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FRV *Scotia*

Cruise 0700S

REPORT

8-22 May 2000

Loading: Aberdeen

Unloading: Aberdeen

Personnel

W R Turrell
G Slesser
S Hughes
J Dunn
M Burns
J McKie
C Wilson
R Swift Aberdeen University

Gear

CTD, ADCP Moorings

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 perform a survey of bottom boundary layer mixing and water mass creation in the Faroe Shetland Channel
4. To service one of the Nordic WOCE ADCP moorings.
5. To deploy a mooring east of Lerwick in support of the MAIA contract (if required following MAIA meeting).
6. To undertake coastal CTD surveys in support of the MAIA contract.
7. If time permits to survey part of the Rockall Trough standard section.
8. If equipment becomes available, to perform *ad hoc* sonar buoy and towed array acoustic recordings for cetaceans.

9. Throughout the trip to undertake an exhaustive examination of nutrient sampling techniques and accuracies.

Narrative

Scotia sailed from Aberdeen at 1400 hours BST on Monday 8 May. She stopped briefly east of Rattray Head in order to perform a test CTD cast. Once this was complete she proceeded to the eastern end of the JONSIS line, where survey work commenced at 0430 hours BST. The JONSIS line was completed at 1600 hours BST on Tuesday 9 May, when *Scotia* proceeded to the start of the Fair Isle Munken standard section. Work along this line commenced at 2200 hours BST that night, and seven stations were completed up to the position of the NWSD mooring. Survey work stopped at 0500 hours BST on Wednesday 10 May, and the mooring was acoustically interrogated. It was released and successfully recovered by 0930 hours BST. *Scotia* then proceeded to resume survey work along the Fair Isle Munken line, which commenced at 1100 hours BST and was completed by 2200 hours BST that day. *Scotia* then proceeded directly to Torshavn, while data was extracted from the recovered ADCP. She berthed at Torshavn at 0900 hours BST on Thursday 11 May, and scientific staff accompanied the ADCP to the Faroese Fishery Laboratory, where the instrument was again downloaded, serviced and re-batteried. This work was completed at 2230 hours that evening, and the instrument was replaced into its buoyancy and returned to the vessel at 0700 hours on the morning of Friday 12 May. During the period in Torshavn, salinity and nutrient samples were analysed. *Scotia* sailed at 0900 hours and proceeded directly to the start of the Nolso Flugga standard section, where survey work commenced at 1030 hours BST and was completed by 1230 hours BST on Saturday 13 May. *Scotia* then proceeded to the location of the east Shetland MAIA coastal hydrographic mooring, which was successfully deployed by 1700 hours that day at 60°25.37'N 00°48.18'W. *Scotia* then proceeded back to the Foinaven area, sailing around the southern end of Shetland.

Scotia then proceeded to the FIM03 standard station, where the first of the repeat nutrient tests was to be performed. This work commenced at 0900 hours BST on Sunday 14 May and was completed by 0830 hours BST the following day. During this time five repeat 12 bottle samples were collected at the same depth (50 m) for repetitive analysis. As chemical analysis of each rosette sample took approximately three hours, in between water sampling *Scotia* undertook an acoustic survey for the NWSE mooring, which had previously sent one Argos alarm, indicating it had possibly surfaced before the cruise commenced. No trace of the mooring could be located after an extensive search during this 24 hour period.

The last rosette cast occurred at 2300 hours on Sunday 14 May, and while chemical analysis continued, *Scotia* commenced a brief trial cetacean acoustic survey. This was completed by 2100 hours on Monday 15 May, allowing the chemical analysts time to prepare for the second repeat nutrient sampling station. This took place at standard station FIM07, and commenced at 2200 hours that day. Five deep casts were performed, the last one at 1300 hours on Tuesday 16 May, and chemical analysis of these repeat samples was completed by 1700 hours that day. Before the completion of the last deep cast, mooring NWSE was redeployed at 60°27.32'N 04°22.49'W. After the last cast was complete, *Scotia* immediately made passage to Rockall.

The Rockall CTD section commenced at 1930 BST on Wednesday 17 May and was completed by 0830 hours on Friday 19 May. During the survey additional nutrient tests were performed, as well as the deployment of acoustic buoys. On completion of the Rockall section, *Scotia* returned to east of Shetland to perform a coastal CTD survey in order to meet objective 6. This survey commenced at 1600 hours on Saturday 20 May and was completed by 1200 hours BST the

following day, when *Scotia* proceeded directly to Aberdeen. She arrived there at 0600 hours on Monday 22 May.

Results

The cruise was characterised by excellent weather throughout, which allowed all objectives to be achieved.

All CTD surveys (Objective 1 - the JONSIS line, objective 2 - the standard Faroe Shetland Channel sections, objective 6 - to undertake coastal CTD surveys in support of the MAIA contract and objective 7 - to survey part of the Rockall Trough standard section) were successfully completed using the 911+ CTD system and CTD crane. This system worked excellently throughout the cruise, and can now be said to be fully operational. Although CTD data was partly worked up during the cruise, final analysis is yet to be completed. All calibration salinities were analysed on board.

All mooring work was also completed successfully (Objective 4 - to service one of the Nordic WOCE ADCP moorings, and objective 5 - to deploy a mooring east of Lerwick in support of the MAIA contract). Protocols and draft risk assessments were completed on board. A further objective, to perform an acoustic search for the mooring NWSD was also achieved. A single satellite alarm message was received from this mooring prior to the start of the cruise, hence it was known that all or part of the mooring had surfaced. Unfortunately the Argos beacon did not provide further alarms or position fixes. Although during the survey one or two positive responses were received via the telecommand unit, it was discovered that these were erroneous messages caused by the operation of the air compressor. Which is situated in the hull close to the position where the submerged transducer is placed. In future this must be considered when operating with acoustic releases.

A further objective was to examine the use of the thermosalinograph in the water sampling laboratory. It was concluded that, despite all attempts at solving the aeration problem, a new type of pump is required. A full report was prepared on board.

Approximately 30 sonobuoys were deployed during the trip, and a 24 hour towed hydrophone survey took place. Although the records await full analysis, it proved that the method was possible during standard hydrographic surveys. The deep casts permitted sufficient time on station for useful recording to be obtained although the operation of the bow thruster proved sometimes to interfere with the recordings.

Finally, throughout the cruise extensive nutrient sampling and analysis experiments took place, and considerable progress was made, thanks to the efforts of Ms C Wilson and Mr J McKie. Many new and useful insights into sampling problems were obtained, and new protocols developed during the trip. A full report describing these results will be prepared in due course.

W Turrell
29 May 2000

Seen in draft: P Ramsay