

R1/12

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FRV *Scotia*

Cruise 1798S

REPORT

3-16 October 1998

Loading:	Aberdeen
Half Landing:	Thorshavn
Unloading:	Aberdeen

Personnel

W R Turrell	C1
R Payne	B2
G Slessor	B2
R D Adams	B1
P Barkel	B1
L Bullough	Student
M Burns	PTO
S Heine	Aberdeen University
S Henderson	Aberdeen University
S Taylor	JNCC
R O'Hanlan	Writer

Gear

Beam trawl, Model trawl, Aggasiz trawl, Fish traps, Day Grab, Underwater TV gear.

Objectives

1. To recover and redeploy two Nordic WOCE ADCP moorings.
2. To perform hydrographic surveys along the standard Faroe-Shetland Channel sections.
3. To perform experimental deep water beam trawls, TV observations and grab stations northwest of Shetland.
4. To perform repeat 24 hour fish trap deployments northwest of Shetland.
5. To perform hydrographic surveys along the JONSIS standard section and in the northern North Sea if time permits.
6. To collect samples of meso-pelagic fish for heavy metal analysis.
7. To collect the Fair Isle caesium sample.

Narrative

After some initial problems with the bow thruster, *Scotia* sailed at 1200 hours (all times BST) on Saturday 3 October 1998. She proceeded directly to the eastward end of the JONSSIS line, during which extensive tests and trials were performed on many systems in the vessel. *Scotia* arrived at the first station at 0000 hours on 4 October, and trials with the CTD crane commenced. After repeated deployments of a dummy frame proved unsuccessful, the station was performed with a self-contained CTD using the plankton crane. The survey along the JONSSIS line was completed using this method by 1630 hours that day.

Scotia then proceeded to the start of the Fair Isle-Munken standard section. Work here commenced at 0000 hours on Monday 5 October. Three stations had been completed by 0330 hours, when *Scotia* steamed towards the position of the ADCP mooring NWSE. During the next 34 hours extensive acoustic searches were performed for moorings NWSE and NWSD. Complications arose because of the intensive seismic work in the area, and problems with the acoustic transponder system onboard, which had to be repaired after a failure of a cable. Eventually NWSE was successfully located and recovered. Work recommenced along the standard section by 1430 hours on Tuesday 6th and was completed by 0500 hours the following day. *Scotia* then proceeded to the central stations on the Nolso-Flugga standard section. Two CTD stations were completed, and a fish trap fitted with TV gear was deployed in the central deep water. *Scotia* then proceeded to the half landing in Thorshavn.

Scotia entered Thorshavn at 0700 hours on Thursday 8 October. The ADCP was collected by the Fisheries Institute and work commenced on its servicing and preparation. This was completed by 1700 hours that day. A reception was held on board that evening for Institute staff and local guests. During the night severe gales occurred, causing some problems with the gangway to the vessel. At 0800 hours the following morning two ADCPs were delivered to the ship, and she sailed at 1030 hours.

She proceeded directly to the position of the fish trap, which was located at 1300 hours. After the successful recovery of the trap, work along the Nolso standard section then resumed, and five stations worked across the Scottish slope. This was completed by 1700 hours on Saturday 10 October. The data collected was immediately processed, and two locations chosen for the deployment of fishtraps within the tidally active intermediate layers. These traps (one fitted with TV gear) were deployed by 1845 hours that day, and a repeat CTD section commenced through the trap locations. Four complete surveys were achieved by daylight on Sunday 11th, when beam trawling along the same section commenced. By 1600 hours that day five trawls had been completed along the section. Significant net damage had been incurred during the last haul, and while net repair proceeded, *Scotia* commenced a combined CTD/Methot net survey during the night. This was concluded by 0600 hours on Monday 12 October, after some problems with the plankton winch, when *Scotia* proceeded to the first fish trap location. The trap was located at 0900 hours, and recovered by 1030 hours. The second trap was located at 1100 hours, and recovered by 1300 hours. *Scotia* then proceeded back to the lost ADCP position, NWSD.

On arrival at the NWSD location a combined beam trawl and TV survey was planned to utilise time until daylight. Unfortunately operational problems resulted in damage to the TV gear, and the survey was abandoned at 0200 hours on Tuesday 13 October. The beam trawl was dismantled and rigged with creepers, and a search for the lost mooring commenced at 0700 hours. Initially a single acoustic response was received from the release, causing a further acoustic search to be performed. This was completed by 1000 hours, with no further responses being received. A search using a beam trawl rigged with creepers then commenced at 1000 hours and continued until the early hours of the following morning, Wednesday 14 October. After daylight, the replacement NWSD mooring was deployed, and *Scotia* proceeded to the position of NWSE. This mooring was successfully layed by 1400 hours, in increasingly deteriorating weather. While a second combined CTD/Methot net survey was planned, poor weather prevented this, and *Scotia* dodged on position during the remainder of the

day and night experiencing winds up to Force 10. With a heavy sea running, a planned final instrument calibration CTD cast was not possible, and *Scotia* had to depart the survey area at 0900 hours on Thursday 15 October, in order to make for Aberdeen, where she arrived at 0600 hours on Friday 16 October.

Results

1. After extensive acoustic and creeping searches only one Nordic WOCE ADCP mooring (NWSE) was recovered. Initial data analysis would indicate that a full year of data was successfully collected. NWSE was redeployed in almost the same location as before, and NWSD was deployed at a new location, in deeper water with the ADCP nearer to the sea bed. (After completion of this cruise, and on return to the Laboratory, a signal was received from the Argos beacon on the lost NWSD mooring, indicating that it was freely drifting in the North Sea. Hence the search was partly successful, in that the mooring was released from the sea bed. As at 27 October, the mooring has not yet been found).
2. The Fair Isle - Munken section was successfully completed. Initial results indicate higher than normal salinities at the Scottish shelf edge (>35.44). A second core of near-surface high salinity was observed towards the Faroes. As in the earlier survey this year (0598S), the Norwegian Sea Arctic Intermediate Water (NSAIW) is no longer a salinity minimum, and is now marked by an inflection in the θS curve, returning to conditions prior to 1997. Bottom water salinities are still low (~ 34.90).
3. Only six beam trawl hauls were performed. Significant net damage was incurred during several of the hauls. Better net rigs were suggested for the extremely rough grounds experienced in the Channel. The TV gear was not tried on the beam trawl, due to damage during deployment. No grab sample was retrieved, partly owing to the rough ground, limited time and poor weather.
4. Three repeat fish trap deployments were performed. Two were deployed in an area with an extremely active internal tide. Instrumentation on the cages indicated that we had been successful in obtaining 24 hours of data from within this zone.
5. The JONSSIS line was successfully surveyed. Again high salinities were observed within the North Sea, with a large volume of the central Fladen Ground exhibiting values above 35.30.
6. Although the requirement for meso-pelagic fish had been removed before the trip commenced, the combined Methot net and CTD survey successfully recovered several samples of myctophids from the intense scattering layer in the Channel (the so-called "Simrad" layer). Further analysis of the plankton samples collected are required before details of this layer can be determined.
7. The Fair Isle caesium sample was not collected, as weather forced our return through the Pentland Firth.

W R Turrell
30 October 1998

Seen in draft: J Nichols, Master