

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

1999 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 11

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UWB - University of Wales, Bangor  
POL - Proudman Oceanographic Laboratory

DURATION: 21 - 28 October

LOCALITY: North Sea

#### AIMS:

The work is directed at a better understanding of the dynamics of the circulation processes fringing the north east coast of England, between the Firth of Forth and Flamborough Head, and in vicinity of the Dogger Bank. It is intended to characterise the extent and nature of the density driven and seasonal jet like circulation which acts as a direct and rapid pathway for transport of material from the coastal region to the central North Sea. 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 region. Additionally, work includes an examination of whether nutrients derived from the UK coast region are being advected rapidly into the central North Sea via secondary circulations at the margins between mixed and stratified waters. The main sampling aims of the cruise were:

1. Conduct Scanfish and CTD surveys of the north-east coast and Dogger Bank to collect information on nutrients and the circulation and structure of the water column during the autumn breakdown of stratification.
2. To undertake water column and grab surveys of the north-east coast and Dogger Bank to collect information on metal concentrations.

#### NARRATIVE (all times GMT):

RV CORYSTES sailed at 1900 for the region of Flamborough Head and the first Scanfish line, which commenced at 0930 22 October. Soon after deployment the signal from the controlling CTD on the Scanfish failed. Upon recovery, the unit was found to be flooded. The manufacturers had recently overhauled the instrument, but had failed to 'mate' the protective 'o'-ring seal. An attempt at salvage proved futile and as there was no spare unit available a CTD grid was begun (Fig. 1). The latter was interrupted by a comparatively short period of

poor weather (2000 24 October – 0800 25 October) and later when the CTD cable 'jumped' from the drum during deployment (1800 25 October). The latter was caused by the swell 'lifting' the CTD rosette as it entered the water column and a slackening of the cable. The CTD was eventually recovered by attaching a 'Chinese stocking' to the wire and lifting the CTD sufficiently so that the wire could be unravelled at the winch. Following this, the instrument was recovered safely and the survey continued. The following day (26 October), in improving weather, sampling was undertaken for metals in the water column. The grid finished at 2000 27 October and was followed by one high-resolution section across the bottom frontal region at latitude 55°N. Corystes docked at 1130 on the River Tyne.

#### RESULTS (Preliminary):

1. Despite the reduced quality of data coverage caused by the damage to the Scanfish, the CTD survey revealed that a pool of cool ( $< 8.0\text{ }^{\circ}\text{C}$ ) comparatively nutrient rich water was isolated beneath the remains of the summer thermocline ( $\delta T \approx 3.4\text{ }^{\circ}\text{C}$ ). This bottom water was approximately  $1.5\text{ }^{\circ}\text{C}$  warmer than that observed during Corystes 5/99 in June. However, the surface water had cooled by approximately  $5.5\text{ }^{\circ}\text{C}$  since August (Corystes 7/99). Bounding the cold pool were pronounced bottom fronts, indicative of a cyclonic (anti-clockwise) circulation pattern. Full analysis of data awaits return to the laboratory.
2. The relatively poor weather limited sampling for metals and prevented coring work on the Dogger Bank. Results from the water column await analysis in the laboratory.

Unfortunately, time lost to poor weather resulted in the loss of approximately 15% of the scheduled cruise time, with a consequential impact on the cruise aims. However, the hard work, enthusiasm and good humour of the ships officers and crew was a significant factor in the success of the remainder of the programme.

Juan Brown  
(Scientist-in-Charge)  
28 October 1999

#### SEEN IN DRAFT:

R Williams (Master)  
R Graham (Senior Fishing Skipper)

#### DISTRIBUTION:

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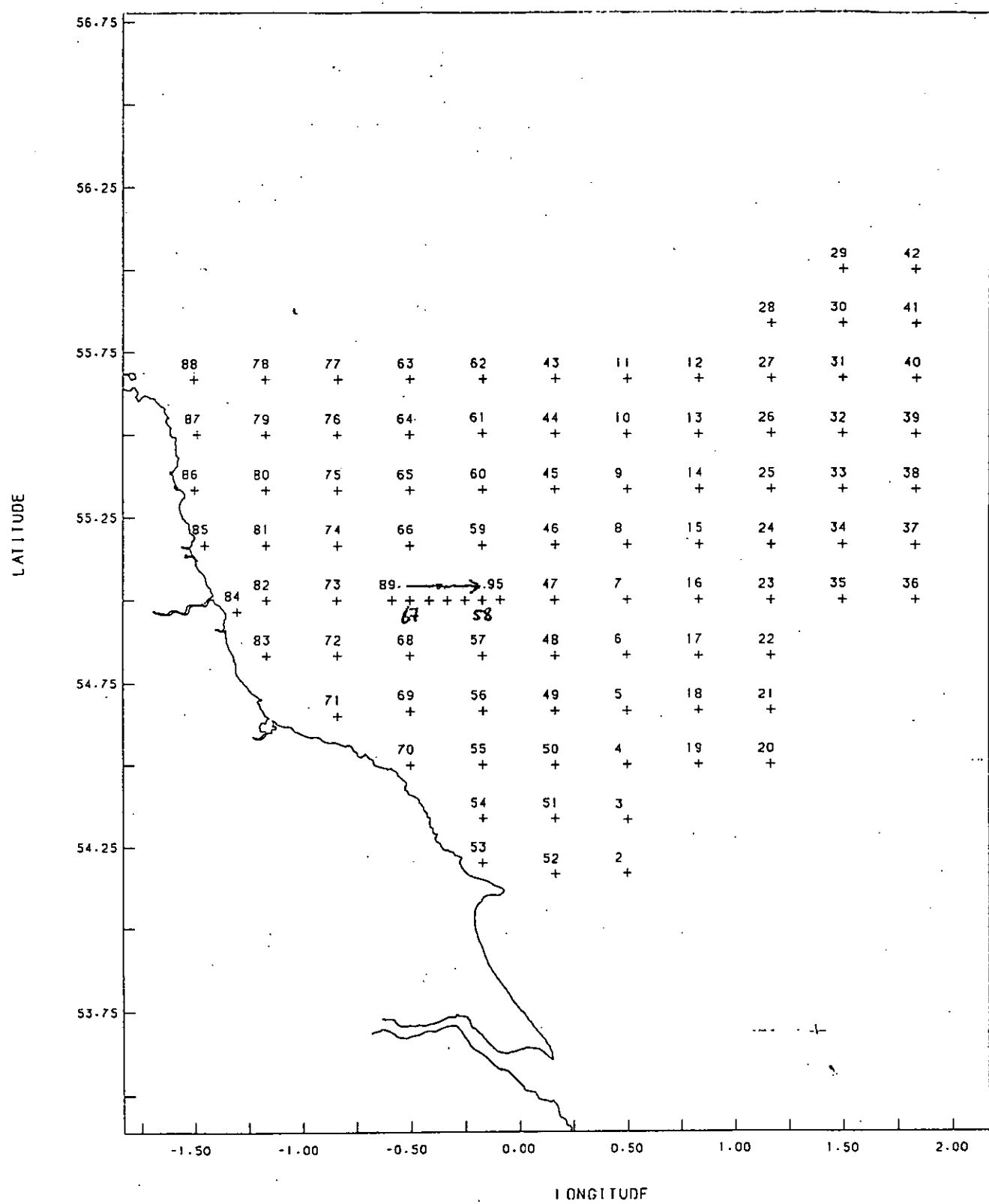


Figure 1. Locations of CTD stations.