Scottish Marine Biological Association

Dunstaffnage Marine Research Laboratory

CRUISE REPORT

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DUNSTAFFNAGE MARINE LABORATORY

and the

SCOTTISH MARINE BIOLOGICAL ASSOCIATION

OBAN, ARGYLL, SCOTLAND

CRUISE REPORT

RRS CHALLENGER

CRUISE 81/1991

1 - 8 July 1991

RRS CHALLENGER, Cruise 81/1991

Duration: 1220h 1 July - 0908h 8 July 1991
All times GMT

Locality: Scottish continental shelf and Rockall Channel

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Aims:

1) To collect CTD profiles and large-volume water samples at standard positions between the Sound of Mull and the shelf-edge west of Barra for radiocaesium studies.

2) To service the DML current meter mooring in the Tiree Passage.

3) To work the CTD stations of the Anton Dohrn Seamount section, between the shelf-edge and Rockall, to continue the Rockall Trough time-series as a UK contribution to WOCE Goal 3.

4) To work the Rockall - Malin Head CTD section for further investigation of recent water mass changes west of Britain.

5) To collect Craib cores for microbiological enrichment studies at 3-4 sites.

6) To work shelf CTD sections in the Sea of the Hebrides and North Channel as time permits.

7) To collect wave data for POL using the ship's radar.

Narrative:

CHALLENGER had sailed from Plymouth at 1300h 28 June and berthed at the Dunstaffnage pontoon at 0840h 1 July. Scientific gear was loaded during the morning and the ship sailed at 1220h, courses being set via the Sound of Mull for the Tiree Passage mooring in quiet weather. The spar buoy was grappled at 1629h and recovery was complete by 1648h. A new mooring was run onto the winches and laid between 1827 and 1833h, after which the section from the Sound of Mull to the shelf-edge was begun at station 1G off Ardmore Point at 1938h. Work continued in light northeasterly winds and station 16G at the shelf-edge was completed at 1600h 2 July. Thereafter the Anton Dohrn Seamount CTD section was worked, station A near Rockall being completed at 0255h 4 July. A section of five CTD stations was worked westwards into the Hatton - Rockall Basin, and at the last of these a Craib core was obtained in 1150m depth.

A Mayday message for a position 60 n.ml northwest of this position was received as the corer was being recovered, and at 1600h CHALLENGER began steaming for this vicinity, but at 1615h Falmouth MRCC cancelled the message and the ship resumed course for station QS of the Rockall - Malin Head section. Overnight fog slowed progress, but the first CTD station was reached at 0110h 5 July. Slightly fresher easterly winds of force 4 cleared the fog and work continued steadily across the deep water. Tests of the loaned MOD Taunton Bissett-Berman CTD were successfully carried out at station LS, and at station ES at 1558h 6 July a Craib core was obtained from 1530m depth. The ship then diverted northeastwards to attempt coring upon the Donegal Fan, but in the course of retrieving the corer at the first station one of the bearings of the hydrographic winch disintegrated. Whilst the engineers attempted to remove apparently similar bearings from the A-frame outboard roller, coring continued until 0055h 7 July using a 300m length of hydrowire upon one of the auxilliary winches, although no suitable sediments were found. Unfortunately, the bearings from the roller proved to be marginally, but significantly, different in size to the broken bearing, ruling out any further CTD casts.

XBT observations were made at the two stations required to complete the section to the Malin shelf, and at 0430h CHALLENGER set course for locations on the outer shelf where the charts suggested suitable bottoms for coring might be found. No successful cores were retrieved until 1436h, when four good cores were obtained in the deep trough southeast of Barra Head. No further scientific work being possible, the ship set course for the Firth of Clyde. The pilot was picked up off Ayr at 0740h 8 July and CHALLENGER berthed at Troon at 0908h.

Results:

Aim 1) All ten standard positions between the Sound of Mull and the shelf-edge were sampled at the surface, midwater and near-bottom for MAFF, Lowestoft on 1-2 July and CTD profiles were obtained at each station. Surface and near-bottom samples were also collected at the two easternmost positions for SURRC, East Kilbride.

Aim 2) The DML Tiree Passage current meter mooring was serviced between 1629 and 1833h 1 July. Both current meters appeared to have functioned correctly during the 127 days' deployment from 24 February, providing a good record of residual flow in the Scottish coastal current during winter to early summer.

Aim 3) The Anton Dohrn Seamount CTD section was worked between 1457h 2 July and 0255h 4 July in quiet weather. Opportunity was taken to extend the section westwards across Rockall Bank by 100 km to soundings of 1150m in 16°W.

Preliminary examination of the CTD data indicates that the low salinity conditions centered upon the Labrador Sea water in September 1990 were still persisting at less extreme levels over the western half of the Rockall Trough in July 1991.

Aim 4) Stations ES to QS of the Rockall-Malin Head CTD section were worked between 0110h 5 July and 1454h 6 July before the failure of the hydrographic winch stopped station work. XBT profiles were taken across the slope zone at stations CS to ES to complete the section. This section was worked upon twelve occasions during the high salinity period of the later 1960s and a comparison with recent values will be of interest.

Aim 5) The Craib corer obtained samples from three locations; the Hatton-Rockall Basin in 1150m depth, the continental slope west of Islay in 1370m and the deep basin (220m) upon the shelf southeast of Barra Head. Attempts to core at five sites upon the outer Malin Shelf failed due to sandy or rocky bottoms. The cores were kept at low temperature for subsequent microbiological enrichment studies at Dunstaffnage.

Aim 6) Apart from the CTD section of Aim 1, above, no shelf sections were worked, due to the failure of the hydrographic winch.

Aim 7) Despite initial problems due to differing language versions between Bidston PCs and those on board the ship, and repeated unpredictable failures of the heading marker on the ship's secondary radar, sufficient wave data was gathered to provide a good test of the system and to provide demonstrations for scientists from Germany who had arranged to visit the ship at Troon to view the system.

Miscellaneous The Bissett-Berman CTD converted from the STD kindly loaned by the Hydrographic Office, Taunton, was tested in deep water and gave results closely comparable to the DML CTD. It is reassuring to again have a reliable back-up instrument in the event of faults or disasters.

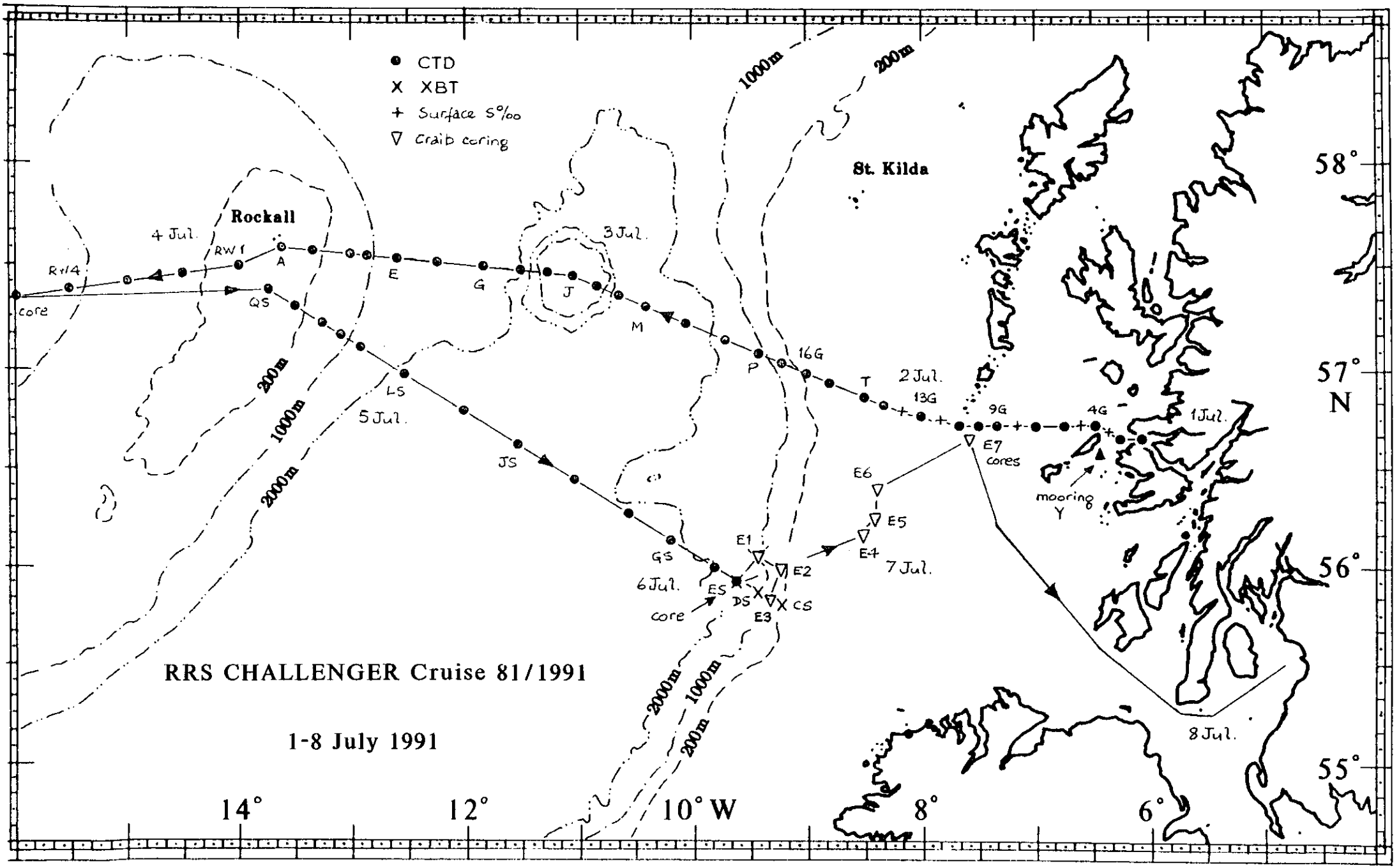
Acknowledgements The pleasure of sailing with Captain Maw, his officers and crew was enhanced on this occasion by the knowledge that we incurred no blame for bringing "normal" Rockall Trough weather with us, as upon most cruises.

D. J. Ellett

19 July 1991

Table 1. Hydrographic stations, Cruise 81/1991

Stations	CTD disk/ dip nos	Dates 1991	Observations
		Sound of Mull - shelf-edge	
1G-16G	175/001-013	1-2 Jul	Surf. sal; CTD, Cs surf. & subsurf. (1,2,4,6,7,9,11,13,15,16)
		Anton Dohrn Seamount section	
Q-P	175/014-015	2 Jul	CTD
O-N	176/016-017	2 Jul	CTD
M	177/018	3 Jul	CTD
L-I	178/019-022	3 Jul	CTD
H	179/023	3 Jul	CTD
G-F	180/024-025	3 Jul	CTD
E	179/026	3 Jul	CTD
D-A	181/027-030	3-4 Jul	CTD
		Rockall westwards	
RW1-RW4	181/031-034	4 Jul	CTD
RW5	182/035	4 Jul	CTD (also Craib core)
		Rockall - Malin Head section	
QS-NS	182/036-039	5 Jul	CTD
MS-LS	183/040-041	5 Jul	CTD
LS(ii)	184/042	5 Jul	CTD test
KS	185/043	5 Jul	CTD
JS	186/044	5 Jul	CTD
IS	187/045	5 Jul	CTD
HS-GS	188/046-047	6 Jul	CTD
FS-ES	189/048-049	6 Jul	CTD (also Craib core)
E1	---	6 Jul	XBT
CS,DS,ES	---	7 Jul	XBT
		Southeast of Barra Head	
E7	---	7 Jul	Craib cores only


CTD
XBT
Surface S‰
Craib coring
Rockall
St. Kilda
4 Jul.
3 Jul.
2 Jul.
1 Jul.
5 Jul.
6 Jul.
7 Jul.
8 Jul.
RW4
RW1
A
E
G
J
M
P
16G
T
13G
9G
4G
core
QS
LS
JS
GS
ES
DS
CS
E1
E2
E3
E4
E5
E6
E7 cores
mooring Y
200m
1000m
2000m
RRS CHALLENGER Cruise 81/1991
1-8 July 1991
58°
57° N
56°
55°
14°
12°
10° W
8°
6°