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

1992 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 8/92

STAFF:
Dr J Brown (SIC)
Ms A Reeve
Mr D Sivyer
Mr N Pearson (P/T 29-1/8)
Mr A Kenny
Dr N Owens (PML)
Mr S Jones
Ms J Taylor
Ms L Greenwood
Mr A Rees (PML)
Ms H Cussen (IOSDL)

DURATION: 29 July-6 August

LOCALITY: North Sea, Wash and Humber

AIMS:

1. To identify and quantify the fate of river-borne nutrients entering the Wash and Humber estuary, examining nutrient distributions and critical processes from the river inputs through to the North Sea in subtidal sediments and overlying water.

2. To measure factors affecting benthic nutrient recycling in subtidal sediments along a transect across the North Sea.

3. To test the deployment and recovery of new COSEDS equipment.

4. To obtain samples and photographs of the bed for the aggregate extraction sampling programme.

5. To take phosphate samples over a grid in the southern North Sea to improve knowledge of the seasonal signal in nutrients (particularly phosphate).

NARRATIVE: (TIMES GMT)

CIROLANA departed Lowestoft at 0815 on Wednesday 29 July 1992 for the sediment process site at BELS2. On arrival, at approximately 1600, the Tetrapod was deployed within 0.5 mile of the site and a sediment core taken using the NIOZ corer.

Subsequently, 7 cores were taken at the BELS2 site for sediment process studies. It was intended that this be immediately followed by a CTD cast for associated water samples. The deployment had to be aborted and the cable reterminated as it had become 'pinched' in a block, which had been painted prior to the cruise. Fortunately, N D Pearson was still aboard and a prompt retermination was effected. Finally, the CTD cast was completed, but not before problems in getting power to the winch, difficulties that have arisen on every trip (3) I have made aboard CIROLANA. Trials were then made using the Simrad 600 sonar to test the effectiveness of the new 34 kHz transponder on the Tetrapod.

The Tetrapod was recovered smoothly at first light before proceeding to the second sediment processing site (OSPIT), where 13 cores were taken and a CTD cast made without mishap.

Whilst steaming to the gravel treatment site off north Norfolk, hourly surface nutrient and chlorophyll samples were taken. At the treatment site, 15 Hamon Grabs and a scallop tow were made, with an additional 5 Hamon Grabs at the reference site.

On the morning of 31 July the camera sled was towed through the treatment box. As the edge of the box was approached the umbilical electric cable apparently passed under the sledge, entering the field of view of the video camera. The sledge was immediately retrieved, the cable was unscathed and the sledge redeployed. Whilst the video worked well, the still camera (unit 2) failed to operate, seemingly due to loose battery connections.

Eight CTD stations were occupied at the mouth of the Humber before passing up to Killingholme to anchor overnight. At this site (A4) eight cores (NIOZ) and a water sample (CTD) were taken.

After disembarking N D Pearson, we weighed anchor (0815, 1 August) to undertake a transect of stations (6) from the Humber to the Wash. Sediment processing site WSS8 was occupied, with 8 cores and a CTD taken. The southern end of the Wash grid was worked (CTD) until midnight, achoring at WSS8. The PML personnel were experiencing problems with their GC (Gas Chromatograph) and required 3 additional cores, taken at 0500, 2 August. The remainder of the Wash grid was completed, accompanied by the third failure of the CTD winch, before a second deployment of the camera sledge (1830, 1 August) at the gravel treatment site. Again, the video was successful, but the still camera (unit 2) failed before entering the treatment site. Loose connection again!

The remainder of the cruise was devoted to a series of surface water samples for nutrients, suspended load and chlorophyll determinations, interspersed with CTD stations along the standard JONUS transect across the southern North Sea.

RESULTS (preliminary):

Aim 1: Sampling was successful. From the cores, oxygen demand at BELS2 and OSPIT was steady, but low, at A4 there was virtually no demand and at WSS8 there was a definite uptake, probably by large macro fauna surface populations.

The PML component, involving GC analysis, experienced some problems with the equipment, but was largely successful. Final rates remain to be calculated, but at the three

sites analysed (OSPIT, BELS2 and A4) denitrification was low, increasing in the order OSPIT, BELS2 and A4. Nitrification rates appeared greatest at OSPIT.

H Cussen (IOSDL) was testing a new design of oxygen electrode intended to provide profiles of dissolved oxygen in sediment cores. The equipment performed well, showing profiles to be similar at all sediment sites, with oxygen penetrating no deeper than 2 cm.

Aim 2: The North Sea JONUS transect was completed successfully, collecting samples for nutrients, chlorophyll and suspended load analysis and water column properties.

Aim 3: Successful 12 h deployment of the Tetrapod in 30 m of water. The latest version of the ABS (Acoustic Backscatter Probe) performed well, although data was uninteresting owing to calm weather conditions and little tidal resuspension. The 34 kHz transponder operated perfectly for ranges from 200-4 000 m, the limit of the sonar range, giving consistent replies without false triggering.

Aim 4: Completed successfully, excepting the failure of the still camera (unit 2). A large variation in species abundance and numbers was found at the treatment site, a reflection of the patchwork of dredge tracks. Colonies of *Dendrodoa grossularia* were frequently immature, perhaps having colonised since treatment, whilst sand had accumulated at the base of the dredge tracks (also recorded on CORYSTES 6/92). At the reference site there was little variation in species abundance and numbers, with large numbers of mature colonies of *Dendrodoa grossularia.*

Aim 5: Surface samples were collected over a grid for nutrient, suspended load and chlorophyll analysis. Of particular interest was phosphate, providing a valuable addition to the historical data set of the North Sea (Dickson and Kirkwood, 1992), in which phosphate appeared to exhibit a strong seasonal signal with no evidence of a background trend over the period 1930 to 1990. Data had not previously been available for July and August.

ADDITIONAL POINTS:

The EG & G logging software and the current version of the continuous shipboard logging system performed well. Both are a major improvement on previous acquisition systems. All effort must be made to ensure that the continuous system is fully implemented and that calibrations are made on every voyage.

The new shipboard VAX, installed prior to the cruise, offered a limited service, precluding a proper evaluation. Nevertheless, two problems were encountered: (1) user files loaded from the laboratory VAX had privileges disabled and could not be accessed, consequently they were useless; (2) the line printer yielded fragmented portions of files. On a note of concern, there is a rumour that compilers are not to be installed, effectively preventing at sea programme development, data analysis and plotting facilities that mirror those available on the laboratory system. On the plus side, the boot up was simple as were the backups and the system has the potential to offer a reliable and flexible service.

REFERENCE:

Dickson, R R and Kirkwood, D S, 1992. An analysis of historical phosphate data for the southern North Sea. Quality Status Report, North Sea.

Juan Brown
6 August 1992

SEEN IN DRAFT: B Chapman (Master)
J Harper (Fishing Skipper)

INITIALLED: CEP

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Basic list +
J Brown (4 copies)
A Reeve
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CIROLANA 8/1992 (JONUS 9) STATION POSITIONS

SHOWING :
STATION POSITION
COASTLINE