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MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1982 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA CRUISE 6

STAFF:
R R Dickson (SIC)
A R Folland
C W Baker
E G Shreeve
J W Read
J Wooltorton
R I Sawyer
A K Young

DURATION:
Sailed 1320 GMT 18 June
Docked 0320 GMT 18 July

LOCALITY:
North east Atlantic

AIMS:

1. To recover existing current meter moorings at the NEADS 6 site (1), eastern flanks of the Mid Atlantic Ridge (4) and Madeira Abyssal Plain (6).

2. To relay current meter moorings at the Porcupine Bank Slope (2 MAFF, 2 SMBA), a full-depth array between the tail of Rockall-Hatton Bank and the head of the Porcupine Abyssal Plain (6, including NEADS-6) and in the deep gap between Hatton Bank and the Mid Atlantic Ridge (1).

3. To work a closely spaced $^{226/228}Ra$ section across the Continental Slope west of Porcupine Bank using bulk samplers, and with back-up CTD/HIAC/Nephelometer profiles.

4. To work a full depth Cs and C-14 station in the NEA dumpsite.

5. For Dr Pentreaths faunal settlement studies, to moor a waste drum (empty) at the NEA dumpsite for recovery during CIROLANA 8/82.

6. To collect XBT profiles on selected cruise legs.

7. To collect fish trap samples for Dr Pentreath whenever convenient.

8. To work a neuston net transect of the Celtic Sea for FSM 1.

9. To sample conventional nutrients and chlorophyll fluorescence in the vicinity of the Continental Slope.

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NARRATIVE:

CIROLANA sailed 1320h 18 June and proceeded to the deep water off Porcupine Seabight to stretch CTD and Gerard Barrel 'wires' before continuing to the first working area on the west slope of Porcupine Bank. Between 0853h 22 June and 0100h 25 June a 7 station 58-sample $^{226/228}Ra$ section was successfully worked normal to the slope in water depths from 405 to 3600m and in winds of up to 32kts. An interruption due to bad weather pm 22 June was occupied with acoustic release wire tests and with the launch of a fishtrap.

On completion of this transect the section was repeated until 2225h 25 June using CTD and nephelometer with samples for Barium conventional nutrients and HIAC analysis (principally suspended load versus particle volume and particle size distribution). From 0702h to 1633h, 26 June the 4 current meter moorings of the MAFF/SMBA array were laid along the same section (moorings 82-01 to 82-04) and after further acoustic release tests am 27 June, a 6-mooring current meter array of 15 instruments was laid from the tail of Rockall Bank to the head of the Porcupine Abyssal Plain. (Moorings 82-05 to 82-10). This work lasted from 1612h 27 June to 1614h 29 June and included the recovery of the existing NEADS - 6 mooring, its replacement by a full depth rig, a further series of acoustic release tests and the deployment and recovery of a second fish trap.

CIROLANA then proceeded south to the pre-existing array of 4 moorings across the eastern flanks of the mid-Atlantic Ridge, stopping briefly en route to lay her 11th current meter mooring in the deep gap at the entrance to the Icelandic Basin (82-11). Between 0630 1 July and 1656h 2 July the 4 moorings 81-09 to 81-12 were successfully recovered and with full XBT/PDR coverage round the clock CIROLANA then steamed for Ponta Delgada, Azores, docking 1715h 4 July. While in port, hospital checks confirmed that Baker had broken a bone in his foot during an earlier accident during heavy weather on 30 June.

Saling 0950h 6 July CIROLANA continued south to recover the 6 moorings of the Great-Meteor-East array, (81-13 to 81-18) with full XBT/PDR coverage as before. Attempts to locate 81-13 on the evening of 7 July and morning of 8 July proved abortive and after a considerable search around the site to distances of 3 miles this mooring was abandoned. From 1647h 8 July until 1852 10 July however, the remaining 5 moorings were recovered intact and without problem including the full depth rig 81-16 and the in situ radium collector apparatus deployed on mooring 81-15. The XBT/PDR coverage was then ended and CIROLANA steamed to the NEA dumpsite where the "dummy drum" mooring for Dr Pentreath's benthic colonisation experiment was wire tested and laid by 0201h 14 July. Concern about the thimble-terminations of the Gerard Barrel cable and wear in the 5 retractor kits due to their heavy use earlier in the cruise prevented the planned $^{14}C/^{137}Cs$ station on the dumpsite and this was held over until cruise 8/82. Instead CIROLANA steamed east to the continental slope of the Celtic Sea. Between 0839h 15 June and 1222h 16 June a line of 12 half-hour neuston net tows were made between the continental slope and the western channel with accompanying on-line HIAC, chlorophyll fluorescence and nutrients in the 100 mile zone centred on the slope itself.

With her work programme completed CIROLANA then continued to Grimsby, docking 0320h 18 June.

RESULTS:

1. The modified lightweight Gerard Barrel rig worked virtually without a hitch. The acoustic triggering of the barrels via MAFF/IOS acoustic releases fitted with retractor mechanisms worked faultlessly. Maximum loads on the cable were 0.8 tonnes (with a b.s. of 5 tonne). As a result the 58 quarter-ton samples necessary for the close-spaced Ra section were completed rapidly and we now have a safe, dependable, all-weather rig for our radiochemistry program, though cable terminations will have to be remade. The ^{226}Ra and supporting ^{222}R analyses were largely completed on board. Internal and external (niskin) salinity samples confirmed that none of the Gerard barrels leak.

2. Eleven current meter moorings were laid including one full-depth without problems.

3. Ten out of eleven existing current meter moorings including one full depth rig were recovered intact without problems. Of the 23 records recovered, 22 were complete full-term tapes and one was ¼ full. The new titanium release mechanisms showed no sign of corrosion. Thus with the exception of the single unexplained loss (2 instruments) we are confident that our corrosion problem has been overcome. Entering its 6th year, the NEADS-6 mooring is now the largest continuous deep current meter record from the World Ocean.

4. The in situ radium collector double-trip Go-Flo bottles functioned correctly and the contents will be analysed at Lowestoft.

5. The CTD/Nephelometer section West of Porcupine Bank was worked and logged without problems. A total of 35 Ba samples were collected to complement the Ra analyses and their interpretation, and the weight/volume and particle size analyses of the near bottom and intermediate nepheloid layers was completed via extensive HIAC sampling. It was confirmed that the resuspended material from the erosion zone at 300-500m on the slope spreads laterally off the slope and deepens to > 900m following the 27.35 δt surface. Further into the interior, where the nephel "signature" can no longer be distinguished the presence of these interleaving layers from the slope appears as a locally complex macrostructure in T and S around the 900-1000m level.

6. Due to an evident misalignment between disc drive units at Lowestoft and on board ship none of the source programs for CTD, XBT or current meter data processing written at Lowestoft could be read aboard ship. Despite protracted efforts to bypass the problem this resulted in a serious waste of time in data processing which is normally largely completed at a preliminary level aboard ship.

7. The tight cruise schedule permitted only two fish trap deployments. One coryphanoides and a number of amphipods were collected.

8. The "delayed release" dummy drum mooring on the dumpsite was successfully moored.

9. A total of 99 T7 and T4 (alternating) XBT dips were worked from south of Rockall to the Madeira abyssal plain along the same track as the CIROLANA 9/81 transect to check the consistency of occurrence of the major features found then. The results were radioed to Bracknell.

10. The 12 neuston stations showed very low recoveries of mackerel larval and no post larvae compared with the corresponding cruise of 1981, though comparable levels of other species confirmed that the gear worked well. All samples were preserved for analysis at Lowestoft. A photo library of usual species was made as a guide to non-biologist users.

11. Continuous opportunistic sampling of HIAC chlorophyll and nutrients were made within 50 miles either side of the Celtic Sea Continental slope, as on previous cruises.

Acknowledgement:

The most successful results of this cruise are due in no small way to the effective working of a range of heavy and often new gear by the ships officers and crew, at all hours in all weather and to a tight time schedule. Their help is gratefully acknowledged.

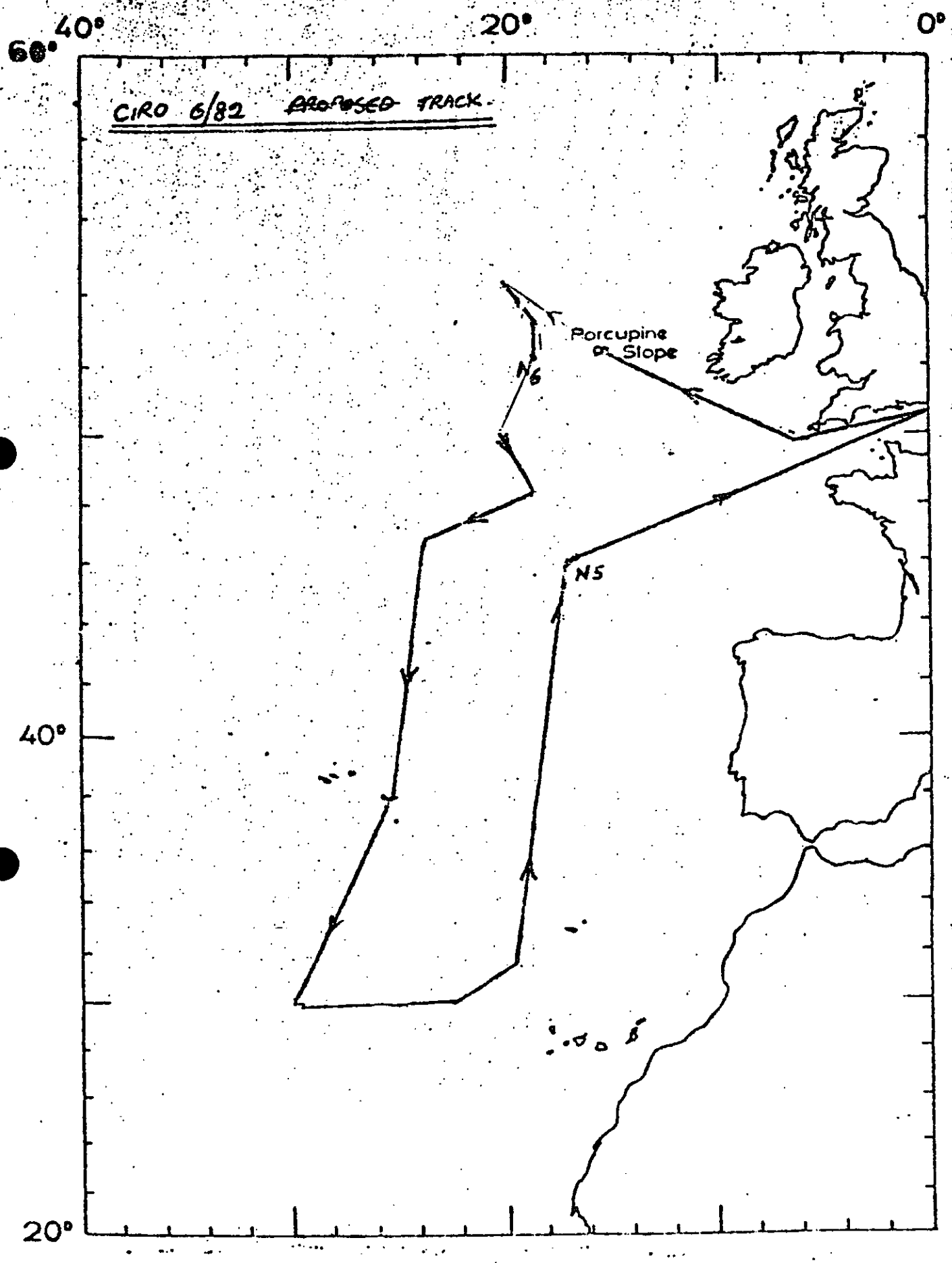
R R Dickson SIC

Seen in draft:

H W Hill
B A Chapman Master
E D Pearson fishing skipper

Distribution:

Basic list +
R R Dickson
A R Folkard
C W Baker
E G Shreeve
J W Read
J Wooltorton
R I Sawyer
A K Young


60°
40°
20°
0°
CIRO 6/82 PROPOSED TRACK.
Porcupine Slope
N6
N5
40°
20°