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AXBT Measurements in the Iceland-Faeroe Frontal Zone, June 1989

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J. D. Boyd
Oceanography Division
Ocean Science Directorate

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Abstract

In summer 1989, extensive shipboard oceanographic measurements were made in the Norwegian and Iceland Seas by the SACLANT Undersea Research Centre. In support of this, two sets of RP-3A aircraft flights collected 180 AXBT (air deployed expendable bathythermograph) depth-temperature profiles in the Iceland-Faeroe Frontal Zone between Iceland and the Faeroe Islands. The first two flights took place on 7 and 8 June 1989, and the second flight on 19 June. This technical note describes the experimental plan and the data acquisition and processing techniques used and presents the resulting data in graphical and tabular form.

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Acknowledgments

The aircraft was provided by the Naval Research Laboratory. Richard Myrick and Steven Sova of the Physical Oceanography Branch of the Naval Oceanographic and Atmospheric Research Laboratory and Michael Wilcox and Robert Linzell of Planning Systems, Inc., participated in various phases of the data collection and analysis. Funding and the AXBT's themselves were provided by the Office of Naval Research, Code 12SP, W. V. Harned Program Manager, under Program Element 65857N.

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AXBT Measurements in the Iceland-Faeroe Frontal Zone, June 1989

Introduction

In summer 1989, extensive shipboard oceanographic measurements were made in the Norwegian and Iceland Seas by the SACLANT Undersea Research Centre, La Spezia, Italy. In support of this, two sets of RP-3A aircraft flights collected 180 AXBT (air deployed expendable bathythermograph) depth-temperature profiles in the Iceland-Faeroe Frontal Zone between Iceland and the Faeroe Islands. The first phase of two flights took place on 7 and 8 June 1989. The second phase was also intended to consist of two flights, but only one flight was successfully concluded, on 19 June. A succession of mechanical problems unfortunately prevented the fourth flight from taking place either on 20 June or within the following several days.

Experimental Plan and Operations Description

The study area is shown in Fig. 1. The three successful flights on 7, 8, and 19 June 1989 were conducted out of Keflavik, in Iceland. Along-track drop spacing ranged from 14 nmi (26 km) in the expected vicinity of the front to 29 nmi (54 km) in regions expected to be less spatially variable. Between-track spacing in the frontal region was about 40 nmi (74 km), although this was approximately halved to 20 nmi (37 km) by the track arrangement in some regions. As shown in Fig. 1, the tracks were set up in an interleaved fashion so that over the 2 days needed to complete each phase of the operations, each day would cover the full area at approximately half the resolution. This proved to be a wise experimental design in light of our inability to complete the fourth flight even after attempts on several separate days.

Navigation

Navigation was with the on-board Litton 72 Inertial Navigation System. Navigation errors upon landing were: 6.8 nmi (12.6 km) at the conclusion of the 7 June flight, 1 (1.9 km) nmi at the conclusion of the 8 June flight, and 9 nmi (16.7 km) at the conclusion of the 19 June flight. Drops were made at between 10,000 - 20,000 ft. Ground speed ranged between 260 - 320 kt, and indicated air speed ranged between 220 - 250 kt, depending upon winds at flight level.

Data Collection and Processing

All AXBT's were 305 m (shallow) models manufactured by Sippican Ocean Systems, Marion, MA, under contract numbers N00163-85-C-0001 and N00163-87-C-0001. Failure rates were modest, less than 8%.

The data were collected and processed with the NOARL (Naval Oceanographic and Atmospheric Research Laboratory) Code 331 Isis aircraft system, the organization and capabilities of which are given in Figs. 2 - 4. The raw data (and replayed data) were initially acquired at 10 samples per second (about every 15 cm in depth) and were then filtered with a 21 point (2.1 s) median filter to remove most of the one to several point data spikes and other "glitches" that occurred in the data. The raw data were then converted to engineering units using the Navy standard conversion equations. For temperature this is

$$T = -40.0 + 0.02778F,$$

where F is frequency in hertz and T is temperature in °C. The Navy standard requires the temperature accuracy to be about ±0.55° C within the range -2° to 35° C, and Boyd (1987) has shown this to hold.

The Navy standard elapsed-fall-time to depth conversion equation is

$$z = 1.52t,$$

where z is depth in meters and t is elapsed time after probe release in seconds. The standard requires the depth be accurate to ±5% down to 305 m, and studies done on earlier AXBT versions have shown this is usually the case (Boyd, 1987).

After conversion to engineering units, the data were decimated to 1-m resolution and a final 9-point median filter was applied to complete the smoothing process. The processed data were then visually scanned to detect instances were the probes had hit bottom and to remove occasional data spikes at the beginning and ending of the profile that were not removed by the filtering process. The data were then archived in 1 m and 2 m form.

Results

The Iceland-Faeroe Frontal Zone, lying along the Iceland-Faeroe Ridge between Iceland and the Faeroe Islands, represents the boundary between the warmer and less dense North Atlantic waters and the colder and denser Norwegian and Iceland Sea waters. A large loop is often observed around 64.5°N, 11°W, where cooler waters from the Iceland Current appear to penetrate south and warmer North Atlantic waters penetrate north. In general, scales of both temporal and spatial variability within the front are short, making it impossible to obtain synoptic surveys of the region by ship, and the area is often cloud-covered, making monitoring by infrared sensing satellites difficult. Aircraft are the only platforms capable of making even near-synoptic surveys of the front.

Appendix A presents the results from the combined Phase 1 surveys. Horizontal contours of temperature for selected depth levels show the frontal zone as a region of bunched isotherms, with the frontal intensity becoming less as one goes from west to east. The above mentioned frontal loop near 64.5°N, 11°W is apparent at all depths from the surface down to 300 m. The impact of the short spatial (and temporal?) scales may then be seen by comparing these results with the corresponding temperature contours from only the 7 June

survey and only the 8 June survey (Appendices B and C). The across-front sampling distance of around 40 nmi (74 km) for each separate survey is clearly inadequate to resolve significant features. The frontal loop is virtually missing from the 7 June figures, for example.

Unfortunately during Phase 2, only the first survey was completed on 19 June. The frontal loop is not seen in the figures in Appendix D, but this is probably because of the inadequate between-track spacing of about 40 nmi (74 km). The 19 June survey pattern was similar to the 7 June pattern, and the Appendix D horizontal temperature contour plots are rather more similar to the 7 June plots in Appendix B than the 8 June plots in Appendix C. However, the effect of temporal changes over 12 days is quite evident in the many differences observed when comparing the plots.

Vertical temperature contours along selected tracks are given in Appendices E (7 - 8 June) and F (19 June). These plots are quite revealing. The front is seen to be usually tied at the bottom to the Ridge; however, a striking exception to this may be seen in the 7 June Stations 56 - 64 plot and the comparable 19 June Stations 249 - 256 plot. On 7 June the front was slightly south of the shallowest portion of the Ridge, and at depth the temperature isotherms move southward away from the Ridge. On 19 June the whole front appears to have moved slightly south of the Ridge and appears to be detached from it at least in the upper 400 m.

Further evidence of temporal variability may be seen when comparing two other sets of tracks. The 8 June Stations 98 - 106 plot compared with the 19 June Stations 233 - 241 plot shows the front along that transect moved about 70 km south over those 12 days. The 19 June Stations 225 - 232 plot shows a warm core feature with a diameter of about 40 km which is completely absent from the 7 June Stations 19 - 27 plot.

Several small, subsurface cold features appear in the 8 June Stations 98 - 106 and Stations 107 - 115 plots. Two occur in the first plot, with diameters on the order of 30 and 50 km, and one in the second, with a diameter of about 50 km. Clearly features such as these can only be detected fortuitously with a spacing such as used in this study.

Some evidence for overflow of cold polar water over the Ridge towards the south is seen in the 8 June Stations 80 - 88 and Stations 89 - 97 plots, where a deep, distinctive blob of very cold water is seen on top of the Ridge (first plot) and somewhat to the south of the Ridge (second plot). Depending on how the boundaries of the blob are defined, it is on the order of 50 km or less wide. Perhaps it or a similar overflow blob is visible in the 7 June Stations 10 - 17 and Stations 98 - 106 plots, and the 19 June Stations 242 - 248 plot.

References

Boyd, J.D. (1987). Improved Depth and Temperature Conversion Equations for Sippican AXBT's. *J. Atm. Oc. Tech.*, 4: 545-551.

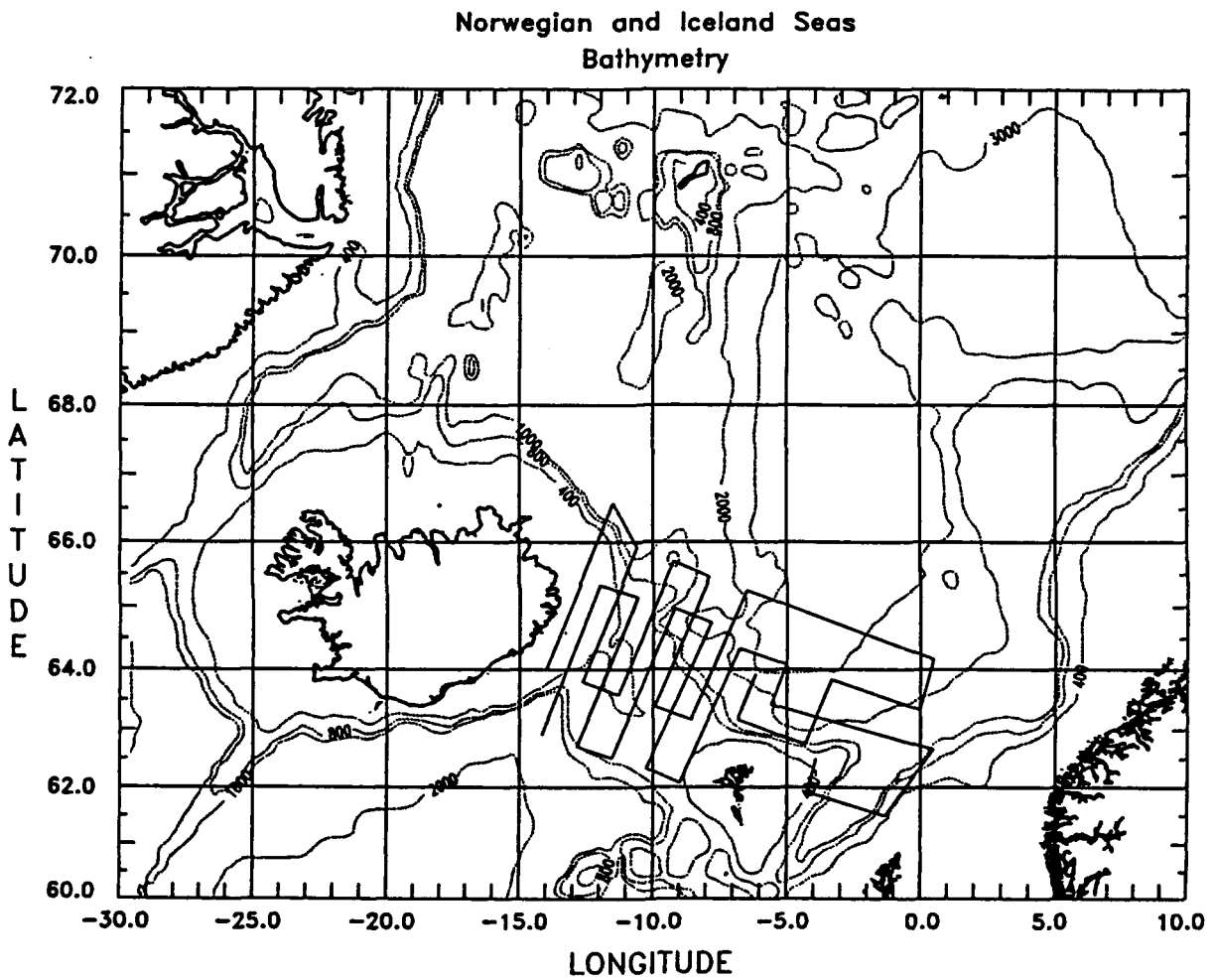


Fig. 1. The Norwegian and Iceland Seas and the study area for the June 1989 operations. The scheduled flight tracks are indicated in the Figure, with the actual flight tracks given in the Appendices.

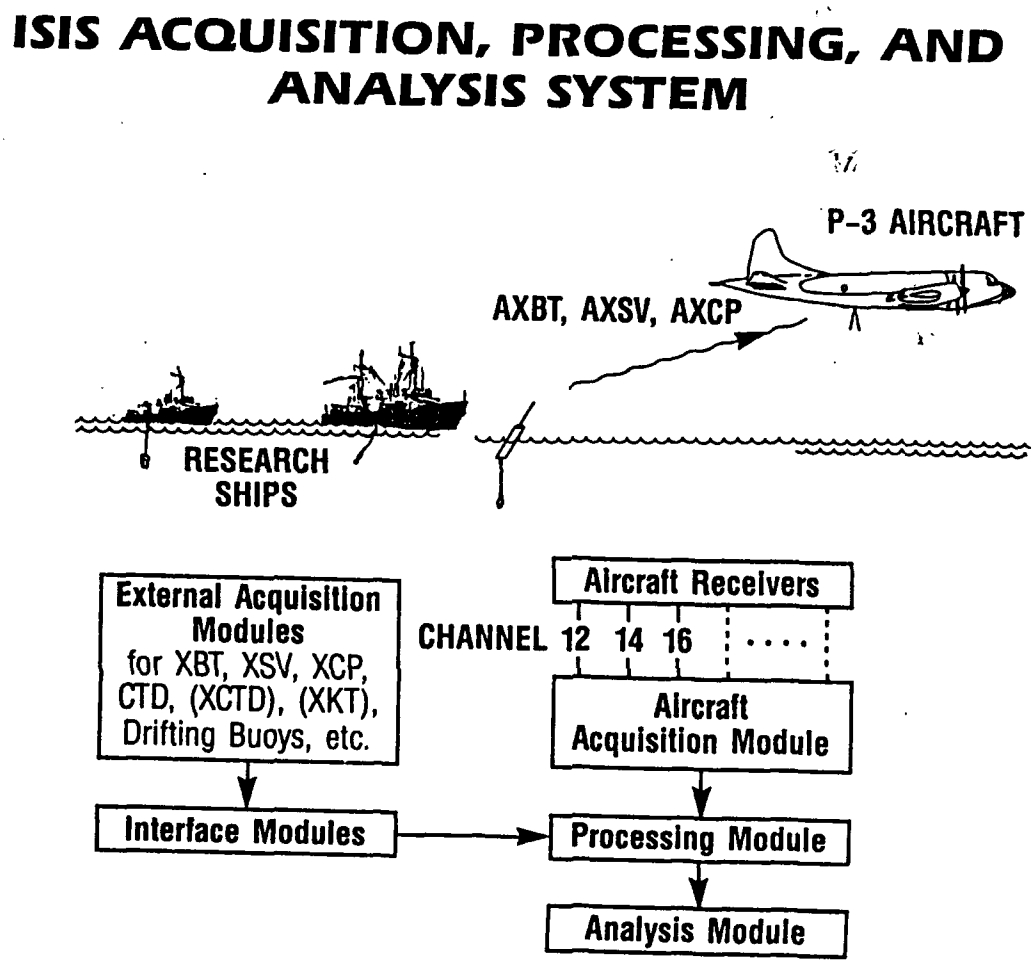


Figure 2. Schematic of the Isis acquisition, processing, and analysis system.

ISIS PROCESSING MODULE

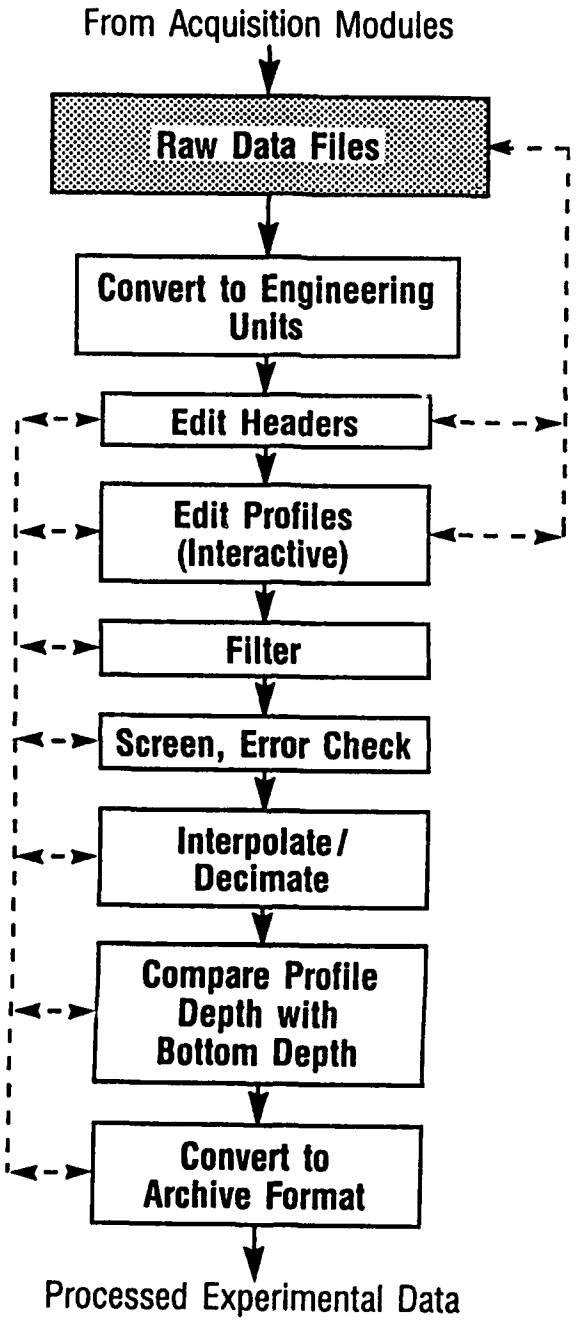


Figure 3. Isis processing system.

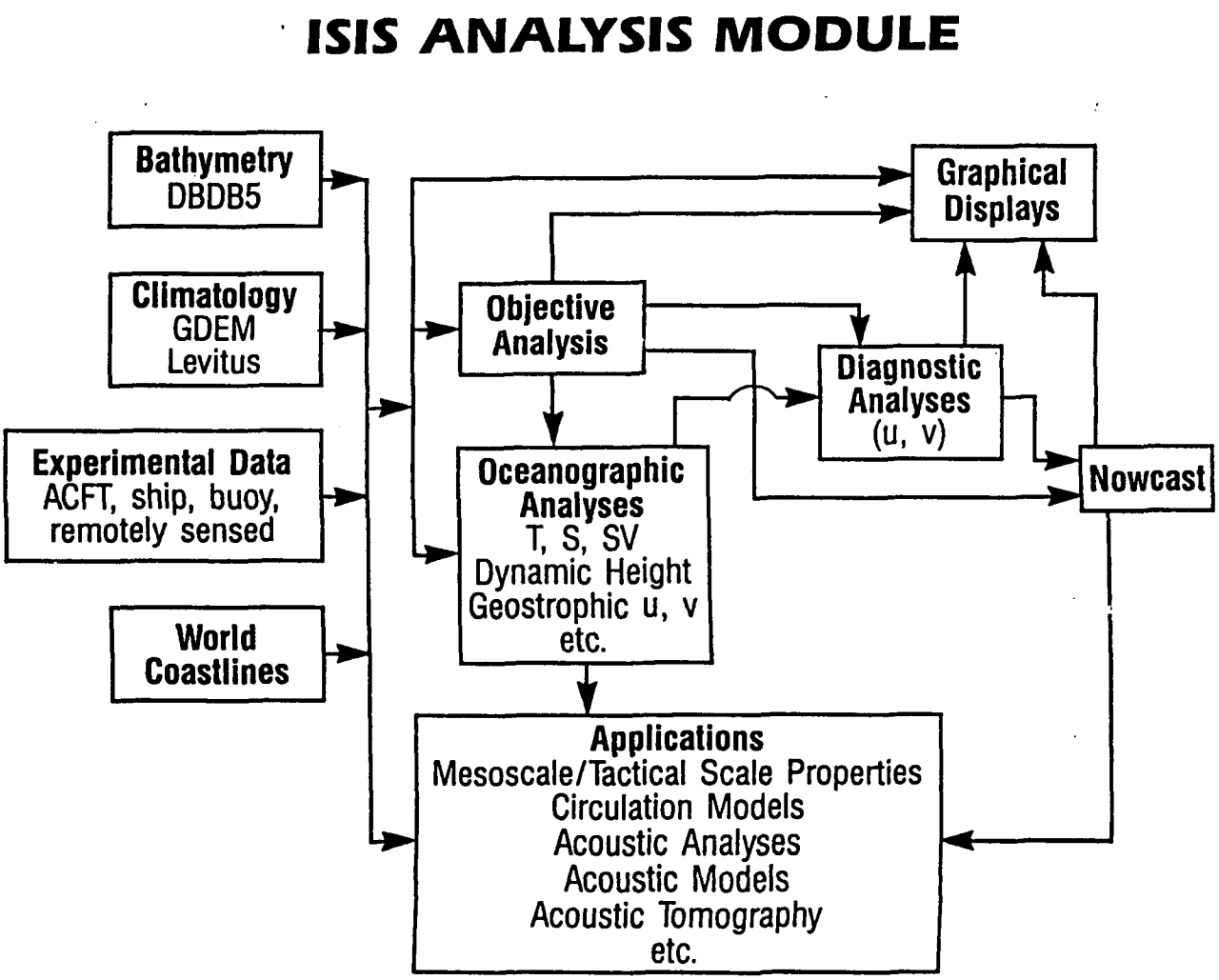
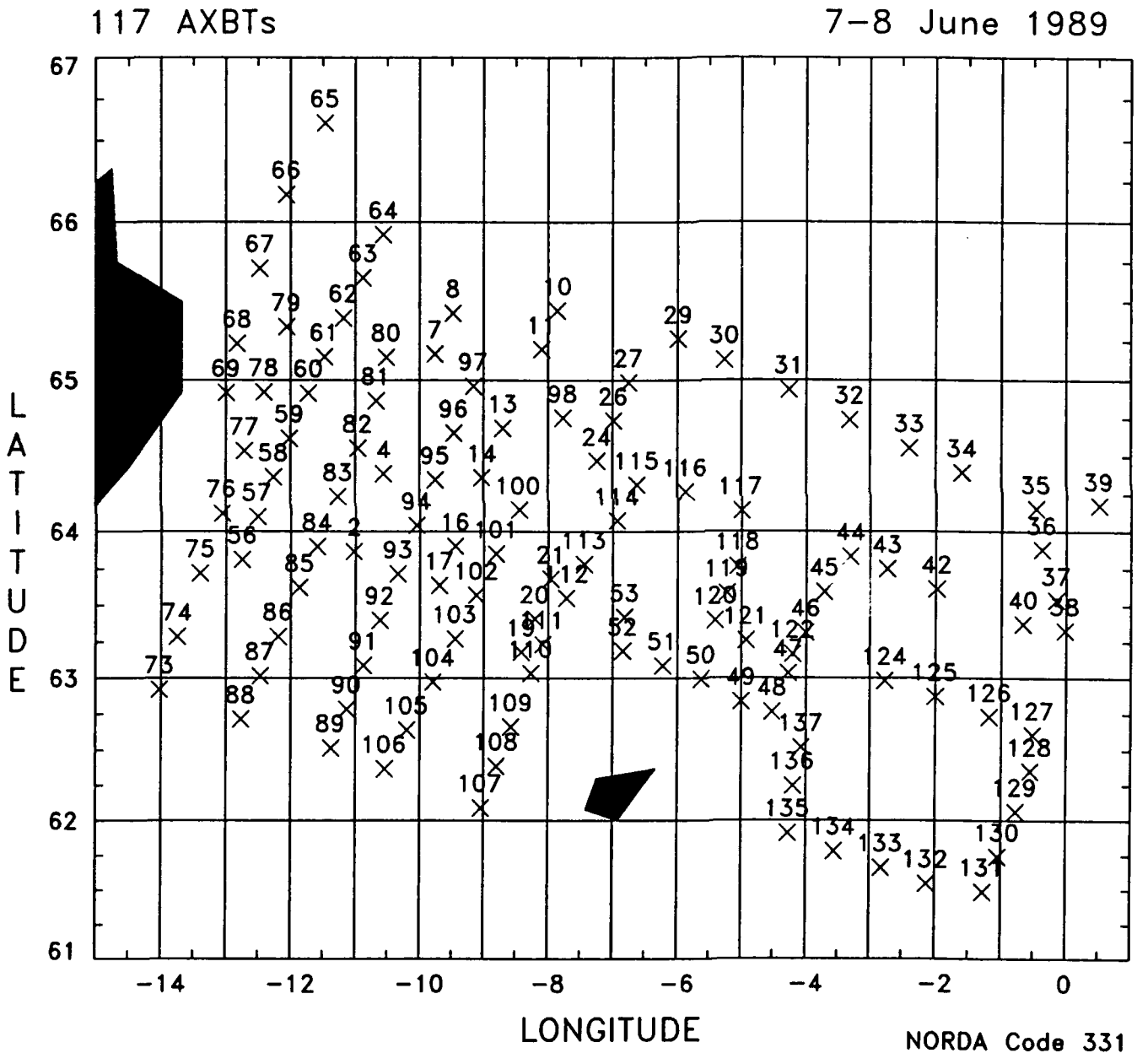


Figure 4. Isis analysis system.

Appendix A.

Temperature Contours at Selected Depths,

Combined Phase 1, 7 - 8 June 1989.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7-8 June 1989
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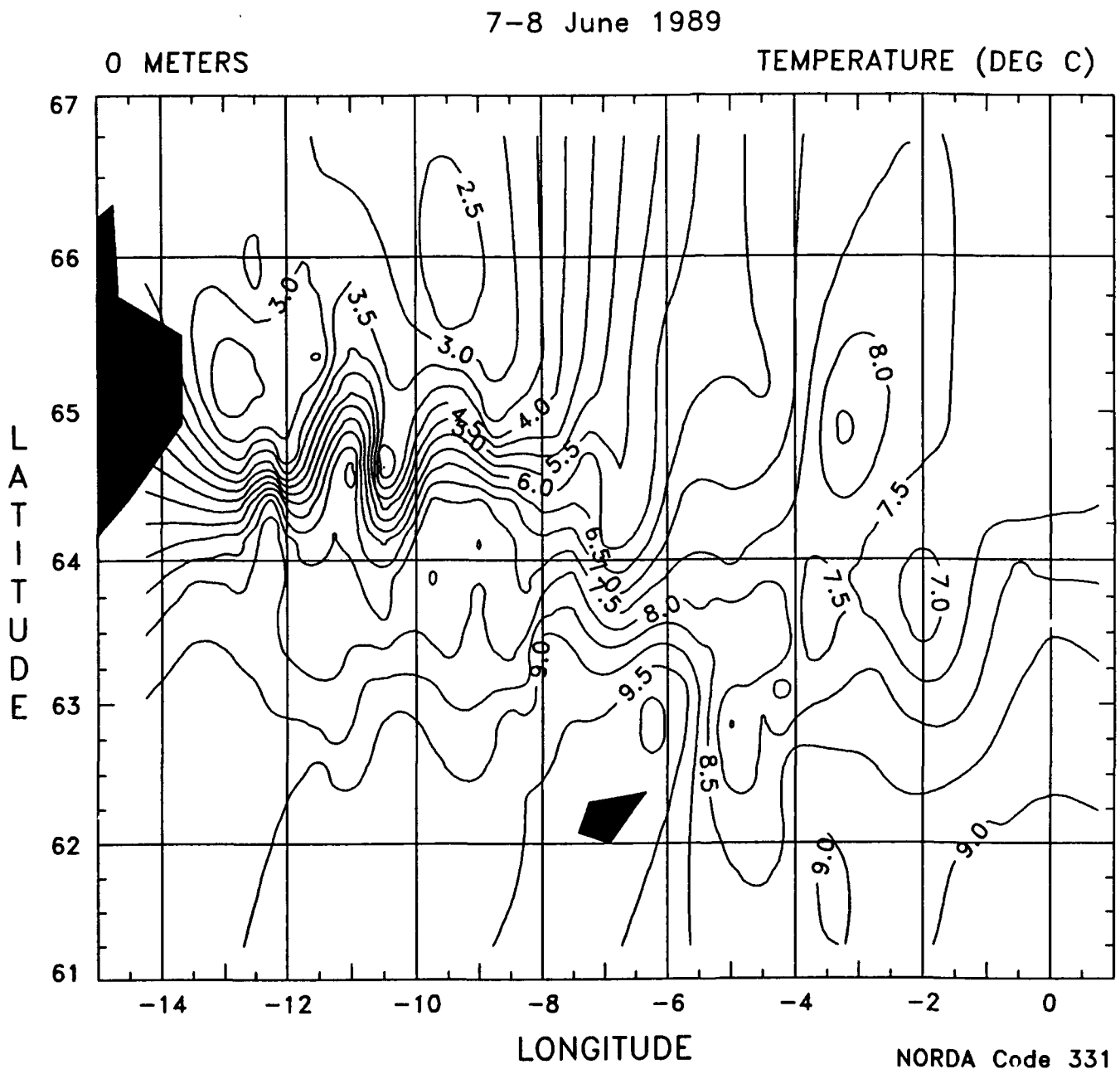
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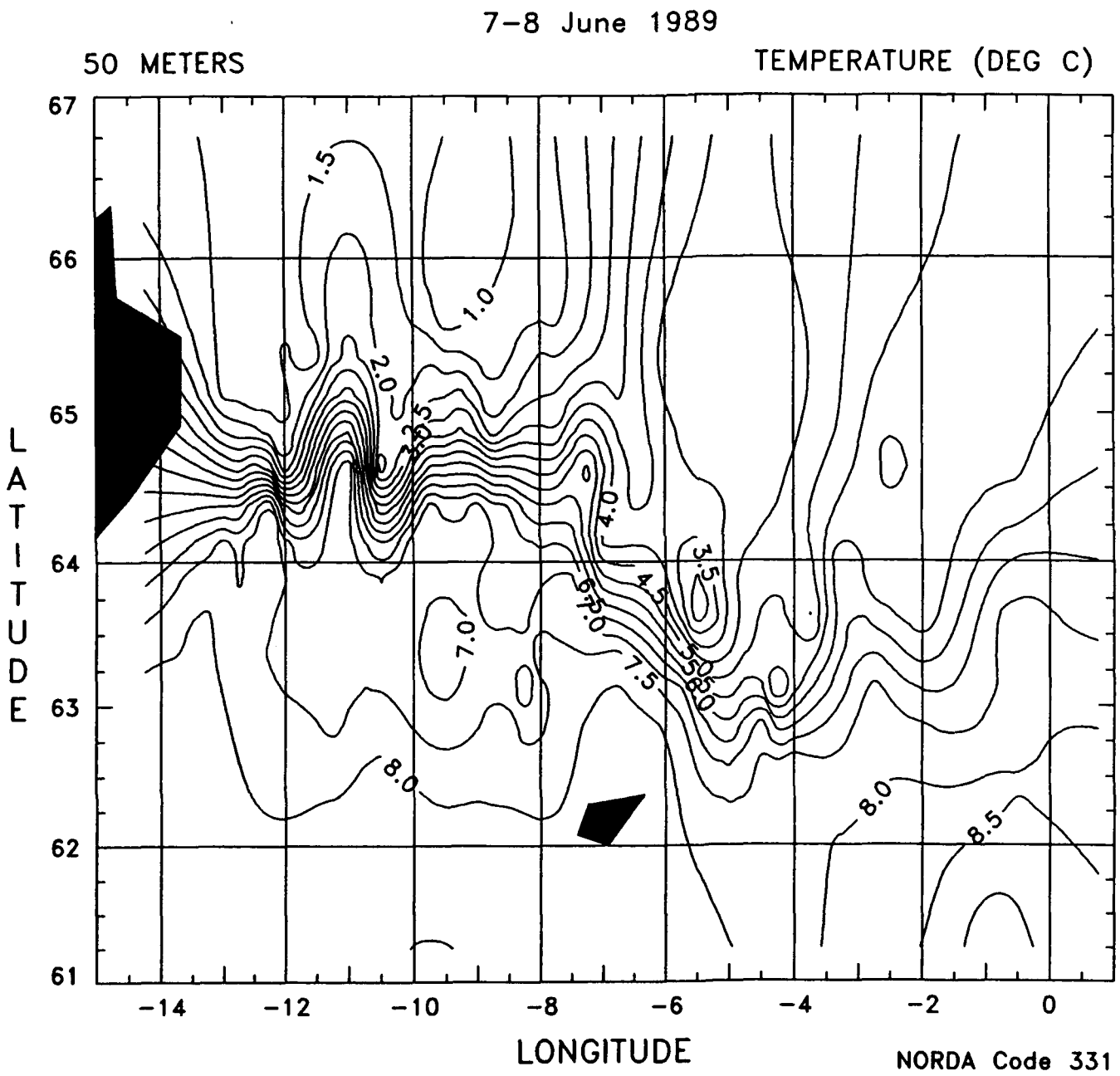
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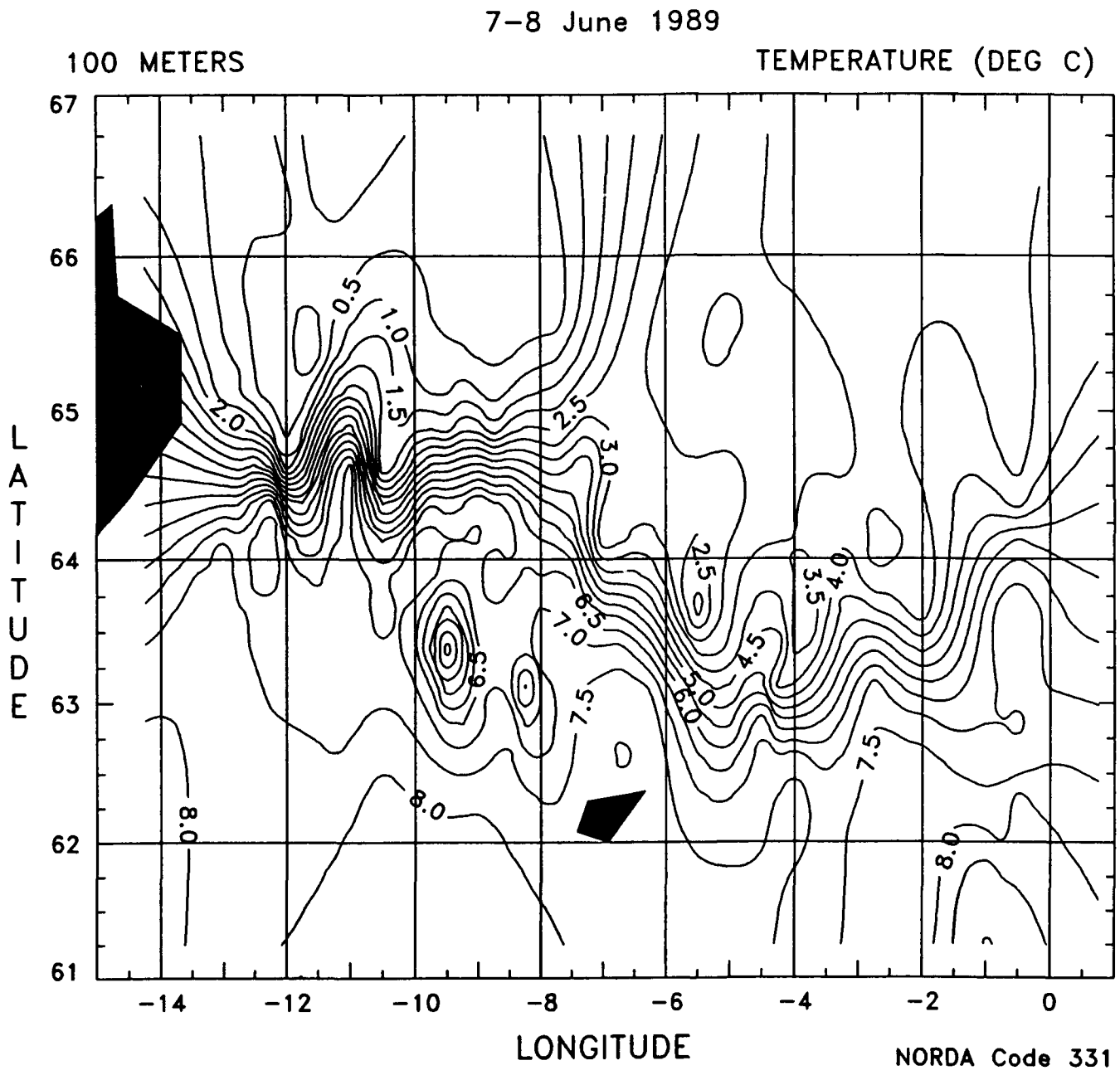
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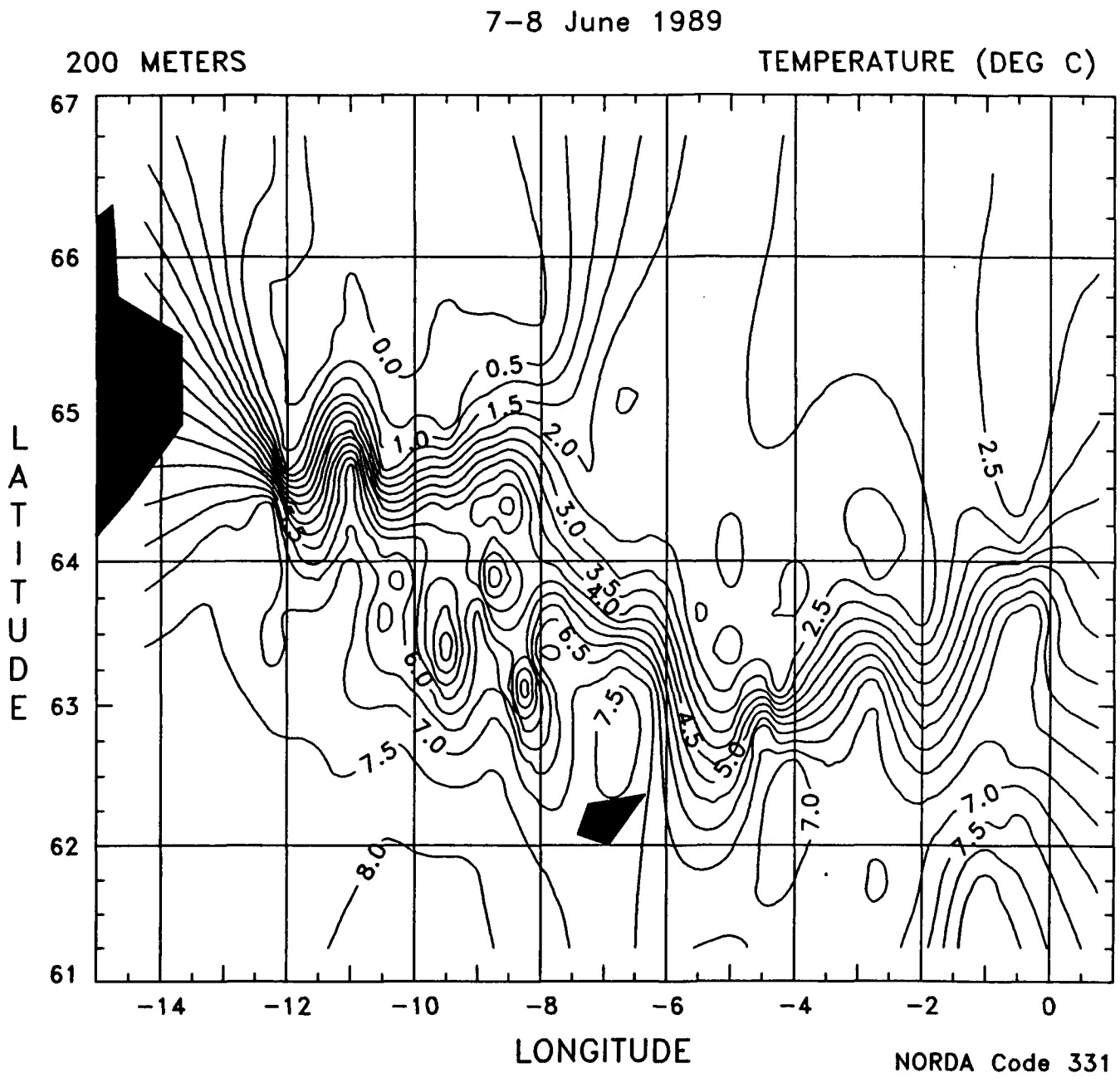
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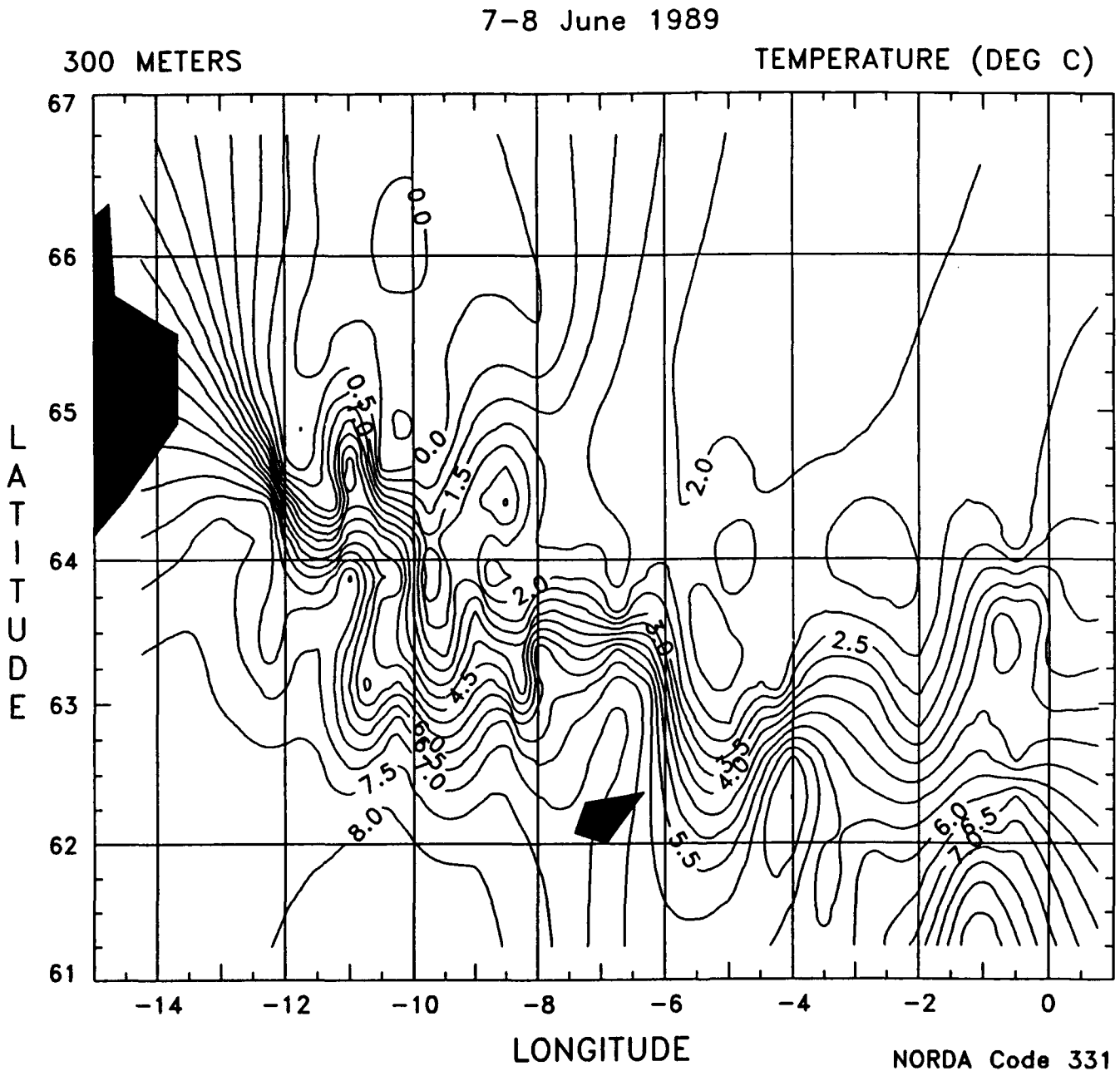
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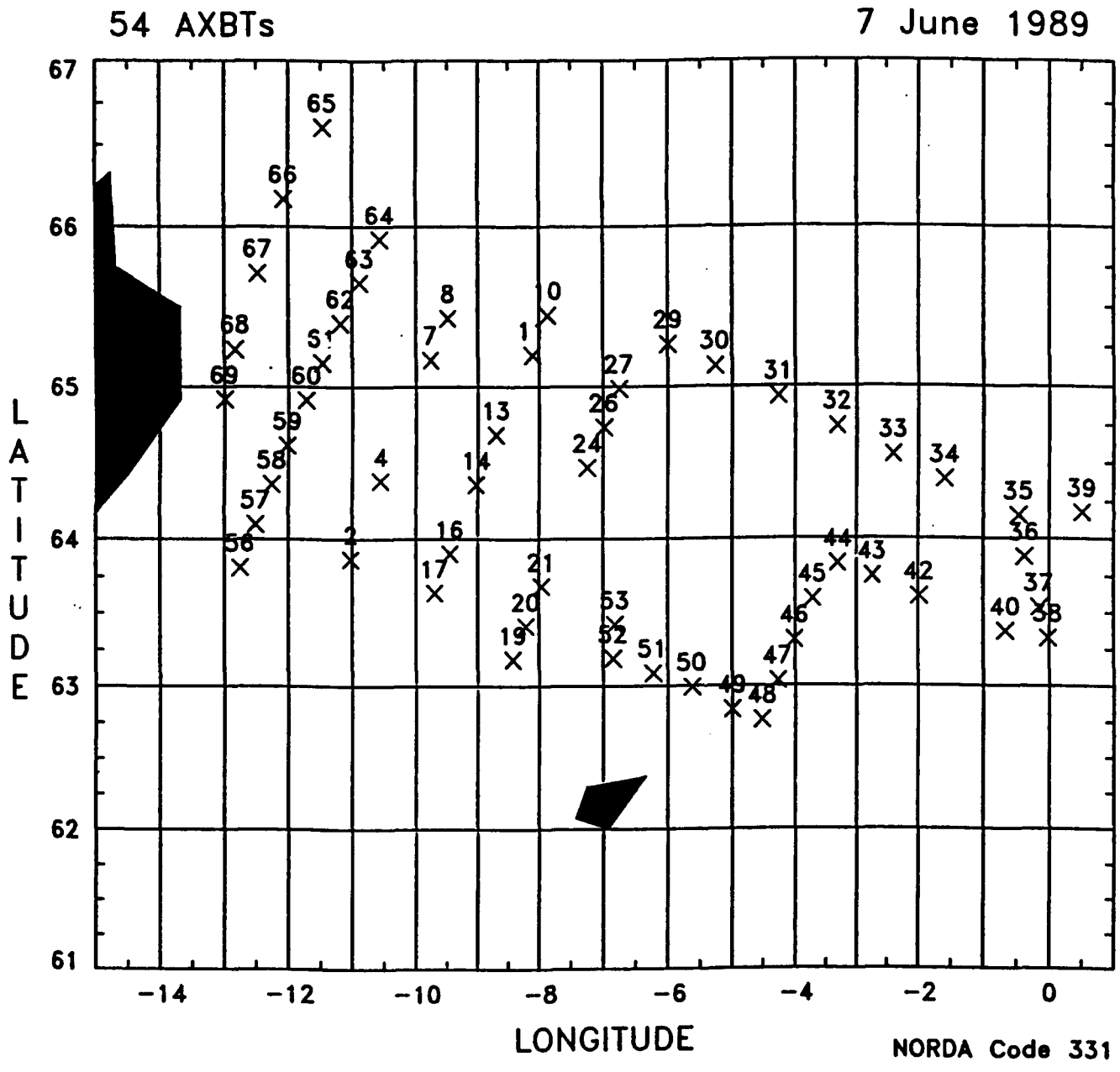
Appendix B.

Temperature Contours at Selected Depths,

7 June 1989.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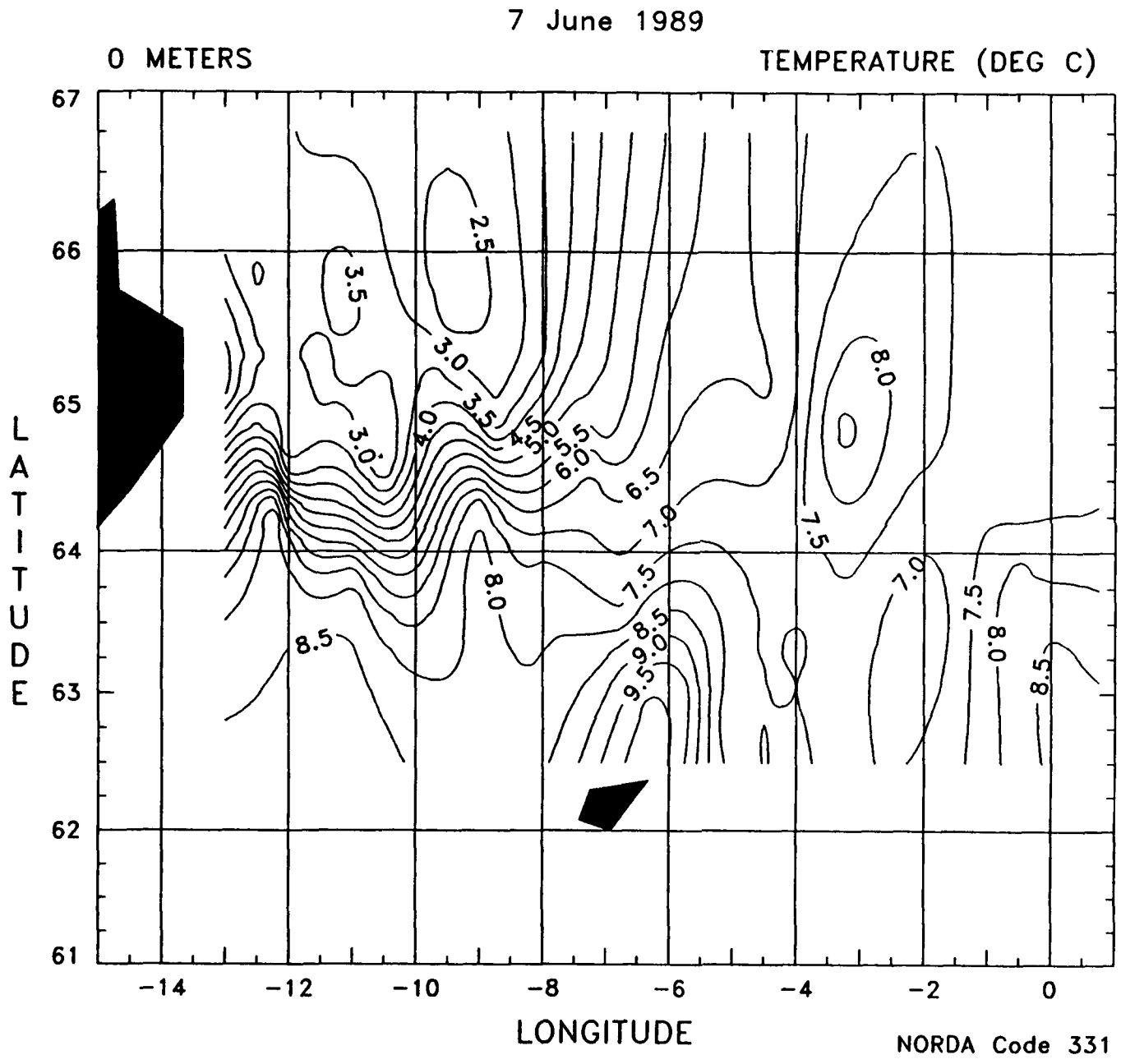
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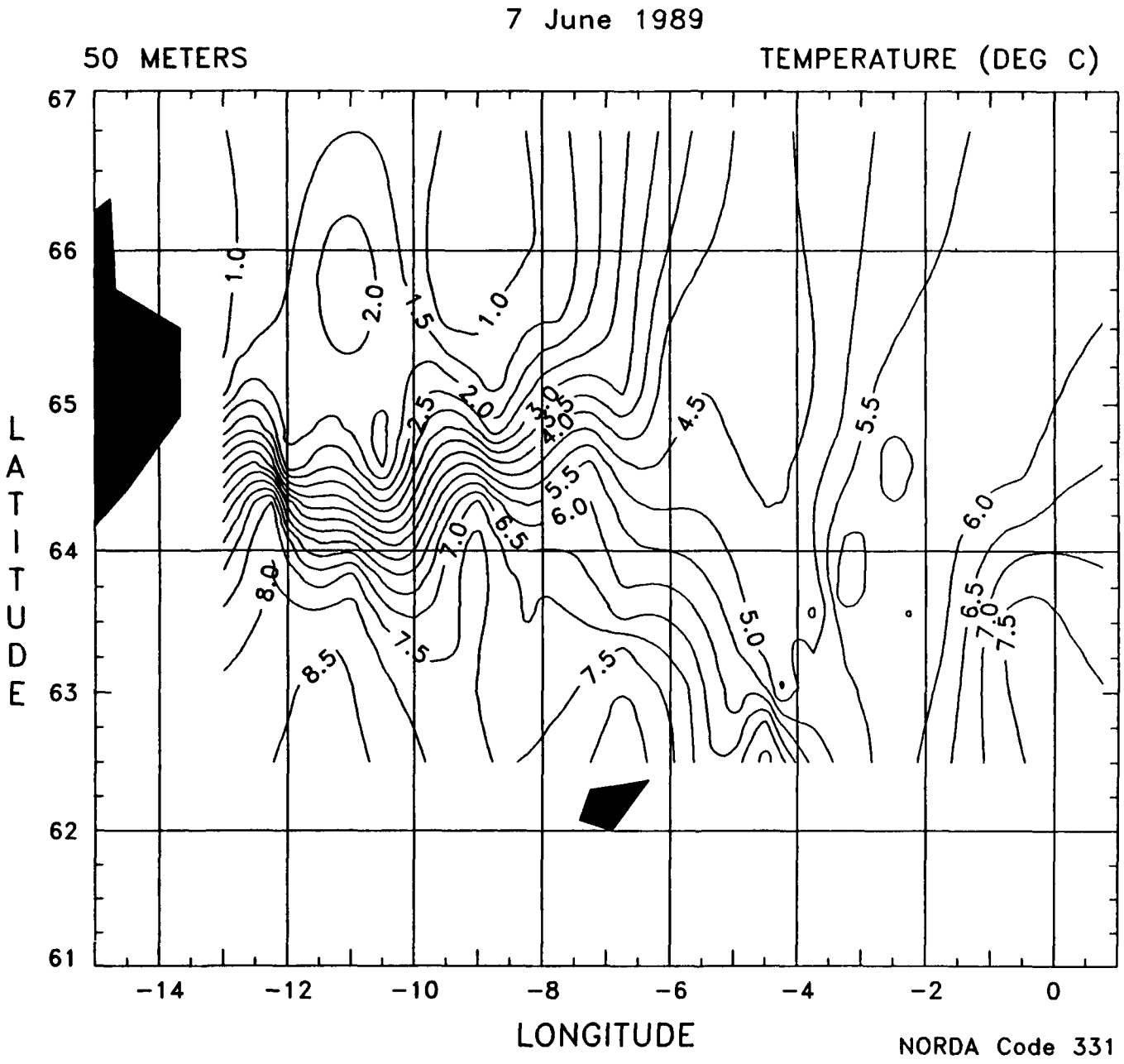
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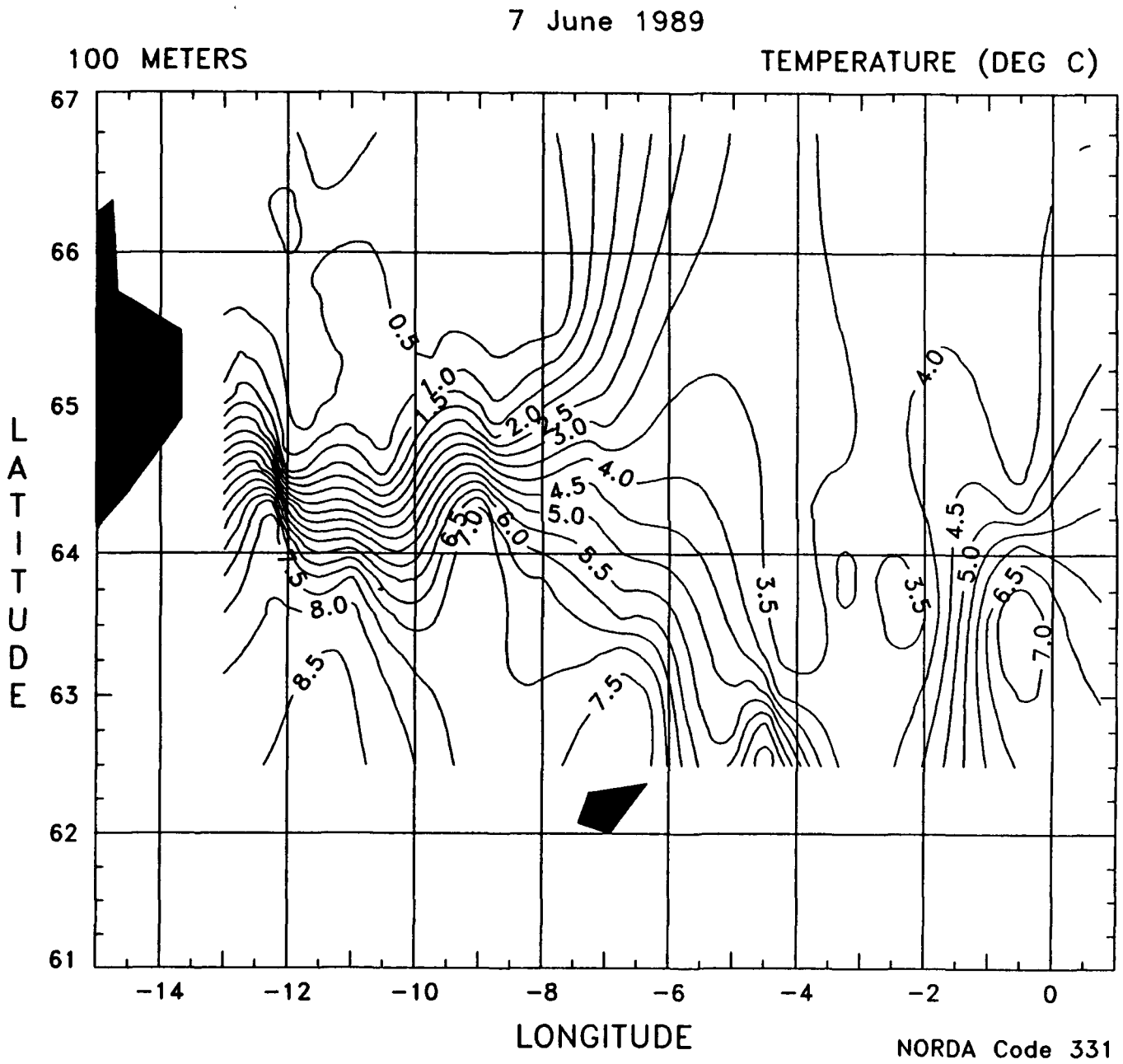
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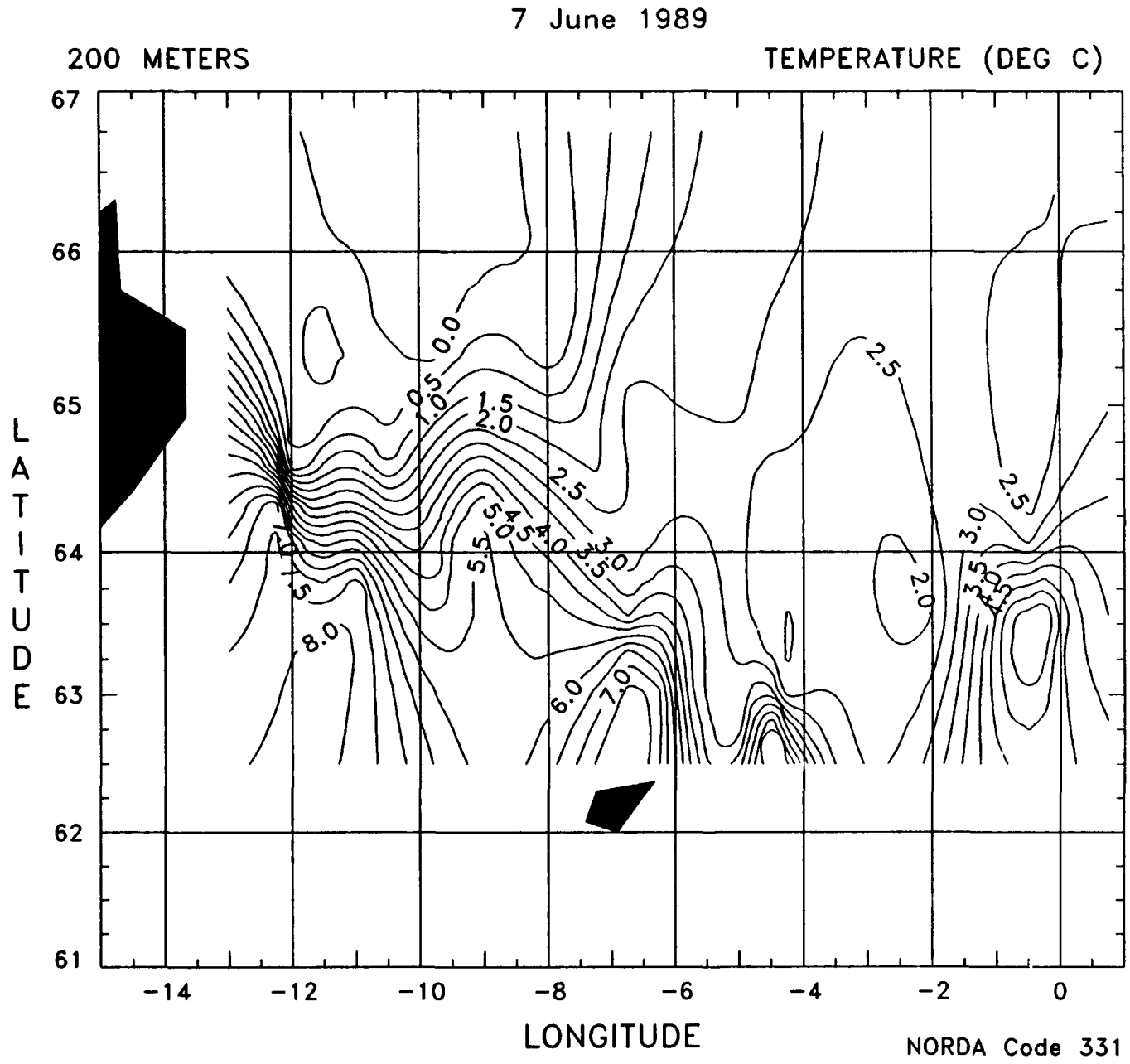
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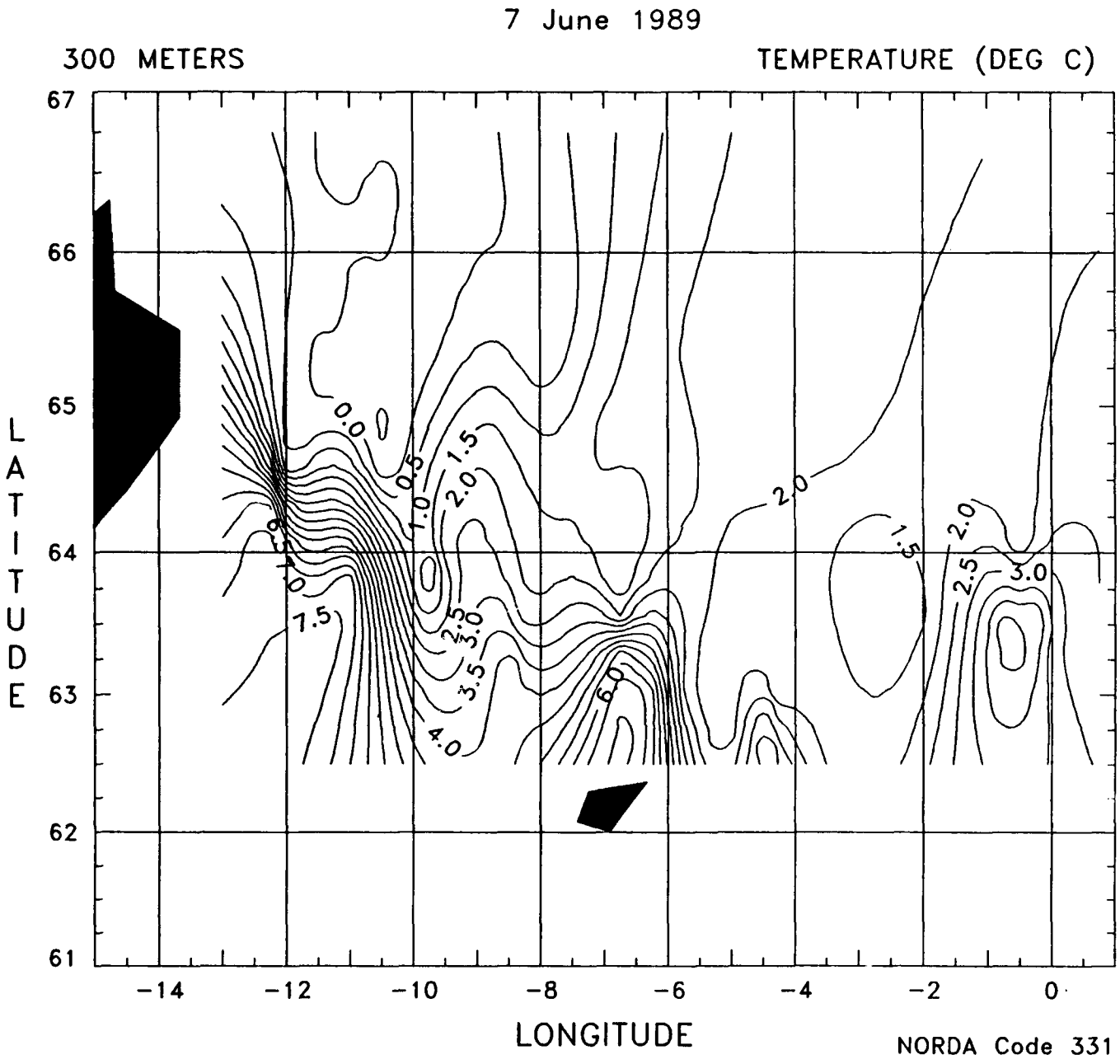
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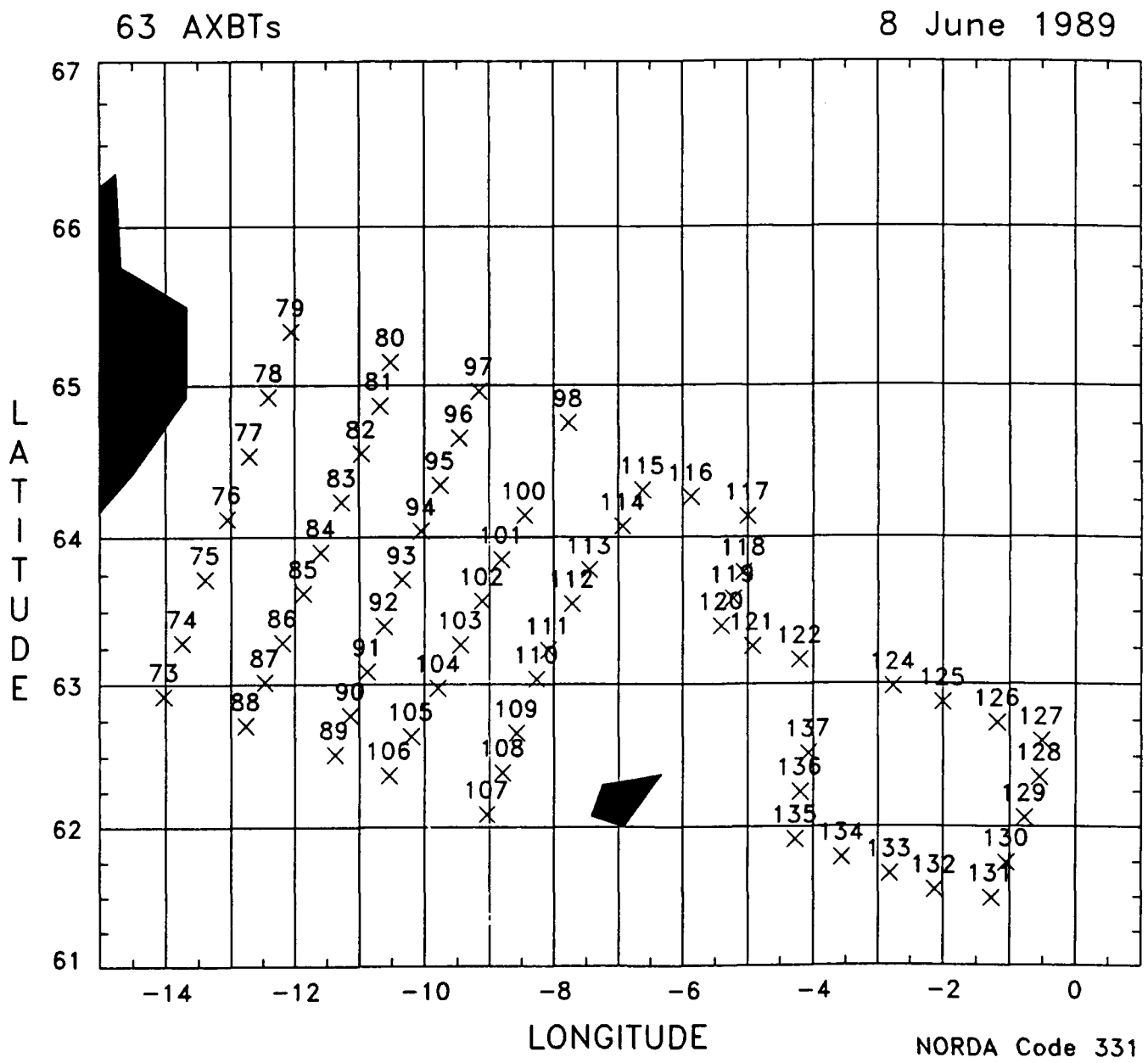
Appendix C.

Temperature Contours at Selected Depths,

8 June 1989.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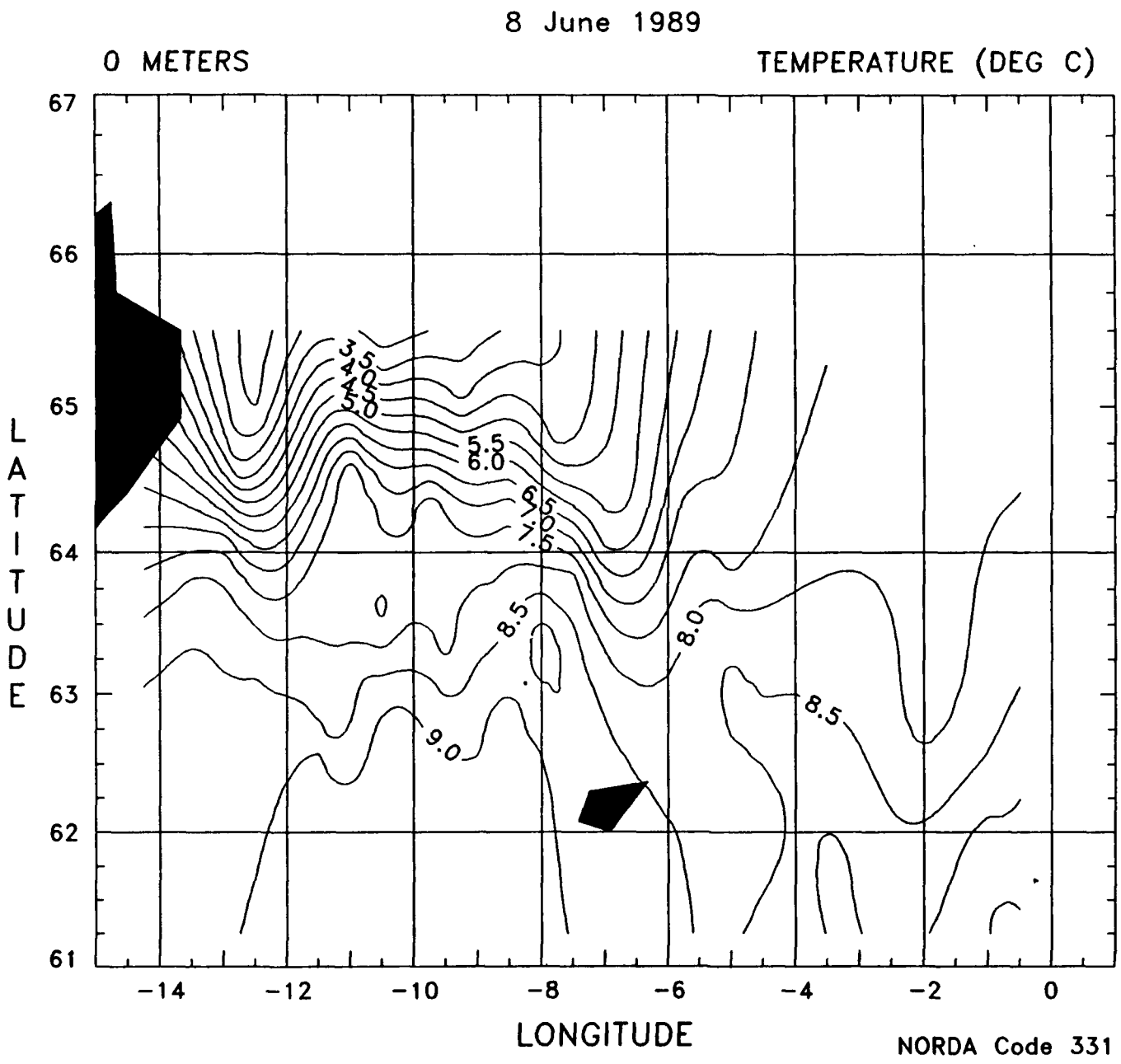
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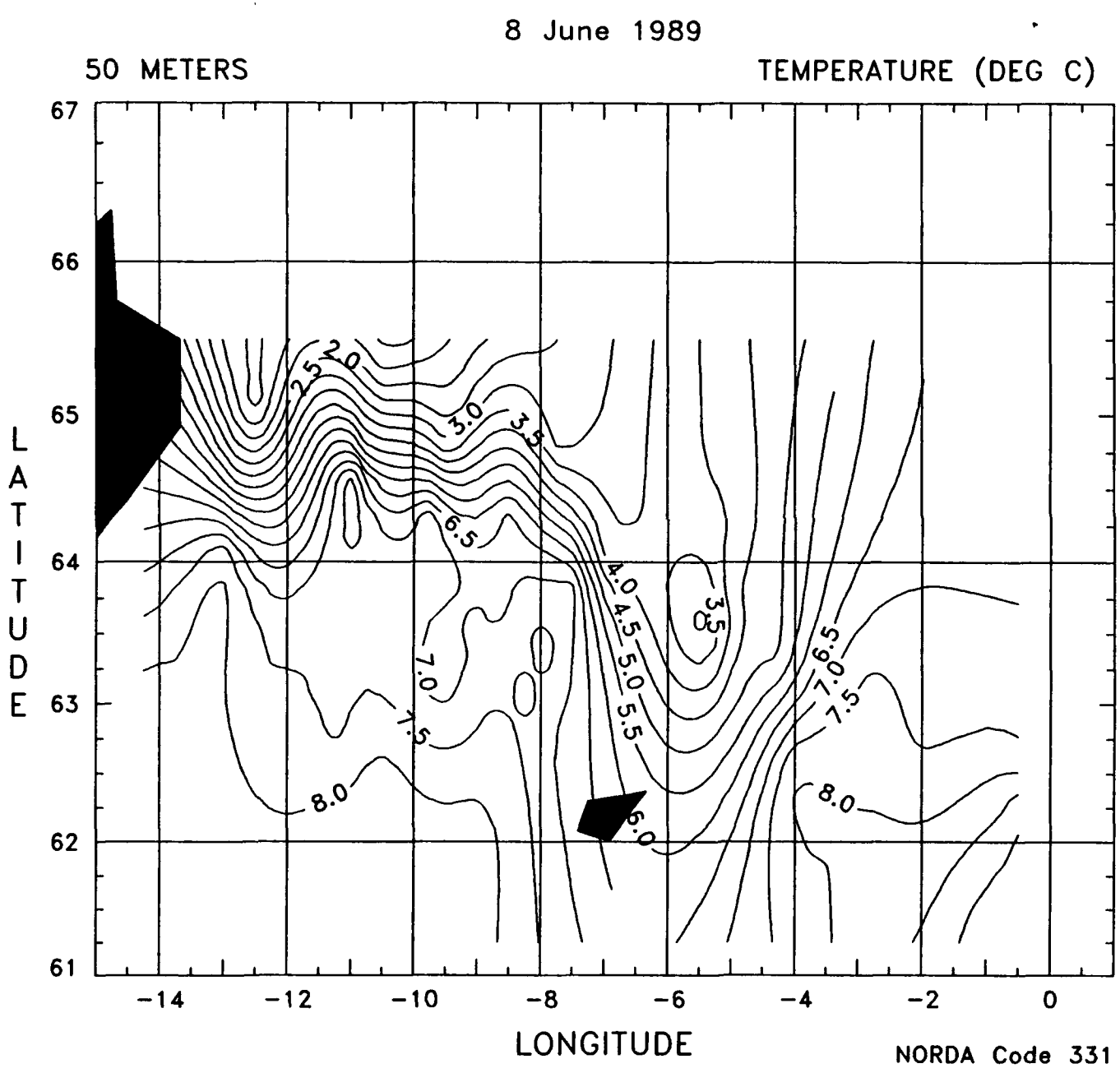
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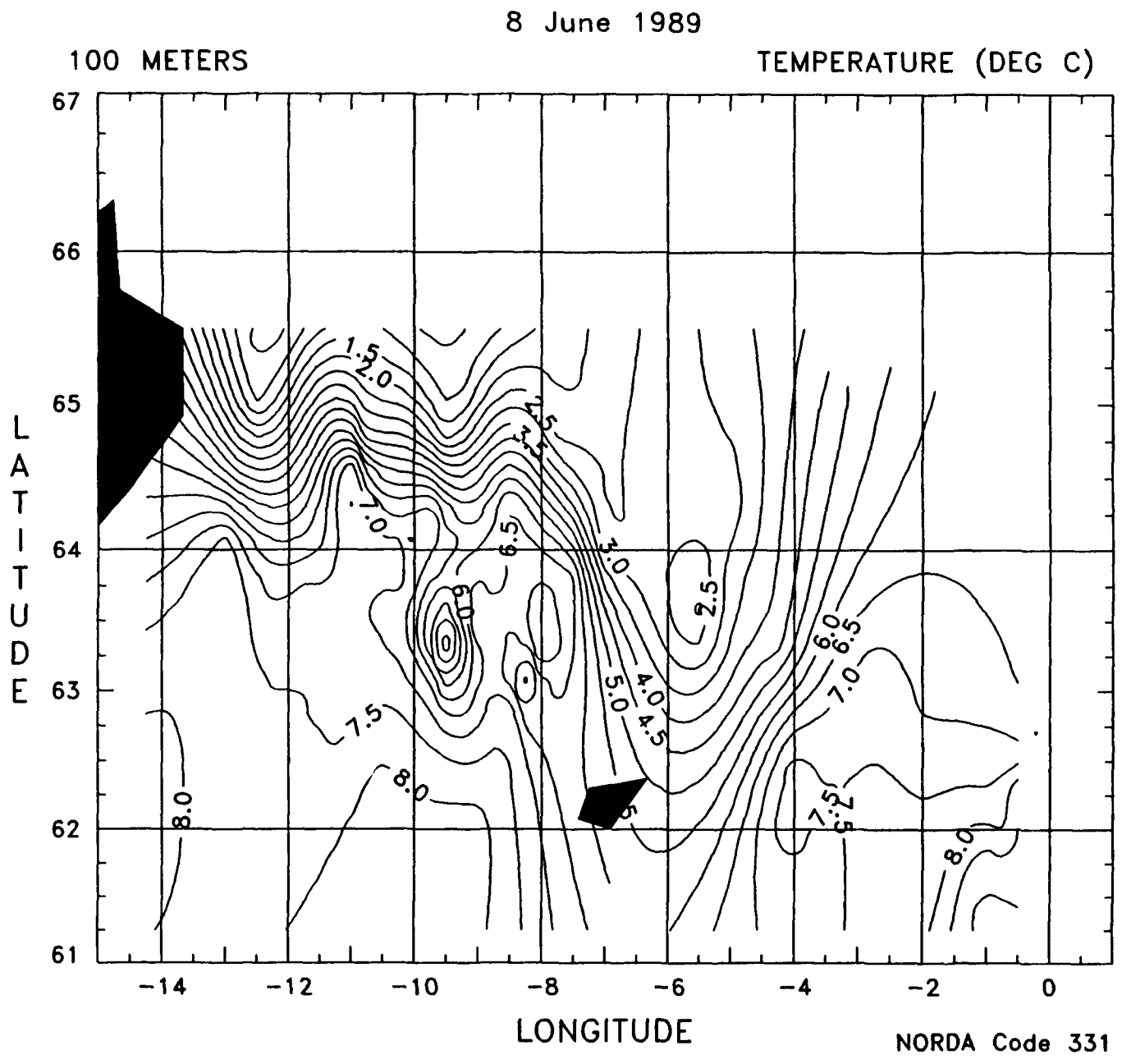
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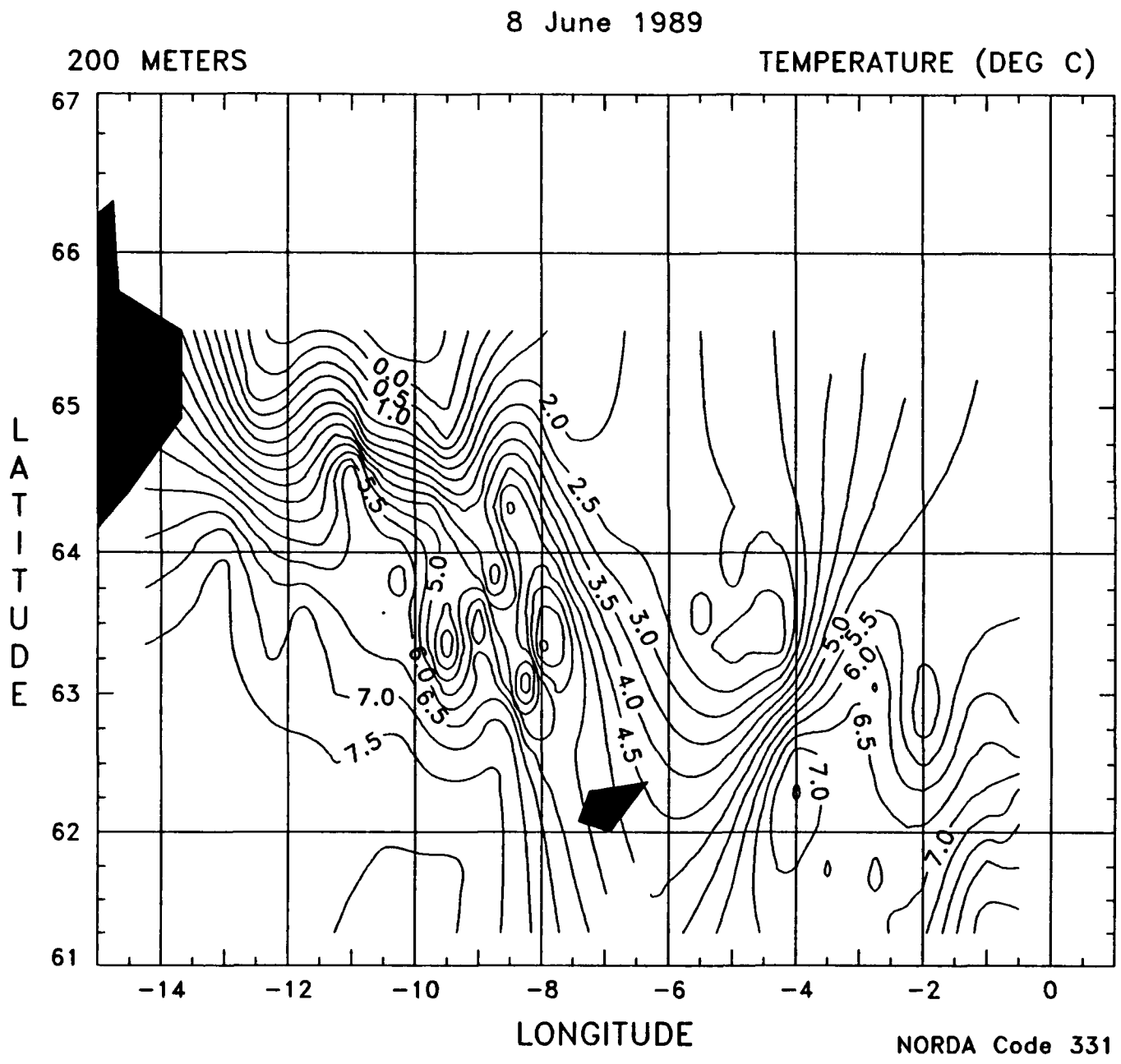
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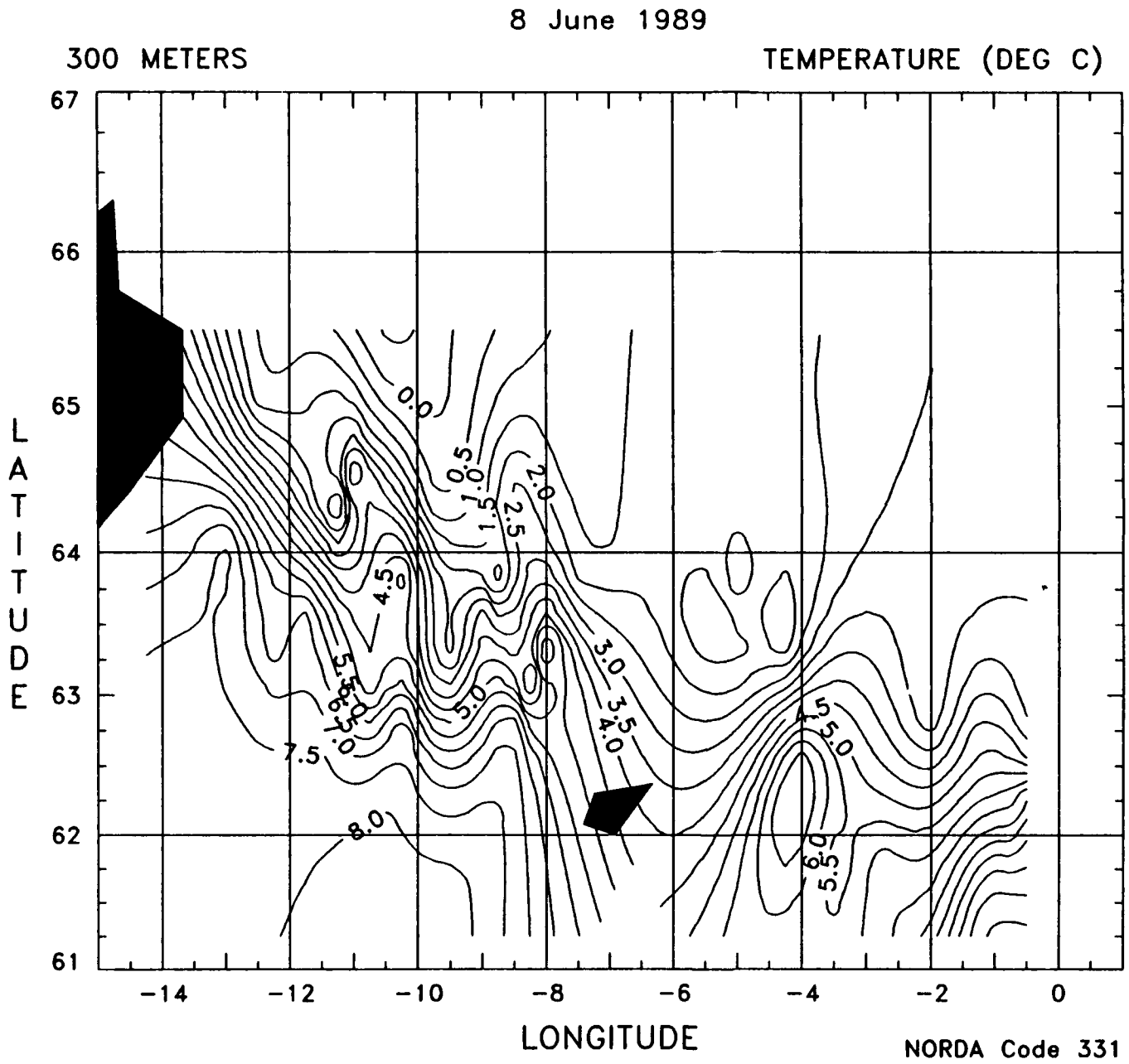
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300 METERS
TEMPERATURE (DEG C)
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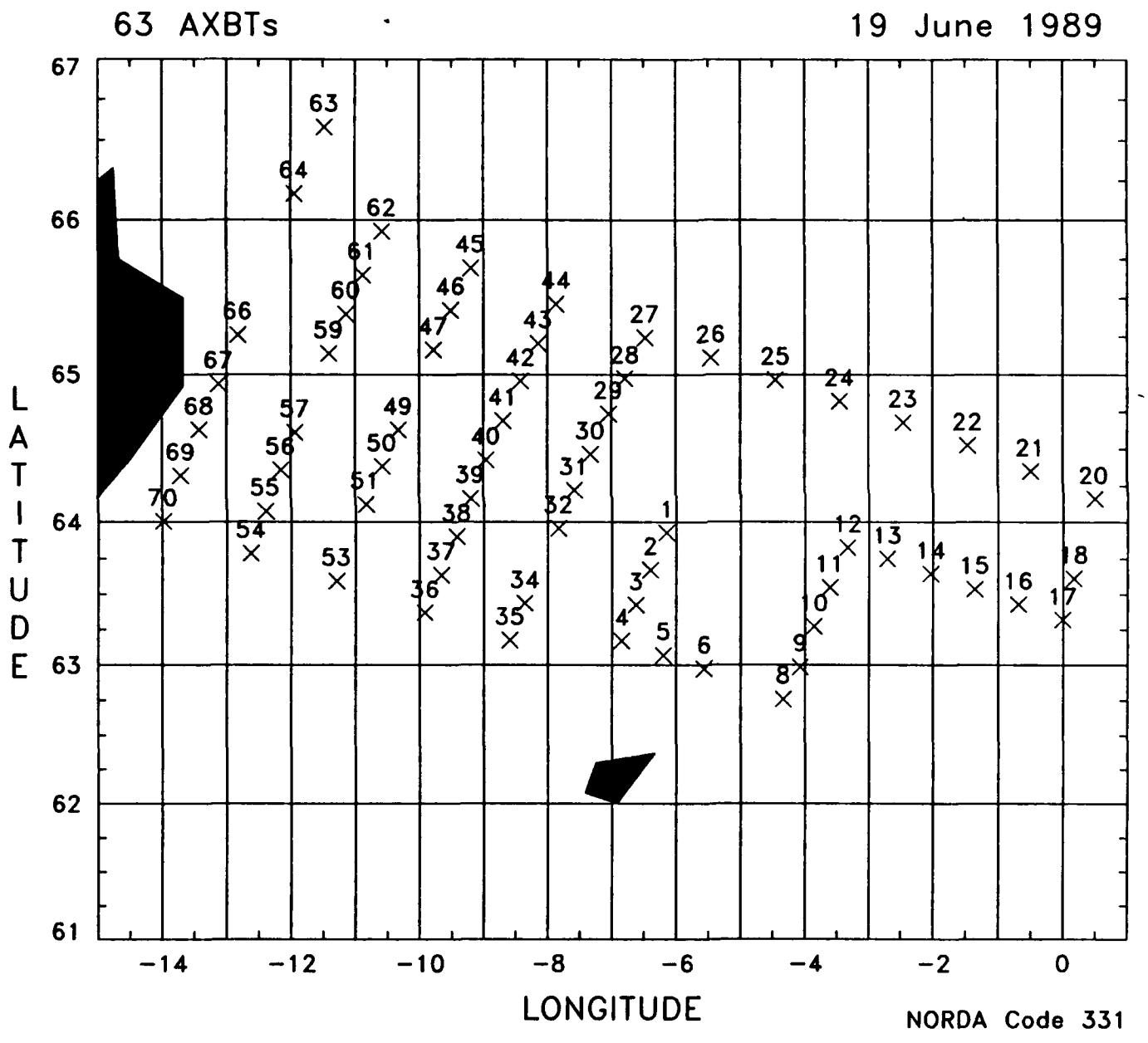
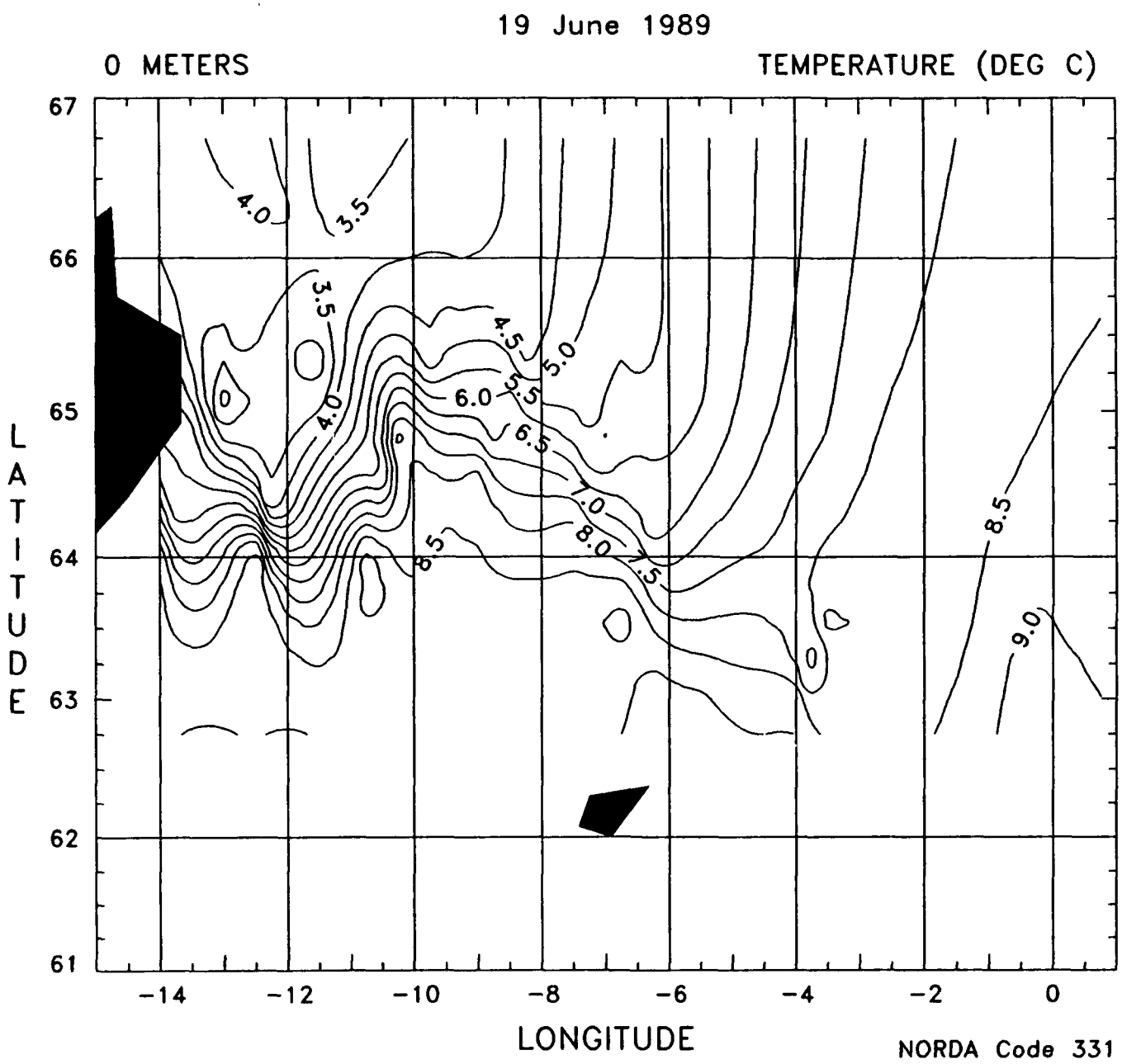
-14
-12
-10
-8
-6
-4
-2
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
NORDA Code 331

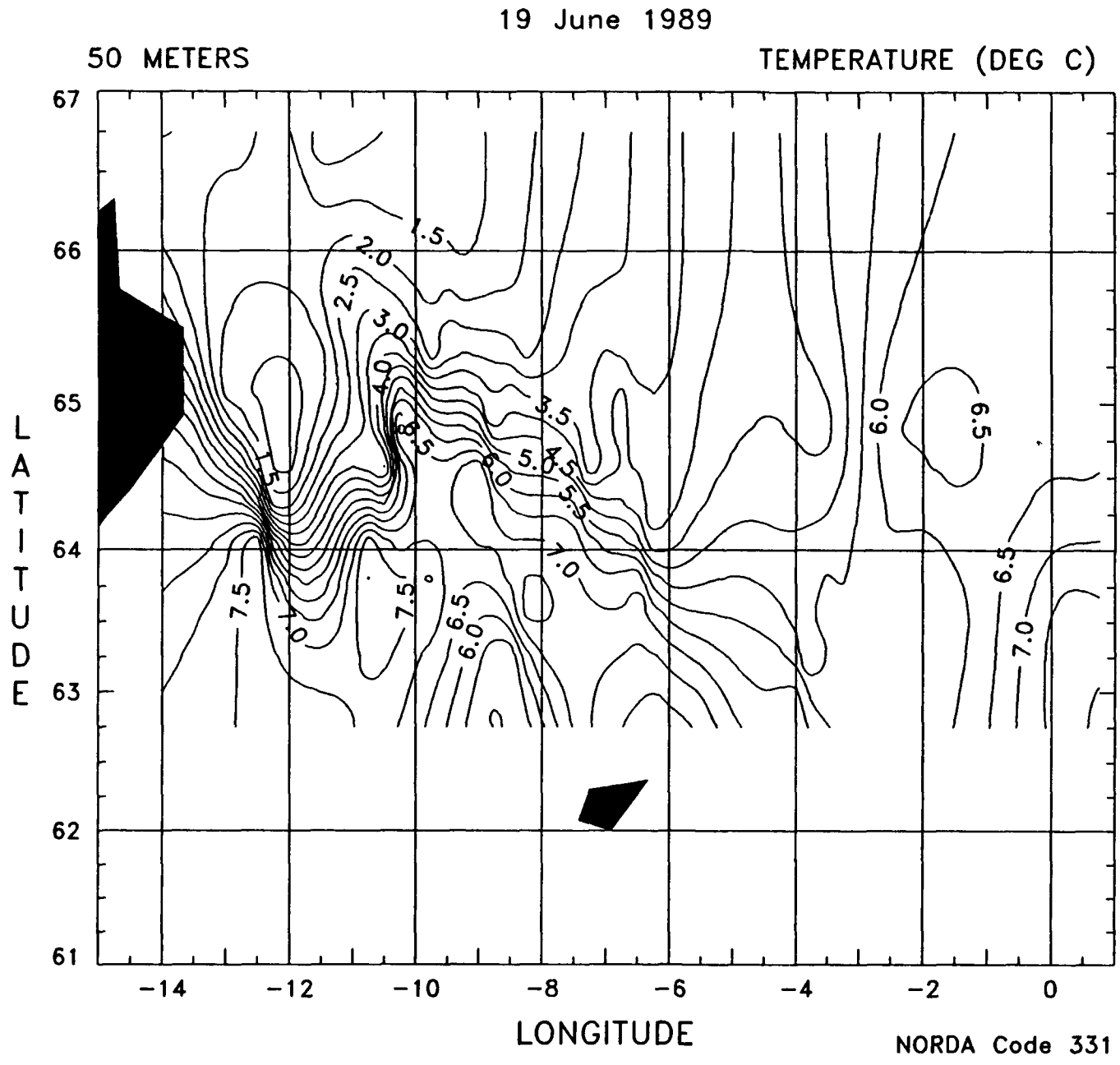
Appendix D.

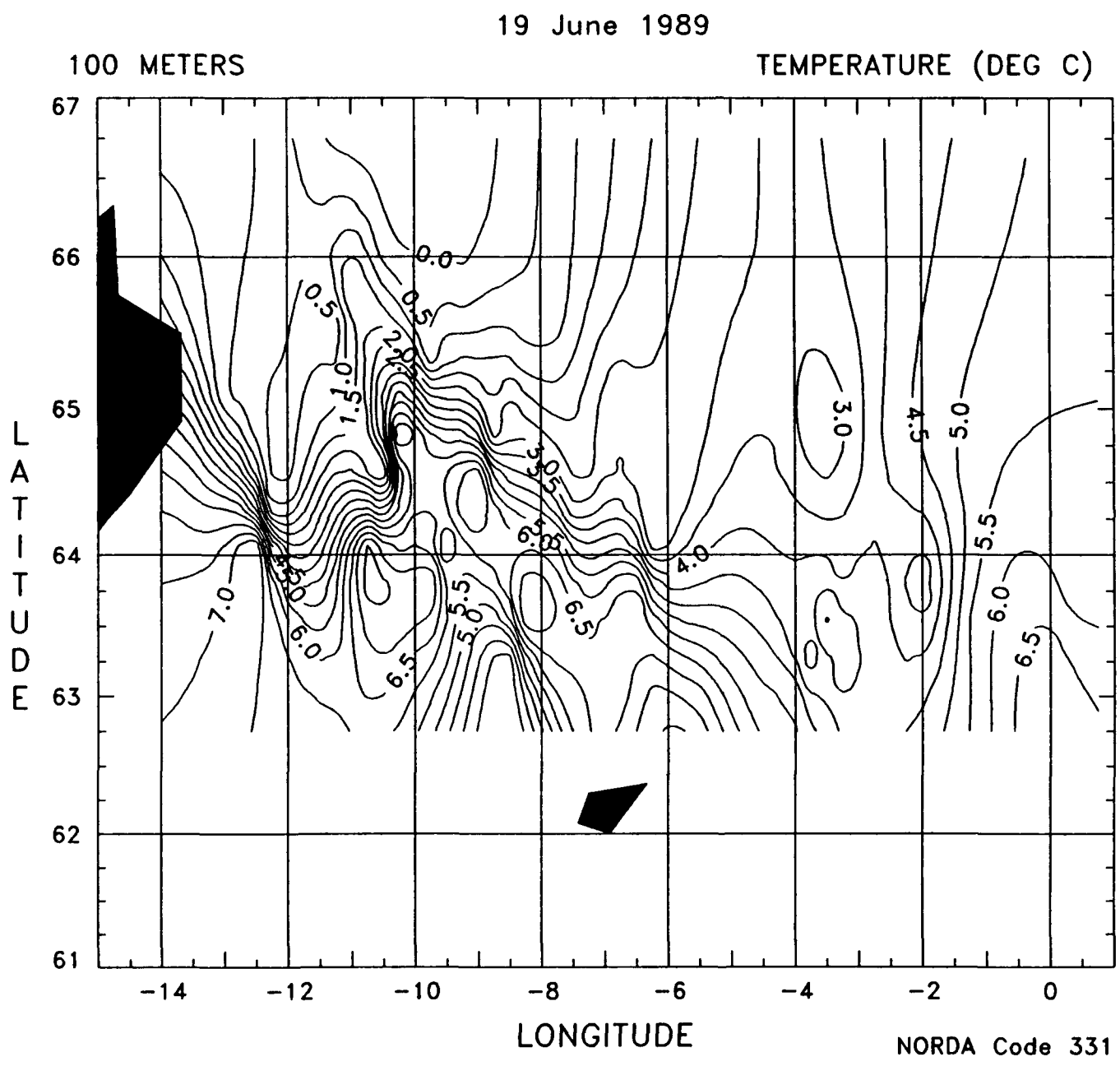
Temperature Contours at Selected Depths,

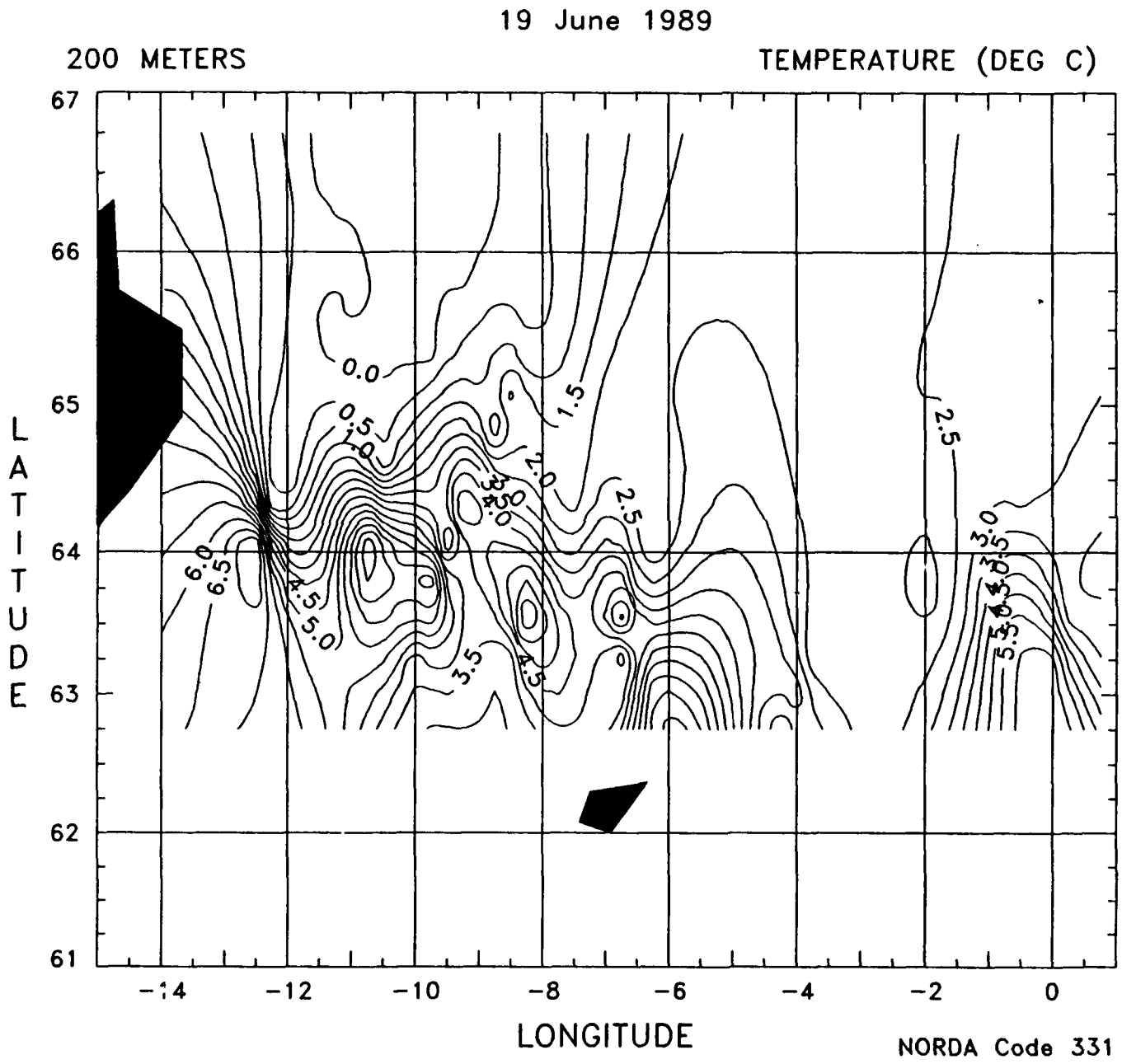
19 June 1989.

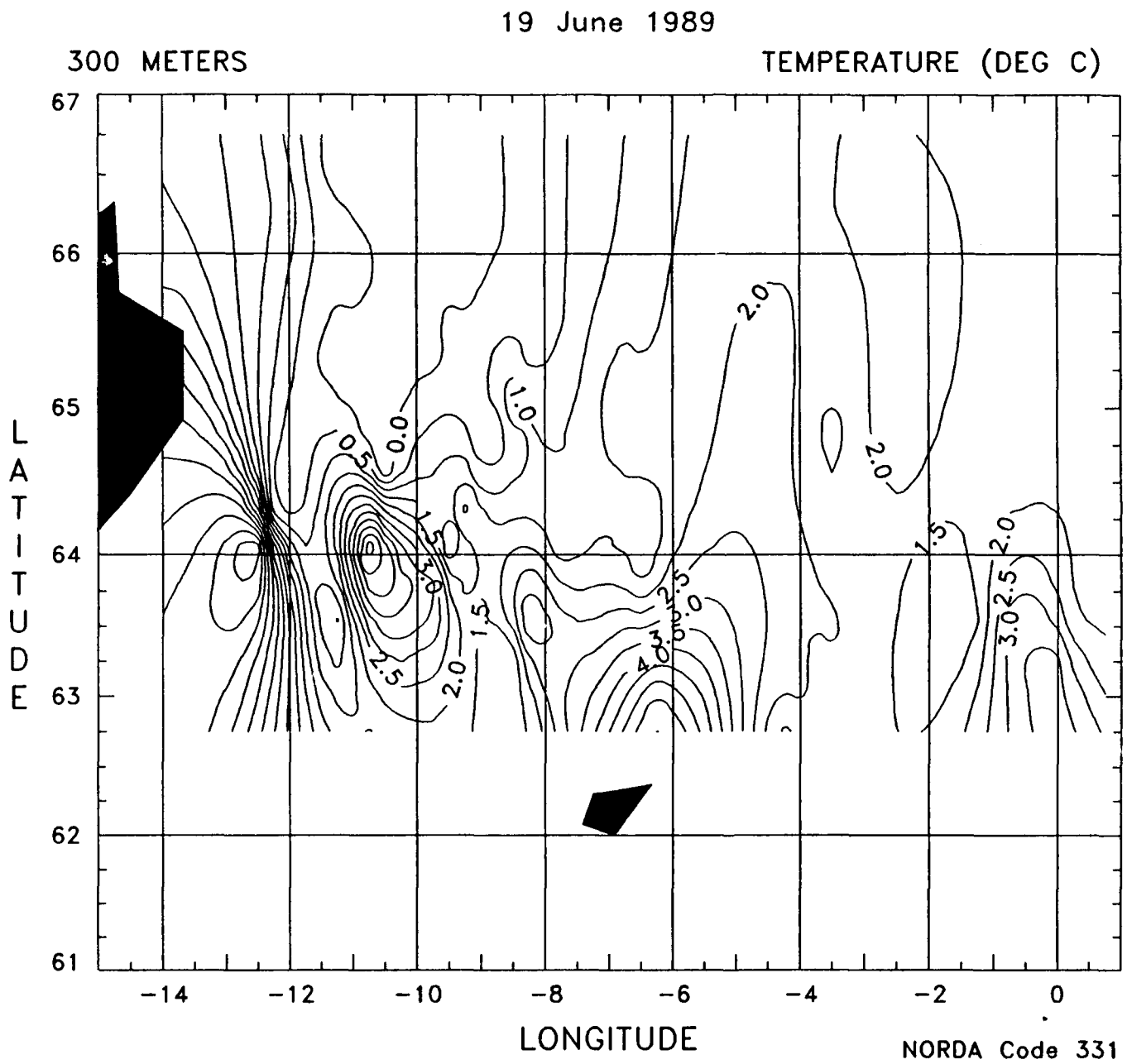

63 AXBTs
19 June 1989
LATITUDE
LONGITUDE
67
66
65
64
63
62
61
-14
-12
-10
-8
-6
-4
-2
0
NORDA Code 331


19 June 1989
0 METERS
TEMPERATURE (DEG C)
67
66
65
64
63
62
61
LATITUDE
-14
-12
-10
-8
-6
-4
-2
0
LONGITUDE
4.0
3.5
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
8.5
9.0
0
0
0
NORDA Code 331


19 June 1989
50 METERS
TEMPERATURE (DEG C)
LATITUDE
LONGITUDE
67
66
65
64
63
62
61
-14
-12
-10
-8
-6
-4
-2
0
1.5
2.0
2.5
3.0
4.0
3.5
5.0
5.5
6.0
6.5
7.0
7.5
NORDA Code 331


19 June 1989
100 METERS
TEMPERATURE (DEG C)
LATITUDE
LONGITUDE
67
66
65
64
63
62
61
-14
-12
-10
-8
-6
-4
-2
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
NORDA Code 331


19 June 1989
200 METERS
TEMPERATURE (DEG C)
LATITUDE
LONGITUDE
67
66
65
64
63
62
61
-14
-12
-10
-8
-6
-4
-2
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
NORDA Code 331


19 June 1989
300 METERS
TEMPERATURE (DEG C)
67
66
65
64
63
62
61
LATITUDE
-14
-12
-10
-8
-6
-4
-2
0
LONGITUDE
NORDA Code 331

Appendix E.

Temperature Contours along Selected Vertical Transects,

7 - 8 June 1989.

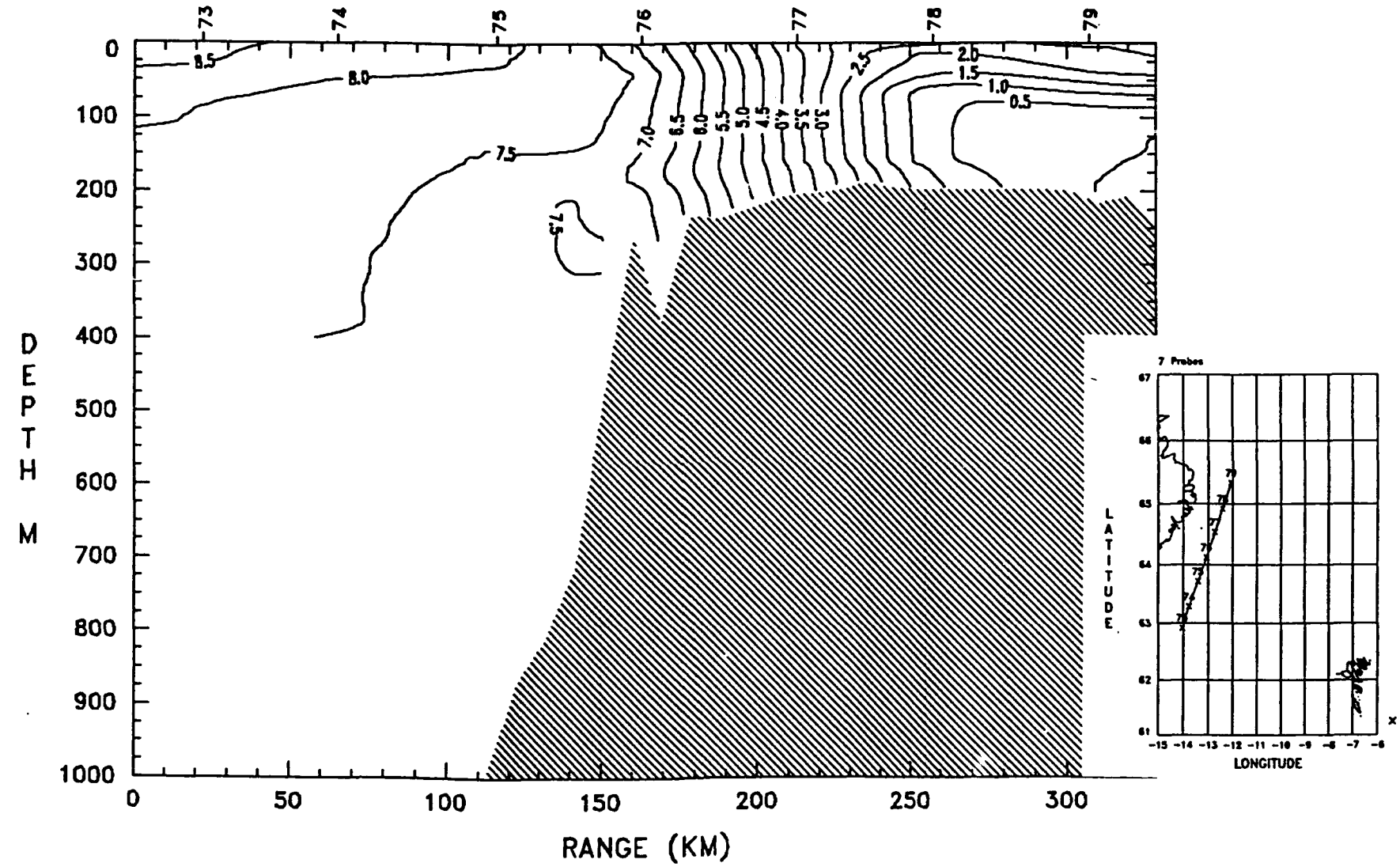
8 June 1989, Sta. 73 – 79

62.75, −14.25 Temp (deg C) 65.50, −11.75

14:41:01

4/08/91

dx= 9.27,dy= 5



LAT	62.75	63	63.25	63.5	63.75	64	64.25	64.5	64.75	65	65.25	65.5
LONG	−14.25	−14	−13.75	−13.5	−13.25	−13	−12.75	−12.5	−12.25	−12	−11.75	

NOARL Code 331

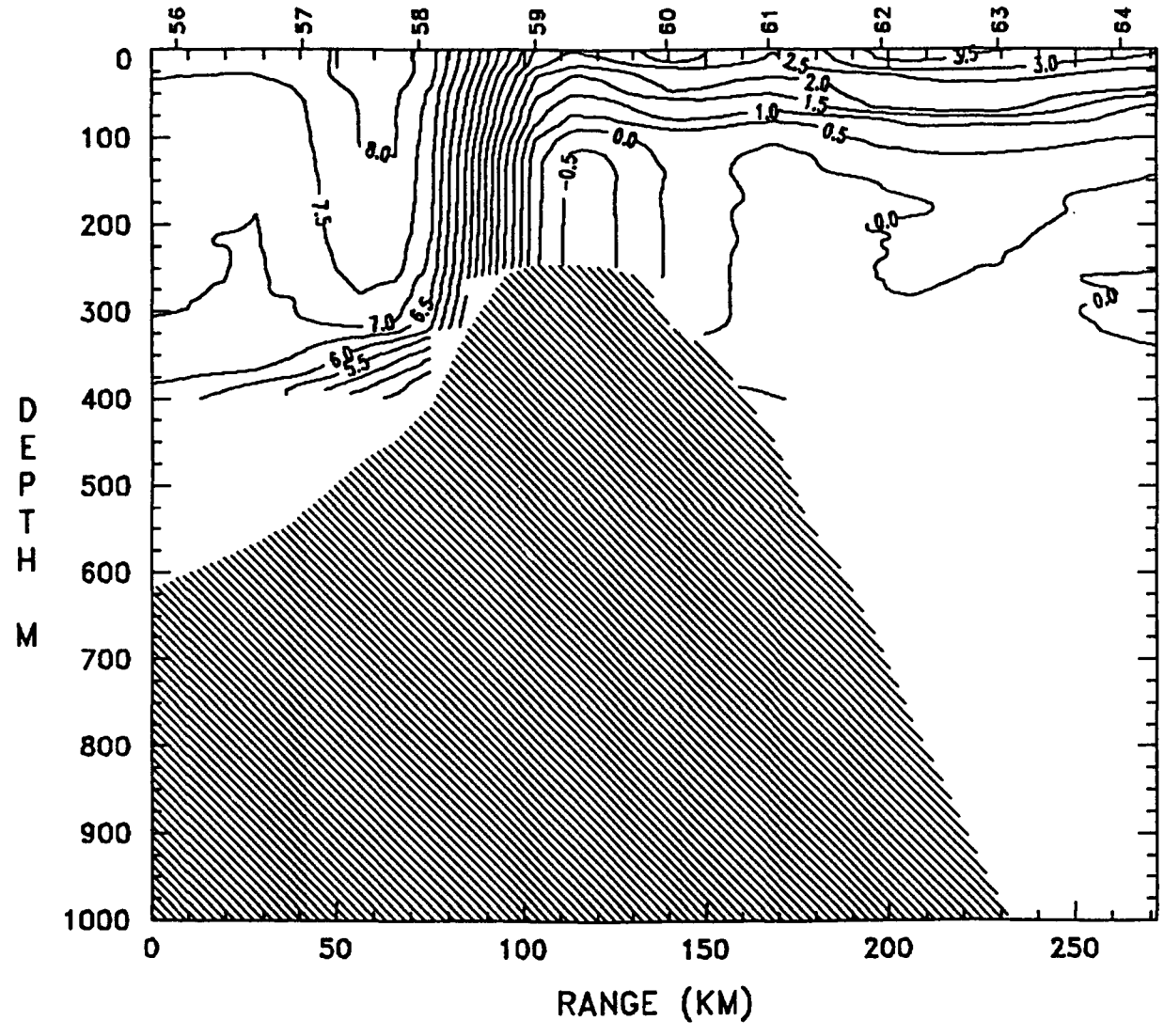
7 June 1989, Sta. 56 – 64

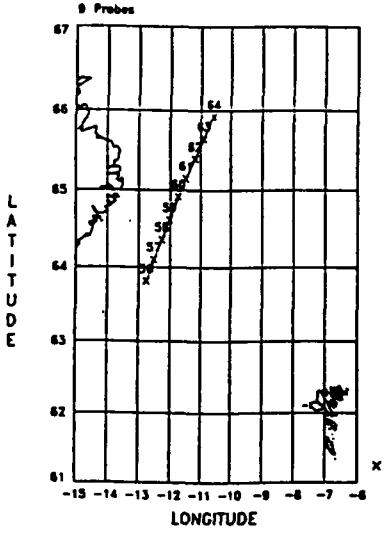
63.75, −12.75 Temp (deg C) 66.00, −10.50

15:18:43

4/08/91

dx= 9.27,dy= 5





LAT	63.75	64	64.25	64.5	64.75	65	65.25	65.5	65.75	66
LONG		−12.5		−12		−11.5		−11		−10.5

NOARL Code 331

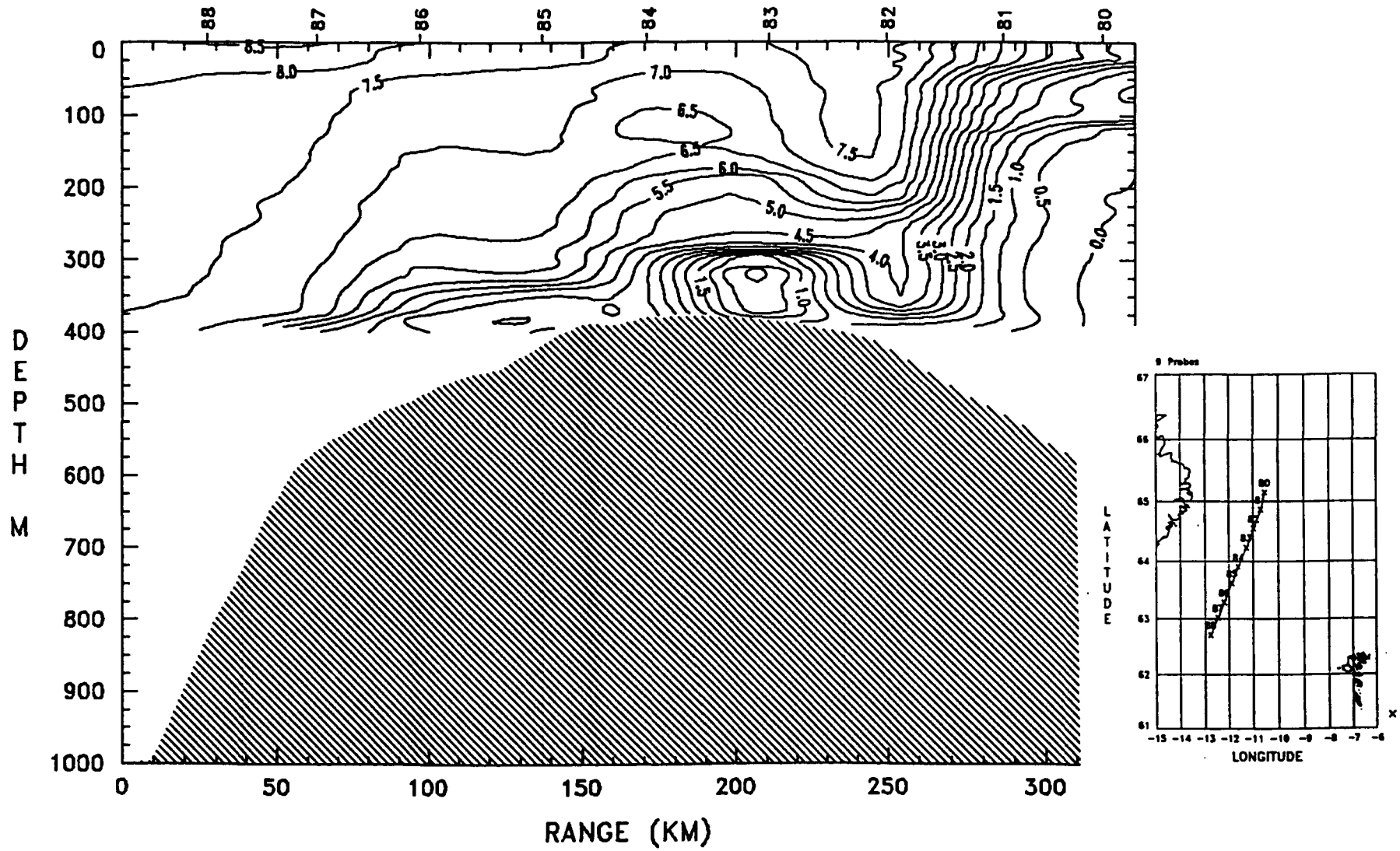
8 June 1989, Sta. 80 - 88

62.50, −13.00 Temp (deg C) 65.25, −10.50

14:50:37

4/08/91

dx= 9.27,dy= 5



LAT	62.5	62.75	63	63.25	63.5	63.75	64	64.25	64.5	64.75	65	65.25	
LONG	−13	−12.75	−12.5	−12.25	−12	−11.75	−11.5	−11.25	−11	−10.75	−10.5		

NOARL Code 331

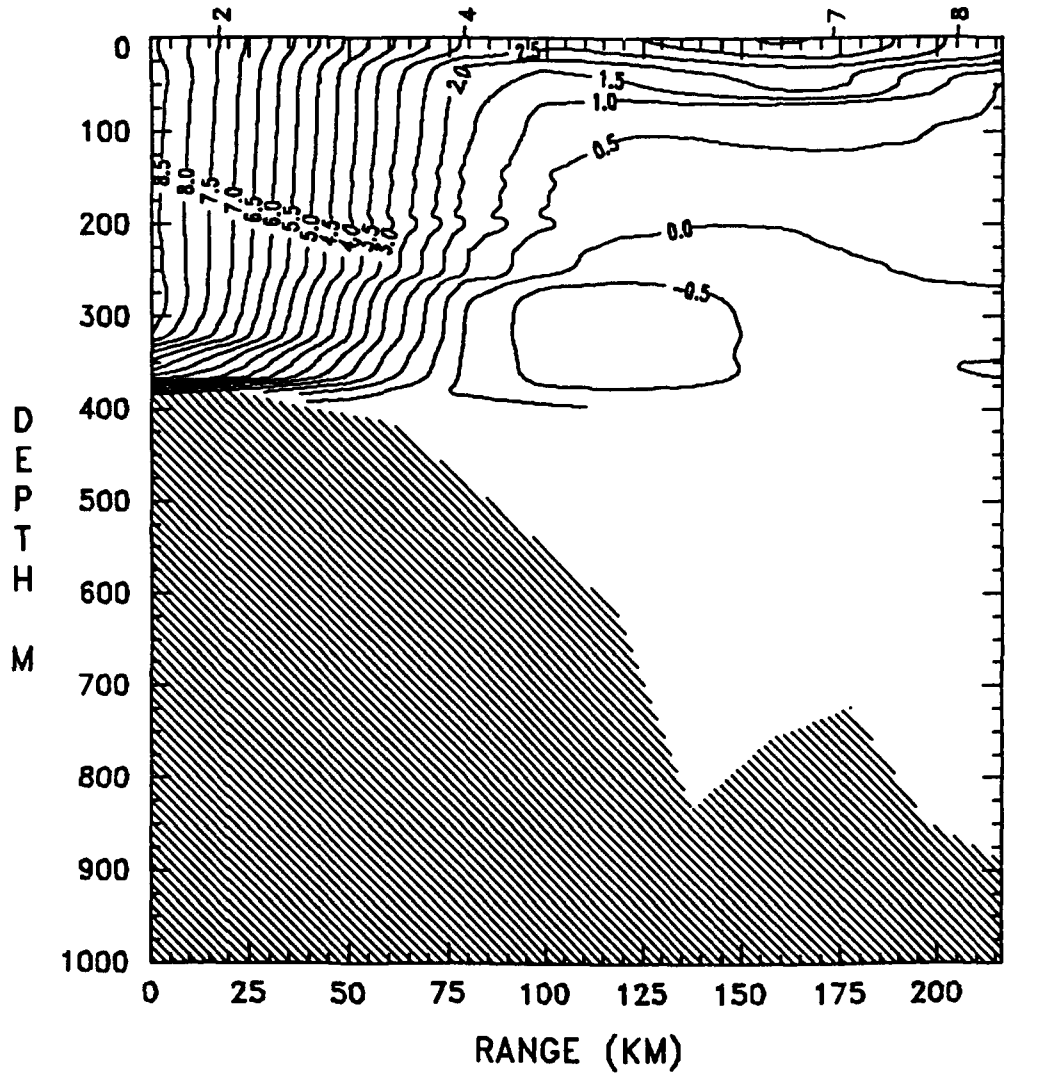
7 June 1989, Sta. 2 – 8

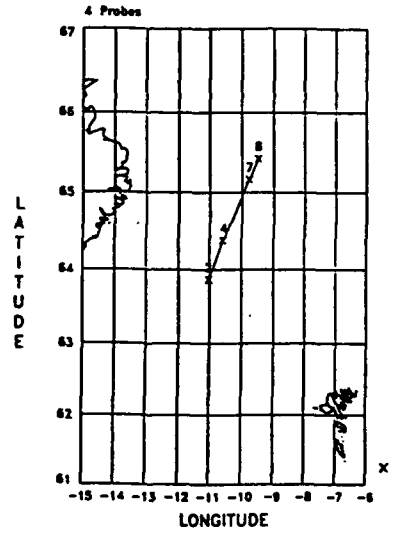
63.75, −11.25 Temp (deg C) 65.50, −9.25

15:25:08

4/08/91

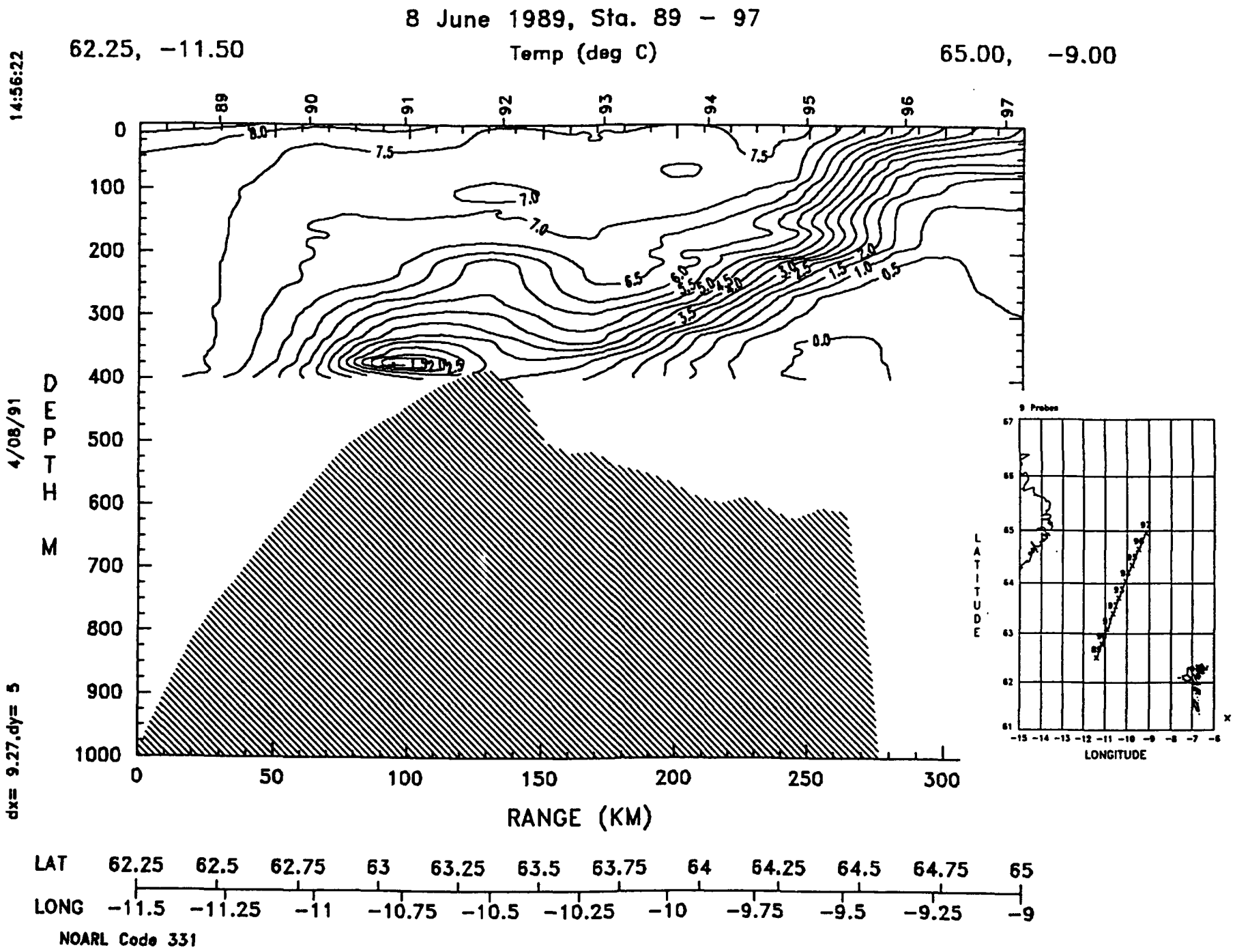
dx= 18.53,dy= 5





LAT	63.75	64	64.25	64.5	64.75	65	65.25	65.5
LONG		−11		−10.5		−10		−9.5

NOARL Code 331


8 June 1989, Sta. 89 - 97
Temp (deg C)
62.25, -11.50
65.00, -9.00
14:56:22
4/08/91
dx= 9.27,dy= 5
DEPTH M
RANGE (KM)
LAT 62.25 62.5 62.75 63 63.25 63.5 63.75 64 64.25 64.5 64.75 65
LONG -11.5 -11.25 -11 -10.75 -10.5 -10.25 -10 -9.75 -9.5 -9.25 -9
NOARL Code 331
9 Probes
LATITUDE
LONGITUDE

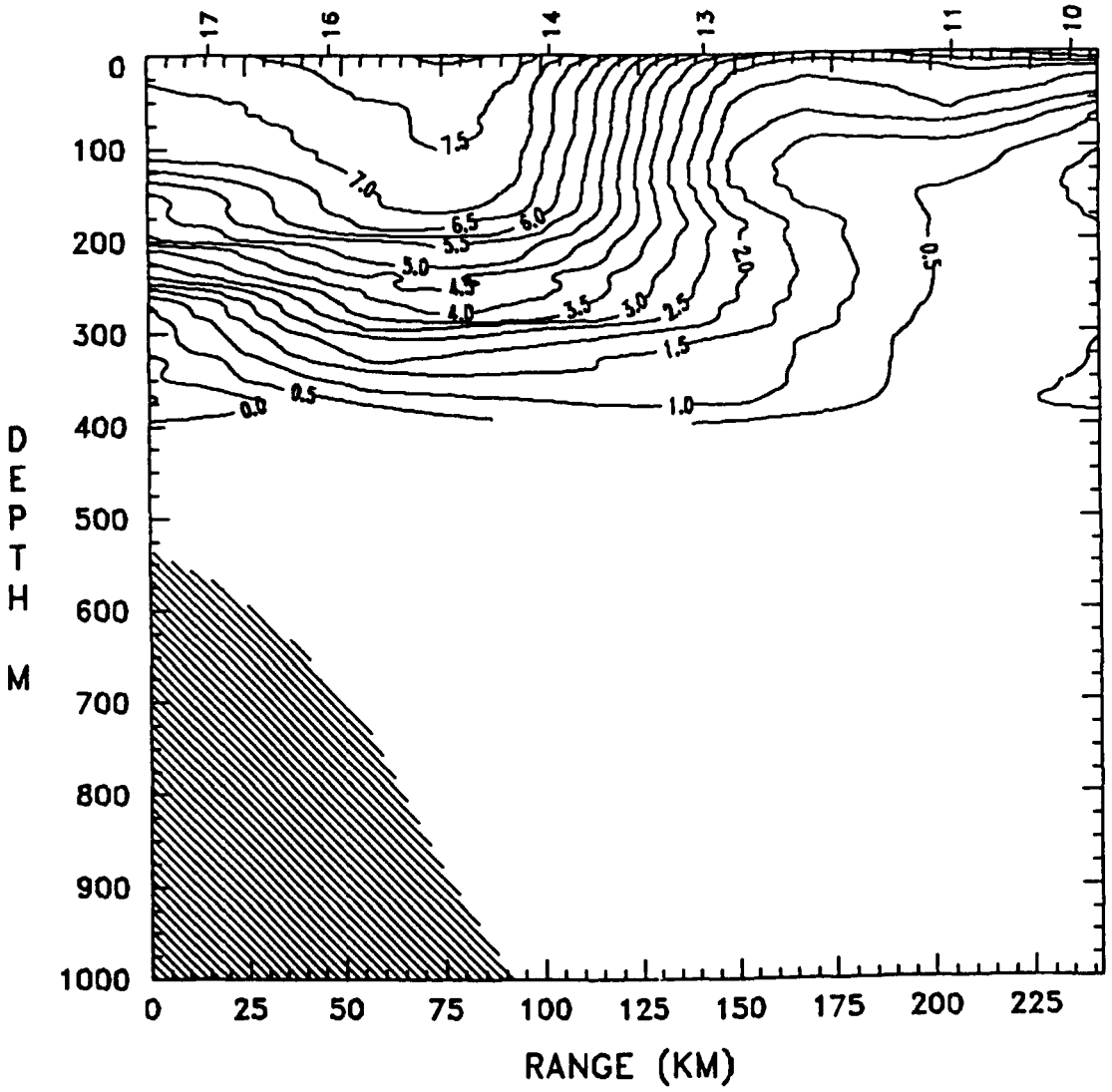
7 June 1989, Sta. 10 - 17

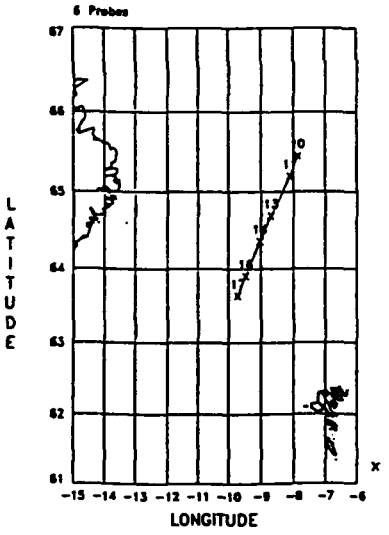
63.50, -9.75 Temp (deg C) 65.50, -7.75

15:31:40

4/08/91

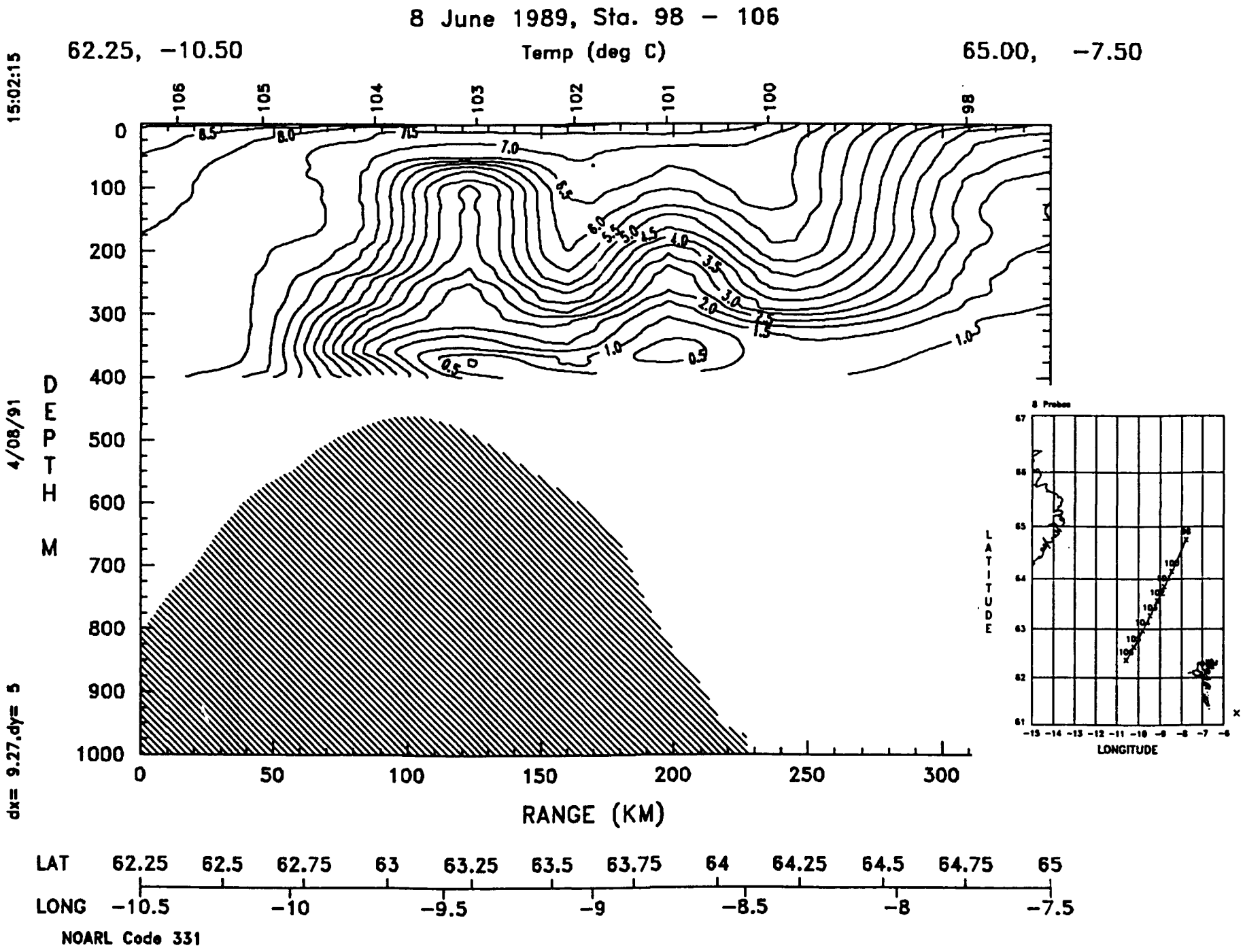
dx= 18.53,dy= 5





LAT	63.5	63.75	64	64.25	64.5	64.75	65	65.25	65.5
LONG		-9.5		-9		-8.5		-8	

NOARL Code 331


8 June 1989, Sta. 98 - 106
62.25, -10.50
Temp (deg C)
65.00, -7.50
15:02:15
4/08/91
dx= 9.27,dy= 5
DEPTH M
RANGE (KM)
LAT 62.25 62.5 62.75 63 63.25 63.5 63.75 64 64.25 64.5 64.75 65
LONG -10.5 -10 -9.5 -9 -8.5 -8 -7.5
NOARL Code 331
LATITUDE
LONGITUDE

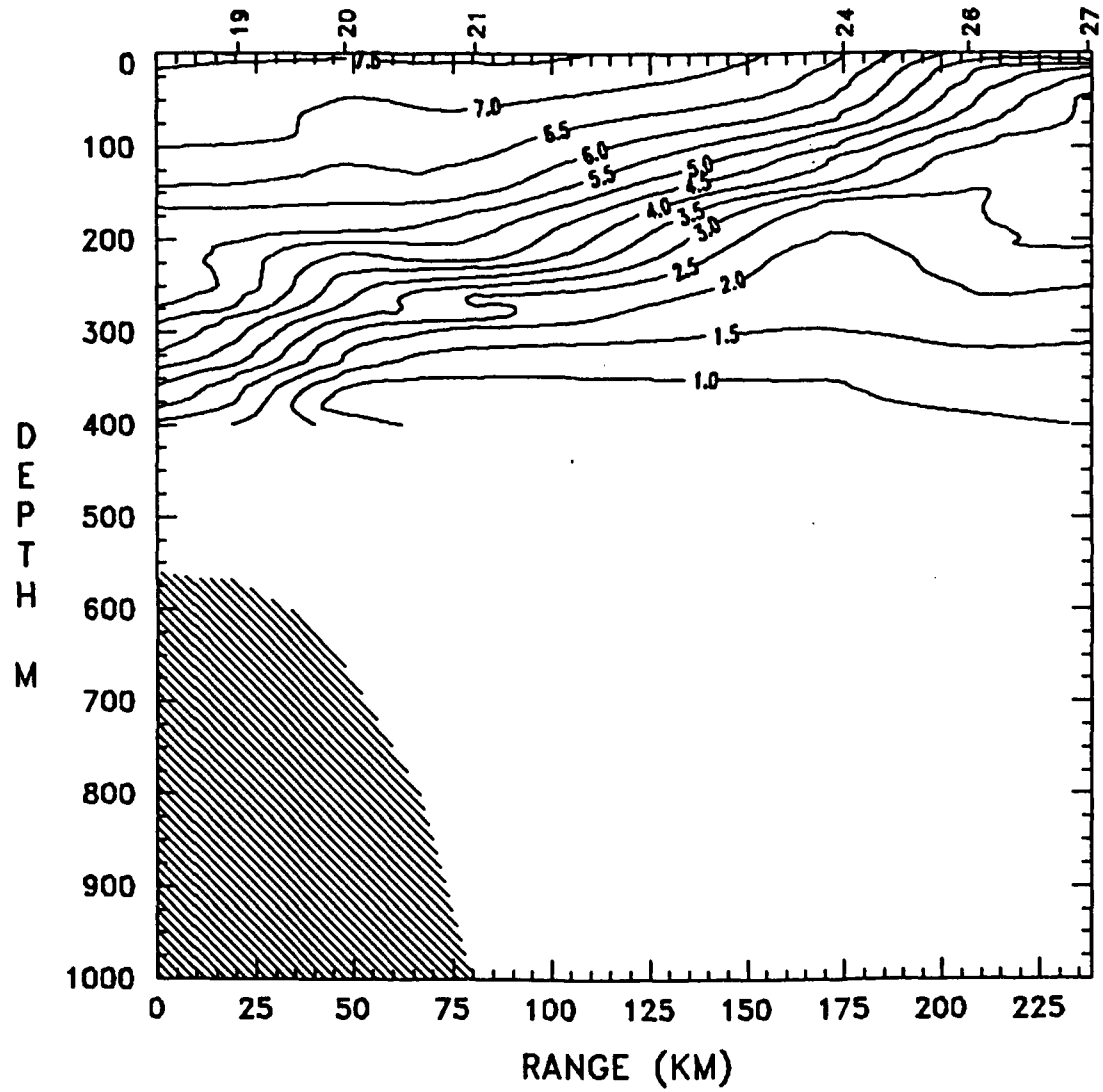
7 June 1989, Sta. 19 - 27

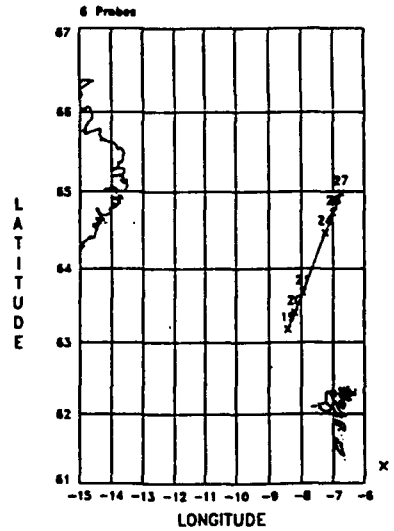
63.00, -8.50 Temp (deg C) 65.00, -6.75

15:36:49

4/08/91

dx= 9.27,dy= 5





LAT	63	63.25	63.5	63.75	64	64.25	64.5	64.75	65
LONG	-8.5	-8.25	-8	-7.75	-7.5	-7.25	-7	-6.75	

NOARL Code 331

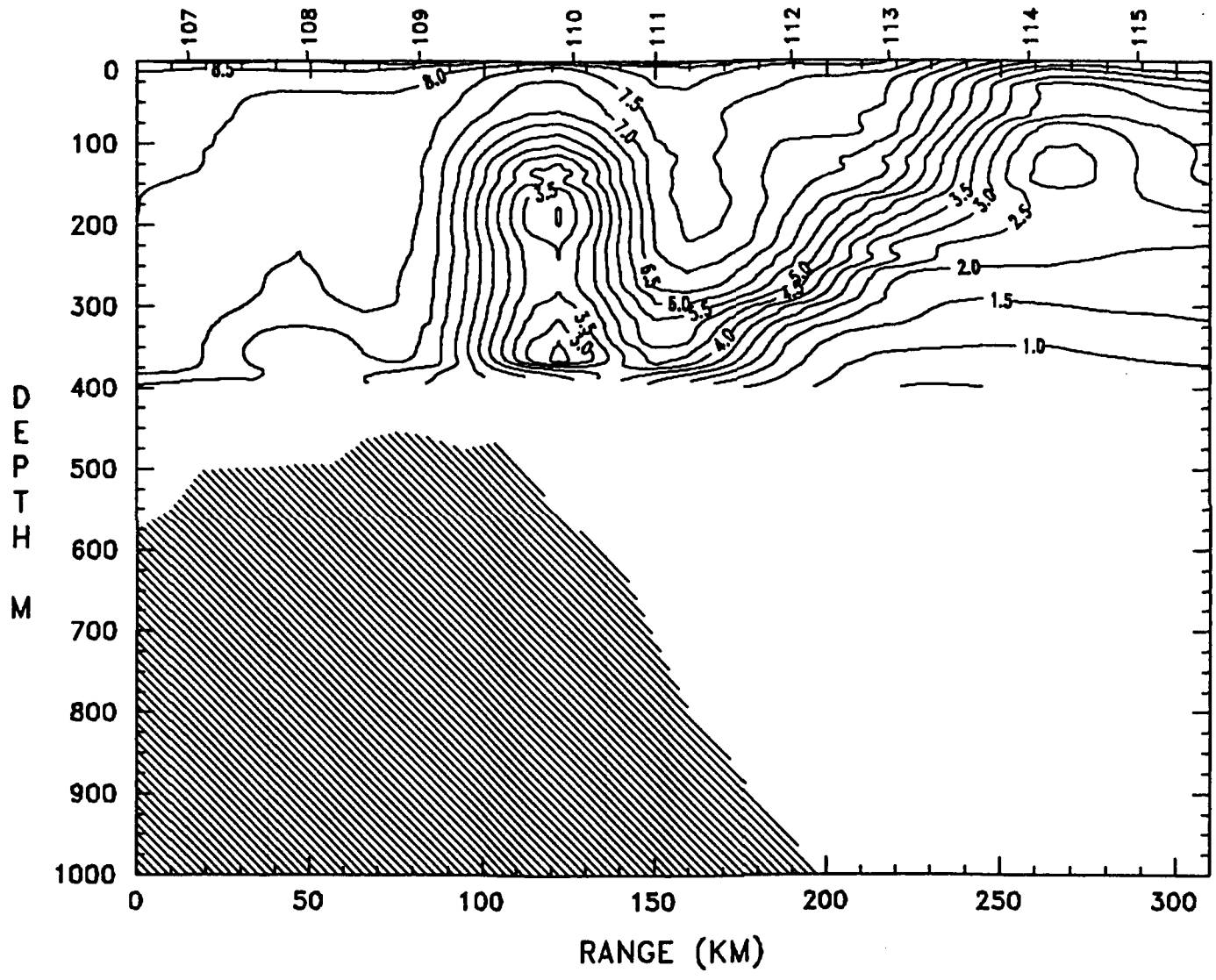
8 June 1989, Sta. 107 - 115

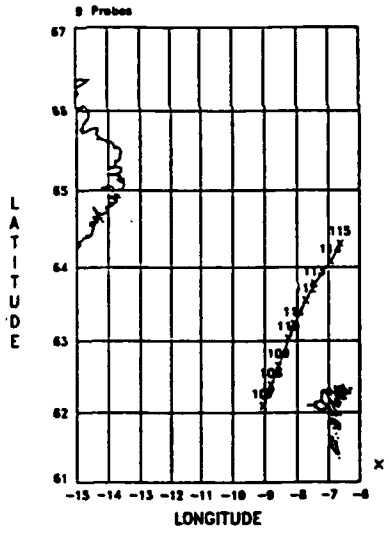
62.00, -9.25 Temp (deg C) 64.50, -6.50

15:08:57

4/08/91

dx= 9.27,dy= 5





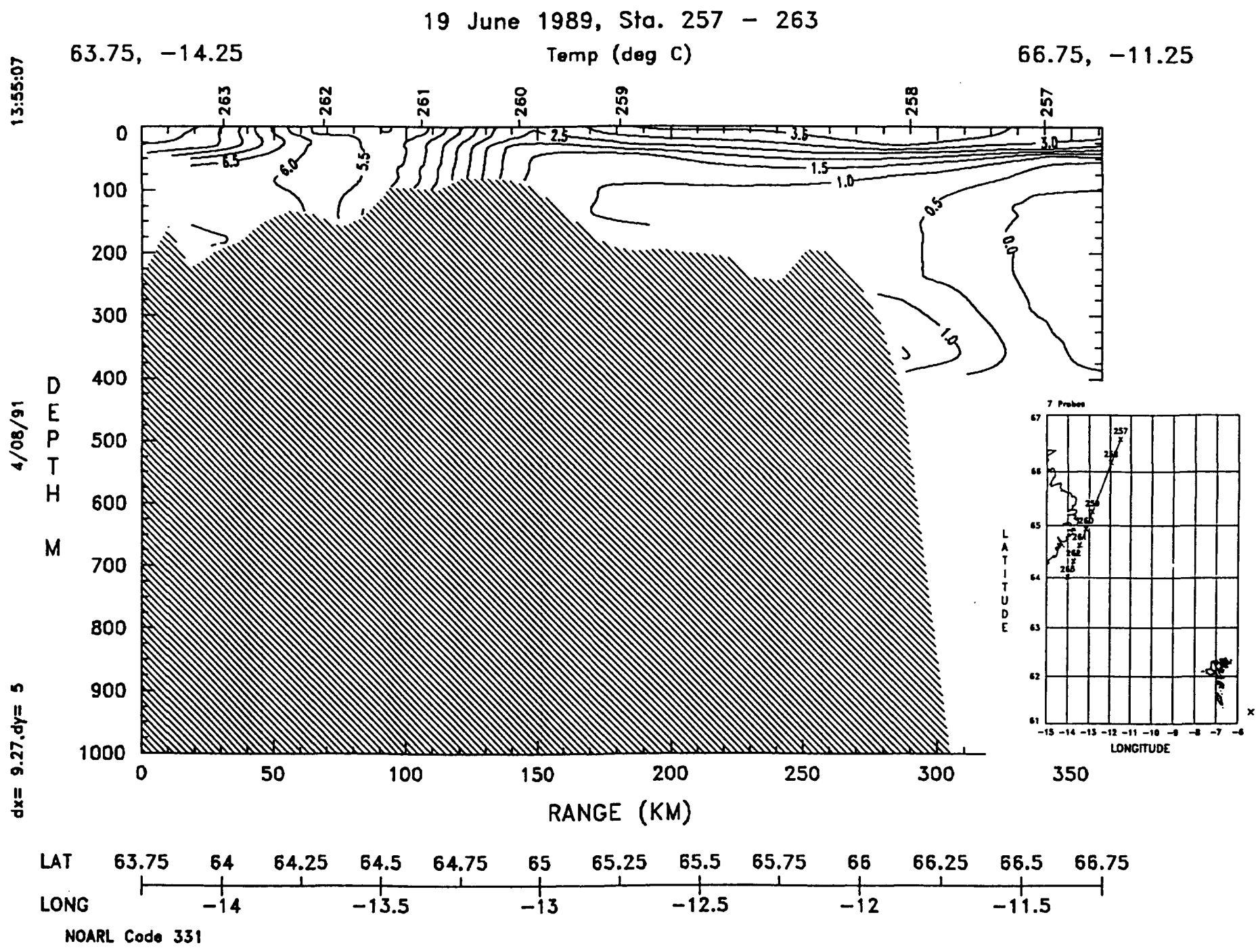
LAT	62	62.25	62.5	62.75	63	63.25	63.5	63.75	64	64.25	64.5
LONG		-9		-8.5		-8		-7.5		-7	-6.5

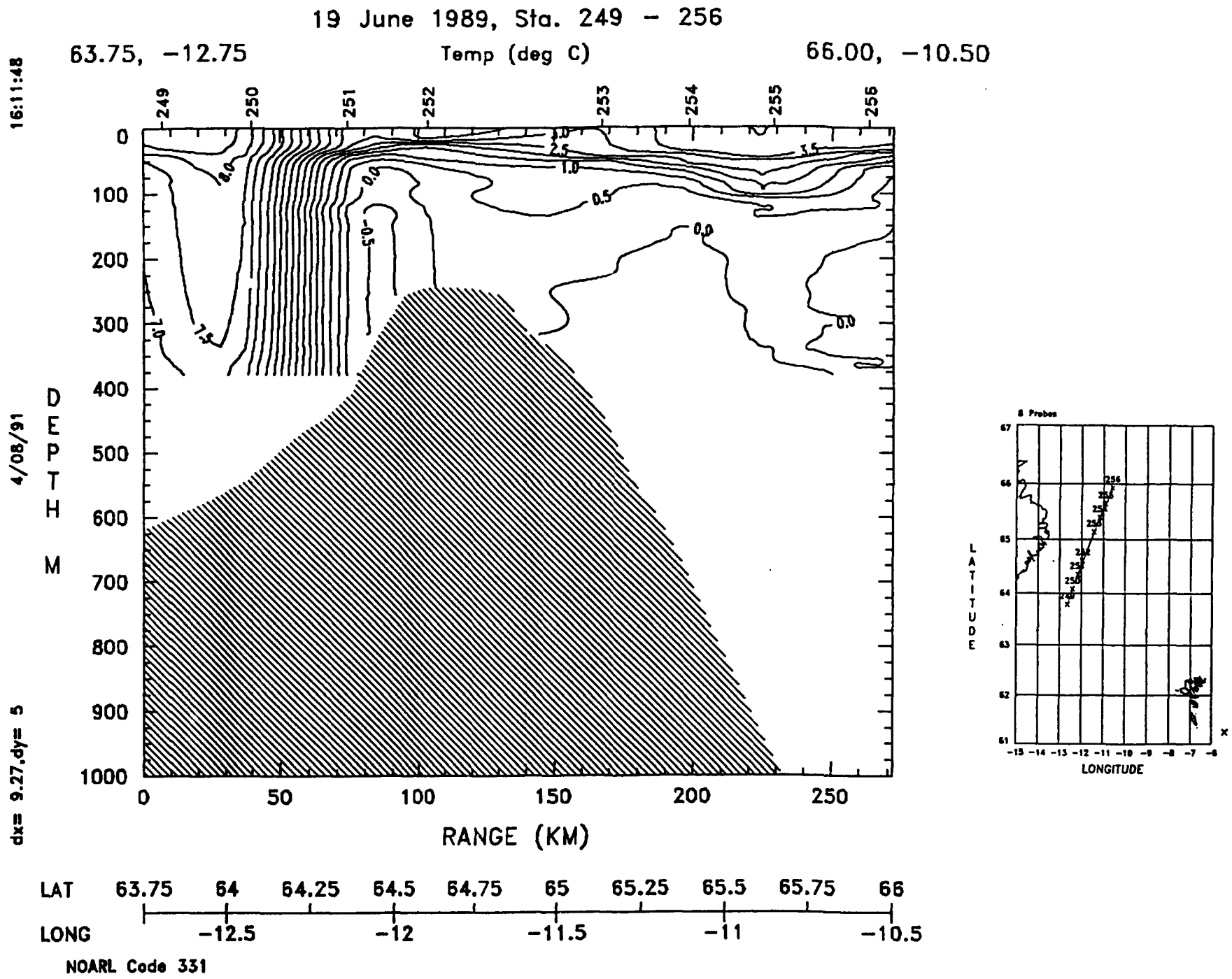
NOARL Code 331

Appendix F.

Temperature Contours along Selected Vertical Transects,

19 June 1989.


19 June 1989, Sta. 257 - 263
63.75, -14.25
Temp (deg C)
66.75, -11.25
13:55:07
4/08/91
dx= 9.27,dy= 5
263
262
261
260
259
258
257
DEPTH M
RANGE (KM)
LAT 63.75 64 64.25 64.5 64.75 65 65.25 65.5 65.75 66 66.25 66.5 66.75
LONG -14 -13.5 -13 -12.5 -12 -11.5
NOARL Code 331
7 Probes
LATITUDE
LONGITUDE


19 June 1989, Sta. 249 - 256
63.75, -12.75
Temp (deg C)
66.00, -10.50
16:11:48
4/08/91
dx= 9.27,dy= 5
249
250
251
252
253
254
255
256
DEPTH M
0
100
200
300
400
500
600
700
800
900
1000
RANGE (KM)
0
50
100
150
200
250
LAT 63.75 64 64.25 64.5 64.75 65 65.25 65.5 65.75 66
LONG -12.5 -12 -11.5 -11 -10.5
NOARL Code 331
LATITUDE
LONGITUDE

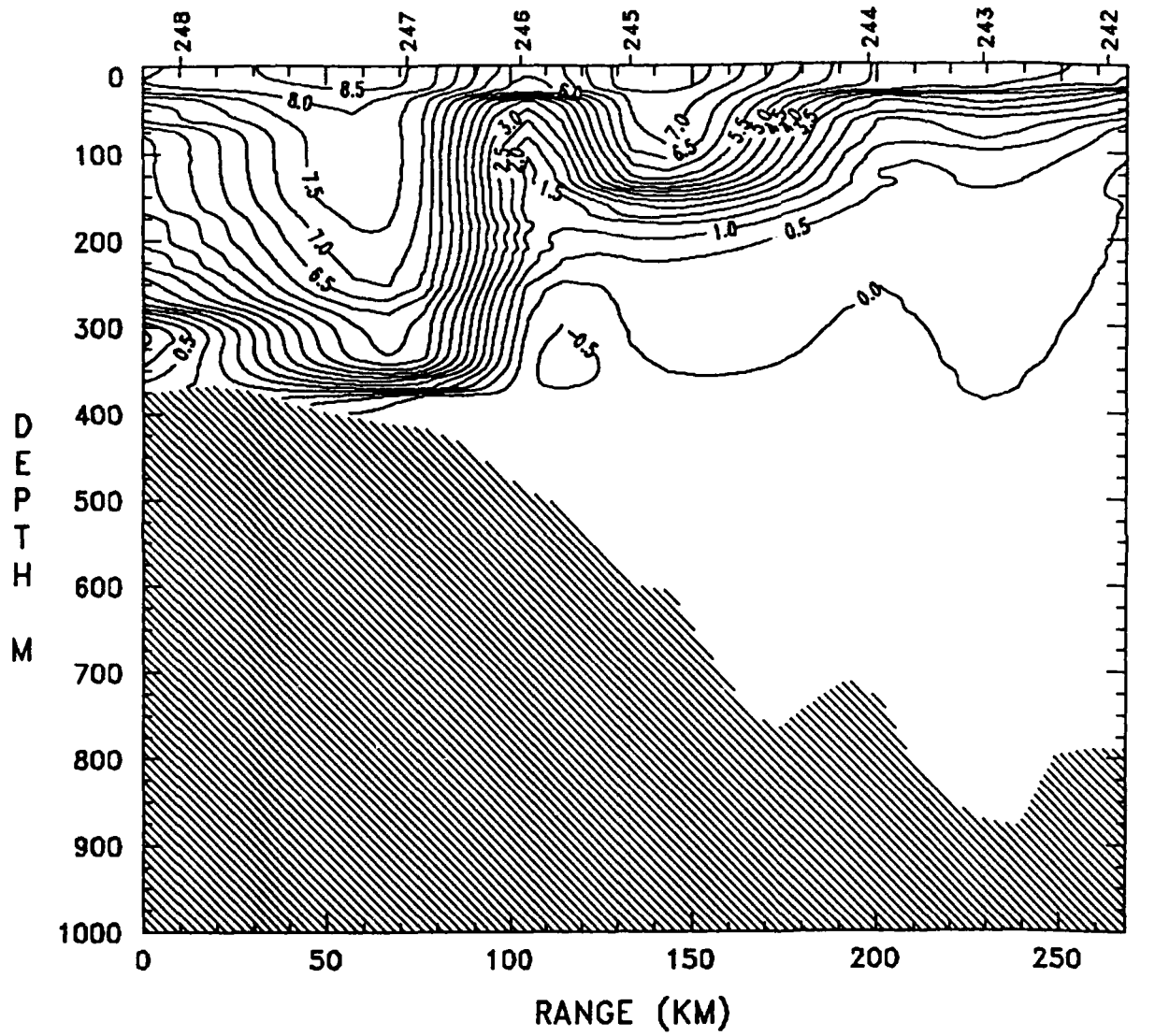
19 June 1989, Sta. 242 – 248

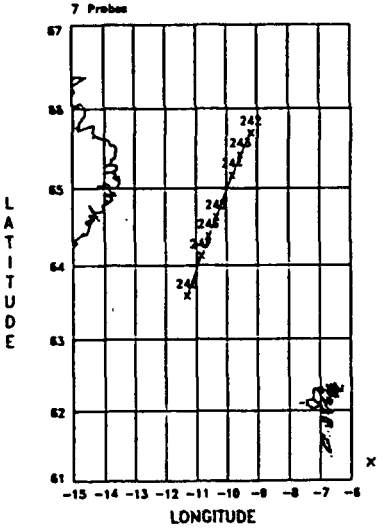
63.50, −11.25 Temp (deg C) 65.75, −9.25

14:17:08

4/08/91

dx= 9.27,dy= 5





LAT	63.5	63.75	64	64.25	64.5	64.75	65	65.25	65.5	65.75
LONG	−11.25	−11	−10.75	−10.5	−10.25	−10	−9.75	−9.5	−9.25	

NOARL Code 331

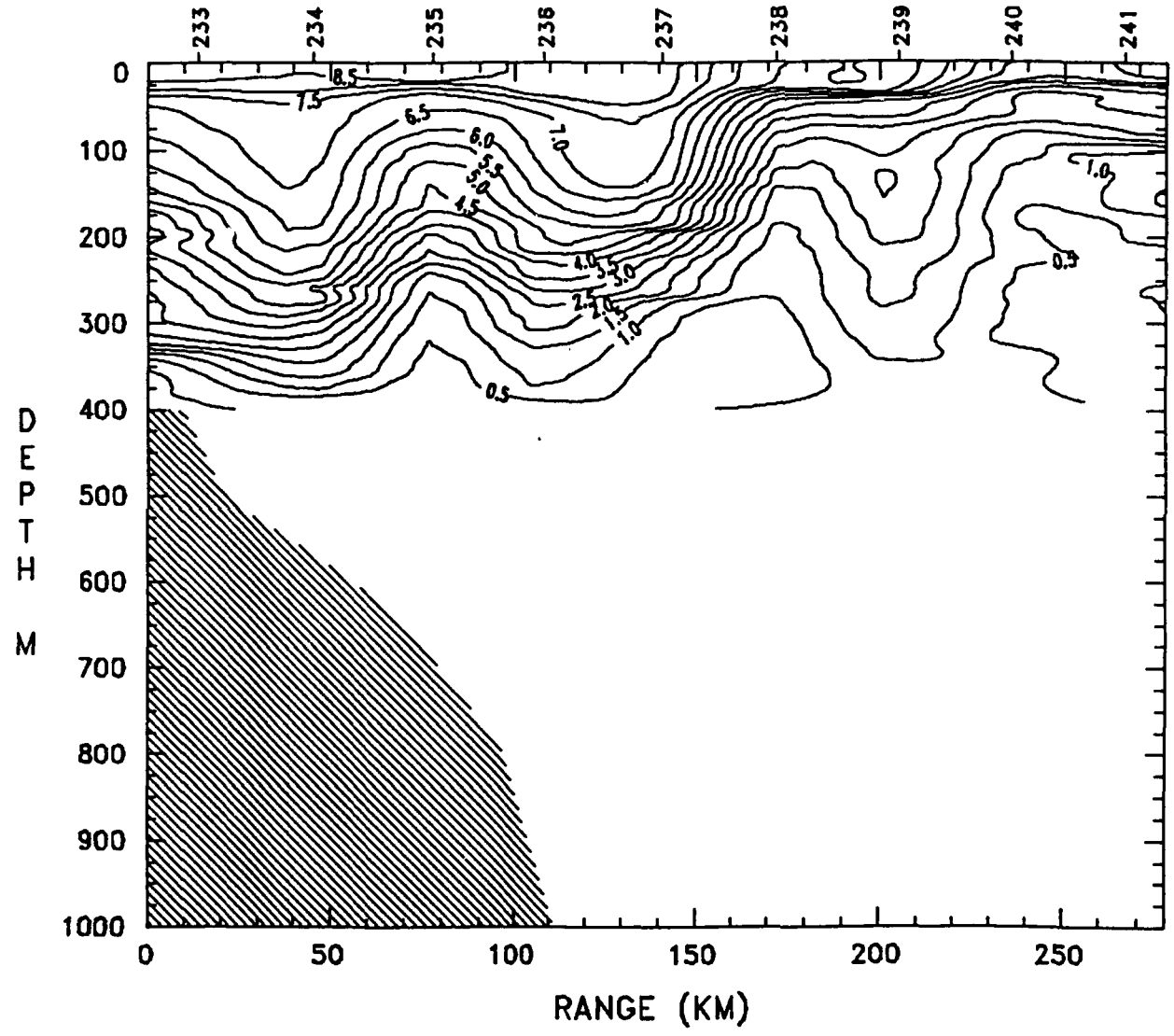
19 June 1989, Sta. 233 - 241

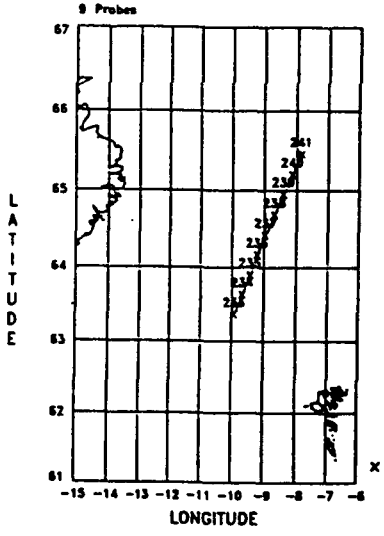
63.25, -10.00 Temp (deg C) 65.50, -7.50

14:27:09

4/08/91

dx= 9.27,dy= 5





LAT	63.25	63.5	63.75	64	64.25	64.5	64.75	65	65.25	65.5
LONG	-10		-9.5		-9		-8.5		-8	-7.5

NOARL Code 331

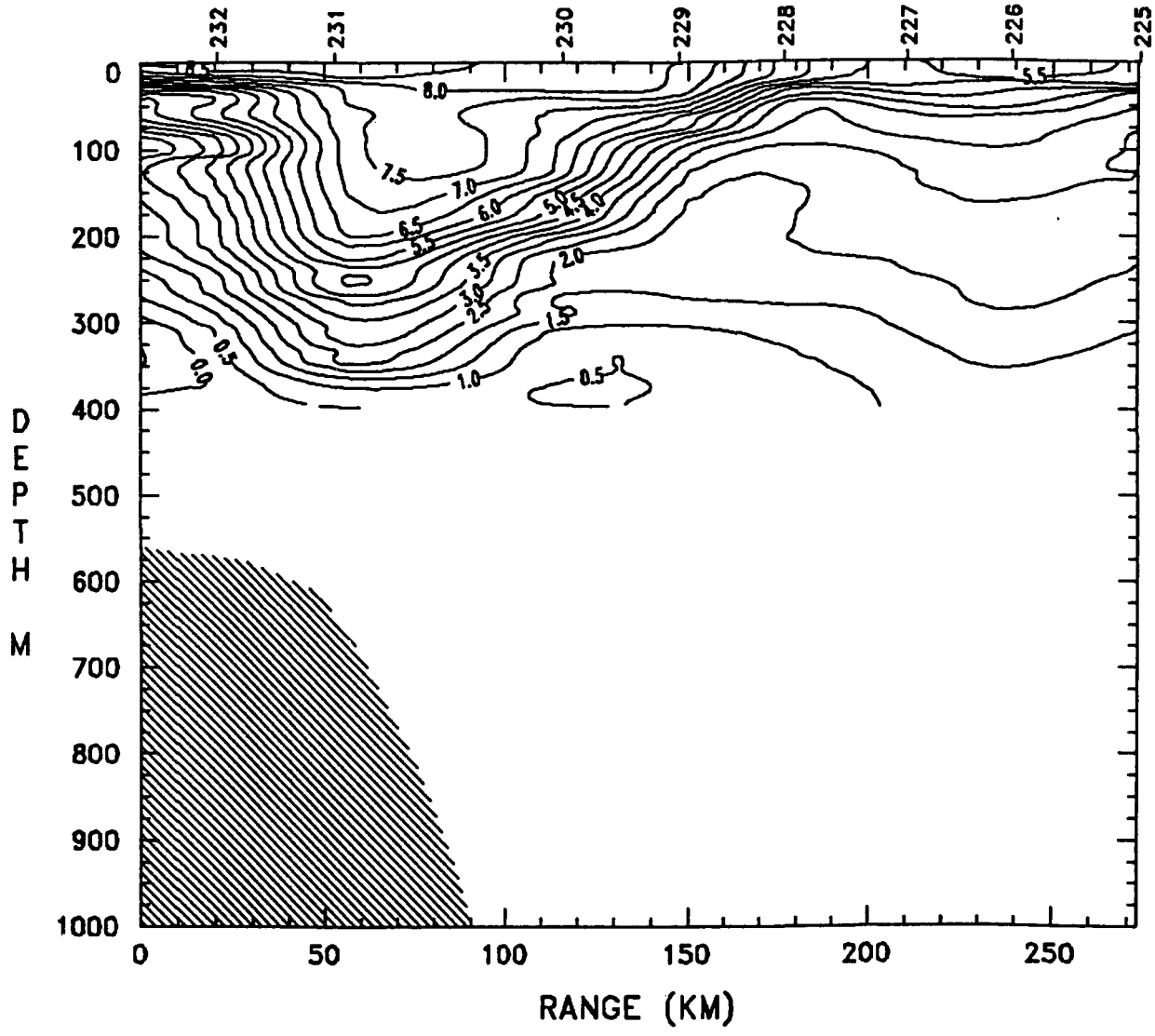
19 June 1989, Sta. 225 - 232

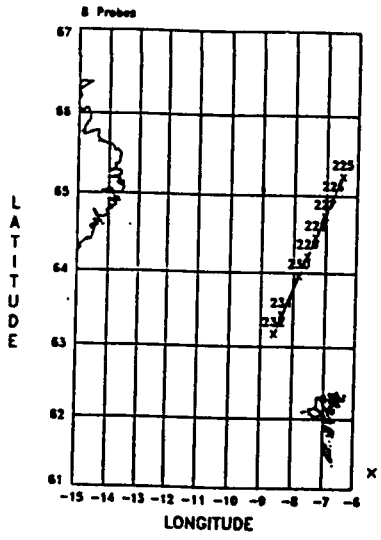
63.00, -8.75 Temp (deg C) 65.25, -6.50

14:33:27

4/08/91

dx= 9.27,dy= 5





LAT	63	63.25	63.5	63.75	64	64.25	64.5	64.75	65	65.25
LONG		-8.5		-8		-7.5		-7		-6.5

NOARL Code 331

Appendix G.

Drop Times, Positions, and Data Traces, 7 June 1989

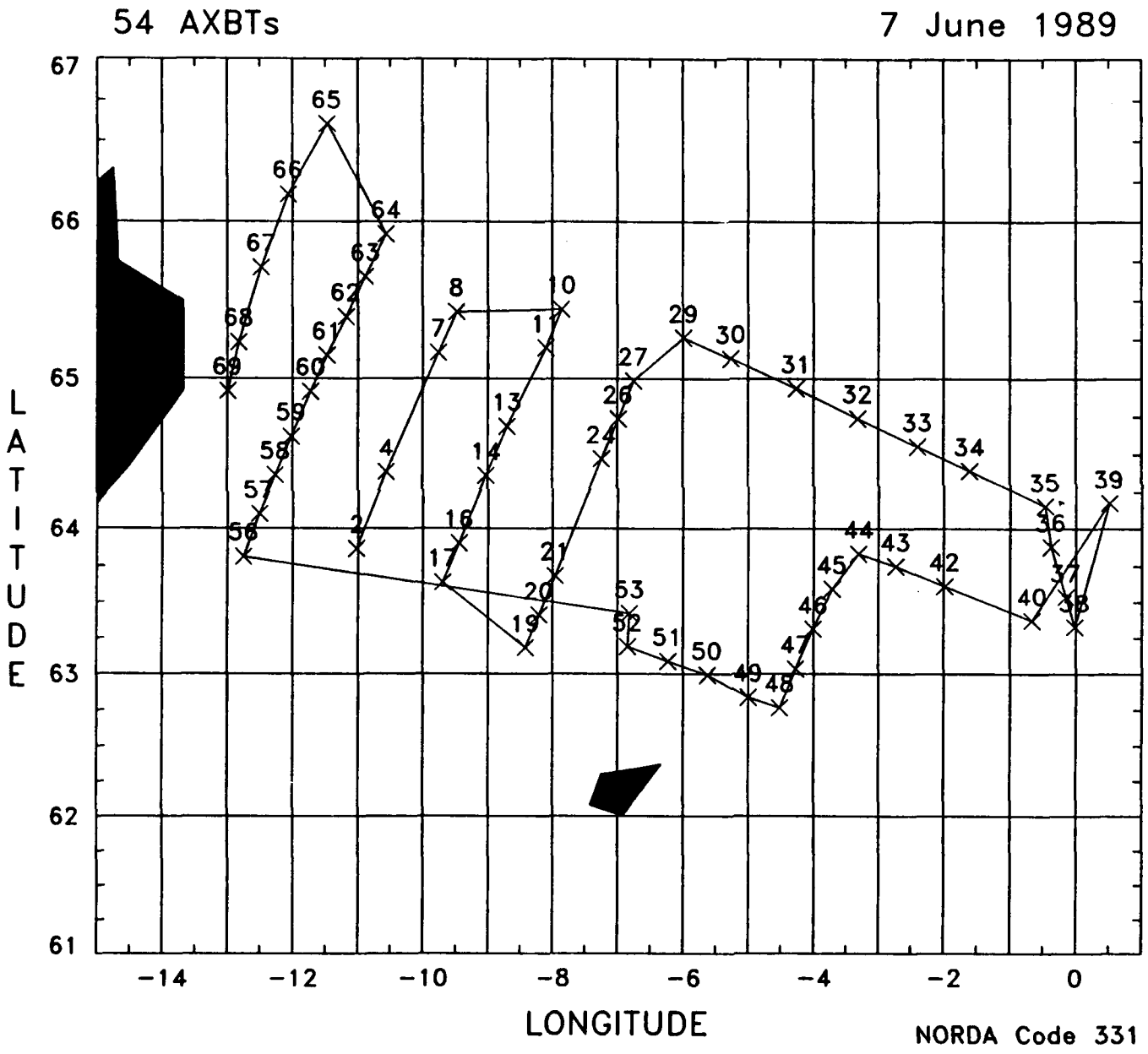
Table 1. Header information for AXBT drops for Phase 1's flight 1 on 7 June 1989. Times are UTC.

DATE: 6/07/89 PROJECT ID: SACLANT

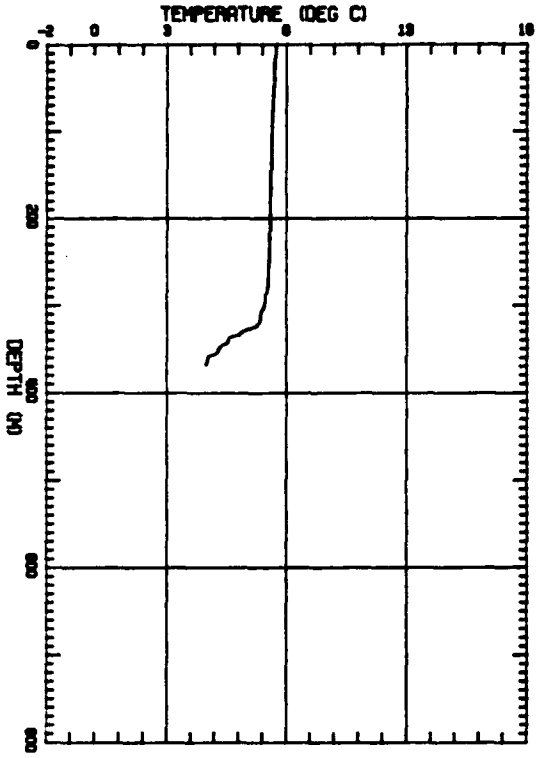
#	TYPE	D/S	LATITUDE		LONGITUDE		TIME	FLT	RT	CH
2	AXBT	S	63	52.00	-11	-1.40	10:21:55	1	10	14
4	AXBT	S	64	23.10	-10	-33.60	10:28:30	1	10	12
7	AXBT	S	65	10.00	-9	-45.90	10:38:21	1	10	12
8	AXBT	S	65	25.70	-9	-28.80	10:41:37	1	10	14
10	AXBT	S	65	26.80	-7	-51.20	10:52:35	1	10	12
11	AXBT	S	65	11.90	-8	-5.90	10:55:40	1	10	14
13	AXBT	S	64	41.30	-8	-41.70	11:02:12	1	10	12
14	AXBT	S	64	21.70	-9	-1.20	11:06:18	1	10	14
16	AXBT	S	63	54.10	-9	-26.90	11:11:54	1	10	12
17	AXBT	S	63	38.30	-9	-41.80	11:15:06	1	10	14
19	AXBT	S	63	11.00	-8	-24.80	11:28:37	1	10	12
20	AXBT	S	63	24.60	-8	-12.40	11:31:35	1	10	14
21	AXBT	S	63	41.00	-7	-57.30	11:35:08	1	10	16
24	AXBT	S	64	28.30	-7	-14.40	11:45:11	1	10	16
26	AXBT	S	64	44.10	-6	-59.20	11:48:33	1	10	12
27	AXBT	S	64	59.10	-6	-45.10	11:51:41	1	10	14
29	AXBT	S	65	15.80	-5	-59.40	11:57:48	1	10	12
30	AXBT	S	65	7.80	-5	-16.10	12:01:31	1	10	14
31	AXBT	S	64	56.10	-4	-15.60	12:06:44	1	10	16
32	AXBT	S	64	44.50	-3	-19.00	12:11:43	1	10	12
33	AXBT	S	64	33.30	-2	-23.40	12:16:39	1	10	14
34	AXBT	S	64	23.60	-1	-36.20	12:20:58	1	10	16
35	AXBT	S	64	9.20	0	-28.10	12:27:20	1	10	12
36	AXBT	S	63	52.80	0	-22.80	12:30:45	1	10	14
37	AXBT	S	63	32.20	0	-9.30	12:34:49	1	10	16
38	AXBT	S	63	19.80	0	-1.30	12:37:14	1	10	12
39	AXBT	S	64	10.50	0	30.40	12:49:37	1	10	14
40	AXBT	S	63	22.50	0	-39.90	13:05:01	1	10	14
42	AXBT	S	63	36.80	-1	-59.10	13:12:11	1	10	12
43	AXBT	S	63	44.80	-2	-43.90	13:16:13	1	10	14
44	AXBT	S	63	50.00	-3	-18.10	13:19:11	1	10	16
45	AXBT	S	63	35.60	-3	-42.80	13:22:53	1	10	12
46	AXBT	S	63	18.80	-4	-.10	13:26:30	1	10	14
47	AXBT	S	63	2.20	-4	-16.30	13:29:56	1	10	16
48	AXBT	S	62	45.90	-4	-31.10	13:33:16	1	10	12
49	AXBT	S	62	50.30	-5	.00	13:36:35	1	10	14
50	AXBT	S	62	59.60	-5	-37.80	13:40:21	1	10	16
51	AXBT	S	63	5.40	-6	-13.60	13:43:34	1	10	12
52	AXBT	S	63	11.30	-6	-50.60	13:46:54	1	10	14
53	AXBT	S	63	25.30	-6	-48.80	13:50:17	1	10	16
56	AXBT	S	63	48.70	-12	-44.90	14:26:42	1	10	16
57	AXBT	S	64	6.00	-12	-30.50	14:30:28	1	10	12
58	AXBT	S	64	21.80	-12	-15.50	14:33:53	1	10	14
59	AXBT	S	64	37.20	-12	-.80	14:37:10	1	10	16
60	AXBT	S	64	54.90	-11	-43.40	14:40:59	1	10	12
61	AXBT	S	65	8.90	-11	-28.50	14:44:02	1	10	14

#	TYPE	D/S	LATITUDE		LONGITUDE		TIME	FLT	RT	CH
62	AXBT	S	65	23.90	-11	-11.10	14:47:24	1	10	16
63	AXBT	S	65	39.10	-10	-52.90	14:50:44	1	10	12
64	AXBT	S	65	55.30	-10	-34.00	14:54:19	1	10	14
65	AXBT	S	66	36.30	-11	-28.30	15:04:18	1	10	16
66	AXBT	S	66	10.20	-12	-4.10	15:12:05	1	10	12
67	AXBT	S	65	42.70	-12	-28.30	15:18:42	1	10	14
68	AXBT	S	65	14.10	-12	-49.50	15:25:28	1	10	16
69	AXBT	S	64	55.00	-12	-59.60	15:29:48	1	10	12

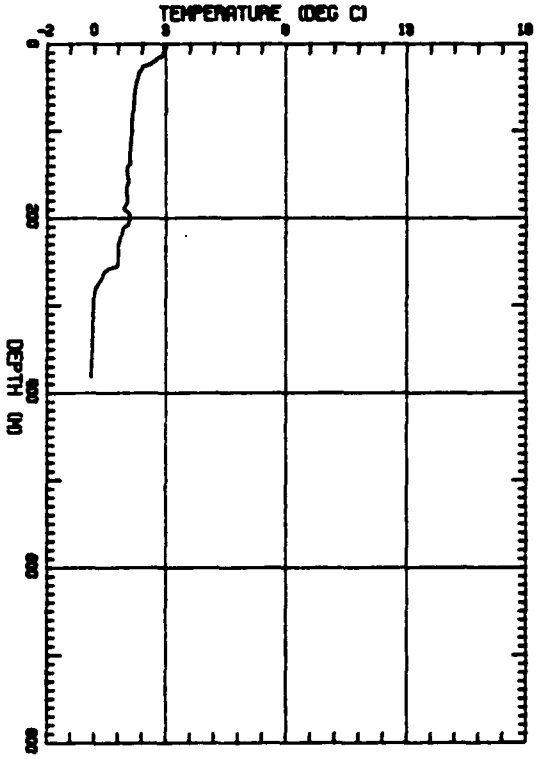
TOTAL NO. OF FILES: 54


54 AXBTs
7 June 1989
LATITUDE
LONGITUDE
67
66
65
64
63
62
61
−14
−12
−10
−8
−6
−4
−2
0
NORDA Code 331

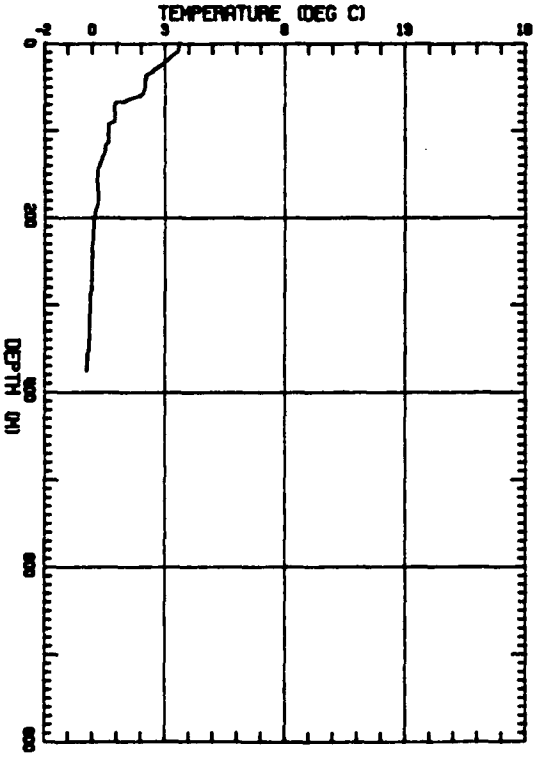
PROJECT: SACLANT
DROP NO: 2 CHANNEL: 14 LATITUDE: 63 52.0
DATE: 6/ 7/80 TIME: 10:21:55 LONGITUDE: -11 -1.4



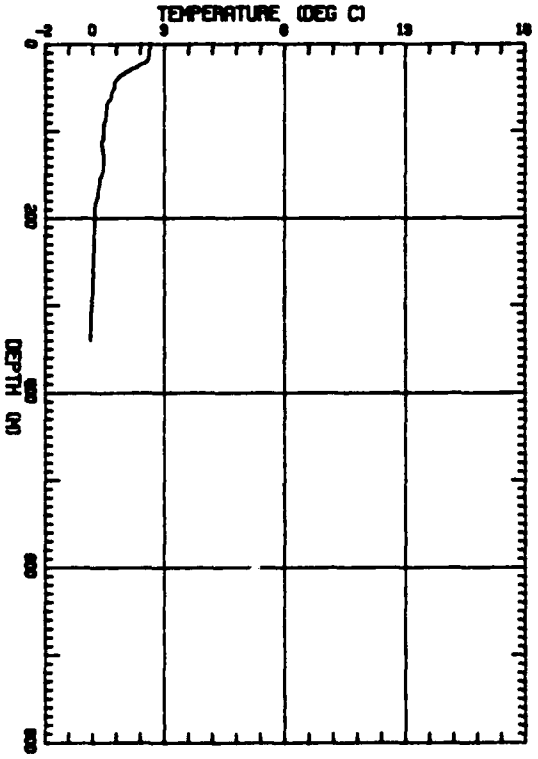
PROJECT: SACLANT
DROP NO: 4 CHANNEL: 12 LATITUDE: 64 23.1
DATE: 6/ 7/80 TIME: 10:28:30 LONGITUDE: -10 -33.6



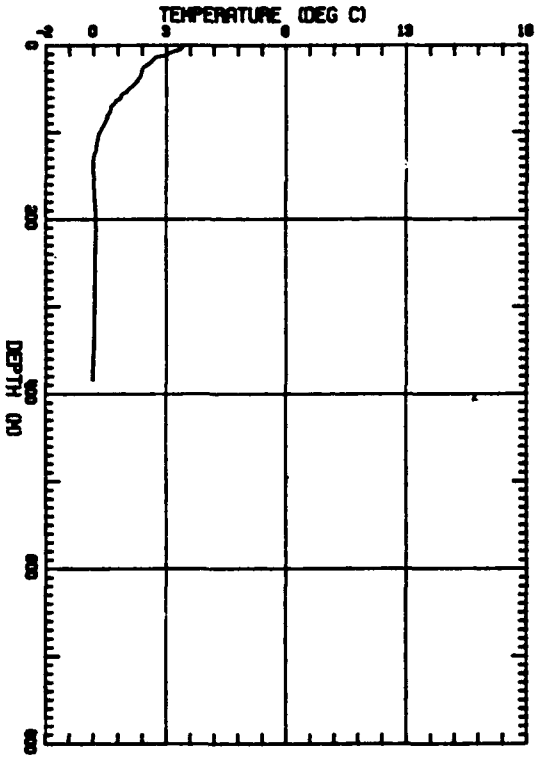
PROJECT: SACLANT
DROP NO: 7 CHANNEL: 12 LATITUDE: 65 10.0
DATE: 6/ 7/80 TIME: 10:38:21 LONGITUDE: -9 -45.9



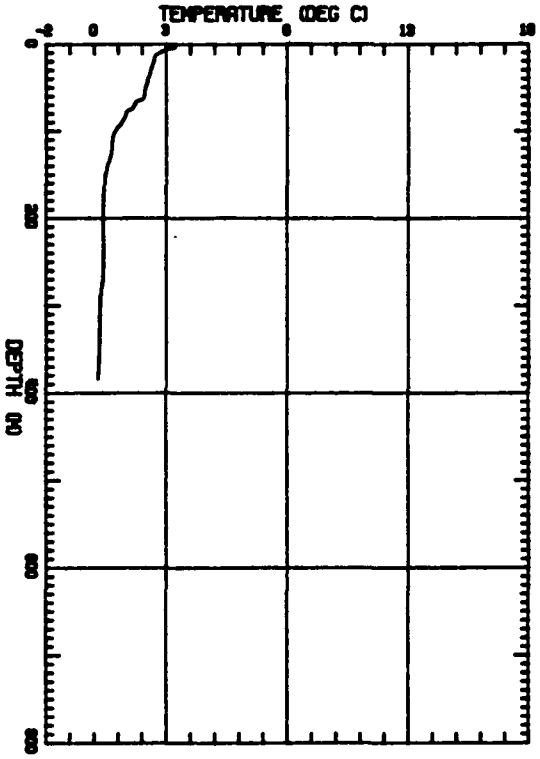
PROJECT: SACLANT
DROP NO: 8 CHANNEL: 14 LATITUDE: 65 25.7
DATE: 6/ 7/80 TIME: 10:41:37 LONGITUDE: -9 -28.8



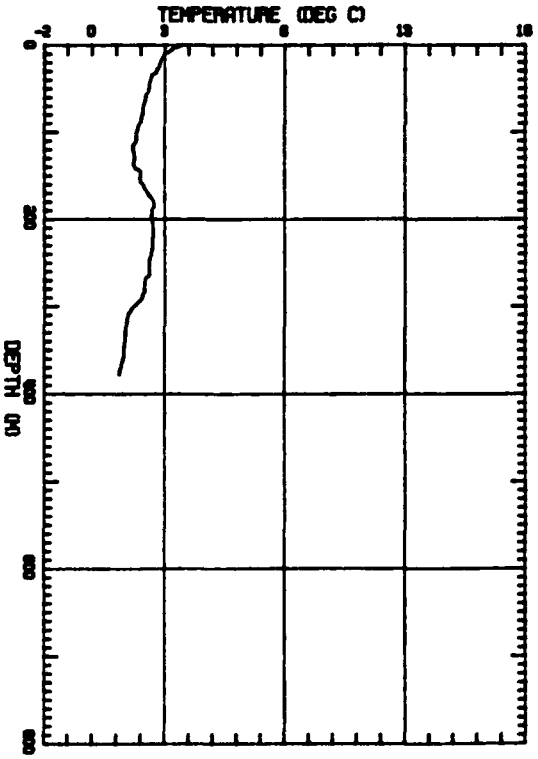
PROJECT: SACLANT
DROP NO: 10 CHANNEL: 12 LATITUDE: 65 28.8
DATE: 6/ 7/88 TIME: 10:52:35 LONGITUDE: -7 -51.2



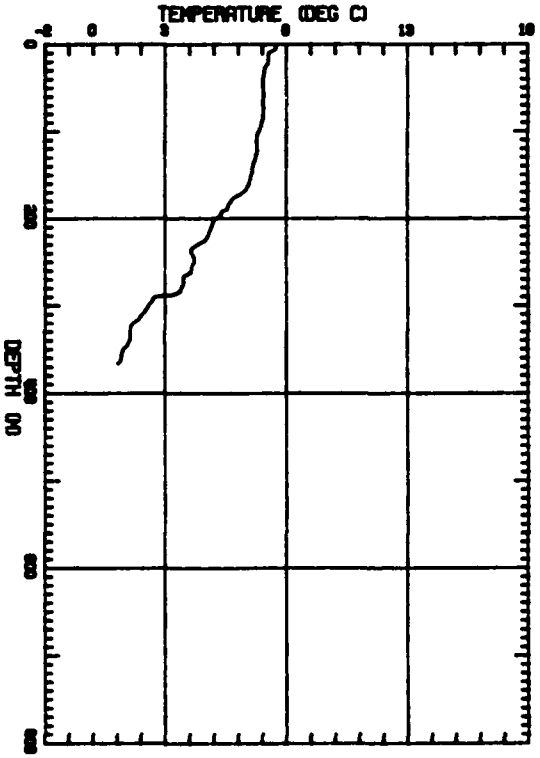
PROJECT: SACLANT
DROP NO: 11 CHANNEL: 14 LATITUDE: 65 11.9
DATE: 6/ 7/88 TIME: 10:55:40 LONGITUDE: -8 -5.8



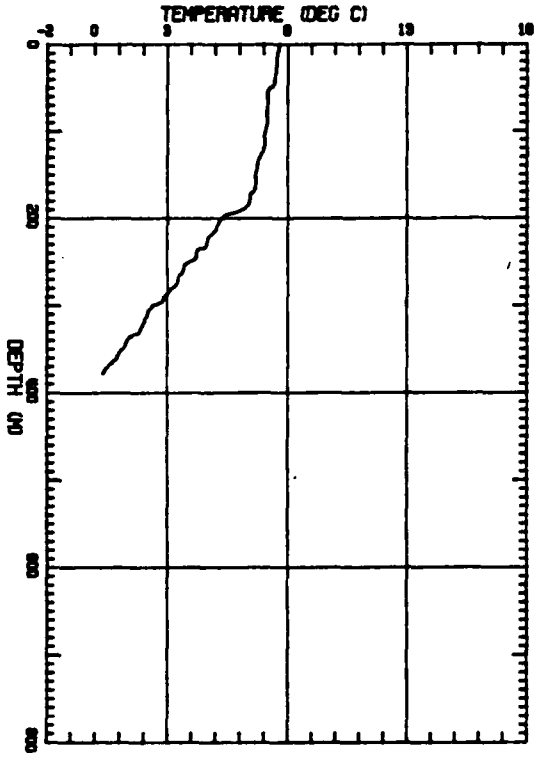
PROJECT: SACLANT
DROP NO: 13 CHANNEL: 12 LATITUDE: 64 41.9
DATE: 6/ 7/88 TIME: 11: 2:12 LONGITUDE: -8 -41.7



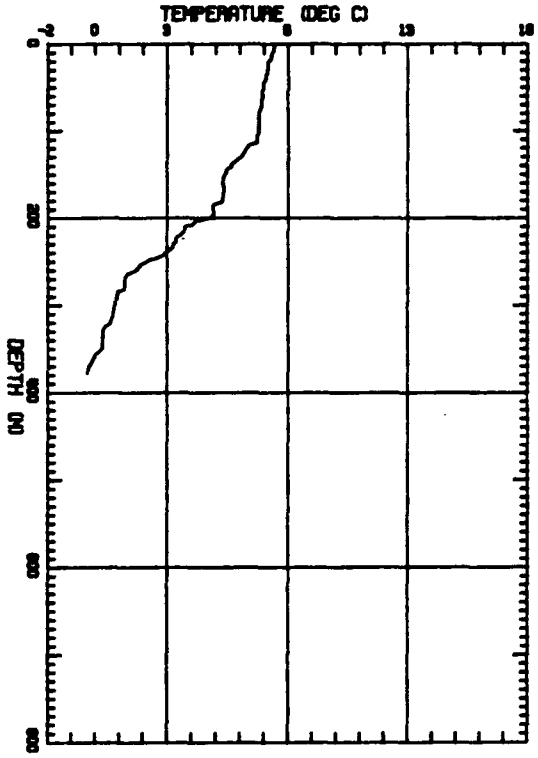
PROJECT: SACLANT
DROP NO: 14 CHANNEL: 14 LATITUDE: 64 21.7
DATE: 6/ 7/88 TIME: 11: 6:18 LONGITUDE: -8 -1.2



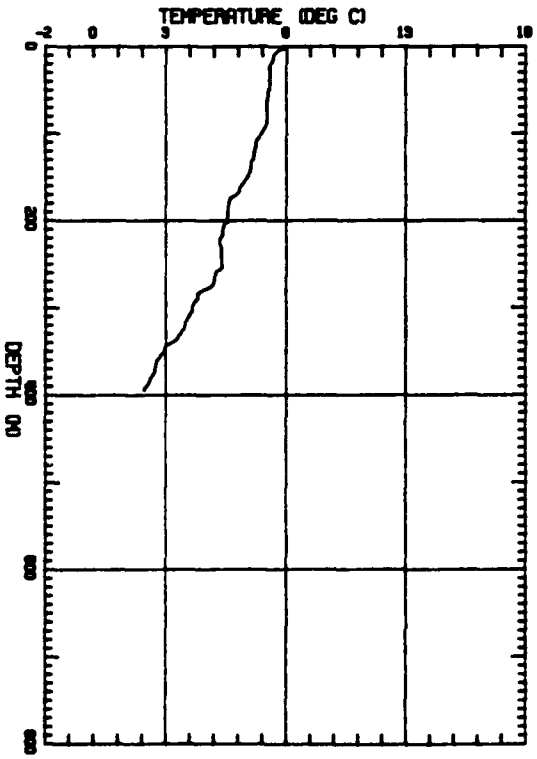
PROJECT: SACLANT
DROP NO: 16 CHANNEL: 12 LATITUDE: 63 54.1
DATE: 6/ 7/89 TIME: 11:11:54 LONGITUDE: -0 -28.9



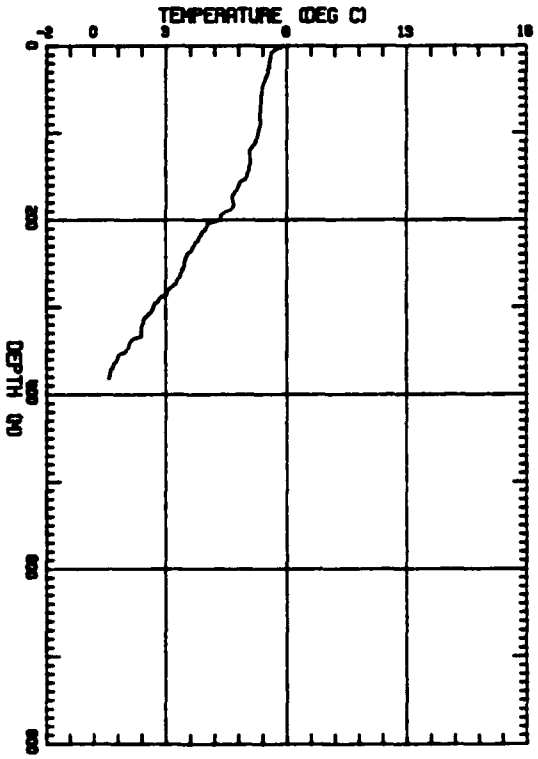
PROJECT: SACLANT
DROP NO: 17 CHANNEL: 14 LATITUDE: 63 38.3
DATE: 6/ 7/89 TIME: 11:15: 8 LONGITUDE: -0 -41.6



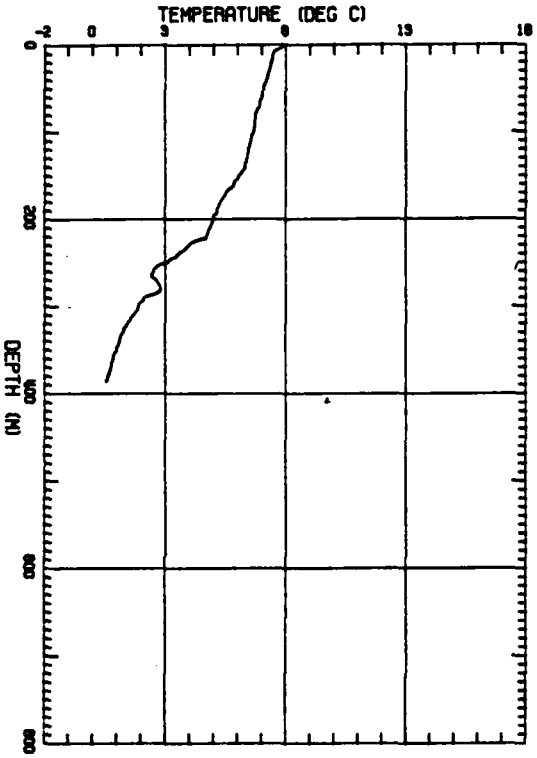
PROJECT: SACLANT
DROP NO: 19 CHANNEL: 12 LATITUDE: 63 11.0
DATE: 6/ 7/89 TIME: 11:28:37 LONGITUDE: -0 -24.8



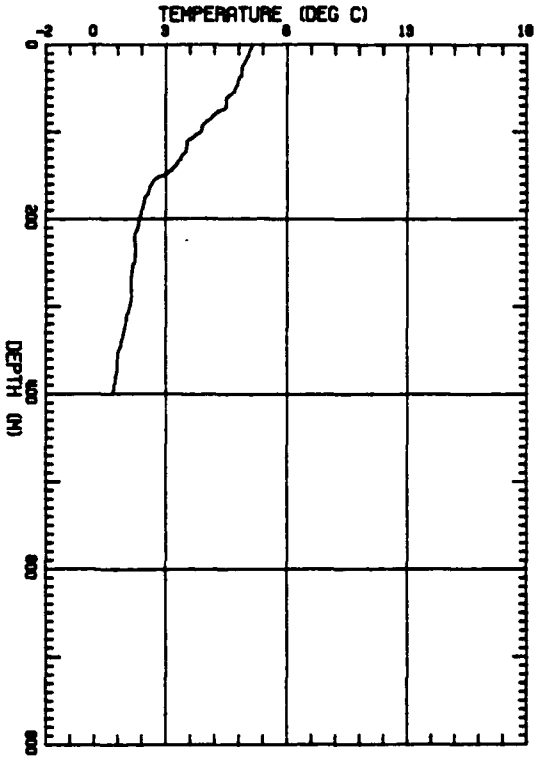
PROJECT: SACLANT
DROP NO: 20 CHANNEL: 14 LATITUDE: 63 24.6
DATE: 6/ 7/89 TIME: 11:31:35 LONGITUDE: -0 -12.4



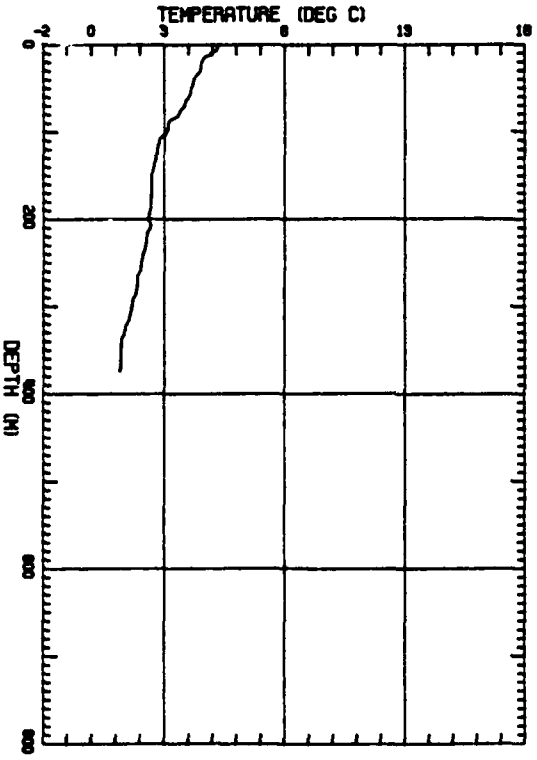
PROJECT: SACLANT
DROP NO: 21 CHANNEL: 16 LATITUDE: 69 41.0
DATE: 6/ 7/89 TIME: 11:35: 8 LONGITUDE: -7 -57.9



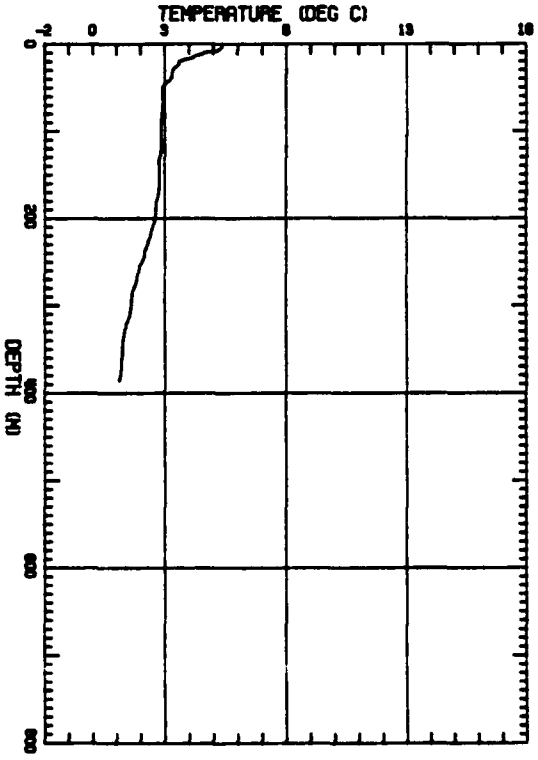
PROJECT: SACLANT
DROP NO: 24 CHANNEL: 16 LATITUDE: 64 28.9
DATE: 6/ 7/89 TIME: 11:45:11 LONGITUDE: -7 -14.4



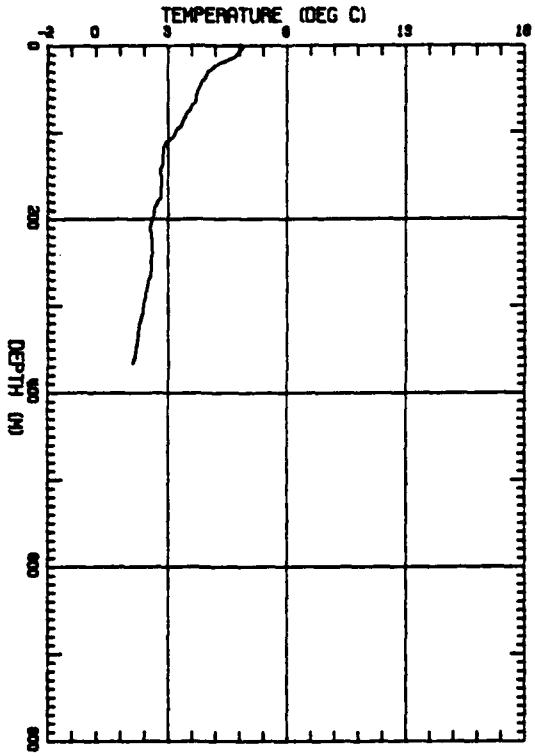
PROJECT: SACLANT
DROP NO: 26 CHANNEL: 12 LATITUDE: 64 44.1
DATE: 6/ 7/89 TIME: 11:48:33 LONGITUDE: -6 -59.2



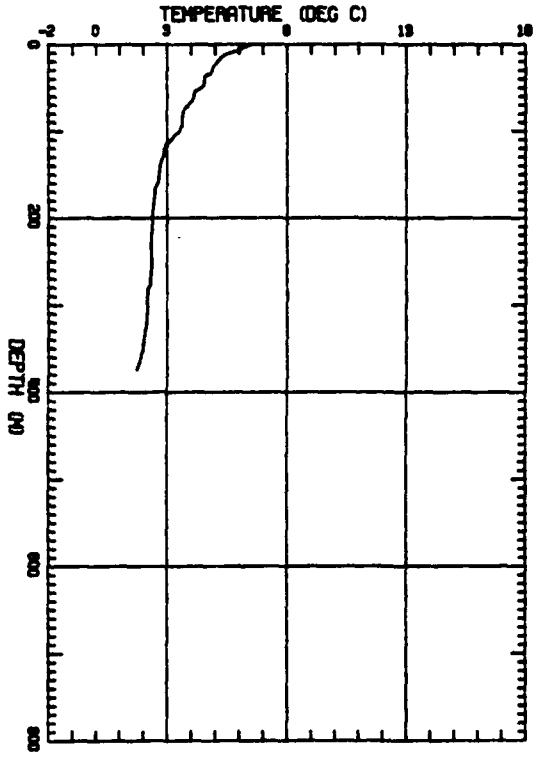
PROJECT: SACLANT
DROP NO: 27 CHANNEL: 14 LATITUDE: 64 59.1
DATE: 6/ 7/89 TIME: 11:51:41 LONGITUDE: -6 -45.1



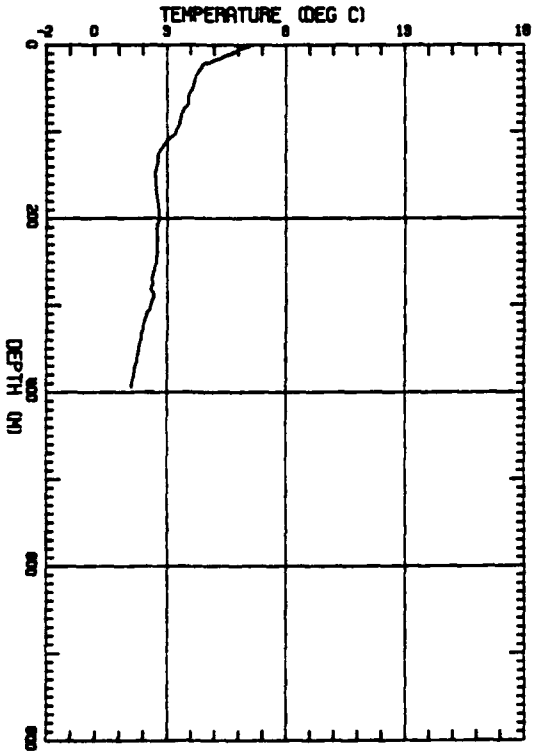
PROJECT: SACLANT
DROP NO: 29 CHANNEL: 12 LATITUDE: 65 15.6
DATE: 6/ 7/89 TIME: 11:57:48 LONGITUDE: -5 -59.4



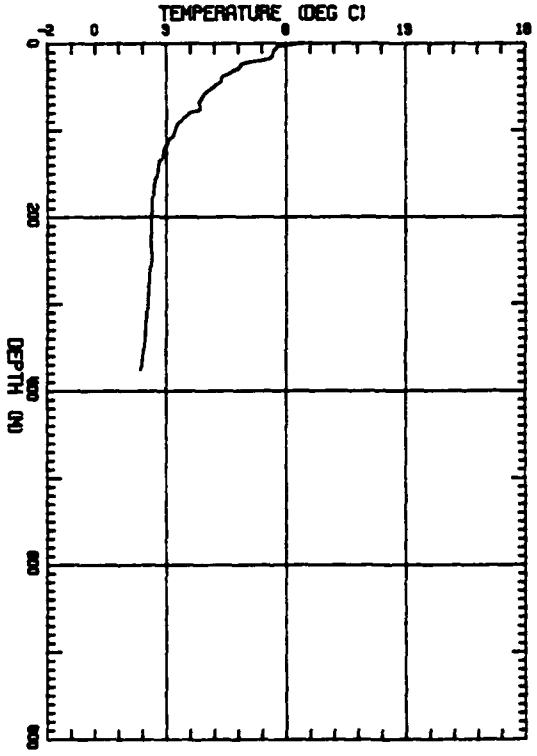
PROJECT: SACLANT
DROP NO: 30 CHANNEL: 14 LATITUDE: 65 7.8
DATE: 6/ 7/89 TIME: 12: 1:31 LONGITUDE: -5 -16.1



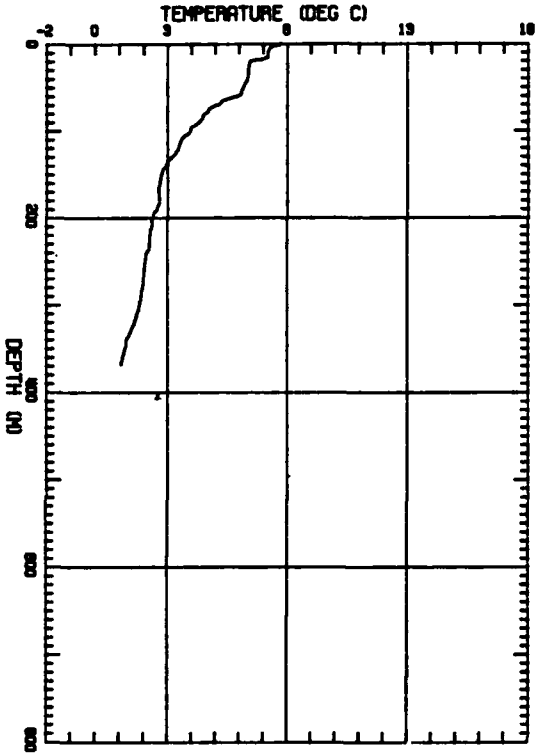
PROJECT: SACLANT
DROP NO: 31 CHANNEL: 16 LATITUDE: 64 58.1
DATE: 6/ 7/89 TIME: 12: 6:44 LONGITUDE: -4 -15.8



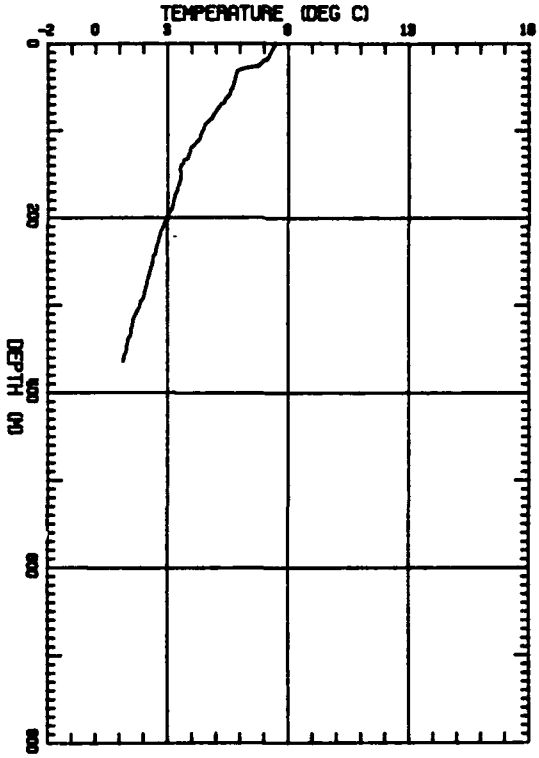
PROJECT: SACLANT
DROP NO: 32 CHANNEL: 12 LATITUDE: 64 44.5
DATE: 6/ 7/89 TIME: 12:11:43 LONGITUDE: -3 -19.0



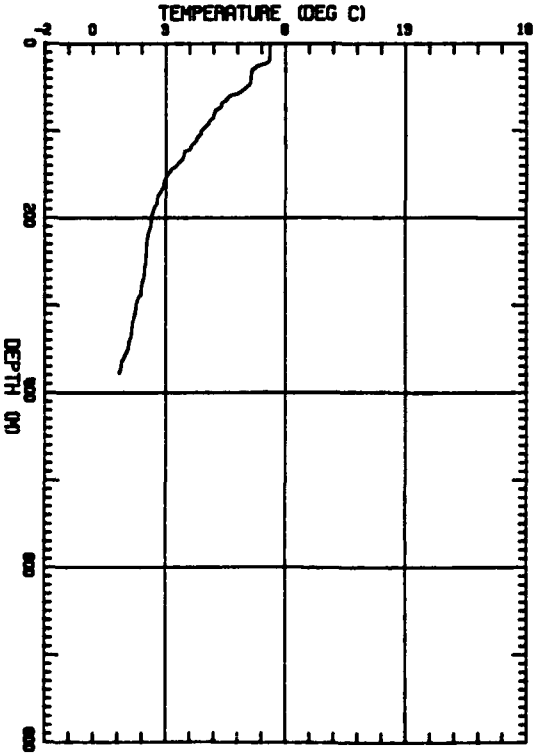
PROJECT: SACLANT
DROP NO: 33 CHANNEL: 14 LATITUDE: 64 33.3
DATE: 6/ 7/88 TIME: 12:18:39 LONGITUDE: -2 -23.4



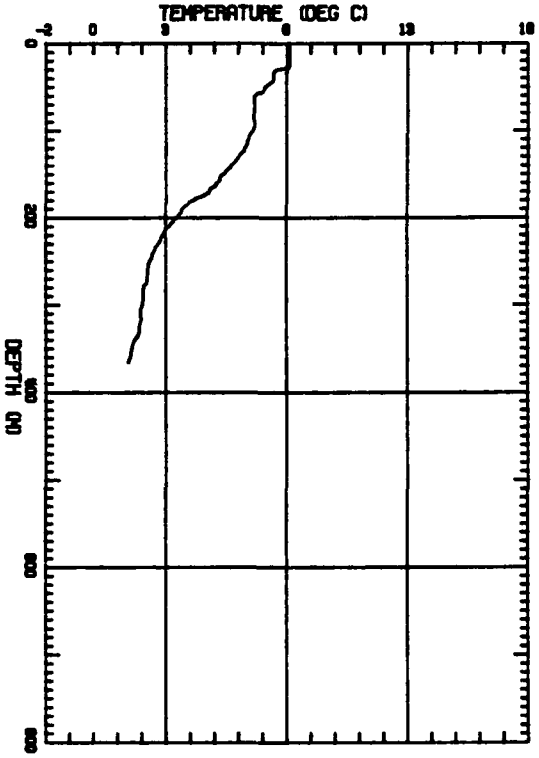
PROJECT: SACLANT
DROP NO: 34 CHANNEL: 16 LATITUDE: 64 23.6
DATE: 6/ 7/88 TIME: 12:20:58 LONGITUDE: -1 -36.2



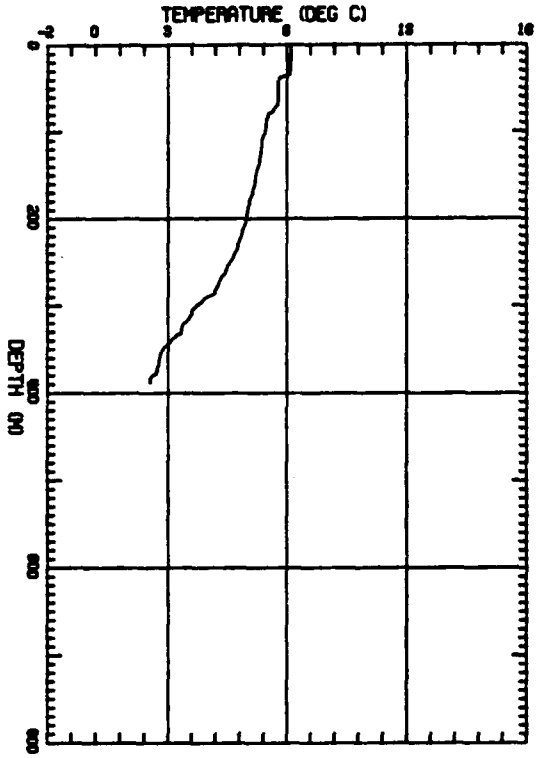
PROJECT: SACLANT
DROP NO: 35 CHANNEL: 12 LATITUDE: 64 9.2
DATE: 6/ 7/88 TIME: 12:27:20 LONGITUDE: 0 -28.1



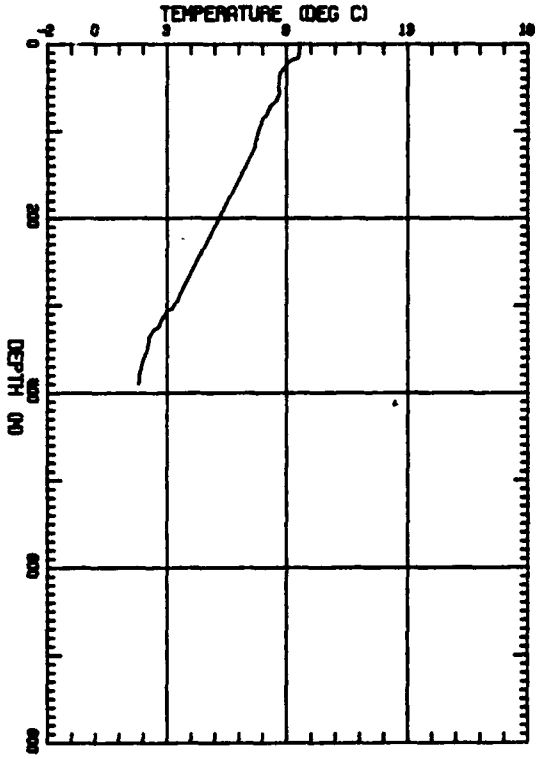
PROJECT: SACLANT
DROP NO: 36 CHANNEL: 14 LATITUDE: 63 52.8
DATE: 6/ 7/88 TIME: 12:30:45 LONGITUDE: 0 -22.8



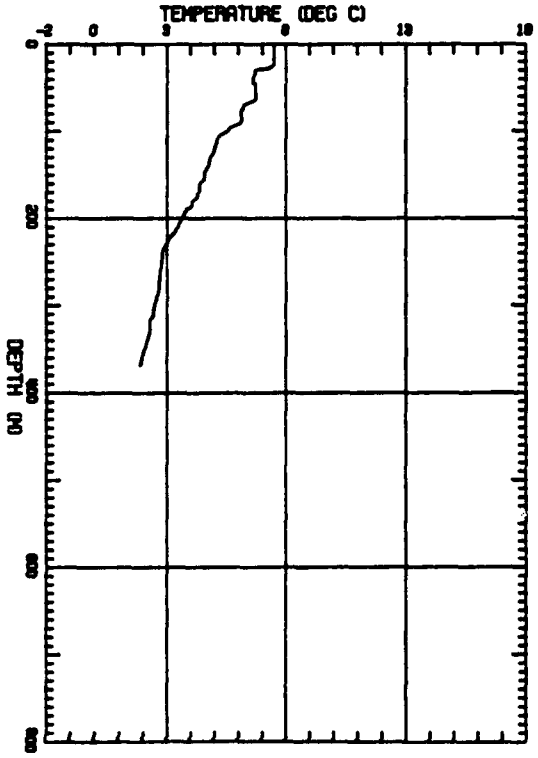
PROJECT: SACLANT
DROP NO: 37 CHANNEL: 16 LATITUDE: 63 32.2
DATE: 6/ 7/80 TIME: 12:34:40 LONGITUDE: 0 -0.3



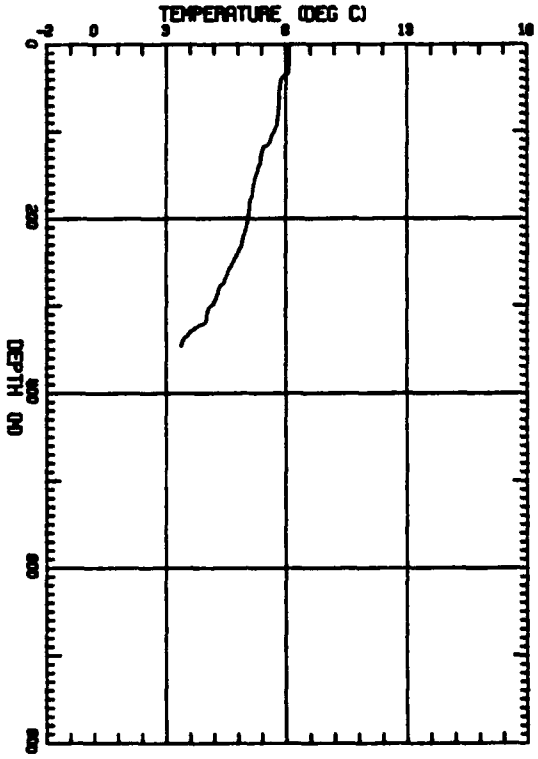
PROJECT: SACLANT
DROP NO: 38 CHANNEL: 12 LATITUDE: 63 18.8
DATE: 6/ 7/80 TIME: 12:37:14 LONGITUDE: 0 -1.3



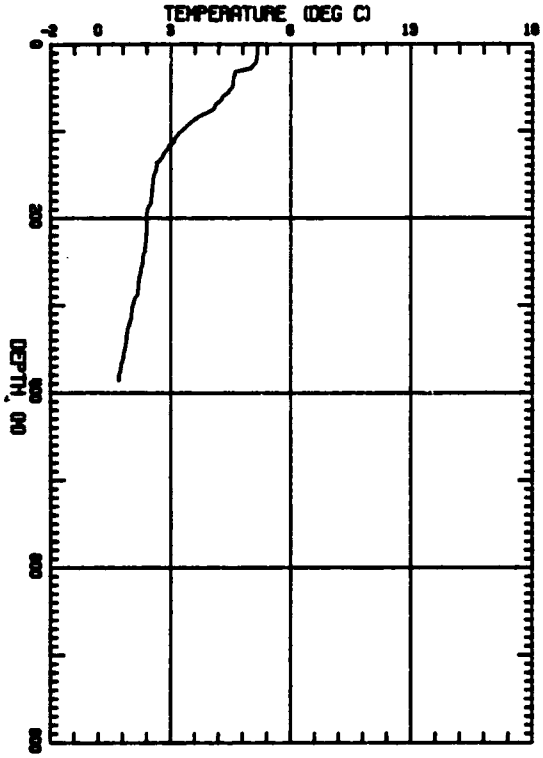
PROJECT: SACLANT
DROP NO: 39 CHANNEL: 14 LATITUDE: 64 10.5
DATE: 6/ 7/80 TIME: 12:40:37 LONGITUDE: 0 30.4



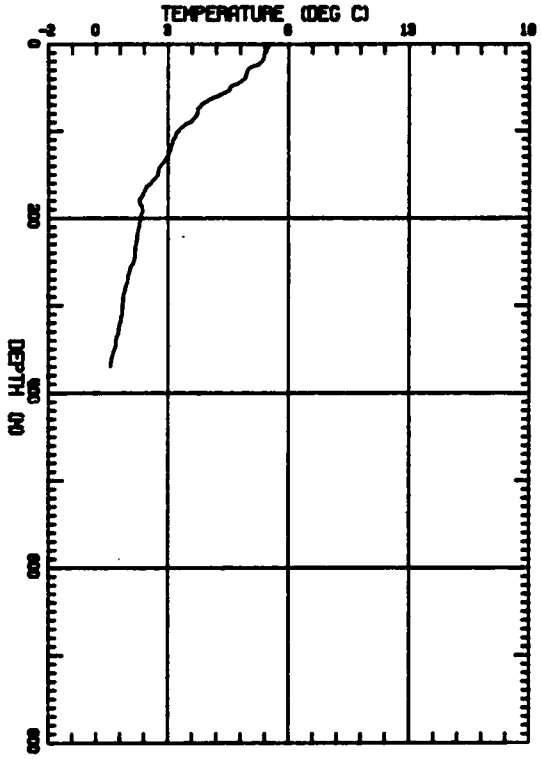
PROJECT: SACLANT
DROP NO: 40 CHANNEL: 14 LATITUDE: 63 22.5
DATE: 6/ 7/80 TIME: 13: 5: 1 LONGITUDE: 0 -30.9



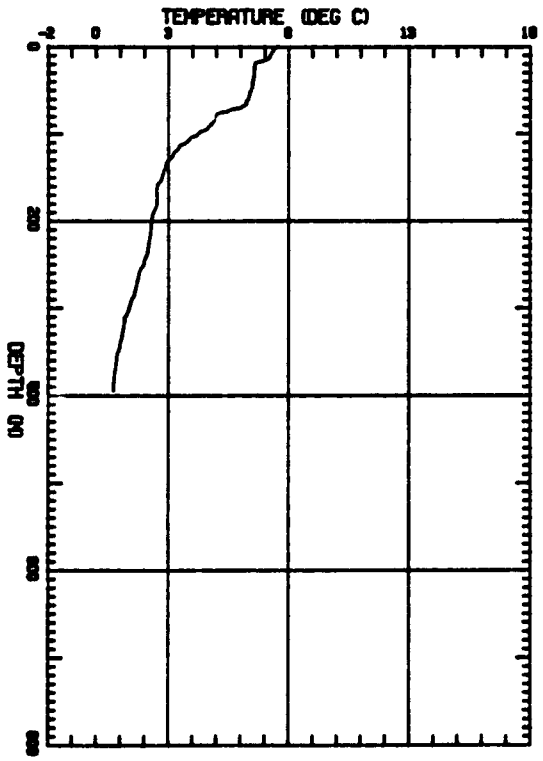
PROJECT: SACLANT
DROP NO: 42 CHANNEL: 12 LATITUDE: 63 36.0
DATE: 6/ 7/89 TIME: 13:12:11 LONGITUDE: -1 -60.1



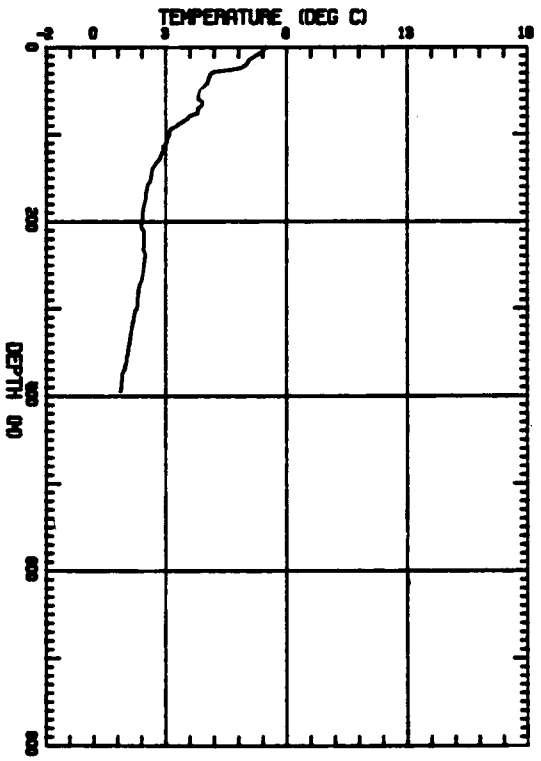
PROJECT: SACLANT
DROP NO: 43 CHANNEL: 14 LATITUDE: 63 44.0
DATE: 6/ 7/89 TIME: 13:16:13 LONGITUDE: -2 -43.0



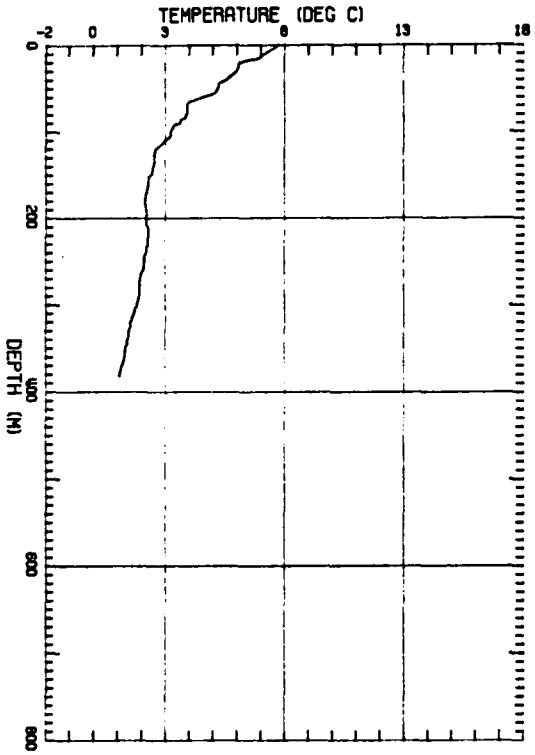
PROJECT: SACLANT
DROP NO: 44 CHANNEL: 18 LATITUDE: 63 50.0
DATE: 6/ 7/89 TIME: 13:19:11 LONGITUDE: -3 -18.1



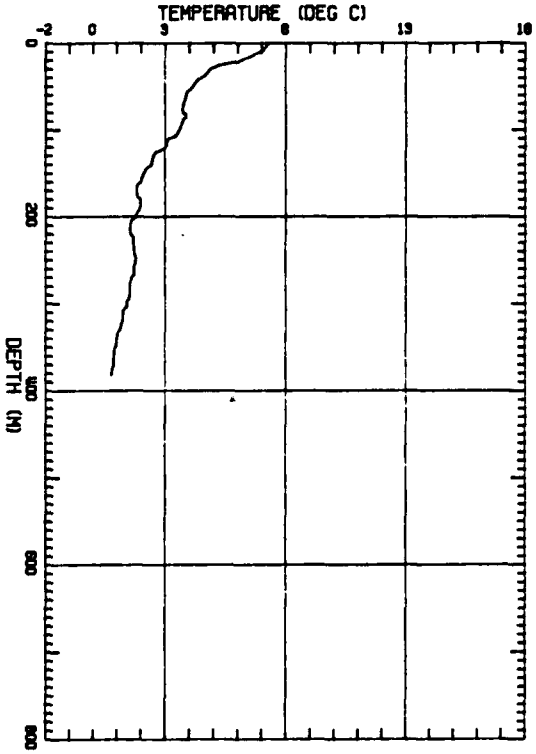
PROJECT: SACLANT
DROP NO: 45 CHANNEL: 12 LATITUDE: 63 35.6
DATE: 6/ 7/89 TIME: 13:22:53 LONGITUDE: -3 -42.8



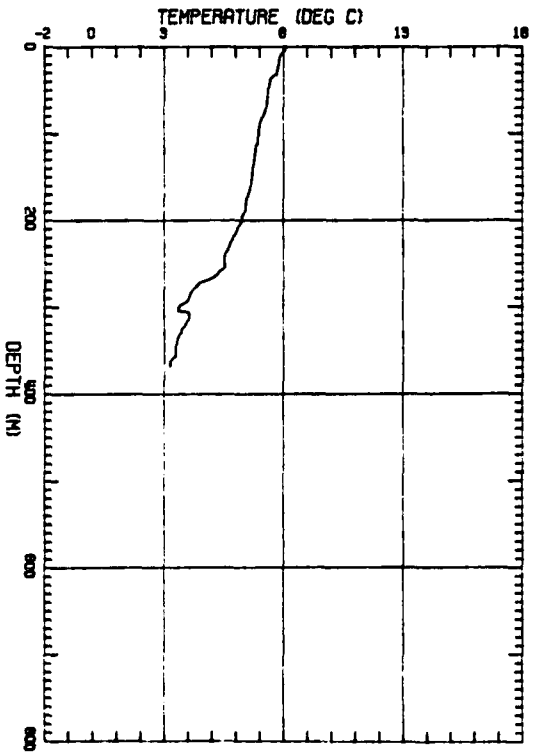
PROJECT: SACLANT
DROP NO: 46 CHANNEL: 14 LATITUDE: 63 18.8
DATE: 6/ 7/89 TIME: 13:26:30 LONGITUDE: -4 -.1



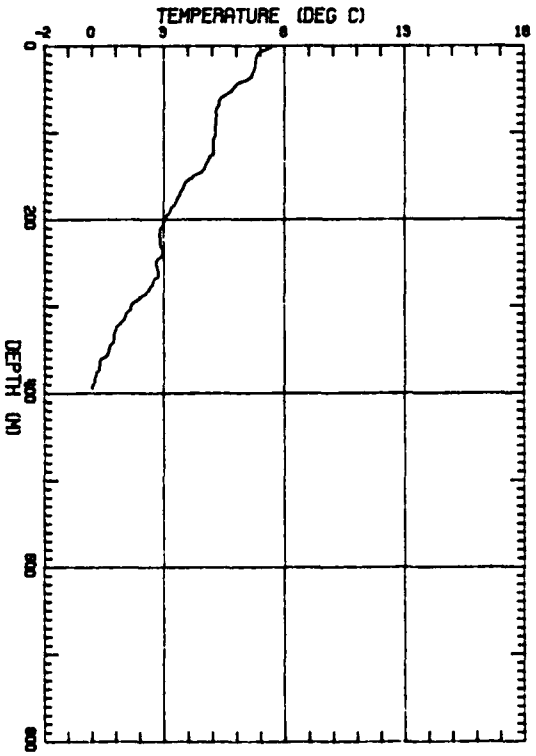
PROJECT: SACLANT
DROP NO: 47 CHANNEL: 16 LATITUDE: 63 2.2
DATE: 6/ 7/89 TIME: 13:29:58 LONGITUDE: -4 -16.3



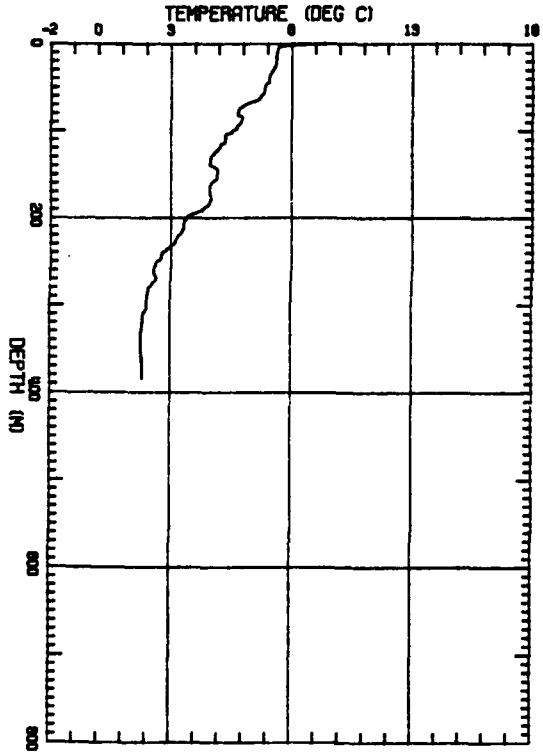
PROJECT: SACLANT
DROP NO: 48 CHANNEL: 12 LATITUDE: 62 45.8
DATE: 6/ 7/89 TIME: 13:33:16 LONGITUDE: -4 -31.1



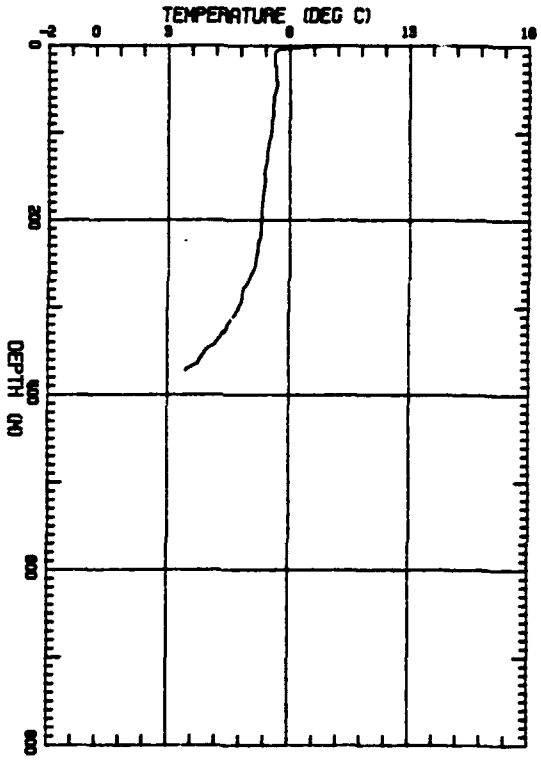
PROJECT: SACLANT
DROP NO: 49 CHANNEL: 14 LATITUDE: 62 50.3
DATE: 6/ 7/89 TIME: 13:36:35 LONGITUDE: -5 .0



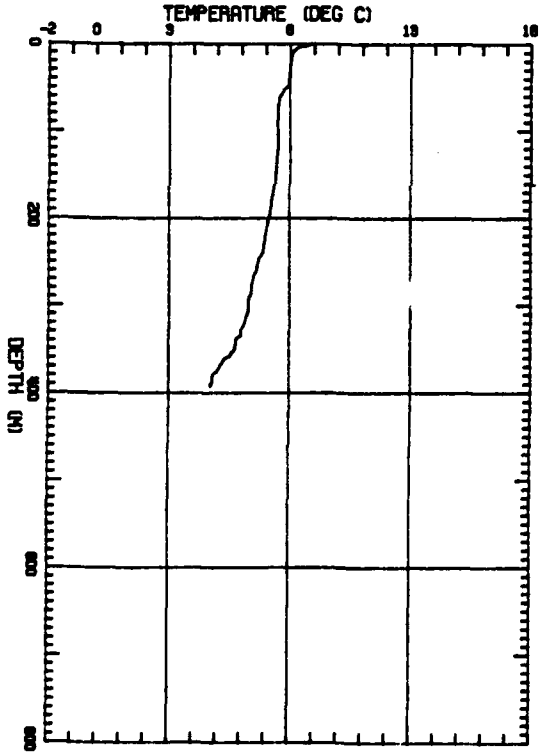
PROJECT: SACLANT
DROP NO: 50 CHANNEL: 16 LATITUDE: 62 59.6
DATE: 6/ 7/89 TIME: 19:40:21 LONGITUDE: -5 -37.6



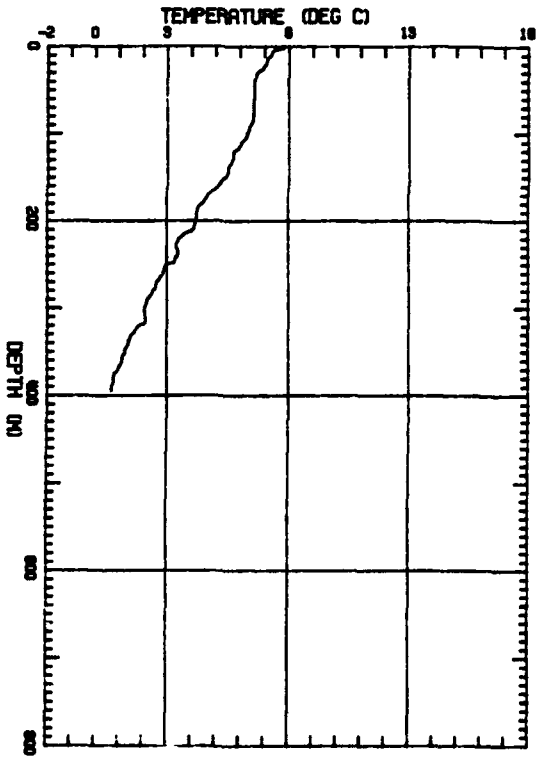
PROJECT: SACLANT
DROP NO: 51 CHANNEL: 12 LATITUDE: 63 5.4
DATE: 6/ 7/89 TIME: 19:43:34 LONGITUDE: -6 -13.6



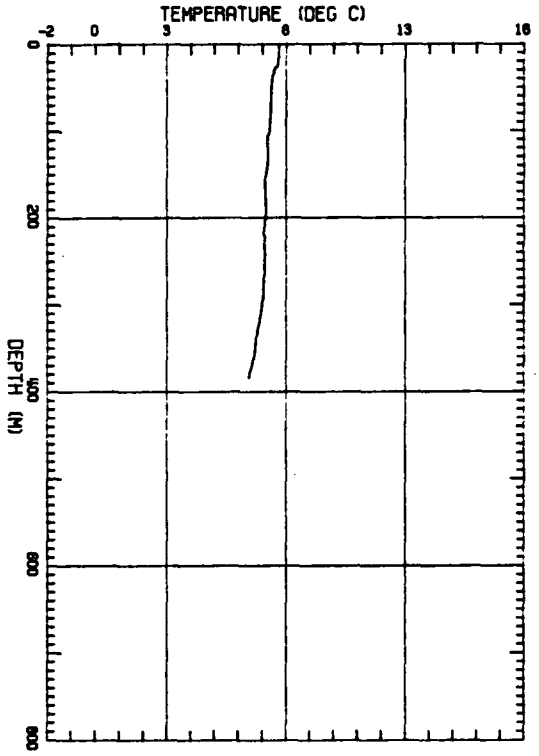
PROJECT: SACLANT
DROP NO: 52 CHANNEL: 14 LATITUDE: 63 11.3
DATE: 6/ 7/89 TIME: 19:48:54 LONGITUDE: -6 -50.6



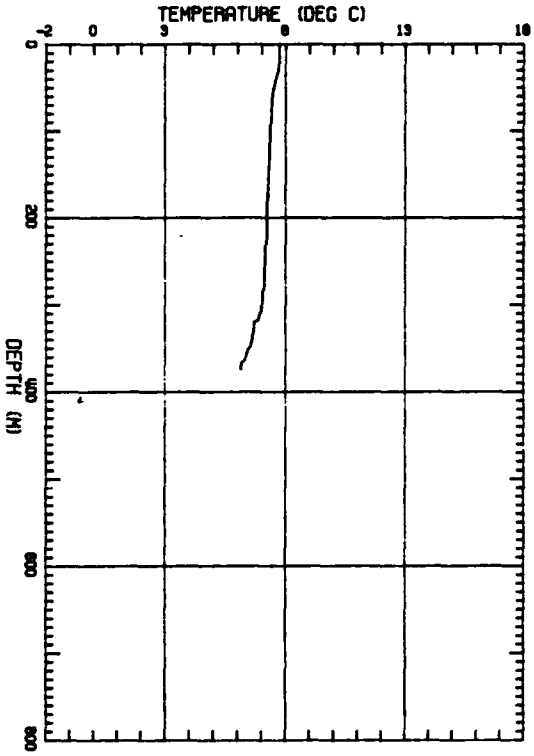
PROJECT: SACLANT
DROP NO: 53 CHANNEL: 16 LATITUDE: 63 25.3
DATE: 6/ 7/89 TIME: 19:50:17 LONGITUDE: -6 -48.6



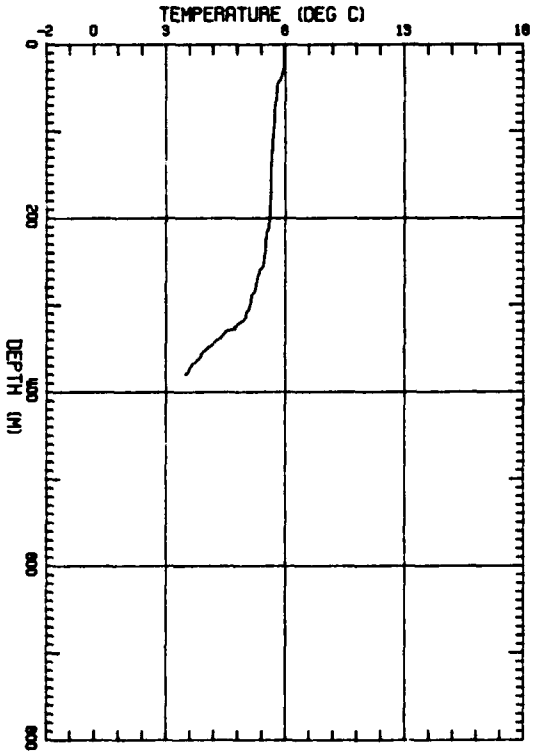
PROJECT: GINSER
DROP NO: 56 CHANNEL: 16 LATITUDE: 63 48.7
DATE: 6/ 7/89 TIME: 14:26:42 LONGITUDE: -12 -44.9



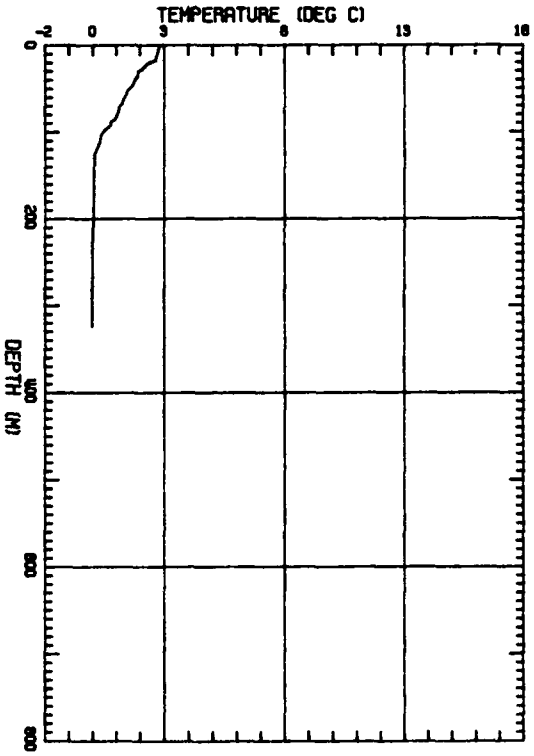
PROJECT: GINSER
DROP NO: 57 CHANNEL: 12 LATITUDE: 64 6.0
DATE: 6/ 7/89 TIME: 14:30:28 LONGITUDE: -12 -30.5



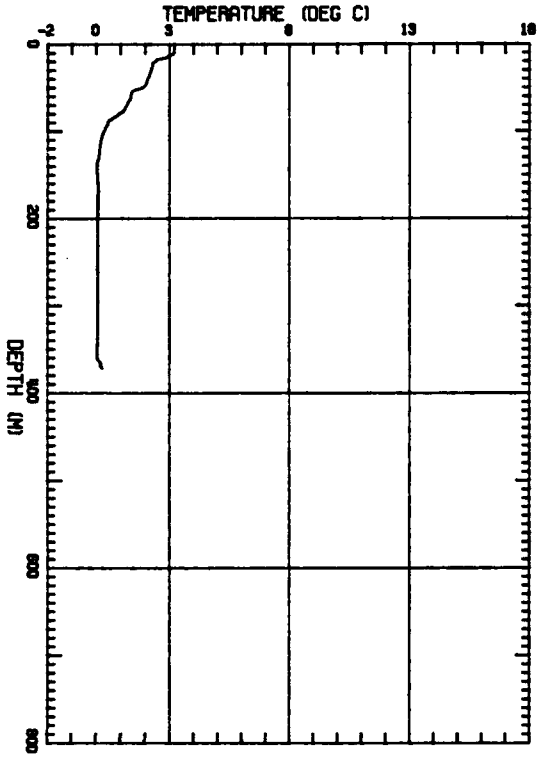
PROJECT: GINSER
DROP NO: 58 CHANNEL: 14 LATITUDE: 64 21.8
DATE: 6/ 7/89 TIME: 14:33:53 LONGITUDE: -12 -15.5



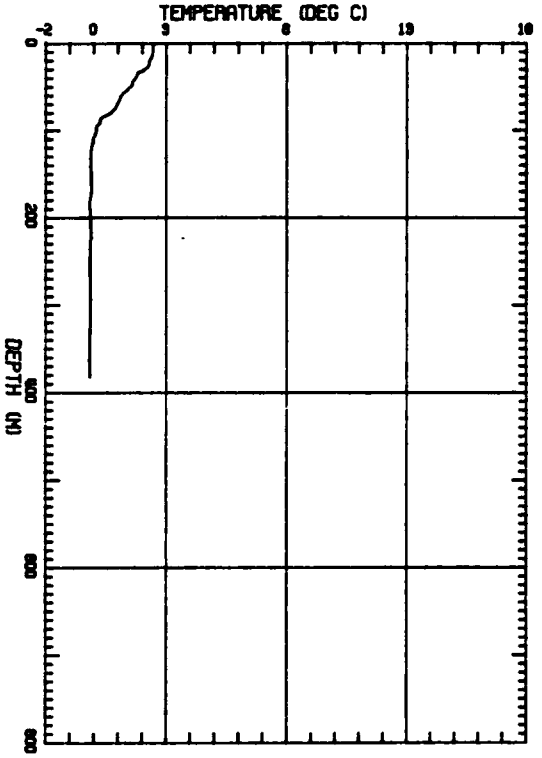
PROJECT: GINSER
DROP NO: 59 CHANNEL: 16 LATITUDE: 64 37.2
DATE: 6/ 7/89 TIME: 14:37:10 LONGITUDE: -12 -.8



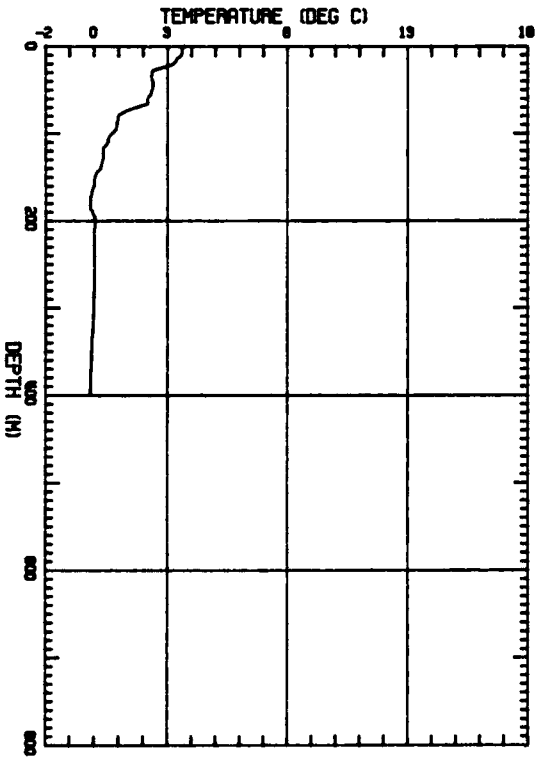
PROJECT: GINSER
DROP NO: 60 CHANNEL: 12 LATITUDE: 64 54.9
DATE: 6/ 7/89 TIME: 14:40:59 LONGITUDE: -11 -43.4



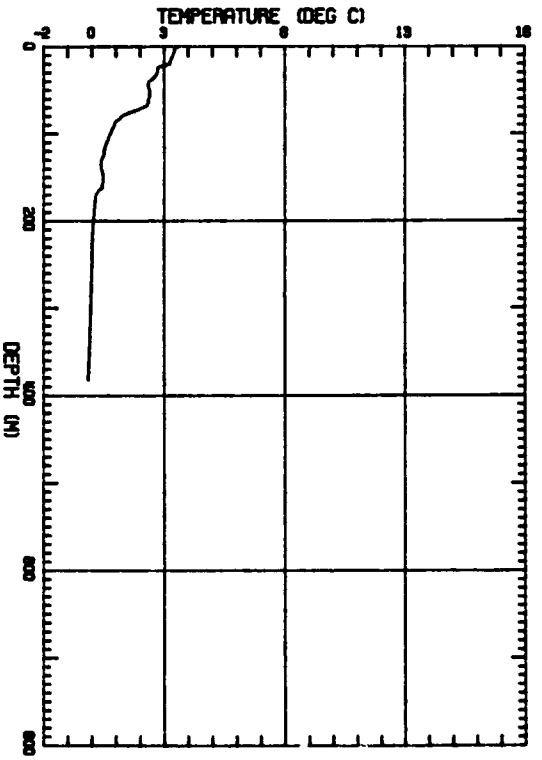
PROJECT: GINSER
DROP NO: 61 CHANNEL: 14 LATITUDE: 65 8.9
DATE: 6/ 7/89 TIME: 14:44: 2 LONGITUDE: -11 -28.5



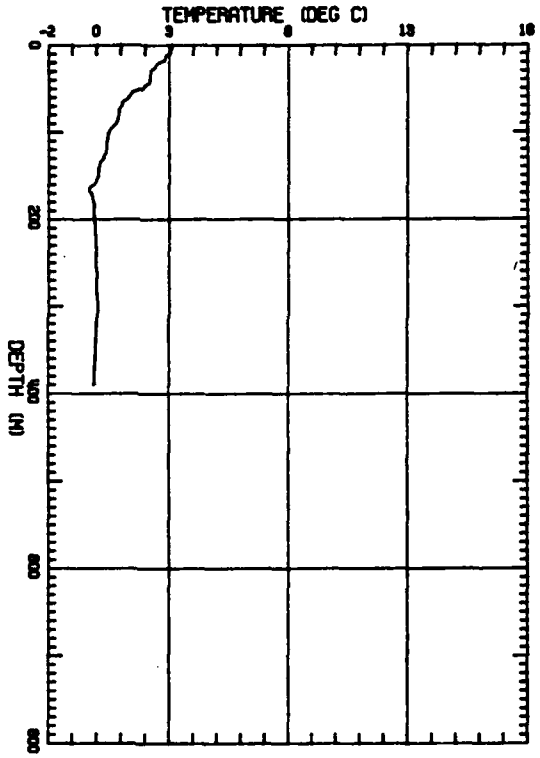
PROJECT: GINSER
DROP NO: 62 CHANNEL: 16 LATITUDE: 65 23.9
DATE: 6/ 7/89 TIME: 14:47:24 LONGITUDE: -11 -11.1



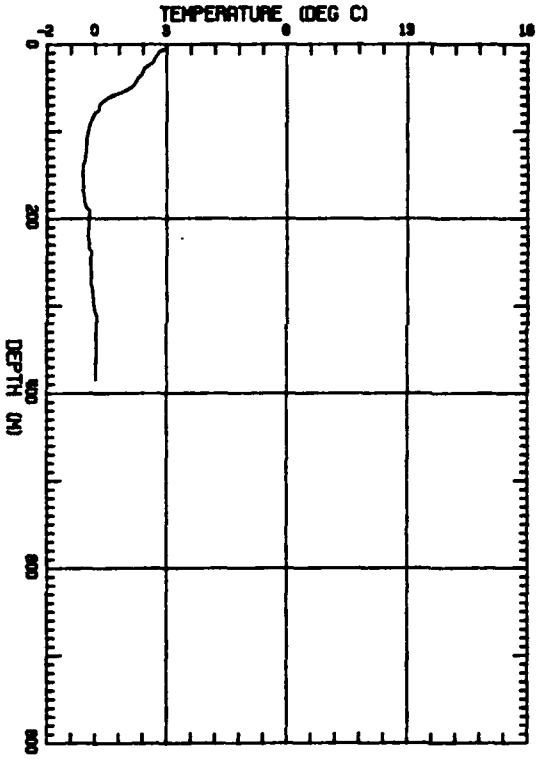
PROJECT: GINSER
DROP NO: 63 CHANNEL: 12 LATITUDE: 65 39.1
DATE: 6/ 7/89 TIME: 14:50:44 LONGITUDE: -10 -52.9



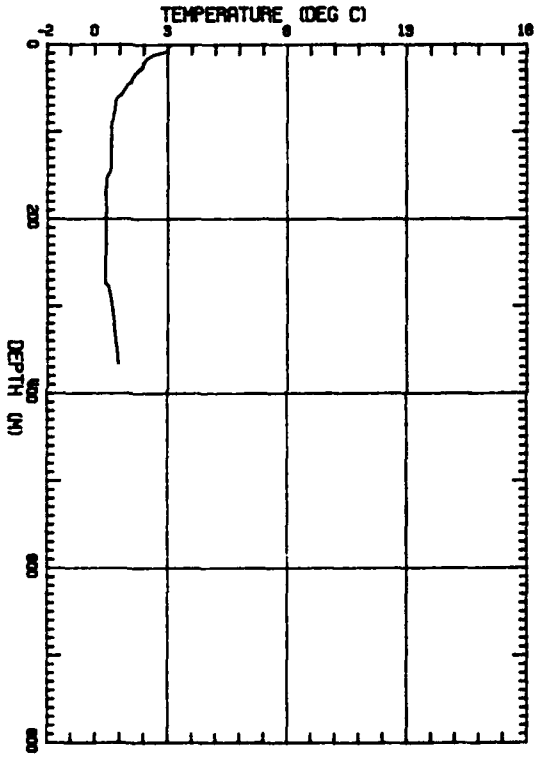
PROJECT: GINSER
DROP NO: 64 CHANNEL: 14 LATITUDE: 65 55.3
DATE: 6/ 7/89 TIME: 14:54:19 LONGITUDE: -10 -34.0



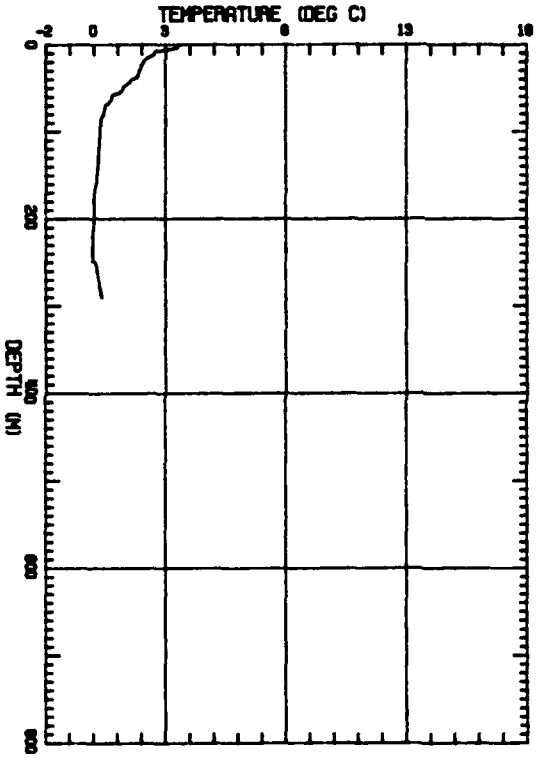
PROJECT: GINSER
DROP NO: 65 CHANNEL: 16 LATITUDE: 66 36.9
DATE: 6/ 7/89 TIME: 15: 4:18 LONGITUDE: -11 -28.3



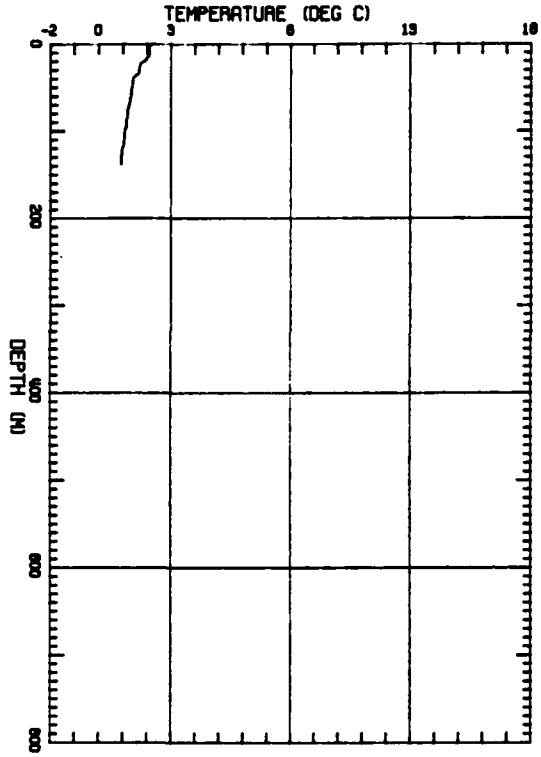
PROJECT: GINSER
DROP NO: 66 CHANNEL: 12 LATITUDE: 66 10.2
DATE: 6/ 7/89 TIME: 15:12: 5 LONGITUDE: -12 -4.1



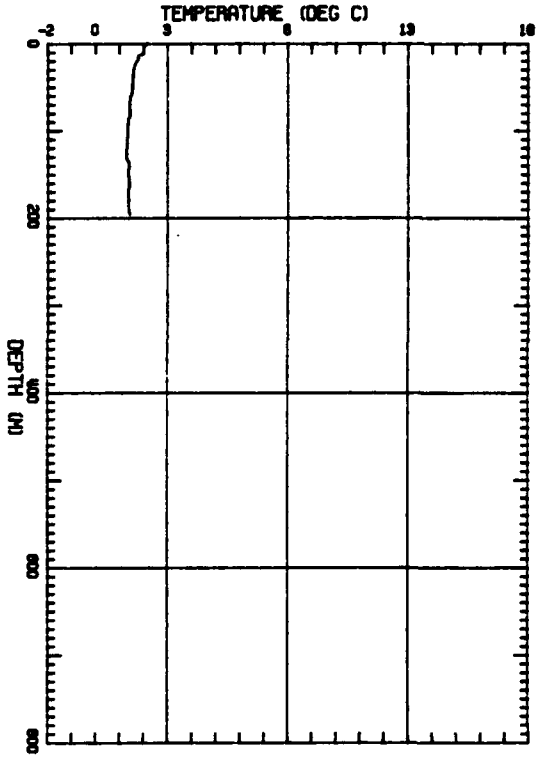
PROJECT: GINSER
DROP NO: 67 CHANNEL: 14 LATITUDE: 65 42.7
DATE: 6/ 7/89 TIME: 15:18:42 LONGITUDE: -12 -28.3



PROJECT: GINSER
DROP NO: 68 CHANNEL: 16 LATITUDE: 65 14.1
DATE: 6/ 7/89 TIME: 15:25:28 LONGITUDE: -12 -49.5



PROJECT: GINSER
DROP NO: 69 CHANNEL: 12 LATITUDE: 64 55.0
DATE: 6/ 7/89 TIME: 15:29:48 LONGITUDE: -12 -58.8



Appendix H.

Drop Times, Positions, and Data Traces, 8 June 1989

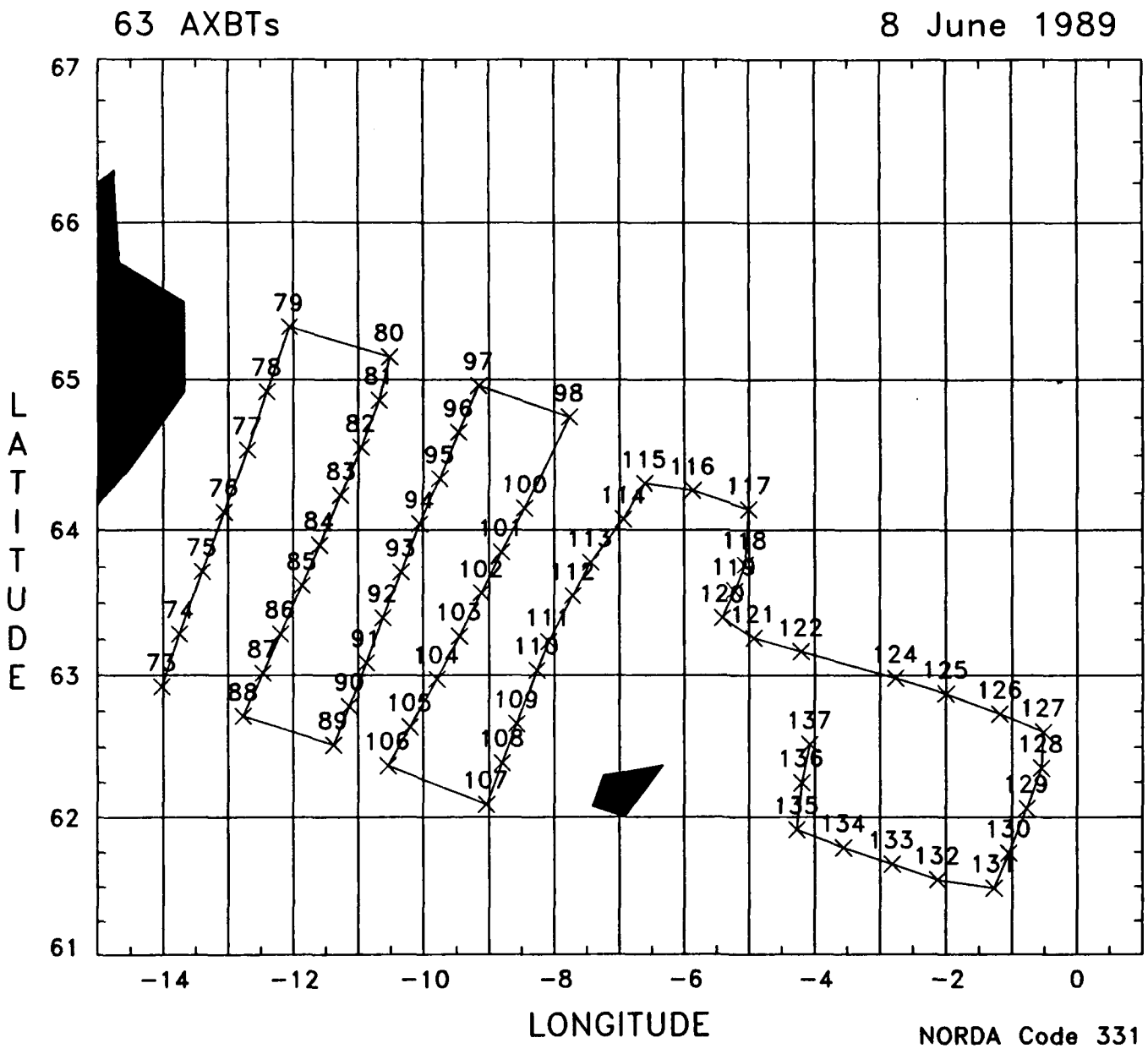
Table 2. Header information for AXBT drops for Phase 1's flight 2 on 8 June 1989. Times are UTC.

DATE: 6/08/89 PROJECT ID: SACLANT

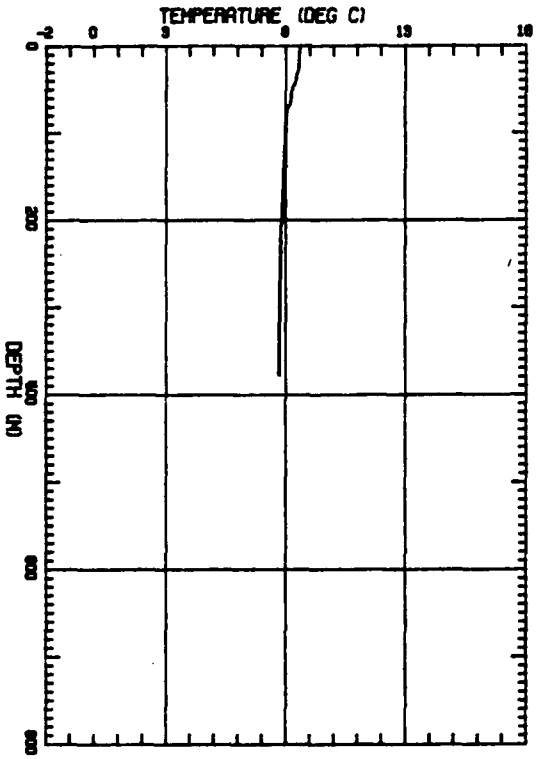
#	TYPE	D/S	LATITUDE		LONGITUDE		TIME	FLT	RT	CH
73	AXBT	S	62	55.30	-14	-1.20	11:24:24	2	10	14
74	AXBT	S	63	17.20	-13	-44.80	11:29:15	2	10	16
75	AXBT	S	63	43.20	-13	-23.90	11:34:53	2	10	12
76	AXBT	S	64	7.40	-13	-3.60	11:40:05	2	10	14
77	AXBT	S	64	32.30	-12	-42.30	11:45:28	2	10	16
78	AXBT	S	64	55.30	-12	-24.50	11:50:25	2	10	12
79	AXBT	S	65	20.40	-12	-3.70	11:55:57	2	10	14
80	AXBT	S	65	8.80	-10	-31.20	12:04:12	2	10	16
81	AXBT	S	64	51.90	-10	-40.70	12:07:32	2	10	12
82	AXBT	S	64	33.20	-10	-57.80	12:11:13	2	10	14
83	AXBT	S	64	14.00	-11	-15.90	12:15:01	2	10	16
84	AXBT	S	63	54.00	-11	-35.70	12:19:00	2	10	12
85	AXBT	S	63	37.30	-11	-51.80	12:22:17	2	10	14
86	AXBT	S	63	17.30	-12	-11.70	12:26:14	2	10	16
87	AXBT	S	63	.90	-12	-28.00	12:29:27	2	10	12
88	AXBT	S	62	42.90	-12	-46.00	12:32:59	2	10	14
89	AXBT	S	62	30.90	-11	-22.70	12:42:27	2	10	16
90	AXBT	S	62	47.20	-11	-8.10	12:45:55	2	10	12
91	AXBT	S	63	5.40	-10	-52.50	12:49:46	2	10	14
92	AXBT	S	63	24.00	-10	-37.40	12:53:44	2	10	16
93	AXBT	S	63	42.80	-10	-20.60	12:57:43	2	10	12
94	AXBT	S	64	2.40	-10	-3.10	13:01:51	2	10	14
95	AXBT	S	64	20.70	-9	-45.30	13:05:50	2	10	16
96	AXBT	S	64	39.20	-9	-27.80	13:10:02	2	10	12
97	AXBT	S	64	57.60	-9	-9.40	13:14:12	2	10	14
98	AXBT	S	64	45.20	-7	-46.10	13:22:00	2	10	16
100	AXBT	S	64	8.80	-8	-27.00	13:29:40	2	10	14
101	AXBT	S	63	51.10	-8	-48.10	13:33:31	2	10	16
102	AXBT	S	63	34.20	-9	-6.70	13:37:20	2	10	12
103	AXBT	S	63	16.40	-9	-27.00	13:41:14	2	10	14
104	AXBT	S	62	58.50	-9	-47.80	13:45:11	2	10	16
105	AXBT	S	62	38.40	-10	-12.40	13:49:50	2	10	12
106	AXBT	S	62	22.10	-10	-32.80	13:53:34	2	10	14
107	AXBT	S	62	5.60	-9	-2.50	14:04:17	2	10	16
108	AXBT	S	62	23.20	-8	-47.70	14:08:20	2	10	12
109	AXBT	S	62	39.70	-8	-34.20	14:12:04	2	10	14
110	AXBT	S	63	2.20	-8	-15.90	14:17:11	2	10	16
111	AXBT	S	63	14.10	-8	-5.00	14:19:56	2	10	12
112	AXBT	S	63	33.20	-7	-42.80	14:24:49	2	10	14
113	AXBT	S	63	46.80	-7	-26.70	14:27:54	2	10	16
114	AXBT	S	64	4.50	-6	-55.80	14:32:23	2	10	12
115	AXBT	S	64	18.80	-6	-37.20	14:35:37	2	10	14
116	AXBT	S	64	15.90	-5	-52.30	14:39:31	2	10	16
117	AXBT	S	64	8.30	-5	-.20	14:43:50	2	10	12
118	AXBT	S	63	46.10	-5	-3.70	14:48:20	2	10	14
119	AXBT	S	63	35.20	-5	-13.70	14:50:31	2	10	16

#	TYPE	D/S	LATITUDE		LONGITUDE		TIME	FLT	RT	CH
120	AXBT	S	63	24.10	-5	-24.40	14:52:47	2	10	12
121	AXBT	S	63	15.60	-4	-55.80	14:56:06	2	10	14
122	AXBT	S	63	10.00	-4	-12.20	14:59:54	2	10	16
124	AXBT	S	62	58.90	-2	-46.00	15:07:25	2	10	14
125	AXBT	S	62	52.30	-2	-.10	15:11:27	2	10	16
126	AXBT	S	62	43.90	-1	-11.00	15:15:56	2	10	12
127	AXBT	S	62	36.30	0	-31.10	15:19:47	2	10	14
128	AXBT	S	62	21.00	0	-33.20	15:22:56	2	10	16
129	AXBT	S	62	3.90	0	-46.70	15:26:10	2	10	12
130	AXBT	S	61	44.60	-1	-2.90	15:29:53	2	10	14
131	AXBT	S	61	29.40	-1	-16.30	15:32:52	2	10	16
132	AXBT	S	61	32.90	-2	-7.50	15:37:49	2	10	12
133	AXBT	S	61	39.70	-2	-49.00	15:41:47	2	10	14
134	AXBT	S	61	47.00	-3	-33.20	15:46:01	2	10	16
135	AXBT	S	61	54.60	-4	-16.20	15:50:11	2	10	12
136	AXBT	S	62	14.90	-4	-11.90	15:54:30	2	10	14
137	AXBT	S	62	31.00	-4	-4.10	15:57:39	2	10	16

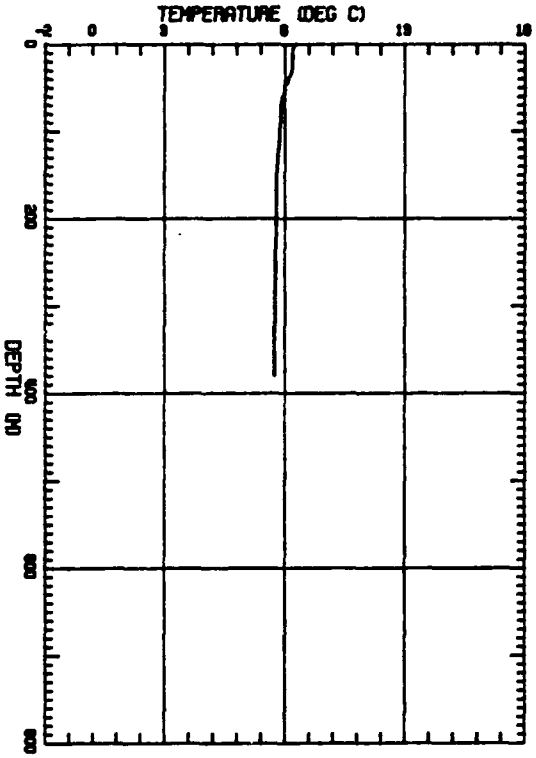
TOTAL NO. OF FILES: 63


63 AXBTs
8 June 1989
LATITUDE
LONGITUDE
67
66
65
64
63
62
61
-14
-12
-10
-8
-6
-4
-2
0
NORDA Code 331

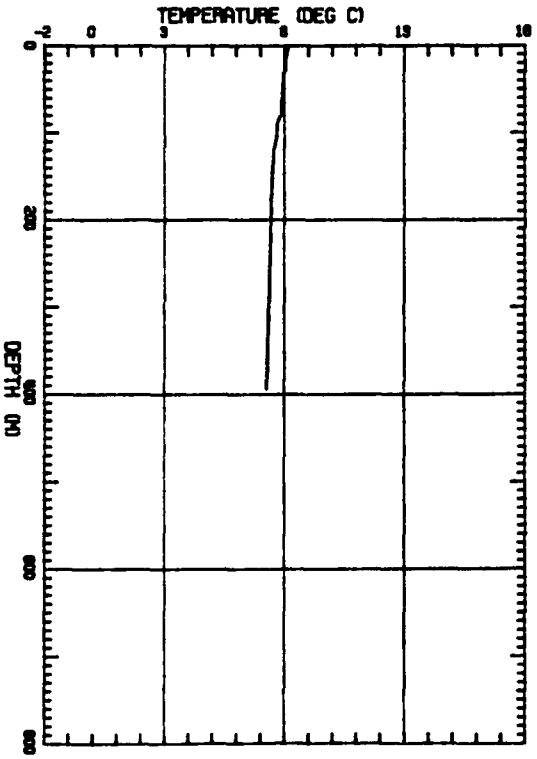
PROJECT: SACLANT
DROP NO: 73 CHANNEL: 14 LATITUDE: 62 55.3
DATE: 6/ 8/89 TIME: 11:24:24 LONGITUDE: -14 -1.2



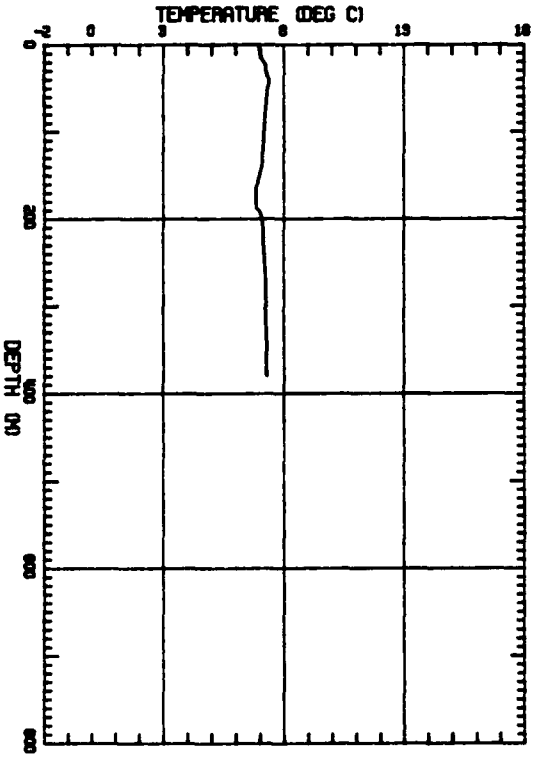
PROJECT: SACLANT
DROP NO: 74 CHANNEL: 16 LATITUDE: 63 17.2
DATE: 6/ 8/89 TIME: 11:28:15 LONGITUDE: -13 -44.8



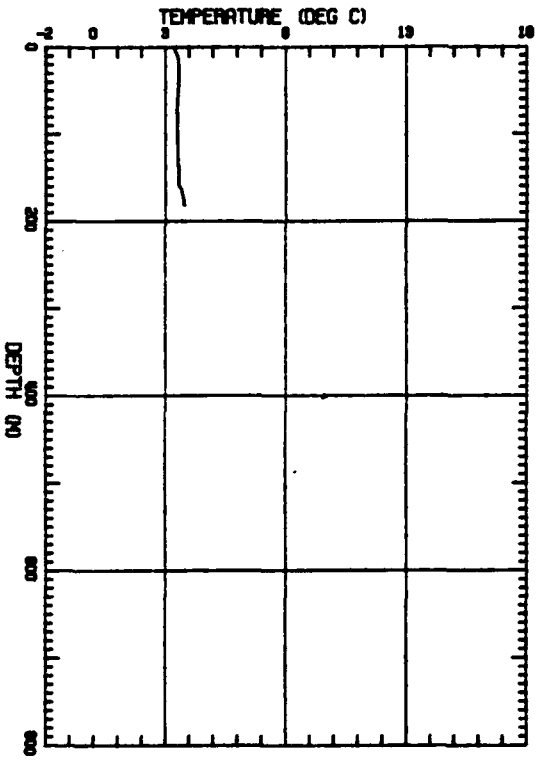
PROJECT: SACLANT
DROP NO: 75 CHANNEL: 12 LATITUDE: 63 43.2
DATE: 6/ 8/89 TIME: 11:34:53 LONGITUDE: -13 -29.8



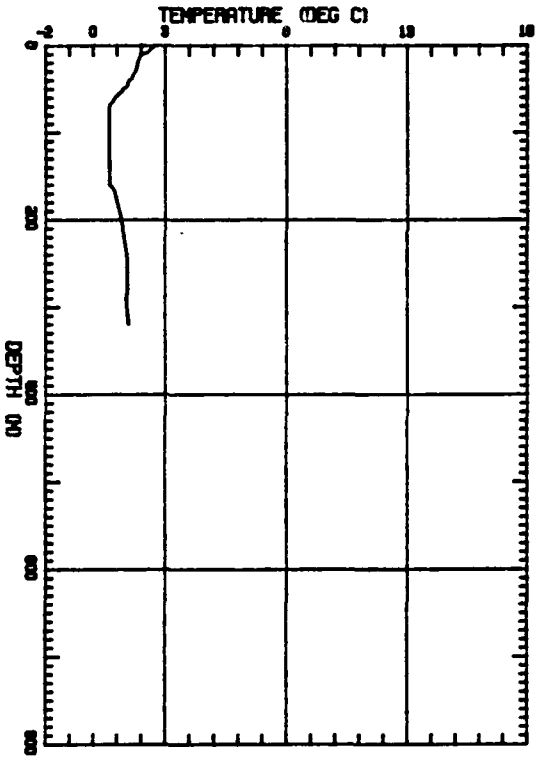
PROJECT: SACLANT
DROP NO: 76 CHANNEL: 14 LATITUDE: 64 7.4
DATE: 6/ 8/89 TIME: 11:40: 5 LONGITUDE: -13 -3.6



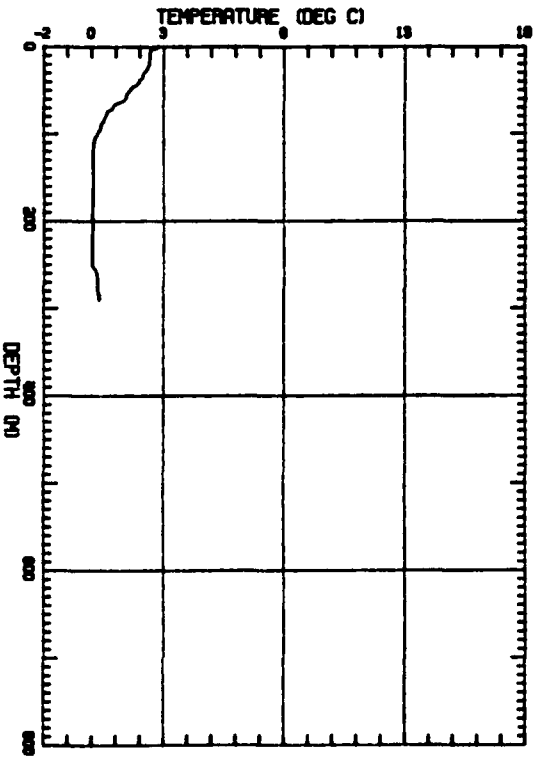
PROJECT: SACLANT
DROP NO: 77 CHANNEL: 16 LATITUDE: 64 32.3
DATE: 6/ 8/89 TIME: 11:45:28 LONGITUDE: -12 -42.3



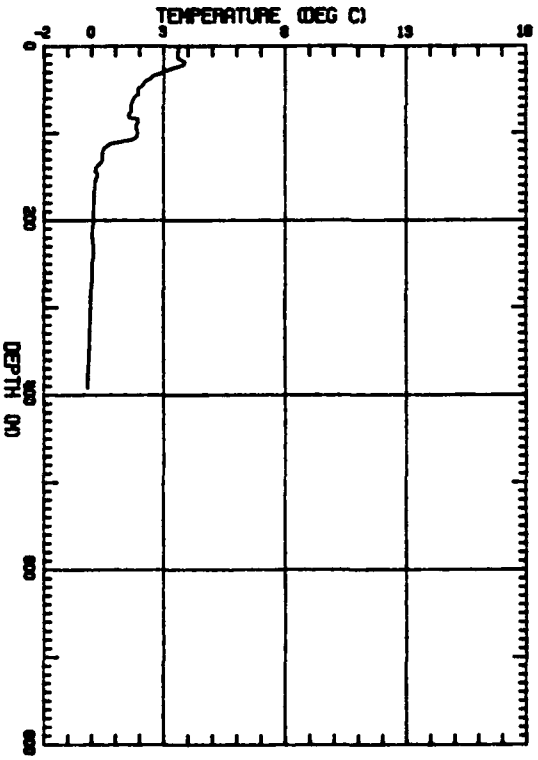
PROJECT: SACLANT
DROP NO: 78 CHANNEL: 12 LATITUDE: 64 55.3
DATE: 6/ 8/89 TIME: 11:50:25 LONGITUDE: -12 -24.5



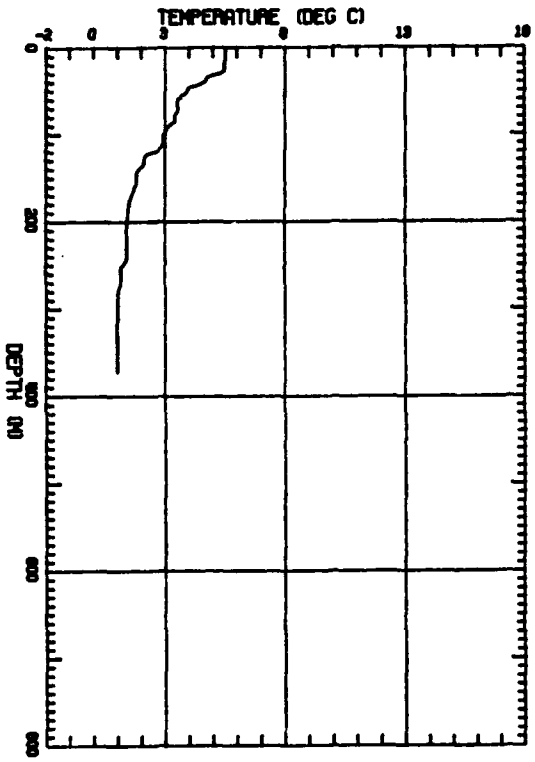
PROJECT: SACLANT
DROP NO: 79 CHANNEL: 14 LATITUDE: 65 20.4
DATE: 6/ 8/89 TIME: 11:55:57 LONGITUDE: -12 -9.7



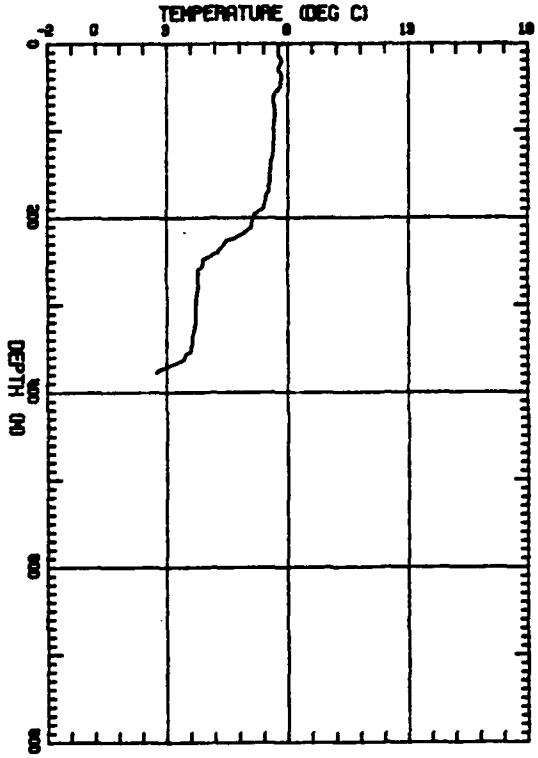
PROJECT: SACLANT
DROP NO: 80 CHANNEL: 16 LATITUDE: 65 8.8
DATE: 6/ 8/89 TIME: 12: 4:12 LONGITUDE: -10 -31.2



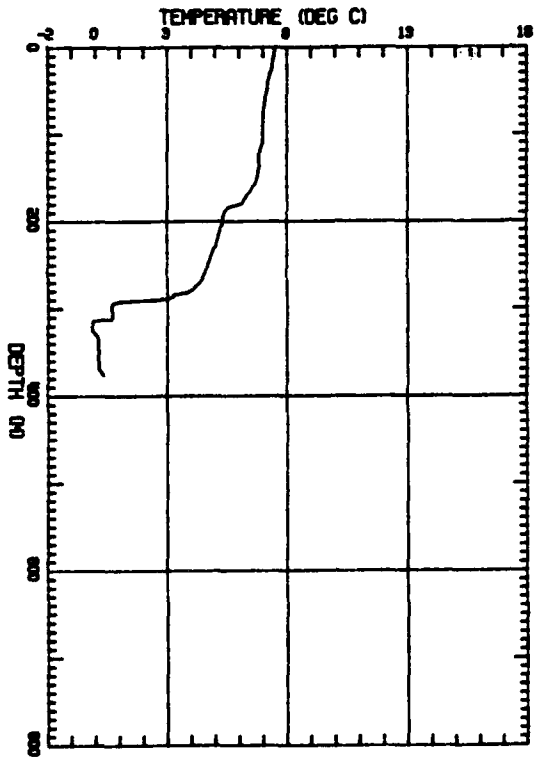
PROJECT: SACLANT
DROP NO: 81 CHANNEL: 12 LATITUDE: 64 51.9
DATE: 6/ 8/89 TIME: 12: 7:32 LONGITUDE: -10 -40.7



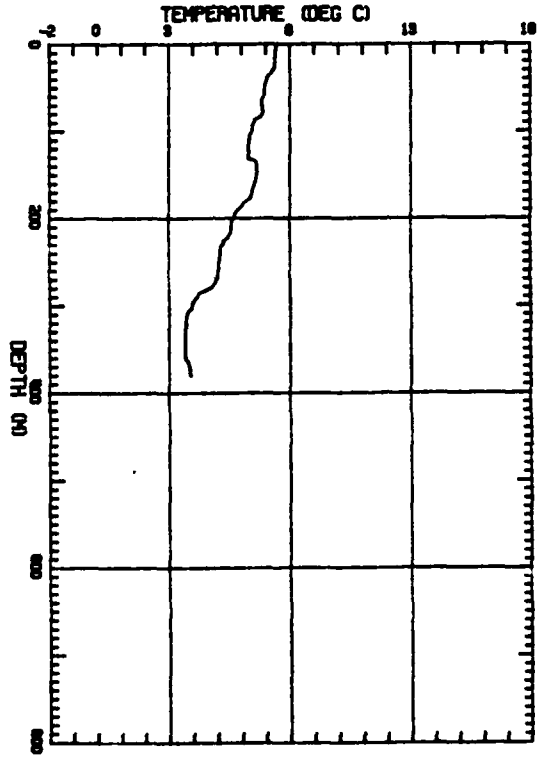
PROJECT: SACLANT
DROP NO: 82 CHANNEL: 14 LATITUDE: 64 39.2
DATE: 6/ 8/89 TIME: 12:11:13 LONGITUDE: -10 -57.6



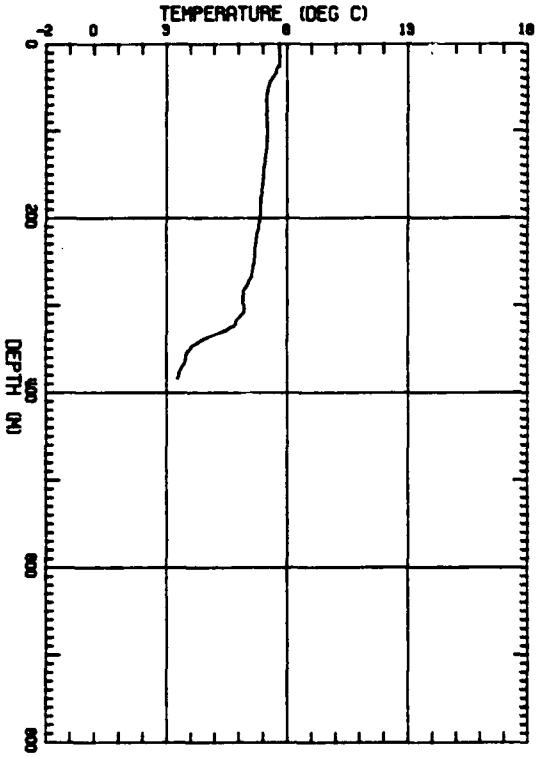
PROJECT: SACLANT
DROP NO: 83 CHANNEL: 16 LATITUDE: 64 14.0
DATE: 6/ 8/89 TIME: 12:15: 1 LONGITUDE: -11 -15.9



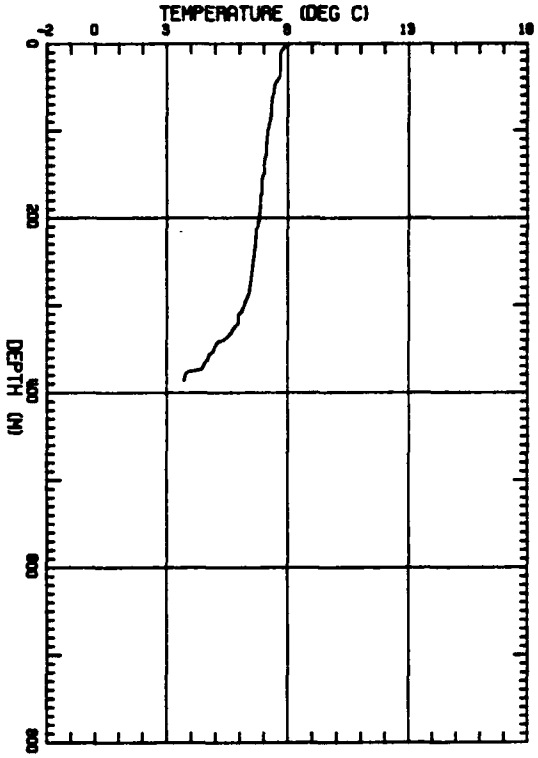
PROJECT: SACLANT
DROP NO: 84 CHANNEL: 12 LATITUDE: 63 54.0
DATE: 6/ 8/89 TIME: 12:19: 0 LONGITUDE: -11 -35.7



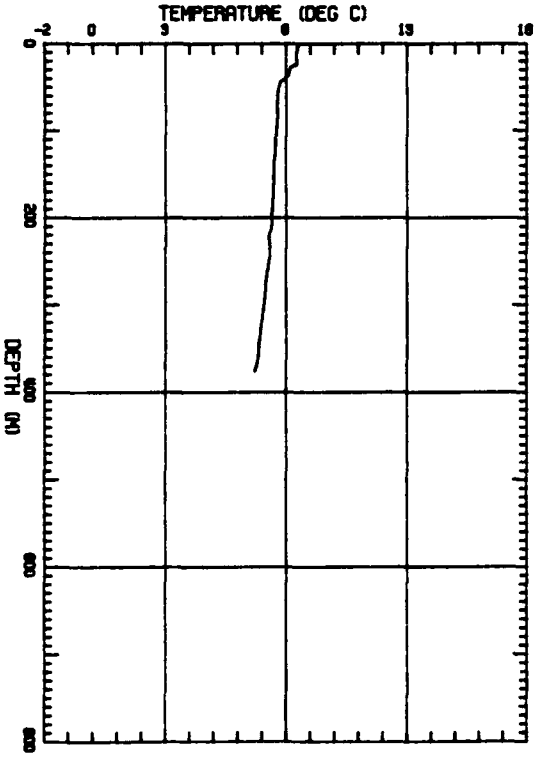
PROJECT: SACLANT
DROP NO: 65 CHANNEL: 14 LATITUDE: 63 37.9
DATE: 6/ 8/89 TIME: 12:22:17 LONGITUDE: -11 -51.8



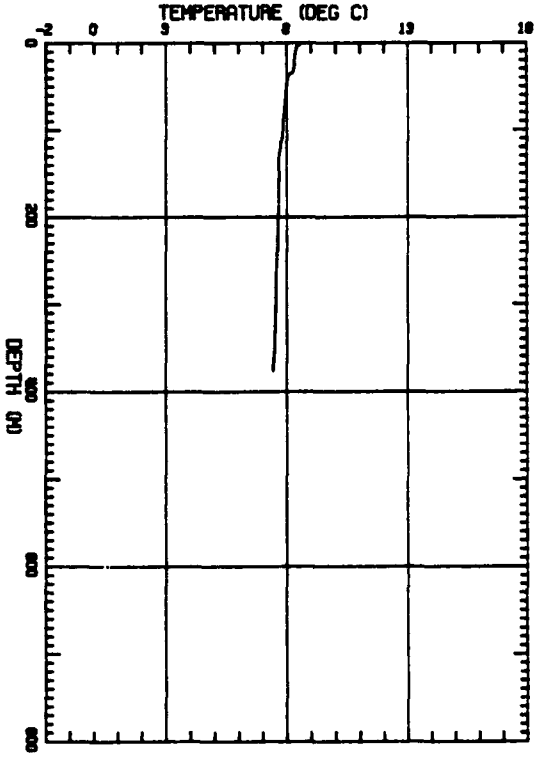
PROJECT: SACLANT
DROP NO: 66 CHANNEL: 16 LATITUDE: 63 17.9
DATE: 6/ 8/89 TIME: 12:26:14 LONGITUDE: -12 -11.7



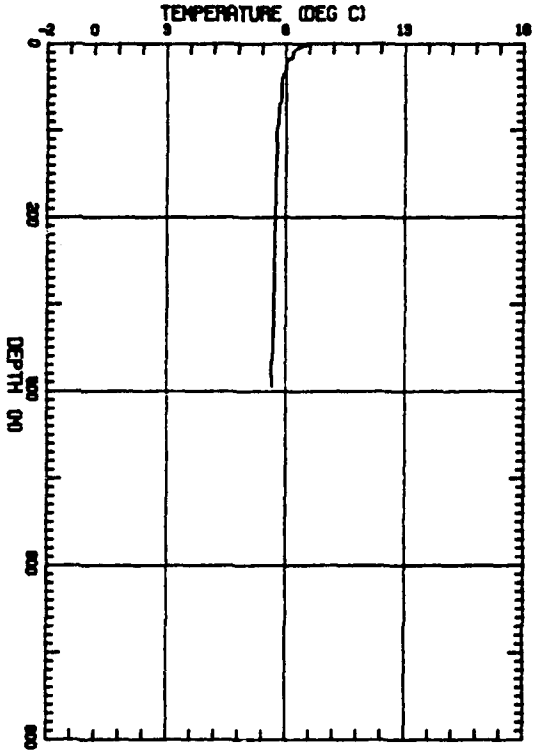
PROJECT: SACLANT
DROP NO: 67 CHANNEL: 12 LATITUDE: 63 .9
DATE: 6/ 8/89 TIME: 12:29:27 LONGITUDE: -12 -28.0



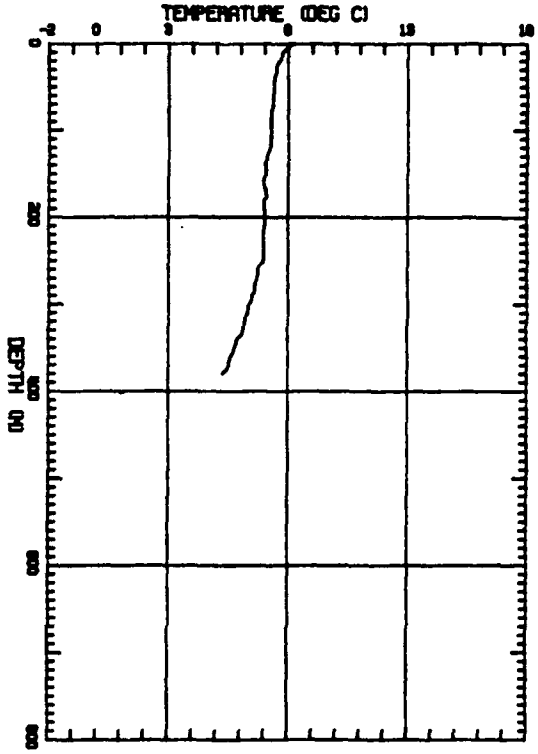
PROJECT: SACLANT
DROP NO: 68 CHANNEL: 14 LATITUDE: 62 42.8
DATE: 6/ 8/89 TIME: 12:32:59 LONGITUDE: -12 -48.0



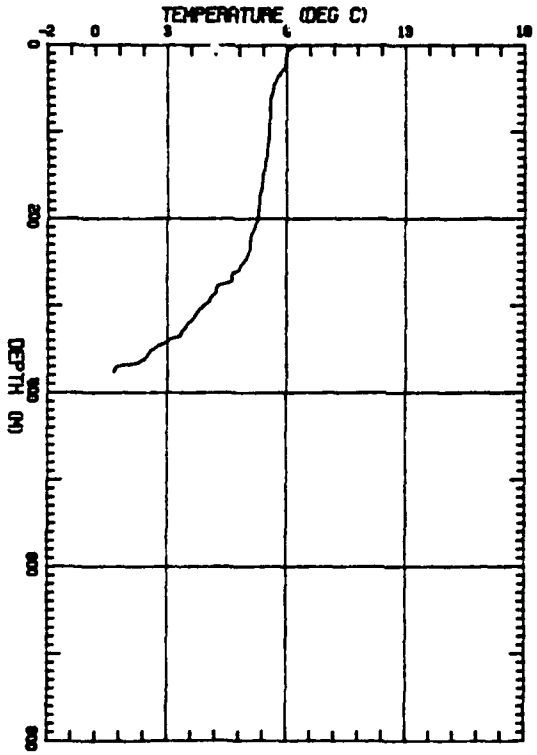
PROJECT: SACLANT
DROP NO: 89 CHANNEL: 16 LATITUDE: 62 30.0
DATE: 6/ 8/89 TIME: 12:42:27 LONGITUDE: -11 -22.7



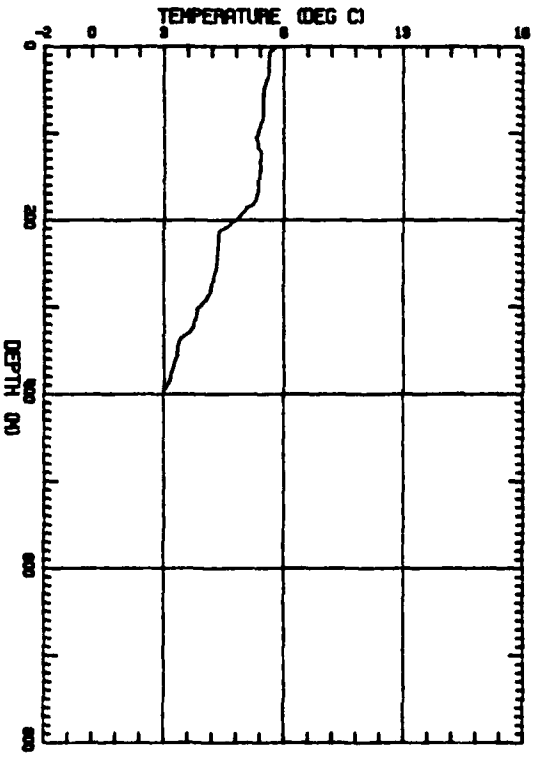
PROJECT: SACLANT
DROP NO: 90 CHANNEL: 12 LATITUDE: 62 47.2
DATE: 6/ 8/89 TIME: 12:45:55 LONGITUDE: -11 -8.1



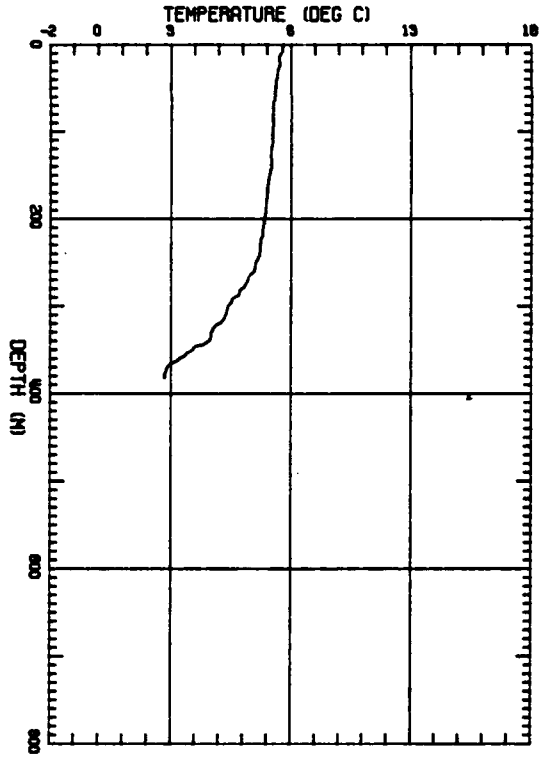
PROJECT: SACLANT
DROP NO: 91 CHANNEL: 14 LATITUDE: 63 5.4
DATE: 6/ 8/89 TIME: 12:49:48 LONGITUDE: -10 -52.5



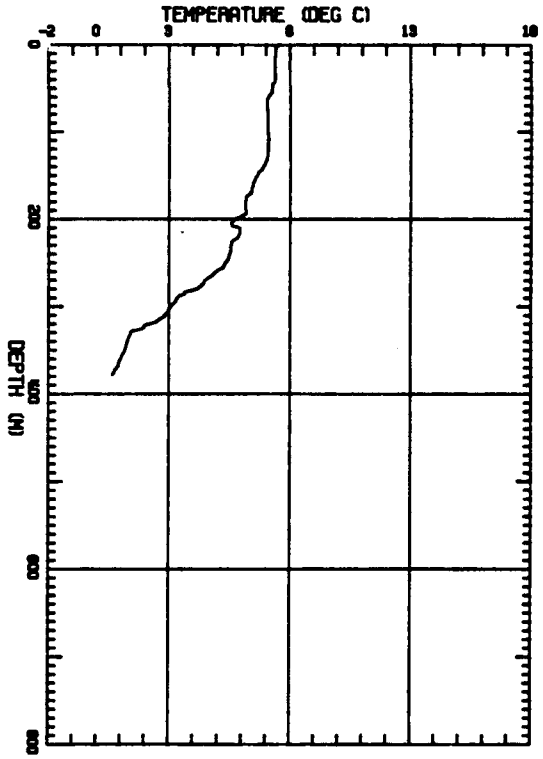
PROJECT: SACLANT
DROP NO: 92 CHANNEL: 16 LATITUDE: 63 24.0
DATE: 6/ 8/89 TIME: 12:53:44 LONGITUDE: -10 -37.4



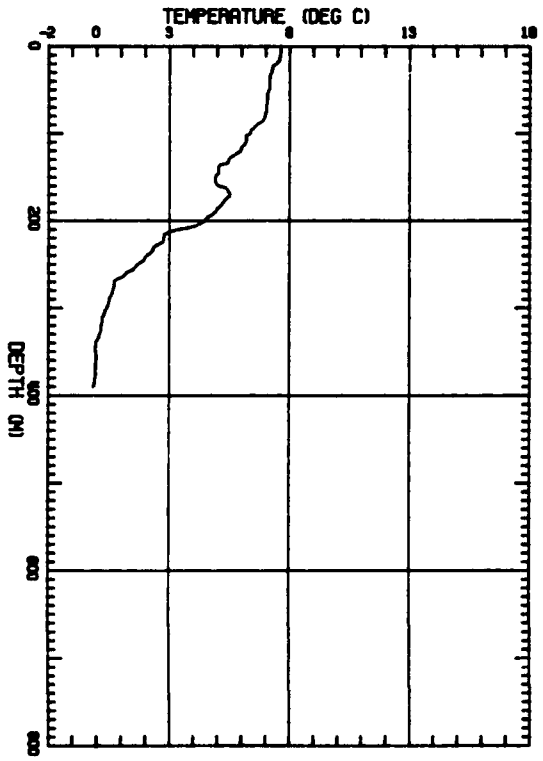
PROJECT: SACLANT
DROP NO: 93 CHANNEL: 12 LATITUDE: 63 42.8
DATE: 6/ 8/89 TIME: 12:57:43 LONGITUDE: -10 -20.6



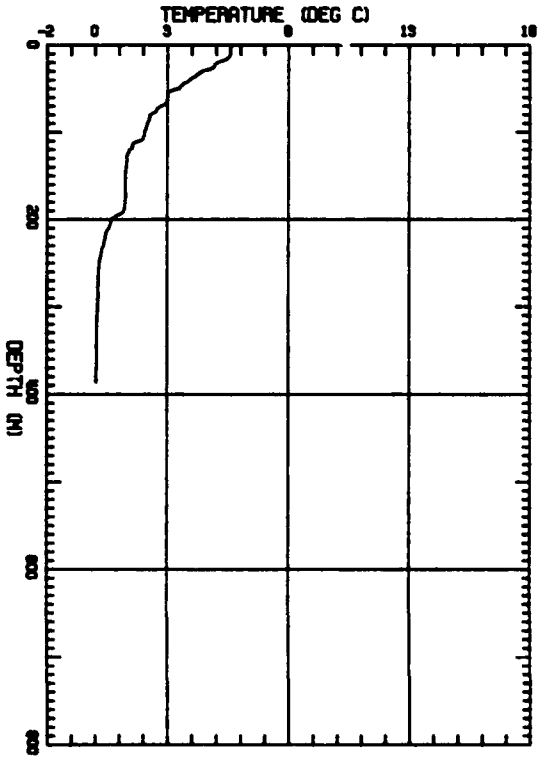
PROJECT: SACLANT
DROP NO: 94 CHANNEL: 14 LATITUDE: 64 2.4
DATE: 6/ 8/89 TIME: 13: 1:51 LONGITUDE: -10 -3.1



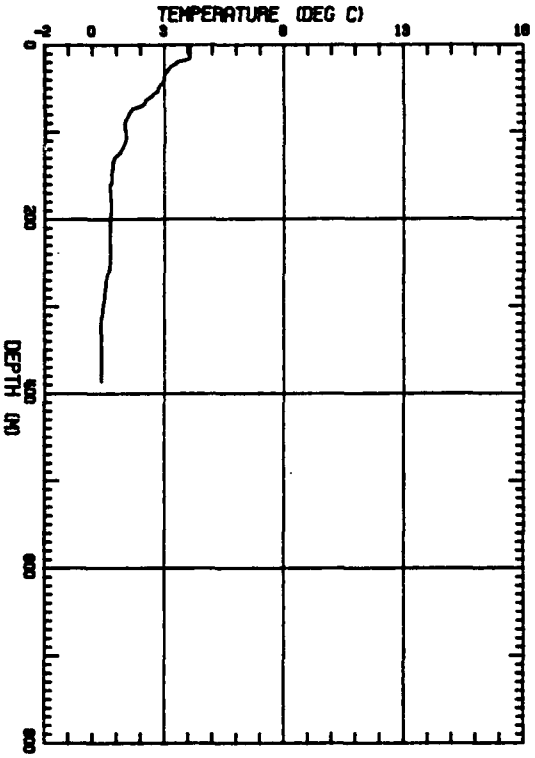
PROJECT: SACLANT
DROP NO: 95 CHANNEL: 16 LATITUDE: 64 20.7
DATE: 6/ 8/89 TIME: 13: 5:50 LONGITUDE: -9 -45.3



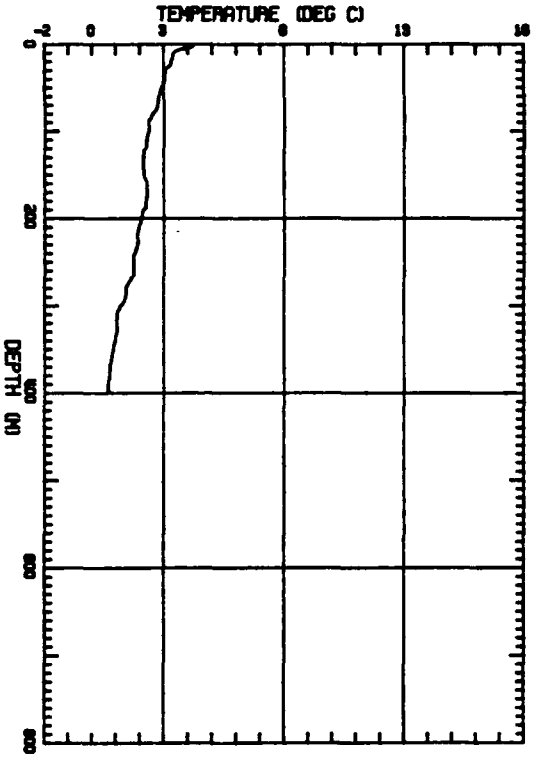
PROJECT: SACLANT
DROP NO: 96 CHANNEL: 12 LATITUDE: 64 39.2
DATE: 6/ 8/89 TIME: 13:10: 2 LONGITUDE: -9 -27.8



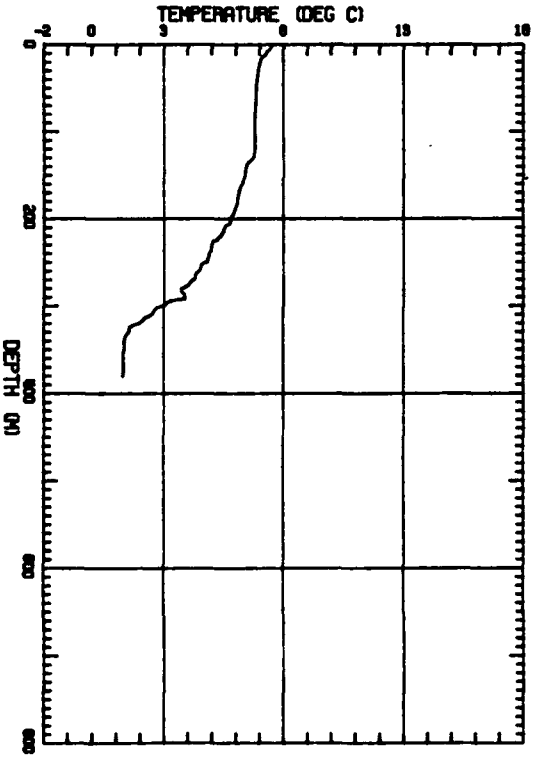
PROJECT: SACLANT
DROP NO: 97 CHANNEL: 14 LATITUDE: 64 57.6
DATE: 6/ 8/89 TIME: 13:14:12 LONGITUDE: -8 -8.4



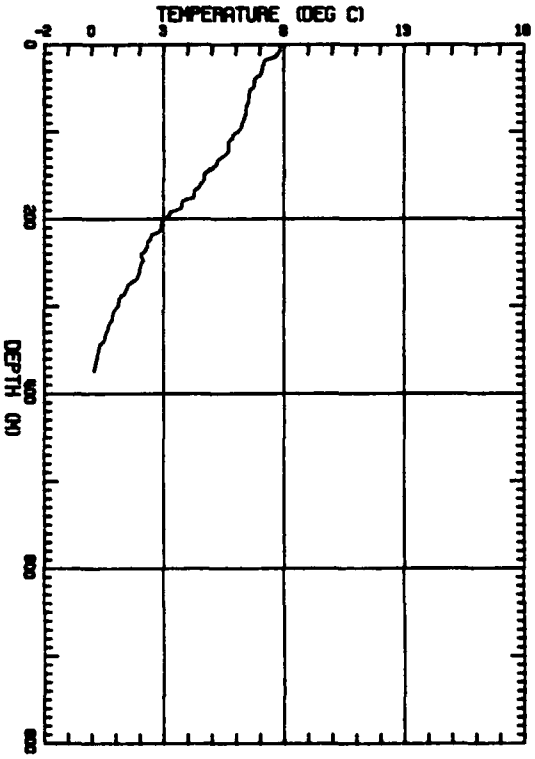
PROJECT: SACLANT
DROP NO: 98 CHANNEL: 16 LATITUDE: 64 45.2
DATE: 6/ 8/89 TIME: 13:22: 0 LONGITUDE: -7 -48.1



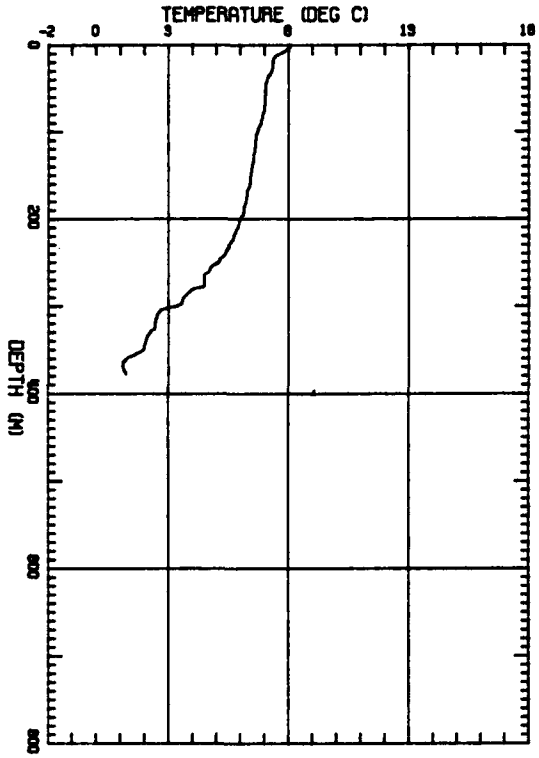
PROJECT: SACLANT
DROP NO: 100 CHANNEL: 14 LATITUDE: 64 8.8
DATE: 6/ 8/89 TIME: 13:29:40 LONGITUDE: -8 -27.0



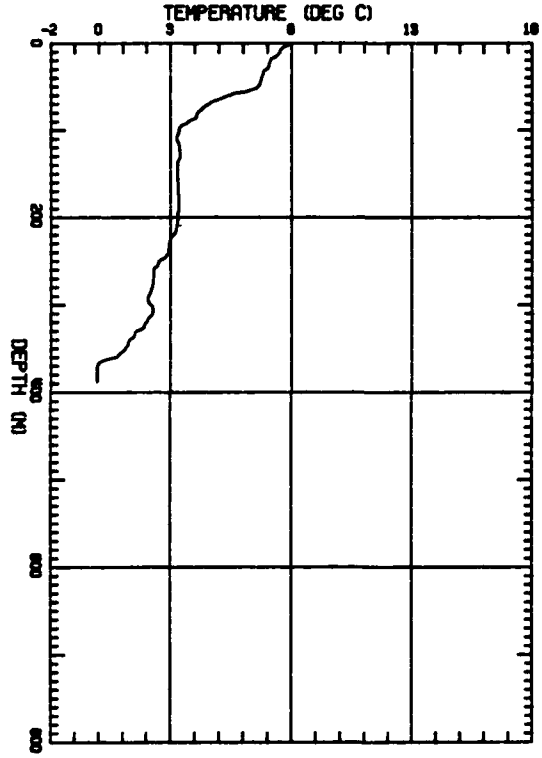
PROJECT: SACLANT
DROP NO: 101 CHANNEL: 16 LATITUDE: 63 51.1
DATE: 6/ 8/89 TIME: 13:33:31 LONGITUDE: -8 -48.1



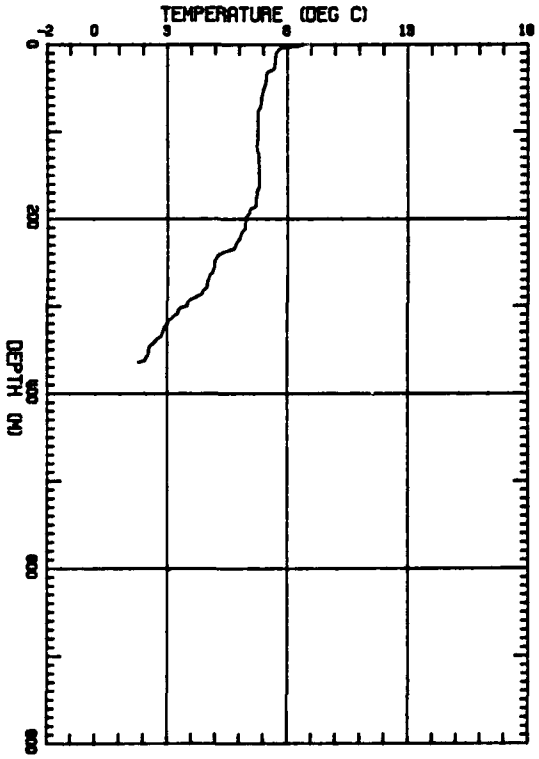
PROJECT: SACLANT
DROP NO: 102 CHANNEL: 12 LATITUDE: 63 34.2
DATE: 6/ 8/89 TIME: 13:37:20 LONGITUDE: -8 -6.7



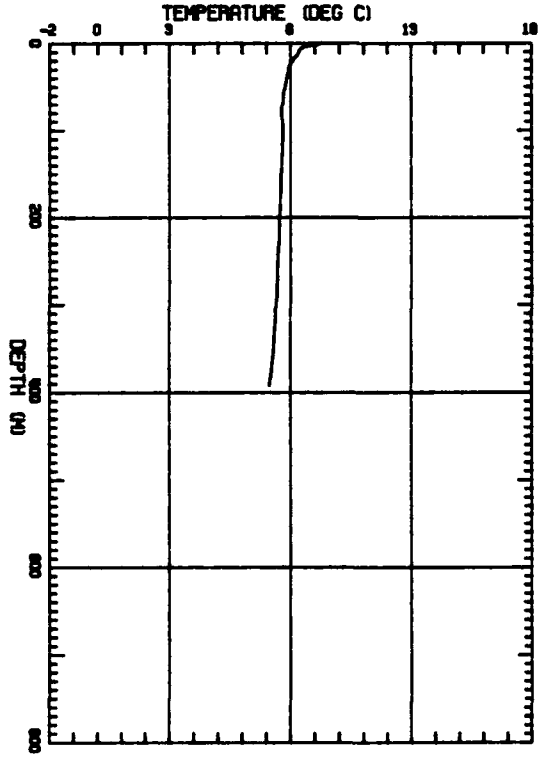
PROJECT: SACLANT
DROP NO: 103 CHANNEL: 14 LATITUDE: 63 16.4
DATE: 6/ 8/89 TIME: 13:41:14 LONGITUDE: -9 -27.0



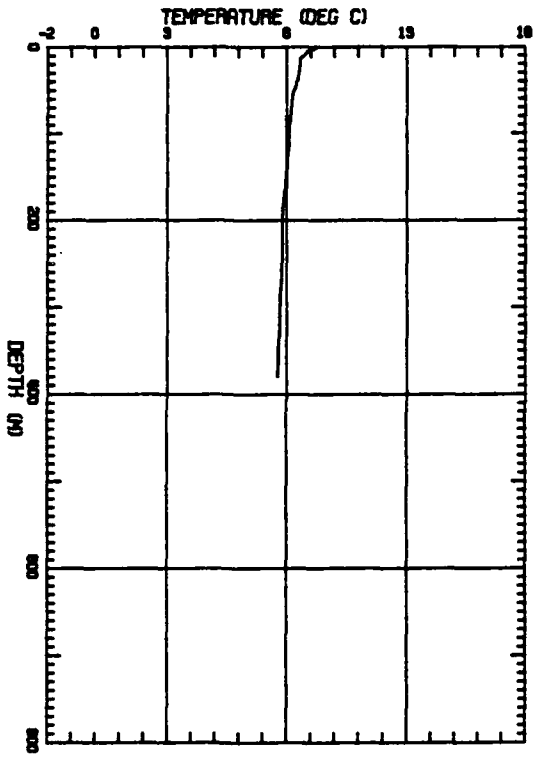
PROJECT: SACLANT
DROP NO: 104 CHANNEL: 16 LATITUDE: 62 58.5
DATE: 6/ 8/89 TIME: 13:45:11 LONGITUDE: -9 -47.8



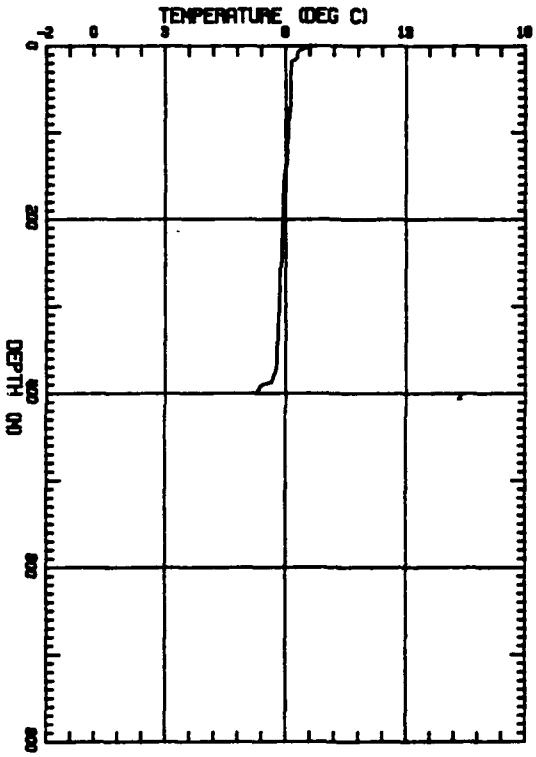
PROJECT: SACLANT
DROP NO: 105 CHANNEL: 12 LATITUDE: 62 38.4
DATE: 6/ 8/89 TIME: 13:49:50 LONGITUDE: -10 -12.4



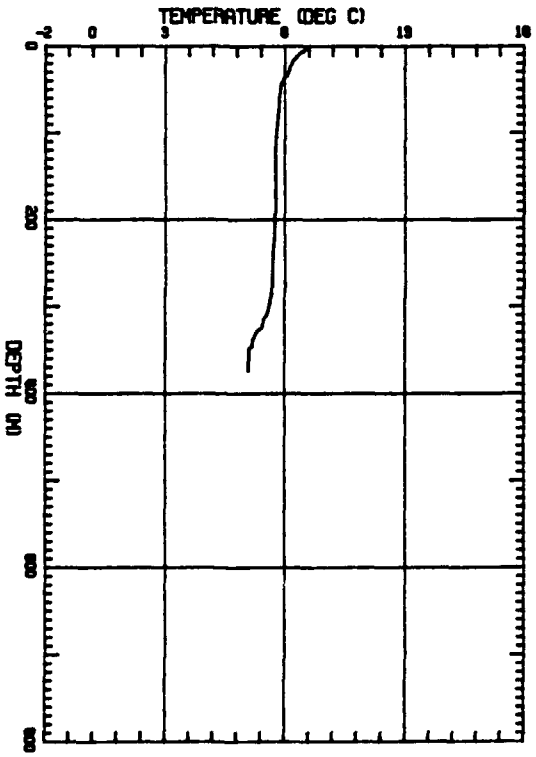
PROJECT: SACLANT
DROP NO: 108 CHANNEL: 14 LATITUDE: 62 22.1
DATE: 6/ 6/89 TIME: 13:53:34 LONGITUDE: -10 -32.6



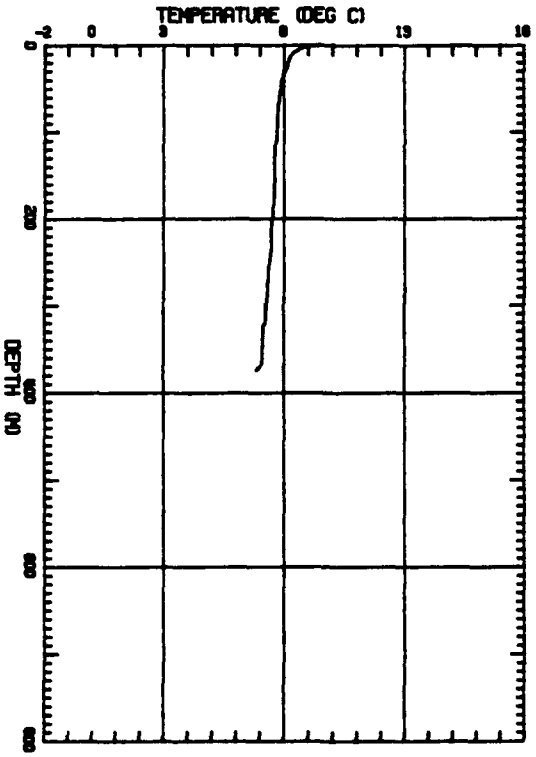
PROJECT: SACLANT
DROP NO: 107 CHANNEL: 16 LATITUDE: 62 5.6
DATE: 6/ 6/89 TIME: 14: 6:17 LONGITUDE: -8 -2.5



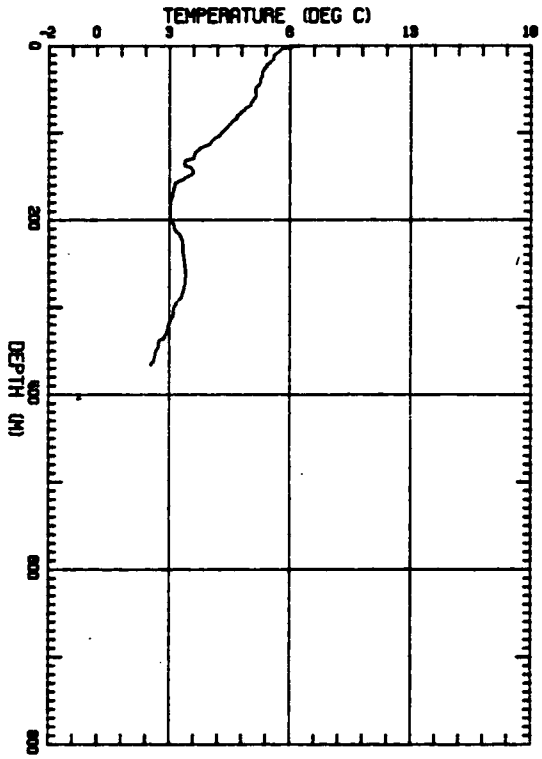
PROJECT: SACLANT
DROP NO: 106 CHANNEL: 12 LATITUDE: 62 29.2
DATE: 6/ 6/89 TIME: 16: 8:20 LONGITUDE: -8 -47.7



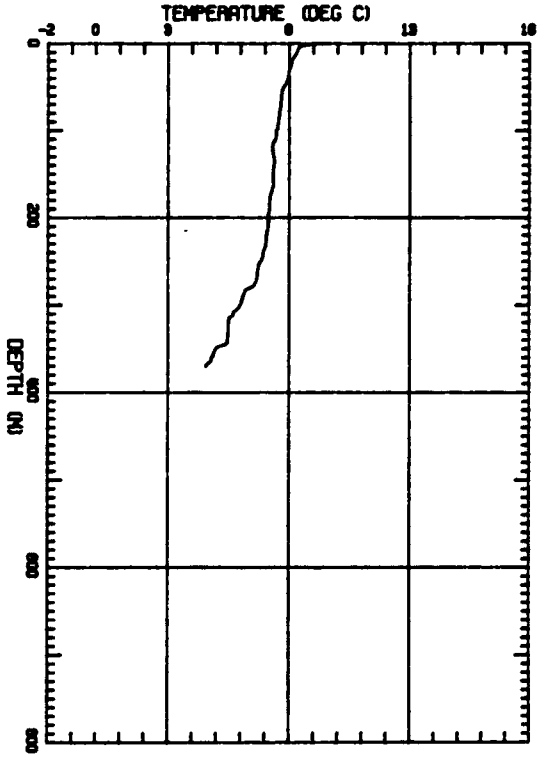
PROJECT: SACLANT
DROP NO: 109 CHANNEL: 14 LATITUDE: 62 39.7
DATE: 6/ 6/89 TIME: 14:12: 4 LONGITUDE: -8 -54.2



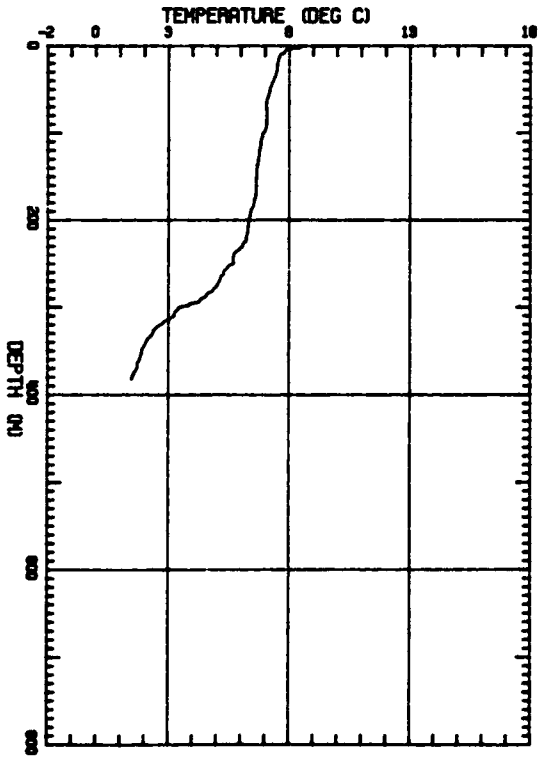
PROJECT: SACLANT
DROP NO: 110 CHANNEL: 18 LATITUDE: 69 2.2
DATE: 6/ 8/89 TIME: 14:17:11 LONGITUDE: -8 -15.9



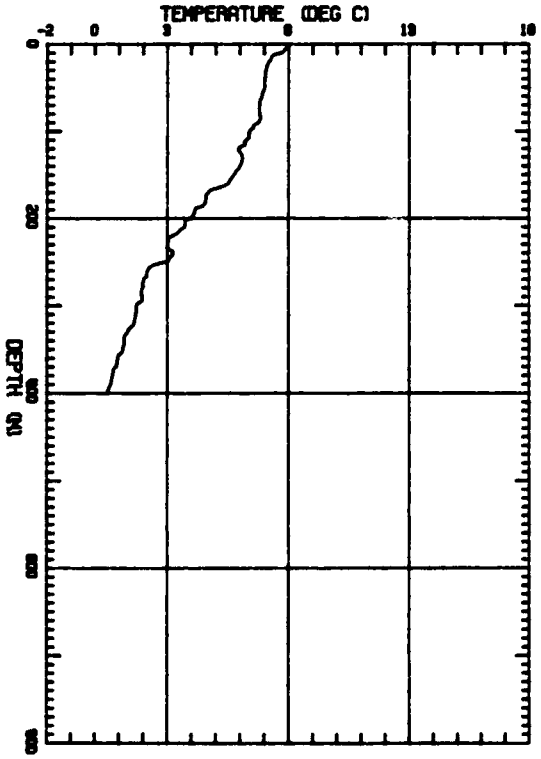
PROJECT: SACLANT
DROP NO: 111 CHANNEL: 12 LATITUDE: 69 14.1
DATE: 6/ 8/89 TIME: 14:19:58 LONGITUDE: -8 -5.0



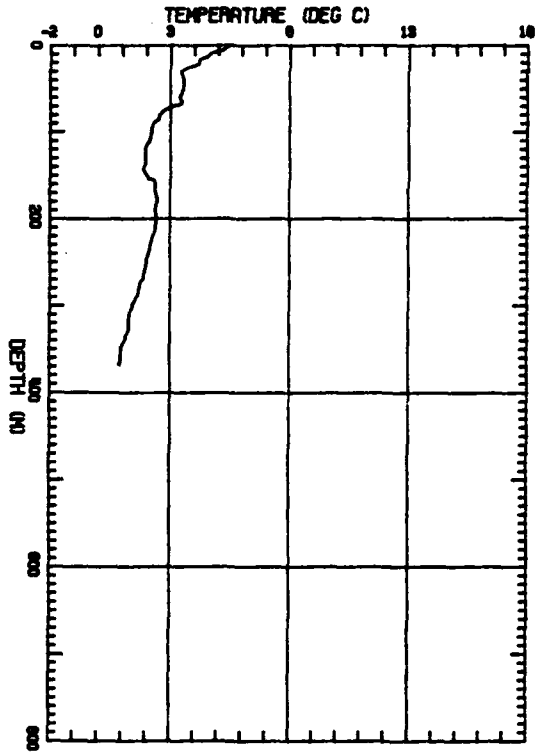
PROJECT: SACLANT
DROP NO: 112 CHANNEL: 14 LATITUDE: 69 33.2
DATE: 6/ 8/89 TIME: 14:24:49 LONGITUDE: -7 -42.8



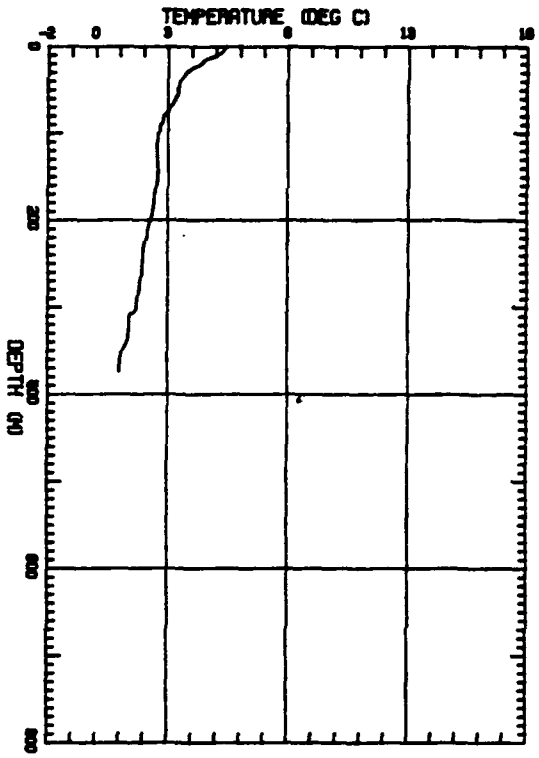
PROJECT: SACLANT
DROP NO: 113 CHANNEL: 16 LATITUDE: 69 46.6
DATE: 6/ 8/89 TIME: 14:27:54 LONGITUDE: -7 -28.7



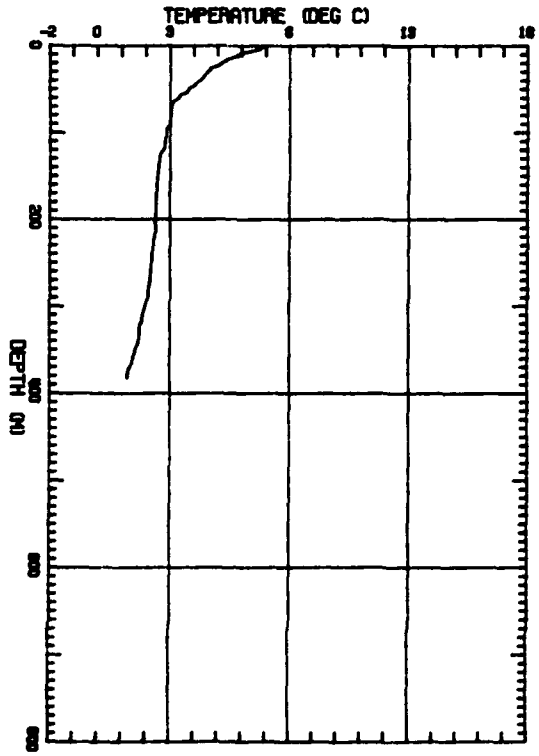
PROJECT: SACLANT
DROP NO: 114 CHANNEL: 12 LATITUDE: 64 4.5
DATE: 6/ 8/89 TIME: 14:32:29 LONGITUDE: -6 -55.8



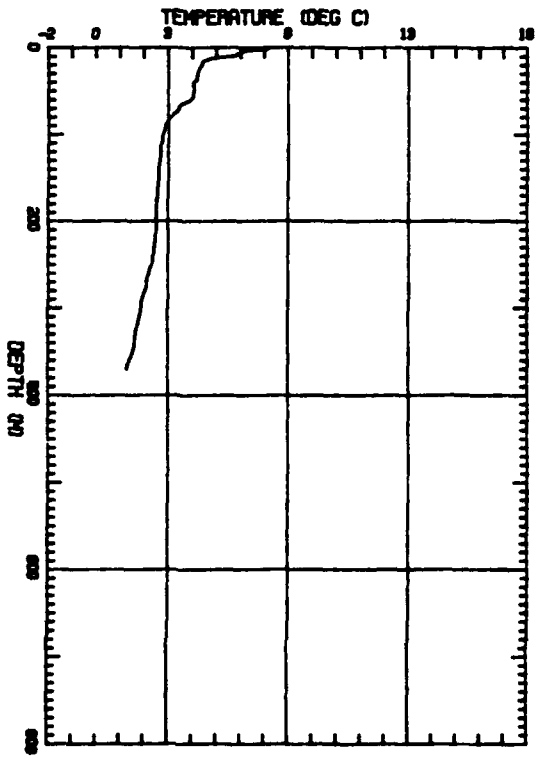
PROJECT: SACLANT
DROP NO: 115 CHANNEL: 14 LATITUDE: 64 10.0
DATE: 6/ 8/89 TIME: 14:35:37 LONGITUDE: -6 -57.2



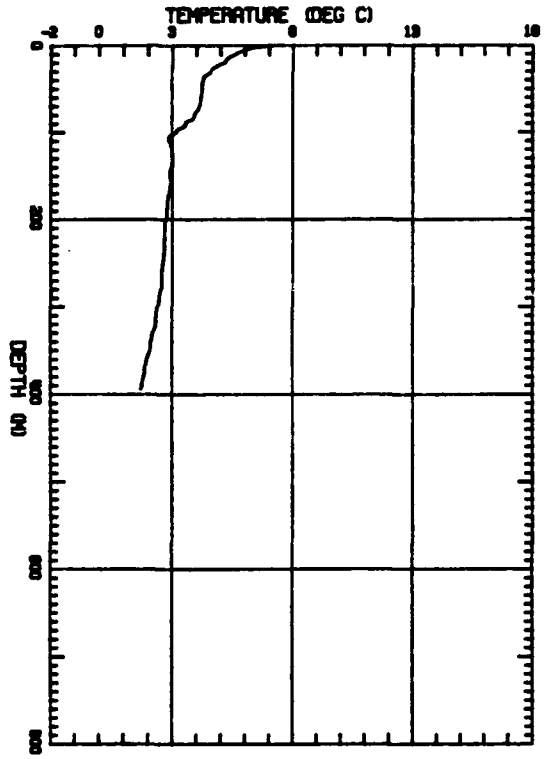
PROJECT: SACLANT
DROP NO: 116 CHANNEL: 16 LATITUDE: 64 15.0
DATE: 6/ 8/89 TIME: 14:38:31 LONGITUDE: -5 -52.3



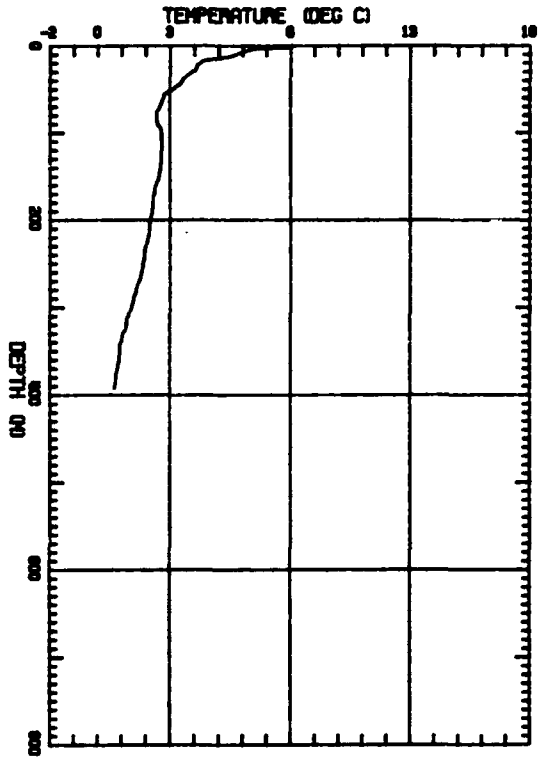
PROJECT: SACLANT
DROP NO: 117 CHANNEL: 12 LATITUDE: 64 8.3
DATE: 6/ 8/89 TIME: 14:43:50 LONGITUDE: -5 -.2



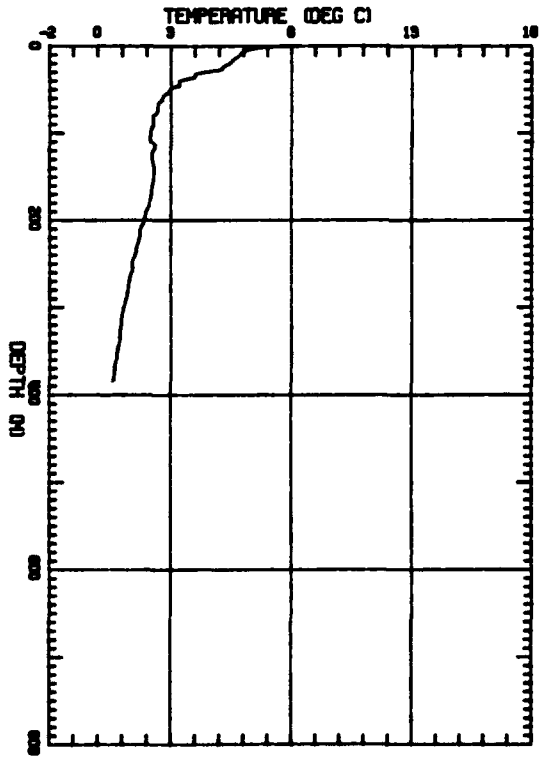
PROJECT: SACLANT
DROP NO: 118 CHANNEL: 14 LATITUDE: 63 48.1
DATE: 6/ 8/89 TIME: 14:48:20 LONGITUDE: -5 -3.7



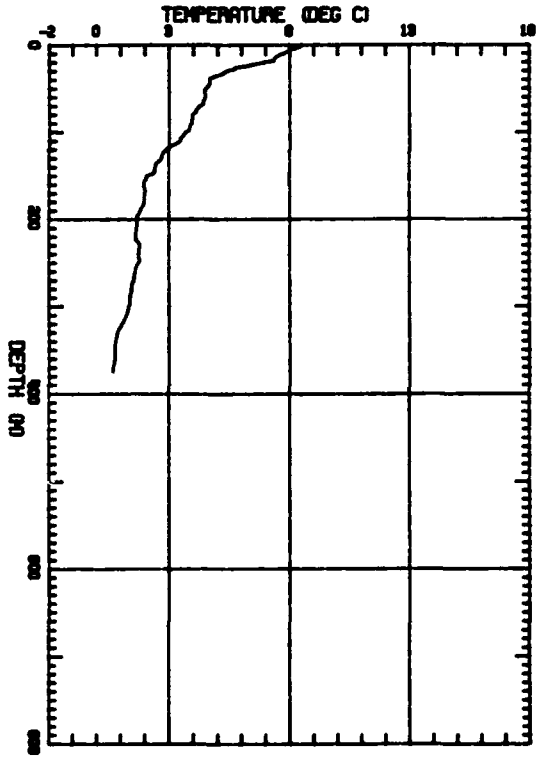
PROJECT: SACLANT
DROP NO: 119 CHANNEL: 16 LATITUDE: 63 35.2
DATE: 6/ 8/89 TIME: 14:50:31 LONGITUDE: -5 -13.7



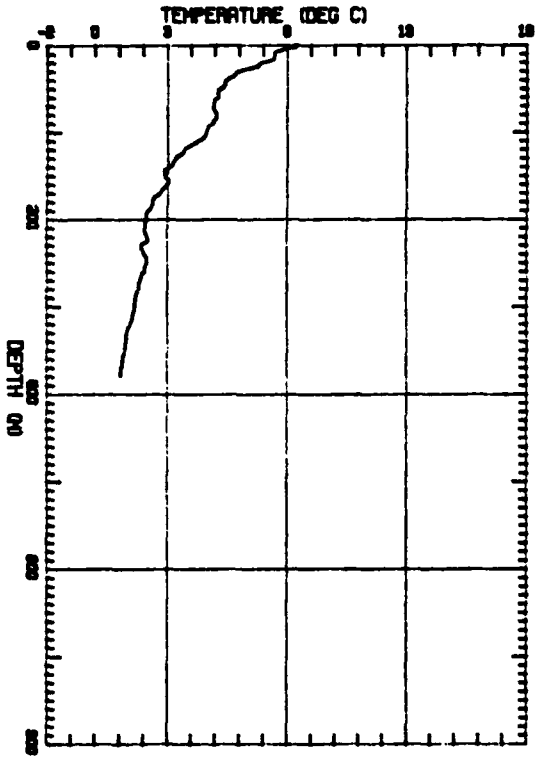
PROJECT: SACLANT
DROP NO: 120 CHANNEL: 12 LATITUDE: 63 24.1
DATE: 6/ 8/89 TIME: 14:52:47 LONGITUDE: -5 -24.4



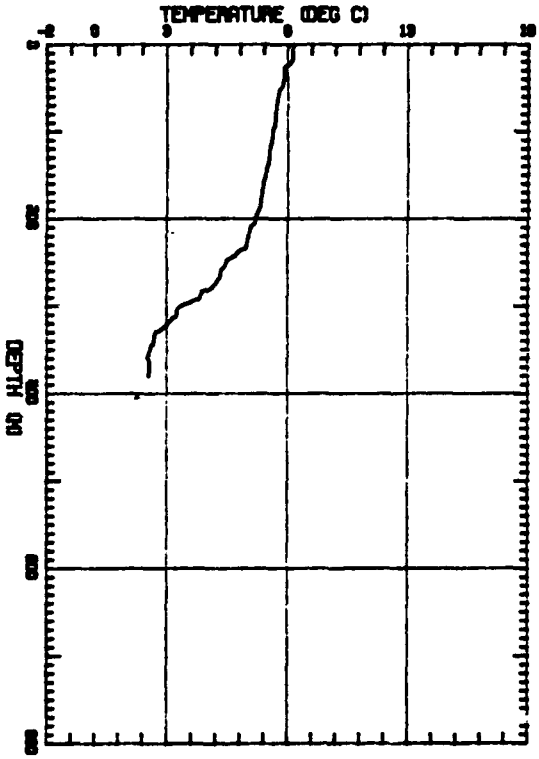
PROJECT: SACLANT
DROP NO: 121 CHANNEL: 14 LATITUDE: 63 15.6
DATE: 6/ 8/89 TIME: 14:58: 6 LONGITUDE: -4 -55.6



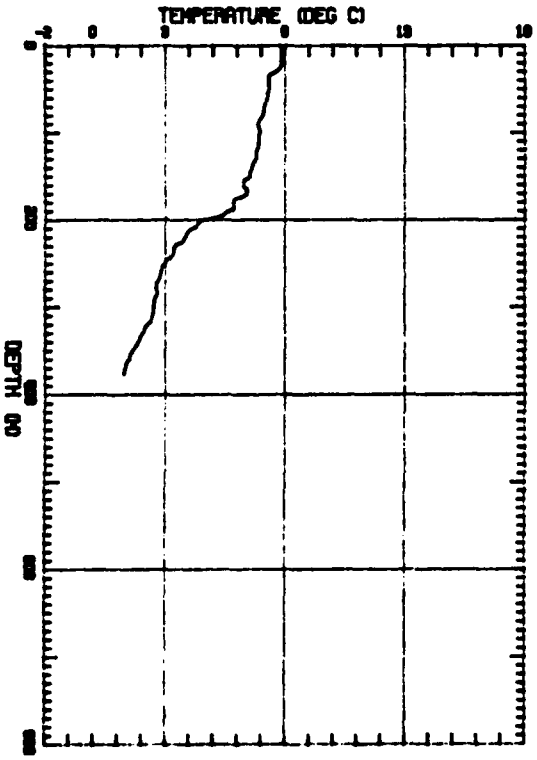
PROJECT: SACLANT
DROP NO: 122 CHANNEL: 16 LATITUDE: 69 10.0
DATE: 6/ 8/88 TIME: 14:58:54 LONGITUDE: -4 -12.2



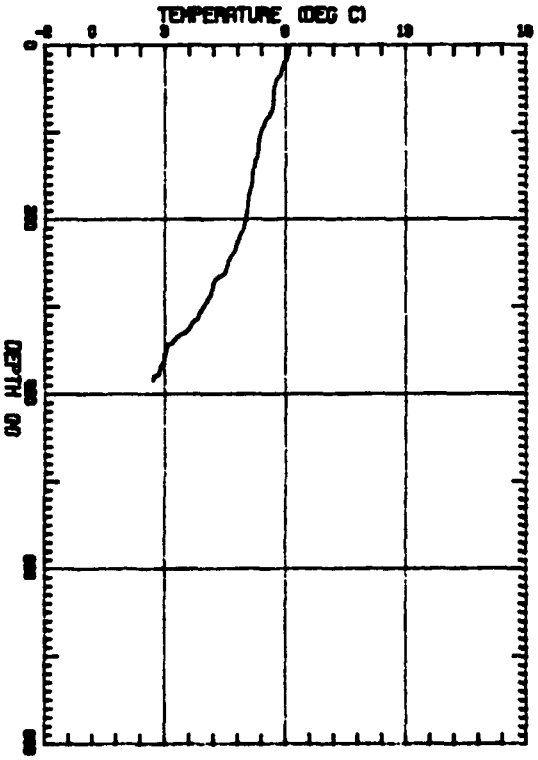
PROJECT: SACLANT
DROP NO: 124 CHANNEL: 16 LATITUDE: 62 58.0
DATE: 6/ 8/88 TIME: 15: 7:25 LONGITUDE: -2 -48.0



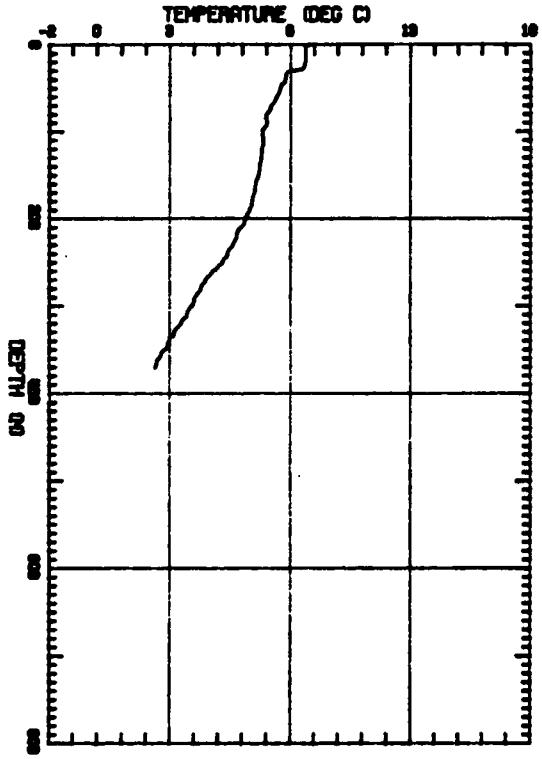
PROJECT: SACLANT
DROP NO: 125 CHANNEL: .8 LATITUDE: 62 52.9
DATE: 6/ 8/88 TIME: 15:11:27 LONGITUDE: -2 -.1



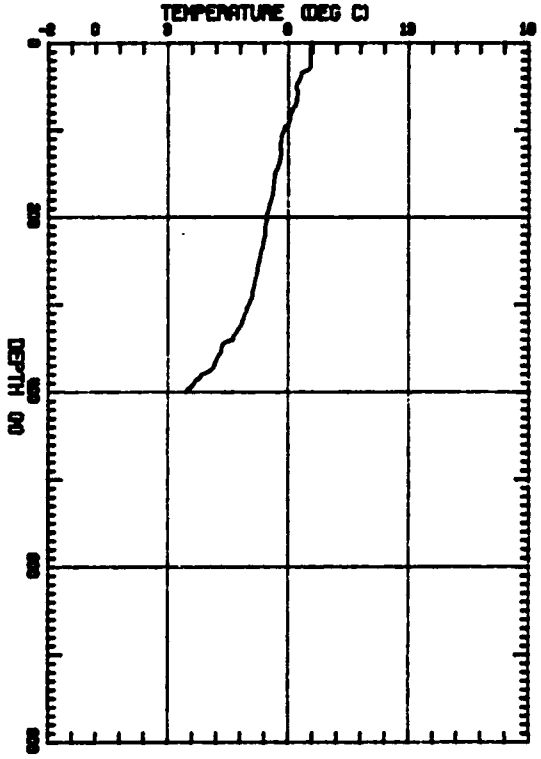
PROJECT: SACLANT
DROP NO: 126 CHANNEL: 12 LATITUDE: 62 43.0
DATE: 6/ 8/88 TIME: 15:16:08 LONGITUDE: -1 -11.0



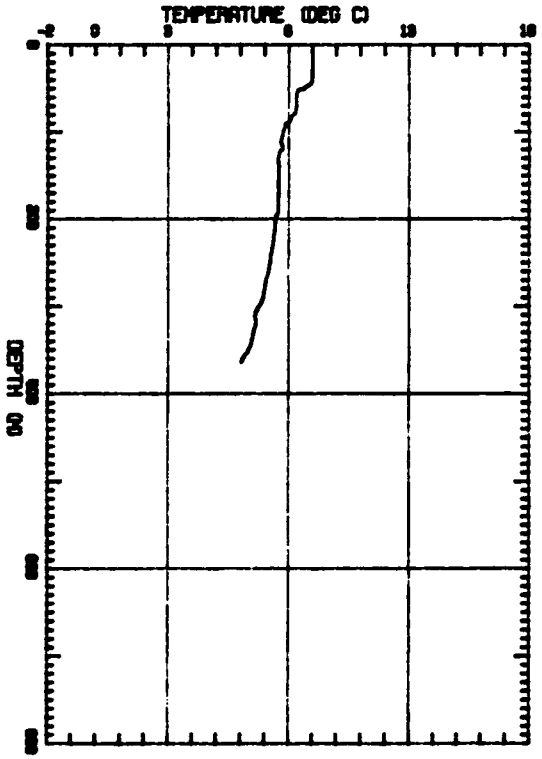
PROJECT: SACLANT
DROP NO: 127 CHANNEL: 16 LATITUDE: 62 38.3
DATE: 6/ 8/88 TIME: 15:18:47 LONGITUDE: 0 -31.1



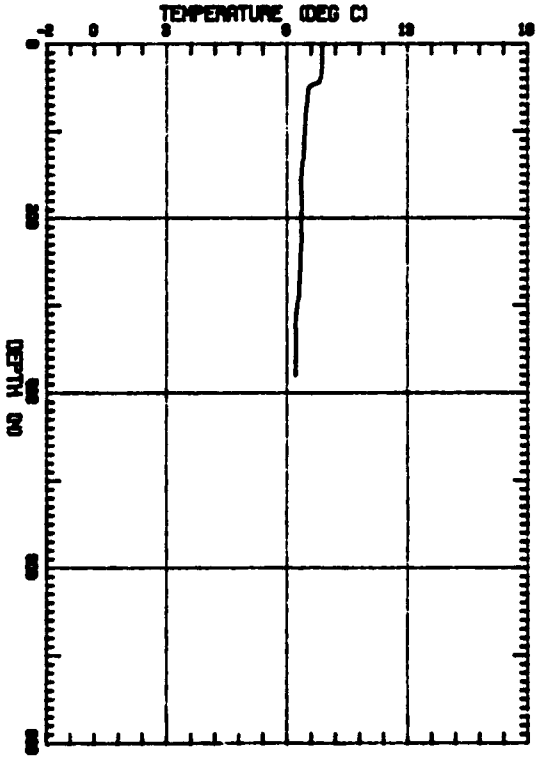
PROJECT: SACLANT
DROP NO: 128 CHANNEL: 16 LATITUDE: 62 21.0
DATE: 6/ 8/88 TIME: 15:22:58 LONGITUDE: 0 -38.2



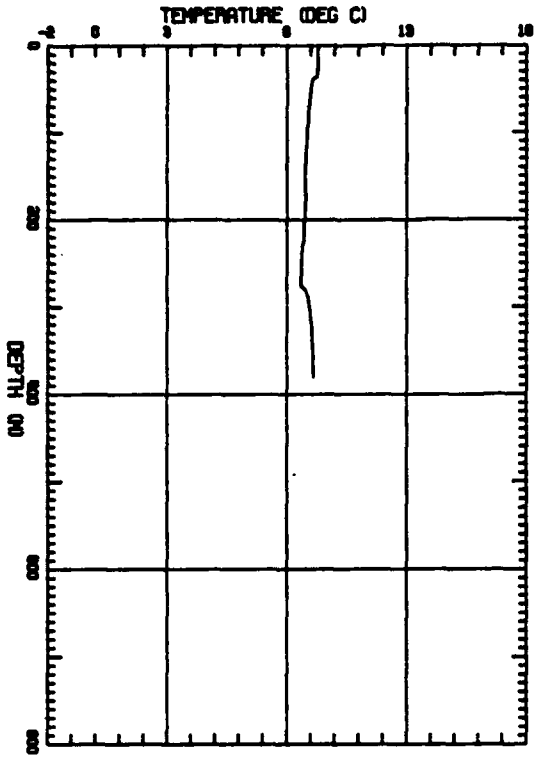
PROJECT: SACLANT
DROP NO: 129 CHANNEL: 12 LATITUDE: 62 9.0
DATE: 6/ 8/88 TIME: 15:28:10 LONGITUDE: 0 -46.7



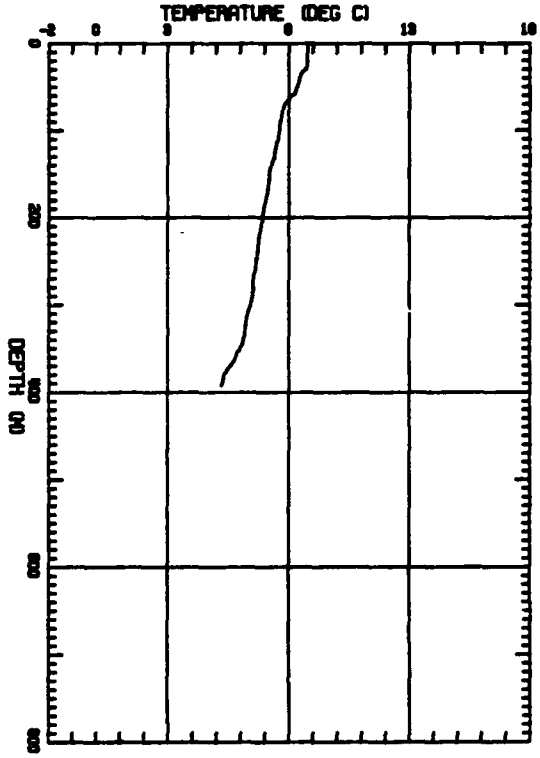
PROJECT: SACLANT
DROP NO: 130 CHANNEL: 16 LATITUDE: 61 51.6
DATE: 6/ 8/88 TIME: 15:28:58 LONGITUDE: -1 -2.0



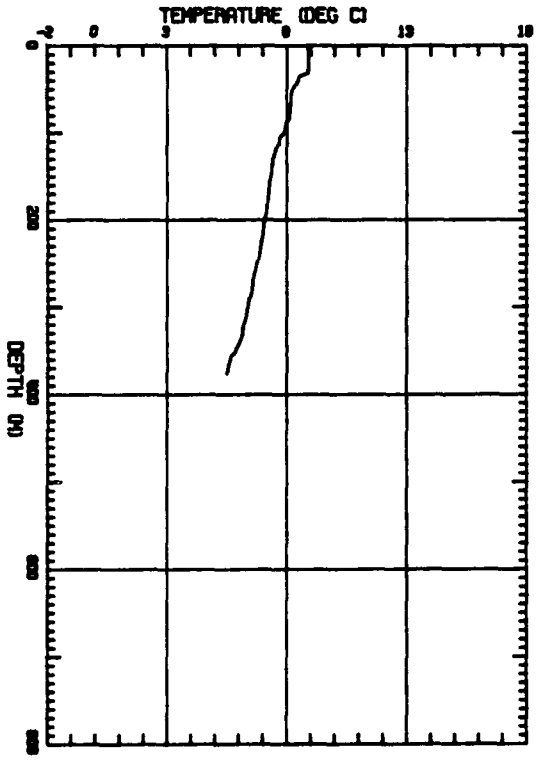
PROJECT: SACLANT
DROP NO: 131 CHANNEL: 16 LATITUDE: 61 29.4
DATE: 6/ 6/89 TIME: 15:32:52 LONGITUDE: -1 -16.9



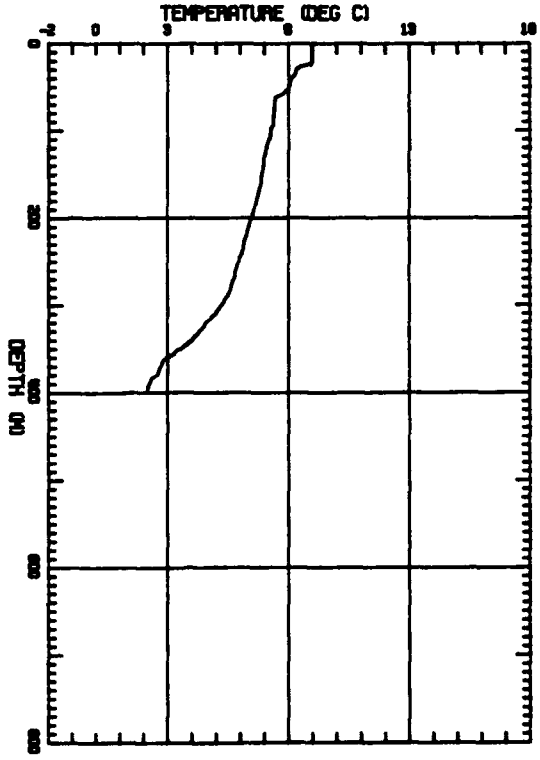
PROJECT: SACLANT
DROP NO: 132 CHANNEL: 12 LATITUDE: 61 32.9
DATE: 6/ 6/89 TIME: 15:37:49 LONGITUDE: -2 -7.5



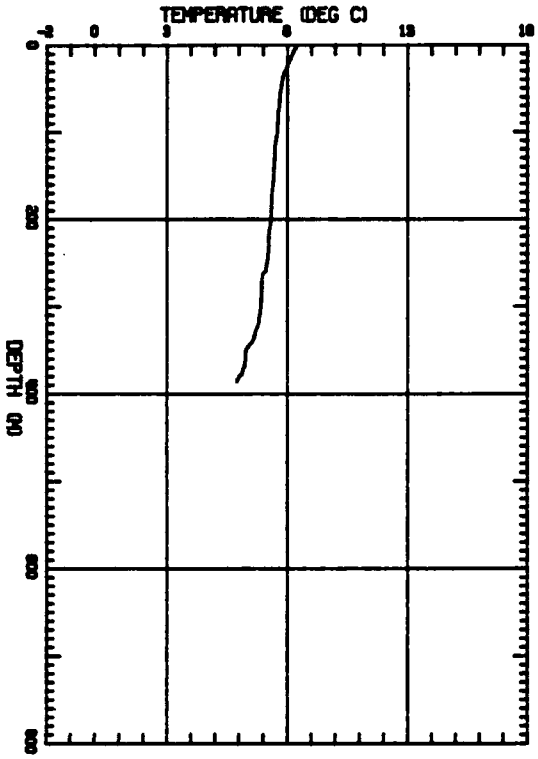
PROJECT: SACLANT
DROP NO: 133 CHANNEL: 14 LATITUDE: 61 39.7
DATE: 6/ 6/89 TIME: 15:41:47 LONGITUDE: -2 -49.0



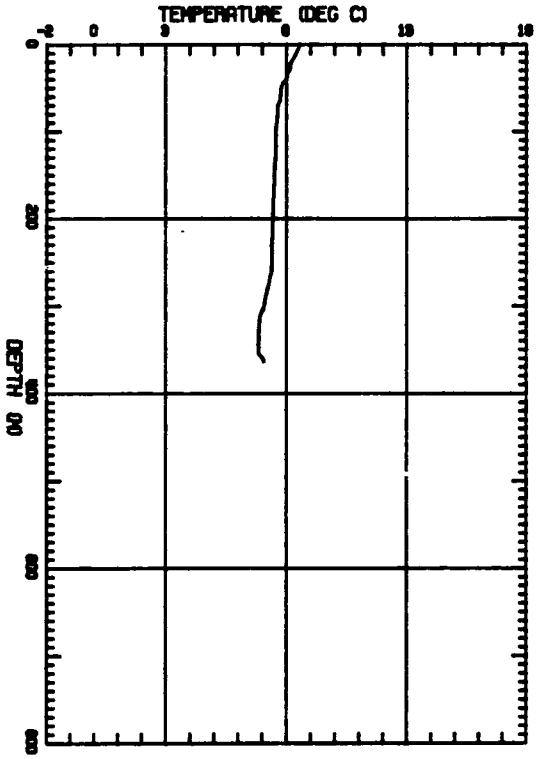
PROJECT: SACLANT
DROP NO: 134 CHANNEL: 16 LATITUDE: 61 47.0
DATE: 6/ 6/89 TIME: 15:48: 1 LONGITUDE: -9 -33.2



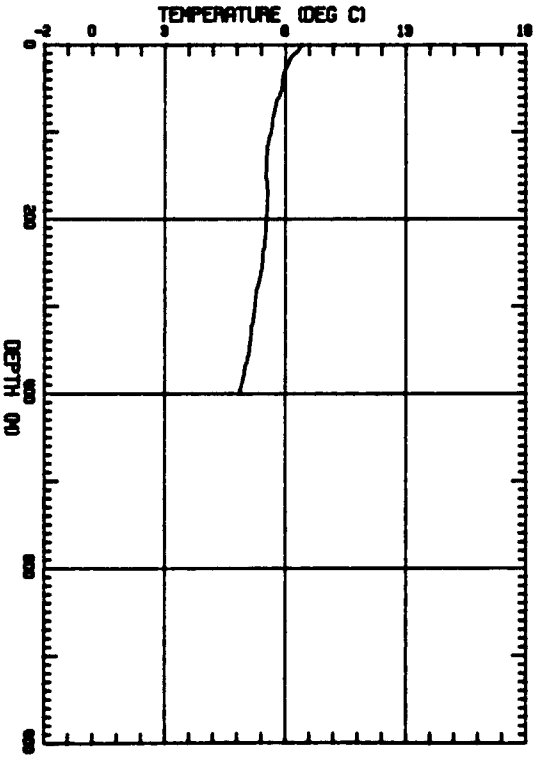
PROJECT: SACLANT
DROP NO: 135 CHANNEL: 12 LATITUDE: 61 54.6
DATE: 6/ 6/89 TIME: 15:50:11 LONGITUDE: -4 -16.2



PROJECT: SACLANT
DROP NO: 136 CHANNEL: 14 LATITUDE: 62 16.9
DATE: 6/ 6/89 TIME: 15:54:30 LONGITUDE: -4 -11.9



PROJECT: SACLANT
DROP NO: 137 CHANNEL: 16 LATITUDE: 62 31.0
DATE: 6/ 6/89 TIME: 15:57:38 LONGITUDE: -4 -4.1



Appendix I.

Drop Times, Positions, and Data Traces, 19 June 1989

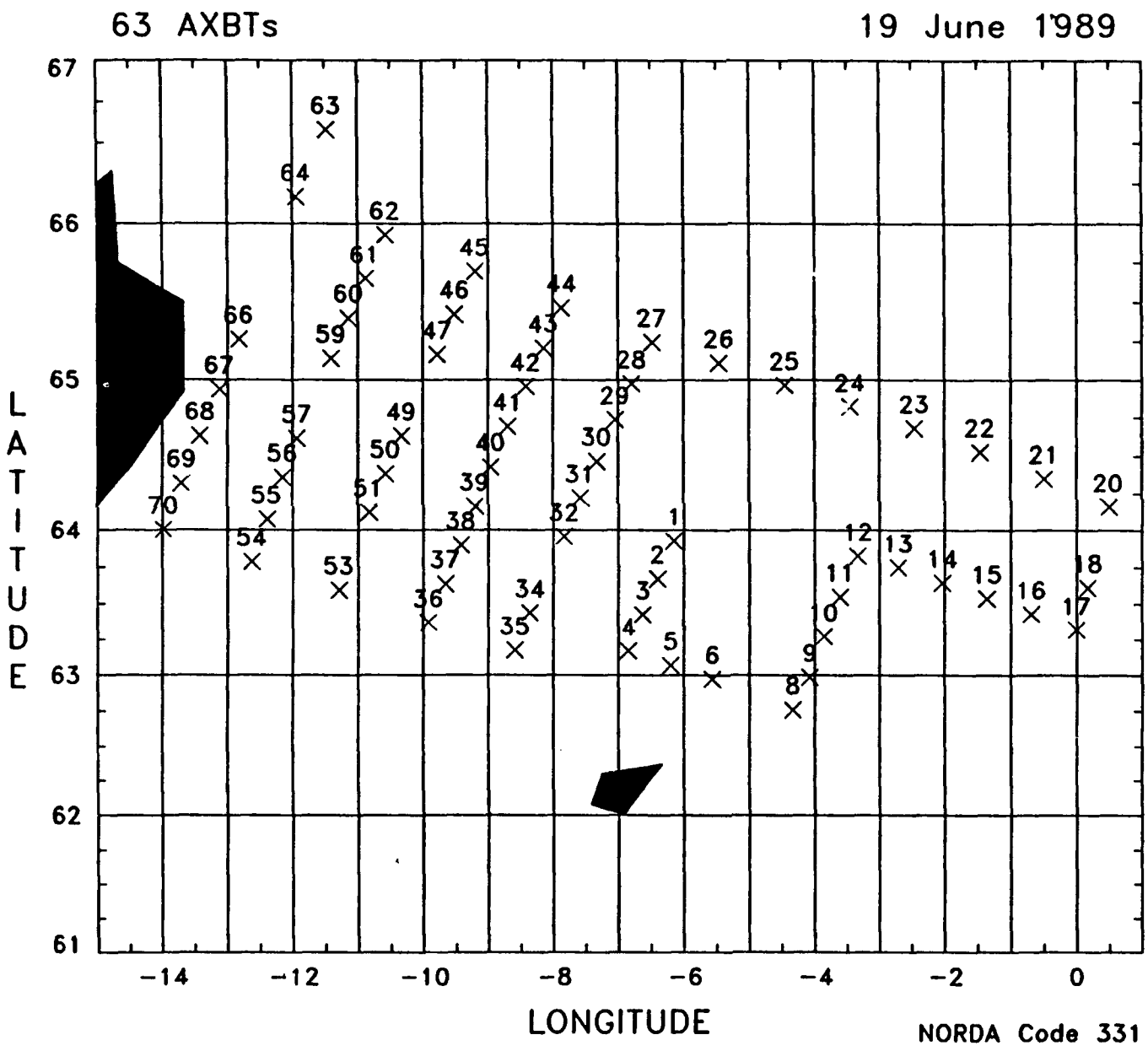
Table 3. Header information for AXBT drops for flight 3 on 19 June 1989. Times are UTC.

DATE: 6/19/89 PROJECT ID: SACLANT

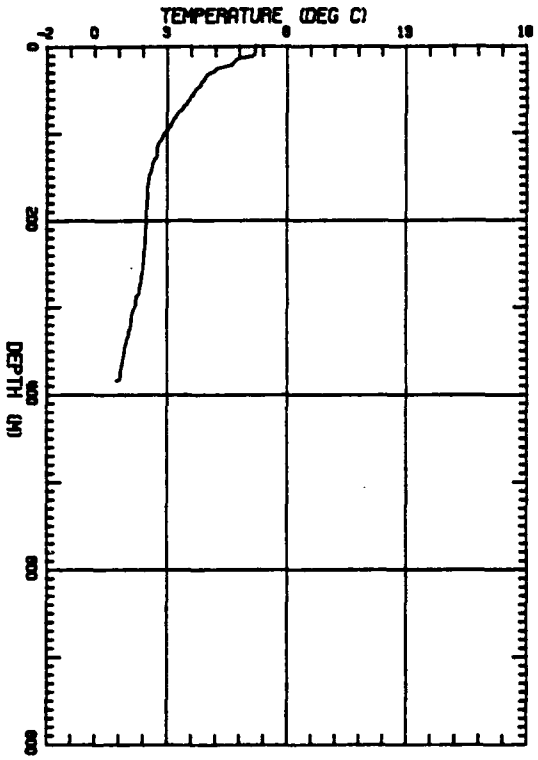
#	TYPE	D/S	LATITUDE		LONGITUDE		TIME	FLT	RT	CH
201	AXBT	S	63	55.70	-6	-8.90	17:00:51	3	10	16
202	AXBT	S	63	40.30	-6	-24.10	17:06:56	3	10	14
203	AXBT	S	63	25.50	-6	37.60	17:10:00	3	10	12
204	AXBT	S	63	10.20	-6	-50.90	17:14:28	3	10	16
205	AXBT	S	63	4.20	-6	-12.00	17:18:06	3	10	14
206	AXBT	S	62	58.50	-5	-34.20	17:21:20	3	10	12
207	AXBT	S	62	45.60	-4	-20.20	17:27:51	3	10	14
208	AXBT	S	62	59.20	-4	-4.20	17:31:12	3	10	12
209	AXBT	S	63	16.30	-3	-51.50	17:34:31	3	10	16
210	AXBT	S	63	33.00	-3	-36.40	17:37:44	3	10	14
211	AXBT	S	63	49.50	-3	-19.70	17:40:55	3	10	12
212	AXBT	S	63	44.80	-2	-42.30	17:44:36	3	10	16
213	AXBT	S	63	38.60	-2	-2.00	17:47:56	3	10	14
214	AXBT	S	63	32.30	-1	-21.60	17:51:18	3	10	12
215	AXBT	S	63	25.70	0	-41.70	17:54:39	3	10	16
216	AXBT	S	63	19.20	0	-.50	17:58:06	3	10	12
217	AXBT	S	63	36.70	0	9.80	18:02:27	3	10	14
218	AXBT	S	64	9.60	0	29.10	18:08:42	3	10	16
219	AXBT	S	64	21.00	0	-29.60	18:16:50	3	10	16
220	AXBT	S	64	31.50	-1	27.50	18:23:00	3	10	16
221	AXBT	S	64	40.80	-2	-27.10	18:30:33	3	10	16
222	AXBT	S	64	49.30	-3	-26.80	18:37:15	3	10	16
223	AXBT	S	64	57.80	-4	-27.00	18:43:53	3	10	16
224	AXBT	S	65	6.60	-5	-27.50	18:50:29	3	10	16
225	AXBT	S	65	14.70	-6	-28.70	18:56:58	3	10	12
226	AXBT	S	64	58.50	-6	-47.40	19:01:32	3	10	16
227	AXBT	S	64	44.20	-7	-2.50	19:05:06	3	10	14
228	AXBT	S	64	27.80	-7	-19.60	19:09:13	3	10	12
229	AXBT	S	64	13.10	-7	-34.40	19:12:54	3	10	16
230	AXBT	S	63	57.40	-7	-50.00	19:16:51	3	10	14
231	AXBT	S	63	26.20	-8	-21.20	19:24:41	3	10	16
232	AXBT	S	63	10.50	-8	-35.30	19:28:34	3	10	14
233	AXBT	S	63	22.10	-9	55.10	19:37:00	3	10	12
234	AXBT	S	63	38.10	-9	-39.70	19:42:11	3	10	16
235	AXBT	S	63	53.90	-9	-25.50	19:46:05	3	10	14
236	AXBT	S	64	9.80	-9	-11.90	19:50:03	3	10	12
237	AXBT	S	64	25.60	-8	-57.40	19:53:51	3	10	16
238	AXBT	S	64	41.50	-8	41.20	19:57:00	3	10	14
239	AXBT	S	64	57.30	-8	24.80	20:01:00	3	10	12
240	AXBT	S	65	12.40	-8	8.60	20:05:00	3	10	16
241	AXBT	S	65	27.70	-7	51.70	20:09:00	3	10	14
242	AXBT	S	65	41.70	-9	11.80	20:18:00	3	10	12
243	AXBT	S	65	25.30	-9	30.60	20:23:00	3	10	16
244	AXBT	S	65	9.80	-9	46.90	20:26:00	3	10	14
245	AXBT	S	64	37.80	-10	19.80	20:34:00	3	10	16
246	AXBT	S	64	22.90	-10	34.90	20:38:00	3	10	14

#	TYPE	D/S	LATITUDE		LONGITUDE		TIME	FLT	RT	CH
247	AXBT	S	64	7.40	-10	50.20	20:42:00	3	10	12
248	AXBT	S	63	35.60	-11	17.80	20:49:00	3	10	14
249	AXBT	S	63	47.10	-12	37.60	21:03:00	3	10	16
250	AXBT	S	64	4.50	-12	23.60	21:08:00	3	10	14
251	AXBT	S	64	21.40	-12	9.20	21:12:00	3	10	16
252	AXBT	S	64	36.70	-11	55.90	21:16:00	3	10	12
253	AXBT	S	65	8.30	-11	24.50	21:24:00	3	10	14
254	AXBT	S	65	23.90	-11	8.70	21:28:00	3	10	16
255	AXBT	S	65	38.90	-10	-53.20	21:32:26	3	10	12
256	AXBT	S	65	55.70	-10	-34.80	21:36:41	3	10	16
257	AXBT	S	66	34.70	-11	-28.50	21:47:55	3	10	14
258	AXBT	S	66	9.90	-11	-56.60	21:55:58	3	10	16
259	AXBT	S	65	15.60	-12	-49.50	22:10:47	3	10	16
260	AXBT	S	64	56.20	-13	-7.30	22:15:47	3	10	14
261	AXBT	S	64	37.70	-13	-25.30	22:20:33	3	10	16
262	AXBT	S	64	19.10	-13	-42.30	22:25:13	3	10	12
263	AXBT	S	64	.30	-13	-58.60	22:30:09	3	10	16

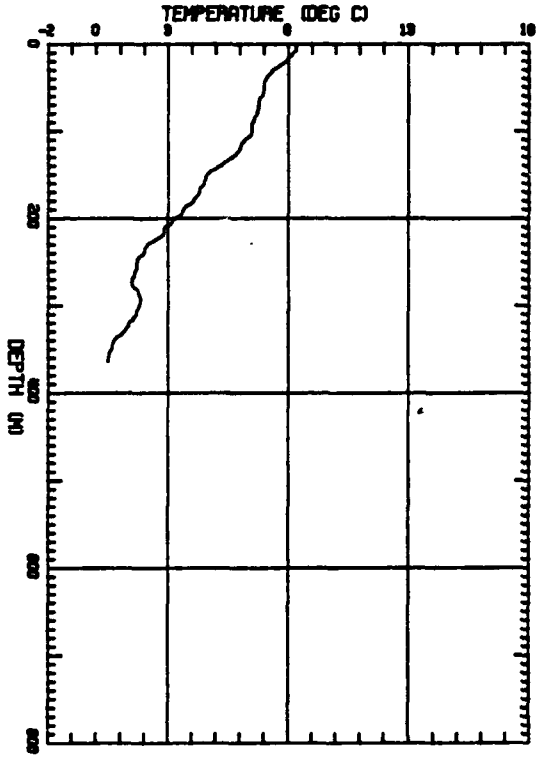
TOTAL NO. OF FILES: 63


63 AXBTs
19 June 1989
LATITUDE
LONGITUDE
67
66
65
64
63
62
61
-14
-12
-10
-8
-6
-4
-2
0
NORDA Code 331

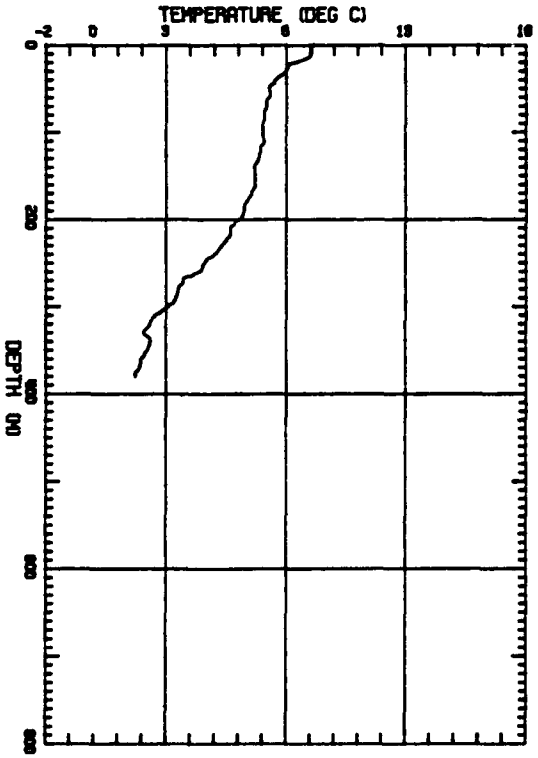
PROJECT: SACLANT
DROP NO: 201 CHANNEL: 16 LATITUDE: 63 55.7
DATE: 6/19/89 TIME: 17:00:51 LONGITUDE: -6 -8.9



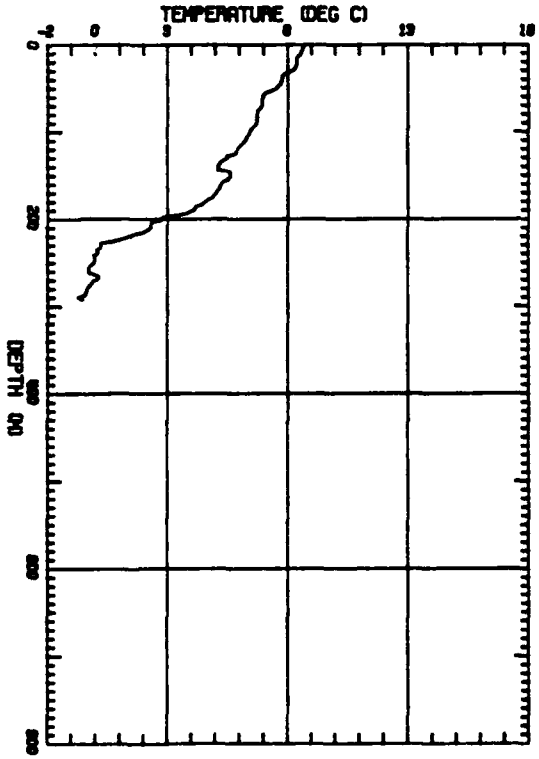
PROJECT: SACLANT
DROP NO: 202 CHANNEL: 14 LATITUDE: 63 40.3
DATE: 6/19/89 TIME: 17:06:58 LONGITUDE: -6 -24.1



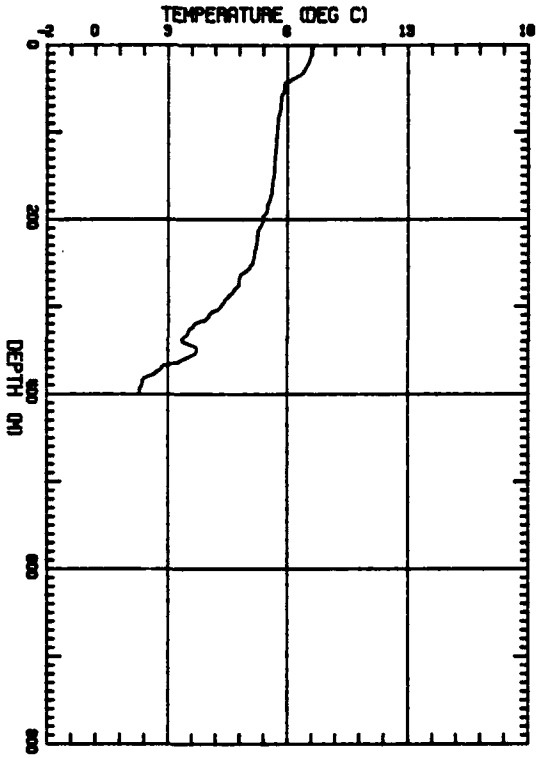
PROJECT: SACLANT
DROP NO: 203 CHANNEL: 12 LATITUDE: 63 25.5
DATE: 6/19/89 TIME: 17:10:00 LONGITUDE: -6 37.6



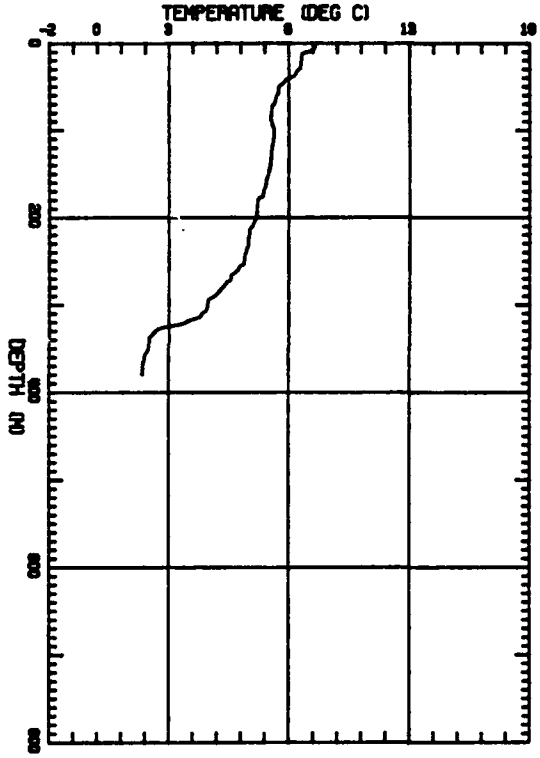
PROJECT: SACLANT
DROP NO: 204 CHANNEL: 10 LATITUDE: 63 10.2
DATE: 6/19/89 TIME: 17:14:28 LONGITUDE: -6 -50.9



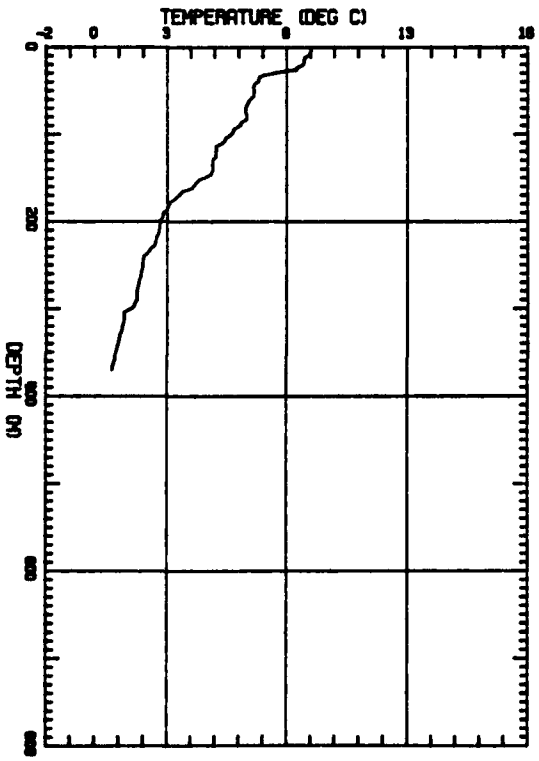
PROJECT: SACLANT
DROP NO: 205 CHANNEL: 14 LATITUDE: 63 4.2
DATE: 6/19/89 TIME: 17:18:06 LONGITUDE: -6 -12.0



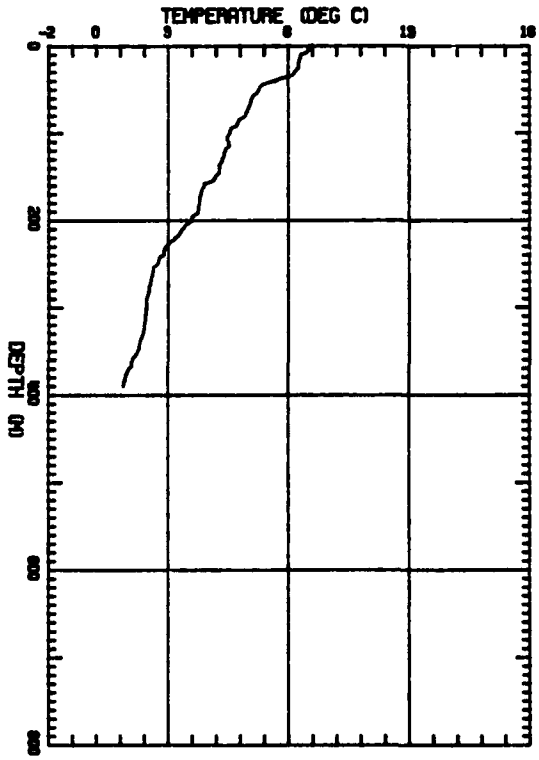
PROJECT: SACLANT
DROP NO: 206 CHANNEL: 12 LATITUDE: 62 58.5
DATE: 6/19/89 TIME: 17:21:20 LONGITUDE: -5 -34.2



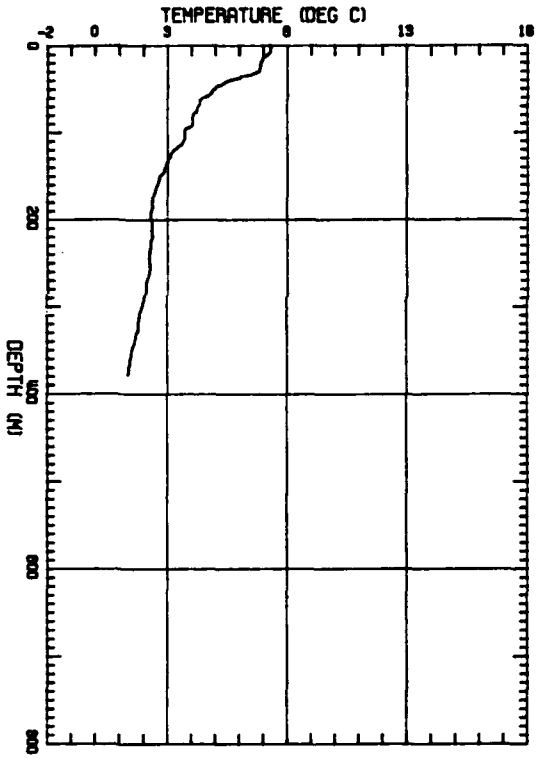
PROJECT: SACLANT
DROP NO: 207 CHANNEL: 14 LATITUDE: 62 45.6
DATE: 6/19/89 TIME: 17:27:51 LONGITUDE: -4 -20.2



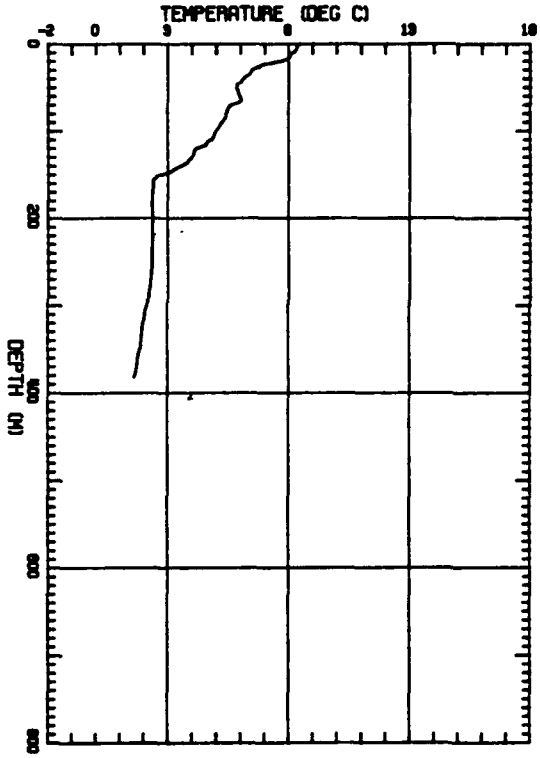
PROJECT: SACLANT
DROP NO: 208 CHANNEL: 12 LATITUDE: 62 58.2
DATE: 6/19/89 TIME: 17:31:12 LONGITUDE: -4 -4.2



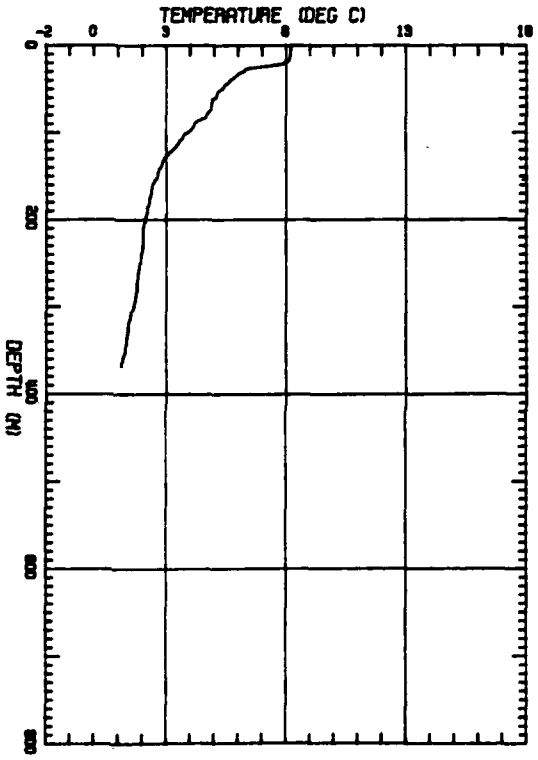
PROJECT: SACLANT
DROP NO: 209 CHANNEL: 16 LATITUDE: 63 16.3
DATE: 6/19/89 TIME: 17:34:31 LONGITUDE: -3 -51.5



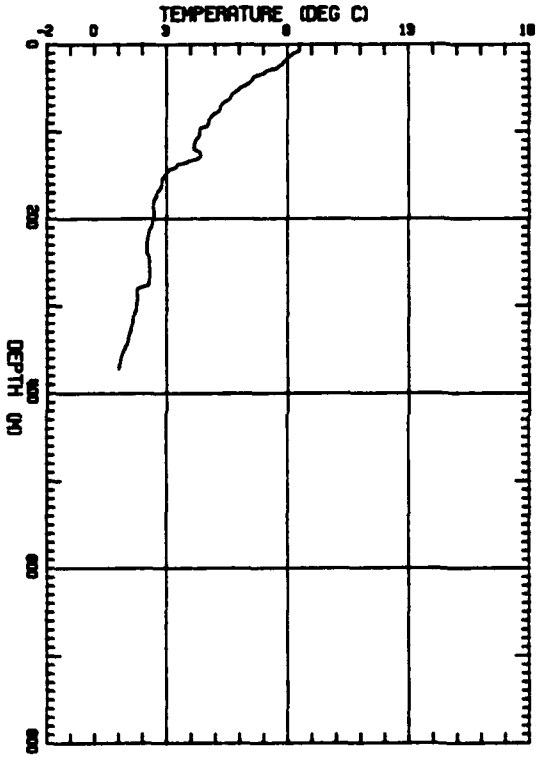
PROJECT: SACLANT
DROP NO: 210 CHANNEL: 14 LATITUDE: 63 33.0
DATE: 6/19/89 TIME: 17:37:44 LONGITUDE: -3 -36.4



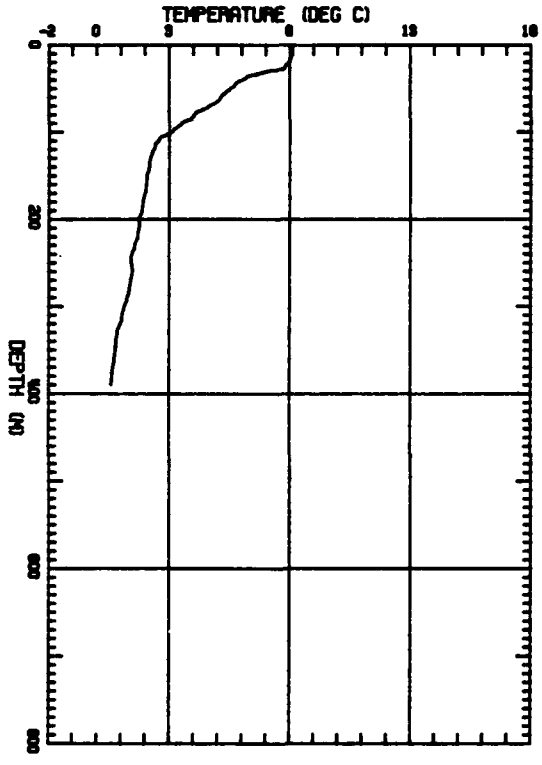
PROJECT: SACLANT
DROP NO: 211 CHANNEL: 12 LATITUDE: 63 49.5
DATE: 6/19/89 TIME: 17:40:55 LONGITUDE: -3 -18.7



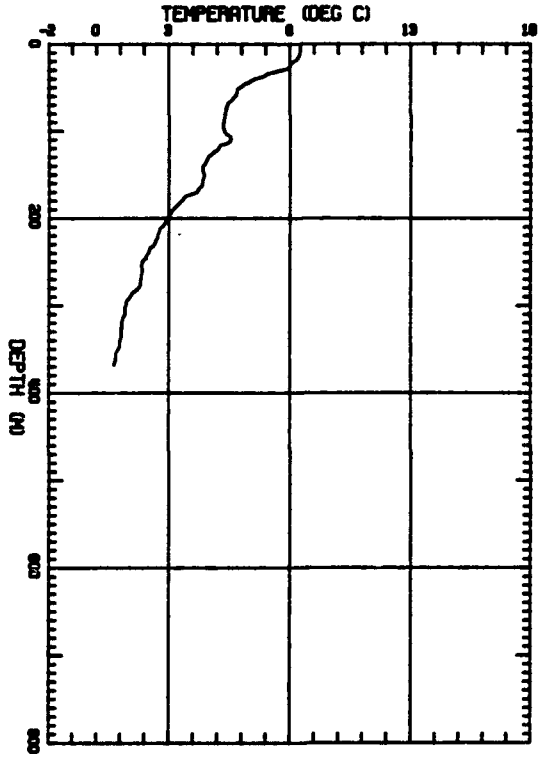
PROJECT: SACLANT
DROP NO: 212 CHANNEL: 16 LATITUDE: 63 44.8
DATE: 6/19/89 TIME: 17:44:36 LONGITUDE: -2 -42.3



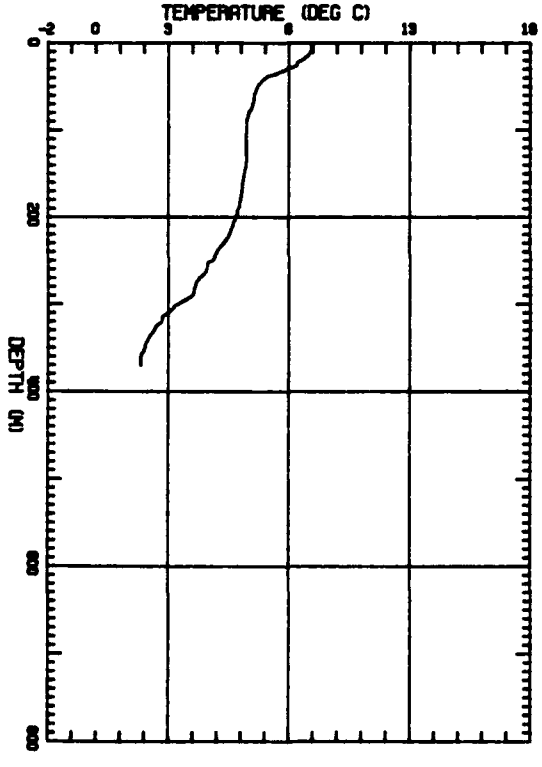
PROJECT: SACLANT
DROP NO: 213 CHANNEL: 14 LATITUDE: 63 38.6
DATE: 6/19/89 TIME: 17:47:58 LONGITUDE: -2 -2.0



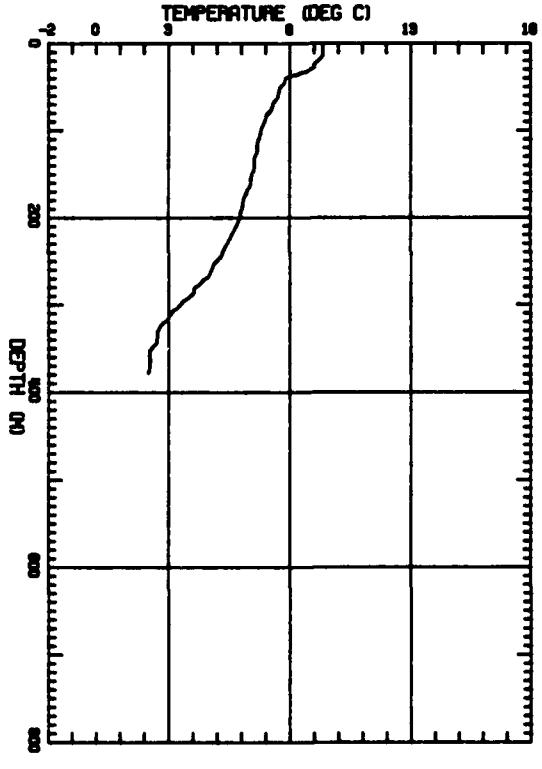
PROJECT: SACLANT
DROP NO: 214 CHANNEL: 12 LATITUDE: 63 32.3
DATE: 6/19/89 TIME: 17:51:18 LONGITUDE: -1 -21.6



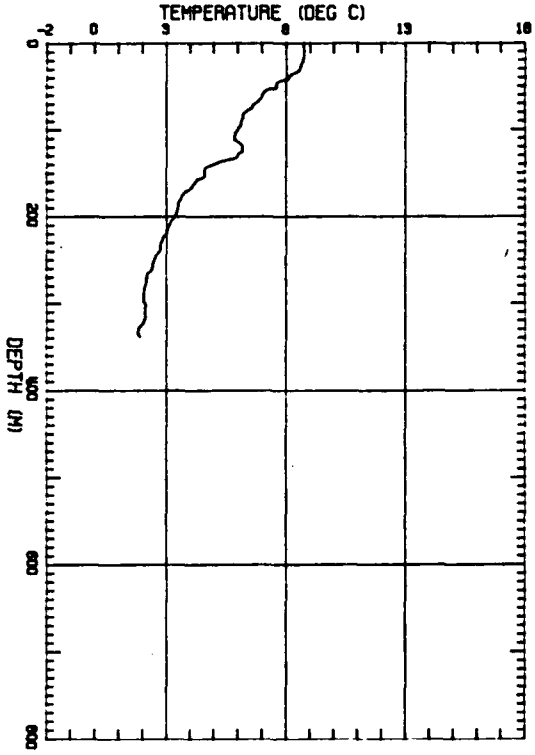
PROJECT: SACLANT
DROP NO: 215 CHANNEL: 16 LATITUDE: 63 25.7
DATE: 6/19/89 TIME: 17:54:39 LONGITUDE: 0 -41.7



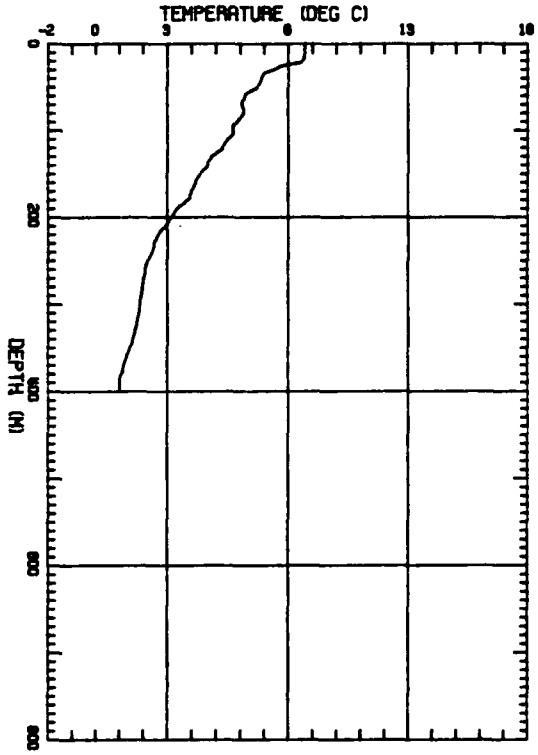
PROJECT: SACLANT
DROP NO: 216 CHANNEL: 12 LATITUDE: 63 19.2
DATE: 6/19/89 TIME: 17:58:08 LONGITUDE: 0 -.5



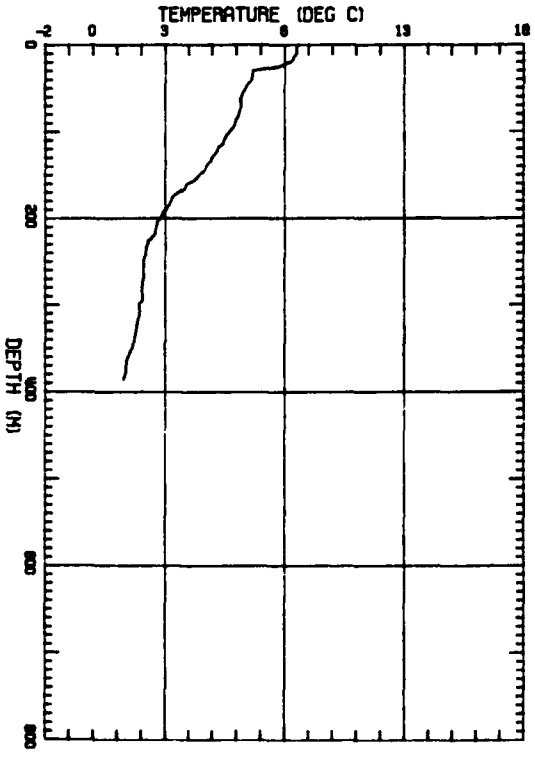
PROJECT: SACLANT
DROP NO: 217 CHANNEL: 14 LATITUDE: 63 36.7
DATE: 6/19/89 TIME: 18:02:27 LONGITUDE: 0 9.8



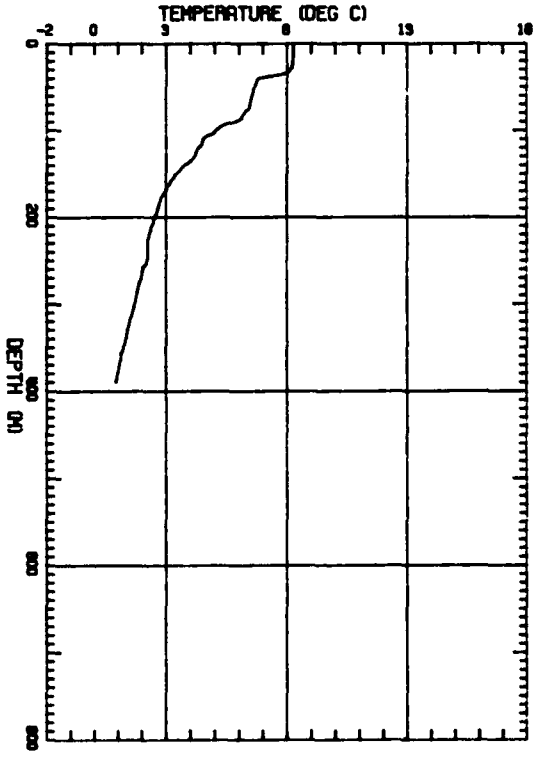
PROJECT: SACLANT
DROP NO: 218 CHANNEL: 16 LATITUDE: 64 9.6
DATE: 6/19/89 TIME: 18:08:42 LONGITUDE: 0 29.1



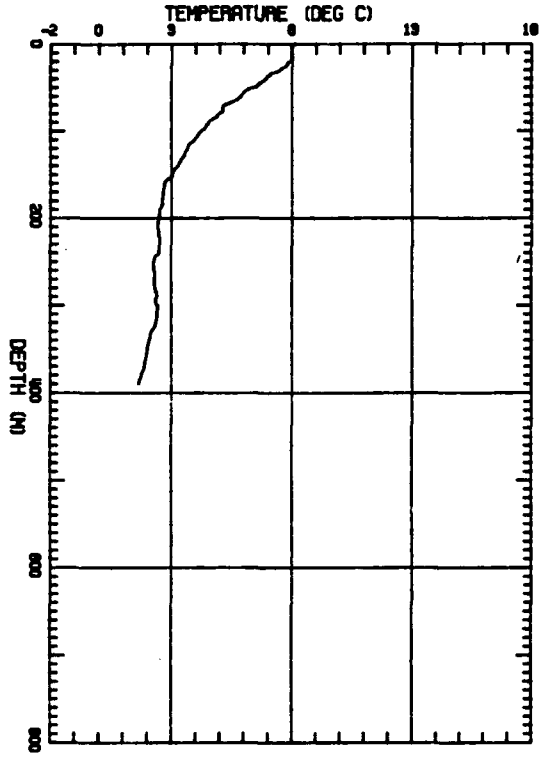
PROJECT: SACLANT
DROP NO: 219 CHANNEL: 16 LATITUDE: 64 21.0
DATE: 6/19/89 TIME: 18:16:50 LONGITUDE: 0 -29.6



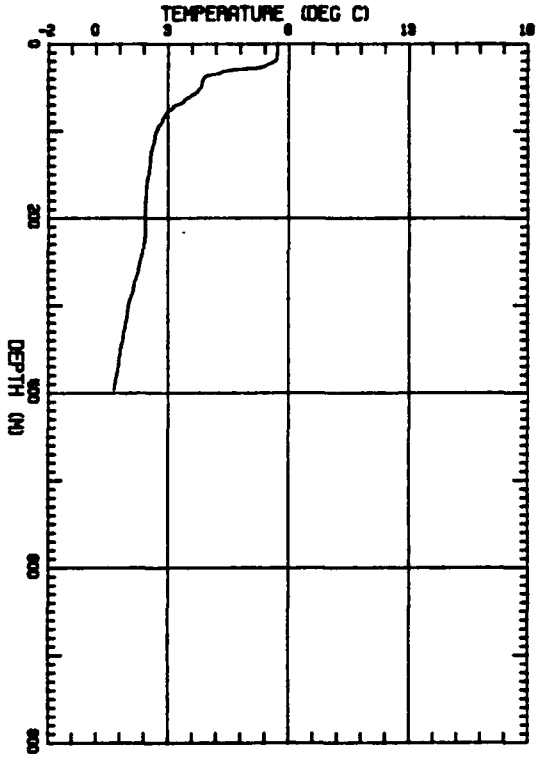
PROJECT: SACLANT
DROP NO: 220 CHANNEL: 16 LATITUDE: 64 31.5
DATE: 6/19/89 TIME: 18:23:00 LONGITUDE: -1 27.5



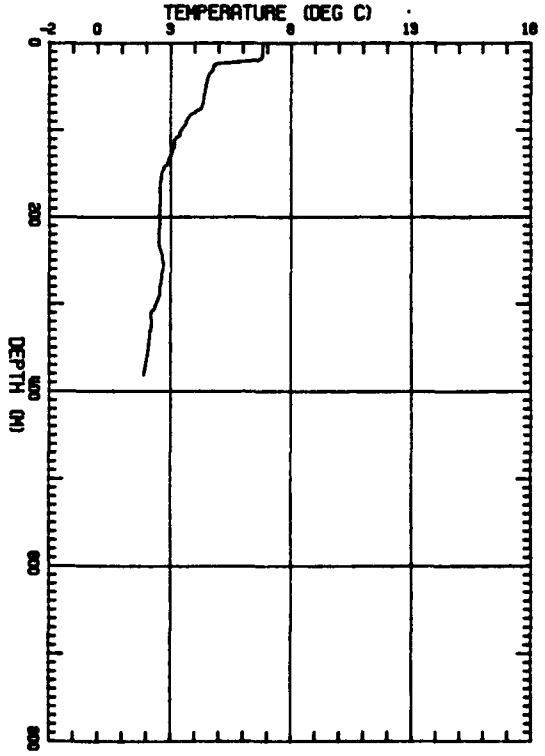
PROJECT: SACLANT
DROP NO: 221 CHANNEL: 16 LATITUDE: 64 40.6
DATE: 6/19/89 TIME: 18:30:33 LONGITUDE: -2 -27.1



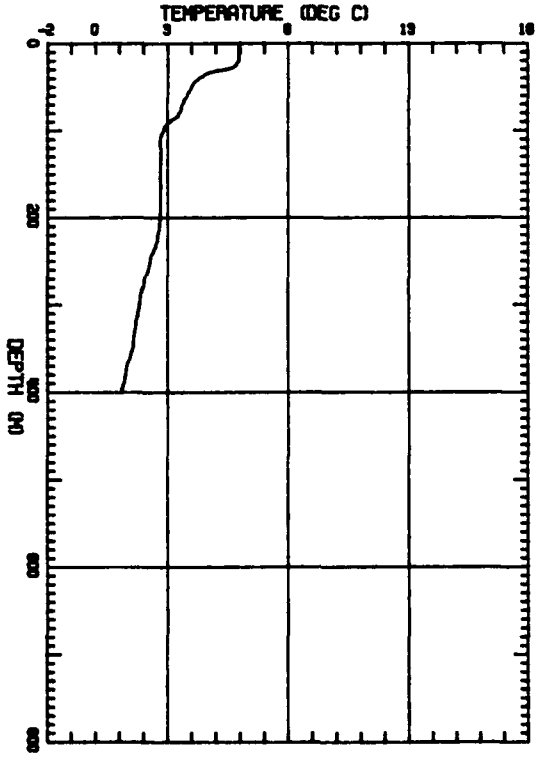
PROJECT: SACLANT
DROP NO: 222 CHANNEL: 16 LATITUDE: 64 49.3
DATE: 6/19/89 TIME: 18:37:15 LONGITUDE: -3 -28.8



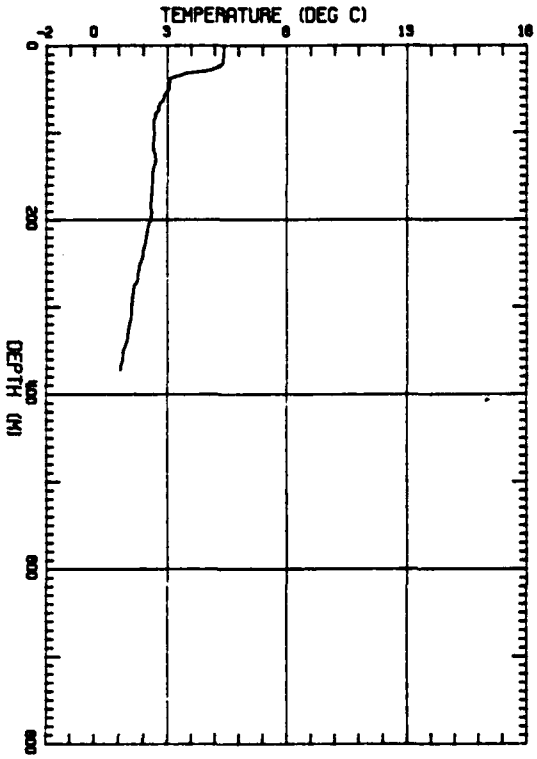
PROJECT: SACLANT
DROP NO: 223 CHANNEL: 16 LATITUDE: 64 57.8
DATE: 6/19/89 TIME: 18:43:53 LONGITUDE: -4 -27.0



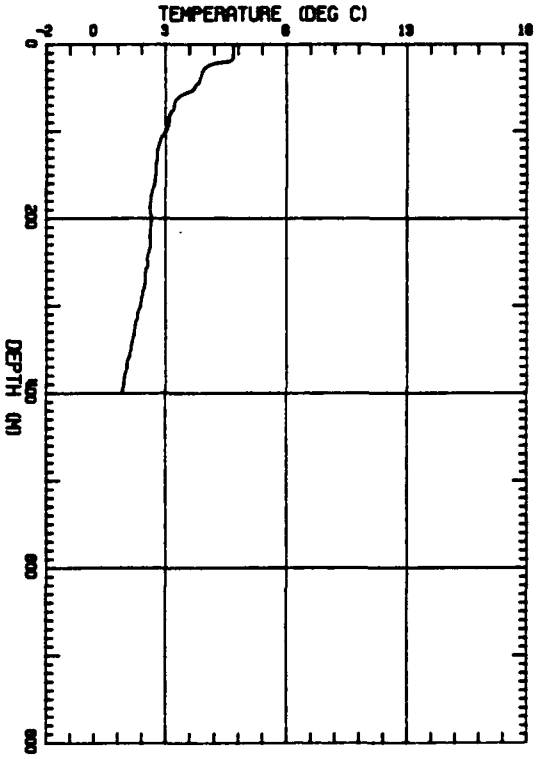
PROJECT: SACLANT
DROP NO: 224 CHANNEL: 16 LATITUDE: 65 6.6
DATE: 6/19/89 TIME: 18:50:29 LONGITUDE: -5 -27.5



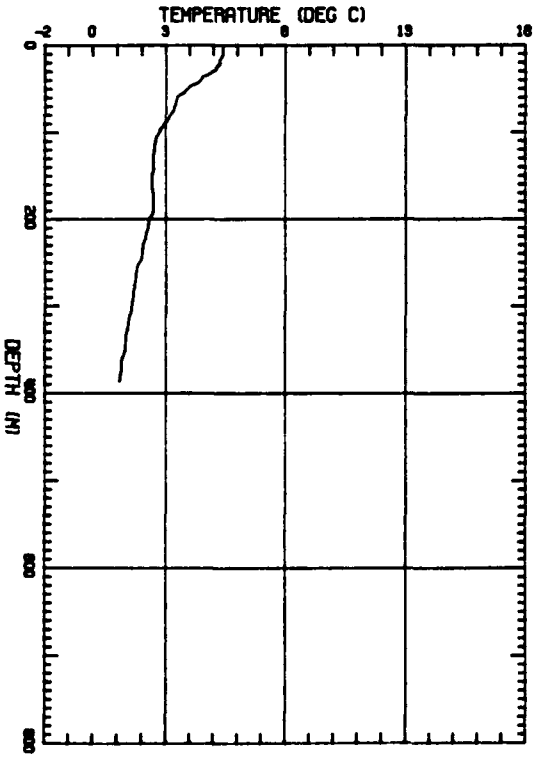
PROJECT: SACLANT
DROP NO: 225 CHANNEL: 12 LATITUDE: 65 14.7
DATE: 6/19/89 TIME: 18:58:58 LONGITUDE: -6 -28.7



PROJECT: SACLANT
DROP NO: 226 CHANNEL: 16 LATITUDE: 64 58.5
DATE: 6/19/89 TIME: 19:01:32 LONGITUDE: -6 -47.4



PROJECT: SACLANT
DROP NO: 227 CHANNEL: 14 LATITUDE: 64 44.2
DATE: 6/19/89 TIME: 19:05:08 LONGITUDE: -7 -2.5



PROJECT: SACLANT
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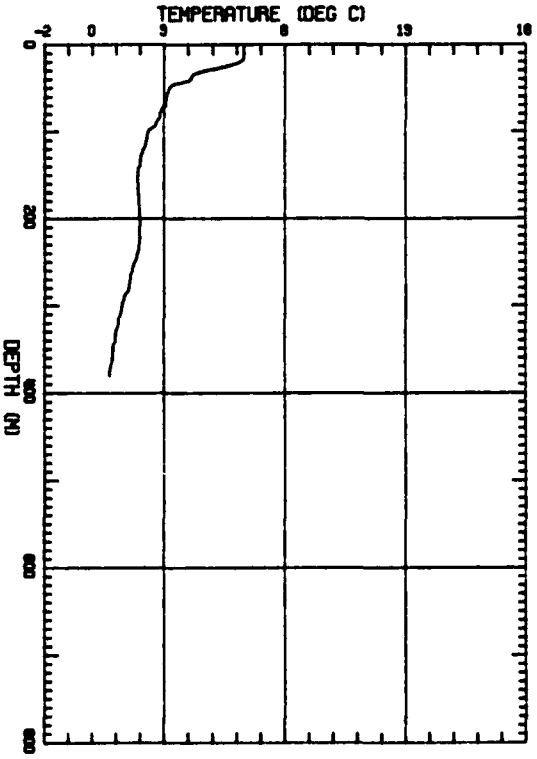

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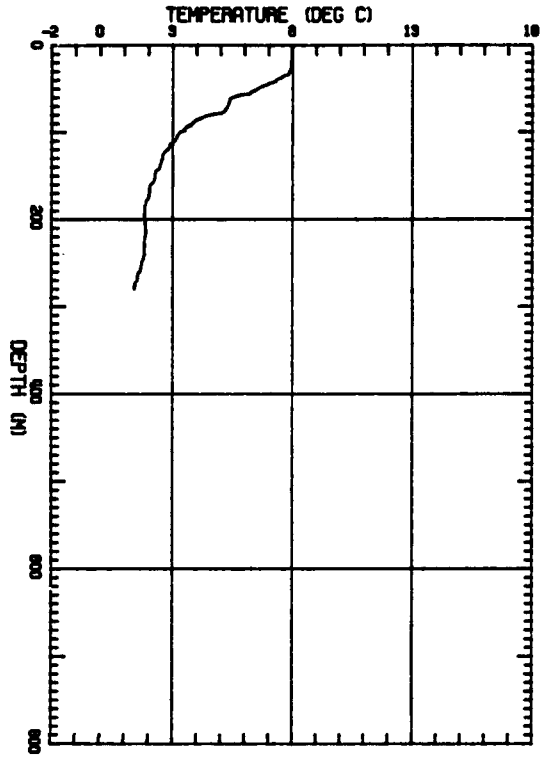

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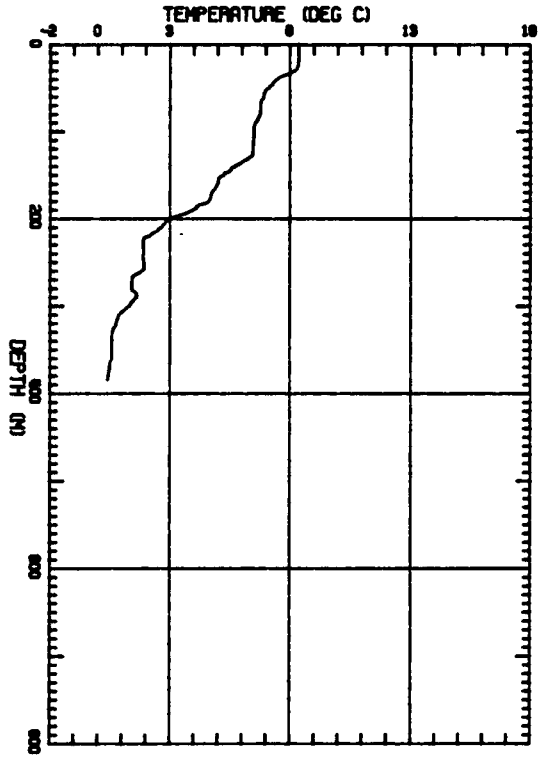

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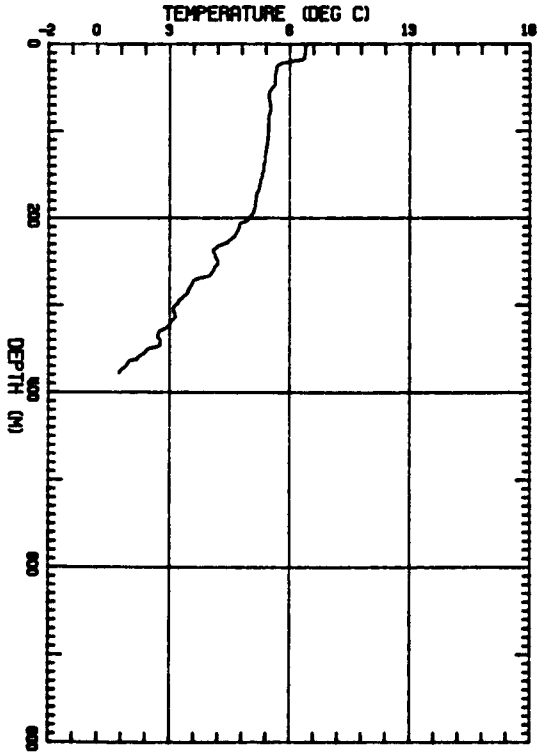

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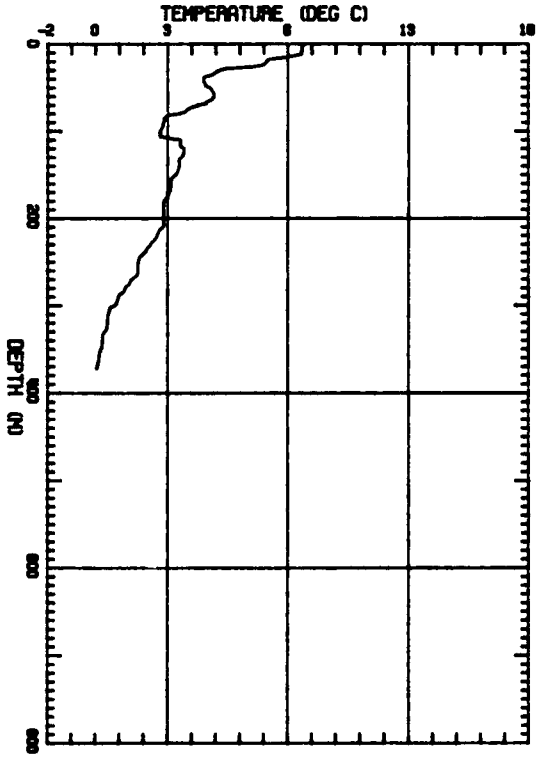

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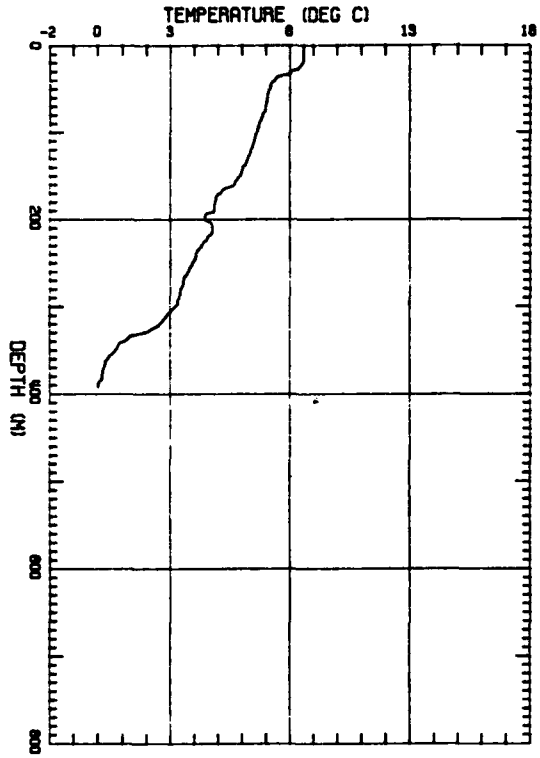
DATE: 6/19/89 TIME: 19:37:00 LONGITUDE: -9 55.1



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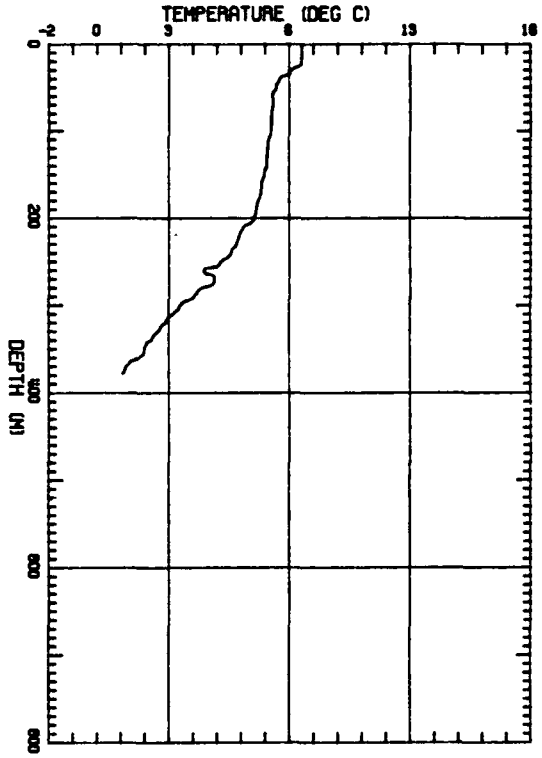
DATE: 6/19/89 TIME: 19:42:11 LONGITUDE: -9 -39.7



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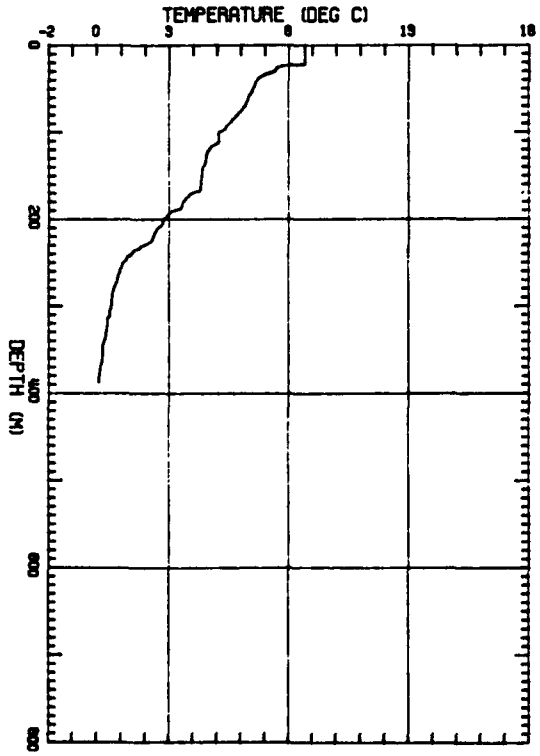

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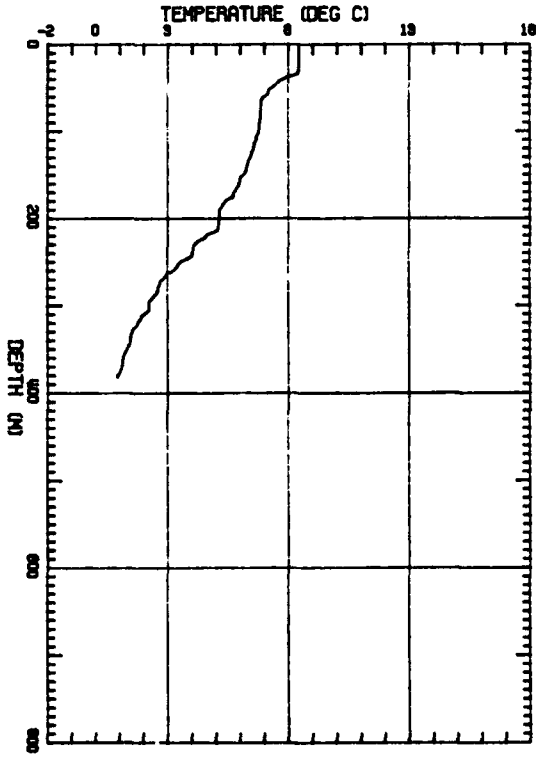

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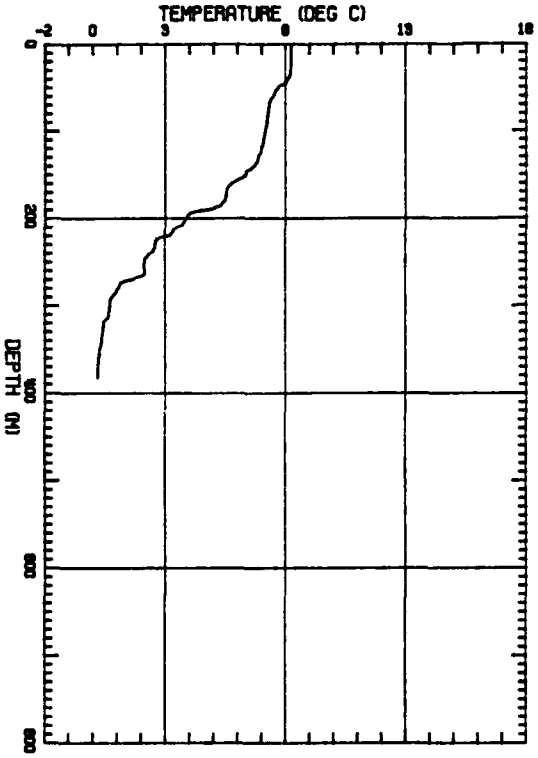

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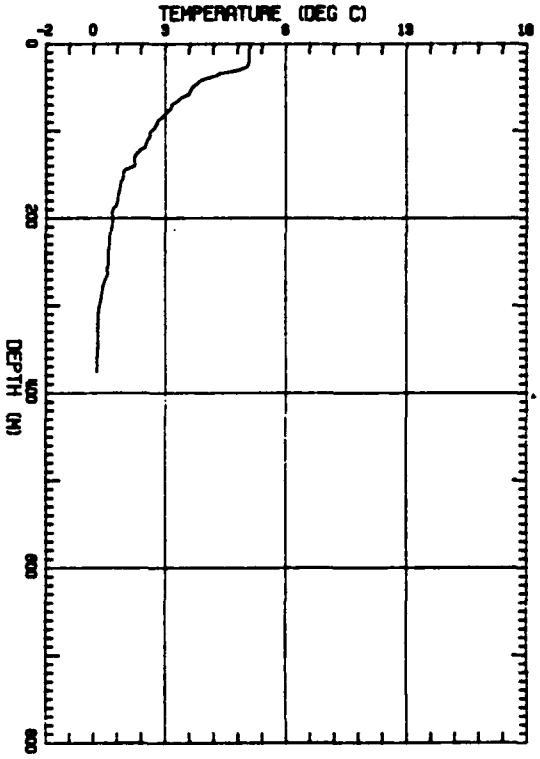

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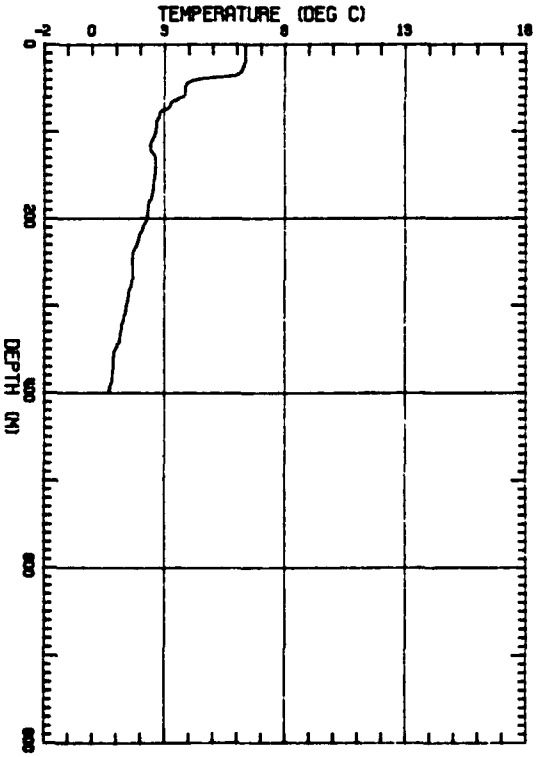

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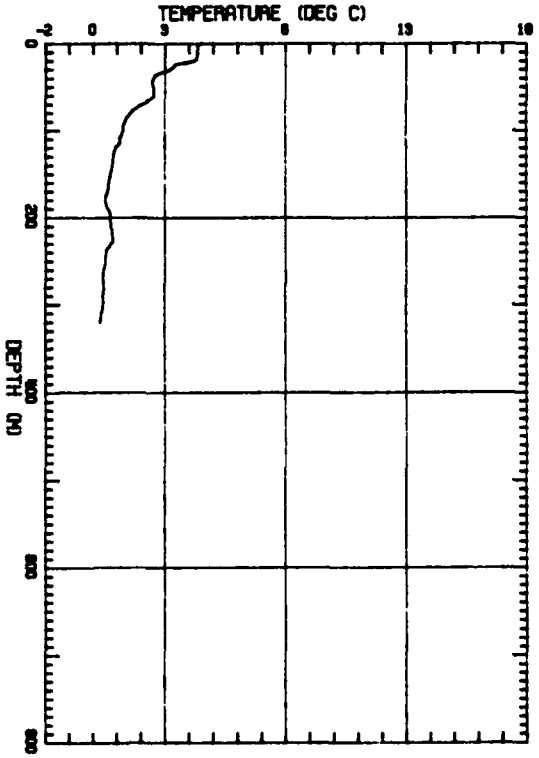

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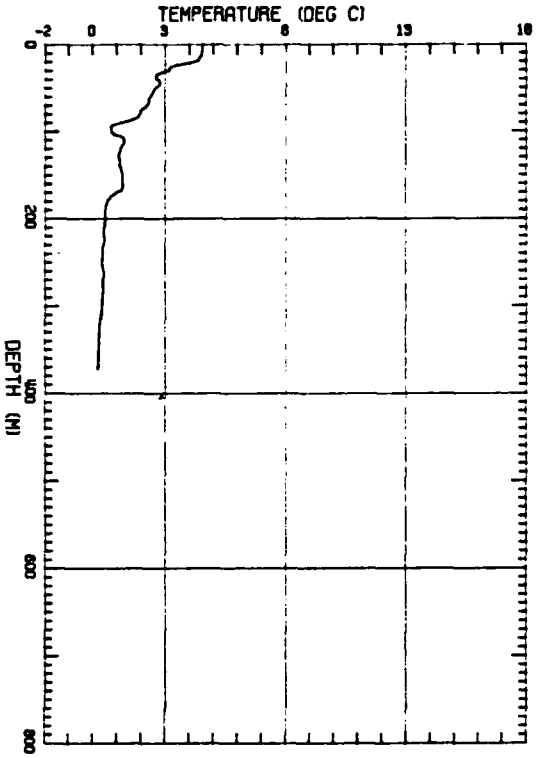

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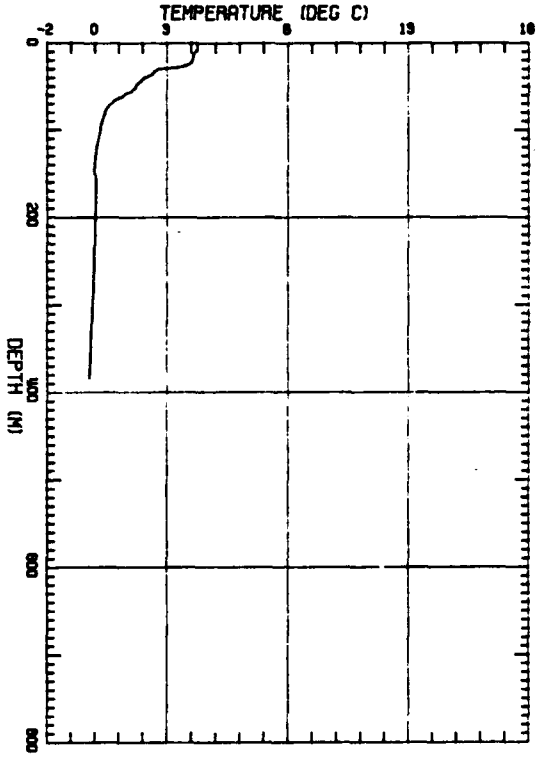

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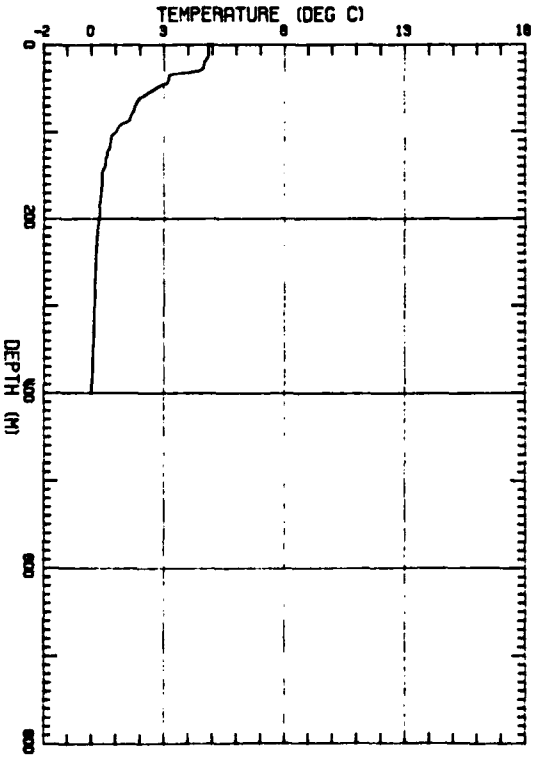

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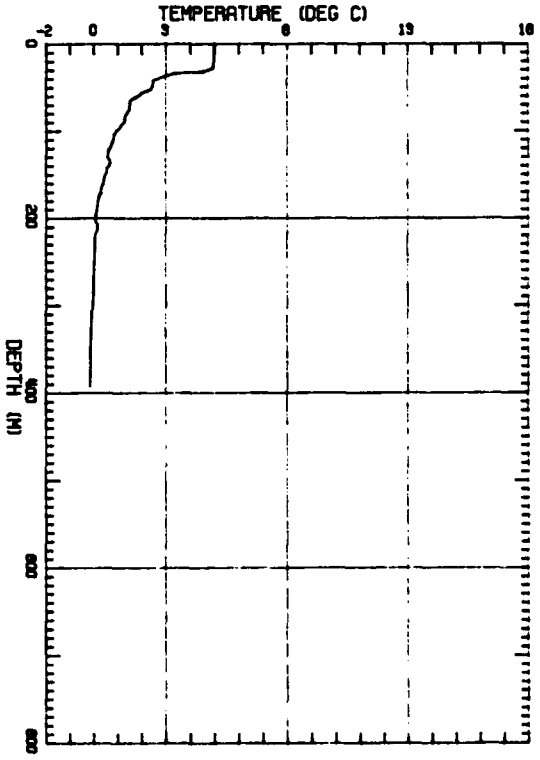

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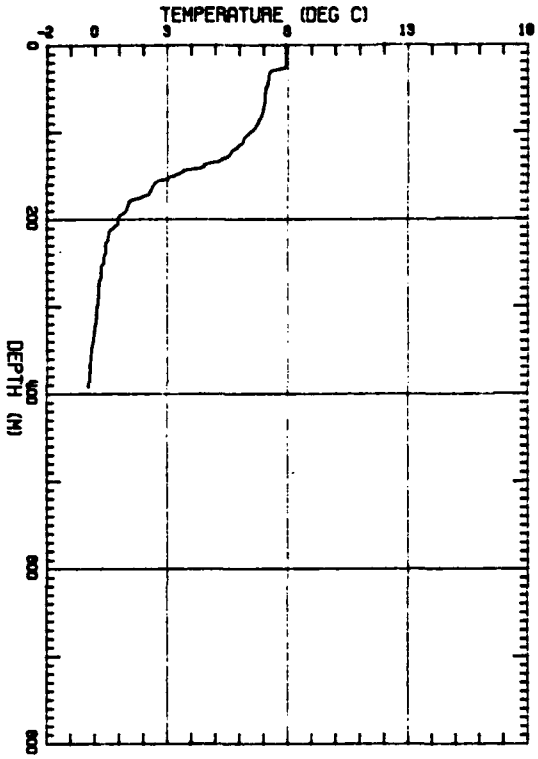

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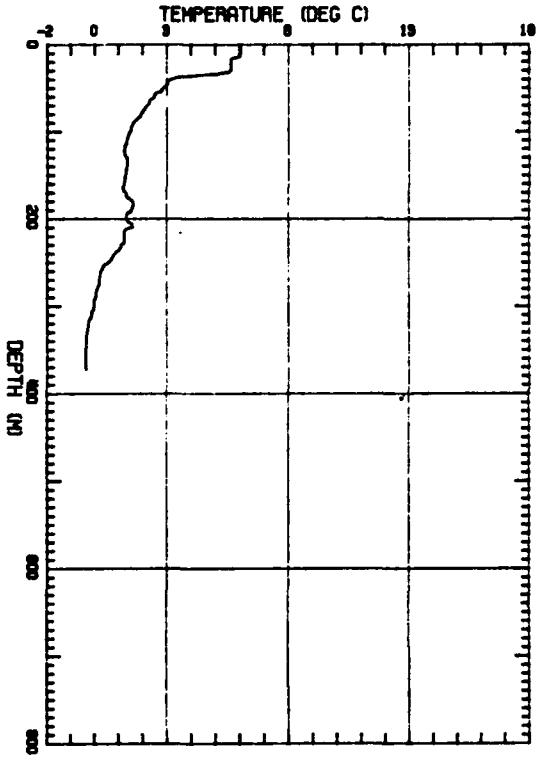
DATE: 6/19/89 TIME: 20:38:00 LONGITUDE: -10 34.9



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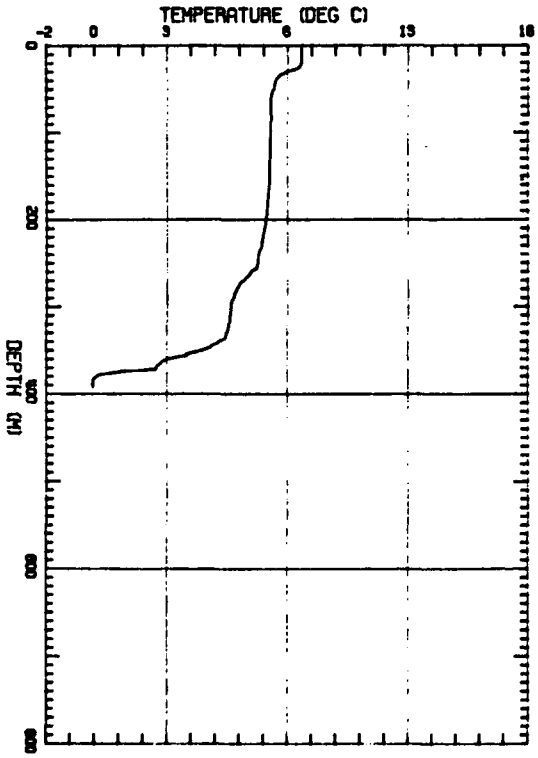

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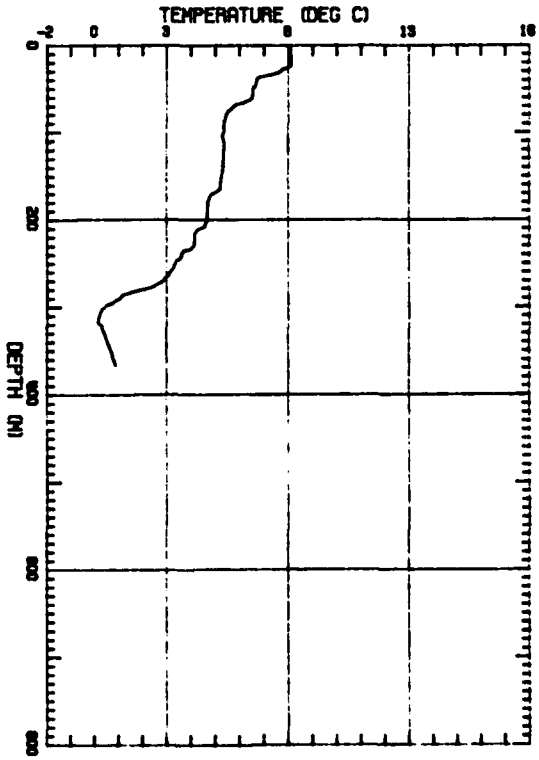

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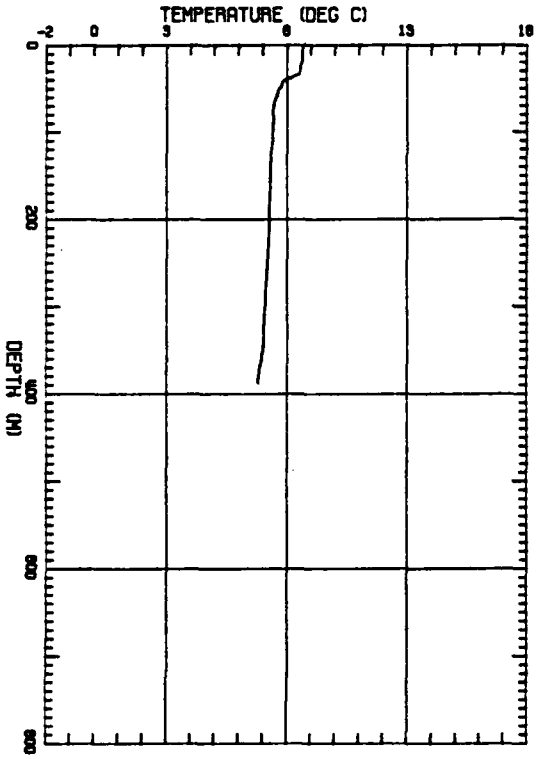

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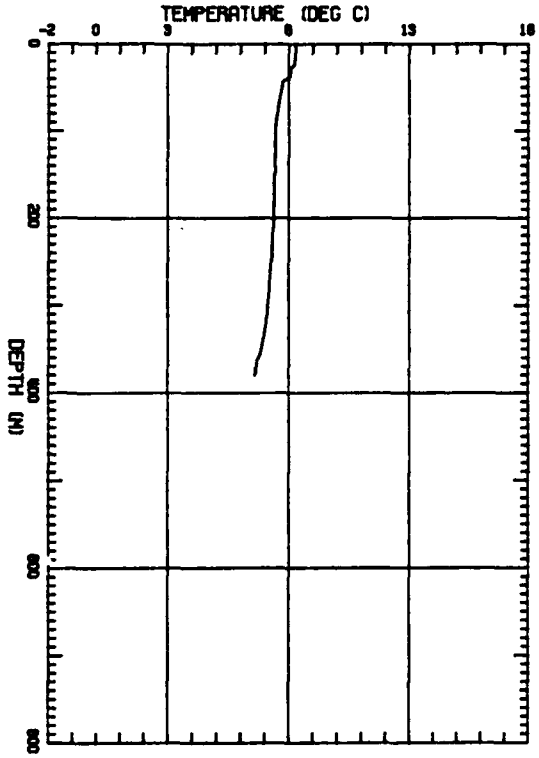

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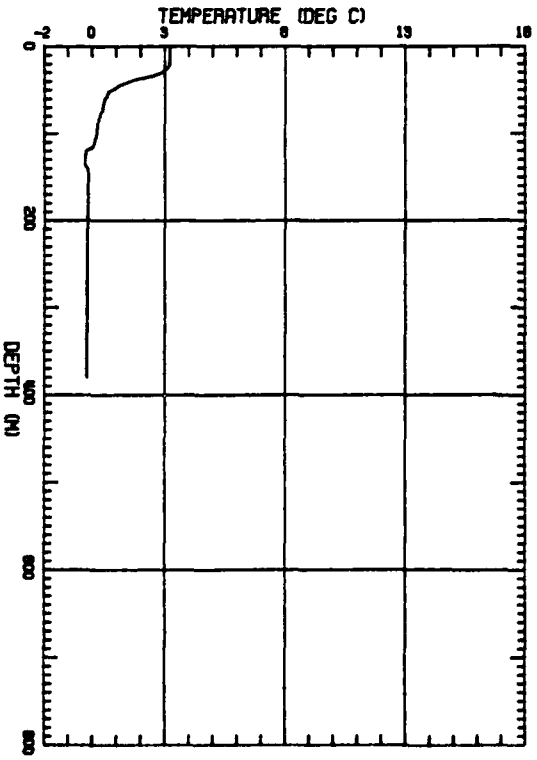

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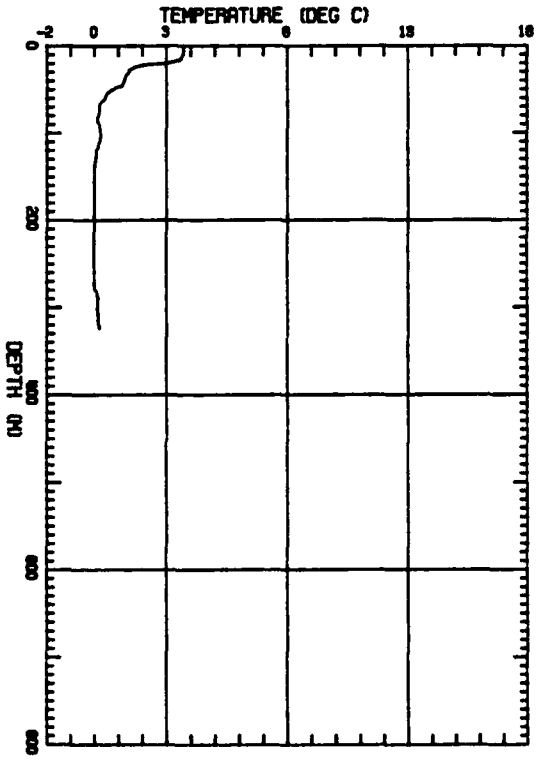

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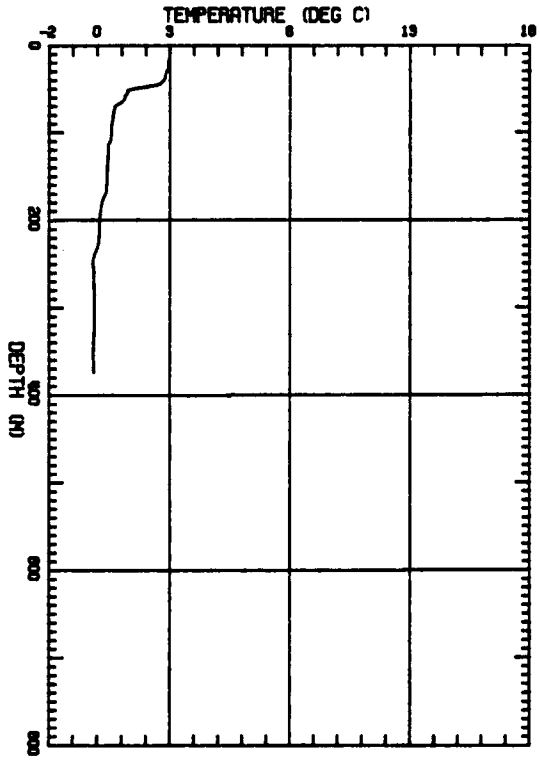

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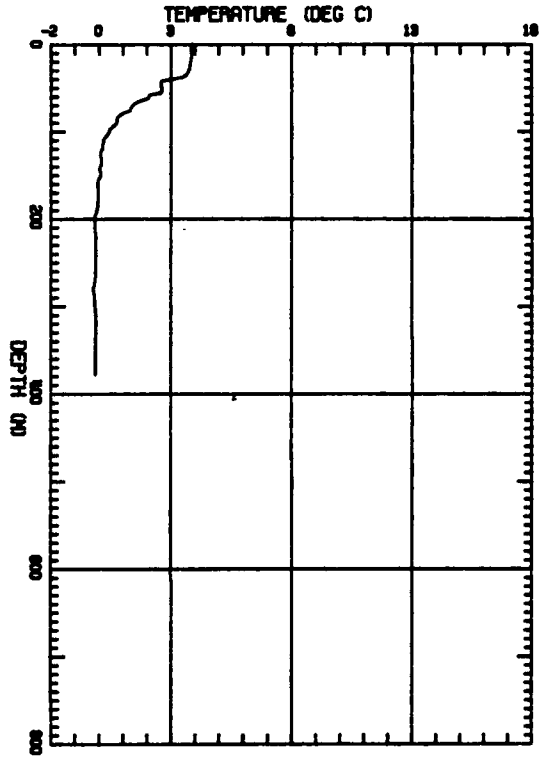

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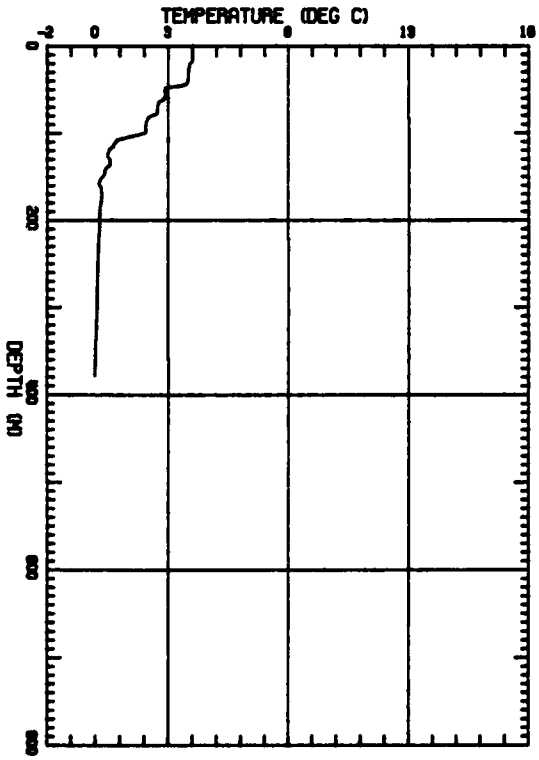

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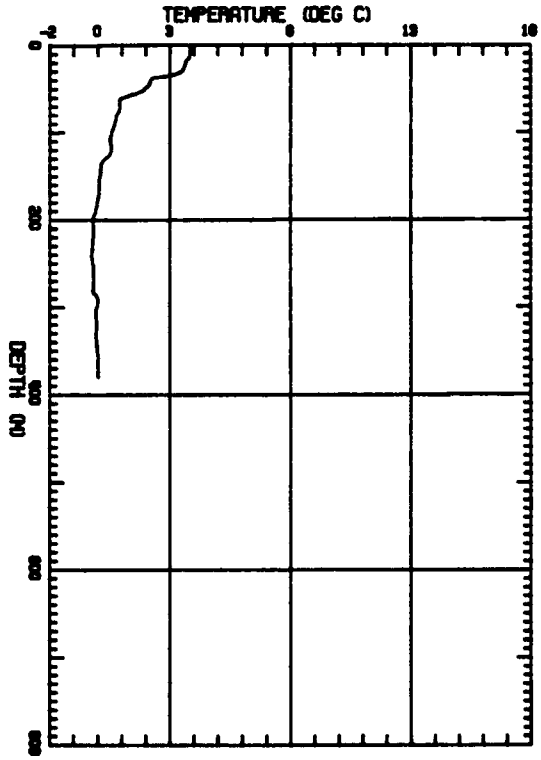

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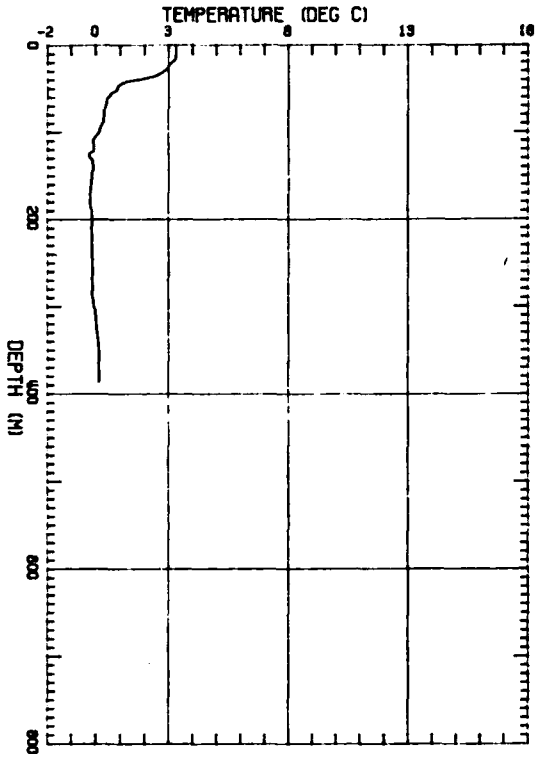

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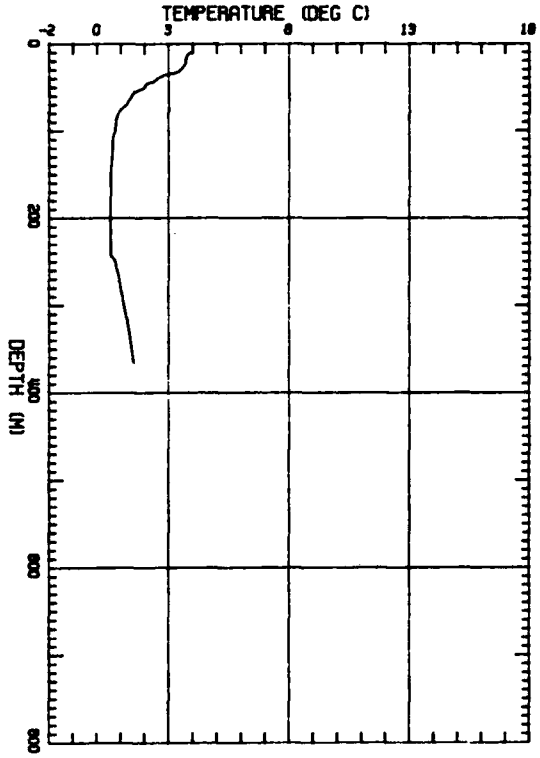

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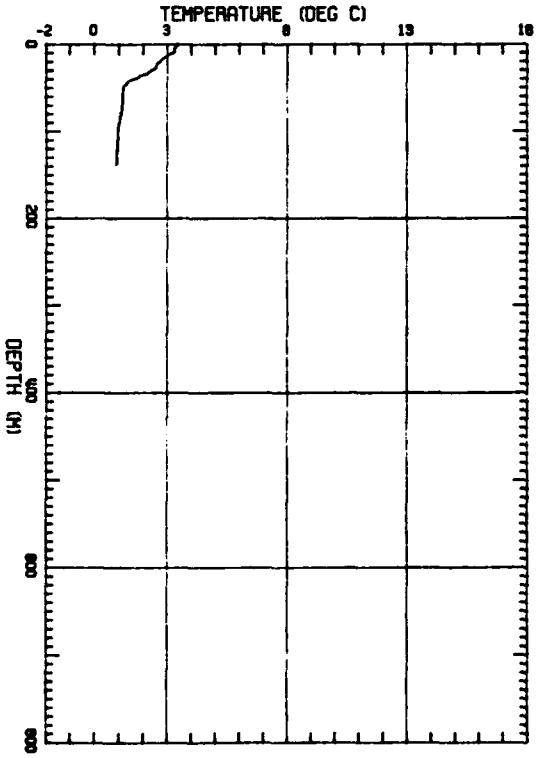

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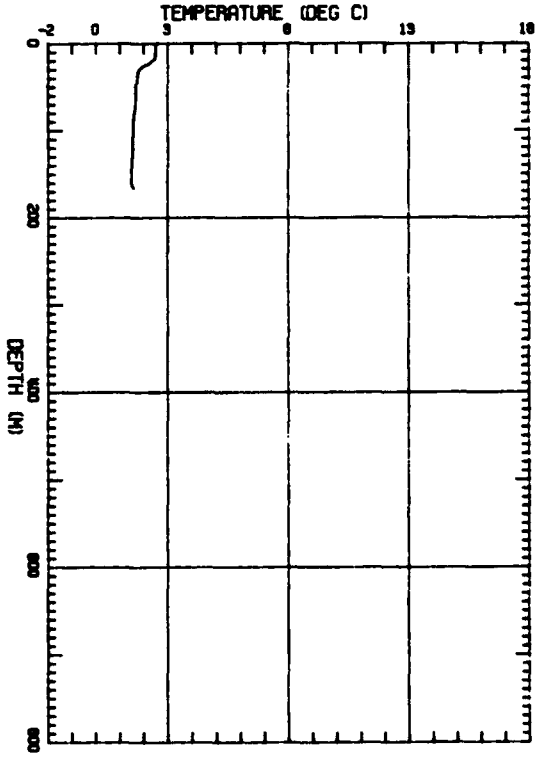

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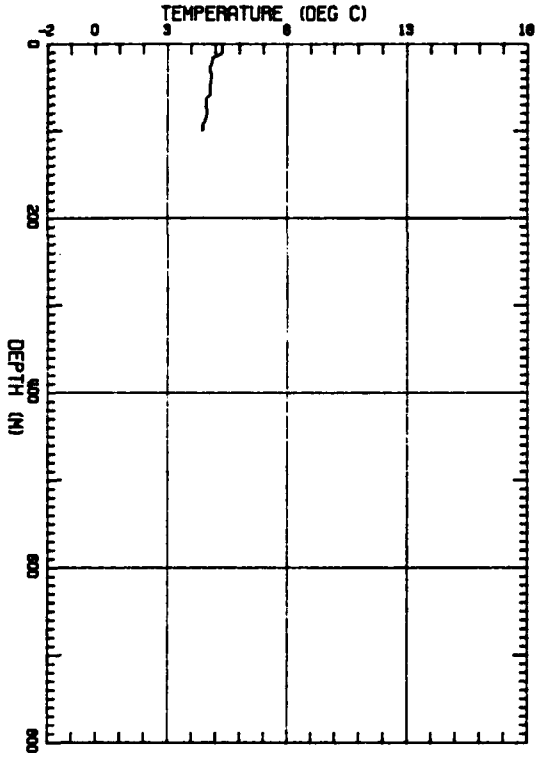

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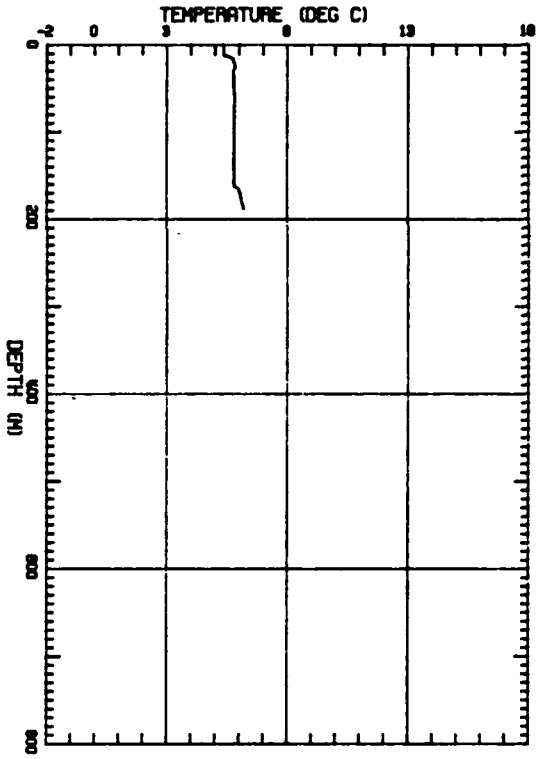

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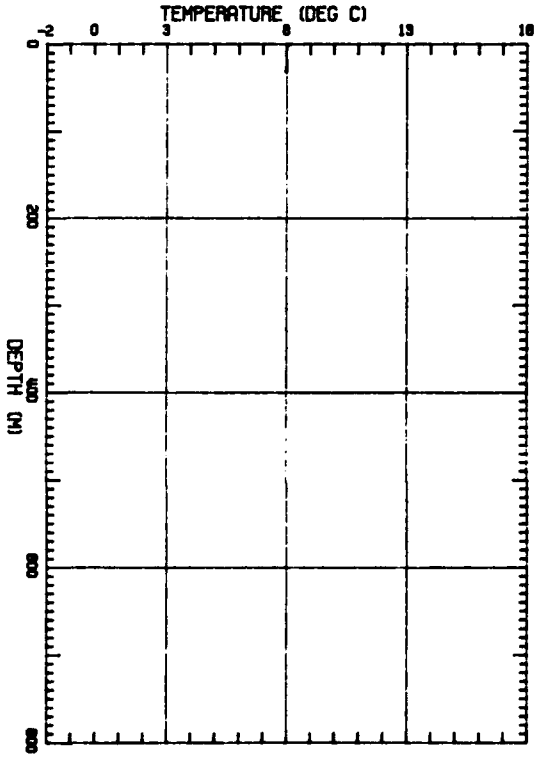

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13. Abstract (Maximum 200 words).

In summer 1989, extensive shipboard oceanographic measurements were made in the Norwegian and Iceland Seas by the SACLANT Undersea Research Centre. In support of this, two sets of RP-3A aircraft flights collected 180 AXBT (air deployed expendable bathythermograph) depth-temperature profiles in the Iceland-Faeroe Frontal Zone between Iceland and the Faeroe Islands. The first two flights took place on 7 and 8 June 1989, and the second flight on 19 June. This technical note describes the experimental plan and the data acquisition and processing techniques used and presents the resulting data in graphical and tabular form.

14. Subject Terms.
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15. Number of Pages.
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