SCOTTISH MARINE BIOLOGICAL ASSOCIATION

Dunstaffnage Marine Research Laboratory

Cruise Report

R.R.S. CHALLENGER

Cruise 16/1979

28 October - 11 November 1979.

R.R.S. CHALLENGER, Cruise 16/1979.

Duration of Cruise: 1003 h 28 October - 1248 h 11 November 1979.
All times GMT.

Locality: Rockall Channel and Scottish Continental Shelf.

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Aims:

1) To service SMBA current meter moorings at Stations F and M in deep water and Station R at the shelf-edge.

2) To service IOS moorings I1 to I4 in the northern Rockall Channel.

3) To work the Anton Dohrn Seamount CTD section and additional CTD sections in the northern Rockall Channel, as time permits.

4) To collect 50 litre water samples for radiocaesium analysis and CTD profiles on the shelf.

Narrative: CHALLENGER sailed from Ardrossan at 1003 h 28 October in fine calm weather and made a good passage to the Sound of Mull by way of the Sound of Islay. The first radiocaesium station was reached at 0228 h 29 October and the ship proceeded westwards making CTD lowerings and collecting surface water samples in clear weather with freshening winds and showers beyond Barra Head. The shelf mooring was sighted in passing after dark and Stations T to P of the Anton Dohrn Seamount CTD section were worked. Progress was stopped at Station O at 0045 h 30 October by winds gusting to 45 kt, and the ship hove to until 0800 h, when the southerly wind had dropped to force 5. Station O was worked and in view of poor weather forecasts the ship steamed to the vicinity of mooring M, beginning an acoustic search at 1145 h at the position as given by Loran-C. Obtaining no response here we moved to the Decca co-ordinates, which differed at this time by about 4 n.ml, and the release was contacted en route. The ship hove-to over the strongest signal at 1452 h, but as the wind had now risen to force 7-8 difficulties would have been experienced in picking up a released mooring, so CHALLENGER remained hove-to awaiting an improvement. Force 8 south-west to west winds with squally showers continued during 31 October, and as further deterioration was expected, at 1800 h course was set for Barra Head which, with a stern sea, was reached at 0630 h 1 November. A CTD section across the Little Minch from Loch Maddy to Loch Dunvegan was worked between 1418 and 1844 h and repeated between 2034 and 0001 h 2 November with a view to examining tidal changes, and subsequently a short section of three

stations was worked immediately to the south of the sill between Harris and north Skye. At 0810 h a section from Loch Seaforth via Staffin to Loch Gairloch, worked previously during June, was begun, and upon its completion the ship proceeded to the first station of a short section west of Loch Ewe. The strong southerly winds had increased further however, and at 1645 h CHALLENGER set course at slow speed back to the Inner Sound in a short heavy sea. Winds were force 9-10 overnight, and during 3 November were forecast to turn westerly; hence at 0800 h we began dodge towards the coast of Lewis for better shelter, arriving off Loch Erisort at 1600 h. High winds were again experienced overnight, even under the lee of the land, and the ship was hove-to between Loch Erisort and Stornoway, throughout 4 November, anchoring to the south of Arnish Point during the morning of 5 November. Conditions had improved inshore by 1100 h and a CTD section eastward from Stornoway was begun, but it was found impossible to work after the second station had been completed at 1210 h. It was decided to steam at slow speed towards the southern end of the Minch in the hope that conditions to the west of the Hebrides would improve during the week. At 1315 h a Mayday call was received from m.v. SINGULARITY, broken down and anchored within 0.4 n.ml. to windward of Dunvegan Head. CHALLENGER proceeded at full speed in squalls which attained 70 kt in gusts, but assistance was not necessary as SINGULARITY was ready to re-start her engines at 1700 h when we reached her position. CHALLENGER returned westwards for shelter and hove-to off Benbecula and S. Uist overnight.

With the chance of a brief change in the weather, course was

set for Barra Head at 0745 h 6 November and this was rounded at 1330 h. A very heavy swell existed with force 7 westerly winds and the ship proceeded at slow speed in order to reach the shelf mooring at first light. By 0821 h 7 November the wind was light and variable and the swell had subsided sufficiently to allow recovery of the mooring. This was completed at 0851 h and course was immediately set for mooring M. The acoustic release was fired at 1442 h and the mooring was aboard by 1615 h. CHALLENGER steamed for mooring F and at 0040 h 8 November contacted a release at a position about 3 n.ml. short of the Loran-C position. Contact was maintained until daylight, but it became apparent that this release was on the sea-bed and had operating frequencies differing from that laid in May 1979. A link-call to Wormley confirmed that these frequencies were those of an IOS mooring lost on launching at this position in August 1976. Box searches on the correct frequency for the May mooring were begun at 0840 h and continued until nightfall at 1645 h without contact being made. As sea and swell conditions had deteriorated during the day, it was agreed to set course for Cape Wrath, which was passed at 2000 h, 9 November. The Tyne was reached during the forenoon of 11 November, and the ship berthed for annual refit at the Middle Docks, South Shields at 1258 h.

Results: Aim 1) The shelf current meter mooring at Station R (57°N, 9°W) and the deep mooring at M ($57^{\circ}13'$N, $10^{\circ}22'$W) were retrieved on 7 November. No attempt was made to re-lay the moorings at the time of recovery as the deep moorings had been

in situ for six months and a brief improvement only in the weather was expected, with no further opportunity for recovery until February - March 1980. Hopes of re-laying after retrieving mooring F were defeated by the failure to find the latter before worsening weather and lack of time brought all work to an end.

The four Aanderaa meters at M, at nominal depths of 159, 570, 1072 and 1823 m, appeared to have functioned correctly for the 172 days since deployment. Corrosion of the acoustic release was slight. At R, two Plessey meters at 40 and 110 m nominal depths appear to have given satisfactory results over the 54 days since the mooring was serviced on 14 September.

Lack of satellite navigation equipment caused difficulties in locating the deep moorings. At M. the Loran-C position differed from that of the Decca Navigator, by about 4 n.ml, the latter fortunately being correct. At F a difference of about 2 n.ml was found, but with the Decca being here at extreme range and with the Loran having previously given erroneous positions, doubts remain as to whether the correct area was searched. Good fixes were obtained at the time of launch with the Magnavox two-component satnav, and any future search should use a comparable system.

Aim 2) The very large proportion of bad weather during the cruise gave no opportunity to visit or service IOS moorings I1 to I4. Although these were renewed in August, tapes from the metres at the two southern moorings, I3 and I4, will expire before the next SMBA cruise in the area, and those at I1 and I2 before the next scheduled joint SMBA/IOS cruise.

Aim 3) The Anton Dohrn Seamount CTD section was worked between Stations O and T only, covering the continental slope and shelf-edge during 29-30 October. Thermocline depths were 40 to 60 m over the deeper water. Bad weather and the need to retrieve the moorings prevented both completion of the section and the working of other deep-water sections. Surface salinity samples were taken en route to mooring F, and between F and Cape Wrath on the homeward passage.

The state of the CTD cable again gave cause for concern. Outer strands broke and fouled descending messengers at a number of stations, and rust had increased the diameter sufficiently to prevent the lower water-bottle clip from closing properly. The latter is probably the cause of the spooling difficulties, which in turn may be responsible for broken strands at positions where turns are nipped. 500 m of cable were cropped, but although the lower layers were less rusty, stranding still occurred.

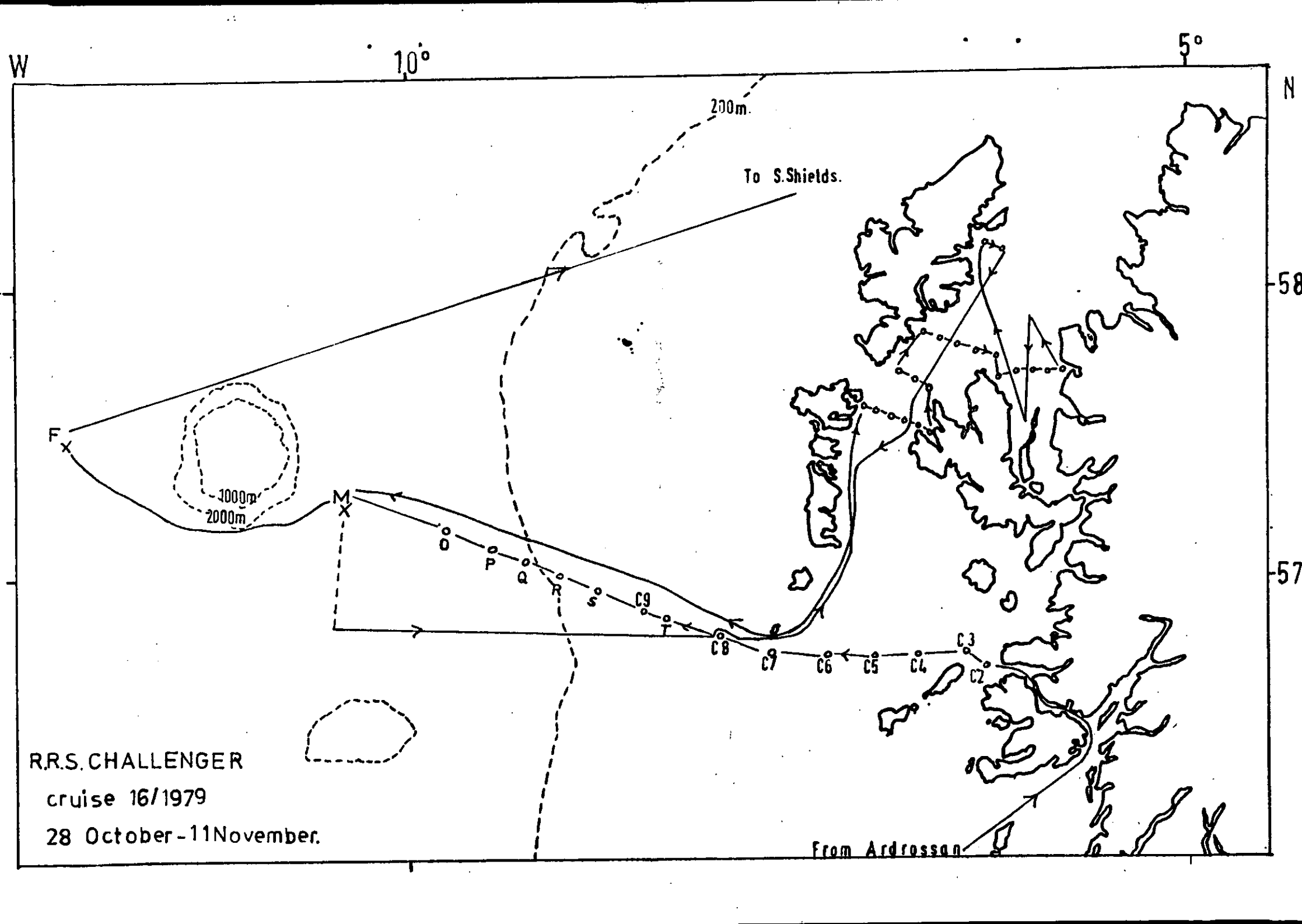
Aim 4) Surface samples for radiocaesium analysis by the Fisheries Radiobiological Laboratory were collected at ten standard positions between the Sound of Mull and the shelf mooring. CTD lowerings were made at all but the easternmost station. In the Sea of the Hebrides the water-column was homogeneous and relatively warm (ca. 12°C), except at the station immediately to the east of Barra Head where a shallow mixed layer, cooler by about 0.5 deg.C existed. Over the outer half of the Hebridean Shelf a cooler (ca. 11.5°C) homogeneous layer extended to 60-90 m depth at three of four stations, with bottom temperatures of 9.9° to 10.5°C reflecting the persistence of

water formed in the previous spring.

Miscellaneous Two CTD sections across the Little Minch and the North Minch which were previously worked in June were repeated during 1-2 November and five other CTD lowerings were made in the North Minch. Temperatures were between 11.5° and 12°C, mostly showing a slight warming with depth. A few only of the 27 profiles showed any discontinuities of temperature and conductivity, and these were of small scale.

D.J. Ellett.

11 November 1979.


W
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To S.Shields.
F
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C6
C5
C4
C3
C2
From Ardrossan
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