

CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE,
LOWESTOFT, SUFFOLK, ENGLAND

2001 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 6

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	Dr E Young	Mr K Medler
	Dr S Dye	Dr G Tattersall

DURATION: 26 June – 3 July

LOCALITY: North Sea

AIMS:

The work is directed toward:

- a) A better understanding of the dynamics of the circulation processes of the central North Sea in order to characterise the extent and nature of density driven and seasonal jet-like circulation which acts as a direct and rapid pathway for transport of material. Subsequently, the knowledge will be viewed with respect to concerns that elevated levels of contaminants on the Dogger Bank have originated in the near coastal regions.
- b) Improved knowledge of the processes that determine areas of strong phytoplankton production in the vicinity of the Dogger Bank.

The main sampling aims of the cruise were:

1. To deploy seven moorings in the vicinity of the Dogger Bank.
2. Deploy free-floating satellite tracked buoys in order to determine the Lagrangian circulation. Subsequently, a number may be retrieved.
3. To undertake Scanfish and CTD surveys to collect information on the water column structure in relation to nutrient and plankton dynamics.
4. Conduct experiments to examine the near-bed cross frontal circulation.

NARRATIVE (all times GMT):

RV CORYSTES sailed at 1300, approximately twelve hours late owing to operational difficulties. Work began with a Scanfish line (1; Fig. 1) on the northern flank of the Dogger Bank in order to characterise the water column structure. On the basis of this section, started at 0330 27 June, the deployment positions of seven ADCP (acoustic Doppler current profiler) moorings were determined (Fig. 2). Deployments started mid-afternoon and continued to dusk. Overnight six Argos buoys were laid (Fig. 2) before returning to deploy the remaining moorings (28 June). Following this, a further 13 ARGOS buoys were laid. Subsequently, two Scanfish lines (42 & 43; Fig. 1) were undertaken before a line of CTD's stations was occupied along the mooring line (Fig. 1) (30 June). The remainder of the cruise was occupied

with a series of Scanfish sections (58 – 64), before CORYSTES returned to Lowestoft (2000 3 July).

RESULTS (Preliminary):

- 1) The seven ADCP moorings were successfully deployed and will be recovered during CORYSTES 08/01.
- 2) Nineteen satellite tracked drifters were deployed on the northern flank and to the east of the Dogger Bank (Fig. 2) in order to monitor the Lagrangian circulation during the period until CORYSTES 08/01.
- 3) The Scanfish surveys revealed that large regions of the Dogger Bank and surrounding waters were thermally stratified, although at this stage of the season the bottom fronts that drive the residual circulation were comparatively weak. To the north of the eastern most section bottom water temperatures were approximately 5.6 °C, the coldest summertime values in the region since 1996. Toward the west there was an increase in bottom temperature to 7.6 °C at the western end of section 60. Broadly, the distribution of bottom temperatures reflects the degree of winter cooling of the water column. As a result of the comparatively cold easterly and northerly winds during January to March, the eastern central North Sea and Dogger Bank was cooled more than the average for the 1990's (excepting 1996). The differential cooling in the east as compared to the west resulted in the disparity in bottom temperatures. Similarly, bottom waters to the south of the Bank were comparatively cold (7.2 °C).

At this stage of the year the gradient of bottom temperature from deep to shallow water on the flanks of the Bank was comparatively weak, as was the associated eastward residual flow. However, there was strong phytoplankton production associated with the intense thermocline (~5 °C over 6 m) and in the zone of bottom fronts.

Interestingly, preliminary results from the nutrient analysis indicate comparatively high levels of ammonia in the deeper waters under the thermocline, indicative of the decay of phytoplankton, but also providing an easily utilised food source for new phytoplankton growth at the base of thermocline.

Further analysis awaits the return to the laboratory.

- 4) As the frontal zones were still evolving, this objective was deferred to CORYSTES 8/01.

Overall, the cruise aims were met through the hard work, enthusiasm and good humour of the ships crew and scientific staff. However, the late departure and subsequent problems with the port engine meant some reduction in the possible sampling programme. Nevertheless, aided by excellent weather conditions the principal sampling aims of the cruise were achieved.

Juan Brown
(Scientist-in-Charge)
3 July 2001

SEEN IN DRAFT:

R McCurry (Master)

A Simpson (Senior Fishing Skipper)

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Dr J Brown x 10

Ms A Reeve

Dr E Young

Dr S Dye

Dr L Fernand

Mr P Hudson

Mr K Medler

Dr G Tattersall

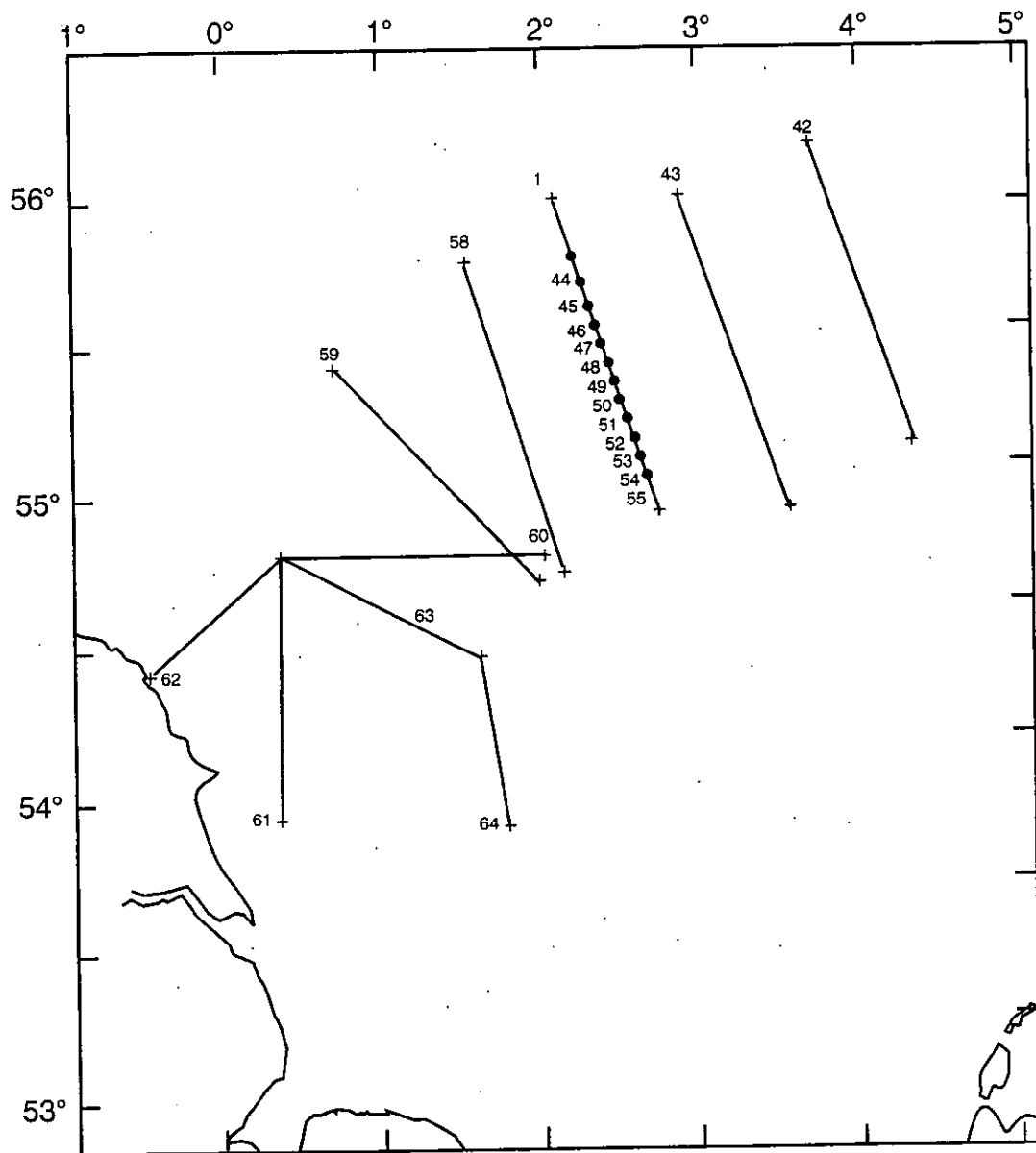


Figure 1. Location of CTD stations (●) and Scanfish transects (lines)

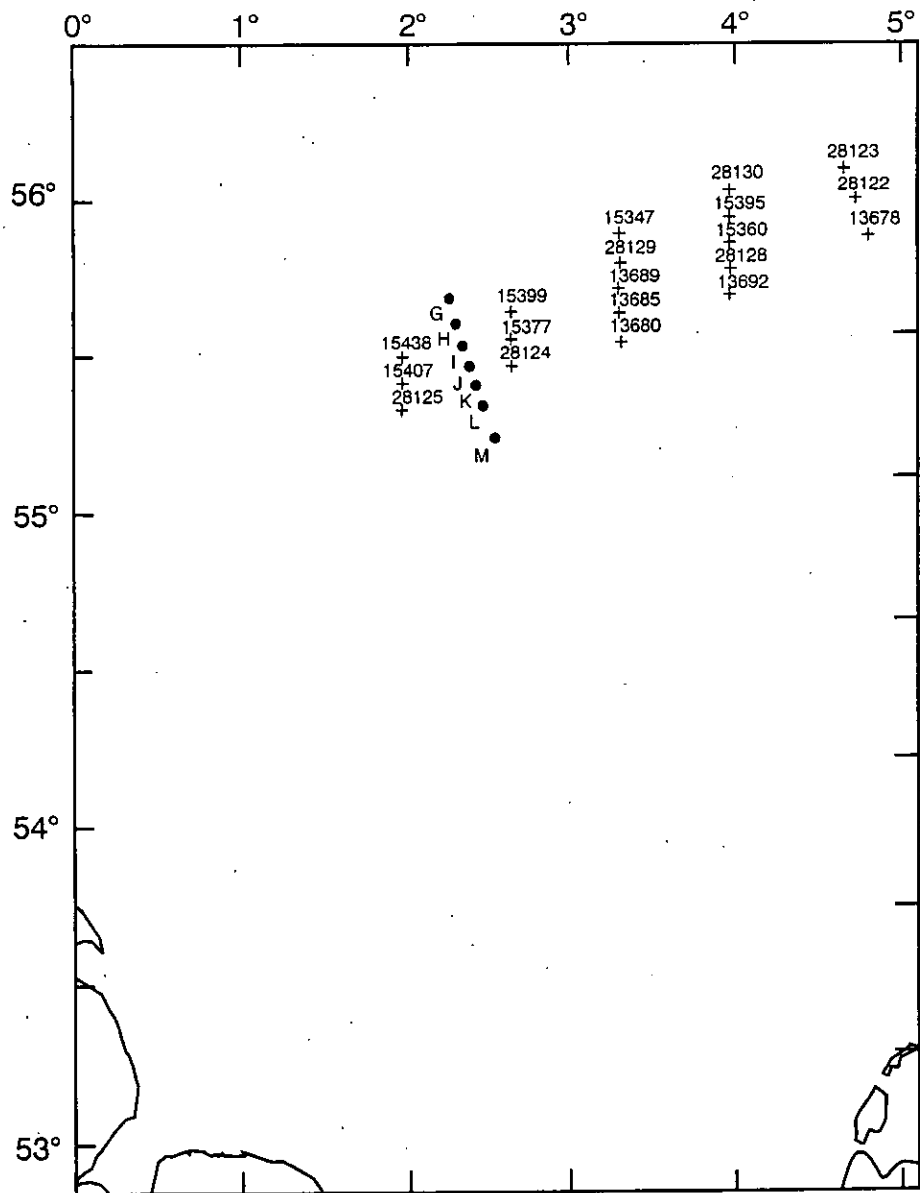


Figure 2. Location of Argos buoy releases (numbers) and moorings (G-M)