Scottish Marine Biological Association

Dunstaffnage Marine Research Laboratory.

Cruise Report

R.R.S. CHALLENGER

Cruise 4/1977

25 February - 11 March 1977

Duration of cruise : 1030 h 25 February to 2140 h 11 March 1977.
All times GMT.

Locality : Rockall Channel, 50° to 57°30'N.

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Aims :
1) To re-establish the shelf current meter mooring in 57°N, 9°W.
2) To work the Anton Dohrn Seamount STD section.
3) To work STD sections across the southern Rockall Channel and its entrance.
4) To release a drifting buoy carrying a wave recorder and thermistor chain in the vicinity of the former Ocean Weather Station JULIETT (52°30'N, 20°W) for tracking by the NIMBUS-F satellite.
5) To collect 50 litre surface samples on the Scottish shelf for radiocaesium analysis.

Narrative : CHALLENGER sailed from the Research Vessel Base, Barry, at 1030 h 25 February. After swinging compasses in the roadstead, course was set at 1145 h for soundings of 5000 m in the vicinity of 50°N, 17°W in order to stream and tension a new STD cable. Winds were light until the afternoon of the following day, when they became south-easterly and rose rapidly to force 7-8. At 1800 h, 26 February, the ship hove to in order to retrieve a life-raft capsule which had gone adrift, and remained dodging in winds which attained 50 kt. during the evening. By 0900 h, 27 February the wind had moderated to force 6, and the ship proceeded, arriving at the location of the deep water at 0730 h, 28 February. After hoisting out the precision echo-sounder transducer, streaming of the STD wire began at 1006 h. Recovery occupied from 1223 h until 2235 h, due to difficulties with the spooling gear of the winch and the need to ensure that the lowest 3000 m of cable were evenly wound on the barrel. Subsequently, the STD probe was attached and a lowering attempted, but the drive for the depth channel of the analogue recorder was found to have failed, and in addition a newly replaced circuit board in the Hewlett-Packard 9820 A calculator was found to be faulty, preventing the data-logging from one of the three frequency outputs of the STD. The station was therefore abandoned at 0112 h, 1 March and the ship steamed north-westwards whilst these faults were investigated.

Winds increased to force 7, southerly, during the morning of 1 March, and after a brief stop at 0900 h for further unsuccessful

STD tests, course was resumed for a station to the west of the former Ocean Weather Station JULIETT. This was reached at 2342 h and STD observations were made at 100 m intervals and standard depths by a combination of automatic logging and manual entry on to the cassette tape stores of the calculator, in a routine used subsequently throughout the cruise. A section of 11 STD stations was worked eastwards from this position, the third being at JULIETT ($52^{o}30'N$, $20^{o}W$), and here the satellite-interrogated drifting buoy was launched at 1004 h 2 March in squally north-westerly winds varying between forces 5 and 7. The precision echo-sounder ceased to function during the afternoon of 3 March, and shortly after completing the section in the vicinity of the Farm Area of Porcupine Bank at 1927 h, 3 March, the teleprinter of the satellite navigator became defective, causing some difficulty in assessing the quality of the fixes obtained during the remainder of the cruise.

CHALLENGER steamed northward across Porcupine Bank to begin a section to Rockall Bank, but force 7-8 winds and heavy swell on the bank forced the abandonment of the first station of this section. At 0500 h 4 March the ship hove to at the second position (station B), but work was not able to commence until 0930 h. The southerly winds remained strong throughout the day, and reached forces 8-9 at 0030 h, 5 March, when the ship was again hove to until 0812 h. Weather conditions improved somewhat during 5 March and the section of nine stations was completed at station J on Rockall Bank at 2212 h.

Station A of the Anton Dohrn Seamount section was begun at 0717 h, 6 March, and despite force 7-8 winds work was able to continue until 0200 h, 7 March, when the ship hove to between K & L. Work recommenced at 0800 h at station L in strong cross-swells, but with some decrease of wind strength. Forecasts of deteriorating conditions made it prudent to increase the station spacing in order to save working time, and after omitting station Q the Scottish continental shelf was reached at station R at 1940 h. Conditions were unsuitable for laying the current meter mooring, and as no improvement could be expected within 24 hours, the ship continued to work eastwards, making STD lowerings at the radiocaesium sampling stations. Station C1, off Tobermory, was completed at 0924 h 8 March and CHALLENGER proceeded in force 8 winds through the Sound of Mull, berthing at Dunstaffnage at 1340 h. Scientific staff and gear were unloaded and fuel taken aboard, the ship sailing at 1330 h 9 March. Due to a strike at South Wales ports the cruise finished at Avonmouth at 2140 h 22 March.

Results : Aim 1) Force 7 winds and a heavy swell prevented the re-laying of the current meter mooring when the ship was in the vicinity of 57°N, 9°W. Forecasts of worsening weather, which subsequently proved correct, held out no hope of completing this aim in the time available, and the re-laying was therefore postponed until the April cruise.

Aim 2) The Anton Dohrn Seamount section was worked on 6-7 March. To save time, one station (Q) was omitted and the neighbouring stations re-spaced. Due to logic faults within the 9820A calculator the STD data were logged at 100 m intervals plus standard depths.

Aim 3) A section of eleven stations was worked in latitude 52°30'N from 20°55'W to 14°26'W during 1-3 March. Data were logged as in Aim 2, above, and the lowest depth of observation was limited to 2200 m because of spooling gear faults and indifferent weather. The western part of this section will provide geostrophic currents for comparison with the drift of the satellite buoy and will provide data to supplement the now discontinued long-term series of observations at Ocean Weather Station JULIETT.

Nine stations were worked northwards from Porcupine Bank to Rockall Bank on 4-5 March, again with observations to a maximum depth of 2200 m.

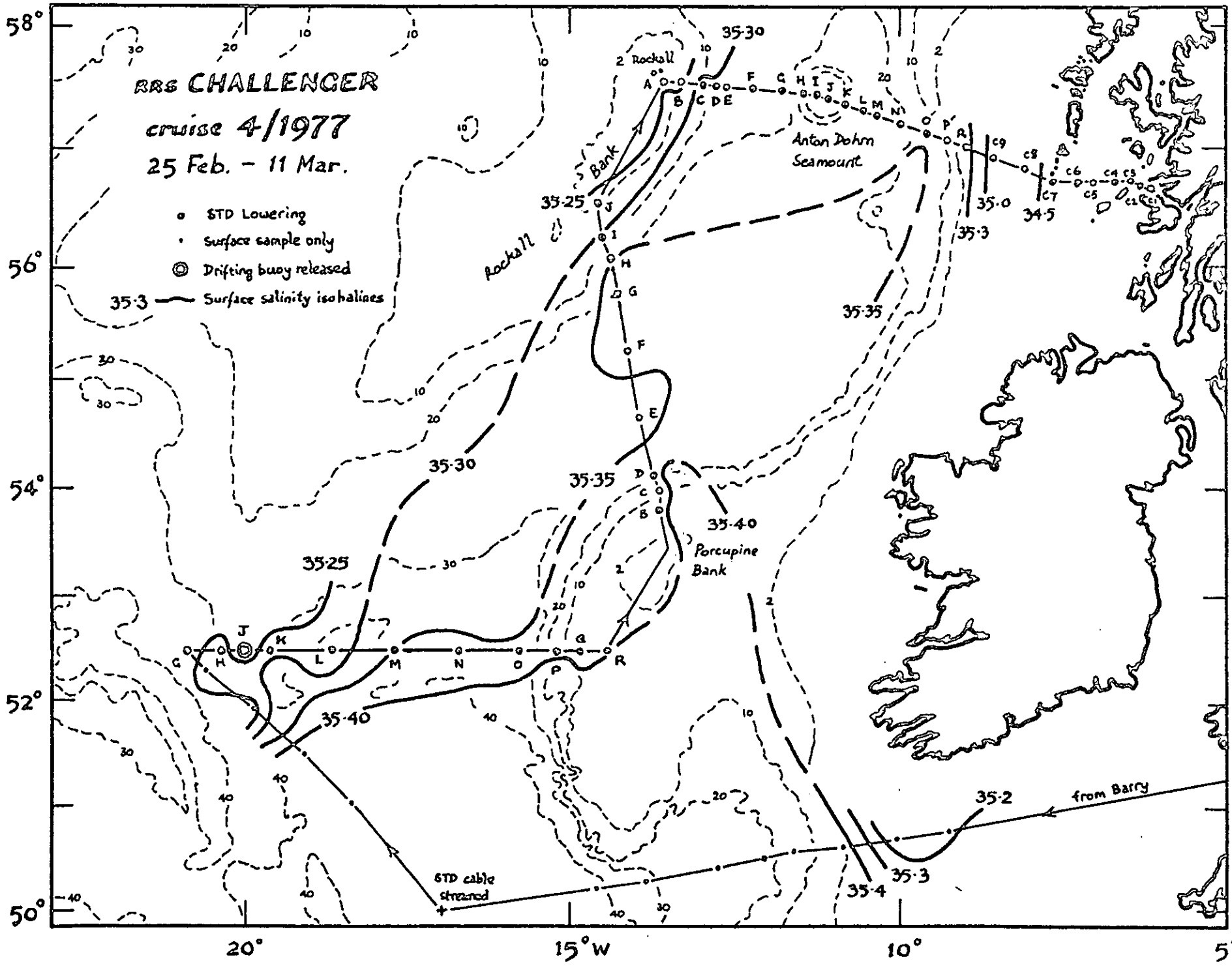
Surface salinity samples were taken during the passage from the Celtic Sea to the start of the first section.

Aim 4) The satellite-tracked buoy was released at JULIETT on 2 March. It carried a wave recorder and a thermistor chain with sensors at 20, 25 and 45 m depths. Although, as in its two previous abortive launchings from CIROLANA and CHALLENGER, it received a slight knock whilst being hoisted outboard despite notable care in handling, the new buoy transmit terminal appears to be more robust, and signals have been successfully received following the release. Fixes during the first three days of drift gave a small northward movement.

Aim 5) 50 litre surface water samples were collected at ten standard sampling positions between the shelf-edge and the Sound of Mull for radiocaesium analysis by the Fisheries Radiobiological Laboratory, Lowestoft. STD lowerings were made at all except the last station, and these show a generally rather weak inverse thermocline with a more marked halocline.

D.J. Ellett

22 March 1977.


RRS CHALLENGER
cruise 4/1977
25 Feb. – 11 Mar.
STD Lowering
Surface sample only
Drifting buoy released
35·3 Surface salinity isohalines
Rockall Bank
Anton Dohrn Seamount
Porcupine Bank
35·30
35·25
35·35
35·40
35·0
34·5
35·2
35·4
STD cable streamed
from Barry
58°
56°
54°
52°
50°
20°
15°W
10°
5°