

**I.O.S.**

RRS FREDERICK RUSSELL

CRUISE 13/84

DUNSTAFFNAGE 24 JULY – FALMOUTH 7 AUGUST

1984

CURRENT MEASUREMENTS, CTD STATIONS  
AND SIDE-SCAN SURVEYS IN THE FAROE-SHETLAND  
CHANNEL AND WEST OF SCOTLAND

CRUISE REPORT NO. 171

1984

NATURAL ENVIRONMENT  
INSTITUTE OF  
OCEANOGRAPHIC  
SCIENCES  
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WORMLEY

RRS FREDERICK RUSSELL

Cruise 13/84

Dunstaffnage 24 July - Falmouth 7 August

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and side-scan surveys in the Faroe-Shetland  
Channel and west of Scotland

Principal Scientist

W.J. Gould

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CONTENTS

|                     | <u>Page</u> |
|---------------------|-------------|
| Cruise participants | 4           |
| Ships officers      | 4           |
| Cruise objectives   | 4           |
| <br>                |             |
| Narrative           | 5           |
| <br>                |             |
| CTD Stations        | 7           |
| XBT data            | 7           |
| Moorings            | 7           |
| Side scan sonar     | 8           |
| <br>                |             |
| Acknowledgements    | 8           |
| <br>                |             |
| Tables              |             |
| 1 CTD Stations      | 9,10        |
| 2 XBT data          | 11          |
| <br>                |             |
| Track chart         |             |

Cruise Participants

W.J. Gould, Principal Scientist  
J.W. Cherriman  
A.N. Cutler  
J. Loynes  
J. Smithers  
C. Woodley

Ships Officers

|              |                |
|--------------|----------------|
| P. Maw       | Master         |
| D. Coverdale | Mate           |
| S. Jackson   | 2nd Officer    |
| T. Rees      | Chief Engineer |

Cruise objectives

- (1) To locate, and if possible recover by dragging, the remains of mooring 356 (60° 43'N, 03° 03'W). The top two current meters and buoyancy were recovered adrift on 25-IV-84.
- (2) To deploy a replacement mooring nearby.
- (3) To check that the remaining five moorings laid at the same time as 356 were in place and upright.
- (4) To occupy CTD sections across the Faroe-Shetland Channel
- (5) To supplement these with XBT observations.
- (6) To drag for other lost moorings in the area as time permitted.
- (7) To carry out side-scan sonar surveys of the upper areas of the continental slope.

All objectives were achieved.

Narrative

The scientific party embarked on the morning of Monday July 23rd at Dunstaffnage, Ron Stubbs assisting in the installation of the side scan sonar equipment. The vessel sailed at noon on July 24th and course was set via the Minch towards the position of mooring 356. The side scan spars and PES fish were deployed one hour before reaching the mooring position at 1640z/25th. The beacon on the mooring was located and its position confirmed. A drilling rig the DYVI OMEGA lay 1.73 miles x  $015^{\circ}$  from the mooring. The remaining moorings were then checked and found to be in place and on completion of this at 2245z/25th, the ship commenced a sidescan sonar run via  $61^{\circ}00'N$   $02^{\circ}30'W$ ,  $61^{\circ}10'N$   $02^{\circ}00'W$  and  $61^{\circ}28'N$   $01^{\circ}16'W$  returning to the mooring position for the deployment of the replacement mooring. En route the ship stopped at 1230z/26th to test the acoustic releases for the new mooring. The mooring was deployed at 1855z/26th and the ship set course towards deep water to test the CTD wire which had not been used to any great depth. In view of the rather poor weather prospect and the known vulnerability of PES fish on the vessel the fish and the side scan spars were recovered. XBT drops at hourly intervals were carried out on the leg towards  $62^{\circ}00'N$   $02^{\circ}30'W$  where the wire was deployed to 1650m and thereafter on the leg towards  $62^{\circ}00'N$   $05^{\circ}00'W$  where a cross-channel line of CTD stations was commenced at 1130z/27th.

This section comprised 11 stations at approximately 10 mile spacing. The southern stations were adjusted to give adequate clearance of the line of moorings and the section was completed by 1200z/28th. The rather poor weather precluded a dragging attempt for the lost mooring and so a side scan survey towards the southwest was carried out. The PES fish again had to be recovered due to the excessive pitching and only 3-4 kts could be made. One sidescan channel (the starboard one) was not working but in view of the lively motion of the vessel the spar could not be recovered.

The vessel returned to the mooring site by 0800z/29th and the sidescan spar was recovered. The transducer was found to have come loose and turned to face upwards towards the hull. Drag wires were wound on and a drag attempt on mooring 356 started at 0930, this was abandoned without success at 1950z. Manoeuvring was hampered by strong winds and heavy seas and thus no real attempt could be made.

On completion a sidescan run was made towards 60°05'N 04°40'W for the start of two cross channel CTD sections, the first to 60°47'N 06°10'W and the second from 60°48'N 06°30'W to 60°10'N 07°43'W. These sections were started at 0347z/30th and completed by 1340z/31st. An attempt was then made to find evidence for cold water overflowing the Wyville Thomson ridge and issuing through the Ymir channel into the Rockall trough.

A run was made from the end of the CTD line via 60°05'N 07°47'W, 60°15'N 08°40'W to 60°20'N 09°10'W with XBT drops every half hour for much of the run. Water as cold as 3°C was found on some stations. A drift station down the slope of Faroe Bank was started at 1942z/31st and abandoned at 2343z when the strong set resulted in a drift back up the slope. A further CTD station to 1650m at 60°17'N 09°12'W showed no cold water at the foot of the slope.

On recovery of the CTD course was set across Faroe Bank to the start of a CTD section across the Faroe-Bank channel. This was completed in perfect weather between 0740 and 1630z/1-VIII. The vessel then steamed via a sidescan survey of the Wyville Thomson ridge to attempt recovery of CONSLEX mooring E2 at 60°13'N 04°30'W. The mooring was found to be lying on the sea bed during the recovery cruise Challenger 5/83. The release beacon was found to be no longer working and dragging was done around the Decca coordinates. Dragging was started at 1446/2 and on the first recovery of the drag wire the deepest current meter, some wire and part of a swivel were retrieved. A second drag attempt was unsuccessful and the work was curtailed at 2230/2nd.



Course was set for an extensive sidescan survey of the outer continental shelf and upper slope ending at 0510/4 at 57° 50' N 09° 30' W where the sidescan and PES fishes were recovered and course set towards Falmouth.

The vessel berthed in Falmouth at 1330z/6th August.

#### CTD Stations

The new deep Neil Brown CTD unit was used throughout together with the 24 bottle General Oceanics multisampler but this carrying only 2 sample bottles. The CTD worked well throughout, the only minor problem being fouling of the conductivity sensor on stations in the Faroe-Bank channel. The housing of the oxygen sensor was broken at some stage prior to Stn. 8 and thereafter no oxygen data were recorded.

Data were recorded on a digidata tape deck and viewed in real time via a BBC micro computer. Station positions are listed in table 1.

#### XBT data

These were recoded using the Bathysystems interface to an HP85 desk computer. T4 and Deep blue probes were used and gave good data throughout the cruise. Station positions are given in table 2.

#### Moorings

There were three mooring objectives

- (1) The deployment of a replacement for mooring 356 which had been damaged by a trawler in April.
- (2) To check that the remaining moorings of this array 357-361 were in position and upright.
- (3) To drag for moorings lost in the area.

All these objectives were achieved. Mooring 372 was deployed at 61° 42'.0N 03° 06'.0W at 1857z 26-VII-84. It carried 3 Aanderaa RCM4 current meters at depths of 100, 200 and 350m in 396m of water. The site was moved some way from

that of the original mooring to allow scope to drag for the lost mooring 356 and to avoid interference with the nearby drilling rig.

All the remaining moorings were interrogated and their positions confirmed. They were all upright.

Dragging operations for the remains of mooring 356 were hampered by poor weather but with the acoustic beacon still operating and the water depth being only 400m this provided a good target. The remains of this mooring were abandoned. The attempt to drag for the remains of CONSLEX mooring E2 (337) resulted in the recovery of the bottom current meter, some wire (in excellent condition) and part of a swivel which had suffered severe corrosion perhaps as a result of lying on the sea bed close to dissimilar metals. The cause of mooring failure could not be positively established but the instrument had produced a complete data tape which showed that the mooring had fallen to the sea bed only 36 hours prior to its attempted recovery on 23-III-83.

#### Sidescan sonar

On the majority of passage legs around the continental slope region a hull mounted 35kHz sidescan sonar system was used. It provided excellent results for the majority of the cruise the only data loss being due to either poor weather imposing high sea and propeller noise on the records or on one occasion when one of the spar mounted transducers came loose and changed its orientation.

#### Acknowledgements

It is a pleasure to acknowledge the willing assistance of the ship's Master, officers and crew in completing this most successful cruise. No time was lost through either weather or equipment failure.

TABLE 1

## CTD Stations

| No | Date     | Time | Lat N    | Long W   | Water depth (m) | Max Press. (db) | Calibration vals. | Comments                                  |
|----|----------|------|----------|----------|-----------------|-----------------|-------------------|---|
| 1  | 27 - VII | 1210 | 61° 59.7 | 05° 01.1 | 187             | 164             | 2                 | START SECTION A                           |
| 2  | 27 - VII | 1430 | 61° 51.2 | 04° 47.1 | 215             | 210             | 2                 |   |
| 3  | 27 - VII | 1630 | 61° 42.9 | 04° 32.9 | 477             | 470             | 2                 |   |
| 4  | 27 - VII | 1850 | 61° 35.2 | 04° 19.2 | 762             | 748             | 2                 |   |
| 5  | 27 - VII | 2126 | 61° 27.8 | 04° 05.6 | 1161            | 1142            | 2                 |   |
| 6  | 28 - VII | 0005 | 61° 19.1 | 04° 00.4 | 1083            | 1067            | 2                 |   |
| 7  | 28 - VII | 0255 | 61° 11.3 | 03° 47.0 | 1133            | 1118            | 2                 |   |
| 8  | 28 - VII | 0535 | 61° 03.1 | 03° 33.3 | 1134            | 1132            | 2                 | No oxygen on this and subsequent stations |
| 9  | 28 - VII | 0800 | 60° 53.9 | 03° 24.5 | 839             | 822             | 2                 |   |
| 10 | 28 - VII | 1002 | 60° 46.5 | 03° 12.6 | 527             | 521             | 2                 |   |
| 11 | 28 - VII | 1212 | 60° 38.3 | 03° 00.5 | 266             | 259             | 2                 | END SECTION A                             |
| 12 | 30 - VII | 0400 | 60° 05.1 | 04° 40.2 | 298             | 290             | 1                 | START SECTION B                           |
| 13 | 30 - VII | 0540 | 60° 09.5 | 04° 50.3 | 606             | 603             | 2                 |   |
| 14 | 30 - VII | 0740 | 60° 14.0 | 05° 00.4 | 830             | 829             | 2                 |   |
| 15 | 30 - VII | 0945 | 60° 19.1 | 05° 09.4 | 1054            | 1042            | 2                 |   |
| 16 | 30 - VII | 1203 | 60° 23.6 | 05° 18.8 | 1215            |                 | 2                 | Max. pressure not noted                   |
| 17 | 30 - VII | 1420 | 60° 27.0 | 05° 29.8 | 739             | 728             | 2                 |   |
| 18 | 30 - VII | 1625 | 60° 32.6 | 05° 40.4 | 703             | 693             | 2                 |   |
| 19 | 30 - VII | 1818 | 60° 38.2 | 05° 50.9 | 620             | 603             | 2                 |   |
| 20 | 30 - VII | 1955 | 60° 42.2 | 06° 01.2 | 507             | 486             | 2                 |   |
| 21 | 30 - VII | 2125 | 60° 46.9 | 06° 09.8 | 238             | 226             | 2                 | END SECTION B                             |

Table 1  
CTD Stations cont.

| No | Date     | Time          | Lat N    | Long W   | Water depth (m) | Max Press. (db) | Calibration vals. | Comments                                   |
|----|----------|---------------|----------|----------|-----------------|-----------------|-------------------|--|
| 22 | 30 - VII | 2320          | 60° 48.6 | 06° 31.9 | 187             | 181             | 1                 | START SECTION C                            |
| 23 | 31 - VII | 0035          | 60° 42.5 | 06° 38.8 | 232             |                 | 1                 | Max pressure not noted (10m above bottom)  |
| 24 | 31 - VII | 0210          | 60° 36.4 | 06° 49.4 | 347             |                 | 1                 | Max pressure note noted (15m above bottom) |
| 25 | 31 - VII | 0340          | 60° 32.4 | 06° 58.9 | 803             | 802             | 2                 |  |
| 26 | 31 - VII | 0537          | 60° 25.8 | 07° 06.1 | 1036            |                 | 2                 | Max pressure not noted (30m above bottom)  |
| 27 | 31 - VII | 0740          | 60° 20.8 | 07° 17.5 | 1064            | 1063            | 2                 |  |
| 28 | 31 - VII | 0940          | 60° 14.8 | 07° 22.6 | 901             | 898             | 2                 |  |
| 29 | 31 - VII | 1122          | 60° 12.3 | 07° 30.4 | 687             | 695             | 2                 |  |
| 30 | 31 - VII | 1310          | 60° 09.1 | 07° 42.5 | 640             | 632             | 2                 | END SECTION C                              |
| 31 | 31 - VII | 2002-<br>2309 | 60° 19.1 | 09° 13.3 | 1252            | 1297            | 0                 | Drift Stn.                                 |
| 32 | 1 -VIII  | 0052          | 60° 16.8 | 09° 12.3 | 1663            |                 | 0                 | Max. press. not noted                      |
| 33 | 1 -VIII  | 0750          | 60° 59.7 | 07° 59.7 | 195             | 184             | 1                 | START SECTION D                            |
| 34 | 1 -VIII  | 0905          | 61° 03.4 | 07° 50.0 | 642             | 663             | 2                 |  |
| 35 | 1 -VIII  | 1045          | 61° 07.6 | 07° 42.3 | 907             | 889             | 2                 |  |
| 36 | 1 -VIII  | 1230          | 61° 11.3 | 07° 31.6 | 812             | 802             | 2                 | Conductivity jump                          |
| 37 | 1 -VIII  | 1350          | 61° 15.1 | 07° 22.3 | 460             | 460             | 2                 |  |
| 38 | 1 -VIII  | 1445          | 61° 17.1 | 07° 15.8 | 190             | 187             | 1                 |  |
| 39 | 1 -VIII  | 1605          | 61° 13.3 | 07° 26.9 | 722             | 720             | 1                 | END OF SECTION D                           |

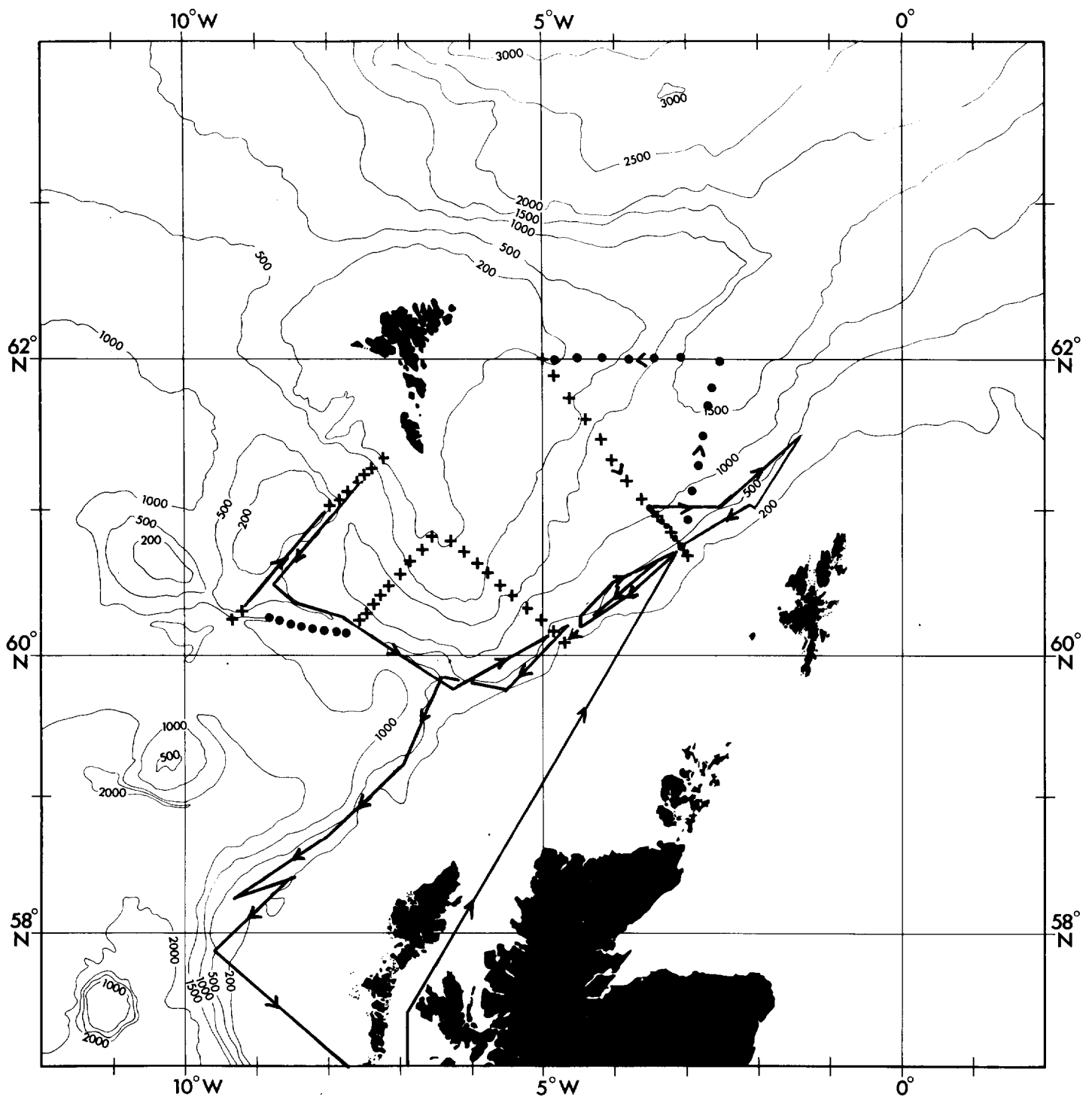
TABLE 2

XBT data

| No | Date     | Time (z) | Lat<br>N | Long<br>W | Probe*<br>Type | Comment |
|----|----------|----------|----------|-----------|----------------|---------|
| 1  | 25 - VII | 1915     | 60° 48.5 | 03° 08.0  | DB             |         |
| 2  | 26 - VII | 19       | 60° 43.1 | 03° 04.8  | 4              |         |
| 3  | 26 - VII | 2030     | 60° 54.9 | 03° 01.2  | 4              |         |
| 4  | 26 - VII | 2130     | 61° 06.0 | 02° 56.5  | 4              |         |
| 5  | 26 - VII | 2230     | 61° 17.1 | 02° 51.8  | DB             |         |
| 6  | 26 - VII | 2330     | 61° 29.4 | 02° 47.2  | DB             |         |
| 7  | 27 - VII | 0030     | 61° 41.1 | 02° 41.8  | DB             |         |
| 8  | 27 - VII | 0130     | 61° 49.5 | 02° 38.2  | DB             |         |
| 9  | 27 - VII | 0230     | 61° 58.8 | 02° 30.8  | DB             |         |
| 10 | 27 - VII | 0500     | 61° 59.3 | 02° 42.9  | DB             |         |
| 11 | 27 - VII | 0600     | 61° 59.4 | 03° 04.7  | DB             |         |
| 12 | 27 - VII | 0700     | 62° 00.0 | 03° 25.0  | DB             |         |
| 13 | 27 - VII | 0800     | 62° 00.0 | 03° 47.3  | DB             |         |
| 14 | 27 - VII | 0900     | 62° 00.1 | 04° 10.7  | 4              |         |
| 15 | 27 - VII | 1000     | 62° 00.2 | 04° 30.8  | 4              |         |
| 16 | 27 - VII | 1100     | 62° 00.1 | 04° 51.5  | 4              |         |
| 17 | 31 - VII | 1400     | 60° 08.5 | 07° 43.2  | DB             |         |
| 18 | 31 - VII | 1430     | 60° 04.2 | 07° 47.9  | DB             |         |
| 19 | 31 - VII | 1500     | 60° 05.6 | 07° 55.1  | DB             |         |
| 20 | 31 - VII | 1530     | 60° 07.3 | 08° 03.1  | DB             |         |
| 21 | 31 - VII | 1600     | 60° 08.8 | 08° 09.9  | DB             |         |
| 22 | 31 - VII | 1630     | 60° 10.6 | 08° 19.7  | DB             |         |
| 23 | 31 - VII | 1700     | 60° 12.2 | 08° 26.6  | DB             |         |
| 24 | 31 - VII | 1730     | 60° 14.1 | 08° 36.7  | DB             |         |
| 25 | 31 - VII | 1800     | 60° 15.3 | 08° 45.0  | DB             |         |
| 26 | 31 - VII | 1820     | 60° 16.1 | 08° 51.1  | DB             | Failed  |

\* 4 = T4

DB = Deep Blue



TRACK CHART

+ CTD Station positions

o XBT Station positions

(see tables for exact positions)

Moorings lie on line from 60°53'N 63°03'W to 61°01'N 03°30'W.