R1/12

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FRV *Scotia*

Cruise 0799S

REPORT

26 April - 10 May 1999

Loading: Aberdeen
Unloading: Aberdeen

Personnel

W R Turrell	C1
G Slesser	B2
P Gillibrand	B2
R D Adams	B1
J Dunn	B2
M Burns	B1
M Williams	Metoc plc
M Gausset	Universite de Perpignan
J Hamilton	Glasgow Caledonian University
K Ewart	Glasgow Caledonian University
N Nichol	Visitor

Gear

Methot net, 1 m plankton net

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 the eddy formation area in the southern Faroe Shetland Channel and seed the area with satellite tracked buoys.

4. To service two of the Nordic WOCE ADCP moorings.

5. To perform experimental plankton net hauls in order to study the sound scattering layer.

Narrative

Scotia sailed from Aberdeen at 1000 hours (all times are GMT) on Monday 26 April and proceeded towards the eastern end of the JONSIS line. A test CTD deployment was performed during the passage which led to some problems with the 911+ CTD. While a retermination was performed the secondary CTD was prepared. Work along the JONSIS standard section commenced at 2350 hours and was completed at 1000 hours on Tuesday 27 April (Stns 61-72). *Scotia* then proceeded to the location of the first mooring NWSE (60°16.20'N 004°20.58'W). This mooring was

successfully located acoustically and recovered by 1830 hours. As little day light was left biological sampling commenced, and two dual Methot net hauls were performed (H144-H145), work ending at 0100 hours on Wednesday 28 April. *Scotia* then steamed to the second mooring location. An acoustic search for this mooring commenced at 0600 hours but no signal was received. At approximately 1000 hours, once a wider area survey had started, a fax was received informing the vessel that the mooring had in fact surfaced at 0330 hours the previous day, and was drifting in the Foinaven field. After concluding a drifter buoyancy test, *Scotia* proceeded to the last reported position of the surfaced mooring and commenced a search. Repeated but confusing signals were received using the Gonio *in-situ* Argos receiver, confirming that the correct PTT beacon was adrift somewhere in the area.

An acoustic search for the release attached to the mooring eventually located this on the sea bed at approximately 60°18.67'N 004°7.85'W, in 379 m of water, 10 nm to the southeast of where it was deployed and first surfaced. The continued transmissions from the Argos beacon confirmed that there was still part of the mooring at the surface. As signals from the drifting buoy were confused, a frontal survey in the southern Faroe plateau area was begun, while awaiting further satellite fixes from the beacon.

The frontal survey commenced at 2330 hours on Wednesday 28 April and was suspended at 1600 hours on Thursday 29 April due to worsening weather. Work recommenced at 0200 hours the following day and the survey was completed by 1900 hours on Saturday 1 May (Stns 73-96), after the deployment of the last of eight satellite tracked drifters.

Scotia then sailed directly to the last recorded satellite fix from the mooring adrift between Foinaven and Shetland. This mooring was located and successfully recovered by 0830 hours on Sunday 2 May. *Scotia* then proceeded to the start of the Nolso Flugga section. Work along this line commenced at 1400 hours that day and was completed by 1730 hours on Monday 3 May (Stns 97-112). Two Methot net hauls were performed at a central station (H146-147).

Scotia then proceeded to the Fair Isle Munken section, where survey work commenced at 2130 hours on Monday 3 May. Unfortunately after two stations a problem with the primary CTD winch system resulted in damage to the underwater termination, hence work continued with the secondary CTD, and was completed by 0000 hours on Wednesday 5 May (Stns 113-126). During this survey a further three Methot hauls were performed (H148-150). Passage was then made to the NWSD mooring location. This was successfully redeployed at 0630 hours on Wednesday 5 May (60°26.93'N 004°22.64'W, 808 m), and *Scotia* proceeded to the previous location of the NWSE mooring which was also successfully redeployed at 0832 hours that day (60°16.36'N 004°20.60'W, 446 m).

Scotia then steamed to a central location, with a depth of approximately 900 m where the first of two 24 hour stations commenced at 1130 hours on Wednesday 5 May. Hourly CTD profiles (Stns 127-146) accompanied two night time (H153-154) and four daytime (H151,152,155,156) dual-Methot net hauls. The second 24 hour station commenced in a depth of approximately 400 m at 1640 hours on Thursday 6 May. Again hourly CTD casts (Stns 147-166) were performed, along with two night time (H157, 158) and four day time (H159-162) dual-Methot net hauls. The station was completed at 1400 hours on Friday 7 May, when *Scotia* commenced a recovery and redeployment of the instrumented drifters.

For the remainder of the trip *Scotia* continued to perform a combined CTD and XBT survey in the vicinity of the drifters, guided by their location and the results obtained from the thermosalinograph. A further 16 CTD casts were performed (Stns 167-182) until work was completed at 0600 hours on Sunday 9 May, when *Scotia* returned to Aberdeen, where she berthed at 0500 hours on Monday 10 May.

Results

The trip was characterised by excellent weather, permitting all objectives to be achieved:

1. The JONSIS standard section in the northern North Sea was surveyed. Offshore in the northern North Sea seasonal stratification had just commenced. The bottom water was fairly warm (7.4°C) reflecting a mild winter. A core of low salinity water (<35.0) appeared to mark the Fair Isle inflow indicating fresher conditions north and west of Scotland.

2. The two standard Faroe Shetland Channel sections were surveyed. Extremely low salinities were observed in the intermediate water (Modified East Icelandic Water) which was present as a salinity minimum on a θS diagram. This intermediate water appeared to fill a larger volume of the Channel than normal, particularly in the northern area.

3. An extensive survey of the eddy formation area in the southern Faroe Shetland Channel was performed and seeded with eight satellite tracked buoys. The preliminary survey appeared to identify a cold/warm water surface front in the vicinity of the southern tip of the Faroese plateau. It was notable that this feature was associated with a large concentration of Faroese and Russian trawlers, indicating its possible importance to the migration of adult blue whiting. Although the overcast conditions resulted in poor satellite imagery, subsequent images have confirmed that the drifters still remain in cold-core eddies breaking away from the frontal area. The on board Argos receiver produced confusing results, and picking up the drifters did not prove successful. However, as they remain in the water and are transmitting to the Argos satellite system they are continuing to produce very interesting results.

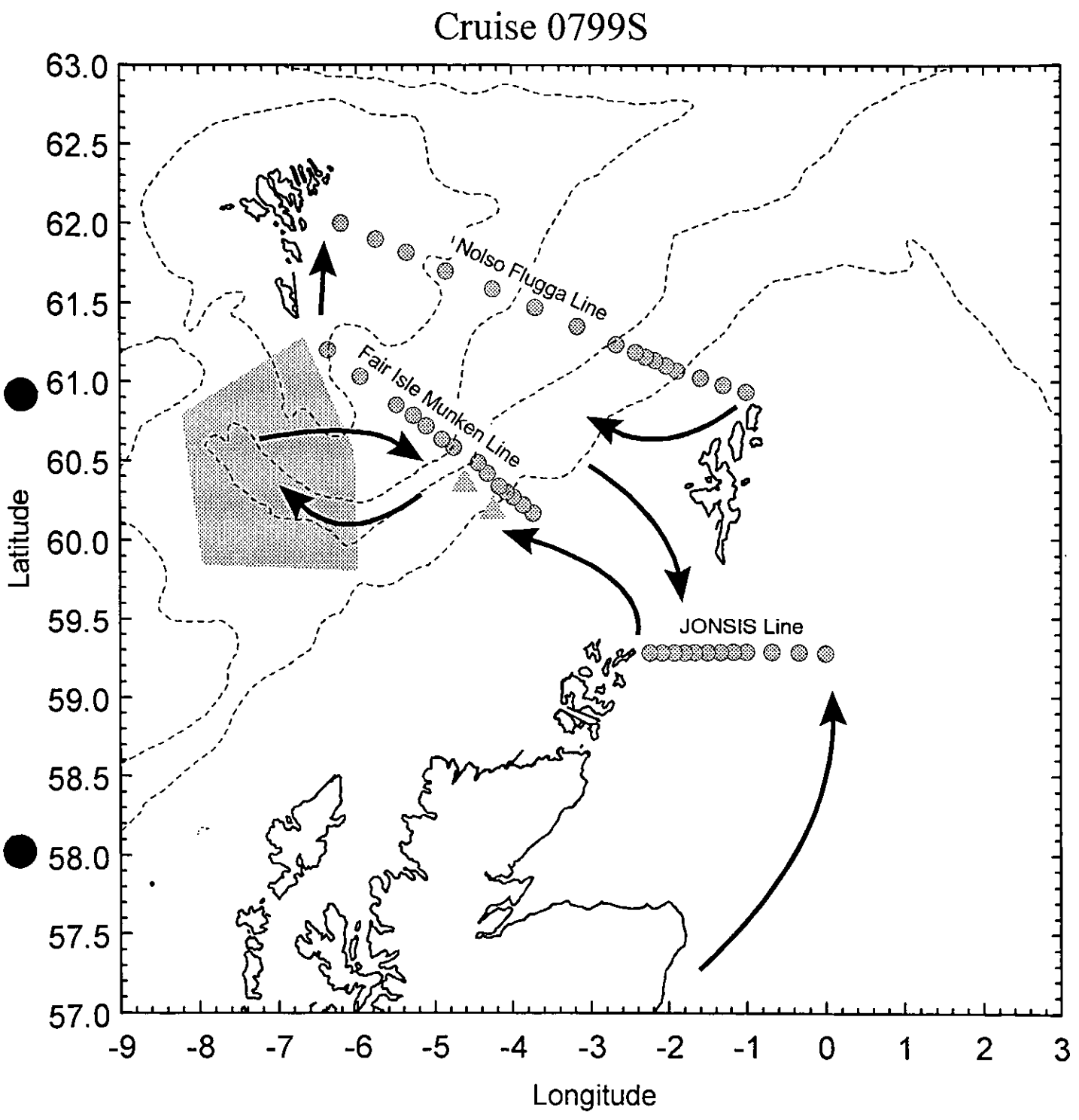
4. The two Nordic WOCE ADCP moorings were both recovered successfully, the data downloaded, the instruments reset and redeployed. Although some time was expended searching for the NWSD mooring, which surfaced before *Scotia* was in the area, it was successfully recovered due to a combination of satellite fixes and the on board Argos receiver.

5. In all 19 dual-Methot net hauls were performed in order to characterise the deep Sound Scattering Layers (SSLs) observed throughout the survey area. Distinct differences were found to occur between upper and lower layers, although samples await complete analysis. The two 24 hour stations performed will allow a good description of deil vertical migration in two distinct hydrographic areas.

In addition to the stated objectives, a nutrient storage experiment was conducted on behalf of the Chemistry section, and the semi-automatic CTD deployment system proved extremely successful following modifications carried by the Engineering Section.

J Morrison
20 May 1999

Seen in draft: D Hodges, OIC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Fair Isle Munken Line
JONSIS Line
Eddy survey and drifter deployments
NWOCE ADCP Mooring