

5732

LOGICAL OCEANOGRAPHY CRUISE REPORT

LF 39/98

20 - 22 September 1998

PERSONNEL

B Stewart	(SIC), SSO, DANI.
P Elliott	SO, DANI.
S Bloomfield	ASO, DANI
C Cochrane	Temp. LA, DANI
K Embelton	Res. Assist. QUB

Prof Pearce
 This is a cruise which compares
 two in situ samplers. One the
 US manufactured equipment which
 successfully used for some years now
 & a record of UK manufactured
 The UK design is based on a large DE
 contract involving DANI/CEFRS
 SA 14605 & is also used in a towed
 version.
 June 14 19/00

OBJECTIVES

- i. To assess temperature, salinity and nutrient distributions over depth at stations 38A and 47.
- ii. To assess the performance of a moored W.S Ocean automated water sampler.
- iii. To redeploy the McLane automated water sampler at station 38A.
- iv. To assess nutrient and chlorophyll concentrations along a transect between Liverpool Bay and Dundalk Bay.

CRUISE NARRATIVE

Sunday 20 September 1998

In preparation for the cruise, all DANI scientific crew were onboard by 2000 hrs when mooring instrumentation was prepared for deployment. Problems were encountered with valve alignment on the W.S Ocean water sampler and it was decided to postpone the deployment operation to allow time to overcome the difficulty. Following a talk on ship's safety and a demonstration of personal life saving equipment, the RV Lough Foyle departed Belfast at 2140 hrs and sailed overnight in a light southerly wind to Liverpool Bay.

Monday 21 September 1998

The ship arrived in Liverpool Bay at 0915 hrs. The weather was dry and bright with a light southerly wind. Work commenced on the first transect station in Liverpool Bay and continued in an easterly direction along a grid of stations, approximately 10 miles apart, towards Dundalk Bay. Meanwhile through a number of telephone conversations with W.S. Ocean staff, the problems with the water sampler were eventually overcome

After several successful test runs it was decided to deploy the sampler at the mooring site whilst en route to Dundalk Bay. The vessel arrived on the mooring site at 1900 hrs and the mooring complete with the McLane and W.S. Ocean water samplers was successfully deployed at 1915 hrs on position $53^{\circ} 47' .06N$ $5^{\circ} 37' .93W$. The guard buoy (id No.1) and anchor were then successfully recovered to shipdeck. The mooring was checked for corrosion and components replaced where necessary and successfully redeployed at 2030 hrs on position $53^{\circ} 46' .97N$ $5^{\circ} 38' .12W$. Following deployment of the rosette water sampler and zooplankton net, work for the day finished at 2130 hrs. The ship sailed to anchor overnight at coastal station 47 in Dundalk Bay.

Tuesday 22 September 1998

In a light southerly breeze, work for the day commenced at 0700 hrs on station 47 with the deployment of the rosette water sampler and zooplankton net. Sampling was successfully completed at 0720 hrs and the vessel sailed 10 miles in a westerly direction to sample the final station on the Liverpool to Dundalk Bay transect. Work on the station was completed at 0845 hrs and the vessel sailed to dock in Belfast at 1530 hrs. All scientific crew had disembarked by 1600 hrs.

Wednesday 23 September 1998

Scientific crew returned to the vessel at 0930 hrs to remove samples, scientific instruments and mooring equipment.

PARAMETERS MONITORED

The CTD/rosette water sampler was deployed at station 38A, 47 and 9 other stations positioned at approximately 10 mile intervals between Liverpool and Dundalk Bay to acquire nutrient, chlorophyll *a*, temperature and salinity data from the depth profile. The Bowers & Connelly mini-corer was deployed at station 38A where sediment samples were subsampled for carbon & nitrogen estimation and chlorophyll *a*. The zooplankton net was deployed for 3 hauls at both stations 38A & 47.

Assessment of the W.S Ocean water sampler

In preparation for deployment, fixed volumes of Lugol's iodide and mercuric chloride preserving solutions were introduced alternately into sample bags on the W.S Ocean water sampler. The McLane water sampler used mercuric chloride as preservative for all samples and was programmed for sampling to coincide with the W.S Ocean sampler on the alternate days when it used mercuric chloride as preservative. The W.S Ocean water sampler was deployed and moored directly below the McLane water sampler at approximately 15 metres depth. Following recovery in mid November nutrient concentrations of samples preserved with mercuric chloride from both samplers will be compared. Biological samples taken and preserved by the W.S Ocean sampler will be inspected to ensure sufficient Lugol's solution was retained by the sample bag to effectively preserve the sample.

SUMMARY OF RESULTS

The CTD profile from station 38A showed the remains of the season's thermocline at 15 metres with surface and bottom temperature and salinity 14.7 °C / 34.4 ppt and 12.8 °C / 34.6 ppt respectively (Fig. 1). High fluorescence values associated with the thermocline identified major biological activity in this area. An intermediate body of water between 20 and 60 metres with temperature 13.8 °C is possibly the result of recent "mixing down" as the thermocline begins to destruct. Inorganic nitrogen values were depleted to less than 0.60 micromoles N l⁻¹ in the top 10 metres but below this depth, concentrations gradually increased from 4.05 to 7.72 micromoles N l⁻¹ with depth. This is in stark contrast with data from the previous cruise (22 June '98) when inorganic nitrogen values were almost depleted throughout the entire water column. The source of this nitrogen is uncertain but may result from a gradual influx of Atlantic water to the Irish Sea or perhaps mineralisation of existing organic matter to nitrate. The results are consistent with nutrient data acquired from daily samples taken and preserved *in situ* by the moored sampler at depth 12 metres (Fig. 3). In Dundalk Bay at Station 47 a weak thermocline, created from the prevailing warm and calm conditions, was observed at 4 metres with surface and bottom temperature and salinity 14.7 °C / 33.9 ppt and 14.1 °C / 34.3 ppt respectively (Fig. 2). Lower surface salinity values demonstrate the freshwater influence of the River Boyne in this area. A strong fluorescence signal below the thermocline and nutrients almost depleted throughout the water column indicates major biological activity throughout the water column.

HOTEL REPORT & OPERATIONAL ASPECTS OF THE SHIP

During the cruise the A-frame, main trawl winches, both hydrographic winches and the ship's clean sea-water supply were used. No problems were encountered with any of the ship's equipment nor indeed with any of the scientific equipment. The hotel and catering service was of the usual high 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 grateful to Mr. Philip Elliott for his efforts in overcoming the problems we experienced with the W.S. Ocean water sampler.

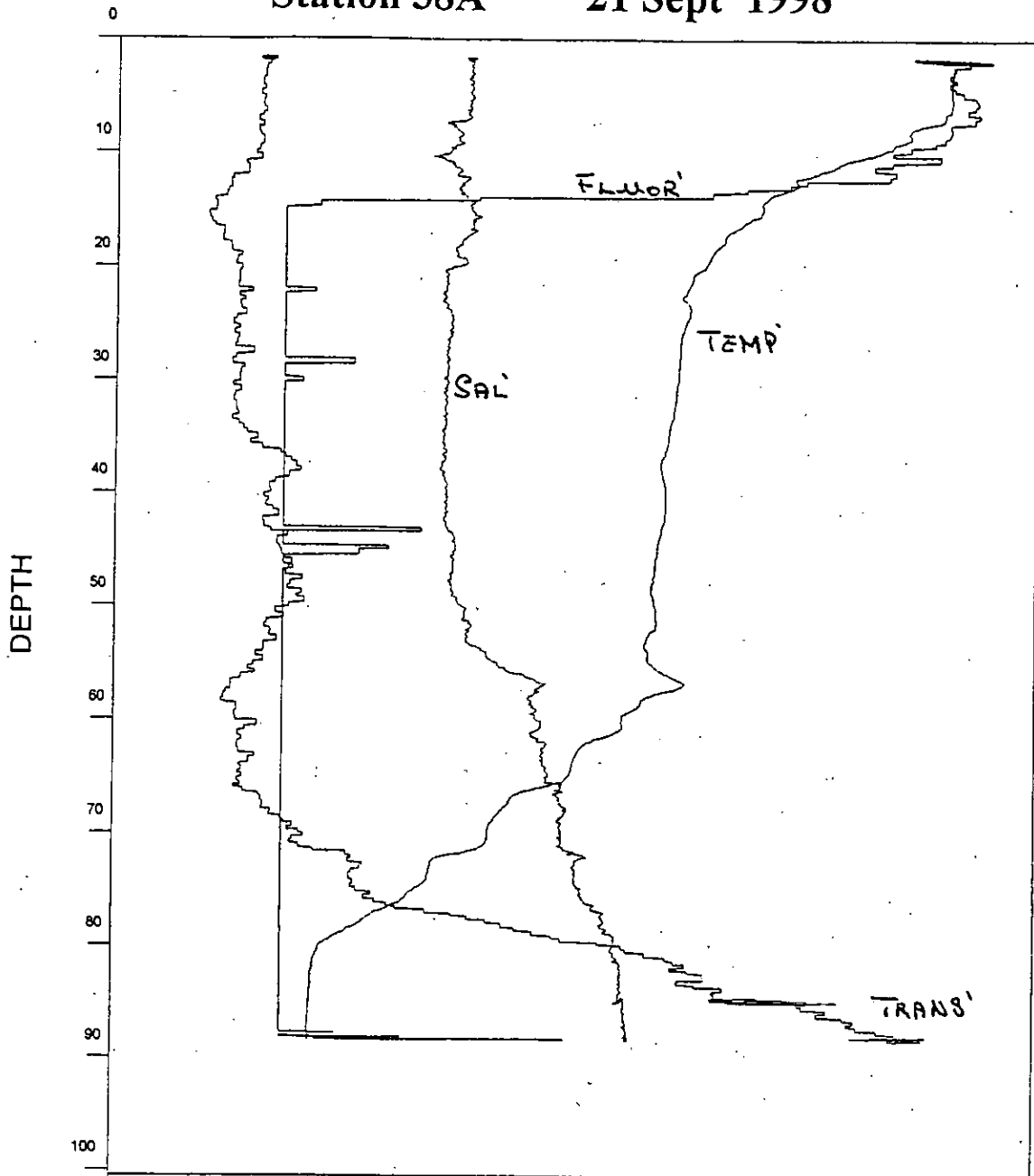
I am indebted the deck crew of the RV Lough Foyle for their co-operation and assistance during the mooring recovery and deployment operation. The ship's master, officers, engineers and catering staff are also thanked for their co-operation during this cruise.



B.M. STEWART
14 October 1998

Station 38A

21 Sept' 1998



DEPTH	SAL	Temp	FLUOR	TRAN
0	34.000	12.000	0.000	0.000
10	34.100	12.300	550.000	500.000
20	34.200	12.600	1100.000	1000.000
30	34.300	12.900	1650.000	1500.000
40	34.400	13.200	2200.000	2000.000
50	34.500	13.500	2750.000	2500.000
60	34.600	13.800	3300.000	3000.000
70	34.700	14.100	3850.000	3500.000
80	34.800	14.400	4400.000	4000.000
90	34.900	14.700	4950.000	4500.000
100	35.000	15.000	5500.000	5000.000

Fig 1

Station 47 22 Sept' 1998

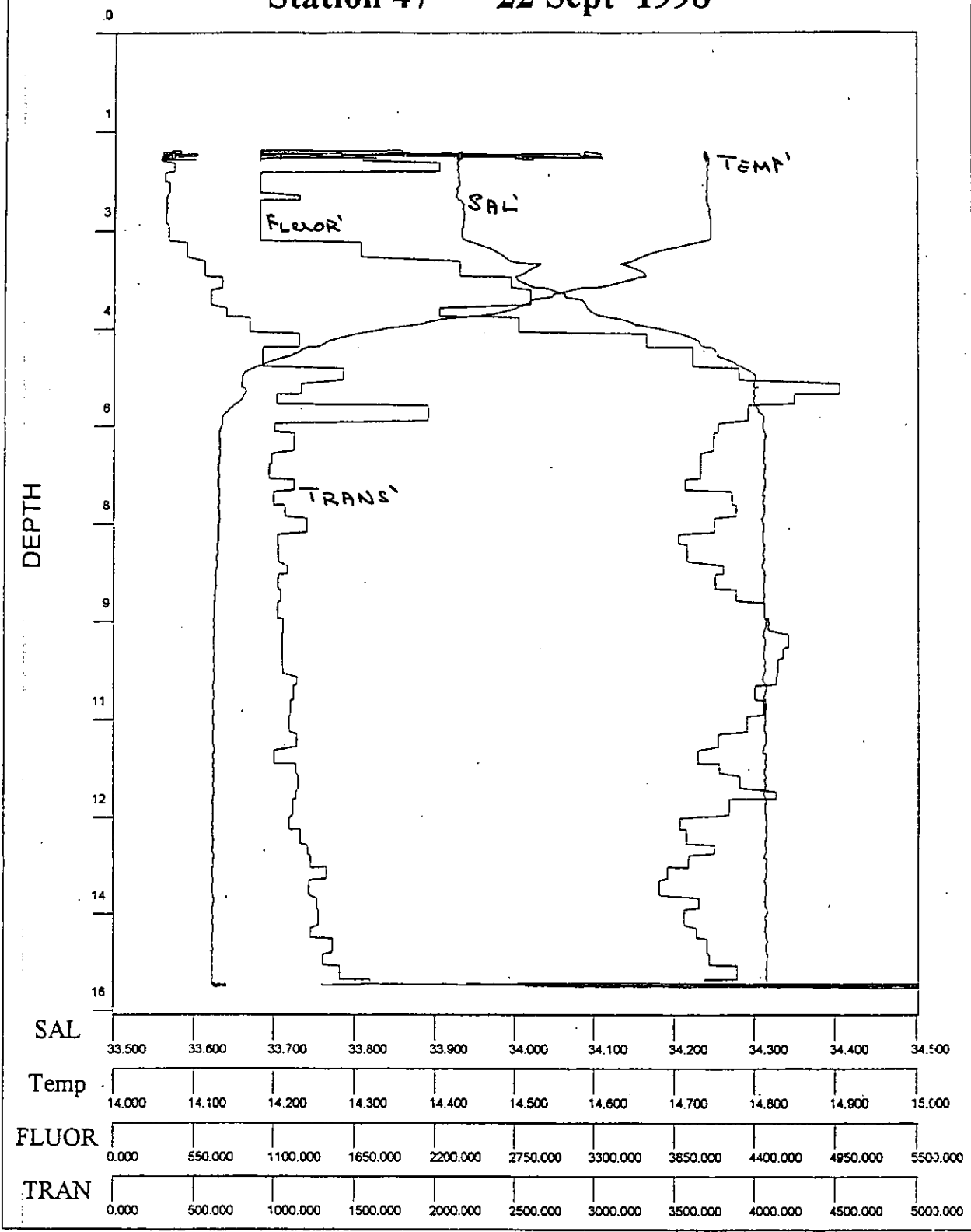


Fig. 2.

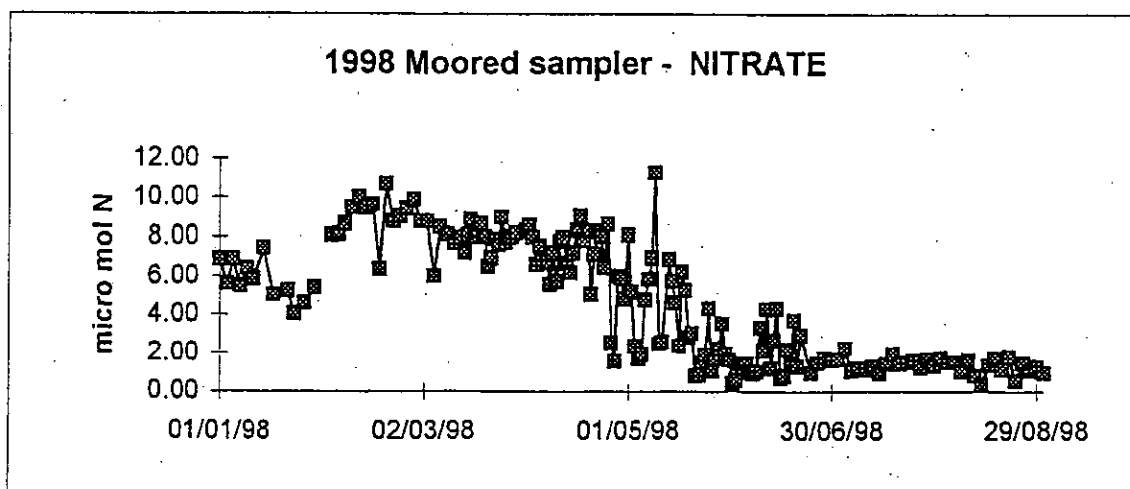
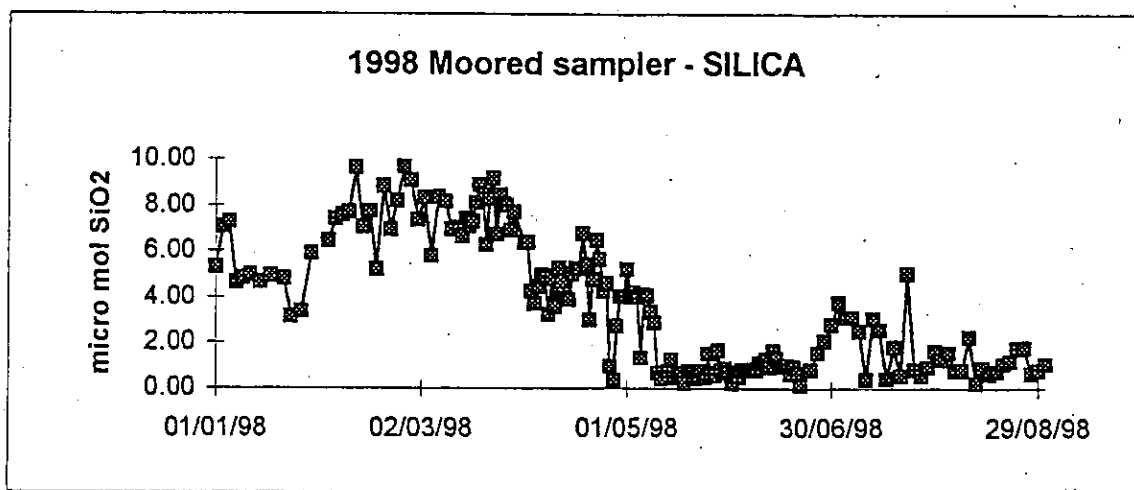
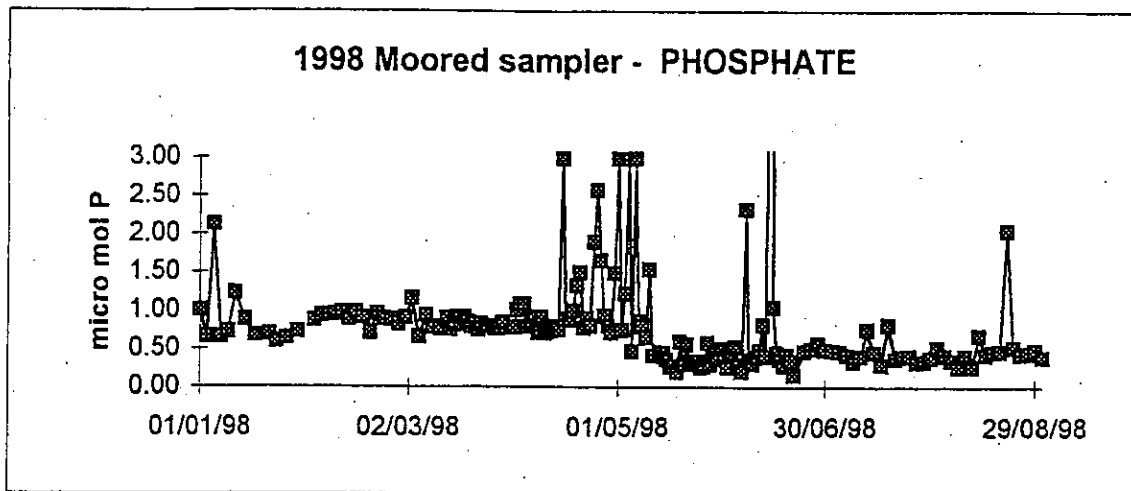


Fig. 3