MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1992 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 5

STAFF:

K Brander	
D Mills	joined on 28 April
D Kirkwood	
S Milligan	
B Riches	
R Harrop	
A Sutcliffe	
C Fox	2-14 May
L Woolner	24-28 April
J Read	24-28 April
D Robbins (PML)	-2 May
M Prestidge (PML)	
J Stephens (PML)	
L Woods (UCNW)	28 April-2 May
A Geffen (Port Erin)	30 April-2 May
I Gordon (JNCC)	10-14 May

DURATION: 24 April-14 May

LOCATION: Irish Sea

AIMS:

1. Test UCES phytoplankton model, by monitoring evolution of physical structure and phytoplankton dynamics.

2. Estimate zooplankton production (and, if possible, zooplankton grazing) in relation to primary production.

3. Estimate fish larval feeding growth rates.

4. Obtain material for cod larval otolith studies.

NARRATIVE:

The ship sailed at 1200 h GMT on Friday 24 April after a 48 h delay due to a strike. Trial deployments of the LHPR and rosette systems were carried out on passage, to test and become familiar with the new EG+G logging routines and post-processing software. The continuous logging system was run in order to intercalibrate the Aquatraka fluorometers with the Turner fluorometer.

The first mooring was laid at position 1 (see Figure 1) 27 April and the second at position 5 at 0620 h on 28 April, after which J Read and L Woolner left the ship at Holyhead and D Mills and L Woods joined. The five positions along the transect were then sampled daily with the rosette, to give vertical profiles of T, S, fluorescence, transmissometry, light, chlorophyll and nutrients. Samples were also taken for CHN analysis and for particulates (near surface only) at alternate stations along with double Bongo net and single vertical net hauls for copepod size fractionation and live production (egg laying) experiments. The UOR (Undulating Oceanographic Recorder) was deployed along the full length of the transect five times at night and once during the day.

A Geffen joined the ship from Douglas on 30 April and a series of HSTN and 1½ m ring net hauls was carried out at the western end of the transect to try to locate useful quantities of cod and other larvae. She disembarked with D Robbins and L Woods at Holyhead on 2 May and C Fox joined.

Persistent strong winds and tides had moved the mooring and guard buoy apart at site 5 and the guard buoy was recovered on 5 May, by which time it was over 3 n miles away from the current meter rig. On 7 May B Chapman was put ashore at Holyhead and one scientists and one crew member received dental and medical treatment. A rendezvous was made with RV Lough Beltra on 10 May, in order to exchange water samples for nutrient intercalibration. That evening B Chapman and Ian Gordon rejoined the ship at Holyhead and the following day the two moorings were successfully recovered and the ship steamed for Plymouth in deteriorating weather conditions.

The ship was unable to dock at Plymouth because the harbourmaster would not allow her in until after noon on 13 May.

RESULTS:

1. Two instrumented moorings were deployed and recovered. Only the position 1 Aquatraka could be analysed on board. It gave a complete 14 day record, showing increased chlorophyll fluorescence after 4 May (Figure 2). One thermistor chain was damaged on recovery.

2. Rosette sampling of all five positions was carried out on 10 days, with samples for chlorophyll, salinity and nutrients being taken at 80, 60, 40, 30, 20, 10 and 2 m. Temperature, salinity, chlorophyll fluorescence and attenuation (transmissometer) were logged using the new EG+G software and were pressure averaged (1 m bins) and plotted on board (Figure 3).

3. At least four series of Copepod (Acartia and Calanus) incubation experiments were carried out at each position, with individual females incubated in water from 10 m for 24 hours. A total of 770 Acartia and 400 Calanus were incubated. Samples for size fractionated biomass and gut fluorescence were taken using Bongo nets. Chlorophyll and C:N samples were filtered from Niskin water taken at 2, 20 and 40 m and particle size analysis was carried out on the 2 m water.

4. Twenty-four hour sampling was carried out at position 1 and position 5, with rosette sampling every hour and net hauls for copepods every four hours.

5. The six UOR deployments showed the fine structure of temperature and chlorophyll between 7 and 37 m along the transect in much greater detail than the rosette sampling and showed consistent high chlorophyll levels between positions 2 and 3 (Figure 4). Unfortunately the calibration supplied for the conductivity sensor was incorrect and it is not yet clear whether any salinity data can be derived from it.

6. Eight measurements of photosynthesis and respiration were made using the O_2 light and dark bottle technique at several sites. Water samples were collected from 10 m depth and incubated for 12 h in the dark or in a deckboard light gradient incubator. Rates of respiration varied between about 1.5 and 12 μ M 0_2 l^{-1} 12 h^{-1} while Pmax (light saturated rate of photosynthesis) varied between 3 and 25 μ M 0_2 l^{-1} 12 h^{-1}.

7. A limited amount of zooplankton and fish larvae sampling was carried out along the transect using the HSTN and LHPR systems. The aim had been to carry out this work as time permitted, using the double LHPR to obtain simultaneous coarse and fine mesh samples. With the loss of two days sea time and the malfunctioning of the LHPR system due to a leaking cable, it was only possible to sample once at each position using the coarse mesh system and once using the HSTN.

8. A small number of cod larvae were obtained for Dr Geffen for otolith growth studies, but shortage of time preclude a more extensive search for concentrations of larvae.

9. Meteorological data supplied by the ship and hydrographic observations on 29 April were used to initiate the UCES primary production model. Meteorological inputs were updated during the cruise and forecasts and hindcasts were produced for comparison with observed water column structure, primary production and nitrate levels. The results produced on board highlighted an error in the input data, which was corrected, and a problem over the effect of haline stratification, which accounted for much of the observed density structure at positions 1 and 2. Special thanks are due to the captain for supplying meteorological information and detailed forecasts.

10. A considerable effort went into becoming familiar with the new logging software for Rosette CTD sampling, LHPR, HSTN and continuous logging systems. Some software development was carried out during the cruise to facilitate post processing, interface with existing processing software and prepare data for analysis and plotting. Separate reports on the various systems have been prepared, with guidance notes for other users.

Keith Brander
21 May 1992

SEEN IN DRAFT: BC, JH

INITIALLED: JGS

DISTRIBUTION:

Basic list+
K Brander
D Mills
D Kirkwood
S Milligan
B Riches
R Harrop
A Sutcliffe
C Fox
L Woolner
J Read
D Robbins (PML)
M Prestidge (PML)
J Stephens (PML)
L Woods (UCNW)
A Geffen (Port Erin)
I Gordon (JNCC)

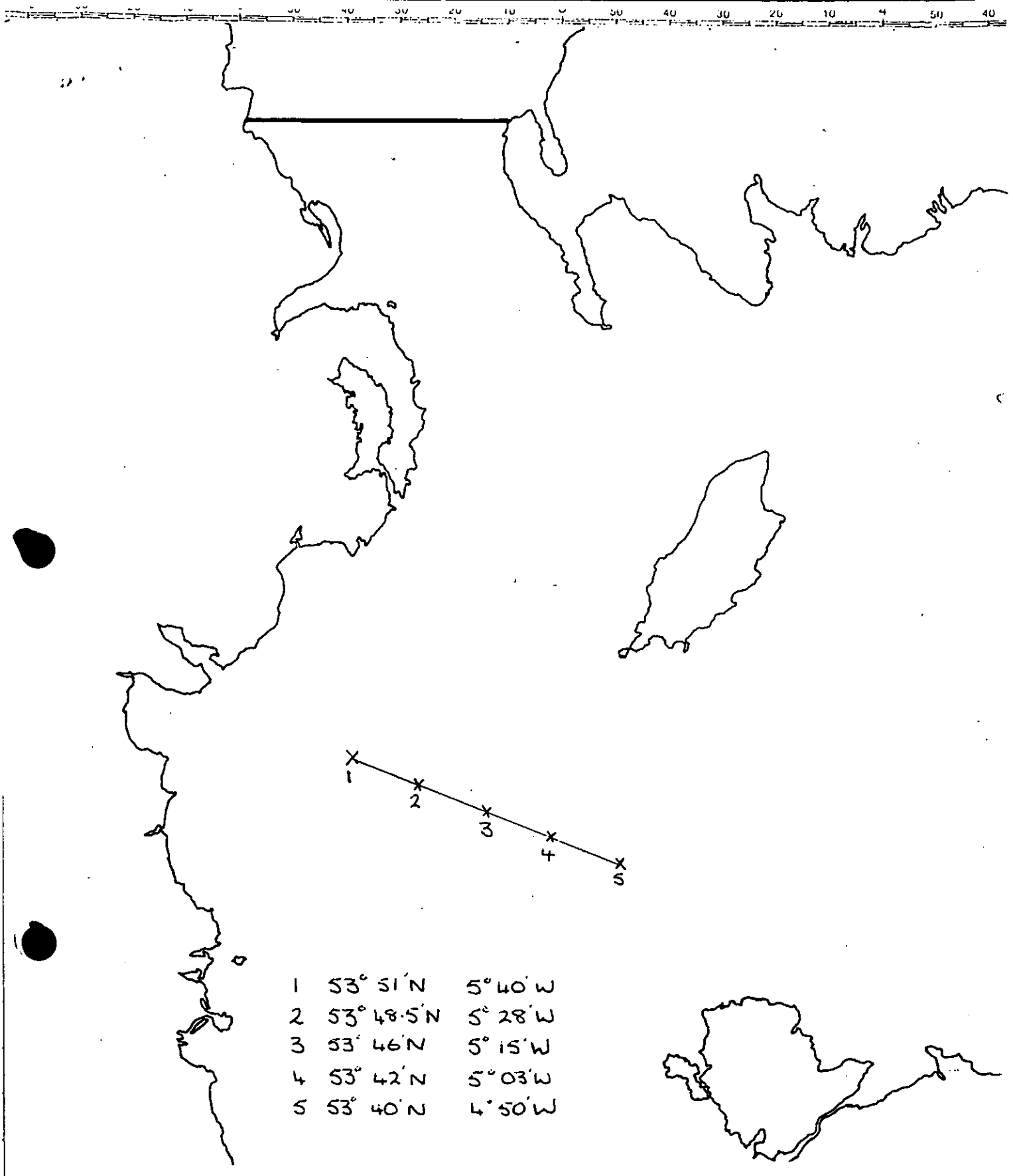

Fig 1 Cirolana 5/92
Track chart showing the five positions sampled routinely throughout the cruise.
Moorings were located at positions 1 and 5.

Fig 2 **Record for Aquatracka fluorometer at position 1**

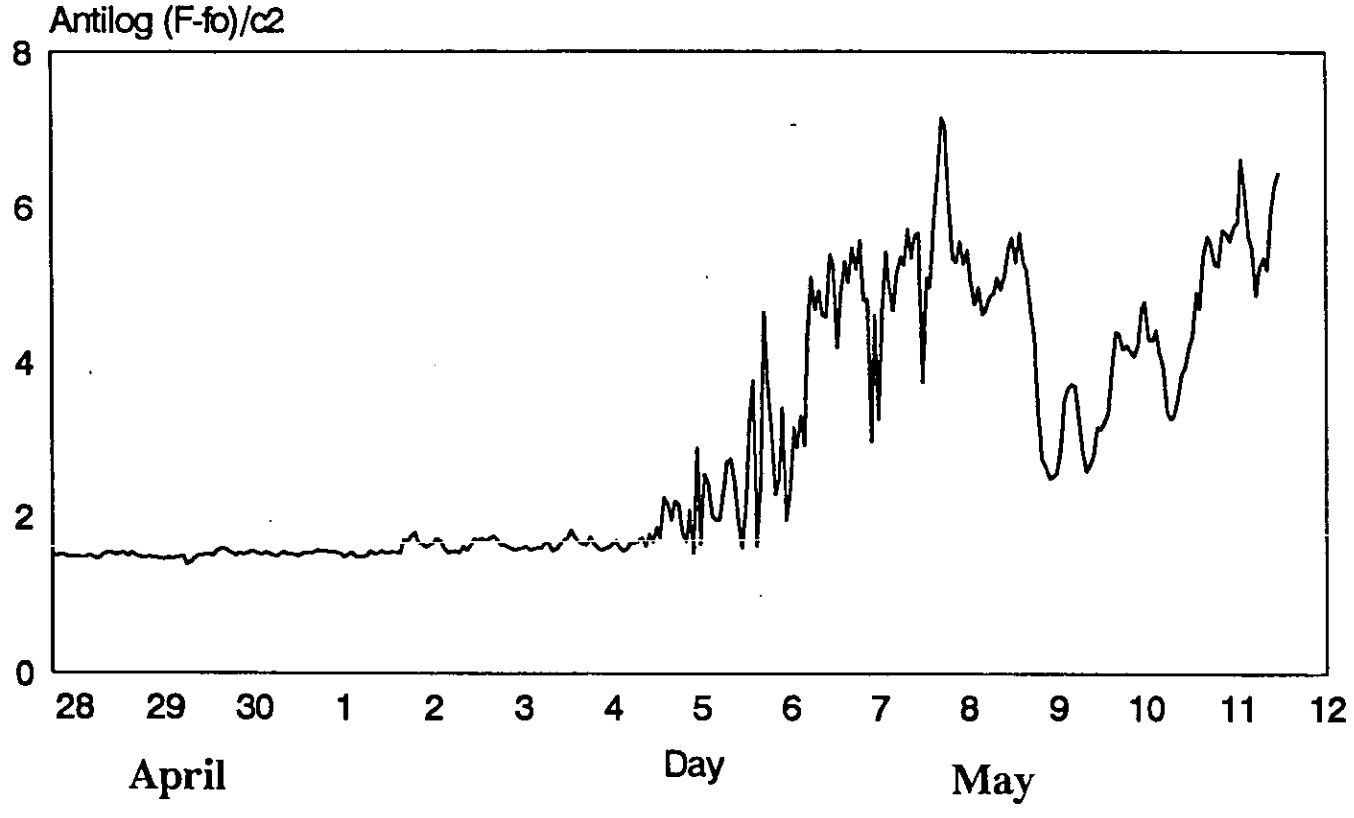

Fig 3a Distance is along the transect from west to east. Rosette sampling was carried out at the five positions marked on Fig 1. Temperature, salinity and transmissometer data are averaged in 1m bins. Nitrate samples were taken with Niskin bottles at 2, 10, 20, 30, 40, 60 and 80m

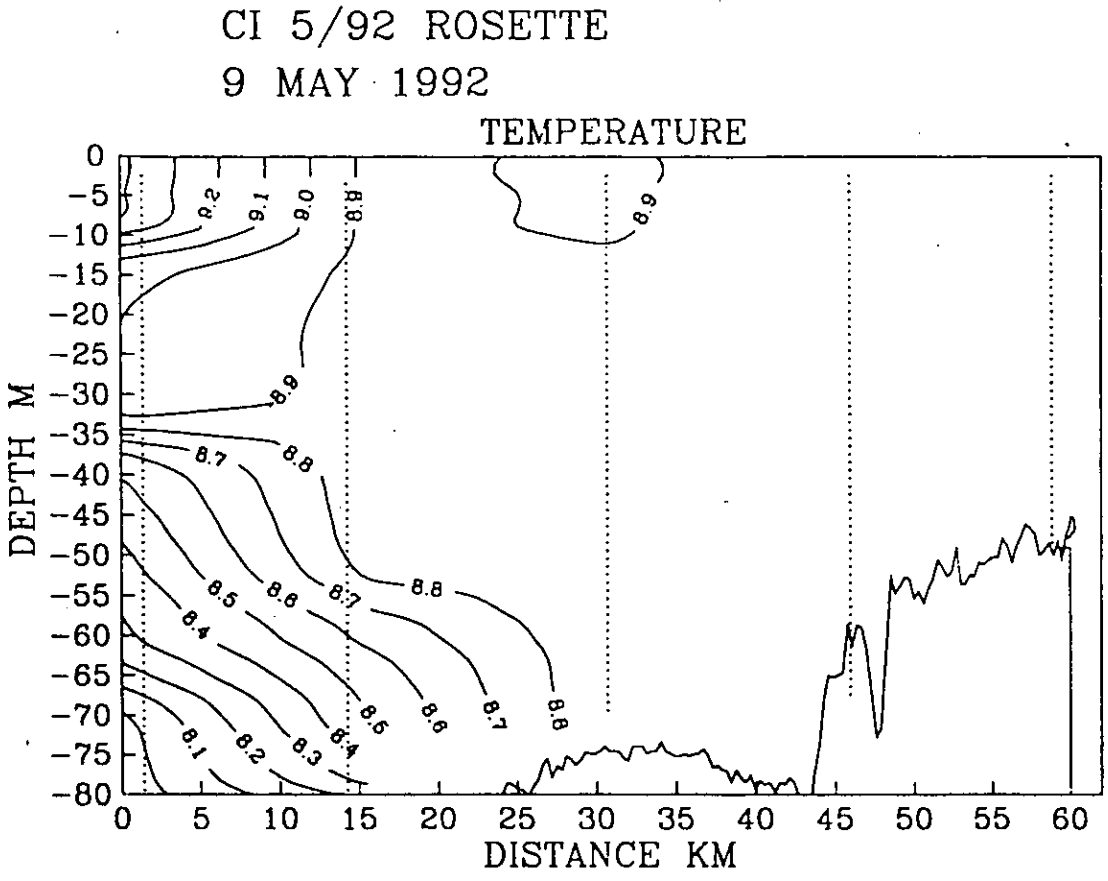

Fig 3b

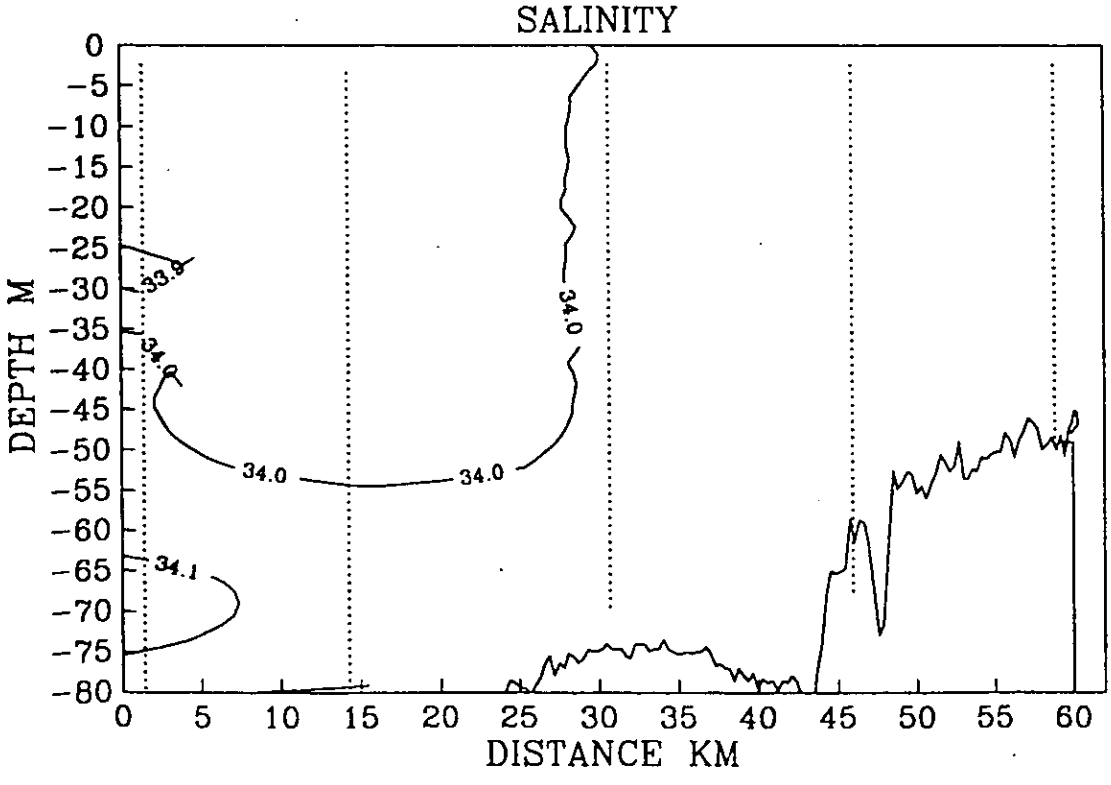

Fig 3c

CI 5/92 ROSETTE
9 MAY 1992

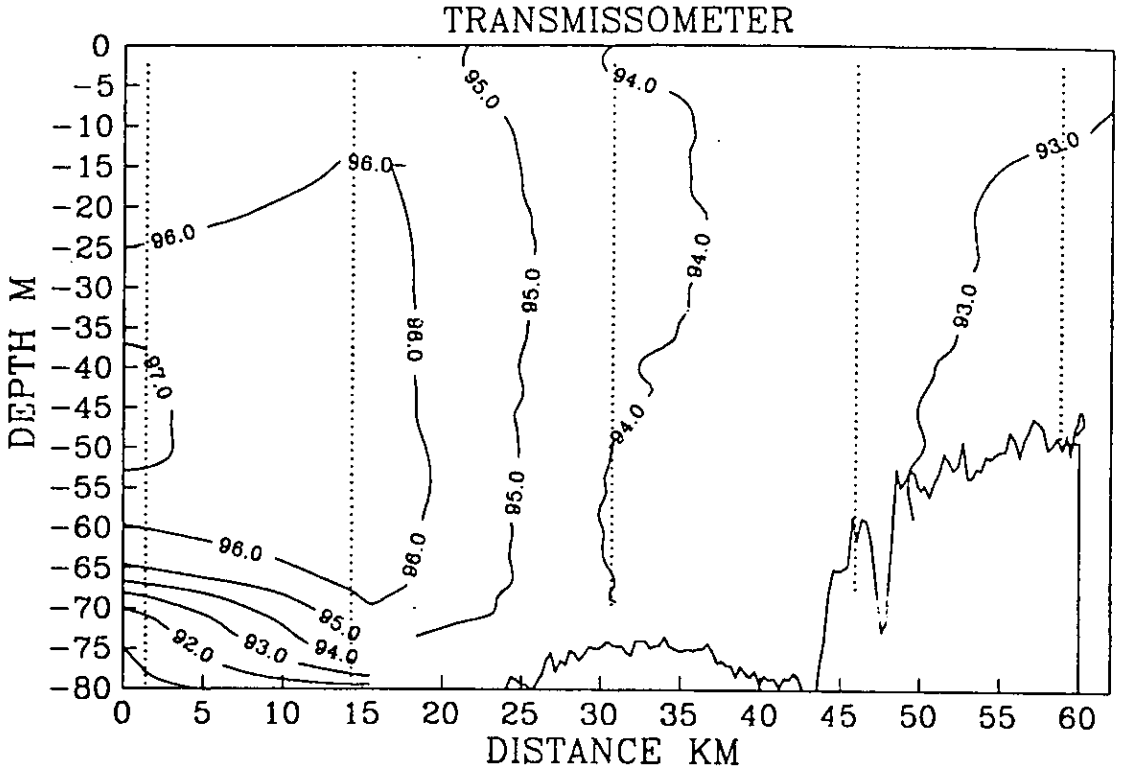

Fig 3d

CI 5/92 ROSETTE
9 MAY 1992

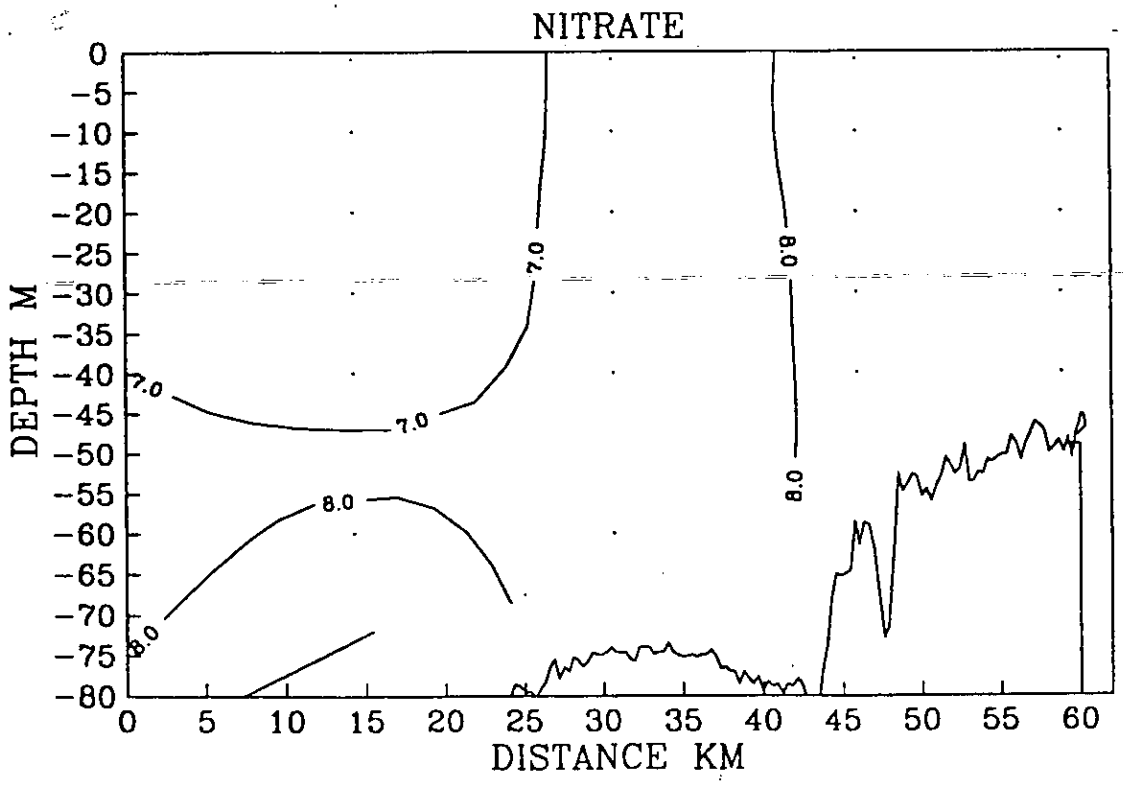

Fig 4

CI 5/92 UOR

9 MAY 1992