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DATA REPORT
on
Currents, Winds and Stratification
in the NW African upwelling region
during early 1975

by

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Introduction

This data report contains, in a graphical form, the information on currents, winds and stratification gathered during the expedition "Auftrieb '75 - Upwelling '75", a joint expedition of the Institut für Meereskunde an der Universität Kiel and of the Department of Oceanography of the University of Liverpool. The research vessels FS "Meteor" and RRS "Discovery" participated in the programme which covered the NW African upwelling region off Rio de Oro from 21° to 26° N. Figure 1 gives the location of the nine current meter moorings and of the standard positions along the three hydrographic sections.

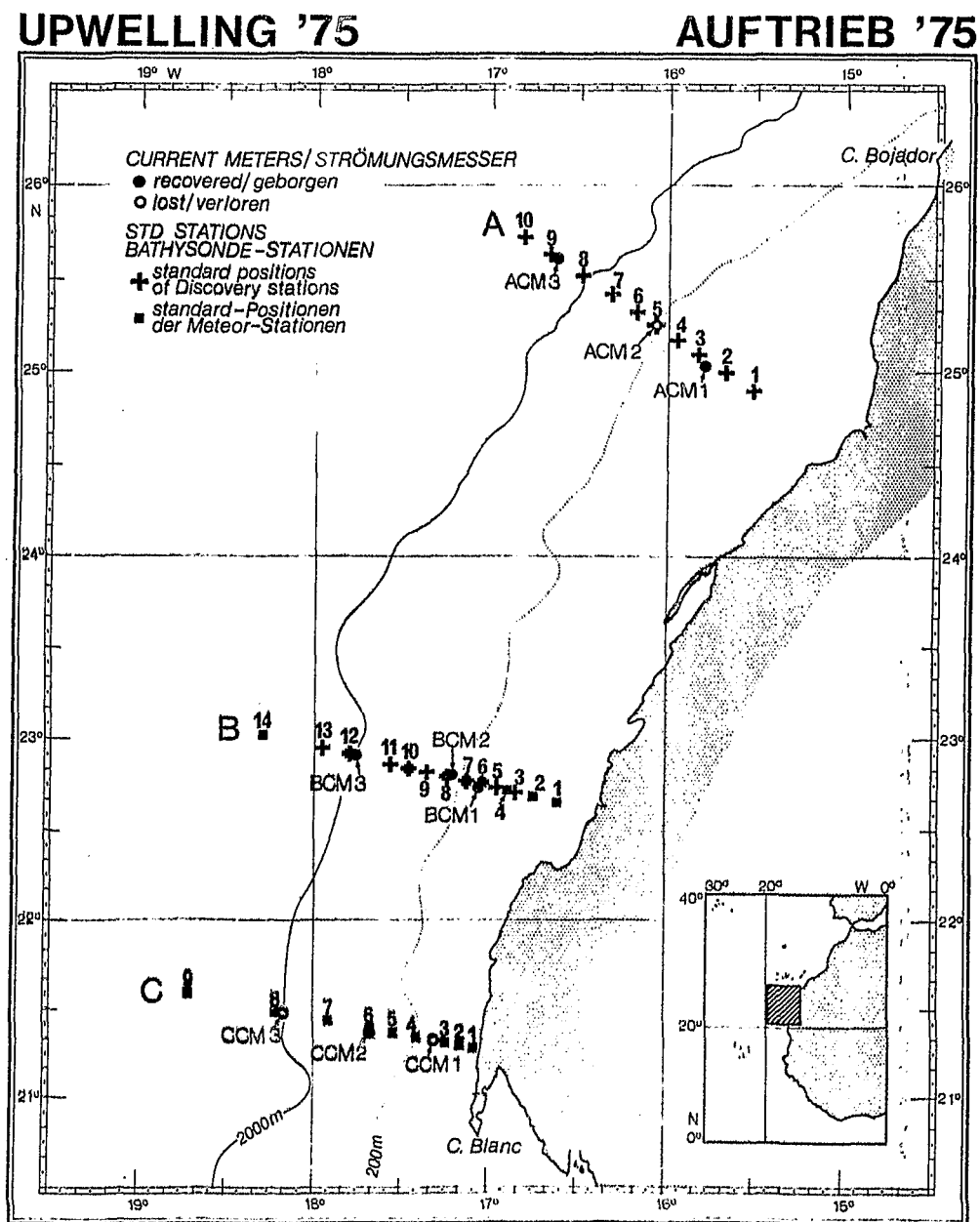


Figure 1: Current meter moorings and standard STD stations of the expedition

This data report summarizes the current measurements obtained from the moorings and some additional observations of a parachute drogue, the wind records obtained on two of the moorings and on both vessels, and the STD information obtained at the sections. Some more information does exist, for example some STD stations inbetween the sections, but is not included in this report. When necessary, this additional data will be published together with the scientific results of the expedition.

The following sets of data are available from the moorings and are included in this report:

ACM 1: Currents and temperature at 38, 48 and 58 m depth, for one week only. The mooring suffered severe damage by fishing activity, all current meters being clumped together at the sea floor at the time of recovery. The first six days give meaningful results.

ACM 2: No data, mooring lost.

ACM 3: Currents and temperature at 99, 228, 305, 437 and 750 m depth. Due to an error in depth setting, the subsurface float of the mooring was exposed to wave motion, which might be responsible for the high frequency motion in the records.

BCM 1: Currents and temperature at 30, 40, 50, 55, 60 and 63 m depth.

BCM 2: Currents and temperature at 60, 150, 275, 350 and 490 m depth.

BCM 3: Currents and temperature at 60, 150, 275, 350, 490 and 800 m depth. Winds (labelled BWM 3) for only five days, with intermittent record for another twelve days.

CCM 1: No currents and temperature due to damage from fishing vessels. Winds (labelled CWM 1) for nearly three weeks.

CCM 2: Currents and temperature at 60, 150, 275, 350 and 490 m depth.

CCM 3: No data, mooring lost.

Conductivity, although recorded at some of the moorings at selected depths, is not included in this report.

Remarks on the presentation

Figure 2: The graphs of the winds at BMW 3 and CWM 1 show hourly means computed from the original records obtained at 10 min. sampling interval. CWM 1 failed during 18 February. The speed sensor of BWM 3 failed during 2 February but gave intermittent records until 13 February. Since computation of hourly means is based on components, the recalculated direction shows the same intermittent behaviour. The envelope of both curves still gives a rough idea of the variation of the wind.

The graphs of the winds from the research vessels are direct plots of the hourly vector means of the ships' acquisition system. The system of FS "Meteor" takes readings at 10 s intervals, the system of RRS "Discovery" at 1 s intervals. The bars labelled A,B,C indicate the hydrographic section on which the ship was working at the respective times. During 18 - 20 February, both ships, called into Santa Cruz de Tenerife.

Figures 4-9: Shown in these figures are the components of the current relative to regional topography. u' is onshore/offshore flow (positive is onshore), v' is longshore flow (positive is poleward).

The rotation relative to EW- and NW- coordinates is only slight and is given by the orientation of the A, B and C line, respectively: It is 37° for all A moorings, 13° for all B moorings and 10° for all C moorings. The components shown have been computed from the original records after only some minor editing.

The instruments used were Aanderaa current meters on lines B and C, and Plessey current meters on line A.

Figures 10-15: The progressive vector diagrams serve to demonstrate the variability of the currents on the "event" scale. For this purpose, hourly means have been computed from the original 10 min. interval records and smoothed over 24 hours (running mean). The tick marks indicate 00 h of every day. Note that the scales for different diagrams might be different. In order to facilitate comparison of absolute speeds between different depths or different moorings, the residual current over the total observation period is given at the same scale for all depths. It is obvious that this figure can only serve for comparison of the scales but does not imply any stationary state of the upwelling system. In some cases, a reduction of the observation period of a few days will drastically change the direction of the residual current.

Figure 16: Pressure sensors were installed in some of the current meters. The pressure records are shown here for the purpose of estimating the effect of the moorings' motions on the temperature records shown in the following figures.

Figures 22-37: All graphs of hydrographic parameters are based on STD data which have been calibrated against observations from water bottle casts, despiked, smoothed and interpolated to 2 m depth increments. The instruments used were a Plessey 9006 STD on board RRS "Discovery" and a Bathysonde on board FS "Meteor". The procedure of STD data treatment is quite standard today and will not be described in detail here.

The calibration curves for the Bathysonde have been determined as

$$T_{\text{true}} = 1.00875 * T_{\text{obs}} - 0.0534 \text{ } ^\circ\text{C}$$
$$C_{\text{true}} = 1.00514 * C_{\text{obs}} - 0.2185 \text{ mmho/cm}$$

and are based on a few water bottle casts only performed for the purpose of calibration.

The Plessey instrument was also calibrated by means of water bottle samples. The comparisons using reversing thermometers showed that the temperature sensor was operating within the manufacturer's specified tolerances and no corrections were necessary. In the case of salinity $0.03^{\circ}/\text{oo}$ was added to all observations during the first leg of the cruise and $0.016^{\circ}/\text{oo}$ on the second leg.

Tables: 1: STD-Stationlist "RRS. Discovery"
 2: STD-Stationlist "FS. Meteor"
 3: Position of Moorings

Acknowledgments

The Deutsches Hydrographisches Institut (DHI) Hamburg provided current meters for two of the moorings, and we thank K.-P. Koltermann from that institution for preparing the two moorings for us. Current meters and the hardware for three moorings were provided by the Institute of Oceanographic Sciences Barry, whose personnel supervised their deployment at sea. The captains, the officers and the crew of both RRS "Discovery" and FS "Meteor" actively helped to make "Auftrieb '75" - Upwelling '75" a success and their interest and support in making it a cooperative effort and a truly joint expedition is especially acknowledged. These thanks have to be expanded to the scientific cruise leaders of FS "Meteor", G. Hempel and H. Thiel, who, for the sake of physical oceanographers, sometimes rearranged their plans of marine biology and geology. Similarly on RRS "Discovery" the Principal Scientist, Mr. A de Baker managed the complicated programme with admirable tact and patience. Thanks are also due to our many colleagues who assisted with the shipboard observations and to Miss Joan Wolfe who was responsible for the development of the STD graphics at Liverpool. The expedition "Auftrieb '75" was supported by the Deutsche Forschungsgemeinschaft, the British Natural Environment Research Council (particularly grant GR 3/1818) and the Universities of Kiel and Liverpool.

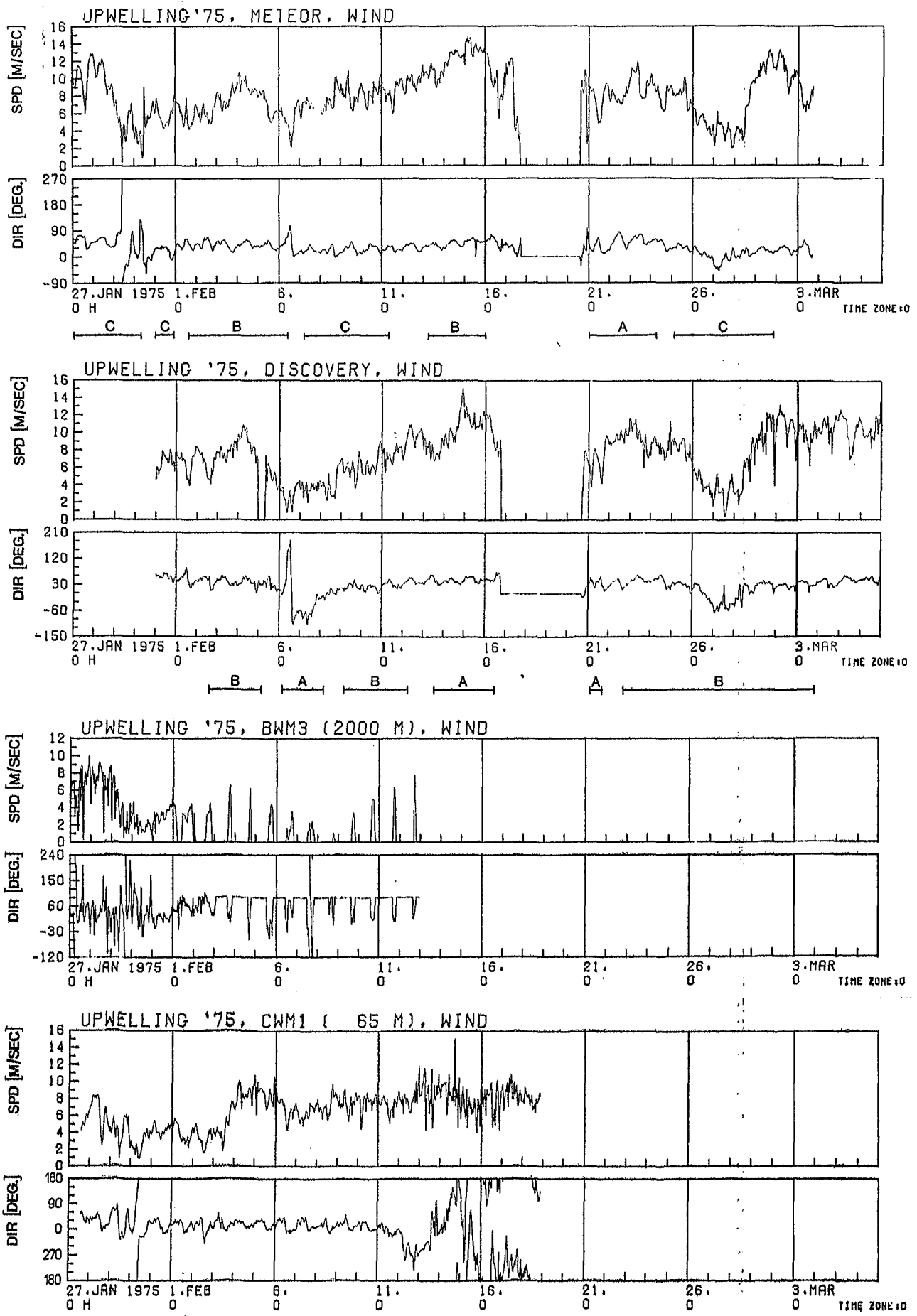


Figure 2: Wind speed and direction as measured on board of FS "Meteor" and RRS "Discovery" and at two moorings CWM 1 (CCM ; in fig. 1) and BWM 3 (BCM 3 in fig. 1). See remarks on page 3.

Figure 3: Text overlaid

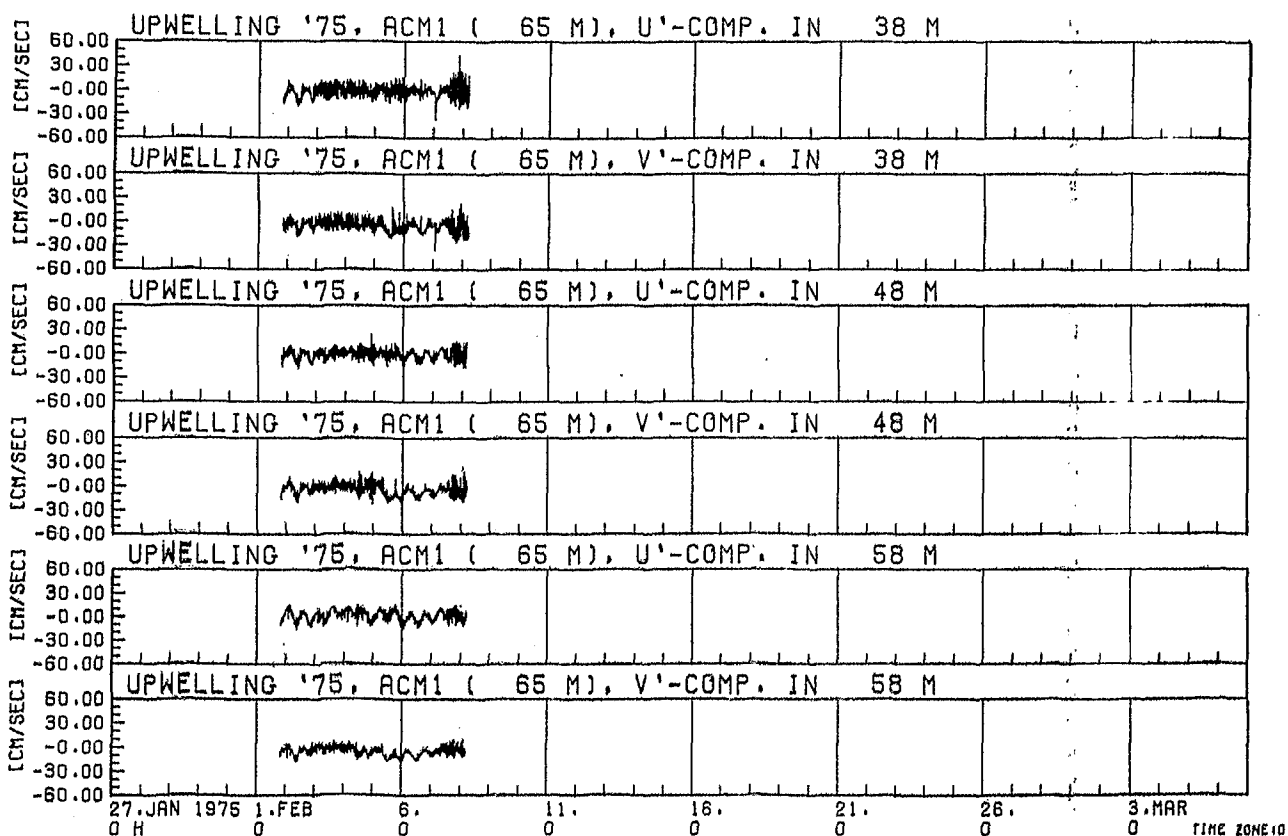
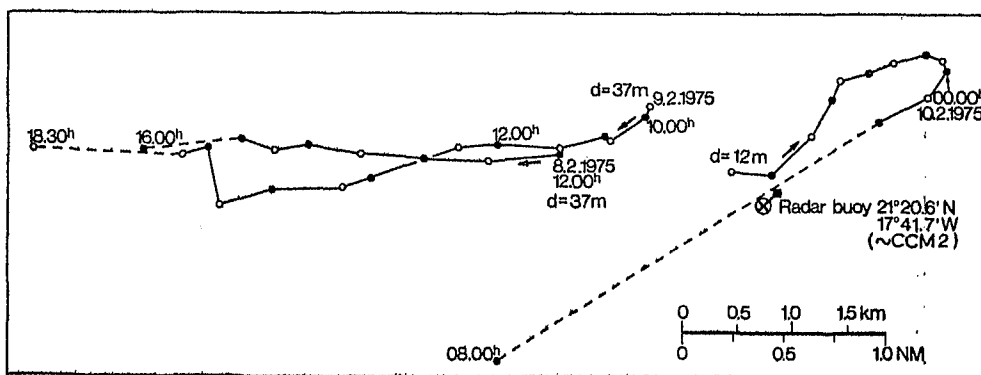
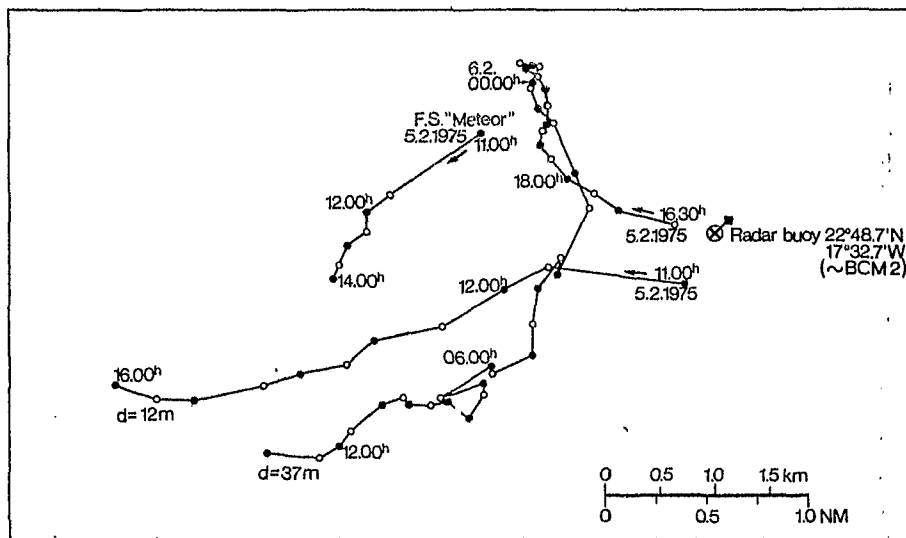


Figure 4: Currents at mooring ACM 1. See remarks on page 3.

Figure 3: Trajectories of a parachute drogue. The drogue consisted of a parachute installed in a metal ring of about 2 m in diameter and attached to a surface float. The depth of the parachute was 12 and 37 m, respectively. The drogue was tracked by radar relative to a fixed radar buoy especially installed for the duration of the experiment near a current meter mooring. All tracks are uncorrected for drag and wind effects on the surface float and wire.

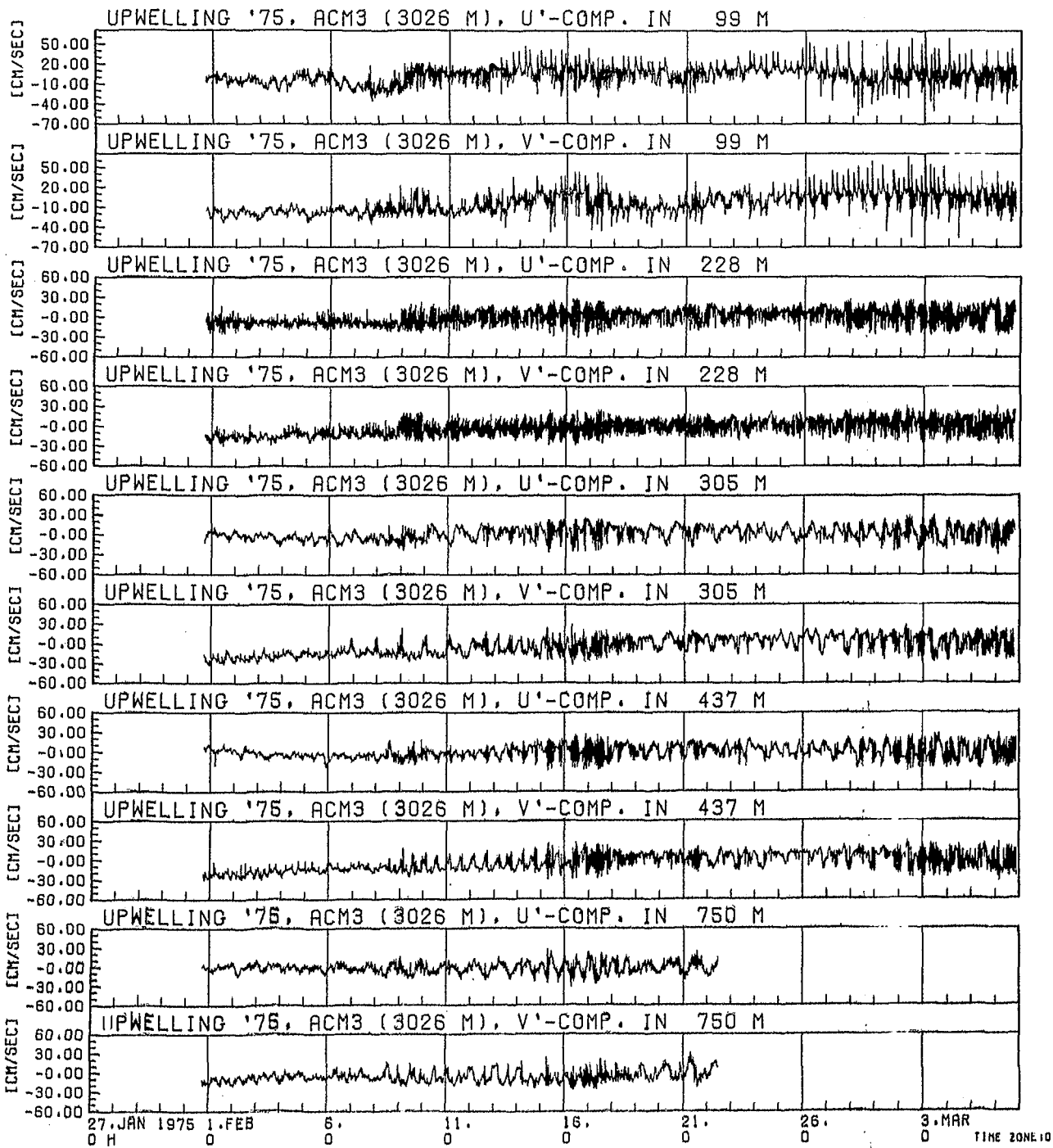


Figure 5: Currents at mooring ACM 3. See remarks on page 3.

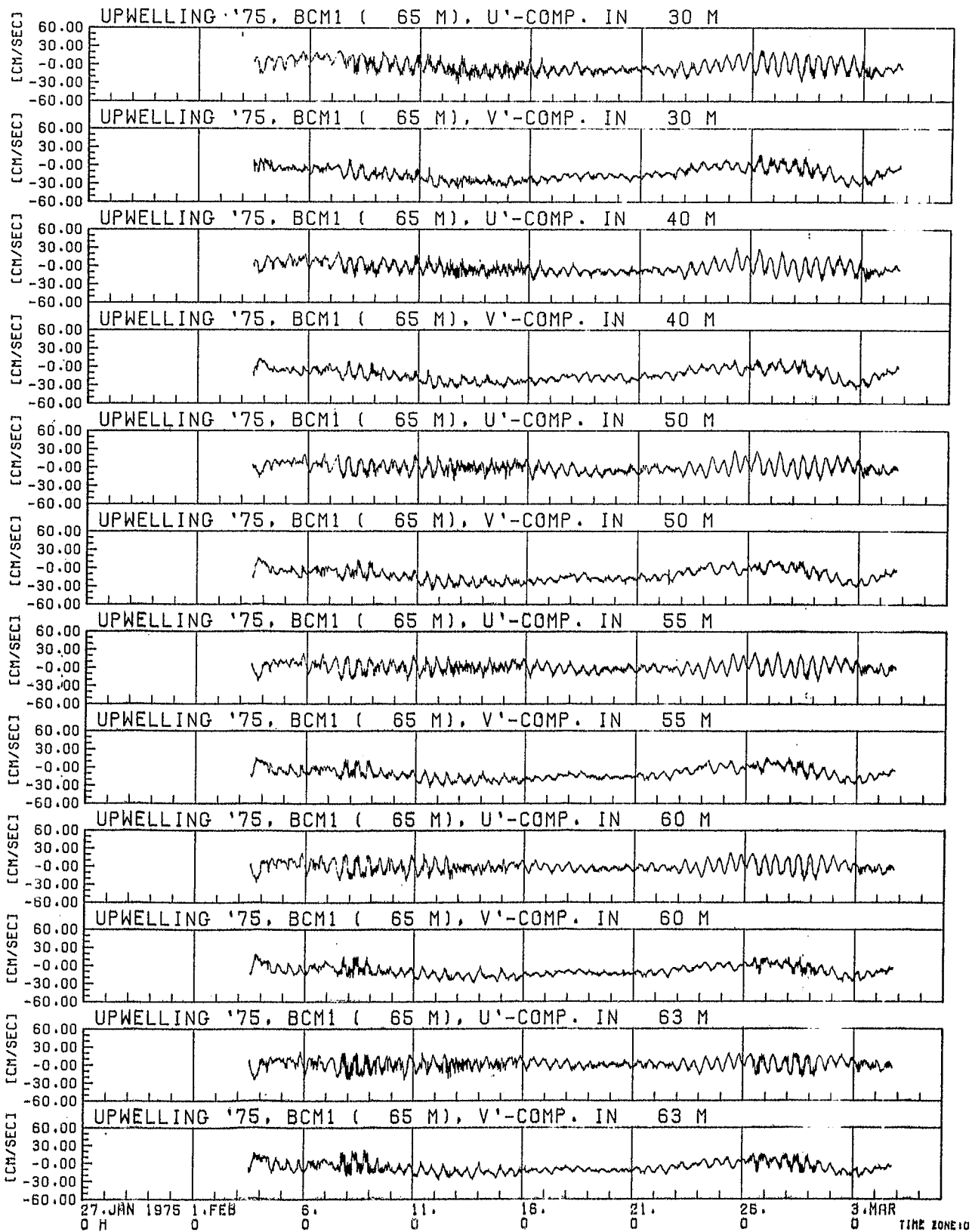


Figure 6: Currents at mooring BCM 1. See remarks on page 3.

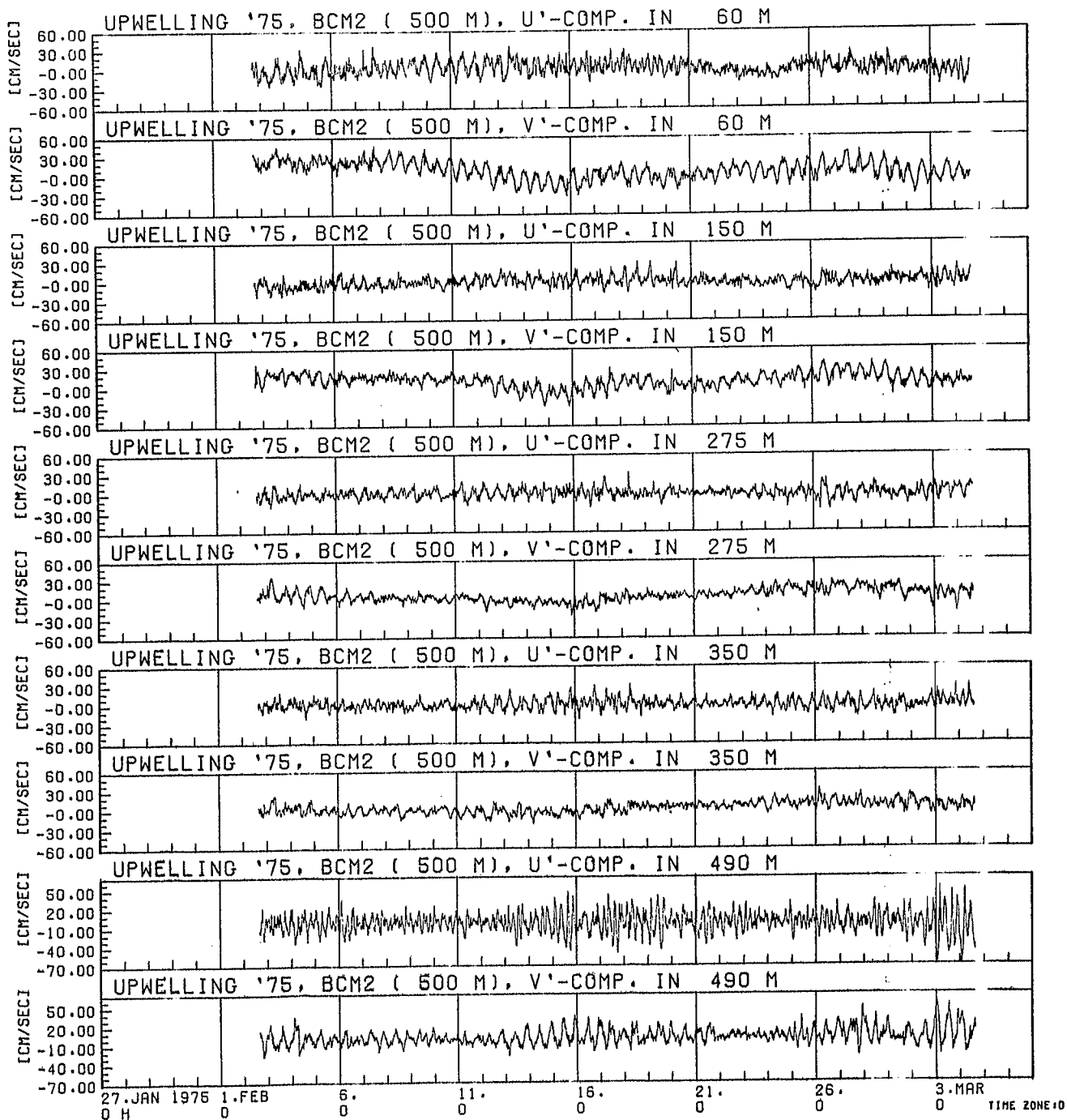


Figure 7: Currents at mooring BCM 2. See remarks on page 3.

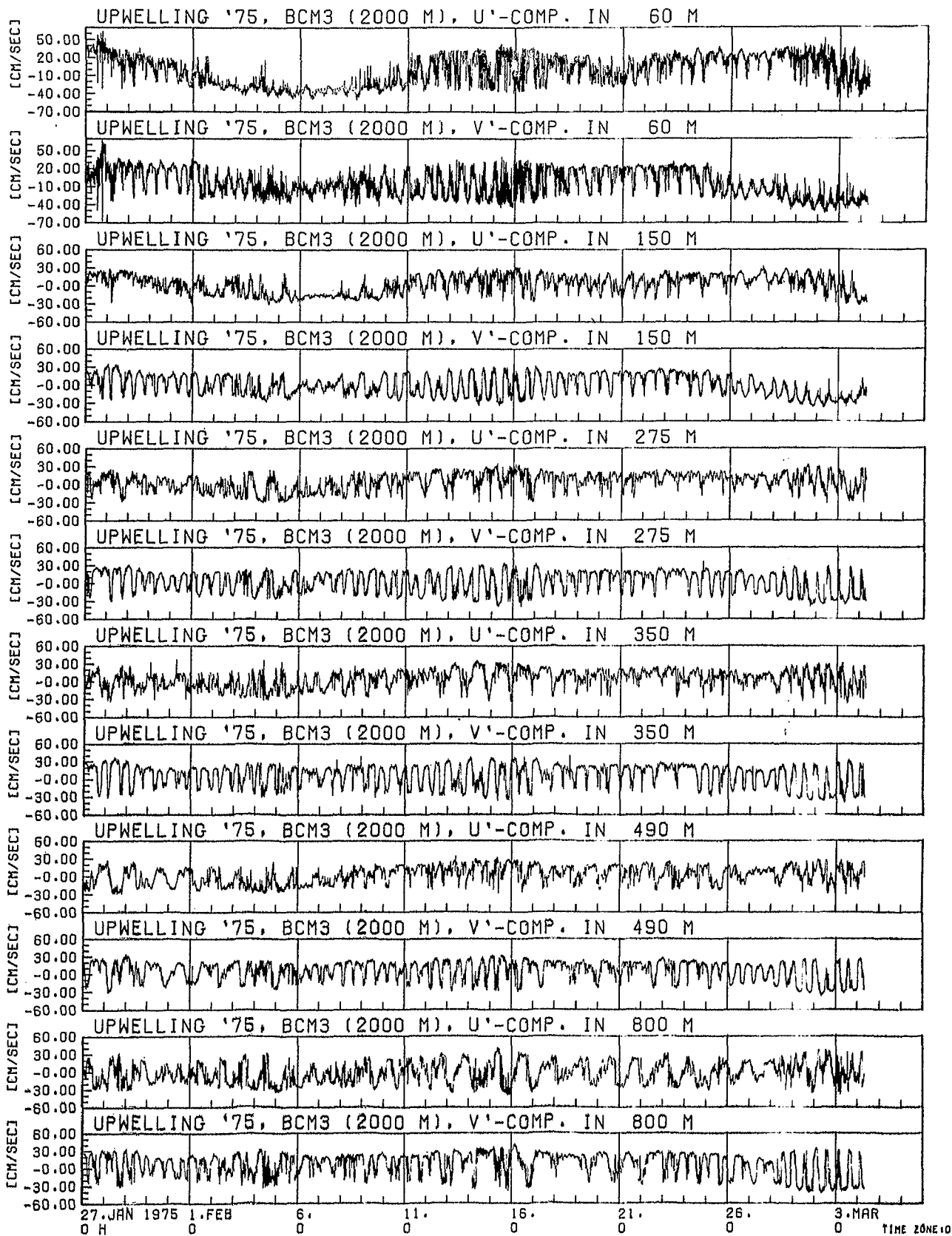


Figure 8: Currents at mooring BCM 3. See remarks on page 3.

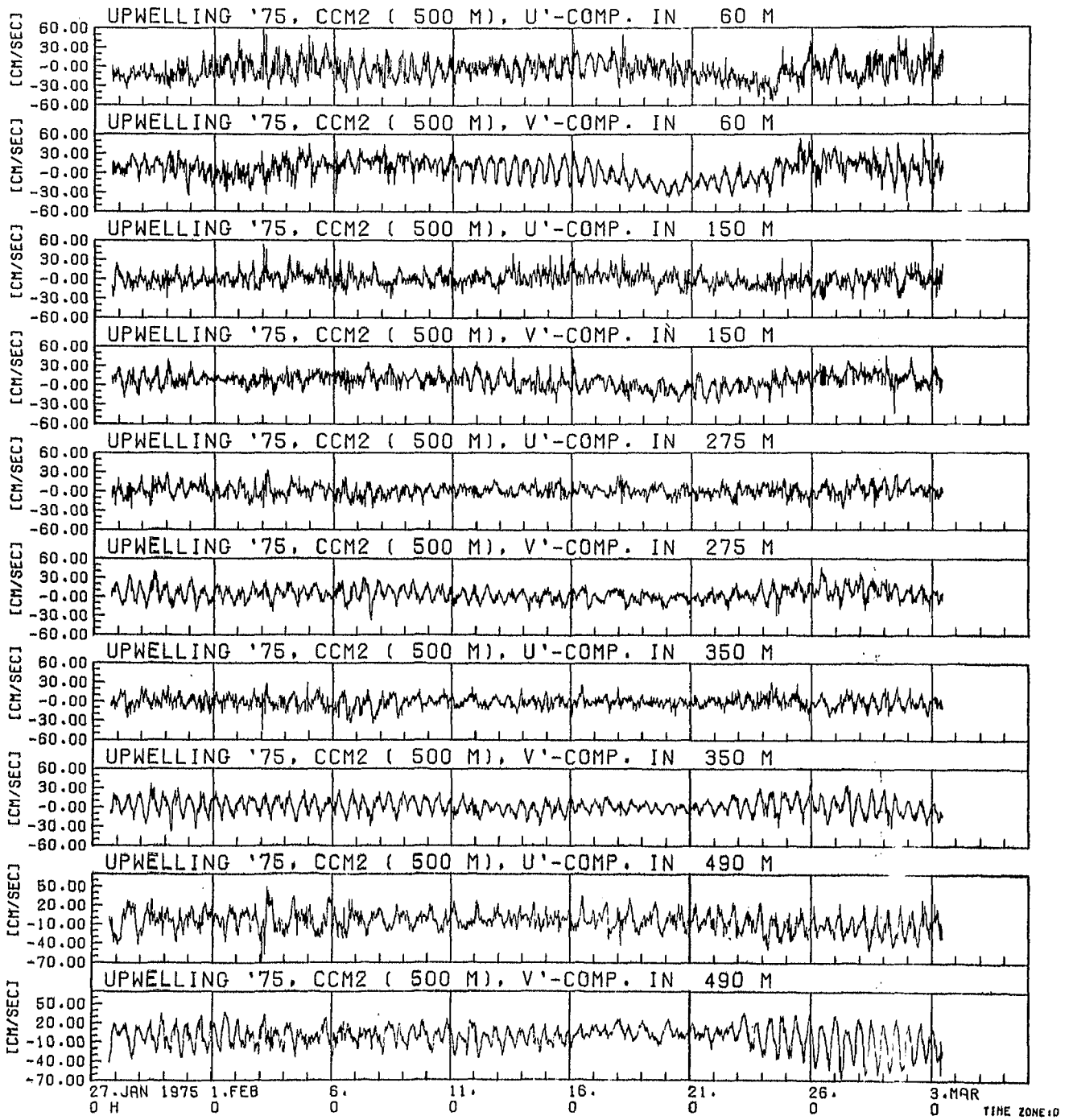


Figure 9: Currents at mooring CCM 2. See remarks on page 3.

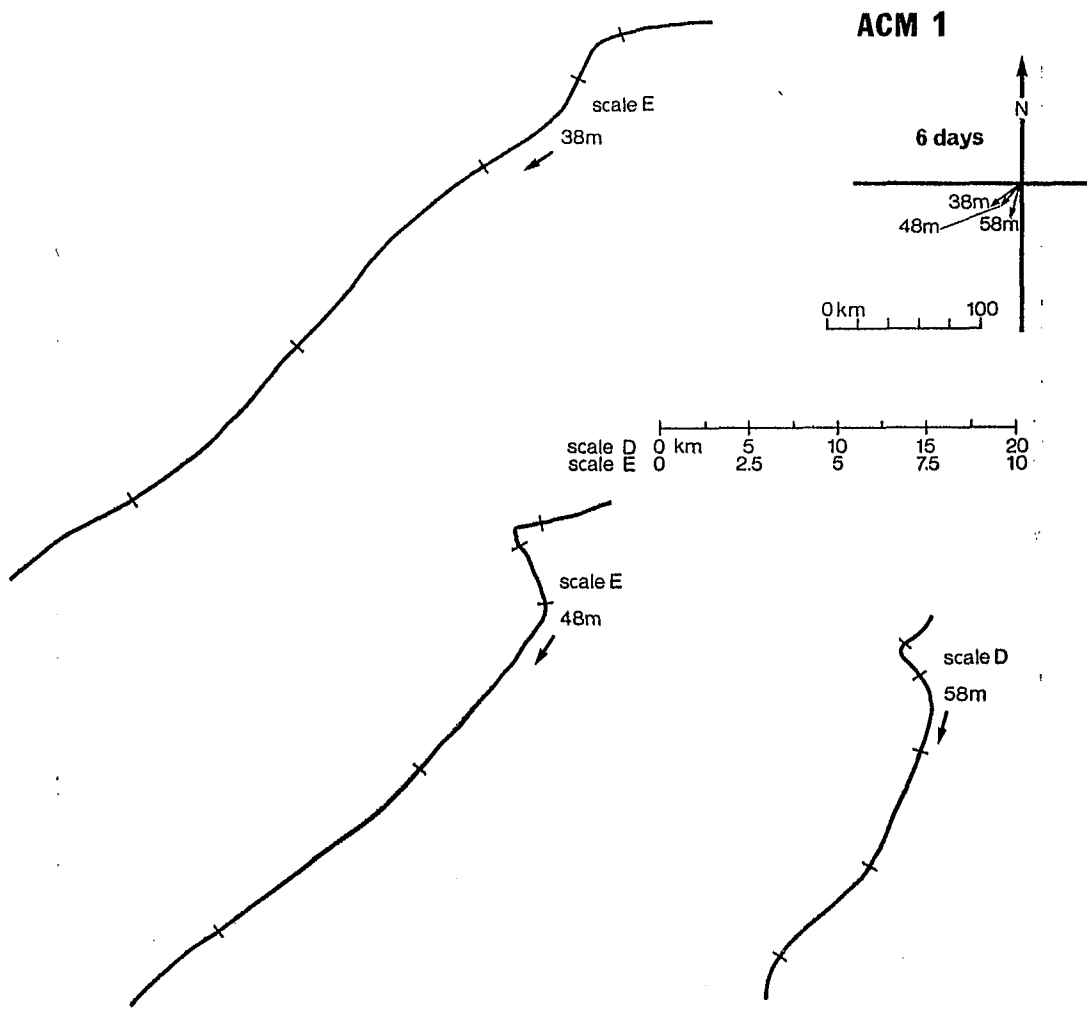


Figure 10: Progressive vector diagrams from mooring ACM 1.
See remarks on page 4. First tick mark is 3 February 1975

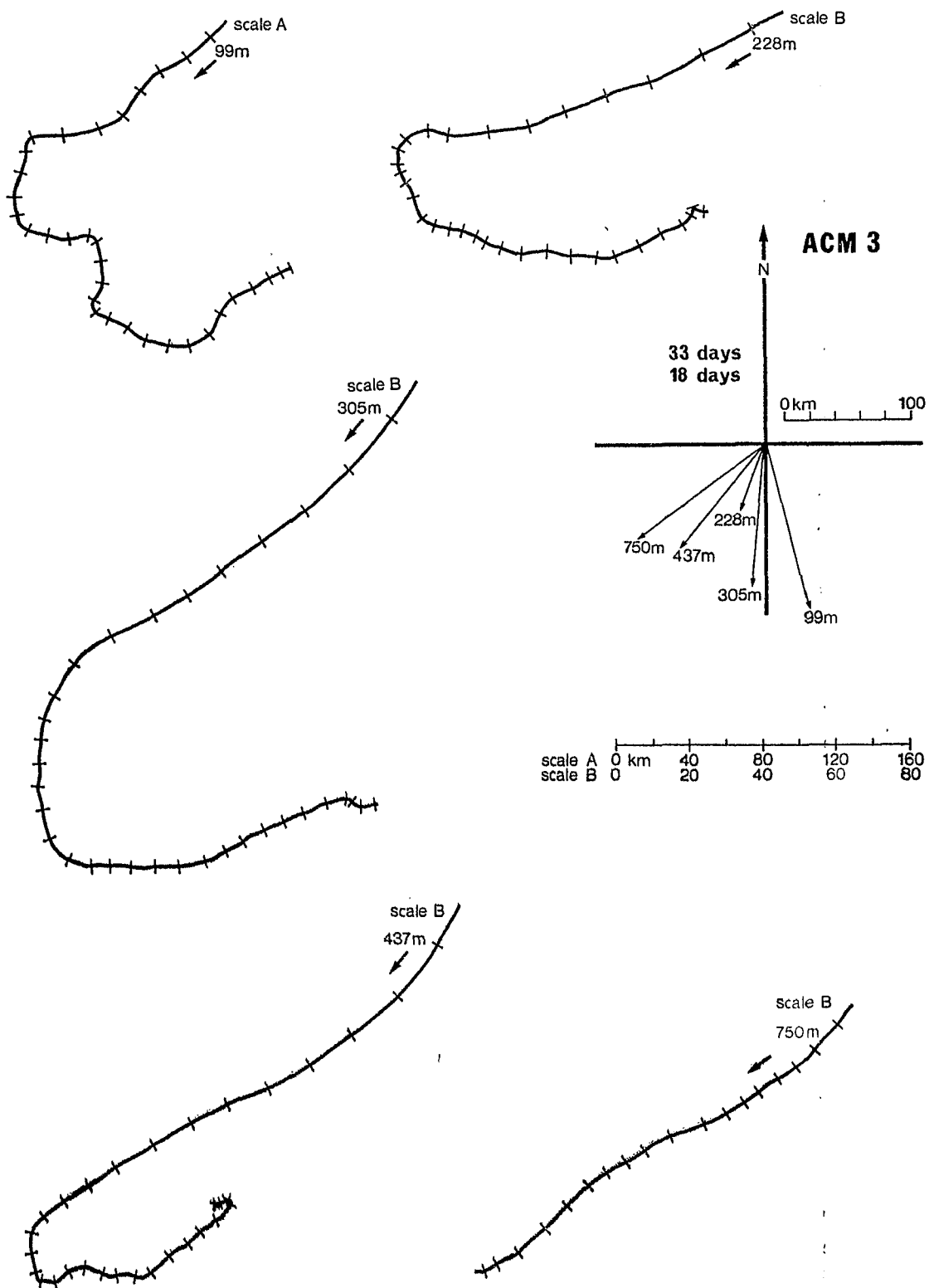


Figure 11: Progressive vector diagrams from mooring ACM 3. See remarks on page 4. First tick mark is 2 February 1975.

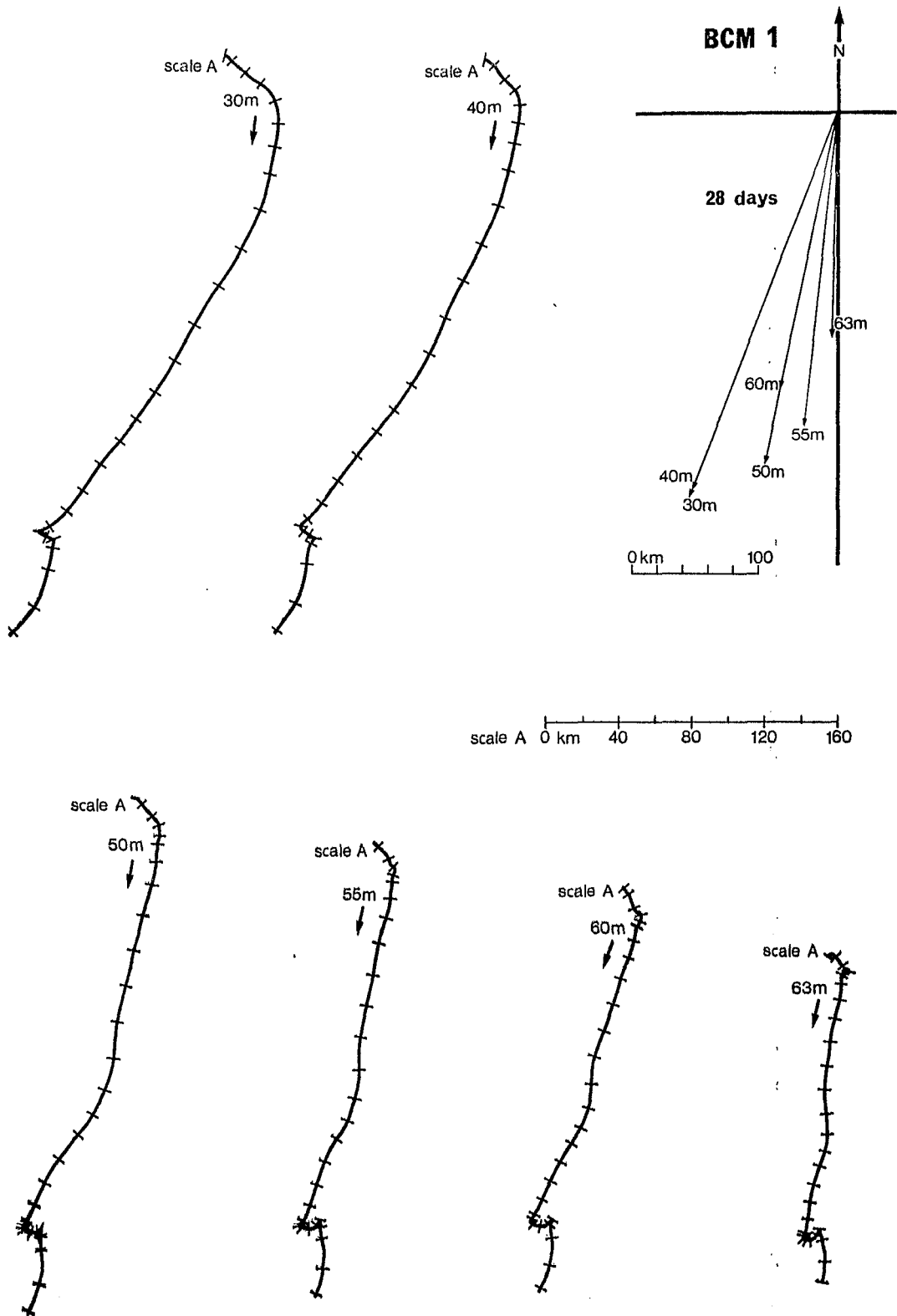


Figure 12: Progressive vector diagrams from mooring BCM 1. See remarks on page 4. First tick mark is 4 February 1975.

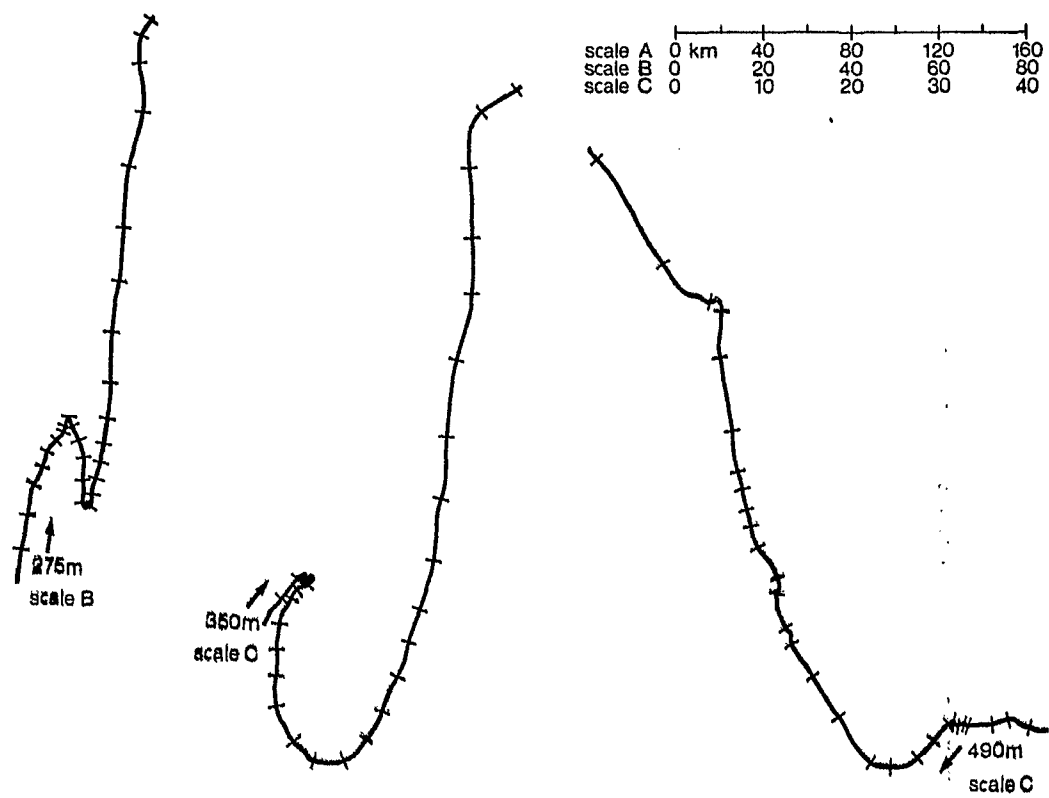
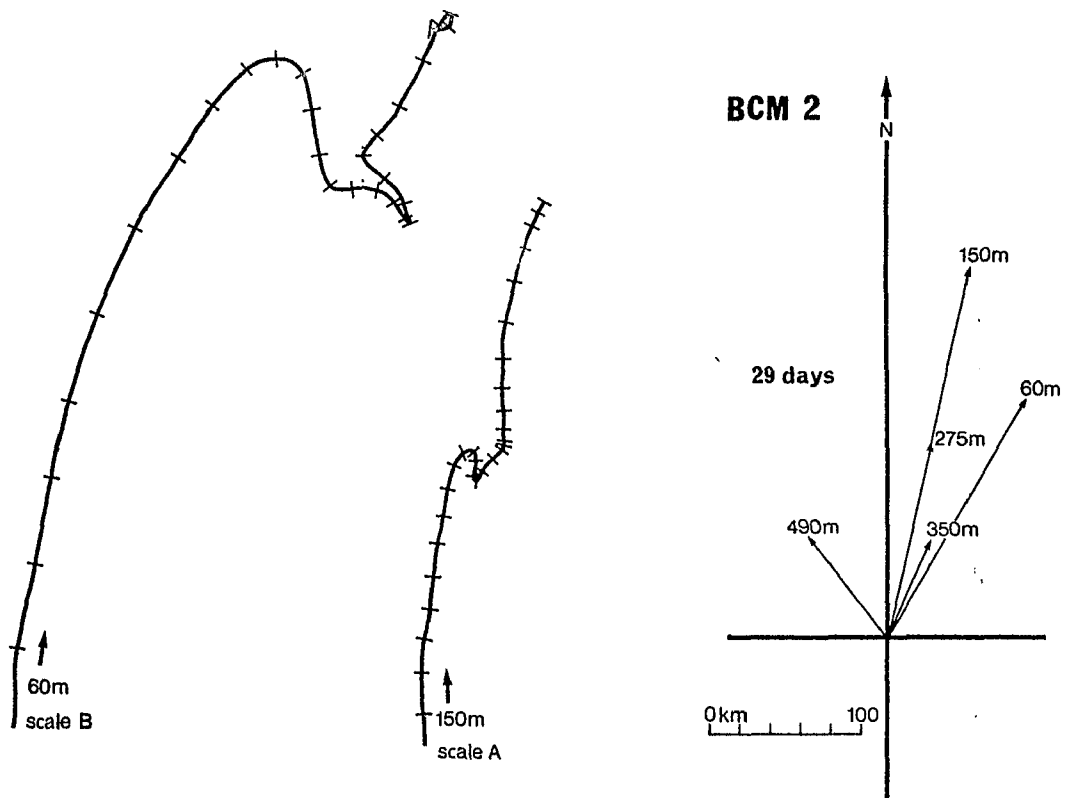


Figure 13: Progressive vector diagrams from mooring BCM 2. See remarks on page 4. First tick mark is 4 February 1975.

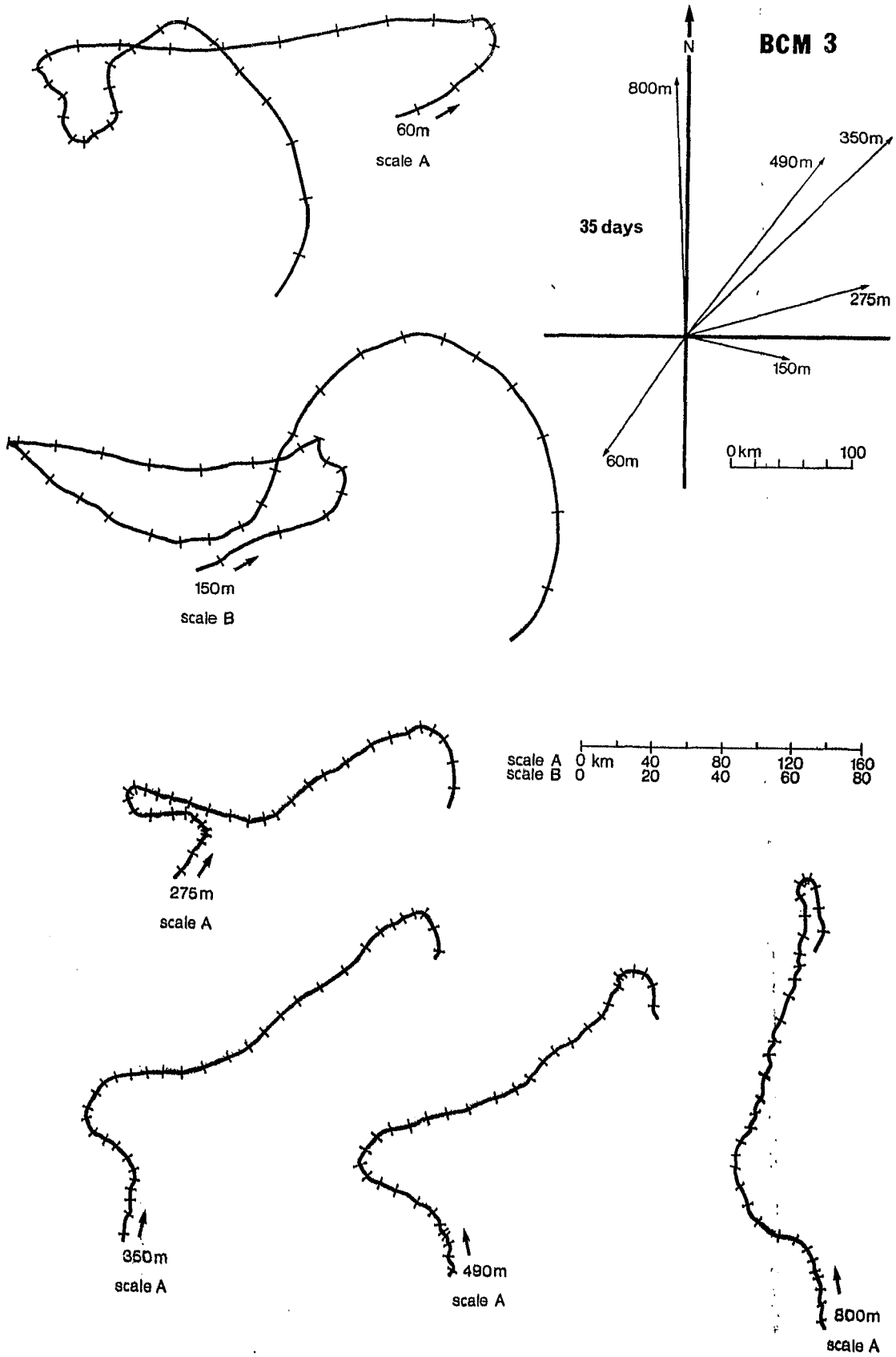


Figure 14: Progressive vector diagrams from mooring BCM 3. See remarks on page 4. First tick mark is 28 January 1975.

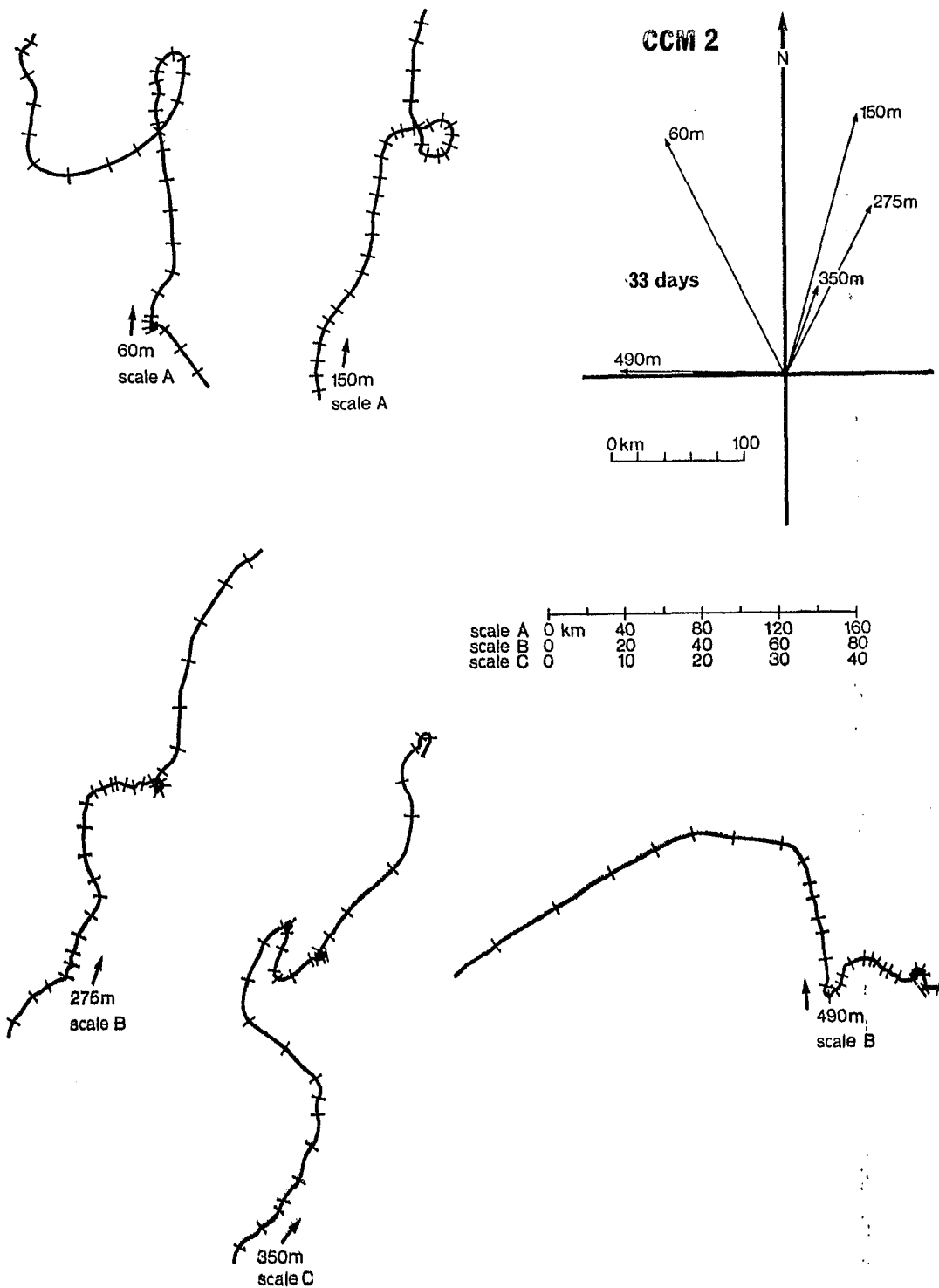


Figure 15: Progressive vector diagrams from mooring CCM 2. See remarks on page 4. First tick mark is 29 January 1975.

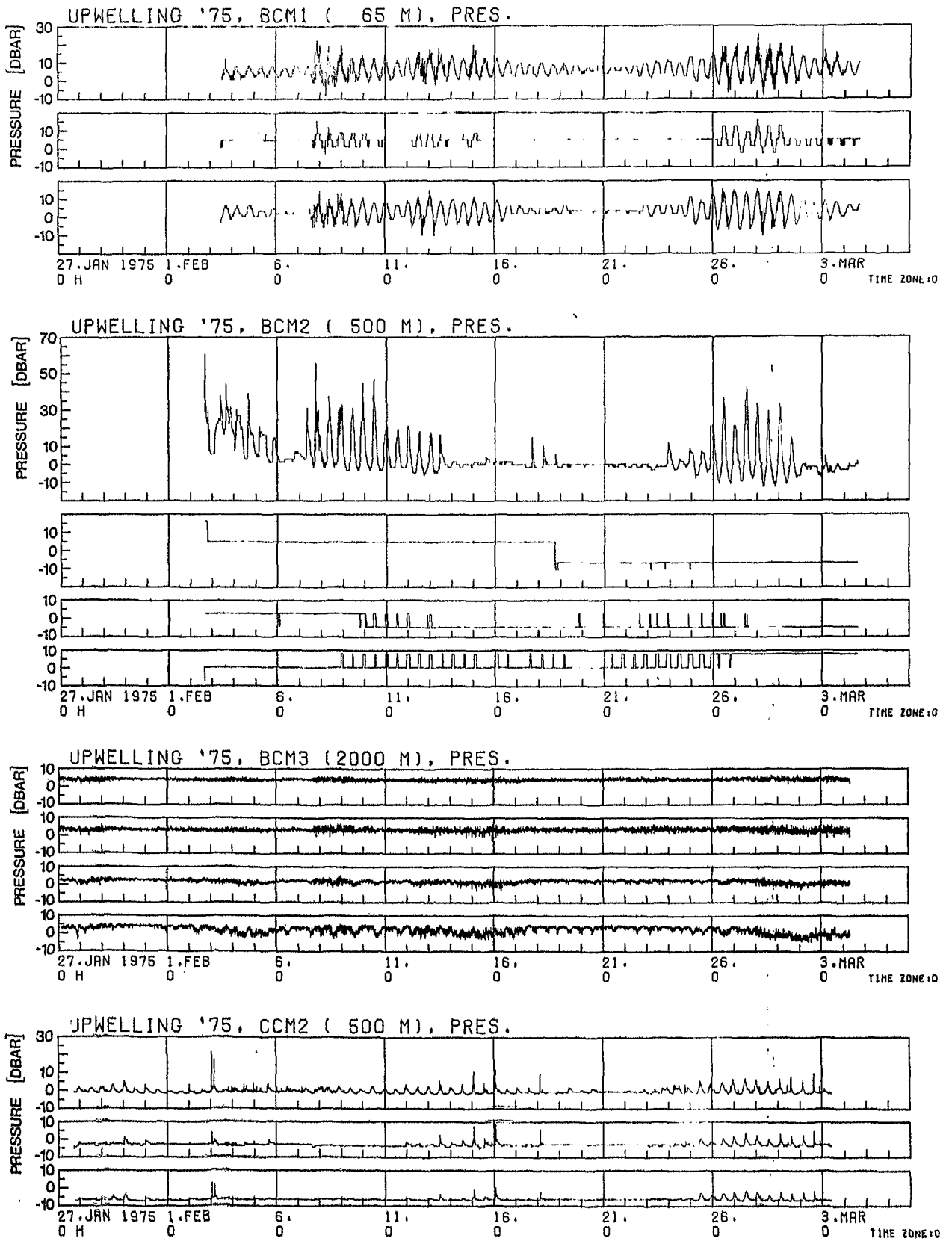


Figure 16: Pressure at the current meter moorings. See remarks on page 4.

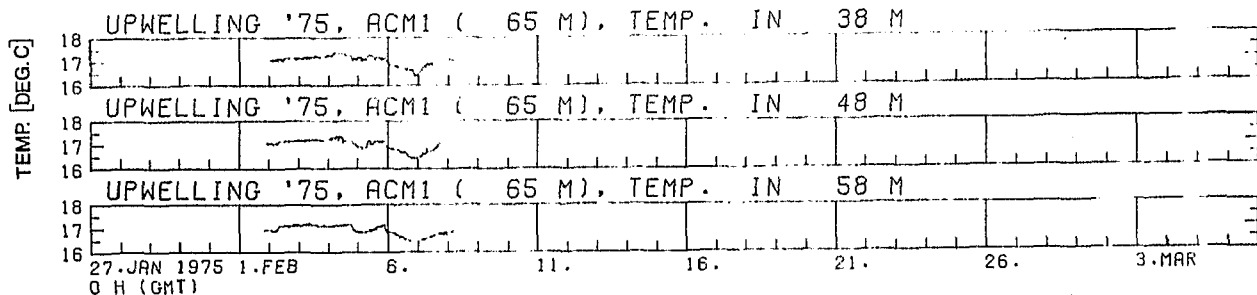


Figure 17: Temperature at mooring ACM 1. All readings of the current meter in 58 m were increased by 0.23°C on the basis of a comparison between the readings taken while all three meters at mooring ACM 1 were on the sea floor.

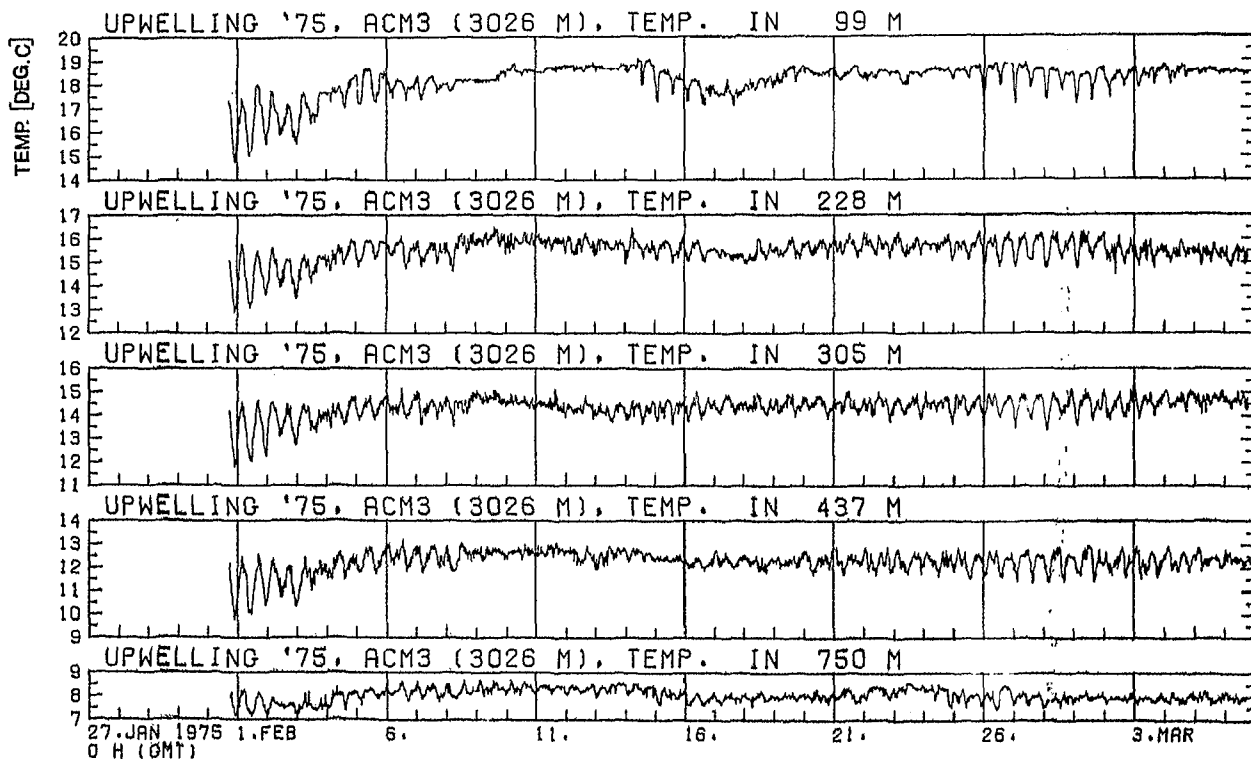


Figure 18: Temperature at mooring ACM 3. All readings of the current meter in 305 m were increased by 0.52°C on the basis of a comparison with STD temperature readings taken at the same time and level.

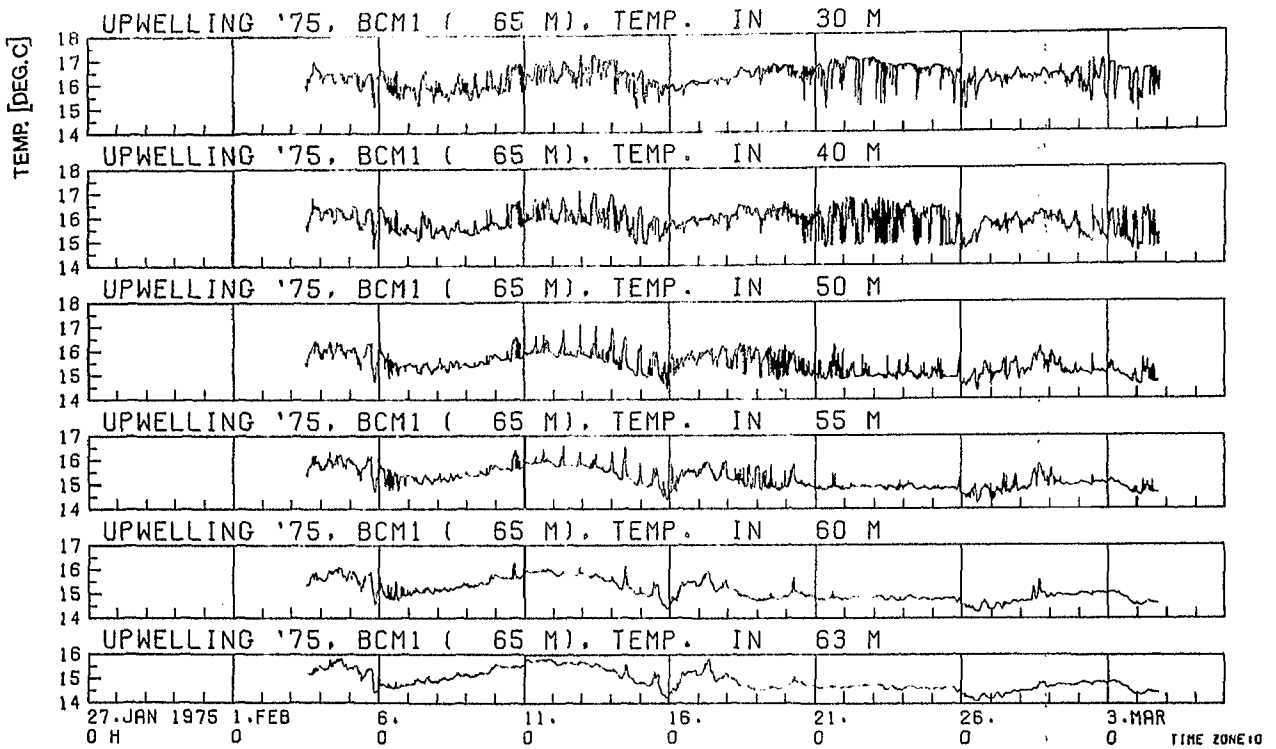


Figure 19: Temperature at mooring BCM 1.

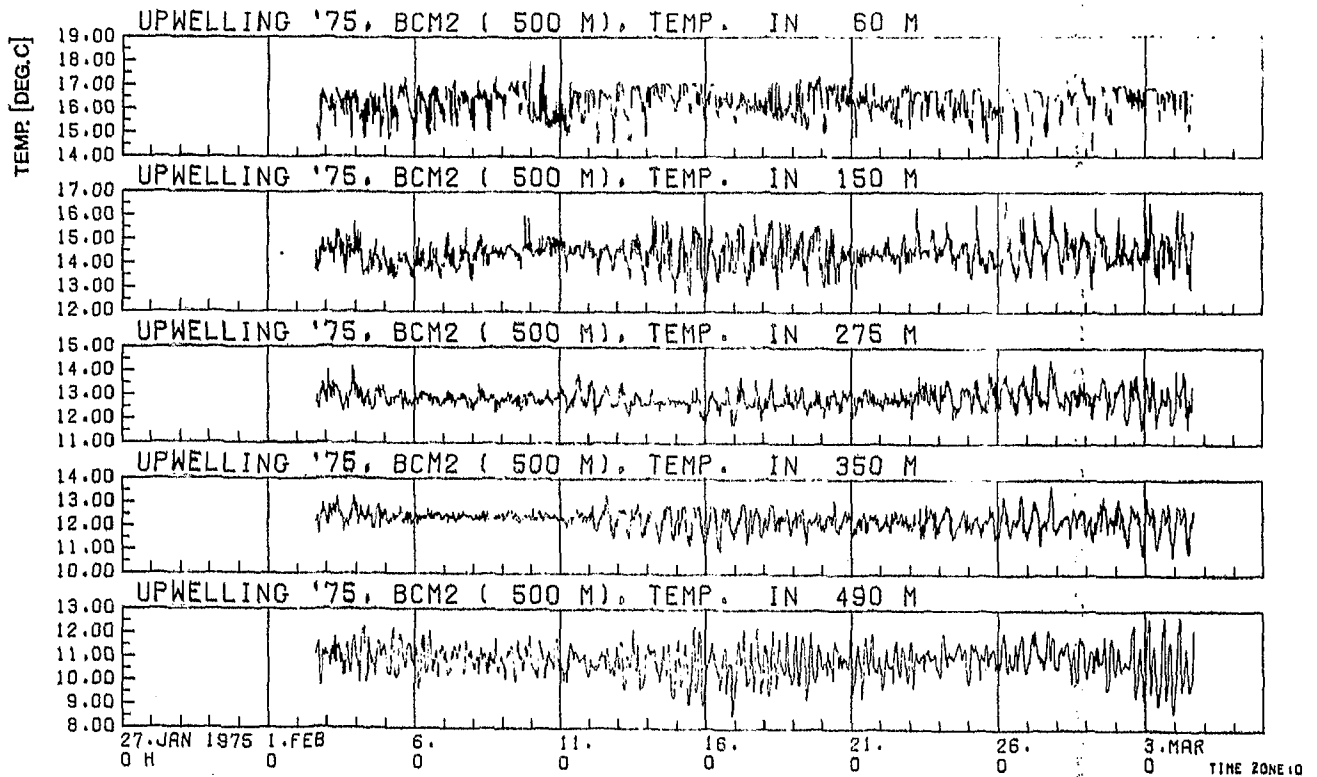


Figure 20: Temperature at mooring BCM 2.

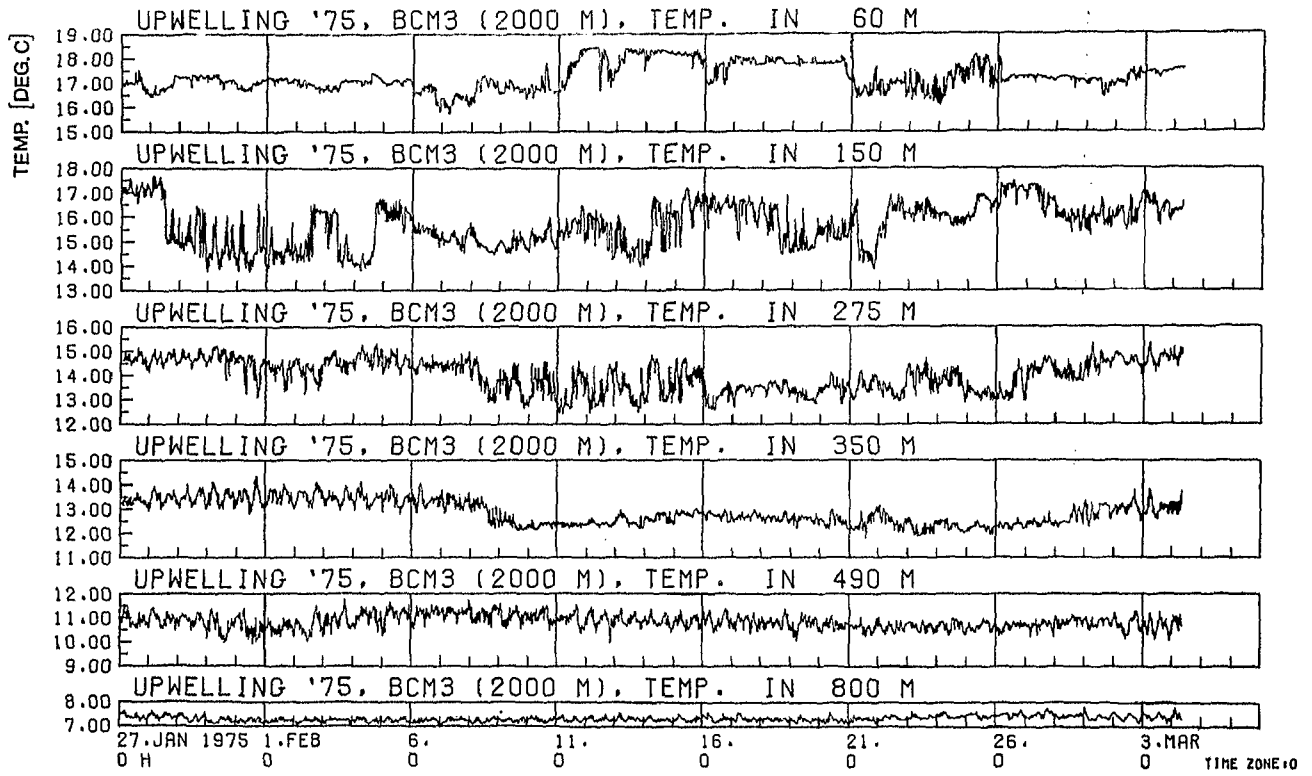


Figure 21: Temperature at mooring BCM 3.

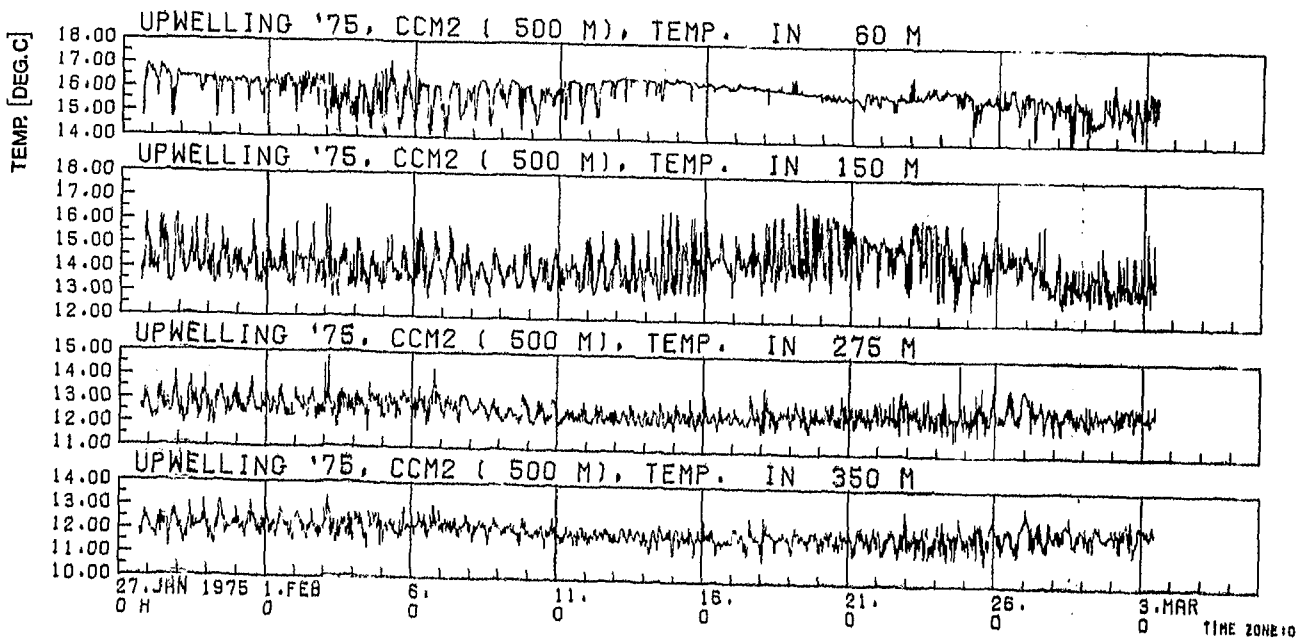


Figure 22: Temperature at mooring CCM 2.

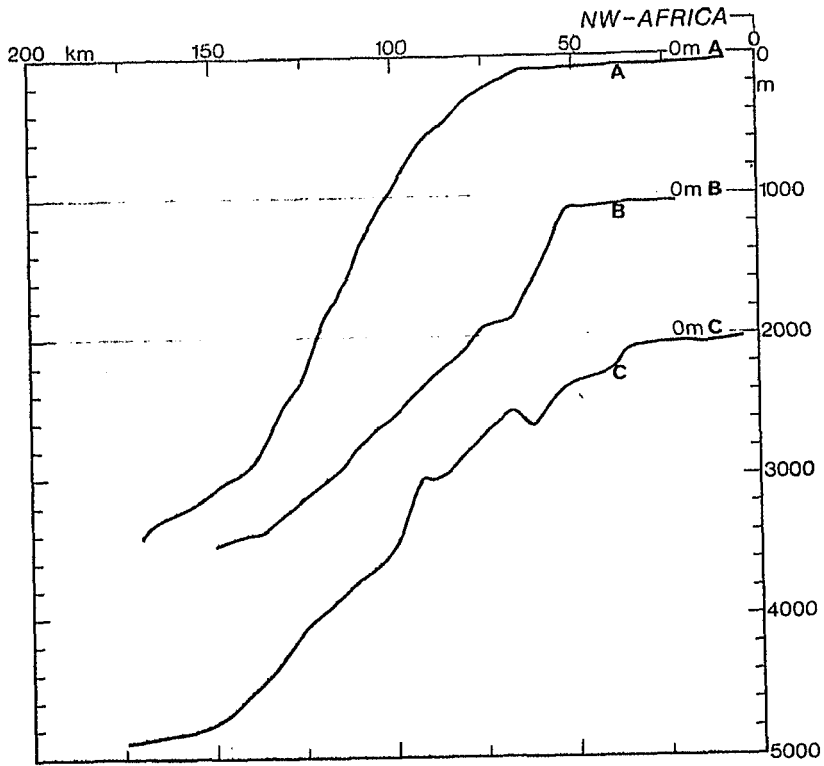
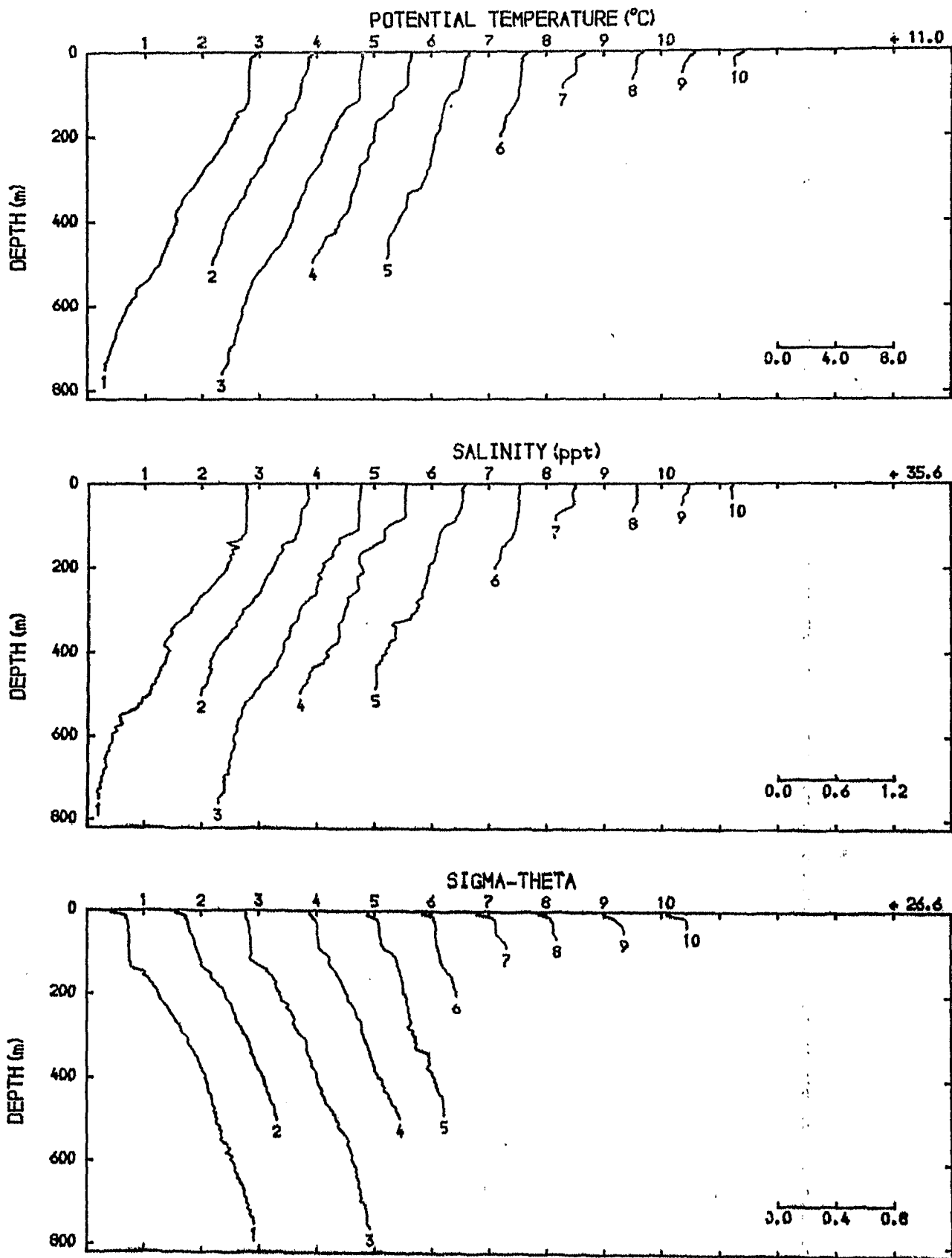


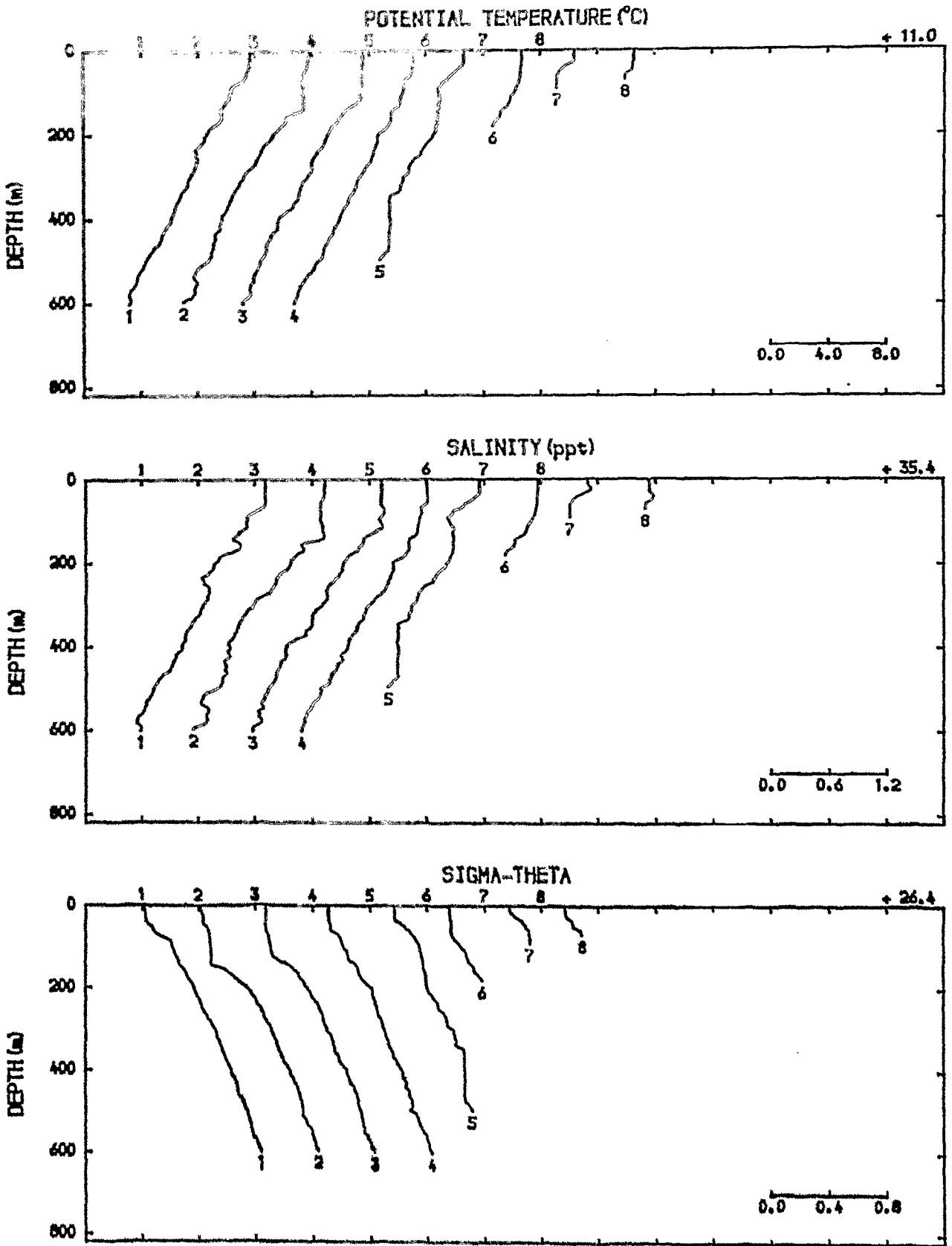
Figure 23: Smoothed bottom profiles of sections A, B and C.



STATIONS AND POSITIONS

- | | | | |
|--------------|-------------|-------------|--------------|
| 1 - 8681 A10 | 4 - 8684 A7 | 7 - 8687 A4 | 10 - 8690 A1 |
| 2 - 8682 A9 | 5 - 8685 A6 | 8 - 8688 A3 | |
| 3 - 8683 A8 | 6 - 8686 A5 | 9 - 8689 A2 | |

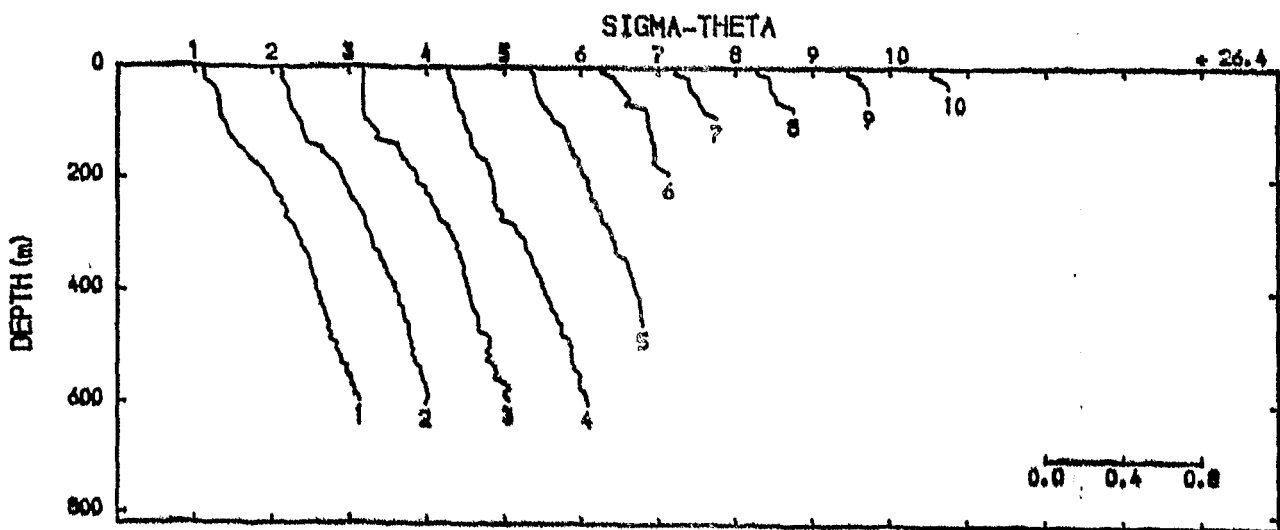
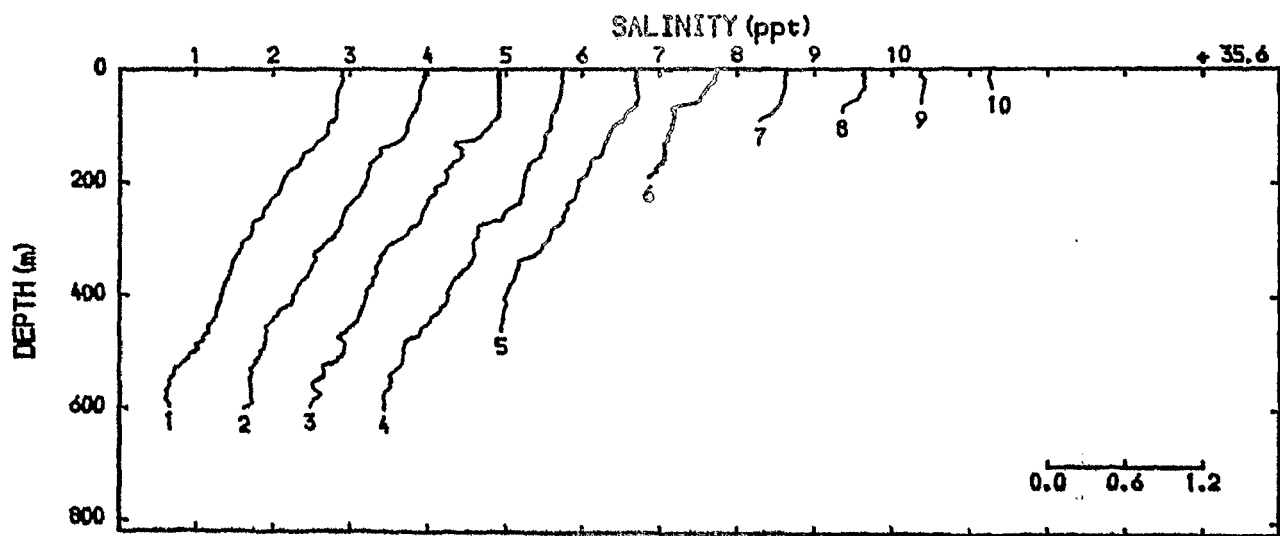
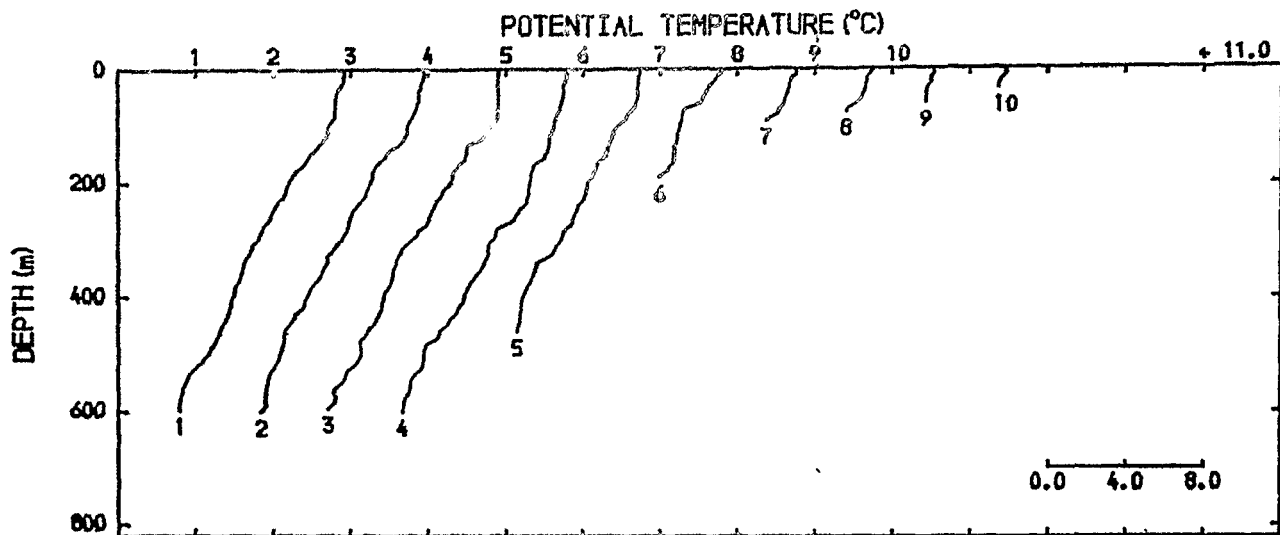
Figure 24: Hydrography on section A, 6-8 February.



STATIONS AND POSITIONS

- | | | |
|--------------|-------------|-------------|
| 1 - 8719 A10 | 4 - 8722 A7 | 7 - 8725 A4 |
| 2 - 8720 A9 | 5 - 8723 A6 | 8 - 8726 A3 |
| 3 - 8721 A8 | 6 - 8724 A5 | |

Figure 25: Hydrography on section A, 13-14 February.



STATIONS AND POSITIONS

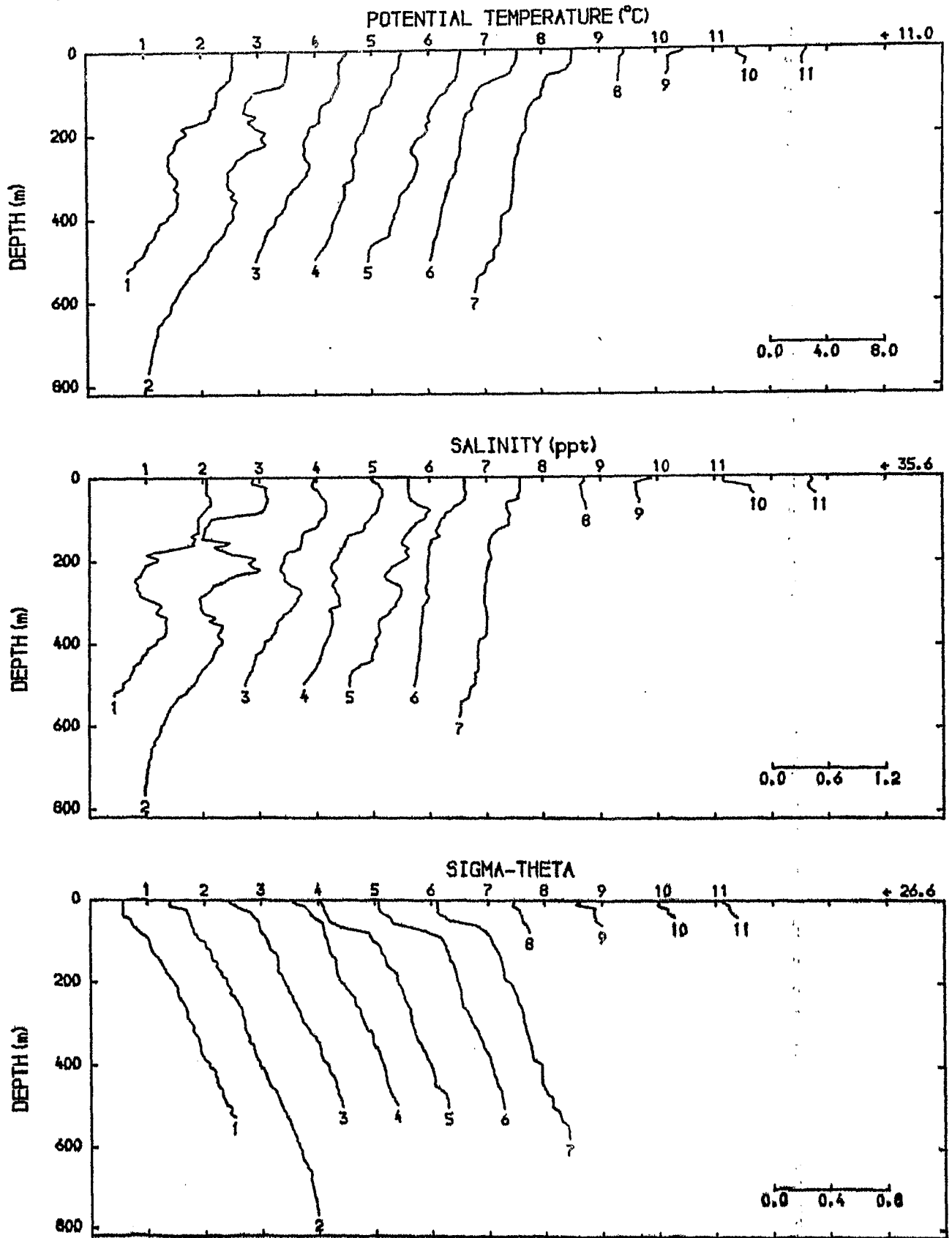
1 - 8736 A10
2 - 8739 AP
3 - 8740 AB

4 - 8741 A7
5 - 8742 Ad
6 - 8743 AS

7 - 8744 A4
8 - 8745 A3
9 - 8746 A2

10 - 8747 A1

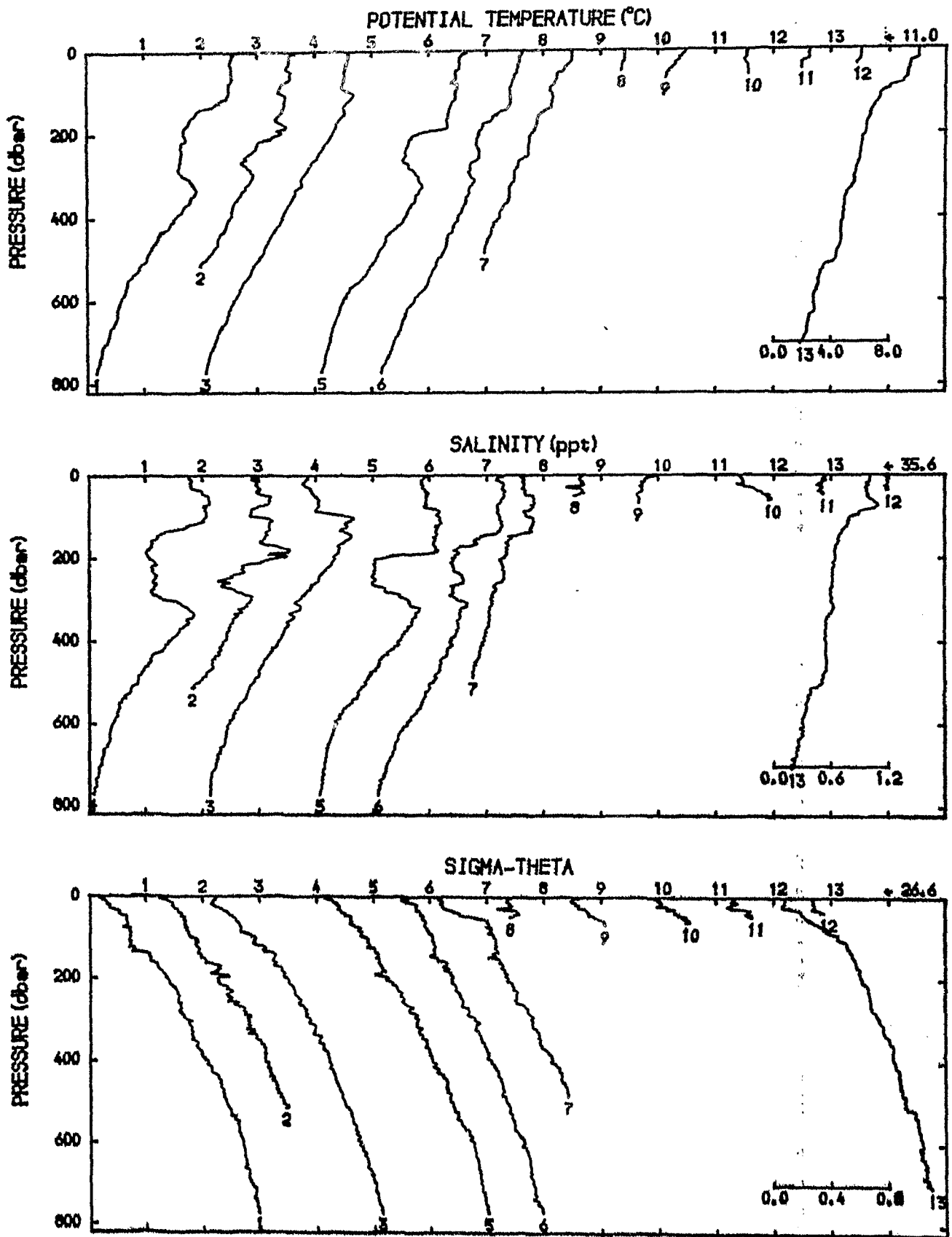
Figure 26: Hydrography on section A, 21 February.



STATIONS AND POSITIONS

- | | | | |
|--------------|--------------|---------------|--------------|
| 1 - 8679 B13 | 4 - 8676 B10 | 7 - 8670 B7/8 | 10 - 8667 B5 |
| 2 - 8678 B12 | 5 - 8675 B9 | 8 - 8669 B7 | 11 - 8666 B4 |
| 3 - 8677 B11 | 6 - 8674 B8 | 9 - 8668 B6 | |

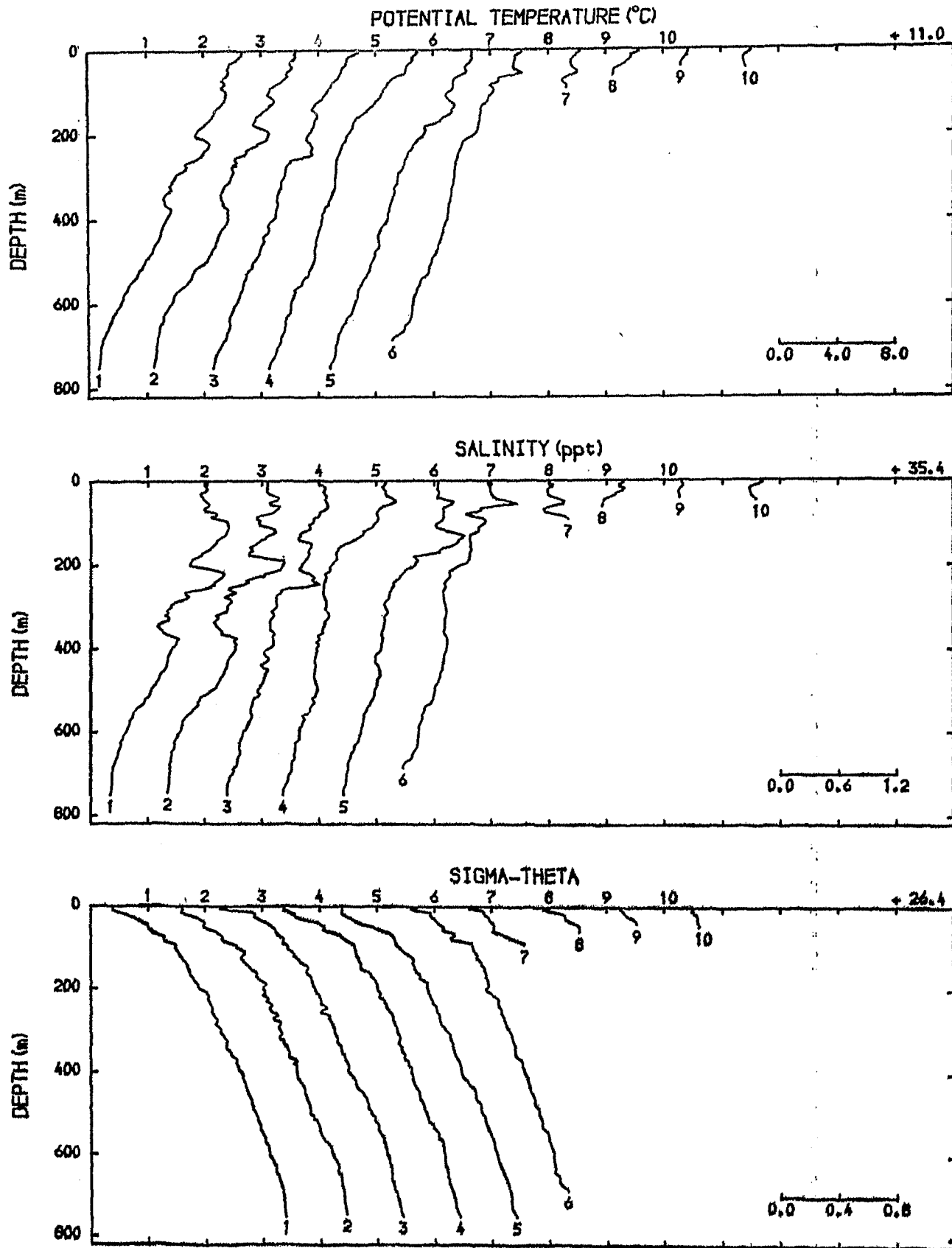
Figure 27: Hydrography on section B, 2-4 February.



STATIONS AND POSITIONS

| | | | | |
|--------------|--------------|-------------|--------------|-----------------|
| 1 - 3644 B12 | 4 - 3646 B10 | 7 - 3649 B6 | 10 - 3652 B4 | 13 - 3655 8700m |
| 2 - 3645 B12 | 5 - 3647 B12 | 8 - 3650 B7 | 11 - 3653 B2 | |
| 3 - 3646 B14 | 6 - 3648 B10 | 9 - 3651 B6 | 12 - 3654 B1 | |

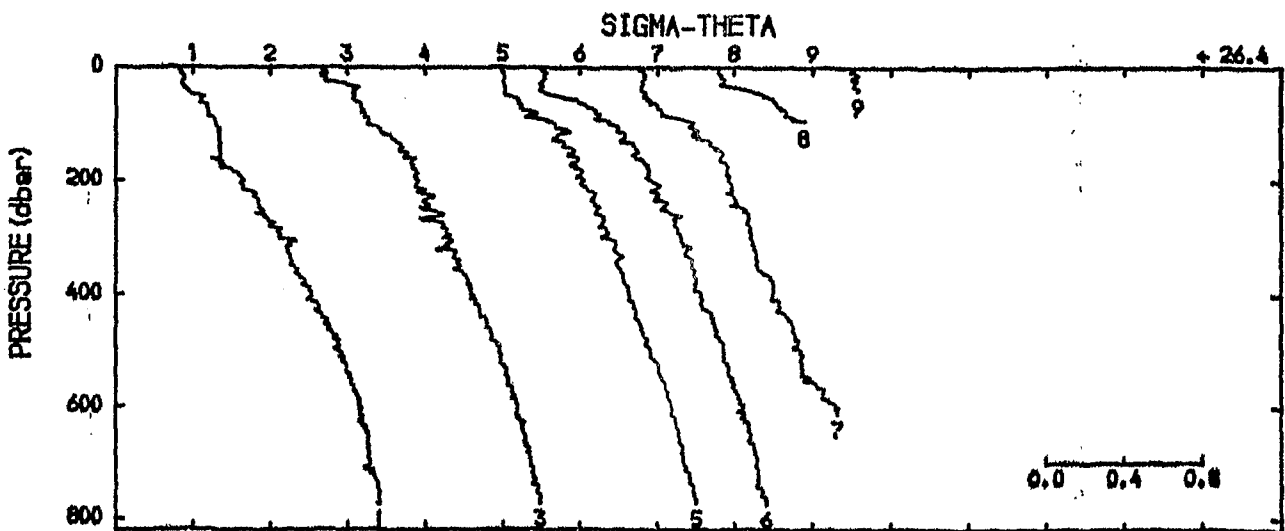
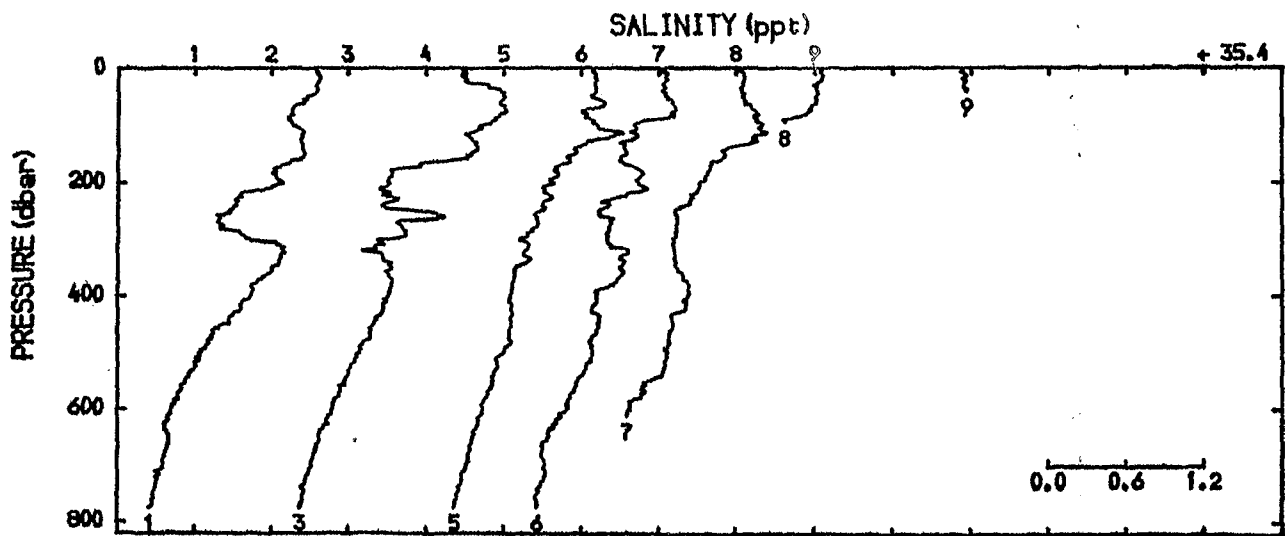
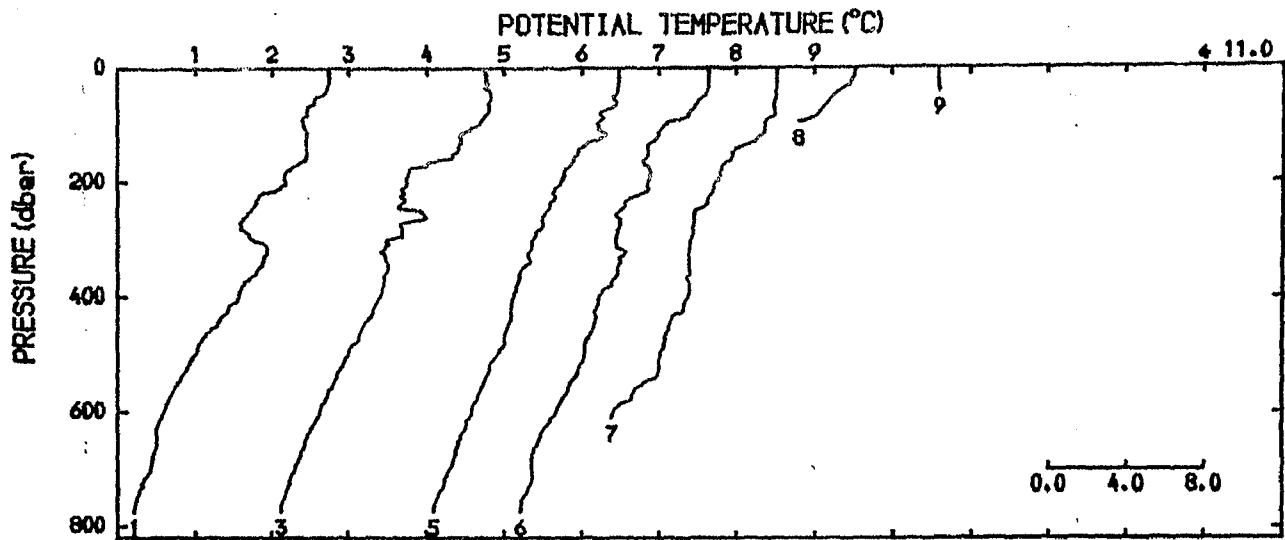
Figure 28: Hydrography on section B, 2-5 February.



STATIONS AND POSITIONS

| | | | |
|--------------|--------------|-------------|--------------|
| 1 - 8692 B13 | 4 - 8695 B10 | 7 - 8698 B7 | 10 - 8701 B3 |
| 2 - 8693 B12 | 5 - 8696 B9 | 8 - 8699 B6 | |
| 3 - 8694 B11 | 6 - 8697 B8 | 9 - 8700 B5 | |

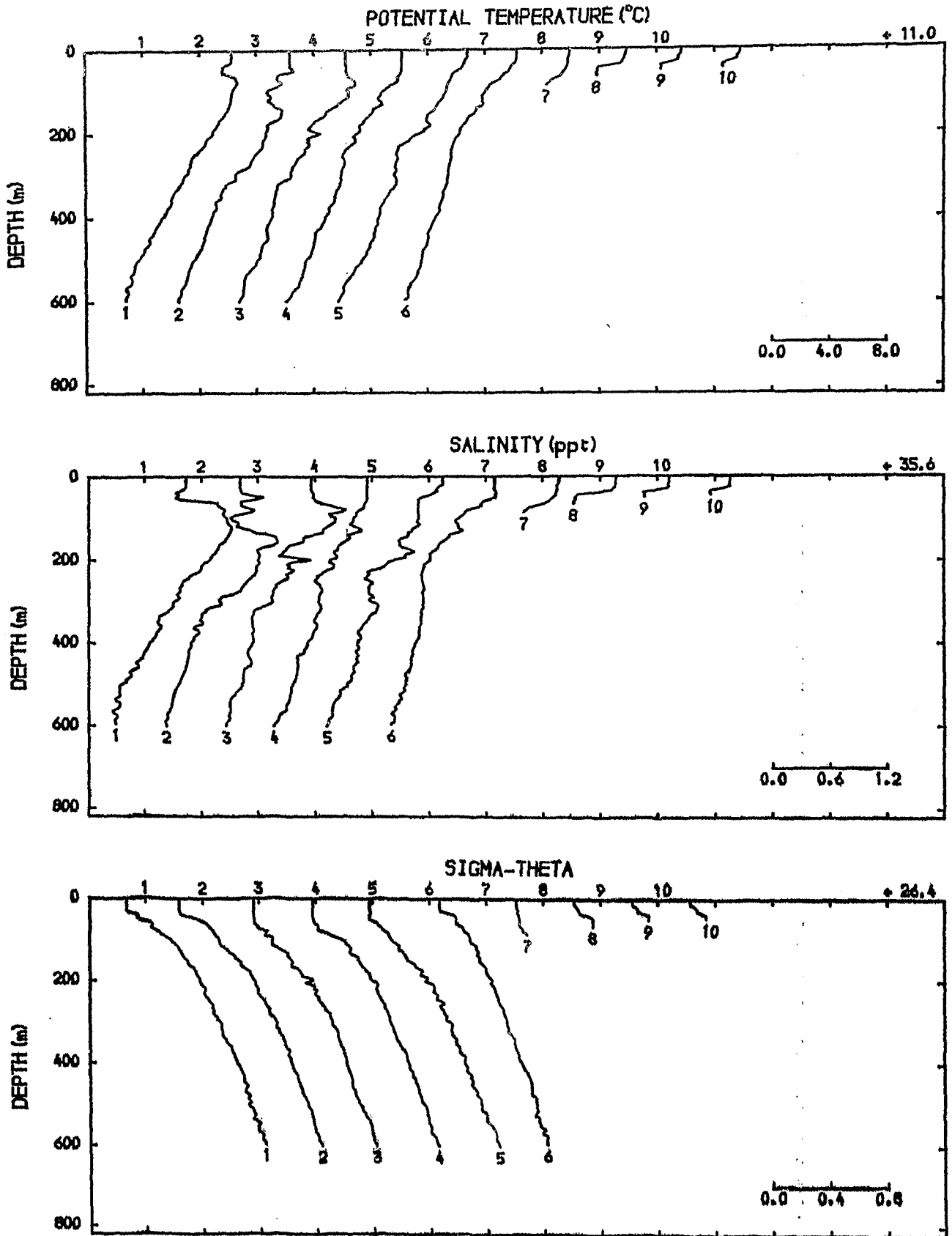
Figure 29: Hydrography on section B, 9-10 February.



STATIONS AND POSITIONS

| | | | |
|--------------|--------------|-------------|-----|
| 1 - 3692 B14 | 4 - 3687 B10 | 7 - 3685 B8 | |
| 2 - 3691 B12 | 5 - 3686 B10 | 8 - 3683 B7 | 885 |
| | | 9 - 3681 B2 | 803 |
| | | | 84 |

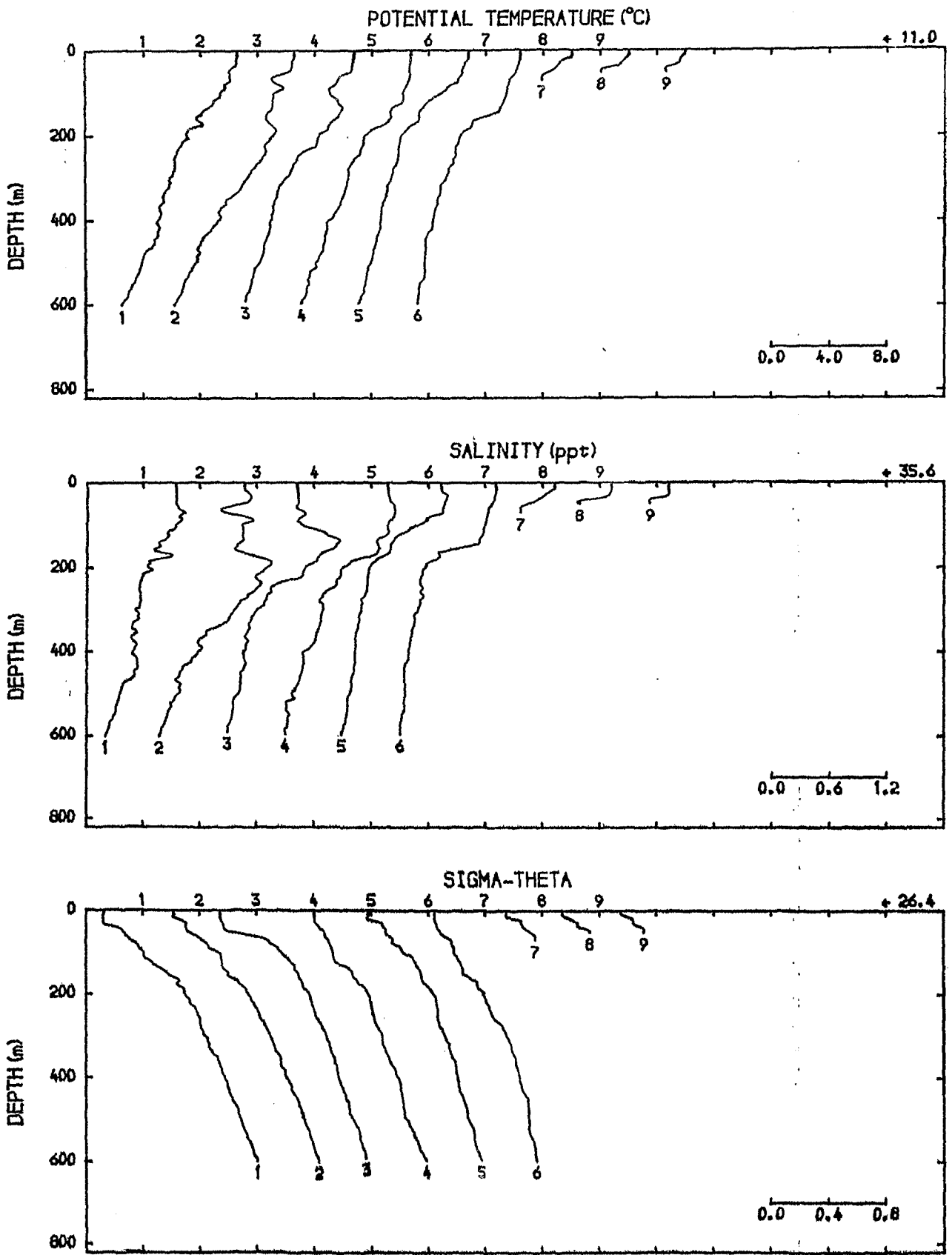
Figure 30: Hydrography on section B, 13-15 February.



STATIONS AND POSITIONS

- | | | | |
|--------------|--------------|-------------|--------------|
| 1 - 8758 B13 | 4 - 8755 B10 | 7 - 8752 B7 | 10 - 8749 B3 |
| 2 - 8757 B12 | 5 - 8754 B9 | 8 - 8751 B6 | |
| 3 - 8756 B11 | 6 - 8753 B8 | 9 - 8750 B5 | |

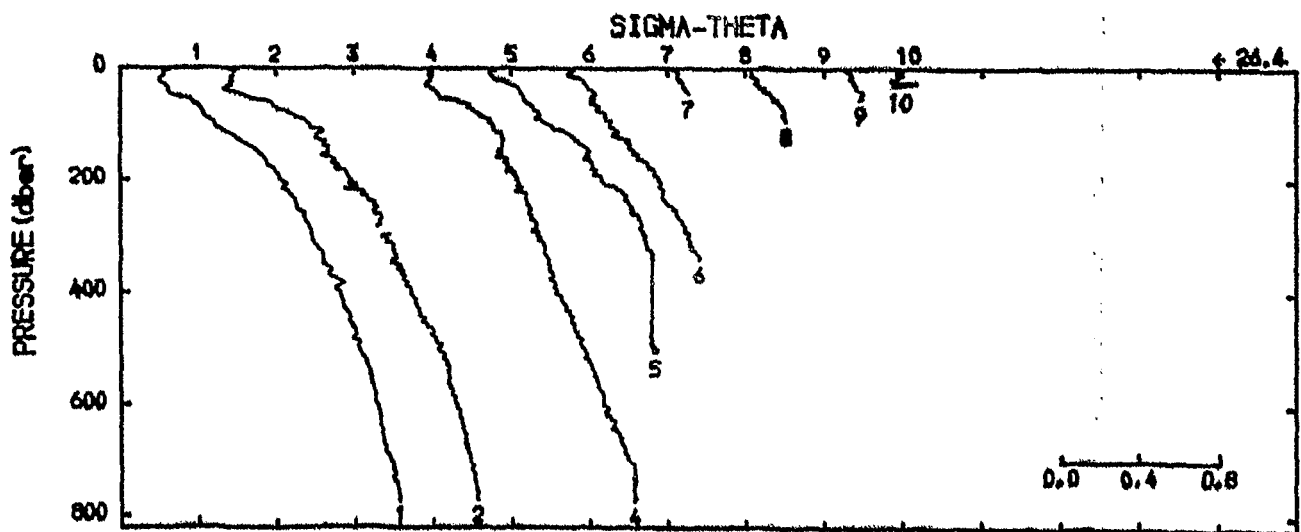
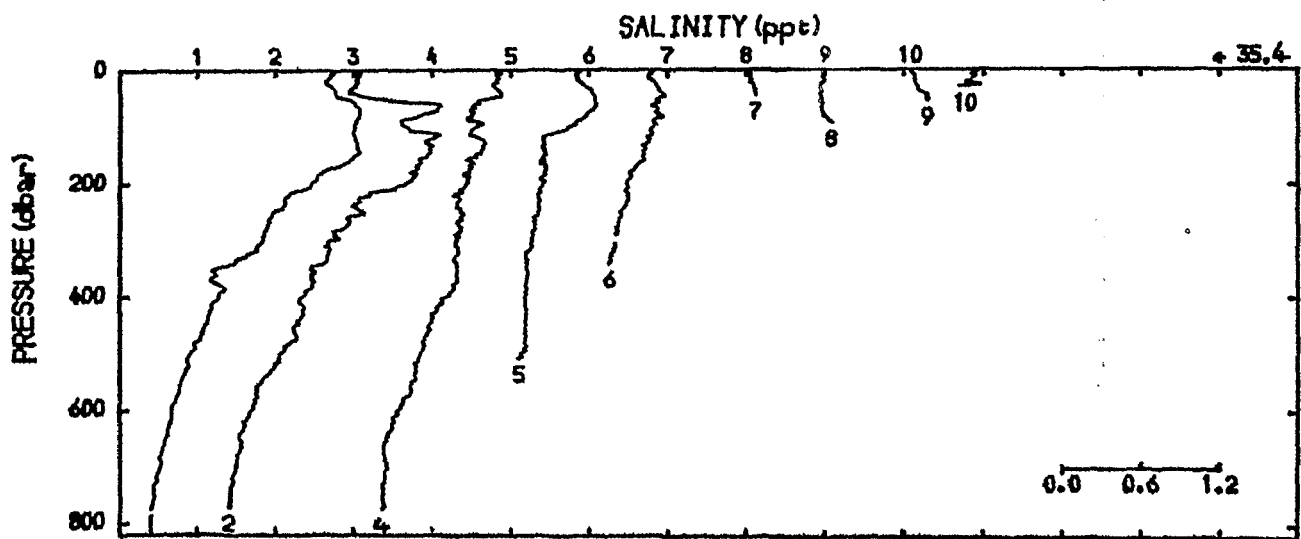
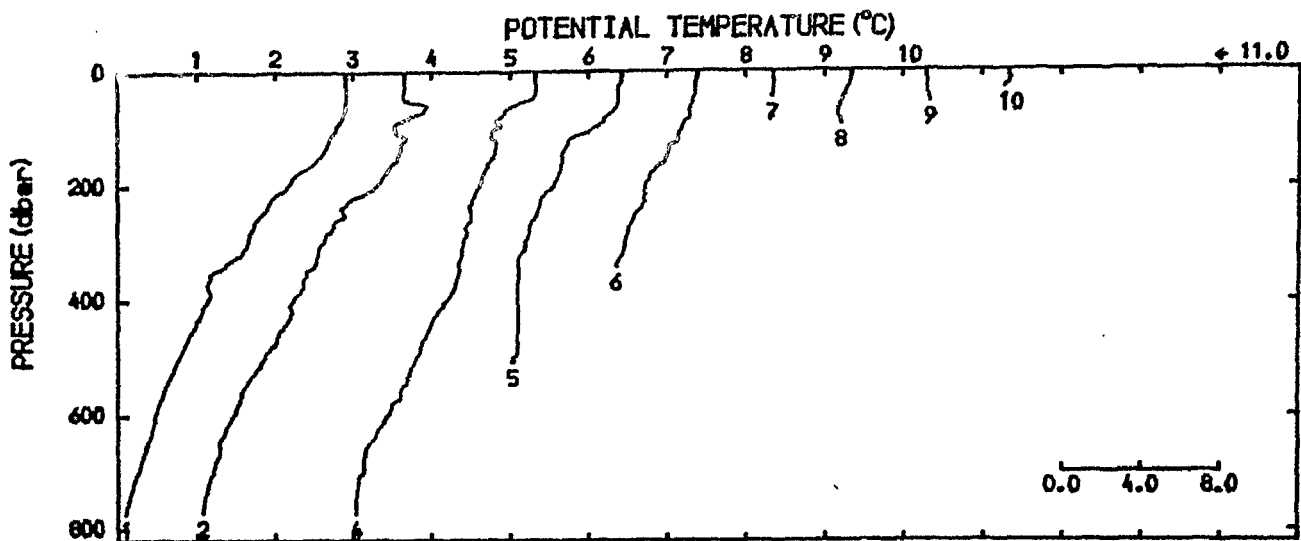
Figure 31: Hydrography on section B, 22-23 February.



STATIONS AND POSITIONS :

| | | |
|--------------|--------------|-------------|
| 1 - 8793 B13 | 4 - 8790 B10 | 7 - 8787 B6 |
| 2 - 8792 B12 | 5 - 8789 B9 | 8 - 8786 B5 |
| 3 - 8791 B11 | 6 - 8788 B8 | 9 - 8785 B3 |

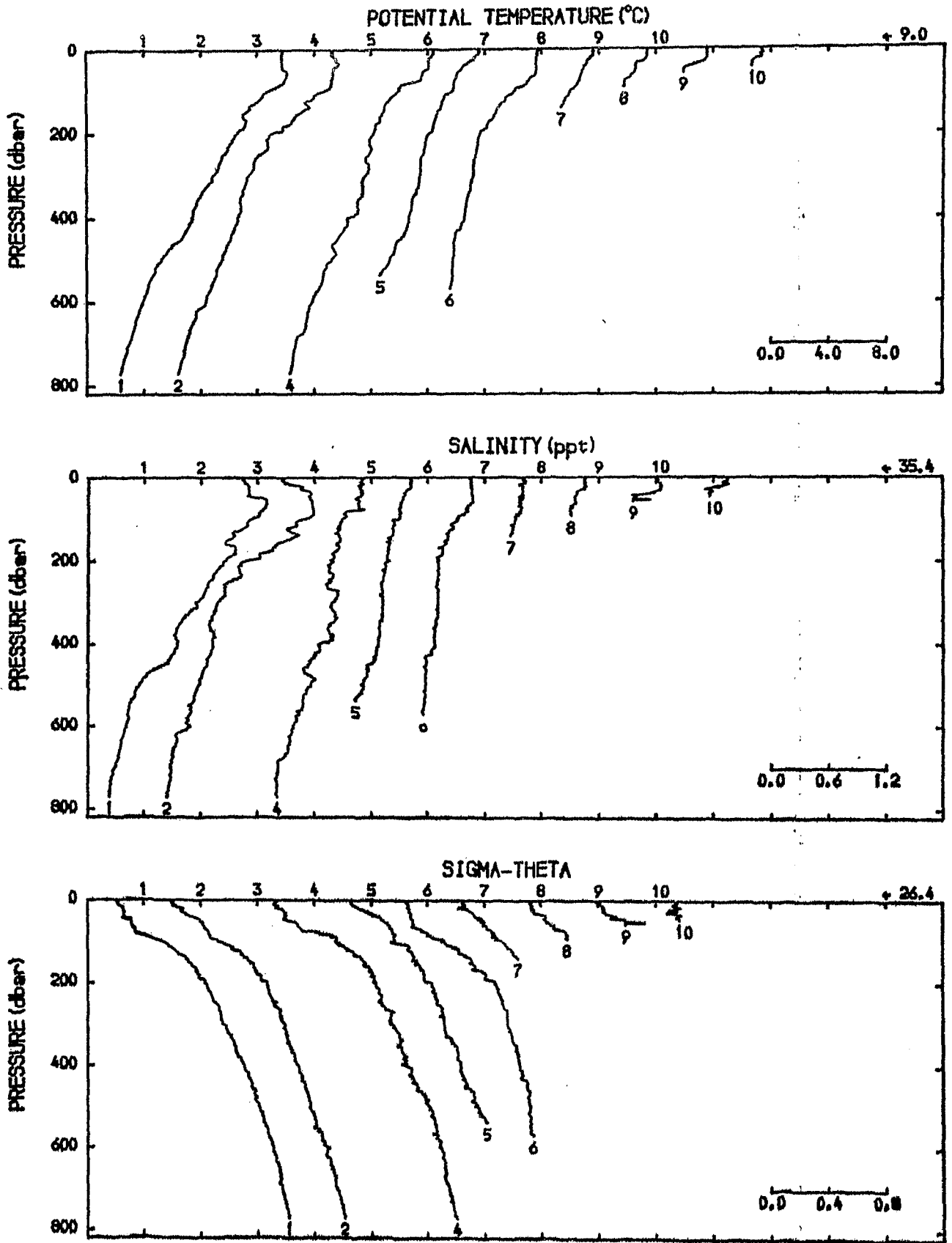
Figure 32: Hydrography on section B, 1 March.



STATIONS AND POSITIONS

- | | | | |
|-------------|-------------|---------------|--------------|
| 1 - 3418 C2 | 4 - 3420 C7 | 7 - 3423/1 C1 | 10 - 3425 C1 |
| 2 - 3419 C8 | 5 - 3421 C6 | 8 - 3423/2 C1 | |
| | 6 - 3422 C5 | 9 - 3424 C3 | |

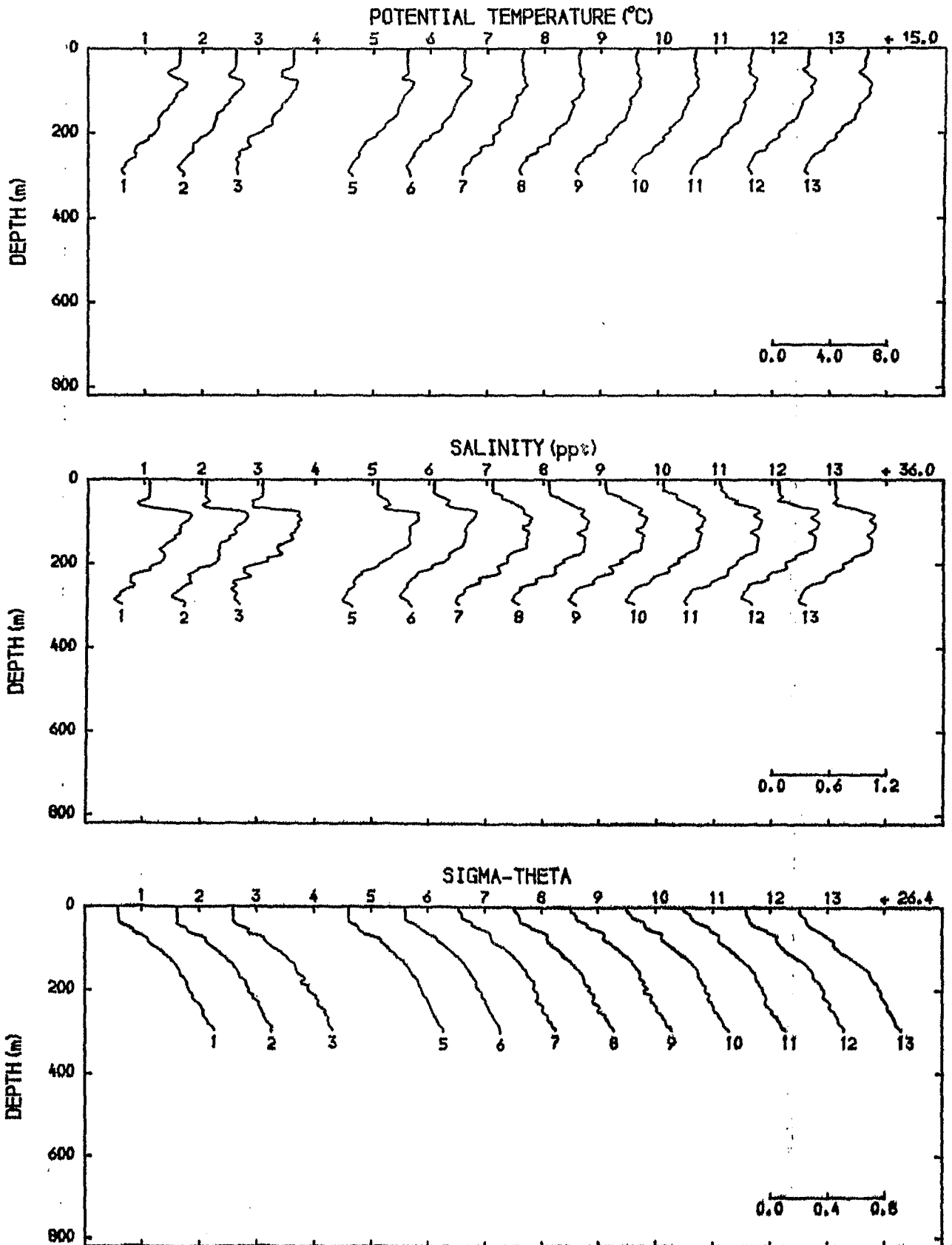
Figure 33: Hydrography on section C, 28-30 January.



STATIONS AND POSITIONS

- | | | | |
|-------------|---------------|-------------|--------------|
| 1 - 3657 C9 | 4 - 3659 C7 | 7 - 3661 C5 | 10 - 3664 C2 |
| 2 - 3658 C8 | 5 - 3660/1 C6 | 8 - 3662 C4 | |
| | 6 - 3660/2 C6 | 9 - 3663 C3 | |

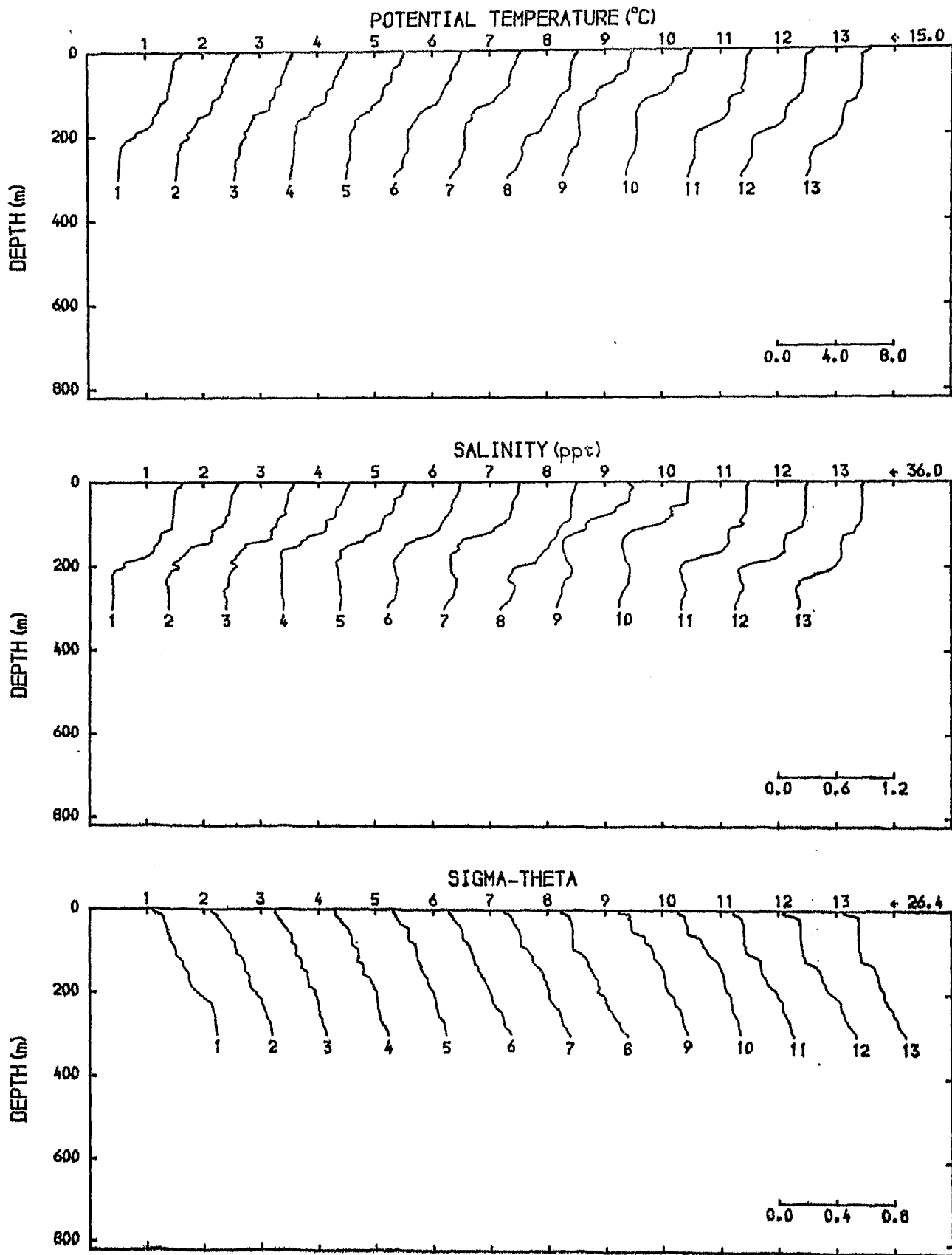
Figure 34: Hydrography on section C, 7-10 February.



DROP START TIMES G.M.T.

| | | | | |
|----------|-------------|----------|-----------|-----------|
| 1 - 0639 | 4 - NO DROP | 7 - 1232 | 10 - 1533 | 13 - 1831 |
| 2 - 0735 | 5 - 1033 | 8 - 1331 | 11 - 1632 | |
| 3 - 0834 | 6 - 1132 | 9 - 1431 | 12 - 1731 | |

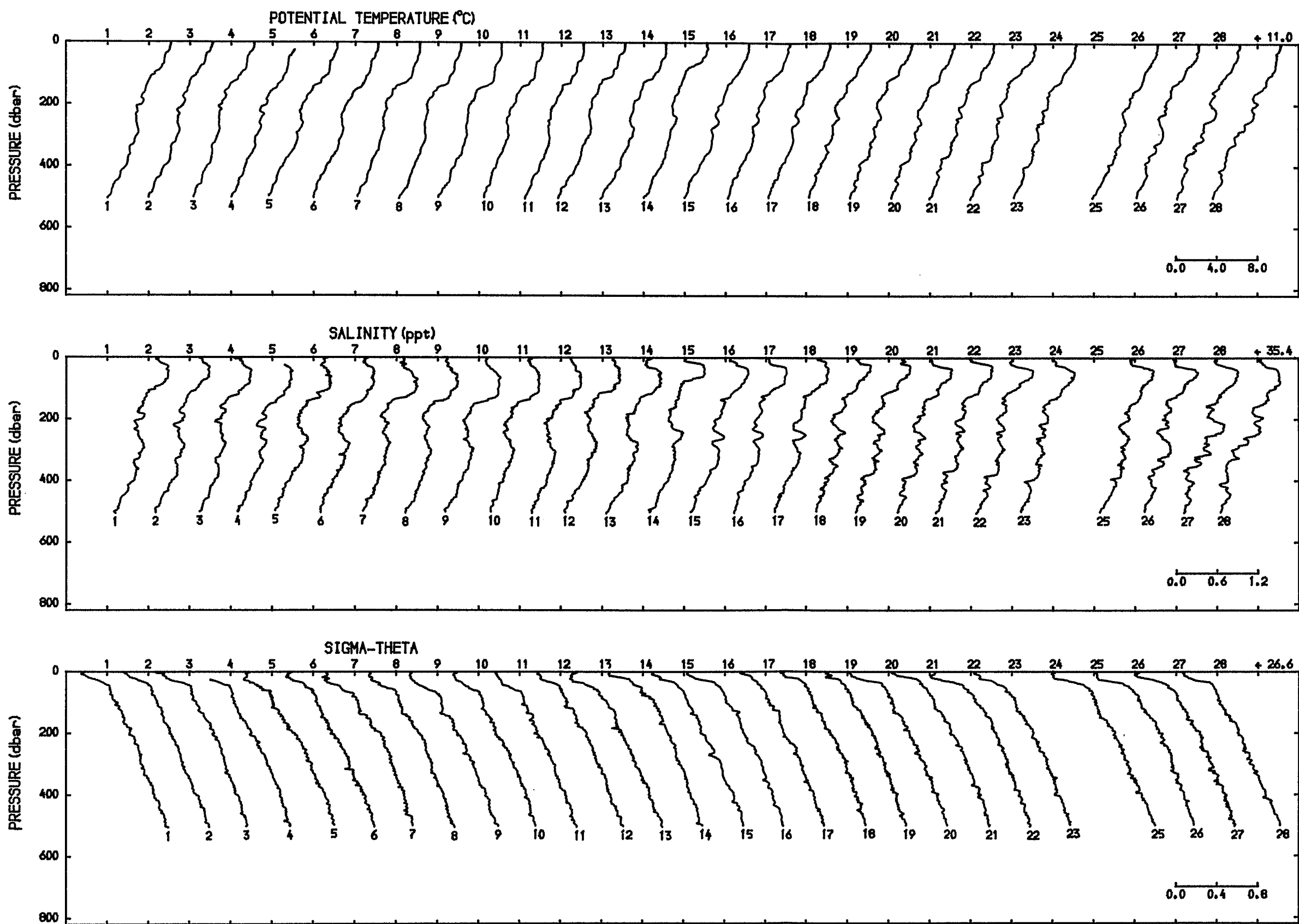
Figure 35: Hydrographic time series at position B 12 (STN 8765), 24 February.



DROP START TIMES G.M.T.

| | | | | |
|----------|----------|----------|-----------|-----------|
| 1 - 0640 | 4 - 0932 | 7 - 1233 | 10 - 1535 | 13 - 1833 |
| 2 - 0733 | 5 - 1031 | 8 - 1331 | 11 - 1631 | |
| 3 - 0834 | 6 - 1132 | 9 - 1429 | 12 - 1733 | |

Figure 36: Hydrographic time series at position B 8 (STN 8772), 26 February.



DROP START TIMES G.M.T.

| | | | | | | | | | |
|----------|----------|----------|-----------|-----------|-----------|-----------|--------------|-----------|-----------|
| 1 - 1220 | 4 - 1631 | 7 - 2115 | 10 - 0142 | 13 - 0602 | 16 - 1330 | 19 - 1859 | 22 - 2200 | 25 - 0000 | 28 - 1207 |
| 2 - 1331 | 5 - 1817 | 8 - 2230 | 11 - 0301 | 14 - 0729 | 17 - 1505 | 20 - 1959 | 23 - 2300 | 26 - 0110 | |
| 3 - 1507 | 6 - 1935 | 9 - 0003 | 12 - 0431 | 15 - 1159 | 18 - 1603 | 21 - 2059 | 24 - NO DROP | 27 - 0204 | |

Figure 37: Hydrographic time series at position B 10 (STN 3656), 4-6 February.

Table 1: STD-STATIONLIST "RRS. Discovery"

| Standard Station | Station | Date | Time | Depth | Latitude | Longitude |
|------------------|-----------|-------|-------|-------|----------|-----------|
| A 10.0 | D 8659.00 | 31.1. | 18.35 | 3268 | 25°41,8' | 16°50,1' |
| A 8.0 | D 8660.00 | 31.1. | 22.17 | 2270 | 25°31,0' | 16°29,2' |
| A 6.0 | D 8661.00 | 1.2. | 03.29 | 412 | 25°19,7' | 16°09,4' |
| B 3.0 | D 8666.00 | 2.2. | 19.26 | 47 | 22°42,1' | 16°54,2' |
| B 5.0 | D 8667.00 | 2.2. | 22.26 | 49 | 22°42,1' | 16°56,3' |
| B 6.0 | D 8668.00 | 3.2. | 00.31 | 64 | 22°42,8' | 17°02,8' |
| B 7.0 | D 8669.00 | 3.2. | 02.21 | 83 | 22°43,2' | 17°08,1' |
| B 8.0 | D 8670.00 | 3.2. | 04.14 | 686 | 22°45,9' | 17°14,7' |
| B 8.0 | D 8674.00 | 3.2. | 18.55 | 716 | 22°46,6' | 17°15,2' |
| B 9.0 | D 8675.00 | 4.2. | 00.50 | 906 | 22°47,9' | 17°21,0' |
| B 10.0 | D 8676.00 | 4.2. | 13.22 | 1248 | 22°50,0' | 17°29,3' |
| B 11.0 | D 8677.00 | 4.2. | 14.57 | 1556 | 22°52,2' | 17°37,5' |
| B 12.0 | D 8678.00 | 5.2. | 02.51 | 2100 | 22°51,1' | 17°49,5' |
| B 13.0 | D 8679.00 | 5.2. | 06.42 | 2486 | 22°55,5' | 17°59,2' |
| A 10.0 | D 8681.00 | 6.2. | 15.56 | 3299 | 25°43,5' | 16°49,3' |
| A 9.0 | D 8682.00 | 6.2. | 19.06 | 3007 | 25°36,3' | 16°41,5' |
| A 8.0 | D 8683.00 | 7.2. | 07.23 | 2336 | 25°30,7' | 16°30,6' |
| A 7.0 | D 8684.00 | 7.2. | 10.48 | 1179 | 25°25,8' | 16°19,6' |
| A 6.0 | D 8685.00 | 7.2. | 15.49 | 497 | 25°18,5' | 16°11,5' |
| A 5.0 | D 8686.00 | 7.2. | 18.53 | 207 | 25°15,2' | 16°04,1' |
| A 4.0 | D 8687.00 | 7.2. | 22.56 | 98 | 25°10,2' | 15°55,9' |
| A 3.0 | D 8688.00 | 8.2. | 00.59 | 75 | 25°06,3' | 15°49,2' |
| A 2.0 | D 8689.00 | 8.2. | 03.49 | 64 | 24°59,9' | 15°41,9' |
| A 1.0 | D 8690.00 | 8.2. | 05.37 | 41 | 24°54,3' | 15°31,0' |
| B 13.0 | D 8692.00 | 9.2. | 02.19 | 2403 | 22°56,0' | 17°57,6' |
| B 12.0 | D 8693.00 | 9.2. | 04.54 | 2141 | 22°53,7' | 17°49,6' |
| B 11.0 | D 8694.00 | 9.2. | 15.57 | 1594 | 22°50,8' | 17°38,2' |
| B 10.0 | D 8695.00 | 9.2. | 23.53 | 1177 | 22°50,1' | 17°26,5' |
| B 9.0 | D 8696.00 | 10.2. | 05.47 | 912 | 22°47,1' | 17°20,7' |
| B 8.0 | D 8697.00 | 10.2. | 13.32 | 696 | 22°45,0' | 17°14,7' |
| B 7.0 | D 8698.00 | 10.2. | 15.14 | 103 | 22°44,3' | 17°10,0' |
| B 6.0 | D 8699.00 | 10.2. | 17.38 | 65 | 22°40,2' | 17°03,1' |
| B 5.0 | D 8700.00 | 10.2. | 20.36 | 55 | 22°40,0' | 16°59,0' |
| B 3.0 | D 8701.00 | 10.2. | 22.04 | 53 | 22°39,6' | 16°53,1' |
| B 8.5 | D 8703.00 | 11.2. | 04.06 | 842 | 22°44,6' | 17°17,6' |

| Standard Station | Station | Date | Time | Depth | Latitude | Longitude |
|------------------|-----------|-------|-------|-------|----------|-----------|
| B 7.5 | D 8704.00 | 11.2. | 06.07 | 638 | 22°44,2' | 17°15,1' |
| B 7.5 | D 8705.00 | 11.2. | 07.24 | 500 | 22°44,1' | 17°13,8' |
| B 7.5 | D 8706.00 | 11.2. | 08.28 | 384 | 22°43,8' | 17°12,3' |
| B 7.5 | D 8707.00 | 11.2. | 09.30 | 150 | 22°43,7' | 17°11,0' |
| B 9.5 | D 8709.00 | 11.2. | 20.37 | 1011 | 22°46,6' | 17°24,3' |
| B 8.0 | D 8710.00 | 11.2. | 23.08 | 786 | 22°46,3' | 17°15,9' |
| B 7.5 | D 8711.00 | 12.2. | 00.21 | 600 | 22°46,5' | 17°13,6' |
| B 7.5 | D 8712.00 | 12.2. | 02.06 | 550 | 22°45,5' | 17°13,3' |
| B 7.5 | D 8713.00 | 12.2. | 03.13 | 420 | 22°44,6' | 17°12,1' |
| B 7.5 | D 8714.00 | 12.2. | 04.16 | 340 | 22°44,1' | 17°12,0' |
| B 7.5 | D 8715.00 | 12.2. | 05.26 | 238 | 22°43,2' | 17°11,6' |
| B 7.0 | D 8716.00 | 12.2. | 06.46 | 103 | 22°42,6' | 17°10,4' |
| B 8.5 | D 8717.00 | 12.2. | 07.57 | 826 | 22°45,9' | 17°16,4' |
| A 10.0 | D 8719.00 | 13.2. | 12.31 | 3299 | 25°44,8' | 16°48,2' |
| A 9.0 | D 8720.00 | 13.2. | 15.34 | 3041 | 25°37,6' | 16°40,0' |
| A 8.0 | D 8721.00 | 13.2. | 22.37 | 2300 | 25°30,0' | 16°30,2' |
| A 7.0 | D 8722.00 | 14.2. | 01.09 | 1272 | 25°25,3' | 16°20,1' |
| A 6.0 | D 8723.00 | 14.2. | 09.44 | 498 | 25°18,8' | 16°11,3' |
| A 5.0 | D 8724.00 | 14.2. | 12.34 | 188 | 25°14,9' | 16°03,6' |
| A 4.0 | D 8725.00 | 14.2. | 15.28 | 98 | 25°11,1' | 15°58,8' |
| A 3.0 | D 8726.00 | 14.2. | 18.41 | 77 | 25°06,3' | 15°50,5' |
| A 6.5 | D 8730.00 | 15.2. | 20.44 | 1053 | 25°19,0' | 16°17,8' |
| A 6.5 | D 8731.00 | 15.2. | 22.06 | 750 | 25°17,3' | 16°15,7' |
| A 6.0 | D 8732.00 | 15.2. | 23.35 | 500 | 25°15,3' | 16°12,7' |
| A 5.5 | D 8733.00 | 16.2. | 01.28 | 355 | 25°12,7' | 16°08,7' |
| A 4.5 | D 8734.00 | 16.2. | 03.12 | 195 | 25°10,4' | 16°05,4' |
| A 4.5 | D 8735.00 | 16.2. | 04.03 | 156 | 25°09,1' | 16°05,5' |
| A 4.5 | D 8736.00 | 16.2. | 05.07 | 102 | 25°08,3' | 16°04,3' |
| A 3.5 | D 8737.00 | 16.2. | 06.57 | 88 | 25°07,9' | 15°55,5' |
| A 10.0 | D 8738.00 | 21.2. | 01.55 | 3318 | 25°45,3' | 16°48,4' |
| A 9.0 | D 8739.00 | 21.2. | 04.43 | 3007 | 25°36,8' | 16°39,1' |
| A 8.0 | D 8740.00 | 21.2. | 07.26 | 2126 | 25°30,5' | 16°28,6' |
| A 7.0 | D 8741.00 | 21.2. | 10.00 | 1138 | 25°25,2' | 16°19,7' |
| A 6.0 | D 8742.00 | 21.2. | 12.32 | 469 | 25°18,8' | 16°11,1' |
| A 5.0 | D 8743.00 | 21.2. | 14.31 | 196 | 25°14,9' | 16°03,7' |
| A 4.0 | D 8744.00 | 21.2. | 16.08 | 98 | 25°10,4' | 15°56,8' |
| A 3.0 | D 8745.00 | 21.2. | 17.47 | 79 | 25°06,9' | 15°50,0' |
| A 2.0 | D 8746.00 | 21.2. | 19.41 | 64 | 25°00,0' | 15°40,5' |
| A 1.0 | D 8747.00 | 21.2. | 21.17 | 40 | 24°54,0' | 15°32,1' |

| Standard Station | Station | Date | Time | Depth | Latitude | Longitude |
|------------------|-----------|-------|-------|-------|----------|-----------|
| B 3.0 | D 8749.00 | 22.2. | 16.16 | 49 | 22°41,4' | 16°50,9' |
| B 5.0 | D 8750.00 | 22.2. | 17.23 | 57 | 22°42,2' | 16°56,0' |
| B 6.0 | D 8751.00 | 22.2. | 18.31 | 68 | 22°42,7' | 17°02,1' |
| B 7.0 | D 8752.00 | 22.2. | 19.55 | 88 | 22°44,2' | 17°07,8' |
| B 8.0 | D 8753.00 | 22.2. | 21.16 | 737 | 22°46,2' | 17°14,8' |
| B 9.0 | D 8754.00 | 22.2. | 23.28 | 911 | 22°48,4' | 17°20,6' |
| B 10.0 | D 8755.00 | 23.2. | 01.49 | 1177 | 22°47,9' | 17°27,6' |
| B 11.0 | D 8756.00 | 23.2. | 04.18 | 1630 | 22°50,4' | 17°39,3' |
| B 12.0 | D 8757.00 | 23.2. | 07.50 | 2037 | 22°53,7' | 17°47,2' |
| B 13.0 | D 8758.00 | 23.2. | 09.54 | 2407 | 22°55,4' | 17°57,4' |
| B 12.0 | D 8759.00 | 23.2. | 13.21 | 2063 | 22°53,0' | 17°48,0' |
| B 12.0 | D 8760.00 | 23.2. | 17.02 | 2044 | 22°53,5' | 17°47,3' |
| B 12.0 | D 8765.01 | 24.2. | 06.39 | 2076 | 22°53,5' | 17°48,5' |
| B 12.0 | D 8765.02 | 24.2. | 07.46 | 2065 | 22°53,5' | 17°48,2' |
| B 12.0 | D 8765.03 | 24.2. | 08.34 | 2070 | 22°54,4' | 17°48,3' |
| B 12.0 | D 8765.05 | 24.2. | 10.33 | 2072 | 22°53,8' | 17°48,2' |
| B 12.0 | D 8765.06 | 24.2. | 11.32 | 2057 | 22°53,5' | 17°48,2' |
| B 12.0 | D 8765.07 | 24.2. | 12.32 | 2078 | 22°53,9' | 17°48,5' |
| B 12.0 | D 8765.08 | 24.2. | 13.31 | 2082 | 22°53,8' | 17°48,9' |
| B 12.0 | D 8765.09 | 24.2. | 14.31 | 2085 | 22°53,6' | 17°48,8' |
| B 12.0 | D 8765.10 | 24.2. | 15.33 | 2082 | 22°53,4' | 17°48,6' |
| B 12.0 | D 8765.11 | 24.2. | 16.32 | 2083 | 22°53,8' | 17°48,4' |
| B 12.0 | D 8765.12 | 24.2. | 17.31 | 2082 | 22°53,9' | 17°48,3' |
| B 12.0 | D 8765.13 | 24.2. | 18.31 | 2078 | 22°53,9' | 17°48,4' |
| B 8.0 | D 8772.01 | 26.2. | 06.40 | 688 | 22°45,6' | 17°14,6' |
| B 8.0 | D 8772.02 | 26.2. | 07.33 | 679 | 22°44,6' | 17°15,0' |
| B 8.0 | D 8772.03 | 26.2. | 08.34 | 677 | 22°45,6' | 17°14,4' |
| B 8.0 | D 8772.04 | 26.2. | 09.37 | 683 | 22°45,8' | 17°14,7' |
| B 8.0 | D 8772.05 | 26.2. | 10.31 | 678 | 22°45,8' | 17°13,9' |
| B 8.0 | D 8772.06 | 26.2. | 11.32 | 694 | 22°45,9' | 17°15,8' |
| B 8.0 | D 8772.07 | 26.2. | 12.33 | 679 | 22°46,1' | 17°16,4' |
| B 8.0 | D 8772.08 | 26.2. | 13.31 | 746 | 22°46,4' | 17°16,0' |
| B 8.0 | D 8772.09 | 26.2. | 14.29 | 685 | 22°46,0' | 17°14,6' |
| B 8.0 | D 8772.10 | 26.2. | 15.35 | 710 | 22°45,8' | 17°14,7' |
| B 8.0 | D 8772.11 | 26.2. | 16.31 | 716 | 22°45,9' | 17°15,1' |
| B 8.0 | D 8772.12 | 26.2. | 17.33 | 725 | 22°46,0' | 17°15,5' |
| B 8.0 | D 8772.13 | 26.2. | 18.43 | 740 | 22°45,9' | 17°15,9' |

| Standard Station | Station | Date | Time | Depth | Latitude | Longitude |
|---------------------|-----------|-------|-------|-------|----------|-----------|
| B 9.5 | D 8775.01 | 27.2. | 07.14 | 1011 | 22°46,2' | 17°24,1' |
| B 9.5 | D 8775.02 | 27.2. | 13.46 | 910 | 22°47,1' | 17°19,8' |
| B 3.0 | D 8785.00 | 1.3. | 00.08 | 52 | 22°40,6' | 16°51,6' |
| B 5.0 | D 8786.00 | 1.3. | 01.20 | 57 | 22°41,7' | 16°57,6' |
| B 6.0 | D 8787.00 | 1.3. | 02.34 | 70 | 22°43,5' | 17°02,1' |
| B 8.0 | D 8788.00 | 1.3. | 05.30 | 800 | 22°45,2' | 17°15,9' |
| B 9.0 | D 8789.00 | 1.3. | 08.44 | 898 | 22°46,5' | 17°19,6' |
| B 10.0 | D 8790.00 | 1.3. | 11.20 | 1180 | 22°48,0' | 17°28,1' |
| B 11.0 | D 8791.00 | 1.3. | 15.13 | 1532 | 22°52,4' | 17°36,9' |
| B 12.0 | D 8792.00 | 1.3. | 18.18 | 2059 | 22°52,3' | 17°48,3' |
| B 13.0 | D 8793.00 | 1.3. | 21.14 | 2466 | 22°54,2' | 17°58,2' |
| B 3.0 | D 8798.00 | 2.3. | 15.52 | 55 | 22°41,7' | 16°54,2' |
| B 3.5 | D 8799.00 | 2.3. | 16.29 | 55 | 22°42,5' | 16°56,9' |
| B 5.0 | D 8800.00 | 2.3. | 17.05 | 59 | 22°42,6' | 16°57,3' |
| B 5.5 | D 8801.00 | 2.3. | 17.55 | 67 | 22°41,3' | 17°00,3' |
| B 6.0 | D 8802.00 | 2.3. | 18.24 | 72 | 22°42,1' | 17°01,7' |
| B 6.5 | D 8803.00 | 2.3. | 19.02 | 78 | 22°42,7' | 17°05,0' |
| B 7.0 | D 8804.00 | 2.3. | 19.52 | 93 | 22°43,3' | 17°08,3' |
| B 7.5 | D 8805.00 | 2.3. | 20.51 | 155 | 22°44,7' | 17°10,9' |
| B 7.0 | D 8809.00 | 3.3. | 14.34 | 91 | 22°43,6' | 17°08,4' |
| B 7.5 | D 8810.01 | 3.3. | 16.13 | 158 | 22°44,4' | 17°11,1' |
| B 7.5 | D 8810.02 | 3.3. | 17.58 | 303 | 22°44,5' | 17°11,6' |
| B 7.5 | D 8811.01 | 3.3. | 19.03 | 363 | 22°44,2' | 17°12,2' |
| B 7.5 | D 8811.02 | 3.3. | 20.16 | 200 | 22°43,3' | 17°11,3' |
| B 7.0 | D 8811.03 | 3.3. | 21.13 | 107 | 22°42,6' | 17°10,8' |
| B 6.5 | D 8811.04 | 3.3. | 22.13 | 74 | 22°40,5' | 17°07,1' |

Table 2: STD-STATIONLIST "FS. Meteor"

| Standard Station | Station | Date | Time | Depth | Latitude | Longitude |
|------------------|-----------|-------|-------|-------|----------|-----------|
| C 9.0 | M 3618.00 | 28.1. | 06.10 | 2550 | 21°25,3' | 18°35,4' |
| C 8.0 | M 3619.00 | 28.1. | 18.48 | 2400 | 21°28,5' | 18°11,0' |
| C 7.0 | M 3620.00 | 28.1. | 23.57 | 1050 | 21°25,3' | 17°54,6' |
| C 6.0 | M 3621.00 | 29.1. | 05.10 | 500 | 21°22,3' | 17°40,1' |
| C 5.0 | M 3622.00 | 29.1. | 17.08 | 350 | 21°20,7' | 17°31,7' |
| C 4.0 | M 3623.01 | 29.1. | 22.39 | 95 | 21°19,8' | 17°23,3' |
| C 4.0 | M 3623.02 | 29.1. | 23.49 | 95 | 21°19,8' | 17°23,3' |
| C 3.0 | M 3624.00 | 30.1. | 04.05 | 54 | 21°19,1' | 17°15,9' |
| C 1.0 | M 3625.00 | 30.1. | 06.55 | 30 | 21°16,2' | 17°04,5' |
| - | M 3629.00 | 30.1. | 20.14 | 50 | 20°35,9' | 17°19,8' |
| - | M 3630.00 | 30.1. | 23.44 | 450 | 20°35,2' | 17°49,5' |
| C | M 3634.00 | 31.1. | 13.57 | 385 | 21°20,6' | 17°35,6' |
| - | M 3635.00 | 31.1. | 17.20 | 1000 | 21°41,0' | 17°49,0' |
| - | M 3636.00 | 31.1. | 20.36 | 880 | 21°50,1' | 17°29,4' |
| - | M 3637.00 | 31.1. | 23.22 | 1375 | 22°03,1' | 17°44,8' |
| - | M 3638.00 | 1.2. | 02.25 | 350 | 22°09,0' | 17°24,0' |
| - | M 3639.00 | 1.2. | 04.52 | 1350 | 22°13,3' | 17°34,1' |
| - | M 3640.00 | 1.2. | 05.24 | 1350 | 22°17,9' | 17°44,0' |
| - | M 3641.00 | 1.2. | 07.23 | 1400 | 22°24,2' | 17°30,2' |
| - | M 3642.00 | 1.2. | 09.32 | 521 | 22°31,1' | 17°17,0' |
| - | M 3643.00 | 1.2. | 11.56 | 1253 | 22°42,3' | 17°31,4' |
| B 12.0 | M 3644.00 | 1.2. | 14.46 | 1963 | 22°53,9' | 17°44,9' |
| B 12.0 | M 3645.00 | 1.2. | 17.50 | 1799 | 22°53,8' | 17°44,7' |
| B 14.0 | M 3646.00 | 2.2. | 04.05 | 1800 | 23°04,8' | 18°16,8' |
| B 12.0 | M 3647.00 | 2.2. | 19.24 | 2000 | 22°56,0' | 17°45,0' |
| B 10.0 | M 3648.00 | 2.2. | 22.46 | 1340 | 22°48,0' | 17°31,0' |
| B 8.0 | M 3649.00 | 3.2. | 03.04 | 491 | 22°48,3' | 17°12,4' |
| B 7.0 | M 3650.00 | 3.2. | 04.54 | 54 | 22°44,0' | 17°08,0' |
| B 6.0 | M 3651.00 | 3.2. | 10.41 | 70 | 22°43,5' | 17°03,5' |
| B 4.0 | M 3652.00 | 3.2. | 15.53 | 58 | 22°43,7' | 16°54,0' |
| B 2.0 | M 3653.00 | 3.2. | 18.35 | 52 | 22°41,5' | 16°45,2' |
| B 1.0 | M 3654.00 | 3.2. | 22.13 | 40 | 22°40,7' | 16°36,2' |
| B | M 3655.00 | 4.2. | 04.32 | 700 | 22°47,4' | 17°13,4' |
| B 10.0 | M 3656.01 | 4.2. | 12.20 | 1245 | 22°48,7' | 17°30,0' |
| B 10.0 | M 3656.02 | 4.2. | 13.31 | 1245 | 22°48,7' | 17°30,0' |

| Standard Station | Station | Date | Time | Depth | Latitude | Longitude |
|------------------|-----------|-------|-------|-------|----------|-----------|
| B 10.0 | M 3656.03 | 4.2. | 15.07 | 1245 | 22°43,4' | 17°30,4' |
| B 10.0 | M 3656.04 | 4.2. | 16.31 | 1245 | 22°43,4' | 17°30,4' |
| B 10.0 | M 3656.05 | 4.2. | 18.17 | 1300 | 22°43,4' | 17°30,4' |
| B 10.0 | M 3656.06 | 4.2. | 19.35 | 1300 | 22°43,4' | 17°30,4' |
| B 10.0 | M 3656.07 | 4.2. | 21.15 | 1250 | 22°43,4' | 17°30,4' |
| B 10.0 | M 3656.08 | 4.2. | 22.30 | 1240 | 22°43,4' | 17°30,4' |
| B 10.0 | M 3656.09 | 5.2. | 00.03 | 1250 | 22°50,6' | 17°30,5' |
| B 10.0 | M 3656.10 | 5.2. | 01.42 | 1260 | 22°50,6' | 17°30,5' |
| B 10.0 | M 3656.11 | 5.2. | 03.01 | 1230 | 22°50,6' | 17°30,5' |
| B 10.0 | M 3656.12 | 5.2. | 04.31 | 1280 | 22°50,6' | 17°30,5' |
| B 10.0 | M 3656.13 | 5.2. | 06.02 | 1320 | 22°48,7' | 17°32,7' |
| B 10.0 | M 3656.14 | 5.2. | 07.29 | 1370 | 22°48,7' | 17°32,7' |
| B 10.0 | M 3656.15 | 5.2. | 11.59 | 1480 | 22°48,7' | 17°32,7' |
| B 10.0 | M 3656.16 | 5.2. | 13.30 | 1450 | 22°48,5' | 17°34,6' |
| B 10.0 | M 3656.17 | 5.2. | 15.05 | 1480 | 22°48,5' | 17°34,6' |
| B 10.0 | M 3656.18 | 5.2. | 18.03 | 1410 | 22°48,5' | 17°34,6' |
| B 10.0 | M 3656.19 | 5.2. | 18.59 | 1420 | 22°48,5' | 17°34,6' |
| B 10.0 | M 3656.20 | 5.2. | 19.59 | 1415 | 22°48,1' | 17°33,5' |
| B 10.0 | M 3656.21 | 5.2. | 20.59 | 1408 | 22°48,1' | 17°33,5' |
| B 10.0 | M 3656.22 | 5.2. | 22.00 | 1395 | 22°48,1' | 17°33,5' |
| B 10.0 | M 3656.23 | 5.2. | 23.00 | 1390 | 22°48,1' | 17°33,5' |
| B 10.0 | M 3656.25 | 6.2. | 00.00 | 1380 | 22°48,1' | 17°33,5' |
| B 10.0 | M 3656.26 | 6.2. | 01.10 | 1380 | 22°48,1' | 17°33,5' |
| B 10.0 | M 3656.27 | 6.2. | 02.04 | 1420 | 22°48,1' | 17°33,5' |
| B 10.0 | M 3656.28 | 6.2. | 12.07 | 1400 | 22°48,7' | 17°30,0' |
| C 9.0 | M 3657.00 | 7.2. | 01.11 | 2910 | 21°30,6' | 18°42,6' |
| C 8.0 | M 3658.00 | 7.2. | 10.17 | 1998 | 21°28,4' | 18°11,2' |
| C 7.0 | M 3659.00 | 7.2. | 19.52 | 1026 | 21°25,5' | 17°53,7' |
| C 6.0 | M 3660.01 | 8.2. | 00.02 | 532 | 21°21,4' | 17°40,8' |
| C 6.0 | M 3660.02 | 8.2. | 12.47 | 563 | 21°20,6' | 17°41,7' |
| C 5.0 | M 3661.00 | 8.2. | 17.42 | 300 | 21°20,5' | 17°32,7' |
| C 4.0 | M 3662.00 | 8.2. | 20.46 | 93 | 21°19,8' | 17°23,1' |
| C 3.0 | M 3663.00 | 9.2. | 02.09 | 49 | 21°19,0' | 17°15,1' |
| C 2.0 | M 3664.00 | 9.2. | 03.29 | 34 | 21°17,8' | 17°09,4' |
| C 6.0 | M 3665.00 | 9.2. | 09.29 | 530 | 21°20,4' | 17°41,6' |
| C 8.0 | M 3668.00 | 10.2. | 12.34 | 793 | 21°21,9' | 17°46,5' |

| Standard Station | Station | Date | Time | Depth | Latitude | Longitude |
|------------------|-----------|-------|-------|-------|----------|-----------|
| C 7.5 | M 3669.00 | 10.2. | 15.18 | 1680 | 21°25,4' | 18°09,5' |
| C 7.5 | M 3673.00 | 12.2. | 08.21 | 1920 | 21°26,7' | 18°10,3' |
| - | M 3674.00 | 12.2. | 11.50 | 1360 | 21°36,0' | 18°00,0' |
| - | M 3675.00 | 12.2. | 14.37 | 1180 | 21°46,1' | 17°48,7' |
| - | M 3676.00 | 12.2. | 17.49 | 1280 | 21°56,1' | 17°36,8' |
| - | M 3677.00 | 12.2. | 20.51 | 390 | 22°06,8' | 17°25,1' |
| - | M 3678.00 | 12.2. | 23.06 | 1650 | 22°16,9' | 17°36,5' |
| - | M 3679.00 | 13.2. | 02.24 | 885 | 22°22,4' | 17°21,9' |
| - | M 3680.00 | 13.2. | 05.15 | 77 | 22°29,2' | 17°08,0' |
| B 2.0 | M 3681.00 | 13.2. | 08.35 | 40 | 22°41,6' | 16°45,2' |
| B 7.0 | M 3683.00 | 13.2. | 13.58 | 85 | 22°44,9' | 17°08,0' |
| B 8.0 | M 3685.00 | 14.2. | 02.16 | 600 | 22°47,5' | 17°14,1' |
| B 10.0 | M 3686.00 | 14.2. | 09.00 | 1360 | 22°48,0' | 17°31,3' |
| B 10.0 | M 3687.00 | 14.2. | 13.37 | 1164 | 22°47,6' | 17°29,1' |
| B 12.0 | M 3691.00 | 15.2. | 03.04 | 1980 | 22°54,0' | 17°46,2' |
| B 14.0 | M 3692.00 | 15.2. | 13.20 | 2792 | 23°06,5' | 18°16,5' |

Table 3: POSITION OF MOORINGS

| Mooring | Depth | Latitude | Longitude |
|---------|-------|-----------|-----------|
| ACM 1 | 65 | 25°01,85' | 15°47,65' |
| ACM 3 | 3026 | 25°37,32' | 16°38,90' |
| BCM 1 | 65 | 22°44,12' | 17°03,60' |
| BCM 2 | 500 | 22°47,60' | 17°12,60' |
| BCM 3 | 2000 | 22°54,00' | 17°45,10' |
| CCM 2 | 500 | 21°22,80' | 17°40,10' |