

INSTITUTE OF OCEANOGRAPHIC SCIENCES

WORMLEY

R.R.S. CHALLENGER

Cruise 14/82

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Mooring and CTD work in the
Faeroe-Shetland Channel

Principal Scientist

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OBJECTIVES

The main objective of this cruise was the deployment of current meters and pressure gauges north of the Wyville-Thomson Ridge as part of the UK continental slope experiment.

NARRATIVE

Challenger sailed from Barry at 1200A 24-IX in fresh southerly winds. The vessel proceeded across the Bristol Channel to anchor in Blue Anchor Bay. At 1830 course was set down the channel in rapidly moderating conditions. Passage continued through the Irish Sea to positions east of the Isle of Man at which cores were to be collected for IOS Taunton. The first position was reached at 0200A/26th but despite several attempts at two sites no cores could be collected. What sediment was collected proved to be a very soft, semi-consolidated mud.

Course was then set through the N. Channel towards mooring I4 in the N. Rockall Trough. Trials of the XBT recorder proved it to be defective, the fault apparently being in the servo circuitry. Passage continued throughout 27-IX with interrogations of Moorings A0, B1, B2 and B3. All were in position. An interrogation of the Tripod mooring which failed to surface during Frederick Russell cruise 2/82 in March was unsuccessful, presumably an account of the mooring having broken loose.

Mooring I4 was approached at 0630A/28th but despite a five hour acoustic search no sign of it was found. After the search had been abandoned a series of wire tests were carried out on acoustic release units required for moorings on lines D and E. A deep CTD station was then successfully worked. This was completed by 1430A but despite good local weather conditions the captain decided to postpone the departure towards site D1 on account of gales in sea area Hebrides. Passage was resumed at 1930A.

Site D1 was reached at 1730A 29-IX. A brief search

was made for the mooring components remaining on site after the current meter mooring had been trawled. The nearby tide gauge was located but the current meter release was not found. The replacement mooring was deployed and a CTD station worked by 1935A/29. Course was set towards E1.

This position was reached in the early hours of the mooring of 30-IX and the current meter mooring and a pressure gauge deployed. A CTD station was worked. The captain then decided to run to shelter in the Shetlands in view of an approaching Atlantic depression. Passage towards Lerwick continued throughout the day in good weather and the ship berthed at Lerwick at 1700A/30th.

The vessel did not sail again until 1030A 3-X. Course was set towards line F. F1 was reached at 2030A and moorings F1, F1P and F2 were successfully laid by 2345A. Mooring F3 was laid by 0400A/4th and a CTD station worked. The good weather forecast allowed the ship to proceed to site G4 which was reached by 2000A/4th. A series of wire tests of acoustic units was carried out and the mooring and tide gauge deployed.

Site G3 was approached at 0700A/5th and eventually, despite poor navigation the mooring laid in March was located. A CTD station was worked nearby. Mooring G2 was later deployed despite some difficulties with the reeler and a pretrip of the acoustic release which resulted in the loss of the anchor. The mooring was completed by 1700A and course was set towards G1. The moorings, one carrying current meters, a thermistor chain mooring and a pressure gauge were deployed and a CTD station worked by 2324A.

Course was set towards line F for interrogation and position confirmation of moorings set earlier and for the working of CTD stations nearby. F1 took some time to locate

but F2 was easier and a CTD station was worked at each site. While on passage towards F3 it was decided to again run for shelter in the Shetlands.

The vessel remained at anchor in the Ura Firth near Hillswick until 0600A/9-X when course was set for the position of E3. On arrival at 1815A a wire test of two acoustic release units was successfully carried out and the pressure gauge and then the current meter mooring were deployed and a CTD station worked. This work was completed by 2116A and course set for E2.

A mooring at this site had been located but could not be recovered during Frederick Russell cruise 2/82 in March and a further attempt was made to find this mooring. A one hour acoustic search revealed nothing and the new mooring at E2 was set and a CTD station worked nearby. On completion at 0210A/10th course was set towards 60° 55'N 05° 10'W where a line of alternate CTD and current profiler stations at 7.5 minute intervals was started. Two core stations were worked on this line.

The section was completed by 0806A/11th. The vessel then proceeded to the E1 site where the current meter rig was located both visually and acoustically but despite an extensive search no trace of the teleost pressure gauge could be found. The vessel moved then to deeper water and 3 acoustic release units were successfully tested and a further core attempted - unsuccessfully due to breakage of the lid on the corer.

On completion of the scientific work at 1340A/11th course was set toward Aberdeen. After passing through the Pentland Firth the weather deteriorated and in view of the forecast for southeasterly gales the ship diverted to Invergordon where it anchored at 1900A/12th.

CTD Stations

A total of 17 CTD stations were worked on the cruise. these included stations at or near the sites of all mooring deployments. The system used was the Bidston Bissett-Bermann CTD logged at 1 sec. intervals during profiles and less frequently in a water bath on the passages between stations. Two sea units were used but most stations were made with the deep unit. The shallow one was confined to stations shallower than 250 m.

On all stations a calibration bottle was taken in either near surface or near bottom well mixed layers. The salinity samples have not yet been analysed. Temperature and depth comparisons show small mean offsets but scatter of approx. $\pm 0.03^{\circ}\text{C}$ and ± 3.0 db. Profiles were for the most part made to within 20 m of the sea bed.

CTD stations are listed in table 1.

Coring

Cores were attempted at five sites in all. Those in the Irish Sea were unsuccessful due to the unconsolidated nature of the sediment. Two successful cores were obtained in the Faeroe Shetland Channel but a third attempt failed due to damage to the corer.

Details of the core sites are given in table 3.

Profiling current meter

Four profiles of current were obtained in the Faeroe Shetland Channel using a profiling Anderaa current meter. Details are given in table 2. During the second profile a

slight leak developed in the bottom end cap of the Anderaa which damaged the rotor counter and resulted in loss of rotor data for the bottom half of the profile. Otherwise data appear of high quality. Ship navigation during the profiles consisted of 5 minute Decca fixes.

Navigation

Decca chain 6C and Sat Nav were the prime navigational aids used on this cruise. The Loran C set failed to operate satisfactorily. Best positions for moorings and tide gauges are given either as Sat Nav DR or where available lat. and long. derived from Decca Coordinates.

Current meter moorings and tide gauges

Wormley moorings (in depths of 500 m and more) used jacketed 6 mm wire rope and were deployed buoy first using the IOS double barrelled winch. The majority of mooring deployments were uneventful, but on site G2 problems with slack turns of wire on the storage winch resulted in having to stop off the anchor, acoustic release and deepest current meter while a wire length was replaced. During this time one pyro fired on the acoustic release and the anchor was lost. This was presumably due to mechanical vibration of the release due to wave action.

There were no problems with the deployment of the Bidston current meter and thermistor chain moorings nor with any of the pressure gauges.

Moorings positions and depths are given in table 4.

Table 1

CTD STATIONS

<u>Stn. No</u>	<u>Date</u>	<u>Time z</u>	<u>Lat</u>	<u>Long</u>	<u>Max depth</u> <u>(m)</u>	<u>Site</u>
CTD 1	28-IX	1235-1317	58° 51' .2N	11° 41' .5W	640	I4
CTD 2(S)	29-IX	1805-1824	59° 39' .4N	06° 04' .7W	230	D1
CTD 3	30-IX	0205-0221	60° 05' .2N	04° 29' .0W	190	E1
CTD 4	4- X	0340-0425	61° 25' .6N	02° 03' .9W	970	F3
CTD 5	4- X	2114-2205	63° 07' .9N	00° 00' .1E	1550	G4
CTD 6	5- X	0900-0938	62° 22' .2N	00° 01' .4E	1020	G3
CTD 7	5- X	1327-1353	62° 04' .1N	00° 00' .4E	470	G2
CTD 8(S)	5- X	2229-2245	61° 31' .2N	00° 01' .9E	190	G1
CTD 9(S)	6- X	0743-0759	61° 10' .1N	01° 32' .3W	180	F1
CTD 10	6- X	1024-1047	61° 17' .7N	01° 44' .4W	460	F2
CTD 11	9- X	1824-1905	60° 31' .7N	04° 58' .8W	990	E3
CTD 12	10- X	0046-0106	60° 13' .0N	04° 34' .5W	430	E2
CTD 13	10- X	0801-0834	60° 55' .0N	05° 19' .8W	600	
CTD 14	10- X	1325-1402	60° 43' .1N	05° 03' .0W	900	
CTD 15	10- X	2020-2104	60° 31' .0N	04° 44' .0W	1030	
CTD 16	11- X	0250-0330	60° 18' .7N	04° 27' .0W	520	
CTD 17	11- X	0652-0705	60° 06' .7N	04° 09' .5W	120	

Table 2

PROFILING CURRENT METER STATIONS

<u>Stn. No</u>	<u>Date</u>	<u>Time z</u>	<u>Lat</u>	<u>Long</u>
PR 1	10-X	1009-1116	60° 48' .5N	05° 13' .0W
PR 2	10-X	1534-1758	60° 38' .0N	04° 53' .9W
PR 3	10-X	2326-0128	60° 23' .3N	04° 32' .5W
PR 4	11-X	0502-0537	60° 12' .3N	04° 17' .7W

Table 3

CORE STATIONS

<u>Stn. No</u>	<u>Date</u>	<u>Time</u>	<u>Lat</u>	<u>Long</u>	<u>Result</u>
1	26-IX	0051-0159	54° 16' .0N	03° 39' .4N	No core. Unconsolidated sediment
2	26-IX	0312-0352	54° 21' .2N	03° 47' .8W	" " " "
3	10- X	1926-2010	60° 31' .0N	04° 44' .0W	Successful
4	10- X	2218-2252	60° 23' .7N	04° 32' .8W	"
5	11- X	1154-1211	60° 08' .0N	04° 38' .0W	No core. Lid on top of cover missing

Table 4

MOORINGS AND PRESSURE GAUGES DEPLOYED

<u>Site</u>	<u>Date</u>	<u>Lat</u>	<u>Long</u>	<u>Water depth m</u>	<u>Type</u>
D1	29-IX	59° 39' .7N	06° 02' .00W	233	Bidston CM SS
EP1	30-IX	60° 05' .7N	04° 27' .7W	183	Bidston P Teleost
E1	30-IX	60° 06' .5N	04° 28' .6W	185	Bidston CM Spar
E2	10- X	60° 12' .9N	04° 34' .9W	478	Wormley CM SS
E3	9- X	60° 32' .0N	04° 57' .5W	1035	Wormley CM SS
EP3	9- X	60° 31' .7N	04° 58' .1W	1027	Bidston P Mk IV
FP1	3- X	61° 08' .1N	01° 31' .3W	185	Bidston P Teleost
F1	3- X	61° 09' .6N	01° 33' .0W	195	Bidston CM SS
F2	3- X	61° 16' .9N	01° 45' .4W	487	Wormley CM SS
F3	4- X	61° 24' .8N	02° 06' .1W	995	Wormley CM SS
FP3	4- X	61° 24' .9N	02° 07' .9W	1025	Bidston P Mk IV
GP1	5- X	61° 31' .2N	00° 00' .3E	192	Bidston P Teleost
GT1	5- X	61° 31' .3N	00° 00' .4E	192	Bidston thermistor SS
G1	5- X	61° 30' .6N	00° 02' .2E	192	Bidston CM SS
G2	5- X	62° 06' .1N	00° 03' .9E	550	Wormley CM SS
G4	5- X	63° 08' .8N	00° 00' .9W	1611	Wormley CM SS
GP4	4- X	63° 07' .9N	00° 00' .2W	1574	Bidston P Mk IV

(SS = Single strand subsurface mooring)



