

## MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND NR33 0HT

## 1985 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 5/85 (PROVISIONAL: Not to be quoted without prior reference to the author).

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DURATION: Sailed 1000 h 20 May  
Docked 0645 h 13 June  
All times are GMT

LOCALITY: NE Atlantic

AIMS:

1. To recover the nine-mooring current meter array at the SCFAR float launch site in the Iberia Abyssal Plain (41°00'-41°50'N, 13°54'W-15°00'W).
2. To recover NEADS-6 (8th deployment) and to lay a coherent nine-mooring c/m array (upper-bottom type) around the NEADS-6 site on the continental rise at the mouth of the Rockall Channel (51°50'N-52°42'N, 17°04'W-18°10'W; includes 9th deployment of NEADS-6).
3. To work tandem Gerard barrel sampling and 30-l rosette (+ CTD) sampling for Cs and Pu in water at a few sites within the NEA dumpsite and 'upstream' (southwards), with emphasis on the near-bottom layer.
4. To take Reinek box cores at the same sampling locations to assess Pu ratios in surficial sediments, plus a bulk near-bottom water sample for in situ Pu K<sub>D</sub> estimation.
5. To deploy fish traps at the same sampling locations to assess Cs and Pu levels in fish.
6. To recover and redeploy the dumpsite dummy drum mooring.
7. XBT's on passage (selected legs).
8. Surface Cs samples for Mr Jefferies where specified.

NARRATIVE

CIROLANA sailed 1000h 20 May and proceeded to her working area in the Iberia Abyssal Plain taking 50 l surface samples for Mr Jefferies en route as requested. On arrival 23 May, the vessel began the recovery of the 9 mooring current meter array, recovering 7 successfully (including the central full-depth mooring) by 1948 h 25 May in conditions of moderate to heavy wind and swell throughout.

One mooring (84-07) failed to respond to interrogation and another (84-05) was lost during recovery operations when the ship drove broadside across the mooring rope

On 26 May with weather still preventing near-bottom geochemistry, a further search was made for mooring 84-07 from 0844h to 1455h. Though the search covered a systematic grid of 17 points around the mooring's launch-position and used both interrogation and cut frequencies at each point the search proved unsuccessful and the mooring was abandoned. CIROLANA then steamed southwest to a point around 41°N 16½°W where the western flanks of a seamount provided an adequately broad and level working area at the required (sub-lysocline) depth. After launching Fishtrap 1, at 0912 h 27 May, the CTD plus full rosette of 11 x 30 l Niskins were worked on two successive lowerings to accurate heights of 5 and 15m above the seabed (~ 4700m) via pinger and altimeter to provide two 330 l samples for Pu/Am analysis. A 470 and 200 l surface sample were also obtained for Cs and Pu analysis via the overside pump. In continuing heavy weather these stations lasted until 2235 h.

After recovering the fishtrap early am on the following day the wind rose to > 40 kts forcing the vessel to dodge for the remainder of the day with no work possible except the streaming of Gerard Barrel cable. On 29 May with the weather too severe for G-B work and no relief in prospect, CIROLANA steamed north to the NEA dumpsite with XBT and PDR coverage en route. On arrival at the site at 2020 h 3 June, the ship carried out an intensive work programme at 2 locations within the overlap area between the past and present dumpsite. Three fishtraps were set and recovered with fish and amphipods, and at each location the CTD + 30 l rosette were worked to heights of 5 and 15 m above the bed, the Reineck provided box-cores, and tandem Gerard Barrels provided half-tonne (540 l) water samples from nominal heights of 15 and 60 m above bottom. In addition an unsuccessful attempt was made to obtain a long core via the Kaston corer and the dummy-drum mooring set in July 1984 was recovered.

Since a blown alternator on 30 May ruled out use of the third engine for the remainder of the cruise the ship left the area on 3rd June after working CTD + 30 l rosette to 5 m off the bed at a third location in the dumpsite.

A further CTD/30 l rosette station to +5m was possible in the western Porcupine A.P. on 4 June but thereafter northerly winds > 40 kts and a heavy northerly swell prevented work at other intended stations on the northward leg to the NEADS-6 site forcing the vessel to dodge or steam at slow speed.

On arrival at the site a temporary moderation of wind and swell on 6-8 June permitted 4 series of a/r tests on G-B cable, the recovery of NEADS-6 and the launch of all 9 moorings of the continental rise array by 1030 h 8 June. A CTD + 30 l rosette station (to +5 m) was also possible in gale-force winds from 8 June before the swell set in but no further geochemistry was possible thereafter and CIROLANA steamed SE in an attempt to run out of the weather. A CTD/30 l rosette station was worked west of the Goban Spur on 9 June in marginal conditions but on 10 June fine weather finally permitted the completion of a full station-programme required from one location outside the dumpsite. CTD + 30 l rosette, Reineck corer and Gerard Barrel lowerings were successfully completed on this site off Meriadzeck Terrace by 1845 h. Since the work programme was now completed and more bad weather was on the way, CIROLANA proceeded to Lowestoft docking 0645 h, 13 July.

RESULTS:

1. 8 out of 10 c/m moorings were successfully recovered. Of the 19 current meters recovered, 2 were Belgian VACM's which were not opened at sea but the remainder all gave full-term records which were processed at sea.
2. The 9 moorings of the Rockall Rise Array, including the 9th successive deployment of NEADS-6, were laid as planned.
3. The full aim of collecting near bottom material for Cs and Pu/Am analysis of fish, water and surficial sediment was achieved at 2 dumpsite stations and 1 station off the dumpsite (W of Meriadzeck Terrace).
4. The aim of discriminating Pu/Am of possible waste origin from that originating in 1960's bomb tests or from the  $^{238}\text{Pu}$  originating in the 1964 SNAP 9A Satellite burnup was met by collecting large-volume water samples from an accurate common height above the seabed and in a common depth-layer above the lysocline ( $\sim 4700$  m) at a total of 8 widely-scattered sites (3 in the dumpsite) from  $41^{\circ}$ - $53^{\circ}\text{N}$ ,  $10^{\circ}$ - $18^{\circ}\text{W}$ .
5. Combining the +5 and +15 m 330 l Rosette samples at each of the two main dumpsite stations gave the  $\sim 1200$  l filtered sample required to give an in situ  $\text{Pu } K_D$  on the suspended sediment from the near-bottom layer. In addition the overlying water in the 3 box cores may provide an additional  $K_D$  for easily resuspended material at the dumpsite and off Meriadzeck Terrace plus a further  $K_D$  for the upper 2 mm of each core.
6. The Kaston corer failed on its one deployment (fell over in stiff sediments). Additional analyses carried out on the 3 box cores were X-ray radiography of equal thickness slabs, subsequently sectioned at closely spaced intervals for Pu, Am,  $^{210}\text{Pb}$  and  $^{14}\text{C}$ .
7. Large volume surface samples were collected by overside pump at 5 of the geochemistry stations. Since surface values are known these will provide confirmation of the effectiveness of the decontamination procedures in force.
8. The dumpsite dummy drum mooring was recovered and had successfully "unrolled" the drum onto the seabed. No colonisation was found as on all previous deployments totalling 3 3/4 yrs. Since its importance for drum corrosion studies appeared to outweigh its value to colonisation studies it was not redeployed but was sealed in polythene for return to NIREX.
9. The fishtraps recovered 2 fish (hook caught) and a considerable weight of amphipods from the two main dumpsite stations. This should provide site specific concentration factor estimates for both Coryphanoides armatus and amphipods. (Samples of the bait were returned frozen to Lowestoft to check decontamination procedures.)
10. XBT hourly and PDR were worked for MOD(N) from the southernmost station  $41^{\circ}\text{N } 16\frac{1}{2}^{\circ}\text{W}$  to the dumpsite (23 XBT's total).
11. Surface 50 l Cs samples were collected at 4 stations on the shelf for Mr Jefferies.

R R Dickson  
18 June 1985

SEEN IN DRAFT: G Sinclair - Master  
R C Newrick - Fishing Skipper

INITIALLED: HWH

DISTRIBUTION: Basic List + Staff (page 1).

20°

10°

