I.O.S.

RRS CHALLENGER

CRUISE 14/82

24 SEPTEMBER – 13 OCTOBER 1982

# MOORING AND CTD WORK IN THE FAEROE-SHETLAND CHANNEL

CRUISE REPORT NO 139

1982

NATURAL ENVIRONMENT RESEARCH COUNCIL

INSTITUTE OF OCEANOGRAPHIC SCIENCES

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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

W.J. Gould

I.O.S. Cruise Report No. 139

1982

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SCIENTIFIC PERSONNEL

| | | |
|---|---|---|
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ACKNOWLEDGMENTS

The cooperation of the Master, Officers and crew of RRS Challenger in carrying out the work outlined in this report is gratefully acknowledged.

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. $\pm 0.03^{\circ}C$ and $\pm 3.0$ 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.

Mooring positions and depths are given in table 4.

Table 1

CTD STATIONS

| Stn. No | Date | Time z | Lat | Long | Max depth (m) | Site |
|---|---|---|---|---|---|---|
| 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

| Stn. No | Date | Time z | Lat | Long |
|---|---|---|---|---|
| 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

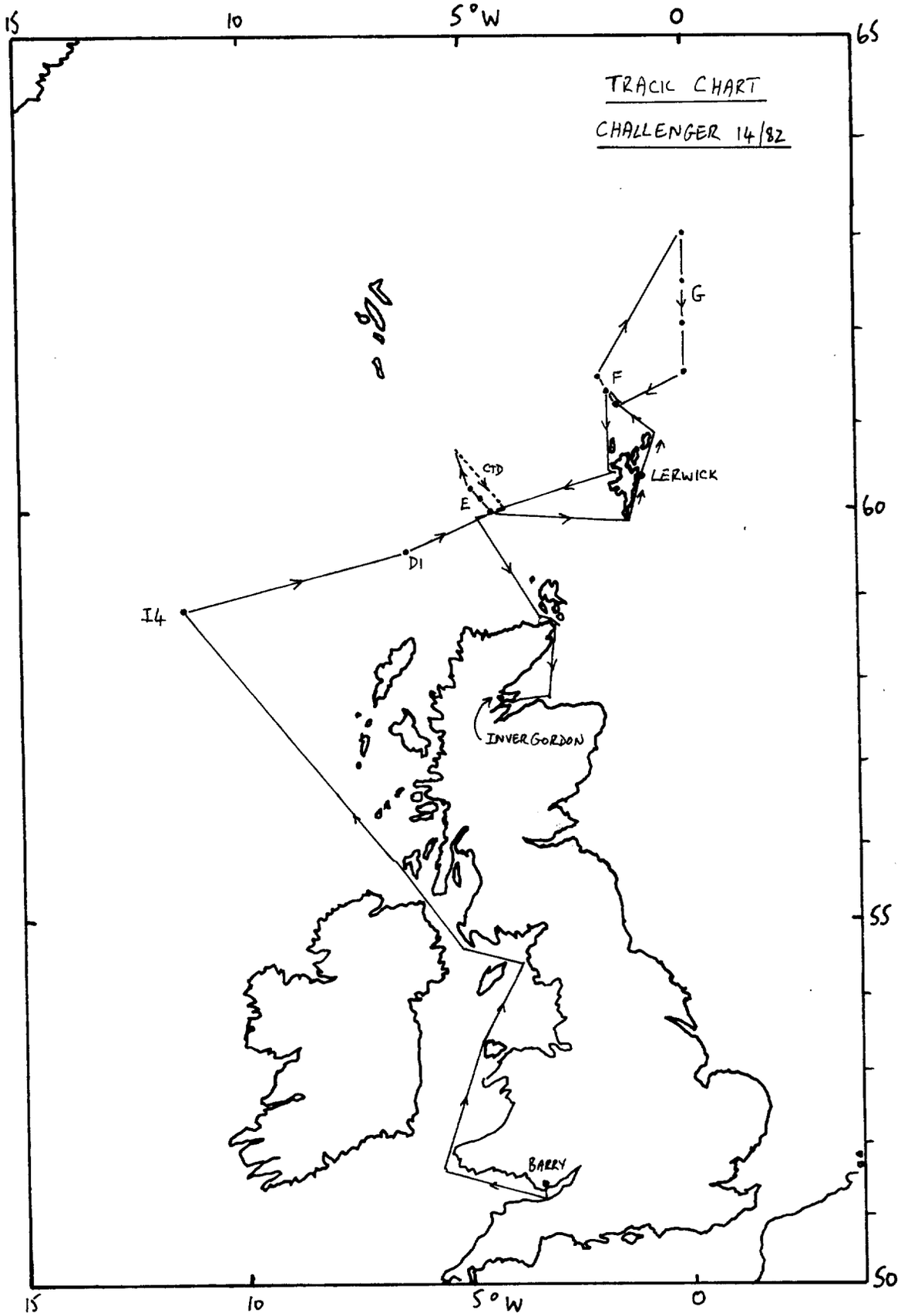
| Stn. No | Date | Time | Lat | Long | Result |
|---|---|---|---|---|---|
| 1 | 26-IX | 0051-0159 | 54° 16'.0N | 03° 39'.4N | No core. Unconsolidated sediment |
| 2 | 26-IX | 0312-0352 | 54° 21'.2N | 03° 47'.8W | " " " " |
| 3 | 10- X | 1926-2010 | 60° 31'.0N | 04° 44'.0W | Successful |
| 4 | 10- X | 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 |

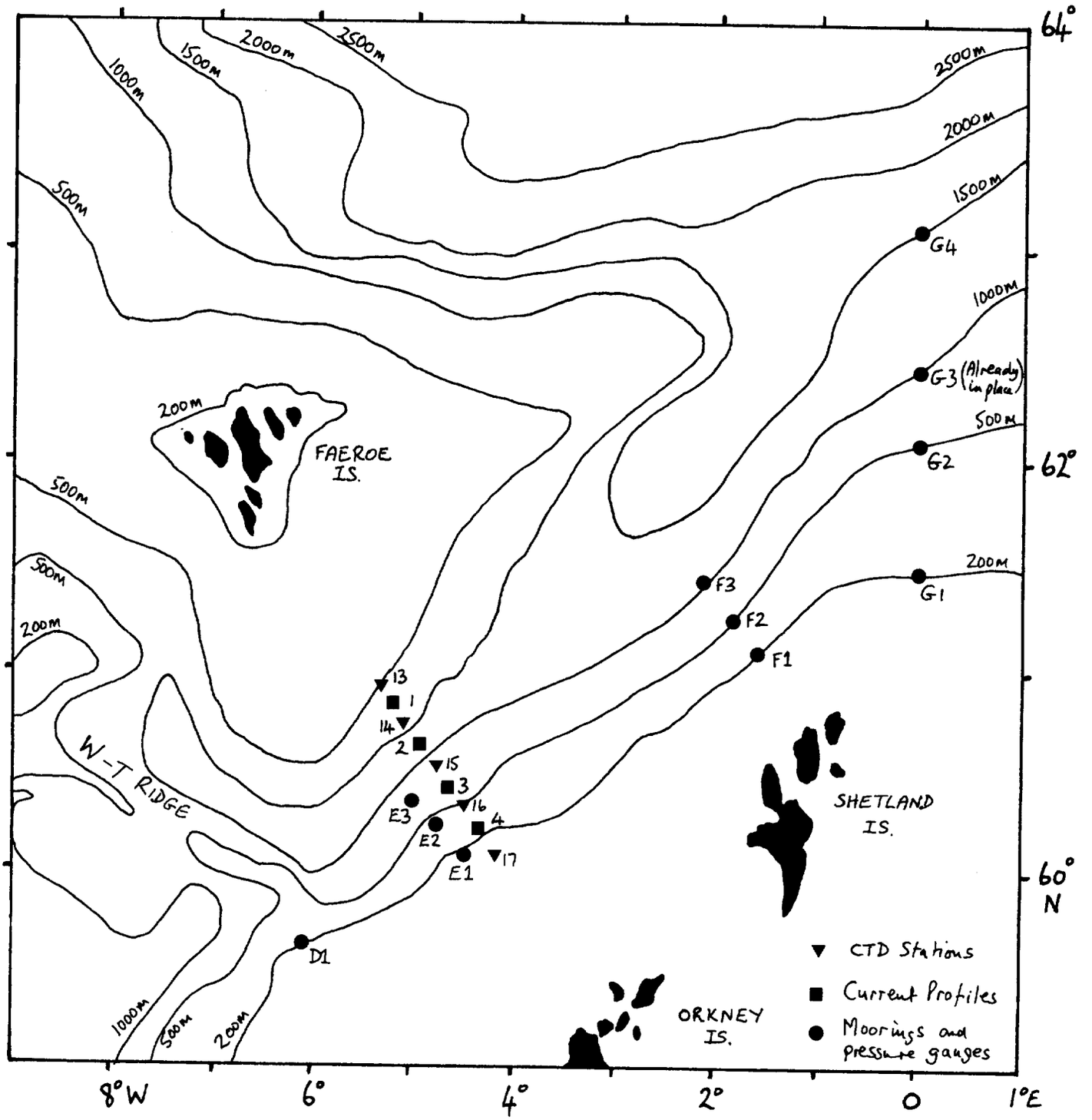
Table 4

MOORINGS AND PRESSURE GAUGES DEPLOYED

| Site | Date | Lat | Long | Water depth m | Type |
|---|---|---|---|---|---|
| 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)


15
10
5°W
0
65
60
55
50
TRACIC CHART
CHALLENGER 14/82
G
F
CTD
E
LERWICK
D1
I4
INVERGORDON
BARRY


64°
62°
60° N
8° W
6°
4°
2°
0
1° E
2500m
2000m
1500m
1000m
500m
200m
FAEROE IS.
SHETLAND IS.
ORKNEY IS.
W-T RIDGE
G4
G3 (Already in place)
G2
G1
F3
F2
F1
E3
E2
E1
D1
13
1
14
2
15
3
16
4
17
CTD Stations
Current Profiles
Moorings and pressure gauges