

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

1996 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 7

STAFF:

S J Malcolm (SIC)	DFR	
D S Kirkwood	DFR	
D Mills	DFR	24/7-25/7
D B Sivyver	DFR	
J Taylor	DFR	
M Trimmer	UE	
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J Read	DFR	24/7-25/7
S Kratzer	UWB	
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DURATION: 24 July - 1 August 1996

LOCALITY: North Sea, Thames Estuary, Wash

AIMS:

1. To undertake process measurements at sites in the Thames estuary, southern North Sea and Wash to determine the impact of land derived nutrients on the marine ecosystem (AE0529A0 and C956J168)
2. To undertake spatial surveys to determine the distribution of nutrients, phytoplankton indicators and other relevant parameters using CTD and underway sampling in the outer Thames estuary, southern North Sea and Wash (AE0529A0 and C956J168)
3. To make supporting bio-optical measurements at sites in the southern North Sea (CSG extra-mural)
4. To conduct trials of a prototype Smart Mooring at the Outer Gabbard site (AE0530B0)

NARRATIVE: [note all times in GMT]

Cirolana departed from Lowestoft at 1500h on the afternoon of Wednesday 24 July 1996 and went directly to the Outer Gabbard station (TH3). The prototype Smart Mooring was laid, after some minor technical problems had been overcome, and Cirolana then went to anchor in the Thames estuary. Sediment samples were collected on the morning of Thursday 25 July and nutrient flux measurements and other process measurements made throughout the day. Two members of the scientific staff responsible for the mooring deployment were transported ashore by searider to Southend Pier. Large volume water samples and zooplankton net samples were collected at 0400h on Friday 26 July and a CTD anchor station worked throughout the rest of the day. Optical measurements were made around midday using the UWB and DFR 4-colour sensors. Cirolana weighed anchor and went to the next site at Long Sand Head. Sediment sampling commenced early on Saturday 27 July and 5 NIOZ cores were collected for the range

of sediment process measurements being measured by University of Essex and DFR staff. CTD profiles and surface water samples were collected through the tidal cycle. A large volume water sample and zooplankton samples were collected pre-dawn on Sunday 28 July 1996 in order to measure the rates of primary production and respiration. Cirolana completed a survey of CTD stations in the southern North Sea to the east of the Thames estuary in excellent weather conditions before returning to the Outer Gabbard. Sediment samples were collected with some difficulty due to the shell and gravel mixed with sand at the Outer Gabbard mooring site on the morning of Monday 29 July 1996. The rest of the day was spent collecting water column profiles using the CTD covering the tidal cycle. During the early evening the Smart Mooring was retrieved and the instruments cleaned and stowed for return to Lowestoft. The final sampling for production rate determination was carried out on the morning of Tuesday 30 July 1996 and was followed by sampling from a grid of stations around the Outer Gabbard. Cirolana made passage overnight to the Wash. Operations in the Wash commenced with sediment sampling followed by water column profiling for zooplankton abundance and species composition and for nutrient and chlorophyll determination. Planned measurement of the primary production rate was not attempted due to greater emphasis having been placed on the Thames transect. Cirolana returned to Lowestoft, docking at xxxxx on Thursday 1 August 1996.

RESULTS:

Aim1. Process measurements in the water column and within the seabed were measured at the 3 Thames transect sites together with tidal cycle state information. Size fractionated primary production rate was determined at all stations along the gradient with most primary production taking place in smaller size fractions offshore compared to inshore. Sediment cores and water controls were incubated in a series of experiments to measure oxygen uptake and production (in the light), denitrification using stable tracers and nutrient exchange and transformation.

Aim2. Surveys to characterise the water masses present around each of the process measurement sites and to delineate the estuary to offshore gradients were conducted with spatial and temporal strategies. Little stratification was encountered even in the inshore estuarine sites due, no doubt, to low discharge from the rivers. Nutrient concentrations were low at all sites.

Aim3. Optical profiles were collected at x sites. Failure of the PAR sensor on the CTD profiler required that light attenuation was estimated using a Secchi disk. Downwelling and upwelling irradiance were determined by use of the four colour sensor and supporting samples were collected for the determination of phytoplankton species composition and the pigments present in the water. This work is conducted by a MAFF CSG supported PhD student (S. Kratzer) from the University of Wales, Bangor.

Aim4. The prototype Smart Mooring was laid successfully at the Outer Gabbard site (52° 00'N 2° 20'E) and retrieved 5 days later. The instruments deployed on the mooring were a PAR (light) sensor, a fluorometer and a turbidity sensor coupled to a new intelligent data logger. The instruments were returned to Lowestoft for interrogation.

S J Malcolm
1 August 1996

SEEN IN DRAFT:

Master
Senior Fishing Mate

R Graham

W. J. Finnicole

DISTRIBUTION:

Basic list +
S J Malcolm (SIC)
D S Kirkwood
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M Trimmer
R Sanders

S Kratzer

A Hammerstein