Agri-Food and Biosciences Institute
Agriculture, Food and Environmental Science Division
Fisheries and Aquatic Ecosystems Branch

Cruise Report: CO 3309
Vessel: RV *Corystes*
Date: 16th – 21st August 2009
Area: Irish Sea (north); ICES div. VIIa & VIIg
Survey Type: Biological Oceanography & Mooring Service

Personnel:

B Stewart	SSO	AFBI	15 – 21 August
R Gilmore	SO	AFBI	15 – 21 August
G Brady	TSO	AFBI	15 – 21 August
G Hamilton	ASO	AFBI	15 – 21 August
C Scherer	Student	Napier	15 – 21 August
AM Crooks	ASO	AFBI	15 – 21 August
C Murray		AWDWG	15 – 21 August

Objectives:

i. To maintain an insitu monitoring programme in the Irish Sea and Celtic Sea.

ii. To investigate the distribution of dissolved nutrients and phytoplankton along a grid of stations in the Irish Sea, Celtic Sea, Celtic Shelf and Beaufort Dyke in the North Channel

Circulation	✓
DCSO & CSO	✓
Ship Managers	✓
Fisheries Division	
ANIFPO	
NIFPO	

Comments

Signed Head of Branch

Methods:

- Stations were profiled using a Seabird SBE 32 water sampler and SBE 911 CTD

- Vertical zooplankton net hauls were taken using a 200 micron mesh bongo net with a 500mm diameter inlet.

Cruise Narrative:

Saturday 15 August 2009
Following a talk on ship's safety and a demonstration of personal life saving equipment, the RV Corystes departed Belfast at 2200 hrs and sailed overnight to the AFBI mooring station 38A.

Sunday 16 August 2009
The vessel arrived on station at 0630 hrs when the weather was dry and bright with a strong westerly wind. Given the poor weather conditions the mooring service was postponed and the survey continued sampling at the mooring site, coastal stations 47D, 36, 37 and progressed along the Liverpool Bay and Isle of Man transect stations.

Monday 17 August 2009
With sampling the Isle of Man transect completed at 0900 hrs the vessel returned to the AFBI mooring site. In light winds the complete mooring was successfully recovered to ship deck at 1315 hrs when data from thermistors, CTD and water sampler were down loaded. Samples were removed from the water sampler and following a detailed inspection of the mooring parts, instruments were reprogrammed and components reassembled. The instrument mooring was successfully redeployed at 1600 hrs in depth 93 metres on position 53^0 46^l .820N 005^0 38^l .169W. The vessel then proceeded to sample along a grid of stations (50, 62, B11, B10, B9, B8 and B7) sailing south towards the SmartBuoy mooring in the Celtic Sea.

Tuesday 18 August 2009
The vessel arrived on the SmartBuoy site at 1130 hrs when a series of reference measurements were taken by the CTD water sampler. In a strengthening southerly wind the survey continued towards the Celtic Shelf sampling at stations C5, CS01, and CS02.

Thursday 19 August 2009
During the early hours station CSO3 was sampled and as winds increased to gale force the ship's progress was reduced to 3 knots, and attempts to survey at the Celtic Shelf were abandoned. At this point the ship turned around and sailed north towards a grid of stations in the North Channel.

Friday 20 August 2009
In lighter winds the survey continued with sampling at stations 26, 16 and 4 and finished with the Beaufort Dyke transect stations before docking in Belfast at 2030 hrs.

Work Completed:
Given the heavy seas and gales in the southern Celtic Sea we were unable to complete the survey at the shelf break. With ship speed reduced to 3 knots and a poor forecast there was insufficient time remaining to await an improvement in the weather conditions. However other aspects of the survey work were successfully completed without incident.

Results:

Detailed results of the hydrographic and nutrient data collected during the period of the cruises will be made available as the data is worked up and interpreted by the laboratory. However some preliminary CTD and inorganic nitrogen data clearly illustrate the demise of the thermocline at the AFBI mooring site. Figure 1 shows the temperature and salinity profile from the August cruise and details a weakening thermocline at 25 metres. The temperature difference between surface and seabed has reduced from 4.5 ^{0}C, as recorded during the July survey, to 2.2 ^{0}C in August. Further mixing induced by surface cooling and stronger winds have resulted in an almost isothermal profile recorded during the September survey (Fig. 2).

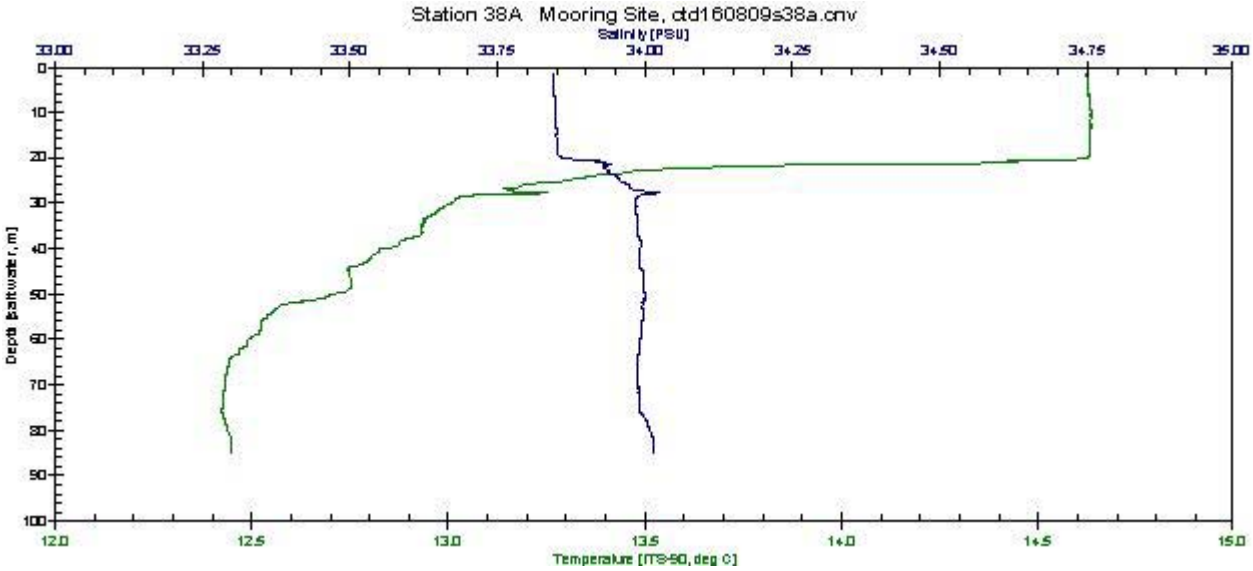


Figure 1. Station 38A Temperature and salinity profile recorded on 16 August 2009

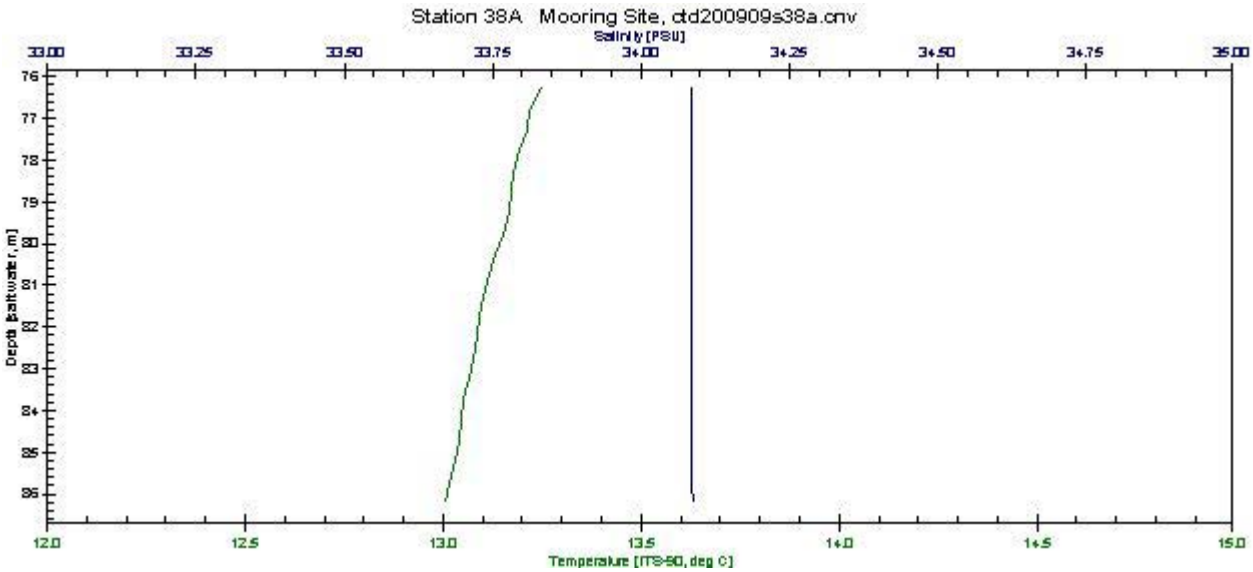


Figure2. Station 38A Temperature and salinity profile recorded on 20 September 2009

The erosion of the thermocline also has an effect on the distribution of nutrients throughout the profile. During the spring bloom surface layers become depleted in inorganic nitrogen and with the onset of stratification density difference at the thermocline limits the transfer of nutrients to the upper layers. The nutrient profile from August show nutrient depletion down to 25 metres: the depth of the thermocline. Below the thermocline there is a gradual diffusion of nutrients from depth to the mid profile region (Fig. 3). In September as the thermocline breaks down inorganic nitrogen begins to diffuse across the profile and into the surface layers as shown in figure 4. With mixing this process will continue until nutrient concentrations are constant across the depth profile.

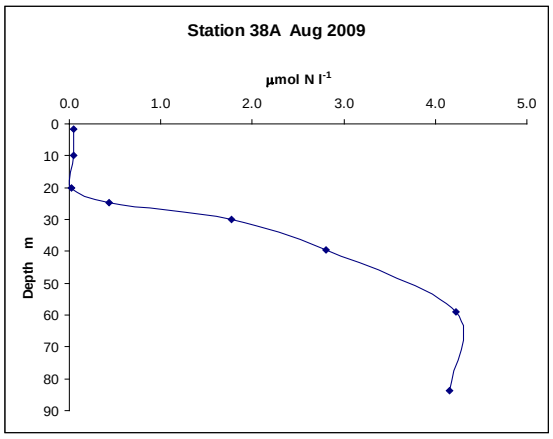


Fig. 3. Inorganic Nitrogen profile from August survey

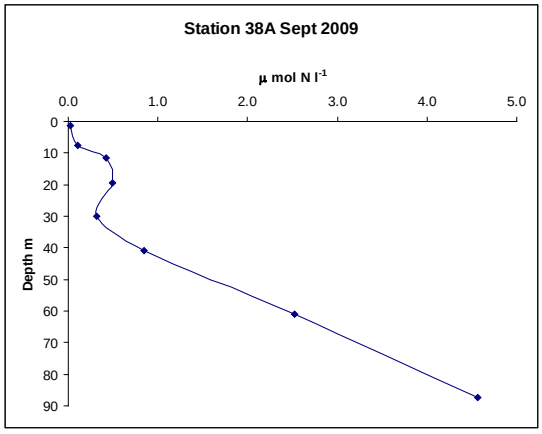


Fig 4. Inorganic nitrogen profile from September survey

Operational Aspects of the Ship:

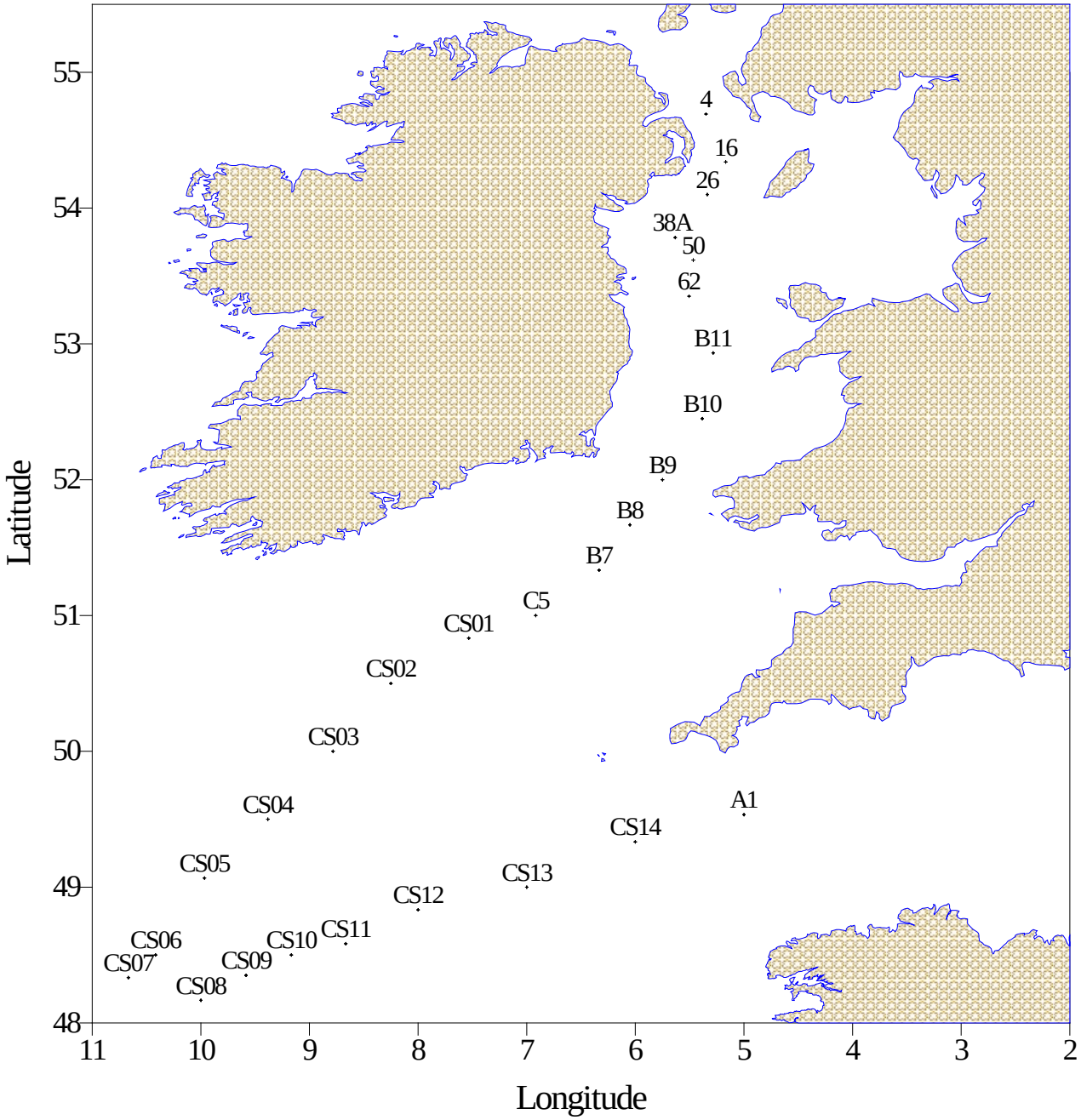
During the cruise the A-frame, main trawl winches, both hydrographic winches and the ship's clean seawater supply were used. No problems were encountered with ship's equipment. The hotel and catering service was of an acceptable standard and there was a good working relationship between the scientists and the ship's crew. Prior to the ship departing Belfast a comprehensive and detailed safety briefing was delivered to the scientific crew.

Acknowledgements:

I am indebted the deck crew of the RV Corystes for their co-operation and assistance during the mooring recovery and deployment operation. The ship's master, officers, engineers and catering staff are also thanked for their co-operation during this cruise.

Scientist in Charge

Date: 14 October 2009



Survey Transect CO 3309