MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK NR33 0HT

1993 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 2
(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF:

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DURATION: Left Lowestoft 1900 (GMT), 3/2/93
Arrived Lowestoft 0700 (GMT), 18/2/93

LOCALITY: Irish Sea

AIMS:

1. To make simultaneous physical and chemical measurements (Tetrapod, CTD, thorium/uranium (Th/U) radionuclides) at 2 sites in the E Irish Sea over a 25 hour period; (AE0104).

2. To lay the Tetrapod near the mouth of Morecambe Bay for a long-term deployment (recovery in April), as part of the COSEDS programme; (AE0207).

3. To lay 2 current meter moorings in the Morecambe Bay area, to provide data for a hydrographic model; (AE0104).

4. To survey all the Tetrapod sites before occupation using side-scan sonar, sledge-mounted TV and Day grab samples, to check bedforms and sediment type; (AE0104,207).

5. To obtain a sample of uncontaminated mud from west of the Isle of Man for an investigation of the Th/U/Pb radiochemical methods; (AE0104)

6. To survey the entrance of the channel leading to Barrow using side-scan and TV sledge; (AE0201)

7. To collect live Dab from a contaminated region of Liverpool Bay and the relatively clean waters of Cardigan Bay for a study of the effects of pollutants on Dab chromosomes and the immune system (AE0106).

8. To collect sediment samples in relation to the new dredge spoil site in the entrance of Morecambe Bay; (AE0201).

NARRATIVE:

CIROLANA sailed at 1900 on 3rd February and steamed, via the Channel, directly to the Irish Sea, making good progress in calm seas - under the influence of a high pressure system which persisted for almost all of the cruise. The Searider made a run ashore at 0900 on the 6th, at Llandudno, to collect a forgotten but vital piece of Tetrapod software, courtesy of the Conwy Lab. Continuing to Liverpool Bay the first 'anchor' station (TH17) was begun, with side-scan and TV surveys, followed by Tetrapod, NIOZ box core and hourly CTD/water samples through until 1630 on the 7th, and then an additional side-scan survey. This pattern was repeated at the second site (TH19) off Barrow on the 8th/9th. A survey of the long-term Tetrapod site (93J) by side-scan and Day grabs (TV abandoned because of high turbidity) was conducted on the morning of the 10th. Deployment of the Tetrapod had to be delayed until slack water because of the high tidal velocities at the site. The ship then steamed to west of the Isle of Man to collect a NIOZ core in the evening before returning to carry out a N-S and E-W side-scan survey centred on the Barrow dredge-spoil ground on the morning of the 11th. Two current meter rigs, each with an additional guard buoy, were then laid, around slack water, in the Lune Deep. A further side-scan survey of the 93J Tetrapod site was made on the morning of the 12th prior to carrying out an exchange of scientific staff off Fleetwood, using the Searider. Day grabs for Th/U analysis and CTD casts for temperature calibrations were completed in the Lune Deep before steaming to Liverpool Bay. Two 30 minute tows, with a Portuguese High Headline Trawl, on the morning of the 13th provided sufficient live Dab for experimental purposes, and tissue analysis at Burnham. A section of Day grabs was run N-S through the Barrow spoil ground in the afternoon. The E-W section was sampled on the 14th. On completion the ship steamed to Cardigan Bay, arriving the morning of the 15th. Trawling took place until the early evening, with fewer Dab in evidence and a delay caused by net damage on aircraft wreckage. CIROLANA commenced the homewards run, via the Channel, and docked at Lowestoft at 0700 on the 17th.

RESULTS:

1. The two 'anchor' stations were completed successfully. Initial analysis showed very good data recovery from the Tetrapod. The deployments coincided with high spring tides (10.1m range at Liverpool) and practically no significant wave activity, ideal for measuring the effects of tidal resuspension. Thirty 100 litre seawater samples were processed onboard for Th/U analysis to quantify scavenging rates by resuspended particles, with additional samples for grain-size analysis, salinity and nutrients (at TH17). The water column at TH17 was, as expected, vertically well mixed, allowing a single mid-water sample to be taken as representative. Surface, mid and bottom samples were taken at the less energetic TH19 site. The new side-scan sonar provided good quality images. The Liverpool Bay site was characterised by large (~ 10m wavelength), asymmetric sand waves with an apparent eastwards transport direction. The TH19 site was characterised by a very high density of

trawl marks on an otherwise featureless bottom, of soft, sandy mud. The NIOZ corer recovered good quality cores at both sites. TV images revealed smaller scale ripples at TH17. However, it was not possible to obtain useful images at TH19 because of the high turbidity and soft bottom - a recurring problem in this area.

2. The Tetrapod was laid at site 93J without incident at slack water. The previous mid-tide attempt had to be abandoned because of the high tidal velocities. The guard buoys were laid in close array. It was noted that ferries using Heysham were cutting through the site area, rather than rounding the outer buoy as expected. More optimistically it does not appear to be a well fished area. The site is on the edge of the Barrow spoil ground. The contrast between the hard, reflective, gravely/pebbly natural bottom (confirmed by Day grab) and the dumped material was evident on the side-scan trace. The Tetrapod was easily distinguishable by sonar.

3. The two current meter arrays were laid without incident in the Lune Deep. Despite being at the edge of the navigation channel, it appeared that the guard buoys at 93H had been moved closer together within 24 hours of being laid, presumably by a vessel.

4. Samples of soft mud, uncontaminated by anthropogenic inputs of Th, were obtained by NIOZ corer from west of the Isle of Man for a method development project.

5. A side-scan and Day grab survey was completed along a N-S and E-W transect centred on the Barrow spoil ground. It proved difficult to obtain samples from the pebbly sediments immediately outside the spoil ground. Sixty-eight samples were retained for grain-size analysis at Burnham.

6. A side-scan survey was completed across the entrance of the Barrow channel near Lightning Knoll.

7. Dab were obtained from Liverpool and Cardigan Bays using a Portuguese High Headline trawl. Dab were far more abundant in Liverpool Bay, as expected, with relatively large numbers of Thornback Ray at the latter site. The following scheme was adopted at Liverpool Bay: 20 fish injected to induce cell division for study of chromosome damage; 20 fish dissected for analysis of EROD in the liver (as an indicator of environmental stress); 20 fish frozen whole for determination of metals and organics at Burnham; about 150 fish returned live to Lowestoft for continuing study of immune response. The live fish were placed in tanks which had been floored with sediment from the area. Dab were less abundant at Cardigan Bay but sufficient for the chromosome study, tissue analysis and comparative immunology work (~ 70 live fish returned).

Dr Peter Kershaw
Scientist-in-Charge
6 May 1993

SEEN IN DRAFT:
Master
Fishing Skipper

INITIALLED:

DISTRIBUTION:

Basic list +
D J Allington
D C Denoon
H Emerson
A Emery
L Greenwood
P Hudson
J F Knowles
M Mason (Univ. Cambridge)
A Poole
J M Rees
A K Young

CIROLANA 2/93 WORKING AREA