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BIOLOGICAL OCEANOGRAPHY CRUISE REPORT

LF 44 2001

29 October – 2 November 2001

PERSONNEL

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C Cochrane	TSO, DARDNI
A Downie	ASO, DARDNI

OBJECTIVES

i. To maintain a nutrient monitoring programme at station 38A.

ii. To assess temperature, salinity and nutrient distributions over depth at stations 38A, 47 and across the frontal region of the Irish Sea.

CRUISE NARRATIVE

Sunday 28 October 2001

In preparation for the cruise, all DANI scientific crew were onboard by 2100 hrs when mooring components and the automated sampler were prepared for deployment. Following a talk on ship's safety and a demonstration of personal life saving equipment, the RV Lough Foyle departed Belfast at 2200 hrs and sailed overnight in a fresh to strong south westerly breeze towards the mooring site at station 38A.

Monday 29 October 2001

With winds increasing overnight, the mooring service was deferred and the vessel diverted to the easterly frontal station F3. The weather was dry and bright with a strong south westerly wind when work for the day commenced at 0800 hrs with the deployment of the rosette water sampler and zooplankton nets. The survey continued in a westerly direction along a grid of frontal stations F5, F1, F4 and F2 with deployments of the water sampler and zooplankton net. The vessel then sailed to the mooring site 38A and with no improvement in the weather conditions the mooring service was again deferred. However, the water sampler and zooplankton net were deployed and the survey continued to station 47 off the Drogheda fore shore, where the sampling operations were repeated. Work for the day finished at 2000 hrs and the vessel anchored overnight nearby station 47.

Tuesday 30 October 2001

With south westerly winds increasing strong to gale force, the vessel remained at anchor.

Wednesday 31 October 2001

With a continuation of the south westerly gale force winds, the vessel remained at anchor.

Thursday 1 November 2001

Overnight the wind subsided creating conditions suited to the mooring service operation.
The anchor was lifted at 0400 hrs and the ship sailed to the mooring site. The weather was dry and bright with a moderate south westerly wind. Work for the day commenced before breakfast at 0650 hrs with the recovery of the instrument mooring. After breakfast the mooring components were inspected for corrosion and replaced where necessary. The thermistor chain was removed from the mooring wire and temperature data downloaded. The automated water sampler was removed and replaced with a similar pre programmed unit. The mooring components and thermistors were then reassembled, the satellite tracking system was confirmed working and the mooring was successfully redeployed at 1000 hrs on position 53^0 46^1.943N 5^0 38^1.031W. Work on the station was completed at 1030 hrs and the vessel sailed to dock in Belfast at 1615 hrs. The scientific crew disembarked at 1630 hrs.

Friday 2 November 2001

The scientific crew returned to the vessel at 0900 hrs when equipment was removed from the vessel for return transportation to Newforge Lane.

PARAMETERS MONITORED

The CTD/rosette water sampler was deployed at stations F1, F2, F3, F4, F5, 38A and 47 to acquire nutrient, chlorophyll *a*, temperature, light and salinity data from the depth profile. Three zooplankton net hauls were taken at both stations 38A & 47.

McLane moored water sampler
The water sampler had made no attempt to function. Initial checks confirmed the sampler had been correctly programmed and that the battery power was more than adequate to power the system. Over the coming days, a systematic testing of the sampler should identify the source of the fault.

SUMMARY OF RESULTS

All stations surveyed were thermally mixed throughout the entire profile (Map 1). The CTD profiles show a constant salinity pattern across all open sea stations; F1, F2, F3, F4, F5 & 38A, typically 34.40 (Figs.1-6). However, temperature values for the former stratified spring/summer stations 38A & F2 (Figs. 2 & 6) are typically 13.4 °C and on average 0.6 °C below spring/summer frontal and mixed stations F1, F3, F4 and F5 (Figs. 1,3,4,5 &7). This may be explained by the overall influence of the predominant, cooler and deeper stratified layer during the late summer mixing process.
As a result of the recent mixing, nutrient concentrations were fairly constant throughout the profile and similar at each of the open sea stations surveyed and typically 4.2 micromoles inorg N l^{-1} , 0.45 micromoles P l^{-1} & 2.6 micromoles SiO_2 l^{-1} (Tables 1 – 6).
Owing to the freshwater influence of the river Boyne at station 47 close to the Drogheda fore shore, temperature and salinity were significantly lower than open sea values while nutrient concentrations were enriched in comparison to those recorded at the open sea stations (Fig. 7 & Table 7).

Car parking for scientists on duty on the MV Lough Foyle

Currently a problem exists concerning the availability of car parking at Belfast harbour for scientists using the MV Lough Foyle. The area designated "Lough Foyle Visitors " car park is currently being used as a store for a large number of buoys and other marine implements that have presumably been removed from Belfast Lough. As a result car parking has been reduced to accommodate only four vehicles, with one "unknown" vehicle occupying the same space for the past four weeks.
With scientists restricted from using the BHC and Harbour Police car parks, with such short notice there was no alternative but to park adjacent to the buoys and equipment with the possibility of preventing access to the equipment or indeed having vehicles damaged whilst access is attempted.

HOTEL REPORT & 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 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.

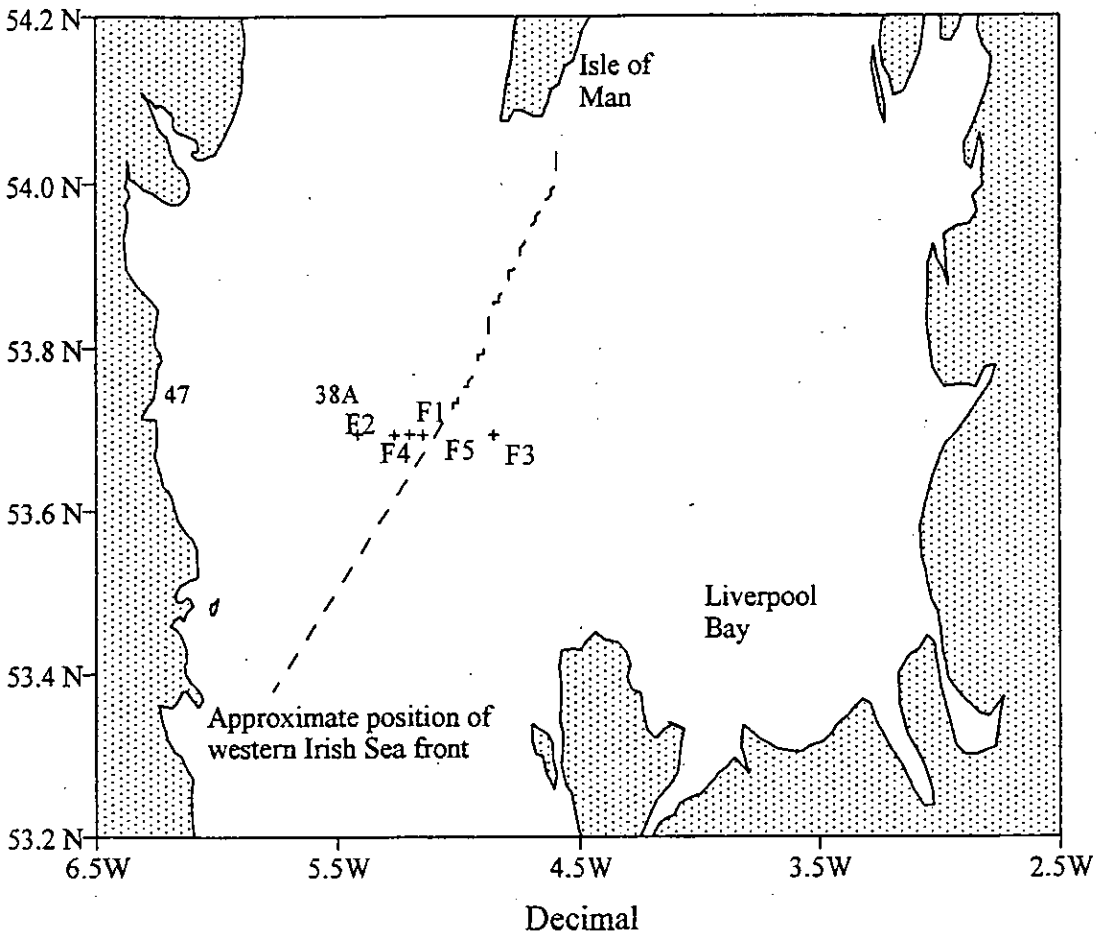
ACKNOWLEDGEMENTS

I am 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

13 November 2001

Map 1



Lat and Long (degrees and

F1: 53 41.62 N 05 12.01 W
F2: 53 41.62 N 05 24.80 W
F3: 53 41.62 N 04 51.04 W
F4: 53 41.62 N 05 15.75 W
F5: 53 41.62 N 05 08.65 W

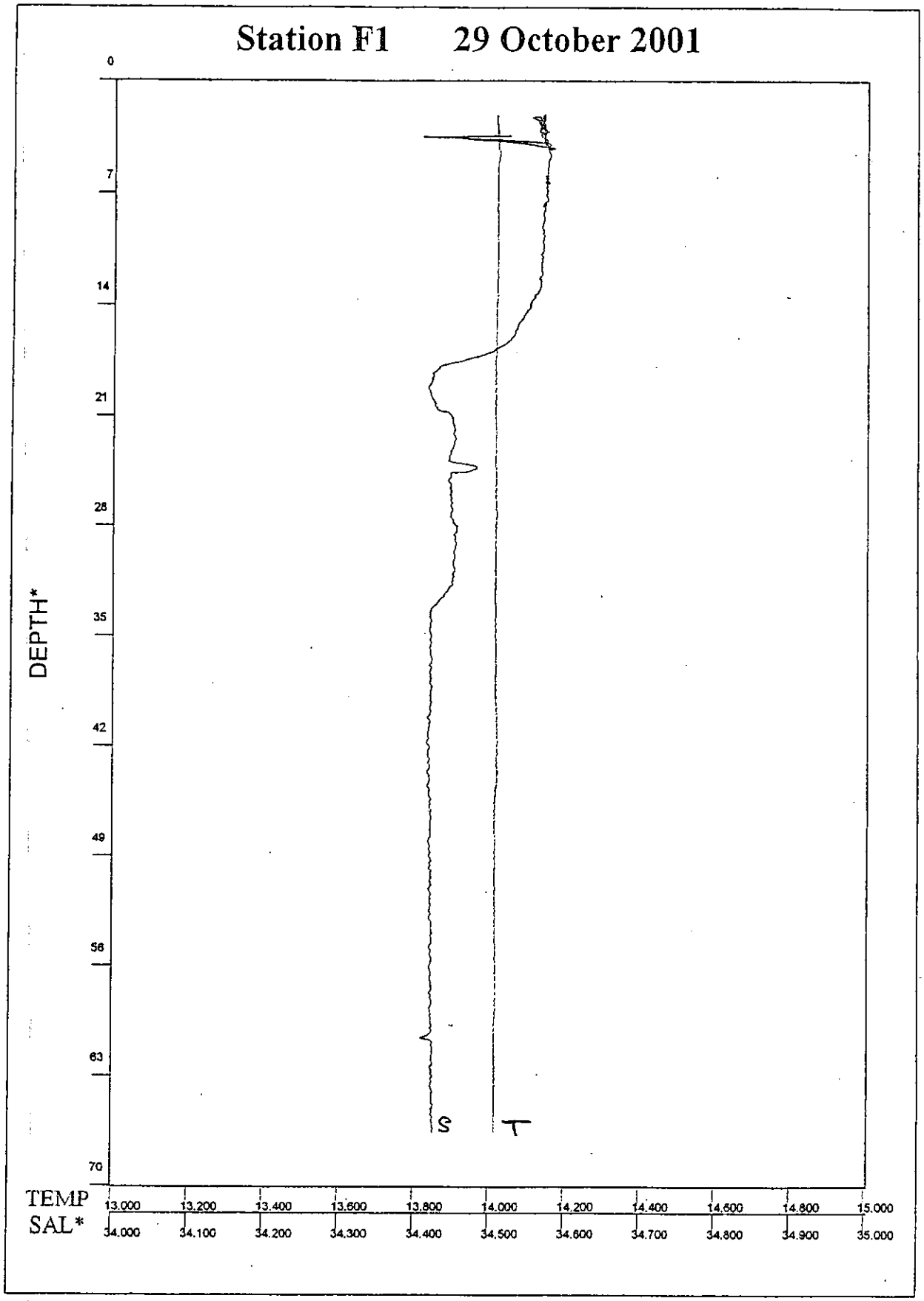

Station F1 29 October 2001
DEPTH*
0
7
14
21
28
35
42
49
56
63
70
S
T
TEMP
13.000
13.200
13.400
13.600
13.800
14.000
14.200
14.400
14.600
14.800
15.000
SAL*
34.000
34.100
34.200
34.300
34.400
34.500
34.600
34.700
34.800
34.900
35.000

Fig 1.

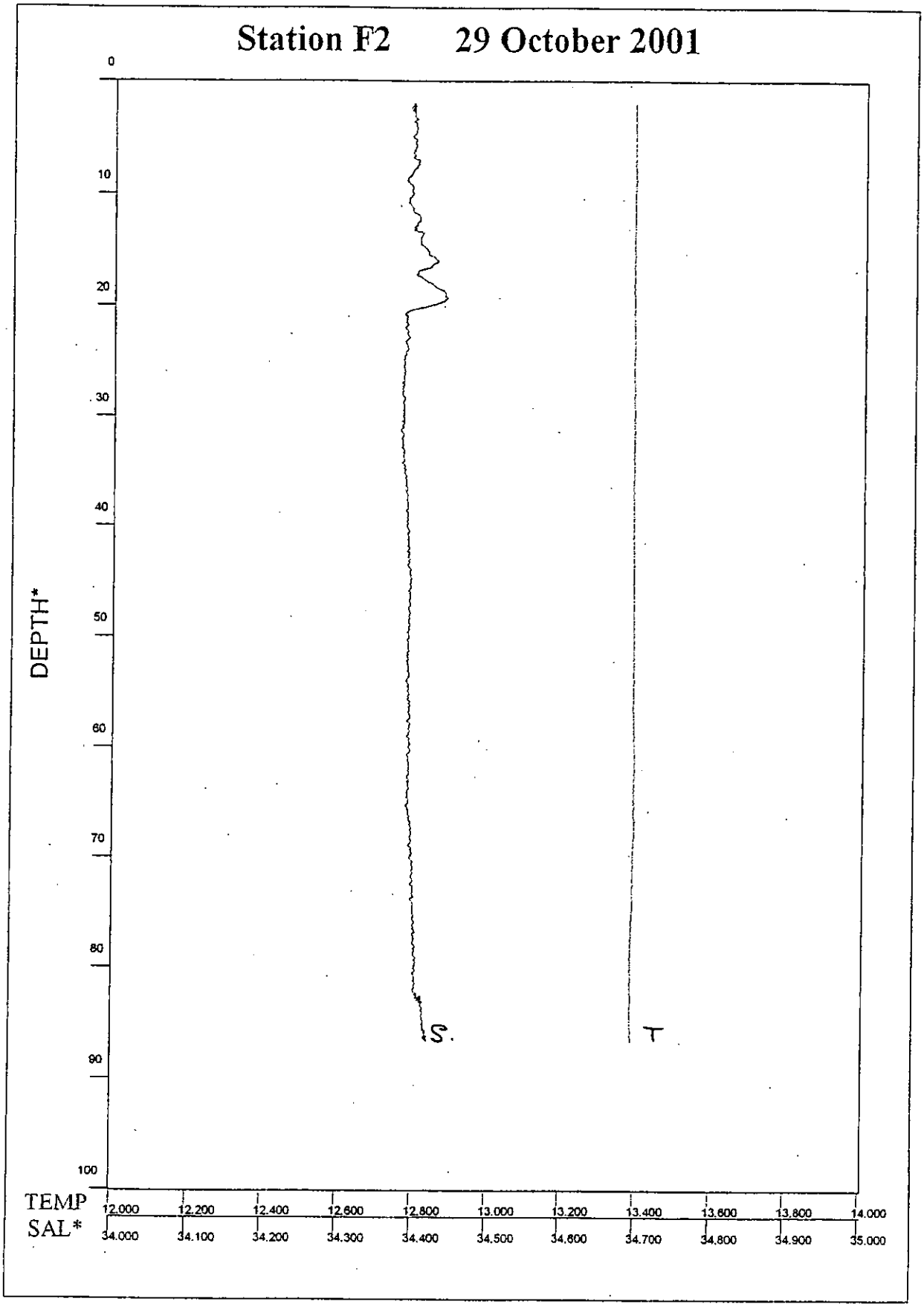

Station F2 29 October 2001
DEPTH*
0
10
20
30
40
50
60
70
80
90
100
S
T
TEMP
SAL*
12.000
12.200
12.400
12.600
12.800
13.000
13.200
13.400
13.600
13.800
14.000
34.000
34.100
34.200
34.300
34.400
34.500
34.600
34.700
34.800
34.900
35.000

Fig 2

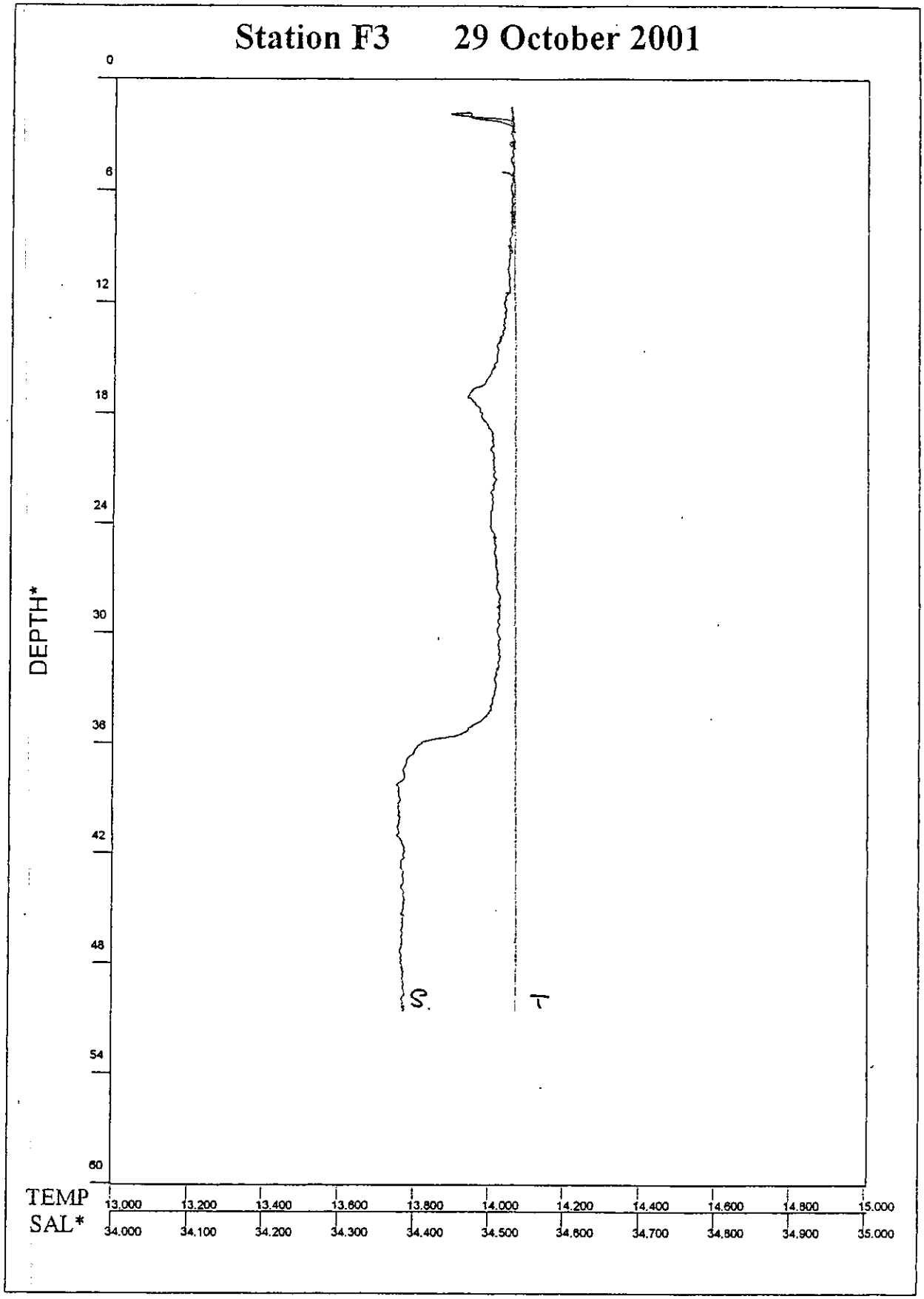

Station F3 29 October 2001
DEPTH*
0
6
12
18
24
30
36
42
48
54
60
S
T
TEMP
13.000
13.200
13.400
13.600
13.800
14.000
14.200
14.400
14.600
14.800
15.000
SAL*
34.000
34.100
34.200
34.300
34.400
34.500
34.600
34.700
34.800
34.900
35.000

Fig 3.

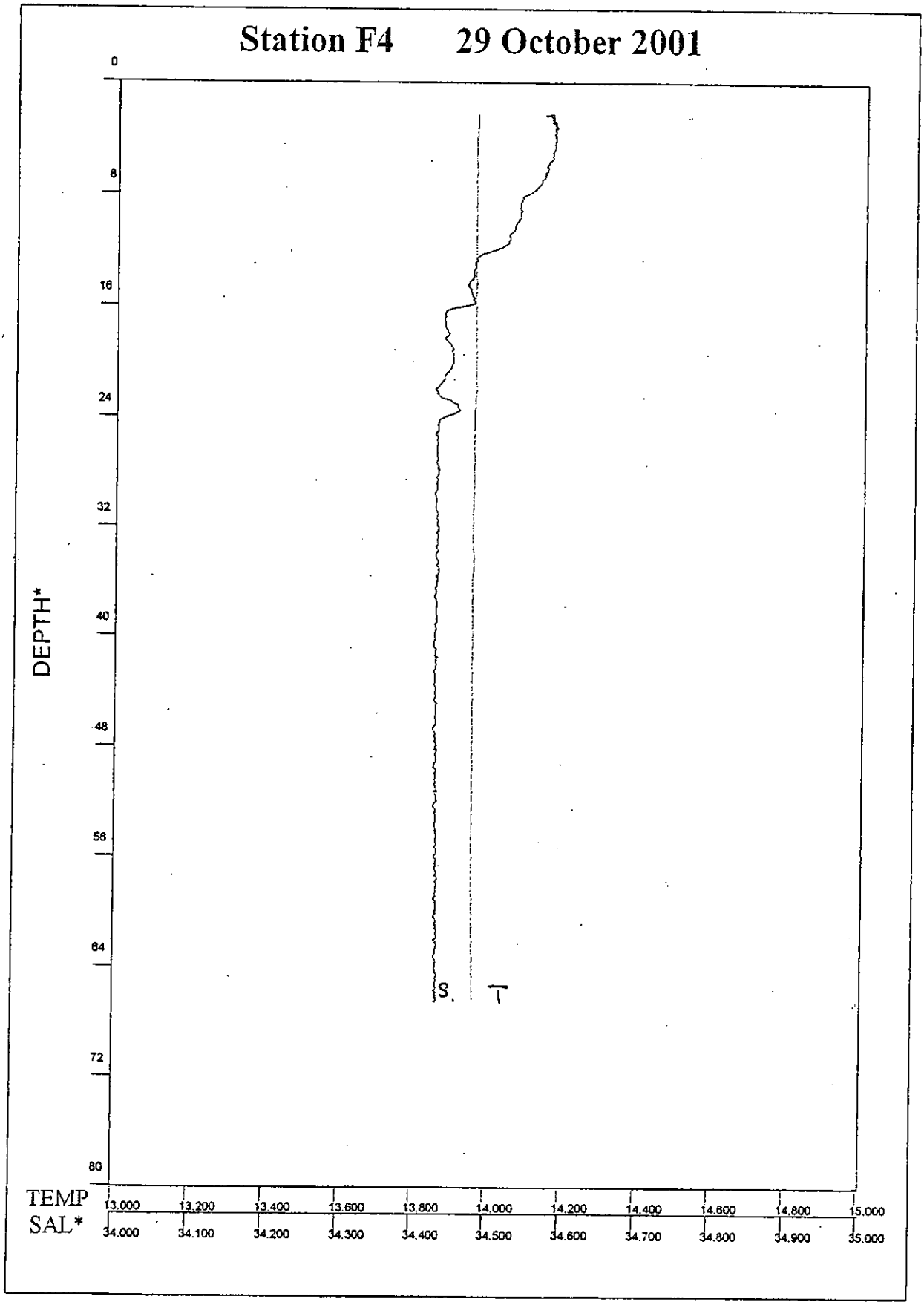

Station F4 29 October 2001
DEPTH*
0
8
16
24
32
40
48
56
64
72
80
S.
T
TEMP
13.000
13.200
13.400
13.600
13.800
14.000
14.200
14.400
14.600
14.800
15.000
SAL*
34.000
34.100
34.200
34.300
34.400
34.500
34.600
34.700
34.800
34.900
35.000

Fig 4

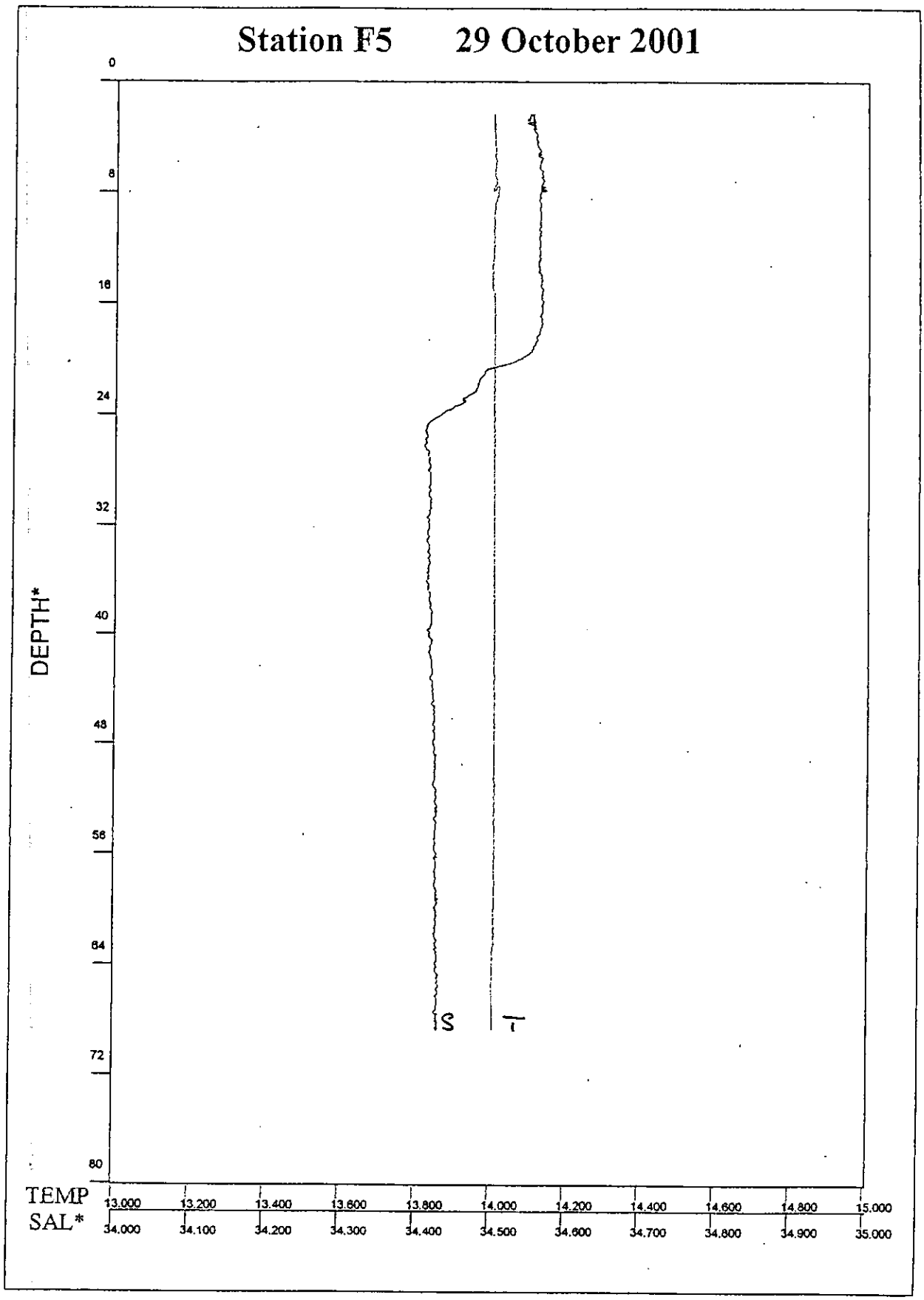
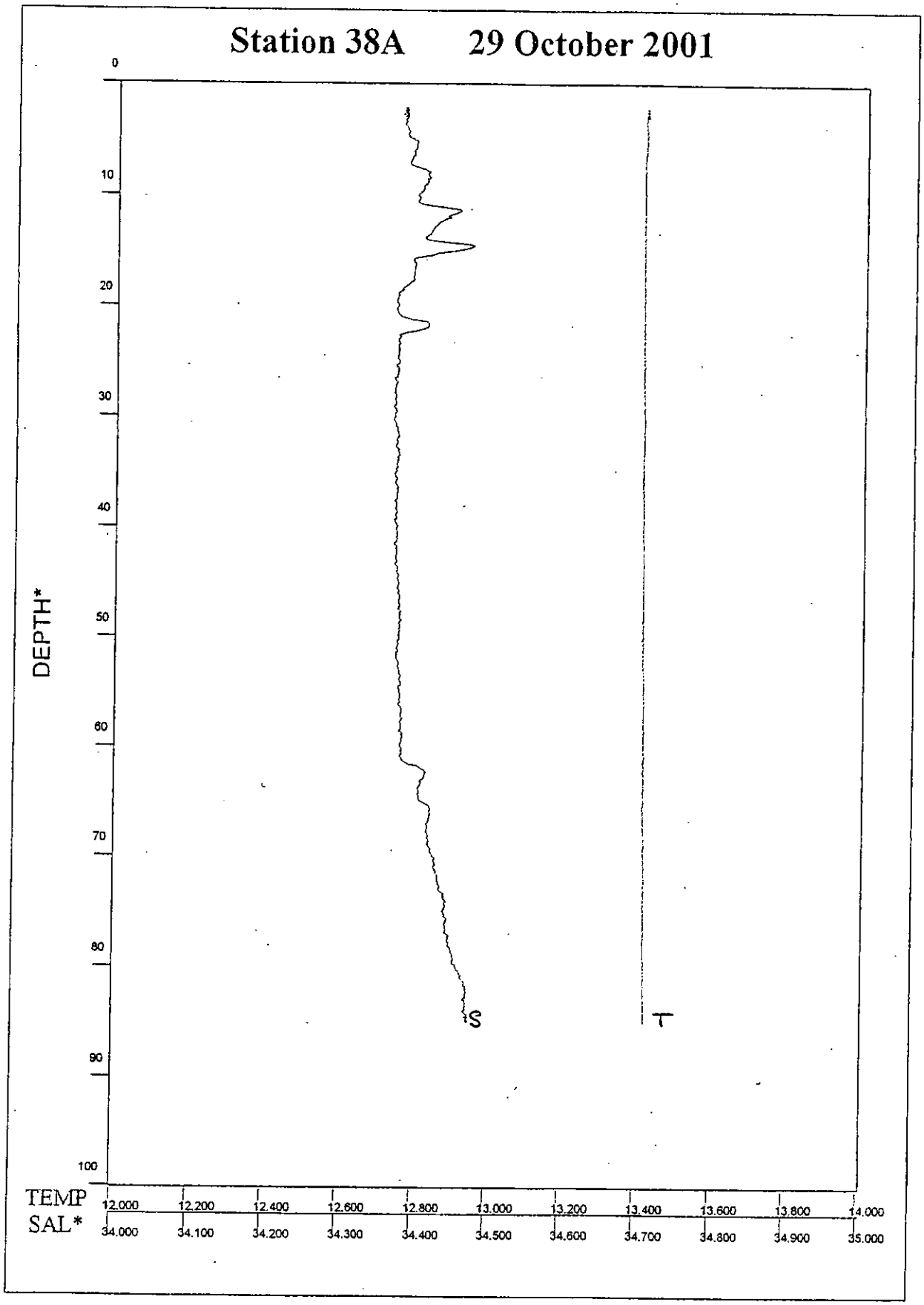

Station F5 29 October 2001
DEPTH*
0
8
16
24
32
40
48
56
64
72
80
S
T
TEMP
13.000
13.200
13.400
13.600
13.800
14.000
14.200
14.400
14.600
14.800
15.000
SAL*
34.000
34.100
34.200
34.300
34.400
34.500
34.600
34.700
34.800
34.900
35.000

Fig 5


Station 38A 29 October 2001
DEPTH*
0
10
20
30
40
50
60
70
80
90
100
S
T
TEMP
SAL*
12.000
12.200
12.400
12.600
12.800
13.000
13.200
13.400
13.600
13.800
14.000
34.000
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34.600
34.700
34.800
34.900
35.000

Fig 6.

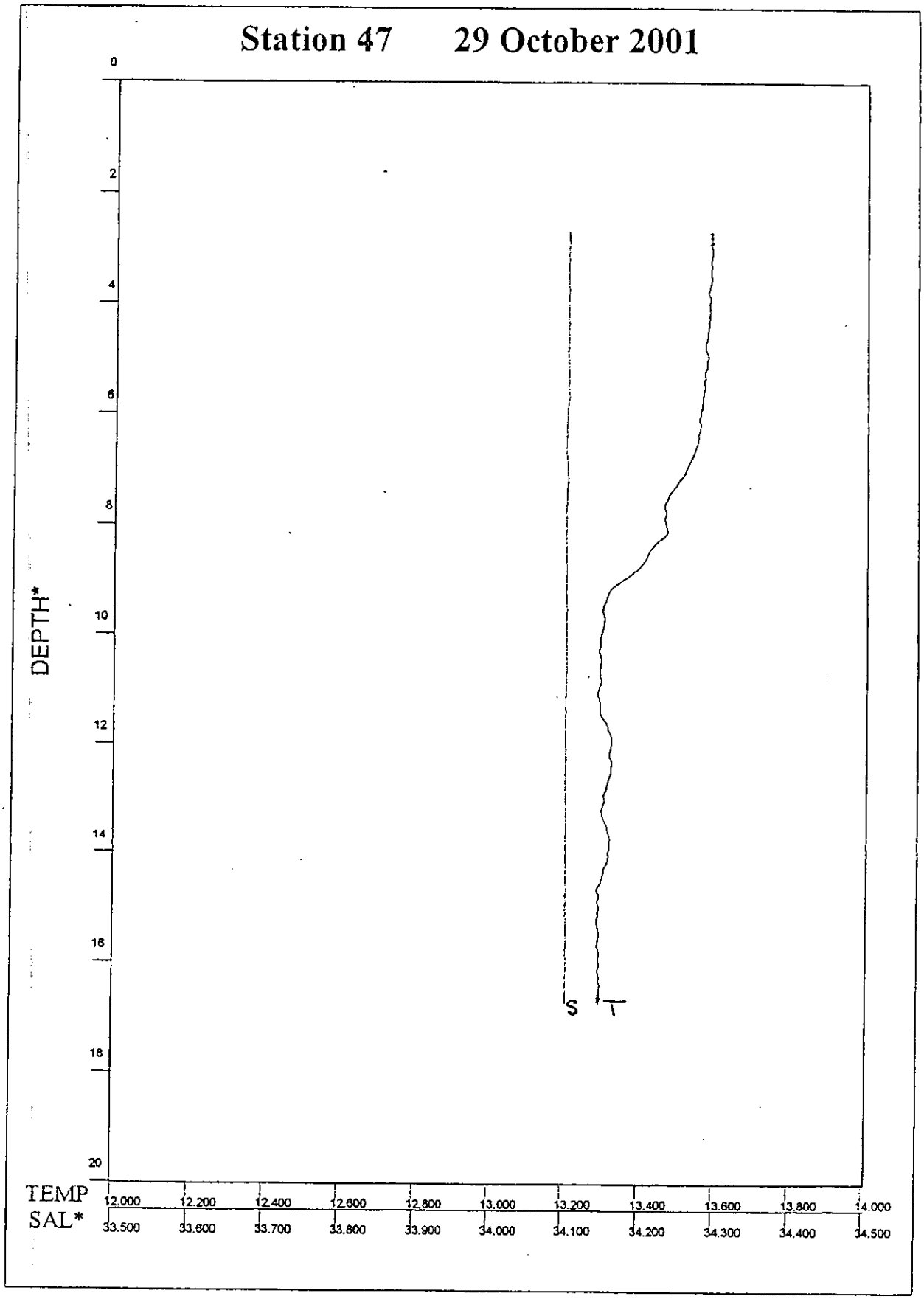
Station 47 29 October 2001
DEPTH*
0
2
4
6
8
10
12
14
16
18
20
S
T
TEMP
12.000
12.200
12.400
12.600
12.800
13.000
13.200
13.400
13.600
13.800
14.000
SAL*
33.500
33.600
33.700
33.800
33.900
34.000
34.100
34.200
34.300
34.400
34.500

Fig 7.

IRISH SEA OCEANOGRAPHY 2001

Depth profile samples (29 October2001)

STATION	DATE	DEPTH M	AMMONIA µm N l^{-1}	PHOSPHATE µm P l^{-1}	INORG N µm N l^{-1}	SILICA µm SiO_2 l^{-1}	UREA µm N l^{-1}	NITRITE µm N l^{-1}	CHL	PHAEO	ACID RATIO
F1	29/10/01	2.3	0.46	0.47	4.71	2.51		0.06	0.60	0.23	1.70
F1	29/10/01	10.5	0.50	0.48	4.77	2.55		0.07	0.66	0.29	1.67
F1	29/10/01	20.7	0.54	0.48	4.70	2.53		0.07	0.62	0.27	1.67
F1	29/10/01	42.5	0.52	0.48	4.77	2.55		0.07	0.62	0.23	1.70
F1	29/10/01	66.6	0.61	0.47	4.68	2.55		0.07	0.58	0.25	1.67

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Table 1.

IRISH SEA OCEANOGRAPHY 2001

Depth profile samples (29 October2001)

STATION	DATE	DEPTH M	AMMONIA $\mu m\ N\ l^{-1}$	PHOSPHATE $\mu m\ P\ l^{-1}$	INORG N $\mu m\ N\ l^{-1}$	SILICA $\mu m\ SiO_2\ l^{-1}$	UREA $\mu m\ N\ l^{-1}$	NITRITE $\mu m\ N\ l^{-1}$	CHL	PHAEO	ACID RATIO
F2	29/10/01	2.2	0.48	0.45	4.13	3.47		0.07	0.64	0.21	1.73
F2	29/10/01	9.8	0.40	0.44	3.99	3.44		0.06	0.68	0.15	1.79
F2	29/10/01	22	0.47	0.45	4.08	3.46		0.07	0.70	0.21	1.74
F2	29/10/01	40.7	0.56	0.49	4.27	3.58		0.09	0.62	0.19	1.74
F2	29/10/01	60.2	0.51	0.47	4.14	3.61		0.08	0.60	0.20	1.73
F2	29/10/01	86.3	0.69	0.55	4.35	3.98		0.13	0.52	0.28	1.63

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Table 2

IRISH SEA OCEANOGRAPHY 2001

Depth profile samples (29 October2001)

STATION	DATE	DEPTH M	AMMONIA µm N l^{-1}	PHOSPHATE µm P l^{-1}	INORG N µm N l^{-1}	SILICA µm SiO_2 l^{-1}	UREA µm N l^{-1}	NITRITE µm N l^{-1}	CHL	PHAEO	ACID RATIO
F3	29/10/01	2.2	0.65	0.46	5.10	2.60		0.08	0.58	0.25	1.67
F3	29/10/01	11.6	0.49	0.45	4.87	2.61		0.06	0.54	0.26	1.66
F3	29/10/01	22.3	0.63	0.45	4.75	2.65		0.06	0.56	0.29	1.64
F3	29/10/01	32.2	0.53	0.45	4.80	2.66		0.06	0.54	0.28	1.64
F3	29/10/01	50.2	0.58	0.46	4.83	2.66		0.08	0.52	0.28	1.63

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Table 3

IRISH SEA OCEANOGRAPHY 2001

Depth profile samples (29 October2001)

STATION	DATE	DEPTH M	AMMONIA $\mu m\ N\ l^{-1}$	PHOSPHATE $\mu m\ P\ l^{-1}$	INORG N $\mu m\ N\ l^{-1}$	SILICA $\mu m\ SiO_2\ l^{-1}$	UREA $\mu m\ N\ l^{-1}$	NITRITE $\mu m\ N\ l^{-1}$	CHL	PHAEO	ACID RATIO
F4	29/10/01	2.8	0.67	0.47	4.57	2.63		0.08	0.62	0.19	1.74
F4	29/10/01	10.1	0.77	0.46	4.58	2.65		0.09	0.64	0.21	1.73
F4	29/10/01	20.2	0.68	0.44	4.51	2.58		0.07	0.64	0.21	1.73
F4	29/10/01	40.8	0.85	0.48	4.50	2.64		0.08	0.64	0.23	1.71
F4	29/10/01	66.4	0.88	0.48	4.47	2.68		0.09	0.64	0.29	1.67

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Table 4

IRISH SEA OCEANOGRAPHY 2001

Depth profile samples (29 October2001)

STATION	DATE	DEPTH M	AMMONIA µm N l^{-1}	PHOSPHATE µm P l^{-1}	INORG N µm N l^{-1}	SILICA µm SiO_2 l^{-1}	UREA µm N l^{-1}	NITRITE µm N l^{-1}	CHL	PHAEO	ACID RATIO
F5	29/10/01	2.1	0.86	0.47	4.67	2.52		0.09	0.56	0.22	1.70
F5	29/10/01	12.1	0.84	0.46	4.56	2.52		0.08	0.64	0.14	1.80
F5	29/10/01	21.8	0.76	0.52	4.52	2.51		0.08	0.56	0.29	1.64
F5	29/10/01	39.7	0.89	0.45	4.50	2.51		0.08	0.56	0.31	1.62
F5	29/10/01	67.6	0.80	0.45	4.44	2.49		0.08	0.58	0.33	1.62

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Table 5

IRISH SEA OCEANOGRAPHY 2001

Depth profile samples (29 October2001)

STATION	DATE	DEPTH M	AMMONIA µm N l^{-1}	PHOSPHATE µm P l^{-1}	INORG N µm N l^{-1}	SILICA µm SiO_2 l^{-1}	UREA µm N l^{-1}	NITRITE µm N l^{-1}	CHL	PHAEO	ACID RATIO
38A	29/10/01	2.1	0.95	0.49	3.72	3.37		0.17	0.58	0.16	1.76
38A	29/10/01	11.3	0.89	0.47	3.48	3.30		0.15	0.60	0.14	1.79
38A	29/10/01	20.8	0.92	0.47	3.47	3.30		0.15	0.58	0.16	1.76
38A	29/10/01	41.7	0.92	0.47	3.46	3.31		0.15	0.58	0.16	1.76
38A	29/10/01	61.4	0.99	0.52	3.65	3.36		0.17	0.26	0.14	1.78
38A	29/10/01	84.4	1.05	0.50	3.45	3.36		0.17	0.50	0.18	1.71

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Table 6.

IRISH SEA OCEANOGRAPHY 2001

Depth profile samples (29 October2001)

STATION	DATE	DEPTH M	AMMONIA $\mu m\ N\ l^{-1}$	PHOSPHATE $\mu m\ P\ l^{-1}$	INORG N $\mu m\ N\ l^{-1}$	SILICA $\mu m\ SiO_2\ l^{-1}$	UREA $\mu m\ N\ l^{-1}$	NITRITE $\mu m\ N\ l^{-1}$	CHL	PHAEO	ACID RATIO
47	29/10/01	2.1	1.81	0.76	6.63	5.83		0.98	1.93	0.48	1.85
47	29/10/01	7.2	1.70	0.72	6.47	5.76		0.95	2.00	0.63	1.81
47	29/10/01	10.2	1.72	0.73	6.48	5.76		0.94	2.00	0.71	1.78
47	29/10/01	16.7	1.86	0.74	6.82	5.78		1.03	2.07	0.56	1.83

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Table 7.