

NOAA Data Report ERL AOML-18

CURRENT VELOCITY AND HYDROGRAPHIC OBSERVATIONS IN THE SOUTHWESTERN NORTH  
ATLANTIC OCEAN: SUBTROPICAL ATLANTIC CLIMATE STUDIES (STACS), 1989

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## I. INTRODUCTION

The primary objectives of the STACS program are to increase our understanding of the dynamics of the North Atlantic circulation and the role of ocean circulation in global climate, to develop the capability to monitor the climatically important processes, and to provide data needed in the development of the coupled ocean-atmosphere general circulation models to be used for global climate prediction. In particular, the mechanisms by which the ocean transports heat to balance the net radiation deficit at northerly latitudes are being studied.

The initial objectives of STACS (Molinari *et al.*, 1985) were directed at the Florida Current, a flow which makes significant contribution to heat flux. After an intensive two-year observing program, we have the capability to monitor Florida Current transport without extensive ship-board observations. Data collected during this period are listed in Williams *et al.* (1983), Leaman and Vertes (1983), Vertes and Leaman (1984), and Ratnaswamy *et al.* (1985). STACS efforts during 1984-1986 were directed toward studying the relationship of western boundary currents along the Antillean Archipelago and in the Caribbean Sea to the dynamics of the North Atlantic subtropical gyre and on meridional heat flux, while continuing the monitoring effort in the Florida Current at 27°N. STACS efforts during 1987-1988 continued the observational studies of western boundary currents, extending the study area southward to northern Brazil (4°N) in order to examine North Atlantic cross-equatorial fluxes of mass and heat. Data collected during these cruises are given in Wilburn *et al.* (1987a,b, 1988, and 1989).

During 1989 STACS observational efforts extended even farther east and south. During the February 1989 cruise the western half of a cross-Atlantic transect along 14.5°N was done (in cooperation with a German cruise which occupied the eastern half) in addition to observations of the western boundary currents between Barbados (13°N) and northern Brazil (4°N). This cruise was done in cooperation with Dr. Rana Fine's group from the University of Miami, and included freon measurements at the CTD-O<sub>2</sub> stations. STACS monitoring of the Abaco, Bahamas transect at 26.5°N continued. The August 1989 cruise extended south to the equator in the course of deploying a joint RSMAS/KIEL moored current meter array. Figures 1 and 2 show station locations for the February and August 1989 cruises, respectively. XBT data were generally collected along the entire cruise track, with CTD-O<sub>2</sub> and Pegasus stations taken where indicated.

## II. DATA COLLECTION AND ANALYSIS

Data from STACS cruises conducted on the NOAA Ships ALBATROSS IV and MALCOLM BALDRIGE during two cruises—February and August 1989—are contained in this report. Table 1 shows the type of data collected on each cruise. Techniques used to reduce the Pegasus, CTD, and XBT data to final form are described below.

### A. Pegasus Current Profiler

The Pegasus instrument is an acoustically-tracked, free-falling profiler of horizontal current components (Spain *et al.*, 1981). A schematic of the Pegasus system is shown in Figure 3. The Pegasus instrument used by AOML consists of a hollow cylindrical metal tube with the electronics package

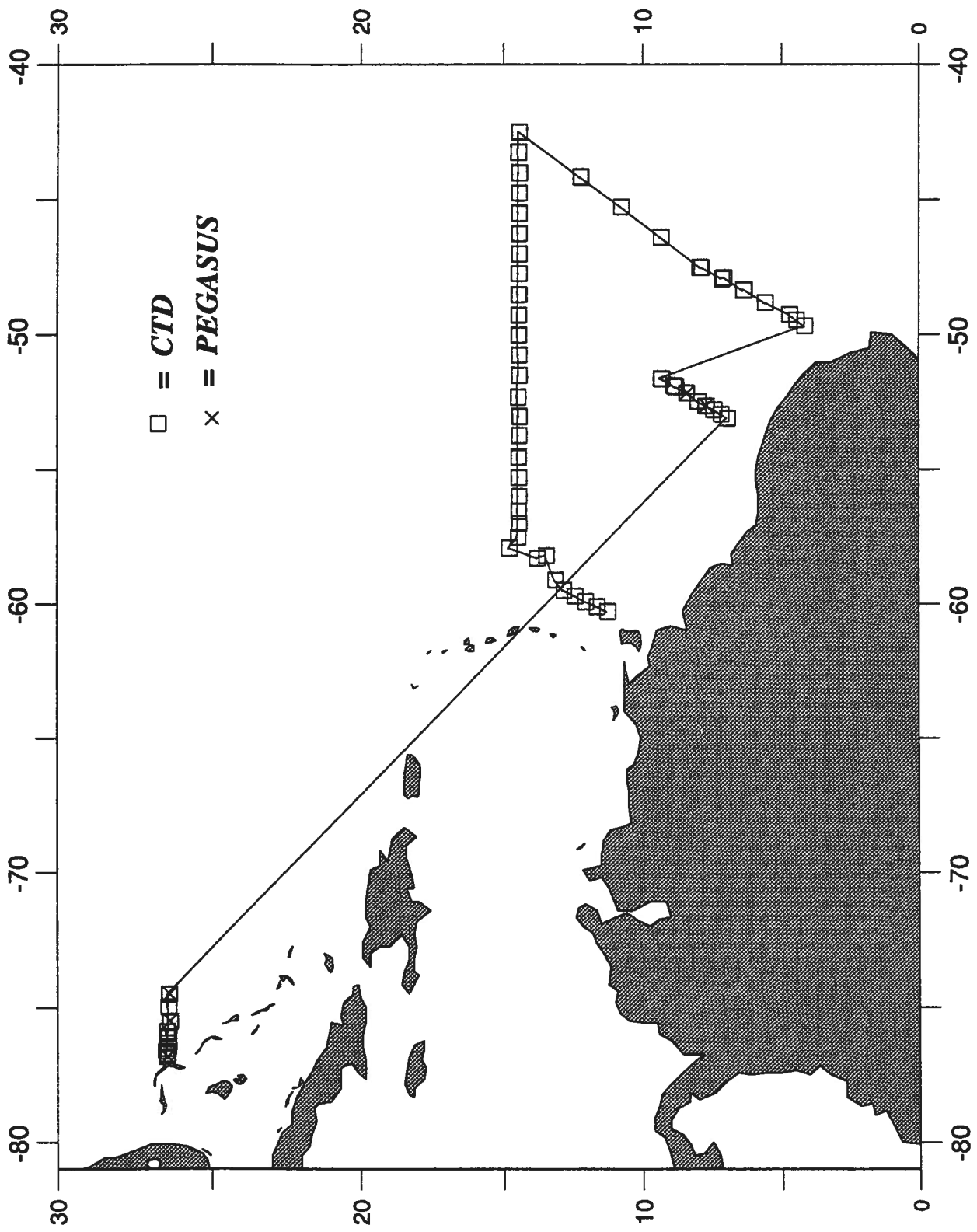


Figure 1. STACS cruise track for February 1989 showing CTD and Pegasus sampling stations.

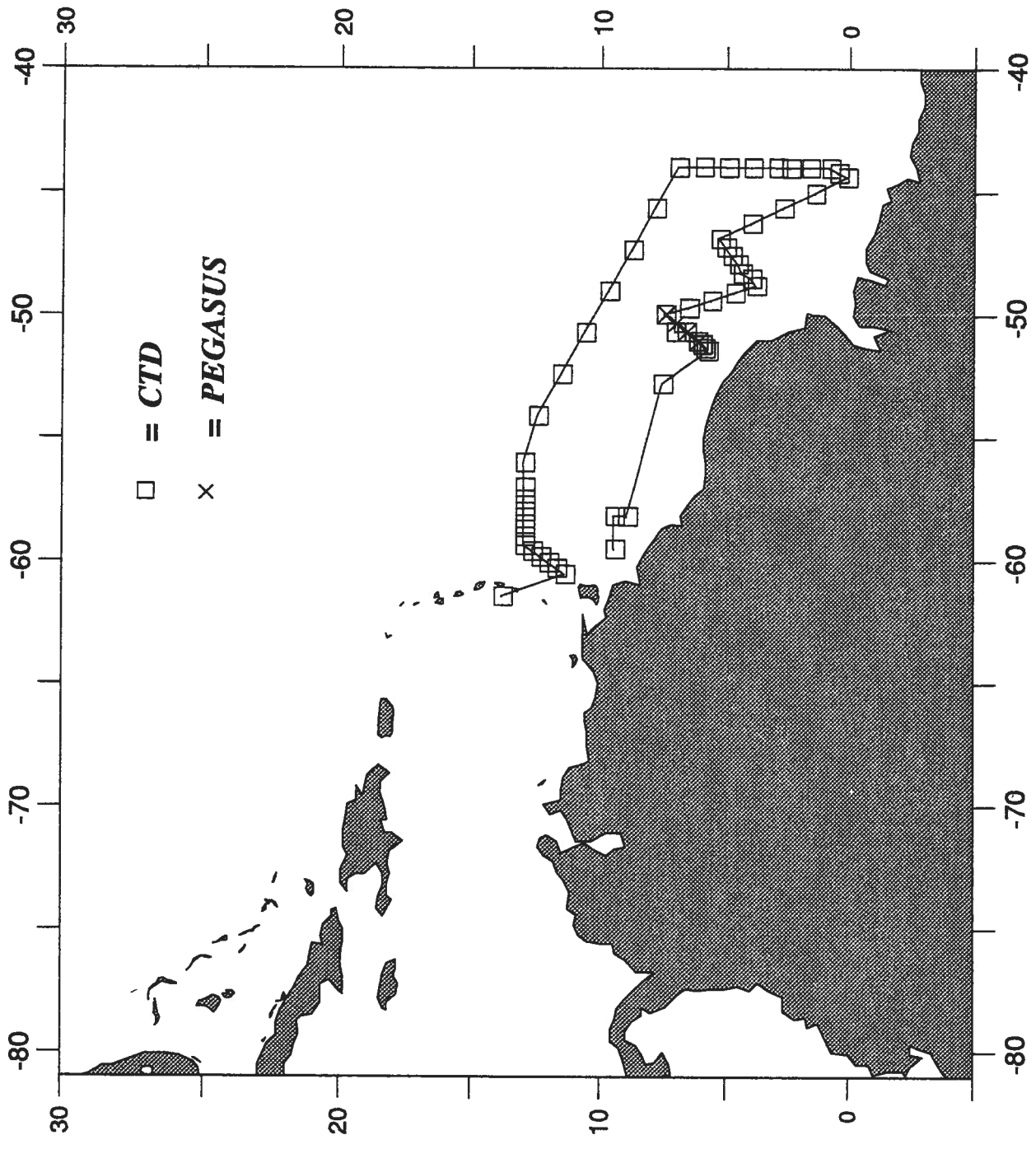


Figure 2. STACS cruise track for August 1989 showing CTD and Pegasus sampling stations.

Table 1. Types of Data Collected by Cruise.

Cruise	Vessel	Dates	Pegasus	CTD	XBT
February 1989 (AL-89-03-STACS)	ALBATROSS IV	1/24-3/16/89	5	80	64
August 1989 (MB-89-04-STACS)	MALCOLM BALDRIGE	8/22-9/22/89	4	54	110

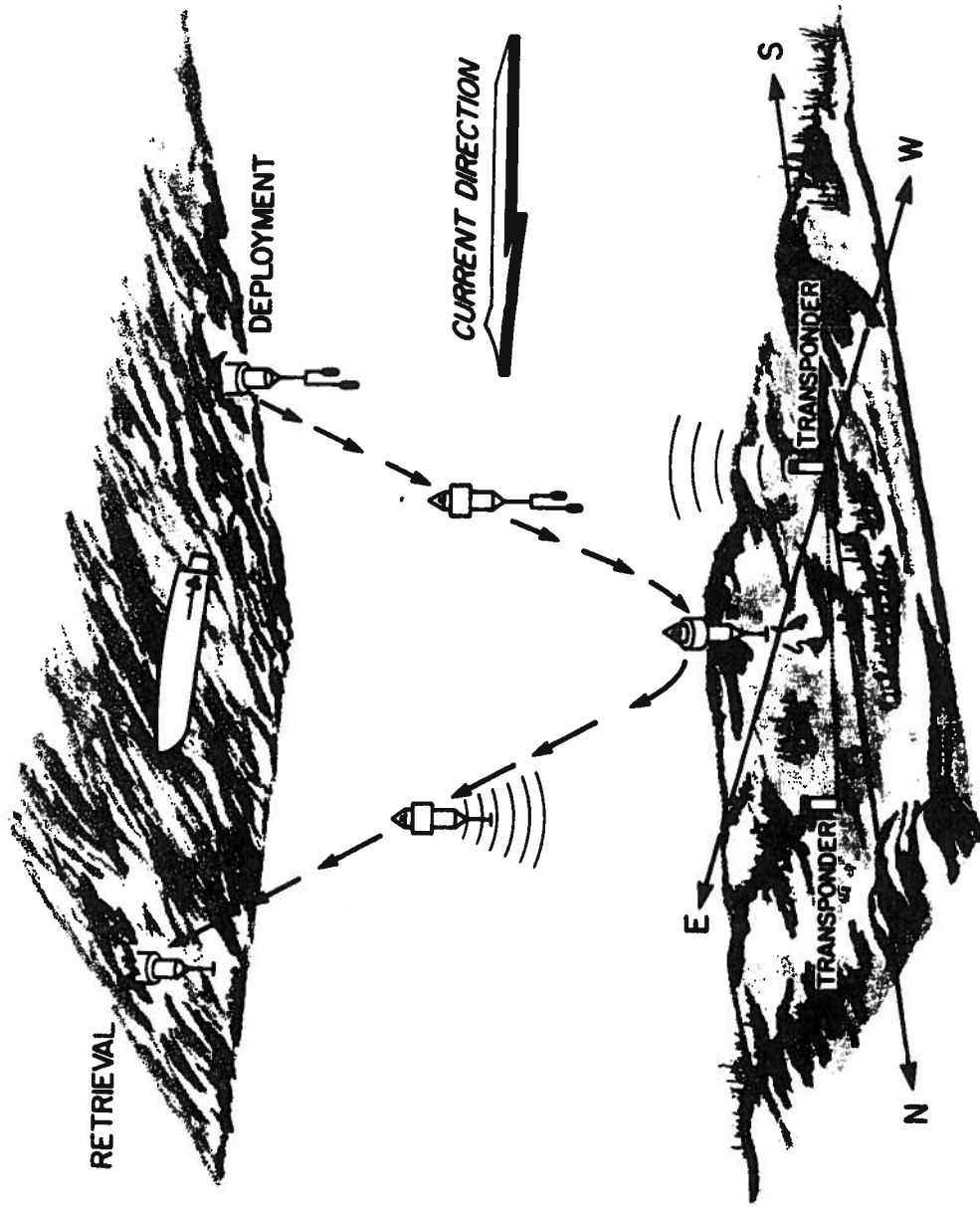


Figure 3. Schematic of the Pegasus current profiler.



sealed within. A flotation collar attached to the exterior of the cylinder provides the instrument buoyancy. Pegasus houses a transducer/receiver, a thermistor and a pressure sensor. When the Pegasus is in the water, its transducer interrogates two fixed transponders on the ocean bottom at a frequency of 10 KHz at an interval of eight or sixteen seconds. Each transponder responds at a different frequency. The Pegasus internally records the acoustic travel times from the transponders, along with temperature and pressure. Transponder frequency pairs are alternated between stations in order to avoid interference from adjacent stations.

The instrument is weighted at the beginning of the drop and falls at a rate between 20-50 cm/sec. This rate may be adjusted by adding or removing weights. External weights are released by a bottom trip mechanism when the weights touch the ocean floor or by a pressure release when the Pegasus reaches a predetermined depth. The instrument ascends at approximately the same rate as it descends.

Each Pegasus station is defined by a unique geometry (see Table 2). A mean sound velocity profile for each station is used to convert the acoustic travel times from the transponders to the instrument into ranges in meters. The baseline becomes the base of a triangle which is projected onto the bottom. The X and Y coordinates of the instrument at each pressure can then be determined.

Following a Pegasus cast the contents of the instrument's solid state memory are transferred to a Hewlett Packard 85 computer for conversion to decimal values and storage on flexible diskettes. The conversion of raw data to a velocity profile is done on an HP-86 in three steps: editing, calibration and velocity computations. Following is a brief description of each step.

### 1. Editing

Two files are created for each Pegasus cast: an ASCII character header file on magnetic tape containing cast information and a multi-record data file on magnetic disk. Each record contains decimal values of the original Pegasus memory address, corresponding pressure and temperature sensor output counts and two travel times significant to  $10^{-4}$  second. HP-86 BASIC programs allow graphic display and printed listings of the data for preliminary evaluation of data quality.

Errors can be introduced into the raw data due to instrument hardware errors and into the travel times by acoustic propagation irregularities such as the detection of reflected instead of direct path signals. Erroneous points are hand edited from the record and replaced by points estimated by a low order polynomial fit.

### 2. Calibration

Prior to each research cruise the Pegasus pressure sensor is calibrated to produce second order polynomial fits of pressure counts versus pressure in decibars (db). Standard deviations from the fits over the working range of the sensors are generally on the order of 1 db. After the raw data has been edited the pressure counts are converted to decibars. Pressure is further smoothed with a five point running mean. Cast limits (surface/bottom/surface)

Table 2. Summary of Pegasus Station Geometry off Abaco Island.

Station	Transponder Parameters			Depth (m)	Baseline Length (m)
	Latitude (N)	Longitude (W)	Frequency (KHz)		
15	26°30.83'	76°19.01'	12.0	4810	4296
	26°31.74'	76°21.55'	13.0		
16	26°32.28'	76°30.10'	11.5	4855	4892
	26°32.20'	76°33.15'	13.0		
17	26°35.48'	76°39.30'	12.5	4050	3937
	26°33.72'	76°39.31'	12.0		
18	26°32.67'	76°45.23'	13.0	3600	3755
	26°30.53'	76°44.88'	12.5		
19	26°33.11'	76°50.85'	12.0	800	1465
	26°32.22'	76°50.92'	11.5		
34	26°29.90'	76°07.22'	12.5	4810	4197
	26°29.71'	76°09.61'	12.0		
35	26°29.31'	75°32.34'	12.0	4610	4038
	26°29.44'	75°29.94'	12.5		
36	26°30.20'	74°32.97'	12.0	4460	1665
	26°30.12'	74°30.31'	12.5		

are recorded in the header file and the data are split into downcast and upcast files containing two travel times and pressure (db).

### 3. Velocity Calculation

Given the transponder depths, baseline length, pressure and the travel times, the Pegasus position can be determined. Each station has an associated sound velocity profile used to calculate harmonic mean velocity and thus convert acoustic travel times to distance for input into the position equations. The resulting profiles of X and Y position (in unrotated baseline coordinates) versus depth are smoothed with a seven point convolution. The resulting U and V velocity components are then rotated into a true geographic coordinate system. Each cast produces two profiles: one represents the downcast portion and the other the upcast. Only one profile from each cast is chosen based on a subjective comparison of the up and down profiles and these data for each cruise are presented by increasing cast numbers in Appendix A. The positions represent deployment locations rather than the transponder positions listed in Table 1.

## B. CTD Data

### 1. System Description

The Neil Brown Instrument Mark III CTD system used in STACS includes pressure, temperature, conductivity and oxygen sensors.

The instrument scans at a rate of 30 scans per second. The descent rate is approximately 30 meters per minute to a depth of 200 meters then increases to 60 meters per minute for the remainder of the cast. CTD values are averaged in one decibar increments. Appendix B contains graphic representations of CTD profiles arranged by cruise and cast number. CTD values are listed at selected depths.

### 2. Calibration

Laboratory calibrations are used for the CTD pressure and temperature sensors. CTD pressures are assumed to be accurate to within  $\pm 6.5$  db and CTD temperatures to within  $\pm .005^{\circ}\text{C}$ . Bottle salinities are collected using a rosette sampler lowered with the CTD, with the final values determined using a Guildline Autosol unit. The bottle salinities are used for calibration of the raw CTD data using the methodology described below.

- a. The bottle salinities are edited for obvious bad values by examination of the residual differences between bottle and CTD salinities over the entire water column and by means of graphical comparisons with previous regional STACS and TTO (Williams, 1986a,b) temperature/salinity relationships in the deep water.
- b. The uncalibrated CTD salinity vs. pressure profiles are examined for conductivity sensor changes by examination of the time history of the residual differences between the edited bottle values and the CTD salinities, and divided into calibration subgroups if necessary. An iterative least squares regression is run on the residual (bottle minus

CTD) salinity vs. pressure data sets for each subgroup, and linear or polynomial fits are obtained over appropriate portions of the water column.

- c. The uncalibrated CTD salinity profiles are corrected using the results of the regressions, and the TS correlation is again compared with the bottle salinity values and the historical data set as a final quality check. The calibrated CTD salinity and temperature data are despiked, and a final data set subsampled to 2 db spacing is produced.

Discussions of the bottle salinity quality and CTD performance for the individual cruises, and tabulations of the respective calibration corrections, follow.

#### February-March 1989:

During the February-March 1989 cruise the bottle salinity data quality was high, and little editing was necessary. However, the CTD performance was atypical in terms of the size of the correction needed. The first CTD, used for casts 1-24, required a correction of .071 ppt. This is an order of magnitude larger than previous STACS CTD salinity calibrations, even though the CTD sensors had been recently calibrated. However, the standard deviation around the .071 ppt was only  $\pm .002$  using 95% of the bottle values, indicating high precision.

Between casts 24 and 25 the CTD was changed, and the second CTD also showed a larger than normal offset in the other direction,  $-.011 \pm .002$  ppt. During cast 40 rough weather caused the instrument to hit the side of the ship, which caused a small depth dependence in the required correction to develop. The Autosal malfunctioned during the running of the bottle salinity samples for the last 12 casts. These casts were taken off Abaco, the Bahamas, where the TS correlation is highly predictable, confirming that the CTD sensor calibration had remained steady to at least .003 ppt.

A plot of the time history of the CTD correction is given in Figure 4, and the statistics of the regression analysis for the three calibration subgroups are tabulated below. Plots of the delta (bottle-CTD) vs. pressure values are shown in Figure 5.

#### Casts Calibration Correction

1-24 dS =  $.071 \pm .002$  ppt using 95% of the bottles

25-40 dS =  $-.011 \pm .002$  ppt using 90% of the bottles

41-80 dS =  $-.010 - 1.62e^{-6} * \text{pressure} \pm .002$  ppt using 95% of the bottles

#### August-September 1989

During the August-September 1989 cruise the bottle salinity data were also of high quality. However, the CTD which was used for casts 3-18 showed a pronounced drift within the range of .040 to .020 ppt, and needed to be calibrated on a cast-by-cast basis. Casts 19-54 were done using another CTD unit, and showed agreement with the bottles of  $.000 \pm .002$  ppt, in other words requiring no post-cruise calibration correction. Casts 1 and 2 did not have

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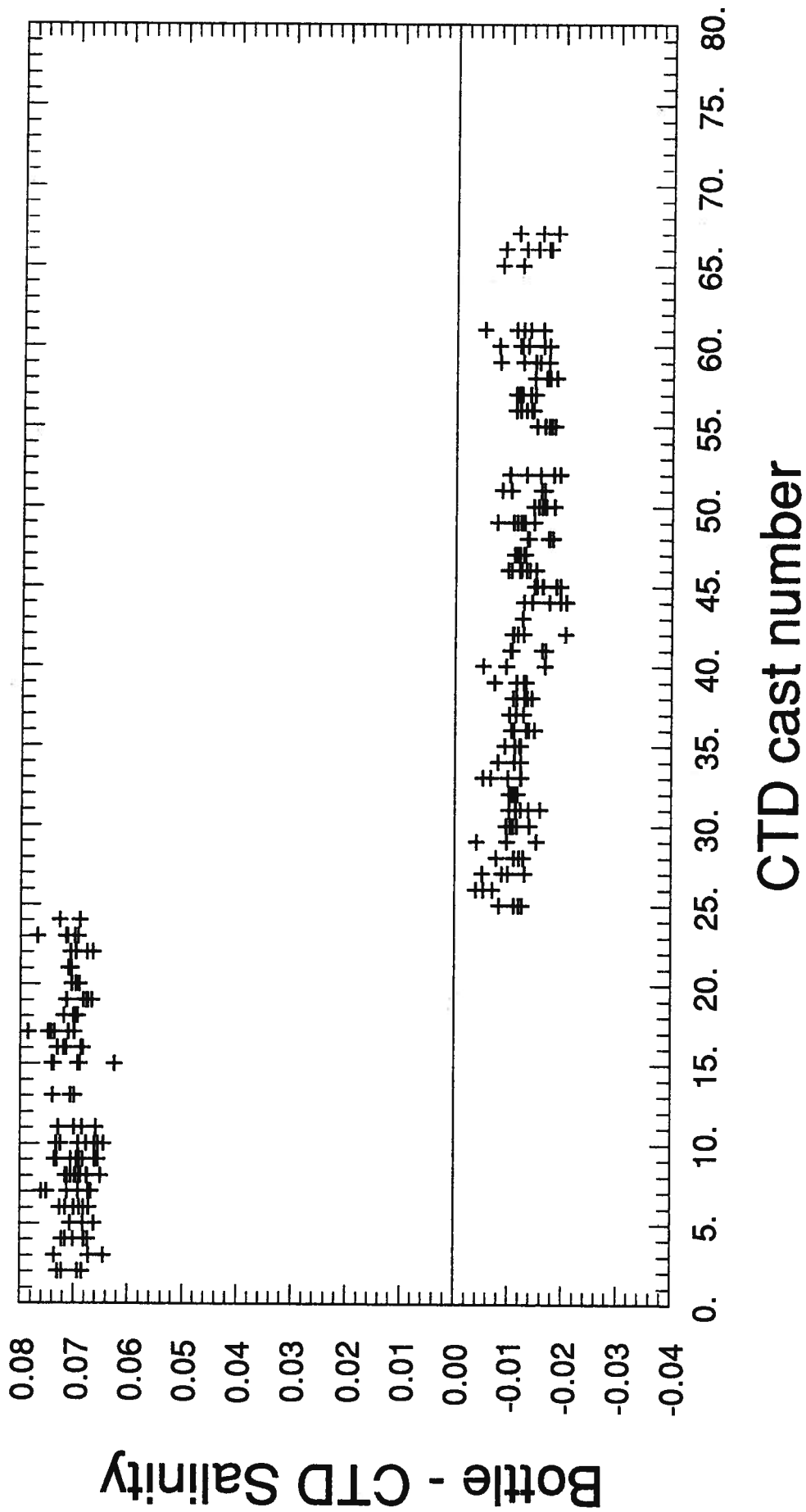


Figure 4. Time history plot of bottle minus CTD salinity vs. cast number for the February 1989 cruise.

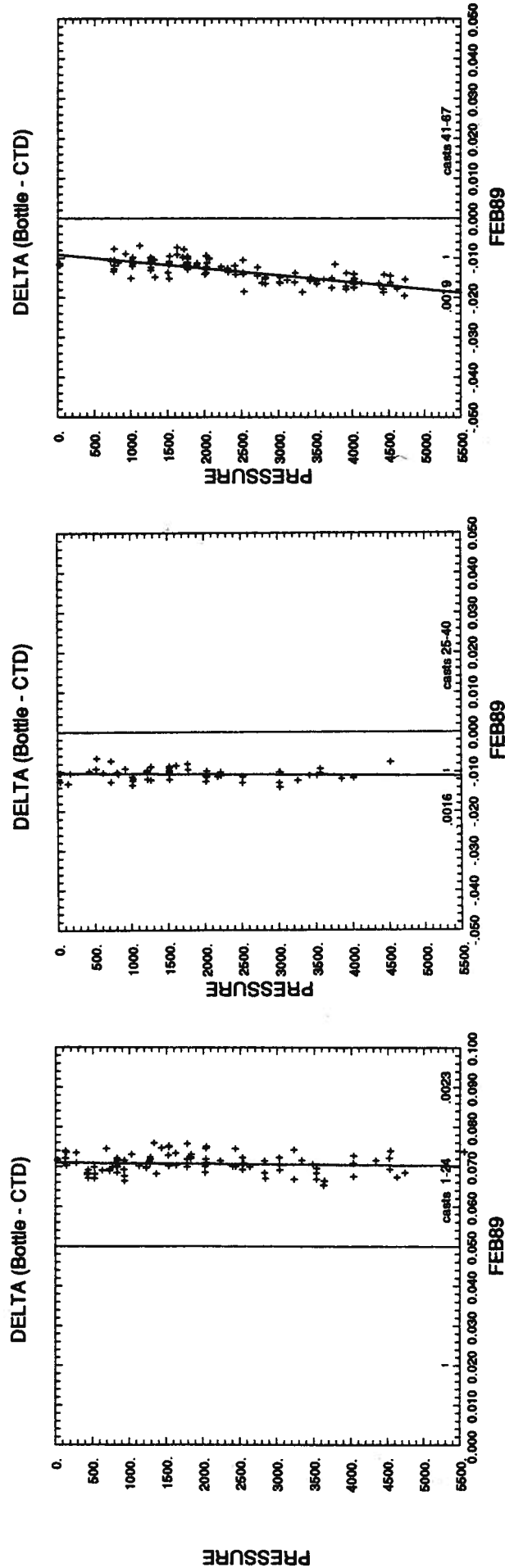


Figure 5. Calibration regression analyses for the February 1989 cruise. Bottle salinity minus uncalibrated CTD salinity values in ppt are shown as +'s vs. pressure in db, and the various linear fits which were used for the calibration are shown as the solid curves. Standard deviation values are indicated at the bottom of each panel.

usable bottle salinity data, but as the same CTD was used as casts 19-54, the same correction was assumed to be valid.

The calibration values used for the three subgroups are tabulated below. A plot of the time history of the CTD correction is shown in Figure 6, and a plot of the delta (bottle-CTD) vs. pressure values is shown in Figure 7.

<u>Casts</u>	<u>Calibration Correction</u>
1,2	.000 (no bottles; same CTD as casts 19-54)
3	.037
4	.038
5	.0385
6	.039
7	.039
8	.0385
9	.038
10	.038
11	.0375
12	.035
13	.033
14	.029
15	.025
16	.023
17	.015 (no bottles; corrected using local TS relationship)
18	.020
19-54	.000 $\pm$ .002 ppt using 96% of the bottles

### C. XBT Data

Appendix C presents XBT data by cruise and cast number.

# AUG89

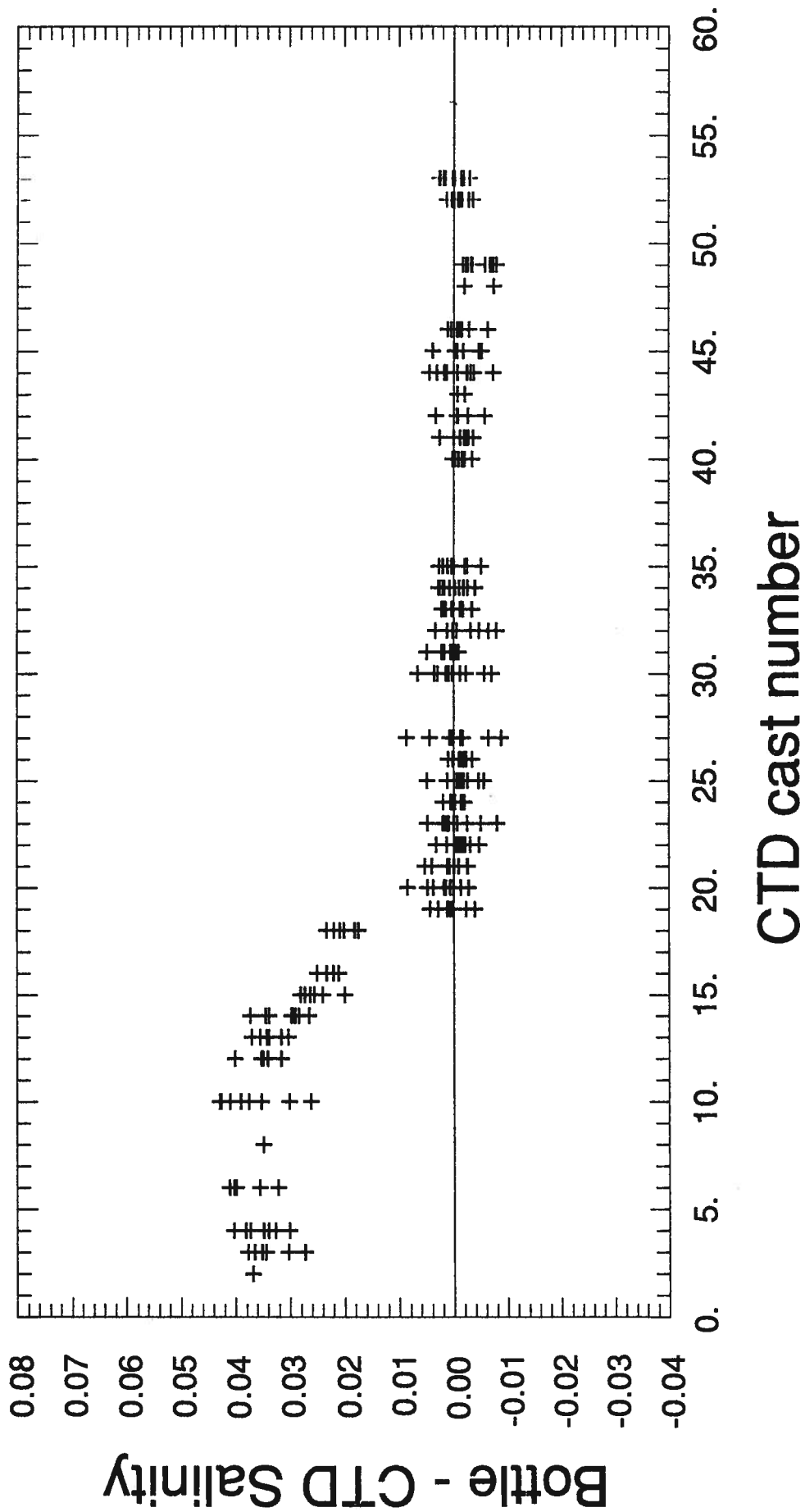


Figure 6. Time history plot of bottle minus CTD salinity vs. cast number for the August 1989 cruise.



# DELTA (Bottle - CTD)

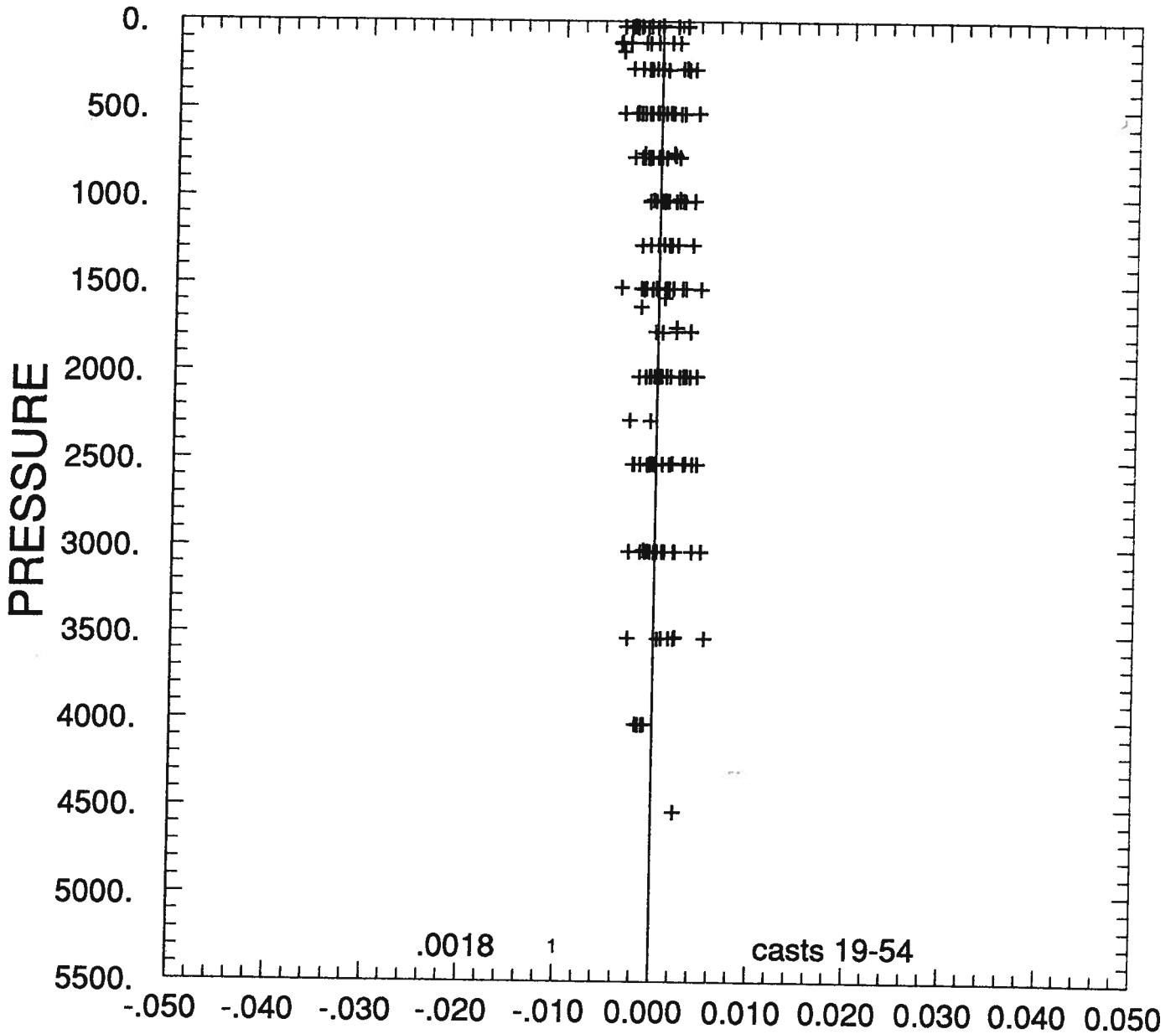


Figure 7. Calibration regression analyses for the August 1989 cruises. Bottle salinity minus uncalibrated CTD salinity values in ppt are shown as '+'s vs. pressure in db. The standard deviation value is indicated at the lower left of the panel.

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#### IV. ACKNOWLEDGMENTS

The extensive efforts of the officers and crew of the NOAA Ships ALBATROSS IV and MALCOLM BALDRIGE are gratefully acknowledged. Contributions by scientific and technical personnel Bob Molinari, Doug Anderson, Bob Roddy, Warren Krug, Mike Minton and Dave Bitterman of NOAA/AOML are greatly appreciated.

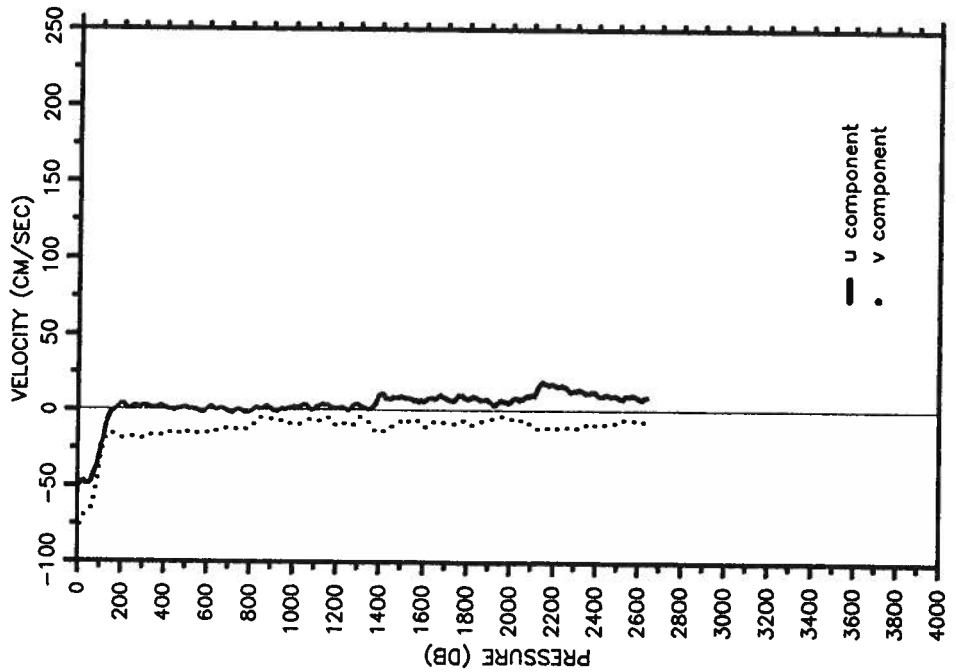
#### APPENDIX A: PEGASUS DATA

Casts are presented by cruise and increasing cast number. The cruise number and vessel, Pegasus cast and station number, Julian day and time, and position are shown at the top of each plot. "U" represents the east component of velocity. "V" represents the north component. Casts where there are no data values given for the U and V components indicate that the transponders signals were not being received by the Pegasus instrument at the given depth.

ALB-STACS33-89 PEGASUS 2 STN 37  
 R/V ALBATROSS IV JDAY 60 TIME 1638 Z  
 Latitude 08.495 N Longitude 052.171 W

Prs U V

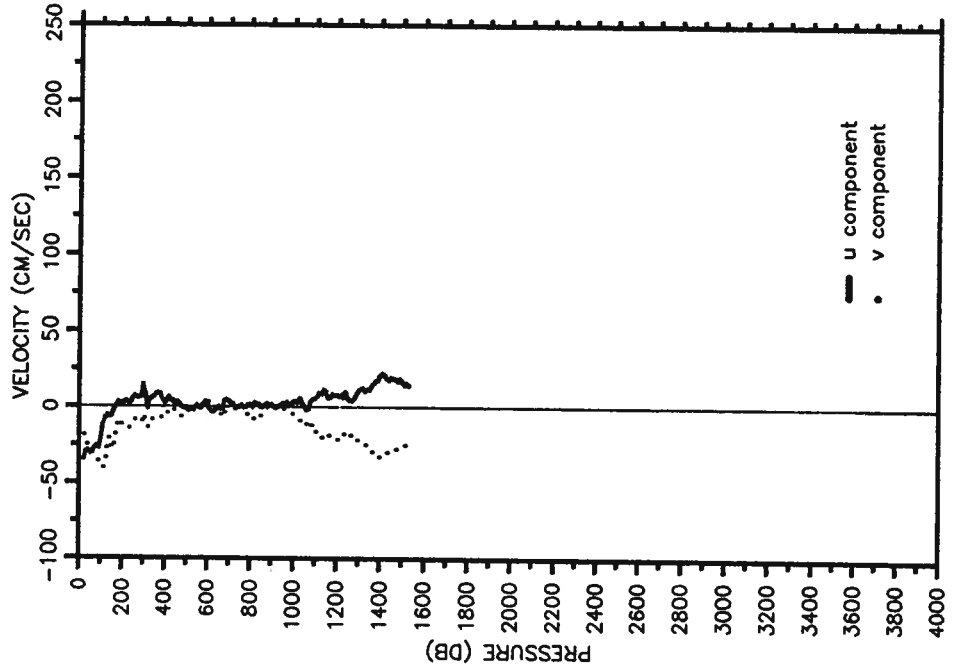
10	-49.6	-76.2
20	-47.8	-72.1
30	-47.7	-69.3
40	-48.8	-68.3
50	-48.9	-67.3
60	-47.6	-65.5
70	-44.8	-61.8
80	-40.8	-55.5
90	-36.6	-46.0
100	-30.8	-36.4
110	-24.6	-27.5
120	-17.9	-21.6
130	-11.5	-18.4
140	-6.8	-16.3
150	-2.8	-16.0
160	-1.0	-16.2
170	-0.2	-16.7
180	1.4	-17.7
190	2.4	-18.6
200	4.0	-19.3
250	1.6	-18.5
300	2.4	-19.0
350	1.7	-17.5
400	1.7	-17.6
450	-0.2	-15.1
500	1.7	-13.9
550	0.0	-15.9
600	0.5	-15.5
650	0.3	-14.6
700	-1.0	-12.1
750	0.2	-13.0
800	-1.2	-12.2
850	1.0	-5.5
900	0.9	-6.3
950	0.8	-7.0
1000	2.2	-9.9
1500	9.2	-6.8
2000	6.1	-5.8
2500	9.7	-7.6
2640	9.1	-6.0



ALB-STACS33-89 PEGASUS 3 STN 38  
 R/V ALBATROSS IV JDAY 61 TIME 0251 Z  
 Latitude 07.789 N Longitude 052.642 W

Prs U V

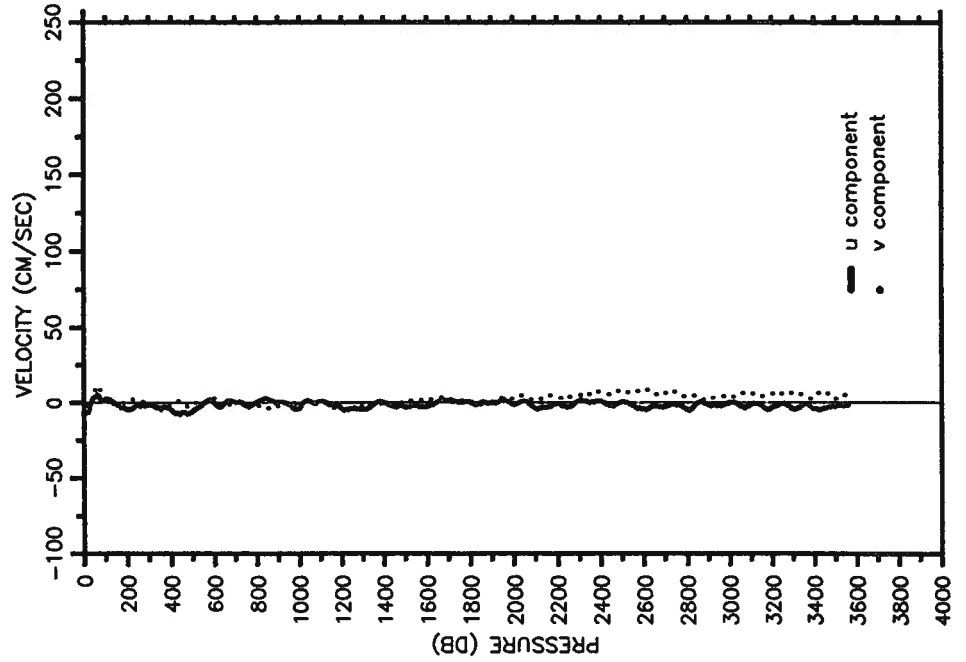
20	-34.8	-18.9
30	-30.2	-23.6
40	-29.3	-26.3
50	-30.3	-28.0
60	-29.8	-31.4
70	-27.6	-34.0
80	-26.2	-34.9
90	-27.2	-36.4
100	-21.2	-39.3
110	-12.6	-41.1
120	-6.8	-36.9
130	-5.6	-21.1
140	-6.7	-20.6
150	-5.8	-28.6
160	-2.5	-26.0
170	0.1	-14.7
180	2.9	-8.8
190	2.2	-9.8
200	1.0	-13.3
250	5.9	-10.0
300	14.6	-5.0
350	6.7	-7.2
400	2.4	-7.5
450	1.7	-3.2
500	-0.7	-2.1
550	1.0	1.0
600	2.5	2.8
650	0.1	-2.3
700	3.7	0.7
750	0.0	-0.5
800	1.3	-8.4
850	-0.1	-5.2
900	1.3	0.0
950	2.1	-0.5
1000	3.4	-5.0
1500	17.0	-24.2
1530	14.7	-27.0



ALB-STACS33-89 PEGASUS 4 STN 36  
 R/V ALBATROSS IV JDAY 72 TIME 0454 Z  
 Latitude 26.454 N Longitude 074.503 W

Prs U V

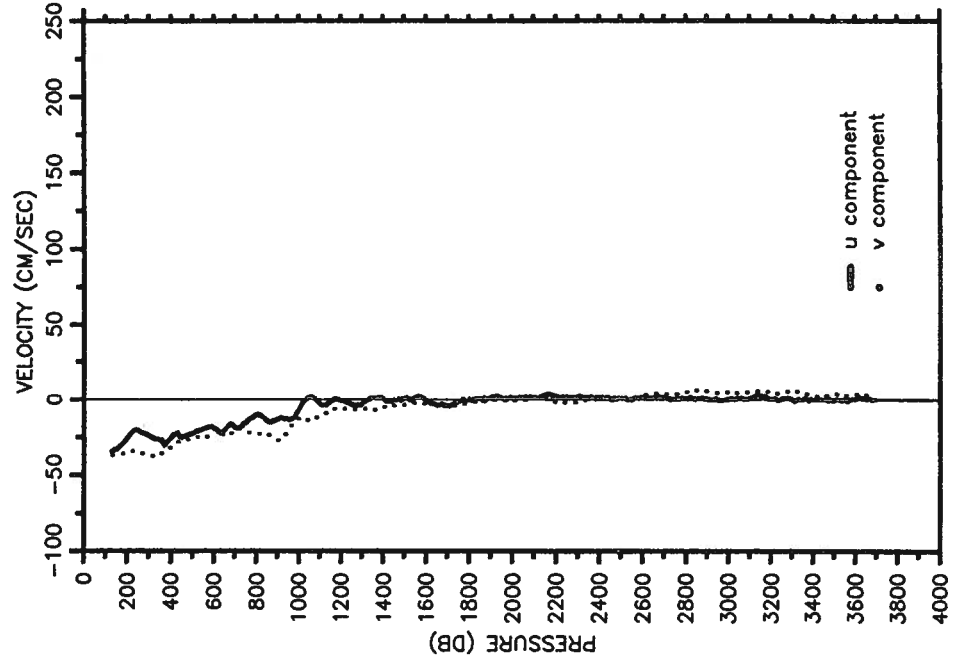
10	-6.5	-2.2
20	-6.1	-6.2
30	-0.8	-1.2
40	3.2	5.4
50	4.3	9.8
60	5.5	11.9
70	4.6	10.2
80	1.9	6.4
90	1.6	4.3
100	2.1	2.6
110	2.4	1.0
120	2.2	-0.5
130	1.0	-0.8
140	-0.1	-0.9
150	-1.3	-0.9
160	-2.2	-0.3
170	-3.1	0.5
180	-2.8	0.0
190	-4.2	0.9
200	-4.7	1.7
250	-1.8	1.9
300	-1.7	0.3
350	-3.5	-5.1
400	-4.8	-0.9
450	-6.8	0.3
500	-5.7	-1.2
550	-0.5	-0.6
600	-0.3	3.4
650	-0.4	-2.8
700	0.6	0.3
750	-1.9	-0.2
800	0.6	-2.6
850	2.7	-3.7
900	0.4	-2.5
950	-1.2	0.2
1000	-3.5	0.7
1500	-2.8	0.8
2000	-1.3	3.7
2500	0.4	8.5
3000	-0.1	3.8
3500	-2.3	3.2
3560	-1.8	6.5



ALB-STACS33-89 PEGASUS 5 STN 35  
 R/V ALBATROSS IV JDAY 72 TIME 1642 Z  
 Latitude 26.467 N Longitude 075.531 W

Prs U V

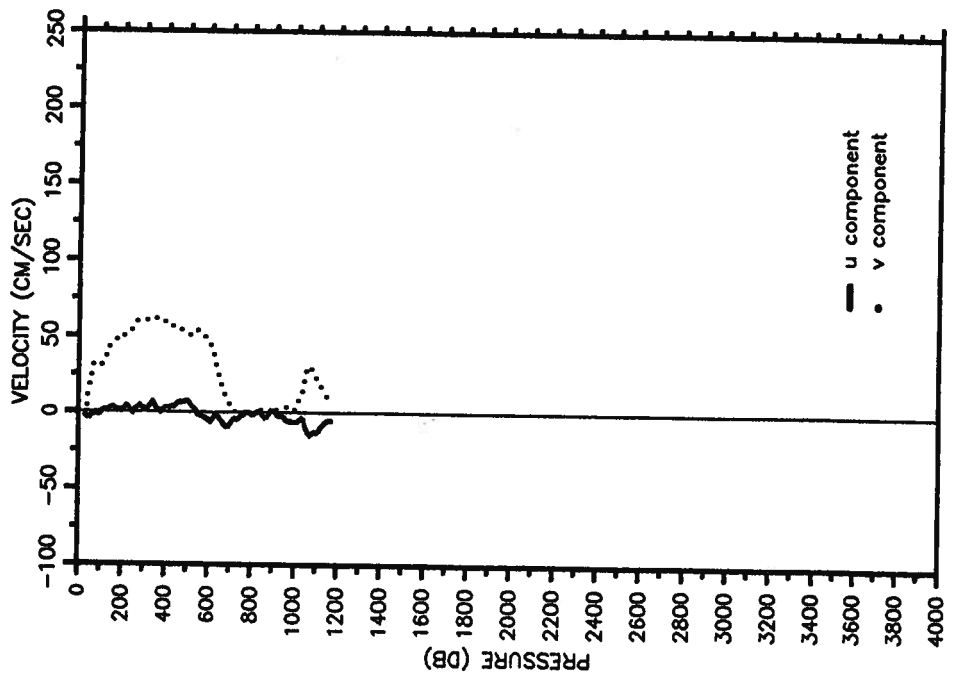
130	-34.5	-37.2
140	-33.5	-36.9
150	-32.9	-36.8
160	-31.8	-36.8
170	-30.5	-36.4
180	-28.1	-35.8
190	-27.6	-35.3
200	-26.0	-35.0
250	-20.9	-34.5
300	-24.1	-36.7
350	-27.2	-36.6
400	-25.3	-31.4
450	-25.1	-28.4
500	-23.0	-25.6
550	-19.8	-25.7
600	-19.0	-21.0
650	-20.4	-24.1
700	-18.7	-19.5
750	-15.2	-21.4
800	-10.2	-22.9
850	-14.6	-23.2
900	-13.2	-26.9
950	-13.2	-19.7
1000	-6.3	-12.3
1500	0.6	-3.9
2000	1.0	-1.0
2500	0.8	0.7
3000	0.2	4.7
3500	-0.2	3.8
3690	0.0	5.1



ALB-STACS33-89 PEGASUS 7 STN 19  
 R/V ALBATROSS IV JDAY 73 TIME 1126 Z  
 Latitude 26.531 N Longitude 076.821 W

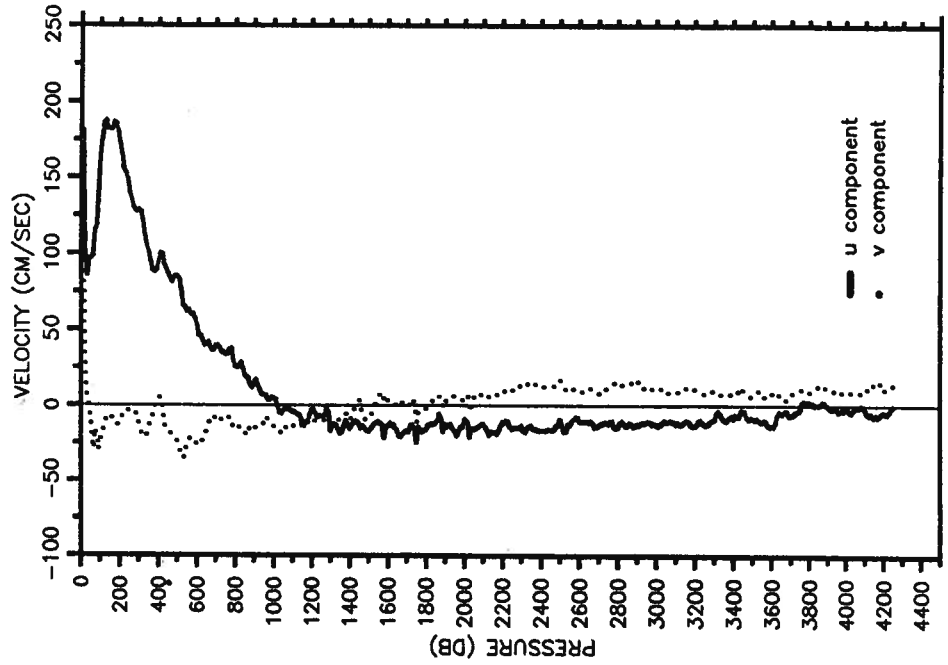
Prs U V

30	-2.5	-2.1
40	-3.6	10.9
50	-3.3	19.6
60	-2.1	27.1
70	-1.5	31.7
80	-1.2	32.6
90	-1.8	30.6
100	-1.0	30.8
110	0.7	31.8
120	1.2	34.6
130	0.9	39.2
140	1.1	43.9
150	3.0	45.2
160	3.3	46.0
170	2.3	47.5
180	1.3	50.1
190	1.5	50.9
200	1.1	50.2
250	-0.4	56.8
300	2.7	60.1
350	5.6	61.8
400	2.8	60.0
450	5.2	53.9
500	7.7	51.7
550	-1.1	54.1
600	-5.2	46.6
650	-4.1	21.6
700	-7.4	4.1
750	-2.2	-2.1
800	-1.1	-1.4
850	-1.8	0.7
900	1.0	1.6
950	-3.3	3.2
1000	-6.1	2.1
1170	-5.5	6.9



MB-STACS34-89 PEGASUS 1 STN 39  
 R/V BALDRIGE JDAY 253 TIME 0315  
 Latitude 07.518 N Longitude 049.958 W

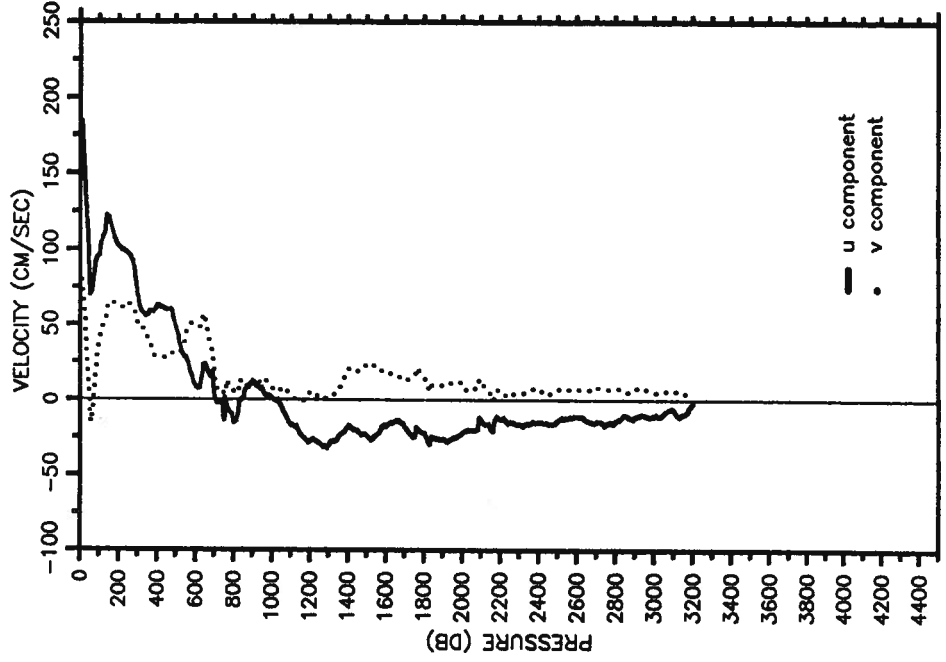
Prs U V



10	180.5	87.7
20	102.2	16.6
30	85.9	5.2
40	96.2	-3.0
50	97.0	-13.7
60	98.9	-29.8
70	115.5	-15.6
80	119.2	-21.9
90	137.5	-29.9
100	164.8	-21.3
110	175.6	-16.9
120	186.2	-11.4
130	187.2	-8.2
140	181.7	-6.7
150	182.0	-8.8
160	181.7	-8.2
170	186.2	-8.4
180	185.2	-12.4
190	180.4	-12.8
200	172.5	-10.7
250	139.9	-5.0
300	128.4	-13.8
350	100.7	-12.8
400	94.6	5.2
450	86.5	-18.2
500	85.1	-25.0
550	61.9	-25.6
600	52.6	-25.8
650	40.7	-14.3
700	39.3	-6.3
750	33.8	-9.9
800	25.9	-14.9
850	19.7	-18.8
900	14.9	-15.3
950	7.2	-8.8
1000	4.5	-14.5
1500	-17.2	-7.9
2000	-9.3	6.2
2500	-9.5	17.4
3000	-13.0	10.9
3500	-8.7	7.5
4000	-1.4	8.2
4250	-0.5	14.4

MB-STACS34-89 PEGASUS 2 STN 40  
 R/V BALDRIGE JDAY 253 TIME 1610  
 Latitude 07.102 N Longitude 050.327 W

Prs U V

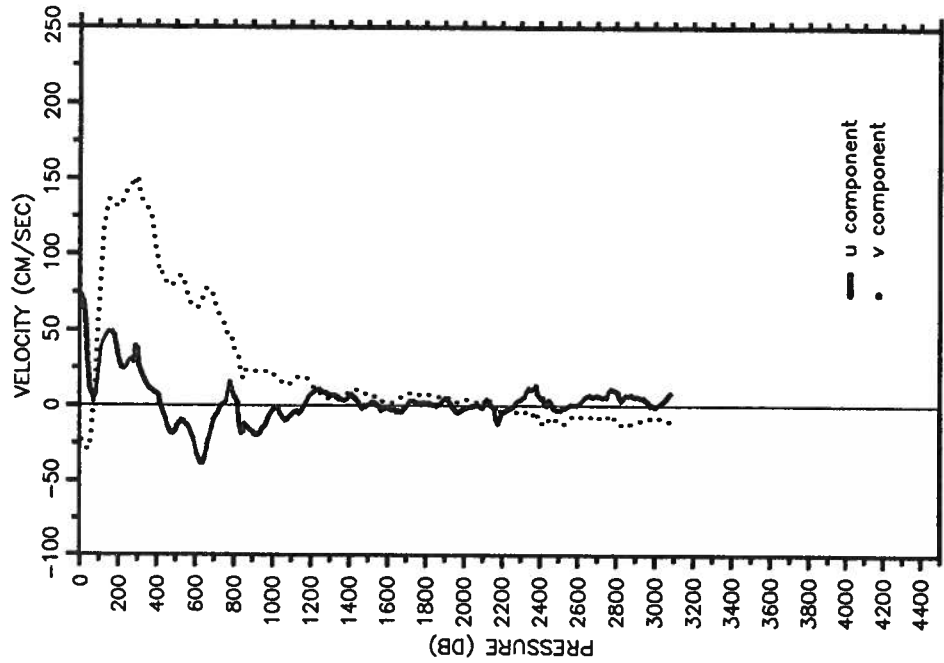


10	184.1	79.5
20	156.8	57.9
30	131.6	33.9
40	110.3	15.0
50	69.7	-16.0
60	73.0	-7.8
70	82.8	7.1
80	92.5	24.9
90	94.7	33.9
100	96.2	38.1
110	104.3	47.6
120	108.3	50.8
130	111.7	53.2
140	122.1	62.9
150	121.1	62.5
160	117.0	62.1
170	112.6	64.0
180	107.4	63.0
190	104.6	63.4
200	102.6	63.0
250	69.2	48.3
300	56.4	40.8
400	62.3	28.3
450	60.0	28.8
500	48.5	29.4
550	28.1	44.4
600	8.9	49.5
650	23.4	52.0
700	3.3	12.5
750	-13.3	0.0
800	-14.9	4.0
850	1.9	11.4
900	7.6	14.9
1000	1.1	7.6
1500	-24.0	23.5
2000	-21.6	9.9
2500	-13.8	7.0
3000	-10.6	5.3
3200	-2.0	6.5



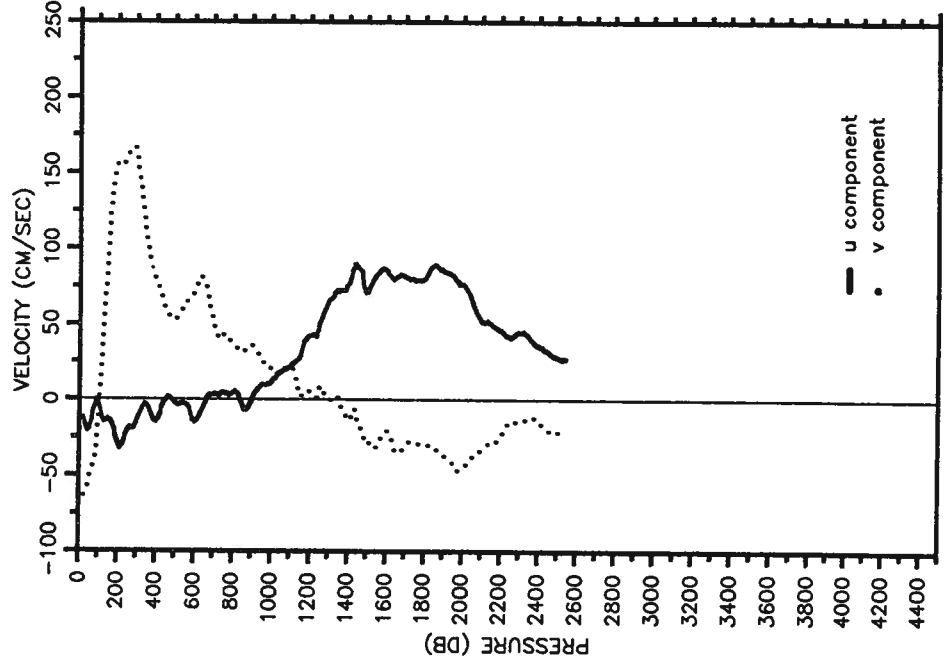
MB-STACS34-89 PEGASUS 3 STN 41  
 R/V BALDRIGE JDAY 254 TIME 0053  
 Latitude 06.675 N Longitude 050.669 W

Prs U V



MB-STACS34-89 PEGASUS 4 STN 42  
 R/V BALDRIGE JDAY 254 TIME 1038  
 Latitude 06.222 N Longitude 051.048 W

Prs U V

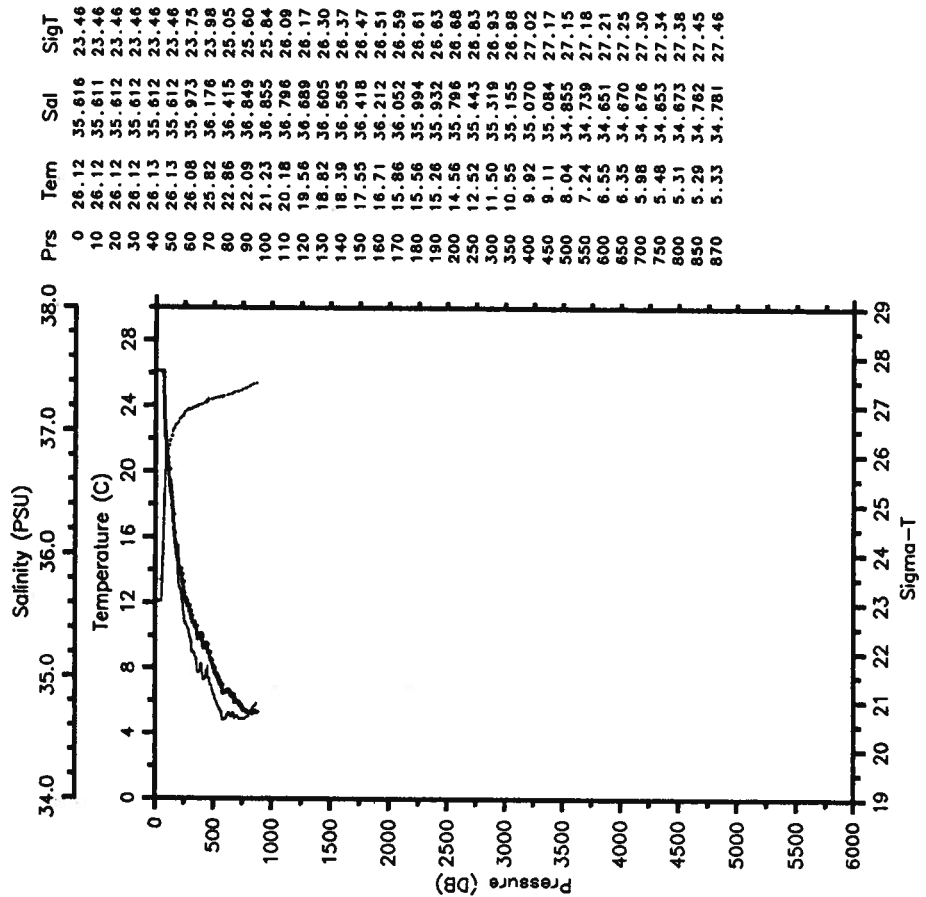


#### APPENDIX B: CTD DATA

Casts are presented by cruise and increasing cast number. Julian day and time, cruise number and vessel, and position are given at the top of each plot. Temperature, salinity and sigma-t profiles are shown for each cast.

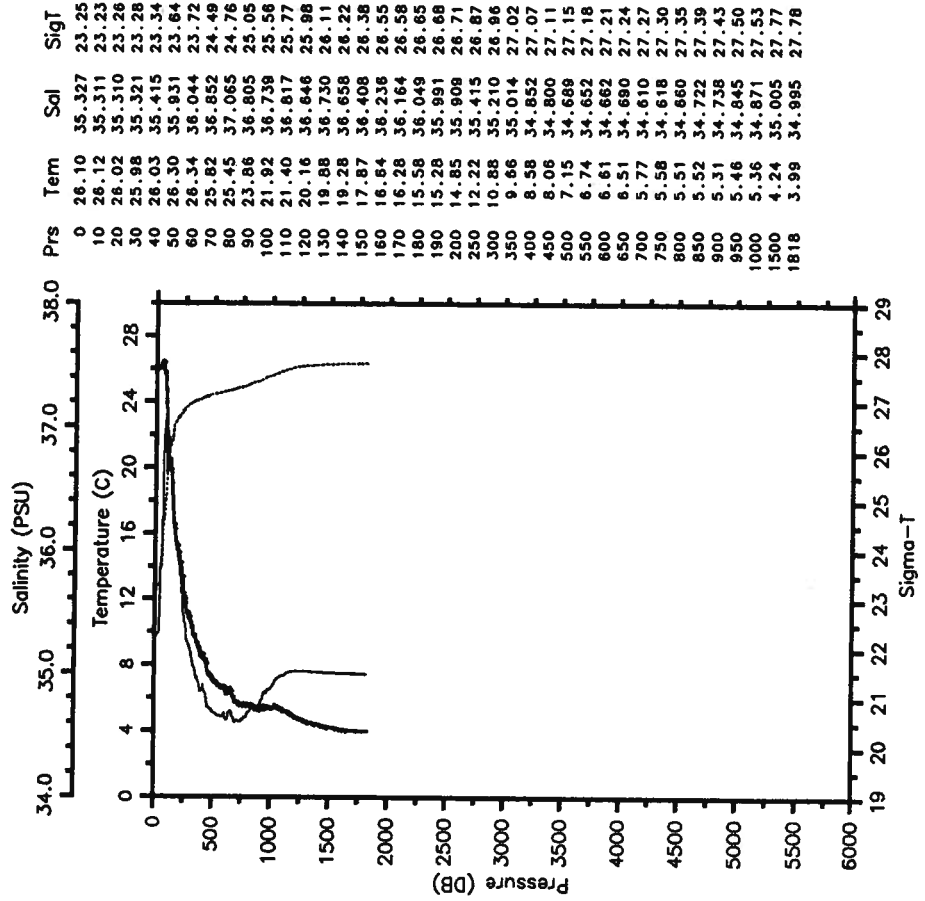
ALB-STACS33-89 CTD 1 ALBATROSS IV  
 Date 02 14 89 Latitude 11.322 N  
 Time 1243 Z Longitude 60.298 W

— Tem — Sal  
 ..... SigT



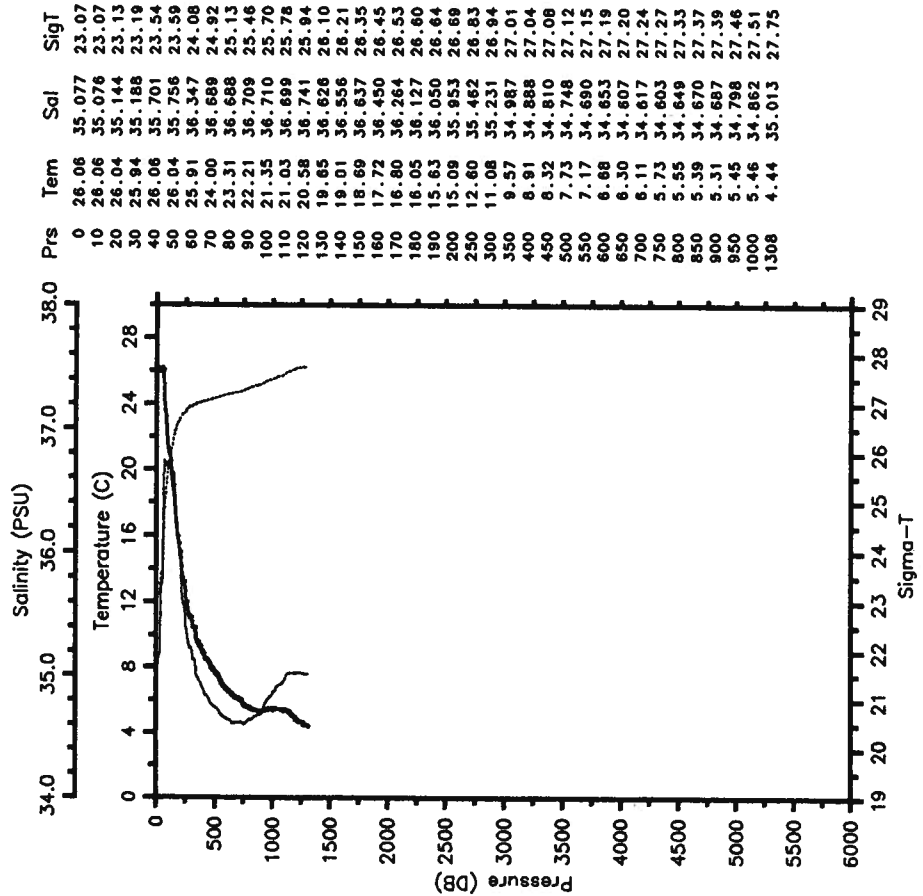
ALB-STACS33-89 CTD 2 ALBATROSS IV  
 Date 02 14 89 Latitude 11.705 N  
 Time 1745 Z Longitude 60.102 W

— Tem — Sal  
 ..... SigT



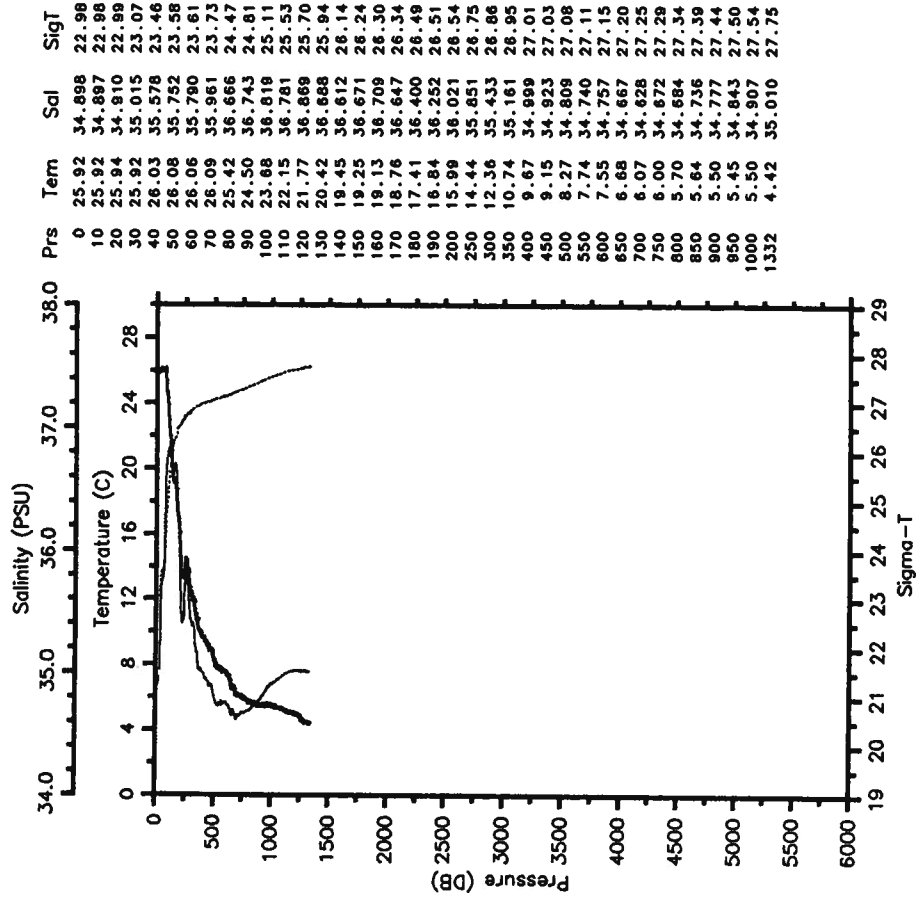
ALB-STACS33-89 CTD 3 ALBATROSS IV  
 Date 02 14 89 Latitude 12.118 N  
 Time 2218 Z Longitude 59.922 W

— Tem — Sal  
 .... SigT



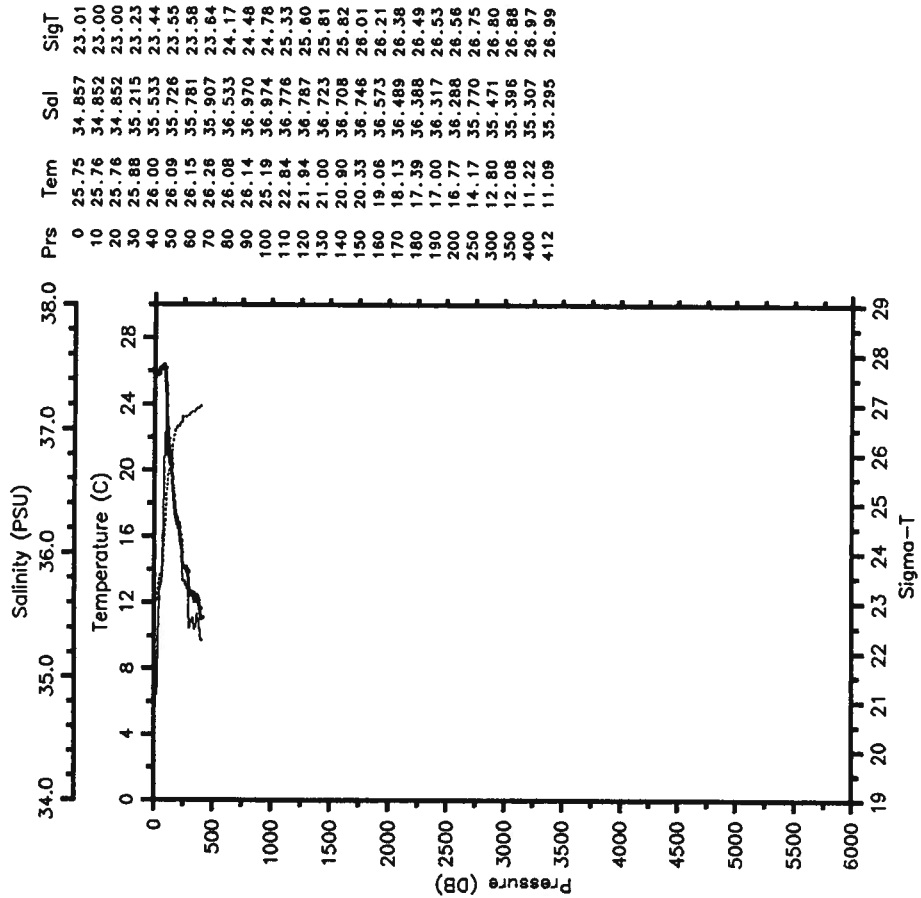
ALB-STACS33-89 CTD 4 ALBATROSS IV  
 Date 02 15 89 Latitude 12.570 N  
 Time 0200 Z Longitude 59.755 W

— Tem — Sal  
 .... SigT



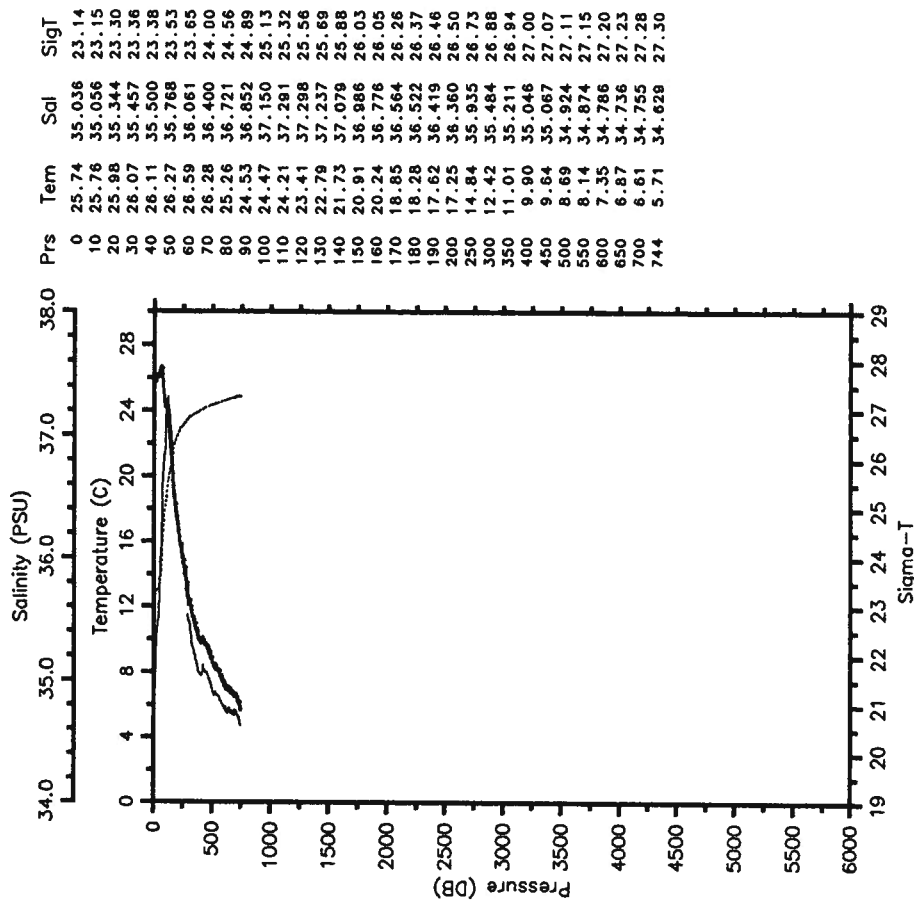
ALB-STACS33-89 CTD 5 ALBATROSS IV  
 Date 02 15 89 Latitude 12.898 N  
 Time 0534 Z Longitude 59.495 W

— Tem — Sal  
 ..... SigT



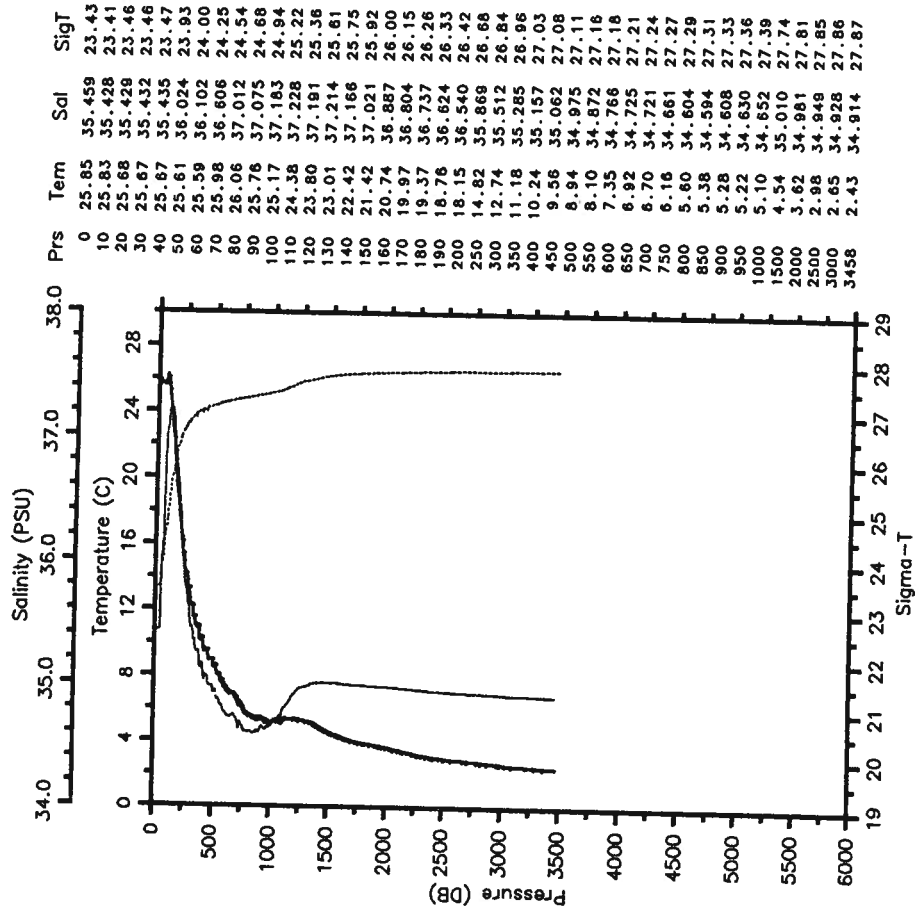
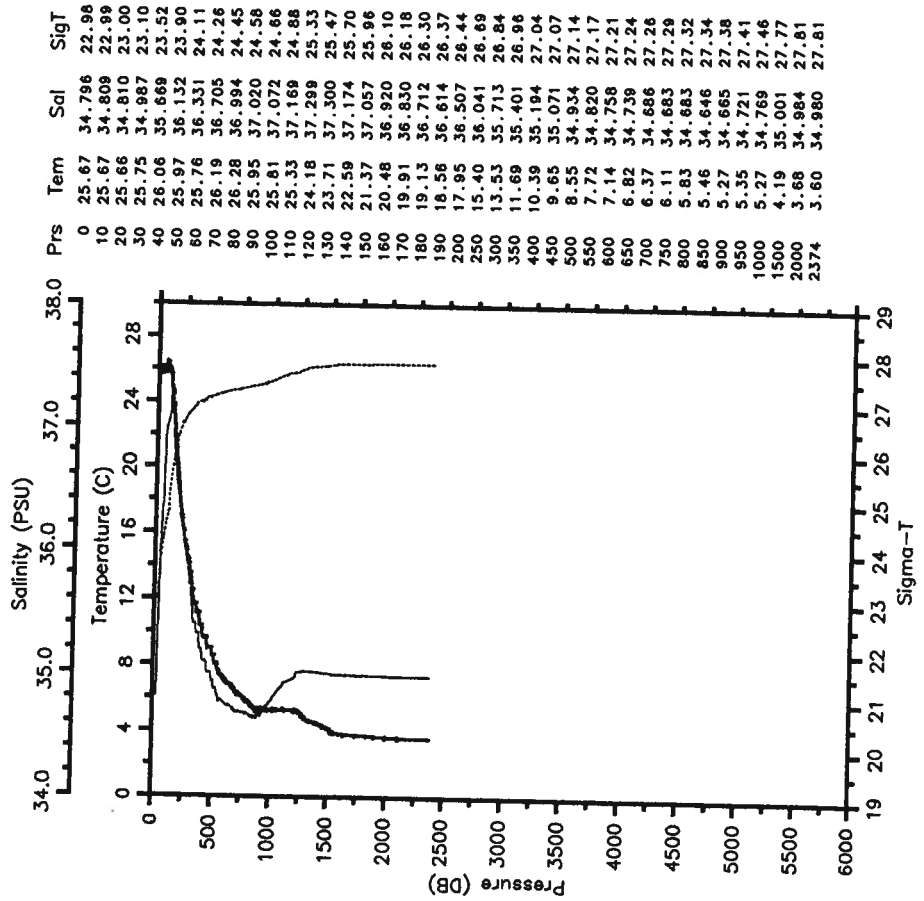
ALB-STACS33-89 CTD 6 ALBATROSS IV  
 Date 02 15 89 Latitude 13.203 N  
 Time 0919 Z Longitude 59.115 W

— Tem — Sal  
 ..... SigT



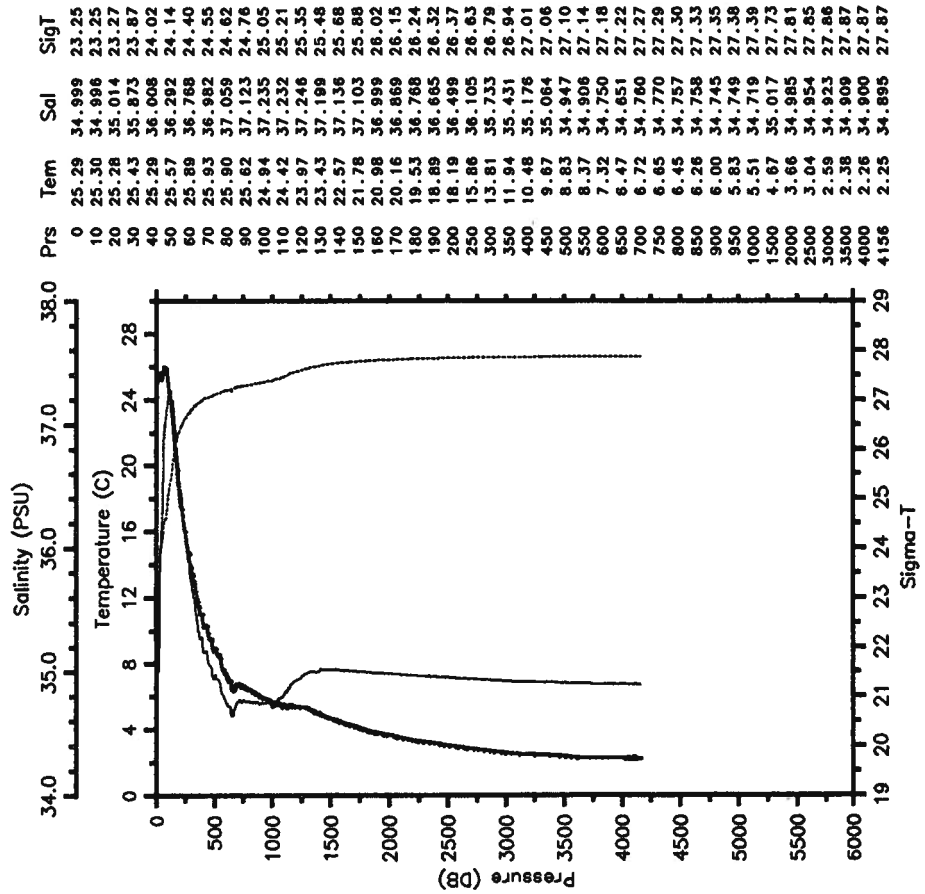
ALB-STACS33-89 CTD 7 ALBATROSS IV  
 Date 02 15 89 Latitude 13.533 N  
 Time 1320 Z Longitude 58.702 W

ALB-STACS33-89 CTD 8 ALBATROSS IV  
 Date 02 15 89 Latitude 13.850 N  
 Time 1756 Z Longitude 58.298 W



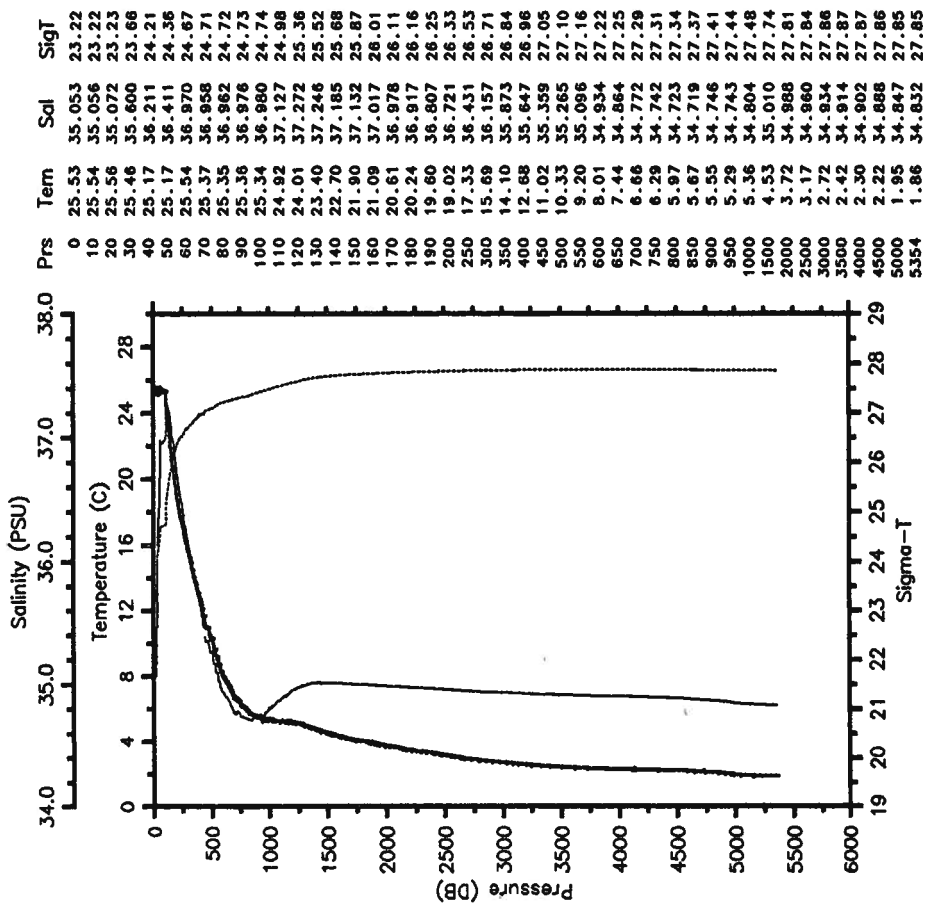
ALB-STACS33-89 CTD 9 ALBATROSS IV  
 Date 02 15 89 Latitude 14.232 N  
 Time 2309 Z Longitude 57.925 W

— Tem — Sal  
 - - - - - SigT

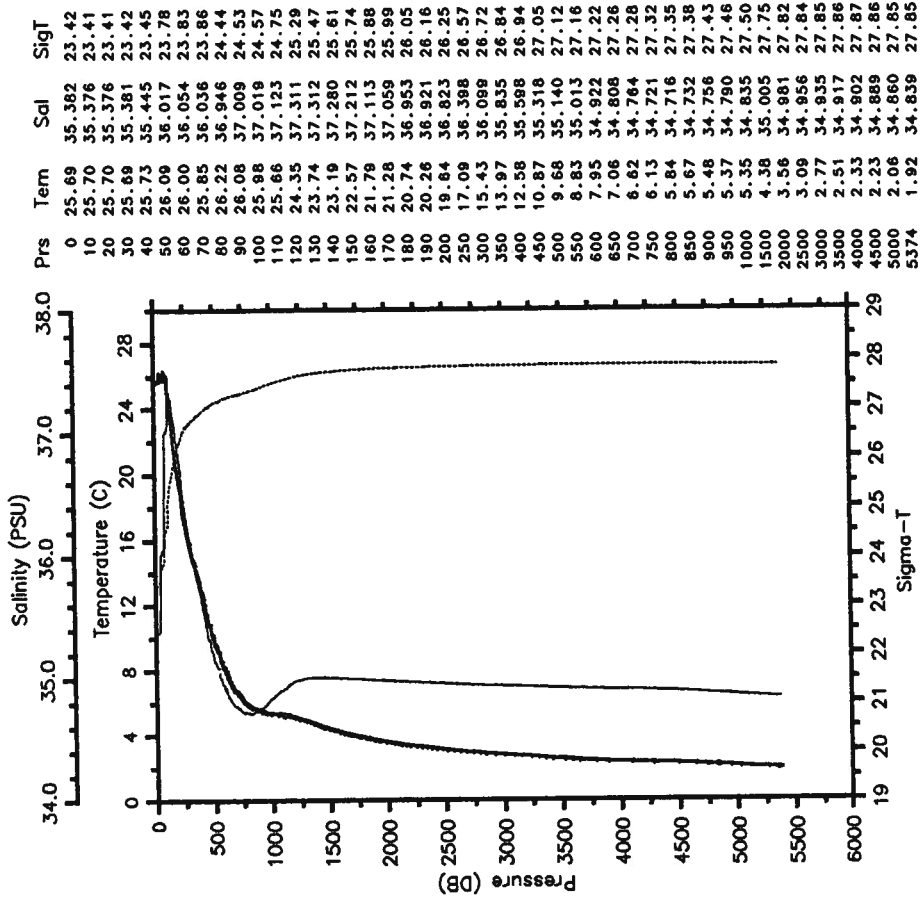


ALB-STACS33-89 CTD 10 ALBATROSS IV  
 Date 02 16 89 Latitude 14.523 N  
 Time 0432 Z Longitude 57.510 W

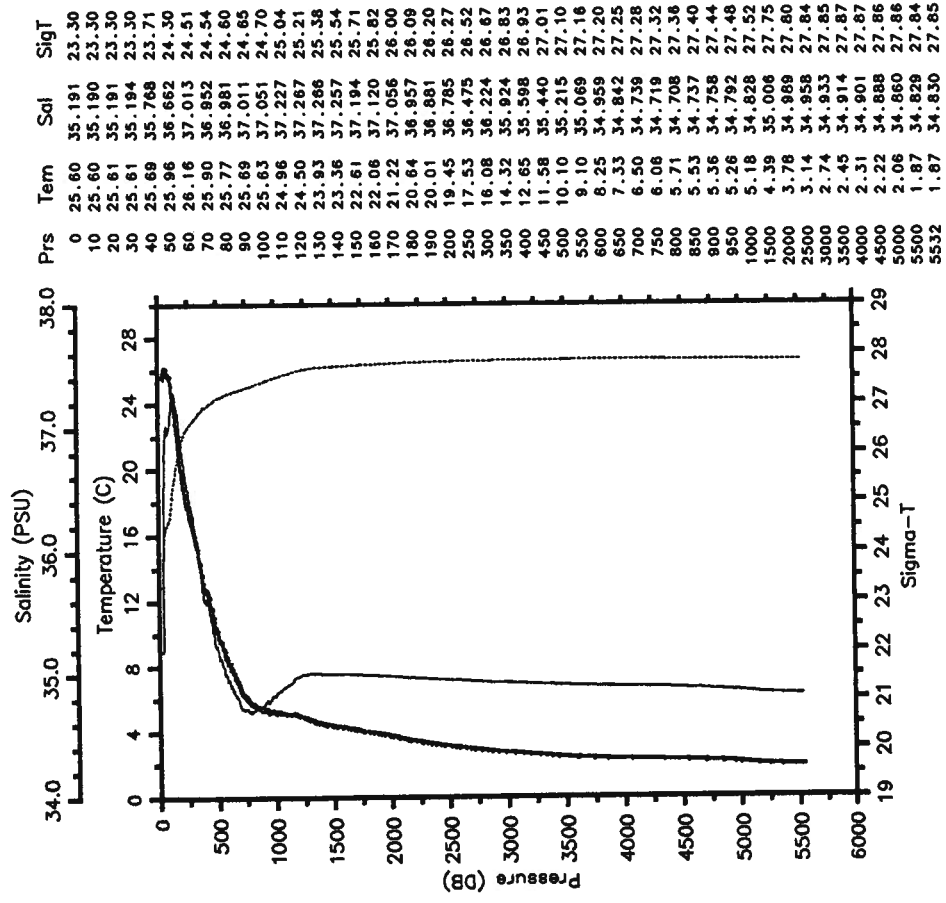
— Tem — Sal  
 - - - - - SigT



ALB-STACS33-89 CTD 12 ALBATROSS IV  
 Date 02 16 89 Latitude 14.520 N  
 Time 1924 Z Longitude 56.552 W



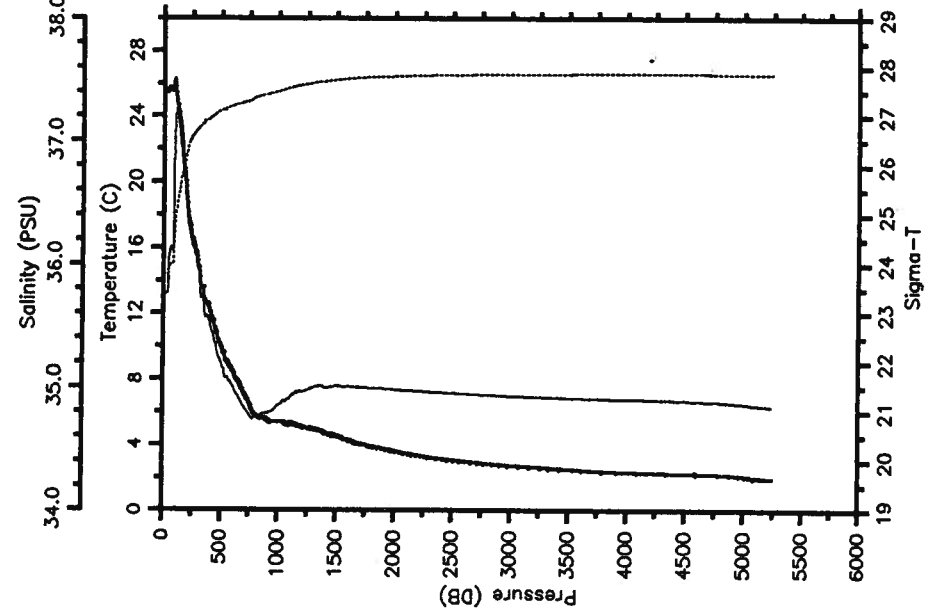
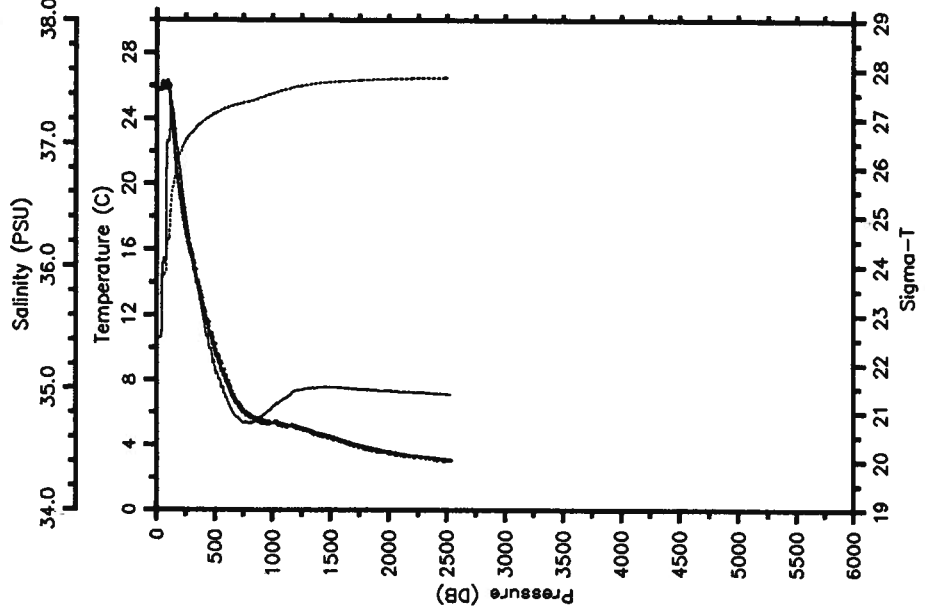
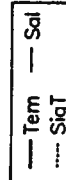
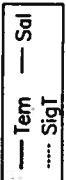
ALB-STACS33-89 CTD 11 ALBATROSS IV  
 Date 02 16 89 Latitude 14.507 N  
 Time 1205 Z Longitude 57.010 W





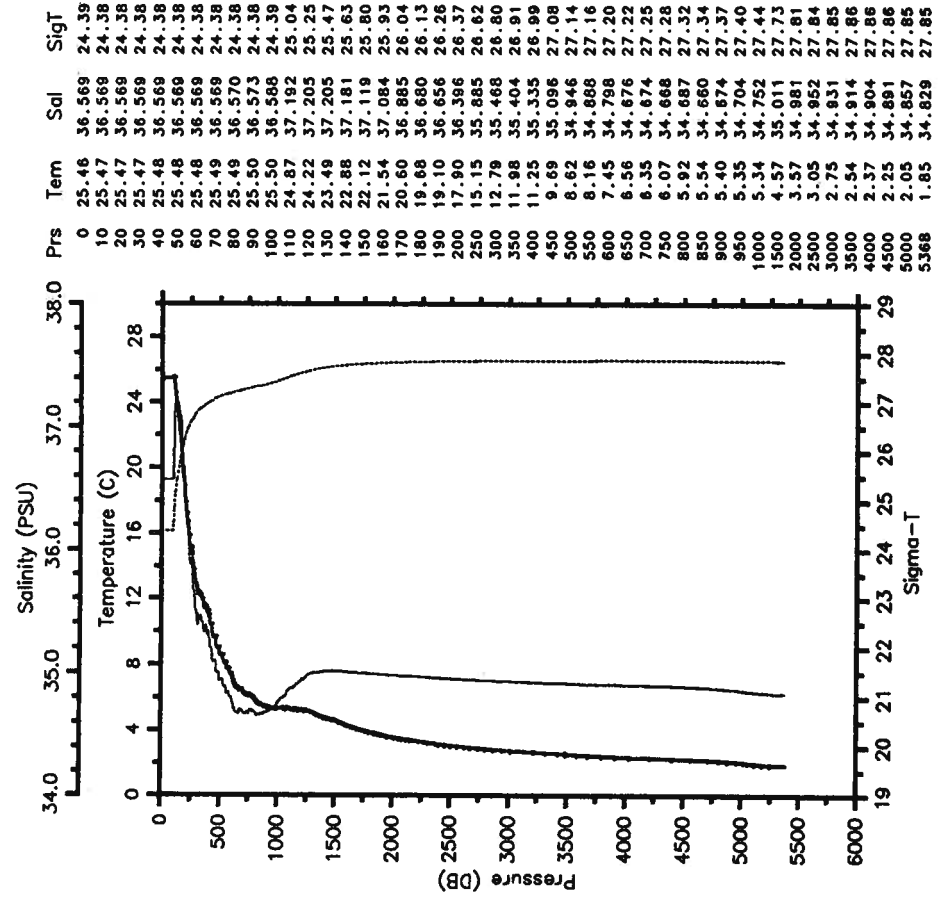
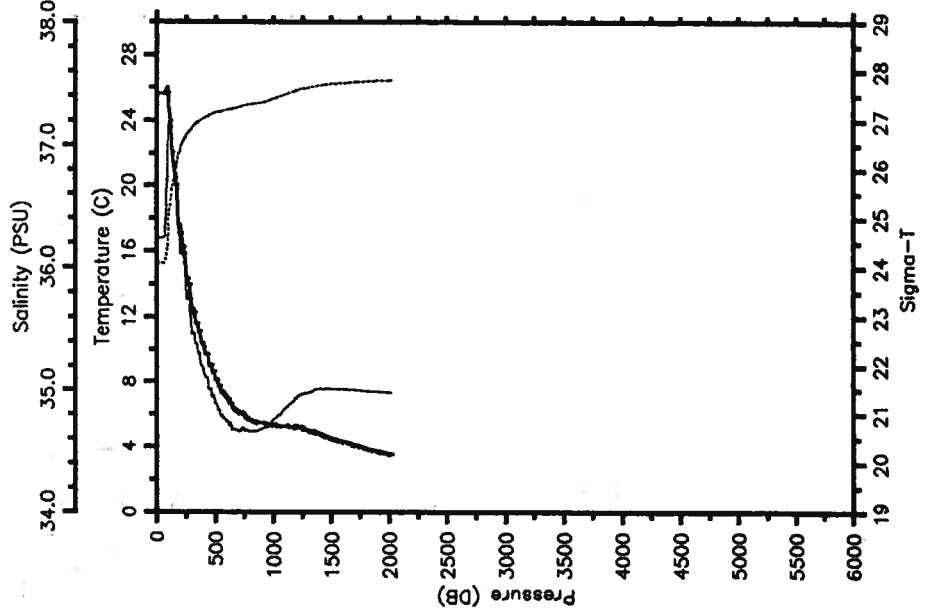
ALB-STACS33-89 CTD 13 ALBATROSS IV  
 Date 02 16 89 Latitude 14.535 N  
 Time 2327 Z Longitude 56.560 W

ALB-STACS33-89 CTD 14 ALBATROSS IV  
 Date 02 17 89 Latitude 14.510 N  
 Time 0506 Z Longitude 56.025 W



ALB-STACS33-89 CTD 15 ALBATROSS IV  
 Date 02 17 89 Latitude 14.512 N  
 Time 1607 Z Longitude 55.303 W

— Tem — Sal  
 ---- SigT



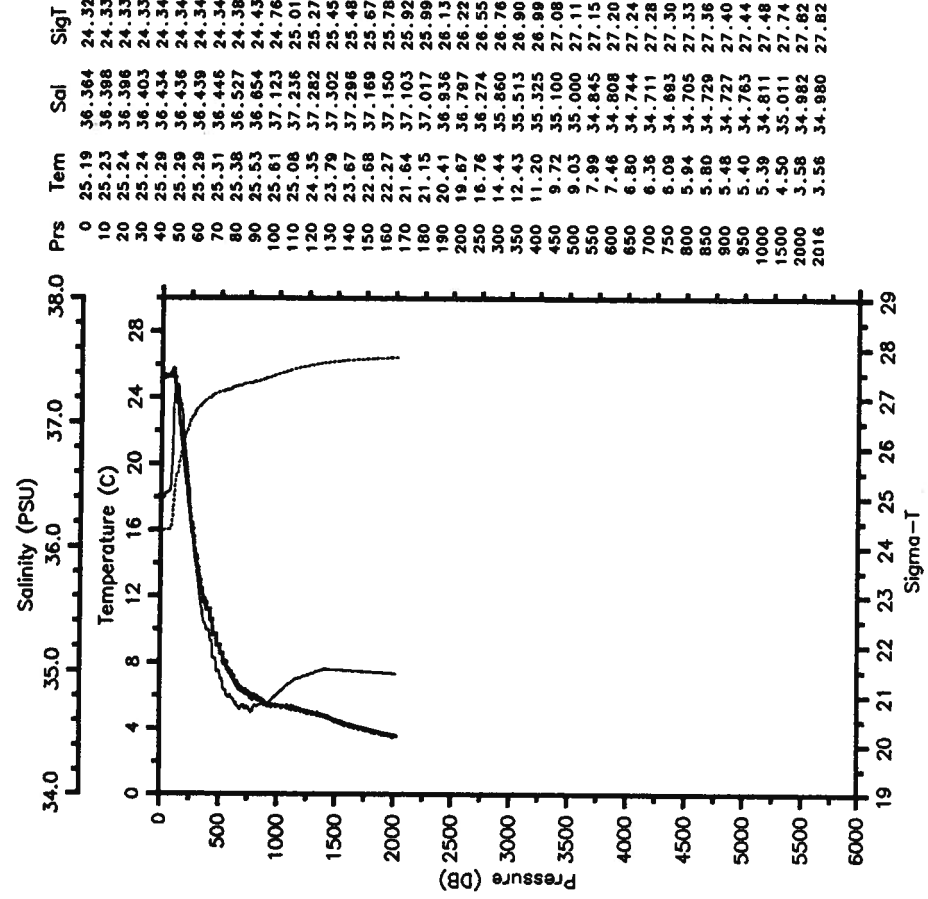
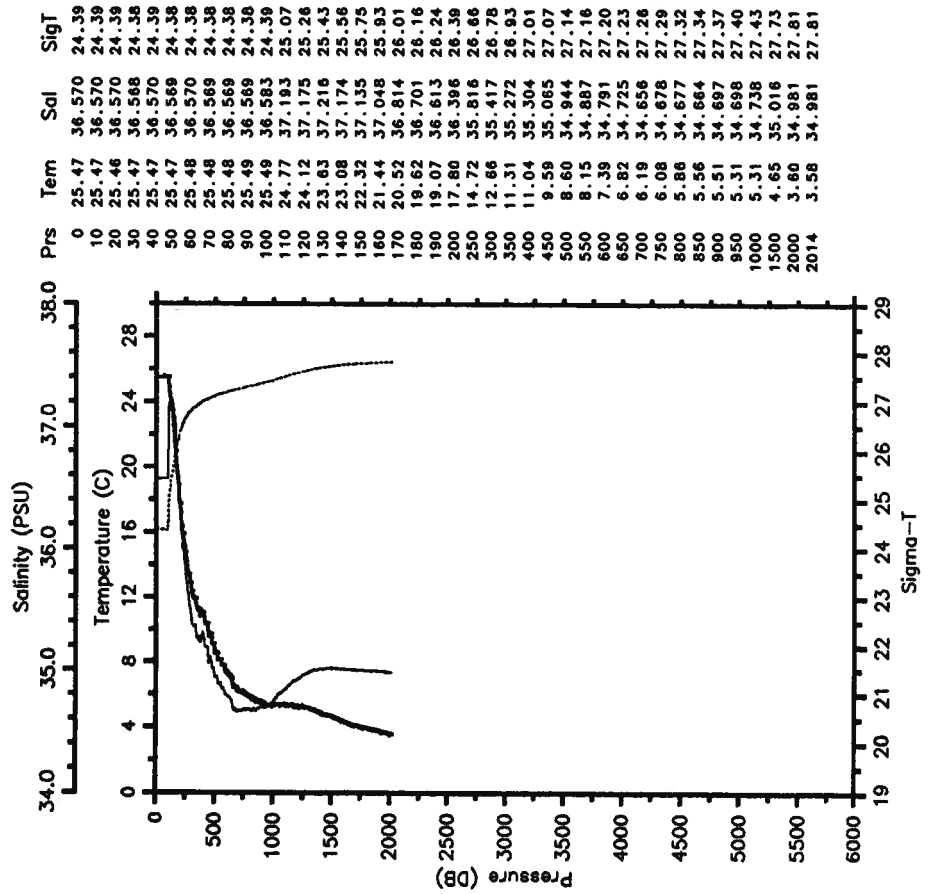
ALB-STACS33-89 CTD 16 ALBATROSS IV  
 Date 02 17 89 Latitude 14.525 N  
 Time 2258 Z Longitude 54.538 W

— Tem — Sal  
 ---- SigT

Pressure (DB)	Salinity (PSU)	Temperature (C)	Sigma-T
0	35.31	24.00	19.50
10	35.32	23.98	19.51
20	35.33	23.96	19.52
30	35.34	23.94	19.53
40	35.35	23.92	19.54
50	35.36	23.90	19.55
60	35.37	23.88	19.56
70	35.38	23.86	19.57
80	35.39	23.84	19.58
90	35.40	23.82	19.59
100	35.41	23.80	19.60
110	35.42	23.78	19.61
120	35.43	23.76	19.62
130	35.44	23.74	19.63
140	35.45	23.72	19.64
150	35.46	23.70	19.65
160	35.47	23.68	19.66
170	35.48	23.66	19.67
180	35.49	23.64	19.68
190	35.50	23.62	19.69
200	35.51	23.60	19.70
250	35.52	23.58	19.71
300	35.53	23.56	19.72
350	35.54	23.54	19.73
400	35.55	23.52	19.74
450	35.56	23.50	19.75
500	35.57	23.48	19.76
550	35.58	23.46	19.77
600	35.59	23.44	19.78
650	35.60	23.42	19.79
700	35.61	23.40	19.80
750	35.62	23.38	19.81
800	35.63	23.36	19.82
850	35.64	23.34	19.83
900	35.65	23.32	19.84
950	35.66	23.30	19.85
1000	35.67	23.28	19.86
1500	35.68	23.26	19.87
2000	35.69	23.24	19.88
2500	35.70	23.22	19.89
3000	35.71	23.20	19.90
3500	35.72	23.18	19.91
4000	35.73	23.16	19.92
4500	35.74	23.14	19.93
5000	35.75	23.12	19.94
5500	35.76	23.10	19.95
6000	35.77	23.08	19.96

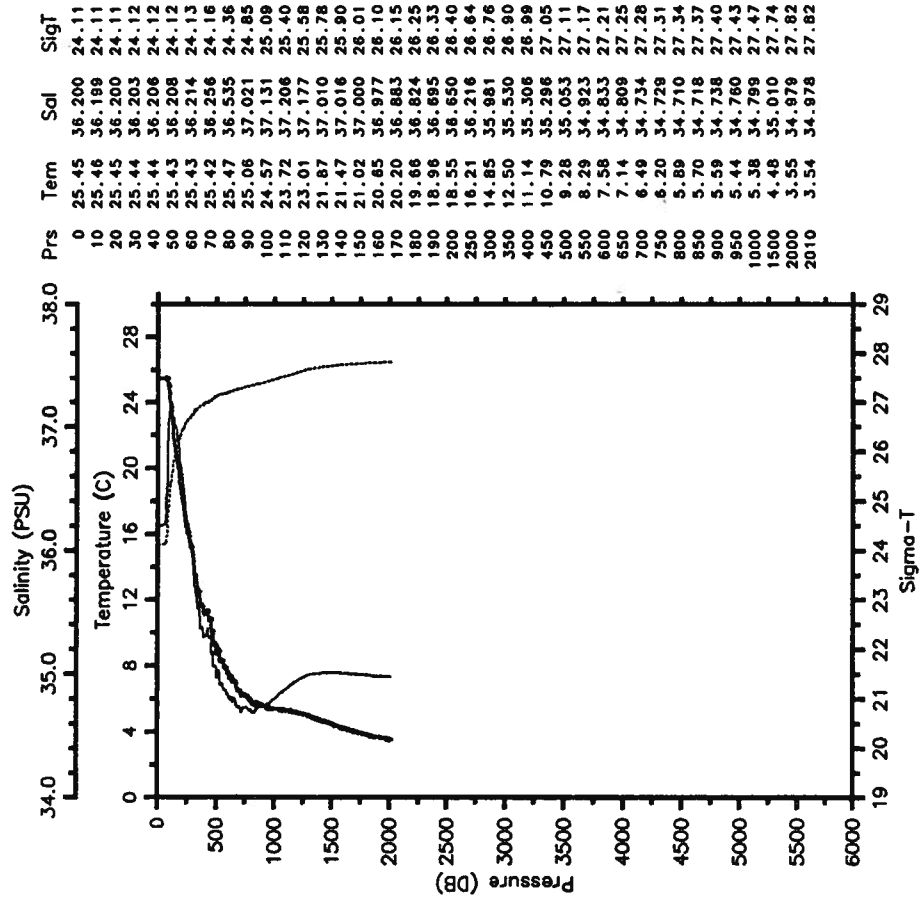
ALB-STACS33-89 CTD 17 ALBATROSS IV  
 Date 02 18 89 Latitude 14.517 N  
 Time 0219 Z Longitude 54.565 W

ALB-STACS33-89 CTD 18 ALBATROSS IV  
 Date 02 18 89 Latitude 14.505 N  
 Time 0948 Z Longitude 53.742 W



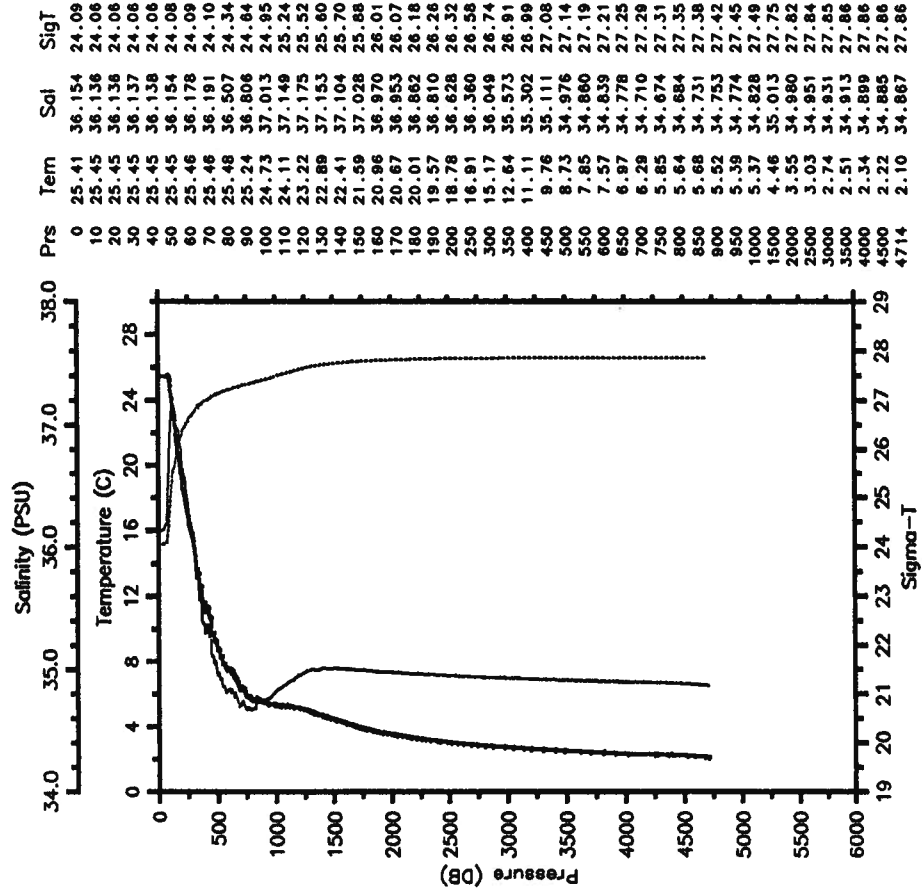
ALB-STACS33-89 CTD 20 ALBATROSS IV  
 Date 02 18 89 Latitude 14.480 N  
 Time 1945 Z Longitude 53.047 W

— Tem — Sal  
 ..... SigT



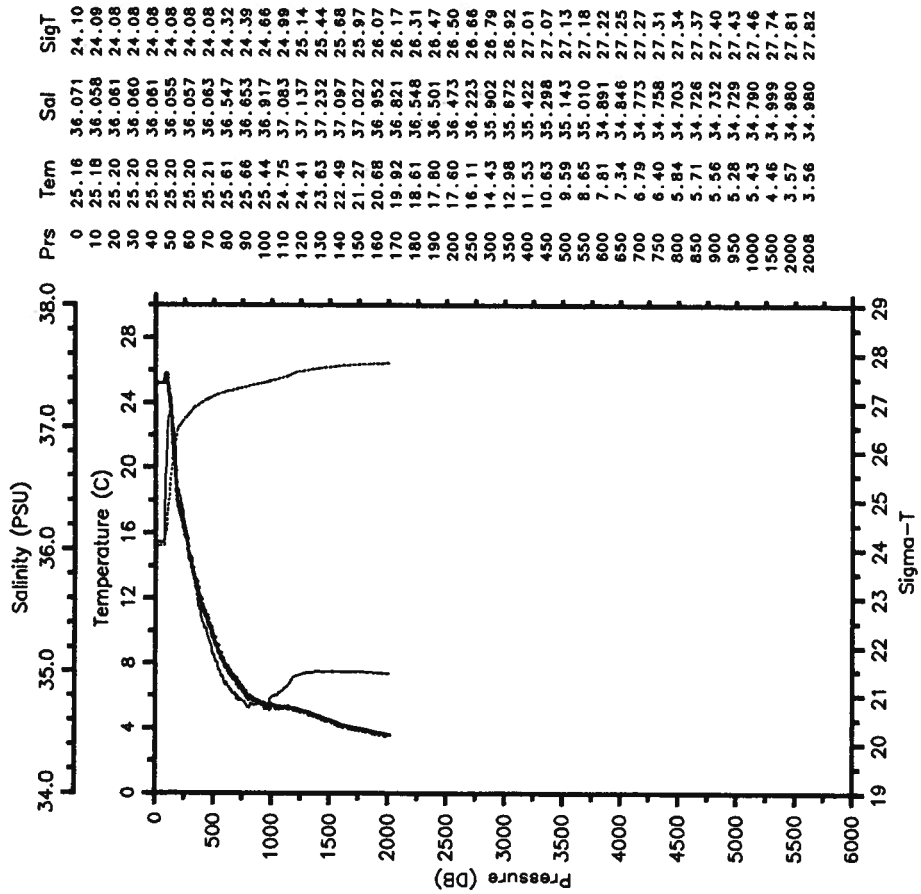
ALB-STACS33-89 CTD 19 ALBATROSS IV  
 Date 02 18 89 Latitude 14.505 N  
 Time 1642 Z Longitude 53.015 W

— Tem — Sal  
 ..... SigT



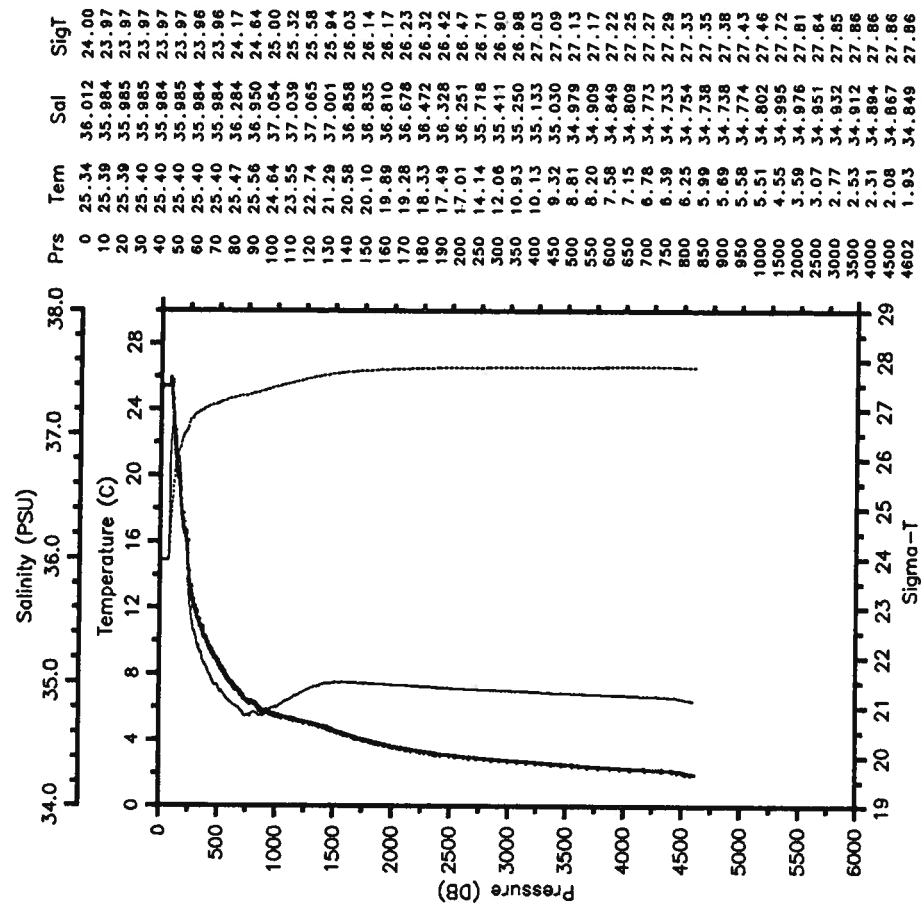
ALB-STACS33-89 CTD 21 ALBATROSS IV  
 Date 02 19 89 Latitude 14.560 N  
 Time 0222 Z Longitude 52.303 W

— Tem — Sal  
 ..... Sigt



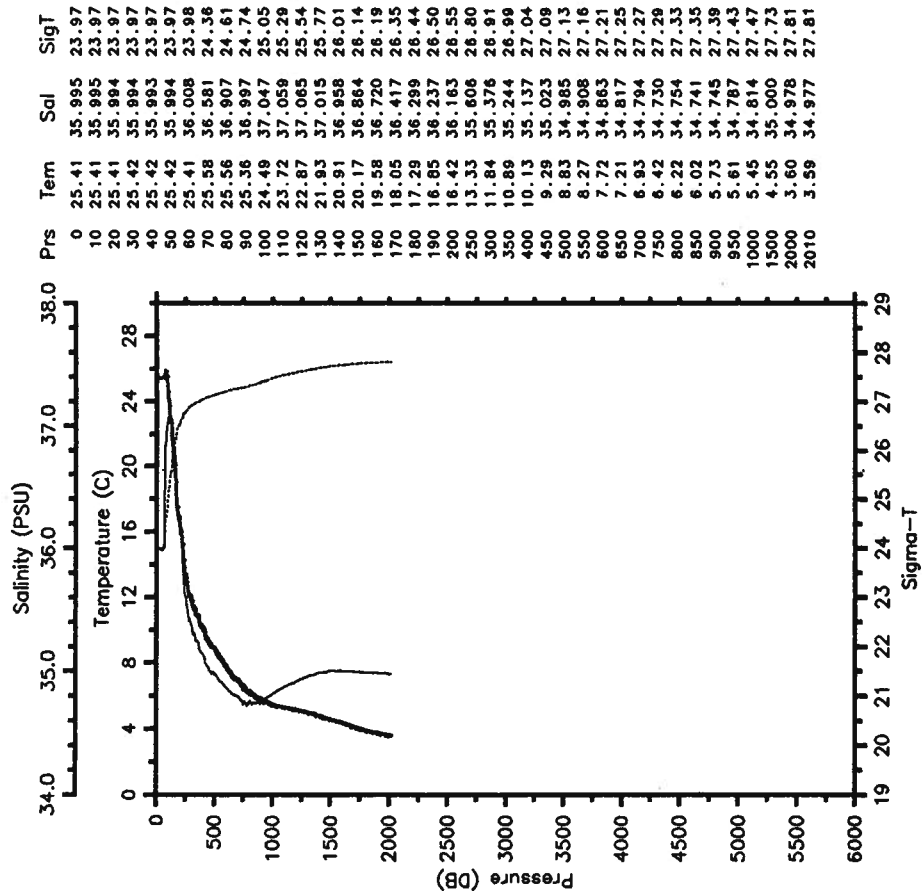
ALB-STACS33-89 CTD 22 ALBATROSS IV  
 Date 02 19 89 Latitude 14.495 N  
 Time 1000 Z Longitude 51.517 W

— Tem — Sal  
 ..... Sigt



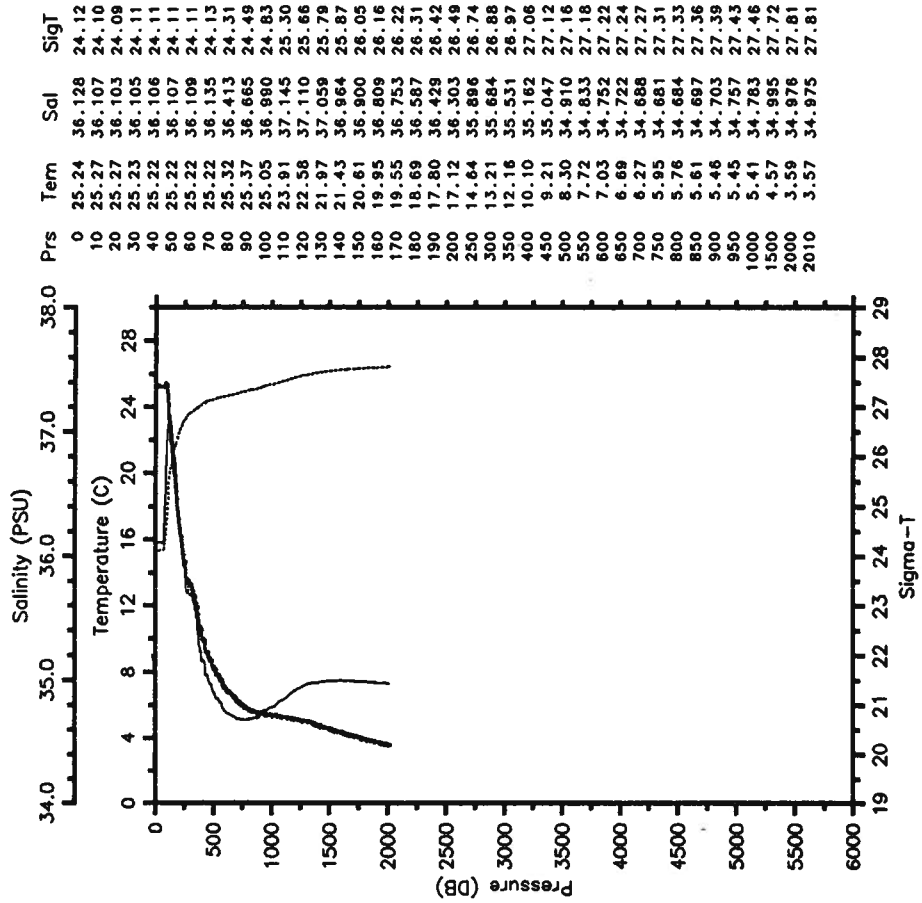
ALB-STACS33-89 CTD 23 ALBATROSS IV  
 Date 02 19 89 Latitude 14.493 N  
 Time 1231 Z Longitude 51.508 W

— Tem — Sal  
 .... SigT



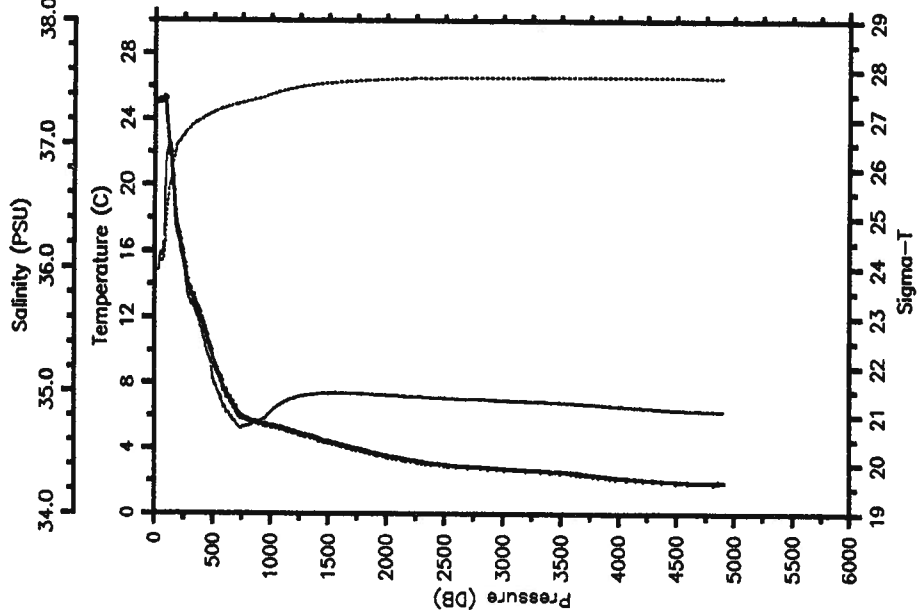
ALB-STACS33-89 CTD 24 ALBATROSS IV  
 Date 02 19 89 Latitude 14.500 N  
 Time 1847 Z Longitude 50.770 W

— Tem — Sal  
 .... SigT



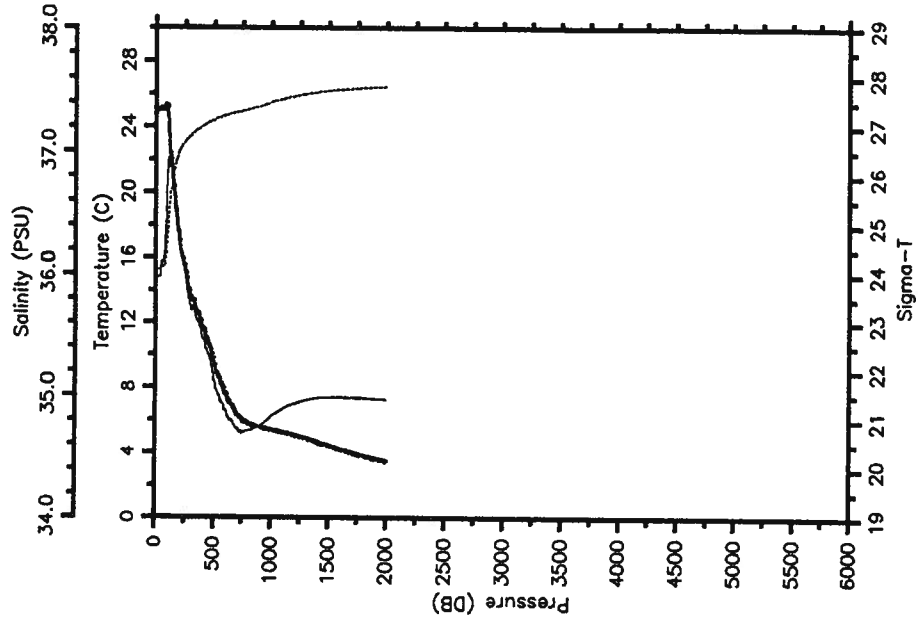
ALB--STACS33--89 CTD 25 ALBATROSS IV  
 Date 02 20 89 Latitude 14.533 N  
 Time 0200 Z Longitude 50.003 W

— Tem — Sal  
 .... SigT



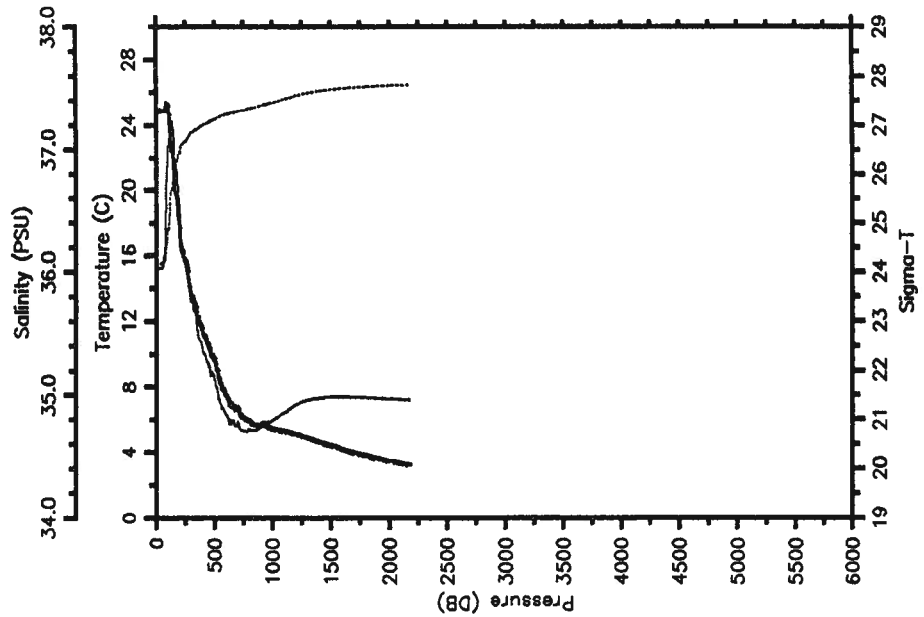
ALB--STACS33--89 CTD 26 ALBATROSS IV  
 Date 02 20 89 Latitude 14.523 N  
 Time 0457 Z Longitude 50.013 W

— Tem — Sal  
 .... SigT



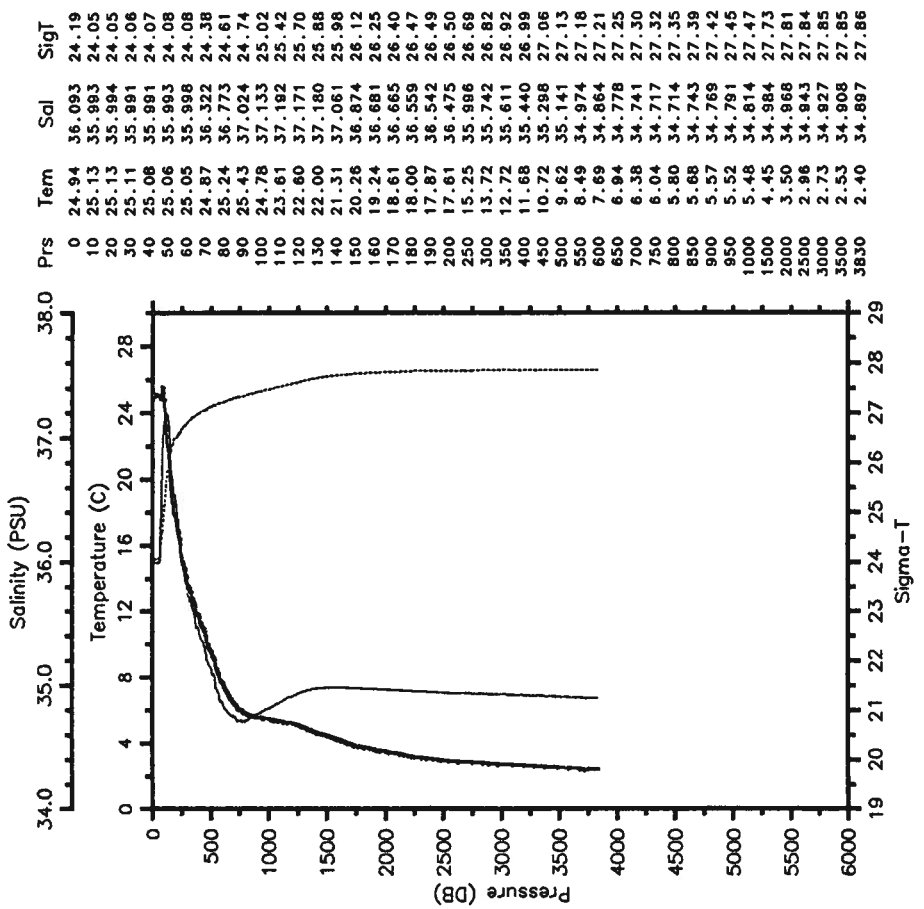
ALB-STACS33-89 CTD 27 ALBATROSS IV  
 Date 02 20 89 Latitude 14.522 N  
 Time 1203 Z Longitude 49.273 W

— Tem — Sal  
 .... SigT



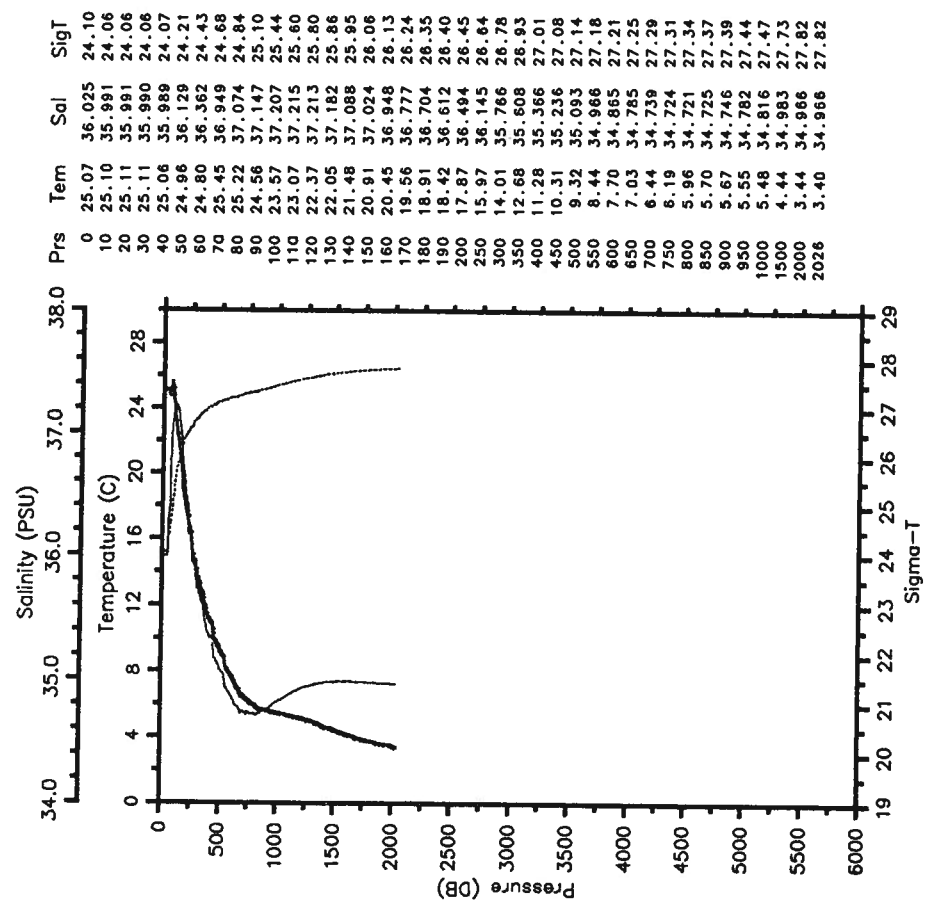
ALB-STACS33-89 CTD 28 ALBATROSS IV  
 Date 02 20 89 Latitude 14.520 N  
 Time 1836 Z Longitude 48.512 W

— Tem — Sal  
 .... SigT

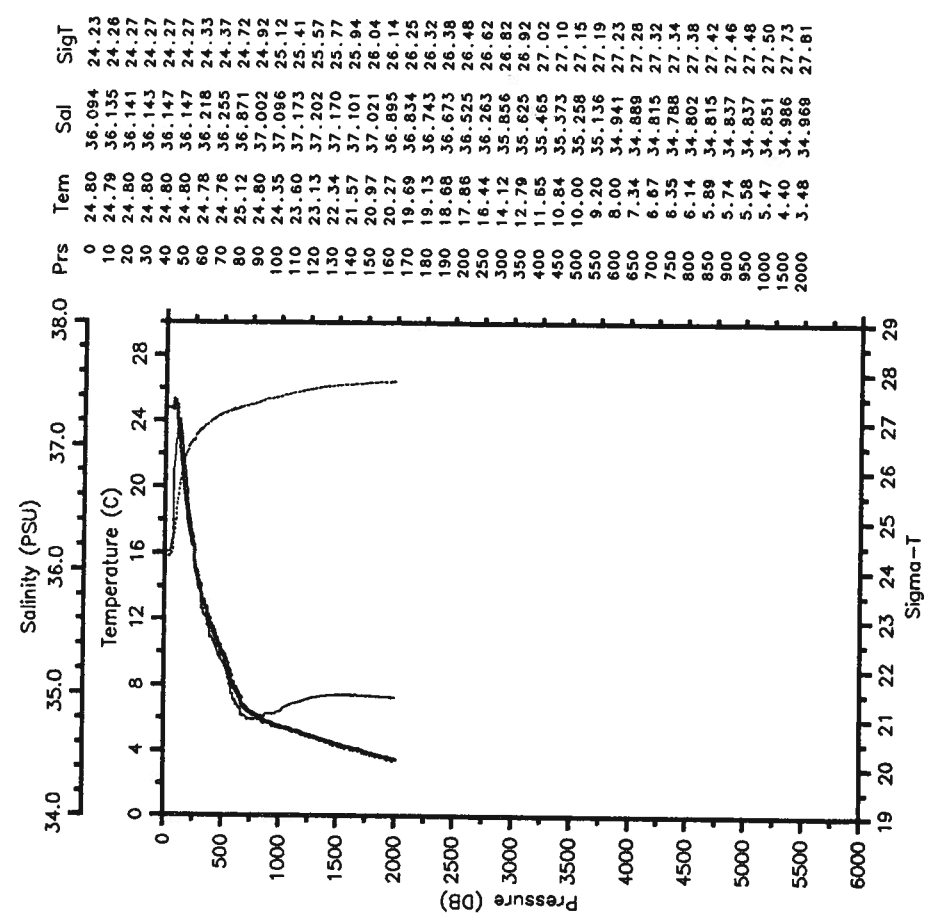




ALB-STACS33-89 CTD 29 ALBATROSS IV  
 Date 02 20 89 Latitude 14.522 N  
 Time 2044 Z Longitude 48.527 W

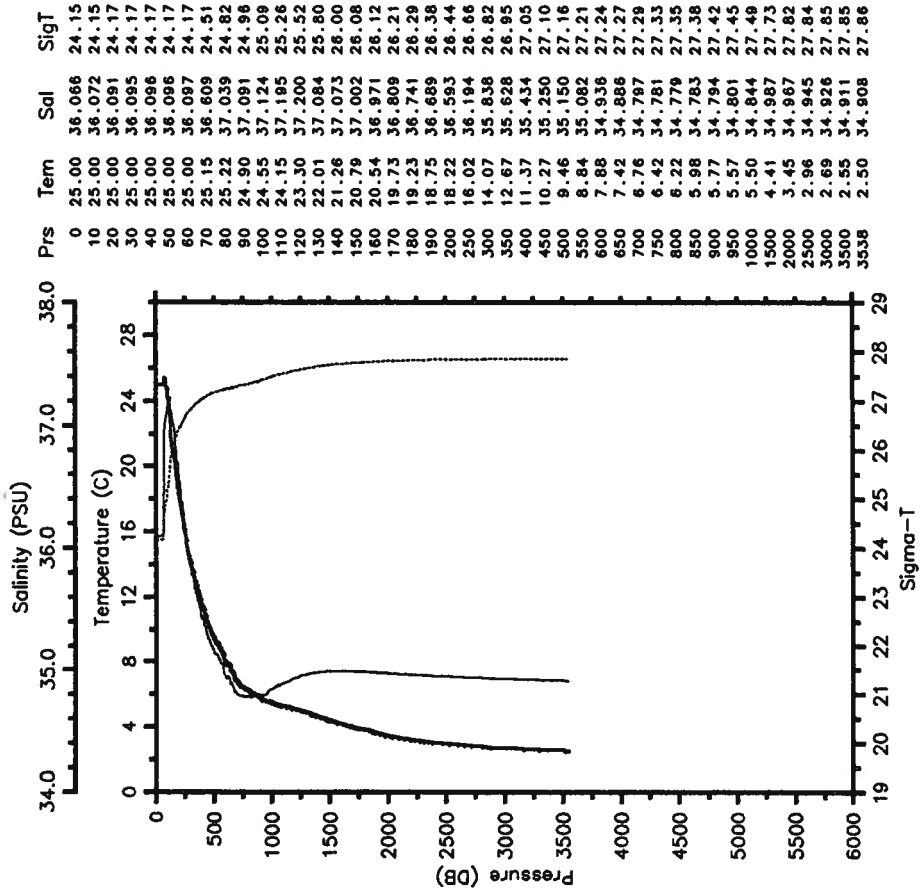


ALB-STACS33-89 CTD 30 ALBATROSS IV  
 Date 02 21 89 Latitude 14.502 N  
 Time 0313 Z Longitude 47.750 W



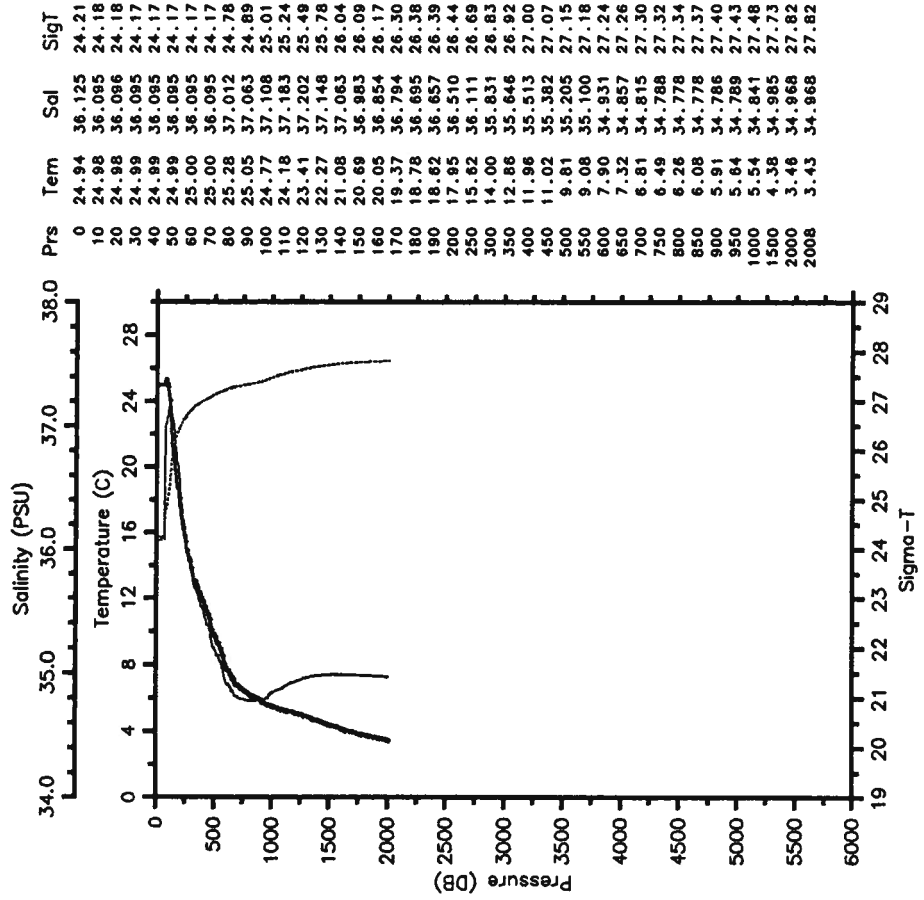
ALB-STACS33-89 CTD 31 ALBATROSS IV  
 Date 02 21 89 Latitude 14.505 N  
 Time 0931 Z Longitude 46.992 W

— Tem — Sal  
 ..... SigT



ALB-STACS33-89 CTD 32 ALBATROSS IV  
 Date 02 21 89 Latitude 14.505 N  
 Time 1134 Z Longitude 47.012 W

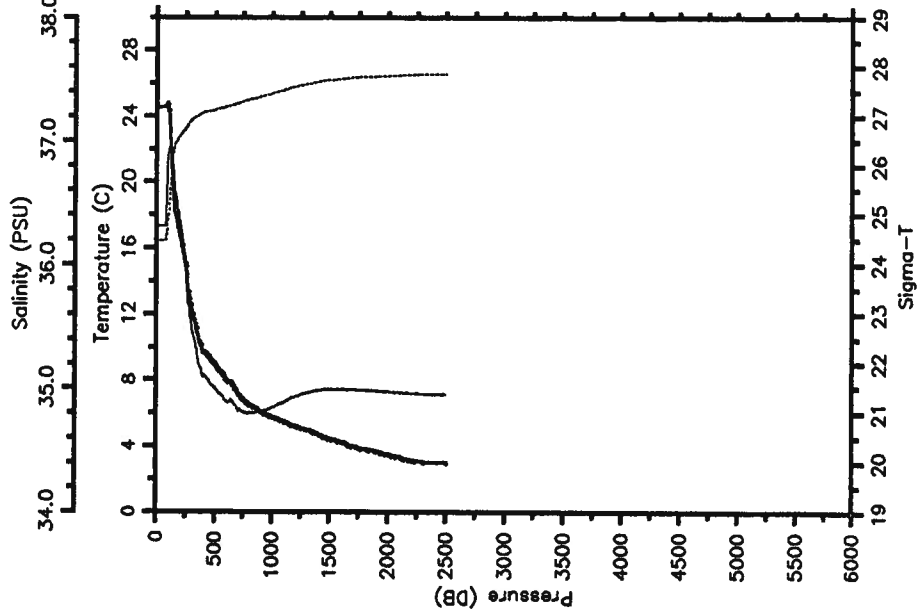
— Tem — Sal  
 ..... SigT





ALB-STACS33-89 CTD 35 ALBATROSS IV  
 Date 02 22 89 Latitude 14.503 N  
 Time 0655 Z Longitude 44.755 W

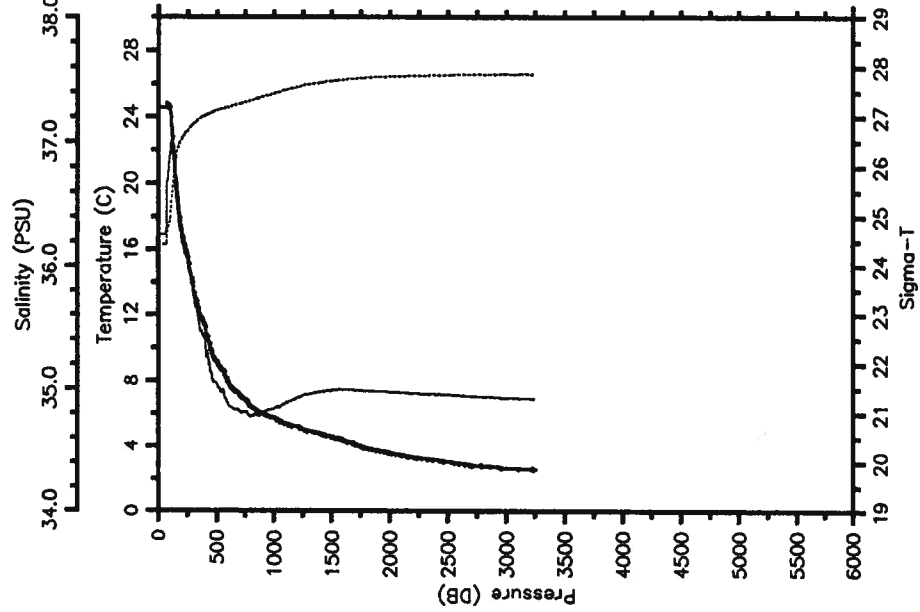
— Tem — Sal  
 .... SigT



Prs	Tem	Sal	SigT
0	24.49	36.339	24.51
10	24.53	36.308	24.47
20	24.53	36.307	24.47
30	24.53	36.309	24.47
40	24.54	36.308	24.47
50	24.54	36.308	24.47
60	24.54	36.309	24.47
70	24.54	36.309	24.47
80	24.57	36.336	24.49
90	24.64	36.625	24.68
100	24.44	36.875	24.93
110	23.91	36.941	25.14
120	22.50	37.003	25.60
130	20.87	36.947	25.99
140	19.90	36.788	26.15
150	19.15	36.728	26.30
160	18.19	36.589	26.44
170	17.93	36.547	26.47
180	17.57	36.471	26.51
190	17.21	36.430	26.56
200	16.78	36.353	26.61
250	15.04	36.041	26.77
300	12.35	35.508	26.92
350	10.89	35.281	27.00
400	9.69	35.087	27.07
450	9.44	35.063	27.10
500	8.99	35.000	27.12
550	8.50	34.953	27.16
600	7.98	34.887	27.19
650	7.76	34.897	27.23
700	7.18	34.835	27.26
750	6.75	34.809	27.30
800	6.46	34.796	27.33
850	6.32	34.804	27.36
900	6.10	34.811	27.39
950	5.91	34.823	27.42
1000	5.76	34.841	27.46
1500	4.43	34.987	27.73
2000	3.50	34.971	27.81
2486	2.98	34.947	27.85

ALB-STACS33-89 CTD 36 ALBATROSS IV  
 Date 02 22 89 Latitude 14.500 N  
 Time 1339 Z Longitude 44.012 W

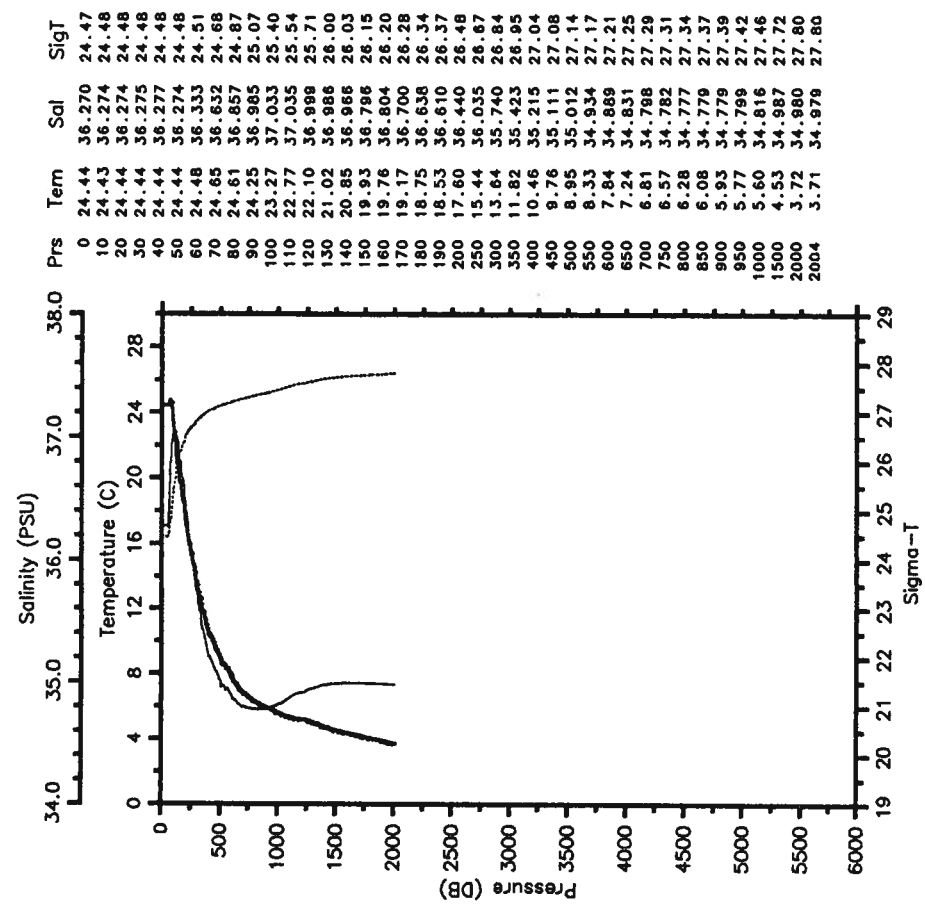
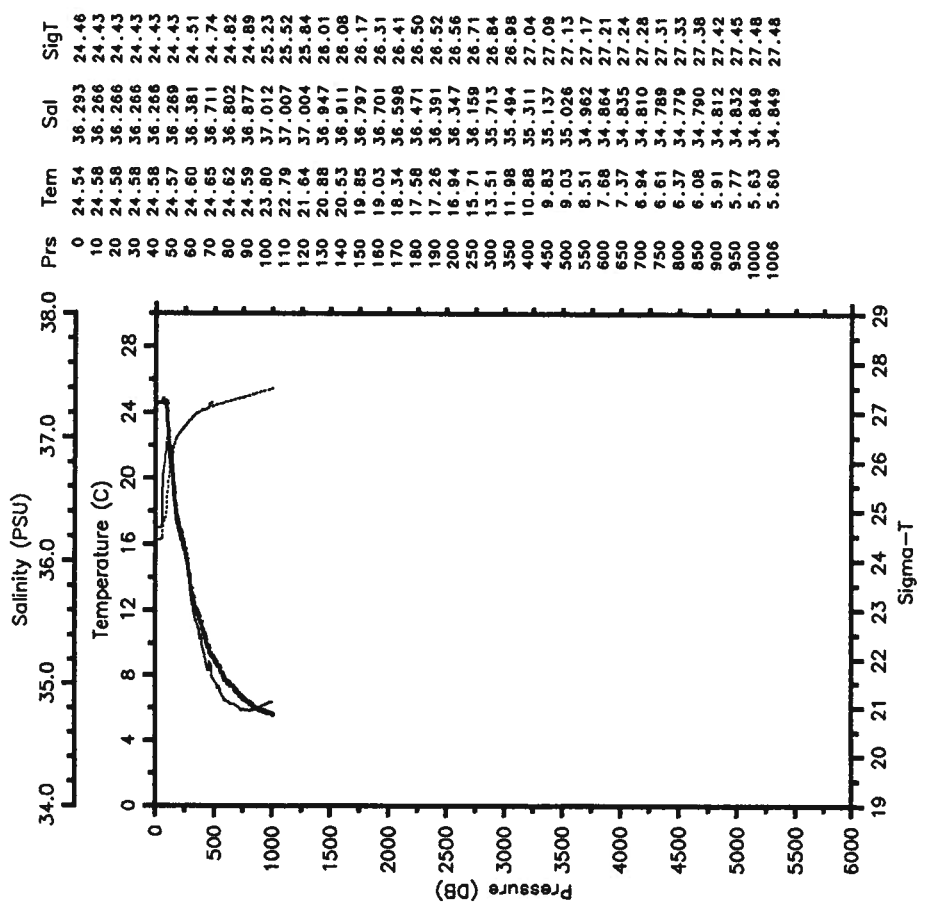
— Tem — Sal  
 .... SigT



Prs	Tem	Sal	SigT
0	24.56	36.238	24.41
10	24.55	36.253	24.43
20	24.55	36.254	24.43
30	24.55	36.254	24.43
40	24.55	36.255	24.43
50	24.55	36.257	24.43
60	24.56	36.258	24.43
70	24.59	36.330	24.47
80	24.65	36.700	24.74
90	24.62	36.830	24.84
100	24.56	36.908	24.92
110	23.97	37.007	25.17
120	22.86	37.026	25.51
130	21.83	36.988	25.79
140	20.94	36.921	25.97
150	19.98	36.798	26.14
160	19.08	36.710	26.31
170	18.40	36.601	26.40
180	17.69	36.451	26.46
190	17.27	36.392	26.52
200	16.87	36.323	26.56
250	15.53	36.125	26.72
300	13.43	35.740	26.88
350	12.11	35.503	26.96
400	11.30	35.416	27.05
450	9.83	35.137	27.09
500	9.15	35.037	27.12
550	8.59	34.988	27.17
600	7.87	34.873	27.19
650	7.41	34.834	27.23
700	7.09	34.814	27.26
750	6.82	34.811	27.29
800	6.42	34.780	27.32
850	6.12	34.779	27.36
900	5.95	34.802	27.40
950	5.83	34.825	27.44
1000	5.72	34.838	27.46
1500	4.56	34.988	27.72
2000	3.59	34.976	27.81
2500	3.02	34.953	27.85
3000	2.63	34.928	27.86
3242	2.58	34.920	27.86

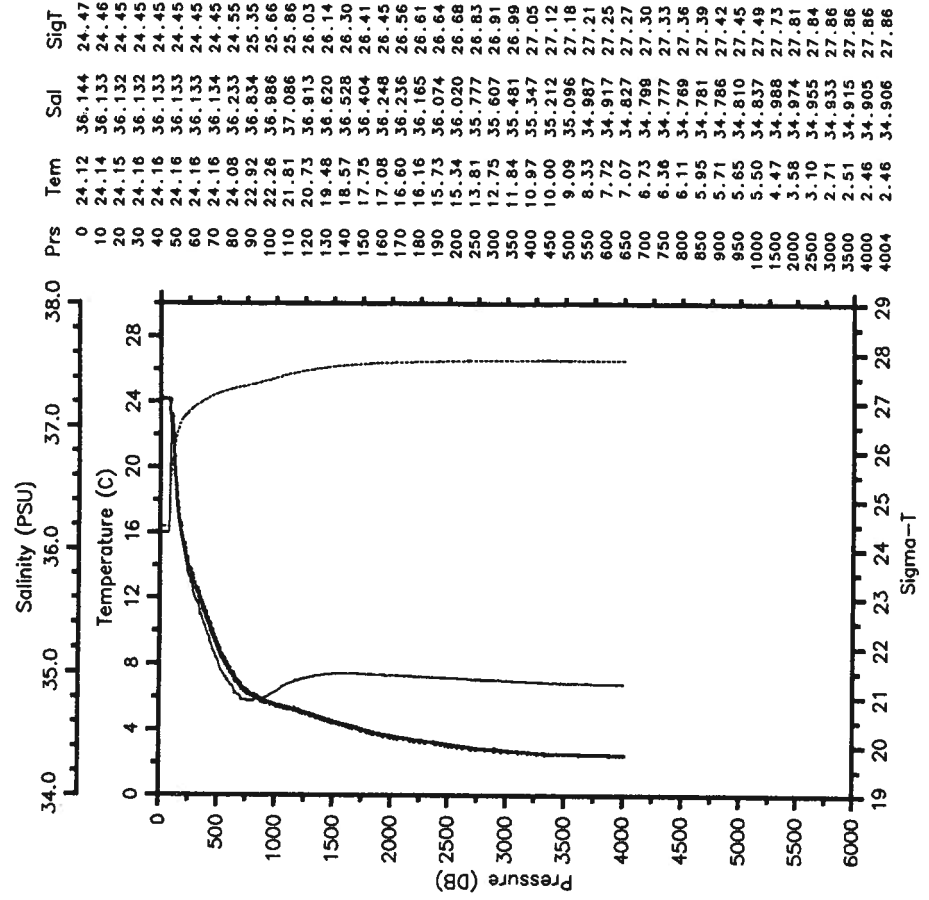
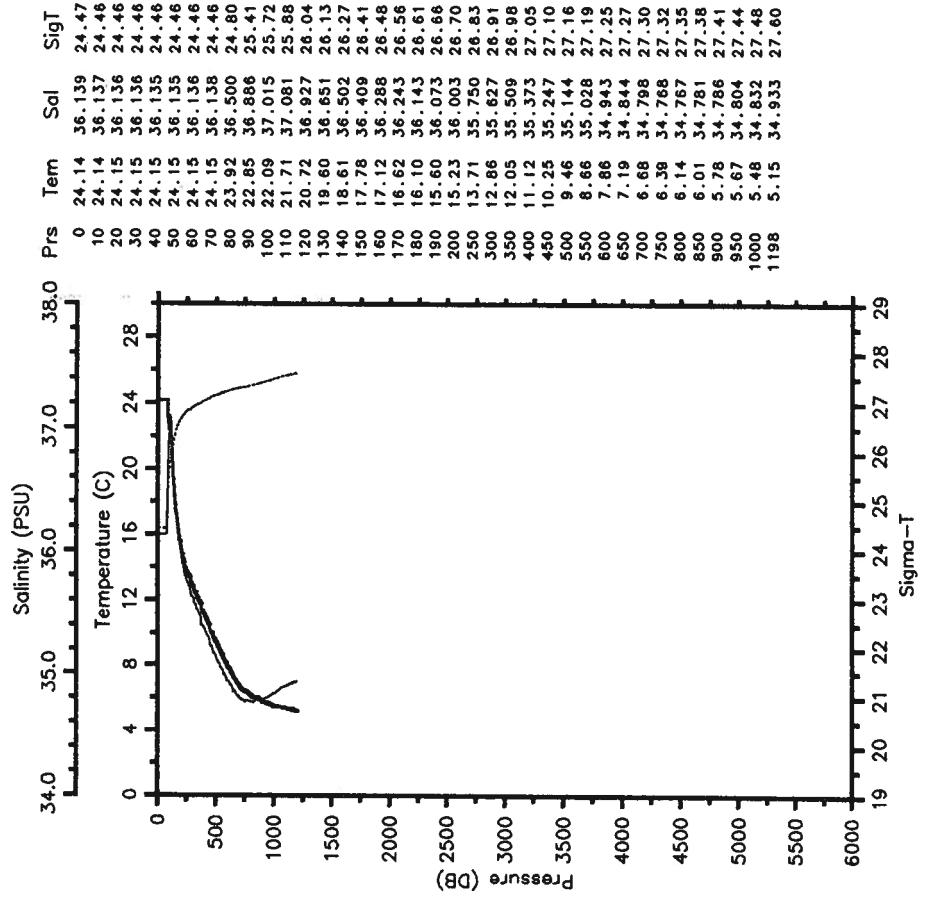
ALB--STACS33--89 CTD 37 ALBATROSS IV  
 Date 02 22 89 Latitude 14.483 N  
 Time 1522 Z Longitude 44.020 W

ALB--STACS33--89 CTD 38 ALBATROSS IV  
 Date 02 22 89 Latitude 14.533 N  
 Time 2148 Z Longitude 43.243 W



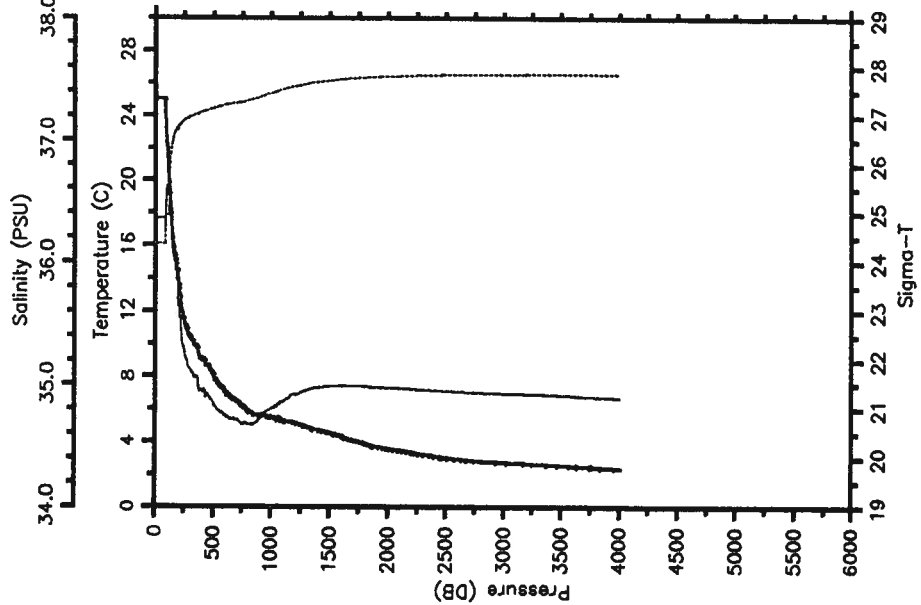
ALB-STACS33-89 CTD 39 ALBATROSS IV  
 Date 02 23 89 Latitude 14.502 N  
 Time 0510 Z Longitude 42.502 W

ALB-STACS33-89 CTD 40 ALBATROSS IV  
 Date 02 23 89 Latitude 14.513 N  
 Time 0612 Z Longitude 42.512 W



ALB-STACS33-89 CTD 41 ALBATROSS IV  
 Date 02 24 89 Latitude 12.298 N  
 Time 0124 Z Longitude 44.167 W

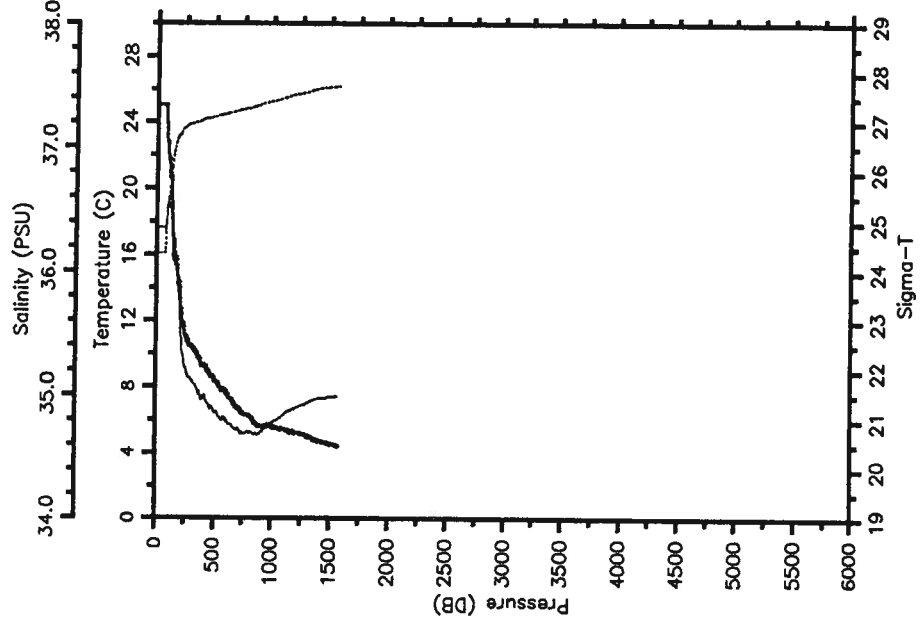
— Tem — Sal  
 ..... SigT



Prs	Tem	Sal	SigT
0	25.01	36.359	24.37
10	25.03	36.353	24.36
20	25.03	36.352	24.36
30	25.04	36.353	24.35
40	25.04	36.353	24.35
50	25.04	36.353	24.35
60	25.05	36.352	24.35
70	25.05	36.352	24.35
80	24.96	36.349	24.37
90	23.14	36.438	24.99
100	22.20	36.607	25.39
110	21.17	36.571	25.65
120	19.92	36.431	25.88
130	18.90	36.395	26.12
140	17.20	36.174	26.37
150	16.32	36.100	26.52
160	15.70	36.020	26.60
170	15.40	36.002	26.66
180	14.98	35.939	26.70
190	14.48	35.861	26.75
200	13.67	35.677	26.78
250	11.49	35.285	26.91
300	10.45	35.126	26.97
350	9.90	35.066	27.02
400	9.09	34.949	27.06
450	8.69	34.919	27.10
500	8.09	34.849	27.14
550	7.44	34.780	27.18
600	7.02	34.745	27.22
650	6.48	34.709	27.26
700	6.17	34.676	27.27
750	5.82	34.675	27.32
800	5.63	34.680	27.35
850	5.56	34.720	27.39
900	5.56	34.772	27.43
950	5.49	34.804	27.46
1000	4.51	34.985	27.72
1500	3.57	34.973	27.81
2000	2.99	34.946	27.84
2500	2.72	34.926	27.85
3000	2.55	34.911	27.85
3500	2.36	34.891	27.85
4000	2.36	34.890	27.85
4002	2.36	34.890	27.85

ALB-STACS33-89 CTD 42 ALBATROSS IV  
 Date 02 24 89 Latitude 12.332 N  
 Time 0400 Z Longitude 44.165 W

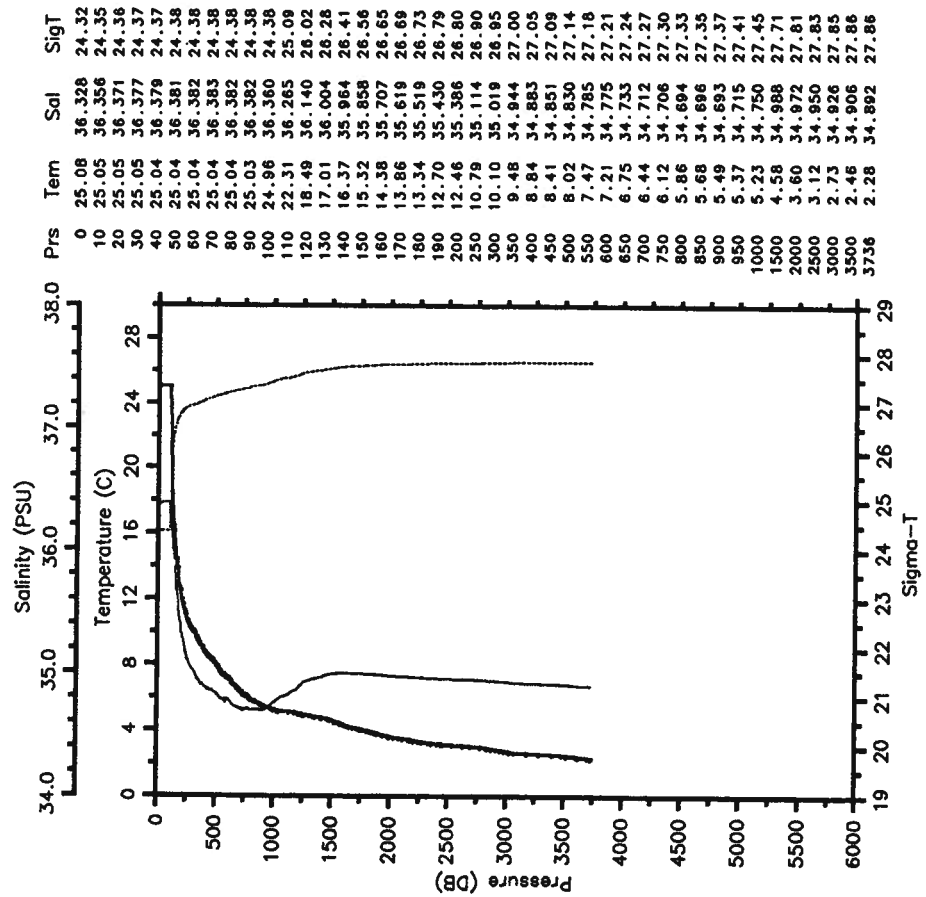
— Tem — Sal  
 ..... SigT



Prs	Tem	Sal	SigT
0	25.01	36.352	24.36
10	25.01	36.353	24.36
20	25.01	36.352	24.36
30	25.02	36.353	24.36
40	25.02	36.353	24.36
50	25.02	36.353	24.36
60	25.02	36.353	24.36
70	25.02	36.353	24.36
80	23.94	36.373	24.70
90	22.73	36.530	25.18
100	21.81	36.556	25.46
110	21.00	36.505	25.64
120	20.67	36.519	25.74
130	19.62	36.410	25.94
140	17.51	36.130	26.26
150	16.88	36.174	26.45
160	16.10	36.080	26.54
170	15.72	36.026	26.60
180	15.29	35.991	26.67
190	14.60	35.875	26.73
200	14.24	35.791	26.75
250	11.14	35.225	26.93
300	10.51	35.133	26.97
350	10.03	35.063	27.00
400	9.23	34.963	27.05
450	8.41	34.930	27.08
500	8.41	34.866	27.11
550	7.93	34.815	27.14
600	7.73	34.810	27.16
650	7.25	34.763	27.20
700	6.79	34.720	27.23
750	6.38	34.686	27.26
800	6.28	34.696	27.28
850	5.86	34.681	27.32
900	5.64	34.686	27.35
950	5.59	34.729	27.39
1000	5.58	34.772	27.43
1500	4.56	34.983	27.71
1564	4.43	34.989	27.73

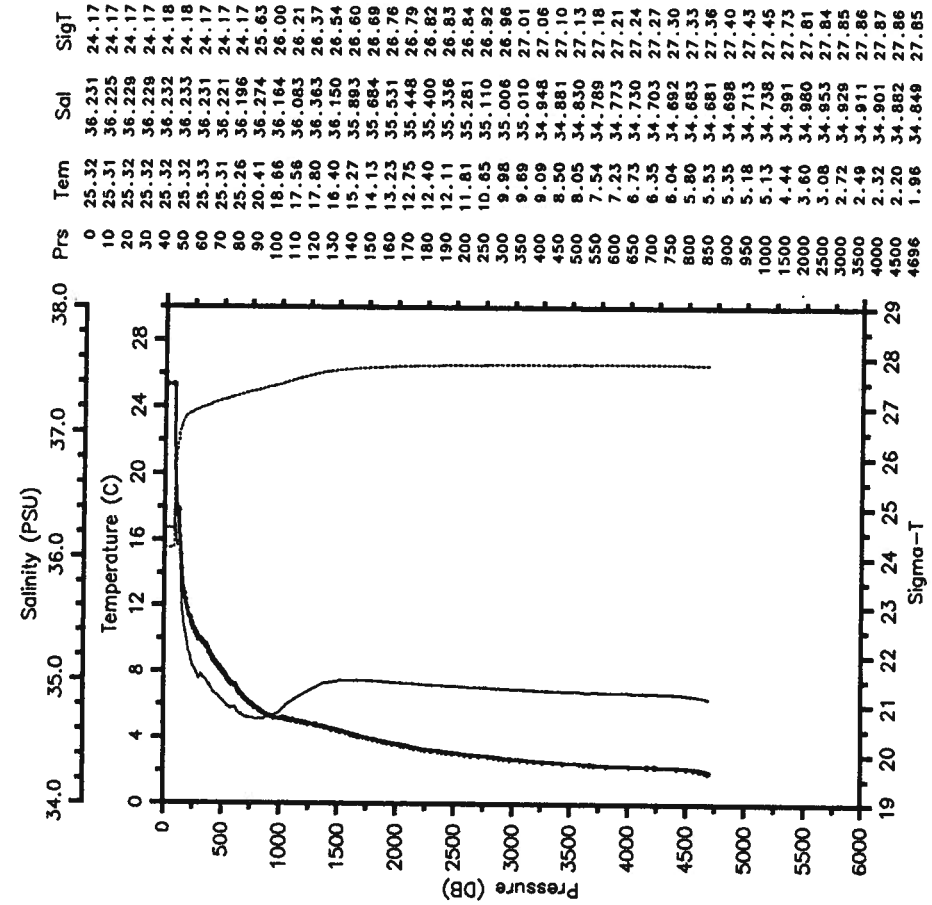
ALB-STACS33-89 CTD 43 ALBATROSS IV  
 Date 02 24 89 Latitude 10.833 N  
 Time 1549 Z Longitude 45.265 W

— Term — Sal  
 ..... SigT



ALB-STACS33-89 CTD 44 ALBATROSS IV  
 Date 02 25 89 Latitude 9.402 N  
 Time 0414 Z Longitude 46.378 W

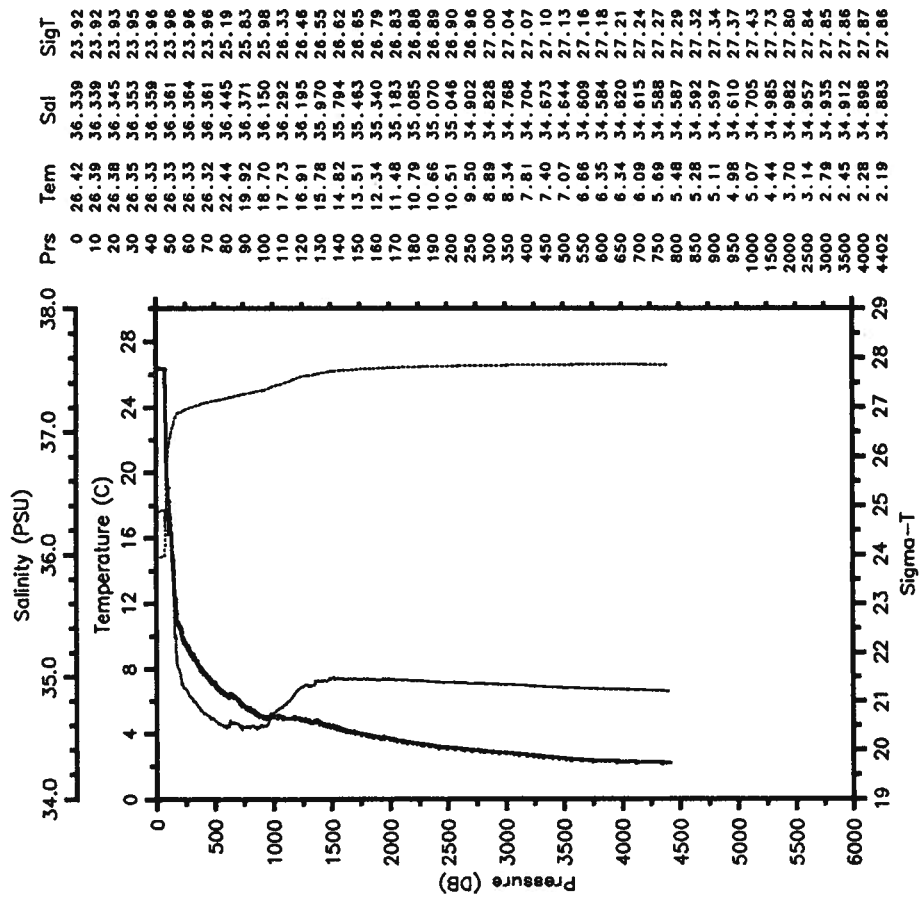
— Term — Sal  
 ..... SigT





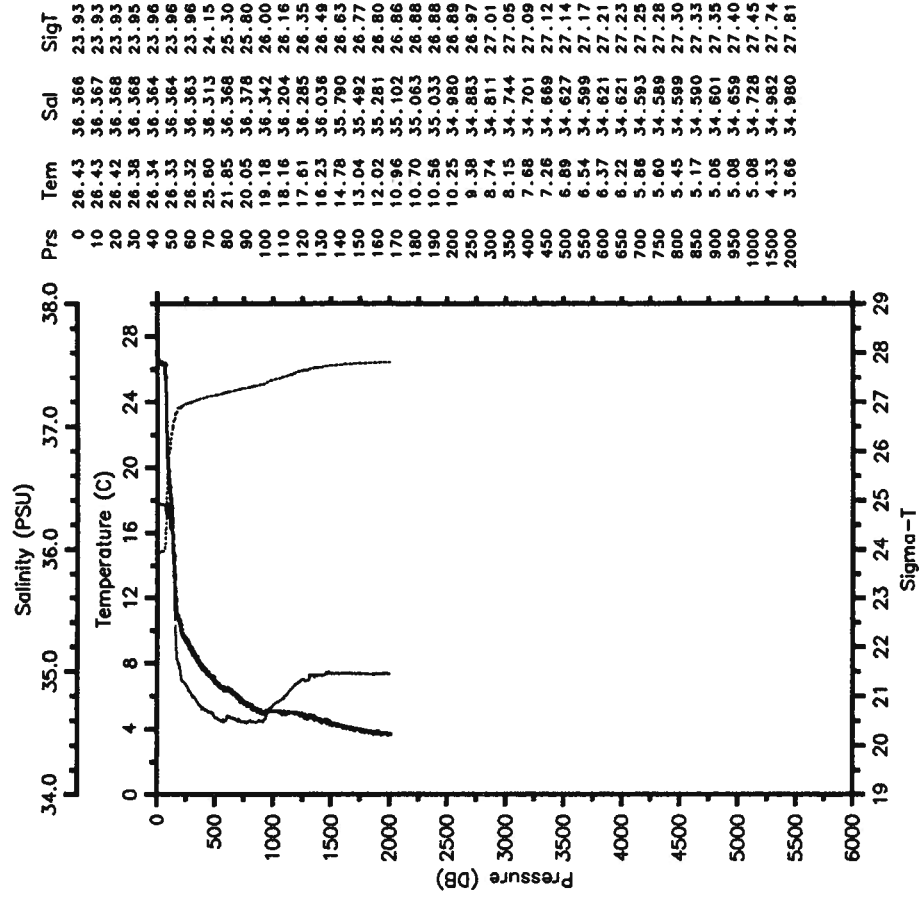
ALB-STACS33-89 CTD 45 ALBATROSS IV  
 Date 02 25 89 Latitude 7.952 N  
 Time 1733 Z Longitude 47.515 W

— Tem — Sal  
 .... SigT



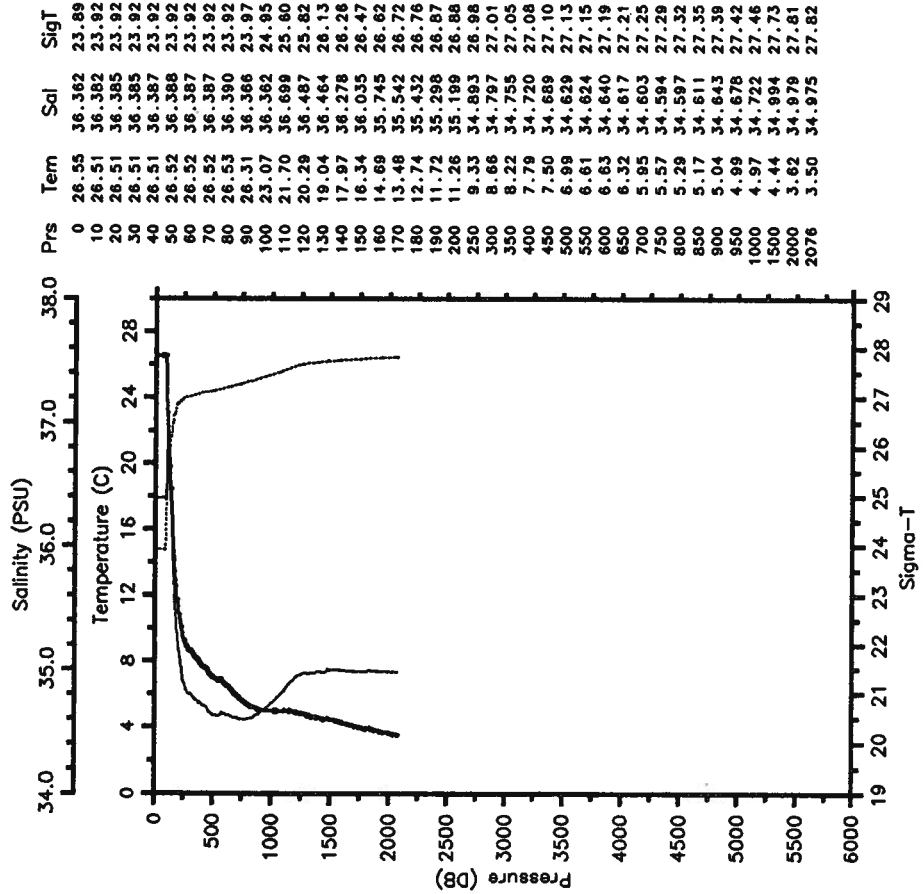
ALB-STACS33-89 CTD 46 ALBATROSS IV  
 Date 02 25 89 Latitude 7.943 N  
 Time 2018 Z Longitude 47.682 W

— Tem — Sal  
 .... SigT



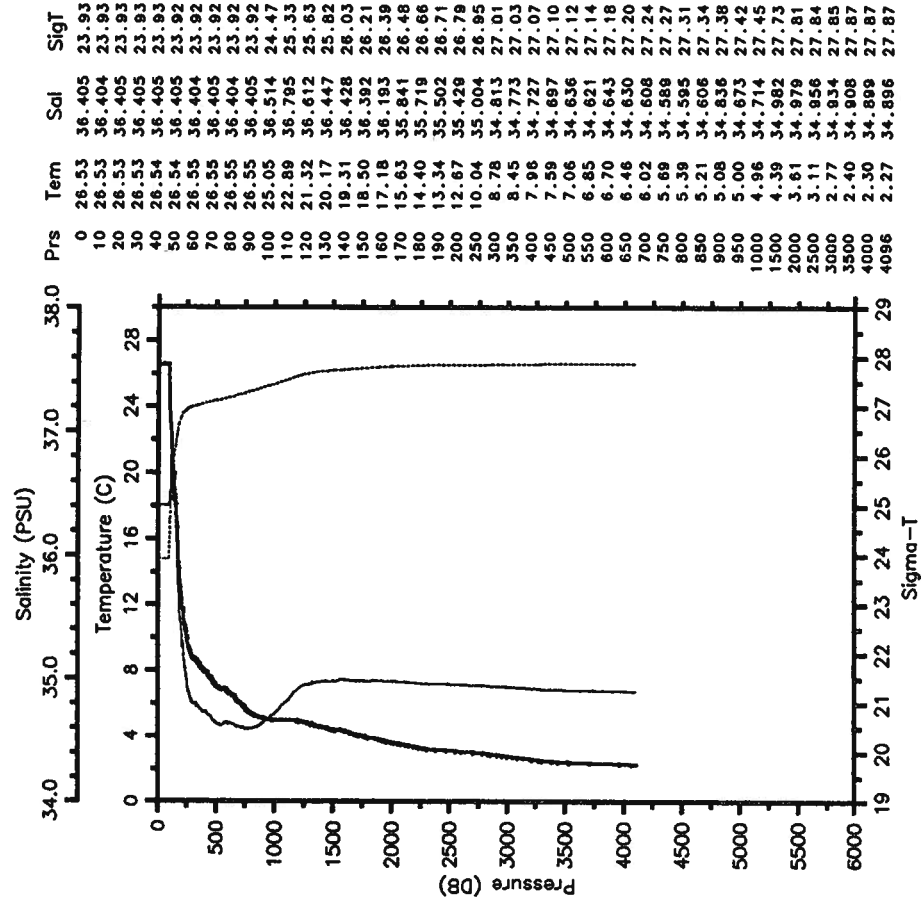
ALB-STACS33-89 CTD 47 ALBATROSS IV  
 Date 02 26 89 Latitude 7.205 N  
 Time 0233 Z Longitude 47.925 W

— Tem — Sal  
 ..... SigT



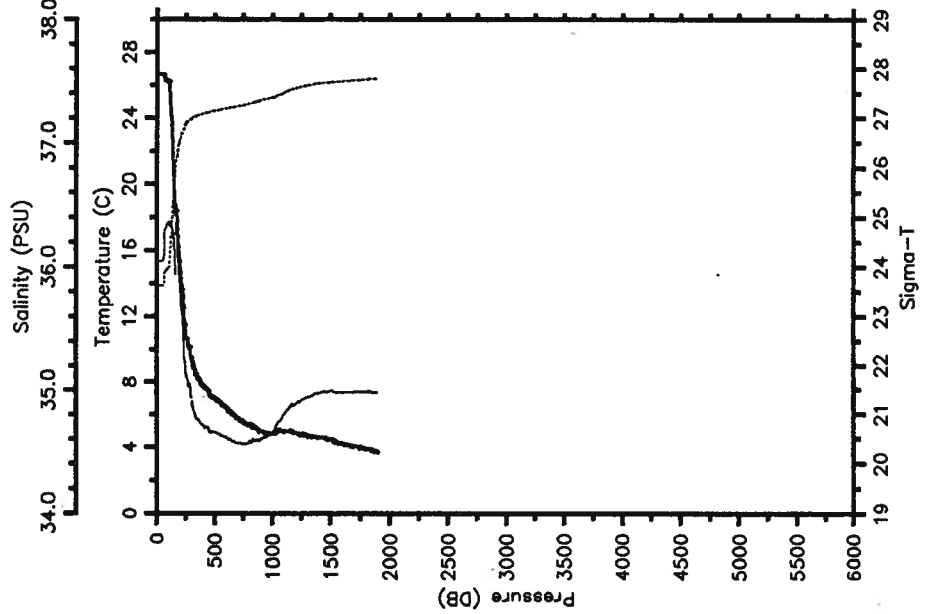
ALB-STACS33-89 CTD 48 ALBATROSS IV  
 Date 02 26 89 Latitude 7.138 N  
 Time 0416 Z Longitude 47.883 W

— Tem — Sal  
 ..... SigT



ALB-STACS33-89 CTD 49 ALBATROSS IV  
 Date 02 26 89 Latitude 6.427 N  
 Time 1158 Z Longitude 48.340 W

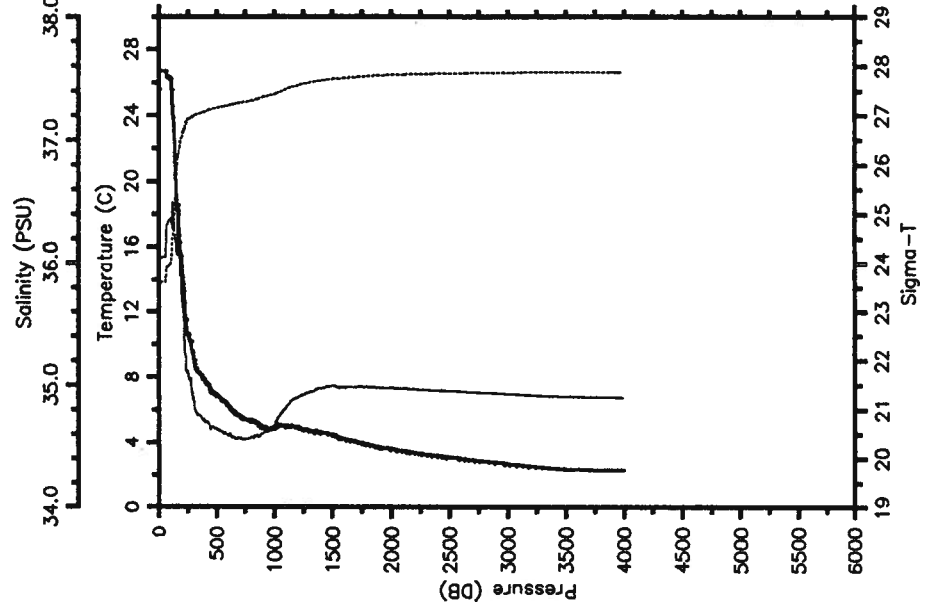
— Term — Sal  
 .... SigT



Prs	Tem	Sal	SigT
0	26.66	36.046	23.61
10	26.65	36.043	23.62
20	26.65	36.047	23.62
30	26.65	36.048	23.62
40	26.65	36.049	23.62
50	26.65	36.050	23.62
60	26.65	36.058	23.64
70	26.37	36.303	23.90
80	26.31	36.321	23.94
90	26.30	36.340	23.95
100	26.24	36.359	23.99
110	26.15	36.325	23.99
120	24.68	36.324	24.44
130	24.04	36.368	24.67
140	21.69	36.289	25.28
150	20.12	36.179	25.63
160	18.64	35.939	25.83
170	18.43	36.340	26.19
180	17.12	36.075	26.31
190	16.20	35.998	26.47
200	15.27	35.835	26.56
250	10.89	35.111	26.88
300	9.49	34.936	26.99
350	8.28	34.764	27.05
400	7.76	34.713	27.08
450	7.38	34.665	27.10
500	7.00	34.654	27.15
550	6.74	34.636	27.17
600	6.43	34.606	27.19
650	6.02	34.581	27.22
700	5.76	34.565	27.24
750	5.51	34.557	27.26
800	5.40	34.572	27.28
850	5.19	34.581	27.32
900	4.97	34.599	27.36
950	4.86	34.617	27.39
1000	4.82	34.649	27.42
1500	4.48	34.994	27.73
1896	3.70	34.979	27.80

ALB-STACS33-89 CTD 50 ALBATROSS IV  
 Date 02 26 89 Latitude 6.410 N  
 Time 1324 Z Longitude 48.333 W

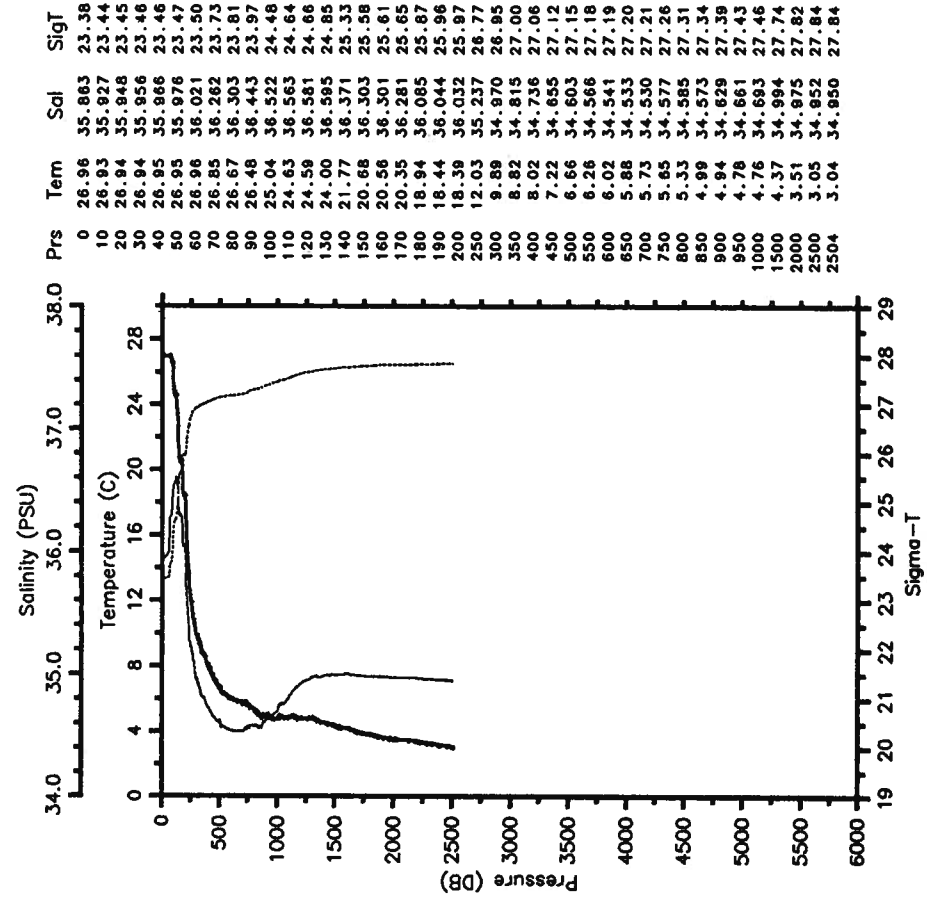
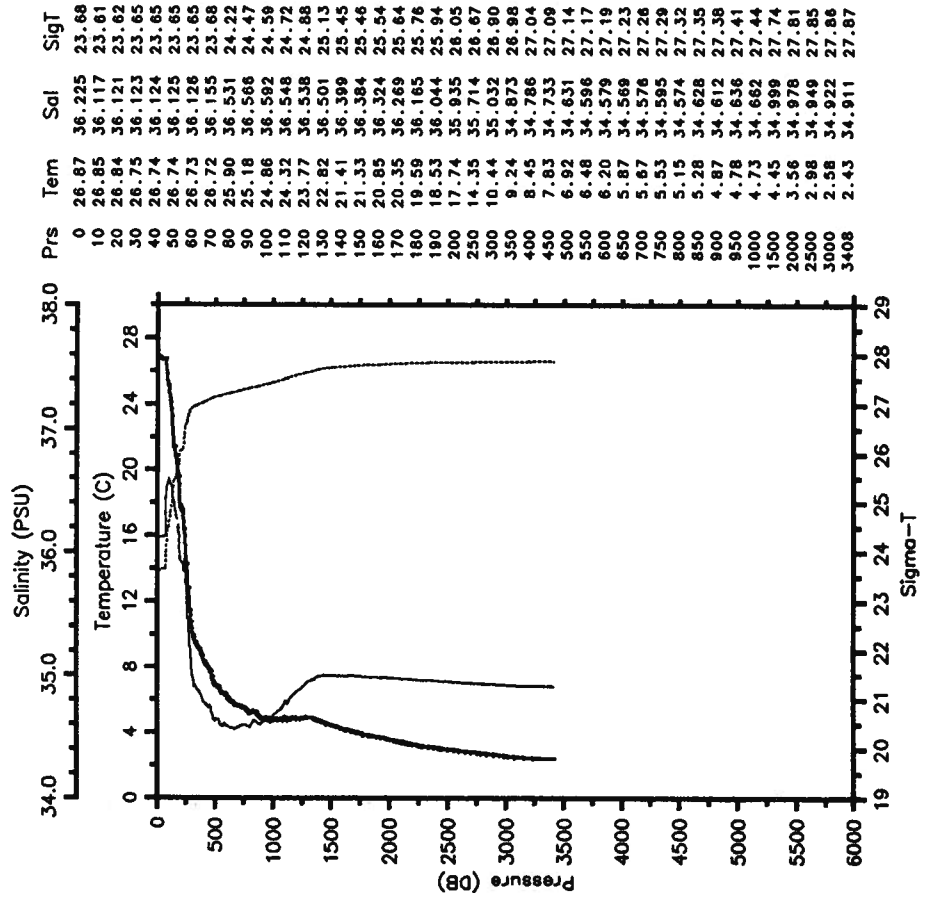
— Term — Sal  
 .... SigT



Prs	Tem	Sal	SigT
0	25.58	3.127	-0.75
10	26.67	36.047	23.61
20	26.67	36.047	23.61
30	26.66	36.048	23.62
40	26.66	36.048	23.62
50	26.66	36.048	23.62
60	26.66	36.069	23.63
70	26.35	36.314	23.92
80	26.32	36.335	23.94
90	26.29	36.352	23.96
100	26.24	36.362	23.99
110	25.89	36.325	24.07
120	24.65	36.496	24.58
130	23.80	36.342	24.72
140	21.35	36.232	25.34
150	19.66	36.113	25.70
160	18.24	36.074	26.04
170	18.28	36.330	26.22
180	16.41	36.040	26.45
190	15.57	35.909	26.55
200	14.84	35.740	26.62
250	10.63	35.103	26.92
300	9.10	34.873	27.00
350	8.21	34.754	27.05
400	7.70	34.708	27.09
450	7.11	34.648	27.13
500	6.86	34.643	27.16
550	6.56	34.617	27.18
600	6.21	34.584	27.20
650	5.86	34.574	27.23
700	5.62	34.566	27.26
750	5.42	34.561	27.28
800	5.32	34.570	27.30
850	5.20	34.589	27.33
900	4.91	34.609	27.38
950	4.85	34.628	27.40
1000	4.85	34.667	27.43
1500	4.47	34.995	27.73
2000	3.58	34.979	27.81
2500	3.06	34.955	27.84
3000	2.67	34.930	27.86
3500	2.34	34.907	27.87
3984	2.27	34.888	27.87

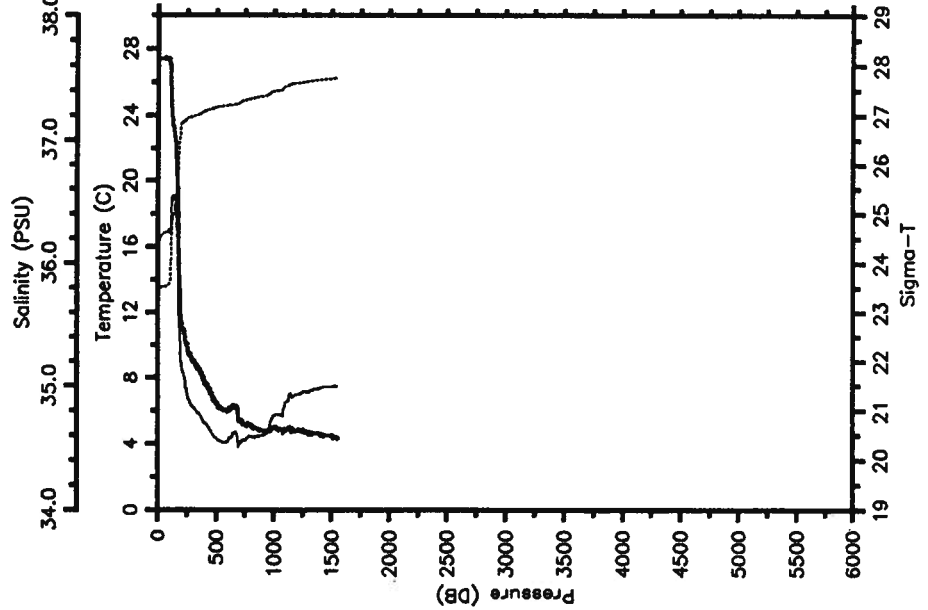
ALB-STACS33-89 CTD 51 ALBATROSS IV  
 Date 02 26 89 Latitude 5.648 N  
 Time 2002 Z Longitude 48.803 W

ALB-STACS33-89 CTD 52 ALBATROSS IV  
 Date 02 27 89 Latitude 4.937 N  
 Time 0259 Z Longitude 49.248 W



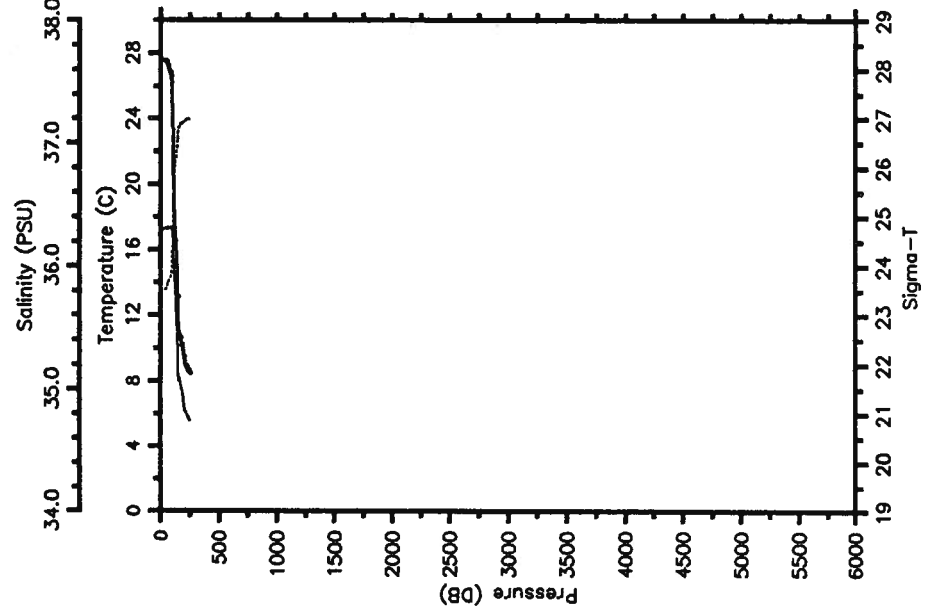
ALB-STACS33-89 CTD 53 ALBATROSS IV  
 Date 02 27 89 Latitude 4.522 N  
 Time 0853 Z Longitude 49.447 W

— Tem — Sal  
 ..... SigT



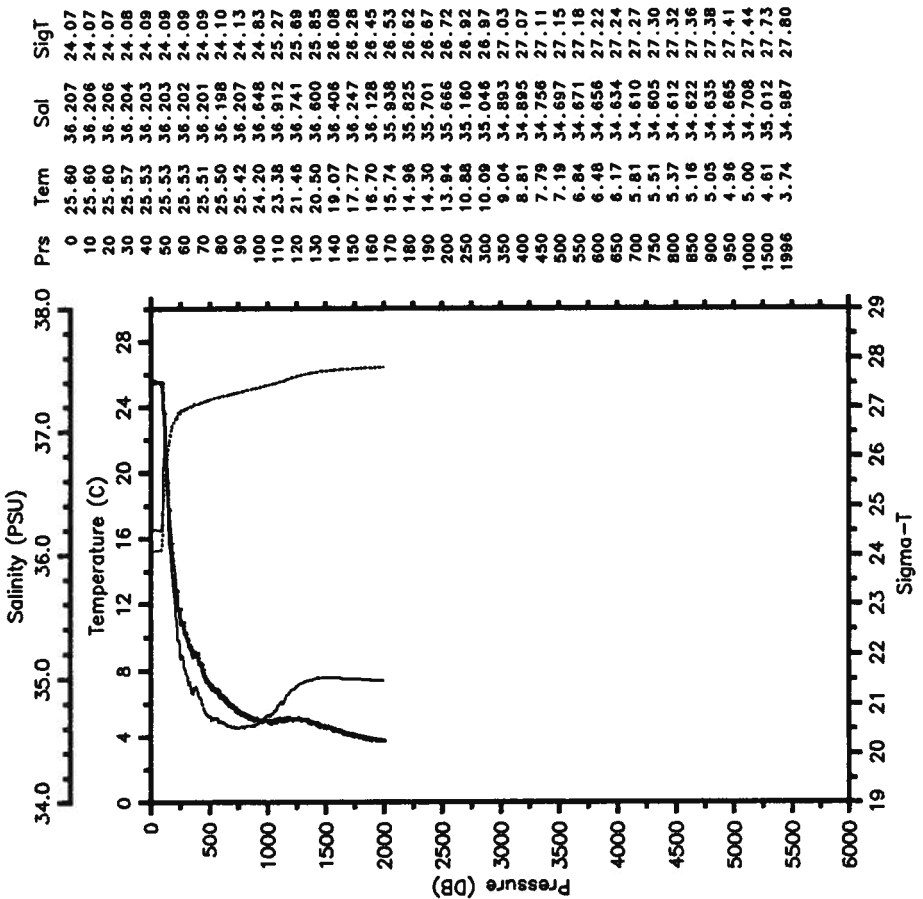
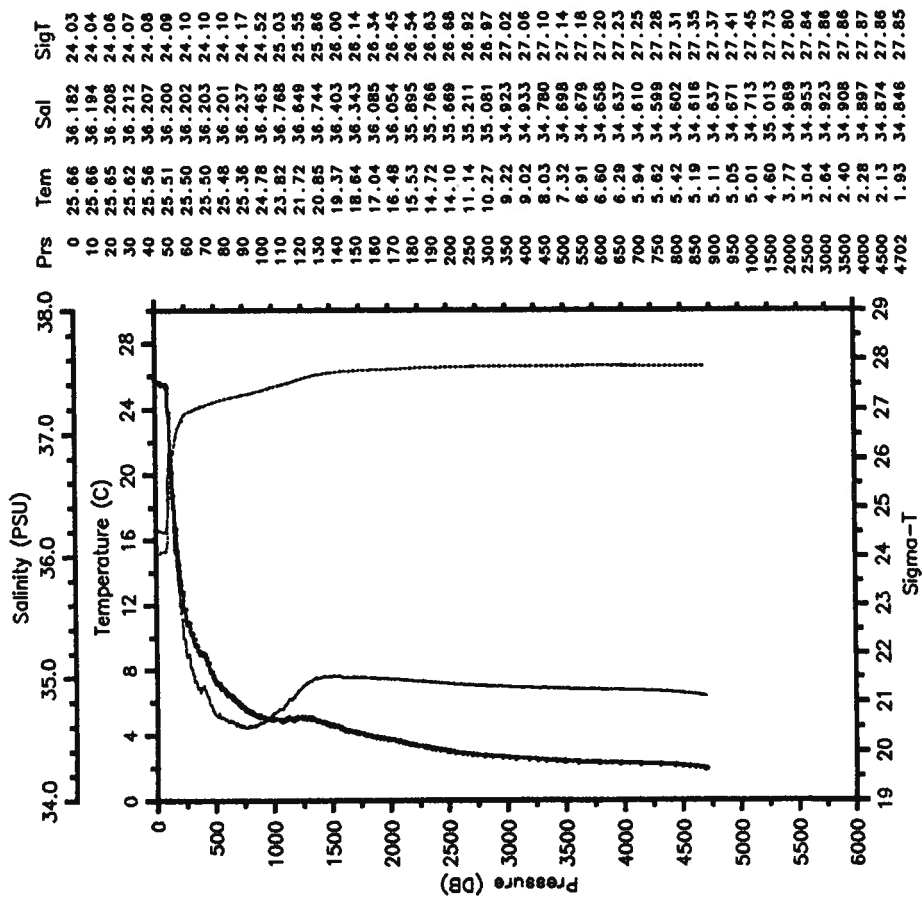
ALB-STACS33-89 CTD 54 ALBATROSS IV  
 Date 02 27 89 Latitude 4.235 N  
 Time 1223 Z Longitude 49.668 W

— Tem — Sal  
 ..... SigT



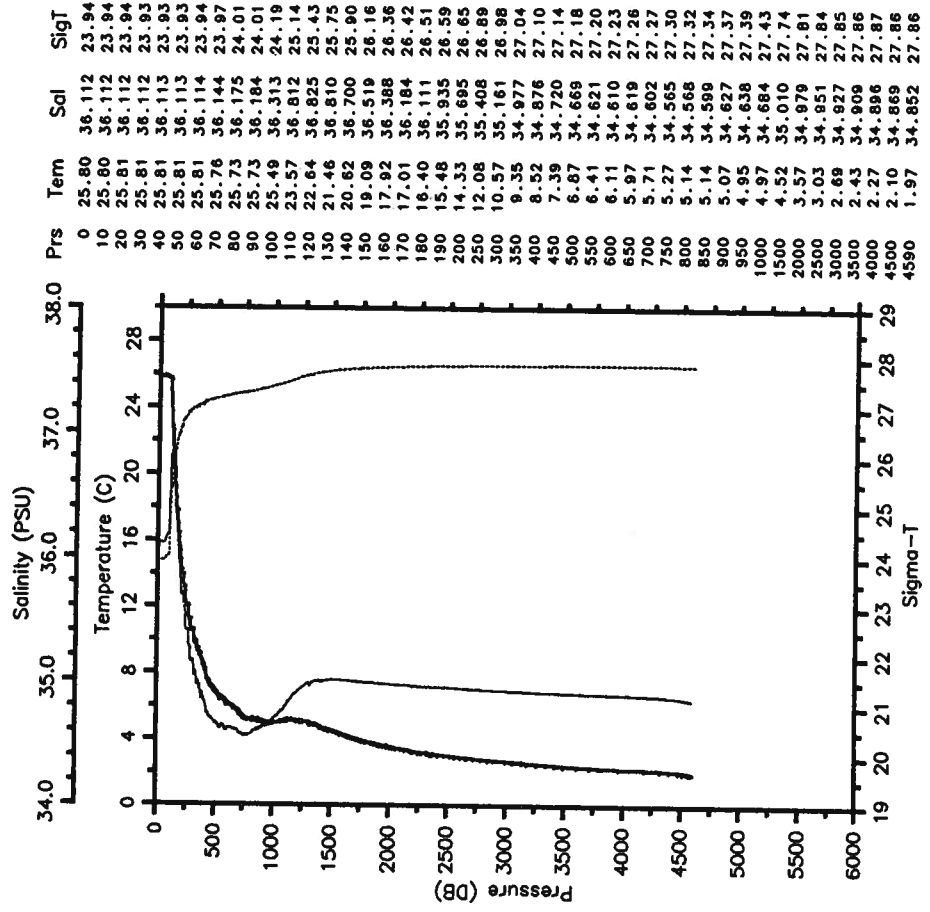
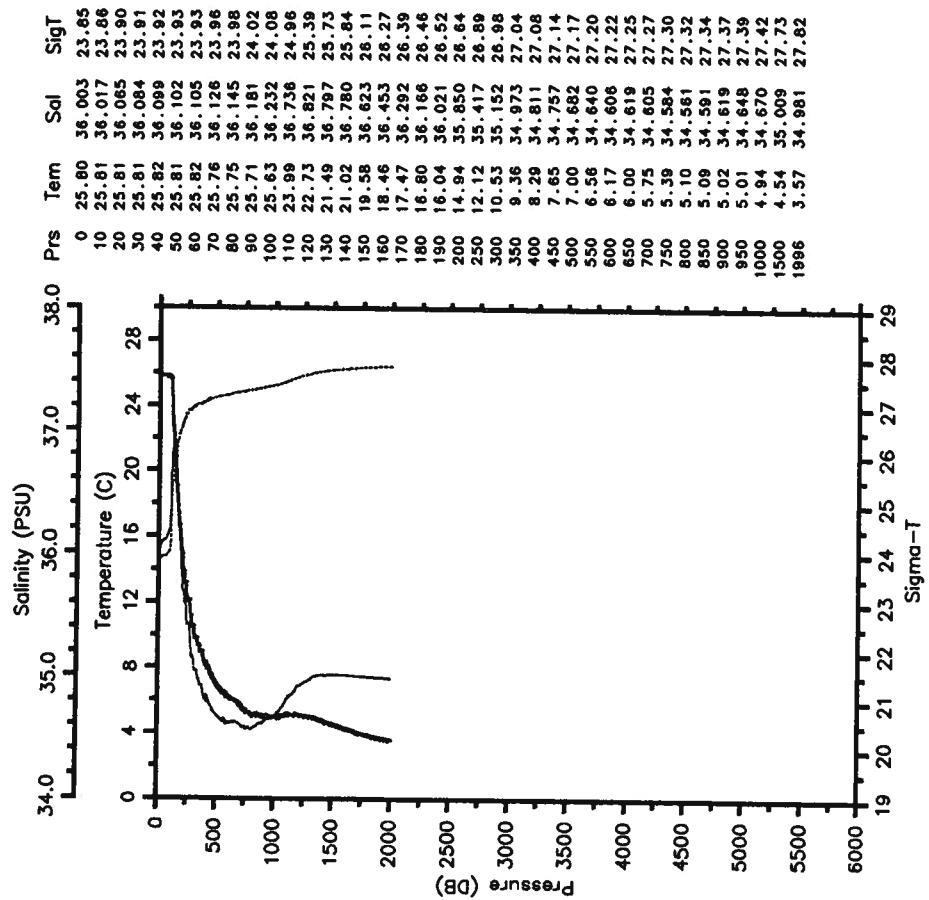
ALB-STACS33-89 CTD 55 ALBATROSS IV  
 Date 02 28 89 Latitude 9.400 N  
 Time 2120 Z Longitude 51.630 W

ALB-STACS33-89 CTD 56 ALBATROSS IV  
 Date 03 01 89 Latitude 9.365 N  
 Time 0005 Z Longitude 51.650 W



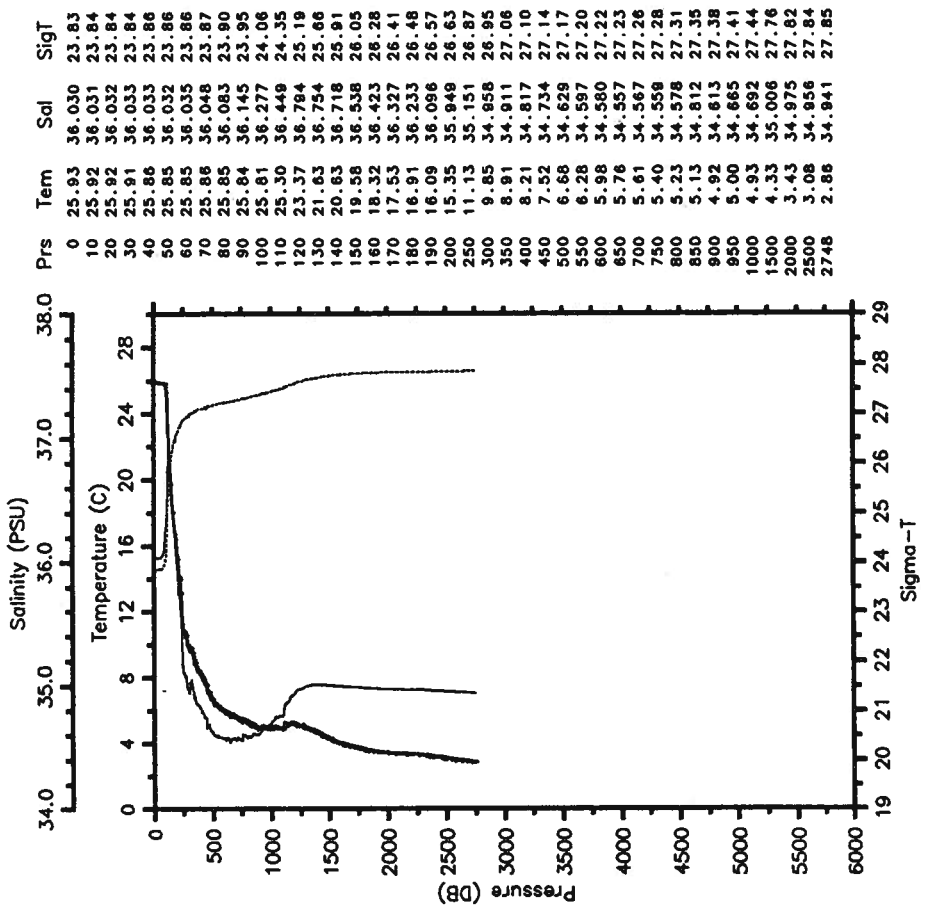
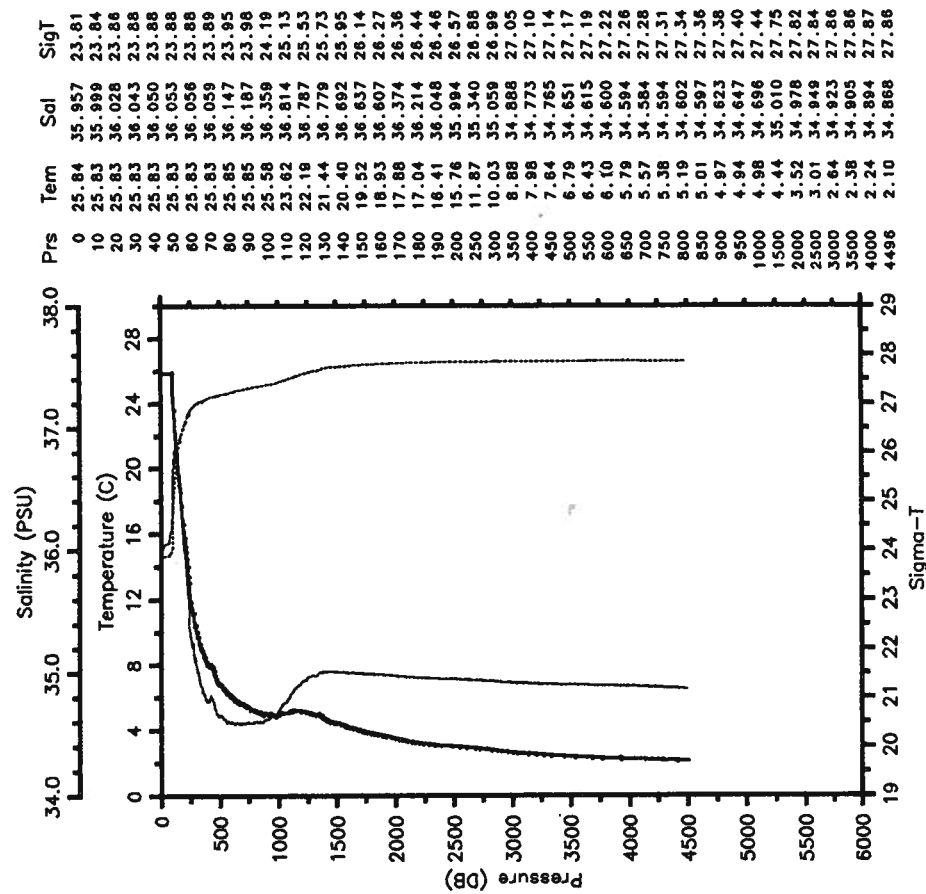
ALB-STACS33-89 CTD 57 ALBATROSS IV  
 Date 03 01 89 Latitude 8.943 N  
 Time 0407 Z Longitude 51.888 W

ALB-STACS33-89 CTD 58 ALBATROSS IV  
 Date 03 01 89 Latitude 8.877 N  
 Time 0547 Z Longitude 51.932 W



ALB-STACS33-89 CTD 59 ALBATROSS IV  
 Date 03 01 89 Latitude 8.463 N  
 Time 1224 Z Longitude 52.170 W

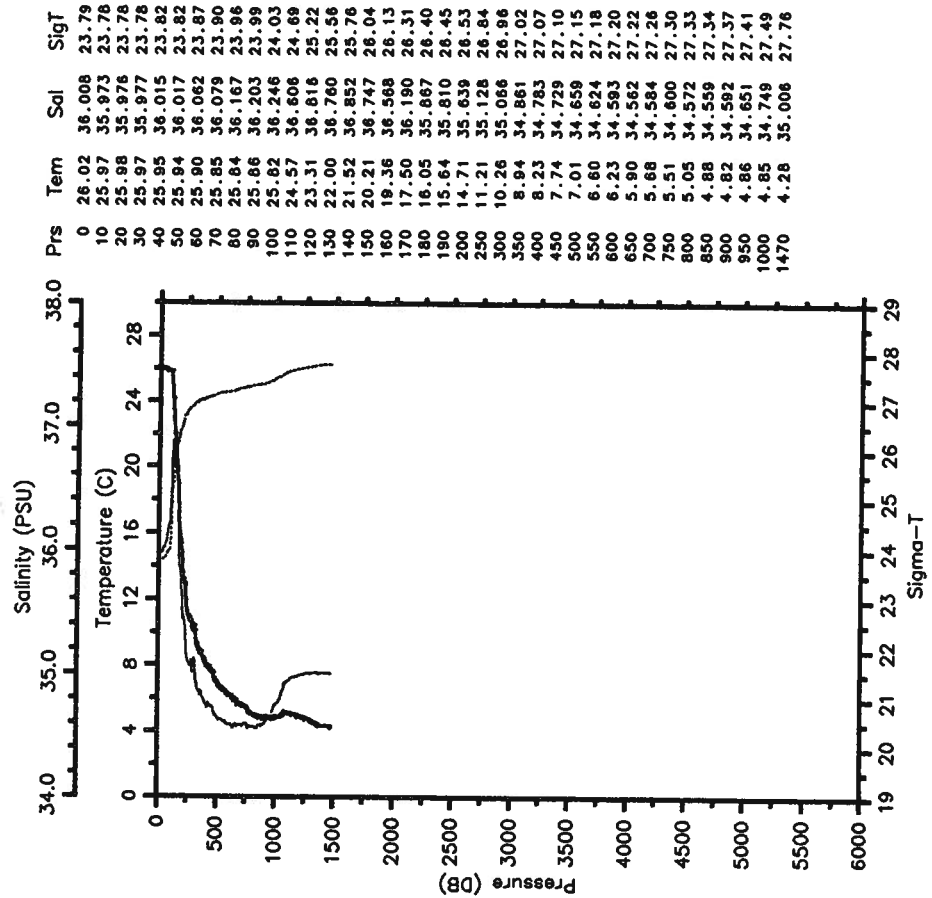
ALB-STACS33-89 CTD 60 ALBATROSS IV  
 Date 03 01 89 Latitude 8.077 N  
 Time 2302 Z Longitude 52.470 W





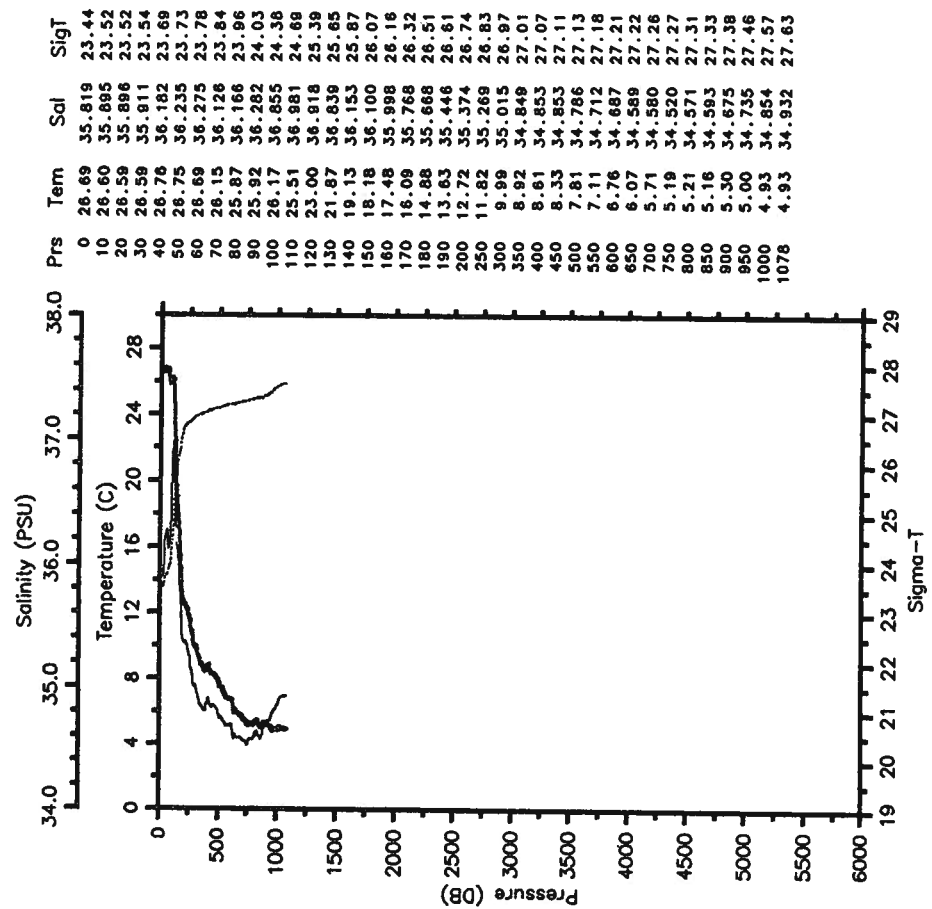
ALB-STACS33-89 CTD 61 ALBATROSS IV  
 Date 03 02 89 Latitude 7.788 N  
 Time 0254 Z Longitude 52.643 W

— Tem — Sal  
 ..... SigT



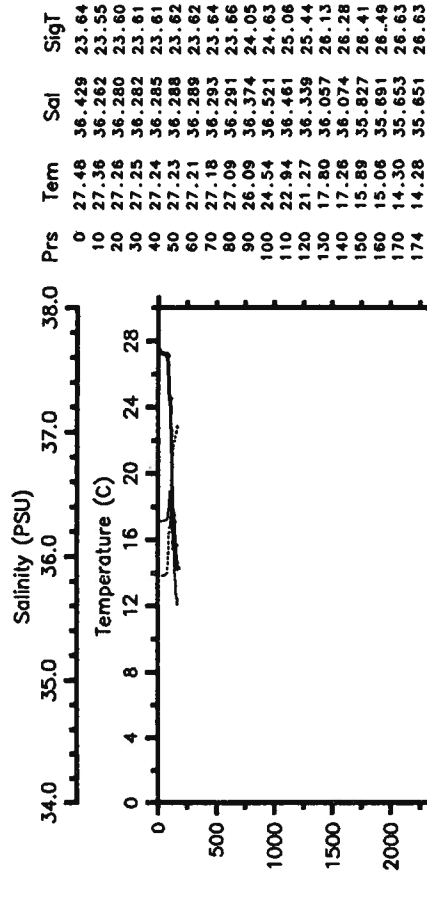
ALB-STACS33-89 CTD 62 ALBATROSS IV  
 Date 03 02 89 Latitude 7.508 N  
 Time 1314 Z Longitude 52.790 W

— Tem — Sal  
 ..... SigT



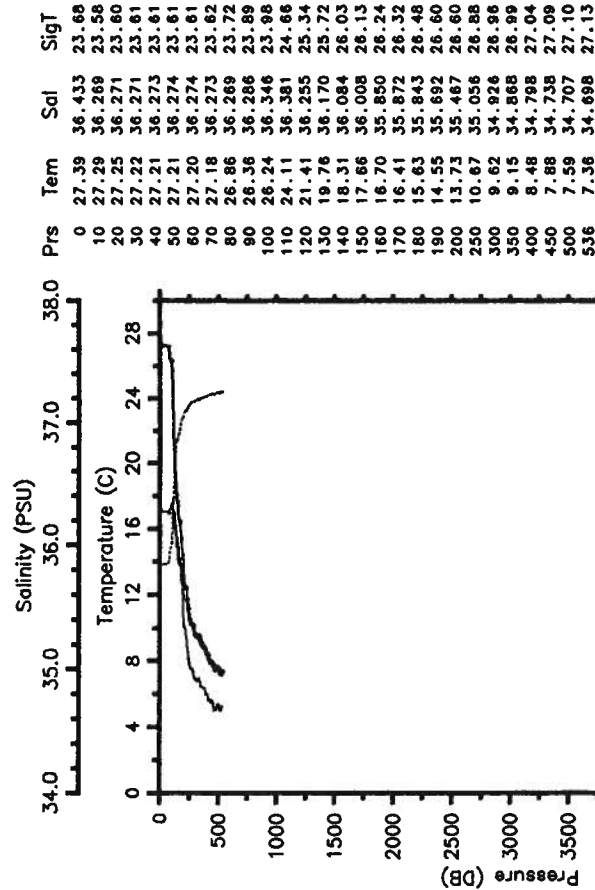
ALB-STACS33-89 CTD 64 ALBATROSS IV  
 Date 03 02 89 Latitude 7.003 N  
 Time 1807 Z Longitude 53.105 W

--- Tem --- Sal  
 ..... SigT



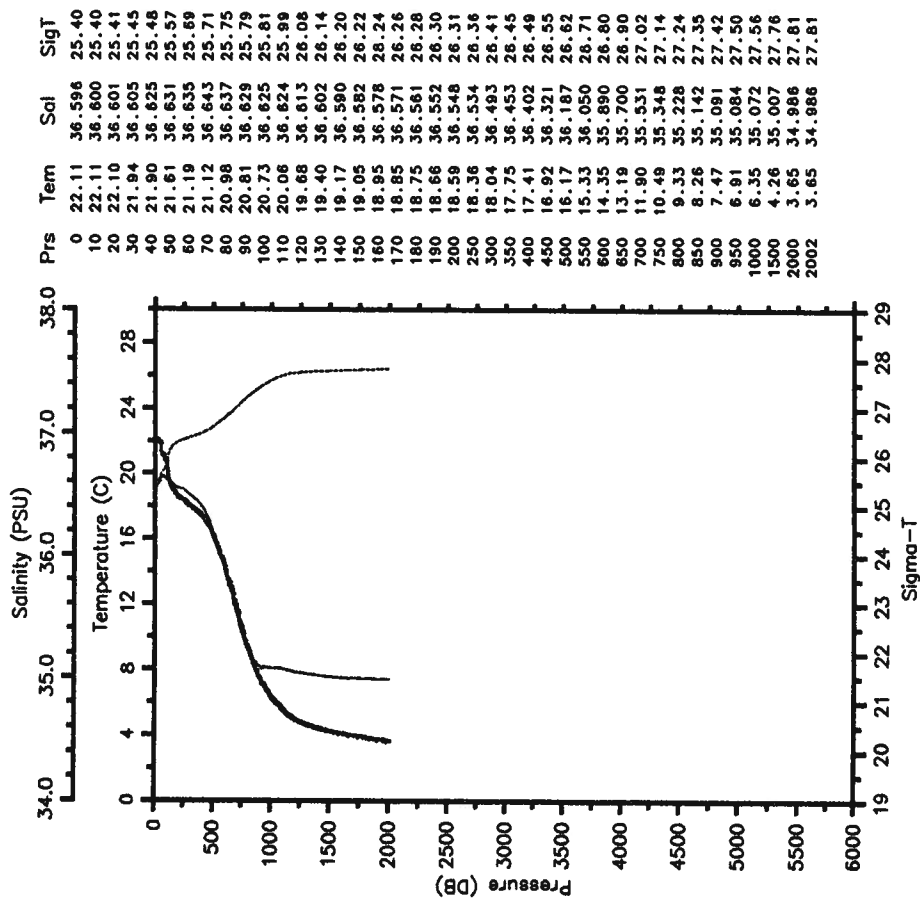
ALB-STACS33-89 CTD 63 ALBATROSS IV  
 Date 03 02 89 Latitude 7.247 N  
 Time 1543 Z Longitude 52.945 W

--- Tem --- Sal  
 ..... SigT



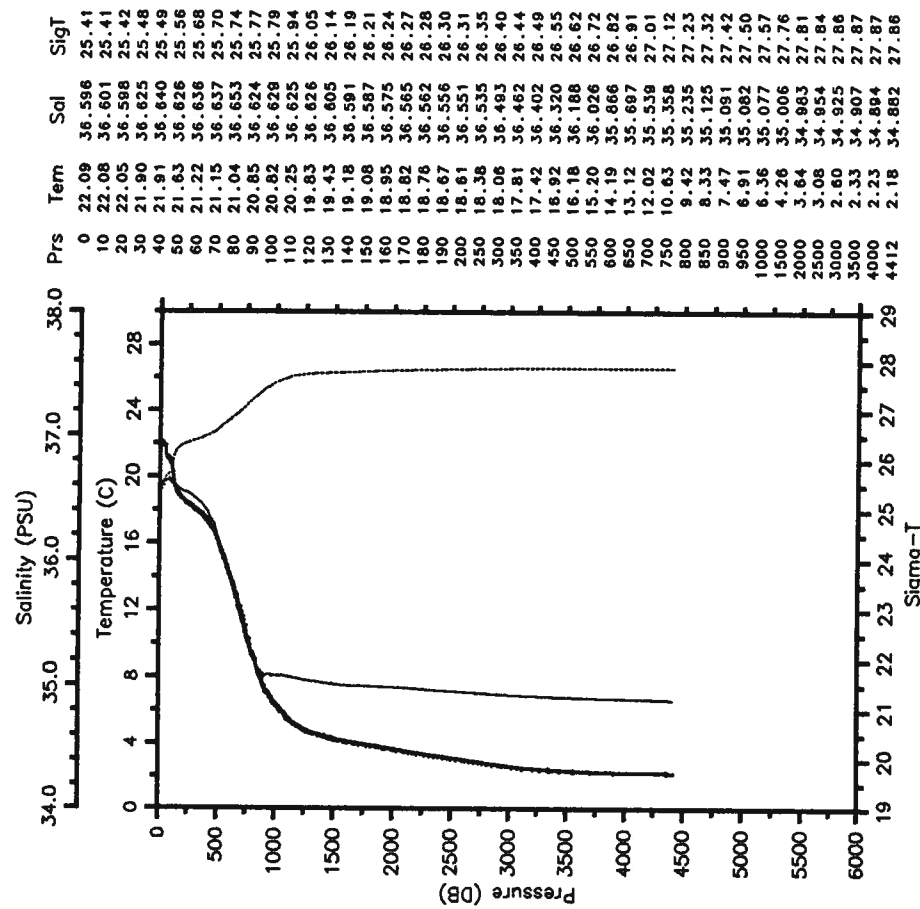
ALB-STACS33-89 CTD 65 ALBATROSS IV  
 Date 03 05 89 Latitude 26.478 N  
 Time 0322 Z Longitude 74.520 W

— Tem — Sal  
 ..... SigT



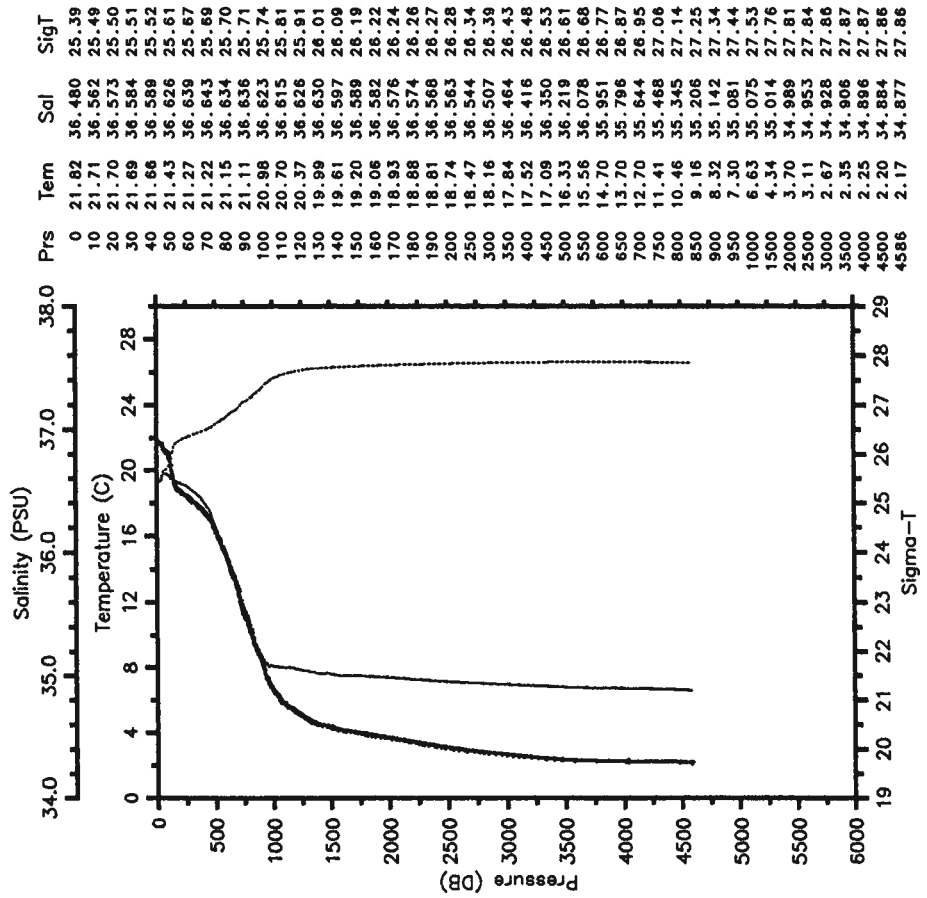
ALB-STACS33-89 CTD 66 ALBATROSS IV  
 Date 03 05 89 Latitude 26.472 N  
 Time 0507 Z Longitude 74.527 W

— Tem — Sal  
 ..... SigT



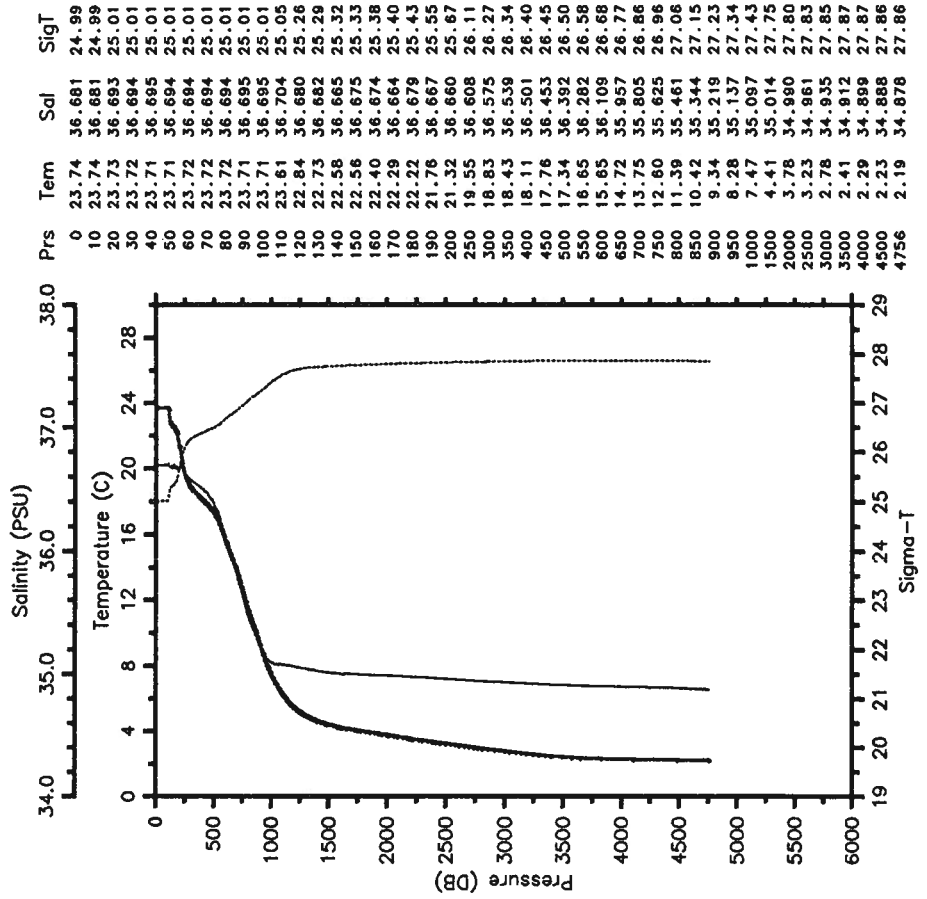
ALB-STACS33-89 CTD 67 ALBATROSS IV  
 Date 03 05 89 Latitude 26.490 N  
 Time 1132 Z Longitude 75.005 W

— Tem — Sal  
 .... SigT

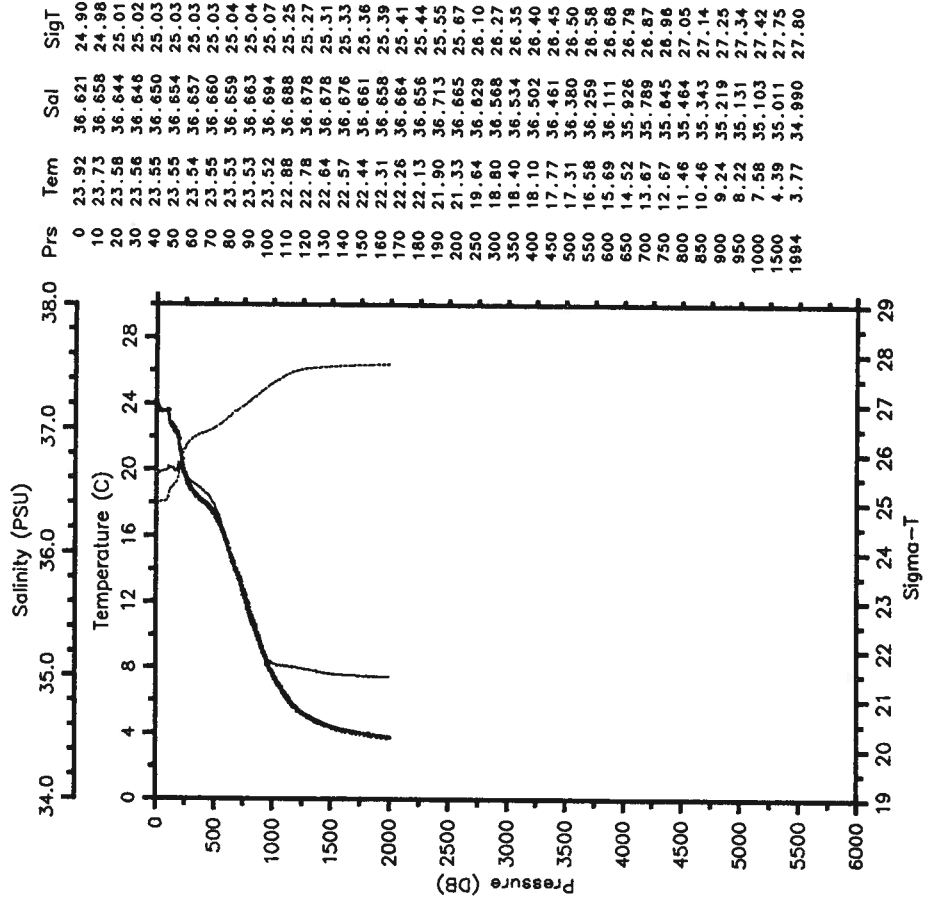
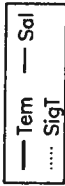


ALB-STACS33-89 CTD 68 ALBATROSS IV  
 Date 03 05 89 Latitude 26.440 N  
 Time 1646 Z Longitude 75.540 W

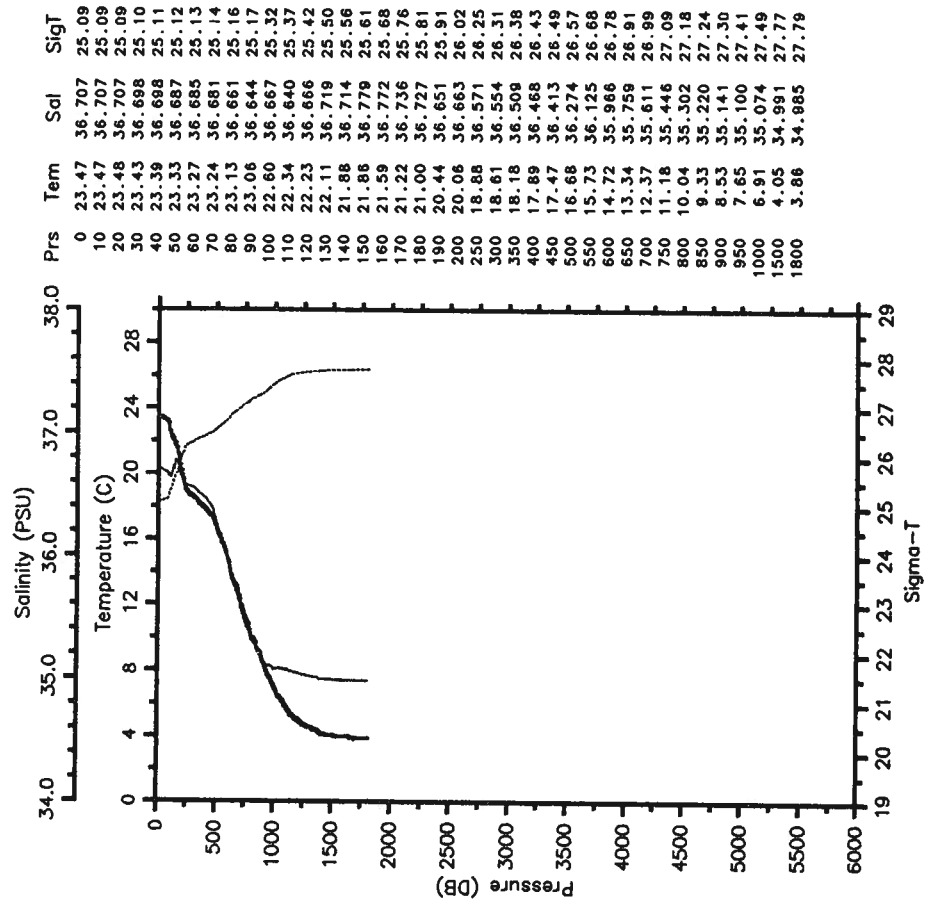
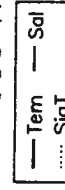
— Tem — Sal  
 .... SigT



ALB-STACS33-89 CTD 69 ALBATROSS IV  
 Date 03 05 89 Latitude 26.438 N  
 Time 0625 Z Longitude 75.540 W

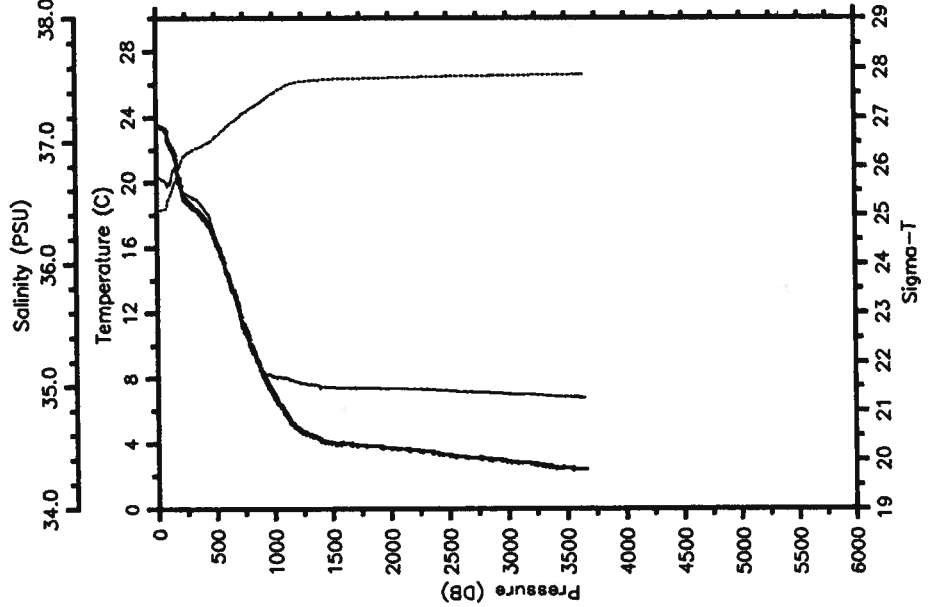


ALB-STACS33-89 CTD 70 ALBATROSS IV  
 Date 03 06 89 Latitude 26.535 N  
 Time 0601 Z Longitude 76.740 W



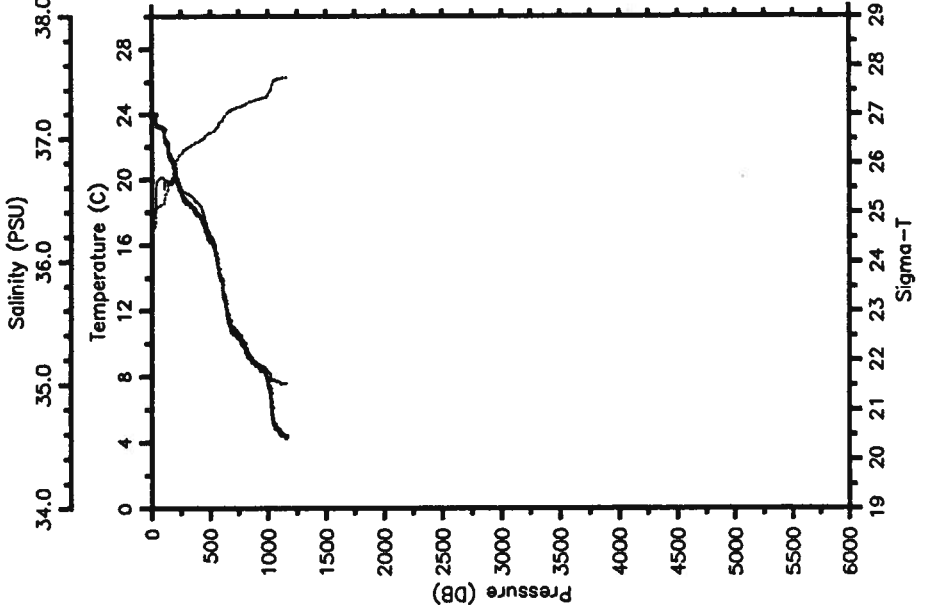
ALB-STACS33-89 CTD 71 ALBATROSS IV  
 Date 03 06 89 Latitude 26.547 N  
 Time 0739 Z Longitude 76.745 W

— Tem — Sal  
 .... SigT



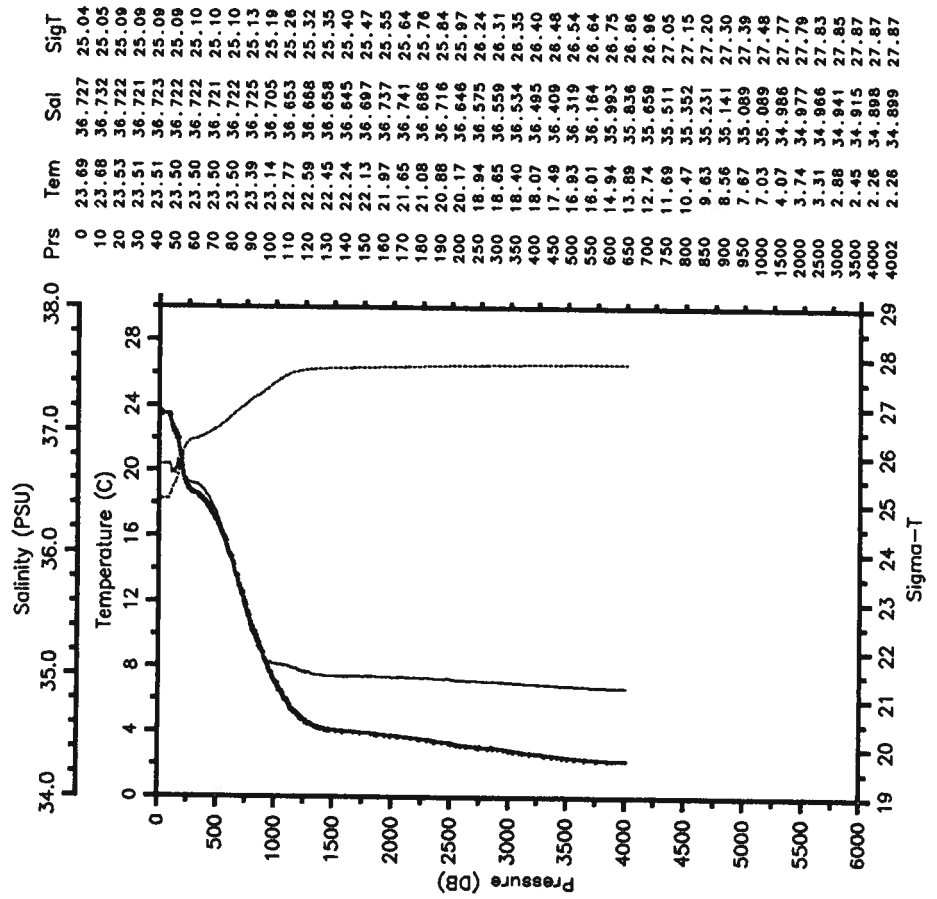
ALB-STACS33-89 CTD 72 ALBATROSS IV  
 Date 03 06 89 Latitude 26.540 N  
 Time 1130 Z Longitude 76.840 W

— Tem — Sal  
 .... SigT



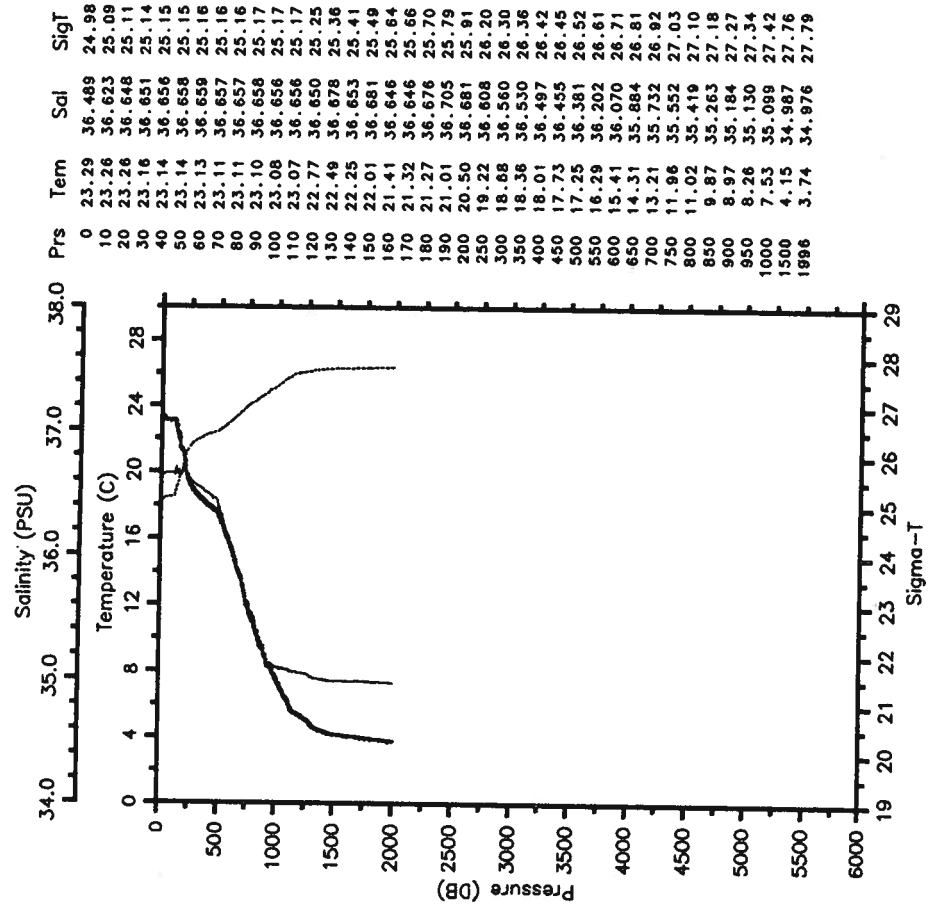
ALB-STACS33-89 CTD 73 ALBATROSS IV  
 Date 03 07 89 Latitude 26.600 N  
 Time 0210 Z Longitude 76.637 W

— Tem — Sal  
 ..... Sigt



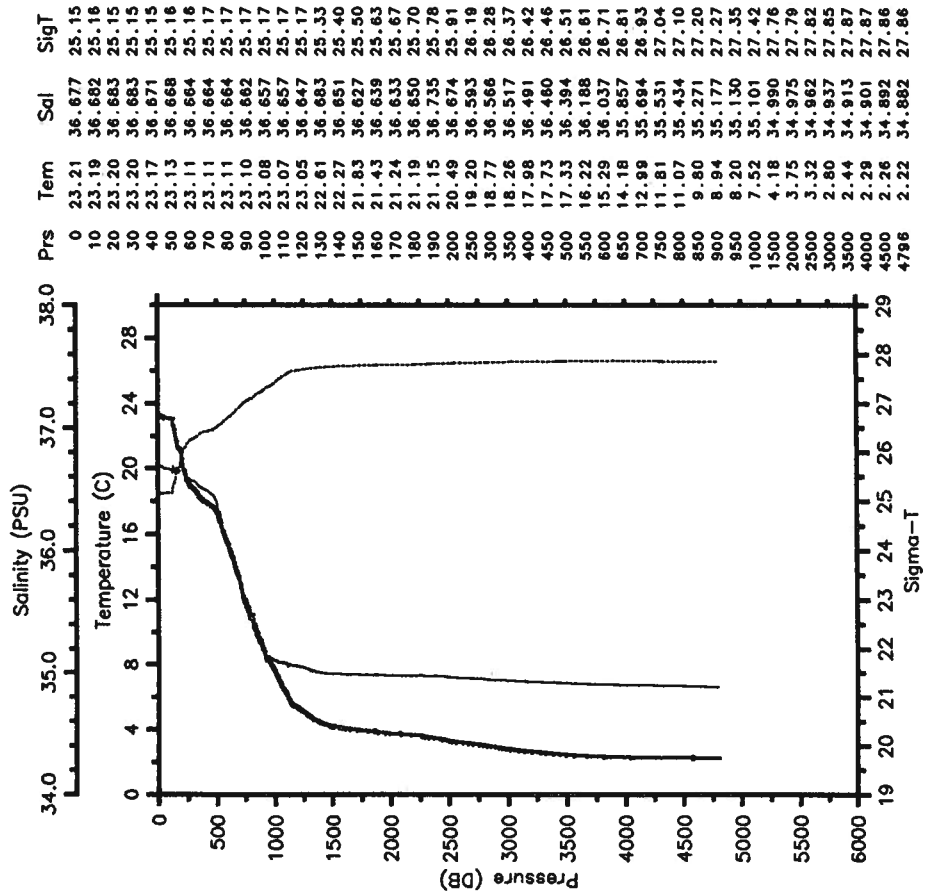
ALB-STACS33-89 CTD 74 ALBATROSS IV  
 Date 03 07 89 Latitude 26.537 N  
 Time 0722 Z Longitude 76.537 W

— Tem — Sal  
 ..... Sigt



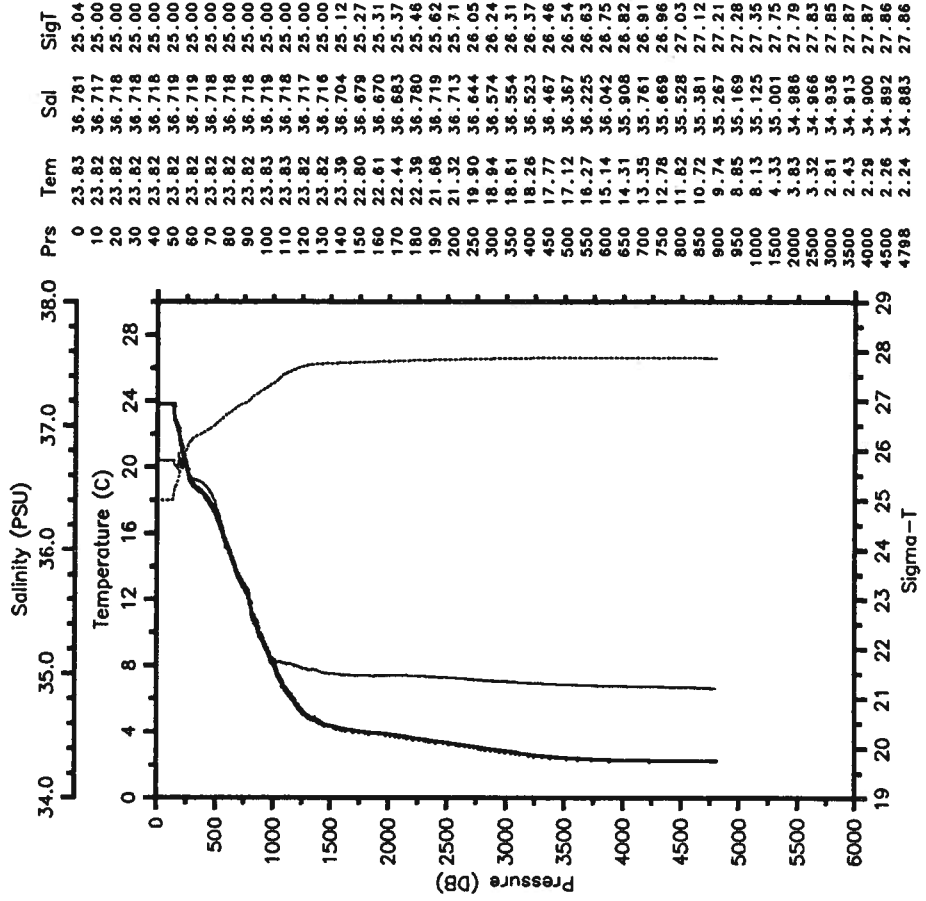
ALB-STACS33-89 CTD 75 ALBATROSS IV  
 Date 03 07 89 Latitude 26.540 N  
 Time 0900 Z Longitude 76.545 W

— Tem — Sal  
 ..... SigT



ALB-STACS33-89 CTD 76 ALBATROSS IV  
 Date 03 07 89 Latitude 26.520 N  
 Time 1355 Z Longitude 76.355 W

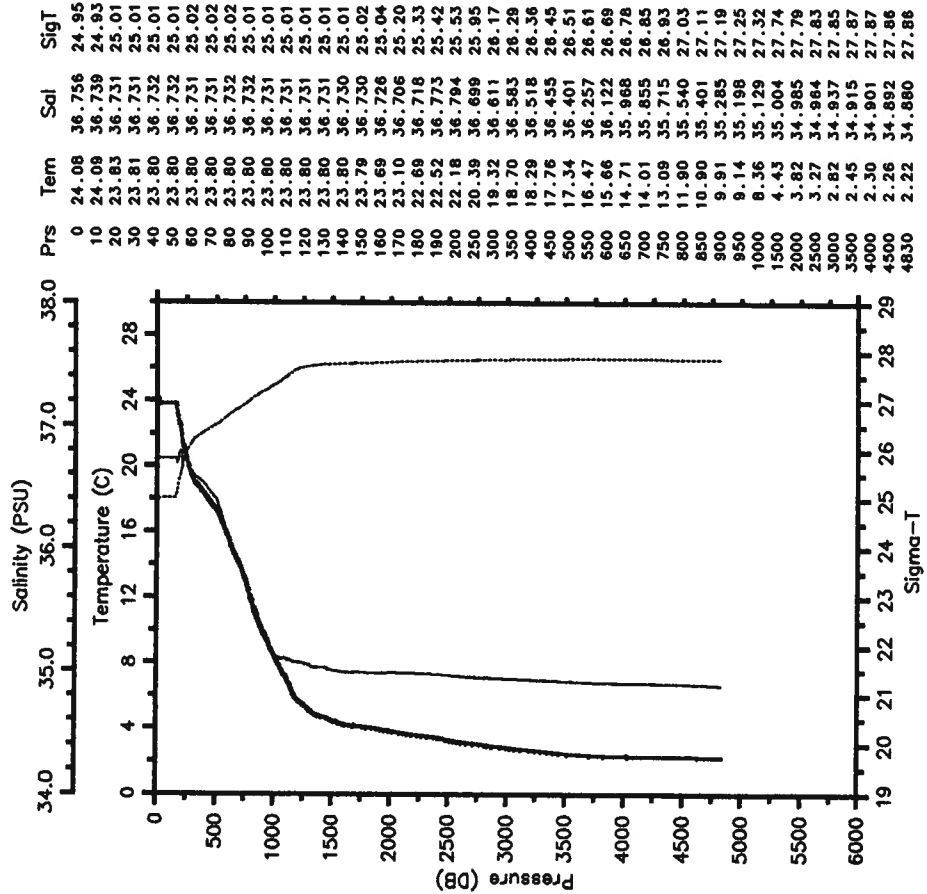
— Tem — Sal  
 ..... SigT





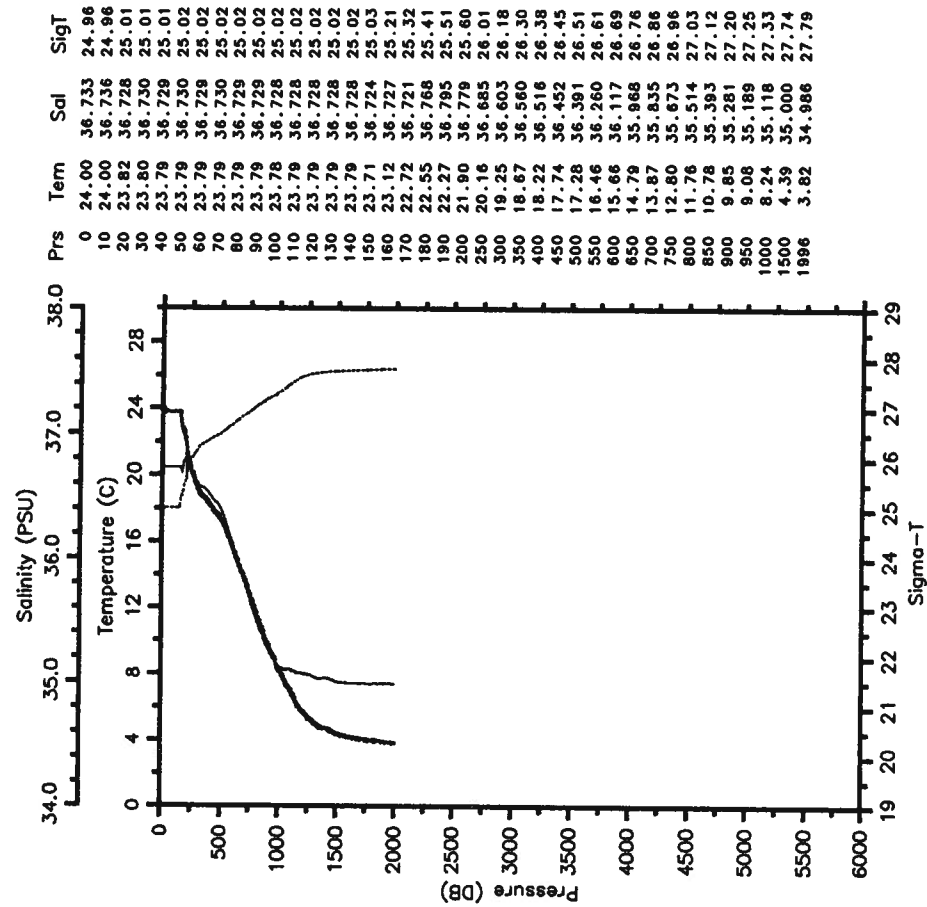
ALB-STACS33-89 CTD 78 ALBATROSS IV  
 Date 03 07 89 Latitude 26.497 N  
 Time 1943 Z Longitude 76.153 W

— Tem — Sal  
 ..... SigT



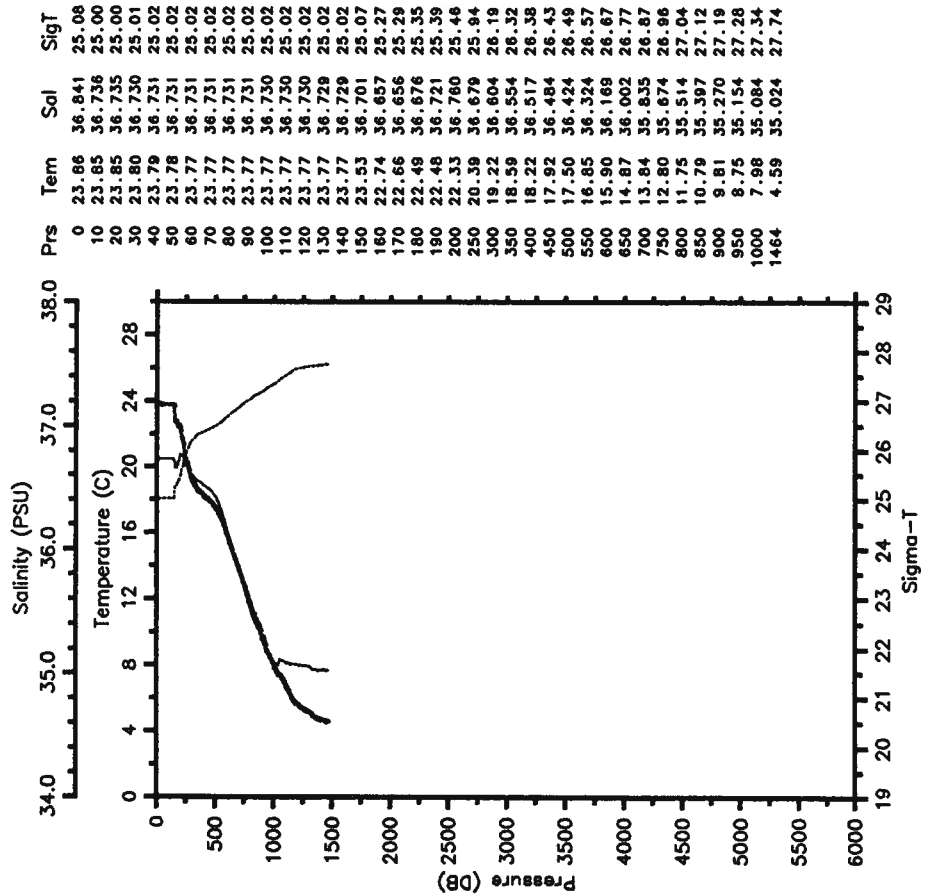
ALB-STACS33-89 CTD 79 ALBATROSS IV  
 Date 03 07 89 Latitude 26.495 N  
 Time 2229 Z Longitude 76.148 W

— Tem — Sal  
 ..... SigT



ALB-STACS33-89 CTD 80 ALBATROSS IV  
 Date 03 08 89 Latitude 26.545 N  
 Time 0129 Z Longitude 75.907 W

— Tem — Sal  
 ..... SigT

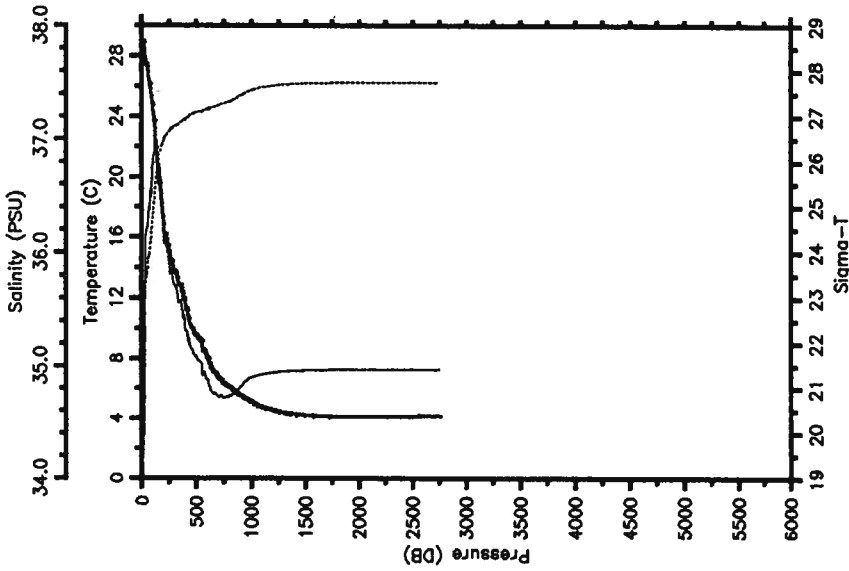


MB-STACS34-89 CTD 1 BALDRIGE

Date 08 28 89 Latitude 13.840 N

Time 1734 Z Longitude 61.440 W

— Term — Sal  
.....SigT



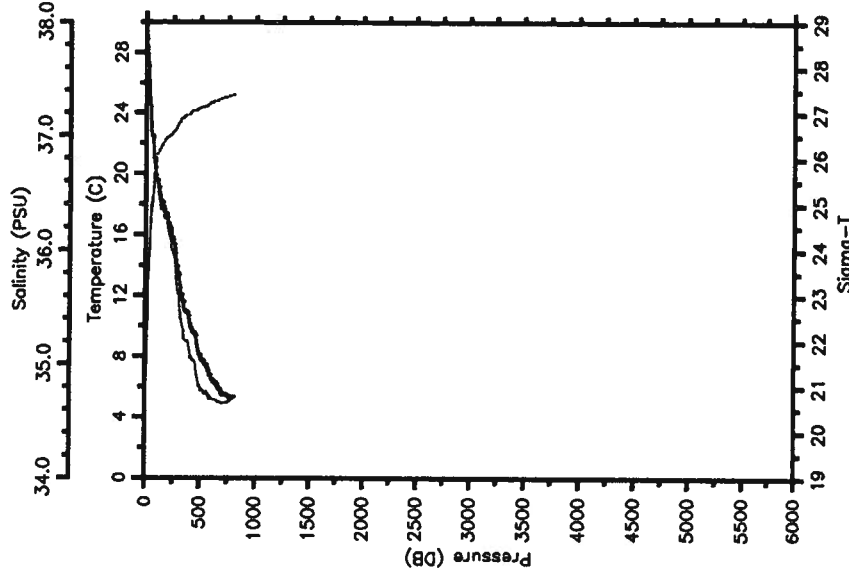
Prs	Tem	Sal	SigT
0	28.97	32.235	19.98
10	28.97	33.862	21.22
20	28.92	34.392	21.64
30	28.02	35.927	22.86
40	27.48	36.178	23.45
50	27.35	36.313	23.52
60	26.71	36.322	23.61
70	26.33	36.405	23.98
80	25.92	36.536	24.22
90	25.25	36.592	24.47
100	24.78	36.797	24.77
110	24.05	36.869	25.04
120	23.55	36.987	25.28
130	22.19	36.907	25.62
140	21.28	36.833	25.82
150	20.20	36.855	25.98
160	19.68	36.752	26.18
170	19.22	36.640	26.22
180	18.55	36.568	26.34
190	17.75	36.390	26.40
200	16.95	36.220	26.46
250	15.07	35.929	26.67
300	13.78	35.715	26.78
350	12.86	35.569	26.86
400	11.38	35.318	26.95
450	10.11	35.159	27.06
500	9.56	35.084	27.09
550	9.14	35.013	27.11
600	8.04	34.874	27.17
650	7.16	34.759	27.21
700	6.75	34.732	27.24
750	6.33	34.721	27.29
800	6.11	34.740	27.33
850	5.81	34.781	27.39
900	5.55	34.810	27.46
950	5.34	34.862	27.53
1000	5.13	34.897	27.58
1500	4.23	34.962	27.73
2000	4.13	34.969	27.75
2500	4.15	34.970	27.75
2752	4.18	34.972	27.75

MB-STACS34-89 CTD 2 BALDRIGE

Date 08 29 89 Latitude 11.420 N

Time 1222 Z Longitude 60.535 W

— Term — Sal  
.....SigT

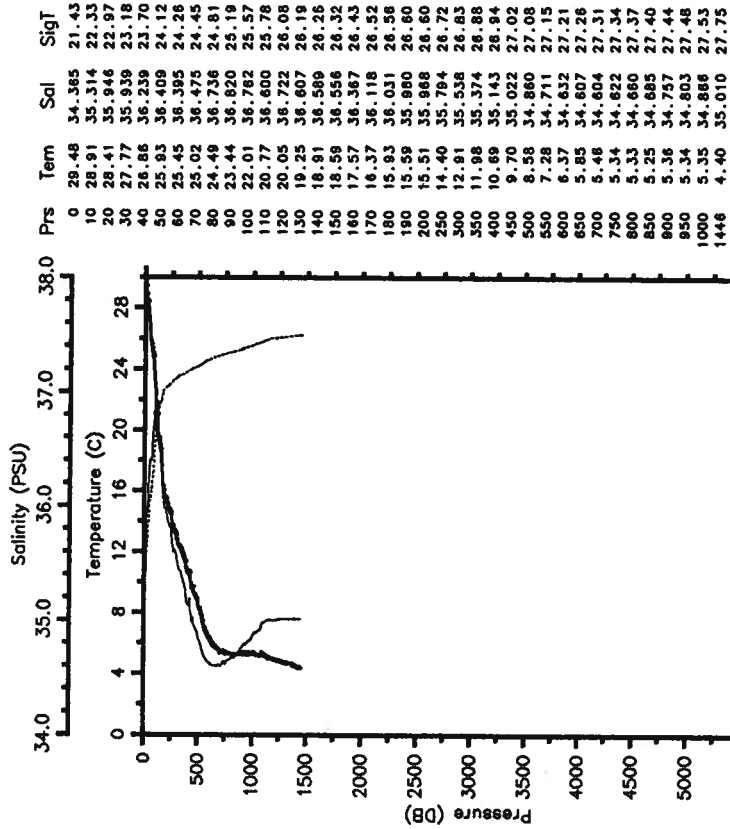


Prs	Tem	Sal	SigT
0	28.88	34.554	21.77
10	28.33	34.878	22.20
20	27.19	35.439	22.99
30	25.29	35.929	23.96
40	24.13	36.073	24.42
50	22.57	36.338	25.07
60	22.42	36.389	25.15
70	21.50	36.549	25.54
80	20.81	36.700	25.84
90	20.07	36.819	25.98
100	19.62	36.892	26.08
110	18.36	36.937	26.10
120	18.81	36.447	26.18
130	18.64	36.416	26.20
140	18.15	36.354	26.27
150	18.09	36.362	26.30
160	17.82	36.338	26.34
170	17.50	36.273	26.37
180	17.38	36.305	26.43
190	17.21	36.288	26.45
200	16.92	36.210	26.46
250	15.68	35.967	26.57
300	13.45	35.815	26.78
350	11.10	35.214	26.82
400	10.35	35.107	26.97
450	9.47	35.017	27.06
500	8.04	34.805	27.11
550	7.47	34.744	27.15
600	6.62	34.681	27.23
650	6.20	34.677	27.27
700	5.51	34.658	27.34
750	5.39	34.662	27.36
800	5.32	34.685	27.40
802	5.33	34.685	27.40

MB-STACS34-89 CTD 3 BALDRIGE

Date 08 29 89 Latitude 11.740 N  
 Time 1456 Z Longitude 60.297 W

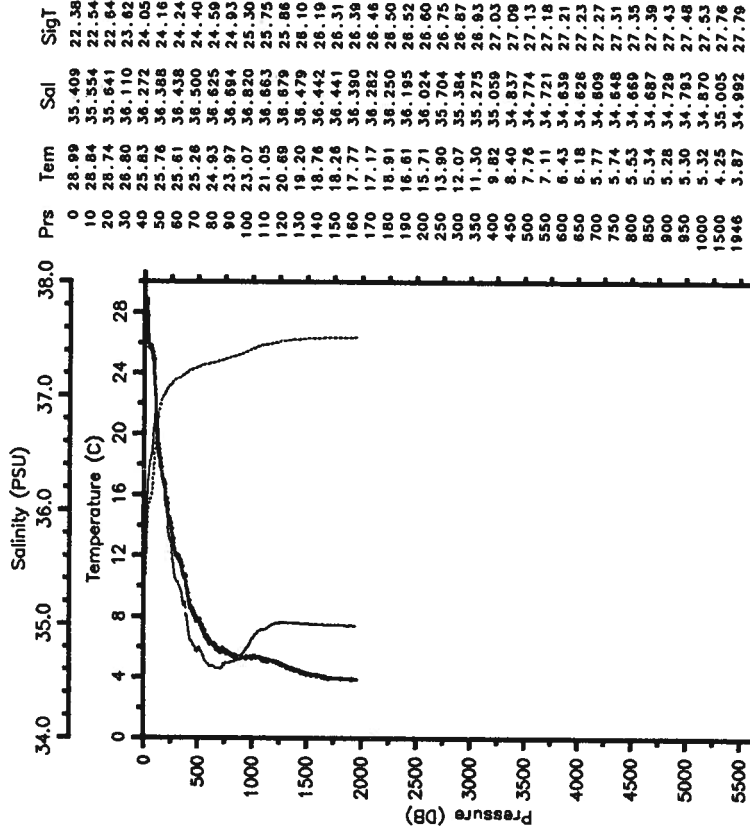
— Tem — Sal  
 .....SigT



MB-STACS34-89 CTD 4 BALDRIGE

Date 08 29 89 Latitude 12.049 N  
 Time 1737 Z Longitude 60.072 W

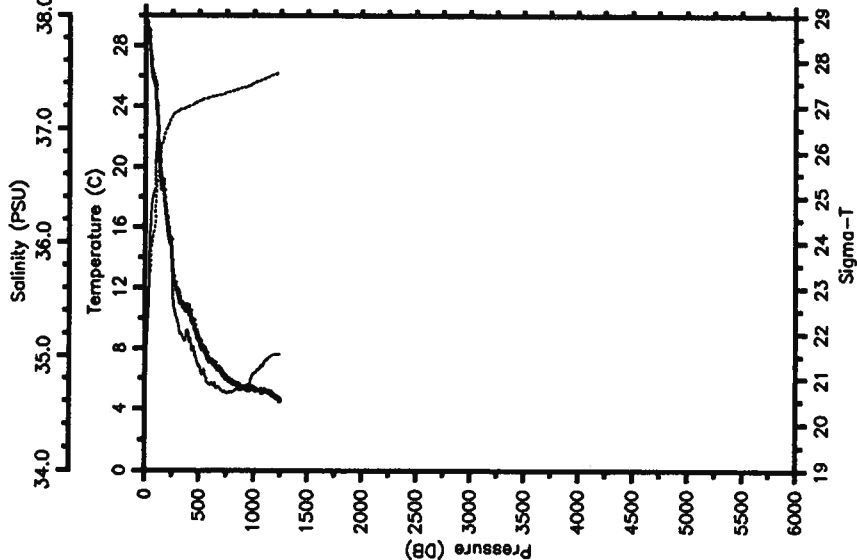
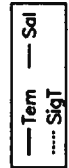
— Tem — Sal  
 .....SigT



MB-STACS34-89 CTD 5 BALDRIGE

Date 08 29 89 Latitude 12.365 N

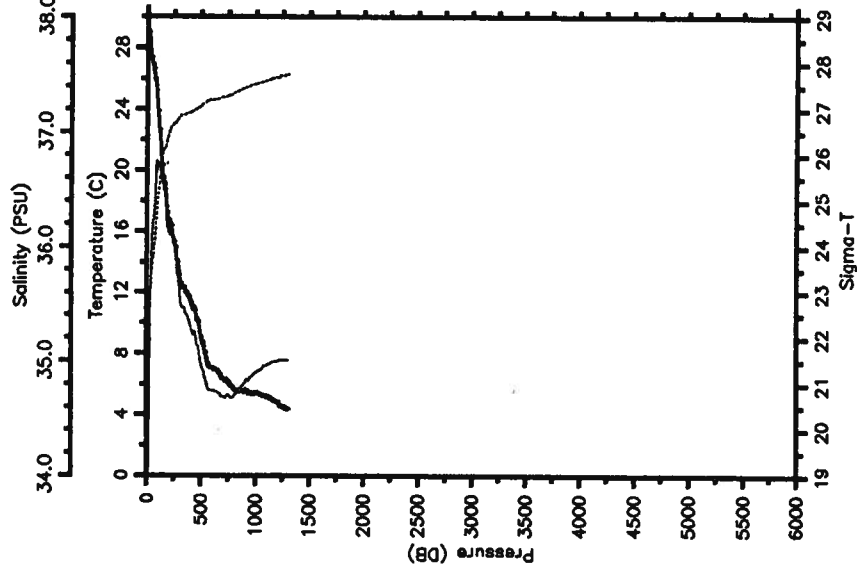
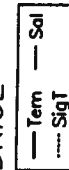
Time 2035 Z Longitude 59.837 W



MB-STACS34-89 CTD 6 BALDRIGE

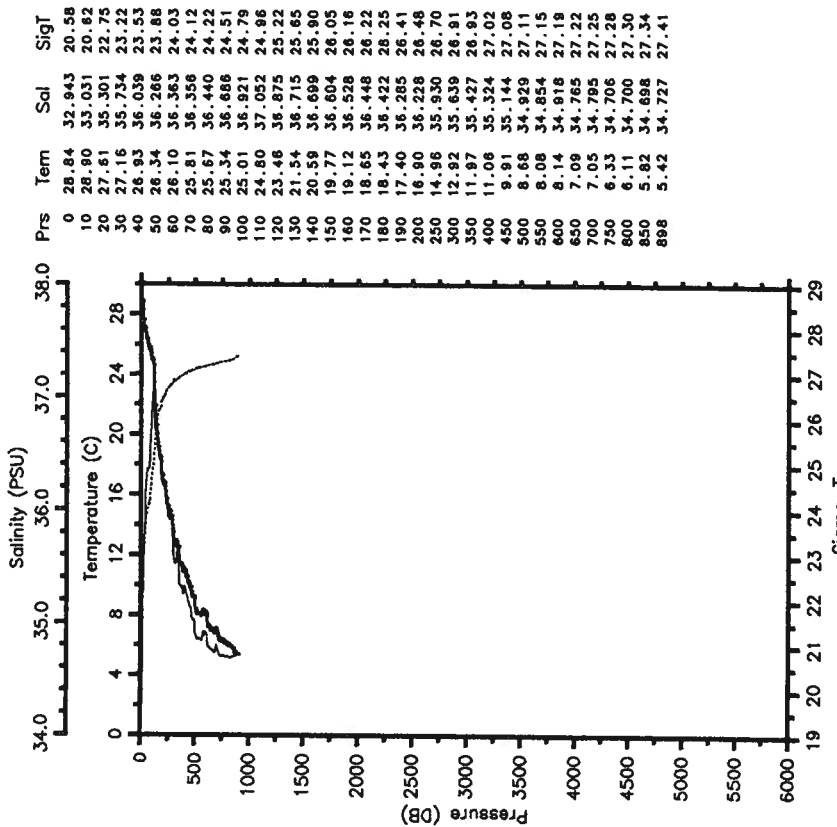
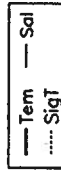
Date 08 29 89 Latitude 12.684 N

Time 2311 Z Longitude 59.600 W



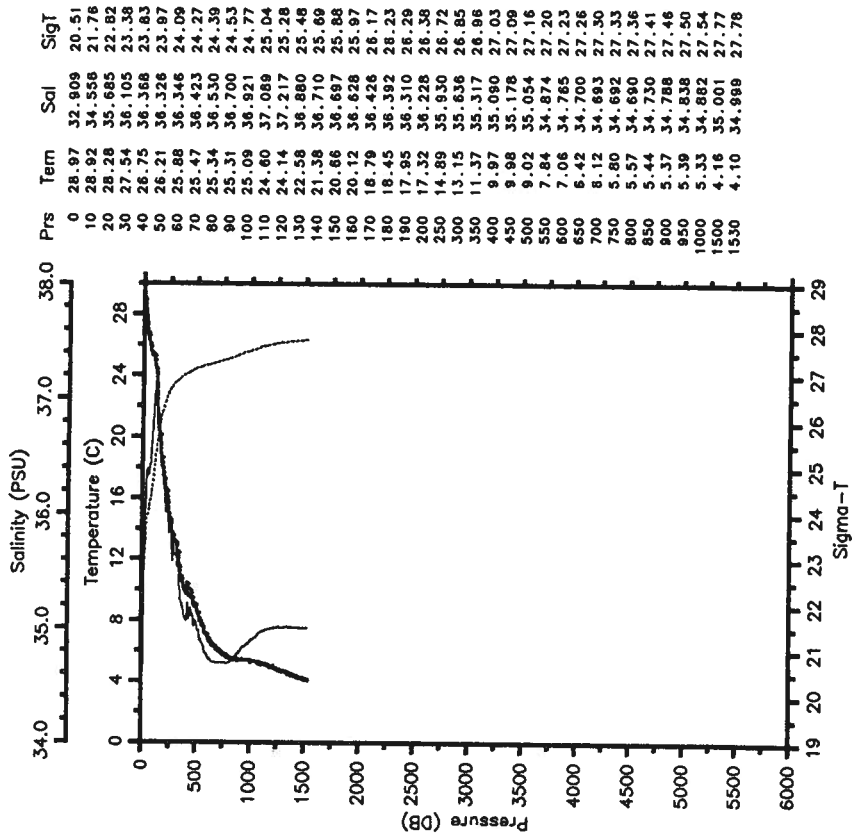
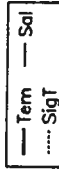
MB-STACS34-89 CTD 7 BALDRIGE

Date 08 30 89 Latitude 12.998 N  
Time 0153 Z Longitude 59.367 W



MB-STACS34-89 CTD 8 BALDRIGE

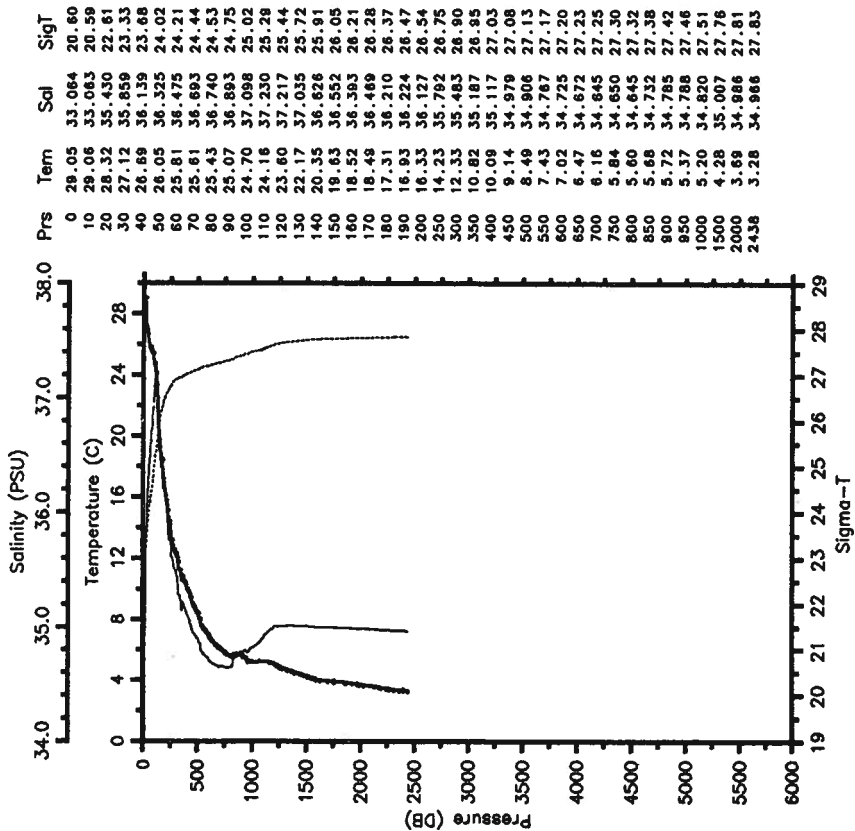
Date 08 30 89 Latitude 13.000 N  
Time 0410 Z Longitude 59.008 W



MB-STACS34-89 CTD 9 BALDRIGE

Date 08 30 89 Latitude 12.998 N  
Time 0716 Z Longitude 58.503 W

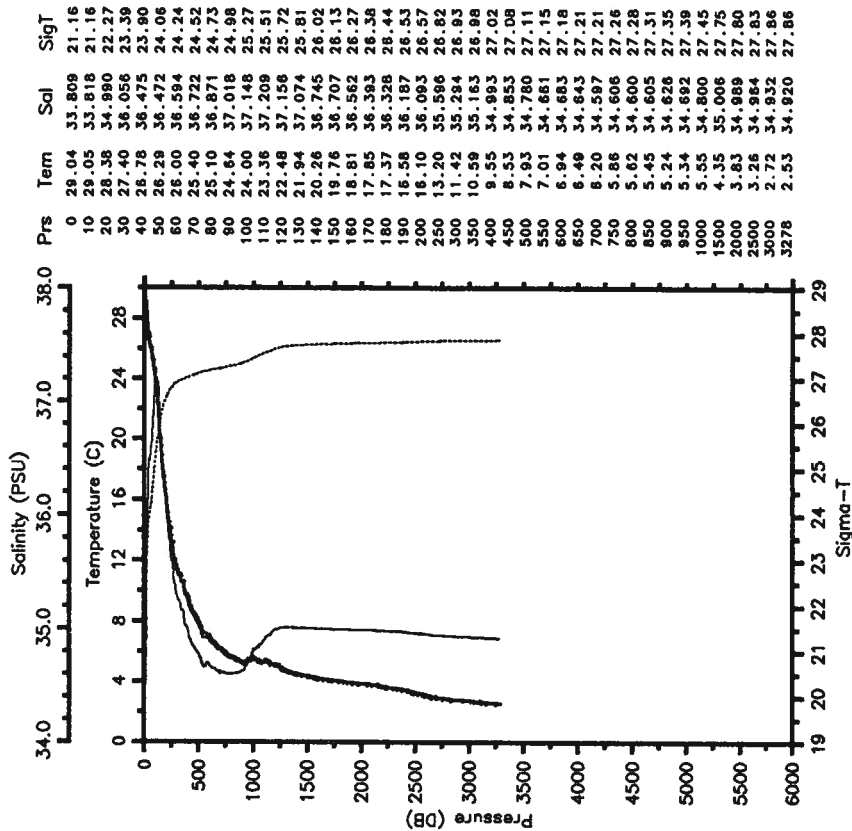
— Tem — Sal  
..... SigT



MB-STACS34-89 CTD 10 BALDRIGE

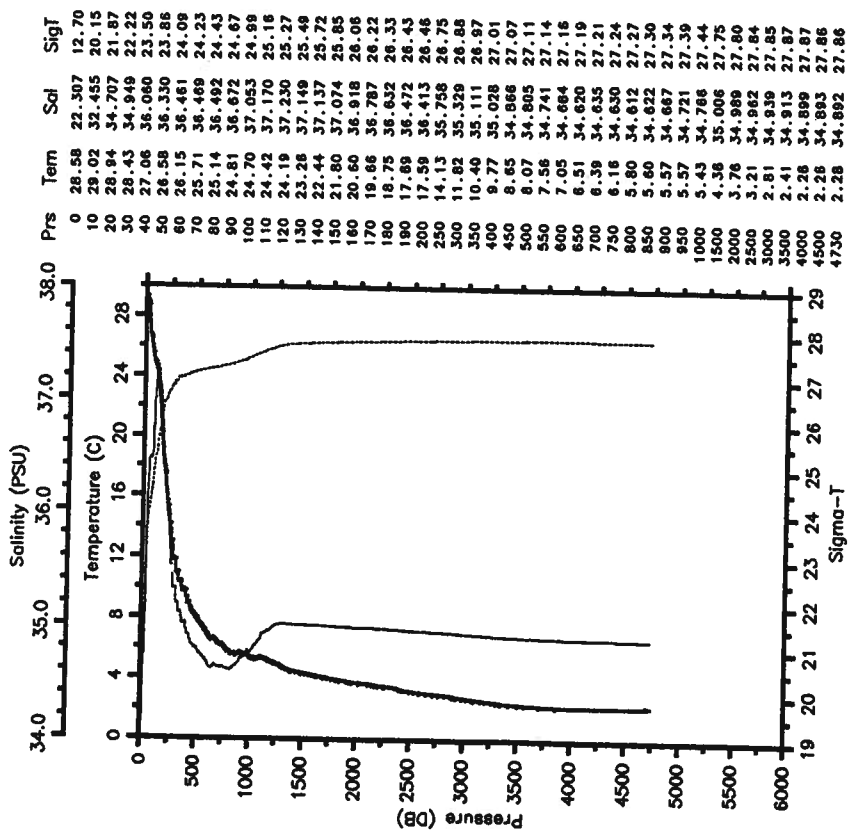
Date 08 30 89 Latitude 13.000 N  
Time 1108 Z Longitude 58.000 W

— Tem — Sal  
..... SigT



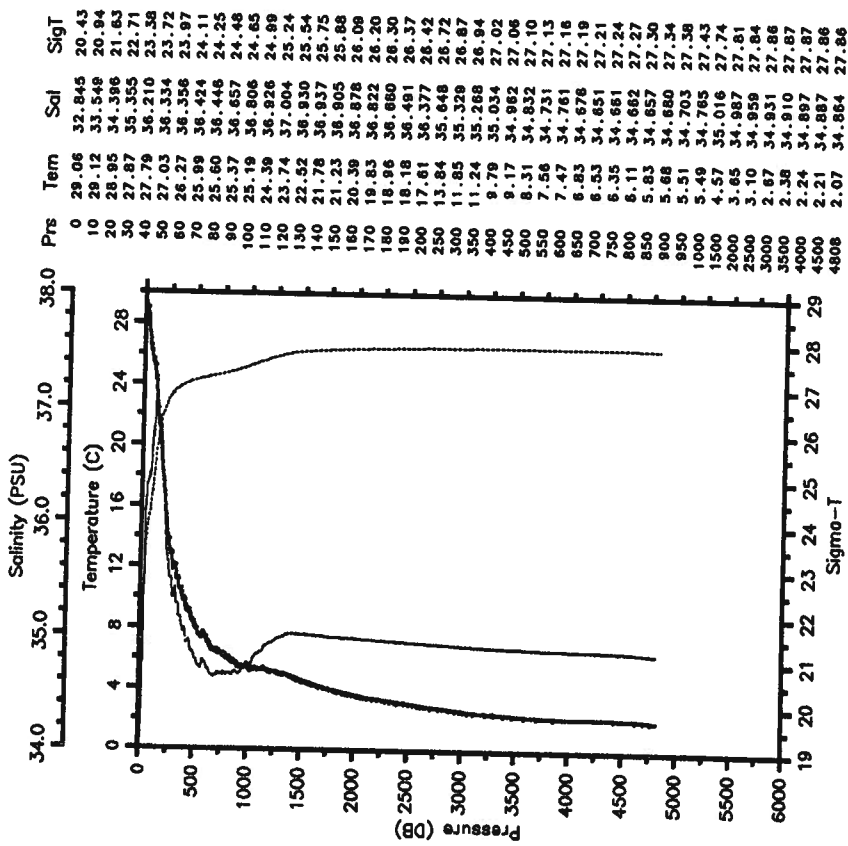
MB-STACS34-89 CTD 11 BALDRIGE  
 Date 08 30 89 Latitude 13.000 N  
 Time 1524 Z Longitude 57.505 W

— Term — Sal  
 - - - - - SigT



MB-STACS34-89 CTD 12 BALDRIGE  
 Date 08 30 89 Latitude 13.000 N  
 Time 2010 Z Longitude 57.003 W

— Term — Sal  
 - - - - - SigT

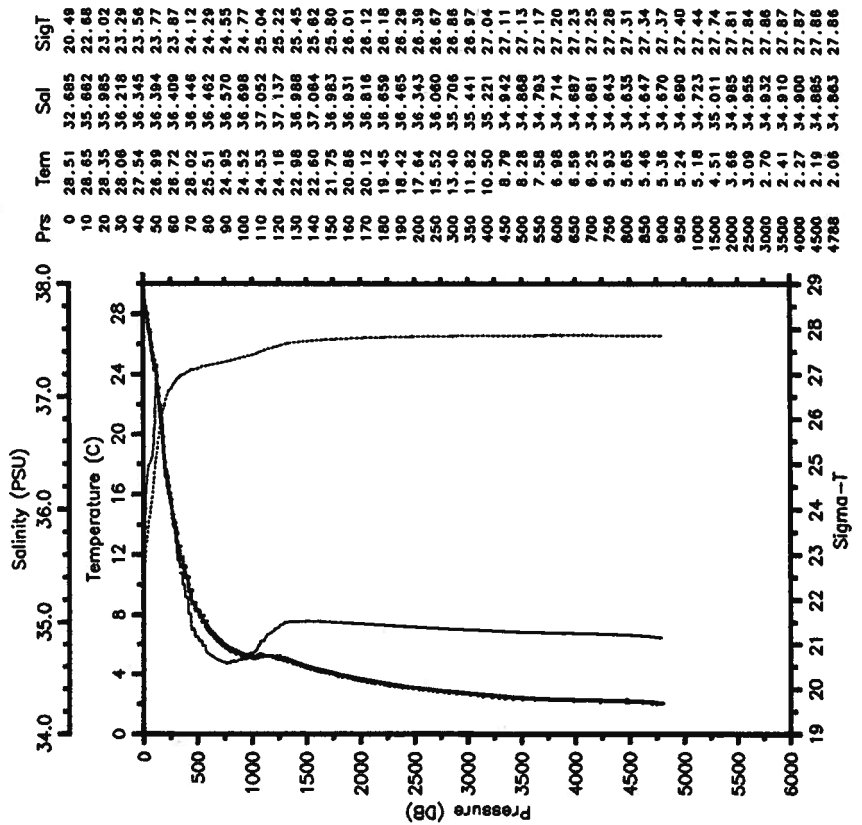




MB-STACS34-89 CTD 13 BALDRIGE

Date 08 31 89 Latitude 13.005 N  
 Time 0314 Z Longitude 56.005 W

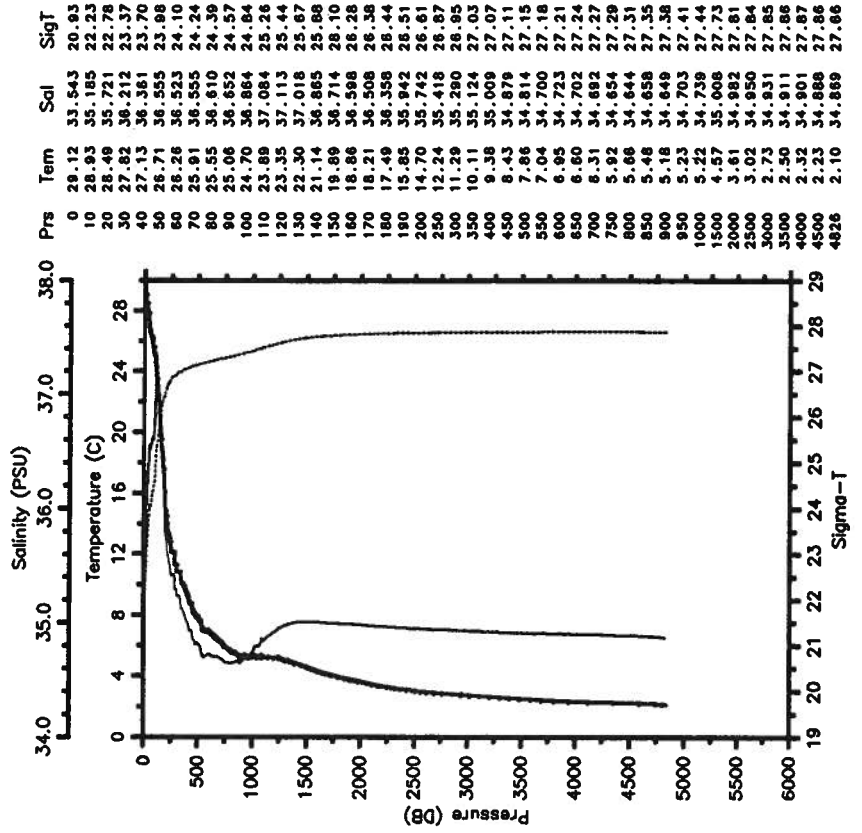
— Tem — Sal  
 ..... SigT



MB-STACS34-89 CTD 14 BALDRIGE

Date 08 31 89 Latitude 12.488 N  
 Time 1443 Z Longitude 54.088 W

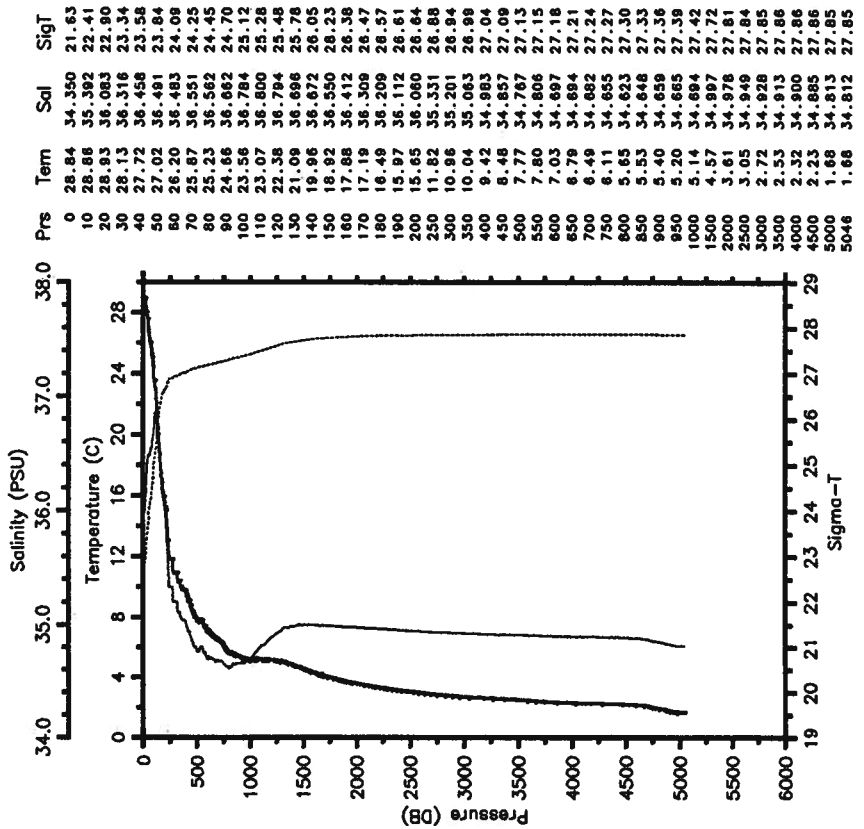
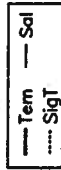
— Tem — Sal  
 ..... SigT



MB-STACS34-89 CTD 15 BALDRIGE

Date 09 01 89 Latitude 11.565 N

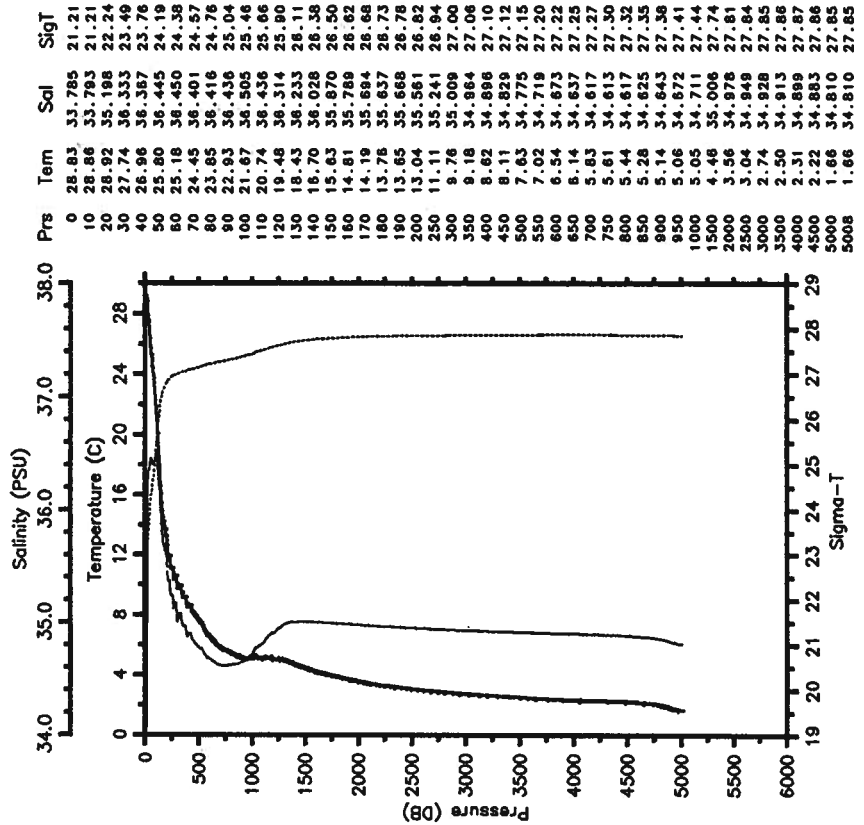
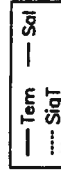
Time 0140 Z Longitude 52.404 W



MB-STACS34-89 CTD 16 BALDRIGE

Date 09 01 89 Latitude 10.658 N

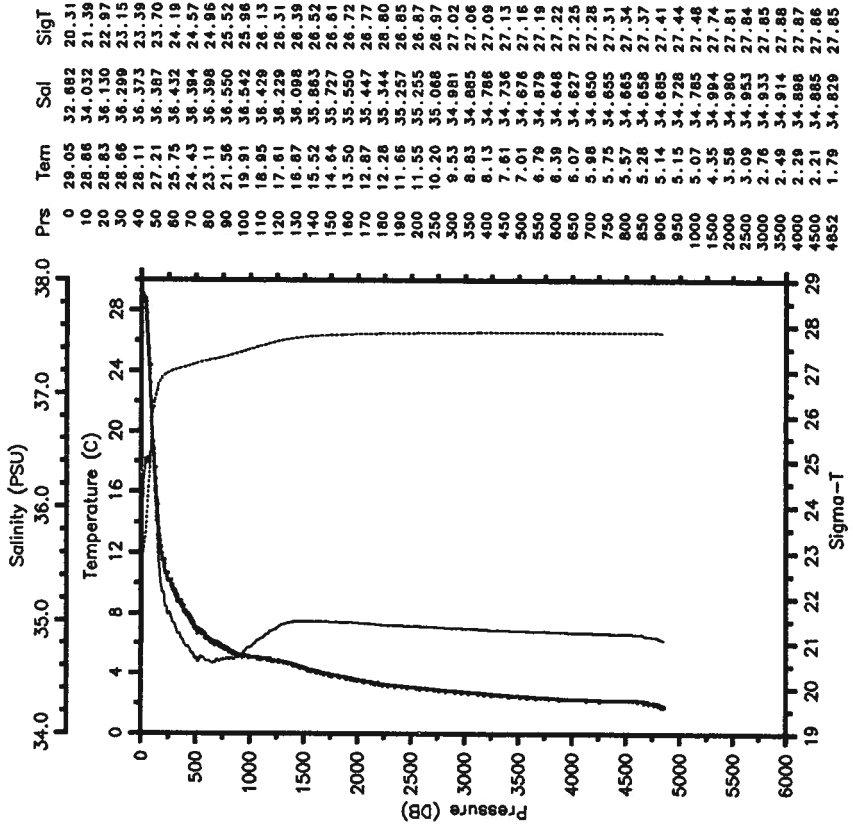
Time 1259 Z Longitude 50.707 W



MB-STACS34-89 CTD 17 BALDRIGE

Date 09 01 89 Latitude 9.741 N  
Time 2332 Z Longitude 49.022 W

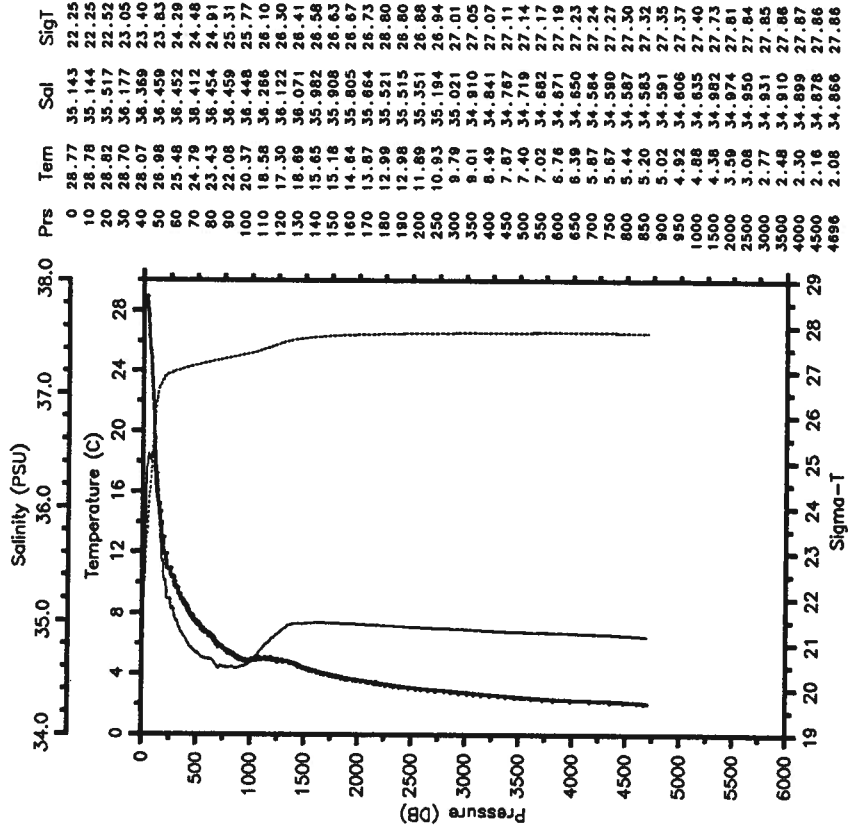
— Tem — Sal  
.....SigT



MB-STACS34-89 CTD 18 BALDRIGE

Date 09 02 89 Latitude 8.822 N  
Time 1029 Z Longitude 47.338 W

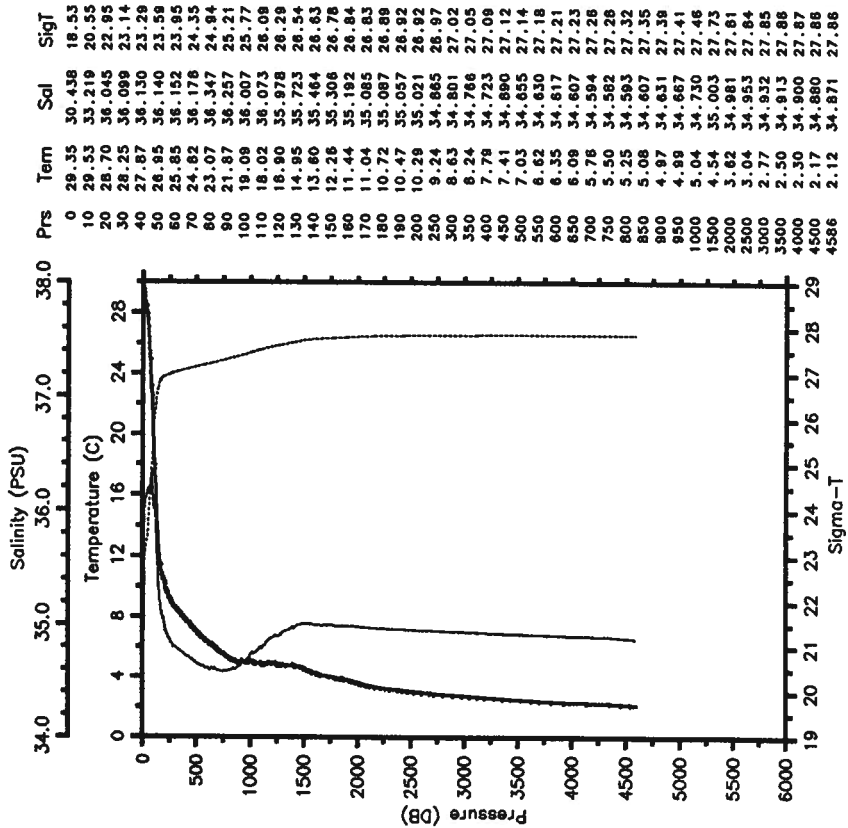
— Tem — Sal  
.....SigT



MB-STACS34-89 CTD 19 BALDRIGE

Date 09 02 89 Latitude 7.906 N  
Time 2040 Z Longitude 45.657 W

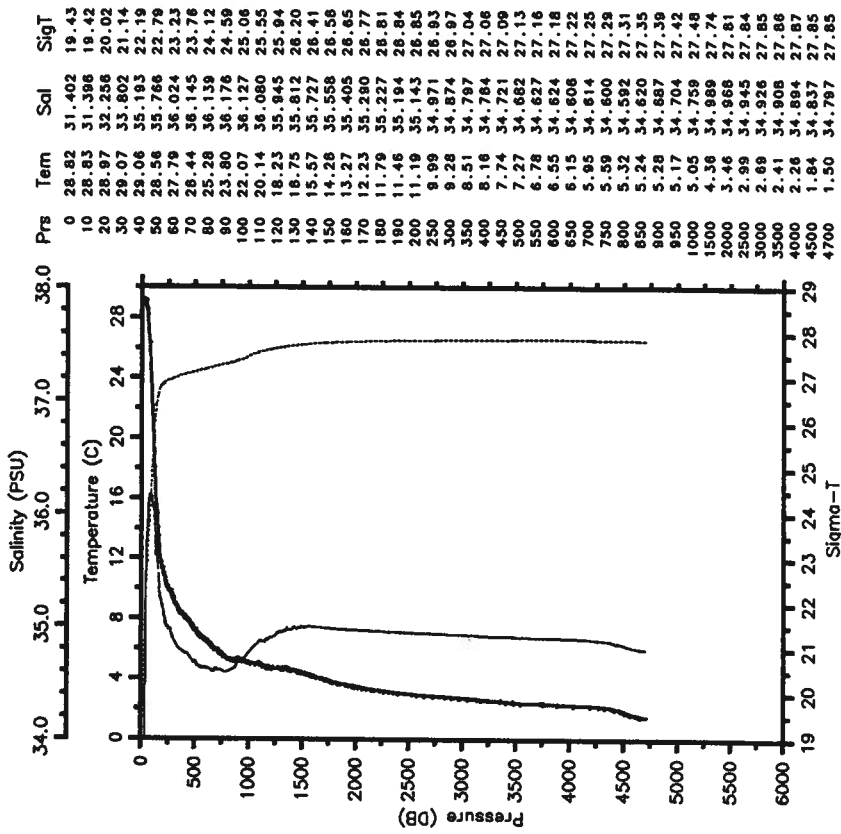
— Tem — Sal  
.....SigT



MB-STACS34-89 CTD 20 BALDRIGE

Date 09 03 89 Latitude 6.998 N  
Time 0734 Z Longitude 43.998 W

— Tem — Sal  
.....SigT

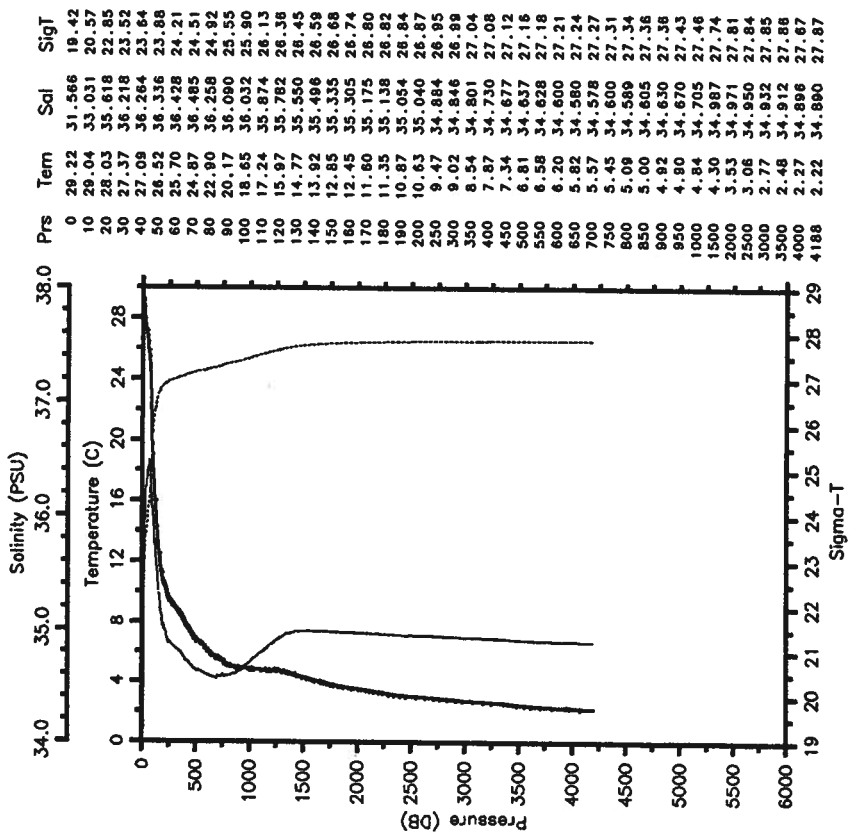


MB-STACS34-89 CTD 21 BALDRIGE

Date 09 03 89 Latitude 5.993 N

Time 1516 Z Longitude 43.985 W

— Term — Sal  
 ..... SigT

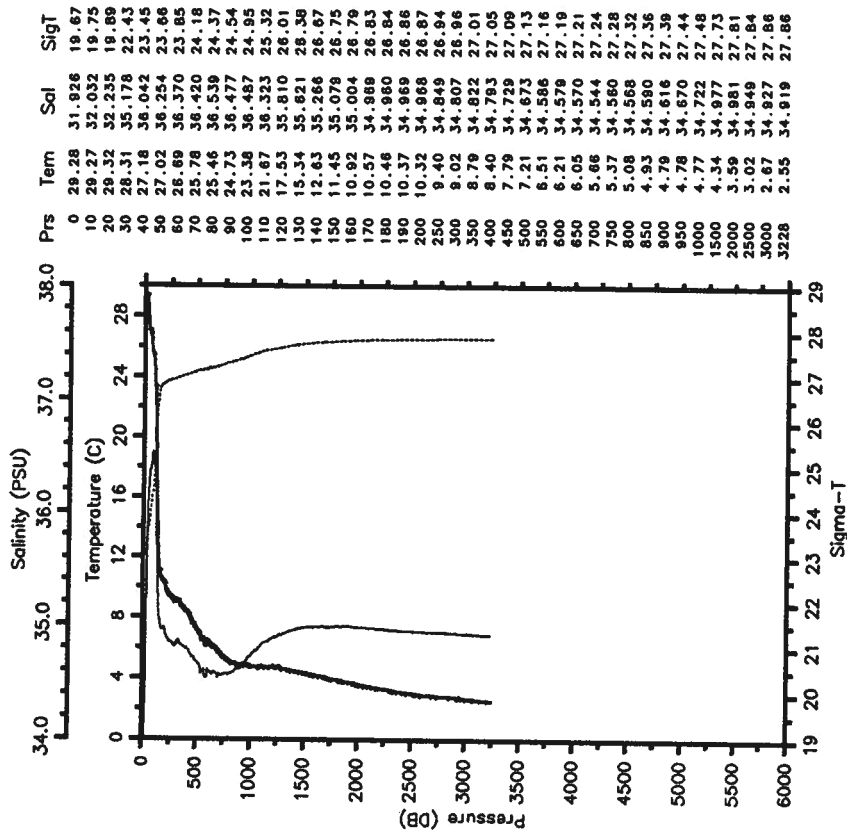


MB-STACS34-89 CTD 22 BALDRIGE

Date 09 03 89 Latitude 5.000 N

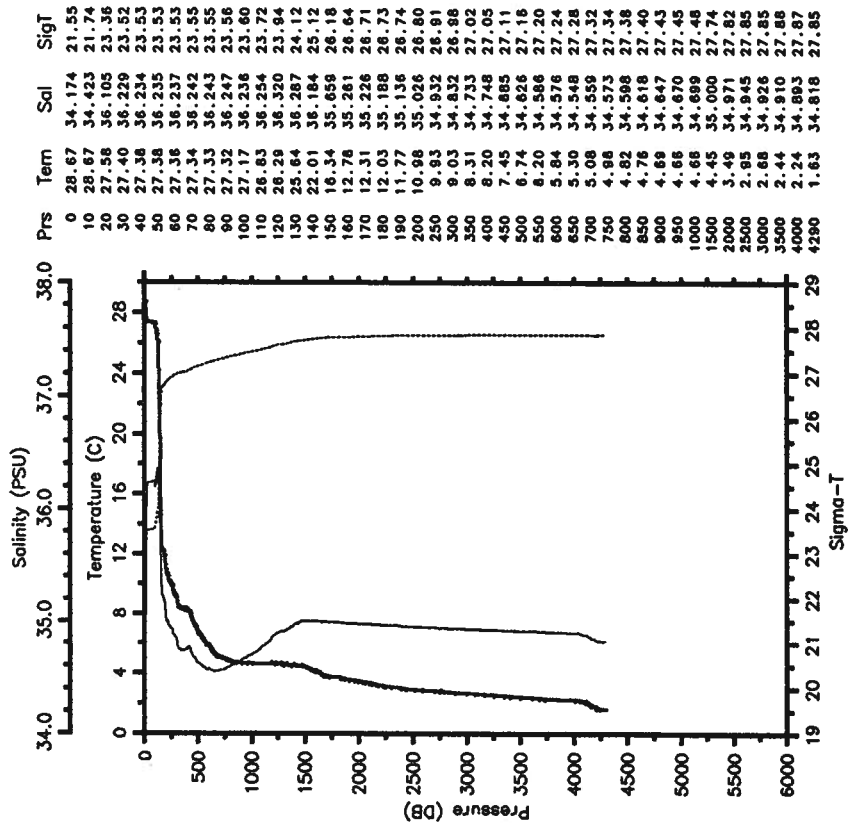
Time 2210 Z Longitude 44.000 W

— Term — Sal  
 ..... SigT



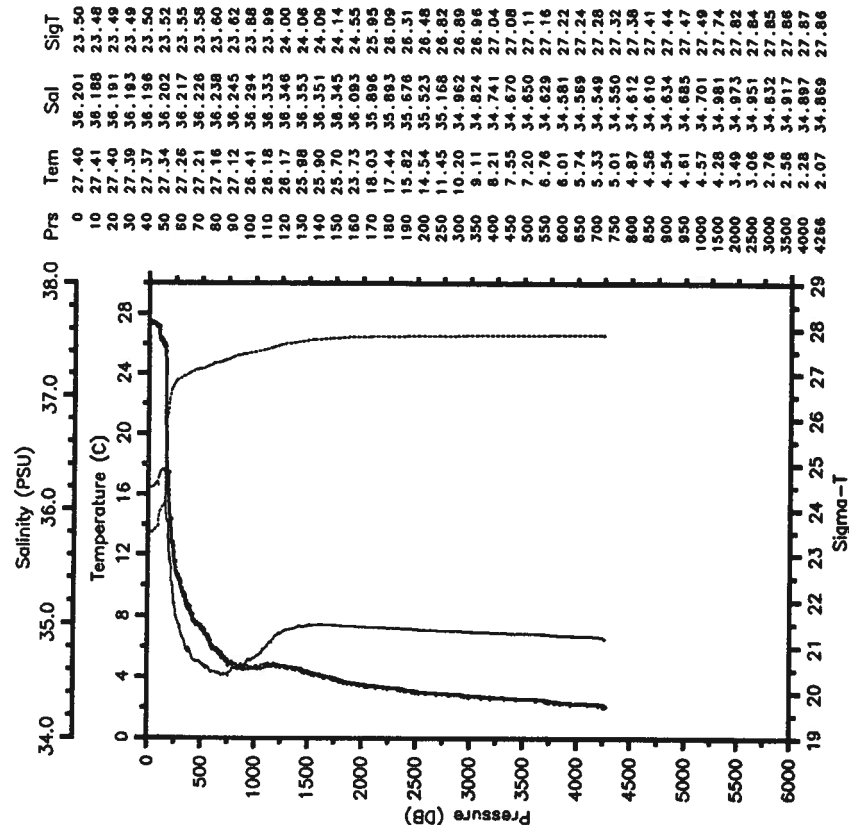
MB-STACS34-89 CTD 23 BALDRIGE  
 Date 09 04 89 Latitude 4.005 N  
 Time 0539 Z Longitude 44.002 W

— Tem — Sal  
 ..... SigT



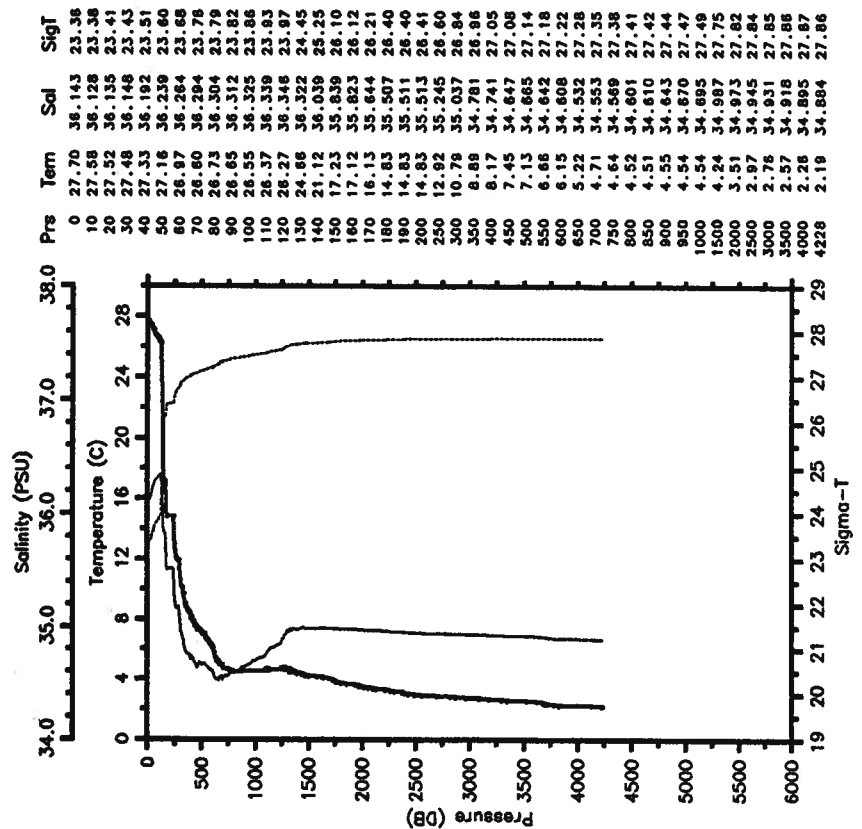
MB-STACS34-89 CTD 24 BALDRIGE  
 Date 09 04 89 Latitude 2.998 N  
 Time 1126 Z Longitude 43.997 W

— Tem — Sal  
 ..... SigT



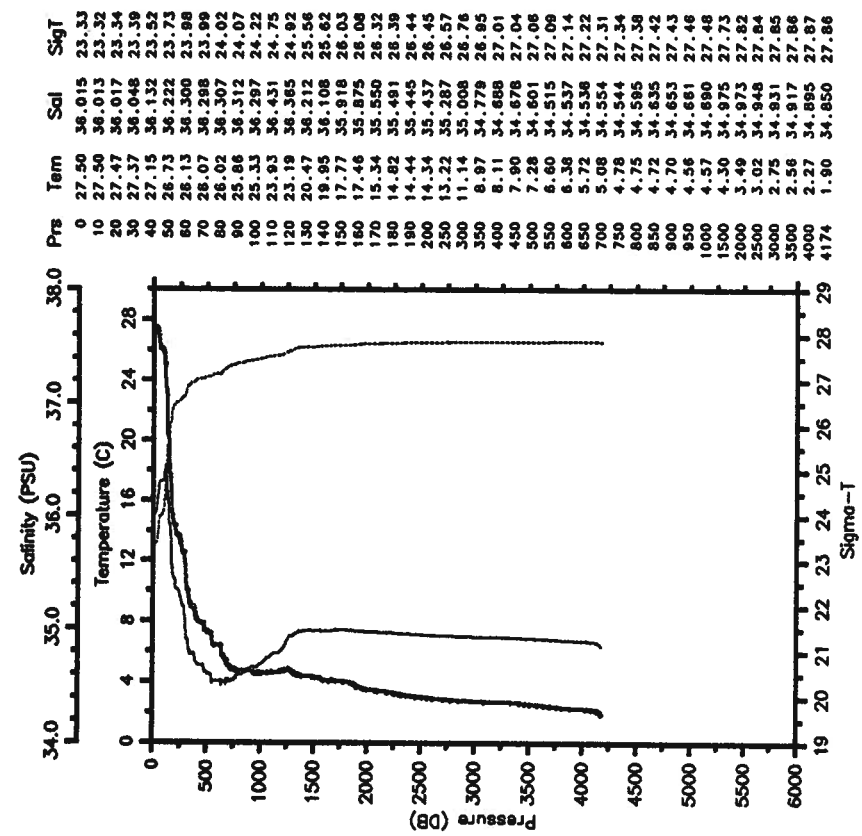
MB-STACS34-89 CTD 25 BALDRIGE  
 Date 09 04 89 Latitude 2.481 N  
 Time 2300 Z Longitude 44.022 W

— Tem — Sal  
 - - - - - Sigt



MB-STACS34-89 CTD 26 BALDRIGE  
 Date 09 05 89 Latitude 1.675 N  
 Time 0501 Z Longitude 44.010 W

— Tem — Sal  
 - - - - - Sigt

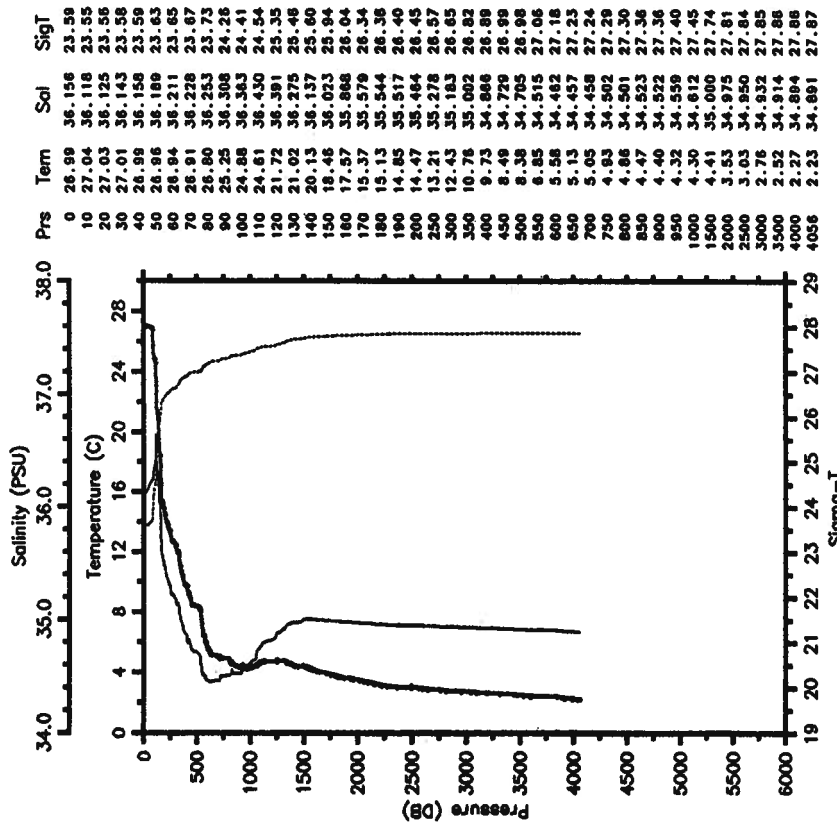


MB-STACS34-89 CTD 27 BALDRIGE

Date 09 05 89 Latitude 0.837 N

Time 1121 Z Longitude 44.015 W

--- Term --- Sal  
 - - - - - SigT

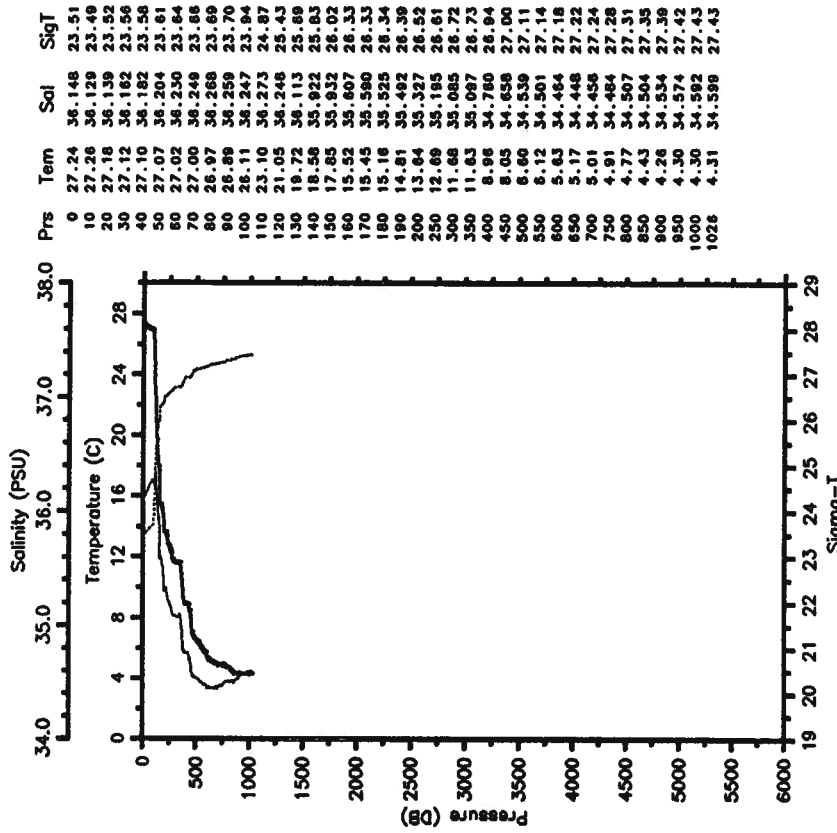


MB-STACS34-89 CTD 28 BALDRIGE

Date 09 05 89 Latitude 0.501 N

Time 2129 Z Longitude 44.208 W

--- Term --- Sal  
 - - - - - SigT

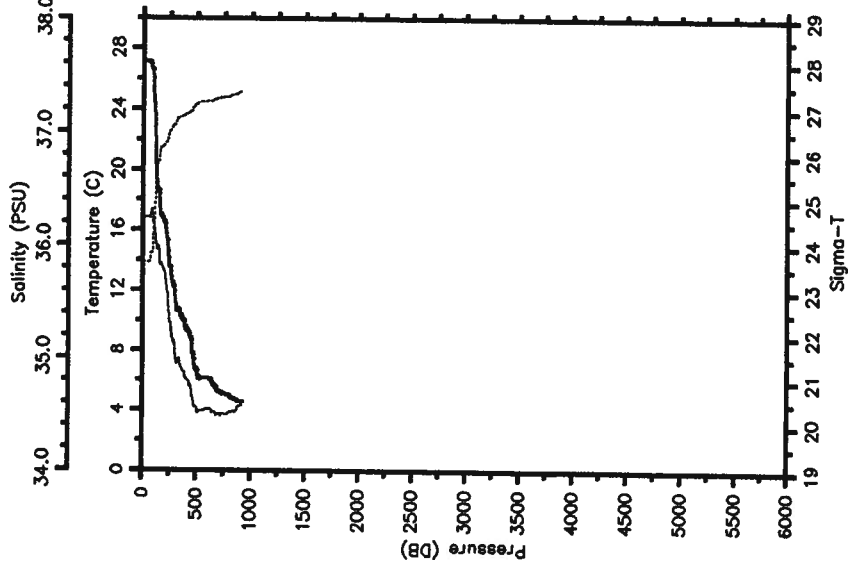
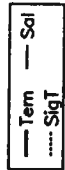




MB-STACS34-89 CTD 29 BALDRICE

Date 09 06 89 Latitude 0.141 N

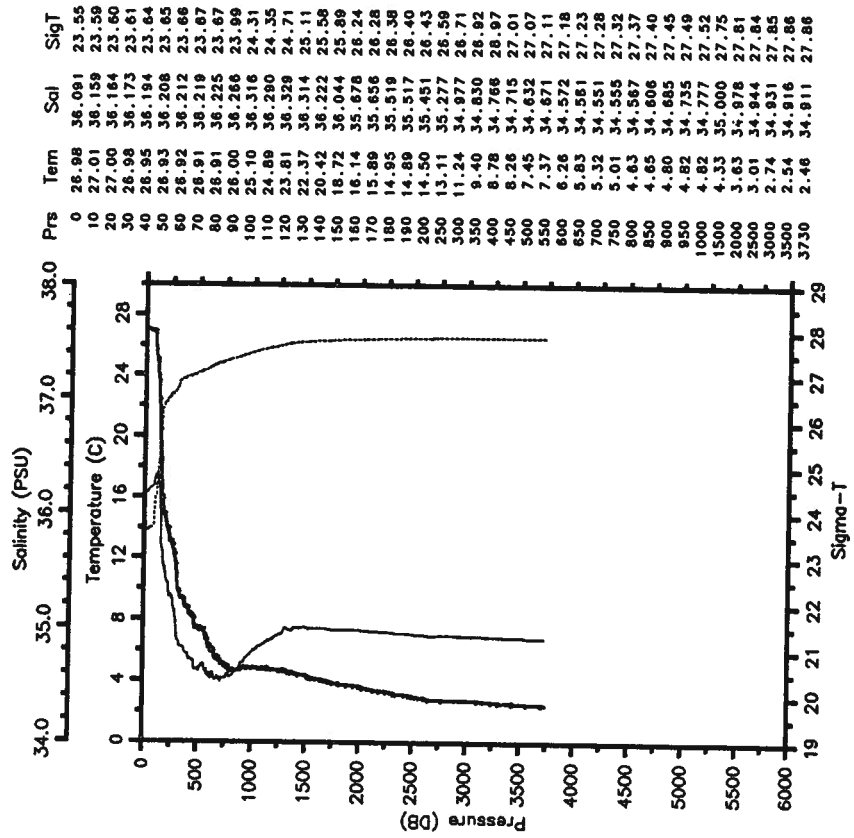
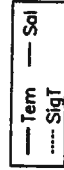
Time 0426 Z Longitude 44.392 W



MB-STACS34-89 CTD 30 BALDRICE

Date 09 06 89 Latitude 1.457 N

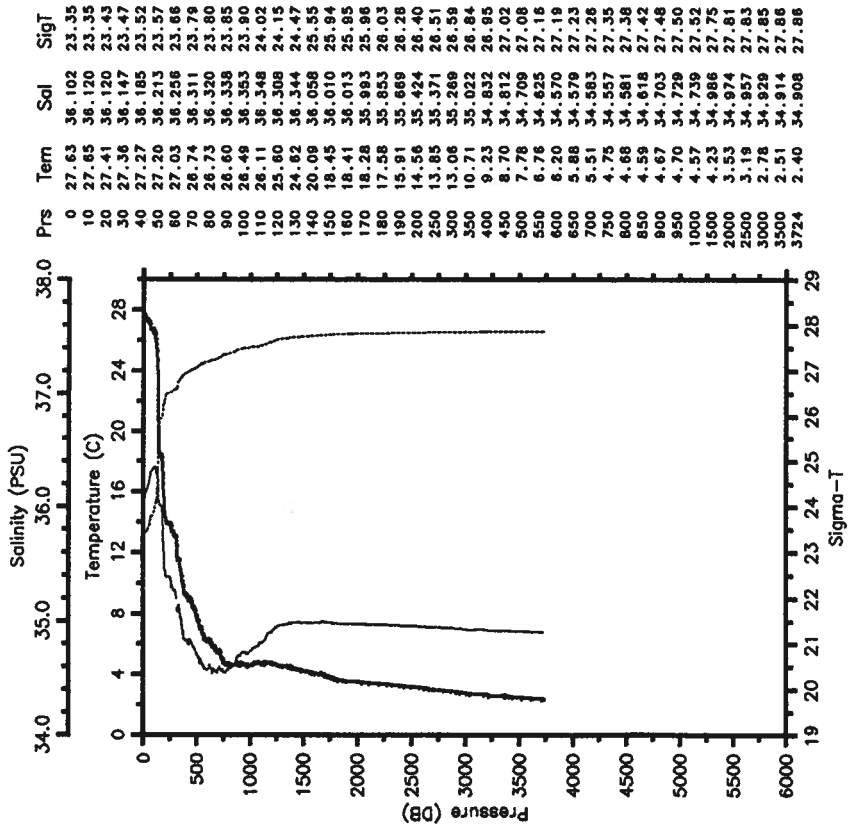
Time 1102 Z Longitude 45.043 W



MB-STACS34-89 CTD 31 BALDRIGE

Date 09 06 89 Latitude 2.751 N  
 Time 1837 Z Longitude 45.640 W

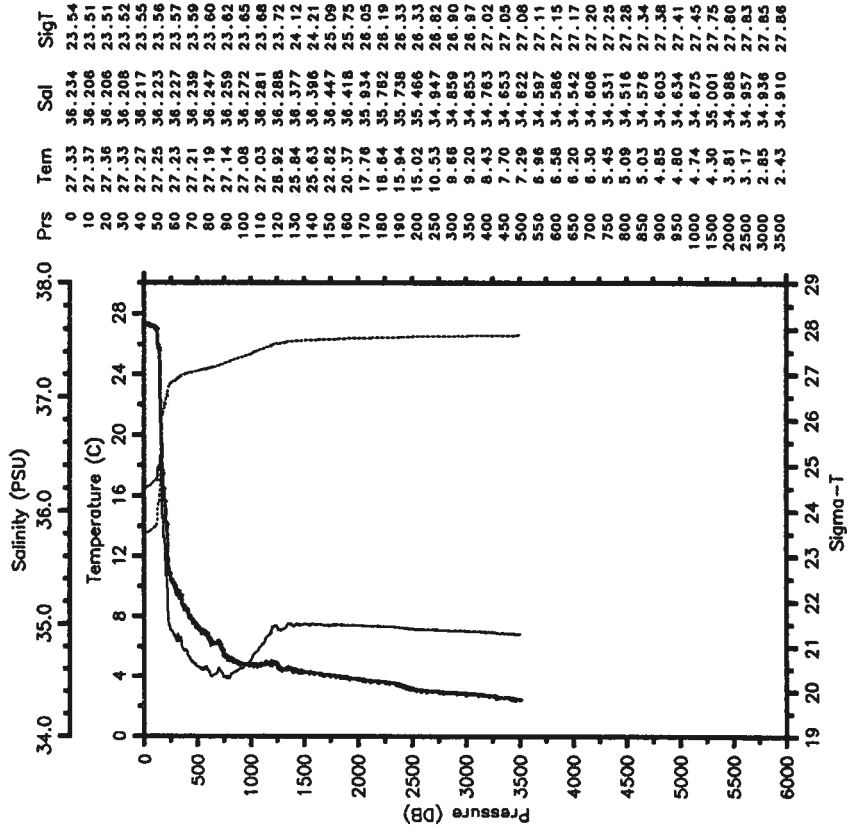
— Term — Sal  
 - - - - - SigT



MB-STACS34-89 CTD 32 BALDRIGE

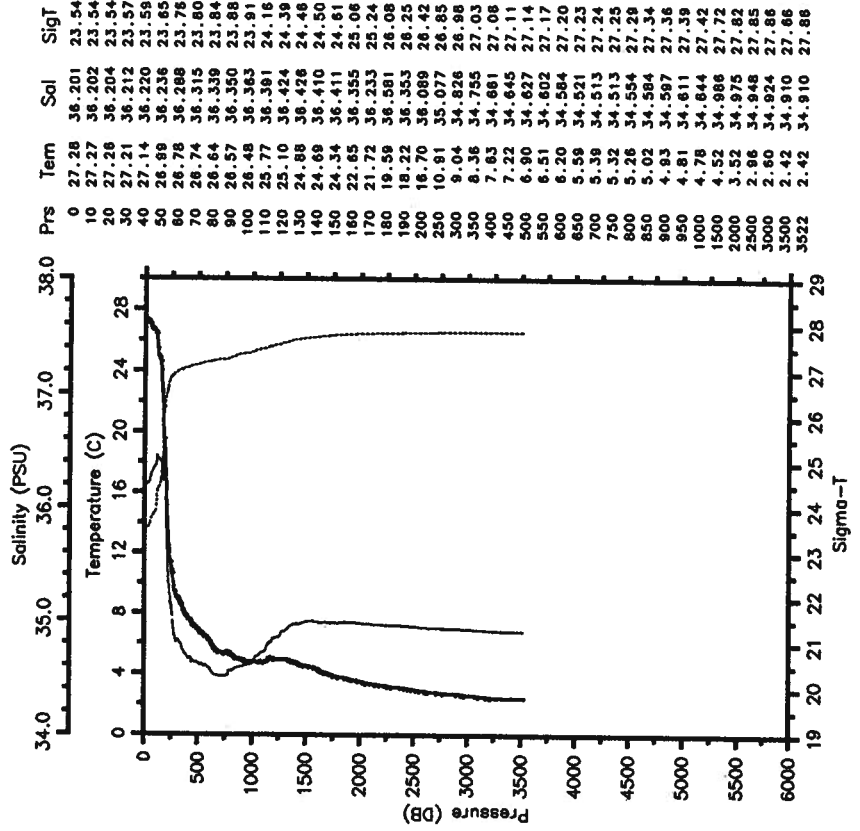
Date 09 07 89 Latitude 4.038 N  
 Time 0213 Z Longitude 46.261 W

— Term — Sal  
 - - - - - SigT



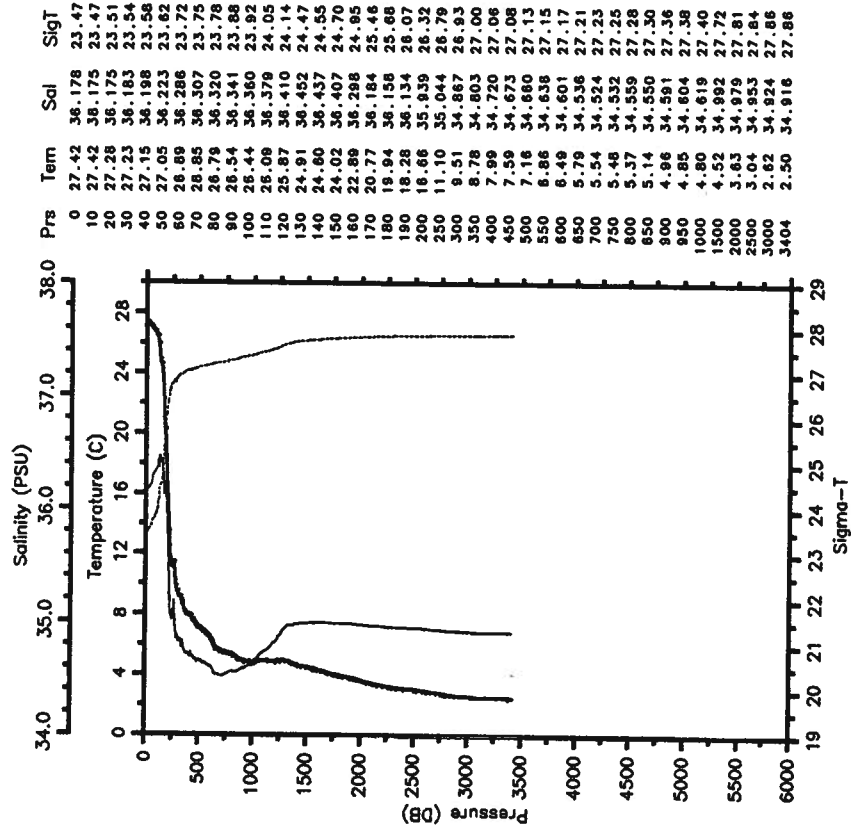
MB-STACS34-89 CTD 33 BALDRIGE  
 Date 09 07 89 Latitude 5.333 N  
 Time 1023 Z Longitude 46.880 W

— Tem — Sal  
 ..... SigT



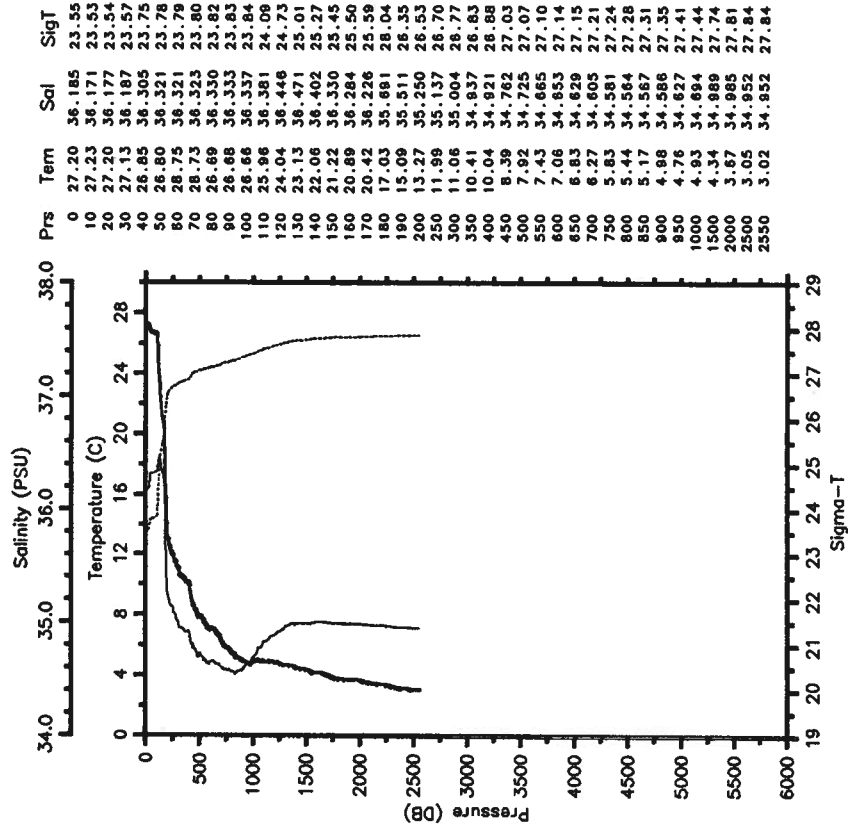
MB-STACS34-89 CTD 34 BALDRIGE  
 Date 09 07 89 Latitude 5.087 N  
 Time 2202 Z Longitude 47.223 W

— Tem — Sal  
 ..... SigT



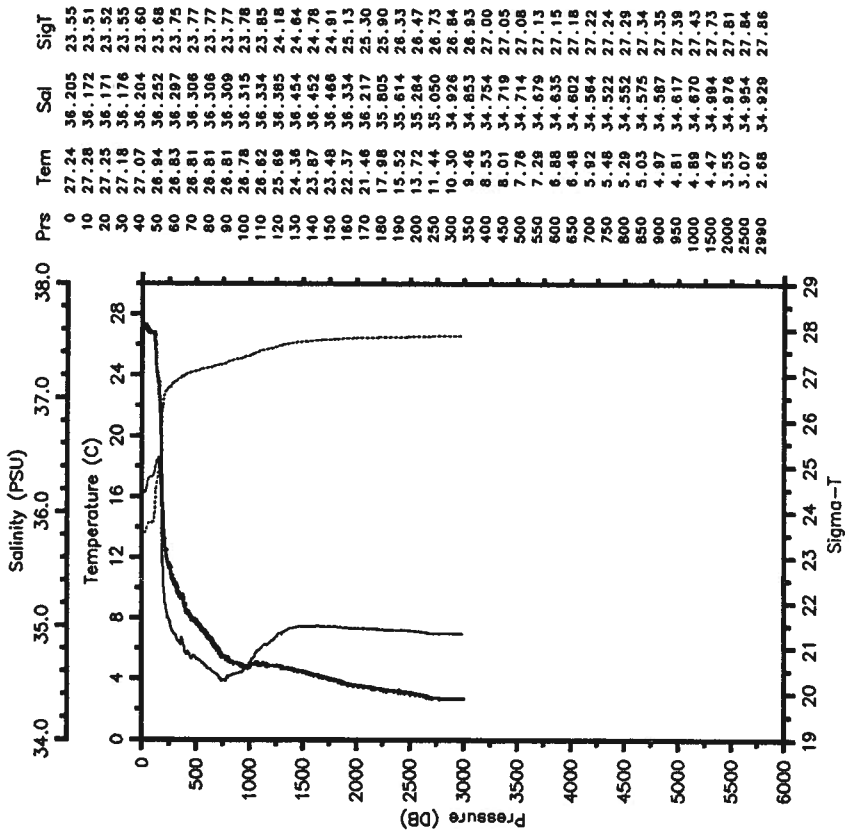
MB-STACS34-89 CTD 36 BALDRICE  
 Date 09 08 89 Latitude 4.585 N  
 Time 0600 Z Longitude 47.910 W

— Tem — Sal  
 .... SigT



MB-STACS34-89 CTD 35 BALDRICE  
 Date 09 08 89 Latitude 4.837 N  
 Time 0202 Z Longitude 47.570 W

— Tem — Sal  
 .... SigT

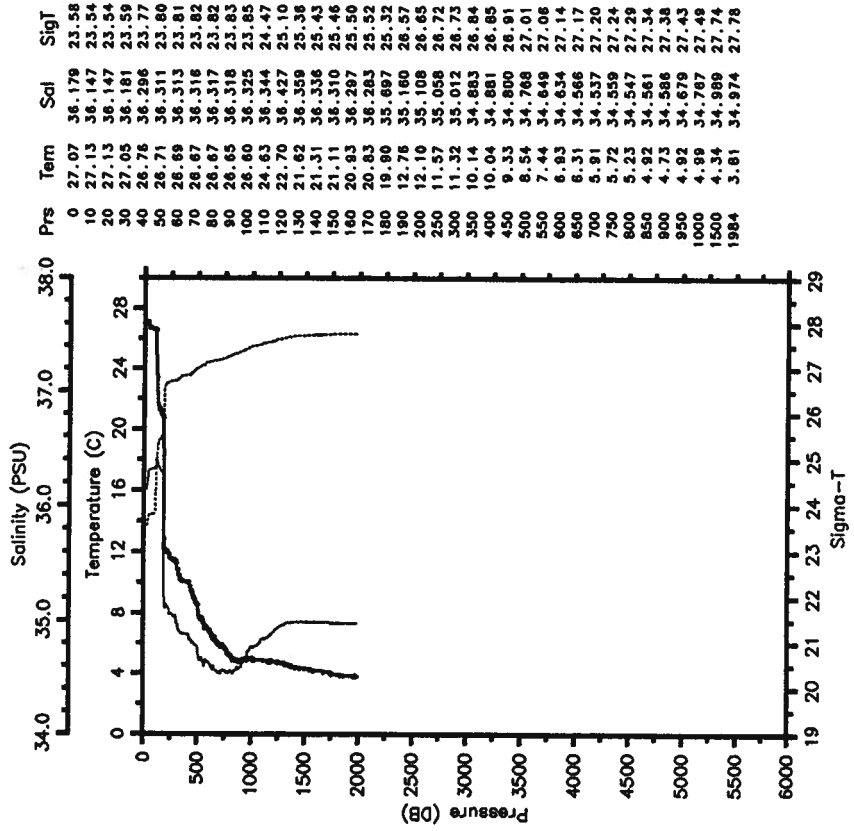


MB-STACS34-89 CTD 37 BALDRIGE

Date 09 08 90 Latitude 4.422 N

Time 0922 Z Longitude 48.283 W

— Term — Sal  
 ..... SigT

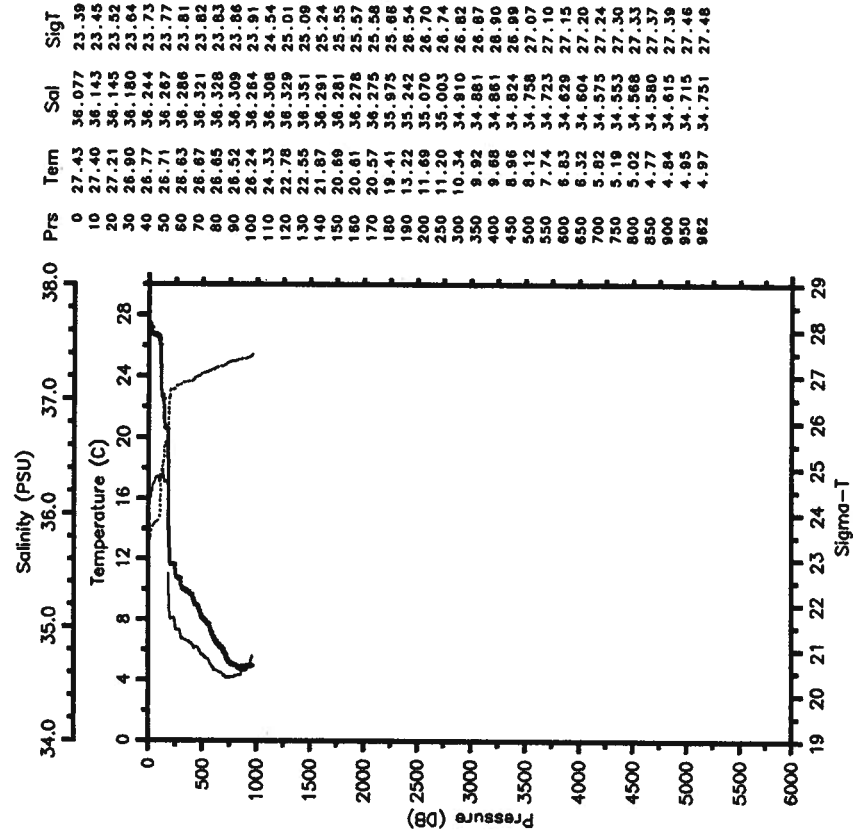


MB-STACS34-89 CTD 38 BALDRIGE

Date 09 08 89 Latitude 4.043 N

Time 1941 Z Longitude 48.506 W

— Term — Sal  
 ..... SigT

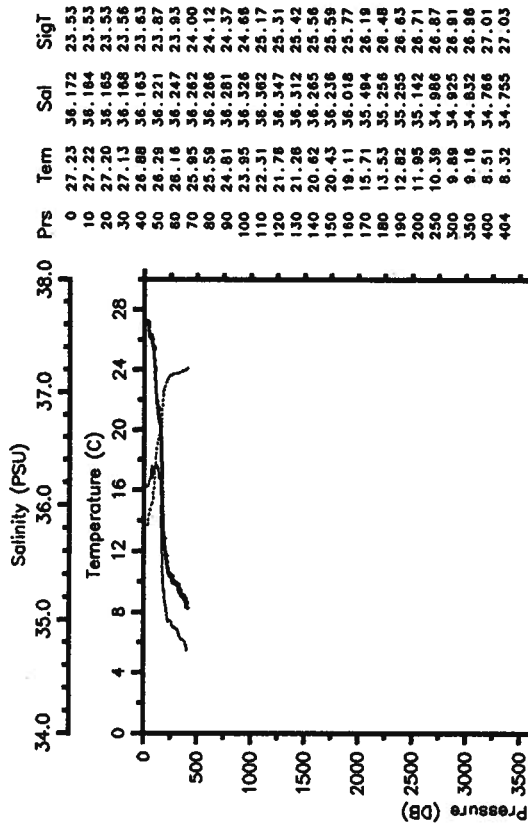


MB-STACS34-89 CTD 39 BALDRIGE

Date 09 09 89 Latitude 3.840 N

Time 0226 Z Longitude 48.790 W

--- Tem --- Sal  
.....SigT

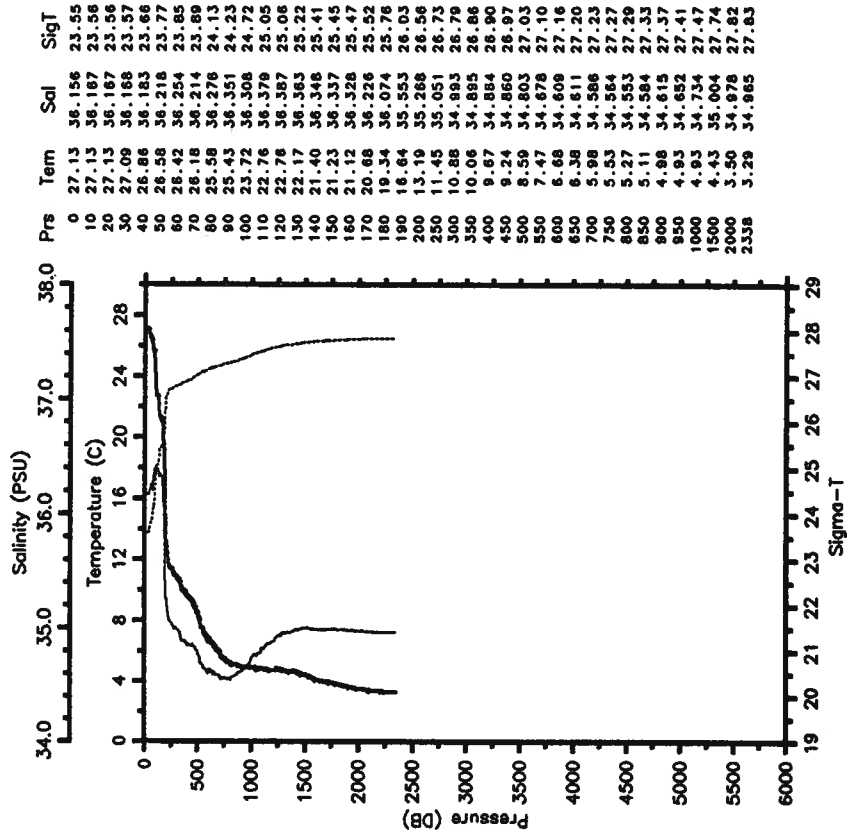


MB-STACS34-89 CTD 40 BALDRIGE

Date 09 09 89 Latitude 4.713 N

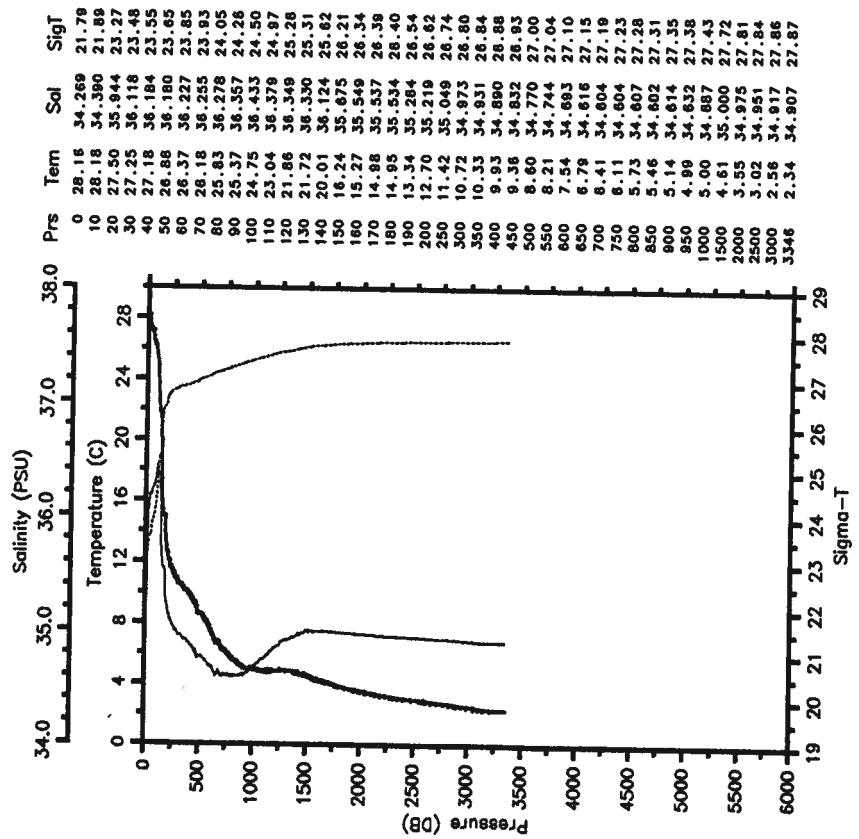
Time 0647 Z Longitude 49.078 W

--- Tem --- Sal  
.....SigT



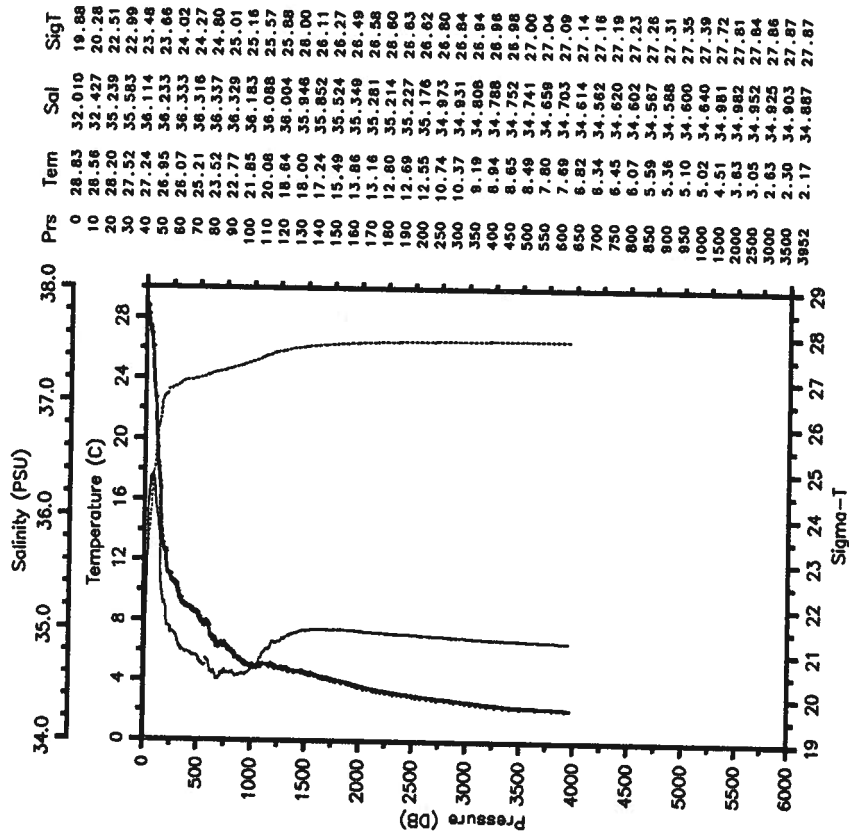
MB-STACS34-89 CTD 41 BALDRICE  
 Date 09 09 89 Latitude 5.652 N  
 Time 1139 Z Longitude 49.400 W

— Term — Sal  
 ..... SigT



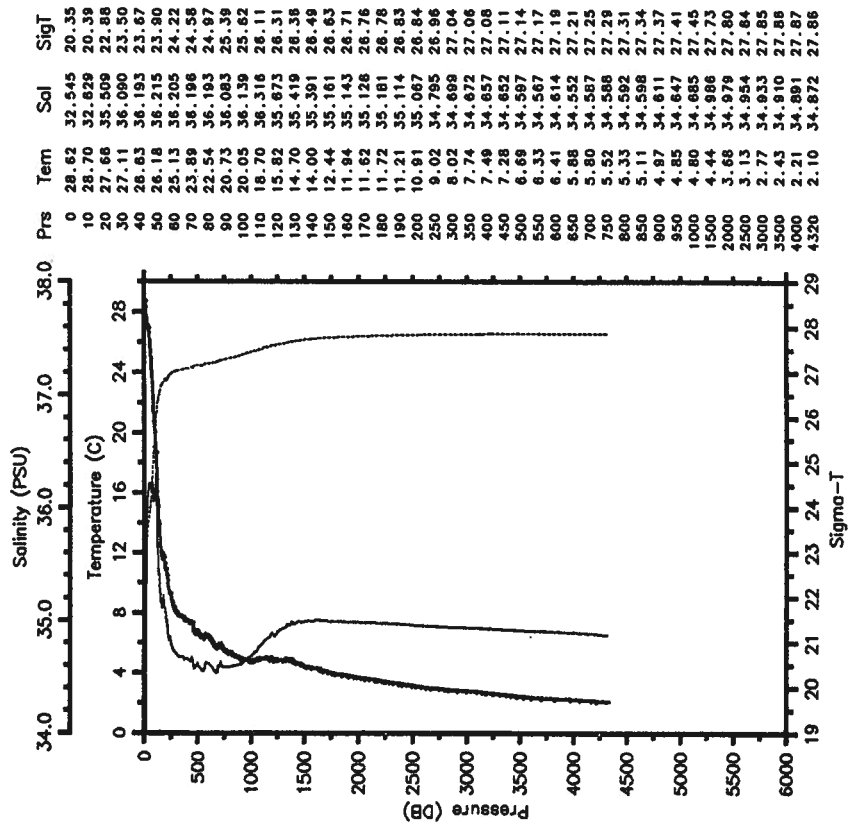
MB-STACS34-89 CTD 42 BALDRICE  
 Date 09 09 89 Latitude 6.572 N  
 Time 1721 Z Longitude 49.695 W

— Term — Sal  
 ..... SigT



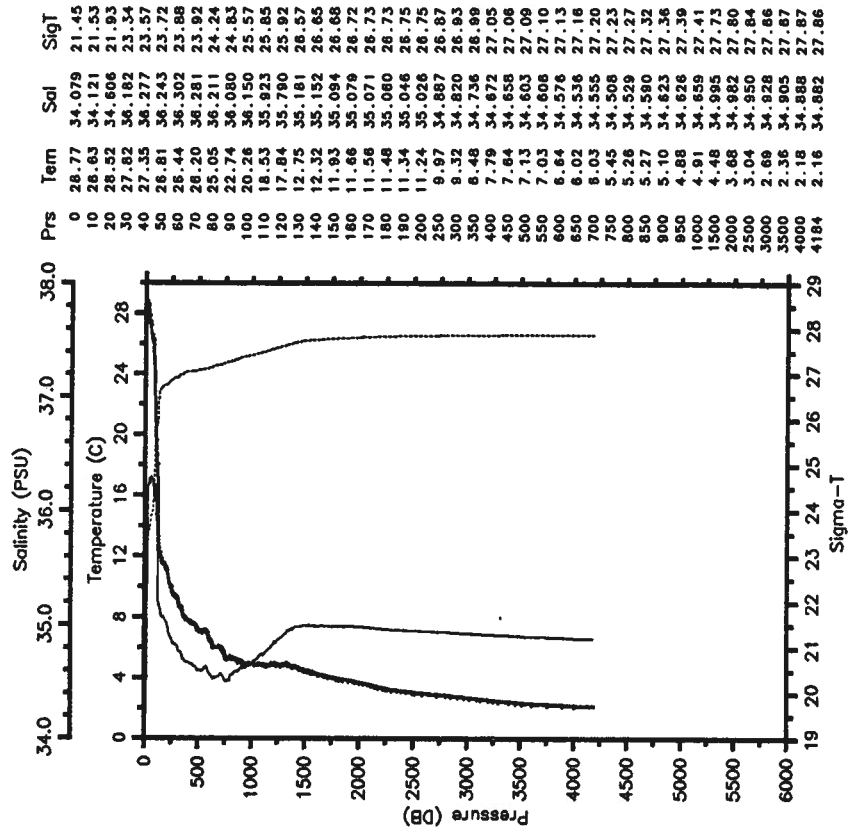
MB-STACS34-89 CTD 43 BALDRIGE  
 Date 09 10 89 Latitude 7.522 N  
 Time 0326 Z Longitude 49.955 W

— Tem — Sal  
 .... Sigma-T



MB-STACS34-89 CTD 44 BALDRIGE  
 Date 09 10 89 Latitude 7.108 N  
 Time 1627 Z Longitude 50.325 W

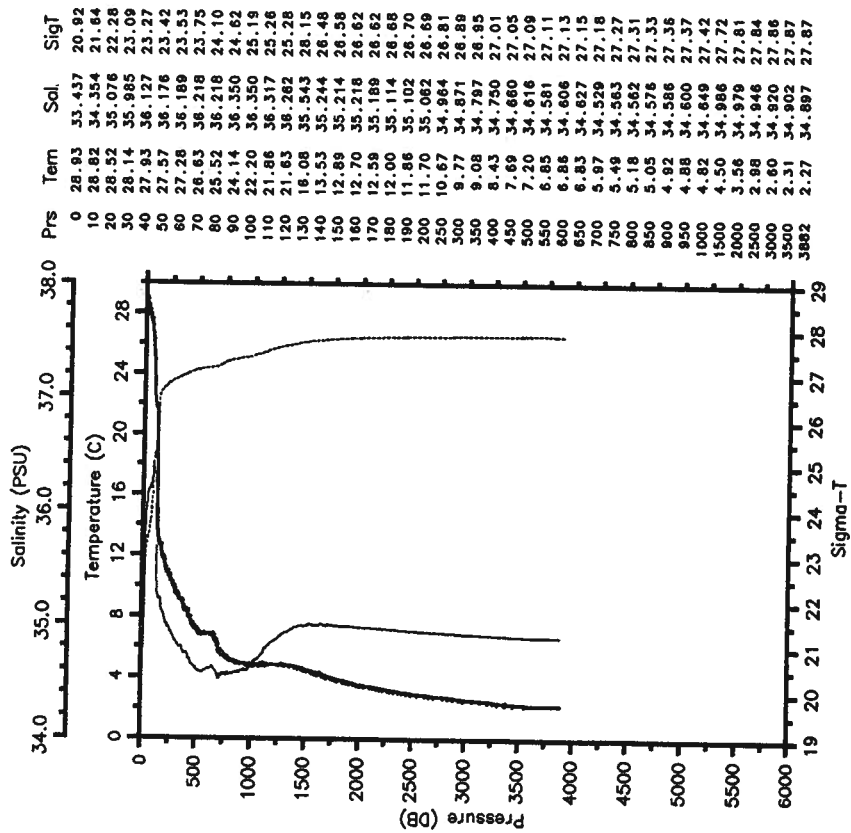
— Tem — Sal  
 .... Sigma-T





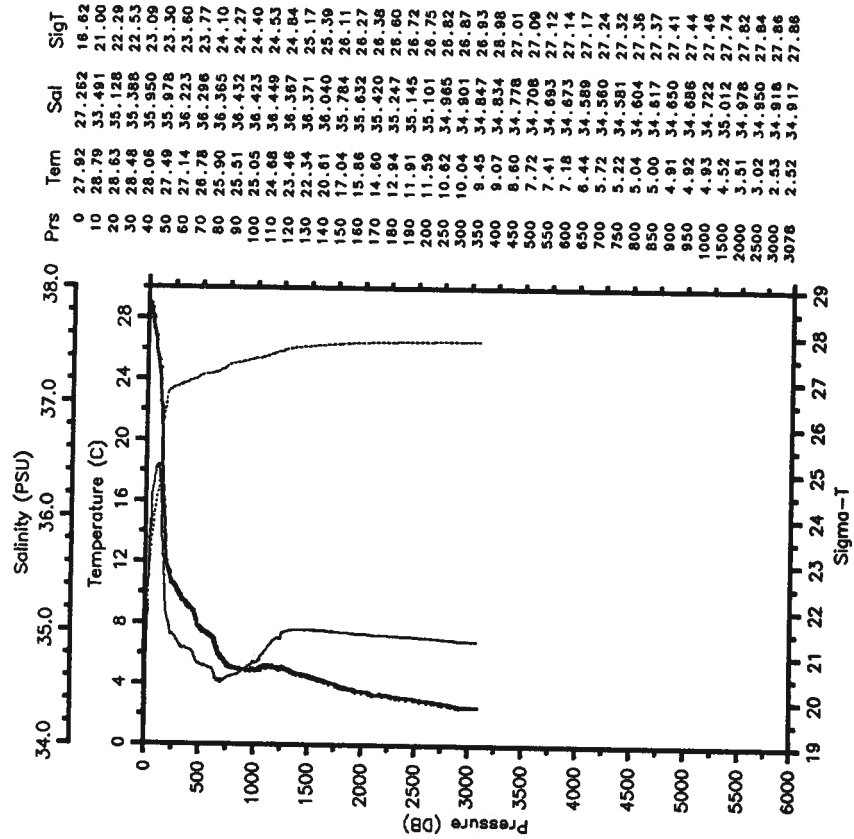
MB-STACS34-89 CTD 45 BALDRIGE  
 Date 09 11 89 Latitude 6.681 N  
 Time 0109 Z Longitude 50.663 W

— Tem — Sal  
 ..... SigT



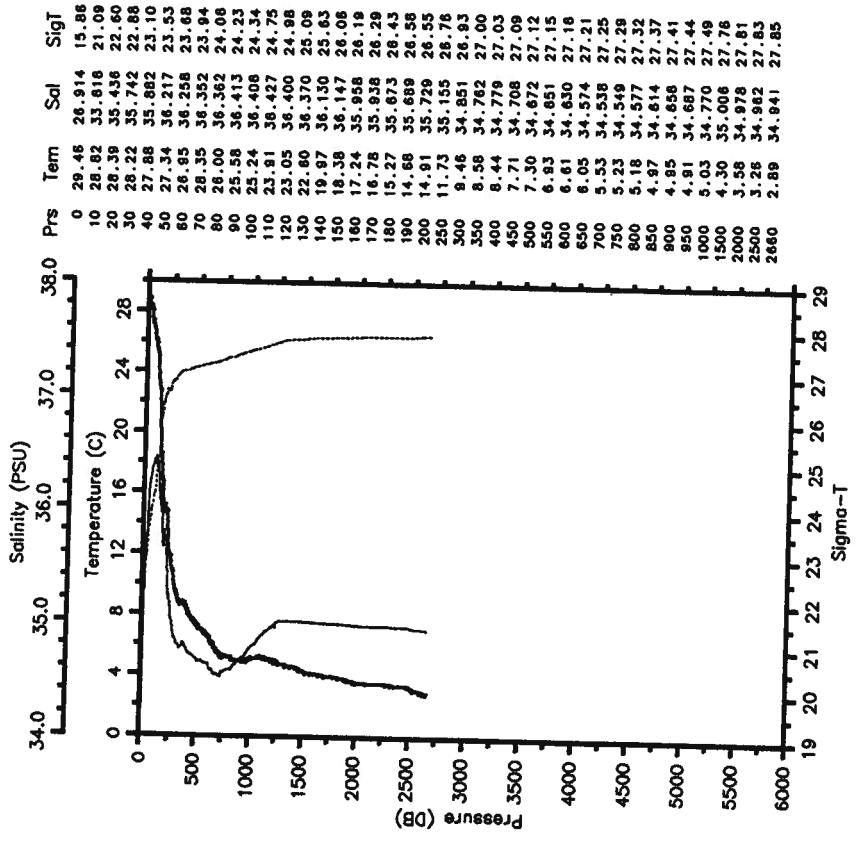
MB-STACS34-89 CTD 46 BALDRIGE  
 Date 09 11 89 Latitude 6.220 N  
 Time 1052 Z Longitude 51.050 W

— Tem — Sal  
 ..... SigT



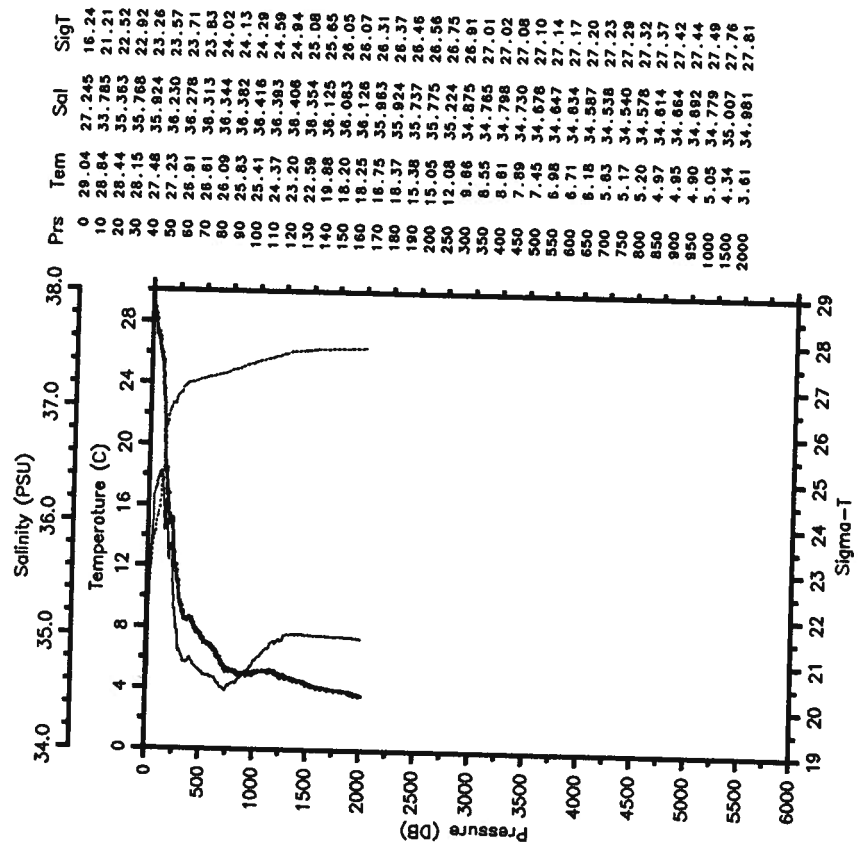
MB-STACS34-89 CTD 47 BALDRIGE  
 Date 09 11 89 Latitude 6.044 N  
 Time 1807 Z Longitude 51.176 W

— Tem — Sal  
 .... Sigt



MB-STACS34-89 CTD 48 BALDRIGE  
 Date 09 11 89 Latitude 6.031 N  
 Time 2108 Z Longitude 51.162 W

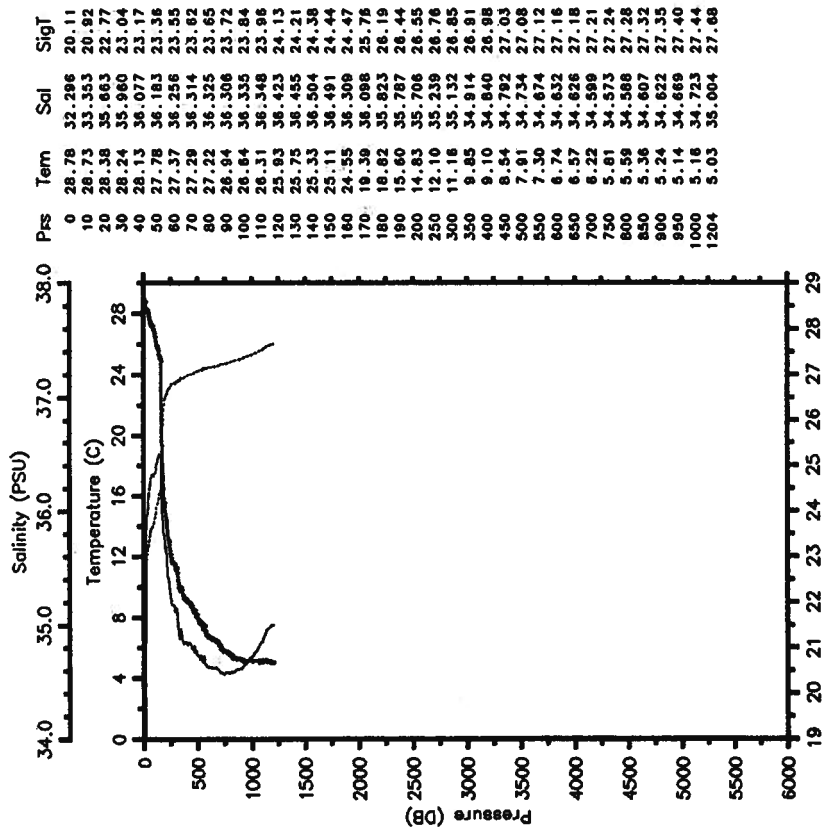
— Tem — Sal  
 .... Sigt





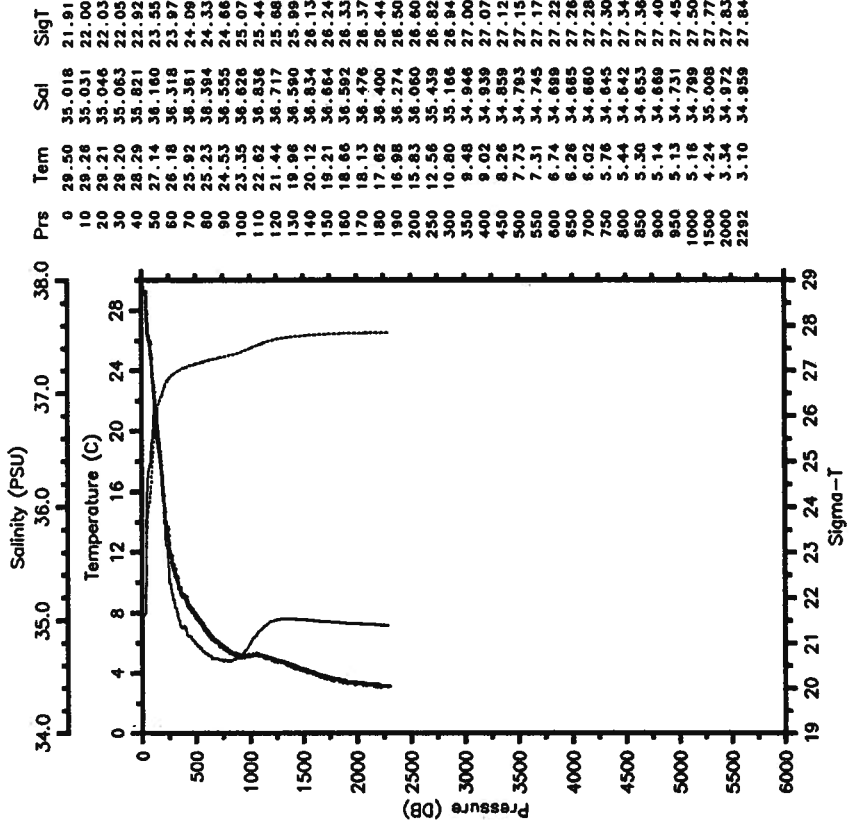
MB-STACS34-89 CTD 51 BALDRIGE  
 Date 09 13 89 Latitude 7.613 N  
 Time 0640 Z Longitude 52.788 W

— Term — Sal  
 ..... SigT



MB-STACS34-89 CTD 52 BALDRIGE  
 Date 09 14 89 Latitude 8.995 N  
 Time 2016 Z Longitude 58.180 W

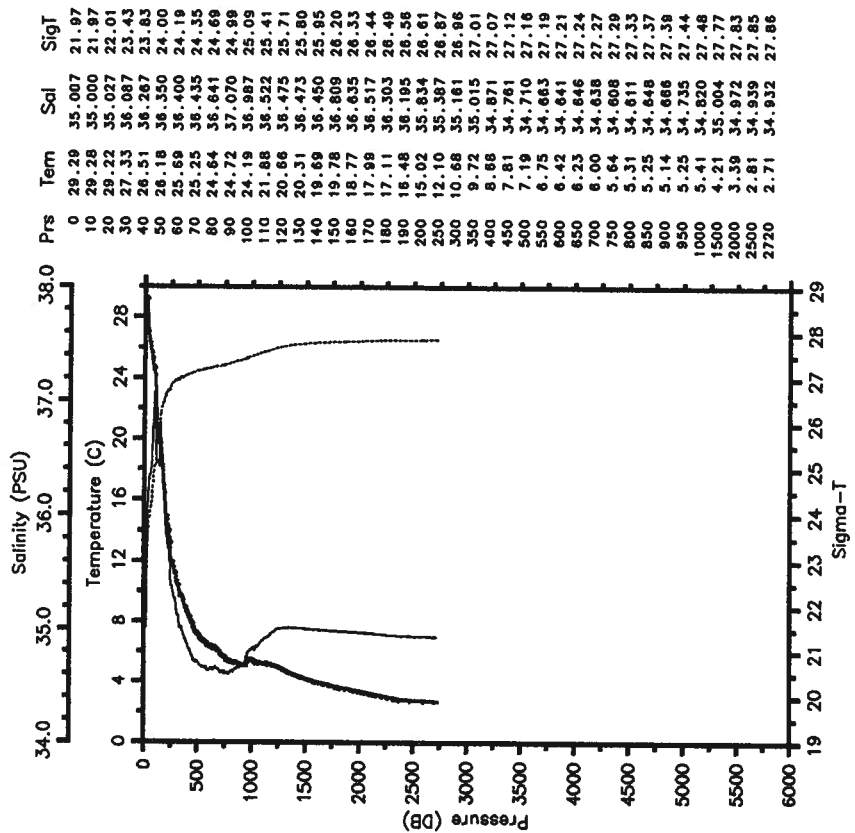
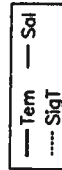
— Term — Sal  
 ..... SigT



MB-STACS34-89 CTD 53 BALDRIGE

Date 09 15 89 Latitude 9.498 N

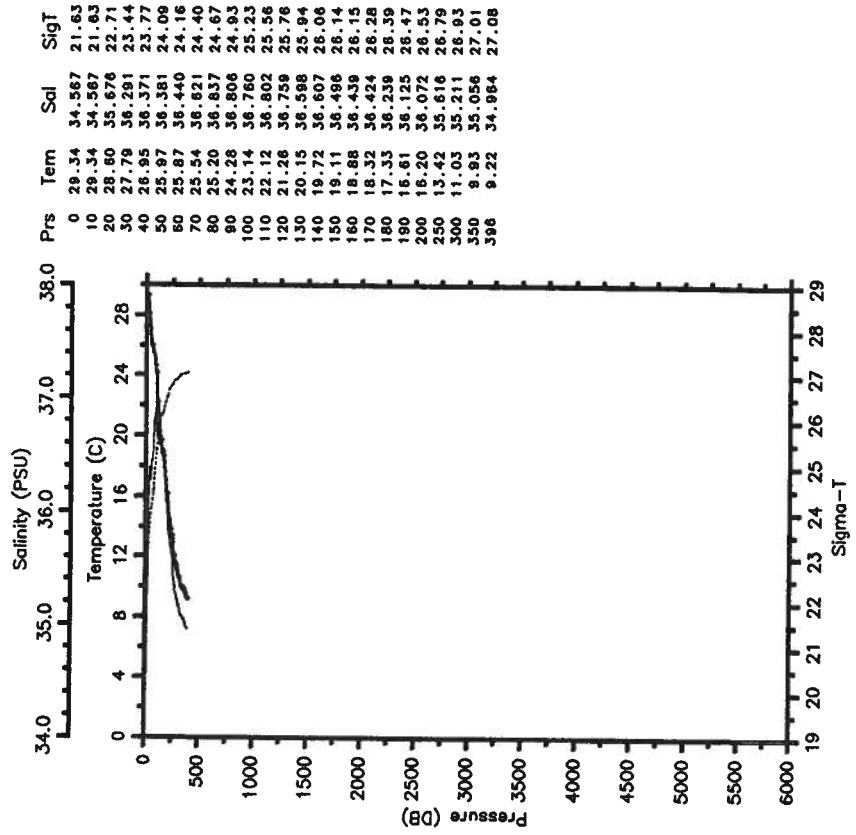
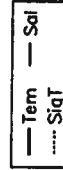
Time 0013 Z Longitude 58.173 W



MB-STACS34-89 CTD 54 BALDRIGE

Date 09 15 89 Latitude 9.493 N

Time 1137 Z Longitude 59.510 W



### **APPENDIX C: XBT DATA**

Casts are presented by cruise and increasing cast number. Isotherm depths in meters are listed at temperatures ranging from 30 to 6 degrees Centigrade.

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89					
XBT NO.	1	2	3	4	5	6	7
YEAR	89	89	89	89	89	89	89
MONTH	2	2	2	2	2	2	2
DAY (GMT)	6	7	8	9	10	10	11
TIME (GMT)	1328	1310	0038	0022	0001	1313	0026
LAT (N)	22.74	21.24	20.64	20.77	18.90	17.34	17.10
LOX (W)	78.50	75.33	73.91	71.14	68.32	66.68	65.68
SURF T (C)	25.4	25.6	25.6	25.5	25.6	25.8	25.9
28							
27							
26					96		
25	103	101	61	86	85	117	119
24	127	114	75	111	102	131	139
23	149	129	108	151	128	151	155
22	167	150	141	171	153	162	166
21	197	177	176	198	171	182	183
20	216	202	211	213	185	195	197
19	238	243	252	239	220	212	214
18	282	309	324	317	266	244	233
17	336	389	367	363	324	268	250
16	353	439		392	364	292	276
15	388			433	413	317	300
14	416				444		331
13							359
12							396
11							429
10							
9							
8							
7							
6							

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89					
XBT NO.	8	9	10	11	12	13	14
YEAR	89	89	89	89	89	89	89
MONTH	2	2	2	2	2	2	2
DAY (GMT)	11	12	16	17	18	20	23
TIME (GMT)	1301	0005	1912	1541	1629	1823	1437
LAT (N)	15.13	13.96	14.50	14.50	14.50	14.50	13.75
LOX (W)	63.43	61.78	56.50	55.25	55.25	48.50	43.05
SURF T (C)	26.0	25.8	26.1	25.6	25.6	25.2	24.8
28							
27							
26		38	96	1			
25	119	107	113	98	96	59	
24	139	118	127	115	112	103	76
23	155	133	144	123	127	113	91
22	170	147	157	131	140	126	107
21	186	151	172	144	155	139	119
20	205	163	189	162	172	144	129
19	217	176	215	169	186	154	136
18	238	190	230	174	211	175	152
17	255	201	249	191	236	200	162
16	271	225	273	217	262	223	177
15	299	245	302	229	289	246	204
14	319	269	334	253	305	284	
13	346	297	370	276	334	333	
12	367	331	401	310	358	368	
11	380	363	429	356	407	420	
10		424		394	429	450	
9							
8							
7							
6							

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89					
XBT NO.	15	16	17	18	19	20	21
YEAR	89	89	89	89	89	89	89
MONTH	2	2	2	2	2	2	2
DAY (GMT)	23	24	24	24	24	25	25
TIME (GMT)	1940	0854	1214	1759	2127	0039	1047
LAT (N)	13.03	11.81	11.33	10.83	10.40	9.93	8.91
LOX (W)	43.12	44.06	44.03	45.25	45.13	45.13	46.11
SURF T (C)	25.0	25.0	25.1	25.2	25.2	25.4	25.7
28							
27							
26							
25	0		3	86	63	85	76
24	75	68	72	91	74	91	77
23	82	77	76	93	79	94	80
22	87	86	80	94	82	97	89
21	94	94	82	96	87	106	93
20	112	98	85	102	92	111	99
19	121	107	95	107	96	127	102
18	146	120	104	113	99	138	106
17	167	125	117	126	103	143	110
16	182	134	123	137	109	154	119
15	197	140	130	145	135	165	127
14	218	151	138	157	153	188	136
13	238	166	147	168	169	198	149
12	270	199	168	185		215	172
11	297	222	199	214		250	208
10	353	307	278	281		331	279
9		405	403	382		402	392
8							
7							
6							

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89					
XBT NO.	22	23	24	25	26	27	28
YEAR	89	89	89	89	89	89	89
MONTH	2	2	2	2	2	2	2
DAY (GMT)	25	27	27	27	27	28	28
TIME (GMT)	1353	1714	1849	2108	2313	0307	0510
LAT (N)	8.43	4.15	5.30	5.73	6.12	6.83	7.12
LOX (W)	47.13	49.13	50.05	50.05	50.23	50.38	50.12
SURF T (C)	25.8	27.5	27.3	27.0	27.0	27.0	27.0
28							
27							
26		88	86	0		0	
25		94	96	104	97	109	122
24	68	103	103	112	104	113	126
23	69	108	110	117	108	118	129
22	71	114	119	122	130	132	136
21	72	117	125	130	140	137	140
20	76	119	130	139	152	141	145
19	86	124	137	156	156	145	150
18	90	131	150	168	157	158	154
17	96	138	158	172	159	161	163
16	103	144	161	174	163	165	180
15	108	148	165	179	171	185	191
14	116	153	169	187	181	189	201
13	122	158	184	189	186	198	211
12	132	171	191	191	189	210	215
11	147	185	199	194	192	214	232
10	159	205	217	216	201	221	273
9	187	236	242		219	277	308
8	269	291	324		307	358	352
7	351	400	398		427	405	428
6							

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89						
XBT NO.	29	30	31	32	33	34	35	
YEAR	89	89	89	89	89	89	89	
MONTH	2	2	2	2	2	2	2	
DAY (GMT)	28	28	28	28	28	28	28	
TIME (GMT)	0717	0904	1107	1307	1503	1712	1920	
LAT (N)	7.40	7.76	8.08	8.38	8.71	8.90	9.17	
LOX (W)	50.52	50.61	50.72	50.83	50.95	51.17	51.52	
SURF T (C)	26.8	26.6	26.0	25.9	25.8	25.9	25.9	
28								
27								
26	100	92	60					
25	105	95	77	77	66	74	84	
24	112	111	83	81	73	76	89	
23	117	118	92	91	81	80	95	
22	122	125	98	102	86	83	102	
21	129	129	105	109	92	104	109	
20	132	137	110	113	104	114	115	
19	137	142	123	126	112	122	122	
18	150	152	133	140	122	132	131	
17	165	169	145	150	133	141	148	
16	183	184	156	160	144	149	160	
15	192	198	171	170	159	155	175	
14	204	204	181	179	175	168	183	
13	219	216	202	201	199	196	192	
12	231	238	220	226	228	207	201	
11	255	259	252	256	246	250	240	
10	303	290	290	305	290	311	295	
9	353	338	347	329	319	343	361	
8	411	388	394	397	355	392	404	
7			460					
6								

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89					
XBT NO.	36	37	38	39	40	41	42
YEAR	89	89	89	89	89	89	89
MONTH	2	2	3	3	3	3	3
DAY (GMT)	28	28	2	3	3	3	3
TIME (GMT)	2104	2107	2102	0001	0301	0610	0854
LAT (N)	9.40	9.40	7.34	7.74	8.22	8.68	9.14
LOX (W)	51.62	51.62	53.53	53.98	54.38	54.81	55.24
SURF T (C)	25.9	25.1	27.0	27.1	27.0	27.0	26.7
28							
27							
26			0	26		66	
			91	92	95	101	107
25	91	16	102	107	102	110	113
24	98	95	106	114	107	114	116
23	109	106	108	119	113	118	120
22	112	113	112	121	120	129	126
21	121	116	115	126	131	140	139
20	130	125	119	132	138	148	153
19	138	134	124	141	155	172	174
18	145	144	134	161	198	212	195
17	151	149	152	178	227	233	211
16	165	157	162	193	238	250	230
15	177	171	174	216	258	258	235
14	193	184	190	223	272	276	247
13	210	201	200	238	288	292	258
12	222	225		255	296	312	279
11	267	248		286	330	321	306
10	310	282		330	346	359	352
9	399	325		400	397	422	405
8		425			428		
7		479					
6		586					

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89						
XBT NO.	43	44	45	46	47	48	49	
YEAR	89	89	89	89	89	89	89	
MONTH	3	3	3	3	3	3	3	
DAY (GMT)	3	3	3	4	4	4	4	
TIME (GMT)	1202	1753	2101	0003	0615	0857	1205	
LAT (N)	9.54	10.20	10.61	11.05	11.75	11.99	12.42	
LOX (W)	55.75	56.65	57.09	57.43	58.19	58.54	59.05	
SURF T (C)	27.1	26.5	26.4	26.2	26.3	26.3	26.2	
28								
27	72							
26	95	68	71	100	101	89	74	
25	106	80	101	127	114	99	90	
24	110	88	111	136	120	112	96	
23	113	107	122	143	137	120	116	
22	118	121	135	149	152	138	128	
21	124	146	166	153	164	146	139	
20	140	159	176	168	174	160	160	
19	144	168	185	188	187	172	172	
18	155	171	192	216	194	176	189	
17	167	182	211	229	201	181	197	
16	173	201	227	241	210	204	222	
15	186	213	257	261	238	218	232	
14	240	228	279	279	267	248	258	
13	261	241	302	298	322	280	316	
12	273	271	320	311	347	303	342	
11	294	293		374	387	346		
10	352	337		411	425	374		
9	404	416		449		429		
8								
7								
6								

ISOTHERM DEPTHS (M)

R/V ALBATROSS IV		ALB-STAC33-89		
XBT NO.	50	51	52	
YEAR	89	89	89	
MONTH	3	3	3	
DAY (GMT)	13	13	13	
TIME (GMT)	0342	1141	1648	
LAT (N)	26.48	26.50	26.47	
LOX (W)	74.52	75.00	75.52	
SURF T (C)	22.4	21.7	24.0	
28				
27				
26				
25				
24				
23			0	
22			110	
21	32		177	
	73	89	203	
20	106	115	227	
19	150	151	276	
18	300	326	399	
17	429	441		
16				
15				
14				
13				
12				
11				
10				
9				
8				
7				
6				



ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STACS34-89					
XBT NO.	1	2	3	4	5	6	7
YEAR	89	89	89	89	89	89	89
MONTH	8	8	8	8	8	8	8
DAY (GMT)	22	23	23	23	23	23	23
TIME (GMT)	1657	0236	0250	0338	0405	0432	1655
LAT (N)	25.84	26.03	26.13	26.25	26.36	26.47	25.30
LOX (W)	80.05	78.85	78.81	78.76	78.71	78.67	75.93
SURF T (C)	30.3	29.3	29.2	29.3	29.1	29.1	28.9
28	33	49	55	58	65	64	46
27	38	79	69	71	78	76	52
26	40	102	85	84	86	88	65
25	43	118	99	99	96	98	83
24	45	133	119	120	116	110	98
23	46	143	132	145	138	124	118
22	48	153	151	168	165	148	138
21	53	173	165	182	182	181	165
20	57	196	188	208	208	210	199
19	60	224	219	244	242	241	235
18	65		303	321	321	316	328
17	67		354	390	390	394	411
16	70			444			
15	73						
14	88						
13	96						
12	109						
11	126						
10	143						
9	156						
8	183						
7							
6							

ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STACS34-89					
XBT NO.	8	9	10	11	12	13	14
YEAR	89	89	89	89	89	89	89
MONTH	8	8	8	8	8	8	8
DAY (GMT)	24	24	24	24	24	24	24
TIME (GMT)	1655	1751	1843	1931	2023	2113	2208
LAT (N)	21.11	20.91	20.77	20.64	20.51	20.38	20.25
LOX (W)	73.87	73.70	73.56	73.42	73.28	73.14	73.00
SURF T (C)	29.0	29.1	28.9	28.9	28.9	28.8	29.0
28	47	61	56	55	44	72	71
27	52	66	72	64	51	84	87
26	66	75	77	72	71	100	96
25	78	97	93	100	124	128	120
24	104	109	120	120	149	148	139
23	123	141	137	143	165	166	167
22	148	162	163	164	182	183	178
21	176	169	200	182	193	202	190
20	197	192	222	212	221	216	210
19	226	222	271	239	258	264	247
18	302		310	328	333	330	304
17	380			401	424	385	354
16	442					429	392
15							425
14							
13							
12							
11							
10							
9							
8							
7							
6							

ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STACS34-89					
XBT NO.	15	16	17	18	19	20	21
YEAR	89	89	89	89	89	89	89
MONTH	8	8	8	8	8	9	8
DAY (GMT)	24	25	25	25	25	24	25
TIME (GMT)	2252	1848	1959	2056	2156	1255	2345
LAT (N)	20.11	18.93	18.87	18.81	18.75	23.44	18.63
LOX (W)	72.82	68.62	68.39	68.15	67.92	72.96	67.45
SURF T (C)	29.2	28.4	29.2	28.9	28.9	28.6	28.9
28	65	21	41	41	41	59	44
27	80	30	57	49	58	65	57
26	97	54	70	60	73	78	68
25	110	95	101	91	107	94	88
24	144	130	133	133	131	117	117
23	172	158	159	155	159	139	135
22	197	193	171	168	180	157	148
21	227	216	193	185	198	182	159
20	237	239	224	210	210	207	177
19	254		248	239	231	256	205
18	267		282	274	277	344	225
17	309		323	324	314	427	297
16	348		363	369	372		345
15	388		409	401	425		392
14	423						428
13							
12							
11							
10							
9							
8							
7							
6							

ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STACS34-89					
XBT NO.	22	23	24	25	26	27	28
YEAR	89	89	89	89	89	89	89
MONTH	8	8	8	8	8	8	8
DAY (GMT)	26	26	26	26	26	26	26
TIME (GMT)	0051	1106	1158	1300	1404	1655	1940
LAT (N)	18.58	18.10	18.01	17.92	17.81	17.35	16.90
LOX (W)	67.22	64.99	64.78	64.57	64.33	63.88	63.42
SURF T (C)	28.7	28.3	28.7	28.6	28.5	28.9	28.9
28	39	12	24	40	45	36	37
27	55	29	33	50	59	49	49
26	74	46	50	64	70	56	68
25	94	79	77	82	83	80	87
24	119	121	116	107	119	101	114
23	138	137	146	135	148	129	138
22	151	163	158	165	168	146	149
21	172	178	166	184	174	164	163
20	204	199	183	201	199	177	182
19	231	221	224	226	239	206	211
18	268	254	267	260	265	233	234
17	301	313	307	295	301	263	268
16		357	342	338	319	286	293
15		392	388	379	357	323	326
14		427	434	408	384	356	348
13				433	410	373	381
12						419	410
11							
10							
9							
8							
7							
6							

ISOTHERM DEPTHS (M)

		R/V BALDRIGE			MB-STACS34-89			
XBT NO.		29	30	31	32	33	34	35
YEAR		89	89	89	89	89	89	89
MONTH		8	8	8	8	8	8	8
DAY (GMT)		26	27	27	27	27	28	28
TIME (GMT)		2232	0117	0416	0656	1155	1457	1655
LAT (N)		16.43	15.97	15.52	15.00	14.59	14.30	13.82
LON (W)		62.96	62.49	62.05	61.58	61.15	61.24	61.42
SURF T (C)		28.6	29.1	29.0	28.7	28.6	28.9	28.8
28		38	61	67	41	31	32	29
27		57	78	80	60	61	51	44
26		69	88	90	82	74	78	72
25		78	96	104	107	94	108	93
24		105	111	119	115	123	127	112
23		134	125	133	117	132	137	124
22		159	137	144	132	160	145	135
21		173	150	154	158	169	159	142
20		187	185	163	175	177	164	146
19		201	181	176	186	189	170	166
18		223	194	189	194	219	188	177
17		255	217	220	226	235	212	188
16		284	258	241	260	250	225	207
15		310	285	273	275	278	242	246
14		336	320	309	290	297	259	273
13		361	346	346	333	324	304	316
12		390	375	375	364	361	327	360
11		432	438	392	395	391	412	394
10						444		445
9								
8								
7								
6								

ISOTHERM DEPTHS (M)

		R/V BALDRIGE			MB-STACS34-89			
XBT NO.		36	37	38	39	40	41	42
YEAR		89	89	89	89	89	89	89
MONTH		8	8	8	8	8	8	8
DAY (GMT)		28	28	29	29	29	29	29
TIME (GMT)		2059	2300	0122	0254	0450	0652	1655
LAT (N)		13.47	13.05	12.52	12.15	11.73	11.42	12.00
LON (W)		61.58	61.70	61.88	62.01	62.07	61.67	60.10
SURF T (C)		29.4	29.5	29.0	29.4	29.6	30.0	29.9
28		35	25	41	37	21	27	37
27		54	41	53	40	35	31	48
26		62	54	62	53	43	40	64
25		78	62	70	85	73	68	83
24		90	84	85	101	88	75	95
23		104	90	98	108	98	81	103
22		121	98	110	117	107	93	118
21		134	111	116	135	113	99	122
20		148	124	121	143	141	113	134
19		168	152	127	159	155	125	139
18		180	179	150	169	167	130	151
17		205	191	183	189	183	168	168
16		217	196	192	215	214	181	181
15		230	226	206	231	239	208	208
14		239	245	235	248	279	243	243
13		263	272	262	280	295	268	268
12		293	310	295	309	307	311	311
11		352	349	343	345	347	360	360
10			385	415	383	393	385	385
9			435		435	440	437	437
8								
7								
6								

ISOTHERM DEPTHS (M)

		R/V BALDRIGE			MB-STACS34-89			
XBT NO.		43	44	45	46	47	48	49
YEAR		89	89	89	89	89	89	89
MONTH		8	8	8	8	8	8	9
DAY (GMT)		30	31	31	31	31	31	1
TIME (GMT)		1654	0828	1135	1430	1921	2239	0647
LAT (N)		12.99	12.85	12.66	12.48	12.23	11.86	11.27
LON (W)		57.51	55.43	54.73	54.09	53.65	52.97	51.84
SURF T (C)		29.2	28.4	28.3	29.1	29.6	28.8	28.7
28		32	32	22	31	27	31	39
27		42	49	45	43	53	50	53
26		64	73	63	68	72	66	61
25		82	96	82	95	91	83	77
24		118	122	105	109	101	103	96
23		127	139	121	119	113	110	111
22		138	147	130	130	124	127	115
21		150	155	138	136	131	139	119
20		157	168	146	143	138	147	128
19		168	178	153	152	153	160	134
18		177	186	167	166	160	169	140
17		196	200	177	175	167	186	146
16		204	206	197	180	173	202	153
15		221	225	213	187	187	219	165
14		235	241	232	205	201	230	181
13		252	278	252	231	221	245	202
12		263	302	256	275	241	261	217
11		290	327	314	299	264	314	249
10		349	391	353	354	325	385	298
9		395	428	419	407	389	430	392
8								
7								
6								

ISOTHERM DEPTHS (M)

		R/V BALDRIGE			MB-STACS34-89			
XBT NO.		50	51	52	53	54	55	56
YEAR		89	89	89	89	89	89	89
MONTH		9	9	9	9	9	9	9
DAY (GMT)		1	1	1	1	2	2	2
TIME (GMT)		0959	1243	1814	2051	0442	0715	1515
LAT (N)		10.96	10.65	10.36	10.05	9.44	9.13	8.52
LON (W)		51.28	50.71	50.15	49.58	48.47	47.90	46.78
SURF T (C)		29.0	28.7	28.9	28.9	28.4	28.5	28.6
28		43	29	28	37	47	44	37
27		53	44	50	47	58	56	47
26		61	52	59	62	69	68	59
25		69	65	79	74	77	77	75
24		79	79	92	80	84	90	86
23		90	90	98	86	95	95	90
22		98	99	105	96	101	100	93
21		112	109	109	108	109	107	96
20		119	118	120	113	112	111	111
19		125	124	134	119	117	119	119
18		131	134	144	126	126	125	125
17		143	139	151	132	144	133	133
16		159	147	163	137	156	146	146
15		183	157	176	152	174	163	163
14		192	171	186	161	184	178	178
13		199	196	202	187	204	194	194
12		218	216	235	201	208	198	198
11		258	251	296	230	252	239	239
10		301	293	340	292	286	271	271
9		385	360	425	368	356	344	344
8			440			434	390	390
7								
6								

## ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STAC34-89					
XBT NO.	57	58	59	60	61	62	63
YEAR	89	89	89	89	89	89	89
MONTH	9	9	9	9	9	9	9
DAY (GMT)	2	2	3	3	3	3	4
TIME (GMT)	1521	1750	0137	0429	1237	1947	0200
LAT (N)	8.52	8.21	7.60	7.29	6.50	5.50	4.50
LON (W)	46.78	46.22	45.10	44.54	44.00	44.00	44.00
SURF T (C)	28.7	28.7	28.8	28.7	28.9	29.4	28.9
28	37	30	44	44	43	33	41
27	47	39	57	60	48	45	69
26	59	52	62	65	52	61	92
25	74	62	68	71	60	74	104
24	84	66	73	75	65	81	110
23	88	75	83	82	71	88	116
22	91	78	90	89	78	91	120
21	94	87	95	99	83	94	123
20	97	90	100	103	88	97	124
19	99	95	105	106	98	100	125
18	107	98	108	111	104	104	126
17	124	108	113	115	107	110	128
16	129	113	117	120	109	116	130
15	133	126	122	125	119	123	132
14	153	133	128	134	126	127	136
13	169	144	138	149	138	131	144
12	180	158	158	161	154	143	162
11	196	197	182	175	179	158	188
10	244	244	214	218	238	196	221
9	308	327	275	285	296	257	283
8	374	404	370	358	402	379	405
7							
6							

## ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STAC34-89					
XBT NO.	71	72	73	74	75	76	77
YEAR	89	89	89	89	89	89	89
MONTH	9	9	9	9	9	9	9
DAY (GMT)	6	6	7	7	8	8	8
TIME (GMT)	1543	2304	0711	2056	0051	0446	0821
LAT (N)	2.10	3.39	4.68	5.23	4.95	4.70	4.45
LON (W)	45.34	45.95	46.57	47.02	47.40	47.73	48.08
SURF T (C)	27.5	27.5	27.3	27.5	27.1	26.9	26.8
28	32	94	83	39	33	29	22
27	85	118	117	102	98	113	114
26							
25	109	141	143	113	115	120	118
24	115	146	149	154	143	126	122
23	117	150	156	162	154	142	126
22	120	153	157	169	165	153	132
21	123	155	158	175	175	161	157
20	126	157	160	178	177	169	180
19	134	158	164	181	186	171	181
18	145	161	171	186	191	172	181
17	151	176	178	190	195	175	182
16	154	189	183	196	201	177	182
15	172	213	189	204	204	180	183
14	193	226	193	211	209	185	184
13	243	241	201	224	213	197	188
12	288	252	211	235	230	211	213
11	309	276	223	251	251	271	346
10	342	317	258	259	285	325	414
9	373	372	291	314	344	384	447
8			336	374	388		
7							
6							

## ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STAC34-89					
XBT NO.	64	65	66	67	68	69	70
YEAR	89	89	89	89	89	89	89
MONTH	9	9	9	9	9	9	9
DAY (GMT)	4	4	5	5	5	5	6
TIME (GMT)	0859	1233	0249	0911	2034	2239	0748
LAT (N)	3.50	2.98	2.09	1.25	0.67	0.33	0.81
LON (W)	44.00	44.00	44.00	44.00	44.12	44.31	44.72
SURF T (C)	27.0	27.5	27.0	27.0	27.3	27.3	26.9
28							
27	99	96	48	22	64	79	62
26	124	134	82	86	90	91	80
25	134	156	119	95	93	96	82
24	160	158	138	103	98	97	83
23	162	159	140	105	109	99	86
22	163	159	142	110	110	102	92
21	164	160	146	113	114	106	98
20	164	160	149	114	119	111	112
19	165	162	151	127	131	117	116
18	166	168	152	135	142	132	137
17	168	179	168	145	147	144	142
16	173	185	172	148	150	160	167
15	175	193	177	160	168	200	184
14	178	203	229	227	201	223	205
13	182	208	256	251	220	250	212
12	185	225	282	277	307	282	266
11	197	244	299	322	337	331	298
10	227	291	330	337	360	348	
9	284	333	352	357	372	412	
8	349	388				438	
7							
6							

## ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STAC34-89					
XBT NO.	78	79	80	81	82	83	84
YEAR	89	89	89	89	89	89	89
MONTH	9	9	9	9	9	9	9
DAY (GMT)	8	8	9	9	9	9	10
TIME (GMT)	1837	2104	0354	0908	1512	2125	1134
LAT (N)	4.19	3.90	4.22	5.16	6.10	7.03	7.29
LON (W)	48.37	48.63	48.92	49.22	49.54	49.85	50.18
SURF T (C)	27.6	27.3	27.2	27.0	29.0	28.6	28.7
28							
27	53	29	37	45	32	41	42
26	98	94	84	77	45	56	65
25	101	108	96	89	61	61	78
24	107	112	107	97	81	76	83
23	120	118	111	110	94	82	87
22	123	125	120	122	111	87	89
21	141	132	132	142	136	89	93
20	173	150	156	155	139	92	97
19	174	153	162	156	140	99	98
18	174	160	167	157	141	115	103
17	175	164	170	158	144	123	108
16	175	165	172	161	162	127	111
15	176	166	173	165	164	129	118
14	176	167	174	168	166	131	121
13	178	169	179	177	175	134	123
12	199	180	202	202	217	147	130
11	251	243	257	295	248	186	178
10	359	304	297	404	324	235	226
9	441	393	361		412	294	294
8						399	341
7							
6							

## ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STACS34-89					
XBT NO.	85	86	87	88	89	90	91
YEAR	89	89	89	89	89	89	89
MONTH	9	9	9	9	9	9	9
DAY (GMT)	10	11	11	12	12	12	12
TIME (GMT)	2045	0516	1426	1343	1927	2140	2341
LAT (N)	6.87	6.45	6.14	6.03	6.25	6.70	7.16
LOX (W)	50.53	50.88	51.13	51.17	51.66	51.89	52.10
SURF T (C)	29.0	28.5	28.6	28.7	29.6	29.1	29.1
28	40	44	45	33	43	46	39
27	72	69	63	46	52	69	86
26	82	82	82	83	85	117	121
25	85	95	106	101	114	126	148
24	92	103	112	105	119	136	153
23	96	115	123	114	129	143	157
22	104	124	135	131	151	147	159
21	111	130	137	134	155	148	165
20	128	133	142	138	159	154	168
19	132	136	145	142	165	161	172
18	134	138	151	145	168	165	182
17	136	142	154	164	170	166	194
16	137	144	160	182	173	168	203
15	139	146	186	201	176	174	212
14	143	148	198	215	180	179	220
13	154	159	201	221	187	184	230
12	183	179	215	229	195	209	239
11	223	214	243	246	218	267	254
10	265	298	321	271	255	317	316
9	332	383	377	306	299	331	352
8		433		405	339	367	406
7					415	414	
6							

## ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STACS34-89					
XBT NO.	92	93	94	95	96	97	98
YEAR	89	89	89	89	89	89	89
MONTH	9	9	9	9	9	9	9
DAY (GMT)	13	13	13	13	14	14	14
TIME (GMT)	0202	0419	0519	1255	1230	1555	1910
LAT (N)	7.62	8.07	7.83	7.29	8.39	8.67	8.95
LOX (W)	52.33	52.57	52.66	52.88	56.67	57.38	58.09
SURF T (C)	28.6	28.8	28.2	28.9	28.2	29.1	29.3
28	44	49	22	35	34	34	48
27	91	81	64	75	54	48	58
26	124	120	104	106	62	59	71
25	150	153	135	135	75	77	78
24	169	161	151	141	93	85	86
23	173	164	159	147	102	90	97
22	177	167	161	151	110	94	111
21	184	168	164	153	118	102	123
20	186	171	168	156	128	135	131
19	188	184	181	162	138	152	148
18	191	192	187	172	144	171	162
17	199	197	192	177	164	183	180
16	205	202	195	186	179	213	195
15	213	209	200	190	189	222	205
14	244	217	205	196	199	240	219
13	252	226	216	209	226	258	242
12	270	237	224	225	243	273	250
11	295	294	280	247	276	296	283
10	344	360	310	279	320	355	323
9	386	432	386	404	357	395	395
8					412		
7							
6							

## ISOTHERM DEPTHS (M)

R/V BALDRIGE		MB-STACS34-89					
XBT NO.	99	100	101	102	103	104	105
YEAR	89	89	89	89	89	89	89
MONTH	9	9	9	9	9	9	9
DAY (GMT)	15	15	20	21	22	23	24
TIME (GMT)	0606	1653	1255	1253	1250	1255	1255
LAT (N)	9.50	9.51	13.21	15.93	17.79	20.26	23.44
LOX (W)	58.83	59.46	63.58	68.73	64.76	67.97	72.96
SURF T (C)	29.2	30.1	29.0	29.4	26.8	28.3	28.6
28	31	30	43	31		75	59
27	45	47	57	52		80	65
26	70	63	59	102	74	86	78
25	88	82	66	130	84	98	94
24	106	89	72	163	101	121	117
23	114	103	79	178	129	152	139
22	123	114	89	197	144	168	157
21	134	123	103	212	170	195	182
20	145	131	116	231	187	215	207
19	158	140	136	243	201	256	256
18	172	155	150	269	224	297	344
17	186	166	167	298	245	338	428
16	197	179	204	321	282	377	
15	225	189	230	344	328	428	
14	239	208	243	370	348		
13	264	227	272	401	376		
12	293	247	315	445	423		
11	327	276	339		451		
10	350	333	403				
9	379	403					
8	416						
7							
6							