

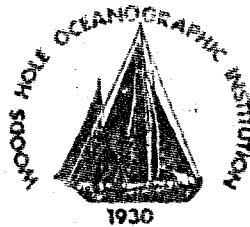
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**A Trans-Indian Ocean Hydrographic Section at Latitude 32°S  
Data Report of RRS *Charles Darwin* Cruise #29**

by

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Woods Hole, Massachusetts 02543

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Miami, Florida 33149

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January 1992

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**Technical Report**

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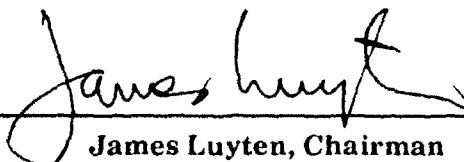
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**James Luyten, Chairman**  
Department of Physical Oceanography

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## Abstract

A trans-Indian Ocean hydrographic section employing CTD/O<sub>2</sub> profilers was conducted between Africa and Australia during austral spring 1987. The cruise track ranged between 29°S and 34°S; the average latitude of the crossing was 32°S. The purpose of the cruise was to explore various aspects of the South Indian Ocean including the characteristics of the core water masses of this ocean, the strength of the subtropical gyre, the structure and transport of deep western-boundary currents, and the net meridional heat flux. A total of 109 CTD/O<sub>2</sub> profiles with associated rosette water sample measurements and 347 XBT profiles were collected, supplemented by underway upper ocean velocity, bathymetric and sea surface temperature and salinity data. This report details the data collection, calibration, and reduction methods, and summarizes the hydrographic observations.



## Introduction

A trans-Indian Ocean hydrographic section along approximate latitude 32°S using Conductivity, Temperature, Depth, Dissolved Oxygen (CTD/O<sub>2</sub>) profilers was successfully completed during austral spring 1987. Water samples, collected with a rosette sampler attached to the CTD mounting frame, were analyzed for salinity, oxygen, dissolved nutrients, chlorofluorocarbons (CFC), tritium, and <sup>3</sup>He content. The expedition, conducted from the RRS *Charles Darwin*, a NERC (Natural Environment Research Council)/RVS (Research Vessel Services) vessel based out of Great Britain, departed Durban, South Africa on 12 November 1987 and made port at Fremantle, Australia on 17 December 1987. The cruise track covered an area between 29° and 34°11'S; several substantial ridge systems extend across the track, dividing the ocean into distinct basins (Figure 1). The purpose of the cruise was to explore various aspects of the South Indian Ocean circulation including the characteristics of the core water masses of this ocean, the zonal extent of the subtropical gyre including the Agulhas Current and its recirculation zone, and the structure and transport of deep western-boundary currents.

Cruise #29 of the RRS *Charles Darwin* was a multi-institution oceanographic effort. A U.S. contingent of thirteen joined by four shipboard technicians from NERC/RVS (Table 1) collected a total of 109 CTD/O<sub>2</sub> profiles (including test stations #1, 2, and 11). A summary of station information is given in Table 2. The NERC/RVS technicians operated the CTD winch and the permanent shipboard scientific equipment and computers. The Woods Hole Oceanographic Institution (WHOI) CTD Group staged, prepared and maintained the CTD and rosette equipment during the cruise. The WHOI Hydrography Group coordinated sampling and analysis of rosette salinity and oxygen data. WHOI personnel processed, quality controlled, and archived the collected data. A group from Oregon State University (OSU) analyzed water samples for dissolved nutrient concentrations (dissolved silica, phosphate, nitrite, and nitrate). A team from the University of Miami determined chlorofluorocarbon (CFC) concentrations (F11, F12) from selected rosette bottles at sea and also collected samples for subsequent processing in the laboratory of <sup>3</sup>H and <sup>3</sup>He. Watchstanders deployed 347 expendable bathythermographs (XBTs) along the transect at nominal spacing of 15-20 km between CTD station positions (Table 3). All hands aided in the deployment and recovery of the instruments. Navigation data as well as continuous sea surface temperature, salinity, and upper ocean velocity were logged digitally throughout the cruise; bathymetry data were logged manually at 20-minute intervals with more frequent sampling over abrupt bottom topography. The data return from the cruise was exceptional, and the major cruise objectives were met due to hard work by both the scientific and shipboard personnel during the trip. Listings of the CTD observations at standard levels and the water sample observations form the bulk of this report, Appendix B.

## Data Acquisition Systems, Water Sample Analysis, and Instrumentation

Two EG&G/Neil Brown Instrument Systems (NBIS) Mark IIIB CTD/O<sub>2</sub> (Conductivity/Temperature/Depth/Oxygen) profilers (WHOI instruments: #8, serial number 01-2252-01, and #9, serial number 01-2405-01) were employed on the cruise. A detailed description of the instrumentation can be found in the report by Brown and Morrison (1978). A 24-position, 10-liter rosette manufactured by Scripps Institution of Oceanography was the primary system for water sample collection; a 24-position 1.2-liter General Oceanics Inc. rosette system was available as a backup. The 10-liter bottle size was dictated by CFC sampling requirements. A 12-kHz pinger was mounted on each CTD underwater package to facilitate sampling close to the ocean bottom.

The CTD data acquisition system employed the NBIS model 1150 deck unit (Figure 2) which passed digital HEXASCII data to a  $\frac{1}{4}$ " Kennedy cartridge tape drive. Data were graphically displayed and listed in real time by an HP-85 computer. Audio tape back-up analog recordings were also collected. Complete back-up sets of acquisition hardware were available on the cruise. Data transcription and processing were performed on Digital Equipment Corporation (DEC) MicroVAX II computer systems (Figure 2). Acquisition data were loaded onto the MicroVAX system via Kennedy cartridge tape drives and displayed graphically using Zeta-8 plotters. Two independent MicroVAX systems were employed: the first devoted to basic processing, the second to data archiving, higher level processing and analysis. Nine-track and DEC TK50 cartridge tapes served as media for data archiving.

Two Guildline AutoSal Model 8400A salinometers were utilized to determine water sample salinities. These were installed in a portable laboratory capable of maintaining constant environmental temperature within  $\pm 1^\circ\text{C}$ . The nominal laboratory temperature was  $22^\circ\text{C}$ . A standardization check was performed once per day, using Standard Seawater Batch P-97. No drift of the Autosal was observed during the cruise, thus no standardization adjustments were made. It should be noted that, based upon a comparison of Batch P-97 and PSS78 DCL Standard, Mantyla (1987) has recommended a correction (which has not been made to these data) of  $+ 0.0008$  for rosette samples analyzed with this batch. The uncertainty in the rosette salinity data is believed to be  $\pm 0.003$  psu, the manufacturer's stated accuracy of the AutoSal.

Water sample dissolved oxygen analyses were also performed in the constant temperature laboratory using a modified Winkler titration technique. The measurements were conducted on 50 ml aliquots of the samples. A Metrohm Titroprocessor controlling a Metrohm Dosimat was used to titrate to an amperometric endpoint as described by Knapp *et al.* (1989). Standardization checks were performed prior to and following the use of each batch of titrant (typically every third day). No observable drift occurred between standardization checks. These data are reproducible to  $\pm 0.02$  ml/l with accuracy of better than 2%.



The inorganic nutrient determinations were carried out by Dr. Louis I. Gordon's group from Oregon State University. Samples were analyzed for dissolved, reactive nutrients at sea using an Alpkem Corporation RFA-300 continuous, segmented flow analyzer (RFA). Nutrients analyzed included orthophosphate, silicic acid, nitrate plus nitrite, and nitrite. The phosphate method was basically that of Atlas *et al.* (1971), modified for the RFA. The remaining methods were those furnished by the Alpkem Corporation for use with the RFA (Alpkem, 1986; Patton, 1983). We have established that all other methods are linear to a few tenths of 1% and give results comparable to, or better than, the AutoAnalyzer-II -based methods we employed in the past (Atlas *et al.*, 1971).

The dissolved nutrients were measured at all station locations; in most cases, these analyses were performed immediately after each CTD cast and were completed within two to three hours after the cast. The short term precision (1 standard deviation), estimated from replicate analysis of the same sample and on occasions where two rosette bottles were tripped at the same depth, was approximately 0.2%, 0.5%, and 1.0% of regional deep water values for silicic acid, nitrate plus nitrite, and phosphate, respectively. Nitrite precision is typically 0.02 micromolar. Due to problems with the autosampler (mentioned below), long term precision and accuracy were estimated at 1-2% for silicic acid and nitrate plus nitrite, 3-5% for phosphate, and 0.04 micromolar for nitrite. Data which seemed clearly in error were rejected during the post cruise quality control review of the data.

Chlorofluorocarbon (CFC) samples (F11 and F12) were drawn from rosette bottles at about 70% of the stations. An analytical system similar to that of Bullister and Weiss (1988) was used. CFC concentrations are reported relative to the SIO86 calibration scale (Weiss, personal communication). A combination bottle and handling blank was used to correct for contamination from the Niskin bottles, and from the collection and storage of samples. This blank was estimated by rotating Niskin bottles, double tripping them and measuring what was believed to be CFC-free water. For F11 the blanks varied throughout the cruise, generally decreasing with time. They ranged from 0.04 pmol/kg to zero. For F12 the blanks were zero; however, contamination problems preclude the use of some of the F12 data. We estimate our precision based on analysis of 166 duplicate samples from the same syringe. The standard deviation of the series of replicates for F11 was as follows: for concentrations in the range zero to 0.10 pmol/kg precision  $\pm 0.004$  pmol/kg, in the range 0.1-0.5 pmol/kg precision  $\pm 0.007$  pmol/kg, in the range 0.5-1.0 pmol/kg precision  $\pm 0.012$  pmol/kg, and greater than 1.0 pmol/kg precision  $\pm 0.092$  pmol/kg. The standard deviation of the series of replicates for F12 was as follows: for concentrations in the range zero to 0.10 pmol/kg precision  $\pm 0.009$  pmol/kg, in the range 0.1-0.5 pmol/kg precision  $\pm 0.011$  pmol/kg, in the range 0.5-1.0 pmol/kg precision  $\pm 0.035$  pmol/kg, and greater than 1.0 pmol/kg precision  $\pm 0.04$  pmol/kg. Marine air for F11 were  $224 \pm 6$  ppt. The water sample salinity, oxygen, nutrient, and CFC observations are presented in Appendix B of this report.

Samples from stations 12, 15, 26, 33, 35, 39, 44, 50, 55, 62, 65, 69, 80, 88, 94, 97, 105, and 106 were analyzed for the following quantities: tritium, helium isotope ratio, total helium and neon. Two hundred and forty measurements each are available for helium isotope ratio, total helium and neon; there are 130 measurements for tritium.

For the noble gas analyses, water samples (approximately 40 g) were collected in clamped copper tubes. These samples were also used for tritium analyses in the upper 500 m. For deep tritium samples, water samples (1 liter) were collected in glass bottles. Tritium measurements were made using the mass-spectrometric helium-3 regrowth technique with a precision of 0.01 TU. Helium isotope ratios, as well as absolute helium and neon concentrations, were measured mass-spectrometrically. Isotope ratios, expressed in the  $\delta$  notation (ratio anomaly with respect to the atmosphere), have a precision of 0.2%; absolute concentrations have a precision of 0.25%. These data are presented in listings appearing in Appendix C.

The ship's equipment inventory included an Acoustic Doppler Velocity Profiling (ADCP) system (RD 150-kHz profiler with IBM AT acquisition computer) and a digital expendable bathythermograph (XBT) recorder (Bathysystems, Inc. with HP-85 computer). A thermosalinograph monitored surface temperature and salinity along track; data were logged to the ship's main computer system. This system also recorded navigation information (transit and GPS fixes) from which all CTD station navigation information was updated after the cruise. Wind speed and direction were recorded manually by each watch at the start of each station. All transit fixes were digitally logged in addition to GPS fixes every two minutes when available; all transit fixes were subsequently interpolated to form a one-minute position record using the ship velocity data.

There were relatively few failures of equipment during the cruise. Upon set-up in Durban, CTD #9 was found to have a faulty FSK board, which was quickly identified and replaced before departure. At cruise start, there was a problem with the Scripps-modified General Oceanics rosette unit which was remedied by replacing a faulty pylon unit. The Kennedy Cartridge tape drives employed for acquisition experienced difficulty switching tracks efficiently; stations greater than 3000 db typically lost up to 15 db of data in mid-profile; data were subsequently interpolated across this gap during processing. At the beginning of the cruise, there was a failure of the nutrient RFA's autosampler. This was replaced by an older model autosampler which was only partly compatible with the RFA; this resulted in noisy and erratic phosphate results, particularly during the first third of the cruise. Late in the cruise one MicroVAX II nine-track tape drive failed; the remaining functional unit was shared between computer systems for the rest of the cruise. Several of the rosette bottles suffered breakage, a function of the difficulty handling such a large package. Many of the rosette bottles leaked; the problem was ultimately traced to old O-rings in the bottles. Careful editing has removed all suspect observations from the final data set.

## Cruise Narrative

Staging of the ship was accomplished during a four-day period in Durban, South Africa. Two containers, one a WHOI portable laboratory (a temperature controlled, 20-foot long container equipped with salinity and oxygen analysis equipment), the other a shipping container used to transport the cruise equipment, were secured to the deck. CTD and CFC laboratories were established in the RRS *Darwin's* large main laboratory: two small adjacent laboratories housed the nutrient and shipboard computer operations.

Departure from Durban was several hours late on November 12 due to a delayed air shipment containing the bulk of the University of Miami chemistry equipment. At 2100 hrs, the ship transited to a test station site roughly 100 km off the African coast in 3000 m of water. On the morning of November 13, CTD #9, mounted with the small 1.2-liter rosette package, was successfully deployed (station 1) to within 10 m of the ocean floor. Station 2 (the test station for CTD #8 mounted in the large rosette package) was aborted at 900 m depth when the CTD signal was lost. The remainder of that day was spent troubleshooting the problem. During this time, the scientific party was notified that the ship was required to return to Durban to put ashore the vessel's electrician because of a home emergency. The replacement electrician was scheduled to arrive Durban on the afternoon of the 15th. Complicating matters, the winds had increased to 40 knots with growing seas. Since the large rosette package was not yet functional, it was decided to work westward from the test station site and occupy the coastal stations of the proposed section using CTD #9 in the small, easily handled rosette package. Stations 3 through 10 make up an east-to-west transect back toward the African coast. A successful CTD #8 test station was subsequently occupied off the coast of Durban with the repaired large rosette system. The balance of the CTD casts were done with this underwater rosette package.

The second departure from Durban occurred at 1700 hrs on 15 November. The ship steamed back to re-occupy the easternmost station position already collected (site of stations 1 and 2) and proceeded to work to the east. The CTD station schedule dictated high-resolution sampling at the western sides of basins and across rough topographic relief with an effort to sample any extraordinarily deep trenches. Larger station spacing intervals were planned over abyssal plains. The section began at the western boundary at 31°S where the Agulhas Current is located near the abrupt African shelf break. Stations were closely spaced down to the abyssal plain of the Natal Valley, spanning the full width of the Agulhas Current. The section then crossed the Mozambique Ridge and Basin, and up over the Madagascar Ridge near Walter's Shoal. High resolution stations were made at the eastern flanks of both ridges so as to observe any western intensification of the baroclinic gradients. Next, the cruise track turned slightly south to cross the Southwest Indian Ridge at approximate right angles, before sampling zonally across the Crozet Basin at latitude 34°S. In the eastern Crozet Basin the section jogged northward at the Southeast Indian Ridge to cross that feature at near right angles before sampling across the southern

extremity of the Central Indian Basin along 29°S. The section continued along the crest of Broken Ridge then concluded by sampling across Naturaliste Plateau and up onto the Australian shelf, terminating in 55 m of water midway between Cape Leeuwin and Cape Naturaliste (Figure 1). Upon arrival in Fremantle, gear was packed up into shipping vans within two days and surface freighted via Singapore (RRS *Darwin's* subsequent port of call) to the United States.

During the cruise, the combination of the large underwater package and the slow winch speed (maximum 60 m/min) led to station times exceeding six hours. The first half of the cruise suffered average lowering/raising rates of 37 m/min. Fortunately, good weather afforded us with more time for CTD stations, and less time devoted to repairs; there were a total of five reterminations of the CTD underwater cable during the entire cruise, several of which occurred in poor weather during the last week.

Selection of the primary CTD instrument for the cruise was based on the consistency with which the CTD sensors matched the analyzed water sample salinity data obtained on test stations and the initial casts. CTD #9 was used to collect the first group of stations (3-10) as noted above, while CTD #8 was employed on stations 11-15. Close scrutiny of these early data revealed that the potential temperature/salinity profiles for the two CTD/O<sub>2</sub> instruments differed slightly; considering both instruments with pre-cruise calibrations applied, CTD #9 better described the hydrographic profile outlined by corresponding rosette water sample data. Thus, at station 16, CTD #9 was placed in the large rosette frame and subsequently employed on stations 16-94, and 96-109. CTD #8 was used once more at station 95 in the Western Australian Basin to confirm its deep-water sensor calibrations.

Estimated accuracies of the final processed and calibrated data are  $\pm 0.002^\circ\text{C}$  for temperature,  $\pm 0.002$  for salinity (with respect to the standard sea water used) and  $\pm 0.02$  ml/l for dissolved oxygen concentration. The following sections detail the procedures used to reduce the CTD data to final form. All stations were collected to within 10 m of the ocean bottom; the deepest station (#91) extends to 5927 db in the Western Australian Basin. The warmest surface waters ( $T = 23.480^\circ\text{C}$ ) were found in the Agulhas Current at station 7; the coldest deep-water temperatures were found at station 50 in the Crozet Basin ( $T = 0.517^\circ\text{C}$ ,  $\Theta = 0.094^\circ\text{C}$ ).

## Calibration of CTD/O<sub>2</sub> Profiles

### Overview:

Laboratory calibrations, performed before and after the cruise, provide the sole correction information for the CTD pressure and temperature sensors. Final CTD data have been pressure averaged at 2 db intervals with the appropriate pressure, temperature and conductivity calibrations. Note that temperature and pressure calibrations are used to

scale both the data profiles and the CTD component of the rosette water sample data files. The pre-cruise laboratory calibrations of CTDs #8 and #9 appeared to describe the at-sea instrumentation more accurately than post-cruise laboratory calibrations. Extended periods of time elapsed (three months prior, four months post) between CTD calibrations and data acquisition; it is likely that an event during post cruise shipment affected post cruise calibrations for CTD #8. In order to preserve a long-standing history on the stability of these sensors, no electronic adjustments were made to the sensor interface boards during laboratory calibrations. Instead, corrections, determined by polynomial least-square fits to the laboratory calibration data, were applied to the data. Temperature calibrations consisted of quadratic fits to seven temperature points ranging between 0 and 25°C in reference to a platinum thermometer standard (Figure 3). Pressure calibrations were done using a dead-weight tester; data were sampled at 1000 psi intervals with both increasing and decreasing pressure between 0 and 10,000 psi. Data reduction employed a cubic calibration algorithm determined from a least-square fit to these data (Figure 4). Conductivity calibrations were derived using the water sample salinity data which is traceable to the IOS Wormley standard sea water. Additional information on CTD calibration methodology and data processing procedures can be found in the report by Fofonoff, Hayes, and Millard (1974) and Millard (1982).

**Pressure:**

For both CTD instruments, the pressure bias term applied to each CTD cast was set equal to the pre-lowering deck unit pressure reading (du). The following downcast (0-6000 db range) pressure calibration algorithm was applied to the CTD #8 profiles.

$$\text{CTD \#8: } P = - (du) + (.996485E-1) P_{\text{raw}} + (.204213E-7) P_{\text{raw}}^2 - (.203510E-12) P_{\text{raw}}^3$$

where  $P_{\text{raw}}$  is the raw counts of the pressure channel.

The downcast pressure calibration algorithm for CTD #9 derived from laboratory measurements is listed below:

$$\text{CTD \#9: } P = - (du) + (.997789E-1) P_{\text{raw}} + (.146634E-7) P_{\text{raw}}^2 - (.199288E-12) P_{\text{raw}}^3$$

This calibration equation was adjusted with a cubic term which increases the pressure of the CTD trace by 15 db at 6000 db but introduces negligible change for  $P < 3000$  db. This step was taken to correct a problem with the pressure gauge which resulted in an uncharacteristically salty (.002) CTD trace in the deep water (see Appendix A). The equation for the laboratory pressure calibration plus the adjustment is:

$$\text{CTD \#9: } P = - (du) + (.99934049E-1) P_{\text{raw}} + (.2878124E-8) P_{\text{raw}}^2 + (.229295E-13) P_{\text{raw}}^3$$

In similar fashion, cubic calibration curves were constructed from the decreasing pressure (upcast) laboratory calibration data. For CTD #8, a weighted combination of the pre-cruise downcast and upcast pressure calibrations was applied to the CTD component of the rosette water sample data (Millard, 1982).

CTD #8 :

$$P_{up} = -.661953E1 + (.993626E-1) P_{raw} + (.358650E-7) P_{raw}^2 - (.370163E-12) P_{raw}^3$$

$$P_{dn} = -.408372E1 + (.996485E-1) P_{raw} + (.204213E-7) P_{raw}^2 - (.203510E-12) P_{raw}^3$$

For CTD #9 observations, the upcast pressure calibration algorithm alone (with adjustment described above) was applied to the upcast CTD component of the rosette water sample data. This method of scaling helped minimize discrepancy in the CTD #9 deep-ocean salinity data.

CTD #9 :

$$P_{up} = .296106E1 + (.9946015E-1) P_{raw} + (.2208452E-7) P_{raw}^2 - (.1510815E-12) P_{raw}^3$$

**Temperature:**

The following pre-cruise temperature calibrations were used for the calibration of CTD downcast and water sample rosette data collected with CTD #8. A time lag correction of 0.250 seconds between the C and T sensors (deduced during the cruise) was also made.

$$\text{CTD \#8 : } T = .481378E-2 + (.499839E-3) T_{raw} + (.183211E-11) T_{raw}^2$$

where  $T_{raw}$  is the raw counts of the temperature channel.

A comparison of CTD #9 pre- and post-cruise temperature calibrations indicated that the temperature sensor remained very stable during the cruise and shipping time period; therefore, a combination of the two laboratory calibrations was used to determine the correction formula. The following was applied to the data along with a time lag correction of 0.150 seconds:

$$\text{CTD \#9: } T = .993360E-2 + (.499908E-3) T_{raw} + (.120247E-11) T_{raw}^2$$

**Conductivity:**

Linear conductivity calibration algorithms, derived from pre-cruise laboratory data (Figure 5), were used to plot and list CTD data during acquisition. The algorithms

employed were:

$$\text{CTD \#8: } C = .844399\text{E-2} + (.100041\text{E-2}) C_{\text{raw}} [1 + \alpha (T - T_0) + \beta (P - P_0)]$$

$$\text{CTD \#9: } C = -.148379\text{E-2} + (.100002\text{E-2}) C_{\text{raw}} [1 + \alpha (T - T_0) + \beta (P - P_0)]$$

where:

- $C_{\text{raw}}$  is the raw counts of the conductivity channel;
- $\alpha$  is the temperature correction coefficient ( $-.65\text{E-5 } ^\circ\text{C}^{-1}$ );
- $\beta$  is the coefficient of cell contraction with pressure ( $1.5\text{E-8 db}^{-1}$ );
- $T$  is scaled temperature;
- $T_0$  is  $2.8^\circ\text{C}$ ;
- $P$  is scaled pressure;
- $P_0$  is 3000 db.

CTD #8 pre-cruise scaling factors resulted in a huge offset (.01 psu) between the CTD and the rosette water sample salinity data. CTD #9 pre-cruise scaling factors described the CTD conductivity cell extraordinarily well, which motivated use of this instrument on the bulk of the stations. It was not until much later in the cruise that a .002 psu inconsistency between CTD #9 and water sample salinity was revealed at very deep stations. Non-standard manipulations of the pressure and conductivity scaling factors were ultimately needed in order to describe the deep ocean accurately (Appendix A).

The final conductivity calibrations applied to the data were determined from multiple regression fits of the CTD data with their respective rosette salinity water samples. CTD #8 stations were calibrated using standard multiple regression fitting methods for conductivity (Millard, 1982). First, a multiple regression fit was done over a homogeneous station group (one in which the differences between water sample and nominally scaled CTD salinities were roughly constant), fitting for conductivity bias and conductivity slope through the entire water column. The resultant bias was next removed from the data, and a second multiple regression fit for conductivity slope was done for the same station group in the deep water. Stations 2 and 11-15 formed a homogeneous calibration group. Station 95 required an independent fit to its corresponding water sample data. The stations which utilized CTD #8 subsequently required a manual adjustment to bring the CTD downcast salinity trace 0.002 psu fresher for consistency with surrounding casts made with CTD #9 and with the upcast water sample data.

Stations 2, 11-15:

$$C = .16271899\text{E-1} + (.99980617\text{E-3}) C_{\text{raw}} [1 + \alpha (T - T_0) + \beta (P - P_0)]$$

Station 95:

$$C = .11818043E-1 + (.99985533E-3) C_{\text{raw}} [1 + \alpha (T - T_0) + \beta (P - P_0)]$$

CTD #9 conductivity scaling coefficients were derived in essentially the same manner as those for CTD #8. As previously mentioned, a deep-water cubic pressure adjustment was made to the CTD #9 data. In addition, the cell contraction coefficient,  $\beta$ , was set to zero in order to describe the subtle uncharacteristic properties of the CTD #9 conductivity cell. Three calibration groups were identified in the CTD #9 data set; the resulting algorithms that were applied are:

Stations 1-10:

$$C = .12371505E-1 + (.99949753E-3) C_{\text{raw}} [1 + (T - T_0)]$$

Stations 16-80:

$$C = .88715050E-2 + (.99949753E-3) C_{\text{raw}} [1 + \alpha (T - T_0)]$$

Stations 81-109:

$$C = .61719213E-2 + (.99968088E-3) C_{\text{raw}} [1 + \alpha(T - T_0)]$$

Uncertainty in the final CTD salinity data may be measured by differences between CTD and water sample salinity data. Absolute CTD salinity accuracy of course hinges on the accuracy of the water sample data which in turn is tied to the Wormley standard water. Two measures of CTD/water-sample consistency were prepared (Figures 6, 7). The time series plot of salinity differences as a function of station number shows the final data to be uniformly calibrated. The histogram of the salinity differences for the data below 2000 decibars is essentially Gaussian with a mean of 0.0003; the standard deviation of the population of 645 points is 0.0085 psu.

#### Oxygen:

Coefficients in the CTD oxygen sensor calibration algorithm were derived from *in situ* water sample oxygen data according to Owens and Millard (1985). The algorithm is:

$$\text{Oxm} = \left[ \alpha \left( \text{Oc} + \beta \left( \frac{d\text{Oc}}{dt} \right) \right) + C \right] \text{Oxsat}(T,S) e^{D [T + E (T_0 - T)] + F P}$$



where,

O<sub>c</sub> is the oxygen current measurement;  
P & T are CTD pressure (dbar) and temperature (°C);  
T<sub>o</sub> is the oxygen sensor temperature (°C);  
S is salinity computed on the 1978 practical salinity scale;  
 $\alpha$  is the oxygen current slope adjustment,  
 $\beta$  is the oxygen sensor lag in seconds; and  
C is the oxygen current bias adjustment.

Parameters D, E, F appearing in the exponential represent adjustments for the permeability of the teflon membrane of the oxygen cell with temperature and pressure. Oxsat(T,S) is the oxygen saturation value as calculated by Weiss (1970).

Stations were first subdivided into groups which appeared to have homogeneous calibration characteristics. A multiple regression technique was then used to define the coefficients. Note that the regression is between downcast CTD oxygen sensor data and water sample observations obtained on the upcast. (This is because erroneous CTD oxygen data are obtained when the underwater package is stopped to close a rosette bottle. As well, the oxygen sensor typically exhibits excessive up-down hysteresis.) Oxygen sensor characteristics changed markedly in time on the trans-Indian cruise. Regression groups were typically small, and frequently consisted of single stations. We have no explanation for the lack of sensor stability. Table 4 details the algorithm coefficients used to generate the final data.

As was the case for the salinity data, a measure of CTD-derived oxygen data uncertainty is given by comparison with the water sample data (Figures 7, 8), but the absolute accuracy depends directly on the water sample accuracy. The population of oxygen difference data below 2000 decibars (678 points) has a standard deviation of 0.037 ml/l with a mean of 0.008 ml/l.

### **Acoustic Doppler Current Profiler Measurements**

Upper ocean velocity profile data from the hull mounted ADCP instrument were vector averaged in 10-minute blocks and archived to floppy disk with the standard RDI software package. A default configuration of 8-m ping length and 8-m bin length was specified, with a ping rate of 1 Hz. As noted above, ship navigation data were recorded on a separate computer. Post-cruise processing of the data initially involved merging these data using time as the common denominator. This entailed correction for a linear drift of 24 seconds/day in the ADCP system time data. The other major correction applied to the data involved determination of the ADCP transducer orientation relative to the ship's gyro. Reciprocal runs of 30-45-minute duration were carried out midway through

the cruise. A study of the resulting data indicates that a transducer rotation angle of  $4.9^\circ$  is appropriate. Work is continuing to refine this estimate.

Representative summary plots of the relative ADCP measurements are given in Figures 9a–d. The top panels in each case denote with bold line the ship position corresponding to each subset of the data shown. The 10-minute average east and north relative velocity profiles are displayed in “waterfall” format in the middle panels. The bottom panels present the time series of depth-averaged relative velocity (east is the bold curve). As is apparent from the figures, the ADCP velocity profiles are characterized by structures with short vertical scales, having small horizontal scale. Table 5 presents estimates of the ADCP-derived absolute across-track velocity averaged horizontally between CTD stations, and in the vertical between 100 and 200 m. For comparison, the table also shows the differences between the ADCP data and the geostrophic velocity relative to 1500 db averaged over the same vertical interval. There is qualitative agreement between ADCP and geostrophic velocities; mean and standard deviation of the difference between them are  $1.729 \text{ E-2 m/s}$  and  $8.035 \text{ E-2 m/s}$ , respectively. Understanding the sources of these differences is an ongoing research topic.

### Summary Presentations of the Final Data Set

As noted in the introduction, the bathymetry of the South Indian Ocean is quite complex. To a large degree, the water property characteristics on the RRS *Darwin* trans-Indian section reflect the underlying bathymetry; significant property differences are seen from basin to basin. As a means of summarizing the observations, potential temperature–property diagrams were constructed from selected stations in each of the major basins sampled on the cruise (Figures 10–21).

Six property *vs.* depth sections (Figures 22–27) of the trans-Indian Ocean section were prepared. Vertical distortion of the full-depth profiles is 500 : 1, while the expanded shallow sections have a vertical distortion of 1250 : 1. The continuous bottom topography shown on these profiles is based on depth recordings made approximately every 20 minutes when the ship was underway. Depths have been corrected for variations in the speed of sound in seawater (Carter, 1980). Profiles of potential temperature, salinity, and dissolved oxygen are based on the calibrated CTD data. The black dots on the  $\text{SiO}_2$ ,  $\text{PO}_4$  and  $\text{NO}_3$  profiles represent bottle positions. All isopleths are interpolated linearly between observations, and contoured by hand.

### Acknowledgments

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## Description of Tables

Table 1: RRS *Charles Darwin* Cruise #29 Shipboard Personnel.

Table 2: RRS *Charles Darwin* Cruise #29 CTD Station Summary Information.

Table 3: RRS *Charles Darwin* Cruise #29 XBT Station Summary Information.

Table 4: Parameters of the CTD Oxygen Algorithm Used to Calibrate RRS *Darwin* Cruise #29 CTD Oxygen Data.

$$\text{Oxm} = \left[ \alpha \left( \text{Oc} + \beta \left( \frac{d\text{Oc}}{dt} \right) \right) + C \right] \text{Oxsat}(T, S) e^{D [T + E (T_0 - T)] + F P}$$

where,  $\text{Oc}$  is the oxygen current measurement;  $P$  &  $T$  are CTD pressure (dbar) and temperature ( $^{\circ}\text{C}$ );  $T_0$  is the oxygen sensor temperature ( $^{\circ}\text{C}$ );  $S$  is salinity computed on the 1978 practical salinity scale;  $\alpha$  is the oxygen current slope adjustment,  $\beta$  is the oxygen sensor lag in seconds; and  $C$  is the oxygen current bias adjustment.

Table 5: RRS *Charles Darwin* Cruise #29 Average Along- and Across-Track ADCP Velocity Estimates. [Velocities are between 96 and 208 db as computed between consecutive station positions. The last column shows the difference between the actual (ADCP) and computed (geostrophic) velocities between station pairs.]



**Tables 1-5**





**Table 1: RRS *Charles Darwin* Cruise #29 Shipboard Personnel**

**Woods Hole Oceanographic Institution:**

Dr. J. Toole	Co-Principal Investigator
Dr. B. Warren	Co-Principal Investigator
A. Morton	WHOI CTD Group - Manager
J. Kinder	WHOI CTD Group - Hardware Technician
M. Francis	Software Technician - Data Processor
R. Stanley	Rosette Oxygen Analyst
G. Knapp	Rosette Salt Analyst
J. Zemba	Watchstander

**Oregon State University:**

J. Jennings	Rosette Nutrient Analyst
J. Johnson	Rosette Nutrient Analyst

**University of Miami:**

Dr. R. Fine	Co-Principal Investigator
K. Sullivan	Rosette CFC Analyst
L. Pope	Rosette CFC Analyst

**NERC/RVS:**

G. Miller	Instrumentation Technician
G. Knight	Computer System Manager
R. Griffiths	Mechanical Technician
K. Smith	Mechanical Technician

**Officers and Engineers:**

S. Mayl (Master)  
G. Harries  
S. Sykes  
G. Procter  
J. Baker  
D. Anderson  
A. Greenhorn  
W. Groody

**Crew:**

C. Woods  
A. Olds  
D. Buffery  
M. Metcalfe  
K. Peters  
P. Bishop  
J. McKeown  
A. Philp  
J. Coleman  
I. Gibb  
G. Pook  
P. Hough

Table 2: RRS *Charles Darwin* Cruise #29 CTD Station Summary Information

Stn	Cast	Day/Mo/Yr	St GMT	End GMT	Latitude	Longitude	P Max	Depth	CTD #
1-test	0	13/11/87	0625	0746	-31°35.07'	31°10.56'	3127	3107	9
2-test	0	13/11/87	1000	1100	-31°34.86'	31°09.55'	889	3071	8
2-test	1	13/11/87	1350	1420	-31°34.86'	31°09.55'	911	3071	8
2-test	2	13/11/87	1652	1723	-31°35.13'	31°08.09'	1505	3071	9
3	0	13/11/87	2035	2140	-31°22.54'	30°50.10'	2951	2931	9
4	0	14/11/87	0125	0230	-31°15.59'	30°39.30'	2935	2926	9
5	0	14/11/87	0546	0658	-31°12.09'	30°35.84'	2655	2675	9
6	0	14/11/87	0929	1025	-31°09.14'	30°32.08'	2247	2306	9
7	0	14/11/87	1219	1300	-31°06.12'	30°27.82'	1783	1739	9
8	0	14/11/87	1440	1508	-31°02.91'	30°24.17'	893	905	9
9	0	14/11/87	1637	1649	-31°02.95'	30°22.07'	247	290	9
10	0	14/11/87	1720	1729	-31°02.31'	30°21.21'	65	90	9
11-test	0	15/11/87	0332	0415	-30°18.46'	31°19.84'	1175	1178	8
12	0	16/11/87	0148	0303	-31°34.73'	31°09.67'	3107	3091	8
13	0	16/11/87	1138	1249	-31°56.62'	31°36.31'	3567	3535	8
14	0	16/11/87	1947	2122	-32°11.67'	32°30.13'	3581	3551	8
15	0	17/11/87	0442	0610	-32°32.75'	33°24.74'	3501	3491	8
16	0	17/11/87	1214	1310	-32°41.54'	34°10.30'	2461	2481	9
17	0	17/11/87	1849	1930	-32°53.96'	35°00.12'	1615	1593	9
18	0	17/11/87	2330	0008	-33°00.14'	35°35.04'	1469	1474	9
19	0	18/11/87	0340	0421	-32°59.37'	36°04.75'	2011	2006	9
20	0	18/11/87	0656	0750	-33°00.87'	36°20.65'	2603	2591	9
21	0	18/11/87	1029	1130	-33°00.69'	36°30.87'	3315	3304	9
22	0	18/11/87	1416	1551	-33°00.32'	36°40.49'	4755	4744	9
23	0	18/11/87	2033	2213	-32°59.65'	37°04.82'	5165	5108	9
24	0	19/11/87	0608	0742	-33°00.39'	37°59.97'	5127	5062	9
25	0	19/11/87	1802	1935	-32°59.42'	39°29.43'	5145	5092	9
26	0	20/11/87	0540	0714	-33°00.32'	41°00.34'	5097	5010	9
27	0	20/11/87	1752	1915	-32°59.71'	42°44.81'	4417	4352	9
28	0	20/11/87	2304	2350	-32°59.87'	43°02.46'	2337	2331	9
29	C	21/11/87	0420	0443	-32°59.95'	43°40.13'	909	906	9
30	0	21/11/87	0911	0933	-32°59.64'	44°29.41'	959	964	9
31	0	21/11/87	1815	1853	-33°12.41'	46°04.79'	2201	2196	9
32	0	21/11/87	2227	2321	-33°18.70'	46°30.25'	2673	2660	9
33	0	22/11/87	0302	0401	-33°22.78'	46°54.98'	3187	3147	9
34	0	22/11/87	0832	0940	-33°29.94'	47°26.84'	3629	3591	9
35	0	22/11/87	1538	1653	-33°33.66'	48°14.68'	4033	3976	9
36	0	23/11/87	0123	0245	-33°45.01'	49°30.39'	4397	4323	9
37	0	23/11/87	1135	1257	-33°59.75'	50°55.55'	4393	4336	9
38	0	23/11/87	2039	2206	-33°59.54'	52°10.57'	4587	4484	9
39	0	24/11/87	0249	0415	-33°59.91'	52°44.66'	4555	4444	9
40	0	24/11/87	0904	1032	-34°00.42'	53°10.22'	4687	4607	9
41	0	24/11/87	1522	1649	-34°00.45'	53°36.86'	4613	4586	9
42	0	24/11/87	2148	2309	-34°00.73'	54°07.11'	4455	4393	9
43	0	25/11/87	0919	1052	-33°59.46'	55°46.98'	4387	4291	9

Table 2 (Continued)

Stn	Cast	Day/Mo/Yr	St GMT	End GMT	Latitude	Longitude	P Max	Depth	CTD #
44	0	25/11/87	1945	2117	-33°58.35'	57°02.08'	5207	5129	9
45	0	26/11/87	0221	0401	-33°59.68'	57°29.09'	5433	5299	9
46	0	26/11/87	0953	1124	-33°59.93'	58°10.05'	5201	5093	9
47	0	26/11/87	1725	1842	-33°59.73'	58°53.63'	4011	3905	9
48	0	27/11/87	0218	0357	-33°59.61'	59°56.99'	5207	5150	9
49	0	27/11/87	0940	1124	-33°59.67'	60°34.15'	5447	5346	9
50	0	27/11/87	2102	2248	-33°59.37'	61°59.67'	5195	5125	9
51	0	28/11/87	1024	1146	-33°59.53'	63°59.93'	4755	4649	9
52	0	28/11/87	2340	0100	-33°59.81'	66°00.21'	4587	4582	9
53	0	29/11/87	1200	1321	-34°00.14'	67°59.86'	4619	4547	9
54	0	30/11/87	0120	0242	-33°59.95'	70°00.33'	4397	4302	9
55	0	30/11/87	1435	1606	-34°00.10'	71°59.84'	5063	4987	9
56	0	01/12/87	0133	0250	-33°19.52'	73°20.15'	4133	4109	9
57	0	01/12/87	1224	1330	-32°40.09'	74°39.66'	3789	3678	9
58	0	01/12/87	2354	0055	-31°59.89'	76°00.09'	3419	3380	9
59	0	02/12/87	0826	0923	-31°30.03'	76°59.91'	3033	2962	9
60	0	02/12/87	1510	1609	-31°07.67'	77°44.36'	3073	3003	9
61	0	02/12/87	2212	2313	-30°45.01'	78°29.81'	3557	3471	9
62	0	03/12/87	0522	0631	-30°22.43'	79°15.32'	3795	3739	9
63	0	03/12/87	1241	1345	-30°00.44'	80°00.14'	3565	3476	9
64	0	03/12/87	2125	2242	-29°30.23'	80°59.51'	4219	4129	9
65	0	04/12/87	0633	0739	-29°00.23'	82°00.09'	4173	4124	9
66	0	04/12/87	1816	1932	-29°09.41'	83°29.55'	4447	4368	9
67	0	05/12/87	0500	0613	-29°19.23'	84°59.44'	3993	3885	9
68	0	05/12/87	1315	1437	-29°27.94'	85°58.69'	4527	4470	9
69	0	05/12/87	2205	2311	-29°32.16'	86°55.20'	3587	3562	9
70	0	06/12/87	0540	0609	-29°39.75'	87°50.08'	1355	1228	9
71	0	06/12/87	1030	1107	-29°49.81'	88°34.84'	1843	1844	9
72	0	06/12/87	1649	1731	-30°04.66'	89°29.86'	2283	2282	9
73	0	07/12/87	0011	0046	-30°20.00'	90°30.30'	1663	1670	9
74	0	07/12/87	0825	0902	-30°40.05'	91°49.63'	1935	1928	9
75	0	07/12/87	1720	1746	-30°50.29'	93°24.64'	1237	1248	9
76	0	08/12/87	0101	0131	-31°10.82'	94°26.11'	1559	1571	9
77	0	08/12/87	0731	0755	-31°33.96'	95°27.31'	1213	1223	9
78	0	08/12/87	1401	1429	-31°59.70'	96°29.67'	1293	1305	9
79	0	08/12/87	2136	2210	-32°00.06'	97°44.79'	1619	1617	9
80	0	09/12/87	0451	0535	-31°59.88'	99°00.12'	2105	2089	9
81	0	09/12/87	1102	1147	-31°59.61'	99°58.56'	2423	2407	9
82	0	09/12/87	1822	1906	-31°59.94'	100°59.48'	2235	2228	9
83	0	10/12/87	0036	0128	-32°14.54'	101°49.73'	2873	2842	9
84	0	10/12/87	0429	0538	-32°20.11'	102°00.03'	3785	3740	9
85	0	10/12/87	0953	1105	-32°24.90'	102°29.69'	4069	4014	9
86	0	10/12/87	1356	1520	-32°29.73'	102°39.41'	4633	4544	9
87	0	10/12/87	1917	2045	-32°35.90'	102°59.45'	4855	4779	9
88	0	11/12/87	0109	0248	-32°44.88'	103°24.00'	5341	5261	9
89	0	11/12/87	0824	1003	-32°54.91'	103°59.00'	5559	5467	9

Table 2 (Continued)

Stn	Cast	Day/Mo/Yr	St GMT	End GMT	Latitude	Longitude	P Max	Depth	CTD #
90	0	11/12/87	1519	1658	-33°05.54'	104°30.27'	5535	5508	9
91	0	11/12/87	2207	2353	-33°14.90'	105°00.14'	6053	5927	9
92	0	12/12/87	0646	0826	-33°26.35'	105°44.89'	5417	5415	9
93	0	12/12/87	1524	1717	-33°39.61'	106°29.47'	5607	5514	9
94	0	13/12/87	0013	0204	-33°53.66'	107°13.45'	5385	5302	9
95	0	13/12/87	0846	0958	-34°09.78'	107°59.77'	5065	4984	8
96	0	13/12/87	1514	1701	-34°09.85'	108°34.38'	5545	5452	9
97	0	13/12/87	2226	0014	-34°10.00'	109°09.05'	5145	5014	9
98	0	14/12/87	0514	0620	-34°09.89'	109°42.30'	3303	3260	9
99	0	14/12/87	0920	1018	-34°09.92'	110°00.08'	2589	2572	9
100	0	14/12/87	1647	1736	-34°09.80'	110°59.81'	2123	2123	9
101	0	15/12/87	0012	0109	-34°09.66'	112°09.72'	2635	2627	9
102	0	15/12/87	1201	1259	-34°09.26'	113°29.39'	3041	3023	9
103	0	15/12/87	1613	1709	-34°10.10'	113°43.81'	2223	2208	9
104	0	15/12/87	1945	2023	-34°10.06'	113°59.84'	1503	1508	9
105	0	15/12/87	2240	2307	-34°10.93'	114°14.53'	1069	1078	9
106	0	16/12/87	0049	0111	-34°10.22'	114°24.64'	685	700	9
107	0	16/12/87	0220	0226	-34°09.71'	114°30.26'	141	160	9
108	0	16/12/87	0353	0358	-34°10.27'	114°44.85'	111	130	9
109	0	16/12/87	0438	0440	-34°09.52'	114°49.64'	41	55	9

Table 3: RRS *Charles Darwin* Cruise #29 XBT Station Summary Information

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surftemp (°C)	Surfsalt (psu)	Comment
7-2A	320	0753	31°46.89'	31°07.69'	20.9	---	
7-3A	320	0855	31°48.76'	31°11.58'	21.0	---	
7-4A	320	0953	31°51.14'	31°20.71'	21.0	---	
7-5A	320	1052	31°53.46'	31°29.22'	20.9	---	
7-6A	320	1546	32°59.00'	31°41.80'	20.8	---	
7-7A	320	1655	32°03.98'	31°53.61'	20.7	---	
7-8A	320	1749	32°07.13'	32°05.98'	20.7	---	
7-9A	320	1846	32°09.50'	32°17.70'	20.7	---	
7-10A	320	2351	32°13.71'	32°36.47'	20.5	---	
7-11A	321	0045	32°17.81'	32°46.22'	20.3	---	
7-12A	321	0146	32°23.32'	32°55.55'	20.1	---	no good
7-13A	321	0215	32°24.45'	33°00.00'	20.0	---	redo
7-14A	321	0316	32°28.42'	33°10.30'	20.0	---	no good
7-15A	321	0336	32°30.18'	33°13.54'	20.1	---	redo
7-16A	321	0909	32°36.43'	33°36.19'	19.9	---	
7-17A	321	1004	32°39.01'	33°45.57'	19.9	---	no good
7-18A	321	1005	32°39.01'	33°45.57'	19.9	---	redo
7-19A	321	1108	32°40.96'	33°57.75'	20.1	---	
7-20A	321	1510	32°43.61'	34°17.76'	20.2	---	
7-21A	321	1530	32°45.18'	34°21.30'	20.3	---	
7-22A	321	1629	32°49.36'	34°32.30'	20.2	---	
7-23A	321	1727	32°52.30'	34°43.24'	20.1	---	
7-24A	321	1815	32°54.57'	34°54.04'	20.1	---	
7-25A	321	2133	32°56.37'	35°14.16'	20.1	---	
7-26A	321	2230	32°58.48'	35°25.60'	19.3	---	
7-27A	322	0204	33°00.00'	35°48.48'	19.7	---	no good
7-28A	322	0216	33°00.00'	35°51.00'	19.7	---	redo
7-29A	322	1132	33°00.87'	36°32.91'	19.9	---	
7-30A	322	1930	32°59.42'	36°52.96'	19.2	---	
7-31A	323	0138	33°00.06'	37°12.24'	19.0	---	
7-32A	323	0244	33°01.18'	37°24.12'	18.9	---	
7-33A	323	0343	33°00.48'	37°34.18'	19.0	---	
7-34A	323	0442	33°00.42'	37°45.36'	19.0	---	
7-35A	323	1122	32°59.83'	38°07.79'	19.1	35.76	
7-36A	323	1227	33°02.98'	38°20.91'	19.8	35.62	
7-37A	323	1330	33°02.42'	38°33.48'	19.3	35.72	
7-38A	323	1429	33°03.00'	38°47.48'	18.9	35.74	
7-39A	323	1529	33°02.54'	39°00.48'	18.9	35.62	
7-39B	323	1630	33°01.60'	39°12.90'	19.1	---	
7-40A	323	2330	32°59.56'	39°45.02'	19.1	35.71	
7-41A	324	0024	33°00.89'	39°56.27'	19.0	35.71	
7-42A	324	0129	33°00.54'	40°10.30'	18.8	35.74	no good
7-43A	324	0140	33°00.48'	40°12.54'	18.7	35.74	redo
7-44A	324	0244	33°00.24'	40°27.12'	18.8	35.74	
7-45A	324	0344	32°59.54'	40°40.12'	18.8	35.74	

Table 3 (Continued)

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surftemp (°C)	Surfsalt (psu)	Comment
7-46A	324	0445	33°00.06'	40°53.12'	18.7	35.74	
7-47A	324	1026	33°00.11'	41°10.10'	19.3	35.70	
7-48A	324	1128	33°00 08'	41°22.70'	18.9	35.70	
7-48B	324	1128	33°00.08'	41°22.70'	18.9	35.70	
7-49A	324	1337	33°02.40'	41°52.30'	20.7	---	
7-50A	324	1429	33°02.70'	42°03.20'	19.6	---	
7-51A	324	1606	33°01.54'	42°24.06'	20.7	---	
7-52A	324	1619	33°01.48'	42°27.06'	20.9	---	
7-53A	324	1720	33°00.28'	42°39.49'	19.9	---	
7-54A	324	2200	33°00.16'	42°51.67'	20.7	35.59	
7-55A	325	0214	32°59.85'	43°17.27'	19.2	35.65	
7-56A	325	0319	32°59.48'	43°30.36'	19.2	35.62	
7-57A	325	0614	33°00.38'	43°50.29'	19.1	35.62	
7-58A	325	0715	32°59.04'	44°06.50'	19.9	---	
7-59A	325	0815	32°59.30'	44°20.39'	19.7	---	
7-60A	325	1131	33°00.73'	44°45.69'	19.7	35.66	
7-60B	325	On data tape, but not listed in station log with all information					
7-61A	325	1306	33°04.73'	45°04.00'	18.9	35.63	
7-62A	325	1410	33°08.37'	45°16.34'	18.8	35.62	
7-63A	325	1526	33°11.00'	45°30.54'	18.7	35.64	
7-64A	325	1546	33°11.28'	45°34.48'	19.2	35.63	
7-65A	325	1648	33°12.70'	45°48.50'	18.8	---	
7-66A	325	2100	33°14.88'	46°14.98'	19.3	35.57	
7-66B	325	2100	33°14.88'	46°14.98'	19.3	35.57	
7-67B	326	0721	33°25.36'	47°13.12'	19.4	---	no good
7-68A	326	0751	33°26.36'	47°18.36'	19.3	---	
7-69A	326	1220	33°30.30'	47°36.70'	19.2	---	
7-70A	326	1258	33°30.54'	47°44.18'	20.0	---	
7-71A	326	1328	33°33.55'	47°51.15'	20.0	---	
7-72A	326	1349	33°33.54'	47°54.30'	---	---	
7-73A	326	1448	33°33.60'	47°06.20'	---	---	
7-74A	326	1952	33°37.66'	48°26.11'	---	---	
7-75A	326	2056	33°38.67'	48°37.86'	19.3	35.55	
7-76A	326	2202	33°40.33'	48°51.08'	19.3	35.56	
7-77A	326	2303	33°41.58'	49°04.10'	19.3	35.57	
7-78A	327	0003	33°43.00'	49°16.06'	19.6	35.62	
7-79A	327	0558	33°47.50'	49°43.16'	20.3	---	
7-80A	327	0700	33°49.64'	50°56.18'	20.2	---	
7-81A	327	0857	33°56.62'	50°22.41'	20.6	35.75	
7-82A	327	1002	33°57.04'	50°37.36'	20.1	35.76	
7-83A	327	1055	33°58.18'	50°48.64'	20.7	35.77	
7-84A	327	1600	33°59.19'	51°09.09'	21.5	---	
7-85A	327	1700	34°00.48'	51°29.91'	21.1	---	
7-86A	327	1800	34°01.30'	51°37.19'	20.8	---	
7-87A	327	1900	34°01.01'	51°50.85'	20.0	---	

Table 3 (Continued)

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surftemp (°C)	Surfsalt (psu)	Comment
7-88A	328	0058	33°59.12'	52°21.54'	20.1	35.78	
7-89A	328	0204	34°00.06'	52°35.54'	20.0	35.76	
7-90A	328	0701	33°59.32'	52°51.57'	20.2	- - -	
7-91A	328	1340	33°59.44'	53°21.54'	20.1	35.75	
7-92A	328	2003	34°00.69'	53°52.09'	19.5	35.74	
7-93A	328	2100	34°01.27'	54°03.69'	20.0	35.74	
7-94A	329	0223	34°01.30'	54°18.54'	20.2	35.75	
7-95A	329	0322	34°00.54'	54°29.24'	19.7	35.74	
7-96A	329	0430	34°00.95'	54°46.50'	19.5	35.77	
7-97A	329	0530	34°01.00'	54°59.00'	19.1	35.72	
7-80B	329	0631	34°01.35'	55°11.58'	18.9	35.73	
7-81B	329	0802	34°01.32'	55°31.76'	20.0	35.77	
7-98A	329	1517	33°59.59'	55°59.77'	- - -	- - -	
7-99A	329	1615	33°59.95'	56°11.91'	19.2	35.73	
7-100A	329	1715	33°59.65'	56°26.34'	19.1	35.77	
7-101A	329	1815	34°00.62'	56°35.49'	19.5	35.71	
7-102A	329	1915	34°01.02'	56°52.50'	18.7	35.70	
7-103A	330	0029	34°00.24'	57°07.12'	18.7	35.69	
7-104A	330	0128	34°00.24'	57°19.18'	18.3	35.69	
7-105A	330	0730	34°00.68'	57°40.17'	19.0	35.72	
7-106A	330	0830	34°00.07'	57°53.21'	19.0	35.72	
7-107A	330	1439	33°59.42'	58°19.54'	18.8	35.65	no good
7-109A	330	1506	33°59.10'	58°25.20'	18.7	- - -	redo
7-115A	331	1015	34°00.00'	60°34.00'	- - -	- - -	no good
7-118A	331	1653	33°59.60'	61°11.00'	18.9	35.64	
7-120A	331	1943	34°00.83'	61°45.37'	19.1	35.62	
7-121A	331	2000	34°00.87'	61°48.50'	19.2	35.64	
7-122A	332	0158	33°59.54'	62°11.00'	18.9	35.60	
7-124A	332	0428	34°00.12'	62°40.42'	19.1	35.65	
7-127A	332	0656	34°01.06'	63°14.34'	19.3	35.67	
7-128A	332	0754	34°01.09'	63°28.02'	19.3	35.68	
7-129A	332	0856	34°00.36'	63°41.97'	19.4	35.65	
7-130A	332	1500	33°58.72'	64°13.82'	19.5	35.77	
7-131A	332	1600	34°00.29'	64°27.39'	19.2	35.66	
7-132A	332	1700	34°00.74'	64°39.37'	19.1	35.68	
7-133A	332	1800	34°02.09'	64°52.44'	19.2	35.67	
7-134A	332	1922	34°02.39'	65°08.87'	18.8	35.64	
7-135A	332	2013	34°01.18'	65°19.55'	18.9	35.62	
7-136A	332	2111	34°00.07'	65°30.89'	19.3	35.72	
7-137A	332	2200	33°59.96'	65°41.03'	19.6	35.83	
7-138A	333	0358	34°00.90'	66°10.33'	19.0	35.75	
7-139A	333	0500	34°00.75'	66°22.29'	18.9	35.75	
7-140A	333	0600	34°01.01'	66°36.47'	18.9	35.75	
7-141A	333	0704	34°00.64'	66°51.21'	19.1	35.75	
7-142A	333	0800	34°00.96'	67°05.38'	19.3	35.78	

Table 3 (Continued)

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surf temp (°C)	Surfsalt (psu)	Comment
7-143A	333	0858	34°00.61'	67°18.82'	19.4	35.80	
7-144A	333	0959	34°00.24'	67°32.82'	19.8	35.84	
7-145A	333	1101	33°59.36'	67°47.18'	19.8	35.84	
7-146A	333	1631	33°58.64'	68°11.92'	19.1	35.73	
7-147A	333	1730	33°59.94'	68°24.50'	19.1	35.73	
7-148A	333	1828	34°00.23'	68°36.71'	18.3	35.66	
7-149B	333	1925	34°00.27'	68°48.91'	18.3	35.65	redo
7-150A	333	2028	34°00.00'	69°02.41'	18.2	35.61	
7-151A	333	2126	33°59.99'	69°14.48'	18.1	35.59	
7-152A	333	2226	33°59.77'	69°25.87'	18.1	35.60	
7-153A	333	2322	33°59.24'	69°37.42'	18.6	35.68	
7-154A	334	0027	34°00.06'	69°51.00'	19.0	35.78	
7-155A	334	0529	34°00.65'	70°11.15'	18.9	35.78	
7-156A	334	0630	34°00.06'	70°22.55'	18.8	35.78	
7-157A	334	0727	34°00.42'	70°34.67'	18.4	35.73	
7-158A	334	0828	34°00.43'	70°46.91'	17.9	35.54	
7-159A	334	0923	34°00.42'	70°58.29'	17.7	35.55	
7-160A	334	1021	34°00.07'	71°08.94'	17.9	35.58	
7-161A	334	1130	34°00.06'	71°22.42'	17.7	35.54	
7-163A	334	1243	34°00.50'	71°37.20'	17.9	34.44	
7-164A	334	1331	34°00.18'	71°47.24'	17.8	35.48	
7-165A	334	1923	33°55.03'	72°11.04'	17.9	35.51	
7-166A	334	2022	33°49.53'	72°21.30'	18.0	35.55	
7-167A	334	2121	33°46.80'	72°36.55'	18.5	35.85	
7-168A	334	2222	33°40.65'	72°47.42'	18.5	35.89	
7-169A	334	2330	33°33.20'	72°58.10'	18.3	35.88	
7-170A	335	0031	33°25.48'	73°09.18'	18.4	35.86	
7-171A	335	0530	33°15.71'	73°28.18'	18.6	35.92	
7-172A	335	0630	33°10.29'	73°38.14'	18.6	35.92	
7-173A	335	0721	33°05.50'	73°50.79'	18.4	35.70	
7-174A	335	0823	32°59.38'	74°02.73'	18.8	35.74	
7-175A	335	0921	32°54.10'	74°12.72'	19.1	35.83	
7-176A	335	1022	32°48.21'	74°23.69'	19.3	35.96	
7-177A	335	1121	32°45.24'	74°31.30'	19.2	35.97	
7-178A	335	1630	32°36.08'	74°51.11'	19.1	35.99	
7-179A	335	1730	32°31.21'	75°00.12'	19.3	35.98	
7-180A	335	1831	32°26.07'	75°09.35'	19.3	35.98	
7-181A	335	1922	32°22.03'	75°16.53'	19.3	35.97	
7-182A	335	2021	32°16.93'	75°24.87'	19.2	35.95	
7-183A	335	2123	32°11.89'	75°37.87'	18.9	35.94	
7-184A	335	2223	32°06.92'	75°47.38'	19.3	35.98	
7-185A	336	0330	31°55.73'	76°07.76'	18.8	35.95	
7-186A	336	0430	31°51.78'	76°20.56'	18.9	35.97	
7-187A	336	0530	31°46.43'	76°31.79'	19.0	35.97	
7-188A	336	0630	31°40.80'	76°41.72'	19.8	35.96	



Table 3 (Continued)

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surftemp (°C)	Surfsalt (psu)	Comment
7-189A	336	0722	31°35.80'	76°51.29'	18.7	35.82	
7-190A	336	1147	31°25.48'	77°07.18'	19.3	35.99	
7-191A	336	1243	31°21.42'	77°19.48'	19.6	36.04	
7-192A	336	1358	31°14.54'	77°31.18'	19.0	36.03	
7-193A	336	1455	31°08.29'	77°42.30'	19.7	35.99	
7-194A	336	1825	31°03.82'	77°53.01'	20.1	36.00	no record
7-194B	336	1922	30°59.36'	78°03.71'	20.0	36.00	
7-195A	336	2028	30°53.63'	78°14.04'	19.4	36.02	
7-196A	336	2122	30°48.36'	78°23.27'	19.3	36.03	
7-197A	337	0144	30°40.42'	78°37.06'	19.4	36.01	
7-198A	337	0245	30°35.83'	78°48.51'	19.1	36.01	
7-199A	337	0345	30°30.41'	78°58.89'	19.2	36.01	
7-200A	337	0446	30°24.89'	79°10.84'	18.9	35.82	
7-201A	337	0825	30°21.59'	79°16.78'	19.7	35.93	
7-202A	337	0926	30°17.15'	79°27.45'	20.3	35.99	
7-203A	337	1030	30°11.06'	79°37.24'	20.2	35.99	
7-207A	337	1130	30°06.50'	79°49.20'	20.1	35.72	
7-208A	337	1237	30°00.24'	79°59.18'	20.1	35.99	
7-209A	337	1600	29°57.78'	80°04.74'	20.0	36.00	
7-210A	337	1700	29°52.86'	80°16.06'	19.9	36.00	
7-211A	337	1759	29°48.38'	80°25.06'	19.8	36.02	
7-212A	337	1856	29°43.67'	80°36.08'	19.7	36.02	
7-213A	337	1958	29°38.42'	80°45.89'	19.6	36.07	
7-214A	337	2059	29°30.84'	80°56.30'	19.8	36.01	
7-215A	338	0144	29°25.06'	81°07.30'	19.0	35.94	
7-216A	338	0245	29°20.39'	81°19.49'	18.9	35.84	
7-217A	338	0347	29°15.34'	81°29.71'	19.5	35.93	
7-218A	338	0445	29°09.12'	81°42.93'	19.6	35.97	
7-219A	338	0545	29°03.74'	81°54.20'	19.8	35.89	
7-220A	338	0930	28°59.10'	82°02.13'	21.0	35.97	
7-221A	338	1049	29°01.48'	82°18.48'	21.2	35.89	
7-222A	338	1147	29°05.00'	82°29.36'	21.0	35.92	
7-223A	338	1245	29°07.00'	82°40.42'	21.2	35.89	
7-224A	338	1349	29°08.56'	82°53.77'	21.6	35.81	
7-225A	338	1445	29°09.32'	83°05.14'	21.8	35.83	
7-226A	338	1545	29°10.25'	83°18.76'	22.0	35.78	
7-227A	338	2220	29°10.94'	83°38.46'	21.2	35.85	
7-228A	338	2322	29°13.06'	83°51.06'	21.2	35.82	
7-229A	339	0022	29°14.42'	84°03.30'	21.6	35.82	
7-230A	339	0122	29°16.00'	84°15.00'	21.6	35.79	
7-231A	339	0230	29°17.62'	84°30.41'	21.4	35.81	
7-232A	339	0330	29°19.18'	84°42.66'	21.4	35.95	
7-233A	339	0900	29°20.95'	85°08.73'	22.0	36.01	
7-234A	339	1101	29°26.24'	85°33.42'	22.4	36.07	
7-235A	339	1217	29°27.48'	85°49.12'	22.5	35.97	

Table 3 (Continued)

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surftemp (°C)	Surfsalt (psu)	Comment
7-236A	339	1731	29°27.94'	86°07.15'	21.5	36.03	
7-237A	339	1827	29°28.70'	86°17.57'	21.4	36.03	
7-238A	339	1928	29°29.60'	86°28.83'	21.5	36.04	
7-239A	339	2022	29°33.29'	86°39.60'	21.7	36.03	
7-240A	339	2128	29°33.57'	86°50.11'	21.5	36.01	
7-241A	340	0205	29°35.34'	87°07.03'	21.3	36.00	
7-242A	340	0300	29°36.79'	87°17.98'	21.3	35.94	
7-243A	340	0400	29°38.99'	87°31.13'	21.6	35.95	
7-244A	340	0500	29°39.87'	87°43.53'	21.6	36.00	
7-245A	340	0721	29°42.75'	87°55.26'	21.7	36.99	
7-246A	340	0825	29°45.45'	88°10.15'	21.5	36.00	
7-247A	340	0926	29°47.96'	88°22.93'	22.0	36.00	
7-248A	340	1316	29°52.90'	88°50.60'	21.3	36.00	
7-249A	340	1415	29°56.30'	89°01.80'	21.3	37.02	
7-250A	340	1515	29°59.63'	89°12.80'	21.1	36.02	
7-251A	340	1615	30°03.44'	89°24.32'	21.1	36.01	
7-252A	340	1922	30°07.13'	89°38.07'	21.0	35.99	
7-253A	340	2030	30°10.98'	89°50.92'	20.5	35.96	
7-254A	340	2130	30°14.00'	90°00.68'	20.8	35.94	
7-255A	340	2231	30°16.12'	90°12.24'	20.6	36.01	
7-256A	340	2330	30°18.00'	90°23.18'	21.3	36.01	
7-257A	341	0230	30°22.16'	90°40.81'	21.1	36.04	
7-258A	341	0330	30°25.00'	90°53.39'	21.2	36.05	
7-259A	341	0430	30°28.81'	91°04.98'	21.4	36.03	
7-260A	341	0530	30°31.66'	91°16.84'	21.0	36.05	
7-261A	341	0622	30°34.55'	91°27.08'	20.5	35.94	
7-262A	341	0724	30°36.73'	91°40.28'	20.8	35.93	
7-263A	341	1110	30°42.30'	92°02.20'	20.8	---	
7-264A	341	1230	30°45.20'	92°19.10'	20.4	35.95	
7-265A	341	1332	30°46.12'	92°30.48'	20.3	35.98	
7-267A	341	1432	30°46.92'	92°41.91'	19.5	35.85	
7-268A	341	1530	30°48.21'	92°53.40'	19.5	35.85	
7-269A	341	1630	30°49.12'	92°05.56'	19.5	35.85	
7-270A	341	1930	30°54.09'	93°26.84'	19.6	35.95	
7-271A	341	2024	30°56.73'	93°37.21'	19.6	35.91	
7-272A	341	2126	30°59.51'	93°48.22'	19.3	35.92	
7-273A	341	2231	31°03.00'	93°59.12'	20.0	36.02	
7-274A	341	2331	31°06.10'	94°10.60'	20.0	36.03	
7-275A	342	0030	31°08.70'	94°21.10'	20.0	36.05	
7-276A	342	0330	31°18.48'	94°41.29'	19.4	35.89	
7-277A	342	0430	31°21.28'	94°51.93'	19.7	35.95	
7-278A	342	0523	31°25.53'	95°02.59'	19.7	35.95	
7-279A	342	0627	31°31.54'	95°15.51'	19.7	35.95	
7-280A	342	0930	31°38.48'	95°39.48'	19.5	35.99	
7-281A	342	1030	31°43.30'	95°52.20'	19.5	35.99	

Table 3 (Continued)

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surf temp (°C)	Surfsalt (psu)	Comment
7-282A	342	1129	31°47.36'	96°02.54'	18.9	35.66	
7-283A	342	1226	31°52.24'	96°12.30'	19.2	35.81	
7-284A	342	1330	31°58.11'	96°24.68'	19.1	35.82	
7-285A	342	1527	32°00.52'	96°33.29'	18.7	35.89	
7-286A	342	1629	32°00.27'	96°45.81'	19.1	35.65	
7-287A	342	1732	32°00.46'	96°57.93'	18.2	35.59	
7-288A	342	1824	32°00.19'	97°08.04'	18.3	35.61	
7-289A	342	1925	31°59.98'	97°19.80'	18.7	35.58	
7-290A	342	2025	32°01.03'	97°32.11'	19.3	35.82	
7-291A	343	0002	32°00.60'	97°55.80'	19.0	36.02	
7-292A	343	0115	32°00.45'	98°10.61'	19.2	36.05	
7-293A	343	0212	32°00.79'	98°24.35'	18.8	36.04	
7-294A	343	0330	32°00.51'	98°42.29'	19.2	36.05	
7-295A	343	0430	31°59.90'	98°56.01'	19.3	36.05	
7-296A	343	0730	32°00.10'	99°12.96'	19.1	36.07	
7-297A	343	0826	32°59.72'	99°25.55'	19.2	36.02	
7-298A	343	0929	32°00.00'	99°40.06'	19.4	36.02	
7-299A	343	1031	31°59.30'	99°53.60'	18.3	35.68	
7-300A	343	1330	31°59.77'	100°06.34'	17.9	35.65	
7-301A	343	1430	32°00.00'	100°18.21'	18.1	35.63	
7-302A	343	1530	32°01.19'	100°28.54'	18.5	35.84	
7-303A	343	1630	32°00.71'	100°40.19'	17.5	35.64	
7-304A	343	1726	32°00.89'	100°50.66'	17.8	35.50	
7-305A	343	2027	32°01.65'	101°02.73'	18.3	35.84	
7-306A	343	2132	32°05.00'	101°16.12'	18.2	35.90	
7-307A	343	2229	32°09.06'	101°25.48'	18.4	35.88	
7-308A	343	2330	32°12.30'	101°37.60'	18.0	35.74	no good
7-309A	344	0828	32°22.34'	102°14.04'	18.0	35.74	
7-310A	344	2400	32°39.66'	103°12.05'	17.6	35.75	
7-311A	345	0601	32°47.66'	103°34.13'	18.1	35.92	
7-312A	345	0655	32°50.67'	103°43.92'	17.9	35.91	
7-313A	345	1344	32°59.95'	104°13.47'	17.9	35.98	
7-314A	345	2013	33°09.12'	104°41.65'	18.3	35.93	
7-315A	345	2115	33°16.50'	104°52.00'	17.9	35.94	
7-316A	346	0330	33°18.00'	105°10.70'	18.0	35.91	
7-317A	346	0430	33°21.94'	105°22.08'	18.1	35.93	
7-318A	346	1210	33°28.84'	105°57.11'	19.3	36.01	
7-319A	346	1310	33°32.52'	106°07.10'	19.3	36.02	
7-320A	346	1410	33°36.49'	106°16.45'	19.1	36.01	
7-321B	346	2057	33°44.24'	106°40.18'	18.7	36.00	no good
7-322A	346	2129	33°46.30'	106°45.30'	18.7	36.00	due to bad
7-322B	346	2144	33°47.18'	106°47.54'	18.6	36.00	launcher
7-777A	346	---	---	---	---	---	test/cal stn 94
7-323A	347	0530	33°58.42'	107°26.95'	17.4	35.84	
7-324A	347	0628	34°02.38'	107°36.86'	17.4	35.84	

Table 3 (Continued)

XBT #	JDAY (1987)	Time (GMT)	Latitude (°S)	Longitude (°E)	Surf temp (°C)	Surfsalt (psu)	Comment
7-325A	347	0724	34°05.87'	107°47.10'	17.3	35.85	
7-326A	347	1310	34°10.00'	108°11.26'	17.1	35.83	
7-327A	347	1413	34°10.15'	108°23.05'	17.1	35.83	
7-328A	347	2023	34°10.18'	108°47.06'	17.2	35.79	
7-329A	347	2120	34°10.42'	108°58.06'	17.3	35.79	
7-330A	348	0340	34°10.50'	109°24.07'	17.3	35.80	
7-331A	348	0430	34°10.82'	109°35.23'	17.3	35.80	
7-332A	348	0845	34°09.48'	109°54.36'	17.4	35.79	
7-332B	348	1159	34°09.92'	110°05.43'	17.3	35.77	
7-333A	348	1258	34°10.58'	110°17.81'	17.2	35.77	
7-334A	348	1400	34°19.93'	110°27.84'	16.9	35.67	
7-335A	348	1500	34°11.00'	110°40.88'	16.8	35.70	
7-336A	348	1600	34°10.69'	110°51.98'	17.2	35.72	
7-337A	348	1923	34°09.80'	111°09.00'	18.0	35.89	
7-338A	348	2029	34°10.30'	111°23.42'	18.0	35.89	
7-339A	348	2129	34°10.30'	111°36.06'	18.0	35.89	
7-340A	348	2229	34°10.18'	111°48.42'	18.0	35.90	
7-341A	348	2330	34°10.00'	111°58.60'	18.0	35.89	
7-342A	349	0300	34°10.32'	112°19.33'	17.9	35.77	
7-343A	349	0405	34°10.79'	112°33.99'	17.9	35.85	
7-344A	349	0828	34°09.54'	112°47.48'	17.8	36.65	
7-345A	349	0930	34°09.80'	113°00.70'	---	---	
7-346A	349	1027	34°10.24'	113°12.54'	18.9	35.93	
7-347A	349	1129	34°10.10'	113°24.30'	18.9	35.93	

**Table 4:** Parameters of the CTD Oxygen Algorithm Used to Calibrate  
RRS *Charles Darwin* Cruise #29 CTD Oxygen Data

Stations	C	$\alpha$	D	E	F	$\beta$
1	0.163	0.532	0.1456E-03	-0.1107E-01	0.3594E+00	0.8115E+01
3-5	0.061	0.666	0.1581E-03	-0.2037E-01	0.1019E+01	0.8000E+01
6-7	0.007	0.767	0.1557E-03	-0.2738E-01	0.9145E+00	0.6274E+01
11-12	-0.020	0.798	0.1954E-03	-0.2367E-01	0.1943E+00	0.1780E+02
13-15	-0.003	0.795	0.1701E-03	-0.2317E-01	0.8059E+00	0.8016E+01
16-19	0.040	0.660	0.1887E-03	-0.2089E-01	0.5664E+00	0.3696E+01
20-22	0.024	0.744	0.1509E-03	-0.2653E-01	0.8161E+00	0.4182E+01
23-24	0.026	0.748	0.1455E-03	-0.2537E-01	0.1252E+01	0.8000E+01
25	0.009	0.801	0.1478E-03	-0.3024E-01	0.7307E+00	0.8000E+01
26	0.023	0.794	0.1390E-03	-0.2896E-01	0.8505E+00	0.7994E+01
27	0.049	0.725	0.1434E-03	-0.2417E-01	0.8776E+00	0.8000E+01
28-36	0.028	0.755	0.1462E-03	-0.2562E-01	0.9920E+00	0.4370E+01
37	0.108	0.648	0.1215E-03	-0.2436E-01	0.4646E+00	0.7990E+01
38	0.113	0.651	0.1227E-03	-0.2101E-01	0.5163E+00	0.7973E+01
39-42	0.038	0.747	0.1413E-03	-0.2674E-01	0.8302E+00	0.2819E+01
43-47	0.050	0.720	0.1400E-03	-0.2352E-01	0.1068E+01	0.4720E+00
48-55	0.036	0.748	0.1428E-03	-0.2513E-01	0.8710E+00	0.7999E+01
56	0.038	0.746	0.1427E-03	-0.2753E-01	0.7105E+00	0.7994E+01
57-58	0.053	0.719	0.1402E-03	-0.2225E-01	0.8985E+00	0.6000E+01
59-60	0.026	0.758	0.1525E-03	-0.2478E-01	0.9031E+00	0.8000E+01
61-64	0.037	0.739	0.1472E-03	-0.2357E-01	0.9310E+00	0.8005E+01
65-67	0.043	0.729	0.1457E-03	-0.2326E-01	0.7681E+00	0.8000E+01
68-69	0.046	0.725	0.1421E-03	-0.2223E-01	0.8972E+00	0.8000E+01
70-81	0.028	0.706	0.1784E-03	-0.2004E-01	0.7328E+00	0.8000E+01
82-83	0.036	0.711	0.1665E-03	-0.2107E-01	0.5484E+00	0.8000E+01
84-88	0.009	0.807	0.1471E-03	-0.2730E-01	0.8875E+00	0.8000E+01
89-91	0.029	0.777	0.1409E-03	-0.2612E-01	0.7450E+00	0.8001E+01
92-93	0.037	0.763	0.1394E-03	-0.2631E-01	0.7288E+00	0.7996E+01
95	-0.017	1.445	0.1000E-03	-0.2231E-01	0.7375E+00	0.8000E+01
96	0.049	0.757	0.1348E-03	-0.2692E-01	0.5672E+00	0.8000E+01
97-102	0.037	0.763	0.1394E-03	-0.2631E-01	0.7288E+00	0.7996E+01

**Table 5: RRS *Charles Darwin* Cruise #29 Average Along- and Across-Track ADCP Velocity Estimates**

Station Number		Along-Track Average ADCP Velocity m/s	Across-Track Average ADCP Velocity m/s	Across-Track ADCP-GEOST Velocity m/s
3	12	-0.220	-0.390	-0.096
4	3	-0.223	-0.649	0.031
5	4	-0.153	-0.731	-0.117
6	5	0.048	-0.890	0.327
7	6	-0.203	-1.040	0.315
8	7	-0.027	-0.917	0.398
9	8	-0.359	-0.289	0.086
12	13	0.031	-0.353	-0.087
13	14	0.067	-0.026	0.026
14	15	0.040	-0.072	-0.060
15	16	-0.112	-0.050	0.013
16	17	-0.030	0.092	0.048
17	18	0.054	0.128	0.046
18	19	0.111	0.026	-0.026
19	20	0.013	-0.035	0.001
20	21	-0.035	-0.032	0.083
21	22	-0.143	-0.088	0.124
22	23	-0.086	-0.040	0.136
23	24	-0.271	0.048	0.003
24	25	-0.167	-0.025	-0.046
25	26	-0.007	0.086	-0.039
26	27	0.106	-0.023	0.032
27	28	0.000	-0.058	0.262
28	29	0.039	-0.045	-0.096
29	30	0.112	0.112	0.063
30	31	-0.186	0.171	0.132
31	32	-0.089	0.040	0.006
32	33	-0.033	-0.030	-0.081
33	34	-0.062	0.074	0.051
34	35	-0.093	-0.023	-0.022
35	36	-0.065	-0.070	-0.008
36	37	0.067	-0.032	0.023
37	38	0.237	-0.008	0.010
38	39	0.204	-0.027	-0.074
39	40	0.345	0.047	0.036
40	41	0.181	-0.012	-0.057
41	42	0.224	0.015	0.031
42	43	0.055	0.023	0.016
43	44	-0.313	0.094	0.083
44	45	-0.059	-0.021	0.017
45	46	-0.003	-0.126	-0.033
46	47	-0.236	-0.114	-0.101
47	48	-0.342	0.003	-0.053

Table 5 (Continued)

Station Number		Along-Track Average ADCP Velocity m/s	Across-Track Average ADCP Velocity m/s	Across-Track ADCP-GEOST Velocity m/s
48	49	-0.152	0.105	-0.014
49	50	-0.041	-0.028	-0.052
50	51	0.031	-0.041	-0.038
51	52	-0.078	-0.108	-0.088
52	53	0.032	-0.014	-0.008
53	54	0.140	-0.003	-0.025
54	55	0.067	0.051	-0.024
55	56	0.027	0.055	0.048
56	57	0.038	-0.038	0.060
57	58	-0.059	0.000	0.003
58	59	0.019	0.095	0.059
59	60	0.013	0.081	0.013
60	61	0.071	0.017	0.034
61	62	0.083	0.030	-0.036
62	63	0.094	0.000	0.030
63	64	0.115	0.062	-0.001
64	65	0.067	0.042	0.030
65	66	0.040	-0.051	0.001
66	67	0.091	0.004	-0.017
67	68	0.015	0.123	-0.006
68	69	0.013	-0.082	0.066
69	70	0.108	-0.099	-0.097
70	71	0.305	0.029	-0.014
71	72	0.188	0.044	-0.057
72	73	0.218	-0.089	-0.033
73	74	0.103	0.023	-0.022
74	75	-0.065	-0.016	-0.003
75	76	0.017	-0.078	-0.040
76	77	0.071	-0.106	-0.010
77	78	-0.035	0.132	0.021
78	79	0.007	-0.074	-0.037
79	80	0.213	-0.074	0.026
80	81	0.360	0.175	-0.001
81	82	0.092	0.043	0.034
82	83	0.153	0.019	-0.019
83	84	-0.002	-0.044	0.048
84	85	0.020	-0.046	0.029
85	86	0.194	-0.023	-0.053
86	87	0.071	0.087	-0.017
87	88	0.067	0.075	0.034
88	89	0.057	0.031	0.028
89	90	0.022	0.037	0.005
90	91	0.018	-0.041	0.039

Table 5 (Continued)

Station Number		Along-Track Average ADCP Velocity m/s	Across-Track Average ADCP Velocity m/s	Across-Track ADCP-GEOST Velocity m/s
91	92	-0.097	0.101	0.037
92	93	-0.354	0.069	0.021
93	94	-0.129	-0.033	0.017
94	95	-0.179	-0.026	0.038
95	96	-0.076	0.079	0.038
96	97	0.106	0.020	0.057
97	98	0.245	0.069	0.011
98	99	0.121	0.068	0.055
99	100	0.102	0.147	0.062
100	101	0.328	0.078	-0.019
101	102	0.221	-0.015	0.024
102	103	-0.025	0.077	0.044
103	104	0.021	0.024	0.036
104	105	0.041	-0.094	0.026
105	106	0.055	-0.157	0.000



**Figures 1-27**



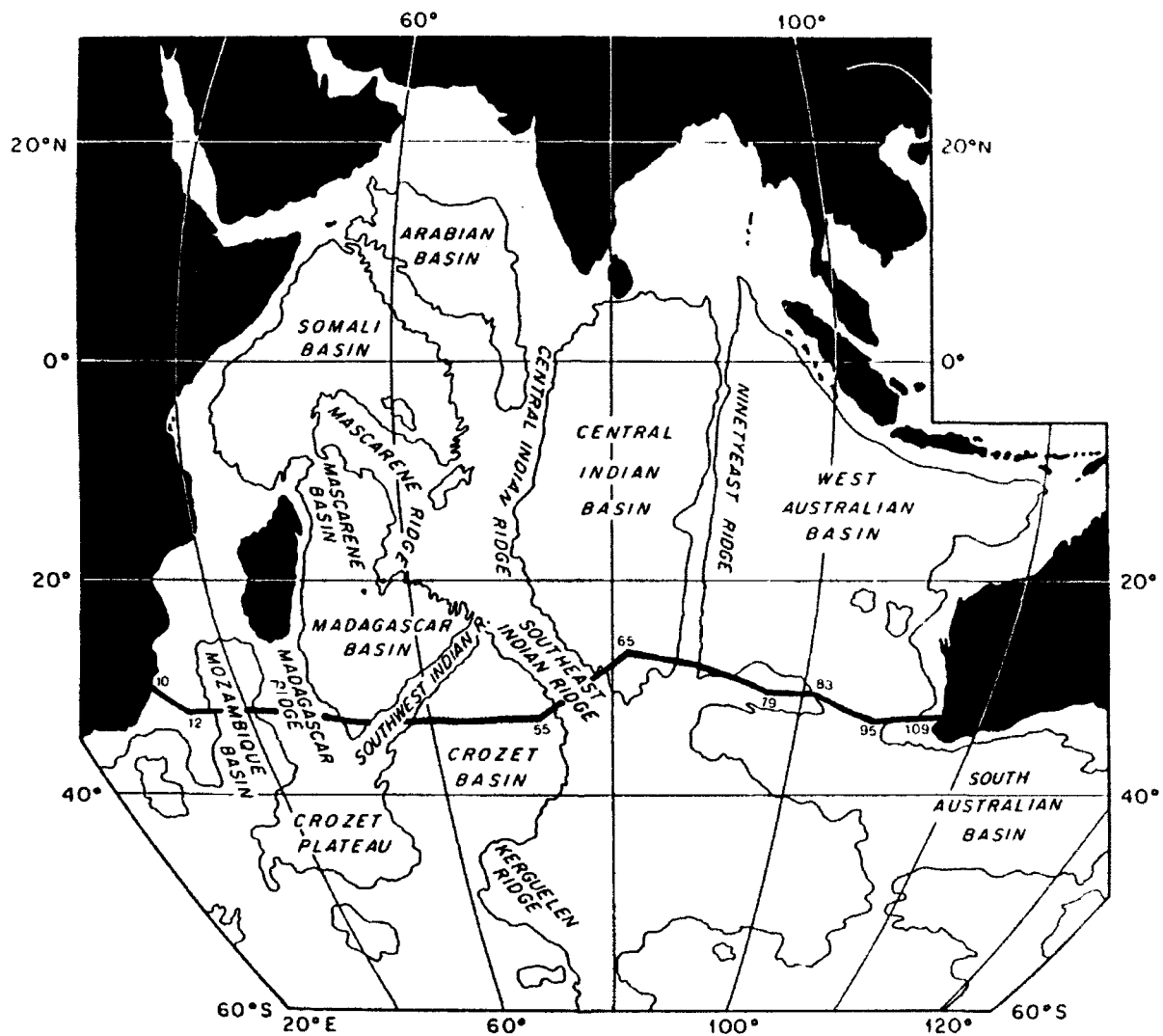
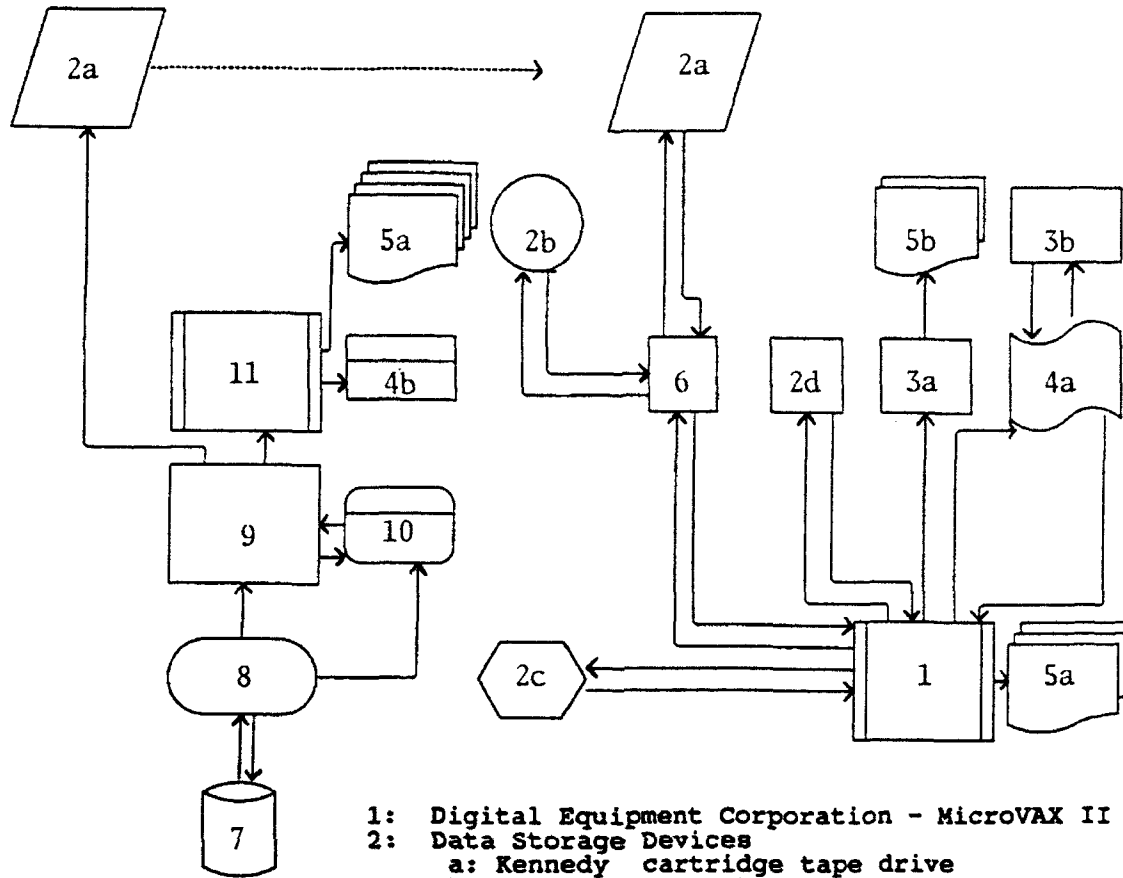


Figure 1: The trans-Indian Ocean cruise track and CTD station locations of RRS *Charles Darwin* cruise #29 from Africa to Australia. Note the many ridges and basins traversed by the cruise track.



# CTD DATA ACQUISITION ... AND ... PROCESSING SYSTEMS



- 1: Digital Equipment Corporation - MicroVAX II
- 2: Data Storage Devices
  - a: Kennedy cartridge tape drive
  - b: Digidata 9 track tape drive
  - c: DEC TK50 cartridge tape drive
  - d: DEC RX50 floppy disk drive
- 3: CRT Terminals
  - a: Ampex 219 system terminal
  - b: VT100 user graphics terminal
- 4: Plotters
  - a: Zeta Corporation Zeta-8 plotter
  - b: Hewlett Packard HP 7475A plotter
- 5: Printers
  - a: Epson FX-85 system printer
  - b: Hewlett Packard Thinkjet image printer
- 6: RS232 switch box : 9T to Cartridge tape
- 7: NBIS CTD/O2 sensors #8 and #9
- 8: Rosette firing deck unit
- 9: NBIS Model 1150 CTD deck unit
- 10: Tascam audio tape recorder
- 11: Hewlett Packard HP-85 Personal computer

Figure 2: Block diagrams of the CTD data collection and processing systems employed on the RRS *Charles Darwin* trans-Indian cruise.

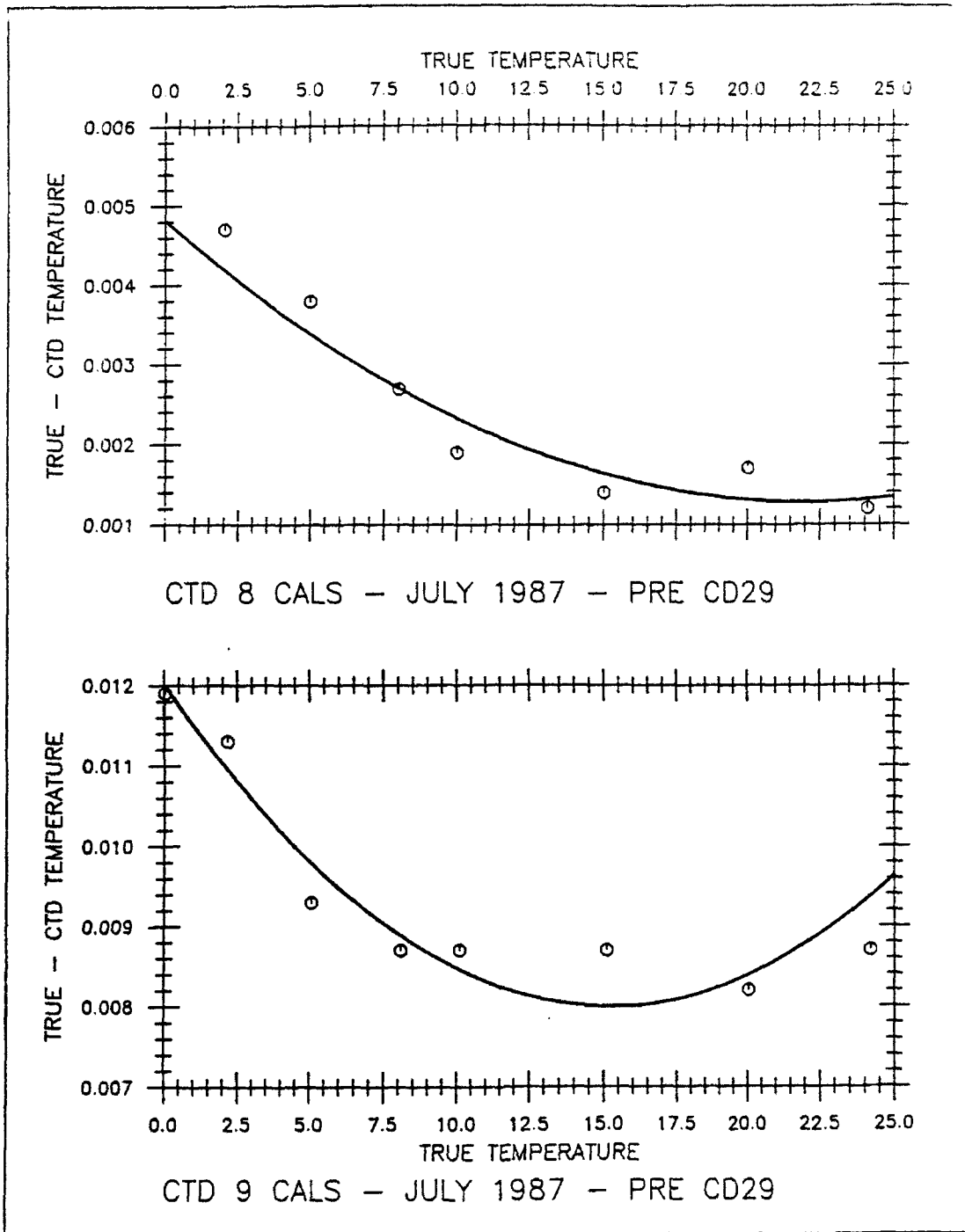


Figure 3: Laboratory calibration data for the CTD temperature sensors along with quadratic least-square fits to the data used to reduce the CTD data.

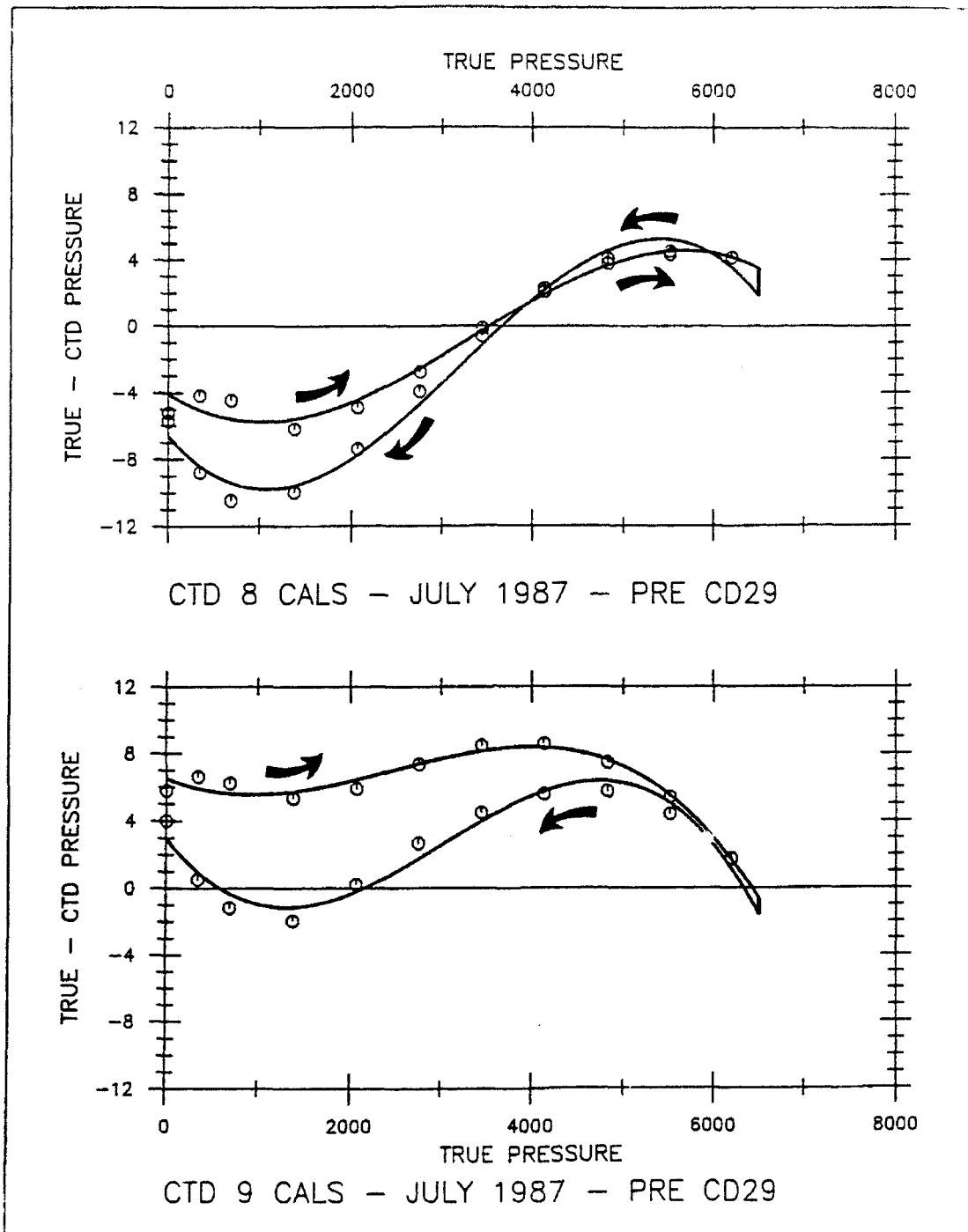


Figure 4: Laboratory calibration data for the CTD pressure sensors along with cubic least-square fits to the data used to reduce the CTD data.

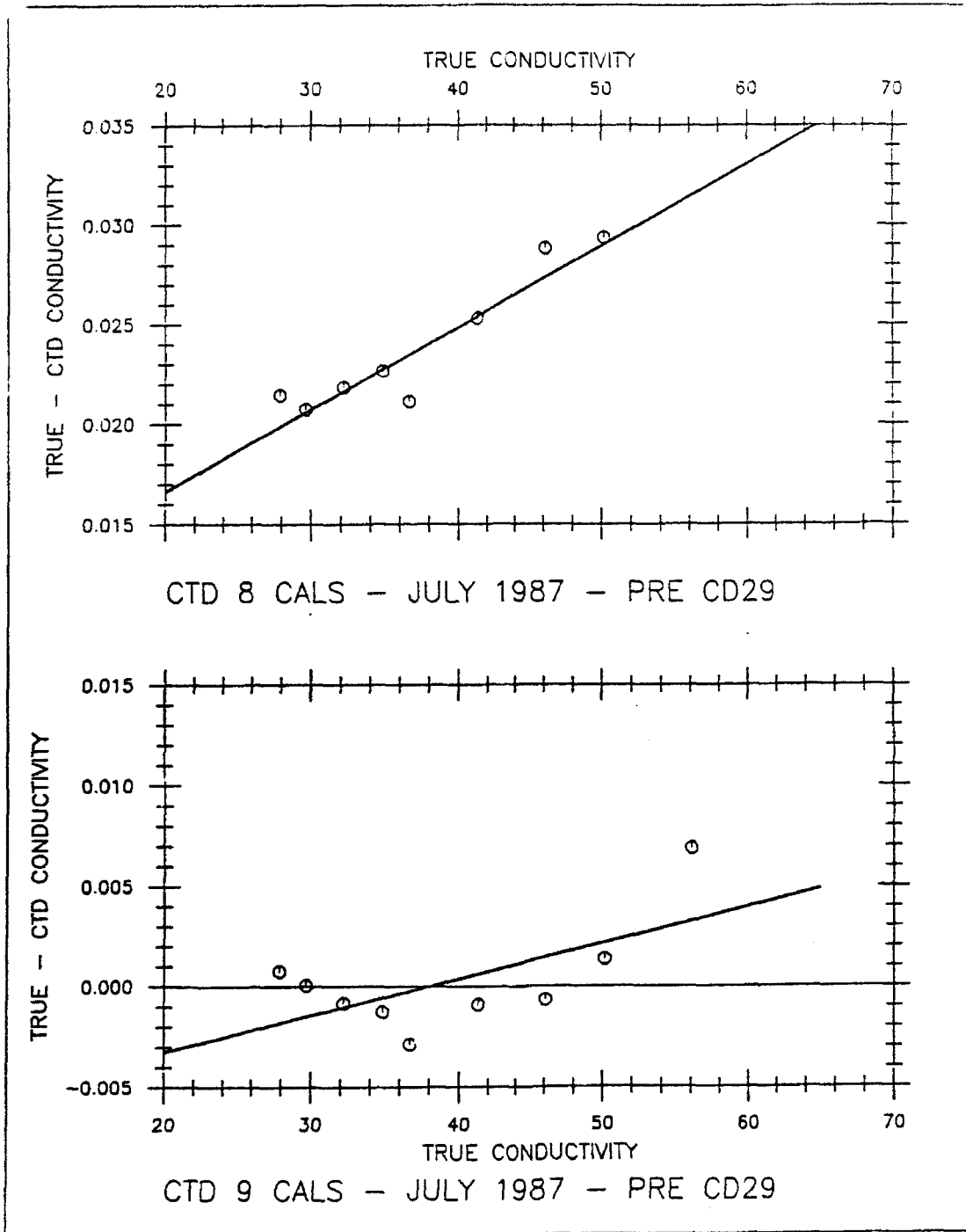


Figure 5: Laboratory calibration data for the CTD conductivity sensors along with linear least-square fits to the data used to reduce the CTD data.



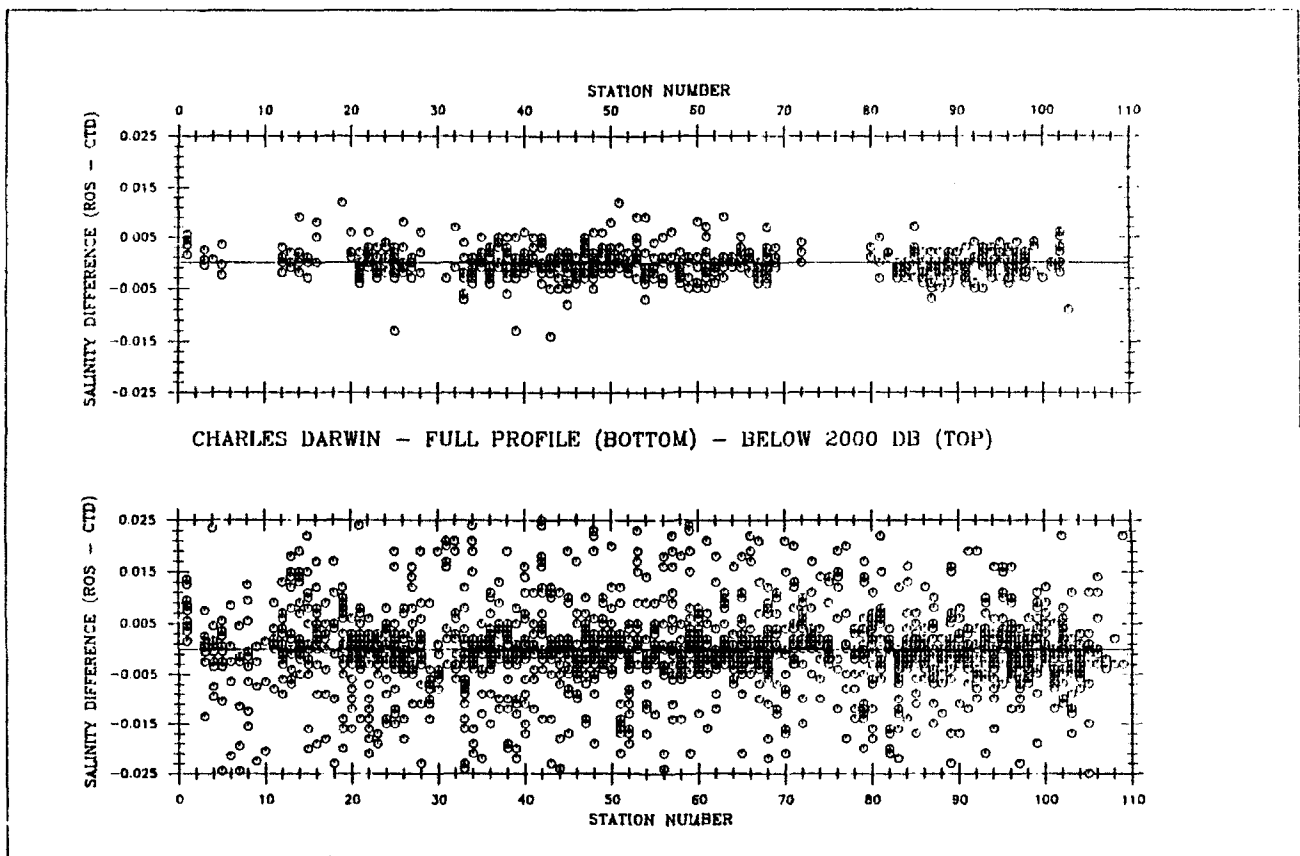


Figure 6: Below: Differences between calibrated CTD salinity data and associated rosette data over the entire ocean profile: RRS *Charles Darwin* cruise #29. Above: Differences between deep (greater than 2000 db) calibrated CTD salinity data and associated rosette data: RRS *Charles Darwin* cruise #29.

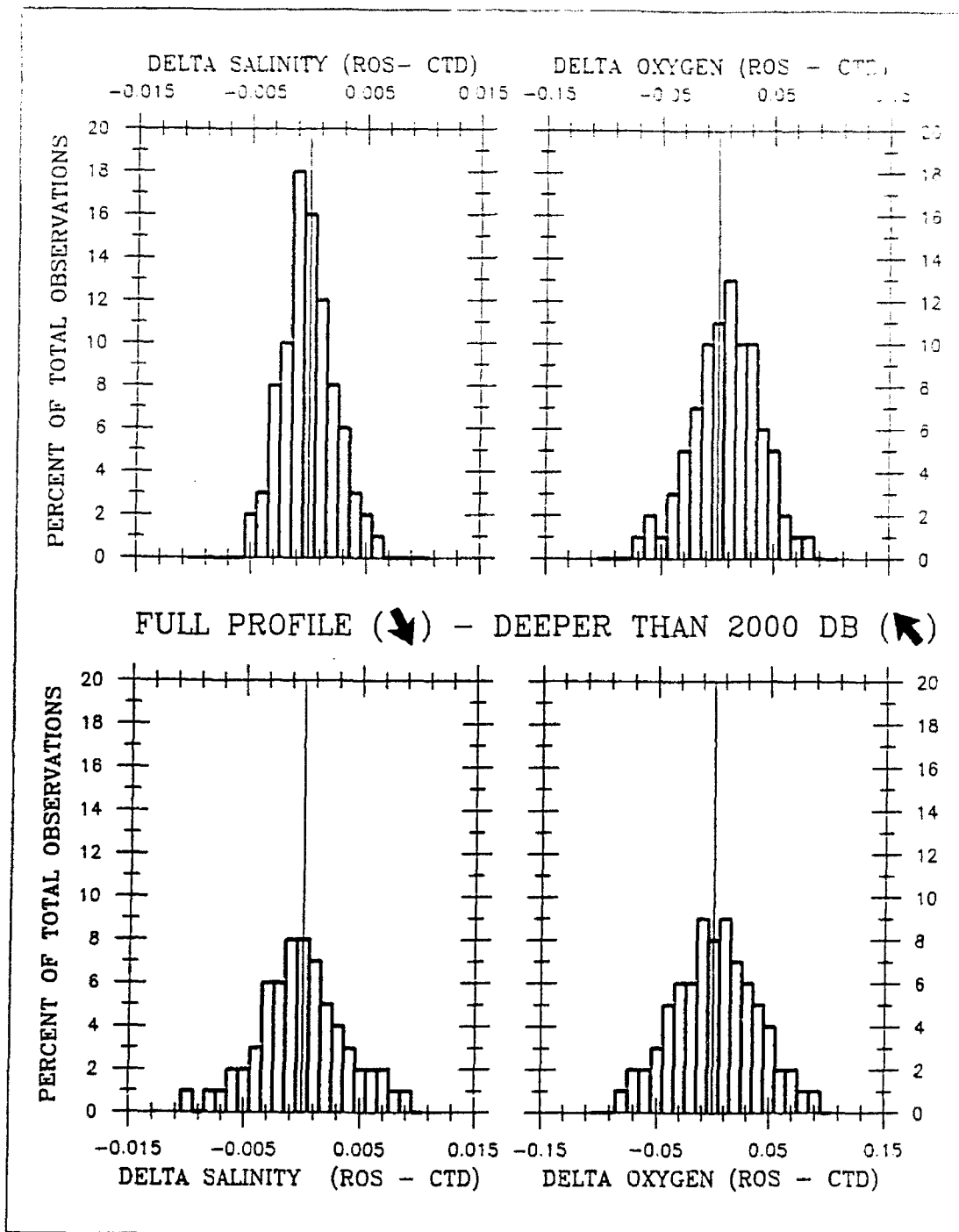


Figure 7: Histograms showing the distribution of the salt and oxygen differences (CTD vs. rosette samples) for: Below: all stations at all depths. Above: all stations at depths greater than 2000 db.

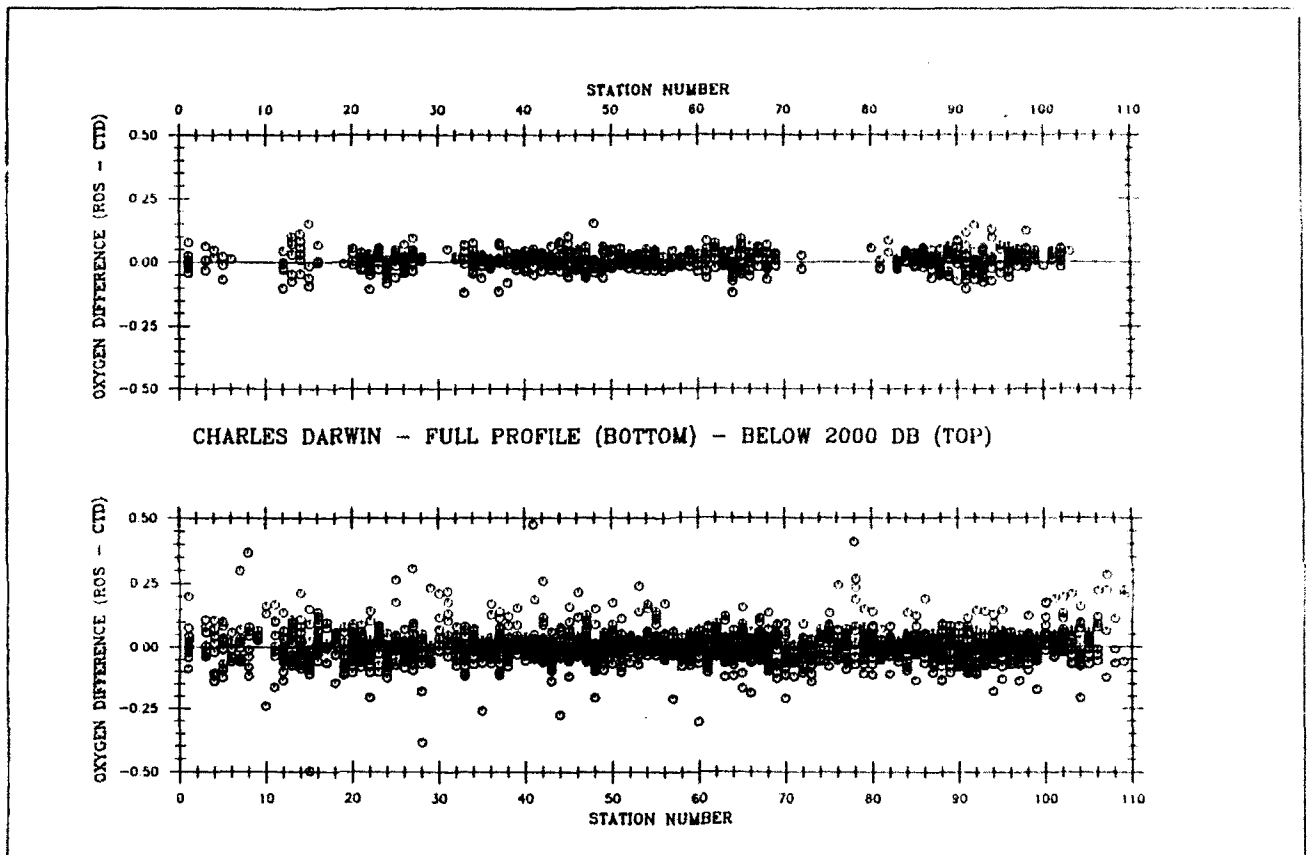


Figure 8: Below: Differences between calibrated CTD oxygen data and associated rosette data over the entire ocean profile: RRS *Charles Darwin* cruise #29. Above: Differences between deep (greater than 2000 db) calibrated CTD oxygen data and associated rosette data: RRS *Charles Darwin* cruise #29.

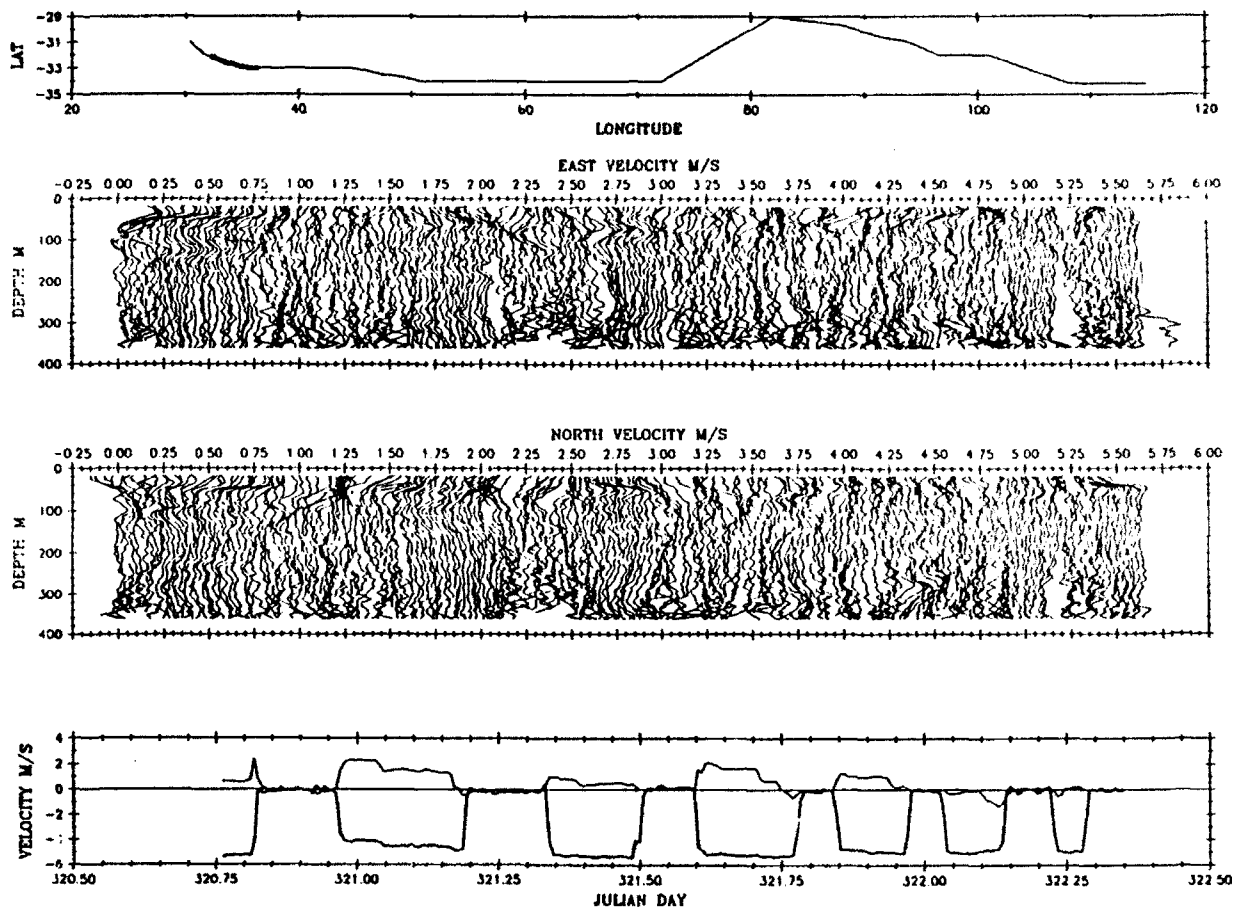


Figure 9: (a) Representative displays of the Acoustic Doppler Current Profiler data obtained on the trans-Indian cruise. Four subsections of the data set are presented (Figures 9a, b, c, and d). In each case, the top panel denotes with bold line where along the cruise track the data were collected. Panels 2 and 3 contain the relative east and north velocity profiles in "waterfall" format where successive profiles are offset to the right. The profiles were biased to have zero vertical mean. The bottom panels give the east (bold line) and north (thin line) components of the depth-averaged relative velocity.

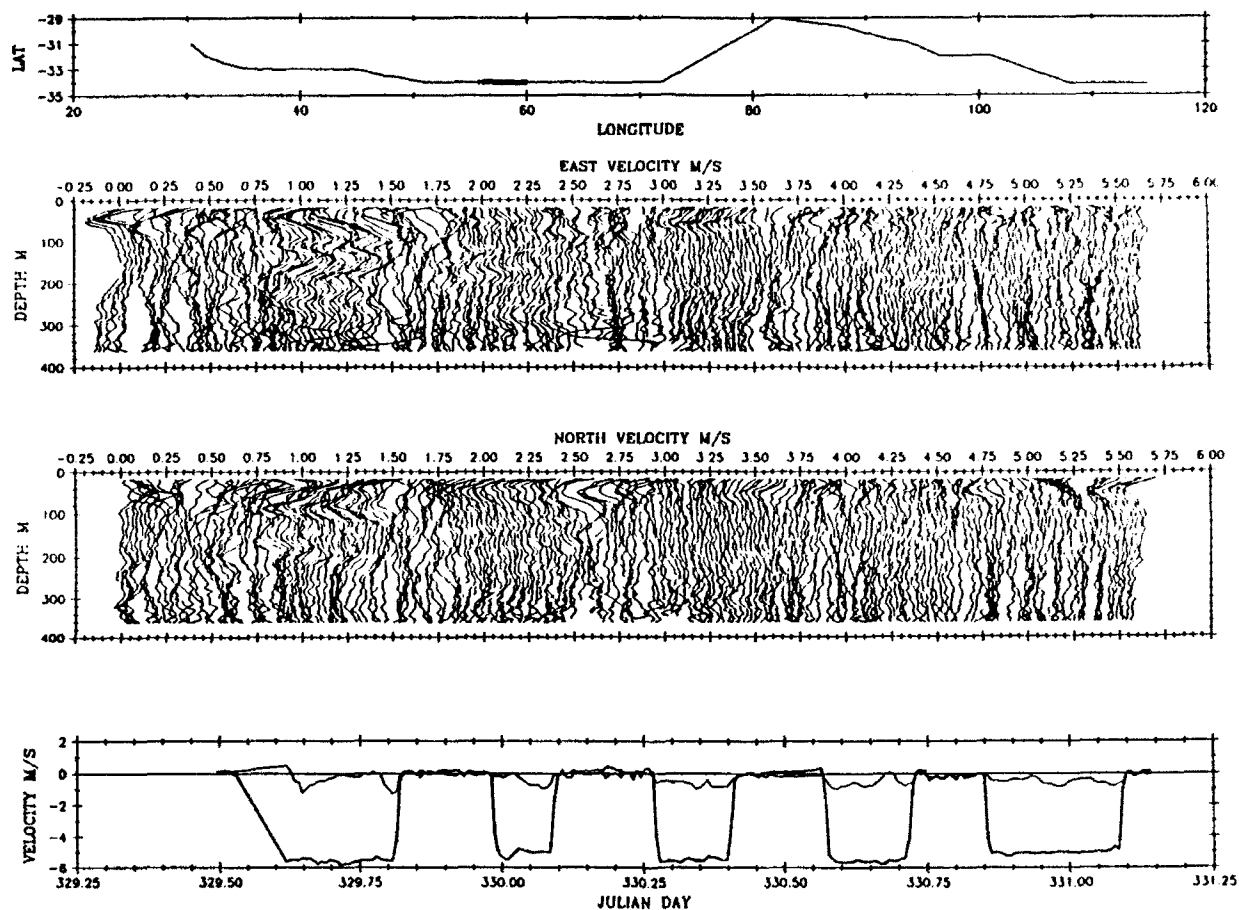


Figure 9: (b) Representative displays of the Acoustic Doppler Current Profiler data obtained on the trans-Indian cruise. Four subsections of the data set are presented (Figures 9a, b, c, and d). In each case, the top panel denotes with bold line where along the cruise track the data were collected. Panels 2 and 3 contain the relative east and north velocity profiles in "waterfall" format where successive profiles are offset to the right. The profiles were biased to have zero vertical mean. The bottom panels give the east (bold line) and north (thin line) components of the depth-averaged relative velocity.

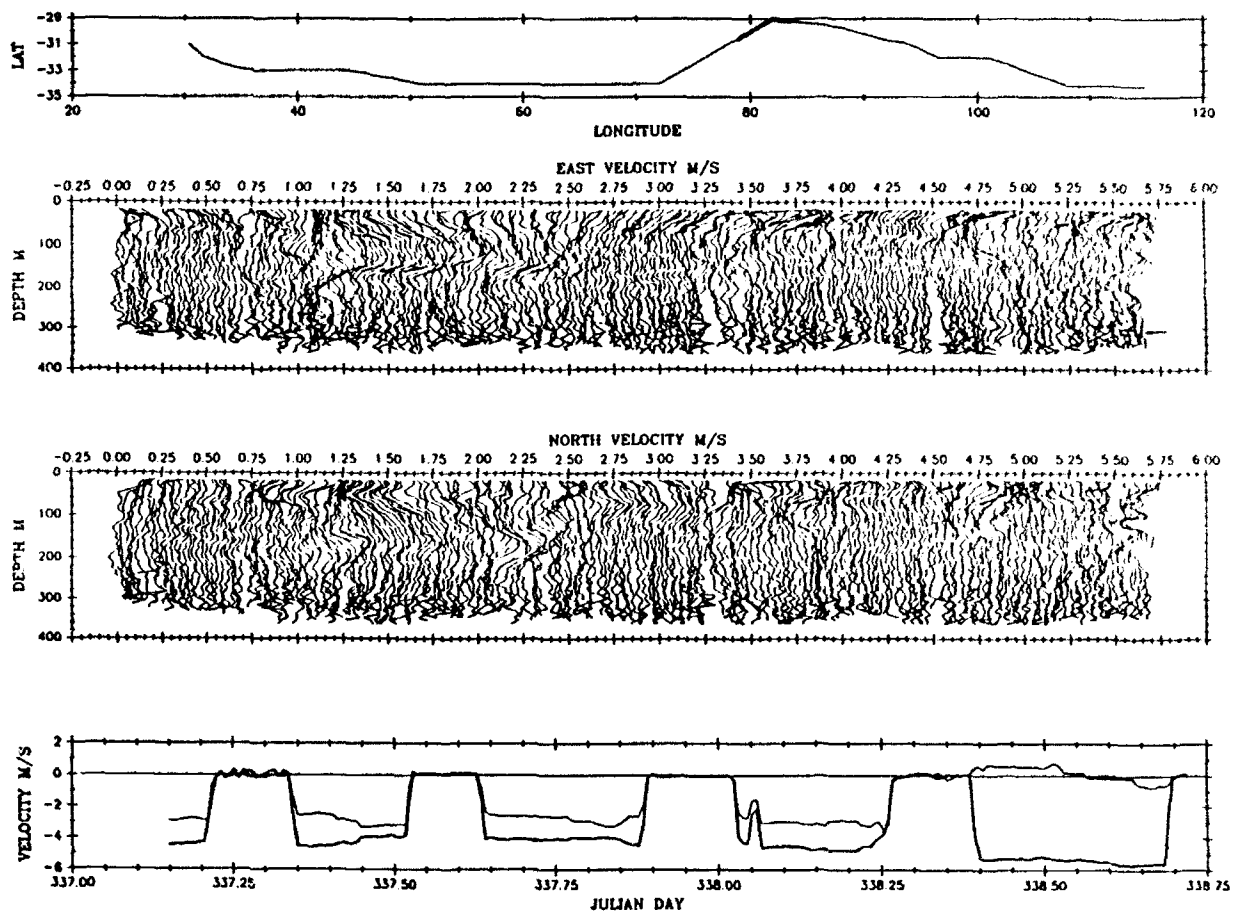


Figure 9: (c) Representative displays of the Acoustic Doppler Current Profiler data obtained on the trans-Indian cruise. Four subsections of the data set are presented (Figures 9a, b, c, and d). In each case, the top panel denotes with bold line where along the cruise track the data were collected. Panels 2 and 3 contain the relative east and north velocity profiles in "waterfall" format where successive profiles are offset to the right. The profiles were biased to have zero vertical mean. The bottom panels give the east (bold line) and north (thin line) components of the depth-averaged relative velocity.

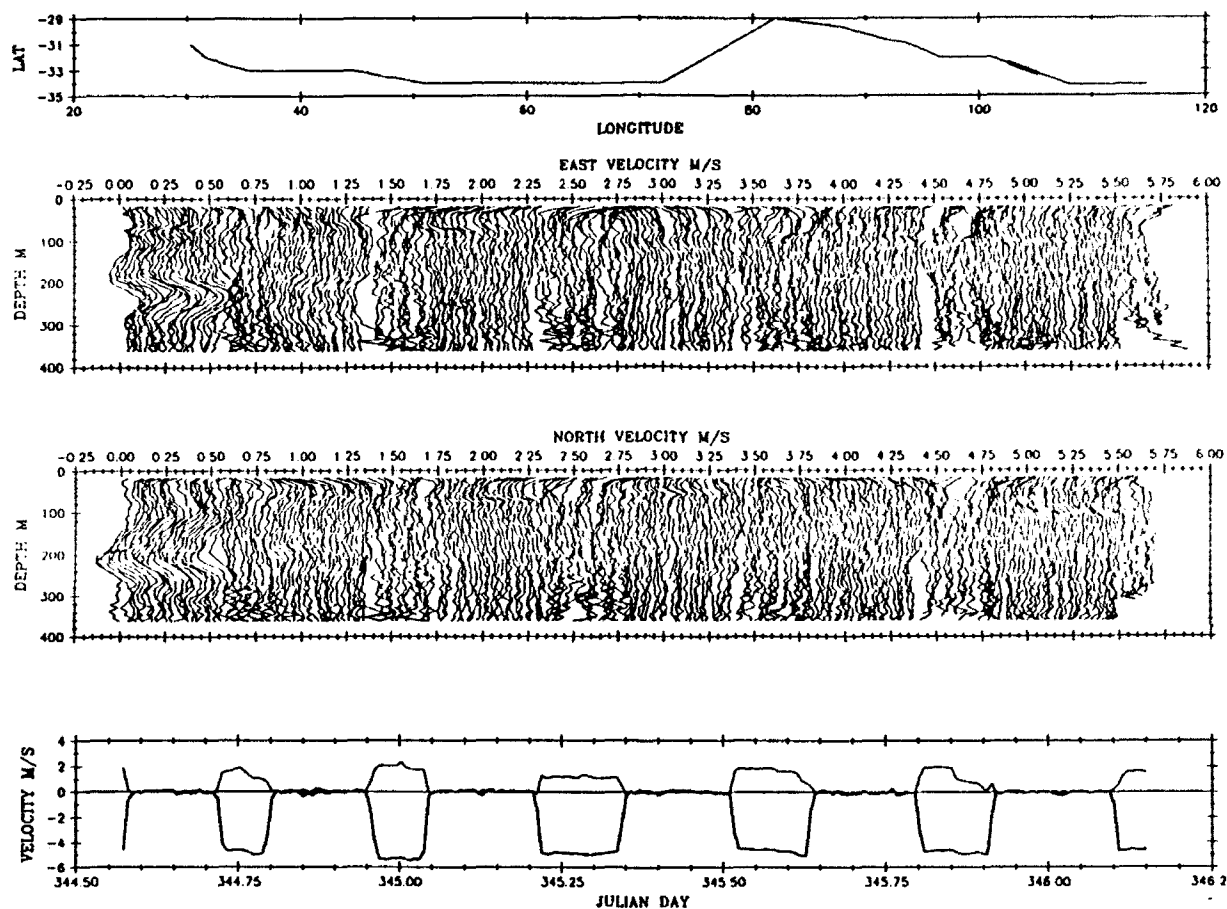


Figure 9: (d) Representative displays of the Acoustic Doppler Current Profiler data obtained on the trans-Indian cruise. Four subsections of the data set are presented (Figures 9a, b, c, and d). In each case, the top panel denotes with bold line where along the cruise track the data were collected. Panels 2 and 3 contain the relative east and north velocity profiles in "waterfall" format where successive profiles are offset to the right. The profiles were biased to have zero vertical mean. The bottom panels give the east (bold line) and north (thin line) components of the depth-averaged relative velocity.

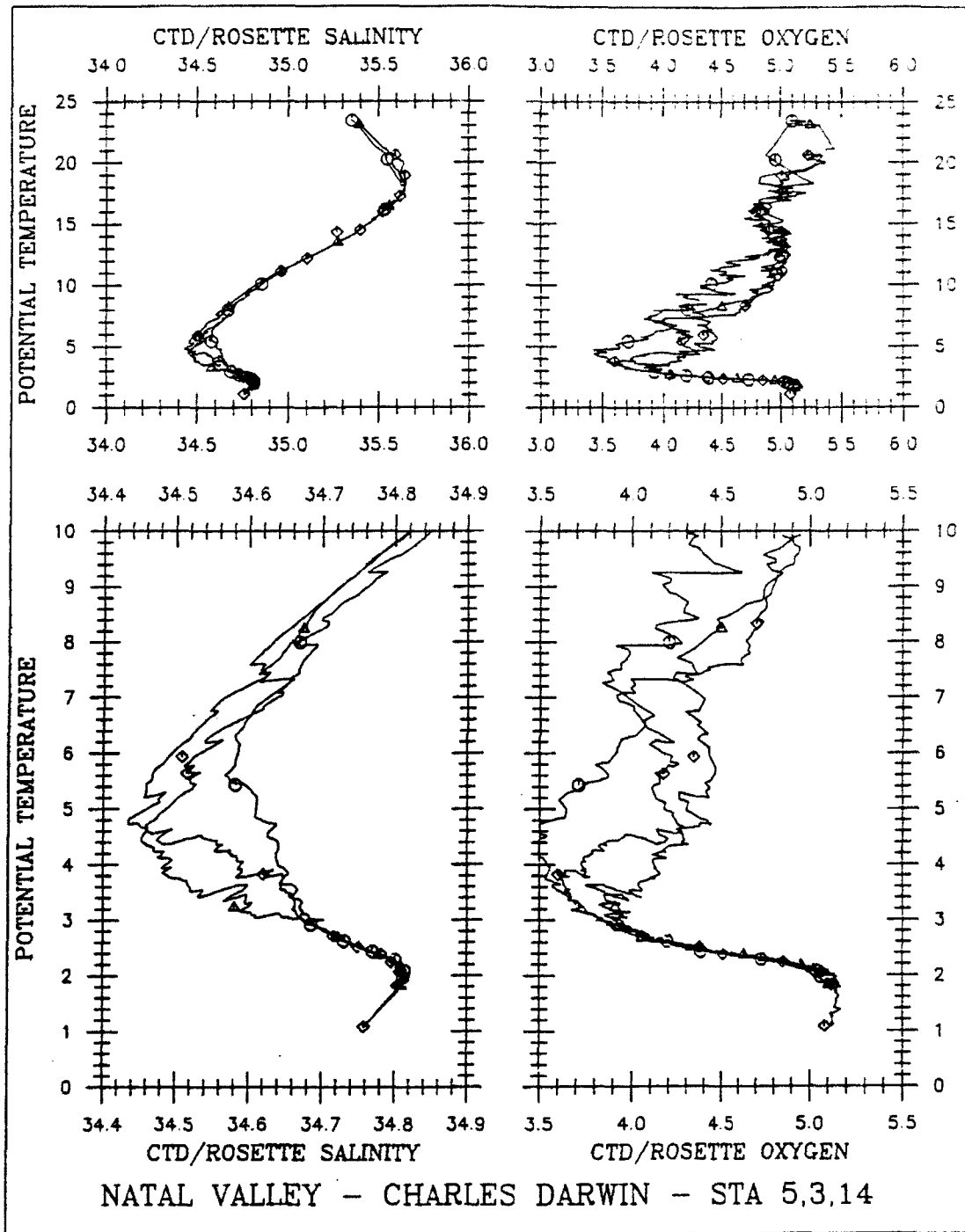


Figure 10: Typical potential temperature vs. salinity and oxygen plots from the Natal Valley during RRS *Charles Darwin* cruise #29. Symbols represent rosette water sample data for those particular casts. The bottom plots are expanded scale to show deep  $\theta$ /property consistency.



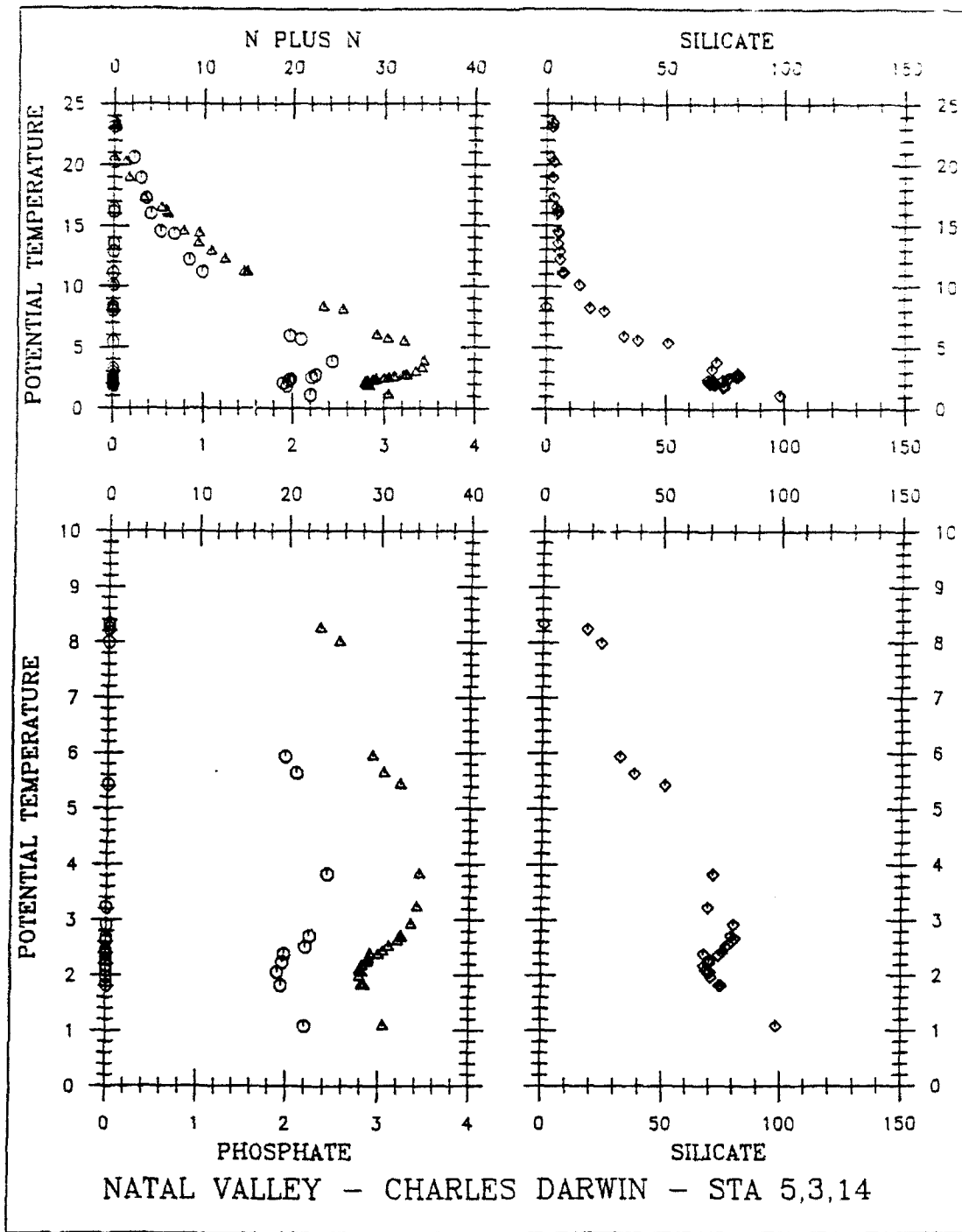


Figure 11: Typical potential temperature vs. nutrient data plots from the Natal Valley during RRS *Charles Darwin* cruise #29. Phosphate data are represented by triangles, N+N by circles, and silicate by diamonds. The ordinates (potential temperature axes) are at the same scales as Figure 10.

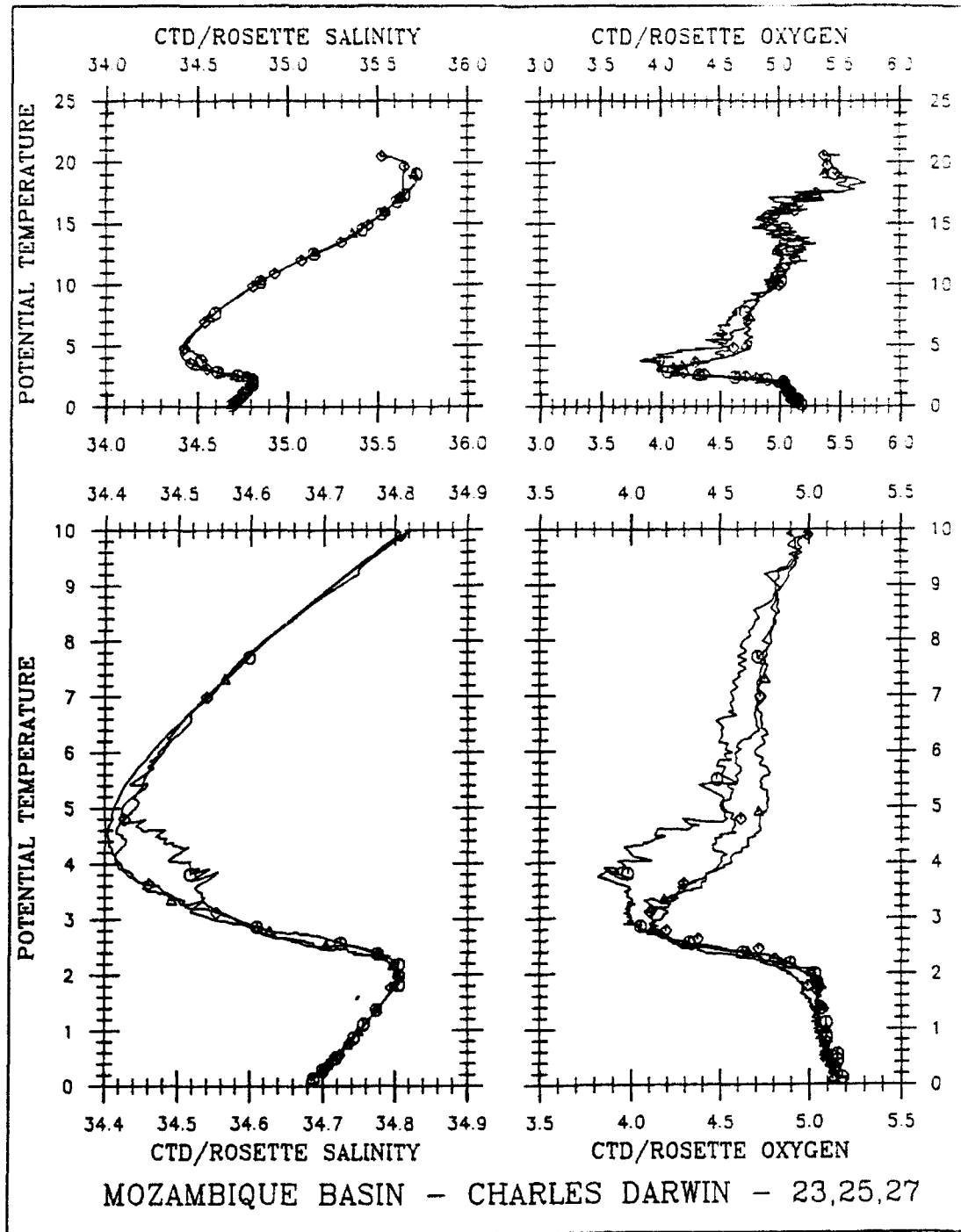


Figure 12: Typical potential temperature vs. salinity and oxygen plots from the Mozambique Basin during RRS *Charles Darwin* cruise #29. Symbols represent rosette water sample data for those particular casts. The bottom plots are expanded scale to show deep  $\theta$ /property consistency.

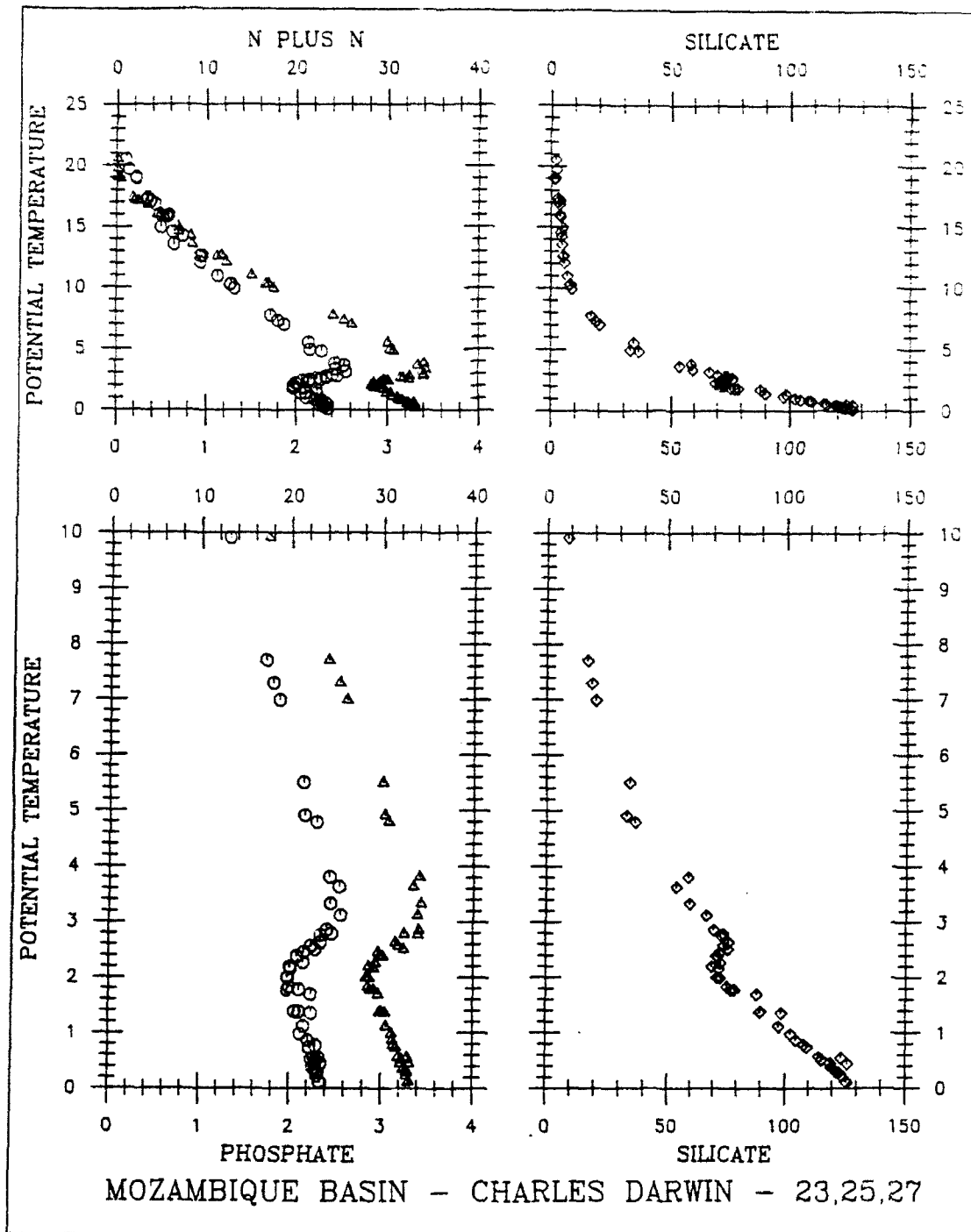


Figure 13: Typical potential temperature vs. nutrient data plots from the Mozambique Basin during RRS *Charles Darwin* cruise #29. Phosphate data are represented by triangles, N+N by circles, and silicate by diamonds. The ordinates (potential temperature axes) are at the same scales as Figure 12.

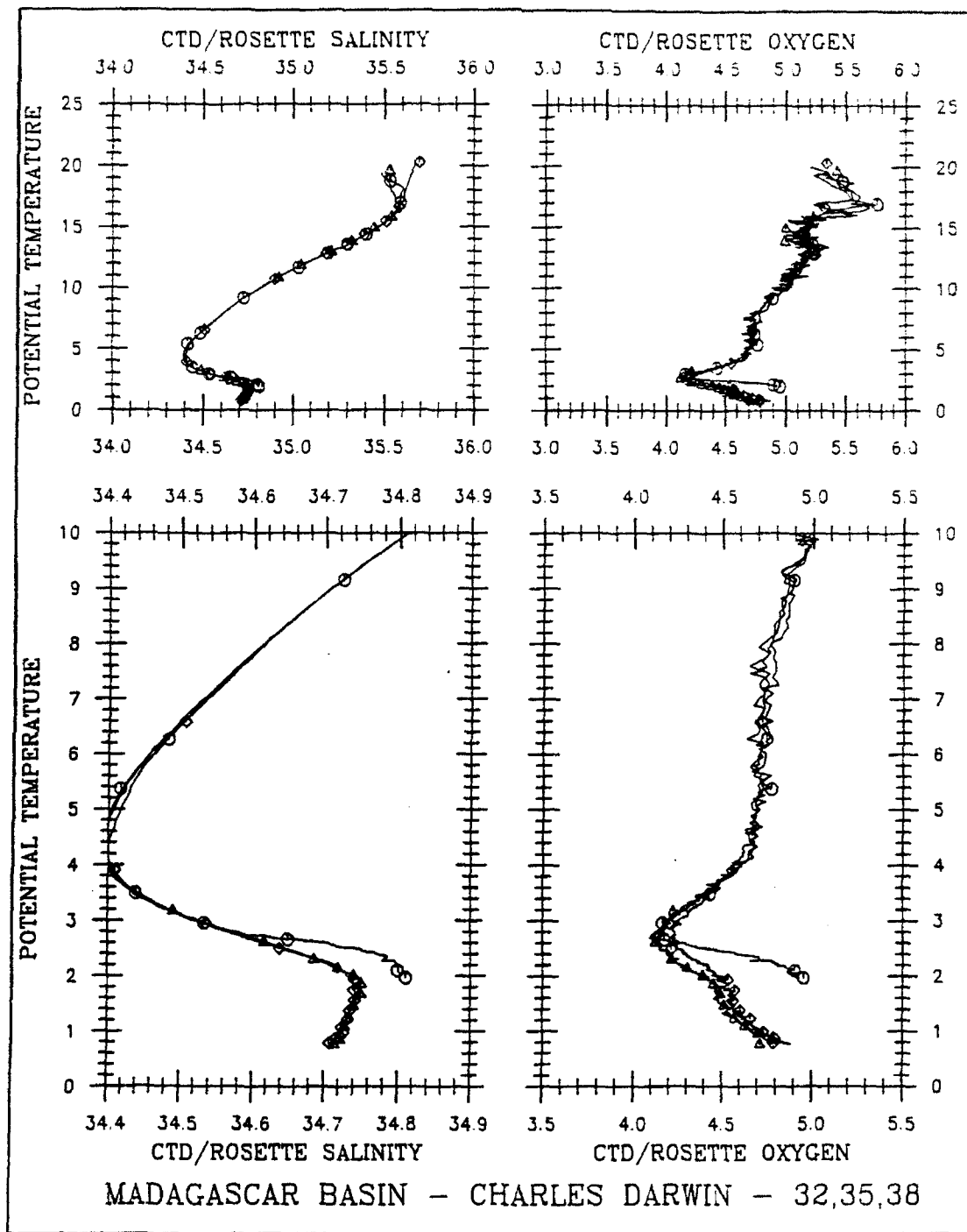


Figure 14: Typical potential temperature vs. salinity and oxygen plots from the Madagascar Basin during RRS *Charles Darwin* cruise #29. Symbols represent rosette water sample data for those particular casts. The bottom plots are expanded scale to show deep  $\theta$ /property consistency.

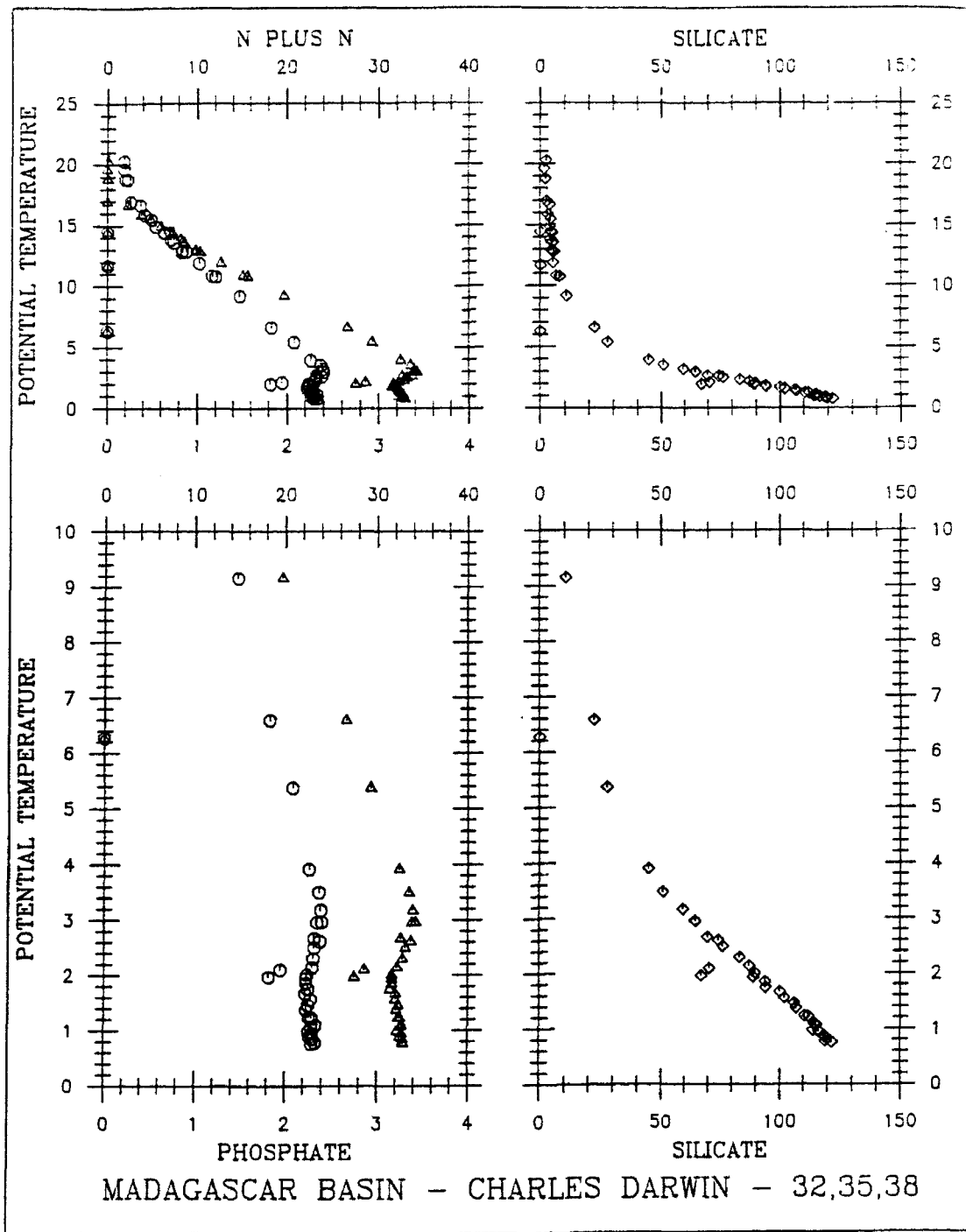


Figure 15: Typical potential temperature vs. nutrient data plots from the Madagascar Basin during RRS *Charles Darwin* cruise #29. Phosphate data are represented by triangles, N+N by circles, and silicate by diamonds. The ordinates (potential temperature axes) are at the same scales as Figure 14.

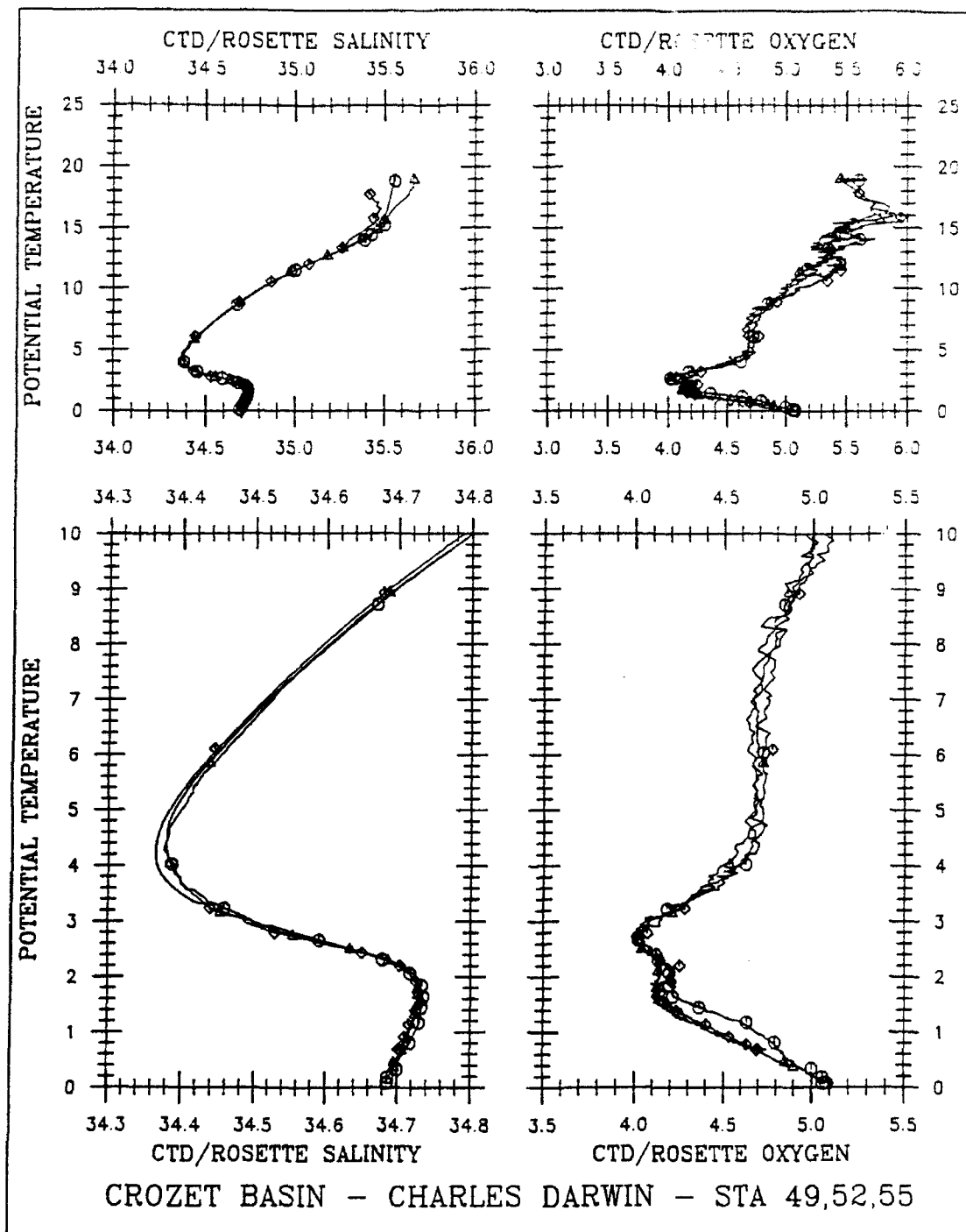


Figure 16: Typical potential temperature vs. salinity and oxygen plots from the Crozet Basin during RRS *Charles Darwin* cruise #29. Symbols represent rosette water sample data for those particular casts. The bottom plots are expanded scale to show deep  $\theta$ /property consistency.

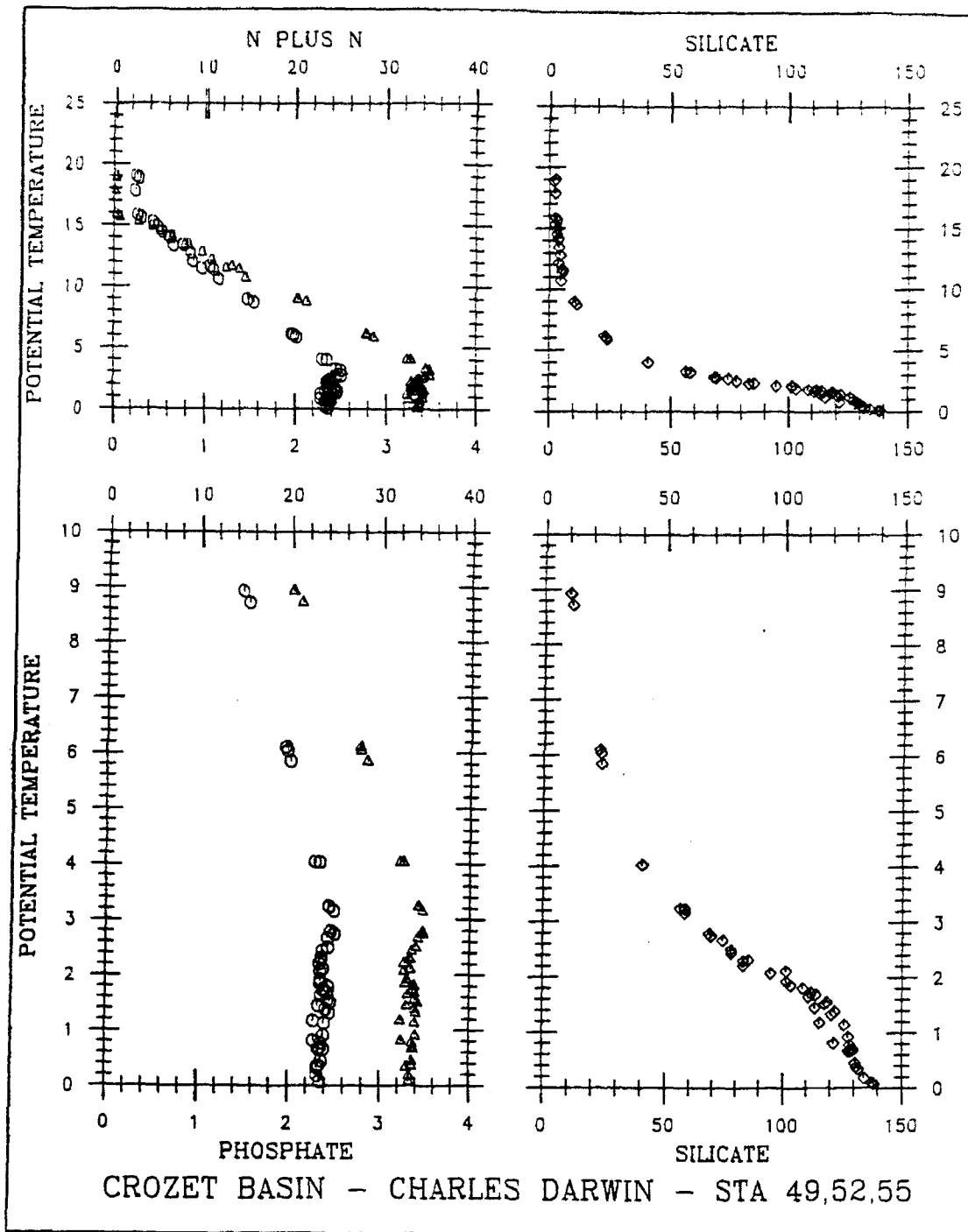


Figure 17: Typical potential temperature vs. nutrient data plots from the Crozet Basin during RRS *Charles Darwin* cruise #29. Phosphate data are represented by triangles, N+N by circles, and silicate by diamonds. The ordinates (potential temperature axes) are at the same scales as Figure 16.

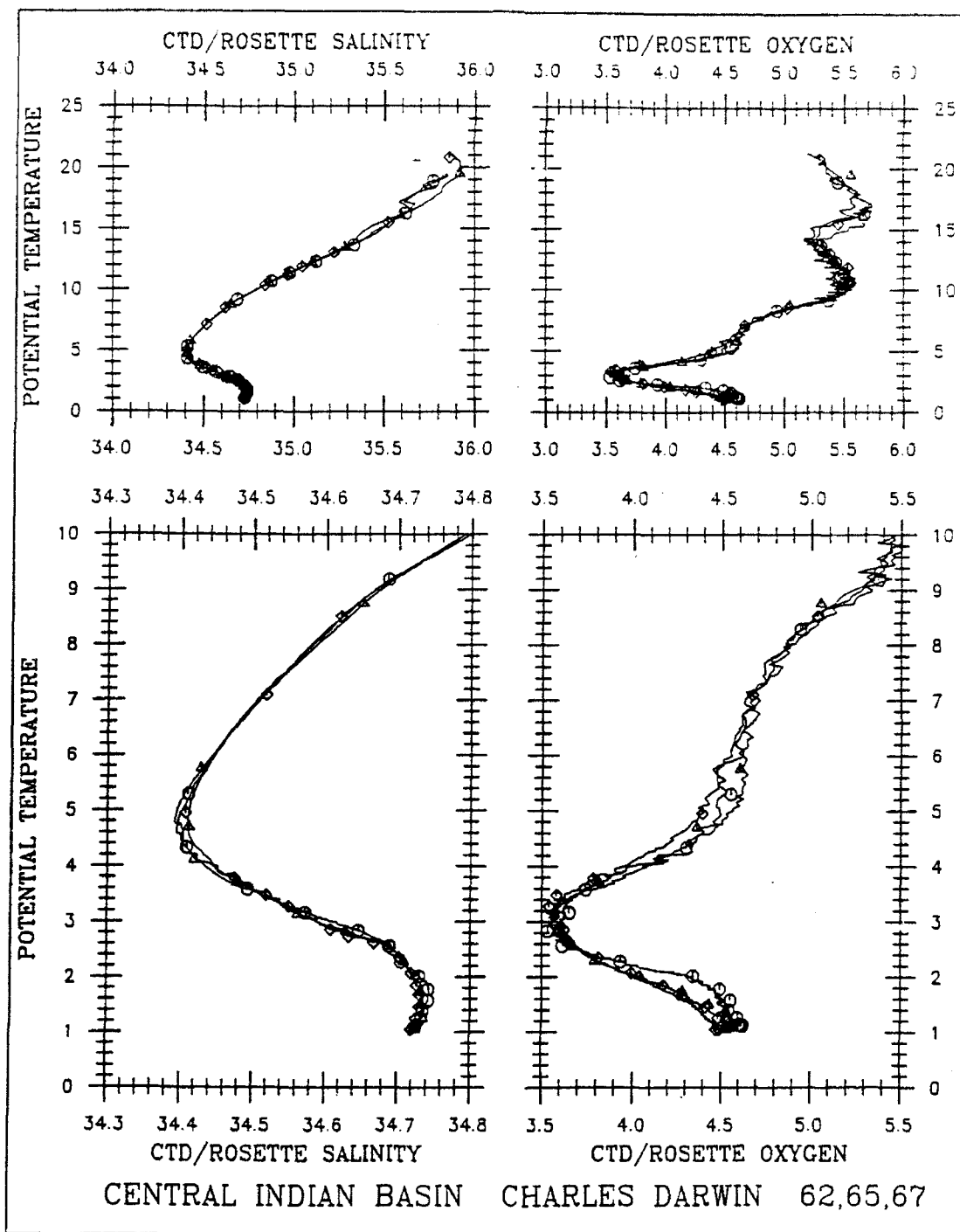


Figure 18: Typical potential temperature vs. salinity and oxygen plots from the Central Indian Basin during RRS *Charles Darwin* cruise #29. Symbols represent rosette water sample data for those particular casts. The bottom plots are expanded scale to show deep  $\theta$ /property consistency.



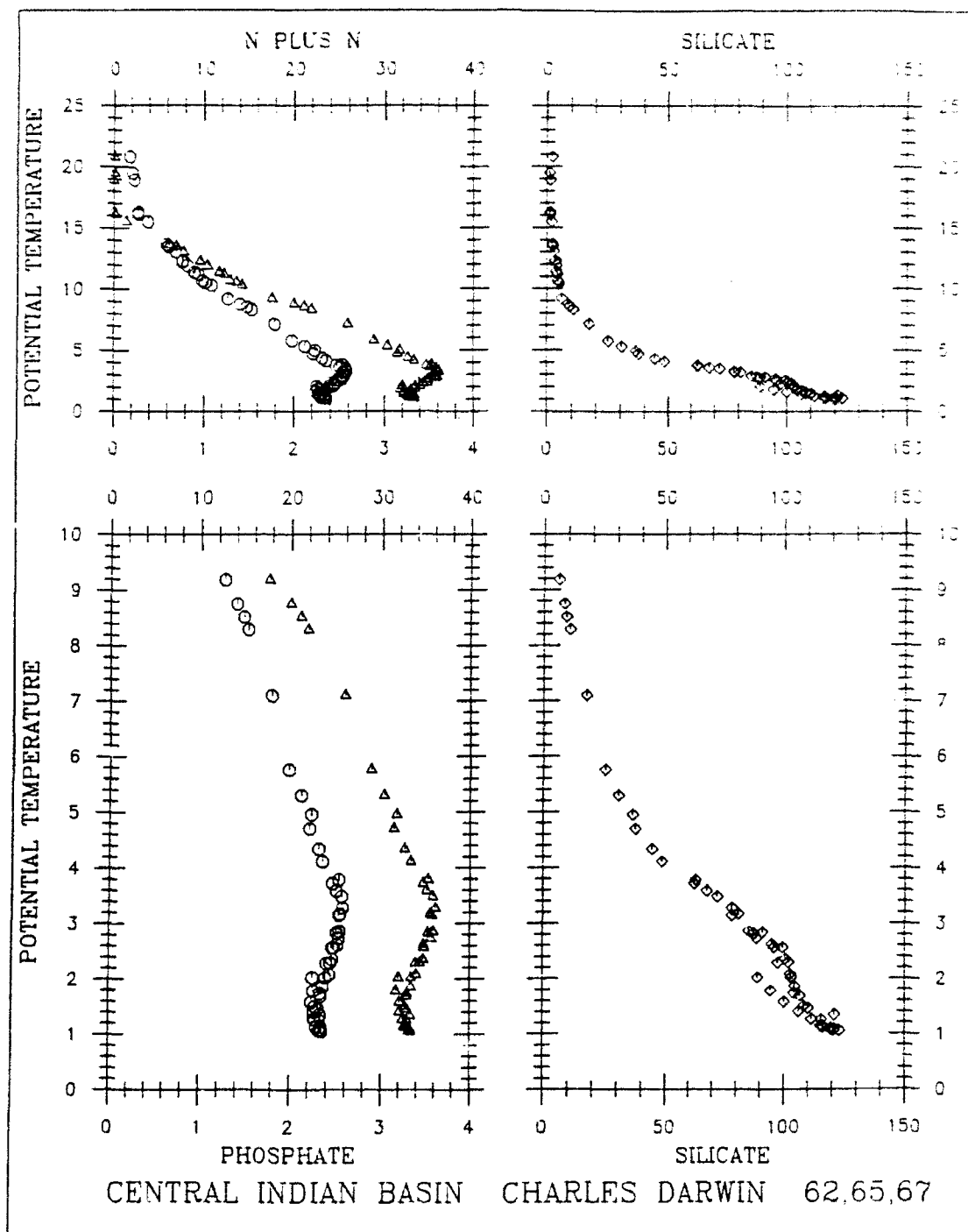


Figure 19: Typical potential temperature vs. nutrient data plots from the Central Indian Basin during RRS *Charles Darwin* cruise #29. Phosphate data are represented by triangles, N+N by circles, and silicate by diamonds. The ordinates (potential temperature axes) are at the same scales as Figure 18.

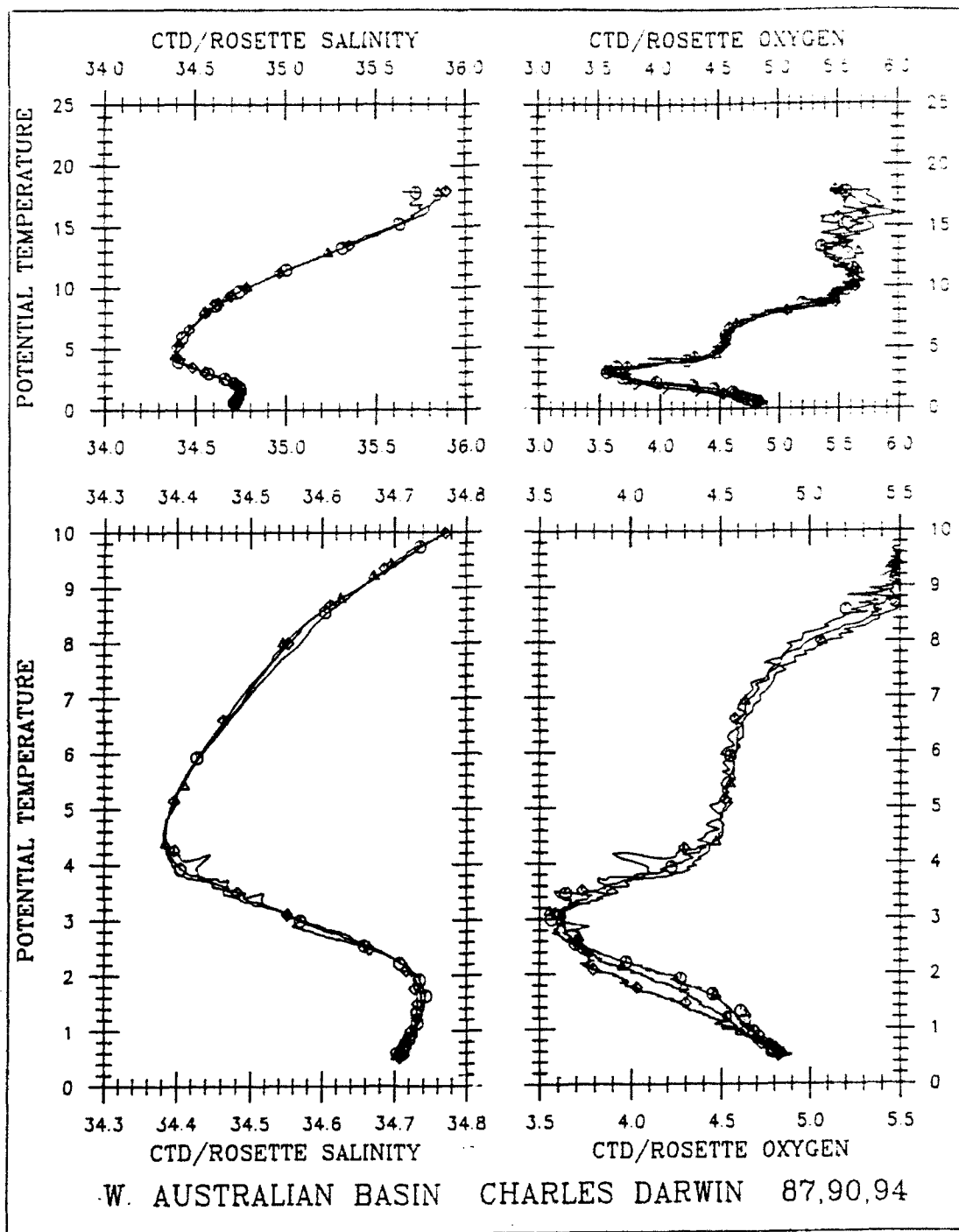


Figure 20: Typical potential temperature vs. salinity and oxygen plots from the West Australian Basin during RRS *Charles Darwin* cruise #29. Symbols represent rosette water sample data for those particular casts. The bottom plots are expanded scale to show deep  $\theta$ /property consistency.

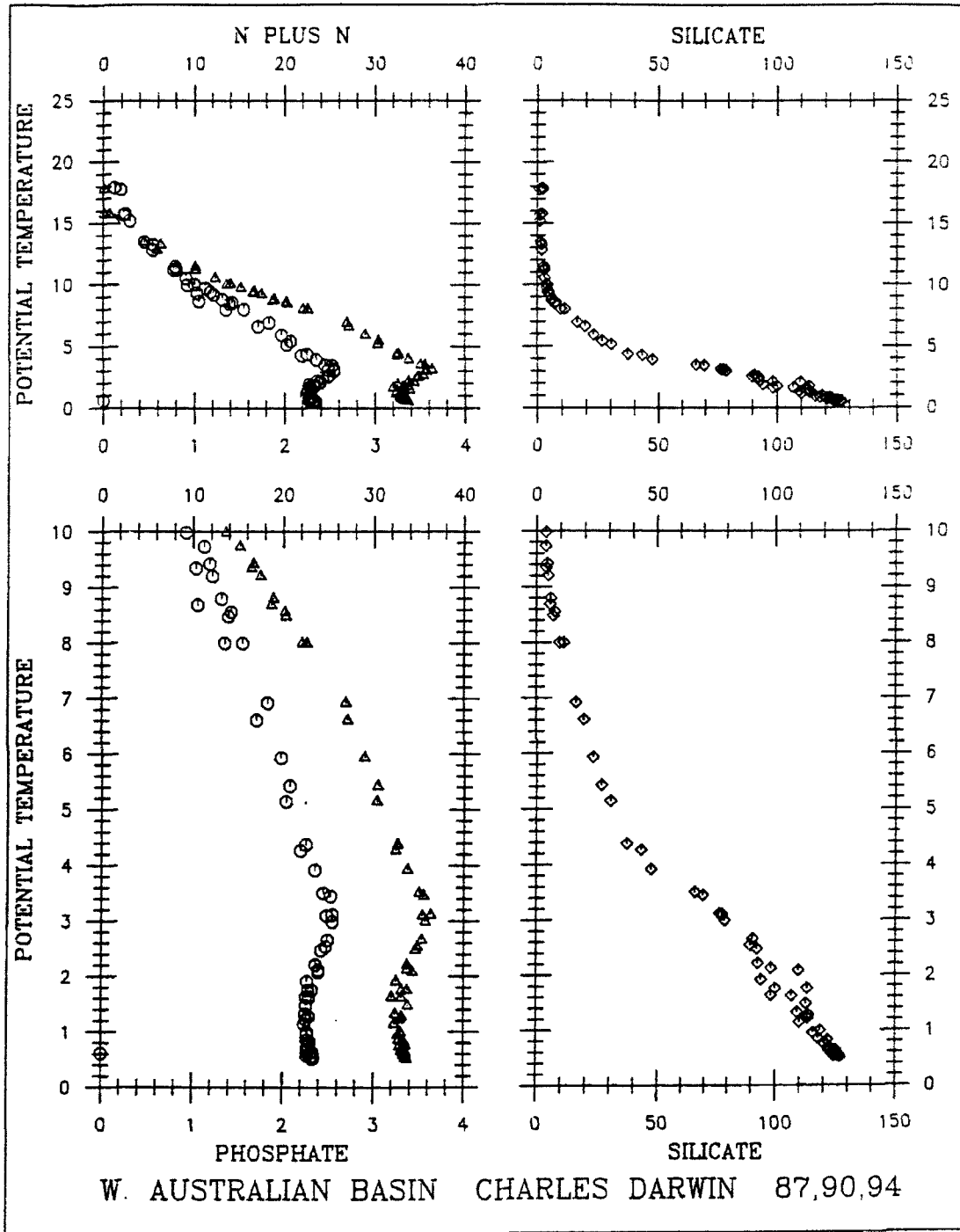


Figure 21: Typical potential temperature vs. nutrient data plots from the West Australian Basin during RRS *Charles Darwin* cruise #29. Phosphate data are represented by triangles, N+N by circles, and silicate by diamonds. The ordinates (potential temperature axes) are at the same scales as Figure 20.

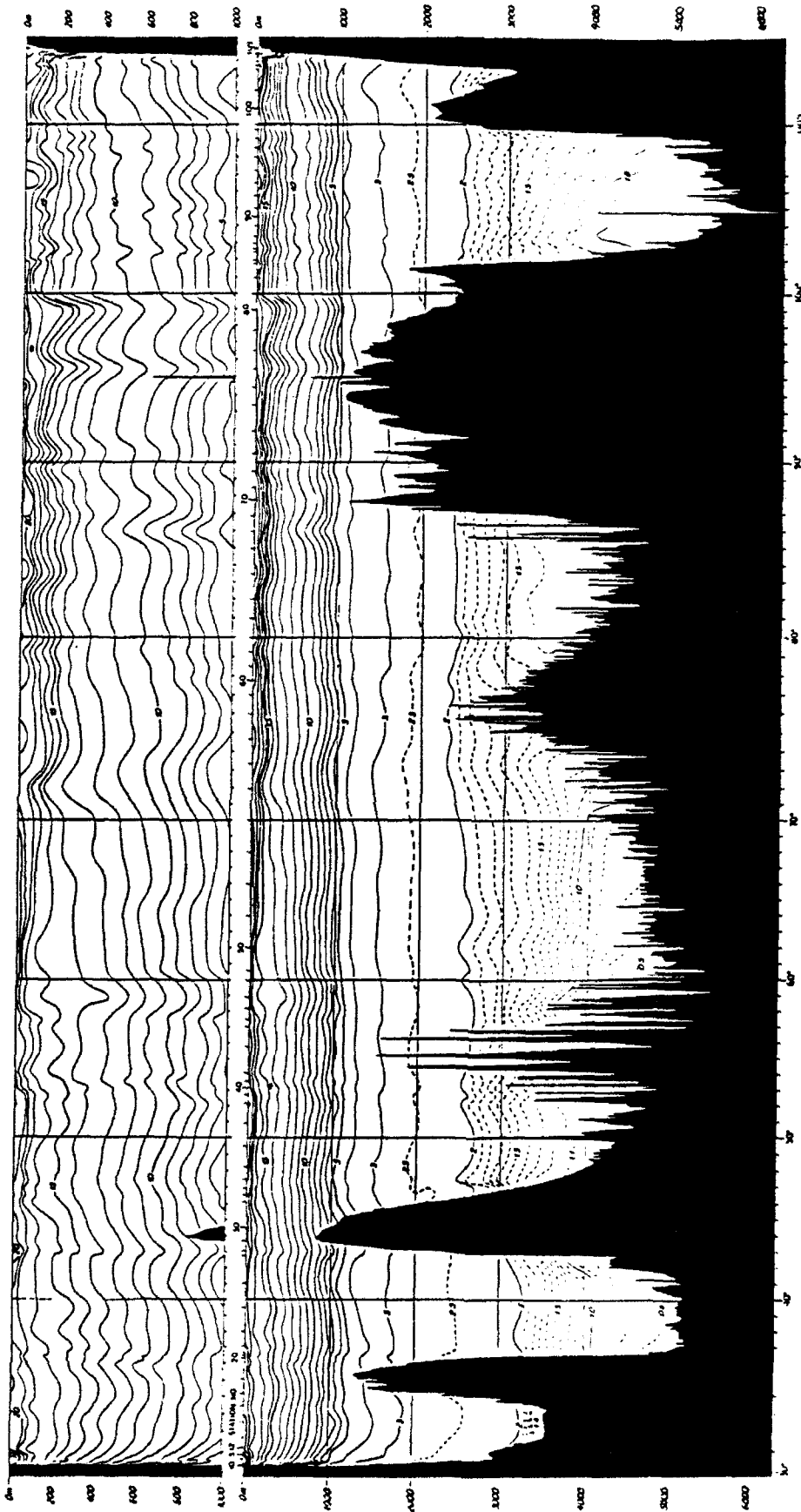


Figure 22: Temperature vs. depth section of trans-Indian Ocean section. Vertical distortion of the full depth profiles is 500 : 1, while for the expanded shallow sections it is 1250 : 1.

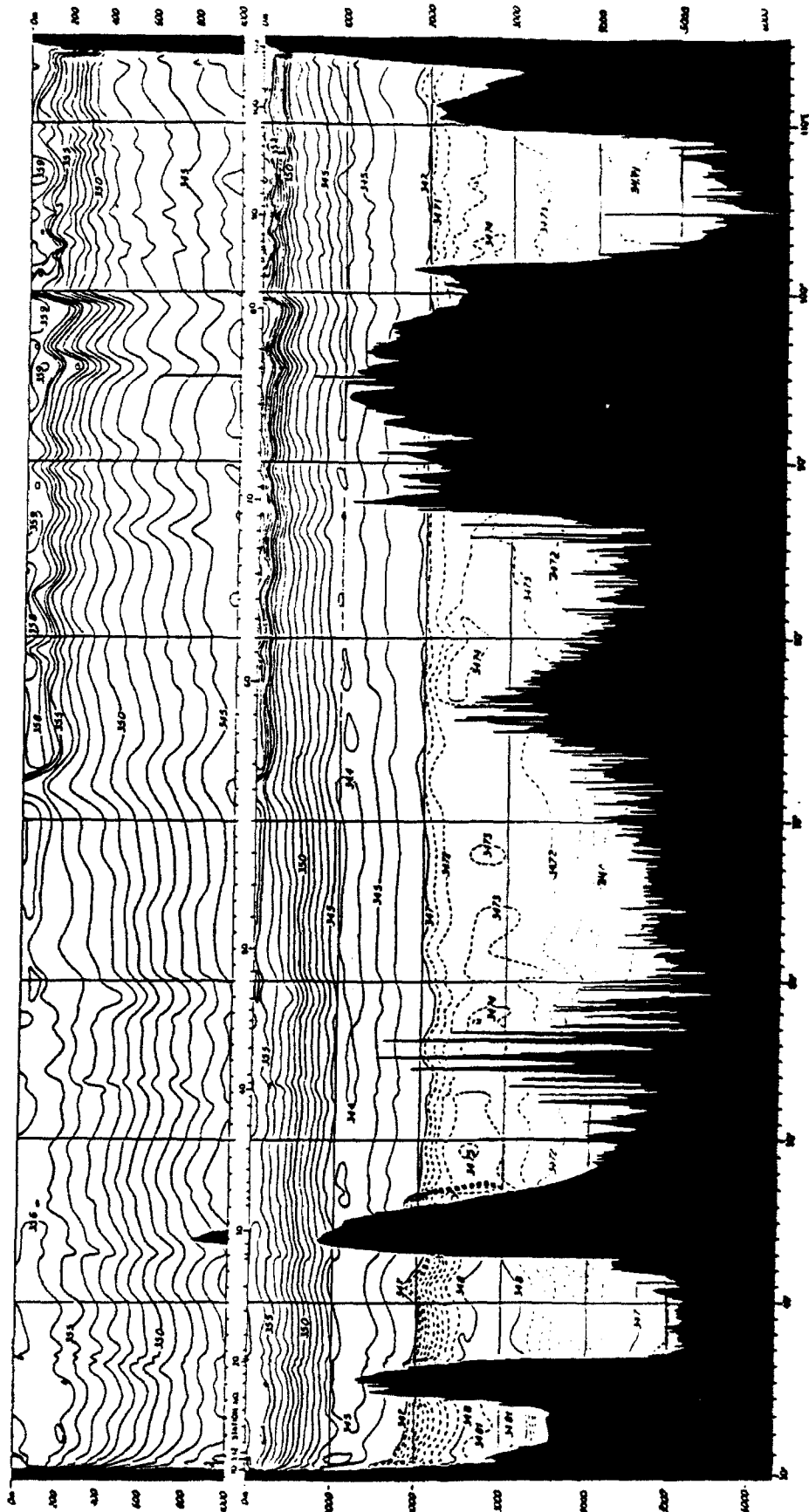


Figure 23: Salinity vs. depth section of trans-Indian Ocean section. Vertical distortion of the full depth profiles is 500 : 1, while for the expanded shallow sections it is 1250 : 1.

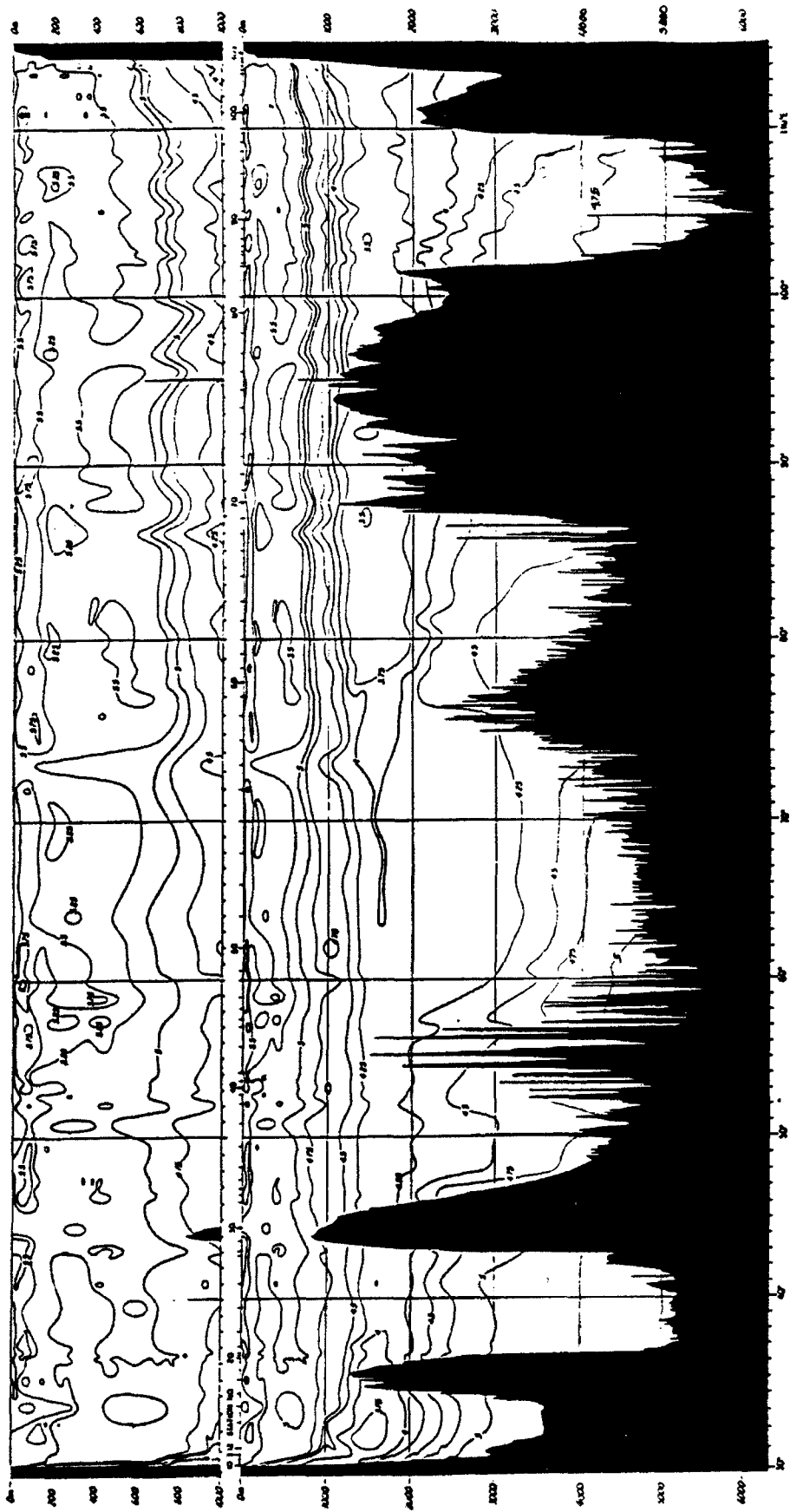


Figure 24: Oxygen vs. depth section of trans-Indian Ocean section. Vertical distortion of the full depth profiles is 500 : 1, while for the expanded shallow sections it is 1250 : 1.

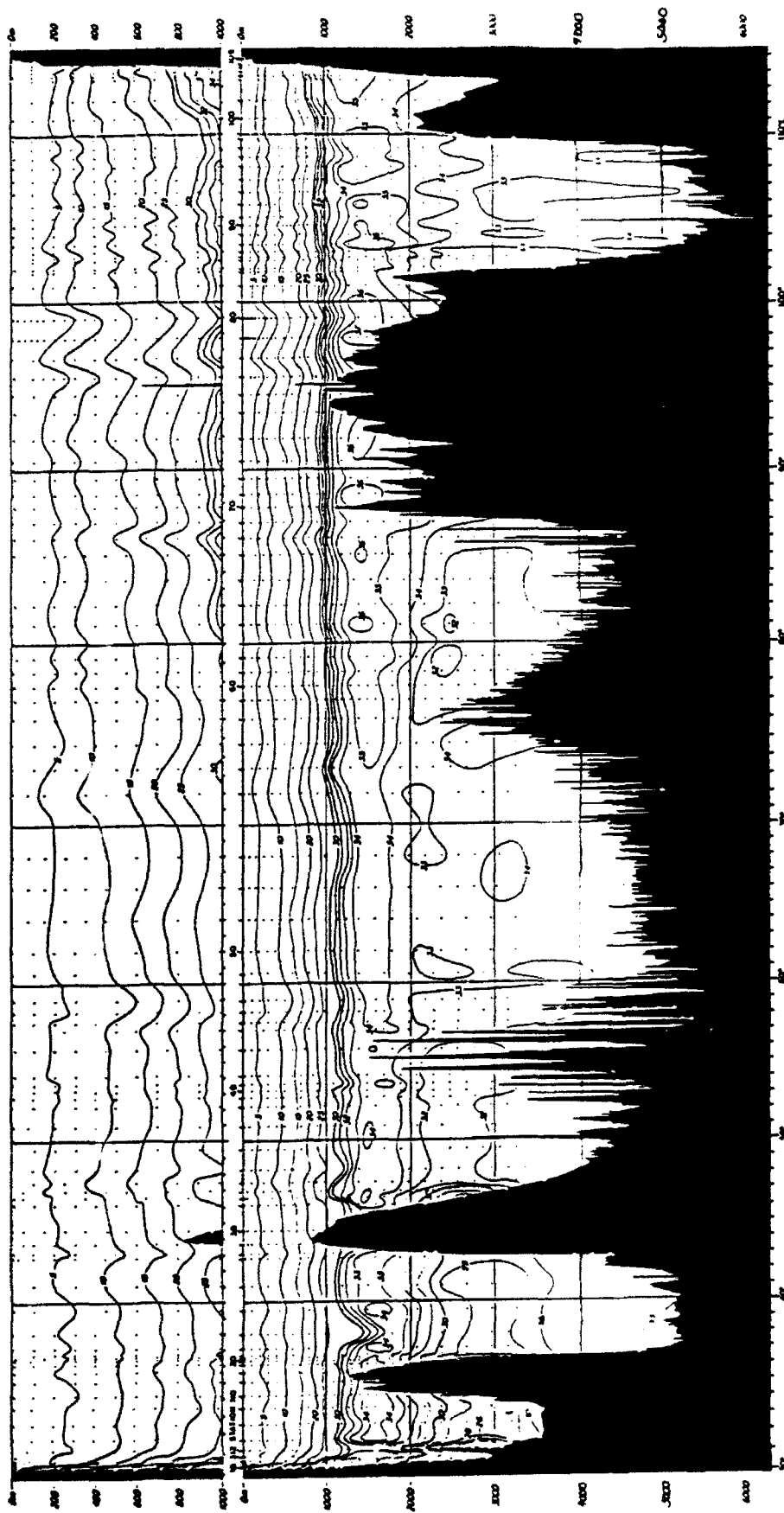


Figure 25: Nitrate vs. depth section of trans-Indian Ocean section. Vertical distortion of the full depth profiles is 500 : 1, while for the expanded shallow sections it is 1250 : 1.

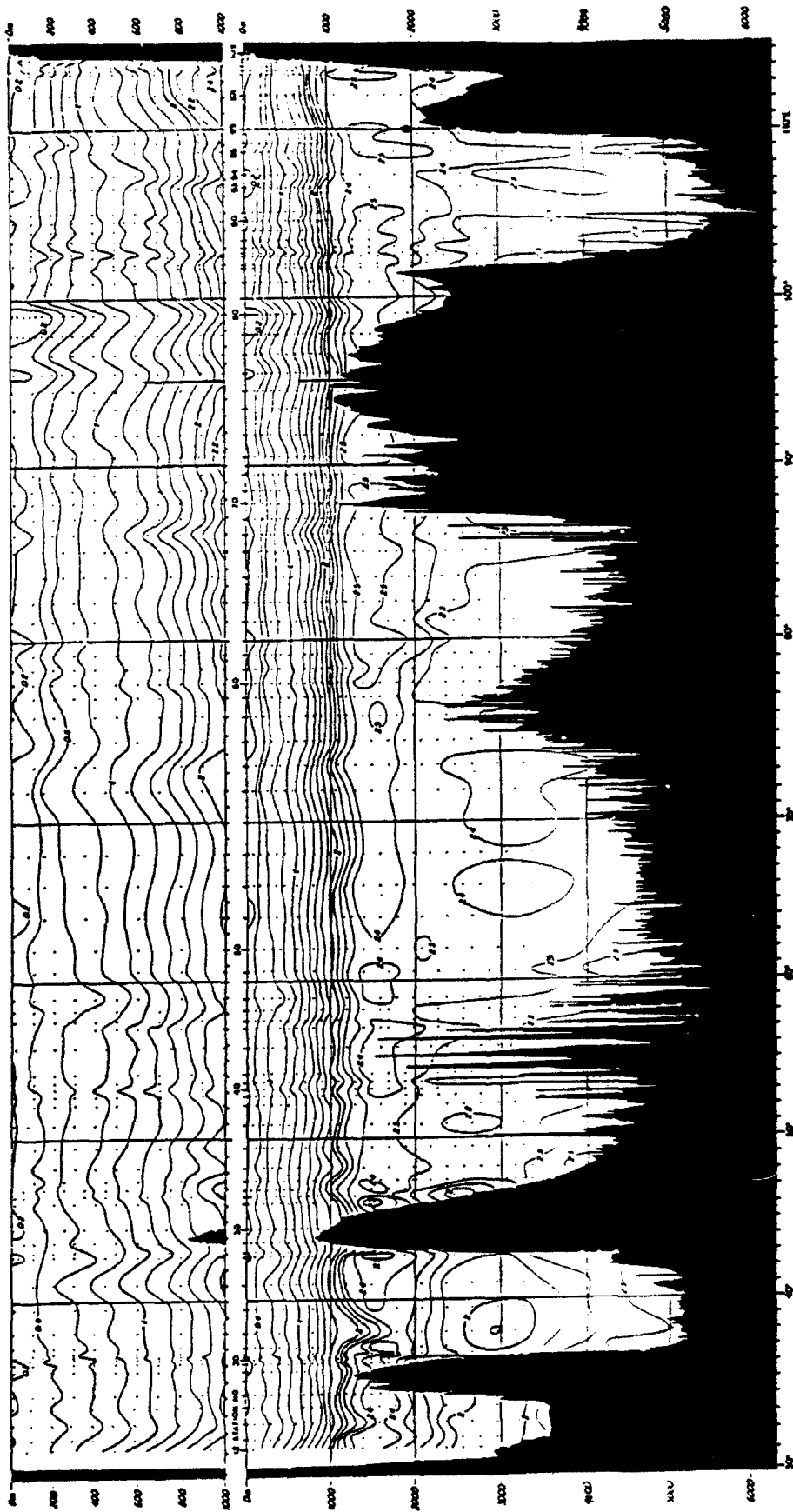


Figure 26: Phosphate vs. depth section of trans-Indian Ocean section. Vertical distortion of the full depth profiles is 500 : 1, while for the expanded shallow sections it is 1250 : 1.



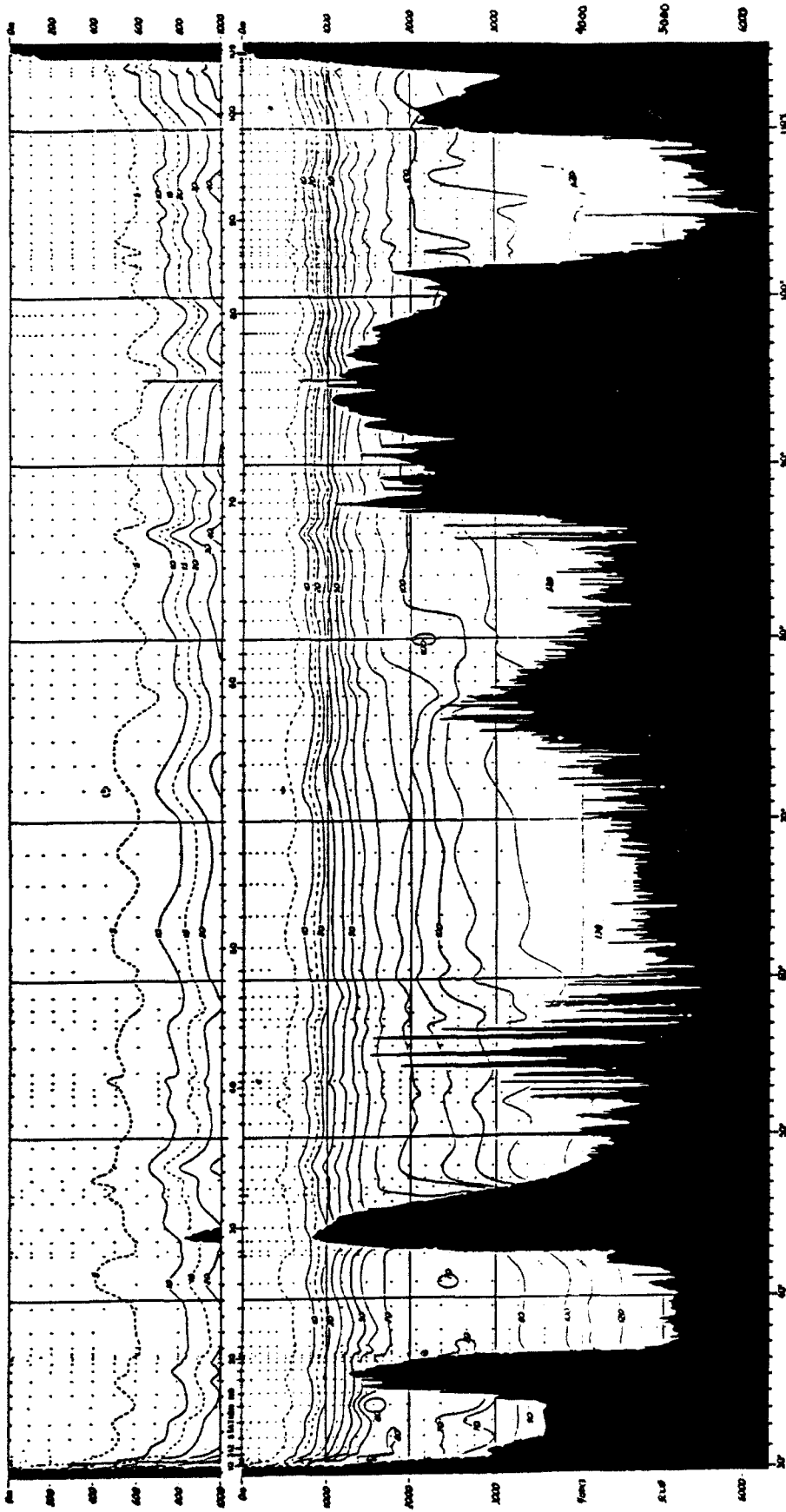


Figure 27: Silicate vs. depth section of trans-Indian Ocean section. Vertical distortion of the full depth profiles is 500 : 1, while for the expanded shallow sections it is 1250 : 1.



## Appendix A: Description of CTD #9 Data Adjustment

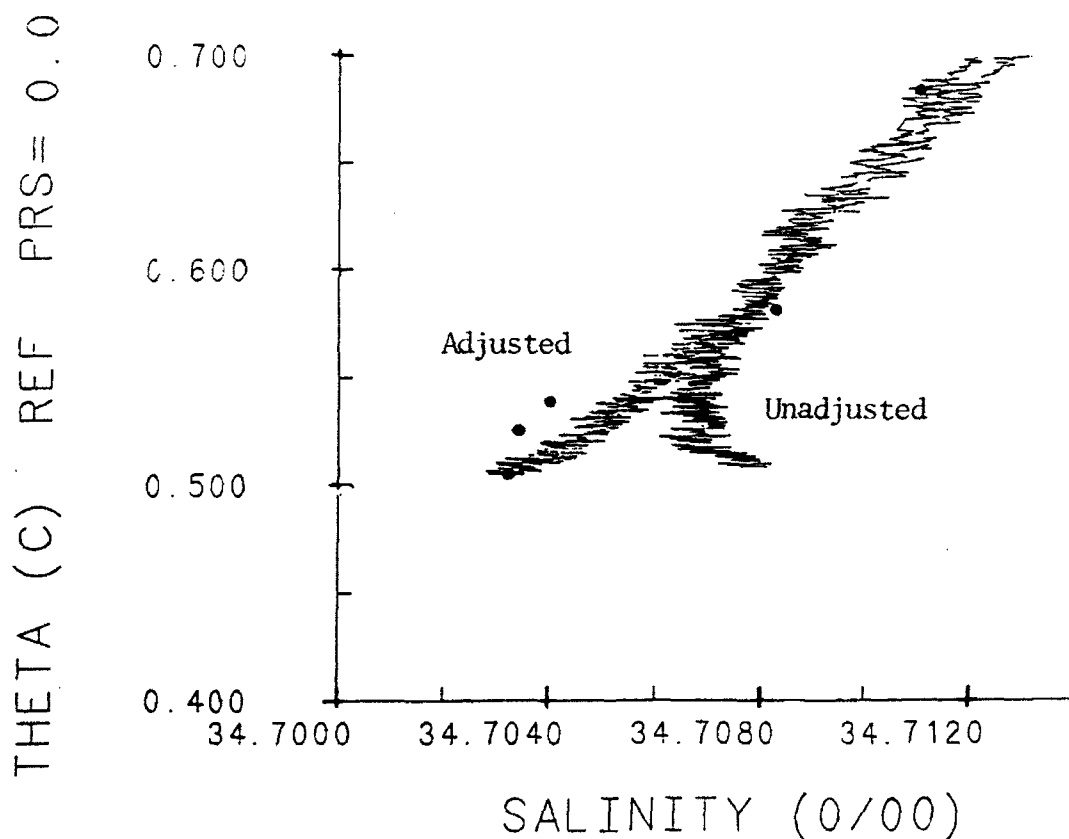
Careful examination of deep ( $T < 4^{\circ}\text{C}$ ) potential temperature/salinity data obtained with WHOI CTD #9 on the  $32^{\circ}\text{S}$  trans-Indian Ocean section revealed a small discrepancy with the water sample measurements. As depicted in Figure A1, standard CTD data calibration techniques yielded CTD profiles which diverged from the water sample data below  $0.8^{\circ}\text{C}$  potential temperature by upwards of 0.002 psu. Salinity, computed from CTD data, is dependent on temperature, conductivity and pressure observations: each of which is subject to error. The relative sensitivity of calculated salinity to these variables is approximately  $0.001^{\circ}\text{C}$ , 0.001 mmho and 2.5 db per 0.001 psu change (based on EOS 80 and nominal values of  $1.5^{\circ}\text{C}$ , 34.7 psu and 4500 db.)

Review of the temperature calibration data for CTD #9 from the pre- and post-cruise laboratory measurements indicated that the salinity discrepancy probably was not the product of error in the temperature calibration. The two laboratory calibrations were internally consistent over the full range of calibration temperatures to better than  $0.002^{\circ}\text{C}$ , and we believe the laboratory measurements have an absolute accuracy of  $0.002^{\circ}\text{C}$ . More importantly, because the salinity error occurred over a rather small temperature interval, the required adjustment of the temperature calibration curve to remove the salinity discrepancy would have induced strong change of curvature to the calibration curve below  $1^{\circ}\text{C}$ . Such structure in a calibration curve is outside our experience with CTD instruments. We therefore concluded that the temperature channel was not the source of the observed salinity problem.

A change in the deep-water conductivity calibration algorithm was also ruled out. In order to match the water sample salinity data, a nonlinear conductivity correction would have been required. The NBIS CTD conductivity sensor, however, is inherently a linear device (N. Brown, personal communication, 1988). Some improvement between CTD and water sample data was obtained by setting to zero the coefficient of conductivity cell deformation with pressure. While full agreement might have been achieved by allowing this coefficient to be negative, we did not pursue this course as it implied non-physical behavior of the CTD sensor (cell expanding with increasing pressure).

Hence by default, we concluded the salinity error was the product of pressure error. Using the figures above, a salinity error of 0.002 psu would result from a pressure error of 5 db. We suspect that residual temperature sensitivity in the pressure sensor was responsible for the pressure error, but we were unable to confirm this in the laboratory. Reduction of the data to final form utilized a modified cubic pressure calibration algorithm. The algorithm agreed with that derived from the polynomial least-square fit to the laboratory data at pressures less than 3000 db. At higher pressures, the final pressures were greater than those generated by the laboratory-derived calibration formula by the amount needed to force the CTD potential temperature/salinity curve to overlie the water sample data; the algorithm is reported in the main section of the text. For the bulk of the deep trans-Indian Ocean

data, the adjustment caused an increase of bottom pressure by 10 db or less. Checks were made to insure that the resulting bottom pressure data were consistent with the acoustic depth recorded at each station. The pressure adjustments that were made were within the uncertainty of the acoustic depth data. Finally it should be noted that because this adjustment was made uniformly to all stations occupied with CTD #9, no spurious signal was introduced into the thermal wind shear field of the ocean interior. Potential does exist for shear error at the transitions between stations which used instruments #9 and #8 (station pairs 3-12 and 15-16). However, bottom pressures at these sites were 3000 db or less, levels where the pressure adjustment of CTD #9 was negligible.



**Figure A1:** Potential temperature vs. CTD salinity plot showing the discrepancy between CTD#9 data and corresponding rosette data in the very deep water. All CTD #9 data was subsequently adjusted as described in Appendix A.

## Appendix B: Station Listing Description

Individual station listings have been created with the following information for the trans-Indian cruise. A description of the Fortran algorithms for computing all parameters except those involving integrals and gradients are documented in Unesco TR 44 "Algorithms for computation of fundamental properties of seawater" by N. P. Fofonoff and R. C. Millard. Starting at the left, the station variables are categorized in four groups as follows. The observed variables: temperature, salinity, and oxygen are vertically filtered values at the pressure level indicated. The standard Woods Hole Oceanographic Institution 2 db pressure-averaged CTD data are centered on odd pressure intervals (1,3,5,7,...) while the adopted pressure listing levels are at even pressure values with the exception of 75 and 125 db. The 2 db temperature, salinity, and oxygen data were smoothed with a binomial filter (Unesco TR 54) and then linearly interpolated as required to the standard levels. The potential temperature, potential density anomaly, and potential density anomaly referenced to 2000 and 4000 db that follow in the listings were computed using the Fortran algorithms of Unesco TR 44. The dynamic height and potential energy are integral quantities from the surface to the pressure interval indicated. These assume that the value of the specific volume anomaly of the first level of the 2 db CTD data profile can be extrapolated to the sea surface. A trapezoidal integration method was employed. The next quantities: potential temperature and salinity gradients, potential vorticity, and Brunt-Väisälä frequency, involve the calculation of vertical gradients. Gradient quantities were estimated from a centered linear least squares fit calculated over half of the neighboring listing intervals. The calculated depth involves a dynamic height correction and a latitude dependent gravity correction.

The header of each station listing contains the beginning time and position for the station. Positions are determined from a transit satellite navigator or by dead reckoning from last fix. The speed of sound is an average value computed from averaged travel time of the profile (Wilson, 1960). The water depth is from an echo sounder, corrected using the Carter tables.

The columns of the station listing are:

PRES DBAR Pressure (P) level in decibars.

TEMP °C Temperature (T) in degrees Celsius calibrated on the 1968 International Practical Temperature Scale (IPTS 1968).

SALT	PSU	Salinity (S) computed from conductivity (C), temperature, and pressure according to the 1978 practical salinity scale. (Unesco TR 44, pp. 6-12). $C(35,15,0) = 42.914$ mmho/cm.
OXYG	ML/L	Oxygen in units of milliliters per liter. The partial pressure of oxygen is computed from the polarographic electrode measurements using an algorithm described by Owens and Millard (1985).
PTEMP	°C	Potential temperature $\theta$ in degrees Celsius computed by integrating the adiabatic lapse rate after Bryden (1973) (see Unesco TR 44, pp. 42-45). The reference level, $P_r$ , for the calculation is 0.0 db. $\theta = \theta(S,T,P,P_r)$ .
SIGTH	kg/m <sup>3</sup>	Potential density anomaly in kilograms/m <sup>3</sup> . Obtained by computing the density anomaly $\gamma(S,T,P)$ (density - 1000 kg/m <sup>3</sup> ) at 0 pressure replacing the <i>in situ</i> temperature with potential temperature $\theta = \theta(S,T,P,0.0)$ referenced to 0 db. $\gamma_\theta = \gamma(S,\theta,0.0)$ .
SIGM2	kg/m <sup>3</sup>	Potential density anomaly referenced to 2000 db in kilograms/m <sup>3</sup> . Obtained by computing the density anomaly $\gamma$ (density - 1000 kg/m <sup>3</sup> ) at 2000 db using potential temperature referenced to 2000 db $\theta = \theta(S,T,P,2000)$ , $\gamma_\theta = \gamma(S,\theta,2000)$ .
SIGM4	kg/m <sup>3</sup>	Potential density anomaly referenced to 4000 db in kilograms/m <sup>3</sup> . Obtained by computing the density anomaly $\gamma$ (density - 1000 kg/m <sup>3</sup> ) at 4000 db with potential temperature referenced to 4000 db $\theta = \theta(S,T,P,4000)$ . $\gamma_\theta = \gamma(S,\theta,4000)$ .
DYN-HT	$10\left(\frac{J}{kg}\right)$	Dynamic height in units of dynamic meters (10 Joules/kg) is the integral with pressure of specific volume anomaly (see <i>The Sea</i> , Volume I, p. 336 by Fonoff, 1962).

POT. E	$10^{-5} \left( \frac{J}{m^2} \right)$	Potential energy anomaly in $10^{-5}$ Joules/m <sup>2</sup> is the integral with pressure of the specific volume anomaly multiplied by pressure (see <i>The Sea</i> , Volume I, p. 338 by Fofonoff, 1962).
GRD-PT	$10^3 \left( \frac{^{\circ}C}{db} \right)$	Potential temperature gradient in units of millidegrees Celsius per decibar. Estimated from the least squares temperature gradient over half the surrounding pressure intervals minus the center pressure adiabatic lapse rate.
GRD-S	$10^3 \left( \frac{psu}{db} \right)$	Salinity gradient in psu per decibar. Estimated from the least squares salinity gradient over half the surrounding pressure intervals.
POT-V	$10^{-12} m s^{-1}$	Planetary potential vorticity in $m^{-1} \cdot s^{-1}$ . This is defined as $fE$ , where $f$ is the Coriolis frequency and $E$ is the stability parameter (Millard <i>et al.</i> , 1990) estimated over half the surrounding pressure intervals.
B-V	(1/hr)	Brunt-Väisälä frequency in cycles per hour. This is the natural frequency of oscillation of a water parcel when vertically displaced from a rest position assuming no exchanges of heat or salt with surroundings. This calculation uses the adiabatic leveling of steric anomaly (Fofonoff, 1985; Millard <i>et al.</i> , 1990).
DEPTH	(m)	The depth of the pressure interval including the local gravity and dynamic height (see DYN-HT definition) corrections (see Unesco TR 44, pp. 25-28).





**Station Listing Data Sheets**



CRUISE: CD 29 STA: 1 DATE (D/M/Y): 13-11-87 TIME: 0625 LAT: 31 35.07 S LONG: 31 10 56 E

GRAVITY= 9.7945 M/S CORIOLIS= -.76386E-04 1/S SOUND SPEED= 1500.2 M/S Depth= 3107 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HT	PE	GRD-PT	GRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	20.685	35.537	5.76	20.685	24.990	33.413	41.473	0.000	0.0	-0.19	0.000	0.00	0.000	0.0
1	20.685	35.537	5.76	20.685	24.990	33.413	41.473	0.003	0.0	-0.38	0.000	0.00	0.000	1.0
20	20.693	35.556	5.67	20.689	25.003	33.425	41.486	0.059	0.1	-0.08	0.003	-1.71	0.268	19.9
30	20.695	35.556	5.67	20.690	25.003	33.425	41.486	0.089	0.1	0.43	-0.030	10.39	-0.661	29.9
40	20.697	35.556	5.67	20.689	25.003	33.426	41.486	0.118	0.2	-0.69	0.079	-10.47	0.882	39.8
50	20.420	35.576	5.69	20.411	25.093	33.524	41.592	0.148	0.4	-123.29	7.263	-2874.04	10.999	49.8
100	18.153	35.643	5.40	18.136	25.732	34.233	42.366	0.271	1.3	-19.09	-0.361	-337.61	3.770	99.5
125	17.794	35.623	5.30	17.773	25.806	34.319	42.464	0.328	2.0	-11.64	-0.340	-197.16	2.881	124.3
150	17.510	35.616	5.30	17.484	25.872	34.394	42.548	0.383	2.7	-10.61	-0.311	-179.91	2.752	149.2
200	16.924	35.580	5.19	16.891	25.987	34.529	42.702	0.489	4.6	-16.19	-1.061	-229.85	3.111	198.9
250	16.169	35.538	5.09	16.129	26.133	34.702	42.899	0.590	6.9	-13.77	-1.192	-172.86	2.697	248.5
300	15.358	35.444	5.04	15.311	26.246	34.845	43.071	0.685	9.6	-15.56	-1.390	-186.11	2.799	298.2
350	14.718	35.387	5.01	14.665	26.345	34.967	43.215	0.777	12.6	-14.32	-1.563	-149.70	2.510	347.8
400	14.150	35.335	5.09	14.091	26.428	35.072	43.340	0.864	16.0	-11.66	-0.875	-140.60	2.433	397.4
450	13.479	35.246	5.21	13.415	26.500	35.171	43.464	0.948	19.6	-14.93	-2.328	-103.68	2.089	447.0
500	12.906	35.180	5.14	12.836	26.566	35.260	43.574	1.030	23.6	-13.44	-1.822	-104.66	2.099	496.6
600	11.721	35.015	5.05	11.642	26.669	35.412	43.772	1.186	32.3	-14.03	-1.818	-104.06	2.093	595.0
700	10.424	34.859	4.99	10.338	26.784	35.582	43.995	1.333	42.1	-14.03	-1.609	-104.16	2.094	694.8
800	9.183	34.737	4.81	9.092	26.898	35.751	44.215	1.469	52.5	-12.92	-1.033	-110.97	2.161	793.8
900	7.740	34.605	4.72	7.647	27.016	35.936	44.462	1.595	63.4	-15.52	-1.275	-117.39	2.223	892.0
1000	6.427	34.517	4.57	6.333	27.128	36.111	44.696	1.708	74.3	-11.22	-0.630	-91.55	1.963	991.7
1200	4.510	34.458	4.44	4.413	27.311	36.389	45.064	1.902	96.1	-6.60	0.138	-77.42	1.805	1189.3
1400	3.903	34.572	4.04	3.793	27.467	36.575	45.278	2.063	117.4	-3.12	0.426	-56.94	1.548	1386.7
1600	3.365	34.652	4.00	3.244	27.584	36.720	45.449	2.200	138.2	-2.33	0.394	-46.92	1.405	1583.9
1800	2.930	34.701	4.21	2.798	27.665	36.823	45.574	2.316	158.4	-1.79	0.245	-32.71	1.173	1780.9
2000	2.749	34.736	4.38	2.601	27.710	36.879	45.639	2.421	178.7	-0.55	0.100	-11.60	0.699	1977.7
2200	2.617	34.762	4.58	2.453	27.744	36.920	45.686	2.521	200.1	-0.70	0.135	-15.43	0.806	2174.3
2400	2.519	34.786	4.76	2.338	27.773	36.955	45.727	2.617	222.5	-0.54	0.091	-11.26	0.688	2370.7
2600	2.442	34.801	4.94	2.243	27.793	36.980	45.756	2.709	246.1	-0.50	0.093	-11.01	0.681	2567.0
2800	2.334	34.814	5.08	2.118	27.813	37.007	45.790	2.799	270.8	-0.70	0.028	-9.70	0.639	2763.0
3000	2.192	34.814	5.16	1.959	27.826	37.028	45.820	2.886	296.5	-1.17	-0.035	-11.74	0.703	2958.9
3127	2.073	34.809	5.22	1.830	27.832	37.042	45.840	2.939	313.3	-0.77	-0.037	-11.74	0.000	3083.2

BOTL NO.	PRES DBAR	CTD IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUAL1
0	1010.1	6.376	6.281	27.141	36.126	44.713	34.528	34.540	4.51							999	222555555
0	1010.1	6.374	6.280	27.141	36.126	44.713	34.528	34.541	4.50							999	222555555
0	1012.4	6.360	6.266	27.144	36.130	44.718	34.530	34.539	4.50							1002	222555555
0	1012.9	6.360	6.265	27.144	36.130	44.718	34.530	34.538	4.37							1002	222555555
0	1012.9	6.359	6.265	27.144	36.130	44.718	34.530	34.537	4.44							1002	222555555
0	1004.1	6.422	6.327	27.131	36.114	44.699	34.524	34.525	4.60							994	222555555
0	1000.6	6.430	6.336	27.126	36.108	44.693	34.518	34.525								990	222555555
0	1999.6	2.749	2.601	27.708	36.876	45.636	34.737	34.741	4.58							1974	222555555
0	1999.6	2.749	2.601	27.708	36.876	45.636	34.737	34.741	4.38							1974	222555555
0	2002.6	2.747	2.599	27.708	36.877	45.636	34.737	34.741	4.37							1977	222555555
0	2004.0	2.746	2.598	27.708	36.877	45.637	34.737	34.740	4.39							1979	222555555
0	2002.6	2.747	2.598	27.708	36.877	45.637	34.737	34.738	4.39							1977	222555555
0	2003.6	2.747	2.599	27.708	36.877	45.636	34.737	34.738	4.37							1978	222555555
0	2003.4	2.747	2.599	27.708	36.877	45.636	34.737	34.738	4.37							1978	222555555
0	2003.0	2.747	2.598	27.708	36.877	45.637	34.737	34.937	4.41							1978	222555555
0	3125.1	2.073	1.831	27.830	37.039	45.837	34.810	34.813	5.22							3078	222555555
0	3124.2	2.074	1.831	27.830	37.039	45.837	34.810	34.813	5.30							3077	222555555
0	3125.4	2.073	1.830	27.830	37.039	45.837	34.810	34.813	5.20							3078	222555555
0	3127.4	2.074	1.831	27.830	37.039	45.837	34.810	34.815	5.18							3080	222555555
0	3129.5	2.073	1.830	27.830	37.039	45.837	34.810	34.814	5.21							3082	222555555
0	3125.6	2.073	1.831	27.830	37.039	45.837	34.810	34.813	5.22							3078	222555555
0	3125.7	2.073	1.831	27.830	37.039	45.837	34.810	34.814	5.20							3078	222555555
0	3124.5	2.073	1.831	27.830	37.039	45.837	34.810	34.811	5.21							3077	222555555

CRUISE: CD 29 STA: 3 DATE (D/M/Y): 13-11-87 TIME: 2035 LAT: 31 22.54 S LONG: 30 50 10 E

GRAVITY= 9.7943 M/S CORIOLIS= -.75932E-04 1/S SOUND SPEED= 1498.6 M/S Depth= 2931 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2	GRD-PT C/DB	GRD-S 1/DB	POT-v (m s)-1	B-v CPM	DEPTH METERS
0	23.083	35.393	5.51	23.083	24.210	32.565	40.564	0.000	0.0	-0.20	0.000	0.00	0.000	0.0
1	23.083	35.393	5.51	23.083	24.210	32.566	40.564	0.004	0.0	-0.41	0.000	0.00	0.000	1.0
20	23.095	35.391	5.20	23.091	24.206	32.561	40.559	0.074	0.1	-1.01	0.057	-25.03	1.030	19.9
30	23.008	35.397	5.33	23.002	24.236	32.594	40.594	0.111	0.2	-110.87	7.701	-2793.52	10.076	29.9
40	21.000	35.539	5.36	21.072	24.886	33.298	41.348	0.145	0.3	-37.95	3.496	-973.76	6.421	39.8
50	20.970	35.549	5.28	20.961	24.924	33.339	41.392	0.176	0.4	-13.50	0.901	-325.16	3.711	49.8
100	18.659	35.626	4.80	18.641	25.592	34.077	42.195	0.310	1.4	-29.38	0.523	-584.06	4.976	99.5
125	17.978	35.643	5.08	17.957	25.777	34.283	42.422	0.368	2.1	-14.65	0.792	-330.69	3.742	124.4
150	17.609	35.637	5.06	17.584	25.863	34.382	42.533	0.423	2.9	-16.70	-0.387	-287.75	3.491	149.2
200	16.675	35.572	4.86	16.643	26.039	34.590	42.771	0.529	4.8	-19.91	-1.297	-279.30	3.439	198.9
250	15.682	35.501	4.92	15.643	26.216	34.802	43.016	0.626	7.0	-17.13	-1.359	-216.19	3.026	248.6
300	14.904	35.431	4.91	14.858	26.337	34.952	43.193	0.718	9.6	-14.00	-1.298	-159.45	2.598	298.2
350	14.300	35.367	4.99	14.248	26.419	35.057	43.320	0.805	12.4	-12.91	-1.484	-125.62	2.306	347.8
400	13.602	35.282	4.96	13.545	26.501	35.166	43.454	0.888	15.6	-14.73	-1.936	-123.10	2.283	397.5
450	13.000	35.200	4.96	12.937	26.561	35.251	43.561	0.969	19.1	-12.92	-1.718	-101.79	2.076	447.1
500	12.361	35.110	5.03	12.294	26.618	35.334	43.669	1.048	22.9	-12.34	-1.843	-80.76	1.849	496.6
600	11.066	34.938	4.94	10.991	26.730	35.500	43.886	1.198	31.4	-12.96	-1.628	-92.10	1.975	595.8
700	9.726	34.784	4.80	9.644	26.844	35.673	44.114	1.339	40.7	-13.29	-1.306	-104.18	2.100	694.8
800	8.415	34.677	4.51	8.329	26.971	35.859	44.355	1.468	50.6	-13.24	-0.806	-120.83	2.262	793.8
900	6.830	34.554	4.33	6.743	27.103	36.065	44.632	1.585	60.7	-16.17	-1.366	-110.76	2.166	892.8
1000	5.499	34.460	4.44	5.412	27.199	36.227	44.854	1.689	70.8	-10.34	-0.240	-98.30	2.040	991.7
1200	4.203	34.491	4.12	4.109	27.370	36.463	45.152	1.869	90.9	-5.21	0.344	-71.94	1.745	1189.3
1400	3.536	34.595	3.85	3.431	27.522	36.648	45.368	2.017	110.4	-3.02	0.398	-52.90	1.497	1386.7
1600	3.114	34.672	3.90	2.996	27.624	36.772	45.513	2.141	129.4	-1.10	0.328	-30.92	1.144	1583.9
1800	2.818	34.721	4.08	2.686	27.691	36.855	45.611	2.251	148.5	-1.56	0.216	-28.34	1.095	1780.8
2000	2.631	34.756	4.40	2.484	27.737	36.911	45.676	2.351	167.8	-0.78	0.144	-16.49	0.836	1977.6
2200	2.517	34.776	4.57	2.354	27.763	36.944	45.716	2.445	188.0	-0.53	0.098	-11.23	0.690	2174.2
2400	2.460	34.797	4.82	2.280	27.786	36.971	45.746	2.537	209.5	-0.51	0.057	-8.83	0.612	2370.7
2600	2.380	34.806	4.94	2.182	27.832	36.992	45.772	2.626	232.3	-0.66	0.067	-11.22	0.689	2566.9
2800	2.236	34.815	5.10	2.022	27.822	37.021	45.809	2.713	256.2	-1.07	-0.006	-11.83	0.708	2762.9
2951	2.042	34.808	5.12	1.817	27.832	37.042	45.841	2.776	274.8	-1.79	-0.078	-11.83	0.000	2910.0

BOTL NO.	PRES DBAR	CTD TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUAL1
13	14.3	23.098	23.096	24.202	32.557	40.555	35.392	35.392	5.25	2.19		0.20	0.00			14	222252255
12	201.5	16.447	16.415	26.090	34.648	42.836	35.572	35.558	4.82	4.12		5.30	0.01			199	222252255
11	402.4	13.567	13.510	26.500	35.166	43.456	35.275	35.274	5.01	4.64		9.40	0.01			398	222252255
10	597.0	11.181	11.105	26.710	35.476	43.858	34.944	34.951	4.94	7.09		15.00	0.01			592	222252255
9	803.8	8.328	8.242	26.980	35.072	44.372	34.676	34.673	4.50	18.12		23.40	0.01			796	222252255
7	1402.5	3.332	3.229	27.537	36.674	45.404	34.594	34.580	3.91	69.38		34.20	0.00			1387	222252255
6	1800.6	2.806	2.675	27.609	36.854	45.610	34.722	34.723	4.05	80.76		32.50	0.00			1779	222252255
5	2199.9	2.527	2.364	27.759	36.940	45.711	34.776	34.778	4.63	73.96		30.00	0.00			2171	222252255
4	2603.4	2.372	2.174	27.801	36.991	45.772	34.808	34.808	4.95	67.85		28.20	0.00			2567	222252255
3	2949.7	2.042	1.817	27.829	37.039	45.838	34.808	34.807	5.10	74.17		28.10	0.00			2906	222252255
2	2949.1	2.041	1.817	27.829	37.039	45.838	34.808	34.810	5.14	74.01		28.10	0.00			2906	222252255

CRUISE: CD 29 STA: 4 DATE (D/M/Y): 14-11-87 TIME: 0125 LAT: 31 15.59 S LONG 30 39 30 E

GRAVITY= 9.7942 M/S CORIOLIS= -.75680E-04 1/S SOUND SPEED= 1497.9 M/S Depth= 2926 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HT	PE	GRD-PT	GRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	23.388	35.368	5.22	23.388	24.101	32.449	40.440	0.000	0.0	-0.21	0.000	0.00	0.000	0.0
3	23.388	35.368	5.22	23.388	24.102	32.449	40.440	0.011	0.0	-0.41	0.000	0.00	0.000	3.0
20	23.394	35.368	5.24	23.390	24.101	32.449	40.439	0.076	0.1	-0.46	0.052	-12.90	0.740	19.9
30	23.399	35.367	5.32	23.393	24.100	32.448	40.438	0.114	0.2	0.88	-0.097	24.49	-1.020	29.9
40	23.343	35.370	5.22	23.334	24.119	32.468	40.460	0.152	0.3	-30.84	1.264	-736.78	5.595	39.8
50	21.831	35.450	5.08	21.821	24.611	33.002	41.033	0.189	0.5	-220.13	16.232	-5489.06	15.271	49.8
100	18.240	35.636	5.10	18.222	25.705	34.203	42.334	0.323	1.5	-32.60	0.460	-635.82	5.197	99.5
125	17.722	35.627	4.98	17.701	25.827	34.342	42.489	0.380	2.1	-19.24	0.149	-351.26	3.863	124.4
150	17.341	35.637	5.23	17.315	25.928	34.456	42.615	0.434	2.9	-6.18	0.603	-146.13	2.492	149.2
200	16.433	35.561	4.94	16.400	26.087	34.646	42.835	0.537	4.7	-21.47	-1.930	-267.51	3.371	198.9
250	15.540	35.491	4.90	15.501	26.240	34.831	43.050	0.633	6.9	-20.33	-1.637	-251.63	3.270	248.6
300	14.636	35.406	4.90	14.591	26.375	35.000	43.251	0.722	9.4	-13.49	-1.303	-147.49	2.503	298.2
350	13.800	35.317	4.94	13.829	26.468	35.123	43.400	0.807	12.2	-13.55	-1.575	-126.85	2.321	347.8
400	13.216	35.229	5.00	13.160	26.539	35.220	43.522	0.889	15.4	-16.51	-2.298	-125.34	2.308	397.5
450	12.521	35.134	5.04	12.460	26.605	35.314	43.642	0.967	18.8	-11.11	-1.353	-90.70	1.963	447.1
500	11.837	35.046	4.98	11.772	26.669	35.406	43.761	1.043	22.5	-15.57	-1.991	-115.01	2.211	496.6
600	10.374	34.880	4.39	10.302	26.807	35.606	44.020	1.187	30.5	-10.61	-1.003	-90.00	1.955	595.0
700	9.456	34.800	4.08	9.376	26.901	35.741	44.193	1.321	39.4	-12.45	-1.205	-94.00	1.999	694.8
800	8.134	34.678	4.20	8.049	27.014	35.915	44.423	1.445	48.9	-18.89	-1.732	-130.39	2.354	793.8
900	6.447	34.546	4.20	6.362	27.147	36.128	44.711	1.556	58.4	-9.75	-0.123	-102.56	2.087	892.8
1000	5.468	34.528	4.02	5.381	27.256	36.285	44.913	1.655	68.0	-6.63	0.399	-93.99	1.998	991.6
1200	4.095	34.583	3.68	4.002	27.455	36.552	45.244	1.820	86.5	-4.78	0.538	-78.89	1.831	1189.2
1400	3.240	34.672	3.78	3.146	27.610	36.750	45.483	1.950	103.7	-3.55	0.170	-44.39	1.373	1386.6
1600	2.854	34.714	4.04	2.739	27.680	36.842	45.595	2.059	120.3	-1.39	0.201	-25.24	1.036	1583.8
1800	2.658	34.748	4.30	2.529	27.726	36.899	45.661	2.158	137.5	-0.76	0.155	-16.57	0.839	1780.7
2000	2.545	34.771	4.54	2.400	27.756	36.935	45.704	2.252	155.7	-0.57	0.109	-12.10	0.717	1977.5
2200	2.462	34.793	4.74	2.300	27.781	36.965	45.739	2.342	175.0	-0.38	0.082	-8.73	0.609	2174.1
2400	2.408	34.805	4.87	2.229	27.797	36.985	45.762	2.430	195.6	-0.44	0.048	-7.45	0.563	2370.5
2600	2.321	34.813	5.00	2.125	27.812	37.005	45.787	2.517	217.8	-0.43	0.033	-6.66	0.532	2566.8
2800	2.178	34.814	5.01	1.965	27.826	37.028	45.819	2.602	241.3	-1.44	-0.040	-13.92	0.769	2762.8
2935	2.014	34.807	5.13	1.792	27.833	37.045	45.845	2.658	257.5	-1.25	-0.061	-13.92	0.000	2895.1

BOTL NO.	PRES DBAR	CTD IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT
14	11.9	23.354	23.351	24.109	32.458	40.450	35.368	35.367	5.15	2.30		0.30	0.01		0.000	11	222252255
13	79.3	19.863	18.849	25.523	34.002	42.114	35.609	35.599	4.93	3.88		2.70	0.25			78	222252255
12	200.4	16.446	16.414	26.080	34.639	42.828	35.560	35.556	4.92	4.23		5.40	0.01			198	222252255
11	500.4	11.769	11.704	26.675	35.416	43.773	35.042	35.034	5.08	5.00		13.10	0.01			495	222252255
10	698.9	9.470	9.389	26.896	35.736	44.187	34.801	34.798	4.17	18.71		22.40	0.01			692	222252255
9	800.3	7.951	7.868	27.037	35.946	44.462	34.677	34.669	4.20	24.12		25.60	0.01			792	222252255
8	1001.9	5.500	5.413	27.252	36.279	44.905	34.531	34.554	3.89	46.98		31.90	0.00			991	222252255
7	1199.6	4.094	4.000	27.452	36.550	45.242	34.584	34.581	3.70	65.66		34.40	0.00			1186	222252255
6	1399.6	3.238	3.136	27.608	36.749	45.482	34.672	34.676	3.76	80.33		34.10	0.01			1384	222252255
5	1600.4	2.848	2.733	27.678	36.840	45.593	34.714	34.715	4.03	80.18		32.70	0.00			1582	222252255
4	1898.2	2.601	2.464	27.740	36.916	45.682	34.763	34.764	4.43	75.49		30.30	0.00			1875	222252255
3	2200.6	2.461	2.299	27.778	36.962	45.737	34.793	34.793	4.79							2172	222555555
2	2502.9	2.351	2.163	27.802	36.993	45.774	34.800	34.800	4.89	68.70		28.30	0.00			2469	222252255

CRUISE: CD 29 STA: 5 DATE (D/M/Y): 14-11-87 TIME: 0546 LAT: 31 12.09 S LONG: 30 35.84 E

GRAVITY= 9.7942 M/S CORIOLIS= -.75553E-04 1/S SOUND SPEED= 1496.9 M/S Depth= 2675 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	23.431	35.351	5.17	23.431	24.076	32.423	40.413	0.000	0.0	-0.21	0.000	0.00	0.000	0.0
1	23.431	35.351	5.17	23.431	24.077	32.423	40.413	0.004	0.0	-0.41	0.000	0.00	0.000	1.0
20	23.429	35.351	5.16	23.425	24.078	32.425	40.415	0.077	0.1	-0.93	0.069	-23.92	1.009	19.9
30	23.424	35.352	5.20	23.418	24.081	32.428	40.418	0.115	0.2	-0.86	0.119	-25.23	1.036	29.9
40	23.377	35.357	5.21	23.369	24.099	32.448	40.439	0.153	0.3	-18.33	1.883	-501.34	4.619	39.8
50	22.842	35.402	5.06	22.832	24.288	32.651	40.656	0.191	0.5	-240.35	14.160	-5847.18	15.774	49.8
100	18.278	35.651	5.30	18.260	25.707	34.204	42.334	0.328	1.5	-37.54	1.331	-776.66	5.749	99.5
125	17.549	35.634	5.08	17.528	25.875	34.395	42.548	0.384	2.2	-22.30	-0.917	-357.42	3.900	124.4
150	17.142	35.608	4.91	17.117	25.954	34.489	42.654	0.437	2.9	-10.38	-0.840	-140.35	2.444	149.2
200	16.447	35.561	4.79	16.415	26.084	34.643	42.831	0.540	4.7	-17.69	-1.601	-219.32	3.055	198.9
250	15.577	35.495	4.79	15.537	26.234	34.825	43.042	0.636	6.9	-16.46	-1.279	-207.58	2.972	248.6
300	14.755	35.416	4.85	14.710	26.357	34.978	43.224	0.727	9.5	-20.49	-2.116	-217.32	3.041	298.2
350	13.912	35.325	4.95	13.861	26.468	35.121	43.398	0.812	12.3	-16.82	-2.209	-142.63	2.464	347.9
400	13.130	35.224	5.02	13.074	26.552	35.236	43.542	0.893	15.4	-16.66	-2.196	-132.51	2.375	397.5
450	12.361	35.115	4.75	12.301	26.621	35.337	43.672	0.971	18.8	-13.50	-1.936	-92.23	1.981	447.1
500	11.687	35.027	4.67	11.622	26.682	35.426	43.787	1.046	22.4	-15.16	-1.789	-118.32	2.244	496.6
600	10.302	34.868	4.52	10.230	26.810	35.613	44.029	1.189	30.4	-11.65	-1.149	-95.34	2.014	595.8
700	9.334	34.785	4.15	9.254	26.909	35.754	44.211	1.322	39.2	-11.48	-0.961	-94.62	2.007	694.8
800	8.021	34.670	4.17	7.938	27.024	35.930	44.443	1.445	48.6	-7.74	-0.258	-80.97	1.856	793.8
900	7.233	34.641	3.92	7.143	27.116	36.059	44.607	1.559	53.5	-16.36	-1.136	-124.12	2.298	892.8
1000	5.574	34.576	3.80	5.486	27.282	36.305	44.927	1.658	68.1	-10.90	0.369	-137.22	2.417	991.6
1200	3.673	34.664	3.58	3.583	27.562	36.679	45.391	1.809	85.0	-6.54	0.215	-76.72	1.807	1189.2
1400	3.028	34.689	3.90	2.928	27.644	36.795	45.539	1.925	109.3	-1.86	0.157	-26.80	1.068	1386.6
1600	2.769	34.727	4.10	2.655	27.698	36.864	45.621	2.029	116.2	-1.26	0.192	-23.30	0.996	1583.7
1800	2.594	34.759	4.35	2.465	27.741	36.916	45.682	2.125	132.8	-0.65	0.113	-13.00	0.744	1780.7
2000	2.522	34.780	4.56	2.377	27.764	36.944	45.714	2.216	150.5	-0.49	0.099	-10.65	0.673	1977.5
2200	2.438	34.798	4.80	2.276	27.788	36.973	45.748	2.305	169.5	-0.30	0.063	-7.58	0.568	2174.1
2400	2.337	34.811	4.95	2.159	27.807	36.999	45.780	2.391	189.8	-0.06	0.060	-12.67	0.734	2370.5
2600	2.184	34.815	5.08	1.990	27.824	37.025	45.814	2.475	211.1	-0.96	0.000	-12.67	0.000	2566.7
2655	2.162	34.814	5.07	1.963	27.826	37.028	45.819	2.497	217.1	-0.83	-0.004	-12.67	0.000	2620.7

BOTL NO.	PRES DBAR	CTD IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	** CTDSAL PSS78	** SALNTY PSS78	** OXYGEN ML/L	** SILCAT UMOL/L	** PHSPHT UMOL/L	** NITRAT UMOL/L	** NITRIT UMOL/L	** CFC-11 PM/KG	** CFC-12 PM/KG	DEPTH METERS	QUALT1
15	9.2	23.419	23.417	24.077	32.425	40.415	35.351	35.353	5.10	2.66		0.20	0.03			9	222252255
14	56.2	20.230	20.220	25.079	33.517	41.591	35.495	35.548	4.96	2.85		1.30	0.07			55	222252255
13	201.6	16.177	16.145	26.143	34.711	42.908	35.560	35.535	4.82	4.46		5.80	0.02			199	222252255
12	482.1	12.886	12.854	26.592	35.285	43.600	35.216		5.01	5.55		10.90	0.00			398	252252255
11	800.2	10.175	10.103	26.828	35.636	44.058	34.867	34.856	4.41	13.57		0.00	0.00			594	222252255
10	800.7	8.081	7.997	27.014	35.917	44.427	34.672	34.668	4.20	24.11		25.50	0.00			793	222252255
9	999.7	5.513	5.425	27.286	36.312	44.937	34.576	34.581	3.71	50.72		32.20	0.00			989	222252255
7	1399.2	3.016	2.916	27.641	36.794	45.538	34.689	34.685	3.92	80.27		33.50	-0.01			1383	222252255
6	1604.0	2.728	2.614	27.699	36.868	45.827	34.728	34.731	4.19	79.79		32.10	0.00			1585	222252255
5	1902.3	2.566	2.428	27.749	36.926	45.694	34.770	34.770	4.38	75.72		30.50	0.00			1879	222252255
4	2202.1	2.446	2.284	27.784	36.969	45.744	34.799	34.802	4.73	70.22		28.90	0.00			2173	222252255
3	2500.1	2.271	2.085	27.813	37.009	45.794	34.815	34.814	5.03	68.66		27.90	-0.01			2466	222252255
2	2646.6	2.165	1.967	27.823	37.025	45.816	34.815	34.812	5.06	70.68		27.90	-0.01			2609	222252255

CRUISE: CD 29 STA: 6 DATE (D/M/Y): 14-11-87 TIME: 0929 LAT: 31 9.14 S LONG: 30 32.08 E

GRAVITY= 9.7942 M/S CORIOLIS= -.75446E-04 1/S SOUND SPEED= 1495.4 M/S Depth= 2306 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-MT DYNAMIC METERS	F J/M2	GRD-PT C/DB	GRD-S 1/DB	POT-V (m s)-1	B-V CPH	DEPTH METERS
0	23.077	35.393	5.17	23.077	24.211	32.567	40.565	0.000	0.0	-0.20	0.000	0.00	0.000	0.0
1	23.077	35.393	5.17	23.077	24.211	32.567	40.565	0.004	0.0	-0.41	0.000	0.00	0.000	1.0
20	23.075	35.396	5.14	23.071	24.215	32.571	40.570	0.074	0.1	-5.04	0.049	-110.52	2.170	19.9
30	23.030	35.394	5.08	23.024	24.227	32.595	40.584	0.111	0.2	-4.93	-0.116	-98.79	2.052	29.9
40	22.927	35.395	4.94	22.919	24.250	32.618	40.621	0.148	0.3	-149.89	8.931	-3654.62	12.480	39.8
50	21.172	35.533	5.00	21.162	24.857	33.266	41.314	0.182	0.5	-103.81	5.688	-2417.54	10.150	49.8
100	17.975	35.624	4.70	17.958	25.762	34.268	42.408	0.312	1.4	-38.73	0.575	-751.24	5.658	99.5
125	17.429	35.631	4.92	17.408	25.901	34.426	42.582	0.367	2.1	-19.04	-0.812	-308.32	3.625	124.4
150	17.118	35.632	5.05	17.093	25.978	34.513	42.679	0.419	2.8	-13.60	-0.449	-223.30	3.085	149.2
200	15.947	35.522	4.73	15.915	26.170	34.746	42.951	0.519	4.6	-21.97	-1.726	-280.55	3.458	198.9
250	14.910	35.439	4.75	14.872	26.339	34.954	43.194	0.611	6.7	-19.13	-1.796	-214.87	3.026	248.6
300	14.234	35.366	4.89	14.190	26.430	35.071	43.335	0.697	9.1	-13.92	-1.548	-135.96	2.407	298.2
350	13.365	35.248	4.94	13.315	26.522	35.197	43.493	0.779	11.8	-18.11	-2.513	-139.51	2.438	347.8
400	12.739	35.162	4.85	12.684	26.582	35.282	43.602	0.858	14.8	-12.43	-1.752	-88.76	1.945	397.4
450	12.037	35.066	4.93	11.977	26.645	35.374	43.721	0.935	18.2	-17.56	-2.371	-123.20	2.291	447.0
500	11.121	34.953	4.97	11.058	26.729	35.496	43.880	1.007	21.7	-15.62	-1.983	-108.18	2.147	496.6
600	10.026	34.819	5.02	9.955	26.818	35.634	44.062	1.145	29.6	-11.63	-1.295	-82.87	1.879	595.7
700	8.906	34.727	4.90	8.829	26.932	35.797	44.272	1.279	38.2	-11.72	-0.844	-102.72	2.092	694.8
800	8.073	34.691	4.89	7.989	27.033	35.936	44.447	1.400	47.5	-15.85	-1.032	-131.61	2.368	793.8
900	6.180	34.587	3.93	6.897	27.214	36.207	44.802	1.507	56.8	-14.85	0.213	-175.65	2.736	892.7
1000	4.944	34.632	3.42	4.861	27.399	36.452	45.103	1.595	65.2	-7.90	0.483	-108.92	2.154	991.6
1200	3.326	34.673	3.65	3.239	27.682	36.737	45.466	1.728	80.1	-4.49	0.130	-50.04	1.460	1189.1
1400	2.908	34.703	3.99	2.809	27.665	36.823	45.573	1.837	94.6	-1.44	0.142	-21.66	0.961	1386.5
1600	2.731	34.731	4.16	2.617	27.705	36.873	45.632	1.938	110.0	-0.82	0.148	-16.44	0.837	1583.7
1800	2.584	34.761	4.41	2.456	27.743	36.919	45.685	2.033	126.4	-0.58	0.125	-13.00	0.744	1780.6
2000	2.521	34.779	4.56	2.376	27.764	36.944	45.714	2.124	144.0	-0.46	0.092	-9.92	0.650	1977.4
2200	2.444	34.797	4.76	2.282	27.786	36.971	45.746	2.212	163.0	-0.38	0.073	-9.92	0.000	2174.0
2247	2.428	34.800	4.77	2.263	27.790	36.976	45.752	2.233	167.6	-0.43	0.079	-9.92	0.000	2220.2

BOTL NO.	PRES DBAR	CTD TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALTY
12	12.7	23.071	23.068	24.212	32.568	40.567	35.395	35.395	5.07	1.84		0.00	3.01			12	222252255
11	104.6	17.725	17.707	25.836	34.350	42.497	35.644	35.637	4.95	3.09		2.40	0.06			103	222252255
10	305.7	14.130	14.085	26.441	35.086	43.354	35.355	35.352	5.00	4.34		8.10	0.01			303	222252255
9	502.4	11.026	10.964	26.736	35.507	43.895	34.944	34.944	5.00	6.12		14.70	0.00			497	222252255
7	850.1	6.616	6.536	27.156	36.128	44.703	34.590	34.568	4.16	49.73		28.40	0.01			841	222252255
6	1003.4	4.782	4.700	27.415	36.476	45.134	34.632	34.640	3.35	66.07		34.10	-0.01			993	222252255
4	1606.7	2.723	2.609	27.703	36.871	45.631	34.732	34.725	4.15	80.72		32.20	-0.01			1588	222252255
3	1901.4	2.550	2.553	27.752	36.930	45.699	34.772		4.50	74.91		30.40	-0.01			1878	252252255
2	2106.3	2.467	2.467	27.776	36.959	45.732	34.791		4.71							2079	252555555

CRUISE: CD 29 STA: 7 DATE (D/M/Y): 14-11-87 TIME: 1219 LAT: 31 6.12 S LONG: 30 27.82 E

GRAVITY= 9.7941 M/S CORIOLIS= -.75337E-04 1/S SOUND SPEED= 1494.2 M/S Depth= 1739 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-MT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	23.480	35.377	4.98	23.480	24.081	32.427	40.415	0.000	0.0	-0.21	0.000	0.00	0.000	0.0
1	23.480	35.377	4.98	23.480	24.081	32.427	40.415	0.004	0.0	-0.41	0.000	0.00	0.000	1.0
20	23.222	35.382	5.13	23.217	24.162	32.514	40.509	0.076	0.1	-53.47	3.699	-1351.93	7.596	19.9
30	22.888	35.407	5.20	22.882	24.278	32.639	40.643	0.113	0.2	-20.53	1.334	-510.61	4.668	29.9
40	21.430	35.505	5.14	21.430	24.762	33.163	41.204	0.148	0.3	-145.05	9.911	-3536.37	12.285	39.8
50	20.962	35.539	5.19	20.953	24.919	33.333	41.387	0.179	0.4	-49.82	2.625	-1148.71	7.002	49.8
100	17.953	35.640	5.00	17.936	25.779	34.287	42.426	0.306	1.4	-31.94	-0.353	-566.07	4.915	99.5
125	17.215	35.613	4.79	17.194	25.939	34.471	42.634	0.361	2.0	-24.82	-0.912	-411.23	4.189	124.4
150	16.684	35.580	4.72	16.660	26.041	34.592	42.772	0.412	2.7	-21.52	-1.941	-279.13	3.451	149.2
200	15.894	35.520	4.69	15.863	26.180	34.758	42.965	0.510	4.5	-16.61	-1.099	-221.21	3.073	198.9
250	15.066	35.441	4.73	14.968	26.320	34.931	43.168	0.601	6.6	-26.60	-3.727	-225.59	3.103	248.5
300	14.078	35.335	4.74	14.034	26.440	35.086	43.356	0.687	9.0	-13.69	-1.195	-149.93	2.530	298.2
350	13.079	35.203	4.57	13.031	26.545	35.231	43.538	0.760	11.7	-23.92	-3.612	-161.22	2.623	347.8
400	12.100	35.087	4.44	12.127	26.633	35.356	43.697	0.846	14.6	-15.86	-1.868	-127.55	2.333	397.4
450	11.485	35.006	4.51	11.427	26.702	35.454	43.823	0.919	17.8	-15.45	-1.841	-115.96	2.225	447.0
500	10.598	34.902	4.51	10.537	26.782	35.572	43.976	0.990	21.2	-17.60	-1.926	-132.85	2.381	496.6
600	9.075	34.754	4.44	9.008	26.924	35.781	44.248	1.122	28.6	-15.29	-1.336	-118.19	2.246	595.7
700	7.547	34.651	3.93	7.477	27.077	36.004	44.537	1.240	36.4	-14.76	-1.004	-115.96	2.225	694.7
800	6.243	34.590	3.88	6.170	27.207	36.197	44.788	1.344	44.4	-14.69	-0.567	-125.76	2.317	793.7
900	5.397	34.617	3.54	5.320	27.334	36.364	44.994	1.434	52.2	-6.82	1.255	-141.71	2.459	892.6
1000	4.226	34.646	3.42	4.148	27.489	36.578	45.262	1.510	59.5	-9.13	0.105	-94.67	2.010	991.5
1200	3.303	34.665	3.70	3.217	27.597	36.734	45.464	1.634	73.4	-2.86	0.109	-32.67	1.181	1189.0
1400	2.866	34.709	3.96	2.768	27.674	36.834	45.586	1.743	87.9	-1.57	0.225	-27.69	1.087	1386.4
1600	2.698	34.740	4.22	2.585	27.714	36.884	45.644	1.841	102.9	-0.50	0.110	-11.59	0.703	1583.6
1763	2.666	34.750	4.34	2.538	27.727	36.899	45.661	1.928	117.9	0.04	-0.014	-11.59	0.000	1763.8

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
13	13.2	23.294	23.291	24.132	32.482	40.475	35.374	35.378	5.07	2.43		0.20	0.04			13	222252255
12	153.3	16.495	16.470	26.076	34.633	42.820	35.572	35.552	4.71	5.08		5.80	0.05			152	222252255
11	308.0	13.434	13.390	26.562	35.233	43.526	35.324	35.204	4.14	10.75		14.10	0.06			305	222252255
10	505.7	10.405	10.376	26.808	35.606	44.017	34.895		4.49	12.35		18.40	0.03			501	252252255
9	602.6	8.753	8.687	26.970	35.841	44.322	34.751	34.720	4.39	18.89		23.20	0.05			597	222252255
8	705.0	7.358	7.288	27.095	36.031	44.572	34.644	34.632	4.08	29.85		27.30	0.03			698	222252255
7	808.9	5.852	5.781	27.256	36.265	44.873	34.594	34.569	3.89	45.42		30.90	0.03			801	222252255
6	1001.9	4.291	4.212	27.479	36.565	45.246	34.646	34.643	3.45	71.05		34.40	0.03			991	222252255
5	1204.1	3.107	3.022	27.620	36.767	45.506	34.674	34.654	3.99	77.97		34.10	0.04			1191	222252255
4	1404.1	2.871	2.772	27.671	36.831	45.582	34.710	34.708	3.99	80.99		32.90	0.02			1388	222252255
3	1599.9	2.698	2.586	27.712	36.881	45.641	34.740	34.737	4.24	78.55		31.80	0.04			1581	222252255
2	1779.7	2.668	2.540	27.724	36.898	45.658	34.751	34.755		76.10		31.10	0.02			1758	225252255



CRUISE: CD 29 STA: 8 DATE (D/M/Y): 14-11-87 TIME: 1440 LAT: 31 2.91 S LONG: 30 24.17 E

GRAVITY= 9.7941 M/S CORIOLIS= -.75220E-04 1/S SOUND SPEED= 1499.6 M/S Depth= 905 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Rows 0 to 893.

Table with columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. Rows 24 to 14.

CRUISE: CD 29 STA: 9 DATE (D/M/Y): 14-11-87 TIME: 1637 LAT: 31 2.95 S LONG: 30 22.07 E

GRAVITY= 9.7941 M/S CORIOLIS= -.75221E-04 1/S SOUND SPEED= 1514.7 M/S Depth= 290 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Rows 0 to 247.

Table with columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. Rows 4 to 1.

CRUISE: CD 29 STA: 10 DATE (D/M/Y): 14-11-87 TIME: 1720 LAT: 31 2.31 S LONG: 30 21.21 E

GRAVITY= 9.7941 M/S CORIOLIS= -.75198E-04 1/S SOUND SPEED= 1524.8 M/S Depth= 90 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	22.005	35.241	4.93	22.005	24.401	32.789	40.817	0.000	0.0	-0.20	0.000	0.00	0.000	0.0
1	22.005	35.241	4.93	22.005	24.401	32.789	40.817	0.004	0.0	-0.40	0.000	0.00	0.000	1.0
20	21.400	35.190	4.89	21.397	24.531	32.937	40.983	0.069	0.1	-5.45	0.072	-114.73	2.215	19.9
30	21.272	35.197	5.03	21.266	24.572	32.982	41.031	0.103	0.2	-32.59	3.254	-841.92	6.000	29.9
40	21.100	35.230	4.93	21.093	24.645	33.060	41.113	0.136	0.3	-26.01	3.175	-700.90	5.474	39.8
50	20.419	35.325	4.35	20.410	24.902	33.336	41.407	0.168	0.4	-99.02	9.539	-2487.15	10.312	49.8
65	18.501	35.387	3.88	18.489	25.447	33.940	42.066	0.210	0.7	-114.23	7.171	-2487.15	0.000	64.7

BOTL NO.	PRES DBAR	CTD TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTD SAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
8	12.4	21.583	21.580	24.478	32.879	40.919	35.191	35.170	5.00	4.47		1.60	0.24			12	22252255
7	53.8	20.038	20.028	25.018	33.463	41.545	35.348	35.341	4.25	5.88		5.90	0.46			53	22252255
6	77.0	16.884	16.871	25.838	34.383	42.559	35.384	35.385	3.67	9.04		10.70	0.06			76	22252255

CRUISE: CD 29 STA: 11 DATE (D/M/Y): 15-11-87 TIME: 0332 LAT: 30 18.46 S LONG: 31 19.84 E

GRAVITY= 9.7935 M/S CORIOLIS= -.73598E-04 1/S SOUND SPEED= 1500.0 M/S Depth= 1178 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	22.849	35.365	4.81	22.849	24.255	32.618	40.623	0.000	0.0	-0.20	0.000	0.00	0.000	0.0
1	22.849	35.365	4.81	22.849	24.256	32.618	40.623	0.004	0.0	-0.41	0.000	0.00	0.000	1.0
20	22.775	35.390	5.02	22.771	24.297	32.662	40.668	0.073	0.1	-34.75	4.684	-974.37	6.524	19.9
30	22.461	35.427	5.02	22.455	24.415	32.788	40.802	0.109	0.2	-167.07	14.192	-4160.96	13.482	29.9
40	21.026	35.543	5.28	21.018	24.904	33.317	41.369	0.141	0.3	-3.99	1.367	-153.63	2.591	39.8
50	20.862	35.558	5.24	20.853	24.960	33.378	41.434	0.171	0.4	-152.21	4.511	-3199.04	11.821	49.8
100	18.062	35.598	4.70	18.044	25.720	34.225	42.362	0.297	1.4	-28.27	-0.567	-475.37	4.557	99.5
125	17.203	35.586	4.86	17.262	25.902	34.432	42.593	0.352	2.0	-30.17	-0.080	-543.62	4.873	124.4
150	16.756	35.545	4.56	16.731	25.997	34.546	42.724	0.405	2.7	-16.59	-1.582	-203.53	2.982	149.2
200	15.846	35.499	4.00	15.814	26.175	34.755	42.964	0.504	4.5	-21.86	-1.256	-295.06	3.590	198.9
250	14.943	35.429	4.93	14.905	26.325	34.938	43.177	0.595	6.6	-15.82	-1.451	-174.50	2.761	248.5
300	14.188	35.350	4.98	14.144	26.428	35.070	43.337	0.682	9.0	-16.30	-1.979	-145.28	2.519	298.2
350	13.451	35.249	4.95	13.401	26.505	35.176	43.470	0.764	11.7	-13.65	-1.752	-110.29	2.195	347.8
400	12.801	35.166	4.95	12.746	26.573	35.270	43.588	0.844	14.8	-11.57	-1.385	-94.84	2.035	397.4
450	12.266	35.096	4.96	12.206	26.625	35.344	43.683	0.921	18.1	-12.26	-1.648	-86.36	1.942	447.0
500	11.367	34.972	4.91	11.303	26.699	35.456	43.830	0.996	21.8	-16.06	-2.223	-101.54	2.106	496.6
600	10.062	34.813	4.91	9.991	26.808	35.621	44.048	1.138	29.7	-14.40	-1.646	-97.27	2.061	595.7
700	8.566	34.662	4.78	8.490	26.934	35.815	44.305	1.269	38.4	-13.81	-1.165	-104.54	2.137	694.8
800	7.678	34.644	4.13	7.596	27.054	35.976	44.504	1.388	47.5	-18.31	0.436	-220.76	3.105	793.8
900	4.633	34.627	3.61	4.561	27.429	36.497	45.162	1.480	55.4	-8.57	0.135	-93.75	2.024	892.7
1000	4.393	34.628	3.51	4.314	27.457	36.538	45.215	1.553	62.5	-2.29	0.011	-22.76	0.997	991.5
1175	3.490	34.633	3.62	3.404	27.554	36.682	45.403	1.672	75.7	-8.24	0.028	-22.76	0.000	1164.4

BOTL NO.	PRES DBAR	CTD TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTD SAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
15	54.5	19.918	19.908	25.244	33.690	41.772	35.597	0.000	5.21		0.23	0.30	0.04	1.904	1.083	54	222522222
14	84.4	18.461	18.446	25.625	34.116	42.240	35.602	35.608			0.45	3.70	0.04	1.903	1.151	83	222522222
13	168.3	16.613	16.586	26.021	34.574	42.758	35.529	35.571	4.87		0.46	4.70	0.04	2.026	1.176	166	222522222
12	238.8	15.106	15.089	26.303	34.910	43.144	35.446	35.452	4.88		0.62	6.90	0.03	1.966	1.097	236	222522222
11	291.7	14.264	14.221	26.425	35.065	43.328	35.366	35.369	4.99		0.69	7.90	0.03	1.992	1.189	289	222522222
10	393.7	12.871	12.817	26.571	35.266	43.581	35.180	35.182	4.98		0.85	10.80	0.01	1.724	1.015	390	222522222
8	495.4	11.615	11.551	26.661	35.408	43.772	34.980	35.018	5.00		1.02	13.30	0.01	1.425	0.872	491	222522222
5	844.7	6.102	6.025	27.245	36.241	44.838	34.612	34.623	3.69		2.24	30.50	0.01	0.240	0.196	836	222522222
4	1009.0	4.377	4.297	27.461	36.542	45.220	34.628	34.631	3.44		2.49	33.90	0.00	0.077		998	222522225
3	1005.2	4.384	4.305	27.460	36.541	45.218	34.628	34.632	3.46		2.49	34.00	0.00	0.055		995	222522225
2	1124.3	3.585	3.482	27.543	36.667	45.384	34.627	34.629	3.64		2.48	34.00	0.00	0.045		1112	222522225

CRUISE: CD 29 STA: 12 DATE (D/M/Y): 16-11-87 TIME: 0148 LAT: 31 34.73 S LONG: 31 9.67 E

GRAVITY= 9.7945 M/S CORIOLIS= -.76373E-04 1/S SOUND SPEED= 1500.0 M/S Depth= 3091 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HT	PE	GRD-PT	GRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	20.828	35.588	5.18	20.828	24.989	33.407	41.464	0.000	0.0	-0.19	0.000	0.00	0.000	0.0
1	20.828	35.588	5.18	20.828	24.990	33.407	41.464	0.003	0.0	-0.38	0.000	0.00	0.000	1.0
20	20.827	35.592	5.25	20.823	24.994	33.412	41.469	0.059	0.1	-6.99	0.460	-168.05	2.660	19.9
30	20.615	35.606	5.25	20.609	25.062	33.487	41.549	0.089	0.1	-109.02	4.765	-2454.40	10.165	29.9
40	18.980	35.661	5.47	18.973	25.535	34.009	42.117	0.115	0.2	-61.54	1.343	-1259.65	7.282	39.8
50	18.611	35.660	5.33	18.603	25.628	34.113	42.233	0.140	0.3	-30.59	-0.063	-576.07	4.925	49.8
100	17.700	35.642	5.22	17.683	25.843	34.358	42.506	0.252	1.2	-14.73	-0.446	-245.40	3.214	99.5
125	17.350	35.642	5.26	17.329	25.929	34.456	42.614	0.306	1.8	-6.20	0.465	-145.70	2.477	124.3
150	17.258	35.641	5.32	17.233	25.952	34.482	42.643	0.358	2.6	-3.61	-0.197	-54.95	1.521	149.2
200	17.093	35.630	5.25	17.060	25.984	34.520	42.687	0.463	4.4	-4.00	-0.336	-53.00	1.495	198.8
250	16.296	35.540	4.98	16.256	26.105	34.669	42.863	0.565	6.8	-18.55	-1.594	-236.66	3.156	248.5
300	15.462	35.481	4.93	15.415	26.251	34.846	43.068	0.662	9.5	-16.13	-1.296	-202.52	2.920	298.2
350	14.827	35.421	5.03	14.774	26.347	34.965	43.209	0.752	12.5	-12.65	-1.279	-138.65	2.416	347.8
400	14.244	35.358	5.00	14.185	26.426	35.066	43.331	0.840	15.8	-15.36	-1.768	-150.40	2.516	397.4
450	13.442	35.255	5.02	13.378	26.515	35.187	43.481	0.924	19.4	-14.35	-2.000	-113.37	2.185	447.0
500	12.849	35.175	5.09	12.780	26.574	35.269	43.586	1.005	23.4	-13.01	-1.681	-105.34	2.106	496.6
600	11.630	35.008	5.06	11.552	26.681	35.427	43.791	1.159	32.0	-11.03	-1.460	-78.74	1.821	595.7
700	10.484	34.865	5.06	10.308	26.778	35.574	43.984	1.306	41.7	-13.10	-1.532	-94.59	1.996	694.8
800	9.122	34.714	4.90	9.032	26.889	35.745	44.212	1.442	52.2	-12.37	-1.205	-92.87	1.977	793.8
900	7.597	34.589	4.66	7.505	27.024	35.950	44.483	1.568	63.1	-15.32	-1.103	-123.85	2.283	892.8
1000	6.613	34.577	4.16	6.517	27.151	36.124	44.700	1.681	74.0	-11.45	-0.497	-103.53	2.088	991.7
1200	4.864	34.43	3.86	4.764	27.340	36.399	45.056	1.872	95.3	-6.35	0.173	-76.05	1.789	1189.3
1400	3.746	34.573	3.81	3.638	27.483	36.599	45.310	2.030	116.2	-2.96	0.445	-56.17	1.538	1386.7
1600	3.272	34.652	3.72	3.152	27.593	36.734	45.467	2.163	136.6	-2.30	0.362	-44.58	1.370	1583.9
1800	2.919	34.702	3.91	2.786	27.666	36.826	45.576	2.278	156.5	-1.33	0.197	-25.07	1.027	1780.9
2000	2.699	34.742	4.23	2.551	27.720	36.891	45.653	2.382	176.6	-0.97	0.187	-21.05	0.941	1977.7
2200	2.574	34.772	4.51	2.411	27.755	36.933	45.702	2.479	197.4	-0.55	0.110	-12.23	0.718	2174.3
2400	2.485	34.793	4.76	2.305	27.781	36.964	45.738	2.572	219.2	-0.51	0.085	-10.54	0.666	2370.7
2600	2.410	34.806	4.92	2.211	27.799	36.988	45.766	2.662	242.3	-0.50	0.054	-8.76	0.607	2566.9
2800	2.302	34.815	5.06	2.087	27.817	37.012	45.797	2.751	266.6	-0.79	0.023	-10.36	0.660	2763.0
3000	2.141	34.813	5.15	1.910	27.829	37.034	45.828	2.837	292.0	-1.19	-0.045	-11.22	0.687	2958.9
3107	1.973	34.804	5.18	1.734	27.835	37.050	45.853	2.881	305.9	-1.67	-0.082	-11.22	0.000	3063.6

BOTL NO.	PRES DBAR	CTD IPTS68	TEMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
23	68.9	18.266	18.254	25.720	34.217	42.346	35.664	35.670	5.13	2.61	0.30	1.70	0.16	2.175	0.000	68	22222222	
21	193.2	17.054	17.022	25.993	34.530	42.698	35.627	35.631	5.34	3.30	0.41	2.60	0.06	2.340	1.206	191	22222222	
18	493.5	12.834	12.766	26.581	35.278	43.595	35.100	35.179	5.02	5.00	0.89	10.00	0.02	1.703	0.999	489	22222222	
17	589.7	11.673	11.596	26.686	35.431	43.793	35.024	35.021	5.00	6.04	1.08	12.40	0.04	1.451	0.877	584	22222222	
14	940.2	7.099	7.007	27.069	36.019	44.574	34.555	34.558	4.54	23.45	1.88	24.10	0.02	0.539	0.328	930	22222222	
13	1088.6	5.409	5.314	27.248	36.200	44.911	34.505	34.496	4.21	39.66	2.20	28.40	0.01	0.290	0.158	1077	22222222	
12	1139.9	4.850	4.756	27.285	36.346	45.004	34.471	34.465	4.29	42.56	2.24	29.20	0.01	0.398	0.232	1128	22222222	
11	1252.4	4.105	4.006	27.371	36.470	45.164	34.477	34.484	4.26	53.65	2.37	30.60	0.01	0.364	0.252	1239	22222222	
10	1393.3	3.908	3.799	27.473	36.581	45.283	34.578	34.591	3.63	68.67	2.48	31.60	0.01	0.112	0.111	1378	22222222	
8	1793.7	2.927	2.795	27.667	36.825	45.576	34.701	34.700	3.99	80.44	2.35	30.40	0.02	0.029		1772	22222225	
7	1993.6	2.718	2.571	27.718	36.888	45.649	34.740	34.737	4.22					0.018		1968	22255525	
6	2195.9	2.580	2.417	27.756	36.934	45.702	34.771	34.774	4.51					0.024	0.022	2167	22255522	
5	2395.4	2.488	2.308	27.782	36.965	45.739	34.792	34.792	4.73	70.37	2.04	26.90	0.03	0.032	0.029	2363	22222222	
4	2597.6	2.411	2.213	27.801	36.989	45.767	34.806	34.807	4.97	67.47	1.94	25.80	0.01	0.020		2561	22222225	
3	2796.7	2.302	2.087	27.818	37.013	45.798	34.815	34.815	5.04	67.30	1.90	25.50	0.01	0.002	0.023	2756	22222222	
2	2998.8	2.144	1.913	27.830	37.035	45.829	34.813	34.811	5.15	70.88	1.92	25.60	0.01	0.000	0.033	2954	22222222	
1	3113.6	1.972	1.733	27.837	37.052	45.855	34.804	34.805	5.08	75.82	1.92	25.70	0.02			3067	22222225	



CRUISE: CD 29 STA: 14 DATE (D/M/Y): 16-11-87 TIME: 1947 LAT: 32 11.67 S LONG: 32 38.13 E

GRAVITY= 9.7950 M/S CORIOLIS= -.77784E-04 1/S SOUND SPEED= 1503.3 M/S Depth= 3551 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2 10-5, GRD-PT C/DB 10-3, GRD-S 1/DB 10-3, POT-V (m s)-1 10-12, B-V CPH, DEPTH METERS. Contains 35 rows of data.

Table with columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTD SAL PSS78, SALT PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALT1. Contains 24 rows of data.





CRUISE: CD 29 STA: 17 DATE (D/M/Y): 17-11-87 TIME: 1849 LAT: 32 53.96 S LONG: 35 0.12 E

GRAVITY= 9.7956 M/S CORIOLIS= -.79216E-04 1/S SOUND SPEED= 1582.9 M/S Depth= 1593 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	20.096	35.610	5.49	20.096	25.203	33.643	41.720	0.000	0.0	-0.19	0.000	0.00	0.000	0.0
1	20.096	35.610	5.49	20.095	25.203	33.643	41.720	0.003	0.0	-0.37	0.000	0.00	0.000	1.0
20	19.967	35.633	5.24	19.963	25.256	33.699	41.779	0.055	0.1	-2.74	-0.017	-55.29	1.498	19.9
30	19.945	35.631	5.22	19.939	25.261	33.705	41.786	0.082	0.1	-3.27	-0.200	-50.51	1.432	29.9
40	19.879	35.627	5.24	19.871	25.276	33.722	41.805	0.109	0.2	-15.71	-0.552	-288.91	3.425	39.8
50	19.421	35.603	5.08	19.411	25.377	33.838	41.934	0.136	0.3	-76.23	-0.476	-1508.04	7.824	49.7
100	18.188	35.659	4.92	18.171	25.736	34.235	42.367	0.255	1.3	-12.38	0.093	-246.00	3.160	99.5
125	17.886	35.655	4.96	17.865	25.808	34.310	42.459	0.311	1.9	-11.96	-0.840	-179.19	2.697	124.3
150	17.540	35.620	4.94	17.514	25.867	34.389	42.542	0.366	2.7	-6.92	0.338	-158.45	2.536	149.2
200	17.198	35.616	4.96	17.164	25.949	34.482	42.645	0.474	4.6	-9.72	-0.715	-141.16	2.394	198.9
250	16.809	35.592	4.99	16.768	26.025	34.572	42.748	0.578	7.0	-5.59	-0.009	-104.02	2.055	248.5
300	16.318	35.540	4.88	16.269	26.102	34.666	42.859	0.680	9.8	-11.03	-1.106	-137.32	2.361	298.2
350	15.782	35.488	4.85	15.727	26.186	34.770	42.981	0.779	13.1	-13.36	-1.362	-160.33	2.551	347.8
400	15.177	35.449	4.89	15.115	26.293	34.899	43.131	0.873	16.7	-11.73	-0.725	-164.54	2.584	397.4
450	14.555	35.384	4.89	14.487	26.380	35.010	43.264	0.964	20.7	-11.00	-1.232	-117.25	2.182	447.1
500	13.882	35.305	4.92	13.810	26.464	35.119	43.398	1.052	24.9	-13.48	-1.526	-136.92	2.358	496.6
600	12.655	35.141	4.86	12.572	26.588	35.292	43.617	1.217	34.2	-11.81	-1.585	-96.22	1.976	595.8
700	11.410	34.978	4.99	11.320	26.701	35.457	43.830	1.374	44.6	-13.22	-1.654	-105.11	2.066	694.9
800	10.211	34.833	4.94	10.115	26.802	35.610	44.032	1.521	55.8	-13.57	-1.529	-105.40	2.069	793.9
900	8.863	34.687	4.81	8.763	26.911	35.780	44.258	1.657	67.6	-15.12	-1.390	-121.64	2.222	892.9
1000	7.162	34.540	4.69	7.063	27.048	35.996	44.548	1.781	79.6	-16.10	-1.279	-123.91	2.243	991.8
1200	4.934	34.426	4.53	4.833	27.239	36.297	44.952	1.993	103.3	-7.13	0.110	-86.37	1.872	1189.4
1400	4.123	34.498	4.08	4.012	27.386	36.484	45.177	2.169	126.6	-3.98	0.505	-72.70	1.718	1386.8
1600	3.465	34.584	3.88	3.343	27.521	36.653	45.377	2.316	149.0	-0.83	0.155	-72.70	0.000	1584.0
1615	3.465	34.585	3.84	3.342	27.522	36.653	45.378	2.326	150.7	-0.79	0.150	-72.70	0.000	1598.8

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	** CTDSAL PSS78	** SALNTY PSS78	** OXYGEN ML/L	** SILCAT UMOL/L	** PHSPHT UMOL/L	** NITRAT UMOL/L	** NITRIT UMOL/L	** CFC-11 PM/KG	** CFC-12 PM/KG	DEPTH METERS	QUALT1
12	11.9	20.037	20.035	25.238	33.679	41.757	35.635	35.638	5.29	1.77		0.00	0.00			11	222252255
11	105.2	18.037	18.019	25.775	34.279	42.416	35.661	35.666	5.19	2.97		1.80	0.00			104	222252255
9	302.8	16.254	16.205	26.114	34.680	42.875	35.536	35.536	4.78	4.18		5.50	0.00			300	222252255
8	401.8	15.164	15.102	26.296	34.902	43.134	35.448	35.450	4.83	4.35		7.10	0.00			398	222252255
7	598.8	12.545	12.463	26.610	35.319	43.647	35.142	35.133	4.93	5.56		11.80	0.00			593	222252255
6	797.9	10.044	9.998	26.834	35.649	44.077	34.837		4.90	8.47		17.00	0.00			790	252252255
5	1001.0	6.908	6.811	27.083	36.043	44.607	34.541	34.523	4.64	21.82		26.30	0.00			990	222252255
4	1099.2	5.021	5.722	27.153	36.166	44.780	34.450	34.448	4.68	26.97		28.60	0.00			1067	222252255
3	1198.5	5.041	4.939	27.227	36.279	44.930	34.426	34.435	4.55	35.53		30.50	0.00	0.621		1185	222252225
2	1399.9	4.147	4.036	27.382	36.479	45.171	34.497	34.500	4.08	54.54		33.00	0.00	0.228	0.146	1384	222252222



CRUISE: CD 29 STA: 18 DATE (D/M/Y): 17-11-87 TIME: 2330 LAT: 33 0.14 S LONG: 35 35.04 E

GRAVITY= 9.7957 M/S CORIOLIS= -.79436E-04 1/S SOUND SPEED= 1503.3 M/S Depth= 1474 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-MT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-v (m s)-1 10-12	B-V CPH	DEPTH METERS
0	19.787	35.673	5.09	19.787	25.333	33.781	41.865	0.008	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.787	35.673	5.09	19.787	25.333	33.781	41.866	0.003	0.0	-0.37	0.000	0.00	0.000	1.0
20	19.796	35.660	5.17	19.792	25.321	33.770	41.854	0.053	0.1	-4.60	-0.211	-81.69	1.818	19.9
30	19.341	35.657	5.26	19.335	25.439	33.901	41.999	0.079	0.1	-125.95	2.028	-2652.28	10.362	29.8
40	18.479	35.665	5.45	18.472	25.665	34.154	42.278	0.103	0.2	-33.81	0.419	-687.83	5.277	39.8
50	18.084	35.664	5.20	18.075	25.763	34.265	42.401	0.126	0.3	-19.99	-0.792	-340.17	3.711	49.7
100	17.714	35.650	5.19	17.697	25.846	34.360	42.507	0.236	1.2	-8.02	-0.378	-131.02	2.303	99.5
125	17.470	35.637	5.08	17.449	25.896	34.419	42.574	0.290	1.8	-8.10	-0.438	-125.38	2.253	124.3
150	17.340	35.634	5.16	17.314	25.926	34.454	42.613	0.343	2.5	-4.84	-0.474	-55.51	1.499	149.1
200	16.965	35.599	5.02	16.932	25.991	34.532	42.704	0.448	4.4	-8.19	-0.976	-95.46	1.966	198.8
250	16.462	35.550	4.82	16.421	26.074	34.633	42.821	0.551	6.7	-12.08	-0.891	-169.68	2.621	248.5
300	15.879	35.502	4.82	15.831	26.173	34.753	42.961	0.649	9.5	-12.14	-0.950	-163.30	2.571	298.1
350	15.183	35.441	4.86	15.130	26.284	34.890	43.121	0.744	12.6	-15.20	-1.592	-174.03	2.654	347.8
400	14.571	35.381	4.86	14.511	26.373	35.001	43.255	0.834	16.1	-11.85	-1.111	-138.61	2.369	397.4
450	14.013	35.335	5.03	13.947	26.458	35.108	43.381	0.921	19.8	-9.60	-0.724	-120.15	2.205	447.0
500	13.514	35.263	5.06	13.442	26.507	35.177	43.469	1.005	23.9	-10.73	-1.703	-76.84	1.764	496.6
600	12.060	35.064	4.99	11.980	26.643	35.372	43.719	1.166	32.9	-12.24	-1.557	-99.82	2.010	595.7
700	10.925	34.916	4.95	10.837	26.740	35.517	43.909	1.316	42.9	-10.47	-1.238	-83.64	1.840	694.8
800	10.128	34.825	4.93	10.032	26.810	35.622	44.047	1.160	53.9	-11.45	-1.312	-85.48	1.860	793.8
900	8.724	34.678	4.80	8.624	26.925	35.800	44.284	1.596	65.6	-10.14	-0.931	-81.88	1.821	892.8
1000	7.320	34.552	4.65	7.220	27.036	35.976	44.521	1.721	77.8	-16.21	-1.334	-125.75	2.256	991.7
1200	4.887	34.410	4.60	4.786	27.232	36.292	44.949	1.934	101.6	-7.14	0.073	-84.36	1.848	1189.4
1400	4.024	34.503	4.01	3.914	27.400	36.503	45.201	2.111	125.1	-3.55	0.541	-84.36	0.000	1386.8
1469	3.860	34.537	3.90	3.746	27.444	36.555	45.261	2.165	133.0	-2.66	0.512	-84.36	0.000	1454.8

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALI
24	12.5	19.838	19.836	25.310	33.757	41.840	35.660	35.665	5.33	1.47	0.13	0.20	0.00			12	222222255
23	203.9	16.716	16.683	26.048	34.597	42.777	35.596	35.573	4.87	3.67	0.42	5.00	0.01			202	222222255
22	301.2	15.695	15.648	26.214	34.800	43.013	35.500	35.490	4.83	4.01	0.52	6.50	0.00			298	222222255
21	403.0	14.477	14.417	26.391	35.023	43.279	35.378	35.377	4.91	4.19	0.60	8.30	0.00			399	222222255
20	502.0	13.573	13.501	26.495	35.162	43.452	35.263	35.274	5.05	4.19	0.69	9.50	0.00			497	222222255
19	602.4	12.189	12.108	26.615	35.339	43.681	35.059	35.088	4.97	5.38	0.88	12.70	0.01			596	222222255
18	701.6	11.026	10.937	26.720	35.493	43.881	34.913	34.930	4.98	6.91	1.06	15.30	0.00			695	222222255
16	1001.4	7.254	7.221	27.042	35.986	44.534	34.549		4.67	19.45	1.74	25.60	0.00			991	252222255
15	1251.5	4.636	4.533	27.276	36.348	45.018	34.430	34.434	4.48	40.48	2.17	31.70	-0.01	0.403	0.242	1238	222222222
14	1350.7	4.153	4.045	27.364	36.461	45.153	34.475	34.486	4.13	52.69	2.32	33.40	0.00	0.251	0.197	1336	222222222
13	1469.9	3.850	3.735	27.444	36.556	45.262	34.536	34.541	3.93	61.84	2.38	34.10	0.00	0.144		1453	222222225

CRUISE: CD 29 STA: 19 DATE (D/M/Y): 18-11-87 TIME: 0340 LAT: 32 59.37 S LONG: 36 4.75 E

GRAVITY= 9.7956 M/S CORIOLIS= -.79489E-04 1/S SOUND SPEED= 1499.7 M/S Depth= 2086 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HT	PE	GRD-PT	GRD-S	POT-V	θ-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	19.688	35.687	5.24	19.688	25.370	33.821	41.908	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
3	19.688	35.687	5.24	19.687	25.370	33.821	41.908	0.008	0.0	-0.37	0.000	0.00	0.000	3.0
20	19.587	35.680	5.29	19.583	25.392	33.846	41.936	0.052	0.1	-5.93	0.149	-129.37	2.289	19.9
30	19.521	35.683	5.35	19.515	25.412	33.868	41.960	0.078	0.1	-10.45	0.159	-221.42	2.994	29.0
40	19.330	35.687	5.39	19.323	25.464	33.927	42.025	0.103	0.2	-16.61	0.124	-342.62	3.725	39.8
50	19.115	35.681	5.40	19.106	25.515	33.985	42.089	0.128	0.3	-22.39	-2.004	-452.79	4.456	49.7
100	17.579	35.644	5.20	17.562	25.874	34.393	42.544	0.241	1.2	-12.56	-0.519	-209.32	2.911	99.5
125	17.372	35.638	5.21	17.351	25.921	34.447	42.605	0.294	1.8	-7.78	-0.387	-125.00	2.257	124.3
150	17.227	35.630	5.14	17.202	25.950	34.482	42.644	0.347	2.5	-4.82	-0.113	-80.17	1.802	149.2
200	16.894	35.597	5.03	16.861	26.007	34.550	42.724	0.450	4.4	-6.80	-0.926	-71.89	1.706	198.8
250	16.438	35.552	4.87	16.397	26.081	34.641	42.830	0.552	6.7	-13.32	-1.040	-183.15	2.723	248.5
300	15.788	35.495	4.89	15.740	26.188	34.771	42.982	0.650	9.5	-12.39	-1.094	-158.53	2.534	298.1
350	15.092	35.433	4.89	15.038	26.299	34.907	43.142	0.744	12.6	-18.02	-1.817	-208.74	2.907	347.8
400	14.387	35.358	4.87	14.328	26.395	35.031	43.298	0.833	16.0	-11.64	-1.223	-126.37	2.262	397.4
450	13.711	35.288	5.04	13.646	26.485	35.147	43.431	0.918	19.7	-10.72	-1.091	-114.63	2.154	447.0
500	13.160	35.210	5.02	13.090	26.538	35.222	43.527	1.001	23.7	-12.73	-1.820	-99.97	2.012	496.6
600	11.940	35.046	5.03	11.860	26.652	35.386	43.733	1.160	32.6	-11.78	-1.556	-91.11	1.921	595.7
700	10.964	34.918	5.04	10.876	26.735	35.510	43.901	1.310	42.5	-9.46	-1.155	-72.00	1.717	694.8
800	9.947	34.801	4.98	9.852	26.822	35.642	44.074	1.453	53.5	-11.49	-1.232	-98.59	1.915	793.8
900	8.716	34.679	4.78	8.616	26.928	35.803	44.287	1.588	65.2	-12.31	-1.138	-97.66	1.989	892.8
1000	7.091	34.547	4.61	6.992	27.064	36.015	44.570	1.712	77.1	-17.13	-1.199	-142.86	2.465	991.7
1200	4.845	34.409	4.62	4.745	27.236	36.298	44.958	1.921	100.6	-7.52	0.034	-85.73	1.863	1189.3
1400	3.809	34.485	4.15	3.780	27.399	36.509	45.214	2.096	123.7	-3.31	0.556	-69.54	1.678	1386.8
1600	3.224	34.563	4.00	3.105	27.527	36.671	45.408	2.243	146.1	-3.42	0.378	-59.05	1.546	1584.0
1800	2.911	34.665	4.04	2.779	27.638	36.798	45.549	2.366	167.5	-1.82	0.273	-36.07	1.209	1781.0
2000	2.670	34.745	4.37	2.523	27.724	36.897	45.660	2.475	188.5	-1.87	0.518	-36.07	0.000	1977.8
2011	2.667	34.746	4.34	2.519	27.725	36.898	45.662	2.480	189.6	-2.02	0.562	-36.07	0.000	1986.6

BOTL NO.	PRES DBAR	CTD TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	** CTD SAL PSS78	** SALINTY PSS78	** OXYGEN ML/L	** SILCAT UMOL/L	** PHSPT UMOL/L	** NITRAT UMOL/L	** NITRIT UMOL/L	** CFC-11 PM/KG	** CFC-12 PM/KG	DEPTH METERS	QUALT1
20	12.6	19.615	19.613	25.388	33.842	41.931	35.686	35.683	5.35	1.39	0.08	0.00	0.00	1.021	0.000	12	22222222
19	101.6	17.583	17.566	25.872	34.391	42.543	35.643	35.643	5.12	3.08	0.26	2.60	0.04			100	22222225
18	206.1	16.812	16.778	26.023	34.569	42.745	35.593	35.588	4.98	3.60	0.38	4.20	0.03			204	22222225
17	302.9	15.753	15.785	26.192	34.776	42.988	35.489	35.499	4.81	3.94	0.52	6.20	0.01			300	22222225
16	400.7	14.435	14.376	26.385	35.018	43.276	35.358	35.364	4.85	4.45	0.63	8.20	0.01			397	22222225
15	500.4	13.439	13.368	26.480	35.153	43.448	35.208	35.258	5.00	4.46	0.71	9.50	0.02			495	22222225
14	600.9	12.245	12.165	26.592	35.314	43.655	35.044	35.085	4.98	5.31	0.90	12.40	0.02	1.188	0.731	595	22222222
13	698.4	10.997	10.909	26.729	35.503	43.893	34.919	34.922	4.97	6.83	1.06	15.10	0.00	1.279	0.727	691	22222222
12	798.9	9.795	9.701	26.848	35.675	44.113	34.802	34.786	4.86	8.87	1.23	18.20	0.01	0.970	0.561	791	22222222
11	899.2	8.545	8.446	26.956	35.838	44.330	34.661	34.661	4.71	13.97	1.50	22.10	0.01	0.618	0.417	890	22222222
10	1000.0	6.921	6.824	27.089	36.048	44.610	34.550	34.536	4.59	22.45	1.83	26.70	0.00	0.618	0.408	989	22222222
9	1100.9	5.734	5.635	27.165	36.183	44.800	34.452	34.450	4.61	29.06	2.04	29.00	0.00	0.646	0.391	1089	22222222
8	1199.8	4.771	4.672	27.245	36.311	44.974	34.410	34.411	4.59	36.01	2.25	31.10	0.01	0.637	0.364	1187	22222222
7	1299.1	4.302	4.198	27.328	36.417	45.102	34.450	34.453	4.28	47.20	2.28	32.50	0.00	0.344	0.186	1285	22222222
6	1399.0	3.850	3.742	27.402	36.514	45.221	34.484	34.493	4.08	56.36	2.40	33.00	0.00	0.206	0.146	1383	22222222
5	1499.4	3.634	3.519	27.470	36.593	45.309	34.541	34.550	3.89	64.33	2.43	34.30	0.00	0.118	0.097	1482	22222222
4	1600.4	3.181	3.062	27.531	36.678	45.417	34.564	34.571	3.96	67.89	2.42	34.60	-0.01	0.091	0.061	1582	22222222
3	1700.7	3.123	2.997	27.598	36.747	45.488	34.640	34.648	3.88	75.19	2.38	34.10	0.00	0.082	0.023	1680	22222222
2	1800.0	2.905	2.773	27.638	36.799	45.551	34.665	34.668	4.02	74.51	2.31	33.40	-0.01	0.009		1778	22222225
1	2007.6	2.668	2.520	27.725	36.898	45.661	34.746	34.758	4.34	70.96	2.08	30.60	0.00	0.035		1982	22222225



CRUISE: CD 29 STA: 21 DATE (D/M/Y): 18-11-87 TIME: 1029 LAT: 33 0.69 S LONG: 36 30.87 E

GRAVITY= 9.7957 M/S CORIOLIS= -.79456E-04 1/S SOUND SPEED= 1501.4 M/S Depth= 3304 Cor Meters

Table with 15 columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Data rows from 0 to 3315.

Table with 17 columns: BOTL NO., PRES DBAR, CTDTMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALT1. Data rows from 24 to 13316.2.







CRUISE: CD 29 STA: 25 DATE (D/M/Y): 19-11-87 TIME: 1882 LAT: 32 59.42 S LONG: 39 29.43 E

GRAVITY= 9.7956 M/S CORIOLIS= - 79411E-04 1/S SOUND SPEED= 1509.7 M/S Depth= 5892 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Rows 0 to 5145.

Table with columns: BCTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTD SAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALT1. Rows 24 to 5145.



CRUISE: CD 29 STA: 26 DATE (D/M/Y): 20-11-87 TIME 0540 LAT. 33 0 32 S LONG 41 0 34 E

GRAVITY= 9.7957 M/S CORIOLIS= -.79443E-04 1/S SOUND SPEED= 1508.7 M/S Depth= 5010 Cor Meters

Table with 15 columns: PRES, TMP, SALT, OXYG, PTMP, SIG-TH, SIG-2, SIG-4, DYN-HT, PE, GRD-PT, GRD-S, POT-V, B-V, DEPTH. Rows represent depth measurements from 0 to 5097 meters.

Table with 18 columns: BOTL NO., PRES DBAR, CTD TPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALT1. Rows represent water sample analysis from 24 to 5100 meters.



CRUISE: CD 29 STA: 28 DATE (D/M/Y): 20-11-87 TIME: 2304 LAT: 32 59.87 S LONG: 43 2.46 E

GRAVITY= 9.7957 M/S CORIOLIS= -.79427E-04 1/S SOUND SPEED= 1499.7 M/S Depth= 2331 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-MT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	20.277	-9.000	5.67	20.277	-8.598	0.409	9.015	0.000	0.0	-0.14	0.000	0.00	0.000	0.0
1	20.277	-9.000	5.67	20.277	-8.598	0.409	9.015	0.036	0.0	-0.28	0.000	0.00	0.000	1.0
20	20.306	35.553	5.62	20.302	25.104	33.538	41.610	0.140	0.1	-6.38	3.006	-310.87	3.548	20.0
30	19.810	35.617	5.70	19.805	25.285	33.733	41.810	0.168	0.1	-83.79	2.155	-1843.05	0.638	29.9
40	19.434	35.619	5.58	19.427	25.386	33.846	41.942	0.194	0.2	-5.64	0.428	-139.55	2.377	39.9
50	19.352	35.618	5.68	19.343	25.407	33.869	41.967	0.220	0.4	-32.12	-1.644	-549.62	4.717	49.8
100	17.476	35.618	5.37	17.459	25.879	34.402	42.557	0.334	1.2	-14.51	-0.214	-263.07	3.264	99.6
125	17.134	35.611	5.29	17.113	25.958	34.492	42.658	0.387	1.8	-15.12	-0.757	-232.72	3.070	124.4
150	16.809	35.598	5.30	16.785	26.026	34.572	42.748	0.438	2.5	-8.66	-0.144	-158.05	2.530	149.2
200	16.401	35.588	5.44	16.368	26.116	34.676	42.865	0.538	4.3	-7.40	-0.356	-114.62	2.154	198.9
250	15.908	35.543	5.32	15.868	26.196	34.774	42.980	0.634	6.5	-11.43	-1.132	-139.50	2.377	248.6
300	15.339	35.489	5.14	15.293	26.285	34.884	43.109	0.727	9.1	-12.69	-1.090	-160.36	2.548	298.2
350	14.740	35.435	5.11	14.687	26.377	34.998	43.245	0.817	12.1	-8.55	-0.532	-117.13	2.178	347.9
400	14.448	35.419	5.27	14.388	26.429	35.061	43.318	0.903	15.4	-9.20	-1.259	-82.75	1.830	397.5
450	13.982	35.350	5.25	13.917	26.476	35.126	43.401	0.988	19.1	-8.94	-1.293	-74.16	1.733	447.1
500	13.451	35.273	5.28	13.379	26.528	35.200	43.494	1.071	23.1	-11.99	-1.743	-95.00	1.961	496.7
600	12.429	35.119	5.19	12.348	26.615	35.328	43.661	1.232	32.1	-9.68	-1.417	-69.45	1.677	595.8
700	11.392	34.976	5.09	11.301	26.702	35.459	43.833	1.387	42.4	-10.94	-1.354	-87.26	1.860	694.9
800	10.095	34.818	5.00	9.999	26.811	35.624	44.050	1.533	53.6	-12.87	-1.472	-100.37	2.016	793.9
900	9.032	34.707	4.94	8.930	26.900	35.761	44.232	1.671	65.5	-11.87	-1.142	-95.00	1.969	892.9
1000	7.888	34.601	4.79	7.783	26.993	35.907	44.427	1.799	77.9	-10.40	-0.810	-87.15	1.878	991.8
1200	5.039	34.423	4.59	4.937	27.225	36.277	44.928	2.018	102.4	-6.77	-0.119	-69.42	1.676	1189.4
1400	4.159	34.444	4.37	4.048	27.339	36.436	45.128	2.202	126.8	-5.06	0.235	-68.85	1.670	1306.9
1600	3.285	34.525	4.19	3.165	27.491	36.633	45.367	2.359	150.7	-2.32	0.421	-50.34	1.428	1504.1
1800	2.956	34.608	4.12	2.823	27.588	36.747	45.498	2.493	173.9	-1.58	0.415	-42.29	1.308	1701.1
2000	2.714	34.668	4.22	2.567	27.659	36.830	45.592	2.610	196.6	-0.88	0.298	-27.68	1.059	1977.9
2200	2.530	34.743	4.41	2.368	27.736	36.917	45.688	2.717	219.4	-1.31	0.431	-40.95	1.288	2174.5
2337	2.393	34.776	4.61	2.220	27.775	36.963	45.742	2.781	234.3	-1.01	0.164	-40.95	0.000	2309.1

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUAL1
15	9.7	20.152	20.150	25.142	33.581	41.657	35.549	35.558	5.30	1.61	0.19	0.10	0.00			9	22222255
14	104.2	17.296	17.278	25.922	34.451	42.611	35.617	35.620	5.23	2.81	0.35	1.90	0.04			103	22222255
13	200.9	16.339	16.306	26.129	34.692	42.883	35.587	35.585	5.40	2.98	0.37	2.60	0.03			199	22222255
12	303.1	15.217	15.170	26.311	34.915	43.144	35.488	35.481	5.19	3.51	0.53	5.50	0.02			300	22222255
11	500.9	13.564	13.492	26.502	35.170	43.460	35.270	35.289	5.24	4.19	0.73	8.60	0.01			496	22222255
10	748.1	10.931	10.836	26.742	35.519	43.911	34.918	34.915	5.07	6.24	1.15	14.90	0.02			741	22222255
8	1102.7	6.140	6.037	27.143	36.140	44.739	34.487	34.486	4.66	25.64	2.00	27.70	0.00			1091	22222255
7	1199.4	5.145	5.042	27.213	36.260	44.906	34.423	34.424	4.64	32.44	2.14	30.00	0.02			1186	22222255
5	1598.6	3.335	3.215	27.488	36.625	45.357	34.525	34.514	4.16	61.51	2.45	33.70	0.02			1580	22222255
4	1798.4	2.991	2.858	27.586	36.743	45.491	34.609	34.586	4.10	69.67	2.40	33.60	0.01			1776	22222255
3	2003.0	2.720	2.572	27.658	36.829	45.591	34.667	34.665	4.22	74.93	2.35	32.50	0.01			1978	22222255
2	2201.5	2.533	2.370	27.736	36.917	45.689	34.744	34.746	4.43	75.77	2.22	31.00	0.00			2173	22222255
1	2334.6	2.394	2.221	27.774	36.963	45.741	34.776	34.782	4.63	73.56	2.13	29.50	0.01			2303	22222255

CRUISE: CD 29 STA: 29 DATE (D/M/Y): 21-11-87 TIME: 0420 LAT: 32 59.95 S LONG: 43 40.13 E

GRAVITY= 9.7957 M/S CORIOLIS= -.79429E-04 1/S SOUND SPEED= 1509.5 M/S Depth= 906 Cor Meters

PRES DBAR	TMP IPT568	SALT PSS78	OXYG ML/L	PTMP IPT568	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-MT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	19.122	35.505	5.75	19.122	25.377	33.848	41.954	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.122	35.505	5.75	19.122	25.377	33.848	41.954	0.003	0.0	-0.36	0.000	0.00	0.000	1.0
20	19.126	35.534	5.53	19.123	25.399	33.870	41.976	0.052	0.1	-12.34	11.284	-917.79	6.096	19.9
30	18.761	35.636	5.55	18.756	25.571	34.052	42.167	0.077	0.1	-35.82	2.081	-833.16	5.808	29.8
40	18.518	35.644	5.54	18.511	25.639	34.127	42.250	0.101	0.2	-25.05	-0.061	-486.38	4.447	39.6
50	18.302	35.641	5.54	18.373	25.671	34.164	42.291	0.124	0.3	-11.84	-0.362	-210.01	2.916	49.7
100	17.123	35.615	5.37	17.106	25.962	34.497	42.663	0.234	1.1	-17.36	-0.487	-297.19	3.469	99.4
125	16.742	35.597	5.24	16.721	26.040	34.588	42.766	0.285	1.7	-13.78	-0.870	-214.60	2.948	124.3
150	16.553	35.584	5.15	16.528	26.075	34.630	42.814	0.334	2.4	-5.90	-0.332	-86.15	1.868	149.1
200	16.108	35.547	5.11	16.076	26.152	34.723	42.922	0.432	4.2	-6.16	-0.516	-81.36	1.815	198.8
250	15.614	35.499	5.07	15.575	26.229	34.818	43.034	0.527	6.3	-13.51	-1.346	-160.71	2.551	248.5
300	15.105	35.454	5.00	15.059	26.310	34.917	43.151	0.618	8.9	-8.25	-0.658	-105.32	2.065	298.1
350	14.544	35.400	5.03	14.491	26.393	35.021	43.275	0.706	11.8	-8.74	-0.894	-97.54	1.987	347.7
400	14.043	35.338	5.04	13.985	26.452	35.100	43.372	0.792	15.1	-8.92	-1.014	-90.93	1.919	397.4
450	13.735	35.302	5.11	13.670	26.490	35.151	43.434	0.876	18.8	-6.67	-0.846	-61.44	1.577	447.0
500	13.172	35.224	5.14	13.102	26.546	35.229	43.534	0.959	22.8	-10.11	-1.435	-80.96	1.810	496.5
600	12.184	35.084	5.11	12.104	26.635	35.358	43.701	1.118	31.7	-12.39	-1.645	-95.70	1.968	595.7
700	10.950	34.926	5.00	10.862	26.744	35.519	43.911	1.268	41.6	-9.18	-1.119	-70.02	1.684	694.0
800	9.751	34.789	4.93	9.657	26.845	35.674	44.114	1.411	52.5	-13.03	-1.394	-102.45	2.037	793.0
900	8.731	34.685	4.85	8.631	26.930	35.805	44.280	1.544	64.0	-5.52	-0.522	-102.45	0.000	892.7
909	8.720	34.684	4.84	8.620	26.931	35.806	44.290	1.555	65.1	-4.33	-0.396	-102.45	0.000	901.7

BOTL NO.	PRES DBAR	CTDMP IPT568	THETA IPT568	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUAL1
11	0.0	19.162	19.162	24.740	33.220	41.334	34.685	35.486	5.40	1.60	0.21	0.00	-0.01			0	222222255
10	55.3	18.185	18.176	25.719	34.218	42.351	35.639	35.631	5.50	1.78	0.25	0.00	-0.01			54	222222255
9	102.7	16.957	16.940	26.002	34.542	42.713	35.615	35.600	5.25	2.81	0.38	2.30	0.03			101	222222255
8	202.9	16.060	16.028	26.161	34.734	42.935	35.545	35.541	5.04	3.60	0.50	4.70	0.01			201	222222255
7	304.1	14.935	14.889	26.343	34.957	43.197	35.449	35.441	4.96	3.85	0.63	6.70	0.01			301	222222255
6	399.7	13.997	13.939	26.462	35.112	43.385	35.338	35.347	5.04	4.03	0.73	8.00	0.01			396	222222255
5	500.5	13.095	13.025	26.562	35.248	43.555	35.224	35.210	5.37	4.37	0.86	10.00	0.00			496	222222255
4	601.9	12.137	12.056	26.643	35.369	43.713	35.003	35.072	5.06	5.06	1.02	12.30	0.01			596	222222255
3	698.9	10.905	10.817	26.752	35.530	43.923	34.927	34.917	4.99	6.94	1.10	15.90	-0.01			692	222222255
2	796.5	9.782	9.680	26.843	35.670	44.109	34.793	34.787	4.92	9.34	1.39	18.20	0.00			788	222222255
1	908.7	8.666	8.566	26.940	35.818	44.304	34.685	34.674	4.80	13.27	1.56	21.30	0.00			899	222222255

CRUISE: CD 29 STA: 30 DATE (D/M/Y): 21-11-87 TIME: 0911 LAT: 32 59.64 S LONG: 44 29.41 E

GRAVITY= 9.7956 M/S CORIOLIS= -.79418E-04 1/S SOUND SPEED= 1507.6 M/S Depth= 964 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S I/DB 10-3	POT-V (m s)-1 10-12	B-V CPM	DEPTH METERS
0	19.777	35.558	5.19	19.777	25.247	33.697	41.784	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.777	35.558	5.19	19.777	25.247	33.697	41.784	0.003	0.0	-0.37	0.000	0.00	0.000	1.0
20	19.206	35.558	5.17	19.203	25.397	33.865	41.968	0.053	0.1	-24.91	4.549	-769.22	5.581	19.9
30	18.854	35.622	5.17	18.848	25.537	34.015	42.127	0.078	0.1	-18.41	2.100	-490.35	4.456	29.8
40	18.635	35.633	5.24	18.628	25.601	34.086	42.205	0.103	0.2	-32.76	-0.599	-609.47	4.960	39.8
50	18.364	35.625	5.24	18.355	25.664	34.157	42.285	0.126	0.3	-15.75	-0.285	-290.71	3.431	49.7
100	17.495	35.617	5.09	17.478	25.873	34.396	42.550	0.238	1.2	-14.67	-0.029	-276.40	3.345	99.5
125	17.039	35.605	5.12	17.019	25.975	34.513	42.682	0.291	1.8	-15.55	-0.797	-252.64	3.198	124.3
150	16.750	35.601	5.14	16.725	26.042	34.590	42.767	0.342	2.5	-14.45	-0.773	-225.23	3.020	149.1
200	16.216	35.559	5.07	16.184	26.136	34.703	42.899	0.440	4.2	-7.91	-0.708	-102.02	2.032	198.8
250	15.712	35.511	4.97	15.672	26.217	34.802	43.015	0.535	6.4	-17.31	-1.727	-206.61	2.892	248.5
300	14.923	35.437	4.97	14.877	26.337	34.951	43.191	0.626	9.0	-12.61	-1.148	-151.35	2.476	298.1
350	14.289	35.368	4.99	14.237	26.422	35.061	43.324	0.713	11.8	-9.41	-1.084	-95.91	1.971	347.8
400	13.728	35.299	5.09	13.671	26.488	35.148	43.432	0.797	15.1	-8.68	-1.060	-81.88	1.821	397.4
450	13.284	35.239	5.08	13.221	26.534	35.212	43.512	0.879	18.6	-10.51	-1.430	-87.56	1.883	447.0
500	12.806	35.175	5.04	12.737	26.582	35.280	43.598	0.960	22.5	-13.00	-1.788	-102.90	2.041	496.5
600	11.598	35.008	5.03	11.521	26.687	35.434	43.900	1.114	31.2	-11.87	-1.595	-86.39	1.870	595.7
700	10.187	34.835	4.95	10.103	26.806	35.615	44.037	1.259	40.8	-14.18	-1.562	-111.78	2.127	694.8
800	8.988	34.711	4.83	8.898	26.909	35.771	44.243	1.394	51.1	-10.30	-0.966	-82.27	1.825	793.8
900	7.980	34.619	4.77	7.886	26.992	35.900	44.416	1.520	62.0	-8.28	-0.706	-65.59	1.630	892.7
959	7.587	34.586	4.70	7.489	27.024	35.951	44.485	1.591	68.8	-7.67	-0.633	-65.59	0.000	951.1

BOTL NO.	PRES DBAR	CTD IPTS68	TEMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	** CTDSAL PSS78	** SALNTY PSS78	** OXYGEN ML/L	** SILCAT UMOL/L	** PHSPHT UMOL/L	** NITRAT UMOL/L	** NITRIT UMOL/L	** CFC-11 PM/KG	** CFC-12 PM/KG	DEPTH METERS	QUAL1
11	1.4	19.871	19.871	24.481	32.940	41.035	34.586	35.557	5.39	1.67	0.12	0.00	0.00	1.996	0.000	0.000	1	22222222
10	55.0	18.371	18.362	25.682	34.155	42.282	35.625	35.626	5.45	1.85	0.21	0.00	0.00	2.033	1.161	1.161	54	22222222
9	153.0	16.437	16.413	26.115	34.673	42.861	35.600	35.573	5.16	3.42	0.39	3.70	0.00	2.100	1.135	1.135	151	22222222
8	254.9	15.499	15.460	26.253	34.846	43.066	35.496	35.488	5.05	3.77	0.50	5.50	0.00	2.036	1.181	1.181	252	22222222
7	351.1	14.245	14.194	26.431	35.071	43.336	35.368	35.363	5.04	4.13	0.64	7.80	0.00	1.971	1.070	1.070	348	22222222
6	458.6	13.373	13.308	26.512	35.187	43.483	35.233	35.252	5.08	4.48	0.77	9.30	0.00	1.876	1.031	1.031	454	22222222
5	549.6	12.316	12.274	26.619	35.337	43.674	35.098		5.05	5.01	0.95	11.70	0.00	1.593	0.885	0.885	544	25222222
4	650.1	10.998	10.916	26.734	35.508	43.897	34.927	34.928	5.02	6.40	1.14	14.90	0.00	1.303	0.720	0.720	644	22222222
3	733.8	9.771	9.685	26.839	35.667	44.106	34.787	34.786	4.92	9.52	1.34	18.20	0.00	1.014	0.538	0.538	726	22222222
2	850.3	8.404	8.313	26.959	35.848	44.345	34.659	34.653	4.80	14.53	1.59	22.10	0.00	0.828	0.463	0.463	842	22222222
1	958.7	7.572	7.474	27.026	35.954	44.488	34.586	34.582	4.75	18.34	1.79	24.30	0.00	0.686	0.415	0.415	949	22222222

CRUISE: CD 29 STA: 31 DATE (D/M/Y): 21-11-87 TIME: 1815 LAT: 33 12.41 S LONG: 46 4.79 E

GRAVITY= 9.7958 M/S CORIOLIS= -.79872E-04 1/S SOUND SPEED= 1496.5 M/S Depth= 2196 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	18.735	35.543	5.12	18.735	25.505	33.987	42.104	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	18.735	35.543	5.12	18.735	25.505	33.988	42.104	0.002	0.0	-0.35	0.000	0.00	0.000	1.0
20	18.496	35.508	5.33	18.493	25.539	34.030	42.154	0.050	0.1	-2.29	2.900	-218.00	2.968	19.9
30	18.368	35.540	5.40	18.363	25.596	34.091	42.219	0.074	0.1	-122.81	5.004	-2683.82	10.395	29.8
40	17.123	35.548	5.58	17.116	25.908	34.443	42.609	0.096	0.2	-46.18	-1.622	-770.46	5.570	39.8
50	16.849	35.550	5.60	16.841	25.976	34.520	42.695	0.117	0.3	-21.93	-0.797	-359.94	3.807	49.7
100	15.797	35.499	5.39	15.781	26.183	34.764	42.974	0.214	1.0	-14.87	-0.445	-241.21	3.116	99.4
125	15.579	35.505	5.17	15.559	26.237	34.827	43.043	0.260	1.6	-8.71	-0.406	-135.09	2.332	124.3
150	15.424	35.492	5.18	15.401	26.263	34.858	43.080	0.305	2.2	-5.56	-0.503	-60.80	1.565	149.1
200	15.246	35.498	5.24	15.216	26.309	34.911	43.139	0.394	3.8	-5.10	-0.433	-63.69	1.601	198.0
250	14.739	35.420	5.11	14.701	26.362	34.983	43.230	0.482	5.8	-13.52	-2.004	-113.97	2.142	248.4
300	14.148	35.342	5.06	14.104	26.430	35.074	43.342	0.567	8.2	-8.96	-0.694	-110.67	2.111	298.1
350	13.768	35.309	5.09	13.718	26.486	35.145	43.426	0.650	10.9	-5.15	-0.352	-65.12	1.619	347.7
400	13.460	35.276	5.15	13.403	26.525	35.196	43.489	0.731	14.0	-7.59	-1.074	-61.34	1.572	397.3
450	12.987	35.206	5.09	12.925	26.568	35.258	43.569	0.812	17.5	-12.04	-1.884	-82.62	1.824	446.9
500	12.417	35.116	5.06	12.349	26.612	35.326	43.659	0.890	21.3	-9.45	-1.436	-64.15	1.607	496.5
600	11.347	34.963	5.03	11.270	26.698	35.437	43.832	1.042	29.9	-11.52	-1.492	-85.60	1.856	595.6
700	10.143	34.818	4.92	10.060	26.800	35.611	44.035	1.187	39.4	-12.26	-1.355	-95.48	1.961	694.7
800	8.719	34.671	4.78	8.631	26.919	35.794	44.278	1.322	49.7	-16.19	-1.528	-127.34	2.264	793.7
900	7.080	34.524	4.70	6.991	27.045	35.997	44.552	1.444	60.3	-17.94	-1.426	-136.54	2.345	892.6
1000	5.833	34.441	4.71	5.743	27.143	36.155	44.768	1.553	70.9	-10.54	-0.572	-86.45	1.866	991.5
1200	4.177	34.404	4.56	4.083	27.304	36.400	45.091	1.746	92.4	-6.17	0.214	-78.55	1.778	1189.2
1400	3.413	34.485	4.21	3.310	27.445	36.580	45.308	1.906	113.7	-2.76	0.491	-58.50	1.535	1306.6
1600	2.979	34.588	4.08	2.863	27.568	36.725	45.474	2.042	134.5	-2.00	0.504	-51.59	1.441	1583.8
1800	2.724	34.682	4.21	2.594	27.667	36.837	45.598	2.157	154.3	-0.71	0.327	-27.56	1.053	1780.7
2000	2.593	34.732	4.40	2.447	27.720	36.897	45.664	2.260	174.3	-0.89	0.222	-23.27	0.968	1977.5
2200	2.442	34.774	4.59	2.281	27.768	36.953	45.728	2.355	194.7	-0.87	0.226	-23.27	0.000	2174.1

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
15	11.3	18.547	18.545	25.498	33.987	42.111	35.471	35.560	5.49	1.81	0.21	0.00	0.01	2.188	0.000	11	222222222
14	106.0	15.094	15.078	26.209	34.794	43.007	35.503	35.520	5.43	3.18	0.41	3.30	0.30	2.227	1.363	105	222222222
13	204.5	15.116	15.085	26.334	34.940	43.173	35.493	35.467	5.34	3.53	0.54	5.30	0.03	2.224	1.239	202	222222222
12	304.5	14.157	14.113	26.428	35.071	43.338	35.341	35.345	5.15	4.05	0.69	7.60	0.02	2.046	1.140	301	222222222
11	404.2	13.523	13.465	26.510	35.178	43.469	35.272	35.288	5.26	4.07	0.74	8.50	0.02	2.039	1.170	400	222222222
10	501.8	12.503	12.435	26.594	35.304	43.634	35.114	35.134	5.14	4.92	0.93	11.20	0.02	1.808	1.020	497	222222222
9	602.0	11.521	11.443	26.665	35.417	43.786	34.962	34.989	5.05	5.45	1.09	13.70	-0.02	1.512	0.827	596	222222222
8	803.7	8.855	8.766	26.893	35.762	44.240	34.665	34.686	4.82	11.77	1.55	20.80	0.01	0.919	0.536	795	222222222
5	1403.3	3.372	3.269	27.450	36.587	45.317	34.486	34.502	4.20	57.94	2.51	33.50	-0.01	0.248	0.128	1307	222222222
4	1601.4	2.901	2.865	27.569	36.725	45.474	34.588	34.590	4.11	67.65	2.51	33.50	-0.01	0.076	0.055	1583	222222222
3	1802.5	2.725	2.595	27.669	36.839	45.600	34.684	34.635	4.16	69.87	2.40	32.70	-0.01			1781	222222255
1	2200.2	2.441	2.279	27.768	36.953	45.729	34.774	34.771	4.66	68.35	2.13	29.10	-0.01	0.000		2171	222222225

CRUISE: CD 29 STA: 32 DATE (D/M/Y): 21-11-87 TIME: 2227 LAT: 33 18.70 S LONG: 46 30 25 E

GRAVITY= 9.7959 M/S CORIOLIS= -.80095E-04 1/S SOUND SPEED= 1497.0 M/S Depth= 2660 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-MT	PE	GRD-PT	GRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	19.349	35.483	5.28	19.349	25.302	33.766	41.866	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.349	35.483	5.28	19.349	25.302	33.766	41.866	0.003	0.0	-0.36	0.000	0.00	0.000	1.0
20	18.799	35.525	5.51	18.796	25.476	33.957	42.072	0.051	0.1	-22.33	4.198	-696.93	5.290	19.9
30	18.501	35.568	5.52	18.496	25.585	34.074	42.198	0.076	0.1	-41.38	4.939	-1113.44	6.666	29.8
40	18.068	35.600	5.55	18.061	25.718	34.221	42.358	0.099	0.2	-25.64	-1.013	-439.10	4.199	39.8
50	17.424	35.582	5.63	17.416	25.862	34.387	42.543	0.122	0.3	-80.51	-0.053	-1532.97	7.845	49.7
100	16.250	35.564	5.36	16.234	26.128	34.693	42.887	0.222	1.1	-19.20	-1.102	-285.13	3.363	99.4
125	15.823	35.534	5.21	15.803	26.204	34.785	42.993	0.269	1.6	-15.54	-1.408	-196.26	2.807	124.3
150	15.525	35.508	5.05	15.501	26.253	34.844	43.063	0.314	2.2	-9.27	-0.587	-129.90	2.204	149.1
200	15.016	35.462	5.13	14.986	26.332	34.942	43.179	0.403	3.8	-12.02	-1.356	-129.22	2.278	198.8
250	14.503	35.406	5.14	14.466	26.402	35.032	43.286	0.489	5.8	-11.22	-1.201	-120.76	2.202	248.4
300	13.991	35.343	5.15	13.948	26.464	35.114	43.387	0.572	8.1	-8.40	-1.053	-78.39	1.774	298.1
350	13.587	35.292	5.19	13.537	26.510	35.175	43.463	0.654	10.8	-6.57	-0.808	-60.73	1.562	347.7
400	13.268	35.251	5.26	13.212	26.545	35.223	43.524	0.734	13.9	-6.02	-0.864	-47.30	1.378	397.3
450	12.902	35.192	5.27	12.840	26.575	35.268	43.582	0.814	17.4	-10.60	-1.708	-69.38	1.669	446.9
500	12.406	35.114	5.15	12.339	26.613	35.327	43.660	0.892	21.2	-10.43	-1.581	-71.03	1.689	496.5
600	11.271	34.953	5.08	11.194	26.704	35.466	43.844	1.044	29.7	-11.47	-1.461	-86.42	1.863	595.6
700	10.003	34.802	4.93	9.920	26.811	35.628	44.058	1.188	39.2	-13.28	-1.471	-101.95	2.023	694.7
800	8.572	34.656	4.80	8.485	26.930	35.812	44.302	1.322	49.4	-17.02	-1.552	-133.97	2.319	793.7
900	6.953	34.526	4.68	6.905	27.059	36.014	44.574	1.442	59.8	-13.27	-1.042	-101.58	2.019	892.6
1000	5.804	34.438	4.67	5.714	27.145	36.158	44.772	1.552	70.4	-12.94	-0.807	-100.31	2.007	991.5
1200	4.020	34.399	4.56	3.928	27.316	36.420	45.119	1.742	91.8	-5.89	0.234	-76.37	1.751	1189.2
1400	3.291	34.481	4.30	3.189	27.454	36.595	45.329	1.901	112.8	-2.48	0.478	-54.93	1.485	1386.6
1600	2.905	34.574	4.16	2.790	27.564	36.725	45.477	2.036	133.4	-1.48	0.504	-46.31	1.364	1583.8
1800	2.760	34.672	4.21	2.629	27.656	36.824	45.583	2.153	153.6	-0.53	0.403	-30.41	1.105	1780.7
2000	2.650	34.739	4.40	2.503	27.721	36.895	45.659	2.257	173.9	-0.66	0.263	-23.38	0.969	1977.5
2200	2.537	34.779	4.62	2.374	27.764	36.944	45.715	2.353	194.4	-0.82	0.100	-15.28	0.783	2174.1
2400	2.393	34.799	4.80	2.215	27.793	36.982	45.760	2.444	215.6	-1.00	0.060	-15.02	0.777	2370.6
2600	2.222	34.803	4.89	2.028	27.812	37.010	45.798	2.530	237.6	-0.86	0.014	-15.02	0.000	2566.8
2673	2.160	34.802	4.93	1.960	27.816	37.019	45.810	2.561	245.9	-1.03	-0.011	-15.02	0.000	2638.4

BOTL NO.	PRES DBAR	CTD TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
22	12.9	18.784	18.782	25.469	33.950	42.066	35.511	35.532	5.48	2.07	0.20	0.10	0.02			12	22222255
21	12.9	18.784	18.782	25.469	33.950	42.066	35.511	35.532	5.47	2.10	0.23	0.00	0.01			12	22222255
20	53.0	16.953	16.944	25.975	34.515	42.686	35.581	35.587	5.76	2.60	0.26	0.00	0.01			52	22227255
19	253.6	14.465	14.428	26.407	35.039	43.294	35.402	35.399	5.15							251	22255555
18	253.6	14.465	14.428	26.407	35.039	43.294	35.402	35.399	5.14	4.14	0.64	7.00	0.01			251	22222255
17	352.1	13.648	13.598	26.497	35.160	43.446	35.291	35.297	5.22	4.31	0.74	8.40	0.00			349	22222255
16	451.3	12.909	12.846	26.572	35.266	43.580	35.191	35.193	5.23	4.66	0.88	9.90	0.01			447	22222255
15	552.3	11.716	11.644	26.674	35.417	43.777	35.022	35.028	5.08							547	22255555
13	748.3	9.241	9.156	26.881	35.732	44.193	34.729	34.723	4.89	10.48	1.47	19.70	0.01			741	22222255
11	950.2	6.357	6.268	27.108	36.095	44.683	34.481	34.483	4.74							940	22255555
10	1023.7	5.454	5.385	27.173	36.204	44.834	34.420	34.416	4.77	27.59	2.00	29.30	0.00			1013	22222255
8	1296.1	3.586	3.490	27.388	36.514	45.234	34.435	34.438	4.43	50.86	2.37	33.50	0.01			1282	22222255
7	1499.1	3.068	2.960	27.510	36.663	45.408	34.526	34.533	4.16	64.39	2.40	34.20	0.01			1482	22222255
6	1703.5	2.784	2.661	27.620	36.787	45.545	34.630	34.649	4.17	69.69	2.32	32.60	0.01			1683	22222255
2	2499.2	2.283	2.096	27.804	36.999	45.783	34.800	34.799	4.90	70.55	1.95	28.60	0.01			2465	22222255
1	2672.2	2.161	1.961	27.816	37.019	45.810	34.802	34.809	4.95	67.14	1.82	27.50	0.01			2634	22222255

CRUISE: CD 29 STA: 33 DATE (D/M/Y): 22-11-87 TIME: 0302 LAT: 33 22.78 S LONG: 46 54 98 E

GRAVITY= 9.7960 M/S CORIOLIS= -.80240E-04 1/S SOUND SPEED= 1498.1 M/S Depth= 3147 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POI-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	18.899	35.563	5.20	18.899	25.479	33.956	42.068	0.000	0.0	-0.10	0.000	0.00	0.000	0.0
1	18.899	35.563	5.20	18.899	25.479	33.956	42.068	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	18.794	35.555	5.41	18.790	25.500	33.981	42.096	0.050	0.1	-9.11	-1.036	-120.10	2.194	19.9
30	18.751	35.555	5.39	18.746	25.512	33.994	42.110	0.075	0.1	-26.53	1.838	-639.09	5.061	29.8
40	18.246	35.571	5.51	18.239	25.651	34.149	42.261	0.099	0.2	-86.52	-1.055	-1627.45	8.076	39.8
50	17.130	35.566	5.65	17.122	25.921	34.456	42.621	0.121	0.3	-50.10	1.210	-1172.11	6.854	49.7
100	16.155	35.563	5.30	16.139	26.150	34.718	42.915	0.219	1.1	-19.33	-1.236	-278.41	3.340	99.4
125	15.662	35.521	5.17	15.642	26.231	34.817	43.031	0.266	1.6	-14.37	-1.072	-203.65	2.857	124.3
150	15.387	35.500	5.11	15.364	26.278	34.874	43.097	0.311	2.2	-11.87	-0.916	-156.56	2.505	149.1
200	14.925	35.452	5.09	14.894	26.345	34.958	43.198	0.399	3.8	-10.29	-1.162	-109.76	2.097	198.8
250	14.420	35.399	5.09	14.383	26.415	35.047	43.305	0.484	5.7	-9.47	-0.997	-102.68	2.029	248.4
300	13.960	35.341	5.12	13.916	26.469	35.120	43.394	0.567	8.1	-10.14	-1.289	-93.46	1.935	298.1
350	13.569	35.293	5.18	13.519	26.515	35.181	43.469	0.648	10.8	-5.45	-0.595	-55.08	1.486	347.7
400	13.240	35.249	5.27	13.184	26.549	35.229	43.530	0.729	13.8	-0.85	-1.330	-65.59	1.621	397.3
450	12.744	35.168	5.19	12.682	26.587	35.287	43.607	0.808	17.3	-9.17	-1.465	-60.09	1.552	446.9
500	12.175	35.080	5.00	12.100	26.631	35.354	43.697	0.885	21.0	-11.81	-1.754	-80.84	1.800	496.5
600	11.118	34.934	5.08	11.042	26.717	35.485	43.869	1.035	29.4	-10.85	-1.360	-81.24	1.804	595.6
700	9.739	34.773	4.99	9.657	26.833	35.661	44.102	1.177	38.8	-14.56	-1.555	-113.20	2.130	694.7
800	8.406	34.642	4.78	8.320	26.944	35.833	44.330	1.308	48.8	-13.38	-1.189	-104.90	2.050	793.7
900	6.893	34.515	4.72	6.806	27.064	36.024	44.588	1.428	59.2	-14.99	-1.113	-116.77	2.163	892.6
1000	5.561	34.429	4.70	5.474	27.167	36.193	44.818	1.535	69.6	-10.46	-0.571	-85.16	1.847	991.5
1200	4.079	34.405	4.57	3.986	27.314	36.415	45.111	1.724	90.7	-5.93	0.160	-72.33	1.703	1189.1
1400	3.262	34.487	4.22	3.160	27.461	36.604	45.339	1.883	111.7	-3.10	0.467	-60.52	1.557	1386.5
1600	2.840	34.580	4.16	2.726	27.574	36.739	45.494	2.015	132.0	-1.50	0.379	-38.95	1.249	1583.7
1800	2.638	34.639	4.22	2.509	27.640	36.815	45.581	2.132	152.2	-1.10	0.272	-28.31	1.065	1780.9
2000	2.489	34.697	4.35	2.345	27.700	36.884	45.657	2.238	172.7	-0.73	0.266	-24.28	0.986	1977.5
2200	2.514	34.766	4.57	2.351	27.756	36.937	45.709	2.335	193.5	-0.13	0.274	-18.31	0.857	2174.1
2400	2.484	34.794	4.74	2.225	27.788	36.977	45.754	2.427	215.0	-0.54	0.122	-13.69	0.741	2370.5
2600	2.163	34.788	4.81	1.970	27.804	37.006	45.797	2.514	237.3	-1.36	0.002	-15.87	0.797	2566.8
2800	1.993	34.794	4.88	1.784	27.824	37.036	45.837	2.597	260.1	-0.40	0.053	-7.95	0.565	2762.8
3000	1.837	34.778	4.92	1.613	27.824	37.046	45.855	2.678	284.1	-1.57	-0.176	-8.12	0.571	2958.7
3187	1.579	34.752	4.72	1.342	27.823	37.061	45.885	2.753	307.6	-1.40	-0.135	-8.12	0.000	3141.7

BOTL NO.	PRES DBAR	CTD TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	** CTDSAL PSS78	** SALNTY PSS78	** OXYGEN ML/L	** SILCAT UMOL/L	** PHSPT UMOL/L	** NITRAT UMOL/L	** NITRIT UMOL/L	** CFC-11 PM/KG	** CFC-12 PM/KG	DEPTH METERS	QUALTY
24	1.7	19.069	19.069	24.815	33.297	41.413	34.752	35.577	5.39	1.91	0.20	0.10	0.00	1.989	1.232	1	22222222
23	54.0	17.347	17.338	25.873	34.401	42.560	35.572	35.580	5.63	2.08	0.23	0.10	-0.01	2.353	1.347	53	22222222
22	153.7	15.374	15.350	26.279	34.876	43.099	35.498	35.496	5.00	3.28	0.52	5.10	0.00	2.082	1.293	152	22222222
21	252.1	14.308	14.271	26.436	35.073	43.335	35.396	35.382	5.14	3.45	0.63	7.20	0.00	2.093	1.190	250	22222222
20	352.0	13.446	13.396	26.539	35.210	43.503	35.292	35.276	5.19	3.46	0.72	6.70	0.00	1.990	1.268	349	22222222
19	453.2	12.600	12.538	26.614	35.320	43.645	35.166	35.142	5.12	4.13	0.89	10.90	0.00	1.885	1.067	449	22222222
18	551.2	11.521	11.449	26.698	35.449	43.817	35.006	34.983	5.00	5.84	1.06	13.80	0.00	1.548	0.935	546	22222222
16	751.7	9.175	9.090	26.868	35.722	44.187	34.699	34.711	4.81	10.42	1.44	20.00	0.00	0.937	0.540	744	22222222
14	952.9	6.093	6.006	27.133	36.132	44.732	34.469	34.458	4.74	23.65	2.01	27.00	0.00	0.673	0.430	943	22222222
13	1025.8	5.276	5.188	27.194	36.233	44.872	34.420	34.419	4.69	29.59	2.13	29.60	0.00	0.597	0.338	1015	22222222
12	1099.7	4.721	4.631	27.249	36.316	44.981	34.409	34.407	4.61	35.86	2.23	31.00	0.00			1088	22222225
11	1300.8	3.587	3.584	27.394	36.520	45.240	34.443		4.32							1286	25255555
10	1500.7	3.034	2.926	27.520	36.674	45.421	34.534	34.525	4.14	64.17	2.45	34.10	0.01	0.110	0.082	1483	22222222
9	1701.7	2.743	2.621	27.609	36.778	45.539	34.611	34.603	4.14	71.97	2.39	33.60	0.01			1681	22222225
8	1899.0	2.525	2.389	27.671	36.852	45.623	34.664	34.666	4.20	76.71	2.33	32.80	0.01			1875	22222225
7	2101.0	2.438	2.286	27.724	36.910	45.686	34.720	34.724	4.42	78.40	2.23	31.40	0.01	0.014	0.000	2074	22222222
6	2302.2	2.297	2.129	27.786	36.979	45.762	34.781	34.754	4.57	78.56	2.14	30.50	0.01			2272	22222225
5	2501.4	2.236	2.051	27.800	36.998	45.785	34.791	34.784	4.79	75.17	2.06	29.20	0.01			2467	22222225
4	2704.4	2.018	1.818	27.818	37.028	45.827	34.790	34.784	4.90	79.74	2.07	29.10	0.01	0.001		2666	22222225
3	2905.0	1.927	1.710	27.827	37.043	45.848	34.791	34.788	4.95	80.41	2.07	29.10	0.01			2862	22222225
2	3095.9	1.658	1.426	27.821	37.054	45.874	34.758	34.756	4.82	96.16	2.17	30.70	0.00	0.003	0.000	3049	22222222
1	3186.1	1.579	1.342	27.823	37.060	45.885	34.752	34.753	4.73	97.17	2.14	30.90	0.00	0.005		3137	22222225



CRUISE: CD 29 STA: 34 DATE (D/M/Y): 22-11-87 TIME: 0832 LAT: 33 29.94 S LONG: 47 26.84 E

GRAVITY= 9.7961 M/S CORIOLIS= -.80493E-04 1/S SOUND SPEED= 1499.3 M/S Depth= 3591 Cor Meters

Table with 14 columns: PRES DBAR, TMP IPTS68, SALT PSS578, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Rows show data from 0 to 3829 meters depth.

Table with 14 columns: BOTL NO., PRES DBAR, CTDTMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSSAL PSS578, SALNTY PSS578, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. Rows show data from 24 to 23630.2 meters depth.



CRUISE: CD 29 STA: 36 DATE (D/M/Y): 23-11-87 TIME: 0123 LAT: 33 45 01 S LONG 49 30 39 E

GRAVITY= 9.7963 M/S CORIOLIS= -.81026E-04 1/S SOUND SPEED= 1503.8 M/S Depth= 4323 Cor Meters

Table with 14 columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2 10-5, GRD-PT C/DB 10-3, GRD-S 10-3, POT-V (m s)-1 10-12, B-V CPH, DEPTH METERS. Rows 0 to 4397.

Table with 15 columns: BOTL NO., PRES DBAR, CTDTMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPHT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALT1. Rows 24 to 14398.





















CRUISE: CD 29 STA: 46 DATE (D/M/Y): 26-11-87 TIME: 0953 LAT: 33 59.93 S LONG: 58 10.05 E

GRAVITY= 9.7965 M/S CORIOLIS= -.81551E-04 1/S SOUND SPEED= 1508.2 M/S Depth= 5093 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYC ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Contains depth profile data from 0 to 5200 meters.

Table with columns: BOTL NO., PRES DBAR, CTD IPTS68, TMP IPTS68, THETA, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, \*\* PSS78, \*\* PSS78, \*\* OXYGEN ML/L, \*\* SILCAT UMOL/L, \*\* PMSPT UMOL/L, \*\* NITRAT UMOL/L, \*\* NITRIT UMOL/L, \*\* CFC-11 PM/KG, \*\* CFC-12 PM/KG, DEPTH METERS, QUALTY. Contains discrete water sample data.





CRUISE: CD 29 STA: 49 DATE (D/M/Y): 27-11-87 TIME: 0940 LAT: 33 59.67 S LONG: 60 34.15 E

GRAVITY= 9.7965 M/S CORIOLIS= -.81542E-04 1/S SOUND SPEED= 1509.2 M/S Depth= 5346 Cor Meters

Table with 16 columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-MT DYNAMIC METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. It contains a series of depth profile data points from 0 to 5447 meters.

Table with 16 columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. It contains a series of depth profile data points from 24 to 15452.9 meters.















CRUISE: CD 29 STA: 56 DATE (D/M/Y): 1-12-87 TIME: 0133 LAT: 33 19.52 S LONG: 73 20 15 E

GRAVITY= 9.7959 M/S CORIOLIS= -.80124E-04 1/S SOUND SPEED= 1500.9 M/S Depth= 4109 Cor Meters

Table with 15 columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2 10-5, GRD-PT C/DB 10-3, GRD-S 1/DB 10-3, POT-V (m s)-1 10-12, B-V CPH, DEPTH METERS. Rows range from 0 to 4133.

Table with 18 columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPHT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. Rows range from 24 to 14136.4.





CRUISE: CD 29 STA: 58 DATE (D/M/Y): 1-12-87 TIME: 2354 LAT: 31 59.89 S LONG: 76 0.09 E

GRAVITY= 9.7948 M/S CORIOLIS= -.77281E-04 1/S SOUND SPEED= 1498.7 M/S Depth= 3388 Cor Meters

Table with columns: PRES, TMP, SALT, OXYG, PTMP, SIG-TH, SIG-2, SIG-4, DYN-HT, PE, GRD-PT, GRD-S, POT-V, B-V, DEPTH. Rows contain depth profile data from 0 to 3419 meters.

Table with columns: BOTL NO., PRES, CTDTMP, THETA, SIG-TH, SIG-2, SIG-4, CTDALS, SALNTY, OXYGEN, SILCAT, PHSPT, NITRAT, NITRIT, CFC-11, CFC-12, DEPTH, QUALTY. Rows contain water sampling data from 24 to 3421.4 meters.



CRUISE: CD 29 STA: 60 DATE (D/M/Y): 2-12-87 TIME: 1510 LAT: 31 7.67 S LONG: 77 44.36 E

GRAVITY= 9.7941 M/S CORIOLIS= -.75393E-04 1/S SOUND SPEED= 1496.7 M/S Depth= 3003 Cor Meters

Table with 14 columns: PRES, TMP, SALT, OXYG, PTMP, SIG-TH, SIG-2, SIG-4, DYN-HT, PE, GRD-PT, GRD-S, POT-V, B-V, DEPTH. Rows include depth measurements from 0 to 3073 meters.

Table with 14 columns: BOTL NO., PRES DBAR, CTDTMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, OUALT1. Rows include depth measurements from 24 to 3074 meters.



CRUISE: CD 29 STA: 62 DATE (D/M/Y): 3-12-87 TIME: 0522 LAT: 30 22.43 S LONG: 79 15.32 E

GRAVITY= 9.7935 M/S CORIOLIS= -.73744E-04 1/S SOUND SPEED= 1499.5 M/S Depth= 3739 Cor Meters

Table with 15 columns: PRES, TMP, SALT, OXYG, PTMP, SIG-TH, SIG-2, SIG-4, DYN-HT, PE, GRD-PT, GRD-S, POT-V, B-V, DEPTH. Rows contain data points from 0 to 3795 meters depth.

Table with 17 columns: BOTL NO., PRES DBAR, CTDMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMO/L, PHSPT UMO/L, NITRAT UMO/L, NITRIT UMO/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. Rows contain data points from 24 to 13797.0 meters depth.





CRUISE: CD 29 STA: 65 DATE (D/M/Y): 4-12-87 TIME: 0633 LAT: 29 0.23 S LONG: 82 0.09 E

GRAVITY= 9.7925 M/S CORIOLIS= -.70714E-04 1/S SOUND SPEED= 1501.1 M/S Depth= 4124 Cor Meters

Table with columns: PRES, TMP, SALT, OXYG, PTMP, SIG-TH, SIG-2, SIG-4, DYN-HT, PE, GRD-PT, GRD-S, POT-V, 0-V, DEPTH. Rows show data from 0 to 4173 meters depth.

Table with columns: BOTL NO., PRES DBAR, CTDP, THETA, SIG-TH, SIG-2, SIG-4, CTDSSAL, SALNTY, OXYGEN, SILCAT, PHSPT, NITRAT, NITRIT, CFC-11, CFC-12, DEPTH, QUALT1. Rows show data from 24 to 1 meters depth.



CRUISE: CD 29 STA: 66 DATE (D/M/Y): 4-12-87 TIME: 1816 LAT: 29 9.41 S LONG: 83 29.55 E

GRAVITY= 9.7926 M/S CORIOLIS= -.71054E-04 1/S SOUND SPEED= 1503.4 M/S Depth= 4368 Cor Meters

Table with columns: PRES, TMP, SALT, OXYG, PTMP, SIG-TH, SIG-2, SIG-4, DYN-HT, PE, GRD-PT, GRD-S, POT-V, B-V, DEPTH. Rows contain data from 0 to 4447 meters depth.

Table with columns: BOTL NO., PRES DBAR, CTDTMP IPTS68, THETA IPTS68, SIG-TH, SIG-2, SIG-4, CTD, SAL, SALNTY, OXYGEN, SILCAT, PHSPT, NITRAT, NITRIT, CFC-11, CFC-12, DEPTH METERS, QUALTY. Rows contain water quality data from 24 to 4451 meters depth.







CRUISE: CD 29 STA: 70 DATE (D/M/Y): 6-12-87 TIME: 0540 LAT: 29 39.75 S LONG: 87 50.08 E

GRAVITY= 9.7930 M/S CORIOLIS= -.72176E-04 1/S SOUND SPEED= 1497.8 M/S Depth= 1228 Cor M ters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-MT	FE	GRD-PT	GRD-S	POT-v	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	21.130	35.891	4.97	21.130	25.138	33.544	41.588	0.000	0.0	-0.19	0.000	0.00	0.000	0.0
1	21.130	35.891	4.97	21.130	25.138	33.544	41.588	0.003	0.0	-0.39	0.000	0.00	0.000	1.0
20	20.506	35.877	5.48	20.502	25.298	33.722	41.785	0.056	0.1	-26.57	-0.450	-481.50	4.631	19.9
30	20.394	35.892	5.58	20.388	25.340	33.767	41.832	0.082	0.1	-5.42	1.216	-168.42	2.739	29.9
40	20.297	35.889	5.47	20.289	25.364	33.795	41.863	0.108	0.2	-11.00	-0.518	-180.22	2.833	39.8
50	19.782	35.861	5.56	19.773	25.480	33.926	42.009	0.134	0.3	-86.21	-2.648	-1463.17	8.073	49.7
100	17.758	35.802	5.62	17.741	25.951	34.463	42.607	0.247	1.2	-47.88	-4.629	-577.37	5.071	99.5
125	16.405	35.646	5.47	16.385	26.156	34.715	42.903	0.297	1.8	-49.00	-6.767	-454.44	4.499	124.3
150	15.564	35.540	5.41	15.541	26.269	34.858	43.075	0.343	2.4	-27.74	-1.984	-335.58	3.866	149.1
200	14.096	35.378	5.34	14.067	26.466	35.111	43.379	0.427	3.9	-23.66	-3.218	-184.83	2.869	198.8
250	13.178	35.239	5.39	13.143	26.550	35.231	43.534	0.506	5.7	-18.52	-2.823	-116.94	2.282	248.5
300	12.325	35.109	5.45	12.285	26.619	35.335	43.671	0.582	7.8	-18.46	-3.100	-91.12	2.015	298.1
350	11.756	35.017	5.52	11.711	26.658	35.398	43.756	0.656	10.3	-6.37	-0.886	-39.37	1.324	347.7
400	11.494	34.980	5.51	11.443	26.679	35.430	43.799	0.729	13.1	-6.03	-0.827	-37.09	1.285	397.3
450	11.280	34.949	5.43	11.223	26.696	35.457	43.834	0.801	16.2	-5.47	-0.750	-33.03	1.213	446.9
500	10.852	34.891	5.61	10.790	26.729	35.509	43.903	0.873	19.7	-7.35	-0.777	-55.75	1.576	496.5
600	10.109	34.795	5.54	10.037	26.786	35.598	44.023	1.014	27.6	-7.55	-0.985	-43.79	1.397	595.6
700	9.405	34.706	5.45	9.325	26.836	35.680	44.135	1.151	36.7	-8.10	-0.987	-47.64	1.457	694.6
800	8.403	34.605	5.04	8.318	26.916	35.806	44.303	1.284	46.9	-15.90	-1.256	-119.37	2.306	793.7
900	6.314	34.462	4.57	6.231	27.098	36.086	44.677	1.483	57.2	-15.68	-0.833	-123.91	2.349	892.6
1000	5.117	34.420	4.24	5.033	27.211	36.259	44.905	1.506	67.1	-10.66	-0.292	-90.10	2.003	991.5
1200	3.820	34.475	3.80	3.729	27.396	36.509	45.216	1.681	86.7	-3.69	0.525	-63.65	1.684	1189.1
1355	3.414	34.541	3.56	3.314	27.489	36.623	45.350	1.795	101.6	-2.73	0.421	-63.65	0.000	1342.1

BOTL	PRES	CTD	THETA	SIG-TH	SIG-2	SIG-4	**	**	**	**	**	**	**	**	DEPTH	QUAL1
NO.	DBAR	IPTS68	IPTS68	KG/M3	KG/M3	KG/M3	PSS78	PSS78	ML/L	UMOL/L	UMOL/L	UMOL/L	UMOL/L	PM/KG	PM/KG	METERS
14	14.6	20.749	20.746	25.232	33.649	41.704	35.877	35.898	5.27	2.85	0.16	0.20	0.00		14	222222255
13	103.4	17.703	17.685	25.951	34.465	42.611	35.784	35.799	5.49	2.35	0.22	0.20	0.00		102	222222255
12	203.4	14.289	14.259	26.416	35.053	43.315	35.366	35.404	5.25	2.18	0.51	5.20	0.00		201	222222255
11	302.3	12.575	12.534	26.564	35.270	43.597	35.100	35.149	5.39	3.70	0.73	9.00	0.00		299	222222255
10	399.4	11.500	11.448	26.679	35.430	43.798	34.981	34.981	5.57	3.87	0.87	11.30	0.00		395	222222255
9	501.8	10.755	10.693	26.746	35.529	43.928	34.891	34.882	5.54	4.37	0.97	13.10	0.00		497	222222255
8	600.4	9.998	9.927	26.805	35.621	44.051	34.795	34.778	5.48	5.38	1.11	15.50	0.00		594	222222255
7	698.6	9.244	9.165	26.863	35.714	44.175	34.708	34.687	5.33	6.05	1.27	18.10	0.00		692	222222255
6	798.7	8.188	8.104	26.949	35.848	44.355	34.606	34.590	4.91	11.43	1.54	22.80	0.00		791	222222255
5	899.9	6.302	6.219	27.100	36.088	44.679	34.462	34.457	4.54	23.88	1.95	28.70	0.00		891	222222255
4	997.7	5.077	4.993	27.220	36.269	44.917	34.424	34.416	4.29	36.67	2.20	32.00	0.00		987	222222255
3	1098.0	4.265	4.179	27.302	36.393	45.079	34.415	34.414	4.15	47.96	2.35	34.10	0.00		1086	222222255
2	1201.3	3.816	3.812	27.397	36.510	45.217	34.475		3.78	62.78	2.47	35.70	0.00		1188	252222255
1	1352.5	3.406	3.306	27.489	36.623	45.350	34.539	34.543	3.57	75.75	2.51	36.20	0.00		1337	222222255









CRUISE: CD 29 STA: 74 DATE (D/M/Y): 7-12-87 TIME: 0825 LAT: 30 40.05 S LONG: 91 49.63 E

GRAVITY= 9.7938 M/S CORIOLIS= -.74387E-04 1/S SOUND SPEED= 1492.7 M/S Depth= 1928 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	21.118	35.642	4.59	21.118	24.952	33.361	41.408	0.000	0.0	-0.19	0.000	0.00	0.000	0.0
1	21.118	35.642	4.59	21.118	24.952	33.361	41.408	0.003	0.0	-0.38	0.000	0.00	0.000	1.0
20	18.064	35.711	5.45	18.061	25.803	34.305	42.440	0.051	0.0	-54.39	1.922	-1090.99	6.867	19.9
30	17.688	35.718	5.49	17.683	25.901	34.416	42.562	0.072	0.1	-25.09	0.554	-479.27	4.551	29.8
40	17.506	35.729	5.51	17.499	25.955	34.475	42.627	0.093	0.2	-14.70	1.011	-317.73	3.706	39.8
50	17.261	35.721	5.60	17.252	26.008	34.536	42.696	0.113	0.3	-43.25	-3.442	-568.33	4.956	49.7
100	14.893	35.512	5.48	14.878	26.394	35.008	43.247	0.204	1.0	-39.02	-4.707	-365.52	3.975	99.4
125	14.006	35.397	5.31	13.988	26.497	35.145	43.416	0.244	1.4	-35.45	-4.523	-303.97	3.625	124.3
150	13.321	35.307	5.28	13.300	26.570	35.245	43.541	0.282	2.0	-13.48	-1.027	-109.36	2.174	149.1
200	12.619	35.199	5.36	12.592	26.629	35.332	43.655	0.357	3.3	-18.12	-2.987	-97.59	2.054	198.7
250	11.948	35.087	5.44	11.915	26.673	35.404	43.754	0.429	4.9	-14.99	-2.510	-71.41	1.757	248.4
300	11.360	34.988	5.49	11.322	26.707	35.464	43.837	0.499	6.9	-10.00	-1.650	-45.25	1.398	298.0
350	10.840	34.901	5.54	10.797	26.735	35.514	43.908	0.569	9.2	-10.51	-1.715	-45.34	1.400	347.6
400	10.411	34.831	5.56	10.363	26.758	35.555	43.967	0.638	11.9	-7.39	-1.124	-34.68	1.224	397.2
450	10.075	34.785	5.53	10.022	26.780	35.593	44.019	0.706	14.8	-6.58	-0.783	-41.66	1.345	446.8
500	9.747	34.741	5.48	9.689	26.803	35.630	44.070	0.774	18.1	-5.57	-0.658	-34.87	1.228	496.4
600	9.026	34.650	5.37	8.959	26.851	35.711	44.182	0.907	25.6	-6.25	-0.737	-36.79	1.261	595.5
700	8.328	34.584	5.06	8.254	26.909	35.802	44.302	1.036	34.1	-10.34	-0.822	-78.62	1.043	694.5
800	7.122	34.499	4.68	7.043	27.018	35.967	44.521	1.159	43.5	-13.87	-0.889	-106.96	2.150	793.5
900	5.658	34.413	4.52	5.579	27.141	36.162	44.783	1.268	53.0	-11.47	-0.511	-90.92	1.982	892.5
1000	4.647	34.392	4.39	4.567	27.242	36.314	44.982	1.367	62.5	-7.29	0.204	-83.61	1.901	991.3
1200	3.790	34.496	3.67	3.699	27.416	36.531	45.239	1.535	81.3	-2.97	0.479	-55.95	1.555	1188.9
1400	3.341	34.572	3.45	3.238	27.521	36.658	45.388	1.677	100.2	-2.10	0.320	-38.46	1.289	1386.3
1600	3.000	34.622	3.50	2.884	27.594	36.749	45.496	1.804	119.5	-1.75	0.265	-32.03	1.177	1583.5
1800	2.724	34.668	3.58	2.594	27.656	36.826	45.587	1.918	139.3	-1.47	0.203	-26.07	1.061	1780.5
1935	2.550	34.690	3.63	2.411	27.690	36.870	45.639	1.990	152.9	-0.93	0.115	-26.07	0.000	1913.4

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	** CTDSAL PSS78	** SALNTY PSS78	** OXYGEN ML/L	** SILCAT UMOL/L	** PHSPHT UMOL/L	** NITRAT UMOL/L	** NITRIT UMOL/L	** CFC-11 PM/KG	** CFC-12 PM/KG	DEPTH METERS	QUAL1
16	12.6	18.128	18.126	25.765	34.265	42.399	35.683	35.818	5.52	1.22	0.22	0.20	0.00	2.055		12	22222225
15	103.6	14.845	14.830	26.397	35.012	43.253	35.501	35.515	5.52	1.06	0.38	2.70	0.00	2.102		102	22222225
14	202.0	12.660	12.633	26.616	35.317	43.639	35.192	35.225	5.40	2.07	0.73	8.10	0.00	2.206		200	22222225
13	301.4	11.250	11.213	26.726	35.486	43.863	34.985	34.975	5.55	2.57	0.87	11.20	0.00	2.242		298	22222225
12	402.3	10.323	10.275	26.770	35.572	43.987	34.827	34.821	5.60	3.75	0.99	13.50	0.00	2.118		398	22222225
11	501.0	9.732	9.674	26.805	35.634	44.074	34.741	34.739	5.49	5.26	1.13	16.00	0.00	1.883		496	22222225
10	602.3	9.024	8.957	26.850	35.710	44.181	34.648	34.650	5.41	5.09	1.28	18.40	0.00	1.605		596	22222225
9	700.1	8.301	8.226	26.913	35.806	44.308	34.583	34.585	5.02	9.12	1.51	22.10	0.00	1.007		693	22222225
8	800.5	7.180	7.155	27.010	35.956	44.508	34.498		4.65	16.15	1.79	26.20	0.00	0.552		792	25222225
7	899.5	5.746	5.667	27.131	36.148	44.764	34.414	34.418	4.55	25.68	2.04	29.80	0.00	0.359		890	22222225
6	1000.6	4.654	4.574	27.242	36.313	44.981	34.393	34.394	4.43	38.06	2.24	32.40	0.00	0.207		990	22222225
5	1199.6	3.807	3.717	27.414	36.528	45.235	34.496	34.496	3.62	66.99	2.50	35.70	0.00	0.035		1186	22222225
4	1400.2	3.336	3.233	27.522	36.659	45.390	34.572	34.573	3.40	81.53	2.56	36.30	0.00	0.007		1384	22222225
3	1600.9	2.995	2.879	27.594	36.750	45.497	34.622	34.626	3.49	88.54	2.54	36.00	0.00	0.004		1502	22222225
2	1802.4	2.711	2.581	27.657	36.820	45.590	34.668	34.670	3.60	95.72	2.49	35.60	0.00			1780	22222225
1	1934.6	2.533	2.394	27.690	36.870	45.641	34.688	34.692	3.65	100.56	2.48	35.20	0.00	0.005		1910	22222225

CRUISE: CD 29 STA: 75 DATE (D/M/Y): 7-12-87 TIME: 1728 LAT: 30 50.29 S LONG: 93 24.64 E

GRAVITY= 9.7939 M/S CORIOLIS= -.74761E-04 1/S SOUND SPEED= 1495.9 M/S Depth= 1248 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-MT	PE	GRD-PT	GRD-S	POT-V	σ-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	19.600	35.665	4.18	19.600	25.375	33.830	41.920	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.600	35.665	4.18	19.600	25.376	33.830	41.920	0.003	0.0	-0.36	0.000	0.00	0.000	1.0
20	18.885	35.741	5.56	18.882	25.821	34.322	42.456	0.049	0.0	-18.06	4.111	-559.60	4.906	19.9
30	17.988	35.774	5.59	17.983	25.870	34.374	42.511	0.070	0.1	-19.47	1.872	-458.28	4.439	29.8
40	17.809	35.789	5.58	17.802	25.926	34.436	42.578	0.091	0.2	-14.12	2.238	-380.42	4.045	39.8
50	17.720	35.835	5.64	17.712	25.984	34.496	42.641	0.112	0.3	-5.48	2.501	-239.18	3.207	49.7
100	15.646	35.823	5.71	15.630	26.312	34.897	43.110	0.208	1.0	-43.51	-4.554	-472.18	4.506	99.4
125	14.745	35.509	5.54	14.726	26.426	35.044	43.289	0.250	1.5	-20.36	-2.868	-168.17	2.689	124.3
150	14.290	35.451	5.48	14.268	26.480	35.116	43.377	0.290	2.0	-19.95	-2.617	-158.50	2.611	149.1
200	13.266	35.307	5.33	13.238	26.583	35.260	43.558	0.367	3.4	-18.46	-2.652	-129.66	2.361	198.7
250	12.319	35.157	5.43	12.285	26.656	35.372	43.787	0.440	5.1	-18.87	-3.324	-86.47	1.928	248.4
300	11.607	35.025	5.49	11.568	26.691	35.436	43.800	0.512	7.1	-11.63	-2.029	-48.81	1.449	298.0
350	11.036	34.928	5.53	10.992	26.721	35.492	43.878	0.582	9.4	-8.66	-1.412	-38.95	1.294	347.6
400	10.549	34.851	5.54	10.500	26.749	35.541	43.948	0.652	12.1	-8.26	-1.285	-38.32	1.284	397.2
450	10.211	34.799	5.53	10.157	26.769	35.575	43.996	0.721	15.1	-7.38	-1.056	-37.81	1.275	446.8
500	9.835	34.748	5.47	9.777	26.793	35.617	44.053	0.789	18.4	-6.35	-0.804	-37.32	1.267	496.4
600	9.190	34.668	5.35	9.123	26.839	35.692	44.156	0.923	25.9	-7.62	-0.881	-47.00	1.422	595.5
700	8.382	34.598	5.04	8.308	26.912	35.802	44.308	1.054	34.6	-9.04	-0.662	-72.54	1.766	694.5
800	7.134	34.505	4.70	7.055	27.022	35.970	44.524	1.176	43.9	-16.44	-1.120	-125.29	2.321	793.5
900	5.901	34.430	4.53	5.826	27.125	36.133	44.743	1.285	53.4	-10.07	-0.477	-79.81	1.853	892.5
1000	4.938	34.399	4.38	4.856	27.216	36.272	44.927	1.385	63.1	-9.57	0.033	-96.96	2.042	991.4
1200	3.755	34.469	3.83	3.665	27.398	36.515	45.225	1.555	82.1	-2.91	0.268	-96.96	0.000	1189.0
1237	3.717	34.472	3.76	3.624	27.405	36.523	45.236	1.584	85.6	-3.08	0.227	-96.96	0.000	1225.5

BOTL NO.	PRES DBAR	CTD IPTS68	TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTD SAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALITY
12	15.3	17.996	17.993	25.820	34.324	42.461	35.711	35.830	5.57	1.79	0.20	0.10	0.00	2.143			15	22222225
11	104.1	14.967	14.951	26.445	35.054	43.290	35.598	35.549	5.62								103	22255555
10	202.2	13.289	13.261	26.574	35.250	43.548	35.301	35.310	5.38	2.30	0.60	6.50	0.00	2.290			200	22222225
9	300.7	11.717	11.679	26.669	35.411	43.770	35.024	35.059	5.57	2.81	0.76	9.50	0.00	2.300			298	22222225
8	402.1	10.595	10.546	26.737	35.527	43.932	34.846	34.859	5.63	3.98	0.94	12.60	0.00	2.322			398	22222225
7	501.3	9.888	9.749	26.798	35.623	44.080	34.748	34.746	5.52	4.96	1.09	15.20	0.00	1.978			496	22222225
6	601.0	9.174	9.106	26.841	35.694	44.159	34.667	34.668	5.46	4.17	1.25	17.60	0.00	1.761			595	22222225
5	751.5	7.979	7.901	26.942	35.851	44.367	34.558	34.572	4.84	11.62	1.58	23.00	0.00	0.699			744	22222225
4	899.6	5.909	5.828	27.124	36.132	44.741	34.430	34.427	4.56	25.02	2.01	29.10	0.00	0.349			890	22222225
3	1000.3	4.900	4.817	27.220	36.270	44.935	34.399	34.398	4.42	35.60	2.15	31.40	0.00	0.220			990	22222225
2	1100.7	4.096	4.011	27.331	36.430	45.125	34.429	34.431	4.03	52.14	2.31	34.20	0.00	0.086			1089	22222225
1	1236.3	3.714	3.621	27.405	36.523	45.236	34.472	34.472	3.82	62.56	2.46	35.10	0.00	0.045			1223	22222225

CRUISE: CD 29 STA: 76 DATE (D/M/Y): 8-12-87 TIME: 0101 LAT: 31 18 82 S LONG 94 26 11 E

GRAVITY= 9.7942 M/S CORIOLIS= -.75507E-04 1/S SOUND SPEED= 1494.9 M/S Depth= 1571 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s) <sup>-1</sup> 10-12	θ-V CPH	DEPTH METERS
0	20.108	35.817	5.03	20.108	25.358	33.794	41.868	0.000	0.0	-0.19	0.000	0.00	0.000	0 0
1	20.108	35.817	5.03	20.108	25.358	33.794	41.868	0.003	0.0	-0.37	0.000	0.00	0.000	1.0
20	19.306	35.877	5.48	19.302	25.615	34.076	42.172	0.051	0.1	-43.75	2.339	-970.16	6.427	19.9
30	18.938	35.897	5.49	18.932	25.725	34.197	42.304	0.074	0.1	-51.62	-0.556	-944.26	6.341	29.8
40	18.523	35.881	5.56	18.516	25.819	34.304	42.424	0.096	0.2	-23.94	-3.215	-265.33	3.361	39.8
50	18.249	35.852	5.59	18.240	25.866	34.361	42.489	0.118	0.3	-32.69	-2.305	-475.13	4.498	49.7
100	16.374	35.689	5.62	16.358	26.196	34.755	42.943	0.218	1.0	-43.80	-4.666	-498.30	4.606	99.4
125	15.337	35.576	5.46	15.317	26.346	34.943	43.167	0.262	1.6	-45.81	-6.087	-440.88	4.333	124.3
150	14.683	35.503	5.39	14.661	26.435	35.056	43.303	0.304	2.1	-13.77	-0.603	-189.12	2.838	149.1
200	13.691	35.376	5.32	13.663	26.549	35.209	43.492	0.383	3.6	-19.80	-2.992	-137.04	2.416	198.8
250	12.772	35.223	5.41	12.738	26.619	35.316	43.633	0.458	5.3	-13.20	-2.083	-79.03	1.834	248.4
300	11.939	35.082	5.49	11.900	26.672	35.404	43.754	0.531	7.3	-16.40	-2.872	-74.37	1.780	298.0
350	11.443	35.000	5.53	11.398	26.703	35.456	43.826	0.603	9.7	-12.25	-1.968	-60.84	1.610	347.6
400	10.921	34.913	5.53	10.872	26.731	35.507	43.898	0.673	12.4	-9.11	-1.454	-42.90	1.352	397.2
450	10.426	34.835	5.55	10.372	26.759	35.557	43.968	0.743	15.4	-7.56	-1.143	-37.21	1.259	446.8
500	10.034	34.777	5.54	9.975	26.782	35.597	44.025	0.812	18.7	-6.76	-0.905	-38.59	1.282	496.4
600	9.397	34.694	5.45	9.328	26.825	35.669	44.124	0.948	26.4	-7.35	-0.924	-43.07	1.354	595.5
700	8.778	34.619	5.32	8.702	26.867	35.740	44.221	1.081	35.2	-6.85	-0.646	-48.93	1.443	694.6
800	7.729	34.535	4.84	7.647	26.961	35.882	44.410	1.209	45.0	-12.70	-0.886	-102.36	2.088	793.6
900	6.188	34.441	4.55	6.106	27.098	36.092	44.689	1.325	55.1	-17.29	-0.930	-137.89	2.423	892.5
1000	4.774	34.392	4.38	4.693	27.228	36.293	44.955	1.427	64.9	-11.05	0.017	-113.65	2.200	991.4
1200	3.883	34.475	3.79	3.792	27.390	36.499	45.204	1.598	84.1	-2.51	0.485	-52.64	1.497	1189.0
1400	3.375	34.540	3.55	3.272	27.493	36.629	45.357	1.747	103.7	-2.08	0.278	-36.27	1.243	1386.4
1559	3.086	34.586	3.52	2.972	27.558	36.709	45.452	1.853	119.8	-2.29	0.426	-36.27	0.000	1543.2

BOTL NO.	PRES DBAR	CTD IPTS68	TEMP IPTS68	THETA	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILICAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
12	5.0	20.217	20.216	25.323	33.756	41.827	35.809	35.991	5.29	2.43	0.24	0.10	0.00	1.749			4	22222225
11	103.1	16.389	16.372	26.185	34.744	42.932	35.679	35.694	5.55	1.95	0.32	0.20	0.00	1.999			102	22222225
10	203.6	13.524	13.495	26.564	35.231	43.520	35.351	35.357	5.31	2.46	0.56	0.10	0.00	2.104			201	22222225
9	301.7	12.131	12.091	26.631	35.355	43.698	35.076	35.115	5.50	3.13	0.74	0.90	0.00	2.314			299	22222225
8	402.4	10.919	10.869	26.728	35.504	43.895	34.908	34.920	5.58	3.65	0.89	11.90	0.00	2.188			398	22222225
7	502.1	10.141	10.081	26.765	35.576	43.999	34.778	34.792	5.58	4.49	1.01	14.00	0.00	2.103			497	22222225
6	602.9	9.526	9.457	26.801	35.640	44.089	34.690	34.709	5.46	4.00	1.14	16.30	0.00	1.876			597	22222225
5	801.7	7.865	7.782	26.941	35.856	44.377	34.535	34.550	4.78	11.29	1.63	23.70	0.00	0.760			794	22222225
4	1001.7	4.761	4.680	27.230	36.295	44.958	34.392	34.390	4.41	34.80	2.16	31.70	0.00	0.197			991	22222225
3	1201.3	3.831	3.740	27.398	36.510	45.217	34.478	34.466	3.79	60.62	2.42	35.10	0.00	0.044			1188	22222225
2	1400.2	3.371	3.268	27.493	36.629	45.350	34.540	34.546	3.55	75.18	2.49	35.80	0.00	0.011			1384	22222225
1	1550.2	3.086	2.972	27.557	36.708	45.452	34.586	34.582	3.52	79.98	2.46	35.70	0.00	0.010			1540	22222225

CRUISE: CD 29 STA: 77 DATE (D/M/Y): 8-12-87 TIME: 0731 LAT: 31 33.96 S LONG: 95 27.31 E

GRAVITY= 9.7945 M/S CORIOLIS= -.76345E-04 1/S SOUND SPEED= 1500.1 M/S Depth= 1223 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-10	θ-V CPH	DEPTH METERS
0	19.355	35.621	4.93	19.355	25.405	33.868	41.965	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.355	35.621	4.93	19.355	25.405	33.868	41.965	0.003	0.0	-0.36	0.000	0.00	0.000	1.0
20	17.737	35.866	5.55	17.733	26.003	34.513	42.657	0.045	0.0	-47.17	1.950	-978.17	6.418	19.9
30	17.389	35.883	5.53	17.384	26.101	34.623	42.777	0.064	0.1	-14.06	1.438	-338.05	3.773	29.8
40	17.320	35.896	5.57	17.313	26.128	34.652	42.808	0.083	0.2	-3.70	1.162	-133.70	2.373	39.8
50	17.286	35.908	5.55	17.278	26.146	34.671	42.828	0.102	0.2	-4.53	0.902	-133.78	2.374	49.7
100	17.002	35.890	5.60	16.985	26.202	34.737	42.904	0.195	1.0	-11.10	-1.324	-123.17	2.278	99.4
125	16.617	35.838	5.61	16.597	26.254	34.804	42.983	0.240	1.5	-15.88	-1.998	-166.85	2.651	124.2
150	16.164	35.771	5.51	16.140	26.310	34.875	43.070	0.285	2.1	-30.99	-5.650	-203.44	2.927	149.1
200	14.856	35.559	5.48	14.825	26.442	35.057	43.297	0.369	3.6	-4.21	0.525	-100.71	2.059	198.7
250	14.520	35.547	5.36	14.483	26.508	35.135	43.387	0.450	5.5	-22.26	-4.073	-130.73	2.346	248.4
300	13.435	35.356	5.41	13.393	26.589	35.259	43.552	0.528	7.7	-16.78	-2.634	-112.37	2.175	298.0
350	12.504	35.188	5.48	12.456	26.648	35.356	43.684	0.603	10.1	-19.75	-3.693	-86.87	1.913	347.6
400	11.912	35.080	5.51	11.859	26.679	35.412	43.764	0.677	13.0	-13.12	-2.379	-55.55	1.530	397.2
450	11.390	34.986	5.56	11.333	26.704	35.460	43.833	0.749	16.1	-10.65	-1.810	-48.60	1.431	446.8
500	10.893	34.905	5.57	10.831	26.733	35.510	43.903	0.821	19.6	-11.19	-1.742	-57.59	1.557	496.4
600	9.969	34.769	5.52	9.898	26.789	35.608	44.039	0.961	27.4	-7.00	-0.940	-40.93	1.313	595.5
700	9.302	34.682	5.43	9.222	26.834	35.682	44.142	1.099	36.5	-6.40	-0.786	-39.25	1.286	694.6
800	8.575	34.605	5.20	8.408	26.890	35.772	44.262	1.233	46.8	-9.96	-0.843	-77.00	1.801	793.6
900	7.186	34.504	4.73	7.097	27.014	35.961	44.513	1.358	57.6	-14.16	-0.934	-115.22	2.203	892.6
1000	5.574	34.413	4.51	5.487	27.152	36.178	44.803	1.470	68.5	-14.93	-0.650	-125.93	2.303	991.5
1200	4.096	34.429	3.99	4.003	27.331	36.431	45.126	1.656	89.3	-5.26	0.404	-125.93	0.000	1189.1
1213	3.970	34.438	3.99	3.877	27.352	36.458	45.159	1.667	90.6	-5.24	0.432	-125.93	0.000	1201.9

BOTL NO.	PRES DBAR	CTD IPTS68	TEMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
2	14.0	17.806	17.804	25.974	34.482	42.624	35.851	35.924	5.56	0.89	0.18	0.20	0.00				13	222222255
1	101.8	16.798	16.781	26.249	34.791	42.964	35.888	35.870	5.57	1.04	0.19	0.20	0.00	2.251	1.243		100	222222222
24	151.9	15.615	15.591	26.434	35.018	43.231	35.769	35.676	5.59	0.70	0.28	1.50	0.00	2.363	1.318		150	222222222
23	202.1	14.872	14.841	26.442	35.056	43.296	35.563	35.570	5.44	0.69	0.38	2.70	0.00	2.299	1.351		200	222222222
22	250.9	14.492	14.455	26.512	35.140	43.393	35.545	35.540	5.34	1.84	0.41	4.10	0.00	2.316	1.257		248	222222222
21	303.2	13.387	13.344	26.594	35.266	43.560	35.349	35.350	5.39	1.50	0.58	6.30	0.00	2.336	1.308		300	222222222
20	400.4	12.009	11.956	26.658	35.387	43.735	35.077	35.097	5.54	2.15	0.77	9.40	0.00	2.372	1.333		396	222222222
19	501.5	10.931	10.869	26.723	35.499	43.891	34.902	34.909	5.59	2.80	0.91	12.10	0.00	2.369	1.315		497	222222222
18	600.8	9.968	9.897	26.789	35.607	44.038	34.768	34.768	5.53	3.29	1.09	15.20	0.00	2.228	1.187		595	222222222
17	699.9	9.314	9.235	26.832	35.680	44.139	34.682	34.683	5.46	4.26	1.25	17.50	0.00	1.980	1.048		693	222222222
16	899.3	7.105	7.017	27.026	35.976	44.531	34.504	34.499	4.64	15.98	1.00	26.50	0.00	0.540	0.330		890	222222222
15	999.1	5.463	5.376	27.167	36.198	44.828	34.415	34.407	4.54	27.34	2.08	30.60	0.00	0.348	0.196		989	222222222
14	1100.5	4.530	4.442	27.259	36.337	45.011	34.396	34.397	4.38	39.04	2.16	32.90	0.00	0.207	0.148		1089	222222222
13	1212.2	3.941	3.848	27.354	36.461	45.164	34.437	34.444	3.96	55.18	2.43	34.90	0.00	0.093			1199	222222225

CRUISE: CD 29 STA: 78 DATE (D/M/Y): 8-12-87 TIME: 1401 LAT: 31 59.70 S LONG: 90 29.67 E

GRAVITY= 9.7948 M/S CORIOLIS= -.77274E-04 1/S SOUND SPEED= 1495.5 M/S Depth= 1305 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HT	PE	GRD-PT	CRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPM	METERS
0	19.060	35.806	5.05	19.060	25.623	34.092	42.197	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.060	35.806	5.05	19.059	25.623	34.092	42.197	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	17.549	35.756	5.47	17.546	25.964	34.483	42.633	0.044	0.0	-103.58	-10.363	-1307.93	7.377	19.9
30	16.859	35.657	5.58	16.854	26.054	34.597	42.770	0.064	0.1	-26.63	-3.887	-254.16	3.252	29.0
40	17.029	35.748	5.52	17.023	26.084	34.620	42.787	0.083	0.2	46.22	18.008	-207.76	1.440	39.8
50	17.226	35.832	5.51	17.217	26.102	34.630	42.790	0.102	0.3	-5.74	-0.533	-73.99	1.555	49.7
100	15.334	35.602	5.50	15.318	26.367	34.963	43.187	0.192	0.9	-35.41	-4.841	-322.42	3.663	99.4
125	14.582	35.487	5.32	14.563	26.444	35.069	43.319	0.234	1.4	-22.75	-3.325	-179.94	2.736	124.2
150	14.021	35.411	5.22	13.999	26.506	35.152	43.423	0.273	2.0	-17.78	-2.374	-145.36	2.459	149.1
200	13.208	35.296	5.20	13.180	26.587	35.266	43.567	0.350	3.3	-17.90	-3.022	-101.26	2.053	198.7
250	12.248	35.118	5.32	12.215	26.640	35.359	43.697	0.423	5.0	-9.33	-1.451	-55.02	1.513	248.4
300	11.639	35.027	5.38	11.601	26.686	35.431	43.793	0.495	7.0	-13.08	-2.074	-69.33	1.699	298.0
350	11.073	34.926	5.44	11.030	26.713	35.482	43.867	0.566	9.4	-8.27	-1.215	-46.69	1.394	347.6
400	10.624	34.863	5.48	10.576	26.745	35.533	43.937	0.636	12.1	-8.82	-1.341	-44.79	1.365	397.2
450	10.250	34.806	5.45	10.197	26.767	35.573	43.991	0.705	15.1	-9.24	-1.295	-51.00	1.457	446.8
500	9.881	34.754	5.41	9.823	26.790	35.612	44.046	0.773	18.4	-6.27	-0.879	-33.26	1.176	496.4
600	9.248	34.676	5.36	9.180	26.835	35.686	44.147	0.908	25.9	-6.19	-0.726	-38.94	1.273	595.5
700	8.541	34.601	5.11	8.465	26.890	35.773	44.264	1.040	34.6	-8.06	-0.710	-61.15	1.595	694.5
800	7.517	34.528	4.71	7.436	26.986	35.917	44.453	1.165	44.2	-14.72	-1.055	-115.40	2.191	793.5
900	6.046	34.434	4.54	5.964	27.110	36.111	44.714	1.278	54.0	-13.81	-0.712	-111.05	2.150	892.5
1000	4.863	34.395	4.38	4.781	27.221	36.202	44.940	1.378	63.7	-7.40	-0.038	-74.74	1.764	991.4
1200	3.813	34.464	3.86	3.723	27.388	36.502	45.210	1.553	83.3	-3.92	0.570	-74.74	0.000	1189.0
1293	3.509	34.513	3.65	3.414	27.457	36.586	45.308	1.623	92.2	-3.40	0.529	-74.74	0.000	1280.8

BOTL	PRES	CTD	TMP	THETA	SIG-TH	SIG-2	SIG-4	CTDSAL	SALNTY	OXYGEN	SILCAT	PHSPHT	NITRAT	NITRIT	CFC-11	CFC-12	DEPTH	QUALT1
NO.	DBAR	IPTS68	IPTS68	KG/M3	KG/M3	KG/M3	PSS78	PSS78	ML/L	UMOL/L	UMOL/L	UMOL/L	UMOL/L	PM/KG	PM/KG	METERS		
13	3.2	18.491	18.490	25.773	34.261	42.382	35.813	35.817	5.46	1.23	0.18	0.20	0.00			3	22222255	
12	104.1	14.632	14.617	26.506	35.128	43.375	35.583	35.497	5.62	1.58	0.36	3.60	0.00			103	22222255	
11	202.1	12.627	12.600	26.692	35.394	43.715	35.282	35.190	5.37	2.42	0.64	8.00	0.00			200	22222255	
10	302.5	11.391	11.353	26.743	35.498	43.869	35.041	34.983	5.57	3.27	0.82	11.60	0.00			299	22222255	
9	401.8	10.517	10.469	26.763	35.556	43.963	34.861	34.849	5.56	3.78	0.93	13.90	0.00			398	22222255	
8	502.8	9.850	9.792	26.794	35.617	44.053	34.752	34.751	5.49	4.46	1.00	16.20	0.00			498	22222255	
7	601.9	9.143	9.076	26.852	35.707	44.172	34.675	34.661	5.37	5.48	1.23	18.00	0.00			596	22222255	
6	702.3	8.463	8.388	26.900	35.786	44.281	34.598	34.598	5.05	6.69	1.43	22.10	0.00			695	22222255	
5	801.4	7.371	7.291	27.006	35.944	44.487	34.528	34.520	4.67	15.27	1.68	26.20	0.00			793	22222255	
4	898.7	6.023	5.941	27.113	36.116	44.720	34.434	34.429	4.55	24.05	1.95	29.00	0.00			889	22222255	
3	1001.1	4.829	4.747	27.225	36.287	44.947	34.395	34.393	4.39	36.38	2.18	32.00	0.00			991	22222255	
2	1200.7	3.788	3.697	27.392	36.507	45.216	34.466	34.469	3.81	61.87	2.40	36.00	0.00			1188	22222255	
1	1291.1	3.504	3.409	27.457	36.586	45.309	34.512	34.515	3.60	71.18	2.46	36.00	0.00			1277	22222255	

CRUISE: CD 29 STA: 79 DATE (D/M/Y): 8-12-87 TIME: 2136 LAT: 32 0.06 S LONG: 97 44.79 E

GRAVITY= 9.7948 M/S CORIOLIS= -.77287E-04 1/S SOUND SPEED= 1495.0 M/S Depth= 1617 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-TH DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	19.441	35.986	4.77	19.441	25.662	34.117	42.206	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.441	35.986	4.77	19.441	25.662	34.117	42.208	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	18.745	35.948	5.45	18.742	25.813	34.290	42.402	0.046	0.0	-90.95	-3.546	-1540.88	8.007	19.9
30	18.043	35.924	5.50	18.038	25.972	34.472	42.605	0.067	0.1	-44.09	-1.227	-758.15	5.616	29.8
40	17.681	35.916	5.55	17.674	26.055	34.567	42.712	0.087	0.2	-17.87	0.206	-344.48	3.786	39.8
50	17.554	35.916	5.58	17.546	26.087	34.603	42.752	0.106	0.3	-20.06	-1.791	-267.55	3.336	49.7
100	16.463	35.804	5.60	16.447	26.263	34.818	43.002	0.199	1.0	-16.42	0.030	-295.69	3.507	99.4
125	16.184	35.819	5.47	16.164	26.340	34.905	43.098	0.243	1.5	-16.28	-2.988	-106.50	2.106	124.3
150	15.610	35.702	5.47	15.586	26.383	34.969	43.182	0.285	2.1	-23.46	-4.585	-142.61	2.436	149.1
200	14.392	35.479	5.40	14.362	26.481	35.114	43.371	0.367	3.5	-19.69	-3.239	-136.12	2.380	198.7
250	13.445	35.341	5.38	13.409	26.574	35.244	43.536	0.446	5.3	-20.29	-3.212	-133.22	2.354	248.4
300	12.372	35.164	5.45	12.332	26.653	35.366	43.699	0.520	7.4	-13.47	-2.127	-80.02	1.825	298.0
350	11.778	35.060	5.47	11.733	26.687	35.426	43.782	0.593	9.8	-13.40	-2.310	-63.11	1.620	347.6
400	11.170	34.957	5.47	11.120	26.720	35.485	43.866	0.664	12.5	-13.84	-2.341	-61.87	1.604	397.2
450	10.549	34.854	5.57	10.494	26.752	35.544	43.951	0.734	15.6	-11.83	-1.892	-54.53	1.506	446.8
500	10.096	34.781	5.57	10.037	26.775	35.587	44.013	0.803	18.9	-9.19	-1.343	-46.90	1.397	496.4
600	9.430	34.696	5.44	9.362	26.822	35.664	44.118	0.939	26.6	-6.68	-0.823	-40.81	1.303	595.5
700	8.869	34.624	5.42	8.792	26.857	35.726	44.203	1.073	35.4	-6.25	-0.662	-42.05	1.323	694.6
800	8.044	34.556	4.98	7.960	26.931	35.837	44.351	1.203	45.3	-14.08	-0.935	-119.44	2.229	793.6
900	6.301	34.446	4.60	6.218	27.087	36.076	44.668	1.321	55.6	-17.58	-0.992	-142.22	2.432	892.5
1000	4.836	34.389	4.45	4.754	27.219	36.281	44.941	1.423	65.5	-10.15	-0.085	-101.74	2.057	991.4
1200	3.762	34.451	3.94	3.672	27.383	36.499	45.210	1.598	85.0	-3.46	0.509	-64.61	1.640	1189.0
1400	3.287	34.546	3.58	3.184	27.506	36.647	45.380	1.744	104.4	-2.34	0.370	-45.17	1.371	1386.4
1600	2.959	34.609	3.54	2.843	27.587	36.745	45.494	1.872	123.9	-1.28	0.295	-45.17	0.000	1583.6
1619	2.952	34.611	3.52	2.835	27.590	36.748	45.498	1.883	125.8	-1.31	0.272	-45.17	0.000	1602.3

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT
24	2.4	19.457	19.457	24.608	33.079	41.186	34.611	35.995	5.37	2.01	0.14	0.10	0.00			2	22222225
23	32.8	17.757	17.752	26.042	34.552	42.694	35.924	35.941	5.56	1.85	0.15	0.20	0.00			32	22222225
22	63.2	17.235	17.224	26.167	34.694	42.852	35.919	35.891	5.59	1.68	0.15	0.20	0.00			62	22222225
21	92.5	16.385	16.370	26.289	34.846	43.033	35.814	35.802	5.61	1.51	0.19	0.30	0.00			91	22222225
20	122.3	15.993	15.973	26.390	34.961	43.160	35.826	35.783	5.49	1.68	0.22	0.90	0.00			121	22222225
19	151.5	15.320	15.296	26.447	35.043	43.266	35.700	35.647	5.41	1.68	0.30	2.30	0.00			150	22222225
18	201.4	14.169	14.140	26.526	35.167	43.432	35.476	35.438	5.39	1.68	0.43	4.70	0.00			199	22222225
17	250.7	13.202	13.167	26.622	35.301	43.601	35.338	35.318	5.38	2.18	0.53	6.50	0.00			248	22222225
16	301.1	12.323	12.283	26.662	35.377	43.712	35.163	35.152	5.51	2.51	0.65	8.60	0.00			298	22222225
15	351.2	11.698	11.653	26.700	35.442	43.801	35.057	35.043	5.62	2.68	0.73	9.80	0.00			348	22222225
14	402.0	11.087	11.036	26.734	35.502	43.886	34.954	34.941	5.65	3.01	0.83	11.40	0.00			398	22222225
13	499.9	10.191	10.132	26.760	35.568	43.989	34.782	34.796	5.64	3.86	1.00	14.10	0.00			495	22222225
12	600.0	9.508	9.439	26.811	35.649	44.100	34.698	34.704	5.49	4.69	1.15	16.80	0.00			594	22222225
11	699.8	8.875	8.798	26.857	35.725	44.202	34.625	34.623	5.44	5.87	1.29	19.30	0.00			693	22222225
10	799.3	7.969	7.886	26.942	35.852	44.369	34.556	34.551	4.88	11.06	1.57	23.90	0.00			791	22222225
9	900.8	6.293	6.210	27.088	36.078	44.669	34.446	34.446	4.56	21.62	1.94	29.50	0.00			891	22222225
8	1000.0	4.827	4.745	27.220	36.282	44.942	34.389	34.393	4.48	34.52	2.19	32.90	0.00			989	22222225
7	1098.0	4.211	4.125	27.299	36.393	45.082	34.404	34.407	4.22	45.92	2.32	34.70	0.00			1086	22222225
6	1198.2	3.747	3.657	27.384	36.501	45.213	34.451	34.450	3.91	59.16	2.43	36.80	0.00			1185	22222225
5	1299.2	3.491	3.395	27.455	36.585	45.309	34.508	34.521	3.62	71.89	2.54	37.60	0.00			1285	22222225
4	1398.8	3.259	3.157	27.508	36.650	45.385	34.546	34.550	3.54	77.50	2.55	37.70	0.00			1383	22222225
3	1499.5	3.078	2.969	27.552	36.703	45.447	34.579	34.580	3.55	81.93	2.52	37.60	0.00			1482	22222225
2	1603.3	2.956	2.840	27.588	36.745	45.495	34.609	34.613	3.54	86.12	2.52	37.30	0.00			1584	22222225
1	1617.3	2.952	2.835	27.590	36.748	45.497	34.611	34.611	3.55	85.61	2.52	37.10	0.00			1598	22222225



CRUISE: CD 29 STA: B1 DATE (D/M/Y): 9-12-87 TIME: 1102 LAT: 31 59.61 S LONG: 99 58.56 E

GRAVITY= 9.7948 M/S CORIOLIS= -.77270E-04 1/S SOUND SPEED= 1493.5 M/S Depth= 2407 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HI	PE	GRD-PT	GRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m σ)-1 10-12	CPH	METERS
0	18.179	35.613	4.61	18.179	25.698	34.198	42.331	0.000	0.0	-0.17	0.000	0.00	0.000	0.0
1	18.179	35.613	4.61	18.179	25.698	34.198	42.331	0.002	0.0	-0.35	0.000	0.00	0.000	1.0
20	17.655	35.548	5.65	17.651	25.779	34.296	42.446	3.045	0.0	-53.54	0.470	-1006.16	6.471	19.9
30	16.634	35.508	5.68	16.629	25.993	34.545	42.727	0.066	0.1	-43.54	-0.658	-739.74	5.548	29.8
40	16.592	35.555	5.69	16.586	26.039	34.592	42.775	0.086	0.2	-3.57	4.005	-296.37	3.512	39.8
50	16.121	35.493	5.79	16.113	26.102	34.672	42.871	0.105	0.3	-57.10	-6.064	-646.92	5.188	49.7
100	14.458	35.401	5.60	14.443	26.403	35.034	43.289	0.193	0.9	-19.47	-1.509	-233.12	3.115	99.4
125	14.123	35.385	5.54	14.105	26.463	35.106	43.374	0.233	1.4	-11.69	-0.621	-159.08	2.573	124.2
150	13.946	35.384	5.36	13.924	26.500	35.150	43.424	0.273	1.9	-21.00	-2.659	-167.78	2.642	149.1
200	12.520	35.156	5.40	12.493	26.615	35.323	43.650	0.349	3.3	-19.69	-3.075	-119.95	2.234	198.7
250	11.874	35.050	5.44	11.842	26.659	35.393	43.746	0.421	5.0	-12.00	-1.916	-64.19	1.634	248.4
300	11.244	34.952	5.51	11.207	26.701	35.462	43.840	0.492	7.0	-10.03	-1.604	-49.89	1.441	298.0
350	10.954	34.909	5.50	10.911	26.721	35.495	43.885	0.563	9.3	-6.92	-0.966	-41.23	1.310	347.6
400	10.663	34.867	5.51	10.614	26.742	35.529	43.930	0.632	11.9	-5.88	-0.823	-33.95	1.189	397.2
450	10.367	34.825	5.48	10.313	26.762	35.562	43.976	0.702	14.9	-6.53	-0.883	-38.54	1.266	446.8
500	10.028	34.780	5.45	9.969	26.786	35.601	44.029	0.770	18.3	-5.60	-0.721	-34.27	1.194	496.4
600	9.436	34.703	5.40	9.368	26.827	35.668	44.122	0.906	25.9	-7.14	-0.875	-43.81	1.350	595.5
700	8.742	34.627	5.20	8.665	26.879	35.753	44.236	1.038	34.7	-8.97	-0.865	-64.54	1.639	694.5
800	7.628	34.532	4.78	7.545	26.974	35.899	44.431	1.165	44.3	-14.95	-1.056	-118.93	2.225	793.5
900	6.046	34.435	4.52	5.965	27.111	36.112	44.715	1.278	54.2	-12.65	-0.680	-102.00	2.060	892.5
1000	4.959	34.396	4.43	4.876	27.210	36.266	44.920	1.380	64.0	-11.25	-0.109	-111.73	2.156	991.4
1200	3.741	34.454	3.92	3.651	27.387	36.505	45.215	1.553	83.4	-2.50	0.504	-54.96	1.512	1189.0
1400	3.369	34.542	3.55	3.266	27.495	36.631	45.361	1.701	103.0	-2.12	0.318	-40.10	1.292	1386.4
1600	3.060	34.601	3.52	2.943	27.572	36.725	45.469	1.833	123.1	-1.94	0.320	-38.34	1.263	1583.5
1800	2.715	34.664	3.59	2.585	27.654	36.824	45.586	1.949	143.2	-1.39	0.192	-25.44	1.029	1780.5
2000	2.476	34.698	3.79	2.332	27.703	36.886	45.660	2.054	163.6	-1.00	0.148	-19.16	0.893	1977.3
2200	2.308	34.715	4.00	2.149	27.732	36.925	45.708	2.152	184.5	-0.82	0.067	-12.54	0.722	2173.9
2400	2.034	34.732	4.10	1.862	27.768	36.977	45.774	2.245	206.3	-2.10	0.090	-12.54	0.000	2370.4
2423	1.984	34.733	4.11	1.811	27.773	36.985	45.785	2.255	208.8	-2.16	0.084	-12.54	0.000	2392.9

BOTL NO.	PRES DBAR	CTDPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUAL1
19	3.0	18.127	18.126	25.711	34.213	42.347	35.613	35.566	5.50	1.19	0.22	0.20	0.00			2	22222255
18	103.8	14.532	14.517	26.387	35.015	43.267	35.400	35.402	5.58	1.36		2.30	0.00			102	222252255
17	201.7	12.786	12.759	26.560	35.257	43.574	35.152	35.206	5.38	2.37	0.65	8.10	0.00			200	222222255
16	301.6	11.446	11.408	26.662	35.415	43.785	34.949	34.979	5.54	3.39	0.83	11.00	0.00			299	222222255
15	401.8	10.749	10.699	26.726	35.510	43.908	34.867	34.875	5.50	3.89	0.95	12.90	0.00			398	222222255
14	500.6	10.111	10.051	26.771	35.583	44.008	34.779	34.801	5.49	4.06	1.05	14.80	0.00			496	222222255
13	601.3	9.476	9.407	26.820	35.660	44.112	34.703	34.705	5.39	4.74	1.19	16.90	0.00			595	222222255
12	700.7	8.832	8.755	26.862	35.732	44.212	34.623	34.638	5.18	6.94	1.38	19.70	0.00			694	222222255
11	801.5	7.723	7.641	26.959	35.881	44.408	34.532	34.539	4.76	12.54	1.67	24.40	0.00			793	222222255
10	900.8	6.162	6.080	27.095	36.091	44.689	34.434	34.440	4.53	22.71	1.98	29.00	0.00			891	222222255
9	998.2	4.971	4.888	27.209	36.284	44.918	34.396	34.392	4.43	33.39	2.20	31.80	0.00			988	222222255
8	1100.4	4.185	4.100	27.307	36.402	45.093	34.411	34.409	4.22	46.45	2.39	33.90	0.00			1089	222222255
7	1299.8	3.598	3.501	27.443	36.568	45.286	34.506	34.511	3.59	70.55	2.57	36.10	0.00			1285	222222255
6	1499.0	3.181	3.072	27.534	36.680	45.418	34.568	34.575	3.49	81.60	2.60	36.40	0.00			1482	222222255
5	1699.2	2.822	2.700	27.623	36.788	45.544	34.638	34.638	3.59	89.25	2.56	35.90	0.00			1679	222222255
4	1900.5	2.576	2.439	27.678	36.856	45.625	34.678	34.672	3.80	90.97	2.48	35.00	0.00			1877	222222255
3	2100.3	2.382	2.230	27.720	36.909	45.688	34.709	34.706	3.83	99.15	2.46	34.70	0.00			2073	222222255
2	2300.1	2.221	2.054	27.745	36.944	45.732	34.723	34.728	4.03	98.67	2.40	34.00	0.00			2270	222222255
1	2421.2	1.985	1.811	27.773	36.985	45.785	34.734	34.734	4.13	104.31	2.38	33.80	0.00			2388	222222255



CRUISE: CD 29 STA: 82 DATE (D/M/Y) 9-12-87 TIME 1822 LAT 31 59 04 S LONG 100 59 48 E

GRAVITY= 9.7948 1/S CORIOLIS= -77282E-04 1/S SOUND SPEED= 1493.0 M/S Depth= 2228 Cor Meters

PRES	TMP	SALT	σ <sub>T</sub>	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HI	PE	GRD-PT	GRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s) <sup>-1</sup> 10-12	CPH	METERS
0	18.440	35.736	5.36	18.440	25.727	34.217	42.340	0.000	0.0	-0.17	0.000	0.00	0.000	0.0
1	18.440	35.736	5.36	18.440	25.727	34.217	42.340	0.002	0.0	-0.35	0.000	0.00	0.000	1.0
20	16.982	35.583	5.72	16.978	25.968	34.508	42.678	0.044	0.0	-111.83	-11.290	-1352.48	7.501	19.9
30	16.090	35.498	5.84	16.085	26.112	34.683	42.883	0.063	0.1	-30.76	-5.036	-245.51	3.196	29.8
40	15.994	35.485	5.86	15.987	26.124	34.699	42.902	0.082	0.2	-7.33	-0.121	-120.73	2.241	39.8
50	15.857	35.508	5.82	15.849	26.174	34.753	42.960	0.101	0.2	1.86	5.567	-291.90	3.485	49.7
100	14.892	35.553	5.54	14.877	26.426	35.039	43.278	0.187	0.9	-17.94	-2.207	-173.35	2.686	99.4
125	14.587	35.509	5.59	14.569	26.459	35.084	43.334	0.227	1.4	-19.32	-2.966	-144.85	2.455	124.2
150	13.984	35.411	5.50	13.962	26.514	35.162	43.434	0.267	1.9	-26.30	-3.925	-189.92	2.811	149.1
200	12.761	35.217	5.52	12.734	26.615	35.312	43.630	0.342	3.3	-18.53	-2.993	-109.94	2.139	198.7
250	12.137	35.126	5.51	12.104	26.667	35.398	43.732	0.415	4.9	-12.28	-2.009	-64.91	1.643	248.4
300	11.551	35.023	5.57	11.513	26.700	35.448	43.813	0.486	6.9	-9.31	-1.588	-42.18	1.325	298.0
350	11.090	34.946	5.61	11.050	26.725	35.493	43.876	0.556	9.2	-8.54	-1.299	-45.65	1.378	347.6
400	10.709	34.883	5.60	10.660	26.746	35.531	43.930	0.625	11.9	-10.75	-1.779	-46.09	1.385	397.2
450	10.270	34.809	5.60	10.216	26.766	35.570	43.988	0.694	14.9	-6.35	-0.984	-29.49	1.108	446.0
500	9.973	34.764	5.58	9.915	26.783	35.600	44.031	0.763	18.2	-7.36	-0.986	-42.01	1.322	496.3
600	9.288	34.678	5.45	9.220	26.830	35.679	44.139	0.898	25.8	-6.70	-0.811	-41.11	1.308	595.5
700	8.690	34.606	5.33	8.614	26.871	35.747	44.233	1.030	34.6	-8.17	-0.778	-50.73	1.563	694.5
800	7.572	34.523	4.82	7.491	26.974	35.902	44.436	1.157	44.2	-15.49	-0.981	-129.66	2.323	793.5
900	5.911	34.423	4.56	5.831	27.119	36.127	44.736	1.270	54.1	-13.39	-0.656	-100.87	2.128	892.5
1000	4.672	34.389	4.42	4.591	27.237	36.307	44.975	1.370	63.7	-9.65	0.055	-101.85	2.058	991.4
1200	3.745	34.456	3.91	3.654	27.389	36.506	45.217	1.539	82.7	-2.80	0.410	-51.90	1.470	1189.8
1400	3.320	34.530	3.61	3.217	27.490	36.629	45.361	1.687	102.2	-1.95	0.354	-40.35	1.296	1386.3
1600	2.967	34.598	3.61	2.851	27.578	36.735	45.484	1.818	122.2	-1.44	0.341	-34.66	1.201	1583.5
1800	2.725	34.649	3.67	2.595	27.641	36.811	45.572	1.935	142.4	-1.33	0.221	-26.53	1.051	1780.5
2000	2.443	34.696	3.83	2.300	27.704	36.890	45.665	2.041	163.0	-1.41	0.177	-25.05	1.021	1977.3
2200	2.206	34.722	4.00	2.049	27.745	36.944	45.732	2.137	183.7	-1.36	0.116	-25.05	0.000	2173.9
2235	2.167	34.725	4.08	2.007	27.751	36.952	45.742	2.154	187.3	-1.36	0.121	-25.05	0.000	2208.3

BOTL	PRES	CTD	THETA	SIG-TH	SIG-2	SIG-4	CTDSAL	SALNTY	OXYGEN	SILCAT	PHSPHT	NITRAT	NITRIT	CFC-11	CFC-12	DEPTH	QUAL1
NO.	DBAR	IPTS68	IPTS68	KG/M3	KG/M3	KG/M3	PSS78	PSS78	ML/L	UMOL/L	UMOL/L	UMOL/L	UMOL/L	PM/KG	PM/KG	METERS	
18	11.3	18.110	18.108	25.823	34.323	42.456	35.752	35.736	5.61	1.33	0.19	0.30	0.00	2.210	1.419	11	22222222
17	104.0	14.556	14.541	26.495	35.120	43.370	35.547	35.500	5.58	1.36	0.35	2.50	0.00	2.423	1.322	103	22222222
16	199.4	12.280	12.253	26.705	35.421	43.756	35.211	35.137	5.50	2.23	0.65	8.40	0.00	2.563	1.393	197	22222222
15	304.5	11.245	11.207	26.753	35.513	43.890	35.019	34.966	5.66	2.93	0.80	10.80	0.00	2.570	1.381	301	22222222
14	399.9	10.471	10.422	26.790	35.585	43.994	34.886	34.837	5.64	3.64	0.93	12.60	0.00	2.450	1.353	396	22222222
13	500.7	9.796	9.738	26.812	35.637	44.074	34.763	34.736	5.56	4.35	1.07	14.80	0.00	2.240	1.248	496	22222222
12	600.6	9.147	9.080	26.854	35.708	44.174	34.678	34.657	5.45	5.22	1.21	17.30	0.00	2.022	1.072	595	22222222
11	698.7	8.553	8.478	26.894	35.776	44.267	34.608	34.588	5.30	7.26	1.38	19.70	0.00	1.565	0.909	692	22222222
10	798.5	7.381	7.301	27.002	35.939	44.481	34.524	34.507	4.71	14.67	1.70	24.90	0.00	0.610	0.420	790	22222222
9	901.3	5.958	5.877	27.112	36.118	44.725	34.423	34.424	4.57	23.75	2.00	28.70	0.00	0.382	0.225	892	22222222
8	1002.2	4.701	4.620	27.234	36.303	44.969	34.389	34.388	4.45	36.01	2.22	31.40	0.00	0.158	0.141	992	22222222
7	1100.9	4.018	4.014	27.331	36.434	45.132	34.419		4.14				0.097	0.055	1089	25255552	
6	1298.4	3.489	3.393	27.448	36.579	45.302	34.499	34.499	3.70	68.21	2.51	35.30	0.00	0.023	0.000	1264	22722222
5	1503.3	3.135	3.026	27.536	36.684	45.425	34.565	34.566	3.60	78.31	2.52	35.60	0.00			1486	22222255
4	1698.5	2.846	2.724	27.614	36.777	45.533	34.629	34.633	3.60	87.57	2.51	35.00	0.00			1678	22222255
3	1899.1	2.581	2.444	27.674	36.841	45.621	34.674	34.676	3.75	92.31	2.44	34.30	0.00			1876	22222255
2	2100.3	2.323	2.173	27.725	36.917	45.699	34.709	34.711	3.93	97.71	2.38	33.60	0.00			2073	22222255
1	2234.0	2.167	2.007	27.751	36.952	45.742	34.725	34.726	4.17	95.24	2.30	32.80	0.00	0.001	0.000	2205	22222222







CRUISE: CD 29 STA: 86 DATE (D/M/Y): 10-12-87 TIME: 1356 LAT: 32 29.73 S LONG: 102 39.41 E

GRAVITY= 9.7952 M/S CORIOLIS= -.78351E-04 1/S SOUND SPEED= 1503.3 M/S Depth= 4544 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POI-V (m s)-1, B-V CPH, DEPTH METERS. Rows contain depth measurements from 0 to 4633 meters.

Table with columns: BOTL NO., PRES DBAR, CTDTMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. Rows contain water quality data from 24 to 4635 meters.

CRUISE: CD 29 STA: 87 DATE (D/M/Y): 10-12-87 TIME: 1917 LAT: 32 35 90 S LONG: 102 59.45 E

GRAVITY= 9.7953 M/S CORIOLIS= -.78572E-04 1/S SOUND SPEED= 1504.3 M/S Depth= 4779 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Rows show depth data from 0 to 4855 meters.

Table with columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALITY. Rows show water quality data from 24 to 1486 meters.











CRUISE: CD 29 STA: 92 DATE (D/M/Y): 12-12-87 TIME: 0646 LAT: 33 26.35 S LONG: 105 44.89 E

GRAVITY= 9.7960 M/S CORIOLIS= -.80366E-04 1/S SOUND SPEED= 1507.9 M/S Depth= 5415 Cor Meters

Table with columns: PRES, TMP, SALT, OXYG, PTMP, SIG-TH, SIG-2, SIG-4, DYN-HI, PE, GRD-PT, GRD-S, POT-V, B-V, DEPTH. Rows represent depth measurements from 0 to 5417 meters.

Table with columns: BOTL NO., PRES DBAR, CTD TMP, THETA, SIG-TH, SIG-2, SIG-4, CTDSAL, SALNTY, OXYGEN, SILCAT, PHSPT, NITRAT, NITRIT, CFC-11, CFC-12, DEPTH, QUALTY. Rows represent specific bottle samples with various parameters and quality ratings.





CRUISE: CD 29 STA: 95 DATE (D/M/Y): 13-12-87 TIME: 0846 LAT: 34 9.78 S LONG: 107 59.77 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81897E-04 1/S SOUND SPEED= 1505.8 M/S Depth= 4984 Cor Meters

Table with 15 columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HT DYNAMIC METERS, PE J/M2 10-5, GRD-PT C/DB 10-3, GRD-S 1/DB 10-3, POT-V (m s)-1 10-12, B-V CPH, DEPTH METERS. Data rows range from 0 to 5065.

Table with 18 columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPHT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALT1. Data rows range from 24 to 24906.1.









CRUISE: CD 29 STA: 99 DATE (D/M/Y): 14-12-87 TIME: 0920 LAT: 34 9.92 S LONG: 110 0.88 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81902E-04 1/S SOUND SPEED= 1493.1 M/S Depth= 2572 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-MT DYNAMIC METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Rows 0 to 2589.

Table with columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALTY. Rows 24 to 2589.

CRUISE: CD 29 STA: 100 DATE (D/M/Y): 14-12-87 TIME: 1647 LAT: 34 9.80 S LONG 110 59 81 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81898E-04 1/S SOUND SPEED= 1490.9 M/S Depth= 2123 Cor Meters

Table with columns: PRES DBAR, TMP IPTS68, SALT PSS78, OXYG ML/L, PTMP IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, DYN-HY METERS, PE J/M2, GRD-PT C/DB, GRD-S 1/DB, POT-V (m s)-1, B-V CPH, DEPTH METERS. Rows 0 to 2123.

Table with columns: BOTL NO., PRES DBAR, CTD TMP IPTS68, THETA IPTS68, SIG-TH KG/M3, SIG-2 KG/M3, SIG-4 KG/M3, CTDSAL PSS78, SALNTY PSS78, OXYGEN ML/L, SILCAT UMOL/L, PHSPHT UMOL/L, NITRAT UMOL/L, NITRIT UMOL/L, CFC-11 PM/KG, CFC-12 PM/KG, DEPTH METERS, QUALT1. Rows 18 to 2122.

CRUISE: CD 29 STA: 181 DATE (D/M/Y): 15-12-87 TIME: 0012 LAT: 34 9.66 S LONG: 112 9.72 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81893E-04 1/S SOUND SPEED= 1491.4 M/S Depth= 2627 Cor Meters

PRES	TMP	SALT	OXYG	PTMP	SIG-TH	SIG-2	SIG-4	DYN-HT	PE	GRD-PT	GRD-S	POT-V	B-V	DEPTH
DBAR	IPTS68	PSS78	ML/L	IPTS68	KG/M3	KG/M3	KG/M3	DYNAMIC METERS	J/M2 10-5	C/DB 10-3	1/DB 10-3	(m s)-1 10-12	CPH	METERS
0	17.762	35.832	5.28	17.762	25.969	34.479	42.622	0.000	0.0	-0.17	0.000	0.00	0.000	0.0
1	17.762	35.832	5.20	17.762	25.969	34.480	42.622	0.002	0.0	-0.34	0.000	0.00	0.000	1.0
20	17.713	35.835	5.57	17.710	25.985	34.497	42.641	0.041	0.0	-32.58	-1.287	-561.05	4.694	19.9
30	17.246	35.812	5.57	17.241	26.080	34.608	42.767	0.060	0.1	-35.78	-2.984	-509.41	4.473	29.8
40	16.933	35.780	5.50	16.926	26.131	34.670	42.839	0.079	0.2	-20.73	-1.652	-295.75	3.408	39.8
50	16.710	35.755	5.45	16.702	26.166	34.712	42.889	0.098	0.2	-36.89	-5.552	-358.29	3.751	49.7
100	15.040	35.558	5.49	15.025	26.397	35.005	43.238	0.185	0.9	-25.64	-3.048	-268.41	3.247	99.4
125	14.415	35.478	5.51	14.396	26.473	35.104	43.360	0.225	1.4	-17.06	-1.789	-194.07	2.761	124.2
150	14.109	35.440	5.52	14.081	26.510	35.153	43.420	0.265	1.9	-19.99	-3.424	-127.44	2.237	149.1
200	13.140	35.264	5.57	13.112	26.575	35.257	43.561	0.341	3.3	-20.38	-3.643	-109.92	2.078	198.7
250	11.669	35.016	5.48	11.637	26.671	35.414	43.775	0.415	5.0	-29.13	-4.624	-162.41	2.525	248.4
300	10.711	34.867	5.67	10.674	26.731	35.516	43.915	0.485	6.9	-15.17	-2.170	-87.13	1.850	298.0
350	9.790	34.728	5.57	9.749	26.783	35.608	44.046	0.552	9.2	-10.46	-1.360	-62.68	1.569	347.6
400	9.486	34.698	5.45	9.440	26.811	35.650	44.100	0.618	11.7	-5.34	-0.385	-50.04	1.402	397.2
450	9.191	34.670	5.38	9.141	26.837	35.689	44.152	0.684	14.5	-6.65	-0.817	-40.14	1.256	446.8
500	8.912	34.635	5.41	8.857	26.855	35.720	44.195	0.748	17.7	-5.91	-0.689	-37.04	1.206	496.3
600	8.123	34.549	5.03	8.061	26.911	35.813	44.322	0.875	24.8	-10.84	-0.802	-90.00	1.800	595.4
700	6.990	34.472	4.67	6.823	27.027	35.987	44.551	0.995	32.7	-14.77	-0.813	-127.19	2.235	694.5
800	5.293	34.395	4.53	5.226	27.170	36.208	44.845	1.101	40.8	-14.07	-0.530	-121.63	2.186	793.5
900	4.186	34.382	4.42	4.118	27.282	36.377	45.067	1.193	48.8	-7.58	0.260	-94.10	1.922	892.4
1000	3.613	34.424	4.15	3.540	27.375	36.498	45.216	1.276	56.8	-3.60	0.473	-65.95	1.609	991.3
1200	3.120	34.518	3.81	3.036	27.497	36.646	45.387	1.420	72.9	-2.09	0.444	-48.68	1.383	1188.8
1400	2.840	34.598	3.67	2.742	27.587	36.750	45.505	1.545	89.5	-1.03	0.349	-32.37	1.128	1386.2
1600	2.647	34.656	3.67	2.535	27.652	36.826	45.590	1.657	106.6	-1.22	0.277	-30.06	1.087	1583.4
1800	2.424	34.696	3.78	2.298	27.704	36.890	45.666	1.758	124.2	-1.02	0.137	-19.33	0.871	1780.3
2000	2.234	34.717	3.88	2.094	27.737	36.934	45.720	1.853	142.5	-0.95	0.067	-14.36	0.751	1977.1
2200	2.088	34.725	3.95	1.933	27.757	36.962	45.756	1.944	161.9	-0.84	0.030	-11.09	0.660	2173.7
2400	1.916	34.730	4.05	1.746	27.775	36.991	45.794	2.031	182.5	-0.78	0.015	-9.80	0.620	2370.1
2600	1.761	34.731	4.15	1.576	27.789	37.014	45.826	2.116	204.1	-1.77	0.005	-9.80	0.000	2566.4
2635	1.601	34.731	4.25	1.416	27.800	37.034	45.855	2.130	207.9	-2.10	0.002	-9.80	0.000	2600.7

BOTL	PRES	CTD	THETA	SIG-TH	SIG-2	SIG-4	CTD	SAL	OXYGEN	SILCAT	PHSPHT	NITRAT	NITRIT	CFC-11	CFC-12	DEPTH	QUALT1
NO.	DBAR	IPTS68	IPTS68	KG/M3	KG/M3	KG/M3	PSS78	PSS78	ML/L	UMOL/L	UMOL/L	UMOL/L	UMOL/L	PM/KG	PM/KG	METERS	
19	2.4	17.793	17.793	25.118	33.641	41.796	34.731	35.839	5.51	1.73	0.16	0.10	0.00	2.119	1.151	2	22222222
18	102.9	14.693	14.678	26.469	35.089	43.335	35.552	35.513	5.57	1.23	0.33	1.00	0.00	2.434	1.286	102	22222222
17	201.9	12.781	12.753	26.648	35.343	43.660	35.264	35.202	5.55	1.24	0.55	5.60	0.00	2.520	1.386	200	22222222
16	299.4	10.523	10.487	26.765	35.557	43.964	34.868	34.832	5.65	2.76	0.92	12.10	0.00	2.697	1.438	296	22222222
15	400.6	9.417	9.372	26.871	35.663	44.116	34.697	34.691	5.49	4.12	1.18	16.50	0.00	2.367	1.270	397	22222222
14	501.5	8.855	8.801	26.864	35.731	44.209	34.634	34.622	5.44	5.13	1.35	18.60	0.00	2.036	1.112	497	22222222
13	600.9	8.195	8.132	26.900	35.799	44.305	34.549	34.554	5.18	8.35	1.52	21.50	0.00	1.459	0.769	595	22222222
12	699.7	6.870	6.804	27.030	35.991	44.556	34.472	34.465		17.47	1.86	26.00	0.00	0.608	0.346	693	22522222
11	799.7	5.213	5.147	27.180	36.222	44.863	34.396	34.390	4.54	28.78	2.13	30.40	0.00	0.377	0.203	792	22222222
10	901.1	4.149	4.080	27.286	36.383	45.074	34.382	34.378	4.43	41.44	2.32	32.70	0.00	0.206	0.106	892	22222222
8	1098.5	3.330	3.252	27.438	36.576	45.307	34.469	34.464	3.97	61.86	2.48	34.80	0.00	0.037		1087	22222222
7	1298.9	2.947	2.856	27.548	36.706	45.455	34.561	34.557	3.71	76.20	2.50	35.20	0.00	0.016	0.000	1284	22222222
6	1502.0	2.746	2.641	27.620	36.789	45.548	34.620	34.620	3.69	84.47	2.49	34.80	0.00			1485	22222225
5	1697.5	2.523	2.405	27.681	36.862	45.632	34.679	34.679	3.72	94.08	2.47	34.30	0.00			1677	22222225
4	1898.2	2.332	2.199	27.722	36.913	45.693	34.708	34.706	3.80	101.17	2.42	34.00	0.00	0.004	0.000	1875	22222222
3	2101.4	2.148	2.000	27.742	36.951	45.741	34.722	34.721	3.93	105.38	2.38	33.70	0.00			2074	22222225
2	2401.1	1.920	1.749	27.775	36.990	45.794	34.730	34.730	4.09	109.42	2.35	33.30	0.00			2369	22222225
1	2632.2	1.609	1.424	27.800	37.033	45.854	34.731	34.731	4.30	113.80	2.34	33.10	0.00			2595	22222225



CRUISE: CD 29 STA: 103 DATE (D/M/Y): 15-12-87 TIME: 1613 LAT: 34 10.10 S LONG: 113 43.81 E

GRAVITY= 9.7966 M/S CORIOLIS= - .81909E-04 1/S SOUND SPEED= 1491.0 M/S Depth= 2208 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HY DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	18.348	35.875	4.71	18.348	25.857	34.348	42.473	0.000	0.0	-0.17	0.000	0.00	0.000	0.0
1	18.348	35.875	4.71	18.347	25.857	34.348	42.473	0.002	0.0	-0.35	0.000	0.00	0.000	1.0
20	18.369	35.874	5.61	18.366	25.852	34.342	42.466	0.043	0.0	-0.05	0.013	-1.00	0.266	19.9
30	18.319	35.870	5.52	18.314	25.861	34.353	42.479	0.064	0.1	-24.43	-1.945	-371.75	3.821	29.8
40	17.964	35.849	5.56	17.957	25.934	34.438	42.575	0.085	0.2	-38.01	-2.261	-611.08	4.922	39.8
50	17.716	35.835	5.65	17.707	25.985	34.497	42.642	0.106	0.3	-16.77	-0.744	-284.94	3.345	49.7
100	15.291	35.600	5.70	15.275	26.375	34.972	43.197	0.200	1.0	-50.48	-5.791	-567.76	4.721	99.4
125	14.666	35.507	5.63	14.647	26.441	35.063	43.310	0.241	1.5	-20.77	-3.735	-125.58	2.221	124.3
150	13.997	35.389	5.69	13.975	26.494	35.142	43.413	0.281	2.0	-19.88	-3.287	-140.14	2.346	149.1
200	13.209	35.258	5.61	13.181	26.557	35.236	43.537	0.359	3.4	-19.88	-3.575	-107.18	2.051	198.7
250	11.963	35.050	5.58	11.931	26.641	35.372	43.722	0.433	5.1	-25.20	-3.907	-153.20	2.453	248.4
300	10.881	34.896	5.48	10.844	26.723	35.500	43.892	0.504	7.1	-20.94	-2.982	-126.59	2.229	298.0
350	9.992	34.769	5.47	9.951	26.780	35.596	44.025	0.572	9.4	-12.57	-1.620	-78.44	1.755	347.6
400	9.578	34.720	5.44	9.533	26.812	35.647	44.093	0.639	11.9	-6.17	-0.703	-42.47	1.291	397.2
450	9.265	34.682	5.46	9.214	26.835	35.684	44.143	0.704	14.7	-5.92	-0.653	-40.97	1.268	446.8
500	8.923	34.639	5.36	8.869	26.857	35.721	44.196	0.769	17.9	-8.04	-1.175	-46.39	1.350	496.4
600	7.802	34.528	5.04	7.741	26.942	35.858	44.382	0.894	24.9	-13.41	-0.963	-110.78	2.086	595.5
700	6.293	34.445	4.57	6.229	27.085	36.074	44.664	1.009	32.5	-15.35	-0.761	-131.97	2.276	694.5
800	4.959	34.394	4.43	4.894	27.207	36.262	44.915	1.110	40.2	-10.46	-0.061	-110.17	2.080	793.5
900	4.376	34.416	4.18	4.306	27.290	36.374	45.054	1.200	48.0	-4.09	0.365	-65.90	1.609	892.4
1000	4.009	34.451	3.91	3.933	27.356	36.459	45.157	1.283	56.1	-1.83	0.712	-63.65	1.581	991.3
1200	3.609	34.537	3.41	3.520	27.467	36.590	45.306	1.434	72.9	-2.38	0.212	-37.92	1.220	1188.8
1400	3.133	34.568	3.61	3.032	27.538	36.686	45.426	1.569	90.8	-1.71	0.303	-36.69	1.200	1386.2
1600	2.819	34.623	3.64	2.705	27.611	36.776	45.532	1.691	109.4	-1.44	0.243	-30.37	1.092	1583.4
1800	2.585	34.673	3.67	2.457	27.672	36.850	45.618	1.801	128.5	-1.14	0.193	-24.22	0.975	1780.4
2000	2.385	34.704	3.75	2.243	27.715	36.903	45.682	1.902	148.1	-1.10	0.117	-19.27	0.870	1977.2
2200	2.193	34.719	3.82	2.036	27.744	36.944	45.732	1.997	168.4	-1.14	0.058	-19.27	0.000	2173.8
2223	2.152	34.721	3.84	1.994	27.749	36.951	45.741	2.007	170.8	-1.33	0.066	-19.27	0.000	2196.4

BOTL NO.	PRES DBAR	CTD IPTS68	TMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUAL1
18	13.0	18.425	18.423	25.837	34.326	42.448	35.874	35.869	5.45	2.33	0.13	0.00	0.00				12	222222255
17	101.6	15.185	15.169	26.394	34.996	43.224	35.595	35.578	5.61	1.66	0.21	0.40	0.00				100	222222255
16	200.2	13.245	13.217	26.546	35.274	43.524	35.253	35.264	5.66	1.32	0.44	4.00	0.00				198	222222255
15	301.3	10.986	10.948	26.704	35.476	43.865	34.895	34.906	5.51	2.66	0.84	11.00	0.00				298	222222255
14	401.7	9.560	9.514	26.815	35.651	44.098	34.720	34.716	5.51	4.17	1.12	15.70	0.00				398	222222255
13	497.9	8.890	8.836	26.864	35.730	44.206	34.642	34.630	5.47	5.69	1.29	18.50	0.00				493	222222255
12	598.4	7.791	7.731	26.943	35.860	44.384	34.528	34.527	5.00	11.56	1.56	23.20	0.00				592	222222255
11	699.3	6.241	6.178	27.092	36.083	44.676	34.446	34.433	4.58	22.33	1.91	28.10	0.00				692	222222255
10	800.3	4.900	4.835	27.214	36.272	44.927	34.394	34.389	4.50	33.76	2.16	31.20	0.00				792	222222255
9	900.5	4.343	4.273	27.294	36.380	45.062	34.417	34.419	4.11	48.05	2.30	33.30	0.00				891	222222255
8	999.7	3.998	3.922	27.357	36.460	45.159	34.450	34.447	3.86	57.63	2.41	34.50	0.00				989	222222255
7	1100.4	3.794	3.712	27.423	36.537	45.245	34.507	34.502	3.55	69.57	2.49	35.50	0.00				1089	222222255
6	1197.6	3.617	3.528	27.465	36.587	45.304	34.536	34.533	3.45	76.29	2.53	35.80	0.00				1185	222222255
5	1396.9	3.122	3.022	27.538	36.686	45.427	34.567	34.569	3.79	80.32	2.49	35.60	0.00				1381	222222255
4	1599.2	2.805	2.691	27.612	36.778	45.534	34.623	34.623	3.64	86.88	2.47	35.10	0.00				1580	222222255
3	1799.5	2.580	2.453	27.673	36.850	45.618	34.673	34.670	3.72	94.44	2.43	34.60	0.00				1778	222222255
2	1999.8	2.381	2.239	27.715	36.904	45.683	34.704	34.704	3.76	102.00	2.40	34.30	0.00				1975	222222255
1	2222.0	2.150	1.992	27.749	36.951	45.742	34.721	34.712	3.87	109.57	2.38	34.20	0.00				2193	222222255

CRUISE: CD 29 STA: 104 DATE (D/M/Y): 15-12-87 TIME: 1945 LAT: 34 10.06 S LONG: 113 59.84 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81907E-04 1/S SOUND SPEED= 1491.0 M/S Depth= 1508 Cor Meters

PRES DBAR	TMP IPT568	SALT PSS78	OXYG ML/L	PTMP IPT568	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	18.898	35.883	4.71	18.898	25.724	34.197	42.305	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	18.898	35.883	4.71	18.898	25.724	34.197	42.305	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	18.895	35.889	5.35	18.892	25.730	34.203	42.311	0.045	0.0	-7.80	-0.745	-114.22	2.118	19.9
30	18.696	35.874	5.37	18.691	25.769	34.249	42.363	0.068	0.1	-27.69	-1.633	-464.21	4.269	29.8
40	18.407	35.865	5.47	18.400	25.836	34.325	42.448	0.090	0.2	-24.55	-0.079	-491.11	4.391	39.8
50	18.251	35.864	5.39	18.242	25.875	34.369	42.497	0.111	0.3	-8.41	-0.152	-159.85	2.505	49.7
100	15.683	35.638	5.58	15.667	26.316	34.899	43.111	0.210	1.0	-53.73	-6.125	-611.96	4.902	99.4
125	14.568	35.492	5.52	14.550	26.451	35.076	43.327	0.251	1.5	-33.47	-4.724	-304.33	3.457	124.3
150	13.987	35.403	5.46	13.965	26.507	35.155	43.426	0.291	2.1	-18.40	-2.807	-144.27	2.380	149.1
200	13.009	35.237	5.54	12.981	26.581	35.268	43.577	0.368	3.4	-19.55	-3.270	-118.22	2.154	198.7
250	11.831	35.039	5.45	11.799	26.658	35.395	43.749	0.441	5.1	-25.94	-3.989	-155.05	2.467	248.4
300	10.682	34.859	5.39	10.646	26.730	35.516	43.916	0.511	7.1	-18.42	-2.783	-98.04	1.962	298.0
350	9.817	34.732	5.56	9.776	26.781	35.605	44.042	0.579	9.3	-13.44	-1.850	-74.39	1.709	347.6
400	9.527	34.703	5.40	9.482	26.808	35.645	44.093	0.645	11.9	-5.08	-0.323	-0.36	1.406	397.2
450	9.196	34.668	5.48	9.146	26.835	35.687	44.150	0.711	14.7	-6.80	-0.872	-38.89	1.236	446.8
500	8.795	34.617	5.52	8.741	26.860	35.731	44.211	0.775	17.8	-9.50	-1.118	-58.04	1.510	496.4
600	7.487	34.511	4.93	7.427	26.974	35.905	44.442	0.900	24.8	-18.32	-1.072	-163.21	2.531	595.5
700	6.070	34.434	4.58	6.007	27.105	36.104	44.705	1.010	32.1	-11.82	-0.512	-103.56	2.017	694.5
800	4.931	34.398	4.39	4.866	27.213	36.270	44.924	1.109	39.7	-8.86	-0.117	-88.09	1.860	793.5
900	4.313	34.415	4.14	4.244	27.295	36.383	45.066	1.199	47.5	-5.00	0.355	-74.63	1.712	892.4
1000	4.078	34.459	3.82	4.002	27.356	36.455	45.149	1.283	55.5	-1.31	0.363	-36.71	1.201	991.3
1200	3.734	34.515	3.53	3.644	27.436	36.553	45.264	1.438	72.9	-2.38	0.238	-39.63	1.247	1188.8
1400	3.261	34.562	3.56	3.159	27.521	36.663	45.397	1.578	91.5	-1.85	0.220	-33.09	1.140	1386.2
1503	3.093	34.586	3.53	2.983	27.557	36.707	45.450	1.645	101.4	-1.71	0.231	-33.09	0.000	1487.8

BOTL NO.	PRES DBAR	CTDMP IPT568	THETA IPT568	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUAL1
14	3.3	18.832	18.832	25.747	34.222	42.332	35.891	35.894	5.37	1.75	0.11	0.00	0.00			3	22222255
13	101.5	15.332	15.316	26.388	34.984	43.207	35.629	35.594	5.54	1.42	0.25	0.00	0.00			100	2 2222255
12	204.2	12.958	12.930	26.585	35.275	43.585	35.229	35.227	5.56	1.43	0.51	5.00	0.00			202	22222255
11	303.4	10.694	10.657	26.725	35.510	43.910	34.855	34.856	5.60	2.44	0.87	11.30	0.00			300	22222255
10	404.2	9.490	9.444	26.813	35.652	44.102	34.702	34.696	5.54	3.95	1.14	15.90	0.00			400	22222255
9	497.8	8.726	8.672	26.873	35.746	44.229	34.620	34.612	5.46	5.47	1.31	18.80	0.00			493	22222255
8	600.8	7.124	7.066	27.022	35.970	44.523	34.508	34.482	4.72	15.33	1.73	25.50	0.00			595	22222255
7	701.3	6.064	6.002	27.105	36.105	44.706	34.434	34.431	4.55	23.03	1.96	28.60	0.00			694	22222255
6	799.3	4.955	4.890	27.211	36.266	44.919	34.398	34.397	4.41	34.23	2.17	31.30	0.00			791	22222255
5	901.2	4.395	4.325	27.288	36.371	45.050	34.416	34.412	4.21	44.10	2.28	32.90	0.00			892	22222255
4	1001.1	4.081	4.005	27.355	36.454	45.149	34.459	34.454	3.81	57.48	2.43	34.40	0.00			991	22222255
3	1099.4	3.937	3.853	27.398	36.504	45.205	34.493	34.485	3.57	65.67	2.48	35.20	0.00			1088	22222255
2	1299.1	3.473	3.377	27.484	36.615	45.338	34.542	34.540	3.44	76.37	2.54	35.80	0.00			1285	22222255
1	1501.9	3.090	2.981	27.557	36.708	45.450	34.587	34.587	3.50	82.23	2.52	35.30	0.00			1485	22222255

CRUISE: CD 29 STA: 105 DATE (D/M/Y): 15-12-87 TIME: 2240 LAT: 34 10.93 S LONG: 114 14.53 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81938E-04 1/S SOUND SPEED= 1494.5 M/S Depth= 1078 Cor Meters

PRES DBAR	TMP IPT568	SALT PSS78	OXYG ML/L	PTMP IPT568	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	19.026	35.889	5.25	19.026	25.695	34.164	42.269	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	18.826	35.889	5.25	19.026	25.695	34.165	42.269	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	18.910	35.876	5.36	18.906	25.716	34.189	42.297	0.046	0.0	-29.23	-1.519	-505.58	4.455	19.9
30	18.639	35.862	5.33	18.634	25.775	34.257	42.373	0.068	0.1	-4.95	-0.297	-82.64	1.801	29.8
40	18.497	35.854	5.34	18.490	25.805	34.292	42.412	0.090	0.2	-10.26	-0.830	-206.47	2.847	39.8
50	18.385	35.854	5.32	18.376	25.834	34.324	42.448	0.112	0.3	-12.69	0.311	-275.72	3.290	49.7
100	16.097	35.688	5.47	16.081	26.259	34.828	43.026	0.212	1.0	-42.78	-4.555	-517.07	4.505	99.4
125	15.082	35.561	5.43	15.063	26.391	34.997	43.230	0.255	1.5	-26.52	-3.419	-294.74	3.401	124.3
150	14.904	35.537	5.50	14.881	26.413	35.026	43.265	0.297	2.1	-6.57	-0.830	-64.52	1.591	149.1
200	14.293	35.449	5.54	14.264	26.479	35.115	43.376	0.378	3.6	-14.29	-2.062	-121.75	2.186	198.8
250	13.307	35.292	5.40	13.272	26.565	35.240	43.538	0.457	5.4	-22.30	-3.599	-149.12	2.419	248.4
300	11.563	35.000	5.44	11.524	26.680	35.428	43.793	0.532	7.5	-40.48	-6.377	-229.30	3.000	298.0
350	10.166	34.795	5.36	10.125	26.771	35.579	44.001	0.601	9.8	-14.66	-1.870	-95.53	1.936	347.6
400	9.542	34.709	5.49	9.497	26.810	35.646	44.094	0.667	12.3	-12.64	-1.816	-63.71	1.581	397.2
450	9.184	34.667	5.39	9.134	26.836	35.688	44.152	0.733	15.1	-7.52	-0.883	-48.20	1.375	446.8
500	8.853	34.625	5.47	8.799	26.857	35.725	44.203	0.797	18.3	-8.21	-0.980	-49.65	1.396	496.4
600	7.756	34.525	4.92	7.695	26.946	35.865	44.391	0.923	25.3	-14.72	-0.994	-125.35	2.218	595.5
700	6.291	34.443	4.54	6.227	27.084	36.072	44.663	1.037	32.8	-12.67	-0.627	-108.88	2.067	694.5
800	5.022	34.395	4.47	4.956	27.200	36.252	44.902	1.138	40.6	-11.08	-0.236	-104.93	2.029	793.5
900	4.310	34.410	4.23	4.241	27.292	36.379	45.063	1.229	48.4	-3.60	0.553	-72.12	1.682	892.4
1000	4.086	34.462	3.78	4.010	27.358	36.456	45.150	1.312	56.5	-2.12	0.369	-45.31	1.334	991.3
1069	3.958	34.487	3.64	3.877	27.391	36.496	45.196	1.366	62.2	-2.11	0.352	-45.31	0.000	1059.5

BOTL NO.	PRES DBAR	CTD IPT568	TEMP IPT568	THETA	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
12	2.5	19.145	19.145	24.593	33.076	41.193	34.487	35.800	5.40	2.05	0.14	0.00	0.00	2.024	1.124	2	22222222	
11	101.8	16.198	16.182	26.234	34.799	42.993	35.685	35.696	5.53	1.89	0.22	0.30	0.00	2.235	1.201	100	22222222	
10	203.3	14.265	14.235	26.482	35.120	43.381	35.445	35.446	5.51	1.57	0.39	3.00	0.00	2.499	1.317	201	22222222	
9	301.8	11.305	11.267	26.723	35.481	43.856	34.994	34.969	5.54	2.40	0.83	10.10	0.00	2.663	1.367	299	22222222	
8	402.4	9.497	9.452	26.813	35.652	44.101	34.704	34.704	5.51	4.25	1.19	16.30	0.00	2.398	1.233	398	22222222	
7	502.6	8.697	8.643	26.880	35.755	44.239	34.623	34.608	5.45	6.09	1.35	19.10	0.00	2.028	1.053	498	22222222	
6	600.1	7.771	7.710	26.944	35.862	44.387	34.525	34.524	4.93	11.60	1.64	23.60	0.00	1.127	0.592	594	22222222	
5	698.9	6.219	6.156	27.094	36.086	44.680	34.444	34.437	4.59	21.77	1.96	28.50	0.00	0.510	0.278	692	22222222	
4	800.3	4.966	4.901	27.206	36.261	44.913	34.394	34.394	4.47	32.96	2.18	31.60	0.00	0.286	0.167	792	22222222	
3	899.7	4.300	4.230	27.293	36.381	45.065	34.410	34.413	4.16	45.98	2.36	33.70	0.00	0.153	0.083	890	22222222	
2	998.5	4.074	3.998	27.359	36.458	45.152	34.462	34.473	3.76	59.33	2.49	35.10	0.00	0.051	0.045	988	22222222	
1	1064.8	3.957	3.878	27.389	36.495	45.195	34.485	34.482	3.59	64.05	2.54	35.60	0.00	0.035	0.022	1053	22222222	



CRUISE: CD 29 STA: 106 DATE (D/M/Y): 16-12-87 TIME: 0049 LAT: 34 10.22 S LONG: 114 24.64 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81913E-04 1/S SOUND SPEED= 1502.2 M/S Depth= 700 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	19.421	35.853	4.76	19.421	25.566	34.023	42.117	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.421	35.853	4.76	19.420	25.566	34.023	42.117	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	19.383	35.858	5.20	19.379	25.581	34.039	42.134	0.048	0.0	-10.21	0.451	-240.46	3.073	19.9
30	19.098	35.869	5.51	19.092	25.663	34.130	42.233	0.072	0.1	-89.19	0.826	-1885.37	8.604	29.8
40	18.432	35.858	5.20	18.425	25.824	34.313	42.435	0.094	0.2	-38.58	-2.153	-647.63	5.043	39.8
50	18.166	35.848	5.47	18.157	25.884	34.381	42.512	0.116	0.3	-15.43	-0.153	-300.09	3.432	49.7
100	16.990	35.769	5.08	16.974	26.112	34.649	42.817	0.215	1.0	-2.78	0.015	-54.61	1.464	99.4
125	16.923	35.774	5.18	16.903	26.133	34.672	42.842	0.263	1.6	-4.18	-0.202	-70.29	1.661	124.3
150	16.796	35.760	5.08	16.771	26.153	34.697	42.871	0.311	2.3	-6.19	-0.524	-92.82	1.909	149.1
200	16.467	35.734	5.25	16.434	26.212	34.768	42.954	0.406	4.0	-17.27	-1.785	-217.15	2.920	198.8
250	14.624	35.487	5.44	14.586	26.439	35.063	43.312	0.495	6.0	-37.25	-5.379	-333.34	3.618	248.4
300	12.955	35.226	5.41	12.913	26.586	35.277	43.588	0.575	8.2	-72.30	-11.567	-457.66	4.239	298.1
350	10.123	34.790	5.39	10.081	26.775	35.585	44.009	0.645	10.6	-26.12	-3.756	-144.72	2.384	347.7
400	9.526	34.711	5.40	9.480	26.814	35.651	44.099	0.711	13.1	-8.63	-1.006	-57.43	1.502	397.3
450	9.119	34.664	5.34	9.070	26.844	35.700	44.165	0.776	15.9	-10.14	-1.253	-60.15	1.537	446.9
500	8.719	34.614	5.30	8.665	26.869	35.743	44.227	0.840	19.0	-8.59	-1.008	-51.84	1.427	496.4
600	7.283	34.497	4.66	7.224	26.992	35.933	44.479	0.963	25.9	-18.78	-1.119	-161.12	2.515	595.5
685	6.141	34.440	4.56	6.080	27.100	36.096	44.693	1.056	32.0	-6.84	-0.317	-161.12	0.000	679.7

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
8	3.5	19.396	19.395	25.575	34.033	42.127	35.856	35.855	5.31	2.33	0.12	0.00	0.00	2.016	1.153	3	22222222
7	104.1	16.974	16.957	26.116	34.654	42.822	35.769	35.769	5.15	2.17	0.28	1.50	0.00	2.143	1.229	103	22222222
6	202.3	16.458	16.425	26.210	34.766	42.952	35.728	35.734	5.25	2.00	0.31	1.50	0.00	2.279	1.232	200	22222222
5	304.1	12.430	12.407	26.594	35.306	43.638	35.102		5.50	2.00	0.59	6.50	0.00	2.482	1.373	301	25222222
4	403.1	9.588	9.542	26.801	35.635	44.081	34.707	34.718	5.53	4.34	1.18	16.30	0.00	2.405	1.279	4	12222222
3	500.2	8.712	8.658	26.869	35.743	44.227	34.612	34.618	5.40	6.34	1.41	19.70	0.00	1.957	1.044		12222222
2	602.6	7.257	7.199	26.994	35.936	44.484	34.496	34.510	4.77	14.85	1.81	26.00	0.00	0.875	0.445	597	22222222
1	687.6	6.122	6.061	27.103	36.099	44.698	34.440	34.437	4.55	23.19	2.00	29.40	0.00	0.479	0.280	681	22222222

CRUISE: CD 29 STA: 107 DATE (D/M/Y): 16-12-87 TIME: 0220 LAT: 34 9.71 S LONG: 114 30.26 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81895E-04 1/S SOUND SPEED= 1518.2 M/S Depth= 160 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	19.530	35.849	5.01	19.530	25.535	33.989	42.079	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.530	35.849	5.09	19.530	25.535	33.989	42.079	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	19.414	35.849	5.44	19.410	25.566	34.023	42.117	0.048	0.0	-3.32	0.085	-74.44	1.710	19.9
30	19.251	35.852	5.44	19.246	25.610	34.073	42.171	0.073	0.1	-59.06	1.436	-1311.57	7.177	29.8
40	18.743	35.849	5.43	18.736	25.739	34.218	42.331	0.096	0.2	-13.20	-0.548	-236.30	3.046	39.8
50	18.602	35.852	5.50	18.594	25.777	34.260	42.378	0.118	0.3	-23.56	-0.332	-458.75	4.244	49.7
100	17.142	35.784	5.03	17.125	26.087	34.619	42.782	0.223	1.1	-14.10	-0.888	-221.14	2.947	99.4
125	17.100	35.786	5.01	17.080	26.099	34.633	42.797	0.271	1.6	-0.53	-0.036	-8.39	0.574	124.3
141	17.098	35.786	4.97	17.074	26.101	34.634	42.799	0.302	2.1	-0.25	0.029	-8.39	0.000	140.2

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
4	2.5	19.531	19.530	25.485	33.940	42.031	35.785	35.853	5.30	2.30	0.11	0.10	0.00	0.000	1.100	2	22222222
3	53.4	18.503	18.493	25.800	34.287	42.407	35.849	35.845	5.40	2.30	0.12	0.10	0.00	2.020	1.136	52	22222222
2	104.8	17.129	17.112	26.090	34.623	42.786	35.784	35.782	5.17	2.30	0.26	1.20	0.00	2.129	1.192	103	22222222
1	143.0	17.100	17.076	26.100	34.633	42.798	35.785	35.783	5.14	2.20	0.25	1.20	0.00	2.115	1.181	141	22222222

CRUISE: CD 29 STA: 108 DATE (D/M/Y): 16-12-87 TIME: 0353 LAT: 34 10.27 S LONG: 114 44.85 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81915E-04 1/S SOUND SPEED= 1519.6 M/S Depth= 130 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	19.133	35.862	5.42	19.133	25.647	34.113	42.215	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	19.133	35.862	5.42	19.133	25.647	34.113	42.215	0.002	0.0	-0.36	0.000	0.00	0.000	1.0
20	18.974	35.861	5.42	18.971	25.688	34.159	42.266	0.046	0.0	-2.63	0.860	-106.95	2.049	19.9
30	18.949	35.868	5.38	18.944	25.700	34.172	42.279	0.069	0.1	-3.06	0.549	-96.80	1.949	29.8
40	18.905	35.873	5.37	18.898	25.716	34.190	42.298	0.092	0.2	-3.00	0.296	-79.78	1.770	39.8
50	18.887	35.875	5.38	18.878	25.722	34.196	42.305	0.115	0.3	-1.72	-0.037	-33.04	1.139	49.7
100	18.168	35.833	5.34	18.151	25.874	34.371	42.502	0.225	1.1	-2.92	-0.070	-33.04	0.000	99.4
111	18.164	35.833	5.31	18.145	25.875	34.373	42.504	0.249	1.4	-0.55	-0.005	-33.04	0.000	110.4

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
3	2.9	19.073	19.073	25.641	34.109	42.212	35.833	35.869	5.39	2.09	0.15	0.00	0.00			2	22222255
2	53.6	18.858	18.849	25.729	34.204	42.314	35.874	35.876	5.3	2.10	0.16	0.00	0.00			53	22222255
1	115.2	18.154	18.134	25.878	34.376	42.508	35.833	35.838	5.21	2.27	0.23	0.60	0.00			114	22222255

CRUISE: CD 29 STA: 109 DATE (D/M/Y): 16-12-87 TIME: 0438 LAT: 34 9.52 S LONG: 114 49.64 E

GRAVITY= 9.7966 M/S CORIOLIS= -.81888E-04 1/S SOUND SPEED= 1518.7 M/S Depth= 55 Cor Meters

PRES DBAR	TMP IPTS68	SALT PSS78	OXYG ML/L	PTMP IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	DYN-HT DYNAMIC METERS	PE J/M2 10-5	GRD-PT C/DB 10-3	GRD-S 1/DB 10-3	POT-V (m s)-1 10-12	B-V CPH	DEPTH METERS
0	18.802	35.867	5.55	18.802	25.736	34.212	42.323	0.000	0.0	-0.18	0.000	0.00	0.000	0.0
1	18.802	35.867	5.55	18.802	25.736	34.212	42.324	0.002	0.0	-0.35	0.000	0.00	0.000	1.0
20	18.515	35.857	5.29	18.511	25.802	34.288	42.408	0.044	0.0	-12.39	-1.185	-178.13	2.645	19.9
30	18.427	35.849	5.10	18.422	25.818	34.307	42.430	0.066	0.1	-4.61	-0.225	-79.43	1.766	29.8
40	18.390	35.847	5.19	18.383	25.827	34.317	42.441	0.088	0.2	-1.27	-0.053	-79.43	0.000	39.8

BOTL NO.	PRES DBAR	CTDMP IPTS68	THETA IPTS68	SIG-TH KG/M3	SIG-2 KG/M3	SIG-4 KG/M3	CTDSAL PSS78	SALNTY PSS78	OXYGEN ML/L	SILCAT UMOL/L	PHSPHT UMOL/L	NITRAT UMOL/L	NITRIT UMOL/L	CFC-11 PM/KG	CFC-12 PM/KG	DEPTH METERS	QUALT1
-9	2.9	19.073	19.073	25.651	34.119	42.223	35.847	0.000	5.39	2.09	0.15	0.00	0.00			2	22222255
2	12.7	18.572	18.570	25.793	34.276	42.394	35.864	35.861	5.42	1.74	0.16	0.10	0.00			12	22222255
1	44.8	18.387	18.379	25.827	34.318	42.442	35.847	35.844	5.13	1.75	0.21	0.90	0.00			44	22222255

**Appendix C: Tritium, Helium, and Neon Observations**



INDIAN OCEAN 32S ST12

DEPTH db	T pot. deg C	SALINITY permil	DELTA He3 ‰	He ccSTP/g	DELTA He ‰	Ne ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
8.8	20.830								
200	17.022	35.631	0.00	3.85	1.9	13.41	4.5	0.640	4.7
598	11.596	35.021						0.338	
949	7.007	34.558						0.016	
1148	4.756	34.465	2.60	4.10	3.5	17.87	4.8		57.0
1400	3.799	34.591						-0.003	
1800	2.795	34.700	5.80	4.15	4.1	17.55	3.8	0.000	
2202	2.417	34.774	6.50	4.28	5.9	18.48	5.5		
2400	2.308	34.792		4.28	7.1	18.62	6.2		

IND OCEAN 32 S ST 15 32 32.7S 33 24E ST 15

DEPTH db	T pot. deg C	SALINITY permil	DELTA He3 ‰	He ccSTP/g	DELTA He ‰	Ne ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 age (years)
100	17.873	35.662	-0.7	3.82	1.2	15.83	2.6	0.910	2.1
200	17.048		-0.5	3.78	3.4	15.63	3.8	0.861	1.3
601	12.606	35.149					0.4	0.420	
901	8.893		6.2	4.16	4.4	18.38	5.1		
1502	3.652	34.546	7.8	4.46	12.0	19.11	10.3		
1804	3.158	34.668							
2001	2.780	34.708	6.2	4.18	4.7	18.45	5.7		
3525	1.142	34.760	7.9	4.14	3.0	18.27	3.2		

INDIAN OCEAN 32S 33 03S, 41 00E ST 26

DEPTH db	T pot. deg C	SALINITY permil	DELTA He3 ‰	He ccSTP/g	DELTA He ‰	Ne ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
6.8	19.172	35.706	-1.8	3.75	-0.2	15.79	2.7	0.685	-0.6
100	17.116	35.636	-1.3	3.95	4.2	16.01	3.0	0.793	0.5
200	15.939	35.529	-0.5	3.95	3.7	16.42	4.9	0.840	4.9
300	14.800	35.428	1.0	4.02	5.1	16.37	3.8	0.710	3.5
450	13.228	35.241	2.1	4.04	4.9	16.91	6.3	0.547	5.9
600	11.639	35.021	4.8	4.07	5.0	16.90	4.8	0.440	10.8
800	9.178	34.722	6.3	4.00	2.2	17.15	4.1		
1000	6.225	34.474	6.4	4.11	3.8	17.63	4.2	0.178	
1200	4.278	34.412	5.7	4.19	5.4	18.04	4.7		
1500	3.244	34.553	7.3	4.15	4.0	18.19	4.6		
1800	2.751							0.297	
2100	2.487	34.747						0.123	
2400	2.316	34.793	6.0	4.35	8.8	18.50	5.5		
3300	1.740	34.797						0.005	
4500	0.375	34.705						0.025	
4900	0.229	34.695	5.8	4.41	10.3	18.60	5.9		
5088	0.192	34.691						0.003	

INDIAN OCEAN 32S ST 33 33 22.7S ,46 54E ST 33

DEPTH db	T pot. deg. C	SALINITY permil	DELTA He3 ‰	He ccSTP/g	DELTA He ‰	Ne ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
0	19.068	35.577		3.77	0.2	15.56	1.1	0.711	0.1
54	17.338	35.580	-1.6	3.95	2.8	16.21	4.4	0.792	0.1
150	15.35	35.496	-1.1	3.98	4.3	16.54	3.6		0.8
350	13.396	35.276	-0.7	3.99	3.7	16.52	4.2	0.644	1.5
450	12.538	35.142	-1.2	4.01	3.9	16.87	5.3	0.402	1.2
850	7.604	34.717	4.3	4.12	4.7	17.72	5.5		
1500	2.927	34.525	8.2	4.14	3.8	18.15	4.0		
2100	2.287	34.724		4.20	5.2	18.31	4.3		
2503	2.052	34.784	14.8	4.31	7.8	18.88	7.1		
2701	1.819	34.784		4.33	8.3				
3090	1.428	34.756	12.2	4.33	8.1	18.84	6.4		

INDIAN OCEAN 32S ST35 33 33.6S, 48 14E ST35

DEPTH db	T pot. deg. C	SALINITY permil	DELTA He3 ‰	He ccSTP/g	DELTA He ‰	Ne ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
0	19.594	35.532	-1.2	3.85	2.7	16.02	4.3	0.756	0.7
100	15.849	35.539	-2.0	3.87	1.8	16.12	2.9	0.680	-0.4
200	14.884	35.444	0.4	3.84	3.5	16.57	5.2		2.8
300	13.818	35.323	0.4	3.95	3.1	16.33	2.9	0.805	2.4
400	12.936	35.211	0.8	4.02	4.4	16.75	4.9	0.464	4.7
600	10.804	34.919	0.0	4.06	4.5	16.92	4.2	0.409	3.8
1000	5.341	34.461	2.8	4.14	4.3	17.90	5.0		10.9
1200	3.901	34.451	3.2	4.13	3.8	18.02	4.1	0.288	12.0
1400	3.169	34.489	5.2	4.12	3.2	18.09	3.9		
1700	2.608	34.615	6.8	4.18	4.7	18.30	4.6	0.195	
2400	2.004	34.739	16.9	4.30	7.6	18.53	5.3		
2800	1.667	34.749	14.9	4.33	8.2	18.67	5.7		
3200	1.227	34.731	9.6	4.34	8.2	18.88	6.4		
3205	1.227	34.731	10.8	4.36	8.8	18.97	6.9		
3782	0.842	34.721	6.8	4.29	6.8	18.78	5.4	0.000	
4029	0.756	34.713	6.8	4.46	11.3			0.017	

INDIAN OCEAN 32S ST39 33 59.9S, 52 44E ST39

DEPTH db	T pot. deg. C	SALINITY permil	DELTA He3 ‰	He ccSTP/g	DELTA He ‰	Ne ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
10.1	19.350	35.625	-1.8	3.88	3.3	16.00	4.1	0.794	-0.1
200	15.488	35.507	-1.5	3.87	1.6	16.42	2.9	0.692	0.3
300	14.442	35.404	-1.6	3.97	3.6	16.45	4.1	0.707	0.1
500	12.676	35.172	5.1	4.00	3.7	16.45	2.8		
700	10.373	34.867	4.8	4.04	3.9	16.70	2.5	0.577	8.8
900	7.499	34.569	5.0	4.05	3.0	17.43	4.3		
1300	3.839		6.8	4.09	2.8	18.16	3.9		
1500	3.174	34.482	7.9	4.14	4.0	18.18	4.4	0.144	
1903	2.479	34.646	5.1	4.22	5.6	18.47	5.4	0.178	
2801	1.640	34.742	7.8	4.31	7.8	18.17	4.9		
3400	1.104	34.725	7.1	4.38	9.2	18.78	5.7	0.032	
4001	0.840	34.716	5.6	4.43	10.3	19.30	8.3		
4201	0.802	34.713	5.4	4.34	8.1	18.83	5.6	0.044	
4402	0.773		4.8	4.27	6.4	18.58	4.2		

INDIAN OCEAN

32S ST44

33 58.3S, 57 02E

ST44

DEPTH db	T pot deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
250	14.336	35.398	-0.3	3.90	1.8	15.96	0.9	0.758	1.8
400	13.333	35.276	0.3	3.95	2.7	16.53	3.8	0.742	2.5
500	12.289	35.104	1.6	4.02	4.0	16.78	4.5	0.705	4.2
600	11.308	34.969	1.2	4.00	3.3	16.51	2.1		4.3
800	8.717	34.675	1.8	4.09	4.4	17.18	3.9		5.9
1000	5.918	34.457	1.7	4.16	5.0	17.76	4.7	0.377	7.3
1200	4.350	34.401	3.4	4.07	2.2	17.67	2.6	0.033	40.0
1400	3.399		5.8	4.14	3.9	18.26	5.1	0.177	
1600	2.978	34.525	6.6	4.16	4.3			0.000	
2000	2.355	34.670	6.1	4.19	4.8	18.40	4.9	0.099	
2600	1.908	34.734	6.8	4.26	6.6	18.55	5.3	0.129	
3200	1.333	34.733	7.7	4.31	7.6	18.61	5.0	0.328	
3800	0.533	34.705	6.9	4.33	7.9	19.05	4.8	0.105	
4099	0.465	34.703	6.0	4.37	8.7	18.89	5.6	0.019	56.3
4401	0.376	34.700						0.004	
4741	0.289	34.693	4.7	4.27	6.3	18.78	4.7	0.510	9.8
5103	0.210	34.690	6.0	4.40	9.4	19.09	6.4	0.393	13.2
5197	0.206	34.691		4.43	10.2	19.18	6.8	0.000	
5197	0.209	34.691		4.37	8.7	19.01	5.9		

INDIAN OCEAN

32S ST50 '33 59.3S, 61 59E

ST 50

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
3.2	19.015	35.550	-1.6	3.85	2.4	16.23	5.3	0.898	0.1
200	14.193	35.400	-1.2	3.87	1.1	16.28	2.9	0.774	0.6
300	13.867	35.344	-0.8	4.00	4.3	16.62	4.8	0.481	1.8
600	11.328	34.962	1.8	4.07	5.0	16.89	4.4	0.412	7.0
800	8.718	34.671	2.1	4.11	4.9	17.29	4.6		
1100	4.629	34.372	3.0	4.20	5.8	18.09	5.3	0.040	
1200	3.946	34.368						0.103	
1400	3.183	34.454	6.4	4.09	2.5	18.13	4.1		
2400	1.904	34.726	8.9	4.25	6.3	18.80	6.7		
3000	1.514	34.737	8.8	4.37	9.2	18.75	6.0		
3300	1.352	34.726	7.2	4.30	7.4	18.04	1.8	0.034	
3600	1.070	34.725						0.028	
3900	0.708	34.709	6.6	4.28	6.6	18.76	5.1	0.157	25.0
4200	0.463	34.700	5.8	4.29	6.9	18.60	3.9	0.111	28.0
4500	0.285	34.692						0.010	
4800	0.159		5.6	4.30	7.2	19.09	6.3	0.000	
5187	0.096	34.686	5.9	4.25	5.7	18.69	3.9		

INDIAN OCEAN

32S ST55

34 01S, 71 59E

ST55

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
1.5	17.815	35.416	-1.4	3.86	2.0	16.03	3.4	0.624	0.5
70	15.823	35.437	-1.3	3.88	2.4	16.24	3.6	0.926	0.4
150	13.390	35.262	-1.5	4.00	4.1	16.61	4.3	0.809	0.2
250	12.689	35.224	-2.1	3.97	3.2	16.32	2.0	0.541	-0.1
350	12.102	35.077		4.00	3.6	16.73	4.1	0.333	
450	11.501	34.982	-1.2	3.78	5.3	17.04	5.5		2.4
550	10.653	34.863		4.07	4.7	17.25	6.1		
700	8.920	34.678	1.2	4.10	4.8	17.31	4.9	0.210	10.3
900	6.102	34.444	1.8	4.08	3.2	17.39	2.7		
1300	3.238	34.438	3.8	4.26	6.8	18.33	5.3		
1500	2.789	34.529	7.7	4.20	5.0	18.55	6.2		
2200	1.917	34.726	14.7	4.22	5.4	18.50	5.1		
3500	1.135	34.716	10.3	4.20	4.8	18.72	5.4		
4100	0.771	34.708	7.2	4.31	7.4	18.82	5.5	0.169	24.5
4700	0.672	34.705	7.1	4.29	6.9	18.72	4.8		
5055	0.668	34.705	5.6	4.19	4.3	18.44	3.3		

INDIAN OCEAN

32S ST62

30 22.4S, 79 15E

ST62

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
22	18.897	35.772	-1.4	3.95	5.0	16.13	4.8	0.636	0.5
100	16.265	35.622	3.1	3.88	2.1	16.24	4.0	0.762	5.4
200	13.646	35.335	5.3	3.98	3.8	16.27	2.4	0.645	8.5
300	12.301	35.121	5.7	4.06	5.2	16.45	2.5	0.608	9.3
400	11.377	34.975	8.7	4.06	4.7	16.86	4.4	0.741	10.4
500	10.666	34.875	6.6	4.00	3.0	16.45	1.2	0.603	10.2
700	9.183	34.686	8.8	3.99	2.1	17.59	6.8		
800	8.235		9.8	4.19	6.8	17.30	4.2		
1000	5.294	34.410	9.4	4.14	4.5	17.65	3.5		
1100	4.332	34.408	7.2	4.19	5.3	17.60	2.3		
1300	3.583	34.493	11.1	4.27	7.4	17.78	2.5		
1500	3.169	34.572	9.0	4.20	5.4	18.02	3.5		
2300	2.017	34.729	14.9	4.53	13.2	18.72	6.4		
2700	1.576	34.742	10.9	4.42	10.3	18.69	5.7		
2900	1.400	34.735	8.2	4.46	11.4	19.04	7.5		
3100	1.258	34.732	6.4	4.20	4.9	18.68	5.3		
3500	1.137	34.726	5.0	4.25	6.0	18.25	2.8		
3792	1.121	34.726	5.5	4.32	7.8	18.83	6.0		



INDIAN OCEAN

32S ST65

29 02S, 82E

ST65

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
17	19.482	35.917	-1.2	3.84	2.5	15.93	3.8	0.706	0.7
100	16.089	35.593	3.8	3.87	1.9	15.97	2.3	0.707	6.5
200	13.485	35.283	4.8	4.10	6.8	16.74	5.2	0.679	7.7
301	12.229	35.102	5.5	4.04	5.1			0.782	7.5
400	11.340	34.971	9.4	4.06	4.7	16.77	3.8	0.767	10.6
500	10.539	34.863	6.9	4.09	5.0	16.98	4.3	0.767	8.7
700	8.752	34.651	8.1	4.18	6.6	17.37	5.1		
1001	4.696	34.411	7.0	4.24	6.8	18.09	5.5		
1100	4.110	34.418	6.6	4.21	5.9	18.32	5.8		
1200	3.716	34.477	10.3	4.31	8.2	18.40	6.2		
2000	2.290	34.708	12.4	4.31	7.8	18.56	5.8		
2500	1.737	34.732	11.9	4.28	7.0	18.65	5.7		
3100	1.263	34.735	7.0	4.31	7.6	18.86	6.0		
4000	1.057	34.722	6.8	4.25	5.9	18.72	5.3		
4167	1.049	0	5.9	4.17	4.0	18.65	4.9		

INDIAN OCEAN

32S ST69

29 32.1S, 86 55E

ST69

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
2.6	21.593	36.528	-1.5	3.74	0.9	15.59	2.9	0.599	0.3
100	18.010	35.853	-0.9	3.91	3.6	15.91	3.0	0.635	1.2
200	14.776	35.492	0.6	4.00	4.5	16.50	4.8	0.712	3.0
300	12.632	35.177		4.04	7.4	16.82	5.1	0.652	
400	11.408	34.989	1.8	4.02	3.9	16.84	4.2	0.783	4.0
500	10.519	34.865	0.9	4.04	4.0	17.06	4.8		4.6
600	9.746	34.765	4.3	4.07	4.3	17.10	4.4	0.406	10.8
700	8.971	34.665	5.8	4.09	4.5	17.37	5.2	0.000	
800	7.894	34.567	7.9	4.11	5.0	17.36	4.3		
900	6.339	34.461	9.5	4.13	4.8	17.82	5.5	0.080	
1000	4.808	34.403	9.3	4.24	6.8	18.13	5.8	0.040	
1100	4.238	34.464	10.2	4.14	4.1	17.76	3.1		
1300	3.463	34.529	9.8	4.27	7.2	18.05	3.9	0.058	
1700	2.702	34.653	10.9	4.27	6.9	18.49	5.8	0.340	
2300	1.940	34.724	11.2	4.30	7.5	18.67	6.0	0.086	
2700	1.575	34.730	13.7	4.31	7.8	18.79	6.3		
3300	1.197	34.724	12.0	4.29	7.0	18.85	6.2		
3585	1.069	34.721	11.5	4.33	8.0	18.92	6.6		

INDIAN OCEAN

32S ST80

31 59.8S, 99E

ST80

DEPTH db	T pot. deg. C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
8.4	18.875	35.984	-1.7	3.88	3.3	15.91	3.5	0.674	-0.3
60	17.503	35.961	-1.7	3.85	2.1	16.04	3.6	0.649	-0.3
120	16.482	35.874	-1.1	3.99	5.2	15.99	2.7	0.754	0.8
200	15.846	35.759	-0.3	3.94	4.0	16.51	5.6	0.793	1.7
300	13.651	35.391	4.8	4.09	6.7	16.23	2.2	0.529	9.4
400	11.856	35.089						0.502	
500	10.648	34.871	6.3	4.10	5.4	16.85	3.6	0.345	14.9
700	9.040	34.653	6.3	4.18	6.9	17.43	5.7		
800	8.539	34.595	6.5	4.19	6.6	17.28	4.3		
901	7.324	34.509	6.6	4.14	5.1	17.51	4.6		
1000	5.582	34.415	5.8	4.15	4.8	17.73	4.1		
1198	3.873	34.421						0.000	
1600	2.945	34.584	6.8	4.34	8.8	18.28	4.8	0.401	14.0
1800	2.649	34.645							
1950	2.482	34.674	5.1	4.24	6.1	18.72	6.9		
2104	2.241	34.704	6.9	4.16	4.1	18.35	4.5		

INDIAN OCEAN

32S ST88

32 44.8S 103.24E

ST88

DEPTH db	T pot. deg. C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
9.8	17.530	35.709	-1.4	3.85	1.9	16.05	3.6	0.718	0.4
102	14.208	35.474	-0.4	3.94	2.9	16.36	3.4	0.846	1.5
200	12.434	35.158	1.8	4.08	5.8	16.81	4.9	0.851	3.7
300	10.983	34.923	4.2	4.02	3.6	16.89	4.1		
400	10.352	34.825	7.2	4.17	7.0	17.41	6.8		
500	9.631	34.726	9.7	4.17	6.8	17.37	5.9	0.409	
700	8.323	34.594	8.6	4.11	4.8	17.36	4.7		
898	5.600	34.404	9.3	4.17	5.3	17.83	4.8	0.000	
1100	3.912	34.403	9.6	4.31	8.4	18.26	5.6	0.009	
1300	3.364	34.512	10.1	4.28	7.4	18.21	4.9	0.000	
1500	3.025	34.581							
1797	2.609	34.662	9.6	4.31	7.9	18.52	5.9	0.212	
2101	2.229	34.703							
2401	1.929	34.730	8.4	4.41	10.3	18.87	7.1	0.076	
2703	1.653	34.736							
3000	1.413	34.737	10.0	4.35	8.5	18.83	6.4		
3300	1.131	34.729							
3600	0.929	34.721	8.5	4.38	9.2	18.82	5.7		
3906	0.761	34.717	8.5	4.41	9.9	19.02	6.7	0.009	
4208	0.661	34.711							
4501	0.606	34.707	7.9	4.28	6.7	18.56	4.1		
4806	0.573	34.705							
5102	0.550	34.705	7.5	4.31	7.4	18.81	5.2		
5336	0.539	34.700	8.2	4.35	8.2	19.12	6.9	0.242	21.3

INDIAN OCEAN 32S ST94 33 53.6S, 107 13E ST94

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
13.4	17.901	35.893	-1.6	3.87	2.8	16.02	3.9	0.649	0.2
100	15.703	35.700	0.0	3.86	1.6	16.17	3.3	0.806	2.0
200	13.466	35.350	2.1	4.01	3.3	16.77	4.2	0.682	4.9
300	11.210	34.963	0.8	4.12	6.4	17.10	5.6	0.060	21.5
400	9.983	34.771	3.7	4.08	4.8	17.14	4.8		
500	9.347	34.686	4.9	4.11	5.2	17.10	4.0		
600	8.687	34.611	7.8	4.18	6.7	17.35	4.9		
700	8.001	34.552	8.4	4.17	6.1	17.52	5.3		
800	6.610	34.464	8.1	4.21	6.6	17.78	5.5		
900	5.147	34.396	7.9	4.22	7.4	18.15	6.2		
1000	4.269	34.396	8.8	4.28	7.7	18.06	4.8		
1200	3.509	34.482	7.6	4.38	9.8	18.55	6.9		
1800	2.475	34.665	7.9	4.21	5.4	18.27	4.3		
2600	1.752	34.728	8.8	4.32	8.1	18.67	5.8		
3400	1.220	34.731	15.0	4.24	5.9	18.86	6.3		
4200	0.817	34.715	6.4	4.29	6.9	18.66	4.7		
4900	0.558	34.705	10.9	4.27	6.3	18.58	3.9		
5375	0.507	34.707	8.6	4.31	7.2	18.86	5.4		

INDIAN OCEAN 32S ST97 34 10S, 109 09E ST97

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
100	14.903	35.595	-1.0	3.95	3.6	16.40	4.2		
200	13.782	35.394	-0.8	3.94	2.8	16.47	3.8		
300	12.067	35.092	-1.2	4.05	4.9	16.64	3.5		
400	10.084	34.770	-1.6	4.05	3.9	17.10	4.6	0.313	0.3
500	9.479	34.697	0.2	4.15	6.1	17.19	4.7		
600	8.918	34.638	2.3	4.15	6.0	17.43	5.5		
700	8.302	34.563	6.3	4.13	5.5	17.39	4.8		
800	7.186	34.488	7.1	4.23	7.4	17.43	4.0		
900	5.766	0.000	9.1	4.27	7.8	18.01	6.1		
1000	4.508	34.370	10.8	4.30	8.3	18.30	6.4		
1300	3.284	0.000	11.4	4.23	6.2	18.32	5.3	0.055	
1900	2.400	34.677	11.8	4.26	6.7	18.39	4.9		
2500	1.844	34.727	12.4	4.29	7.3	18.54	5.2		
3100	1.453	34.732	12.1	4.23	5.8	18.58	5.0		
3800	1.020	34.725	11.4	4.33	7.9	18.63	4.7		
4000	0.898	34.716	10.5	4.35	8.4	18.92	6.2		
5138	0.515	34.702	9.7	4.27	6.2	18.89	5.6		

INDIAN OCEAN 325 ST105

ST105

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
2.5	19.145	35.880	-1.8	3.80	1.1	15.65	1.9		
100	16.182	35.696	-1.1	4.09	7.9	16.64	6.6		
200	14.235	35.446	-0.2	4.02	5.1	16.48	4.2		
400	9.452	34.704		4.06	3.9	17.15	4.4		
500	8.643	34.608	-0.6	4.07	4.0	17.17	3.8		
600	7.711	34.524	2.1	4.12	4.8	17.35	4.0		
700	6.156	34.437		4.13	4.4	17.83	5.3		
800	4.902	34.394	8.2	4.13	4.1	17.68	3.3		
900	4.231	34.413	10.4	4.21	5.8	17.74	2.9		
1000	3.999	34.473	10.8	4.12	3.6	17.95	3.9		
1080	3.877	34.482	11.1	4.12	3.6	17.94	3.8		

INDIAN OCEAN 325 ST106

ST 106

DEPTH db	T pot. deg.C	SALINITY permil	DELTA He3 ‰	HELIUM ccSTP/g	DELTA He ‰	NEON ccSTP/g	DELTA Ne ‰	TRITIUM TU	T-He3 AGE years
3.5	19.395	35.855	-1.5	3.86	3.1	15.78	2.8	0.698	0.3
100	16.957	35.769	-0.9	4.10	8.3	16.47	5.9	0.477	1.6
200	16.425	35.734	0.0	4.00	5.4	16.29	4.5	0.341	4.4
300	12.389			4.01	4.2	16.90	4.5		
400	9.542	34.718		4.08	4.6	17.03	3.8		
500	8.659	34.618	0.5	4.12	5.1	17.26	4.3		
600	7.199	34.510	2.5	4.11	4.5	17.41	3.9		
687	6.062	34.437	6.9	4.15	4.9	17.79	5.0		

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