

SCOTTISH MARINE BIOLOGICAL ASSOCIATION

Dunstaffnage Marine Research Laboratory

Cruise Report

R.R.S. CHALLENGER

Cruise 2/1978

30 January - 13 February 1978

RRS CHALLENGER Cruise 2/1978

Duration of cruise: 1235 h 30 January - 0920 h 13 February 1978.

All times GMT

Locality: Rockall Channel and Scottish continental shelf.

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- Aims:
- 1) To re-lay the SMBA shelf current meter mooring in 57°N , 9°W .
 - 2) To lay an SMBA deep-water mooring between Anton Dohrn Seamount and Rockall Bank.
 - 3) To work the Anton Dohrn Seamount CTD section and to repeat stations in the vicinity of the deep mooring.
 - 4) To work CTD sections on the shelf to the west of the Hebrides.
 - 5) To collect 50 litre surface water samples at standard positions on the shelf for radiocaesium analysis.

Narrative: CHALLENGER sailed from Barry at 1235 h 30 January in good weather and set course for the North Channel. A call at Dunstaffnage was necessary in order to collect mooring components which had been omitted from a Wormley delivery to Barry, and the ship anchored in Ardmucknish Bay at 0753 h 1 February. Arrival of the parts at Oban was delayed by the disruption of rail and road communications by snow on the previous day, but at 2100 h they were brought out by SEOL MARA. Because of forecasts of force 9 winds, CHALLENGER remained at anchor overnight, sailing for the Sound of Mull at 0707 h 2 February in moderating north-westerly winds. The first standard caesium sampling station was worked at 1024 h and surface sampling stations with CTD lowerings continued throughout the day.

The five easternmost stations of the Anton Dohrn Seamount section were worked before the ship returned to the position of the shelf mooring at daybreak on 3 February. The mooring was laid uneventfully in southerly force 6-7 winds between 0836 and 0913 h. CHALLENGER then proceeded to the next station of the section, but as increasing winds and swell were making conditions difficult for CTD work it was decided to steam westwards to the position for the deep-water current meter mooring in order to be ready to launch this when the weather improved. Tests of the acoustic releases were made en route between 2100 and 2303 h, and the ship hove to near the launching position at 0048 h 4 February.

Despite a moderate swell and south-westerly winds rising to force 7 in squalls, the mooring was successfully laid between 1023 and 1226 h, and subsequent tests showed that the acoustic release system was functioning correctly. Test lowerings of the CTD were made at this position before the ship set course at 1533 h for Rockall Bank.

The western part of the Anton Dohrn Seamount section was begun at 2122 h at station B in force 7-8 southerly winds and continued until 1336 h 5 February to station J, on the crest of the seamount, at which point the ship turned back to repeat this half of the section. The winds had however become westerly and increased during the night to force 8-9, and the heavy head swell caused speed to be reduced at 2300 h. Work on the section was able to commence at 0808 h 6 February and stations A to R were completed in steadily improving weather. Tests were made by Mr Price on the towing angles of the Precision Echo Sounder transducer body between stations N and O. The shelf mooring was inspected upon arrival at station R at 1710 h 7 February and appeared to be as left except for the loss of the radar reflector from the top of the spar buoy, probably during the preceding heavy weather.

A CTD section from the shelf-edge to Barra was begun at 2033 h, and on its completion at 0505 h 8 February stations were worked northwards along the west coast of S. Uist. A second section extended north-westwards from the Monach Is. to deep water (0830 to 2207 h), and was followed by another from south-east of

Rosemary Bank to Harris during 0342 to 1724 h 9 February. Calm seas with light winds and showery weather continued throughout this period. Two further sections were worked to the northwest of Lewis, the first from near Gallan Head into the Northern Rockall Chammel during 2016 h 9 February to 0739 h 10 February and the second returning from the deep water to the Butt of Lewis during 1106 to 2306 h 10 February.

During the passage south through the Minches on 11 February opportunity was taken to work a CTD section from Gruinard Bay to Stornoway between 0433 and 1021 h, and to repeat two sections where observations were made in July 1977. The first of these, across the narrowest part of the Little Minch, was occupied from 1452 to 1806 h, and the second, from Loch Maddy to Loch Moidart, was worked between 2238 h and 0800 h 12 February. Acoustic release tests were also made in soundings of 200 m in the Little Minch.

On the completion of work, CHALLENGER set course for the Firth of Clyde via the Sound of Mull and the Sound of Islay in continuing fine weather, berthing at Ardrossan at 0920 h 13 February.

Results Aim 1) The SMBA current meter mooring in 57°N , 9°W was re-established on 3 February, 53 days after its retrieval in December 1977 by f.r.s. SCOTIA. Details of the mooring are given in Table 1. The two Plessey current meters are due to be changed in mid-April during CHALLENGER cruise 6/1978.

Aim 2) A sub-surface mooring with acoustic release was laid close to station F of the Anton Dohrn Seamount section on 4 February. The mooring was laid over the stern, anchor last, using the 5 ton Lebus winch on the boat deck, and although weather conditions were marginal, strains on the 8 mm diameter wire were minimal. Attachment of the uppermost of the four Aanderaa current meters, when the sub-surface float was still close astern, provided the only awkward stage of the operation. Retrieval and replacement are planned for cruise 9 in early June. Positions and nominal depths of the current meters are given in Table 1.

Aim 3) Stations T to P of the Anton Dohrn Seamount section, crossing the Scottish continental shelf-edge, were worked with the CTD on 2-3 February. Following the laying of the deep mooring in the vicinity of station F, stations B to J from Rockall Bank to the seamount were worked on 4-5 February. Subsequently the complete section apart from the two easternmost shelf stations was worked during 6-7 February. Two sets of data are thus available across the western part of the Rockall Channel for comparison with the moored current meters.

The new 6000 m range CTD underwater unit, replacing the STD head lost by Menai Bridge in June 1977, gave excellent records. The circuits added to the deck unit to provide full-scale ranges of 300 and 600 m were tested and adjusted over deep water, and although requiring further small modifications in the laboratory, were used extensively on the shelf.

Aim 4) Five sections were worked across the continental shelf to the west of the Hebrides during 7-10 February, and four of these extended across the shelf-edge into deep water. Three sections were also worked between the North Minch and the Small Isles on 11-12 February. Taken in conjunction with CTD lowerings at radiocaesium sampling stations (Aim 5, below), a grid of over 65 shelf observations was obtained. Few lowerings showed completely mixed conditions: Over much of the shelf bottom temperatures were typically 0.1 to 0.6 deg. C warmer than at the surface, although at the shelf-edge surface temperatures were the higher due to the influence of the warmer waters of the Rockall Channel. Surface temperatures ranged from less than 6°C immediately to the west of Harris to over 9°C over the continental slope. All the shelf-edge sections showed mixing extending to 500 - 600 m depth in the channel, but with a north-eastward decline in temperature of about 0.5°C between 57° and 59°N.

Aim 5) Ten 50 litre surface water samples were collected between the Sound of Mull and the shelf mooring position for radiocaesium analysis by the Fisheries Radiobiological Laboratory, Lowestoft. CTD observations were made at each of the standard positions.

Miscellaneous a) New metering gear for the main warp was constructed and installed during the cruise by Mr Price. Tests made over the continental slope gave satisfactory results. Installation of two similar sets of meters on the trawl warps is planned during the course of Cruise 3.

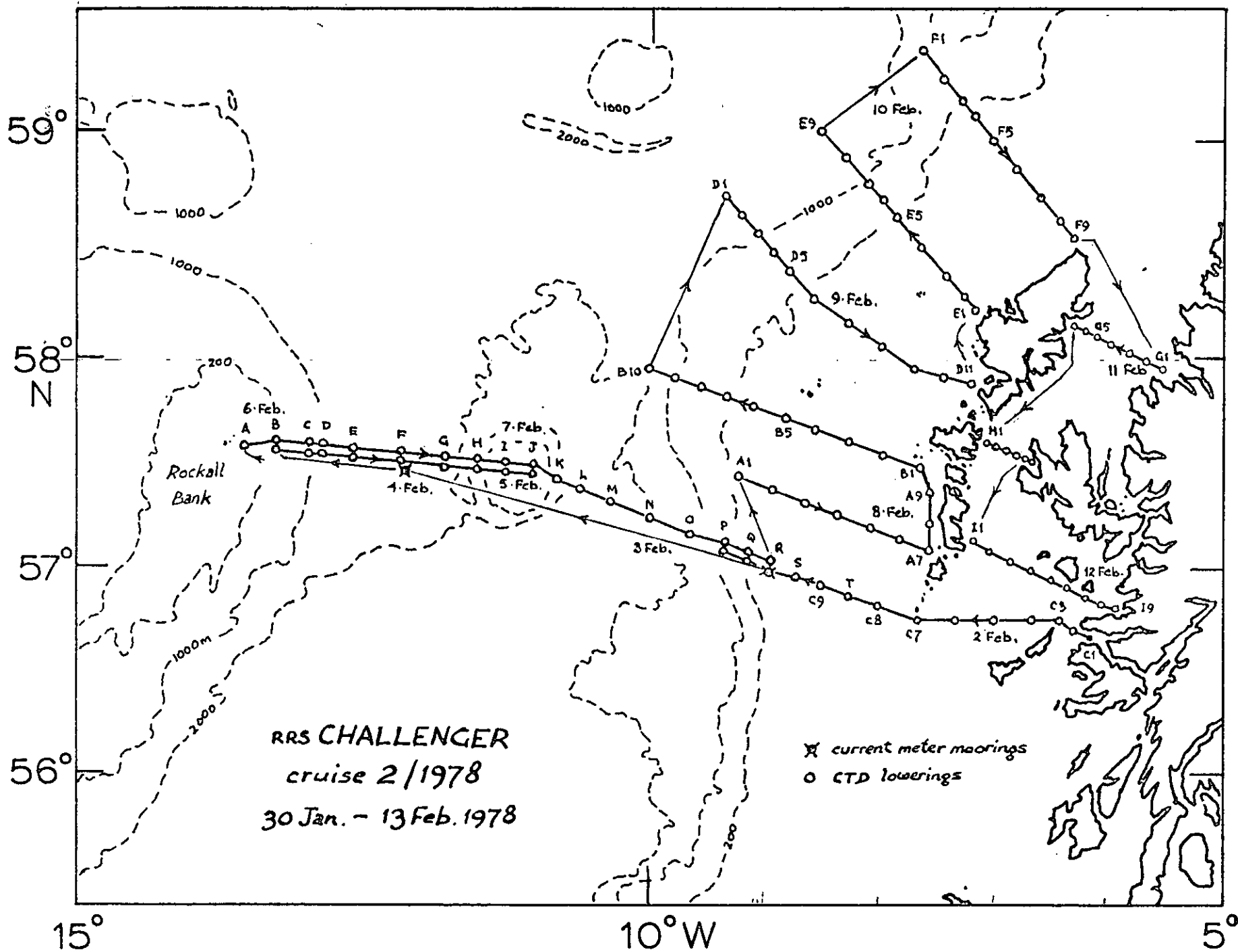
b) The Precision Echo-Sounder was run throughout the shelf survey to provide information for the selection of sites for current meter moorings.

D.J. Ellett

15 February 1978

Table 1. Details of moorings set during CHALLENGER cruise 2/1978

Station	F	R
Position	57° 29.6' N 12° 12.0' W	57°00.8' N 09°01.2' W
SMBA Number	39	38
Sounding (m.)	1810	137
Nominal depth of sub-surface float (m.)	81	24
Nominal meter depths (m.)	92 ^P	30
(P: pressure sensor fitted)	503 ^P 1003 ^P	108
(All have temperature sensors)	1753	
Sampling frequency	20 min.	10 min.
Laid at (GMT)	1233 h 4 Feb. 1978	0913 h 3 Feb. 1978



MARS 1977