

**I.O.S.**

RRS CHARLES DARWIN  
CRUISE 3/85  
28 APRIL – 14 MAY 1985

PHYSICAL OCEANOGRAPHIC STUDIES IN THE  
NORTH-EAST ATLANTIC OCEAN

CRUISE REPORT NO. 183  
1986

NATURAL ENVIRONMENT  
INSTITUTE OF OCEANOGRAPHIC SCIENCES  
RESEARCH COUNCIL

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*When citing this document in a bibliography the reference should be given as follows:-*

GOULD, W.J. *et al* 1986 RRS *Charles Darwin* Cruise 3/85:  
28 April - 14 May 1985. Physical oceanographic  
studies in the north-east Atlantic Ocean.  
*Institute of Oceanographic Sciences, Cruise Report,*  
No. 183, 13pp.

INSTITUTE OF OCEANOGRAPHIC SCIENCES

WORMLEY

RRS CHARLES DARWIN

Cruise 3/85

28 April - 14 May 1985

Physical oceanographic studies in the  
north-east Atlantic Ocean

Principal Scientist

W.J. Gould

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*The work described in this report has, in part, been carried out under contract for the Department of the Environment. The results will be used in the formulation of Government policy but at this stage they do not necessarily represent that policy*



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SCIENTIFIC PERSONNEL

W.J. Gould	IOS (Wormley)	Principal Scientist
C.H. Clayson	"	"
A.W. Gray	"	"
N.W. Millard	"	"
J.A. Moorey	"	"
G.R.J. Phillips	"	"
Miss J F Read	"	"
I.P. Rouse	"	"
J. Smithers	"	"
I. Waddington	"	"

E.B. Cooper	RVS Barry
R.P. Griffiths	"
A.R. Lewis	"
K.G. Robertson	"
A.D. Robinson	"
J.P. Strangwood	"

SHIPS OFFICERS

G. Long	Master
M Putman	Chief Officer
S. Sykes	2nd Officer
R. Chamberlain	3rd Officer
C. Storrier	Chief Engineer
J. Baker	Radio Officer

Acknowledgements

It is a pleasure to acknowledge the willing and capable assistance of all the officers and crew of RRS Charles Darwin in carrying out the scientific work of this cruise.

Cruise Objectives

1. Recovery and redeployment of Autonomous Listening Stations.
2. Recovery of current meter moorings on the western slope of Porcupine Bank.
3. Occupation of CTD stations throughout the cruise.
4. Recovery of surface current measuring device in SW approaches for Dr P Collar.

Narrative (Times throughout are GMT+1)

RRS Charles Darwin sailed from Funchal Madeira at 0900 April 28th. J. Cleverly of NERC HQ and J. Barker of Burness-Corlett & Partners were on board and carried out propeller noise measurements in the steering flat while steaming at various speeds off Funchal. On completion of these trials the vessel moved to deeper water to test the refurbished CTD winch traverse mechanism. The wire with a 150 kg weight was lowered to 4000 m. On completion of the winch trials the vessel set course towards Funchal in order to land Messrs. Cleverly & Barker via the agent's launch and to pick up urgently needed radar spares. At 1930 the vessel stopped to do a brief trial of the CTD and multisampler and after loading the radar spares and disembarking the passengers the vessel set course towards the first ALS station at 2300/28th.

Passage continued throughout 29th and at 0115/30th the vessel hove to to listen to the float signals while awaiting daylight for mooring recovery. The lowered hydrophone was recovered by 0915 and the mooring located and recovered between 1000 and 1200. A CTD station (CTD2) was then worked and the ALS mooring redeployed between 1500 and 1715. During mooring deployment the data tape from the listening station just recovered was found to have wound on but not recorded any data. In view of the fact that the ALS just deployed may have had the same fault the mooring was recovered and the tape checked. Another ALS known to be operating correctly was prepared and a new mooring deployed between 2040 and 2230.

After checking the data telemetry from the ALS, course was set towards the position of mooring 380 which could not be located on Cruise 1/85. The position of the mooring was passed at 0100/1st again without any acoustic sign of the mooring release.

Passage was then continued towards the next ALS position in fresh (F6) NEly winds. In view of the high noise level the PES fish was deployed during the morning of May 1st and propulsion changed to electric drive. Later that day a message was received from RVS imposing pitch and rev limits in order to reduce fuel consumption and thereafter the electric drive (max speed ~11.5 kts) was used throughout.

The second ALS position (mooring 379) was reached at 1710/2nd the mooring located and recovered between 1730 and 2030. A CTD station (3) was then worked followed by listening to the floats via a lowered hydrophone. This work was completed at 0740/3rd and deployment of the replacement ALS mooring (394) carried out between 0845 and 1121.

Course was set towards the next ALS at 42°N 19°W which was reached at 1030/4th. The mooring was recovered by 1310 and redeployed as mooring 395 between 1415 and 1620. After fixing the mooring position and listening to the ALS data telemetry, course was set towards CTD stations to be occupied in the Peake and Freen deeps. These were completed by 0930A/5th and course set towards the last ALS station. Passage was made in 30-35 kt northwesterly winds with the ship rolling heavily at times but maintaining speeds of 11 to 11.5 kts.

The mooring site was reached at 0700/6th and the ALS recovered by 1025 and relaid by 1310. After fixing the mooring position and listening to the ALS data telemetry the vessel stood off 3 miles to the east of the ALS and a CTD station was worked. At 1730 course was set towards the Porcupine Bank mooring array.

A further CTD station was worked on the Porcupine abyssal plain between 1000 and 1350/7th and the moored array reached at 0430/8th. The positions of moorings "A", "B" and "O" were confirmed but "C" could not be found. The benthic thermistor chain "BERTHA" was deployed close to mooring "O" between 0950 and 1150 but immediately after reaching the seabed the release was seen to have pretripped and the mooring to return to the surface. The mooring was recovered by 1350 and it was found that one retractor had failed.

After manoeuvring near to mooring "O" BERTHA was redeployed between 1430 and 1610. A line of four CTD stations across the continental slope was then worked between 1800/8 and 0420/9th. A further search was then



made for mooring "C" without any result. Between 0700 and 2045 moorings "A", "B", "O" and BERTHA were recovered and a CTD station worked near the BERTHA mooring. The line of four CTD stations was repeated between 0130 and 1130/10th the vessel then steamed to the position of mooring "C" and transmitted on the release frequency for 2 hrs with no sign either of acoustic signals from the release nor of the mooring appearing at the surface. After a box search course was set towards the DB2 position at 1430/10th.

DB2 was reached at 1200/11th and the Collar near surface buoy located. The workboat was launched to make a close inspection of the buoy and to attach a recovery line. The acoustic release could not be fired and therefore the mooring had to be recovered with the anchor (1500 kg) still attached. Recovery operations started at 1256 and were completed at 1440 when the anchor finally separated from the release. The workboat and PES fish were then recovered and course set towards Ardrossan at 1500/11th.

INDIVIDUAL PROJECTS REPORTS

MOORING WORK (Gould, Phillips, Waddington, Gray)

The following are comments on operations in chronological order. Further details are given in Table 1.

Mooring 386 (ALS 15)

Recovered uneventfully. Locking pin at one end of ALS bar was corroded away, the pin at the other end although apparently magnetic was not corroded. Nylon had been used for the recovery line (non-buoyant) which made recovery unnecessarily difficult. ALS 15 was at 1930 m.

Mooring 392 (ALS 13)

This was deployed as a replacement for 386 but when the electronics problem with the ALS was detected it was deemed prudent to recover the mooring to confirm that the ALS was operating correctly.

Mooring 393 (ALS 17)

This mooring replaced 392.

Mooring 379 (ALS 11)

Recovered successfully. Again a nylon pickup line had been used. The ALS was one of the original batch of 3 and did not suffer from the corrosion of the locking pin on the bar. ALS depth is estimated at 1738 m.

Mooring 394 (ALS 15)

This mooring replaced 379.

Mooring 381 (ALS 14)

Comments as for 386 above. ALS depth 1581 m.

Mooring 395 (ALS 13)

Replacement for 381.

Mooring 382 (ALS 16)

Comments as for 386 and 381. Stray line snagged on ship's non toxic sea water intake but recovery otherwise uneventful. ALS depth 1647 m.

Mooring 396 (ALS 14)

Replacement for 382.

Mooring 397 (BERTHA)

Deployed successfully but 90 secs after reaching the sea bed a retractor failed and the mooring was recovered.

Mooring 398 (BERTHA)

Redeployment of 397 using pyro units in place of retractors. A transponder was attached to the acoustic release which allowed the horizontal separation of BERTHA and mooring "O" to be measured. The separation was 60 m!

The mooring was recovered after approx 26 hrs.

Mooring 377 Porcupine Slope Mooring "A"

Recovered uneventfully.

Mooring 375 Porcupine Slope Mooring "B"

Recovered uneventfully.

Mooring 373 Porcupine Slope Mooring "O"

Recovered uneventfully.

Mooring 376 Porcupine Slope Mooring "C"

Extensive acoustic search for this mooring failed to make contact. Two hours were spent transmitting on the release frequency and making a visual search. The mooring was not recovered.

Mooring 385 (Collar surface current buoy)

Release on the subsurface component of the mooring was put through the firing position but failed to separate from the anchor. The entire mooring was recovered with the anchor (1500 kg) still attached. The anchor finally separated when the subsurface 4' sphere was brought to the surface. All mooring components were in excellent condition.

The failure of the release was found to be due to a miswiring of the retractor units.

CTD Stations (Smithers, Gould, Moorey)

CTD stations were worked with the IOS New Deep Neil Brown CTD probe, Transmissometer and General Oceanics multisampler. Data were logged on a BBC Microcomputer and Digidata logger as well as being recorded by the ship's computer system. The system worked well throughout the cruise with

few problems. The oxygen sensor became erratic after the deepest station in Peake Deep.

Most stations were made to within a few metres of the seabed, the height off bottom being measured by a near bottom echo sounder. Acoustic release tests were carried out on CTD stations by bolting the releases to the CTD frame.

Details of CTD stations are given in Table 2. Subsequent analysis of the digidata tapes showed that a misaligned connector had prevented sensible data being recorded after Station 4. Data from the shipboard computer system appear to be good.

TABLE 1

Moorings

<u>Mooring</u>	<u>Deploy/ Recover</u>	<u>Date</u>	<u>Lat N</u>	<u>Long W</u>	<u>Depth</u> <u>M</u>	<u>Notes</u>
373	R	9.V.85	50° 33.4	14° 41.4	3314	"0"
375	R	9.V.85	50° 32.2	14° 43.0	3567	"B"
376	Attempt R	10.V.85	50° 35.6	14° 44.8	3294	No sign of mooring "C"
377	R	9.V.85	50° 30.1	14° 37.3	3314	"A"
379	R	2.V.85	41° 29.5	13° 28.1	5340	ALS 11
381	R	4.V.85	42° 43.5	18° 58.1	3990	ALS 14
382	R	6.V.85	44° 50.2	15° 02.4	4210	ALS 16
385	R	11.V.85	48° 43.3	08° 55.2	150	Collar buoy
386	R	30.iV.85	37° 17.7	18° 38.6	3735	ALS 15
392	D	30.IV.85	37° 18.5	18° 38.8	3705	ALS 13
392	R	30.IV.85	37° 18.7	18° 38.1	3705	ALS 13 Recovery to look at possible ALS malfunction
393	D	30.IV.85	37° 18.2	18° 39.4	3548	ALS 17
394	D	3.V.85	41° 29.5	13° 28.3	5350	ALS 15
395	D	4.V.85	42° 43.0	19° 00.3	4083	ALS 13
396	D	6.V.85	44° 50.0	15° 04.0	4276	ALS 14
397	D	8.V.85	50° 33.3	14° 41.4	3314	BERTHA
397	R	8.v.85	50° 33.3	14° 41.4	3314	Release pretripped
398	D	8.V.85	50° 33.4	14° 41.7	3312	BERTHA
398	R	9.V.85	50° 33.4	14° 41.7	3312	

TABLE 2  
CTD Stations

<u>No.</u>	<u>Date</u>	<u>Time*</u>	<u>Lat N</u>	<u>Long W</u>	<u>Water</u> <u>Depth</u>	<u>Ht. off</u> <u>bottom</u>	<u>Comments</u>
1	28.IV	1748	32° 20'.0	17° 08'.8	3700		Functional test to 450m
2	30.IV	1129	37° 17'.3	18° 33'.5	3750	approx 12m	Near moorings 386/393
3	2.V	2139	41° 29'.2	13° 28'.9	5350	5m	Near moorings 379/394
4	4.V	2148	42° 39'.5	19° 00'.4	5327	0	Frean Deep. CTD laid on bottom.
5	5.V	0525	43° 07'.0	19° 49'.3	5964	12m	Peake Deep. Oxygen erratic after 5600m
6	6.V	1439	44° 50'.9	14° 59'.5	4219	10m	3 miles east of moorings 382/396
7	7.V	1040	47° 44'.4	15° 21'.7	4844	10m	Porcupine Abyssal Plain
8	8.V	1746	50° 40'.4	14° 40'.6	1763	15m	Porcupine slope section
9	8.V	1955	50° 37'.9	14° 45'.7	3098	12m	" " "
10	9.V	2251	50° 35'.8	14° 50'.4	3390	12m	" " "
11	9.V	0202	50° 33'.2	14° 54'.6	3670	12m	" " "
12	9.V	1643	50° 33'.2	14° 42'.6	3390	12m	340m from BERTHA
13	10.V	0101	50° 40'.7	14° 40'.1	1704	15m	Repeat of Stn 8
14	10.V	0320	50° 38'.1	14° 46'.9	3120	12m	Repeat of Stn 9
15	10.V	0601	50° 36'.2	14° 49'.5	3414	12m	Repeat of Stn 10
16	10.V	0918	50° 33'.6	14° 55'.5	3691	12m	Repeat of Stn 11

\* Times are GMT times at which the CTD reached the sea bed.

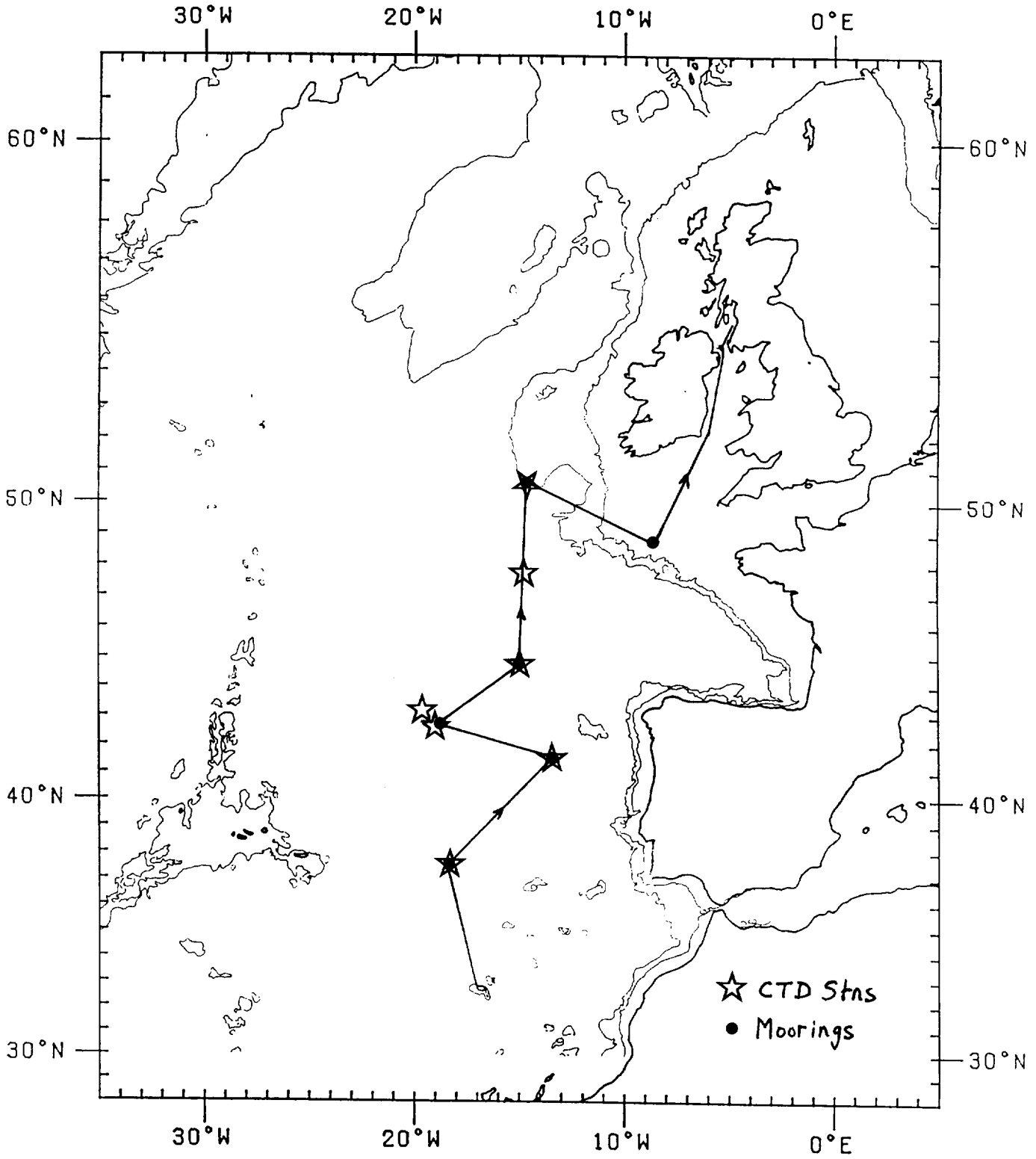


Figure 1. Track Chart - Charles Darwin Cr. 3/85