SCOTTISH MARINE BIOLOGICAL ASSOCIATION

Dunstaffnage Marine Research Laboratory

Cruise Report

R.R.S. CHALLENGER

Cruise 7/1980

21 April - 6 May 1980

R.R.S. CHALLENGER, Cruise 7/1980

Duration of cruise: 2210 h 21 April - 1210 h 6 May 1980.

Times BST unless specified otherwise.

Locality: Rockall Channel and Scottish continental shelf.

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Aims:

(1) To service the SMBA current meter moorings at stations F, M and R.

(2) To recover IOS moorings at Sites I1, I2 and I4 and to set replacement moorings at I1, 2, 3A and 4.

(3) To work the Anton Dohrn Seamount CTD section and other CTD sections as time permits.

(4) To set an experimental IOS bottom current mooring with a design life in excess of one year.

(5) To moor an IOS Bidston tide gauge upon the Anton Dohrn Seamount section.

SHIP and CRUISE No.	REPORT No.	DATES	LAB.
DAWNSKY		2 JUN - 15 JUN 1986	SMBA
CALANUS	184	24 APR - 2 MAY 1986	IOS ; SMBA
USNS LYNCH		1 AUG - 22 AUG 1986	NOSC & SIO (San Diego) IMER
KOMMANDOR SUBSEA	Marine Report 87/7	SEP. 1986 - JAN. 1987	BGS
GORSETHORN		23 OCT - 6 NOV 1988	SMBA
GIN SEA 86) HLNMS TYDEMAN A906		26 MAY - 30 JUN 86	
GORSETHORN	-	23 OCT - 6 NOV '88	SMBA

(6) To collect 50 litre water samples for radiocaesium analysis and CTD profiles at standard positions between the Sound of Mull and the shelf-edge.

(7) To locate and grapple for lost current meter moorings at I3 and F, as time permits.

(8) To moor an SMBA current meter and corrosion monitoring experiment off the west coast of S. Uist.

Narrative:

Sailing was delayed from 1000 h 21 April to 2210 h because of the late delivery of diesel fuel. CHALLENGER left Ardrossan in fine weather and westerly winds of forces 3 - 5. Passage was made via the Sound of Islay and Sound of Mull to the first radiocaesium sampling station which was reached at 1427 h 22 April. Sampling continued westwards to station C9 at 0117 h 23 April, when the ship set course for S. Uist to arrive at the Wave Energy test site at daybreak. The sub-surface SMBA mooring was laid between 0625 h and 0725 h, and the ship proceeded north-westwards with the aim of servicing the northernmost moorings during the settled spell of weather. Acoustic releases were tested in deep water between 2000 h and 2205 h. Mooring I4, near Rosemary Bank, was successfully interrogated at 0552 h 24 April en route to I1, south-east of Lousy Bank. I1 was released at 1300 h and recovered and re-set between 1329 h and 1617 h, and in continuing fine weather CHALLENGER headed for I2, near the Ymir Ridge. Acoustic releases were tested between 2137 and 2342 h, and sounding lines were run from 0240 h to 0720 h 25 April to examine the col south of Cirolana Deep. Mooring I2 was located, recovered and replaced between 0800 and 1124 h. In view of somewhat increased wind and swell, it was agreed to postpone

the laying of the IOS experimental mooring until later in the cruise, and sounding lines were run to the west of Cirolana Deep between 1400 and 2215 h en route to mooring I4. A moderate swell during the night slowed the ship, but I4 was reached at 0507 h 26 April and recovered at 0523 to 0723 h. Re-laying began at 0858 h and was completed at 1018 h. Acoustic release tests were carried out from 1253 to 1455 h and course was set for position I3, where a mooring had been lost on laying during cruise 17/1979. An acoustic search between 1941 and 2017 h failed to contact the release and the ship steamed 5 n ml. from the given position to lay a replacement mooring between 2104 and 2226 h. Subsequently the search for the lost mooring recommenced, and contact was made at 0008 h 27 April. The position was well fixed, but in view of a squally south-westerly wind it was agreed to head for the SMBA moorings in case of deteriorating weather, rather than to grapple at this stage of the cruise.

Mooring F was contacted at 1030 h and released at 1205 h. Recovery was complete by 1316 h, and after dumping the used wire, the station was re-laid between 1617 and 1726 h. A search was made for an SMBA mooring lost close to this position during 1979 between 1829 and 2016 h, but despite excellent conditions no response was found to signals on the releasing frequency. Following this, efforts were made to locate IOS mooring 214, lost during launch in 1976, and which had responded in November 1979. Contact was made and the position fixed at 2330 h, as CHALLENGER was steaming eastward towards station N of the Anton Dohrn Seamount section to deploy the Bidston tide gauge. This was laid in fine calm weather at 0713 to 0803 h 28 April, and course was set for SMBA mooring M. This was located, raised and re-laid without

incident between 0950 and 1509 h, and the ship steamed for soundings of 1400 m on the Barra Fan to lay the IOS experimental one-year mooring. After deploying this between 2030 and 2220 h, course was set for the Porcupine Abyssal Plain to stream the new CTD wire.

Passage to soundings of 4800 m occupied 29 April and until 2348 h 30 April, when 4780 m of the new 5500 m CTD cable were veered. Although the remaining layers on the drum were apparently well packed, even spooling became progressively more difficult, and 0800 h 1 May it was decided to re-stream the wire with the ship lying-to in order to tension the complete cable from the lowest layer on the drum. This was more successful, with only minor problems in the upper layers, and the operation was complete by 1320 h. Steaming was then resumed through 2 May to reach station A, near Rockall, of the Anton Dohrn Seamount CTD section at 1145 h 3 May. Stations A to G were worked until 2337 h, when the ship returned to the vicinity of F to grapple for IOS mooring 214 at the position located earlier in the cruise. Dragging continued from 0128 h 4 May until 0738 but, despite close approaches to the lost equipment, was unsuccessful. The section was resumed at station H at 1003 h, where adjustments were made to the spooling gear upon hauling, and continued in excellent weather to station R upon the continental shelf, two additional profiles being taken over the slope region. Upon completing the section at 0905 h 5 May, the replacement shelf-edge current meter mooring was laid at R and its predecessor retrieved between 0945 and 1240 h. CHALLENGER then set course for the Clyde, reaching Ardrossan at 1210 h 6 May.

Results:

Aim (1)

All three SMBA current meter moorings were raised and re-set, details of dates and positions being given in Table 1. The ten Aanderaa current meters appeared to have functioned correctly, obtaining data for 57 days at F, 56 at M and 61 days at R. No difficulties were encountered at the deep stations, but at R both the floating pick-up line and the reserve lifting strop on the spar-buoy had been cut away, causing some initial difficulties which would have been more serious in less calm weather. It seems probable that a fishing vessel had become entangled with the spar, but no damage to the underwater gear had resulted.

Aim (2)

All three moorings were recovered uneventfully. Details are given in Table 2. The condition of the wire rope, even on buoys set in August 1979 was good and there was little evidence of corrosion in the stainless steel components of the command releases, beacons and transponders. An exception to this was the top lug of the release mechanism on mooring I2 which had suffered severe intercrystalline corrosion but still retained much of its strength.

With only two exceptions the current meters were retrieved undamaged and with full data tapes. The deepest instrument on I1 had a partly broken rotor and the 600 m instrument on I4 had only about one-third of its maximum data due to leakage. The moorings fitted with transponders were readily located at ranges up to 2 miles. (W.J. Gould)

Aim (3)

The Anton Dohrn Seamount CTD section was occupied during 3 - 5 May. Shallow upper thermoclines had developed at depths of 6 to 30 metres and surface temperature ranged from 9.3° close to Rockall to 10.7°C over the Scottish continental slope. Two additional stations (O^1 and P^1) were worked over the slope region.

No time was available for the working of other CTD sections.

Aim (4)

The site originally chosen for the deployment of the experimental mooring was close to I2 but due to the need for mooring preparation the deployment was delayed until later in the cruise and the location changed to a site on the Barra Fan. The mooring was made up of 6 mm jacketed wire and carried a combined dual release/current meter/ buoyancy package near the sea bed. The normal stainless steel components of the acoustic release were made of Titanium alloy. The mooring is designed for a minimum 1 year life and the current meter has sufficient data capacity for a 2 year record.

The anchor-first deployment for the double-barrelled winch was uneventful despite the 2000 lb. anchor weight on the 6 mm wire. There was some wire slip on the drums resulting in quite high tensions on the storage reel. This could be obviated by having 5 instead of the normal 4 turns of wire on the drums. The wire was undamaged by the deployment procedure, and given a somewhat smaller anchor weight there seems no reason to doubt that moorings of similar design to the others set on this cruise could be set using this wire. (W.J. Gould)

Aim (5)

A pop-up tide gauge was laid at station N (57° 14.407' N, 10° 03.882' W) in 2,100 m of water which consisted of 3 self-recording pressure/temperature recorders mounted in a small frame together with the recovery acoustics unit and attached to a buoyancy unit by a 2 m rope strop.

The objectives of the deployment are to investigate and compare the low frequency performance of the 3 instruments and to use the tidal data obtained at this station to extend the coverage of the NW approaches. (A.J. Harrison)

Aim (6)

Water samples for radiocaesium determination by the Fisheries Radiobiological Laboratory, Lowestoft, were taken at standard positions C1 to C9 on 22 - 23 April and at C10 on 5 May. Only at the latter station are CTD data available, as the new CTD cable had not been tensioned before the earlier dates, although bucket temperatures and surface salinity samples were collected.

Aim (7)

IOS mooring I3A (lost on deployment in December 1979) was located and both command release (CR) and transponder were working well. The LORAN-C coordinates given on deployment are probably in error due to lane slip and a revised position is given in Table 2. From the signals received it appears that the CR and transponder are separated by approx. 35 m and oriented in a generally north-south direction. The new mooring was set some 5 miles away in order not to interfere with possible dragging operations.

Mooring 214 (lost on deployment in August 1976) was interrogated briefly early in the cruise and later seven hours were spent in an attempt to recover the mooring by dragging. The release pinger is still strong although the fact that it is lying on its side makes the signal strength very dependent on the ship's position relative to the mooring. The beacon turned on readily on 320 kHz but could not be locked on with the release frequency. The dragging attempt was unsuccessful. (W.J. Gould)

Rig (3)

An Aanderaa current meter equipped with anodes to record corrosion potential was laid in the neighbourhood of the SMBA fouling study site to the west of S. Uist on 23 April in 65 m of water. Good radar and Decca fixes of the position were obtained, but in view of the narrow angle of the acoustic transducer beam of the release, it would seem advisable to work from temporary marker buoys when re-locating the rig in September, and to establish a permanent marker when the meter is re-laid.

Miscellaneous

(a) The new CTD cable was streamed and tensioned successfully with the assistance of Mr. C.S. Storrier, Chief Engineer. Small adjustments were needed to ensure the even spooling of the upper 2000 m of wire, possibly because of wear in the reeving gear. In view of modern fuel costs, it is becoming increasingly economic to provide shore-side facilities for tensioning new wires in port.

(b) A number of sounding lines were run in the vicinity of the Cirolana Deep to check for the continuity of small-scale features in the south and west of the area.

(c) Surface salinity samples were taken over most of the area covered by the cruise.

D.J. Ellett 12 May 1980

Table 1. Details of SMBA current meter moorings set during Cruise 7/1980.

Station	P	M	R	Z
Position N	57° 32.2'	57° 16.0'	56° 59.6'	57° 18.8'
W	12° 16.6'	10° 20.2'	08° 58.5'	07° 36.6'
SMBA mooring no.	64	65	66	63
Sounding (m.)	1784	2216	134	65
Nominal depth of sub-surface float (m.)	58	110	29	35
Nominal meter depths (m.) (P = pressure sensor)	69 P	121 P	35	40
All have temperature sensors	480 P	532 P	105 P	-
	980 P	1032 P	-	-
	1730 P	1782	-	-
Sampling frequency	30 mins	30 mins	10 mins	30 mins
Laid at (GMT)	1640	1421	0926	0624
	27 Apr.	28 Apr.	5 May	22 Apr.

Table 2. IOS moorings serviced during Cruise 7/1980.

(a) IOS current meter moorings recovered

Mooring No.	Site	Lat. N.	Long. W.	Sounding (m.)	Date set	Date recovered
278	I1	59° 58.1'	12° 11.7'	1165	21 Aug. '79	24 Apr. '80
279	I2	60° 12.7'	09° 16.0'	1465	24 Aug. '79	25 Apr. '80
283	I4	58° 49.9'	11° 41.1'	1850	11 Dec. '79	26 Apr. '80

(b) IOS current meter moorings set

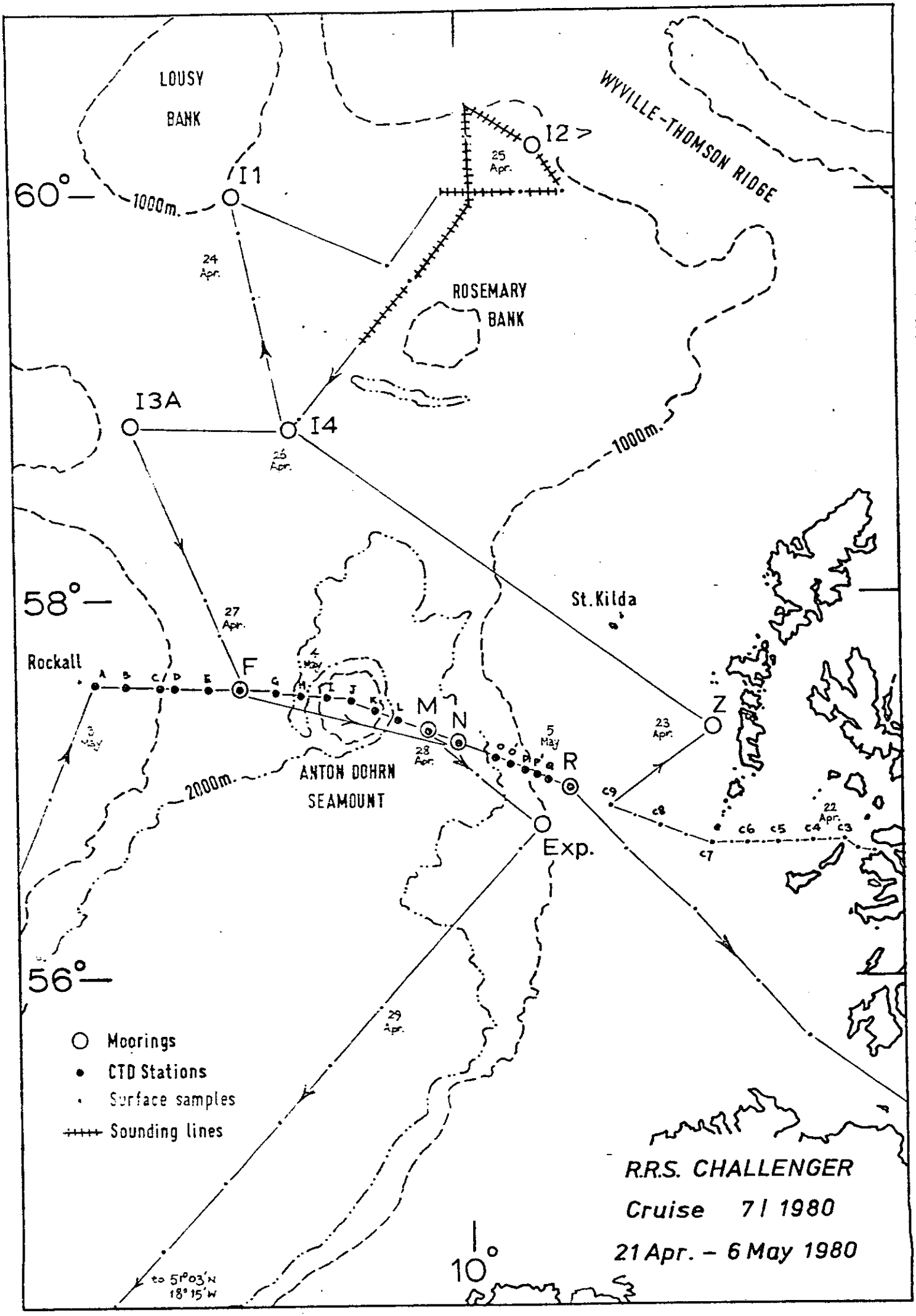
284	I1	59° 56.5'	12° 10.7'	1216	24 Apr. '80	
285	I2	60° 11.8'	09° 19.6'	1425	25 Apr. '80	
286	I4	58° 51.4'	11° 40.3'	1832	26 Apr. '80	
287	I3A	58° 52.1'	13° 15.4'	1627	26 Apr. '80	
288	Exp.	56° 48.6'	09° 16.0'	1419	28 Apr. '80	

(c) IOS Bidston tide gauge mooring set

-	N	57° 14.4'	10° 03.9'	2100	28 Apr. '80	

(d) IOS lost current meter moorings investigated

214	F	57° 29.4'	12° 14.1'	1806	7 Aug. '76	Located & grappled for.
282	I3A	58° 55.4'	13° 16.9'	1600	10 Dec. '79	Position fixed.


LOUSY
BANK
WYVILLE-THOMSON RIDGE
I2
25 Apr.
I1
60°
1000m.
24 Apr.
ROSEMARY
BANK
I3A
I4
26 Apr.
1000m.
58°
27 Apr.
St.Kilda
Rockall
A
B
C
D
E
F
G
H
I
J
K
L
M
N
4 May
3 May
28 Apr.
5 May
O
P
Q
R
Z
23 Apr.
2000m.
ANTON DOHRN
SEAMOUNT
Exp.
C9
C8
C7
C6
C5
C4
C3
22 Apr.
56°
29 Apr.
Moorings
CTD Stations
Surface samples
Sounding lines
to 51°03'N
18°15'W
10°
R.R.S. CHALLENGER
Cruise 7/1980
21 Apr. – 6 May 1980