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BIOLOGICAL OCEANOGRAPHY CRUISE REPORT

LF 23/96

3 - 6 June 1996

PERSONNEL

B Stewart	(SIC), SSO, DANI.
P Elliott	SO, DANI.
S Bloomfield	ASO, DANI
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J Berges	QUB

OBJECTIVES

i. To assess temperature, salinity and nutrient distributions over a grid of stations in the north western Irish Sea.
ii. To recover MAFF instrumentation from mooring located at station 45 on the sampling grid.

CRUISE NARRATIVE

Monday 3 June 1996

In preparation for the cruise, all DANI scientific crew were onboard by 1930 hrs when monitoring equipment was tested and confirmed to be functioning properly. Following a talk on ship safety and a demonstration of life saving equipment, the RV Lough Foyle departed Belfast at 2200 hrs and sailed overnight in a strong southerly wind to station 38 (see attached sampling grid).

Tuesday 4 June 1996

The ship arrived on station 38 at 0645 hrs. The weather was dry and bright with a fresh breeze. Work commenced at 0700 hrs when the rosette water sampler was deployment. On completion of sampling, the vessel sailed to the mooring site at station 45. DANI mooring (buoy id. No 2) with MAFF instrumentation attached (2 current meters, a fluorometer and transmissometer) was recovered to the ship deck at 0845 hrs. The instrumentation was detached and data downloaded to a laptop p.c. The buoy and anchor only, were then redeployed at 1035 hrs on position $53^0\ 43^1.26N$ $05^0\ 32^1.01W$. The position of DANI mooring (buoy id. No 3) was confirmed as $53^0\ 43^1.07N$ $05^0\ 32^1.19W$. 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 the successful deployment of the rosette water sampler and sediment corer at station 45, the survey continued in a southerly direction to station 50, before sampling stations 45A, 45B, 45C and 45D, located at equidistant intervals between

station 45 and 47. The survey continued in a northerly direction from station 47 at 1730 hrs, to station 36 and thereafter to station 33 where work for the day was completed at 2030 hrs. Overnight the vessel sailed slowly towards station 24.

Wednesday 5 June 1996

Work commenced on station 24 at 0810 hrs and continued in an easterly direction to station 26. The weather was dry and bright with a strong force 6-7 southerly wind. The strong winds and rough sea presented an unacceptable risk in deploying the rosette water sampler and consequently samples were taken via the ship's clean seawater supply. The survey continued in a mainly northerly direction, along a grid of stations 21, 22, 15 and 14, when in all cases samples were taken via the clean seawater supply. The rosette water sampler was then succesfully deployed at stations 6 and 4 where survey work finished at 1700 hrs. The McLane water sampler was programmed to sample overnight and after the vessel anchored in Bangor Bay it was deployed over the stern of the ship to a depth of 10 metres. Work for the day was completed at 2000hrs.

Thursday 6 June 1996

Work commenced at 0750 hrs when the McLane sampler was recovered to shipdeck. The vessel sailed to dock in Belfast at 0930 hrs when scientific and mooring equipment was prepared for unloading. The scientific crew disembarked at 1000 hrs and returned with vehicles to unload the vessel. Unloading was completed at 1300hrs.

PARAMETERS MONITORED

The CTD/rosette water sampler was deployed, weather permitting, at most stations on the sampling grid to acquire nutrient, chlorophyll a, temperature and salinity data from the depth profile. Samples were taken every 10 metres over the depth profile at stations 38, 45 and 50. At stations 26, 21, 22, 15 and 14, samples were taken via the ship's clean seawater supply.
Daylight permitting, Secchi disc readings were also taken at each station. The Bowers & Connelly mini-corer was deployed at stations 45 and 47 where sediment samples were subsampled for C/N and chlorophyll *a* analysis.
At station 38, 45 and 50, samples were taken every 10 metres for the determination of oxygen by the Winkler method.
Additional stations located at four equidistant positions between stations 45 and 47 were sampled throughout the depth profile.

SUMMARY OF RESULTS

From the acquired nutrient and CTD profile data, weak saline stratification acccompanied by strong thermal stratification was observed at 40 metres at open sea stations 38, 45 and 50 with typical surface and bottom temperatures 10.0 and 8.0 °C respectively; and salinity 34.30 and 34.70 ppt respectively. Nutrients were depleted

though detectible with nitrate concentrations less than 1 micromole N l^{-1} in the upper layer, wheras below the thermocline concentrations were typically 8 - 10 micromoles N l^{-1}.

At the shallower coastal stations 47, 36 and 33, surface and mid depth temperatures were higher and typically 11.0 and 9.5 °C respectively. These stations exhibited total nitrate depletion in the surface layers with typical mid depth concentration 0.5 - 1.0 micromoles N l^{-1}. With the influence of freshwater, salinity values were generally lower than open sea stations but constant throughout the profile, typically, 34.2 ppt. High fluorescence values were observed throughout the depth profile in this area, particularly at station 36 where "back scatter" values were greater than 2.5 and chlorophyll *a* concentration ranged 12 - 16 micrograms l^{-1}. Microscopic examination of a water sample identified the algal growth as *phaeocystis*.

Coastal stations 14, 15 and northerly open sea stations 26, 21 and 22 were sampled at depth 4 metres via the ship's clean seawater. Again, reduced nitrate levels were recorded, typically 8 - 10 micromoles N l^{-1}.

Stations 4 and 6 in the North Channel were mixed throughout the profile, where temperature and salinity were typically 8.7 °C and 34.5 ppt respectively. Partial nutrient depletion was observed with typical nitrate concentration 3 - 4 micromoles N l^{-1}.

Samples taken from 45A, 45B, 45C and 45D, the four "inter" stations between open sea station 45 and coastal station 47, exhibited similar patterns with well defined thermoclines; typical temperatures above and below the thermocline were 10.6 and 8.2 °C respectively. Nutrients were almost depleted in the upper layer with nitrate concentration typically 0.2 micromoles N l^{-1}.

Moored McLane water sampler

The McLane water sampler is currently moored and operating *in situ* at station 45. The spare sampler was deployed overnight Wed' 5 June, in an experiment to investigate the suitability of membrane type for sample filtration.

ACKNOWLEGEMENTS

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

B M Stewart

B M STEWART

10 June 1996

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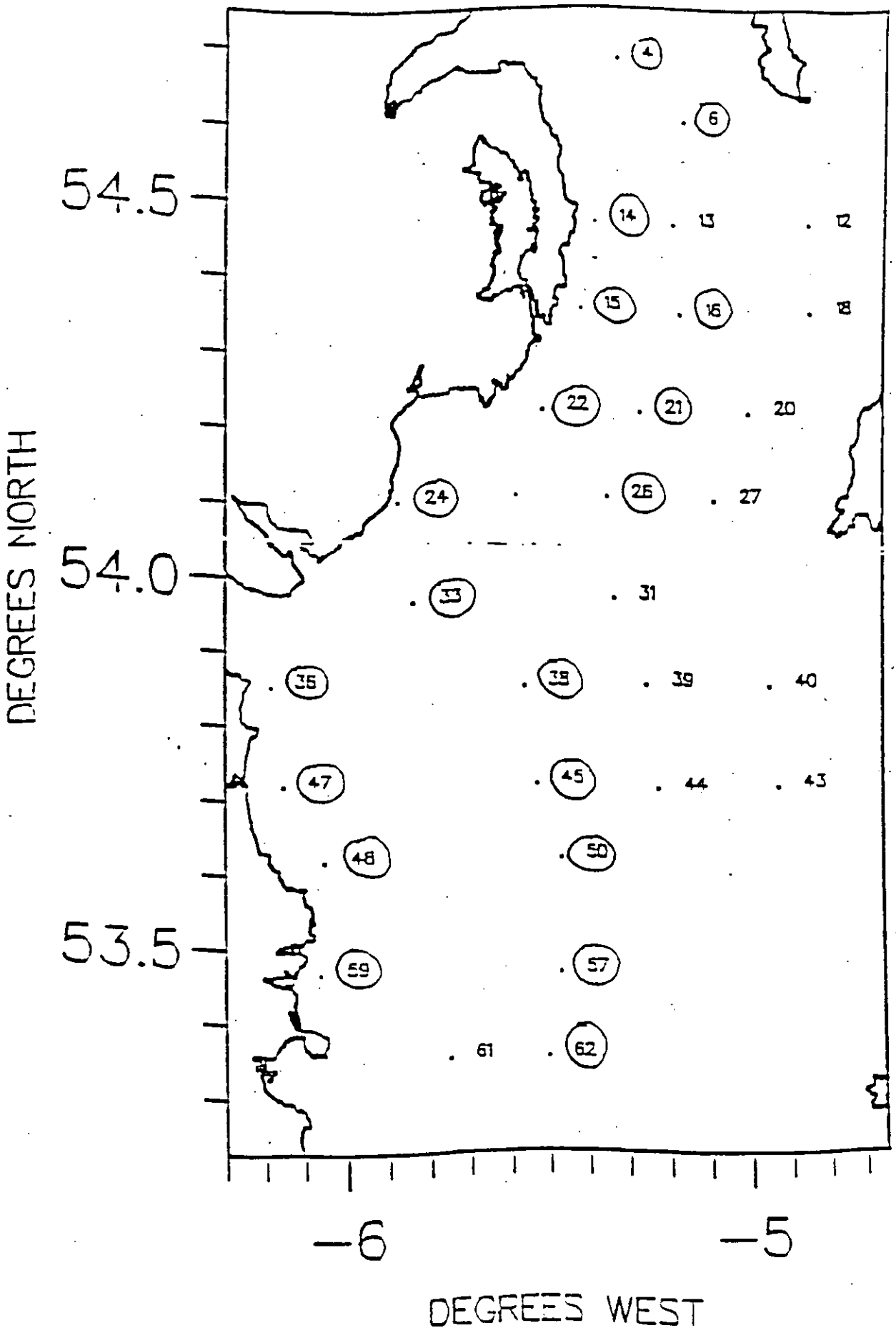
PROPOSED WORK SCHEDULE

STATION	Lat.	Long.	Activity
36	53 51	06 11	CTD, Secchi
47	53 43	06 09	CTD, Secchi, corer + sediment C/N & Chl a.
48	53 37	06 03	CTD, Secchi.
59	53 28	06 03	CTD, Secchi
62	53 21	05 30	CTD, Secchi
57	53 28	05 28	CTD, Secchi
45	53 43	05 32	CTD, Secchi, corer + sediment C/N & Chl a, & mooring service (C/N & Oxygen @ 10 m intervals) 24 hour duration process experiment
50	53 37	05 28	CTD, Secchi (C/N & Oxygen @ 10 m intervals)
38	53 51	05 34	CTD, Secchi (C/N & Oxygen @ 10 m intervals)
4	54 41	05 20	CTD, Secchi
6	54 36	05 10	CTD, Secchi
16	54 21	05 10	CTD, Secchi
21	54 13	05 16	CTD, Secchi.
26	54 06	05 21	CTD, Secchi
33	53 58	05 50	CTD, Secchi
24	54 06	05 52	CTD, Secchi
22	54 13	05 31	CTD, Secchi
15	54 21	05 25	CTD, Secchi
14	54 28	05 23	CTD, Secchi



SAMPLING SCHEDULE

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DATE 3-7 June 1996 291