U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HYDROGRAPHY OF LYDONIA CANYON:

DATA REPORT FOR R/V OCEANUS CRUISE 91, January 1981

by

John A. Moody[1], Bradford Butman[1], and Sandra J. Conley[1]

Open-File Report 86-174

Prepared in cooperation with the
U.S. Minerals Management Service
under Interagency Agreement
14-12-0001-30180

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HYDROGRAPHY OF LYDONIA CANYON:

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INTRODUCTION

This report presents hydrographic data obtained on R/V OCEANUS cruise 91, conducted between January 16-22, 1981. Hydrographic measurements (temperature, salinity, oxygen, and light transmission), nutrient measurements (phosphate, nitrate, silicate, nitrite, ammonia and chlorophyll) and suspended matter measurements were obtained around Lydonia Canyon (lat 40°30' N., long 67°30' W.) and the adjacent continental shelf (fig. 1).

During the R/V OCEANUS 91, a total of 30 hydrographic profiles were obtained, 18 by means of a conductivity-temperature-depth (CTD) profiler and 12 by means of expendable bathythermographs (XBT's). Stations are numbered sequentially and station information is tabulated in table 1. The stations were spaced about 3 km apart and arranged in 5 sections (fig. 2). Sections 1 and 2 were perpendicular to the canyon axis, section 3 followed the canyon axis and section 4 was 5-10 km east and parallel to the canyon axis across the adjacent shelf and slope. Section 5 (fig. 1) started in 64 m of water, crossed the shelf, and ended 15 km from the head of Lydonia Canyon in 78 m of water. The southern part of sections 3 and 4 may have crossed the northern edge of the warm eddy 80-G which was located southeast of Lydonia Canyon (fig. 1).

OBJECTIVES

This survey was designed to provide hydrographic and nutrient data sections in and surrounding Lydonia Canyon during winter. The sections were designed to aid in the interpretation of current, temperatures, pressure, and light transmission measured by a large moored instrument array (fig. 3) located at the head of Lydonia Canyon, on the adjacent canyon walls, on the adjacent slope, and in the canyon itself (Butman and others, 1983; Butman and Conley, 1984).

STATION PROCEDURES

At each XBT station, surface salinity data were obtained using a bucket sampler and an XBT was released while the ship was underway. At each CTD station, the ship was stopped and a surface-water sample was obtained, using a bucket sampler for analysis of salinity and nutrients. All nutrient samples were immediately frozen for analysis on shore. The CTD (with 10-liter(L) Niskin bottles attached to a General Oceanics Rosette) was lowered and held at the surface while CTD surface readings, latitude, longitude and water depth were recorded in a log. The CTD was then lowered at approximately 30 m/min and stopped approximately 2-5 m above bottom. After the deepest readings were recorded, one Niskin bottle was closed electronically. The CTD was then raised at approximately 50 m/min and stopped at nominal depths of 400, 150, 120, 100, 60 and 30 m, CTD readings were recorded in the deck log at each stop and another Niskin bottle was closed electronically. The Niskin bottles were removed and 1 water sample was collected for analysis of salinity and 1-3 samples for measurement of oxygen. A sample was taken for nutrient analysis (PO_4, Si_4, NO_3, NO_2, NH_3 see Appendix IV), which was performed later at the Woods Hole Oceanographic Institution (WHOI). Approximately 2-liters of sea water was filtered through paired 0.45-mm Millipore filters for determination of suspended matter concentration. Water samples (~500 ml) for chlorophyll determination were filtered through glass fiber filters using a vacuum pressure of 10-inches of mercury. Within 24-hours the chlorophyll was dissolved by grinding in 90 percent acetone and the fluorescence of the resulting solution was compared to a chlorophyll a standard using a Turner 110 fluorometer. The results of nutrient and chlorophyll analysis are listed in table 3; the results for suspended matter are listed in table 4. Bottle samples were not obtained at all depths because of some bottle malfunctions. Samples of nutrients were obtained at 18 stations, suspended matter at 15 stations, oxygen at 6 stations, and salinity at 29 stations. The oxygen and salinity samples were used as calibration checks on the CTD. Meterological observations made during the cruise were obtained from the ships log and are listed in tables 5 and 6.

INSTRUMENT DESCRIPTION

The CTD profiler (Neil Brown Instrument Systems, Mark III) was modified to also measure oxygen and light transmission. A scan of data (conductivity, temperature, pressure, oxygen current, oxygen temperature, and light transmission) was obtained 32 times each second. Conductivity was measured with a miniature four-electrode alumina ceramic cell (Neil Brown Instrument #B10086). The temperature sensor was a platinum resistance thermometer (Rosemount Engineering Co., model 171-BJ) mounted in a temperature bridge with a reference resistor. Pressure was measured with a bonded wire strain gauge bridge (Standard Control, Inc., model no. 211-35-440). The dissolved oxygen was computed from a time average measurement (1.024 s) of the current and internal temperature of a polargraphic membrane (Beckman model no. 147737). Light transmission was measured using a Sea Tech 25-cm path length transmissometer (Bartz and others, 1978) mounted horizontally inside the CTD cage. The light source was a light emitting diode with a wavelength of 660 nm and a beam diameter of 20 mm. All sensor ranges, accuracies, and resolutions from manufacturers' specifications are listed in Appendix II. For more detailed technical description of the CTD system, see Brown and Morrison (1978), and for more detailed description of field performance, see Fofonoff and others (1974).

Expendable bathythermographs or XBT's (Sippican Ocean Systems, models T-4, T-5, T-6, T-7, and T-10) were used to measure vertical temperature profiles. Systematic differences in XBT (models T-4 and T-7) and CTD profiles have been reported by Heinmiller and others (1983) from field data. They found mean temperature difference (XBT-CTD) of 0.19°C and 0.13°C for the T-4 and T-7 compared to the generally accepted accuracy of ~0.1°C (Georgi and others, 1980). They also found that the mean T-7 depth error was within the generally accepted depth accuracy of ±2% of the recorded depth (Stegen and others, 1975) but the T-4 XBT's exceeded this below ~200 m. The XBT data in this report were not corrected for these possible systematic errors.

The salinity of water samples collected during the CTD cast was measured by a salinometer (Guildline Autosal 8400) and the oxygen was measured by the Winkler chemical titration method. The accuracies of both methods are listed in table 2.

Navigation was by a Northstar 6000 Loran-C, and latitude and longitude were determined by the Northstar 5101 algorithm. The Northstar latitude/longitude grid in this region is offset from true latitude/longitude by about 0.92 km toward 294.5° (Butman and Moody, 1984). Water depth at each station was measured by means of a Gifft echo sounder.

INSTRUMENT CALIBRATION

Temperature time-lag

The platinum resistance thermometer time constant (Tlag = 0.125 s) was selected to minimize density inversions in regions of strong thermal gradients. Since the temperature sensor had a slower response than the conductivity and pressure sensors, an exponential recursive filter (Bendat and Piersol, 1971) was applied to the conductivity and pressure series to lag these variables to match the temperature (Millard, 1982). The digital form of the filter is:

$$y(t) = y(t-dt) \cdot W0 + x(t) \cdot W1$$

dt = CTD sampling time interval = 0.03125 s
y(t) is the filtered output of conductivity or pressure
y(t-dt) is the previous value
x(t) is the unfiltered input

$$W0 = e^{-dt/Tlag}$$

$$W1 = 1 - W0$$

A post-cruise laboratory calibration of the CTD temperature was done on March 31, 1981 at the Neil Brown Instrument Systems, Inc.(NBIS) and the temperature offset (calibration bath - CTD) ranged between +0.0008°C at 0° and -0.0026°C at 15°C. No correction was made to the temperatures measured by the CTD to account for these offsets.

Salinity

Salinity and sigma-t were calculated from conductivity, temperature, and pressure using algorithms given by Fofonoff and Millard (1983). Salinity values of the bottle samples collected during CTD casts were determined using a salinometer (see table 2 for accuracy). The 22 bottle salinities and the salinities computed from the CTD observations are listed in table 2. The mean difference (bottle-CTD) for the 18 surface salinities was -0.006 psu (practical salinity units; Lewis, 1980; Fofonoff and Millard, 1983) with a standard deviation of ±0.038 psu. Some of the difference between the bottle and CTD values of salinity could be due to the difference in depth of the CTD (1-4 m) compared with the bucket sample obtained at the surface. The CTD values of salinity selected for comparison with the bottle samples at lower depths were measured on the downcast, which was often separated from the bottle samples collected on the upcast by several minutes. If there was a vertical gradient in the region of the bottle sample, ship heave, etc., could also cause a large uncertainity in the bottle salinity. The uncertainity in salinity (see ΔS in table 2) caused by a vertical gradient was estimated as the product of the salinity gradient (determined over 10 m centered approximately at the expected bottle depth) times 2 dbar (a typical CTD or bottle excursion caused by ship motion). The uncertainity ΔS was estimated to be 0.040 psu and 0.016 psu for station 7 (129 m) and station 10 (98 m), respectively, and represents a large portion of the residual. The mean residual from four deep bottle samples was -0.078 psu with a standard deviation of ±0.123 psu. No correction was made to the salinities reported here to account for this offset between bottle and CTD salinities.

A post-cruise laboratory calibration of conductivity was done on April 1, 1981 at Neil Brown Instrument Systems, Inc. and the offset (calibration bath - CTD) ranged between -0.003 mmhos and -0.007 mmho which corresponds to salinity values of -0.003 psu and -0.005 psu.

Oxygen

The oxygen sensor did not work and no reliable oxygen measurements were obtained using the CTD. Oxygen was measured by Winkler chemical titration method (Strickland and Parson, 1972) at six stations and these oxygen values are listed in Table 2.

Light transmission

The beam attenuation coefficient, ATN (in m^{-1}) over a 100-cm path length, was computed from the measured transmissometer voltages (TR) using

$$ATN = -\frac{1}{0.25} \ln \left(\frac{TR}{TR_{cw}}\right)$$

where TR_{cw} is the voltage measured in clear water. TR_{cw} can be determined as 0.95 times the measured voltage in air or in a laboratory tank (see Moody and others, 1986 for method). The transmission sensor (SN 44) was calibated in the laboratory 1 day prior to the cruise and gave a value of TR_{cw} equal to 4.71 volts.

SUMMARY

Based on these calibrations, the CTD temperature and salinity data are accurate to ±0.003°C and 0.01 psu, respectively. The changes in the attenuation coefficient are accurate to about ±0.04 m^{-1}. Because there is some uncertainity in the normalization voltage for the transmissometer, however, the absolute value of the coefficients could be offset by a constant.

DATA PROCESSING

The CTD data (pressure, temperature, conductivity, oxygen current, oxygen temperature, and light transmission) were recorded on both 9-track magnetic tape (see Appendix III) and 1/4" FM tape. The data were processed ashore using the techniques described by Millard (1982). The original 9-track data tapes were first checked for proper format and station sequence, and the data were transferred to disc storage. The data obtained on both upcast and downcast were subsampled (usually every 100 to 200 points) and listed and plotted to check instrument performance. Wild points were identified and replaced with the previous good value using range filters for each variable. The ranges were typically 1 variable unit except for transmission which was 0.05-0.10 volts. The conductivity and pressure data were time lagged to correct for the time constant of the temperature sensor (see above), and then filtered to obtain a monotonically increasing series in pressure. The pressure and temperature channels of the CTD did not update properly so that a special filter was used to eliminate all data scans in which the pressure or temperature difference (current scan - previous scan) were less than ±0.05 dbar or ±0.001°C, respectively. This eliminated about 95 to 97 percent of the scans, leaving about 0.4-3.0 scans per dbar. The data were therefore averaged over a 10 dbar pressure interval which gave a maximum of between 8 and 41 scans per interval and a minimum of one scan per interval for a few depths at some stations. These averaged data were used to contour the hydrographic sections presented in this report. The data was not submitted to the National Oceanographic Data Center (NODC) to be archived because the 10-dbar averaging interval was not compatible with the NODC format and the oxygen values were not reliable.

The XBT data were recorded on a strip chart. The traces were digitized approximately every 2 m with a depth accuracy of ±1 m and a temperature accuracy of ±0.2°C. The XBT data were not averaged to 10-dbar intervals due to the irregular number of data points.

DATA PRODUCTS

Vertical sections

The hydrographic data are presented in several ways. Vertical sections are shown in figures 4-8. The sections are numbered as OC091-N, where N is the section number (see fig. 1 and column 2 of table 1). The station numbers for each section are labeled across the top with the station type (C = CTD or X = XBT) and surface value of the contoured variable printed below. The vertical scale (1 cm = 40 m) is the same for all sections. The horizontal scale (1 cm = 1 km) for sections 1 and 2 across the canyon is not the same as the horizontal scale (1 cm = 6.5 km) for the sections parallel to the canyon axis (3, 4, and 5).

The contour interval for each variable is the same for all sections and every fifth contour is thicker. Because of the contouring algorithms used, these sections do not show much detail at vertical scales less than 10 m and are intended to give an overall picture of the hydrography.

The sections showing temperature, salinity, sigma-t and light attenuation coefficient used the 10-dbar-averaged data which were contoured using DISSPLA graphic subroutines (Integrated Software Systems Corp., 1981). These subroutines require data on a regularly spaced grid in both the horizontal and vertical. A regularly spaced vertical grid of 2N-1 grid lines, where N is the number of stations, was constructed for each hydrographic section. The leftmost and rightmost vertical grid lines were set at the first and last stations in the section. The spacing between the remaining vertical grid lines was determined by computing the sum of the great circle distance between successive stations along the trackline and dividing by 2N-2. The position of the equally spaced, interior, vertical grid lines does not always correspond to a station location. Horizontal grid lines were spaced every 10 m.

Data values at each regularly spaced grid point were computed as a weighted average of the irregularly spaced data within a region one 10-m cell vertically and usually five cells horizontally (two on either side) from the grid point. The data were weighted by D^{-3} where D is the distance (in grid units) between the location of the data values and the grid point. This smoothing removes some of the fine structure from the sections and may spread some of the frontal features.

The contouring algorithm has no provisions for terminating contours at the sea floor and requires data in a rectangle. For the sections in this data report, the left and right boundaries are the left and right vertical grid lines, the top boundary was the sea surface, and the bottom boundary was the deepest cast in the section. To speed contouring and to obtain reasonable contours at the sea floor, data were provided below the measurement depth by repeating the data measured at the greatest depth to a distance H into the bottom below the last measured value. Data below the distance H were taken from values observed at an adjacent deeper station, shifted upward or downward by a constant so that the values matched at the starting depth. In some cases the values from an adjacent station were inserted below the depth H without adjusting by a constant. The constant distance H ranged from 0 to 100 m and was adjusted for each station to make the contours meet the sea floor in as reasonable a way as possible. The shape and slope of the contours near the sea floor should be interpreted with care. Contours below the sea floor were deleted in the sections presented here.

The contouring algorithm used a linear interpolation between the adjacent regularly spaced points. The tension parameter, which controls the smoothness vs. straight line connection of points of equal value, was varied over its entire range between 1 and 10 and little difference was noted in the contours due to the high density of data points to control the contours.

The sections showing nutrients and suspended matter had only 3-5 data points per station and were contoured by hand.

Horizontal sections

Horizontal sections of temperature, salinity, sigma-t, and light attenuation coefficient were contoured for the 10, 50, 100, and 200 dbars pressure surfaces (figs. 9-24), and the nutrients (PO_4, SiO_4, NO_3,) and chlorophyll were contoured for the 0 and 100 dbar surface (figs. 25-32). Because of the sparse data, all horizontal sections were contoured by hand.

TS diagrams

Plots of temperature vs. salinity (TS plots in figs. 33-36) were organized by section (see column 2 of table 1). The symbol for each station was plotted every 100 dbar and the 100-, 200- and 500-dbar points have been annotated.

Station profiles

Plots of temperature, salinity, sigma-t, light attenuation coefficient, and Brunt-Vaisala frequency

$$N = (g/\rho)\,\frac{\partial \rho}{\partial z}$$

where ρ = water density and g is gravity, as a function of pressure at each station are shown in figures 37-65. For the Brunt-Vaisala frequency, density was determined using the 1980 equation of state (Millero and others, 1980), and the gradient of the specific volume anomaly was estimated from a least squares fit of a straight line to nine observations (±40 m) centered about the specified depth. The Brunt-Vaisala frequency was not computed for the first and last four average depths; the magnitudes of N listed at these depths are the same as the Brunt-Vaisala frequency for the fifth and fifth to last depth, respectively. The different symbols used to distinguish variables are shown on each variable axis. XBT profiles have been limited to 500 m. The units of salt are practical salinity units (psu) and are defined by Lewis (1980). The data for the first CTD station (#2) were not recorded and the XBT at station 21 malfunctioned so there are no plots for these two stations.

Data listing

A listing of the 10-dbar-averaged data is contained in Appendix I. For the data listings, time is in Eastern Standard Time, ATN is the beam attenuation coefficient, SIGT is the density anomaly sigma-t, N is the Brunt-Vaisala frequency, DYHT A is the dynamic height anomaly, and S SPD is the speed of sound in seawater computed using a Fortran subroutine given in Fofonoff and Millard (1983). For pressures greater than 500 dbar, the 10-dbar-averaged data are listed at 20-dbar intervals.

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Table 1. Hydrographic stations R/V OCEANUS Cruise 91, January 16-22, 1981

Station	Section	Date	Time	Latitude (N.)	Longitude (W.)	Water Depth (m)	Type
1	-	JAN 17	0033	40°29.97'	70°13.44'	60	XBT
2	-	JAN 19	1503	40°33.70'	67°44.72'	106	CTD
3	3	JAN 19	1930	40°32.07'	67°42.95'	180	CTD
4	1	JAN 19	2120	40°28.66'	67°45.23'	135	CTD
5	1	JAN 19	2235	40°29.00'	67°43.28'	165	CTD
6	1,3	JAN 19	2330	40°29.35'	67°42.18'	422	CTD
7	1	JAN 20	0150	40°29.35'	67°40.51'	155	CTD
8	1	JAN 20	0311	40°29.23'	67°39.86'	153	CTD
9	3	JAN 20	0516	40°26.09'	67°39.73'	605	CTD
10	2	JAN 20	0740	40°23.36'	67°36.17'	190	CTD
11	2	JAN 20	0855	40°23.37'	67°38.38'	255	CTD
12	2,3	JAN 20	0955	40°23.12'	67°39.88'	665	CTD
13	2	JAN 20	1155	40°22.64'	67°40.98'	350	CTD
14	2	JAN 20	1330	40°22.88'	67°43.14'	160	CTD
15	3	JAN 20	1451	40°18.25'	67°39.83'	1425*	XBT
16	3	JAN 20	2259	40°16.90'	67°39.12'	1355	CTD
17	3	JAN 21	0011	40°14.09'	67°37.00'	1450	XBT
18	-	JAN 21	0024	40°15.52'	67°33.77'	1380	XBT
19	4	JAN 21	0047	40°18.61'	67°30.56'	1100	XBT
20	4	JAN 21	0100	40°20.19'	67°31.47'	755	CTD
21	4	JAN 21	--	40°22.15'	67°31.98'	360	---
22	4	JAN 21	0210	40°23.81'	67°33.14'	195	CTD
23	4	JAN 21	0243	40°25.99'	67°33.70'	155	XBT
24	4	JAN 21	0300	40°28.92'	67°35.44'	140	XBT
25	4	JAN 21	0324	40°32.28'	67°38.43'	132	CTD
26	-	JAN 21	0420	40°36.78'	67°34.99'	98	XBT
27	5	JAN 21	1054	40° 0.70'	67°34.41'	64+	XBT
28	5	JAN 21	1107	40°58.13'	67°35.68'	70	XBT
29	5	JAN 21	1140	40°51.94'	67°38.30'	73	XBT
30	5	JAN 21	1210	40°45.88'	67°41.26'	71+	XBT
31	5,3	JAN 21	1336	40°40.00'	67°45.40'	78	CTD

Time is Eastern Standard Time
Latitudes and longitudes computed using Northstar-6000 5101 algorithm

* from USGS MF-1710
+ from NOAA Chart 13200

Table 2. - Calibration data for R/V OCEANUS Cruise 91, January 16-22, 1981.

Station	Sample depth[a] (m)	Salinity (psu) Bottle	CTD[b]	Residual	±ΔS[c]	Oxygen (ml/l) Bottle	No. titrations
2	0	33.323	lost	--		8.13[d]	2
	102	33.367	lost	--		--	
3	0	33.217	33.227	-0.010		--	
	59	33.234	33.232	0.002	0.000	5.38	3
4	0	33.456	33.463	-0.007			
	199	--	--				
5	0	33.456	33.469	-0.013		4.49	2
5	0	33.465	33.469	-0.004		--	
6	0	33.463	33.466	-0.003		--	
7	0	33.404	33.349	0.055		--	
	129	34.958	35.083	-0.125	0.040	5.94	2
8	0	33.368	34.413	-0.045		--	
9	0	33.440	33.448	-0.008		--	
	102	34.561	34.520	0.041	0.009	--	
	400	--	--	--		6.81	3
10	0	33.458	33.469	-0.011		--	
	98	34.654	34.884	-0.230	0.032	--	
11	0	33.448	33.449	-0.001		--	
12	0	33.464	33.457	0.007		--	
13	0	33.480	33.471	0.009		--	
	100	--	--	--		5.53	3
14	0	33.486	33.489	-0.003		--	
15	0	33.862	XBT	--		--	
16	0	35.674	35.615	0.059		--	
17	0	36.050	XBT	--		--	
18	0	35.726	XBT	--		--	
20	0	34.213	34.243	-0.030		--	
21	0	33.919	XBT	--		--	
22	0	33.752	33.633	0.119		--	
23	0	33.527	XBT	--		--	
24	0	33.447	XBT	--		--	
25	0	33.237	33.254	0.017		--	
26	0	33.227	XBT	--		--	
27	0	33.185	XBT	--		--	
28	0	33.187	XBT	--		--	
29	0	33.189	XBT	--		--	
30	0	33.194	XBT	--		--	
31	0	33.160	33.179	-0.019		--	

[a]Accuracy of sample depth is ±2 dbars.
[b]Surface depth varies from 1-4 dbars.
[c]Change in salinity between estimated depth (±2 dbar) of the sample bottle.
[d]Depth unknown.

Table 3. Nutrient and chlorophyll values for water samples obtained on R/V OCEANUS Cruise 91

Station	Sample depth (dbar)	PO_4 (µg-at/l)	SiO_4 (µg-at/l)	NO_3 (µg-at/l)	NO_2 (µg-at/l)	NH_3 (µg-at/l)	Chlorophyll (µg-at/l)
2	0.	0.63	2.90	6.45	0.12	0.17	0.91
	58.	0.71	3.50	5.30	0.11	0.68	0.38
	102.	0.64	3.40	6.90	0.13	0.41	0.90
3	0.	0.70	1.70	6.89	0.17	0.63	1.20
	29.	0.52	1.20	5.24	0.15	0.36	1.60
	59.	0.64	1.50	5.03	0.11	0.35	1.60
	126.	0.99	6.60	11.98	0.10	0.36	0.35
	169.	0.78	6.30	11.92	0.08	0.44	0.07
4	0.	0.77	5.80	8.91	0.11	0.37	0.20
	59.	0.96	6.00	9.16	0.08	1.12	0.13
	126.	0.92	8.10	13.71	0.12	0.40	0.19
5	0.	0.56	4.20	6.38	0.04	0.16	0.23
	30.	0.49	3.70	6.96	0.08	0.36	0.11
	61.	0.90	6.60	9.15	0.05	0.69	0.21
	101.	0.63	4.70	7.00	0.02	0.13	0.13
	150.	1.15	10.80	18.85	0.09	2.54	0.03
6	59.	0.83	6.00	8.67	0.05	0.17	0.16
	119.	0.89	6.40	9.37	0.06	0.20	0.26
	349.	1.42	13.60	19.96	0.04	0.15	0.05
	398.	1.27	13.00	20.19	0.05	0.51	0.00
7	0.	0.79	5.00	8.87	0.15	1.38	0.61
	30.	1.12	3.70	7.76	0.16	0.53	0.61
	62.	0.78	5.10	7.79	0.04	0.18	0.34
	129.	0.88	7.00	11.73	0.05	1.20	0.07
	144.	0.91	7.10	14.09	0.03	0.27	0.06
8	0.	0.69	4.50	7.72	0.10	0.35	0.32
	29.	0.87	5.20	9.43	0.16	1.78	0.31
	56.	0.69	4.00	6.74	0.07	0.18	0.37
	135.	0.99	8.10	14.09	0.02	0.18	0.10
	145.	0.96	9.10	---	0.05	0.25	0.15
9	0.	0.81	6.50	9.98	0.12	0.68	0.32
	59.	0.90	6.50	10.08	0.05	0.17	0.29
	99.	0.85	6.30	10.81	0.08	0.16	0.18
	399.	0.93	7.00	10.85	0.08	0.53	0.23

Table 3. Nutrient and chlorophyll values for water samples obtained on R/V OCEANUS Cruise 91--Cont.

Station	Sample depth (dbar)	PO_4 (μg-at/l)	SiO_4 (μg-at/l)	NO_3 (μg-at/l)	NO_2 (μg-at/l)	NH_3 (μg-at/l)	Chlorophyll (μg-at/l)
10	0.	0.81	6.60	10.19	0.08	0.68	0.21
	59.	0.85	6.40	9.61	0.09	0.78	0.21
	99.	0.70	4.70	8.37	0.13	0.21	0.22
	154.	0.82	6.70	12.21	0.10	0.30	0.10
11	0.	0.86	7.60	9.71	0.12	1.85	0.22
	30.	0.77	6.30	9.48	0.13	0.23	0.28
	56.	0.81	5.90	9.24	0.14	0.41	---
	102.	0.72	5.10	9.37	0.11	0.77	0.10
	238.	1.44	13.40	20.57	0.09	1.45	0.00
12	0.	0.85	6.50	9.74	0.11	1.06	0.11
	98.	0.75	4.40	9.17	0.11	0.18	0.03
	198.	0.80	6.50	12.00	0.08	0.30	0.00
	436.	1.25	12.80	19.08	0.05	0.54	0.16
	667.	1.24	13.20	19.99	0.05	1.25	0.12
13	0.	0.80	6.40	9.74	0.11	0.36	0.24
	29.	0.79	6.30	9.62	0.07	0.28	0.15
	59.	0.62	4.70	7.74	0.11	0.37	0.20
	99.	0.66	5.20	8.28	0.11	2.08	0.17
14	0.	0.68	5.20	7.45	0.14	0.69	0.24
	29.	0.52	3.90	6.05	0.07	0.28	0.31
	99.	0.53	4.10	6.91	0.08	0.38	0.16
	142.	0.63	5.20	8.82	0.13	0.59	0.09
	157.	0.79	6.80	12.78	0.04	0.68	0.00
16	0.	0.46	3.40	6.95	0.10	0.81	0.06
	60.	0.47	3.20	6.44	0.08	0.16	0.13
	100.	0.52	2.80	5.52	0.06	0.19	0.19
	401.	1.12	11.30	17.17	0.03	0.13	0.05
	798.	1.02	8.80	12.87	0.03	0.12	0.03
	999.	1.00	10.30	14.90	0.06	0.63	0.02
20	0.	0.46	4.00	6.27	0.09	0.52	0.24
	33.	0.53	3.40	6.54	0.07	1.02	0.17
	62.	0.46	3.40	6.07	0.07	0.29	0.25
	101.	0.46	3.90	6.50	0.08	0.66	0.15
	398.	1.02	11.60	16.36	0.05	0.71	0.09

Table 3. Nutrient and chlorophyll values for water samples obtained on R/V OCEANUS Cruise 91--Cont.

Station	Sample depth (dbar)	PO_4 (µg-at/l)	SiO_4 (µg-at/l)	NO_3 (µg-at/l)	NO_2 (µg-at/l)	NH_3 (µg-at/l)	Chlorophyll (µg-at/l)
22	0.	0.51	5.40	7.44	0.09	0.22	0.32
	29.	0.52	4.20	6.76	0.08	0.67	0.32
	61.	0.52	3.60	6.87	0.08	0.19	0.08
	179.	0.62	5.10	6.22	0.09	0.14	0.14
	194.	0.58	4.80	9.37	0.05	0.14	0.34
25	0.	0.41	0.90	4.44	0.09	0.53	1.10
	30.	0.50	1.00	5.06	0.10	0.48	1.10
	59.	0.42	1.40	4.92	0.13	0.36	2.10
	111.	0.52	2.50	6.09	0.13	0.36	1.50
	124.	0.78	5.10	9.97	0.12	0.35	1.10
31	0.	0.56	0.80	6.41	0.16	0.40	1.50
	29.	0.54	0.40	5.94	0.10	0.80	1.60
	59.	0.77	1.00	6.79	0.18	1.74	1.90
	79.	0.75	0.80	6.96	0.13	1.11	1.00

Table 4. Suspended matter concentration and light attenuation coefficient for water samples obtained on R/V OCEANUS 91

Station	Water depth (m)	Sample depth (dbar)	Total suspended matter (μg/l)	Non-combust. matter (μg/l)	Non-combust. matter (%)	Light attenuation coefficient (m^{-1})
3	180	29.	330.0	144.0	44.0	0.21
		59.	328.0	96.0	29.0	0.22
		126.	347.0	166.0	48.0	0.13
		169.	245.0	124.0	50.0	0.18
4	135	59.	138.0	49.0	36.0	0.12
		126.	309.0	149.0	48.0	0.20
6	422	59.	155.0	35.0	23.0	0.12
		119.	139.0	21.0	15.0	0.11
		349.	312.0	194.0	62.0	0.20
		398.	425.0	300.0	70.0	0.25
8	153	0.	184.0	57.0	31.0	0.14
		29.	186.0	60.0	32.0	0.13
		135.	165.0	58.0	35.0	0.10
		145.	200.0	108.0	54.0	0.10
9	605	59.	143.0	8.0	6.0	0.10
		99.	89.0	28.0	31.0	0.08
		399.	147.0	35.0	24.0	0.17
10	190	59.	110.0	6.0	5.0	0.09
		99.	110.0	62.0	65.0	0.06
		154.	175.0	56.0	32.0	0.08
11	255	238.	121.0	53.0	44.0	0.11
12	665	98.	71.0	4.0	6.0	0.08
		198.	96.0	17.0	17.0	0.12
		436.	102.0	84.0	82.0	0.13
		667.	137.0	92.0	67.0	0.12
13	350	29.	87.0	21.0	24.0	0.65
		59.	114.0	30.0	26.0	0.65
		99.	122.0	113.0	93.0	0.65
14	160	29.	128.0	26.0	20.0	0.11
		99.	94.0	38.0	40.0	0.08
		142.	160.0	50.0	31.0	0.10
		157.	163.0	97.0	59.0	0.11

Table 4. Suspended matter concentration and light attenuation coefficient for water samples obtained on R/V OCEANUS 91--Cont.

Station	Water depth (m)	Sample depth (dbar)	Total suspended matter (µg/l)	Non-combust. matter (µg/l)	Non-combust. matter (%)	Light attenuation coefficient (m^{-1})
16	1355	100.	99.0	20.0	21.0	0.06
		401.	90.0	22.0	25.0	0.11
		798.	88.0	22.0	25.0	0.11
		999.	82.0	25.0	31.0	0.11
20	755	33.	116.0	12.0	10.0	0.07
		62.	85.0	16.0	28.0	0.08
		101.	85.0	6.0	7.0	0.08
		398.	113.0	17.0	15.0	0.12
22	195	61.	84.0	22.0	26.0	0.11
		179.	149.0	57.0	38.0	0.13
		194.	160.0	65.0	41.0	0.13
25	132	30.	382.0	198.0	52.0	0.20
		59.	361.0	193.0	54.0	0.23
		111.	346.0	203.0	54.0	0.19
		124.	326.0	156.0	48.0	0.19
31	78	0.	459.0	158.0	65.0	0.20
		29.	1550.0	479.0	31.0	0.25
		59.	1127.0	521.0	46.0	0.40
		79.	1283.0	866.0	67.0	0.40

Table 5. - Meteorological observations for R/V OCEANUS Cruise 91 obtained from ship's Deck Log. (Time is Eastern Standard Time.) [See Table 6 for key to meteorological observations]

Date	Time	Wind		Sea			Air		Weather
		Dir	Force	Dir	Swell	Height	Pressure (mb)	Temp (°C)	
Jan 16	1200	NE	3	--	--	2	1020	-1.1	o
	1600	ESE	3	ESE	2	2	1018	1.1	o
	2000	E	2	ESE	2	2	1015	3.3	s
	2400	E	4	--	--	3	1011	2.2	os
Jan 17	0400	NE	2	--	2	3	1009	2.8	or
	0800	NW	6	VAR	5	5	1006	1.7	--
	1200	NW	5-6	NW	3	4	1004	1.1	os
	1600	N	6	NNE	3	5	1002	--	or
	2000	NW	6	NNE	--	4	1007	-3.3	--
	2400	--	--	--	--	--	---	--	--
Jan 18*	1200	NNW	4-5	NNW	1	3	1008	-5.5	bc
	1600	NNW	5	NW	2	3	1006	-4.4	bc
	2000	NW	6	--	--	4-5	1004	-1.7	bc
	2400	WNW	6	WNW	3	4	1002	-1.1	c
Jan 19	0400	WNW	7	NNW	3	5-6	1000	0.0	c
	0800	WxN	6	--	--	5	1004	0.6	c
	1200	WxN	5	WNW	3	4	1004	1.1	c
	1600	W	5	WNW	3	3	1003	0.6	bc
	1800	WxS	7-8	WNW	4	5	1004	4.4	bc
	2400	W	5-6	W	3	4	1004	4.4	bc
Jan 20	0400	W	6	WxN	3	4	1006	3.9	bc
	0800	NW	6	WxN	3	4	1010	3.9	bc,r
	1200	NW	5-6	WNW	3	3	1013	4.4	c
	1600	NxW	5	NNW	1	3	1016	1.7	c
	2000	NNW	4	NNW	2	3	--	1.7	c
	2400	NxW	4	NNW	1	3	1020	1.7	c
Jan 21	0400	NW	3	W	2	3	1020	0.0	bc
	0800	NW	2	--	--	1	1020	1.7	bc
	1100	NW	2-3	--	--	2	1018	1.7	bc
	1600	N	3	NxW	2	2	1017	0.6	bc
	2000	E	2	NxW	1	1	1015	1.1	bc
	2400	NExE	3	N	1	2	1012	1.1	bc
Jan 22	0400	N	3	N	2	2	1011	1.1	bc
	0800	SE	1	--	0	0	1009	1.7	--
	1200	SW	4	--	--	3	--	2.2	lc

* At WHOI dock 0020-0830

Table 6. - Key to meteorological observations.

Swell		Sea height	
0	No swell	0	Calm
1	Low, short or average	1	Smooth, less than 1'
2	Low, long	2	Slight 1-3'
3	Moderate, short	3	Moderate 3-5'
4	Moderate, average	4	Rough 5-8'
5	Moderate, long	5	Very rough 8-12'
6	Heavy, short	6	High 12-20'
7	Heavy, average	7	Very high 20-40'
8	Heavy, long	8	Mountainous 40' and higher
9	Confused	9	Confused

Weather		Wind		
			knots	mph
bc	scattered clouds	1	1-3	1-3
d	drizzle	2	4-6	4-7
f	fog	3	7-10	8-12
h	hail	4	11-16	13-18
l	lightening	5	17-21	19-24
o	overcast	6	22-27	25-31
c	mostly cloudy	7	28-33	32-38
p	passing rain showers	8	34-40	39-46
q	squalls	9	41-47	47-54
r	rain	10	48-55	55-63
s	snow	11	36-63	64-72
t	thunder	12	64-71	73-82
z	haze			

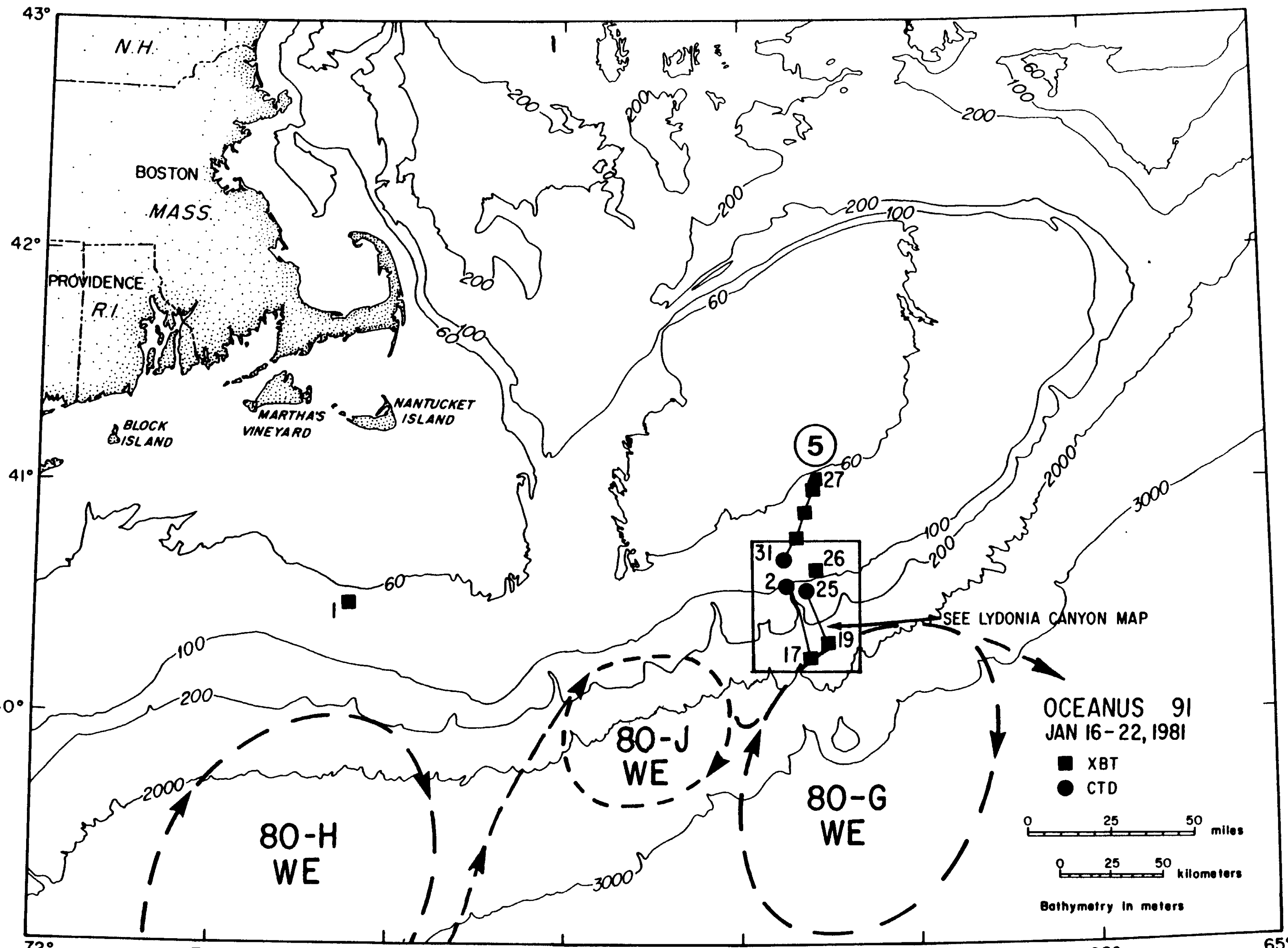


Figure 1. Location of stations near Lydonia Canyon occupied on R/V OCEANUS cruise 91, January 16-22, 1981. The circled number identifies the section in figure 8. The positions of three warm core eddies are based on the Oceanographic Analysis Chart for January 13, 1981 as modified by the Atlantic Environmental Group, National Marine Fisheries Service, Narragansett, R.I.

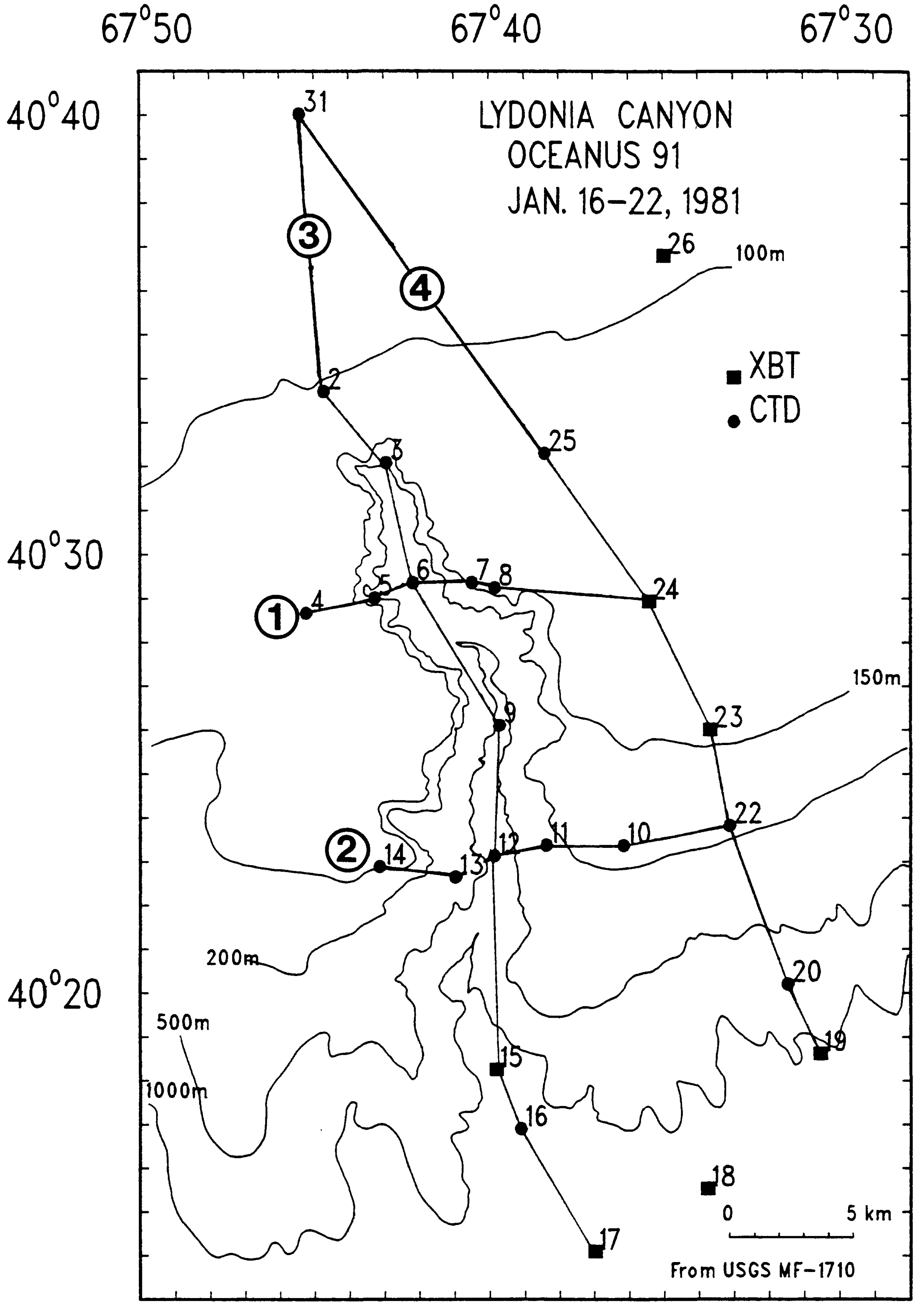


Figure 2. Location of stations occupied on R/V OCEANUS cruise 91, January 16-22, 1981. The circled numbers identify the sections shown in figures 4-7.

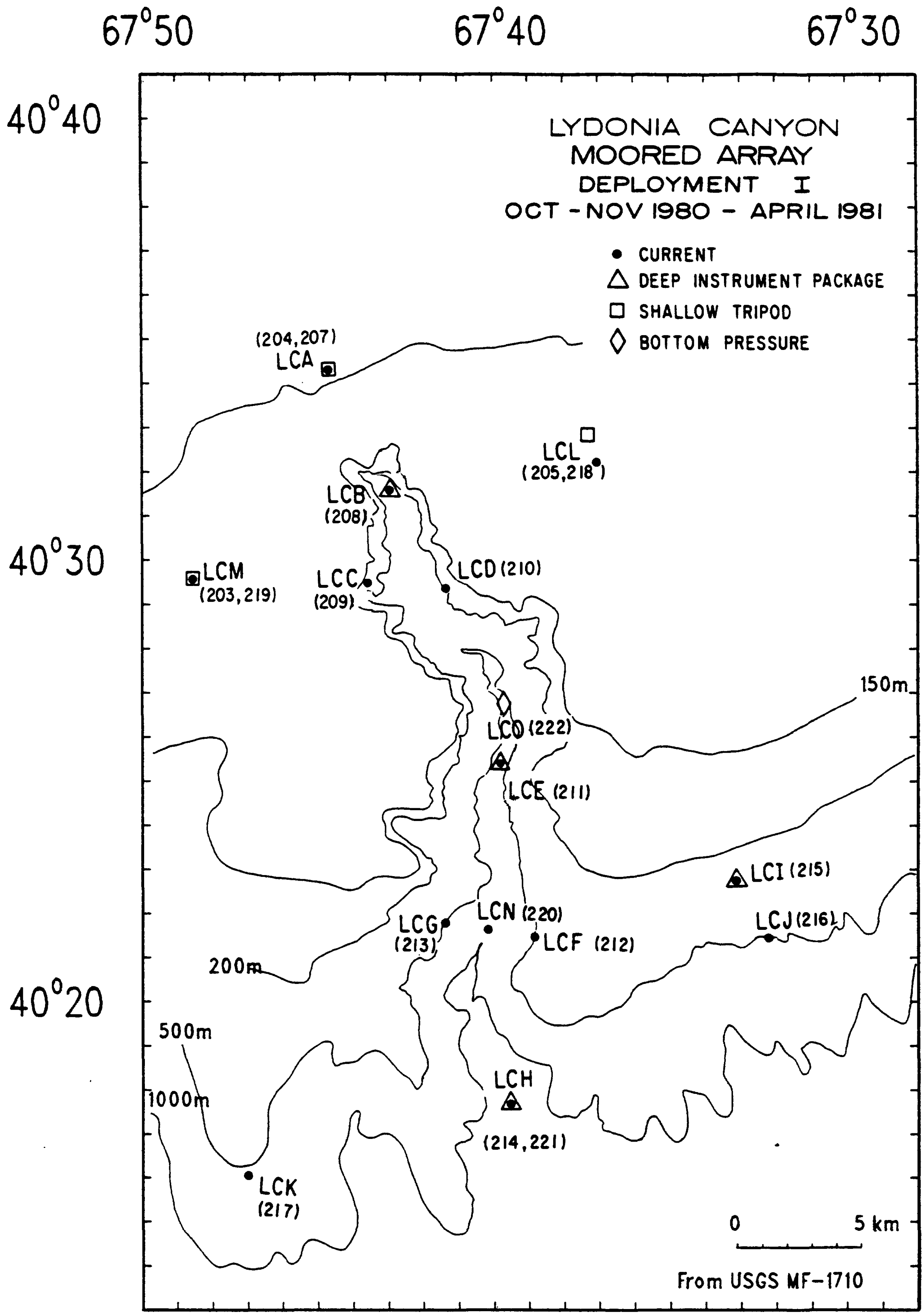


Figure 3a. **Lydonia Canyon moored array, deployment I. Stations are indicated by letters. The three-digit number in parenthesis following the station letters is the mooring number. All data are referenced by this mooring number.**

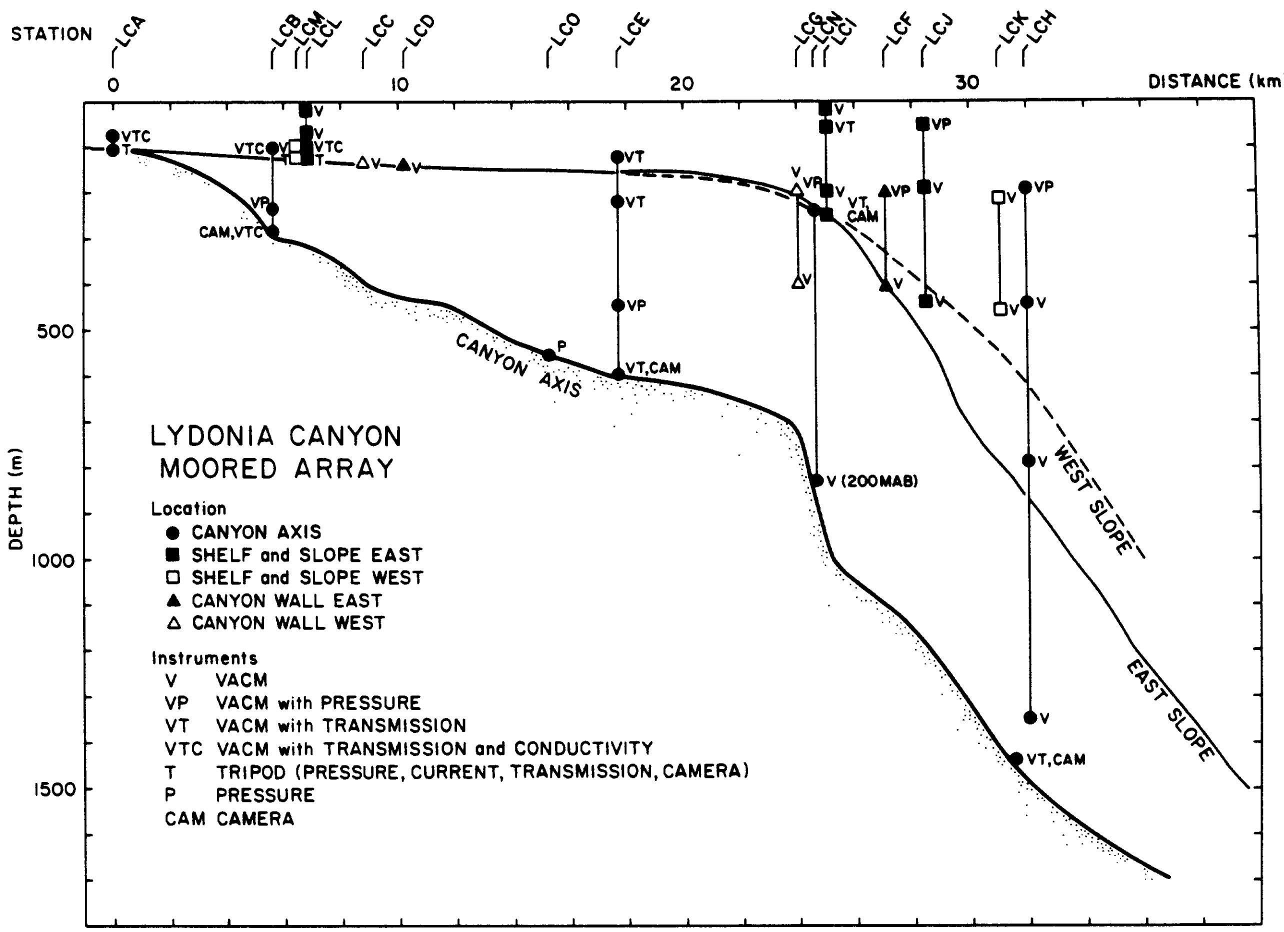
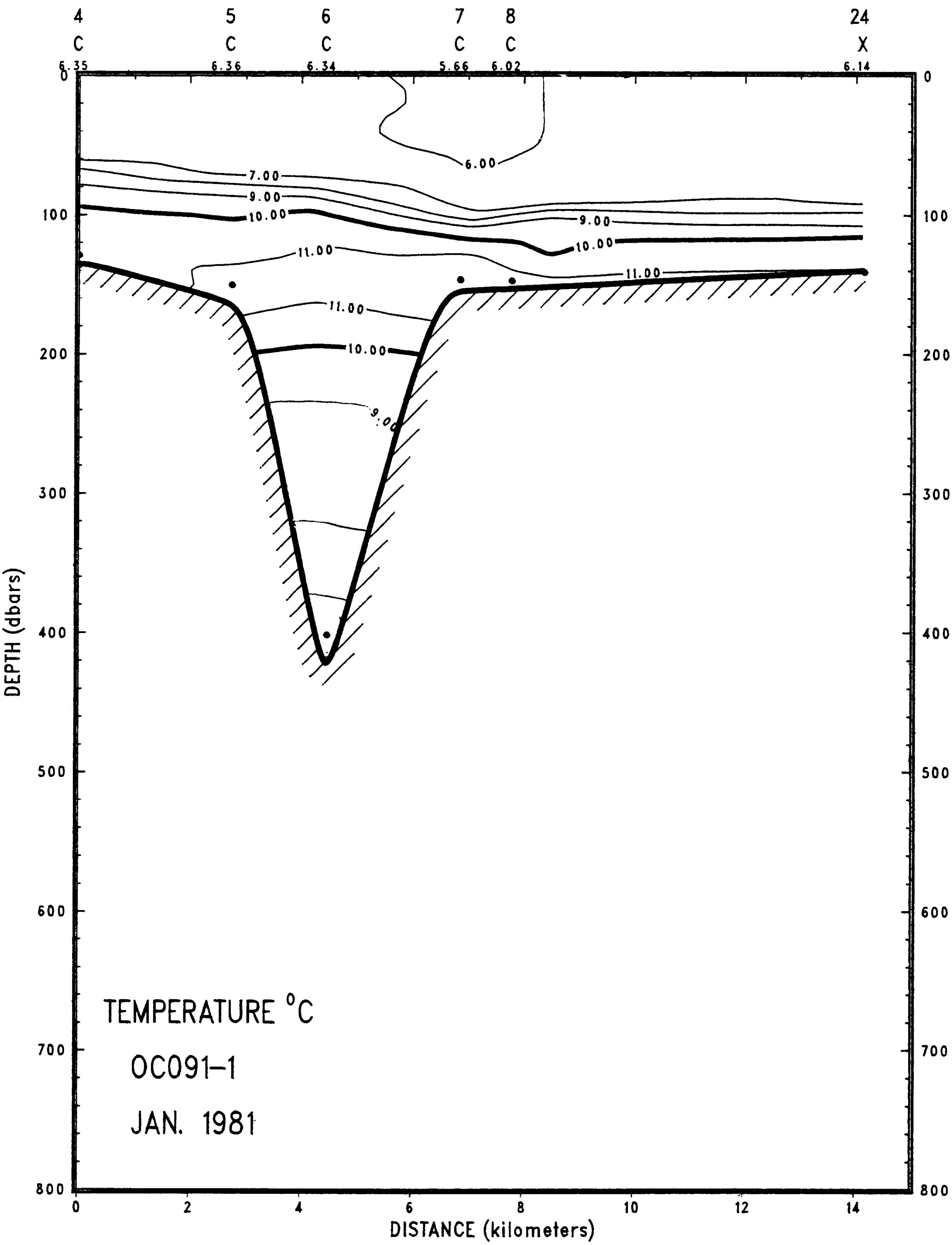


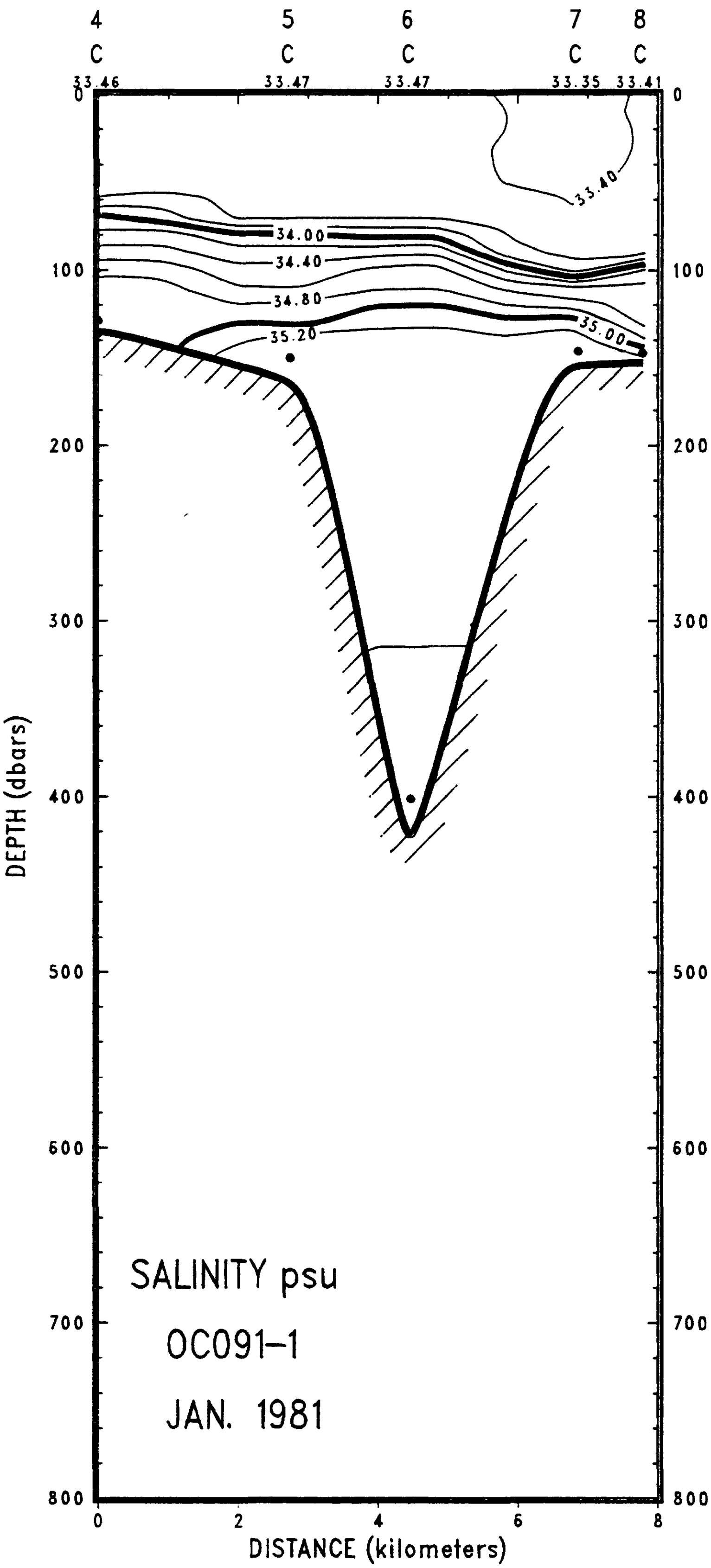
Figure 3b. Cross section of Lydonia Canyon and adjacent shelf and slope showing approximate positions of instruments in the moored array.

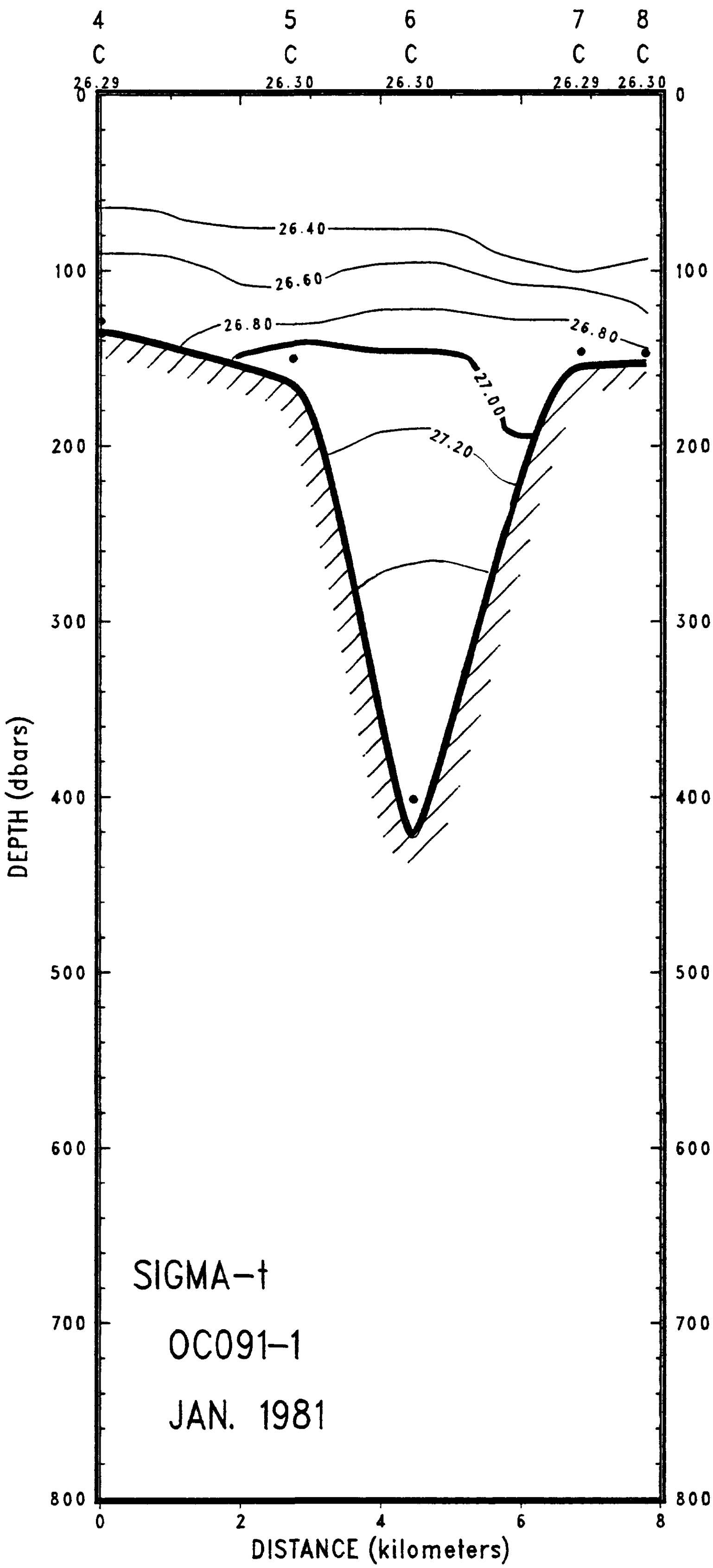
Vertical sections

The section numbers follow the hyphen after the cruise symbol OC091 (see figs. 1, 2 and table 1). The station numbers are shown across the top of each section with the station type (C = CTD or X = XBT) and surface value of the contoured variable printed below. The location of the deepest measurement in the cast is shown by a dot below the station number. The contour intervals are also the same for each section (1°C for temperature, 0.2 psu for salinity, 0.2 for sigma-t, and 0.05 m^{-1} for attenuation coefficient). Because of the computer contouring routine, the shape and slope of the contours near the sea floor should be interpreted with caution (see text). Note also that the bathymetry is determined by the depths of the hydrographic stations and thus the sea floor is not accurately represented in regions where the depth changes rapidly.

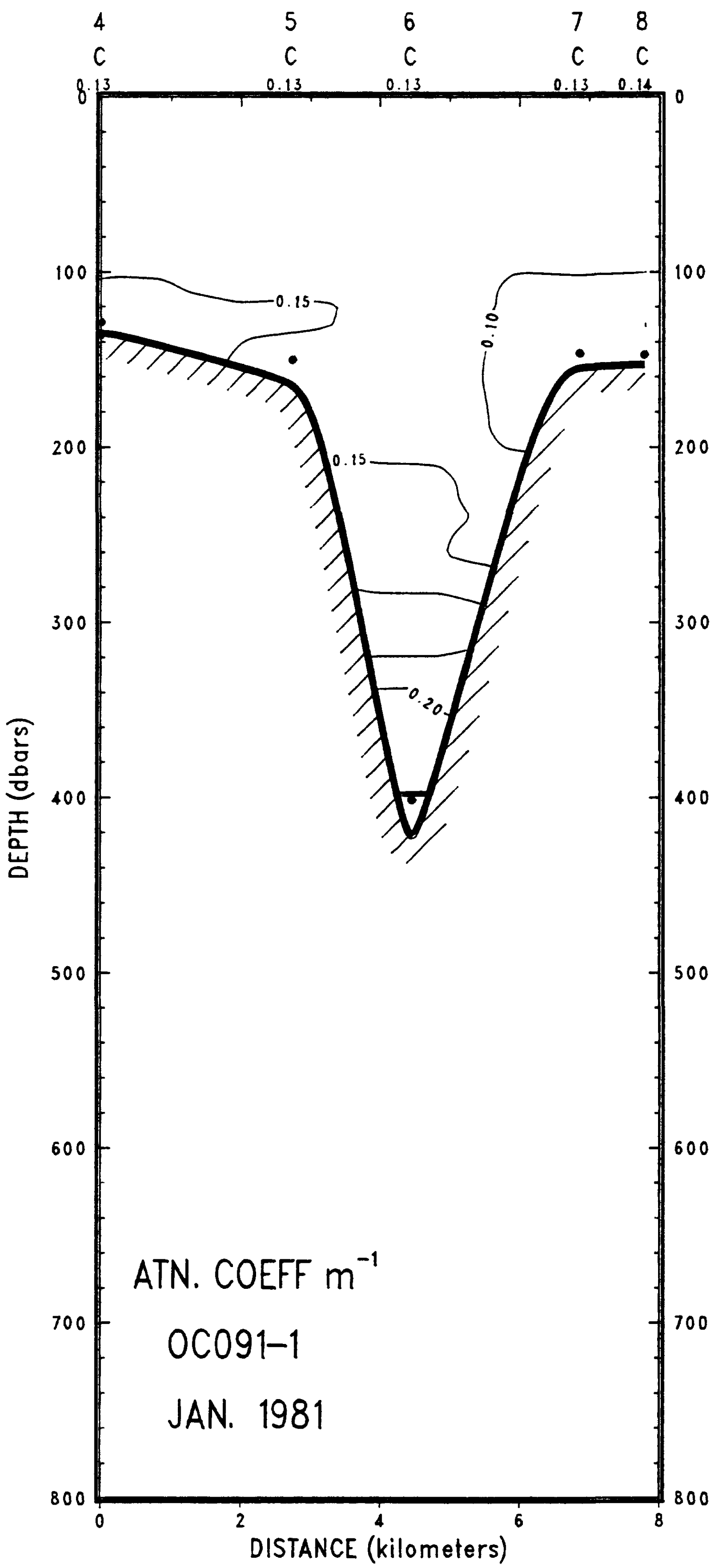


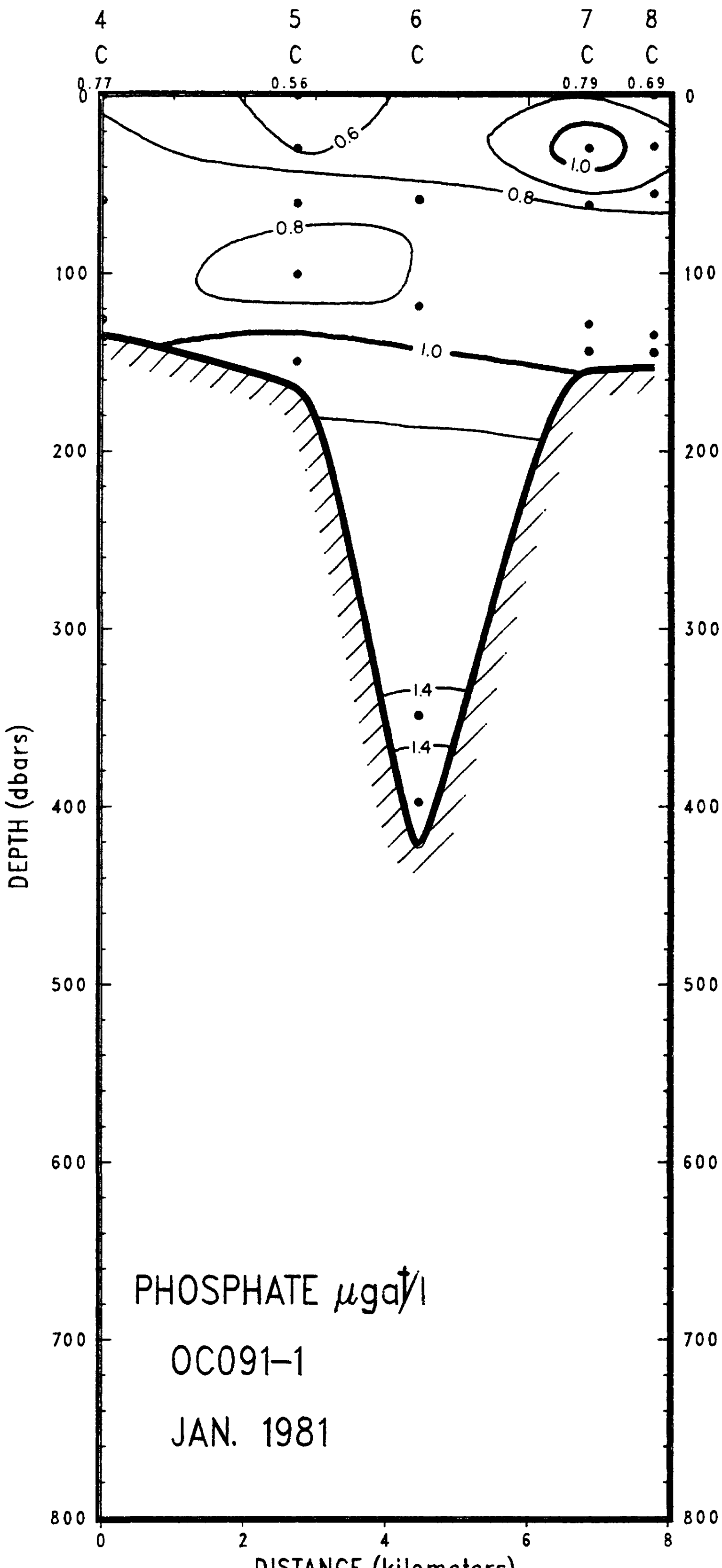
4 5 6 7 8 24
C C C C C X
6.35 6.36 6.34 5.66 6.02 6.14
6.00
7.00
9.00
10.00
11.00
DEPTH (dbars)
DISTANCE (kilometers)
TEMPERATURE °C
OC091-1
JAN. 1981


4 5 6 7 8
C C C C C
33.46 33.47 33.47 33.35 33.41
33.40
34.00
34.40
34.80
35.00
35.20
DEPTH (dbars)
DISTANCE (kilometers)
SALINITY psu
OC091-1
JAN. 1981

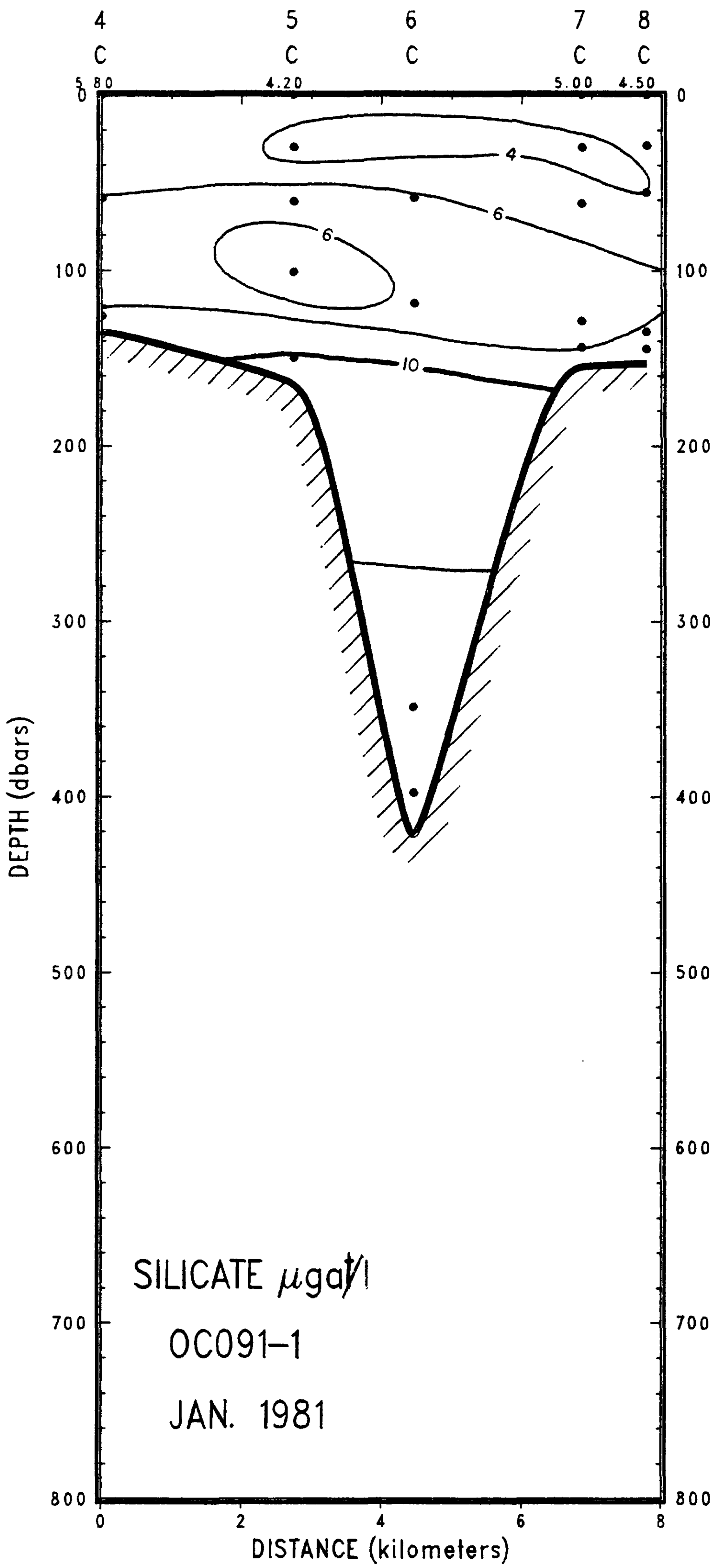


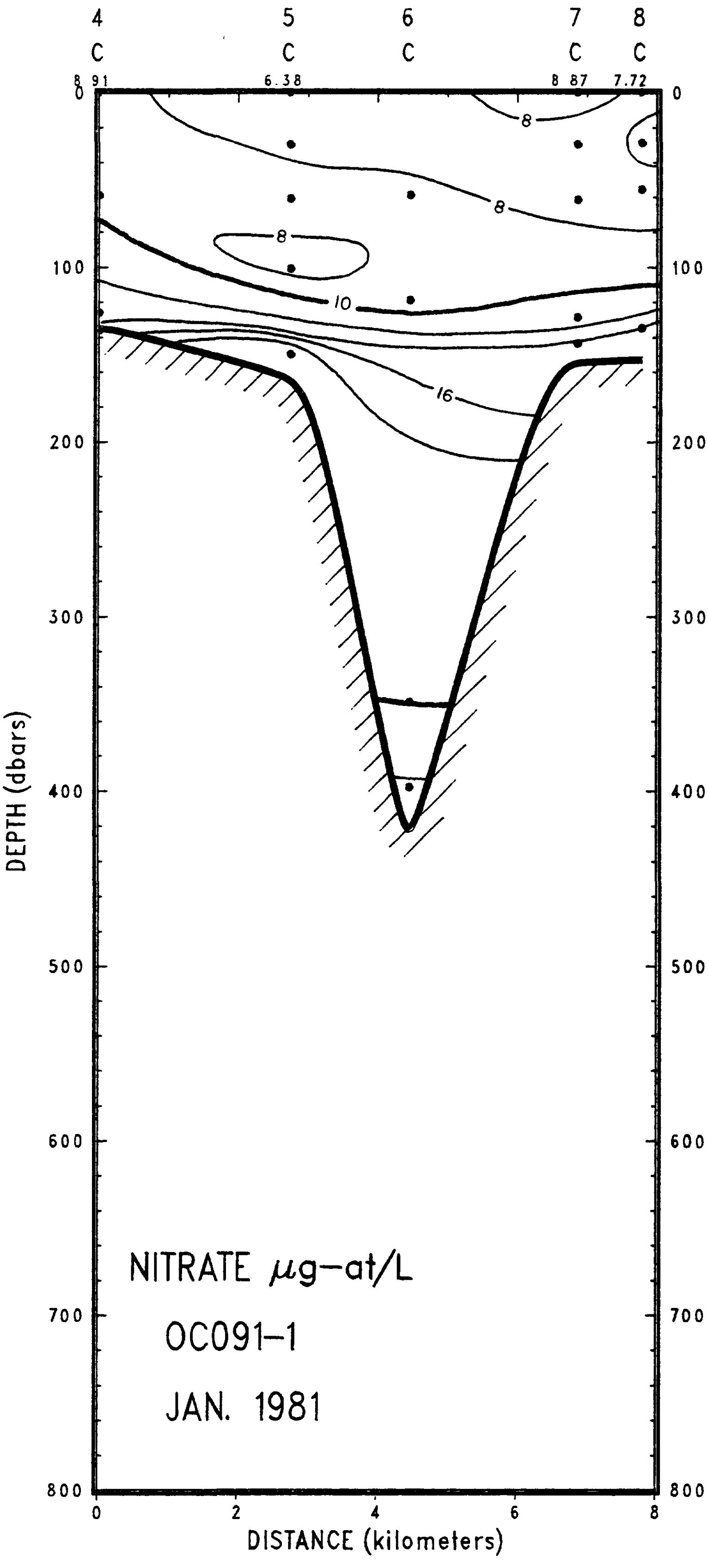
4 5 6 7 8
C C C C C
26.29 26.30 26.30 26.29 26.30
26.40
26.60
26.80
26.80
27.00
27.20
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
0
2
4
6
8
DISTANCE (kilometers)
SIGMA-t
OC091-1
JAN. 1981

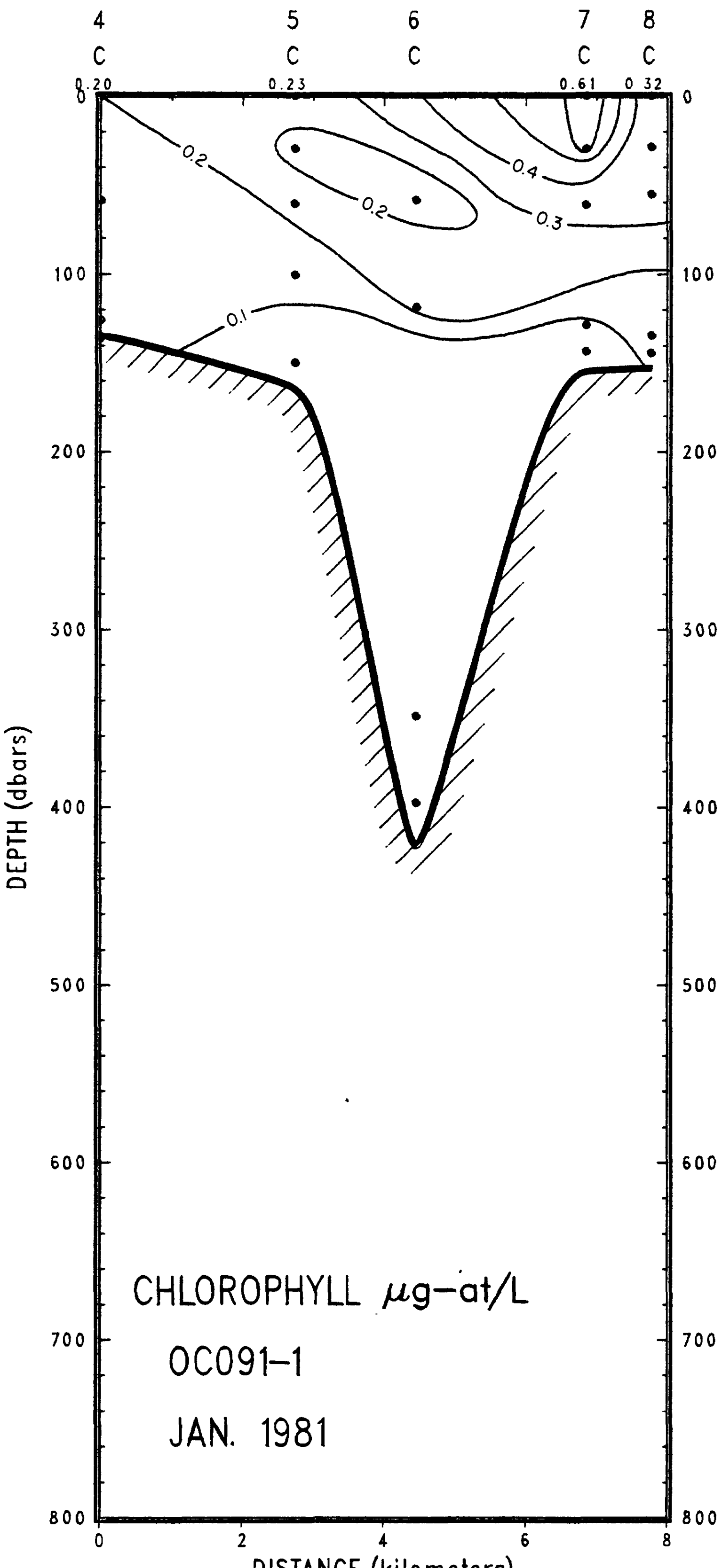

4 5 6 7 8
C C C C C
0.13 0.13 0.13 0.13 0.14
0.15
0.10
0.20
DEPTH (dbars)
DISTANCE (kilometers)
ATN. COEFF m^{-1}
OC091-1
JAN. 1981



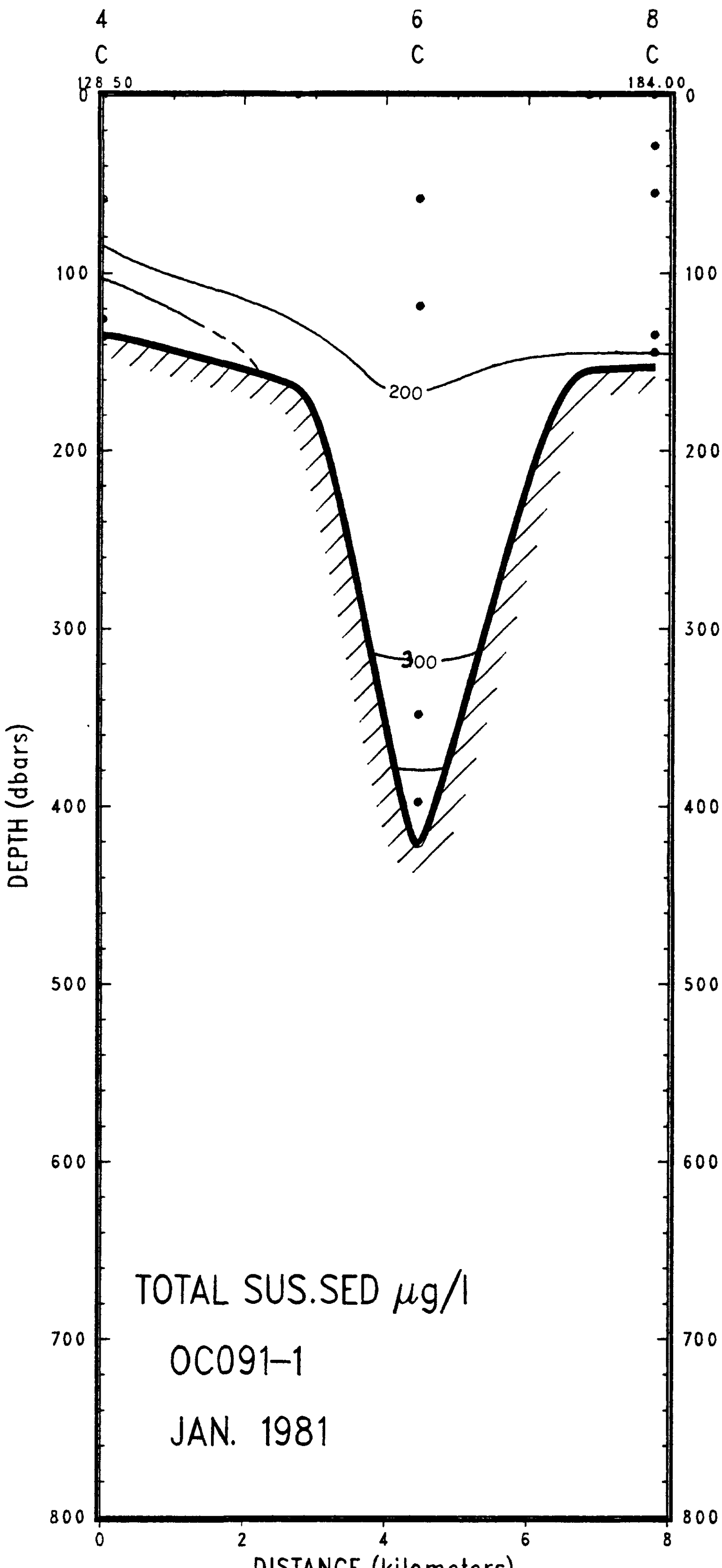
4
C
5
C
6
C
7
C
8
C
0.77
0.56
0.79
0.69
0.6
1.0
0.8
0.8
1.0
1.4
1.4
0
100
200
300
400
500
600
700
800
DEPTH (dbars)
0
2
4
6
8
DISTANCE (kilometers)
PHOSPHATE µgat/l
OC091-1
JAN. 1981

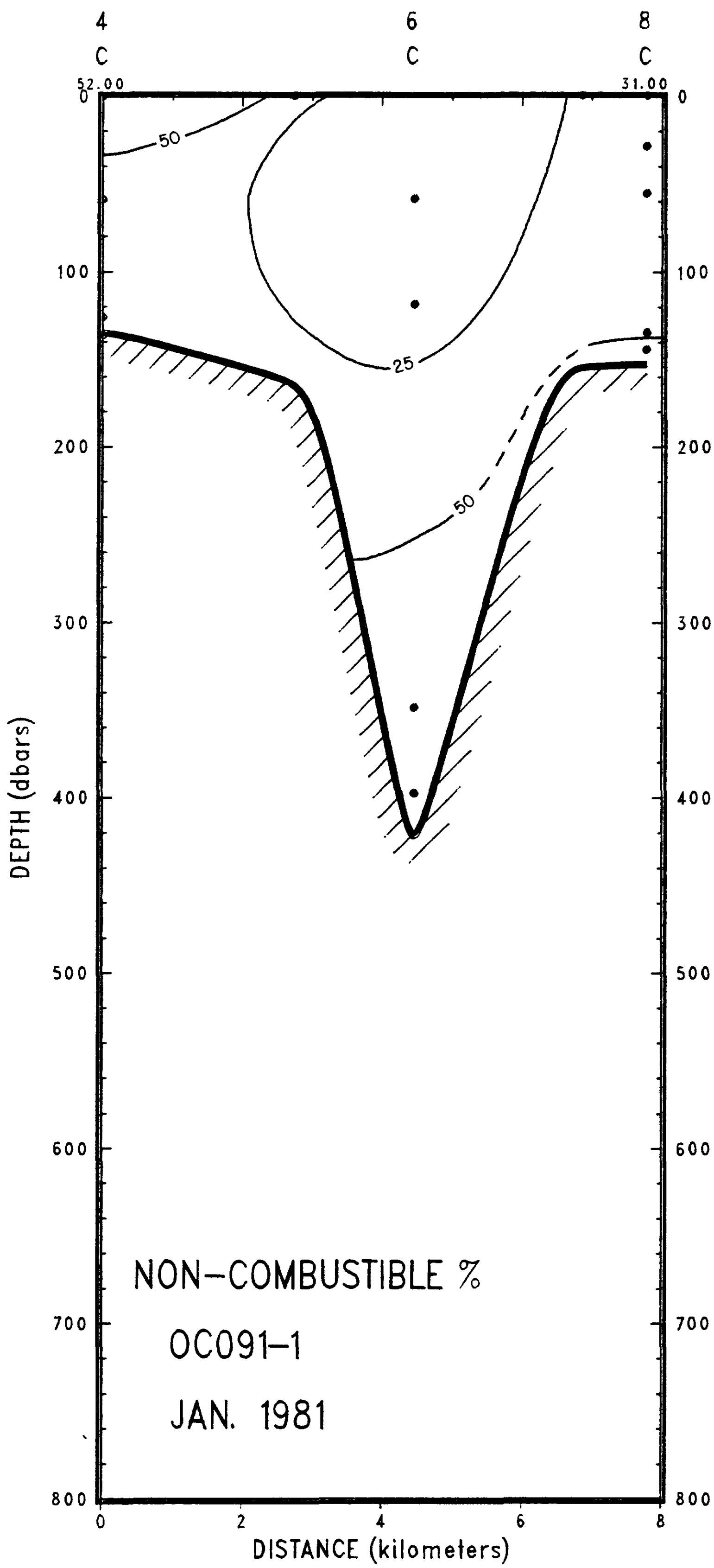

4
5
6
7
8
C
C
C
C
C
5.80
4.20
5.00
4.50
4
6
6
10
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
DISTANCE (kilometers)
0
2
4
6
8
SILICATE μgat/l
OC091-1
JAN. 1981

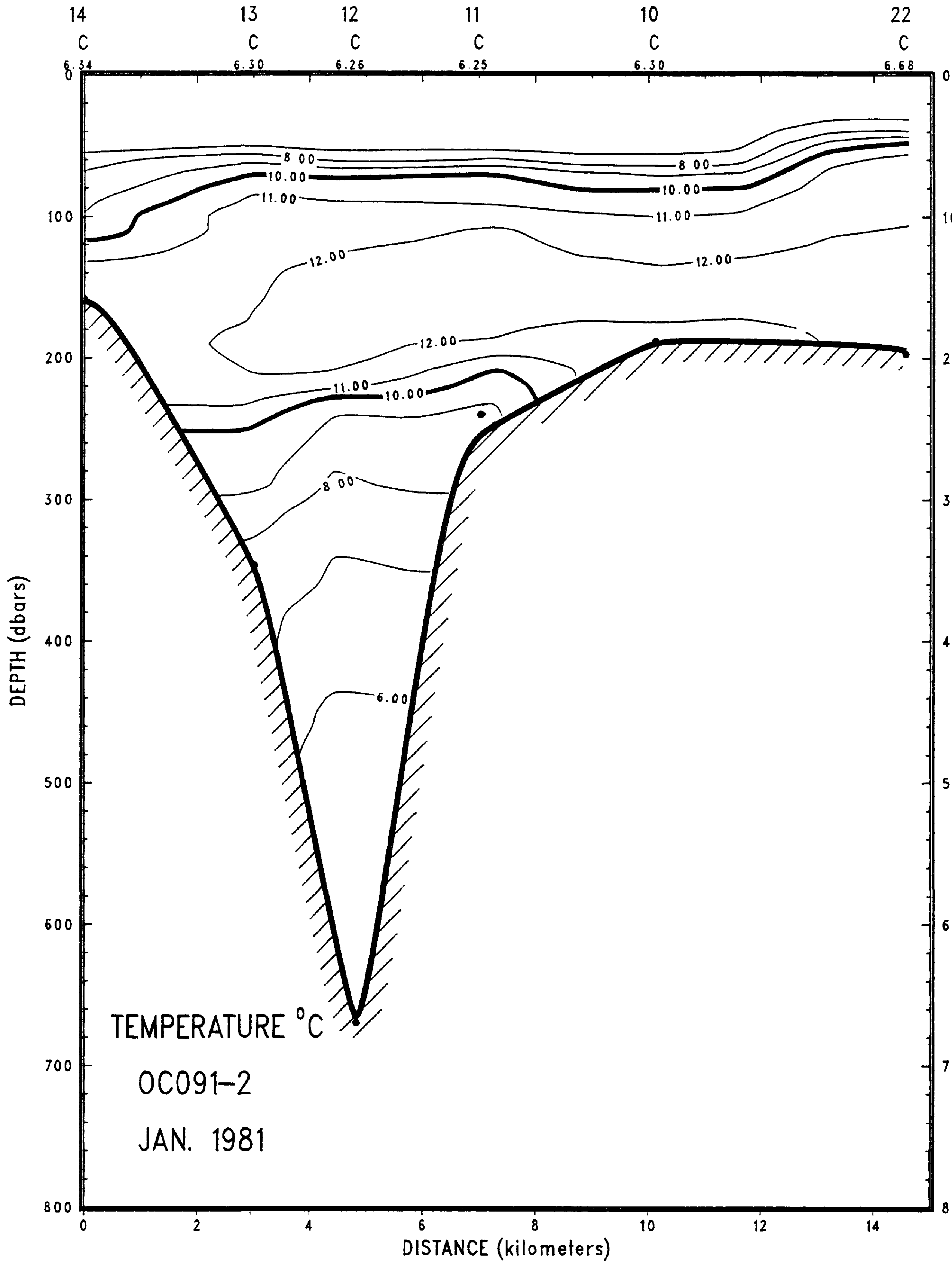

4
5
6
7
8
C
C
C
C
C
8.91
6.38
8.87
7.72
8
8
8
10
16
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
0
2
4
6
8
DISTANCE (kilometers)
NITRATE µg-at/L
OC091-1
JAN. 1981

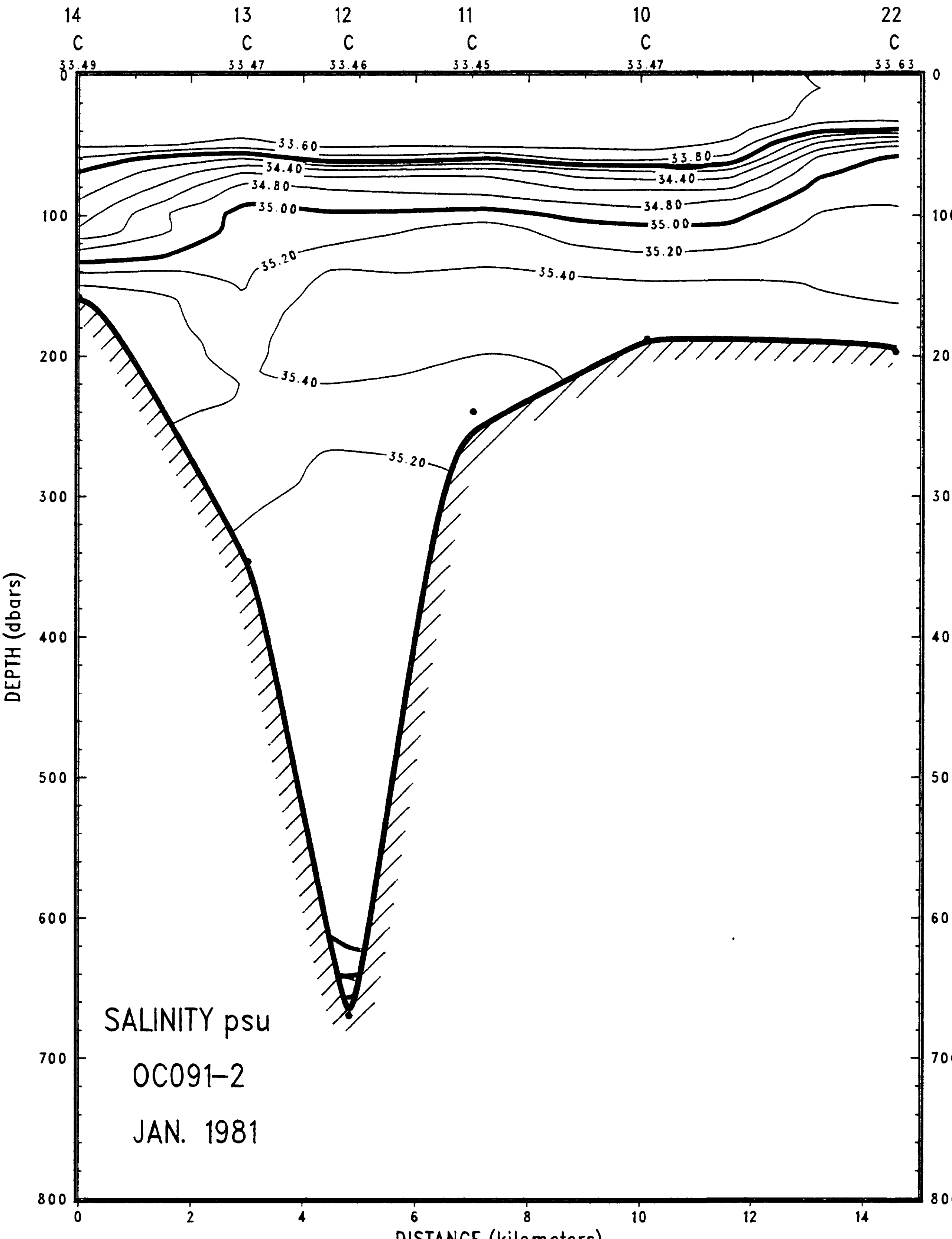


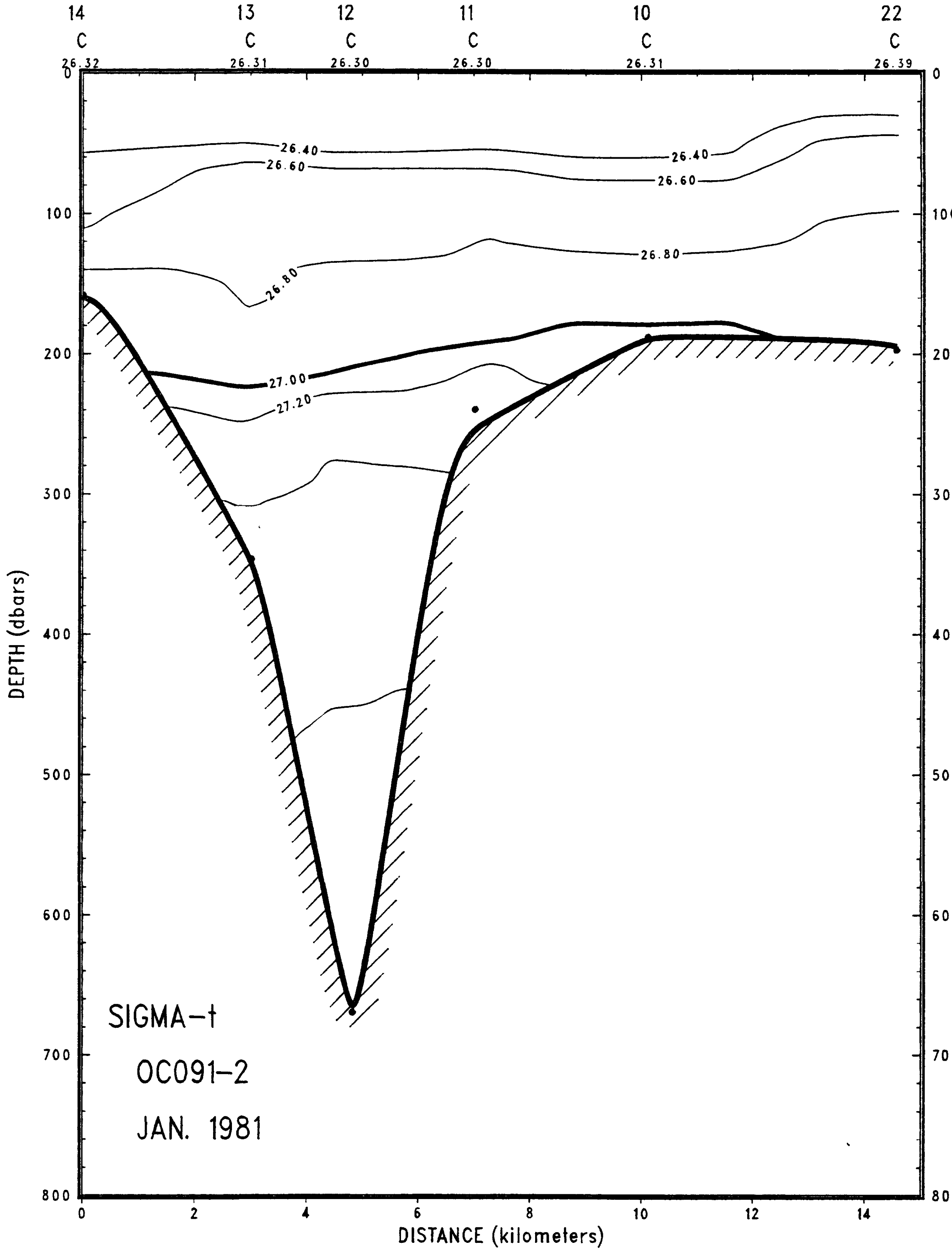
4
5
6
7
8
C
C
C
C
C
0.20
0.23
0.61
0 32
0.2
0.2
0.4
0.3
0.1
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
0
2
4
6
8
DISTANCE (kilometers)
CHLOROPHYLL μg-at/L
OC091-1
JAN. 1981

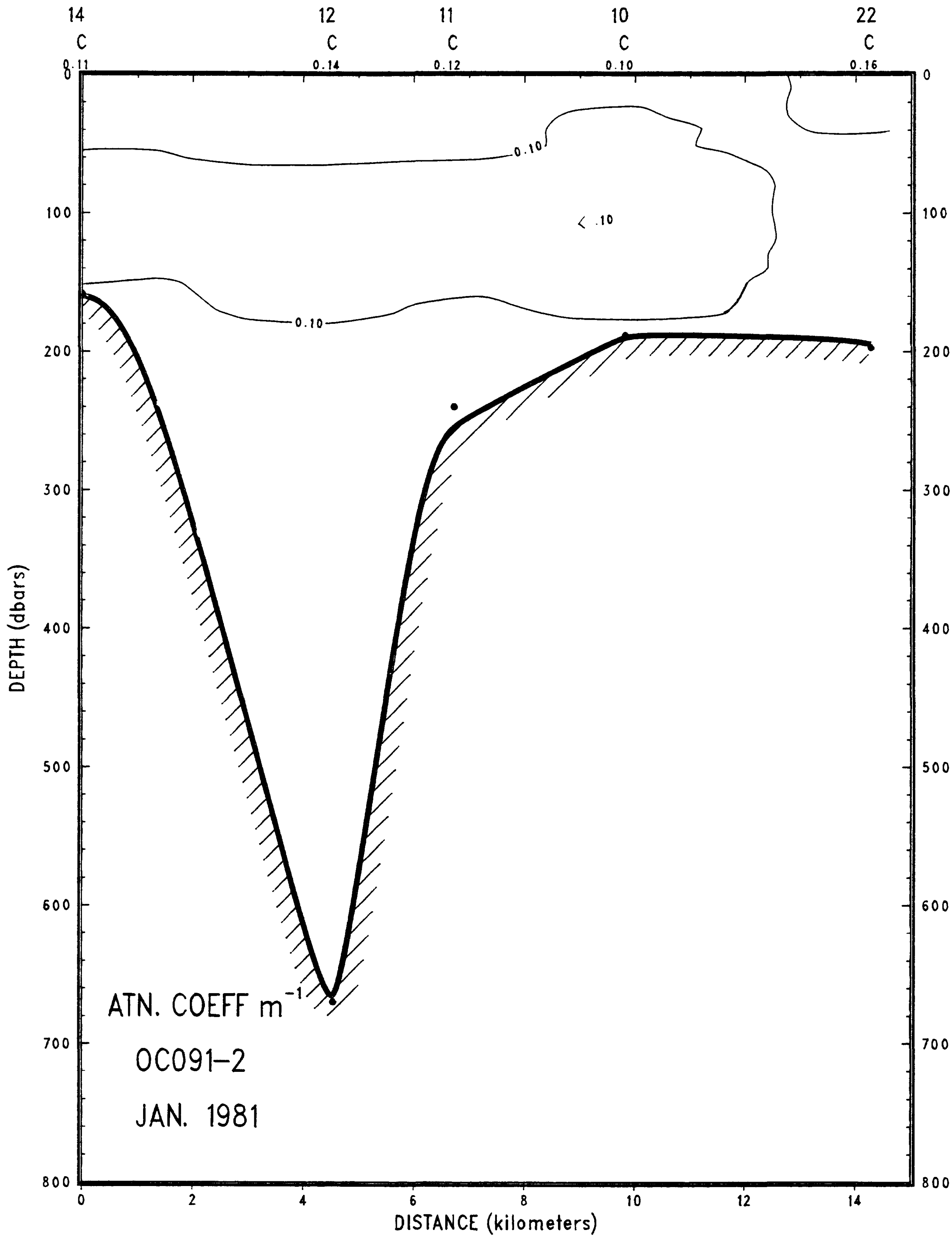

4
6
8
C
C
C
128.50
184.00
0
100
200
300
400
500
600
700
800
200
300
DEPTH (dbars)
0
2
4
6
8
DISTANCE (kilometers)
TOTAL SUS.SED µg/l
OC091-1
JAN. 1981

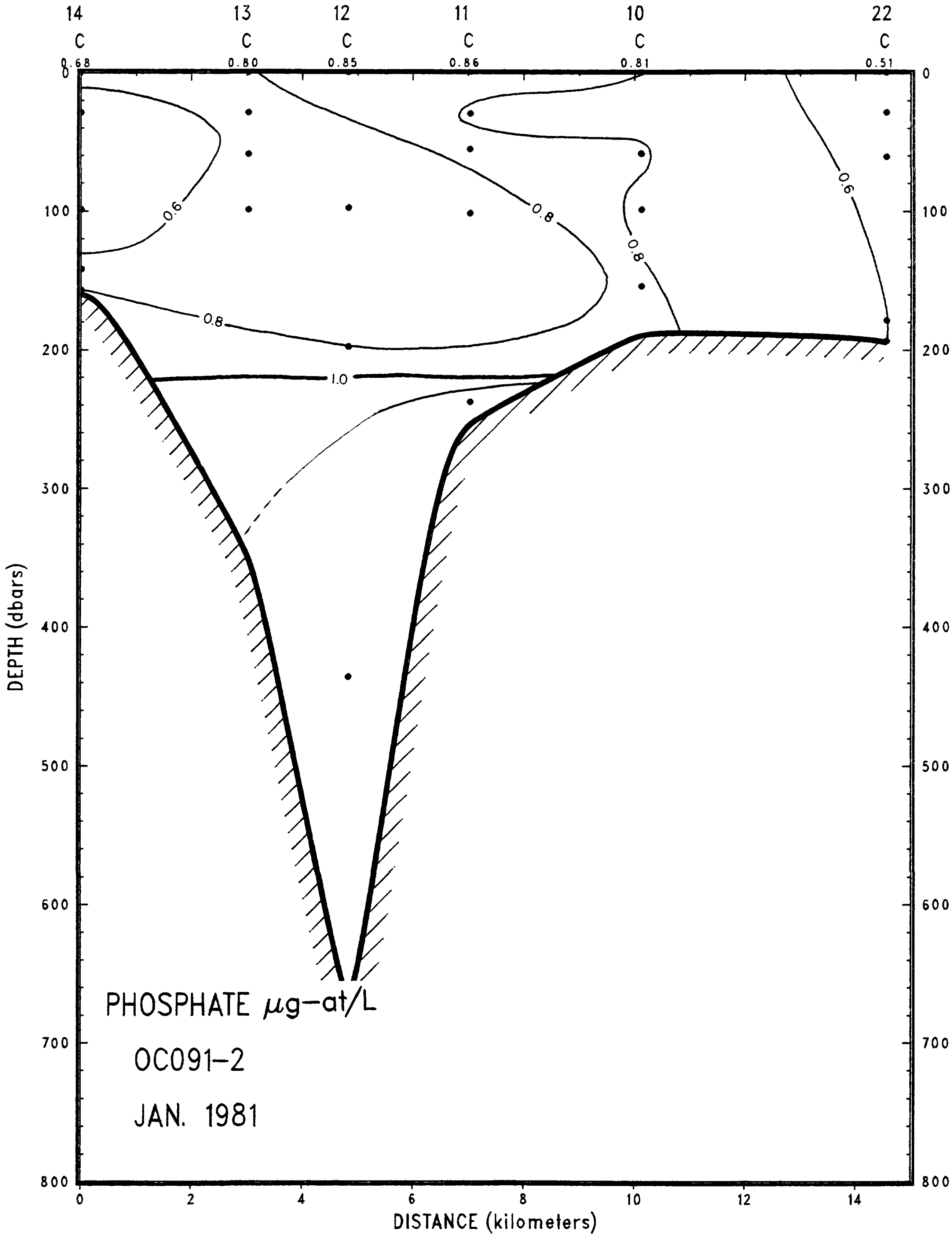

4
6
8
C
C
C
52.00
31.00
50
25
50
0
100
200
300
400
500
600
700
800
DEPTH (dbars)
0
2
4
6
8
DISTANCE (kilometers)
NON-COMBUSTIBLE %
OC091-1
JAN. 1981


14 13 12 11 10 22
C C C C C C
6.34 6.30 6.26 6.25 6.30 6.68
8.00
10.00
11.00
12.00
6.00
DEPTH (dbars)
DISTANCE (kilometers)
TEMPERATURE °C
OC091-2
JAN. 1981

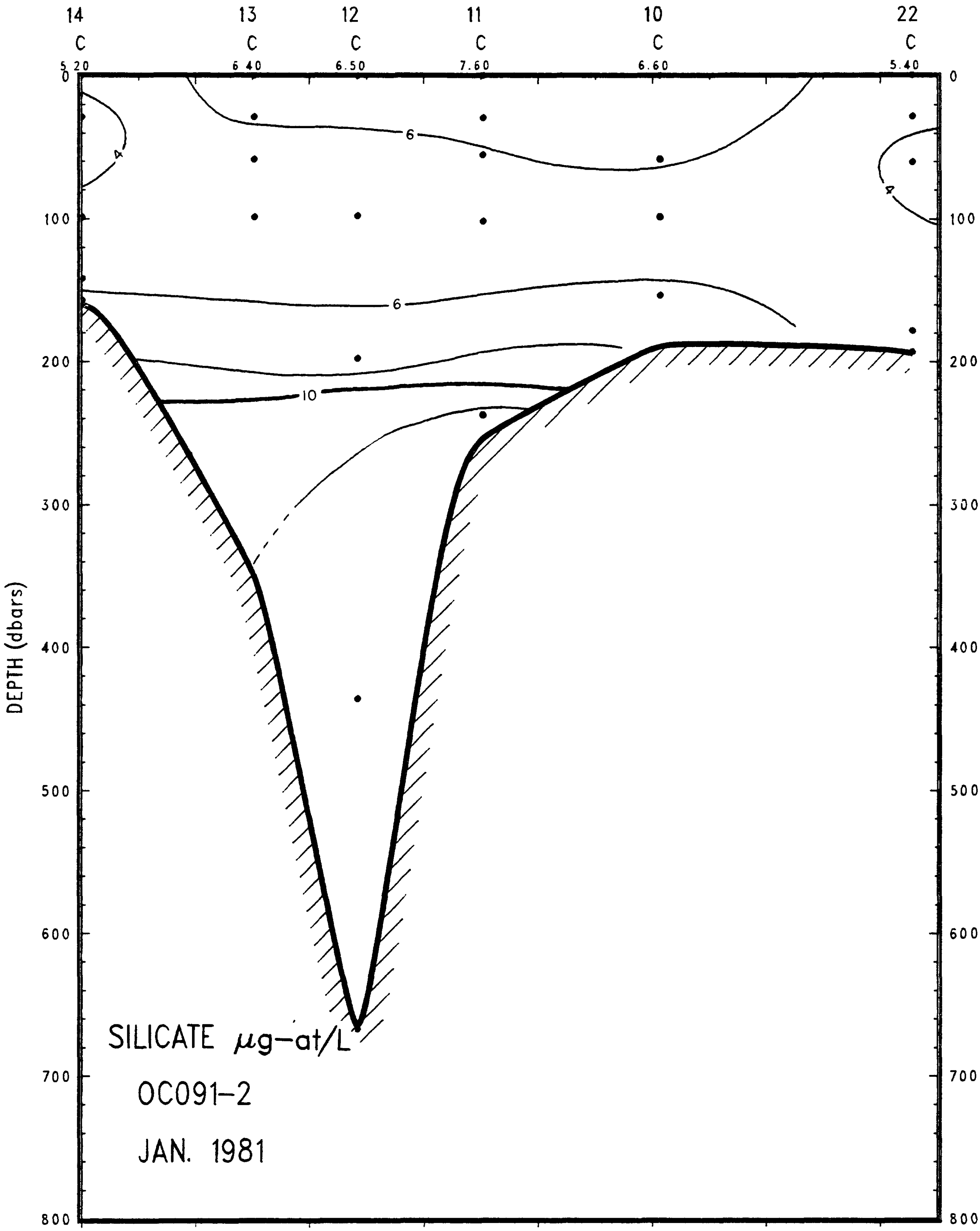

14
13
12
11
10
22
C
33.49
33.47
33.46
33.45
33.47
33.63
33.60
33.80
34.40
34.80
35.00
35.20
35.40
DEPTH (dbars)
DISTANCE (kilometers)
SALINITY psu
OC091-2
JAN. 1981


14 13 12 11 10 22
C C C C C C
26.32 26.31 26.30 26.30 26.31 26.39
26.40
26.60
26.80
27.00
27.20
DEPTH (dbars)
DISTANCE (kilometers)
SIGMA-t
OC091-2
JAN. 1981

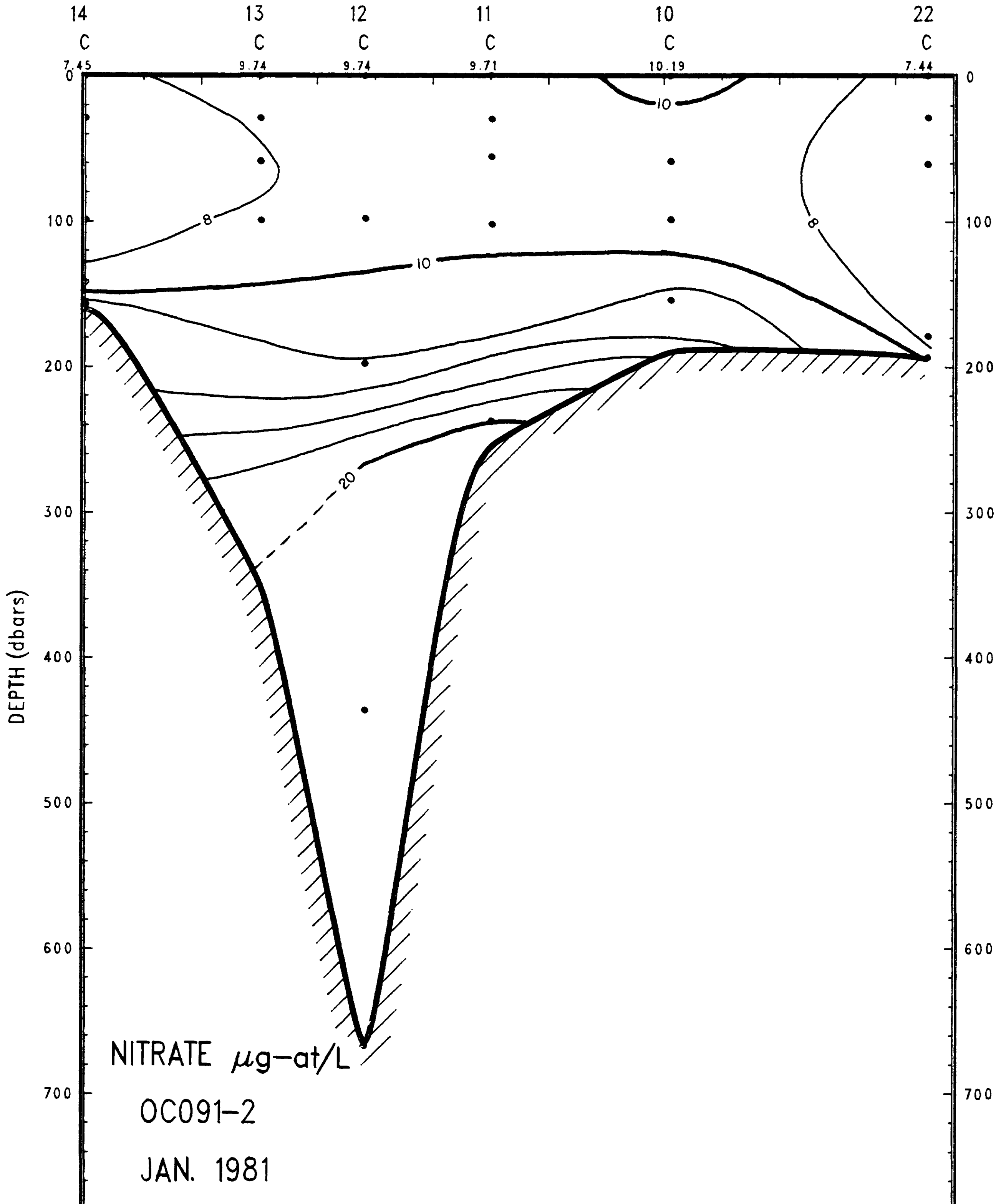

14
12
11
10
22
C
C
C
C
C
0.11
0.14
0.12
0.10
0.16
0.10
< .10
0.10
ATN. COEFF m⁻¹
OC091–2
JAN. 1981
DEPTH (dbars)
DISTANCE (kilometers)
0
100
200
300
400
500
600
700
800
0
2
4
6
8
10
12
14

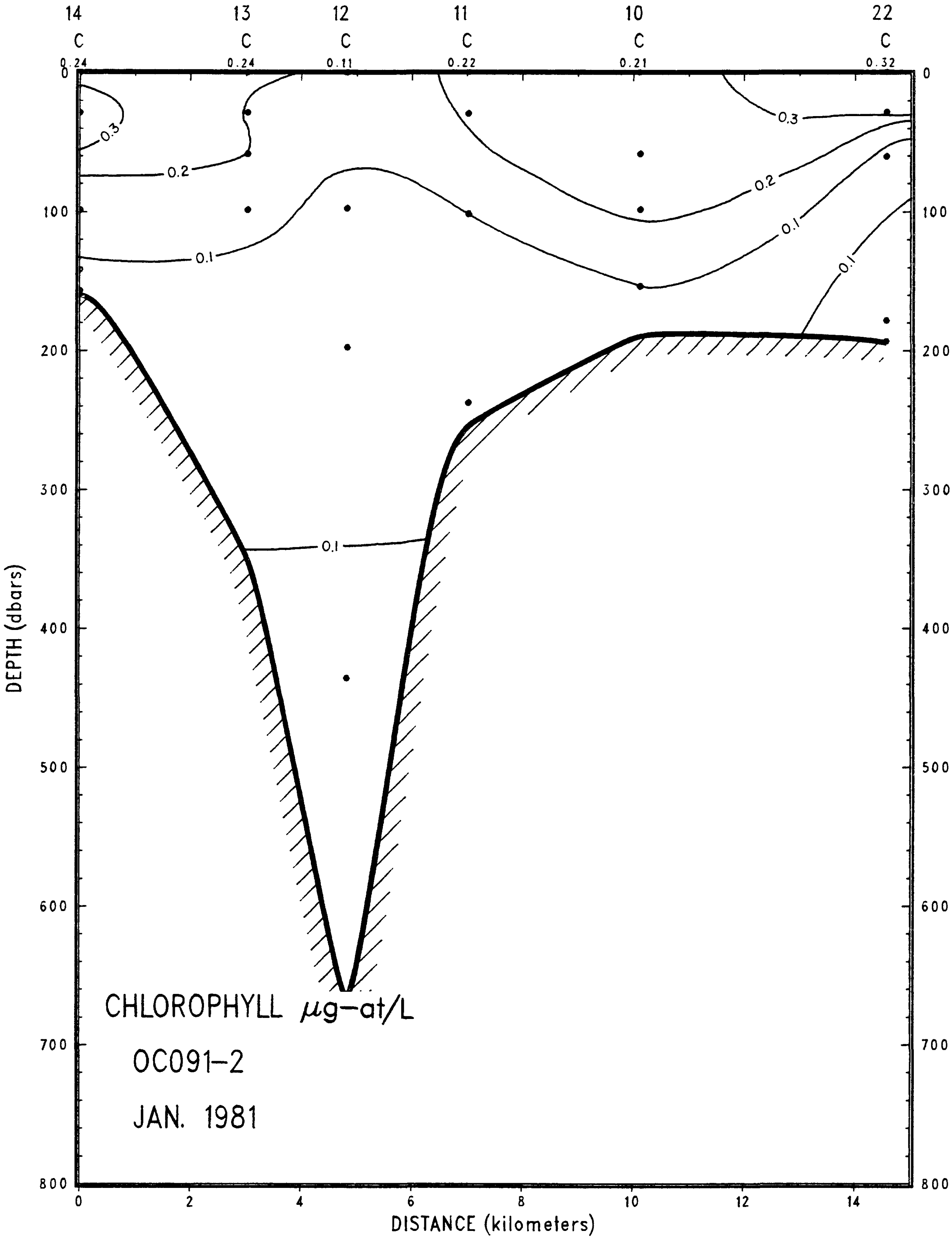


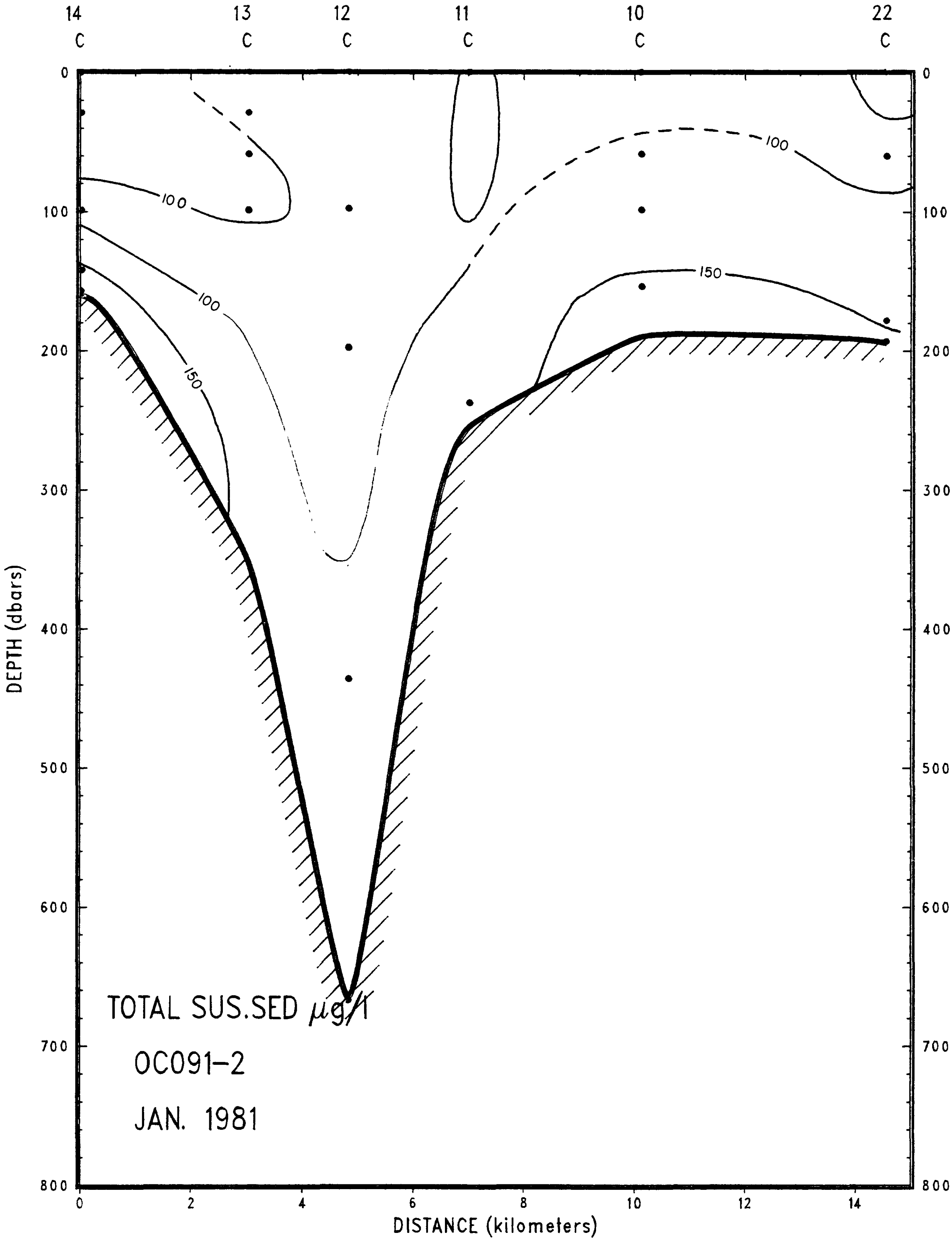
14
C
0.68
13
C
0.80
12
C
0.85
11
C
0.86
10
C
0.81
22
C
0.51
0.6
0.8
0.8
1.0
0.8
0.6
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
0
2
4
6
8
10
12
14
DISTANCE (kilometers)
PHOSPHATE μg-at/L
OC091-2
JAN. 1981



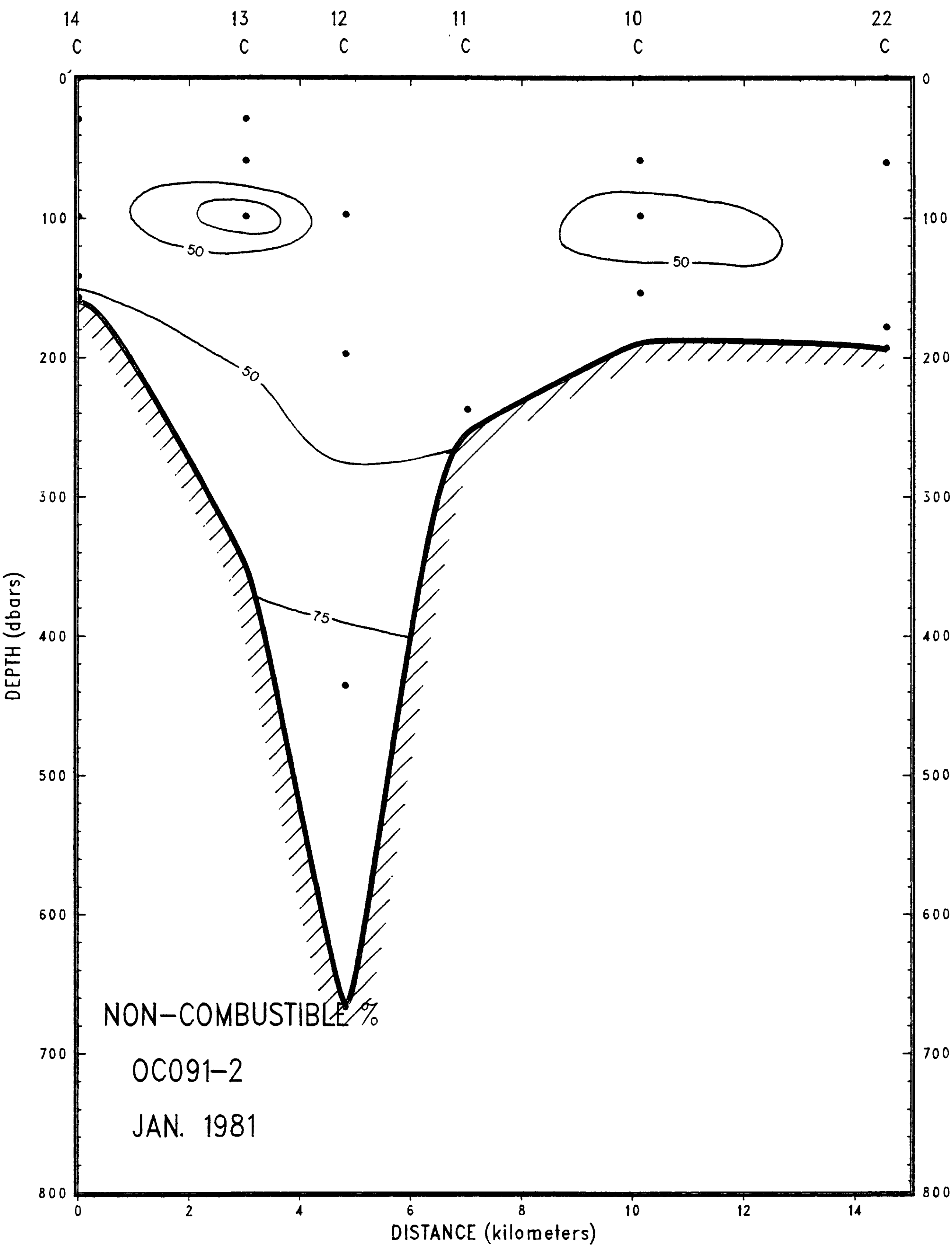
14
C
5.20
13
C
6.40
12
C
6.50
11
C
7.60
10
C
6.60
22
C
5.40
DEPTH (dbars)
DISTANCE (kilometers)
4
6
6
10
SILICATE μg-at/L
OC091-2
JAN. 1981

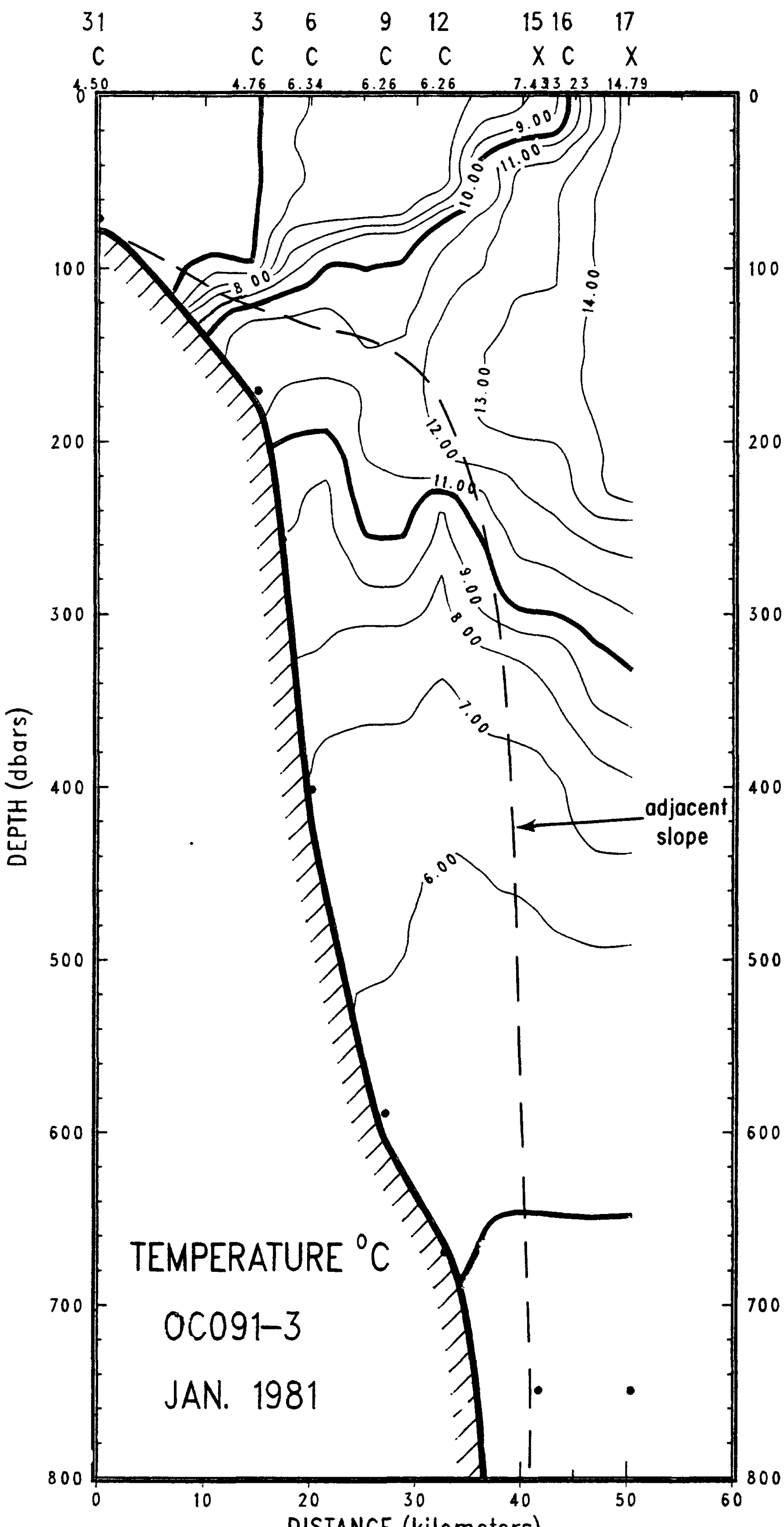

14 C 7.45
13 C 9.74
12 C 9.74
11 C 9.71
10 C 10.19
22 C 7.44
10
8
10
8
20
DEPTH (dbars)
DISTANCE (kilometers)
NITRATE µg-at/L
OC091-2
JAN. 1981

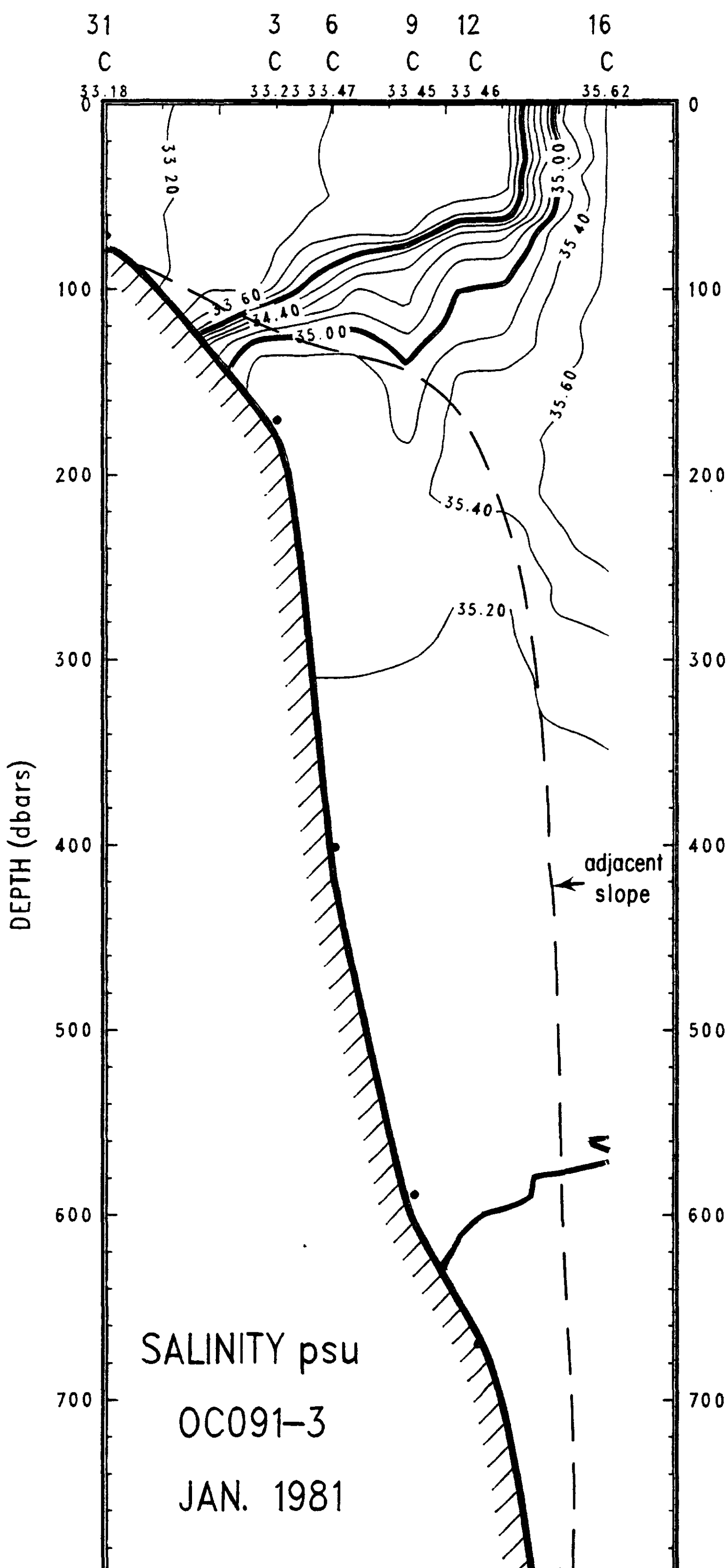

14
13
12
11
10
22
C
0.24
0.24
0.11
0.22
0.21
0.32
0.3
0.2
0.1
DEPTH (dbars)
DISTANCE (kilometers)
CHLOROPHYLL μg-at/L
OC091-2
JAN. 1981

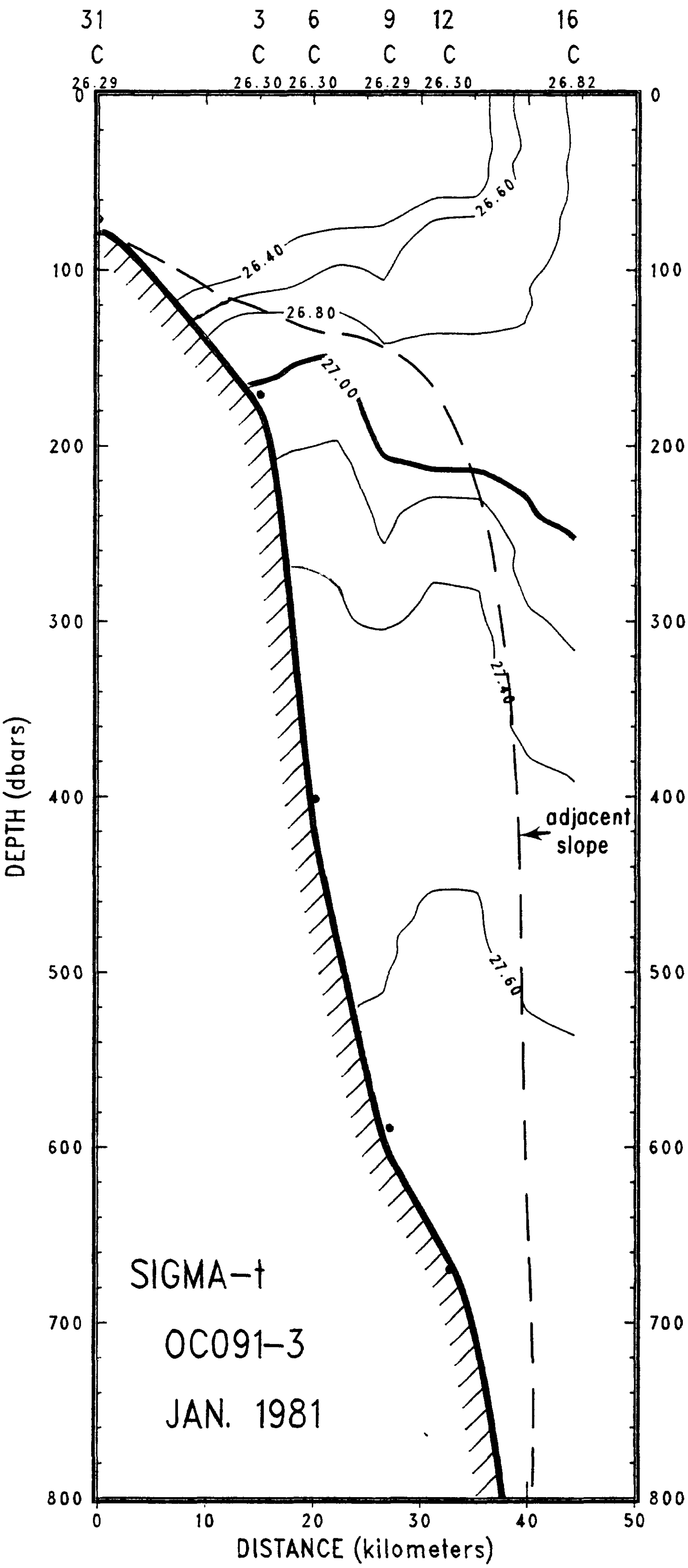


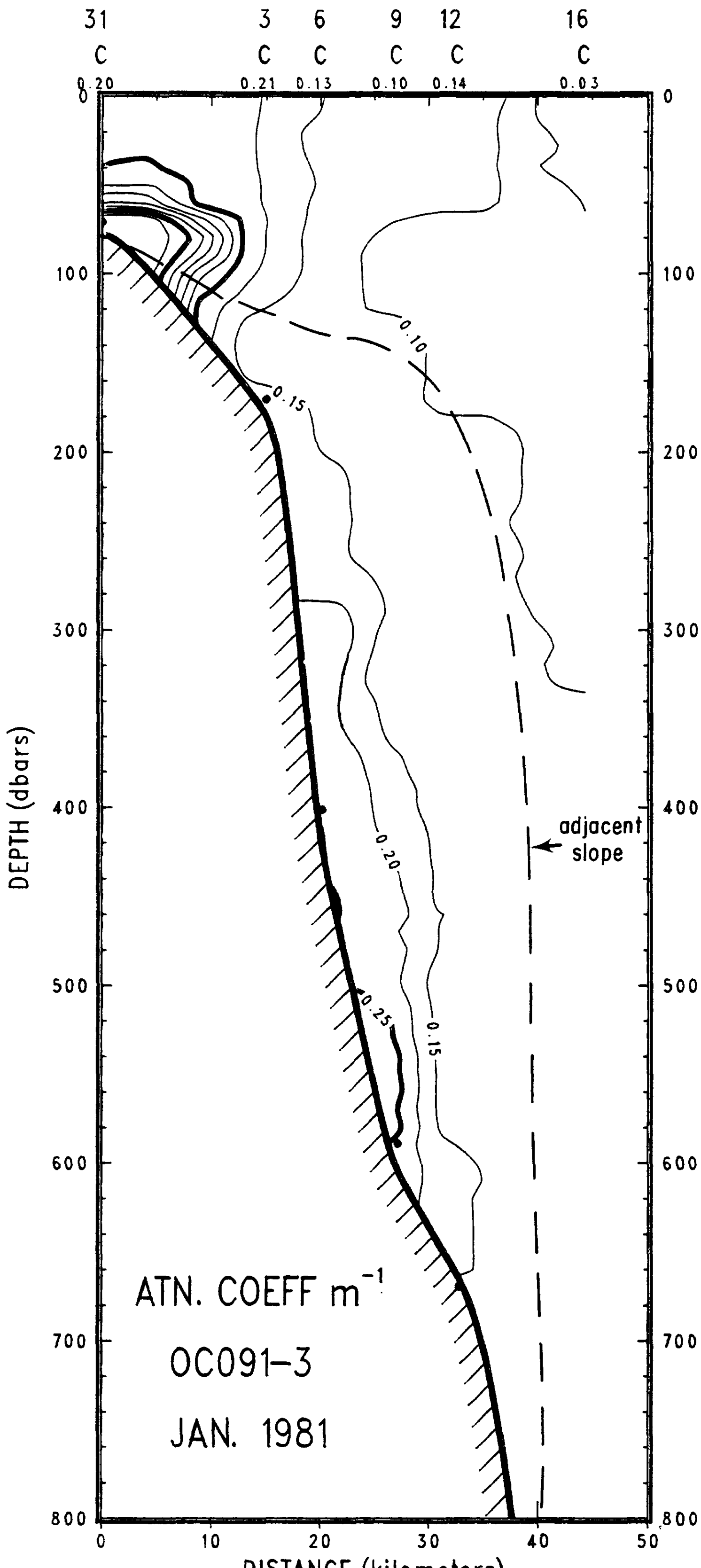
14 C
13 C
12 C
11 C
10 C
22 C
DEPTH (dbars)
DISTANCE (kilometers)
100
150
TOTAL SUS.SED μg/l
OC091-2
JAN. 1981

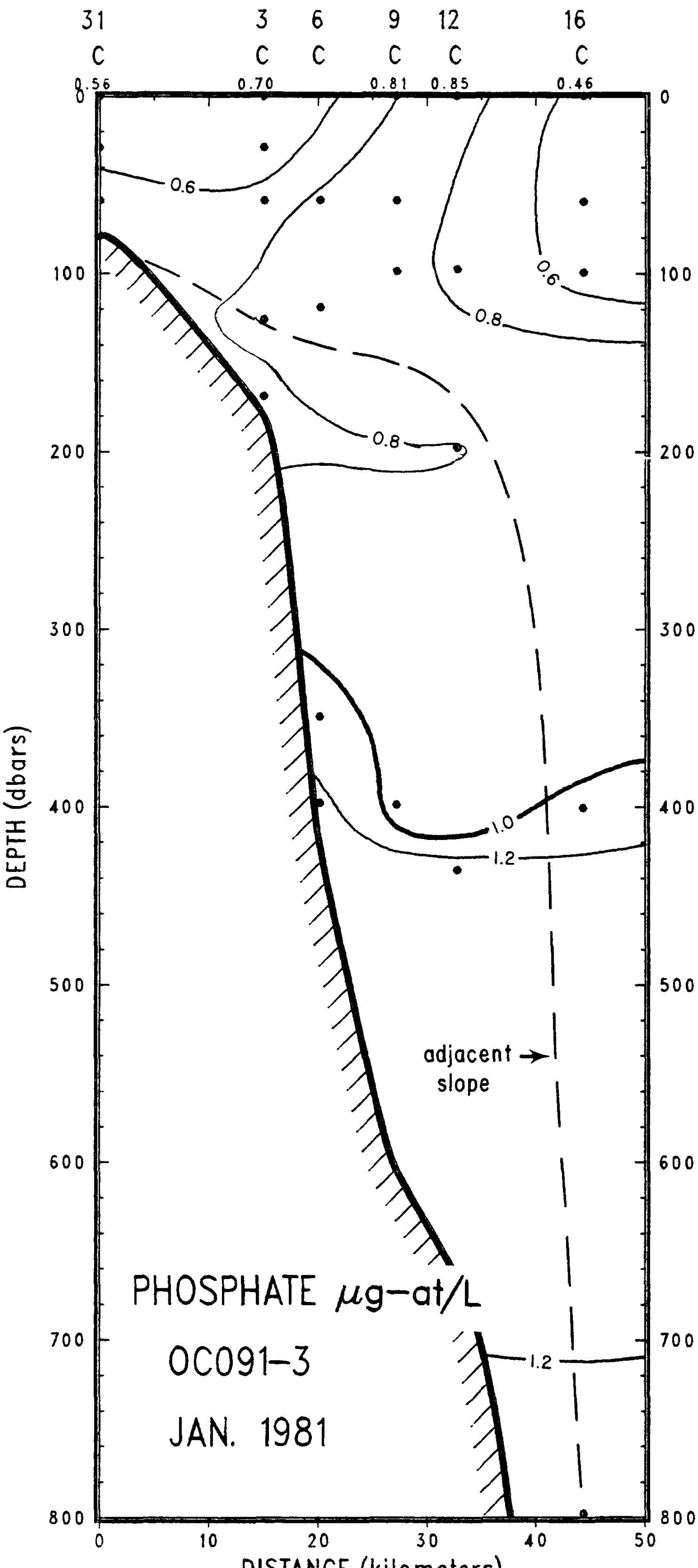

14
13
12
11
10
22
C
C
C
C
C
C
0
100
200
300
400
500
600
700
800
DEPTH (dbars)
50
50
50
75
NON-COMBUSTIBLE %
OC091-2
JAN. 1981
0
2
4
6
8
10
12
14
DISTANCE (kilometers)


31
C
3
C
6
C
9
C
12
C
15
X
16
C
17
X
DEPTH (dbars)
DISTANCE (kilometers)
adjacent slope
TEMPERATURE °C
OC091-3
JAN. 1981

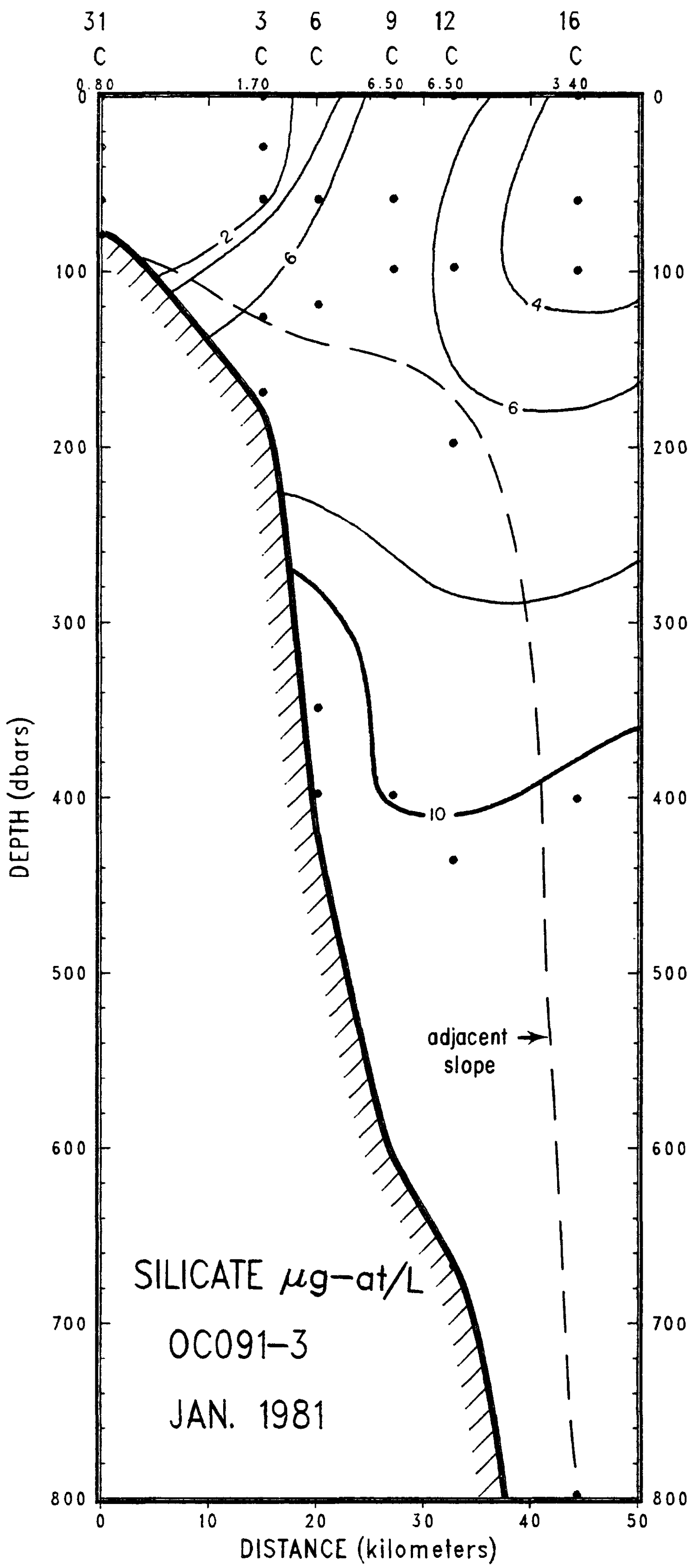

31 C 3 C 6 C 9 C 12 C 16 C
33.18 33.23 33.47 33.45 33.46 35.62
33.20
33.60
34.40
35.00
35.40
35.60
35.20
adjacent slope
DEPTH (dbars)
DISTANCE (kilometers)
SALINITY psu
OC091-3
JAN. 1981

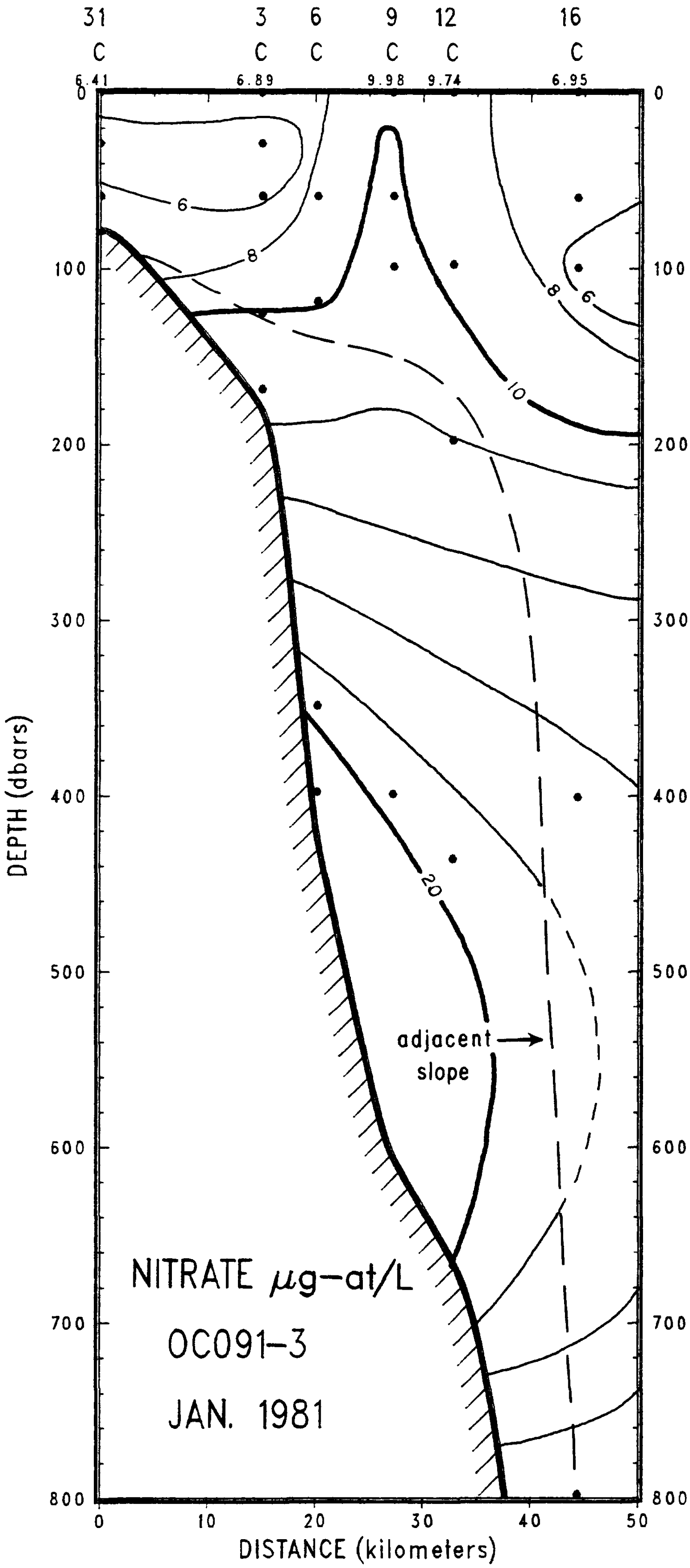

31 3 6 9 12 16
C C C C C C
26.29 26.30 26.30 26.29 26.30 26.82
26.40
26.60
26.80
27.00
27.40
27.60
adjacent slope
DEPTH (dbars)
DISTANCE (kilometers)
SIGMA-t
OC091-3
JAN. 1981


31
3
6
9
12
16
C
0.20
0.21
0.13
0.10
0.14
0.03
DEPTH (dbars)
DISTANCE (kilometers)
0.10
0.15
0.20
0.25
adjacent slope
ATN. COEFF m⁻¹
OC091-3
JAN. 1981

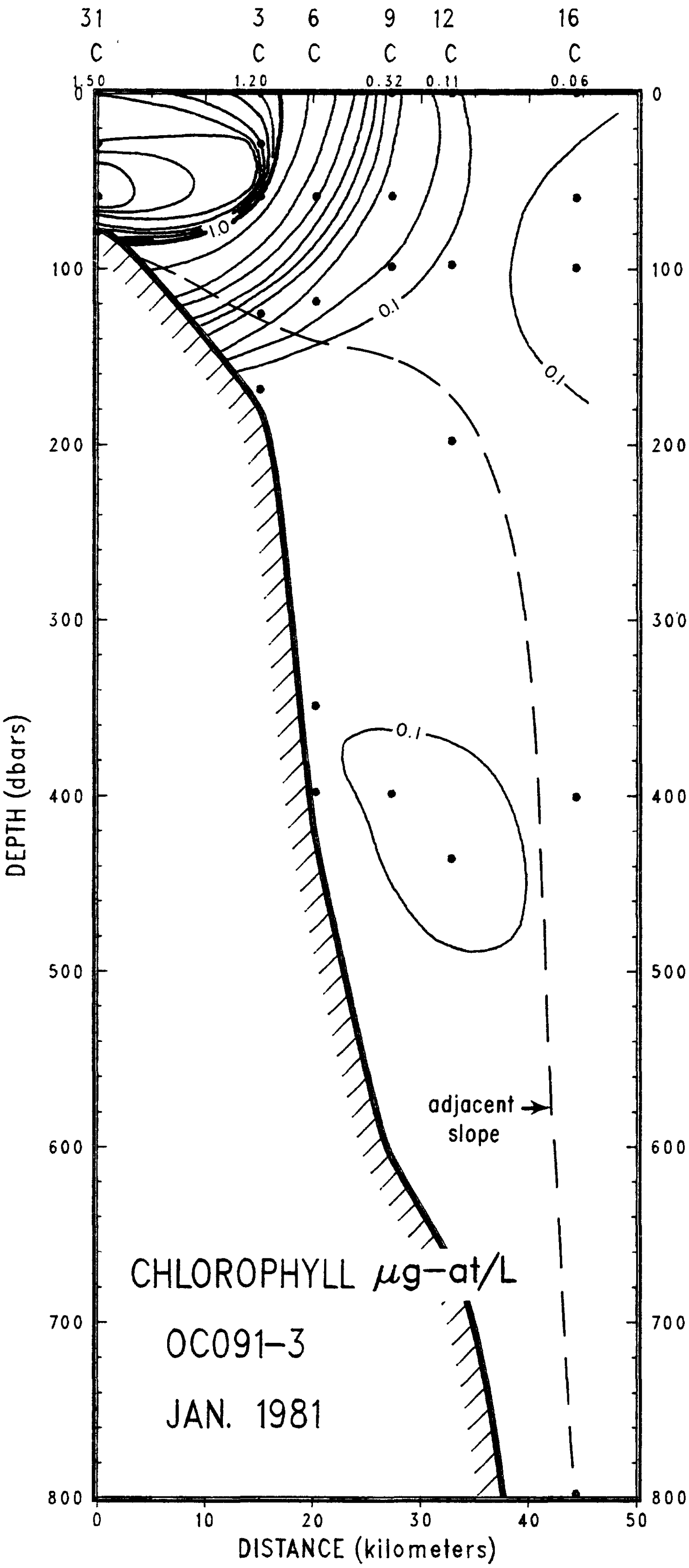


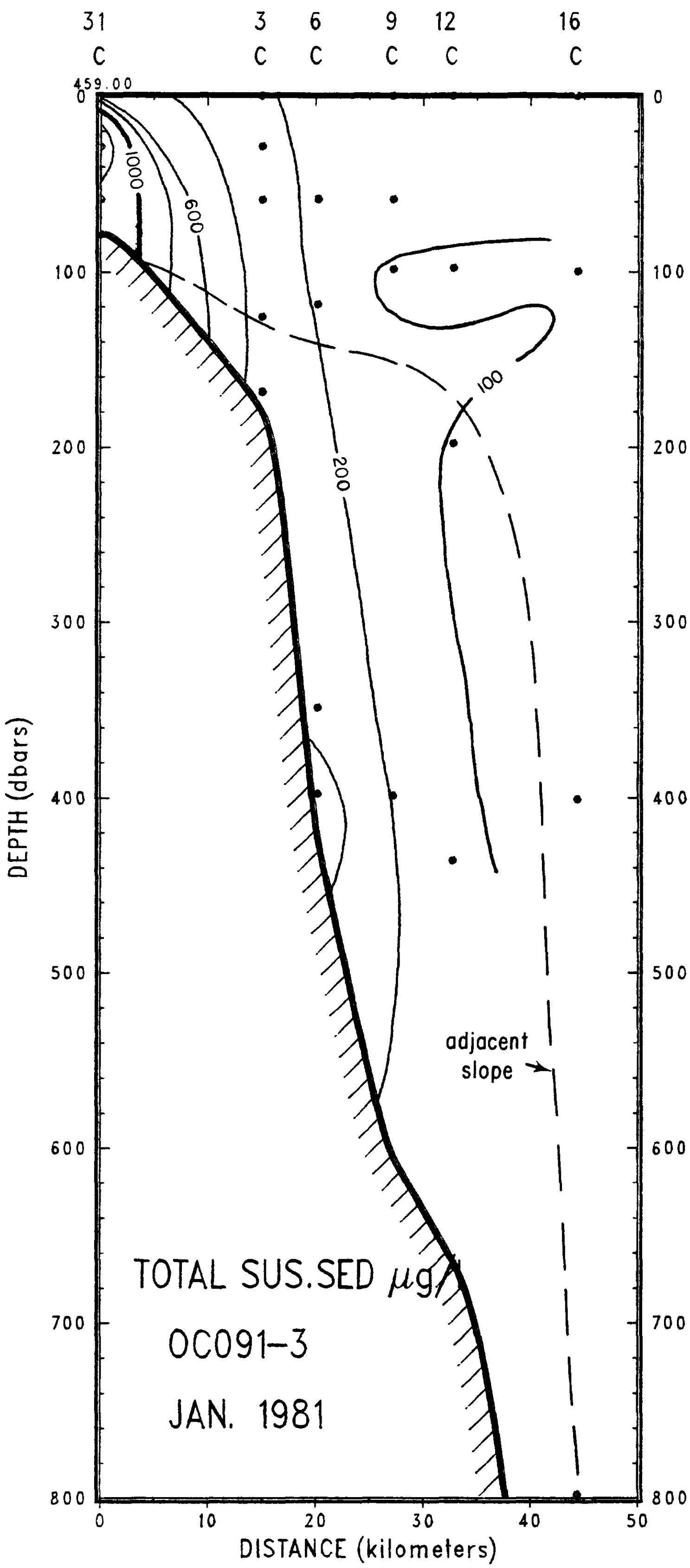
31
3
6
9
12
16
C
C
C
C
C
C
0.56
0.70
0.81
0.85
0.46
0.6
0.6
0.8
0.8
1.0
1.2
1.2
adjacent slope
PHOSPHATE μg-at/L
OC091-3
JAN. 1981
DEPTH (dbars)
DISTANCE (kilometers)
0
100
200
300
400
500
600
700
800
0
10
20
30
40
50

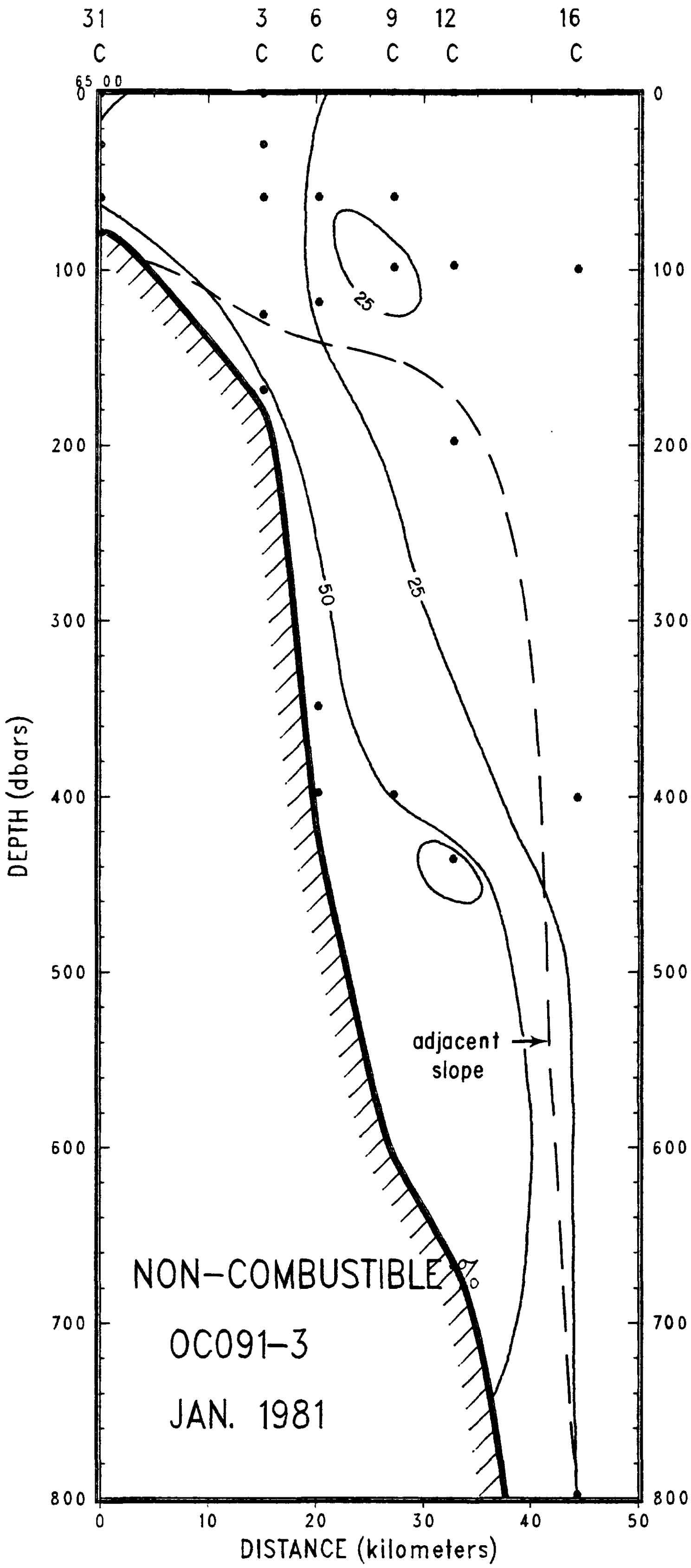

31 3 6 9 12 16
C C C C C C
0.80 1.70 6.50 6.50 3.40
2
6
4
6
10
adjacent slope
SILICATE μg-at/L
OC091-3
JAN. 1981
DEPTH (dbars)
DISTANCE (kilometers)
0 100 200 300 400 500 600 700 800
0 10 20 30 40 50

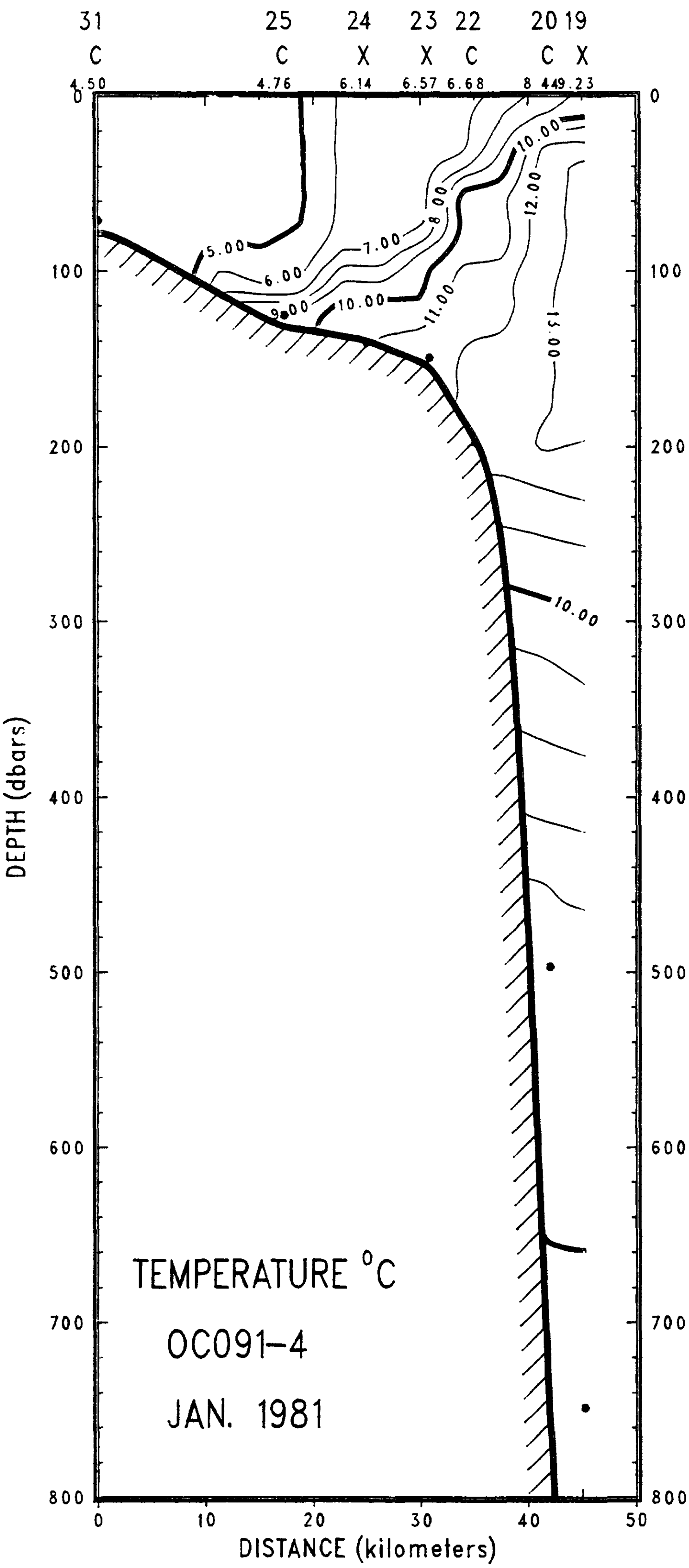


31 C 6.41
3 C 6.89
6 C
9 C 9.98
12 C 9.74
16 C 6.95
DEPTH (dbars)
DISTANCE (kilometers)
adjacent slope
NITRATE µg-at/L
OC091-3
JAN. 1981

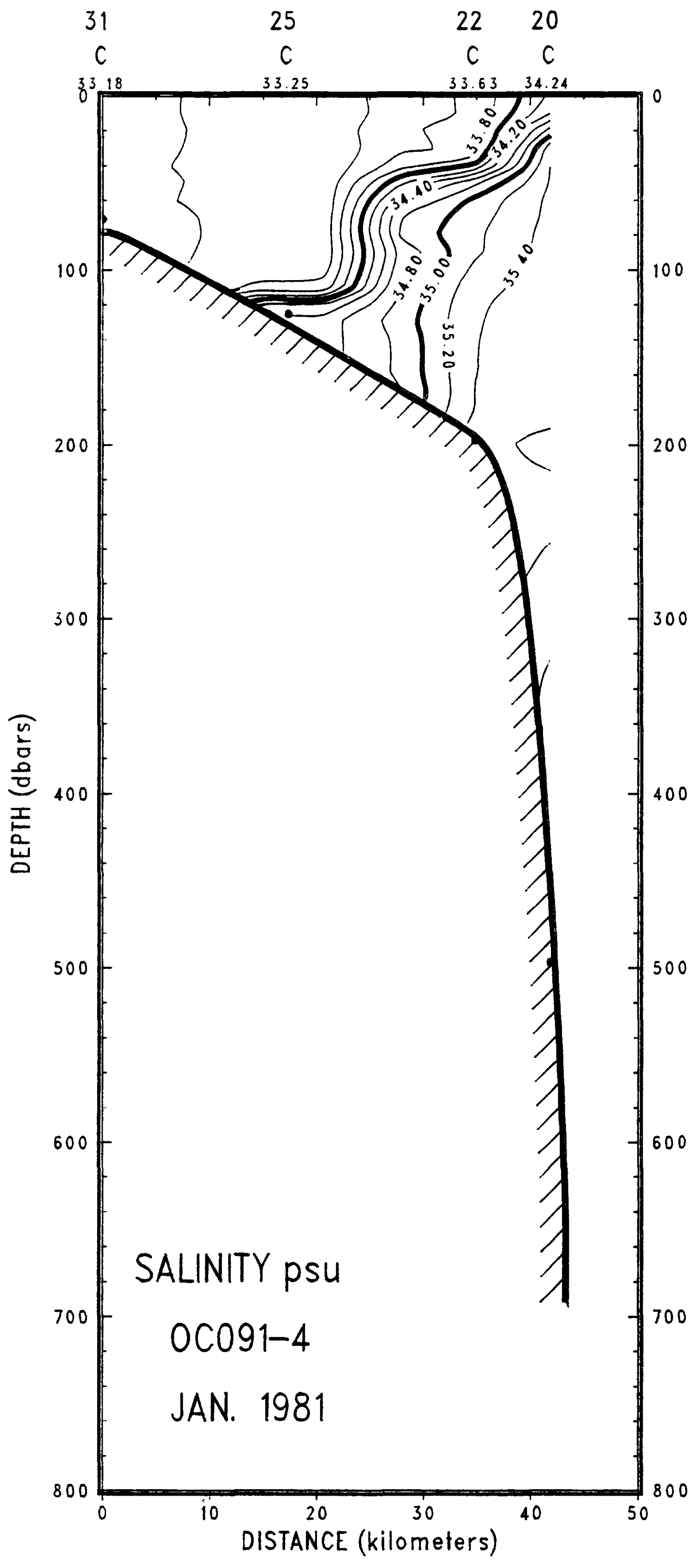

31
3
6
9
12
16
C
1.50
1.20
0.32
0.11
0.06
1.0
0.1
0.1
0.1
adjacent slope
CHLOROPHYLL μg-at/L
OC091-3
JAN. 1981
DEPTH (dbars)
DISTANCE (kilometers)
0
100
200
300
400
500
600
700
800
10
20
30
40
50

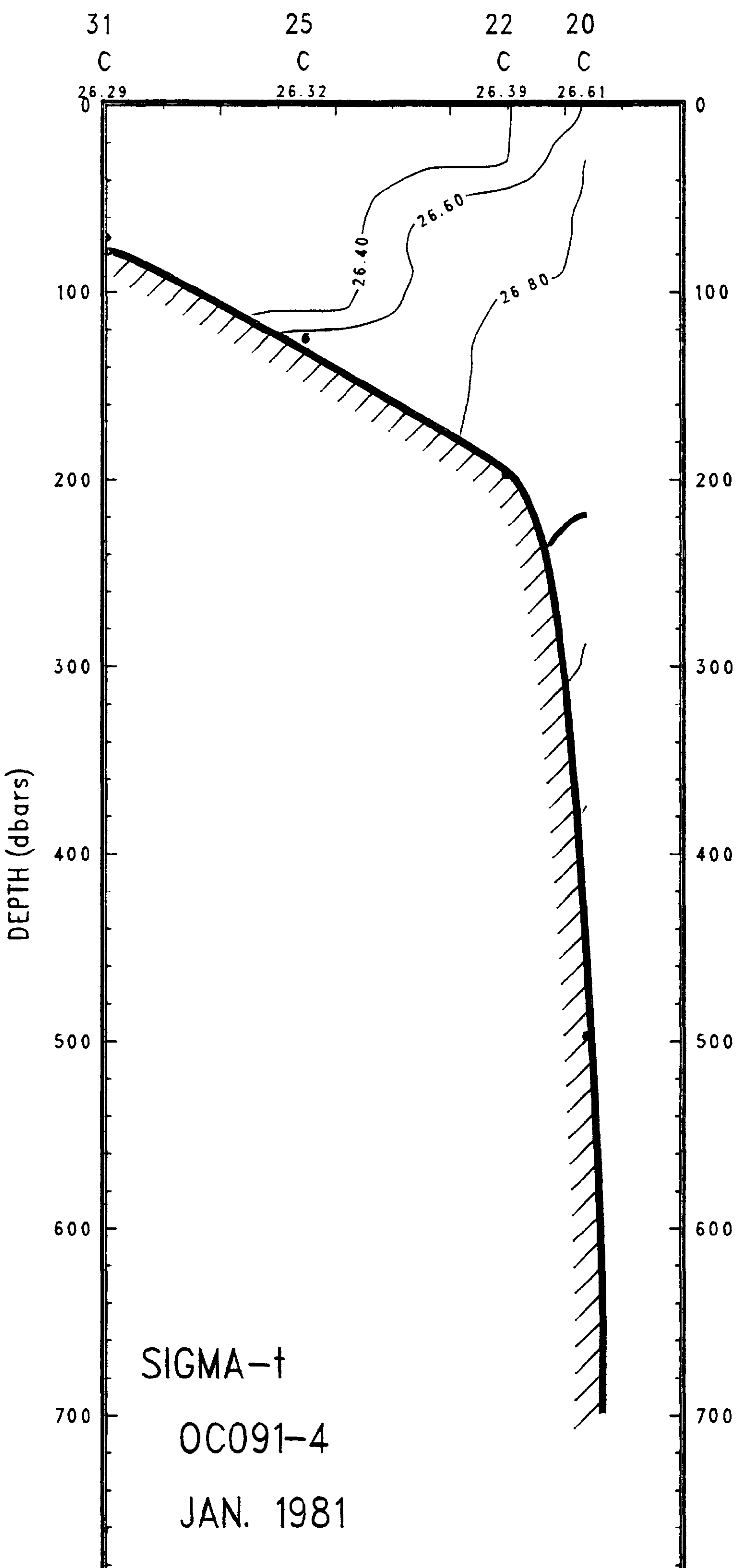

31 C
3 C
6 C
9 C
12 C
16 C
459.00
1000
600
200
100
adjacent slope
DEPTH (dbars)
DISTANCE (kilometers)
TOTAL SUS.SED μg/l
OC091-3
JAN. 1981


31
3
6
9
12
16
C
C
C
C
C
C
65 00
DEPTH (dbars)
DISTANCE (kilometers)
25
50
25
adjacent
slope
NON-COMBUSTIBLE %
OC091-3
JAN. 1981
0
100
200
300
400
500
600
700
800
0
10
20
30
40
50

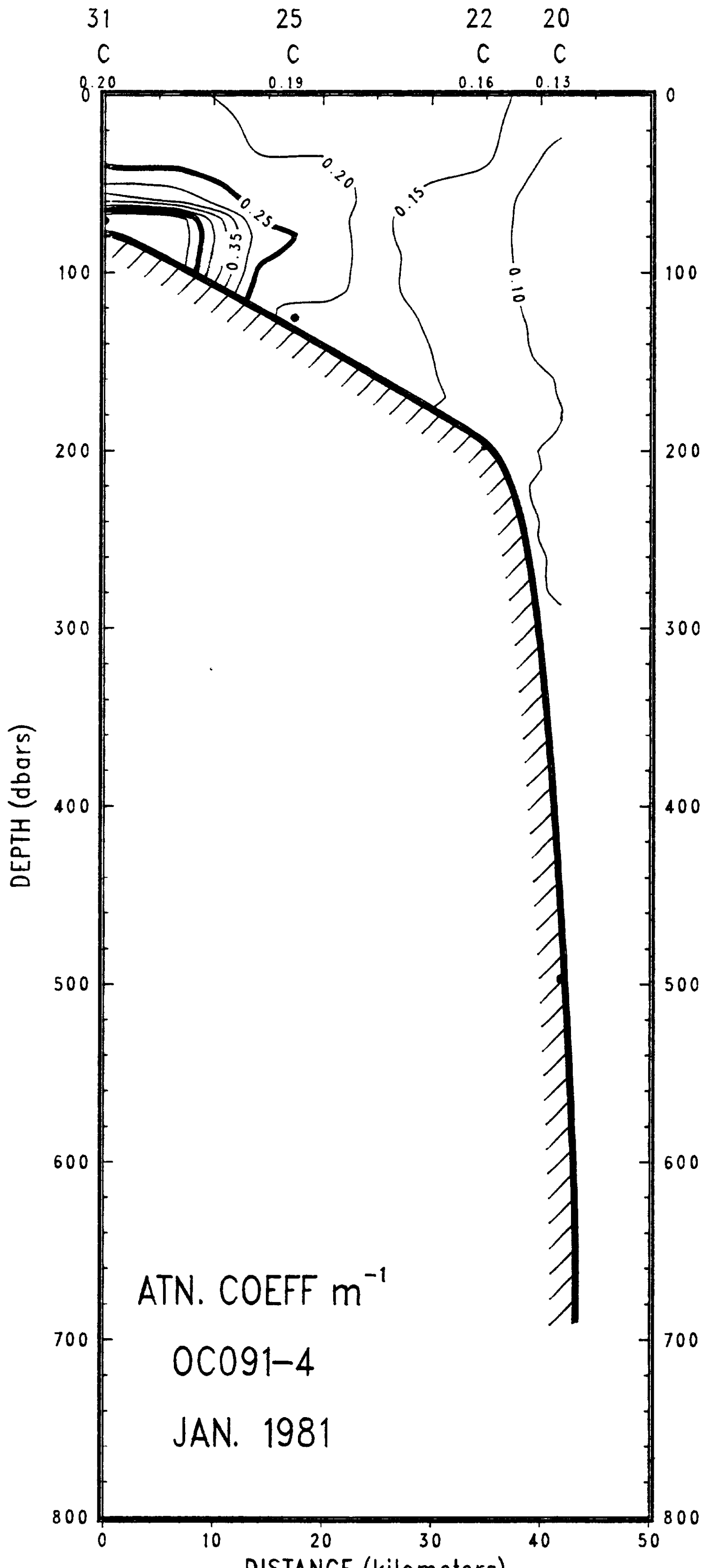


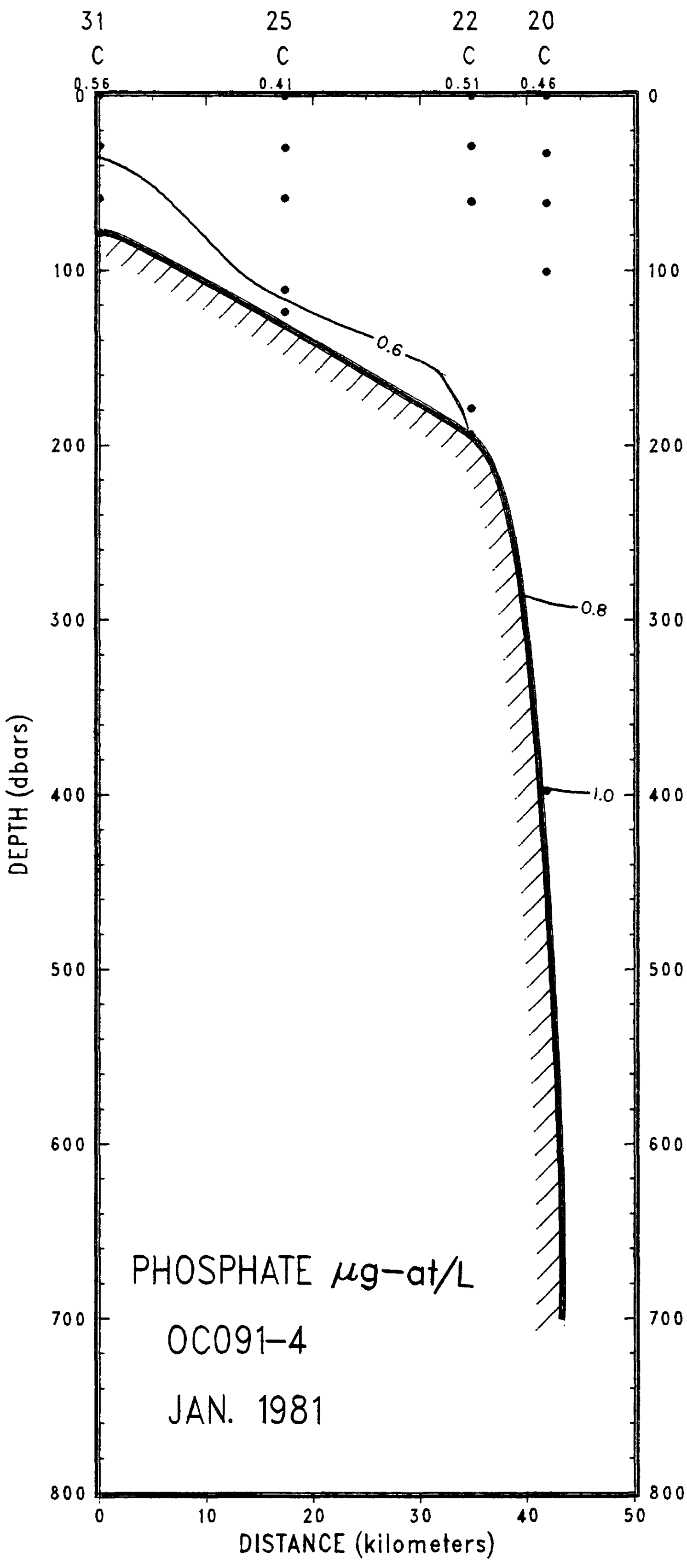
31
C
25
C
24
X
23
X
22
C
20
C
19
X
4.50
4.76
6.14
6.57
6.68
8.44
9.23
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00
13.00
10.00
DEPTH (dbars)
DISTANCE (kilometers)
TEMPERATURE °C
OC091-4
JAN. 1981


31
25
22
20
C
C
C
C
33.18
33.25
33.63
34.24
33.80
34.20
34.40
34.80
35.00
35.20
35.40
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
DISTANCE (kilometers)
10
20
30
40
50
SALINITY psu
OC091-4
JAN. 1981

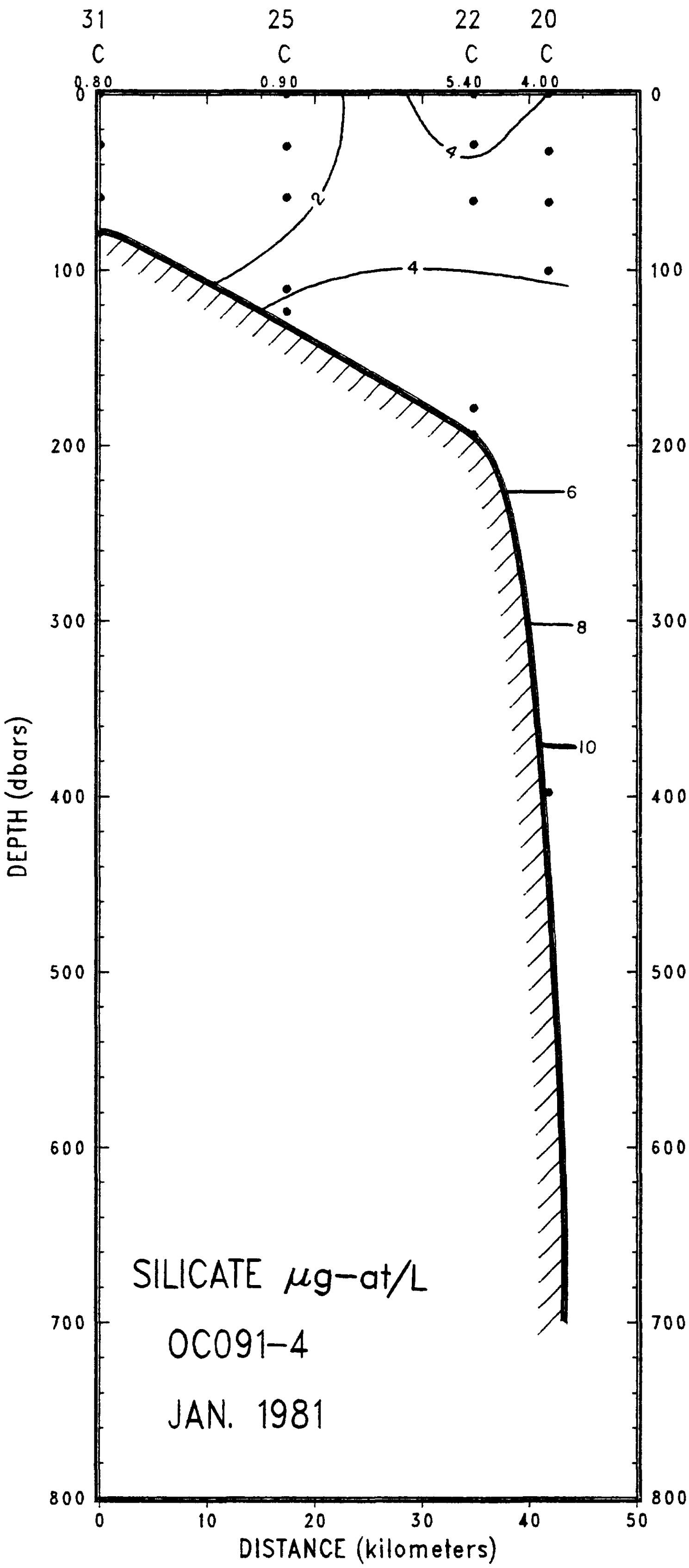


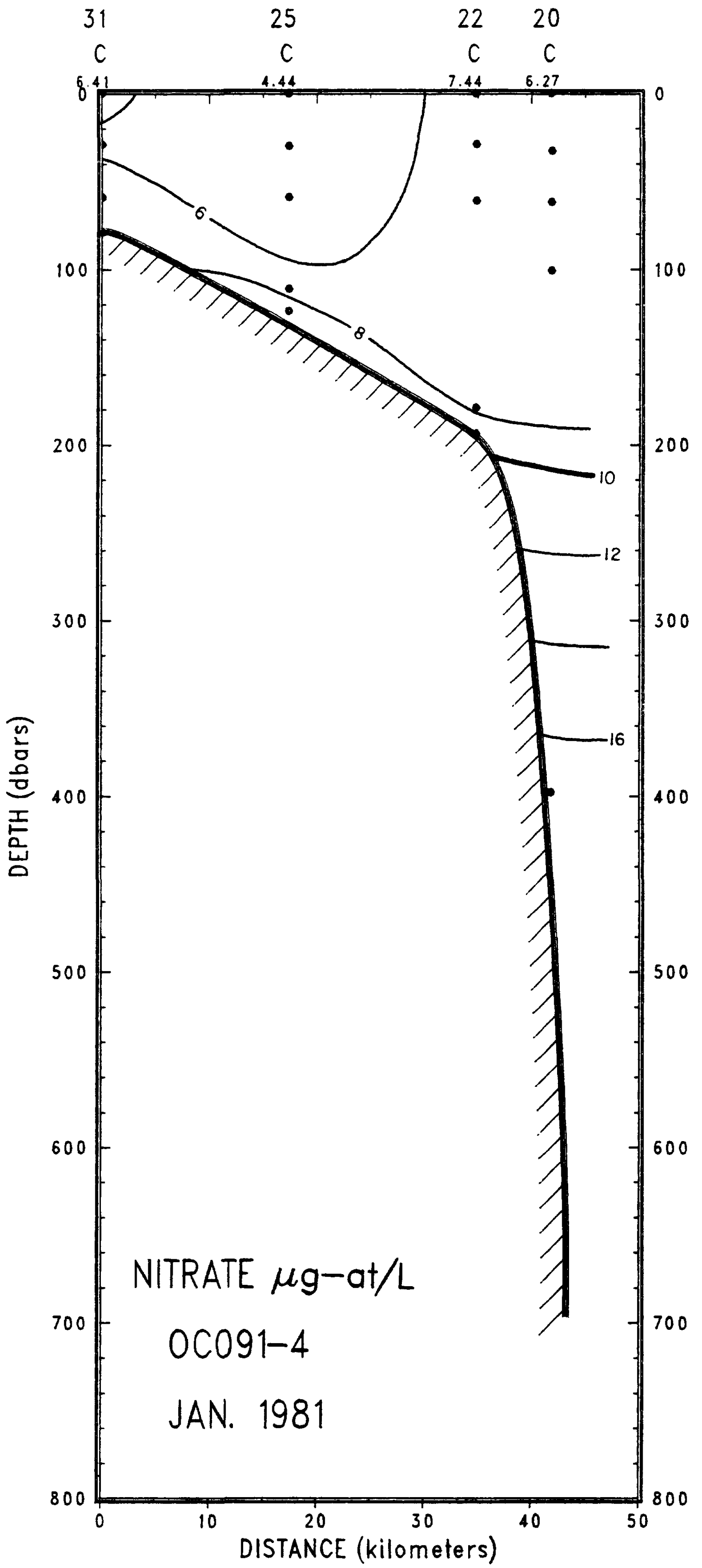
31
C
25
C
22
C
20
C
26.29
26.32
26.39
26.61
26.40
26.60
26 80
DEPTH (dbars)
DISTANCE (kilometers)
0
100
200
300
400
500
600
700
800
10
20
30
40
50
SIGMA-t
OC091-4
JAN. 1981

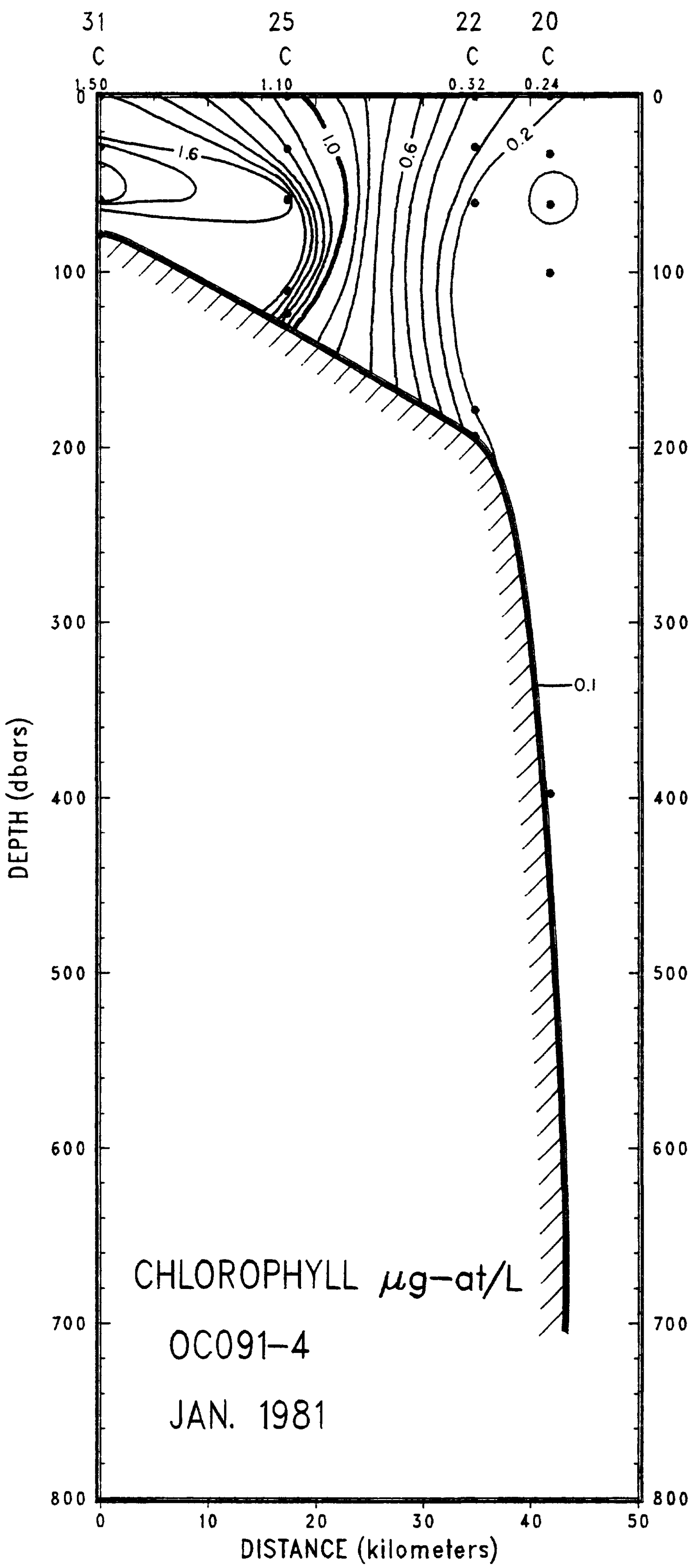

31 25 22 20
C C C C
0.20 0.19 0.16 0.13
0.20
0.15
0.25
0.35
0.10
DEPTH (dbars)
DISTANCE (kilometers)
ATN. COEFF m^{-1}
OC091-4
JAN. 1981



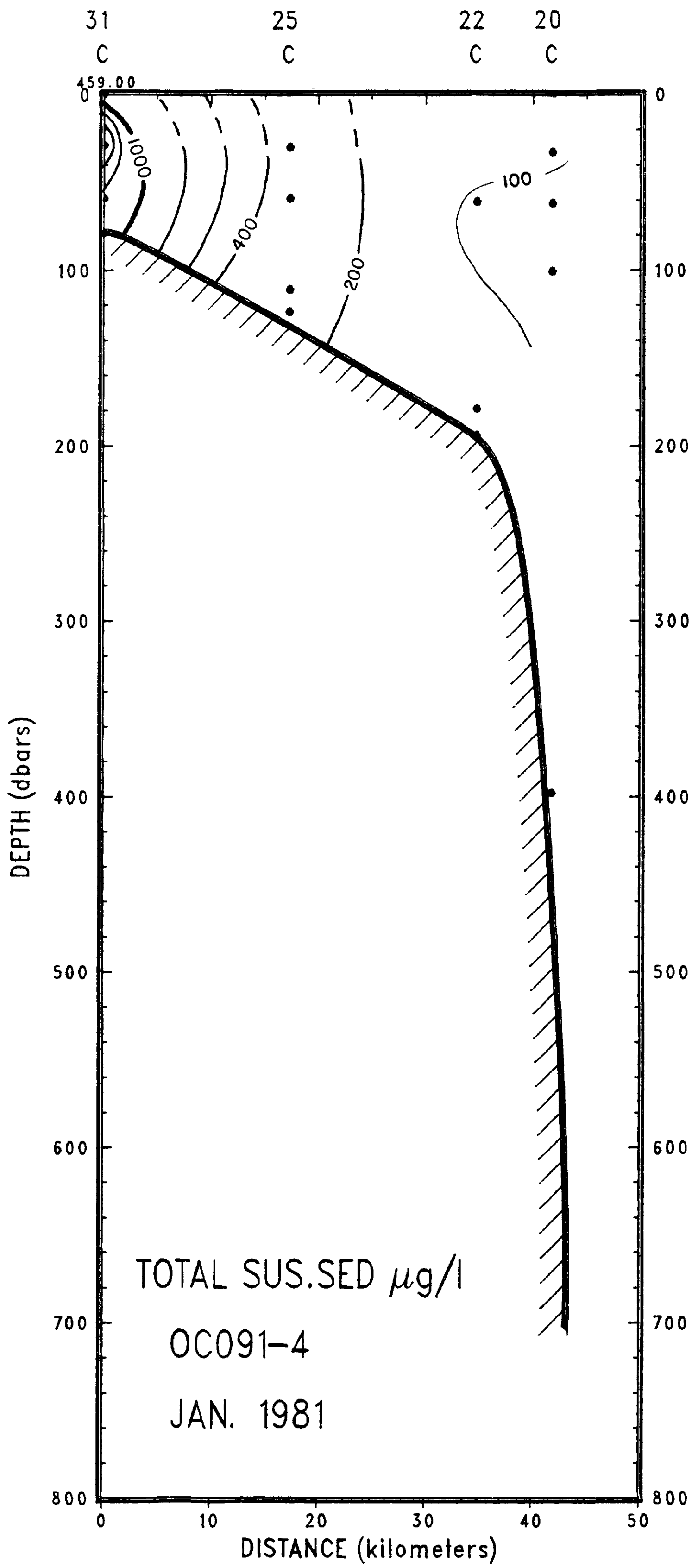
31
25
22
20
C
C
C
C
0.56
0.41
0.51
0.46
0
100
200
300
400
500
600
700
800
DEPTH (dbars)
0.6
0.8
1.0
PHOSPHATE μg-at/L
OC091-4
JAN. 1981
0
10
20
30
40
50
DISTANCE (kilometers)


31
25
22
20
C
C
C
C
0.80
0.90
5.40
4.00
0
100
200
300
400
500
600
700
800
DEPTH (dbars)
0
10
20
30
40
50
DISTANCE (kilometers)
2
4
4
6
8
10
SILICATE µg-at/L
OC091-4
JAN. 1981

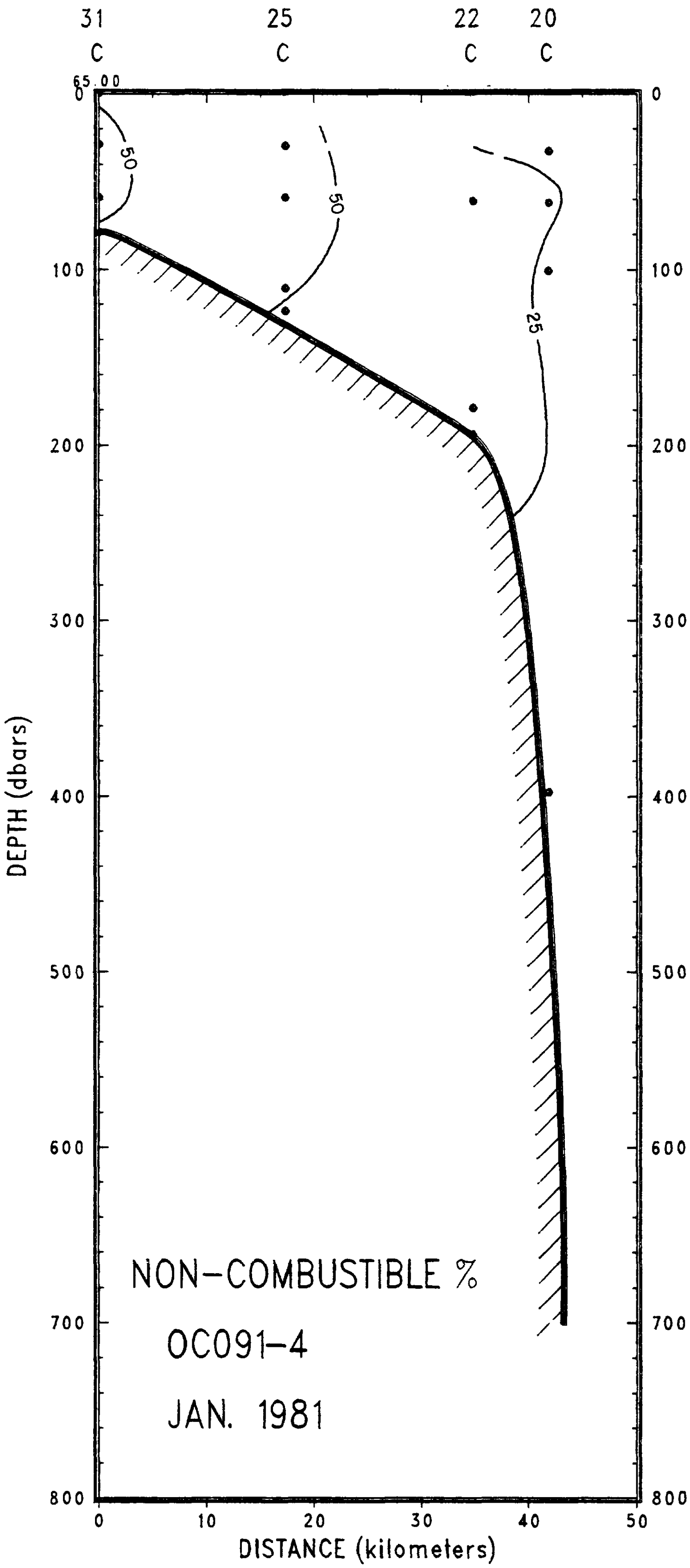

31
25
22
20
C
C
C
C
6.41
4.44
7.44
6.27
6
8
10
12
16
DEPTH (dbars)
DISTANCE (kilometers)
0
100
200
300
400
500
600
700
800
0
10
20
30
40
50
NITRATE µg-at/L
OC091-4
JAN. 1981

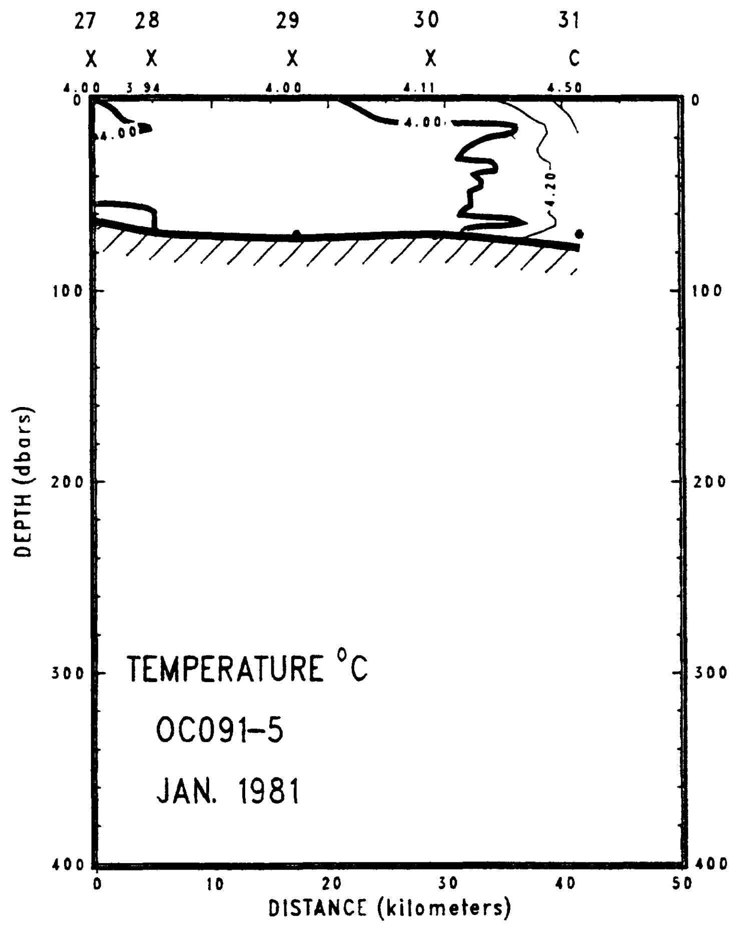


31
25
22
20
C
C
C
C
1.50
1.10
0.32
0.24
1.6
1.0
0.6
0.2
0.1
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
DISTANCE (kilometers)
0
10
20
30
40
50
CHLOROPHYLL μg-at/L
OC091-4
JAN. 1981



31
C
25
C
22
C
20
C
459.00
1000
400
200
100
DEPTH (dbars)
0
100
200
300
400
500
600
700
800
TOTAL SUS.SED μg/l
OC091-4
JAN. 1981
0
10
20
30
40
50
DISTANCE (kilometers)

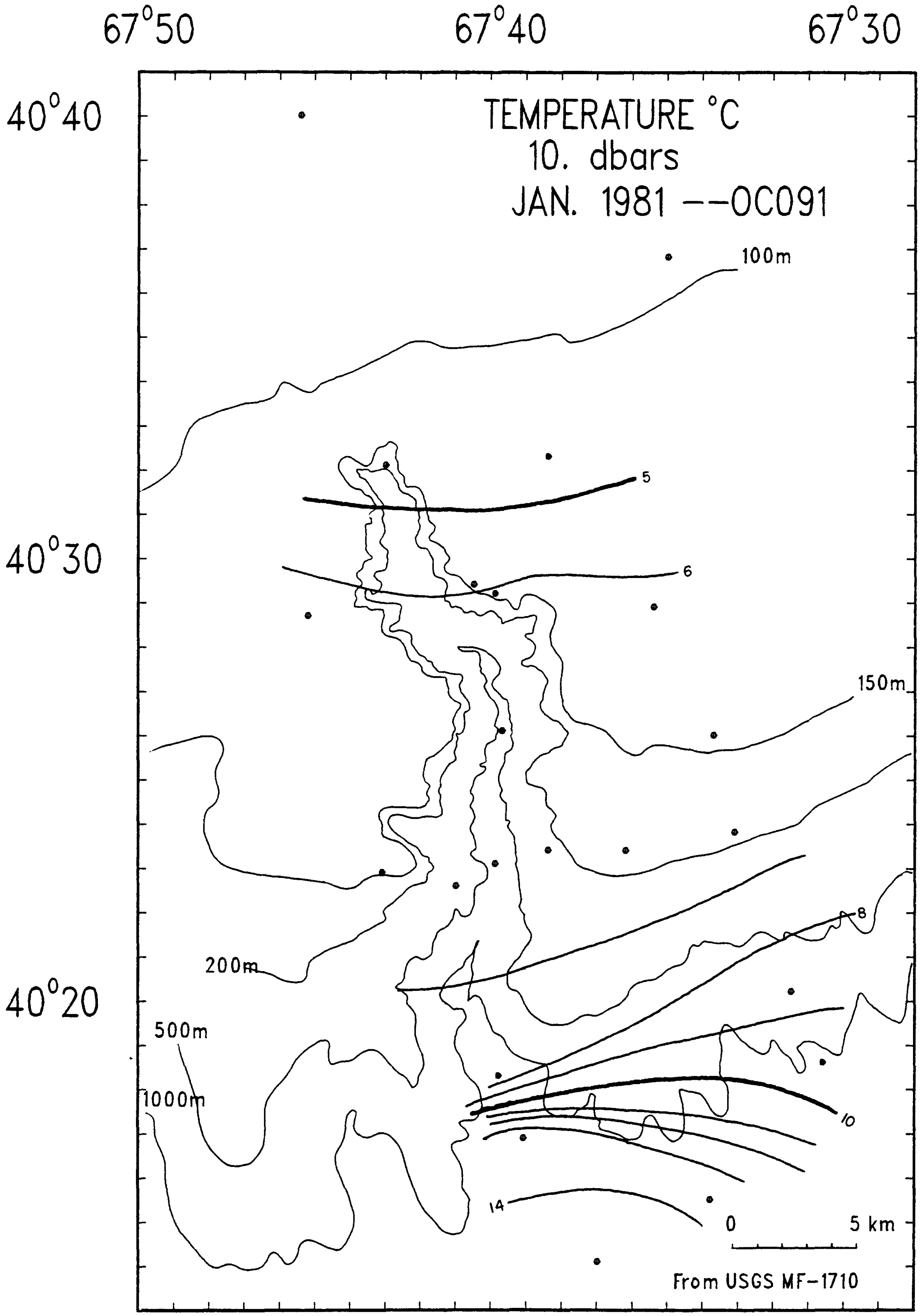

31
25
22
20
C
C
C
C
65.00
0
100
200
300
400
500
600
700
800
DEPTH (dbars)
50
50
25
NON-COMBUSTIBLE %
OC091-4
JAN. 1981
0
10
20
30
40
50
DISTANCE (kilometers)

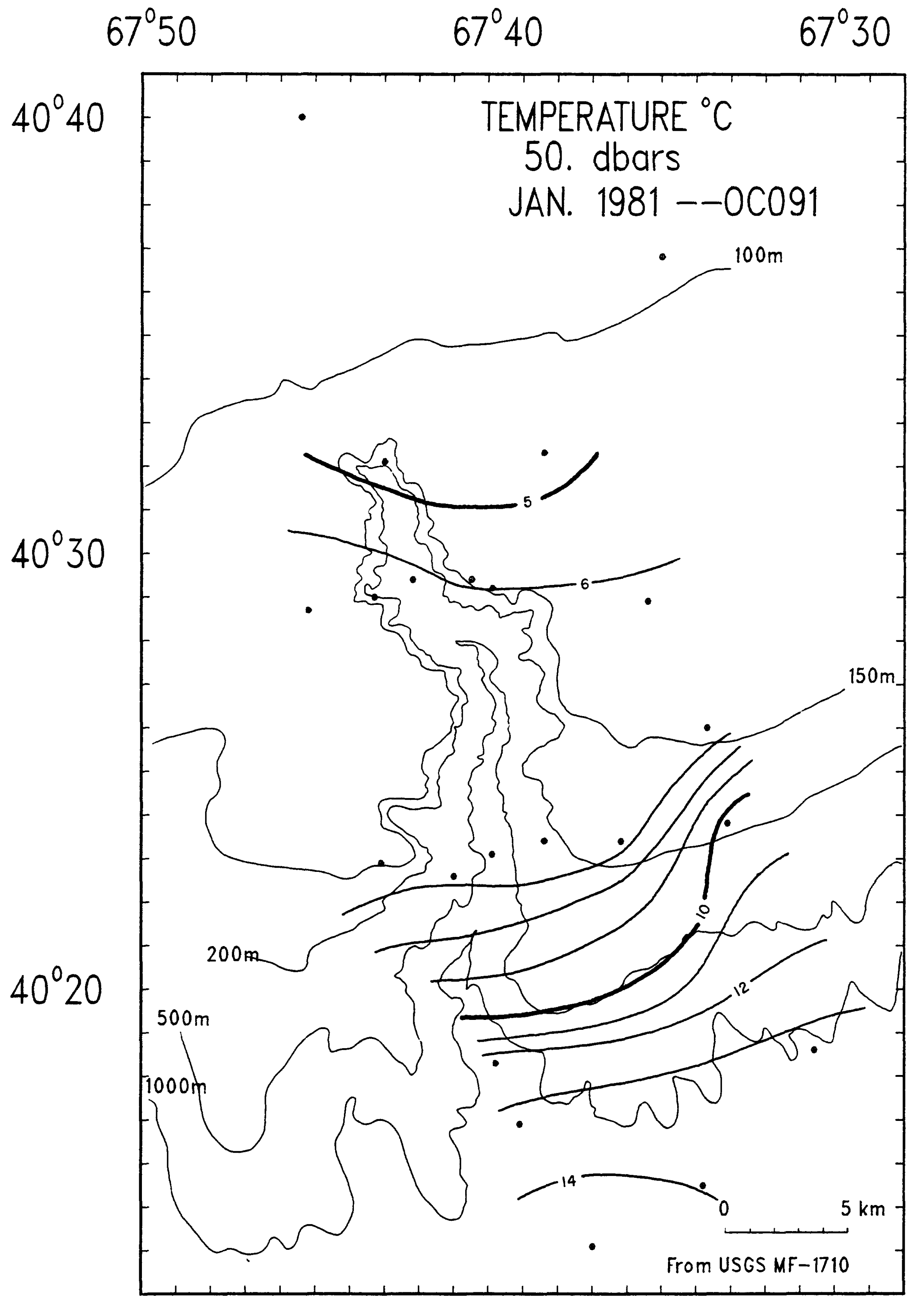


27
28
29
30
31
X
X
X
X
C
4.00
3.94
4.00
4.11
4.50
4.00
4.00
4.20
0
100
200
300
400
DEPTH (dbars)
TEMPERATURE °C
OC091-5
JAN. 1981
0
10
20
30
40
50
DISTANCE (kilometers)

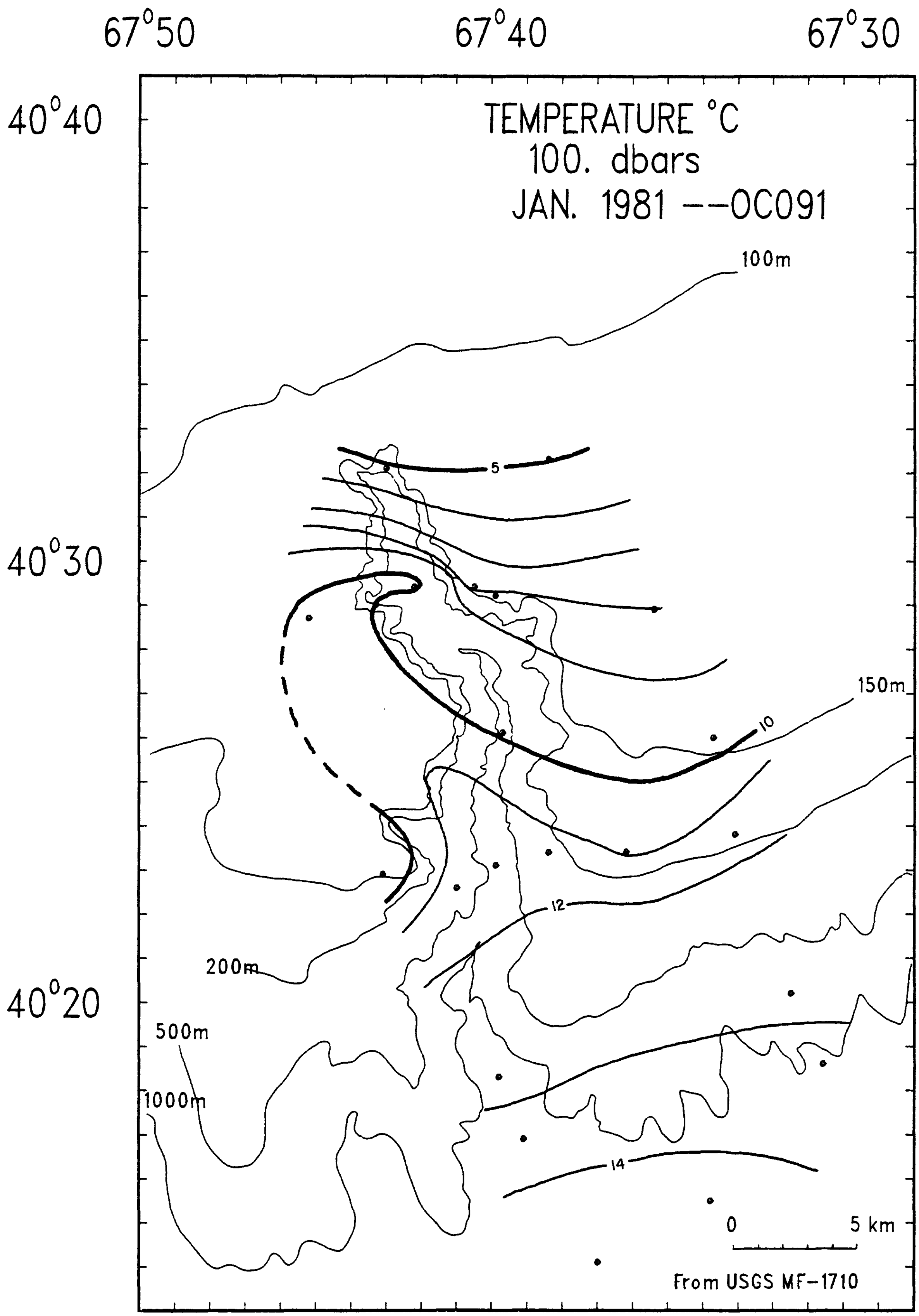
Horizontal sections

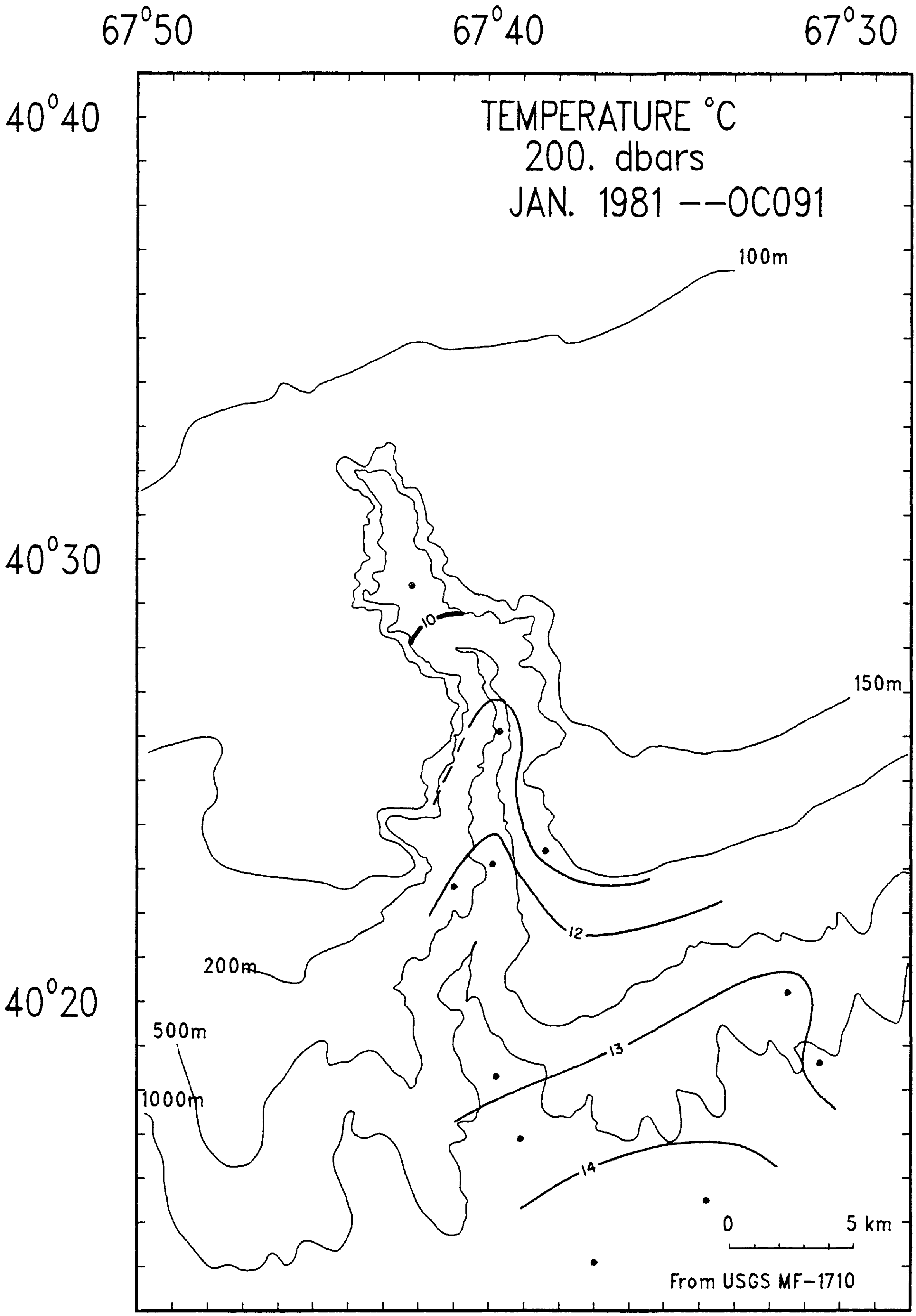
Horizontal sections were constructed on the 10-, 50-, 100-, and 200-dbar pressure surfaces for temperature, salinity, density and light extinction coefficient. Sections for nutrients (PO_4, SiO_4, NO_3, NH_3) and chlorophyll were only drawn for the 0- and 100-dbar surfaces since there were fewer than seven samples at most stations. Dots indicate the location of stations that were used in contouring the section. All sections were contoured by hand.

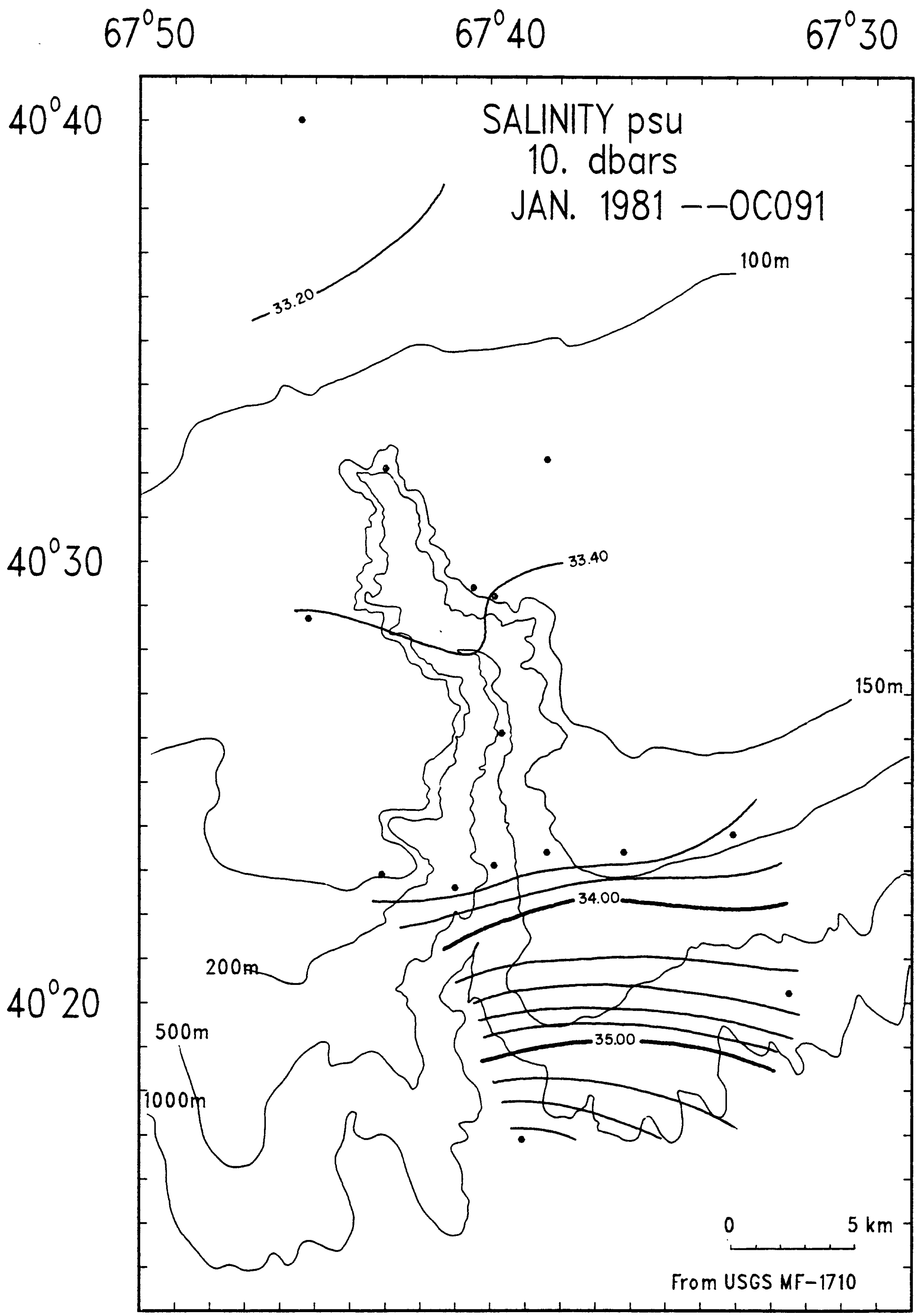

67°50
67°40
67°30
40°40
40°30
40°20
TEMPERATURE °C
10. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
5
6
8
10
14
0
5 km
From USGS MF-1710

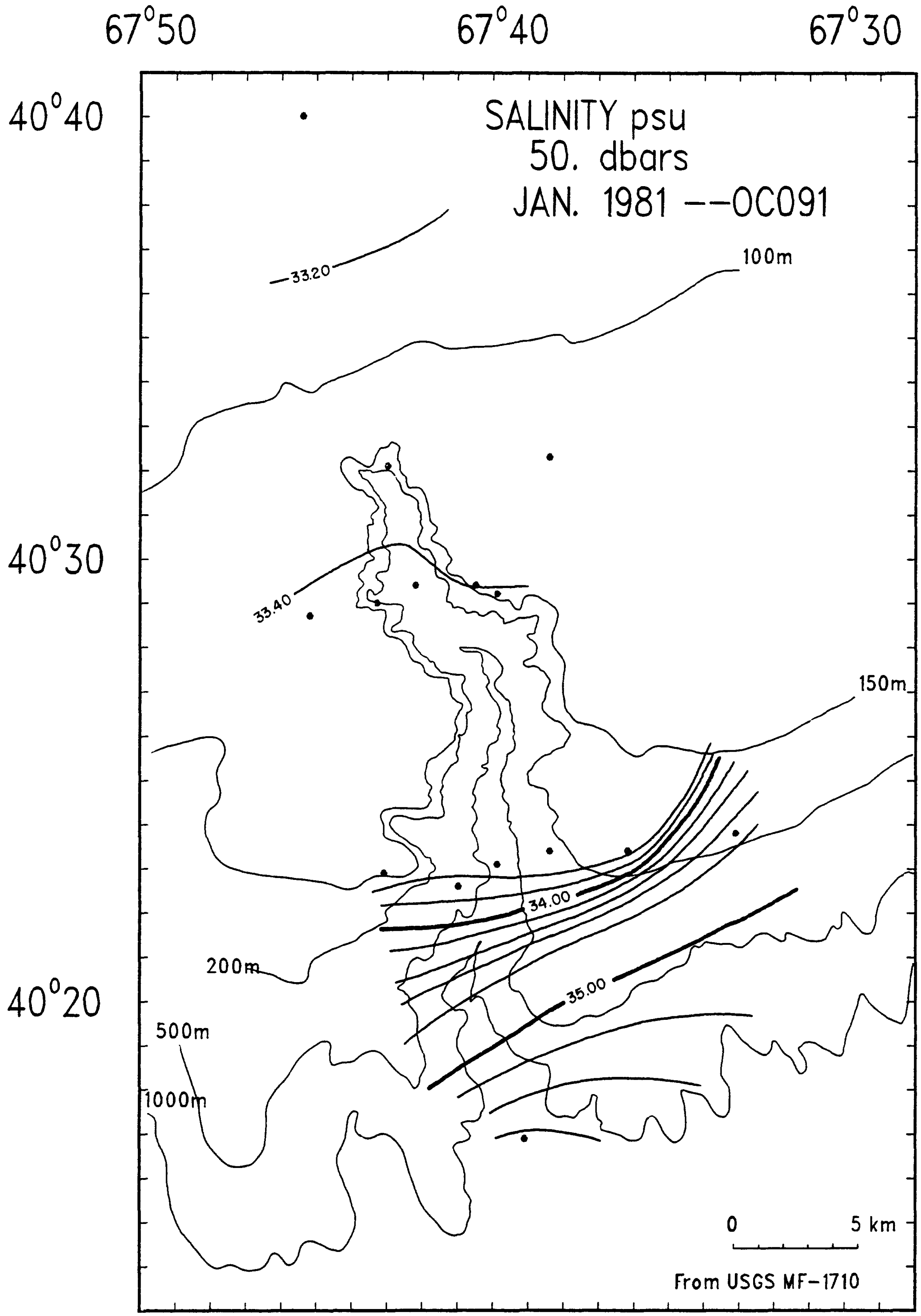


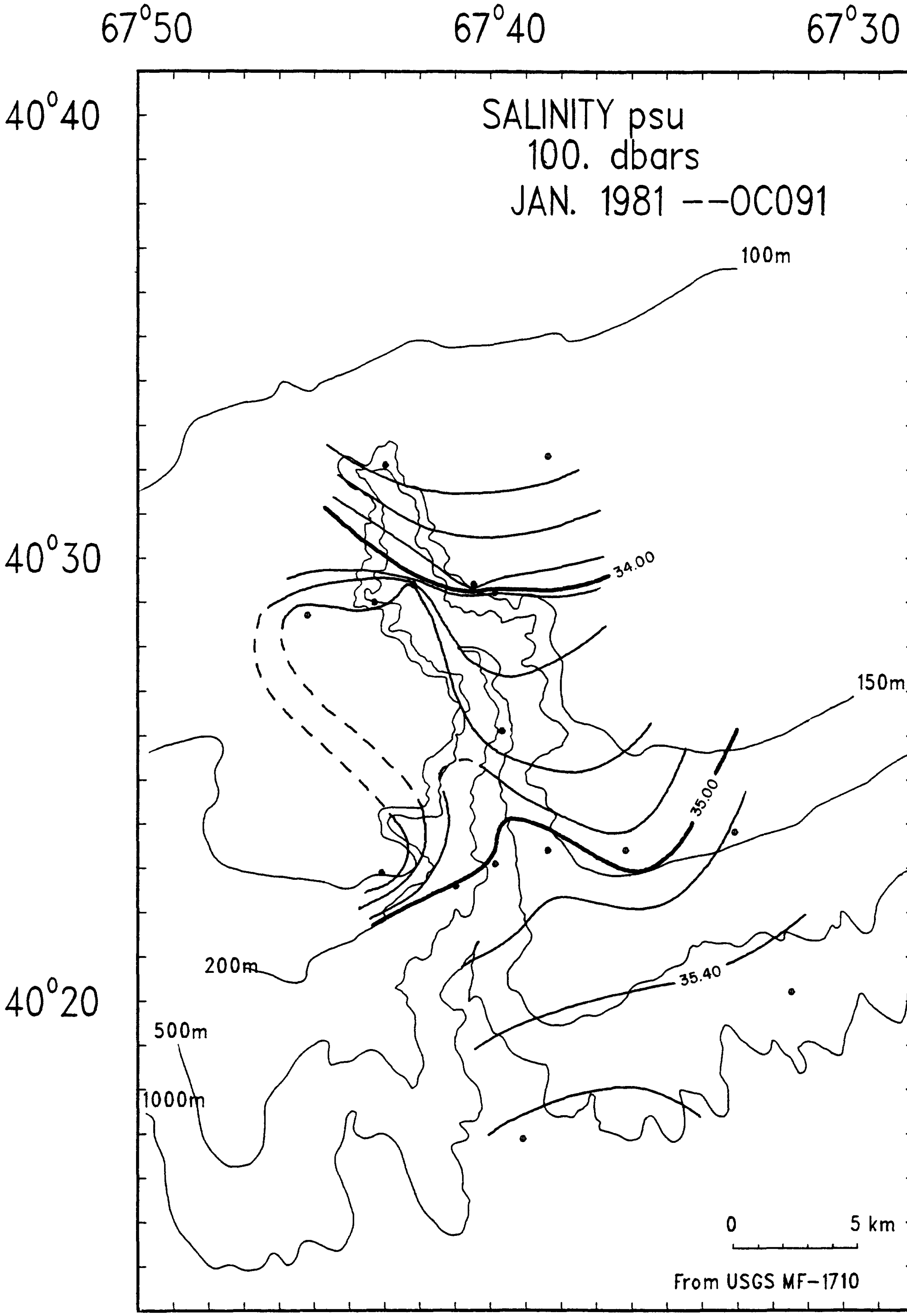
67°50
67°40
67°30
40°40
40°30
40°20
TEMPERATURE °C
50. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
5
6
10
12
14
0
5 km
From USGS MF-1710

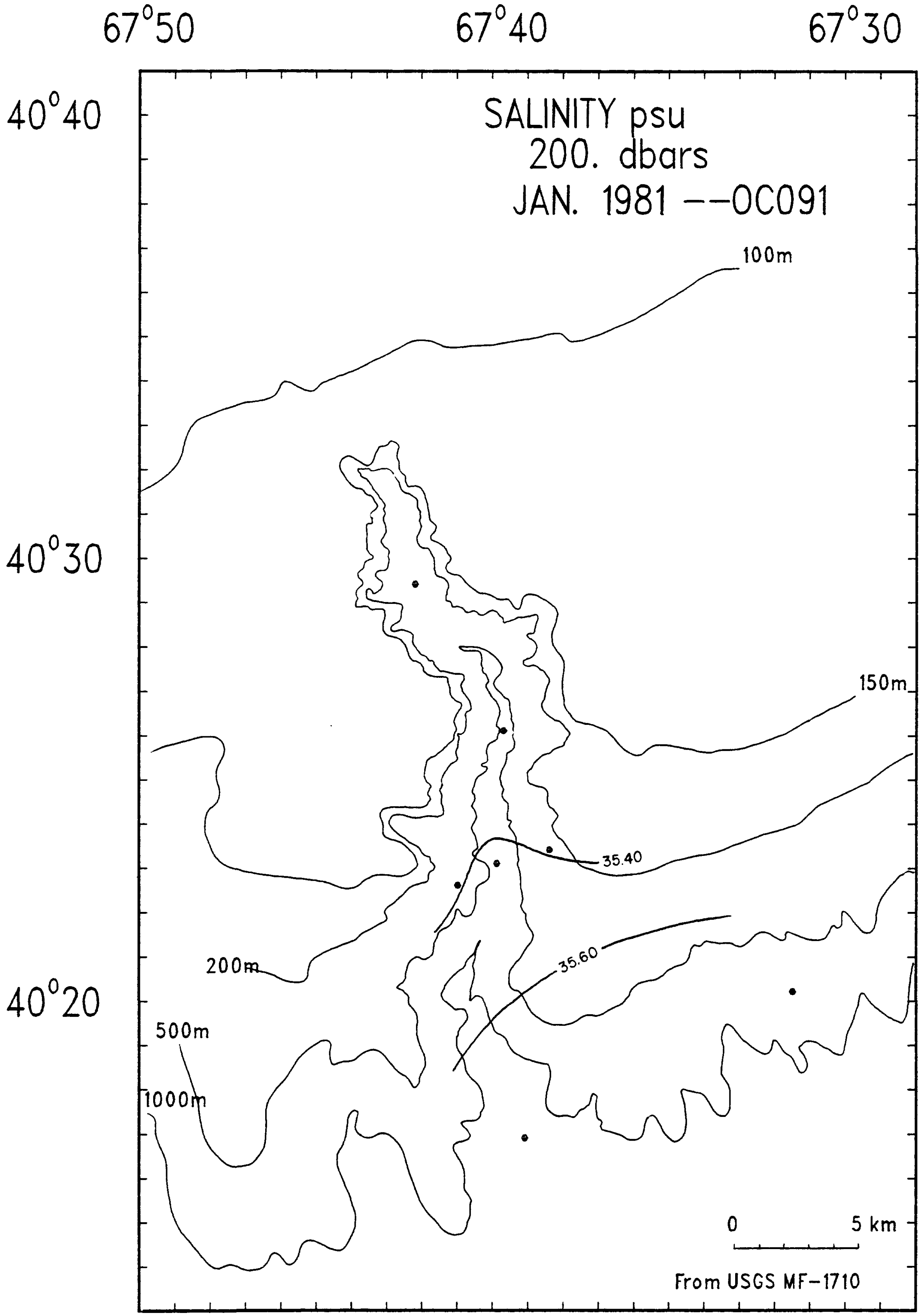

67°50
67°40
67°30
40°40
40°30
40°20
TEMPERATURE °C
100. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
5
10
12
14
0
5 km
From USGS MF-1710

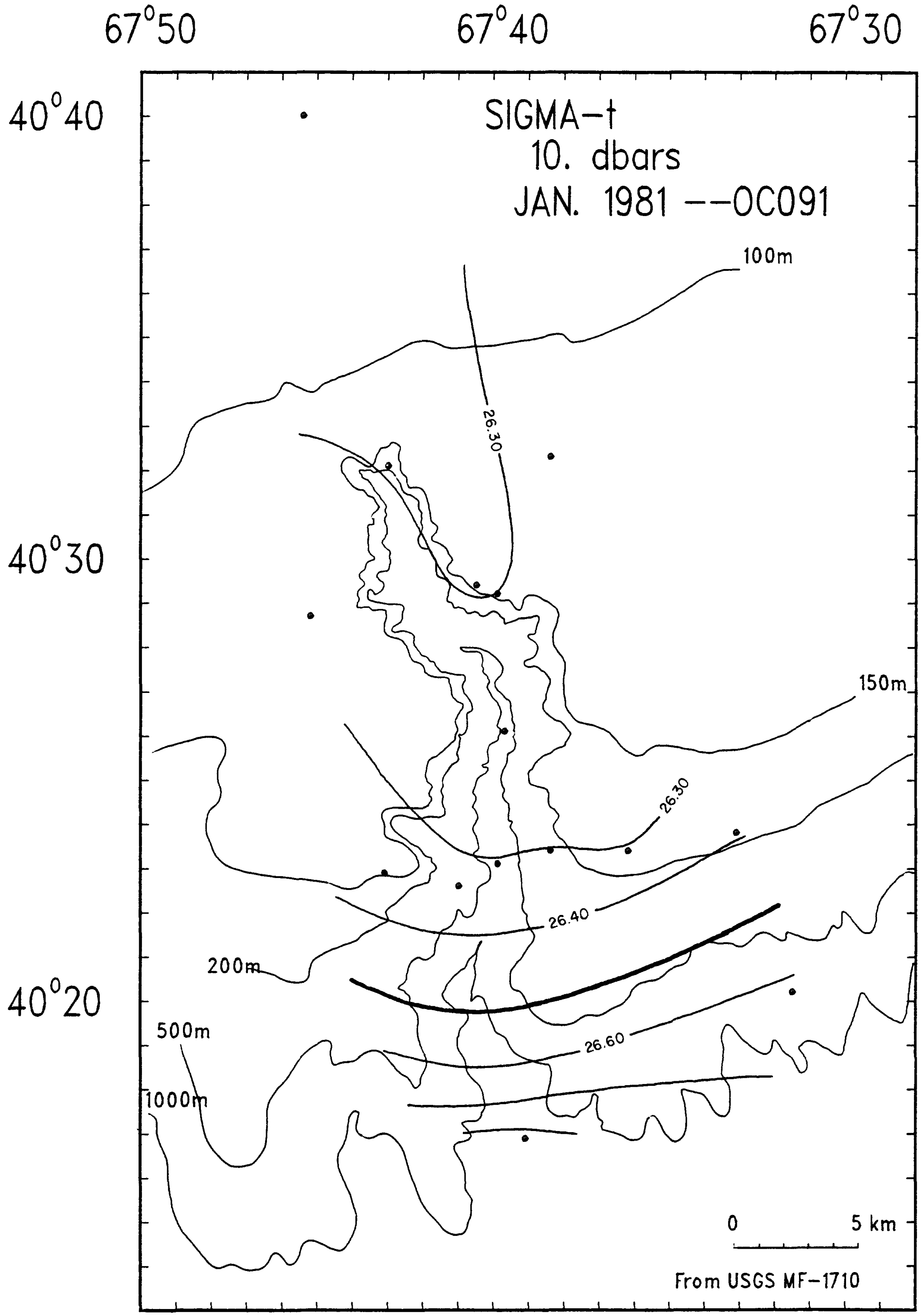

67°50
67°40
67°30
40°40
40°30
40°20
TEMPERATURE °C
200. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
10
12
13
14
0
5 km
From USGS MF-1710

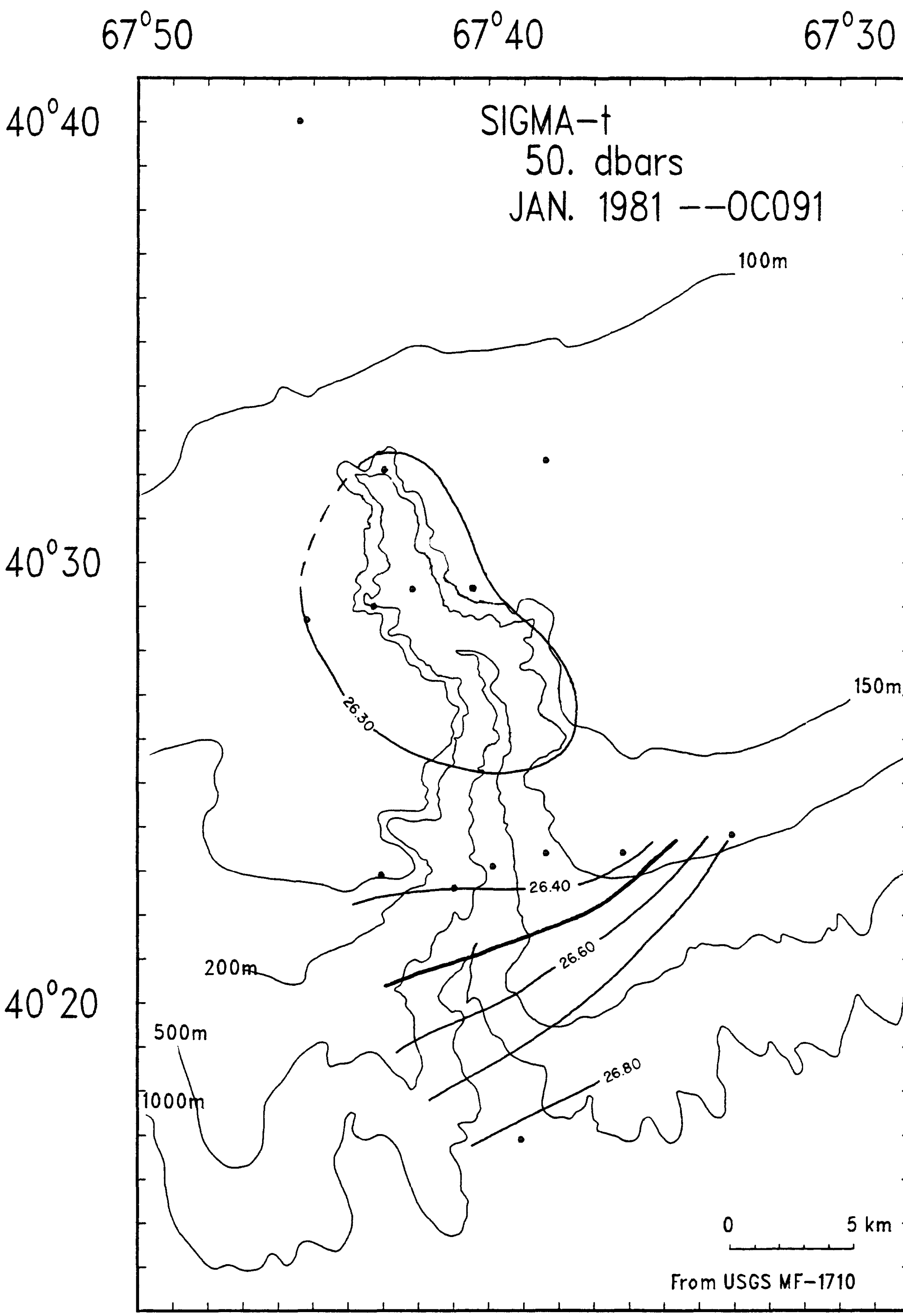

67°50
67°40
67°30
40°40
40°30
40°20
SALINITY psu
10. dbars
JAN. 1981 --OC091
100m
33.20
33.40
150m
34.00
200m
35.00
500m
1000m
0
5 km
From USGS MF-1710

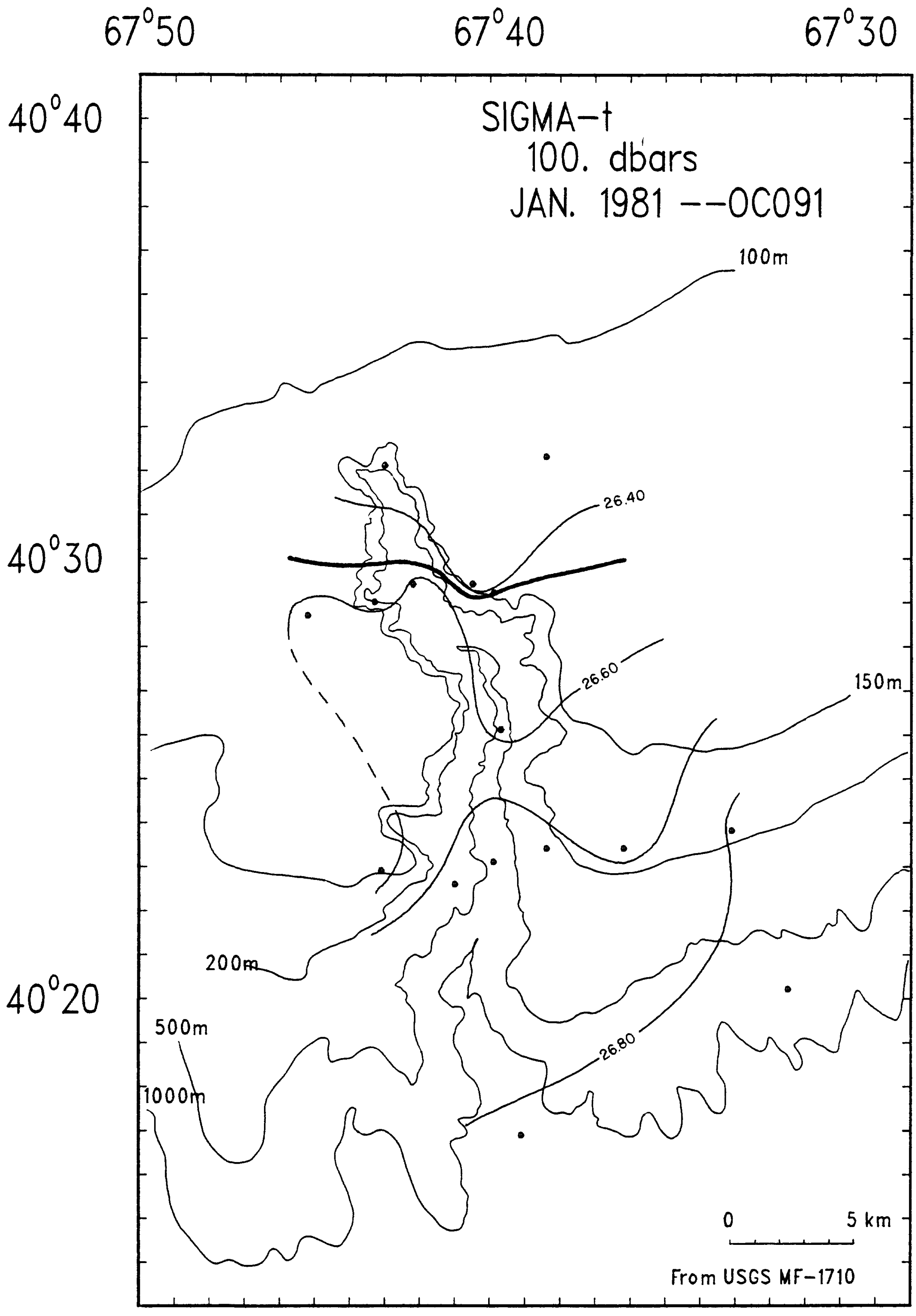

67°50
67°40
67°30
40°40
40°30
40°20
SALINITY psu
50. dbars
JAN. 1981 --OC091
33.20
100m
33.40
150m
34.00
200m
35.00
500m
1000m
0
5 km
From USGS MF-1710

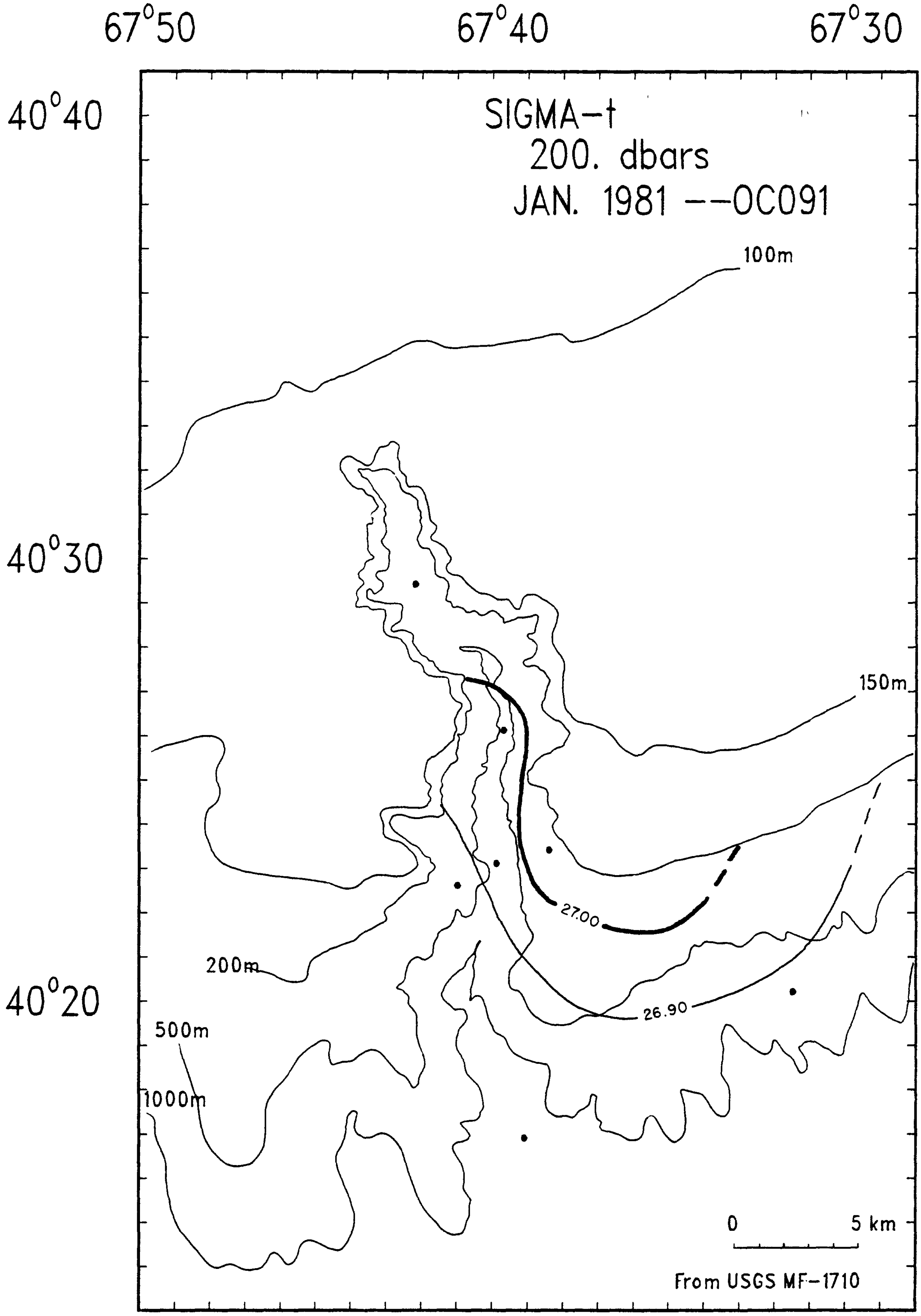

67°50
67°40
67°30
40°40
40°30
40°20
SALINITY psu
100. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
34.00
35.00
35.40
0
5 km
From USGS MF-1710

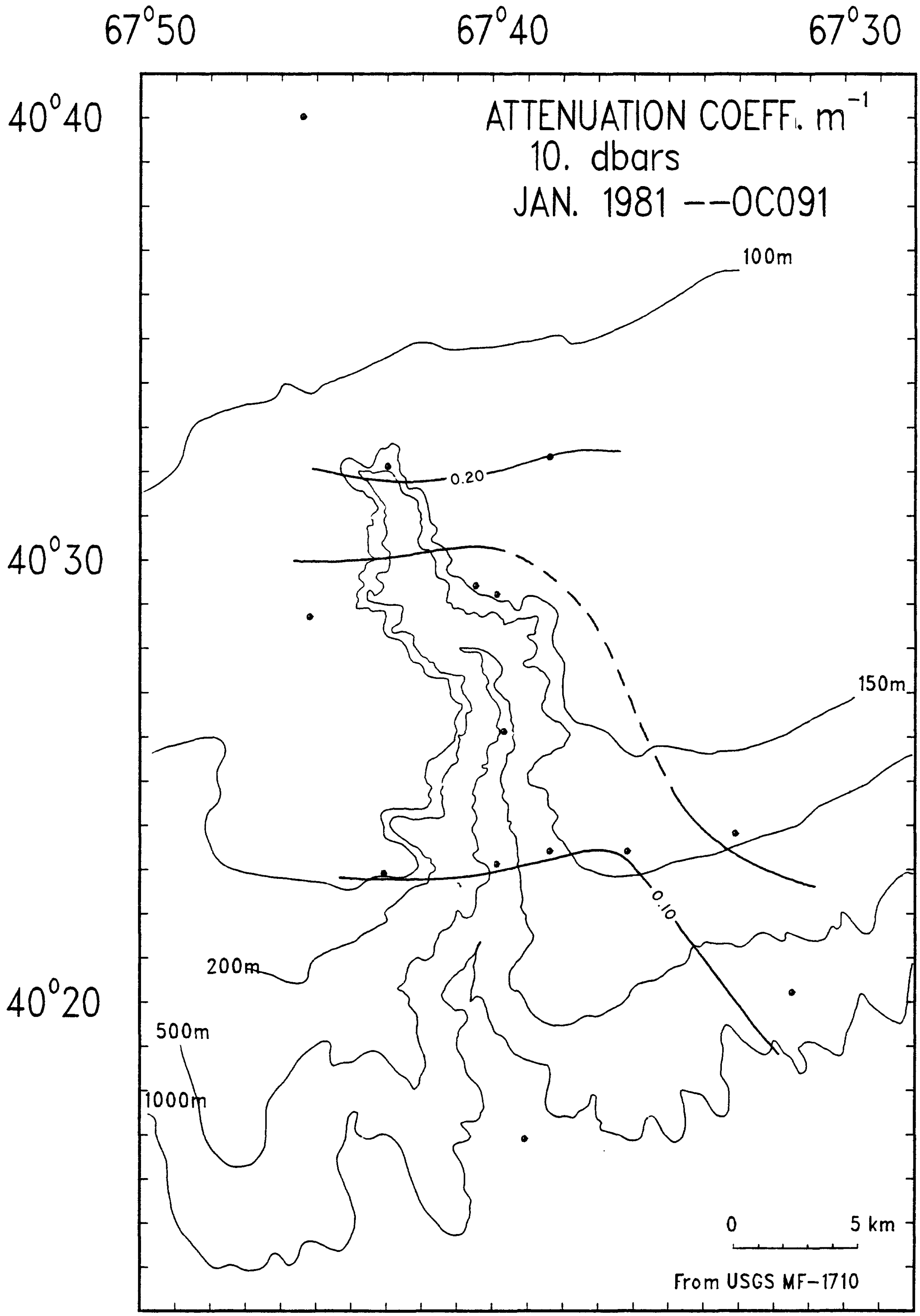

67°50
67°40
67°30
40°40
40°30
40°20
SALINITY psu
200. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
35.40
35.60
0
5 km
From USGS MF-1710


67°50
67°40
67°30
40°40
40°30
40°20
SIGMA-t
10. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
26.30
26.30
26.40
26.60
0
5 km
From USGS MF-1710

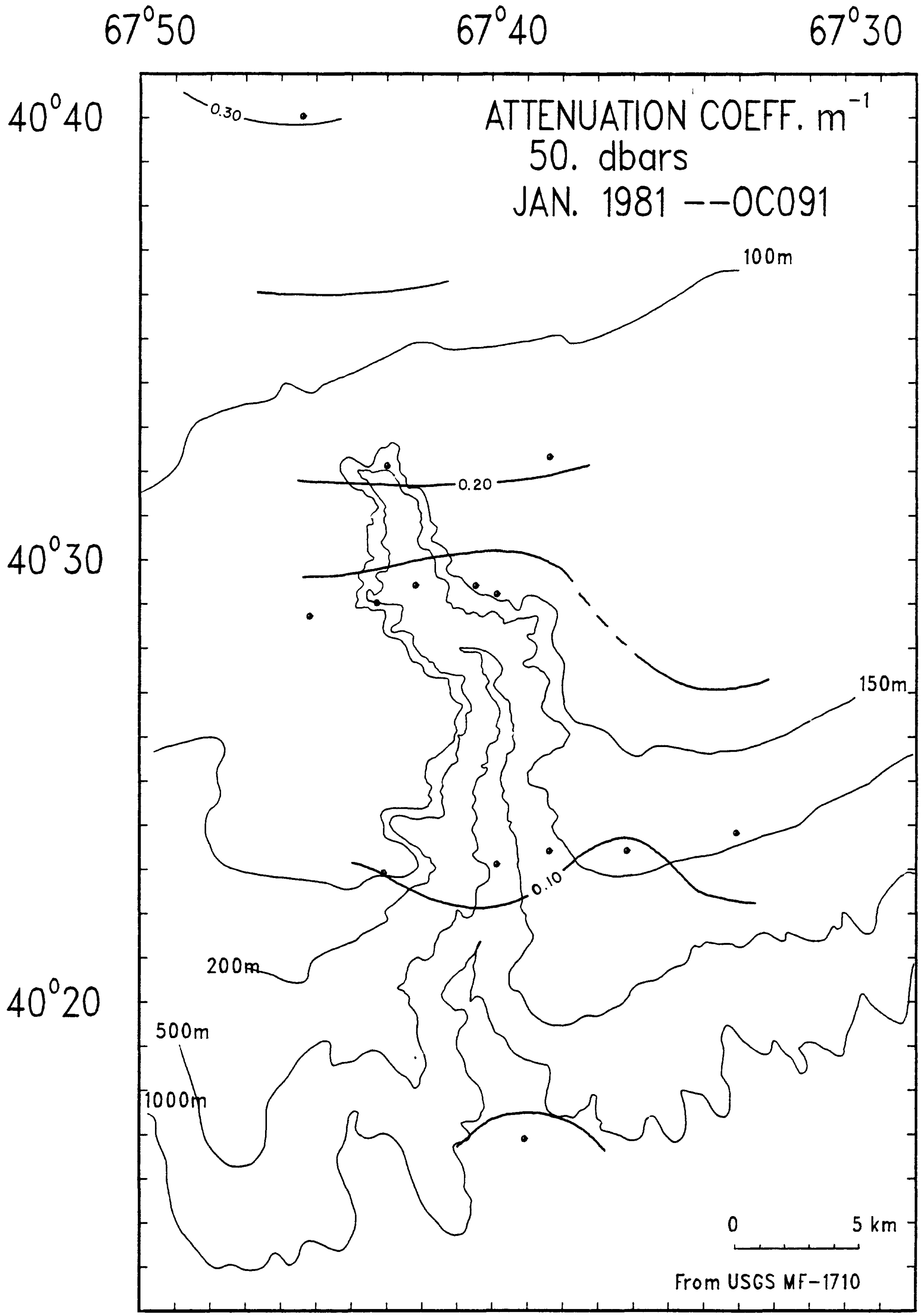

67°50
67°40
67°30
40°40
40°30
40°20
SIGMA-t
50. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
26.30
26.40
26.60
26.80
0
5 km
From USGS MF-1710

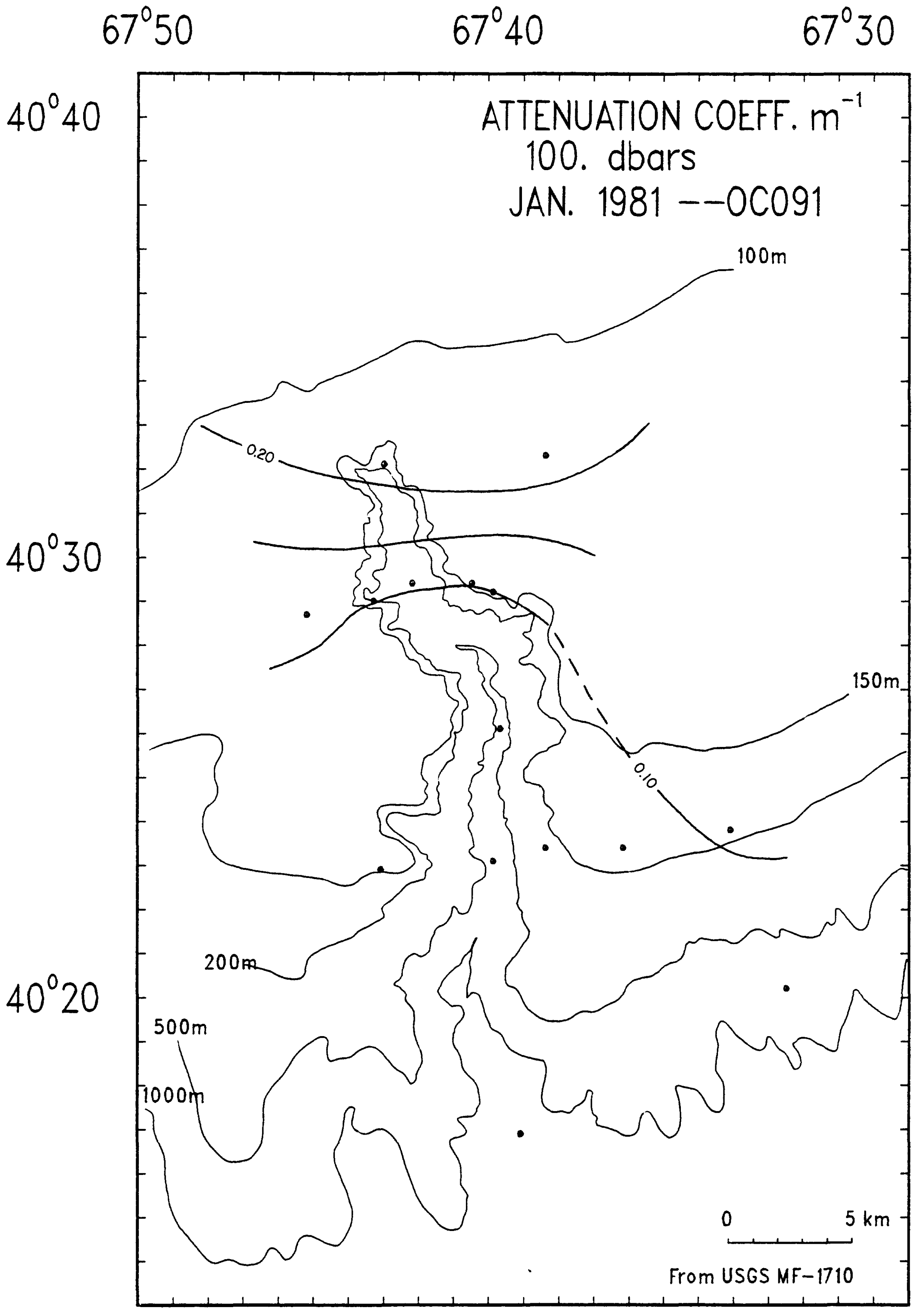

67°50
67°40
67°30
40°40
40°30
40°20
SIGMA-t
100. dbars
JAN. 1981 --OC091
100m
26.40
26.60
150m
200m
500m
1000m
26.80
0
5 km
From USGS MF-1710

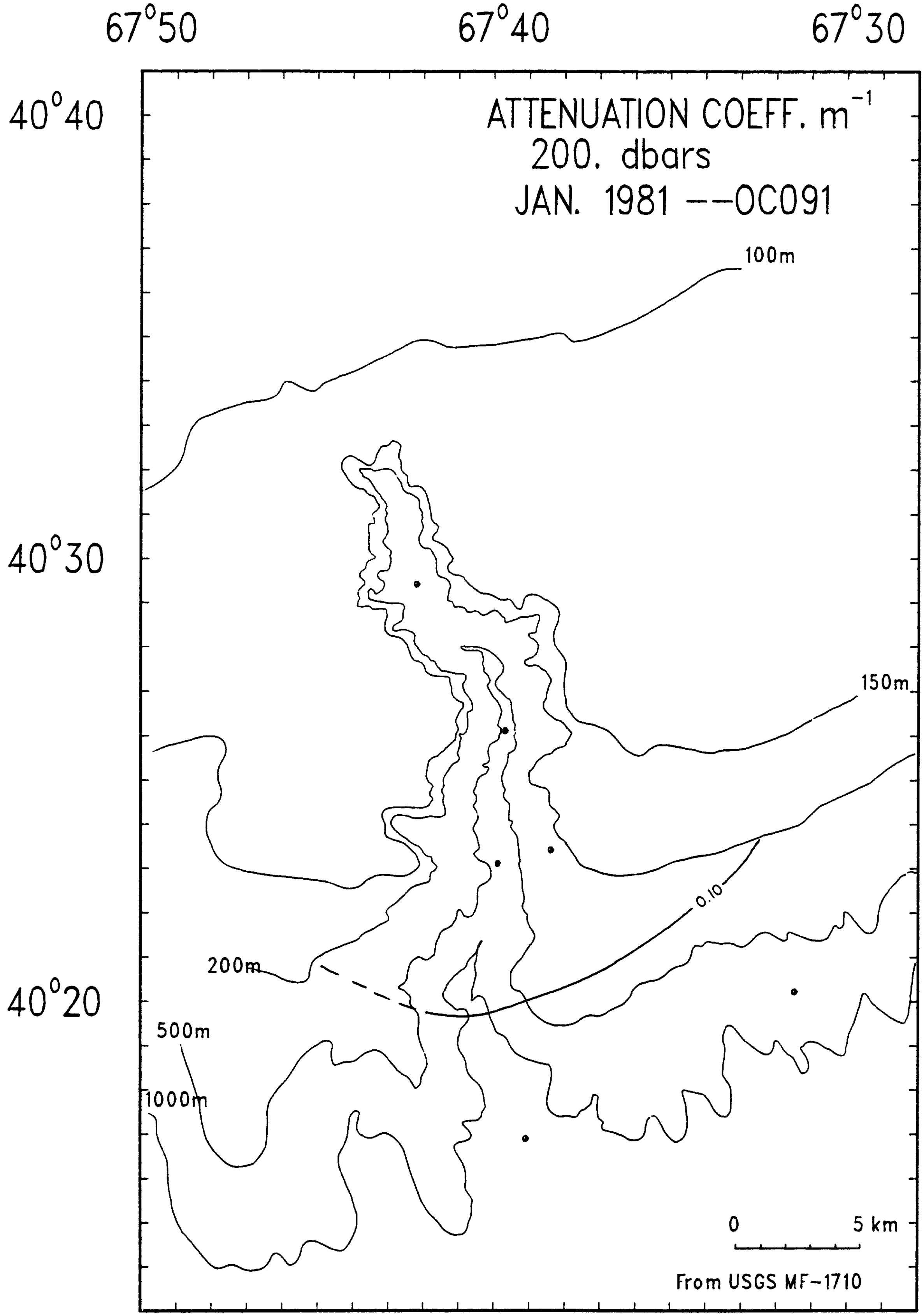

67°50
67°40
67°30
40°40
40°30
40°20
SIGMA-t
200. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
27.00
26.90
0
5 km
From USGS MF-1710

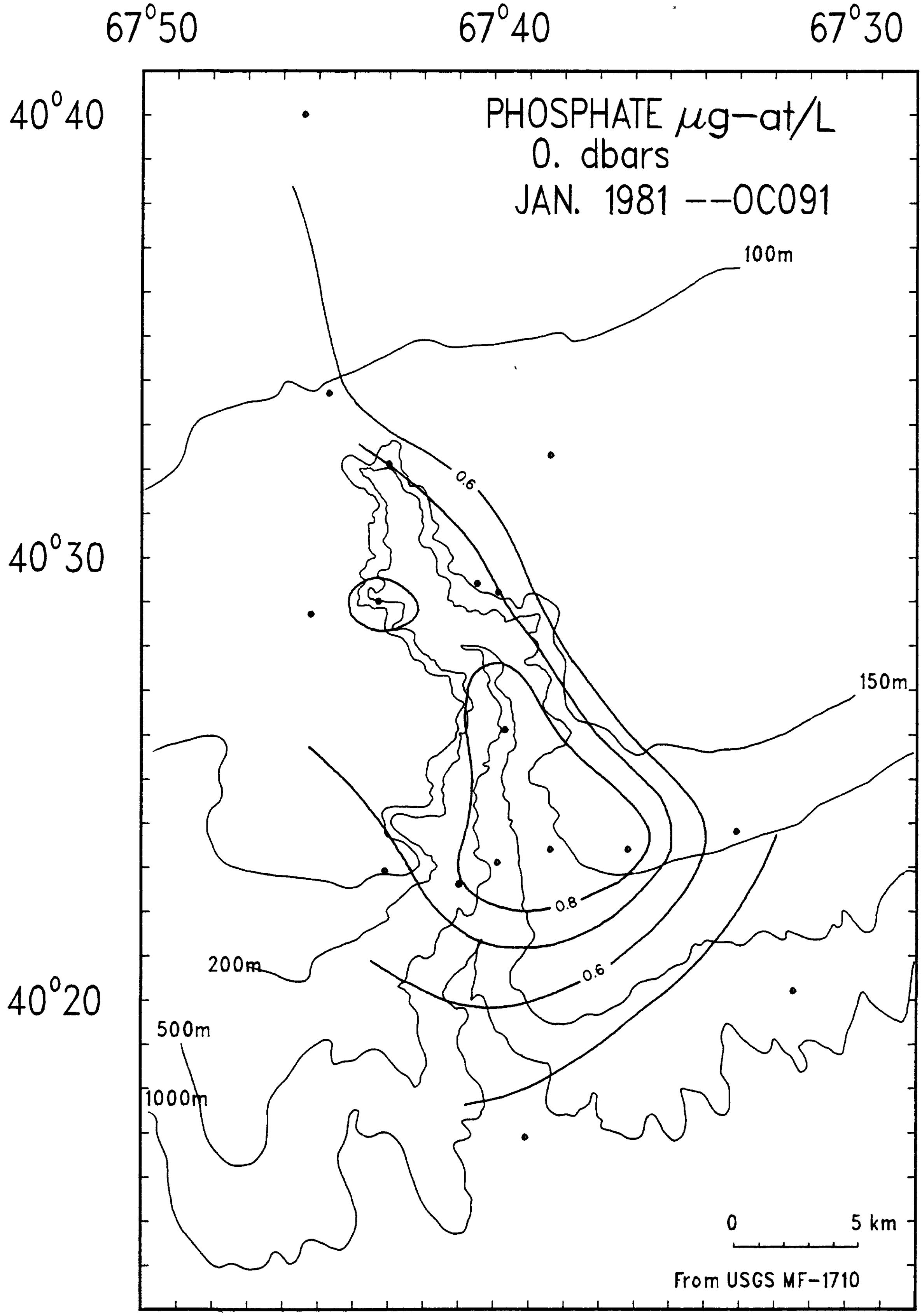


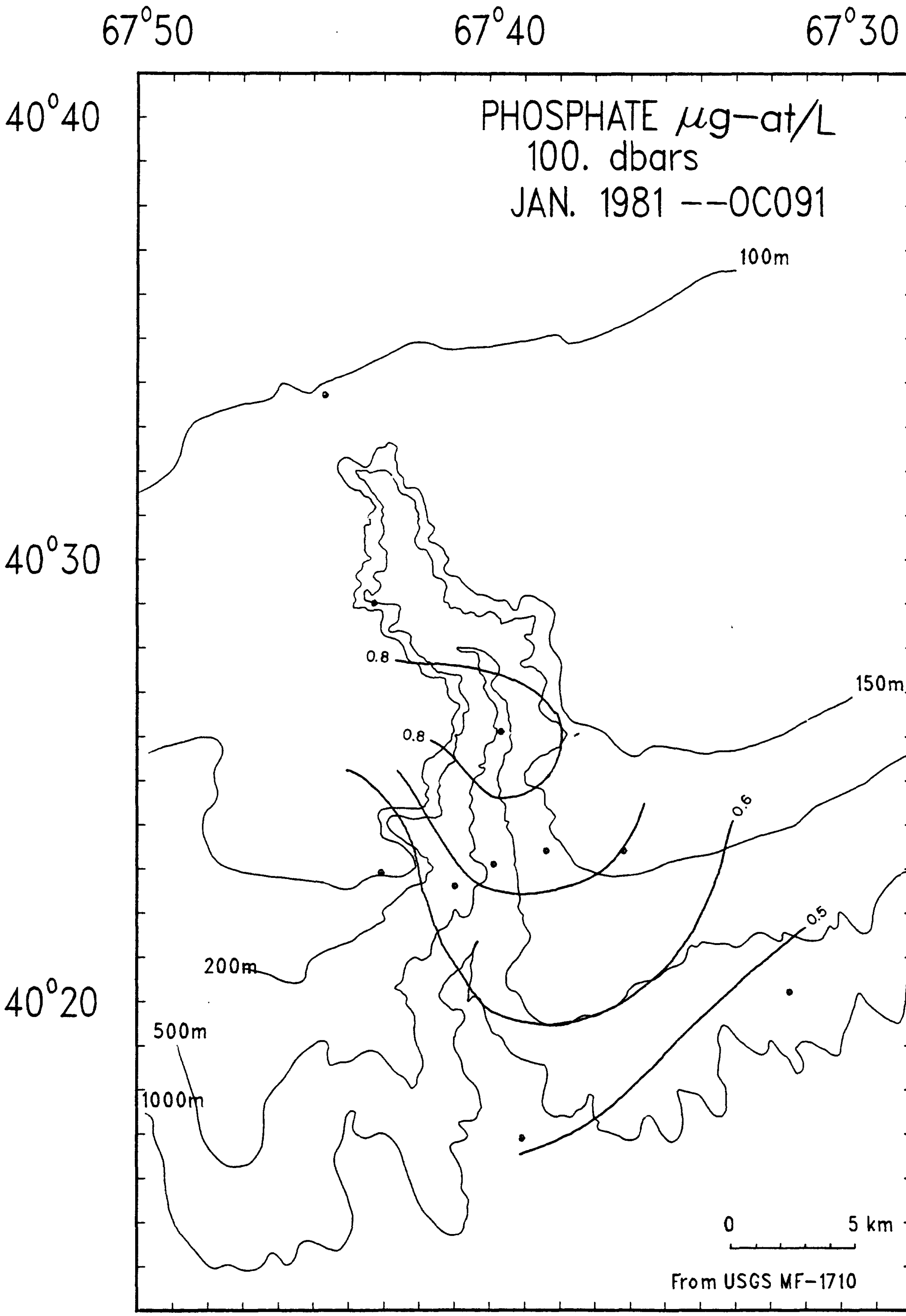
67°50
67°40
67°30
40°40
40°30
40°20
ATTENUATION COEFF. m⁻¹
10. dbars
JAN. 1981 --OC091
100m
0.20
150m
0.10
200m
500m
1000m
0
5 km
From USGS MF-1710


67°50
67°40
67°30
40°40
40°30
40°20
ATTENUATION COEFF. m⁻¹
50. dbars
JAN. 1981 --OC091
0.30
0.20
0.10
100m
150m
200m
500m
1000m
0
5 km
From USGS MF-1710

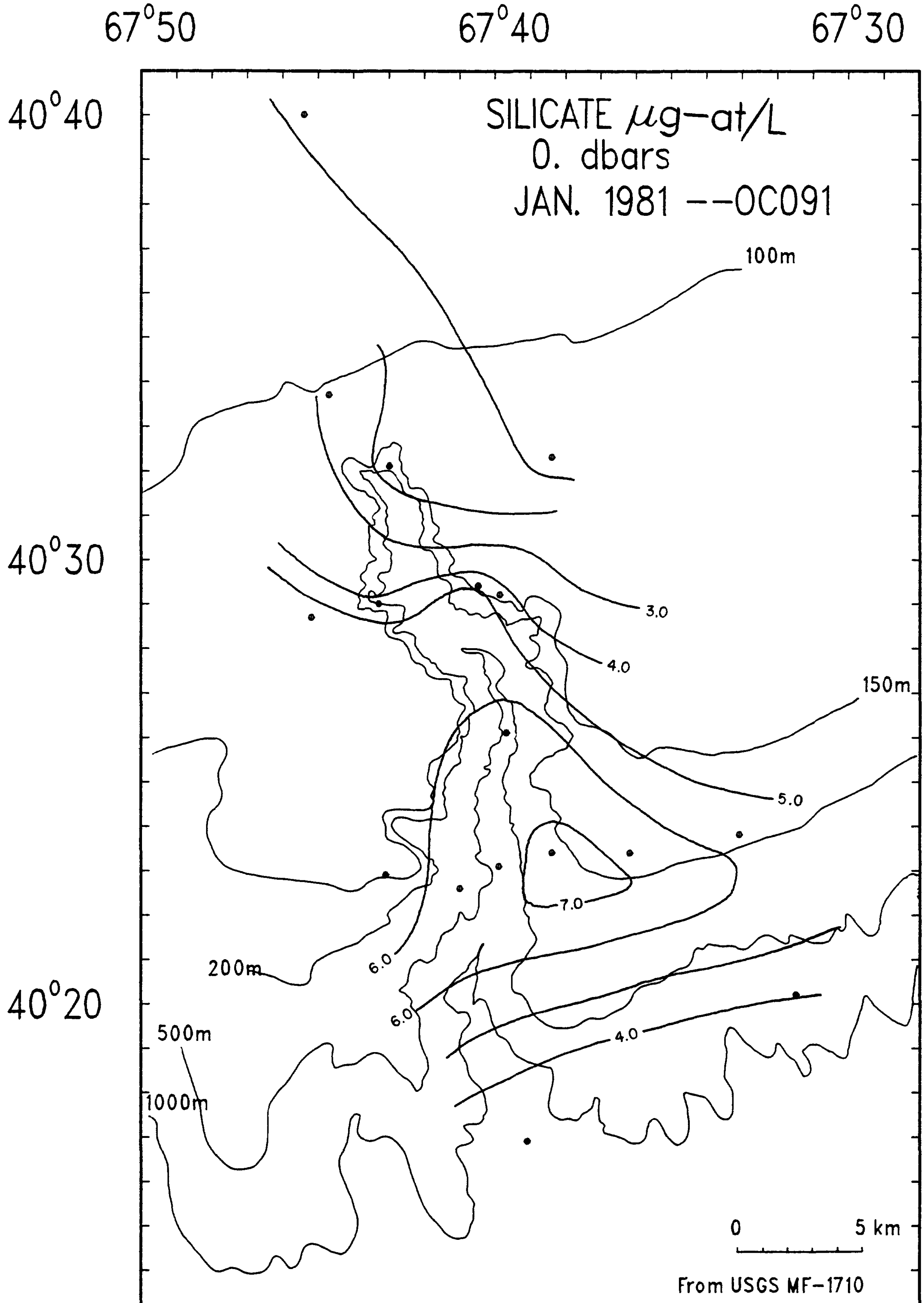

67°50
67°40
67°30
40°40
40°30
40°20
ATTENUATION COEFF. m⁻¹
100. dbars
JAN. 1981 --OC091
100m
0.20
150m
0.10
200m
500m
1000m
0
5 km
From USGS MF-1710

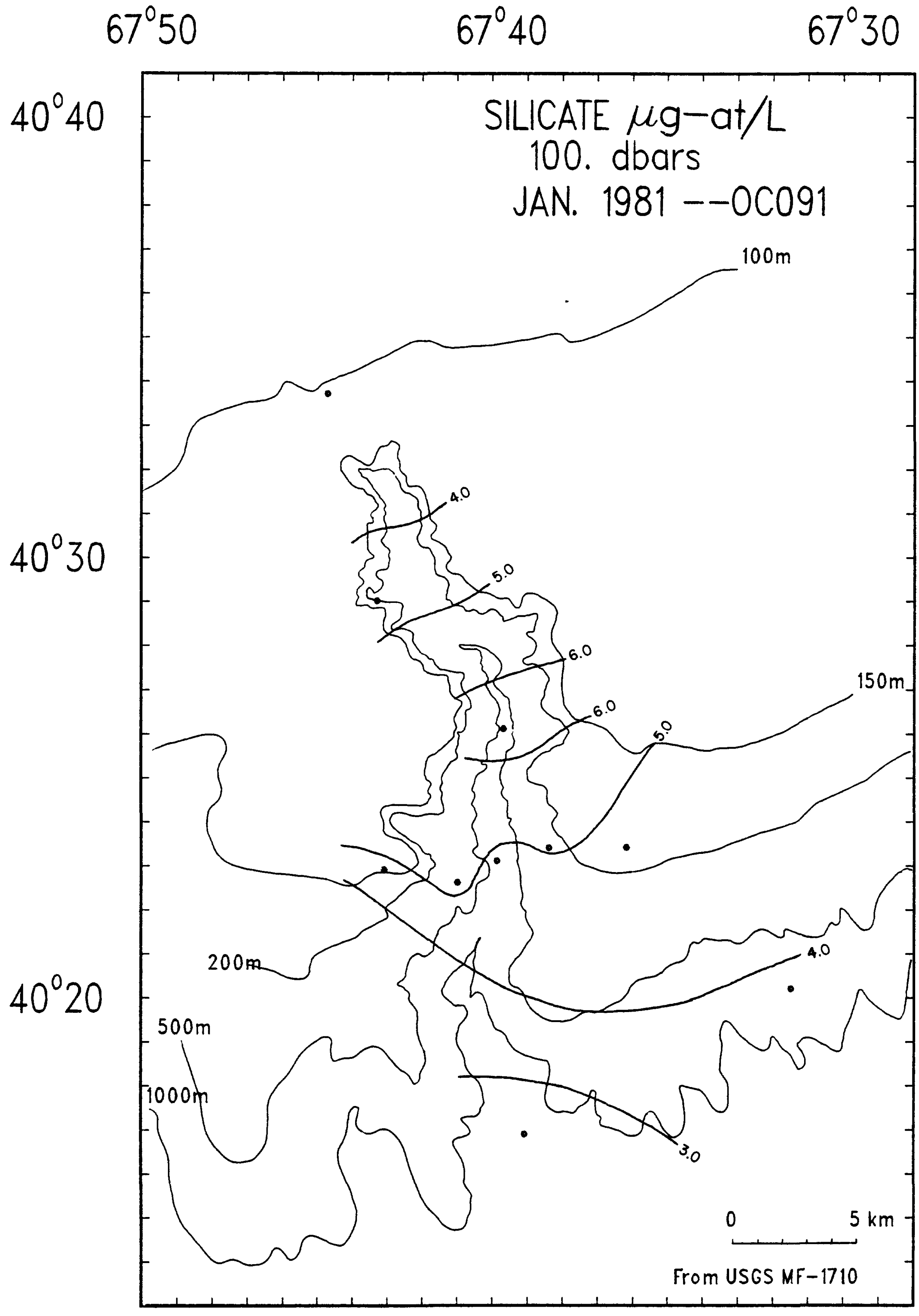

67°50
67°40
67°30
40°40
40°30
40°20
ATTENUATION COEFF. m^{-1}
200. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
0.10
0 5 km
From USGS MF-1710

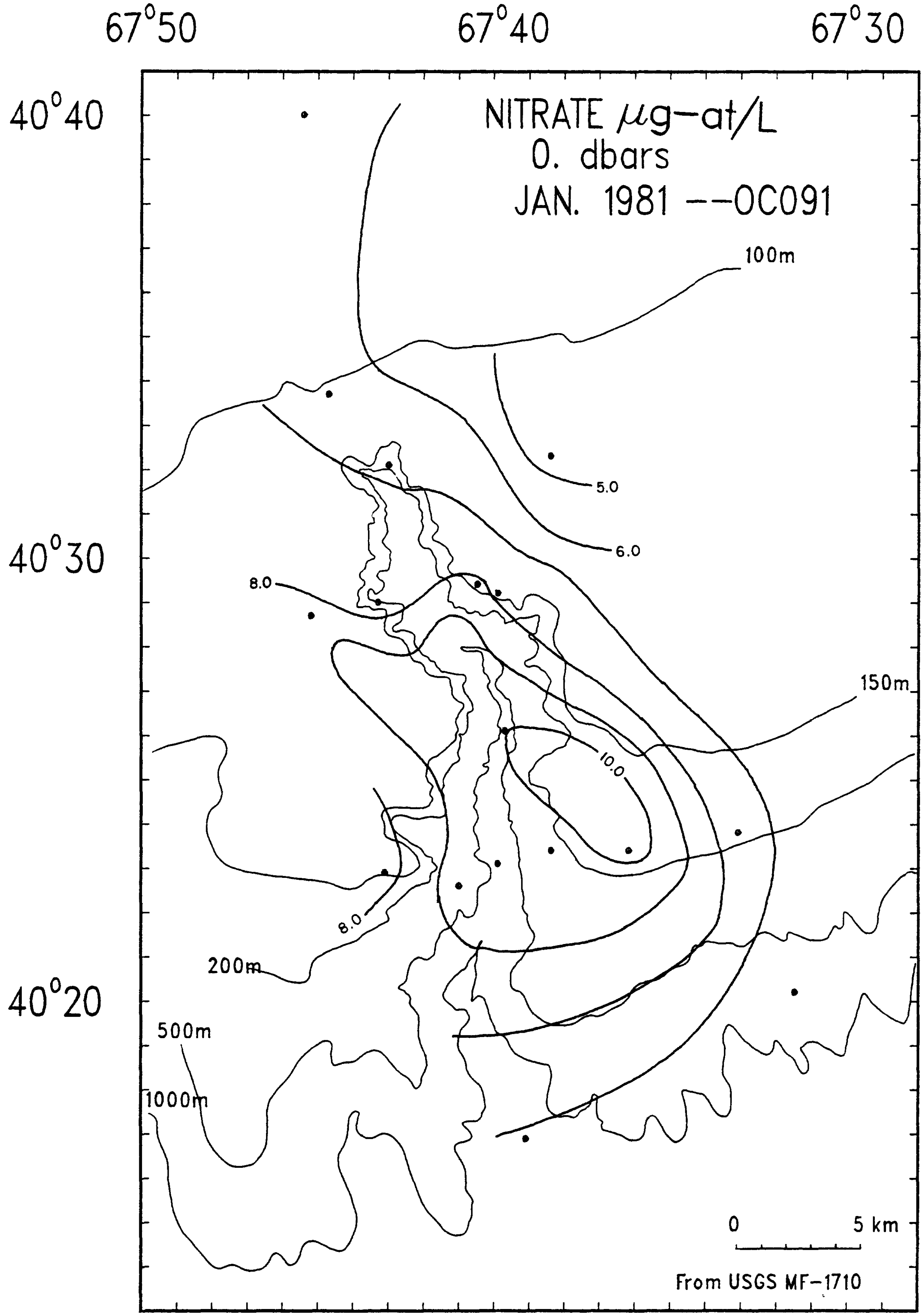

67°50
67°40
67°30
40°40
40°30
40°20
PHOSPHATE µg-at/L
0. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
0.6
0.8
0.6
0
5 km
From USGS MF-1710

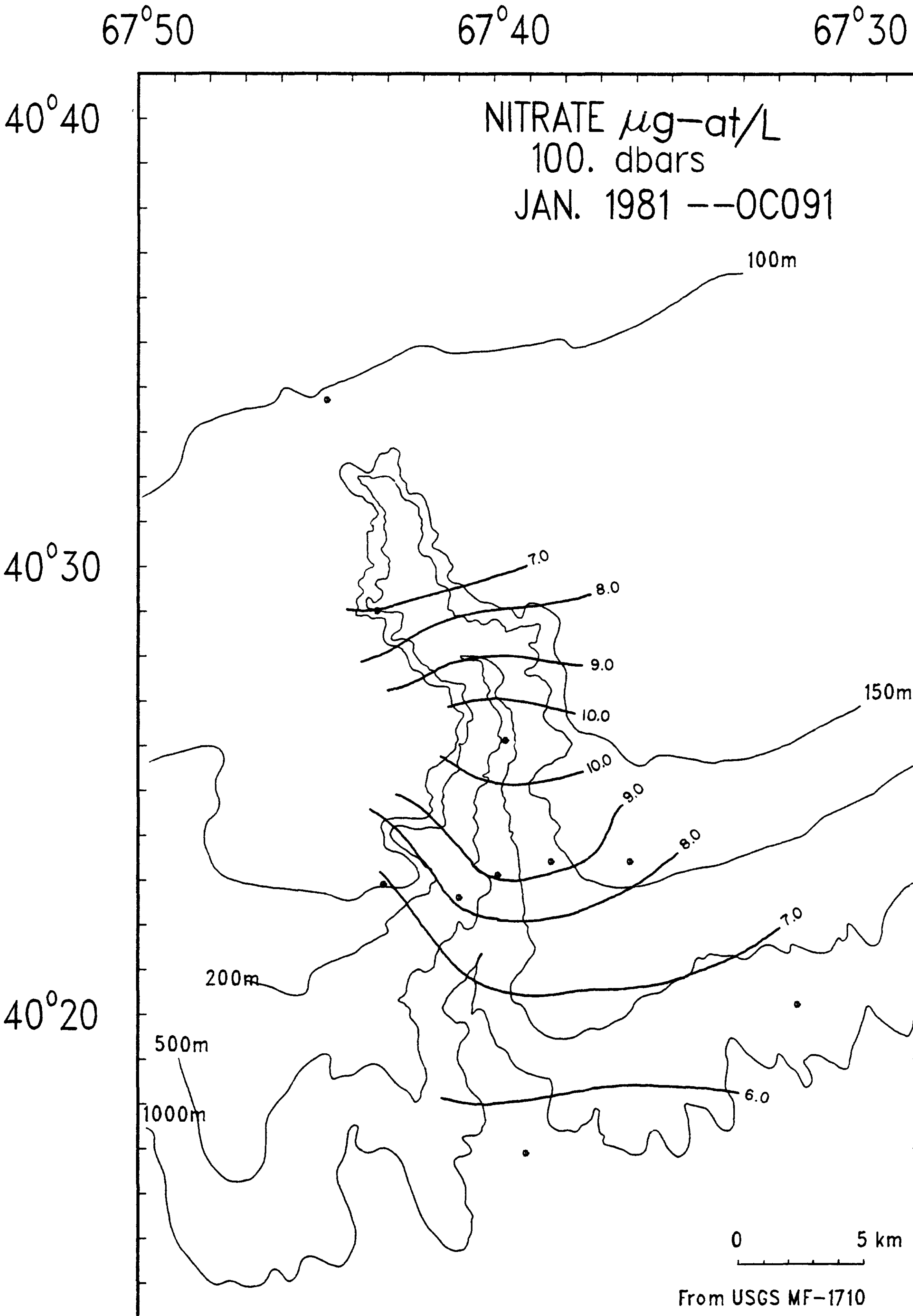


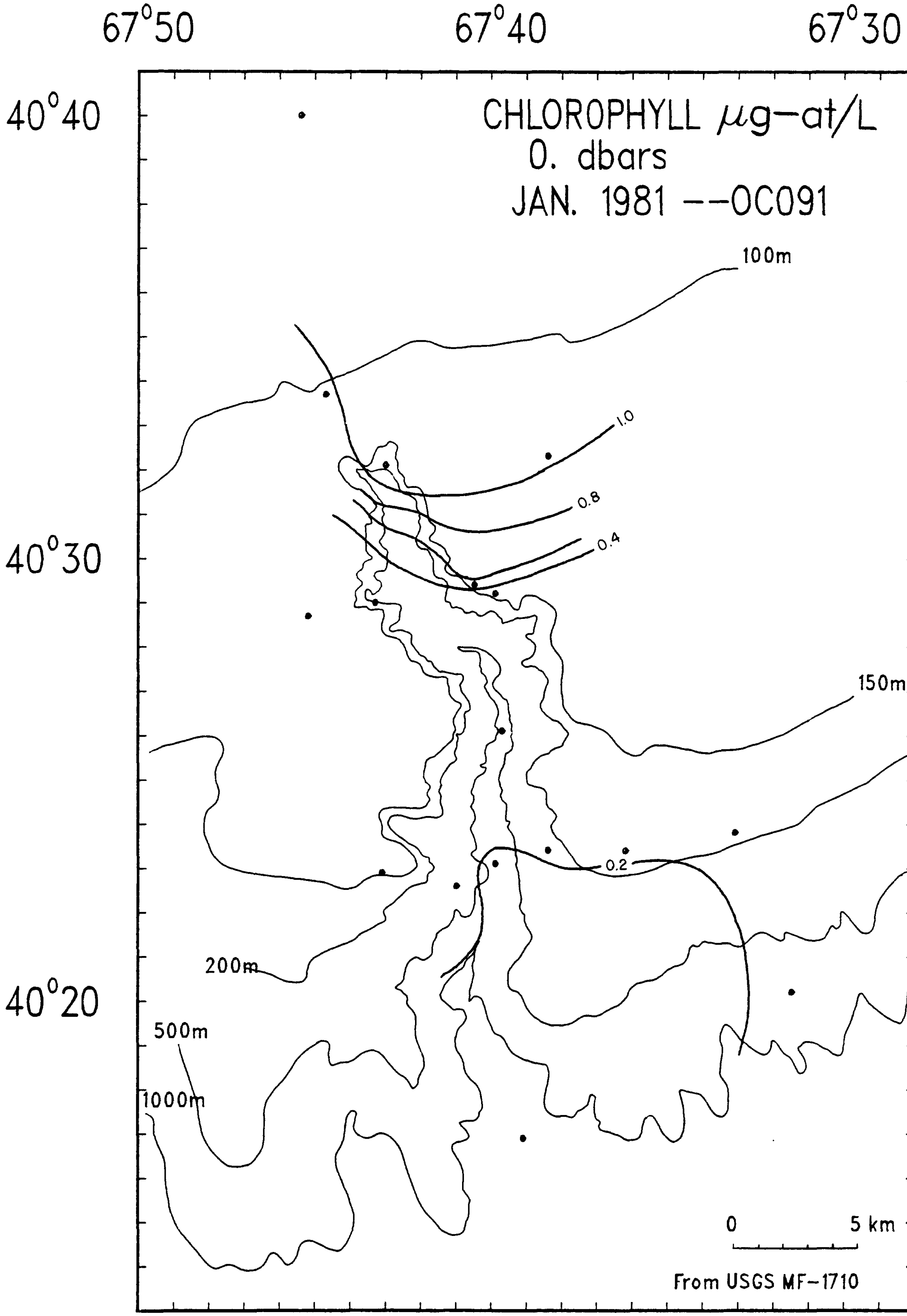
67°50
67°40
67°30
40°40
40°30
40°20
PHOSPHATE µg-at/L
100. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
0.8
0.8
0.6
0.5
0
5 km
From USGS MF-1710

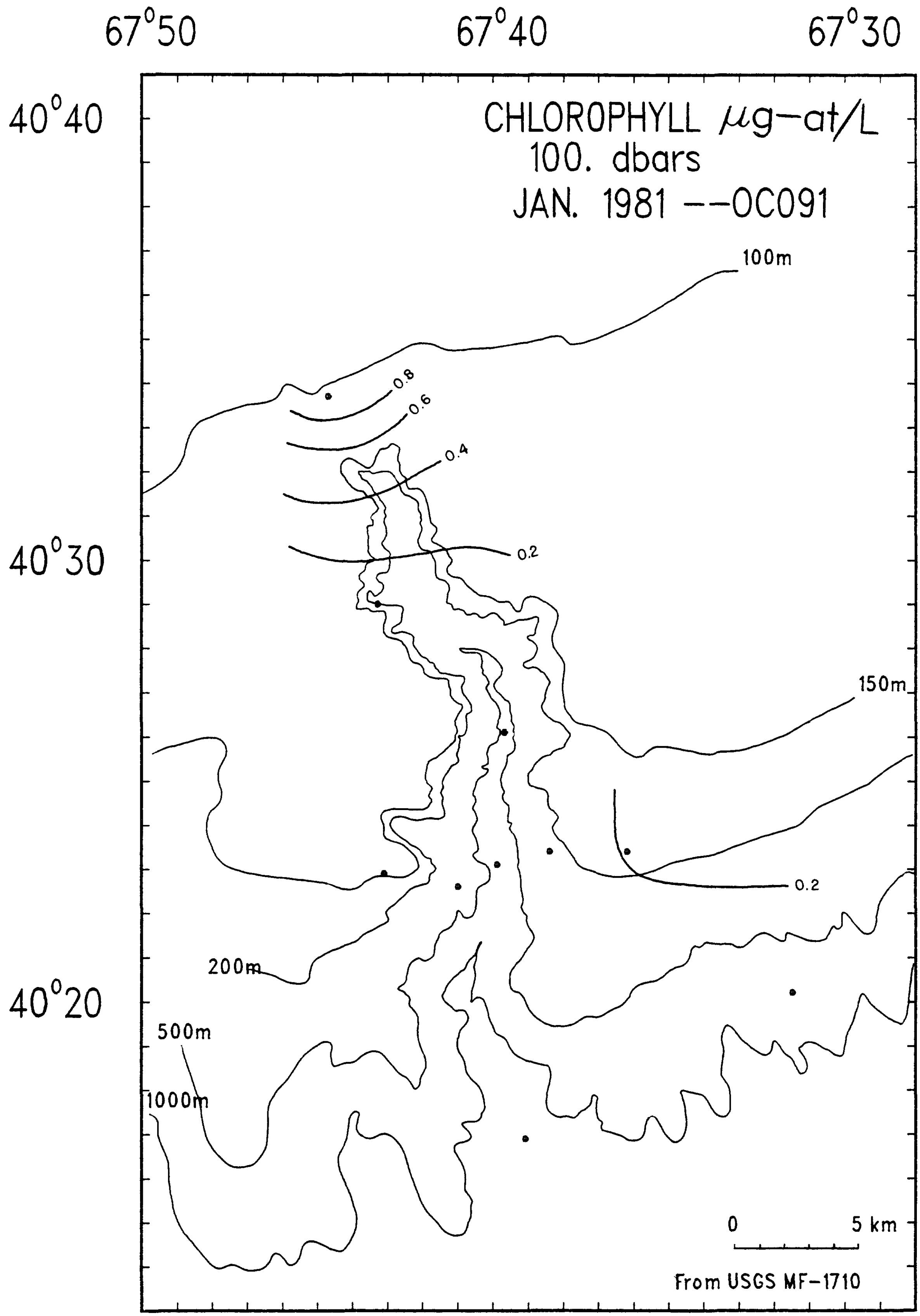

67°50
67°40
67°30
40°40
40°30
40°20
SILICATE μg-at/L
0. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
3.0
4.0
5.0
6.0
7.0
6.0
6.0
4.0
0
5 km
From USGS MF-1710


67°50
67°40
67°30
40°40
40°30
40°20
SILICATE µg-at/L
100. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
4.0
5.0
6.0
6.0
5.0
4.0
3.0
0
5 km
From USGS MF-1710


67°50
67°40
67°30
40°40
40°30
40°20
NITRATE µg-at/L
0. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
5.0
6.0
8.0
10.0
8.0
0
5 km
From USGS MF-1710


67°50
67°40
67°30
40°40
40°30
40°20
NITRATE μg-at/L
100. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
7.0
8.0
9.0
10.0
10.0
9.0
8.0
7.0
6.0
0
5 km
From USGS MF-1710

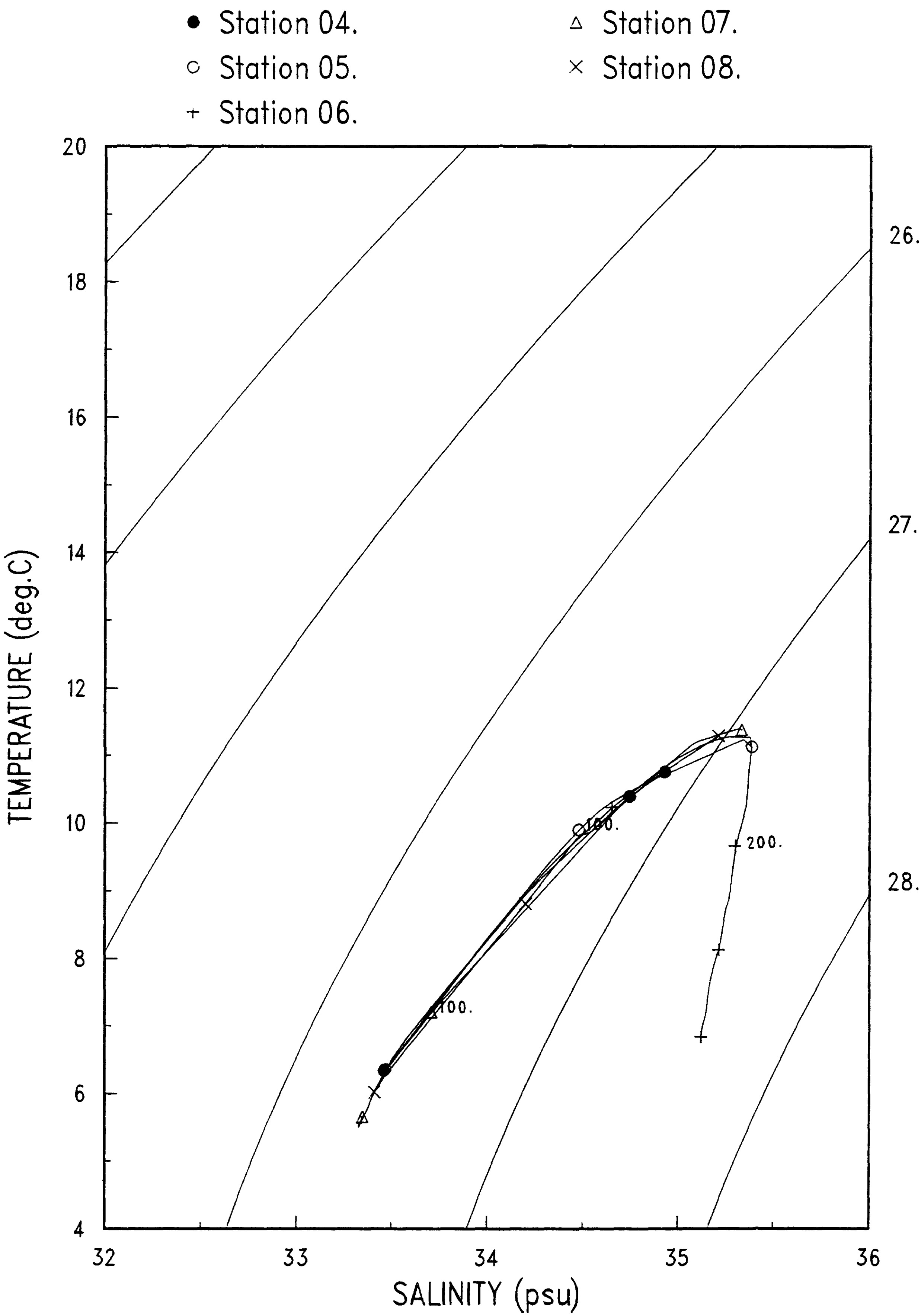

67°50
67°40
67°30
40°40
40°30
40°20
CHLOROPHYLL µg-at/L
0. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
1.0
0.8
0.4
0.2
0
5 km
From USGS MF-1710


67°50
67°40
67°30
40°40
40°30
40°20
CHLOROPHYLL μg-at/L
100. dbars
JAN. 1981 --OC091
100m
150m
200m
500m
1000m
0.8
0.6
0.4
0.2
0.2
0
5 km
From USGS MF-1710

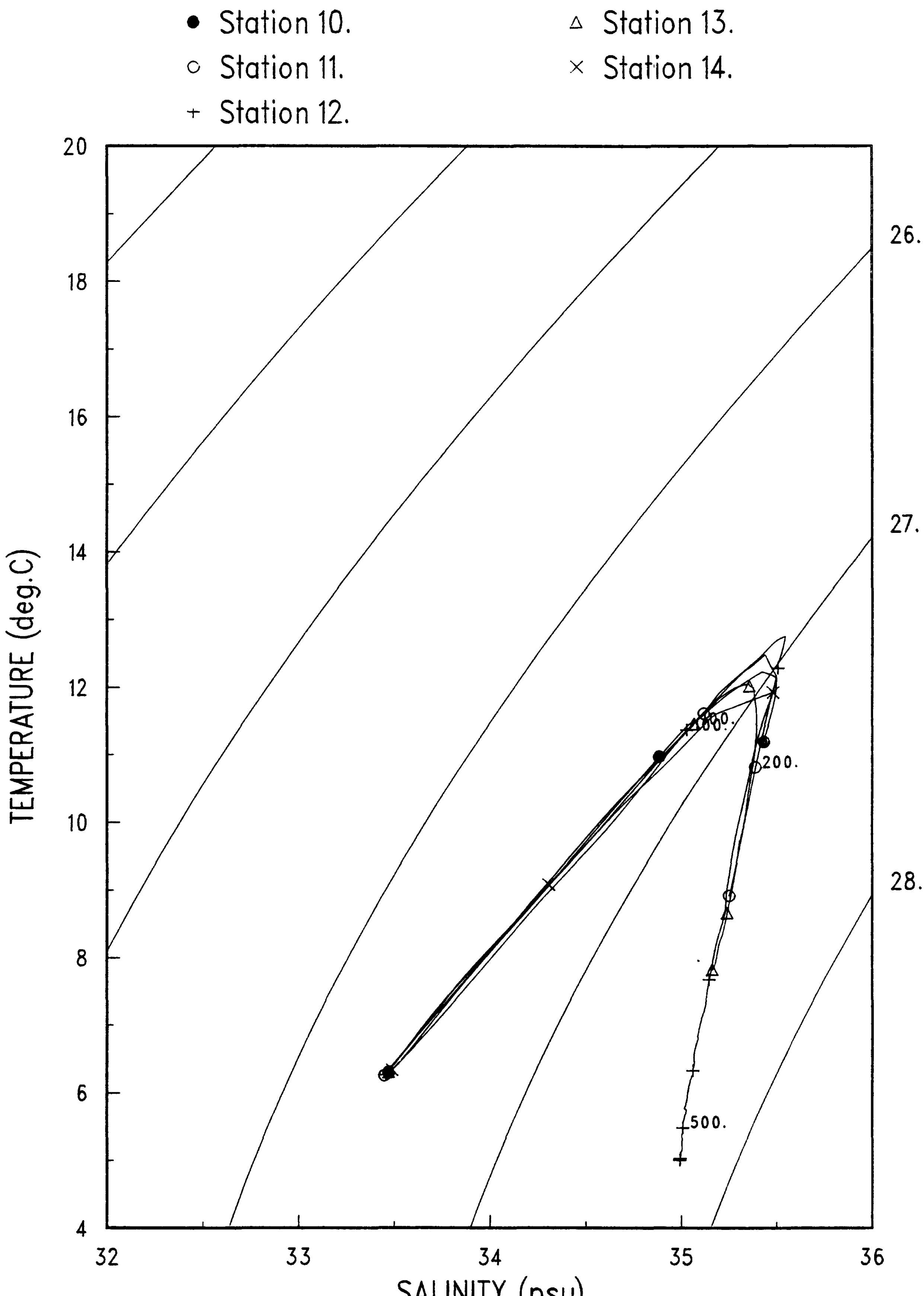
Temperature salinity diagrams

Plots of temperature vs. salinity by section (see fig. 1 and 2). Each station is identified with a different symbol. The symbols are plotted every 20 dbars, and the 100-, 200-, and 500-dbar points have been labeled.

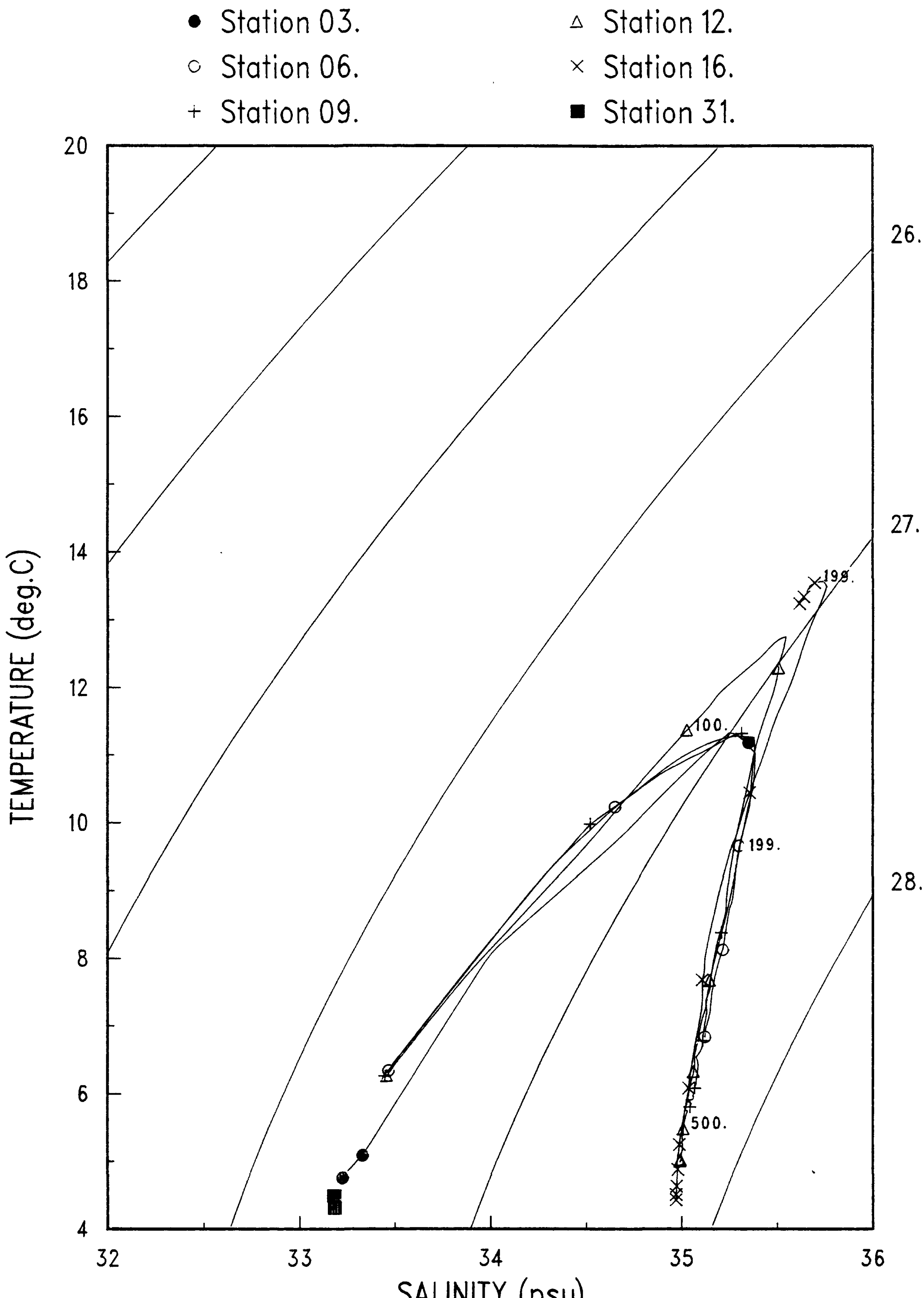
OC091--TS Diagram - Section 1



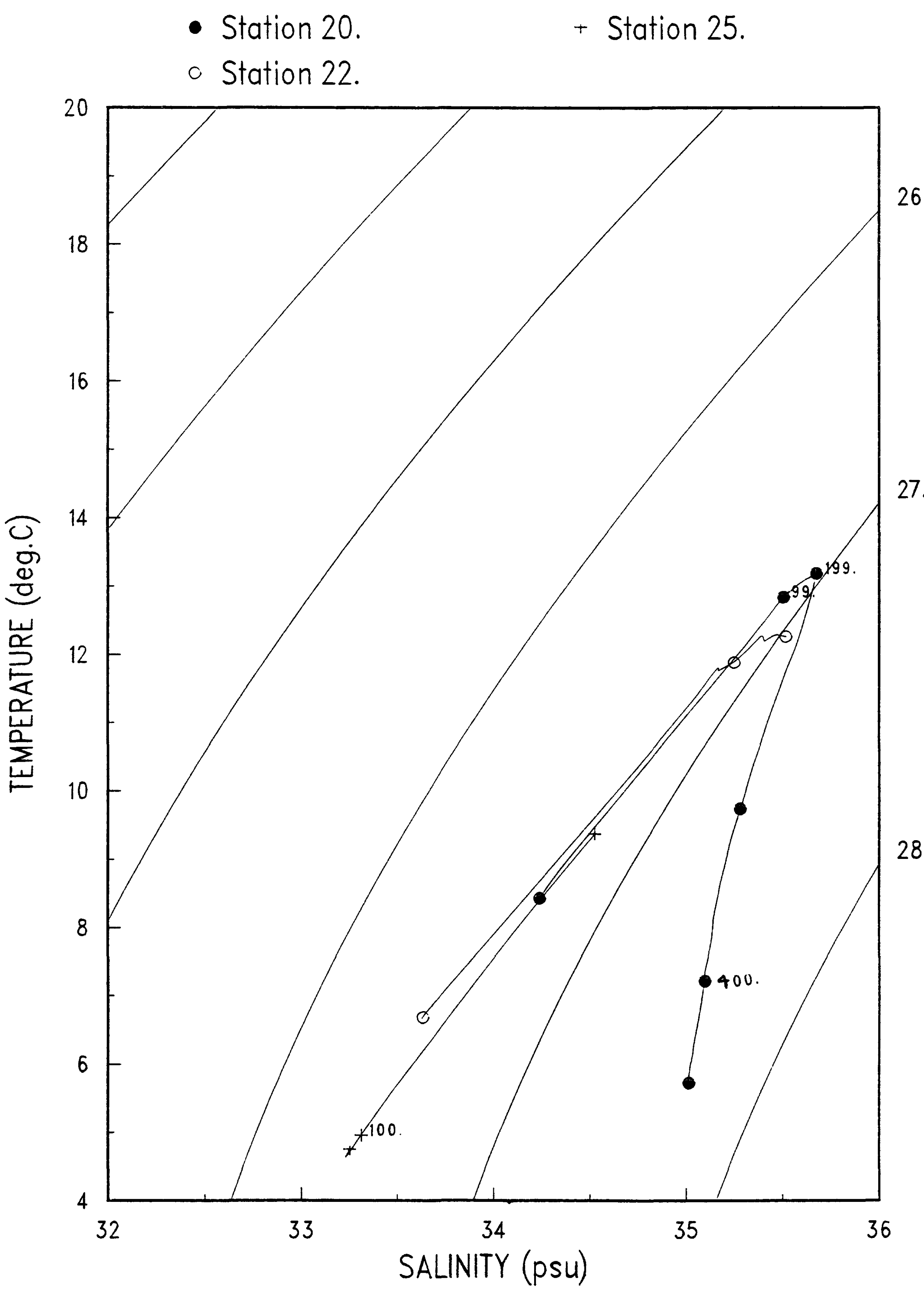
OC091--TS Diagram – Section 2



OC091--TS Diagram – Section 3



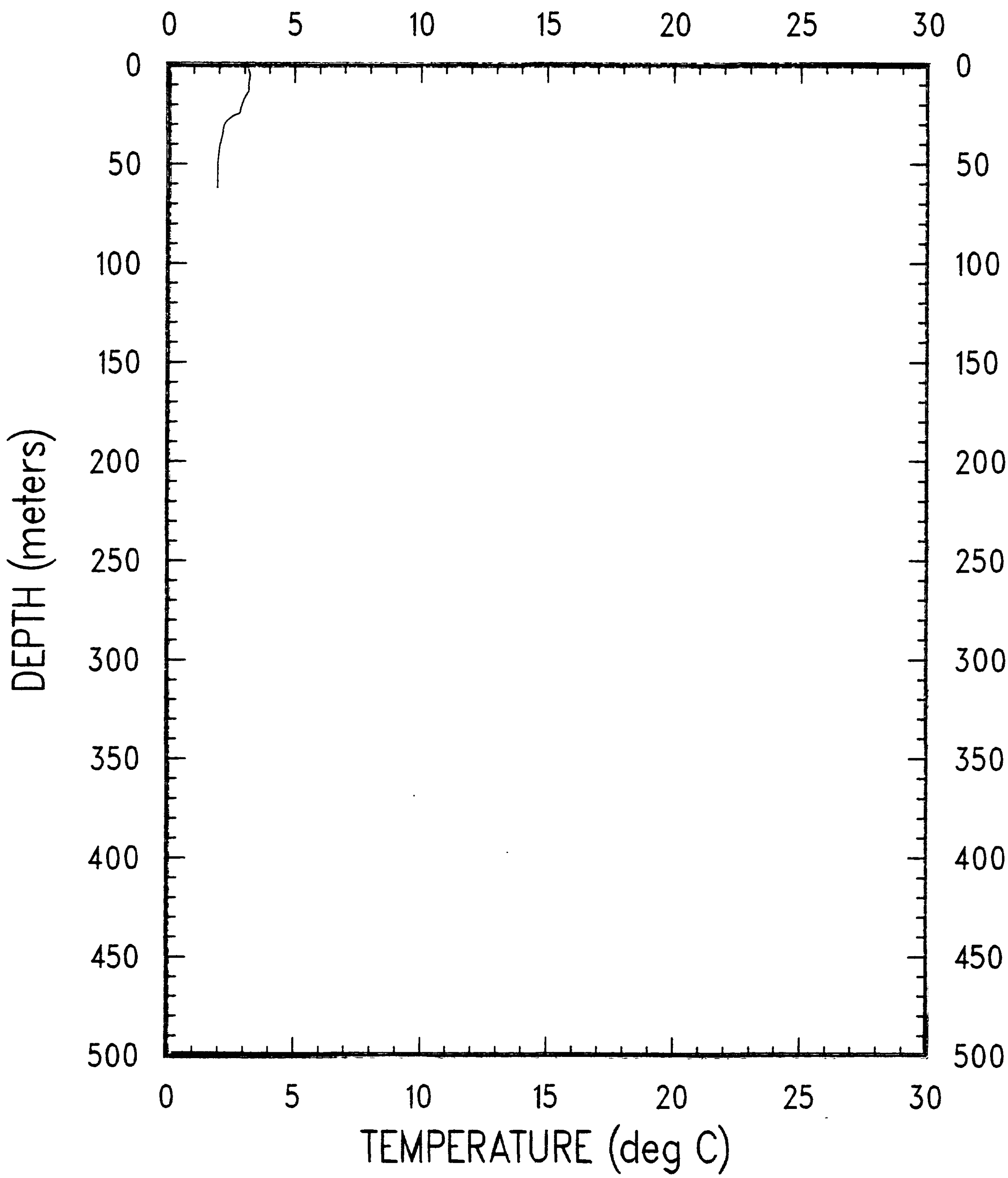
OC091--TS Diagram - Section 4



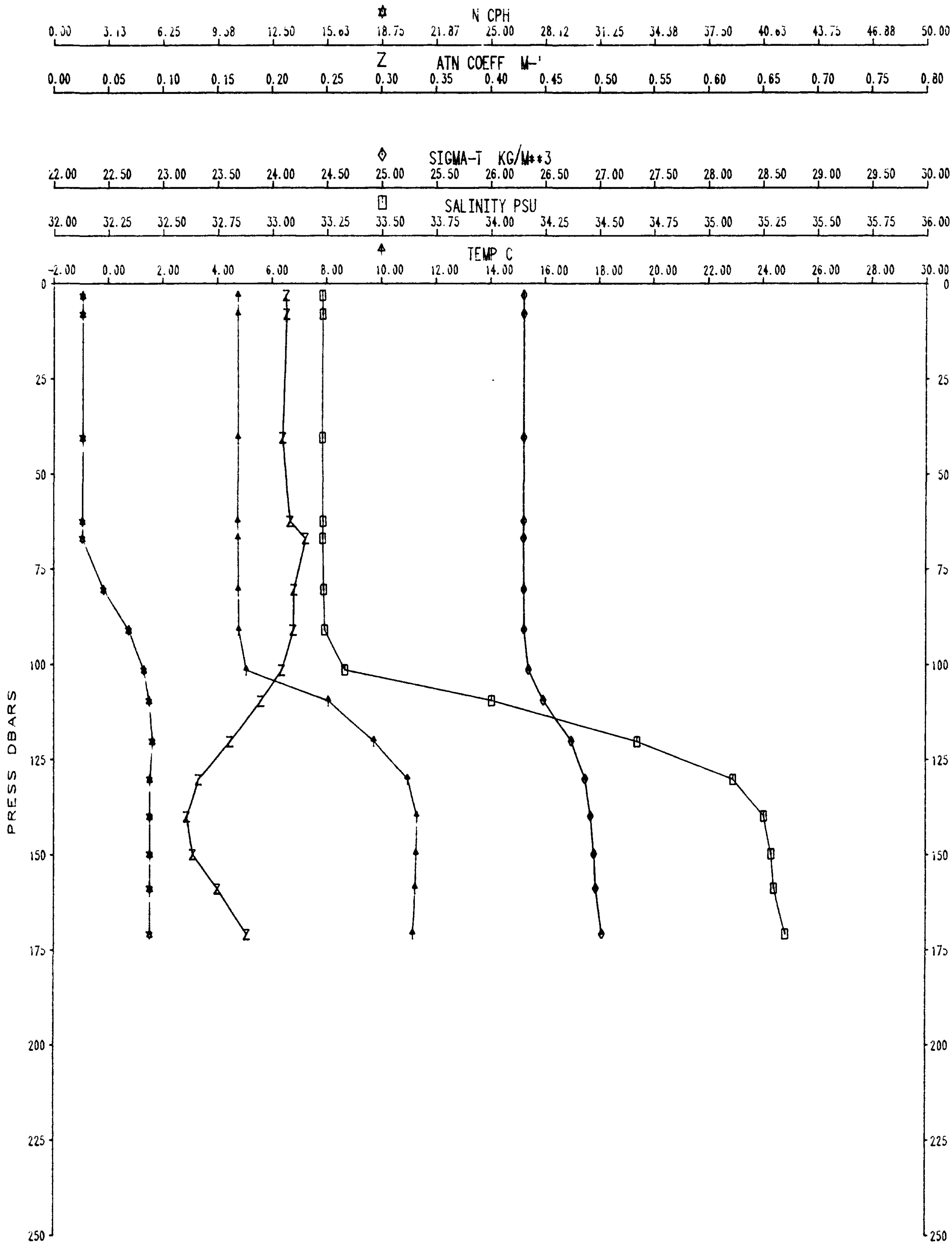
Station profiles

Vertical profiles of temperature, salinity, sigma-t, light attenuation coefficient, and Brunt-Vaisala frequency at each station are shown in figures 37-65. The profiles are drawn using the 10-dbar-averaged data. The data are listed in Appendix I. The different symbols used to distinguish variables are shown on each variable axis. XBT profiles are limited to 500 m. The units of salinity are practical salinity units (psu) and are defined by Lewis (1980).

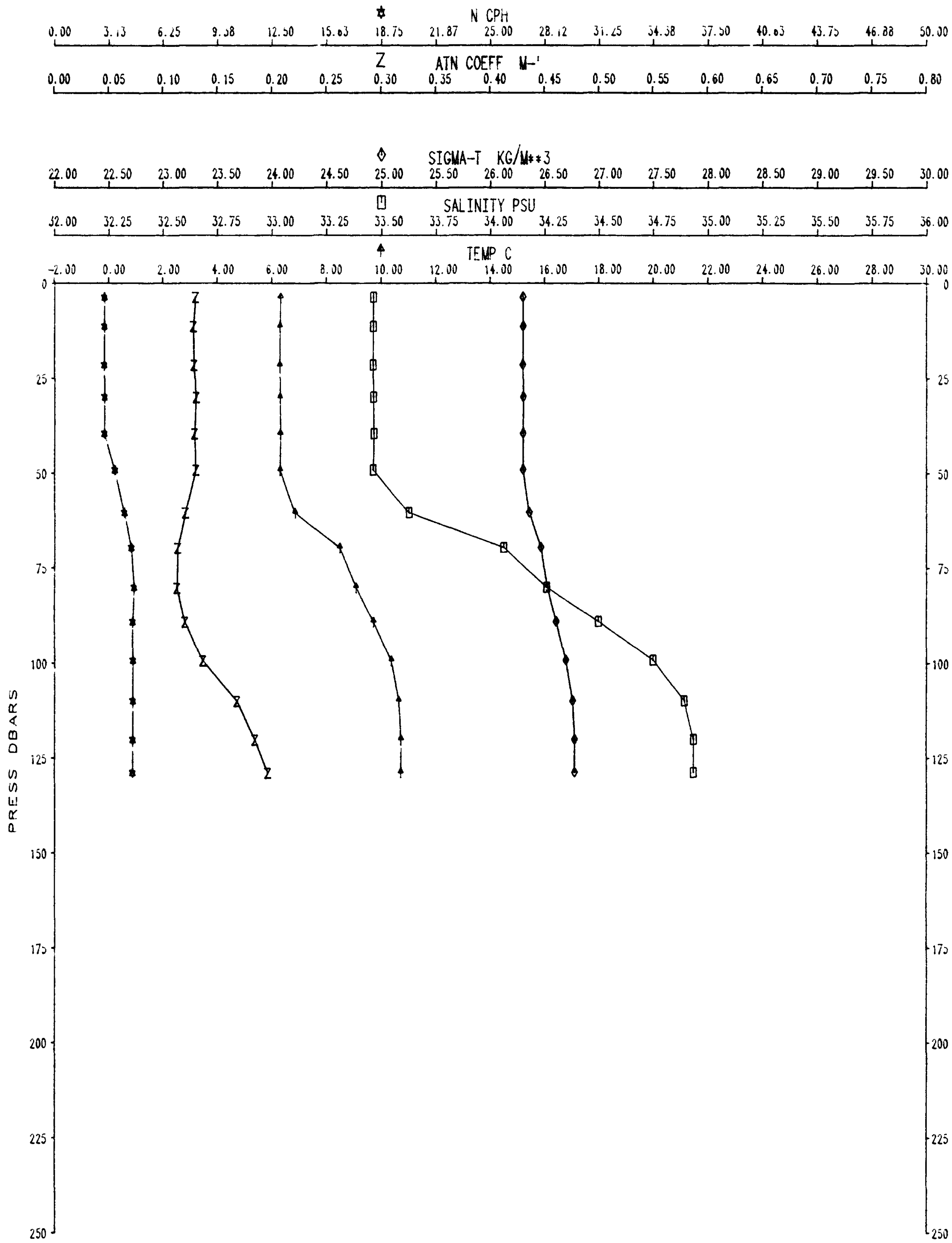
OC091 XBT-1


0 5 10 15 20 25 30
0
50
100
150
200
250
300
350
400
450
500
DEPTH (meters)
TEMPERATURE (deg C)

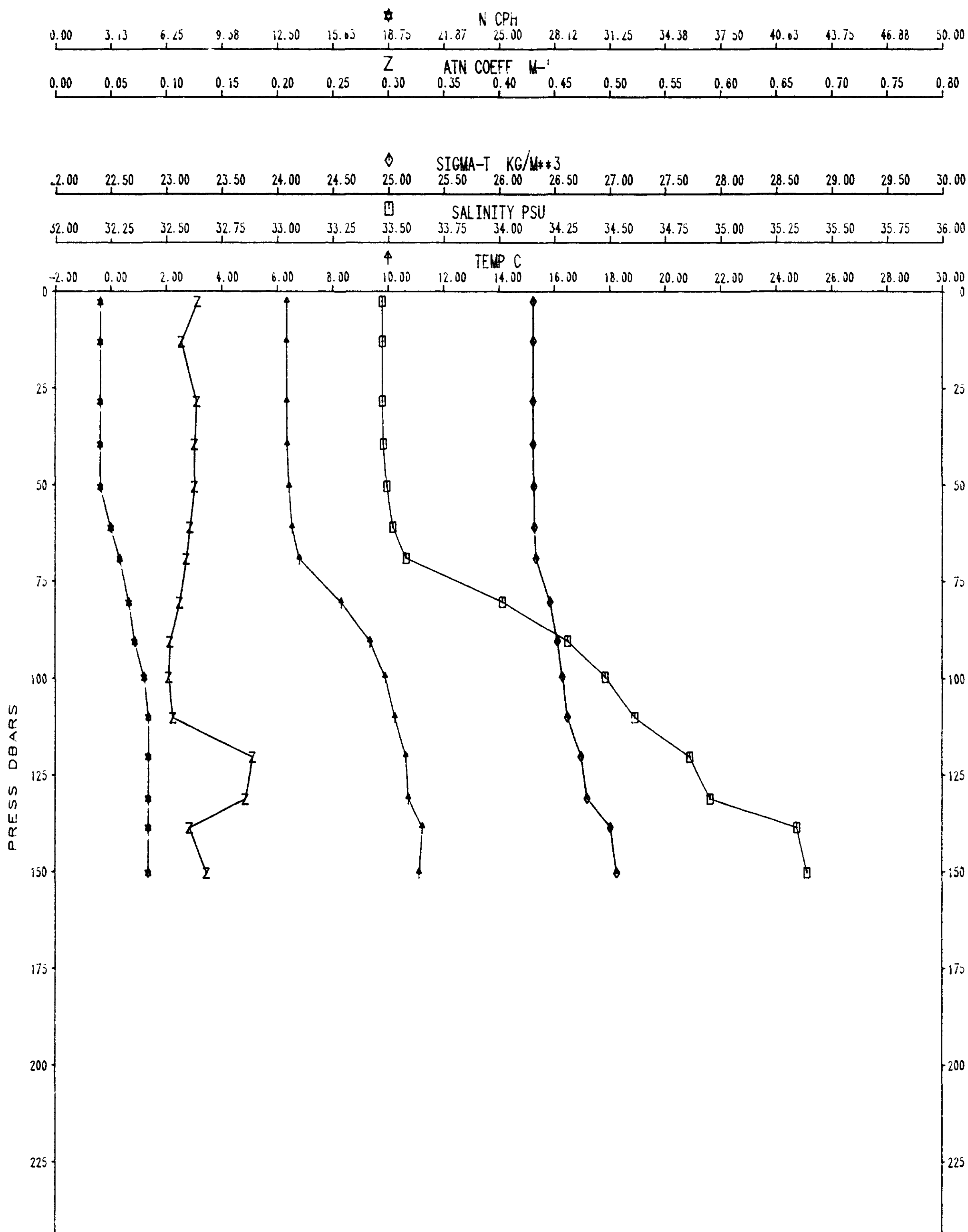
OC091A CAST #3



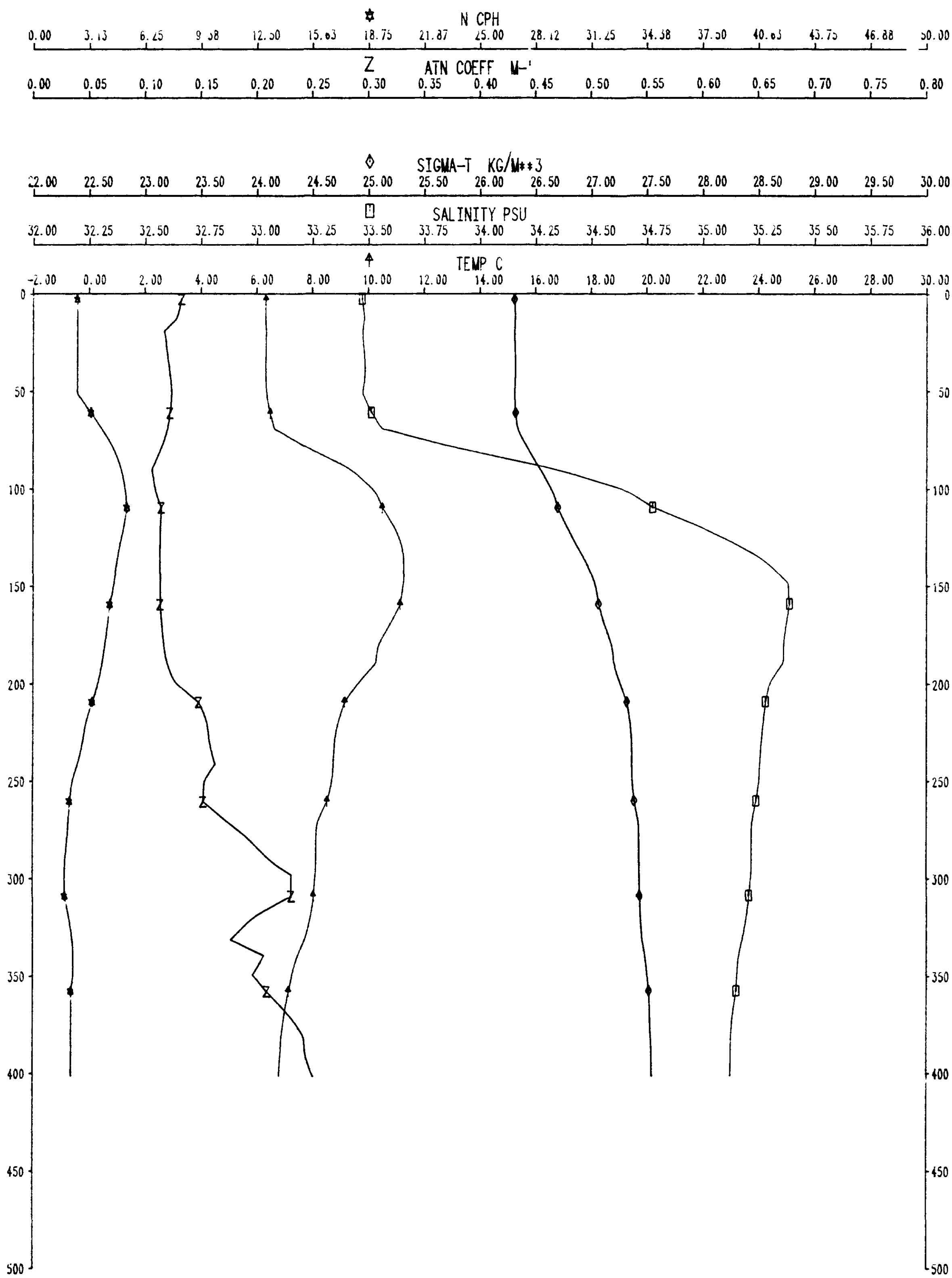
OC091A CAST #4



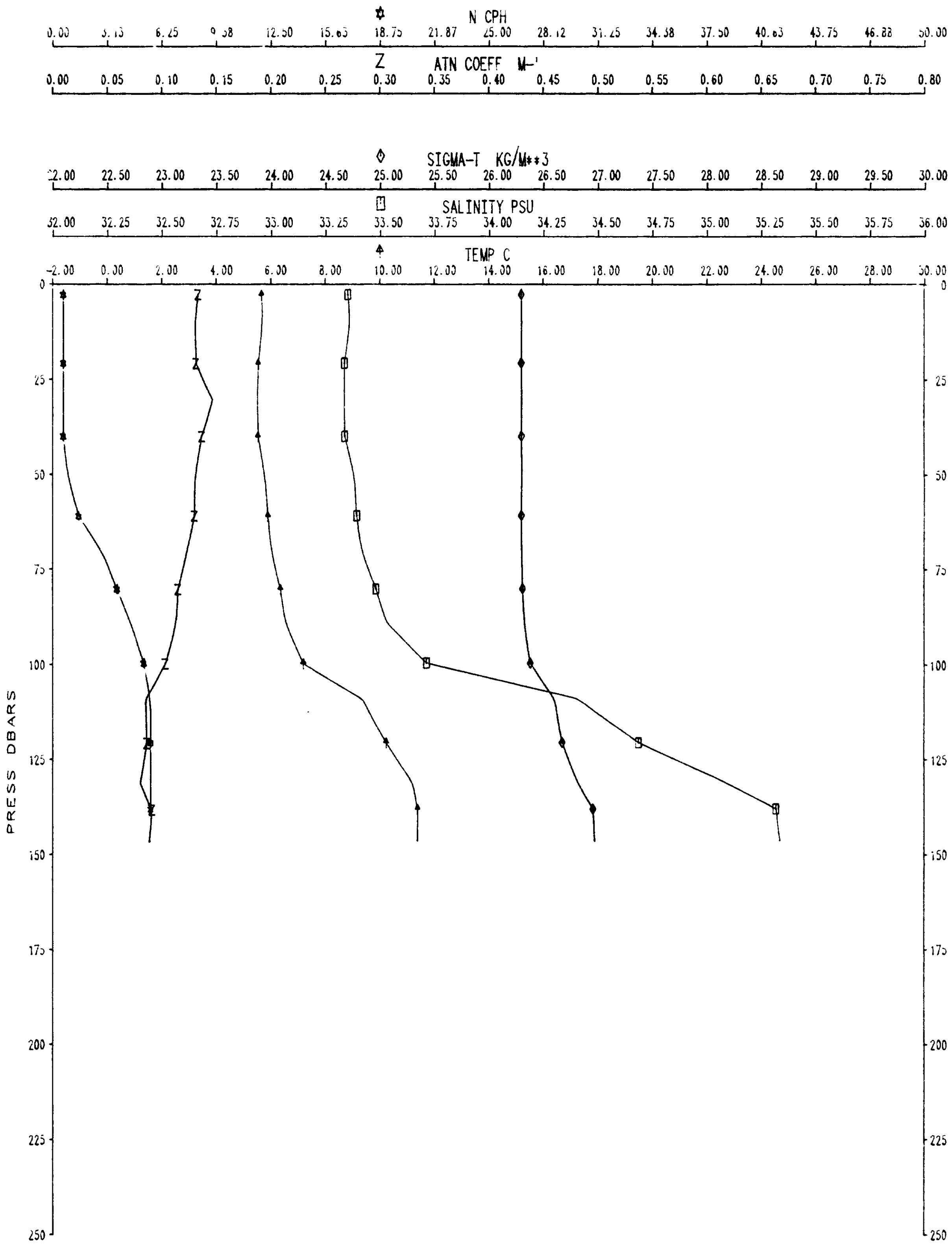
OC091A CAST #5



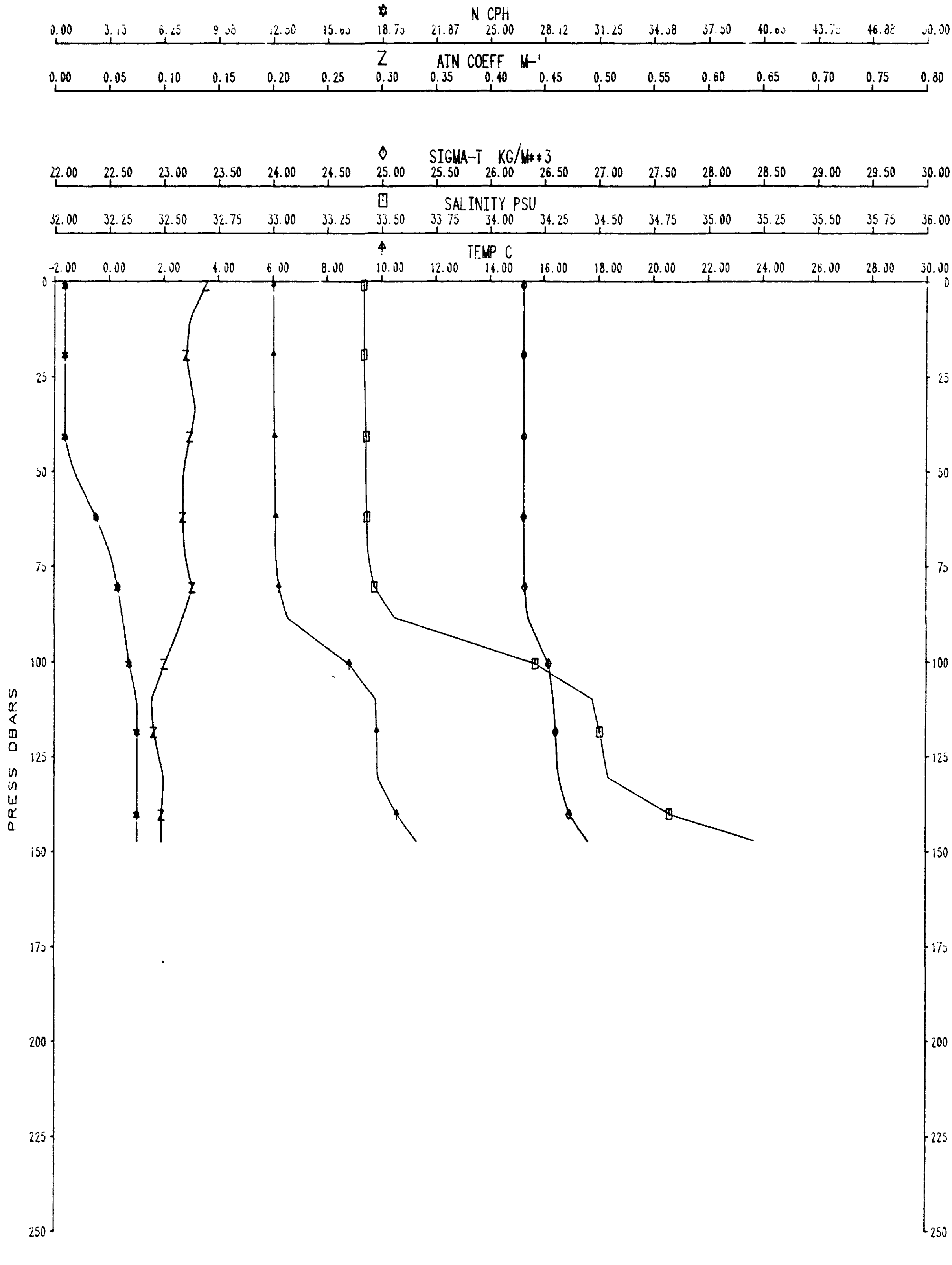
OC091A CAST #6



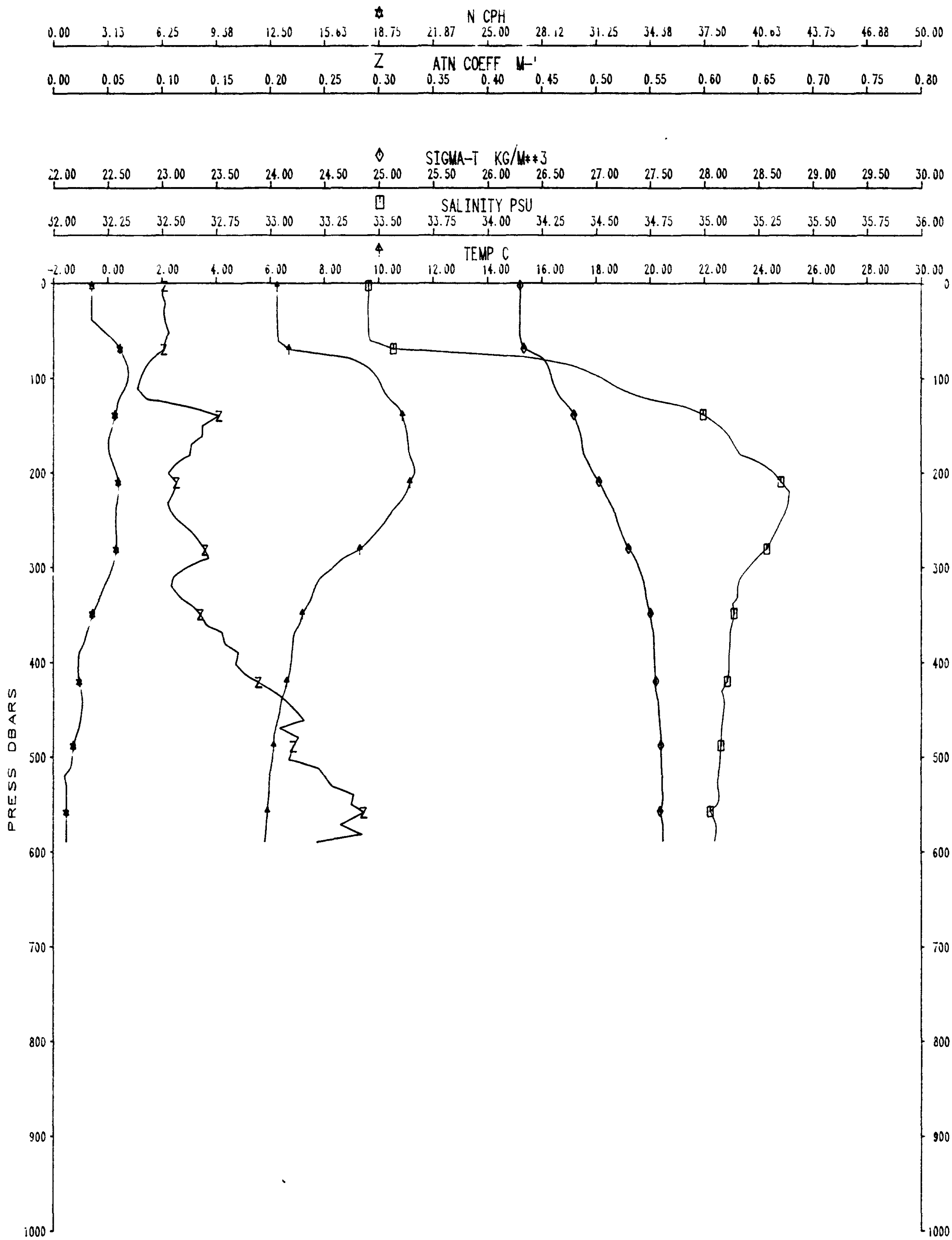
OC091A CAST #7



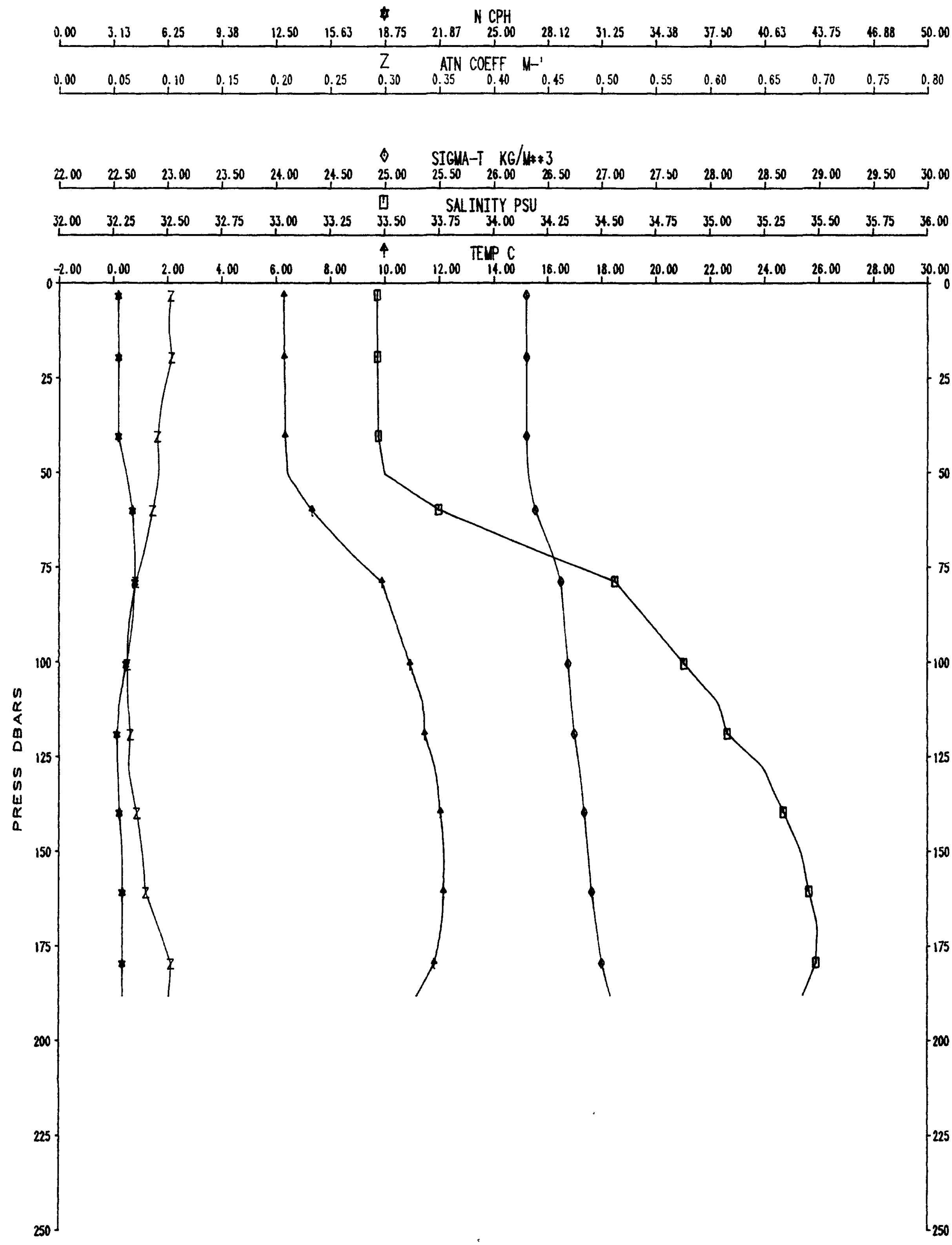
OC091A CAST #8



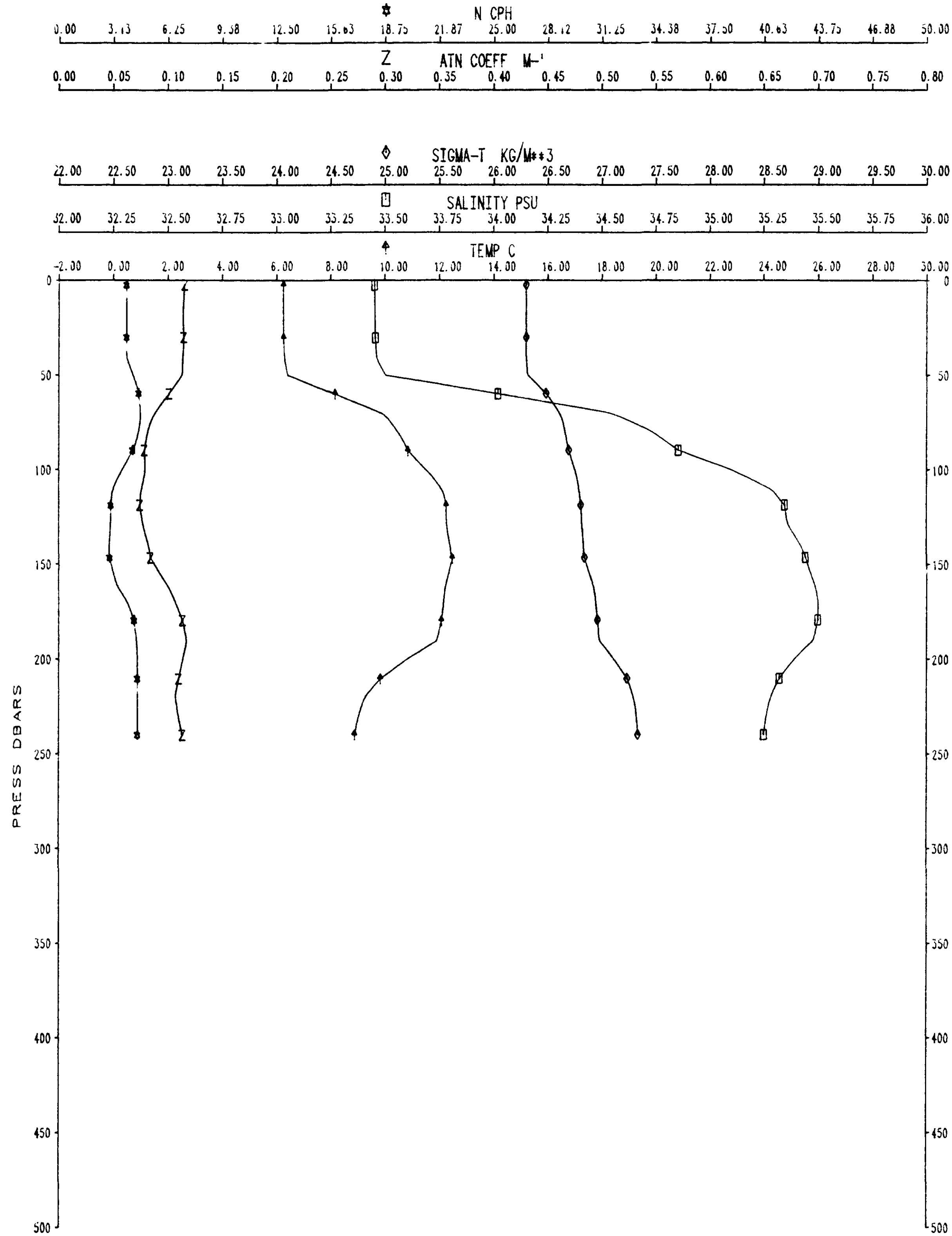
OC091A CAST #9



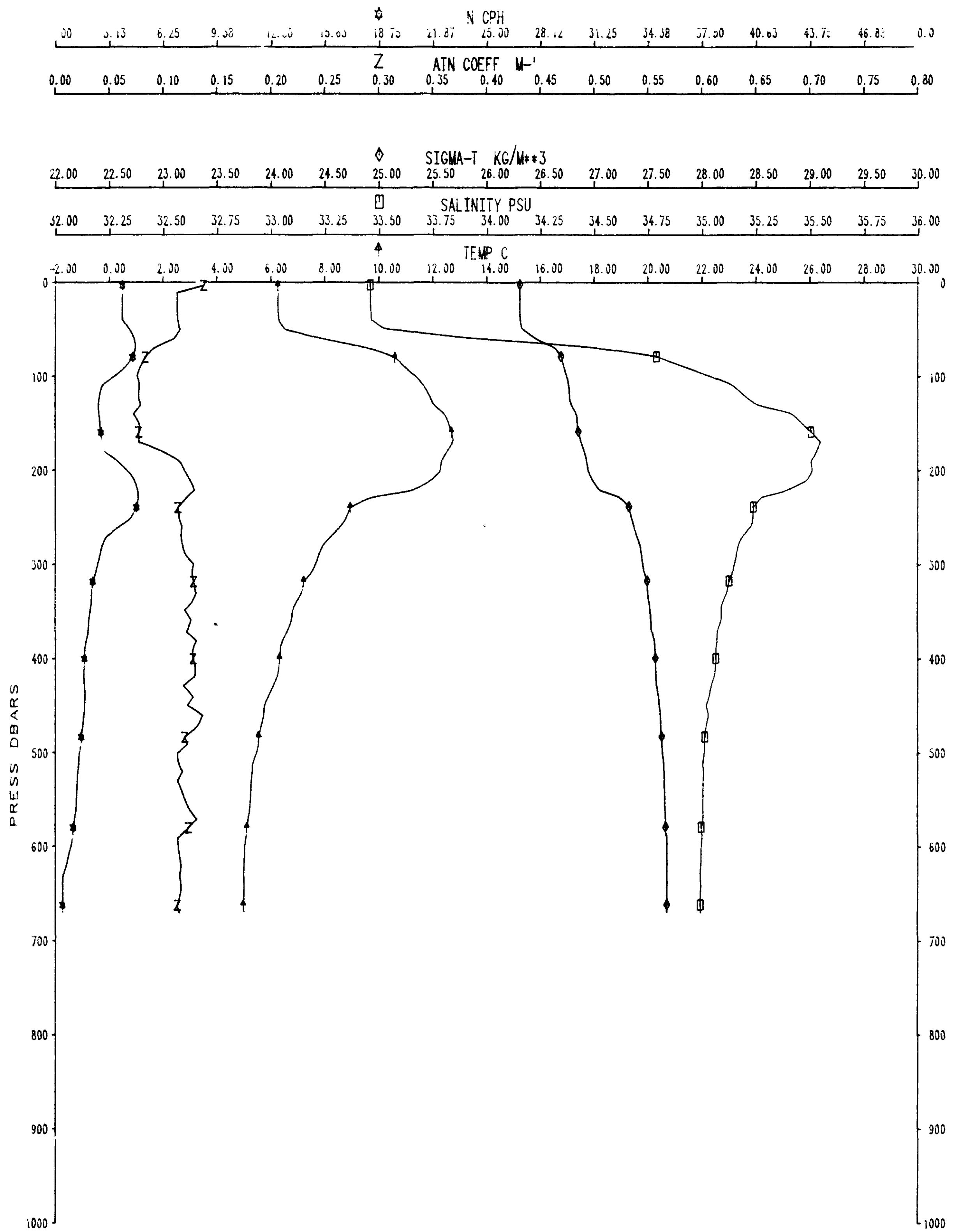
OC091A CAST #10



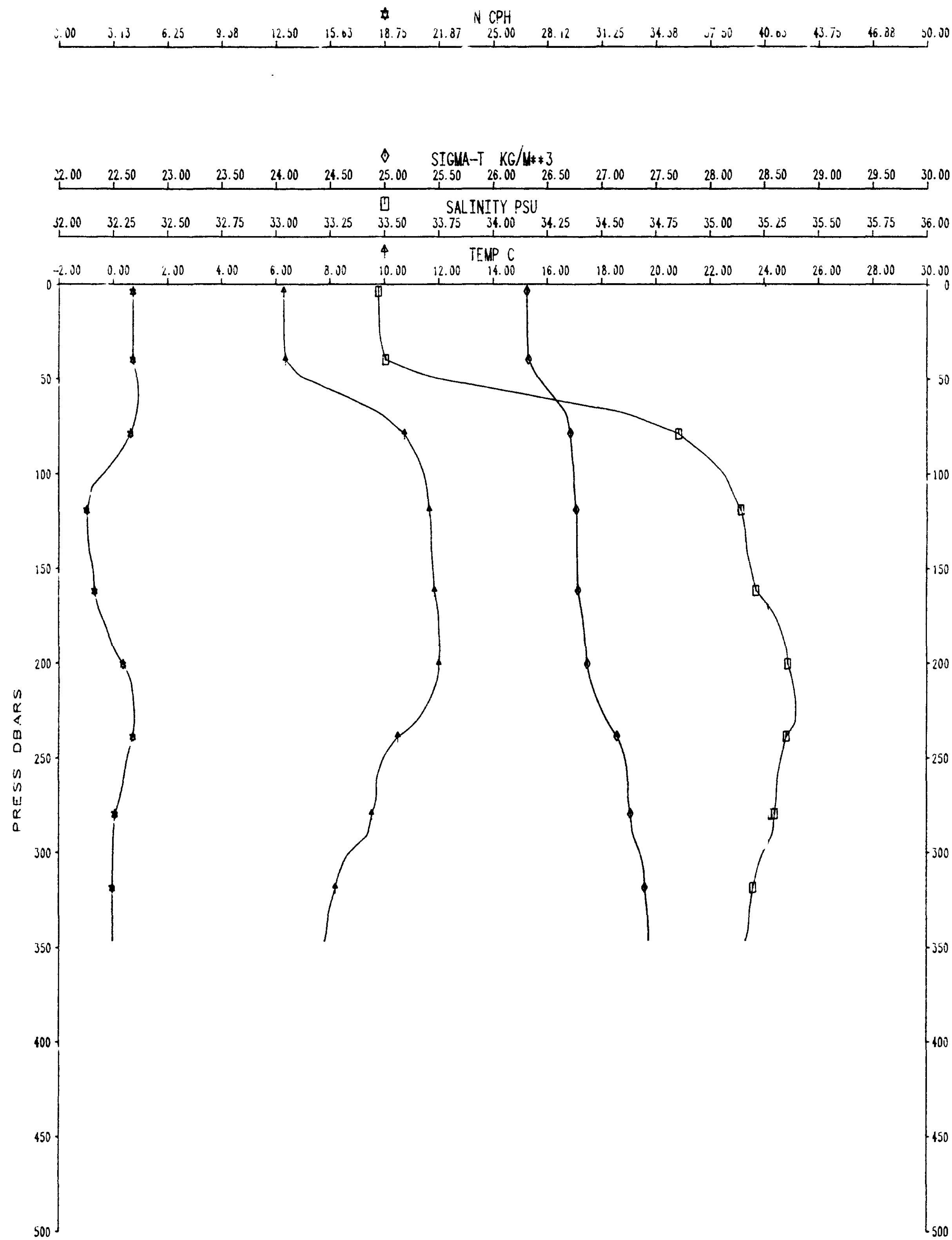
OC091A CAST #11



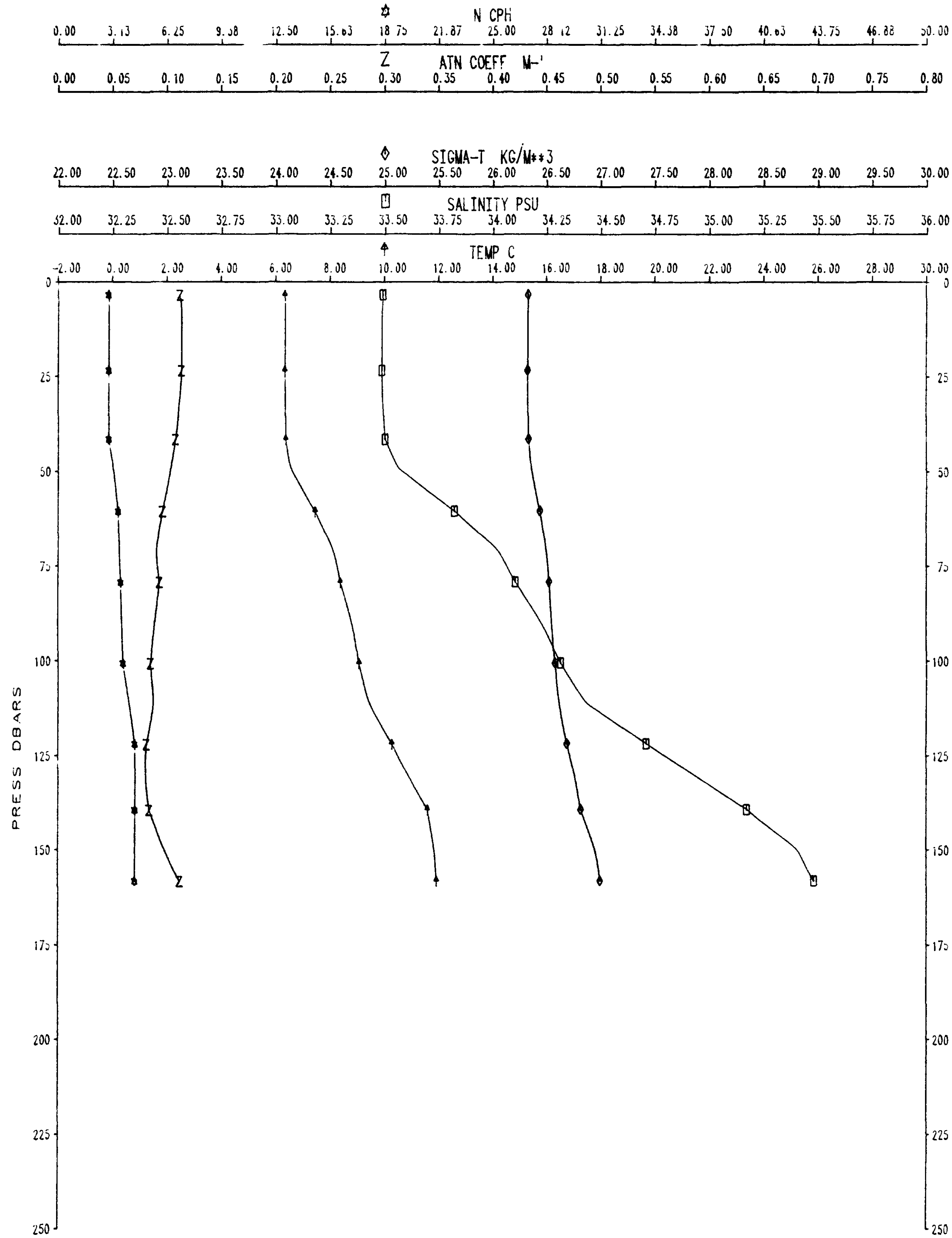
OC091A CAST #12



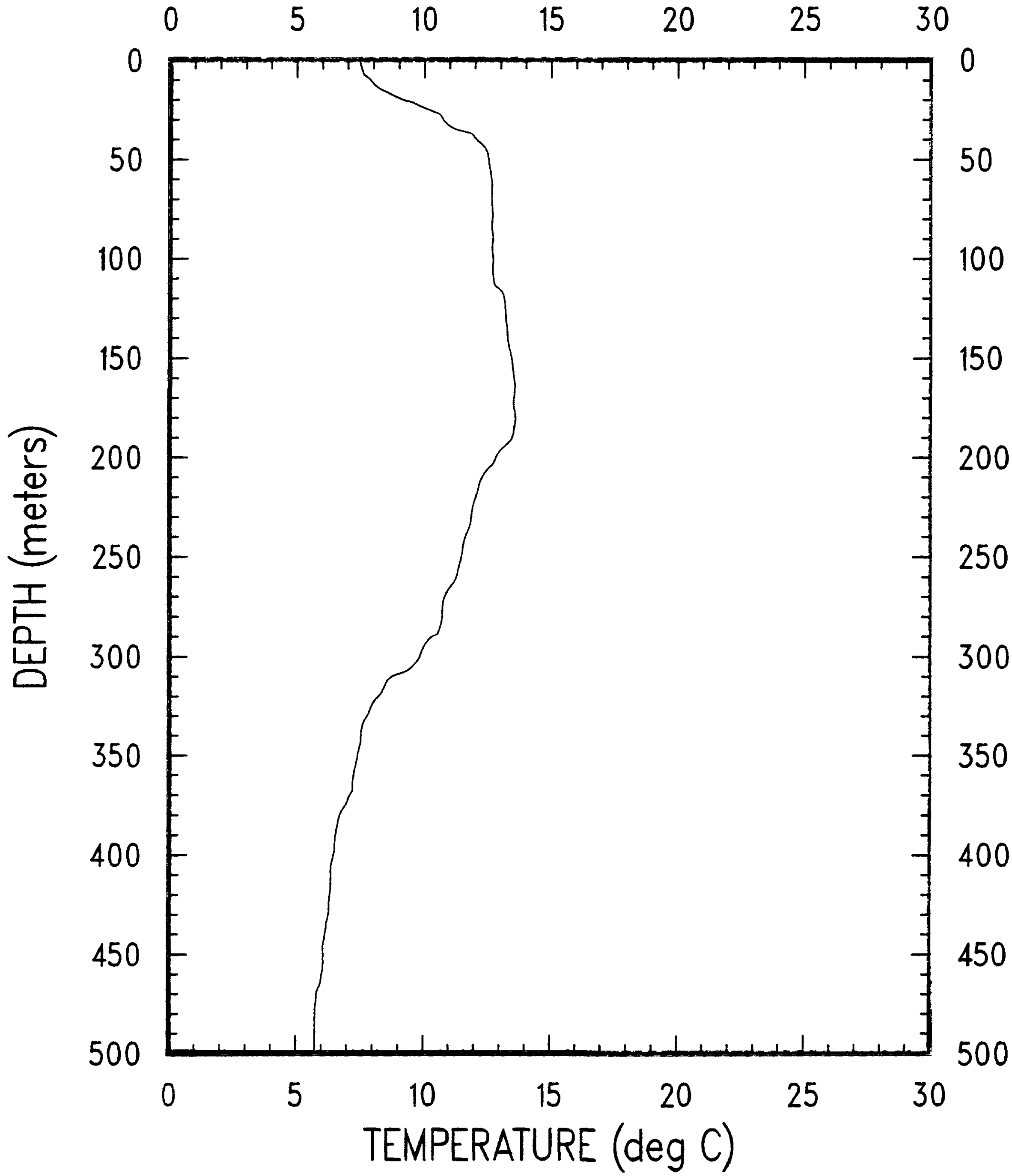
OC091A CAST #13



OC091A CAST #14

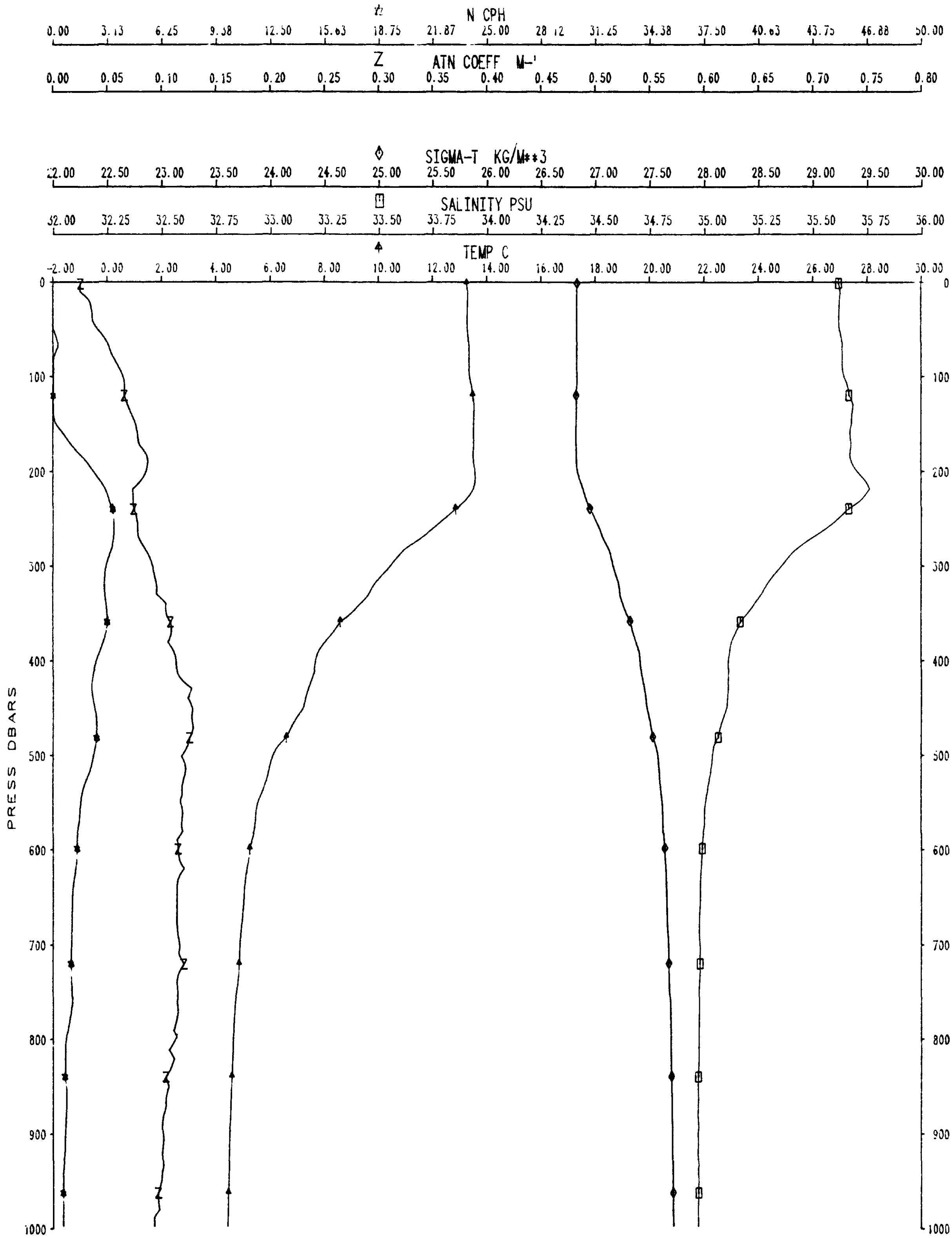


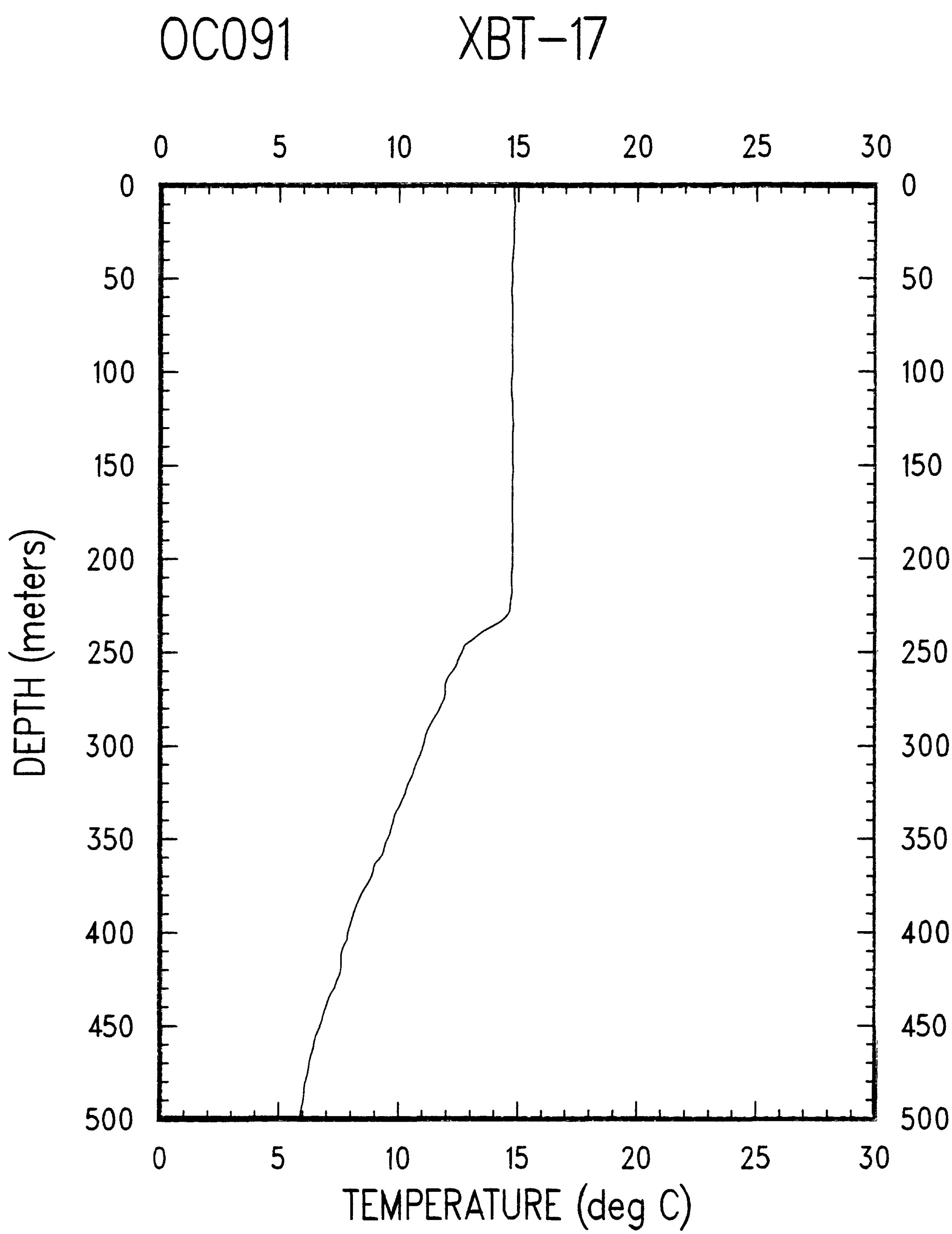
OC091 XBT-15



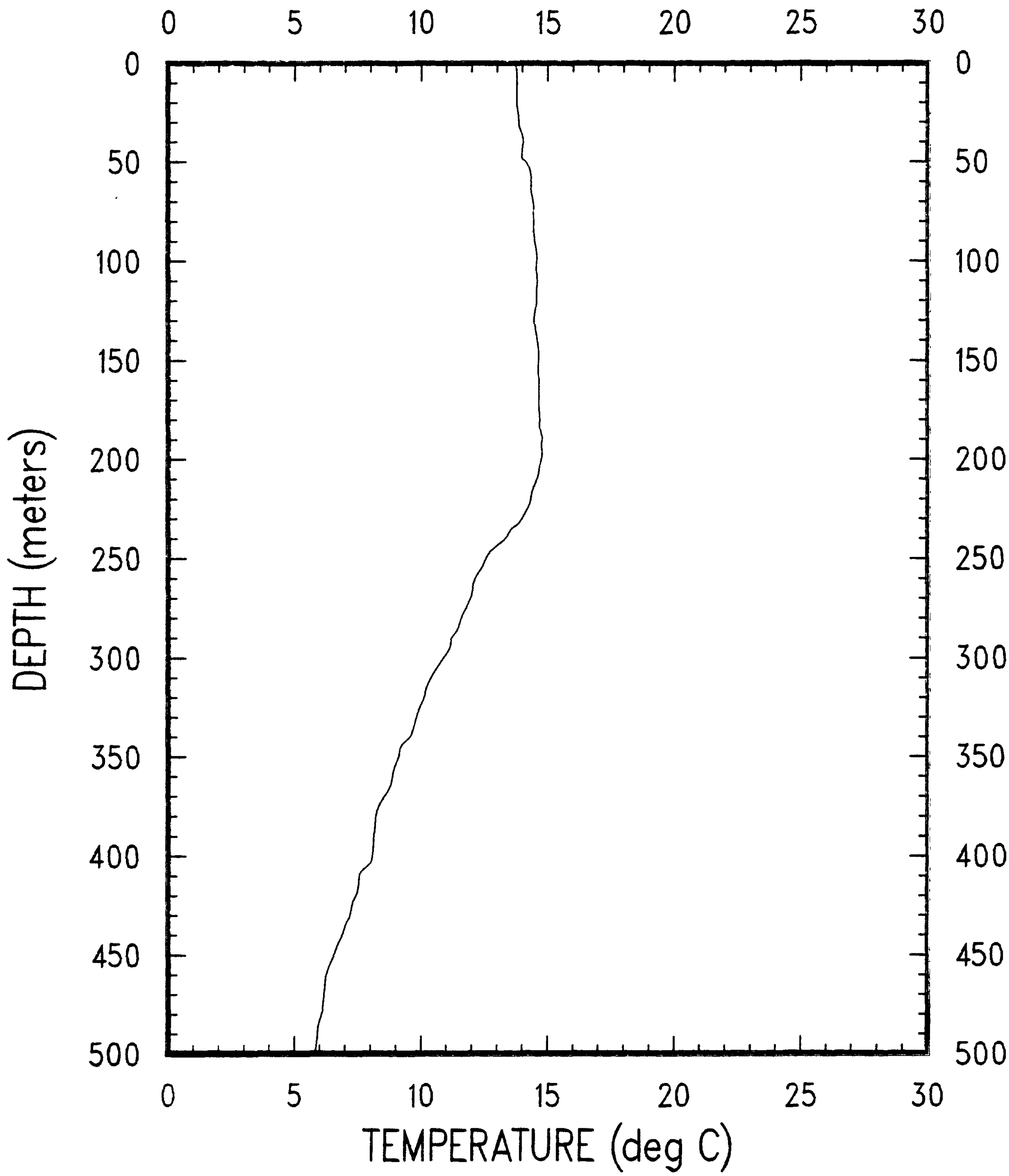
0
5
10
15
20
25
30
0
50
100
150
200
250
300
350
400
450
500
DEPTH (meters)
TEMPERATURE (deg C)

OC091A CAST #16



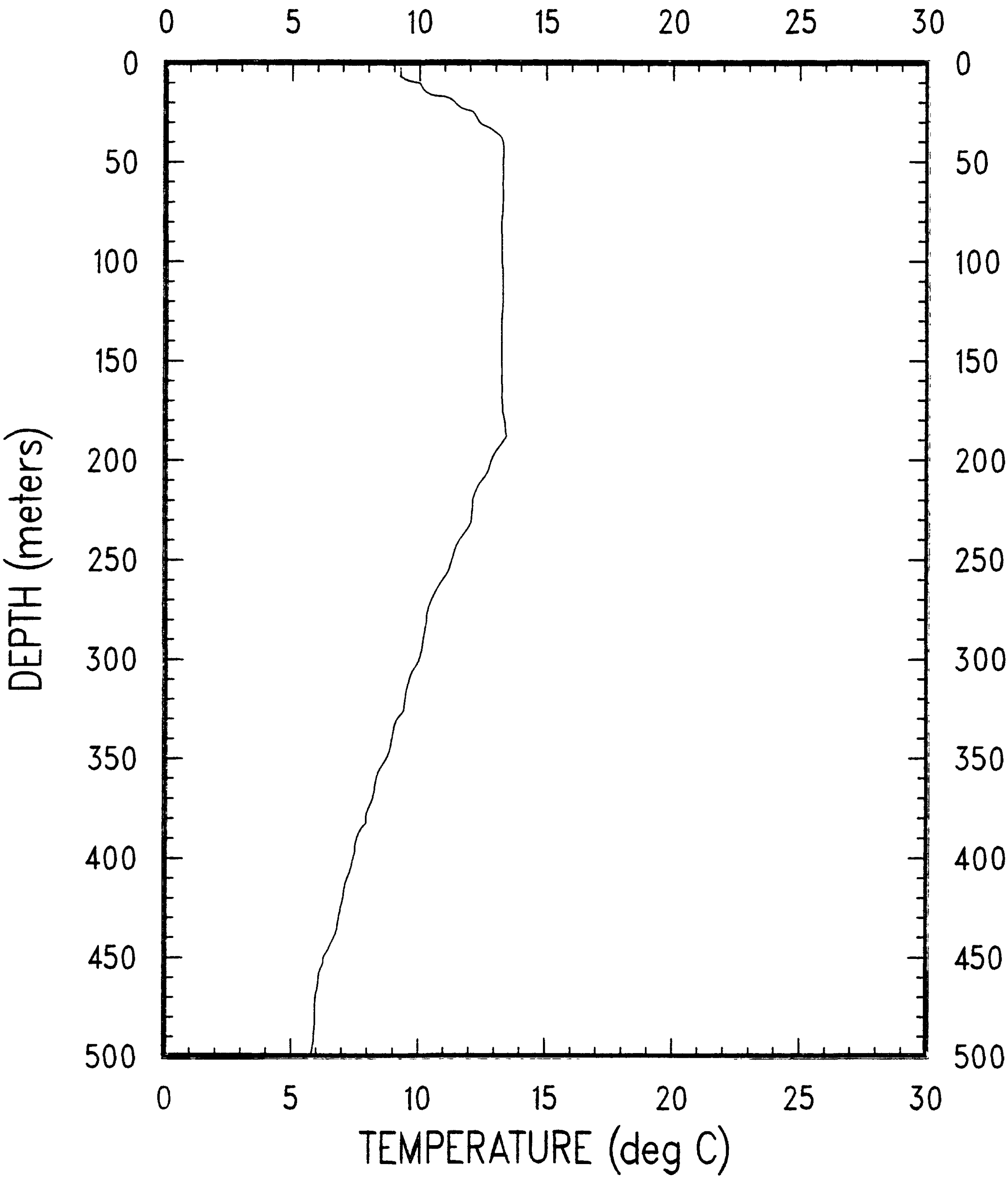

OC091
XBT-17
DEPTH (meters)
TEMPERATURE (deg C)
0
5
10
15
20
25
30
0
50
100
150
200
250
300
350
400
450
500

OC091 XBT-18



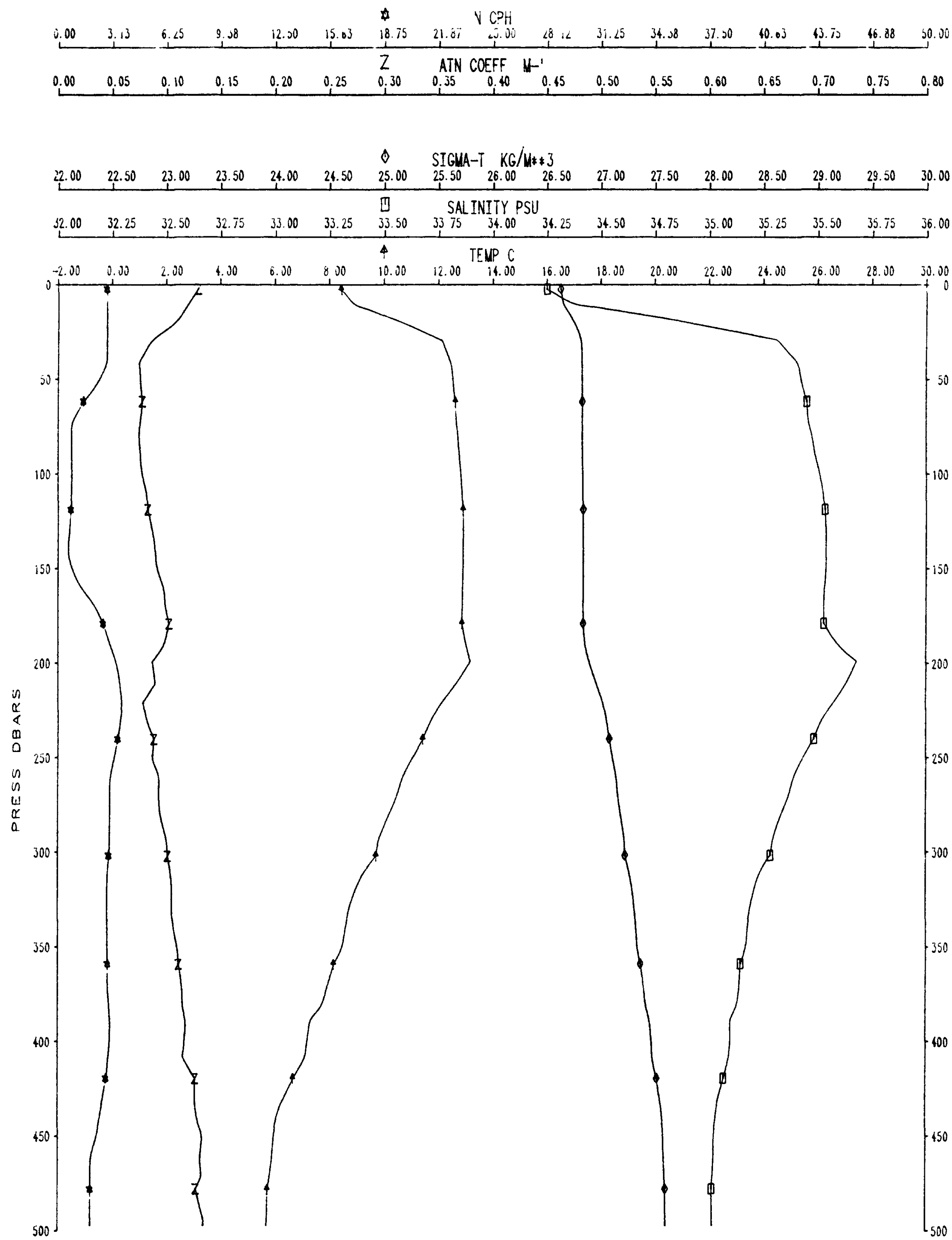
0
5
10
15
20
25
30
0
50
100
150
200
250
300
350
400
450
500
DEPTH (meters)
TEMPERATURE (deg C)

OC091 XBT-19

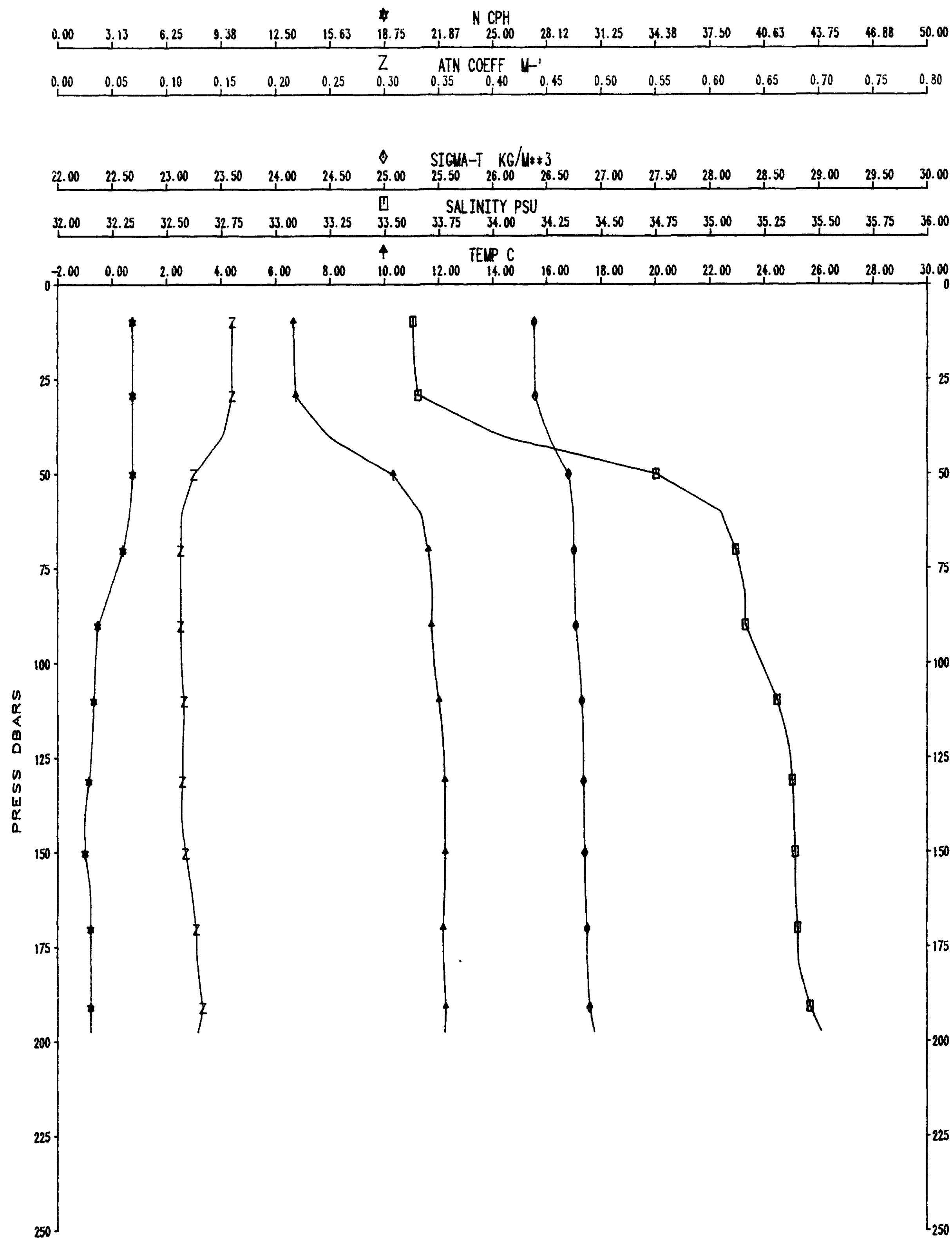


0
5
10
15
20
25
30
0
50
100
150
200
250
300
350
400
450
500
DEPTH (meters)
TEMPERATURE (deg C)

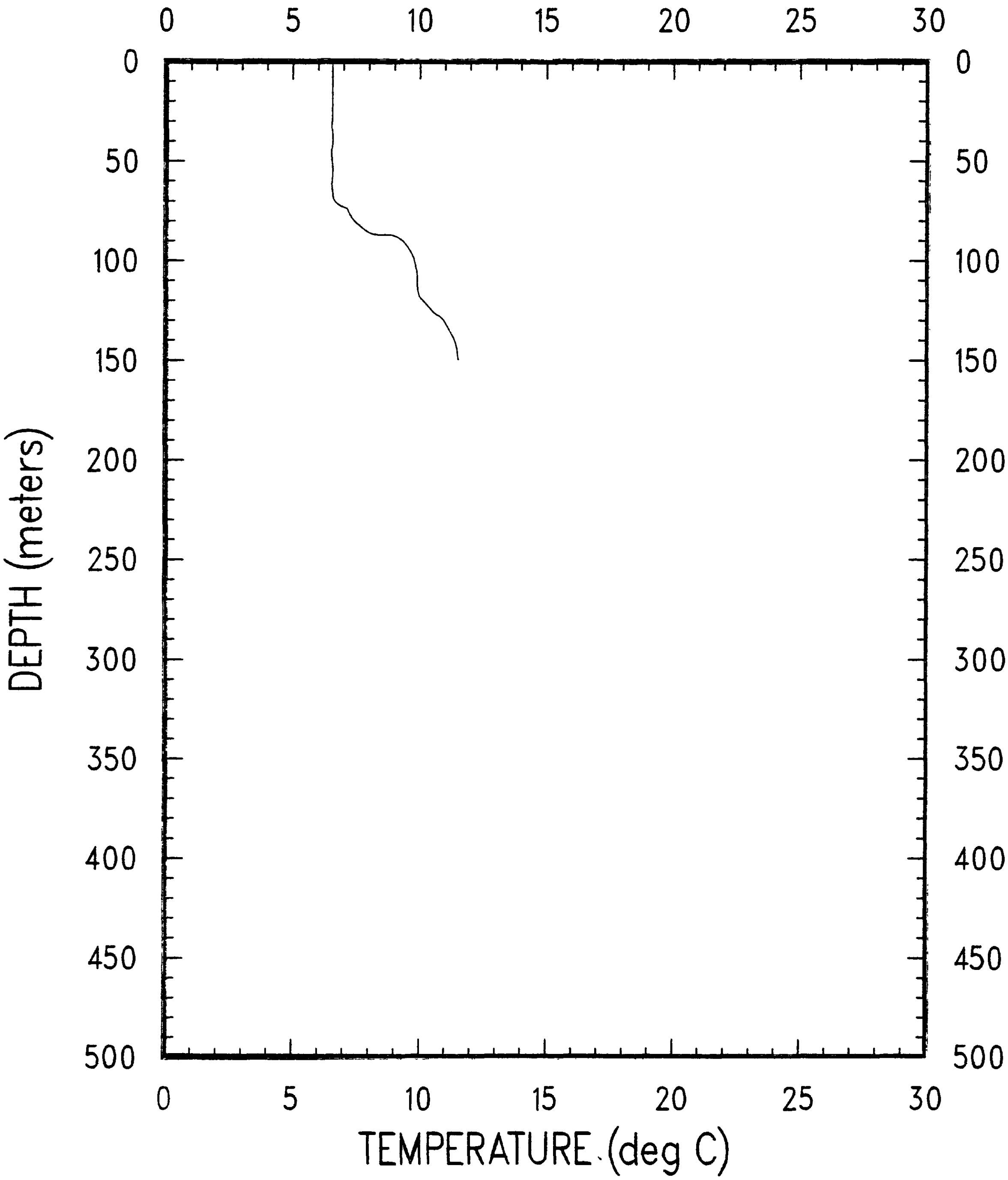
OC091A CAST #20



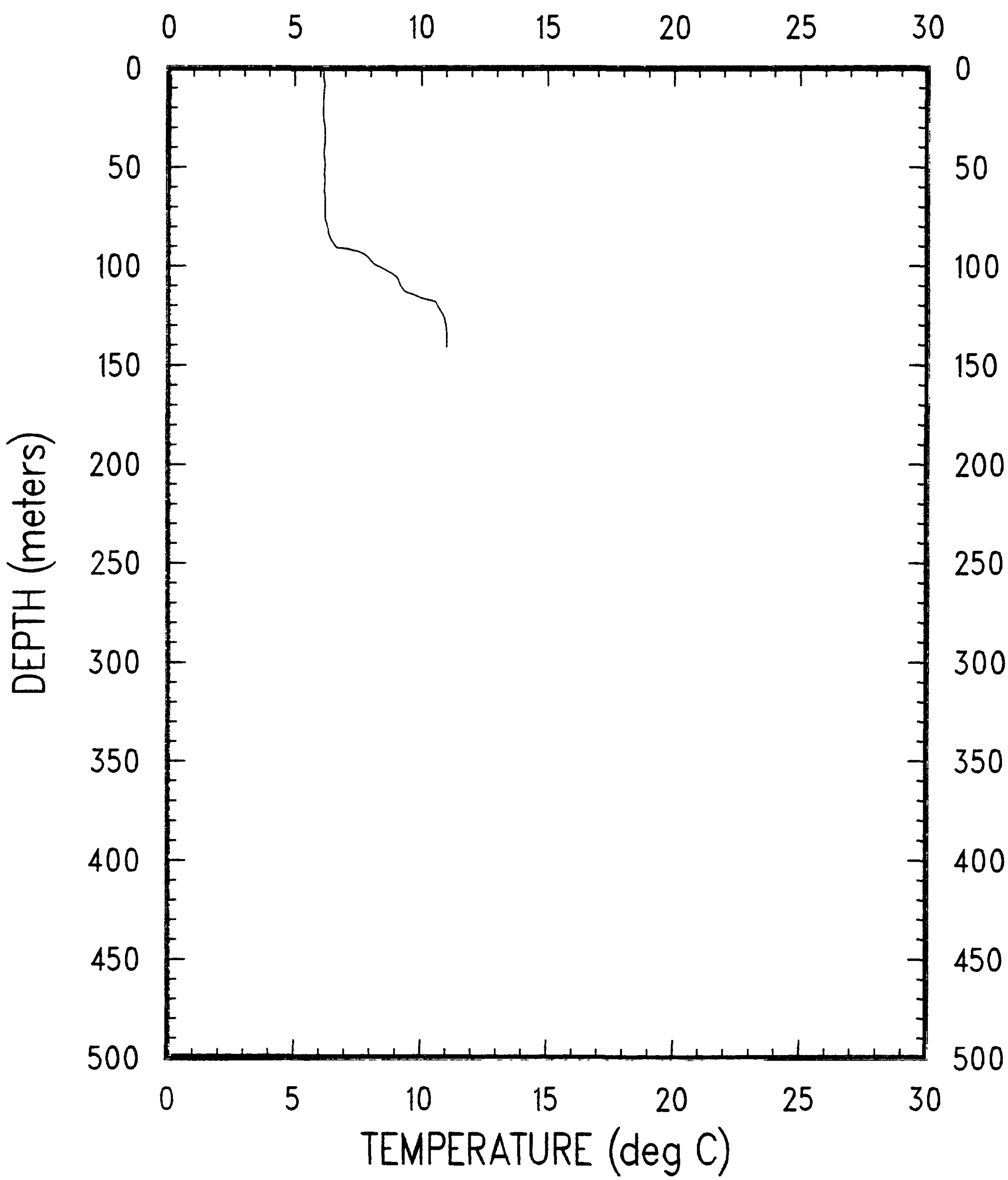
OC091A CAST #22



OC091 XBT-23

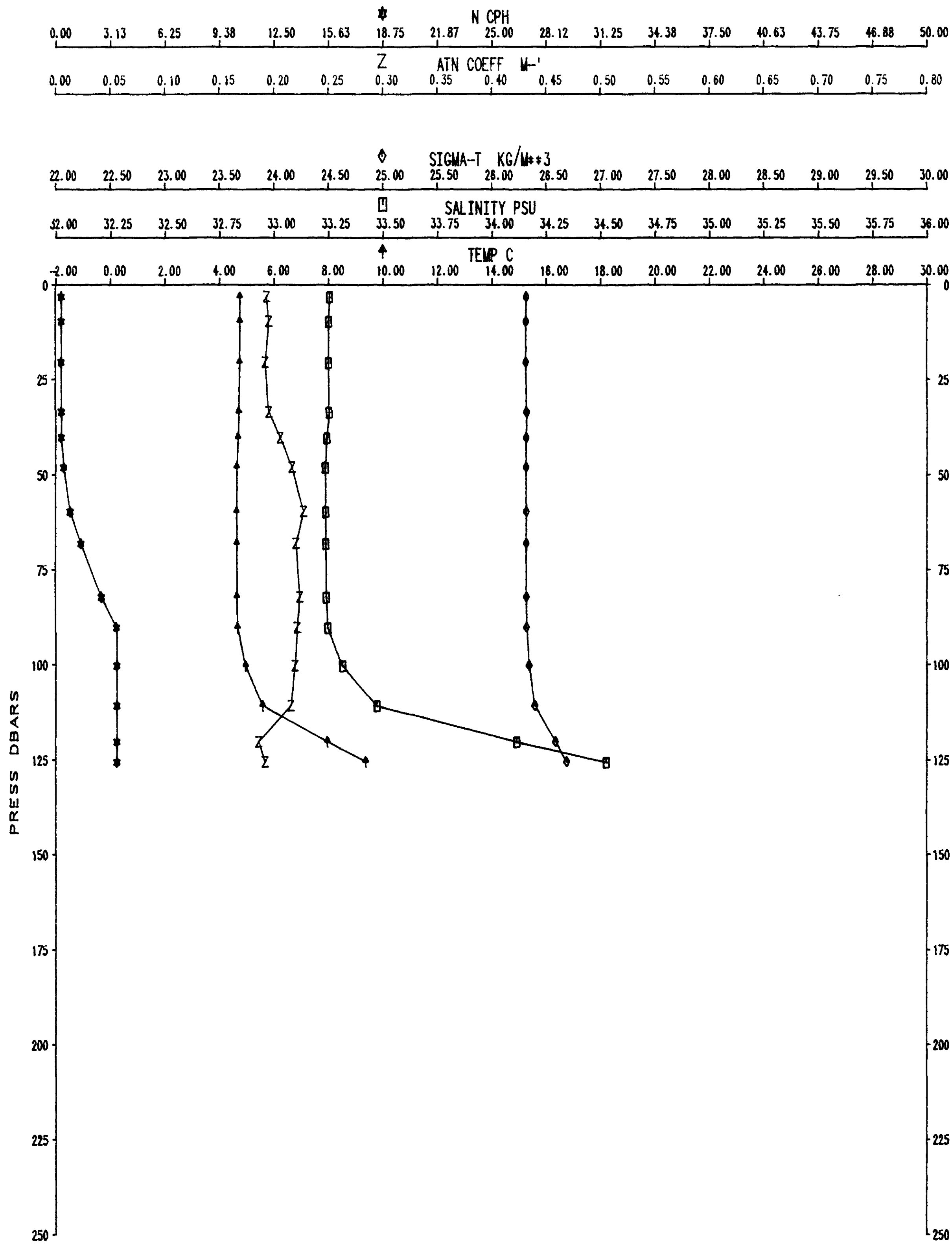

0
5
10
15
20
25
30
0
50
100
150
200
250
300
350
400
450
500
DEPTH (meters)
TEMPERATURE (deg C)

OC091 XBT-24

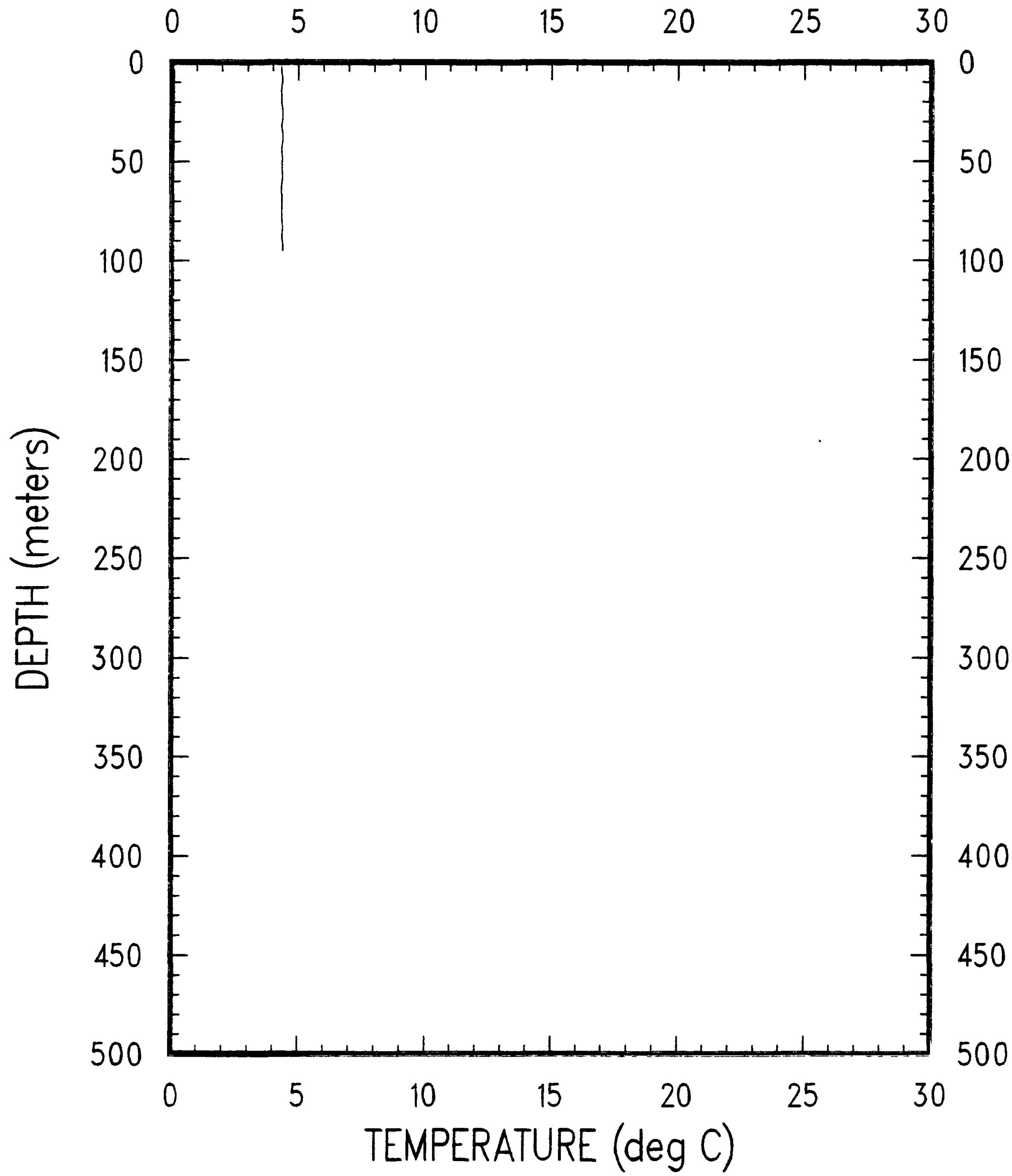


0
5
10
15
20
25
30
0
50
100
150
200
250
300
350
400
450
500
DEPTH (meters)
TEMPERATURE (deg C)

OC091A CAST #25



OC091 XBT-26



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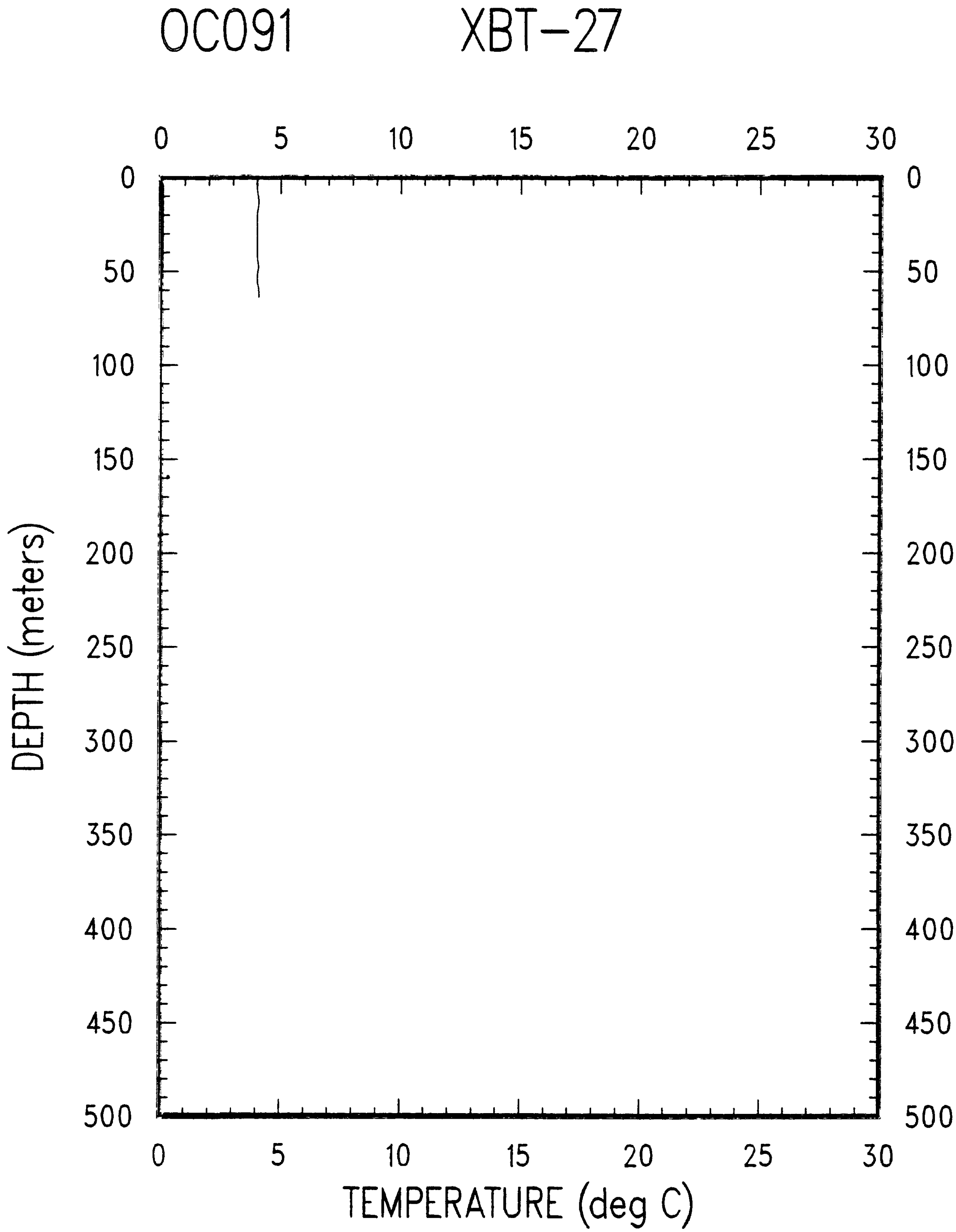
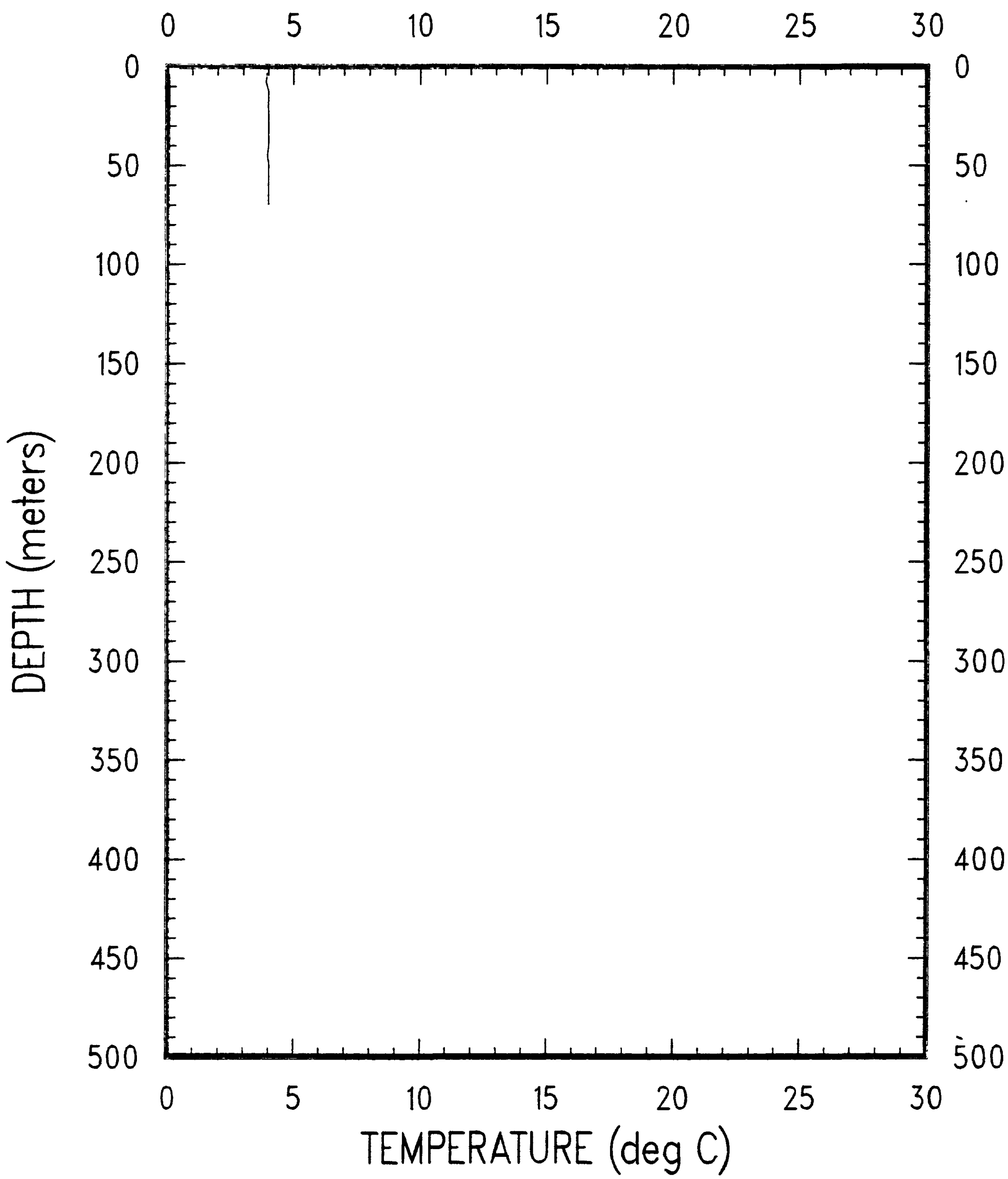
500
DEPTH (meters)
TEMPERATURE (deg C)


OC091 XBT-27
0 5 10 15 20 25 30
0 50 100 150 200 250 300 350 400 450 500
DEPTH (meters)
TEMPERATURE (deg C)

OC091 XBT-28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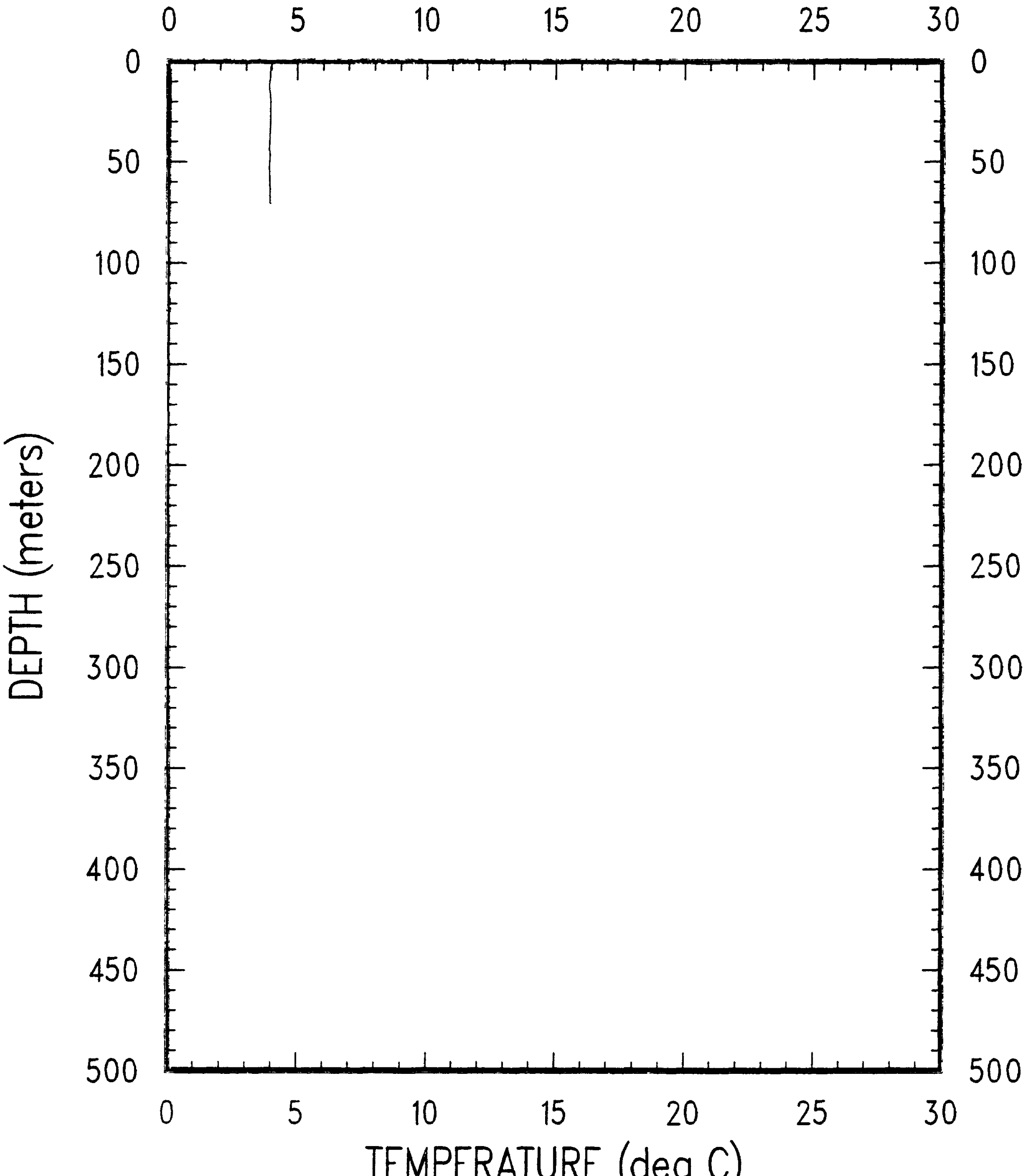
0 50 100 150 200 250 300 350 400 450 500
DEPTH (meters)
TEMPERATURE (deg C)

OC091 XBT-29



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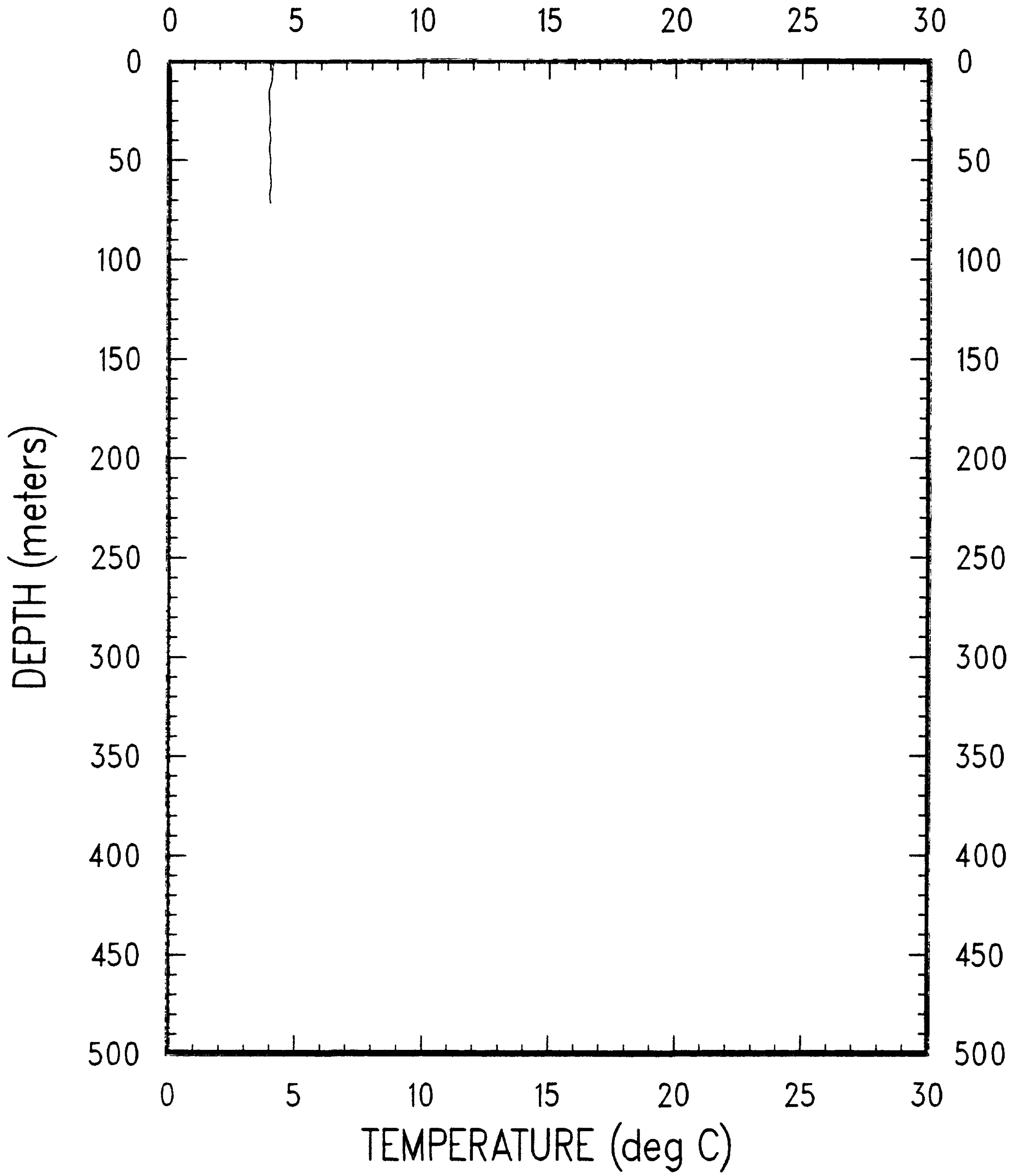
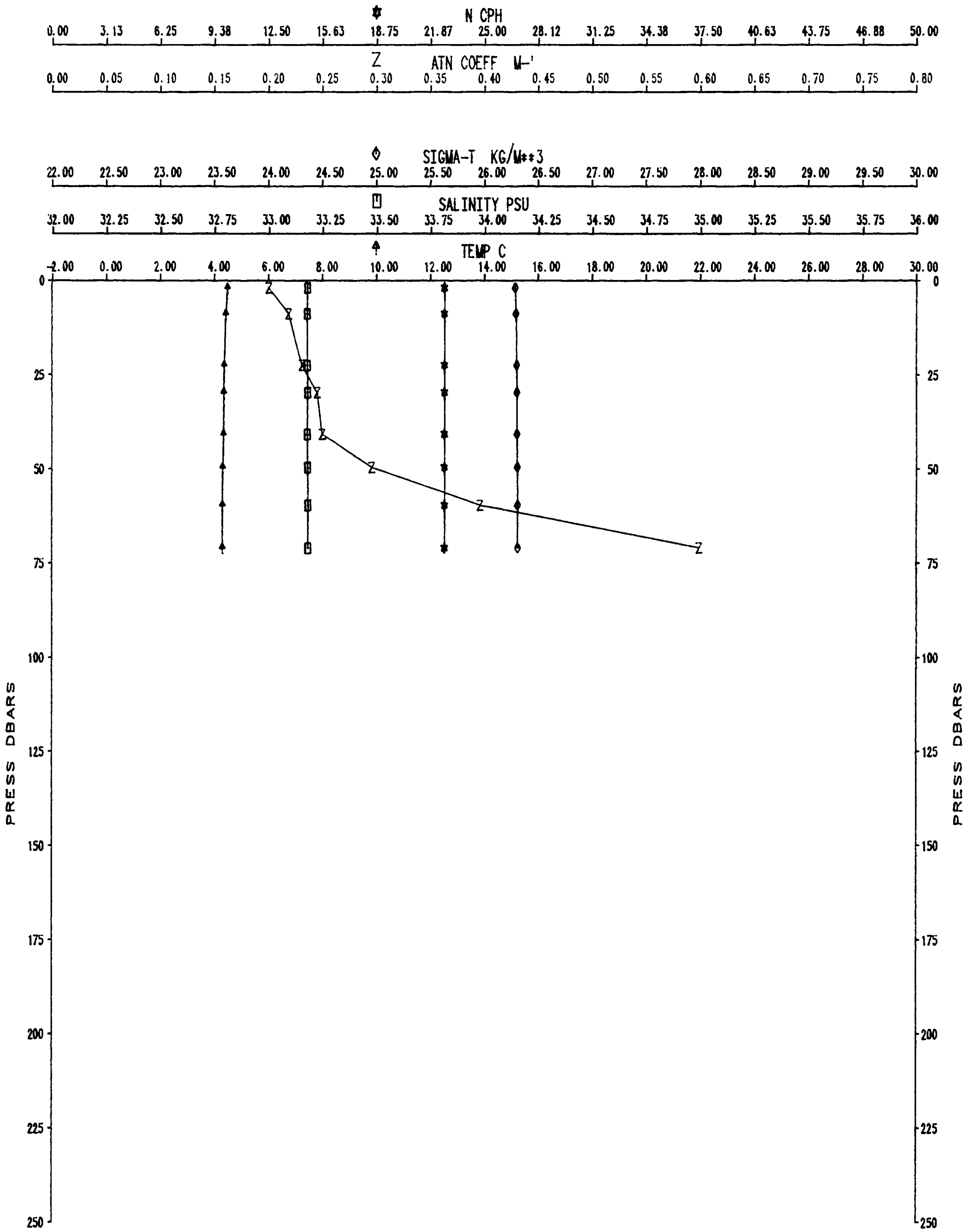
DEPTH (meters)
TEMPERATURE (deg C)

OC091 XBT-30



0 5 10 15 20 25 30
0 50 100 150 200 250 300 350 400 450 500
DEPTH (meters)
TEMPERATURE (deg C)

OC091A CAST #31



Appendix I. - Data listings

The 10-dbar-averaged data are listed in Appendix I. For the data listings, time is in Eastern Standard Time, ATN is the beam attenuation coefficient, SIGT is the density anomaly sigma-t, N is the Brunt-Vaisala frequency, DYHT A is the dynamic height anomaly, and S SPD is the speed of sound in seawater. There are no listings for station 2 and 21.

STA 1 DAY: 17 TIME: 0033

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
1.0	3.1	12.7	3.2	24.3	2.8	34.1	2.1	48.6	1.9
1.9	3.2	13.6	3.2	25.3	2.7	36.0	2.1	50.6	1.9
3.9	3.2	14.6	3.1	26.3	2.5	37.9	2.1	51.5	1.9
5.8	3.2	15.6	3.0	26.3	2.4	38.9	2.0	54.4	1.9
7.8	3.2	17.5	2.9	27.3	2.3	41.8	2.0	56.4	1.9
8.8	3.2	19.5	2.9	28.2	2.3	43.8	2.0	59.3	1.9
10.7	3.2	21.4	2.9	30.2	2.2	45.7	2.0	61.2	1.9
11.6	3.2	23.4	2.8	32.1	2.1	46.7	1.9	62.2	1.9

SHIP OC CRUISE 091 STATION 3 DATE 19 JAN 1981 EST 19.5 LATITUDE 40°32.1'N. LONGITUDE 67°42.9'W. DEPTH 180

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	3.3	4.756	33.227		0.21	26.297	0.000	1468.	1.7
8	8.2	4.756	33.229		0.21	26.299	0.008	1468.	1.7
40	40.5	4.761	33.228		0.21	26.297	0.064	1468.	1.7
62	62.5	4.761	33.232		0.22	26.300	0.102	1469.	1.7
66	67.0	4.768	33.231		0.23	26.298	0.109	1469.	1.7
80	80.4	4.779	33.236		0.22	26.302	0.132	1469.	2.9
90	91.0	4.803	33.240		0.22	26.302	0.151	1469.	4.3
101	101.5	5.086	33.332		0.21	26.344	0.168	1471.	5.2
109	109.6	8.084	34.002		0.19	26.478	0.182	1483.	5.5
119	120.2	9.750	34.668		0.16	26.736	0.197	1490.	5.6
129	130.2	10.990	35.108		0.13	26.862	0.210	1496.	5.5
139	140.0	11.330	35.253		0.12	26.912	0.221	1497.	5.5
149	149.8	11.302	35.286		0.13	26.944	0.232	1497.	5.5
158	158.8	11.265	35.298		0.15	26.960	0.243	1497.	5.5
169	170.8	11.178	35.350		0.18	27.016	0.256	1497.	5.5

SHIP OC CRUISE 091 STATION 4 DATE 19 JAN 1981 EST 21.3 LATITUDE 40°28.7'N. LONGITUDE 67°45.2'W. DEPTH 136

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
4	3.8	6.346	33.463		0.13	26.295	0.000	1474.	2.9
11	11.5	6.331	33.463		0.13	26.297	0.013	1474.	2.9
21	21.6	6.328	33.462		0.13	26.296	0.031	1474.	2.9
30	30.0	6.328	33.463		0.13	26.297	0.045	1475.	2.9
39	39.6	6.347	33.465		0.13	26.297	0.062	1475.	2.9
49	49.2	6.334	33.463		0.13	26.296	0.078	1475.	3.5
60	60.4	6.873	33.626		0.12	26.354	0.097	1477.	4.0
69	69.7	8.510	34.058		0.11	26.457	0.112	1484.	4.4
80	80.2	9.109	34.254		0.11	26.517	0.128	1487.	4.6
89	89.2	9.748	34.491		0.12	26.598	0.142	1490.	4.5
99	99.3	10.388	34.742		0.14	26.684	0.156	1493.	4.5
109	109.9	10.668	34.887		0.17	26.748	0.170	1494.	4.5
119	120.1	10.752	34.930		0.18	26.766	0.183	1494.	4.5
128	128.9	10.752	34.930		0.20	26.766	0.195	1495.	4.5

SHIP OC CRUISE 091 STATION 5 DATE 19 JAN 1981 EST 22.6 LATITUDE 40°29.0'N. LONGITUDE 67°43.3'W. DEPTH 165

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	2.8	6.355	33.469		0.13	26.298	0.000	1474.	2.5
13	13.2	6.353	33.470		0.11	26.299	0.018	1474.	2.5
28	28.6	6.358	33.470		0.13	26.299	0.044	1475.	2.5
39	39.6	6.380	33.475		0.13	26.300	0.063	1475.	2.5
50	50.6	6.442	33.490		0.13	26.303	0.082	1475.	2.5
61	61.1	6.553	33.517		0.12	26.310	0.100	1476.	3.1
69	69.2	6.811	33.578		0.12	26.325	0.114	1477.	3.6
80	80.5	8.314	34.010		0.11	26.450	0.132	1484.	4.1
90	90.6	9.353	34.304		0.10	26.516	0.148	1488.	4.5
99	99.7	9.897	34.475		0.10	26.560	0.162	1490.	5.0
109	110.1	10.237	34.607		0.11	26.605	0.177	1492.	5.2
119	120.3	10.638	34.856		0.18	26.729	0.191	1494.	5.2
130	131.2	10.737	34.949		0.17	26.783	0.205	1495.	5.2
138	138.7	11.233	35.339		0.12	26.998	0.214	1497.	5.2
149	150.4	11.120	35.386		0.14	27.055	0.227	1497.	5.2

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	6	19 JAN 1981	23.5	40°29.4'N.	67°42.2'W.	422

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	3.1	6.336	33.466		0.13	26.298	0.000	1474.	2.4
13	13.0	6.330	33.479		0.13	26.309	0.017	1474.	2.4
19	19.5	6.349	33.468		0.12	26.298	0.028	1475.	2.4
39	39.7	6.334	33.484		0.12	26.313	0.063	1475.	2.4
51	51.4	6.352	33.469		0.12	26.299	0.083	1475.	2.4
61	61.2	6.497	33.508		0.12	26.311	0.099	1476.	3.2
69	69.3	6.656	33.555		0.12	26.327	0.113	1477.	3.8
79	79.3	7.886	33.892		0.11	26.421	0.130	1482.	4.5
89	90.0	9.399	34.334		0.11	26.532	0.146	1488.	4.9
100	100.9	10.227	34.650		0.11	26.640	0.162	1492.	5.1
109	109.8	10.488	34.771		0.11	26.689	0.175	1493.	5.2
119	119.6	10.935	34.978		0.11	26.771	0.188	1495.	5.0
128	128.7	11.181	35.143		0.11	26.854	0.199	1496.	4.8
135	136.4	11.279	35.269		0.11	26.934	0.208	1497.	4.7
147	148.6	11.259	35.377		0.11	27.022	0.222	1497.	4.5
158	159.3	11.126	35.384		0.11	27.052	0.233	1497.	4.3
169	170.6	10.722	35.368		0.12	27.113	0.244	1496.	4.1
179	180.0	10.341	35.359		0.12	27.173	0.253	1494.	4.0
188	189.4	10.258	35.357		0.12	27.186	0.262	1494.	3.8
197	198.9	9.656	35.298		0.13	27.244	0.270	1492.	3.6
208	209.2	9.166	35.278		0.15	27.309	0.279	1491.	3.3
216	218.1	8.948	35.269		0.16	27.338	0.286	1490.	2.9
227	228.9	8.804	35.260		0.16	27.354	0.294	1490.	2.8
239	241.1	8.757	35.252		0.16	27.355	0.303	1490.	2.5
247	249.4	8.724	35.250		0.15	27.359	0.310	1490.	2.2
258	260.4	8.542	35.237		0.15	27.377	0.318	1489.	2.0
269	270.9	8.189	35.218		0.17	27.417	0.325	1488.	2.0
277	279.4	8.144	35.215		0.19	27.422	0.331	1488.	1.9
288	290.4	8.141	35.215		0.21	27.422	0.339	1488.	1.8
295	298.0	8.124	35.215		0.23	27.425	0.344	1488.	1.7
306	308.9	8.059	35.204		0.23	27.426	0.352	1488.	1.8
317	319.3	7.955	35.193		0.20	27.433	0.359	1488.	2.0
328	331.3	7.749	35.174		0.18	27.449	0.368	1487.	2.2
336	339.2	7.467	35.157		0.21	27.476	0.373	1486.	2.2
346	349.3	7.300	35.151		0.20	27.496	0.379	1486.	2.2
355	357.7	7.171	35.147		0.21	27.511	0.385	1485.	2.1
366	369.6	7.014	35.131		0.23	27.521	0.392	1485.	2.1
378	381.3	6.917	35.124		0.24	27.528	0.399	1485.	2.1
387	390.4	6.877	35.123		0.24	27.533	0.405	1485.	2.1
398	401.5	6.833	35.121		0.25	27.538	0.411	1485.	2.1

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	7	20 JAN 1981	0.8	40°29.4'N.	67°40.5'W.	155

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	2.8	5.660	33.349		0.13	26.290	0.000	1471.	0.6
9	9.4	5.693	33.360		0.13	26.295	0.011	1472.	0.6
21	20.9	5.542	33.333		0.13	26.291	0.031	1471.	0.6
30	30.5	5.498	33.332		0.15	26.296	0.047	1471.	0.6
40	40.0	5.535	33.335		0.14	26.294	0.064	1471.	0.6
50	50.0	5.783	33.380		0.13	26.299	0.081	1473.	0.8
61	61.0	5.898	33.391		0.13	26.294	0.100	1473.	1.5
70	70.1	6.021	33.413		0.12	26.296	0.116	1474.	2.8
80	80.2	6.366	33.477		0.11	26.303	0.133	1476.	3.6
89	89.0	6.550	33.528		0.11	26.319	0.148	1477.	4.4
99	99.7	7.201	33.710		0.10	26.375	0.166	1479.	5.2
108	109.0	9.352	34.403		0.09	26.594	0.181	1489.	5.6
120	120.6	10.228	34.683		0.09	26.666	0.197	1492.	5.6
130	131.2	11.189	35.083		0.08	26.806	0.211	1496.	5.6
137	138.2	11.390	35.314		0.09	26.948	0.220	1497.	5.6
146	146.6	11.375	35.333		0.09	26.967	0.229	1497.	5.6

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	8	20 JAN 1981	3.2	40°29.2'N.	67°39.9'W.	153

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
1	1.2	6.025	33.413		0.14	26.296	0.000	1473.	0.6
10	9.9	6.029	33.416		0.12	26.298	0.015	1473.	0.6
19	19.5	6.030	33.414		0.12	26.296	0.031	1473.	0.6
34	33.8	6.050	33.421		0.13	26.299	0.056	1473.	0.6
41	40.9	6.072	33.425		0.12	26.300	0.068	1474.	0.6
49	49.3	6.077	33.423		0.12	26.297	0.083	1474.	1.0
62	62.1	6.118	33.429		0.12	26.297	0.105	1474.	2.4
71	71.3	6.100	33.432		0.12	26.301	0.120	1474.	3.2
80	80.5	6.250	33.464		0.13	26.307	0.136	1475.	3.6
88	88.6	6.570	33.555		0.12	26.338	0.150	1477.	3.9
100	100.6	8.809	34.201		0.10	26.523	0.169	1486.	4.2
109	109.8	9.769	34.462		0.09	26.571	0.183	1490.	4.7
118	118.5	9.830	34.497		0.09	26.588	0.196	1491.	4.7
130	130.6	9.856	34.535		0.10	26.614	0.213	1491.	4.7
139	140.3	10.561	34.820		0.10	26.715	0.227	1494.	4.7
147	147.4	11.286	35.209		0.10	26.887	0.236	1497.	4.7

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	9	20 JAN 1981	5.3	40°25.1'N.	67°39.7'W.	605

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	3.2	6.256	33.448		0.10	26.294	0.000	1474.	2.2
11	10.9	6.254	33.449		0.10	26.296	0.013	1474.	2.2
21	21.0	6.255	33.447		0.10	26.293	0.030	1474.	2.2
28	28.4	6.257	33.445		0.10	26.292	0.043	1474.	2.2
39	39.0	6.258	33.448		0.10	26.294	0.062	1474.	2.2
52	52.2	6.276	33.449		0.11	26.293	0.084	1475.	3.0
61	61.1	6.293	33.455		0.10	26.295	0.100	1475.	3.5
69	69.6	6.688	33.561		0.10	26.327	0.114	1477.	3.8
79	79.0	8.951	34.196		0.09	26.497	0.129	1486.	4.1
88	88.4	9.604	34.405		0.08	26.554	0.144	1489.	4.3
100	100.5	9.978	34.520		0.08	26.581	0.161	1491.	4.3
110	110.7	10.110	34.590		0.08	26.613	0.176	1492.	4.1
120	121.1	10.339	34.701		0.09	26.661	0.191	1493.	3.8
130	130.8	10.741	34.902		0.13	26.747	0.204	1494.	3.7
139	139.6	10.866	34.988		0.15	26.791	0.216	1495.	3.5
149	150.1	10.974	35.057		0.14	26.826	0.229	1496.	3.4
160	161.3	11.033	35.104		0.14	26.851	0.243	1496.	3.2
169	169.8	11.065	35.126		0.13	26.863	0.253	1497.	3.1
180	180.9	11.108	35.156		0.13	26.878	0.267	1497.	3.2
190	190.7	11.274	35.259		0.11	26.927	0.278	1498.	3.4
199	200.7	11.317	35.313		0.11	26.962	0.290	1498.	3.6
209	210.4	11.136	35.347		0.11	27.022	0.300	1498.	3.7
219	220.5	11.028	35.386		0.11	27.071	0.311	1498.	3.7
230	231.9	10.764	35.383		0.11	27.117	0.322	1497.	3.6
239	240.2	10.470	35.372		0.11	27.161	0.331	1496.	3.6
248	249.6	10.274	35.350		0.11	27.178	0.339	1495.	3.6
258	259.6	9.999	35.331		0.12	27.211	0.349	1494.	3.6
268	270.0	9.684	35.306		0.13	27.245	0.358	1494.	3.6
280	281.2	9.299	35.283		0.14	27.291	0.367	1492.	3.6
288	290.1	8.689	35.238		0.14	27.355	0.375	1490.	3.5
297	299.0	8.380	35.207		0.12	27.378	0.381	1489.	3.4
308	309.5	7.884	35.164		0.11	27.421	0.389	1487.	3.2
317	319.3	7.668	35.149		0.11	27.441	0.396	1487.	2.9
330	332.4	7.535	35.149		0.12	27.460	0.405	1486.	2.7
336	338.6	7.380	35.125		0.13	27.464	0.409	1486.	2.5
347	348.9	7.194	35.132		0.14	27.496	0.415	1485.	2.2
358	360.2	7.087	35.122		0.14	27.503	0.423	1485.	2.1
365	367.5	6.898	35.115		0.15	27.524	0.427	1484.	1.9
377	379.6	6.849	35.114		0.16	27.530	0.434	1484.	1.8
387	389.3	6.817	35.110		0.17	27.531	0.440	1484.	1.5
398	400.9	6.778	35.110		0.17	27.537	0.447	1485.	1.4
408	410.7	6.739	35.109		0.17	27.541	0.453	1485.	1.4
418	420.5	6.636	35.103		0.19	27.550	0.459	1484.	1.5
428	430.9	6.542	35.076		0.20	27.542	0.465	1484.	1.6
436	438.7	6.427	35.087		0.21	27.566	0.470	1484.	1.7
447	450.0	6.372	35.086		0.22	27.572	0.476	1484.	1.6
458	460.8	6.282	35.081		0.23	27.580	0.482	1484.	1.5
466	468.9	6.206	35.076		0.21	27.586	0.487	1483.	1.5
476	478.7	6.133	35.075		0.23	27.595	0.492	1483.	1.3
485	488.4	6.139	35.073		0.22	27.593	0.498	1483.	1.2

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	9	20 JAN 1981	5.3	40°25.1'N.	67°39.7'W.	605

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
508	511.0	6.048	35.066		0.24	27.599	0.510	1483.	1.0
527	530.4	5.964	35.055		0.26	27.601	0.521	1483.	0.7
546	549.7	5.912	35.059		0.27	27.611	0.532	1483.	0.7
567	571.3	5.853	35.051		0.26	27.612	0.544	1484.	0.7

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	10	20 JAN 1981	7.7	40°23.4'N.	67°36.2'W.	190

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	3.5	6.302	33.469		0.10	26.305	0.000	1474.	3.4
10	10.4	6.305	33.469		0.10	26.305	0.012	1474.	3.4
20	19.7	6.306	33.469		0.10	26.305	0.028	1474.	3.4
30	30.3	6.328	33.473		0.09	26.305	0.046	1475.	3.4
40	40.5	6.342	33.476		0.09	26.305	0.063	1475.	3.4
50	50.5	6.444	33.507		0.09	26.317	0.081	1475.	3.9
60	60.1	7.351	33.753		0.09	26.389	0.096	1479.	4.2
71	71.7	8.802	34.231		0.08	26.548	0.115	1486.	4.4
79	79.0	9.929	34.563		0.07	26.624	0.125	1490.	4.4
89	89.8	10.460	34.726		0.06	26.659	0.140	1493.	4.3
100	100.6	10.968	34.884		0.06	26.691	0.155	1495.	3.9
110	110.8	11.461	35.040		0.06	26.722	0.169	1497.	3.5
118	119.1	11.507	35.083		0.07	26.747	0.180	1497.	3.3
127	127.9	11.912	35.248		0.06	26.799	0.191	1499.	3.4
139	139.9	12.087	35.343		0.07	26.839	0.206	1500.	3.5
149	149.8	12.232	35.423		0.08	26.873	0.219	1501.	3.7
160	160.8	12.198	35.461		0.08	26.910	0.232	1501.	3.7
169	169.6	12.139	35.501		0.09	26.952	0.242	1501.	3.7
179	179.6	11.853	35.493		0.10	27.001	0.253	1500.	3.7
187	188.2	11.189	35.433		0.10	27.079	0.262	1498.	3.7

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	11	20 JAN 1981	8.9	40°23.4'N.	67°38.4'W.	255

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	2.8	6.254	33.449		0.12	26.295	0.000	1474.	3.8
10	10.4	6.251	33.450		0.11	26.296	0.013	1474.	3.8
20	20.3	6.258	33.451		0.11	26.297	0.030	1474.	3.8
30	30.5	6.266	33.453		0.11	26.297	0.048	1474.	3.8
41	41.3	6.294	33.459		0.11	26.298	0.066	1475.	3.8
50	50.1	6.433	33.500		0.11	26.313	0.081	1475.	4.3
60	60.0	8.153	34.018		0.10	26.480	0.097	1483.	4.6
70	70.3	9.929	34.547		0.09	26.611	0.113	1490.	4.7
79	79.2	10.471	34.722		0.08	26.654	0.125	1492.	4.6
90	90.1	10.837	34.851		0.08	26.689	0.140	1494.	4.2
101	101.3	11.610	35.117		0.08	26.754	0.155	1497.	3.5
110	110.8	12.117	35.282		0.08	26.787	0.168	1499.	3.0
118	118.9	12.269	35.341		0.07	26.803	0.178	1500.	3.0
128	129.2	12.278	35.355		0.08	26.812	0.191	1500.	2.9
140	140.7	12.432	35.419		0.08	26.832	0.205	1501.	2.9
146	146.7	12.485	35.437		0.08	26.835	0.213	1501.	2.9
160	161.4	12.239	35.482		0.10	26.918	0.230	1501.	3.3
168	168.8	12.183	35.496		0.11	26.940	0.239	1501.	3.9
179	179.6	12.100	35.496		0.11	26.956	0.251	1501.	4.3
189	190.4	11.920	35.475		0.12	26.974	0.263	1500.	4.5
199	200.0	10.811	35.387		0.11	27.111	0.274	1496.	4.5
209	210.4	9.854	35.321		0.11	27.228	0.283	1493.	4.5
218	219.0	9.312	35.282		0.11	27.289	0.291	1491.	4.5
229	230.8	9.024	35.260		0.11	27.318	0.300	1490.	4.5
239	240.0	8.913	35.250		0.11	27.329	0.307	1490.	4.5

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	12	20 JAN 1981	9.8	40°23.1'N.	67°39.9'W.	665

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
4	3.6	6.265	33.457		0.14	26.301	0.000	1474.	3.9
11	11.4	6.268	33.459		0.11	26.302	0.013	1474.	3.9
20	20.5	6.270	33.460		0.11	26.302	0.029	1474.	3.9
28	28.3	6.270	33.460		0.11	26.302	0.042	1474.	3.9
41	40.8	6.289	33.465		0.11	26.303	0.064	1475.	3.9
50	50.1	6.509	33.522		0.12	26.320	0.080	1476.	4.3
60	60.0	7.760	33.878		0.11	26.428	0.096	1481.	4.5
70	70.8	9.694	34.513		0.09	26.624	0.112	1489.	4.6
80	80.0	10.598	34.784		0.08	26.680	0.125	1493.	4.5
90	90.9	11.012	34.917		0.08	26.710	0.140	1495.	4.0
99	99.9	11.364	35.028		0.08	26.731	0.152	1496.	3.4
108	108.9	11.660	35.131		0.08	26.756	0.164	1498.	2.7
120	120.6	11.891	35.189		0.08	26.758	0.179	1499.	2.5
130	130.8	12.043	35.248		0.08	26.774	0.192	1499.	2.5
139	139.9	12.439	35.412		0.07	26.825	0.204	1501.	2.5
149	150.3	12.602	35.463		0.08	26.832	0.217	1502.	2.6
159	159.5	12.701	35.502		0.08	26.842	0.228	1502.	2.6
169	169.9	12.753	35.544		0.08	26.865	0.241	1503.	2.7
179	179.8	12.539	35.529		0.10	26.896	0.253	1502.	2.8
189	190.4	12.309	35.502		0.12	26.920	0.265	1502.	3.6
200	200.9	12.285	35.507		0.12	26.929	0.278	1502.	4.2
209	210.2	11.974	35.485		0.13	26.972	0.289	1501.	4.6
220	221.4	11.316	35.403		0.13	27.032	0.301	1499.	4.7
228	229.3	9.644	35.274		0.12	27.227	0.308	1493.	4.8
238	239.2	8.956	35.236		0.11	27.311	0.317	1490.	4.7
250	251.7	8.780	35.234		0.12	27.337	0.327	1490.	4.3
257	258.9	8.627	35.228		0.12	27.357	0.332	1489.	3.7
268	269.6	8.258	35.186		0.12	27.381	0.340	1488.	2.9
277	279.1	7.925	35.164		0.12	27.414	0.347	1487.	2.7
287	289.2	7.799	35.157		0.12	27.428	0.354	1487.	2.6
297	299.3	7.673	35.147		0.13	27.438	0.361	1486.	2.4
307	309.0	7.523	35.138		0.13	27.453	0.368	1486.	2.3
316	318.0	7.235	35.123		0.13	27.483	0.374	1485.	2.2
328	330.6	7.162	35.112		0.13	27.485	0.382	1485.	2.1
339	340.7	6.944	35.092		0.13	27.500	0.388	1484.	2.1
346	348.2	6.823	35.086		0.12	27.512	0.393	1484.	2.0
356	358.7	6.802	35.090		0.13	27.517	0.399	1484.	1.9
369	371.6	6.619	35.068		0.12	27.525	0.407	1483.	1.9
378	380.5	6.419	35.069		0.13	27.553	0.412	1483.	1.8
388	390.1	6.362	35.062		0.13	27.555	0.418	1483.	1.7
397	399.8	6.326	35.063		0.13	27.561	0.424	1483.	1.7
407	409.9	6.297	35.061		0.13	27.563	0.429	1483.	1.7
416	418.6	6.252	35.056		0.13	27.565	0.434	1483.	1.6
426	428.5	6.101	35.040		0.12	27.572	0.440	1482.	1.7
437	440.3	5.909	35.034		0.13	27.591	0.447	1482.	1.7
446	449.1	5.766	35.019		0.12	27.598	0.451	1481.	1.7
457	460.0	5.751	35.031		0.14	27.609	0.457	1481.	1.6
468	470.8	5.656	35.020		0.13	27.612	0.463	1481.	1.6
480	483.0	5.553	35.012		0.12	27.619	0.470	1481.	1.5
487	490.6	5.546	35.011		0.12	27.618	0.473	1481.	1.5

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	12	20 JAN 1981	9.8	40°23.1'N.	67°39.9'W.	665

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
497	500.3	5.484	35.011		0.11	27.626	0.479	1481.	1.3
516	519.7	5.317	35.007		0.12	27.643	0.488	1481.	1.3
557	560.3	5.227	35.005		0.12	27.652	0.509	1481.	1.2
576	579.6	5.123	34.997		0.12	27.658	0.518	1481.	1.0
607	611.6	5.029	34.995		0.12	27.668	0.534	1481.	0.7
626	630.8	4.990	34.991		0.12	27.669	0.543	1481.	0.4
646	650.4	5.003	34.992		0.12	27.669	0.553	1481.	0.4
665	669.6	5.004	34.995		0.12	27.671	0.562	1482.	0.4

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	13	20 JAN 1981	11.8	40°22.6'N.	67°41.0'W.	350

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
4	3.9	6.302	33.471			26.307	0.000	1474.	4.2
11	10.7	6.301	33.473			26.308	0.012	1474.	4.2
21	21.3	6.304	33.477			26.311	0.030	1474.	4.2
28	27.8	6.304	33.478			26.312	0.041	1474.	4.2
40	40.2	6.381	33.506			26.324	0.062	1475.	4.2
48	48.6	6.926	33.687			26.394	0.076	1478.	4.5
60	60.0	8.687	34.215			26.553	0.094	1485.	4.6
68	68.3	9.891	34.610			26.667	0.105	1490.	4.5
79	79.1	10.746	34.855			26.709	0.120	1494.	4.1
89	89.3	11.174	34.973			26.723	0.134	1495.	3.5
99	100.0	11.458	35.067			26.744	0.148	1497.	2.6
105	106.2	11.561	35.089			26.742	0.156	1497.	1.9
118	119.2	11.674	35.143			26.763	0.173	1498.	1.6
127	127.8	11.727	35.160			26.766	0.184	1498.	1.6
140	140.9	11.750	35.170			26.769	0.201	1498.	1.7
147	147.7	11.794	35.184			26.772	0.210	1499.	1.9
161	162.0	11.867	35.211			26.779	0.229	1499.	2.1
170	170.9	11.991	35.278			26.808	0.240	1500.	2.2
178	179.1	12.024	35.316			26.831	0.250	1500.	2.6
190	192.0	12.058	35.353			26.853	0.267	1501.	3.1
199	200.7	12.020	35.358			26.864	0.277	1501.	3.7
205	206.8	12.005	35.377			26.881	0.285	1501.	4.1
218	220.1	11.682	35.397			26.958	0.300	1500.	4.3
230	231.5	11.165	35.394			27.052	0.313	1498.	4.3
237	238.8	10.513	35.352			27.138	0.320	1496.	4.2
245	246.6	10.058	35.334			27.203	0.328	1495.	4.0
258	260.4	9.722	35.308			27.241	0.340	1493.	3.7
270	271.9	9.726	35.304			27.237	0.350	1494.	3.4
277	279.7	9.548	35.297			27.261	0.357	1493.	3.2
288	290.8	9.397	35.289			27.280	0.366	1493.	3.1
298	300.7	8.661	35.241			27.361	0.374	1490.	3.1
308	311.1	8.328	35.215			27.393	0.382	1489.	3.1
316	318.6	8.224	35.199			27.397	0.388	1489.	3.1
328	330.7	7.966	35.183			27.423	0.396	1488.	3.1
338	340.9	7.893	35.177			27.430	0.403	1488.	3.1
344	346.5	7.822	35.165			27.430	0.407	1488.	3.1

SHIP	CRUISE	STATION	DATE		EST	LATITUDE	LONGITUDE		DEPTH
OC	091	14	20 JAN 1981		13.5	40°22.9'N.	67°43.1'W.		160

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
4	3.6	6.339	33.489		0.11	26.316	0.000	1474.	2.9
8	8.4	6.345	33.483		0.11	26.311	0.008	1474.	2.9
23	23.6	6.346	33.484		0.11	26.311	0.034	1475.	2.9
31	31.0	6.352	33.487		0.11	26.313	0.047	1475.	2.9
41	41.7	6.377	33.499		0.11	26.319	0.065	1475.	2.9
49	49.2	6.548	33.559		0.10	26.344	0.077	1476.	3.2
60	60.6	7.465	33.819		0.10	26.424	0.096	1480.	3.4
70	70.6	8.134	34.016		0.09	26.481	0.112	1483.	3.5
79	79.5	8.389	34.097		0.09	26.507	0.126	1484.	3.6
89	89.8	8.832	34.218		0.09	26.532	0.141	1486.	3.6
100	100.7	9.077	34.304		0.08	26.561	0.158	1487.	3.7
110	111.1	9.427	34.420		0.09	26.595	0.173	1489.	4.1
121	122.0	10.284	34.701		0.08	26.670	0.188	1492.	4.4
129	129.7	10.828	34.912		0.08	26.738	0.199	1495.	4.4
138	139.4	11.590	35.168		0.08	26.798	0.211	1498.	4.4
149	149.9	11.843	35.402		0.10	26.932	0.224	1499.	4.4
157	158.2	11.924	35.480		0.11	26.977	0.234	1500.	4.4

STA 15 DAY: 20 TIME: 1451

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
0.0	7.4	55.4	12.5	182.4	13.6	274.6	10.7	365.8	7.2
1.0	7.5	59.3	12.7	183.4	13.6	277.4	10.7	367.7	7.2
1.9	7.5	62.2	12.7	185.3	13.5	279.3	10.7	368.7	7.2
3.9	7.5	64.1	12.7	188.1	13.5	281.2	10.7	369.6	7.1
5.8	7.5	67.0	12.7	190.1	13.5	283.1	10.7	371.5	7.1
6.8	7.6	69.9	12.7	192.0	13.4	285.9	10.6	372.4	7.1
8.8	7.7	71.9	12.7	193.9	13.3	287.8	10.6	374.3	7.0
9.7	7.8	75.7	12.7	194.8	13.2	288.8	10.6	376.1	6.9
9.7	7.9	78.6	12.7	195.8	13.1	289.7	10.4	377.1	6.9
10.7	7.9	79.6	12.7	195.8	13.0	290.7	10.3	378.0	6.7
11.7	8.0	82.5	12.7	197.7	13.0	292.6	10.2	379.9	6.7
12.7	8.0	85.4	12.7	199.6	12.9	294.4	10.0	381.7	6.7
13.6	8.1	87.3	12.7	201.5	12.8	296.3	10.0	383.6	6.7
14.6	8.3	89.2	12.7	202.5	12.7	298.2	9.9	385.5	6.6
15.6	8.3	92.1	12.7	204.4	12.7	300.1	9.9	386.4	6.6
15.6	8.4	94.1	12.7	205.3	12.6	301.0	9.9	388.3	6.6
16.6	8.5	96.0	12.7	206.3	12.5	302.9	9.8	391.1	6.5
17.5	8.7	98.9	12.7	207.2	12.3	304.8	9.6	394.8	6.5
18.5	8.8	101.8	12.7	209.1	12.3	306.7	9.5	396.7	6.5
18.5	8.9	104.7	12.7	211.0	12.3	307.6	9.3	399.5	6.5
19.5	9.0	106.6	12.7	212.0	12.3	309.5	9.0	401.3	6.5
20.4	9.2	109.5	12.7	212.9	12.2	310.5	8.7	404.1	6.4
20.4	9.3	112.4	12.7	214.8	12.1	313.3	8.5	405.1	6.4
21.4	9.5	114.3	12.8	217.7	12.1	315.2	8.5	408.8	6.4
22.4	9.6	115.3	12.9	218.6	12.1	317.1	8.4	410.6	6.4
23.4	9.8	116.2	13.0	220.5	12.0	318.0	8.3	414.4	6.4
24.3	10.0	117.2	13.1	222.4	12.0	319.9	8.3	416.2	6.4
25.3	10.2	119.1	13.1	224.4	11.9	320.8	8.1	418.1	6.4
26.3	10.3	121.1	13.2	226.3	11.9	322.7	8.1	419.9	6.3
26.3	10.4	122.0	13.2	229.1	11.9	324.6	8.0	421.8	6.3
27.3	10.6	125.9	13.2	231.0	11.9	326.5	7.9	423.7	6.3
29.2	10.7	128.7	13.2	232.9	11.8	328.3	7.9	425.5	6.3
32.1	10.8	131.6	13.2	235.8	11.8	329.3	7.9	428.3	6.3
33.1	11.0	133.5	13.2	237.7	11.8	330.2	7.8	431.1	6.3
34.1	11.1	136.4	13.3	238.6	11.7	332.1	7.7	432.0	6.2
35.0	11.2	140.3	13.3	240.5	11.6	333.0	7.6	433.9	6.2
36.0	11.4	141.2	13.3	243.4	11.6	334.9	7.6	436.7	6.2
36.0	11.5	144.1	13.3	245.2	11.5	337.7	7.6	438.5	6.1
36.0	11.7	147.0	13.4	247.1	11.5	340.5	7.5	440.4	6.1
37.0	11.8	148.9	13.4	250.0	11.5	342.4	7.5	442.2	6.1
37.9	12.0	152.7	13.5	251.9	11.5	344.3	7.5	443.2	6.1
38.9	12.0	156.6	13.5	254.7	11.4	345.2	7.5	446.9	6.1
40.9	12.0	160.4	13.5	256.6	11.4	348.1	7.4	448.7	6.1
41.8	12.1	163.3	13.6	259.5	11.3	349.0	7.4	450.6	6.1
42.8	12.3	166.2	13.6	262.3	11.2	352.7	7.4	452.4	6.1
44.7	12.4	170.9	13.5	263.3	11.2	354.6	7.3	455.2	6.1
45.7	12.4	172.9	13.5	264.2	11.1	356.5	7.3	458.0	6.1
48.6	12.5	174.8	13.5	267.0	11.0	359.3	7.3	458.9	6.1
49.6	12.5	177.6	13.6	269.9	10.8	361.2	7.2	460.8	6.0
51.5	12.5	180.5	13.6	271.8	10.8	364.0	7.2	461.7	6.0

STA 15 DAY: 20 TIME: 1451

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
463.5	6.0	578.3	5.1	684.4	4.9
465.4	6.0	580.2	5.1	686.2	4.9
466.3	5.9	582.9	5.1	688.0	4.9
469.1	5.8	585.6	5.1	690.7	4.9
470.0	5.8	588.4	5.1	692.5	4.9
473.7	5.8	589.3	5.1	693.4	4.9
475.5	5.8	592.0	5.1	696.1	4.9
478.3	5.8	594.7	5.1	697.9	4.9
479.2	5.8	597.5	5.1	699.7	4.9
482.0	5.8	599.3	5.1	702.3	4.9
484.8	5.8	602.0	5.1	703.2	4.8
487.5	5.8	603.8	5.0	705.0	4.8
488.5	5.8	606.6	5.0	706.8	4.8
490.3	5.8	608.4	5.1	708.6	4.8
493.1	5.8	610.2	5.1	709.5	4.8
495.8	5.8	612.0	5.1	711.3	4.8
498.6	5.8	613.8	5.1	713.1	4.8
499.5	5.7	615.7	5.1	714.9	4.9
501.4	5.7	617.5	5.0	716.7	4.8
503.2	5.7	620.2	5.0	718.5	4.8
505.0	5.7	621.1	5.0	719.4	4.8
507.8	5.6	623.8	5.0	721.2	4.8
508.7	5.6	625.6	5.0	723.9	4.8
510.6	5.6	628.4	5.0	725.7	4.8
512.4	5.6	630.2	5.0	726.6	4.8
514.2	5.5	631.1	5.0	728.4	4.8
515.2	5.5	632.9	5.0	729.2	4.8
517.0	5.4	636.5	5.0	731.0	4.8
517.9	5.4	638.3	5.0	732.8	4.8
520.7	5.4	640.1	5.0	735.5	4.8
523.4	5.4	641.9	5.0	737.3	4.8
526.2	5.4	645.6	5.0	738.2	4.8
528.0	5.4	647.4	5.0	739.1	4.8
530.8	5.3	649.2	4.9	740.0	4.8
533.5	5.3	651.9	4.9	741.8	4.8
537.2	5.3	654.6	4.9	743.6	4.8
539.0	5.3	656.4	4.9	745.3	4.8
541.8	5.3	659.1	5.0	746.2	4.8
544.5	5.2	660.9	4.9	748.0	4.8
548.2	5.2	662.7	4.9	749.8	4.8
550.9	5.3	664.5	4.9		
554.6	5.3	667.2	4.9		
557.3	5.3	669.0	4.9		
561.0	5.3	670.9	4.9		
562.8	5.3	672.7	4.9		
565.6	5.2	675.4	4.9		
568.3	5.2	676.3	4.9		
571.0	5.2	678.1	4.9		
573.8	5.2	679.0	4.9		
576.5	5.2	681.7	4.9		

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	16	20 JAN 1981	23.0	40°16.9'N.	67°39.1'W.	135

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
2	2.2	13.232	35.615		0.03	26.823	0.000	1502.	-0.3
10	10.3	13.280	35.623		0.03	26.820	0.010	1502.	-0.3
18	18.6	13.276	35.620		0.03	26.818	0.020	1502.	-0.3
29	29.2	13.268	35.618		0.04	26.818	0.033	1502.	-0.3
41	41.2	13.262	35.615		0.04	26.817	0.048	1502.	-0.3
50	49.9	13.259	35.618		0.04	26.820	0.059	1503.	-0.2
60	60.1	13.306	35.630		0.05	26.819	0.071	1503.	0.2
69	69.1	13.320	35.630		0.05	26.817	0.082	1503.	0.3
78	79.1	13.329	35.631		0.05	26.815	0.095	1503.	-0.1
89	89.3	13.324	35.630		0.06	26.816	0.107	1503.	-0.2
100	100.5	13.336	35.638		0.06	26.819	0.121	1504.	-0.2
108	108.6	13.404	35.655		0.07	26.819	0.132	1504.	-0.1
120	120.5	13.454	35.661		0.07	26.813	0.146	1504.	-0.4
127	128.3	13.515	35.681		0.07	26.816	0.156	1505.	-0.4
140	141.2	13.501	35.676		0.07	26.815	0.173	1505.	-0.3
149	150.6	13.494	35.673		0.08	26.814	0.184	1505.	0.1
157	158.4	13.481	35.664		0.08	26.810	0.194	1505.	0.5
170	171.4	13.498	35.674		0.08	26.814	0.211	1505.	1.0
180	181.8	13.462	35.665		0.09	26.815	0.224	1506.	1.5
187	189.0	13.471	35.669		0.09	26.816	0.233	1506.	1.9
198	199.2	13.538	35.695		0.09	26.822	0.246	1506.	2.3
208	209.7	13.561	35.739		0.08	26.851	0.259	1506.	2.7
217	218.7	13.489	35.757		0.07	26.880	0.271	1506.	3.0
228	229.5	13.267	35.728		0.07	26.903	0.284	1506.	3.2
238	239.9	12.829	35.661		0.07	26.940	0.296	1504.	3.4
248	249.8	12.421	35.616		0.08	26.987	0.307	1503.	3.5
259	261.0	11.972	35.558		0.08	27.029	0.320	1502.	3.5
268	270.1	11.584	35.496		0.08	27.054	0.330	1500.	3.4
279	280.9	11.004	35.430		0.08	27.110	0.341	1499.	3.4
287	289.6	10.700	35.389		0.09	27.134	0.349	1498.	3.2
297	300.0	10.438	35.357		0.09	27.155	0.360	1497.	3.0
307	309.2	10.135	35.318		0.09	27.178	0.368	1496.	2.9
318	320.3	9.789	35.286		0.10	27.212	0.379	1495.	2.9
327	329.8	9.672	35.263		0.10	27.213	0.387	1494.	2.9
336	339.2	9.353	35.231		0.10	27.242	0.396	1493.	3.0
347	350.5	8.970	35.194		0.10	27.276	0.406	1492.	3.1
356	358.9	8.585	35.164		0.11	27.313	0.413	1491.	3.1
367	370.2	8.320	35.142		0.11	27.337	0.422	1490.	3.0
377	380.2	8.004	35.121		0.11	27.369	0.430	1489.	2.8
386	389.8	7.784	35.117		0.11	27.399	0.437	1488.	2.7
395	398.0	7.682	35.109		0.11	27.407	0.443	1488.	2.5
408	411.7	7.625	35.110		0.11	27.417	0.453	1488.	2.3
416	419.4	7.531	35.107		0.12	27.428	0.458	1488.	2.2
425	428.6	7.400	35.109		0.13	27.448	0.465	1487.	2.2
435	438.9	7.303	35.105		0.12	27.459	0.472	1487.	2.2
446	449.9	7.223	35.102		0.13	27.468	0.480	1487.	2.4
455	458.9	6.978	35.087		0.13	27.491	0.486	1486.	2.5
466	470.3	6.777	35.072		0.13	27.506	0.493	1486.	2.5
477	480.9	6.607	35.063		0.13	27.523	0.500	1485.	2.5
484	488.7	6.275	35.042		0.12	27.551	0.505	1484.	2.4

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	16	20 JAN 1981	23.0	40°16.9'N.	67°39.1'W.	135

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
506	510.2	5.979	35.032		0.12	27.581	0.517	1483.	2.2
526	530.5	5.800	35.018		0.12	27.592	0.528	1483.	1.8
554	558.8	5.473	34.999		0.12	27.618	0.544	1482.	1.5
575	580.6	5.401	34.995		0.12	27.624	0.555	1482.	1.4
605	610.6	5.204	34.986		0.12	27.640	0.571	1482.	1.3
634	639.7	5.048	34.980		0.11	27.654	0.586	1481.	1.1
654	660.3	5.007	34.978		0.11	27.657	0.596	1482.	1.1
683	689.2	4.902	34.976		0.11	27.668	0.611	1482.	1.0
703	709.2	4.871	34.980		0.12	27.674	0.621	1482.	1.0
723	730.1	4.852	34.980		0.11	27.677	0.631	1482.	1.0
743	749.9	4.759	34.974		0.11	27.683	0.640	1482.	1.1
771	778.4	4.673	34.975		0.11	27.693	0.654	1482.	0.9
803	811.3	4.631	34.974		0.11	27.697	0.670	1483.	0.7
832	839.7	4.594	34.972		0.10	27.700	0.683	1483.	0.7
852	860.5	4.569	34.972		0.10	27.703	0.693	1483.	0.8
885	894.0	4.516	34.974		0.10	27.710	0.709	1483.	0.7
911	919.6	4.502	34.972		0.10	27.710	0.721	1484.	0.7
930	939.7	4.477	34.971		0.10	27.712	0.731	1484.	0.6
953	962.1	4.465	34.972		0.10	27.714	0.741	1484.	0.6
977	987.1	4.446	34.972		0.09	27.716	0.753	1485.	0.6

STA 17 DAY: 21 TIME: 0011

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
0.0	14.8	81.5	14.7	161.4	14.7	240.5	13.4	308.6	10.7
2.9	14.8	83.5	14.7	163.3	14.7	241.5	13.3	309.5	10.7
4.9	14.8	85.4	14.7	165.2	14.7	242.4	13.2	310.5	10.7
6.8	14.8	86.4	14.7	167.1	14.7	243.4	13.2	311.4	10.6
7.8	14.8	88.3	14.7	169.0	14.7	243.4	13.1	313.3	10.6
8.8	14.8	89.2	14.7	170.0	14.7	243.4	13.1	315.2	10.6
11.7	14.8	91.2	14.7	172.9	14.7	244.3	13.0	317.1	10.5
13.6	14.8	93.1	14.7	174.8	14.7	244.3	12.9	318.0	10.5
14.6	14.8	94.1	14.7	176.7	14.7	245.2	12.9	318.9	10.4
16.6	14.8	96.0	14.7	178.6	14.7	246.2	12.8	319.9	10.4
18.5	14.8	97.9	14.7	180.5	14.7	247.1	12.8	319.9	10.3
19.5	14.8	99.9	14.7	182.4	14.7	249.0	12.7	321.8	10.3
22.4	14.8	101.8	14.7	184.3	14.7	250.9	12.6	323.6	10.3
23.4	14.8	103.7	14.7	186.2	14.7	251.9	12.5	325.5	10.3
25.3	14.8	105.6	14.7	189.1	14.7	252.8	12.5	326.5	10.2
26.3	14.8	107.6	14.7	191.0	14.7	253.8	12.4	327.4	10.2
28.2	14.8	108.5	14.7	193.9	14.7	255.7	12.4	328.3	10.2
29.2	14.8	109.5	14.7	194.8	14.7	257.6	12.4	329.3	10.1
30.2	14.8	110.5	14.7	196.7	14.7	258.5	12.3	330.2	10.1
31.1	14.8	113.4	14.7	198.6	14.7	259.5	12.3	332.1	10.1
33.1	14.8	114.3	14.7	200.5	14.7	260.4	12.2	333.0	10.0
34.1	14.7	115.3	14.7	202.5	14.7	262.3	12.2	334.9	9.9
36.0	14.7	117.2	14.7	205.3	14.7	263.3	12.1	335.9	9.9
37.9	14.7	119.1	14.7	209.1	14.7	263.3	12.0	336.8	9.8
38.9	14.7	121.1	14.7	211.0	14.7	265.1	12.0	338.7	9.8
39.9	14.7	123.0	14.7	212.9	14.7	267.0	11.9	341.5	9.8
41.8	14.7	124.9	14.7	213.9	14.7	268.9	11.9	342.4	9.8
42.8	14.7	126.8	14.7	216.7	14.7	269.9	11.9	343.4	9.7
44.7	14.7	127.8	14.8	218.6	14.7	271.8	11.9	344.3	9.7
45.7	14.7	129.7	14.7	219.6	14.7	274.6	11.9	345.2	9.7
47.6	14.7	130.7	14.7	220.5	14.7	275.6	11.9	346.2	9.7
48.6	14.7	132.6	14.7	222.4	14.7	276.5	11.8	347.1	9.7
50.6	14.7	133.5	14.7	223.4	14.6	278.4	11.7	349.0	9.6
53.5	14.7	135.5	14.7	225.3	14.6	280.3	11.7	349.9	9.6
55.4	14.7	136.4	14.7	228.2	14.6	282.2	11.6	349.9	9.5
57.3	14.7	138.3	14.7	230.1	14.6	283.1	11.5	349.9	9.5
58.3	14.7	139.3	14.7	232.0	14.4	284.1	11.5	351.8	9.4
59.3	14.7	141.2	14.7	232.9	14.4	285.9	11.4	352.7	9.4
62.2	14.7	143.1	14.7	232.9	14.3	287.8	11.3	354.6	9.4
63.1	14.7	144.1	14.7	233.9	14.2	289.7	11.3	356.5	9.4
64.1	14.7	146.0	14.7	234.8	14.2	291.6	11.2	358.4	9.3
67.0	14.7	147.0	14.7	234.8	14.1	293.5	11.1	359.3	9.3
68.0	14.7	148.9	14.7	234.8	14.0	295.4	11.1	360.2	9.2
69.0	14.7	149.9	14.7	235.8	14.0	297.3	11.1	360.2	9.2
71.9	14.7	151.8	14.8	236.7	13.9	298.2	11.1	361.2	9.2
72.8	14.7	152.7	14.8	237.7	13.8	300.1	11.0	361.2	9.1
74.8	14.7	154.7	14.8	237.7	13.7	302.0	11.0	362.1	9.0
75.7	14.7	156.6	14.7	238.6	13.7	303.9	10.9	363.0	9.0
78.6	14.7	158.5	14.8	239.6	13.6	305.8	10.8	364.0	8.9
79.6	14.7	159.4	14.7	239.6	13.5	306.7	10.8	364.9	8.9

STA 17 DAY: 21 TIME: 0011

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
367.7	8.9	432.0	7.2	509.6	5.8	600.2	5.3	697.0	4.8
368.7	8.9	433.9	7.1	511.5	5.8	602.9	5.3	699.7	4.7
370.5	8.9	435.7	7.1	513.3	5.8	604.8	5.3	701.5	4.7
371.5	8.8	436.7	7.1	515.2	5.8	607.5	5.3	702.3	4.7
372.4	8.8	437.6	7.0	516.1	5.8	608.4	5.3	705.0	4.7
374.3	8.7	439.4	7.0	517.9	5.8	611.1	5.3	706.8	4.7
375.2	8.6	440.4	6.9	519.8	5.7	612.9	5.3	708.6	4.7
376.1	8.6	442.2	6.9	521.6	5.7	613.8	5.3	711.3	4.7
377.1	8.5	443.2	6.8	523.4	5.7	615.7	5.2	712.2	4.7
378.0	8.5	445.0	6.8	524.4	5.7	616.6	5.2	715.8	4.7
379.9	8.4	445.9	6.8	526.2	5.7	617.5	5.2	716.7	4.7
380.8	8.4	447.8	6.8	528.0	5.7	619.3	5.1	718.5	4.7
382.7	8.3	449.6	6.7	528.9	5.7	621.1	5.1	720.3	4.7
383.6	8.3	450.6	6.7	531.7	5.7	623.8	5.1	723.0	4.7
385.5	8.2	451.5	6.7	532.6	5.7	625.6	5.1	723.9	4.7
386.4	8.2	452.4	6.6	534.4	5.7	627.5	5.1	726.6	4.6
387.3	8.2	454.3	6.6	535.4	5.7	629.3	5.1	729.2	4.7
389.2	8.1	455.2	6.5	538.1	5.7	631.1	5.1	731.0	4.7
390.1	8.1	456.1	6.5	539.9	5.7	632.9	5.1	731.9	4.7
391.1	8.1	458.0	6.5	541.8	5.7	634.7	5.1	733.7	4.7
392.0	8.1	458.9	6.5	544.5	5.7	636.5	5.1	735.5	4.7
392.9	8.0	460.8	6.4	546.4	5.7	638.3	5.1	738.2	4.7
393.9	8.0	461.7	6.4	548.2	5.7	640.1	5.0	739.1	4.7
394.8	8.0	463.5	6.4	550.0	5.6	641.9	5.0	741.8	4.7
396.7	8.0	465.4	6.4	550.9	5.6	643.8	5.0	742.7	4.7
397.6	7.9	466.3	6.3	552.8	5.6	645.6	5.0	744.4	4.6
399.5	7.9	467.2	6.3	554.6	5.6	646.5	5.0	746.2	4.6
401.3	7.9	468.2	6.2	557.3	5.6	648.3	5.0	748.0	4.6
402.3	7.9	470.0	6.2	559.2	5.6	649.2	5.0	749.8	4.6
404.1	7.9	471.8	6.2	561.0	5.6	651.9	4.9		
406.0	7.8	473.7	6.2	561.9	5.6	653.7	4.9		
406.0	7.8	476.5	6.2	564.7	5.5	655.5	5.0		
406.9	7.7	478.3	6.1	564.7	5.5	657.3	5.0		
407.8	7.6	480.2	6.1	567.4	5.5	660.0	4.9		
408.8	7.6	481.1	6.1	570.1	5.5	661.8	4.9		
411.6	7.6	482.9	6.0	572.9	5.5	663.6	4.9		
414.4	7.6	484.8	6.0	574.7	5.5	665.4	4.9		
414.4	7.6	486.6	6.0	576.5	5.5	667.2	4.9		
418.1	7.6	488.5	6.0	578.3	5.5	669.0	4.9		
419.0	7.6	489.4	6.0	580.2	5.5	673.6	4.8		
419.9	7.6	491.2	6.0	581.1	5.4	675.4	4.9		
421.8	7.5	493.1	5.9	582.9	5.4	678.1	4.8		
421.8	7.5	494.9	5.9	585.6	5.4	679.0	4.8		
424.6	7.5	496.8	5.9	587.5	5.4	680.8	4.8		
425.5	7.5	497.7	5.9	590.2	5.4	683.5	4.8		
426.5	7.4	499.5	5.9	592.9	5.5	685.3	4.8		
427.4	7.4	502.3	5.9	593.8	5.5	688.0	4.7		
428.3	7.3	504.1	5.9	595.7	5.4	691.6	4.8		
430.2	7.3	506.9	5.9	597.5	5.4	695.2	4.8		
431.1	7.3	508.7	5.9	599.3	5.3	696.1	4.8		

STA 18 DAY: 21 TIME: 0024

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
1.0	13.7	71.9	14.4	144.1	14.6	215.8	14.4	259.5	12.1
2.9	13.8	72.8	14.4	146.0	14.6	216.7	14.3	261.4	12.1
4.9	13.8	74.8	14.4	147.0	14.6	217.7	14.3	262.3	12.1
6.8	13.8	76.7	14.4	147.9	14.6	219.6	14.3	263.3	12.0
8.8	13.8	77.7	14.4	148.9	14.6	221.5	14.3	265.1	12.0
9.7	13.8	78.6	14.4	149.9	14.6	222.4	14.3	266.1	12.0
10.7	13.8	80.6	14.4	151.8	14.6	222.4	14.3	268.0	12.0
12.7	13.8	82.5	14.4	153.7	14.6	223.4	14.2	268.9	12.0
14.6	13.8	83.5	14.4	155.6	14.6	224.4	14.2	269.9	12.0
16.6	13.8	85.4	14.4	157.5	14.6	225.3	14.2	270.8	11.9
17.5	13.8	86.4	14.4	158.5	14.6	226.3	14.1	271.8	11.9
19.5	13.7	87.3	14.4	160.4	14.6	227.2	14.1	272.7	11.8
20.4	13.8	88.3	14.4	162.3	14.6	228.2	14.1	273.7	11.7
22.4	13.8	90.2	14.5	163.3	14.6	229.1	14.0	275.6	11.7
24.3	13.8	91.2	14.5	165.2	14.6	230.1	14.0	276.5	11.7
26.3	13.8	92.1	14.5	167.1	14.6	231.0	13.9	277.4	11.7
27.3	13.8	95.0	14.5	170.0	14.6	232.0	13.9	278.4	11.6
28.2	13.8	97.0	14.5	171.9	14.6	232.9	13.8	279.3	11.6
30.2	13.8	97.9	14.6	172.9	14.6	232.9	13.8	281.2	11.6
32.1	13.8	98.9	14.6	174.8	14.6	233.9	13.7	283.1	11.5
33.1	13.9	100.8	14.5	175.7	14.7	234.8	13.6	284.1	11.5
34.1	13.9	102.8	14.5	177.6	14.7	234.8	13.5	285.0	11.5
36.0	14.0	103.7	14.5	179.5	14.6	234.8	13.5	285.9	11.4
37.0	14.0	104.7	14.5	180.5	14.7	236.7	13.5	286.9	11.4
38.9	14.0	106.6	14.5	182.4	14.6	238.6	13.4	287.8	11.4
39.9	14.0	107.6	14.5	183.4	14.6	239.6	13.3	288.8	11.3
41.8	14.0	108.5	14.5	185.3	14.7	240.5	13.3	289.7	11.2
42.8	14.0	110.5	14.6	186.2	14.7	241.5	13.2	291.6	11.2
43.8	14.0	112.4	14.6	187.2	14.7	242.4	13.2	293.5	11.2
45.7	14.0	113.4	14.5	189.1	14.8	243.4	13.1	295.4	11.2
46.7	14.0	114.3	14.5	190.1	14.8	243.4	13.0	298.2	11.0
48.6	14.0	115.3	14.5	192.9	14.7	244.3	12.9	299.2	11.0
48.6	14.1	117.2	14.5	193.9	14.8	245.2	12.8	299.2	10.9
48.6	14.1	119.1	14.5	194.8	14.8	246.2	12.8	301.0	10.8
49.6	14.1	121.1	14.5	196.7	14.8	246.2	12.7	302.0	10.7
50.6	14.2	123.0	14.5	198.6	14.8	247.1	12.7	303.9	10.7
51.5	14.2	123.9	14.5	199.6	14.8	248.1	12.6	305.8	10.6
52.5	14.3	124.9	14.5	200.5	14.7	249.0	12.6	306.7	10.5
53.5	14.3	126.8	14.4	201.5	14.7	250.0	12.5	307.6	10.5
55.4	14.3	127.8	14.4	203.4	14.7	251.9	12.5	309.5	10.4
56.4	14.3	128.7	14.4	204.4	14.6	252.8	12.5	310.5	10.4
57.3	14.3	129.7	14.4	205.3	14.6	253.8	12.4	311.4	10.3
58.3	14.3	131.6	14.5	207.2	14.6	253.8	12.4	312.4	10.3
60.2	14.3	132.6	14.5	209.1	14.6	255.7	12.3	314.2	10.2
63.1	14.3	133.5	14.5	210.1	14.6	255.7	12.3	316.1	10.2
64.1	14.3	134.5	14.5	211.0	14.5	256.6	12.3	318.0	10.2
66.0	14.3	136.4	14.5	212.0	14.5	257.6	12.2	319.9	10.1
67.0	14.3	137.4	14.5	212.9	14.4	257.6	12.2	320.8	10.1
68.0	14.3	139.3	14.6	212.9	14.4	258.5	12.2	321.8	10.1
69.9	14.4	142.2	14.6	214.8	14.4	259.5	12.1	324.6	10.0

STA 18 DAY: 21 TIME: 0024

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
324.6	10.0	399.5	8.1	450.6	6.5	550.0	5.4	644.7	5.0
326.5	9.9	401.3	8.1	452.4	6.5	551.8	5.4	645.6	5.0
328.3	9.9	403.2	8.0	453.3	6.4	553.7	5.4	646.5	4.9
330.2	9.8	404.1	8.0	455.2	6.4	556.4	5.3	646.5	4.9
331.2	9.8	405.1	7.9	455.2	6.3	558.3	5.3	648.3	4.9
333.0	9.8	406.0	7.8	457.1	6.3	560.1	5.3	649.2	4.9
334.0	9.8	406.0	7.8	461.7	6.2	561.9	5.3	650.1	4.9
334.9	9.7	406.9	7.6	462.6	6.2	563.7	5.3	651.0	4.9
335.9	9.7	407.8	7.6	465.4	6.2	565.6	5.3	651.9	4.9
336.8	9.7	408.8	7.6	467.2	6.2	568.3	5.3	652.8	4.9
337.7	9.7	409.7	7.5	469.1	6.2	570.1	5.3	654.6	4.9
339.6	9.6	410.6	7.5	470.9	6.1	572.0	5.3	655.5	4.9
340.5	9.5	411.6	7.5	472.8	6.1	573.8	5.2	656.4	4.9
341.5	9.5	413.4	7.5	474.6	6.1	575.6	5.2	658.2	4.9
342.4	9.3	414.4	7.5	476.5	6.1	577.4	5.2	659.1	4.9
343.4	9.3	416.2	7.5	479.2	6.1	581.1	5.2	660.9	4.9
343.4	9.3	417.2	7.5	481.1	6.0	582.9	5.2	661.8	4.9
344.3	9.3	419.0	7.5	482.9	6.0	586.5	5.2	663.6	4.9
345.2	9.2	419.9	7.4	485.7	5.9	588.4	5.2	664.5	4.9
345.2	9.2	420.9	7.4	489.4	5.9	591.1	5.2	666.3	4.9
347.1	9.1	421.8	7.4	491.2	5.9	592.9	5.2	668.1	4.9
348.1	9.1	422.7	7.3	493.1	5.9	595.7	5.2	670.0	4.9
349.9	9.1	423.7	7.3	494.9	5.9	597.5	5.1	671.8	4.9
351.8	9.1	425.5	7.3	496.8	5.9	599.3	5.1	673.6	4.9
352.7	9.0	426.5	7.3	498.6	5.8	600.2	5.1	674.5	4.9
354.6	9.0	427.4	7.2	501.4	5.8	602.9	5.0	675.4	4.9
356.5	8.9	428.3	7.2	503.2	5.8	605.7	5.0	677.2	4.9
358.4	8.9	429.2	7.2	506.0	5.8	607.5	5.0	678.1	4.9
360.2	8.9	430.2	7.2	507.8	5.8	608.4	5.0	679.9	4.9
363.0	8.9	431.1	7.2	510.6	5.8	611.1	5.0	680.8	4.9
364.9	8.8	432.0	7.1	512.4	5.8	612.0	5.0	681.7	4.9
366.8	8.7	433.0	7.1	514.2	5.8	614.7	5.0	683.5	4.9
369.6	8.6	433.9	7.1	517.0	5.8	615.7	5.0	685.3	4.9
370.5	8.5	433.9	7.0	518.8	5.8	618.4	5.0	685.3	4.9
372.4	8.4	434.8	7.0	520.7	5.7	619.3	5.0	686.2	4.9
373.3	8.4	435.7	6.9	523.4	5.7	621.1	5.0	688.9	4.9
374.3	8.3	437.6	6.9	525.3	5.7	622.9	5.0	690.7	4.9
376.1	8.3	438.5	6.9	526.2	5.7	624.7	5.0	693.4	4.9
377.1	8.3	439.4	6.9	528.9	5.6	627.5	4.9	695.2	4.9
378.9	8.2	440.4	6.8	529.9	5.5	630.2	4.9	697.0	4.9
379.9	8.2	441.3	6.8	532.6	5.5	630.2	4.9	697.9	4.9
381.7	8.2	442.2	6.8	534.4	5.5	632.0	5.0	699.7	4.9
383.6	8.2	443.2	6.8	536.3	5.5	632.9	4.9	701.5	4.9
385.5	8.2	444.1	6.7	538.1	5.5	634.7	5.0	702.3	4.9
386.4	8.2	445.0	6.7	539.9	5.5	635.6	5.0	704.1	4.9
389.2	8.1	445.9	6.7	541.8	5.5	636.5	5.0	705.9	4.9
391.1	8.1	446.9	6.7	543.6	5.5	638.3	5.0	706.8	4.9
394.8	8.1	447.8	6.6	545.4	5.5	640.1	5.0	708.6	4.9
396.7	8.1	448.7	6.6	546.4	5.5	641.9	5.0	710.4	4.9
398.5	8.1	449.6	6.6	548.2	5.4	643.8	5.0	711.3	4.8

STA 18 DAY: 21 TIME: 0024

DEPTH (m)	TEMP (°C)
713.1	4.8
714.9	4.8
716.7	4.8
719.4	4.8
720.3	4.8
723.0	4.8
724.8	4.8
726.6	4.8
728.4	4.8
730.1	4.8
731.9	4.8
732.8	4.8
735.5	4.8
737.3	4.8
739.1	4.8
740.0	4.8
740.9	4.8
742.7	4.8
743.6	4.8
745.3	4.8
746.2	4.8
748.0	4.8
749.8	4.7

STA 19 DAY: 21 TIME: 0047

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
2.9	9.2	47.6	13.3	114.3	13.3	184.3	13.4	241.5	11.5
3.9	9.2	48.6	13.3	115.3	13.3	186.2	13.4	242.4	11.5
4.9	9.2	50.6	13.3	117.2	13.3	187.2	13.4	243.4	11.4
5.8	9.2	51.5	13.3	118.2	13.3	188.1	13.4	244.3	11.4
8.8	9.2	52.5	13.3	120.1	13.3	188.1	13.4	245.2	11.4
8.8	9.3	53.5	13.3	122.0	13.3	189.1	13.4	247.1	11.4
9.7	9.5	55.4	13.3	123.9	13.3	191.0	13.3	248.1	11.3
9.7	9.7	57.3	13.3	125.9	13.3	192.0	13.3	250.0	11.3
10.7	9.9	58.3	13.3	126.8	13.3	192.9	13.2	250.9	11.2
10.7	10.0	60.2	13.3	128.7	13.2	193.9	13.2	251.9	11.2
11.7	10.1	61.2	13.3	130.7	13.2	193.9	13.1	253.8	11.2
12.7	10.1	63.1	13.3	130.7	13.2	194.8	13.1	254.7	11.2
13.6	10.1	64.1	13.3	131.6	13.2	195.8	13.0	256.6	11.1
15.6	10.3	65.1	13.3	133.5	13.2	196.7	13.0	257.6	11.1
16.6	10.4	67.0	13.3	135.5	13.2	197.7	12.9	258.5	11.0
16.6	10.6	69.0	13.3	136.4	13.2	198.6	12.9	259.5	11.0
17.5	10.8	69.9	13.3	138.3	13.2	199.6	12.9	260.4	10.9
17.5	11.2	70.9	13.3	140.3	13.2	201.5	12.8	262.3	10.8
18.5	11.3	72.8	13.3	142.2	13.2	202.5	12.8	263.3	10.7
19.5	11.3	74.8	13.3	143.1	13.2	203.4	12.8	265.1	10.7
20.4	11.4	75.7	13.3	144.1	13.2	205.3	12.7	266.1	10.6
21.4	11.5	76.7	13.3	146.0	13.2	206.3	12.7	267.0	10.6
22.4	11.5	77.7	13.3	147.9	13.2	208.2	12.6	268.0	10.6
23.4	11.6	78.6	13.3	148.9	13.2	208.2	12.6	268.9	10.5
23.4	11.7	79.6	13.2	149.9	13.2	209.1	12.5	269.9	10.5
24.3	11.9	81.5	13.2	151.8	13.2	210.1	12.4	271.8	10.4
25.3	12.1	82.5	13.2	152.7	13.2	211.0	12.4	272.7	10.4
26.3	12.2	84.4	13.2	154.7	13.2	212.0	12.3	274.6	10.4
27.3	12.2	86.4	13.2	156.6	13.2	212.9	12.3	277.4	10.3
28.2	12.2	87.3	13.2	158.5	13.3	213.9	12.3	279.3	10.3
29.2	12.2	88.3	13.2	159.4	13.2	214.8	12.2	280.3	10.3
30.2	12.3	89.2	13.2	161.4	13.2	215.8	12.2	281.2	10.3
31.1	12.4	91.2	13.2	162.3	13.2	216.7	12.1	283.1	10.3
32.1	12.4	92.1	13.2	164.2	13.2	218.6	12.1	285.0	10.2
32.1	12.6	93.1	13.2	165.2	13.3	219.6	12.1	286.9	10.2
33.1	12.7	94.1	13.2	167.1	13.2	222.4	12.1	288.8	10.2
34.1	12.8	96.0	13.2	168.1	13.2	224.4	12.1	290.7	10.2
34.1	12.8	97.0	13.2	170.0	13.2	226.3	12.0	291.6	10.1
35.0	12.9	98.9	13.2	170.9	13.2	229.1	12.0	293.5	10.1
35.0	13.0	99.9	13.2	172.9	13.3	230.1	12.0	295.4	10.1
36.0	13.1	100.8	13.2	173.8	13.3	232.0	12.0	296.3	10.1
36.0	13.1	101.8	13.2	174.8	13.3	232.9	12.0	298.2	10.0
37.0	13.2	103.7	13.3	176.7	13.3	233.9	11.9	299.2	10.0
37.0	13.2	104.7	13.3	177.6	13.3	234.8	11.9	301.0	10.0
38.9	13.2	105.6	13.3	178.6	13.4	235.8	11.8	302.0	10.0
39.9	13.3	106.6	13.3	179.5	13.4	236.7	11.8	302.9	9.9
41.8	13.3	108.5	13.3	180.5	13.4	237.7	11.7	304.8	9.8
42.8	13.3	109.5	13.3	181.5	13.4	238.6	11.6	305.8	9.8
44.7	13.3	111.4	13.3	182.4	13.4	238.6	11.6	306.7	9.7
45.7	13.3	112.4	13.3	183.4	13.4	240.5	11.6	307.6	9.7

STA 19 DAY: 21 TIME: 0047

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
309.5	9.7	389.2	7.6	458.9	6.1	545.4	5.5	655.5	5.0
310.5	9.7	390.1	7.5	461.7	6.0	546.4	5.5	658.2	5.0
311.4	9.6	392.0	7.5	462.6	6.0	549.1	5.5	660.0	5.0
313.3	9.5	393.9	7.5	464.5	6.0	550.9	5.5	662.7	5.0
315.2	9.5	395.7	7.5	465.4	6.0	551.8	5.5	663.6	5.0
317.1	9.5	397.6	7.5	467.2	6.0	553.7	5.5	666.3	5.0
318.9	9.4	398.5	7.5	470.0	5.9	555.5	5.5	668.1	5.0
319.9	9.4	399.5	7.4	470.9	5.9	557.3	5.5	670.0	5.0
321.8	9.4	400.4	7.4	472.8	5.9	560.1	5.4	671.8	5.0
323.6	9.4	401.3	7.4	474.6	5.9	561.0	5.4	674.5	5.0
324.6	9.4	403.2	7.3	476.5	5.9	563.7	5.4	676.3	5.0
326.5	9.4	405.1	7.3	479.2	5.9	565.6	5.4	679.0	5.0
327.4	9.3	406.9	7.3	480.2	5.9	568.3	5.4	680.8	5.0
328.3	9.3	407.8	7.2	482.9	5.9	571.0	5.4	683.5	5.0
329.3	9.2	408.8	7.2	484.8	5.9	574.7	5.4	685.3	5.0
330.2	9.1	410.6	7.2	485.7	5.9	576.5	5.3	687.1	5.0
331.2	9.1	411.6	7.1	488.5	5.9	579.3	5.3	688.9	4.9
333.0	9.0	413.4	7.1	490.3	5.9	582.0	5.3	692.5	5.0
334.9	9.0	415.3	7.1	492.2	5.9	583.8	5.3	693.4	4.9
335.9	9.0	417.2	7.1	493.1	5.9	586.5	5.3	695.2	4.9
337.7	9.0	419.0	7.0	494.0	5.9	588.4	5.3	697.9	4.9
339.6	8.9	419.9	7.0	495.8	5.8	591.1	5.3	699.7	4.9
343.4	8.9	422.7	7.0	496.8	5.8	593.8	5.3	702.3	4.9
345.2	8.9	423.7	6.9	498.6	5.8	596.6	5.2	705.0	4.9
348.1	8.8	426.5	6.9	500.4	5.8	598.4	5.3	706.8	4.9
349.0	8.8	427.4	6.9	502.3	5.7	600.2	5.2	709.5	4.9
350.9	8.7	429.2	6.8	504.1	5.7	602.9	5.2	711.3	4.9
352.7	8.6	431.1	6.8	506.9	5.7	604.8	5.2	714.0	4.9
354.6	8.5	433.0	6.8	508.7	5.7	606.6	5.2	716.7	4.9
355.6	8.4	434.8	6.8	509.6	5.7	610.2	5.2	718.5	4.9
357.4	8.4	436.7	6.8	512.4	5.7	612.9	5.1	721.2	4.9
359.3	8.3	437.6	6.8	513.3	5.7	616.6	5.1	723.9	4.9
361.2	8.3	438.5	6.7	515.2	5.7	618.4	5.2	726.6	4 9
363.0	8.3	439.4	6.7	517.9	5.7	620.2	5.2	728.4	4.9
364.9	8.2	440.4	6.7	517.9	5.7	622.9	5.2	731.0	4.9
367.7	8.2	442.2	6.6	519.8	5.7	626.5	5.2	733.7	4.9
369.6	8.2	443.2	6.5	521.6	5.7	628.4	5.2	734.6	4.8
370.5	8.2	444.1	6.5	523.4	5.7	631.1	5.2	737.3	4.8
372.4	8.1	445.0	6.5	525.3	5.7	632.0	5.1	740.0	4.8
373.3	8.1	446.9	6.4	526.2	5.6	634.7	5.1	742.7	4.8
374.3	8.0	447.8	6.4	528.0	5.6	636.5	5.1	744.4	4.8
376.1	8.0	447.8	6.4	529.9	5.6	639.2	5.1	746.2	4.8
377.1	8.0	448.7	6.3	531.7	5.6	641.0	5.1	748.0	4.8
378.0	7.9	449.6	6.2	533.5	5.6	643.8	5.0	748.9	4.8
379.9	7.9	450.6	6.3	534.4	5.5	645.6	5.0		
381.7	7.9	452.4	6.3	537.2	5.5	648.3	5.0		
383.6	7.9	453.3	6.2	539.0	5.5	649.2	5.0		
384.5	7.8	455.2	6.1	540.9	5.5	651.0	5.0		
385.5	7.7	456.1	6.1	541.8	5.5	652.8	5.0		
387.3	7.6	458.0	6.1	543.6	5.5	654.6	5.0		

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	20	21 JAN 1981	01.0	40°20.2'N.	67°31.5'W.	755

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	2.7	8.436	34.243		0.13	26.614	0.000	1483.	2.8
10	10.4	8.896	34.358		0.12	26.632	0.011	1485.	2.8
19	19.2	10.589	34.852		0.11	26.735	0.023	1492.	2.8
29	29.5	12.129	35.306		0.09	26.803	0.036	1498.	2.8
41	41.1	12.472	35.400		0.07	26.809	0.050	1500.	2.8
52	52.1	12.545	35.422		0.08	26.811	0.064	1500.	2.3
61	61.9	12.630	35.444		0.08	26.812	0.076	1500.	1.4
72	72.2	12.656	35.450		0.08	26.812	0.089	1501.	0.8
78	78.8	12.714	35.467		0.07	26.813	0.097	1501.	0.8
89	89.7	12.772	35.484		0.08	26.814	0.111	1501.	0.8
98	99.2	12.837	35.505		0.08	26.817	0.123	1502.	0.8
109	109.8	12.885	35.521		0.08	26.821	0.136	1502.	0.8
118	118.9	12.909	35.529		0.08	26.822	0.147	1502.	0.7
130	130.9	12.929	35.535		0.09	26.823	0.162	1503.	0.6
140	141.3	12.921	35.534		0.09	26.824	0.175	1503.	0.5
149	149.7	12.925	35.536		0.09	26.824	0.186	1503.	0.7
159	159.9	12.900	35.528		0.10	26.823	0.199	1503.	1.3
166	167.7	12.884	35.523		0.10	26.822	0.208	1503.	2.0
178	179.1	12.879	35.524		0.10	26.824	0.223	1503.	2.6
189	191.0	13.045	35.590		0.10	26.842	0.238	1504.	3.0
198	199.2	13.183	35.675		0.09	26.880	0.248	1505.	3.3
209	210.8	12.671	35.629		0.09	26.947	0.262	1503.	3.5
219	220.8	12.150	35.574		0.08	27.006	0.273	1502.	3.7
227	228.5	11.779	35.520		0.08	27.036	0.281	1500.	3.6
238	240.3	11.446	35.479		0.09	27.067	0.294	1499.	3.4
249	250.8	11.036	35.425		0.09	27.101	0.304	1498.	3.2
257	259.2	10.715	35.389		0.09	27.131	0.313	1497.	3.0
268	270.1	10.511	35.365		0.09	27.148	0.323	1497.	2.9
278	280.0	10.201	35.328		0.09	27.174	0.333	1496.	3.0
290	292.5	9.828	35.292		0.10	27.210	0.344	1494.	2.9
299	301.8	9.737	35.280		0.10	27.216	0.353	1494.	2.9
307	309.3	9.315	35.234		0.10	27.251	0.360	1493.	2.8
316	318.9	9.002	35.209		0.11	27.282	0.368	1492.	2.8
326	328.8	8.755	35.187		0.10	27.304	0.376	1491.	2.8
336	339.2	8.610	35.174		0.11	27.317	0.385	1491.	2.8
347	349.9	8.521	35.169		0.11	27.327	0.393	1490.	2.8
356	359.1	8.184	35.144		0.11	27.359	0.401	1489.	2.8
367	370.7	7.948	35.139		0.11	27.391	0.409	1489.	2.8
378	381.0	7.758	35.129		0.11	27.412	0.417	1488.	2.9
385	388.1	7.343	35.098		0.12	27.447	0.422	1486.	3.0
397	400.0	7.211	35.099		0.12	27.467	0.430	1486.	3.0
405	408.2	7.157	35.093		0.12	27.470	0.435	1486.	2.9
416	419.6	6.700	35.068		0.13	27.514	0.443	1484.	2.8
426	430.1	6.339	35.042		0.13	27.542	0.449	1483.	2.6
434	437.6	6.103	35.034		0.13	27.566	0.454	1482.	2.4
447	450.5	5.973	35.021		0.13	27.573	0.461	1482.	2.2
456	460.0	5.933	35.023		0.13	27.579	0.466	1482.	1.9
467	471.6	5.830	35.015		0.13	27.587	0.473	1482.	1.9
474	478.0	5.754	35.013		0.13	27.594	0.476	1482.	1.9
490	494.2	5.729	35.015		0.13	27.599	0.485	1482.	1.9
493	497.2	5.725	35.016		0.13	27.600	0.487	1482.	1.9

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	22	21 JAN 1981	02.2	40°23.8'N.	67°33.1'W.	195

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
10	10.1	6.679	33.633		0.16	26.385	0.000	1476.	4.3
20	20.2	6.693	33.635		0.16	26.385	0.017	1476.	4.3
29	29.5	6.770	33.657		0.16	26.392	0.032	1477.	4.3
40	40.3	8.000	34.031		0.15	26.514	0.049	1482.	4.3
50	50.3	10.352	34.750		0.13	26.696	0.063	1492.	4.3
60	60.3	11.377	35.050		0.11	26.746	0.076	1496.	4.1
70	70.3	11.660	35.121		0.11	26.749	0.089	1497.	3.8
80	80.4	11.805	35.163		0.11	26.754	0.102	1498.	3.0
90	90.3	11.758	35.166		0.11	26.765	0.115	1498.	2.3
100	101.2	11.879	35.249		0.11	26.806	0.129	1498.	2.1
109	110.0	12.057	35.314		0.12	26.823	0.140	1499.	2.1
121	121.7	12.214	35.369		0.12	26.835	0.155	1500.	2.0
130	131.2	12.259	35.383		0.12	26.838	0.166	1500.	1.8
139	139.7	12.272	35.392		0.11	26.842	0.177	1501.	1.5
149	150.3	12.264	35.396		0.12	26.846	0.190	1501.	1.6
159	159.8	12.241	35.396		0.12	26.851	0.202	1501.	1.9
169	170.3	12.188	35.408		0.13	26.871	0.215	1501.	1.9
179	180.1	12.206	35.411		0.13	26.869	0.226	1501.	1.9
190	191.1	12.288	35.465		0.13	26.895	0.240	1502.	1.9
196	197.5	12.258	35.516		0.13	26.940	0.247	1502.	1.9

STA 23 DAY: 21 TIME: 0243

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
1.0	6.6	86.4	8.1	136.4	11.2
1.9	6.5	87.3	8.2	137.4	11.3
3.9	6.6	87.3	8.4	138.3	11.3
5.8	6.6	87.3	8.5	139.3	11.3
7.8	6.5	87.3	8.8	140.3	11.3
8.8	6.6	87.3	8.9	140.3	11.4
10.7	6.6	88.3	9.0	142.2	11.4
12.7	6.6	88.3	9.1	143.1	11.5
14.6	6.6	89.2	9.2	144.1	11.5
16.6	6.6	90.2	9.3	146.0	11.5
18.5	6.6	91.2	9.4	147.0	11.5
20.4	6.6	93.1	9.4	147.9	11.5
22.4	6.6	94.1	9.5	148.9	11.5
24.3	6.6	95.0	9.6	149.9	11.5
27.3	6.6	96.0	9.7		
28.2	6.6	97.9	9.8		
31.1	6.6	98.9	9.8		
33.1	6.5	101.8	9.8		
35.0	6.5	104.7	9.9		
37.0	6.6	106.6	9.9		
38.9	6.6	107.6	9.9		
40.9	6.6	109.5	9.9		
42.8	6.6	109.5	9.9		
44.7	6.5	111.4	9.9		
46.7	6.5	112.4	9.9		
48.6	6.5	114.3	9.9		
51.5	6.6	115.3	9.9		
53.5	6.6	117.2	10.0		
55.4	6.6	118.2	10.0		
57.3	6.6	120.1	10.0		
60.2	6.5	121.1	10.1		
63.1	6.6	121.1	10.2		
65.1	6.6	122.0	10.2		
68.0	6.6	122.0	10.3		
69.0	6.6	123.0	10.3		
70.9	6.6	123.9	10.4		
71.9	6.7	124.9	10.4		
72.8	6.9	126.8	10.5		
72.8	6.9	126.8	10.5		
72.8	7.1	126.8	10.6		
73.8	7.1	127.8	10.7		
74.8	7.2	127.8	10.8		
76.7	7.2	128.7	10.8		
77.7	7.3	129.7	10.9		
78.6	7.3	130.7	11.0		
80.6	7.4	131.6	11.0		
81.5	7.5	132.6	11.0		
82.5	7.6	133.5	11.1		
84.4	7.8	134.5	11.1		
85.4	7.9	135.5	11.2		

STA 24 DAY: 21 TIME: 0300

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
1.0	6.1	80.6	6.3	125.9	10.9
2.9	6.1	82.5	6.3	127.8	11.0
3.9	6.1	84.4	6.4	129.7	11.0
5.8	6.1	85.4	6.4	131.6	11.0
6.8	6.1	87.3	6.5	133.5	11.0
7.8	6.2	89.2	6.5	135.5	11.0
8.8	6.2	90.2	6.6	136.4	11.0
10.7	6.1	91.2	6.7	138.3	11.0
12.7	6.1	91.2	6.8	139.3	11.0
13.6	6.1	91.2	7.0	141.2	11.0
15.6	6.1	91.2	7.2		
16.6	6.1	92.1	7.3		
18.5	6.2	92.1	7.5		
20.4	6.1	93.1	7.6		
22.4	6.1	94.1	7.8		
23.4	6.1	95.0	7.9		
24.3	6.1	96.0	7.9		
26.3	6.1	97.9	8.0		
28.2	6.1	98.9	8.1		
29.2	6.2	98.9	8.2		
31.1	6.2	99.9	8.3		
33.1	6.2	100.8	8.4		
35.0	6.2	101.8	8.5		
36.0	6.2	101.8	8.5		
37.9	6.2	102.8	8.6		
38.9	6.1	103.7	8.7		
40.9	6.1	103.7	8.8		
41.8	6.2	104.7	8.9		
43.8	6.1	104.7	9.0		
45.7	6.2	106.6	9.1		
46.7	6.2	108.5	9.1		
48.6	6.2	110.5	9.2		
51.5	6.2	111.4	9.2		
52.5	6.1	112.4	9.3		
54.4	6.2	113.4	9.4		
56.4	6.2	113.4	9.5		
57.3	6.2	114.3	9.6		
59.3	6.2	114.3	9.7		
61.2	6.1	115.3	9.8		
63.1	6.1	116.2	10.0		
65.1	6.2	116.2	10.1		
66.0	6.1	117.2	10.2		
68.0	6.2	117.2	10.3		
69.0	6.2	117.2	10.4		
70.9	6.2	118.2	10.5		
72.8	6.2	120.1	10.6		
74.8	6.1	121.1	10.6		
76.7	6.2	122.0	10.7		
77.7	6.2	123.0	10.8		
78.6	6.3	123.9	10.8		

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	25	21 JAN 1981	03.4	40°32.2'N.	67°38.4'W.	132

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
3	3.3	4.759	33.254		0.19	26.318	0.000	1468.	0.3
10	9.8	4.759	33.250		0.20	26.315	0.011	1468.	0.3
20	20.6	4.753	33.250		0.19	26.315	0.029	1468.	0.3
33	33.6	4.719	33.253		0.20	26.321	0.051	1468.	0.3
40	40.4	4.689	33.242		0.21	26.316	0.063	1468.	0.3
48	48.1	4.643	33.235		0.22	26.316	0.076	1468.	0.4
59	59.7	4.641	33.237		0.23	26.317	0.096	1468.	0.8
68	68.1	4.645	33.238		0.22	26.317	0.110	1468.	1.4
82	82.3	4.652	33.240		0.22	26.319	0.134	1468.	2.6
90	90.4	4.680	33.248		0.22	26.322	0.148	1469.	3.5
100	100.3	4.958	33.314		0.22	26.344	0.165	1470.	3.5
110	110.8	5.589	33.472		0.22	26.396	0.182	1473.	3.5
119	120.3	7.959	34.113		0.19	26.583	0.197	1483.	3.5
125	125.6	9.372	34.523		0.19	26.685	0.204	1489.	3.5

STA 26 DAY: 21 TIME: 0420

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
1.0	4.3	19.5	4.3	36.0	4.4	56.4	4.4	77.7	4.3
2.9	4.3	20.4	4.3	36.0	4.4	57.3	4.4	78.6	4.4
3.9	4.3	21.4	4.3	37.9	4.3	59.3	4.4	79.6	4.3
4.9	4.3	22.4	4.3	38.9	4.3	60.2	4.3	81.5	4.4
6.8	4.3	23.4	4.3	39.9	4.4	62.2	4.3	82.5	4.4
7.8	4.4	24.3	4.4	41.8	4.4	64.1	4.3	83.5	4.4
8.8	4.4	25.3	4.4	43.8	4.3	65.1	4.3	84.4	4.3
9.7	4.3	26.3	4.3	45.7	4.3	67.0	4.3	85.4	4.3
11.7	4.3	27.3	4.4	46.7	4.3	68.0	4.3	87.3	4.3
12.7	4.3	28.2	4.4	48.6	4.4	69.9	4.3	88.3	4.3
13.6	4.3	29.2	4.4	49.6	4.4	71.9	4.3	89.2	4.3
14.6	4.3	30.2	4.4	50.6	4.4	72.8	4.3	91.2	4.4
15.6	4.3	32.1	4.3	52.5	4.3	73.8	4.3	93.1	4.3
16.6	4.3	33.1	4.4	53.5	4.3	74.8	4.3	94.1	4.3
17.5	4.3	34.1	4.4	54.4	4.3	76.7	4.3	95.0	4.4

STA 27 DAY: 21 TIME: 1054

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
0.0	4.0	14.6	4.0	27.3	4.0	39.9	4.0	52.5	4.0
1.9	4.0	15.6	4.1	28.2	4.0	40.9	4.0	54.4	4.0
3.9	4.0	16.6	4.0	30.2	4.0	42.8	4.0	55.4	4.0
4.9	4.1	18.5	4.0	32.1	4.0	43.8	4.0	57.3	4.0
6.8	4.1	20.4	4.0	33.1	4.0	44.7	4.0	59.3	4.1
7.8	4.0	21.4	4.0	34.1	4.0	45.7	4.0	61.2	4.1
8.8	4.0	22.4	4.0	36.0	4.0	47.6	4.1	62.2	4.1
10.7	4.1	24.3	4.0	37.9	4.0	49.6	4.0	64.1	4.1
12.7	4.1	25.3	4.0	38.9	4.0	50.6	4.0		

STA 28 DAY: 21 TIME: 1107

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
3.9	3.9	18.5	4.0	30.2	4.0	44.7	3.9	59.3	4.0
4.9	3.9	19.5	4.0	31.1	4.0	46.7	4.0	60.2	4.0
6.8	3.9	21.4	3.9	34.1	4.0	48.6	4.0	61.2	4.0
8.8	3.9	22.4	4.0	35.0	4.0	49.6	4.0	62.2	4.0
9.7	3.9	24.3	4.0	37.0	4.0	50.6	4.0	64.1	4.0
11.7	4.0	25.3	4.0	37.9	4.0	52.5	4.0	65.1	4.0
13.6	4.0	26.3	4.0	39.9	4.0	53.5	4.0	67.0	4.0
14.6	4.0	27.3	4.0	40.9	4.0	55.4	4.0	68.0	4.0
16.6	4.0	28.2	4.0	41.8	4.0	57.3	4.0	68.0	4.0
17.5	4.0	29.2	4.0	43.8	4.0	58.3	4.0	69.9	4.0

STA 29 DAY: 21 TIME: 1140

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)
1.0	4.0	16.6	3.9	31.1	3.9	45.7	3.9	58.3	3.9
2.9	3.9	18.5	3.9	33.1	3.9	46.7	3.9	60.2	3.9
4.9	3.9	19.5	3.9	34.1	3.9	47.6	3.9	62.2	3.9
6.8	3.9	21.4	2.9	36.0	3.9	48.6	3.9	63.1	3.9
8.8	3.9	24.3	3.9	37.0	3.9	50.6	3.9	65.1	3.9
9.7	3.9	25.3	3.9	37.9	3.9	51.5	3.9	66.0	3.9
11.7	3.9	26.3	3.9	38.9	3.9	53.5	3.9	68.0	3.9
11.7	3.9	28.2	3.9	40.9	3.9	54.4	3.9	69.0	3.9
13.6	3.9	29.2	3.9	42.8	3.9	56.4	3.9	70.9	3.9
15.6	3.9	30.2	3.9	43.8	3.9	57.3	3.9		

STA 30 DAY: 21 TIME: 1210

DEPTH (m)	TEMP (°C)	DEPTH (m)	TEMP (°C)	DEPTH (M)	TEMP (°C)	DEPTH (M)	TEMP (°C)	DEPTH (M)	TEMP (°C)
1.9	4.1	13.6	3.9	30.2	4.0	46.7	4.0	61.2	4.0
2.9	4.1	15.6	3.9	32.1	4.0	47.6	3.9	62.2	4.0
3.9	4.1	16.6	3.9	33.1	4.0	48.6	3.9	64.1	4.0
4.9	4.1	18.5	3.9	35.0	3.9	50.6	4.0	65.1	3.9
5.8	4.1	19.5	3.9	37.0	3.9	51.5	4.0	66.0	3.9
6.8	4.1	21.4	3.9	38.9	4.0	53.5	4.0	68.0	3.9
8.8	4.1	22.4	3.9	39.9	4.0	54.4	4.0	69.0	4.0
9.7	4.1	23.4	4.0	40.9	3.9	56.4	3.9	69.9	4.0
10.7	4.1	26.3	3.9	41.8	3.9	57.3	4.0	71.9	4.0
11.7	4.0	27.3	4.0	43.8	3.9	58.3	4.0		
12.7	4.0	29.2	4.0	44.7	3.9	59.3	4.0		

SHIP	CRUISE	STATION	DATE	EST	LATITUDE	LONGITUDE	DEPTH
OC	091	31	21 JAN 1981	13.6	40°40.0'N.	67°45.4'W.	78

DEPTH (m)	PRESS (dbar)	TEMP (°C)	SALIN (psu)	OXY (ml/l)	ATN (m^{-1})	SIGT (gm/cm^3)	DYHT A ($10m^2/s^2$)	S SPD (m/s)	N (cph)
2	2.0	4.497	33.179		0.20	26.287	0.000	1466.	22.7
9	8.9	4.428	33.178		0.22	26.293	0.012	1466.	22.7
22	22.6	4.372	33.179		0.23	26.300	0.035	1466.	22.7
30	29.8	4.360	33.181		0.25	26.302	0.048	1466.	22.7
40	40.8	4.348	33.180		0.25	26.303	0.067	1466.	22.7
49	49.6	4.320	33.181		0.30	26.307	0.082	1466.	22.7
59	59.7	4.313	33.182		0.40	26.308	0.099	1467.	22.7
70	71.0	4.310	33.183		0.60	26.309	0.118	1467.	22.7

Appendix II. Manufactures' specifications for instruments used on R/V OCEANUS cruise 91 for calibration of CTD (see text)

Instrument	Sensor	Range	Accuracy	Resolution
CTD	Conductivity	1 to 65 mmho	±0.005 mmhos	0.001 mmhos
	Temperature	-32 to +32°C	±0.005°C	0.0005°C
	Pressure	0-3200 dbar	±3.2 dbar	0.048 dbar
	Oxygen	0-2 μA	±2 nA	0.5 nA
	Light	0-4.50 v	±0.1 v	0.01 v
XBT*	T-4	0-460 m	±0.1°C, ±2% depth	0.01°C, 0.65 m
	T-5	0-1830 m	±0.1°C, ±2% depth	0.01°C, 0.65 m
	T-6	0-460 m	±0.1°C, ±2% depth	0.01°C, 0.65 m
	T-7	0-760 m	±0.1°C, ±2% depth	0.01°C, 0.65 m
	T-10	0-200 m	±0.1°C, ±2% depth	0.01°C, 0.65 m
Salinometer	--	0-40 ppt	±0.003 ppt	0.0002 ppt
Winkler	--	0-10 ml/l	±0.04 ml/l	0.2%

*See text for discussion of temperature and depth accuracy.

Appendix III. - NBIS CTD 9-track tape format

The NBIS CTD tape recorder interface writes two types of records; data records and header records. The records are 512 bytes (8 bits/byte) long. The usual sequence in a CTD cast will be one header record, followed by data records, followed by an End-Of-File.

Data records

A single scan of CTD data is 13 bytes long, 1 byte of frame sync and 12 bytes of data (table 1). An integer number of data scans is packed into 512 byte data records. For the USGS CTD, a data record contains 39 scans of data, and the remaining 5 bytes in the data record are filled with zeros.

Header records

A scan of header information consists of 8 bytes. The first byte is frame sync, which is either 00 (all "0"s) or FF (all "1"s). The remaining 7 bytes represent 14 BCD digits (4 bits each) which may be set on the CTD front panel. The 8 byte scan of header information is padded with zeros. One header record is written on the 9-T tape when "enter CTD header" data button is pushed.

Appendix Table III-1. - Bit assignments for USGS NBIS CTD

Byte	Variable	Range	Conversion
	Frame sync	15 or 240	
1	Pressure LSB	0-65535	÷ 20 = P (dbars)
2	Pressure MSB		
3	Temperature LSB	0-65535	÷ 2000 = T (°C)
4	Temperature MSB		
5	Conductivity LSB	0-65535	÷ 1000 C (mmho)
6	Conductivity MSB		
7	Sign		LSB = pressure negative 2nd = temperature negative 3rd = oxygen temperature negative 4th-8th = zero
8	Oxygen current	0-4096	÷ 2000 = current (μA)
9	(12 bits only)		
10	Oxygen temperature	0-255	x 256 ÷ 2000 T (°C)
11	Transmission	0-4096	x 32 ÷ 4096 = TR (volts)

Appendix IV. Methods for nutrient analysis

Automated methods for nutrients were based on Wood, Armstrong and Richards (1967) for nitrate, Bendschneider and Robinson (1952) for nitrite, Murphy and Riley (1962) for phosphate, Koroleff (1976) for silicate, Solorzano (1969) for ammonia, and described in Technicon Corp. Industrial method papers (1973). During analytical work with water samples some minor and major method changes have been made.

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