

R.R.S. Challenger, Cruise 12/82

16th - 31st August

<u>Personnel:</u>	D. Booth	SMBA	
	N. Pascoe	"	
	J. Graham	"	
	N. McDougall	"	
	A. Harrison	IOS Bidston	
	D. Flatt	" "	
	D. Lughton	" "	
	G. Ballard	" "	
	J. Huthnance	" "	leg B only
	J. Cherriman	IOS Wormley	} leg A only
	B. Wallace	" "	

Aims:

- (1) To lay current meter, pressure gauge and thermistor chain moorings along the four sections A B C and D across the Scottish Continental Slope as part of the 1982/83 Slope Experiment.
- (2) To collect CTD data along the same sections.
- (3) To record bottom profiles across the slope on the same sections.
- (4) To service moorings at M, and at Tiree Passage and to recover those at P and R.
- (5) To collect Caesium samples along the shelf section from Mull.

Cruise Narrative:

Loading began early on Friday 13th August but the plan of transferring equipment from the Bidston lorry to the Oban lorry to reduce the total transport costs was not approved by the dockers without a bonus

payment. However the ship was completely loaded before evening, apart from some redistribution to provide access to liferafts and a fire-door.

The ship left Ardrossan harbour at 1600 hrs Monday 16th August, after an engine room delay and was heading northwestwards outside Islay when the weather deteriorated and so spent Wednesday 18th anchored in Tobermory Bay. However by mid-afternoon on Thursday, ^{19 AUG} the ship was passing Barra Head, surface Caesium and salinity samples having been collected at C1 - C7 with additional salinity samples at the mid-points. At midnight the first U shaped mooring at A0 was commenced, but was delayed due to snagging on the starboard winch, a problem that arose because access to the spooling gear on the port winch had been blocked by subsurface buoys, and all the mooring wire was wound on a single winch. At 0200, the ^{FRIDAY} mooring was complete, but soon the weather deteriorated again, and ^{20 AUG} shelter was found behind Barra.

By morning of Saturday 21st, the swell had calmed sufficiently, the ship rounded Barra Head again, and the mooring at A1 was laid by 1630 hrs. About ten large fishing ships were scattered along the horizon. Moorings at A2 and A3, including the pressure gauge at A2, were laid without mishap, but the mooring at A4 was omitted, partly because of lack of time, but also because three new SMBA releases all failed.

A4 was considered the best choice to leave vacant as a mooring at P, about 10 miles to the south but in the same depth of water could be left until the next cruise. The mooring at A5 was deployed by 1130 hrs on Sunday 22nd, and the pressure gauge at A6 was recovered, serviced and relaid by 1700. CTD dips were completed at all stations throughout the cruise and release tests were done as required, but with additional

releases required for later moorings.

Work on the B section began just after midnight by laying a pressure gauge at B5. The two Wormley moorings, at B4 and B3 were ^{23 AUG} laid during the early morning. The ship then steamed towards C4, and moorings between there and C1, including the pressure gauges were all deployed by 0700 on Tuesday 24th. At 1830 hrs the ship docked at Stornoway as another depression moved across and the weather worsened again.

Reloading of mooring gear was completed at 0900 on Wednesday 25th, but the ship did not leave Stornoway until Thursday morning on ^{26 AUG} account of high winds and a bad forecast. Although the ship was on station at D1 that evening, the wind increased and deployments were postponed until the morning. ^{27 AUG} The mooring at D2 was then laid first followed by the current meter mooring and pressure gauge at D1. ^{28 AUG} B1 was reached at 0900 hrs the following morning and the mooring was laid. At B2 the U shaped mooring caused some problems, and was delayed while the rigging was altered. However by 1700 the moorings including the thermistor chain and the pressure gauge were all deployed.

The only remaining mooring to be deployed was A4, but the weather worsened once again while steaming south-west and shelter was eventually found in Village Bay on St. Kilda, where the ship remained until 1000 hrs on Monday 30th August when it left to steam in a following sea towards Barra Head and Oban where a film crew was to board for the passage to Barry.

Achievements:

- (1) All moorings, including current meter moorings, thermistor chains and pressure gauges for the slope experiment, were laid except for A4.
- (2) CTD dips were completed at all stations including A4, but unfortunately much of the salinity data is noisy due to a faulty counter.
- (3) Bottom profiles were recorded between stations.
- (4) None of the SMBA moorings were serviced, but the P mooring which is in the same depth of water as A4, is about 10 miles south of A4 and its results will be of use to fill the gap in the A line. The meters at both P and R have sufficient tape to last until the next cruise.
- (5) Caesium samples were collected at stations between C1 and C7.

Equipment faults

- (1) Both meters on the hydro-winch are in error. The mechanical one reads approximately 40% too high, and the digital meter reads about 6% too low.
- (2) The drive belt in the satellite navigator printer is loose and regularly slips off its roller.
- (3) The PDR Mufax displayed several faults, including a tendency to go into spontaneous oscillation producing a black chart, a faulty helix drive, and a problem with the 5V supply line to the oscillator.

- (4) The scientific master clock loses approximately 4 minutes/week.
- (5) The main A frame has become very slow to move.
- (6) Three new SMBA releases all failed initial tests, and faults were found in supply wiring and some batteries were low.
- (7) The acoustic current meter supplied by RVS Barry failed to record its first sample in the lab., and some of its lithium batteries were found to be warm indicating high currents.
- (8) Several components in the CTD deck unit power supply were found to be blown at the start of the cruise, but the board was temporarily repaired satisfactorily.
- (9) The H.P. salinity counter was found to read consistently high but also to be noisier than usual.

Notes:

(1) Quoted depths

By measuring the length and angle of the faired cable it was estimated that the fish was about 11 m below the surface while underway at about 7.5 knots and at 14 m while stationary. All depths quoted here include both this correction as well as the normal correction for the speed of sound.

(2) Moorings

Three types of moorings were deployed, U shaped, single strand and bottom frames. All U shaped moorings were marked with a yellow spar buoy and had a ground line of about 300 m. The Bidston U shaped moorings had pingers inserted at the bottom of the instrument string. All single strand moorings and bottom frames, excluding the

frame at B2 which lies at one end of a U shaped mooring, are connected to ballast with IOS acoustic releases. All current meters were Aanderaa meters. Thermistor chains were also from Aanderaa. Some Bidston moorings had back up buoyancy consisting either of Aanderaa or Benthos floats as well as the usual steel subsurface buoy. The Wormley moorings were laid anchor first with the double barrel winch, all other single strand moorings were laid buoy first. U shaped moorings were laid with subsurface buoy first, except for the bottom frame at B2.

(3) Releases

Releases with similar release frequencies have been kept separated. All are initially triggered by a frequency of 320 although the Bidston releases then show a double rather than a single ping. Release frequencies and sweep periods are given below. All releases were tested on a hydrographic wire before deployment.

(4) Navigation

Position fixing was mainly by Decca. Two receivers were used, and each was read by a different observer. However it should be realised that moorings were laid at all times of day so that dusk and night time errors may apply. Chain 8E was used throughout except for the D moorings when chain 6C was used. Satellite and dead reckoning fixes were also recorded, although there was not time to wait for a new fix at every station, so some dead reckoning estimates are very poor particularly a couple

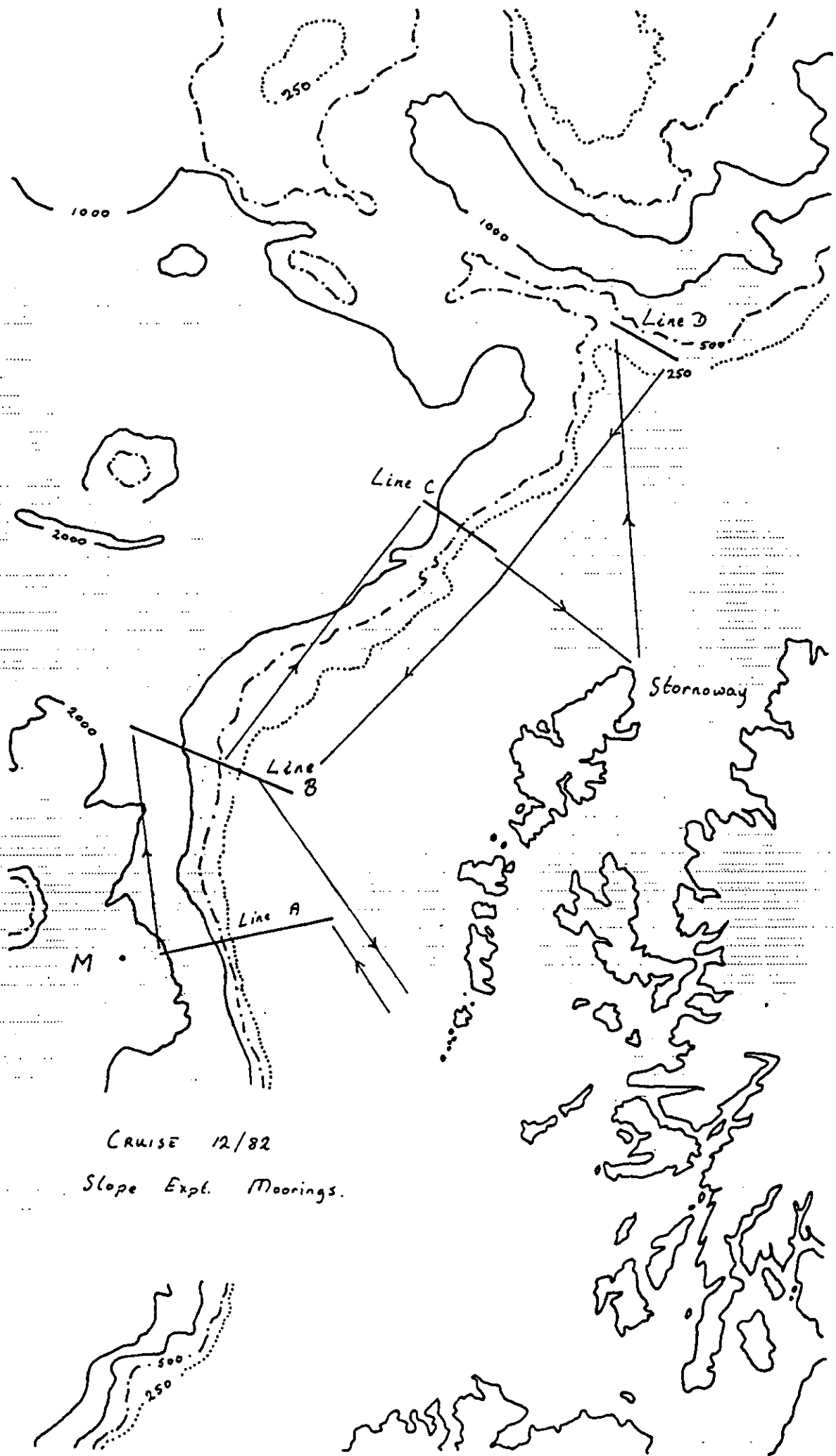
of hours or more after the last fix or after considerable manoeuvring when the velocity of water past the E.M. transducer may not represent the ship velocity. Satellite fixes are given below when they are thought to have reasonable accuracy.

Mooring Details

Position	Depth m	Decca	Satellite Fix	Mooring	Instruments	Acoustic Details	Institute
A0	158	D47.6, C50.1	57°23.86'N, 8°30.97'W	U	2 cm	-	SMBA
A1	153	D45.6, D66.3	57°20.85'N, 9°06.67'W	U	2 cm	1.12, 270	Bidston
A2	209	D45.6, E51.2	57°19.45'N, 9°19.23'W	U	2 cm	-	SMBA
A2	205	D44.8, E51.8	-	SS	TC	1.02, 300	Bidston
A2	206	D44.2, E52.1	-	BF	PG	1.04, 360	Bidston
A3	504	E30.2, E59.1	-	SS	3 cm	1.10, 419	SMBA
A5	1599	E31.1, E73.9	-	SS	4 cm	0.98, 300	SMBA
A6	1988	E31.1, F55.7	57°19.18'N, 9°53.24'W	BF	PG	1.10, 262	Bidston
B1	161	H37.0, B73.5	57°56.40'N, 8°50.45'W	U	2 cm	0.90, 370	Bidston
B2	206	H41.5, C53.9	58°00.53'N, 9°08.57'W	U	CM, PG	0.92, 349	Bidston
B2	203	H41.4, C53.3	-	SS	2 cm	1.08, 270	Bidston
B2	201	H40.9, C53.4	58°00.24'N, 9°07.50'W	SS	TC	0.92, 361	Bidston
B3	508	H45.5, C67.7	58°06.26'N, 9°32.96'W	SS	3 cm	1.06, 419	Wormley
B4	1080	H45.2, C73.6	-	SS	4 cm	1.04, 342	Wormley
B5	1868	H47.3, D51.2	-	BF	PG	0.94, 281	Bidston

U=U shaped mooring, SS=single strand mooring, BF=bottom frame, cm=current meter, TC=thermistor chain, PG=pressure gauge

Position	Depth m	Decca	Satellite Fix	Mooring	Instruments	Acoustic Details	Institute
C1	198	C18.7, F36.2, A55.8	59°00.21'N, 7°23.29'W	U	2 cm	1.10, 359	Bidston
C1	209	C18.4, F35.7, A56.0	58°59.23'N, 7°23.90'W	BF	PG	0.98, 300	Bidston
C2	518	C18.0, F36.7, A56.2	59°05.44'N, 7°26.99'W	SS	3 cm	1.18, 260	Wormley
C3	1002	C14.3, F32.2, A59.0	-	SS	4 cm	1.12, 360	Wormley
C4	1090	E31.7, A59.4	59°11.64'N, 7°41.47'W	BF	PG	1.08, 403	Bidston
D1	213	A18.1, D30.2, B51.8	59°38.53'N, 6°00.51'W	SS	2 cm	1.18, 263	Bidston
D1	213	A18.2, D30.5, B51.7	59°38.70'N, 6°00.78'N	BF	PG	1.10, 422	Bidston
D2	370	A18.7, D37.1, A78.4	59°47.72'N, 6°11.46'W	SS	3 cm	1.02, 298	Bidston
		Neighbouring moorings laid during previous cruises					
P	1029	D30.1, F50.3	57°05.81'N, 9°23.35'W	SS	4 cm	1.18, 360	SMBA
M	2219	E32.7, G51.4	57°17.64'N, 10°20.22'W	SS	4 cm	1.16, 340	SMBA
-		D47.5, A52.3	56°39.86'N, 11°33.06'W	BF	PG	1.04, 340	Bidston



CRUISE 12/82
Slope Expl. Moorings.