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

2000 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 9a

STAFF:

Dr J Brown	Dr L Fernand
Ms J Taylor	Mr J Read
Dr E Young	Mr K Medler
Mr E Tinton	Dr K Horsburgh (UWB) (26 June – 2 July)
Ms A Reeve (26 – 29 June)	Ms H Cannaby (UWB)
Mr R Delahuntey (UWB)	

UWB – University of Wales, Bangor

DURATION: 26 June – 12 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.
c) A resolution of the processes that influence primary productivity and the distribution and behaviour of particulate matter and nutrients in the southern North Sea. In particular, the interaction between UK and Dutch waters.
d) Additionally, work includes the servicing of a mooring in the vicinity of the Outer Gabbard as part of the National Marine Monitoring Programme.

The main sampling aims of the cruise were:

1. To service moorings deployed during Corystes 7/00 at the Outer Gabbard and Sean Gas field.
2. To undertake Scanfish and CTD surveys between the East Anglian and Dutch coast to collect information on nutrients, suspended sediment and primary production.
3. To deploy four moorings in the vicinity of the Dogger Bank.
4. Deploy free-floating satellite tracked buoys in order to determine the Lagrangian circulation.
5. To undertake Scanfish, CTD and grab surveys of the north-east coast and Dogger Bank to collect information on nutrients, suspended sediment and metals.
6. Conduct experiments to examine the near-bed cross frontal circulation.

NARRATIVE (all times GMT):

RV CORYSTES was scheduled to sail at 1400, however, efforts to repair the hydraulic system associated with the scientific winches, which had failed during the previous cruise, delayed departure. Unfortunately, repairs were not immediately possible and rather than wait for replacement parts and also to make best advantage of favourable weather conditions, CORYSTES sailed at 1630 to service the AE1221 mooring array (Fig. 2). En route, an ARGOS buoy (4384; Fig. 1) equipped with an optical backscatter probe was deployed and, in the absence of CTD capability, a surface water sample was undertaken at dawn (0230 27 June) at the centre of the mooring array (Fig. 2; C) to assess primary production. Unfortunately, the 'Smart' mooring (site C), which we had intended to service was missing. However, the minipod at the site was recovered intact. The remainder of the day was spent servicing moorings F, G, B and A, before proceeding to a further productivity site at 53° 37.17′N 4° 06.46′E for dawn the following day (28 June). Following this, moorings D and E were serviced and the 'Smart' mooring at the Gabbard (H) recovered. An Argos buoy was deployed to the east of this (Fig. 1; 4394) and one at the mouth of the Wash (Fig. 1; 4385) before CORYSTES docked in Lowestoft (0730 29 June) for temporary repairs to the hydraulic system of the scientific winches. By mid-afternoon it was evident that these were insufficient to enable operation of the Scanfish winch.

As new hydraulic pumps were unlikely to arrive before 4 July it was decided to transfer a cable winch from Cirolana when she docked on Saturday. In the interim, CORYSTES sailed at 0530 30 June to relay the Smart buoy at the centre of the AE1221 array and test the CTD gantry and winch. The mooring was successfully deployed at 1145, but unfortunately the side gantry failed. CORYSTES returned to Lowestoft, docking at 1930.

Saturday (1 July) was spent installing an independently powered winch to enable Scanfish and CTD operations. Largely due to the efforts of MSU, CORYSTES was able to sail at 1930, successfully undertaking a trial CTD en route to the start of a Scanfish line in the vicinity of the AE1221 moorings. Scanfish was deployed at approximately 0230 (2 July), whereupon the signal failed almost immediately. On recovery the CTD Sonde was found to have leaked. CORYSTES again sailed for Lowestoft, where Dr Fernand went ashore by sea-rider to arrange shipment of the unit back to the Danish manufacturers, who hoped to be able to effect a repair within 5 days. As there was no immediate prospect of a dye release, Dr Horsburgh was also put ashore. On Dr Fernands return we sailed for the Dogger Bank and the beginning of CTD, coring, Argos buoy and mooring work.

Work re-commenced at 0215 (3 July) at the southern end of a CTD section (Fig. 4) breaking off to deploy four ADCP moorings (Fig. 3; J- M), the latter completed by mid-afternoon. The CTD work was resumed and the stations re-occupied the following morning with NIOZ cores (Fig. 3; 60 – 70). First news from the manufacturers of the Scanfish CTD Sonde suggested that it might be possible to effect a repair by Friday. Meanwhile, 16 Argos buoys were deployed (Fig. 1), whilst preliminary analysis of the NIOZ cores was carried out to assess sediment chlorophyll concentrations and guide subsequent sampling. Deployments finished at 1850 (5 July) and a grid of 20 NIOZ stations (Fig. 3; 87 – 106) was occupied, followed by a further five (Fig. 3; 107 – 111) to the southeast. Having received the news that the CTD Sonde was repaired, COYSTES sailed (1630 6 July) for Esbjerg for collection. The repaired part was collected by searider from the Harbour Master at 1000. En route to the Dogger Bank,

the CTD was tested and found to be faulty despite the repairs. However, some diligent diagnostic work by Dr Fernand and Mr Read eventually traced the problems (missing components/connections) and the instrument was deployed at 0430 8 July (Fig. 4). The line passed without mishap and was followed by a grid of five NIOZ cores (Fig. 3; 114 – 118) and a CTD (Fig. 4; 112).

Overnight, a second Scanfish line was occupied, before performing a trial deployment of the dye release frame (0930 9 July). Whilst largely successful, the possibility of impending bad weather meant that a full dye release was not feasible. Instead, a number of further Scanfish sections were performed, curtailed by bad weather (1530 10 July), whereupon Corystes returned to Lowestoft (11 July).

RESULTS (Preliminary):

1. All moorings at the Sean Gas field (AE1221 array) were successfully serviced, with the exception of the Minipod and Smart mooring. Subsequently, the latter was reported ashore on the Dutch coast. However, the mooring was replaced with that from the Gabbard. It intended that the Gabbard mooring and the Minipod be replaced on CORYSTES 9b. Whilst servicing of the current meter moorings (A, B, D, E, F & G; Fig. 2) was successful, a number of meters did not have complete records. The ADCP at B recorded no data, possibly because of a faulty power cable. A Valeport instrument at A recorded no data as it damaged during deployment and Aanderaas rotors at E and F were fouled by twine part way through the deployments. Full analysis awaits return to the laboratory.
2. This objective was not met through a combination of the failure of the Scientific winches and the flooding of the Scanfish CTD Sonde.
3. The four moorings were successfully deployed and will be recovered during CORYSTES 11/00.
4. Sixteen satellite tracked drifters were deployed on the northern flank of the Dogger Bank (Fig. 1) in order to monitor the Lagrangian circulation between this cruise and Corystes 11/00.
5. This objective met with limited success. All the planned NIOZ samples were taken. However, the CTD and Scanfish work was severely curtailed owing to the lost time. The mooring section was occupied with CTD's and Scanfish which showed the presence of a strong thermocline and bottom fronts. There was strong near bed phytoplankton production in the vicinity of the bottom fronts, whilst in deeper water there was a 'thin' layer of intense production associated with the thermocline. The limited series of Scanfish sections provided strong evidence for the movement of fresher water of coastal origin along the northern flank of the Dogger Bank. The flow is consistent with transport in the jet-like circulation associated with the bottom fronts extending offshore from Flamborough Head.
6. This objective was missed. A trial deployment of the dye release frame was successfull, with the exception that the float intended to indicate when the dye was released failed to operate. On recovery, the mechanism had been bent. However, it was the time lost at the beginning of the cruise, combined with Scanfish problems and poor weather that prevented the experiment.

Unfortunately, time lost to poor weather and operational difficulties resulted in the loss of approximately 35% of the scheduled cruise time. There was a consequential impact on the

cruise aims, which combined with instrument problems, prevented the delivery of aims 2 and 6 and a significant proportion of 5. However, the hard work, enthusiasm and good humour of the ships crew and scientific staff made possible the limited success of the remainder of the programme. Also, the efforts of the SIGS staff over a Saturday (at short notice) to fit the temporary cable winch made much of the work of the second part of the cruise possible.

Juan Brown
(Scientist-in-Charge)
11 July 2000

SEEN IN DRAFT:

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

DISTRIBUTION:
BASIC LIST+

Dr J Brown x 10
Ms J Taylor
Dr E Young
Mr K Medler
Ms A Reeve
Dr S Malcolm
Dr L Fernand
Mr J Read
Mr E Tinton
Dr C Whalley
Dr D Mills

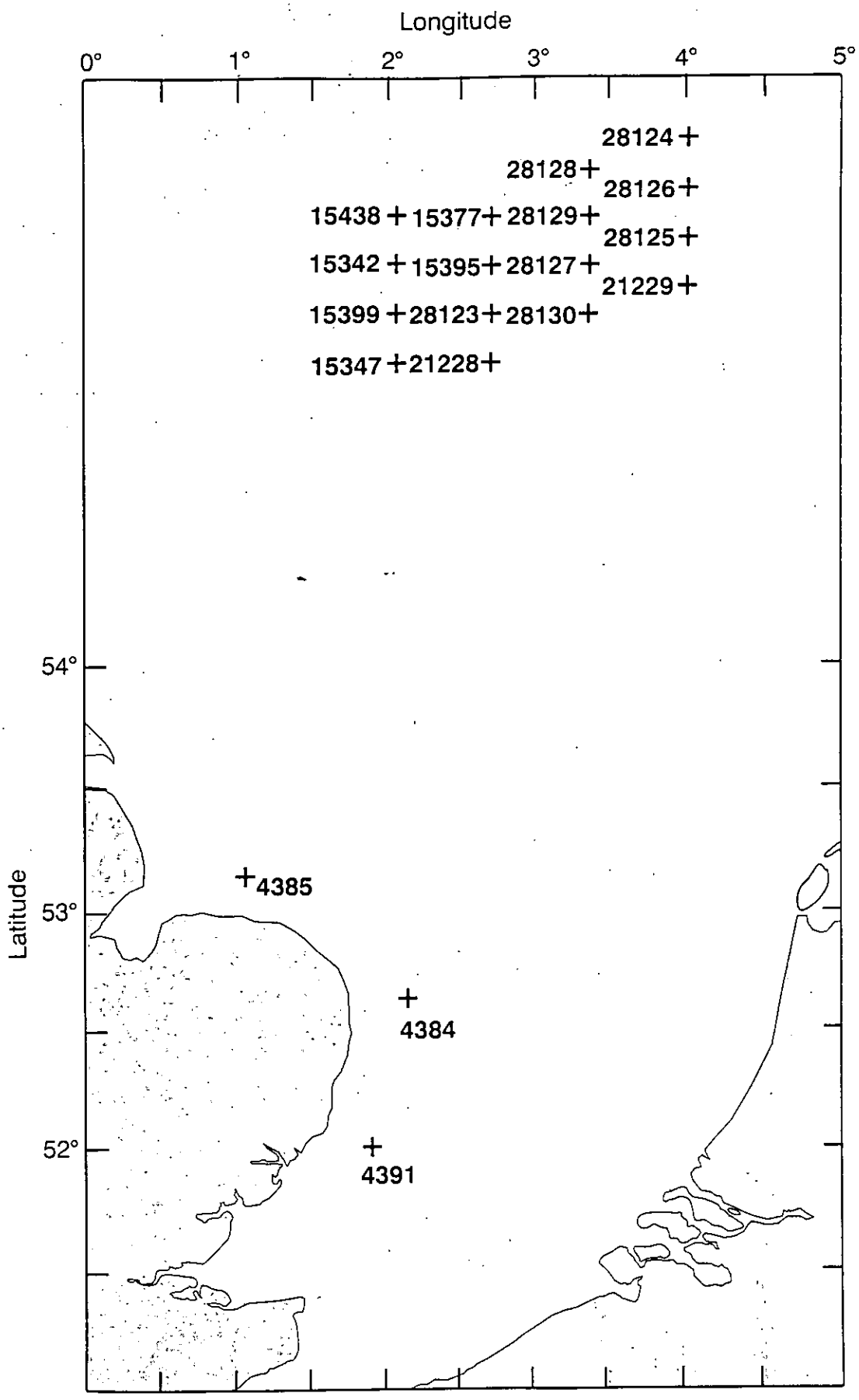

Figure 1. Locations of Argos buoy releases

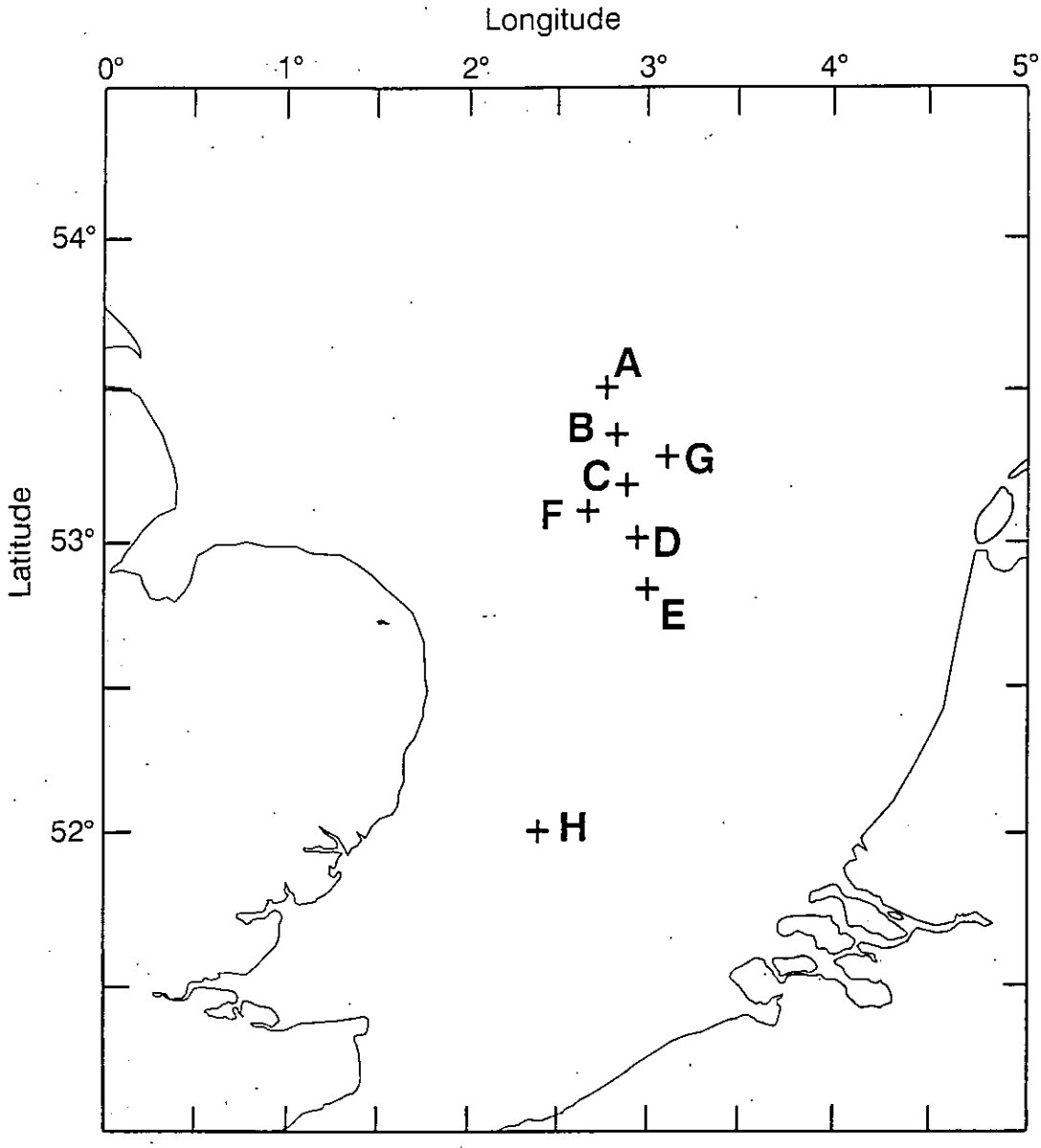

Figure 2. Locations of AE1221 mooring array plus outer gabbard (H)

Mooring positions: A - current meter
B - ADCP
C - SmartBuoy and mini-pod
D - ADCP
E - current meter
F - current meter
G - current meter
H - SmartBuoy

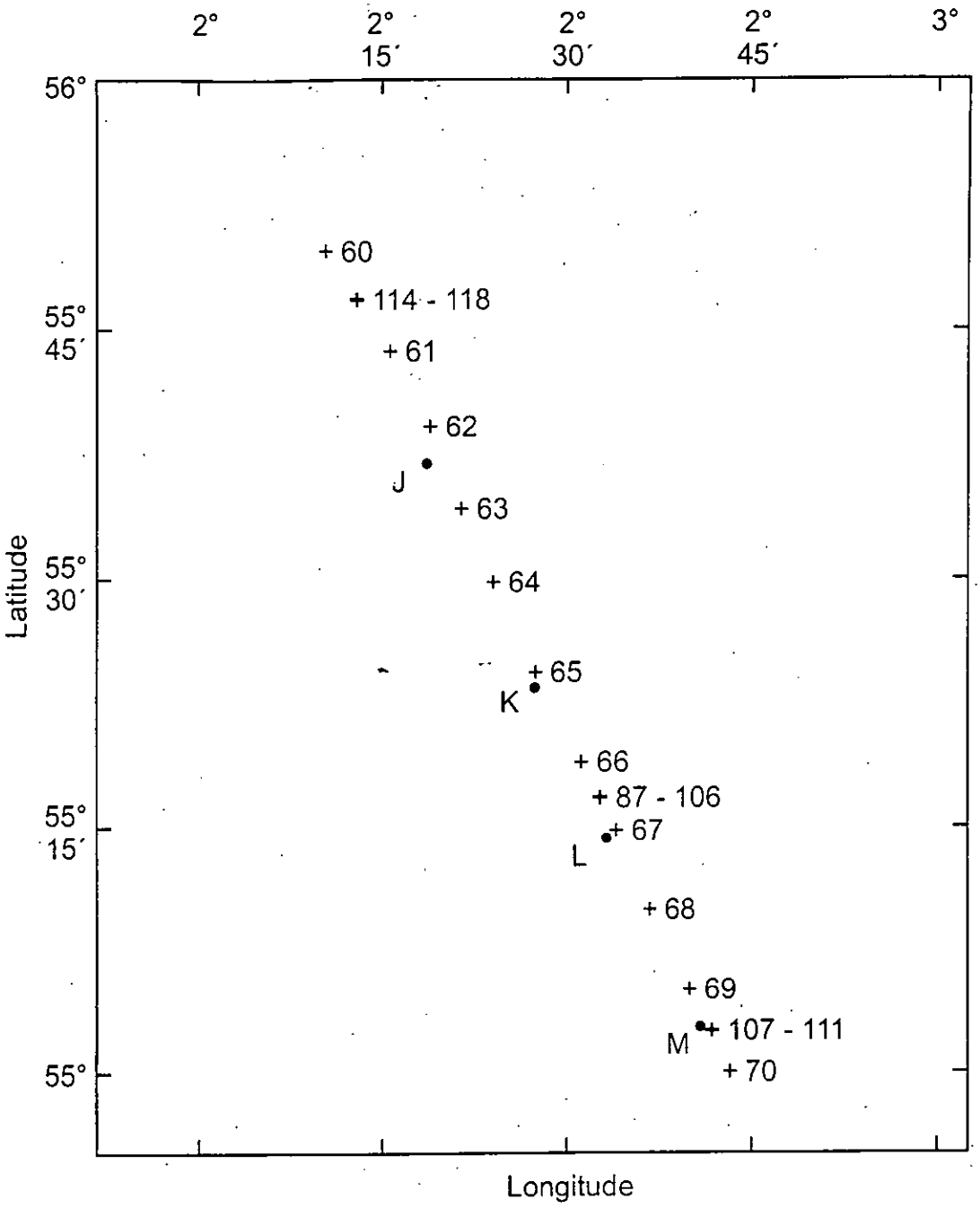

Fig. 3a Locations of Nioz Cores (+) and ADCP moorings (•)

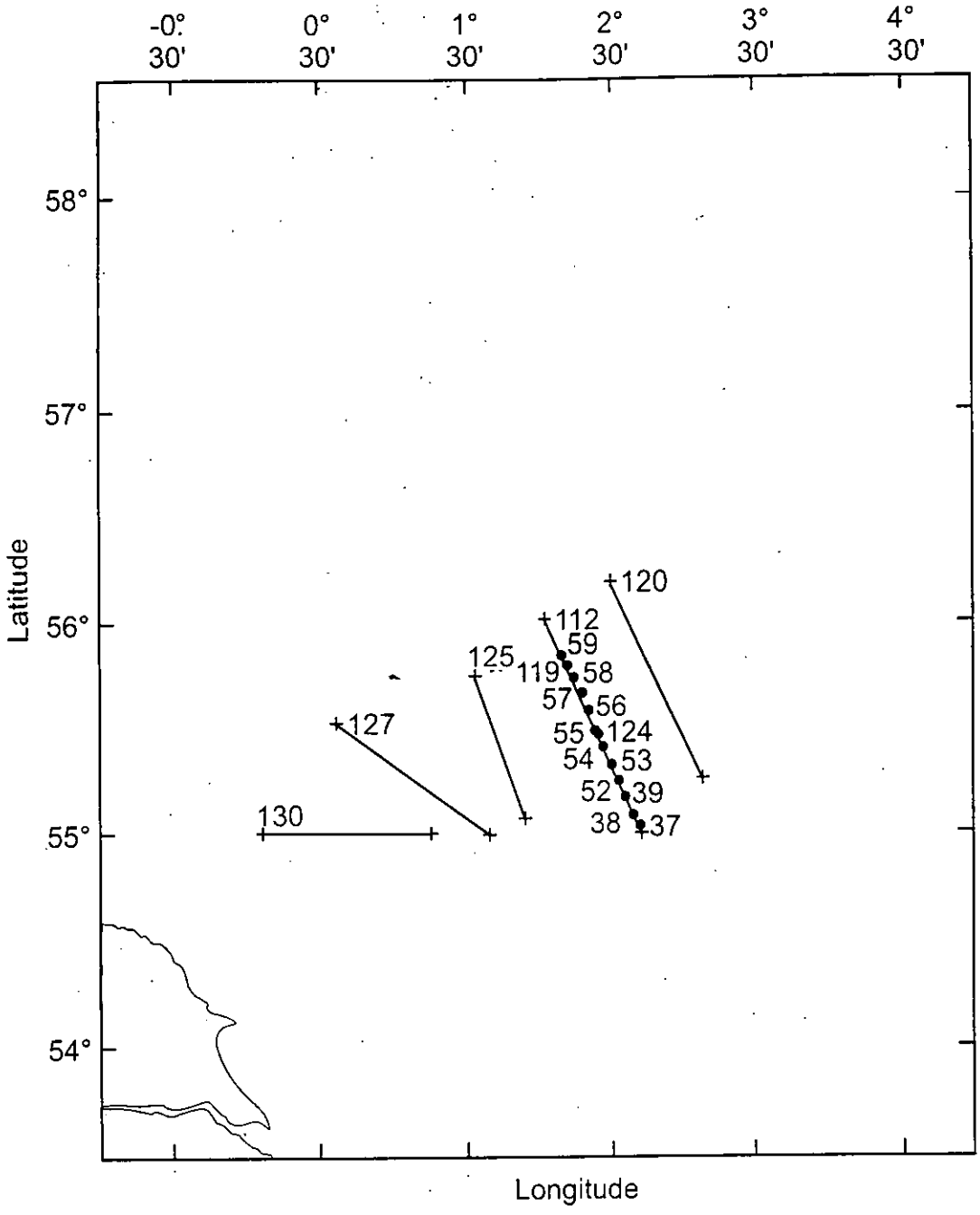

Fig. 4 Locations of CTD Stations (•) and Scanfish transections