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

1984 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 6

STAFF:

R R Dickson (SIC)
A R Folkard
N D Pearson
J W Read
J Wooltorton
M Pulcher
Sr. D de Armas Perez (Spanish Observer)
N Millard, I Rouse } IOS Wormley part time
B Apps ACE Films part time

DURATION:

Sailed GY: 0330 h 28 June
Docked GY: 0727 h 17 July
Times are GMT throughout

LOCALITY:

North East Atlantic

AIMS:

1. To recover and relay the NEADS 6 mooring at the head of the Porcupine Abyssal Plain.

2. To recover the 8 - mooring current meter array from Azores-Biscay Rise to Galicia Bank.

3. To lay the 9 mooring c/m array at the SOFAR float launch site in the Iberia Abyssal Plain.

4. To conduct ballasting trials of two of the MAFF SOFAR floats in the Iberia Abyssal Plain plus backup CTD measurements.

5. To work a 25 station XBT grid across the planned float launch site for initialising the Harvard REM.

6. To recover, sample from, and relay the NEA dumpsite dummy drum (colonisation experiment for Dr Pentreath, drum samples for NIREX).

7. Fishtraps when convenient.

NARRATIVE:

CIROLANA sailed 0330 h 28 June and proceeded towards its working area in the Eastern Atlantic. Collection of 50 l surface-water samples for Cs analysis began at 1°E and was continued at 1° longitude intervals to 17°W. On 29 June while in the Western Channel, the Radio Officer became unwell and from 1430 h to 2350 h the vessel anchored off Newlyn to allow the R/O to be landed for hospital treatment and to await a replacement.

At 0409 h 1 July CIROLANA stopped briefly on the west slope of Porcupine Bank to search for the L4 mooring of the MAFF/SMBA array which Ellett had been unable to locate in January. No contact was made however and CIROLANA continued west to the NEADS-6 site at the head of the Porcupine Abyssal Plain. This mooring (83-02) was recovered, the hydro wire was stretched, acoustic release wire-tests conducted and the mooring was relaid by 1850 h 1 July. The vessel then steamed southward to the NEA dumpsite, stopping to conduct two series of a/r wire-tests en route and arriving on site at 0437 h 3 July. The dummy drum mooring was recovered by 0600 h and after a preliminary examination for any colonising benthos, several cores were made through the drum using the NIREX corer and measurements of electric potential were made between the cement liner and the inner and outer steel 'skins'. All aspects of the recovery operation and the sampling were filmed, and during this period, further a/r tests were conducted on the hydro-wire. At 0939 h with the barrel mooring relaid, CIROLANA steamed south to the mooring sites in the Azores-Biscay Rise with continuous PDR bathymetry observations.

Between 1819 h 3 July and 1019 h 5 July, all 8 moorings of the Azores-Biscay Rise Array had been successfully recovered with continuous PDR mapping between mooring sites and further series of a/r wire tests. By 1532 h 5 July all 9 of the acoustic releases required for subsequent deployment in the SOFAR float site had been tested and CIROLANA steamed for Leixoes (Oporto), docking at 0935 h 6 July. There, Mr Apps disembarked and Messrs Millard and Rouse joined ship.

At 1507 h 7 July CIROLANA sailed to carry out her remaining work programme in the vicinity of the SOFAR float launch-site in the Iberia Abyssal Plain. Between 0655 h 8 July and 0338 h 12 July, a total of 9 full - or intermediate - depth moorings were launched, a regular grid of 30 X BT dips was carried out, the CTD wire was stretched and deployments of both floats to their operational depth of 2500 m were successfully completed. By tethering each SOFAR float to an IOS Mk II float, it was possible to raise and recover them since the Mk II carries ballast which can be dropped on acoustic command. Recovery of the delicate and largely 'un-stiffened' SOFAR floats can only be achieved simply with the aid of the ships Z-boat to tow the float to the ship and attach it overside to the ships crane. The first recovery was carried out without damage but between launch and recovery of the second float, a considerable swell set in which prevented small-boat work. The float was recovered directly from the ship but with the loss of the upper battery sphere and damage to the lower battery sphere.

Since the main aim of ballasting the floats to their correct operational depth had already been achieved on the first trial with each float (Fig 1), no further trials were carried out to prevent the risk of further damage. Instead CIROLANA returned northwards to the Azores-Biscay Rise Gap west of the Charcot Seamounts where a strong through-flow from the Iberia to the Porcupine A.P. had been identified in the recovered c/m records. From 1340 h 13 July to 0550 h 14 July CIROLANA carried out a detailed bathymetric survey of the gap in question and worked a single 10-bottle hydrocast at the site of maximum deep northward flow to aid identification of the source of this water.

At 0600 h 14 July with this work completed, CIROLANA sailed for Grimsby docking at 0727 h 17 July.

RESULTS:

1. All 9 c/m moorings were recovered intact, including the 7th consecutive year of the NEADS-6 mooring. All 18 instruments contained full one-year records though the lower instrument on mooring 83-04 had lost its Savonius rotor during launch the previous year, so that record was restricted to direction and temperature only. All records were processed through VECPLOT at sea, and the results were used to guide the PDR mapping exercise. The most significant (preliminary) results were
   (i) the $\sim$ 7.5 cm s^{-1} mean flow over 355 d through the Azores-Biscay Rise at 4574 m depth west of the Charcot Seamounts and immediately to the SE of the NEA dumpsite. This is one of the strongest deep mean flows yet encountered in the deep eastern atlantic.

   (ii) Confirmation that the north-flowing slope current extends to at least 4000 m on the west slope of Galicia Bank, the deepest observation of the slope current thus far.

2. All 9 c/m moorings of the Iberia array were successfully deployed ready for the SOFAR float experiment - one of full-depth type, four of "thermocline" type and four of stretched "upper-bottom" type (21 instruments).

3. Despite the damage sustained by one SOFAR float on recovery the essential aims of the trials were successfully achieved.
   (i) The method of launching the floats underwater went smoothly using hydraulically-operated jaws on the end of the crane-jib to release them from their "cage".

   (ii) Both floats were ballasted to within 10 m of the desired depth.

   (iii) Once a faulty I.C. in the overside IOS receiver was replaced, both floats were shown to be working at depth.

   (iv) Since the electronics, resonator, and buoyancy (together with the tethered Mk II float) were recovered on the second trial the damage will be repaired without difficulty and little cost before the main experiment. The other float was recovered intact.

4. The grid of 30 X BT dips required to initialise the Harvard REM was completed.

5. On recovery of the dummy drum mooring from the NEA dumpsite, the drum was found to have unrolled correctly onto the seabed during this latest deployment. Despite the fact that after 2 deployments this drum has been on the bottom for a total of 1 year 9 months, no colonisation by benthos was found. One coelenterate was recovered from the suspension frame and preserved for Dr Pentreath. A total of 3 three-inch diameter and 3 one-inch diameter cores were attempted, through the outer drum, concrete lining and inner drum using NIREX equipment. The concrete proved to be friable and insufficiently tough to make good cores except in the case of one of the three-inch. All cores and concrete fragments were stored as instructed. The electric potential measurements were carried out without problems and the drum was then relaid. All operations were filmed.

6. No fish trap deployments were possible, partly through lack of time but mainly because the spare acoustic release failed its wire-test.

7. A total of 14 x 50 l Cs samples were collected for Mr Jefferies.

8. The 10-bottle hydrocast in gap west of the Charcot Seamounts was analysed aboard for T, S, Po_4, SiO_3, NO_3.

Acknowledgement

In recording the almost complete success of this series of delicate and demanding operations, including the recovery of 5 moorings in one day from pre-dawn to post-dusk, it is a pleasure to acknowledge the major part played by the skills of both the officers and men of RV CIROLANA.

R R Dickson
24 July 1984

SEEN IN DRAFT:
M J W (Master)
E W P (Fishing Skipper)

INITIALLED: H W H

DISTRIBUTION:
Basic List +

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I Rouse (IOS)
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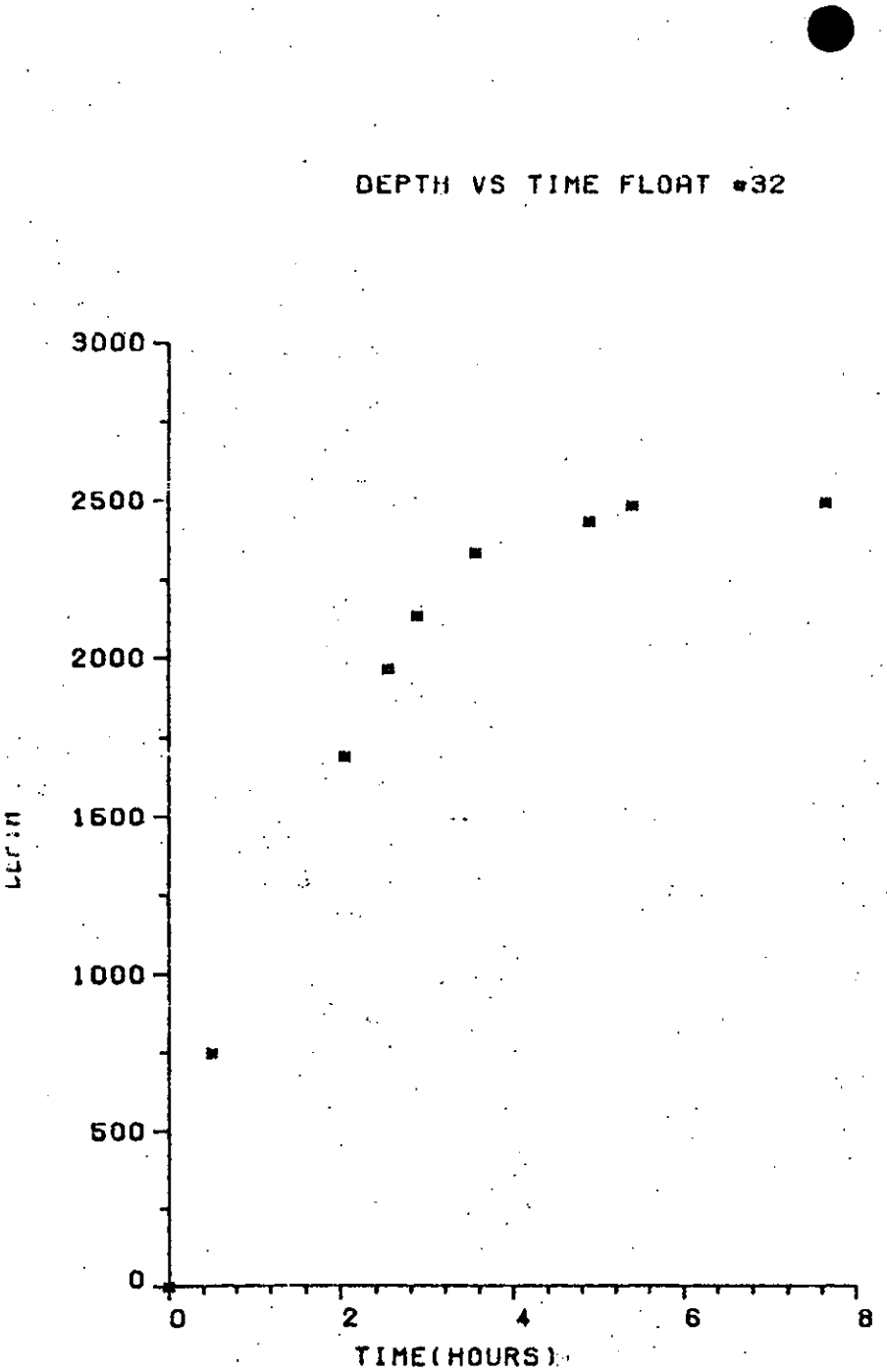
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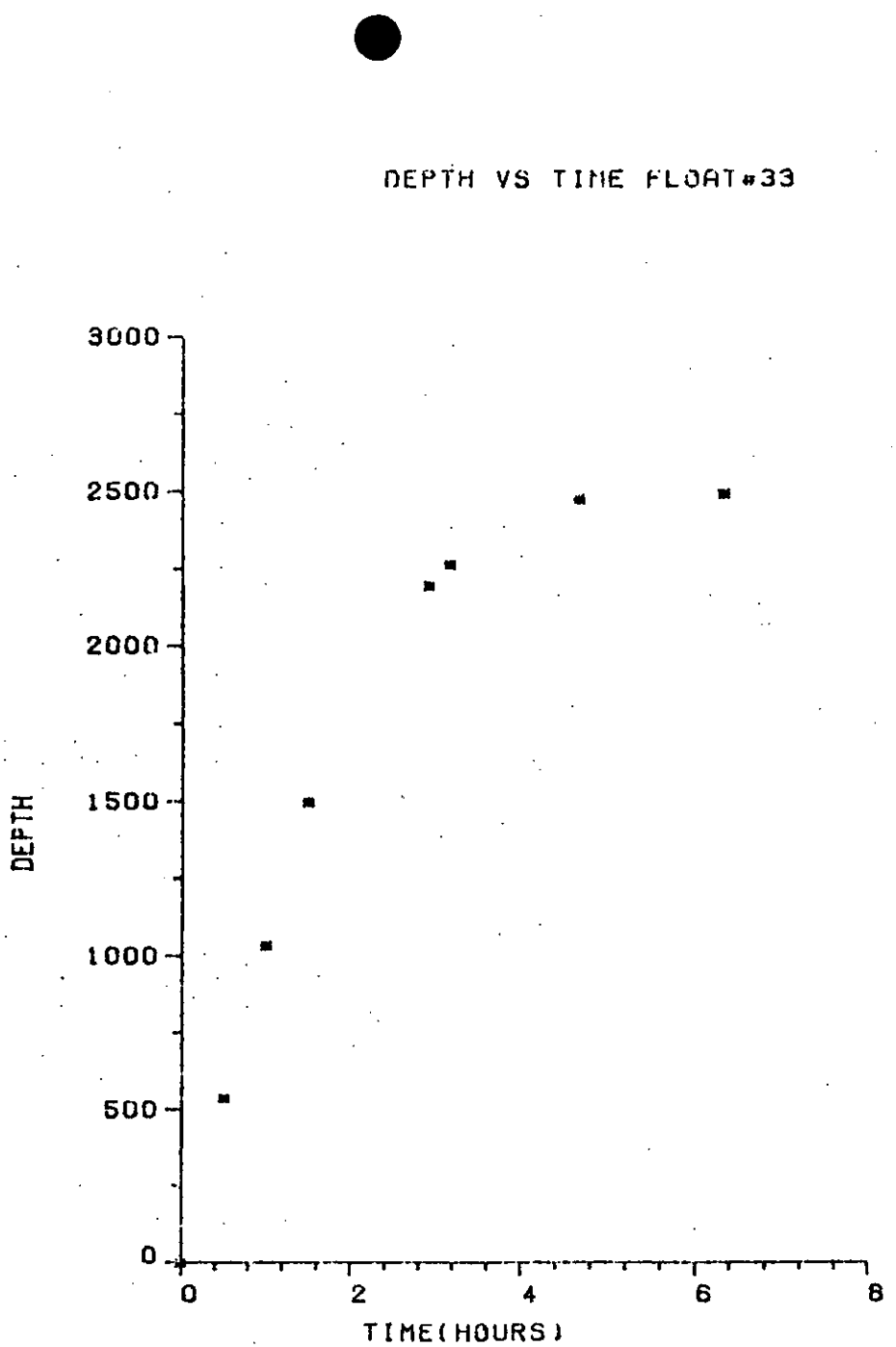
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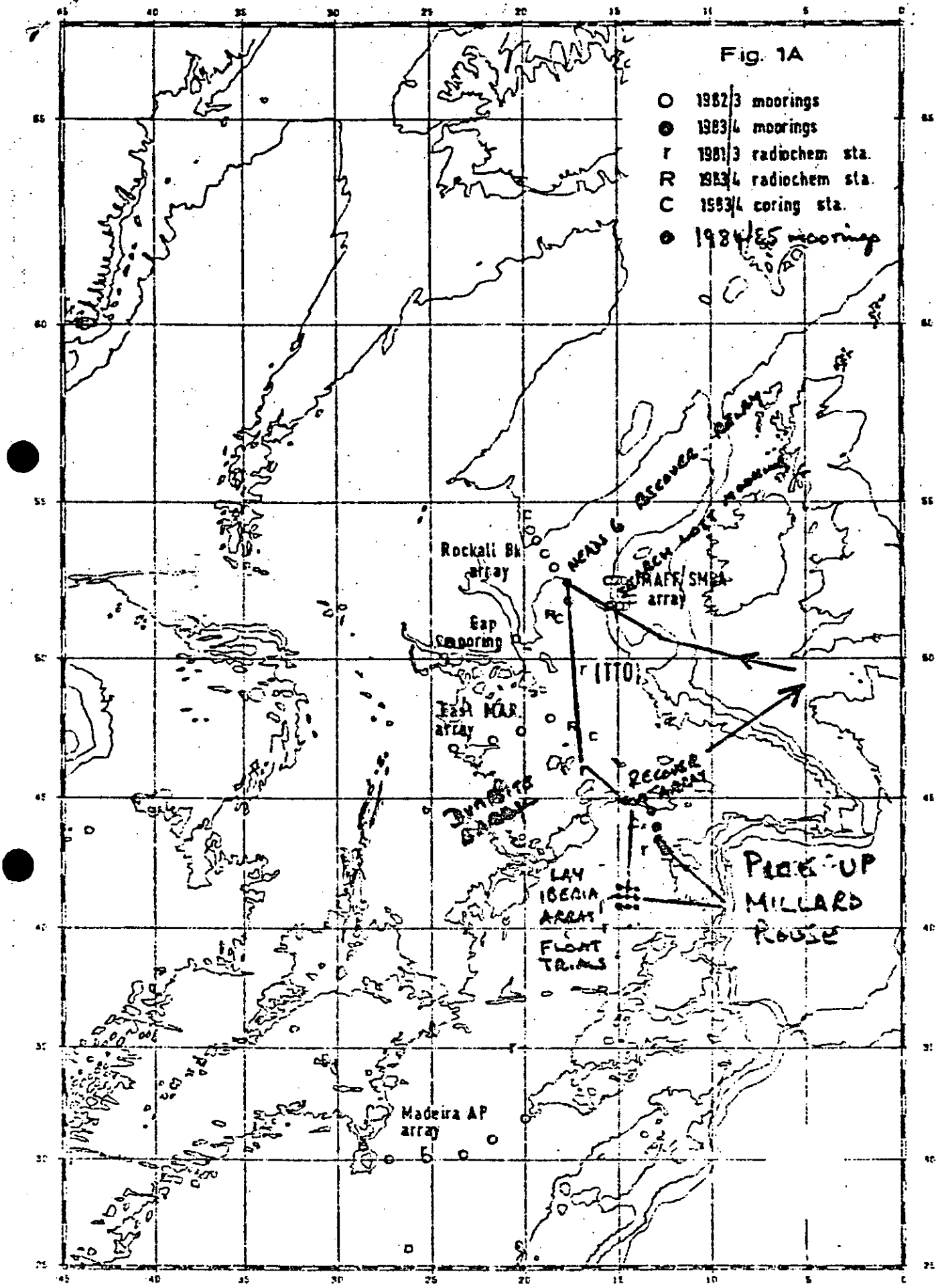

CIROLANA 6/84 28 JUNE - 17 JULY
TRACK CHART