5697

(1) Prof Garrett
(2) CSO
This short cruise has [illegible] some 'new' observations [illegible] with the moored water sampl[illegible] The high temporal resolution [illegible] water chemistry has shown [illegible] depletions of N & P at the [illegible] April which subsequently [illegible] in mid-May. We may unde[illegible] this observation better when [illegible] fully analyse the data from th[illegible] 'biological' water sampler + sedim[illegible] trap material. The spring algal [illegible] may be remarkably effective in nutrient stripping. [illegible] 11/7

BIOLOGICAL OCEANOGRAPHY CRUISE REPORT

LF 11/95

Date 12 - 16 June 1995

PERSONNEL

B Stewart	(SIC), SSO, DANI
P Elliott	SO, DANI
S Bloomfield	ASO, DANI
L Blee	Student, University of Ulster
R Anderson	Student, Coventry University

CRUISE OBJECTIVES

i. To assess temperature, salinity and nutrient distributions in the north western Irish Sea.
ii. To recover, service and redeploy instrumentation moored in the central Irish Sea.
iii. To assess water current movement with depth, over selected areas of the cruise track, using the ship's acoustic doppler current profiling system.
iv. To recover MAFF moorings and instrumentation from two sites in the North Channel.

CRUISE NARRATIVE

Monday 12 June 1995

In preparation for the cruise, all scientific scientific crew were onboard by 2000 hrs when equipment and instrumentation was tested and confirmed to be functioning properly. The RV Lough Foyle departed Belfast at 2200 hrs and sailed overnight in light winds to the mooring site at station 38 (see attached sampling grid).

Tuesday 13 June 1995

Recovery of the moored water samplers to the ship deck commenced at 0600 hrs. Weather conditions were dry and bright with only a light breeze. The samplers were individually serviced and programmed for redeployment, while mooring components were examined for corrosion and replaced where necessary. The mooring was assembled and redeployed at 1355 hrs on position 53^0 51^1.16N 05^0 34^1.19W. Recovery of the second mooring of sediment traps, current meters and a transmissometer commenced at 1400 hrs. Again the instruments were individually serviced and mooring components examined for corrosion before redeployment at 2050 hrs at position 53^0 51^1.18N 05^0 33^1.59W. Finally, water samples and a CTD depth profile was acquired before finishing work at 2200 hrs. The vessel drifted overnight on a calm sea.

Wednesday 14 June 1995

Work commenced on station 45 at 0600 hrs and continued in a southerly direction along a grid of stations 46, 49, 50, 57, 62, 59, 48, 47, 36, 33 to finish on 24 at 2110 hrs. Work for the day was completed at 2145 hrs and again the vessel drifted overnight in light winds.

Thursday 15 June 1995

Work commenced on station 26 at 0700 hrs and continued in a northerly direction along a grid of stations 21, 22, 15, 16, 14, 6 to finish the sampling survey on station 4 at 1625 hrs. The weather deteriorated during the morning sampling period with northerly gale force winds causing the survey to progress at a slower rate. However, conditions improved in the early afternoon and the vessel was able to safely resume normal cruising speed. Work in the laboratory was completed at 2100 hrs and the vessel sailed slowly overnight to the MAFF mooring sites in the North Channel.

Friday 16 June 1995

The vessel arrived on the position of MAFF mooring site L at 0430 hrs (see attached 'Notice to Mariners') and despite an intensive search of the immediate area no marker buoy or other evidence of the mooring could be found. At 0630 hrs further attempts to locate the buoy were abandoned and the vessel sailed to MAFF mooring site K. The marker buoy at site K was clearly visible on the ship's radar system as we approached and the mooring complete with instrumentation was successfully recovered to the ship deck at 1100 hrs. At this point, a closer examination of the instrumentation revealed extensive damage to both recording current meters; probably caused by a fishing boat's trawl gear. The vessel sailed to dock in Belfast at 1230 hrs where the scientific equipment was immediately unloaded and disembarkment of scientific crew was completed at 1500 hrs.

PARAMETERS MONITORED

The CTD/rosette water sampler was deployed at all stations on the sampling grid to acquire nutrient, chlorophyll a, temperature, salinity, oxygen and fluorescence data from the depth profile. Daylight permitting, Secchi disc readings were also taken at all stations. Algal samples were taken at most stations and stored frozen for carbon/nitrogen analysis. Sediment cores were taken at stations 47 & 38 and subsampled for C/N and chlorophyll a analysis. Samples were taken for the determination of oxygen by the Winkler method at stations 38, 45 & 50.
The ship's ADCP was prepared and initiated in Belfast and set to monitor along the cruise track.

SUMMARY OF RESULTS

Nutrient and CTD profile data for southern coastal stations 36, 47, 48 & 59 showed the water column to be mixed with typical temperature and salinity 11.8 °C and 33.80 ppt respectively; typical inorganic nitrogen values ranged 0.0 - 1.0 micromoles N l^{-1}. The northern coastal stations 14, 15 & 22 were also mixed but cooler with typical temperature and salinity 10.2 °C and 33.90 ppt respectively; typical inorganic nitrogen values ranged 1.5 - 4.5 micromoles N l^{-1}. The remaining northern coastal stations 24 & 33, located in areas of low tidal influence, were thermally stratified with a top to bottom temperature difference of approximately 3 °C; surface temperatures and inorganic nitrogen values were similar to the mixed northern coastal stations.
Southern open sea stations 62, 57 & 50 were mixed with typical salinity and temperature 34.2 ppt and 10.6 °C respectively. Open sea stations 45, 38, 49, 46 and 26 exhibited thermal stratification with surface temperatures typically 12.5 °C, approximately 3 - 4 °C above the bottom temperature; typically the thermocline was found at 25 metres. Further north, stations 21 and 16 were generally mixed and similar to stations 6 and 4 in the North Channel with typical temperature and salinity 9.2 °C and 34.0 ppt respectively; typical inorganic nitrogen values ranged 4.0 - 9.0 micromoles N l^{-1}.
Generally, surface temperatures have increased by 2 -3 °C since the May '95 cruise and the calmer milder conditions have allowed thermal stratification to intensify in the in the central Irish Sea region at stations 38 and 45. The "wedge" of high salinity water (typically 34.4 ppt) observed at the southern open sea stations on previous surveys was not detected on this cruise. Typical salinity in this area was 34.0 - 34.2 ppt with no evidence of salinity stratification in the water column.

Moored McLane water samplers

As field trials continue with both the "nutrient" and large volume "biological" water samplers, some minor problems have emerged. To date, the anti fouling flushing system on both samplers has not worked properly and the fault is currently being investigated in liaison with the manufacturers.
The sample bags provided by McLane for use with the large volume sampler are both fragile and poorly designed in that the sample bag becomes damaged during removal and cannot be reused. McLane have agreed to supply bags of higher specification, free of charge.
Abnormally high silica concentrations in samples taken by the "nutrient" sampler have been found to result from contamination with silicone grease used by the manufacturers to lubricate the piston in the sampling syringe barrel. Currently the use of an alternative lubricant and the operation in absence of lubrication is being investigated.
Results from daily samples analysed for inorganic nitrogen and orthophosphate are shown in Figure 1.
Samples taken by the "biological" water sampler for species identification have been stored preserved for inspection at a later date.

Moored sediment traps

Sediment traps set to sample for periods of 6 days have been moored at depths 25, 50 and 75 metres in a depth of 105 metres. Apart from a problem with the 50 m trap in April/May, the traps have continued to operate successfully since their deployment in Feburary this year. Preliminary results for the weight of sediment collected over 6 day periods at the three different depths are shown in Figure 2.

PROBLEMS ENCOUNTERED

Light Meter

Depth sensor on the light meter was not reading correctly as surface was displaying depths of 6 - 7 metres. W Clarke to investigate the fault.

Acoustic Doppler Current Profiler

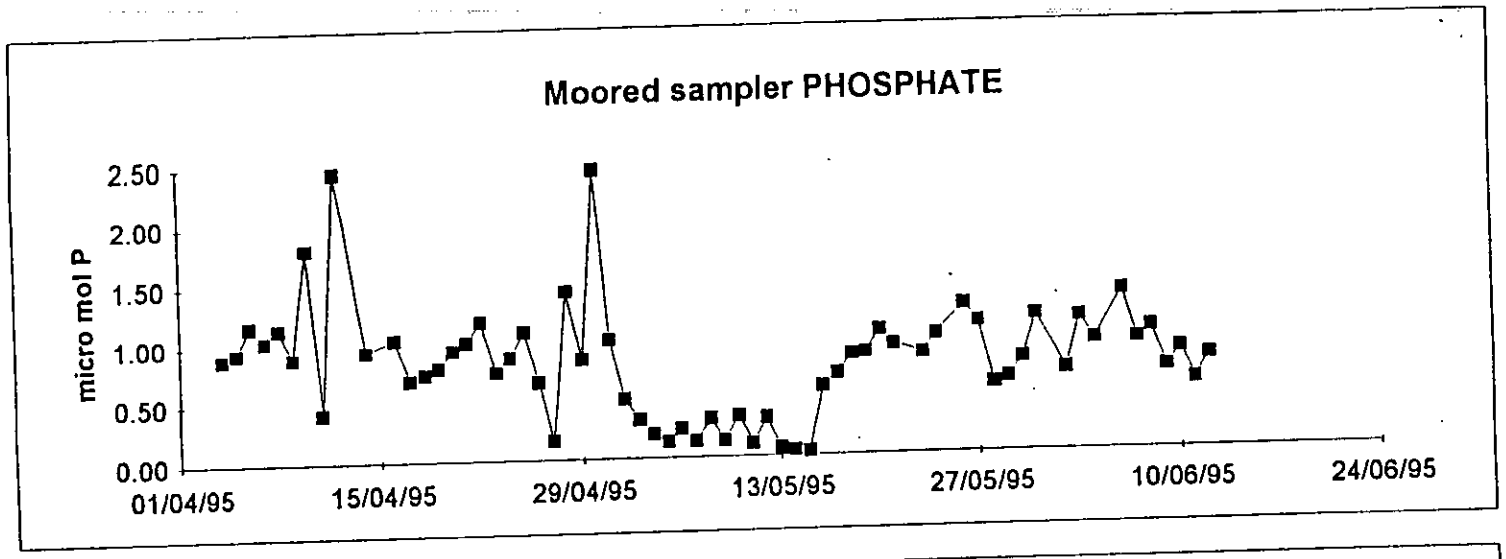
Occassional "bad beam" warning from the ADCP meant it was not possible to monitor along the entire cruise track. Later while the ship was in dry dock it was observed that a dense growth of marine crustaceans had penetrated the surface of the ADCP sensor. The sensor has been subsequently removed from the ship and will be returned to the suppliers for inspection.

ACKNOWLEGEMENTS

The ship's master, officers, engineers, catering staff and crew are thanked for their cooperation during this cruise.

BM STEWART

7 July 1995


Moored sampler PHOSPHATE
micro mol P
2.50
2.00
1.50
1.00
0.50
0.00
01/04/95
15/04/95
29/04/95
13/05/95
27/05/95
10/06/95
24/06/95

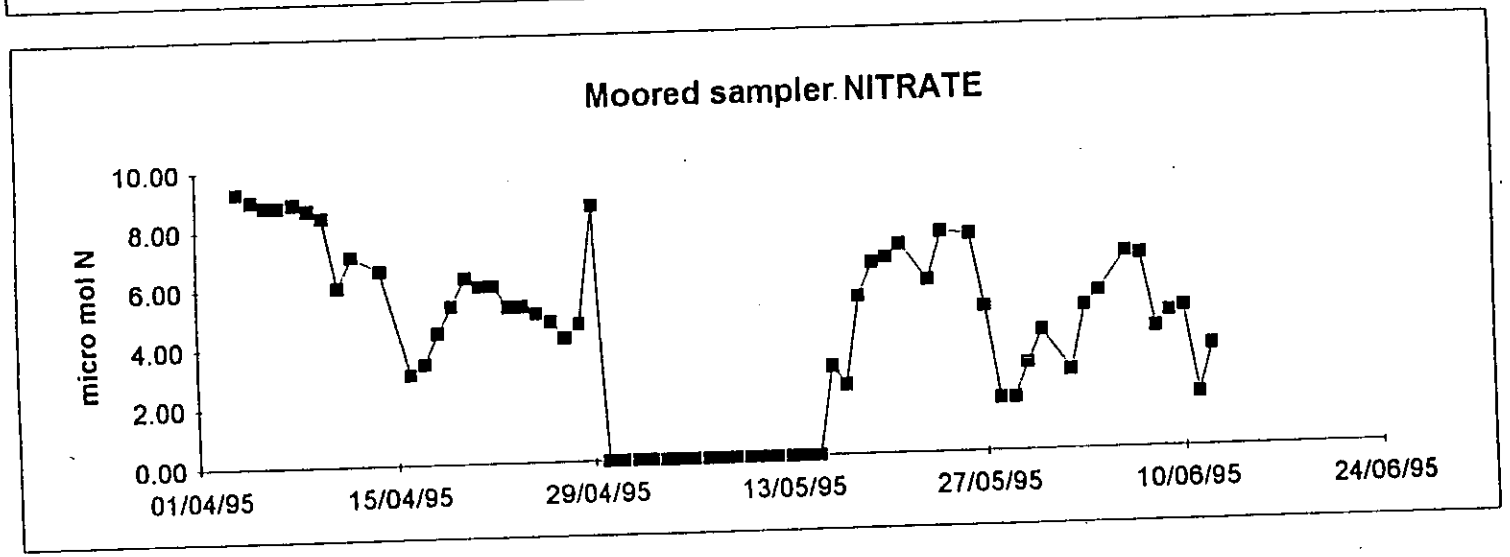
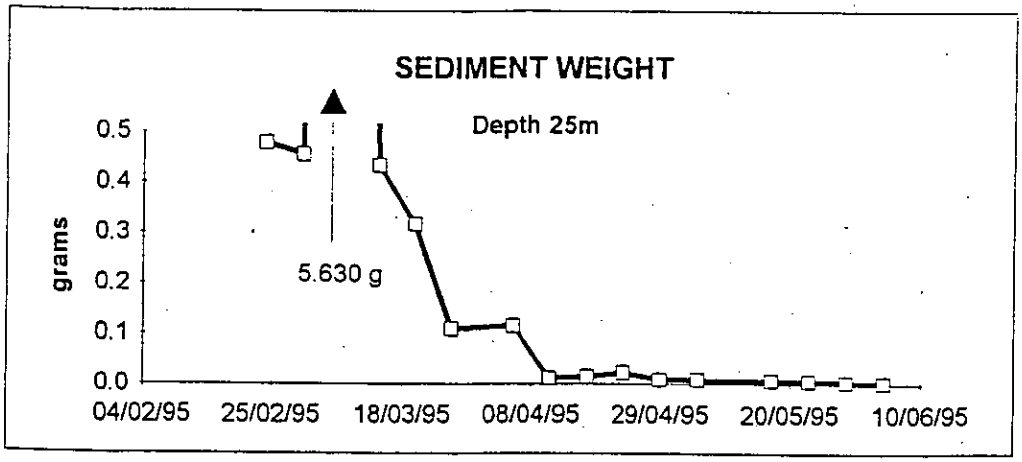
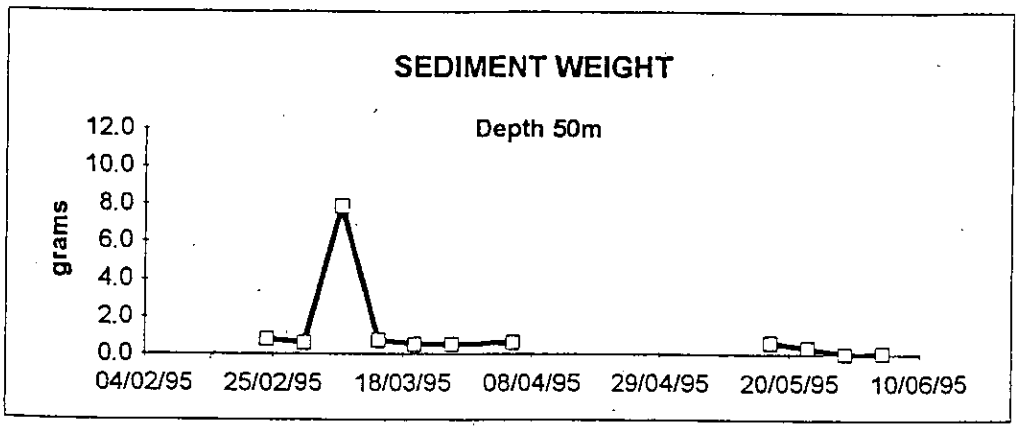

Moored sampler NITRATE
micro mol N
10.00
8.00
6.00
4.00
2.00
0.00
01/04/95
15/04/95
29/04/95
13/05/95
27/05/95
10/06/95
24/06/95

Figure 1.


SEDIMENT WEIGHT
Depth 25m
grams
0.5
0.4
0.3
0.2
0.1
0.0
5.630 g
04/02/95
25/02/95
18/03/95
08/04/95
29/04/95
20/05/95
10/06/95


SEDIMENT WEIGHT
Depth 50m
grams
12.0
10.0
8.0
6.0
4.0
2.0
0.0
04/02/95
25/02/95
18/03/95
08/04/95
29/04/95
20/05/95
10/06/95

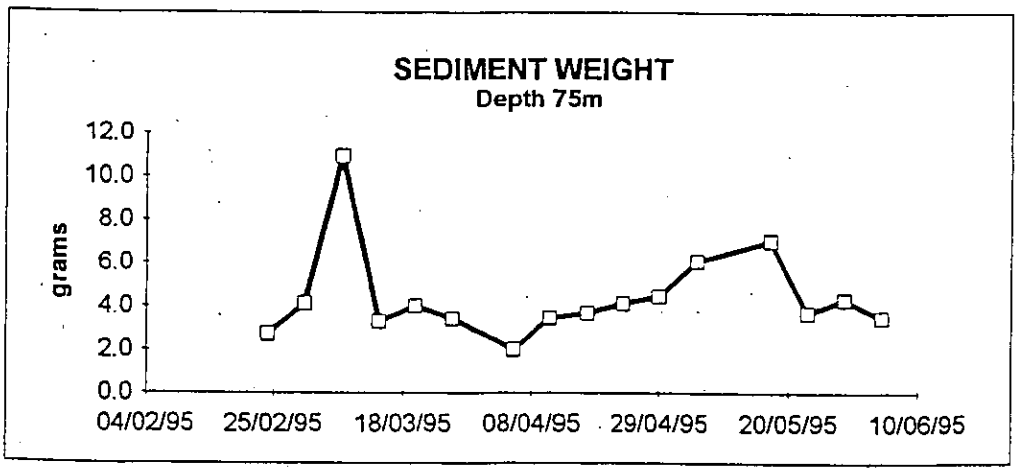

SEDIMENT WEIGHT
Depth 75m
grams
12.0
10.0
8.0
6.0
4.0
2.0
0.0
04/02/95
25/02/95
18/03/95
08/04/95
29/04/95
20/05/95
10/06/95

Figure 2.