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BIOLOGICAL OCEANOGRAPHY CRUISE REPORT

LF 06/98

1 - 3 February 1998

PERSONNEL

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P Elliott	SO, DANI.
J McGinley	Student, Univ. Ulster
M Trimmer	Res. Assist. Univ. Essex

OBJECTIVES

i. To recover and service instrument mooring, attach additional "large volume" water sampler and redeploy.

ii. To recover the "displaced" guard buoy and mooring, service and redeploy adjacent to the instrument mooring.

iii. To assess temperature, salinity and nutrient distributions over depth at station 38A. (DANI mooring site)

iv. To assess oxygen consumption and denitrification at sediment-water interface at station 38A. (M Trimmer: Univ. Essex)

CRUISE NARRATIVE

Sunday 1 February 1998

In preparation for the cruise, all DANI scientific crew were onboard by 2030 hrs when mooring instrumentation was tested and confirmed to be functioning properly. Following a talk on ship safety and a demonstration of personal life saving equipment, the RV Lough Foyle departed Belfast at 2115 hrs and sailed overnight in a light breeze to station 38A, the DANI mooring site.

Monday 2 February 1998

The ship arrived on station 38A at 0730 hrs. The weather was dry with a light north easterly wind. Work commenced at 0800 hrs when the box corer was deployed to acquire sediment for oxygen consumption and denitrification experiments. The rosette water sampler was then deployed to collect a bulk sample for the experiment. The sediment cores were then prepared for incubation and the remainder of the experimental work was continued by M Trimmer (Univ. Essex).

Preparation for mooring recovery commenced at 0930 hrs. The guard buoy (i.d No. 1) was successfully recovered to shipdeck at 1015 hrs and following replacement of all wires, was successfully redeployed at 1130 hrs on position 53^0 46^l.85N 05^0 38^l.07W. After lunch the instrumentation mooring was successfully recovered to shipdeck at 1245 hrs. The water sampler was removed and the mooring reconstructed using new wires. Thermistors were positioned at intervals along the length of the wire. A replacement water sampler together with an additional "large volume" water sampler was attached and the mooring (buoy id. No. 2) was successfully deployed at 1530 hrs on position 53^0 46^l.97N 05^0 37^l.82W. The Irish Marine Emergency Service was informed of the change in position of the moorings and requested to modify their navigation warning broadcasts accordingly. Following deployment of the rosette water sampler and sediment corer, work for the day finished at 1800 hrs. The vessel sailed overnight to Belfast in a fresh northerly wind.

Tuesday 3 February 1998

The vessel docked in Belfast at 0130 hrs. Work commenced after breakfast at 0800 hrs when scientific and mooring equipment was dismantled and unloaded. The scientific crew disembarked at 1100hrs.

PARAMETERS MONITORED

The CTD/rosette water sampler was deployed at station 38A to acquire nutrient, chlorophyll a, temperature and salinity data from the depth profile.
The Bowers & Connelly mini-corer was successfully deployed at station 38A where sediment samples were subsampled for carbon & nitrogen, chlorophyll *a* and trace metal determinations.

Sediment oxygen consumption & denitrification experiments
The box corer was successfully deployed at station 38 to acquire samples for the oxygen consumption and denitrification experiments. Subsamples were taken using Perspex core tubes (50 cm x 80 cm) and (20 cm x 4 cm). Water was collected from the bottom using the rosette water sampler and then carefully reintroduced over the sediment in each core. The cores were then placed in aerated water baths in site water at *in situ* temperature and allowed to re-equilibrate for 2 hours.
Three of the large cores were then used to determine the rate of oxygen consumption by the sediment using dissolved oxygen electrodes and data logging equipment. The measurements will be used to calculate the organic carbon and organically bound nitrogen that is mineralised aerobically.
Three separate large cores were then capped and their overlying water gently aerated. Water samples (20 ml) were collected every 2 hours in order to measure the rate of exchange of nutrients (nitrate, nitrite, silicate, phosphate, ammonium and urea) between the sediment and the overlying water.
Nine of the smaller cores were used to determine the rate of denitrification using a $^{15}N\text{-}NO_3^-$ isotope pairing technique. This will enable the amount of (primarily) mineralised nitrogen that is subsequently lost via denitrification and not available as new nitrogen for primary production, to be calculated.

Four separate small cores were used to measure the rate of sulphate reduction using a $^{35}S\text{-}SO_2^{2-}$ radio-isotope technique. The measurements will be used to calculate the organic carbon and organically bound nitrogen in the sediment that is mineralised anaerobically.

SUMMARY OF RESULTS

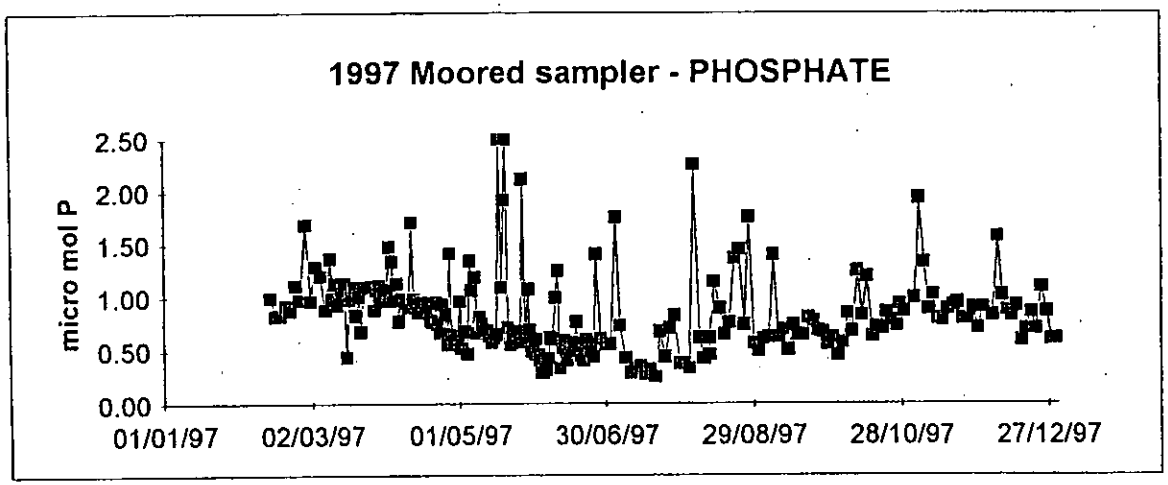
The CTD profile from station 38A showed temperature and salinity progressively increasing with depth. Surface temperature and salinity was 9.9 °C and 34.61 ppt while bottom was 10.2 °C and 34.76 ppt respectively. These temperatures are approximately 2 °C higher than previously recorded during February.
With the disappearance of the thermocline at 38A, surface inorganic nitrogen values had increased from 2-3 micromoles N l^{-1} recorded in August to 6-7 micromoles N l^{-1}. This increase in nutrient concentration is supported by nutrient data acquired from daily samples taken and preserved by the *in situ* moored sampler (*Fig. 1*).

ACKNOWLEDGEMENTS

I am indebted the deck crew of the MV Lough Foyle for their co-operation and assistance during the mooring recovery and deployment operation. The ship's master, officers, engineers and catering staff are also thanked for their co-operation during this cruise.

B M STEWART

11 March 1998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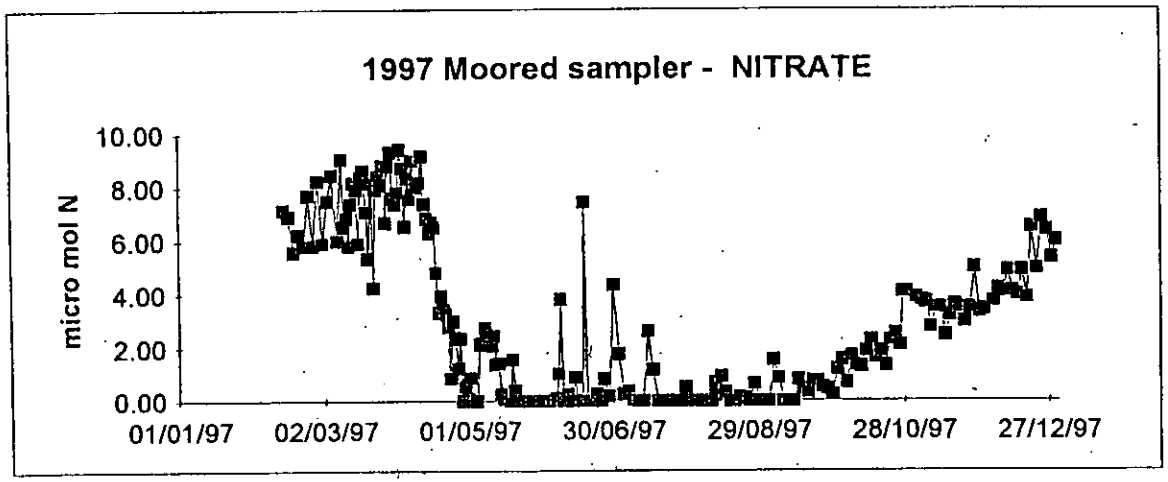
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01/01/97
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01/05/97
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29/08/97
28/10/97
27/12/97

Fig 1.