

Cruise Report : August 1992

Biological oceanography of the
north western Irish Sea

Personnel

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Objectives

To investigate the distribution of dissolved inorganic nutrients and phytoplankton biomass in relation to the vertical structure of the water column. To estimate phytoplankton production at selected locations and carry out a comparison between *in situ* and ship-board, incubator estimates of primary production.

Narrative

Weather conditions gradually deteriorated throughout the 15th with a southerly force six, slowing progress and making working conditions on station difficult. As a result, the cruise programme was modified and following completion of stn 16 the ship steamed to Belfast lough. Station 14 was worked on route and surface mapping of selected variables was carried out in the lough. On completion of the surface mapping and with moderating weather conditions the ship proceeded to stn 15 which was worked thereby completing the first days work. Despite the delay the cruise programme was completed.

A complete list of station positions and work carried out at each station is given in Table I. The following is an outline of each days work:

August 15 : the Lough Foyle departed Belfast at 0700 on the 15th of August and proceeded to stn 4. The final station of the day (stn 15) was completed by 2200.

August 16 : work at stn 22 was started at 0800 and the final stn (44) was completed by 2015.

August 17 : work at stn 36 was started at 0800 and the final stn (46) was completed by 2240.

August 18 : work at stn 45 was started at 0910 and the final stn (12) was completed by 2330 and the ship returned to Belfast.

Sampling

At each station a vertical profile of temperature, conductivity and fluorescence was measured with the Hydrobios CTD and Chelsea Instruments fluorometer. Water samples were collected from depths selected on the basis of the vertical distribution of temperature and salinity for estimation of phytoplankton chlorophyll and dissolved inorganic nutrients (nitrate, nitrite, ammonia, phosphate, silicate and urea). Water samples (50 ml)

were preserved with acidic Lugol's iodine for microscopic analysis of phytoplankton species composition and abundance. The CTD was calibrated for salinity against precision salinometer measurements on discrete water samples and for temperature using reversing thermometers. At each station two vertical zooplankton hauls were made using one of the Bongo nets fitted with a 300 um mesh net. One sample was preserved with formalin for later analysis of species and the second sample was filtered using pre-weighed filters to obtain an estimate of zooplankton biomass. Secchi depth was recorded at each station.

The spatial distribution of physical (temperature and salinity) chemical (dissolved nutrients) and biological (phytoplankton chlorophyll) variables in near surface water were mapped continuously when the ship was steaming between stations.

At selected stations downwelling and upwelling irradiance was measured using Licor 2 Phi sensors. At these stations water samples were collected and used to estimate carbon fixation by phytoplankton using a standard ^{14}C incubation technique. *In situ* experiments were carried out at stations 45 and 62. For each experiment water samples were collected from selected depths in the upper region of the water column placed in tissue culture flasks and inoculated with a known amount of ^{14}C bicarbonate solution. The flasks were then fixed to racks tied to the productivity rig which was deployed in the sea such that the flasks were positioned at depths corresponding to the depth from which the original water samples were collected.

Samples of near bottom water were collected from selected stations for the estimation of dissolved oxygen.

Equipment

All stations were successfully worked and a total of 7 productivity experiments were carried out. No problems were encountered with the Hydrobios CTD (following its overhaul in Germany) although two water bottles failed to trigger.

The Traaks autoanalyser was successfully run throughout the cruise. Only minor faults were encountered and these did not affect the sampling programme.

Acknowledgements

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R.J. Gowen SIC
(1st September 1992)

TABLE 1

Station	Position	Activity
August 15		
4	5441 0510	CTD; Zooplankton; Secchi; Light; [P]
6	5436 0510	CTD; Zooplankton; Secchi
16	5421 0510	CTD; Zooplankton; Secchi; Light; [P]
14	5428 0523	CTD; Zooplankton; Secchi
15	5421 0525	CTD; Zooplankton; Secchi
August 16		
22	5413 0531	CTD; Zooplankton; Secchi
24	5406 0553	CTD; Zooplankton; Secchi; Light; [P]
33	5358 0550	CTD; Zooplankton; Secchi
38	5351 0534	CTD; Zooplankton; Secchi; Light; DO; [P]
31	5358 0520	CTD; Zooplankton; Secchi
40	5351 0457	CTD; Zooplankton; Secchi
43	5343 0456	CTD; Zooplankton; secchi
44	5343 0514	CTD; Zooplankton; Secchi
August 17		
36	5351 0611	CTD; Zooplankton; Secchi
47	5443 0609	CTD; Zooplankton; Secchi; Light; [P]
62	5321 0530	CTD; Zooplankton; Secchi; Light; DO; [P]
57	5328 0528	CTD; Zooplankton; Secchi; DO
50	5337 0528	CTD; Zooplankton; Secchi; DO
49	5337 0546	CTD; Zooplankton; secchi
46	5443 0550	CTD; Zooplankton; Secchi
August 18		
45	5343 0532	CTD; Zooplankton; Secchi; Light; DO; [P]
39	5351 0515	CTD; Zooplankton; secchi
30	5358 0505	CTD; Zooplankton; Secchi
26	5406 0522	CTD; Zooplankton; Secchi
21	5413 0516	CTD; Zooplankton; Secchi
20	5413 0500	CTD; Zooplankton; Secchi
18	5421 0451	CTD; Zooplankton; secchi
12	5428 0451	CTD; Zooplankton; secchi
Note : [P] refers to ship-board incubation experiment		