

R.V. "Challenger" Cruise 3/83

Dates of Cruise: 8th to 22nd February, 1983.

Locality: Scottish continental slope and shelf, Rockall Channel,  $56^{\circ}$  -  $60^{\circ}$ N. Dunstaffnage to Falmouth.

Scientific Staff:

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A. Muirhead	(UCW, Swansea: 8-14 February only)

Aims:

(1) To relay SMBA mooring M ( $57^{\circ}18'N$ ,  $10^{\circ}23'W$ ) and service mooring F ( $57^{\circ}30'N$ ,  $12^{\circ}15'W$ ).

(2) To recover SMBA and IOS slope experiment moorings on lines A to D.

(3) To work CTD sections across each of the mooring transects.

(4) To make Agassiz trawl hauls in the vicinity of mooring M and on the continental slope in 1000 m depth, and other benthic work at M as time allows.

(5) To lay UCNW shelf current meter mooring M2 ( $56^{\circ}11'N$ ,  $7^{\circ}W$ ) and to service mooring HS1 ( $57^{\circ}26'N$ ,  $6^{\circ}58'W$ ).

(6) To grapple for missing moorings R ( $57^{\circ}N$ ,  $9^{\circ}W$ ) and Y ( $56^{\circ}37'N$ ,  $6^{\circ}25'W$ ) if time permits, and to re-lay mooring Y.

(7) To collect 50-litre surface samples for radiocaesium determination and CTD profiles at 10 standard positions between the Sound of Mull and the shelf-edge.

Narrative:

The ship was loaded at Dunstaffnage on the 7th and 8th of February and at 1500h 8th went to anchor in Ardmucknish Bay to await radar and radio repairs. Repairs were complete by 1430h 9th when the ship sailed, in deteriorating weather, up the Sound of Mull. A trial Conductivity-Temperature-Depth (CTD) dip at station C2 showed that the analogue recording system was faulty but that the digital recording was satisfactory: no further repairs to the analogue system were attempted. Caesium and salinity samples were collected from the non-toxic seawater supply at stations C1 to C7. At the end of station C7 course was set for mooring AO. AO was visited at daybreak on the 10th but nothing was sighted there and the ship went to shelter at St Kilda from northwesterly gales until early morning on the 11th. Work started on line B at 0830h; B1a was not seen: B1b replied acoustically and was grappled but its spar buoy parted from the severely corroded mooring wire and the current meters were temporarily abandoned in order to finish line B before dark. B2a was successfully recovered in moderate swell about noon and B2b half an hour later. B3 and B4 were recovered during the afternoon and B5 just as darkness came. The steering gear then became faulty and the ship was steered manually towards Stornoway.

During the night of 11th/12th the steering gear was mended and the ship resumed work at mooring C4 at first light on the 12th. C4, C3 and C2 were successfully recovered during the morning and the afternoon was spent in search of C1a and C1b. Neither rig was seen or responded acoustically during a 3 mile x 1 mile search over the expected positions and nothing was recovered during a 3 hour drag across the ground line position of C1a. Moorings C1 were therefore abandoned at about 1900h.

Three CTD stations CC1, 2 and 3 were worked over the continental slope before breaking to go to mooring D2 at first light on the 13th. D2 was recovered about 0900h 13th but wire, a current meter and some floats fouled the rudder. The floats were recovered with the ship's inflatable dinghy, the current meter and wire remained attached to the rudder. D1a current meter rig was recovered about 1120h and D1b soon afterwards. Another damaged Bidston current meter rig was dragged for but not found and at 1430h the "Challenger" headed for Stornoway as slowly as possible to avoid shaking off the fouled meter at the stern, to arrive at Stornoway at dawn on the 14th.

In Stornoway much of the larger scientific gear was unloaded so as to clear the decks for further work, the rudder was cleared by diver and some radar repairs were attempted. Mr. Muirhead left the ship because it was clear that there would be neither time nor opportunity - the main trawl wire being as yet untensioned - for his benthic work (aim 4).

The ship left Stornoway about 2230h 14th and steamed through the Minch. Station HS1 was visited during the night but despite excellent visibility nothing was seen there either visually or on radar and the ship continued to A0 where the mooring was dragged for from 1440h 15th until darkness, without success. The ship continued passage to station M, via A1, 2, 3, 5 and 6. Nothing was found at A1 (visually, radar, acoustically) or A2 (visually) but A3 and A5 replied acoustically and A6 did not. The new mooring M was laid from 0030h 15th onwards, after a wire test of the acoustic releases for F and M. The ship continued to F. The existing mooring at F at first failed to release when fired about 1130h 16th and a drag was prepared. However, release

was merely delayed - perhaps by corrosive fusion of the release link and its latch, on later inspection - and the mooring was successfully recovered from 1237h onwards. A new mooring was laid and F was left at about 1800h, with hourly surface salinity samples being taken en route for A6.

Early on the 17th, before dawn, A6 was reached but did not reply to acoustic interrogation. After dawn there had been a shift from the night position, the rig responded in the new position and was recovered about 0900h. A5 was recovered about 1100h 17th but A3 could not be recovered - acoustically appearing to be on the bottom rather than above it, indicating loss of the sub surface buoyancy. Rather than spend day time dragging here in 500 m of water, the mooring was abandoned so as to use the daylight at A2, where up to 3 rigs might be recovered. None were, despite a visual and acoustic search lasting 4 hours until 1800h. En route to HS1, A1 was acoustically interrogated and replied. With known positions and equipment for A1 and B1, HS1 was cancelled, A1 transponder was left on ready for recovery the following day and the ship was taken to B1 overnight. On the morning of the 18th the remainder of B1a was successfully dragged for, one current meter retrieved and B1b was also recovered by dragging. In the afternoon A1 was reached about 1630h: the subsurface float and two current meters were caught at the third drag, by circling the transponder. The ship then steamed directly for Y and caesium samples were collected on the way at positions C10<sup>1</sup>, C9<sup>1</sup> and C8<sup>1</sup> - 18, 10 and 2 miles north of the usual positions C10, C9 and C8.

Only the spar buoy and anchor were recovered from Y at morning slack water on the 19th: a new rig was laid before currents became too strong and the ship was able to proceed to M2 and lay the mooring there

by 1600h. The "Challenger" docked at Falmouth in the late evening of 21st February.

### Results

At the start of the cruise a day was lost to repairs and a day to bad weather. Subsequently, the weather was excellent - with a persistent high near north Britain - and only one more day was lost to the visit to Stornoway. Because of a crew shortage, and also because of limitations on the Decca at night, work was largely restricted to daylight hours, with the nights used for passage. Our aims were accomplished in part:

1. Moorings F and M were attended successfully.
2. Moorings A to D were all visited. Returns were good.
3. There was only once enough time between daylight working areas to make a CTD section.
4. Benthic trawling was impracticable from the start because the main wire had not previously been tensioned.
5. M2 was laid; HS1 was not seen at first visit in darkness and a second visit had to be cancelled in favour of work on A1 and B1.
6. There was no time to grapple for R and no need to grapple for Y, which was still intact but unfortunately recovered incomplete.
7. Radiocaesium samples were collected. There was no time out or in to make CTD observations over the shelf.

Table 1 summarizes the moorings work. 39 of the 57 deployed recording instruments were recovered - a 70% recovery.

Table 2 summarizes the CTD/sampling work.

The Cruise Track is shown in Figure 1.

Acknowledgements:

I would like to thank the master, P.J. MacDermott, his officers and crew for their helpful competence and particularly those who persisted with the repair of the steering gear on the 11th February.

A. EDWARDS

1st March 1983.

Table 1. Moorings Cruise 3/83 February 1983

Mooring	Depth	Laid Decca	Recovered Decca	Mooring	Instruments	Comments
A0.S	158	D47.6 C50.1	-	U	2Cm	Abandoned after dragging. 15th.
A1.B	153	D45.6 D66.3	D45.66 D66.49	U	2Cm	Recovered complete by dragging. 18th.
A2a.S	209	D45.6 E51.2	-	U	2Cm	Abandoned after acoustic search only. 17th.
A2b.B	205	D44.8 E51.8	-	SS	TC	Abandoned after acoustic search only. 17th.
A2c.B	206	D44.2 E52.1	-	BF	PG	Abandoned after acoustic search only. 17th.
A3.S	504	E30.2 E59.1	E30.33 E58.54	SS	3Cm	Located: failed to surface: abandoned on bottom. 17th.
A5.S	1599	E31.1 E73.9	E32.87 E73.34	SS	4Cm	Recovered complete. 17th.
A6.B	1988	E31.1 F55.7	E31.72 F55.52	BF	PG	Recovered. 17th.
B1a.B	160	H37.09 B73.5	H37.02 B73.55	U	2Cm	1Cm recovered by dragging. 18th.
B1b.B	145	H35.22 B72.42	H35.04 B73.10	U	Cm/PG	Recovered complete. PG damaged. 18th.
B2a.B	196	H41.62 C53.00	H41.28 C53.08	SS	2Cm	Recovered complete. 11th.
B2b.B	201	H40.9 C53.4	H40.78 C53.54	SS	TC	Recovered complete. 11th.
B3.W	508	H45.5 C67.7	H45.56 C67.64	SS	3Cm	Recovered complete. 11th.
B4.W	1080	H45.2 C73.6	H45.66 C73.06	SS	4Cm	Recovered complete. 11th.
B5.B	1868	H47.3 D51.2	H47.50 D50.74	BF	PG	Recovered complete. 11th.
C1a.B	198	F36.2 A55.8	-	U	2Cm	Abandoned after acoustic search and drag. 12th.
C1b.B	209	F35.7 A56.0	-	BF	PG	Abandoned after acoustic search only. 12th.
C2.W	518	F36.7 A56.2	C75.50 B44.07 F16.1	SS	3Cm	Recovered complete. 12th.
C3.W	1002	F12.5 B47.0	F12.18 B47.00	SS	4Cm	Recovered complete. 12th.
C4.B	1090	E31.7 A59.4	E31.06 59.30	BF	PG	Recovered complete. 12th.

Table 1 (Continued)

Mooring	Depth	Laid Decca	Recovered Decca	Mooring	Instruments	Comments
D1a.B	235	D31.1 B51.28	D31.10 B51.25	SS	2Cm	Recovered complete. 13th.
D1b.B	195	C47.6 B52.12	C47.60 B52.30	BF	PG	Recovered complete. 13th.
D2.B	370	D37.1 A78.4	D37.20 A78.40	SS	3Cm	Recovered complete after fouling rudder. 13th.
M.S	2230	A00.22 E31.52 G52.86	-	SS	4Cm	Laid 15th.
F.S	1820	-	A00.25 F33.69 H72.30	SS	4Cm	Recovered 16th.
F.S	1820	A00.24 F33.86 H70.73	-	SS	4Cm	Laid 16th.
HS1.R	162	C12.13 F34.43 G51.78	-	U + Spar	4Cm	Not seen visually on radar, 15th darkness. Toroid reported in N. Scotland.
Y.S	55	-	Radar	U	1Cm	Spar only recovered
Y.S	60	Radar	-	U	1Cm	Laid 19th. With transponder.
M2.R	73	E13.61 A41.36 H75.90	-	U + Spar	4Cm	Laid 19th.

Notes

S = SMBA  
 B = Bidston  
 W = Wormley  
 R = RVS/UCNW

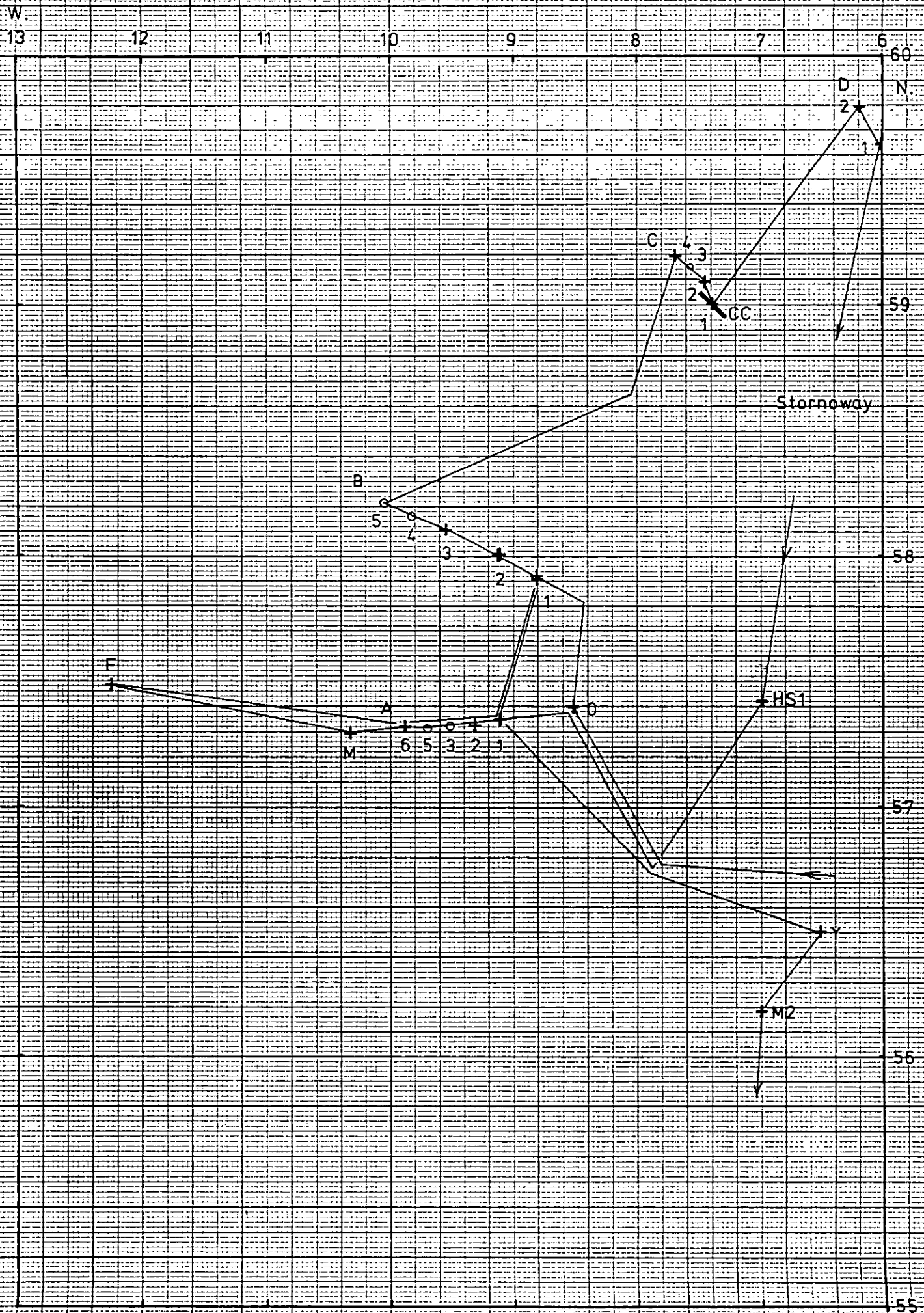
U = "U" Shape Mooring  
 SS = Single Strand Mooring  
 BF = Bottom Frame  
 PG = Pressure Gauge  
 Cm = Current Meter  
 Tc = Thermistor Chain



Table 2.

CTD/Sampling Cruise 3/83 February 1973

<u>Station</u>	<u>Date</u>	<u>Position</u>	<u>Comment</u>
C1	9	56°40'N 6°07'W	Caesium
C2	9	56°44'N 6°17'W	Caesium + CTD dip 001
C2½	9	56°44'N 6°22'W	Salinity
C3	9	56°44'N 6°27'W	Caesium
C3½	9	56°44'N 6°36'W	Salinity
C4	9	56°44'N 6°45'W	Caesium
C4½	9	56°44'N 6°52'W	Salinity
C5	9	56°44'N 7°00'W	Caesium
C5½	9	56°44'N 7°10'W	Salinity
C6	9	56°44'N 7°20'W	Caesium
C6½	9	56°44'N 7°30'W	Salinity
C7	10	56°44'N 7°40'W	Caesium
C7½ <sup>1</sup>	19	56°45'N 7°50'W	Salinity
C8 <sup>1</sup>	19	56°50'N 8°00'W	Caesium
C8½ <sup>1</sup>	18	56°57'N 8°15'W	Salinity
C9 <sup>1</sup>	18	57°04'N 8°30'W	Caesium
C9½ <sup>1</sup>	18	57°10'N 8°45'W	Salinity
C10 <sup>1</sup>	18	57°17'N 9°00'W	Caesium
CC1	12	58°57'N 7°20'W	CTD dip 002
CC2	12	59°00'N 7°25'W	CTD dip 004
CC3	12	59°04'N 7°32'W	CTD dip 005
D21	16	57°29'N 12°11'W	Salinity
D22	16	57°28'N 11°56'W	Salinity
D23	16	57°27'N 11°40'W	Salinity
D24	16	57°25'N 11°24'W	Salinity
D25	16	57°24'N 11°07'W	Salinity
D26	16	57°23'N 10°52'W	Salinity
D27	16	57°23'N 10°35'W	Salinity
D28	17	57°22'N 10°19'W	Salinity
D29	17	57°21'N 10°03'W	Salinity



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