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

1987 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA CRUISE 4B
(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

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- M J Edge) Oxford University
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- D Bowden)
- R Sawala)
- T Henderson)

DURATION

21 April-30 April

LOCALITY

Irish Sea

AIMS

1. To measure the physical and mechanical properties of the muddy sediments of the northeast Irish Sea to a depth of approximately 1m to assess the uniformity of the seabed, using in situ measurements and recovered cores. Some core samples will be tested on board, while others will be returned to the laboratory for additional testing. Ship-board operations will include:
 - (a) Measurement of in situ density, using transmission and back-scatter densimeters.
 - (b) Recovery of sediment samples using the Kaston and Reineck corers. The Kaston cores will be sub-sampled with acrylic liners, as will the Reineck cores if on-board testing is possible. Core samples will be sealed for transport.
 - (c) Spot density measurements will be made on the cores with a Paar density gauge and samples sealed for subsequent analysis of water content, Atterberg limits, particle size distribution and mineralogy.
 - (d) The fall cone and shear vane techniques will be used to measure sediment shear strength at horizons 200-400mm apart through the cores.
 - (e) Restricted flow consolidation tests will be made on samples 200mm apart from a small number of cores.

2. To collect samples of seawater for trace element analysis.

NARRATIVE

The changeover of scientific staff and transfer of equipment to RV CIROLANA took place off Holyhead at 1800h, 20 April, using the harbour tug. The ship then proceeded northeastwards towards the Cumbrian coast, and arrived to commence work at the first station at 0900 h on 21 April. Over the next six days an intensive programme of sediment sampling and testing was completed at 12 stations. The continuing calm weather conditions allowed most of the intended geotechnical tests to be completed on board. In situ sediment density profiles were obtained at the 12 stations. Also during this period 25 stations were worked either from the ship or the day boat to obtain water samples for trace element analysis.

On 27 April, 37 Reineck box cores were taken to obtain live specimens of Callianassa subterranea to be returned to the laboratory for experimental purposes. At 1100h on 27 April, 6 scientific staff were put ashore at Whit haven using the day boat.

CIROLANA commenced the homeward journey in the early afternoon of 27 April, collecting an additional 5 water samples between St Bees Head and Anglesey for trace element analysis. An uneventful journey was completed and the ship docked at Lowestoft at 1115 h on 30 April. All the objectives of the cruise were successfully completed.

RESULTS

1. A full programme of sampling and testing was completed at the twelve stations, with in situ density profiles at eleven. In all 62 cores were obtained, mainly from Reineck box cores with lengths of the order of 300mm, but with some Kaston cores up to 1.2m long at a few sites. The sediment cores were sub-sampled and over 150 shear vane measurement were made, with a similar number of fall cone tests.

Six restricted flow consolidation tests were carried out on two cores, with additional samples from the same cores being sealed for further testing at Oxford. Spot density measurements were made on sub-sampled cores, and core sections and some complete cores were sealed for transport back to Oxford. The results from the in situ densimeter will provide a link between stations where shallow samples were obtained and the condition of the sediment at greater depths.

2. Thirty samples of water were taken for trace metal analysis along a series of transects from St Bees Head and across the Solway Firth. All samples have been analysed for dissolved lead and cadmium and "reactive" and "total" mercury; some were also analysed for "total dissolved" mercury. Samples of water and suspended load were also taken for additional analyses at Burnham-on-Crouch, together with salinity and nutrient analyses at Lowestoft.

A significant source of cadmium has been confirmed in the Whitehaven region, but lead concentrations were comparatively low. Mercury has been found to be present predominantly in the dissolved phase with a slight elevation in concentrations across the Solway Firth.

3. Approximately 75 live specimens of Callianassa subterranea were collected from the Reineck cores and placed on muddy sand substrates in running seawater for return to the laboratory.

D S Woodhead
8 May 1987

SEENN

SEEN IN DRAFT: M J Willcock - Master
E W Pearson - Senior Fishing Mate

INITIALLED: HWH

DISTRIBUTION:

Basic List +
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D Bowden)
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T Henderson)

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4° 11' AS 3370 3°

55°

54°

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52°

51°

CIRROLANA
4B/87

AREA OF WORK

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