooring was drifting at position 61 13.56'N 002 31.48'W (south of the Nolso – Flugga line). The ADCP mooring will be monitored by the positions sent to FRS and plans will be put in place to recover this mooring as practicable.

Results

The weather conditions throughout the cruise were mixed ranging from near calm to gale force conditions. Despite the days when rougher conditions prevailed work continued.

1. The JONSIS standard section in the northern North Sea was surveyed.
2. The two standard Faroe Shetland Channel sections were surveyed.
3. The Nordic WOCE ADCP moorings NWSD was recovered successfully, the data downloaded and redeployed. The recovered ADCP data will be processed in the laboratory by in-house software. Unfortunately, NWSE though eventually released from its anchor is presently drifting. It has been located from the positions using the Argos beacon. Unfortunately this information was received as the *Scotia* was making passage back to Aberdeen. This mooring is being monitored via satellite tracking and will be recovered as practicable.
4. The current meter moorings E of Shetland were recovered, the data successfully downloaded and the current meter moorings redeployed. The current meter data will be validated, edited and processed on return to the laboratory.
5. Three lines of CTD stations were sampled East of Shetland.
6. Coring for deep sea sediment carbon cycling (Evina Gontikaki and Daniel Mayor, Oceanlab, University of Aberdeen) was not possible due to bad weather conditions and

using the day grab for this work also turned out to be unsuccessful.

7. No CTD work was carried out along the shelf edge due to the time spent trying to recover the drifting mooring, NWSE.

Throughout the cruise, sea surface temperature, salinity and fluorescence recordings were made using a Sea-Bird SBE21 Thermosalinograph and Sea Point Fluorometer. Surface samples were taken throughout the cruise to calibrate these data. Detailed results of the data collected during the cruise will be made available as these data are worked up and interpreted in the laboratory. Calibrations were carried out on *Scotia* for both the thermosalinograph and CTD instrumentation. All hydrographic data are delivered to the ICES and BODC data centre in due course over the following year. During the cruise reduced CTD data was sent to BODC for transfer as TESAC (the code for reporting observations of either temperature, salinity or current against depth from a sea station) messages to the Met Office.

G Slesser

1 November 2007