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CASP II SEA-ICE AND OCEANOGRAPHIC OBSERVATIONS MARCH-APRIL 1992

C.L. Tang, B.M. DeTracey, Q.Y. Gui, and R. Lively

Physical and Chemical Sciences Branch
Scotia-Fundy Region
Department of Fisheries and Oceans

Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
Canada B2Y 4A2

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Fisheries and Oceans Pêches et Océans

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Canadian Data Report Of Hydrography and Ocean Sciences

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Rapport statistique canadien sur l'hydrographie et les sciences océaniques

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Les établissements des Sciences et levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports en décembre 1981. Une liste complète de ces publications figure dans le volume 39, Index des publications 1982, du *Journal canadien des sciences halieutiques et aquatiques*. La série actuelle a commencé avec la publication du rapport numéro 1 en janvier 1982.

Canadian Data Report of

Hydrography and Ocean Sciences 128

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Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
Canada B2Y 4A2

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Table of Contents

List of Figures

List of Tables

Abstract

Tang, C.L, B.M. DeTracey, Q.Y. Gui, and R. Lively, 1994. CASP II sea-ice and oceanographic observations, March-April, 1992. Can. Data Rep. Hydrog. and Ocean Sci. 128: vi + 146 pp.

Oceanographic and sea-ice data collected during the *CSS Hudson* cruise (No. 91-61) of the Bedford Institute of Oceanography in March-April, 1992 are presented in graphic form.

Résumé

Tang, C.L, B.M. DeTracey, Q.Y. Gui, and R. Lively, 1994. CASP II sea-ice and oceanographic observations, March-April, 1992. Can. Data Rep. Hydrog. and Ocean Sci. 128: vi + 146 pp.

On présente ici, sous forme graphique, les données océanographiques et les données sur la glace marine recueillies durant la mission que le NSC Hudson (n° 91-61), de l'Institut océanographique de Bedford, a effectuée en mars-avril 1992.

1. Introduction

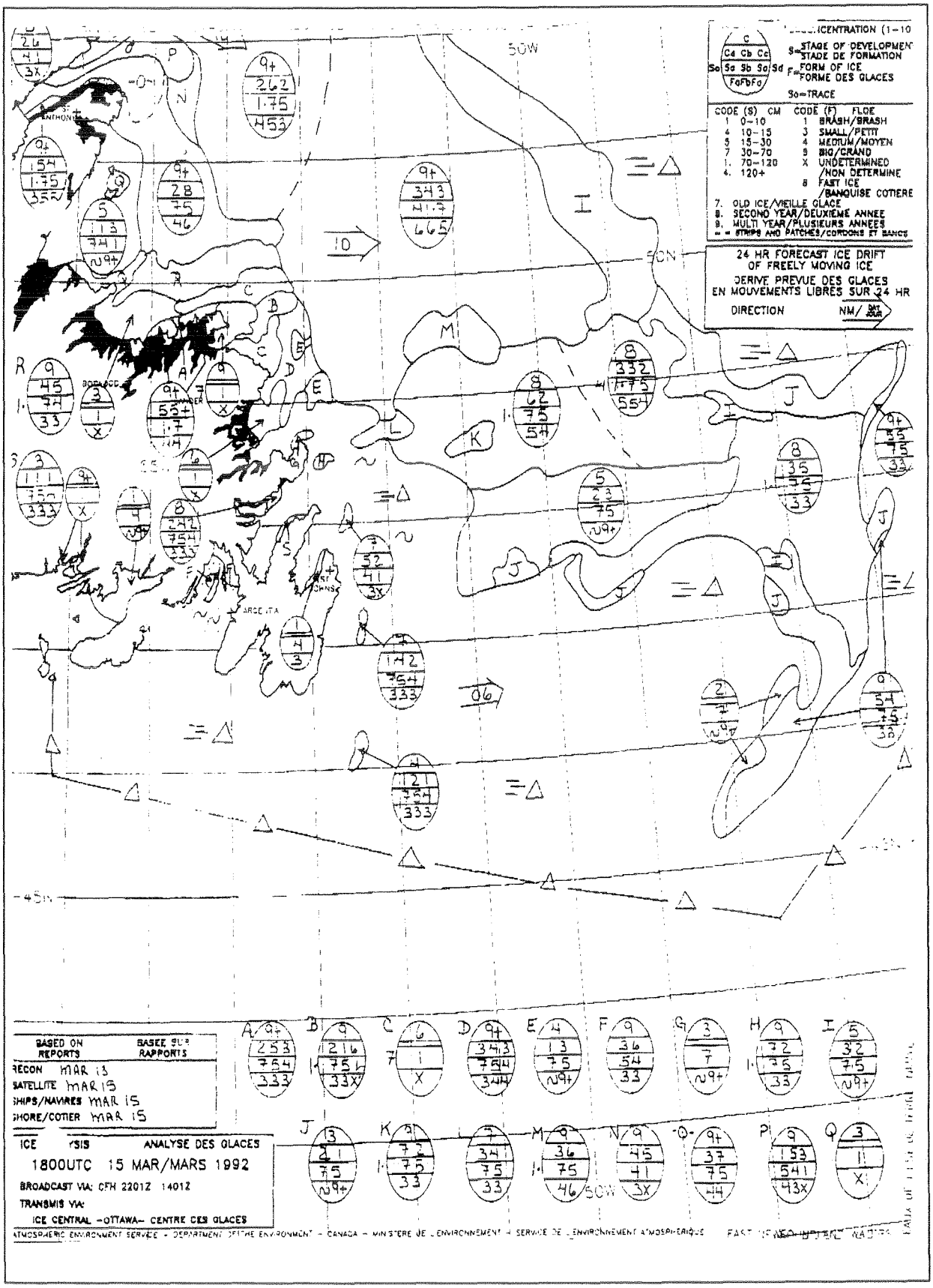
The data included in this report were collected during a cruise on *CSS Hudson* in March-April, 1992 as part of the Canadian Atlantic Storm Program II (CASP II). CASP II was a multi-disciplinary program designed to collect oceanographic and meteorological data for study of the oceanographic conditions, sea-ice, storms and their mutual influence over the Grand Bank and N.E. Newfoundland Shelf. A detailed description of the component programs of CASP II can be found in "Canadian Atlantic Storms Program II, Experimental Design and Operations Plan" compiled by C. Anderson, C. Tang and P.C. Smith.

Several outside agencies, i.e, Institut français de recherche pour l'exploitation de la mer (France), Institute for Marine Dynamics (St. John's) and Memorial University of Newfoundland, participated in the cruise, and collected sea-ice remote sensing data, ice collision data, and ice edge data. These data were reported elsewhere and are not included in this data report. During the cruise, a Russian research vessel, *Akedemik Shouleykin*, from St. Petersburg, joined *CSS Hudson* for a coordinated survey of the water mass of the Labrador Sea. The data collected by *Akedemik Shouleykin* were primarly CTD data in the deep sea, which are presented in Section 4 together with the CTD data of *CSS Hudson*.

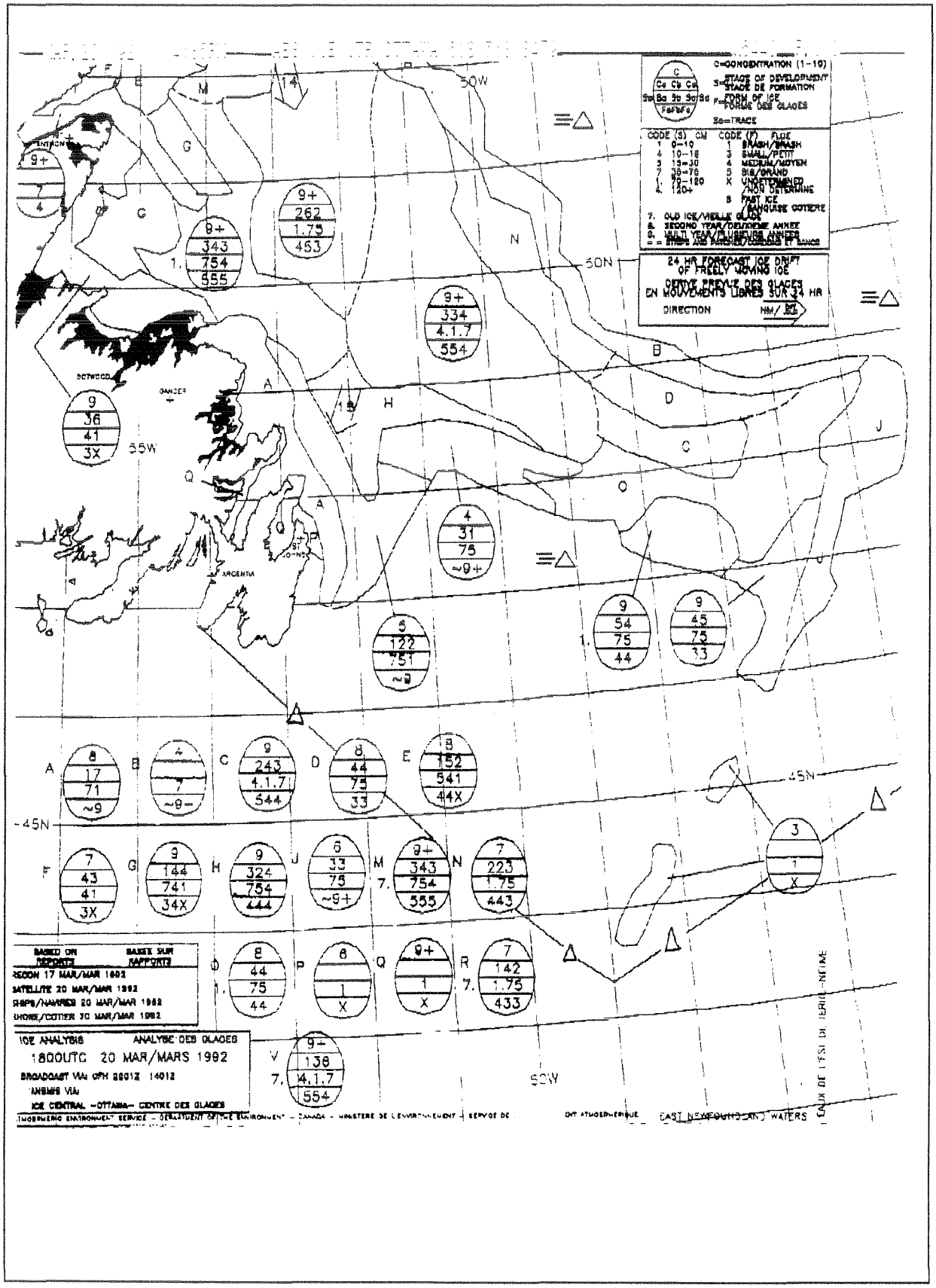
2. Ice Conditions

Ice conditions for selected days during the cruise are shown in p.4 to p.6. The ice conditions charts were produced by the Ice Centre Environment Canada using information derived from reconnaissance flights, satellite images, and ship reports.

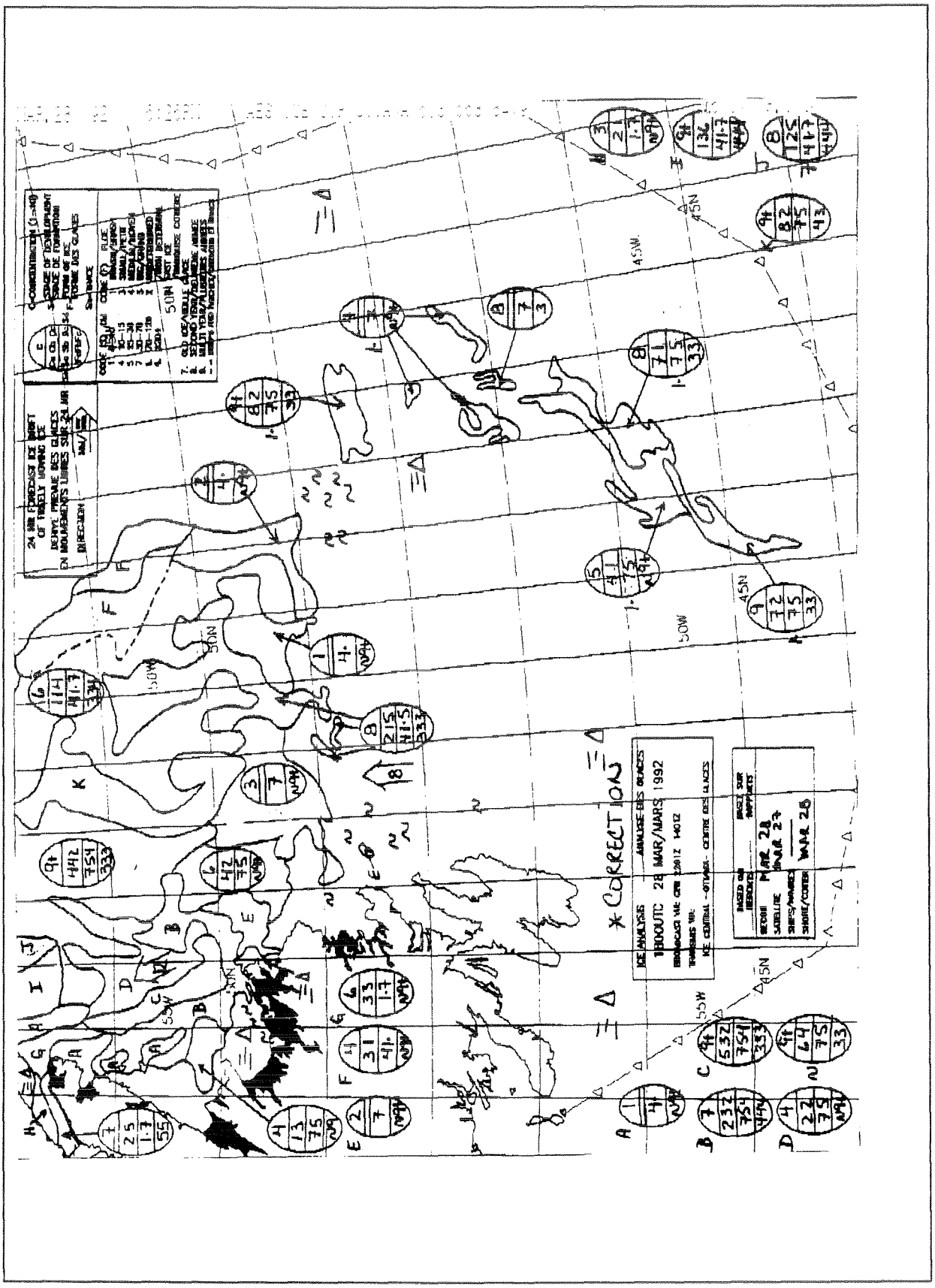
Ice conditions for March 15, 1992



Ice conditions for March 20, 1992



Ice conditions for March 28, 1992



3. Data Summary

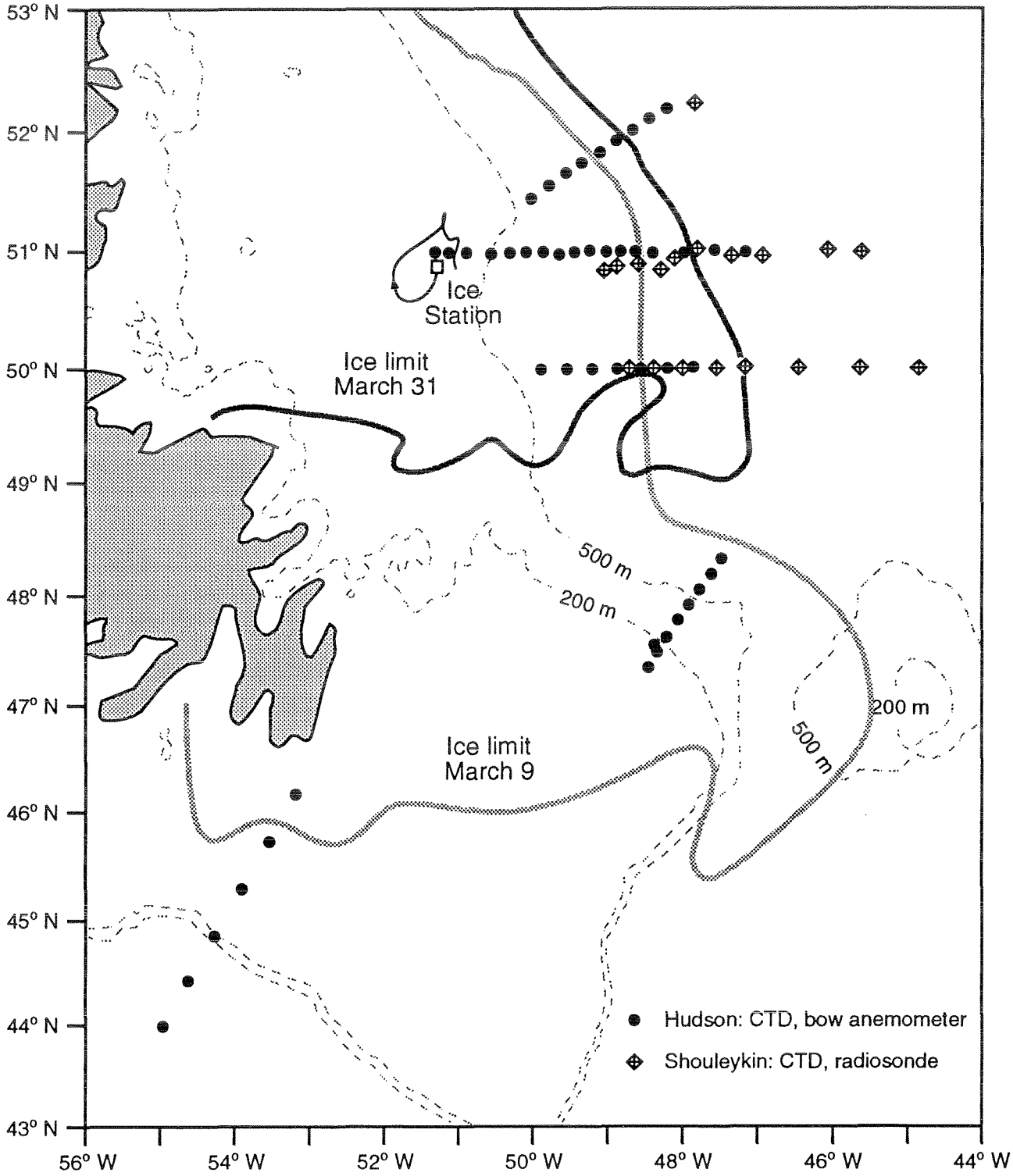
This report presents the oceanographic measurements taken from the *CSS Hudson* and the *Akedemik Shouleykin*, as well as data from deployed instruments, such as ice beacon drifters. On one ice floe, an anemometer ice beacon, three current meters and a thermistor chain were deployed. This floe is referred to as the Ice Station. A location map of measurements taken is shown on p.8. The heavy lines indicate the ice limit on March 9 and March 31.

The following data is presented in this report:

- 112 vertical profiles of temperature, salinity , and sigma-θ from CTD casts.
- 7 vertical sections of temperature, salinity, and sigma-θ from CTD casts.
- Progressive vector diagrams of 3 drifting ice beacons.
- Progressive vector and time series diagrams of 2m wind measured by 2 of the drifting ice beacons.
- Progressive vector and time series diagrams of 20m wind measured shipboard.
- Time series of 3 current meters at 5, 15, and 40m depths, moored at the Ice Station.
- Time series of water temperature at 12 depths under ice, and surface barometric pressure and air temperature, measured by thermistor chain at the Ice Station.
- Time series and progressive vector diagrams of currents measured at 19 depths by acoustic Doppler current profiler.

CASP II HUDSON CRUISE

March 12 - April 3, 1992



4. Temperature, salinity, and density distribution

4.1 Location of CTD stations

91 shipboard CTD profiles were obtained from the *CSS Hudson*. A portable CTD system (Seabird 19) was used to collect 21 profiles from the *Akademik Shouleykin*. The location of the stations are given in p.10 to p.12, the location maps in p.13 to p.16.

4.2 Vertical distribution

Vertical profiles of temperature, salinity, and sigma-θ for each station are shown in p.17 to p.54. Stations 34 to 43 and 53 to 62 were drift stations (ship freely drifting) with a time interval of approximately six hours. Multiple vertical profiles of temperature, salinity, and sigma-θ are shown on p.55 and p.56. The horizontal scale is accurate for the first profiles only. Each following profile is displaced to the right by 4 $^{\circ}$C, 2 ppt., and 1 $kg \cdot m^{-3}$, for temperature, salinity, and sigma-θ, respectively. All data plotted are from down traces except those of stations 18, 30, 35, 36, 37, 38, 39, 46, 51, 54, 61, 63, 66, 67, and 74.

4.3 Vertical sections

The vertical distributions of temperature, salinity, and sigma-θ, for sections A to E are displayed in p.57 to p.77.

CRUISE 91061 CTD STATIONS

STN	CAL. DAY	JD	TIME (UTC)	LATITUDE (DEGREE)	LONGITUDE (DEGREE)	WATER DEPTH (M)
0	12/03/1992	72	17:19	44.5660	63.5402	30
1	13/03/1992	73	23:22	43.9993	55.0059	3280
2	14/03/1992	74	02:31	44.4305	54.6592	2158
3	14/03/1992	74	05:28	44.8706	54.3150	149.5
4	14/03/1992	74	08:13	45.3062	53.9653	84
5	14/03/1992	74	10:57	45.7480	53.6116	91
6	14/03/1992	74	13:38	46.1786	53.2574	150
7	15/03/1992	75	17:58	47.5755	48.4613	184
8	16/03/1992	76	21:33	51.4576	50.1522	835
9	16/03/1992	76	23:40	51.5550	49.9189	2000
10	17/03/1992	77	01:55	51.6510	49.6975	2422
11	17/03/1992	77	03:34	51.7424	49.4772	2725
12	17/03/1992	77	05:21	51.8343	49.2531	2990
13	17/03/1992	77	07:07	51.9262	49.0280	3244
14	17/03/1992	77	09:03	52.0142	48.7979	3420
15	17/03/1992	77	10:41	52.1051	48.5755	3475
16	17/03/1992	77	12:11	52.1972	48.3521	3583
17	17/03/1992	77	19:22	50.9985	47.3176	3072
18	17/03/1992	77	21:35	51.0058	47.7271	3237
19	17/03/1992	77	23:37	51.0003	48.1190	2889
20	18/03/1992	78	01:46	50.9998	48.5300	2578
21	18/03/1992	78	03:19	50.9997	48.7406	2422
22	18/03/1992	78	04:56	50.9994	48.9554	2180
23	18/03/1992	78	06:28	51.0001	49.1659	1829
24	18/03/1992	78	08:24	51.0124	49.3772	1653
25	18/03/1992	78	23:00	51.0127	49.5735	1225
26	19/03/1992	79	01:19	50.9899	49.7950	896
27	19/03/1992	79	11:46	50.9958	49.9764	988
28	19/03/1992	79	13:39	51.0018	50.2311	940
29	19/03/1992	79	15:25	50.9980	50.4368	840
30	19/03/1992	79	18:37	50.9715	50.6827	350
31	19/03/1992	79	22:29	50.9945	51.0208	274
32	19/03/1992	79	23:42	51.0003	51.2294	270
33	20/03/1992	80	01:04	50.9997	51.4342	245
34	21/03/1992	81	02:56	50.8327	51.4937	269
35	21/03/1992	81	09:14	50.7798	51.4920	294
36	21/03/1992	81	15:32	50.7527	51.5206	300
37	21/03/1992	81	22:00	50.7075	51.5362	271
38	22/03/1992	82	03:06	50.6656	51.6089	250
39	22/03/1992	82	09:11	50.6016	51.7228	223
40	22/03/1992	82	15:04	50.6154	51.7939	230
41	22/03/1992	82	21:13	50.6792	51.8225	230
42	23/03/1992	83	03:30	50.7976	51.8198	237
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44	23/03/1992	83	20:21	50.9120	49.0364	2082
45	23/03/1992	83	21:56	50.9212	49.2412	1798

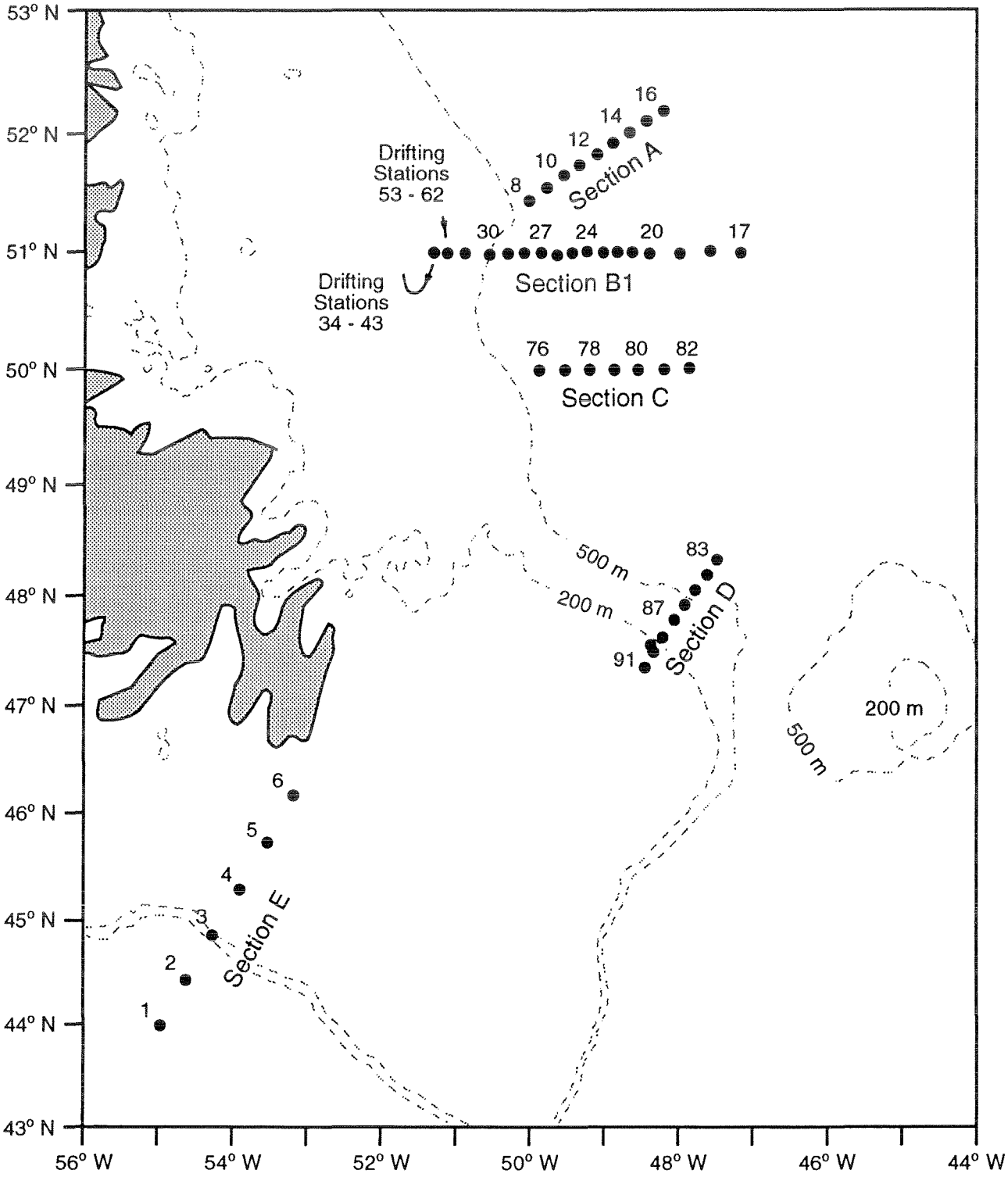
46	23/03/1992	83	23:54	50.9195	49.4491	1550
47	24/03/1992	84	02:02	50.9175	49.6572	1207
48	24/03/1992	84	04:23	50.9145	49.9235	1070
49	24/03/1992	84	06:49	50.9169	50.1773	1024
50	24/03/1992	84	09:13	50.9114	50.4728	840
51	24/03/1992	84	11:24	50.9181	50.7080	360
52	24/03/1992	84	13:48	50.9234	51.2351	305
53	24/03/1992	84	15:25	51.0965	51.2787	256
54	24/03/1992	84	21:54	51.1090	51.2424	265
55	25/03/1992	85	03:09	51.1728	51.2758	248
56	25/03/1992	85	09:04	51.2293	51.2180	243
57	25/03/1992	85	14:01	51.1876	51.2214	250
58	25/03/1992	85	20:12	51.1838	51.2810	243
59	26/03/1992	86	02:01	51.1938	51.3189	245
60	26/03/1992	86	08:04	51.1642	51.3060	242
61	26/03/1992	86	14:09	51.1445	51.3335	250
62	26/03/1992	86	20:05	50.9862	51.1826	294
63	26/03/1992	86	21:40	50.9467	51.0951	304
64	27/03/1992	87	00:56	50.9111	50.6308	530
65	27/03/1992	87	02:17	50.9177	50.4639	860
66	27/03/1992	87	04:38	50.9172	50.1697	1024
67	27/03/1992	87	06:55	50.9198	49.9111	1060
68	27/03/1992	87	08:32	50.9146	49.6491	1225
69	27/03/1992	87	10:14	50.9105	49.4710	1578
70	27/03/1992	87	11:49	50.9141	49.2462	1792
71	27/03/1992	87	13:19	50.9132	49.0307	2085
72	27/03/1992	87	14:43	50.9166	48.8703	2290
73	27/03/1992	87	16:00	50.9163	48.7148	2620
74	28/03/1992	88	10:00	50.9517	51.0273	270
75	28/03/1992	88	18:55	50.9631	50.9878	305
76	29/03/1992	89	01:50	50.0018	50.0021	845
77	29/03/1992	89	03:44	50.0007	49.6584	1225
78	29/03/1992	89	05:41	49.9995	49.3338	1530
79	29/03/1992	89	07:59	50.0027	48.9962	1825
80	29/03/1992	89	10:03	50.0010	48.6661	2098
81	29/03/1992	89	11:54	49.9993	48.3328	2350
82	29/03/1992	89	14:06	50.0024	47.9979	2523
83	31/03/1992	91	06:58	48.3365	47.6132	2005
84	31/03/1992	91	10:14	48.1910	47.7508	1408
85	31/03/1992	91	12:18	48.0550	47.8887	415
86	31/03/1992	91	13:44	47.9175	48.0278	315
87	31/03/1992	91	15:15	47.7757	48.1697	250
88	31/03/1992	91	16:45	47.6334	48.2999	210
89	31/03/1992	91	18:05	47.5707	48.4635	174
90	31/03/1992	91	18:56	47.4919	48.4417	168
91	31/03/1992	91	20:12	47.3544	48.5688	141

CASP II HUDSON CRUISE
SHOULEYKIN, CTD

STN	CAL. DAY	JD	TIME (UTC)	LATITUDE (DEGREE)	LONGITUDE (DEGREE)	WATER DEPTH (M)
1/4048 A	20/03/92	80	11:16	50.0000	45.0067	3850
2/4049 B	20/03/92	80	16:45	50.0033	45.7900	2450
3/4050 B	20/03/92	80	23:41	50.0150	46.6083	2930
4/4051 B	21/03/92	81	05:40	50.0017	47.3217	2760
5/4052 B	21/03/92	81	10:30	50.0133	47.6850	2650
6/4053 B	21/03/92	81	14:29	50.0050	48.1300	2470
7/4054 B	21/03/92	81	20:00	50.0050	48.3017	2290
8/4055 B	21/03/92	81	22:15	50.0000	48.5017	2150
9/4056 B	22/03/92	82	00:45	50.0050	48.7867	2010
10/4057 B	22/03/92	82	03:00	50.0000	48.9900	1800
1/4058 A	23/03/92	83	20:28	50.8617	49.1500	1900
2/4059 B	23/03/92	83	23:41	50.8817	49.0600	2050
3/4060 B	24/03/92	84	03:19	50.9233	48.6850	2450
4/4061 B	24/03/92	84	10:35	50.8550	48.4333	2600
5/4063 B	24/03/92	84	14:08	50.9617	48.2300	2780
6/4064 B	24/03/92	84	17:00	51.0283	47.9650	3070
7/4065 B	24/03/92	84	21:26	50.9783	47.4967	3050
8/4066 B	25/03/92	85	03:44	50.9700	47.0917	3020
9/4067 B	25/03/92	85	09:58	51.0267	46.2300	3050
10/4068 B	25/03/92	85	13:10	51.0067	45.7833	4000
1/4069 A	26/03/92	86	06:32	52.2350	47.9850	3720

LOCATION OF CTD STATIONS

CRUISE 91061



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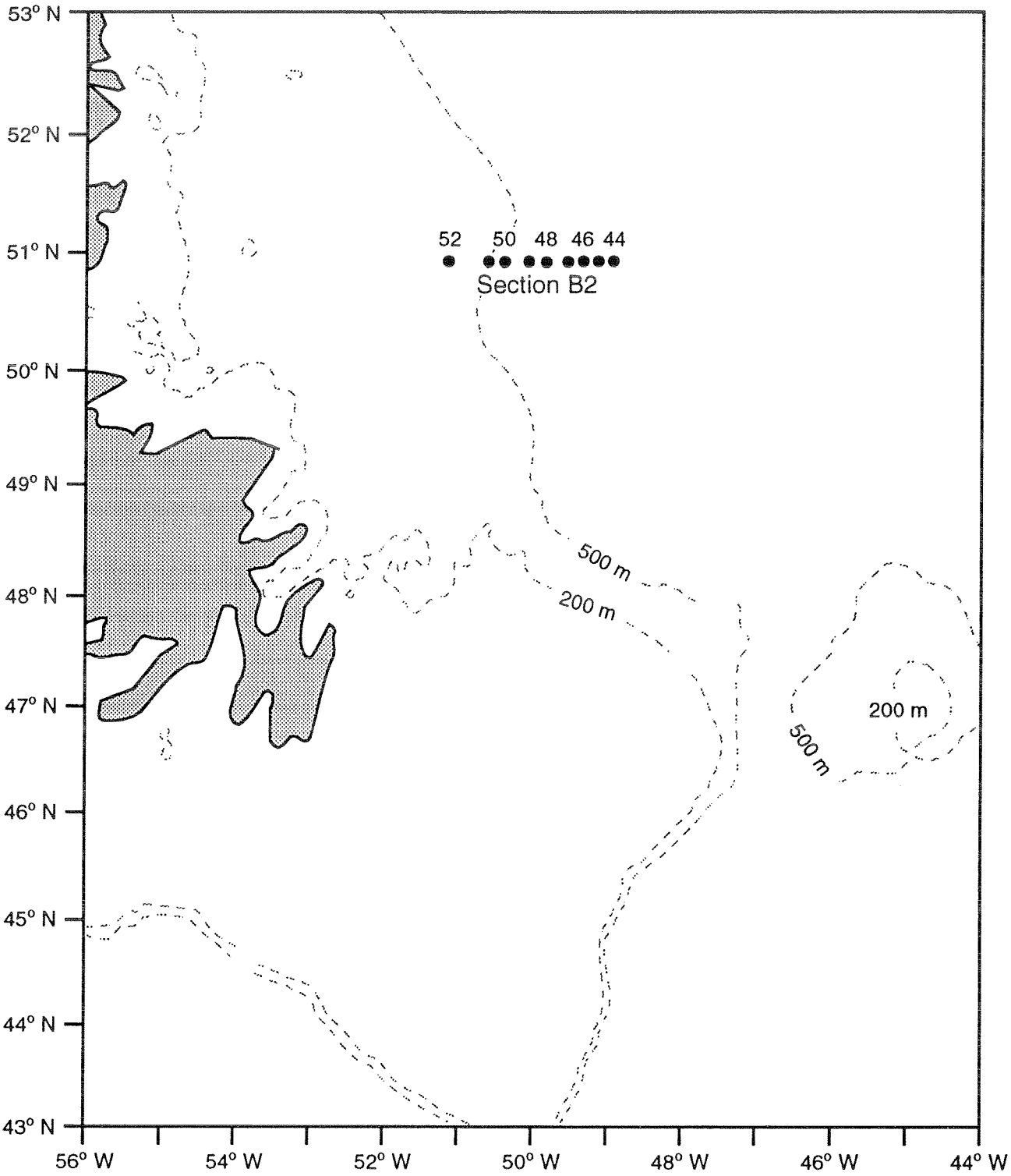

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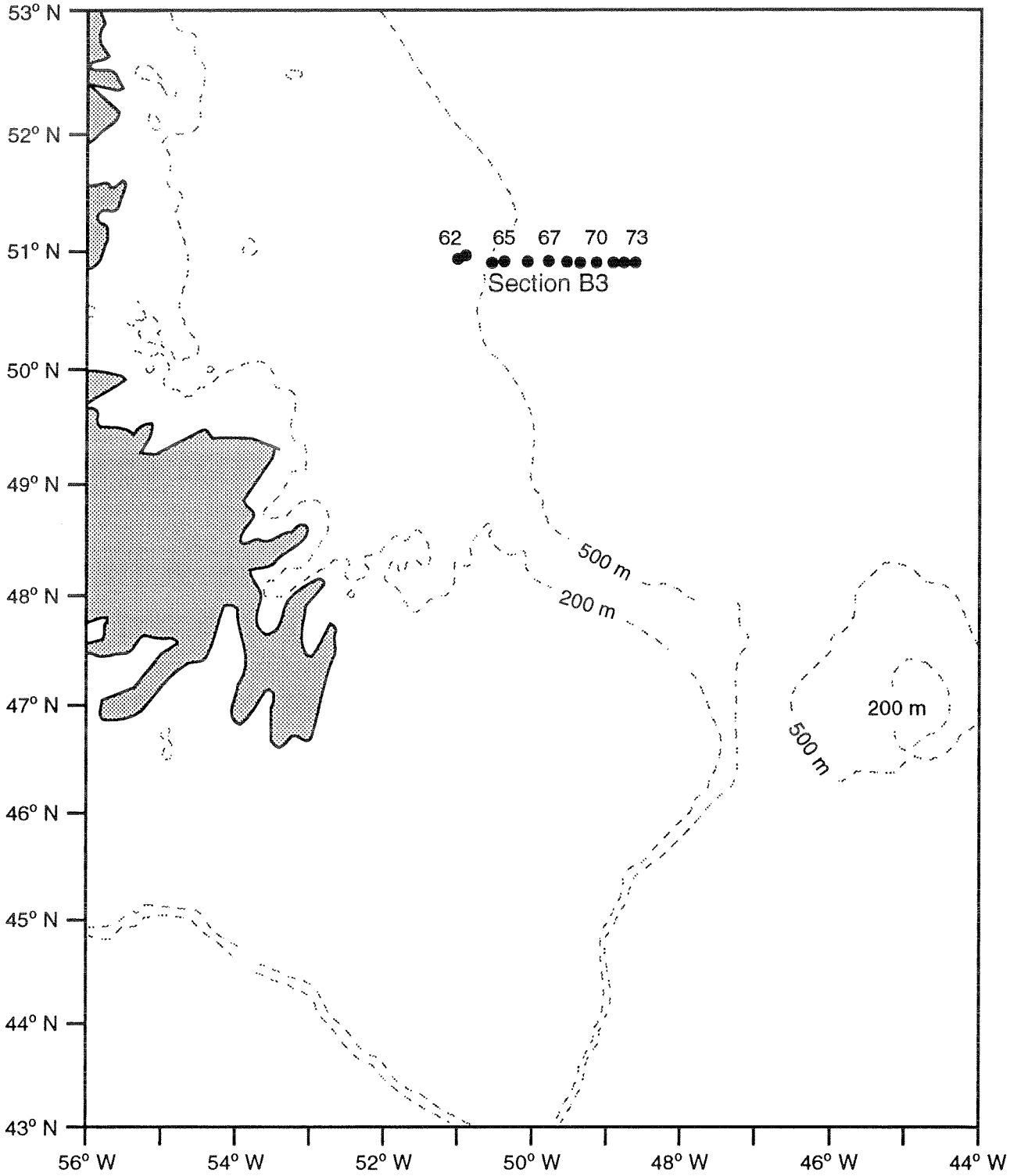
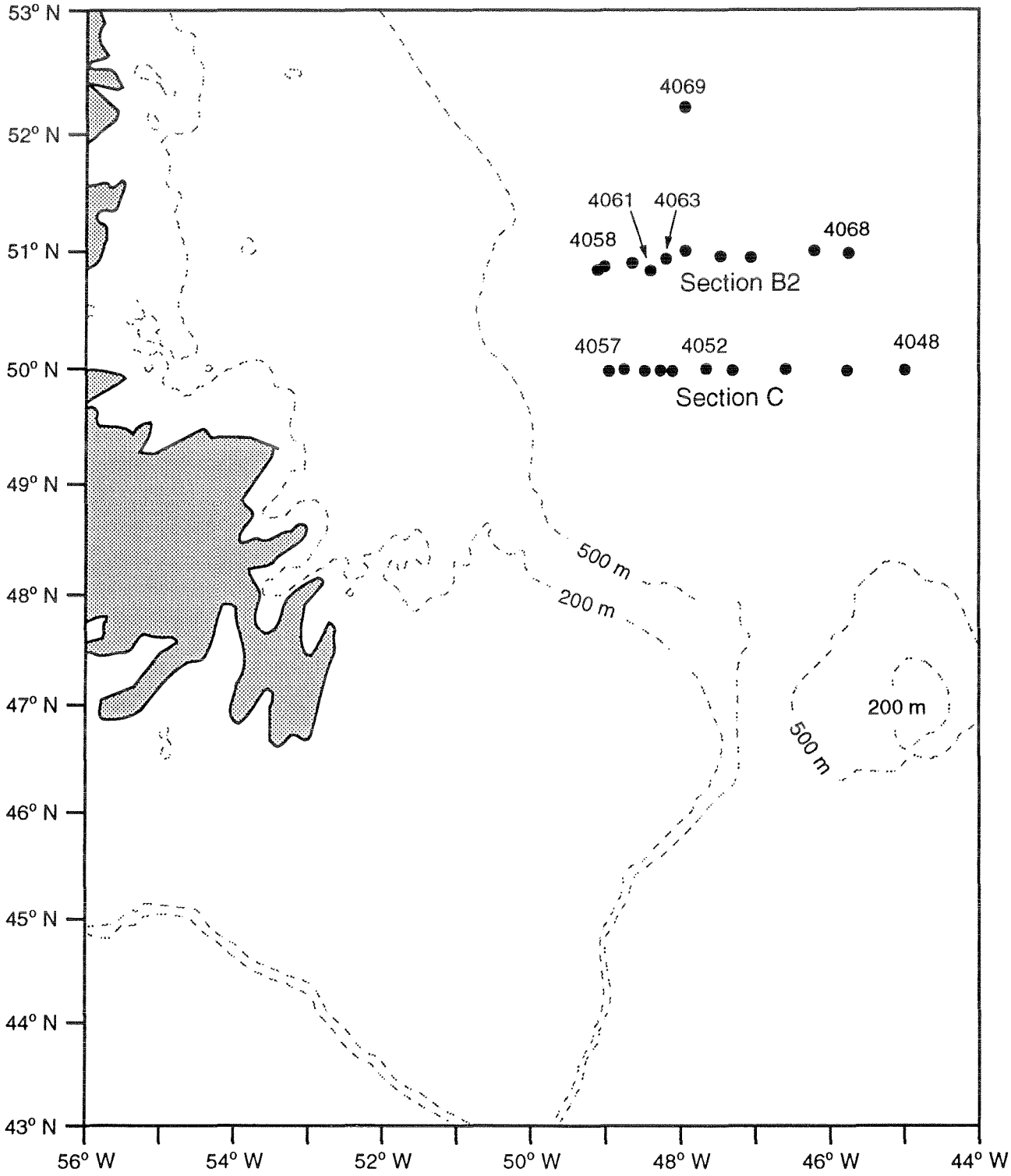
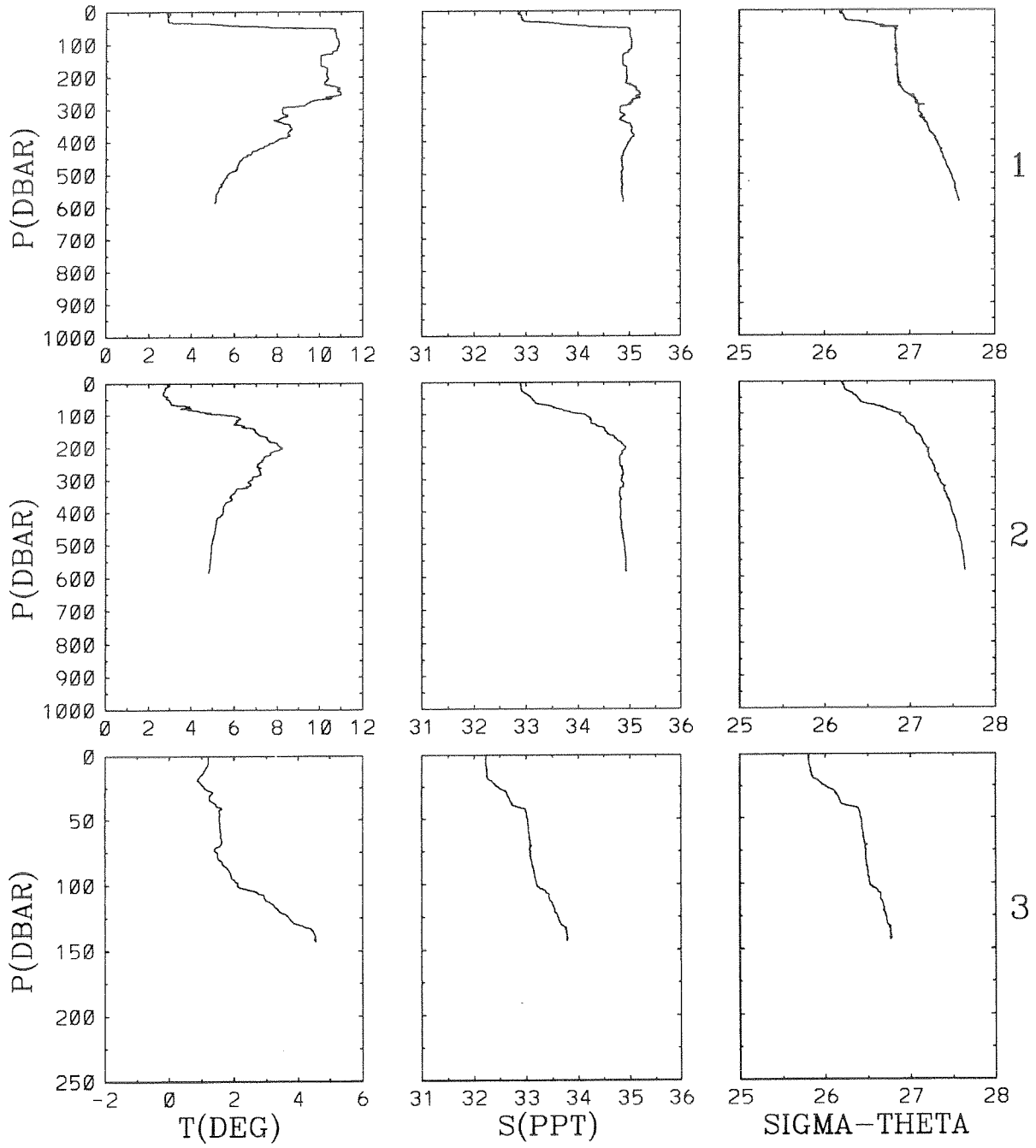


LOCATION OF CTD STATIONS

Shouleykin

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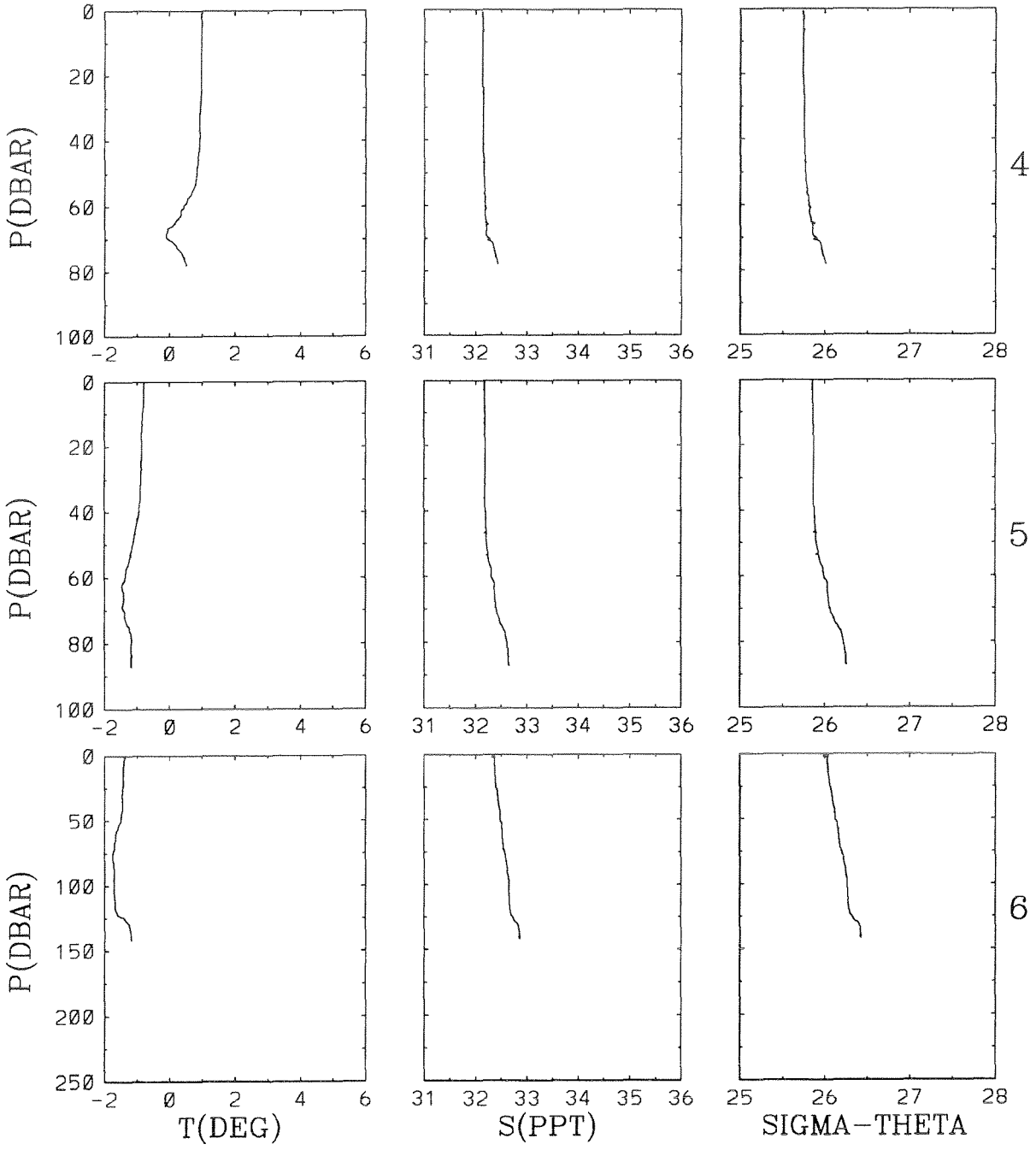
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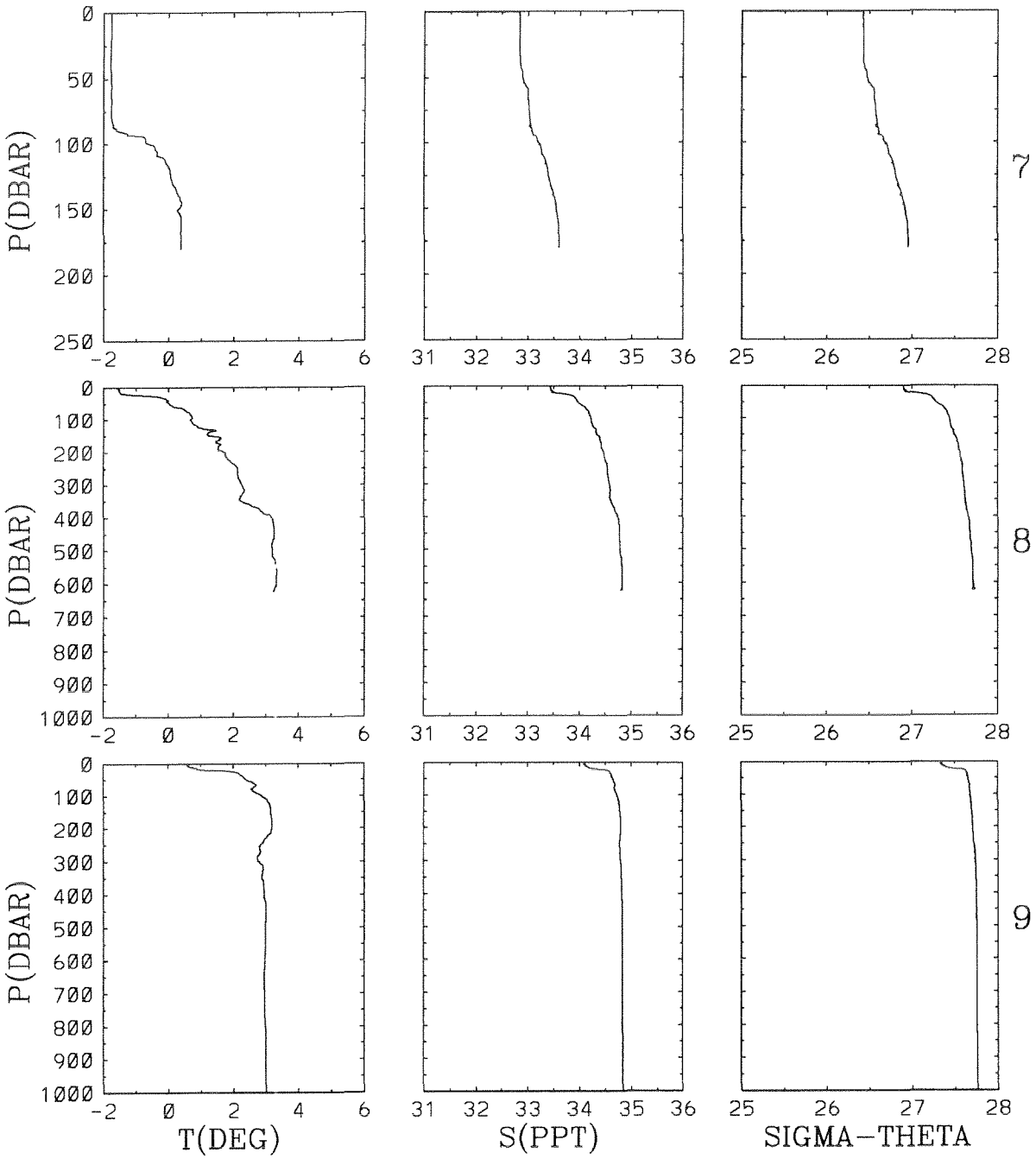
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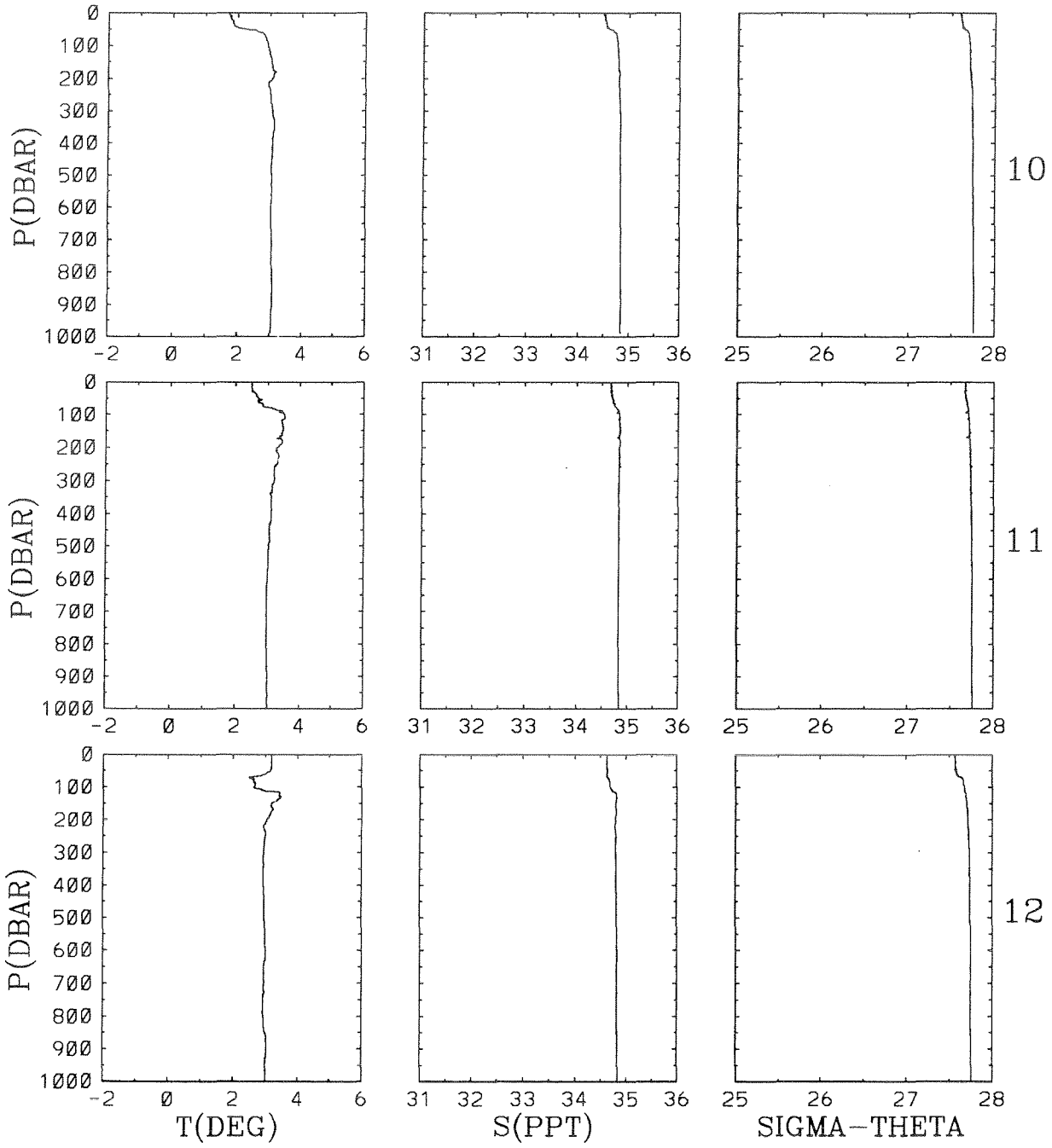
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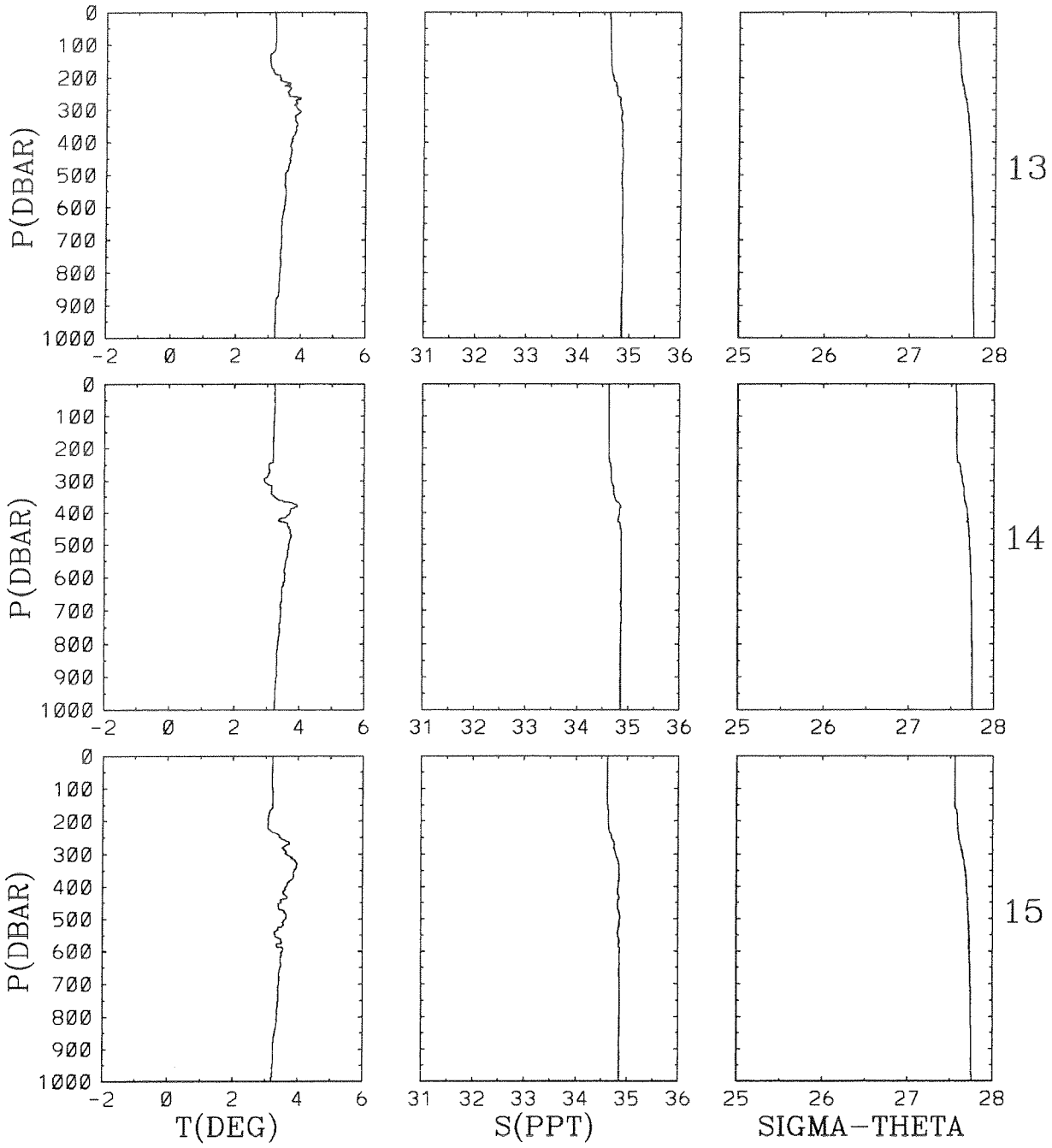
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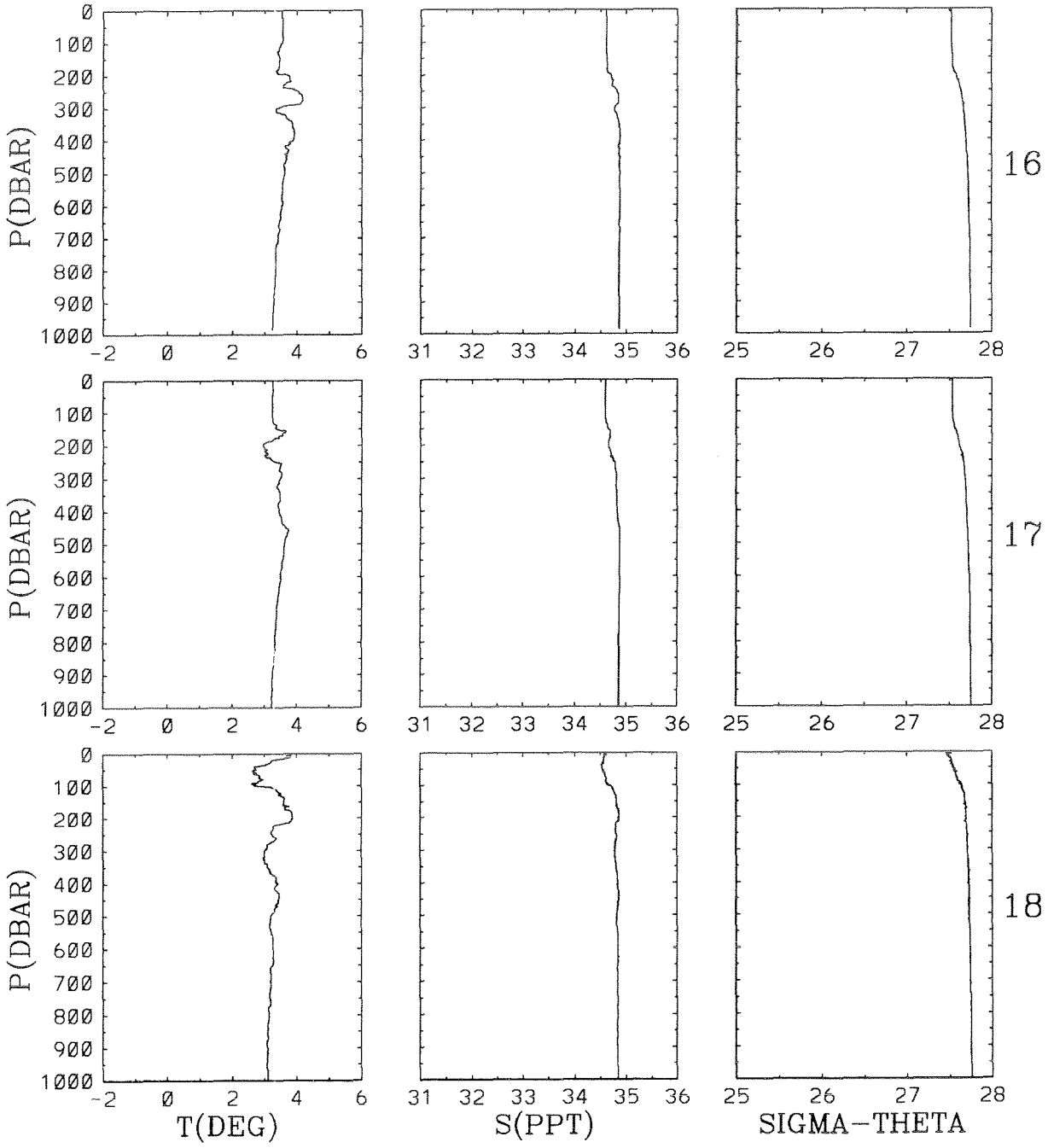
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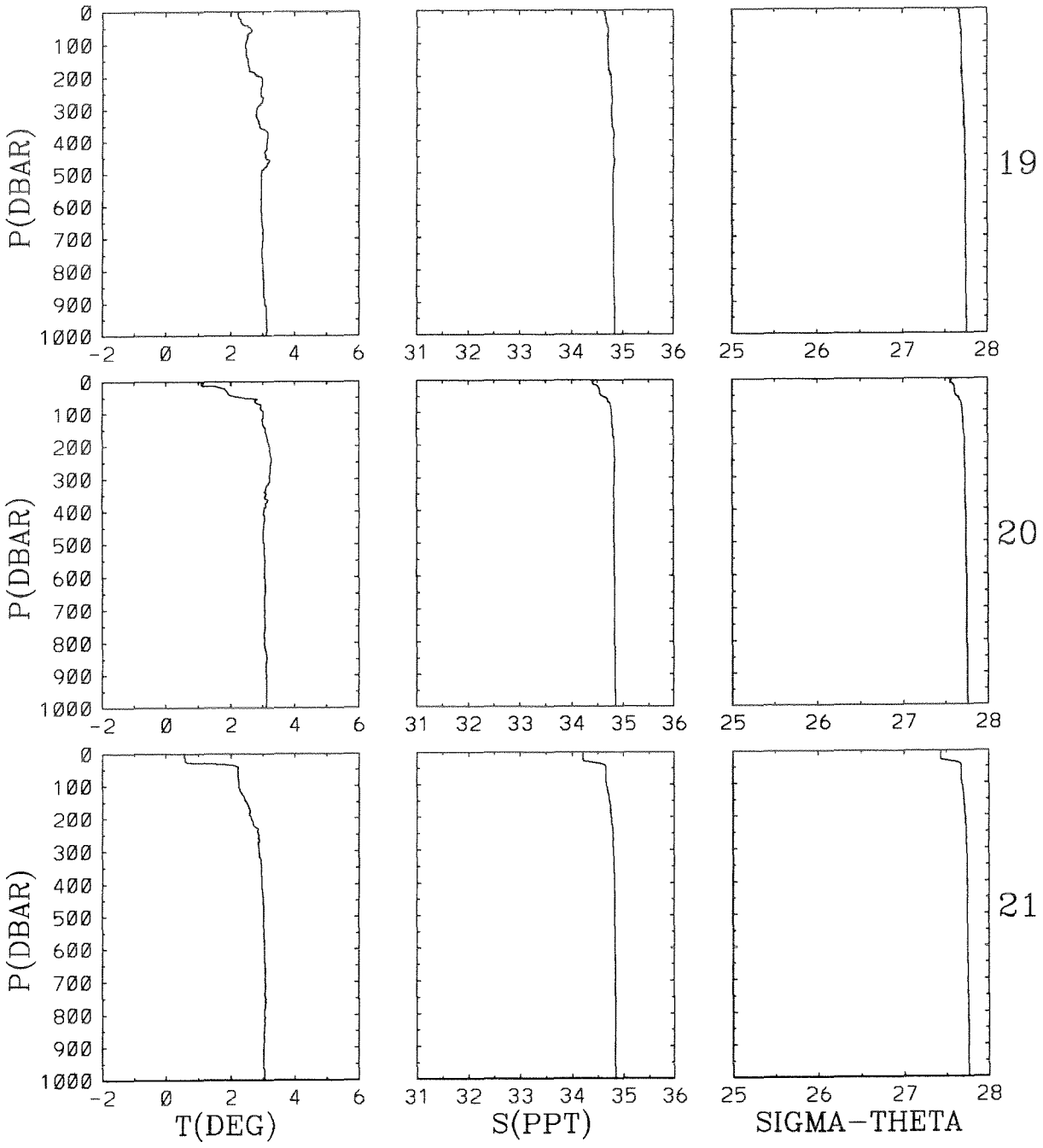
SIGMA-THETA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S(PPT)
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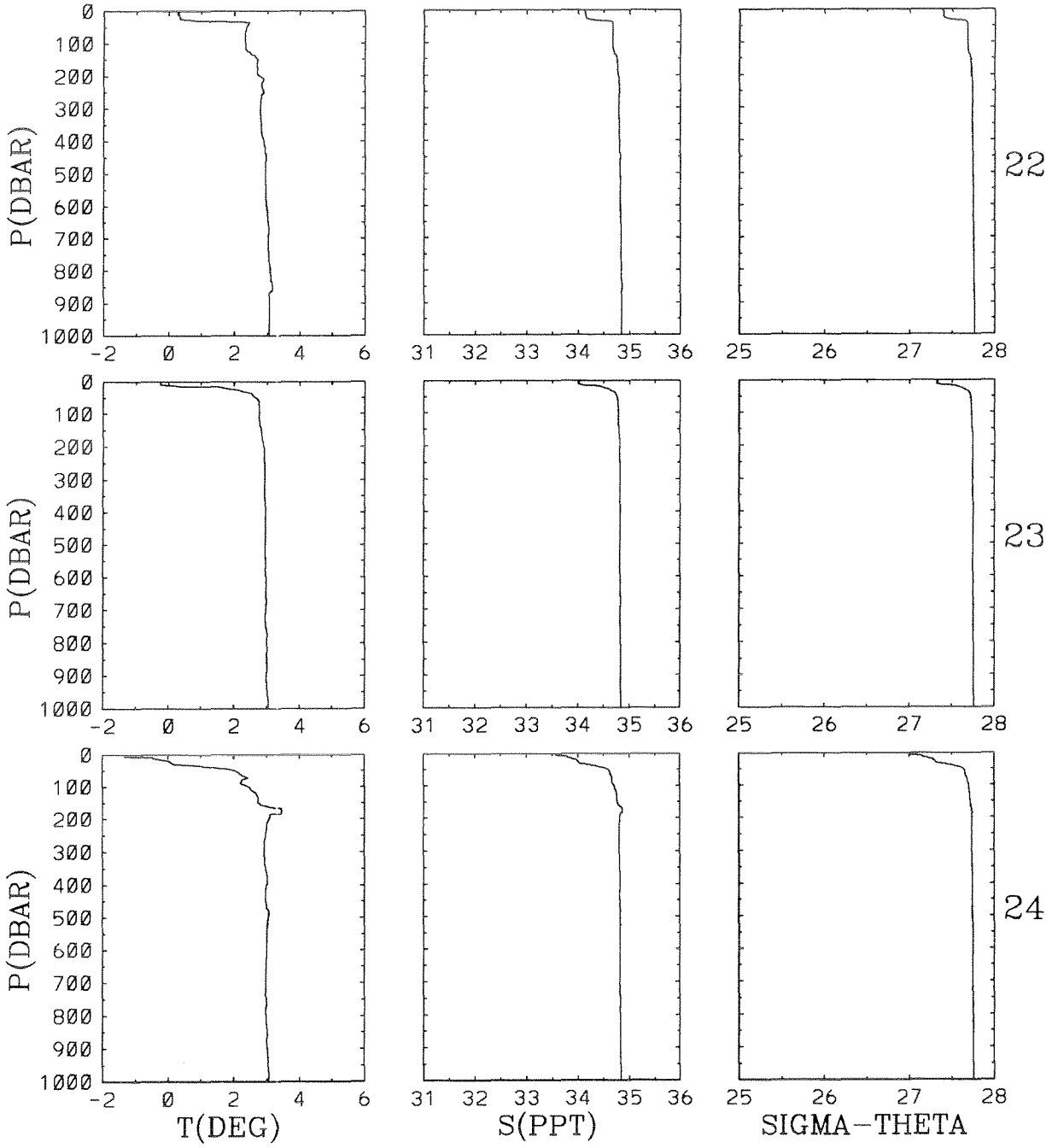
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S(PPT)
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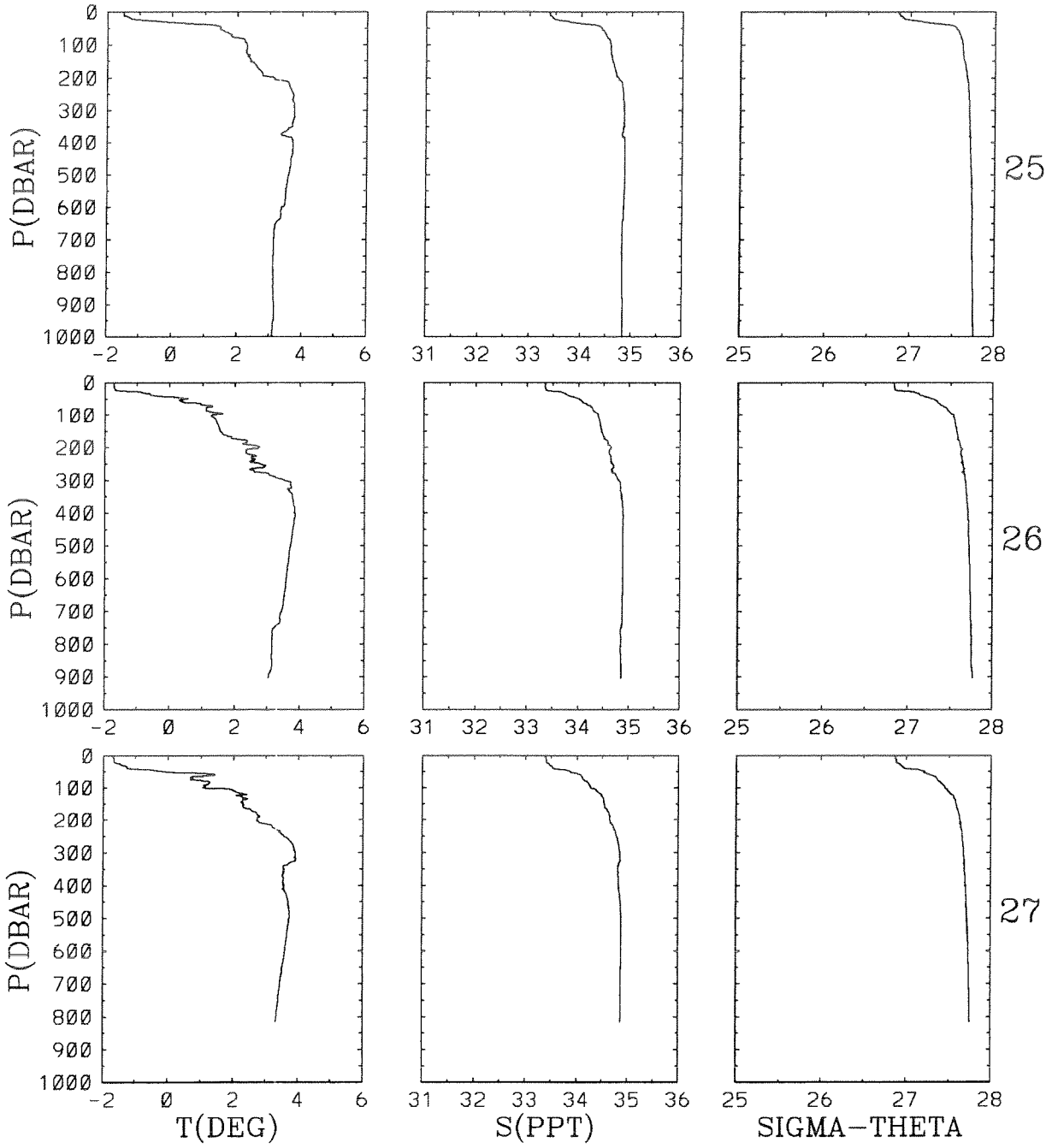
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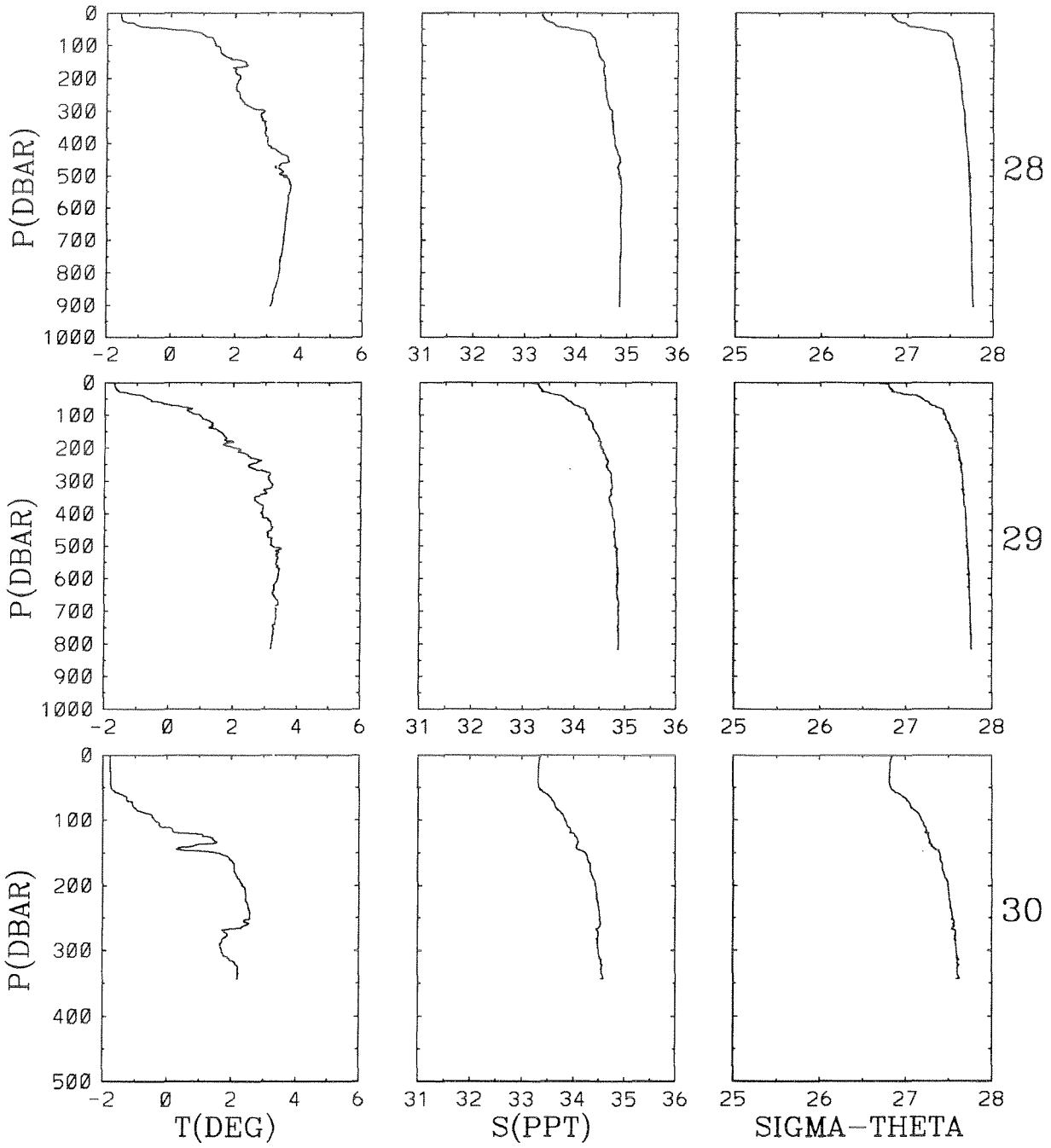
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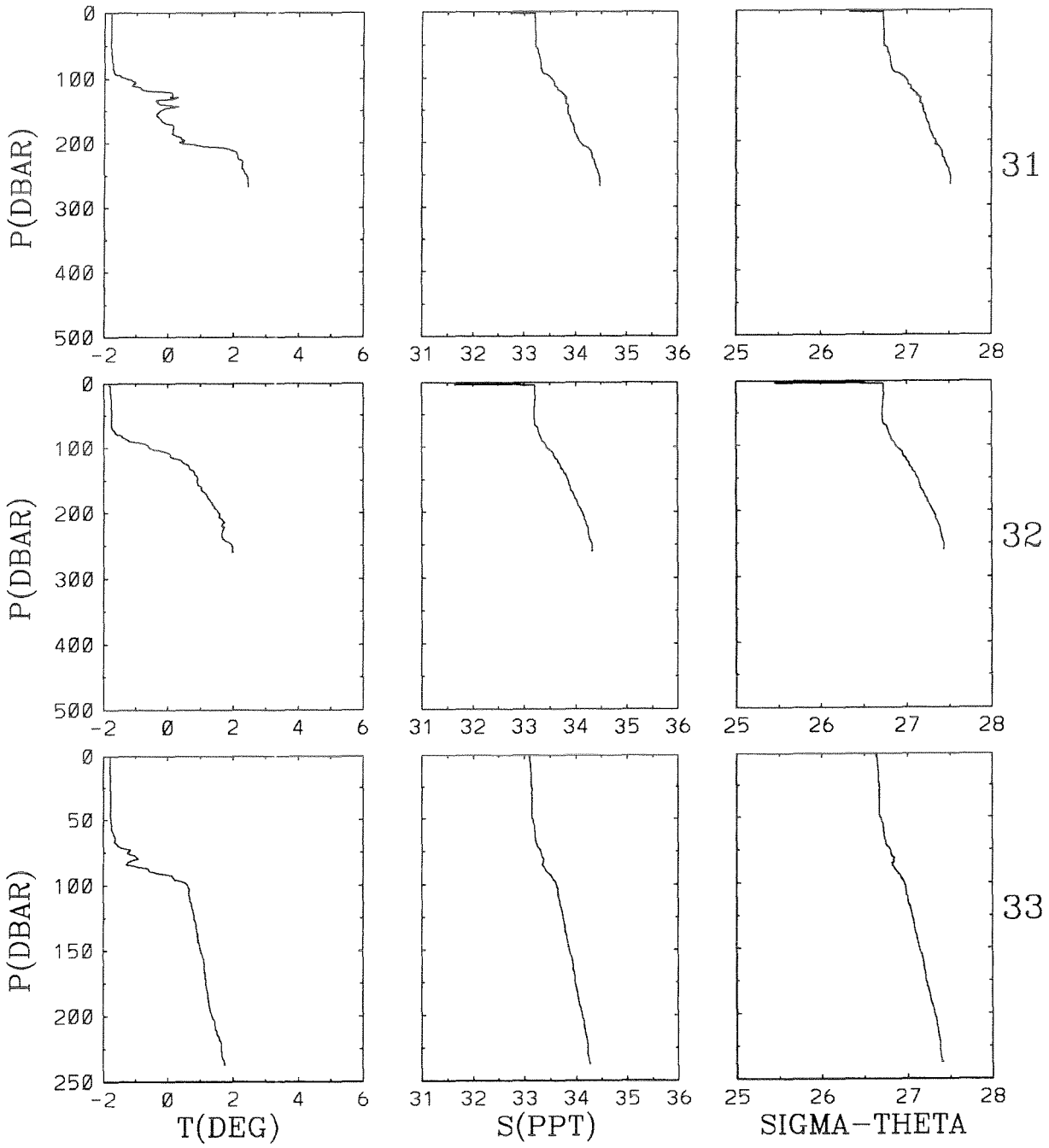
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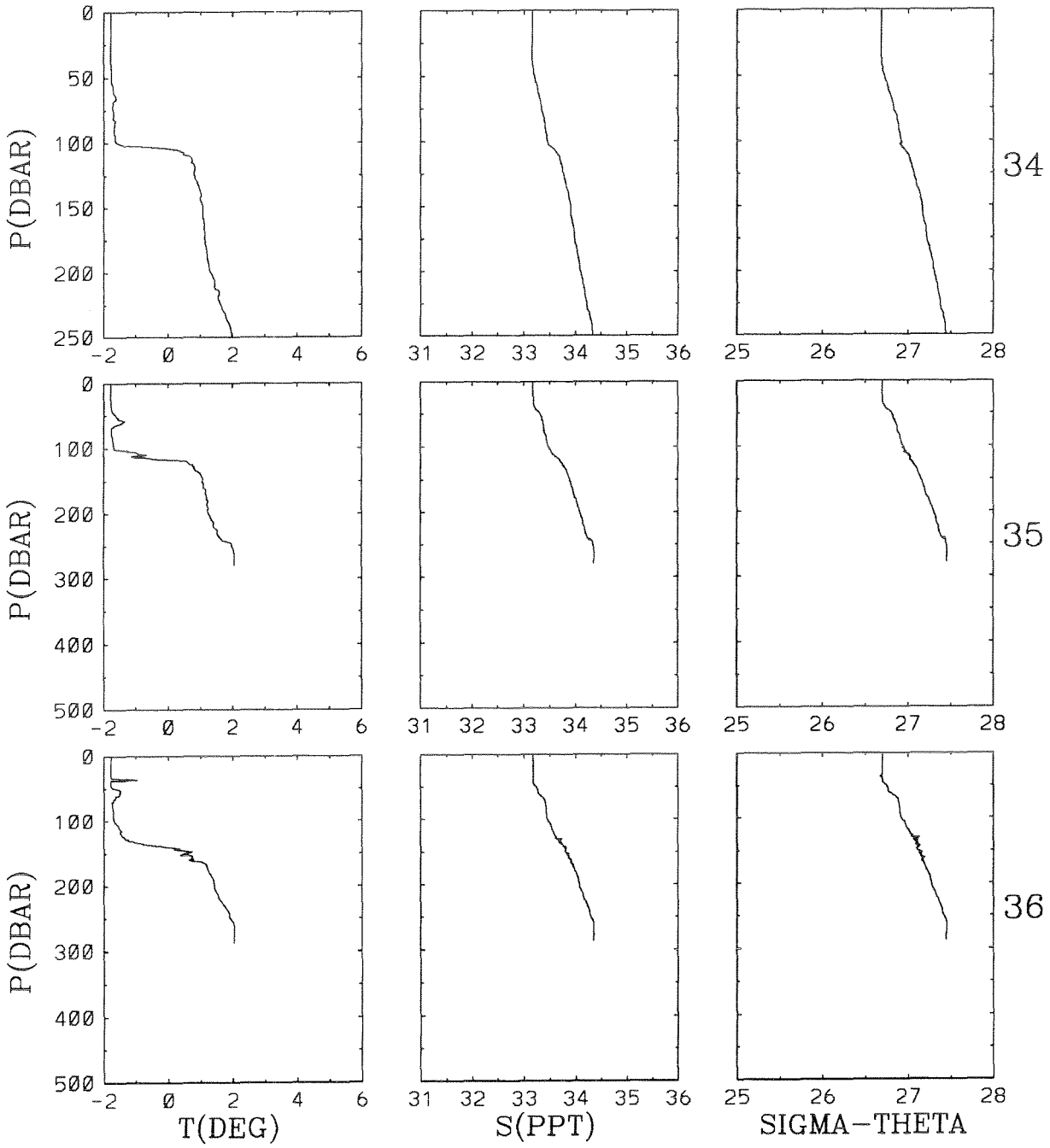
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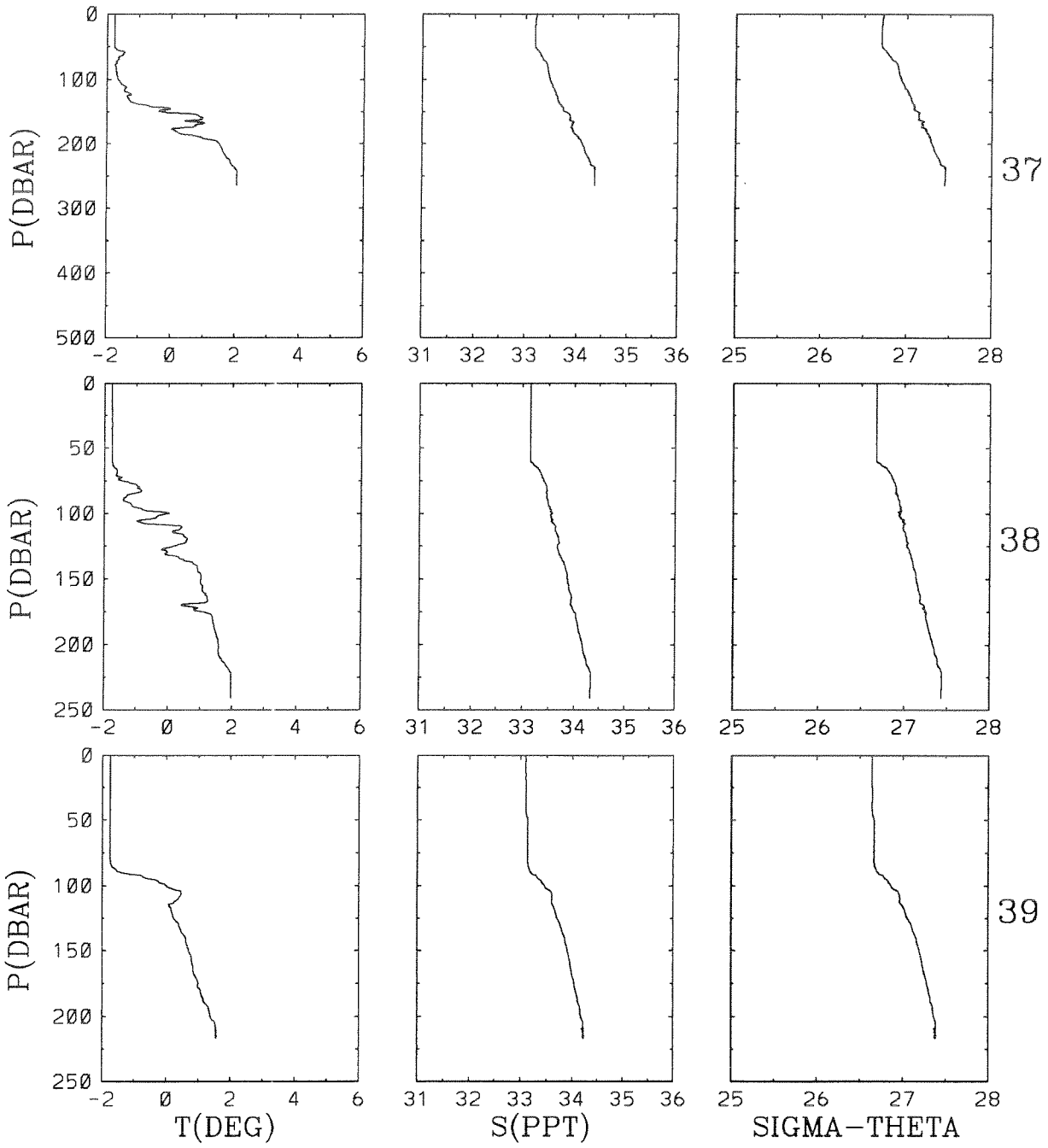
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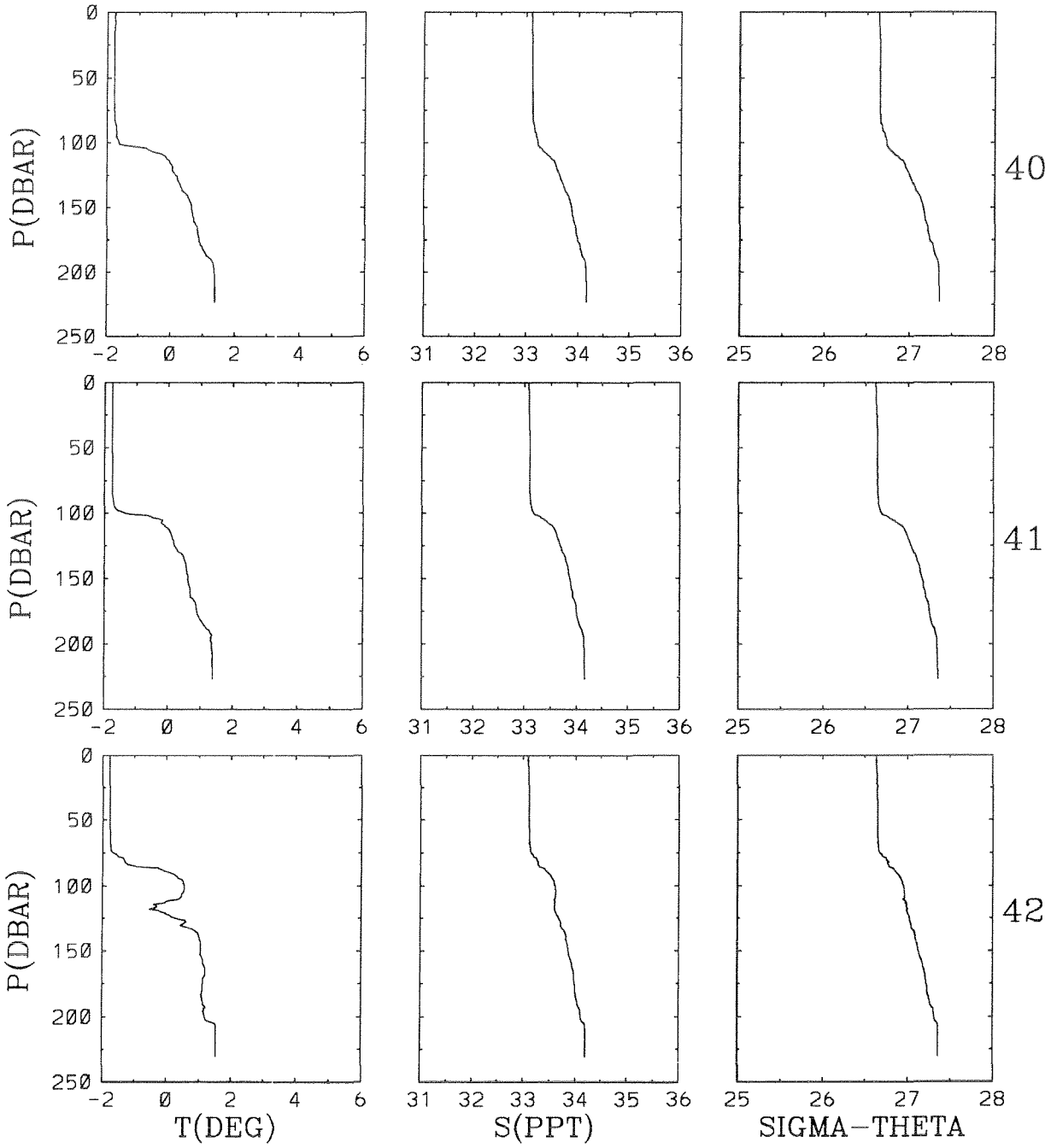
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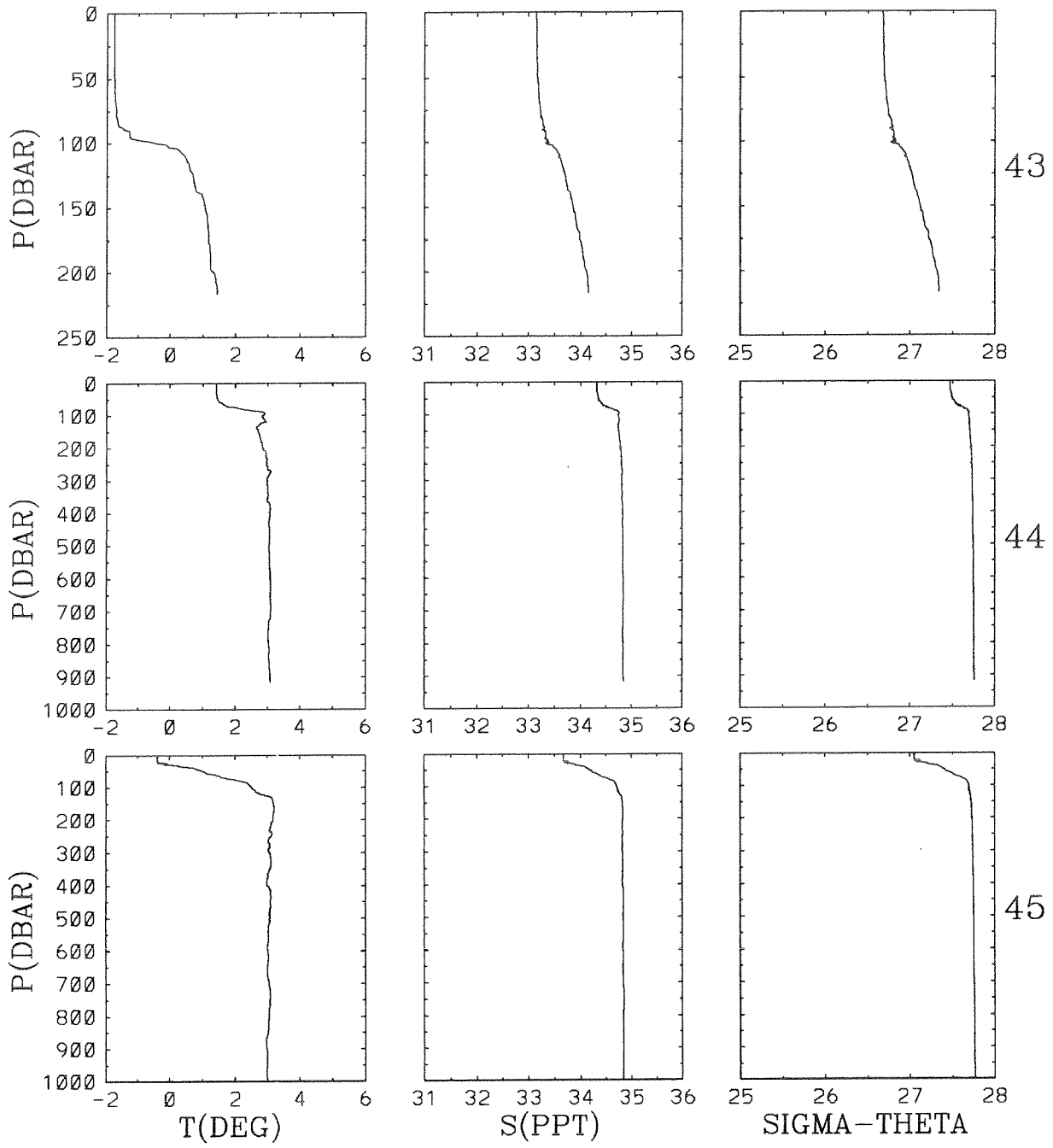
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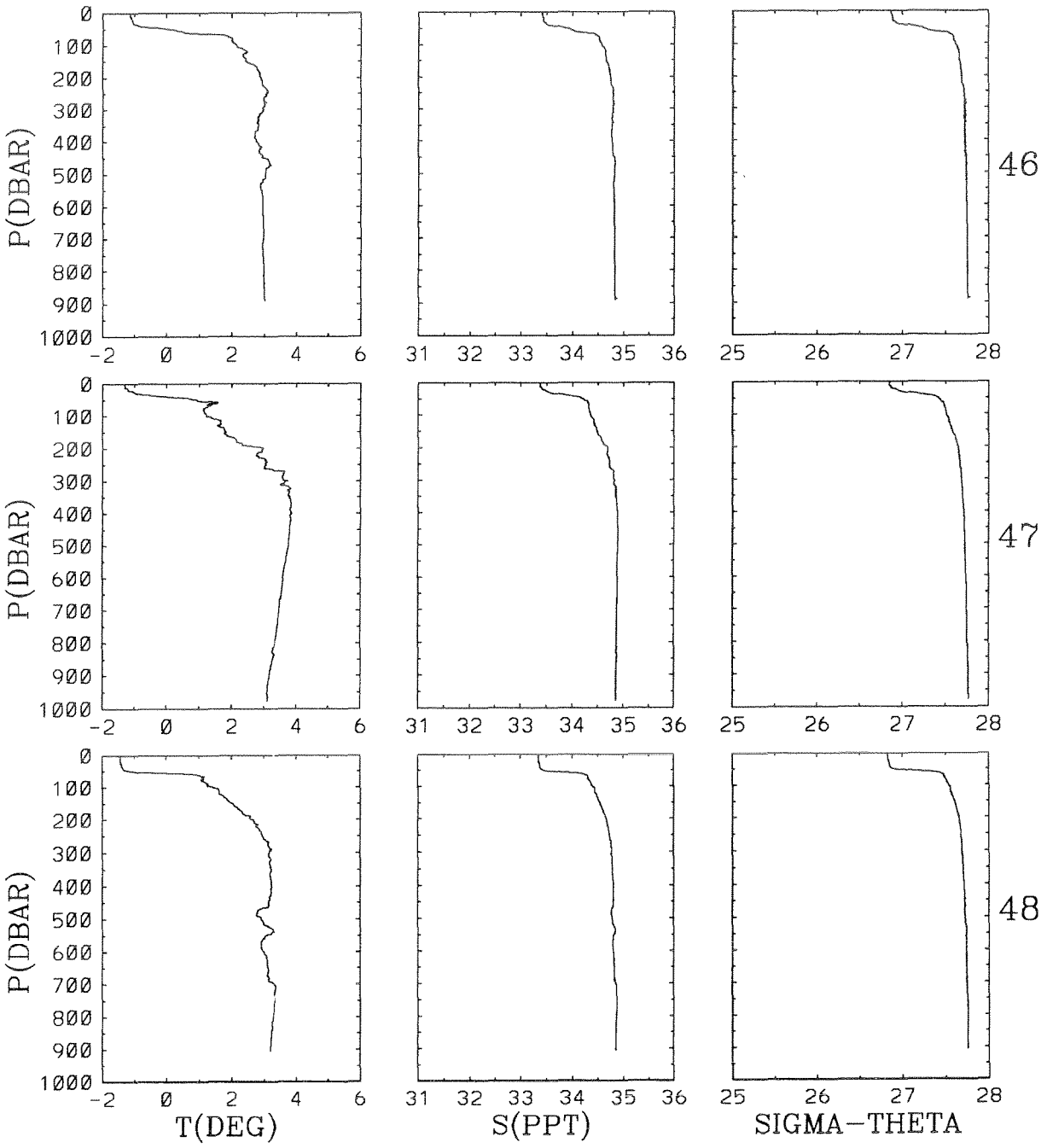
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S(PPT)
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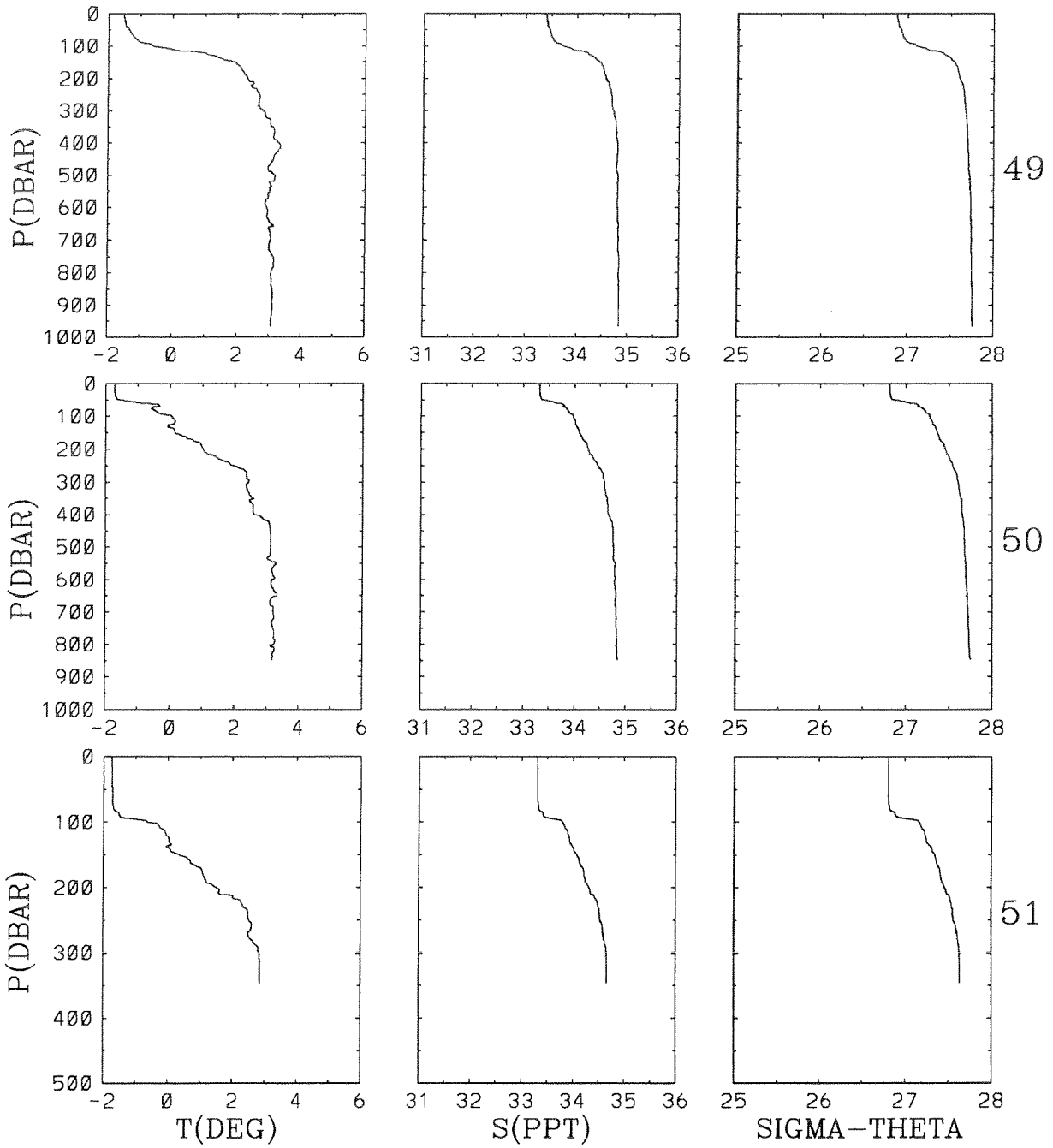
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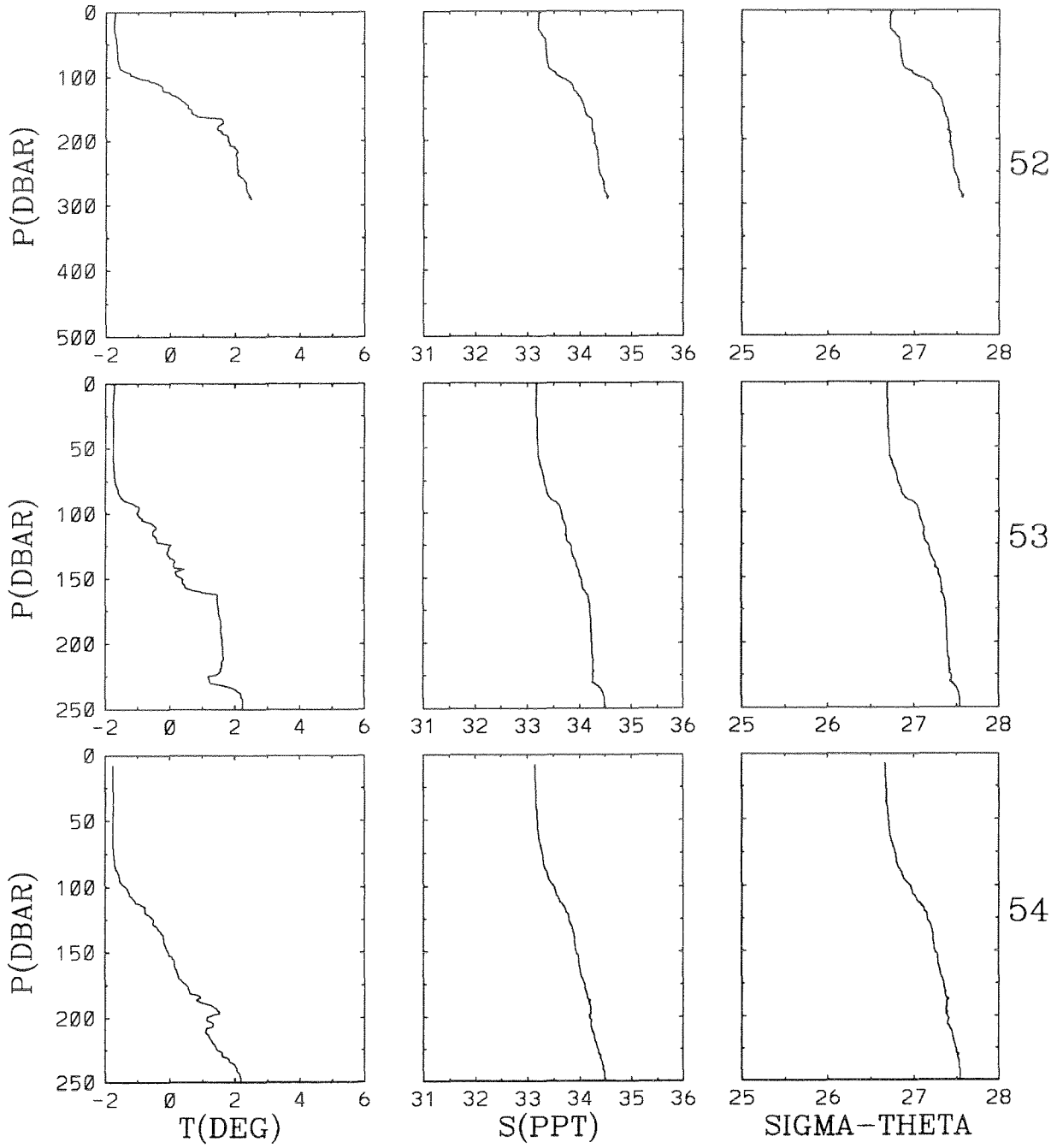
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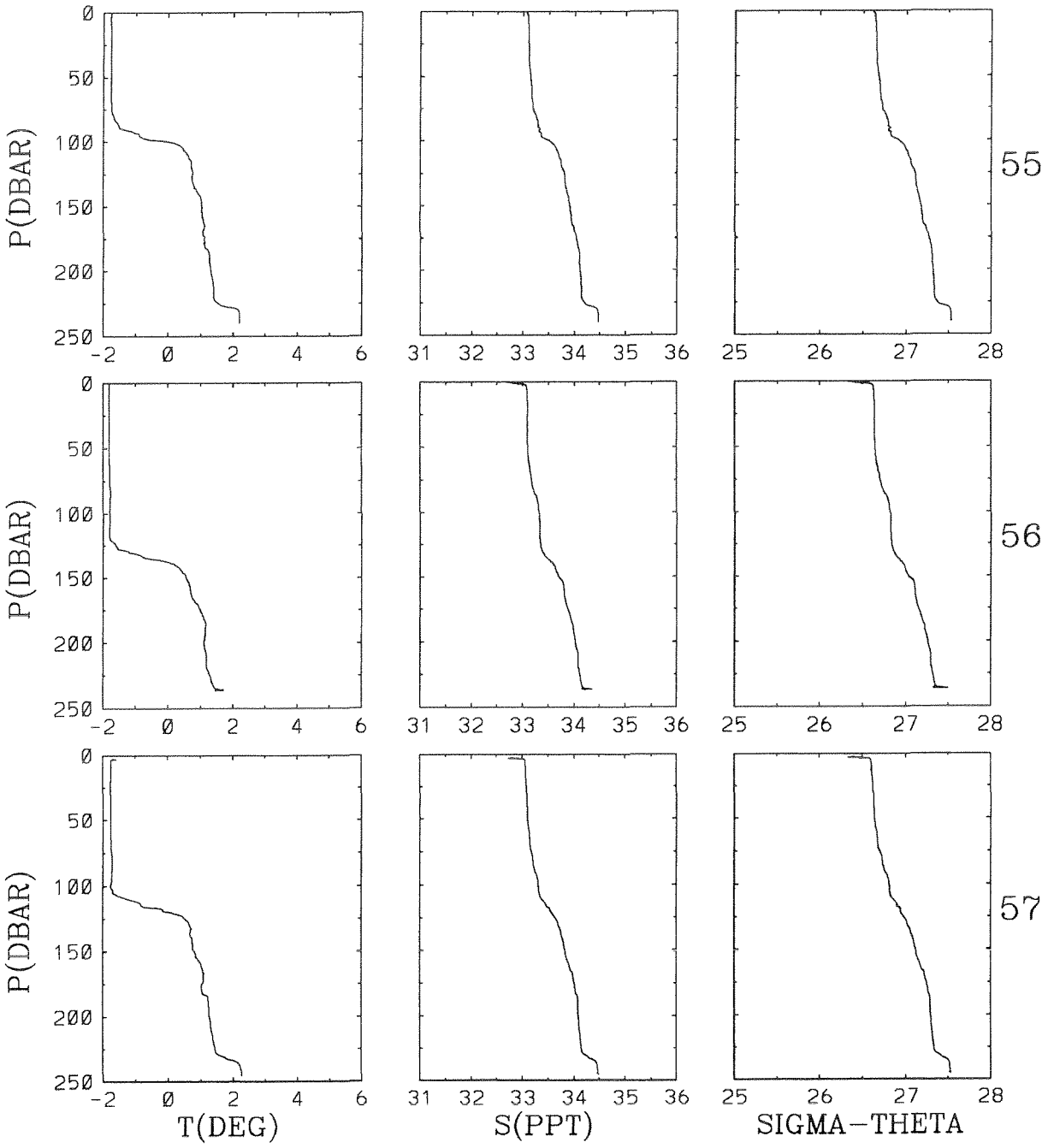
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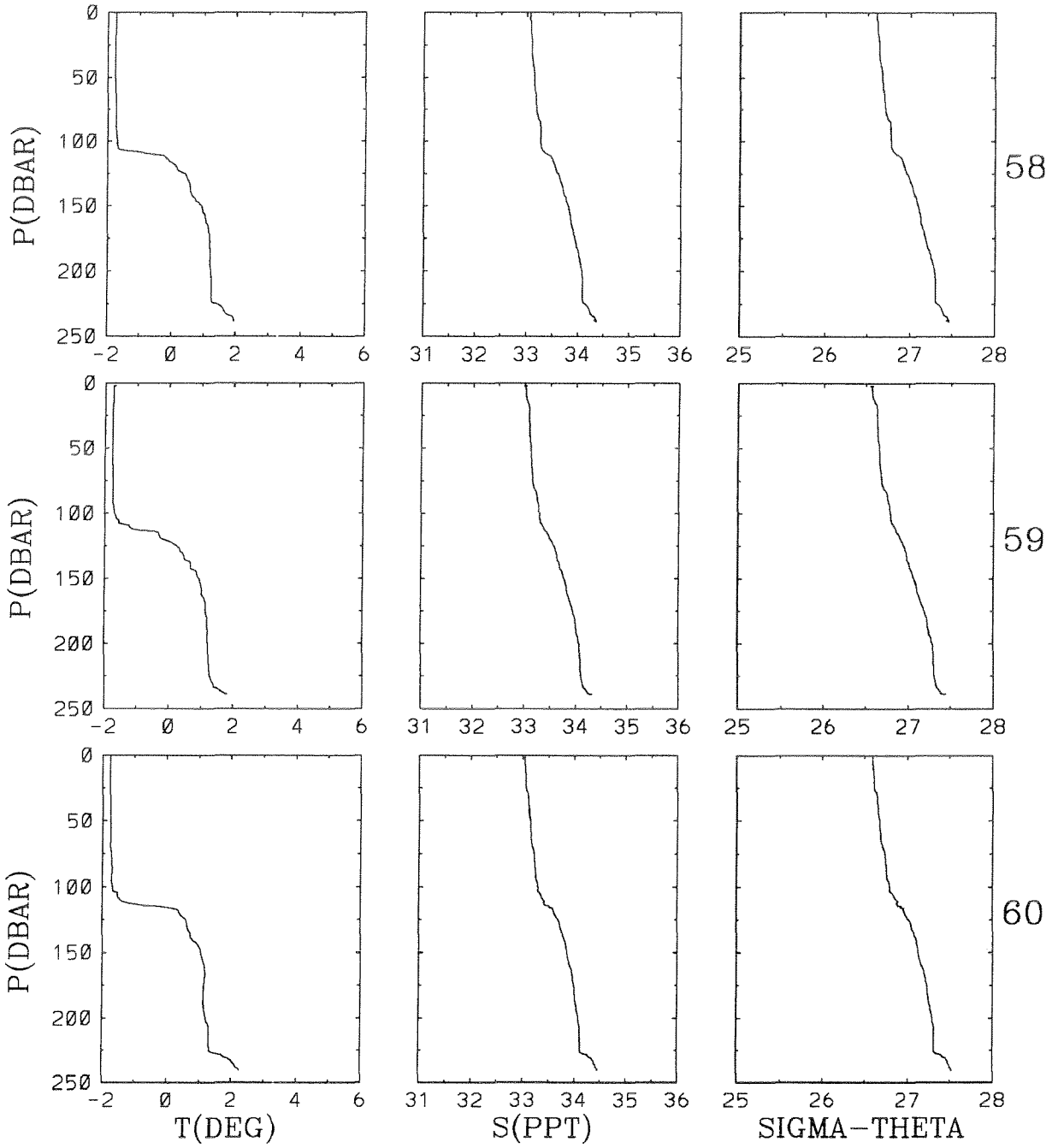
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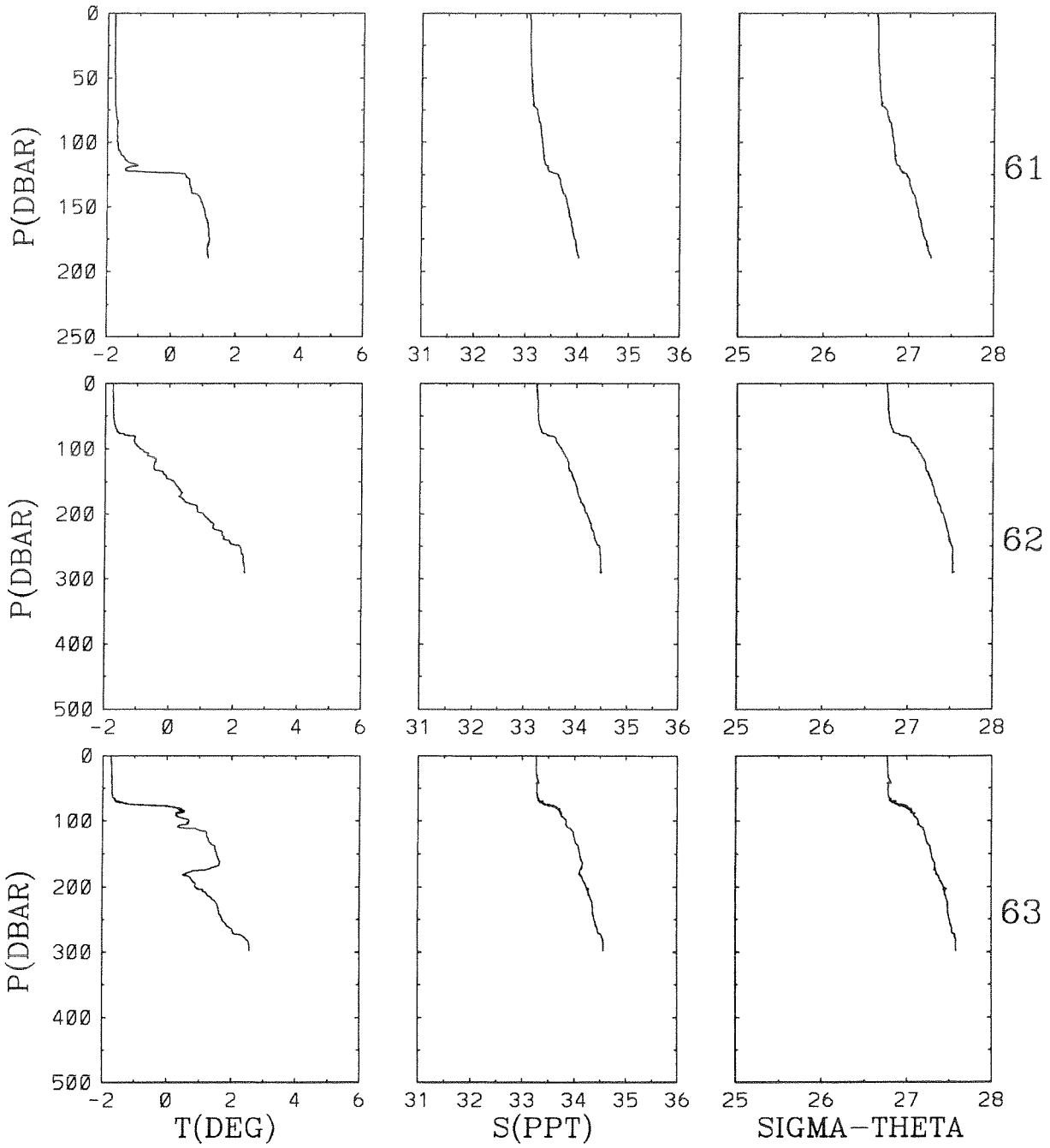
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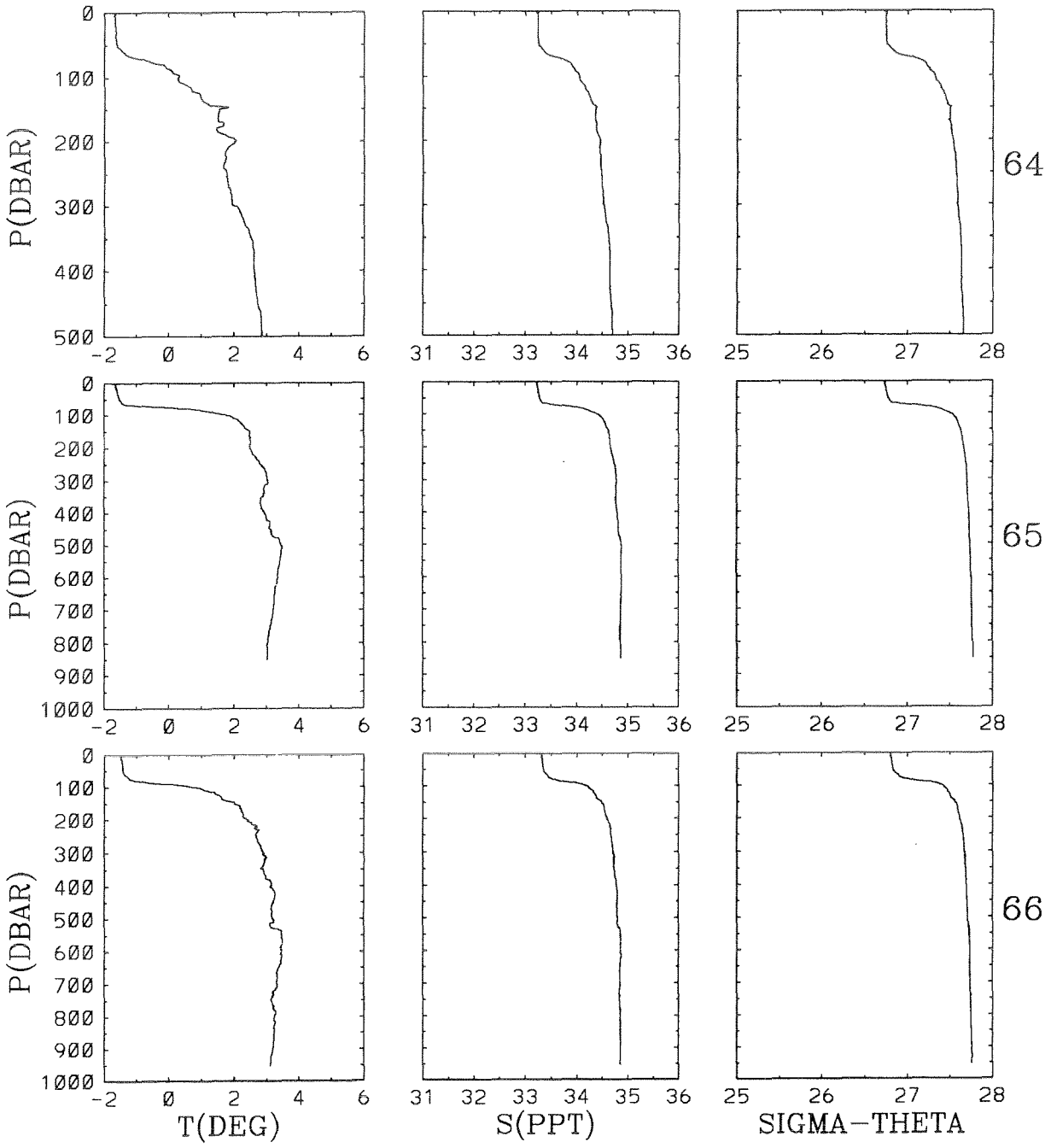
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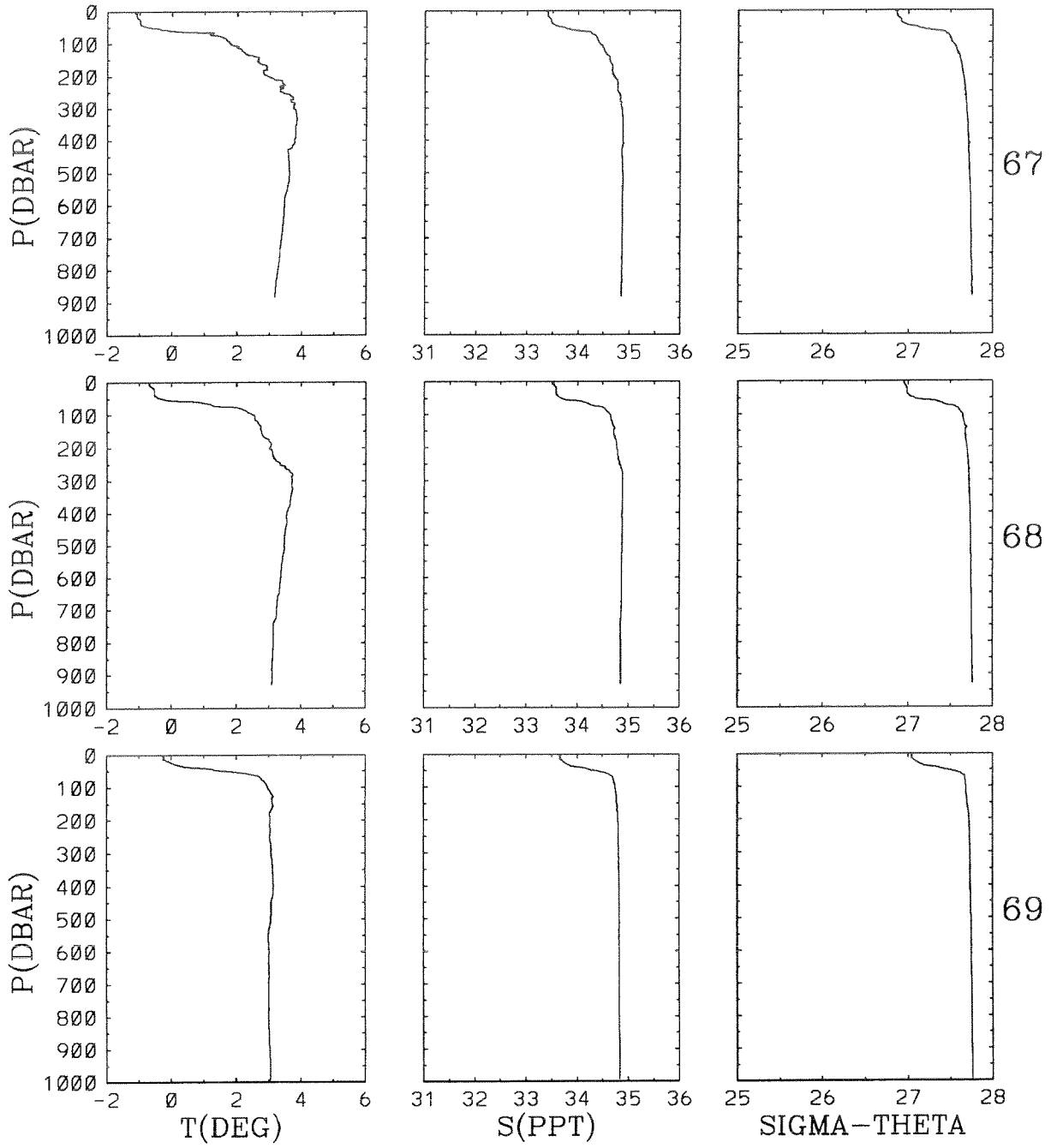
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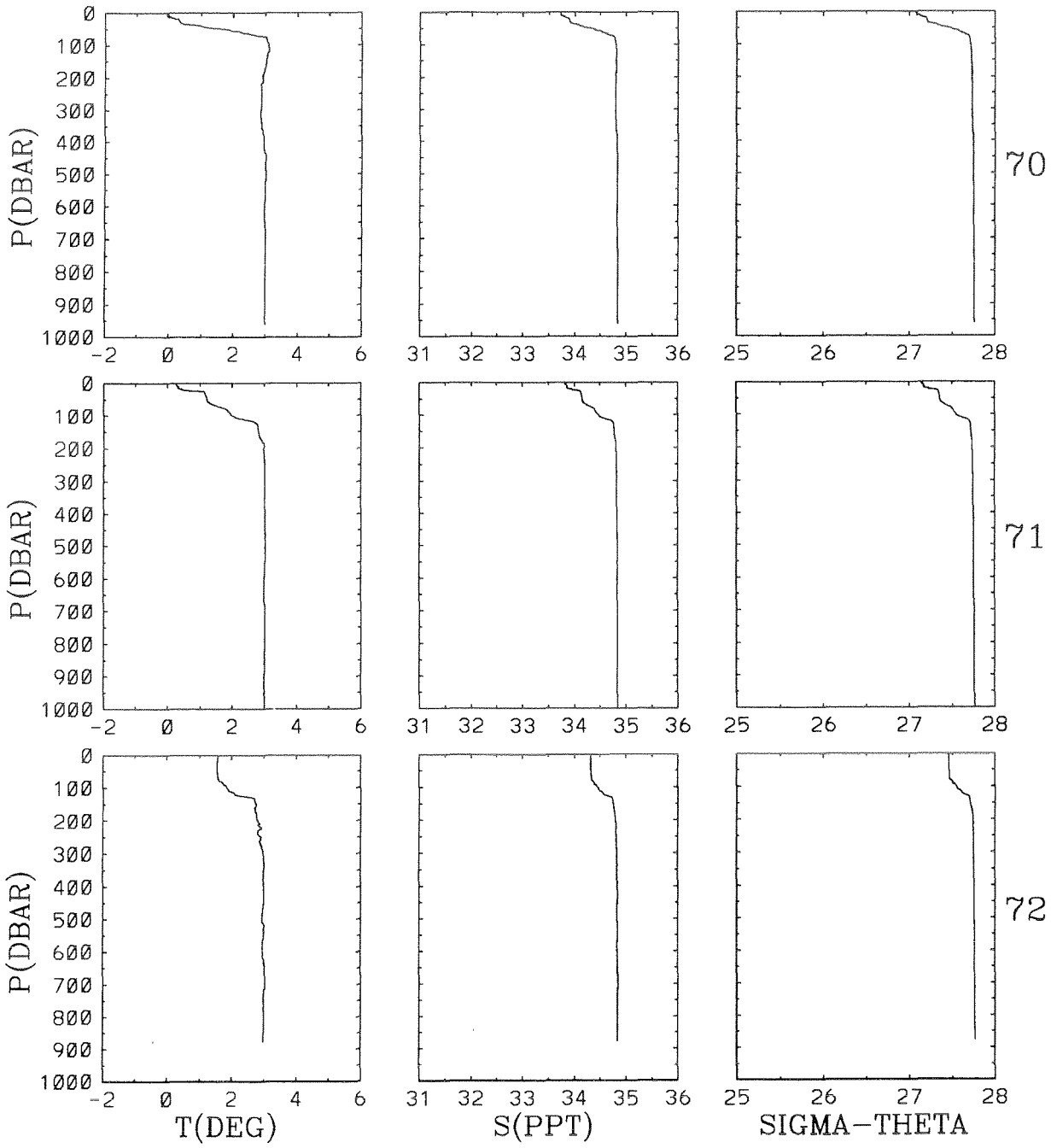
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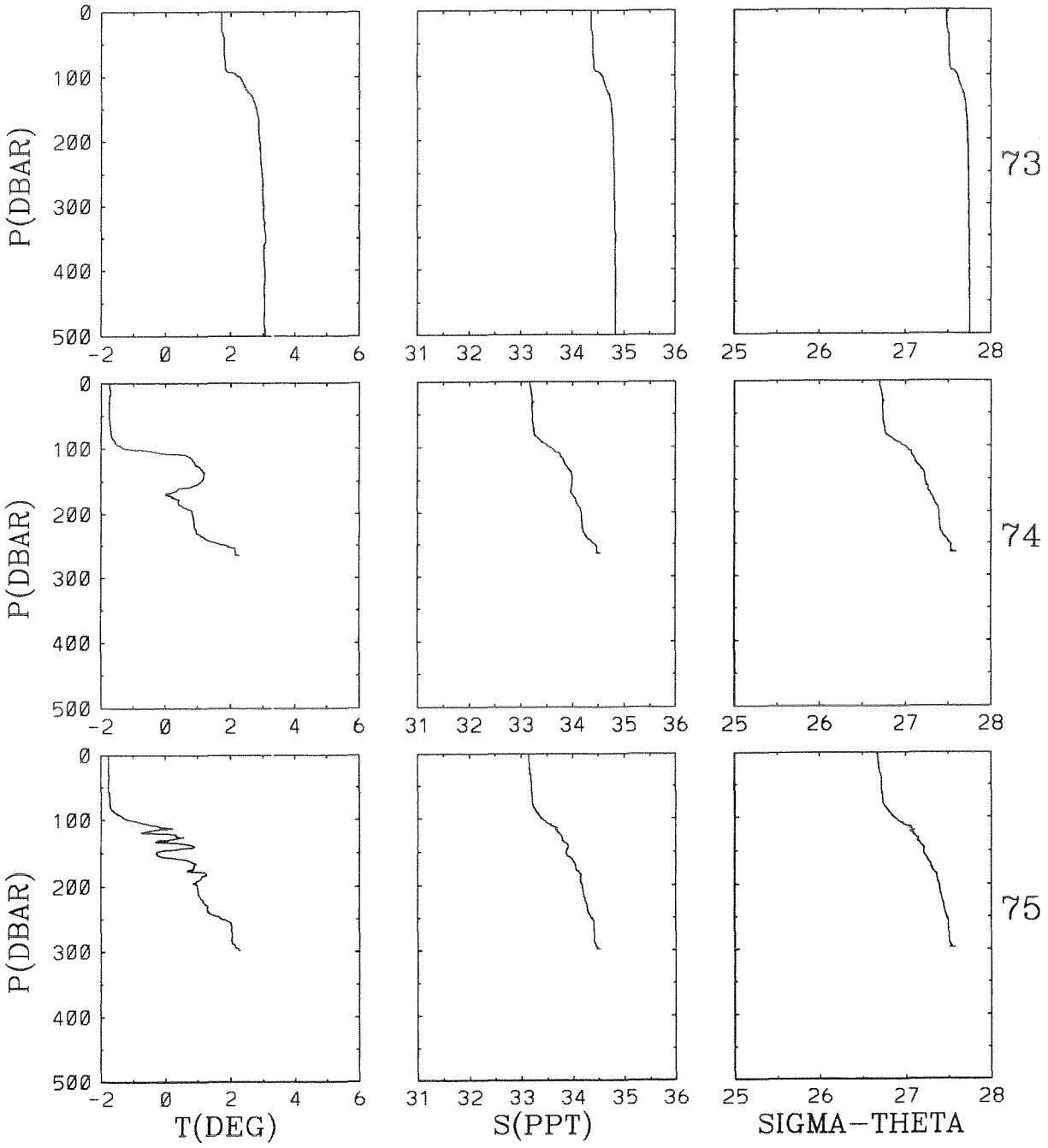
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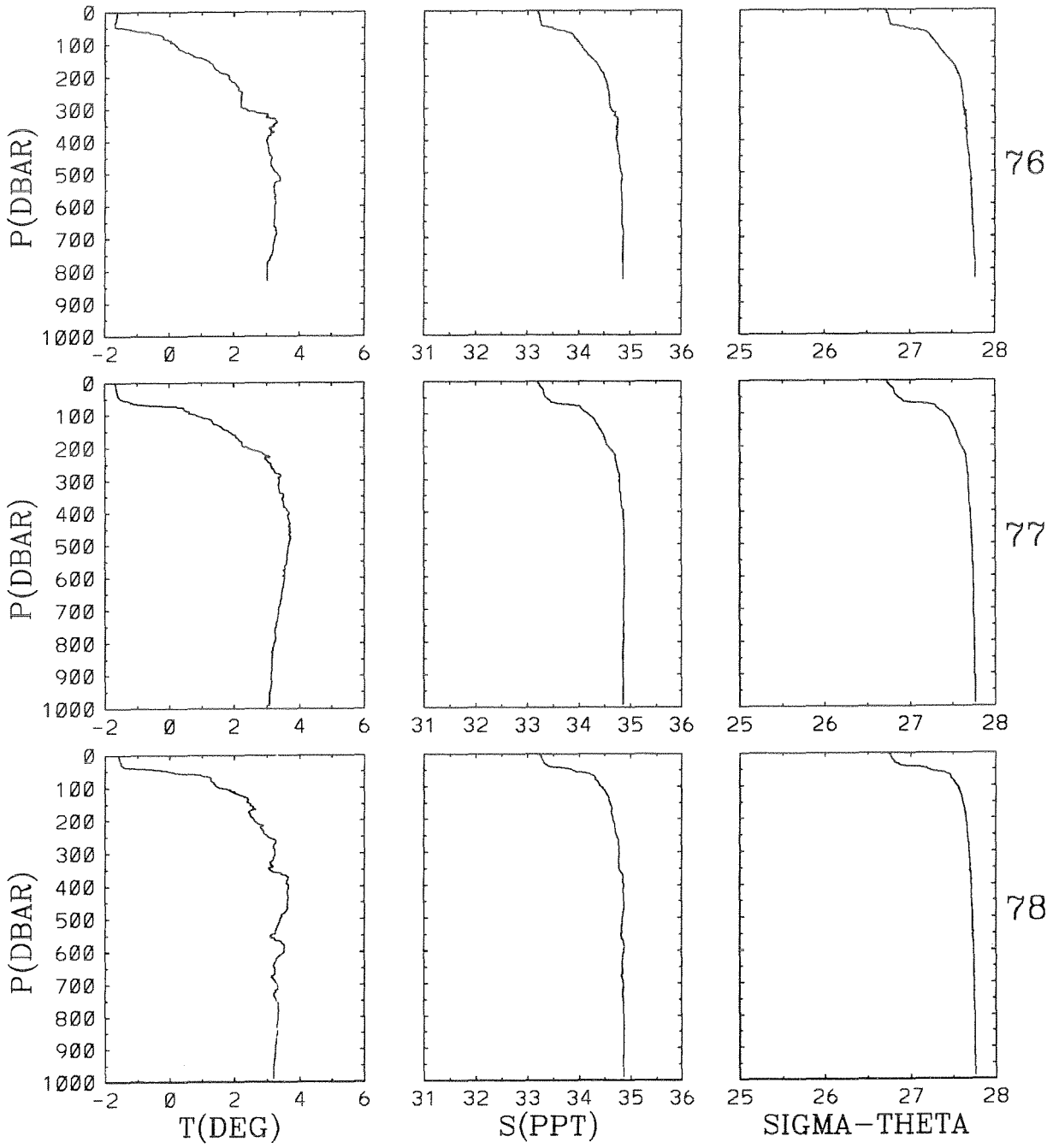
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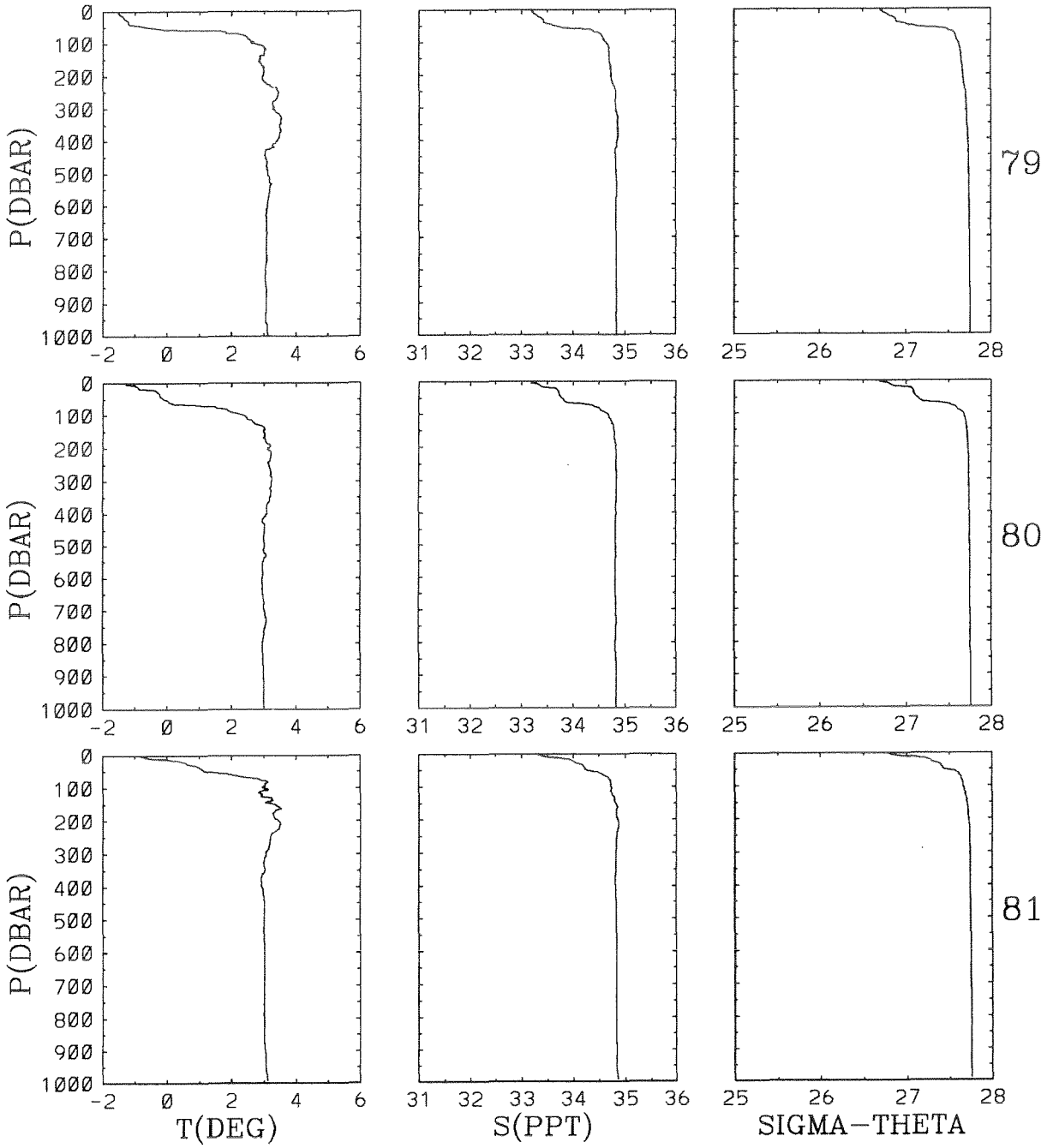
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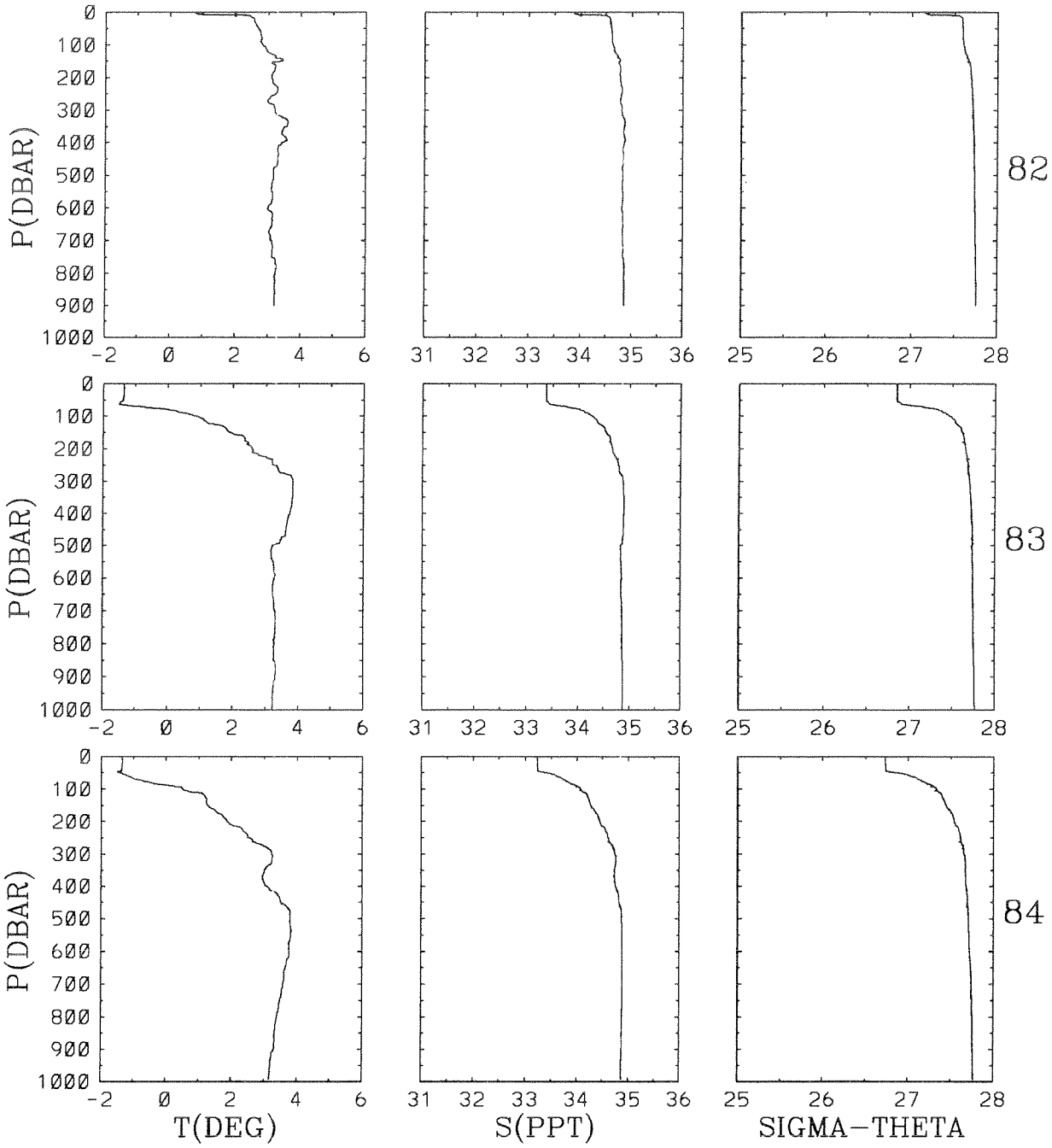
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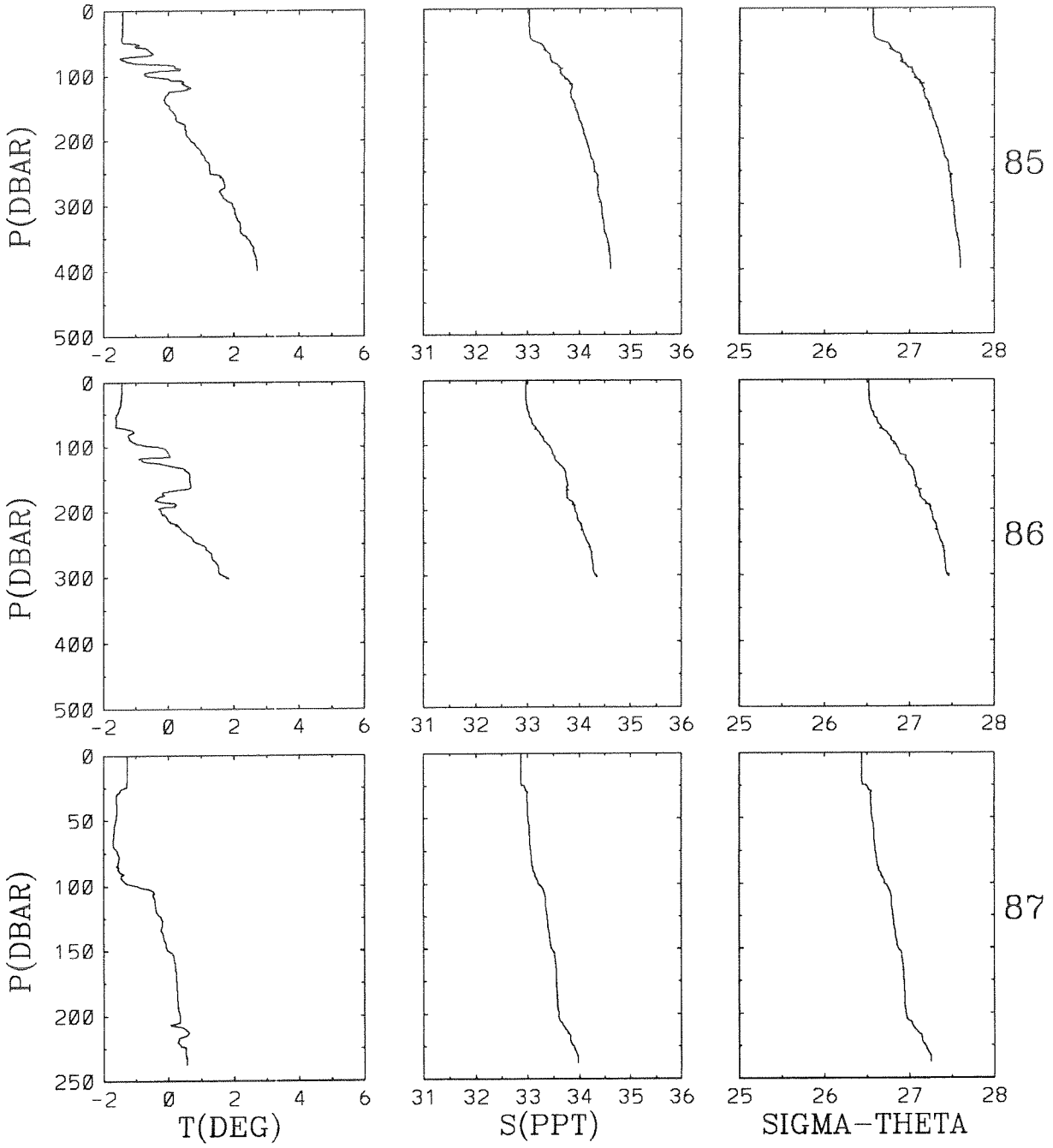
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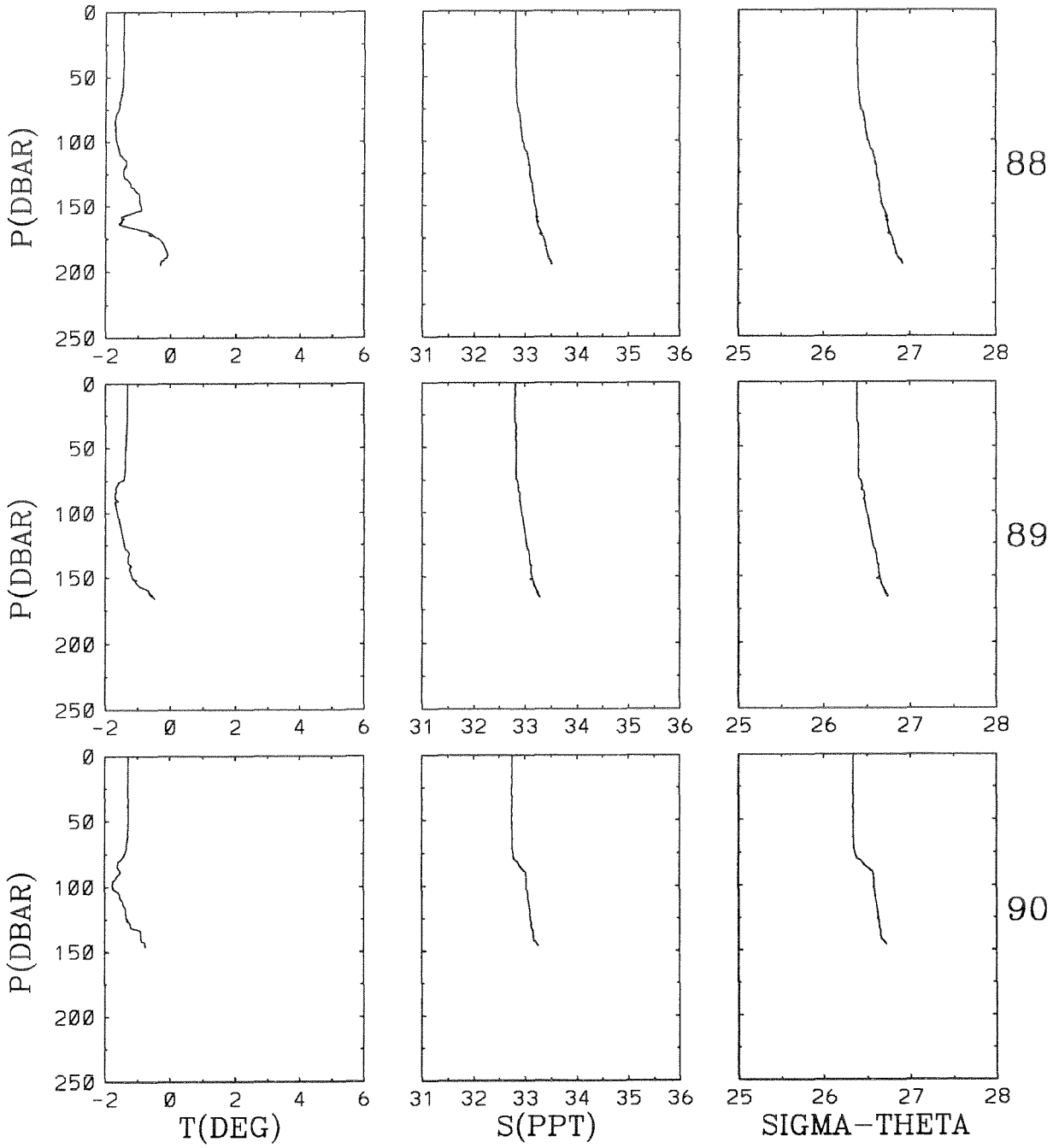
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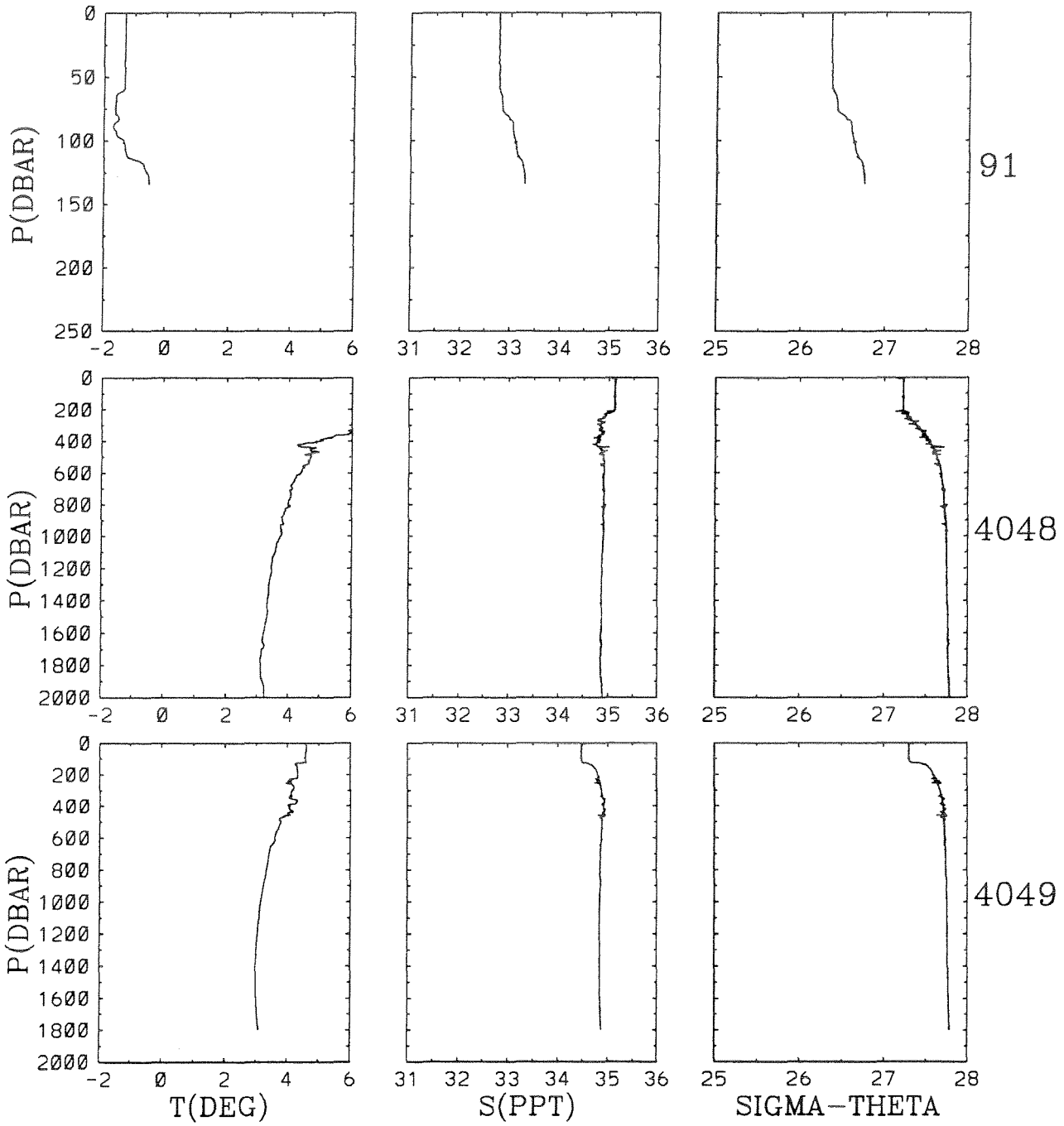
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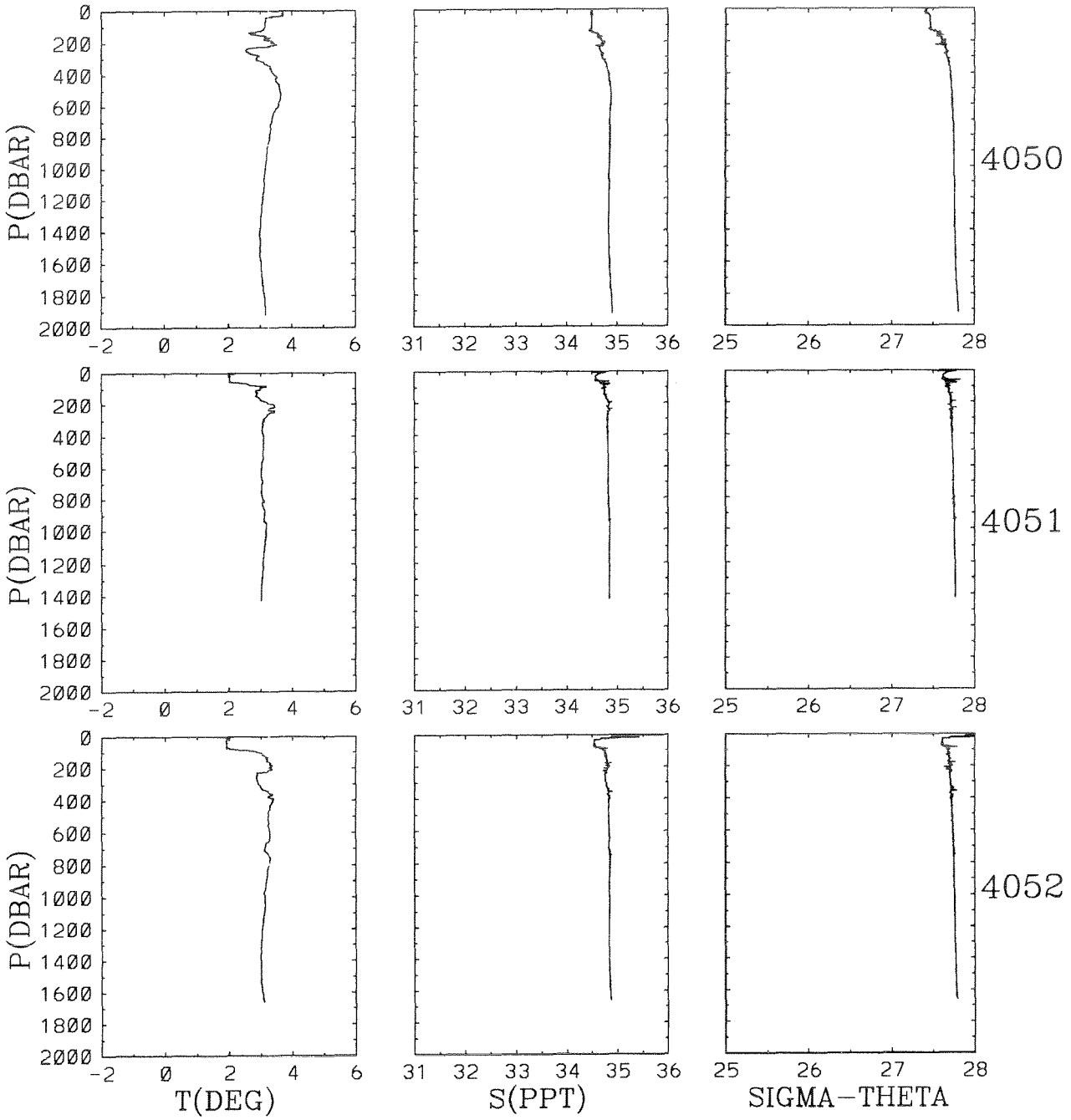
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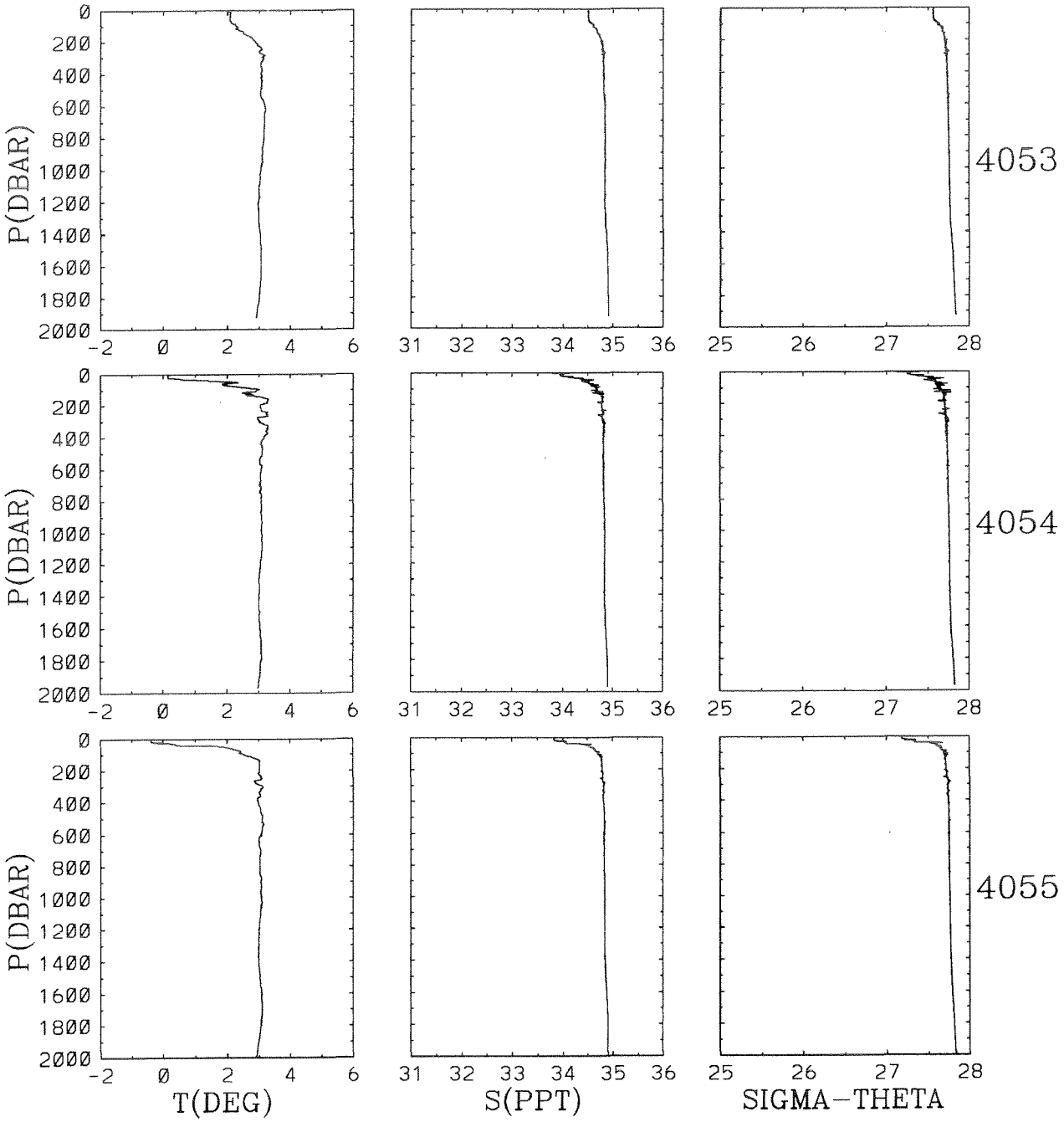
SIGMA-THETA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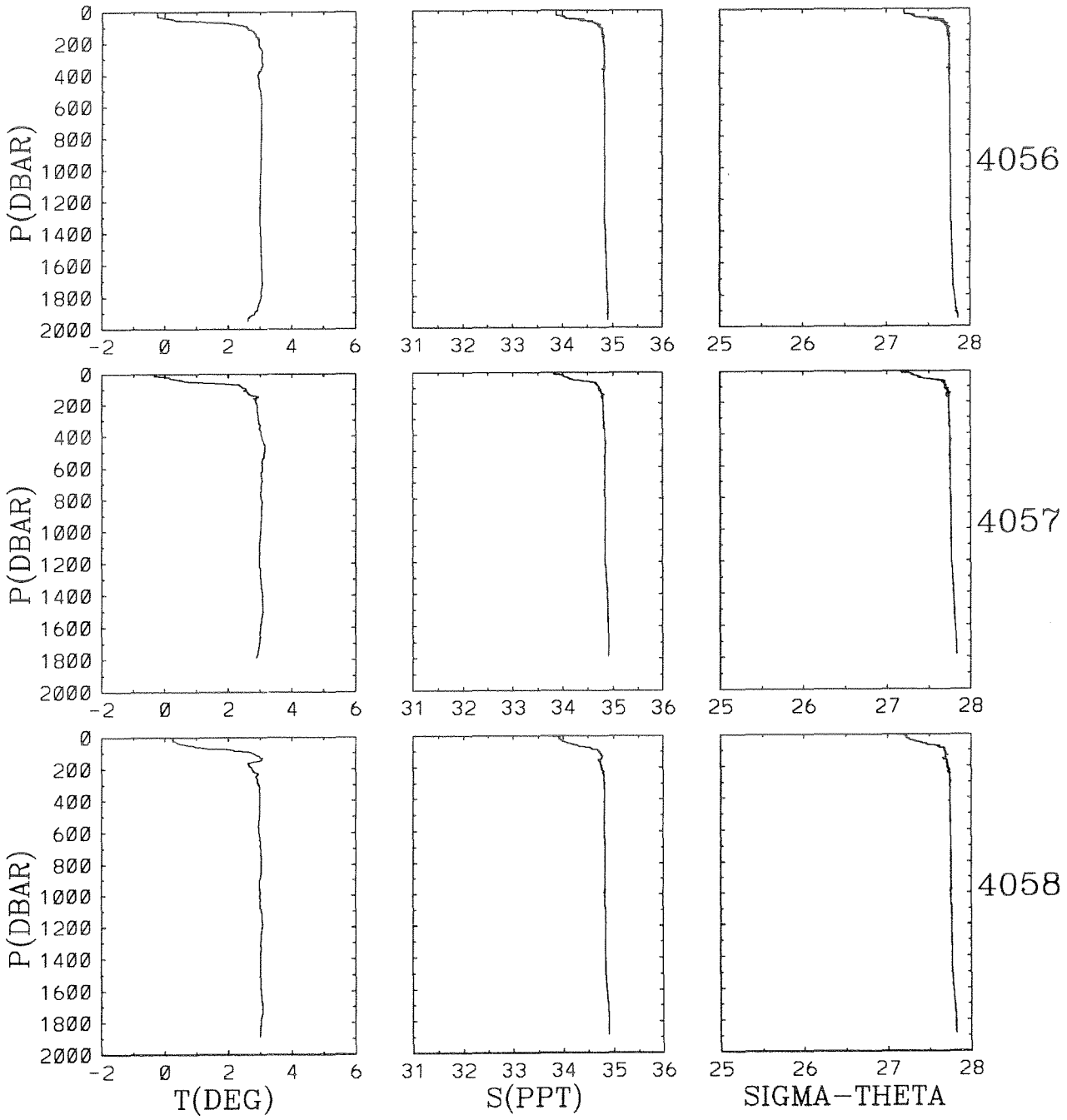
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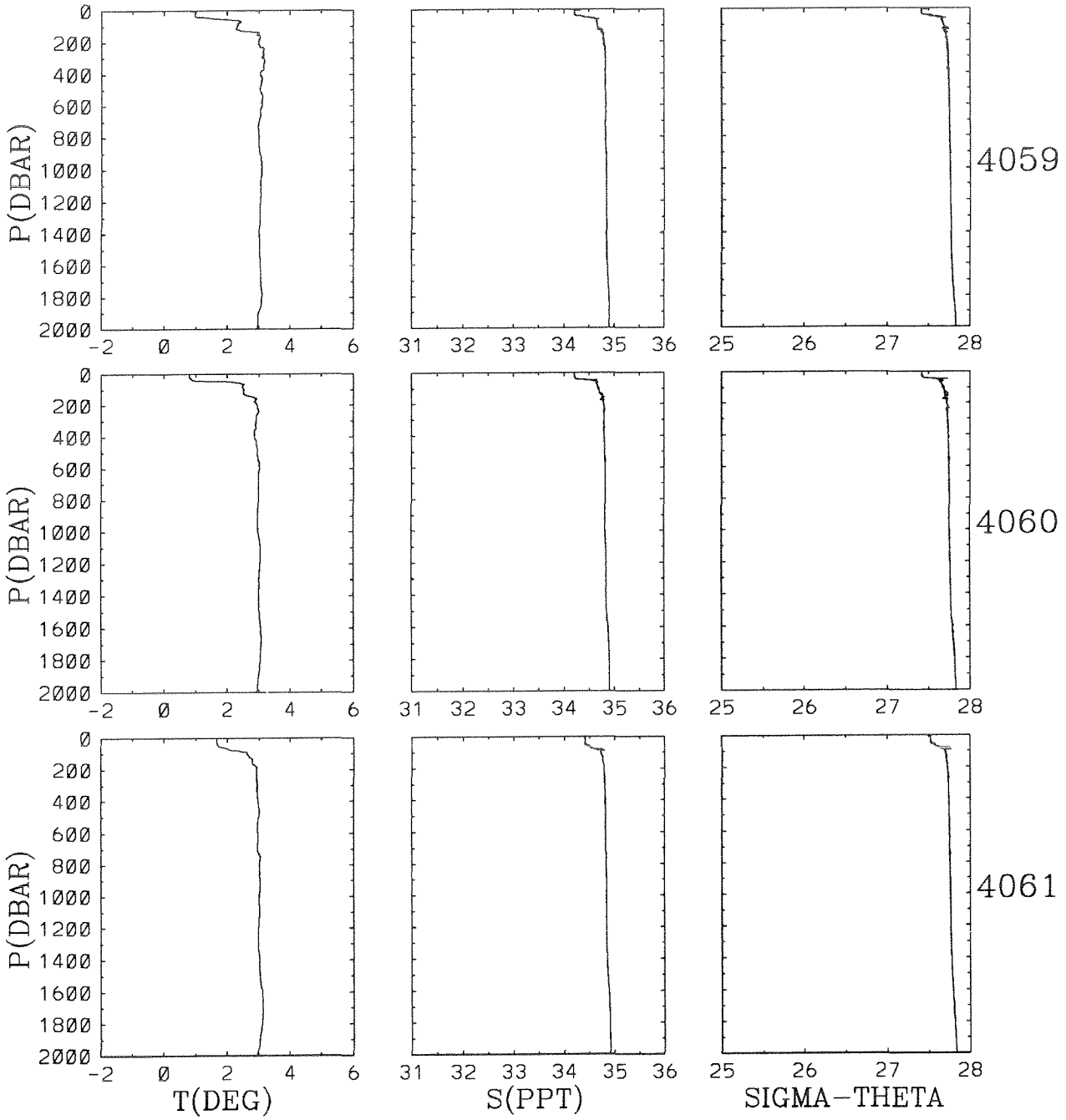
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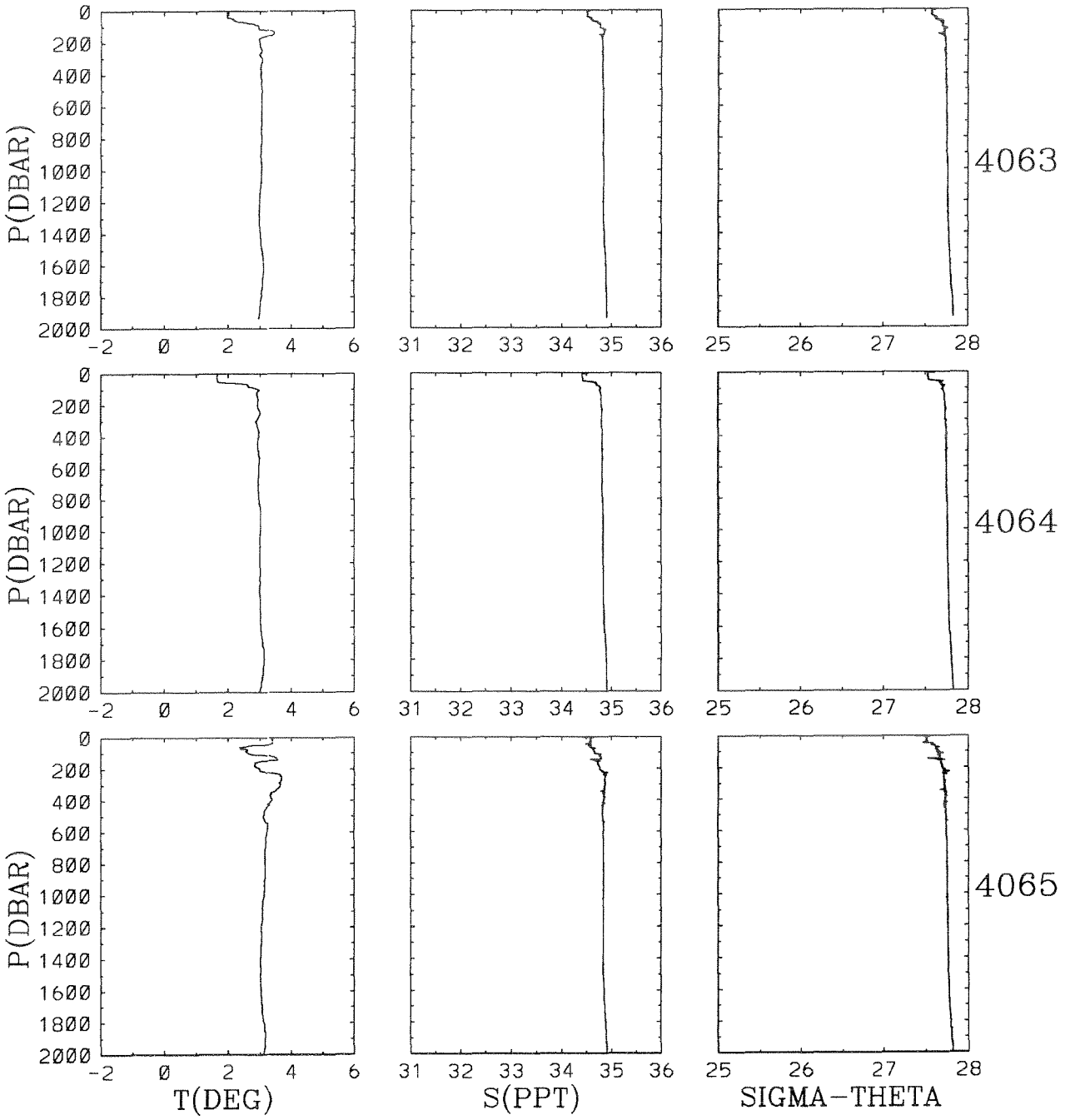
SIGMA-THETA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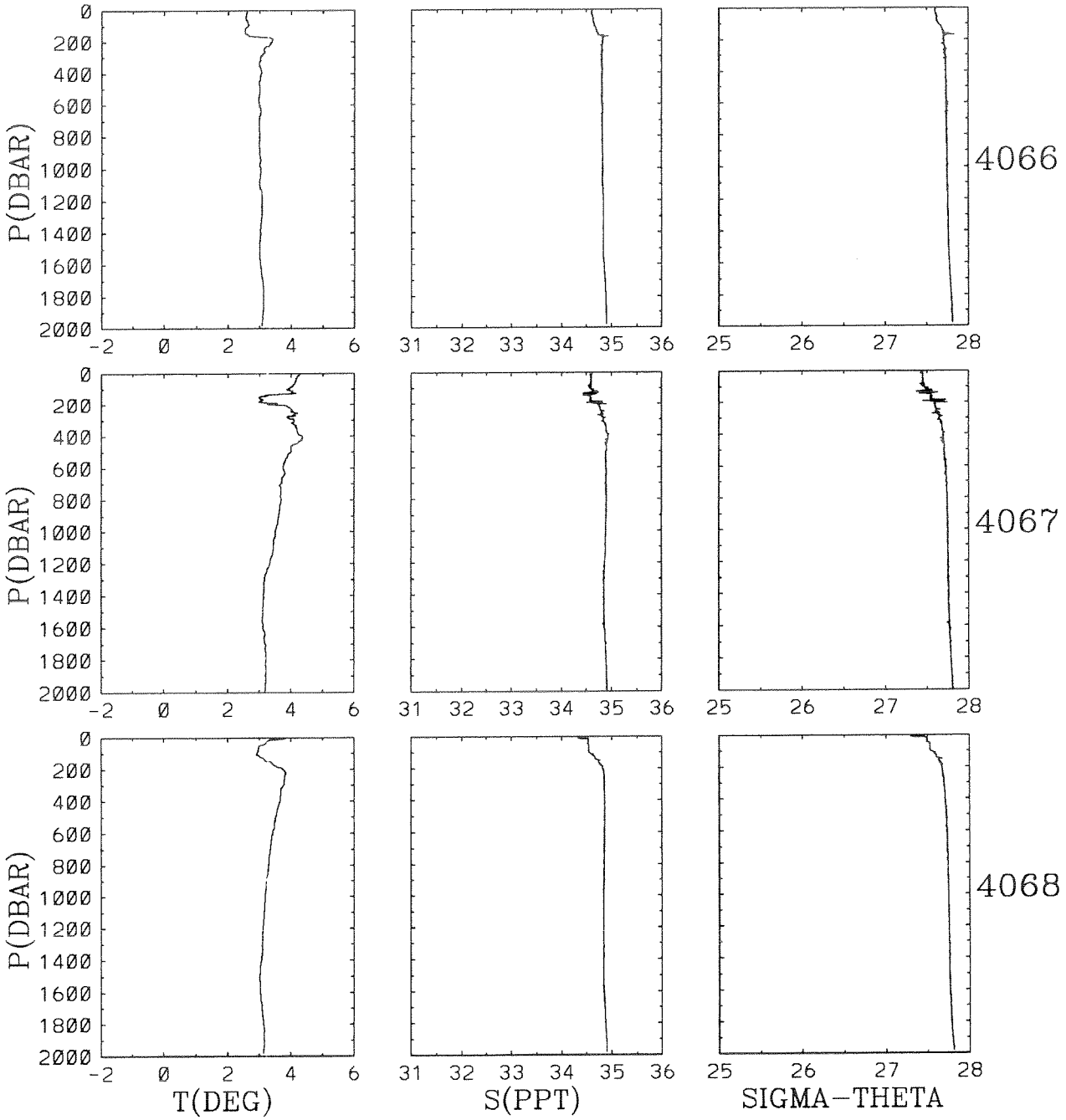
S(PPT)
SIGMA-THETA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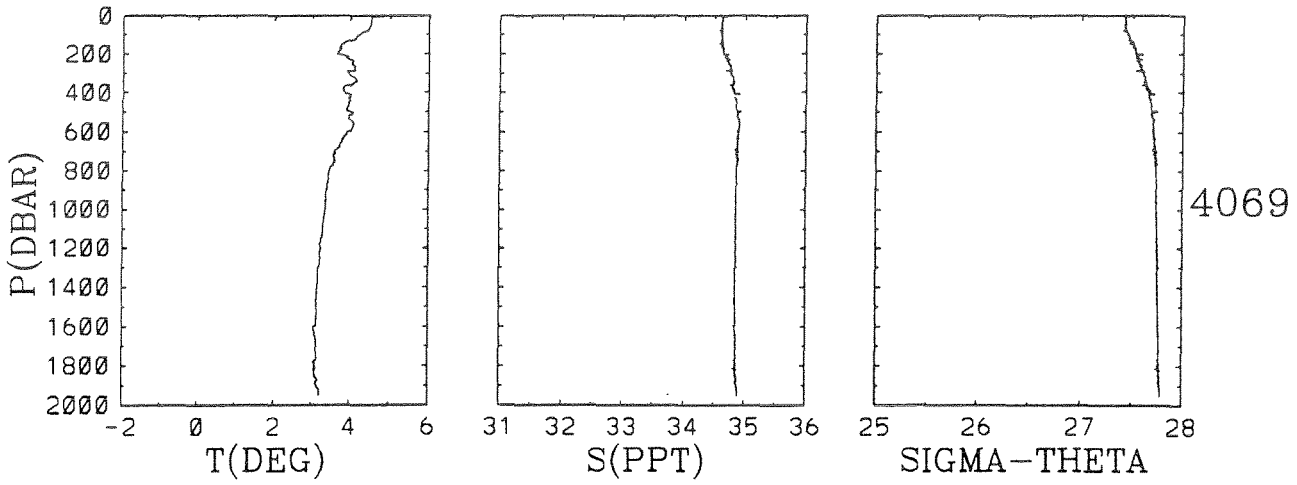
S(PPT)
SIGMA-THETA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SIGMA-THETA
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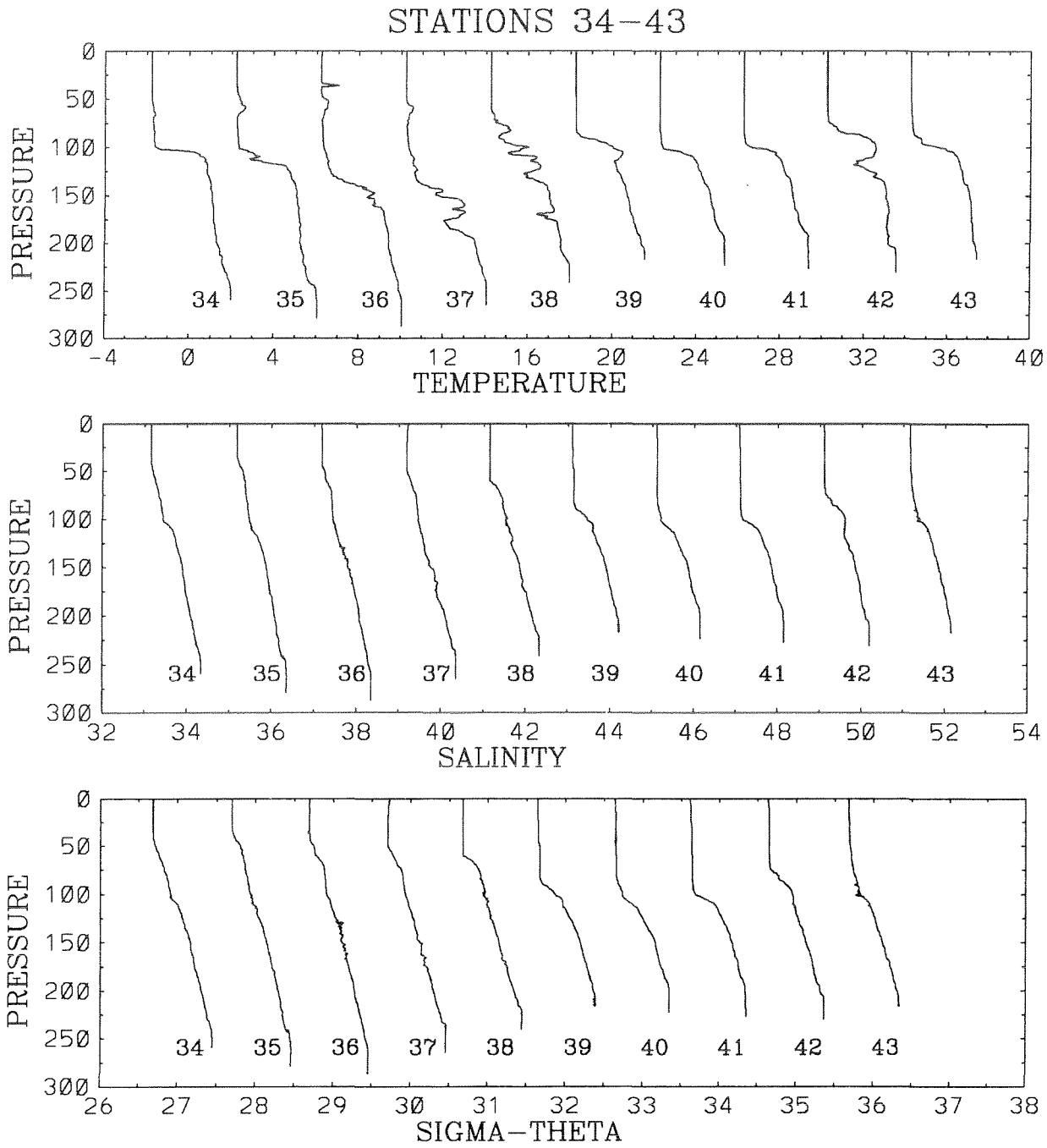
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TEMPERATURE
SALINITY
SIGMA-THETA
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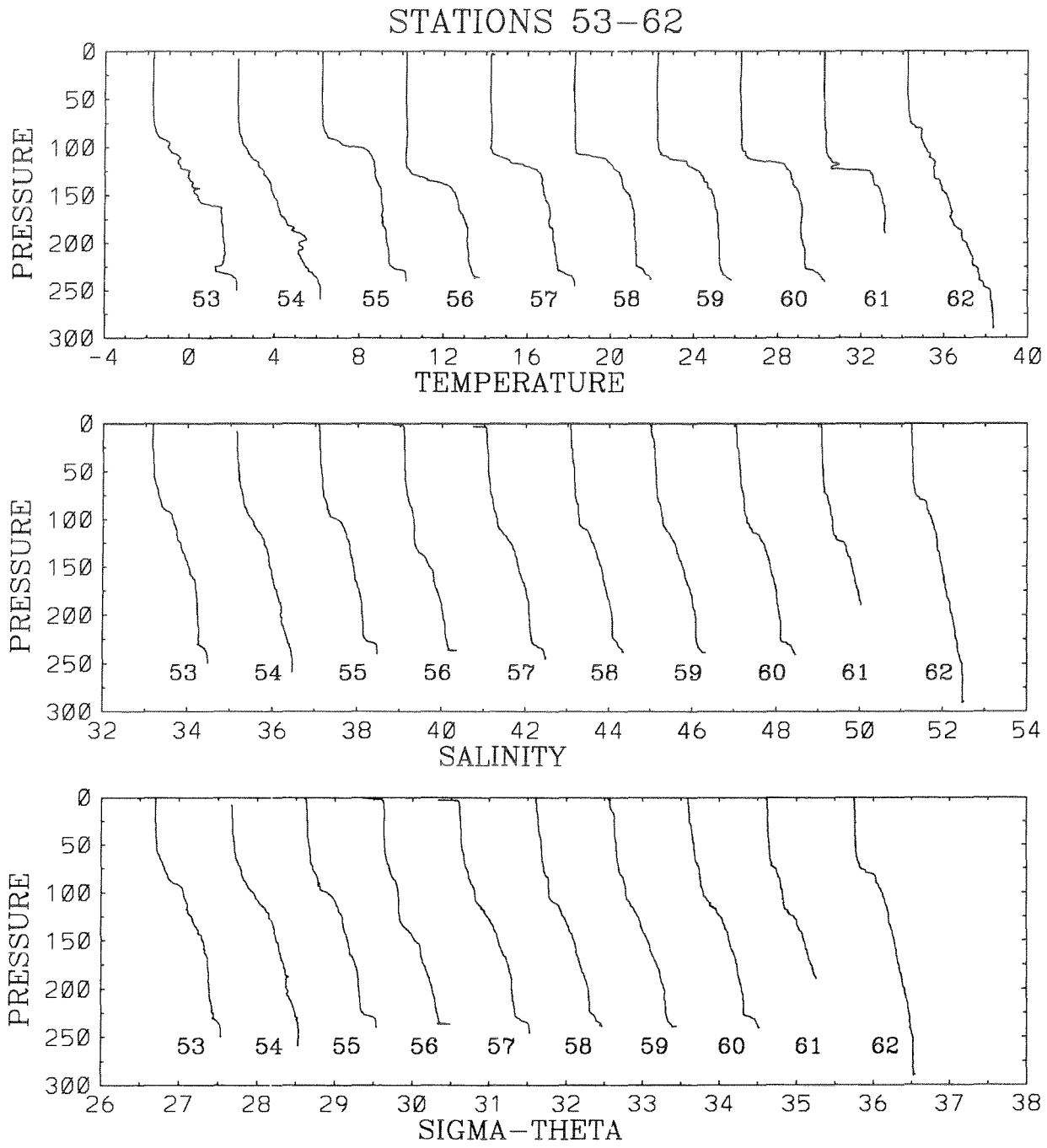
43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TEMPERATURE
PRESSURE
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SALINITY
PRESSURE
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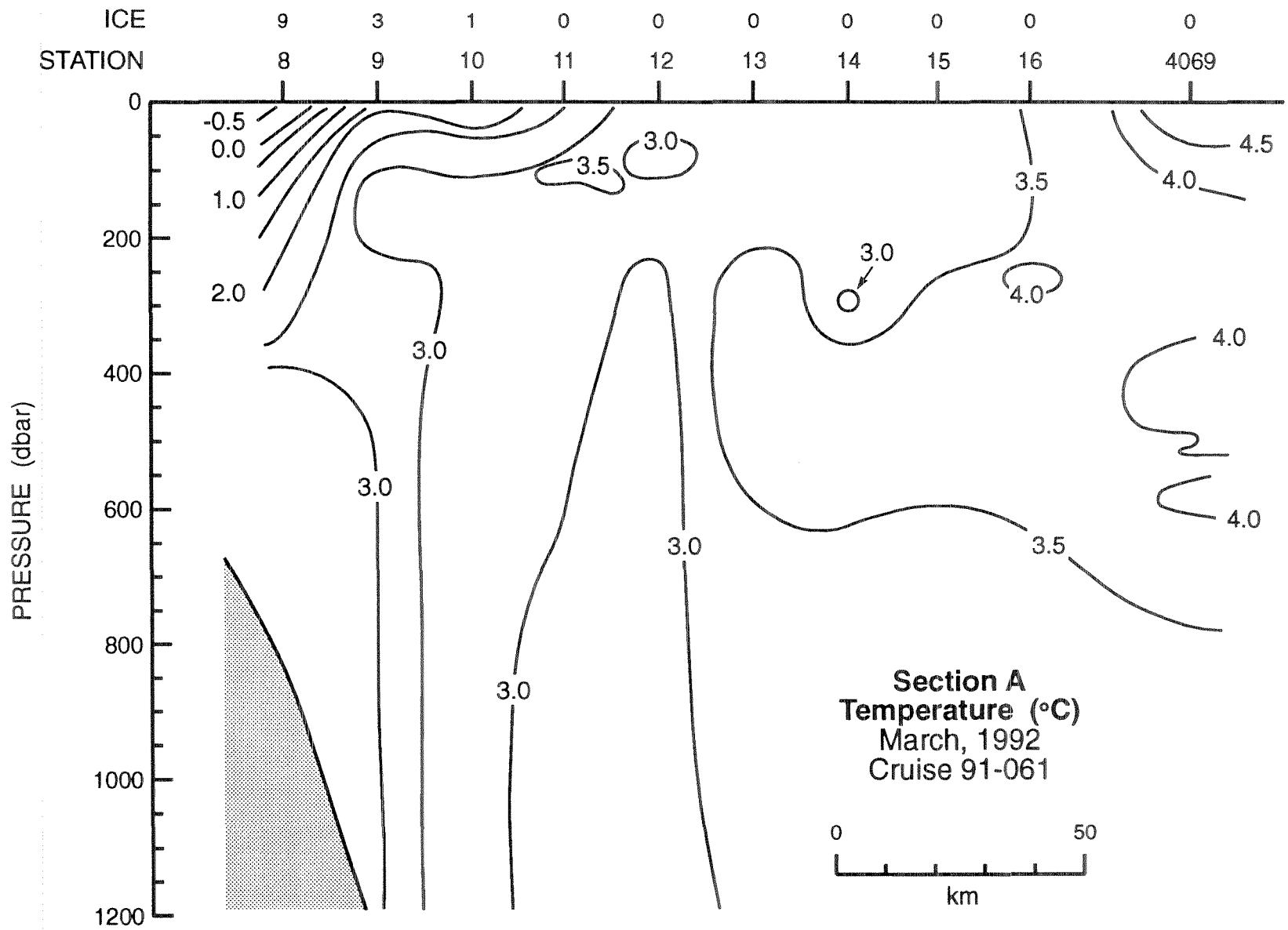
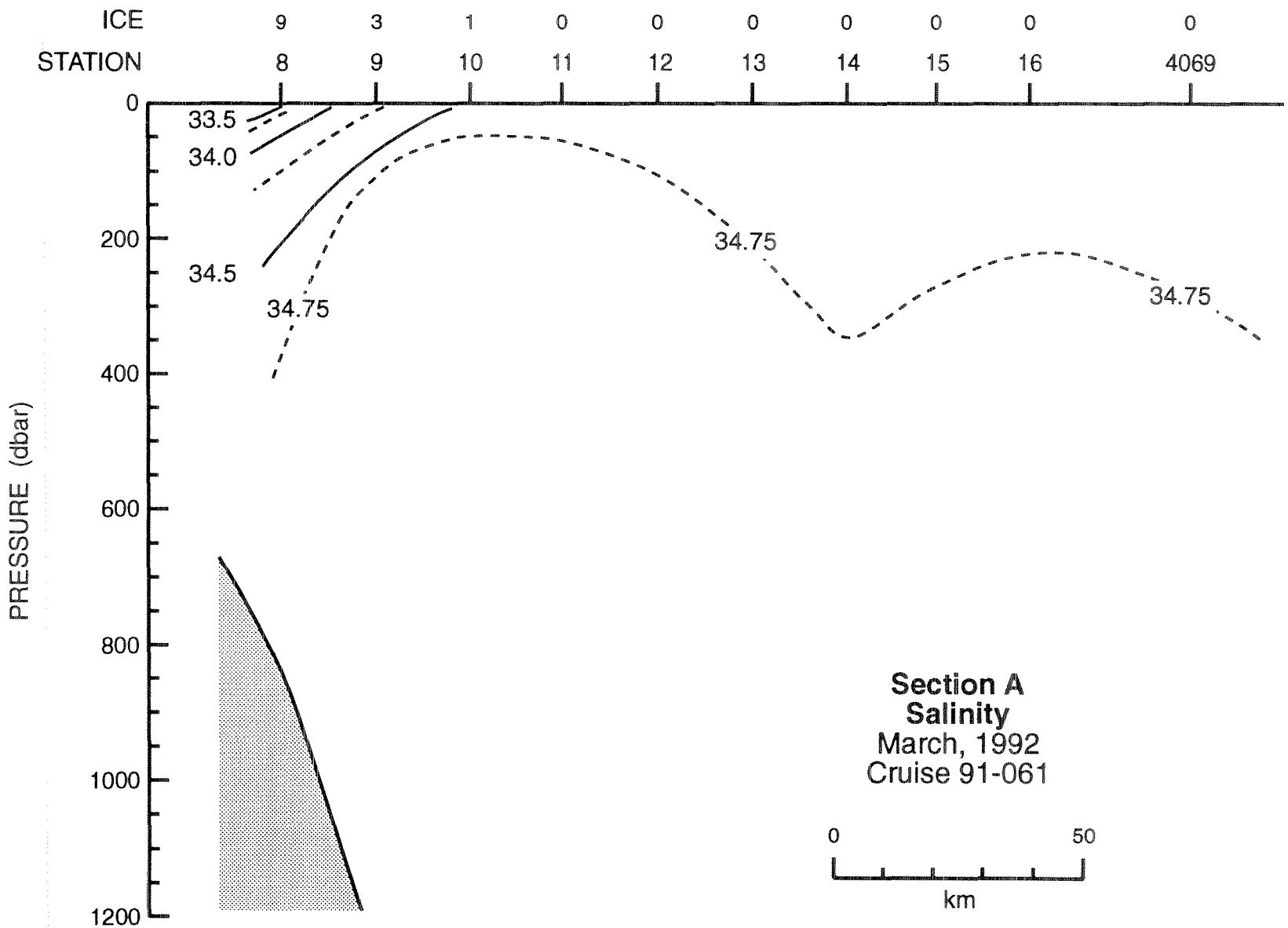
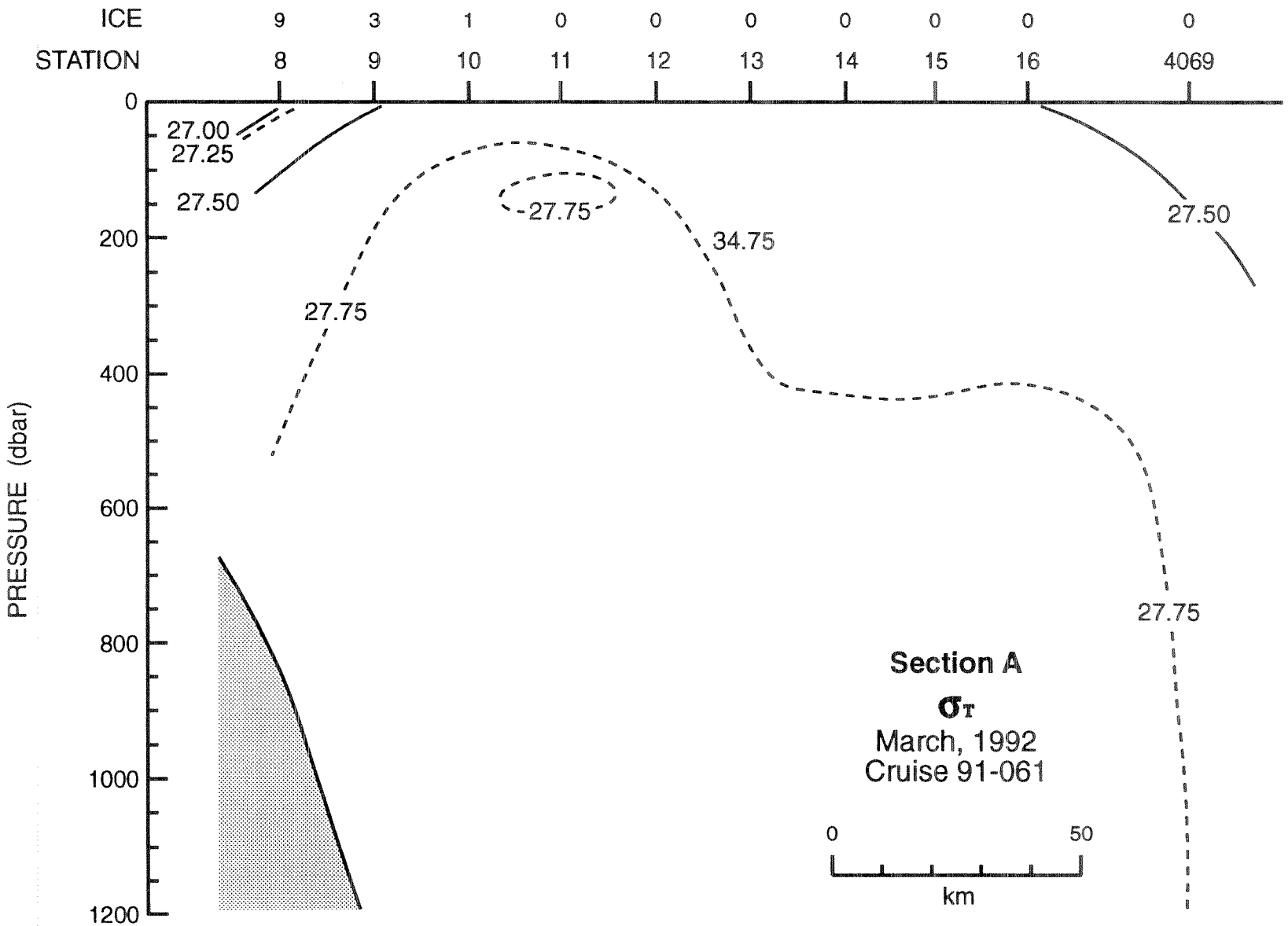
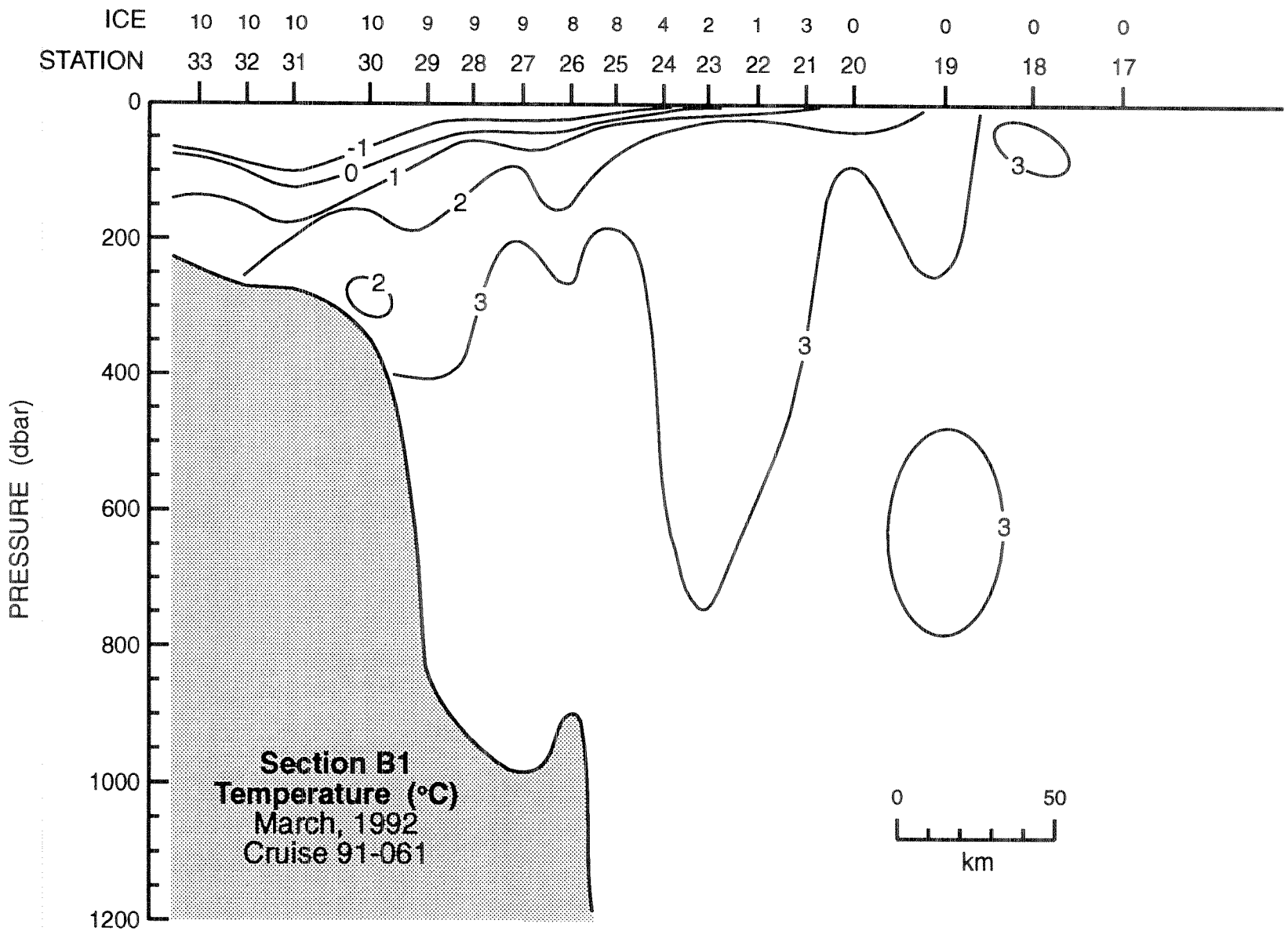
SIGMA-THETA


ICE
STATION
9 3 1 0 0 0 0 0 0 0
8 9 10 11 12 13 14 15 16 4069
PRESSURE (dbar)
0
200
400
600
800
1000
1200
-0.5
0.0
1.0
2.0
3.0
3.5
4.0
4.5
Section A
Temperature (°C)
March, 1992
Cruise 91-061
0
50
km


ICE
9
3
1
0
0
0
0
0
0
0
STATION
8
9
10
11
12
13
14
15
16
4069
0
200
400
600
800
1000
1200
PRESSURE (dbar)
33.5
34.0
34.5
34.75
34.75
34.75
Section A
Salinity
March, 1992
Cruise 91-061
0
50
km


ICE
STATION
9 3 1 0 0 0 0 0 0 0
8 9 10 11 12 13 14 15 16 4069
PRESSURE (dbar)
0
200
400
600
800
1000
1200
27.00
27.25
27.50
27.75
27.75
34.75
27.50
27.75
Section A
σT
March, 1992
Cruise 91-061
0
50
km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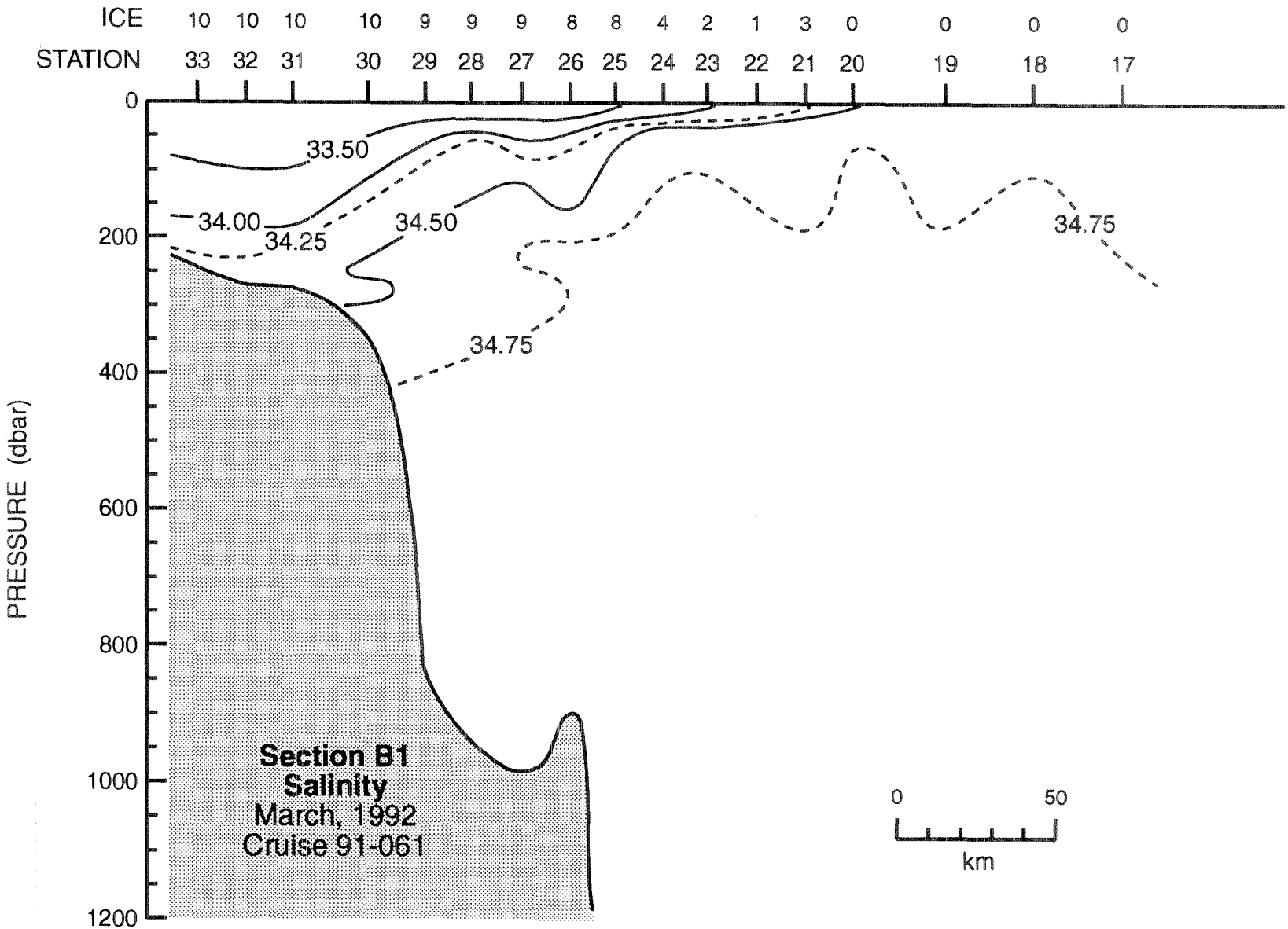
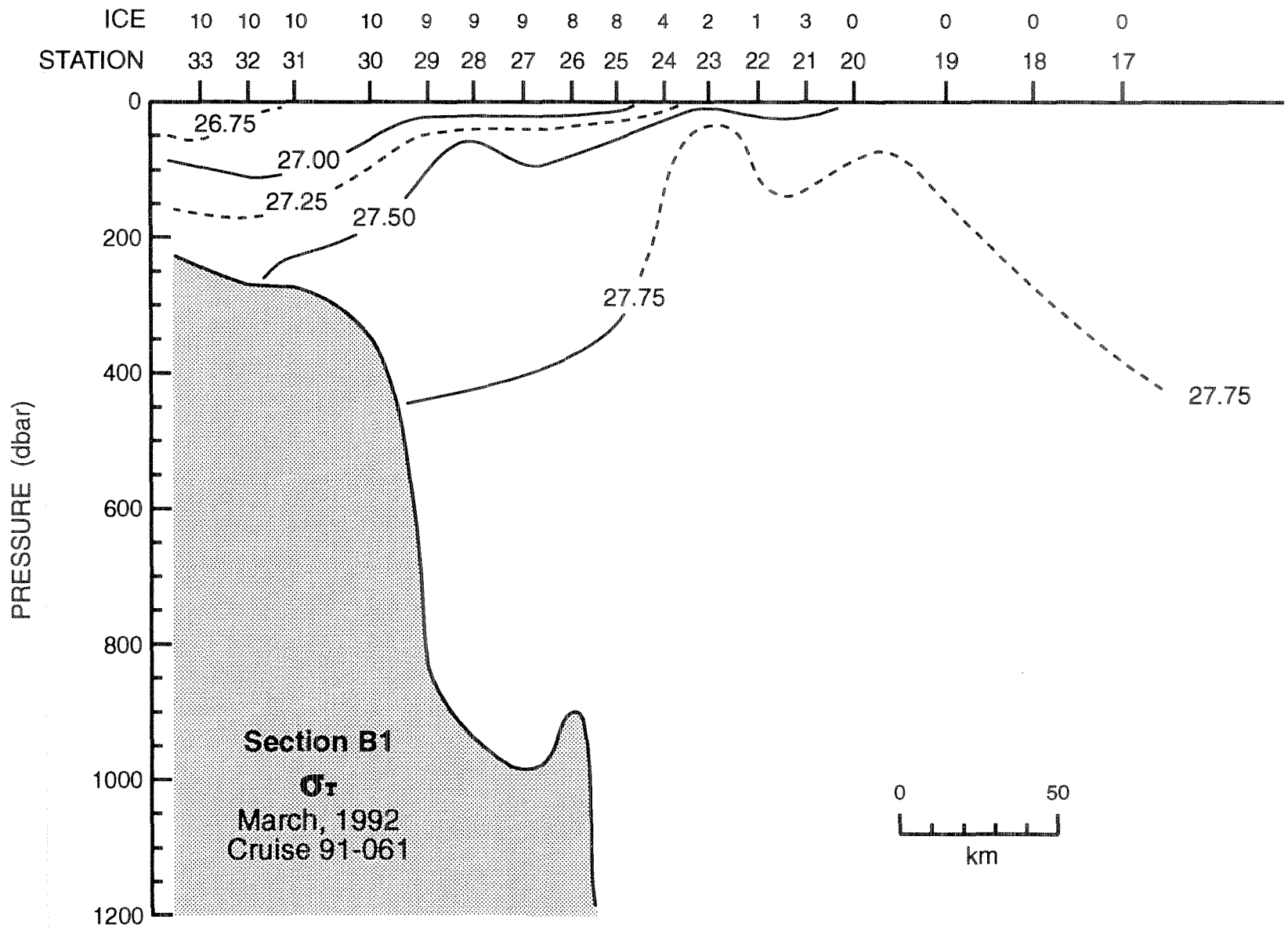
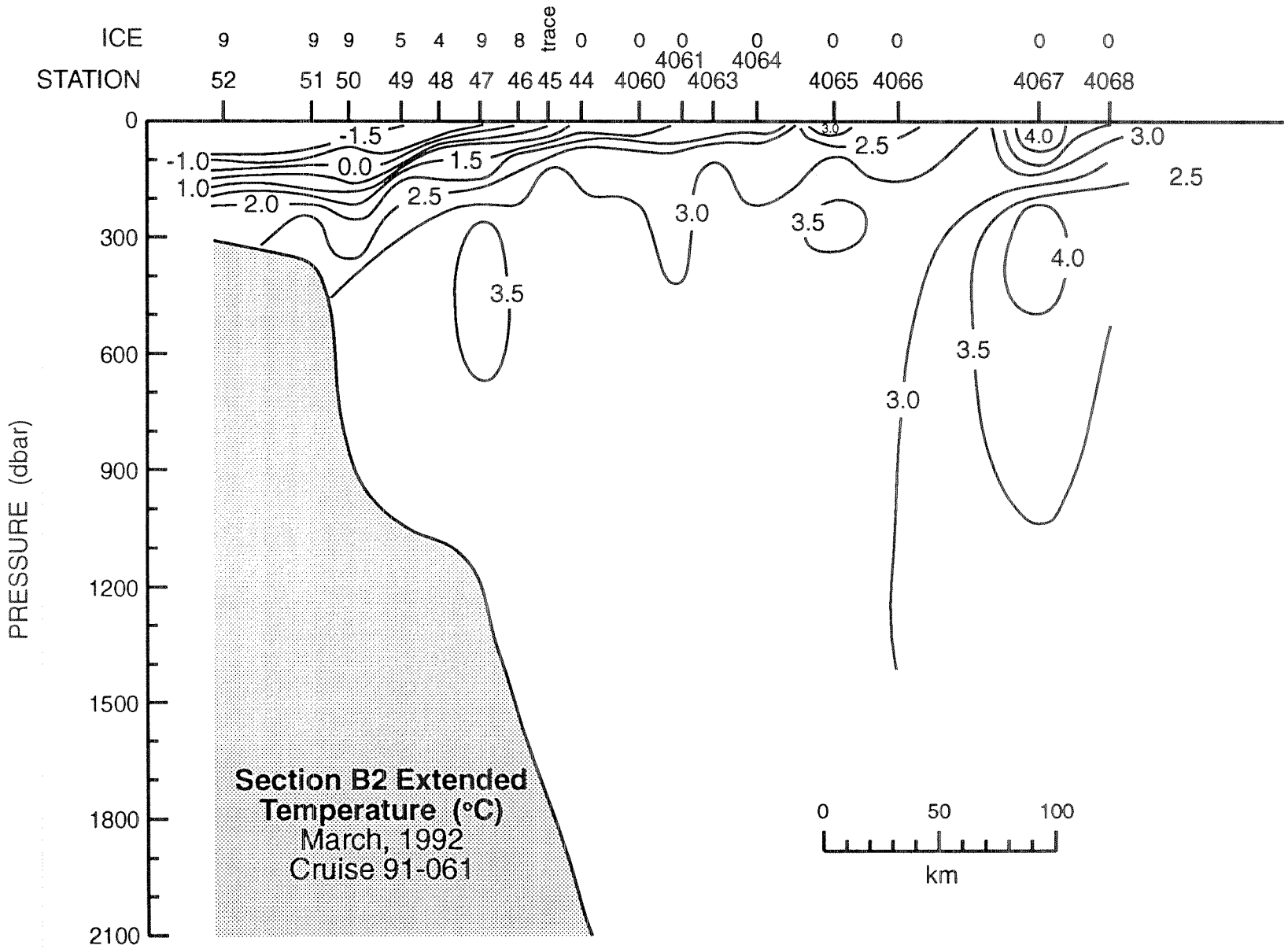
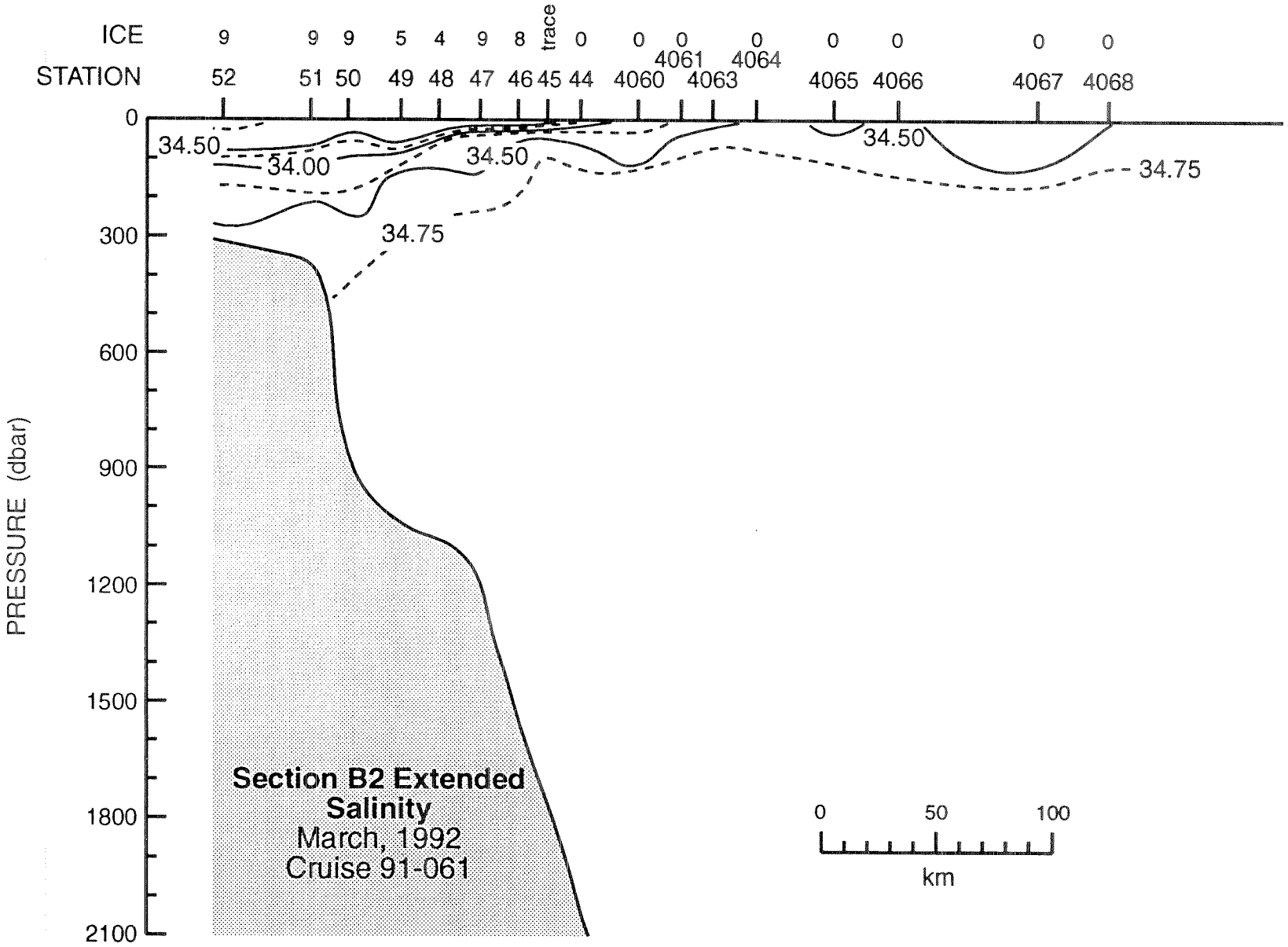
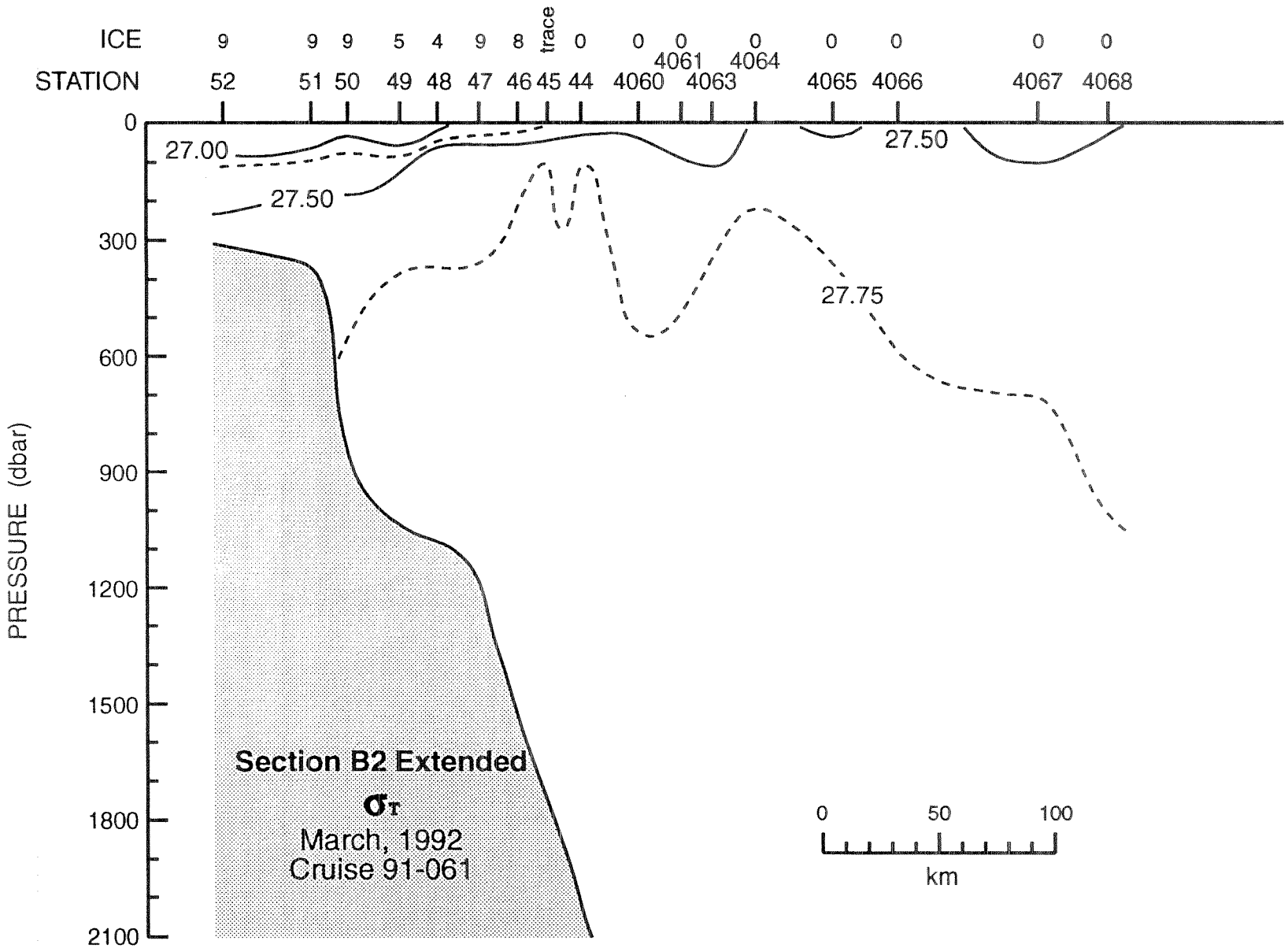
10 10 10 10 9 9 9 8 8 4 2 1 3 0 0 0 0
STATION
33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17
PRESSURE (dbar)
0
200
400
600
800
1000
1200
-1
0
1
2
2
3
3
3
3
Section B1
Temperature (°C)
March, 1992
Cruise 91-061
0
50
km

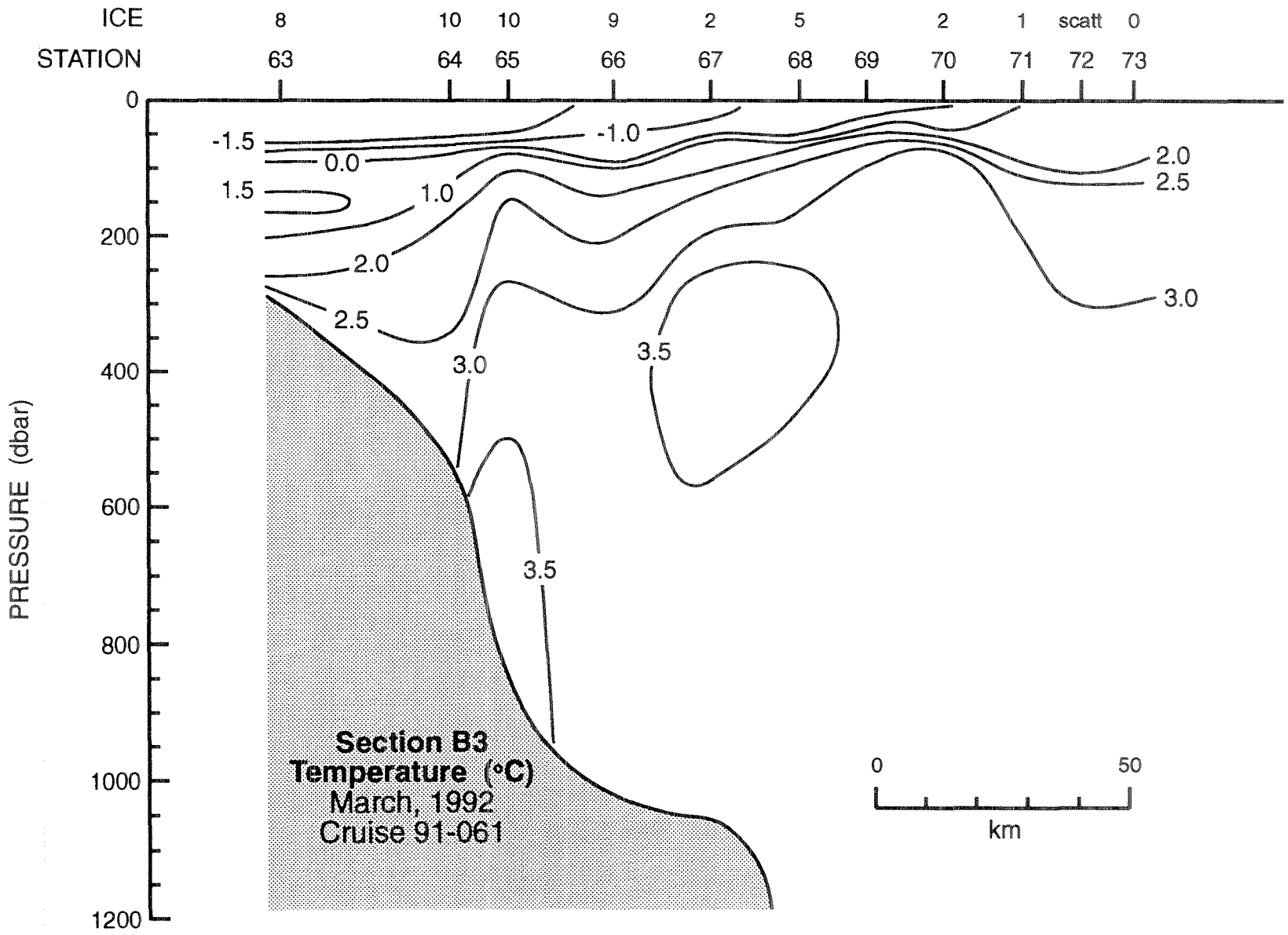

ICE
10 10 10 10 9 9 9 8 8 4 2 1 3 0 0 0 0
STATION
33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17
PRESSURE (dbar)
0
200
400
600
800
1000
1200
33.50
34.00
34.25
34.50
34.75
34.75
Section B1
Salinity
March, 1992
Cruise 91-061
0
50
km

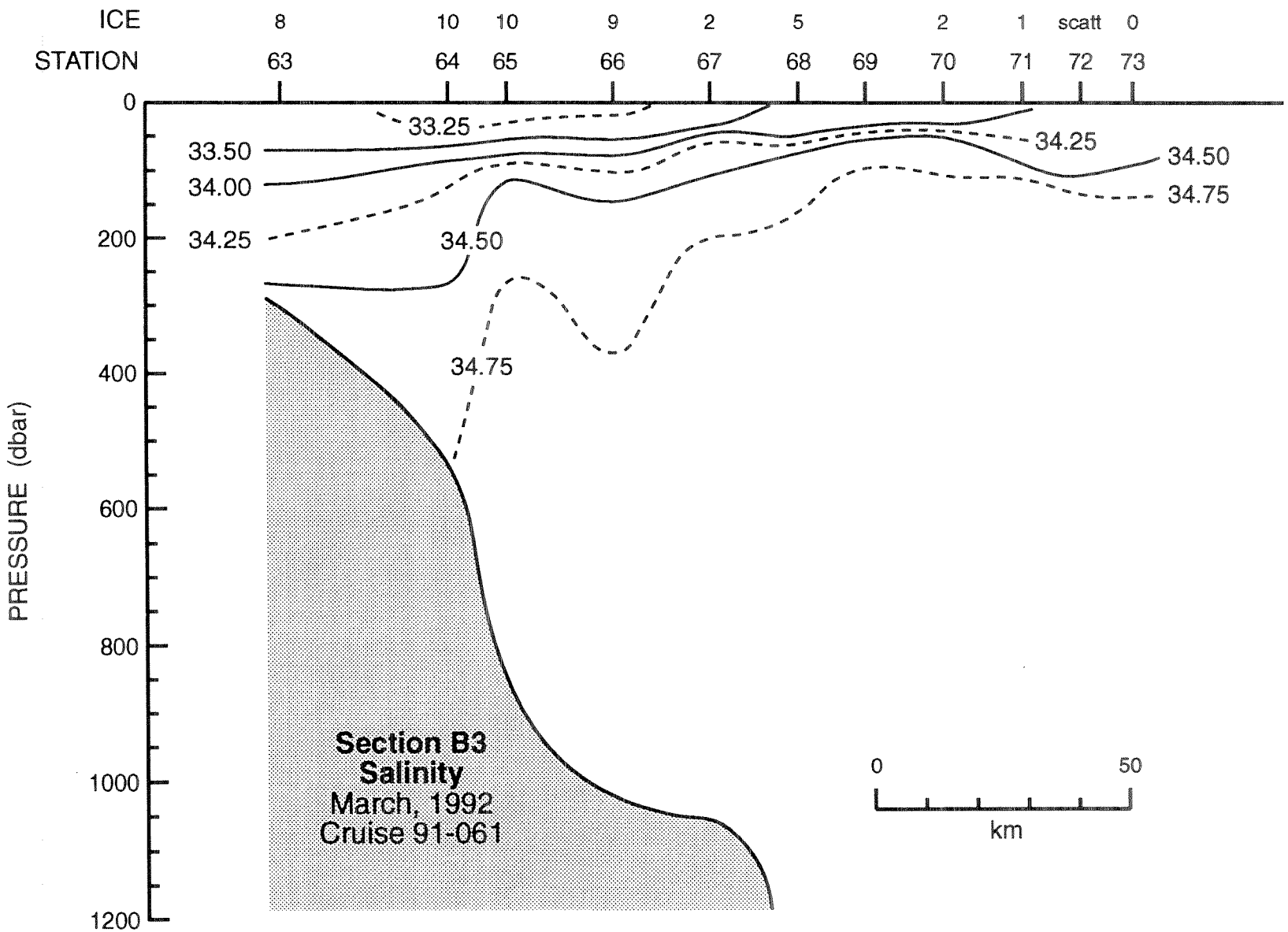

ICE
10 10 10 10 9 9 9 8 8 4 2 1 3 0 0 0 0
STATION
33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17
PRESSURE (dbar)
0
200
400
600
800
1000
1200
26.75
27.00
27.25
27.50
27.75
27.75
Section B1
σT
March, 1992
Cruise 91-061
0
50
km

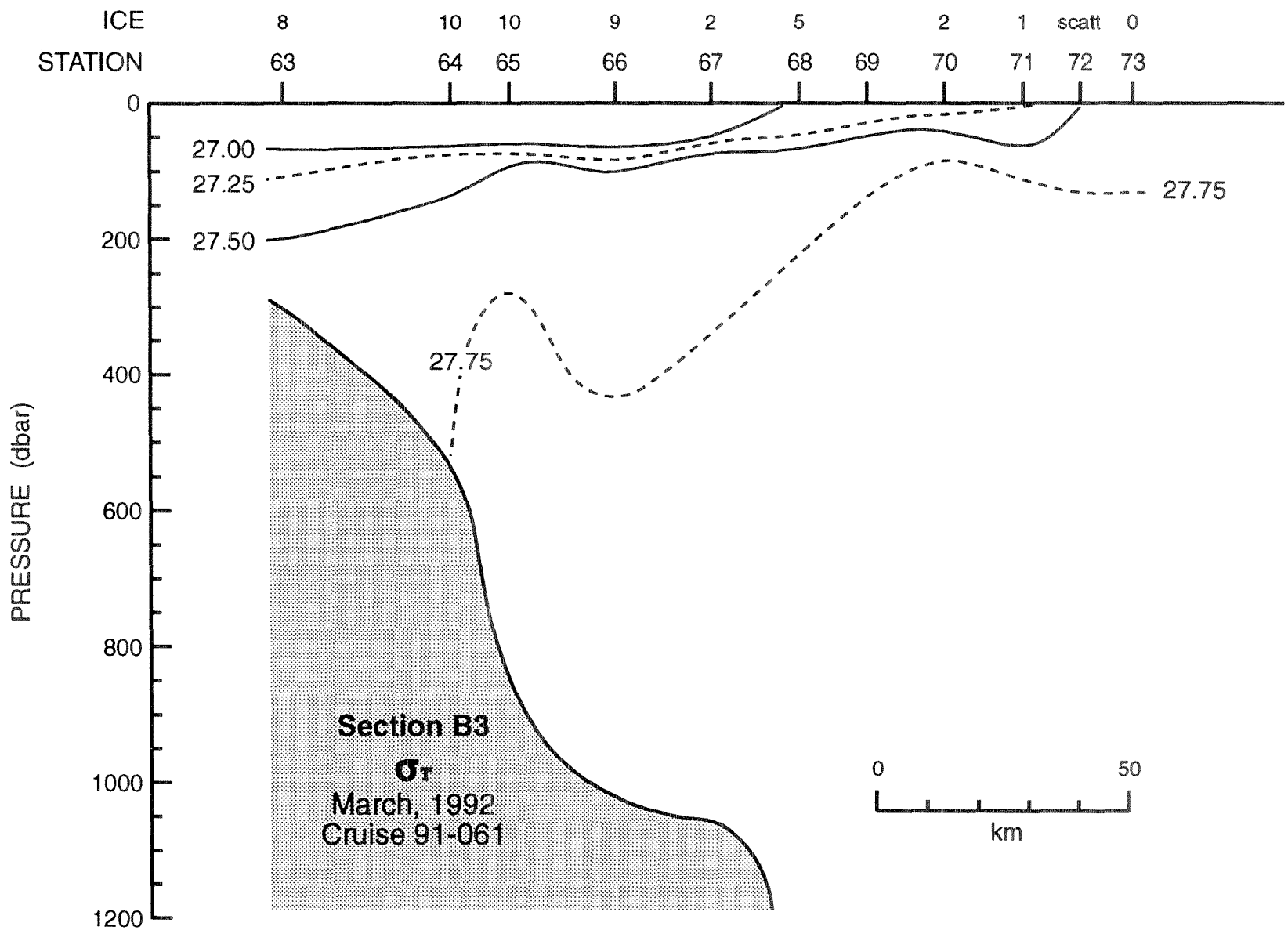

ICE
STATION
9 9 9 5 4 9 8 trace 0 0 0 0 0 0 0 0
52 51 50 49 48 47 46 45 44 4060 4061 4063 4064 4065 4066 4067 4068
PRESSURE (dbar)
0
300
600
900
1200
1500
1800
2100
-1.5
-1.0
0.0
1.5
1.0
2.0
2.5
3.0
3.5
4.0
Section B2 Extended
Temperature (°C)
March, 1992
Cruise 91-061
0 50 100
km

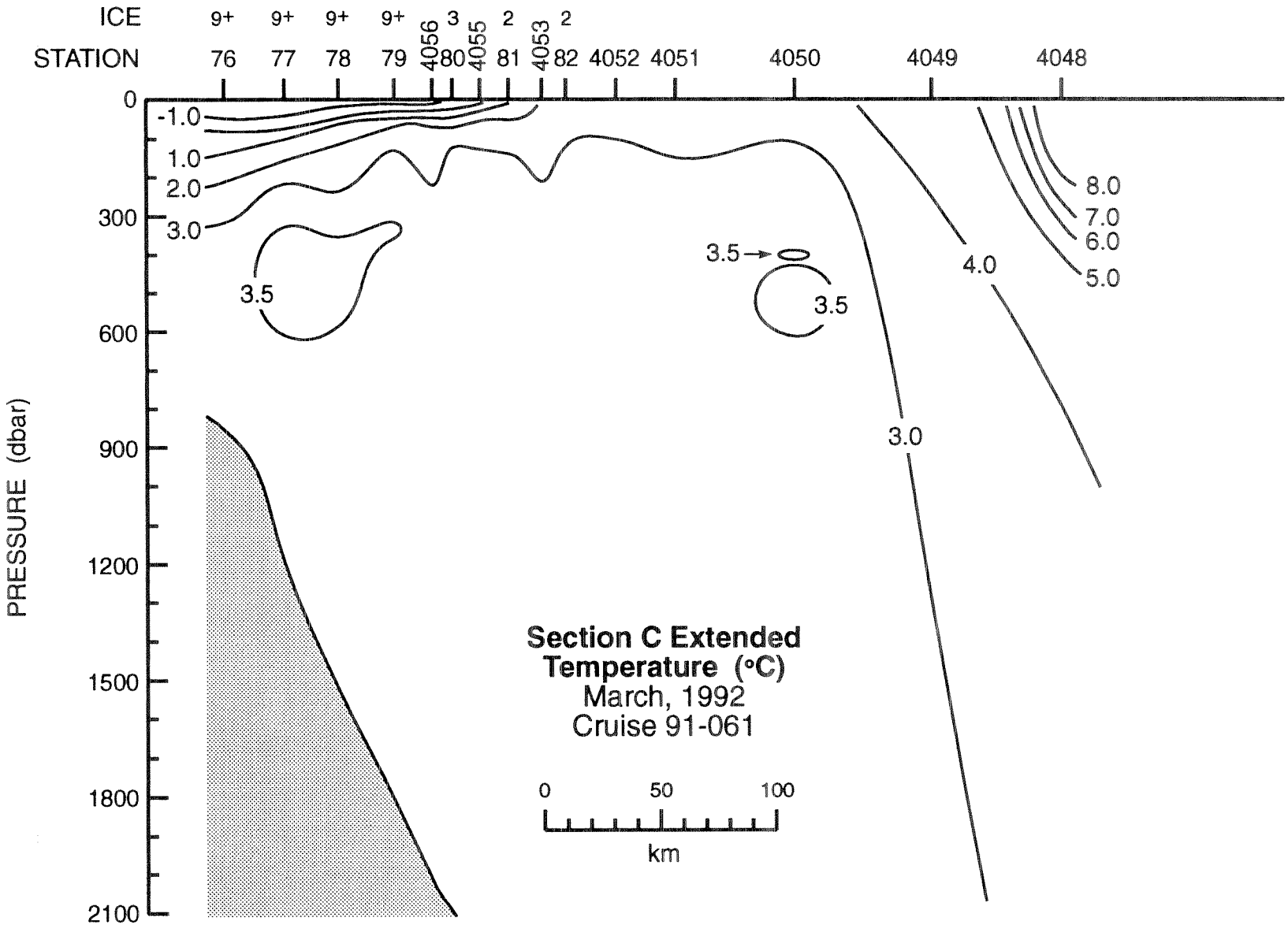

ICE
STATION
9 9 9 5 4 9 8 trace 0 0 0 0 0 0 0 0
52 51 50 49 48 47 46 45 44 4060 4061 4063 4064 4065 4066 4067 4068
PRESSURE (dbar)
0
300
600
900
1200
1500
1800
2100
34.50
34.00
34.50
34.75
34.50
34.75
Section B2 Extended
Salinity
March, 1992
Cruise 91-061
0 50 100
km

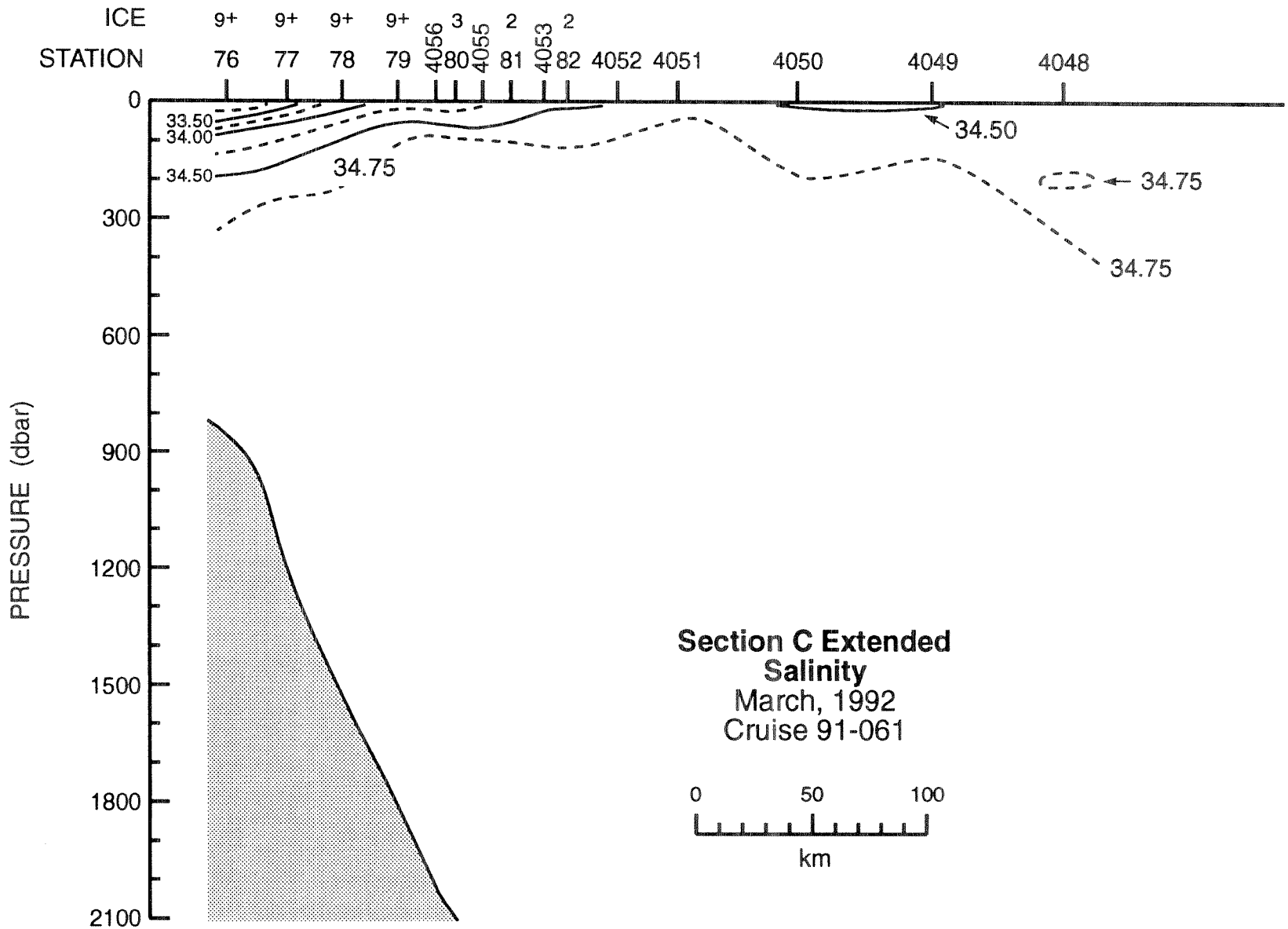

ICE
STATION
9 9 9 5 4 9 8 trace 0 0 0 0 0 0 0 0
52 51 50 49 48 47 46 45 44 4060 4061 4063 4064 4065 4066 4067 4068
0
300
600
900
1200
1500
1800
2100
PRESSURE (dbar)
27.00
27.50
27.50
27.75
Section B2 Extended
σ_T
March, 1992
Cruise 91-061
0 50 100
km

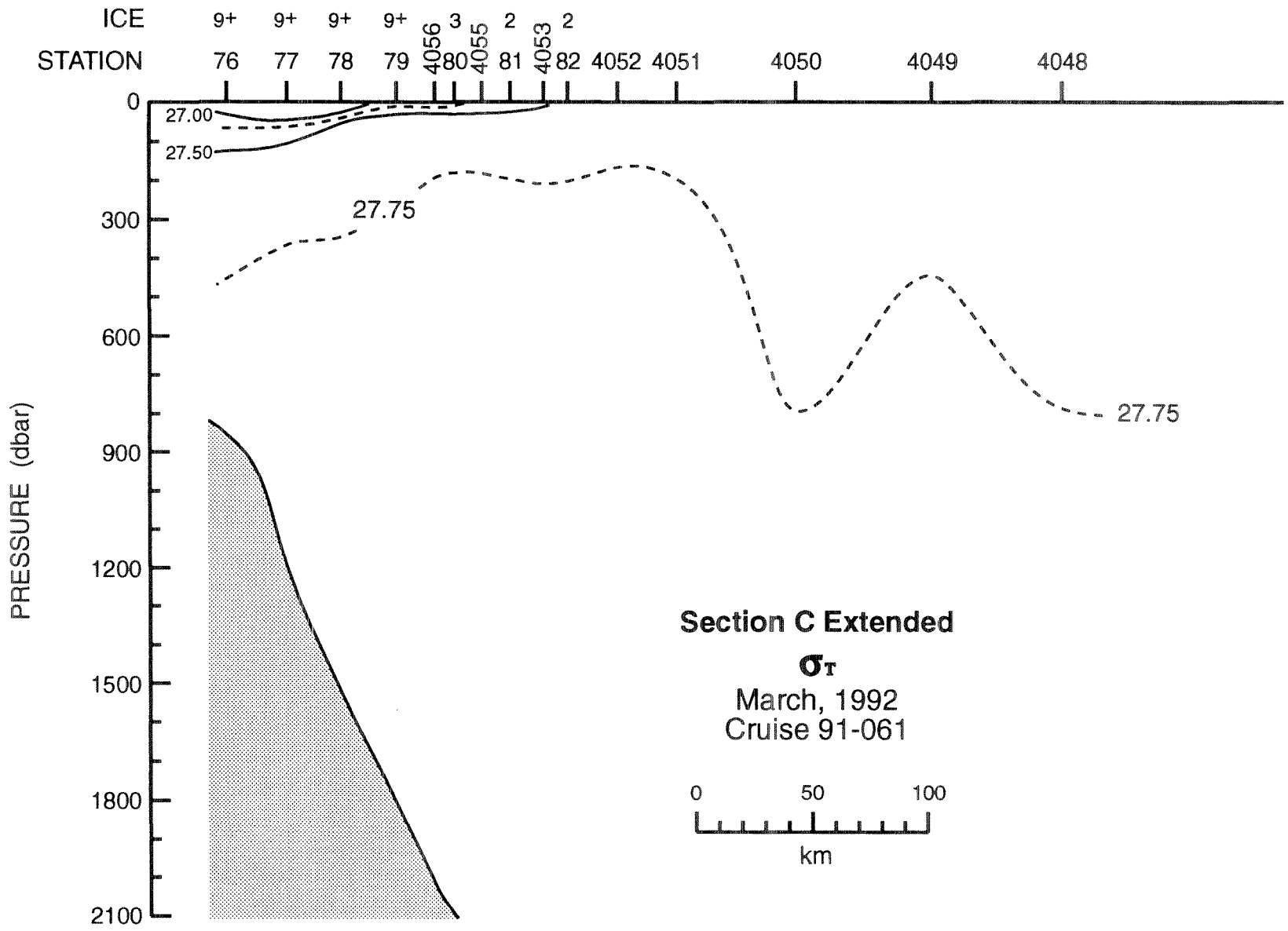

ICE
STATION
8
10
10
9
2
5
2
1
scatt
0
63
64
65
66
67
68
69
70
71
72
73
PRESSURE (dbar)
0
200
400
600
800
1000
1200
-1.5
-1.0
0.0
1.5
1.0
2.0
2.5
3.0
3.5
2.0
2.5
3.0
3.5
Section B3
Temperature (°C)
March, 1992
Cruise 91-061
0
50
km

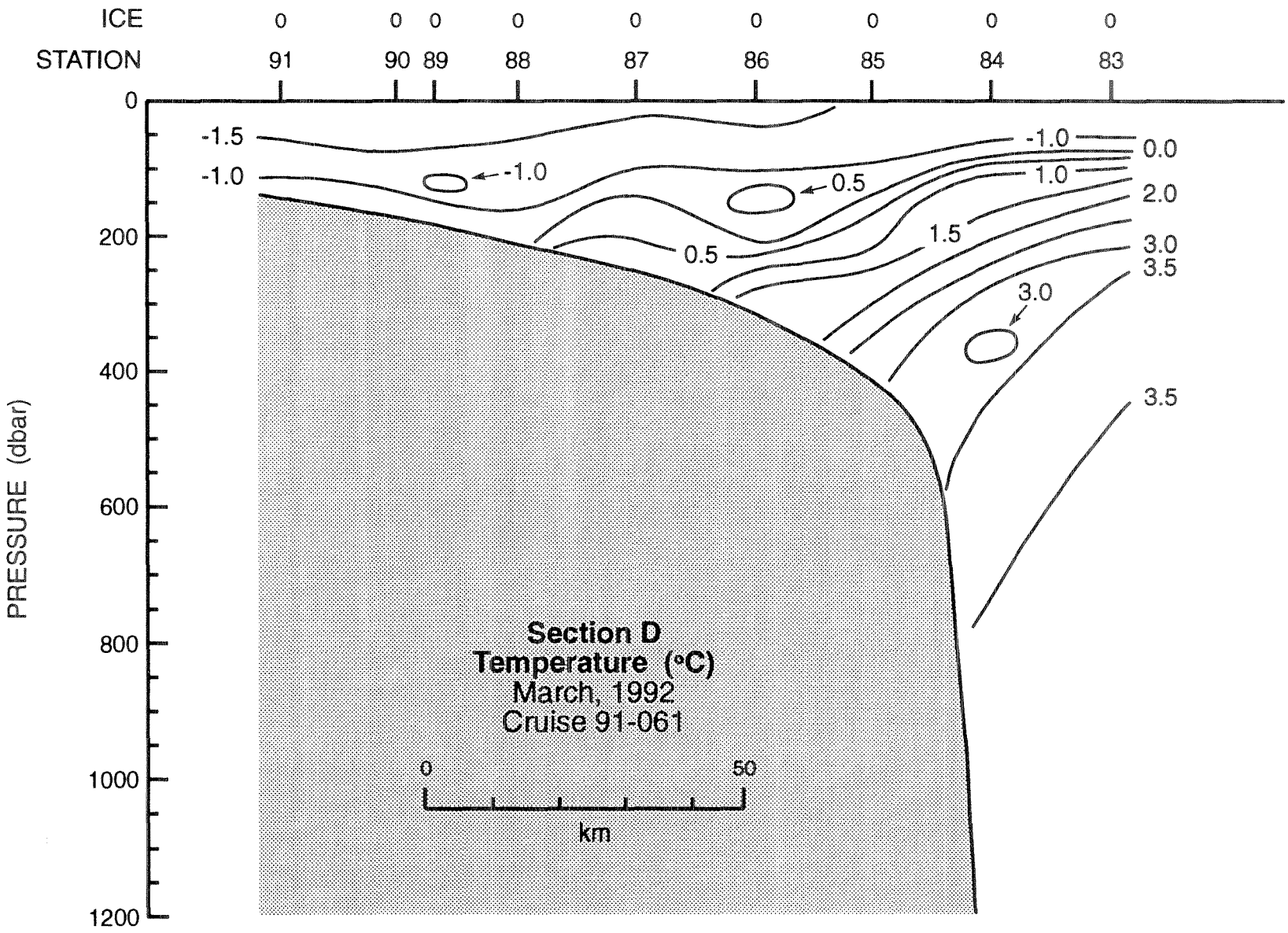

ICE
STATION
8
10
10
9
2
5
2
1
scatt
0
63
64
65
66
67
68
69
70
71
72
73
PRESSURE (dbar)
0
200
400
600
800
1000
1200
33.25
33.50
34.00
34.25
34.50
34.75
34.25
34.50
34.75
Section B3
Salinity
March, 1992
Cruise 91-061
0
50
km

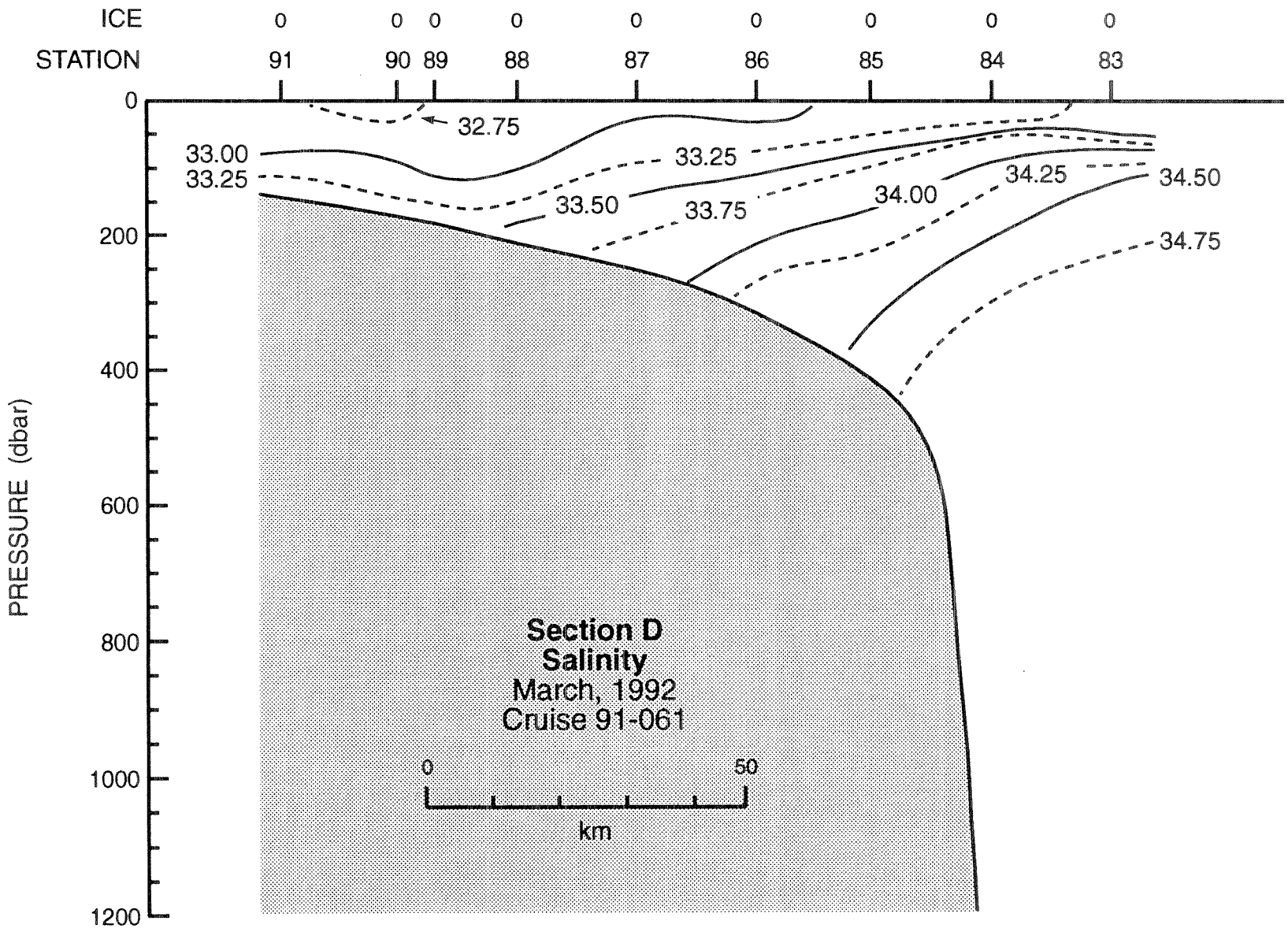

ICE
STATION
8
10
10
9
2
5
2
1
scatt
0
63
64
65
66
67
68
69
70
71
72
73
0
200
400
600
800
1000
1200
PRESSURE (dbar)
27.00
27.25
27.50
27.75
27.75
Section B3
σT
March, 1992
Cruise 91-061
0
50
km

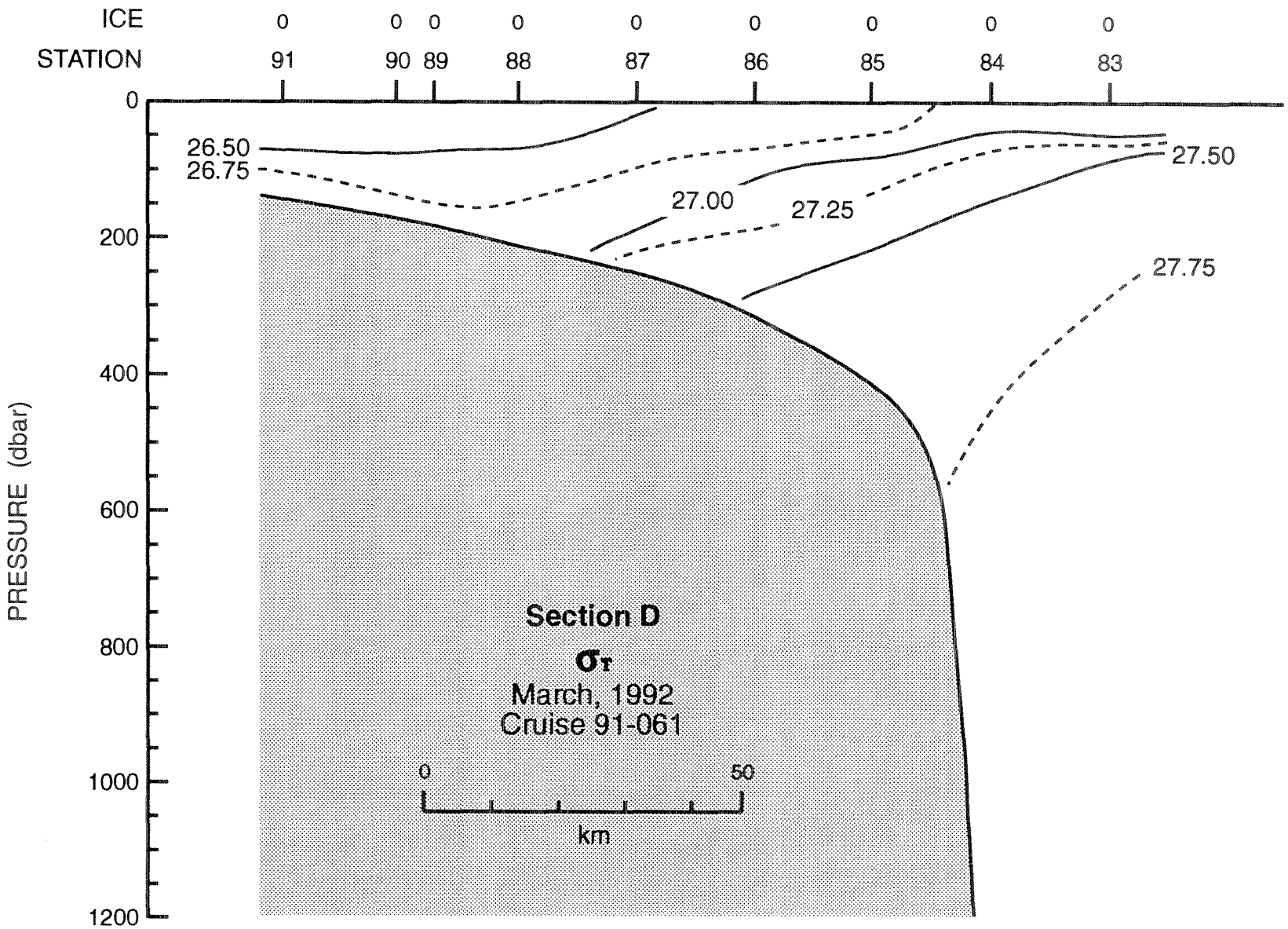

ICE
STATION
9+ 9+ 9+ 9+ 3 2 2
76 77 78 79 4056 80 4055 81 4053 82 4052 4051 4050 4049 4048
PRESSURE (dbar)
0
300
600
900
1200
1500
1800
2100
-1.0
1.0
2.0
3.0
3.5
3.5
3.5
3.5
3.0
4.0
8.0
7.0
6.0
5.0
Section C Extended
Temperature (°C)
March, 1992
Cruise 91-061
0 50 100
km

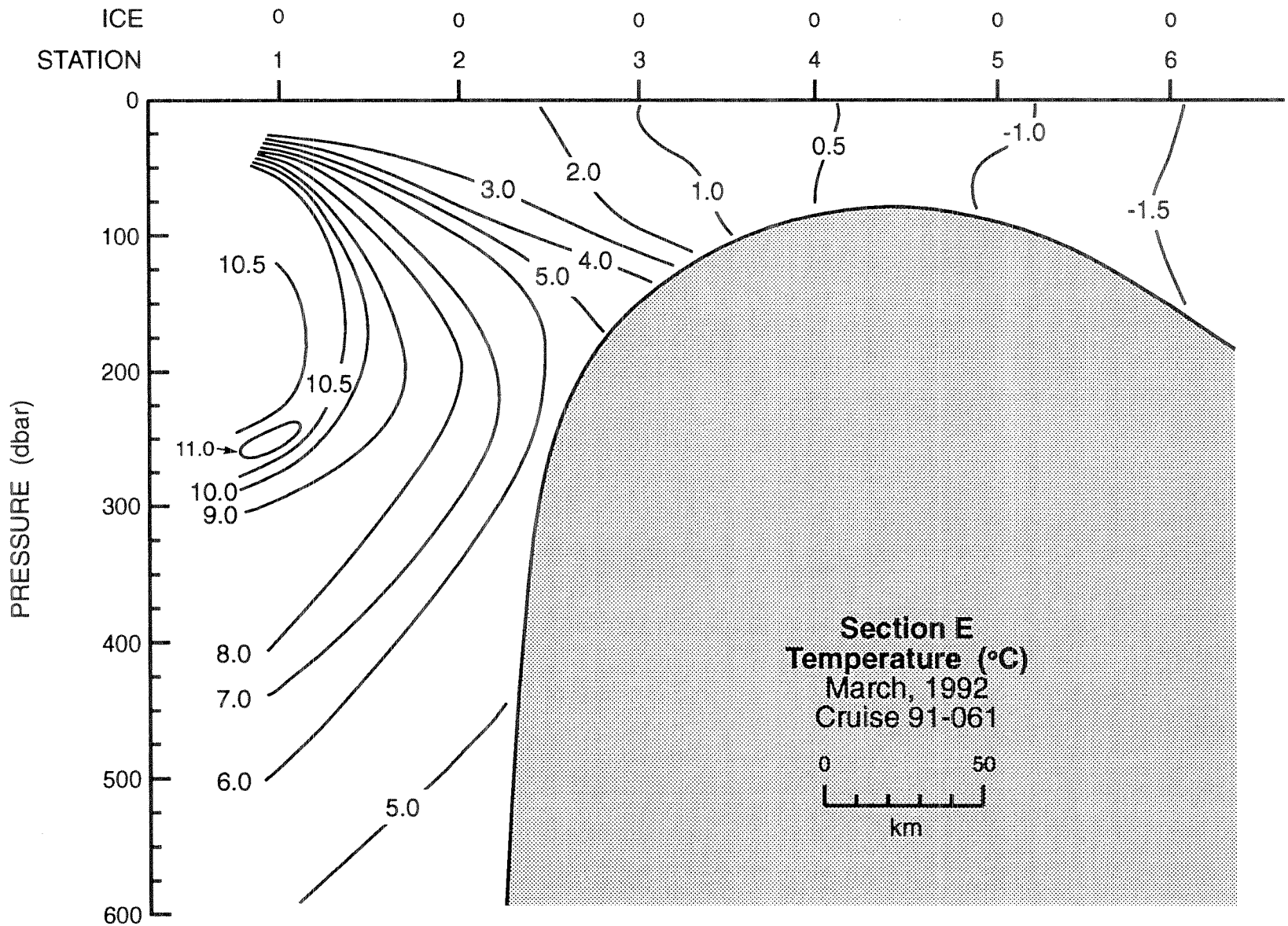

ICE
STATION
9+ 9+ 9+ 9+ 3 2 2
76 77 78 79 4056 80 4055 81 4053 82 4052 4051 4050 4049 4048
PRESSURE (dbar)
0
300
600
900
1200
1500
1800
2100
33.50
34.00
34.50
34.75
34.50
34.75
34.75
Section C Extended
Salinity
March, 1992
Cruise 91-061
0 50 100
km

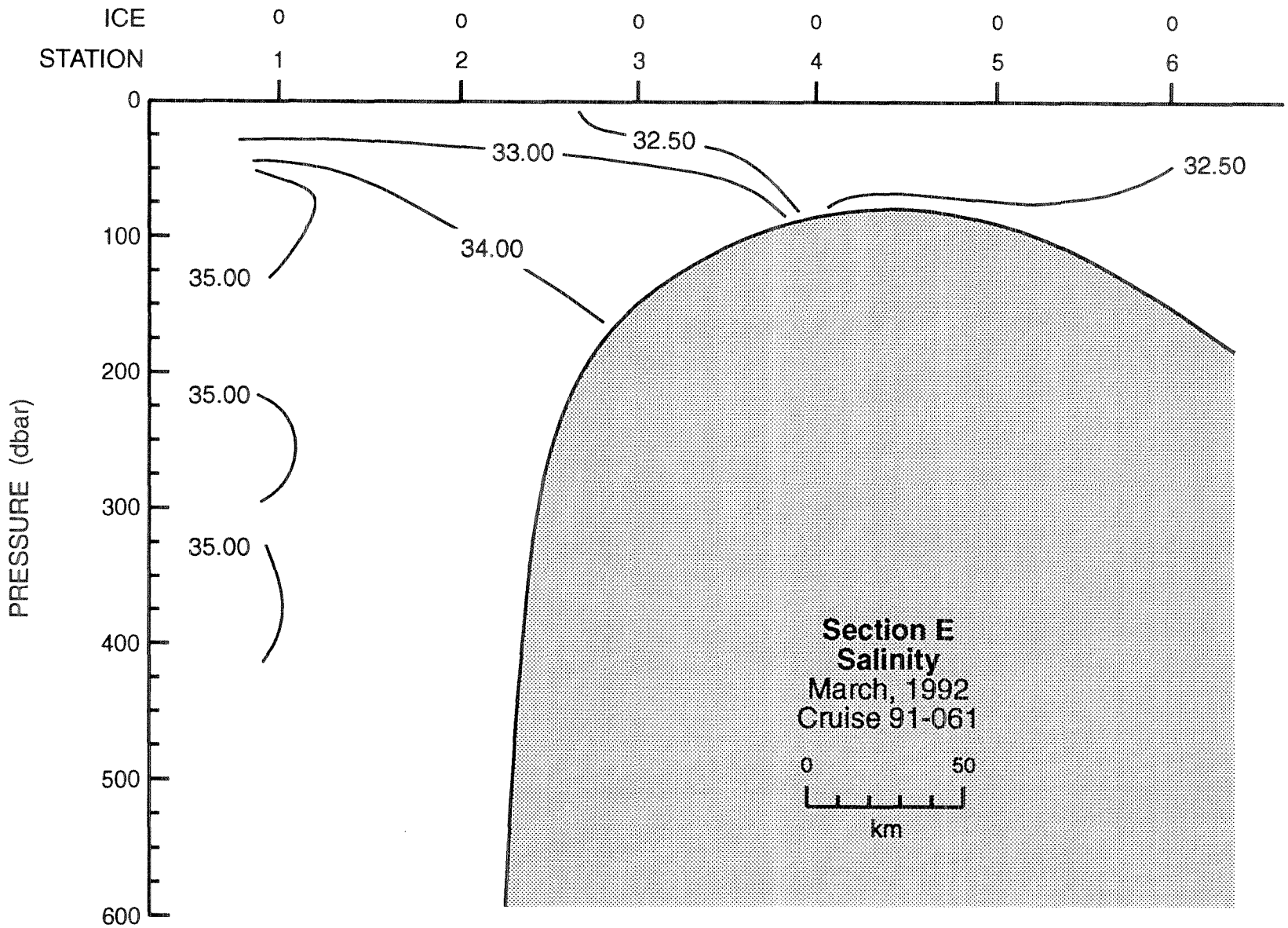

ICE
STATION
9+ 9+ 9+ 9+ 3 2 2
76 77 78 79 4056 80 4055 81 4053 82 4052 4051 4050 4049 4048
0
300
600
900
1200
1500
1800
2100
PRESSURE (dbar)
27.00
27.50
27.75
27.75
Section C Extended
σT
March, 1992
Cruise 91-061
0 50 100
km

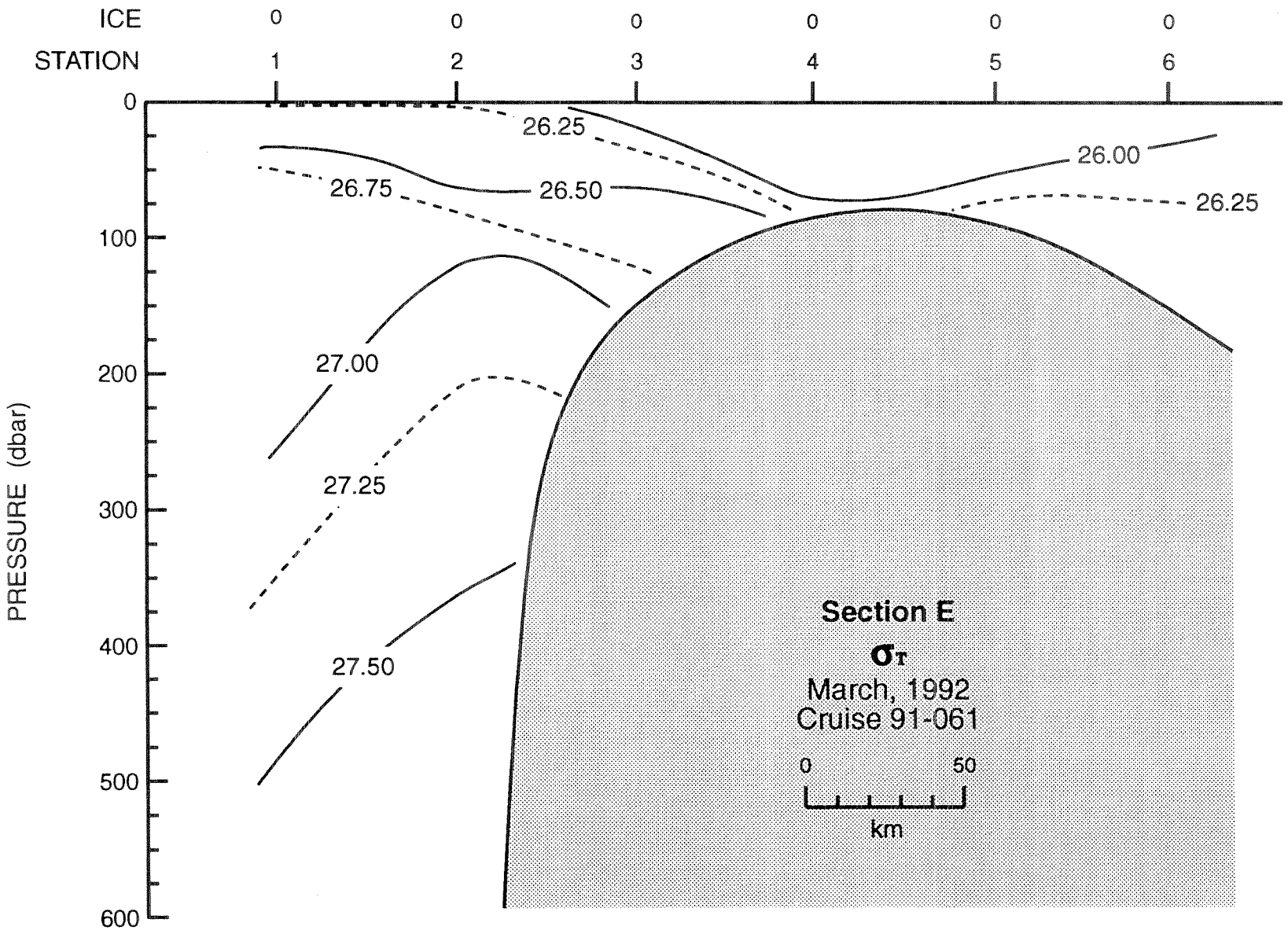

ICE
STATION
0
0
0
0
0
0
0
0
0
91
90
89
88
87
86
85
84
83
PRESSURE (dbar)
0
200
400
600
800
1000
1200
-1.5
-1.0
-1.0
0.5
0.5
1.5
-1.0
0.0
1.0
2.0
3.0
3.5
3.0
3.5
Section D
Temperature (°C)
March, 1992
Cruise 91-061
0
50
km


ICE
STATION
0
0
0
0
0
0
0
0
0
91
90
89
88
87
86
85
84
83
PRESSURE (dbar)
0
200
400
600
800
1000
1200
32.75
33.00
33.25
33.25
33.50
33.75
34.00
34.25
34.50
34.75
Section D
Salinity
March, 1992
Cruise 91-061
0
50
km


ICE
STATION
0
91
0
90
0
89
0
88
0
87
0
86
0
85
0
84
0
83
PRESSURE (dbar)
0
200
400
600
800
1000
1200
26.50
26.75
27.00
27.25
27.50
27.75
Section D
σT
March, 1992
Cruise 91-061
0
50
km


ICE
STATION
0
1
2
3
4
5
6
PRESSURE (dbar)
0
100
200
300
400
500
600
10.5
10.5
11.0
10.0
9.0
8.0
7.0
6.0
5.0
3.0
2.0
4.0
5.0
1.0
0.5
-1.0
-1.5
Section E
Temperature (°C)
March, 1992
Cruise 91-061
0
50
km


ICE
STATION
0
1
2
3
4
5
6
PRESSURE (dbar)
0
100
200
300
400
500
600
32.50
33.00
32.50
34.00
35.00
35.00
35.00
Section E
Salinity
March, 1992
Cruise 91-061
0
50
km


ICE
STATION
0
0
0
0
0
0
1
2
3
4
5
6
PRESSURE (dbar)
0
100
200
300
400
500
600
26.25
26.00
26.75
26.50
26.25
27.00
27.25
27.50
Section E
σT
March, 1992
Cruise 91-061
0
50
km

5. Ice drift

5.1 Deployment

Four ice beacons, three of which were anemometer beacons, were deployed on the ice by helicopter. Anemometer beacons were equipped to measure 2m wind speed and direction, air temperature, and ice surface temperature. Beacon position was reported every one to six hours. Data were transmitted via the ARGOS satellite system, and received on shore or on ship via the IMMARSAT communication system. Information summarizing deployment dates is given in the table below.

Beacon number	Type	Data duration	Position at deployment
4770	anemometer	March 20 - 28	Ice Station
5182	anemometer	March 21 - April 7	50°43.34'N, 50°42.32'W
8644	position only	March 24 - June 23	50°50.19'N, 52°02.07'W
4458	anemometer	March 28- April 21	Ice Station, replacement of 4770

Beacons 4770 and 4458 were part of the Ice Station, under which three S4 current meters and a thermistor chain were also deployed. Refer to Section 6 for details.

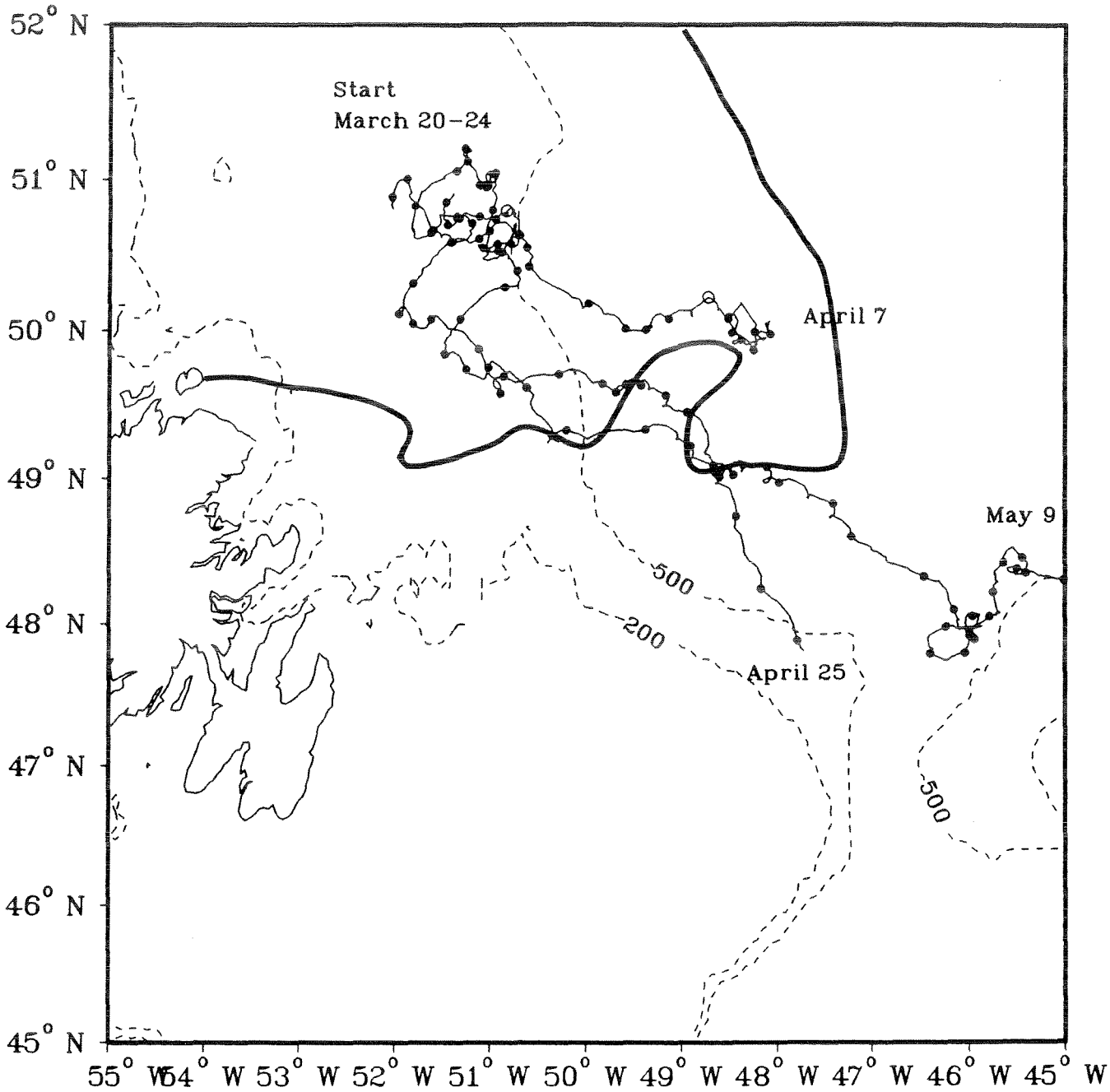
5.2 Drift track

All three drift tracks are shown on p.80. The heavy line indicates the ice limit on March 31. Individual ice tracks are shown in p.81 to p.83.

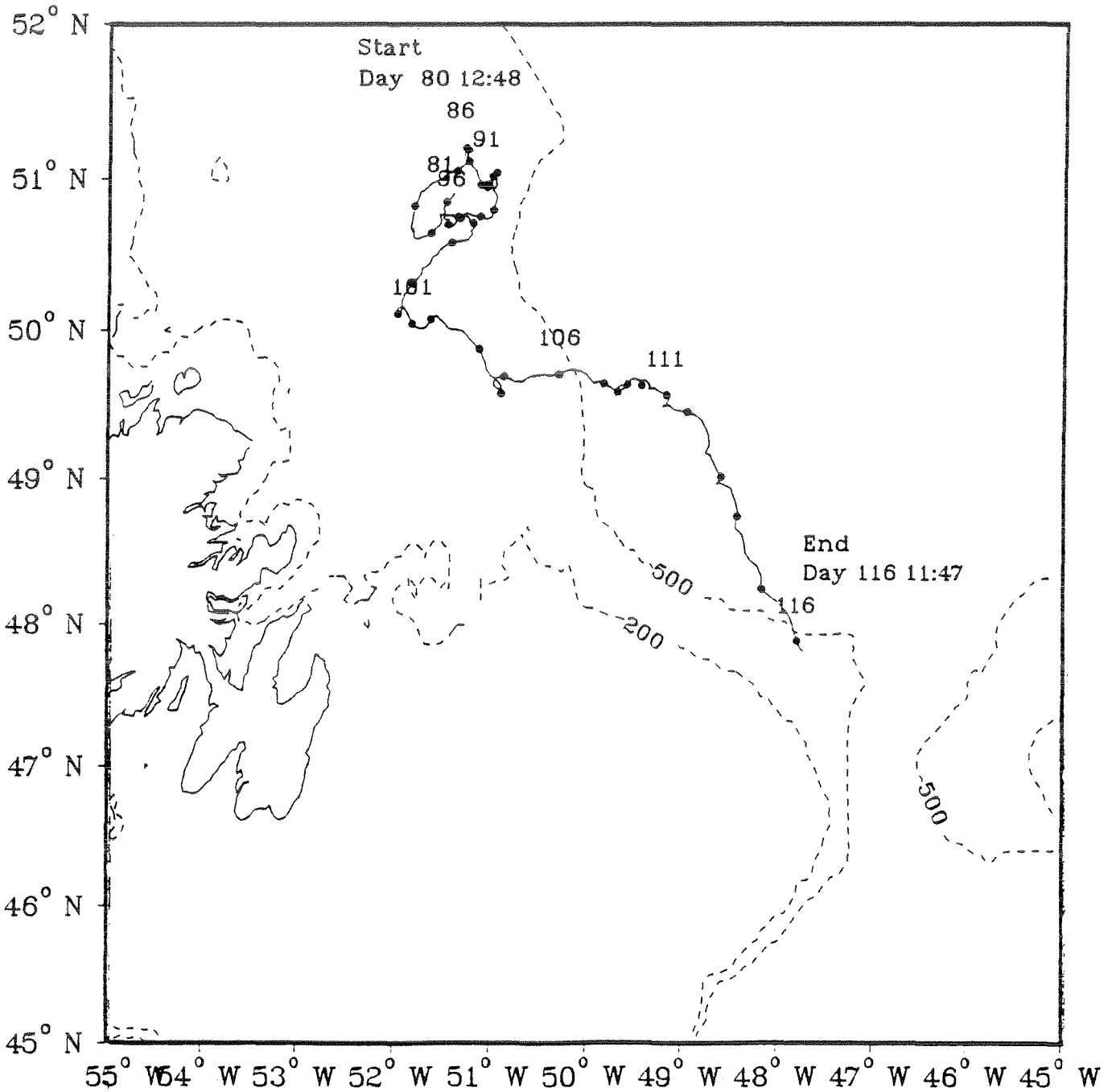
5.3 Wind velocity

2m wind speed and direction was measured by ice beacons 4770/4458 and 5182. 14.5m wind was measured aboard the *CSS Hudson* using a mast-mounted Gill anemometer. Winds are displayed in p.84 to p.91. In all plots true north is in the positive-y direction.

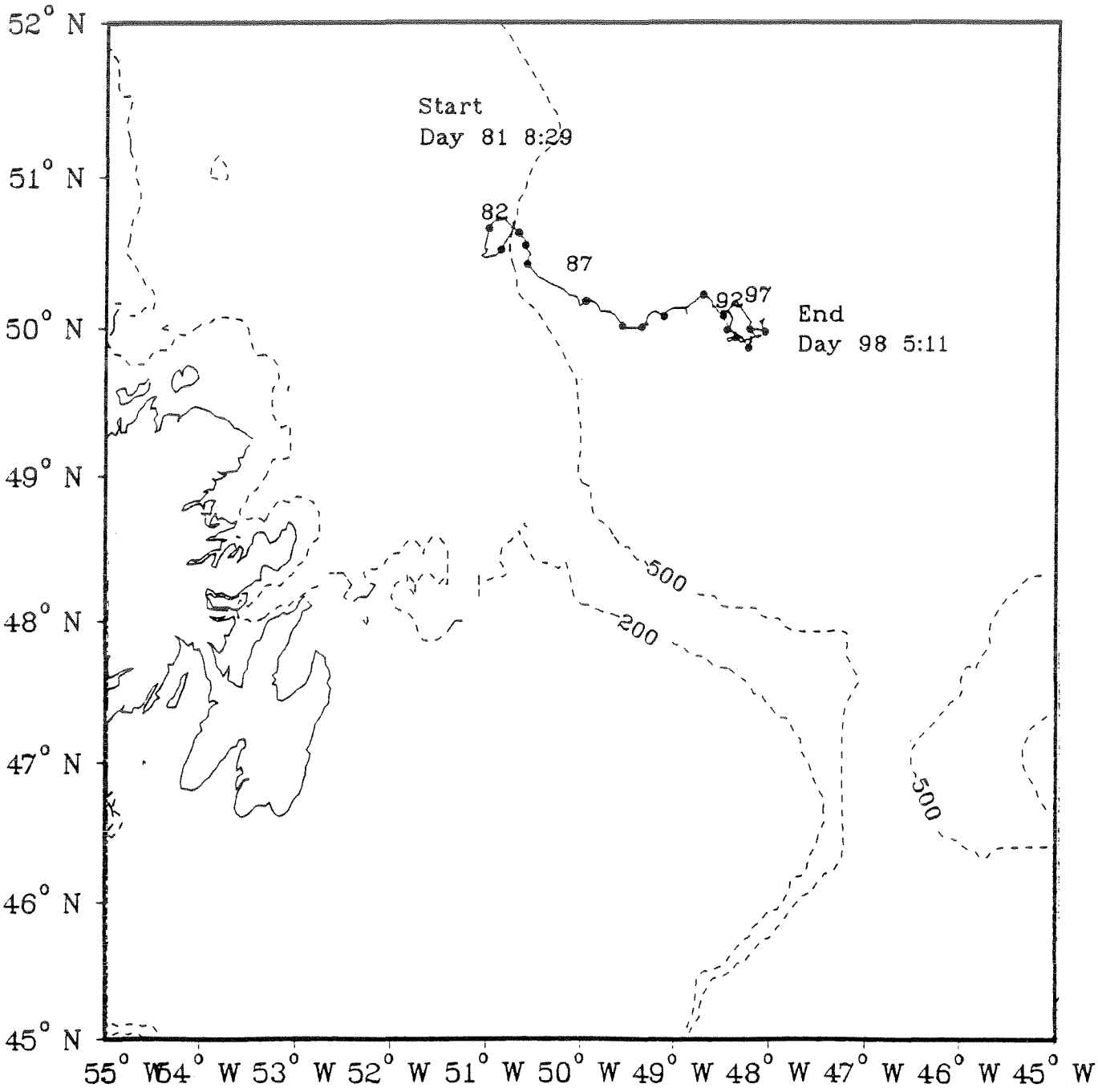
Ice Beacon Tracks
Hudson Cruise 91061



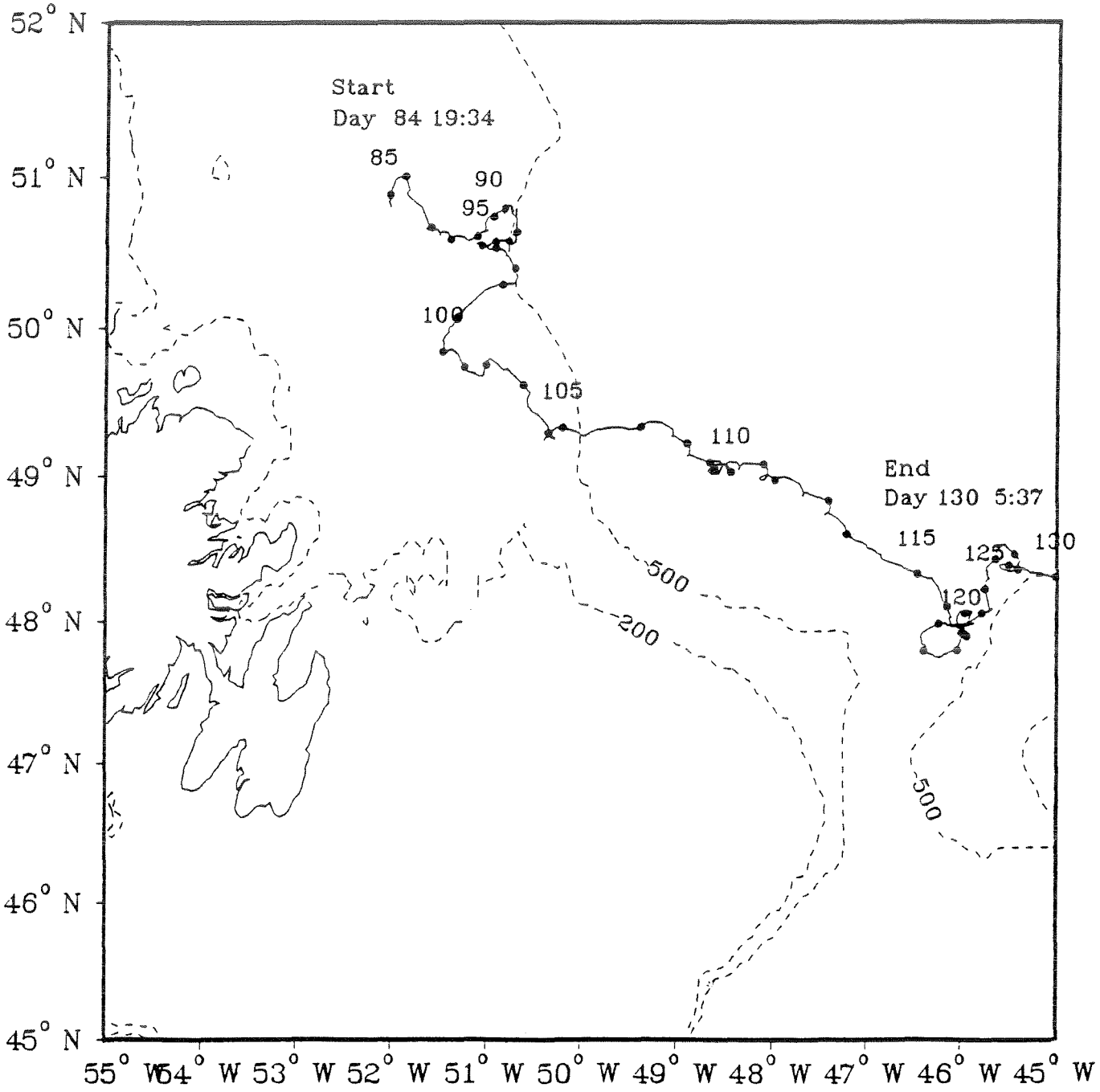
Ice Beacon Track
#4770/4458



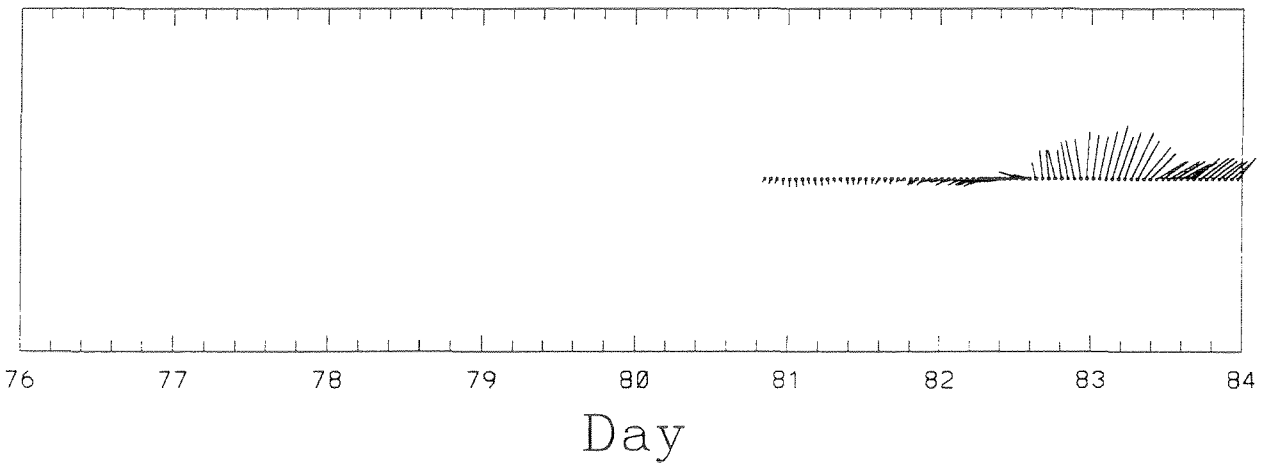
Ice Beacon Track
5182

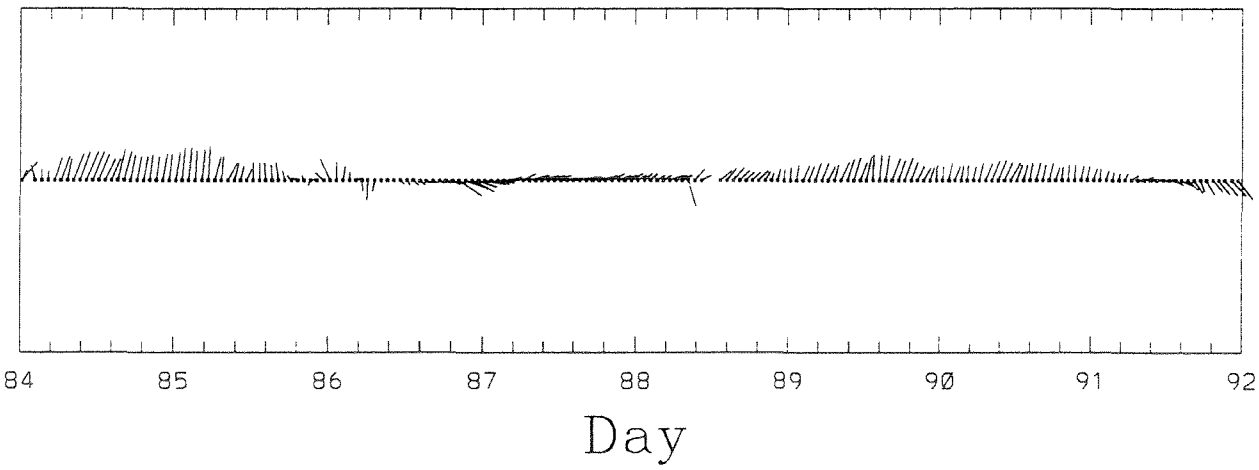


Ice Beacon Track
8644



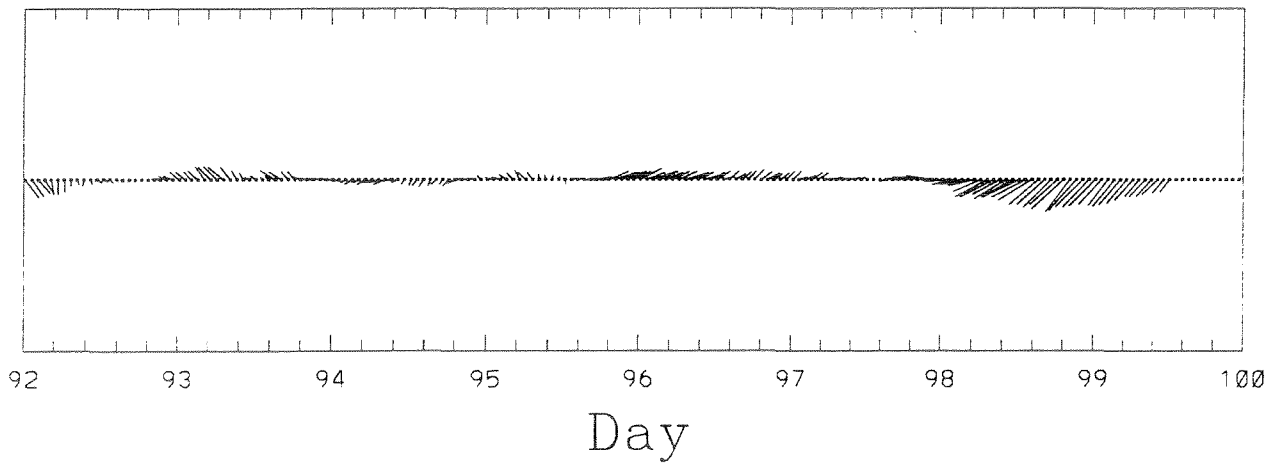
CASP II Hudson Cruise 91061
Ice Beacon Wind 4770 & 4458

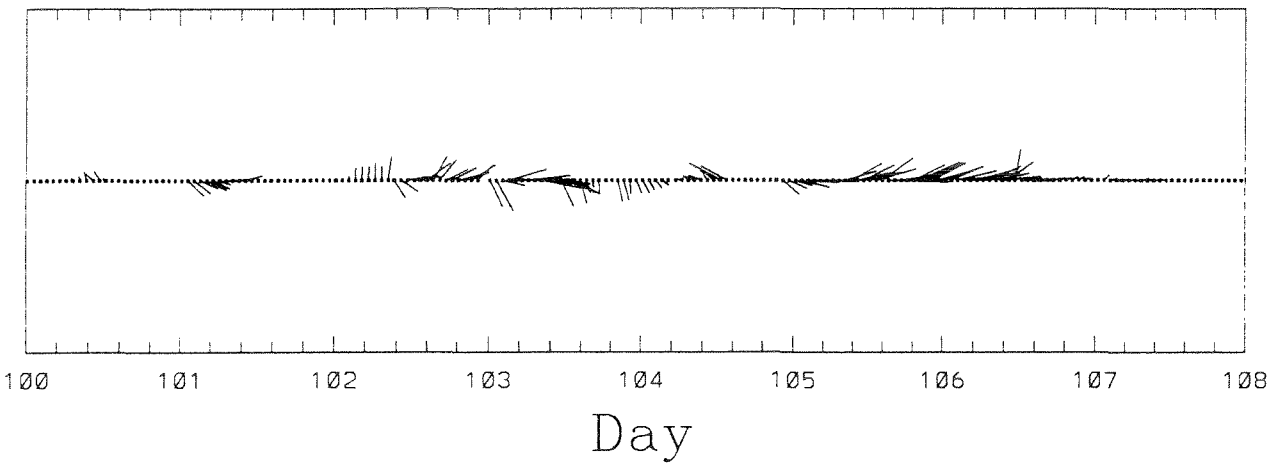




20 m/s

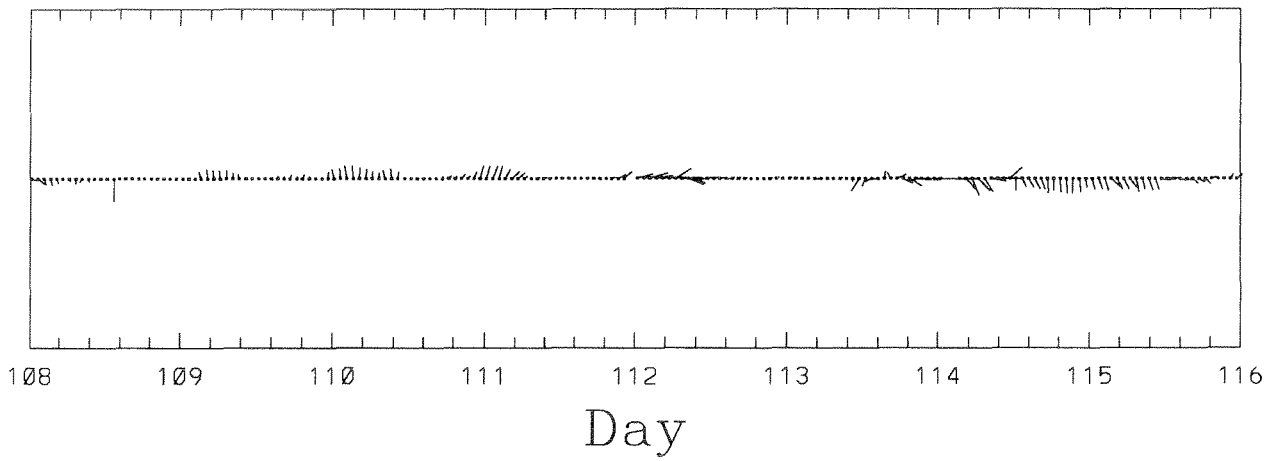
CASP II Hudson Cruise 91061
Ice Beacon Wind 4770 & 4458

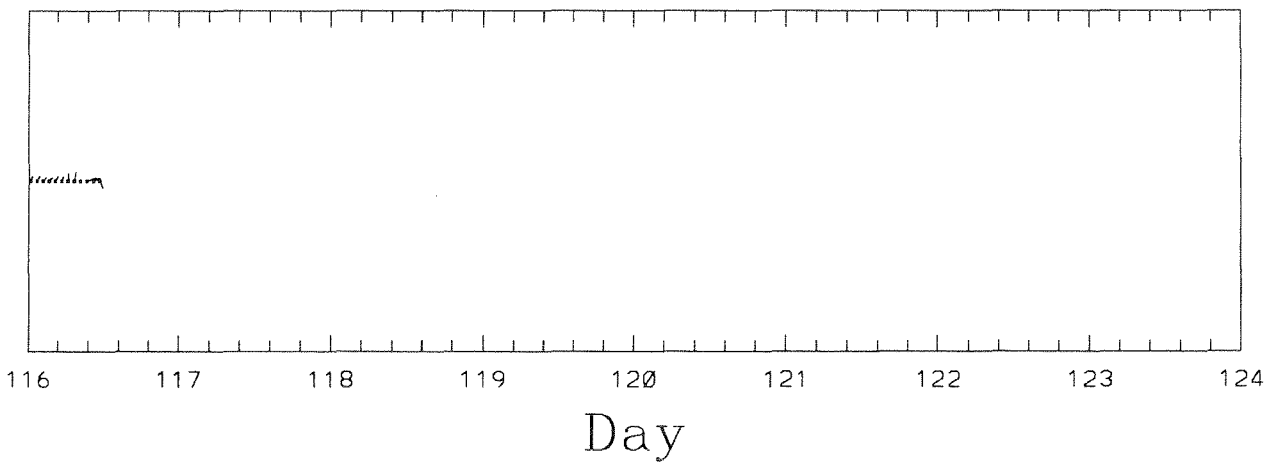




20 m/s

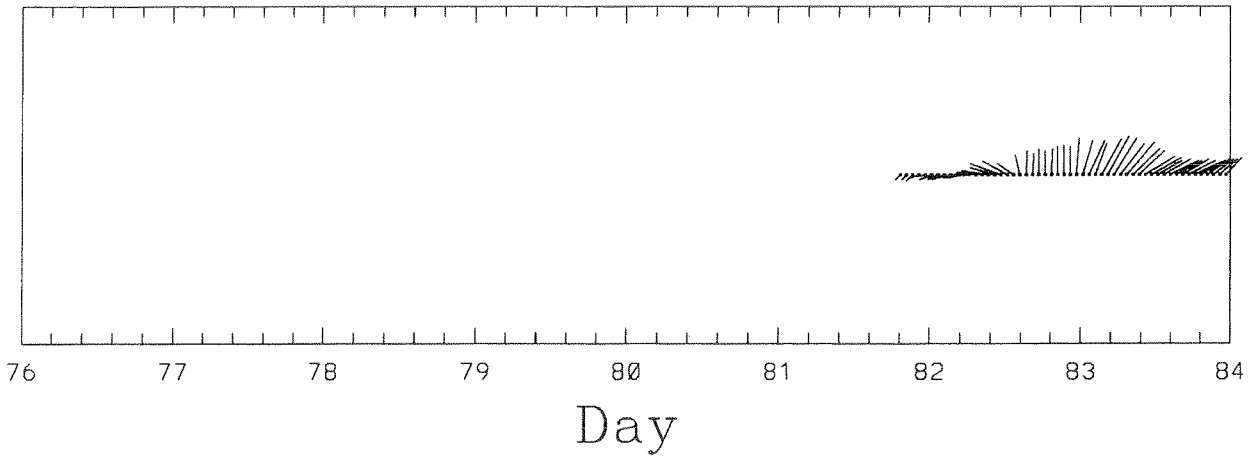
CASP II Hudson Cruise 91061
Ice Beacon Wind 4770 & 4458

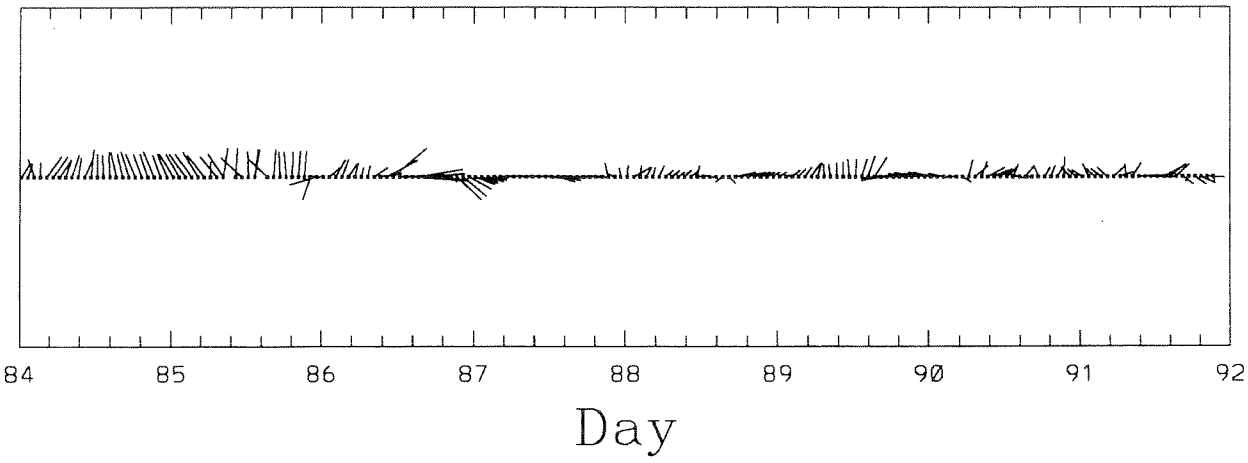




20 m/s

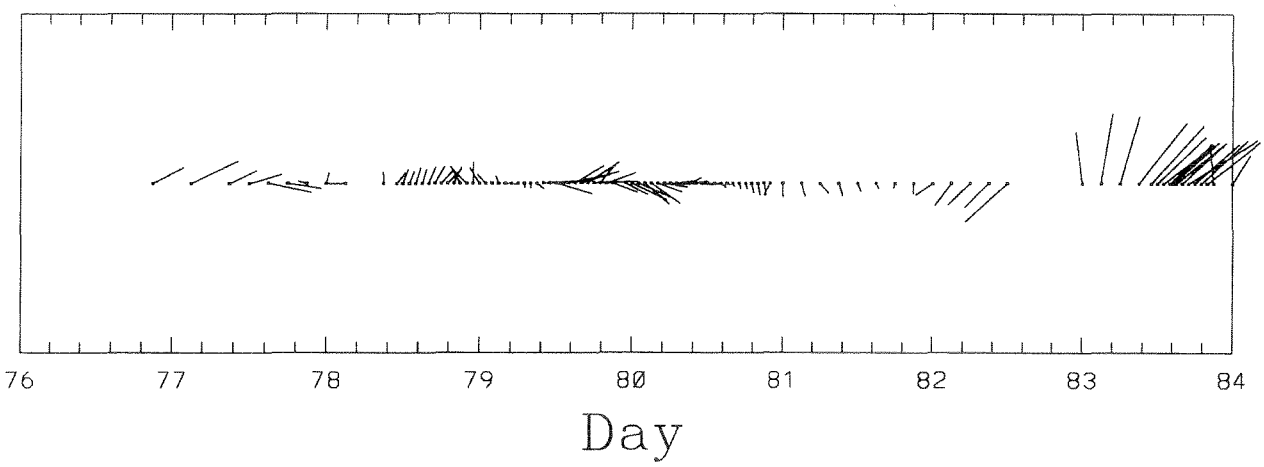
CASP II Hudson Cruise 91061
Ice Beacon Wind 5182

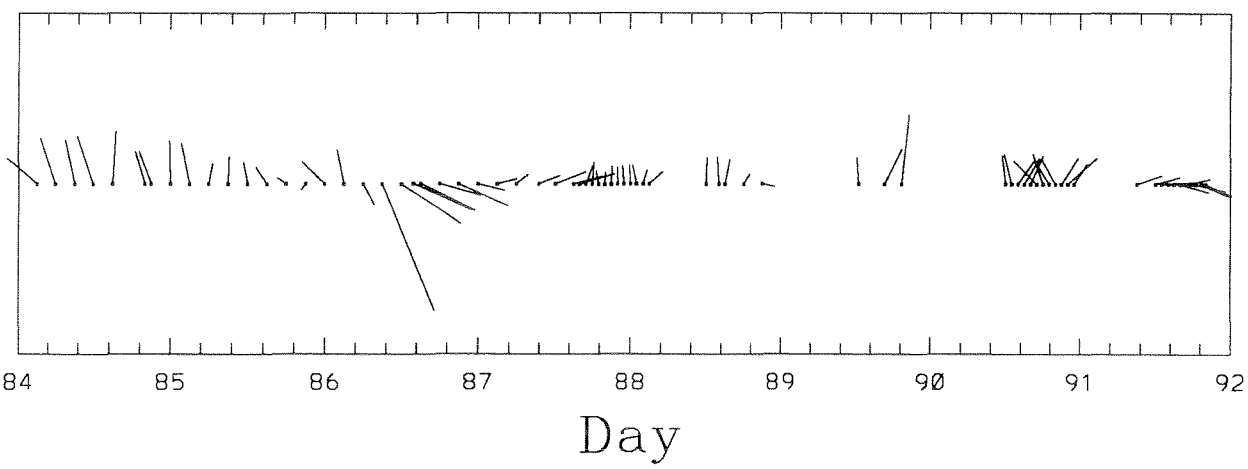




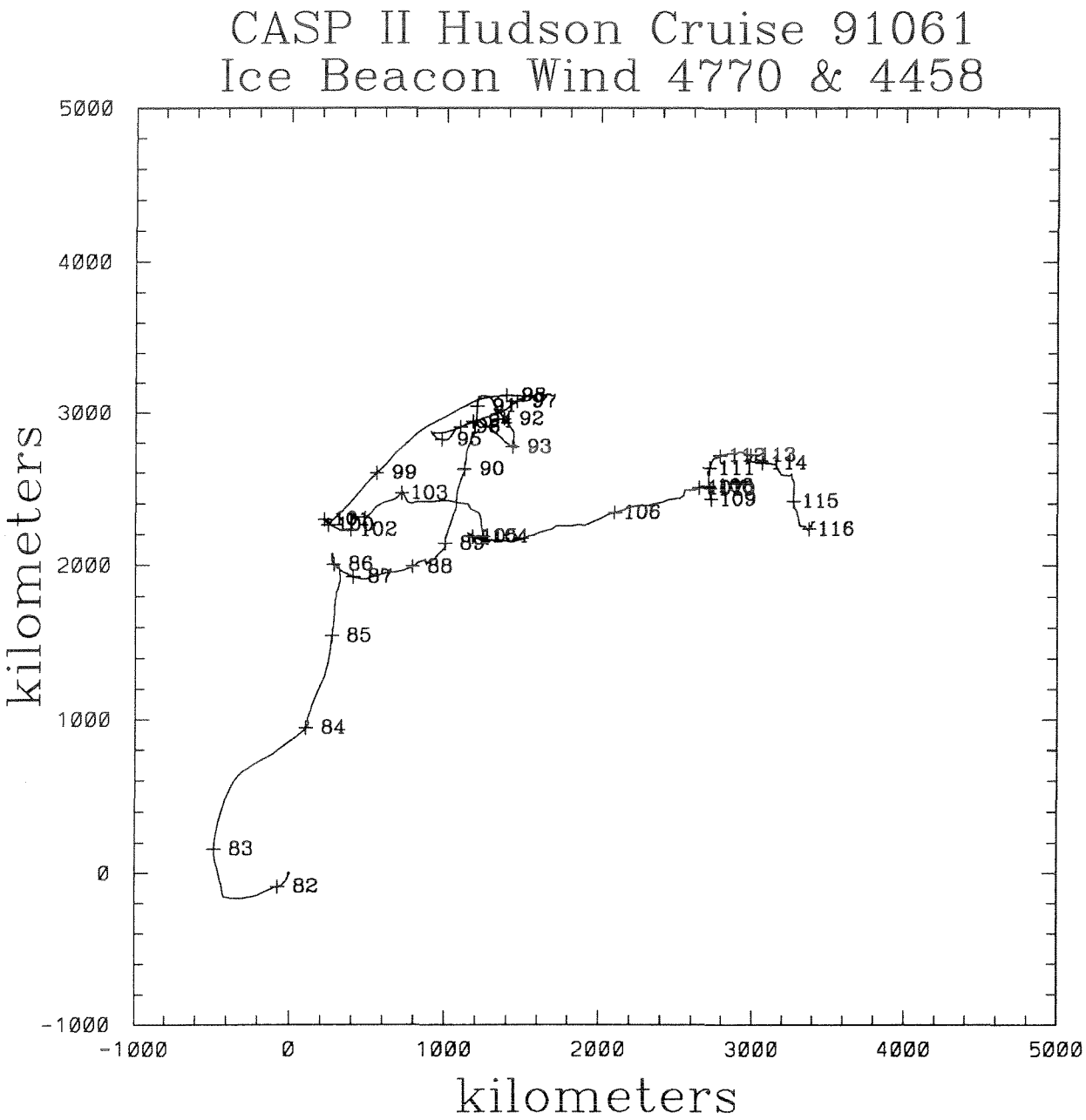
20 m/s

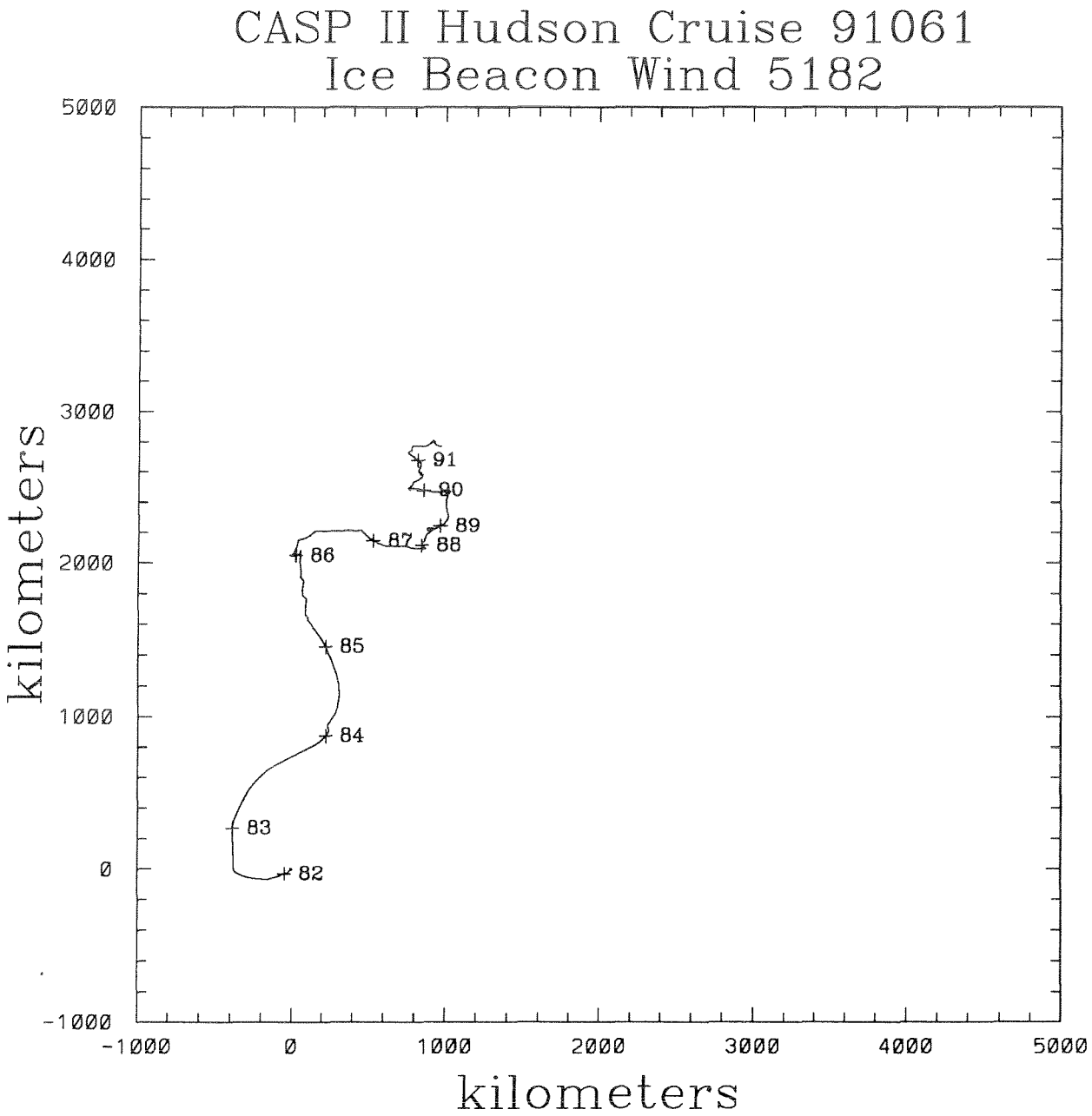
CASP II Hudson Cruise 91061
Bow Anemometer Wind

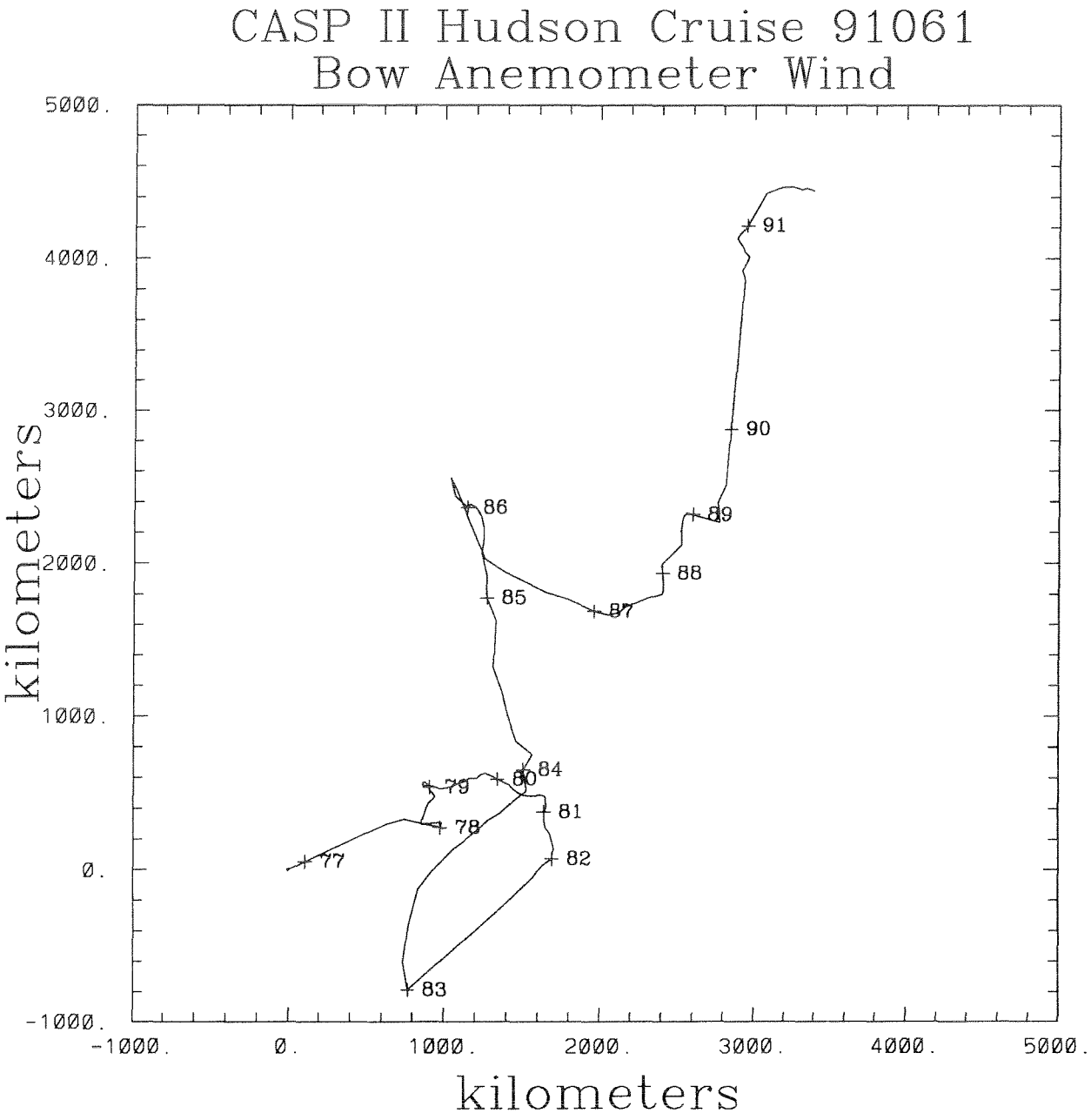




20 m/s


CASP II Hudson Cruise 91061
Ice Beacon Wind 4770 & 4458
kilometers
kilometers
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
82
83
84
85
86
87
88
89
90
92
93
95
99
102
103
106
109
111
114
115
116


CASP II Hudson Cruise 91061
Ice Beacon Wind 5182
5000
4000
3000
2000
1000
0
-1000
kilometers
-1000
0
1000
2000
3000
4000
5000
kilometers
91
90
89
88
87
86
85
84
83
82


CASP II Hudson Cruise 91061
Bow Anemometer Wind
5000.
4000.
3000.
2000.
1000.
0.
-1000.
kilometers
-1000.
0.
1000.
2000.
3000.
4000.
5000.
kilometers
91
90
86
89
88
85
87
84
79
80
81
78
77
82
83

6. Current meter and thermistor chain data

6.1 Location

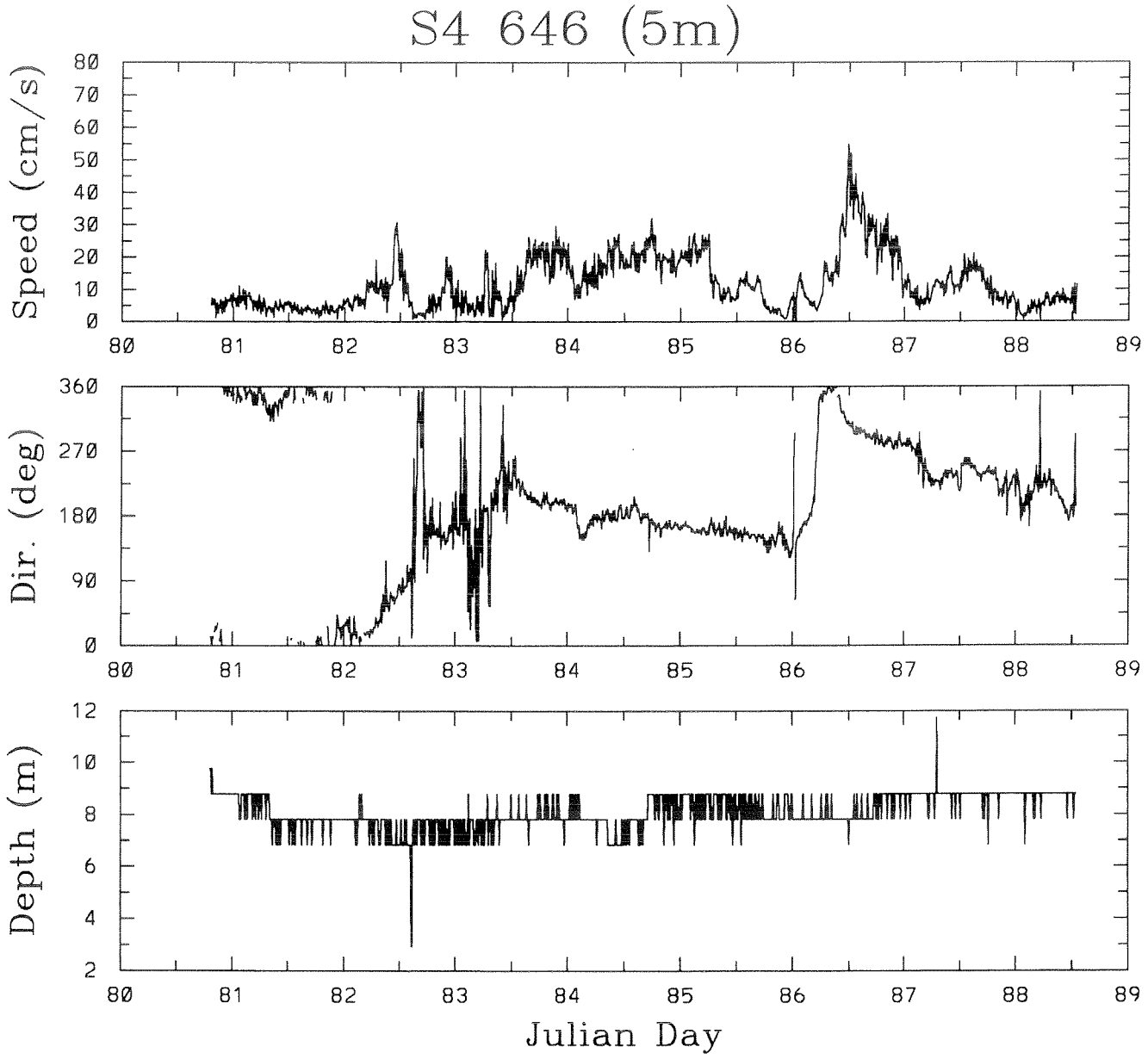
Three current meters(InterOcean S4) and a thermistor chain were deployed on the Ice Station. The following table summarizes the depths and deployment dates.

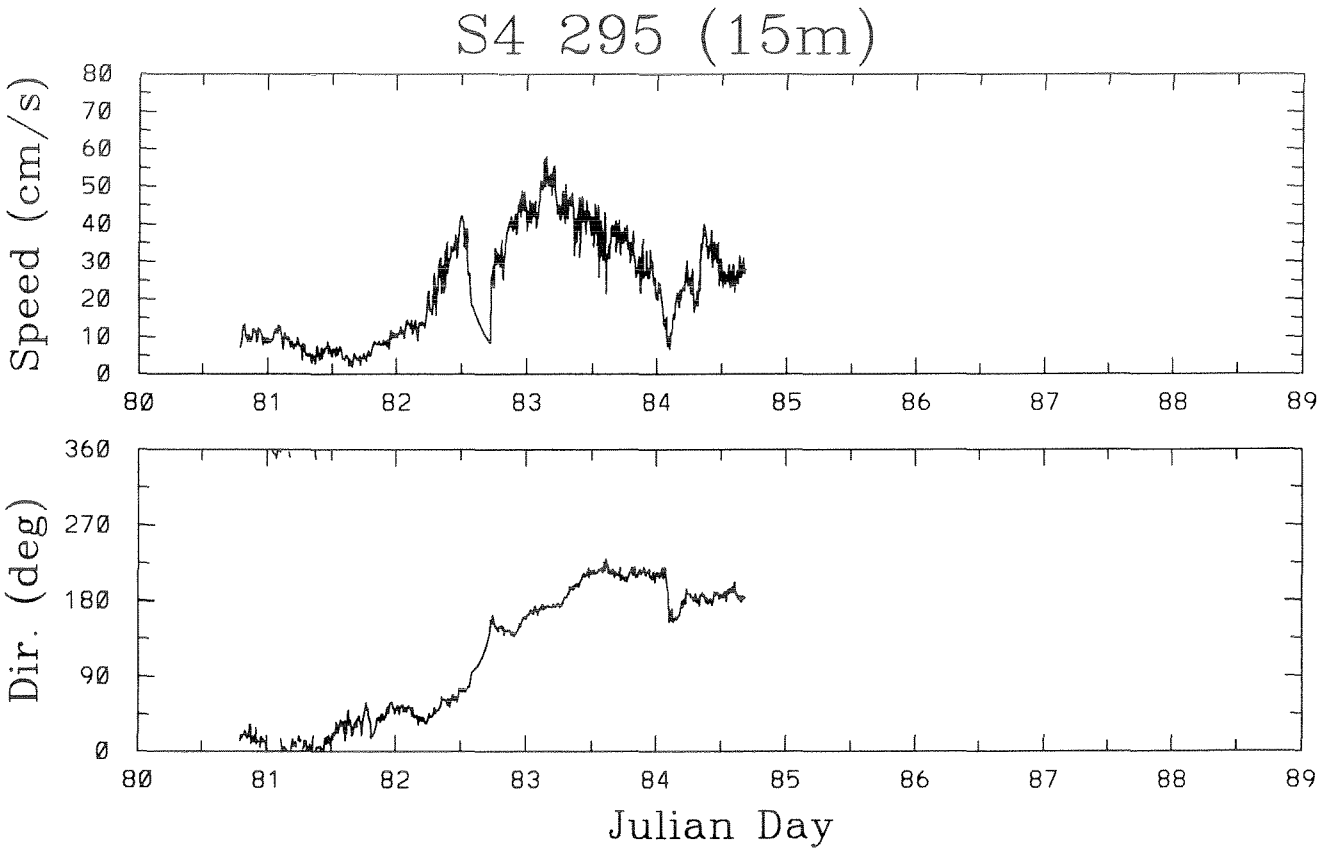
Serial no.	Type	Depth(m)	Data duration
646	S4	5	March 19 - 28
854	S4	15	March 20 - 21
854	S4	15	March 21 - 24
854	S4	15	March 24 - 28
295	S4	40	March 20 - 22
295	S4	40	March 22 - 24
10057	T-chain	.0,.05,.20, .35,.50,.65, .80,2.0,3.0, 5.0,10.0,20.0	March 20 - April 15

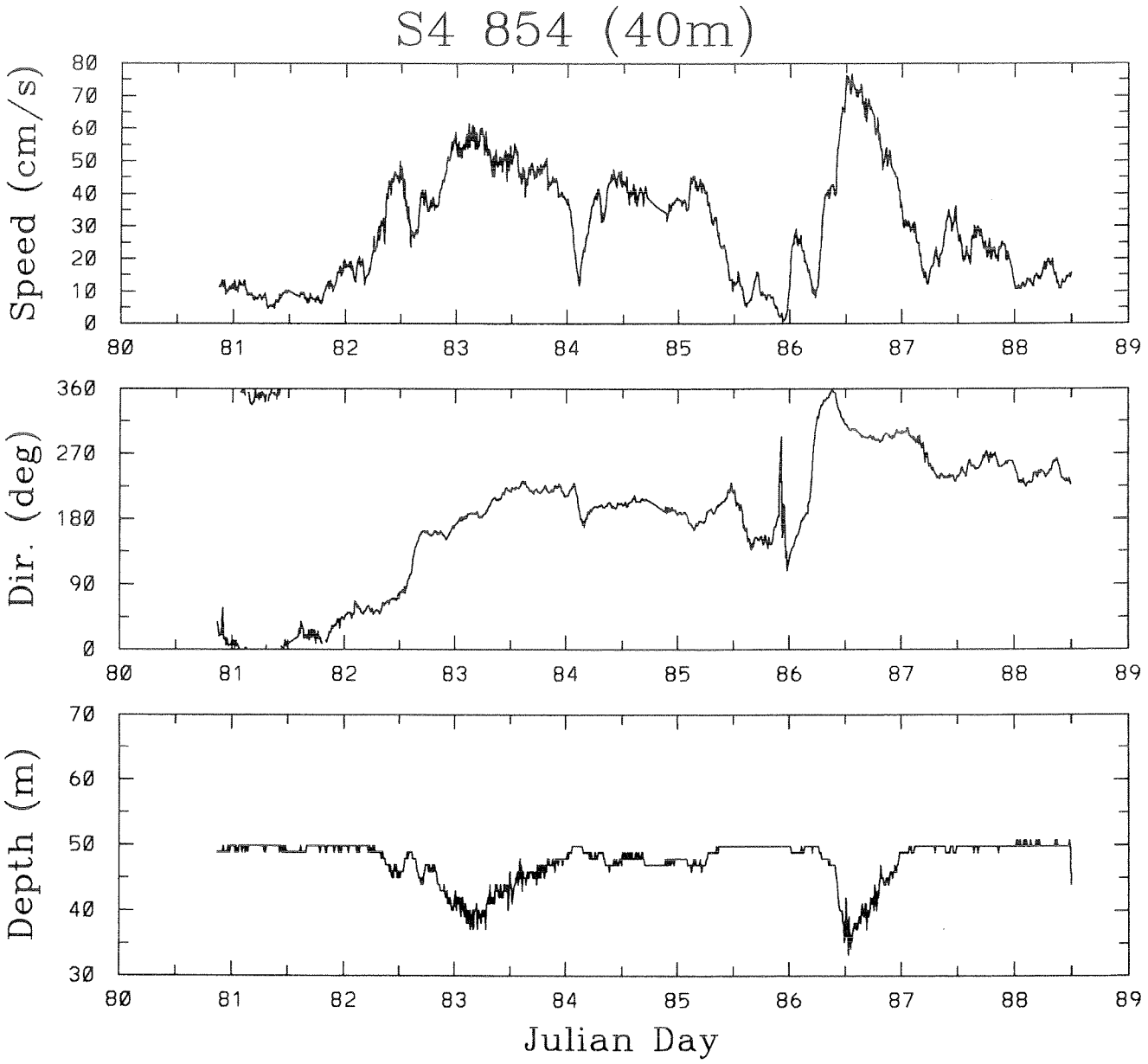
The current meters sampled at 10 minute intervals. The thermistor chain beacon also measured barometric pressure, air temperature, and pressure at the end of the chain, and sampled at 20 minute intervals.

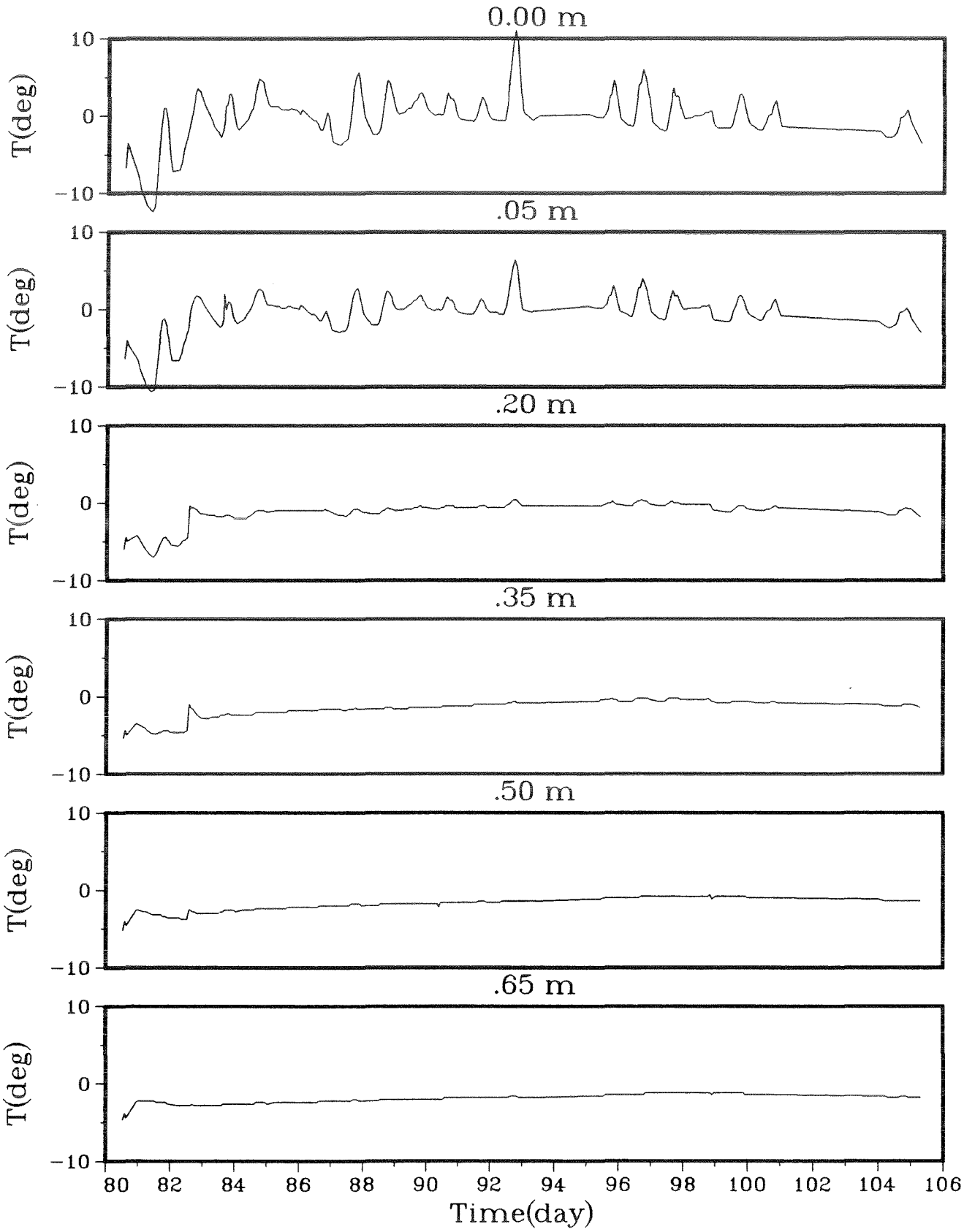
6.2 Time series

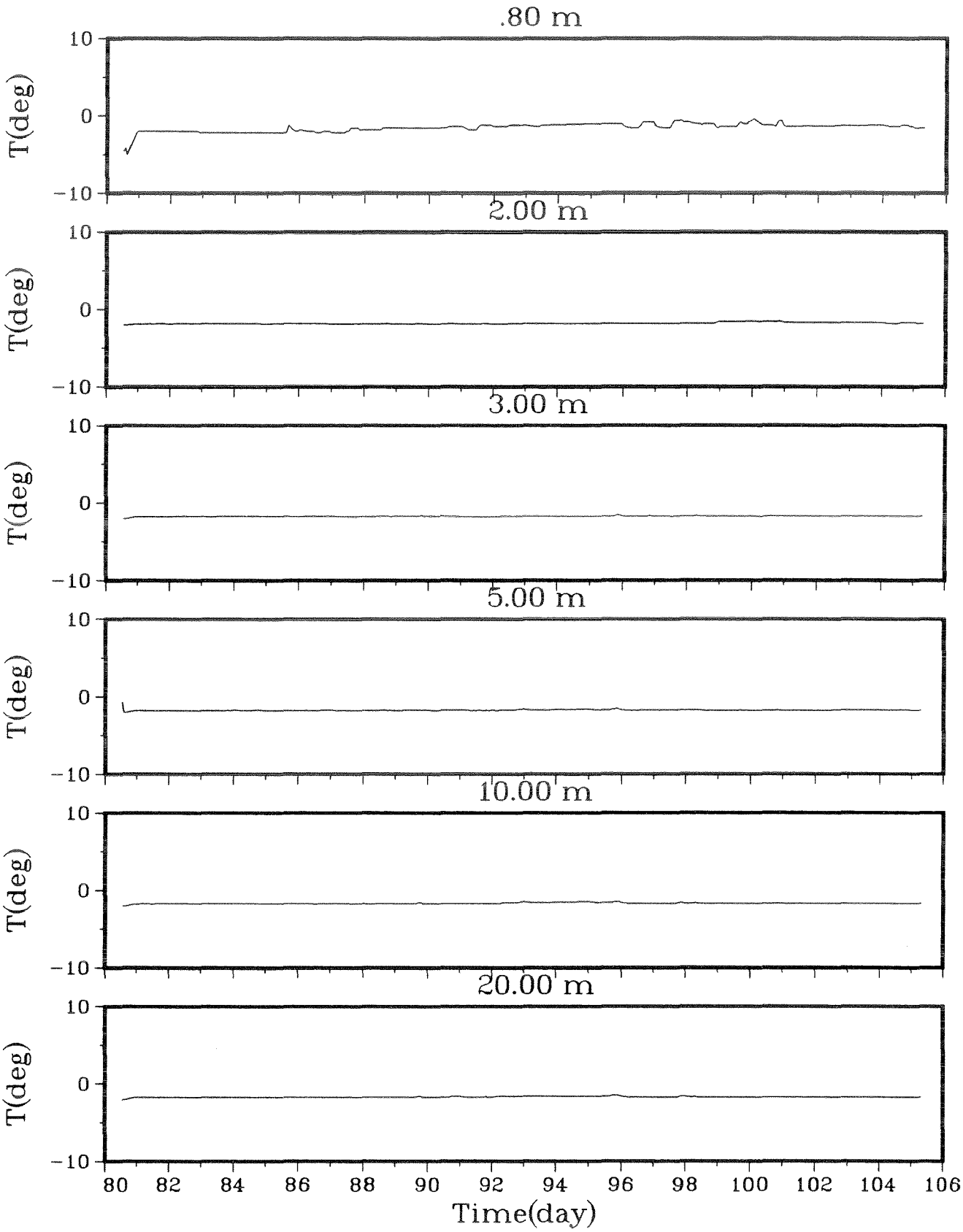
Time series plots for the current meter data are shown in p.94 to p.96. Time series of thermistor chain temperature, surface barometric pressure, and surface air temperature are shown in p.97 to p.100.

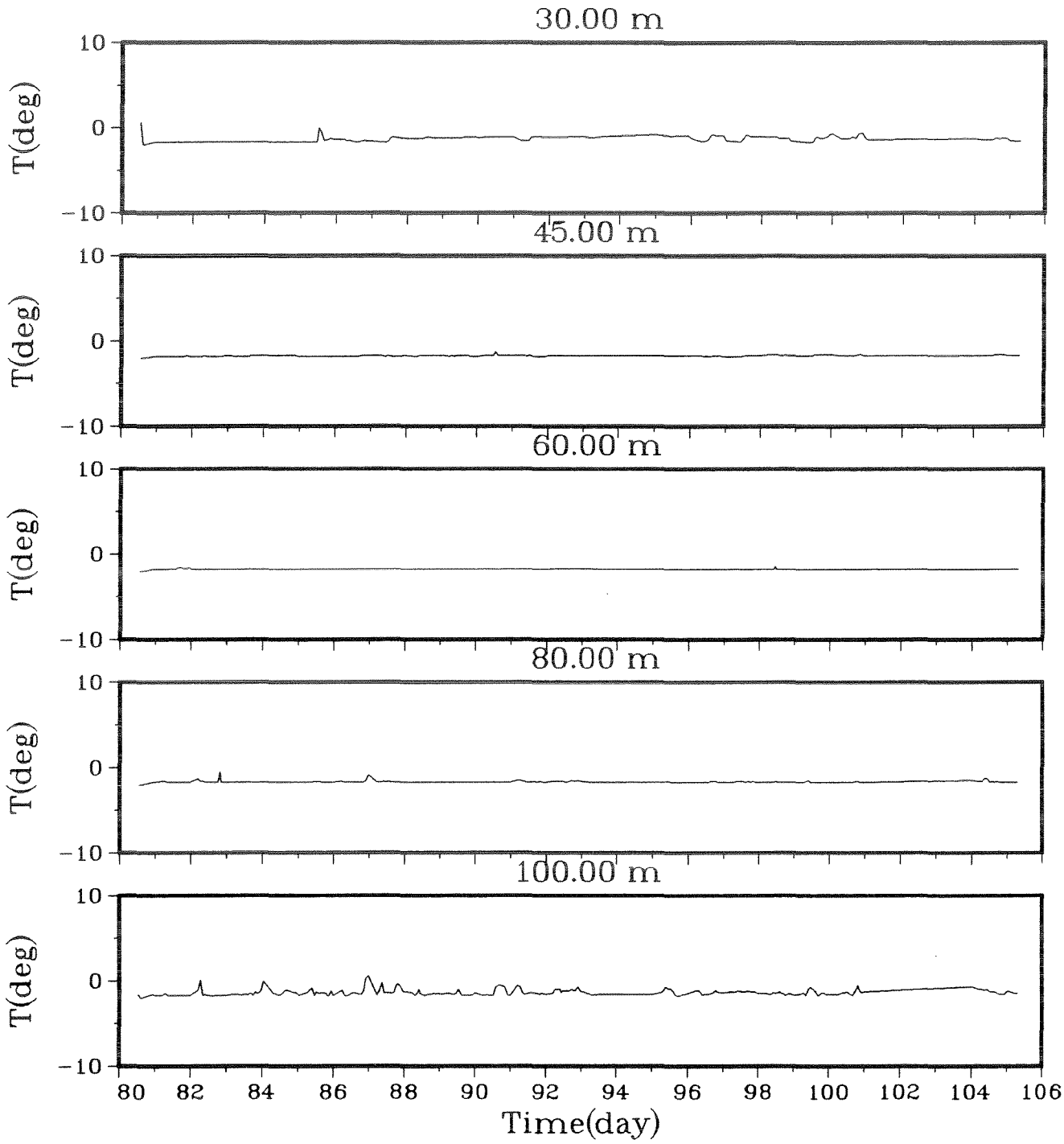

S4 646 (5m)
Speed (cm/s)
80
70
60
50
40
30
20
10
0
Dir. (deg)
360
270
180
90
0
Depth (m)
12
10
8
6
4
2
80
81
82
83
84
85
86
87
88
89
Julian Day

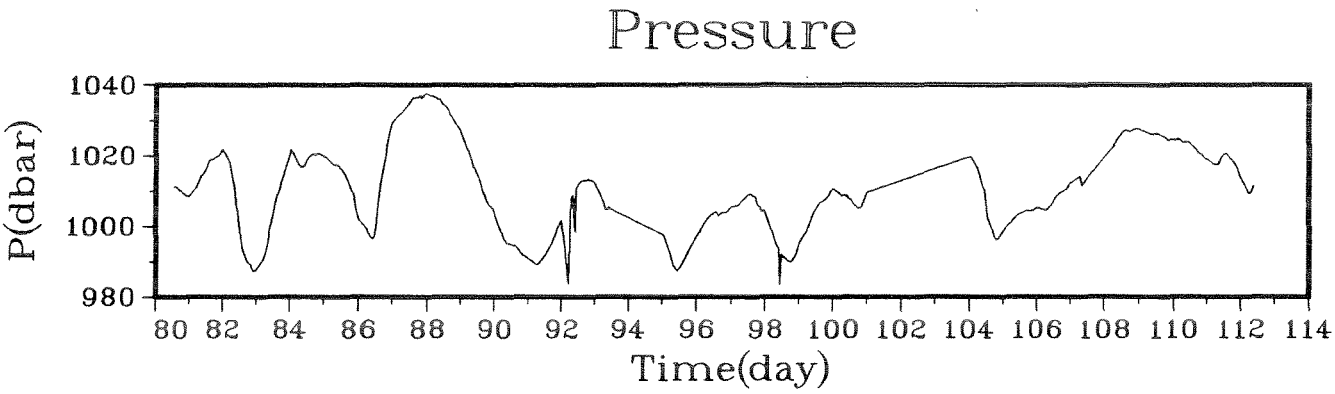

S4 295 (15m)
Speed (cm/s)
80
70
60
50
40
30
20
10
0
80
81
82
83
84
85
86
87
88
89
Dir. (deg)
360
270
180
90
0
Julian Day

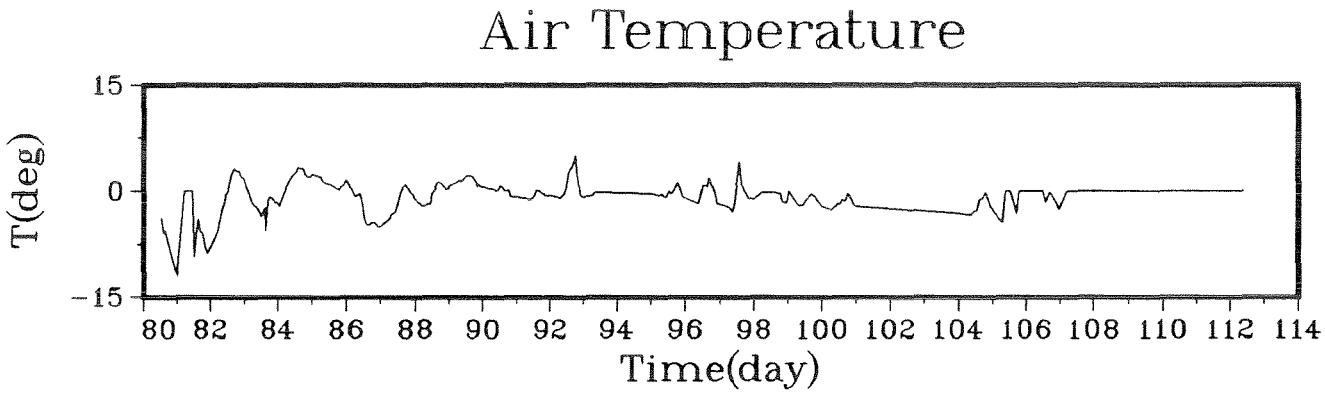

S4 854 (40m)
Speed (cm/s)
80
70
60
50
40
30
20
10
0
Dir. (deg)
360
270
180
90
0
Depth (m)
70
60
50
40
30
80
81
82
83
84
85
86
87
88
89
Julian Day


0.00 m
.05 m
.20 m
.35 m
.50 m
.65 m
T(deg)
10
0
−10
80
82
84
86
88
90
92
94
96
98
100
102
104
106
Time(day)


.80 m
2.00 m
3.00 m
5.00 m
10.00 m
20.00 m
T(deg)
10
0
−10
80
82
84
86
88
90
92
94
96
98
100
102
104
106
Time(day)


30.00 m
45.00 m
60.00 m
80.00 m
100.00 m
T(deg)
10
0
−10
80
82
84
86
88
90
92
94
96
98
100
102
104
106
Time(day)


Pressure
P(dbar)
1040
1020
1000
980
80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114
Time(day)


Air Temperature
T(deg)
15
0
−15
80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114
Time(day)

7. Acoustic Doppler profiler

7.1 Location

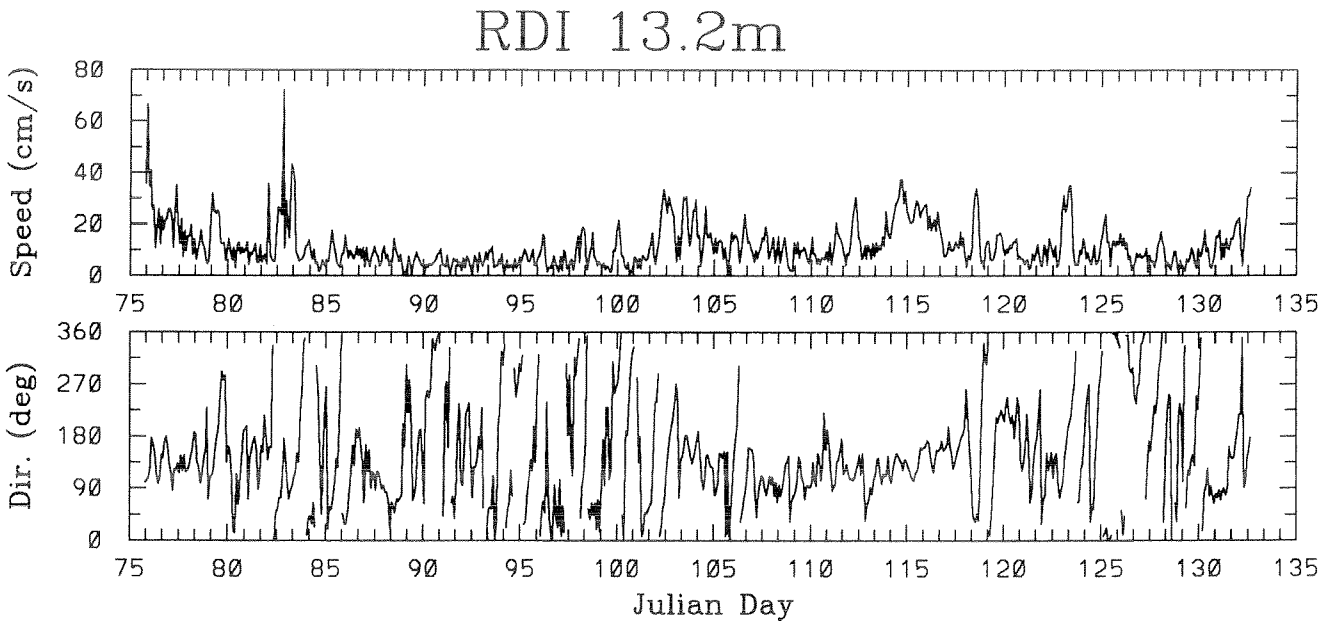
An RDI acoustic Doppler profiler was deployed on the sea bottom near CTD station 89. The profiler measured currents at nineteen depths at 8m intervals. A summary of the mooring information, data retrieval,and mean currents is given below.

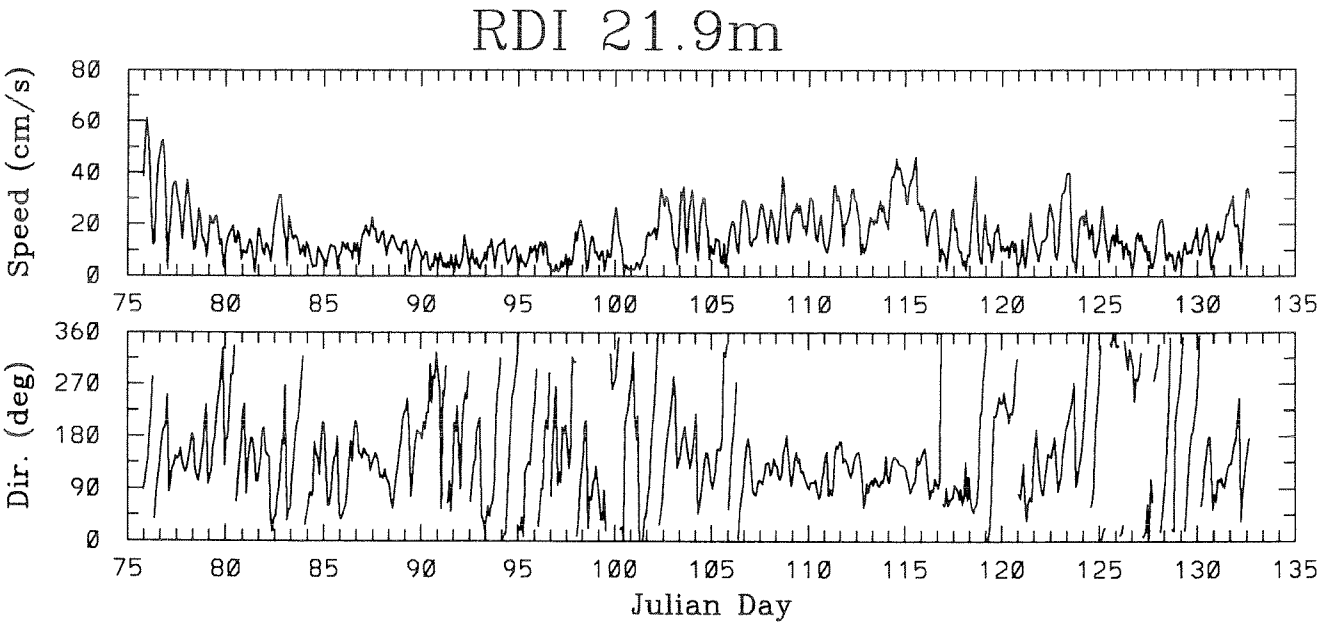
Position: 47°43.19′ N, 48°27.71′ W
Water depth: 183m
Data start date: March 15 End date: May 11
Sampling interval: 30 minutes

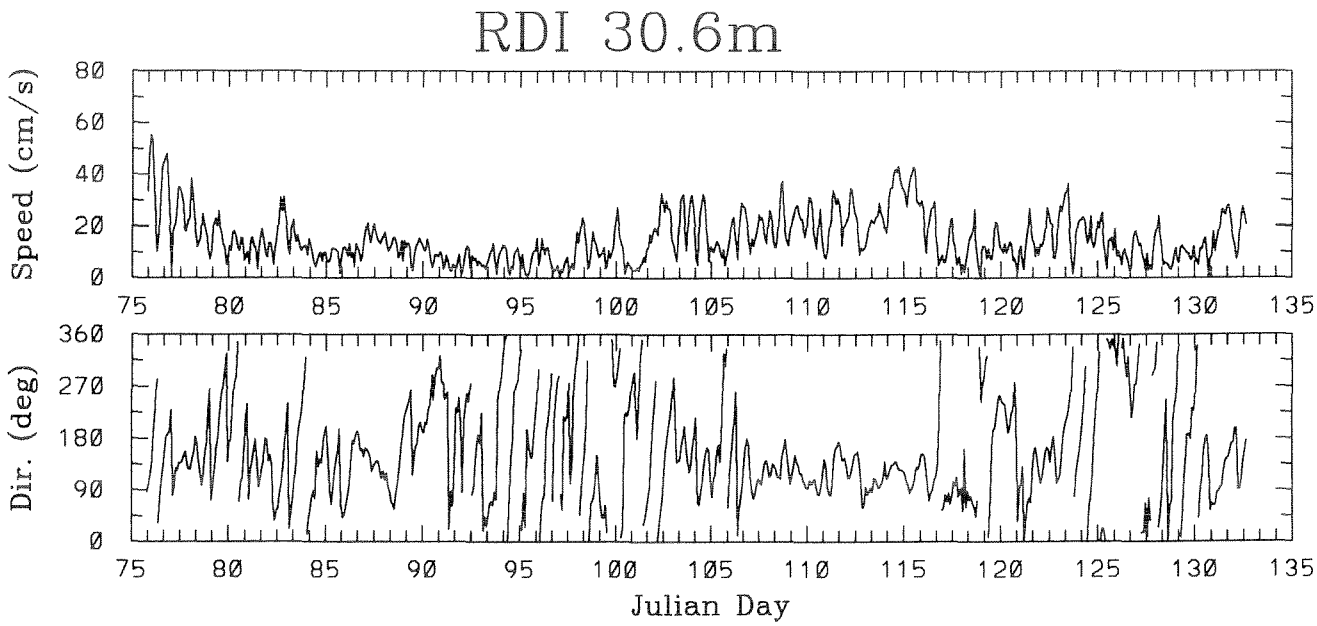
Depth (m)	Mean U (cm/s)	Mean V (cm/s)	Depth (m)	Mean U (cm/s)	Mean V (cm/s)
13.2	4.46	-2.24	100.0	3.77	-3.05
21.9	6.23	-3.54	108.7	4.01	-2.93
30.6	5.67	-3.91	117.4	4.19	-2.82
39.3	5.02	-3.90	126.1	4.31	-2.84
48.0	4.57	-3.75	134.8	4.43	-2.99
56.6	4.24	-3.49	143.4	4.59	-3.18
65.3	3.95	-3.22	152.1	4.79	-3.37
74.0	3.65	-3.02	160.8	5.02	-3.18
82.7	3.66	-2.88	169.5	5.07	-2.24
91.4	3.67	-2.99			

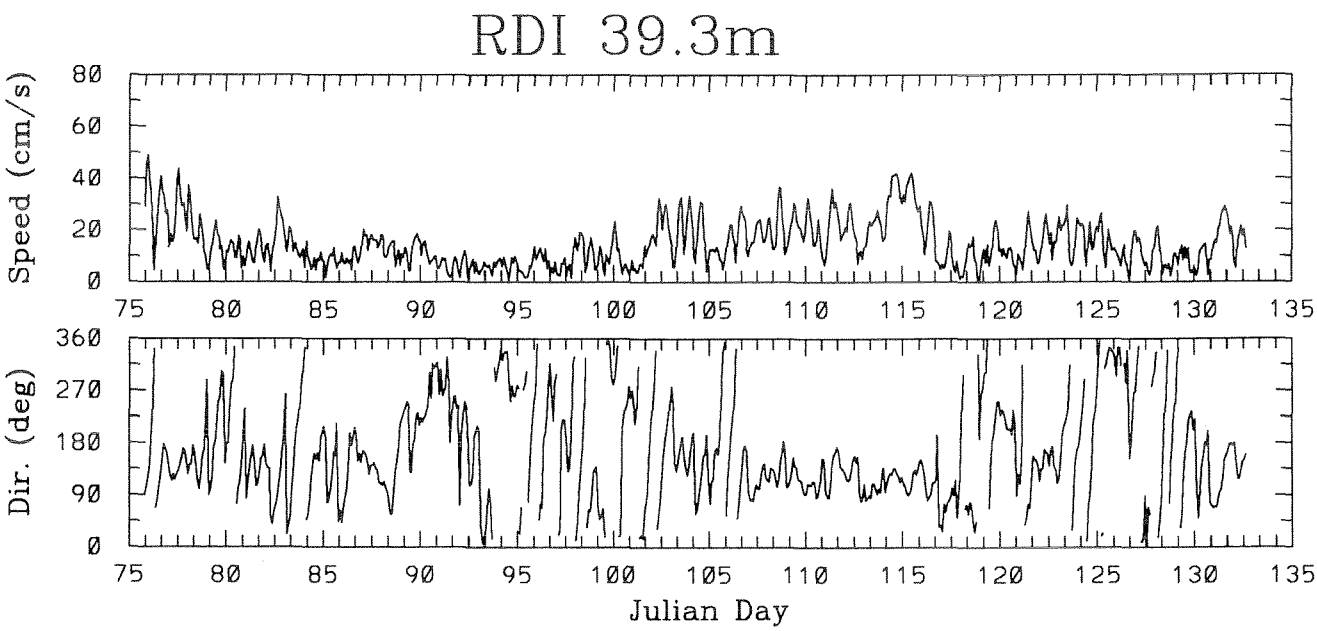
7.2 Profiler data

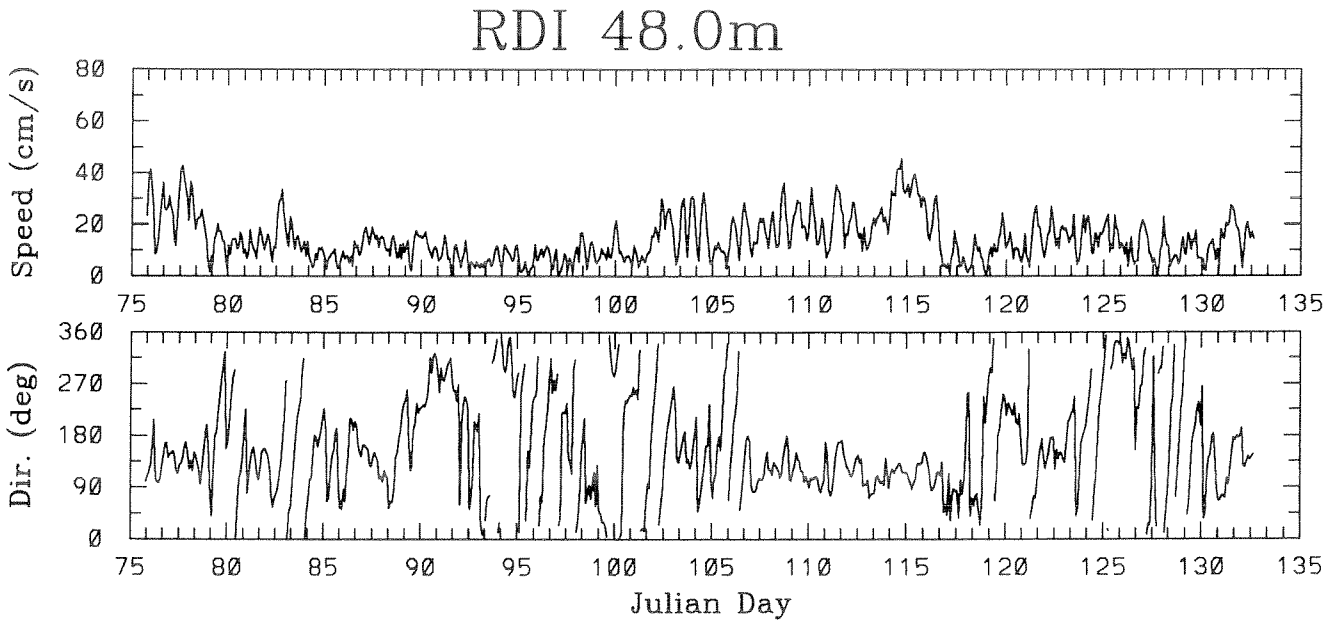
Time series plots of the profiler data for each depth are shown in p.102 to p.111. Progressive vector plots are shown in p.112 to p.130 with true north in the positive-y direction. Stick plots of filtered data are shown in p.131 to p.145 with true north in the positive-y direction. The data was filtered using a low-pass Cartwright filter with a 0.8cpd frequency cut-off , and then sub-sampled at 6 hour intervals.

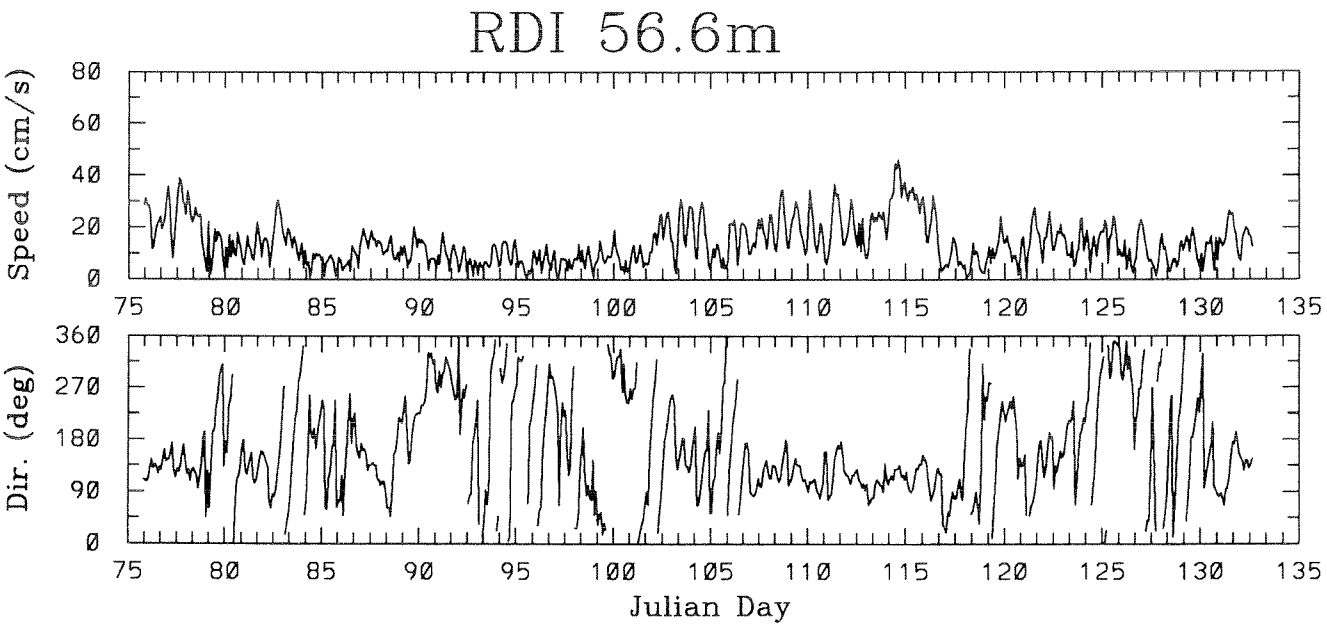

RDI 13.2m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

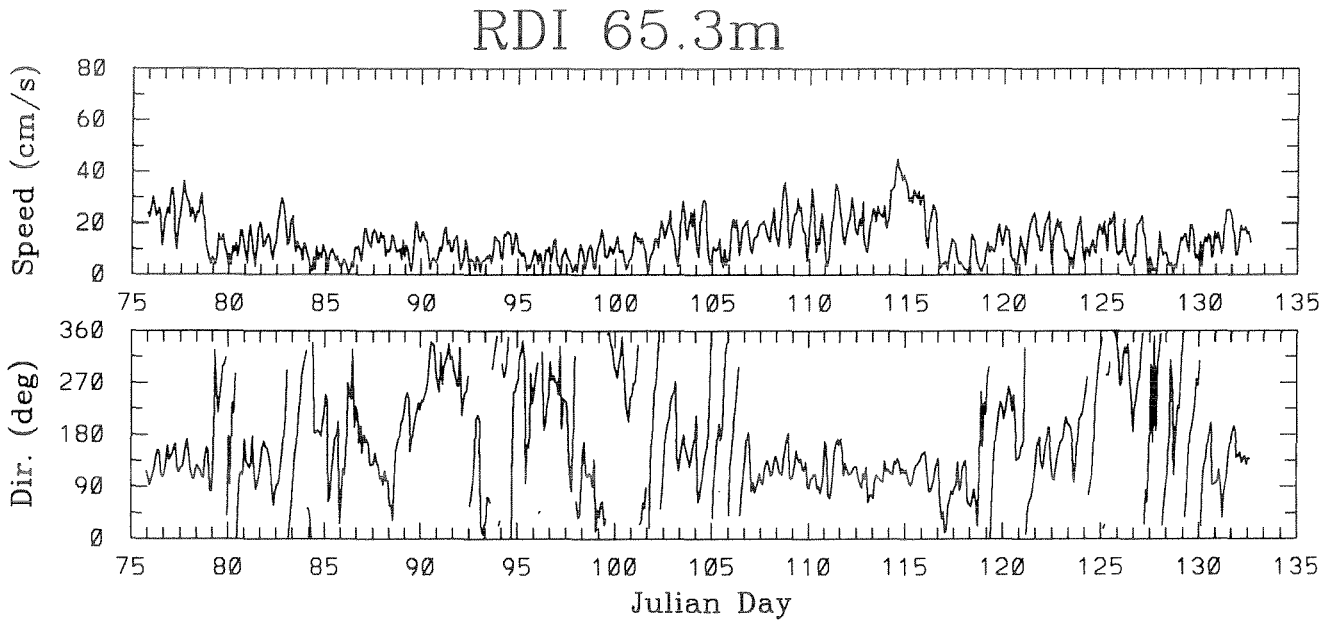

RDI 21.9m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

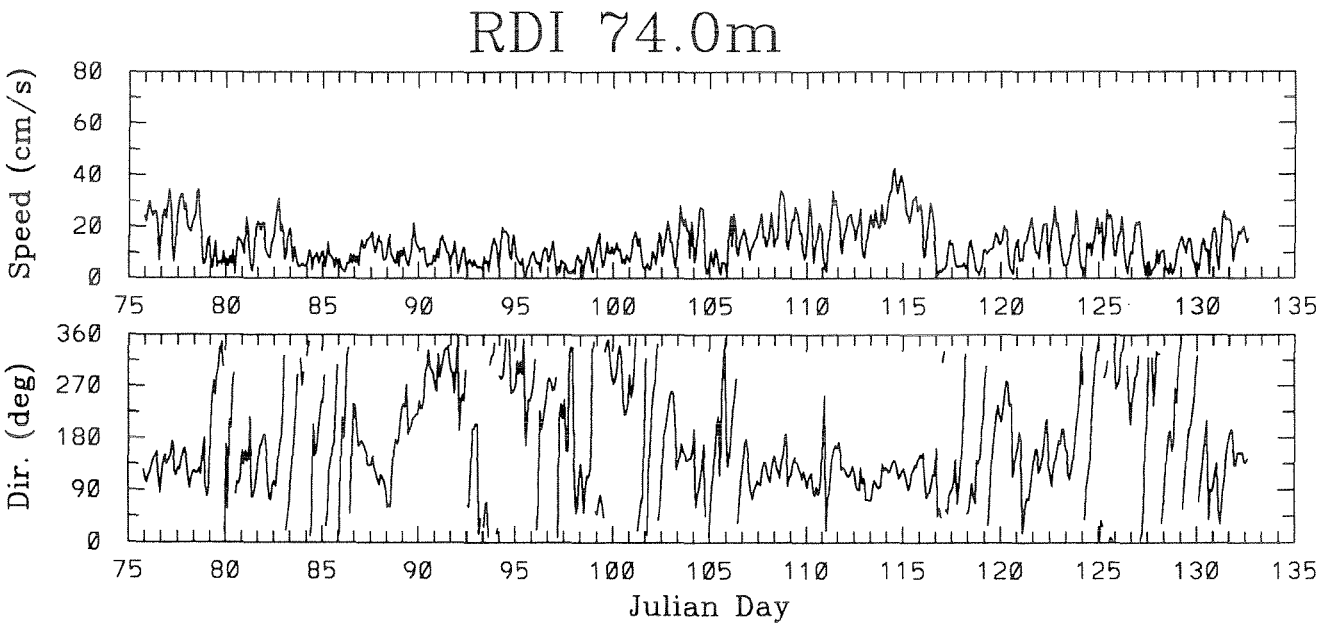

RDI 30.6m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

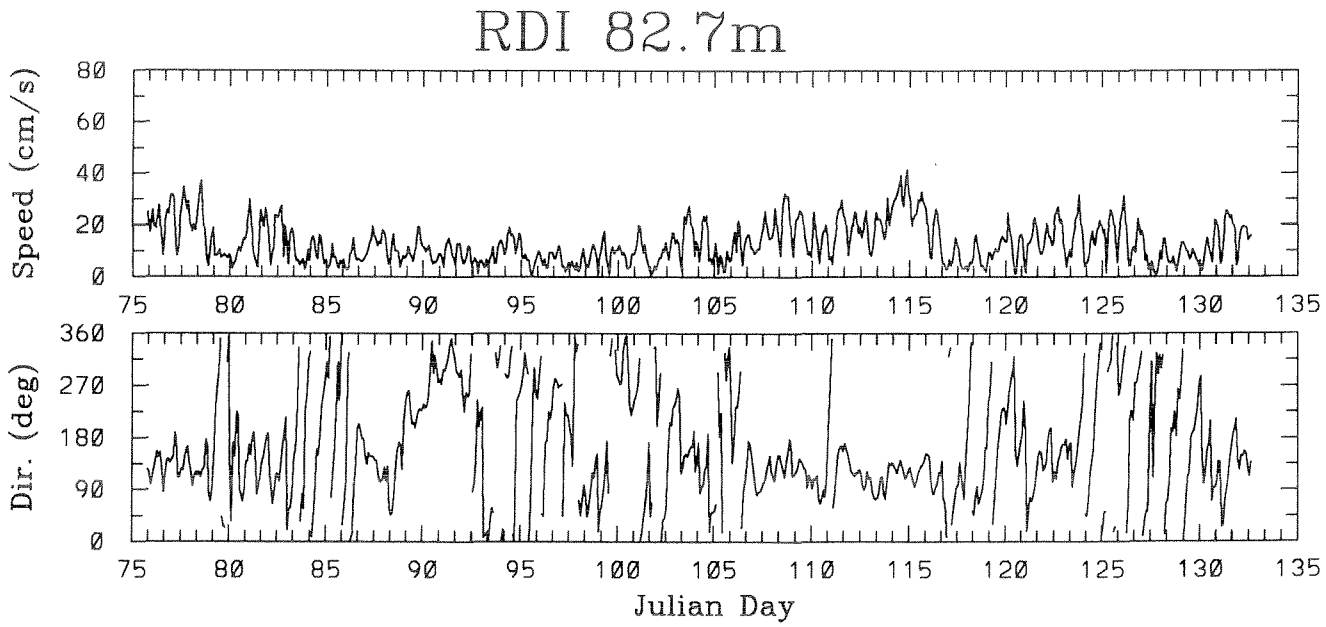

RDI 39.3m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

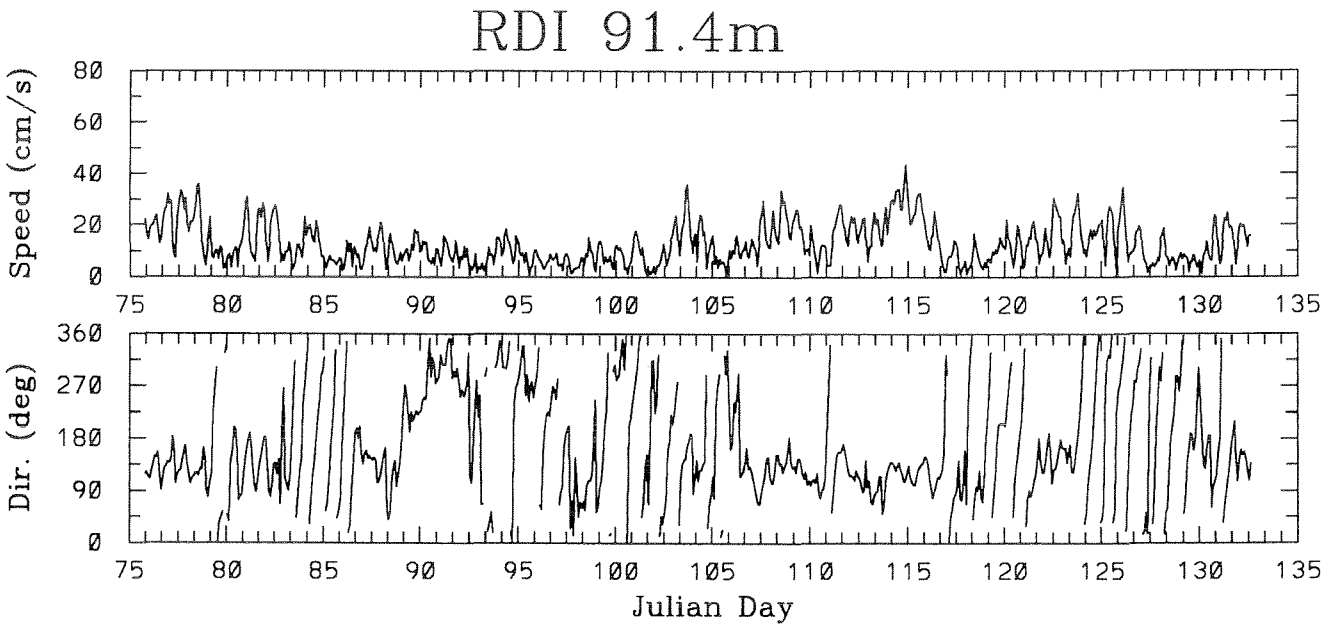

RDI 48.0m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

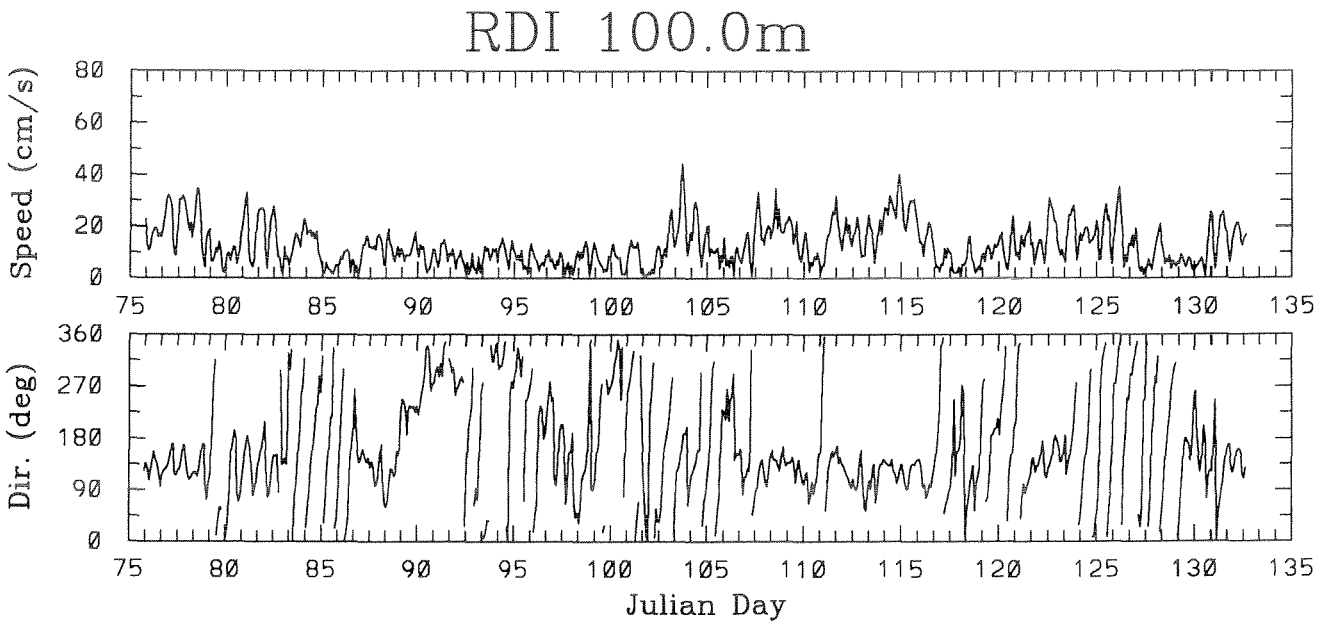

RDI 56.6m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

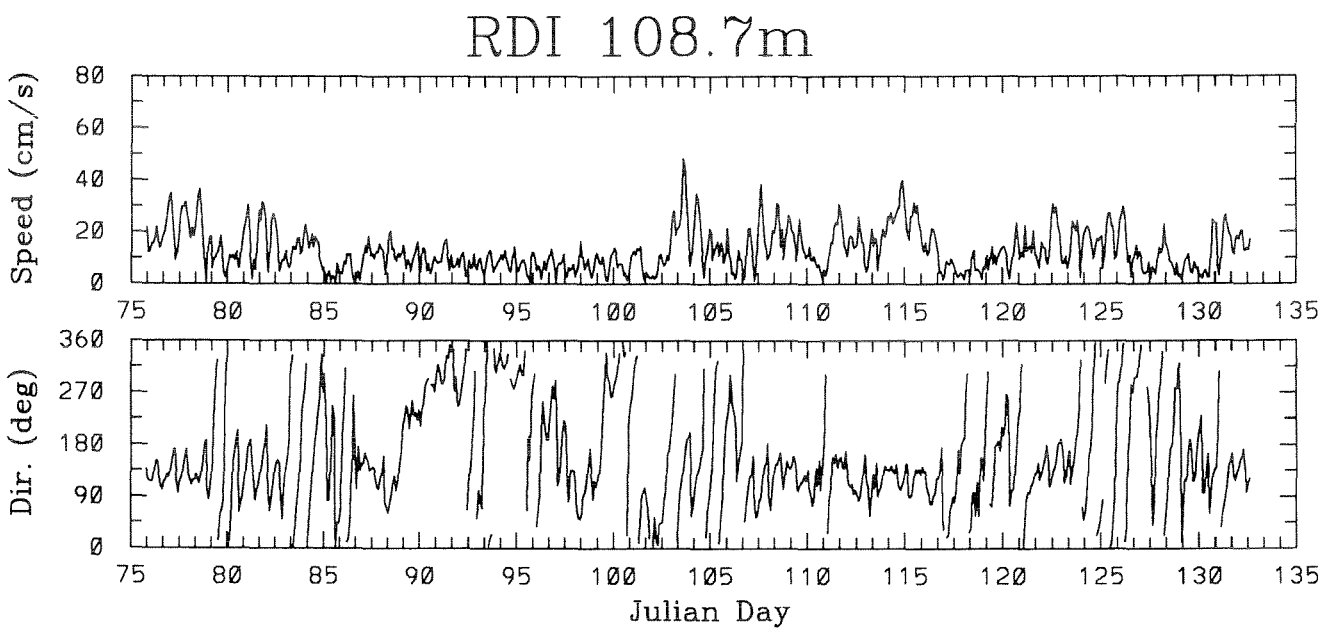

RDI 65.3m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

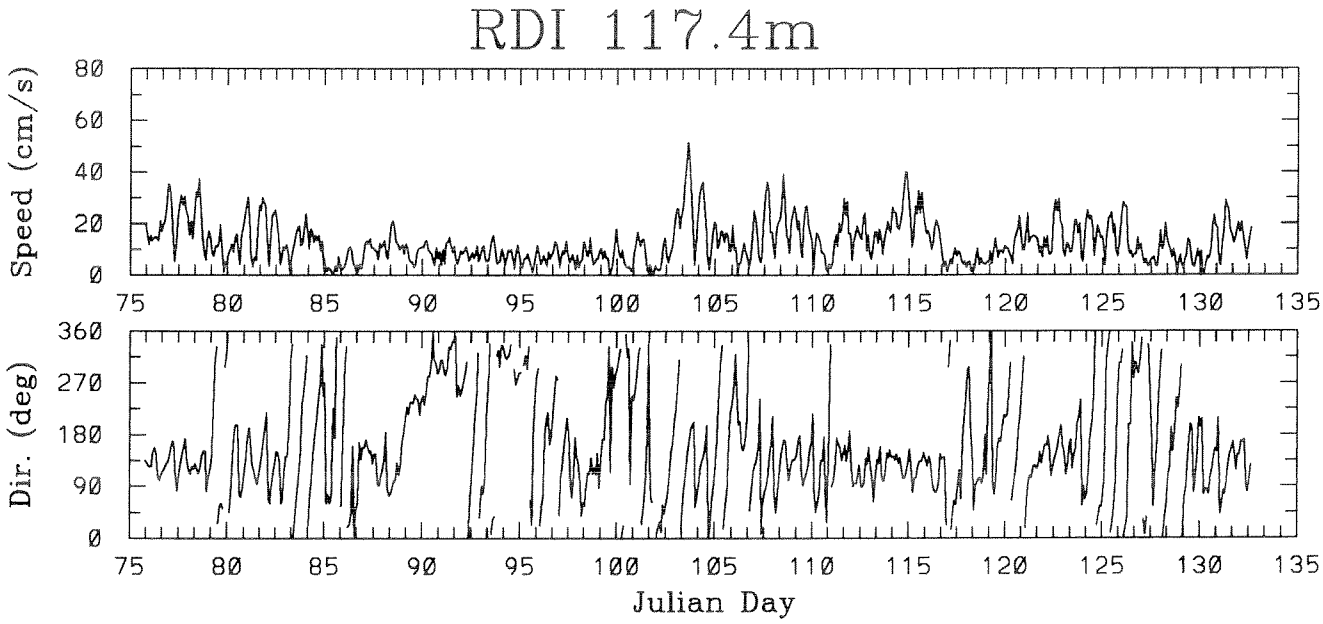

RDI 74.0m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

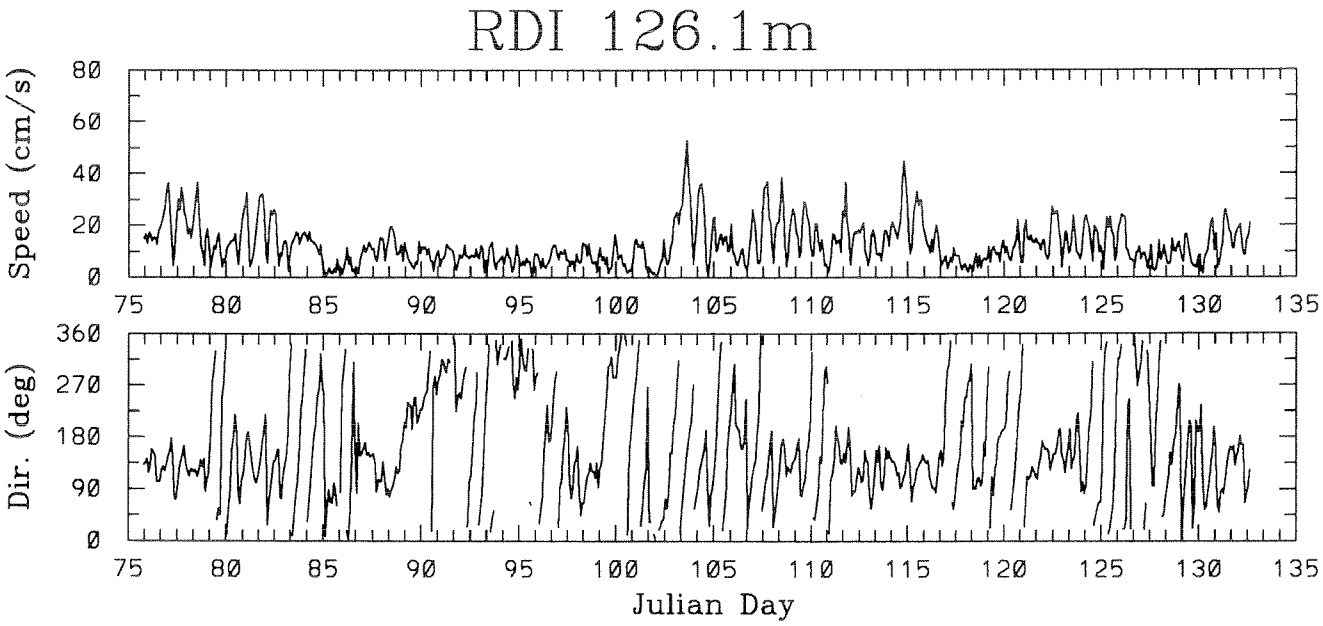

RDI 82.7m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

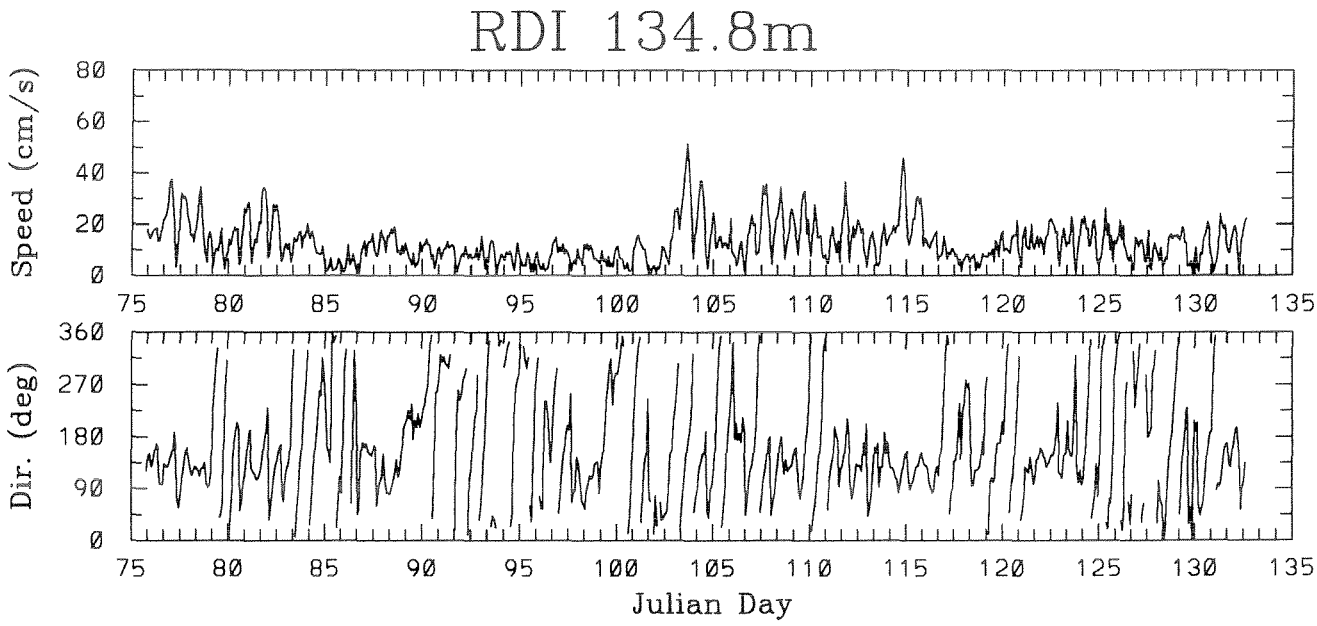

RDI 91.4m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

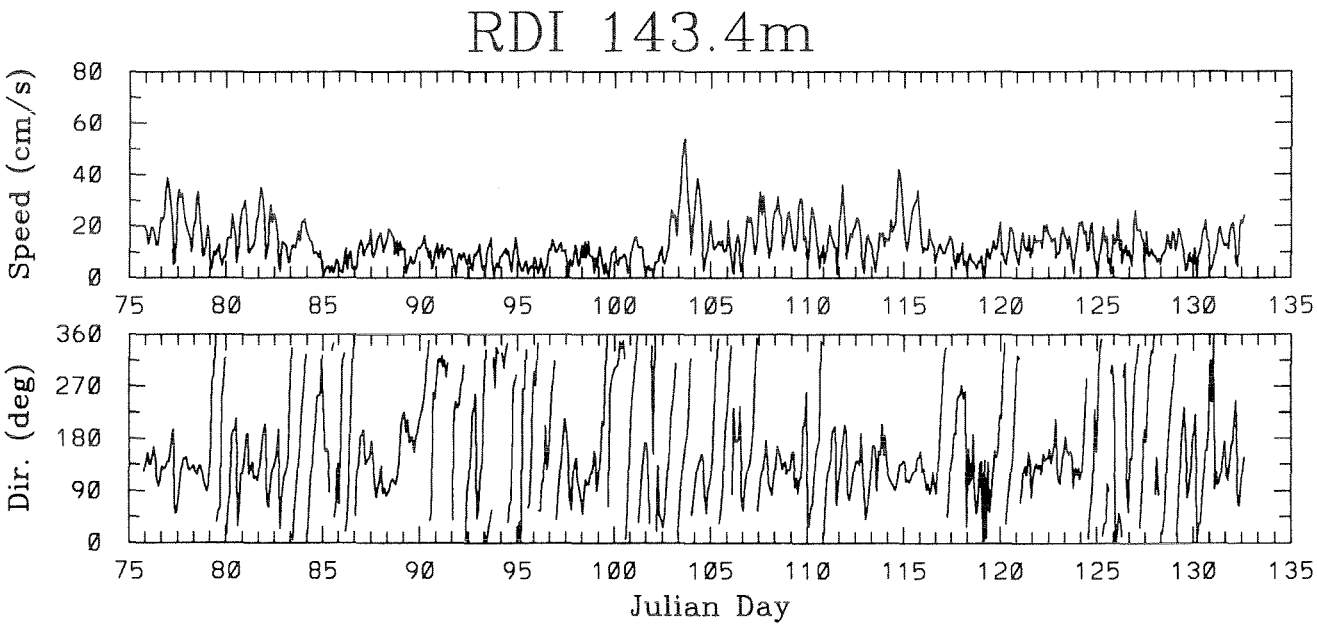

RDI 100.0m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

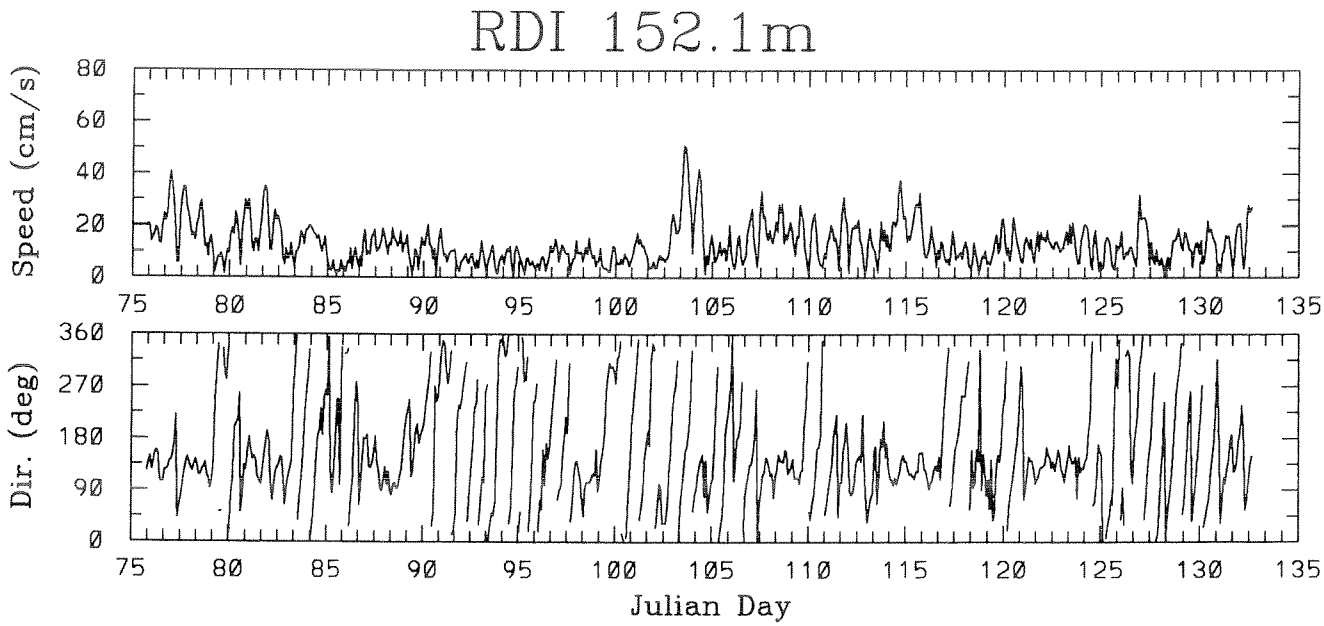

RDI 108.7m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

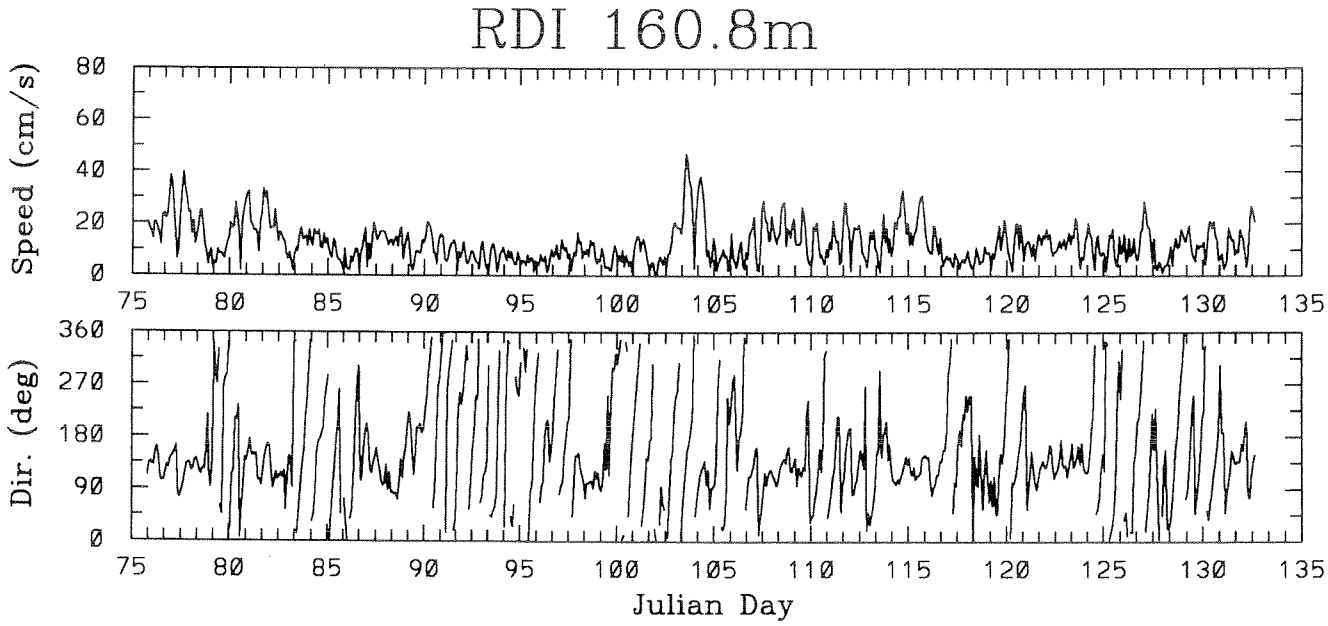

RDI 117.4m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

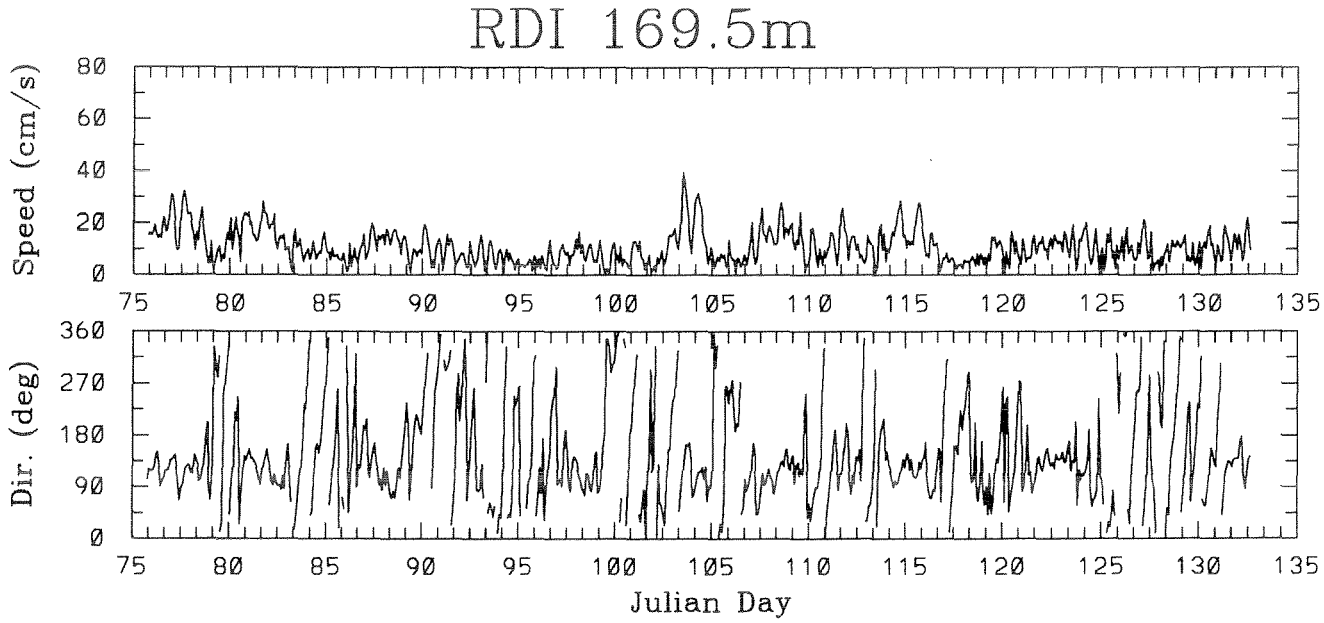

RDI 126.1m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

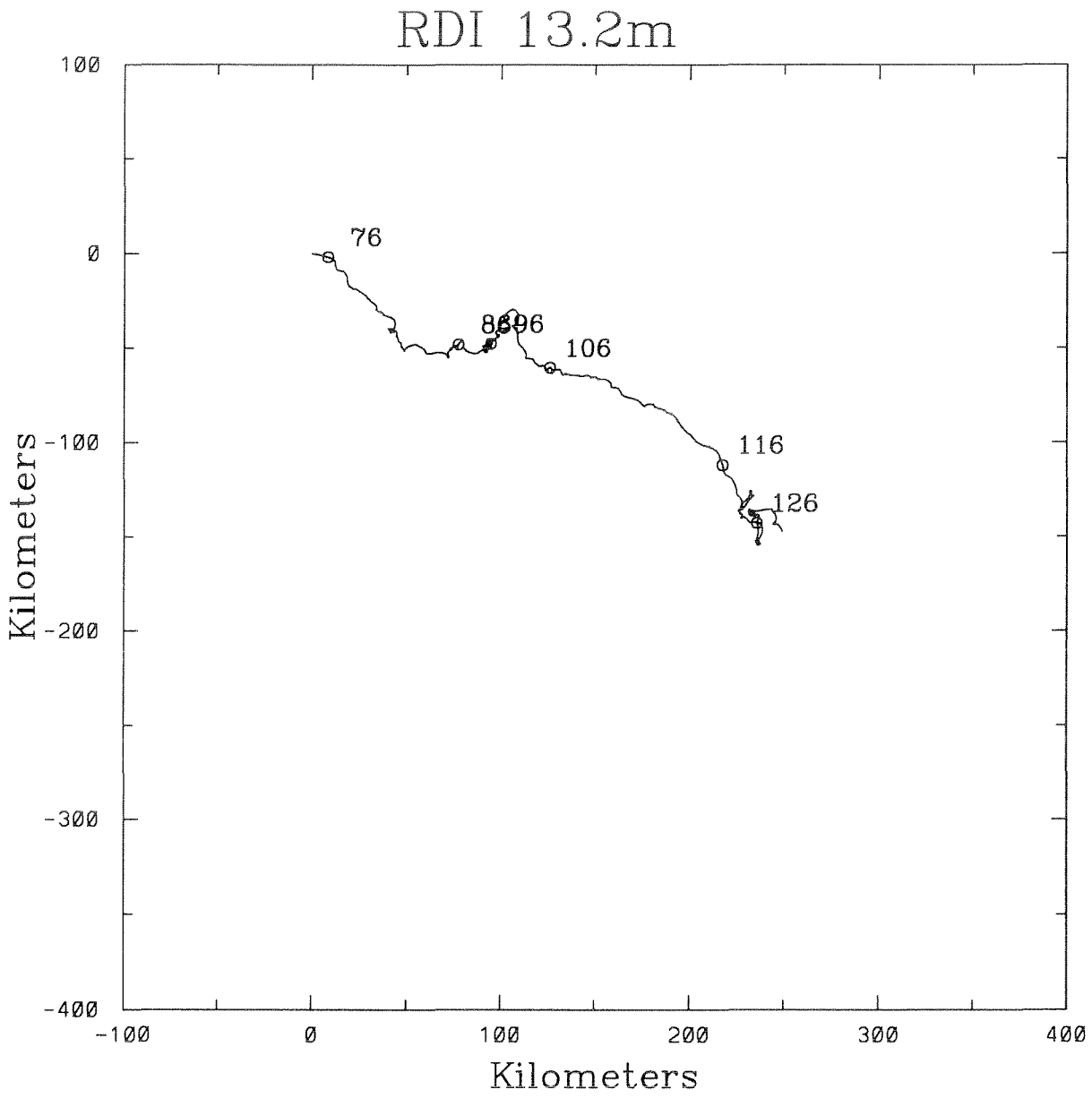

RDI 134.8m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

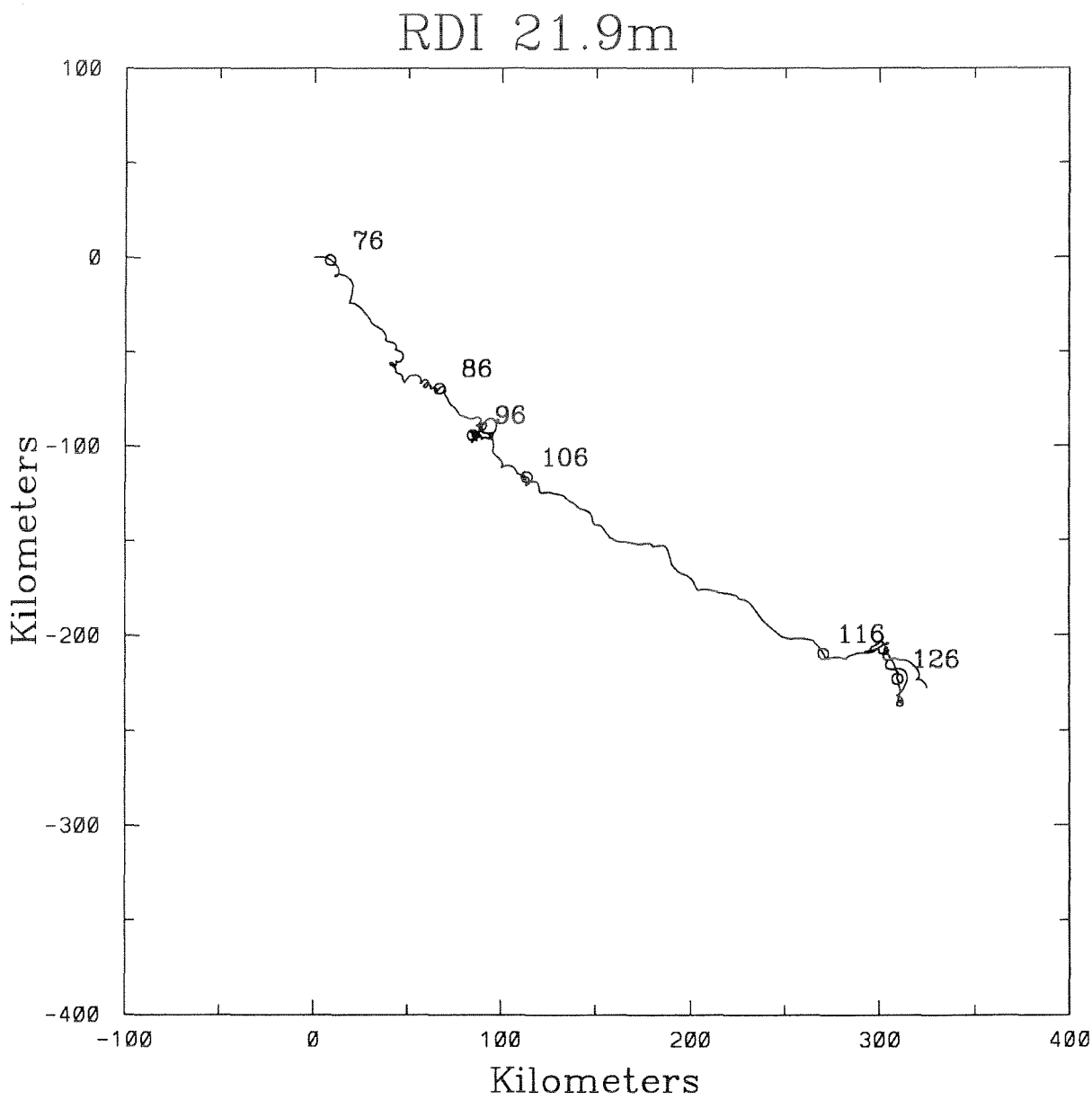

RDI 143.4m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

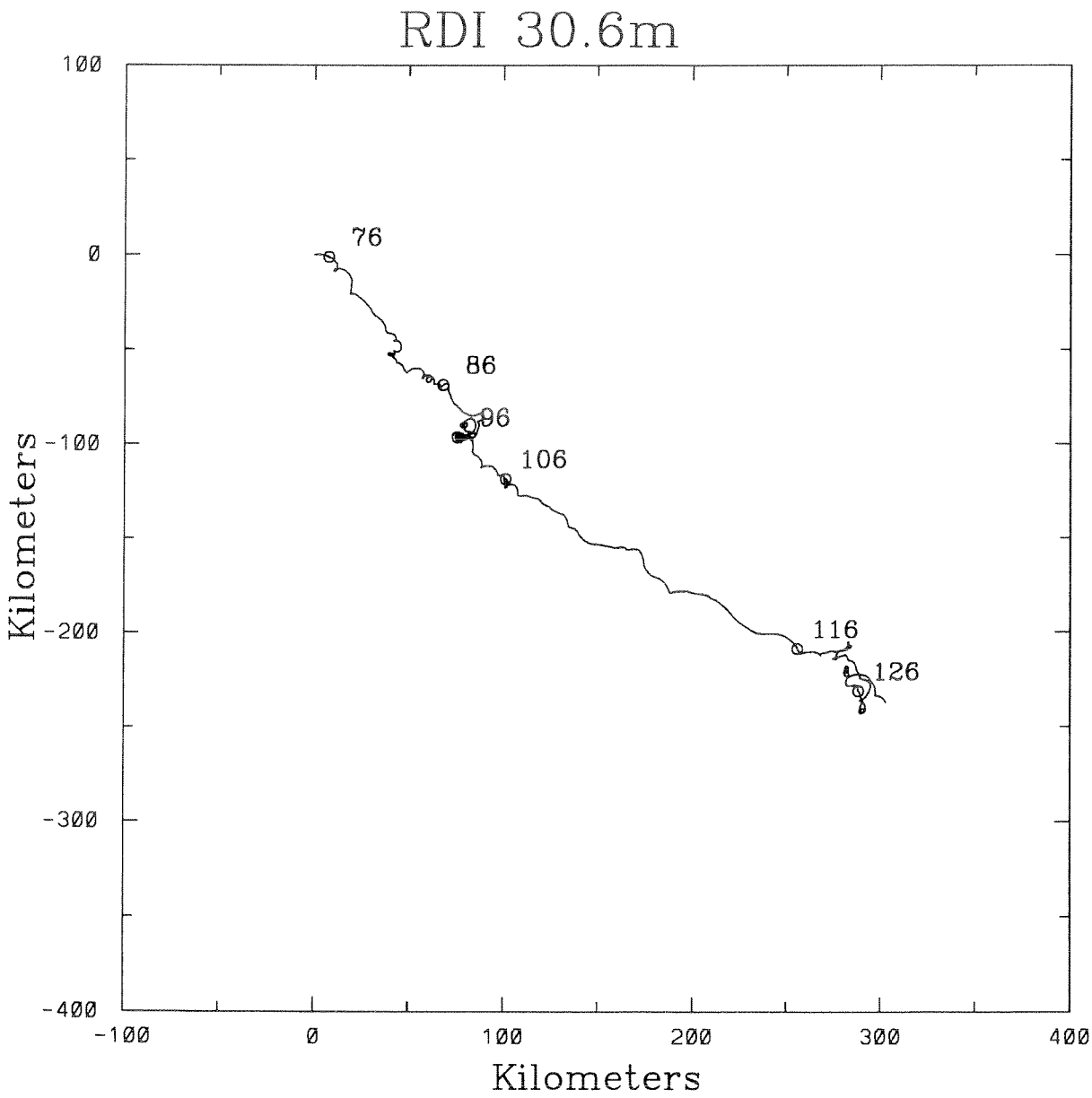

RDI 152.1m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

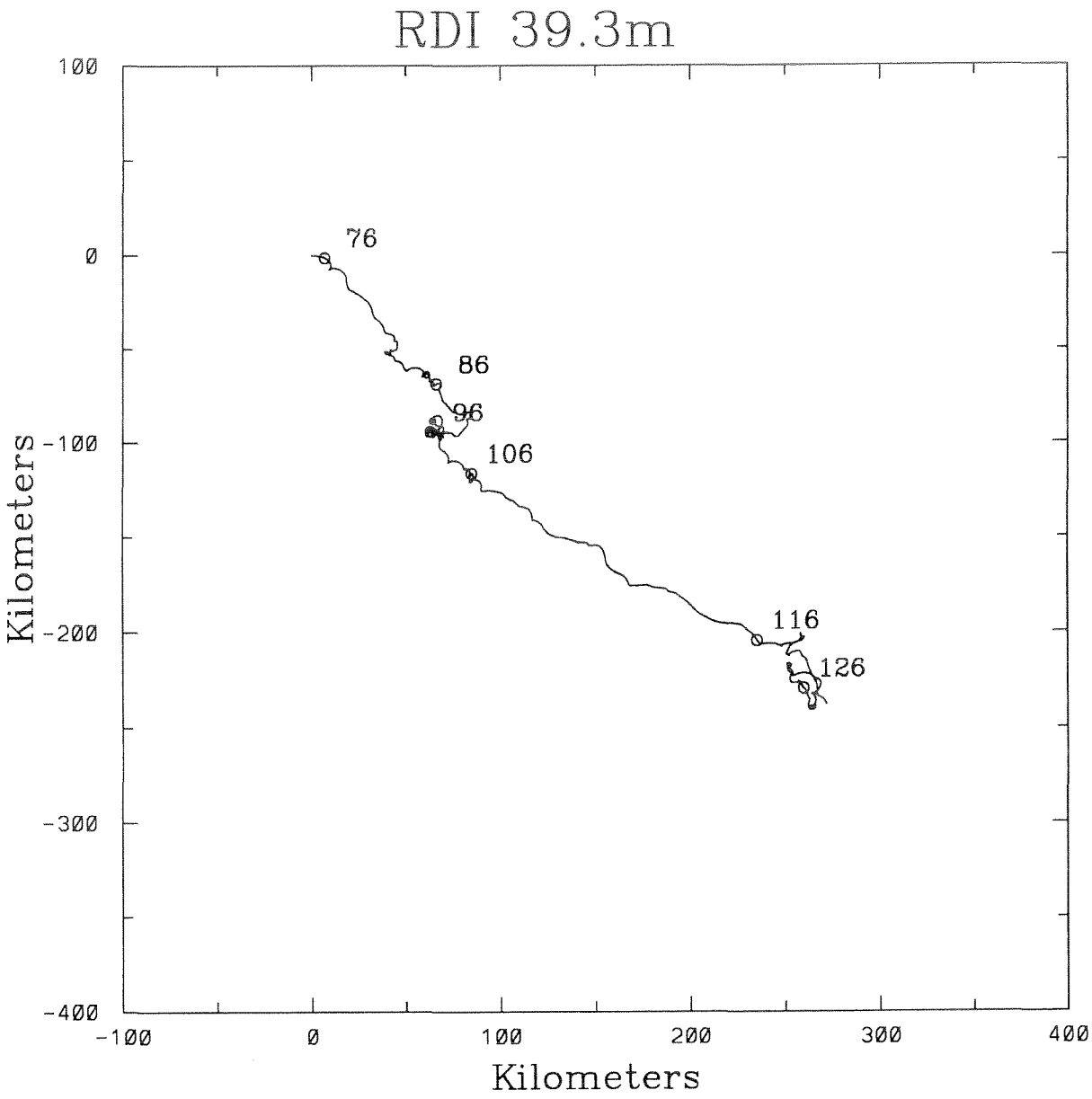

RDI 160.8m
Speed (cm/s)
80
60
40
20
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Dir. (deg)
360
270
180
90
0
75 80 85 90 95 100 105 110 115 120 125 130 135
Julian Day

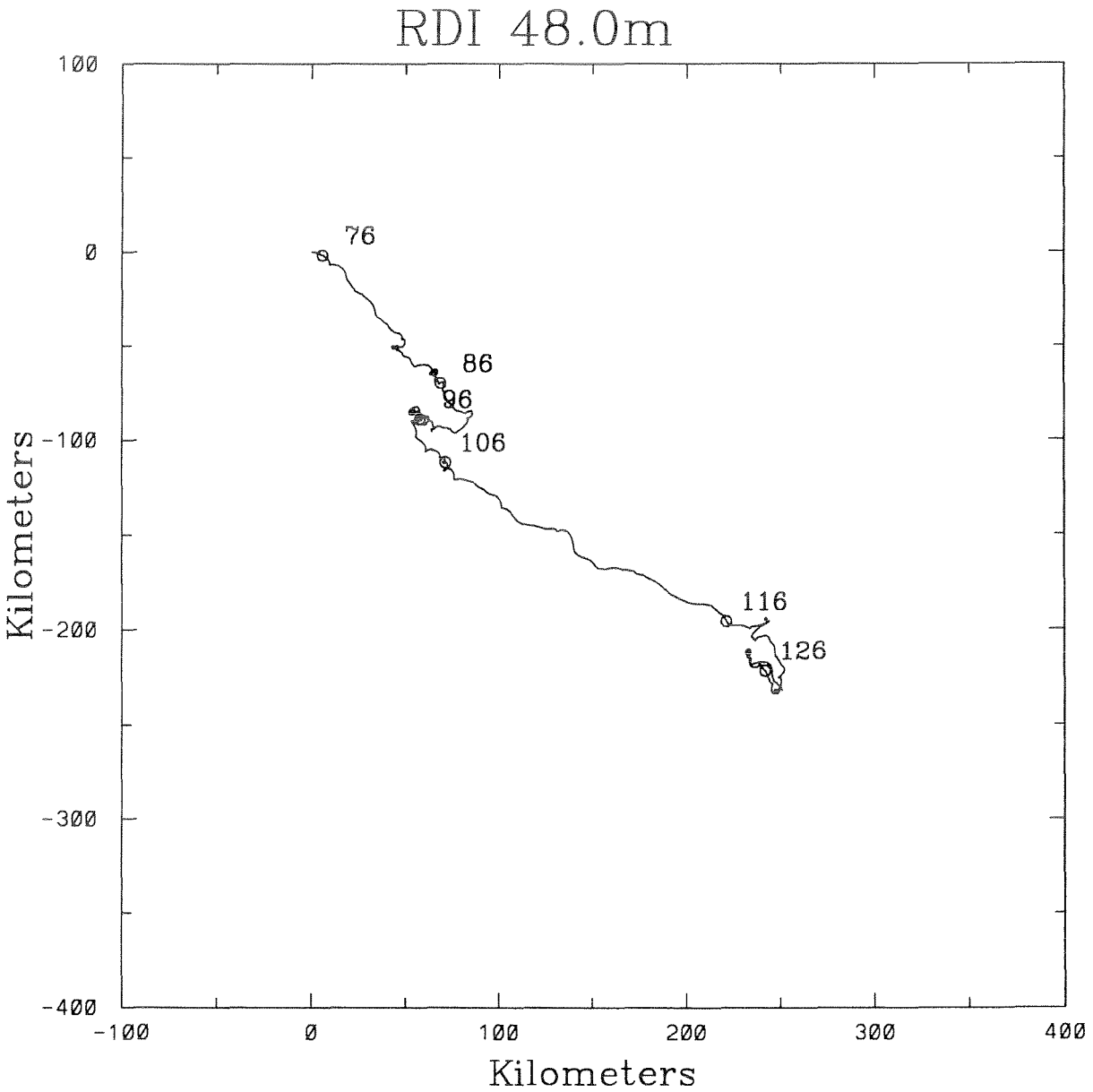

RDI 169.5m
Speed (cm/s)
80
60
40
20
0
75
80
85
90
95
100
105
110
115
120
125
130
135
Dir. (deg)
360
270
180
90
0
Julian Day

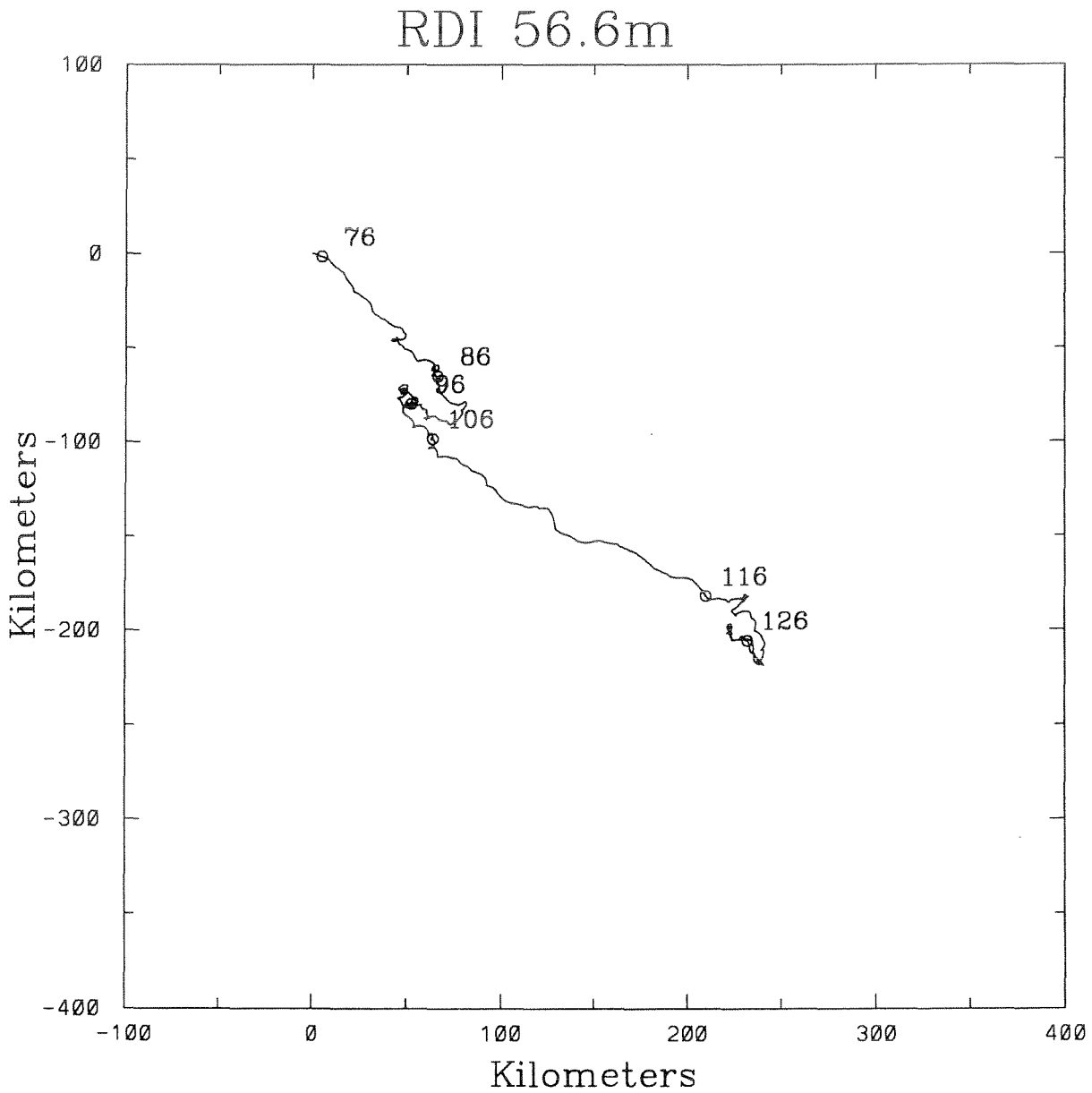

RDI 13.2m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

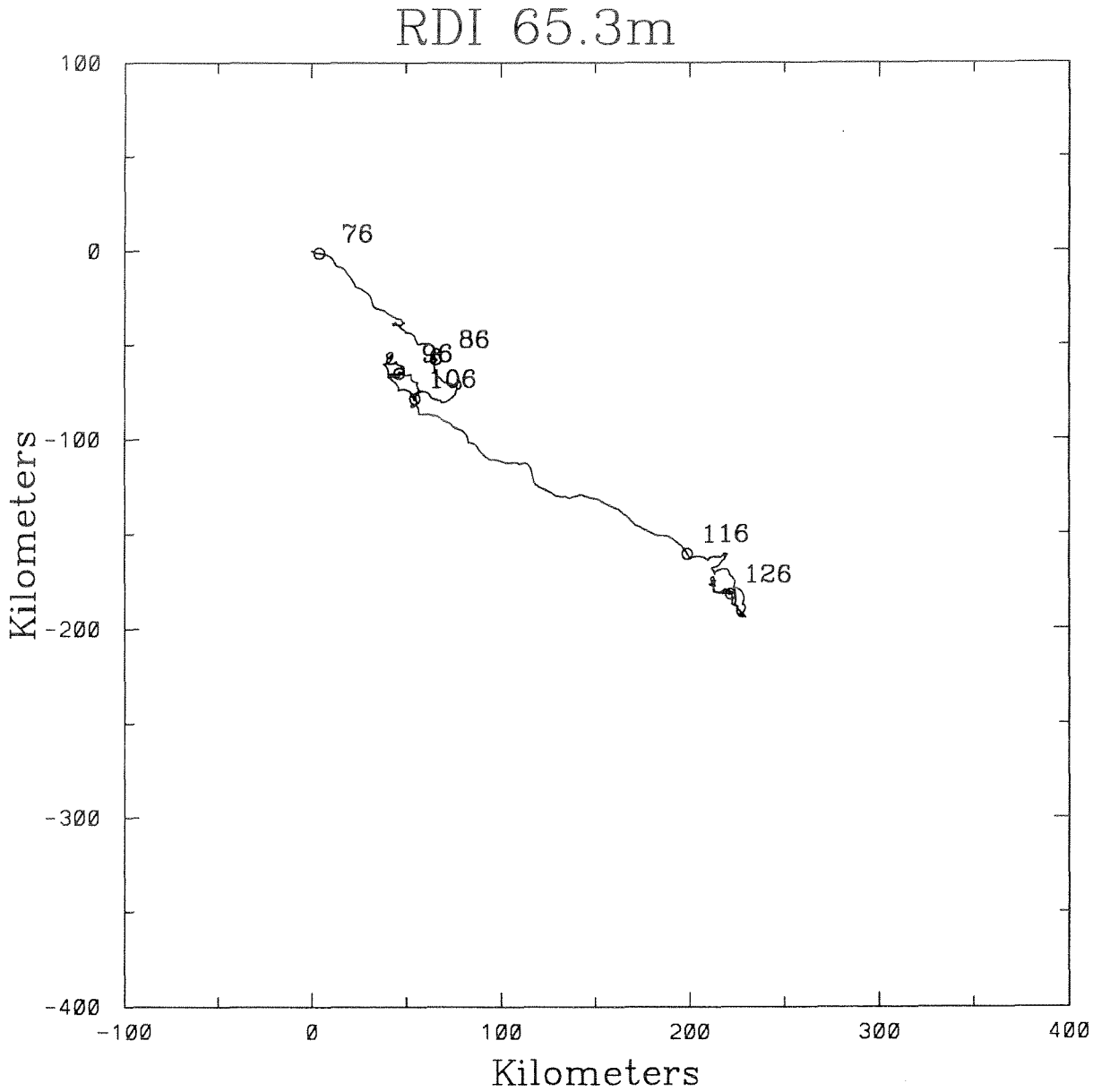

RDI 21.9m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

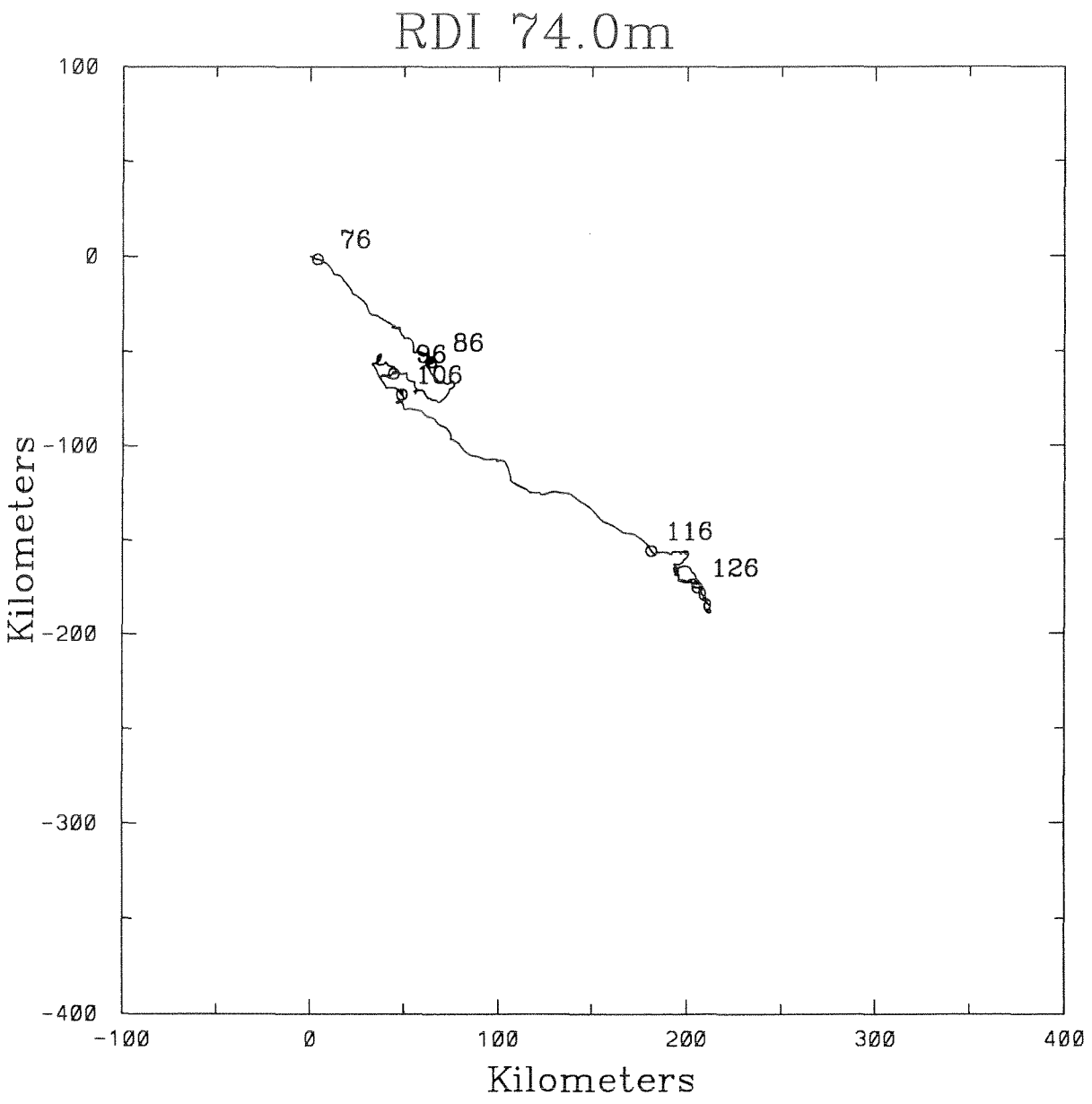

RDI 30.6m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

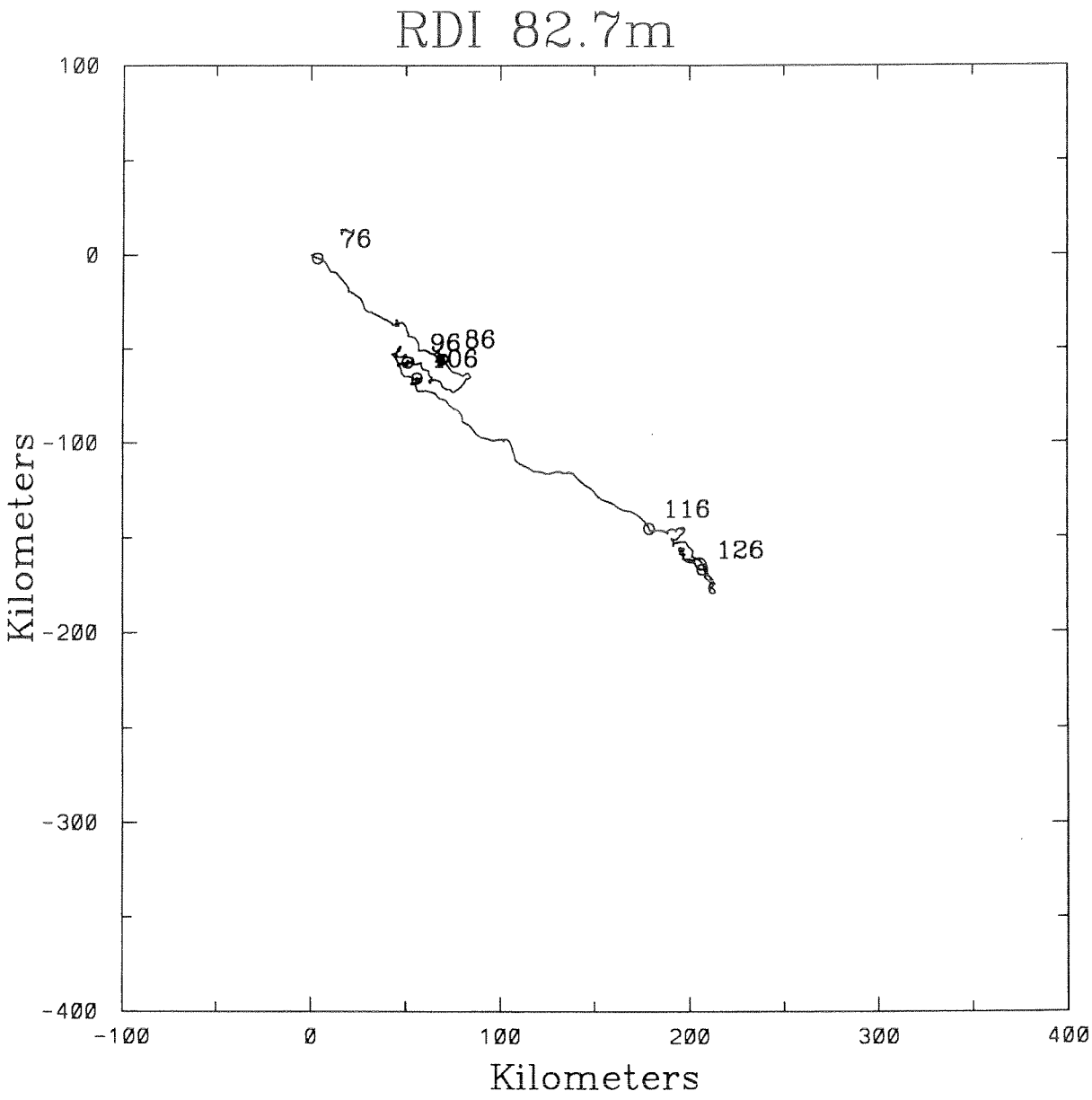

RDI 39.3m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

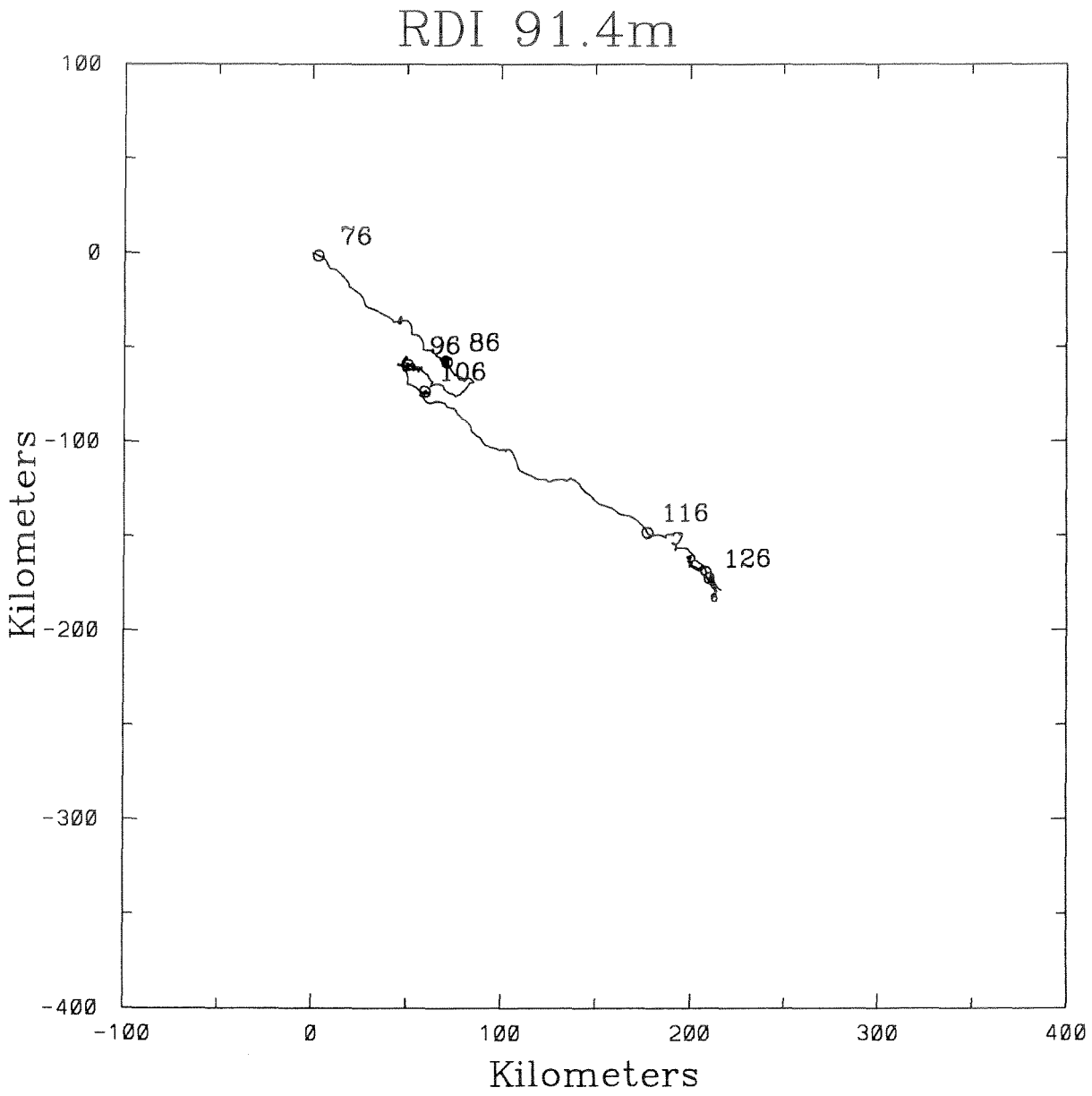

RDI 48.0m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

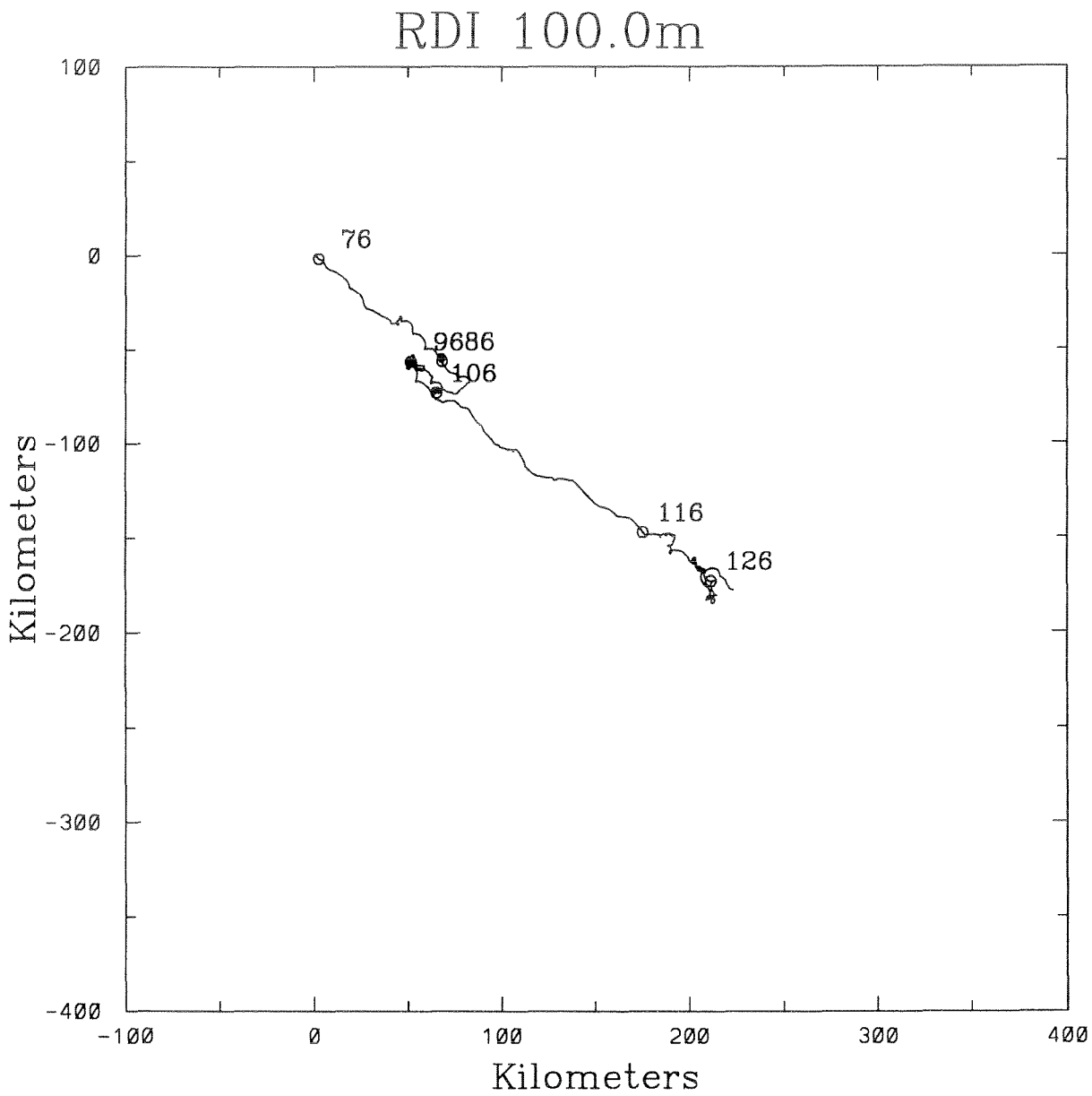

RDI 56.6m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

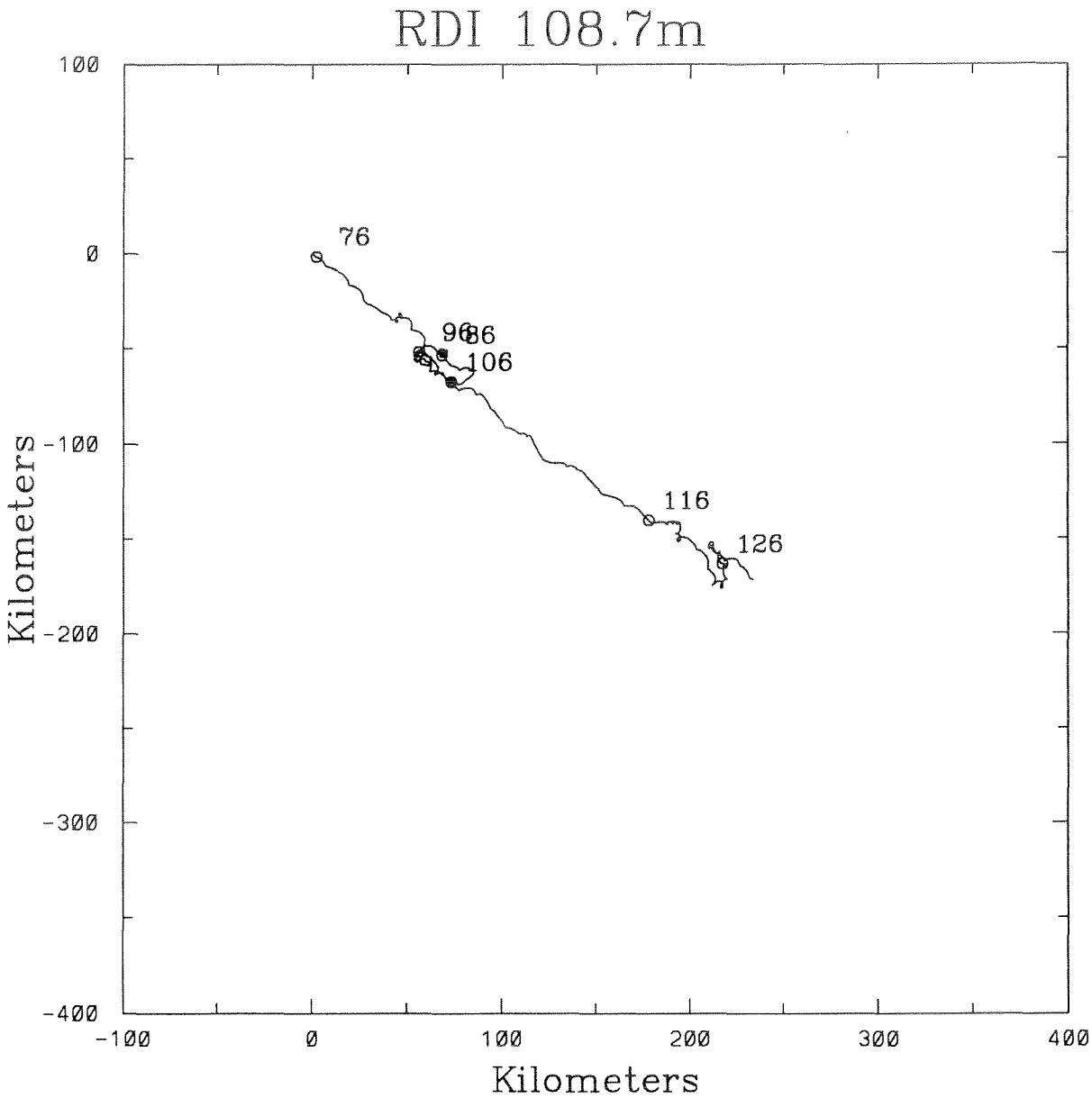

RDI 65.3m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

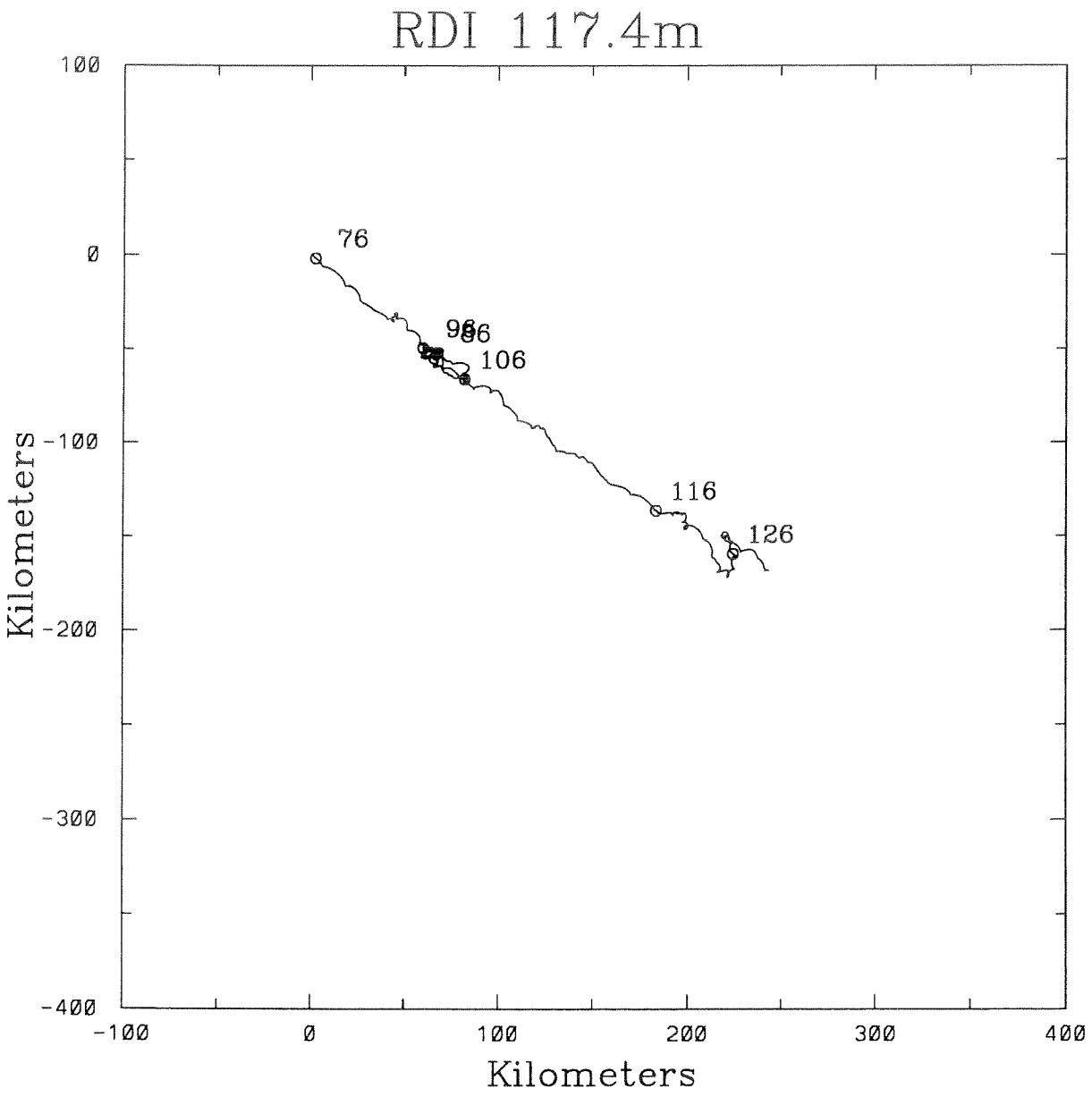

RDI 74.0m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

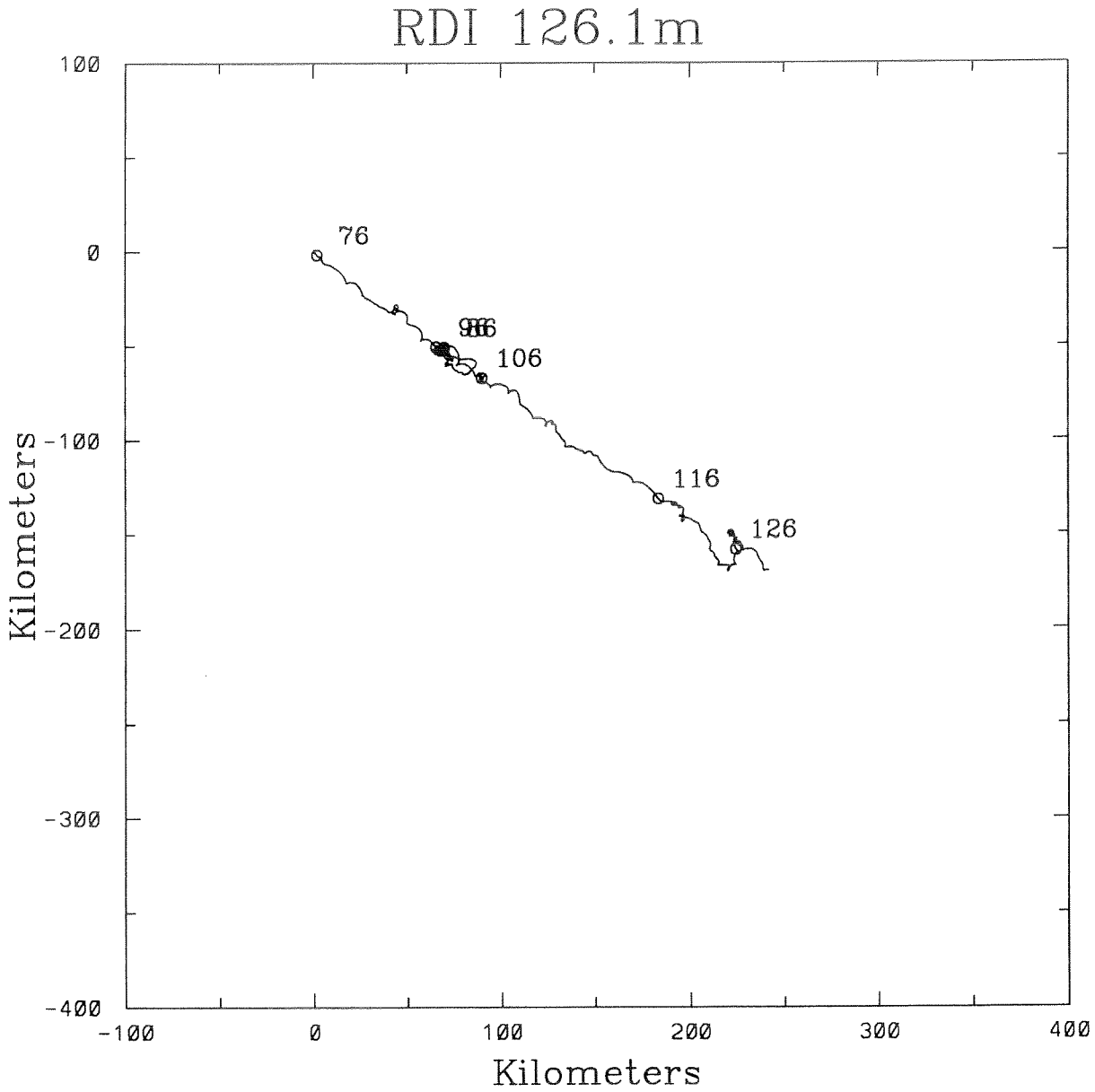

RDI 82.7m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
96
86
106
116
126

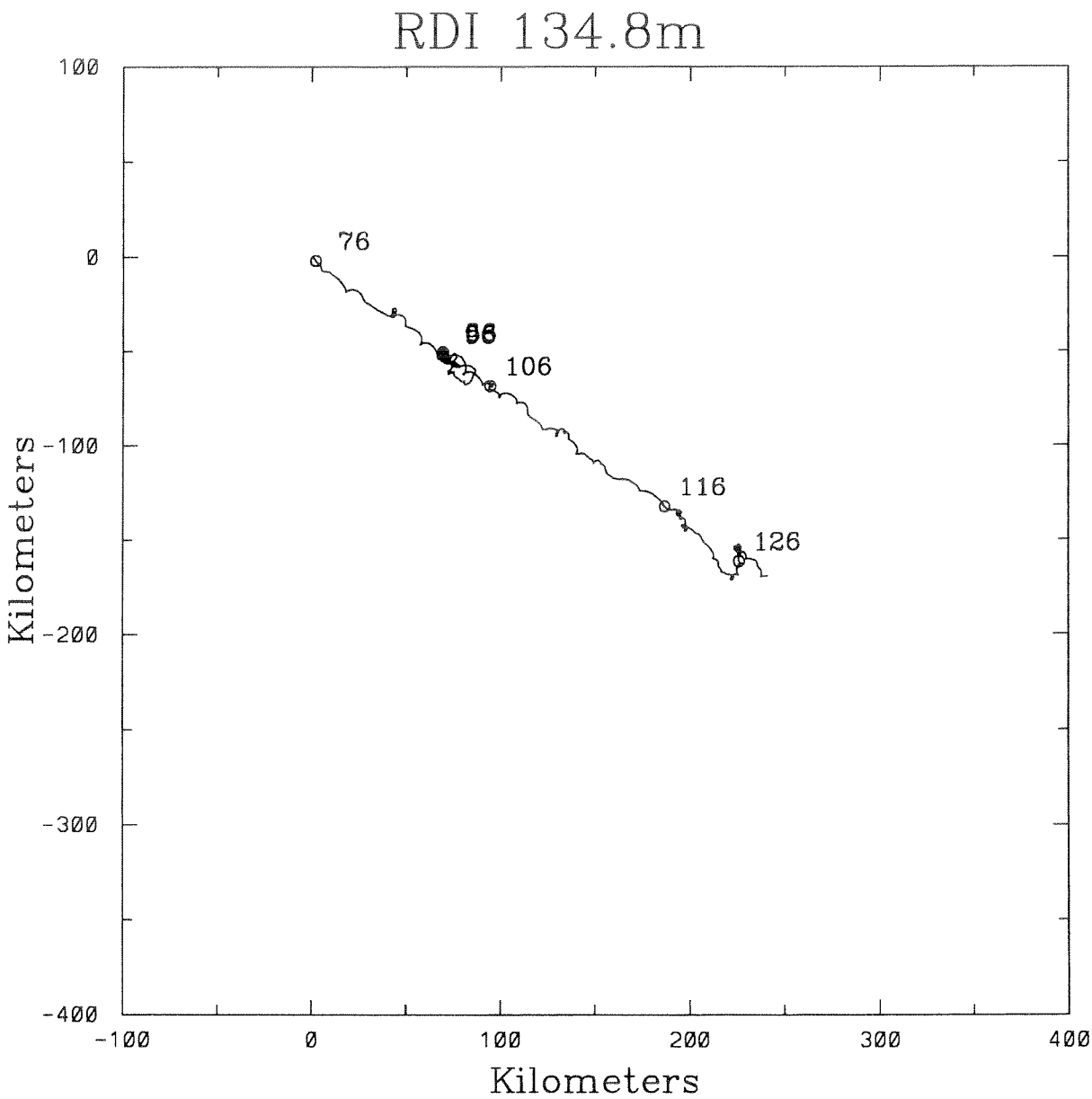

RDI 91.4m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
96
86
106
116
126

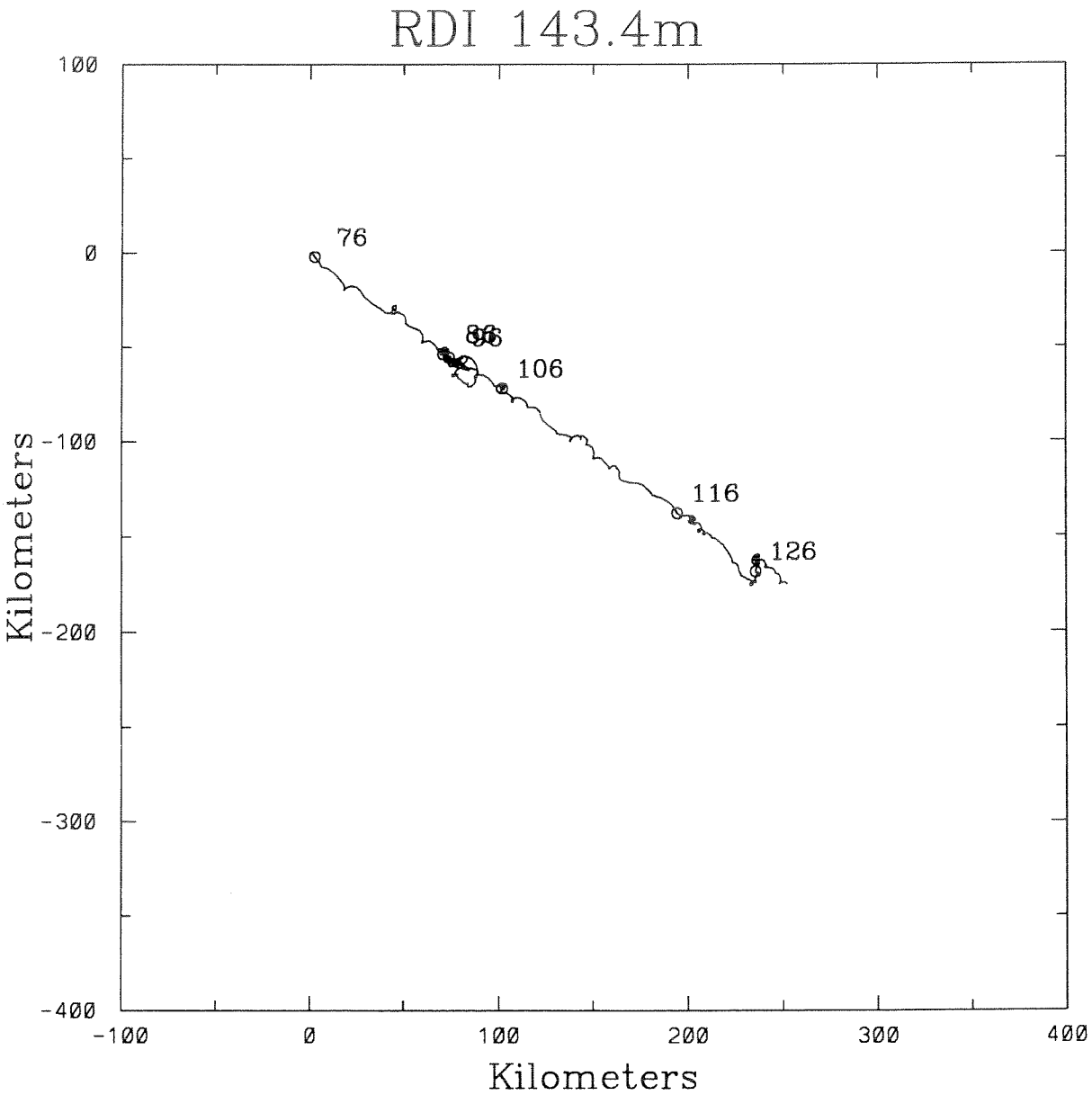

RDI 100.0m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
9686
106
116
126

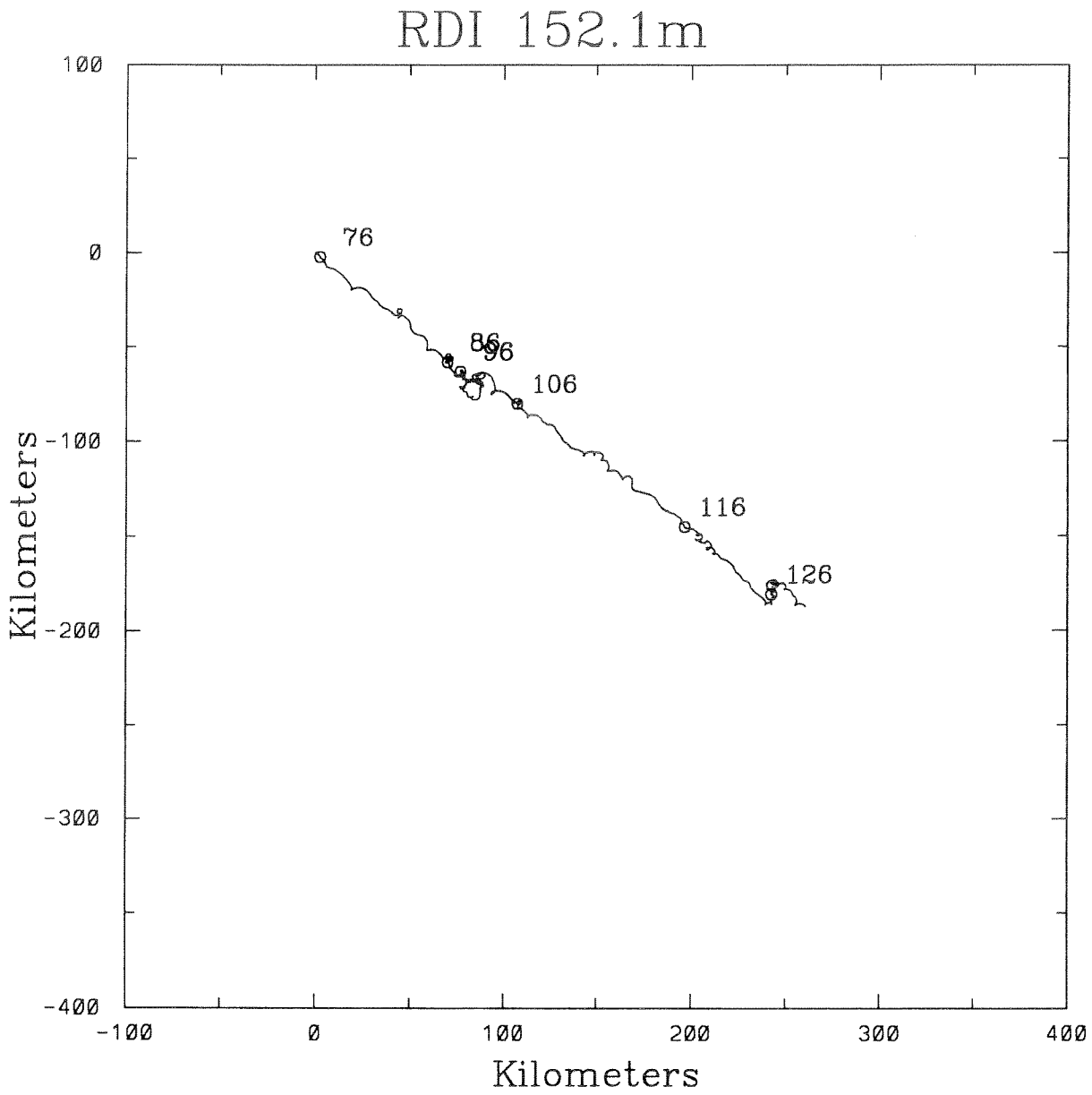

RDI 108.7m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
96
86
106
116
126

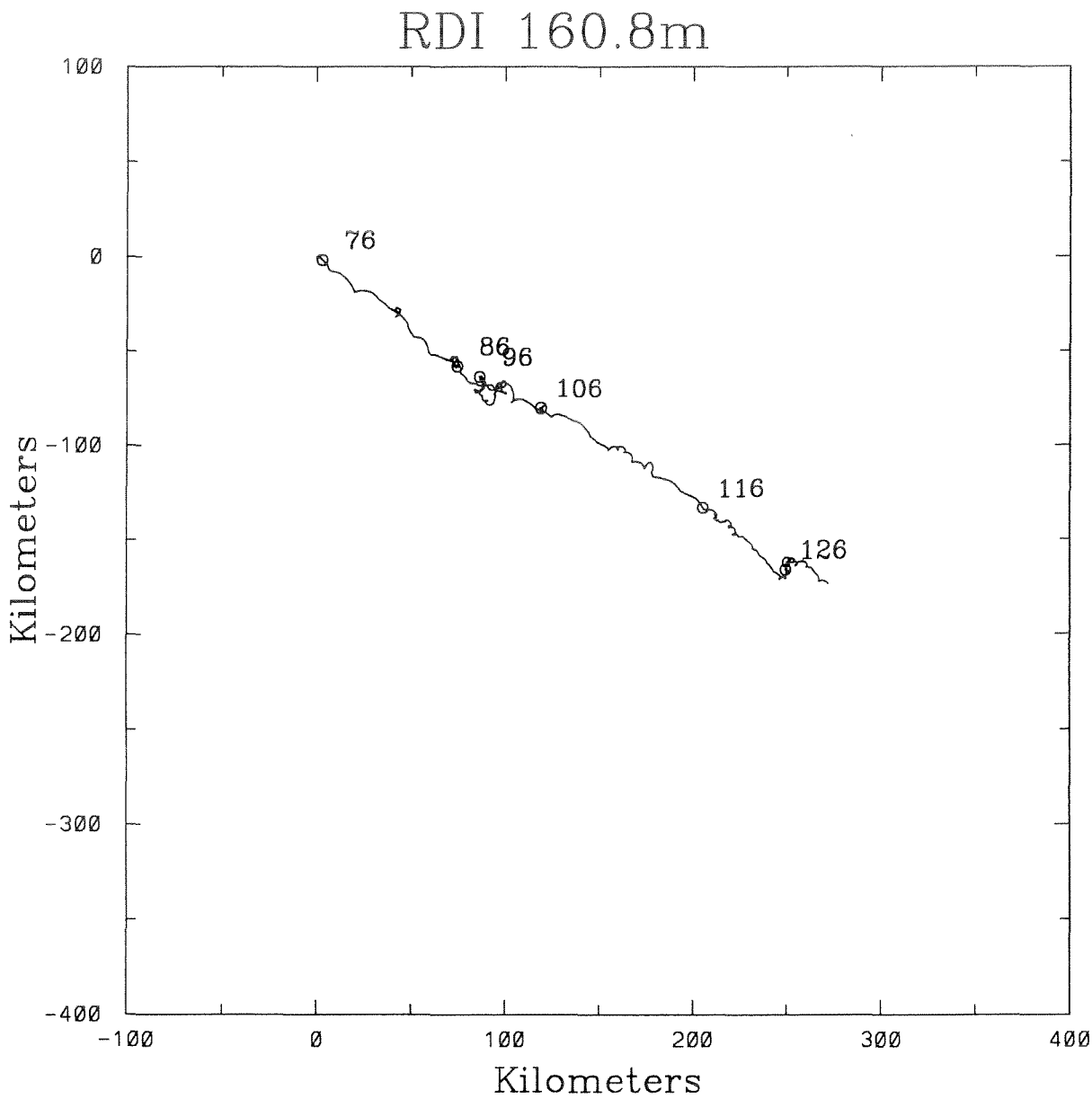

RDI 117.4m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
96
106
116
126

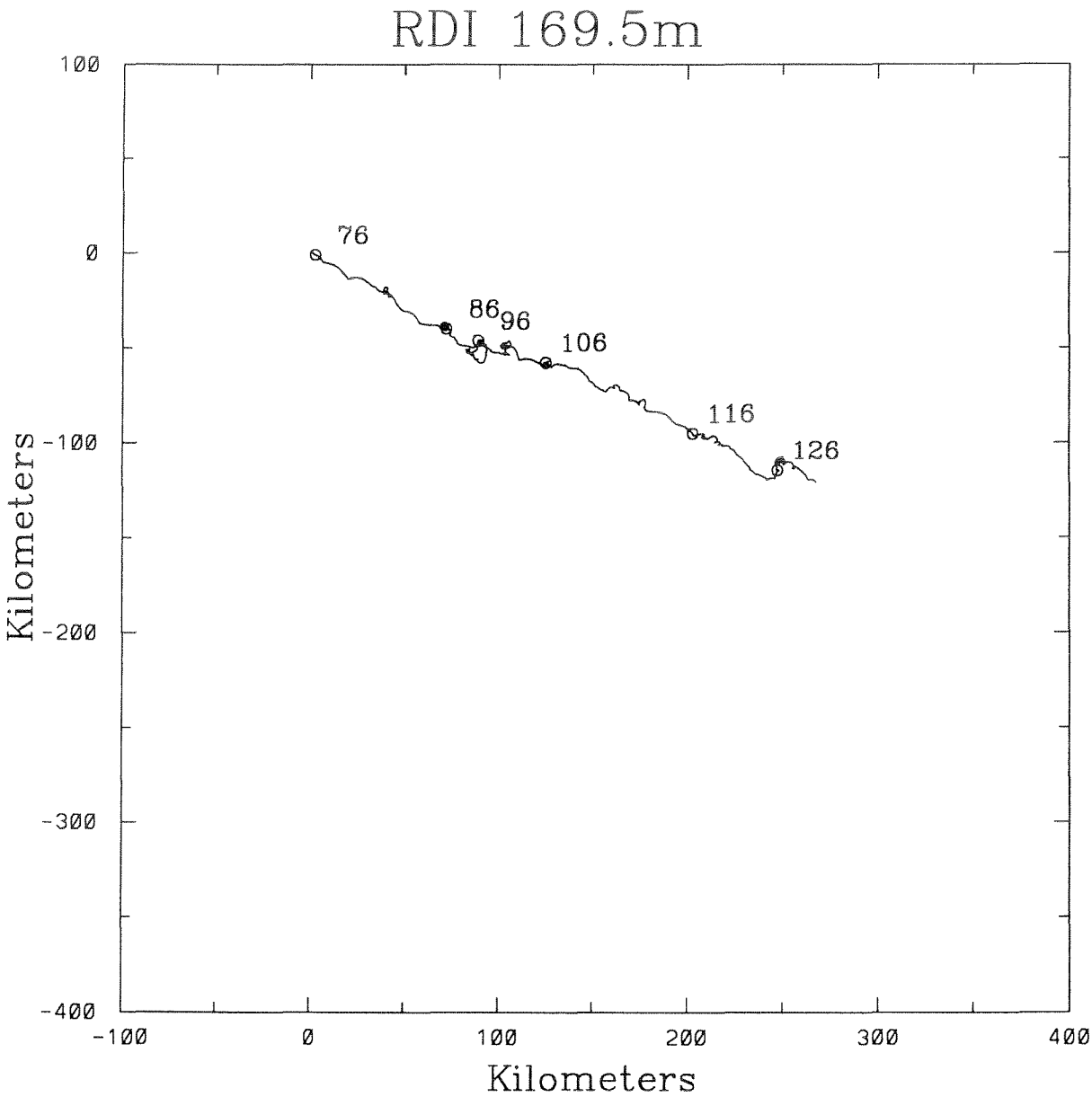

RDI 126.1m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
106
116
126

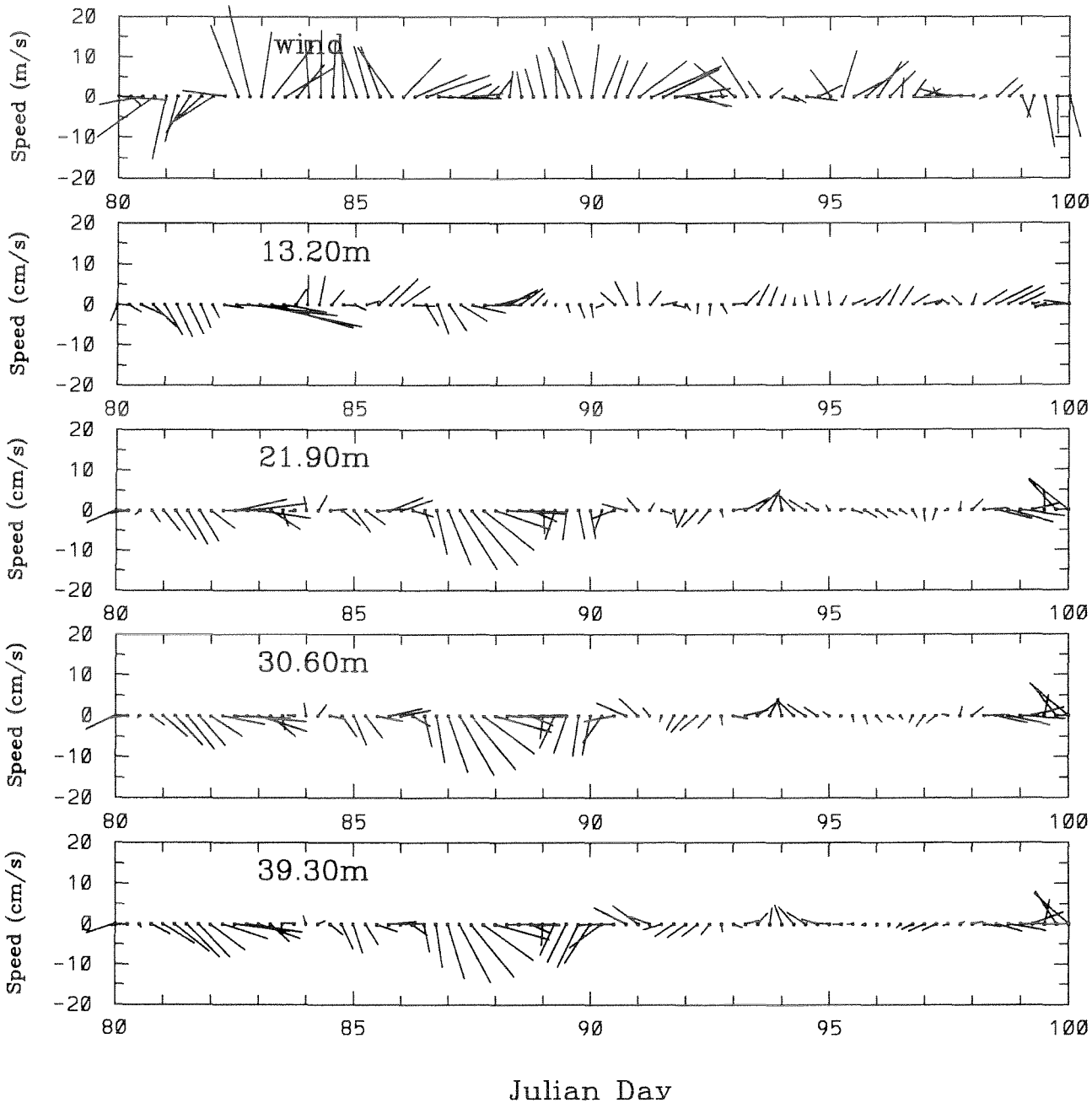

RDI 134.8m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
106
116
126

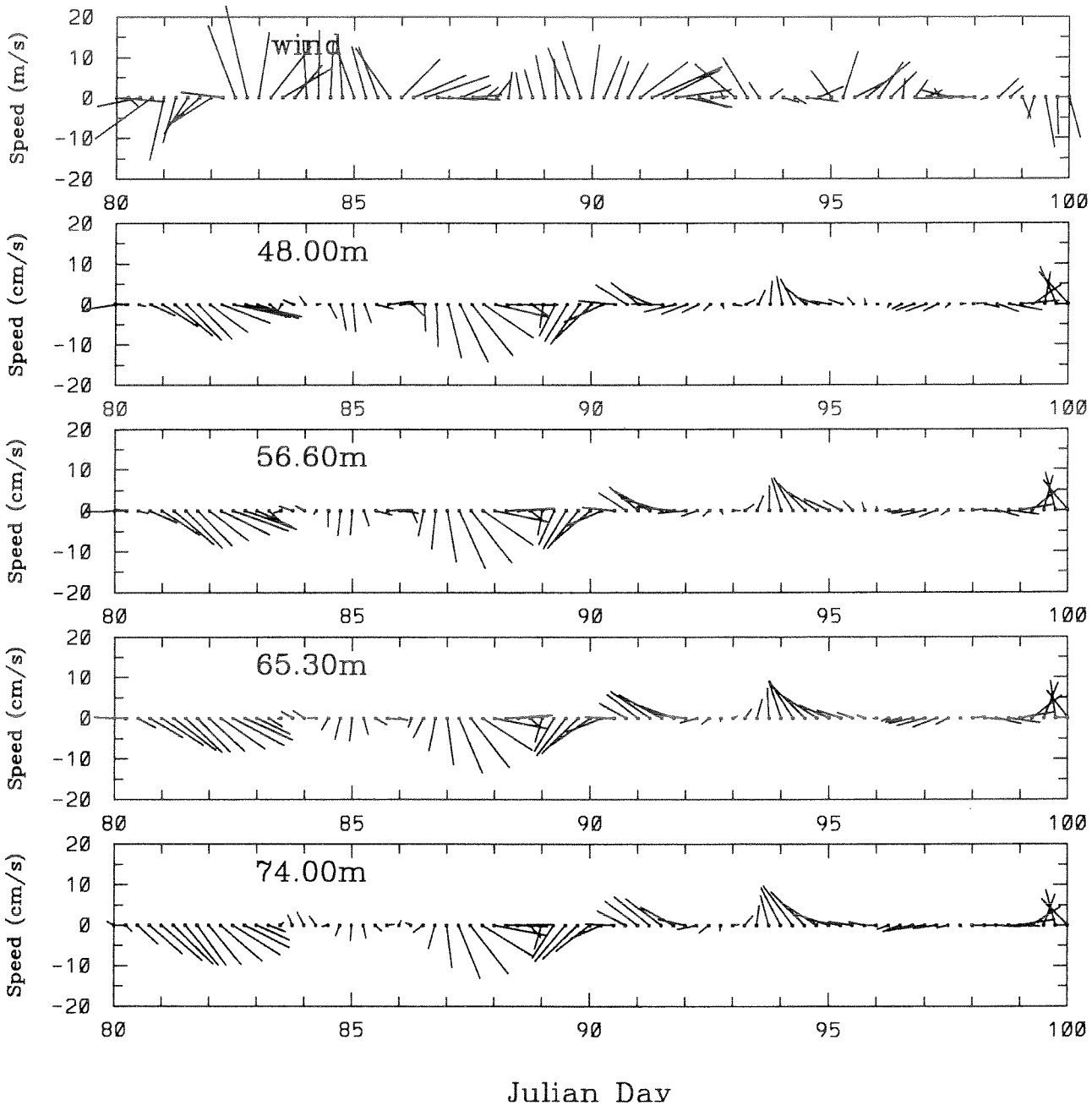

RDI 143.4m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

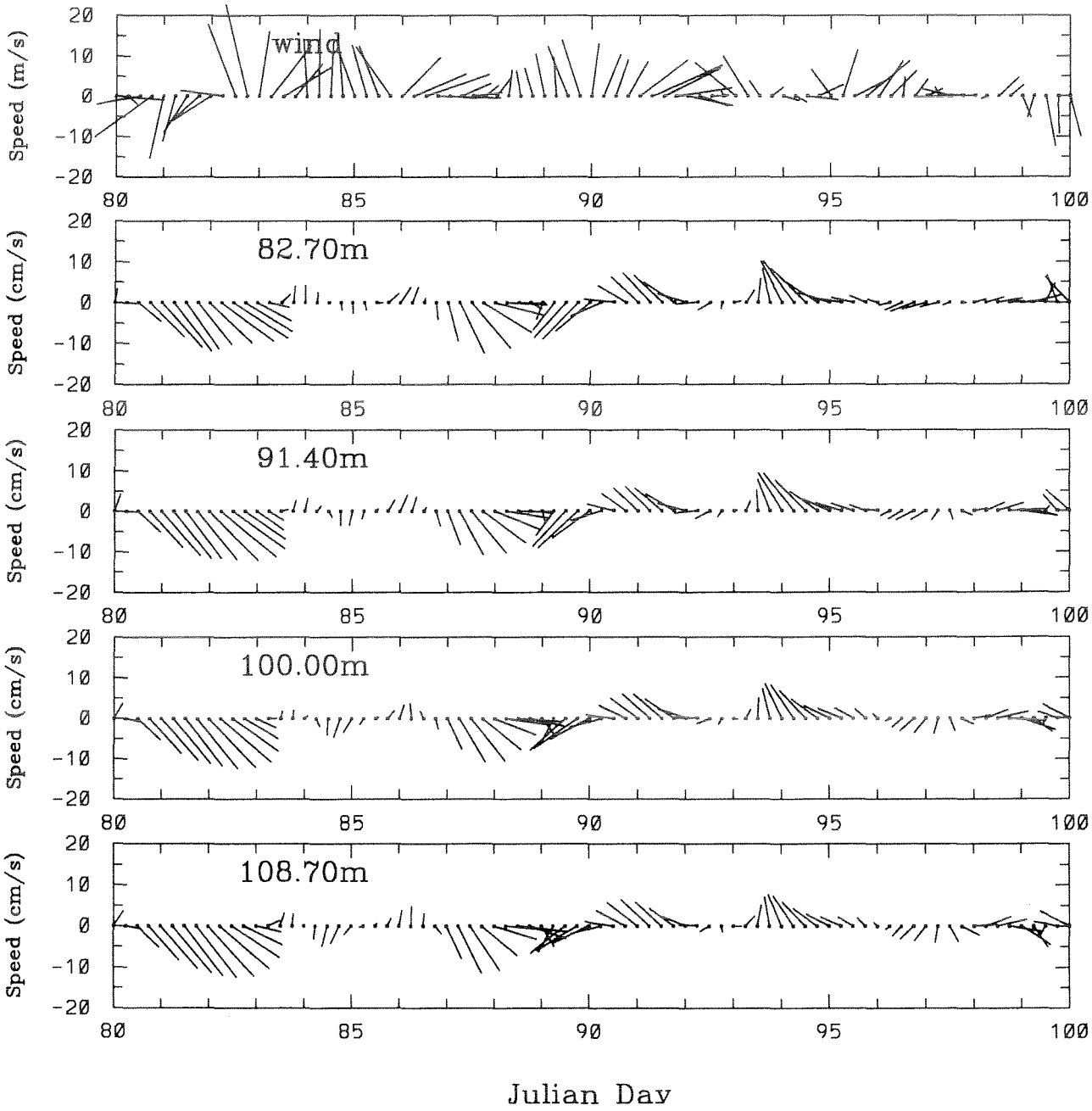

RDI 152.1m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

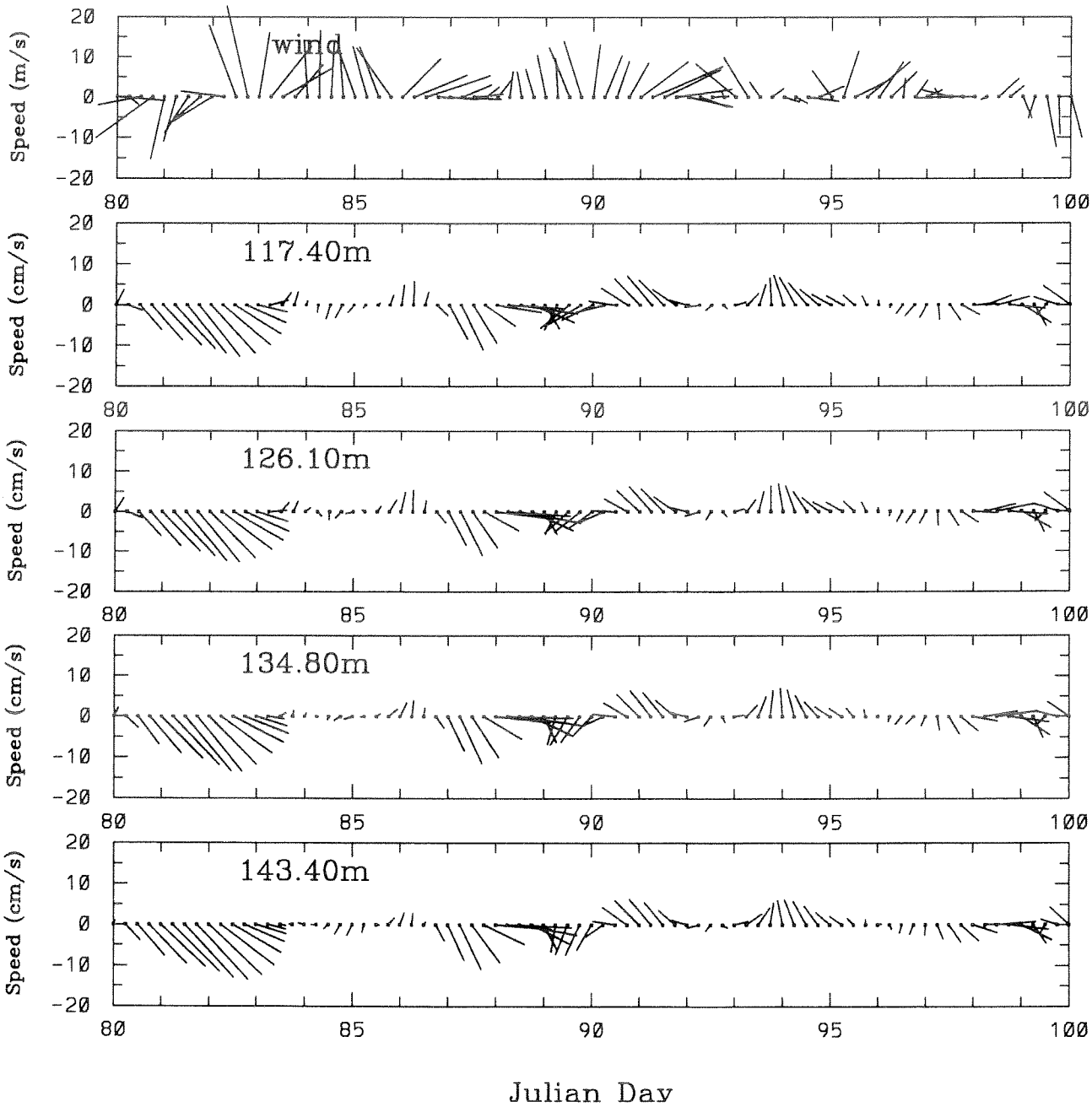

RDI 160.8m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

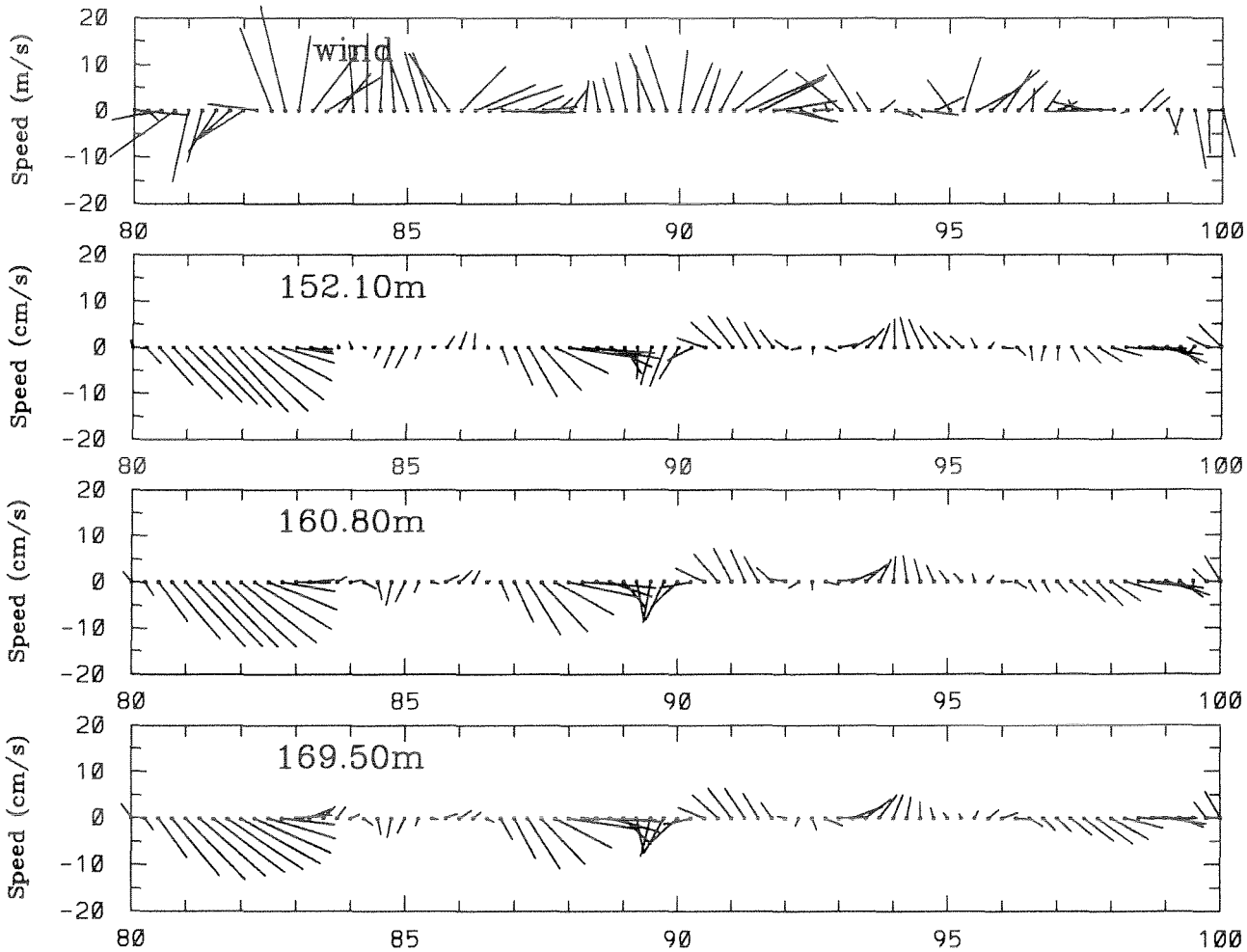

RDI 169.5m
100
0
-100
-200
-300
-400
Kilometers
-100
0
100
200
300
400
Kilometers
76
86
96
106
116
126

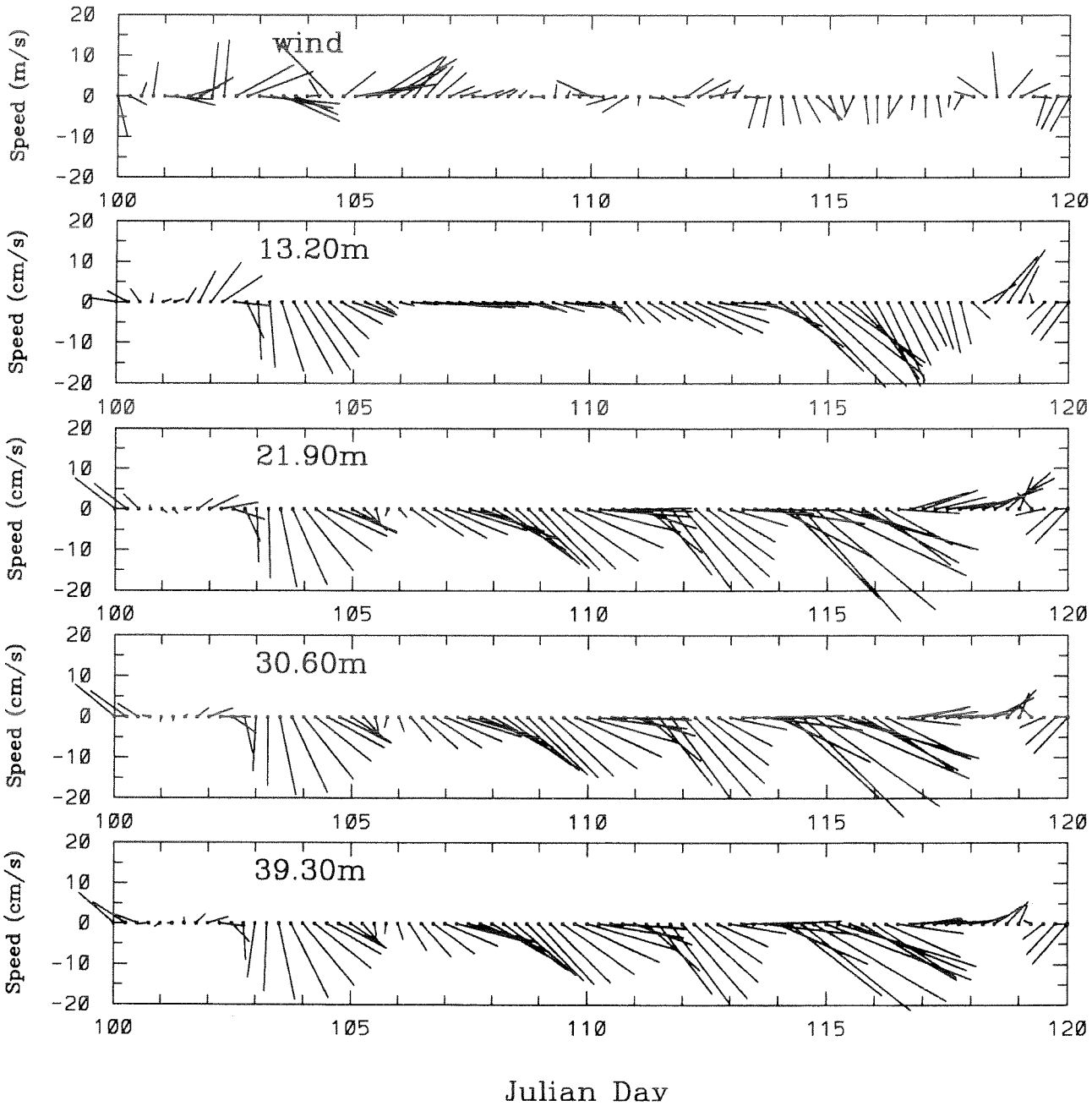

wind
13.20m
21.90m
30.60m
39.30m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
80
85
90
95
100
Julian Day

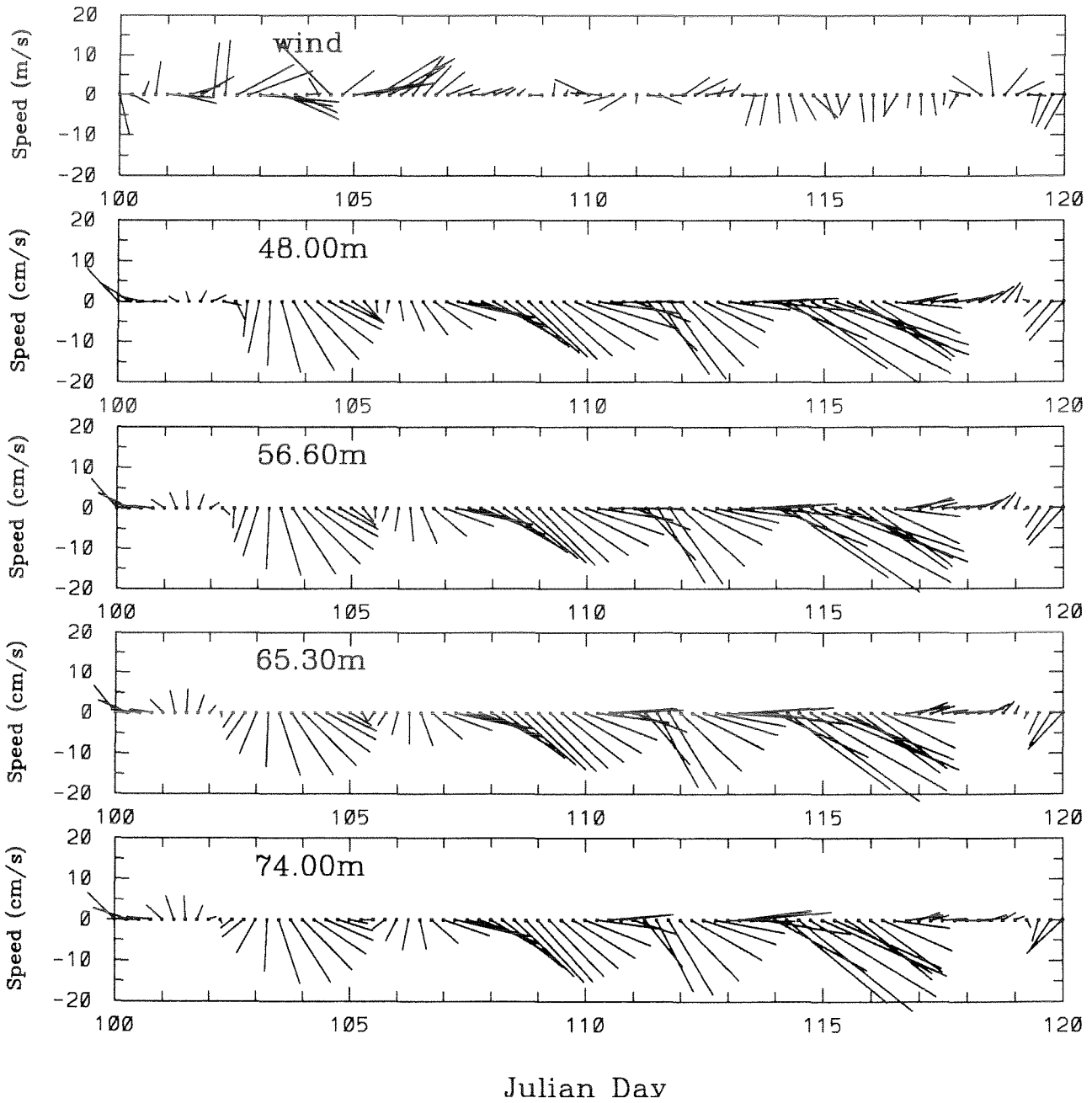

wind
48.00m
56.60m
65.30m
74.00m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
80
85
90
95
100
Julian Day

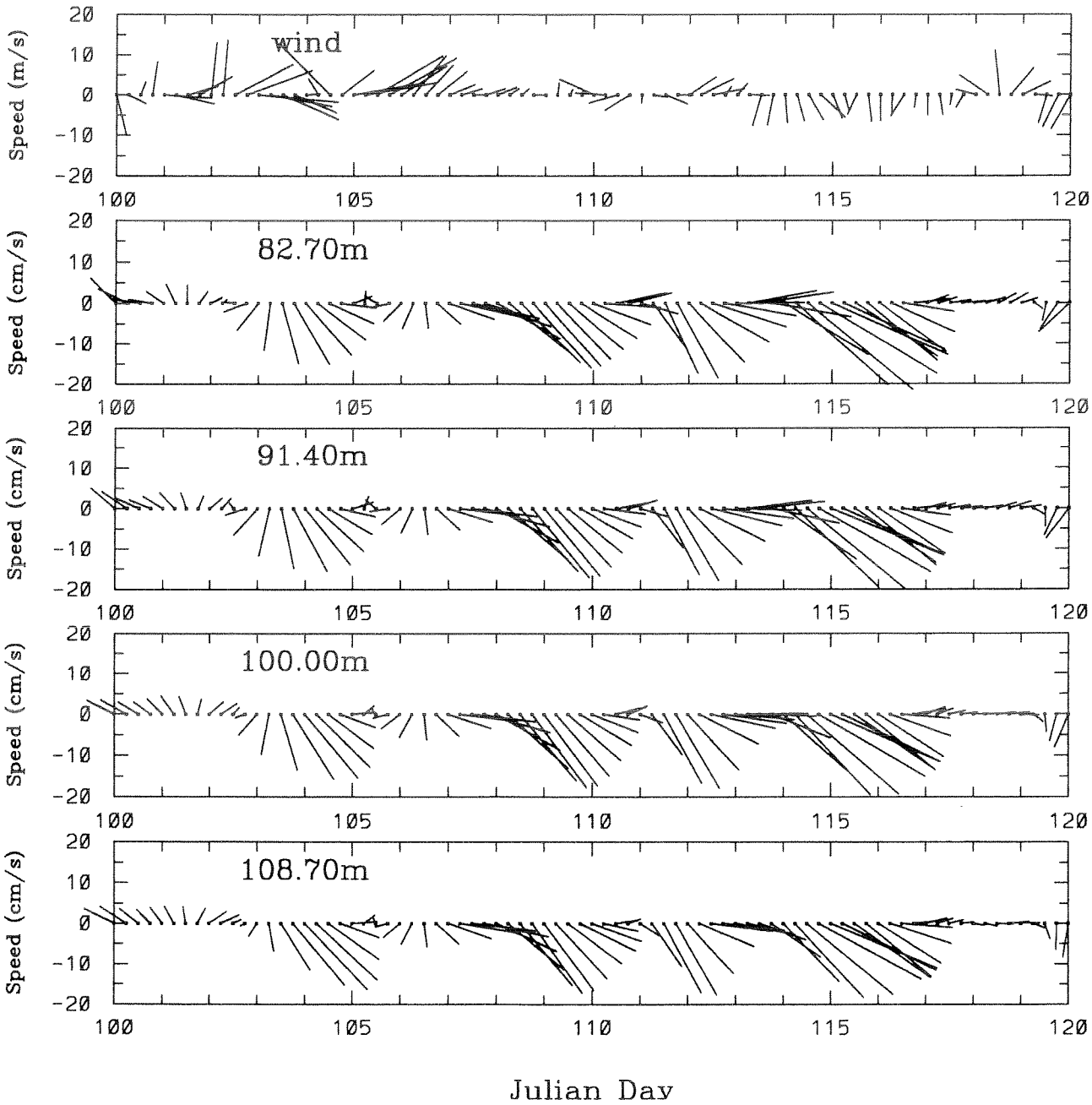

wind
82.70m
91.40m
100.00m
108.70m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
80
85
90
95
100
Julian Day

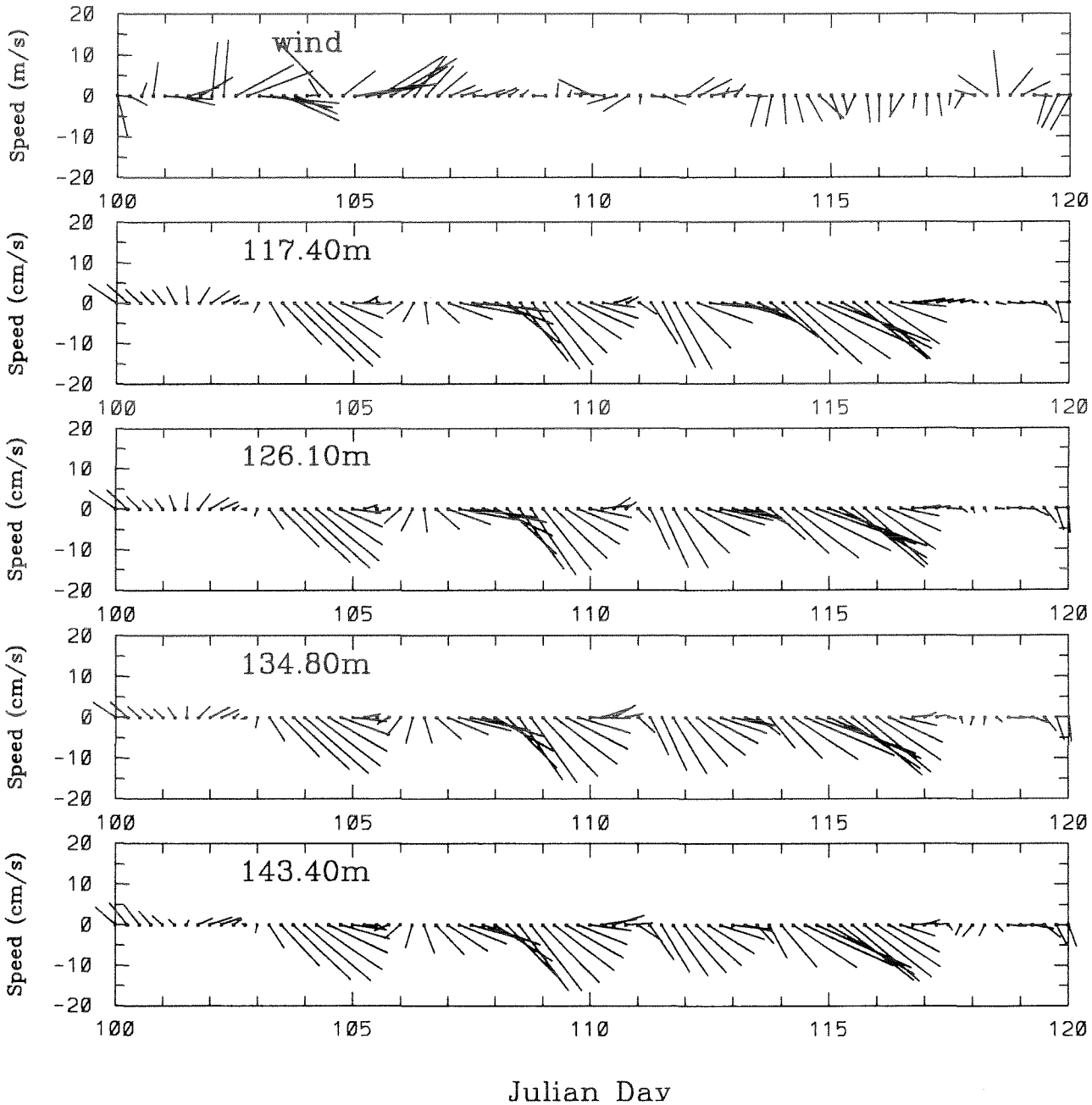

wind
117.40m
126.10m
134.80m
143.40m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
80
85
90
95
100
Julian Day

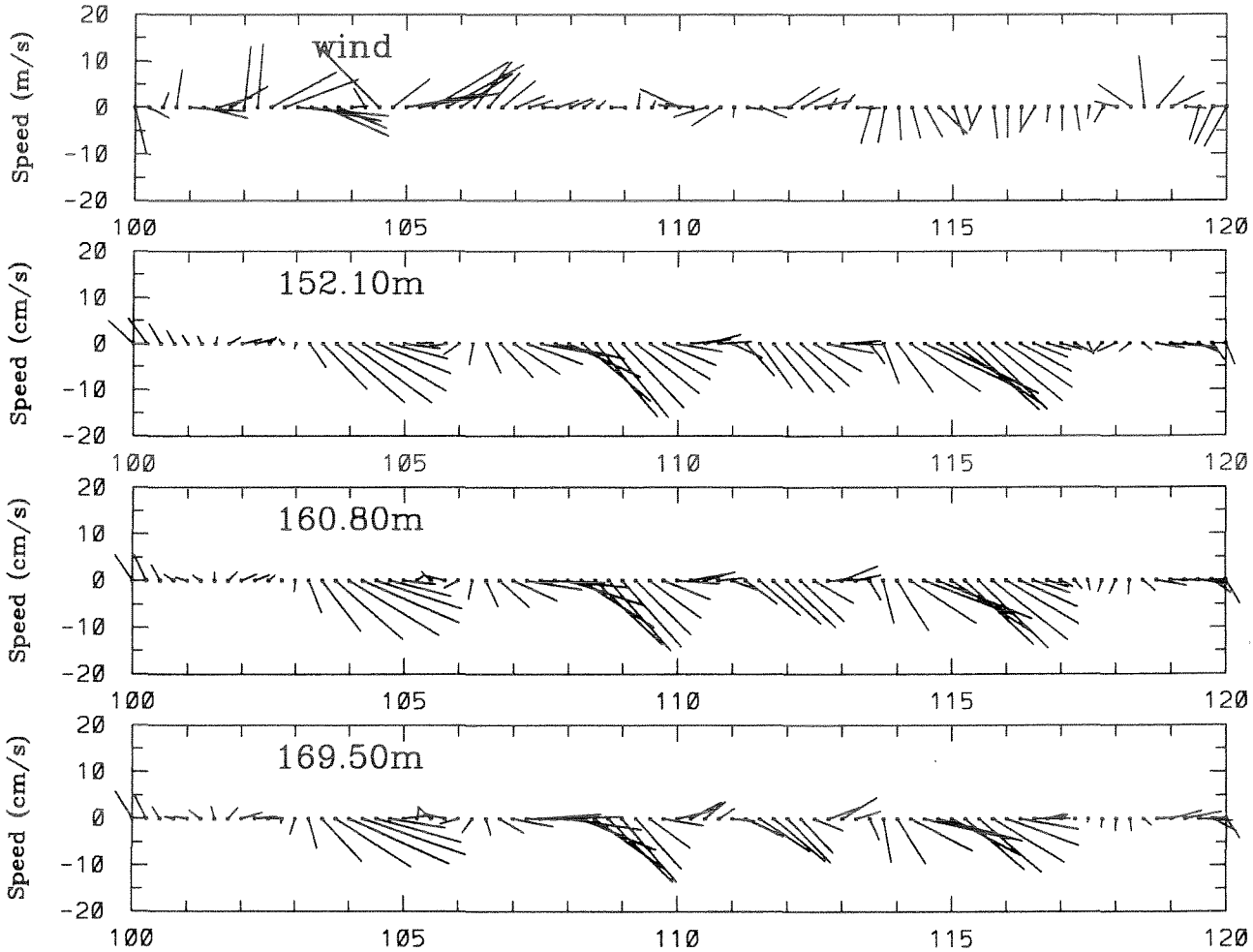

wind
152.10m
160.80m
169.50m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
80
85
90
95
100

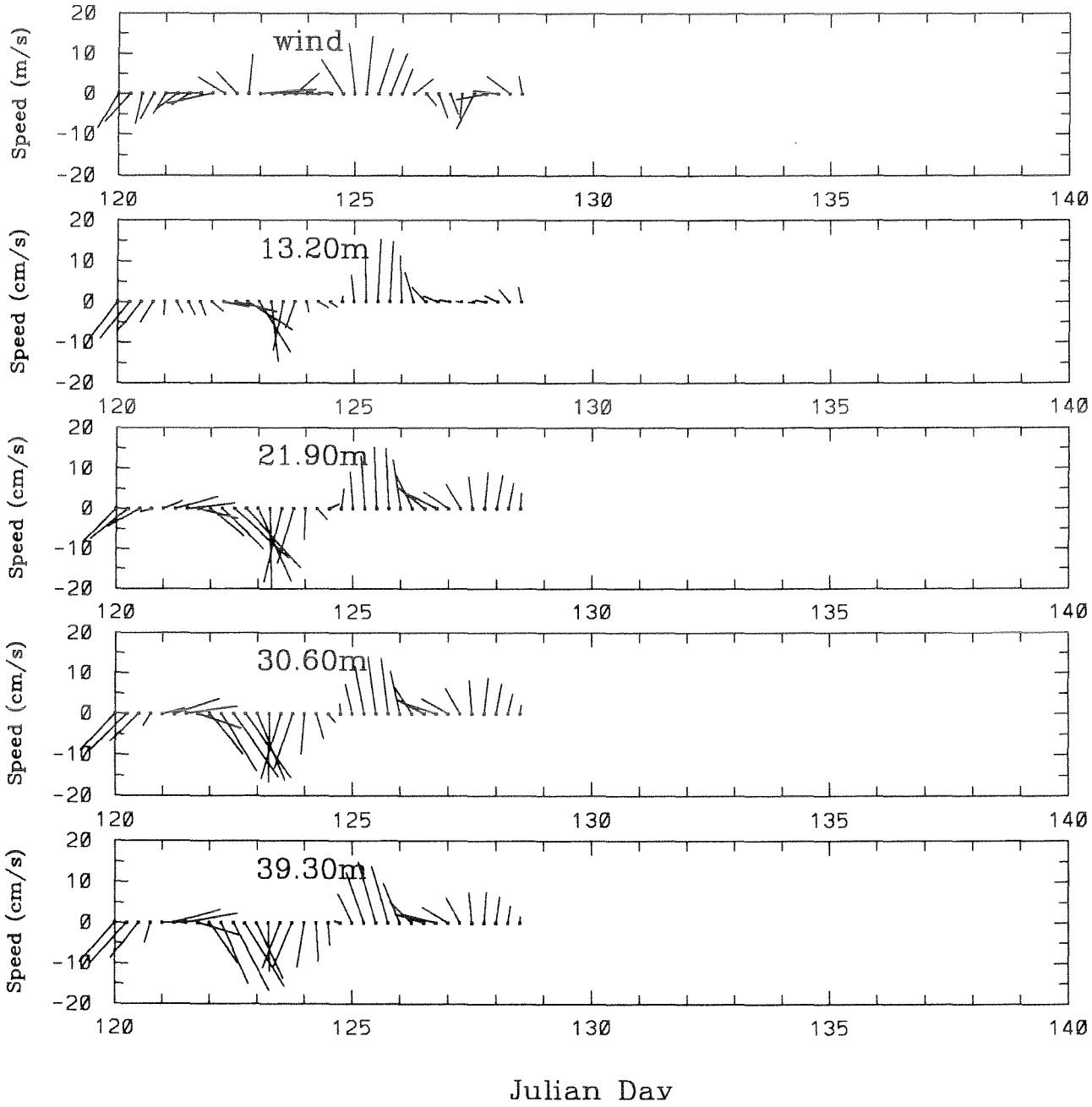

wind
13.20m
21.90m
30.60m
39.30m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
100
105
110
115
120
Julian Day

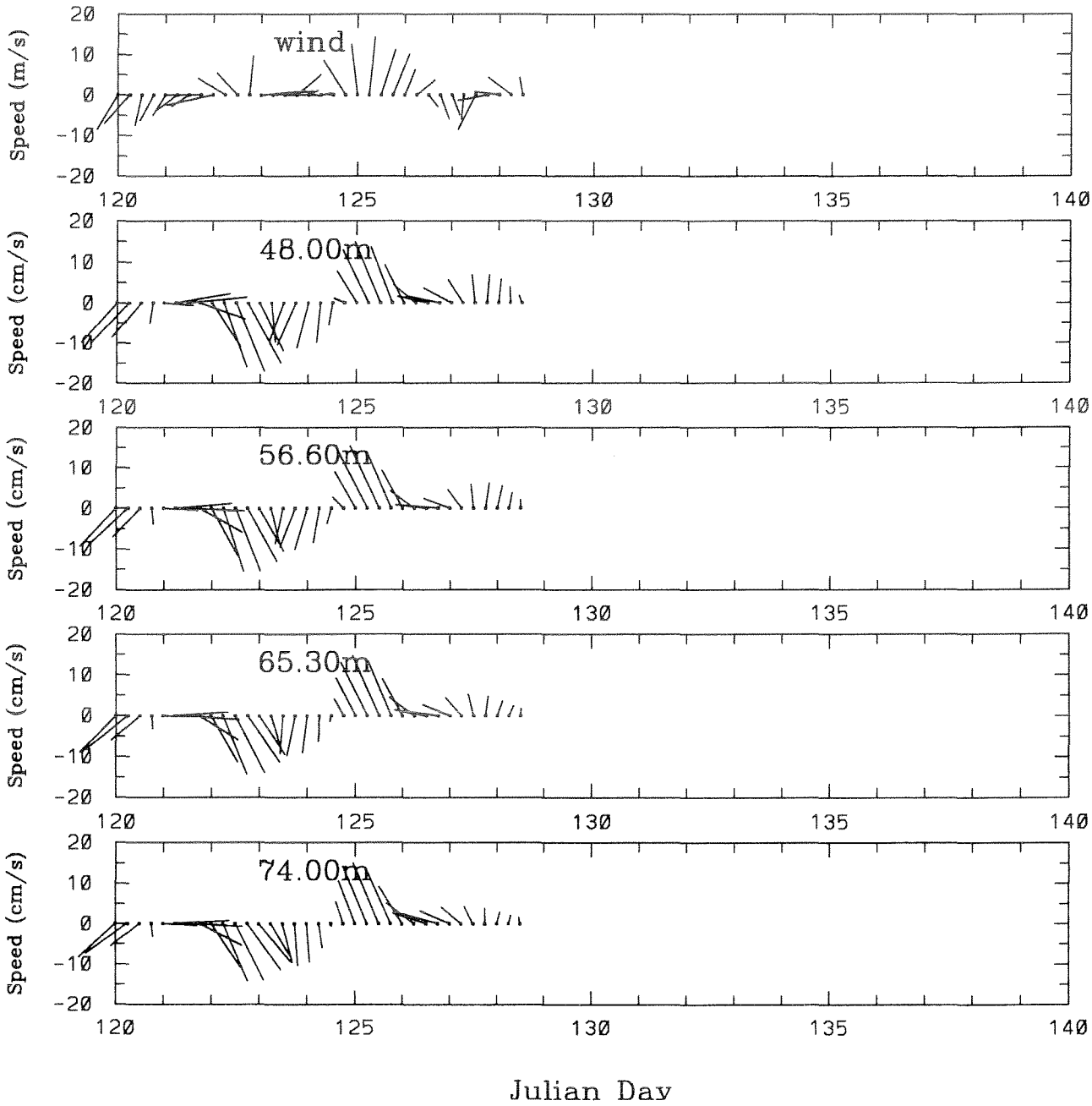

wind
48.00m
56.60m
65.30m
74.00m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
100
105
110
115
120
Julian Day

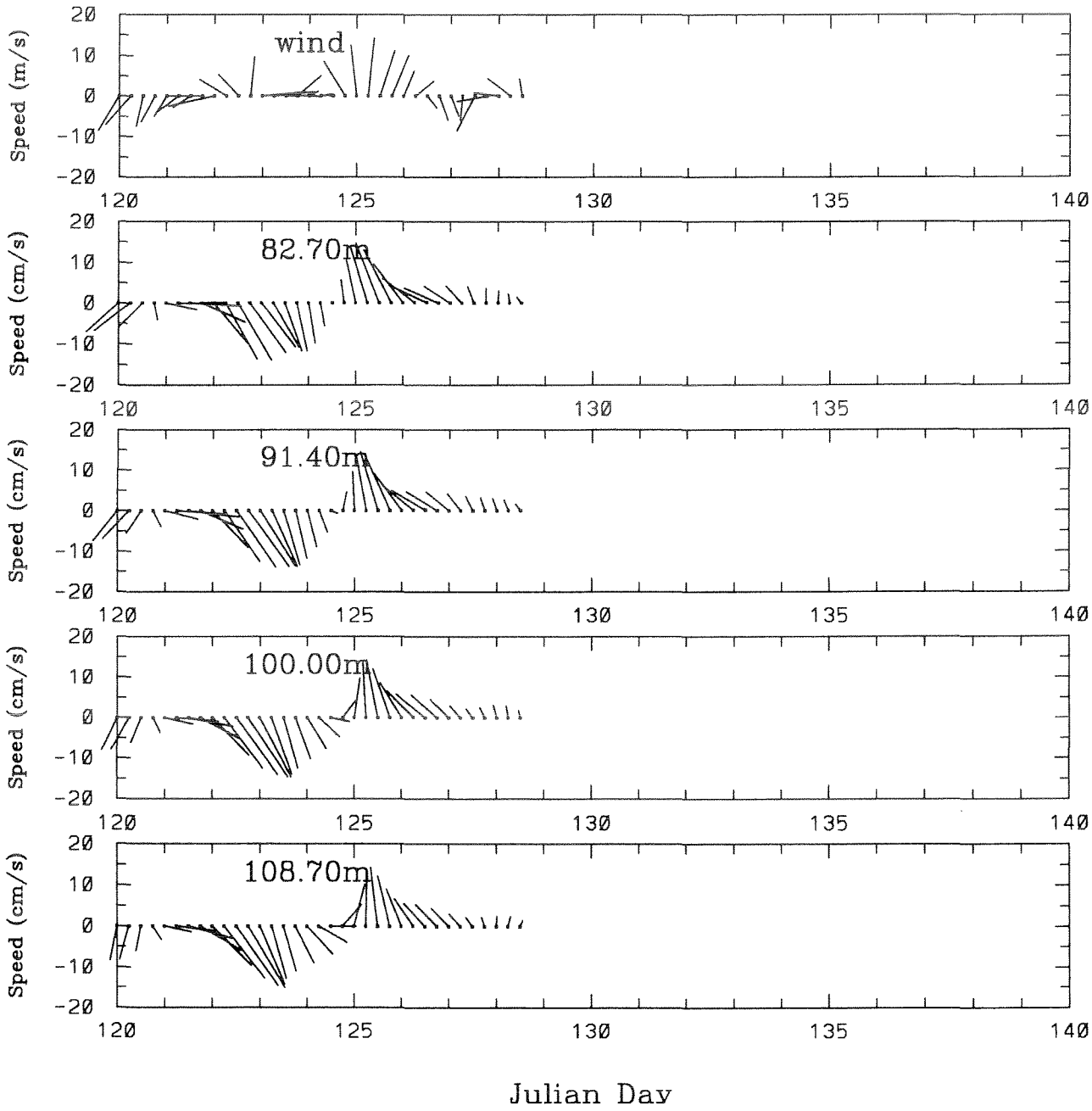

wind
82.70m
91.40m
100.00m
108.70m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
100
105
110
115
120
Julian Day

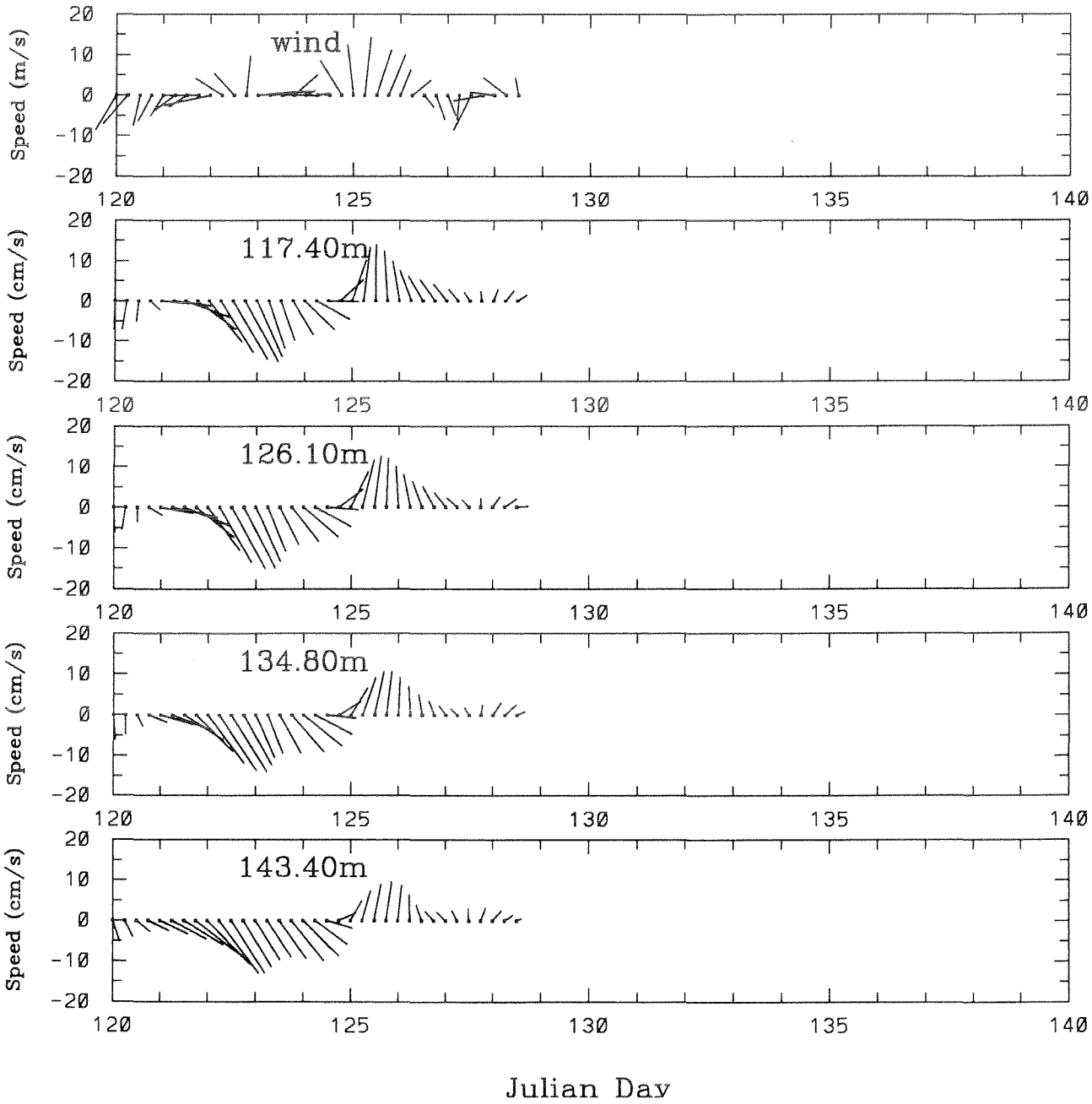

wind
117.40m
126.10m
134.80m
143.40m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
100
105
110
115
120
Julian Day

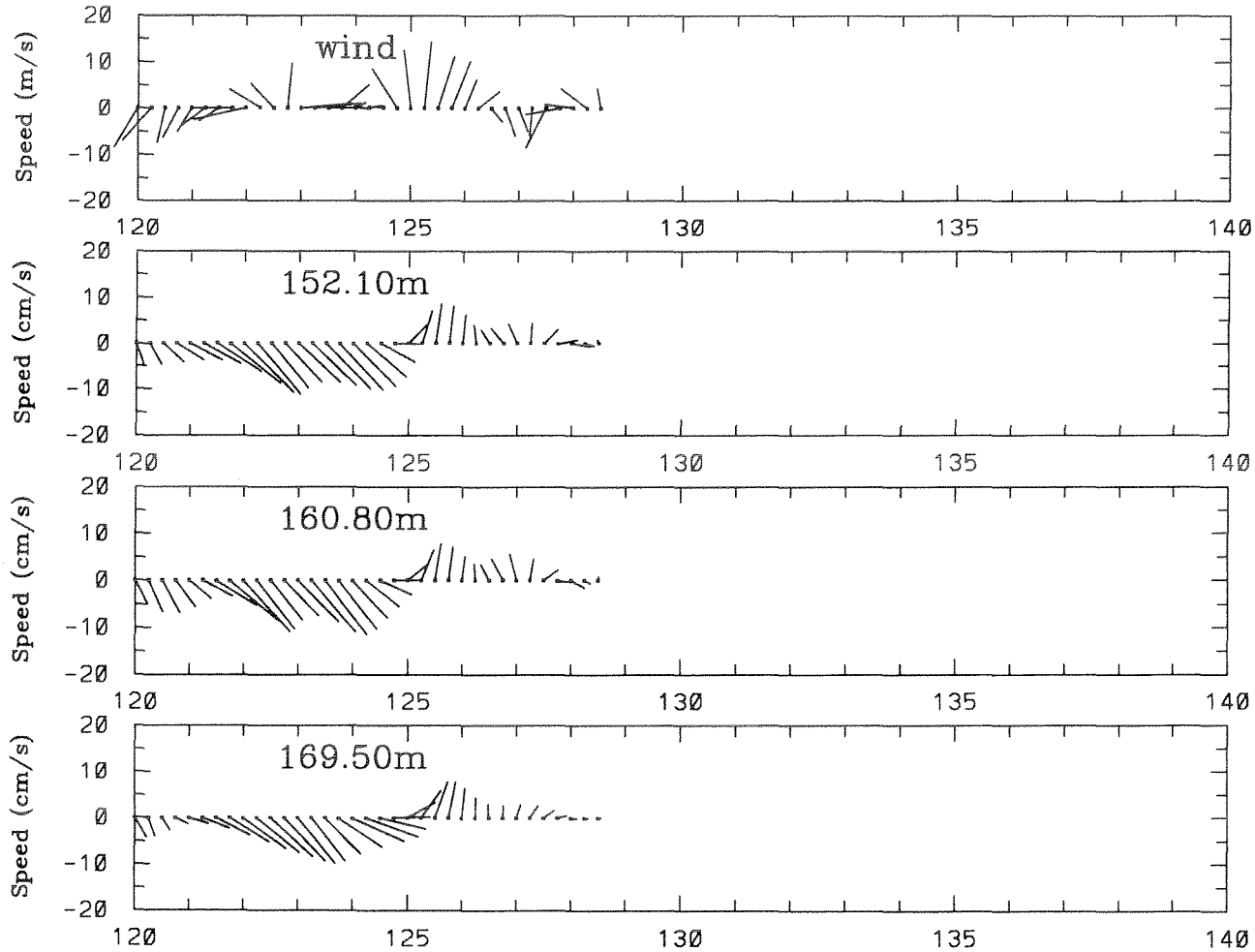

wind
152.10m
160.80m
169.50m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
100
105
110
115
120


wind
13.20m
21.90m
30.60m
39.30m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
120
125
130
135
140
Julian Day


wind
48.00m
56.60m
65.30m
74.00m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
120
125
130
135
140
Julian Day


wind
82.70m
91.40m
100.00m
108.70m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
120
125
130
135
140
Julian Day


wind
117.40m
126.10m
134.80m
143.40m
Speed (m/s)
Speed (cm/s)
20
10
0
-10
-20
120
125
130
135
140
Julian Day


wind
Speed (m/s)
152.10m
Speed (cm/s)
160.80m
Speed (cm/s)
169.50m
Speed (cm/s)
20
10
0
-10
-20
120
125
130
135
140

Conversion between Calendar and Julian dates for 1992

Julian	Calendar	Julian	Calendar	Julian	Calendar
61	March 1	92	April 1	122	May 1
62	2	93	2	123	2
63	3	94	3	124	3
64	4	95	4	125	4
65	5	96	5	126	5
66	6	97	6	127	6
67	7	98	7	128	7
68	8	99	8	129	8
69	9	100	9	130	9
70	10	101	10	131	10
71	11	102	11	132	11
72	12	103	12	133	12
73	13	104	13	134	13
74	14	105	14	135	14
75	15	106	15	136	15
76	16	107	16	137	16
77	17	108	17	138	17
78	18	109	18	139	18
79	19	110	19	140	19
80	20	111	20	141	20
81	21	112	21	142	21
82	22	113	22	143	22
83	23	114	23	144	23
84	24	115	24	145	24
85	25	116	25	146	25
86	26	117	26	147	26
87	27	118	27	148	27
88	28	119	28	149	28
89	29	120	29	150	29
90	30	121	30	151	30
91	31			152	31