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

DRAFT 2004 RESEARCH VESSEL PROGRAMME

Draft Cruise Report : RV CEFAS ENDEAVOUR CRUISE 12 2004

STAFF:

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DURATION: Thursday 30st September – Saturday 9th Oct
Joined ship 09:00 BST (HW 09:49 GMT)
Docked Time Morning tide 9th[h] (HW 0600 GMT)
LOCALITY: Central North Sea, Dogger Bank region

Cruise Aims

The project is generally aimed at achieving a better understanding of the dynamics of the circulation processes of the seas around the UK. 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.
This cruise and the previous Corystes cruise 13/04 and following Endeavour cruise14/04 are targeted to describe the gradual (September – December) alteration of pathways as frontal regions move and revert to the fully mixed and largely wind driven winter regime. The chosen area of interest is the Northern flank of the Dogger Bank along a line that was previously visited in June and August 1999,2000 and in 2001.

Main Sampling aims :

1. To characterise the hydrographic structure associated with the frontal regions and investigate the transport pathways. By use of towed undulating CTDs
2. Recover and redeploy Mooring (ADCP and thermistor chain) to study the mixing processes in the transitional region.
3. Conduct experiments for phyto plankton production both by Nitrogen uptake method and by Carbon14 labelling.
4. Take samples for Isotope analysis

Cruise Narrative:
Endeavour departed the Lowestoft region at 18:00 after conducting engine trials and headed to the Oyster grounds region to perform a CTD at the site of OG1 as taken at the same time last year. This year it was well mixed. A scanfish line was then conducted from the TSS in

the Friesian front region to the Southern side of the Dogger Bank a further scanfish line then conducted eastwards to the limit of Dutch waters.

Two CTDs were performed, at the second station a weak thermocline was observed but there was no difference in oxygen levels in marked contrast to last year. Further scanfish lines were conducted overnight across the Dogger tail end to a line north of the Bank. Once north of the bank at around the 50m contour stratification became pronounced, with a well mixed layer down to 43m.
On Sunday recovery of the moorings was undertaken the thermistor chain at the Southern most mooring was recovered and the ADCP frame contacted. Mooring B (the northern one) was then recovered the mooring was intact except for the weight that held the thermistor chain down. The ADCP mooring was successfully recovered data down loaded and redeployed. Two CTDs were performed at the sites.
Due to bad weather it was necessary to head for the shelter of the North East Coast. The time spent sheltering was used to effect repairs to the scanfish and cable. Worked commenced on Sunday evening with a CTD line from Alnmouth with a further line south of the Farne Islands. On Tuesday 5th the Scanfish was deployed in 35knot winds off the coast and a leg commenced for 7 hours. Further legs were then completed in towards Newcastle and along North East Coast . A long line North completed and CTD undertaken for Carbon 14 and production experiments. Further CTDs and Scanfish sections were undertaken until 13:00 on Friday 8th.

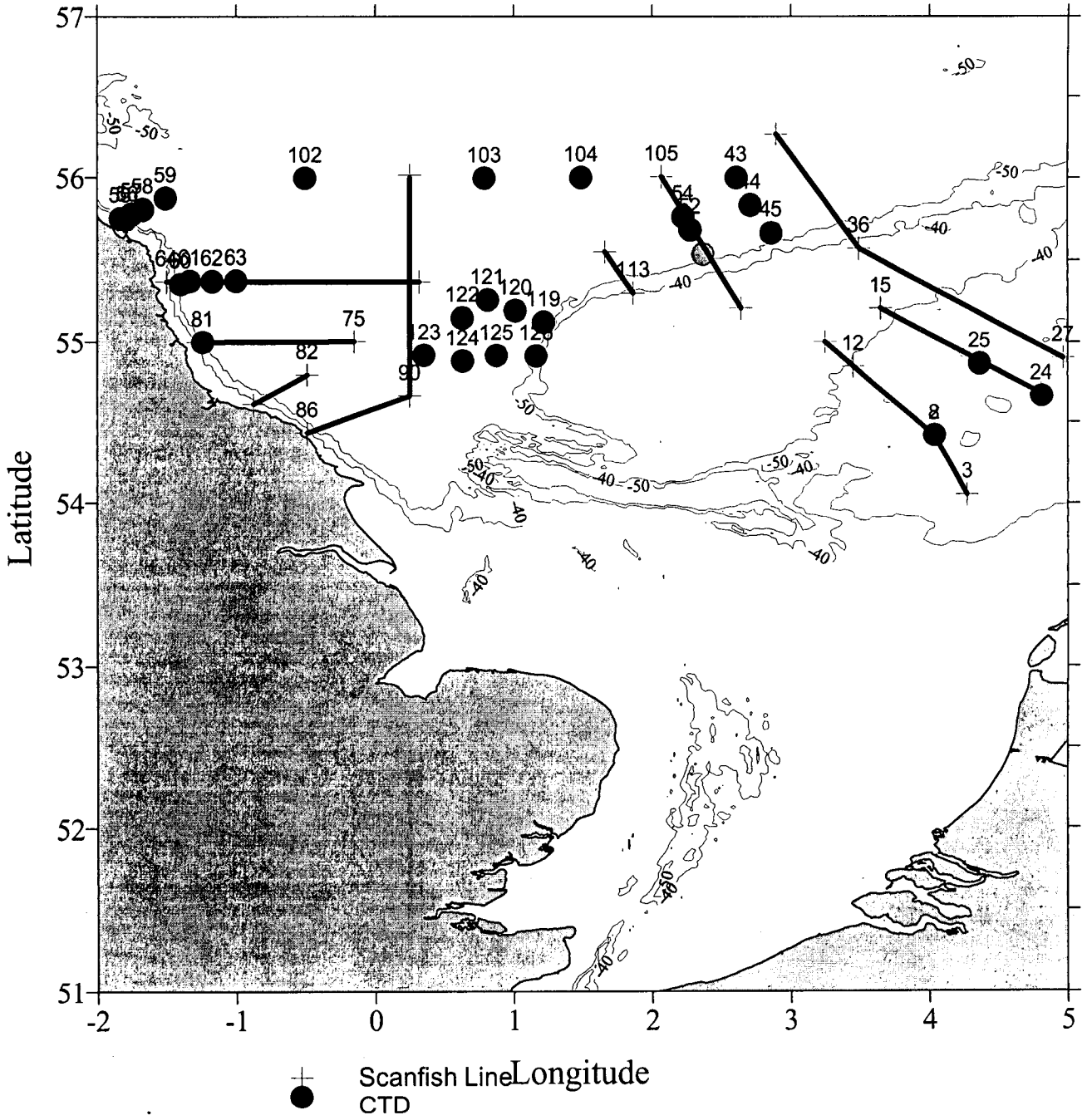
Results
All primary cruise aims of the cruise were achieved despite the bad weather. Wind speeds were not below 30 knots from Sunday evening until Thursday morning. Data from the ADCP shows a very strong two layer structure with strong tidal decoupling between the upper and lower layers.
The scanfish and CTD data shows that the position of the bottom fronts is markedly different from the summer position. The maximum bottom front gradient was further north than on previous cruises and strongly governed by the bathymetry.
Initially the water column was well mixed from the surface down to 40m but after a week on Force 7 – 8 winds the water column was well mixed down to 50m and fully mixed in bathymetry beneath 60m meters in the shallower regions. The vertical gradient at the resulting thermocline was very strong at > 1°C per meter.
There was very little biological activity in the whole of the region with low levels of Chl-a. Despite this incubation experiments appear to have been successful.
Figure 1 shows the cruise track and Figure 2 shows the scanfish derived temperature section along the mooring line.

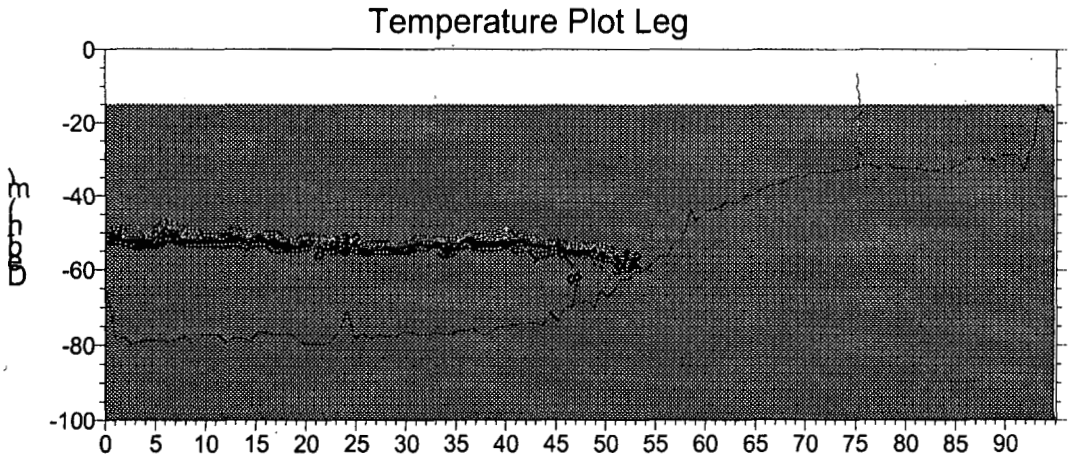
The success of the cruise was in great part due to the experience and good humour of the officers and crew despite the bad weather for much of the period.

Liam Fernand
(Scientist-in-Charge)
9 October 2004

Distribution List
Basic + those on cruise.
Dr Keith Weston UEA
DRP Leonard (DEFRA, London)

Figure 1 Work Area for Cend 12/04




Temperature Plot Leg
0
-20
-40
-60
-80
-100
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90