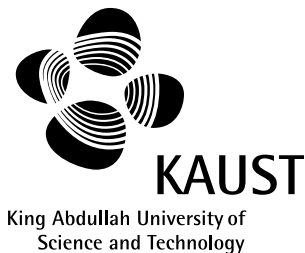


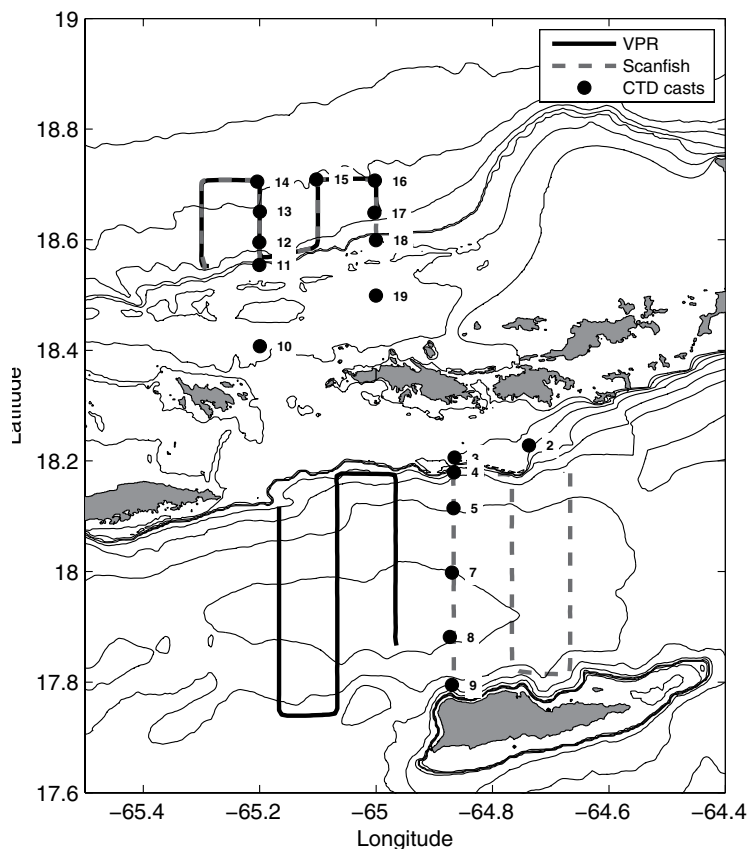
**Woods Hole Oceanographic Institution
King Abdullah University of Science and Technology**



**OC449-09 Data Report: St. Thomas, USVI to Bermuda,
December 1-10, 2008**

by

A. Kirincich, B. Hodges, D. Fratantoni, and F. Bahr



Collaborative Technical Report

Funding for this research was provided by the King Abdullah University of Science and Technology (KAUST) under a cooperative research agreement with Woods Hole Oceanographic Institution.

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WHOI-KAUST-CTR-2009-03

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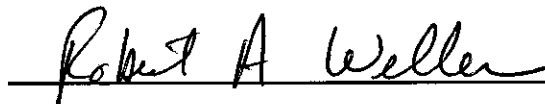
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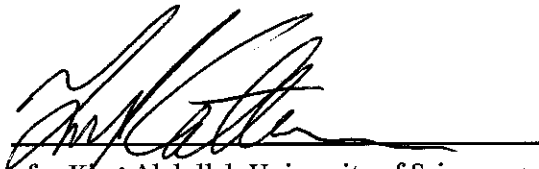
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Approved for Distribution:



Robert A. Weller, Chair, Department of Physical Oceanography
Woods Hole Oceanographic Institution



Representative for King Abdullah University of Science and Technology

Abstract

Data collected during multiple surveys of hydrography, velocity, and biological quantities are presented from a 9-day cruise aboard the *R/V Oceanus* near the island of St. Thomas, USVI and a subsequent transit to Bermuda during December, 2008. This cruise (OC449-09) was undertaken primarily to field test a newly acquired towed-undulating body, the Scanfish. The Scanfish and a second towed body, the Video Plankton Recorder (VPR), were used to survey hydrographic, optical, and biological properties north and south of St. Thomas. Conductivity-Temperature-Depth (CTD) casts and plankton net-tows were made at locations along the survey transects for inter-comparison. The VPR was also used to profile conditions between St. Thomas and Bermuda during transit. An overview of the cruise is given along with descriptions of the data collection methods, processing steps taken, and data products available for distribution.

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1 Introduction

From December 1-10, 2008, a program of high-resolution physical, optical, and biological sampling was carried out from the *R/V Oceanus*. These observations form part of an ongoing effort to investigate the mechanisms responsible for the exchange of biota between the coral reef environment and the open ocean. The primary surveys, conducted in the waters of the U.S. Virgin Islands (USVI), were followed by a 1500-km transect in the western Atlantic, terminating at Bermuda. The reefs surrounding the USVI are home to varied and economically important species, and are subject to intense interaction on several timescales with both the Atlantic Ocean and the Caribbean Sea. A primary objective of this initial cruise was instrument testing and methodology development. The cruise also provided an opportunity, in a relatively controlled environment, for the science party to become familiar with new technologies and techniques.

This data report seeks to introduce the large and varied data set obtained during OC449-09, to describe the steps taken to ensure the quality of the data, and to catalog the data products available for future use. An overview of the sampling done on the cruise and general conditions present is given next. Afterwards, the steps taken to process the raw observations into finished, quality-controlled, data products are described along with the data products available. Finally, initial graphical representation of many of these data are presented in a series of appendices.

2 Scientific Party

The following individuals participated in OC449-09 as part of the science party:

- Dr. David Fratantoni, Chief Scientist, Woods Hole Oceanographic Institution
- Dr. Cabell Davis III, Woods Hole Oceanographic Institution
- Mr. Joshua Eaton, Woods Hole Oceanographic Institution
- Ms. Colleen Petrik, Woods Hole Oceanographic Institution
- Mr. John Lund, Woods Hole Oceanographic Institution
- Dr. Benjamin Hodges, Woods Hole Oceanographic Institution
- Dr. Nasseer Idrisi, University of the Virgin Islands
- Mr. Frank Bahr, Woods Hole Oceanographic Institution
- Dr. Anthony Kirincich, Woods Hole Oceanographic Institution
- Ms. Melissa Patrician, Woods Hole Oceanographic Institution
- Mr. Nicholas Woods, Woods Hole Oceanographic Institution
- Dr. Haitham Aljahdali, King Abdullah University of Science and Technology
- Dr. Yasser Kattan, Aramco Services Company
- Mr. Waring Partridge, Woods Hole Oceanographic Institution
- Mr. Alexander Dorsk, Woods Hole Oceanographic Institution

3 Cruise Overview

Cruise OC449-09 left St. Thomas on December 1st, 2008, spending 2.5 days south of the island and 2 days north of the island before beginning a 4 day transit from St. Thomas to Bermuda. Conductivity-temperature-depth (CTD) casts and net tows were carried out at stations distributed throughout the study area, but the primary method of investigation was towing two robotic profiling platforms: the Scanfish and the Video Plankton Recorder (VPR) towfish. Both platforms were equipped with CTDs and chlorophyll fluorometers. Scanfish also measured turbidity and dissolved oxygen. Each instrument platform was towed in accordion-type survey patterns just offshore of the coral reefs to the south of St. Thomas, and just offshore of the prehistoric reefs to the north of the island. In addition to basic physical and bio-optical sensors,

Table 1. Event log for OC449-09

ACTIVITY	DESCRIPTION	STATION NAME	Water Depth (m)	Starting Time	Longitude	Latitude	Cast	Haul
1	CTD test cast	A1	51	01-Dec-2008 19:23	18° 13.696' N	64° 44.198' W	2	1
2	Scanfish tow #1	lines 1-3		01-Dec-2008 22:13	18° 10.651' N	64° 40.000' W		
3	VPR tow #1	lines 4-6		02-Dec-2008 18:06	17° 51.966' N	65° 2.109' W		
4	CTD section	C1	48	03-Dec-2008 6:28	18° 12.373' N	64° 51.904' W	3	2
		C2	500	03-Dec-2008 8:28	18° 10.770' N	64° 51.998' W	4	3
		C3	1820	03-Dec-2008 10:53	18° 6.969' N	64° 51.987' W	5	4
		C4	1820	03-Dec-2008 14:11	17° 59.970' N	64° 52.070' W	6	
		C4	1820	03-Dec-2008 15:45	18° 0.058' N	64° 52.007' W	7	5
		C5	4397	03-Dec-2008 19:09	17° 53.079' N	64° 52.098' W	8	6
		C6	1652	03-Dec-2008 21:56	17° 47.670' N	64° 52.007' W	9	7,8
5	Scanfish tow#2	line 3		04-Dec-2008 3:03	17° 47.670' N	64° 52.0' W		
6	Transit							
7	Scanfish tow #3	Northern survey		04-Dec-2008 11:05	18° 32.769' N	66° 42.199' W		
8	XBT cast #2			04-Dec-2008 12:16	18° 39.196' N	65° 18.000' W		
9	VPR Tow #2	Northern survey		04-Dec-2008 20:39	18° 37.321' N	64° 59.670' W		
10	CTD surveys	E1	50	05-Dec-2008 3:23	18° 24.484' N	65° 11.970' W	10	9
		E2	75	05-Dec-2008 5:33	18° 33.299' N	65° 12.013' W	11	10
		E3	573	05-Dec-2008 7:00	18° 35.747' N	65° 12.020' W	12	11,12
		E4	1076	05-Dec-2008 9:51	18° 39.080' N	65° 11.990' W	13	13
		E5	1040	05-Dec-2008 12:55	18° 42.337' N	65° 12.224' W	14	14
		E6	904	05-Dec-2008 16:43	18° 42.555' N	65° 6.046' W	15	15,16
		E7	980	05-Dec-2008 19:27	18° 42.496' N	65° 0.008' W	16	17,18
		E8	550	05-Dec-2008 23:00	18° 39.056' N	65° 0.091' W	17	19,20
		E9	60	06-Dec-2008 2:20	18° 35.991' N	65° 0.002' W	18	21
		E10	55	06-Dec-2008 4:15	18° 29.930' N	65° 0.040' W	19	23
11	Transit							
12	VPR Tow #3			06-Dec-2008 20:55	18° 40.900' N	65° 0.400' W		
13	XBT casts #3-53	underway		06-Dec-2008 18:21	18° 36.371' N	65° 10.817' W		

each platform carried a state-of-the-art optical plankton counting instrument. The Laser Optical Plankton Counter (LOPC) mounted on the Scanfish resolves particles into size classes ranging from 0.1 mm to 2 mm in 15-micron increments, and records the outline of larger particles up to 3.5 cm. The VPR on the VPR towfish photographs and automatically categorizes plankton on the basis of their shapes.

A chronological list of the sampling events undertaken and stations occupied during each of these three phases of the cruise is given in Table 1. After an initial CTD cast over the continental shelf south of St. Thomas, the Scanfish towed-undulating body was deployed nearby at line 1 to sample the hydrographic and optical properties of the top 100 m of the water column in the channel between St. Thomas and St. Croix (Figure 1). After approximately 15 hours of sampling, at the end of line 3, a problem developed with data transfer to the Scanfish, and the instrument was recovered for repair. The VPR system was used to finish the large area survey south of St. Thomas (event 3 on Table 1, blue tracklines in Figure 1), occupying the top 100 m of the water column on lines 4, 5, and 6 of the survey grid.

After finishing this first VPR survey, the *R/V Oceanus* returned to line 3 of the survey grid (the C line) to conduct CTD casts at 8 stations spaced between the two islands. At each station, the ship's main CTD was deployed and lowered to depths of 1000 m or approximately 10 m above bottom for shallower locations. Bottle samples were collected on each upcast to provide insitu calibration of the CTD's onboard fluorometer and to collect water for the analysis of nutrients present within the water column. The number of samples collected for each varied due to the depth of the cast and the depth of the local chlorophyll maximum. At all stations, 15- to 30-minute long tows of a pair of plankton nets were made to collect samples for future

analysis. The net meshes were 64 and 150 microns in size respectively and samples for both were collected, split, and preserved for future study. These tows generally went to depths of 500 m or 10 m above the bottom at shallower depths. To record hydrographic properties during the net hauls, an RBR XR-620 CTD was attached to the cable, 1 m above the net openings, and flowmeters were installed in each net opening. Work on these biological samples is ongoing, so only the RBR CTD data will be described here. After CTD station C9, the repaired Scanfish was redeployed and towed north along this "C" line, to test the cable repair made while underway and reoccupy this particular section. At the northern end of line 3 (of the "C" CTD stations) the Scanfish was recovered, and the *R/V Oceanus* transited to the waters north and slightly west of St. Thomas.

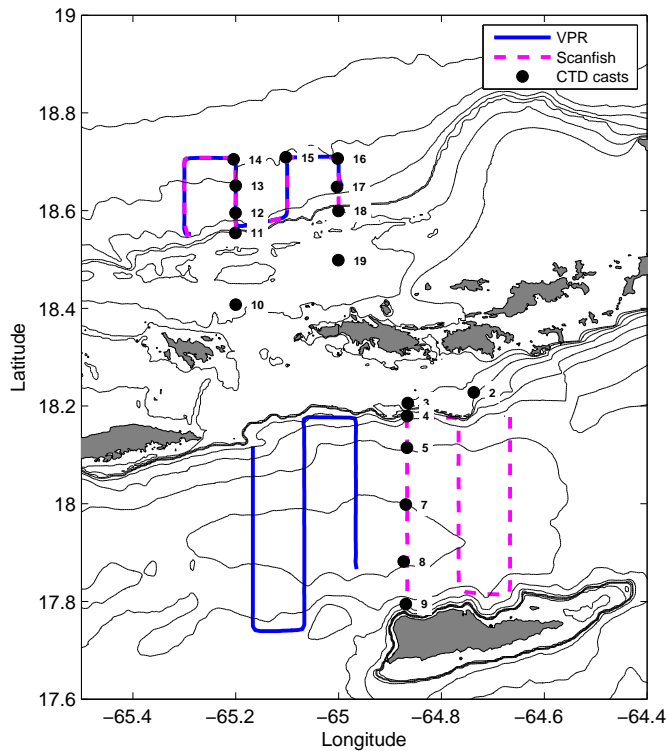


Figure 1. The study area around the island of St. Thomas. Tracklines of Scanfish tows #1 and 3, VPR tows #1 and #2, and the CTD stations are shown, along with bathymetric contours of 0 (shaded) 50, 100, 200, 500, 1000, and 2000 m.

departing the area for the 4 day transit to Bermuda. The VPR system was deployed in the late evening of the 6th to survey the upper water column during transit. During the VPR sampling, a series of 52 Expendable Bathythermograph (XBT) casts were made to collect temperature measurements while underway. Maximum water depths sampled by the XBTs approached 760 m, but infrequently were as shallow as 300 to 400 m.

In addition to the Scanfish, VPR, and CTD sampling described, the *R/V Oceanus* collected velocity, surface hydrography, and local meteorological measurements throughout the cruise as part of the underway data collection system. Velocity measurements to depths as great as 800 m were collected using two Acoustic Doppler Current Profilers (ADCPs) mounted on the hull of the *R/V Oceanus*. Sea surface temperature, conductivity, and chlorophyll fluorescence were measured in a on-board pumped seawater system. Mete-

On the north side of the island, the Scanfish was redeployed and proceeded to sample the top 100 m along a smaller survey grid which took approximately 9 hours to complete. Despite its smaller spatial size, this survey pattern spanned the shelf break and slope, ranging from water depths of 50 to greater than 1500 m. After completion of this Scanfish tow (#3), the VPR was deployed and towed along the same survey track (Figure 1), starting from the southeastern corner. The combined Scanfish and VPR tows resulted in hydrographic and biological sampling of this shelf-slope boundary area for a period of 18+ hours. After completion of the northern survey area by these high-resolution systems, a series of CTD casts and net tows were made at ten additional stations spaced along and inshore of the survey grid. Casts and net tows here were performed the same as described above for the southern survey area.

On December 6th, 2008, the *R/V Oceanus* left the northern survey area and transited back to St. Thomas for a personnel transfer before

orological measurements, collected on the forward mast of the *R/V Oceanus*, were also obtained and are included in the data presented here.

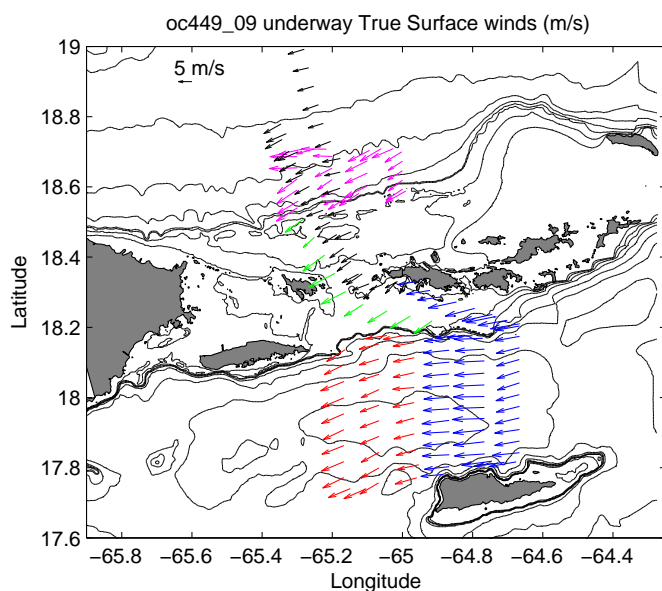


Figure 2. 20 minute averages of *R/V Oceanus* wind measurements, corrected for ship motions before and during Scanfish tow #1 (blue), VPR tow #1 (red), transit to the northern shelf (green), Scanfish tow #3 (magenta), transit to and from St. Thomas after December 6th, 2008 (black).

the southwest corner of the ship tracks. Surface salinity varied over a larger range (2 psu) and was saltiest on northern side of the island, offshore of the northern shelf. The fluorescence voltage shown in the bottom panel of Figure 3 follows that of salinity.

Water column velocities were collected by two separate ADCPs onboard the *R/V Oceanus*. Observations from both were combined to produce a data product of 20 minute ensemble averages of velocities from 13 m below the surface to as much as 800 m below the surface. This product was used to produce the layer-average plots shown in Figure 6 as well as the velocity sections included with the Scanfish and VPR data appendices. Layer-averaged velocities, shown in Figure 6, reveal a strong westward flow in the southern survey area during both the Scanfish and VPR surveys. In contrast, layer-averaged velocities during the Scanfish survey of the northern survey area were weak at most all locations. Isolating the velocities of the top 100 m of the water column where Scanfish and VPR sampling was concentrated shows sharply different results. A large eddy appears to exist adjacent to the shelf south of St. Thomas, while stronger along channel flows exist to the south and west. Along the northern survey area, surface layer velocities are much stronger than that seen in the rest of the top 800 m. These flows are generally directed eastward along the shelf and exceed 10 cm s^{-1} .

While the spatial structure of velocity and hydrography have been described here, it should be noted that the features described here and above were measured over a 5-day period. Thus, the variability seen could also represent temporal variability of the waters in and around St. Thomas, including that associated with tidal variability. Further analysis of those areas where repeated sampling by the Scanfish, VPR, and/or CTD casts was obtained would aid answering this question. However, this task is beyond the scope of this data

An initial look at the oceanographic and meteorological conditions present in and around St. Thomas can be seen in maps of the near-surface winds and surface hydrography obtained during the first two portions of OC449-09 (Figures 2 and 3), as well as the ADCP full depth-averaged and top 100 m average velocities (Figure 6). Winds above the sea surface were generally from the east at $5 \text{ to } 10 \text{ m s}^{-1}$ during the first 6 days of December. These wind directions and velocities are consistent with forcing from the easterly trade winds. The wind product (described later) during each of the major phases of sampling is color-coded by sampling event, as shown in Figure 2, to allow the winds associated with each event to be clearly seen.

Surface temperatures varied over a small, 1°C range at all locations sampled around St. Thomas with the warmest waters occurring at

report.

All observations described here were processed after completion of the cruise to ensure the quality of the data set and organized into data products for distribution and analysis. These methods are described next for the Scanfish and VPR towed surveys, the at-station CTD casts and net-tows, the underway XBT casts, and the underway ADCP, meteorological, and surface hydrographic measurements. Additionally, a catalog of the data products available for each type is given. Processing of the VPR optical data and the biological samples collected during the net tows is ongoing.

4 Description of processing steps and data products

4.1 Scanfish towed surveys

The Scanfish sensor suite included a SBE 9+ unit with sensors for conductivity, temperature, pressure, and dissolved oxygen; a WETLabs Fluorometer & Turbidity Sensor (ECO FLNTU), measuring chlorophyll fluorescence and turbidity; and a LOPC. Data from each instrument were recorded at the native sampling rate: 24 Hz for the SeaBird sensors, 2 Hz for the LOPC, and approximately 1 Hz for the FLNTU.

There were three Scanfish deployments: two to the south of St Thomas and one to the north. Data from each of these tows were processed in MATLAB as follows. Pressure datapoints outside the range of -2 to 150 dB were rejected, as were conductivity datapoints outside the range of 5.4 to 6 S/m. The 24 Hz SBE data were smoothed with a 5-point running median filter. The effect of thermal lag on the conductivity measurements was corrected following Morison et al. (1994). The SBE data were then trimmed to remove non-profiling periods and block-averaged to 1 Hz. The processed data files for each deployment include these 1 Hz time series as well as arrays of the same data in which each column represents a single profile (up or down), along with vectors containing the corresponding average time and location for each profile. A third data product included in each file further averages the data in each column into 1-dB pressure bins. Oxygen measurements exhibited severe hysteresis which was not easily corrected, and these data are not included in this report. This sensor has been returned to Sea Bird for analysis. FLNTU measurements were converted from engineering to science units using the factory calibrations, and are included in the processed data files in the same three forms as the SBE data.

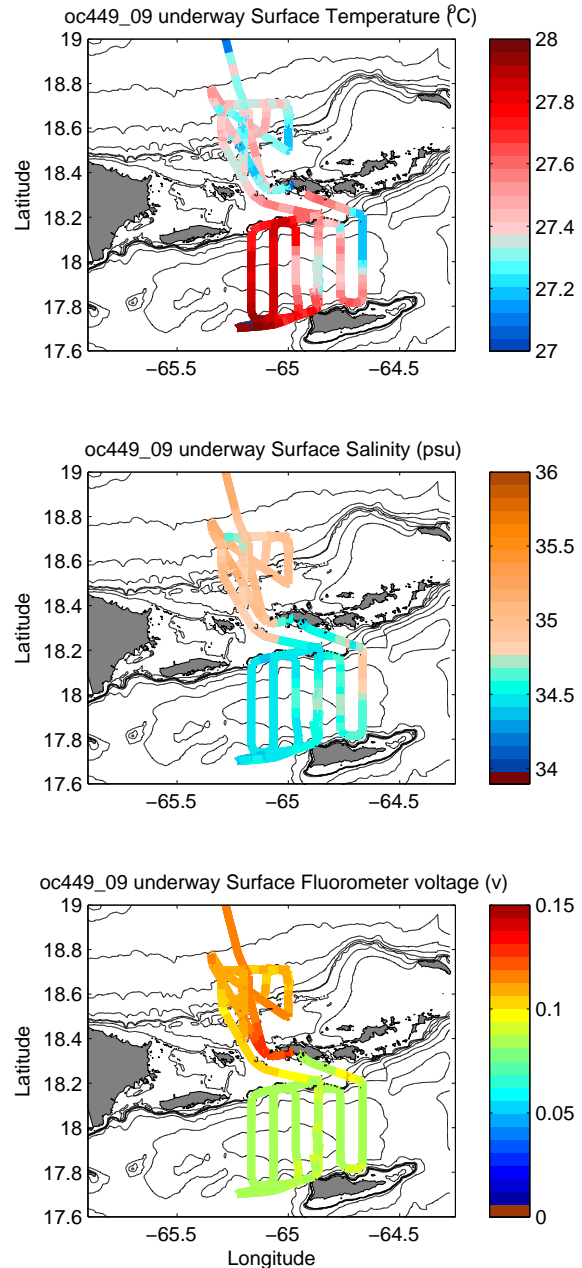


Figure 3. Underway surface temperature (top) salinity (middle) and chlorophyll fluorescence (bottom).

The LOPC counted the number of particles passing through its sensing volume in each of 128 size classes, each spanning a 15-micron range of equivalent spherical diameter. Outlines of the shapes of larger particles were recorded as well, but those data are not presented in this report. The particle size data are included in the processed data files in the same three formats, but with an extra dimension for bin size. Sections of the various data types from each Scanfish deployment are presented in Appendix A. As it is not practical to graphically show all the LOPC data, only the total particle volume and volume-weighted mean particle size are included.

4.2 Video Plankton Recorder towed surveys

Conductivity, temperature, and pressure measurements were collected during each of the VPR tows by an onboard SBE 49 FastCat Conductivity-Temperature (CT) sensor. Data from the instrument, converted to salinity, temperature, and pressure internally, were collected by the VPR's flight computers at the full 16 Hz temporal resolution output by the CT. These data were subsampled in real time to create CT log files of 1 Hz data as a separate data product from the main, image-intensive, VPR data stream. The 1 Hz CT log files were processed as described below for inclusion here, while the main VPR dataset will be analyzed and reported on at a later date.

Four main CT data files exist, one each from VPR tows #1 and #2, and two from the long VPR tow #3 during the transit to Bermuda. CT log files were processed within MATLAB to eliminate unrealistic temperature, salinity, or pressure observations using high and low thresholds of 20 and 30°C, 30 and 38 psu, and 0 and 120 dB for temperature, salinity, and pressure respectively. First-difference thresholds (5 dB, 1.5°C, and 1.2 psu) were then applied to eliminate spikes in the pressure, temperature, and salinity data before density, as σ_θ , was calculated following Fofonoff and Millard (1983). The datasets were then cut to isolate the in-water undulating portion of each file, eliminating the deployments and recoveries. Finally, the top and bottom of each up- and down-cast of the towed undulations were identified and the data between them were used to create vertical profiles of T,S, and σ_θ at 1-dB increments with each profile marked by the average time and location of the data between the peaks.

Data products for the VPR CT data include the raw ASCII log files collected by the instrument, and processed, cleaned MATLAB (*.mat) data files of both timeseries data and the vertical profiles described above. These profiles were used to produce the data products shown in Appendix B.

4.3 SeaBird CTD casts

Hydrographic casts were made at 19 stations using the *R/V Oceanus*'s main CTD, a Seabird SBE 911+ model with a rosette for collecting water samples. This CTD was a dual sensor system, equipped with two SBE 3 fast-response temperature sensors and two SBE 4 conductivity cells. A SBE 43 dissolved oxygen sensor and WET Labs ECO-AFL/FL fluorometer were included in the pumped system of the primary temperature and conductivity sensors. The sensors listed above were calibrated by Seabird in March of 2008 or by WET Labs, for the Fluorometer, in April of 2008. Additional sensors on the CTD included a WET Labs C-Star transmissometer, a WET Labs Turbidity sensor, and an upward-looking irradiance sensor. All data were sampled at 24 Hz by the SBE 911+ system. After the cruise, data from the CTD were reprocessed from the raw *.hex files using the standard SeaBird Data Processing Modules to create 1-dB binned-averages of all sensor and derived data. The SBE data processing modules and constants used are described here.

DATCNV was first used to convert cast data from hex format to ASCII text files (*.cnv files) and compile data for bottle summaries (*.ros files).

ALIGNCTD As the primary conductivity sensor is prelagged at the deck unit, only the secondary conductivity sensor was advanced by the standard 0.073 seconds to account for both the pumping lag and the time constant of the sensor. The SBE 43 Oxygen sensor voltage output was advanced by 3 seconds for the same reasons. This lag is relatively standard for the instrument setup used, but was checked by additional processing efforts that computed cross-covariances between oxygen and temperature for the down- and up-casts.

WILDEDIT marks and eliminates outliers by submitting the data to 2 passes of a standard deviation filter. The first pass uses a 100 scan window and flags data greater than 2 standard deviations from the mean of the window. The second pass uses a 20 standard deviation threshold for the same window size. Scans with flagged data are removed from the data files.

CELLTM applies a recursive filter to remove conductivity cell thermal mass effects from the measured conductivity. A standard thermal anomaly amplitude (α) and time constant (τ) of 0.03 and 7.0 respectively were used to construct the filter.

ROSSUM exports a summary of all the observations collected in the 3 seconds before each bottle was fired. Derived variables of salinity, density (as sigma theta), and oxygen content ($\mu\text{mol/kg}$) and percent saturation (%) were added to the bottle data exported.

FILTER performed a low-pass filter of the pressure data using a time constant of 0.15 seconds. The filter was run forwards and then backwards to produce no time shift.

LOOPEDIT removed data scans where the CTD package was moving downwards at less than a minimum speed of 0.25 dB s^{-1} due to ship roll.

DERIVE was used to compute salinity (psu) and density (as sigma theta) from both sensor pairs as well as oxygen content ($\mu\text{mol/kg}$) and percent saturation (%) for the remaining scans.

After the derive step the resulting data products were loaded into MATLAB to complete the processing steps. Here the data were merged with a digitized log file, further quality controlled by re-screening for outliers, and bin-averaged to 1-dB bins by pressure. In this process it was determined that the fluorescence sensor on the CTD appeared to collect unrealistic data at depths approaching 1000 m for the downcast and then for all of the following upcast. Because of this, only downcast data were used to compare to the extracted chlorophyll samples obtained from the bottles. Data from the downcast was then isolated from each dataset and the file was merged with bottle nutrient data and exported to ASCII text files for the cast and bottle summary. These data were also saved as data structures within a MATLAB data file (*.mat).

4.3.1 Chlorophyll calibrations

Seawater for extracted chlorophyll samples were collected at sea at 5-7 depths for each CTD station by filtering 1 liter of seawater through a standard filter. After collection, samples were kept in a -70°C freezer onboard the *R/V Oceanus* until the *R/V Oceanus* returned to Woods Hole Oceanographic Institution (WHOI) in late December. Once back, the samples were transferred from the -70 freezer to a

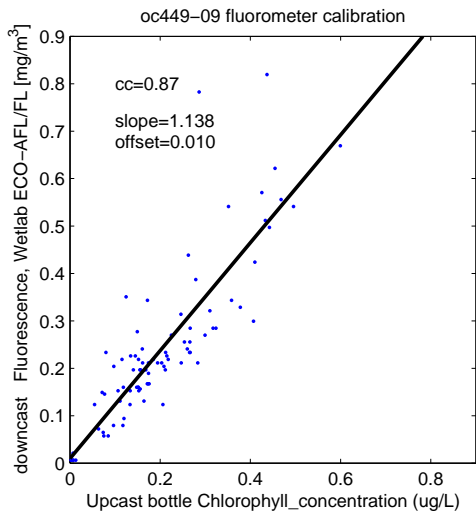


Figure 4. Shipboard CTD chlorophyll fluorescence calibration.

regression between the two had a slope of 1.138 and a near-zero offset of 0.012 $\mu\text{g/L}$. This regression was used to perform the final calibration to the CTD-derived chlorophyll measurements estimated throughout the water column. The bottle chlorophyll results are listed for each cast in Appendix C.

dewar with liquid nitrogen, where they were kept until processing. Sample processing occurred from 3/8/2009 to 3/18/2009. Samples were removed from the dewar and extracted in 5mL of 90% acetone. The filters were left to extract in the 16mm tubes for 24 hours. After this 24 hour period, they were vortexed, centrifuged, and the liquid was carefully extracted and transferred to a 12mm tube which was read for chlorophyll in the calibrated Turner Designs Aquafluor Handheld Fluorometer (S/N 800739 - calibration date of 2/24/2009). Exactly 2 drops of 10% HCl were added, the sample was inverted twice for mixing, and a value for phaeophytin was read. Two replicates were made for each station and depth, with the results being averaged to obtain a mean chlorophyll value for each pair. These data were compared to chlorophyll fluorescence from the WET Labs Wetstar to calibrate the fluorometer for the communities present in the study areas. The insitu estimates of chlorophyll were highly correlated with the bottle data (cc=0.87: Figure 4).

4.3.2 Nutrient samples

Water samples were also collected at 7-8 depths at each CTD station for nutrient analysis. After collection, samples were kept in a freezer onboard the *R/V Oceanus* until the *R/V Oceanus* returned to WHOI in late December. Once back, the samples were transferred from the ship's freezer to a dewar with liquid nitrogen, where they were kept until processing. These samples were processed at the WHOI Nutrient Facility during April, 2009 for levels of ammonia (NH_4), silicate, Phosphate (PO_4), and Nitrate + Nitrite (NO_3+NO_2). The results of these analyses are given on the bottle data table for each CTD cast in Appendix C and within ASCII (*.dat) and MATLAB (*.mat) data files of the bottle data results. For each of these nutrient measurements a value of 0.05 μM , (or <0.05) represents values below the detection limit of the testing equipment.

4.4 RBR CTD casts

An RBR CTD (model XR-620) was attached to the *R/V Oceanus*'s winch used to conduct the net tows. The temperature, conductivity, and pressure sensors of the RBR CTD were located approximately 1 m above the openings of the nets. The CTD was configured to collect measurements at 1 Hz frequency continuously during the first two parts of the cruise (south and north of St. Thomas), resulting in one data file for the whole deployment. However, valid data was only collected when the instrument was in the water. After the cruise the file was converted from the proprietary binary format to a MATLAB *.mat file by the instrument's PC software interface.

This raw data file was processed to quality control the data collected and to form individual files associated with each viable in-water portion and matched with a digitized log file of the cast, haul, and location information. The raw data file was loaded into MATLAB and screened for unrealistic temperature, conductivity, and pressure values, including temperatures greater than 40°C or less than 0°C, conductivities less than 3 S/m, and pressures greater than 700 dB or less than -10 dB. Data were then de-spiked using

a first-difference test with thresholds of 0.5°C , 0.5 S/m , and 5 dB for temperature, conductivity, and pressure. Pressure data were re-zeroed to the minimum found in the dataset to account for atmospheric pressure (recorded by the RBR as 10.375 dB), and the beginning and end of each haul was found by analyzing the dataset for consistent changes in pressure trend. Individual hauls were linked to the station location and net tow information by matching the timestamp of the RBR data file with digitized information from the cruise logs. Haul data were loop edited to eliminate decreasing pressures during downcast and increasing pressure during the upcast.

During the quality control process it was found that the conductivity observations collected by the RBR (and therefore RBR-derived salinities) had unreasonable variations within the well-mixed surface layer and poor correspondence to the subsurface values collected the *R/V Oceanus*'s main CTD. Further investigation proved that these errors were apparent in other datasets recently collected by this particular instrument. Based on these results, the conductivity measurements collected by the RBR were determined to be unreliable and discarded from the dataset. Thus only the temperature observations from these net tows are presented in Appendix E and included in the cruise dataset.

Multiple data products are available for the RBR temperature data, including (1) the raw loop-edited up and down cast, and (2) the downcast data only, bin-averaged to 1-dB pressure bins. While both types are included for all hauls in a RBR data MATLAB data (*.mat) file, only the bin-averaged data is available as ASCII-text files and was subsampled for the plots and tables shown in Appendix D.

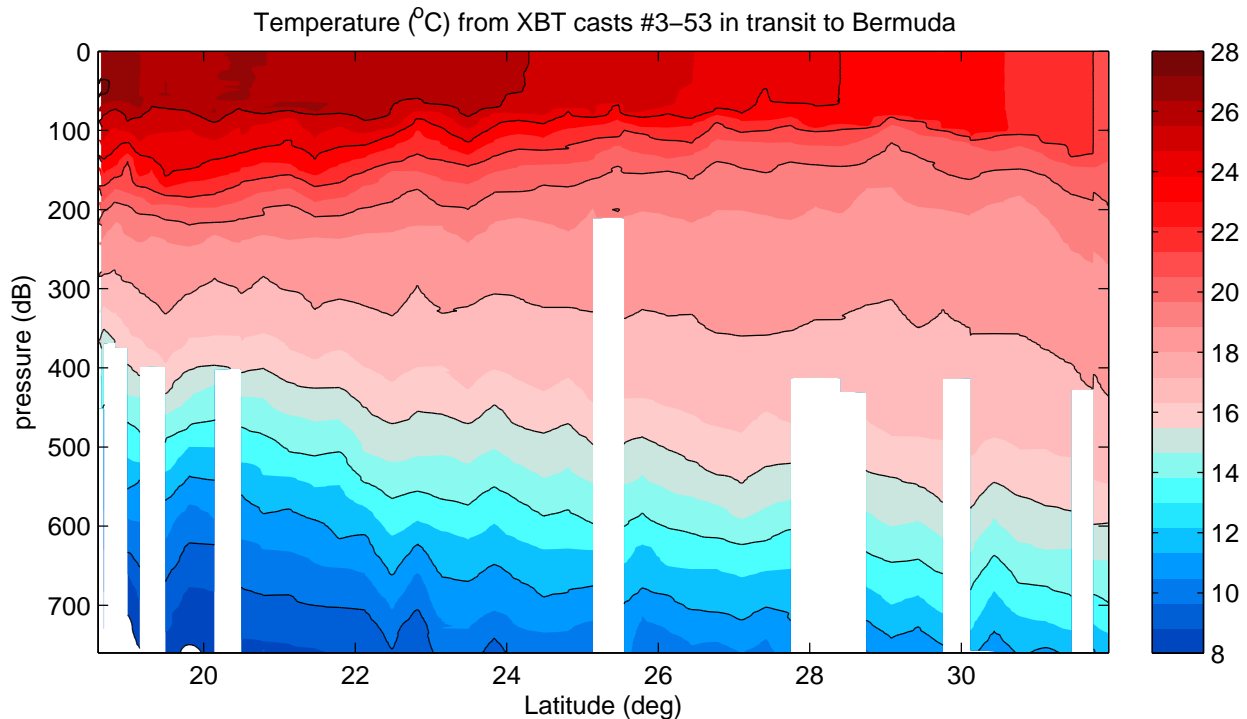


Figure 5. XBT-derived temperature between St. Thomas and Bermuda.

4.5 XBT casts

Lockheed Martin’s Sippican XBT probes were utilized primarily during the transit to Bermuda to collect ocean temperature data to depths of 760 m. Deep Blue-type probes were launched over the side from a hand-held launcher and recorded using an MK21 deckbox. After the cruise, the raw binary data files for each cast were converted to ASCII text files using the PC software interface. Data from the raw files were loaded to MATLAB and cleaned and despiked using similar thresholds as those described above, and interpolated to 1-m depth bins. Data products include a MATLAB data (*.mat) file containing data structures for all 52 casts and ASCII text files with the bin-averaged temperature and sound speed for each individual cast. These temperature data are shown in the figures in Appendix E and subsampled to form the data table listed for each cast. Additionally, the temperature observations for the 51 successful casts made in transit from St. Thomas to Bermuda are shown in Figure 5.

4.6 Underway ADCP

The *R/V Oceanus* had two shipboard ADCP’s: a 75KHz Ocean Surveyor, and a 150KHz NB150 that were sampled almost continuously from the start of the cruise in St. Thomas to the ship’s arrival in Bermuda. The data were collected with the UHDAS package developed and maintained by Drs. Firing and Hummon at the University of Hawaii (Hummon, 2009). Following the cruise, the data were post-processed using the standard (“CODAS”) routines provided by the same group. Information on this package and these processing steps can be found at: http://currents.soest.hawaii.edu/docs/adcp_doc/index.html. The final data products consist of three MATLAB (“.mat”) files, containing post-cruise processed datasets from the two individual ADCPs as well as an attempt to combine the two datasets. In all products, the ship velocities have

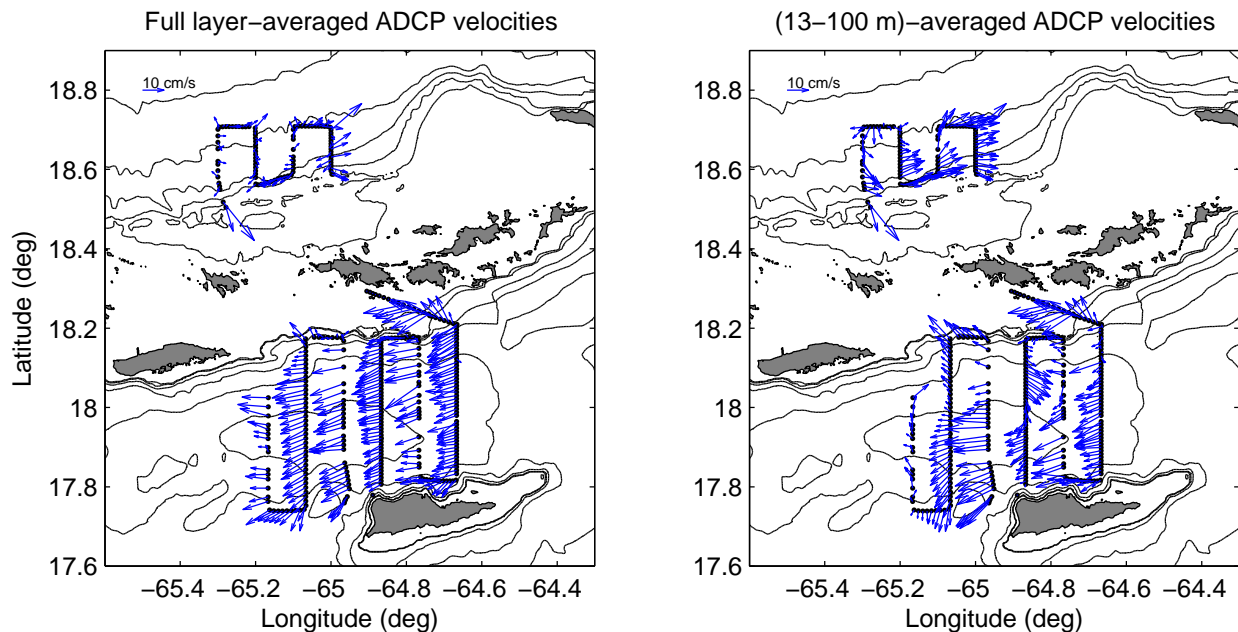


Figure 6. Vertically-averaged, 20 minute averaged ADCP velocities for the full measured portion of the water column (left) and the top 100 m (right). ADCP data shown here were collected during the same events highlighted in Figure 2: including Scanfish tow #1 and VPR tow #1 for the southern survey area, and Scanfish tow#3 for the northern survey area.

been removed, the data were quality controlled, and the individual pings were averaged to 20 minute long time ensemble averages. The data shown in Figure 6 are from this final data product.

4.7 Underway hydrographic, GPS, and Meteorological measurements

The daily data files produced by the *R/V Oceanus*'s underway data collection system were obtained and parsed using MATLAB to separate the underway GPS, meteorological, and surface water property measurements out into separate forms. For the GPS data, observations of Latitude, Longitude, Speed Over Ground (in knots), and Course Over Ground (in degrees) from the *R/V Oceanus*'s main GPS are included as a data product. Meteorological observations of: air temperature ($^{\circ}$ C), barometric pressure (hPa), shortwave radiation (raw millivolts), true wind speed (m/s), true wind direction (deg), relative humidity (%), wind direction (deg), wind speed average (m/s), rain accumulation (mm), and rain intensity (mm/hour) were recorded on the ship's forward mast at a height of 20 m above the waterline. Sea surface temperature and salinity data were collected by both a Seabird SBE45 thermosalinograph as part of the ship's pumped seawater system and at the intake for this system (near the bowthruster) by a Falmouth Scientific TSG. Additionally, a WET Labs Wet-star fluorometer located inside the system near the SBE45 recorded fluorescence voltages. These datasets were collated for the length of the cruise, screened for outliers, and averaged into 20 minute averages using a standard time stamp centered on the hour. The averaged data starts when the *R/V Oceanus* left the harbor in St. Thomas at 1800Z December 1st, 2008 and ends upon arrival in Bermuda at 0800Z December 19th, 2008. Data are stored in separate *.dat files (ASCII text) for each subset of data (gps, met, surfprop) and combined in a single MATLAB (*.mat) data file.

4.8 Temperature-Salinity inter-comparisons

No bottle samples were collected to perform in-situ calibrations of the conductivity sensors on the *R/V Oceanus*'s CTD or the CTDs of the Scanfish and VPR. However, as the same or nearly the same locations were sampled by each of these three CTDs, inter-comparisons of the temperature-salinity properties of the top 100 meters were made to ensure that the measurements obtained by each were at least consistent with each other. Data collected at or near CTD stations 7 and 13 (see map) provide the best data for comparison. Here VPR, Scanfish, and *R/V Oceanus* CTD data were collected at the same locations (or nearby for the VPR survey near station 7) and close in time to each other. Shown here, temperature and salinity relation-

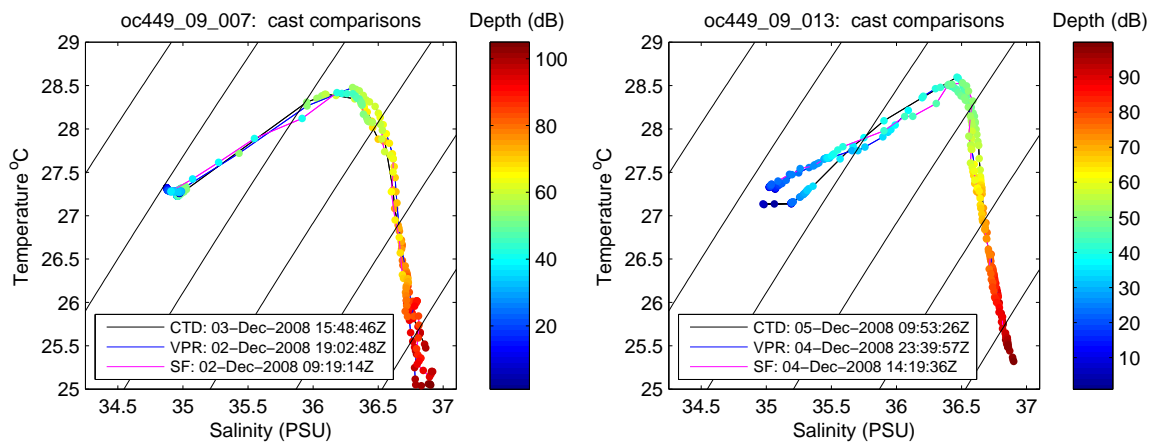


Figure 7. T-S comparisons for the Scanfish, VPR, and *R/V Oceanus* CTDs at CTD stations 7 and 13.

ships for all three data types have similar structures at both stations. Additionally, the distribution of these properties with depth are quite similar for all data sources. The largest amount of variability at both stations appears within the top 10-15 meters, while Temperature-Salinity (T-S) properties and depth distributions are identical below 60 m.

5 Acknowledgements

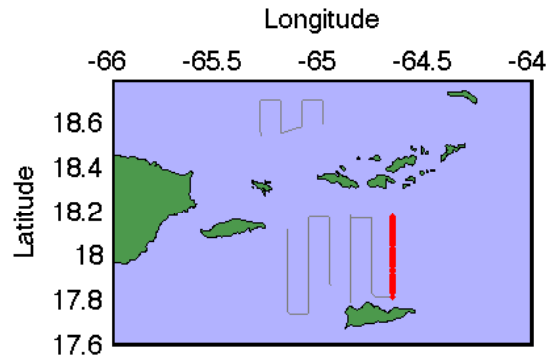
This publication is based in part on work supported by Award No. USA-00002, made by King Abdullah University of Science and Technology (KAUST). We thank Captain Diego Mello and the crew of the *R/V Oceanus* for their efforts in making this cruise a success. Additionally, we thank Melissa Patrician for processing all chlorophyll samples for the post-cruise calibration, Joshua Eaton and Cabell Davis for their work supervising the VPR sampling, Alexander Dorsk for his service as the shipboard scientific technician, and Nasseer Idrisi for arranging the small boat personnel transfer in St. Thomas.

References

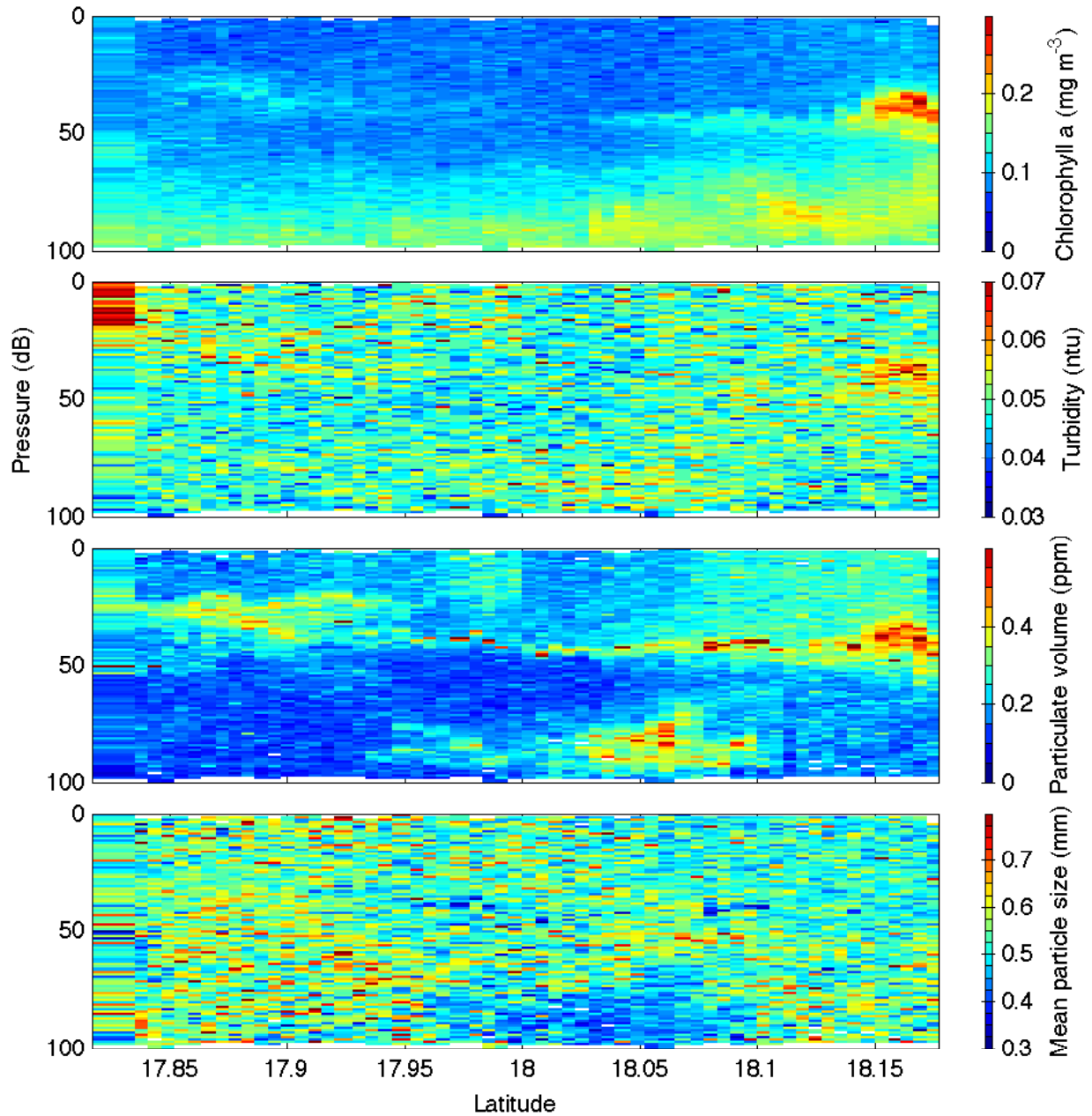
- Fofonoff, P. and R. J. Millard, 1983: Algorithms for computation of fundamental properties of seawater. Tech. Rep. 44, Unesco Tech. Pap. in Mar. Sci.
- Hummon, J., 2009: Uhdas+codas technical documentation. Tech. Rep. UHDAS_Techdoc.pdf, U. Hawaii. URL http://currents.soest.hawaii.edu/docs/adcp_doc/index.html.
- Morison, J., R. Andersen, N. Larson, E. D'Asaro, and T. Boyd, 1994: The correction for thermal-lag effects in the sea-bird ctd data. *J. of Atmos. and Oceanic Techno.*, **11**, 1151–1164.

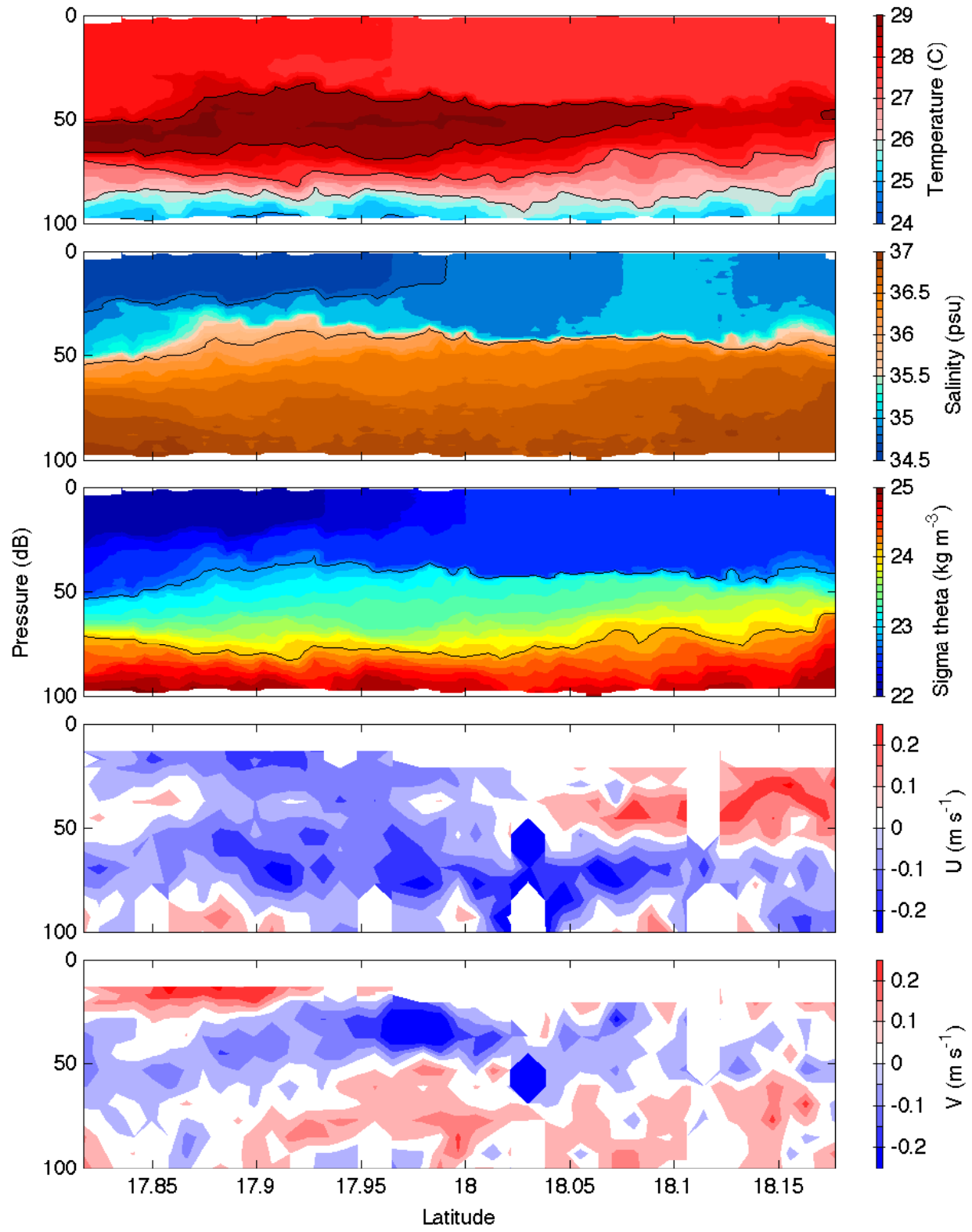
A Appendix: Scanfish Sections

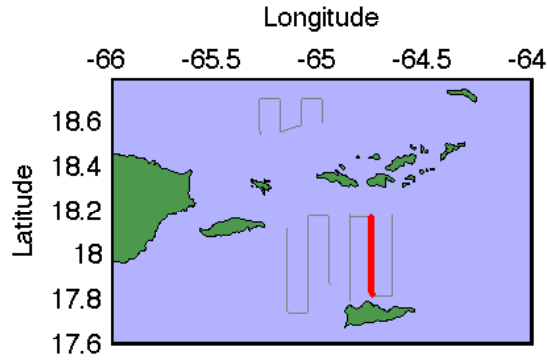
Scanfish survey results are shown for: the three sections made south of St. Thomas during Scanfish tow #1, the resampling of line 3 south of St. Thomas during Scanfish tow#2, and the northern survey sampled during Scanfish tow #3. Each set of figures shows: (*at left from top to bottom*) a map of the relative location of the transect, and vertical sections of Chlorophyll *a* concentrations, Turbidity concentrations, the total particulate volume measured by the LOPC, and the volumetrically-weighted mean particle size. (*at right from top to bottom*) vertical sections of temperature, salinity, and density (as σ_θ), as well as shipboard ADCP East (*U*) and North (*V*) velocities. Different color map ranges are used for the southern survey area and the northern survey area.



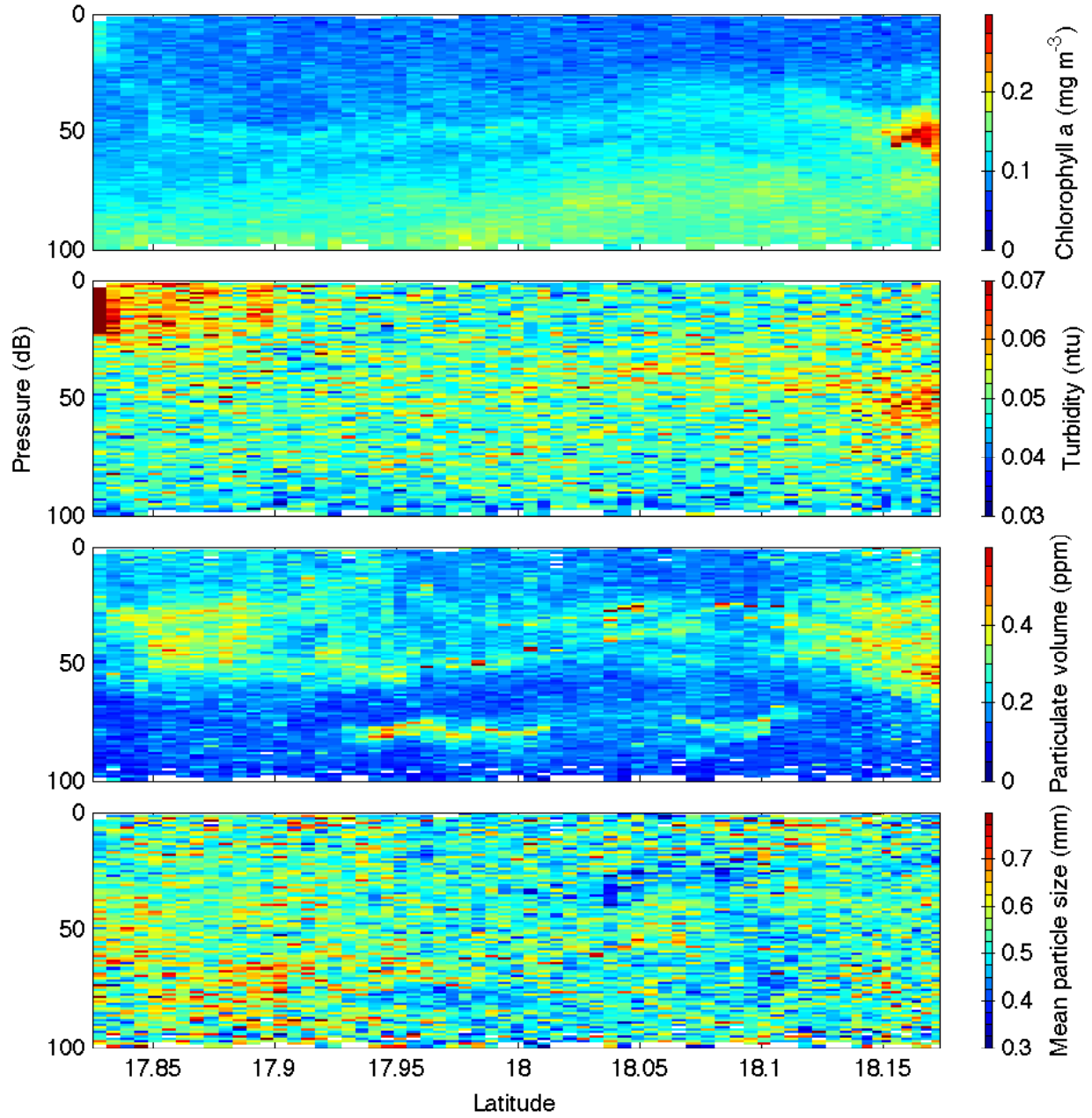
Scanfish tow #1, line #1
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End: 02-Dec-08 02:17 Z

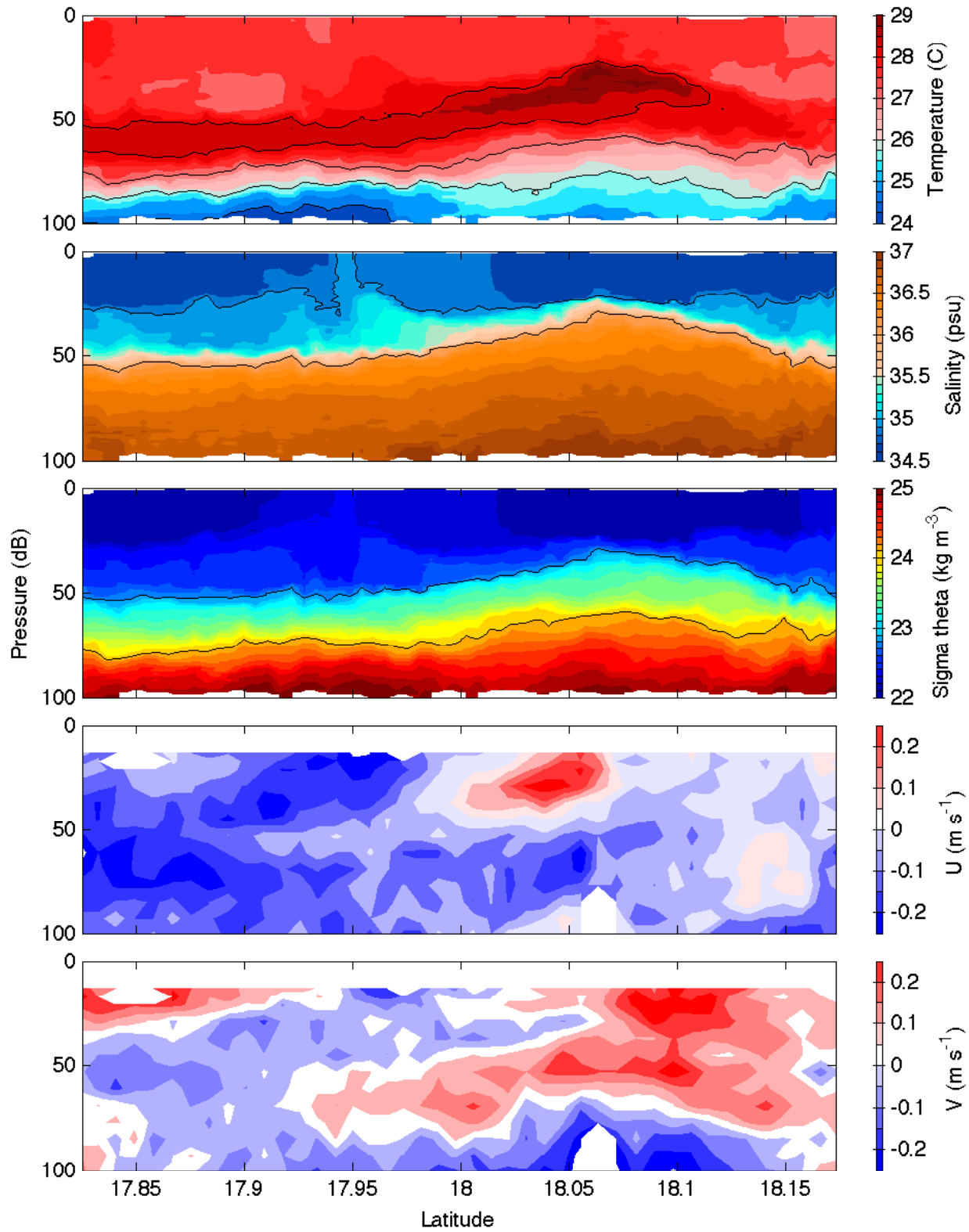


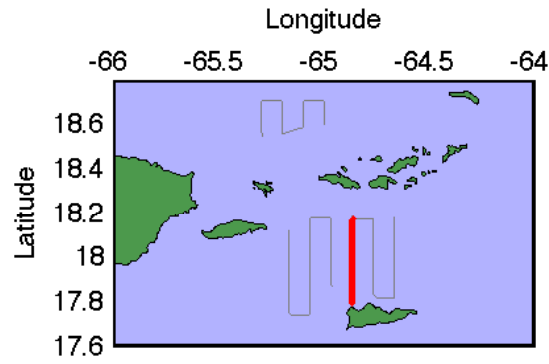




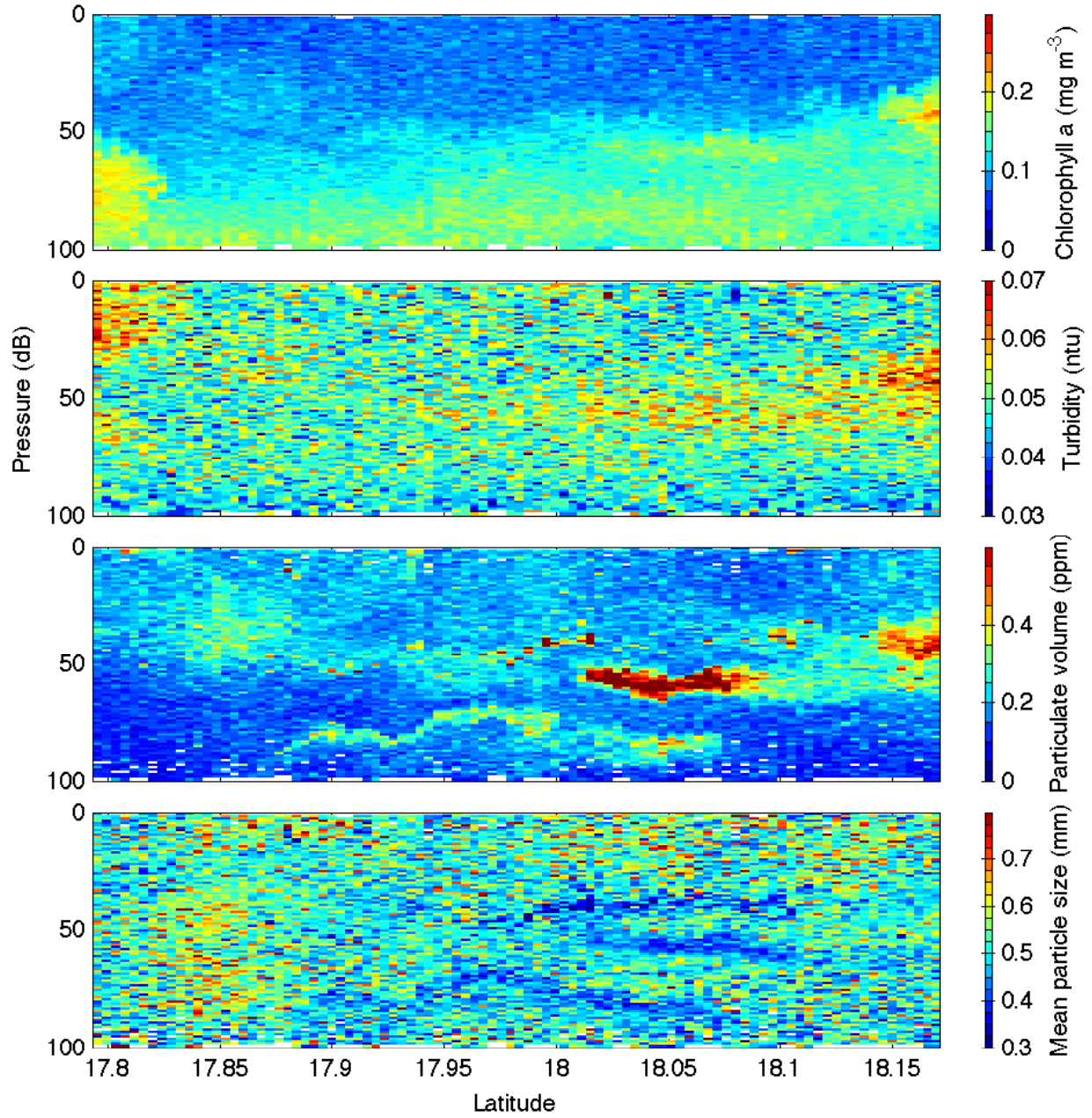
Scanfish tow #1, line #2
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End: 02-Dec-08 06:43 Z

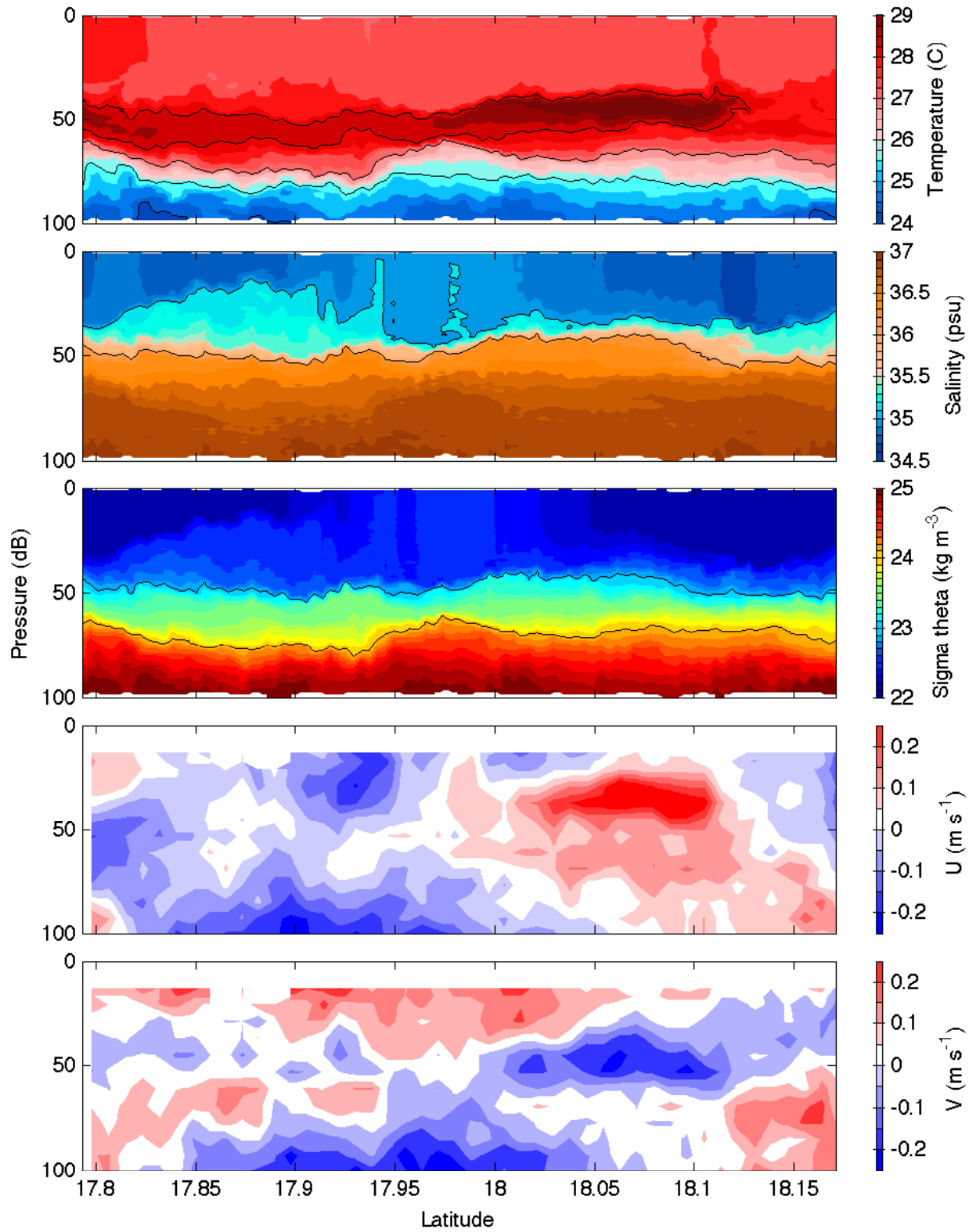


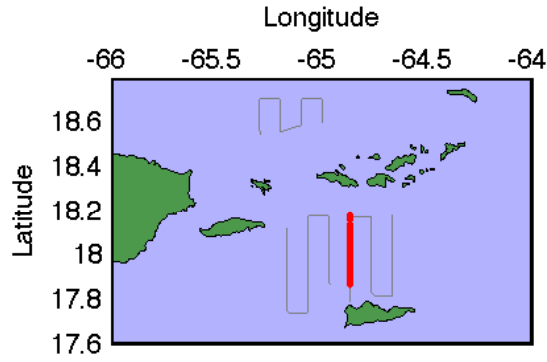




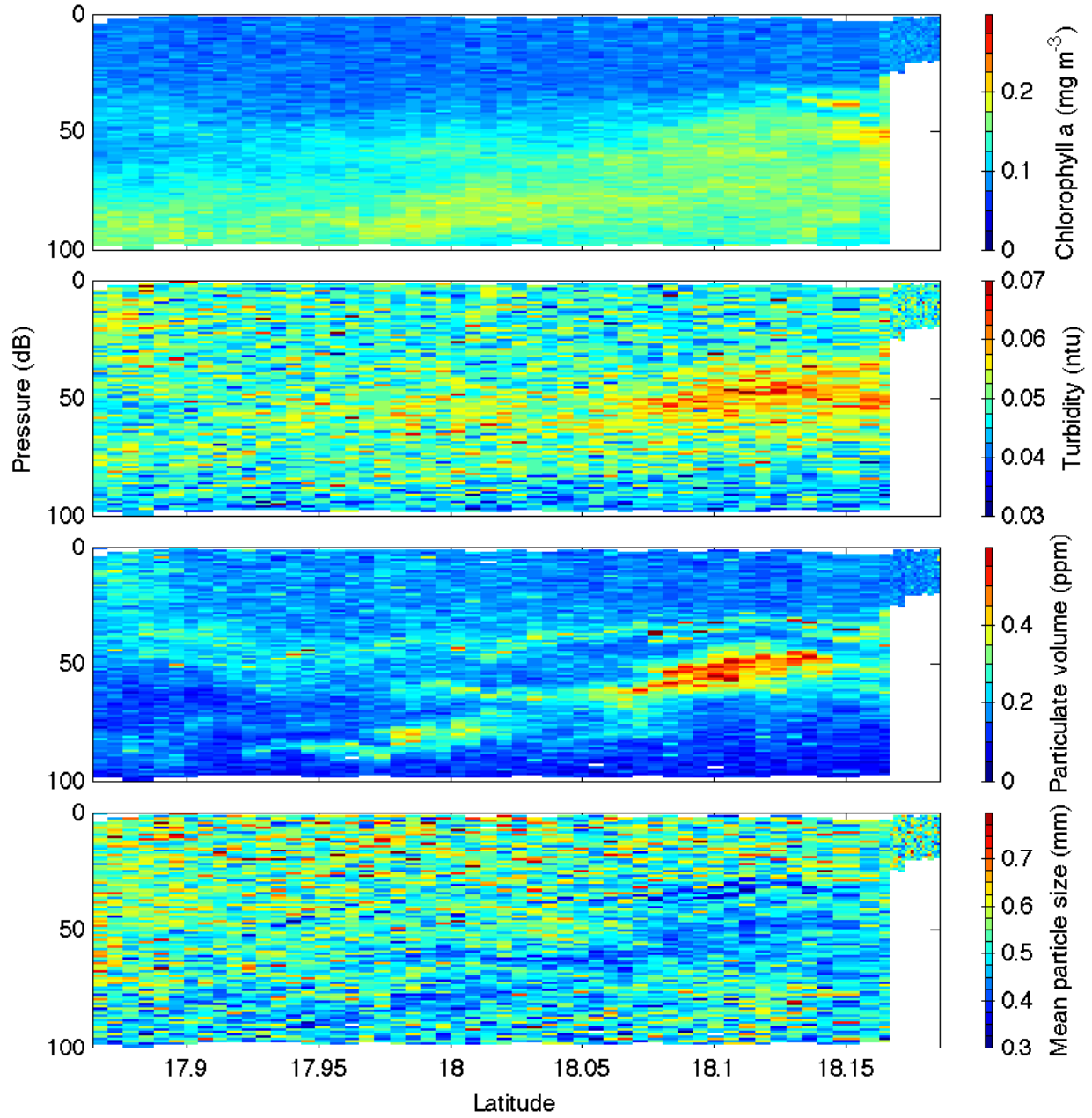
Scanfish tow #1, line #3
Start: 02-Dec-08 07:39 Z
End: 02-Dec-08 11:27 Z

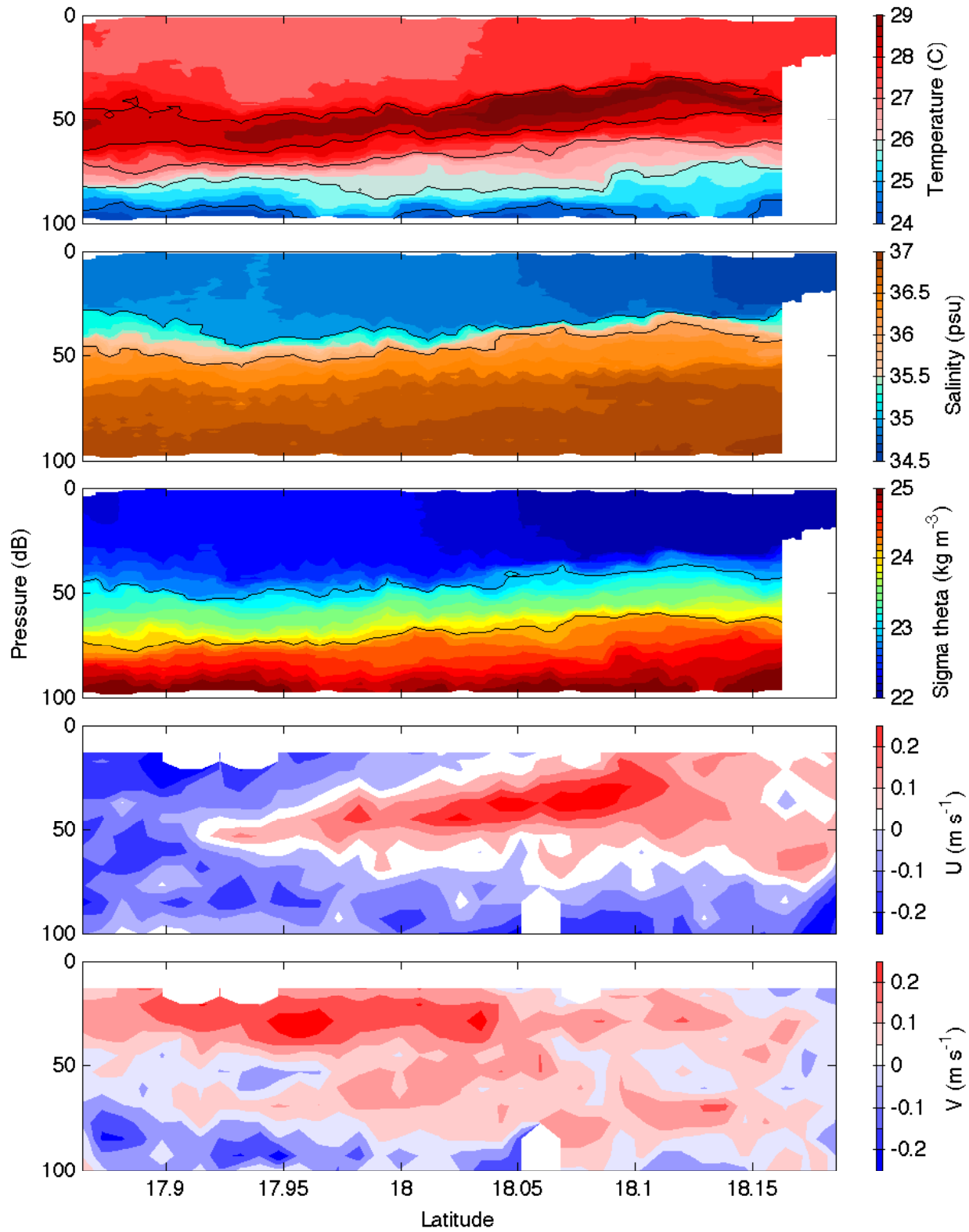


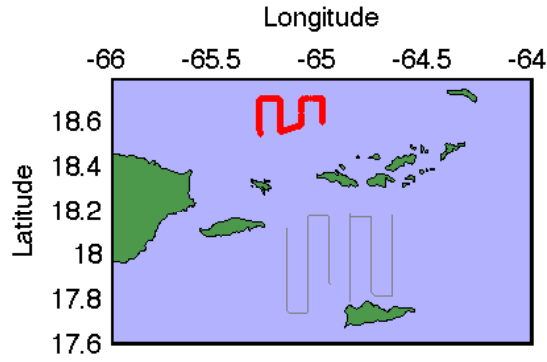




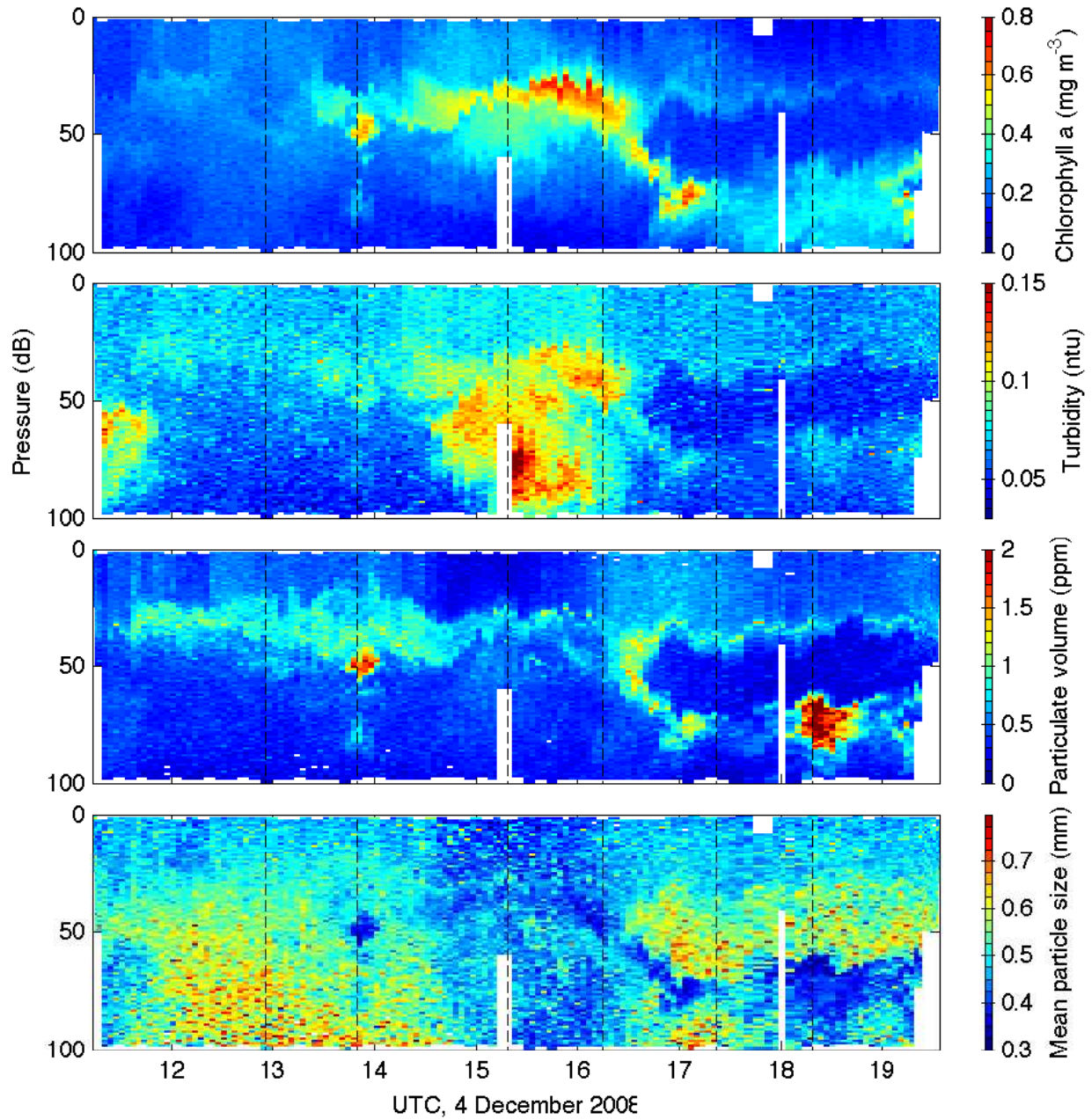
Scanfish tow #2, line #3
Start: 04-Dec-08 03:47 Z
End: 04-Dec-08 06:55 Z

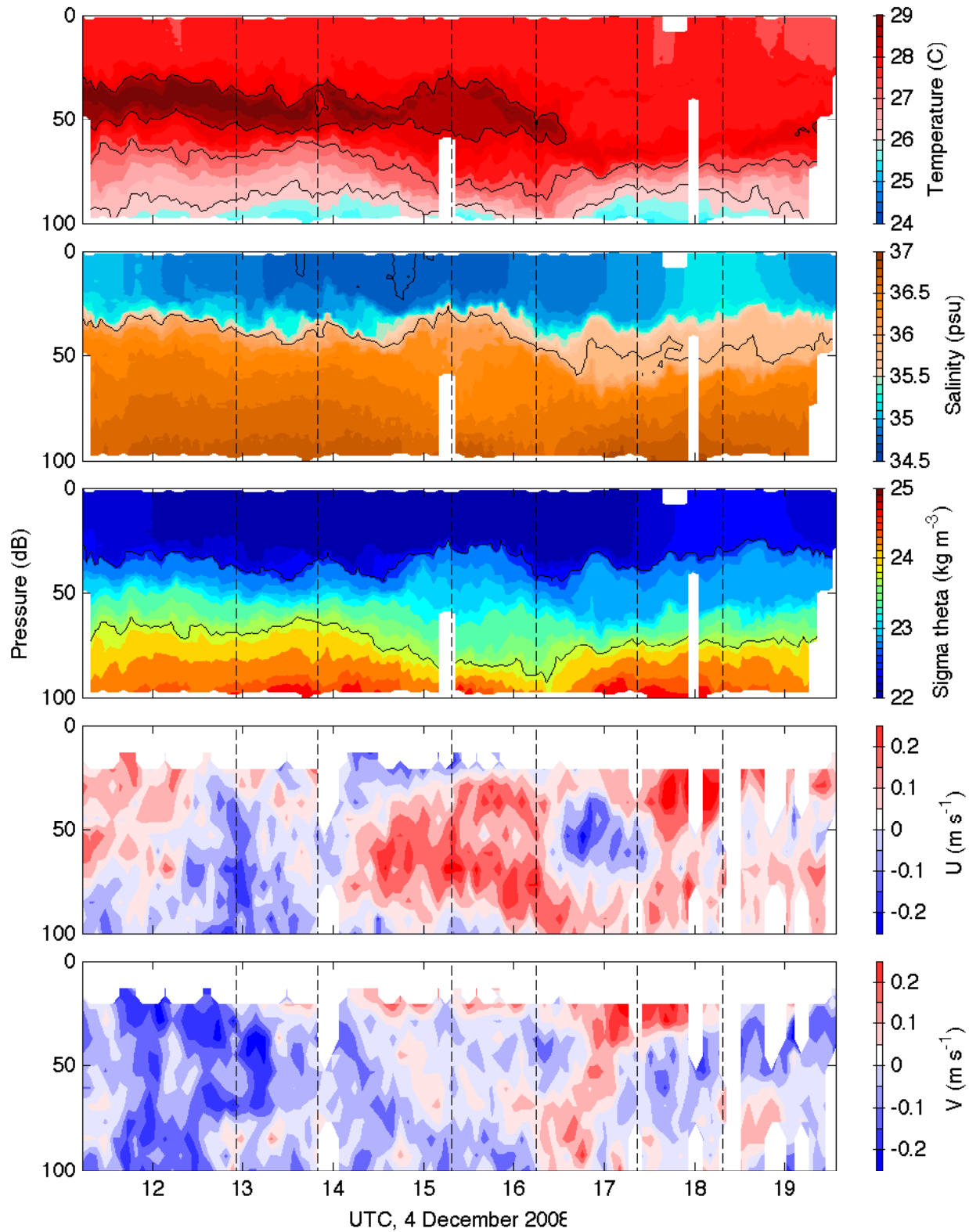






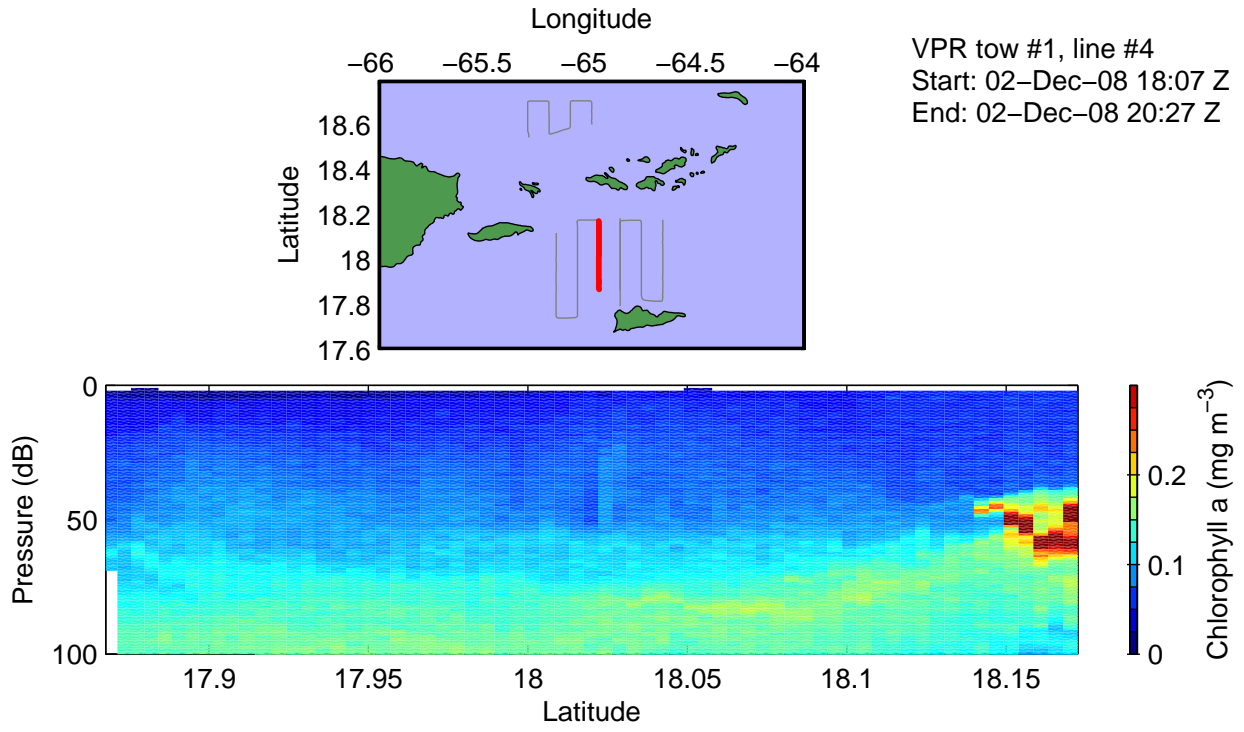
Scanfish tow #3
Start: 04-Dec-08 11:13 Z
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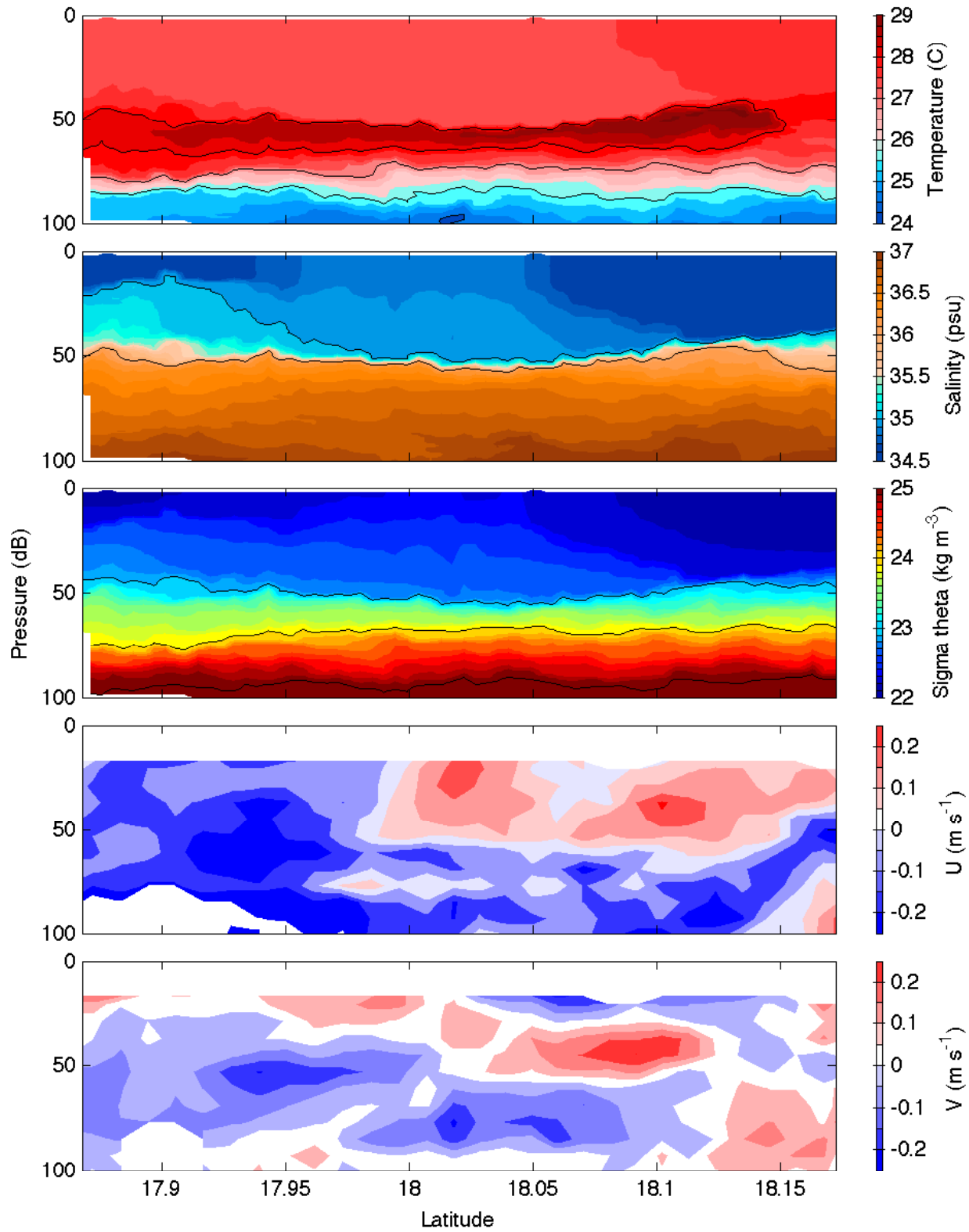


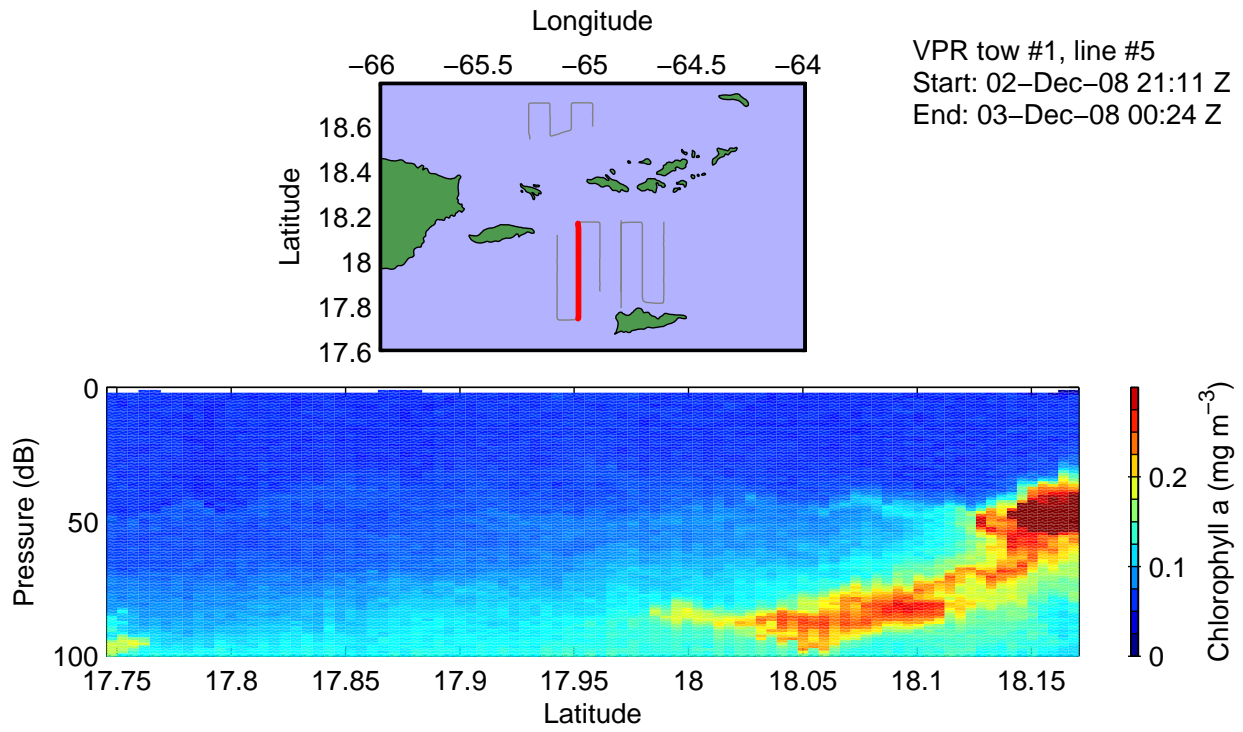


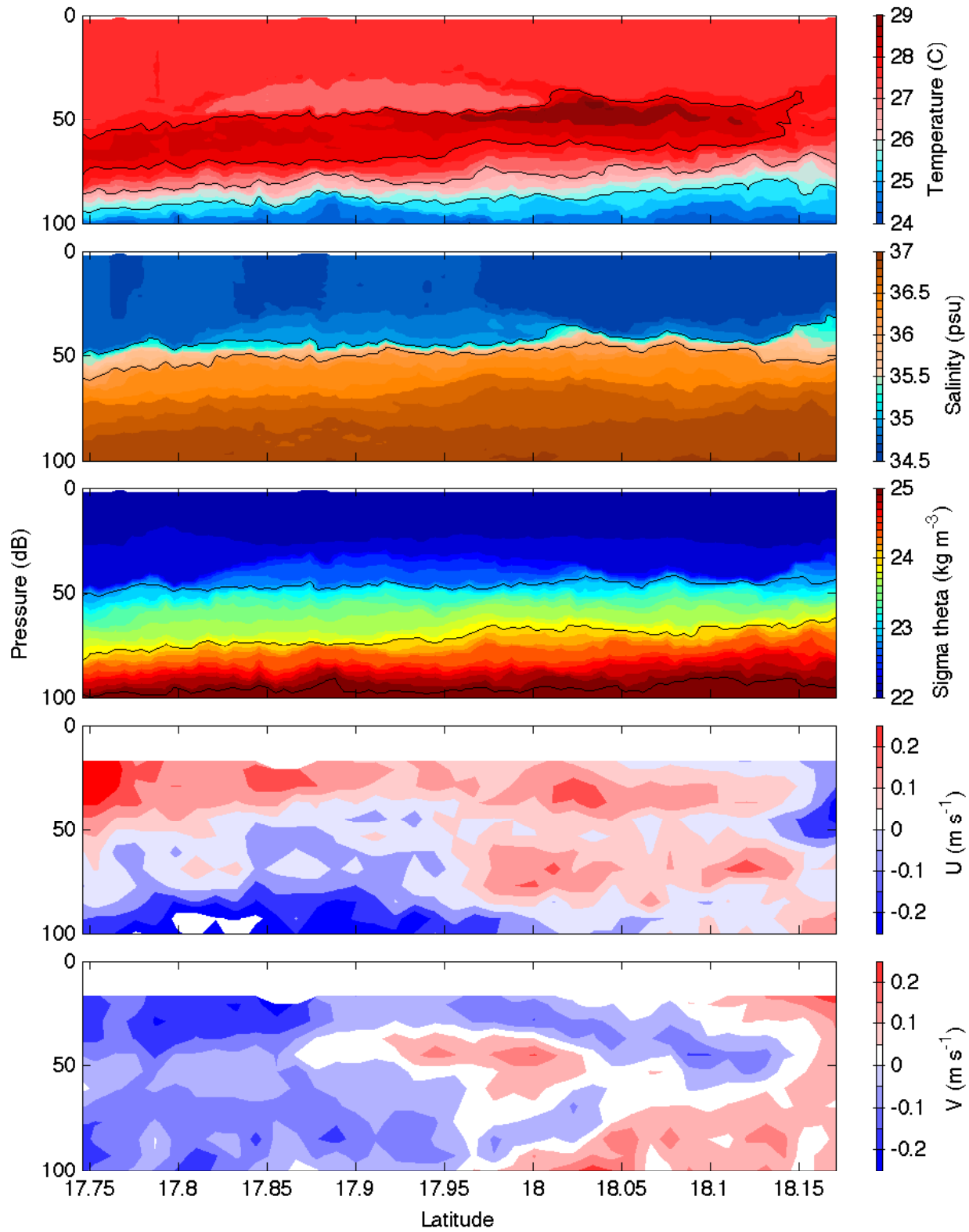
B Appendix: VPR Sections

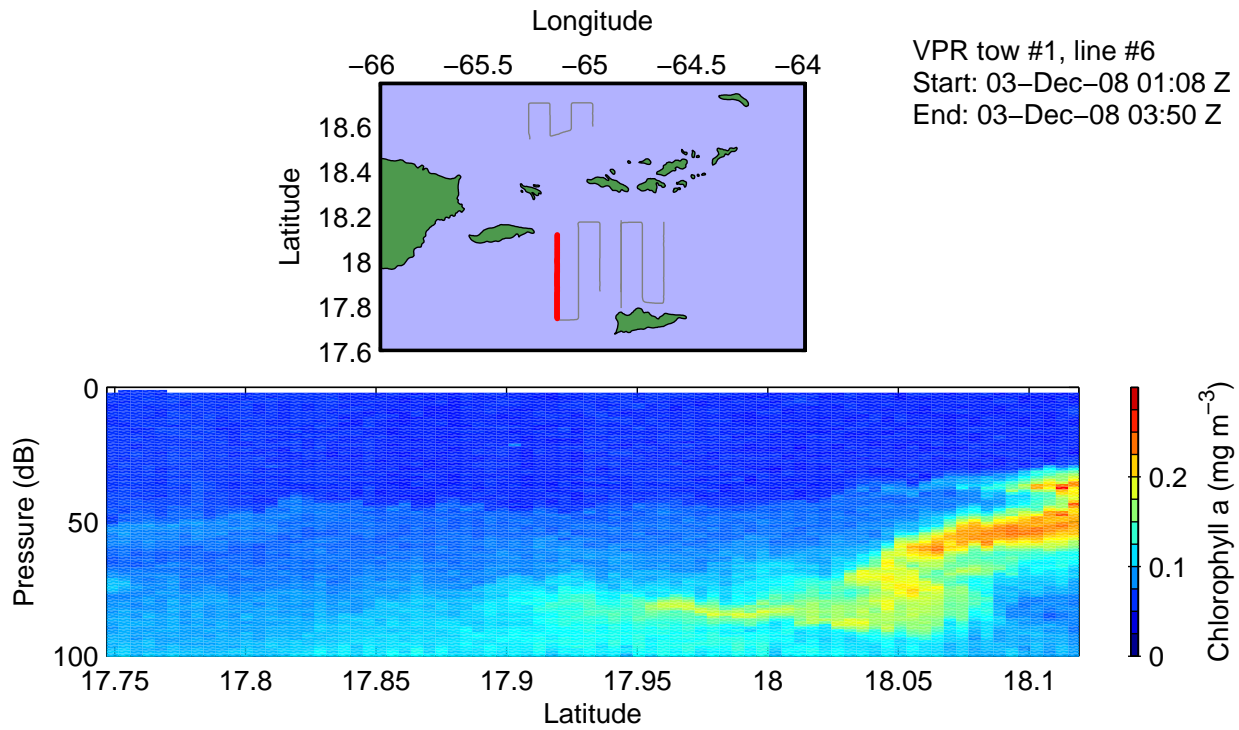
VPR surveys are shown for: the 3 sections made south of St. Thomas during VPR tow #1, the northern survey sampled during VPR tow# 2, and the transit to Bermuda, VPR tow #3. Each set of figures shows: (*at left*) a map of the relative location of the transect and vertical sections of Chlorophyll *a* concentrations. (*at right from top to bottom*) vertical sections of temperature, salinity, and density (as σ_θ), as well as shipboard ADCP East (*U*) and North (*V*) velocities. Different color map ranges are used for the southern survey area, the northern survey area, and the transit to Bermuda.

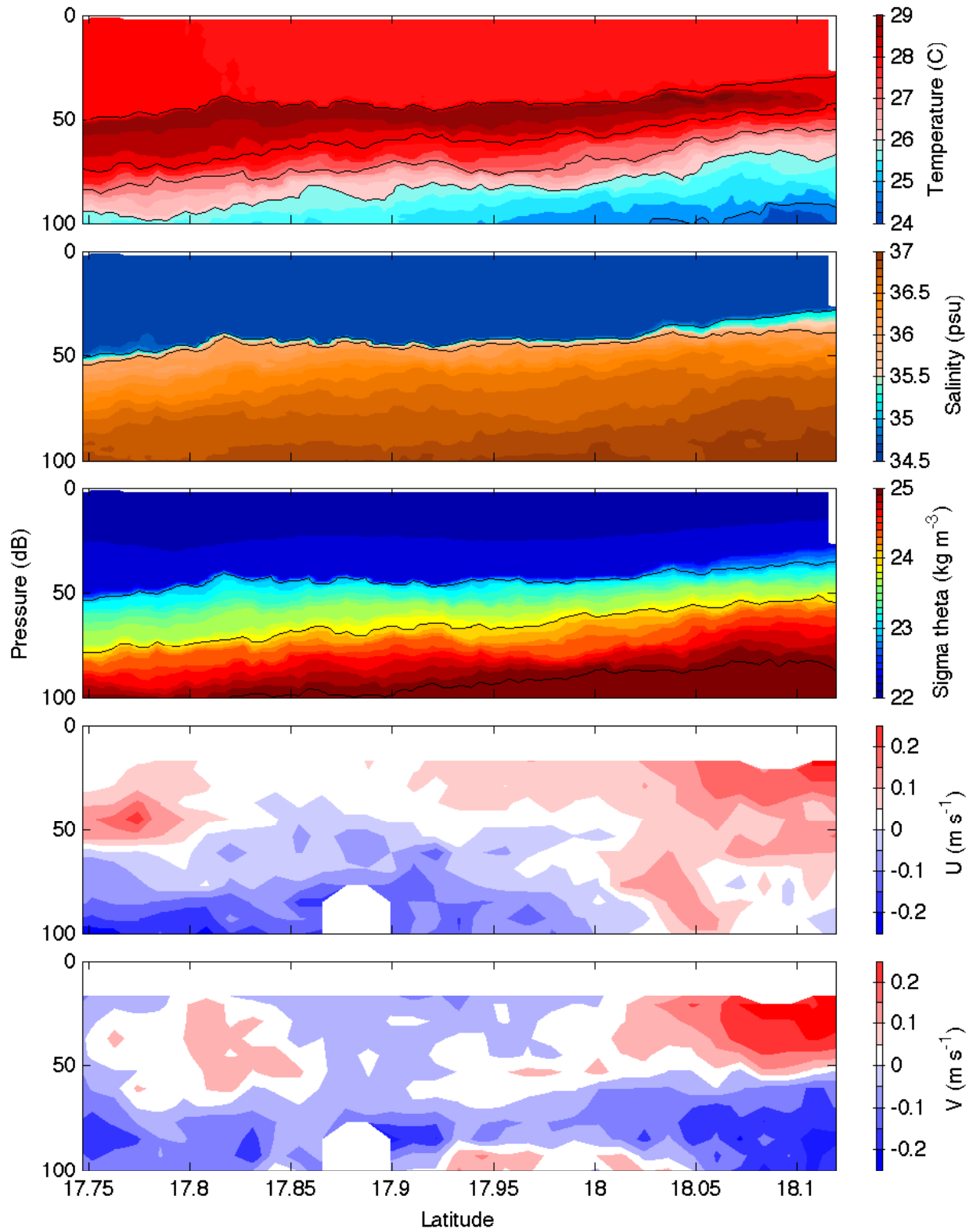


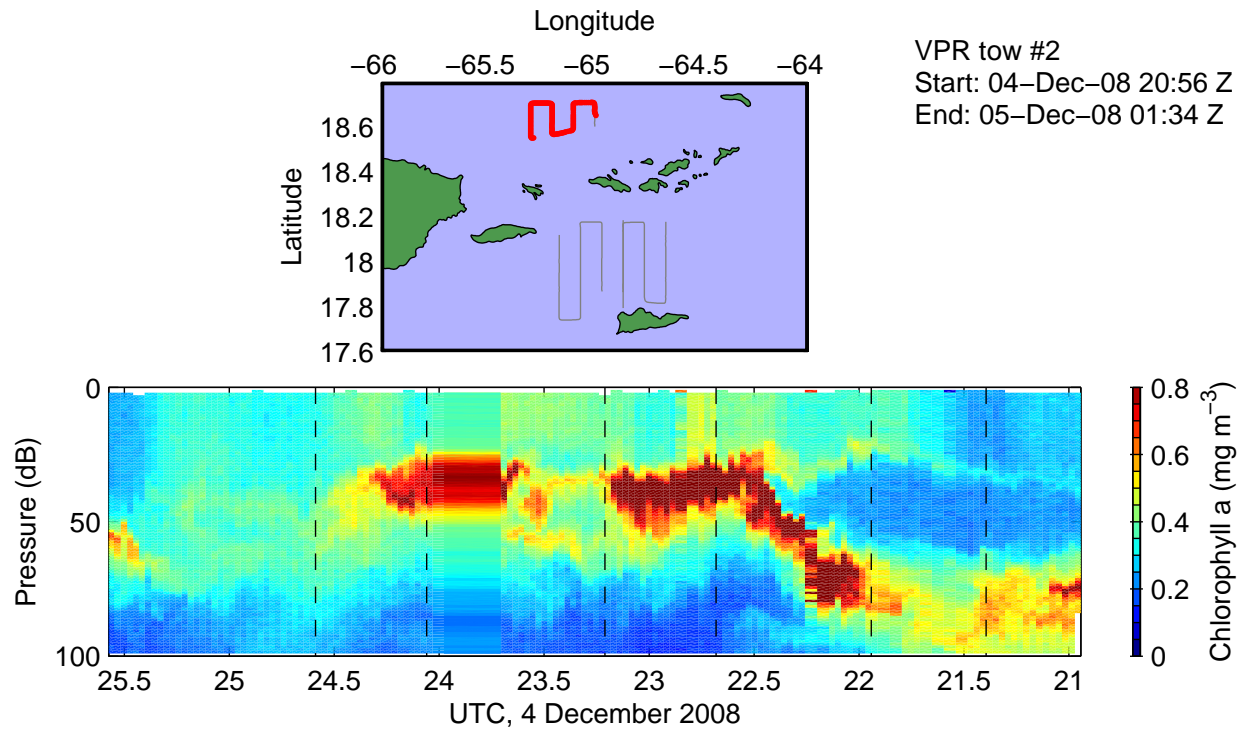


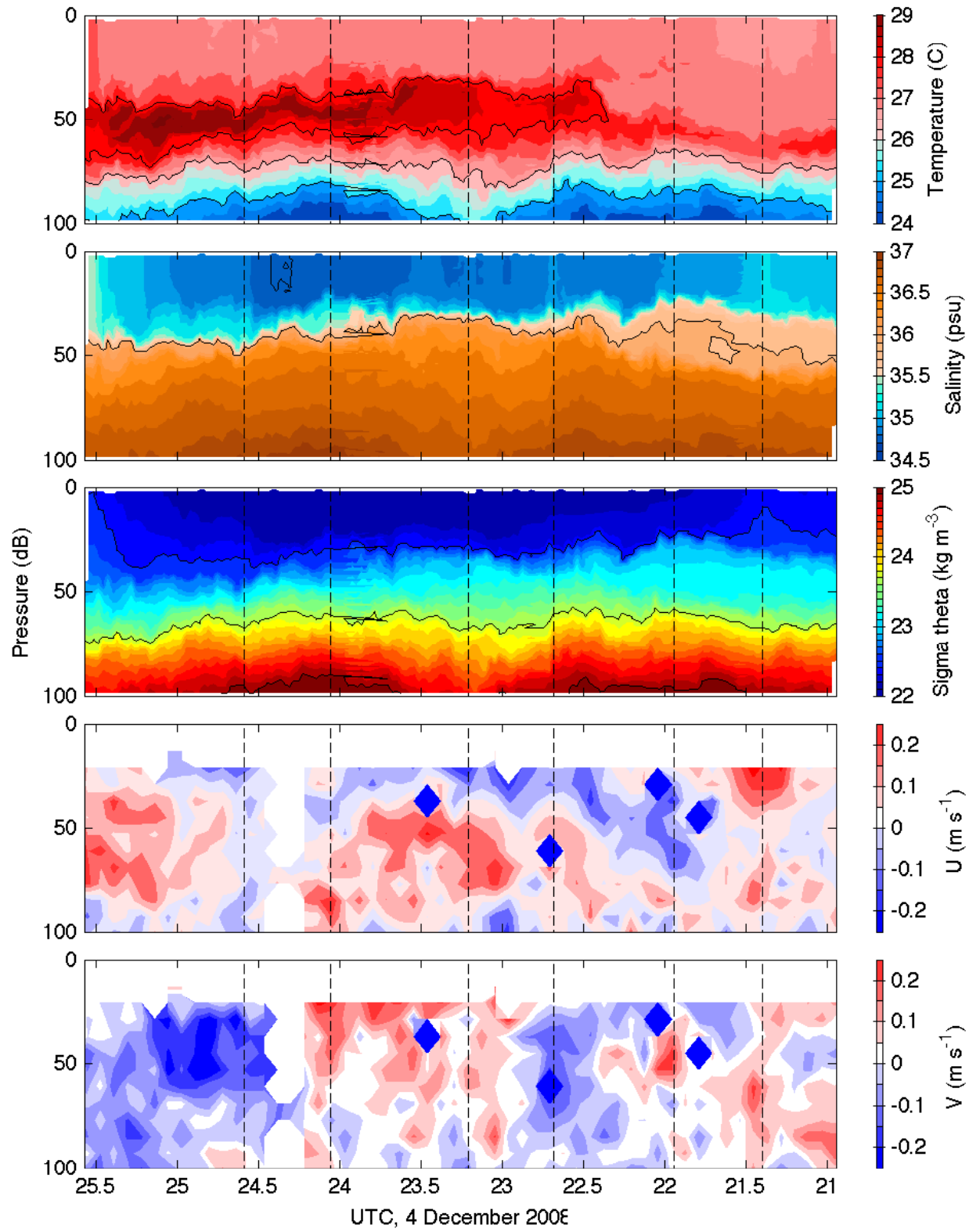


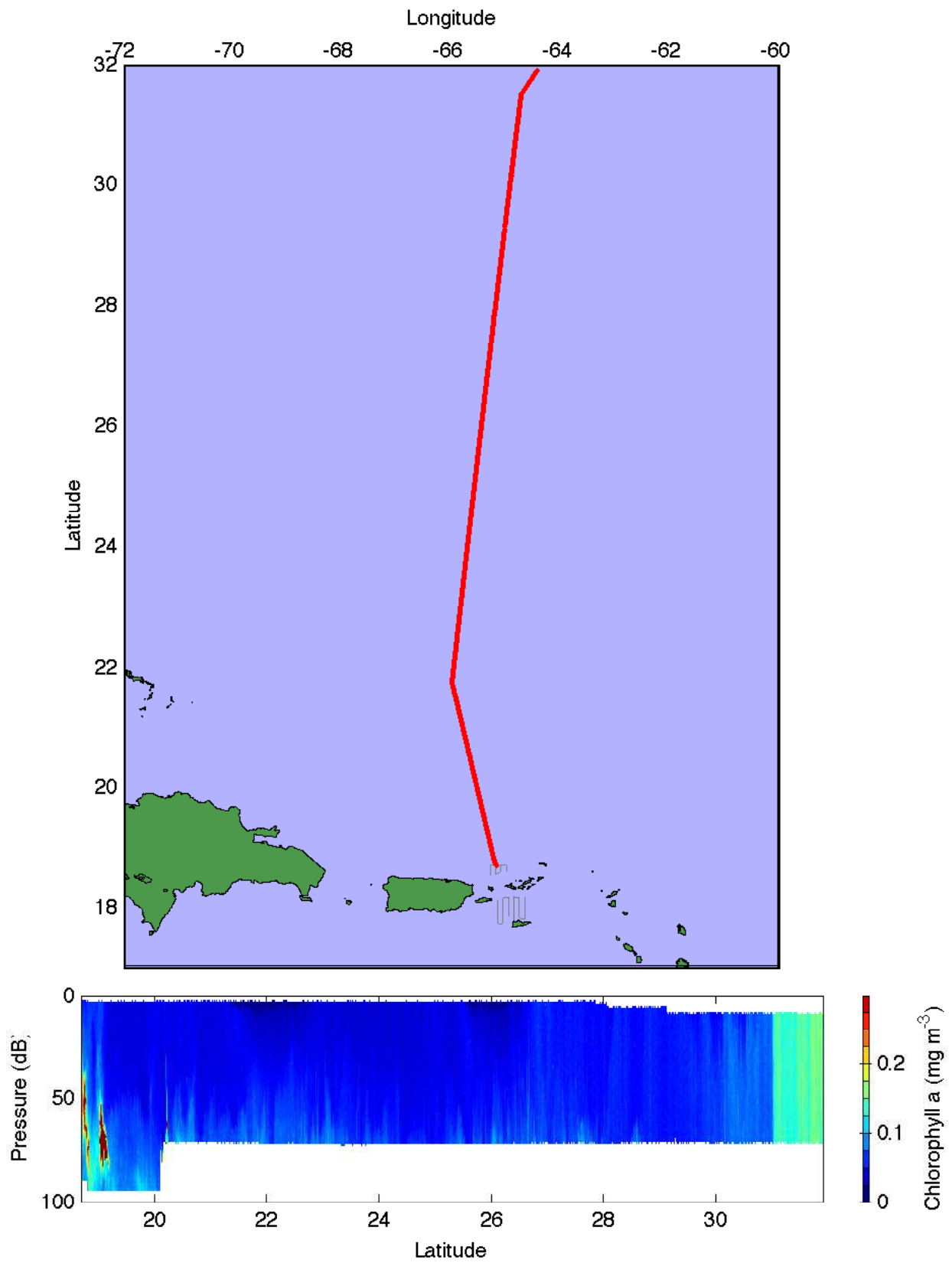


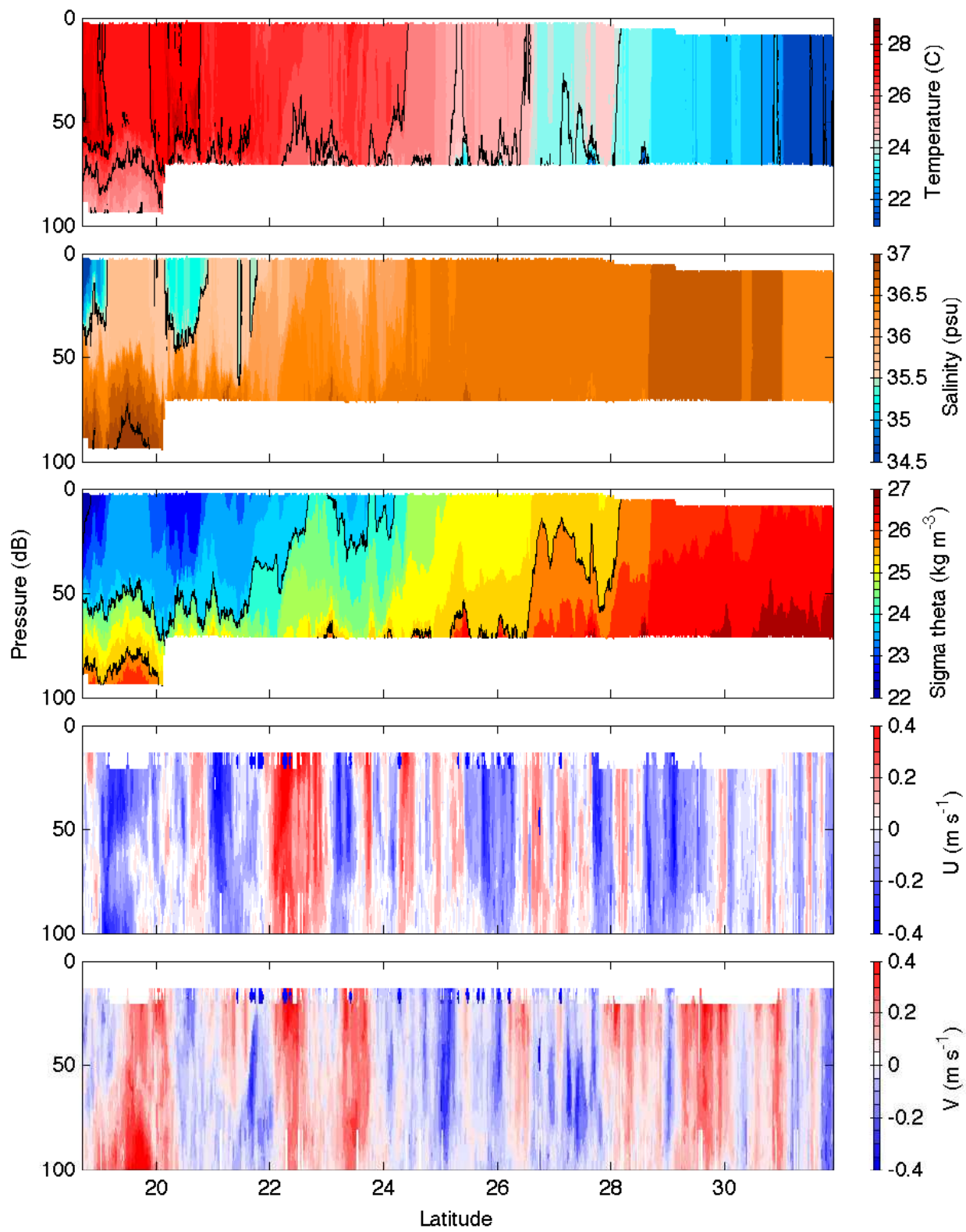












C Appendix: Seabird CTD casts

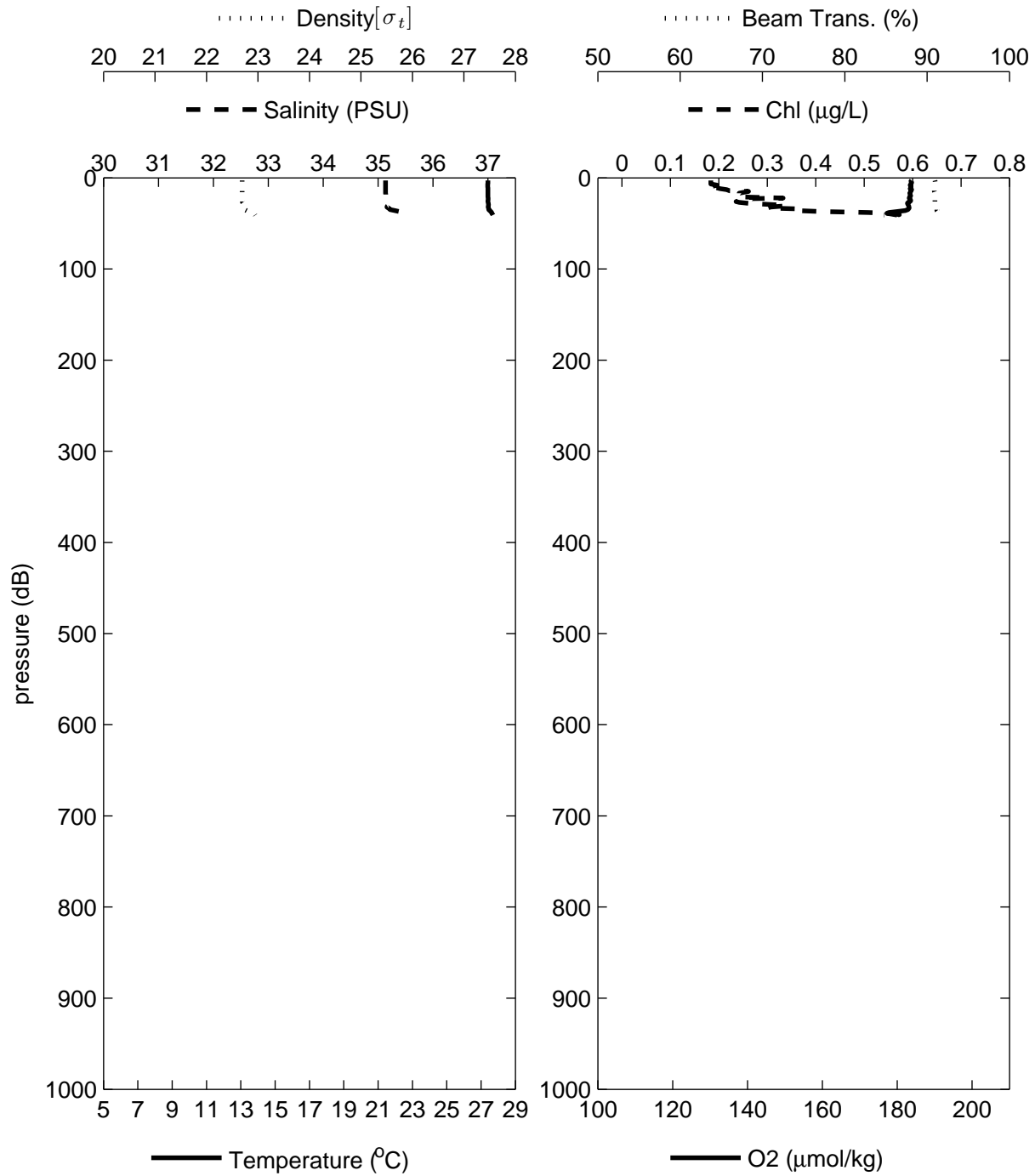
Cast	Date	Latitude	Longitude	File name
2	01-Dec-2008 19:28:02	18° 13.6800' N	64° 44.2092' W	oc449_09_002_DP2.dat
3	03-Dec-2008 06:30:59	18° 12.3600' N	64° 51.9096' W	oc449_09_003_DP2.dat
4	03-Dec-2008 08:31:51	18° 10.7700' N	64° 51.9900' W	oc449_09_004_DP2.dat
5	03-Dec-2008 10:56:23	18° 6.9396' N	64° 51.9900' W	oc449_09_005_DP2.dat
6	03-Dec-2008 14:11:00	17° 59.9700' N	64° 52.0700' W	Bad cast
7	03-Dec-2008 15:49:15	18° 0.0288' N	64° 52.0200' W	oc449_09_007_DP2.dat
8	03-Dec-2008 19:10:10	17° 53.0700' N	64° 52.0992' W	oc449_09_008_DP2.dat
9	03-Dec-2008 21:59:01	17° 47.6796' N	64° 52.0092' W	oc449_09_009_DP2.dat
10	05-Dec-2008 03:33:05	18° 24.4596' N	65° 11.9796' W	oc449_09_010_DP2.dat
11	05-Dec-2008 05:44:10	18° 33.2592' N	65° 12.0300' W	oc449_09_011_DP2.dat
12	05-Dec-2008 07:01:42	18° 35.7600' N	65° 12.0096' W	oc449_09_012_DP2.dat
13	05-Dec-2008 09:53:40	18° 39.0792' N	65° 11.9892' W	oc449_09_013_DP2.dat
14	05-Dec-2008 12:39:40	18° 42.5100' N	65° 12.0900' W	oc449_09_014_DP2.dat
15	05-Dec-2008 16:46:24	18° 42.5796' N	65° 6.0300' W	oc449_09_015_DP2.dat
16	05-Dec-2008 19:30:50	18° 42.5196' N	64° 59.9796' W	oc449_09_016_DP2.dat
17	05-Dec-2008 23:00:51	18° 39.0492' N	65° 0.0792' W	oc449_09_017_DP2.dat
18	06-Dec-2008 02:21:06	18° 36.0000' N	64° 59.9892' W	oc449_09_018_DP2.dat
19	06-Dec-2008 04:15:20	18° 29.9388' N	65° 0.0300' W	oc449_09_019_DP2.dat

OC449_09 R/V Oceanus
 CTD station: 2
 Latitude: 18° 13.6800' N Longitude: 64° 44.2092' W
 01-Dec-2008 19:27:40Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.3942	35.1346	22.6926	183.705	0.1769
20	27.3979	35.1381	22.6940	183.594	0.2353
30	27.4351	35.1984	22.7275	182.907	0.3391
40	27.6896	35.5870	22.9375	179.382	0.5728

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
41	1	27.6971	0.4548	2.10	2.90	0.10	0.10
31	2	27.4188	0.2790	2.10	2.60	0.10	0.05
21	3	27.3983	0.2665	1.20	2.50	0.05	0.05
10	4	27.3942	0.2468	3.60	3.00	0.05	0.05
2	5	27.3973	0.2180	4.10	2.90	0.05	0.05

Project: OC449_09 Time: 01-Dec-2008 19:27:40 Z
 Vessel: R/V Oceanus Water Depth: 51 m
 Data type: shipctd Latitude: 18 13.680
 Cast: 002 Longitude: -64 44.209

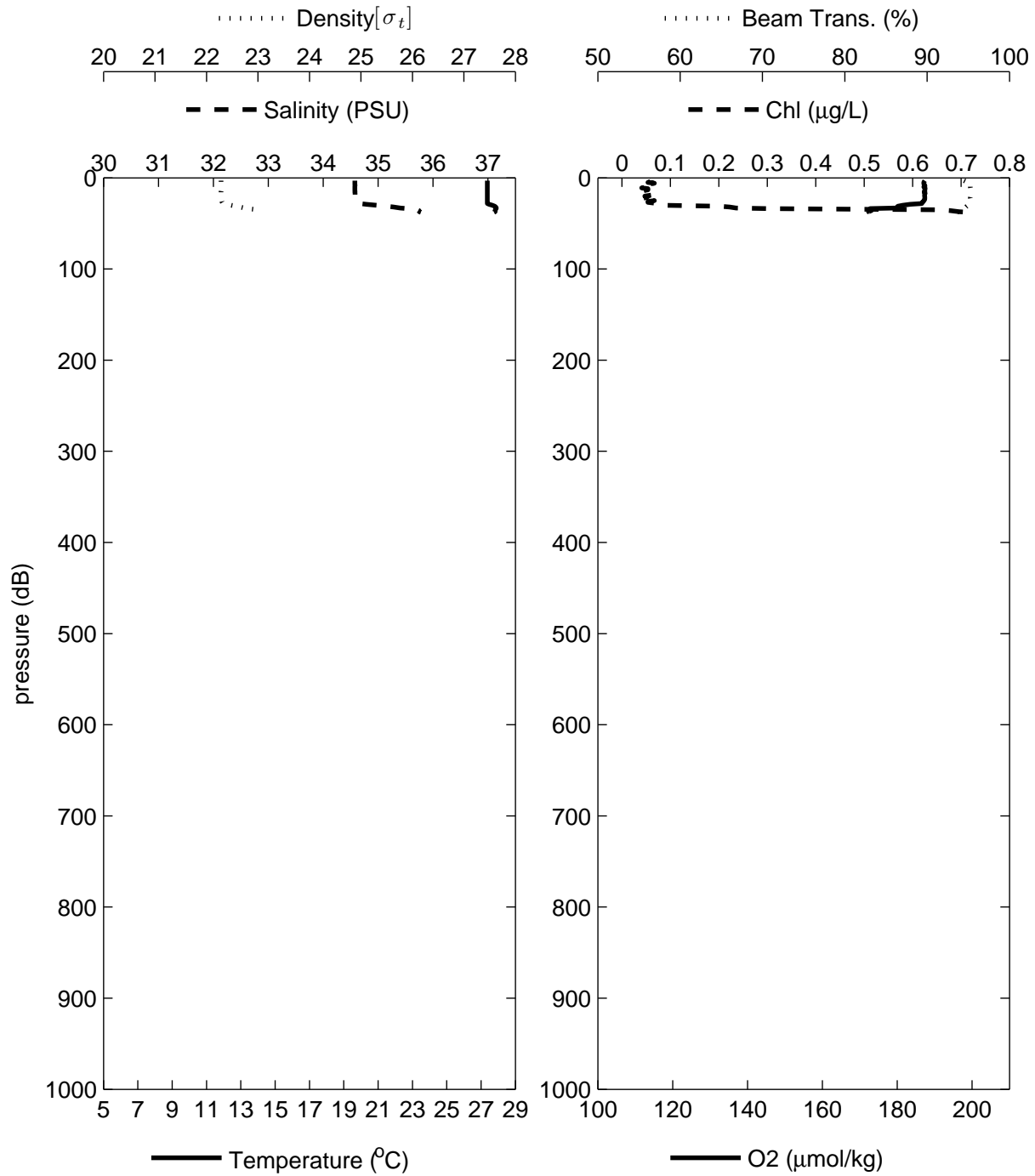


OC449_09 R/V Oceanus
 CTD station: 3
 Latitude: 18° 12.3600' N Longitude: 64° 51.9096' W
 03-Dec-2008 06:30:32Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.3616	34.5789	22.2849	187.121	0.0536
20	27.3667	34.5811	22.2850	187.300	0.0471
30	27.6648	34.9745	22.4846	181.458	0.0860

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
38	1	27.7588	0.4370	1.50	2.70	0.05	0.10
23	2	27.3654	NaN	1.70	3.10	0.05	0.05
11	3	27.3623	NaN	3.20	3.90	0.05	0.05
3	4	27.3664	0.1174	1.30	3.60	0.05	0.05

Project: OC449_09 Time: 03-Dec-2008 06:30:32 Z
 Vessel: R/V Oceanus Water Depth: 48 m
 Data type: shipctd Latitude: 18 12.360
 Cast: 003 Longitude: -64 51.910

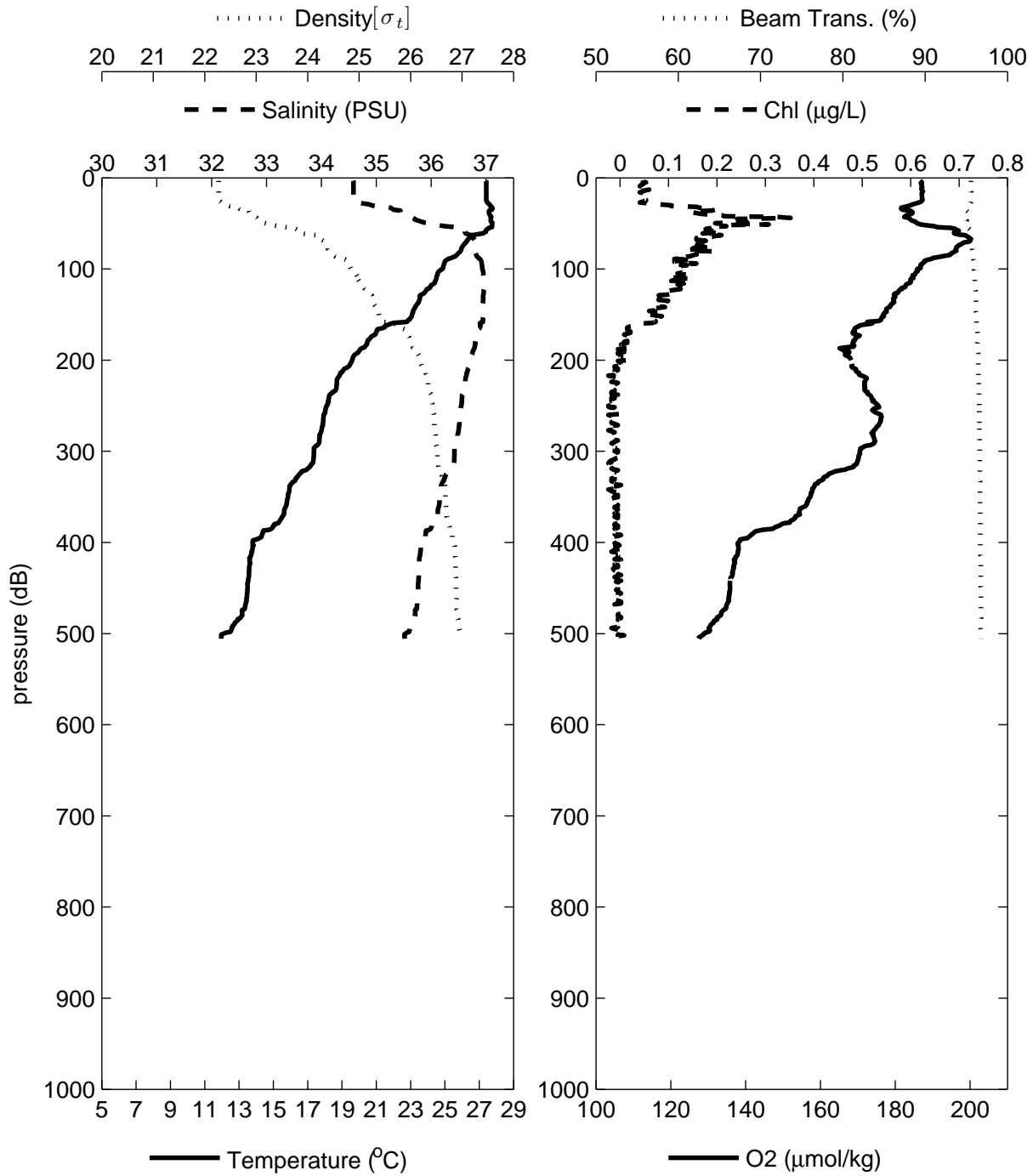


OC449_09 R/V Oceanus
 CTD station: 4
 Latitude: 18° 10.7700' N Longitude: 64° 51.9900' W
 03-Dec-2008 08:31:06Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.4140	34.5849	22.2725	187.235	0.0536
20	27.4153	34.5860	22.2729	187.135	0.0471
30	27.6233	34.9078	22.4479	184.011	0.1055
40	27.5984	35.5035	22.9037	183.718	0.1769
50	27.7605	35.9487	23.1943	185.760	0.1964
60	27.3140	36.6275	23.8454	195.712	0.2093
70	26.2569	36.8011	24.3115	199.686	0.1574
80	25.9258	36.7917	24.4092	196.356	0.1509
90	25.1328	36.8970	24.7354	188.837	0.1509
100	24.8635	36.9338	24.8450	185.894	0.1250
110	24.5052	36.9578	24.9725	184.875	0.1250
120	24.1527	36.9681	25.0866	182.635	0.1250
130	23.5318	36.9470	25.2552	180.005	0.0926
140	23.3286	36.9428	25.3101	178.644	0.0795
150	23.0856	36.9478	25.3868	176.784	0.0601
160	21.8374	36.8851	25.6943	173.649	0.0407
170	20.9935	36.8529	25.9069	168.628	0.0212
180	20.4785	36.8060	26.0118	168.851	0.0081
190	20.0068	36.7629	26.1056	167.367	-0.0113
200	19.5955	36.7218	26.1827	168.193	0.0146
250	18.1005	36.5465	26.4322	175.480	-0.0243
300	17.3667	36.4244	26.5191	170.596	-0.0113
350	15.8510	36.1624	26.6762	157.274	-0.0048
400	13.8068	35.8091	26.8539	138.067	-0.0048
450	13.4951	35.7631	26.8830	135.863	-0.0048
500	12.1205	35.5326	26.9798	128.891	0.0017

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
504	1	11.9632	NaN	2.60	10.90	1.20	21.50
303	2	17.3559	NaN	2.30	1.50	0.30	7.40
201	3	19.5800	0.0062	NaN	NaN	NaN	NaN
102	4	24.6897	NaN	1.60	1.70	0.10	0.10
59	5	27.3903	0.2121	2.20	2.50	0.10	2.60
50	6	27.7605	0.2665	2.50	2.70	0.05	0.10
39	7	27.5688	0.1682	NaN	NaN	NaN	NaN
21	9	27.4155	0.0738	2.00	2.60	0.10	0.05
10	10	27.4140	NaN	0.90	3.20	0.05	0.05
3	11	27.3976	NaN	2.90	3.50	0.10	0.05

Project: OC449_09 Time: 03-Dec-2008 08:31:06 Z
 Vessel: R/V Oceanus Water Depth: 500 m
 Data type: shipctd Latitude: 18 10.770
 Cast: 004 Longitude: -64 51.990



OC449_09 R/V Oceanus

CTD station: 5

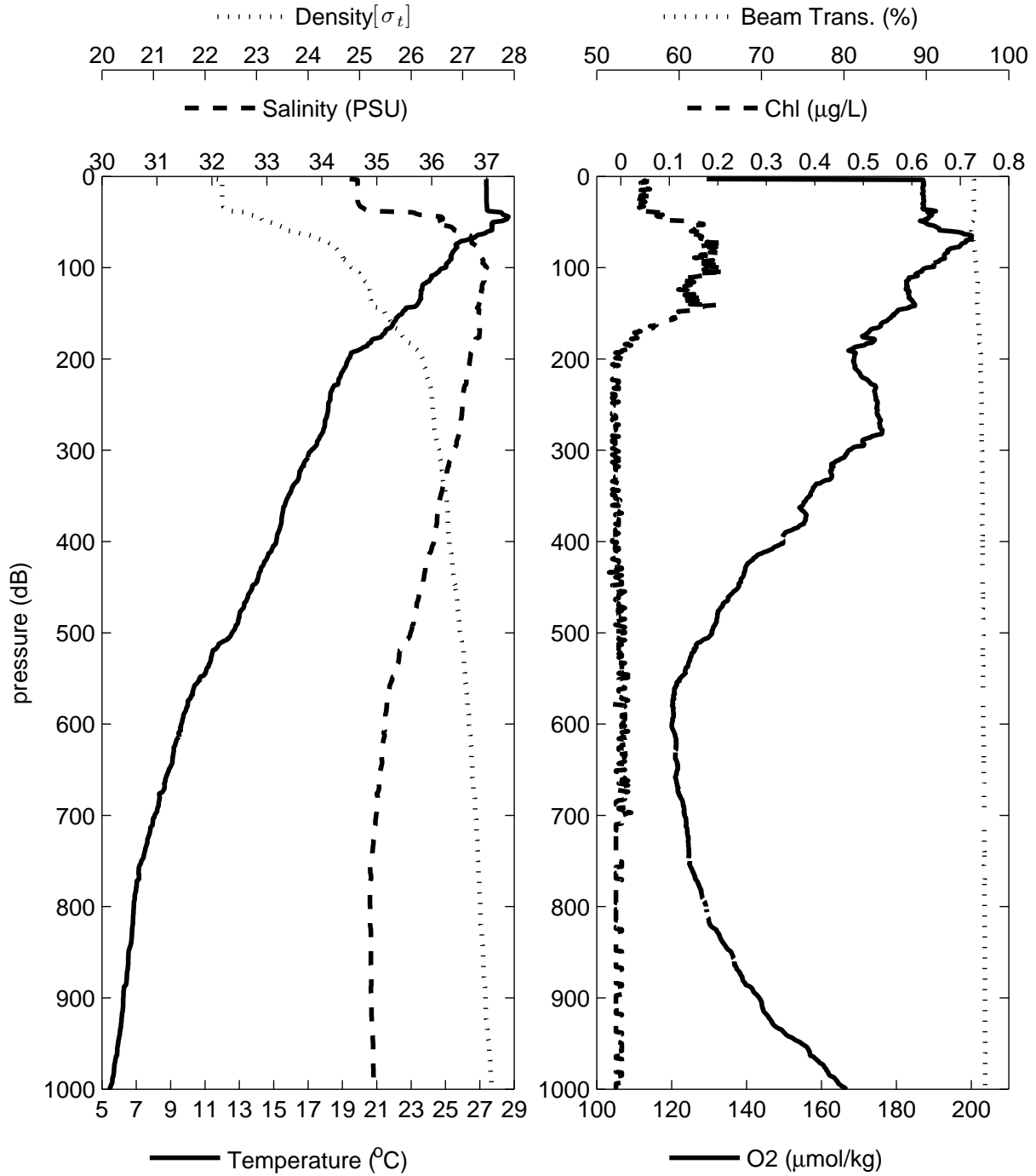
Latitude: 18° 6.9396' N Longitude: 64° 51.9900' W

03-Dec-2008 10:55:48Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.3824	34.6514	22.3328	187.357	0.0407
20	27.3841	34.6520	22.3327	187.064	0.0471
30	27.4027	34.6698	22.3400	186.990	0.0536
40	28.2771	35.6868	22.8194	188.883	0.0860
50	27.7909	36.0499	23.2528	187.541	0.1379
60	27.4973	36.5059	23.6919	194.579	0.1445
70	26.1886	36.7265	24.2802	198.589	0.1834
80	25.5534	36.8308	24.5549	194.168	0.1834
90	25.3462	36.9152	24.6829	192.947	0.1769
100	25.0127	37.0042	24.8559	188.078	0.2029
110	24.2139	36.9439	25.0496	184.349	0.1509
120	23.6548	36.9158	25.1951	182.881	0.1315
130	23.5620	36.8999	25.2106	183.370	0.1315
140	23.3662	36.8610	25.2386	184.895	0.1445
150	22.4779	36.8577	25.4941	179.632	0.1250
160	21.9855	36.8646	25.6397	176.356	0.0860
170	21.5001	36.8723	25.7818	172.703	0.0407
180	20.6857	36.7935	25.9461	174.045	0.0341
190	19.9734	36.7607	26.1108	167.711	0.0081
200	19.3550	36.6966	26.2268	168.712	0.0017
250	18.1803	36.5563	26.4196	174.931	-0.0113
300	17.1980	36.3933	26.5369	167.320	-0.0113
350	15.8714	36.1637	26.6739	156.873	-0.0113
400	15.1494	36.0388	26.7406	149.708	-0.0178
450	13.7652	35.8102	26.8631	137.815	-0.0016
500	12.5805	35.6164	26.9547	130.810	0.0081
600	9.6138	35.1373	27.1245	120.096	0.0017
700	8.0784	34.9895	27.2537	123.424	0.0017
800	6.8574	34.8781	27.3424	129.163	0.0017
900	6.2431	34.9035	27.4452	143.414	-0.0103
1000	5.4541	34.9399	27.5738	166.493	-0.0103

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
1010	1	5.3738	NaN	12.50	24.60	1.60	24.50
756	2	7.1745	NaN	1.90	23.90	1.90	30.90
505	3	12.4189	NaN	6.80	10.20	1.20	19.60
301	4	17.1569	NaN	0.40	3.50	0.40	7.70
203	5	19.2738	0.0036	1.10	9.10	0.10	2.90
101	6	24.7558	NaN	1.30	1.90	0.05	0.05
96	7	25.0401	0.0974	1.30	1.90	0.05	0.05
86	8	25.3355	0.1568	NaN	NaN	NaN	NaN
76	9	25.6287	0.2084	NaN	NaN	NaN	NaN
50	10	27.7909	0.1733	2.50	2.10	0.10	0.05
20	11	27.3841	NaN	2.40	3.70	0.10	0.05
11	12	27.3931	NaN	2.80	3.30	0.05	0.05
2	13	27.3612	0.0633	3.60	3.20	0.10	0.05

Project: OC449_09 Time: 03-Dec-2008 10:55:48 Z
 Vessel: R/V Oceanus Water Depth: 1820 m
 Data type: shipctd Latitude: 18 6.940
 Cast: 005 Longitude: -64 51.990



OC449_09 R/V Oceanus

CTD station: 7

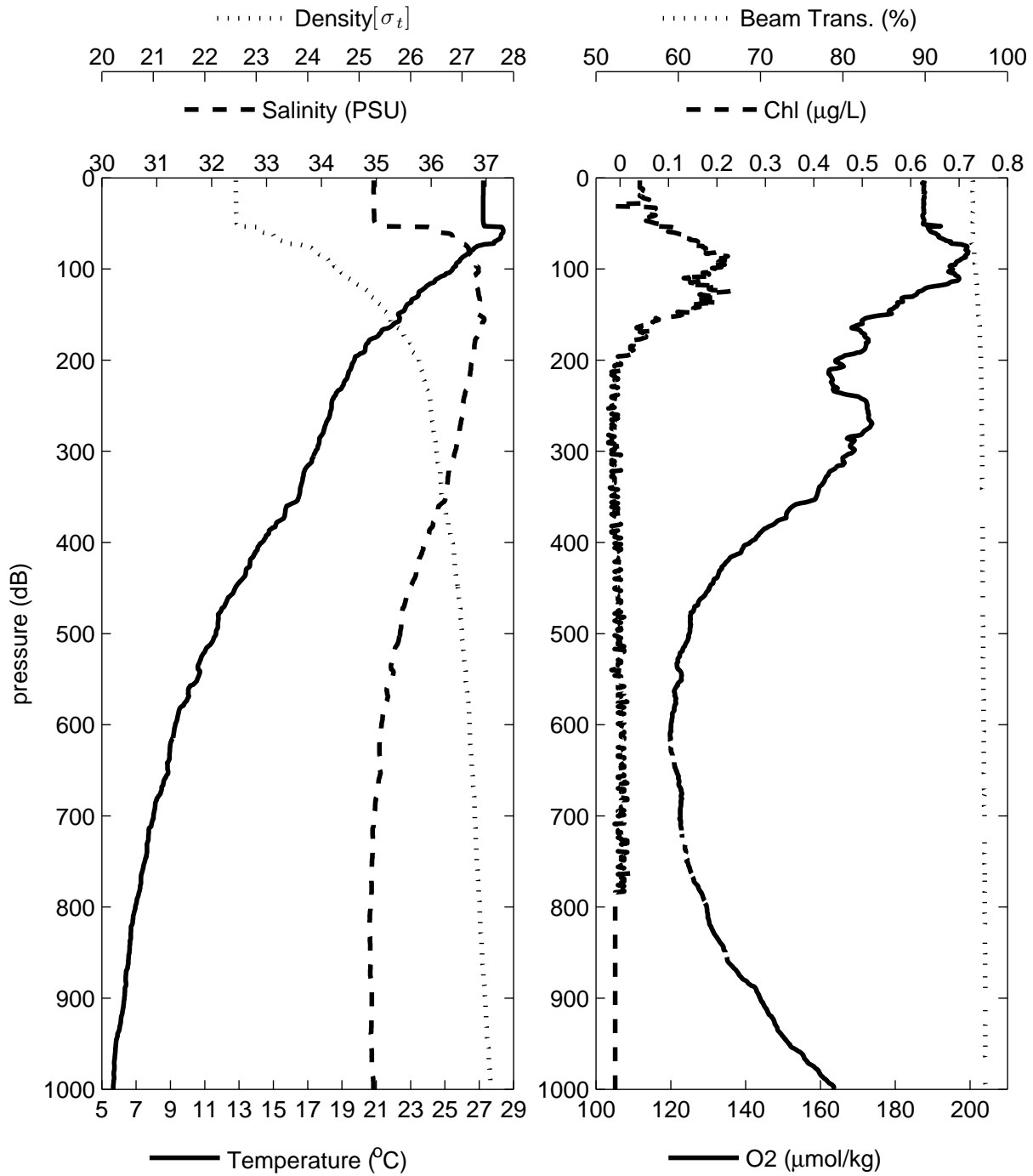
Latitude: 18° 0.0288' N Longitude: 64° 52.0200' W

03-Dec-2008 15:48:46Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.2442	34.9532	22.6043	187.590	0.0407
20	27.2318	34.9542	22.6091	187.752	0.0407
30	27.2306	34.9535	22.6090	187.583	-0.0103
40	27.2273	34.9612	22.6157	187.481	0.0601
50	27.2520	34.9845	22.6255	187.475	0.0731
60	28.3860	36.1765	23.1530	190.128	0.1120
70	27.8824	36.5006	23.5622	194.869	0.1606
80	26.4837	36.6868	24.1546	199.242	0.1769
90	25.8860	36.7576	24.3958	197.438	0.2159
100	25.4411	36.8579	24.6099	195.413	0.2029
110	24.6212	36.7625	24.7882	197.062	0.1315
120	23.8852	36.8288	25.0611	189.000	0.1898
130	23.4052	36.8737	25.2371	184.604	0.1964
140	22.7635	36.8730	25.4234	180.530	0.1379
150	22.2809	36.8580	25.5520	178.238	0.1250
160	22.0157	36.9346	25.6826	171.215	0.0666
170	21.2664	36.8732	25.8467	171.071	0.0471
180	20.5486	36.7987	25.9873	172.822	0.0276
190	20.3366	36.7839	26.0331	171.233	0.0212
200	19.7314	36.7454	26.1651	164.093	-0.0048
250	18.3929	36.5844	26.3876	172.542	-0.0178
300	17.4633	36.4379	26.5062	168.964	0.0017
350	16.4789	36.2634	26.6082	158.870	-0.0048
400	14.3440	35.8992	26.8081	141.158	0.0017
450	12.7936	35.6258	26.9197	130.220	-0.0113
500	11.6570	35.4356	26.9930	124.963	0.0017
600	9.2873	35.0964	27.1471	120.089	0.0017
700	8.0168	34.9687	27.2468	122.569	-0.0048
800	6.9561	34.8951	27.3423	129.621	-0.0103
900	6.3105	34.9178	27.4474	143.939	-0.0103
1000	5.6577	34.9468	27.5540	163.842	-0.0103

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
1013	1	5.5907	NaN	25.70	20.20	1.40	22.10
755	2	7.4300	NaN	12.60	20.60	1.60	27.10
505	3	11.5284	NaN	3.90	11.20	1.10	19.50
302	4	17.4201	NaN	54.80	3.40	0.30	6.50
199	5	19.7330	0.0069	32.20	1.80	0.10	2.60
131	6	23.4052	0.0799	NaN	NaN	NaN	NaN
96	7	25.6443	0.2149	5.20	2.30	0.05	0.05
85	8	26.1880	0.2603	NaN	NaN	NaN	NaN
50	9	27.2520	0.1198	29.80	2.50	0.10	0.05
20	10	27.2318	NaN	53.80	4.70	0.10	0.10
10	11	27.2440	NaN	42.30	4.50	0.10	0.10
2	12	27.2446	0.0848	41.50	2.80	0.10	0.05

Project: OC449_09 Time: 03-Dec-2008 15:48:46 Z
 Vessel: R/V Oceanus Water Depth: 1820 m
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 Cast: 007 Longitude: -64 52.020

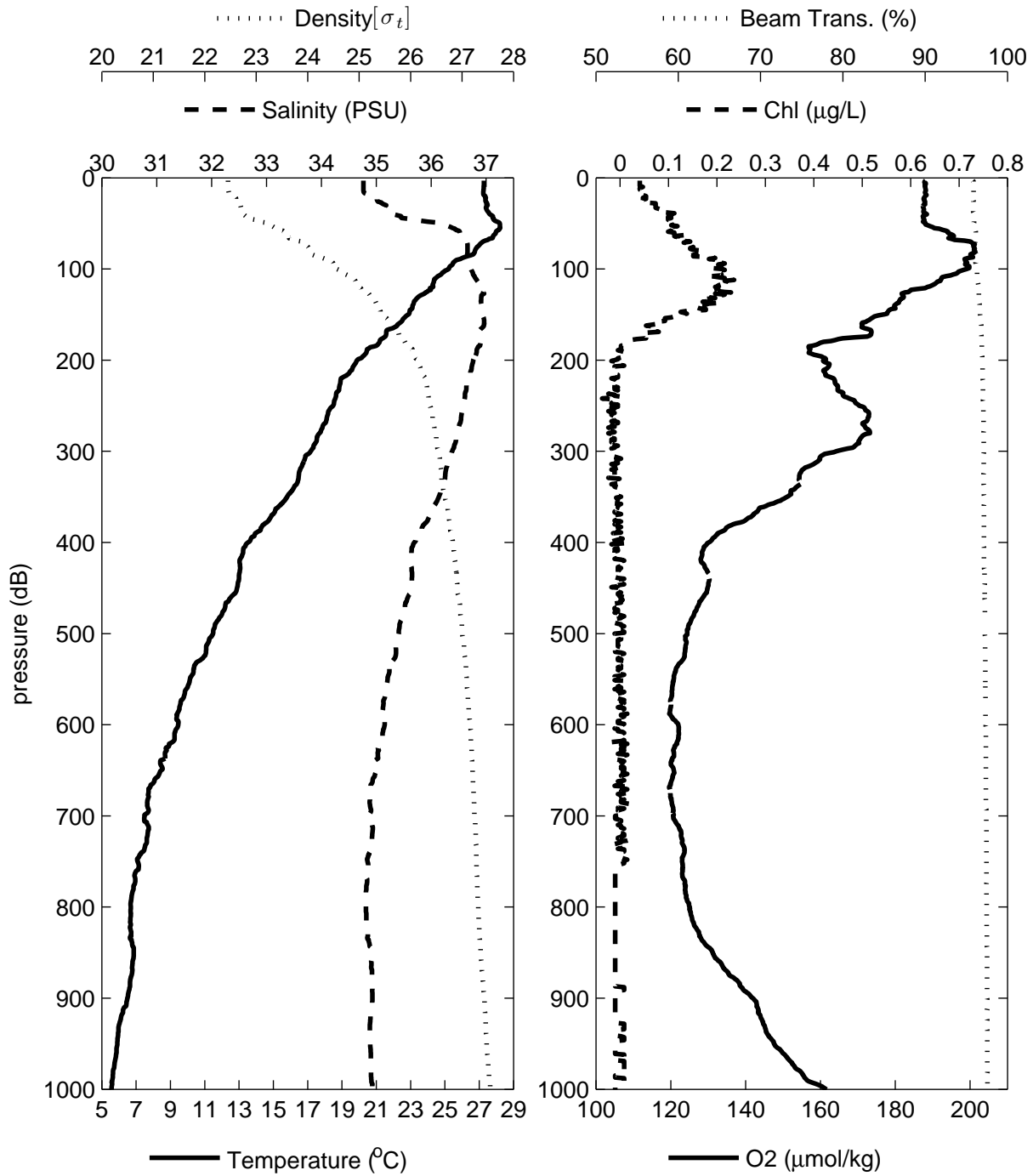


OC449_09 R/V Oceanus
 CTD station: 8
 Latitude: 17° 53.0700' N Longitude: 64° 52.0992' W
 03-Dec-2008 19:09:56Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.2694	34.7668	22.4561	187.941	0.0471
20	27.3504	34.9816	22.5910	188.011	0.0536
30	27.4904	35.1814	22.6969	187.510	0.0731
40	27.6204	35.3130	22.7536	188.451	0.0860
50	28.1953	36.1747	23.2141	187.981	0.0990
60	27.9738	36.5239	23.5498	194.059	0.1120
70	27.2189	36.6489	23.8898	200.156	0.1445
80	26.7567	36.6634	24.0493	201.200	0.1704
90	25.6809	36.7139	24.4298	198.660	0.2029
100	25.2262	36.7223	24.5737	199.128	0.2093
110	24.4631	36.8049	24.8694	192.333	0.2159
120	24.3121	36.9077	24.9946	188.597	0.1964
130	23.4913	36.9141	25.2425	182.264	0.2093
140	23.1193	36.9162	25.3530	179.812	0.1509
150	22.8944	36.9302	25.4288	177.111	0.1185
160	22.3101	36.9672	25.6253	171.018	0.0795
170	21.5798	36.8841	25.7683	173.620	0.0568
180	21.1964	36.8994	25.8865	160.825	0.0212
190	20.4487	36.8301	26.0379	157.089	0.0017
200	19.8917	36.7668	26.1389	160.744	-0.0113
250	18.4895	36.5967	26.3723	170.345	-0.0243
300	17.1790	36.3829	26.5330	164.305	-0.0113
350	15.8027	36.1381	26.6687	151.123	0.0017
400	13.5257	35.6924	26.8233	130.156	-0.0113
450	12.8857	35.6331	26.9067	129.822	0.0017
500	11.4828	35.4085	27.0047	124.339	-0.0113
600	9.4523	35.1519	27.1631	121.993	0.0049
700	7.4919	34.8667	27.2439	120.628	-0.0103
800	6.6861	34.8121	27.3139	125.084	-0.0103
900	6.4871	34.9282	27.4322	141.933	-0.0103
1000	5.5729	34.9342	27.5543	161.553	-0.0103

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
1013	1	5.4650	NaN	5.20	25.80	1.70	25.90
759	2	7.1378	NaN	0.80	25.70	2.00	31.90
506	3	11.2573	NaN	7.90	11.90	1.30	21.20
305	4	16.8699	NaN	3.20	3.80	0.50	8.70
203	5	19.8103	0.0068	4.60	2.30	0.10	3.00
131	6	23.4274	0.1155	NaN	NaN	NaN	NaN
112	7	24.3781	0.1493	NaN	NaN	NaN	NaN
92	8	25.5448	0.2653	2.50	2.10	0.10	0.05
52	9	28.2076	0.1110	1.20	2.60	0.10	0.05
21	10	27.3702	NaN	1.90	3.00	0.10	0.05
11	11	27.2663	NaN	1.10	2.90	0.10	0.05
2	12	27.2719	0.0751	3.00	3.30	0.10	0.05

Project: OC449_09 Time: 03-Dec-2008 19:09:56 Z
 Vessel: R/V Oceanus Water Depth: 4397 m
 Data type: shipctd Latitude: 17 53.070
 Cast: 008 Longitude: -64 52.099

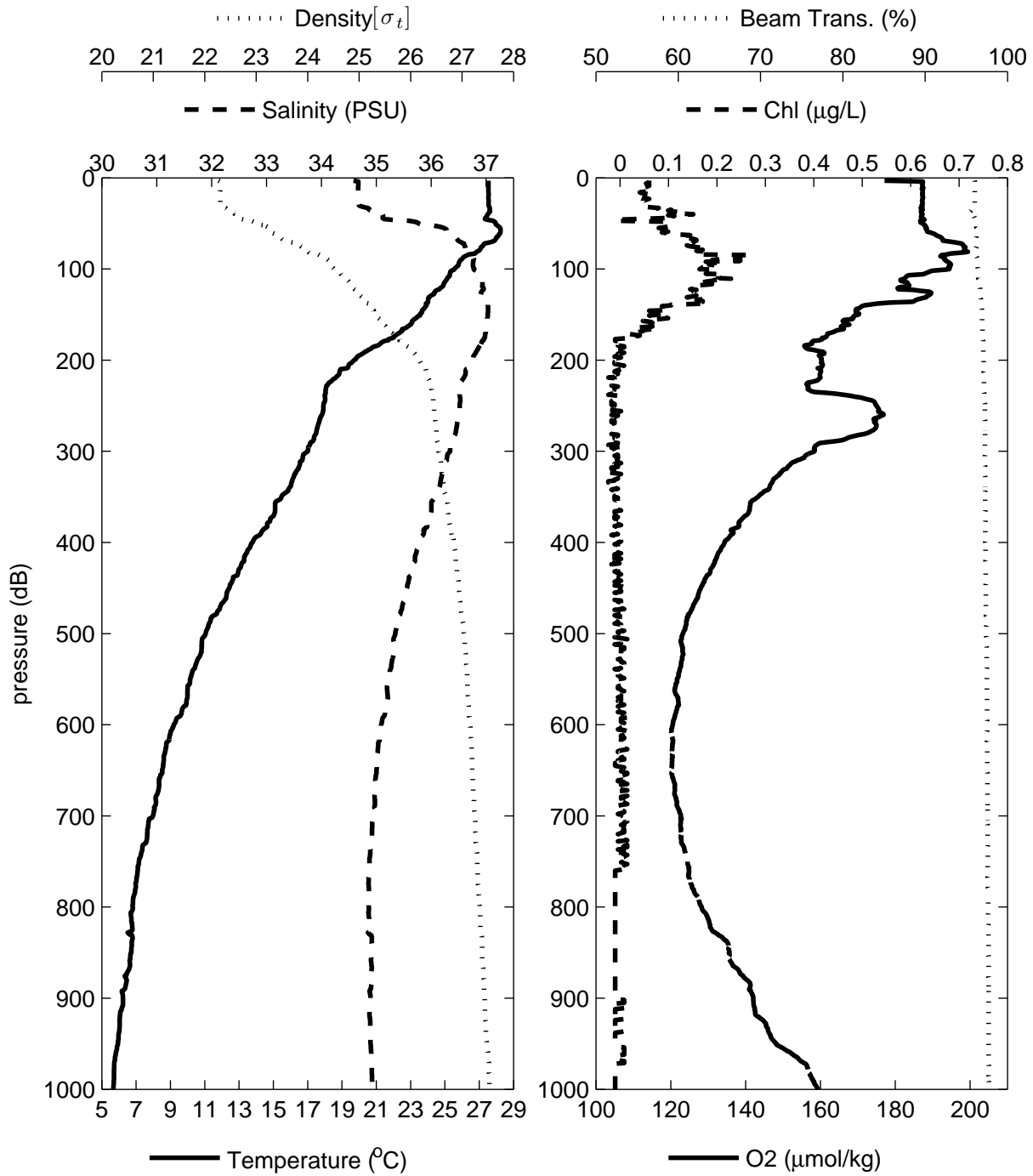


OC449_09 R/V Oceanus
 CTD station: 9
 Latitude: 17° 47.6796' N Longitude: 64° 52.0092' W
 03-Dec-2008 21:58:26Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.5380	34.6713	22.2974	187.300	0.0536
20	27.5454	34.6746	22.2979	187.266	0.0536
30	27.5511	34.6851	22.3036	187.060	0.0536
40	27.5077	35.1182	22.6418	187.313	0.1509
50	27.9539	35.7607	22.9819	187.226	0.0990
60	28.2370	36.2910	23.2878	189.312	0.0860
70	27.7619	36.5230	23.6185	194.616	0.1509
80	26.9817	36.6377	23.9578	198.555	0.1574
90	25.8937	36.7740	24.4058	193.485	0.1898
100	25.5522	36.7747	24.5127	194.410	0.1639
110	25.1320	36.9119	24.7464	182.633	0.2061
120	24.8087	36.9419	24.8682	181.171	0.1574
130	24.1394	36.9031	25.0404	188.344	0.1509
140	23.9246	37.0337	25.2043	171.834	0.1055
150	23.5543	37.0292	25.3110	170.197	0.0795
160	23.0274	37.0179	25.4569	167.261	0.0601
170	22.3704	36.9946	25.6296	162.709	0.0341
180	21.3520	36.9201	25.8587	157.740	0.0081
190	20.4529	36.8300	26.0367	159.409	-0.0048
200	19.7174	36.7494	26.1718	160.267	-0.0178
250	17.9221	36.5182	26.4549	175.003	-0.0113
300	17.0104	36.3451	26.5448	158.416	-0.0113
350	15.4738	36.0622	26.6852	143.291	-0.0113
400	13.7840	35.7825	26.8378	134.384	-0.0048
450	12.4245	35.5591	26.9406	128.013	0.0017
500	11.0493	35.3462	27.0363	123.227	0.0017
600	9.1952	35.0888	27.1560	120.545	0.0081
700	7.9899	34.9677	27.2500	122.709	0.0017
800	6.8031	34.8652	27.3398	128.148	-0.0103
900	6.2344	34.8945	27.4392	142.040	-0.0103
1000	5.6714	34.9271	27.5367	159.341	-0.0103

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
1009	1	5.5926	NaN	14.00	23.60	0.70	23.90
746	2	7.2232	NaN	1.20	23.50	1.10	30.70
504	3	10.9134	NaN	2.30	13.60	0.50	23.40
505	4	10.8710	NaN	2.30	13.60	0.50	23.40
302	5	16.8548	NaN	9.10	4.00	0.10	8.80
200	6	19.7174	0.0030	2.40	2.20	0.10	3.20
116	7	24.9289	0.1404	NaN	NaN	NaN	NaN
100	8	25.5522	0.2116	3.00	1.70	0.10	0.05
85	9	26.3136	0.2460	NaN	NaN	NaN	NaN
51	10	27.9750	0.1333	3.10	2.60	0.10	0.05
20	11	27.5423	NaN	2.10	3.20	0.10	0.05
10	12	27.5380	NaN	1.70	3.30	0.10	0.05
3	13	27.5319	0.0965	2.90	3.90	0.10	0.05

Project: OC449_09 Time: 03-Dec-2008 21:58:26 Z
 Vessel: R/V Oceanus Water Depth: 1652 m
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 Cast: 009 Longitude: -64 52.009

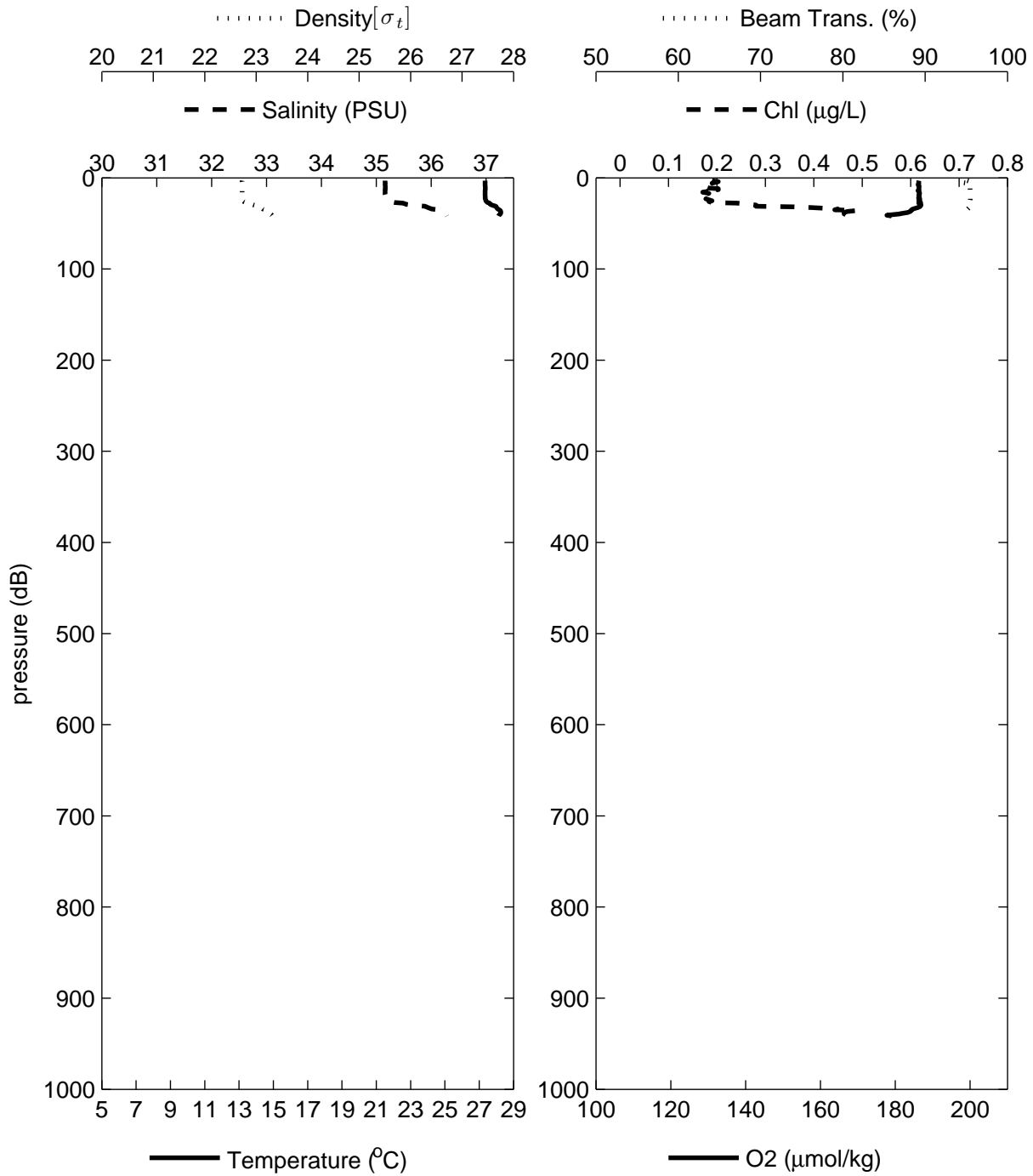


OC449_09 R/V Oceanus
 CTD station: 10
 Latitude: 18° 24.4596' N Longitude: 65° 11.9796' W
 05-Dec-2008 03:32:39Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.3503	35.1641	22.7288	186.367	0.1769
20	27.3482	35.1626	22.7285	186.374	0.1898
30	27.7380	35.6344	22.9575	186.923	0.2807
40	28.2313	36.2711	23.2749	181.332	0.4624

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
41	1	28.1550	0.4956	3.40	2.60	0.10	0.10
30	2	27.7380	0.3778	12.10	1.90	0.10	0.05
21	3	27.3494	0.1520	0.60	2.40	0.10	0.05
10	4	27.3503	0.2033	3.60	2.60	0.10	0.05
3	5	27.3460	0.1449	22.40	2.30	0.10	0.10

Project: OC449_09 Time: 05-Dec-2008 03:32:39 Z
 Vessel: R/V Oceanus Water Depth: 50 m
 Data type: shipctd Latitude: 18 24.460
 Cast: 010 Longitude: -65 11.980

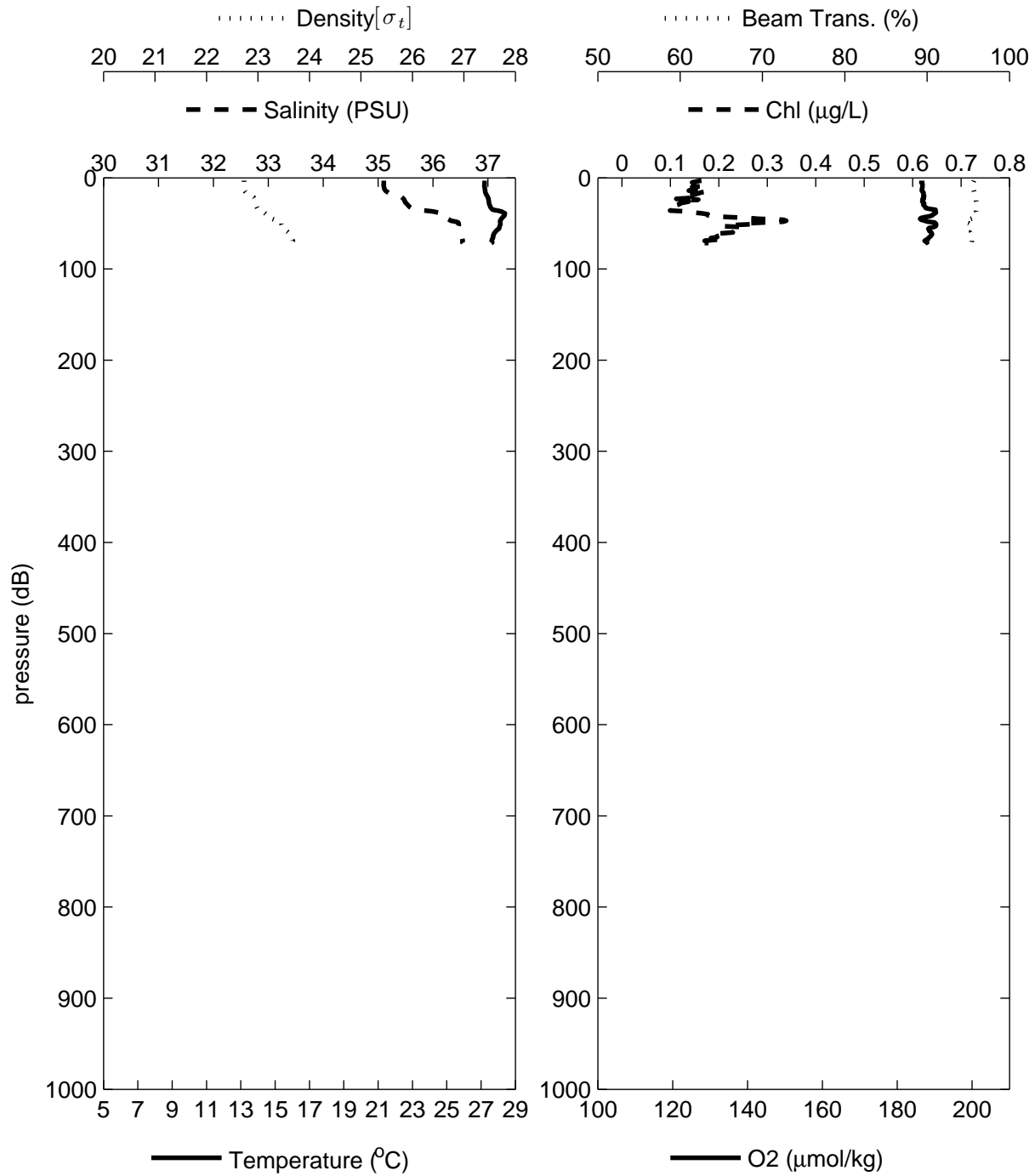


OC449_09 R/V *Oceanus*
 CTD station: 11
 Latitude: 18° 33.2592' N Longitude: 65° 12.0300' W
 05-Dec-2008 05:43:39Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.2073	35.1067	22.7317	186.739	0.1445
20	27.3586	35.3691	22.8806	187.210	0.1250
30	27.4997	35.5427	22.9657	187.073	0.1120
40	28.3843	36.1868	23.1600	189.673	0.1769
50	28.1251	36.4680	23.4579	190.270	0.2548
60	27.8107	36.5046	23.5887	189.070	0.2288
70	27.6518	36.5355	23.6640	187.790	0.1898

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
71	1	27.6506	0.1347	16.20	2.70	0.10	0.10
49	2	28.1179	0.3584	30.10	3.10	0.10	0.10
21	3	27.3887	0.1528	3.50	2.60	0.10	0.05
11	4	27.2189	NaN	48.70	6.00	0.10	0.10
3	5	27.2108	0.1549	60.00	3.20	0.10	0.10

Project: OC449_09 Time: 05-Dec-2008 05:43:39 Z
 Vessel: R/V Oceanus Water Depth: 75 m
 Data type: shipctd Latitude: 18 33.259
 Cast: 011 Longitude: -65 12.030

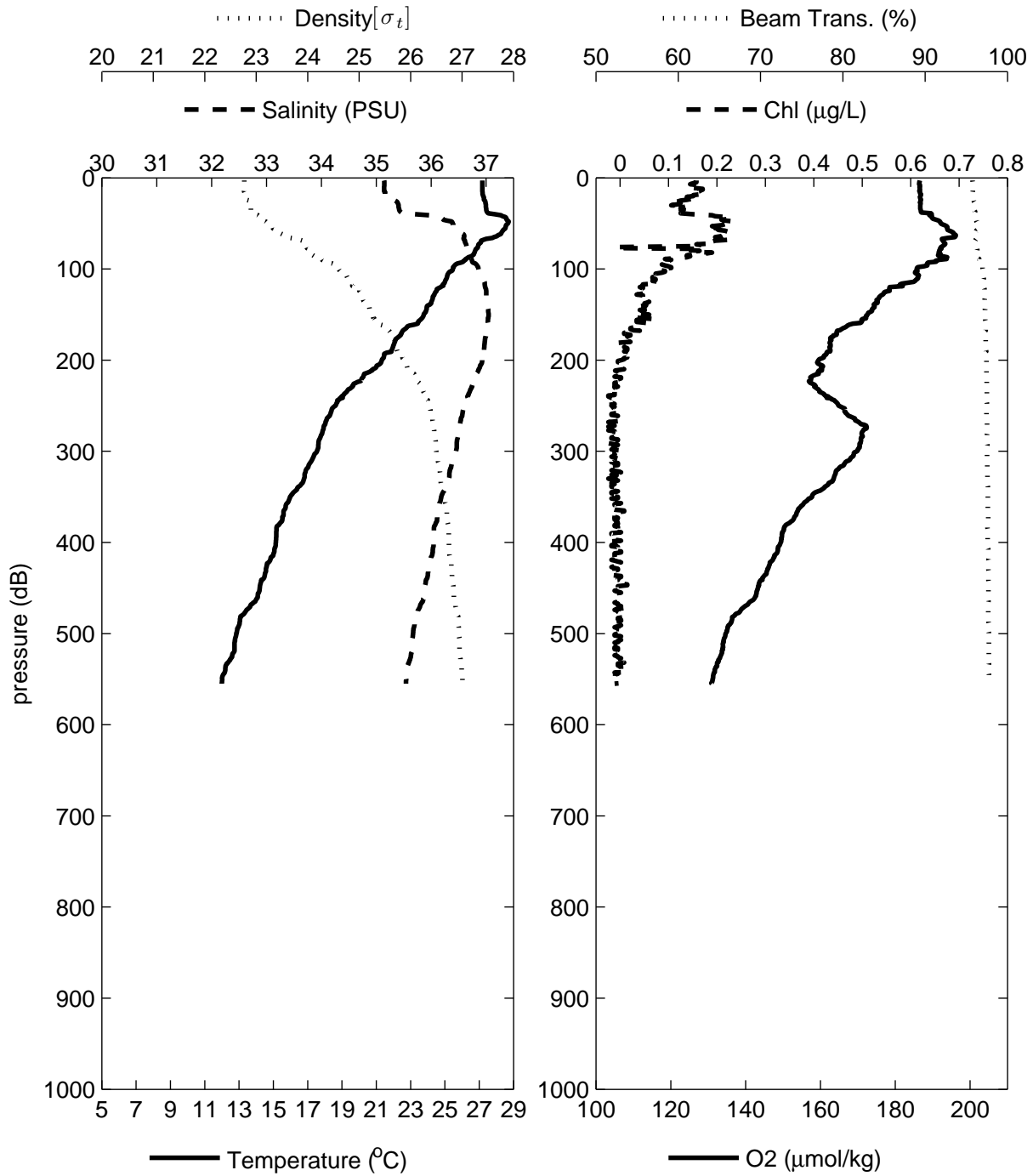


OC449_09 R/V Oceanus
 CTD station: 12
 Latitude: 18° 35.7600' N Longitude: 65° 12.0096' W
 05-Dec-2008 07:01:31Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.1825	35.1446	22.7684	186.479	0.1574
20	27.2349	35.2083	22.7994	186.754	0.1509
30	27.3905	35.4055	22.8977	186.666	0.1055
40	27.9213	35.7219	22.9690	189.763	0.1509
50	28.6711	36.3888	23.2169	192.168	0.2159
60	28.2977	36.5620	23.4717	195.529	0.2093
70	27.1095	36.6169	23.9010	192.883	0.1898
80	26.7672	36.6611	24.0446	191.731	0.1639
90	26.2074	36.7405	24.2819	191.816	0.1055
100	25.4651	36.8619	24.6058	185.742	0.0795
110	25.1050	36.9415	24.7772	186.091	0.0666
120	24.7613	36.9816	24.9062	178.471	0.0407
130	24.3015	37.0046	25.0695	175.959	0.0471
140	24.0009	37.0245	25.1727	174.492	0.0536
150	23.7650	37.0462	25.2615	172.618	0.0601
160	23.4205	37.0389	25.3588	168.674	0.0471
170	22.4849	37.0041	25.6027	164.321	0.0081
180	22.0753	36.9758	25.6986	162.594	0.0212
190	21.8715	36.9610	25.7450	162.634	0.0081
200	21.3177	36.9278	25.8746	159.486	0.0017
250	18.6247	36.6127	26.3507	164.856	-0.0178
300	17.5433	36.4522	26.4980	169.702	-0.0113
350	15.9680	36.1814	26.6643	157.771	-0.0048
400	15.1461	36.0454	26.7458	149.395	-0.0113
450	14.2093	35.8897	26.8301	143.293	-0.0048
500	12.8394	35.6680	26.9432	134.709	-0.0048

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
555	1	11.9906	0.0012	55.90	10.20	0.90	18.20
303	2	17.4050	NaN	37.30	4.00	0.20	5.80
202	4	21.2878	0.0129	40.10	2.60	0.10	1.40
101	5	25.4491	NaN	18.40	1.80	0.10	0.10
71	6	27.0915	0.1612	NaN	NaN	NaN	NaN
61	7	28.2813	0.2658	NaN	NaN	NaN	NaN
50	8	28.6711	0.2537	23.00	4.30	0.10	0.10
21	9	27.2691	NaN	11.40	4.40	0.10	0.05
12	10	27.1827	NaN	22.70	2.30	0.10	0.05
2	11	27.1826	0.1743	48.50	3.60	0.10	0.05

Project: OC449_09 Time: 05-Dec-2008 07:01:31 Z
 Vessel: R/V Oceanus Water Depth: 573 m
 Data type: shipctd Latitude: 18 35.760
 Cast: 012 Longitude: -65 12.010

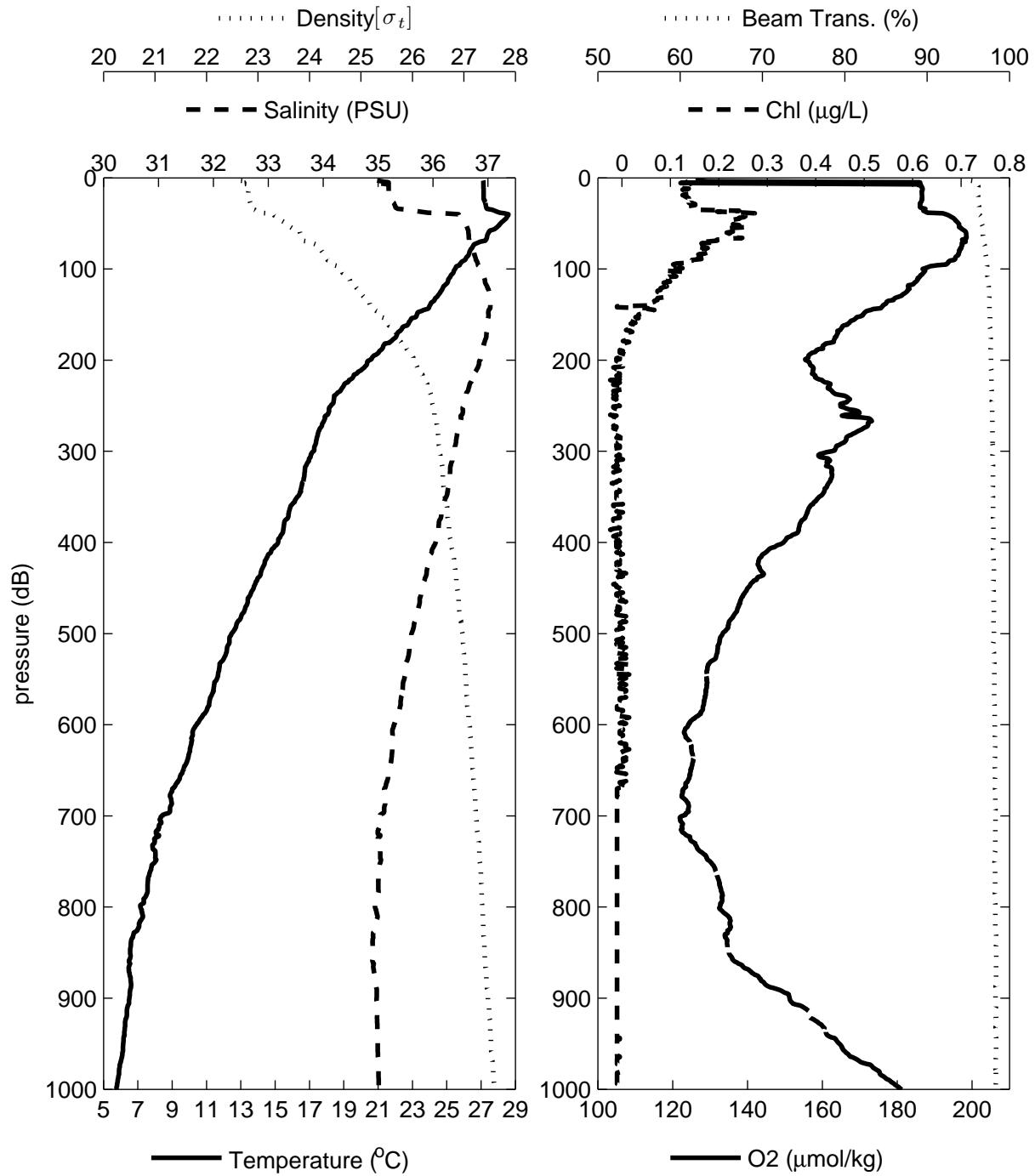


OC449_09 R/V Oceanus
 CTD station: 13
 Latitude: 18° 39.0792' N Longitude: 65° 11.9892' W
 05-Dec-2008 09:53:26Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.1434	35.1924	22.8168	186.552	0.1250
20	27.1508	35.1939	22.8156	186.628	0.1315
30	27.2728	35.3039	22.8593	186.076	0.1509
40	28.5961	36.4656	23.3001	193.023	0.2612
50	28.1458	36.5994	23.5501	196.403	0.2353
60	27.4414	36.6457	23.8154	198.394	0.2159
70	26.9245	36.6760	24.0052	198.302	0.1704
80	26.3694	36.7428	24.2324	196.514	0.1574
90	26.0688	36.7812	24.3563	195.224	0.1445
100	25.4852	36.8561	24.5950	186.806	0.1055
110	25.1520	36.9316	24.7551	185.512	0.0990
120	24.7880	36.9898	24.9105	182.989	0.0860
130	24.4655	37.0378	25.0452	180.715	0.0795
140	24.0178	37.0447	25.1849	176.189	0.0666
150	23.2638	37.0097	25.3817	170.840	0.0341
160	22.7750	37.0060	25.5211	166.851	0.0179
170	22.1371	36.9752	25.6807	164.202	0.0081
180	21.6993	36.9400	25.7771	163.014	0.0146
190	21.0809	36.9106	25.9272	158.336	0.0017
200	20.5216	36.8576	26.0394	155.495	-0.0113
250	18.2438	36.5575	26.4048	164.956	-0.0048
300	17.2441	36.3923	26.5251	162.558	-0.0113
350	16.2923	36.2370	26.6317	159.143	-0.0113
400	15.1778	36.0477	26.7406	149.602	-0.0048
450	13.7462	35.8141	26.8700	140.070	-0.0048
500	12.4678	35.6107	26.9724	133.389	-0.0103
600	10.4243	35.2944	27.1082	124.132	-0.0048
700	8.4260	35.0310	27.2332	122.535	-0.0103
800	7.1478	34.9425	27.3528	132.637	-0.0103
900	6.5074	34.9733	27.4661	151.216	-0.0103
1000	5.7662	35.0133	27.5930	181.274	-0.0103

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
1010	1	5.6941	NaN	8.30	20.00	1.50	23.60
757	2	7.7895	NaN	10.80	21.30	1.70	27.80
505	3	12.3393	NaN	10.10	11.50	1.10	19.40
303	4	17.1195	NaN	5.70	3.90	0.40	8.30
201	5	20.4008	0.0046	5.40	2.10	0.10	3.20
103	6	25.4042	0.1068	16.10	1.90	0.05	0.10
56	7	27.8107	0.2996	19.10	2.10	0.05	0.05
46	8	28.3710	0.2249	NaN	NaN	NaN	NaN
36	9	27.8034	0.3174	NaN	NaN	NaN	NaN
21	10	27.1510	NaN	17.10	1.80	0.05	0.10
10	11	27.1441	NaN	13.00	2.50	0.05	0.10
2	12	27.1287	0.1755	9.80	2.60	0.05	0.10

Project: OC449_09 Time: 05-Dec-2008 09:53:26 Z
 Vessel: R/V Oceanus Water Depth: 1076 m
 Data type: shipctd Latitude: 18 39.079
 Cast: 013 Longitude: -65 11.989

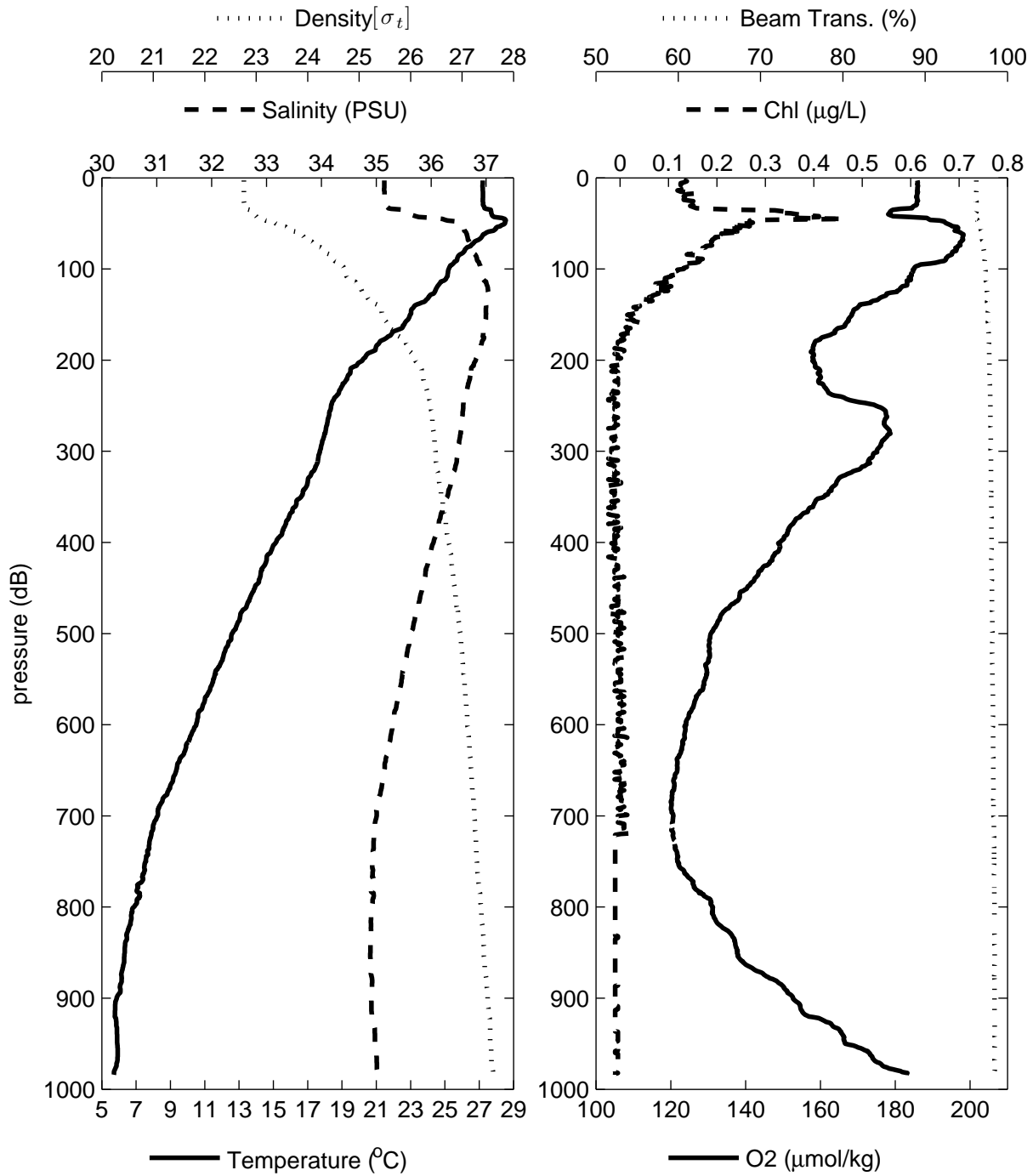


OC449_09 R/V Oceanus
 CTD station: 14
 Latitude: 18° 42.5100' N Longitude: 65° 12.0900' W
 05-Dec-2008 12:39:23Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.1999	35.1464	22.7638	186.000	0.1379
20	27.2174	35.1508	22.7618	185.639	0.1315
30	27.2302	35.1608	22.7649	185.603	0.1509
40	27.7257	35.6216	22.9517	178.136	0.3651
50	28.4995	36.5225	23.3749	193.616	0.2678
60	27.4146	36.6367	23.8174	197.454	0.2353
70	26.7284	36.6950	24.0825	197.648	0.1898
80	26.1465	36.7690	24.3227	196.233	0.1704
90	25.7147	36.8351	24.5079	193.476	0.1445
100	25.2297	36.9125	24.7167	185.060	0.1315
110	25.0742	36.9435	24.7881	183.863	0.0926
120	24.5393	37.0273	25.0147	181.687	0.0795
130	24.1011	37.0300	25.1491	176.915	0.0666
140	23.2486	37.0016	25.3801	170.476	0.0407
150	22.9718	36.9976	25.4577	168.362	0.0146
160	22.6519	36.9882	25.5429	166.814	0.0276
170	21.9267	36.9493	25.7207	163.832	0.0212
180	21.2030	36.9245	25.9039	158.570	-0.0048
190	20.8462	36.8874	25.9737	157.589	0.0081
200	20.1931	36.8119	26.0929	158.181	-0.0048
250	18.3672	36.5847	26.3943	174.839	-0.0048
300	17.7144	36.4868	26.4822	175.094	-0.0178
350	16.6220	36.2930	26.5970	160.918	-0.0113
400	15.1516	36.0417	26.7411	149.027	-0.0048
450	13.9170	35.8377	26.8530	140.401	-0.0048
500	12.5891	35.6325	26.9654	130.728	0.0017
600	10.5084	35.3104	27.1055	123.877	0.0017
700	8.2530	35.0071	27.2411	120.694	-0.0048
800	6.8725	34.9149	27.3694	131.269	-0.0103
900	5.8701	34.9100	27.4982	152.673	-0.0048

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
984	1	5.7010	NaN	11.50	18.70	0.90	22.40
758	2	7.4832	NaN	17.30	21.30	1.50	29.10
509	3	12.3931	NaN	22.50	9.20	0.60	18.30
303	4	17.6725	NaN	10.90	2.80	0.20	5.50
204	5	19.9209	0.0039	12.30	2.10	0.05	2.60
101	6	25.2047	0.0767	16.80	1.90	0.05	0.10
75	7	26.4992	0.1942	NaN	NaN	NaN	NaN
52	8	28.3015	0.3235	NaN	NaN	NaN	NaN
40	9	27.7257	0.4102	NaN	NaN	NaN	NaN
21	10	27.2170	NaN	16.80	2.70	0.10	0.10
10	11	27.1999	NaN	15.60	3.60	0.10	0.10
2	12	27.2051	0.1509	13.80	6.00	0.05	0.10

Project: OC449_09 Time: 05-Dec-2008 12:39:23 Z
 Vessel: R/V Oceanus Water Depth: 1040 m
 Data type: shipctd Latitude: 18 42.510
 Cast: 014 Longitude: -65 12.090

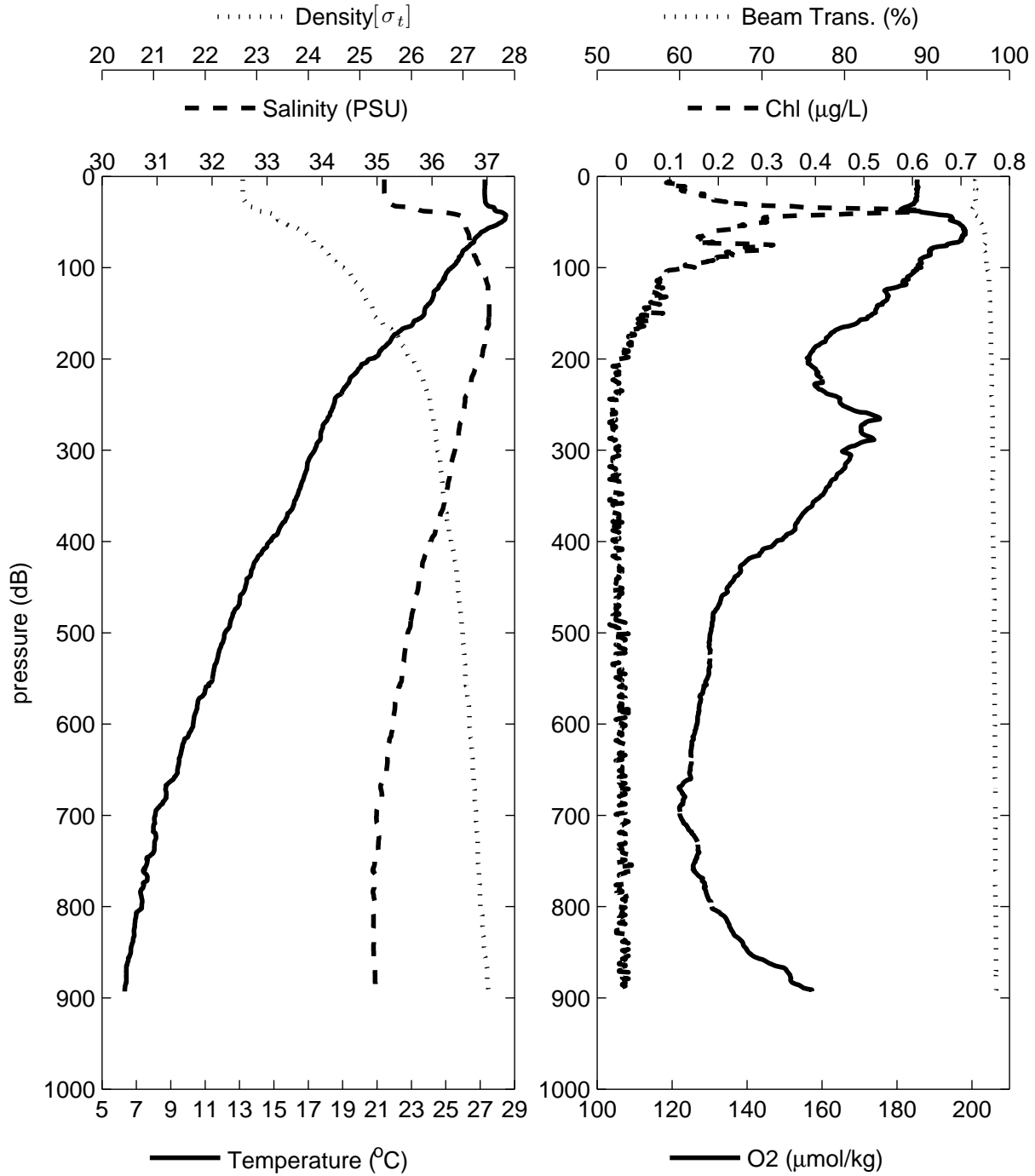


OC449_09 R/V Oceanus
 CTD station: 15
 Latitude: 18° 42.5796' N Longitude: 65° 6.0300' W
 05-Dec-2008 16:46:06Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.2739	35.1325	22.7298	185.449	0.1055
20	27.2646	35.1360	22.7353	185.274	0.1639
30	27.3503	35.2449	22.7897	184.557	0.2548
40	28.3068	36.2641	23.2430	187.501	0.5533
50	28.2653	36.5686	23.4873	195.708	0.3002
60	27.2416	36.6369	23.8731	197.874	0.1964
70	26.6559	36.6838	24.0968	197.226	0.1574
80	26.1619	36.7283	24.2882	189.328	0.2742
90	25.7589	36.8018	24.4689	186.572	0.1964
100	25.3323	36.8967	24.6733	186.487	0.1509
110	24.9299	36.9706	24.8529	182.755	0.0795
120	24.5969	37.0193	24.9913	180.831	0.0795
130	24.2983	37.0324	25.0915	177.631	0.0795
140	23.9726	37.0397	25.1944	176.156	0.0795
150	23.7564	37.0401	25.2594	173.891	0.0860
160	23.1250	37.0294	25.4372	169.576	0.0407
170	22.2692	36.9908	25.6551	163.271	0.0146
180	21.7868	36.9667	25.7729	160.954	0.0146
190	21.2630	36.9305	25.8921	157.608	0.0017
200	20.5660	36.8569	26.0234	156.579	-0.0048
250	18.4808	36.5917	26.3718	165.349	-0.0103
300	17.3728	36.4167	26.5120	165.819	-0.0048
350	16.3638	36.2502	26.6251	159.749	-0.0113
400	14.7473	35.9693	26.7727	147.835	-0.0113
450	13.3368	35.7497	26.9053	134.774	-0.0113
500	12.1583	35.5602	26.9935	130.279	0.0017
600	10.3037	35.2952	27.1300	126.661	0.0017
700	8.1020	34.9947	27.2542	122.098	0.0081
800	7.3127	34.9543	27.3387	130.619	-0.0103

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
893	1	6.3211	NaN	9.20	20.70	1.20	25.50
757	2	7.4949	NaN	10.40	21.10	1.50	28.90
504	3	12.1083	NaN	12.30	10.40	0.70	20.50
304	4	17.2367	NaN	14.50	3.30	0.40	7.30
201	5	20.4812	0.0024	11.10	2.20	0.10	3.00
101	6	25.2776	0.0714	17.40	2.80	0.10	0.10
51	7	28.1093	0.3102	12.30	1.80	0.10	0.10
42	8	28.4901	0.4422	12.00	2.10	0.10	0.10
30	9	27.3503	0.4071	18.90	14.00	0.05	0.05
9	10	27.2772	NaN	16.00	3.80	0.10	0.10
2	11	27.2770	0.2062	11.50	3.90	0.10	0.10

Project: OC449_09 Time: 05-Dec-2008 16:46:06 Z
 Vessel: R/V Oceanus Water Depth: 904 m
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 Cast: 015 Longitude: -65 6.030

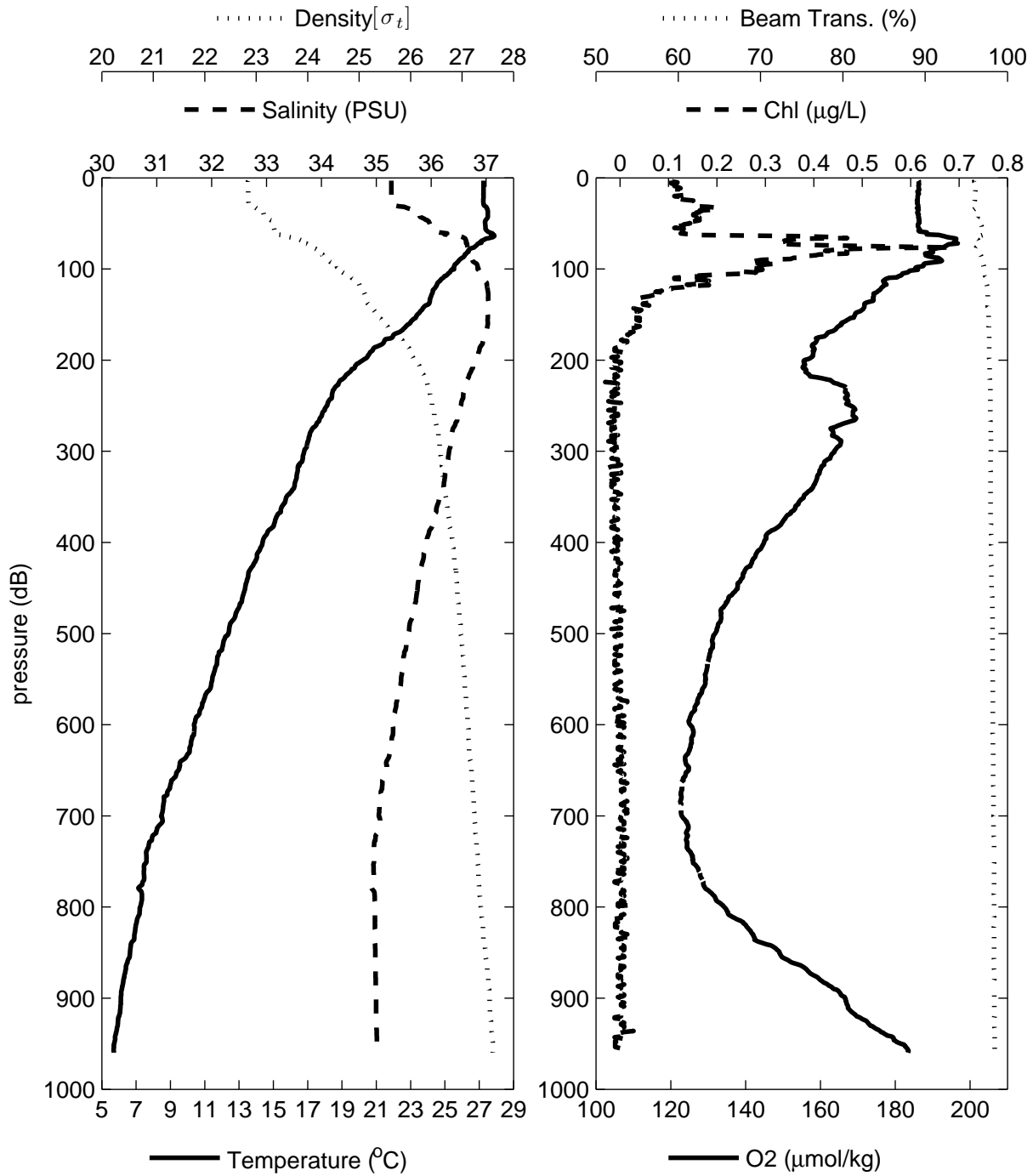


OC449_09 R/V Oceanus
 CTD station: 16
 Latitude: 18° 42.5196' N Longitude: 64° 59.9796' W
 05-Dec-2008 19:30:33Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.2539	35.2747	22.8431	186.273	0.1185
20	27.2483	35.2757	22.8458	185.997	0.1120
30	27.2640	35.3088	22.8657	186.120	0.1509
40	27.4997	35.7830	23.1466	186.262	0.1509
50	27.3449	35.9722	23.3393	186.288	0.1445
60	27.5945	36.1502	23.3925	188.467	0.1315
70	27.0865	36.6408	23.9264	195.985	0.3391
80	26.3475	36.6985	24.2060	189.677	0.4235
90	25.8540	36.7480	24.3985	192.237	0.2937
100	25.5294	36.8474	24.5755	185.365	0.2937
110	24.9029	36.9708	24.8614	178.363	0.1120
120	24.4567	37.0208	25.0349	176.501	0.1315
130	24.1906	37.0382	25.1283	174.240	0.0601
140	23.8751	37.0450	25.2285	171.750	0.0601
150	23.4026	37.0281	25.3544	169.270	0.0276
160	22.9426	37.0319	25.4915	165.517	0.0341
170	22.2642	36.9940	25.6586	161.919	0.0212
180	21.4464	36.9408	25.8483	158.815	0.0146
190	20.7575	36.8741	25.9879	157.984	-0.0113
200	20.2431	36.8197	26.0859	155.786	-0.0048
250	18.1359	36.5401	26.4188	168.102	-0.0113
300	16.8022	36.3272	26.5808	163.720	-0.0146
350	15.7613	36.1464	26.6842	155.497	-0.0048
400	14.3663	35.9158	26.8168	144.916	-0.0113
450	13.3553	35.7526	26.9037	137.801	-0.0103
500	12.3840	35.5922	26.9747	131.821	-0.0048
600	10.3740	35.2972	27.1193	125.212	0.0017
700	8.4702	35.0453	27.2375	122.930	0.0081
800	7.2378	34.9749	27.3653	134.261	0.0017
900	6.1078	34.9960	27.5356	166.532	0.0017

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
958	1	5.6958	NaN	9.70	18.70	0.80	23.00
756	2	7.4580	NaN	12.00	21.70	1.40	28.30
505	3	12.1775	NaN	7.70	10.70	0.70	19.80
304	4	16.7423	NaN	10.80	3.90	0.50	8.30
201	5	20.1527	0.0025	8.90	4.00	0.20	3.70
101	6	25.4007	0.1717	6.70	1.80	0.10	0.10
86	7	26.1204	0.2625	NaN	NaN	NaN	NaN
76	8	26.6913	0.2864	NaN	NaN	NaN	NaN
66	9	27.5704	0.3517	NaN	NaN	NaN	NaN
51	10	27.3507	NaN	11.30	1.10	0.20	0.10
20	11	27.2483	NaN	9.50	4.00	0.10	0.10
10	12	27.2539	NaN	9.40	2.40	0.10	0.10
3	13	27.2575	0.1642	11.10	2.80	0.10	0.05

Project: OC449_09 Time: 05-Dec-2008 19:30:33 Z
 Vessel: R/V Oceanus Water Depth: 980 m
 Data type: shipctd Latitude: 18 42.520
 Cast: 016 Longitude: -64 59.980

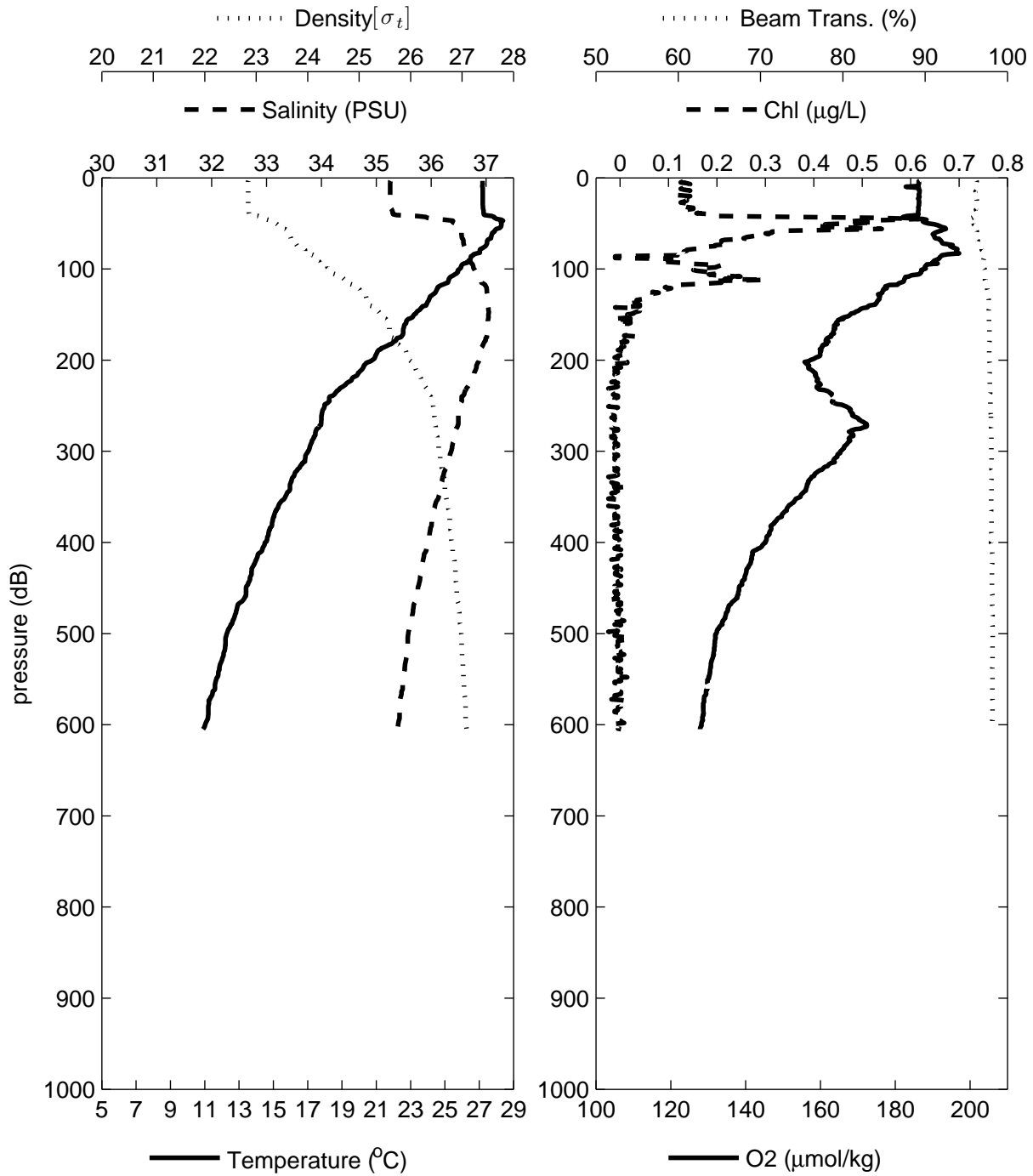


OC449_09 R/V Oceanus
 CTD station: 17
 Latitude: 18° 39.0492' N Longitude: 65° 0.0792' W
 05-Dec-2008 23:00:30Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.1795	35.2530	22.8494	182.820	0.1315
20	27.2052	35.2543	22.8436	186.372	0.1445
30	27.2118	35.2593	22.8455	186.352	0.1315
40	27.2642	35.3081	22.8650	186.227	0.1898
50	28.2884	36.4417	23.3841	188.817	0.4690
60	27.7685	36.5510	23.6371	190.595	0.3131
70	27.4614	36.5875	23.7650	192.361	0.2093
80	27.0397	36.6485	23.9473	196.277	0.1379
90	26.4738	36.6993	24.1665	191.021	0.0926
100	25.8855	36.7763	24.4100	188.142	0.1704
110	25.2632	36.8894	24.6890	182.563	0.2288
120	24.5779	37.0059	24.9869	177.396	0.0926
130	24.1419	37.0230	25.1315	175.924	0.0471
140	23.9100	37.0302	25.2062	173.091	0.0407
150	23.2143	37.0418	25.4200	168.012	0.0146
160	22.7192	37.0318	25.5577	164.462	0.0146
170	22.5714	37.0234	25.5932	163.516	0.0212
180	22.0059	36.9728	25.7171	162.170	0.0146
190	21.0900	36.8880	25.9068	160.188	0.0081
200	20.7737	36.8745	25.9838	157.357	-0.0048
250	17.9882	36.5186	26.4387	166.343	-0.0178
300	17.0166	36.3630	26.5569	165.394	-0.0178
350	15.6983	36.1365	26.6914	154.640	0.0017
400	14.5126	35.9392	26.8032	145.329	-0.0113
450	13.4095	35.7597	26.8980	138.229	0.0017
500	12.2888	35.5827	26.9861	132.121	-0.0048
600	11.0287	35.3992	27.0812	128.158	0.0017

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
503	1	12.2509	NaN	9.80	11.50	0.60	19.70
304	3	16.8874	NaN	8.80	3.00	0.05	0.10
305	4	16.8721	NaN	8.80	3.00	0.05	0.10
201	5	20.6804	0.0079	9.50	4.30	0.40	7.80
122	6	24.5365	0.0545	8.80	2.00	0.05	2.10
112	7	25.2213	0.1245	NaN	NaN	NaN	NaN
80	8	27.0397	0.1714	40.10	2.90	0.10	0.10
47	10	28.3965	0.4255	16.40	1.80	0.10	0.10
18	11	27.2033	NaN	42.80	2.60	0.10	0.10
10	12	27.1795	NaN	40.30	3.30	0.10	0.10
2	13	27.1932	0.1517	27.30	2.60	0.10	0.10

Project: OC449_09 Time: 05-Dec-2008 23:00:30 Z
 Vessel: R/V Oceanus Water Depth: 550 m
 Data type: shipctd Latitude: 18 39.049
 Cast: 017 Longitude: -65 0.079

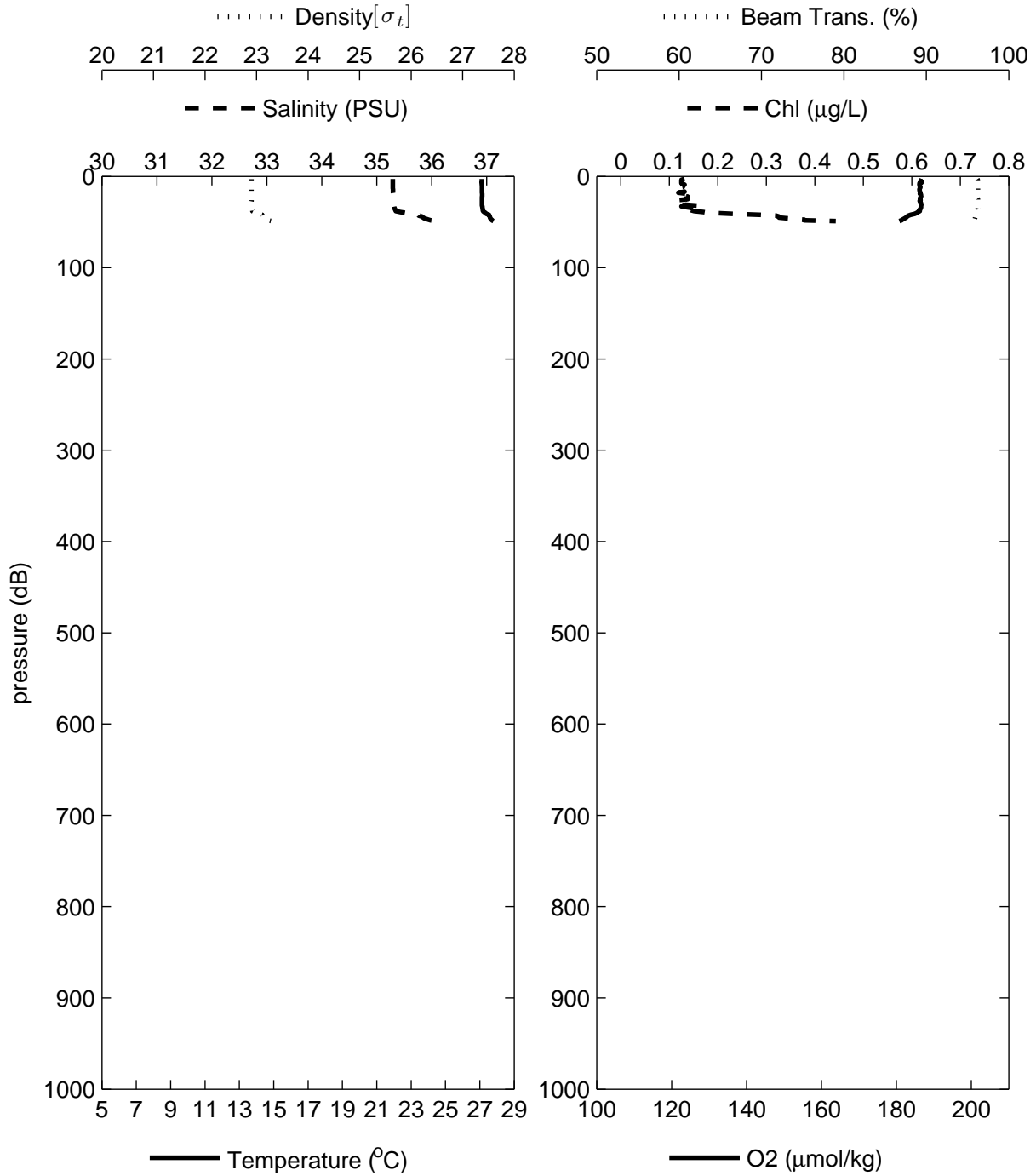


OC449_09 R/V Oceanus
 CTD station: 18
 Latitude: 18° 36.0000' N Longitude: 64° 59.9892' W
 06-Dec-2008 02:20:48Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.1236	35.2935	22.8993	186.187	0.1282
20	27.1346	35.2996	22.9003	186.553	0.1379
30	27.1249	35.2929	22.8984	186.622	0.1315
40	27.3090	35.4941	22.9906	185.589	0.1769
49	27.8019	36.1270	23.3076	180.776	0.4430

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
49	1	27.8019	0.4331	8.20	3.30	0.10	0.10
40	2	27.3090	0.2832	7.40	2.30	0.10	0.10
30	3	27.1249	0.1481	NaN	NaN	NaN	NaN
21	4	27.1378	0.1335	32.70	3.50	0.10	0.10
10	5	27.1236	0.1557	6.40	2.20	0.10	0.05
3	6	27.1149	0.1183	7.90	2.20	0.05	0.05

Project: OC449_09 Time: 06-Dec-2008 02:20:48 Z
 Vessel: R/V Oceanus Water Depth: 60 m
 Data type: shipctd Latitude: 18 36.000
 Cast: 018 Longitude: -64 59.989

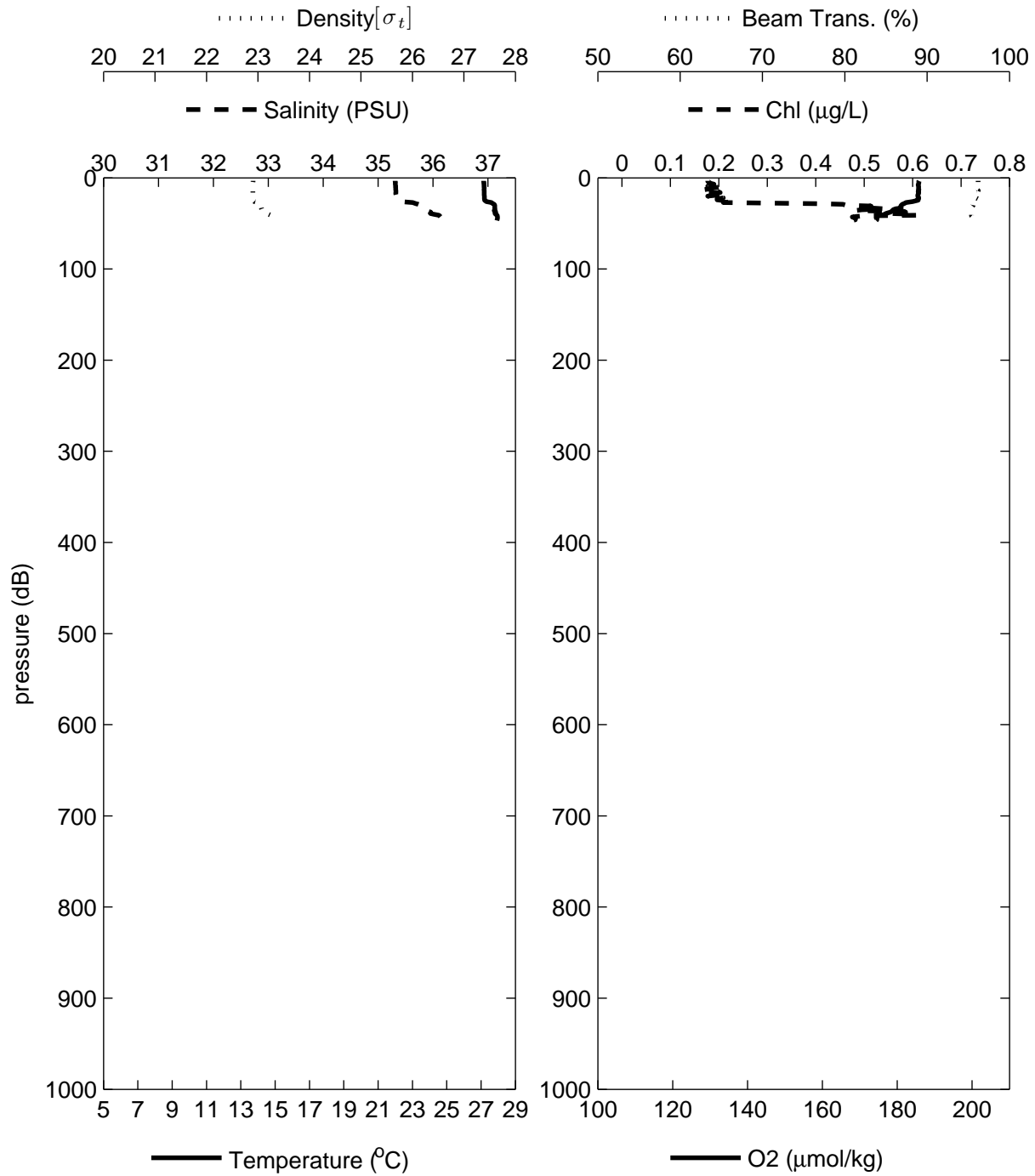


OC449_09 R/V Oceanus
 CTD station: 19
 Latitude: 18° 29.9388' N Longitude: 65° 0.0300' W
 06-Dec-2008 04:15:06Z

Pressure dB	PoTemp90 °C	Salinity PSU	SigTheta	Oxygen umol/Kg	Fluorescence ug/L
10	27.1768	35.3186	22.9012	185.767	0.2029
20	27.1942	35.3294	22.9037	185.609	0.1769
30	27.7969	35.7812	23.0487	181.086	0.4624
40	27.8590	36.0148	23.2040	177.028	0.6052

Pressure dB	Niskin	PoTemp90 °C	Chlorophyll ug/L	NH4 uM	Silicate uM	PO4 uM	NO2+NO3 uM
46	1	27.9389	0.4680	27.30	3.90	0.10	0.10
37	2	27.8376	0.5996	6.20	3.70	0.10	0.10
21	3	27.1959	0.1849	10.40	2.70	0.10	0.05
10	4	27.1768	0.1603	41.70	2.60	0.10	0.10
3	5	27.1507	0.1741	5.30	2.90	0.10	0.05

Project: OC449_09 Time: 06-Dec-2008 04:15:06 Z
 Vessel: R/V Oceanus Water Depth: 55 m
 Data type: shipctd Latitude: 18 29.939
 Cast: 019 Longitude: -65 0.030

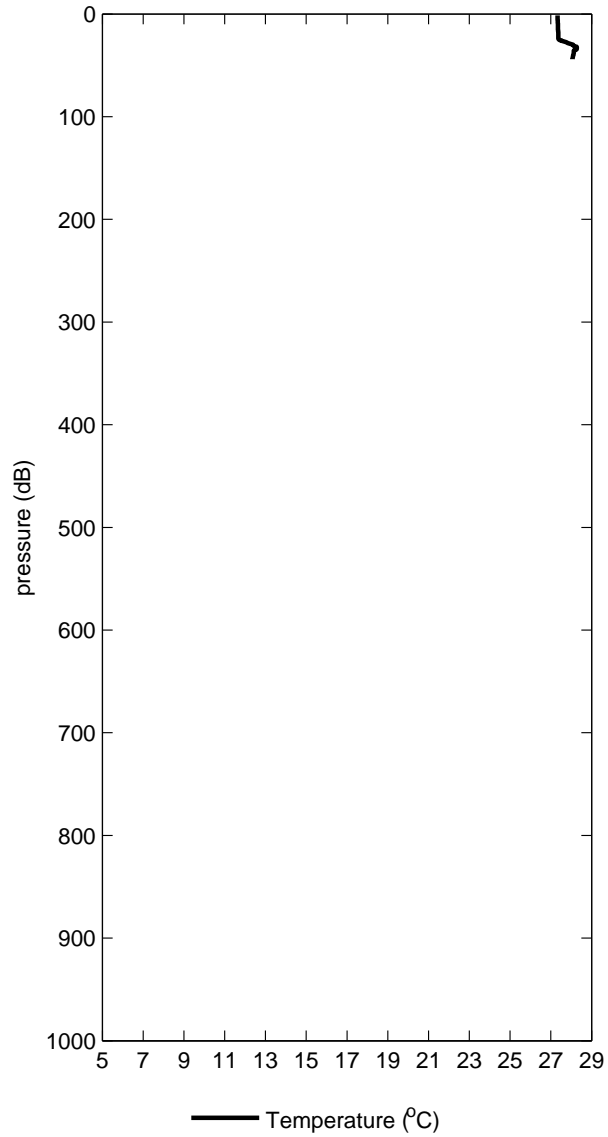


D Appendix: RBR CTD casts

Cast	Haul	Date	Latitude	Longitude	File name
2	1	01-Dec-2008 20:41:41	18° 13.6960' N	64° 44.1980' W	OC449_09_RBRctd_cast2haul1_dp2.dat
3	2	03-Dec-2008 07:15:13	18° 12.4390' N	64° 51.9660' W	OC449_09_RBRctd_cast3haul2_dp2.dat
4	3	03-Dec-2008 09:40:55	18° 10.7860' N	64° 52.0370' W	OC449_09_RBRctd_cast4haul3_dp2.dat
5	4	03-Dec-2008 12:31:38	18° 6.8670' N	64° 52.3560' W	OC449_09_RBRctd_cast5haul4_dp2.dat
7	5	03-Dec-2008 17:15:31	17° 59.9810' N	64° 52.0880' W	OC449_09_RBRctd_cast7haul5_dp2.dat
8	6	03-Dec-2008 20:22:55	17° 52.5670' N	64° 53.0760' W	OC449_09_RBRctd_cast8haul6_dp2.dat
9	7	03-Dec-2008 23:27:18	17° 47.6550' N	64° 51.9660' W	OC449_09_RBRctd_cast9haul7_dp2.dat
9	8	04-Dec-2008 00:25:31	17° 47.9560' N	64° 51.9710' W	OC449_09_RBRctd_cast9haul8_dp2.dat
10	9	05-Dec-2008 04:01:44	18° 24.3420' N	65° 12.1000' W	OC449_09_RBRctd_cast10haul9_dp2.dat
11	10	05-Dec-2008 06:12:18	18° 33.2380' N	65° 11.9210' W	OC449_09_RBRctd_cast11haul10_dp2.dat
12	11	05-Dec-2008 07:52:22	18° 35.6620' N	65° 11.9780' W	OC449_09_RBRctd_cast12haul11_dp2.dat
12	12	05-Dec-2008 08:36:21	18° 35.8780' N	65° 12.2960' W	OC449_09_RBRctd_cast12haul12_dp2.dat
13	13	05-Dec-2008 11:14:32	18° 39.5380' N	65° 11.6340' W	OC449_09_RBRctd_cast13haul13_dp2.dat
14	14	05-Dec-2008 14:10:27	18° 42.6380' N	65° 11.9460' W	OC449_09_RBRctd_cast14haul14_dp2.dat
14	15	05-Dec-2008 14:56:06	18° 42.4950' N	65° 12.0210' W	OC449_09_RBRctd_cast14haul15_dp2.dat
15	16	05-Dec-2008 17:56:17	18° 42.5800' N	65° 5.9920' W	OC449_09_RBRctd_cast15haul16_dp2.dat
16	17	05-Dec-2008 20:49:21	18° 42.5350' N	65° 0.1760' W	OC449_09_RBRctd_cast16haul17_dp2.dat
16	18	05-Dec-2008 21:37:14	18° 42.6240' N	65° 0.5320' W	OC449_09_RBRctd_cast16haul18_dp2.dat
17	19	06-Dec-2008 00:10:40	18° 39.0610' N	64° 59.1880' W	OC449_09_RBRctd_cast17haul19_dp2.dat
17	20	06-Dec-2008 01:01:01	18° 38.9920' N	64° 59.9270' W	OC449_09_RBRctd_cast17haul20_dp2.dat
18	21	06-Dec-2008 03:03:36	18° 36.0100' N	64° 59.9470' W	OC449_09_RBRctd_cast18haul21_dp2.dat
19	23	06-Dec-2008 04:39:10	18° 29.7900' N	65° 0.0400' W	OC449_09_RBRctd_cast19haul23_dp2.dat

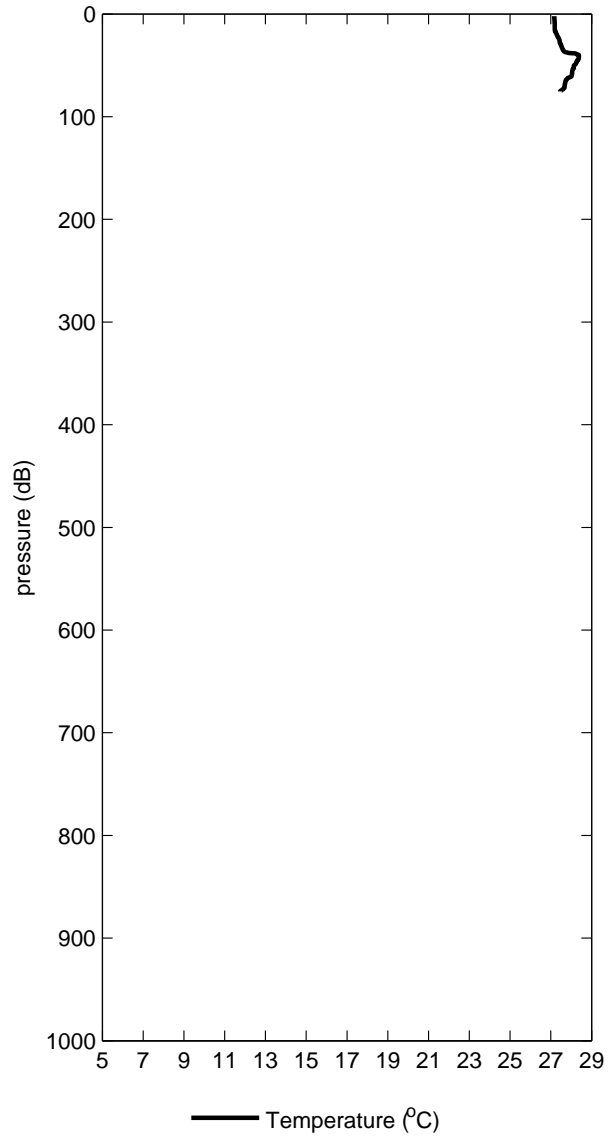
OC449_09 R/V Oceanus
CTD station: 2 Net Haul: 1
Latitude: 18° 24.3420' N Longitude: 65° 12.1000' W
05-Dec-2008 04:01:44Z

Pressure dB	Temp90 °C
10	27.3455
20	27.3679
30	28.0914
40	28.0933



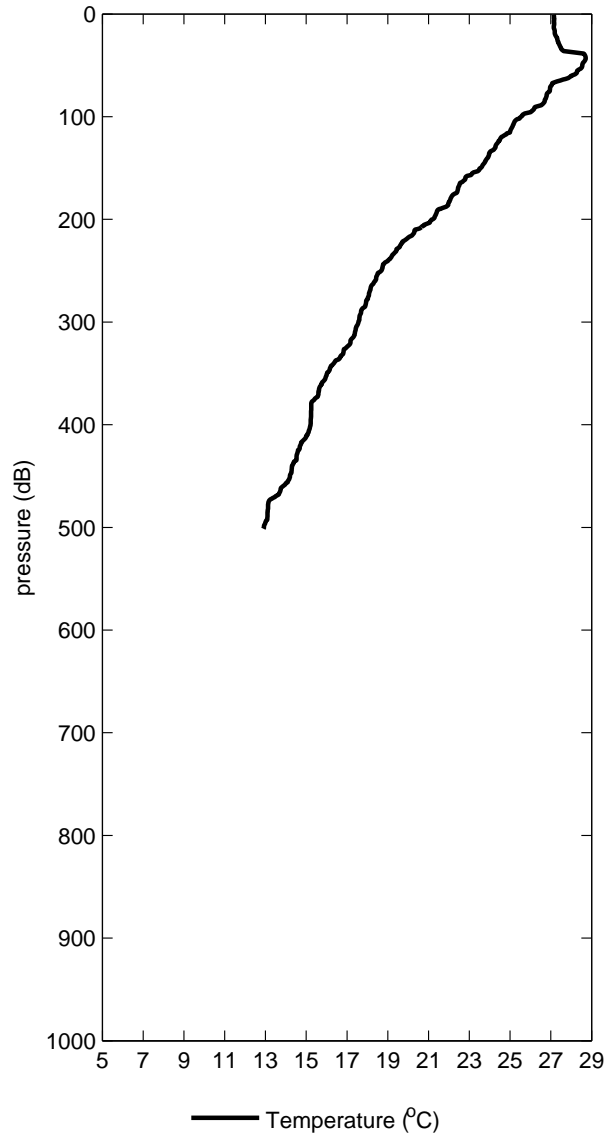
OC449_09 R/V Oceanus
CTD station: 3 Net Haul: 2
Latitude: 18° 33.2380' N Longitude: 65° 11.9210' W
05-Dec-2008 06:12:18Z

Pressure dB	Temp90 °C
10	27.1886
20	27.2958
30	27.4965
40	28.3751
50	28.1247
60	28.0206
70	27.6776



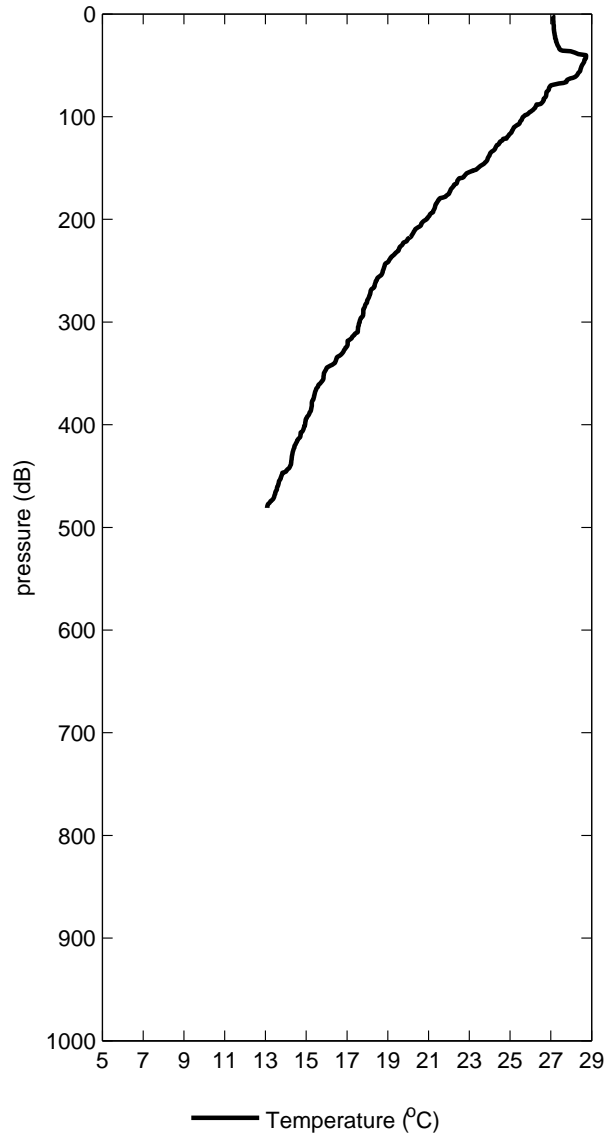
OC449_09 R/V Oceanus
CTD station: 4 Net Haul: 3
Latitude: 18° 35.6620' N Longitude: 65° 11.9780' W
05-Dec-2008 07:52:22Z

Pressure dB	Temp90 °C
10	27.1634
20	27.2189
30	27.4345
40	28.6735
50	28.5380
60	28.0128
70	27.0083
80	26.7902
90	26.2412
100	25.5207
109	25.1178
120	24.5473
130	24.2568
140	23.8708
150	23.5291
160	22.8024
170	22.4448
179	22.0883
190	21.5428
200	21.1402
250	18.6870
300	17.5584
350	16.0061
400	15.2113
450	14.2048
500	12.9235



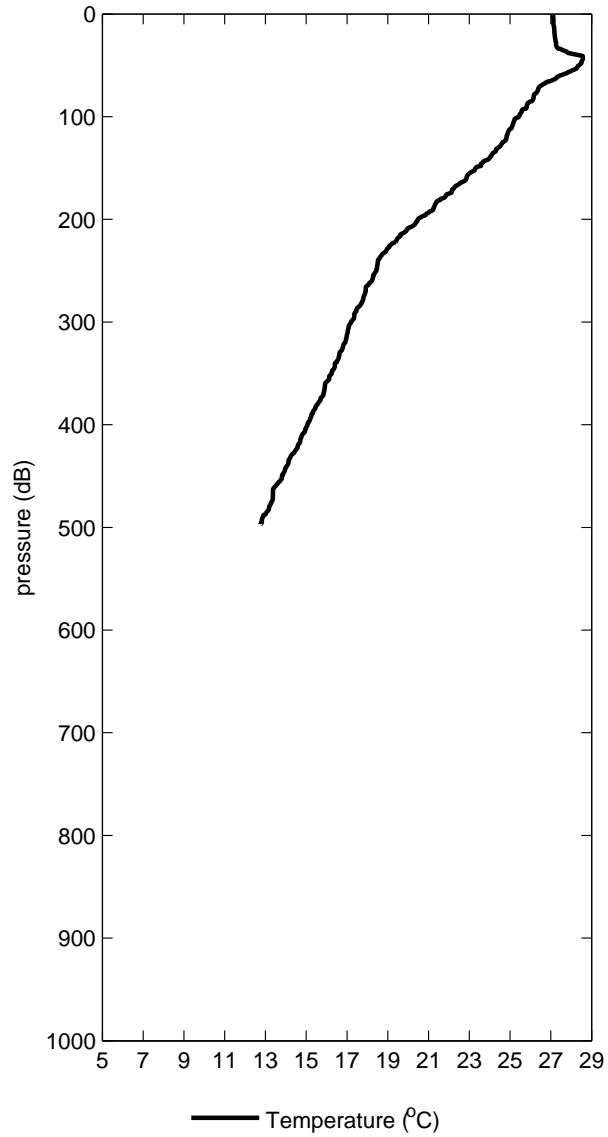
OC449_09 R/V Oceanus
 CTD station: 5 Net Haul: 4
 Latitude: 18° 35.8780' N Longitude: 65° 12.2960' W
 05-Dec-2008 08:36:21Z

Pressure dB	Temp90 °C
10	27.1357
20	27.1892
30	27.3257
40	28.7269
50	28.5215
60	28.2402
70	26.9554
80	26.7670
90	26.2446
100	25.6240
110	25.1895
120	24.8402
130	24.2818
140	23.9099
150	23.4092
160	22.5146
170	22.1176
180	21.5342
190	21.2583
200	20.8895
250	18.7582
300	17.6212
350	15.8699
400	14.9409
450	13.7736



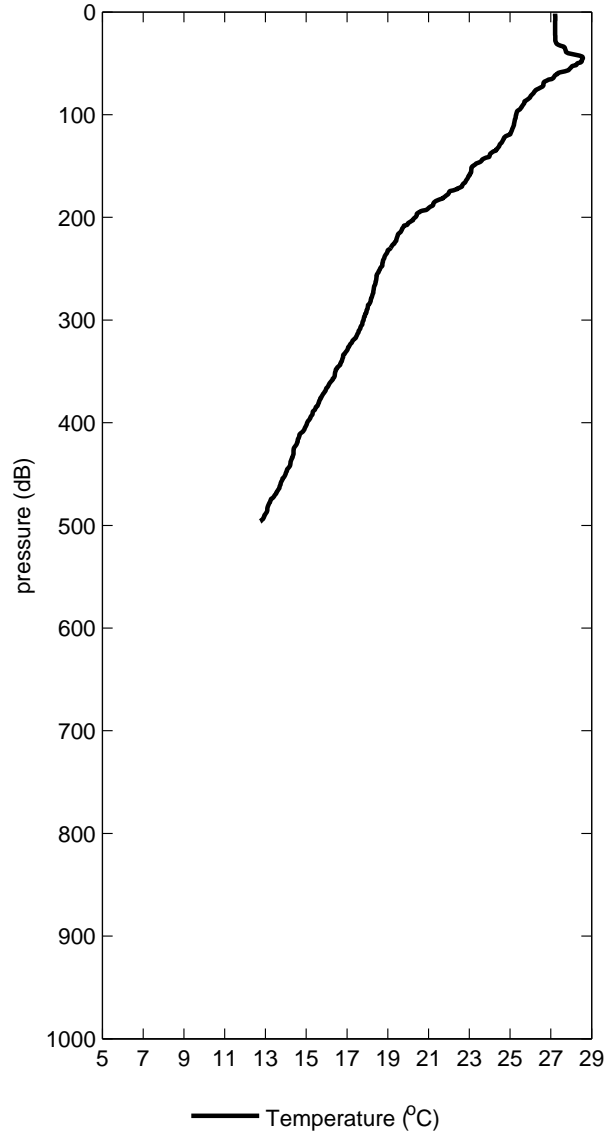
OC449_09 R/V Oceanus
 CTD station: 7 Net Haul: 5
 Latitude: 18° 39.5380' N Longitude: 65° 11.6340' W
 05-Dec-2008 11:14:32Z

Pressure dB	Temp90 °C
10	27.1315
20	27.1875
30	27.2594
41	28.5658
50	28.3482
60	27.4410
70	26.4849
80	26.1531
90	25.8191
100	25.4141
110	25.0858
120	24.8189
130	24.4051
140	23.9994
150	23.2976
160	22.8575
170	22.2045
180	21.5886
190	21.2194
200	20.4742
250	18.4397
300	17.1945
350	16.2451
400	15.0576
450	13.8131



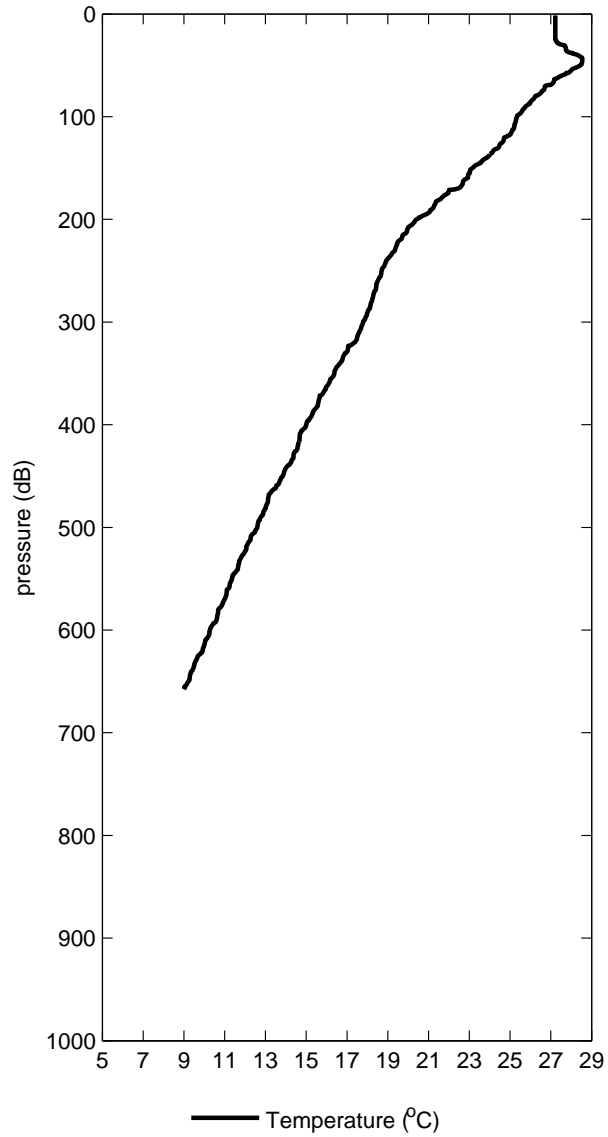
OC449_09 R/V Oceanus
 CTD station: 8 Net Haul: 6
 Latitude: 18° 42.6380' N Longitude: 65° 11.9460' W
 05-Dec-2008 14:10:27Z

Pressure dB	Temp90 °C
10	27.2126
20	27.2135
30	27.2592
40	27.8502
50	28.3068
60	27.3285
70	26.6347
80	26.0905
90	25.6493
100	25.2950
110	25.1888
120	24.9108
130	24.4799
140	23.9942
150	23.1686
160	22.9620
170	22.6388
180	21.7448
190	21.0107
200	20.3230
250	18.6202
300	17.8061
350	16.4303
400	15.0570
450	13.9918



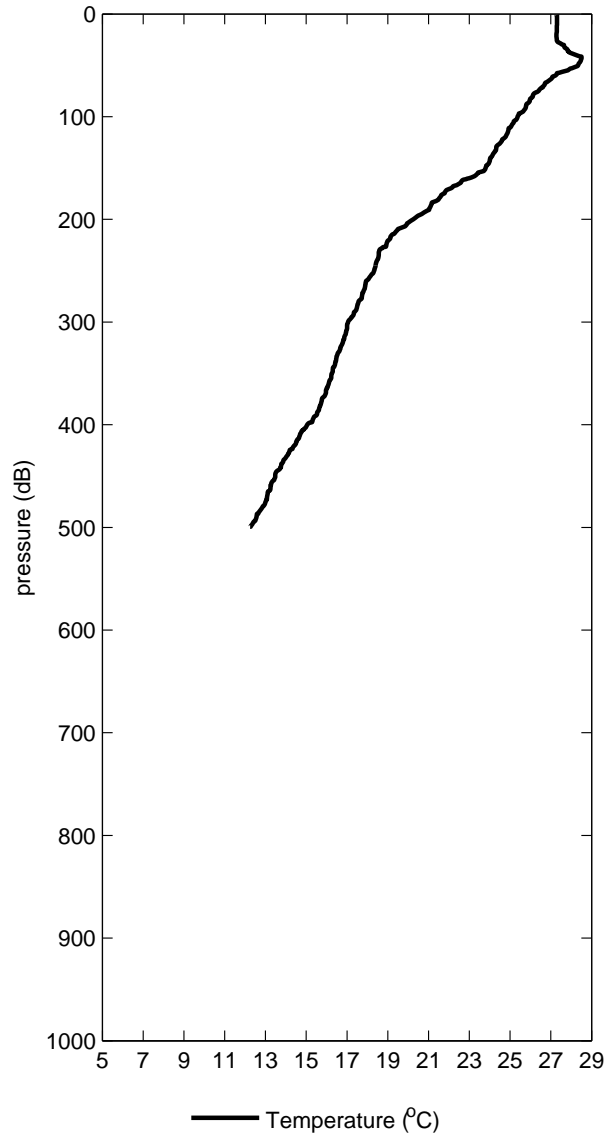
OC449_09 R/V Oceanus
 CTD station: 9 Net Haul: 7
 Latitude: 18° 42.4950' N Longitude: 65° 12.0210' W
 05-Dec-2008 14:56:06Z

Pressure dB	Temp90 °C
10	27.2169
19	27.2170
30	27.6818
40	28.3502
49	28.4917
60	27.5328
70	26.7154
80	26.2251
90	25.7640
100	25.3294
110	25.1982
120	24.7200
129	24.4568
140	23.8748
150	23.1001
160	22.8300
170	22.4619
180	21.5924
190	21.1555
200	20.3877
250	18.6942
300	17.7906
349	16.3872
400	14.9968
450	13.8496
500	12.5960
600	10.2723



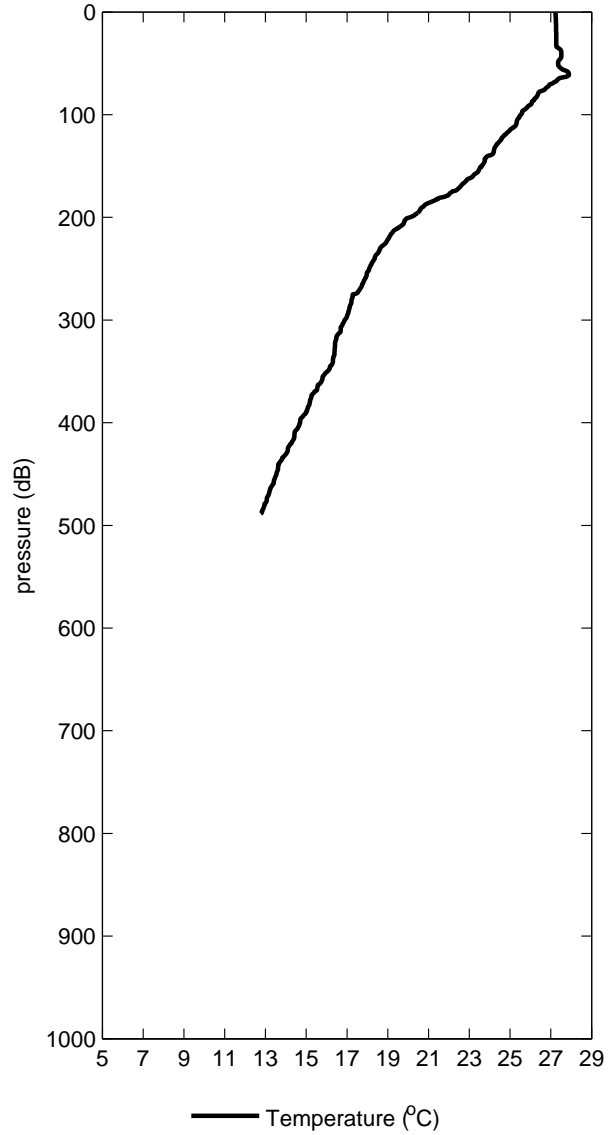
OC449_09 R/V Oceanus
 CTD station: 9 Net Haul: 8
 Latitude: 18° 42.5800' N Longitude: 65° 5.9920' W
 05-Dec-2008 17:56:17Z

Pressure dB	Temp90 °C
10	27.2984
19	27.2784
30	27.6361
40	28.2874
50	28.3229
60	27.1863
70	26.6417
80	26.1142
90	25.7778
100	25.3564
110	25.0073
120	24.7275
130	24.3204
140	24.0421
149	23.8066
160	22.9425
170	21.9907
179	21.5176
190	21.0272
200	20.2523
250	18.3230
299	17.0638
350	16.2575
399	15.0621
450	13.4804
499	12.2582



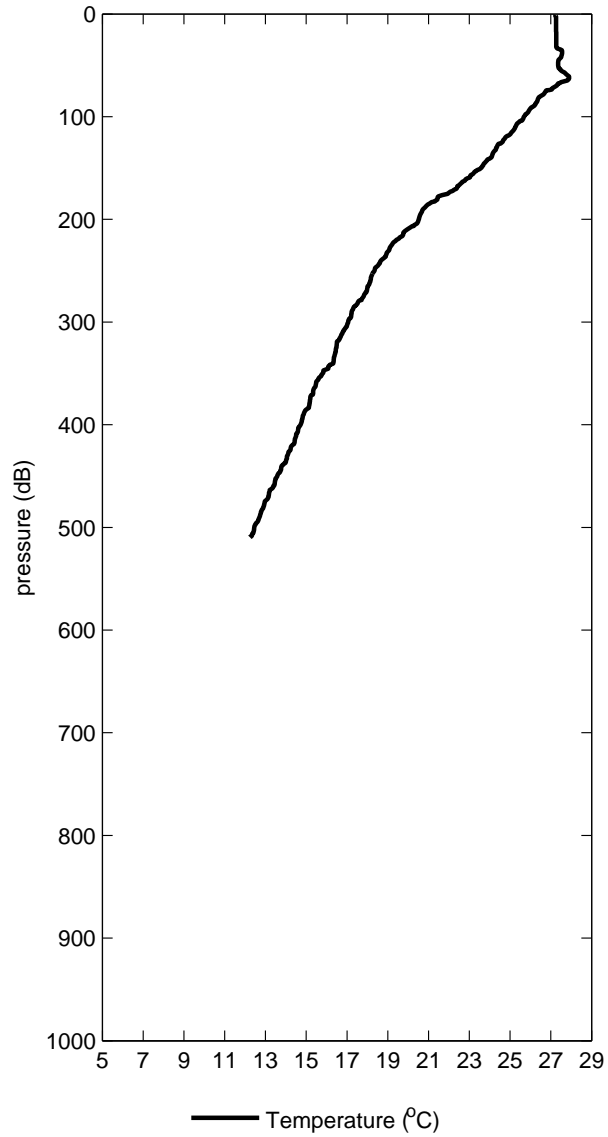
OC449_09 R/V Oceanus
 CTD station: 10 Net Haul: 9
 Latitude: 18° 42.5350' N Longitude: 65° 0.1760' W
 05-Dec-2008 20:49:21Z

Pressure dB	Temp90 °C
10	27.2502
20	27.2607
30	27.2662
40	27.5174
50	27.3594
60	27.8862
70	26.9867
80	26.3665
90	26.0041
100	25.5034
109	25.3057
120	24.7146
130	24.2983
140	23.8985
150	23.5792
160	23.1539
170	22.5657
180	21.7891
190	20.7051
200	20.0953
249	18.1002
300	16.8789
350	16.0135
400	14.6939
450	13.5418



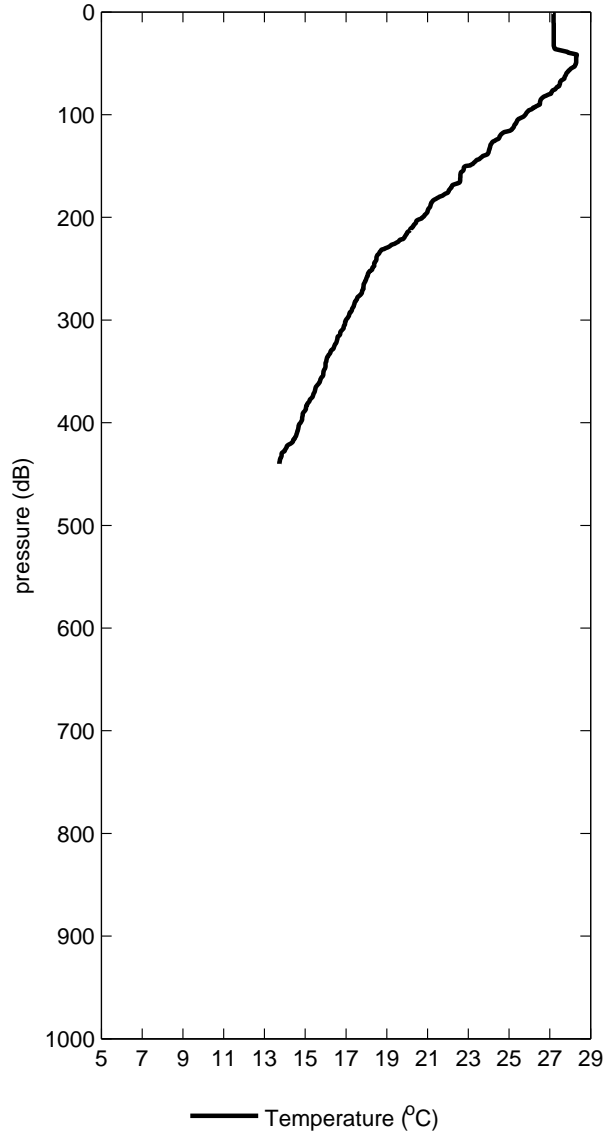
OC449_09 R/V Oceanus
CTD station: 11 Net Haul: 10
Latitude: 18° 42.6240' N Longitude: 65° 0.5320' W
05-Dec-2008 21:37:14Z

Pressure dB	Temp90 °C
10	27.2558
20	27.2650
30	27.2659
40	27.5275
50	27.3601
60	27.8499
69	27.3063
80	26.4969
90	26.1097
100	25.6780
110	25.2543
120	24.7627
130	24.3151
139	24.0947
150	23.5662
160	22.9007
170	22.3741
180	21.4362
190	20.7367
200	20.5270
250	18.3440
299	17.0595
350	15.8140
400	14.7203
450	13.5718
500	12.4551



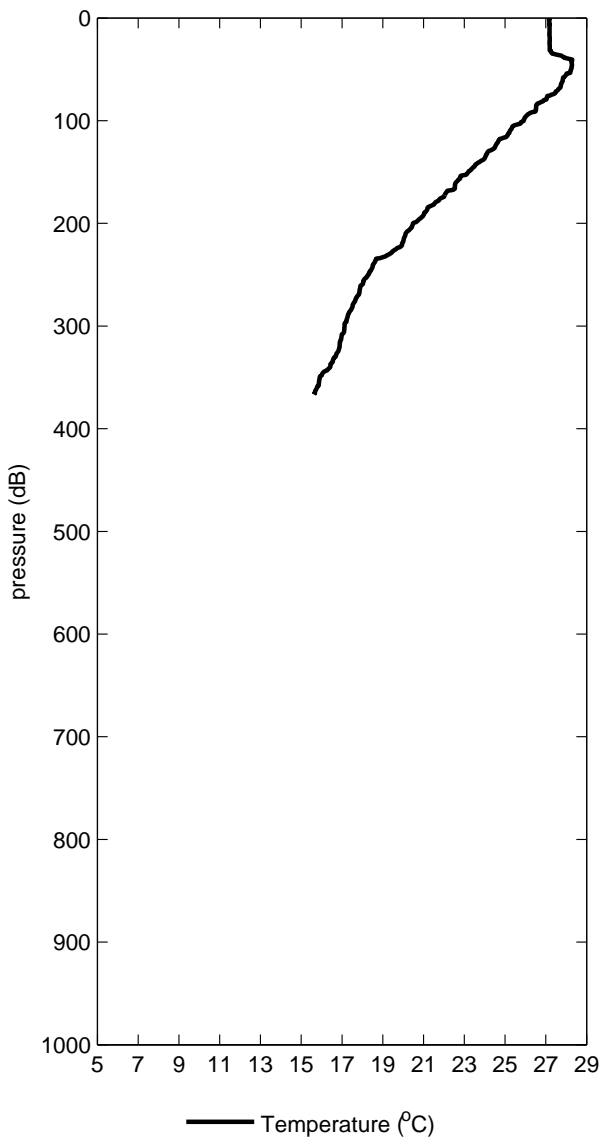
OC449_09 R/V Oceanus
 CTD station: 12 Net Haul: 11
 Latitude: 18° 39.0610' N Longitude: 64° 59.1880' W
 06-Dec-2008 00:10:37Z

Pressure dB	Temp90 °C
10	27.1845
20	27.1918
30	27.1906
40	28.1180
50	28.2783
59	27.8191
70	27.4933
80	26.9587
90	26.5046
99	25.8172
110	25.2636
120	24.5716
130	24.0796
140	23.7157
150	22.8357
160	22.6080
169	22.1867
180	21.5652
190	21.1160
200	20.7486
250	18.2935
300	16.9916
350	15.8970
400	14.7685



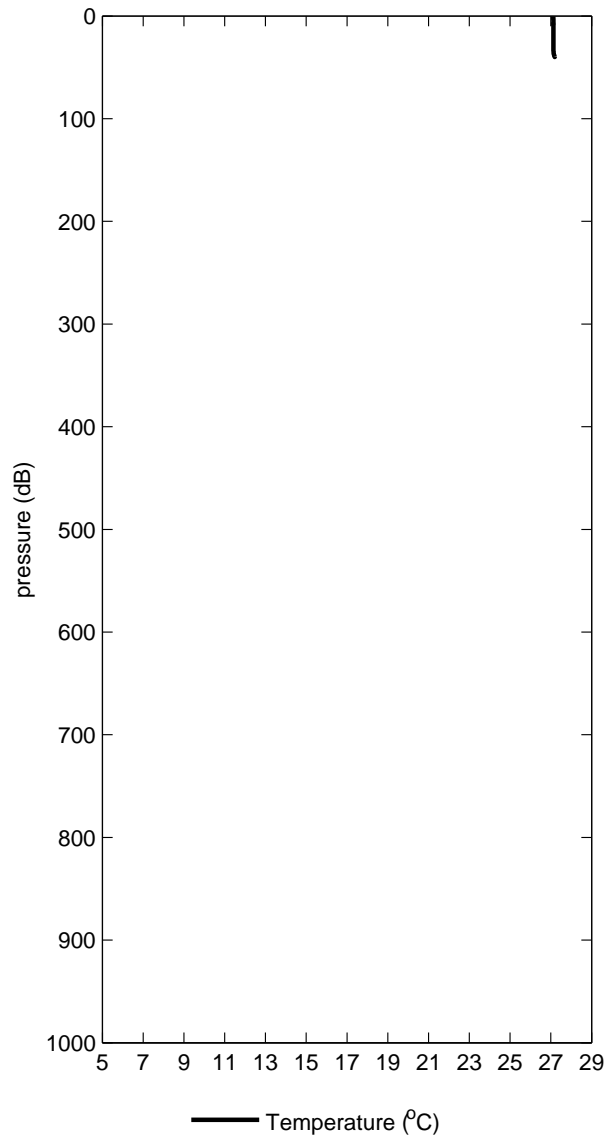
OC449_09 R/V Oceanus
 CTD station: 12 Net Haul: 12
 Latitude: 18° 38.9920' N Longitude: 64° 59.9270' W
 06-Dec-2008 01:01:00Z

Pressure dB	Temp90 °C
10	27.1826
20	27.1871
30	27.1872
40	28.2923
50	28.2250
60	27.8280
70	27.5887
80	26.9014
90	26.5085
100	25.9024
110	25.2329
120	24.6630
130	24.1431
140	23.7513
150	23.1980
160	22.5837
170	22.1084
180	21.5414
190	21.0324
200	20.4833
250	18.2782
300	17.1217
350	15.9072



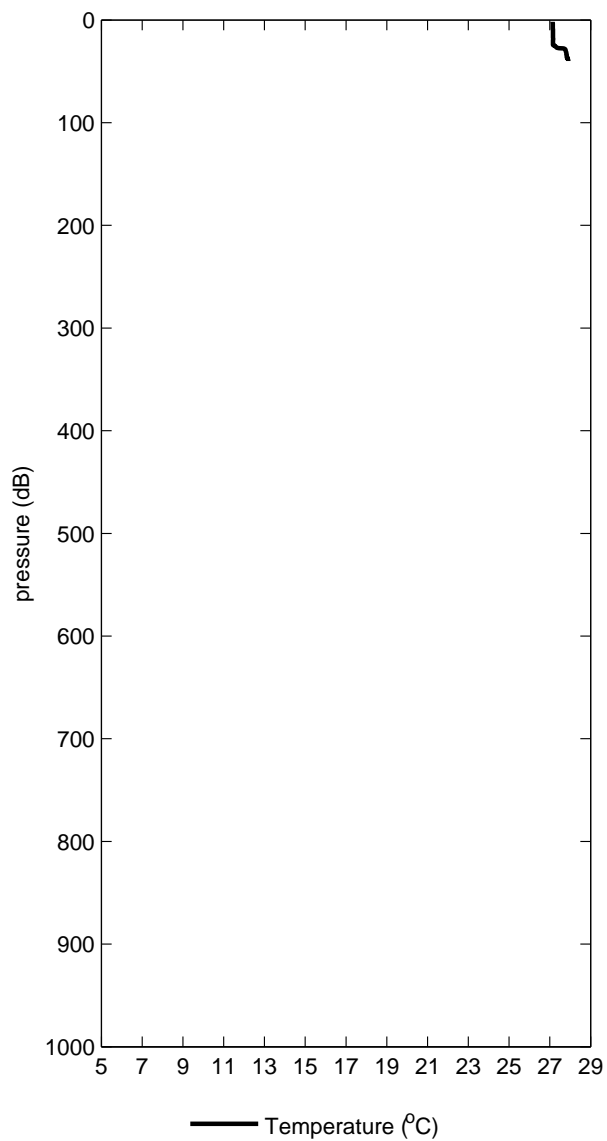
OC449_09 R/V Oceanus
CTD station: 13 Net Haul: 13
Latitude: 18° 36.0100' N Longitude: 64° 59.9470' W
06-Dec-2008 03:03:36Z

Pressure dB	Temp90 °C
10	27.1240
20	27.1249
30	27.1275
39	27.1803



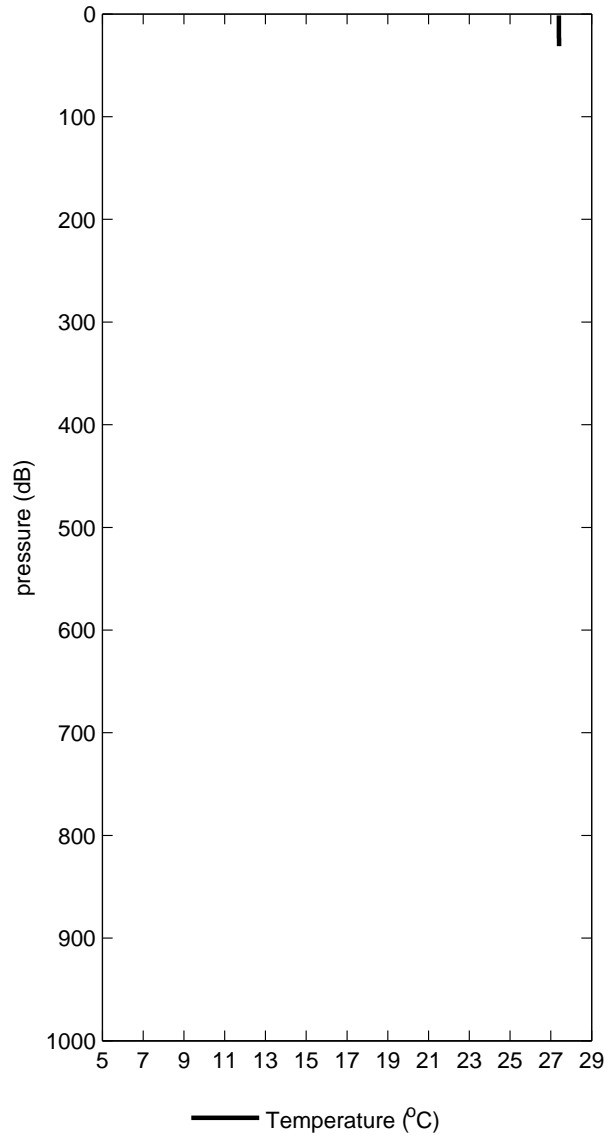
OC449_09 R/V Oceanus
CTD station: 14 Net Haul: 14
Latitude: 18° 29.7900' N Longitude: 65° 0.0400' W
06-Dec-2008 04:39:09Z

Pressure dB	Temp90 °C
10	27.1548
20	27.1507
30	27.7869
39	27.8996



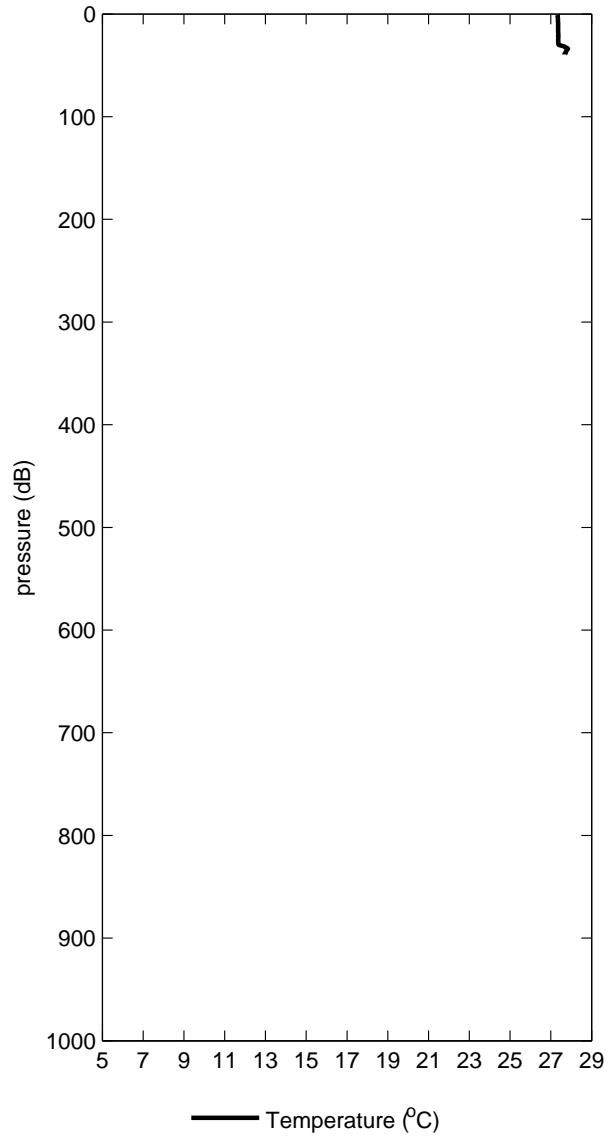
OC449_09 R/V Oceanus
CTD station: 14 Net Haul: 15
Latitude: 18° 13.6960' N Longitude: 64° 44.1980' W
01-Dec-2008 20:41:41Z

Pressure dB	Temp90 °C
10	27.3938
20	27.3986
30	27.4063



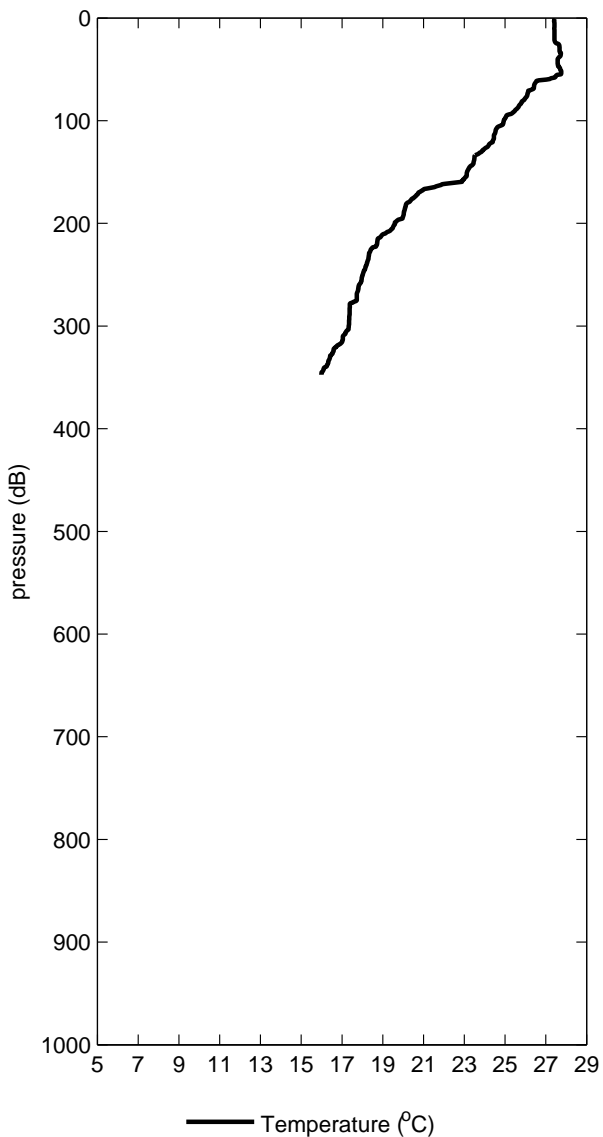
OC449_09 R/V Oceanus
CTD station: 15 Net Haul: 16
Latitude: 18° 12.4390' N Longitude: 64° 51.9660' W
03-Dec-2008 07:15:12Z

Pressure dB	Temp90 °C
10	27.3566
20	27.3626
30	27.3975
39	27.6662



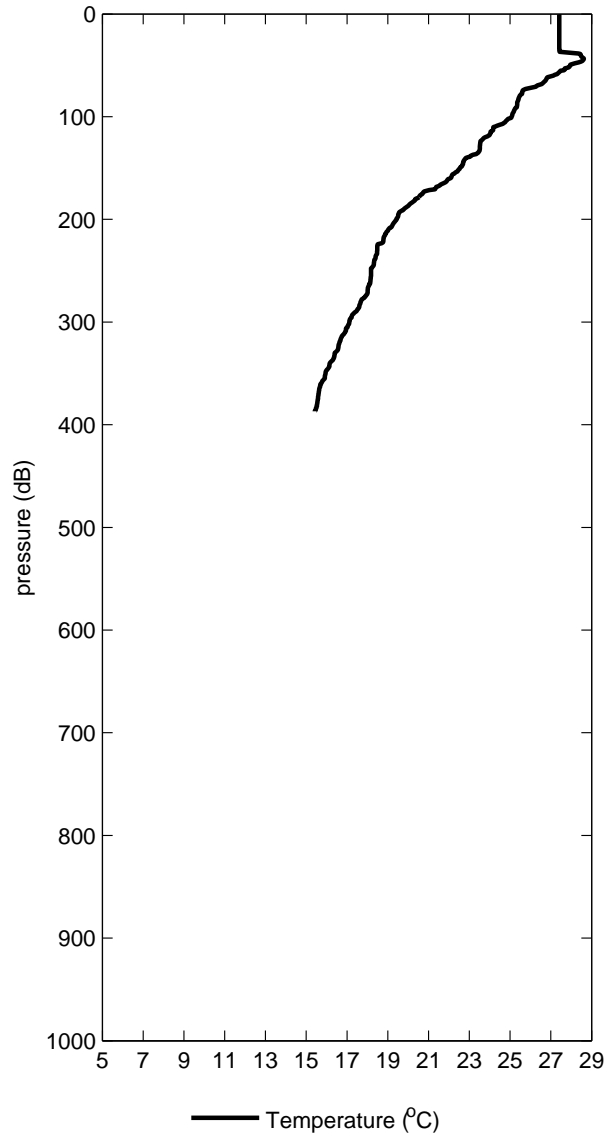
OC449_09 R/V Oceanus
CTD station: 16 Net Haul: 17
Latitude: 18° 10.7860' N Longitude: 64° 52.0370' W
03-Dec-2008 09:40:55Z

Pressure dB	Temp90 °C
10	27.4121
20	27.4226
30	27.6704
40	27.5791
50	27.7057
60	26.8392
70	26.2413
80	25.9148
90	25.4838
100	24.9332
110	24.5313
120	24.3928
130	23.8503
140	23.4596
150	23.1339
159	22.8917
170	20.7517
180	20.2029
190	20.0316
200	19.5933
250	18.0126
300	17.3306



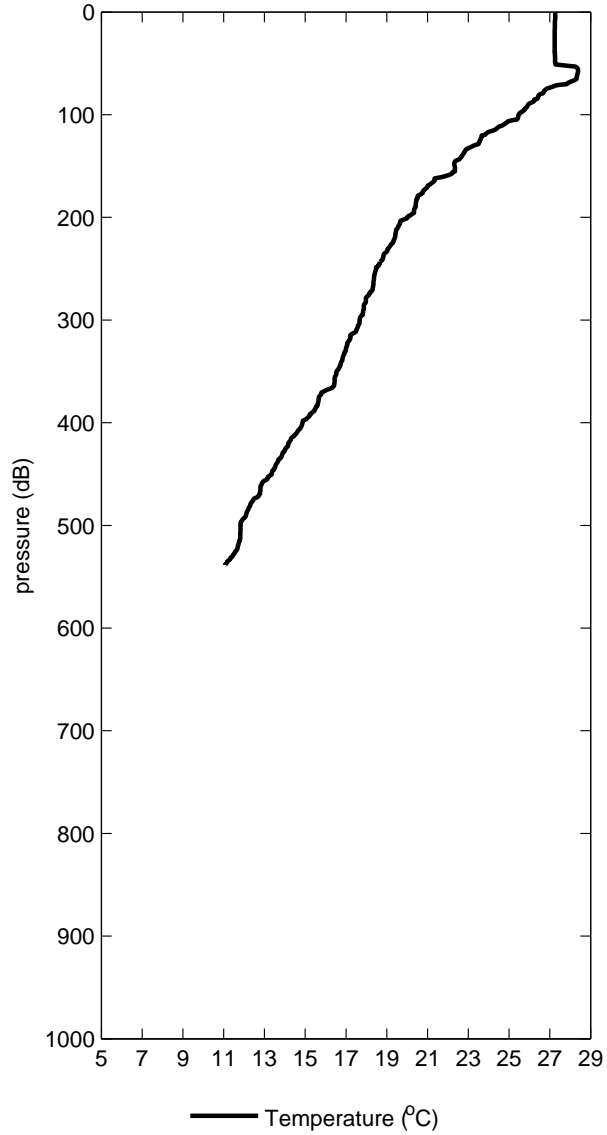
OC449_09 R/V Oceanus
 CTD station: 16 Net Haul: 18
 Latitude: 18° 6.8670' N Longitude: 64° 52.3560' W
 03-Dec-2008 12:31:38Z

Pressure dB	Temp90 °C
10	27.4089
20	27.4109
30	27.4101
40	28.4673
50	27.9461
60	27.0630
70	26.3017
79	25.4771
90	25.3323
100	25.0858
110	24.1830
120	23.7597
130	23.5170
140	22.8273
150	22.5364
160	22.0387
170	21.3317
180	20.3624
190	19.7760
200	19.4235
250	18.1805
300	17.1140
350	15.9440



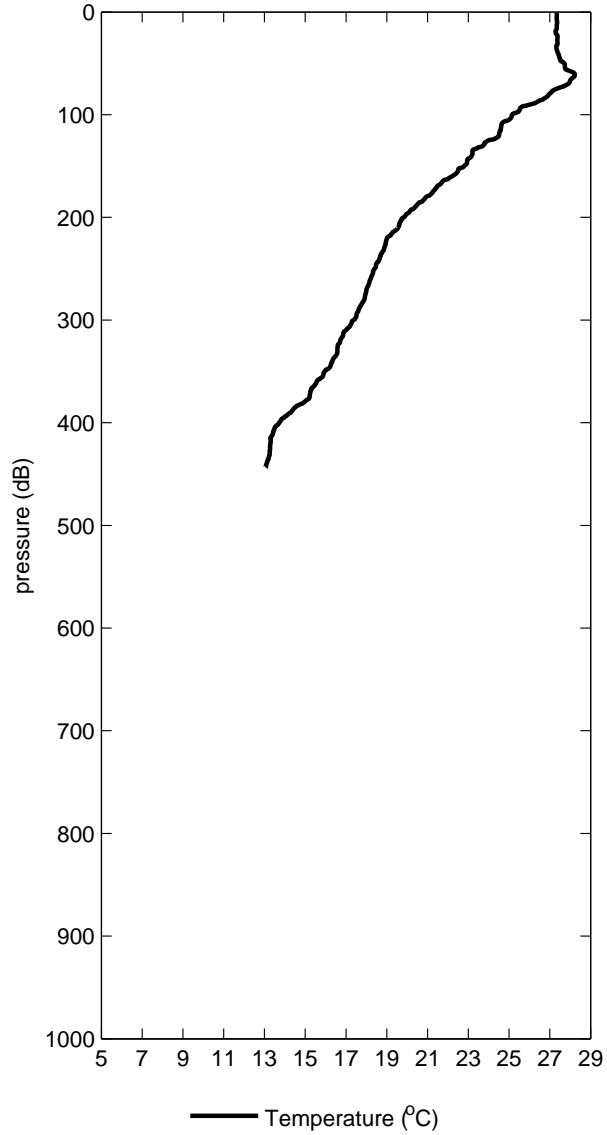
OC449_09 R/V Oceanus
 CTD station: 17 Net Haul: 19
 Latitude: 17° 59.9810' N Longitude: 64° 52.0880' W
 03-Dec-2008 17:15:31Z

Pressure dB	Temp90 °C
10	27.2476
20	27.2408
30	27.2380
39	27.2443
50	27.2686
60	28.3606
70	27.8403
80	26.5567
90	25.9218
100	25.4691
110	24.6784
120	23.6585
130	23.2632
140	22.6732
149	22.3180
160	21.7318
170	20.9876
180	20.5165
190	20.4180
200	19.9973
250	18.4780
300	17.6687
350	16.5417
400	14.8670
450	13.3531
500	11.8275



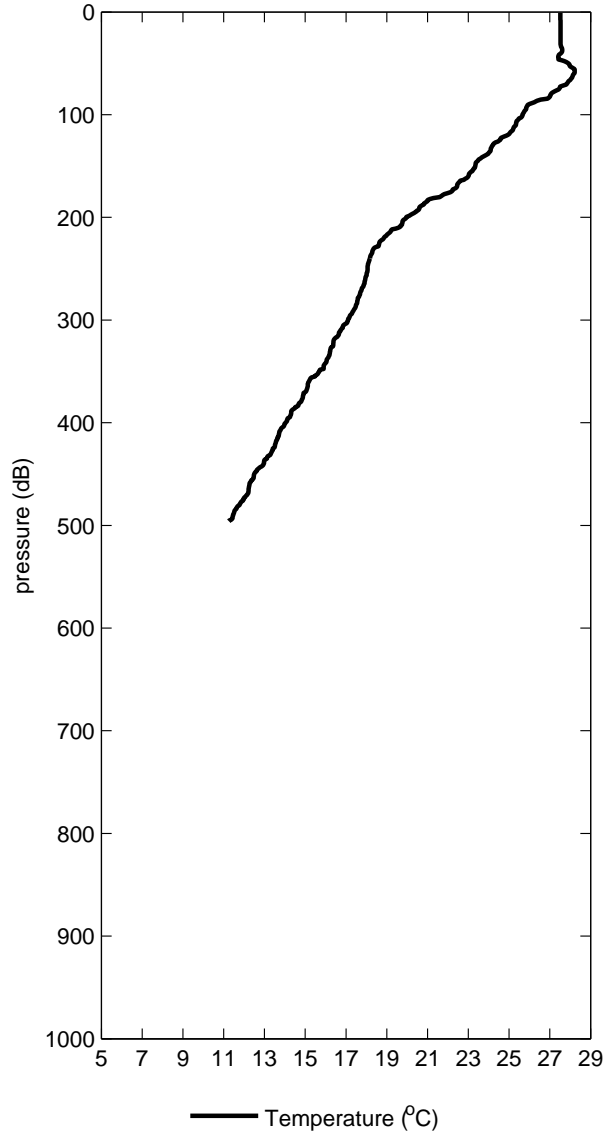
OC449_09 R/V Oceanus
 CTD station: 17 Net Haul: 20
 Latitude: 17° 52.5670' N Longitude: 64° 53.0760' W
 03-Dec-2008 20:22:55Z

Pressure dB	Temp90 °C
10	27.3569
20	27.2816
30	27.3744
40	27.4088
50	27.7242
60	28.2166
70	27.8793
80	26.9497
90	25.9779
100	25.1438
110	24.6249
120	24.5079
130	23.7243
140	23.1532
150	22.7766
160	22.2283
170	21.4657
180	20.9278
190	20.3797
200	19.8209
250	18.3889
300	17.3476
350	15.9680
400	13.7149



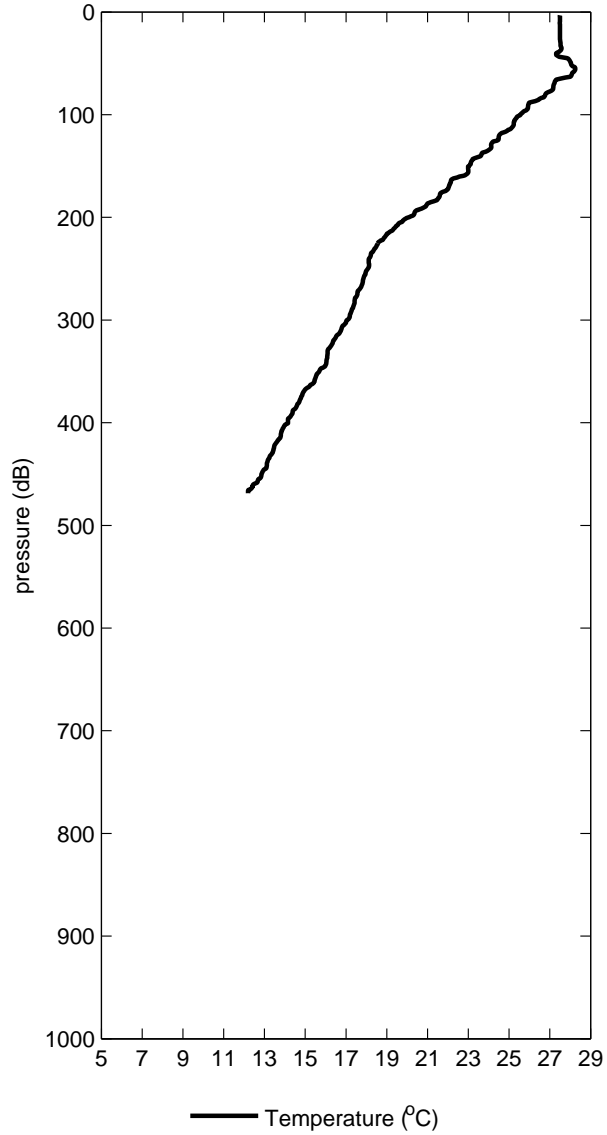
OC449_09 R/V Oceanus
 CTD station: 18 Net Haul: 21
 Latitude: 17° 47.6550' N Longitude: 64° 51.9660' W
 03-Dec-2008 23:27:18Z

Pressure dB	Temp90 °C
10	27.5205
20	27.5252
30	27.5280
40	27.5264
50	27.9252
60	28.1752
70	27.8086
80	27.0425
90	25.9120
100	25.6587
110	25.3310
120	24.8701
130	24.1803
140	23.7655
150	23.3385
160	22.9948
170	22.4461
180	21.5948
190	20.6046
200	19.9570
250	18.0575
300	17.0955
350	15.6876
400	14.0236
450	12.5011



OC449_09 R/V Oceanus
 CTD station: 19 Net Haul: 23
 Latitude: 17° 47.9560' N Longitude: 64° 51.9710' W
 04-Dec-2008 00:25:31Z

Pressure dB	Temp90 °C
10	27.4911
20	27.5000
30	27.5199
40	27.3107
50	28.0376
60	28.0790
70	27.2021
80	26.7832
90	25.9425
100	25.5538
110	25.2125
120	24.5218
130	24.1171
140	23.6058
150	23.0019
160	22.5694
170	22.0476
180	21.5759
190	20.8193
200	20.0661
250	18.0673
300	17.0336
350	15.6732
400	14.1561
450	12.8547

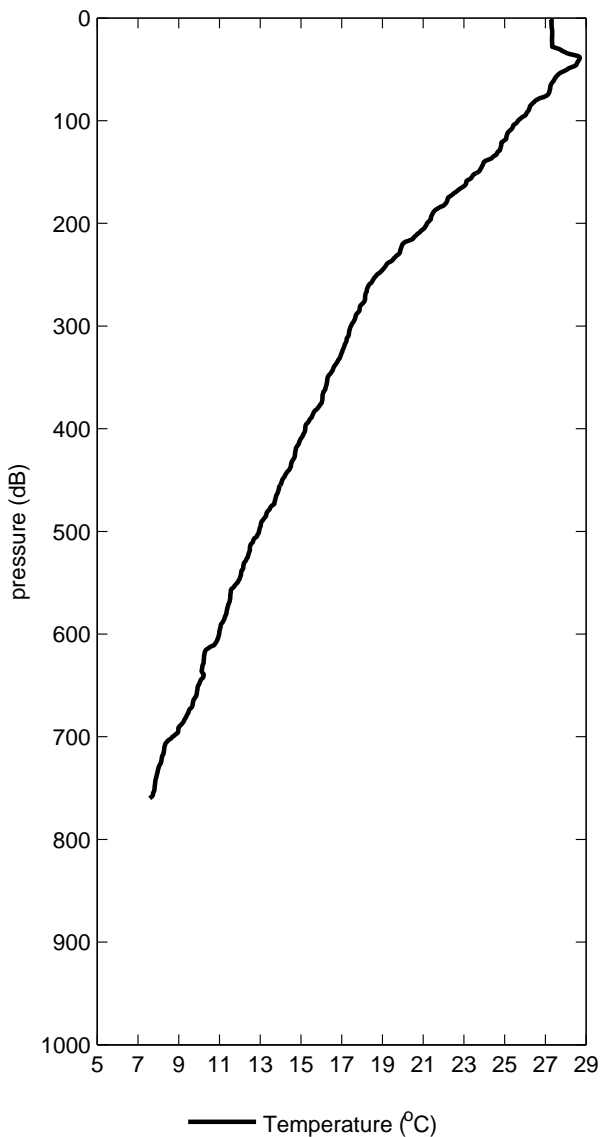


E Appendix: XBT casts

Cast no.	Date	Latitude	Longitude	File name
2	04-Dec-2008 12:19:16	18° 39.1963' N	65° 18.0024' W	oc449-09_XBT_cast2_dp2.dat
3	06-Dec-2008 18:23:16	18° 36.3715' N	65° 10.8169' W	oc449-09_XBT_cast3_dp2.dat
4	06-Dec-2008 19:00:05	18° 40.8862' N	65° 10.5967' W	oc449-09_XBT_cast4_dp2.dat
5	06-Dec-2008 19:56:49	18° 49.5413' N	65° 14.2222' W	oc449-09_XBT_cast5_dp2.dat
6	06-Dec-2008 20:00:57	18° 50.2003' N	65° 14.3906' W	oc449-09_XBT_cast6_dp2.dat
7	06-Dec-2008 21:01:09	18° 59.7239' N	65° 16.8438' W	oc449-09_XBT_cast7_dp2.dat
8	06-Dec-2008 22:02:09	19° 9.3995' N	65° 19.3584' W	oc449-09_XBT_cast8_dp2.dat
9	06-Dec-2008 23:00:34	19° 18.7584' N	65° 21.7520' W	oc449-09_XBT_cast9_dp2.dat
10	07-Dec-2008 00:07:18	19° 29.6980' N	65° 24.6196' W	oc449-09_XBT_cast10_dp2.dat
11	07-Dec-2008 01:59:59	19° 48.5418' N	65° 29.5259' W	oc449-09_XBT_cast11_dp2.dat
12	07-Dec-2008 03:58:29	20° 8.4803' N	65° 34.7046' W	oc449-09_XBT_cast12_dp2.dat
13	07-Dec-2008 05:59:27	20° 28.3352' N	65° 39.8687' W	oc449-09_XBT_cast13_dp2.dat
14	07-Dec-2008 06:08:29	20° 29.8397' N	65° 40.0024' W	oc449-09_XBT_cast14_dp2.dat
15	07-Dec-2008 07:58:26	20° 47.3608' N	65° 44.8691' W	oc449-09_XBT_cast15_dp2.dat
16	07-Dec-2008 09:59:09	21° 7.5813' N	65° 50.1645' W	oc449-09_XBT_cast16_dp2.dat
17	07-Dec-2008 11:58:34	21° 27.8601' N	65° 55.4863' W	oc449-09_XBT_cast17_dp2.dat
18	07-Dec-2008 13:58:09	21° 47.6335' N	65° 59.6509' W	oc449-09_XBT_cast18_dp2.dat
19	07-Dec-2008 15:56:45	22° 7.4102' N	65° 57.1895' W	oc449-09_XBT_cast19_dp2.dat
21	07-Dec-2008 18:00:05	22° 29.1623' N	65° 54.4395' W	oc449-09_XBT_cast21_dp2.dat
22	07-Dec-2008 19:57:14	22° 49.2627' N	65° 51.9585' W	oc449-09_XBT_cast22_dp2.dat
23	07-Dec-2008 21:57:06	23° 8.9663' N	65° 49.4834' W	oc449-09_XBT_cast23_dp2.dat
24	07-Dec-2008 23:57:05	23° 29.4233' N	65° 46.8994' W	oc449-09_XBT_cast24_dp2.dat
25	08-Dec-2008 01:57:57	23° 50.1123' N	65° 44.3027' W	oc449-09_XBT_cast25_dp2.dat
26	08-Dec-2008 03:57:54	24° 9.5300' N	65° 41.8325' W	oc449-09_XBT_cast26_dp2.dat
27	08-Dec-2008 05:58:48	24° 29.1702' N	65° 39.3315' W	oc449-09_XBT_cast27_dp2.dat
28	08-Dec-2008 07:58:16	24° 48.5879' N	65° 36.8745' W	oc449-09_XBT_cast28_dp2.dat
29	08-Dec-2008 09:59:11	25° 8.3506' N	65° 34.3550' W	oc449-09_XBT_cast29_dp2.dat
30	08-Dec-2008 11:59:18	25° 28.1020' N	65° 31.7866' W	oc449-09_XBT_cast30_dp2.dat
31	08-Dec-2008 12:29:09	25° 33.0732' N	65° 31.3242' W	oc449-09_XBT_cast31_dp2.dat
32	08-Dec-2008 13:57:16	25° 47.4353' N	65° 29.3486' W	oc449-09_XBT_cast32_dp2.dat
33	08-Dec-2008 16:03:49	26° 7.5872' N	65° 26.7627' W	oc449-09_XBT_cast33_dp2.dat
34	08-Dec-2008 17:57:33	26° 26.4514' N	65° 24.3325' W	oc449-09_XBT_cast34_dp2.dat
35	08-Dec-2008 19:57:56	26° 46.3987' N	65° 21.7578' W	oc449-09_XBT_cast35_dp2.dat
36	08-Dec-2008 21:58:00	27° 5.9768' N	65° 19.2036' W	oc449-09_XBT_cast36_dp2.dat
37	08-Dec-2008 23:57:39	27° 25.2913' N	65° 16.7026' W	oc449-09_XBT_cast37_dp2.dat
38	09-Dec-2008 01:58:11	27° 44.9062' N	65° 14.1504' W	oc449-09_XBT_cast38_dp2.dat
39	09-Dec-2008 03:59:06	28° 4.4265' N	65° 11.5859' W	oc449-09_XBT_cast39_dp2.dat
40	09-Dec-2008 05:59:09	28° 24.5632' N	65° 8.9419' W	oc449-09_XBT_cast40_dp2.dat
41	09-Dec-2008 07:58:51	28° 44.7766' N	65° 6.2939' W	oc449-09_XBT_cast41_dp2.dat
42	09-Dec-2008 09:59:15	29° 4.5835' N	65° 3.6841' W	oc449-09_XBT_cast42_dp2.dat
43	09-Dec-2008 12:07:02	29° 25.8843' N	65° 0.8301' W	oc449-09_XBT_cast43_dp2.dat
44	09-Dec-2008 13:59:00	29° 45.3589' N	64° 58.2681' W	oc449-09_XBT_cast44_dp2.dat
45	09-Dec-2008 16:03:04	30° 6.6431' N	64° 55.4121' W	oc449-09_XBT_cast45_dp2.dat
46	09-Dec-2008 16:07:08	30° 7.2766' N	64° 55.1738' W	oc449-09_XBT_cast46_dp2.dat
47	09-Dec-2008 17:58:35	30° 25.9424' N	64° 52.8394' W	oc449-09_XBT_cast47_dp2.dat
48	09-Dec-2008 19:57:39	30° 46.2439' N	64° 50.0815' W	oc449-09_XBT_cast48_dp2.dat
49	09-Dec-2008 21:56:52	31° 7.1338' N	64° 47.2217' W	oc449-09_XBT_cast49_dp2.dat
50	09-Dec-2008 23:57:47	31° 27.1404' N	64° 44.4770' W	oc449-09_XBT_cast50_dp2.dat
51	10-Dec-2008 01:57:40	31° 44.2200' N	64° 33.8398' W	oc449-09_XBT_cast51_dp2.dat
52	10-Dec-2008 02:02:09	31° 44.7605' N	64° 33.3076' W	oc449-09_XBT_cast52_dp2.dat
53	10-Dec-2008 03:47:52	31° 56.6404' N	64° 24.4590' W	oc449-09_XBT_cast53_dp2.dat

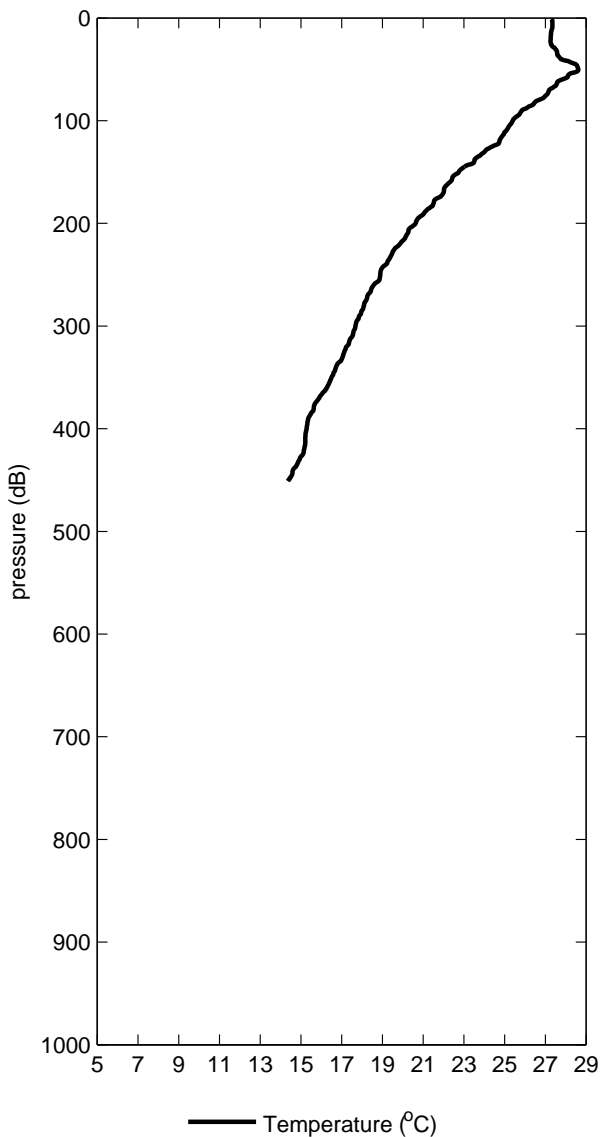
OC449_09 R/V Oceanus
 XBT station: 2
 Latitude: 18° 39.1963' N Longitude: 65° 18.0024' W
 04-Dec-2008 12:19:16Z

Pressure dB	PoTemp90 °C
10	27.3177
20	27.3254
30	27.6574
40	28.6820
50	28.0755
60	27.4363
70	27.2241
80	26.5522
90	26.1773
100	25.6650
110	25.2450
120	24.9345
130	24.6940
140	23.9925
150	23.7065
160	23.1179
170	22.5651
180	22.1400
190	21.4796
200	21.1924
250	18.7285
300	17.4544
350	16.3189
400	15.2174
450	14.0868
500	12.9437
600	10.9886
700	8.6981



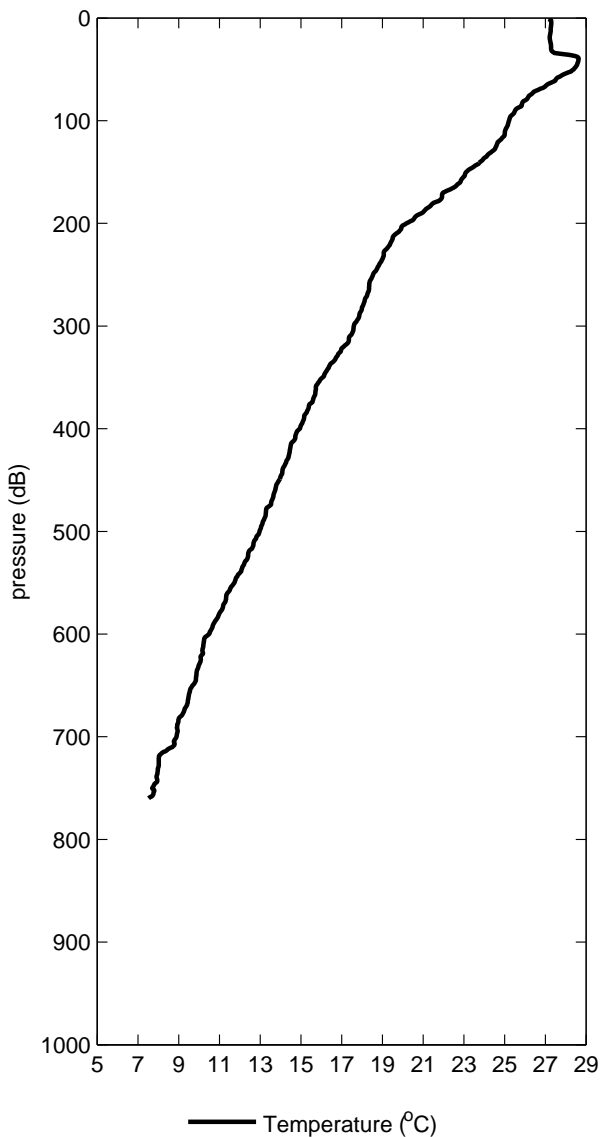
OC449_09 R/V Oceanus
 XBT station: 3
 Latitude: 18° 36.3715' N Longitude: 65° 10.8169' W
 06-Dec-2008 18:23:16Z

Pressure dB	PoTemp90 °C
10	27.3377
20	27.2655
30	27.4903
40	27.7579
50	28.6268
60	27.8061
70	27.1941
80	26.6621
90	25.8475
100	25.4051
110	25.0751
120	24.7504
130	24.0360
140	23.5044
150	22.7517
160	22.3016
170	22.0014
180	21.5208
190	21.0502
200	20.6331
250	18.8968
300	17.6806
350	16.5084
400	15.2806
450	14.3958



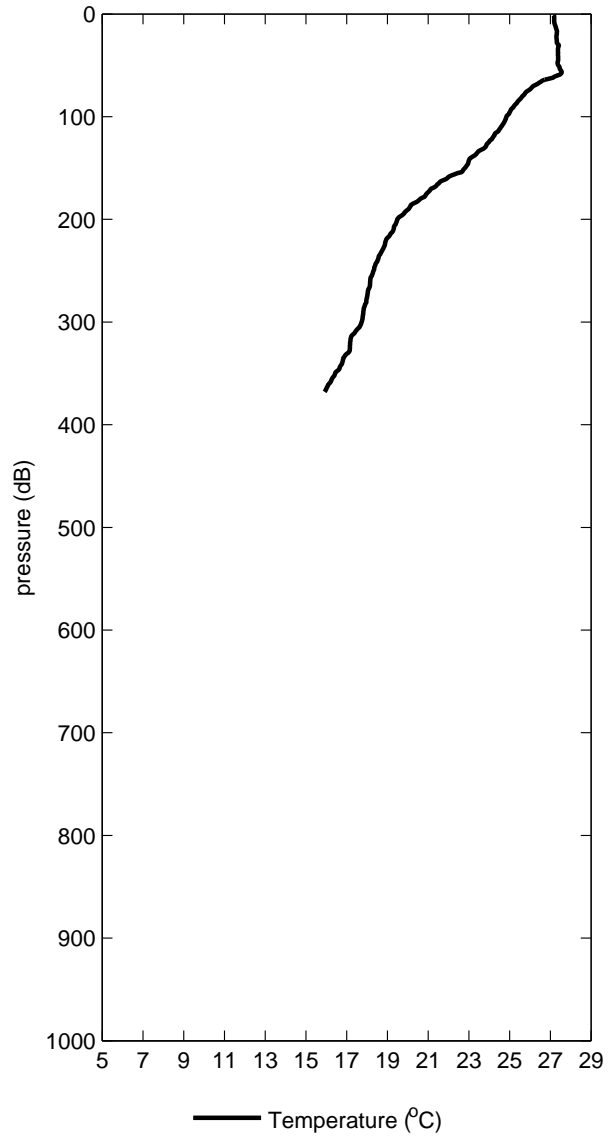
OC449_09 R/V Oceanus
 XBT station: 4
 Latitude: 18° 40.8862' N Longitude: 65° 10.5967' W
 06-Dec-2008 19:00:05Z

Pressure dB	PoTemp90 °C
10	27.2677
20	27.2155
30	27.2832
40	28.6306
50	28.3926
60	27.5163
70	26.6444
80	26.0324
90	25.5191
100	25.2169
110	25.0237
120	24.7175
130	24.3800
140	23.8056
150	23.1156
160	22.8239
170	21.9886
180	21.5258
190	20.9417
200	20.1837
250	18.5431
300	17.5974
350	16.0728
400	14.9482
450	13.9373
500	12.9636
600	10.4908
700	8.8971



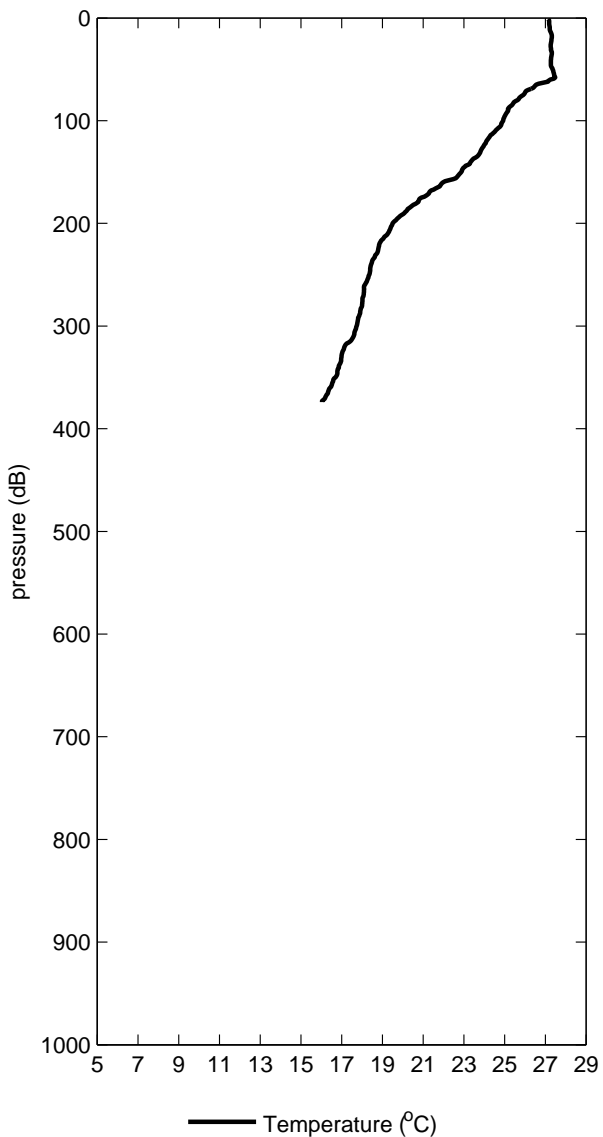
OC449_09 R/V Oceanus
 XBT station: 5
 Latitude: 18° 49.5413' N Longitude: 65° 14.2222' W
 06-Dec-2008 19:56:49Z

Pressure dB	PoTemp90 °C
10	27.2177
20	27.3154
30	27.4074
40	27.3709
50	27.3943
60	27.3263
70	26.1746
80	25.6327
90	25.2093
100	24.8472
110	24.5812
120	24.1865
130	23.7962
140	23.0962
150	22.8145
160	21.9320
170	21.1667
180	20.6219
190	20.0443
200	19.4847
250	18.3235
300	17.7371
350	16.4386



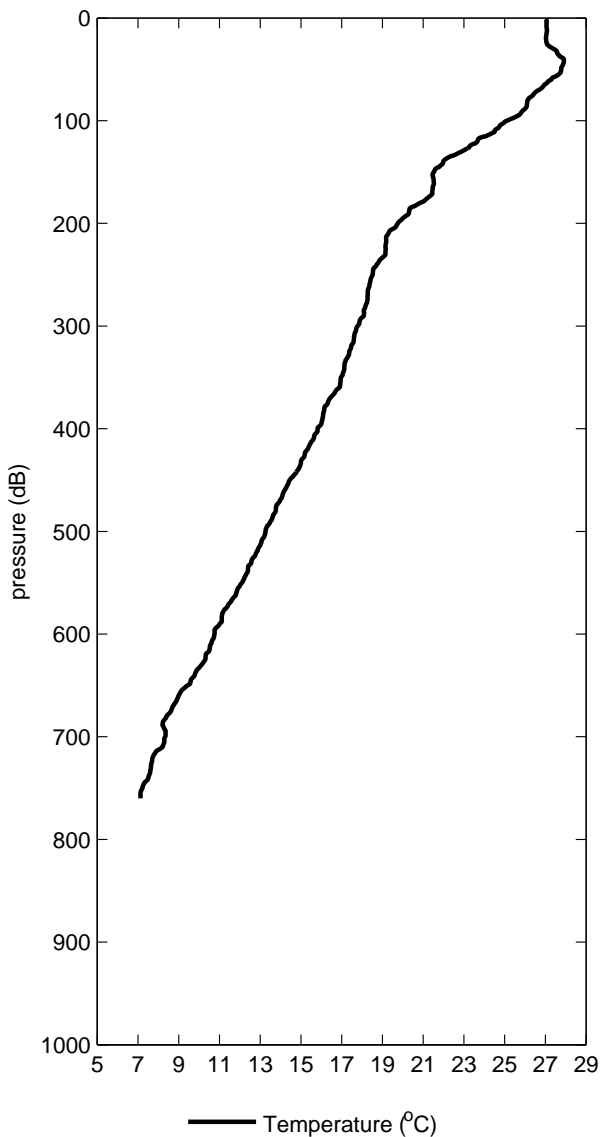
OC449_09 R/V Oceanus
 XBT station: 6
 Latitude: 18° 50.2003' N Longitude: 65° 14.3906' W
 06-Dec-2008 20:00:57Z

Pressure dB	PoTemp90 °C
10	27.2177
20	27.3069
30	27.2817
40	27.2809
50	27.3572
60	27.2464
70	26.1546
80	25.6327
90	25.1793
100	24.9271
110	24.5483
120	24.1109
130	23.8176
140	23.3403
150	22.8744
160	21.9734
170	21.2979
180	20.7068
190	20.0743
200	19.5047
250	18.3592
300	17.7371
350	16.6980



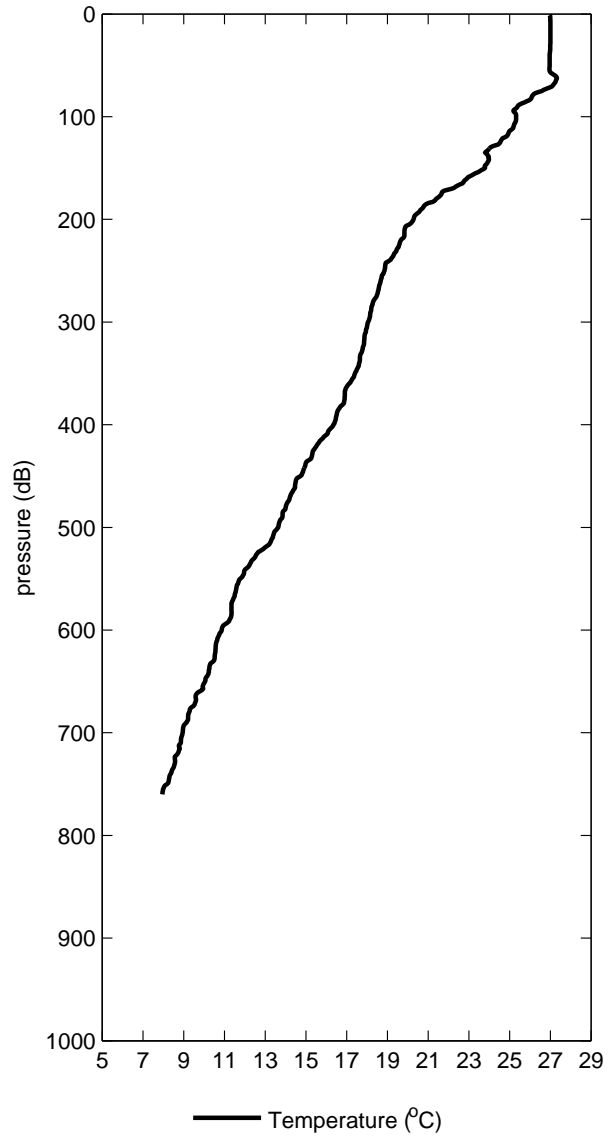
OC449_09 R/V Oceanus
 XBT station: 7
 Latitude: 18° 59.7239' N Longitude: 65° 16.8438' W
 06-Dec-2008 21:01:09Z

Pressure dB	PoTemp90 °C
10	27.0677
20	27.0355
30	27.4032
40	27.9079
50	27.7785
60	27.2963
70	26.6943
80	26.1324
90	25.9146
100	25.1136
110	24.5241
120	23.6669
130	22.9041
140	21.9858
150	21.5343
160	21.5210
170	21.4506
180	20.8616
190	20.3054
200	19.7643
250	18.5232
300	17.7804
350	16.9706
400	15.8191
450	14.4506
500	13.2626
600	10.7596
700	8.3417



OC449_09 R/V Oceanus
 XBT station: 8
 Latitude: 19° 9.3995' N Longitude: 65° 19.3584' W
 06-Dec-2008 22:02:09Z

Pressure dB	PoTemp90 °C
10	27.0077
20	27.0055
30	26.9947
40	26.9710
50	26.9673
60	27.2364
70	27.1042
80	26.1024
90	25.3978
100	25.3185
110	25.1936
120	24.7703
130	24.0560
140	23.9540
150	23.7907
160	22.9152
170	22.1941
180	21.4009
190	20.6835
200	20.2836
250	18.8526
300	18.0532
350	17.4096
400	16.3509
450	14.7447
500	13.6412
600	10.8691
700	8.9485



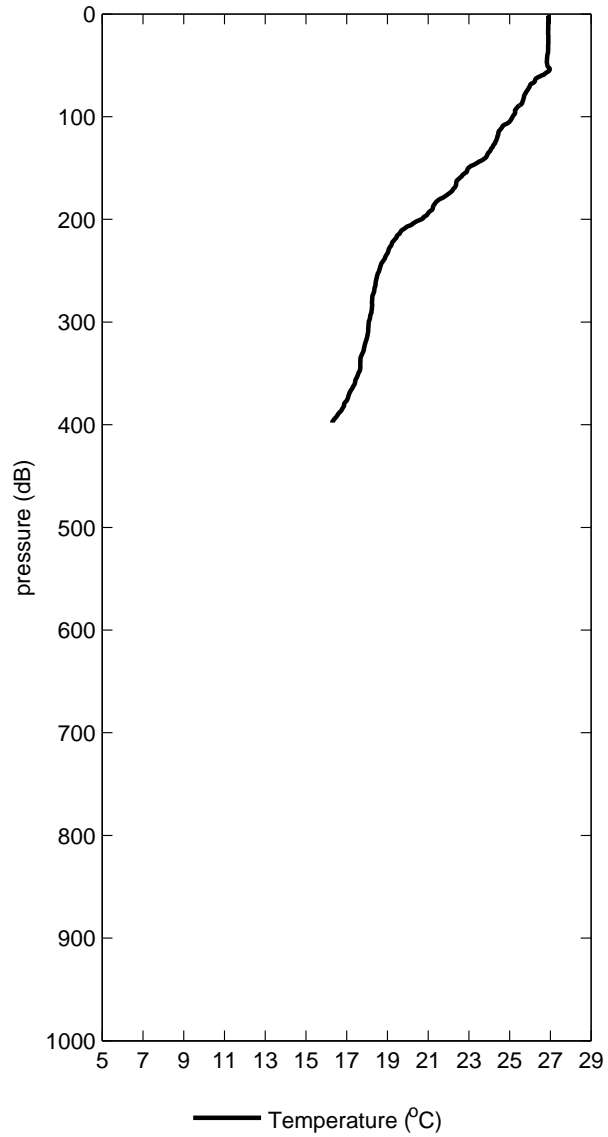
OC449_09 R/V Oceanus

XBT station: 9

Latitude: 19° 18.7584' N Longitude: 65° 21.7520' W

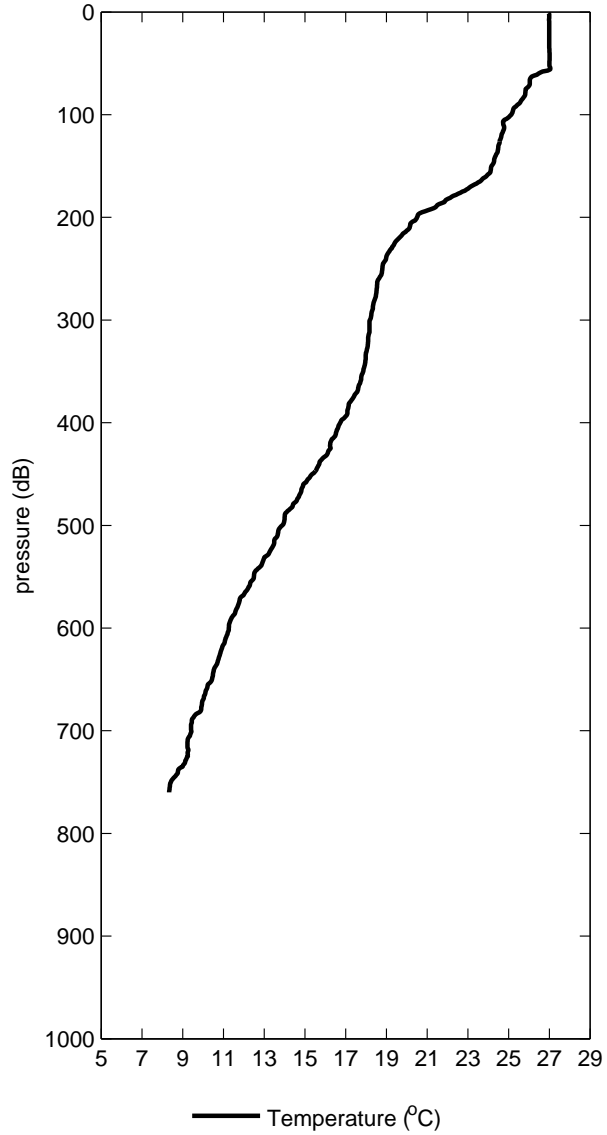
06-Dec-2008 23:00:34Z

Pressure dB	PoTemp90 °C
10	26.8978
20	26.8955
30	26.8947
40	26.8524
50	26.8573
60	26.5566
70	25.9947
80	25.7126
90	25.4177
100	25.1553
110	24.6411
120	24.4006
130	24.1502
140	23.8198
150	22.9758
160	22.5342
170	22.2511
180	21.6057
190	21.2171
200	20.6731
250	18.5930
300	18.0897
350	17.5792



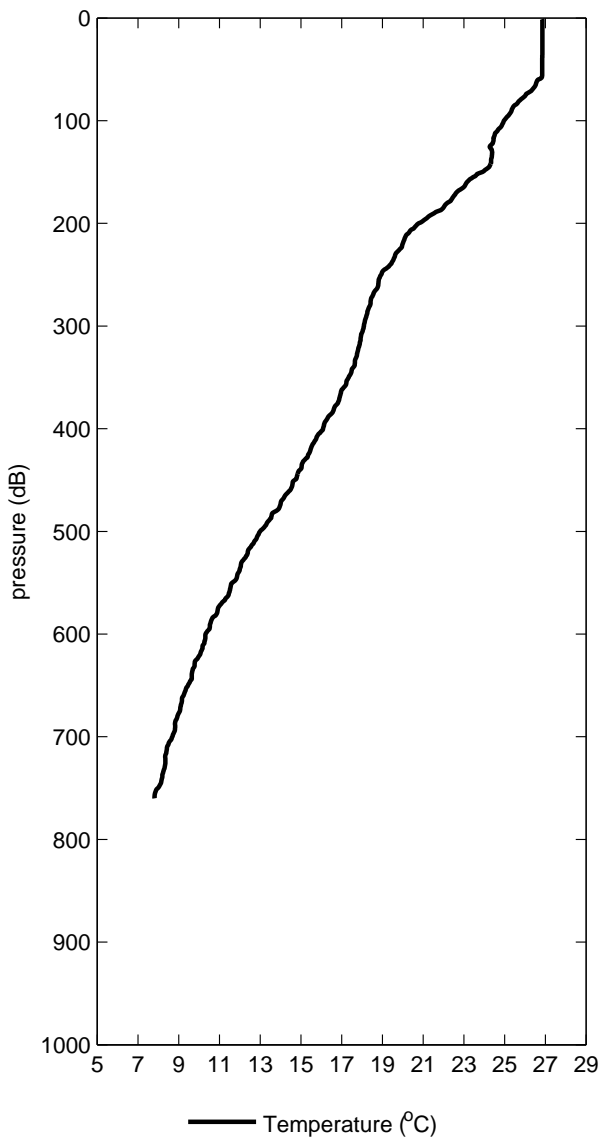
OC449_09 R/V Oceanus
 XBT station: 10
 Latitude: 19° 29.6980' N Longitude: 65° 24.6196' W
 07-Dec-2008 00:07:18Z

Pressure dB	PoTemp90 °C
10	26.9977
20	26.9955
30	26.9932
40	27.0095
50	27.0087
60	26.4667
70	26.0446
80	25.8226
90	25.4634
100	25.1336
110	24.7496
120	24.6547
130	24.5070
140	24.3636
150	24.1617
160	23.9014
170	23.1444
180	22.2099
190	21.4226
200	20.5033
250	18.8027
300	18.1862
350	17.8618
400	16.7398
450	15.3677
500	13.8804
600	11.2674
700	9.4243



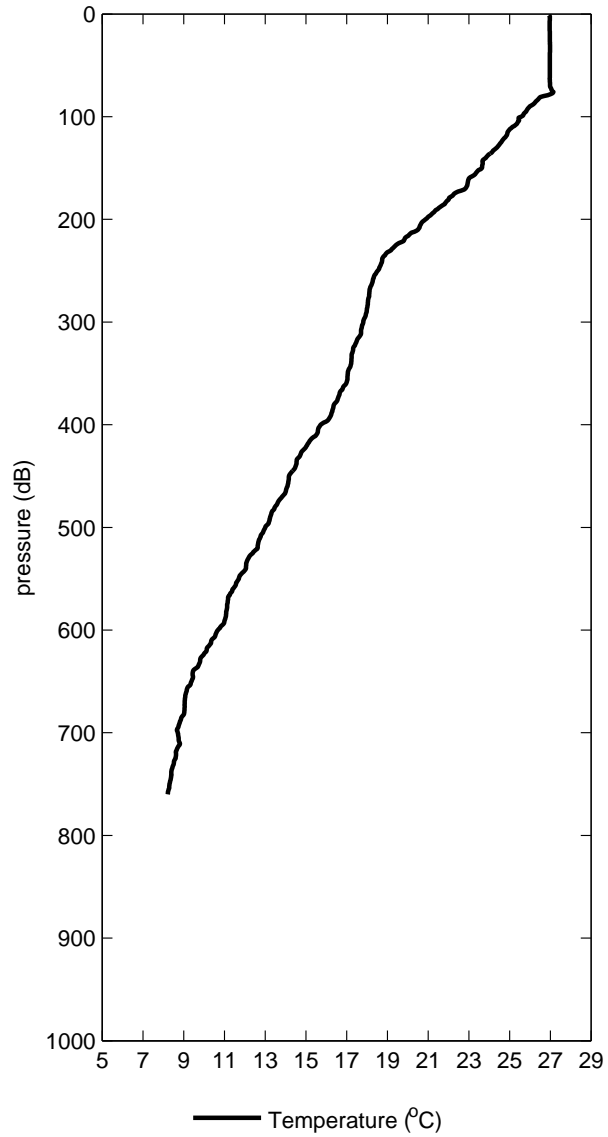
OC449_09 R/V Oceanus
 XBT station: 11
 Latitude: 19° 48.5418' N Longitude: 65° 29.5259' W
 07-Dec-2008 01:59:59Z

Pressure dB	PoTemp90 °C
10	26.8578
20	26.8555
30	26.8533
40	26.8510
50	26.8488
60	26.6466
70	26.3445
80	25.7626
90	25.3492
100	24.9654
110	24.6483
120	24.4449
130	24.3886
140	24.3408
150	23.9091
160	23.1436
170	22.6378
180	22.2000
190	21.5552
200	20.7829
250	18.9424
300	18.0964
350	17.3464
400	16.0883
450	14.6949
500	12.9935
600	10.3166
700	8.6898



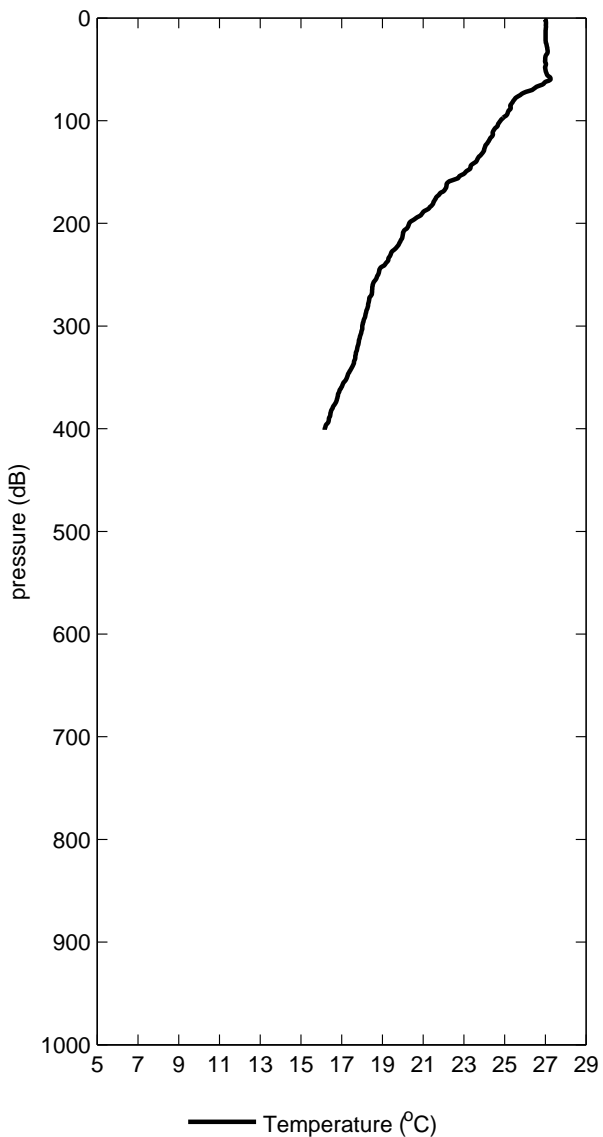
OC449_09 R/V Oceanus
 XBT station: 12
 Latitude: 20° 8.4803' N Longitude: 65° 34.7046' W
 07-Dec-2008 03:58:29Z

Pressure dB	PoTemp90 °C
10	26.9677
20	26.9755
30	26.9818
40	26.9810
50	26.9787
60	26.9765
70	26.9842
80	26.6621
90	25.9960
100	25.5717
110	25.1451
120	24.7875
130	24.3800
140	23.8398
150	23.6408
160	23.0052
170	22.8305
180	22.0202
190	21.4654
200	20.8728
250	18.5246
300	17.8170
350	17.0637
400	15.7293
450	14.1715
500	13.0035
600	10.6849
700	8.7081



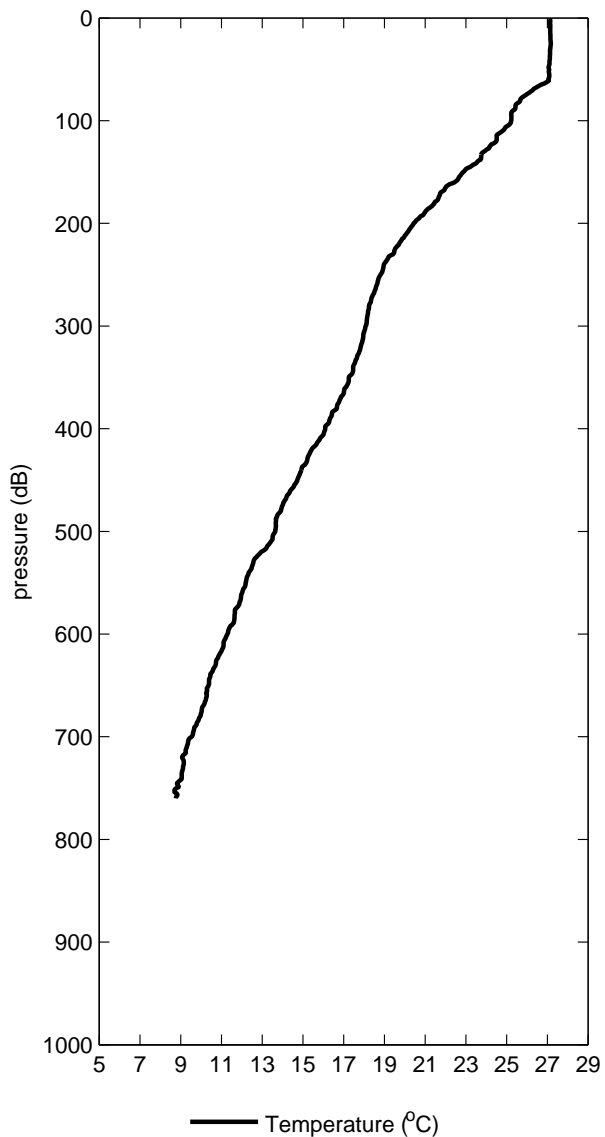
OC449_09 R/V Oceanus
 XBT station: 13
 Latitude: 20° 28.3352' N Longitude: 65° 39.8687' W
 07-Dec-2008 05:59:27Z

Pressure dB	PoTemp90 °C
10	27.0277
20	27.0155
30	27.1018
40	26.9910
50	27.0073
60	27.2564
70	26.3545
80	25.4627
90	25.2079
100	24.8038
110	24.4513
120	24.2165
130	23.9661
140	23.6000
150	23.0842
160	22.2131
170	21.8730
180	21.5008
190	20.9631
200	20.3236
250	18.7884
300	18.0166
350	17.2666
400	16.1747



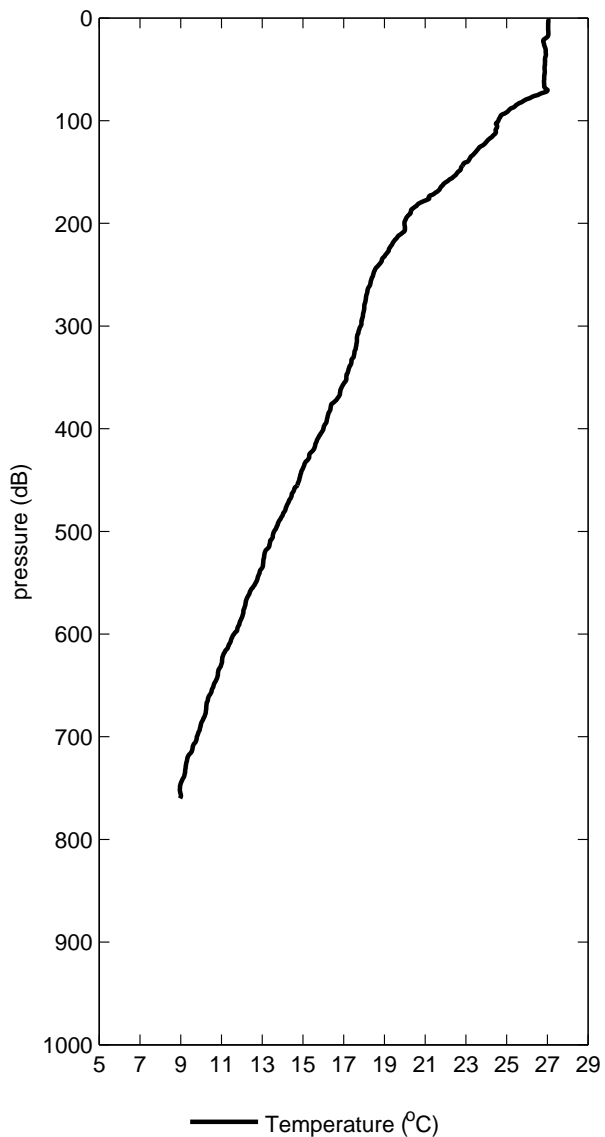
OC449_09 R/V Oceanus
 XBT station: 14
 Latitude: 20° 29.8397' N Longitude: 65° 40.0024' W
 07-Dec-2008 06:08:29Z

Pressure dB	PoTemp90 °C
10	27.1477
20	27.1555
30	27.1432
40	27.1209
50	27.0873
60	27.0564
70	26.2945
80	25.6726
90	25.3321
100	25.2286
110	24.8053
120	24.4920
130	23.9004
140	23.5601
150	22.8759
160	22.4386
170	21.7617
180	21.4608
190	20.9703
200	20.4434
250	18.8084
300	18.0831
350	17.2566
400	16.0950
450	14.7298
500	13.6412
600	11.2923
700	9.5371



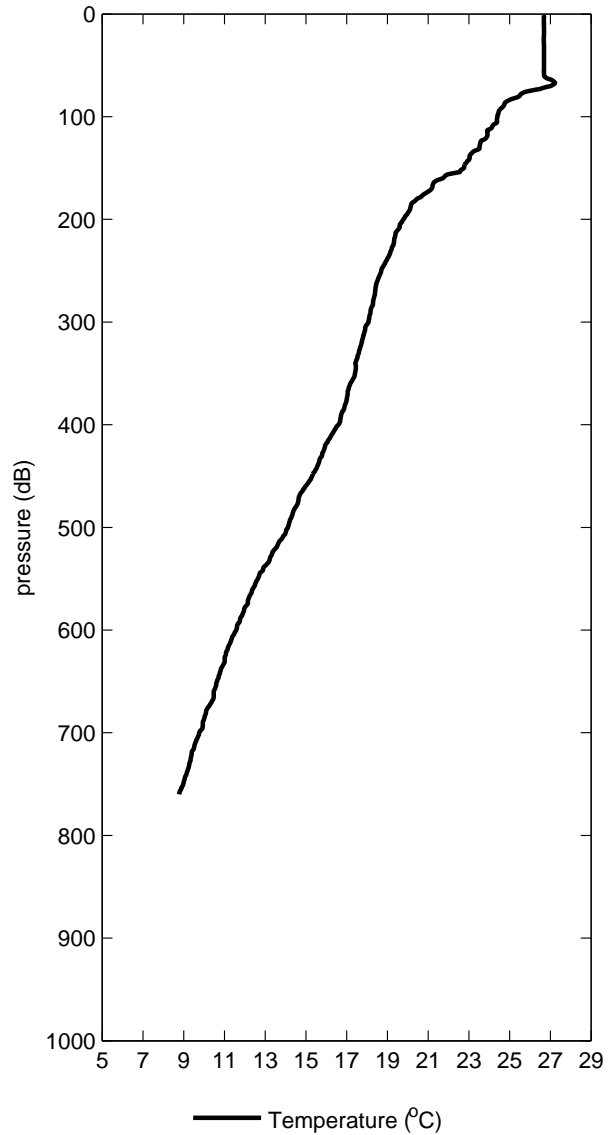
OC449_09 R/V Oceanus
 XBT station: 15
 Latitude: 20° 47.3608' N Longitude: 65° 44.8691' W
 07-Dec-2008 07:58:26Z

Pressure dB	PoTemp90 °C
10	27.0377
20	26.9012
30	26.9118
40	26.8824
50	26.8673
60	26.8465
70	27.0142
80	25.8925
90	25.1065
100	24.5973
110	24.4670
120	24.0366
130	23.5065
140	23.0762
150	22.6061
160	22.0019
170	21.5163
180	20.7617
190	20.2883
200	19.9840
250	18.4533
300	17.8369
350	17.1336
400	16.0085
450	14.8195
500	13.5914
600	11.6208
700	9.7957



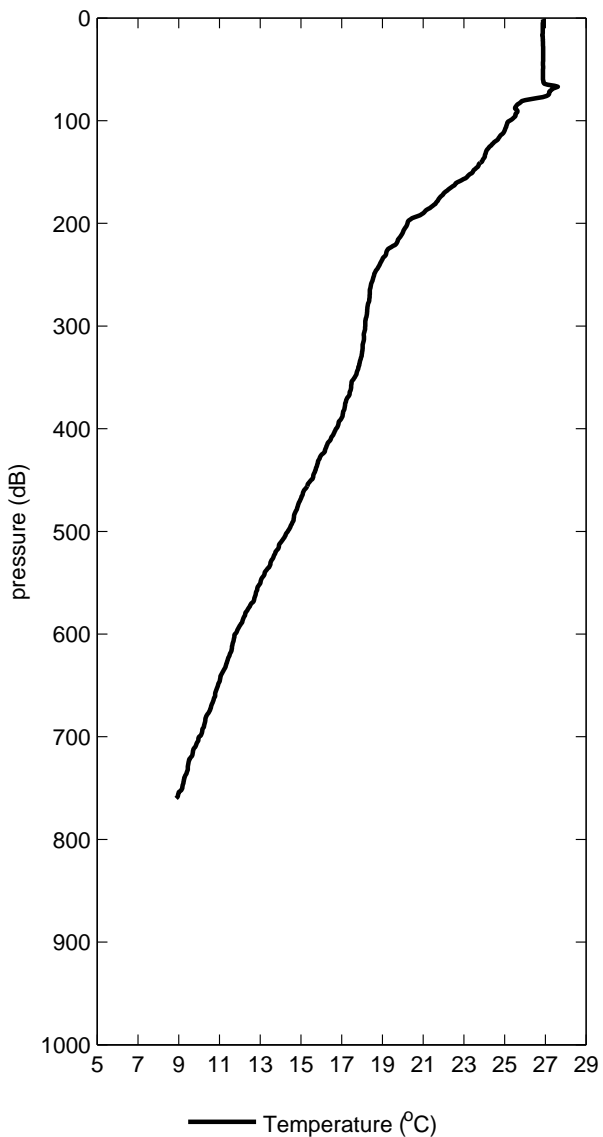
OC449_09 R/V Oceanus
 XBT station: 16
 Latitude: 21° 7.5813' N Longitude: 65° 50.1645' W
 07-Dec-2008 09:59:09Z

Pressure dB	PoTemp90 °C
10	26.6878
20	26.6855
30	26.6933
40	26.6911
50	26.6888
60	26.6966
70	27.0342
80	25.4827
90	24.6868
100	24.4074
110	24.1443
120	23.8768
130	23.5236
140	23.0391
150	22.7617
160	21.7080
170	21.1724
180	20.4621
190	20.1157
200	19.7843
250	18.6971
300	18.0764
350	17.4162
400	16.6035
450	15.3079
500	14.1195
600	11.5810
700	9.7642



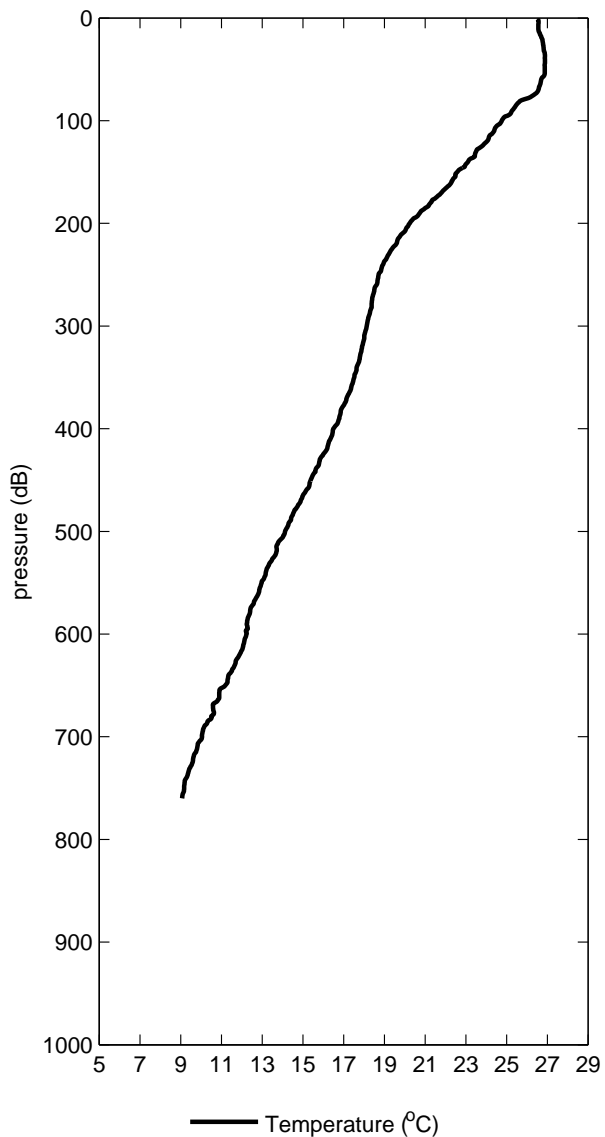
OC449_09 R/V Oceanus
 XBT station: 17
 Latitude: 21° 27.8601' N Longitude: 65° 55.4863' W
 07-Dec-2008 11:58:34Z

Pressure dB	PoTemp90 °C
10	26.8778
20	26.8755
30	26.8933
40	26.8910
50	26.8888
60	26.8865
70	27.3041
80	26.0125
90	25.6219
100	25.2586
110	24.9909
120	24.5534
130	24.0974
140	23.8841
150	23.4410
160	22.6698
170	22.0514
180	21.6356
190	21.0159
200	20.2337
250	18.5973
300	18.1596
350	17.6390
400	16.7265
450	15.5073
500	14.3587
600	11.7652
700	10.0079



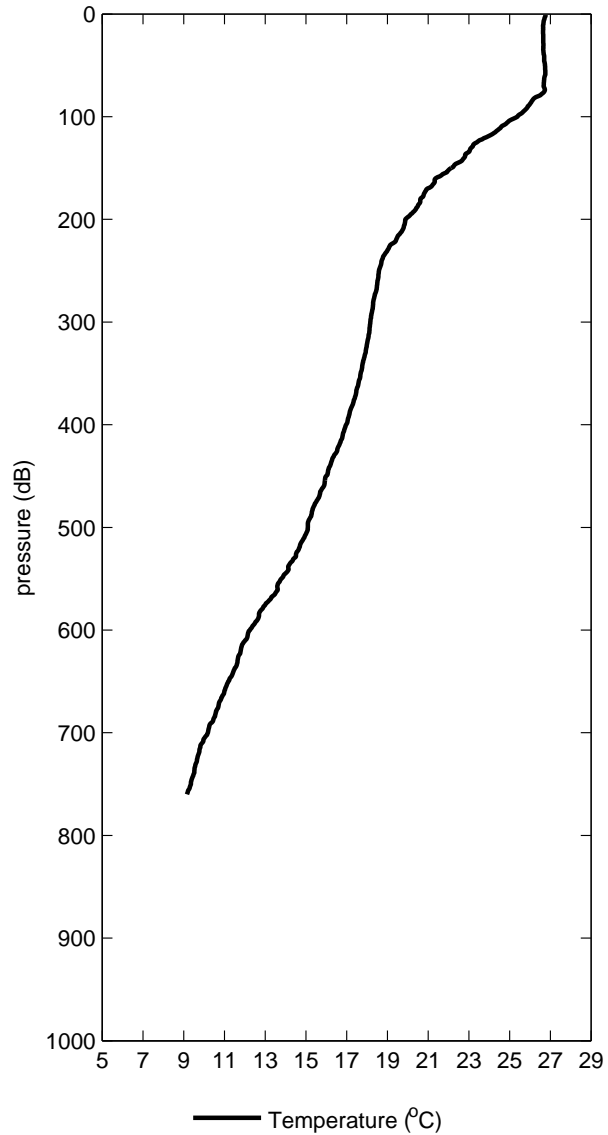
OC449_09 R/V Oceanus
 XBT station: 18
 Latitude: 21° 47.6335' N Longitude: 65° 59.6509' W
 07-Dec-2008 13:58:09Z

Pressure dB	PoTemp90 °C
10	26.5578
20	26.7327
30	26.8233
40	26.8810
50	26.8788
60	26.6966
70	26.5644
80	25.7426
90	25.2864
100	24.7655
110	24.3942
120	24.0424
130	23.5079
140	23.1076
150	22.5747
160	22.2959
170	21.8088
180	21.2711
190	20.7334
200	20.2437
250	18.7171
300	18.1297
350	17.5260
400	16.4939
450	15.3877
500	14.1295
600	12.2381
700	10.0511



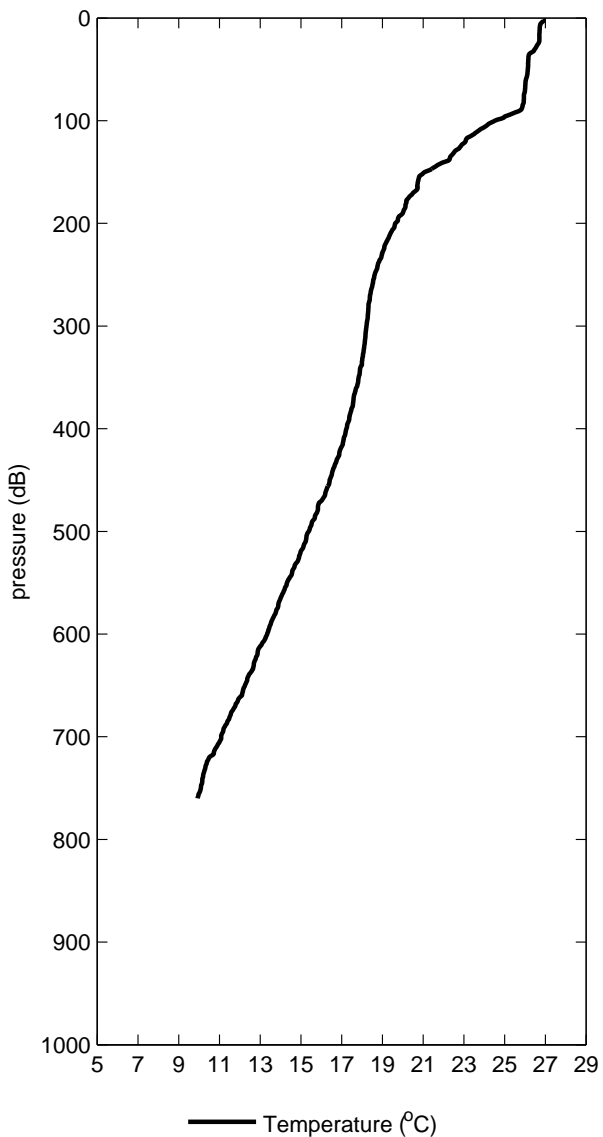
OC449_09 R/V Oceanus
 XBT station: 19
 Latitude: 22° 7.4102' N Longitude: 65° 57.1895' W
 07-Dec-2008 15:56:45Z

Pressure dB	PoTemp90 °C
10	26.6578
20	26.6541
30	26.6633
40	26.6896
50	26.7388
60	26.7366
70	26.6743
80	26.4122
90	25.8975
100	25.3818
110	24.5912
120	23.8611
130	23.1311
140	22.7708
150	22.1309
160	21.3655
170	20.9669
180	20.6219
190	20.4010
200	19.8842
250	18.5873
300	18.1596
350	17.6856
400	16.9792
450	15.9908
500	15.0961
600	12.2531
700	10.1903



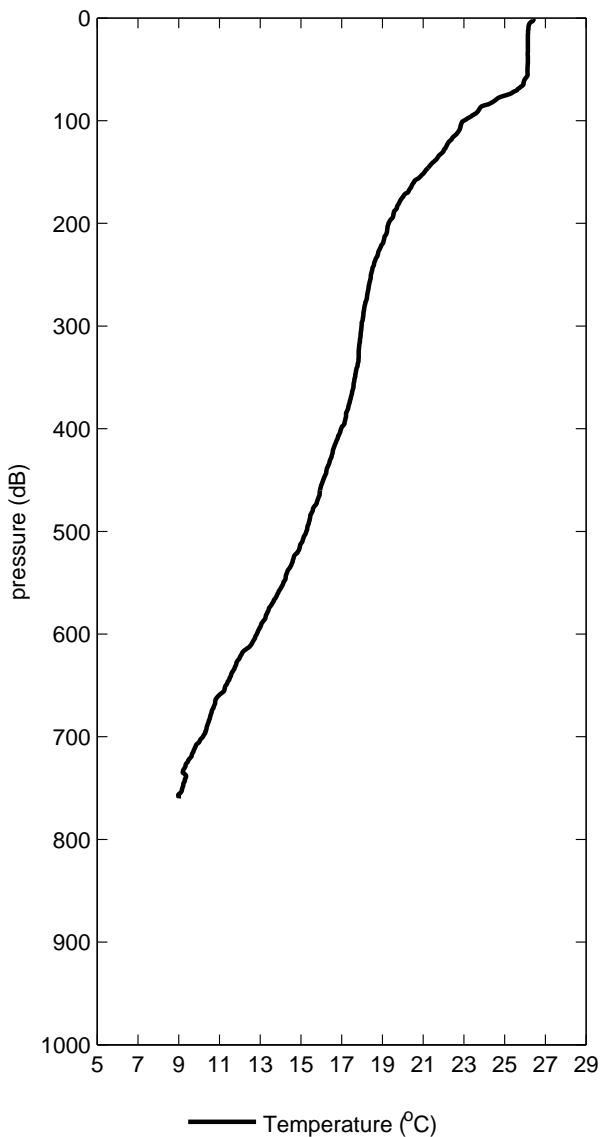
OC449_09 R/V Oceanus
 XBT station: 21
 Latitude: 22° 29.1623' N Longitude: 65° 54.4395' W
 07-Dec-2008 18:00:05Z

Pressure dB	PoTemp90 °C
10	26.7278
20	26.7055
30	26.4976
40	26.1698
50	26.1390
60	26.0468
70	26.0047
80	25.9425
90	25.7718
100	24.5190
110	23.7061
120	23.0917
130	22.5530
140	22.0672
150	21.0819
160	20.7404
170	20.5274
180	20.1774
190	20.0015
200	19.6345
250	18.6230
300	18.2195
350	17.8352
400	17.2385
450	16.4145
500	15.3851
600	13.3484
700	11.0841



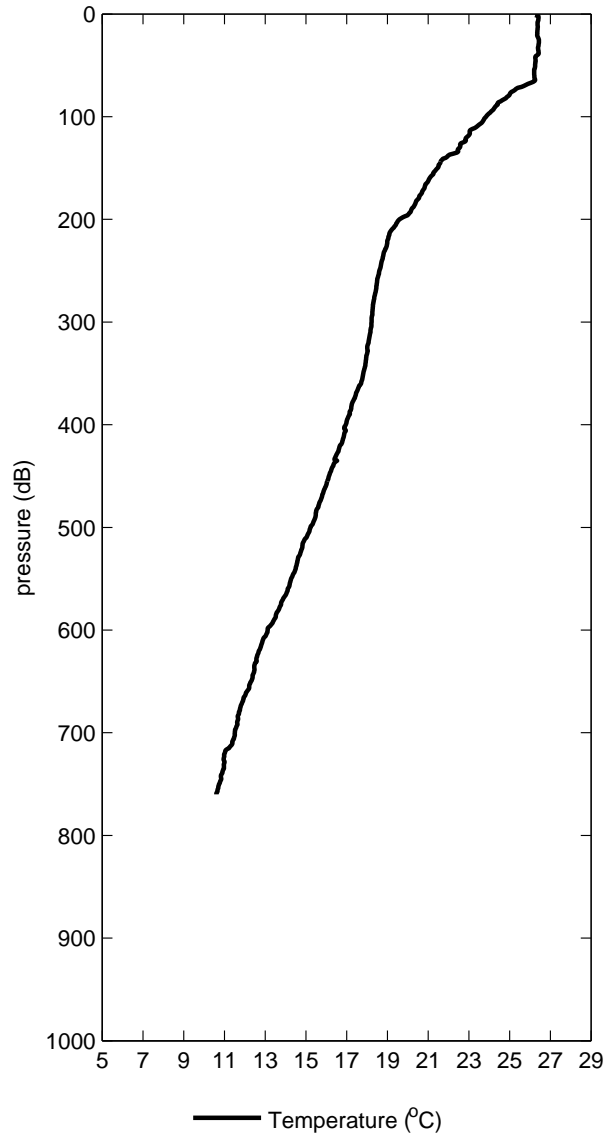
OC449_09 R/V Oceanus
 XBT station: 22
 Latitude: 22° 49.2627' N Longitude: 65° 51.9585' W
 07-Dec-2008 19:57:14Z

Pressure dB	PoTemp90 °C
10	26.1678
20	26.1456
30	26.1434
40	26.1412
50	26.1290
60	25.9869
70	25.6148
80	24.5532
90	23.7287
100	22.9984
110	22.7525
120	22.2994
130	21.9935
140	21.5248
150	21.0662
160	20.5464
170	20.2420
180	19.8278
190	19.5592
200	19.3049
250	18.4376
300	17.9800
350	17.6557
400	16.9792
450	16.0955
500	15.2655
600	12.8356
700	10.1920



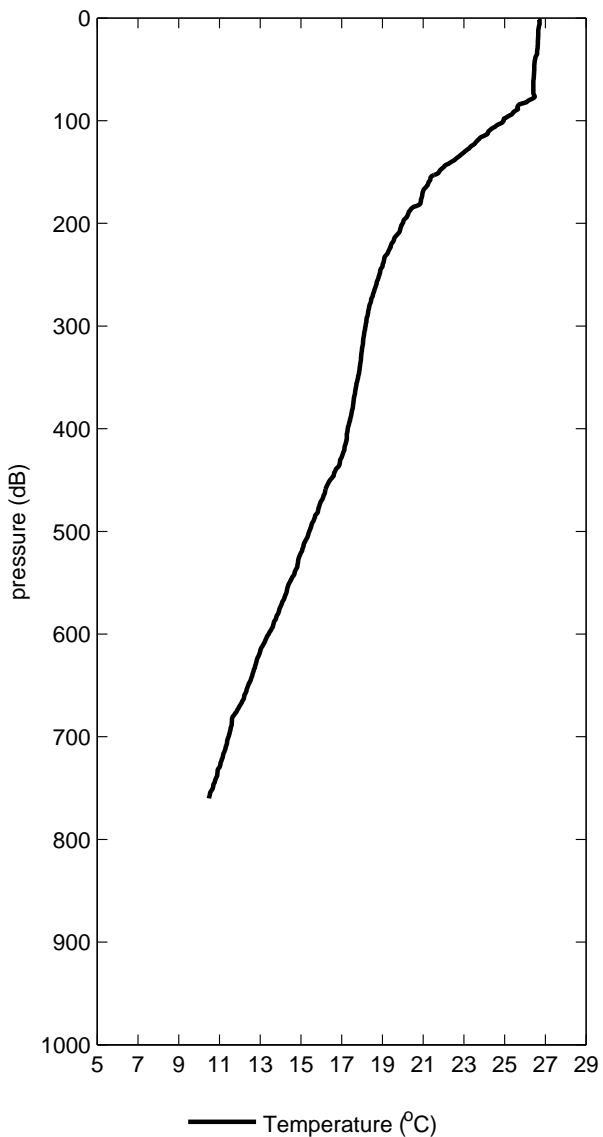
OC449_09 R/V Oceanus
 XBT station: 23
 Latitude: 23° 8.9663' N Longitude: 65° 49.4834' W
 07-Dec-2008 21:57:06Z

Pressure dB	PoTemp90 °C
10	26.3778
20	26.3570
30	26.4233
40	26.3683
50	26.2590
60	26.2168
70	25.6948
80	24.9330
90	24.3084
100	23.8445
110	23.3735
120	22.8933
130	22.5573
140	21.8659
150	21.4658
160	21.0672
170	20.8128
180	20.5220
190	20.1913
200	19.5945
250	18.6030
300	18.2295
350	17.8153
400	16.9592
450	16.1353
500	15.2256
600	13.1293
700	11.5136



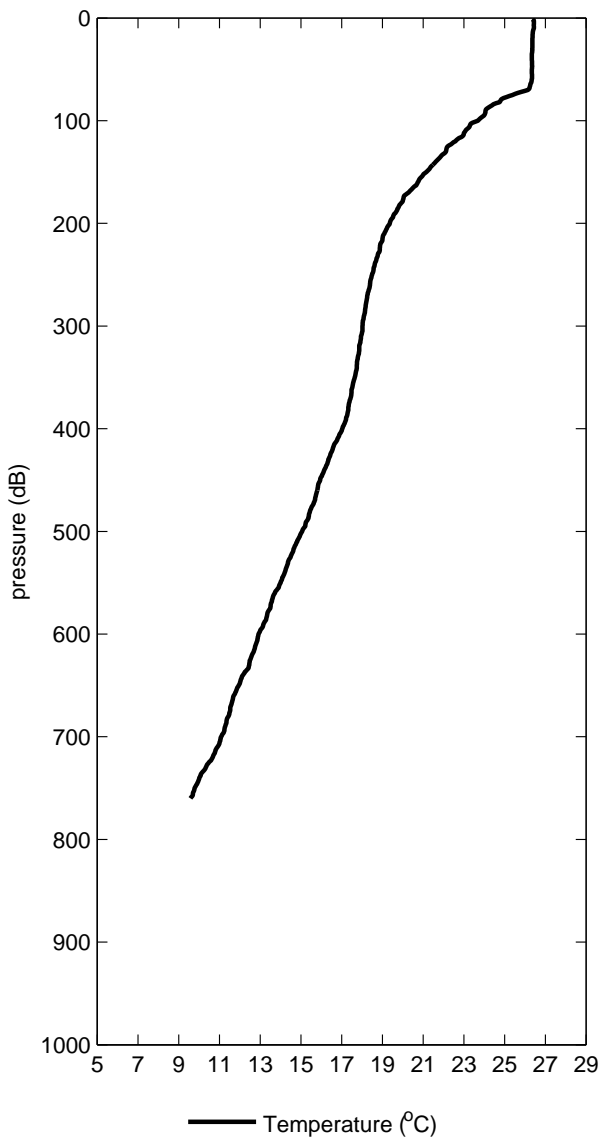
OC449_09 R/V Oceanus
 XBT station: 24
 Latitude: 23° 29.4233' N Longitude: 65° 46.8994' W
 07-Dec-2008 23:57:05Z

Pressure dB	PoTemp90 °C
10	26.6678
20	26.6455
30	26.6147
40	26.5011
50	26.4589
60	26.4167
70	26.4145
80	26.2123
90	25.5619
100	24.9554
110	24.2357
120	23.6327
130	23.0511
140	22.3897
150	21.7841
160	21.2684
170	20.9783
180	20.8766
190	20.2783
200	19.9940
250	18.8526
300	18.1762
350	17.8119
400	17.3049
450	16.4294
500	15.4150
600	13.4181
700	11.4456



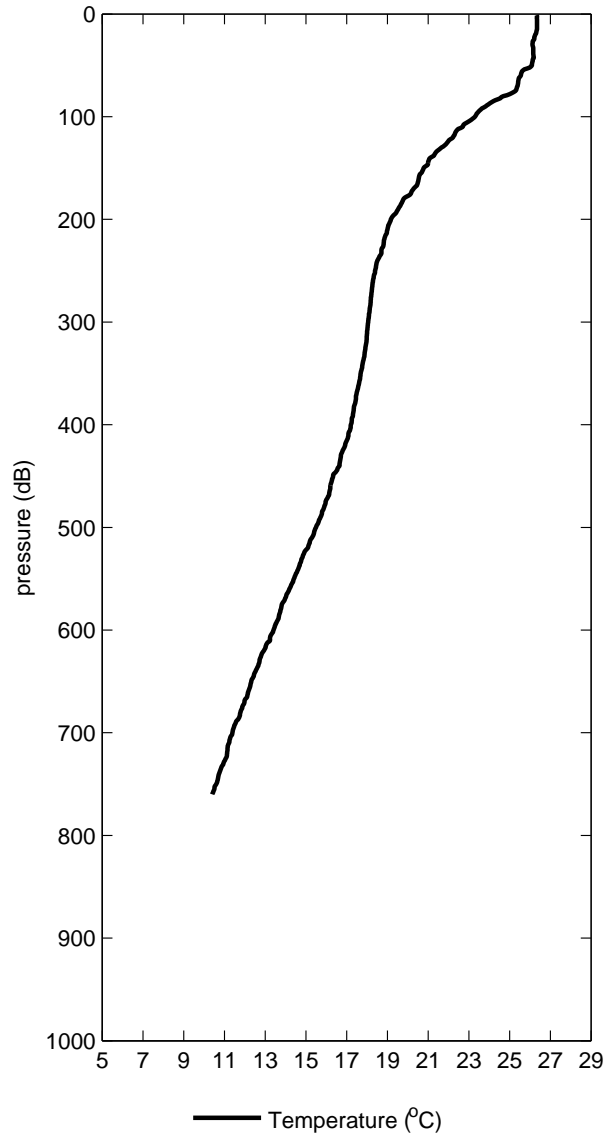
OC449_09 R/V Oceanus
 XBT station: 25
 Latitude: 23° 50.1123' N Longitude: 65° 44.3027' W
 08-Dec-2008 01:57:57Z

Pressure dB	PoTemp90 °C
10	26.4378
20	26.3670
30	26.3548
40	26.3411
50	26.3389
60	26.3267
70	26.1446
80	24.8131
90	24.0700
100	23.6896
110	23.0751
120	22.5892
130	22.1234
140	21.6147
150	21.1661
160	20.7376
170	20.2805
180	19.9427
190	19.6377
200	19.3649
250	18.4932
300	18.0199
350	17.6457
400	17.0324
450	15.9459
500	15.0562
600	12.9252
700	11.0874



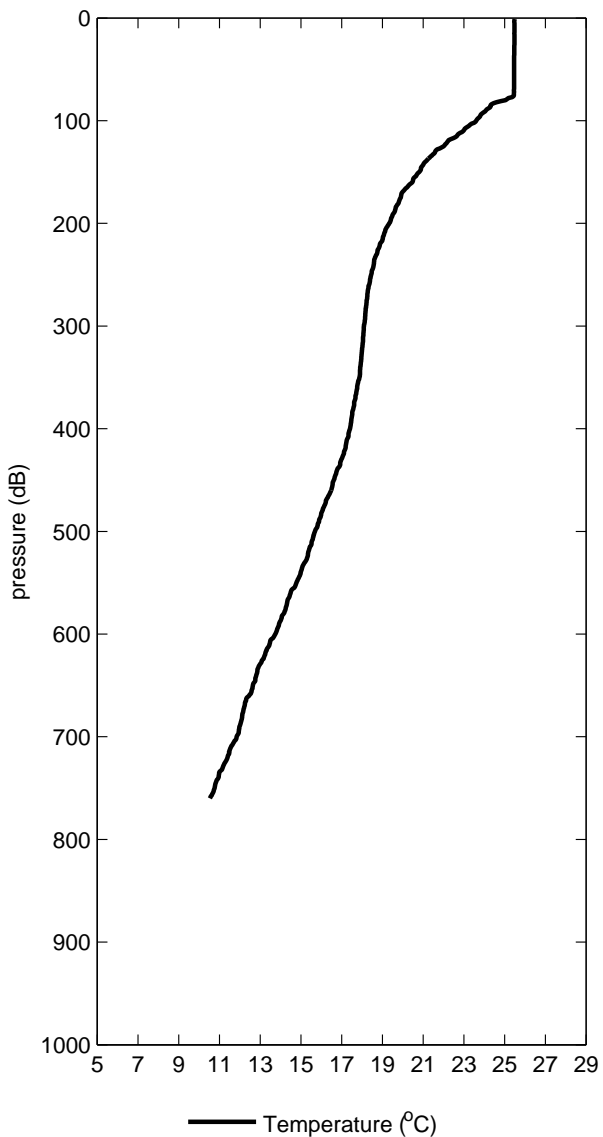
OC449_09 R/V Oceanus
 XBT station: 26
 Latitude: 24° 9.5300' N Longitude: 65° 41.8325' W
 08-Dec-2008 03:57:54Z

Pressure dB	PoTemp90 °C
10	26.3478
20	26.2684
30	26.1234
40	26.1712
50	26.0990
60	25.5470
70	25.3949
80	24.7031
90	23.8244
100	23.2965
110	22.6968
120	22.2281
130	21.6623
140	21.1081
150	20.7851
160	20.5392
170	20.2934
180	19.8029
190	19.5321
200	19.1751
250	18.3977
300	18.0565
350	17.6856
400	17.2119
450	16.3397
500	15.4947
600	13.4131
700	11.3942



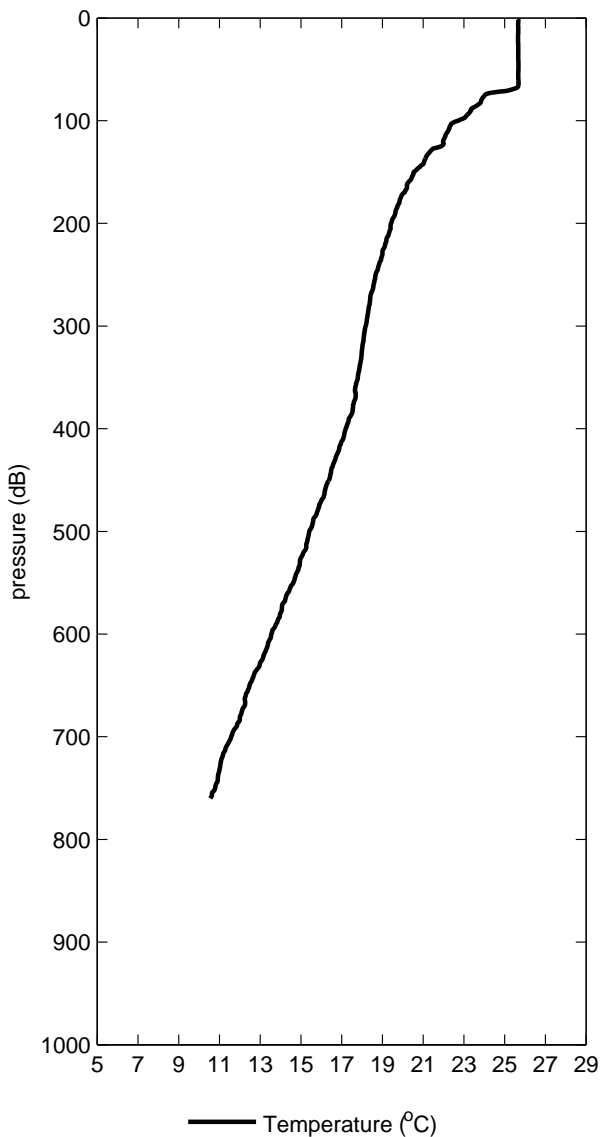
OC449_09 R/V Oceanus
 XBT station: 27
 Latitude: 24° 29.1702' N Longitude: 65° 39.3315' W
 08-Dec-2008 05:58:48Z

Pressure dB	PoTemp90 °C
10	25.4878
20	25.4857
30	25.4735
40	25.4714
50	25.4692
60	25.4671
70	25.4549
80	25.0530
90	24.0871
100	23.6080
110	22.9795
120	22.2181
130	21.5995
140	21.1081
150	20.8065
160	20.4650
170	19.9709
180	19.7979
190	19.5621
200	19.3349
250	18.4533
300	18.0997
350	17.8751
400	17.4113
450	16.6188
500	15.6940
600	13.7467
700	11.8435



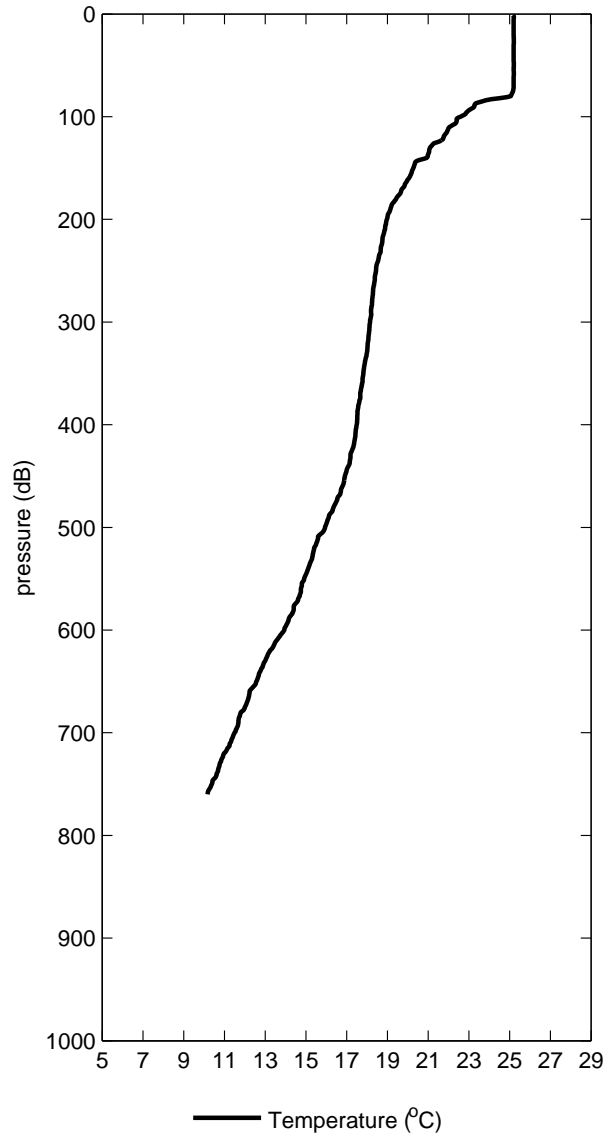
OC449_09 R/V Oceanus
 XBT station: 28
 Latitude: 24° 48.5879' N Longitude: 65° 36.8745' W
 08-Dec-2008 07:58:16Z

Pressure dB	PoTemp90 °C
10	25.6678
20	25.6657
30	25.6735
40	25.6713
50	25.6791
60	25.6770
70	25.2850
80	23.8536
90	23.3590
100	22.7152
110	22.2257
120	21.9826
130	21.3440
140	21.0467
150	20.5382
160	20.2766
170	20.0779
180	19.8328
190	19.6363
200	19.4248
250	18.6672
300	18.1829
350	17.7953
400	17.2019
450	16.3845
500	15.4150
600	13.5525
700	11.5749



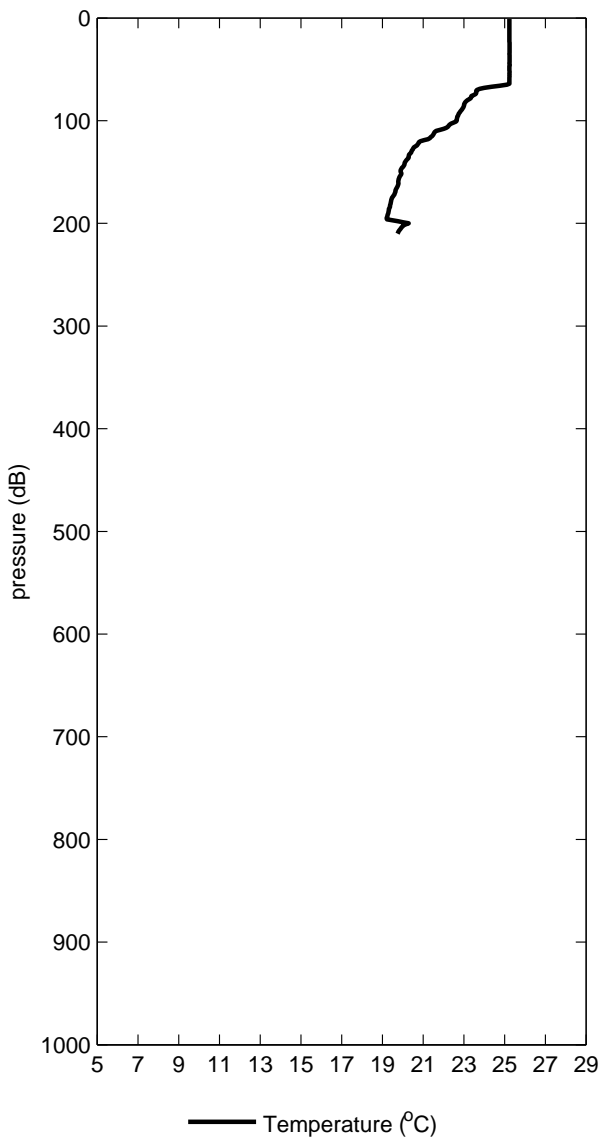
OC449_09 R/V Oceanus
 XBT station: 29
 Latitude: 25° 8.3506' N Longitude: 65° 34.3550' W
 08-Dec-2008 09:59:11Z

Pressure dB	PoTemp90 °C
10	25.1979
20	25.1957
30	25.2036
40	25.2014
50	25.2079
60	25.2072
70	25.1950
80	25.0629
90	23.2690
100	22.5953
110	22.0616
120	21.7627
130	21.1000
140	20.9425
150	20.2756
160	20.0469
170	19.7340
180	19.4333
190	19.1498
200	18.9754
250	18.4376
300	18.1496
350	17.8219
400	17.4911
450	16.9129
500	15.9431
600	13.9358
700	11.4986



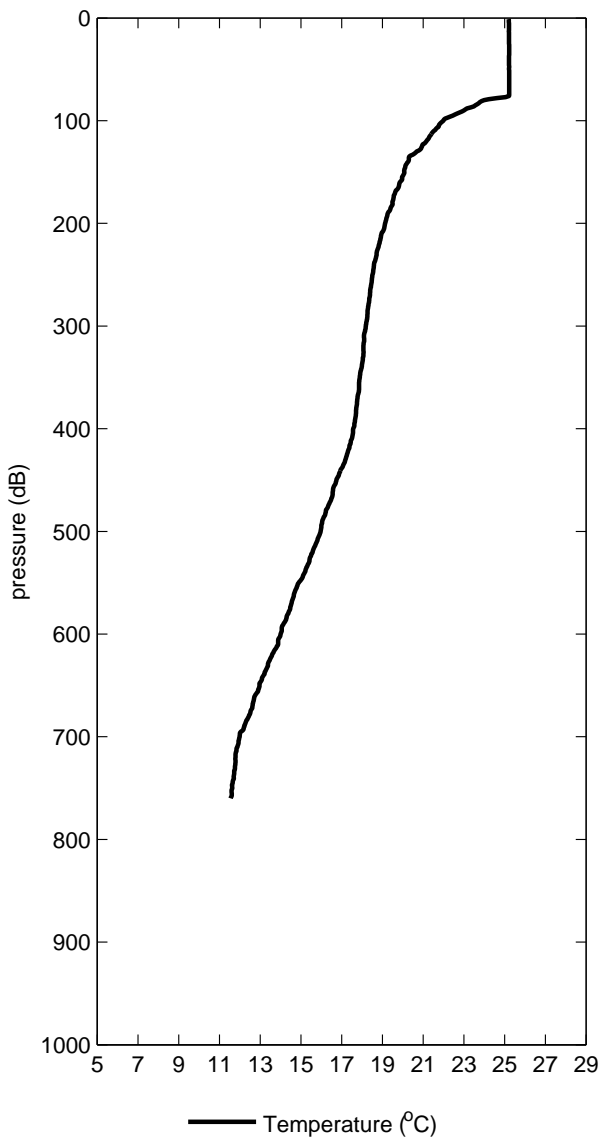
OC449_09 R/V Oceanus
 XBT station: 30
 Latitude: 25° 28.1020' N Longitude: 65° 31.7866' W
 08-Dec-2008 11:59:18Z

Pressure dB	PoTemp90 °C
10	25.2379
20	25.2357
30	25.2436
40	25.2414
50	25.2393
60	25.2371
70	23.6457
80	23.1839
90	22.8778
100	22.6486
110	21.6419
120	20.8635
130	20.4263
140	20.1204
150	19.9017
160	19.7829
170	19.6270
180	19.4133
190	19.2896
200	20.2936



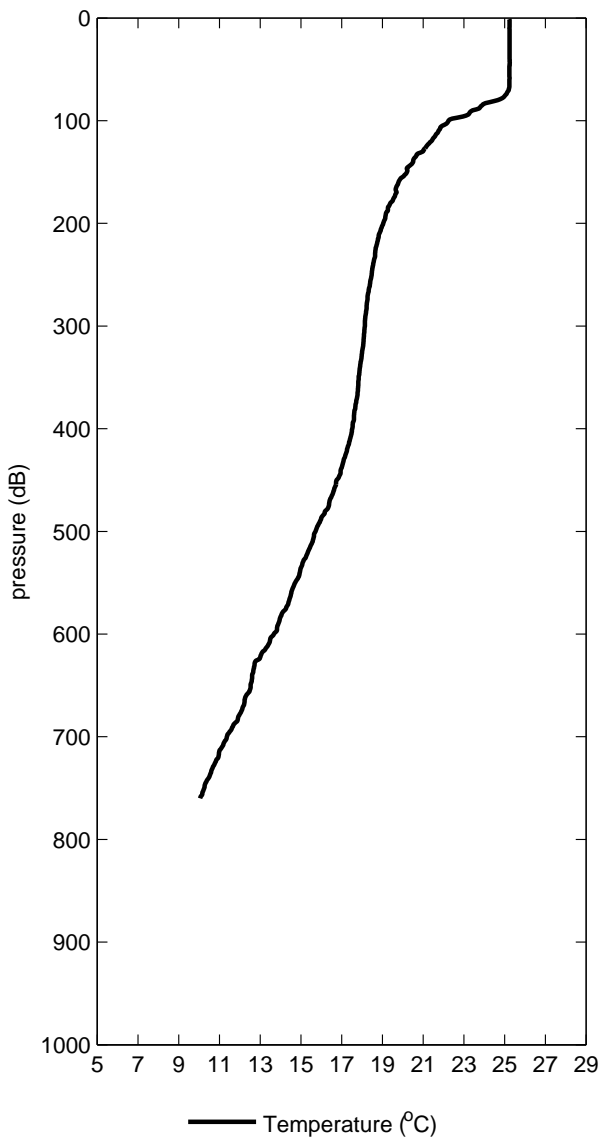
OC449_09 R/V Oceanus
 XBT station: 31
 Latitude: 25° 33.0732' N Longitude: 65° 31.3242' W
 08-Dec-2008 12:29:09Z

Pressure dB	PoTemp90 °C
10	25.2179
20	25.2157
30	25.2236
40	25.2214
50	25.2193
60	25.2272
70	25.2250
80	23.9935
90	23.0135
100	21.9957
110	21.5348
120	21.1589
130	20.6875
140	20.2603
150	20.0815
160	19.8585
170	19.6270
180	19.4982
190	19.2725
200	19.1352
250	18.5175
300	18.1895
350	17.8918
400	17.5709
450	16.7434
500	15.9630
600	14.0056
700	11.9911



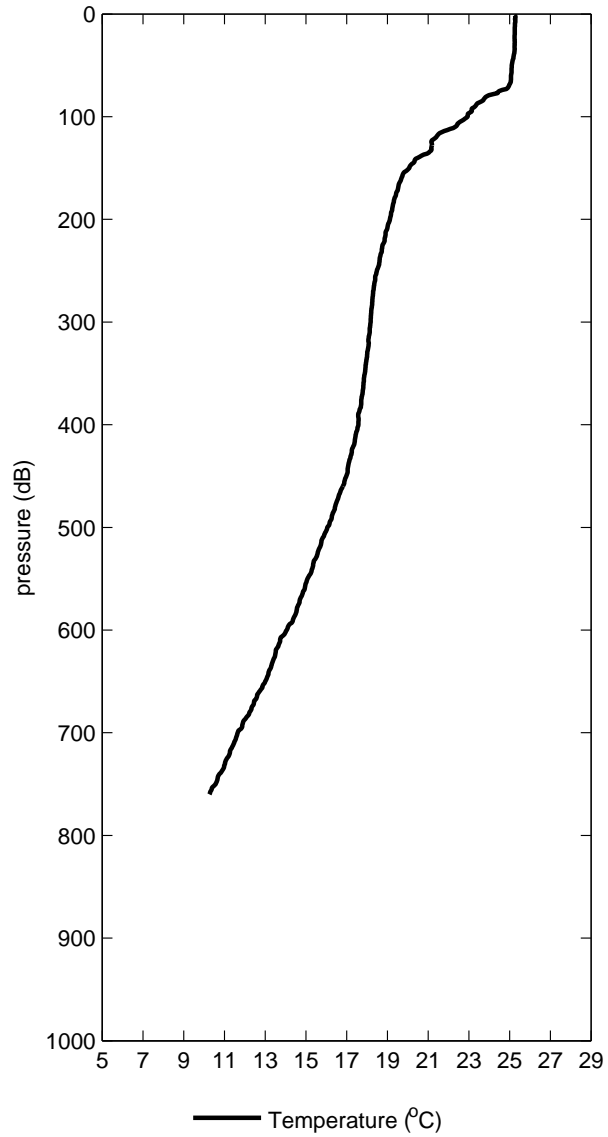
OC449_09 R/V Oceanus
 XBT station: 32
 Latitude: 25° 47.4353' N Longitude: 65° 29.3486' W
 08-Dec-2008 13:57:16Z

Pressure dB	PoTemp90 °C
10	25.2379
20	25.2457
30	25.2436
40	25.2414
50	25.2393
60	25.2371
70	25.2050
80	24.6632
90	23.4318
100	22.2489
110	21.7561
120	21.4002
130	20.9986
140	20.5144
150	20.2057
160	19.7900
170	19.7012
180	19.4033
190	19.1797
200	19.0453
250	18.4732
300	18.1396
350	17.8419
400	17.5210
450	16.7584
500	15.7139
600	13.6720
700	11.3660



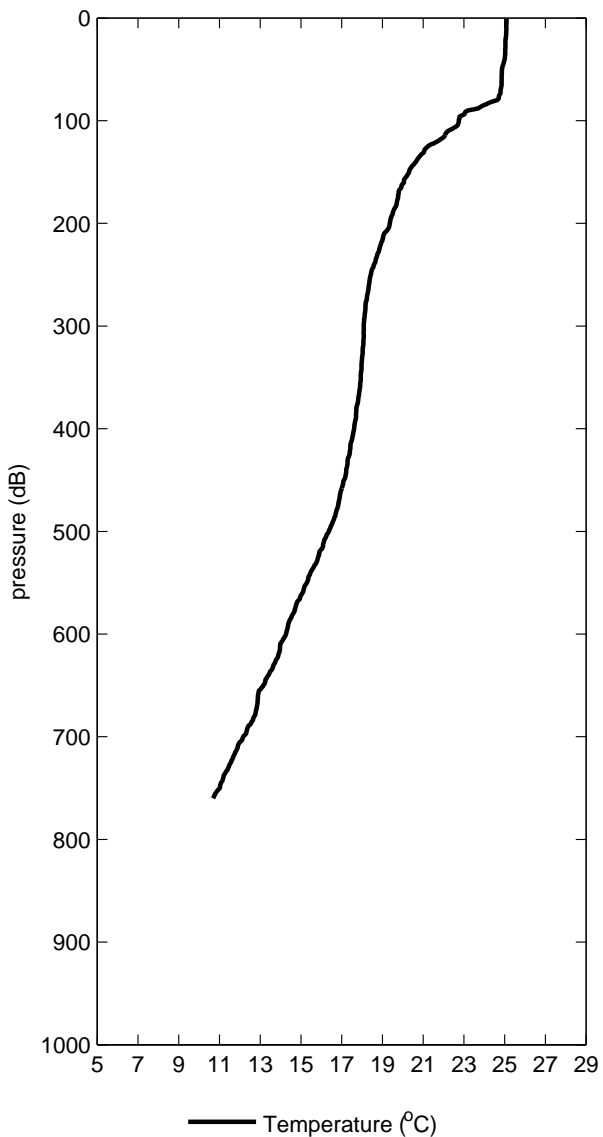
OC449_09 R/V Oceanus
 XBT station: 33
 Latitude: 26° 7.5872' N Longitude: 65° 26.7627' W
 08-Dec-2008 16:03:49Z

Pressure dB	PoTemp90 °C
10	25.2679
20	25.2557
30	25.2536
40	25.2129
50	25.1108
60	25.0672
70	24.9651
80	23.8936
90	23.3076
100	22.9367
110	22.3242
120	21.3945
130	21.1656
140	20.4972
150	20.0744
160	19.6901
170	19.5200
180	19.3434
190	19.2368
200	19.1252
250	18.4875
300	18.1796
350	17.8951
400	17.5742
450	16.9877
500	16.0527
600	14.0603
700	11.6545



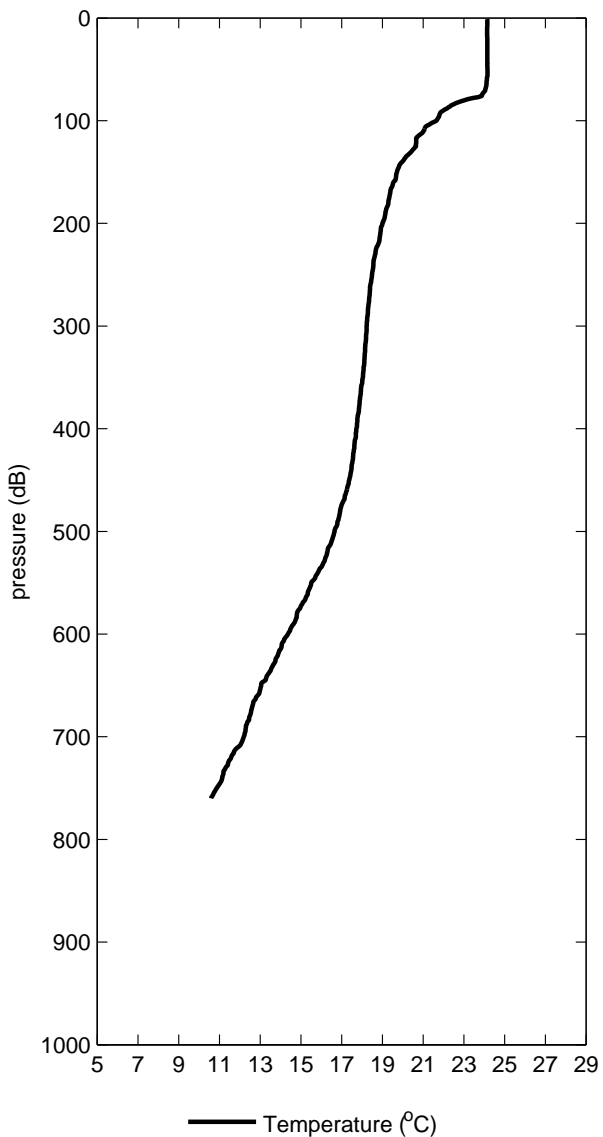
OC449_09 R/V Oceanus
 XBT station: 34
 Latitude: 26° 26.4514' N Longitude: 65° 24.3325' W
 08-Dec-2008 17:57:33Z

Pressure dB	PoTemp90 °C
10	25.0879
20	25.0557
30	25.0336
40	25.0029
50	24.8708
60	24.8573
70	24.8052
80	24.6332
90	23.2262
100	22.7502
110	22.2272
120	21.7171
130	21.0500
140	20.6499
150	20.3141
160	20.0583
170	19.7997
180	19.7080
190	19.5164
200	19.3649
250	18.4333
300	18.0897
350	17.9416
400	17.6141
450	17.1173
500	16.3716
600	14.2694
700	12.1735



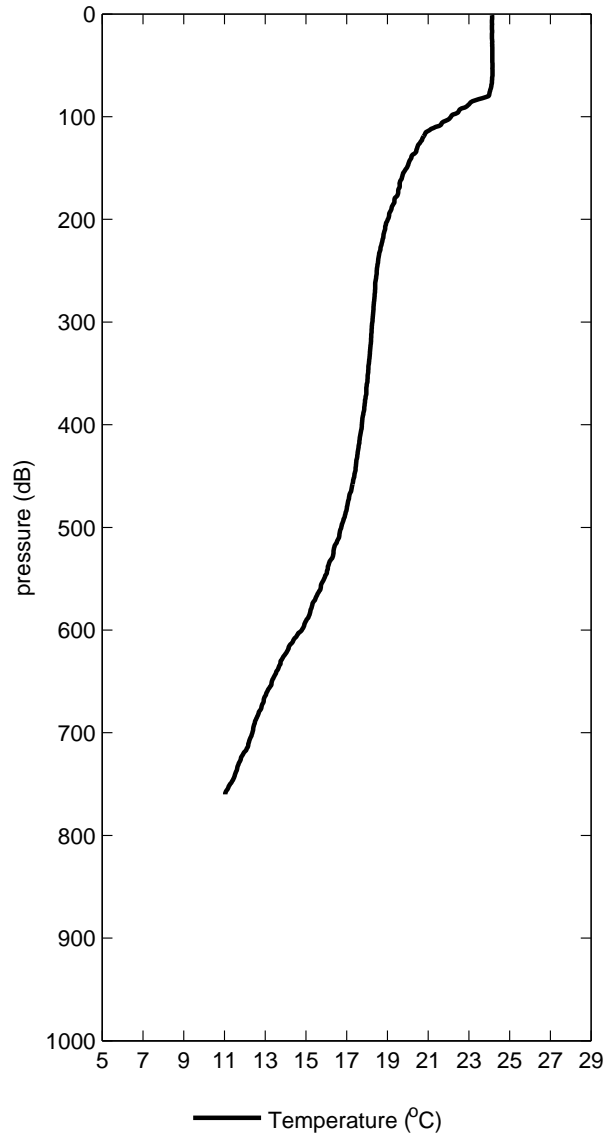
OC449_09 R/V Oceanus
 XBT station: 35
 Latitude: 26° 46.3987' N Longitude: 65° 21.7578' W
 08-Dec-2008 19:57:56Z

Pressure dB	PoTemp90 °C
10	24.1479
20	24.1559
30	24.1538
40	24.1531
50	24.1596
60	24.1376
70	24.0555
80	23.0540
90	22.0055
100	21.6559
110	21.0238
120	20.6579
130	20.4291
140	19.9734
150	19.7148
160	19.5403
170	19.3801
180	19.2885
190	19.1498
200	19.0053
250	18.4975
300	18.2295
350	18.0414
400	17.7238
450	17.3715
500	16.6507
600	14.3690
700	12.2017



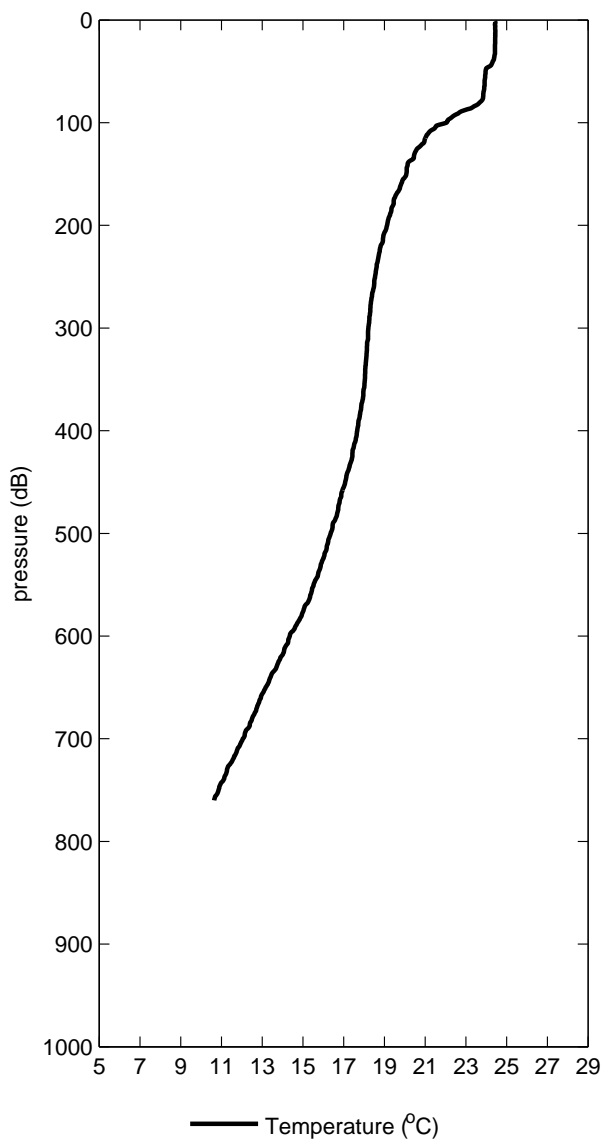
OC449_09 R/V Oceanus
 XBT station: 36
 Latitude: 27° 5.9768' N Longitude: 65° 19.2036' W
 08-Dec-2008 21:58:00Z

Pressure dB	PoTemp90 °C
10	24.1479
20	24.1359
30	24.1524
40	24.1517
50	24.1596
60	24.1576
70	24.1055
80	23.9635
90	22.9050
100	22.1273
110	21.3764
120	20.7535
130	20.4662
140	20.1775
150	19.9459
160	19.7101
170	19.5642
180	19.3584
190	19.1968
200	19.0253
250	18.4775
300	18.2594
350	18.0514
400	17.7437
450	17.3765
500	16.7404
600	14.8022
700	12.3709



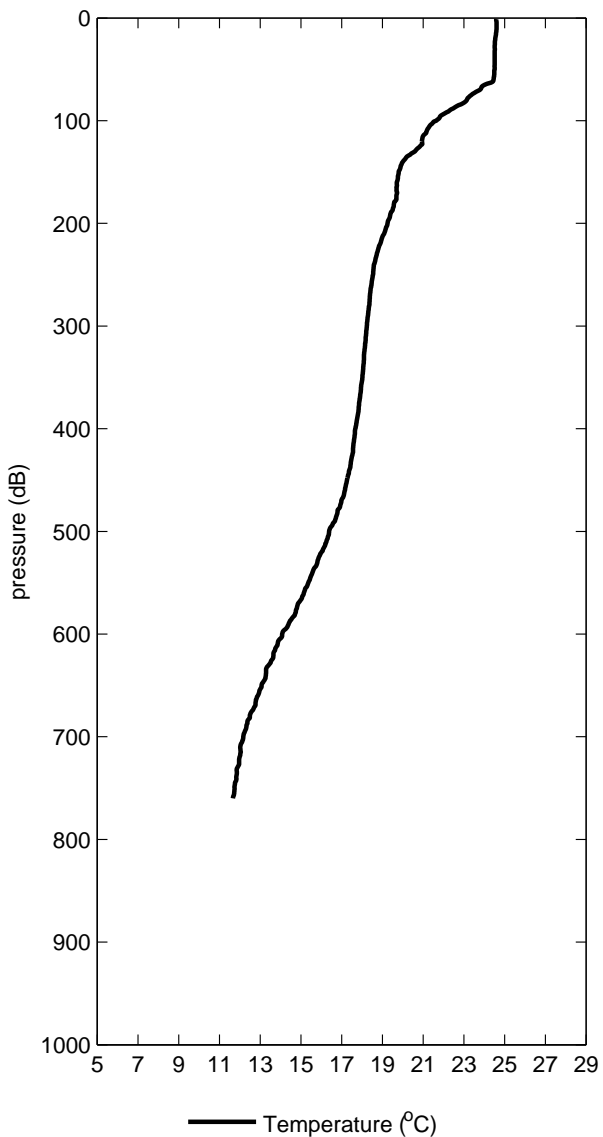
OC449_09 R/V Oceanus
 XBT station: 37
 Latitude: 27° 25.2913' N Longitude: 65° 16.7026' W
 08-Dec-2008 23:57:39Z

Pressure dB	PoTemp90 °C
10	24.4479
20	24.4358
30	24.4337
40	24.3260
50	23.9697
60	23.9177
70	23.8656
80	23.7037
90	22.6879
100	22.0490
110	21.1737
120	20.9206
130	20.4848
140	20.1476
150	20.0744
160	19.8200
170	19.5771
180	19.4383
190	19.2796
200	19.1352
250	18.5431
300	18.2195
350	18.0414
400	17.6706
450	17.0774
500	16.3617
600	14.3591
700	12.0541



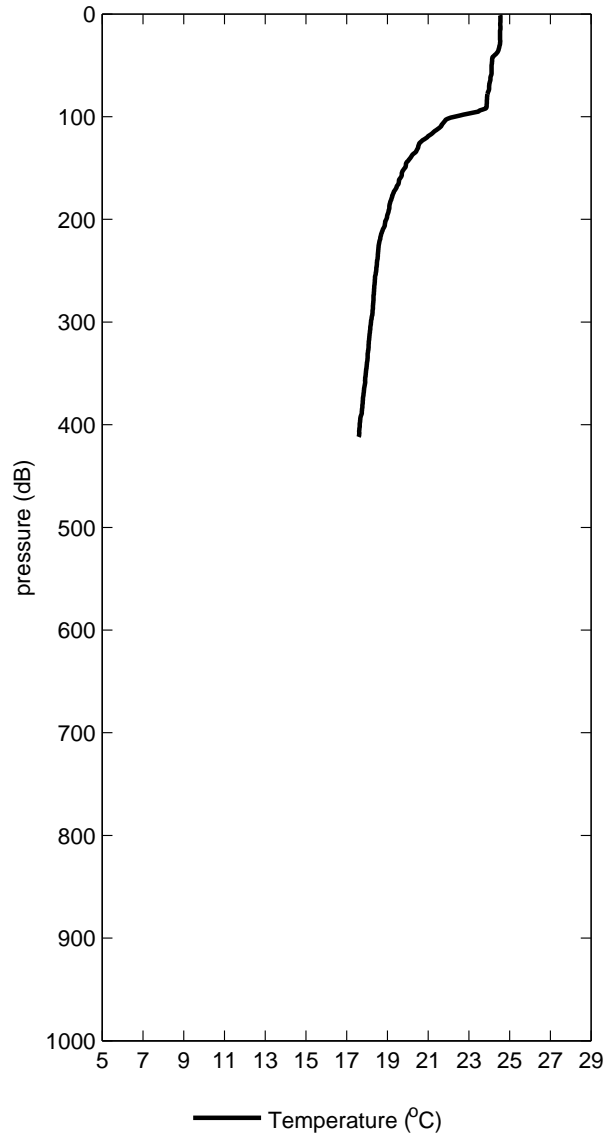
OC449_09 R/V Oceanus
 XBT station: 38
 Latitude: 27° 44.9062' N Longitude: 65° 14.1504' W
 09-Dec-2008 01:58:11Z

Pressure dB	PoTemp90 °C
10	24.6079
20	24.5458
30	24.5223
40	24.5116
50	24.5095
60	24.4575
70	23.7857
80	23.1440
90	22.3082
100	21.6459
110	21.1765
120	20.9434
130	20.5933
140	20.0006
150	19.8047
160	19.7115
170	19.7226
180	19.5781
190	19.4123
200	19.2550
250	18.5374
300	18.2394
350	18.0214
400	17.6706
450	17.2668
500	16.3816
600	14.0802
700	12.1702



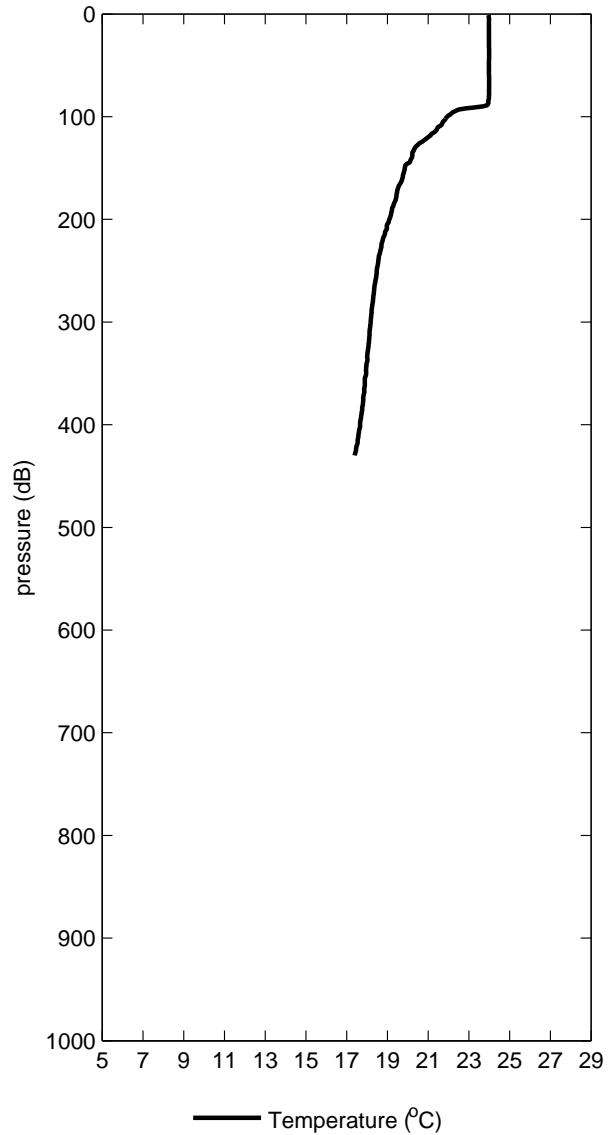
OC449_09 R/V Oceanus
XBT station: 39
Latitude: 28° 4.4265' N Longitude: 65° 11.5859' W
09-Dec-2008 03:59:06Z

Pressure dB	PoTemp90 °C
10	24.5379
20	24.5358
30	24.5237
40	24.2774
50	24.1197
60	24.0876
70	23.9956
80	23.9036
90	23.8715
100	22.3138
110	21.6076
120	20.9605
130	20.5105
140	20.1333
150	19.8575
160	19.6273
170	19.4244
180	19.2036
190	19.0898
200	18.9454
250	18.4533
300	18.1995
350	17.9416
400	17.6440



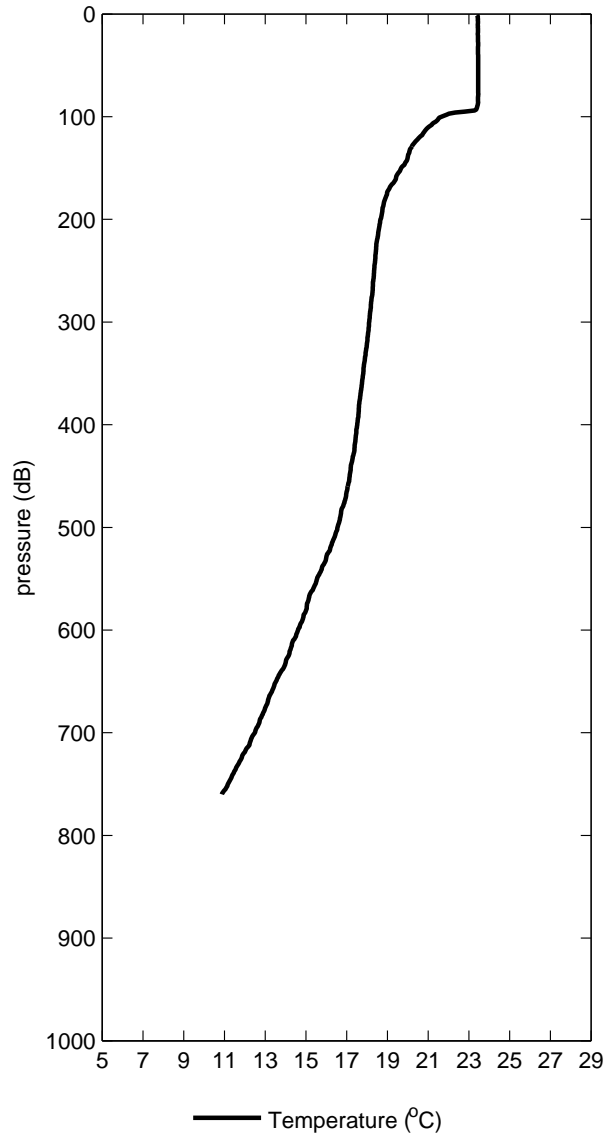
OC449_09 R/V Oceanus
 XBT station: 40
 Latitude: 28° 24.5632' N Longitude: 65° 8.9419' W
 09-Dec-2008 05:59:09Z

Pressure dB	PoTemp90 °C
10	23.9879
20	23.9859
30	23.9924
40	23.9918
50	23.9897
60	23.9976
70	23.9956
80	23.9835
90	23.7079
100	21.9357
110	21.4977
120	20.9948
130	20.3649
140	20.1975
150	19.8546
160	19.7401
170	19.5171
180	19.4233
190	19.2297
200	19.0952
250	18.4775
300	18.1796
350	17.9616
400	17.6640



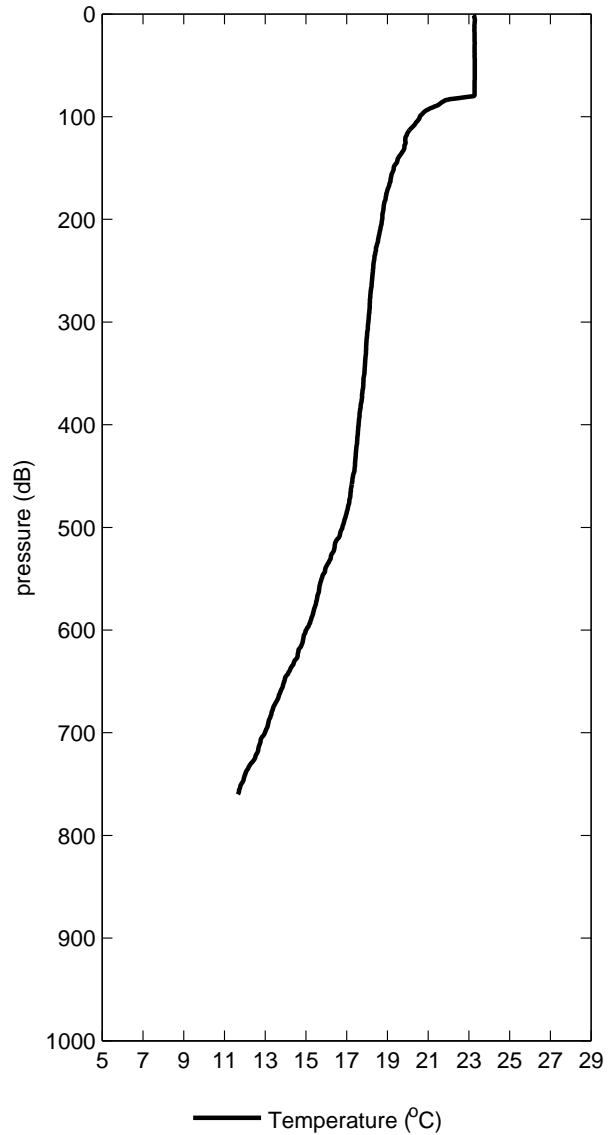
OC449_09 R/V Oceanus
 XBT station: 41
 Latitude: 28° 44.7766' N Longitude: 65° 6.2939' W
 09-Dec-2008 07:58:51Z

Pressure dB	PoTemp90 °C
10	23.4380
20	23.4360
30	23.4539
40	23.4605
50	23.4599
60	23.4579
70	23.4558
80	23.4538
90	23.4104
100	21.6659
110	21.0281
120	20.5751
130	20.1793
140	19.9977
150	19.6762
160	19.4219
170	19.0976
180	18.8940
190	18.7674
200	18.6658
250	18.3477
300	18.1097
350	17.8219
400	17.5210
450	17.1522
500	16.5510
600	14.6130
700	12.4919



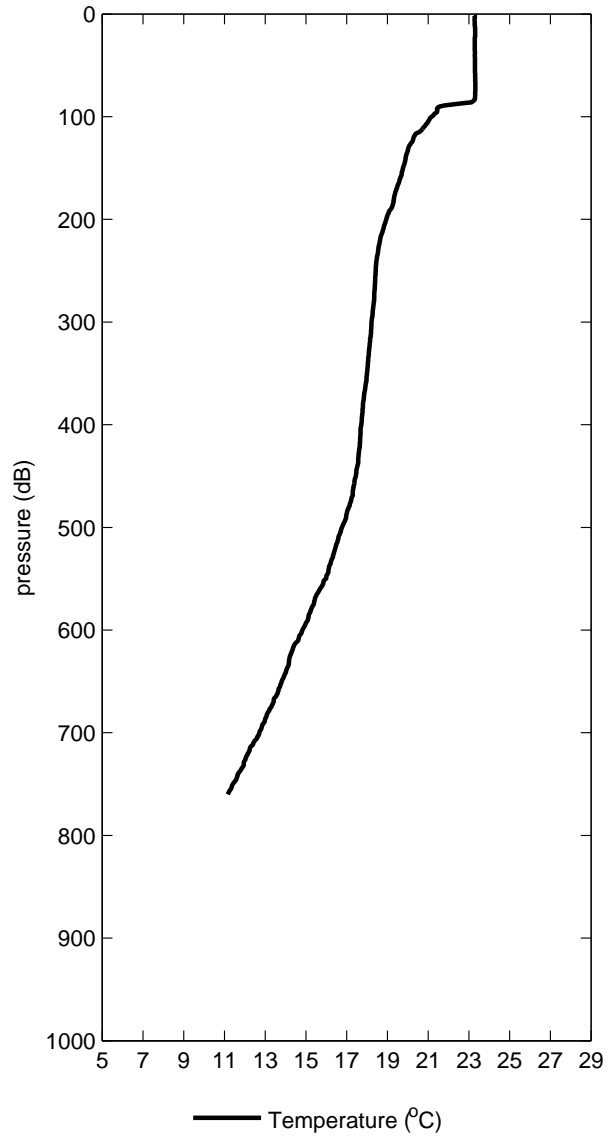
OC449_09 R/V Oceanus
 XBT station: 42
 Latitude: 29° 4.5835' N Longitude: 65° 3.6841' W
 09-Dec-2008 09:59:15Z

Pressure dB	PoTemp90 °C
10	23.2780
20	23.2860
30	23.2840
40	23.2820
50	23.2899
60	23.2879
70	23.2859
80	23.2439
90	21.3416
100	20.5983
110	20.2315
120	19.8942
130	19.8411
140	19.5410
150	19.3137
160	19.1621
170	19.0277
180	18.9089
190	18.8073
200	18.7457
250	18.2878
300	18.0665
350	17.8718
400	17.5842
450	17.3067
500	16.7902
600	15.0113
700	12.9878



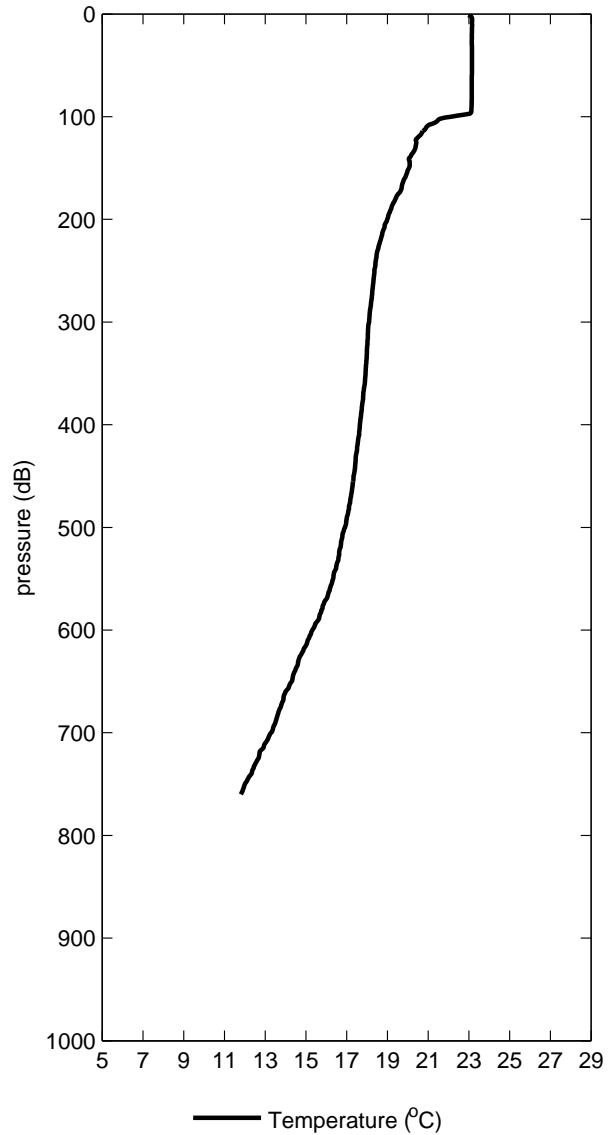
OC449_09 R/V Oceanus
 XBT station: 43
 Latitude: 29° 25.8843' N Longitude: 65° 0.8301' W
 09-Dec-2008 12:07:02Z

Pressure dB	PoTemp90 °C
10	23.2780
20	23.3060
30	23.2940
40	23.2934
50	23.2999
60	23.3079
70	23.3159
80	23.3139
90	21.6000
100	21.1829
110	20.8011
120	20.2939
130	20.0409
140	19.8978
150	19.7647
160	19.6302
170	19.4572
180	19.3234
190	19.1754
200	18.9454
250	18.4276
300	18.2261
350	17.9915
400	17.7205
450	17.4463
500	16.7702
600	14.8271
700	12.7175



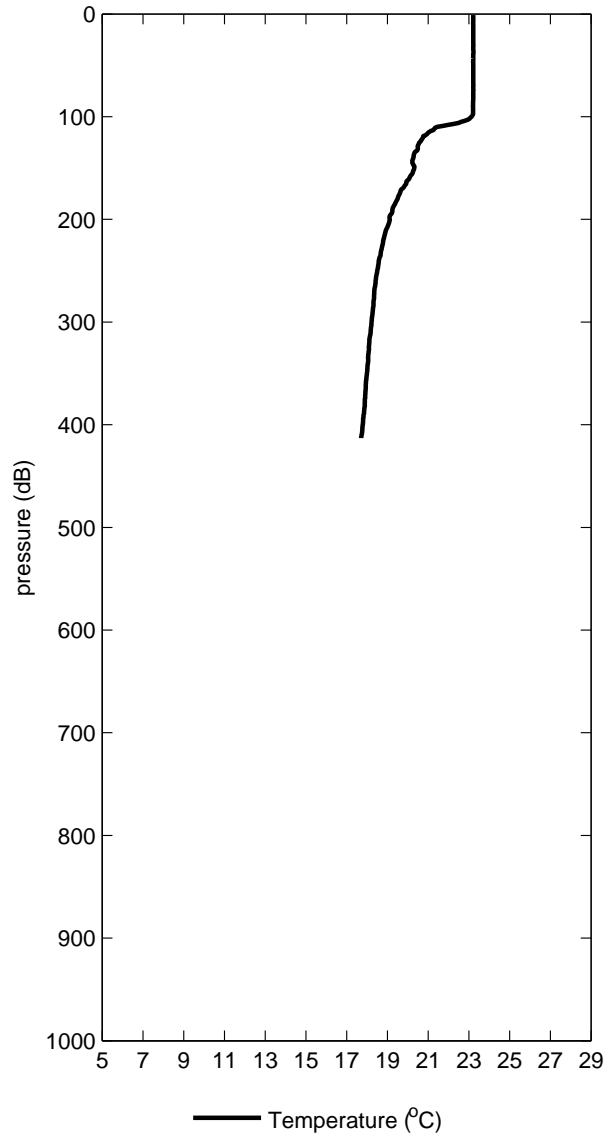
OC449_09 R/V Oceanus
 XBT station: 44
 Latitude: 29° 45.3589' N Longitude: 64° 58.2681' W
 09-Dec-2008 13:59:00Z

Pressure dB	PoTemp90 °C
10	23.1580
20	23.1474
30	23.1440
40	23.1520
50	23.1500
60	23.1480
70	23.1460
80	23.1440
90	23.1320
100	22.1306
110	20.9238
120	20.5052
130	20.3806
140	20.0833
150	20.0558
160	19.8471
170	19.6969
180	19.3983
190	19.1797
200	18.9954
250	18.3677
300	18.1064
350	17.9317
400	17.6507
450	17.3416
500	16.9197
600	15.3150
700	13.2913



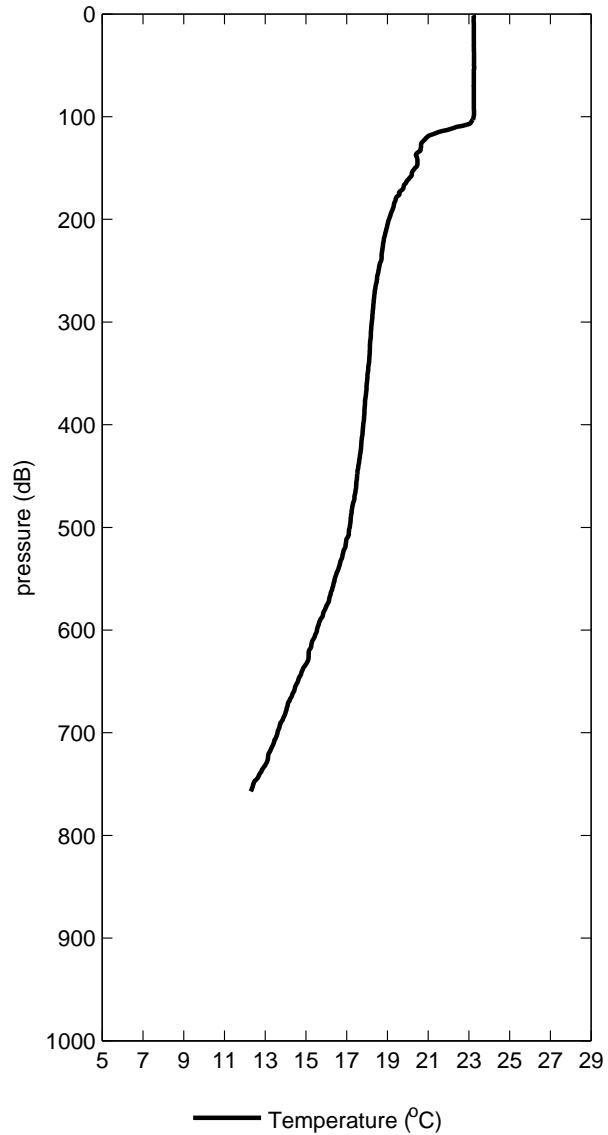
OC449_09 R/V Oceanus
 XBT station: 45
 Latitude: 30° 6.6431' N Longitude: 64° 55.4121' W
 09-Dec-2008 16:03:04Z

Pressure dB	PoTemp90 °C
10	23.2180
20	23.2160
30	23.2240
40	23.2220
50	23.2200
60	23.2179
70	23.2159
80	23.2139
90	23.2019
100	23.1333
110	21.4420
120	20.7535
130	20.4919
140	20.2774
150	20.3227
160	20.0797
170	19.7454
180	19.5032
190	19.2568
200	19.1152
250	18.5075
300	18.2295
350	17.9948
400	17.7936



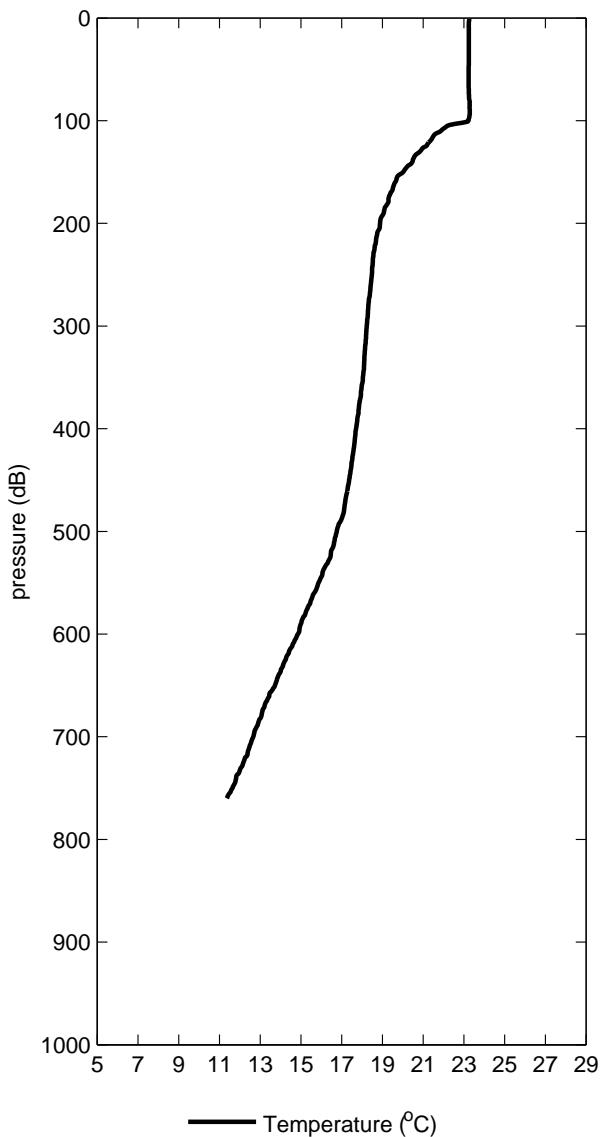
OC449_09 R/V Oceanus
 XBT station: 46
 Latitude: 30° 7.2766' N Longitude: 64° 55.1738' W
 09-Dec-2008 16:07:08Z

Pressure dB	PoTemp90 °C
10	23.2480
20	23.2460
30	23.2454
40	23.2520
50	23.2499
60	23.2479
70	23.2359
80	23.2439
90	23.2419
100	23.2382
110	22.4013
120	20.9505
130	20.6561
140	20.4615
150	20.3584
160	20.0683
170	19.7768
180	19.4133
190	19.2596
200	19.0753
250	18.5631
300	18.2394
350	18.0314
400	17.8235
450	17.5160
500	17.1489
600	15.5441
700	13.6031



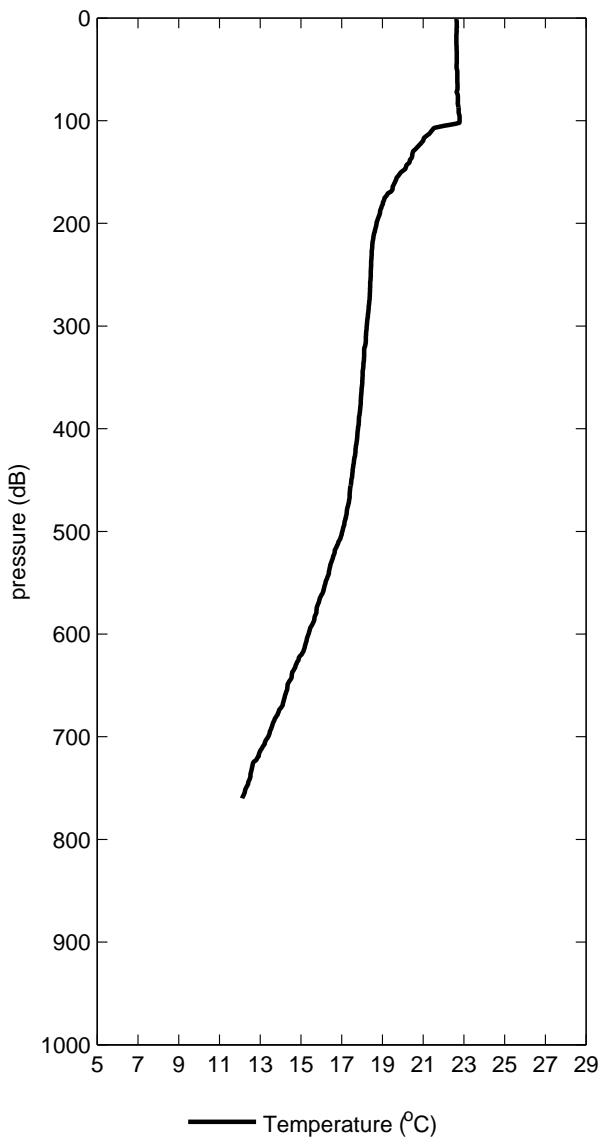
OC449_09 R/V Oceanus
 XBT station: 47
 Latitude: 30° 25.9424' N Longitude: 64° 52.8394' W
 09-Dec-2008 17:58:35Z

Pressure dB	PoTemp90 °C
10	23.2480
20	23.2460
30	23.2440
40	23.2420
50	23.2399
60	23.2379
70	23.2459
80	23.2739
90	23.2919
100	23.2299
110	21.8774
120	21.3359
130	20.8488
140	20.4772
150	20.0273
160	19.6288
170	19.4044
180	19.2835
190	19.0670
200	18.8855
250	18.4875
300	18.2361
350	18.0447
400	17.7105
450	17.3665
500	16.7603
600	14.8570
700	12.6611



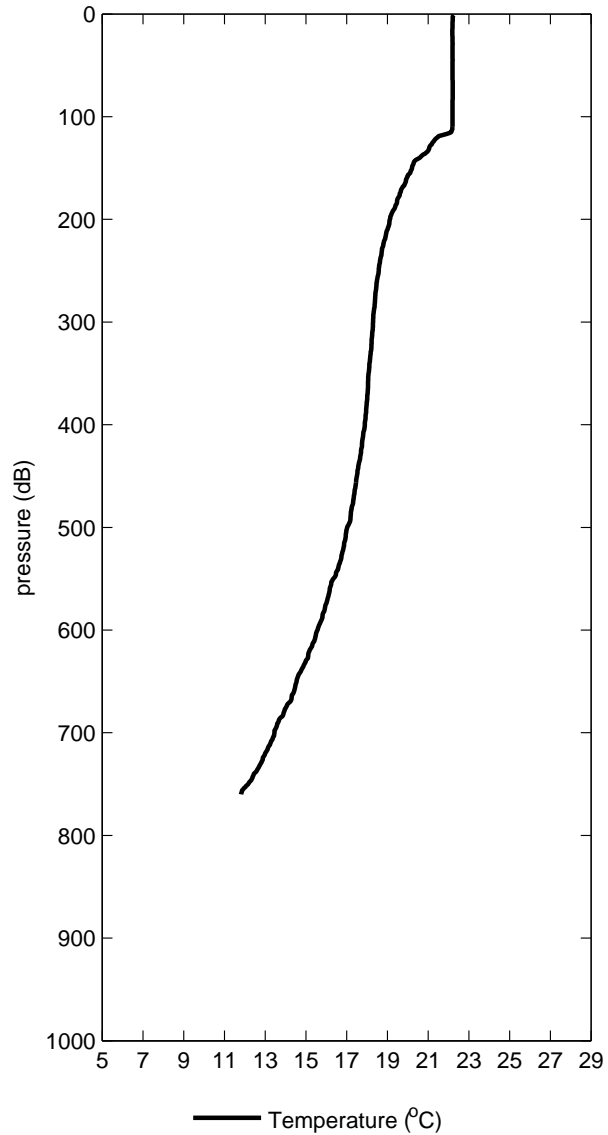
OC449_09 R/V Oceanus
 XBT station: 48
 Latitude: 30° 46.2439' N Longitude: 64° 50.0815' W
 09-Dec-2008 19:57:39Z

Pressure dB	PoTemp90 °C
10	22.6480
20	22.6361
30	22.6441
40	22.6521
50	22.6587
60	22.6782
70	22.6762
80	22.7042
90	22.7422
100	22.7902
110	21.4106
120	20.9848
130	20.5048
140	20.3374
150	19.9288
160	19.6188
170	19.3359
180	19.0238
190	18.8801
200	18.7157
250	18.4276
300	18.2394
350	18.0248
400	17.8036
450	17.4811
500	17.0294
600	15.3748
700	13.3958



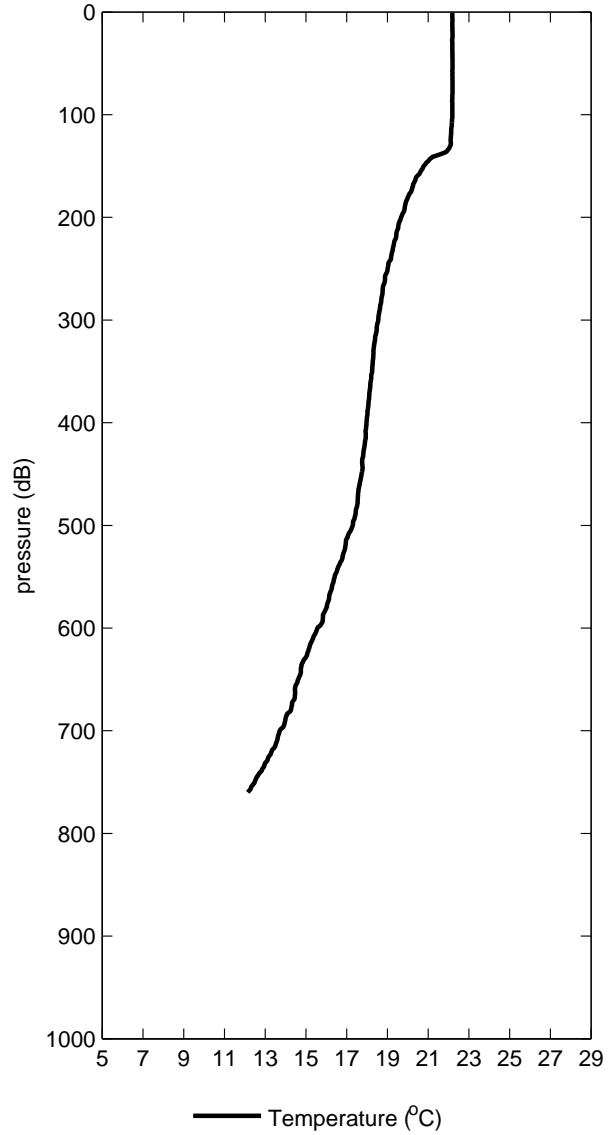
OC449_09 R/V Oceanus
 XBT station: 49
 Latitude: 31° 7.1338' N Longitude: 64° 47.2217' W
 09-Dec-2008 21:56:52Z

Pressure dB	PoTemp90 °C
10	22.1981
20	22.1861
30	22.1956
40	22.2022
50	22.2003
60	22.1984
70	22.2064
80	22.2045
90	22.2025
100	22.2006
110	22.1958
120	21.4644
130	21.0600
140	20.5857
150	20.2043
160	19.9484
170	19.7040
180	19.5032
190	19.3424
200	19.1252
250	18.5774
300	18.2993
350	18.0813
400	17.8933
450	17.5011
500	17.0294
600	15.5739
700	13.4538



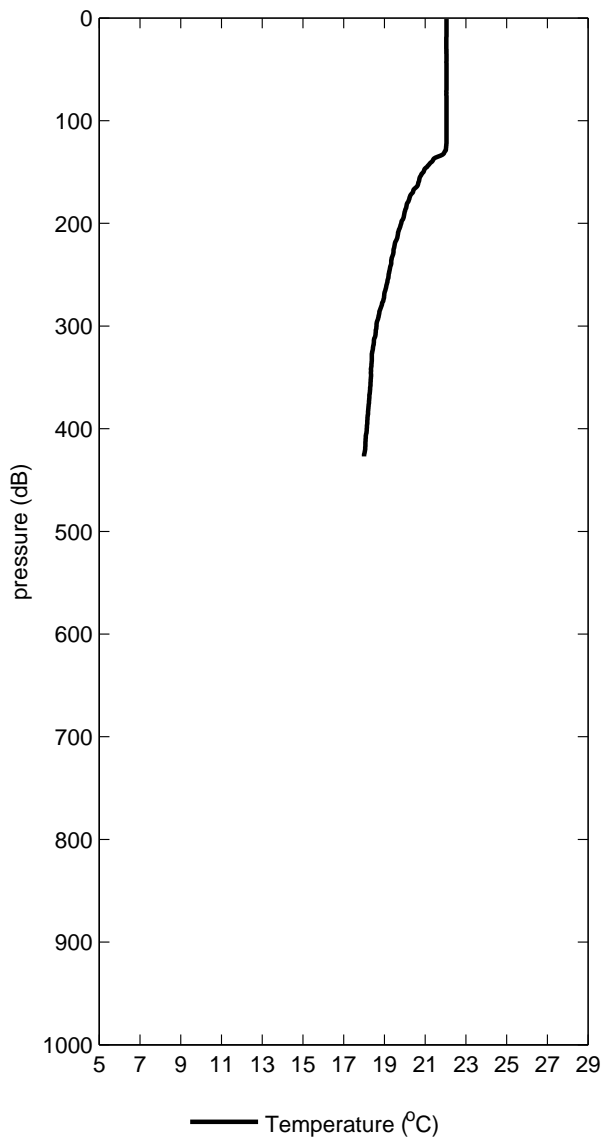
OC449_09 R/V Oceanus
 XBT station: 50
 Latitude: 31° 27.1404' N Longitude: 64° 44.4770' W
 09-Dec-2008 23:57:47Z

Pressure dB	PoTemp90 °C
10	22.1881
20	22.1961
30	22.1942
40	22.1937
50	22.2003
60	22.1984
70	22.1964
80	22.1945
90	22.1925
100	22.1906
110	22.1587
120	22.1267
130	22.0934
140	21.3835
150	20.7865
160	20.4465
170	20.2463
180	20.0226
190	19.8588
200	19.6744
250	19.0166
300	18.5555
350	18.2509
400	17.9798
450	17.7354
500	17.2984
600	15.5690
700	13.7158



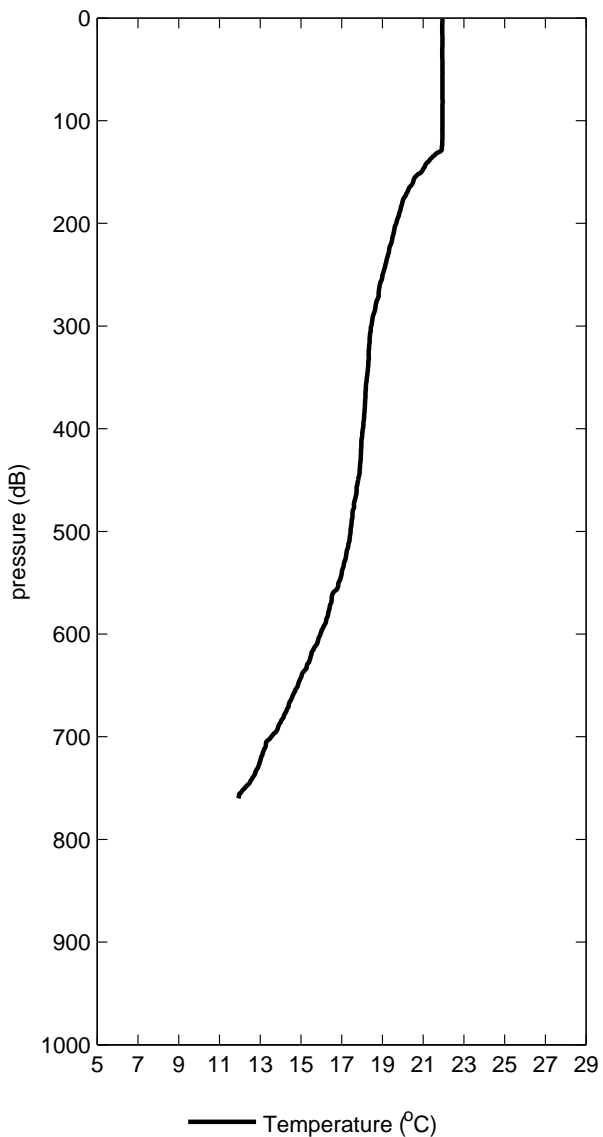
OC449_09 R/V Oceanus
 XBT station: 51
 Latitude: 31° 44.2200' N Longitude: 64° 33.8398' W
 10-Dec-2008 01:57:40Z

Pressure dB	PoTemp90 °C
10	22.0481
20	22.0461
30	22.0442
40	22.0523
50	22.0503
60	22.0484
70	22.0465
80	22.0545
90	22.0526
100	22.0507
110	22.0487
120	22.0468
130	21.9721
140	21.3250
150	20.9250
160	20.6691
170	20.3904
180	20.1374
190	19.9887
200	19.8242
250	19.2120
300	18.6187
350	18.3407
400	18.1327



OC449_09 R/V Oceanus
 XBT station: 52
 Latitude: 31° 44.7605' N Longitude: 64° 33.3076' W
 10-Dec-2008 02:02:09Z

Pressure dB	PoTemp90 °C
10	21.9381
20	21.9462
30	21.9442
40	21.9509
50	21.9504
60	21.9485
70	21.9465
80	21.9546
90	21.9527
100	21.9507
110	21.9488
120	21.9369
130	21.8507
140	21.2522
150	20.9250
160	20.5078
170	20.2135
180	19.9726
190	19.8289
200	19.6844
250	19.0123
300	18.4557
350	18.2409
400	18.0496
450	17.8101
500	17.4380
600	15.9623
700	13.5467



OC449_09 R/V Oceanus
 XBT station: 53
 Latitude: 31° 56.6404' N Longitude: 64° 24.4590' W
 10-Dec-2008 03:47:52Z

Pressure dB	PoTemp90 °C
10	21.9781
20	21.9762
30	21.9842
40	21.9823
50	21.9904
60	21.9884
70	21.9865
80	21.9946
90	21.9926
100	22.0007
110	21.9988
120	21.9968
130	21.9949
140	20.9682
150	20.6552
160	20.4878
170	20.2491
180	20.1374
190	20.0286
200	19.9441
250	19.3361
300	18.6353
350	18.3207
400	18.1426
450	17.9048
500	17.6472
600	15.9773
700	13.9447

