

**GLOBAL CHANGE 93**

**RV BELGICA CRUISE 93/09**

**PARTICIPATING LABORATORIES FROM :**

**ULB - MUMM - VUB - ULg - IMM - SUDO - ENS**

**MUMM contribution**

---

**Sampling stations position and depth.**

**General trackplot.**

**SCTD data : temperature, salinity, depth.**

**PRELIMINARY DATA**

**Authors : J. BACKERS, A. POLLENTIER.**

**Ministry of Public Health and Environment**

**Management Unit of the North Sea and  
Scheldt Estuary Mathematical Model**

**B-8400 Oostende  
3e & 23e Linierregimentsplein**

**Tel.:059/70.01.31  
Fax.:059/70.49.35**

# GLOBAL CHANGE 1993

## RV BELGICA CRUISE 93/09.

---

### Preliminary Data

---

### CONTENTS

---

1. Position of the SCTD stations . . . . . Table 1 & Figure 1.
  2. Trackplots of cruise 93/09 RV BELGICA. . . . . Figure 2.
  3. Horizontal profiles of temperature and salinity . . . . . Figure 3 to 5.
  4. Sea-Bird SBE9 SCTD data at the sampling stations : . . . . Table 2 to 41.
    - date and time of vertical profile(s).
    - bathymetric depth.
    - type and number of sampling bottles.
    - temperature, salinity, DO, density at sampling depths.
  5. Sea-Bird SBE9 SCTD vertical profiles . . . . . Figure 6 to 50.
-

## 1. Position of the SCTD stations.

The RV Belgica cruise 93/09 took place from 19 April until 06 May 1993. During the first leg of the cruise a number of surface water samples have been taken in the Channel (stations 1 to 9).

The position of these stations and all relevant data are given in the chief scientist's cruise report (Prof. R. Wollast (ULB)).

During part two of the first leg the Belgica stayed at the station 10 in the Gulf of Biscay for about 36 hours. The mooring planned in the front of La Coruna had to be cancelled due to the bad weather conditions. The Belgica touched Vigo from 24 till 27 April.

During the first part of leg two, water samples were taken in 3 estuaries (Ria de Vigo, Ria de Arosa and Ria de Muros) while also measurements were performed along the 200 m depth line in front of Galicia. After a short stop at La Coruna for the debarkation of several scientists, leg two continued with the sampling at stations 10 and 18 to 27. The Belgica arrived at Zeebrugge on 06 May.

Table 1 gives the position, the waterdepth, the date and time of the SCTD vertical profiles. All these profiles have taken with the Sea-Bird SBE9 except for the stations RV3, RV4 and 11 which were taken with the Sea-Bird SBE19 Seacat profiler due to a failure of the oceanographic cable.

Figure 1 gives a map with the position of the sampling stations while figure 2 shows a trackplot of the cruise.

In figures 3 to 5 the surface temperature and salinity are plotted in function of time. For the passage Zeebrugge to Vigo the data were acquired with the SBE19 Seacat profiler. From Vigo on, the newly installed Sea-Bird SBE21 thermosalinograph was used.

Table 1. Position SCTD stations GLOBAL CHANGE 93/09.

Station number	Date 1993	Time of V.P.( <sup>1</sup> )	Latitude	Longitude	Water Depth	Data file
10A	21.04	17h04	N 47 25.16	W 07 16.09	1850	GL9310A
10B	21.04	19h02	N 47 25.06	W 07 15.66	1924	GL9310B
10C	21.04	22h34	N 47 25.04	W 07 16.55	1746	GL9310C
10D	22.04	07h34	N 47 24.98	W 07 15.95	1900	GL9310D
10E	22.04	09h07	N 47 24.71	W 07 15.68	1974	GL9310E
10F	22.04	11h35	N 47 24.81	W 07 15.87	1900	GL9310F
RV1	27.04	11h47	N 42 16.88	W 08 40.38	24	GLRV1
RV2	27.04	16h15	N 42 15.92	W 08 42.23	24	GLRV2
RV3(?)	27.04	19h34	N 42 14.67	W 08 45.39	35	GLRV3
RV4(?)	27.04	20h27	N 42 12.03	W 08 50.27	42	GLRV4
RA5	29.04	07h41	N 42 36.99	W 08 49.88	11	GLRA5
RA6	29.04	09h06	N 42 35.17	W 08 52.63	42	GLRA6
RA7	29.04	10h10	N 42 32.44	W 08 56.07	55	GLRA7
RA8	29.04	11h15	N 42 29.26	W 08 58.03	64	GLRA8
RA9	29.04	12h15	N 42 26.12	W 08 58.60	69	GLRA9
RA10	29.04	13h22	N 42 23.74	W 09 02.93	101	GLRA10
RA11	29.04	14h41	N 42 20.09	W 09 10.83	149	GLRA11
RA12	29.04	15h59	N 42 18.21	W 09 15.40	199	GLRA12
11(?)	29.04	19h47	N 42 09.96	W 09 29.15	1220	GL9311
11A	30.04	08h57	N 42 09.59	W 09 29.16	1232	GL9311A
11B	30.04	14h26	N 42 09.73	W 09 29.55	1232	GL9311B
11C	30.04	16h30	N 42 09.91	W 09 28.89	1198	GL9311C
11D	30.04	19h10	N 42 09.55	W 09 29.43	1200	GL9311D
11E	30.04	20h11	N 42 09.53	W 09 28.86	1200	GL9311E
12	01.05	08h23	N 42 38.14	W 09 28.76	204	GL9312
RM1	01.05	10h03	N 42 38.91	W 09 26.81	155	GLRM1
RM2	01.05	11h53	N 42 41.15	W 09 12.46	105	GLRM2
RM3	01.05	13h38	N 42 42.97	W 09 05.55	54	GLRM3

Station number	Date 1993	Time of V.P. <sup>(1)</sup>	Latitude	Longitude	Water Depth	Data file
13	01.05	16h33	N 42 49.35	W 09 30.62	184	GL9313
14	01.05	19h39	N 43 09.40	W 09 31.36	191	GL9314
15	01.05	23h32	N 43 23.61	W 09 12.80	194	GL9315
16	02.05	02h49	N 43 35.33	W 08 51.15	187	GL9316
<del>10G</del>	03.05	09h35	N 47 24.60	W 07 16.06	1900	GL9310G
<del>10H</del>	01.05	11h22	N 47 24.10	W 07 16.47	1873	GL9310H
<del>10I</del>	03.05	18h30	N 47 22.95	W 07 18.29	2550	GL9310I
18	04.05	06h29	N 47 59.47	W 06 00.28	137	GL9318
19	04.05	12h58	N 48 39.92	W 05 00.56	107	GL9319
20	04.05	17h44	N 49 12.99	W 03 59.68	93	GL9320
21	04.05	22h09	N 49 46.19	W 03 00.21	73	GL9321
22	05.05	03h05	N 49 55.74	W 02 03.53	73	GL9322
23	05.05	07h47	N 50 06.91	W 01 00.12	55	GL9323
24	05.05	11h08	N 50 16.89	W 00 00.18	53	GL9324
25	05.05	15h10	N 50 27.43	E 00 59.75	36	GL9325
26	05.05	19h18	N 50 52.70	E 01 29.34	46	GL9326
27	05.05	21h48	N 51 02.20	E 01 46.26	30	GL9327

3<sup>rd</sup> May

Remarks:

(<sup>1</sup>) The time noted is the start time of the vertical profile.

(<sup>2</sup>) SCTD taken with Sea-Bird SBE19 profiler.

Figure 1.a. SCTD sampling stations Global Change RV Belgica cruise 93/09.

(except estuary stations)

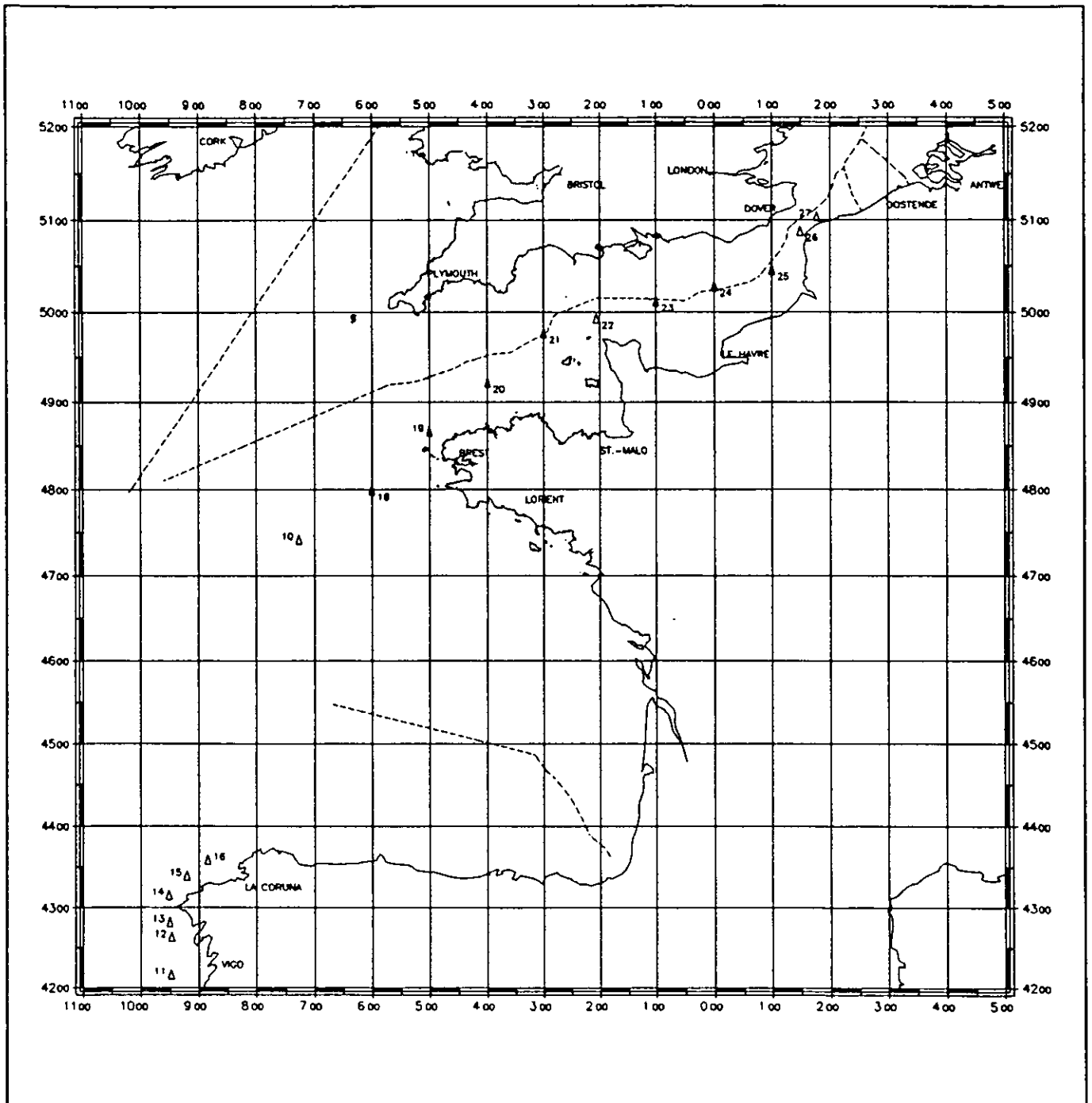


Figure 1.b. SCTD sampling stations Global Change RV Belgica cruise 93/09.

Spanish continental plat.

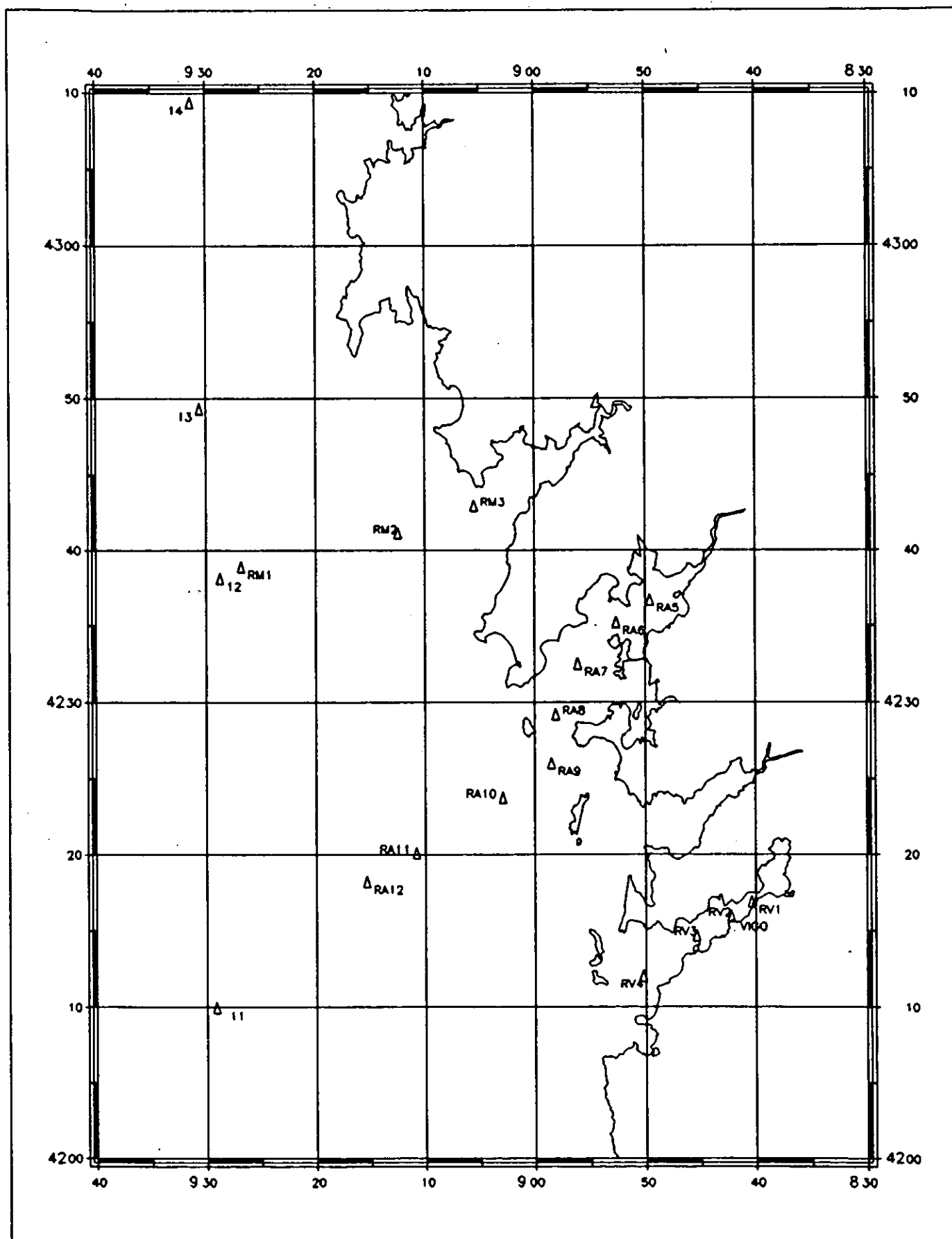


Figure 2.a. General Trackplot Global Change RV Belgica cruise 93/09.

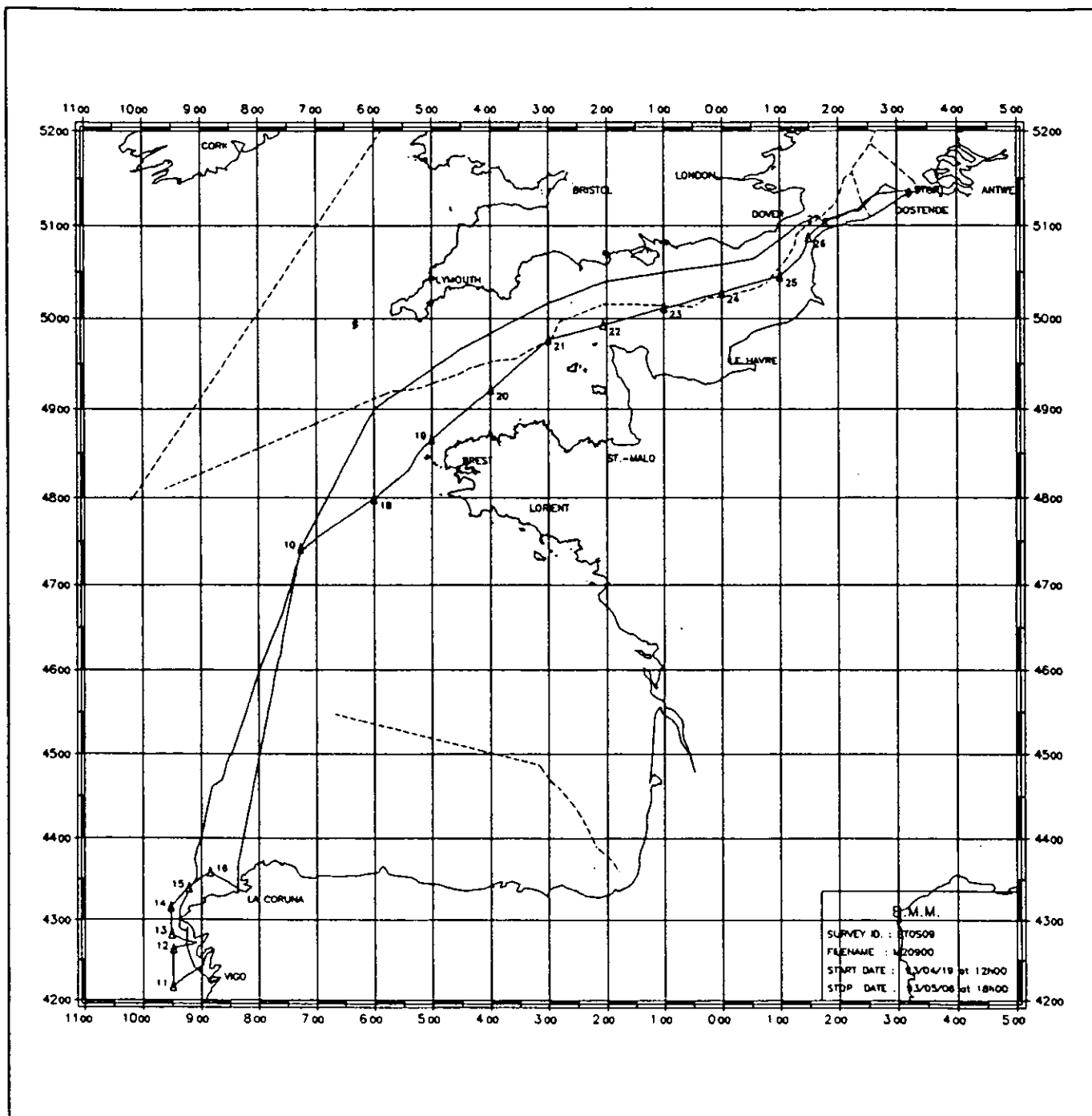
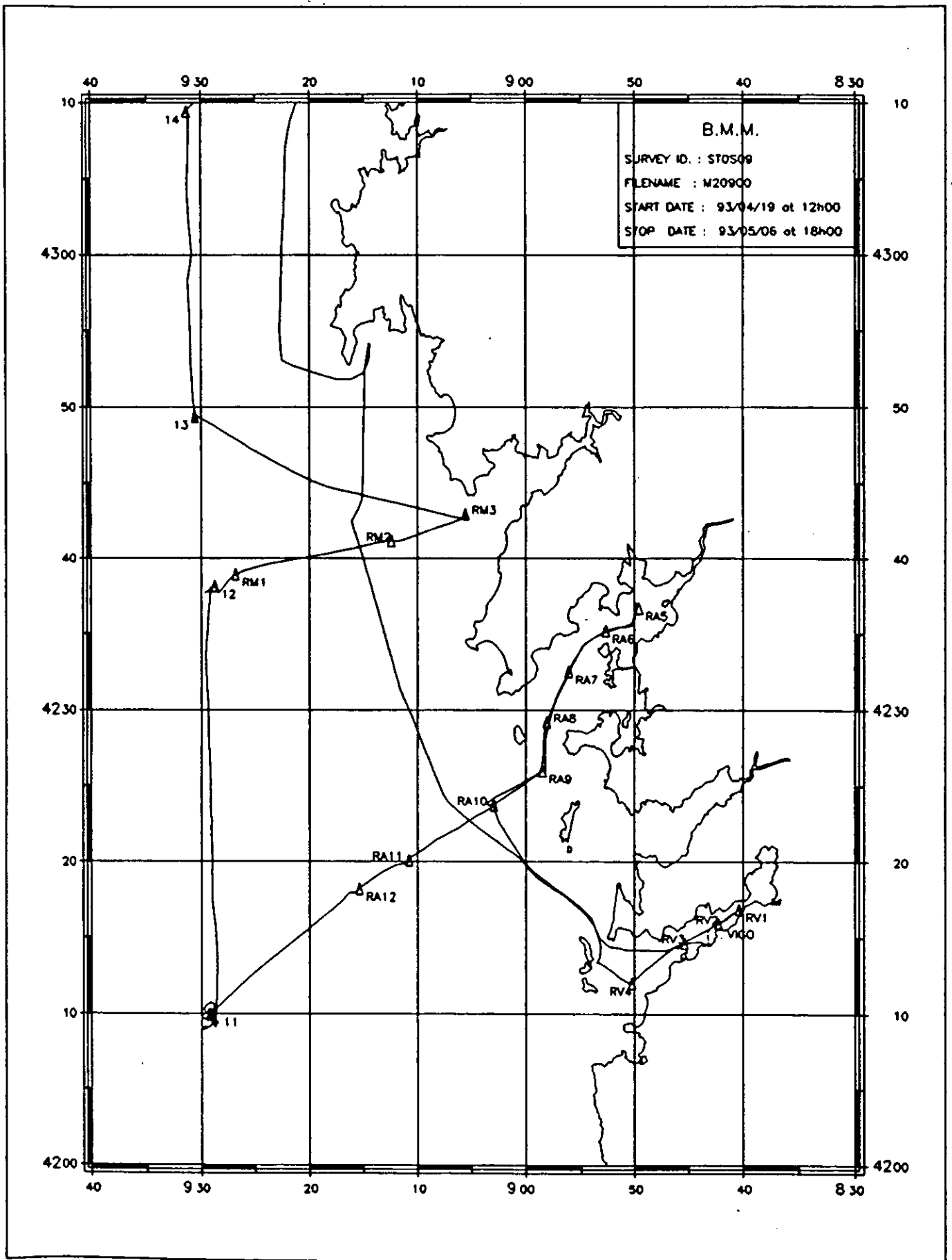




Figure 2.b. Detail Trackplot Global Change RV Belgica cruise 93/09.



Survey ID : GLOBAL CHANGE 1993. Startdate : 19.04.93.

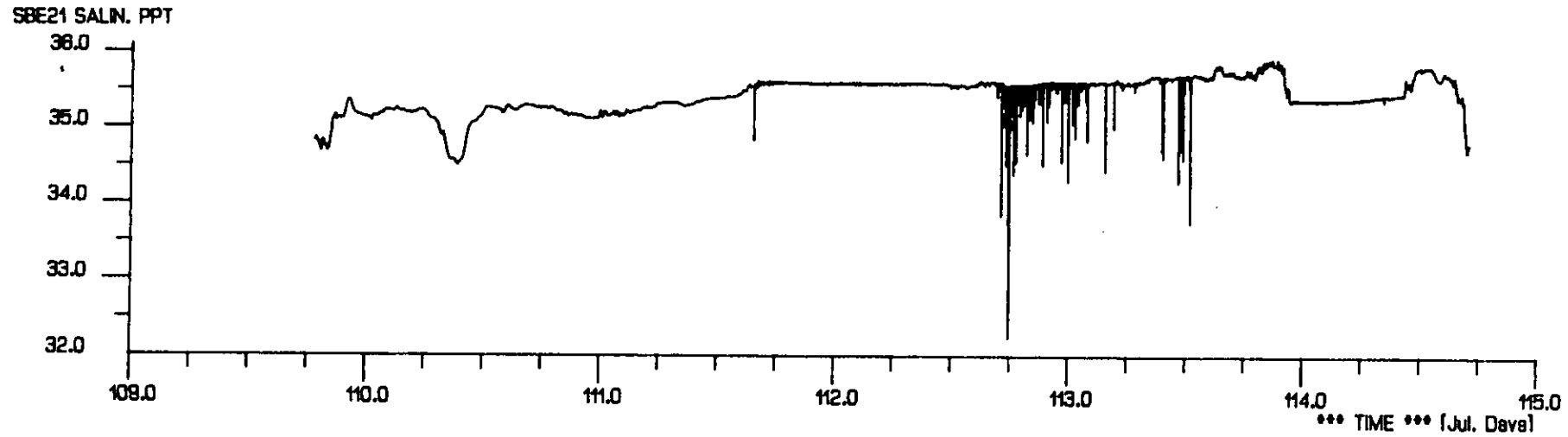
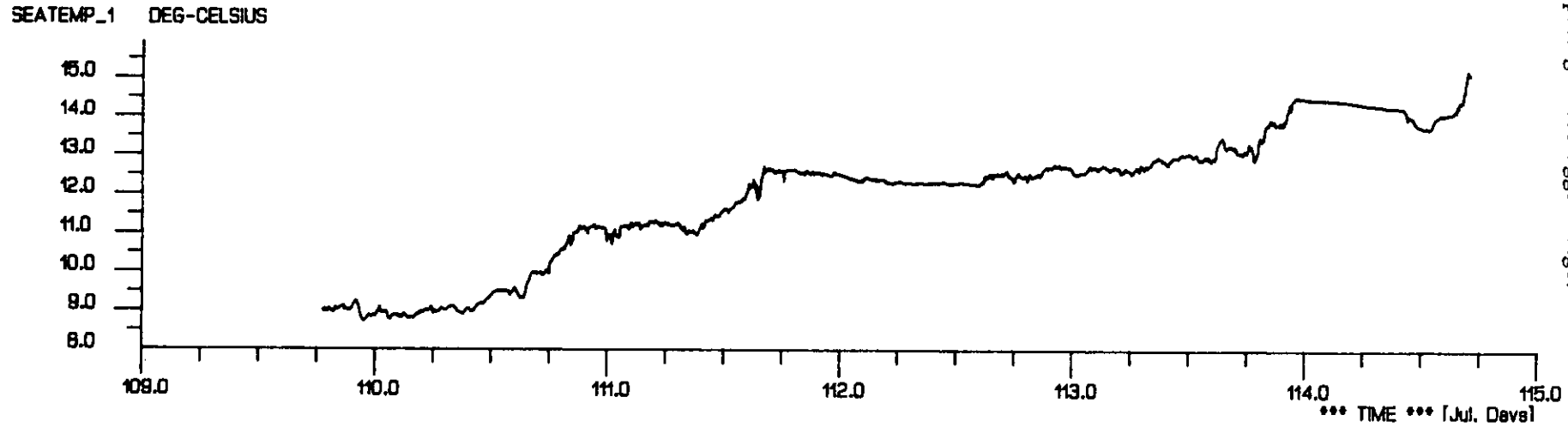
MUMM - Meetdienst Oostende.

File name : 030901

Stopdate : 24.04.93.

3. Horizontal profiles of temperature and salinity.

Figure 3. The passage Zeebrugge - Vigo.



Survey ID : GLOBAL CHANGE 1993.

Startdate : 27.04.93.

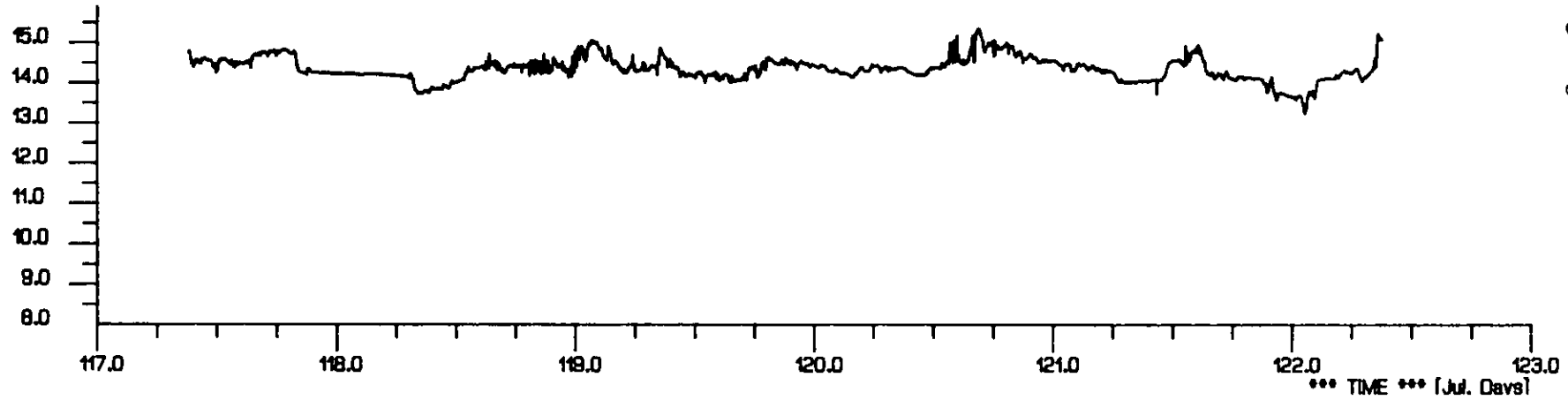
MUMM - Meetdienst Oostende.

File name : 030902

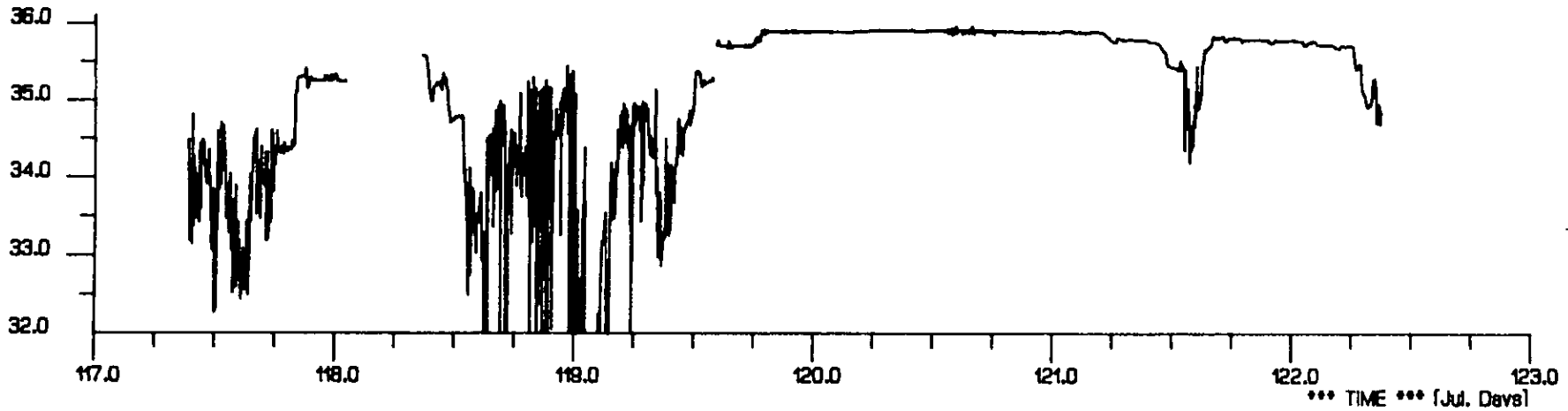
Stopdate : 02.05.93

Figure 4. The passage Vigo - La Coruna.

SEATEMP\_1 DEG-CELSIUS



SBE21 SALIN. PPT



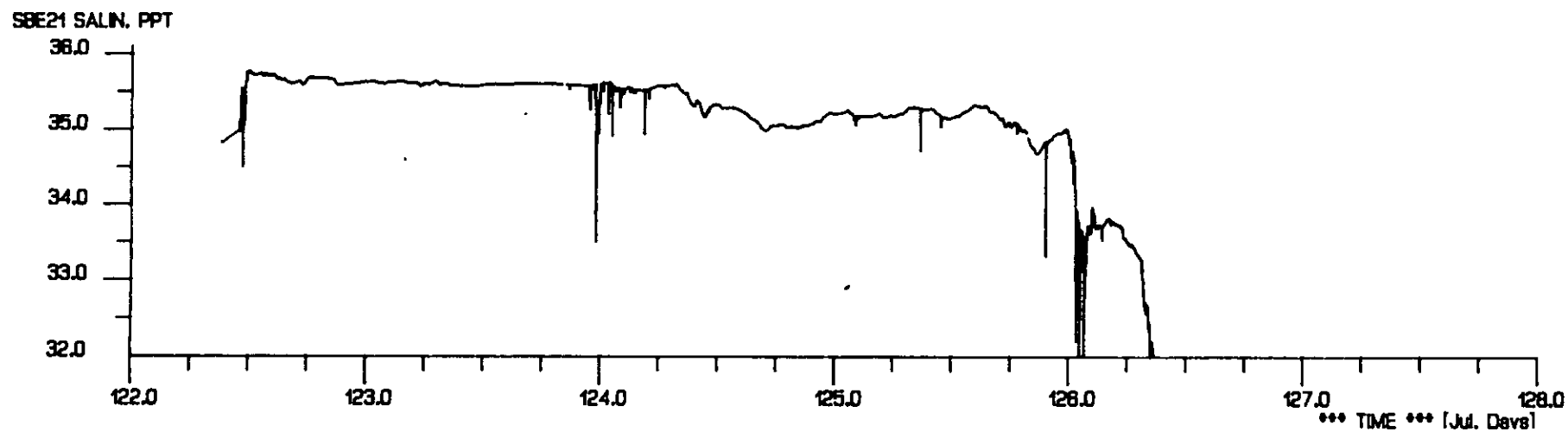
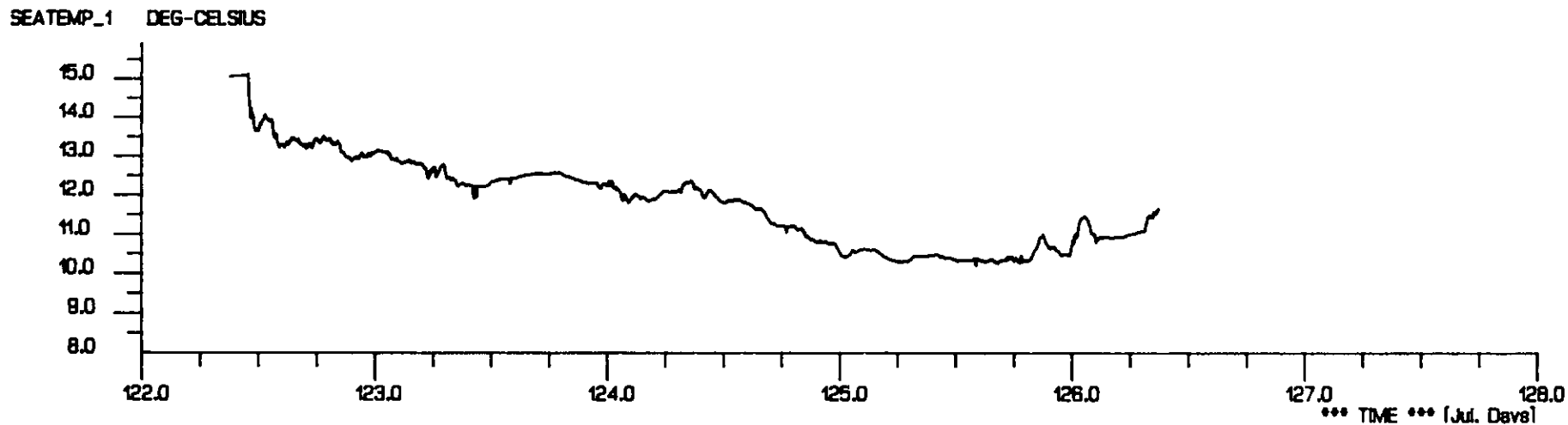
Survey ID : GLOBAL CHANGE 1993. Startdate : 02:05:93.

MUMM - Meetdienst Oostende.

File name : 030903

Stopdate : 06.05.93.

Figure 5. The passage La Coruna - Zeebrugge.



#### 4. Sea-Bird SBE9 SCTD data at the sampling stations.

In tables 2 to 41 the SCTD values are listed each time the water sampling bottles were closed. The sampling depth, the type of bottle and the number of bottles that were closed are also indicated.

In the figures 6 to 50 the SCTD downcast profiles are presented.

The SCTD profiles have been taken with the Sea-Bird SBE Model 9 profiler. Due to a failure of the oceanographic cable on the 27th of April the profiles in the "Ria de Vigo" RV3 and RV4 have been taken with the Sea-Bird Seacat Model 19. Another cable failure occurred on the 29th of April and consequently the profile number 11 again has been taken with the Sea-Bird Seacat.

The dissolved oxygen (DO) values measured by the Sea-Bird Model 9 SCTD-system are raw data only. A postcalibration taking into account the ULg dissolved oxygen data will to be done.

In a number of stations pH data have been measured with the Sea-Bird SBE9 system. Also for these data a postcalibration taking into account the ULg pH data is necessary. These data will be included in the final report.

Table 2

Profile: Station 10 A

Date: 21.04.93

DOWNCAST: starttime: 17h04

bathy depth: 1850 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf.	GO	1	2.44	12.54	35.59	6.22	26.94
10	GO	1	9.1	12.30	35.60	6.27	26.99
20	GO	1	20.0	12.23	35.60	6.27	27.01
30	Ni	1	31.7	12.15	35.60	6.10	27.03
40	Ni	1	40.67	11.94	35.60	5.92	27.07
50	Ni	1	49.9	11.88	35.60	5.83	27.08
60	Ni	1	60.7	11.87	35.61	5.83	27.09
80	Ni	1	81.1	11.84	35.61	5.76	27.09
100	Ni	1	101.1	11.80	35.62	5.65	27.11
125	Ni	1	124.7	11.74	35.62	5.56	27.13
150	Ni	1	151.6	11.69	35.62	5.52	27.13
200	Ni	1	199.2	11.61	35.61	5.46	27.15
Surface			1.57	12.46	35.94	6.10	26.96
Bottom							

GO : GO FLO 10 liter sampling bottle.

NI : NISKIN 10 liter sampling bottle.

GOT : GO FLO 10 liter sampling bottle teflonised and tap altered (SUDO).

**Table 3****Profile: Station 10 B****Date: 21.04.93****DOWNCAST: starttime: 19h02****bathy depth: 1924 m**

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp: (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
20	Ni	3	20.36	12.23	35.599	6.24	27.01
20	GOT	1	20.36	12.23	35.599	6.24	27.01
40	Ni	3	39.96	11.87	35.603	5.87	27.08
40	GOT	1	39.96	11.87	35.603	5.87	27.08
60	Ni	3	60.37	11.87	35.605	5.73	27.09
60	GOT	1	60.37	11.87	35.605	5.73	27.09
Surface			3.99	12.57	35.598	6.20	26.94
Bottom							

Table 4

Profile: Station 10 C

Date: 21.04.93

DOWNCAST: starttime: 22h34

bathy depth: 1746

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
90	Ni	3	89.73	11.79	35.59	5.78	27.09
90	GOT	1	89.73	11.79	35.59	5.78	27.09
130	Ni	3	131.3	11.71	35.61	5.58	27.12
130	GOT	1	131.3	11.71	35.61	5.58	27.12
200	Ni	3	200.6	11.58	35.60	5.47	27.14
200	GOT	1	200.6	11.58	35.60	5.47	27.14
Surface			3.15	12.48	35.59	6.15	26.95
Bottom							



Table 5

Profile: Station 10 D

Date: 22.04.93

DOWNCAST: starttime: 07h34

bathy depth: 1900 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
5	Ni	1	3.24	12.23	35.59	6.34	27.00
5	GO	1	3.24	12.23	35.59	6.34	27.00
5	Ni	1	3.24	12.23	35.59	6.34	27.00
20	Ni	2	18.68	12.22	35.59	6.24	27.00
40	Ni	3	40.80	12.08	35.59	6.08	27.03
50	Ni	2	49.99	11.89	35.59	5.83	27.07
60	Ni	2	60.25	11.85	35.59	5.70	27.08
Surface							
Bottom							

Table 6

Profile: Station 10 E

Date: 22.04.93

DOWNCAST: starttime: 09h07

bathy depth: 1974 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
300	Ni	1	303	11.38	35.59	5.15	27.18
400	Ni	1	401	11.25	35.59	5.11	27.20
500	Ni	1	497	10.90	35.55	4.92	27.23
600	Ni	1	599	10.40	35.50	4.66	27.28
700	Ni	1	700	10.09	35.51	4.40	27.35
800	Ni	1	801	9.83	35.57	4.26	27.44
900	Ni	1	901	9.72	35.63	4.23	27.51
1000	Ni	1	999	9.40	35.66	4.19	27.59
1100	Ni	1	1101	8.99	35.64	4.21	27.64
1200	Ni	1	1201	8.12	35.54	4.39	27.70
1350	Ni	1	1349	7.14	35.40	4.61	27.74
1500	Ni	1	1500	6.09	35.26	4.84	27.77
Surface							
Bottom							

Table 7

Profile: Station 10 F

Date: 22.04.93

DOWNCAST: starttime: 11h35

bathy depth: 1900 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
300	Ni	3	301	11.34	35.58	5.11	27.17
300	GOT	1	301	11.34	35.58	5.11	27.21
450	Ni	3	452	11.07	35.56	5.04	27.21
450	GOT	1	452	11.07	35.56	5.04	27.21
600	Ni	3	601	10.40	35.49	4.63	27.28
600	GOT	1	601	10.40	35.49	4.63	27.28
Surface							
Bottom							

**Table 8**

Profile: Ria de Vigo RV1

Date: 27.04.93

DOWNCAST: starttime: 11h47

bathy depth: 24 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
-1	Ni	4	1.22	14.28	32.87	4.96	24.48
-4	Ni	2	4.08	14.56	35.06	4.72	26.12
-8	Ni	2	7.85	14.54	35.22	4.71	26.25
-16	Ni	2	15.98	14.39	35.43	4.79	26.44
-20	Ni	2	20.59	14.24	35.53	4.48	26.55
Surface							
Bottom							

Table 9

Profile: Ria de Arosa RA5

Date: 29.04.93

DOWNCAST: starttime: 07h40

bathy depth: 11 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
S	Ni	2	1.24	14.75	31.40	6.39	23.25
5	Ni	2	5.09	13.89	35.48	4.59	26.58
10	Ni	2	9.85	13.84	35.53	4.42	26.63
Surface							
Bottom							

Table 10

Profile: Ria de Arosa RA6

Date: 29.04.93

DOWNCAST: starttime: 09h05

bathy depth: 42 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
S	Ni	4	0.92	14.58	33.24	6.01	24.71
3	Ni	1	3.39	14.25	34.65	5.52	25.86
5	Ni	1	5.48	14.20	34.84	5.38	26.02
10	Ni	1	10.12	13.76	35.54	4.88	26.66
15	Ni	1	15.28	13.50	35.70	4.69	26.83
20	Ni	1	20.23	13.39	35.76	4.67	26.90
25	Ni	1	25.16	13.23	35.81	4.53	26.98
30	Ni	1	30.22	13.21	35.82	4.48	26.99
40	Ni	1	40.03	13.20	35.82	4.40	26.99
Surface			0.30	14.53	33.07	5.91	24.59
Bottom			39.78	13.20	35.82	4.41	26.99

Table 11

Profile: Ria de Arosa RA7

Date: 29.04.93

DOWNCAST: starttime: 10h10

bathy depth: 55 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
S	Ni	6	1.06	14.34	33.96	5.95	25.31
5	Ni	1	5.04	13.93	35.03	5.36	26.23
10	Ni	1	10.41	13.77	35.50	4.89	26.63
20	Ni	1	20.73	13.51	35.67	4.69	26.81
30	Ni	1	30.64	13.28	35.78	4.51	26.94
40	Ni	1	40.55	13.12	35.82	4.49	27.01
50	Ni	1	50.58	13.03	35.82	4.42	27.03
Surface			0.30	14.27	33.70	5.81	25.13
Bottom			52.66	13.03	35.82	4.43	27.03

Table 12Profile: Ria de Arosa RA8Date: 29.04.93DOWNCAST: starttime: 11H15

bathy depth: 64 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
S	Ni	5	0.92	14.12	34.67	5.78	25.91
5	Ni	1	5.46	13.99	35.05	5.54	26.23
10	Ni	1	10.30	13.83	35.44	5.31	26.57
20	Ni	1	20.13	13.53	35.71	5.01	26.83
30	Ni	1	30.08	13.26	35.80	4.83	26.96
40	Ni	1	40.52	13.27	35.84	4.86	26.99
50	Ni	1	50.24	13.07	35.83	4.80	27.02
60	Ni	1	59.79	13.07	35.83	4.74	27.02
Surface			0.21	14.08	34.73	5.61	25.96
Bottom			61.59	13.07	35.83	4.76	27.02



Table 13

Profile: Ria de Arosa RA9

Date: 29.04.93

DOWNCAST: starttime: 12h15

bathy depth: 68 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
S	Ni	6	1.41	14.18	35.38	5.60	26.44
10	Ni	1	9.86	14.15	35.38	5.61	26.45
20	Ni	1	20.10	14.14	35.38	5.62	26.45
30	Ni	1	29.89	13.75	35.64	5.39	26.74
40	Ni	1	40.42	13.30	35.83	4.82	26.98
50	Ni	1	50.28	13.10	35.83	4.89	27.02
60	Ni	1	59.95	13.04	35.83	4.78	27.03
Surface			0.13	14.29	35.38	5.54	26.42
Bottom			66.22	12.96	35.82	4.73	27.04

Table 14

Profile: Ria de Arosa RA10

Date: 29.04.93

DOWNCAST: starttime: 13h00

bathy depth: 101 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
S	Ni	3	1.68	14.15	35.26	5.63	26.36
10	Ni	1	10.83	13.86	35.54	5.61	26.63
20	Ni	1	20.44	13.68	35.68	5.46	26.78
30	Ni	1	30.28	13.41	35.79	5.24	26.92
40	Ni	1	40.67	13.27	35.82	5.09	26.98
50	Ni	1	50.33	13.11	35.82	4.95	27.01
60	Ni	1	59.93	13.06	35.82	4.90	27.02
80	Ni	1	79.70	13.02	35.82	4.89	27.03
90	Ni	1	90.18	12.62	35.77	4.77	27.07
100	Ni	1	100.13	11.61	35.66	4.57	27.18
Surface			1.59	14.07	35.30	5.59	26.41
Bottom			98.54	11.61	35.66	4.57	27.18

Table 15

Profile: Ria de Arosa RA11

Date: 29.04.93

DOWNCAST: starttime: 14h40

bathy depth: 149 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
S	Ni	2	1.50	14.12	35.71	5.54	26.71
10	Ni	1	10.52	13.88	35.72	5.54	26.77
20	Ni	1	20.22	13.83	35.75	5.54	26.81
30	Ni	1	29.94	13.73	35.81	5.51	26.87
40	Ni	1	40.12	13.61	35.86	5.34	26.94
60	Ni	1	60.83	13.43	35.85	5.24	26.97
80	Ni	1	79.8	13.32	35.85	5.14	26.99
90	Ni	1	89.89	13.15	35.83	5.15	27.01
100	Ni	1	100.7	13.01	35.82	5.00	27.03
120	Ni	1	119.8	12.61	35.76	4.82	27.07
140	Ni	1	139.7	12.19	35.70	4.74	27.10
Surface			2.00	14.08	35.71	5.47	26.72
Bottom			141.3	12.18	35.70	4.74	27.11

**Table 16****Profile: Station 11A****Date: 30.04.93****DOWNCAST: starttime: 8h57****bathy depth: 1232 m**

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
30	Ni	1	29.41	13.85	35.90	5.50	26.92
50	Ni	1	51.03	13.82	35.90	5.46	26.93
500	Ni	1	500.2	11.11	35.59	4.81	27.22
600	Ni	2	600.0	10.90	35.66	4.37	27.32
800	Ni	2	799.6	11.17	35.99	4.13	27.53
800	GOT	1	799.6	11.17	35.99	4.13	27.53
1000	GOT	1	999.9	10.90	36.07	4.18	27.65
1000	Ni	2	999.9	10.90	36.07	4.18	27.65
1000	GOT	1	999.9	10.90	36.07	4.18	27.65
Surface			2.16	14.31	35.91	5.78	26.83
Bottom			1100.4	10.72	36.07	4.21	27.68

Table 17

Profile: Station 11B

Date: 30.04.93

DOWNCAST: starttime: 14h26

bathy depth: 1198 m

*Mistake  
There are pressures.*

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
500	Ni	4	500.9	10.97	35.63	4.58	27.29
600	GOT	2	600.0	10.94	35.72	4.37	27.36
800	Ni	3	800.0	11.12	35.98	4.21	27.54
800	GOT	1	800.0	11.12	35.98	4.21	27.54
Surface			2.02	14.49	35.91	5.99	26.79
Bottom							

*Other*

Table 18

Profile: Station 11C

Date: 30.04.93

DOWNCAST: starttime: 16h30

bathy depth: 1200 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
100	Ni	3	99.7	13.81	35.91	5.39	26.93
200	Ni	1	199.8	12.82	35.78	4.98	27.04
200	GOT	1	199.8	12.82	35.78	4.98	27.04
300	GOT	1	300.3	11.85	35.64	4.88	27.13
400	GOT	1	400.4	11.30	35.59	4.93	27.19
Surface			11.79	14.36	35.92	5.83	26.82
Bottom							

Table 19

Profile: Station 11D

Date: 30.04.93

DOWNCAST: starttime: 19h10

bathy depth: 1200 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
140	GOT	2	138.2	13.54	35.90	5.14	26.98
200	GOT	1	202.5	12.79	35.78	4.91	27.05
Surface			4.64	14.88	35.90	5.76	26.70
Bottom							

Table 20

Profile: Station 11E

Date: 30.04.93

DOWNCAST: starttime: 20h11

bathy depth: 1200 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
2	Ni	1	3.04	14.70	35.89	5.89	26.72
10	Ni	2	10.91	14.37	35.88	5.98	26.79
10	GOT	1	10.91	14.37	35.88	5.98	26.79
20	Ni	3	20.26	14.10	35.89	5.88	26.86
30	Ni	1	30.22	13.96	35.91	5.63	26.90
50	Ni	1	49.64	13.87	35.92	5.41	26.93
50	GOT	1	49.64	13.87	35.92	5.41	26.93
80	GOT	1	81.06	13.83	35.92	5.31	26.94
Surface			3.55	14.61	35.89	5.79	26.75
Bottom							



Table 21

Profile: Station 12

Date: 01.05.93

DOWNCAST: starttime: 8h20

bathy depth: 204 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
0	Ni	1	1.87	13.96	35.79	5.95	26.81
10	Ni	1	11.04	13.96	35.79	5.89	26.81
20	Ni	1	20.37	13.61	35.83	5.67	26.91
40	Ni	1	40.58	13.52	35.84	5.55	26.94
60	Ni	1	61.17	13.35	35.84	5.37	26.98
20	GOT	1	19.98	13.68	35.82	5.72	26.89
80	Ni	1	79.69	13.22	35.84	5.31	27.00
120	Ni	1	120.9	12.98	35.81	5.18	27.03
140	Ni	1	140.4	12.92	35.81	5.15	27.04
160	Ni	1	160.2	12.84	35.80	5.11	27.05
180	Ni	1	180.2	12.58	35.76	5.02	27.07
180	GOT	1	180.2	12.58	35.76	5.02	27.07
Surface			1.85	13.94	35.79	5.99	26.81
Bottom			196.9	12.58	35.76	5.02	27.08

Table 22

Profile: Ria de Muros RM1

Date: 01.05.93

DOWNCAST: starttime: 10h05

bathy depth: 155 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
S	Ni	1	1.21	14.01	35.76	5.89	26.77
10	Ni	1	10.46	14.01	35.76	5.91	26.78
20	Ni	1	20.35	13.63	35.83	5.69	26.91
40	Ni	1	40.11	13.61	35.83	5.64	26.92
60	Ni	1	60.18	13.57	35.84	5.62	26.93
80	Ni	1	80.77	13.43	35.85	5.45	26.97
100	Ni	1	100.89	13.25	35.85	5.27	27.00
120	Ni	1	119.9	13.08	35.83	5.17	27.03
130	Ni	1	130.8	12.96	35.82	5.09	27.04
140	Ni	1	139.9	12.74	35.79	4.93	27.06
Surface			1.47	14.01	35.76	5.83	26.77
Bottom			144.9	12.71	35.79	4.92	27.06

Table 23

Profile: Ria de Muros RM2

Date: 01.05.93

DOWNCAST: starttime: 11h55

bathy depth: 105 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
0	Ni	1	1.38	14.57	35.42	5.72	26.39
10	Ni	1	10.36	14.07	35.60	5.77	26.64
15	Ni	1	14.85	13.63	35.72	5.54	26.82
20	Ni	1	19.93	13.43	35.78	5.35	26.91
40	Ni	1	40.05	13.17	35.82	5.24	26.99
50	Ni	1	50.61	13.00	35.81	5.21	27.02
60	Ni	1	60.46	12.84	35.79	5.13	27.04
80	Ni	1	80.41	12.44	35.74	5.00	27.08
90	Ni	1	90.17	12.27	35.72	4.87	27.09
Surface			2.41	14.49	35.44	5.68	26.42
Bottom			94.93	12.26	35.72	4.86	27.10

Table 24

Profile: Ria de Muros RM3

Date: 01.05.93

DOWNCAST: starttime: 13h38

bathy depth: 54 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
0	Ni	1	2.43	14.73	34.31	6.06	25.50
5	Ni	1	5.21	14.74	34.19	6.08	25.40
10	Ni	1	10.13	14.28	34.42	5.78	26.45
15	Ni	1	14.91	14.17	35.52	5.78	26.56
20	Ni	1	20.21	13.66	35.73	5.34	26.83
30	Ni	1	30.27	13.48	35.78	5.21	26.90
40	Ni	1	40.40	13.27	35.84	4.57	26.99
46	Ni	1	46.94	13.25	35.84	4.56	27.00
Surface			1.72	14.47	34.99	5.81	26.08
Bottom			46.45	13.27	35.87	4.55	27.01

Table 25

Profile: Station 13

Date: 01.05.93

DOWNCAST: starttime: 16h33

bathy depth: 184 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
S	Ni	1	2.28	14.06	35.82	5.77	26.81
20	Ni	1	20.32	13.85	35.82	5.75	26.86
20	GOT	1	20.32	13.85	35.82	5.75	26.86
40	Ni	1	40.12	13.63	35.84	5.49	26.92
60	Ni	1	61.00	13.62	35.84	5.44	26.92
90	Ni	1	90.99	13.48	35.84	5.33	26.95
100	GOT	1	100.5	13.46	35.84	5.30	26.96
120	Ni	1	119.9	13.28	35.84	5.17	26.99
140	Ni	1	142.0	12.99	35.81	4.97	27.03
160	Ni	1	159.5	12.58	35.77	4.85	27.06
175	Ni	1	174.2	12.45	35.75	4.73	27.09
175	GOT	1	174.2	12.45	35.75	4.73	27.09
Surface			2.51	14.14	35.80	5.72	26.78
Bottom			173.6	12.49	35.76	4.78	27.09

Table 26

Profile: Station 14

Date: 01.05.93

DOWNCAST: starttime: 19h35

bathy depth: 191 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\sigma_t$
S	Ni	1	1.51	14.05	35.80	5.89	26.79
10	Ni	1	10.56	13.98	35.80	5.87	26.81
30	GOT	1	30.25	13.68	35.87	5.45	26.93
30	Ni	1	30.25	13.68	35.87	5.45	26.93
50	Ni	1	49.70	13.42	35.84	5.35	26.96
70	Ni	1	68.87	12.85	35.76	5.41	27.02
100	GOT	1	99.31	12.75	35.76	5.32	27.03
100	Ni	1	99.31	12.75	35.76	5.32	27.03
130	Ni	1	130.9	12.69	35.76	5.21	27.04
160	Ni	1	160.7	12.55	35.74	5.14	27.06
175	Ni	1	178.8	12.40	35.72	5.03	27.08
175	GOT	1	178.8	12.40	35.72	5.03	27.08
Surface			2.61	14.06	35.79	5.80	26.79
Bottom							

Table 27

Profile: Station 15

Date: 01.05.93

DOWNCAST: starttime: 23H32

bathy depth: 194 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
0	Ni	1	2.95	13.59	35.79	5.64	26.88
20	Ni	1	20.60	13.26	35.79	5.45	26.95
20	GOT	1	20.60	13.26	35.79	5.45	26.95
40	Ni	1	40.06	13.20	35.80	5.37	26.97
60	Ni	1	60.20	12.82	35.76	5.29	27.02
80	Ni	1	80.32	12.72	35.75	5.21	27.04
100	GOT	1	99.96	12.60	35.74	5.12	27.05
100	Ni	1	99.96	12.60	35.74	5.12	27.05
130	Ni	1	129.8	12.42	35.72	5.05	27.07
160	Ni	1	160.3	12.37	35.72	5.02	27.08
175	Ni	1	175.7	12.34	35.72	4.95	27.09
175	GOT	1	175.7	12.34	35.72	4.95	27.09
Surface			4.28	13.61	35.78	5.72	26.87
Bottom			183.9	12.35	35.72	4.94	27.09

Table 28

Profile: Station 16

Date: 02.05.93

DOWNCAST: starttime: 02h49

bathy depth: 187 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
0	Ni	1	2.55	14.02	35.73	5.89	26.75
10	Ni	1	10.21	13.56	35.77	5.78	26.87
40	GOT	1	39.97	13.20	35.79	5.35	26.97
40	Ni	1	39.97	13.20	35.79	5.35	26.97
80	Ni	1	80.15	13.01	35.81	5.19	27.02
100	Ni	1	100.22	12.83	35.79	5.05	27.04
100	GOT	1	100.22	12.83	35.79	5.05	27.04
120	Ni	1	120.35	12.63	35.76	4.99	27.06
140	Ni	1	139.97	12.55	35.75	4.95	27.07
160	Ni	1	-	12.32	35.72	4.93	27.09
175	Ni	1	176.16	12.30	35.71	4.93	27.09
175	GOT	1	176.16	12.30	35.71	4.93	27.09
Surface			3.33	14.02	35.73	5.84	26.75
Bottom							



Table 29

Profile: Station 10G

Date: 03.05.93

DOWNCAST: starttime: 9h35

bathy depth: 1900 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
-5	Ni	4	5.15	12.19	35.58	5.98	27.01
-10	Ni	1	10.55	12.19	35.58	5.99	27.01
-20	Ni	1	19.74	12.19	35.58	6.00	27.01
-30	Ni	1	29.56	12.19	35.58	6.06	27.01
-40	Ni	4	41.05	12.04	35.57	5.91	27.02
-60	Ni	1	60.65	11.74	35.57	5.71	27.09
Surface			2.77	12.19	35.58	5.97	27.01
Bottom			100.53	11.57	35.56	5.68	27.11

Table 30

Profile: Station 10H

Date: 03.05.93

DOWNCAST: starttime: 11h20

bathy depth: 1.873 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
400	Ni	1	400.5	11.15	35.58	5.00	27.21
600	Ni	1	600.5	10.61	35.52	4.75	27.27
800	Ni	1	800.9	10.14	35.60	4.23	27.41
975	Ni	2	976.8	9.78	35.74	4.08	27.59
975	GOT	1	976.8	9.78	35.74	4.08	27.59
1200	Ni	2	1200	8.27	35.57	4.35	27.70
1200	GOT	1	1200	8.27	35.57	4.35	27.70
1630	Ni	2	1632	5.21	35.14	5.17	27.78
1630	GOT	1	1632	5.21	35.14	5.17	27.78
Surface			2.30	12.15	35.58	5.85	27.01
Bottom							

Table 31

Profile: Station 10 I

Date: 03.05.93

DOWNCAST: starttime: 18h30

bathy depth: 2550 m

depth	sampling		SCTD values				
	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
5	Ni	1	3.22	12.49	35.61	5.70	26.97
25	Ni	1	24.54	12.47	35.61	5.75	26.97
50	Ni	1	49.86	12.33	35.61	5.66	26.99
75	Ni	1	74.10	11.96	35.60	5.48	27.06
100	Ni	1	101.0	11.81	35.60	5.35	27.09
150	Ni	1	150.6	11.66	35.61	5.25	27.13
200	Ni	1	199.6	11.67	35.62	5.25	27.14
600	GOT	1	600.4	10.67	35.54	4.63	27.27
700	Ni	2	698.7	10.35	35.56	4.32	27.34
700	GOT	1	698.7	10.35	35.56	4.32	27.34
800	GOT	1	801.8	10.06	35.65	4.05	27.47
Surface			4.61	12.51	35.61	5.72	26.96
Bottom							

Table 32

Profile: Station 18

Date: 04.05.93

DOWNCAST: starttime: 06h29

bathy depth: 137 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
Surf	Ni	2	2.24	12.03	35.58	5.65	27.04
-10	GOT	1	11.54	12.03	35.58	5.58	27.03
Surface							
Bottom			125.7	11.28	35.53	5.45	27.14

Table 33

Profile: Station 19

Date: 04.05.93

DOWNCAST: starttime: 12h58

bathy depth: 107 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\Theta$
Surf.	Ni	2	3.51	11.79	35.29	5.61	26.86
-10	GOT	1	11.54	11.79	35.29	5.57	26.86
Surface			2.70	11.79	35.29	5.58	26.86
Bottom			95.56	11.77	35.30	5.57	26.86

Table 34

Profile: Station 20

Date: 04.05.93

DOWNCAST: starttime: 17h44

bathy depth: 93 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf	Ni	2	2.48	11.15	35.05	5.68	26.79
-10	GOT	1	10.10	11.14	35.05	5.61	26.79
Surface							
Bottom			82.99	11.07	35.05	5.57	26.81

Table 35

Profile: Station 21

Date: 04.05.93

DOWNCAST: starttime: 22h09

bathy depth: 73 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf.	Ni	2	2.98	10.74	35.11	6.21	26.91
-10	GOT	1	10.34	10.75	35.11	6.22	26.91
Surface							
Bottom			64.83	10.73	35.13	6.16	26.92

Table 36Profile: Station 22Date: 05.05.93DOWNCAST: starttime: 03h05

bathy depth: 73 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf	Ni	2	3.10	10.55	35.18	5.79	27.00
-10	GOT	1	10.80	10.55	35.18	5.76	27.00
Surface							
Bottom			61.39	10.56	35.18	5.77	27.00

Table 37Profile: Station 23Date: 05.05.93DOWNCAST: starttime: 07h47

bathy depth: 55 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf.	Ni	2	1.90	10.37	35.30	5.72	27.12
-10	GOT	1	10.39	10.37	35.30	5.67	27.12
Surface							
Bottom			48.47	10.38	35.30	5.66	27.12

Table 38

Profile: Station 24

Date: 05.05.93

DOWNCAST: starttime: 11h08

bathy depth: 53 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf	Ni	2	1.92	10.33	35.17	5.78	27.03
-10	GOT	1	10.01	10.34	35.17	5.75	27.03
Surface							
Bottom			46.14	10.31	35.17	5.77	27.03

Table 39

Profile: Station 25

Date: 05.05.93

DOWNCAST: starttime: 15h10

bathy depth: 36 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf.	Ni	2	2.57	10.24	35.31	6.90	27.15
-10	GOT	1	10.22	10.23	35.31	6.77	27.16
Surface							
Bottom			29.83	10.16	35.31	6.66	27.17

Table 40

Profile: Station 26

Date: 05.05.93

DOWNCAST: starttime: 19h18

bathy depth: 46.2 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf	Ni	2	1.59	10.27	35.00	5.68	26.90
-10	GOT	1	10.44	10.27	35.00	5.65	26.91
Surface							
Bottom			38.07	10.25	35.01	5.65	26.92

Table 41

Profile: Station 27

Date: 05.05.93

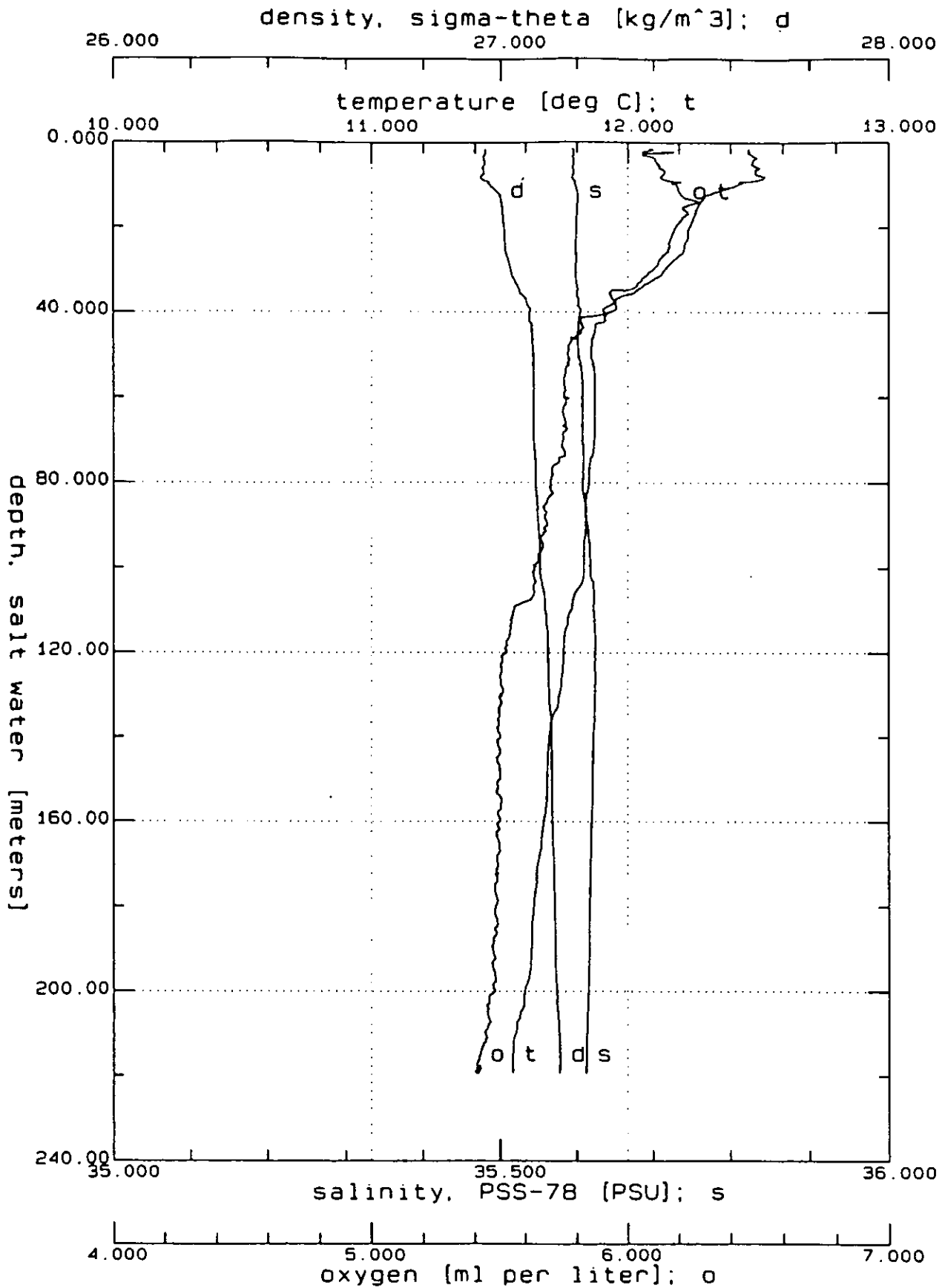
DOWNCAST: starttime: 21h48

bathy depth: 30 m

sampling			SCTD values				
depth	bottle type	no of bottles	depth (m)	temp. (°C)	salinity (ppt)	DO (ml/l)	density sig. $\theta$
Surf.	Ni	2	1.66	10.59	34.85	6.32	26.74
-10	GOT	1	10.37	10.59	34.85	6.31	26.73
Surface							
Bottom			25.72	10.58	34.85	6.31	26.73

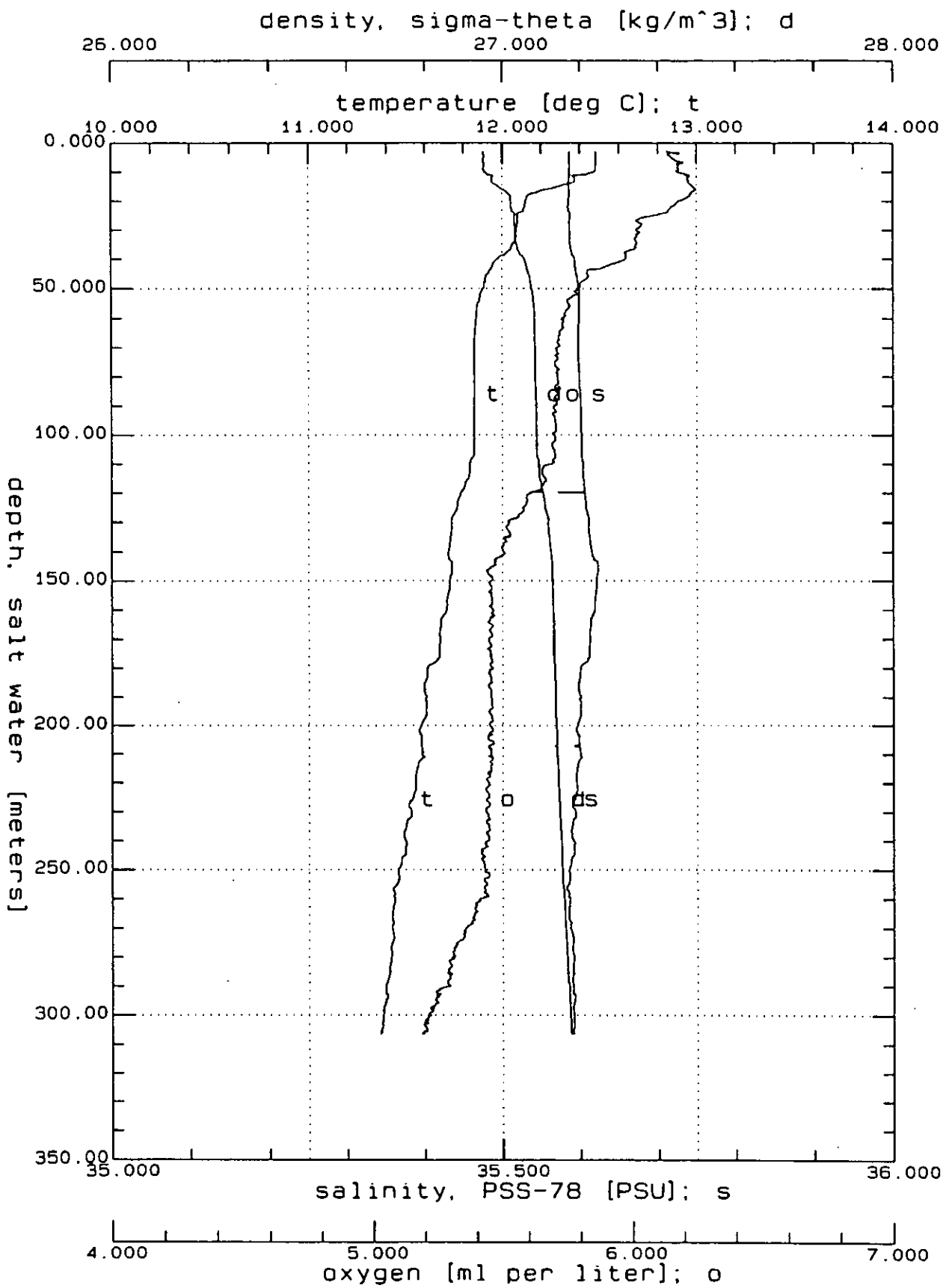


4. Sea-Bird SBE9 SCTD vertical profiles



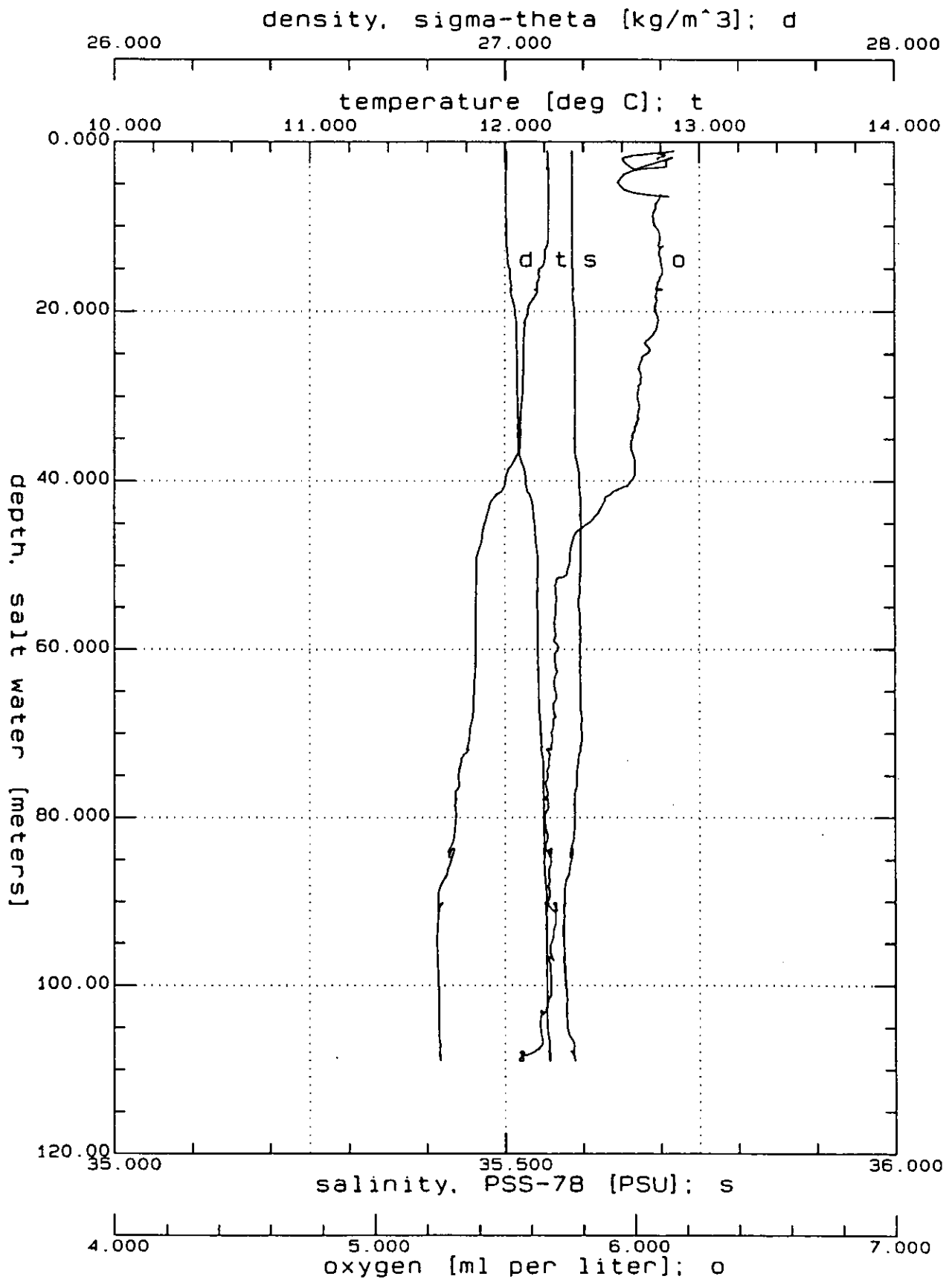
GL9310A.CNV: Station 10A 21.04.93 at 17h04

Figure 6



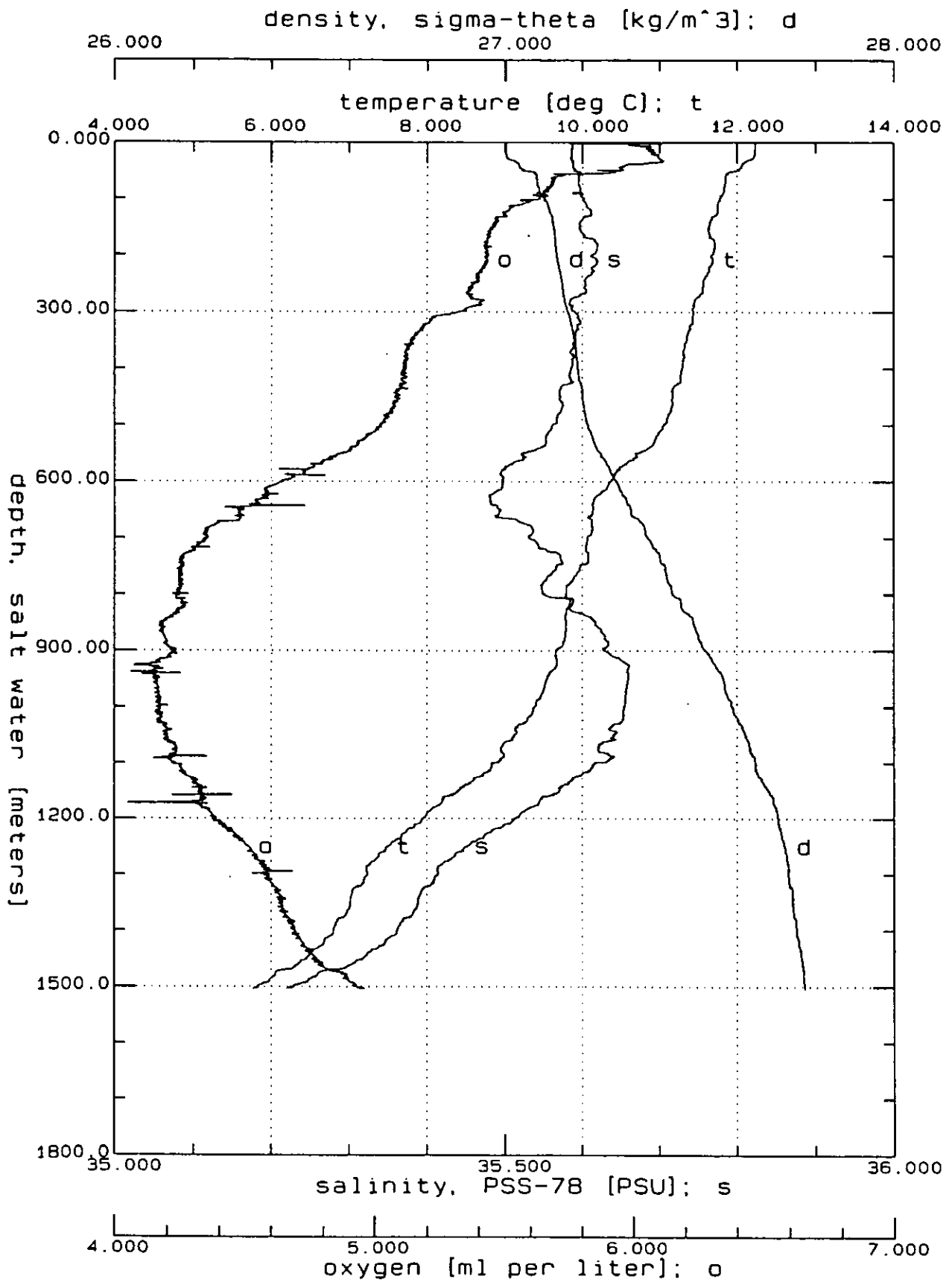
GL9310C.CNV: Station 10C 21.04.93 at 22.34

Figure 7



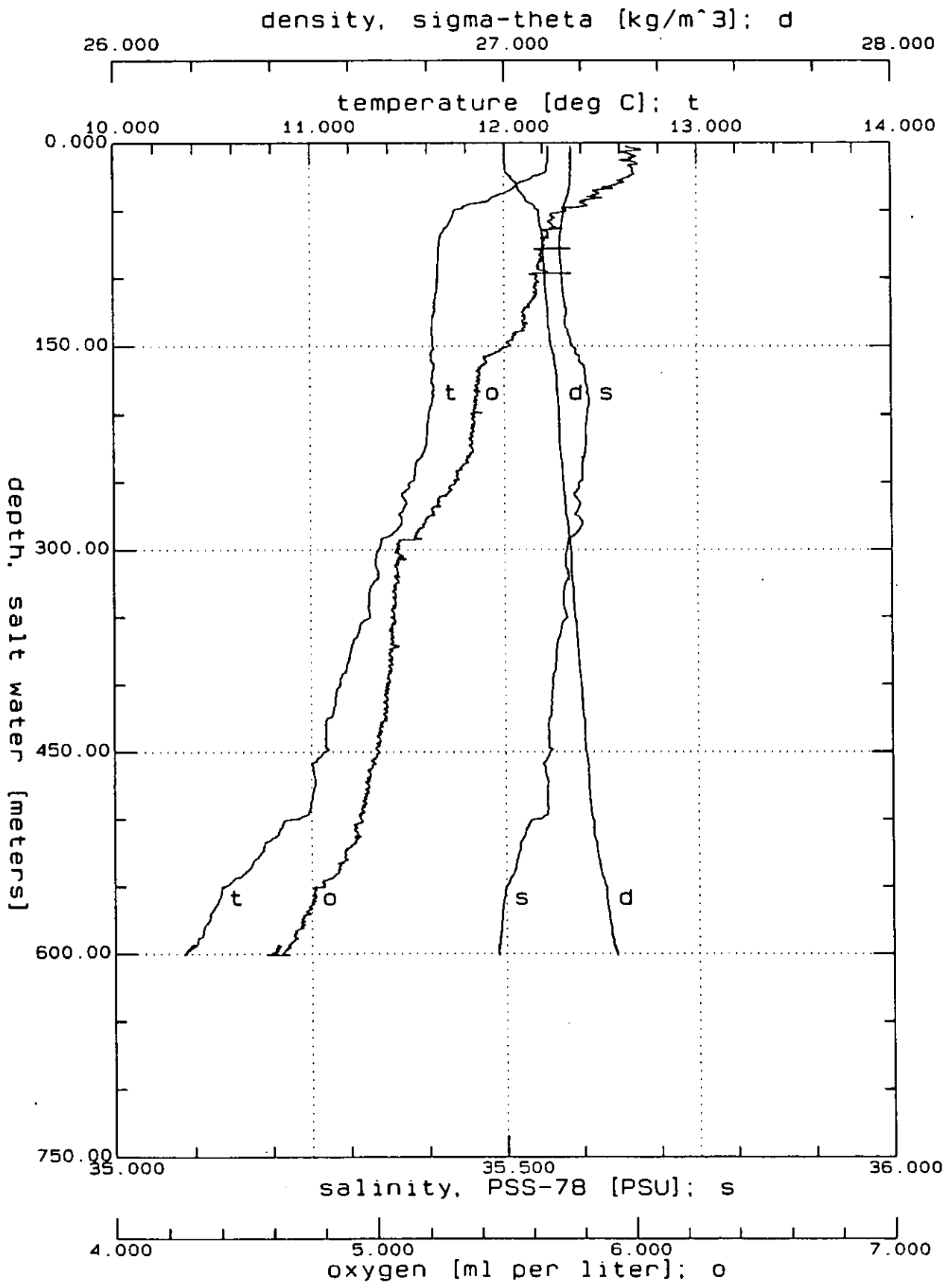
GL9310D.CNV: Station 10D 22.04.93 at 07h34

Figure 8



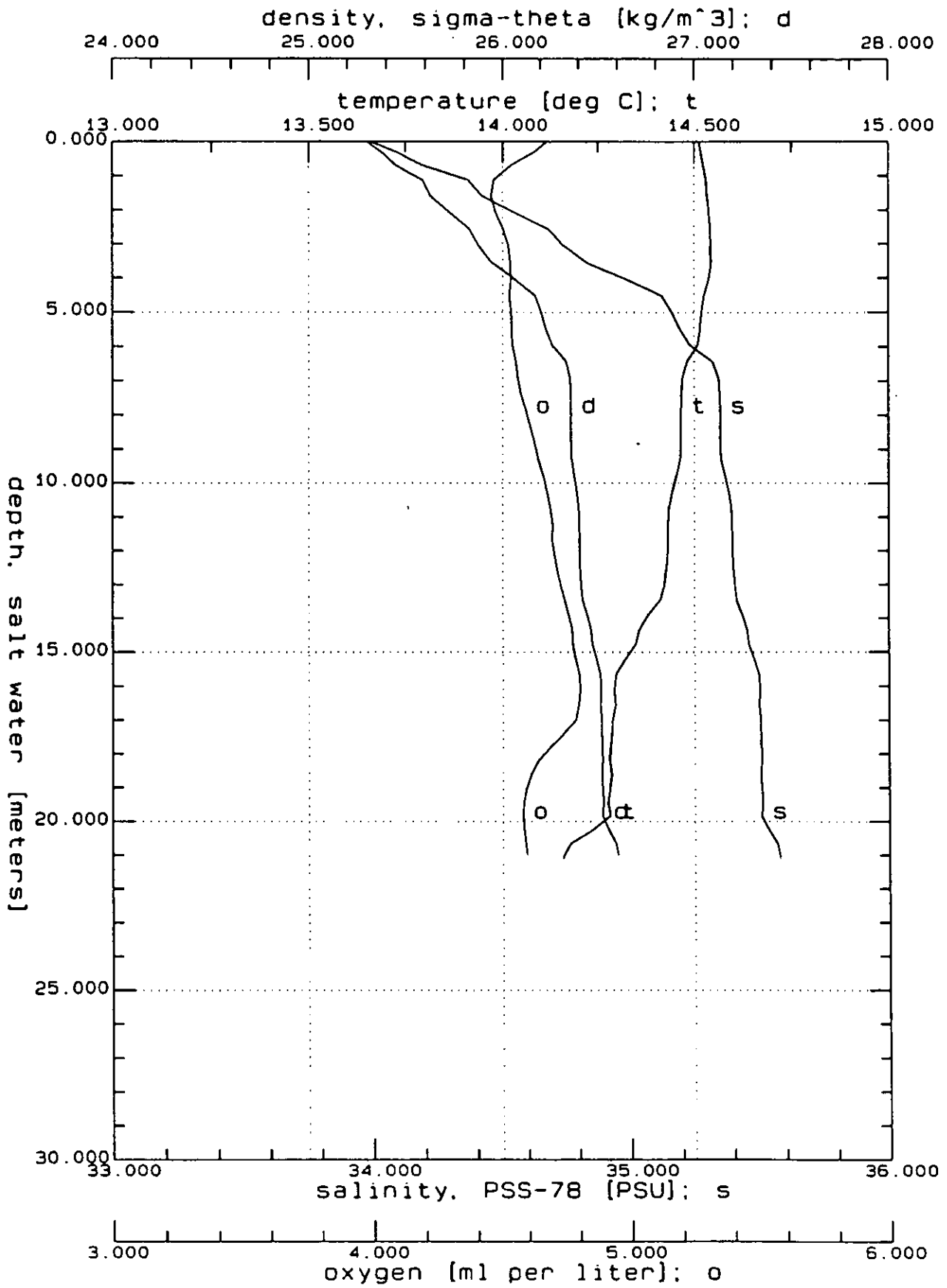
GL9310E.CNV: Station 10E 22.04.93 at 09h07

Figure 9



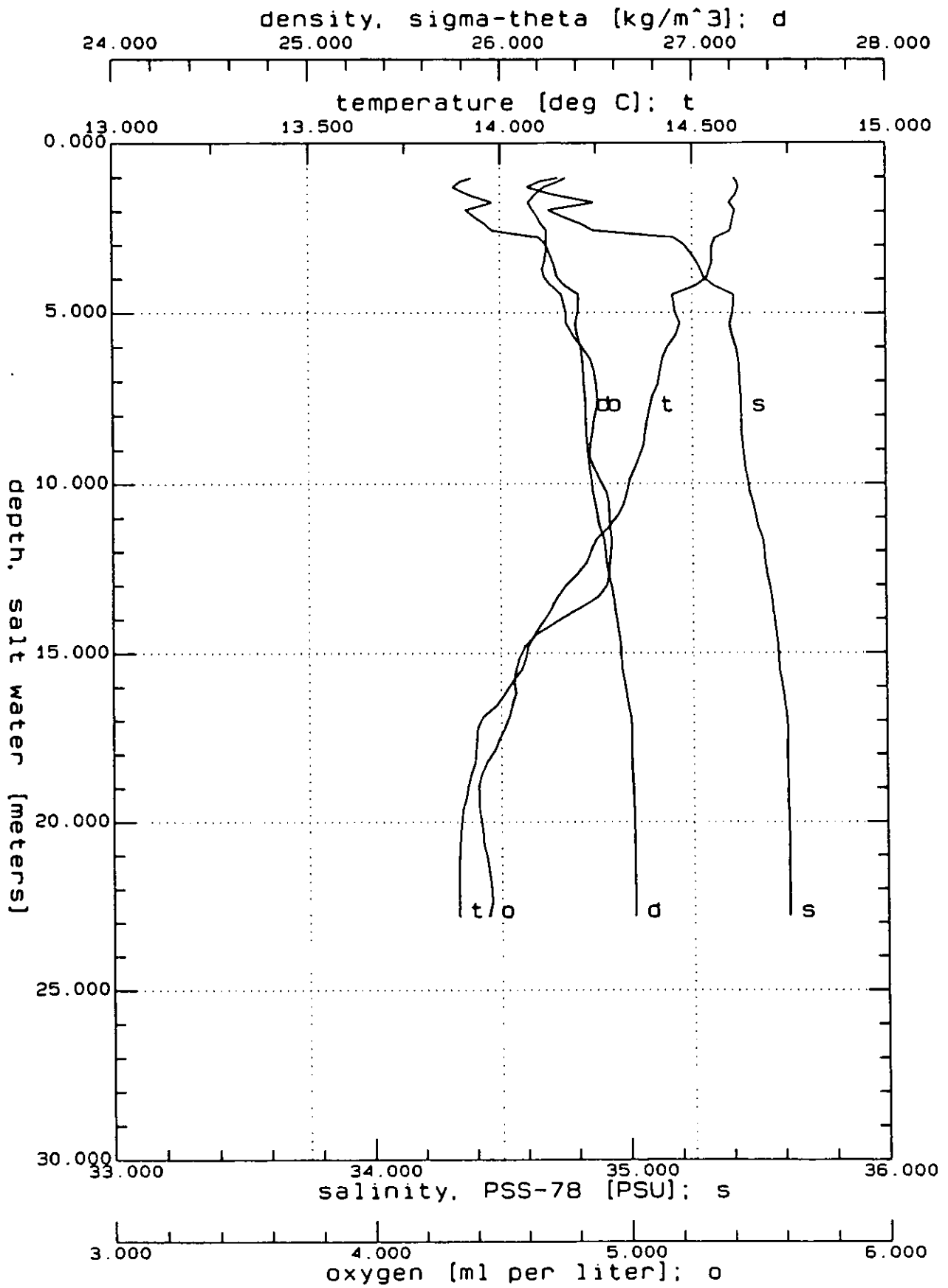
GL9310F.CNV: Station 10F 22.04.93 at 11h35

Figure 10



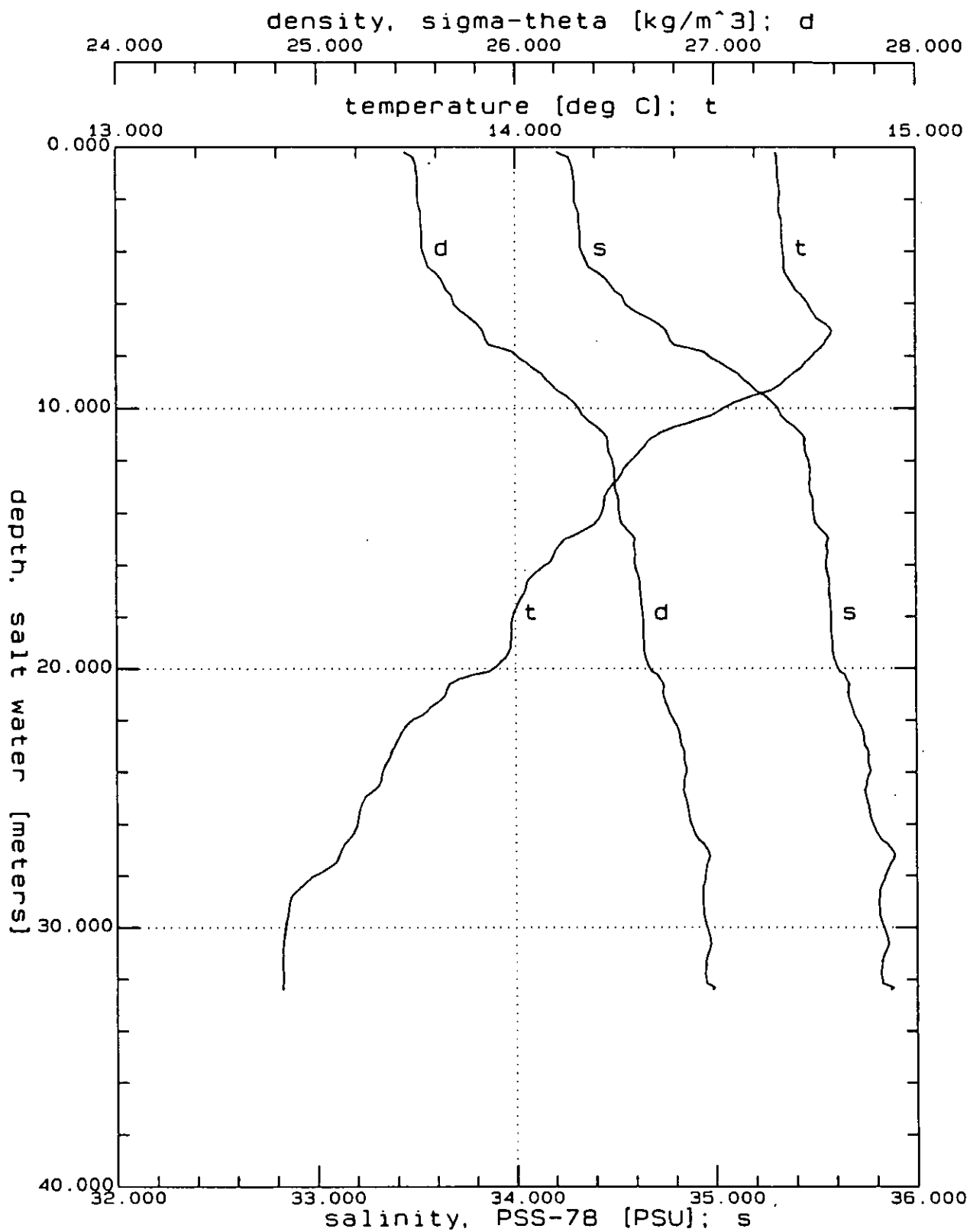
GLRV01.CNV: Station RV1 27.04.93 at 11h47

Figure 11



GLRV02.CNV: Station RV2 27.04.93 at 16h15

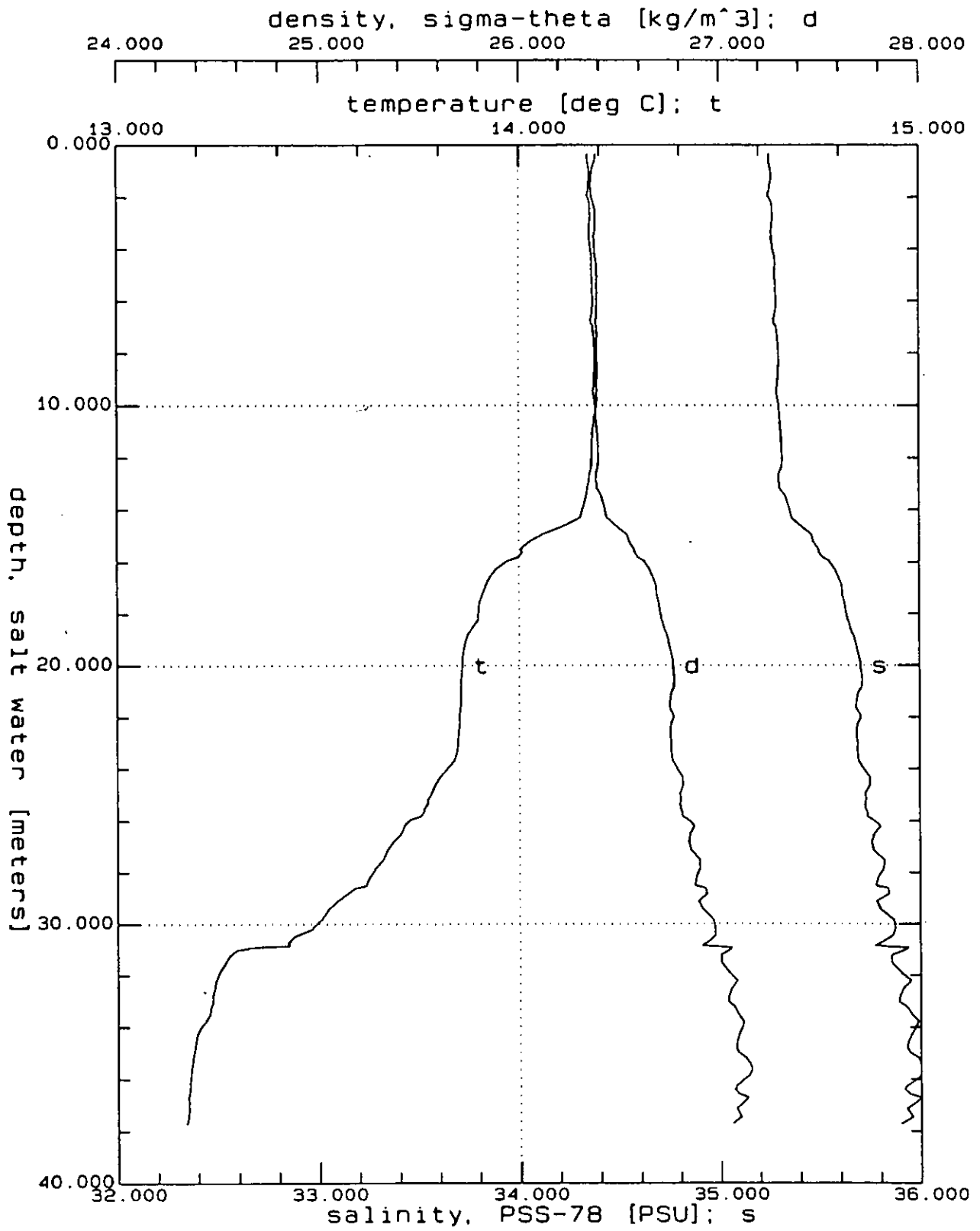
Figure 12



GLRV03.CNV: Station RV3 27.04.93 at 19h34

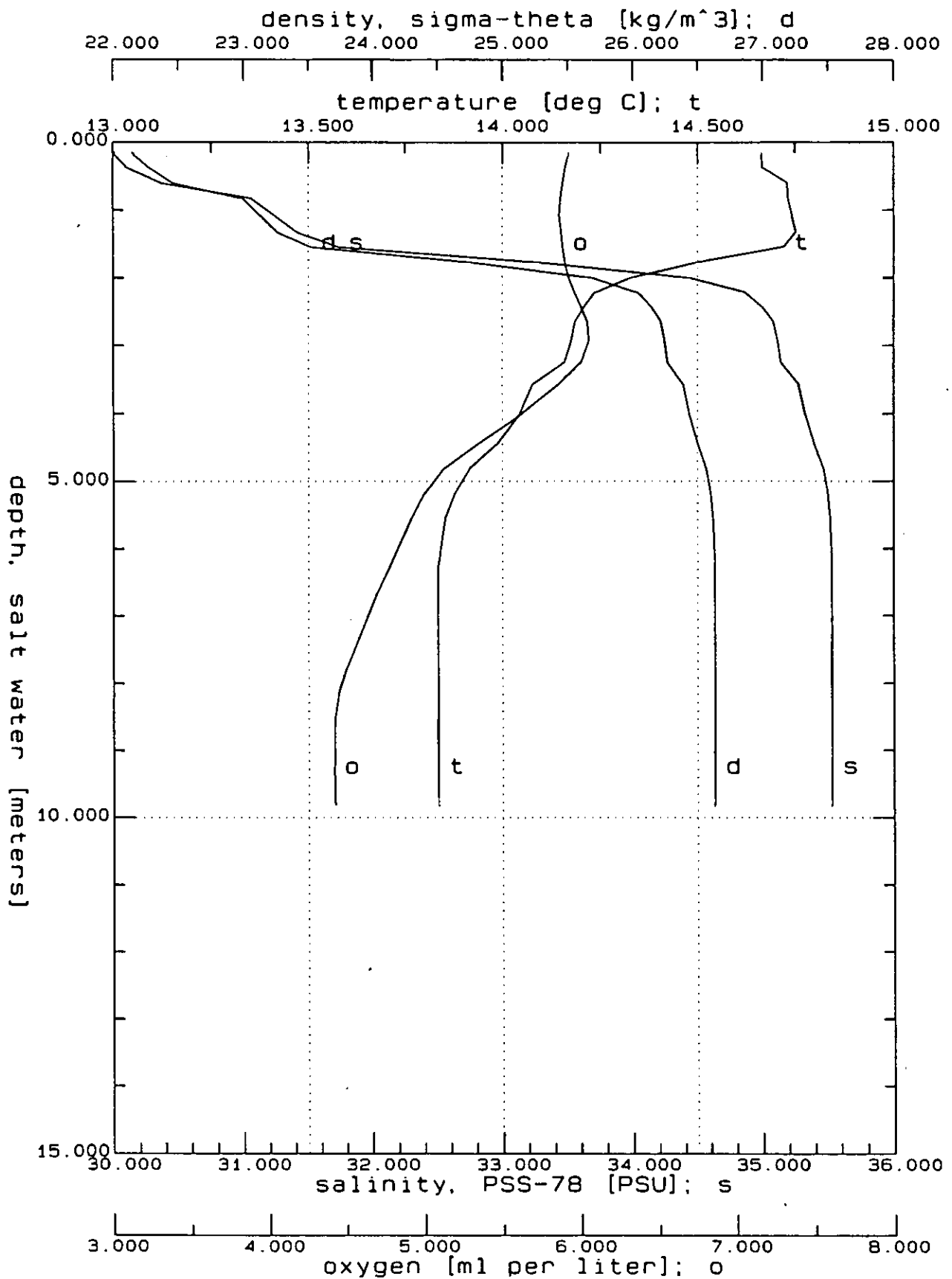
Figure 13





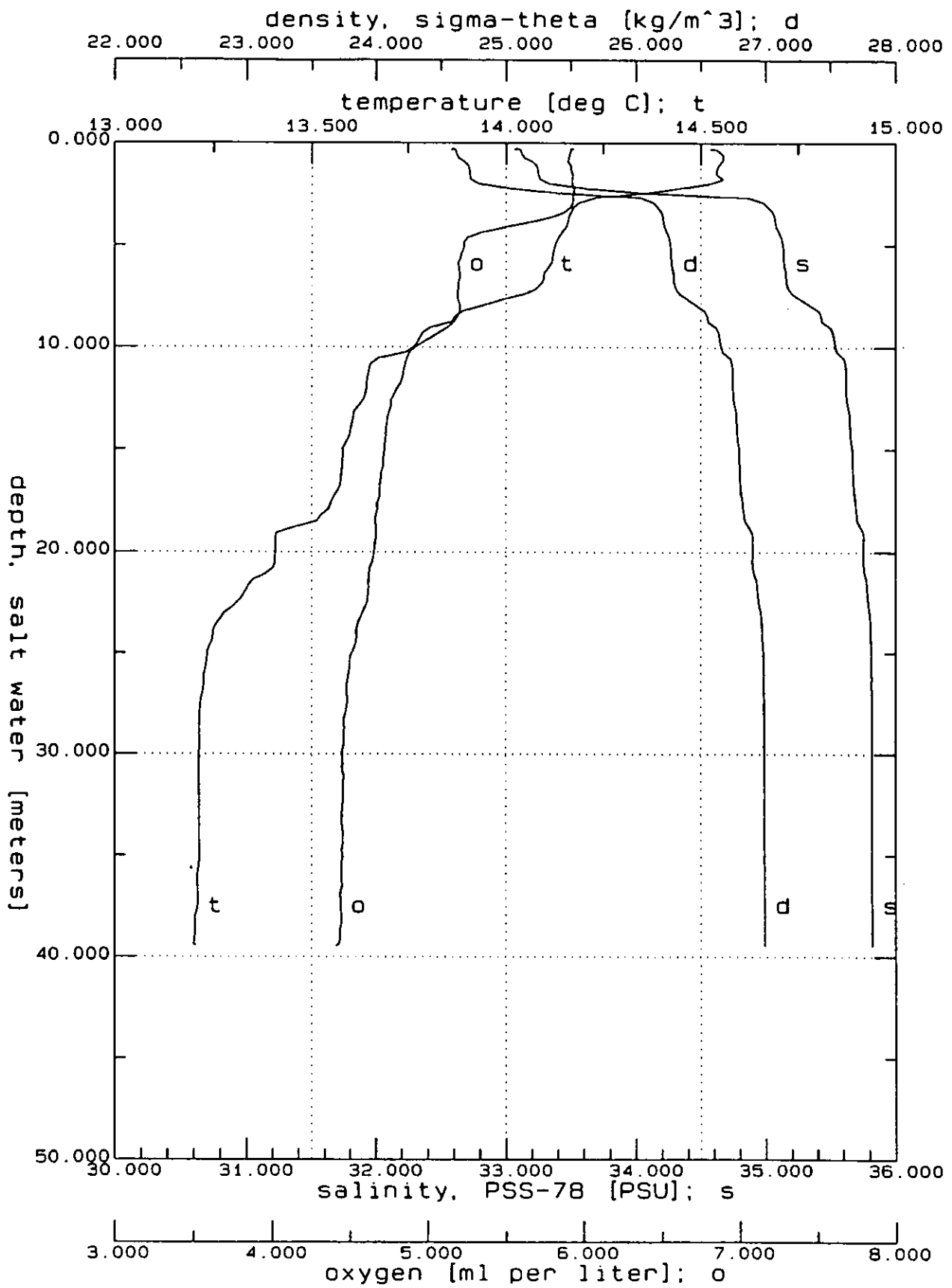
GLRV04.CNV: Station RV4 27.04.93 at 20h27

Figure 14



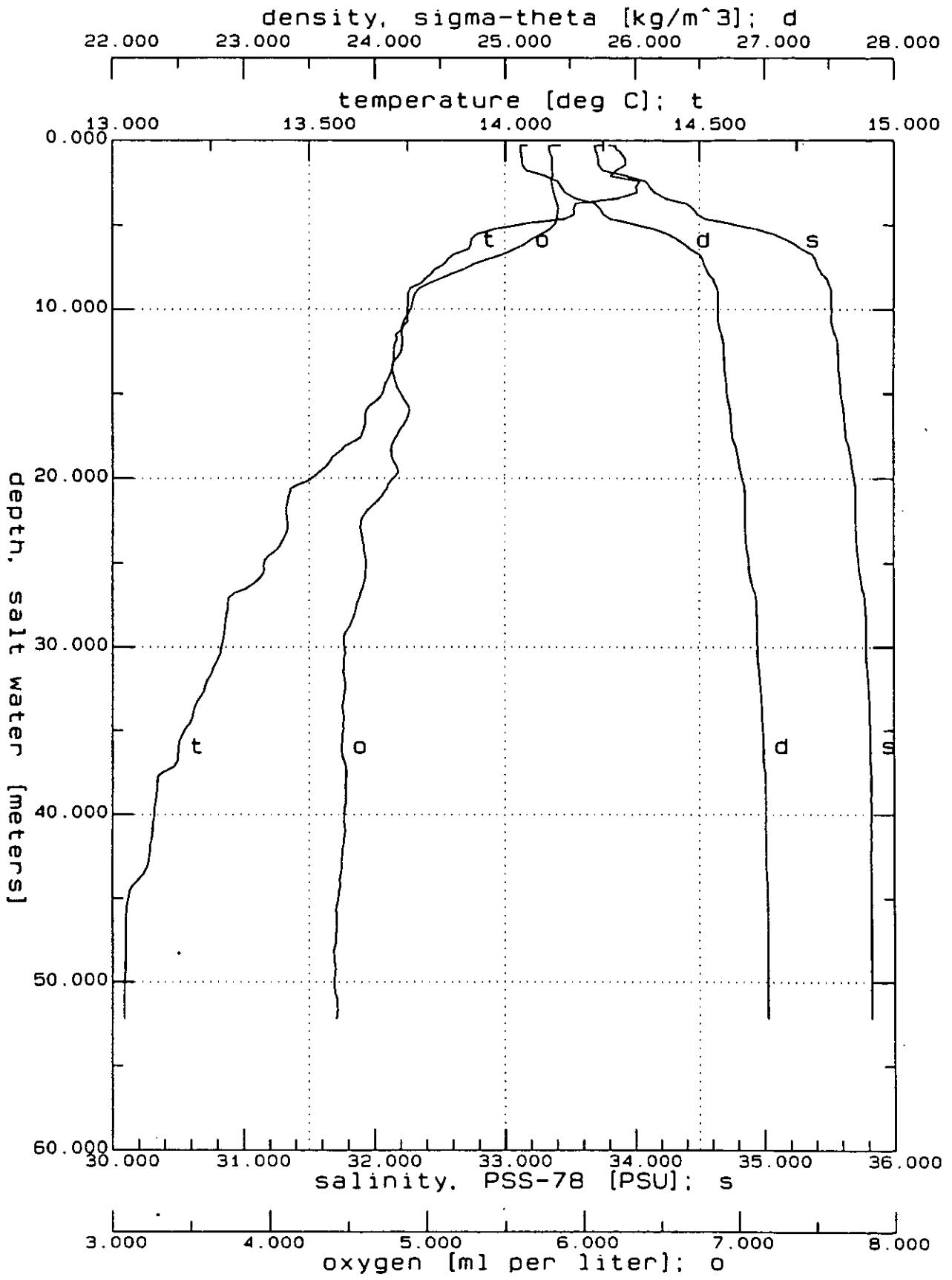
GLRA5.CNV: Station RA5 29.04.93 at 07h41

Figure 15



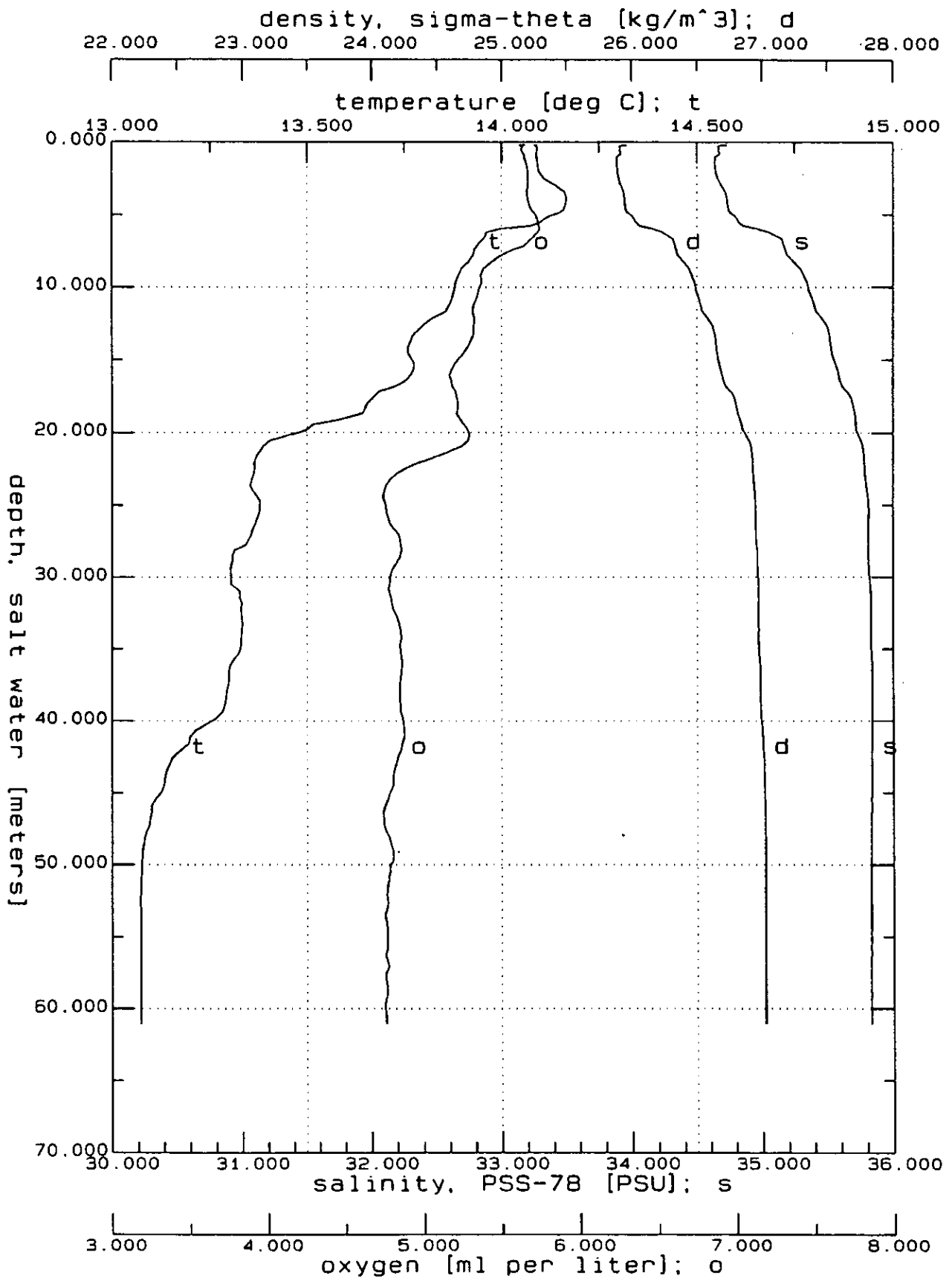
GLRA6.CNV: Station RA6 29.04.93 at 09h05

Figure 16



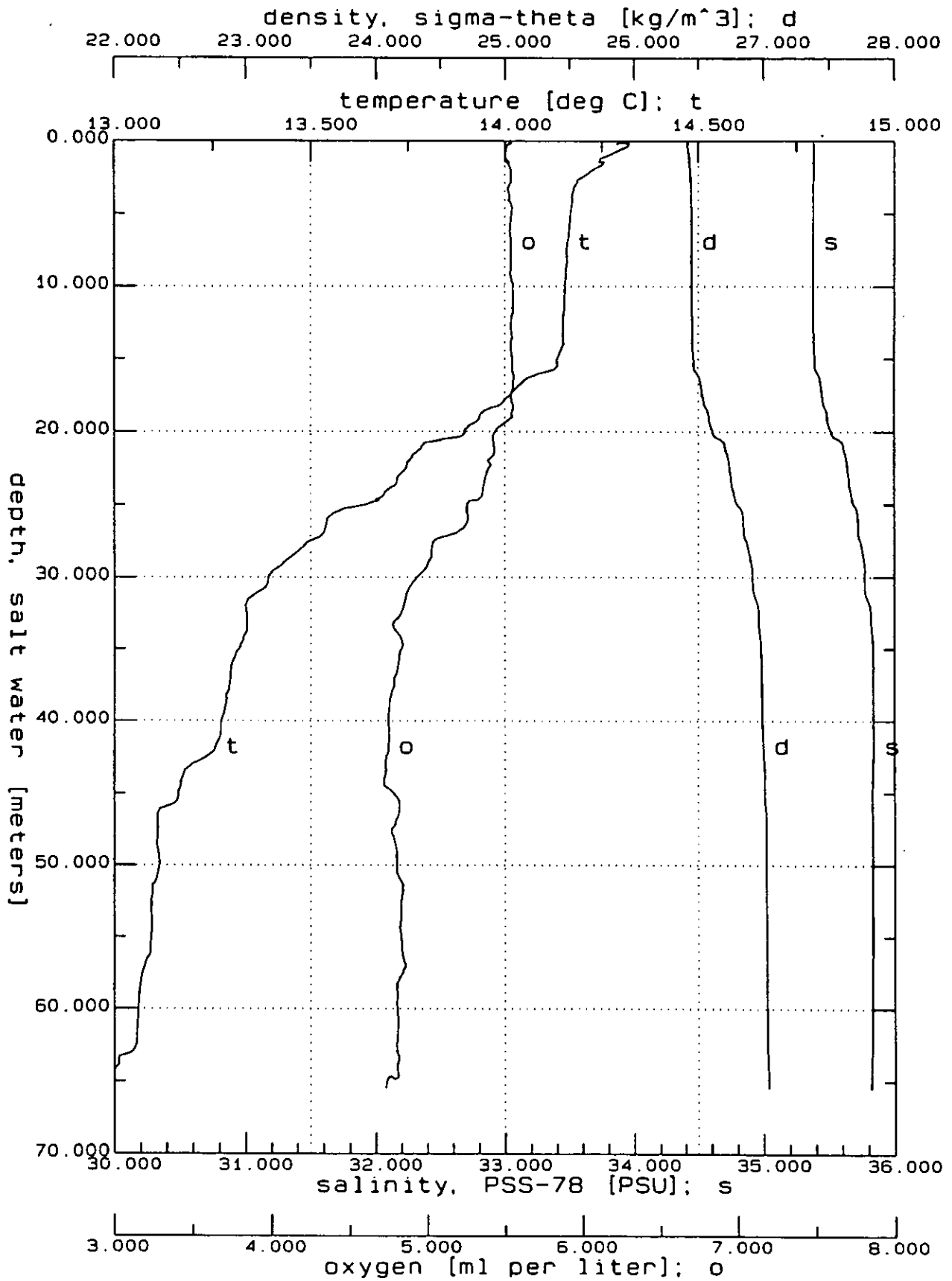
GLRA7.CNV: Station RA7 29.04.93 at 10h10

Figure 17



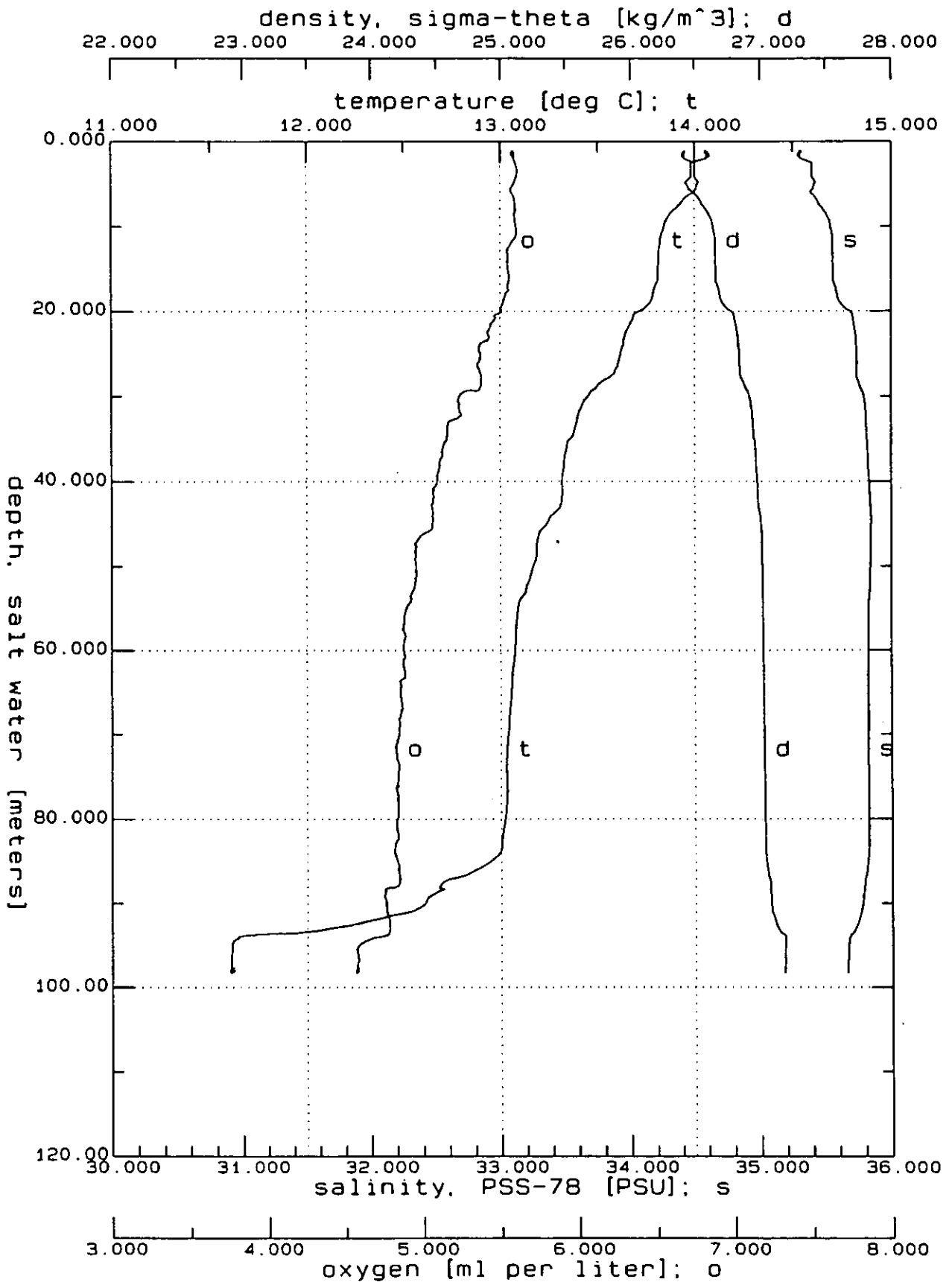
GLRAB.CNV: Station RAB 29.04.93 at 11h15

Figure 18



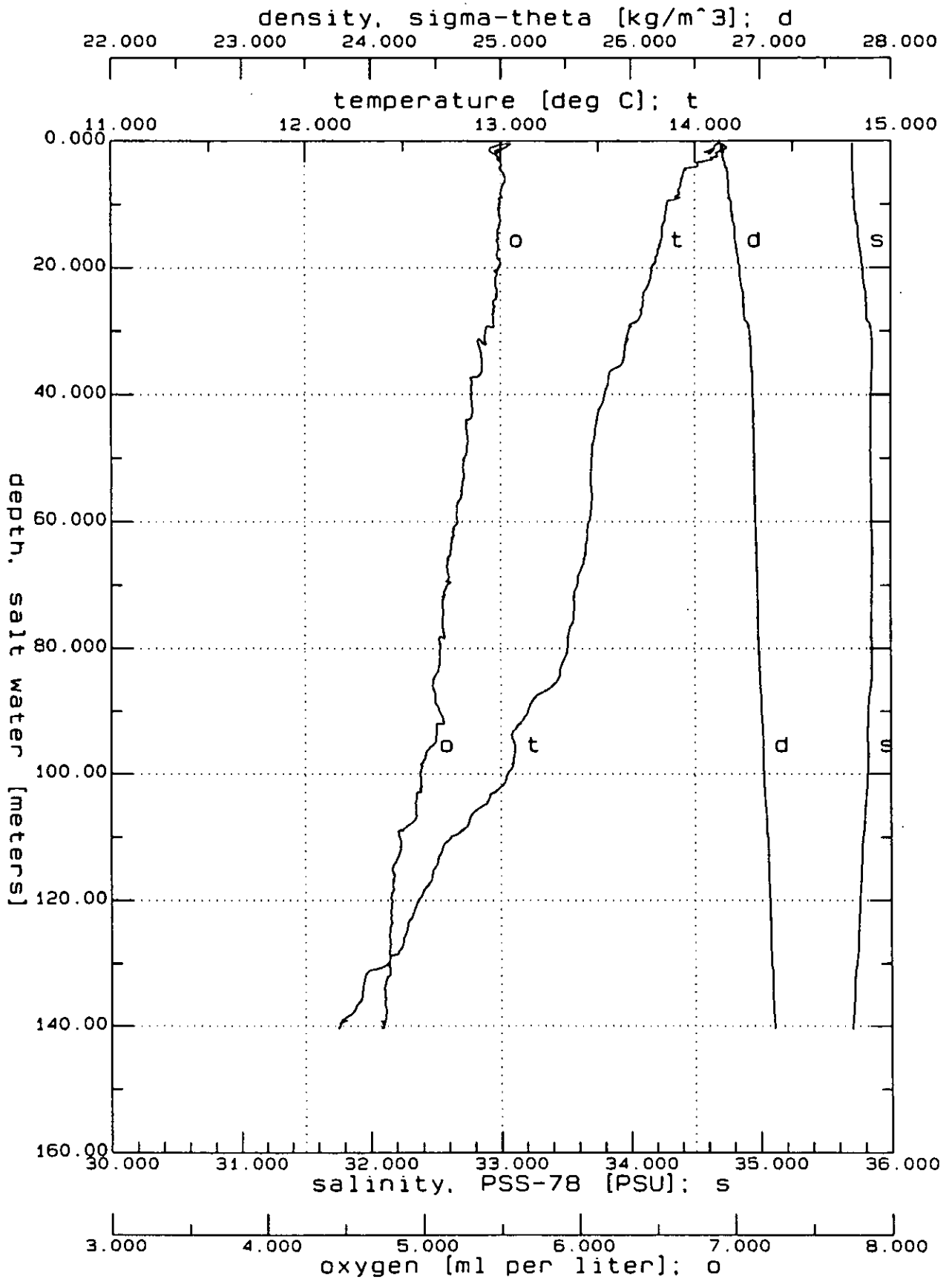
GLRA9.CNV: Station RA9 29.04.93 at 12h15

Figure 19



GLRA10.CNV: Station RA10 29.04.93 at 13h22

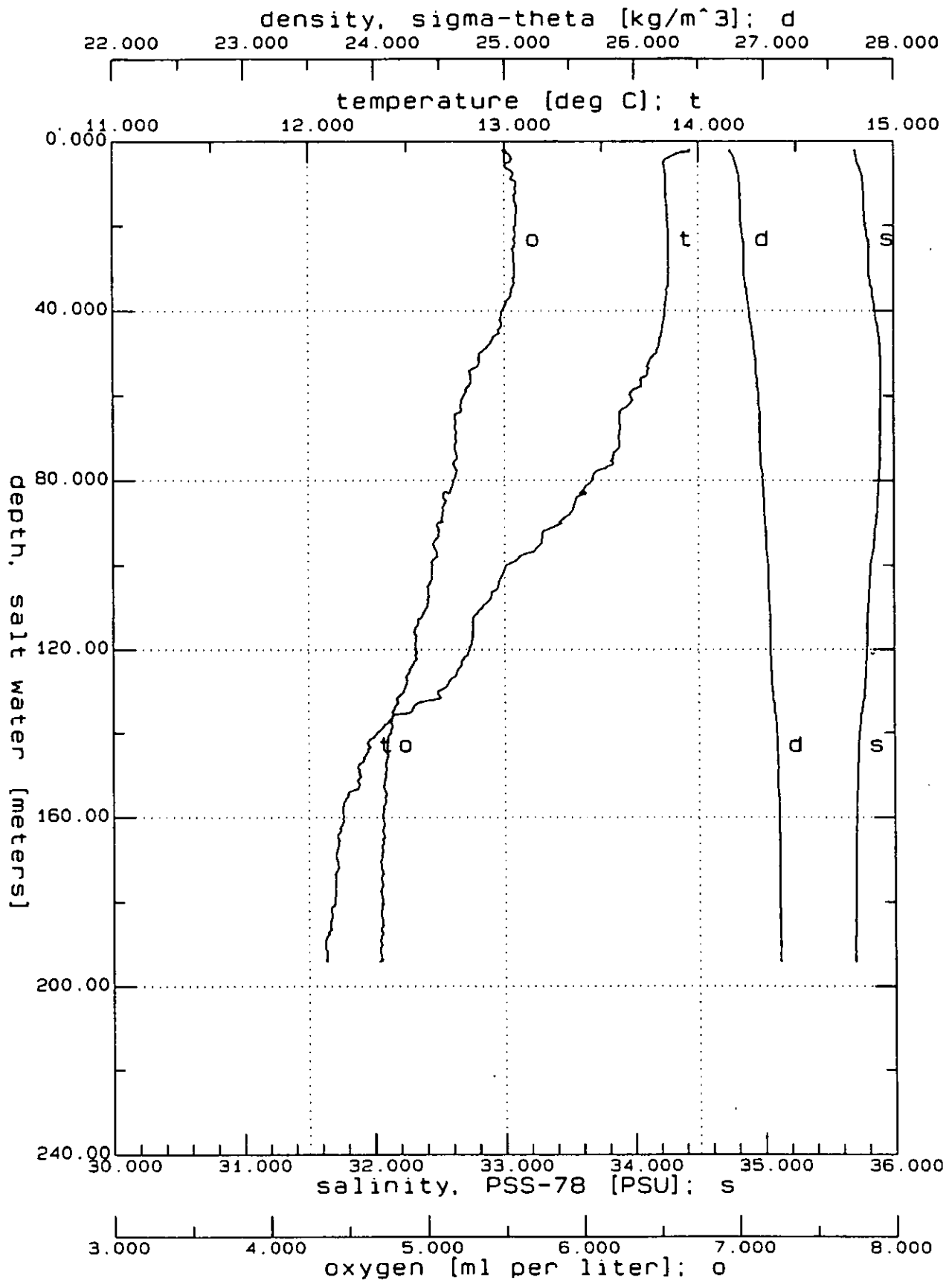
Figure 20



GLRA11.CNV: Station RA11 29.04.93 at 14h41

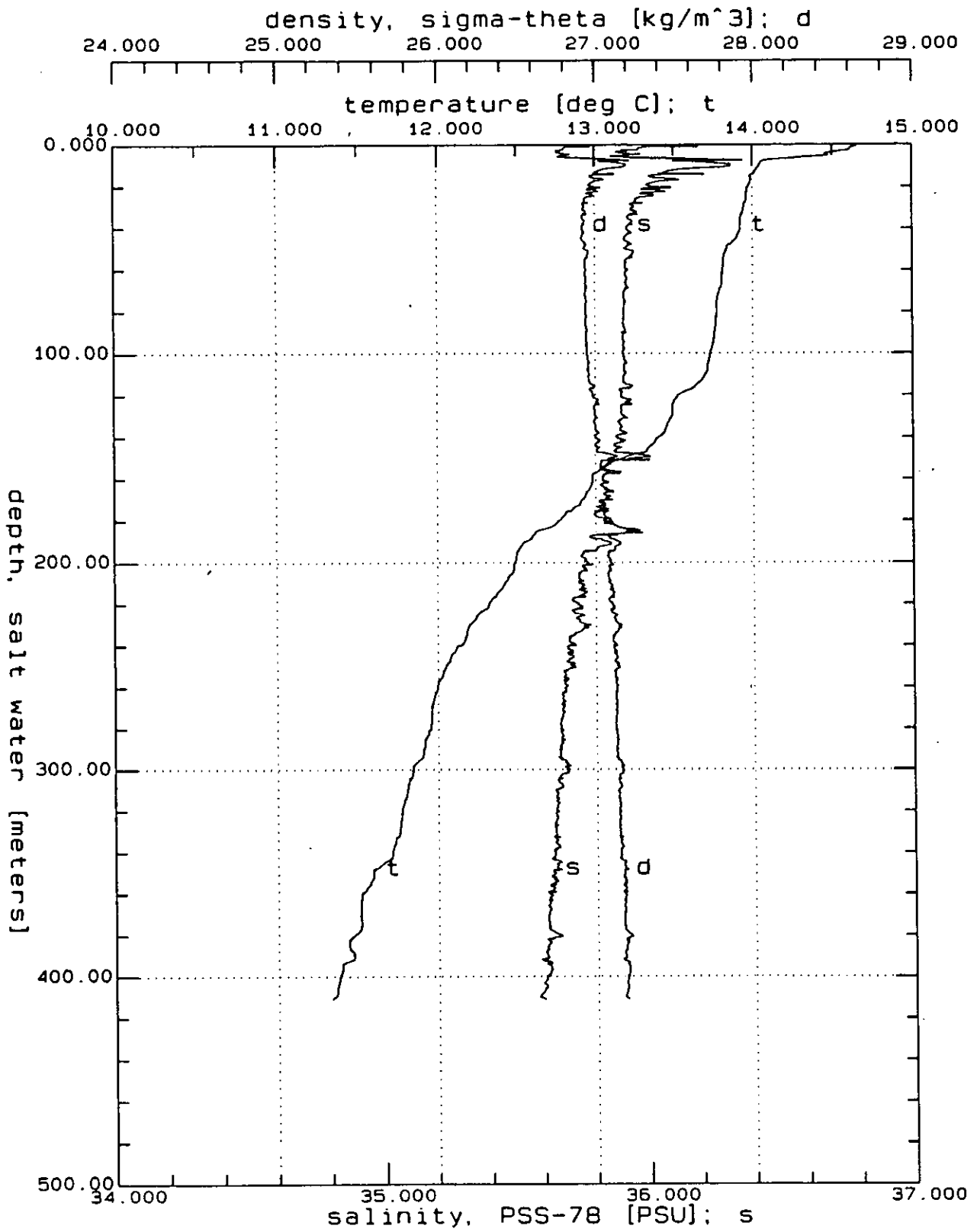
Figure 21





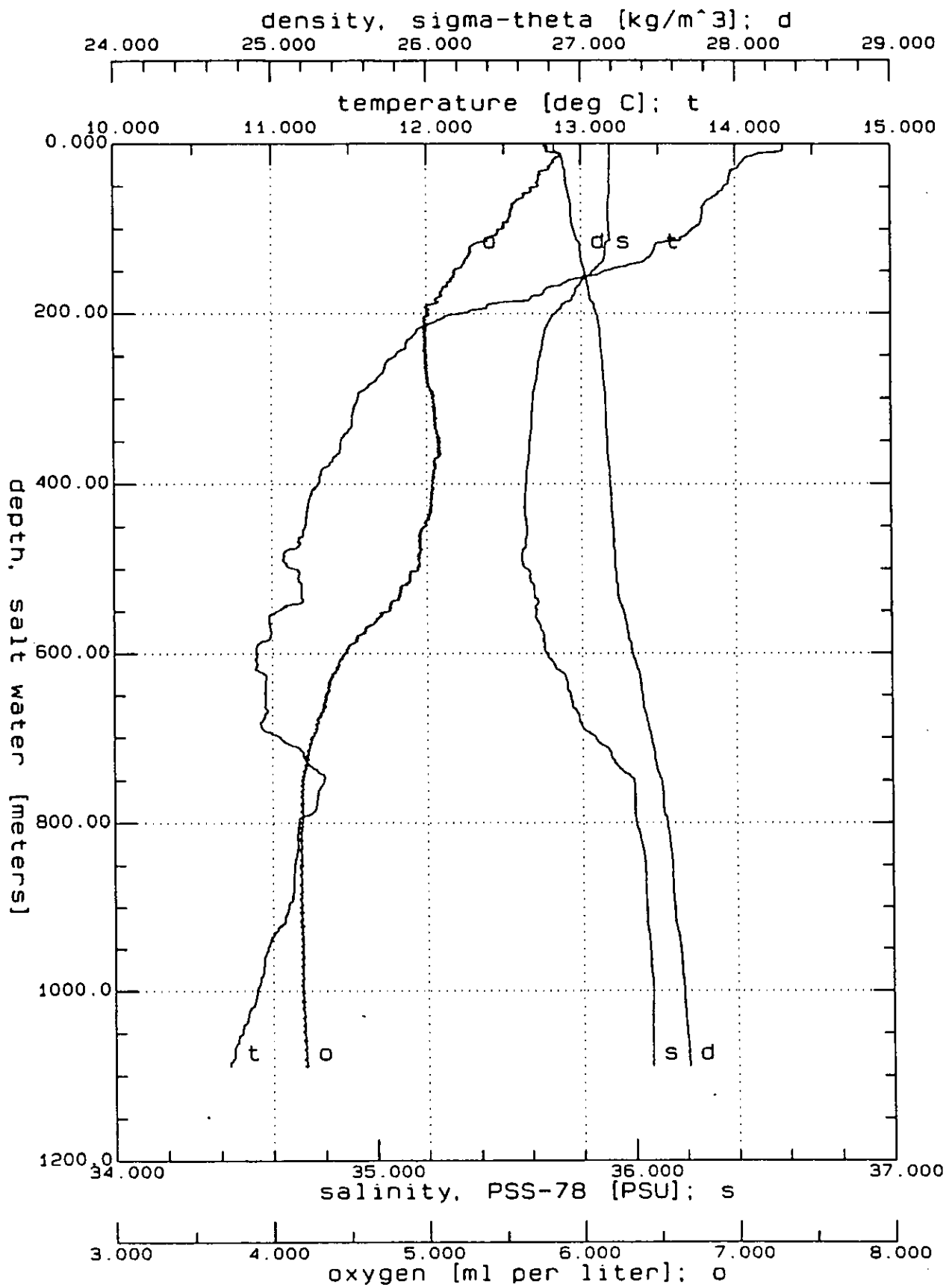
GLRA12.CNV: Station RA12 29.04.93 at 15h59

Figure 22



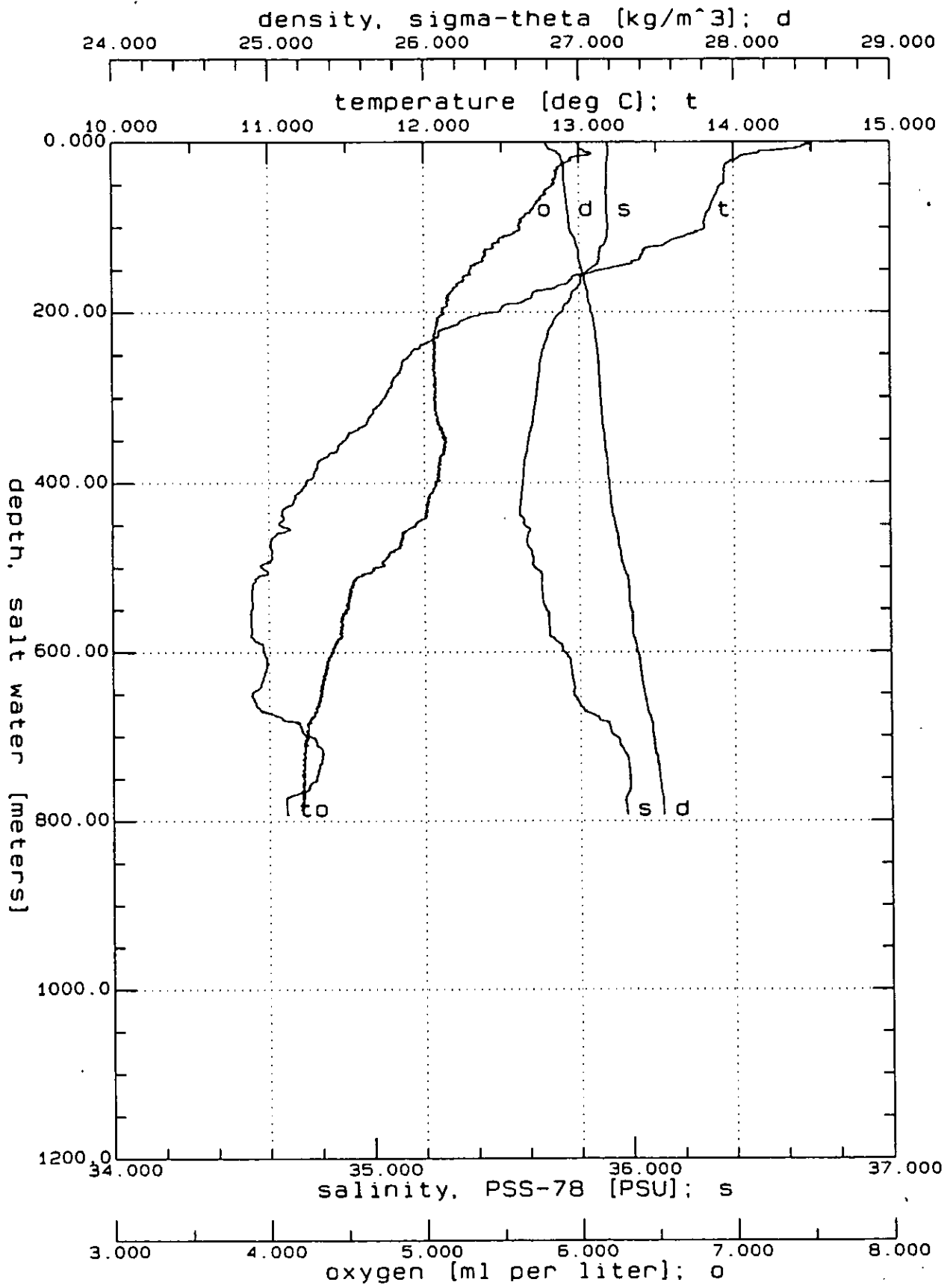
GL9311.CNV: Station 11 29.04.93 at 19h47

Figure 23



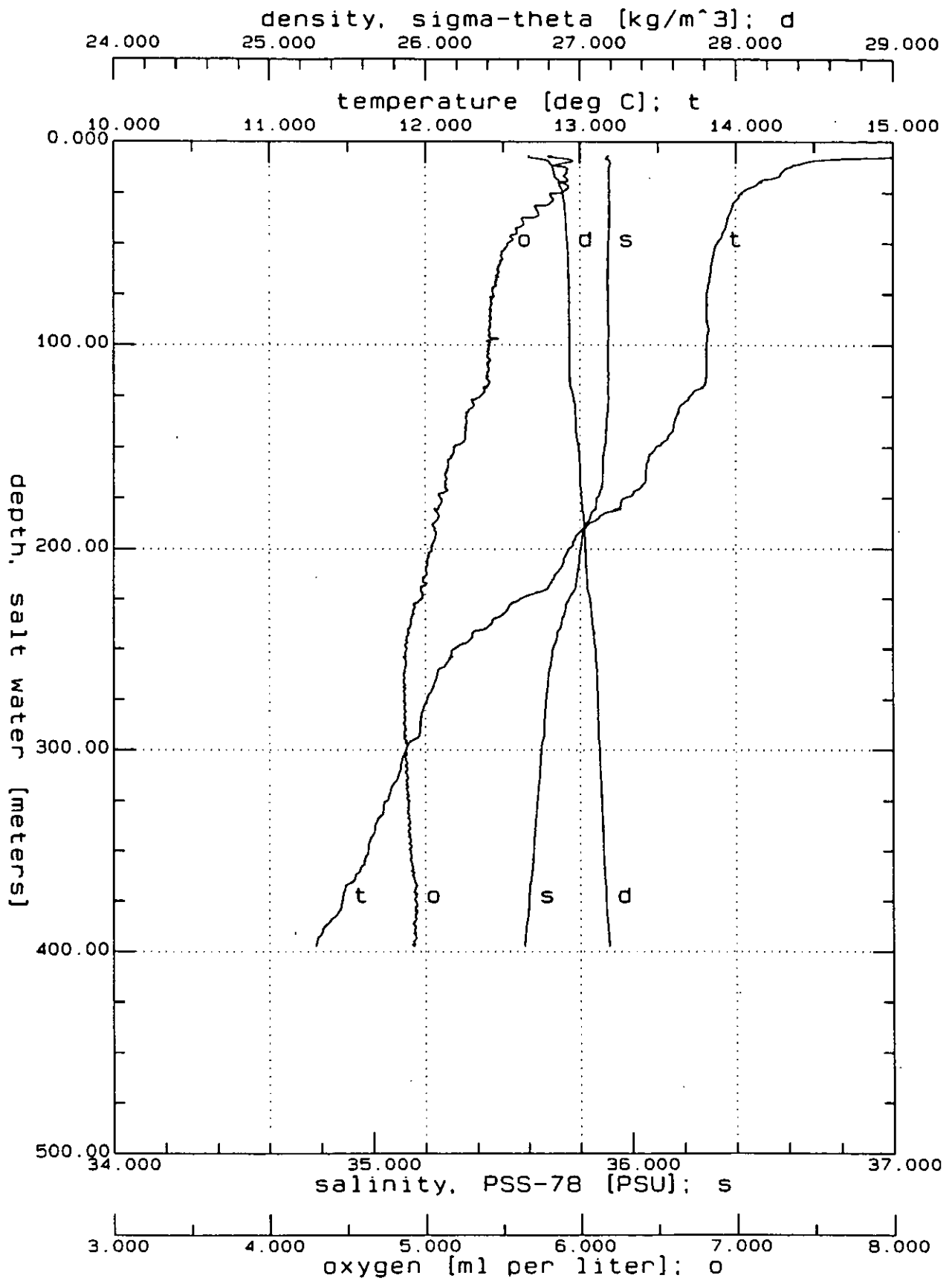
GL9311A.CNV: Station 11A 30.04.93 at 08h57

Figure 24



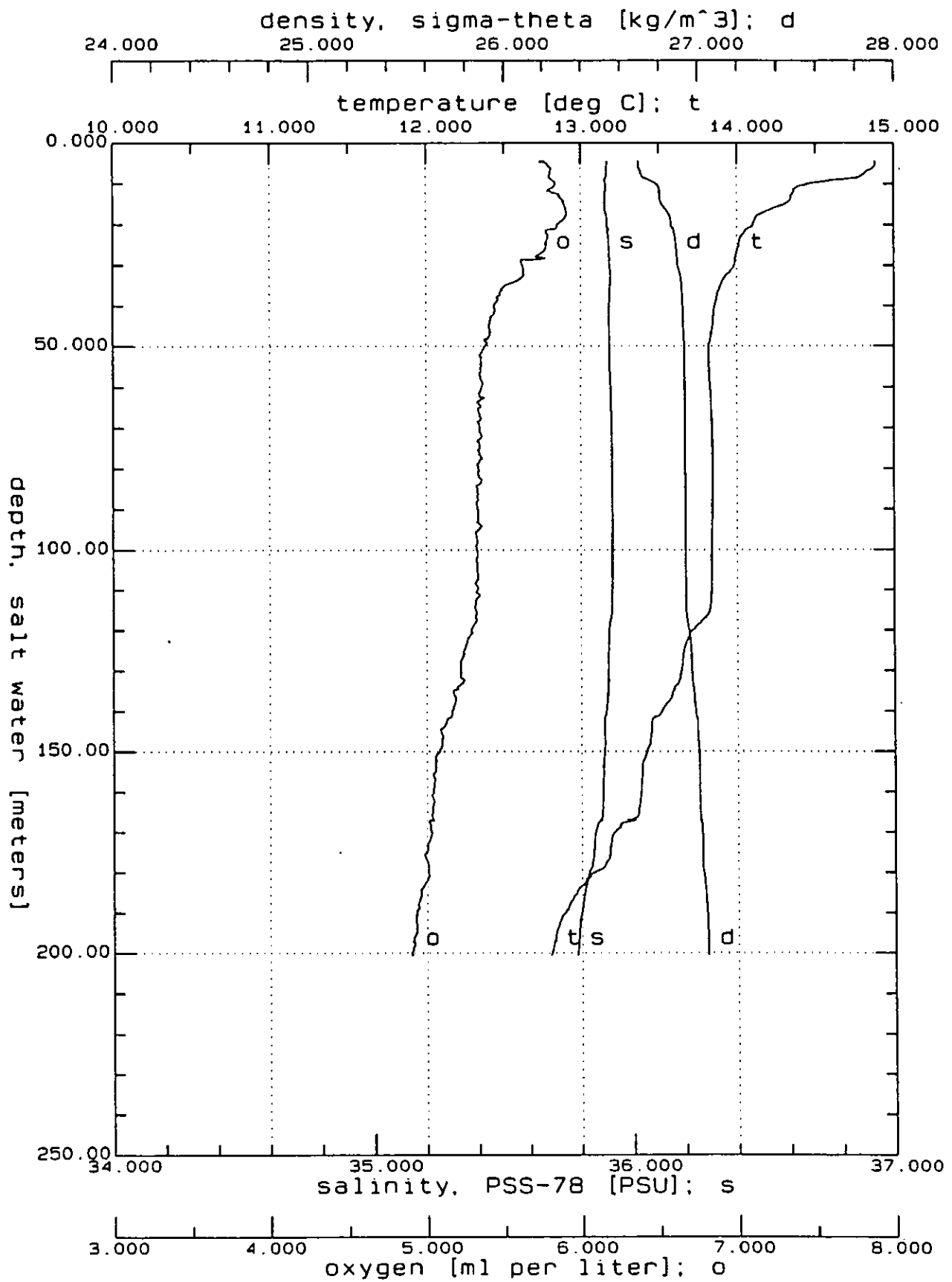
GL9311B.CNV: Station 11B 30.04.93 at 14h26

Figure 25



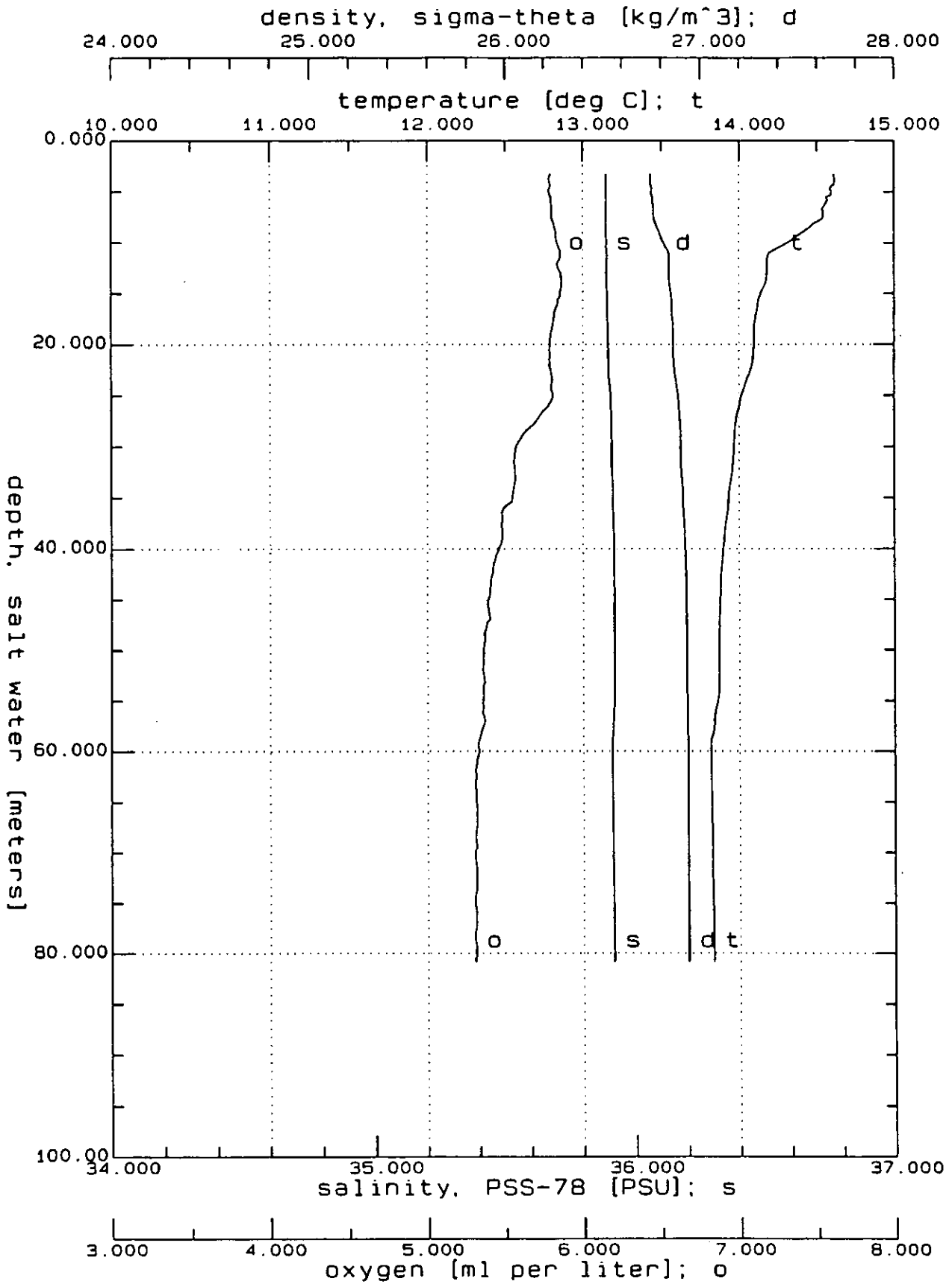
GL9311C.CNV: Station 11C 30.04.93 at 16h30

Figure 26



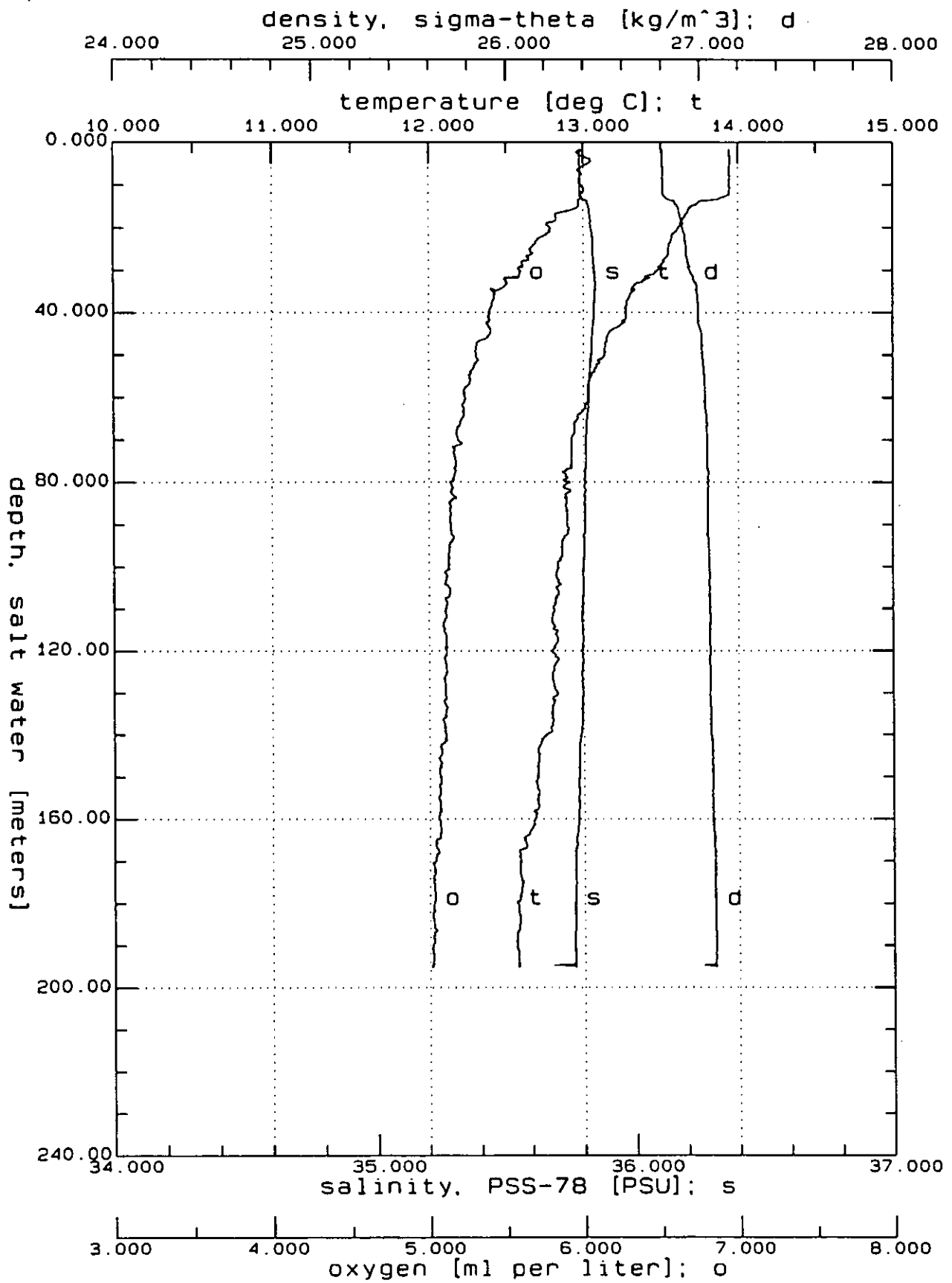
GL9311D.CNV: Station 11D 30.04.93 at 19h10

Figure 27



GL9311E.CNV: Station 11E 30.04.93 at 20h11

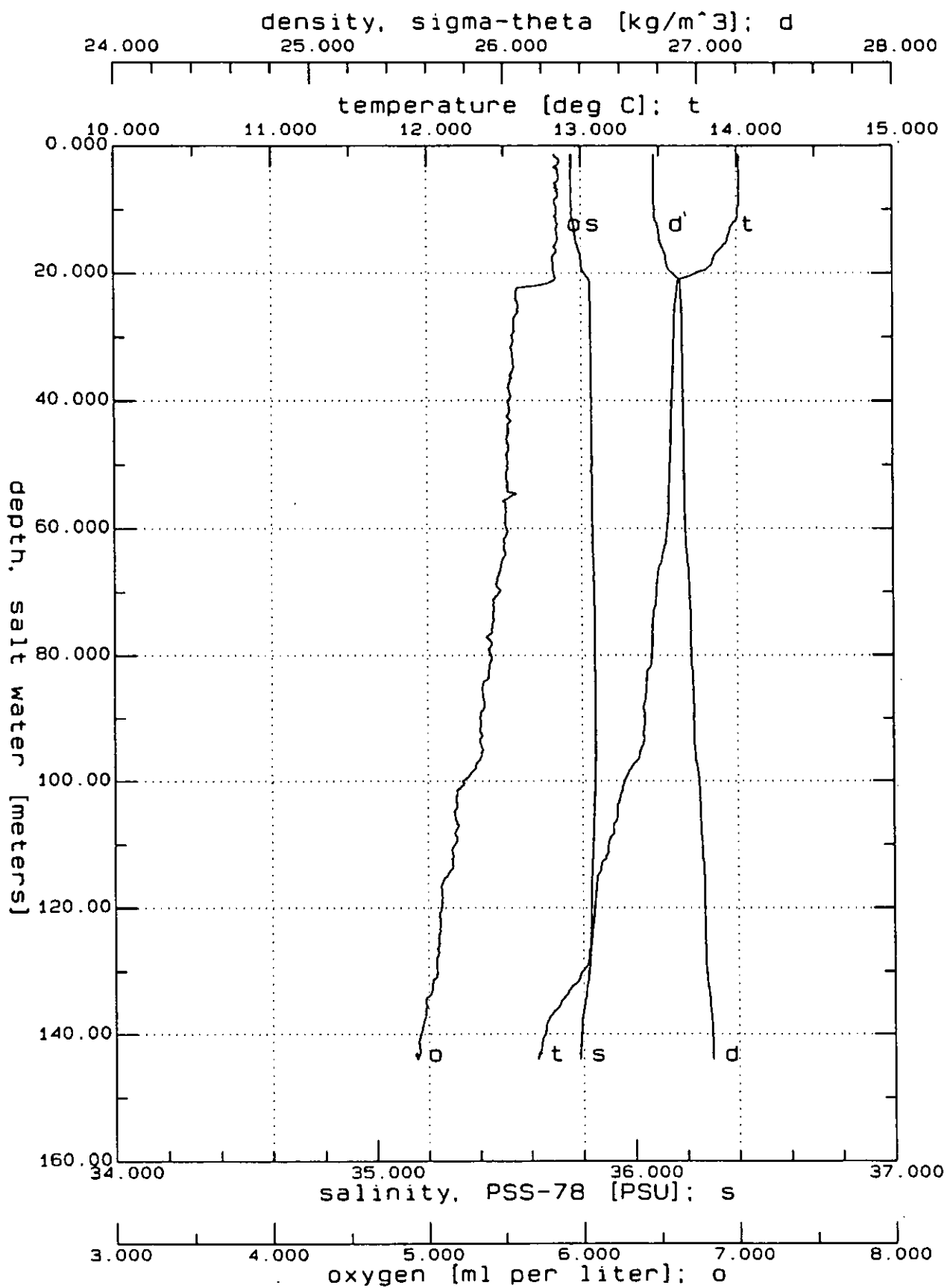
Figure 28



GL9312.CNV: Station 12 01.05.93 at 08h23

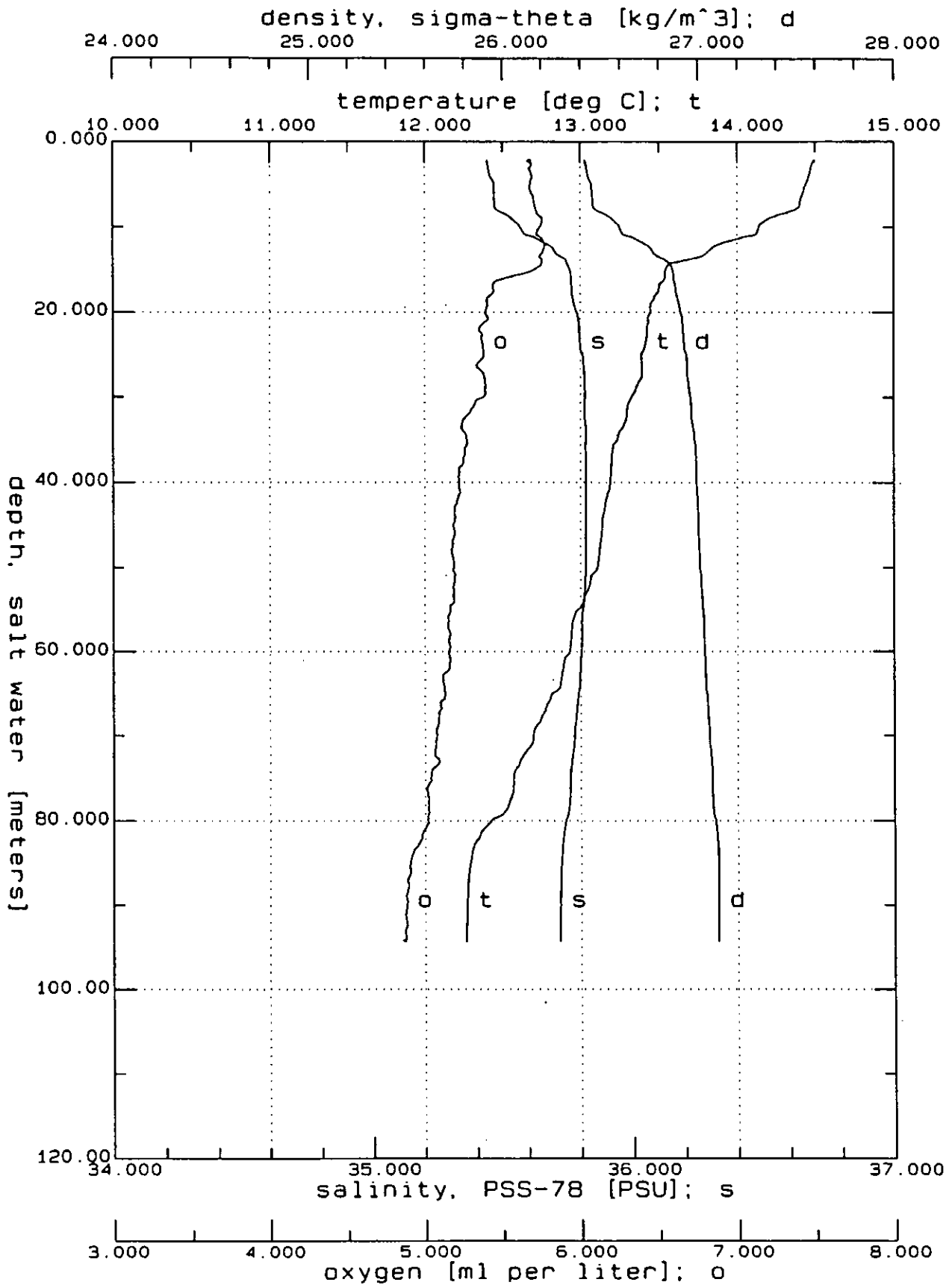
Figure 29





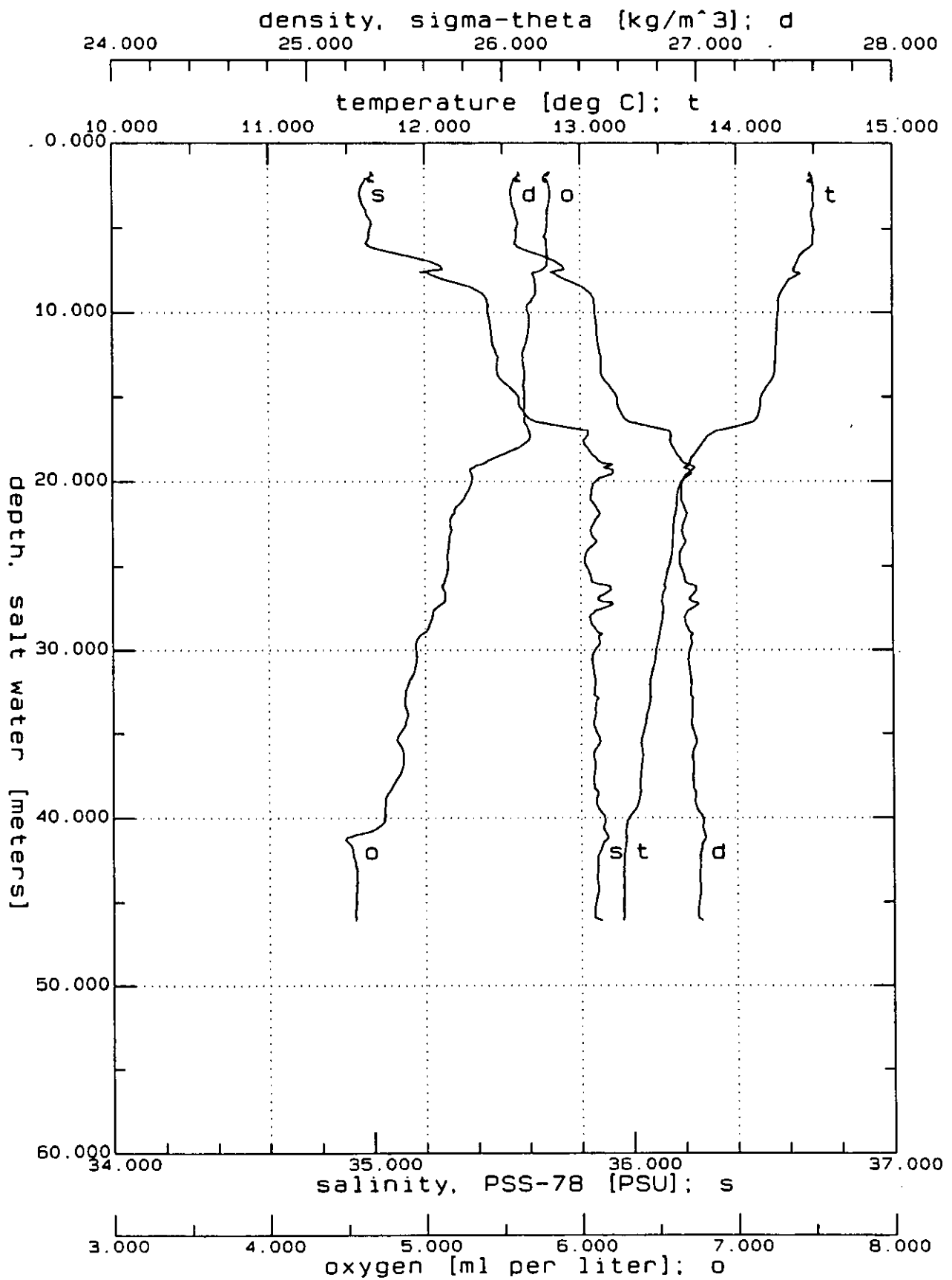
GLRM1.CNV: Station RM1 01.05.93 at 10h03

Figure 30



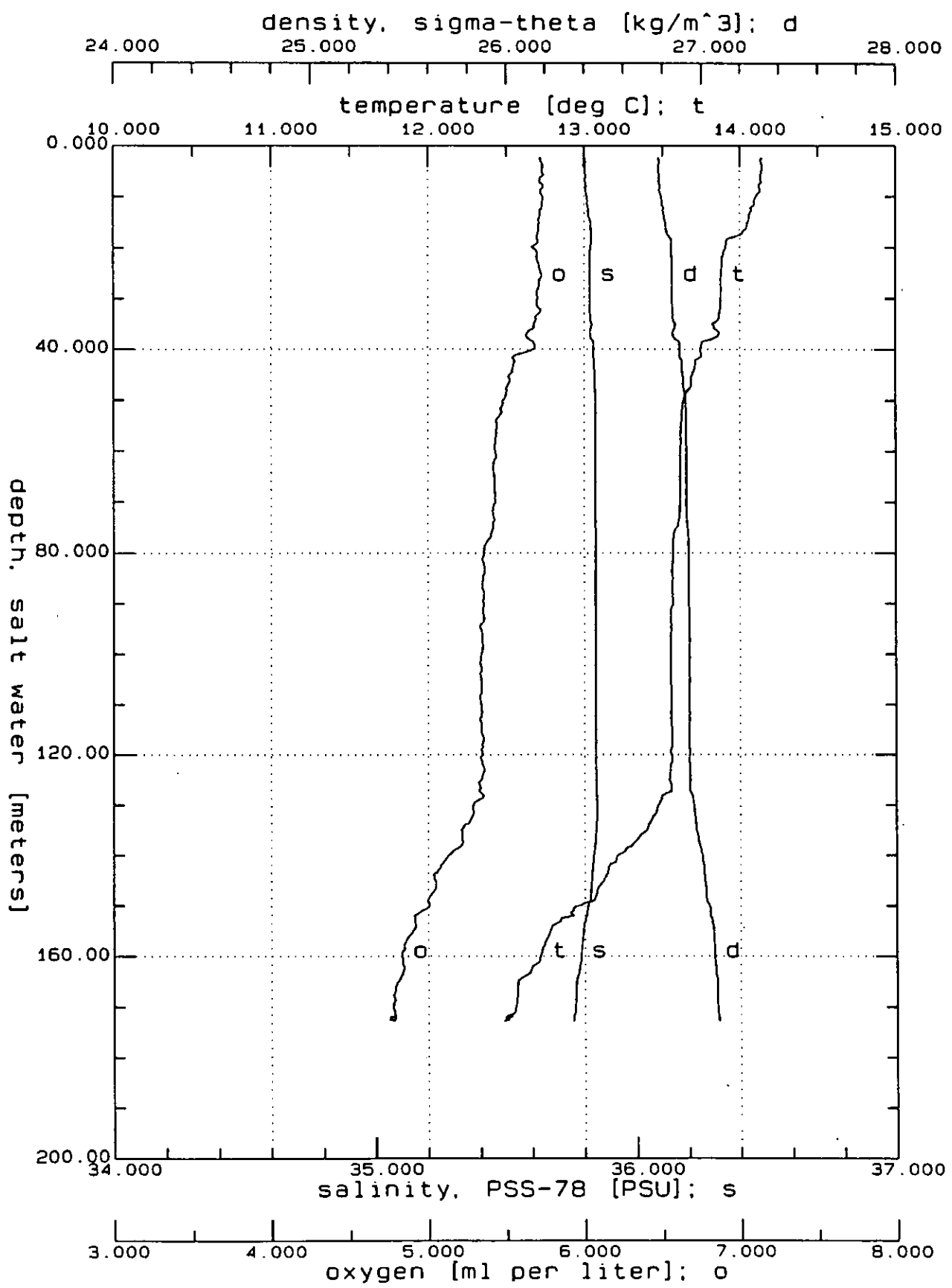
GLRM2.CNV: Station RM2 01.05.93 at 11h53

Figure 31



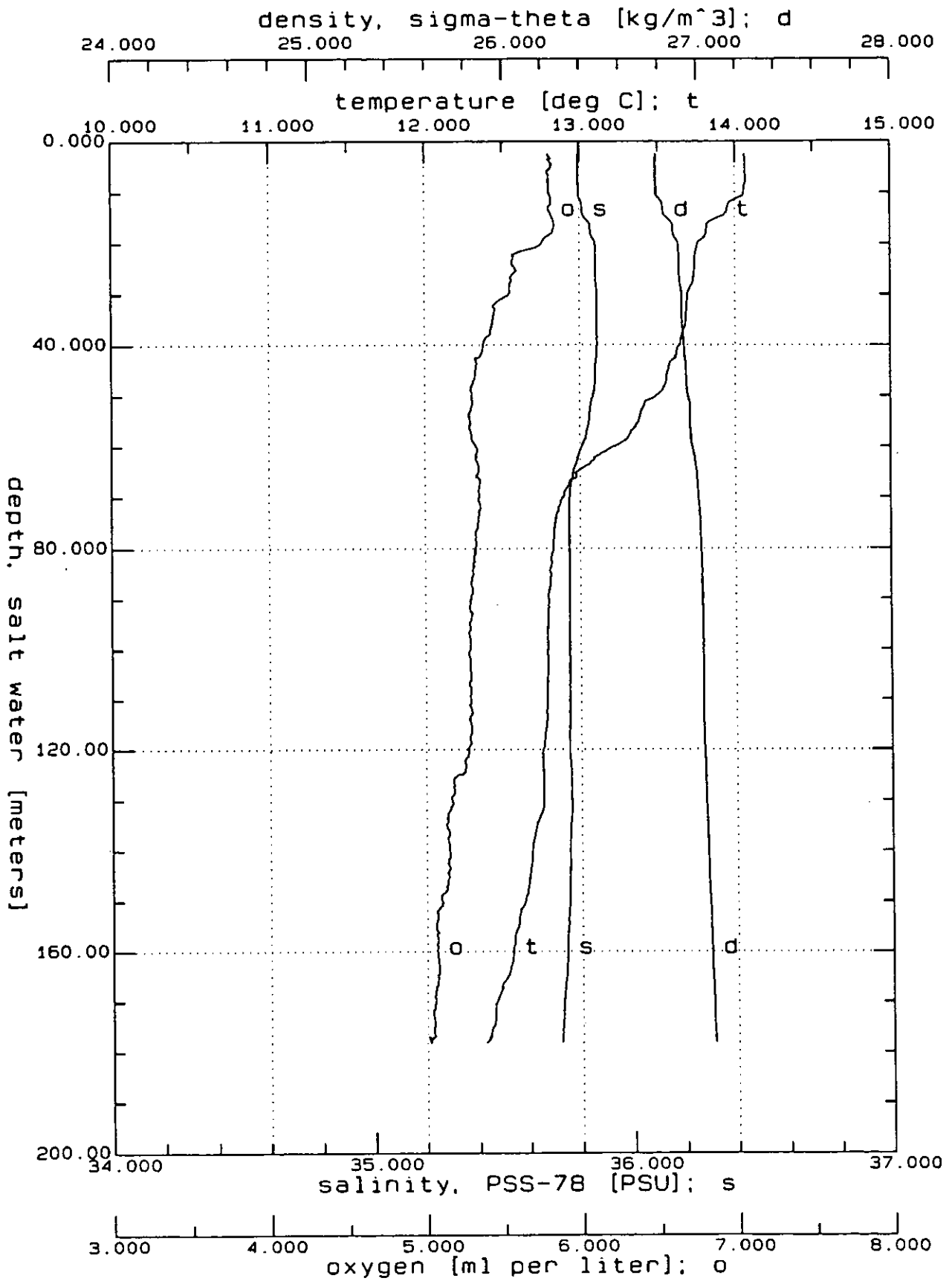
GLRM3.CNV: Station RM3 01.05.93 at 13h38

Figure 32



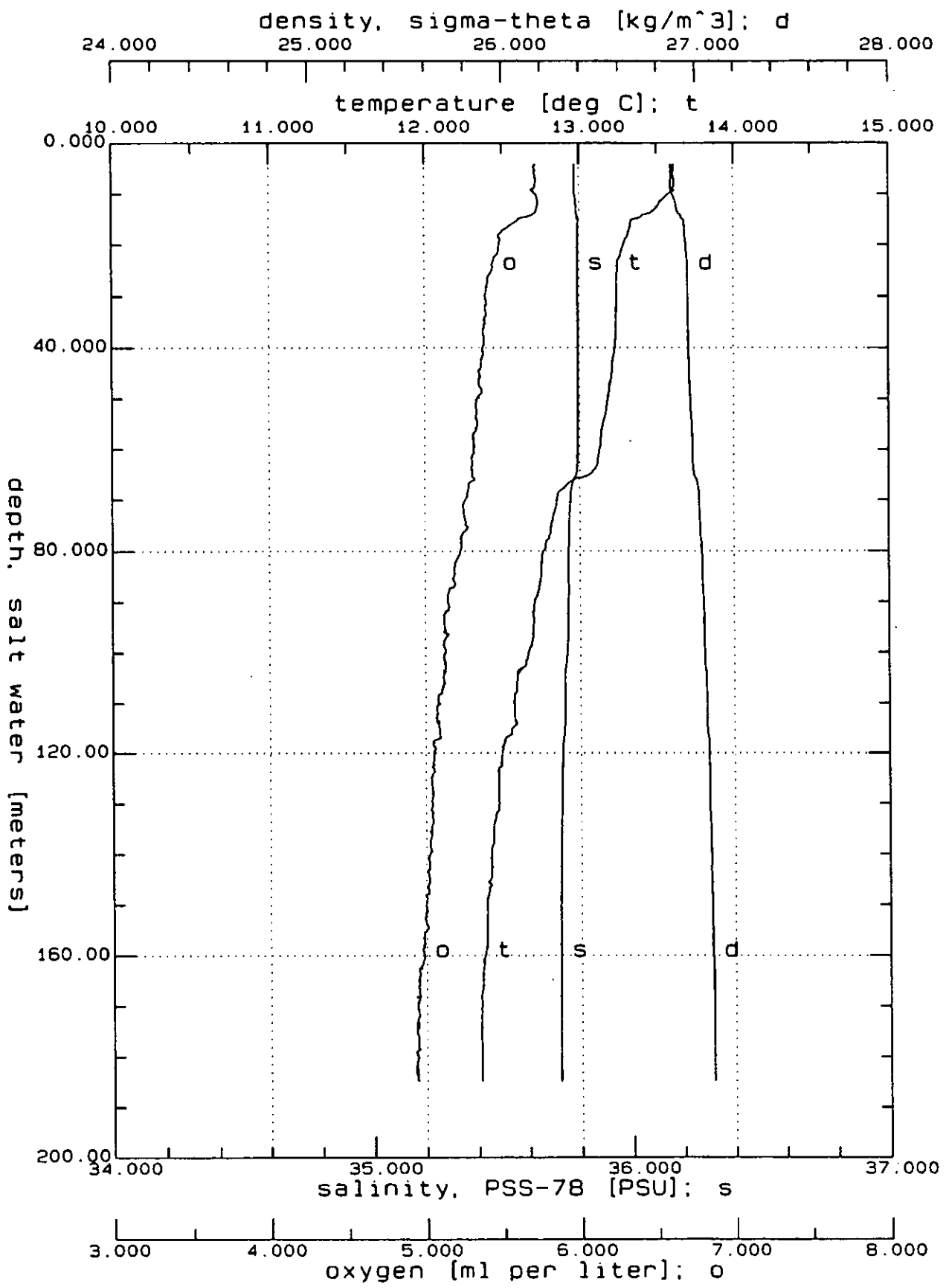
GL9313.CNV: Station 13 01.05.93 at 16h33

Figure 33



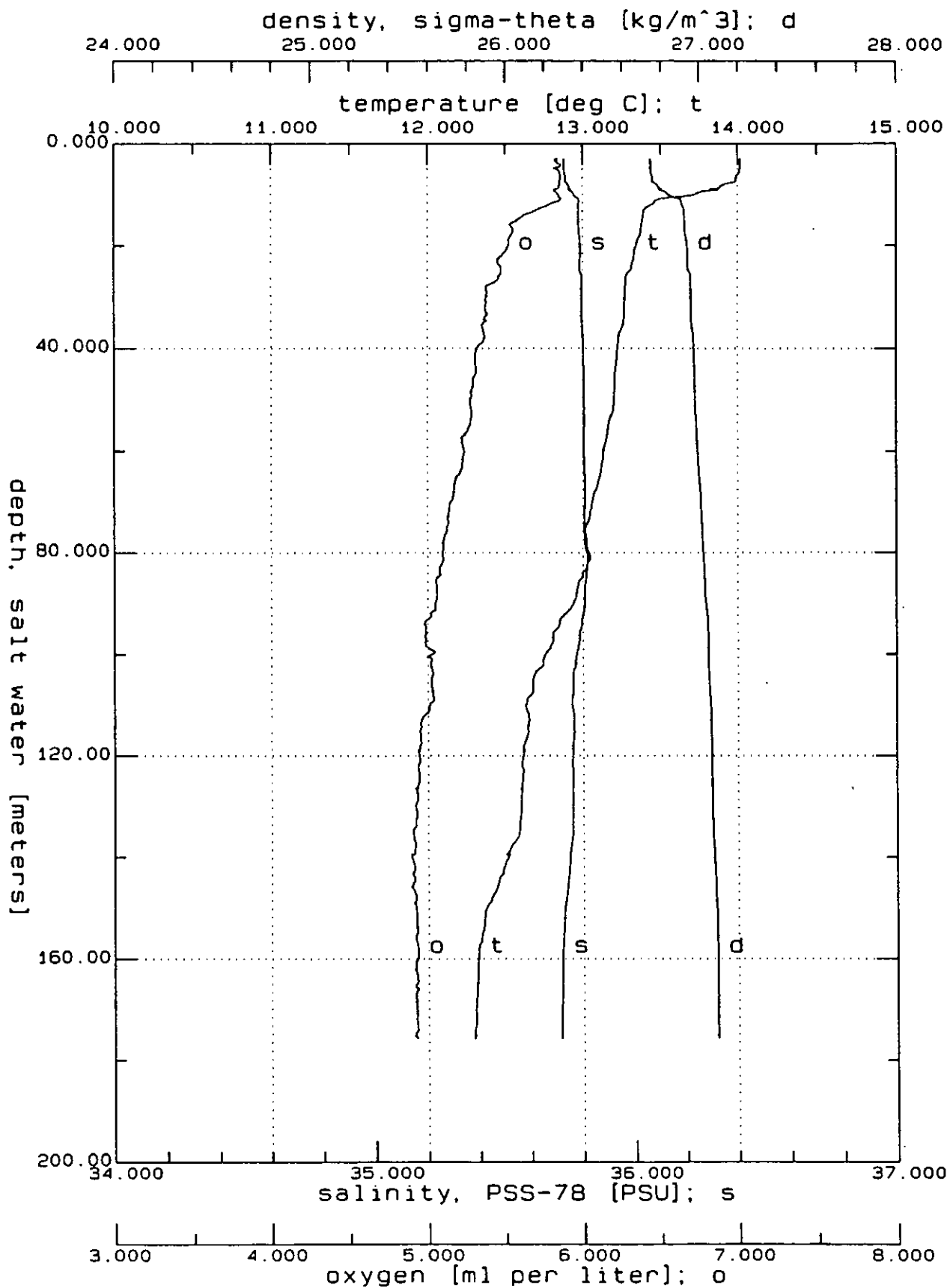
GL9314.CNV: Station 14 01.05.93 at 19h39

Figure 34



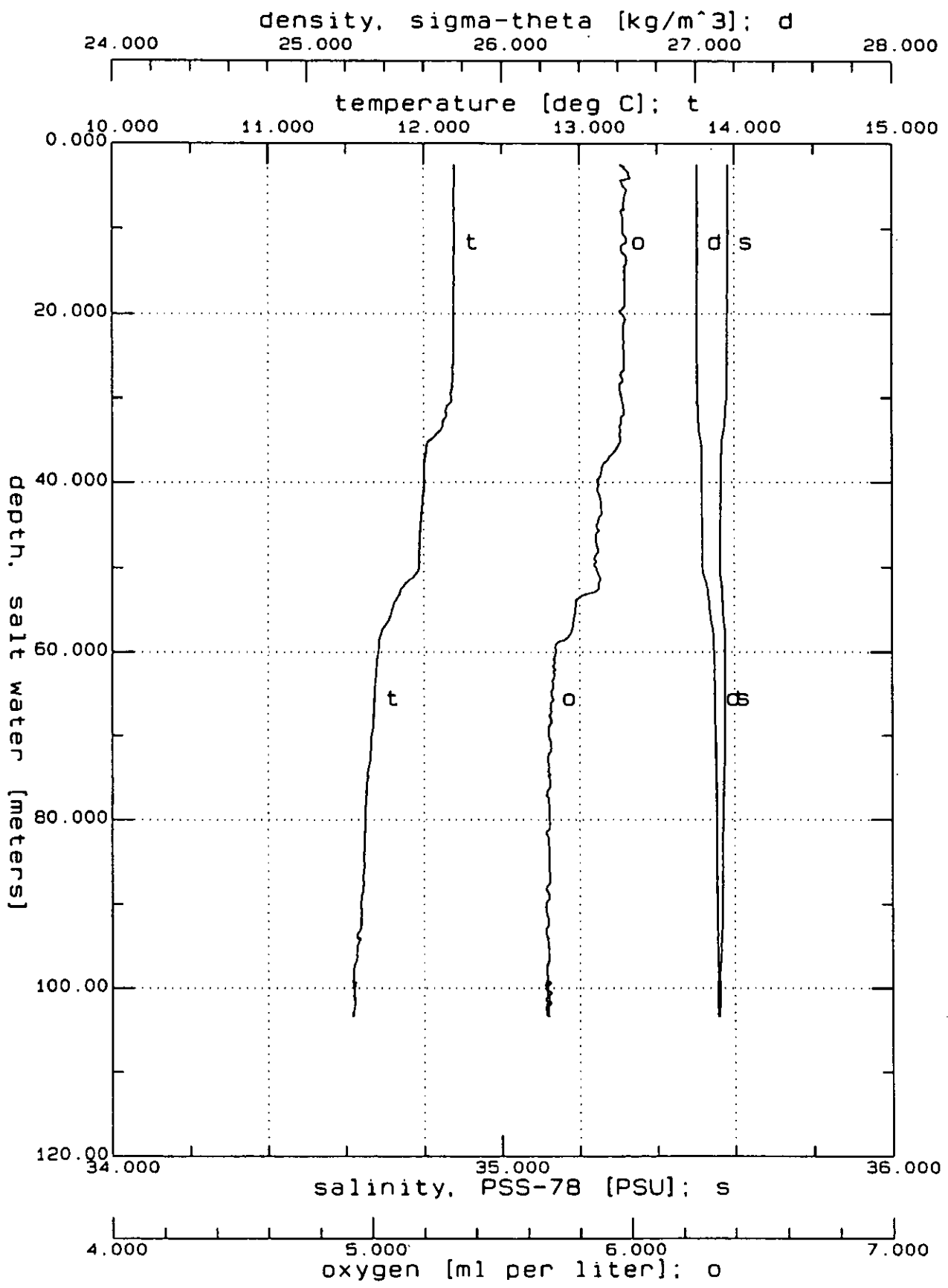
GL9315.CNV: Station 15 01.05.93 at 23h32

Figure 35



GL9316.CNV: Station 16 02.05.93 at 02h49

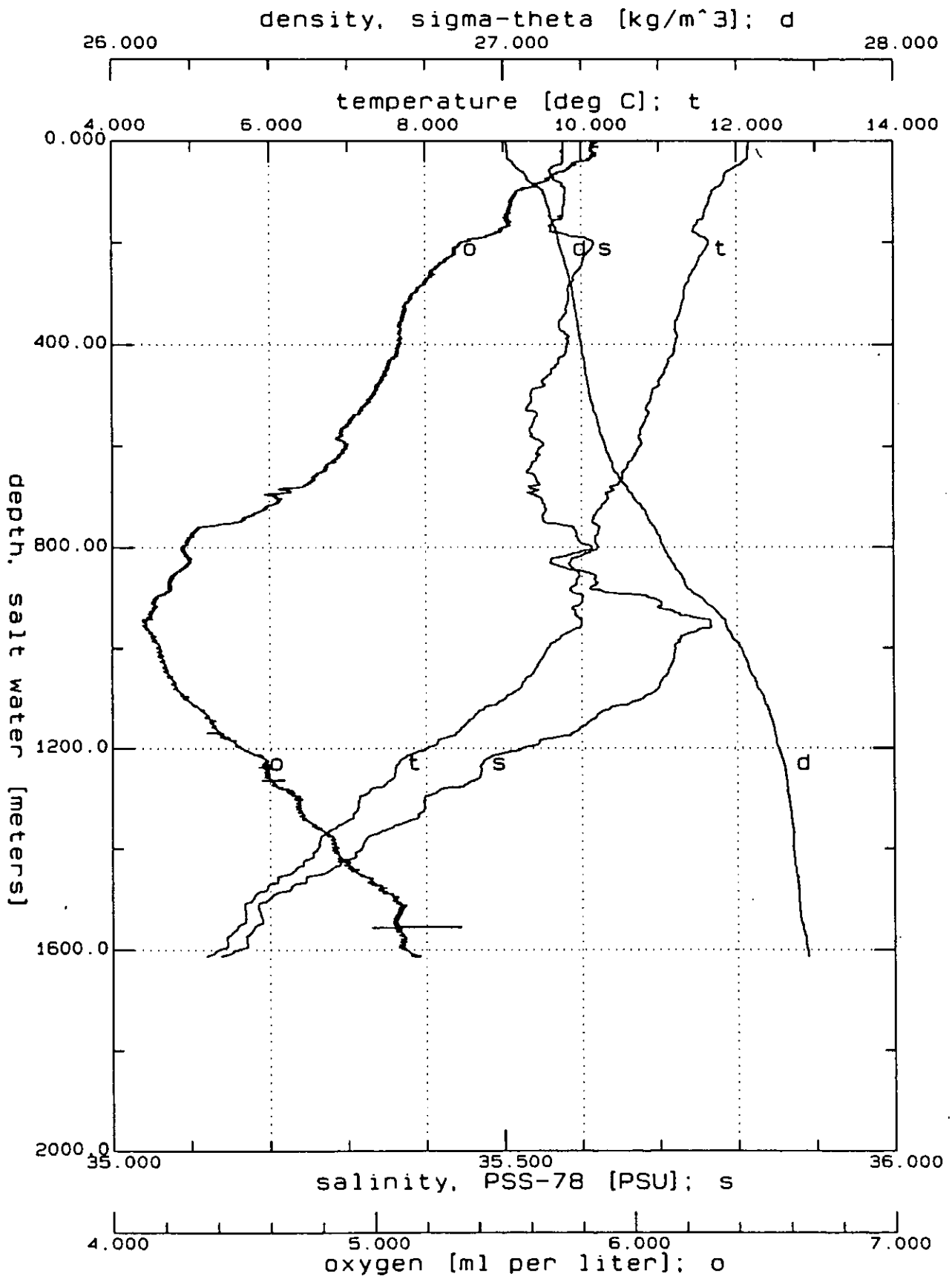
Figure 36



GL9310G.CNV: Station 10G 03.05.93 at 09h35

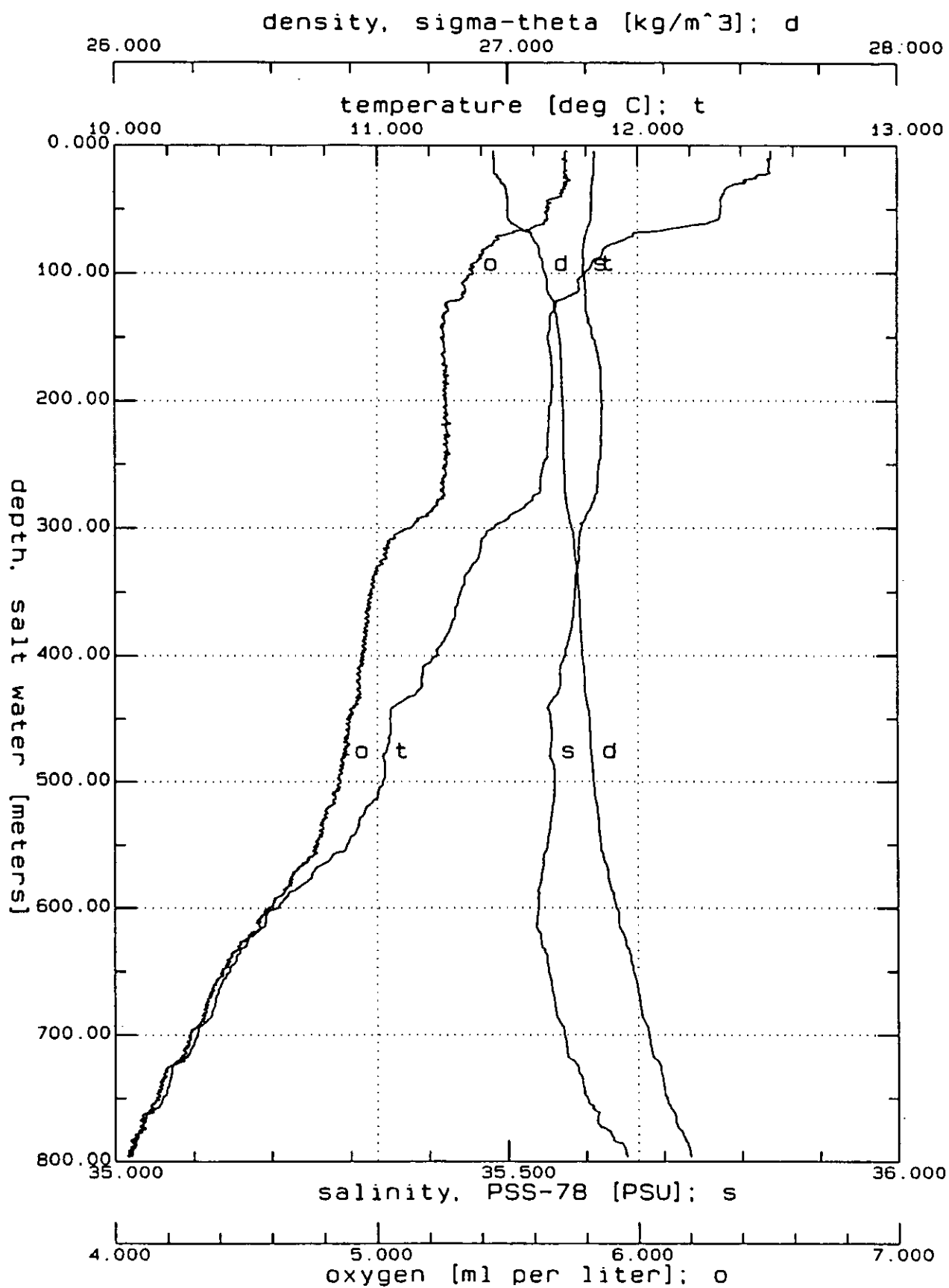
Figure 37





GL9310H.CNV: Station 10H 01.05.93 at 11h22

Figure 38



GL9310I.CNV: Station 10I 03.05.93 at 18h30

Figure 39

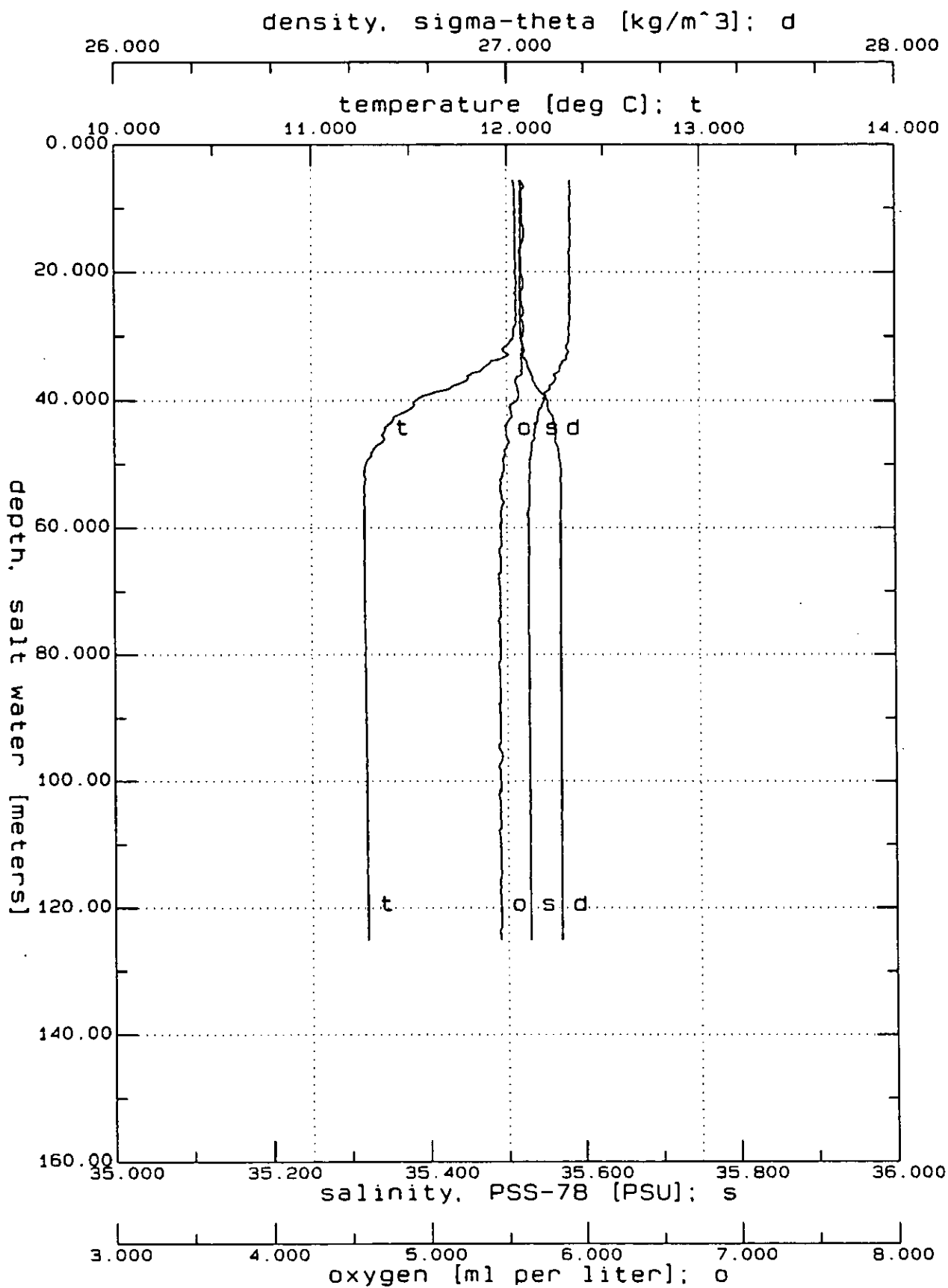
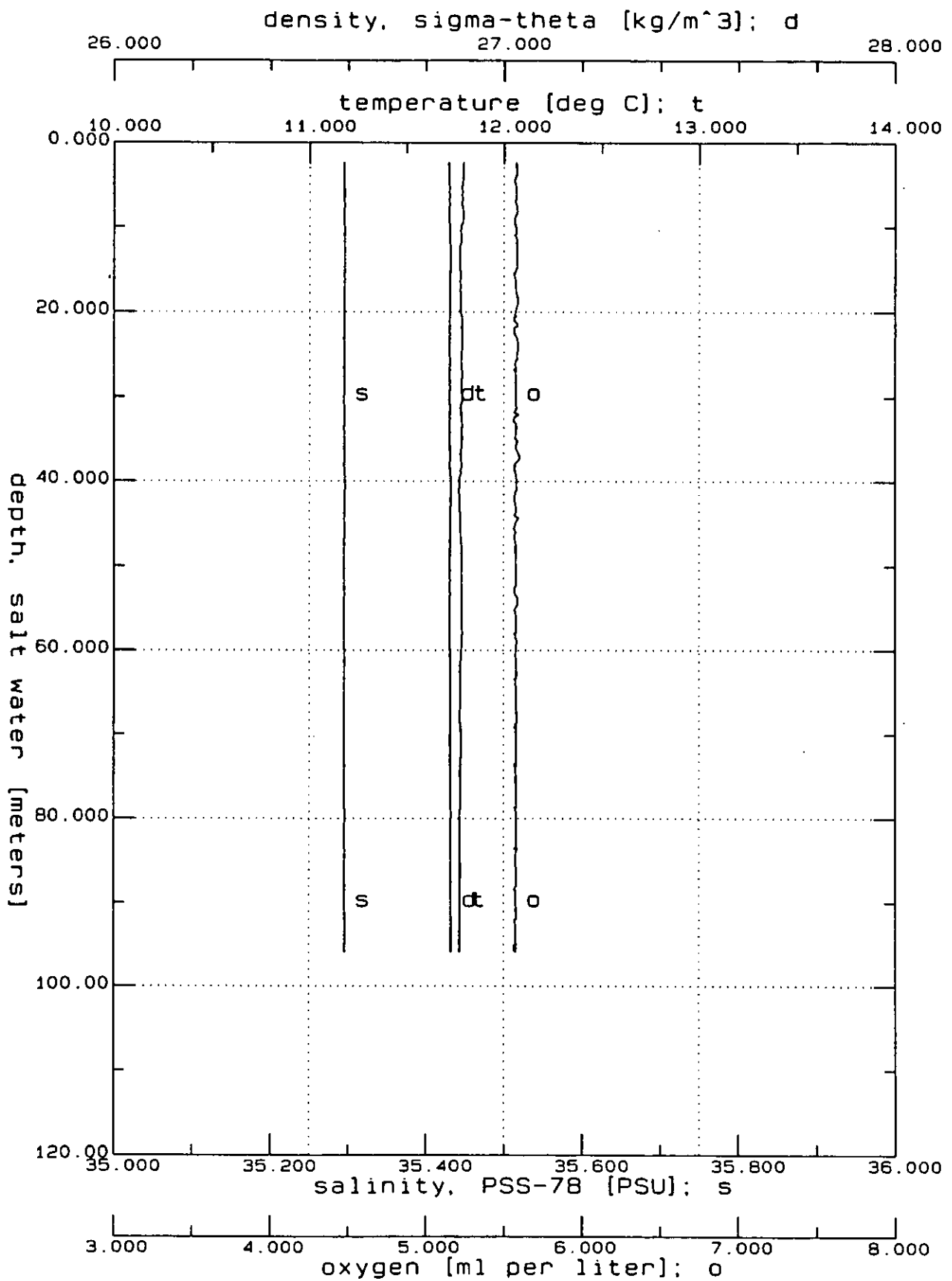


Figure 40



GL9319.CNV: Station 19 04.05.93 at 12h58

Figure 41

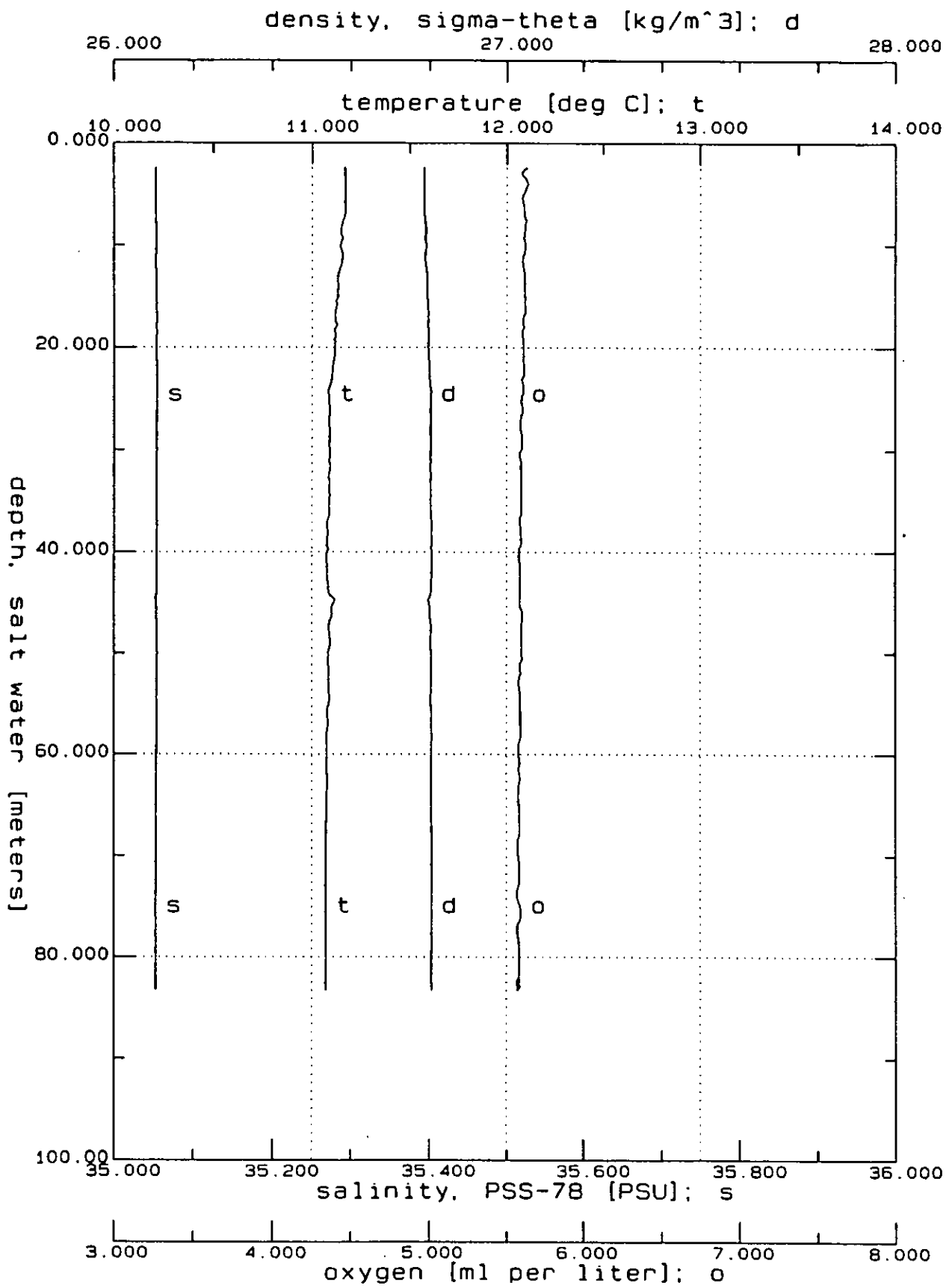
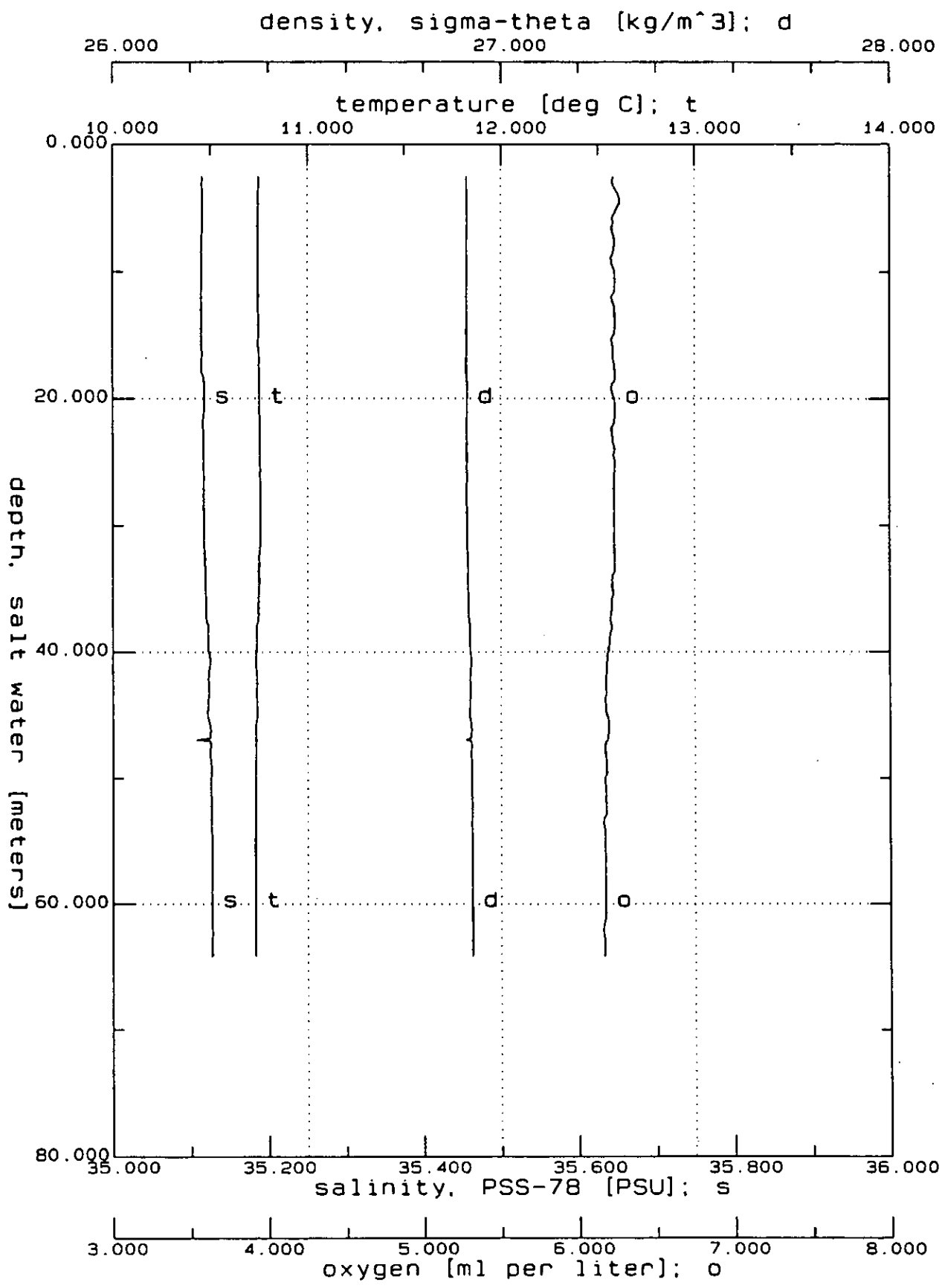
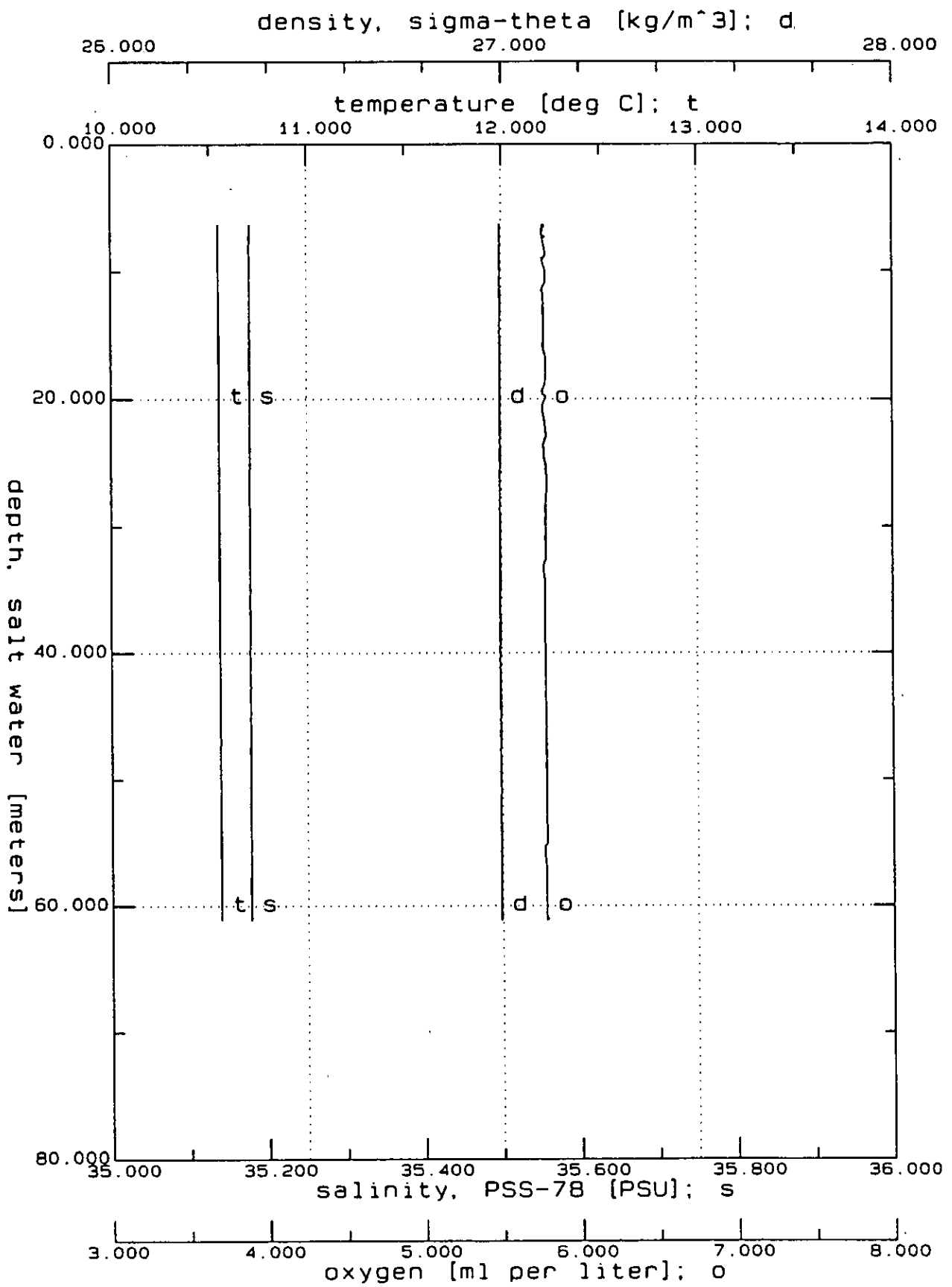


Figure 42



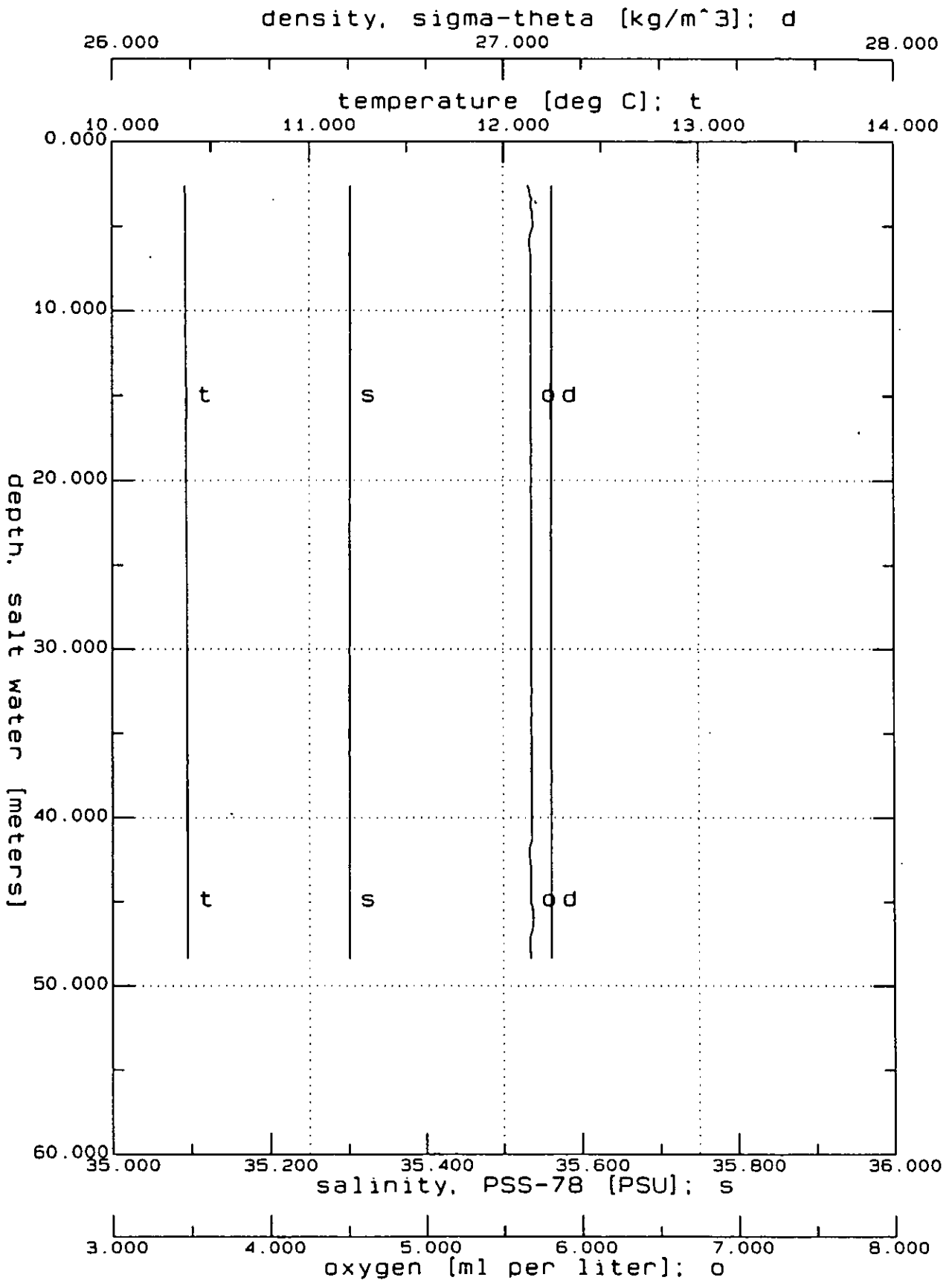
GL9321.CNV: Station 21 04.05.93 at 22h09

Figure 43



GL9322.CNV: Station 22 05.05.93 at 03h05

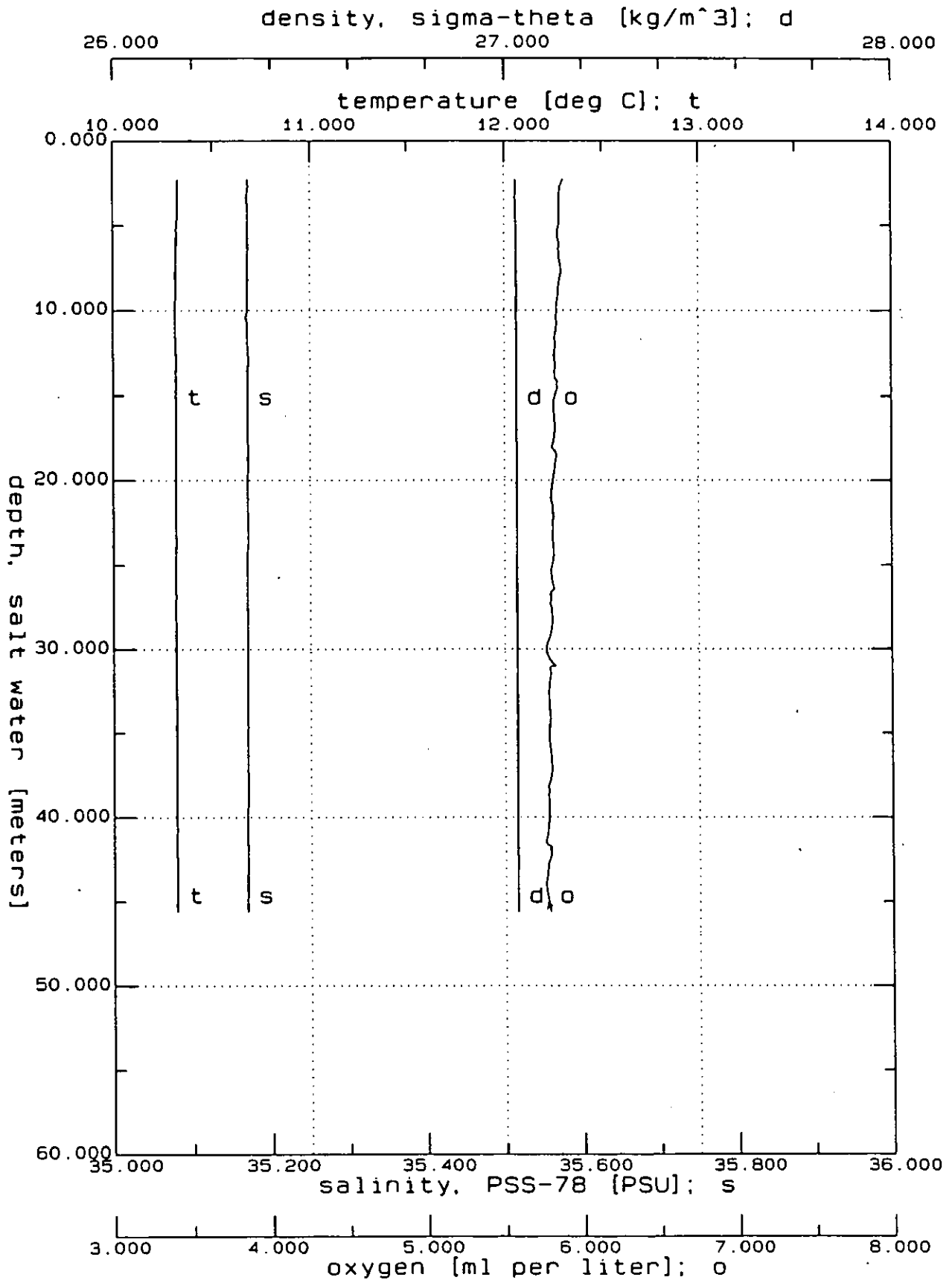
Figure 44



GL9323.CNV: Station 23 05.05.93 at 07h47

Figure 45





GL9324.CNV: Station 24 05.05.93 at 11h08

Figure 46

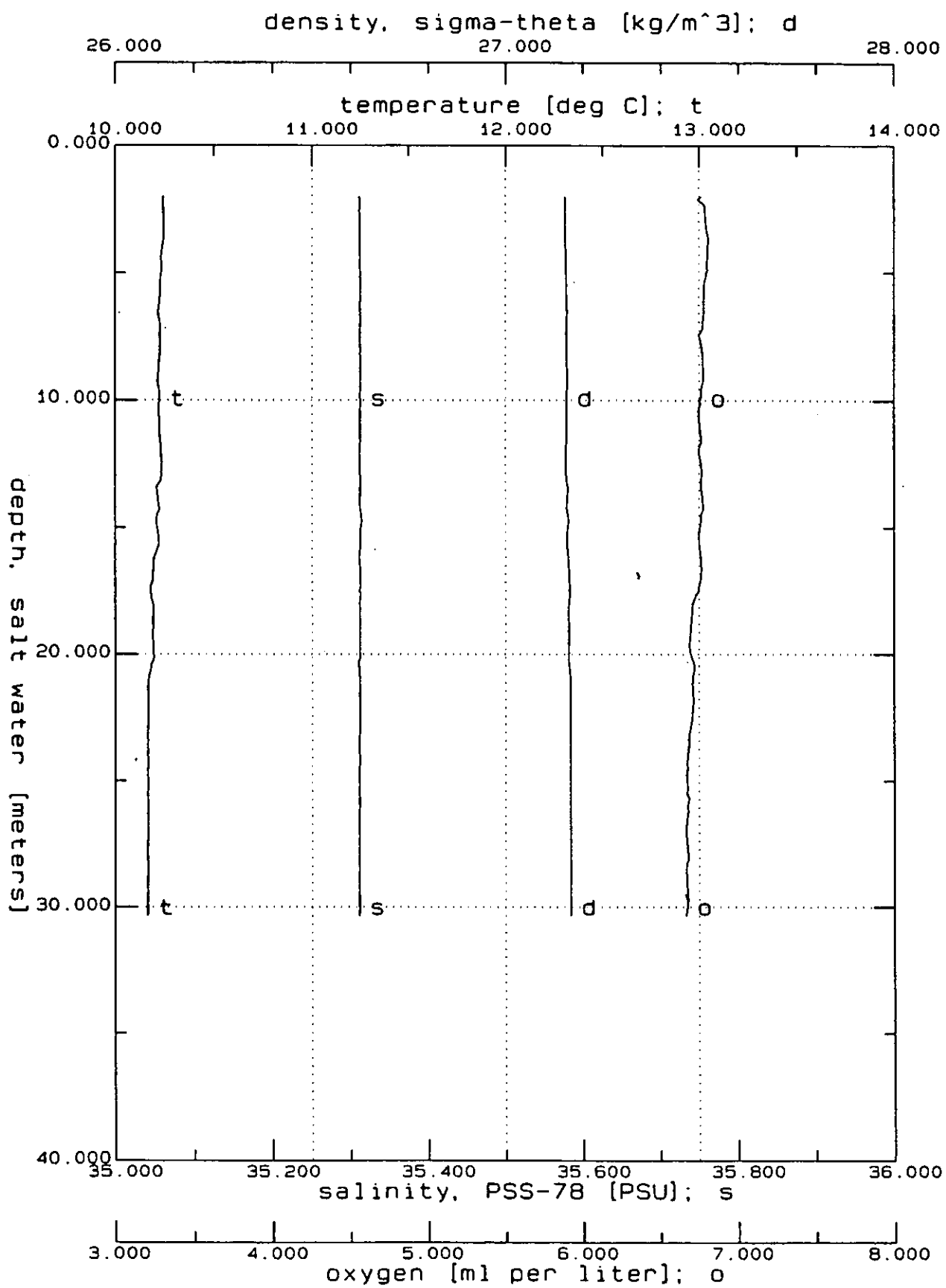
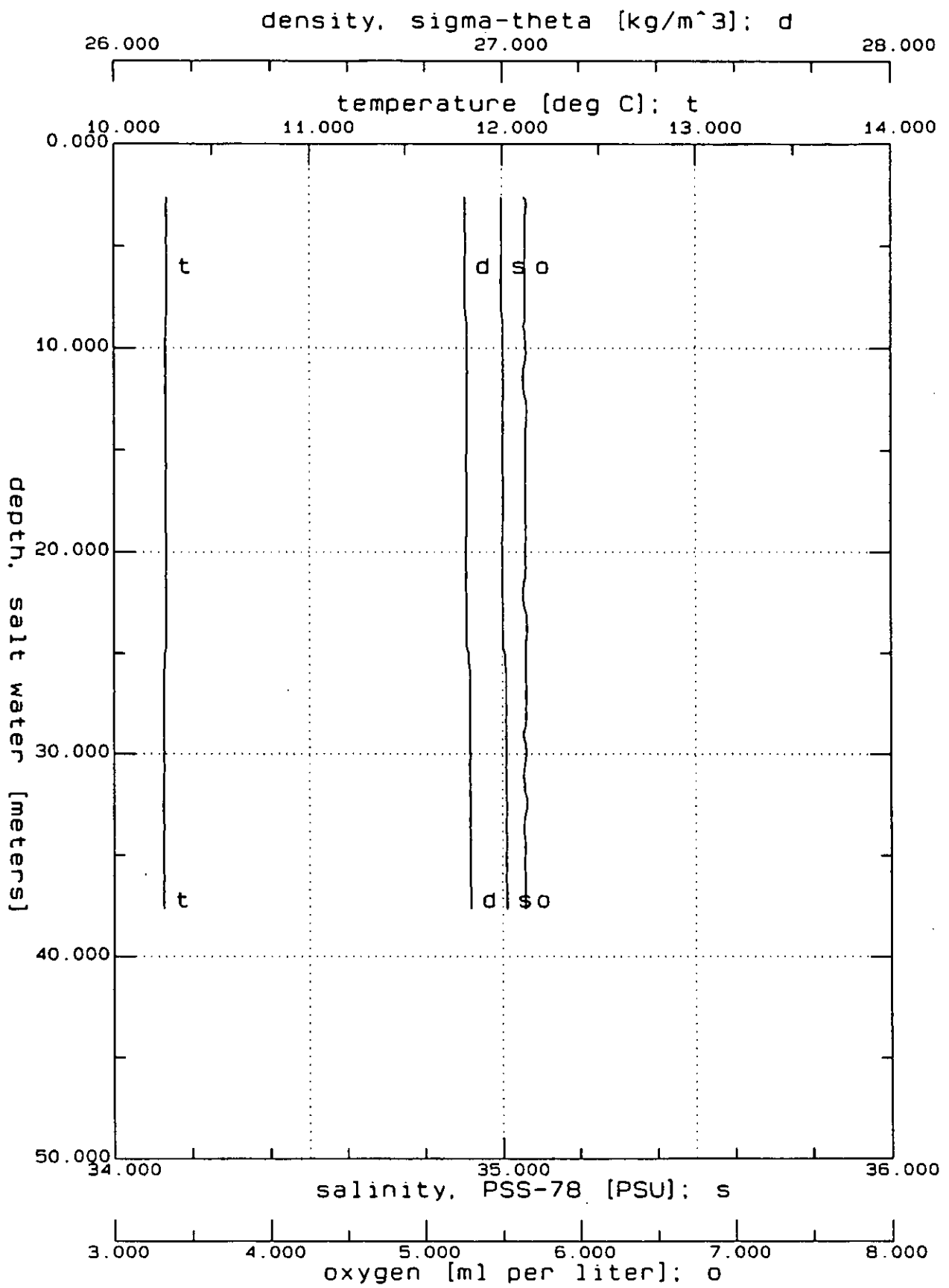
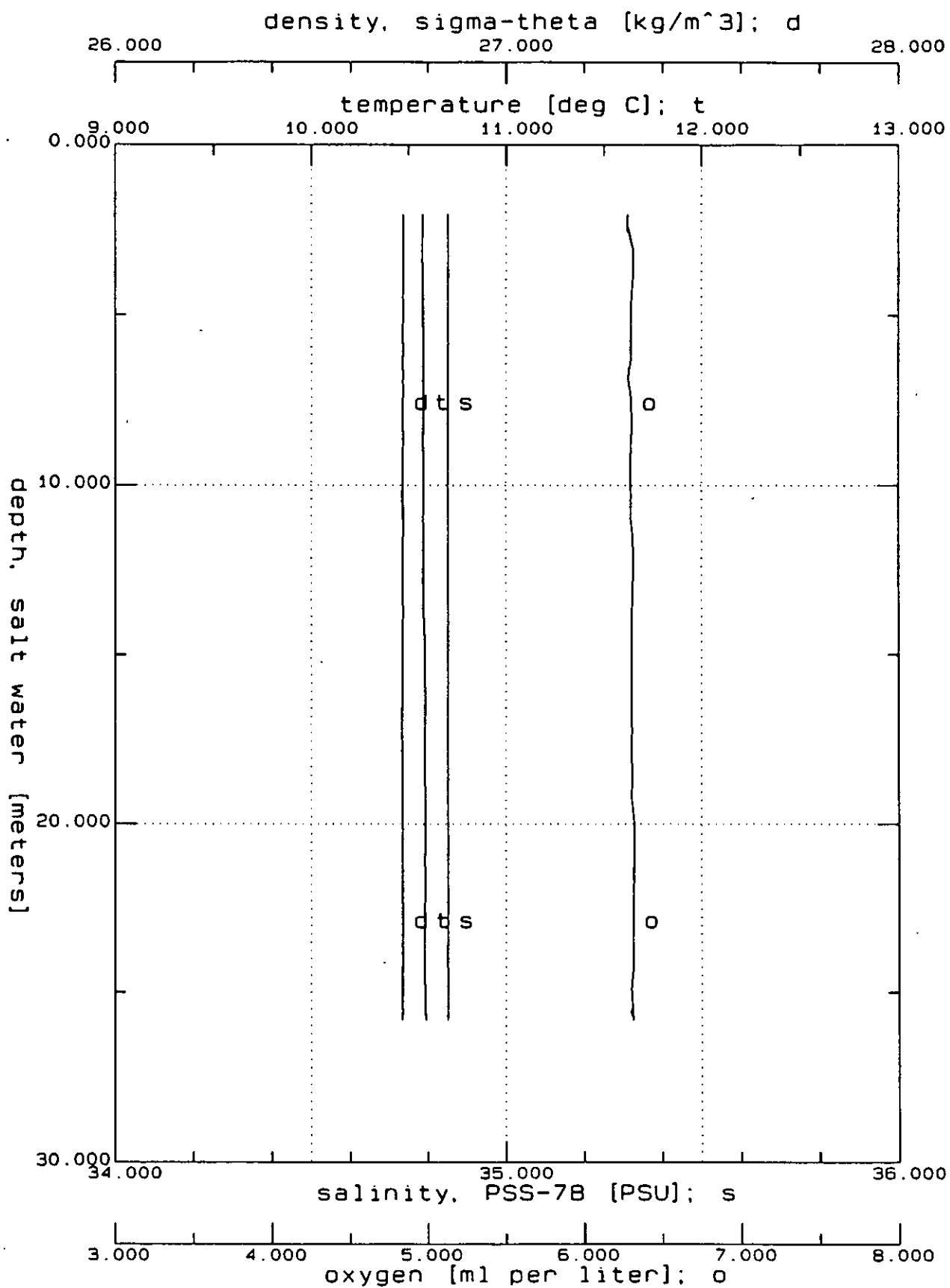


Figure 47



GL9326.CNV: Station 26 05.05.93 at 19h18

Figure 48



GL9327.CNV: Station 27 05.05.93 at 21h48

Figure 49