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Hydrographic Measurements Collected Aboard the R/V Cape Hatteras, September - October 2008: Western Boundary Time Series Cruise (AB0809)

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Abstract

This report summarizes the September - October 2008 cruise on the *R/V Cape Hatteras* involving full-water-column CTD and lowered ADCP profiles, along with shipboard ADCP profiles, conducted within the Florida Straits, the Northwest Providence Channel, and east of Abaco Island, Bahamas. A package consisting of a Seabird Electronics Model 9/11+ CTD O2 system, upward and downward looking ADCPs, and 23 10-liter Niskin bottles was to be lowered to the bottom. This report includes a description of the calibrations procedures and profiles of pressure, salinity (conductivity), temperature, and dissolved oxygen concentration. Water samples were also collected at various depths and analyzed for salinity and oxygen concentration to aid with CTD calibration. A total of 17 LADCP/CTD-O2 stations were occupied. IES telemetry operations were conducted from 3 sites, including recovery, deployment, and telemetry.

1 Introduction

The Abaco time series began in August 1984 when NOAA extended its Straits of Florida program to include measurements of western boundary current transports and water mass properties east of Abaco, the Bahamas. Since 1986, 34 hydrographic sections have been completed east of Abaco, most including direct velocity observations by Pegasus and/or Lowered Acoustic Doppler Current Profiler (LADCP). Transient tracer (CFC) measurements have been made on 8 of these sections. Current meter arrays were also maintained from April 1986 to April 1997. A new international program funded by the United Kingdom's Rapid Climate Change Program and the United States National Science Foundation began in March 2004 and is currently scheduled to end in 2021. Included in this program is a new deployment of current meter moorings along the Abaco section (the UK segment of the program continues with moorings across to the east edge of the Atlantic basin). Independently, the National Oceanic and Atmospheric Administration began a monitoring program in September 2004 utilizing inverted echo sounder moorings (some including bottom pressure measurements and near-bottom current meters) along the Abaco section. All of these programs are collaborating with scientific analysis and logistics including ship time.

The repeated hydrographic and tracer sampling at Abaco has established a high-resolution record of water mass properties in the Deep Western Boundary Current (DWBC) at 26°N, which for temperature and salinity can be reasonably constructed back to about 1985 (Vaughan and Molinari, 1997; Molinari et al., 1998). Events such as the intense convection period in the Labrador Sea and renewal of classical Labrador Sea Water in the 1980's are clearly reflected in the cooling and freshening of the DWBC waters off Abaco, and the arrival of a strong CFC pulse, approximately 10 years later. This program is unique in that it is not just a single time series site, but instead is a section from which transport can be directly calculated, of which very few are available in the ocean that approach a decade or more in length.

To achieve the goals of NOAA's strategic plan in terms of understanding the Atlantic Ocean's role in decadal and longer time scale climate variability, these continued time series observations at Abaco are seen as serving three main purposes:

1. Monitoring of the DWBC for watermass and transport signatures related to changes in the strengths and regions of high latitude water mass formation in the North Atlantic. Monitoring watermass properties in the DWBC at key locations is one part of an effort to track decadal changes in large-scale watermass properties.

2. Serving as a western boundary endpoint of a subtropical Meridional Overturning Circulation (MOC) heat flux monitoring system designed to measure the interior dynamic height difference across the Atlantic basin and the associated baroclinic heat transport.

3. Monitoring the intensity of the Antilles current as an index (together with the Florida Current) of inter-annual variability in the strength of the subtropical gyre. Variations in the strength of the subtropical gyre in relation to the North Atlantic Oscillation

(NAO) has been proposed as an important mechanism in the atmosphere-ocean feedback within coupled models (e.g. Latif and Barnett, 1996).

A hydrographic survey consisting of a repeat LADCP/CTD/rosette section in the western North Atlantic was carried out in September-October 2008 (Figure 1 and Table 2). A total of 17 LADCP/CTD/Rosette stations were occupied. Water samples (up to 23 for each station) and CTD data were collected on each cast to within 20 m of the bottom. Salinity and dissolved oxygen samples were analyzed from the majority of bottles sampled on the rosette. IES operations were conducted at three sties, including recovery, deployment, and telemetry.

Table 1: Cruise participants of R/V Cape Hatteras.

Name	Responsibility	Affiliation
Chris Meinen	Chief Scientist	NOAA/AOML
Ulisses Rivero	LADCP/O2	NOAA/AOML
Pedro Pena	LADCP/O2	NOAA/AOML
Erik Valdez	CTD/Salinity	RSMAS/ U. Miami
Madeleine Adler	CTD/Salinity	NOAA/AOML

Table 2: Abaco Cruise – CTD Cast Summary

Station	Date	Time (GMT)	Latitude	Longitude	Depth
1	09/27/08	02:26:28	26.491N	76.470W	4910
2	09/28/08	13:51:32	26.502N	76.087W	4873
3	09/29/08	05:44:26	26.502N	71.997W	5370
4	10/01/08	22:15:58	26.058N	78.849W	274
5	10/01/08	23:48:39	26.166N	78.801W	413
6	10/01/08	01:11:16	26.249N	78.768W	483
7	10/01/08	02:28:37	26.332N	78.720W	658
8	10/01/08	03:57:10	26.434N	78.666W	725
9	10/02/08	13:15:58	27.001N	79.200W	451
10	10/02/08	14:30:54	27.000N	79.282W	584
11	10/02/08	15:44:46	26.997N	79.381W	654
12	10/02/08	17:11:02	26.997N	79.498W	716
13	10/02/08	18:39:30	26.994N	79.618W	606
14	10/02/08	19:46:52	26.995N	79.681W	503
15	10/02/08	21:04:47	27.000N	79.784W	355
16	10/02/08	22:11:24	26.999N	79.867W	229
17	10/02/08	23:02:33	26.999N	79.930W	119

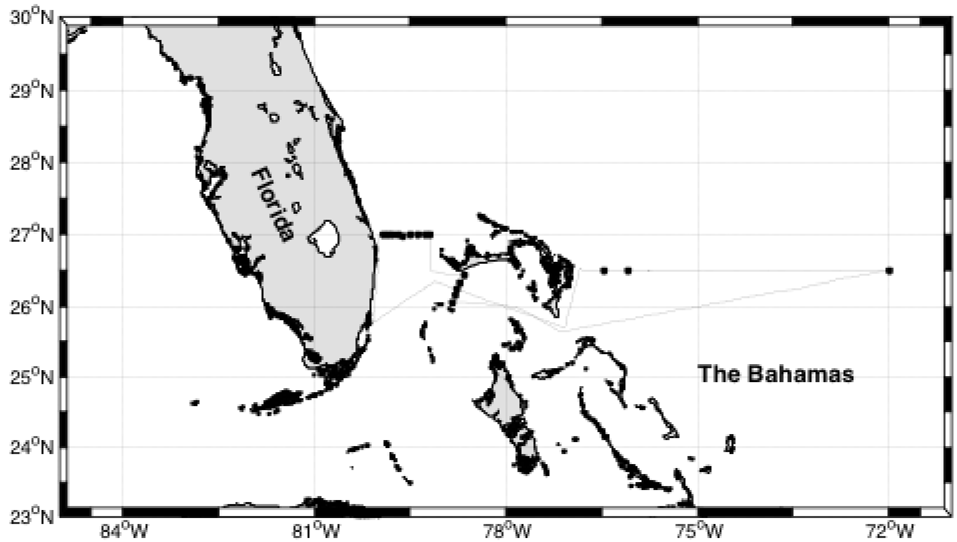


Figure 1: Abaco, Florida Straits, and NWPC CTD station and mooring locations. Land masses are shaded green.

2 Cruise Narrative

During the fall 2008 survey, a total of 17 hydrographic stations were occupied in the Florida Strait and East of Abaco Island, Bahamas (Figure 1) aboard the *R/V Cape Hatteras*. Table 2 provides a summary of cast information. At each station, profiles of temperature, salinity (conductivity) and dissolved oxygen concentration were collected to within approximately 20 m of the bottom. Water samples for calibration of the salinity and dissolved oxygen profiles were collected at each station using 10L niskin bottles. Acoustic telemetry in a total of three locations where Inverted Echo Sounder moorings had previously been deployed were performed in order to retrieve data before recovery of the instruments themselves (C. Meinen, personal comm.). These three inverted echo sounders were replaced. Unfortunately, IES at site B was a total loss; it did not respond and hence no telemetry data was received and the instrument was never recovered. Shipboard ADCP was collected, but is deemed unusable because of the instrument settings. Underway data was collected by the ship and not reported herein. An upward and downward looking LADCP were mounted on the frame. This data is not reported on herein. All the salinity and oxygen bottle samples collected on the cruise were stored and brought back to the laboratory for analysis. The salinity and oxygen samples were analyzed in the second week of October 2008, approximately 2 weeks after the end of the cruise.

3 Standards and Pre-Cruise Calibrations

The CTD/O2 system is a real-time data acquisition system with the data from a Sea-Bird Electronics, Inc. (SBE) 9plus underwater unit transmitted via a conducting cable to a SBE 11plus deck unit (V2). The serial data from the underwater unit is sent to the deck unit in RS-232 NRZ format. The deck unit decodes the serial data and sends it to a personal computer for display and storage in a disk file using Sea-Bird Seasave software.

The SBE 911plus system transmits data from primary and auxiliary sensors in the form of binary numbers equivalent to the frequency or voltage outputs from those sensors. These are referred to as the raw data. The SBE software performs the calculations required to convert raw data to engineering units.

The SBE 911plus system is electrically and mechanically compatible with the standard, unmodified carousel water sampler, also made by Sea-Bird Electronics, Inc. A modem and carousel interface allows the 911plus system to control the operations of the carousel directly without interrupting the flow of data from the CTD.

The SBE 911plus underwater unit is configured with dual standard modular temperature (SBE 3 plus) and conductivity (SBE 4) sensors, which are mounted near the lower end cap. The conductivity cell entrance is co-planar with the tip of the temperature sensor probe. The pressure sensor is mounted inside the underwater unit main housing. A centrifugal pump module flushes water through sensor tubing at a constant rate independent of the CTD's motion to improve dynamic performance. Dual dissolved oxygen sensors (SBE 43) are added to the pumped sensor configuration following the temperature-conductivity (TC) pair. A list of sensors used during the cruise can be seen in Table 3.

Table 3: Equipment used during AB0809

Instrument	SN	Stations	Use
Sea-Bird SBE32 24-place Carousel Water Sampler	328531-0031	1-17	
Sea-Bird SBE9plus CTD	09P36257-378	1-17	
Paroscientific Digiquartz Pressure Sensor	92973	1-17	
Sea-Bird SBE3plus Temperature Sensor	2946	1-17	primary
Sea-Bird SBE3plus Temperature Sensor	4799	1-17	secondary
Sea-Bird SBE4C Conductivity Sensor	3338	1-17	primary
Sea-Bird SBE4C Conductivity Sensor	2980	1-17	secondary
Sea-Bird SBE43 Dissolved Oxygen Sensor	1329	1-17	primary
Sea-Bird SBE43 Dissolved Oxygen Sensor	1348	1-17	secondary

3.1 Conductivity

The flow-through conductivity-sensing element is a glass tube (cell) with three platinum electrodes (Seabird model SBE 4). The resistance measured between the center electrode and the end electrode pair is determined by the cell geometry and the specific conductance of the fluid within the cell, and controls the output frequency of a Wein Bridge circuit. The sensor has a frequency output of approximately 3 to 12 kHz corresponding to conductivity from 0 to 7 Siemens/meter (0 to 70 mmho/cm). The SBE 4 has a typical accuracy/stability of $\pm 0.0003\ \mathrm{S \cdot m^{-1}}$/month and resolution of $0.00004\ \mathrm{S \cdot m^{-1}}$ at 24 scans per second.

Two conductivity sensors were used during AB0809, serial numbers (s/n) 3338 and 2980. Pre-cruise sensor calibrations were performed at Sea-Bird Electronics, Inc. in Bellevue, Washington during February and July 2008. The coefficients shown in Table 4 were entered into Seasave using the configuration file.

Conductivity calibration certificates show an equation containing the appropriate pressure-dependent correction term to account for the effect of hydrostatic loading (pressure) on the conductivity cell:

$$C\ (Siemens/meter) = \frac{(g + h * f^2 + i * f^3 + j * f^4)}{[10 * (1 + c_{t_{cor}} * t + c_{p_{cor}} * p)]}$$

where g, h, i, j, $c_{t_{cor}}$, and $c_{p_{cor}}$ are the calibrations coefficients shown above, f is the instrument frequency (kHz), t is the water temperature (degrees Celsius), and p is the water pressure (dbar). SEASAVE® automatically implements this equation.

Table 4: Calibration coefficients for the conductivity sensors.

s/n 3338 July 16, 2008	s/n 2980 February 27, 2008
g = -1.01945761e+01	g = -1.00371736e+01
h = 1.57722667e+00	h = 1.37071631e+00
i = -2.63636817e-03	i = 2.08995419e-04
j = 2.93538385e-06	j = 5.33084088e-05
CPcor = -9.5700e-08	CPcor = -9.5700e-08
CTcor = 3.2500e-06	CTcor = 3.2500e-06

3.2 Temperature

The temperature-sensing element is a glass-coated thermistor bead, pressure protected by a stainless steel tube. The sensor output frequency ranges from 5–13 kHz corresponding to temperatures from -5 to 35°C. The output frequency is inversely proportional to the square root of the thermistor resistance, which controls the output of a patented Wien Bridge circuit. The thermistor resistance is exponentially related to temperature. The SBE 3 thermometer has a typical accuracy/stability of ±0.001°C per year and resolution of 0.001°C/year at 24 samples per second. The SBE 3 thermometer has a fast response time of 0.065 seconds.

Two temperature sensors (SBE 3plus) were used during AB0809, serial numbers (s/n) 2946 and 4799. Pre-cruise sensor calibrations were performed at Sea-Bird Electronics, Inc. in Bellevue, Washington during February and June 2008. The following coefficients (Table 5) were entered into SEASAVE® using the configuration file. SEASAVE® automatically implements the equation below and converts between ITS-90 and IPTS-68 temperature scales as desired. The Temperature (ITS-90) is computed from g, h, i, j and f_0 and f is the instrument frequency (kHz) coefficients as follows:

$$T\ (^\circ C) = \frac{1}{\left\{ g + h * \left[\ln\left(\frac{f_0}{f}\right)\right] + i * \left[\ln^2\left(\frac{f_0}{f}\right)\right] + j * \left[\ln^3\left(\frac{f_0}{f}\right)\right]\right\}} - 273.15$$

Table 5: Calibration coefficients for the temperature sensors.

s/n 2946 June 19, 2008	s/n 4799 February 29, 2008
g = 4.34403262e-03	g = 4.36387750e-03
h = 6.39117409e-04	h = 6.36761170e-04
i = 2.13550119e-05	i = 2.07226875e-05
j = 1.82276457e-06	j = 1.71706246e-06
f_0 = 1000.0	f_0 = 1000.0

3.3 Pressure

The Paroscientific series 4000 Digiquartz high pressure transducer uses a quartz crystal resonator whose frequency of oscillation varies with pressure induced stress measuring changes in pressure as small as 0.01 parts per million with an absolute range of 0 to 10,000 psia (0 to 6885 dbar). Repeatability, hysteresis and pressure conformance are 0.002% of full-scale. The nominal pressure frequency (0 to full scale) is 34 to 38 kHz. The nominal temperature frequency is 172 kHz ± 50 ppm/°C.

The pressure sensors utilized during AB0809 was s/n 973. Pre-cruise sensor calibrations was performed at Sea-Bird Electronics, Inc. in Bellevue, Washington on August 2004. The following coefficients (Table 6) were entered into SEASAVE® using the configuration file:

Pressure coefficients are first formulated into:

$$
\begin{aligned}
c &= c_1 + c_2 * U + c_3 * U^2 \\
d &= d_1 + d_2 * U \\
t_0 &= t_1 + t_2 * U + t_3 * U^2 + t_4 * U^3 + t_5 * U^4
\end{aligned}
$$

where U is temperature in degrees Celsius. Pressure is computed according to:

$$P\ (psia) = c * \left(1 - \frac{t_0^2}{t}\right) * \left[1 - d * \left(1 - \frac{t_0^2}{t}\right)\right]$$

where t is pressure period (μs). SEASAVE® automatically implements this equation.

Table 6: Calibration coefficients for the pressure sensor.

s/n 92973 August 15, 2004
c_1 = -4.481307e+04
c_2 = -6.537544e-01
c_3 = 1.443480e-02
d_1 = 3.647800e-02
d_2 = 0.000000e+00
t_1 = 3.040635e+01
t_2 = -4.877567e-04
t_3 = 4.277270e-06
t_4 = 2.826111e-09
t_5 = 0.000000e+00
Slope = 1.00001000
Offset = -1.66
AD590M = 1.285440e-02
AD590B = -8.443557e+00

3.4 Dissolved Oxygen

The SBE 43 dissolved oxygen sensor uses a membrane polarographic oxygen detector (MPOD). Oxygen sensors determine the dissolved oxygen concentration by counting the number of oxygen molecules per second (flux) that diffuse through a membrane. By knowing the flux of oxygen and the geometry of the diffusion path, the concentration of oxygen can be computed. The permeability of the membrane to oxygen is a function of temperature and ambient pressure. In order to minimize the errors in the oxygen measurement due to the temperature differences between the water and the oxygen sensor, a temperature compensation is calculated using a temperature measured near the active surface of the sensor. The interface electronics output voltages proportional to the temperature-compensated oxygen current. Initial computation of dissolved oxygen in engineering units is done in the software. The range for dissolved oxygen is 120% of surface saturation in all natural waters, fresh and salt, and the nominal accuracy is 2% of saturation.

Under extreme pressure, changes can occur in gas permeable Teflon membranes that affect their permeability characteristics. Some of these changes (plasticization and amorphous/crystalinity ratios) have long time constants and depend on the sensor's time-pressure history. These slow processes result in hysteresis in long, deep casts. The hysteresis correction algorithm operates through the entire data profile and corrects the oxygen voltage values for changes in membrane permeability as pressure varies. At each measurement, the correction to the membrane permeability is calculated based on the current pressure and how long the sensor spent at previous pressures.

Sea-Bird has implemented an optional hysteresis correction for dissolved oxygen data. The correction algorithm requires a continuous time series of data, with no temporal data gaps (although a continuous time series is necessary, a constant sampling interval is not required). Prior to processing, do not remove any data from the downcast or upcast (if to be used), other than a surface soak at the beginning of the downcast.

Oxygen sensors 1329 and 1348 were used during AB0809. The following oxygen coefficients (Table 7) were entered into SEASAVE® using the configuration file:

Table 7: Calibration coefficients for the dissolved oxygen sensors.

s/n 1329 July 07, 2008	s/n 0154 July 07, 2008
Soc = 0.3316	Soc = 0.4691
Voffset = -0.4000	Voffset = -0.5123
Tau20 = 2.60	Tau20 = 1.62
A = -8.3720e-04	A = -1.4578e-03
B = 1.8678e-04	B = 1.8580e-04
C = 3.5693e-06	C = -3.6687e-06
$E_{nominal} = 0.036$	$E_{nominal} = 0.036$

The use of these constants in linear equations of the form $I = mV + b$ and $T = kV + c$ yield sensor membrane current and temperature (with maximum error of about 0.5 °C) as a function of sensor output voltage.

Dissolved oxygen concentration is calculated according to:

$$O\ (ml/l) = \{Soc * (V + V_{offset} + tau(T,S) * \frac{\delta v}{\delta t}) + p1 * station\}$$
$$*(1.0 + A * T + B * T^2 + C * T^3) * OXSAT(T,S) * e^{E*(\frac{P}{K})}$$

where Soc, V_{offset}, tau, A, B, C, E and $p1$ are the calibration coefficients shown above and V is the instrument voltage (V). T, S and P are the temperature, salinity and pressure measured by the CTD. K is the temperature in the absolute scale (K), $\delta v/\delta t$ is the oxygen voltage time derivative, *station* is the station number, and $OXSAT$ is the oxygen saturation value calculated according to (Weiss, 1970):

$$OXSAT(\theta, S) = \exp\left\{A_1 + A_2 * \left(\frac{100}{\theta}\right) + A_3 * \ln\left(\frac{\theta}{100}\right) + A_4 * \left(\frac{\theta}{100}\right) + S * \left[B_1 + B_2 * \left(\frac{\theta}{100}\right) + B_3 * \left(\frac{\theta}{100}\right)^2\right]\right\}$$

where θ is the absolute temperature (K); and

$$\begin{array}{llll} A_1 = & -173.4292 & B_1 = & -0.033096 \\ A_2 = & 249.6339 & B_2 = & 0.014259 \\ A_3 = & 143.3483 & B_3 = & -0.00170 \\ A_4 = & -21.8492. & & \end{array}$$

SEASAVE® automatically implements this equation.

The hysteresis correction is calculated, using the oxygen voltages, with the following algorithm:

$$D = 1 + H_1 * (e^{\left(\frac{P(i)}{H2}\right)} - 1)$$

$$C = e(-1 * \left(\frac{Time(i) - Time(i-1))}{H3}\right)$$

$$O_V(i) = O_{volt}(i) + V_{offset}$$

$$O_{newvolts}(i) = a * \frac{a}{D}$$

$$O_{finalvolts}(i) = O_{newvolts}(i) - V_{offset}$$

Where:

i = indexing variable (must be a continuous time series to work; can be performed on bin averaged data), where i = 1:end (end is largest data index point plus 1).
$P(i)$ = pressure (decibars) at index point i .
$Time(i)$ = time (seconds) from start of index point i.

$O_{volt}(i)$ = SBE 43 oxygen voltage output directly from sensor, with no calibration or hysteresis corrections, at index point i.
V_{offset} = correction for an electronic offset that is applied to voltage output of sensor. V_{offset} correction is always negative (see factory calibration sheet for this coefficient). V_{offset} is added to raw voltages prior to hysteresis correction. At end of hysteresis corrections, V_{offset} is removed prior to data conversion using SBE 43 calibration equation (see $O_{finalvolts}(i)$).
$O_V(i)$ = dissolved oxygen voltage value with V_{offset} correction (made prior to hysteresis correction) at index point i.
D and C are temporary variables used to simplify expression in processing loop.
$H1$ = amplitude of hysteresis correction function. Default = -0.033, range = -0.02 to -0.05 (varies from sensor to sensor).
$H2$ = function constant or curvature function for hysteresis. Default = 5000.
$H3$ = time constant for hysteresis (seconds). Default = 1450, range = 1200 to 2000 (varies from sensor to sensor).
$O_{newvolts}(i)$ = hysteresis-corrected oxygen value at index point i.
$O_{finalvolts}(i)$ = hysteresis-corrected oxygen value at index point i with V_{offset} removed.

This step is necessary prior to computing oxygen concentration using SBE 43 calibration equation.

4 Data Acquisition

CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame, a 24-place water sampler (SBE32) and 23, 10-liter Bullister-style bottles. Underwater electronic components consisted of a Sea-Bird Electronics (SBE) 9 plus CTD with dual pumps and the following sensors: dual temperature (SBE3), dual conductivity (SBE4), dual dissolved oxygen (SBE43), and an altimeter. The other underwater electronic components consisted of two RDI LADCPs. A total of 17 CTD/rosette casts were made, usually to within 20 m of the bottom.

The CTD's supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9 plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operations. Power to the SBE9 plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE911plus deck unit. The rosette system was suspended from a UNOLS-standard three-conductor 0.322" electro-mechanical sea cable.

The CTD was mounted vertically attached to the bottom center of the rosette frame. All SBE4 conductivity and SBE3 temperature sensors and their respective pumps were mounted vertically as recommended by SBE, outboard of the CTD. The CTD was outfitted with dual pumps. Primary temperature, conductivity, and dissolved oxygen were plumbed on one pump circuit and secondary temperature, conductivity, and dissolved oxygen on the other. Pump exhausts were attached to outside corners of the CTD cage and directed downward. The altimeter was mounted on the inside of a support strut adjacent to the bottom frame ring. The LADCP's were vertically mounted inside the bottle rings with one 150 kHz pointing down, the other 300 kHz transducer pointing up. A niskin bottle had to be removed to mount the upward looking 300 kHz ADCP.

O-rings were changed as necessary and bottle maintenance was performed each day to insure proper closure and sealing. Valves were inspected for leaks and repaired or replaced as needed.

4.1 System Problems

The major problems with the data acquisition system was related to time/location information on the CTD files; no NMEA string was input into the deck unit and latitude and longitude was not typed into the CTD header during the cruise. The time on the acquisition computer was also set to local time instead of GMT. A mistake in the time information on the log sheets forced us to determined time and location of the CTD casts by matching the ship-board GPS time series with the corrected bottom bottle trip time note on the log sheet. The station naming convention on the first three CTD casts were originally labeled as cast 0, 0b and 2b and were renamed as cast 0, 1 and 2. Also the original name CH0708AB0809_castXXX (were XXX is the cast number) was changed to simply AB0809_XXX.

4.2 Data Acquisition Procedure

The deck watch prepared the rosette typically within a few minutes prior to each cast. All valves, vents, and lanyards were checked for proper orientation. The bottles were cocked and all hardware and connections rechecked. Once stopped on station, the LADCP was turned on and syringes were removed from the CTD sensor intake ports. As directed by the deck watch leader, the CTD was powered on and the data acquisition system started.

The console watch initiated CTD deployments after the ship stopped on station. The watch maintained a console operations log containing a description of each deployment, a record of every attempt to close a bottle and any pertinent comments.

The deck watch leader directed the winch operator to raise the package, the squirt boom and rosette were extended outboard, and the package quickly lowered into the water and submerged to 10 meters of wire out. No tag-lines were necessary for either deployments or recoveries during this cruise. The CTD sensor pumps were configured with a 60 second startup delay. The CTD console operator waited for the CTD sensor pumps to turn on, waited an additional 60 seconds for sensors to stabilize (all together about 2 minutes), then directed the winch operator to bring the package close to the surface, pause for typically 10 seconds, hitting "Mark Scan" and begin the descent. The profiling rate was no more than 30 m/min to 50 m, no more than 45 m/min to 100 m, and no more than 60 m/min deeper than 100 m depending on sea cable tension and the sea state.

The console watch monitored the progress of the deployment and quality of the CTD data through interactive graphics and operational displays. Additionally, the watch created a sample log for the deployment that would be later used to record the correspondence between rosette bottles and analytical samples taken. The altimeter channel, CTD pressure, wire-out and bathymetric depth were all monitored to determine the distance of the package from the bottom, usually allowing a safe approach to within 20 m.

On the up cast, the winch operator was directed to stop at each bottle trip depth. The CTD console operator waited 30 seconds before tripping a bottle using a "point and click" graphical trip button. The data acquisition system responded with trip confirmation messages and the corresponding CTD data in a rosette bottle trip window on the display. All tripping attempts were noted on the console log. The console watch then directed the winch operator to raise the package up to the next bottle trip location. After the last bottle was tripped, the console watch directed the deck watch to bring the rosette on deck. Once on deck, the console watch terminated the data acquisition, turned off the deck unit, and assisted with rosette sampling.

Upon completion of the cast, sensors were flushed and stored with deionized water. The bottles and rosette were examined before samples were taken, and anything unusual noted on the sample log. Niskin bottles were then sampled first for oxygen and then salinity.

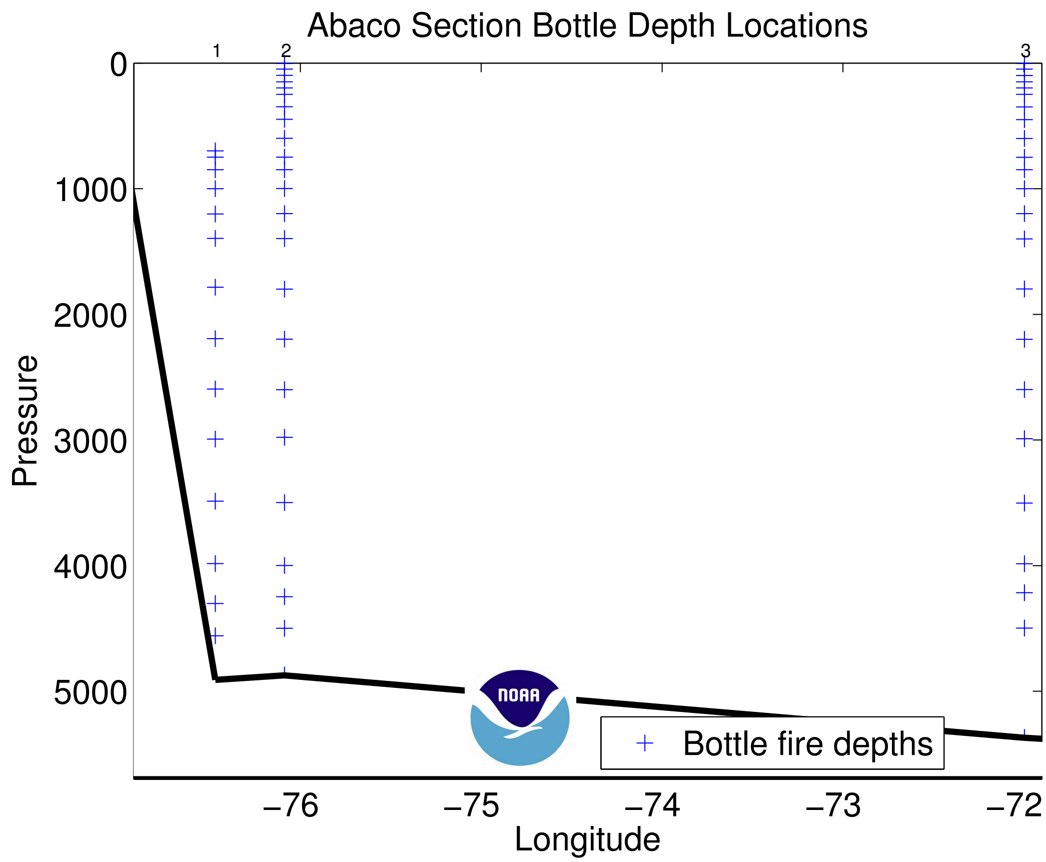


Figure 2: Bottle locations for 26.5°N Deep Western Boundary Current section east of Abaco Island.

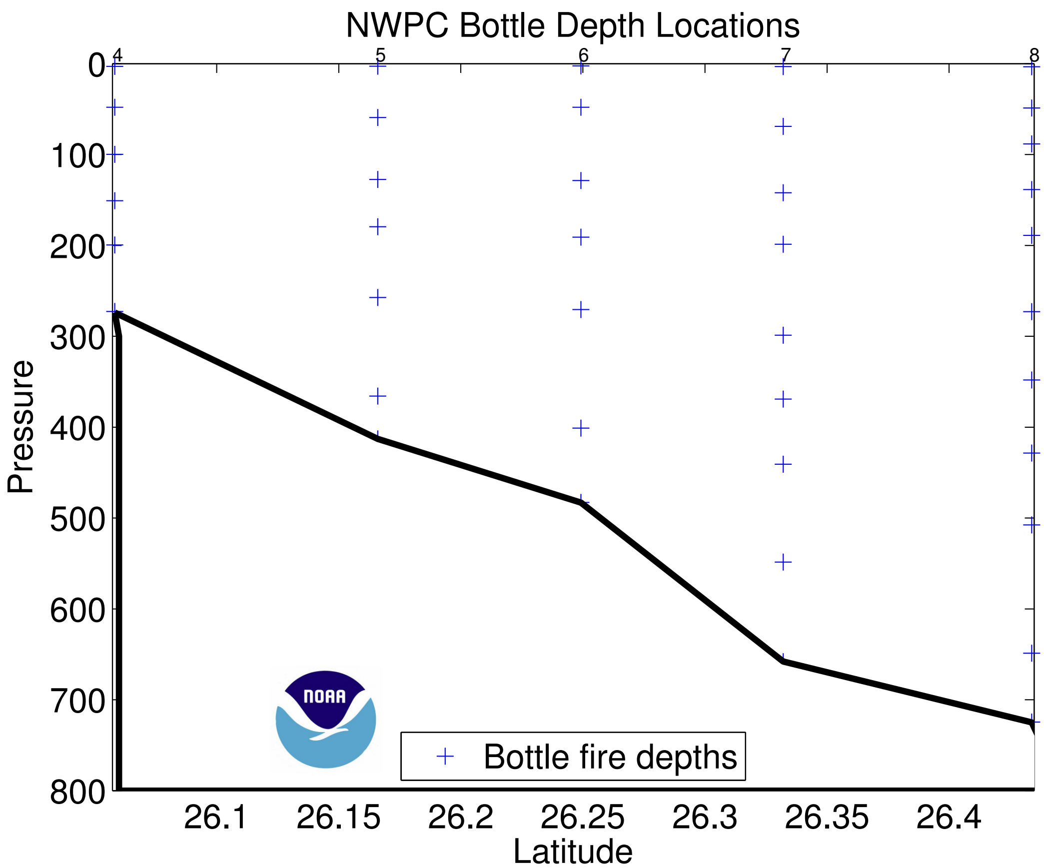


Figure 3: Bottle locations for along the Northwest Providence Channel section.

Figure of the 27N line

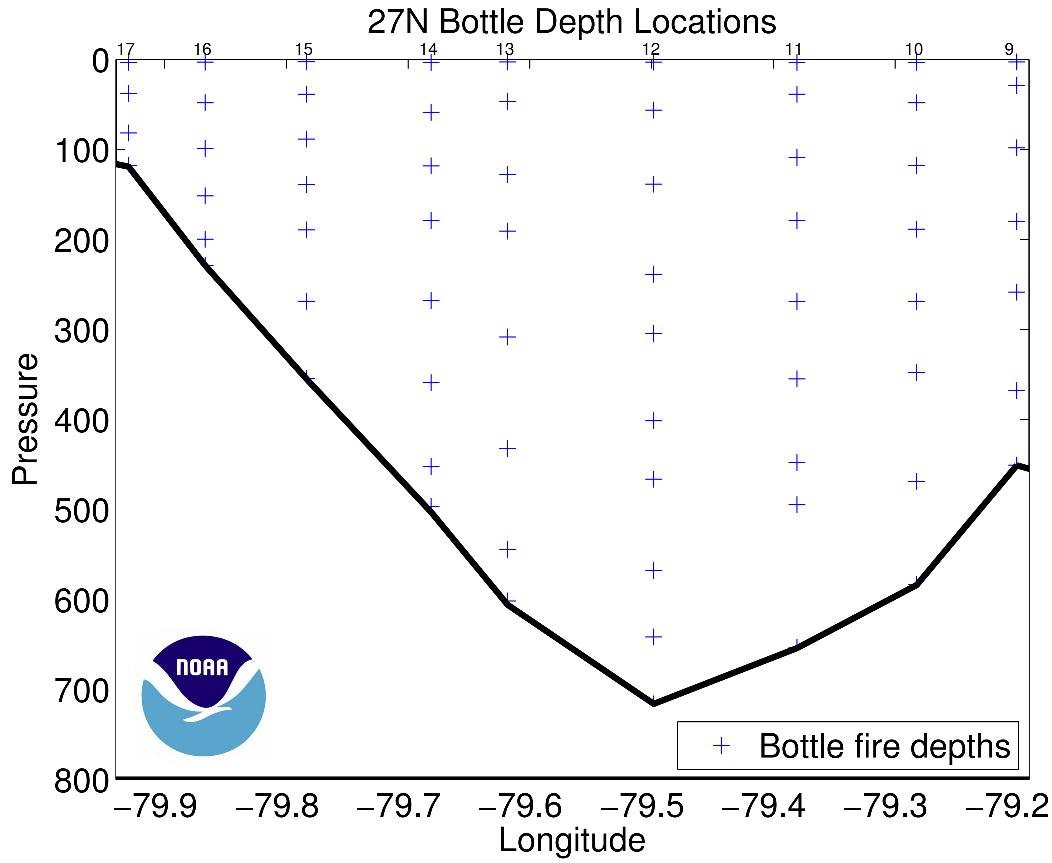


Figure 4: Bottle locations for 27°N section in the Florida Straits.

4.3 Shipboard CTD Data Processing

Shipboard CTD data processing was performed automatically at the end of each deployment using the SEABIRD SBE Data Processing package and AOML Matlab processing software. The raw CTD data and bottle trips acquired by SBE Seasave (version 7.14c) on the Windows workstation were copied onto the CTD processing laptop, and processed to a 1-dbar series and a 1-second time series. Bottle trip values were extracted and a 1-decibar (dbar) down cast pressure series created.

Raw data are acquired from the instruments and are stored unmodified. The conversion module DATCNV uses the instrument configuration and pre-cruise factory calibration coefficients to create a converted engineering unit data file that is utilized by all SBEDataProc® post processing modules. Unless otherwise noted, all calibration parameters given are factory default values recommended by Sea Bird Electronics, Inc. The following is the SBEDataProc® processing module sequence and specifications for primary calibrated data (1 dbar averages) uses the following routines in order for reduction of CTD/O2 data from this cruise:

1. DATCNV converts raw data into engineering units and creates a .ROS bottle file. Both down and up casts were processed for scan, elapsed time(s), depth, pressure, t0 ITS-90 C, t1 ITS-90 C, c0 S/cm, c1 S/cm, salinity (PSU), salinity 2 (PSU), oxygen voltage V, oxygen 2 voltage V, altimeter, optical sensor, oxygen umol/kg, oxygen 2 umol/kg, oxygen mll/l, oxygen 2 ml/l, oxygen dv/dt, oxygen dv/dt 2, latitude, and longitude. MARKSCAN was used to determine the number of scans acquired on deck and while priming the system to exclude these scans from processing.

2. ALIGNCTD aligns temperature, conductivity, and oxygen measurements in time relative to pressure to ensure that derived parameters are made using measurements from the same parcel of water. Secondary conductivity and oxygen were automatically advanced by 0.073 seconds. The primary conductivity was further aligned subtracting -0.007 and the secondary -0.014. The primary oxygen used 1.066 and the secondary 1.059.

3. BOTTLESUM creates a summary of the bottle data. Bottle position, date, and time were output automatically. Pressure, temperature, conductivity, salinity, oxygen voltage and preliminary oxygen values were averaged over a 5 second interval.

4. WILDEDIT computes the standard deviation of 100 point bins, and then makes two passes through the data. The first pass flags points that differ from the mean by more than 2 standard deviations. A new standard deviation is computed excluding the flagged points and the second pass marks bad values greater than 20 standard deviations from the mean. For this data set, data were kept within a distance of 100

of the mean (i.e., all data).

5. FILTER applies a low pass filter to pressure with a time constant of 0.15 seconds. In order to produce zero phase (no time shift), the filter is first run forward through the file and then run backwards through the file.

6. CELLTM uses a recursive filter to remove conductivity cell thermal mass effects from measured conductivity. In areas with steep temperature gradients the thermal mass correction is on the order of 0.005 PSS-78. In other areas the correction is negligible. The value used for the thermal anomaly amplitude (alpha) was 0.03°C. The value used for the thermal anomaly time constant (1/beta) was 7.0°C.

7. LOOPEDIT removes scans associated with pressure slowdowns and reversals. If the CTD velocity is less than 0.25 m/s or the pressure is not greater than the previous maximum scan, the scan is omitted.

8. DERIVE uses 1 dbar averaged pressure, temperature, and conductivity to compute primary and secondary salinities. Oxygen voltage is used to calculate oxygen concentrations.

9. BINAVG averages the data into 1 dbar bins. Each bin is centered on an integer pressure value, e.g., the 1 dbar bin averages scans where pressure is between 0.5 dbar and 1.5 dbar. There is no surface bin. The number of points averaged in each bin is included in the data file.

10. STRIP removes the computed oxygen variable.

11. TRANS converts the binary data file into ASCII format.

12. SPLIT separates the cast into upcast and downcast values.

Package slowdowns and reversals owing to ship roll can move mixed water in tow to in front of the CTD sensors and create artificial density inversions and other artifacts. In addition to Seasoft module LOOPEDIT, a program computes values of density locally referenced between every 1 dbar of pressure to compute N^2 and linearly interpolates temperature, conductivity, and oxygen voltage over those records where N^2 is less than or equal to -1 x 10^{-5} s^{-2}. These data were retained but flagged as questionable in the final WOCE formatted files.

Final calibrations are applied to delooped data files. ITS-90 temperature, salinity, and oxygen are computed, and WOCE quality flags are created.

CTD data were examined at the completion of each deployment for clean corrected sensor response and any calibration shifts. As bottle salinity and oxygen results became available, they were used to refine shipboard conductivity and oxygen sensor calibrations.

A total of 17 casts were processed.

4.4 CTD Calibration Procedures

Laboratory calibrations of the CTD pressure, temperature, conductivity, and oxygen sensors were all performed at SBE. The calibration dates are listed in Table 3.

Secondary temperature, conductivity and dissolved oxygen (T2, C2 and DO2) sensors served as calibration checks for the reported primary sensors. During the cruise, it was determined that the primary T/C and secondary DO2 sensors behaved more stably during the cruise.

In-situ salinity and dissolved O2 check samples collected during each cast were used to calibrate the conductivity and dissolved O2 sensors.

There were two sensor combinations (not including pump replacements) used during the cruise (Table 3).

4.4.1 Salinity Analysis

Bottle salinity analyses were performed using a Guildline Model 8400B inductive autosalinometer, and a dedicated PC. Software allowed the user to standardize the autosalinometer. IAPSO Standard Seawater was used as the standard. The autosal was standardized before each case of samples was analyzed, or every 24 samples.

Two different batches of the Ocean Scientific (OSIL) standard seawater (P147 and P149) were used in this cruise (Table 8).

4.4.2 Oxygen Analysis

Bottle oxygen analyses were also performed using a photometric automatic Winkler method titration with a Carpenter modification, and a dedicated PC. The water samples are drawn (without air bubbles) from Niskin bottles immediately upon arrival on deck. Manganese sulfate (or chloride) is added to the sample, followed by the addition of an alkaline sodium

Table 8: Nominal values for the batches of IAPSO standard seawater.

P-147	P-149
Stations: 1-12	Stations: 13-17
Use By: June 2006	Use By: October 2007
K15: 0.99982	K15: 0.99984
Salinity: 34.993	Salinity: 34.994

hydroxide-sodium iodide solution. These solutions "pickle" the sample causing it to precipitate and react with the dissolved oxygen in the water sample. The sample is then dissolved and photometrically titrated to an end point with a standardized sodium thiosulphate solution. The content of oxygen value is calculated utilizing the volume of the water sample bottle and the amount of added thiosulphate. Automated titrating systems can attain a precision of about $\pm 4.46\ umol/kg$ (Friederich, et al., 1991).

5 Post-Cruise Calibrations

Post cruise sensor calibrations were done at Sea-Bird Electronics, Inc.. Secondary temperature, conductivity and dissolved oxygen sensors served as calibration checks for the reported primary sensors.

In-situ salinity and dissolved oxygen samples collected during each cast were used to calibrate the conductivity and dissolved oxygen sensors.

Two sensor combinations were used during the cruise as listed in Table 3. Secondary TC pair T4799/C2980 was selected for final data reduction. Secondary oxygen sensor, s/n 1348, was used for the final data reduction. In addition to the Seasave processing modules, additional statistics, delooping, despiking and calibration was done using MATLAB.

5.1 CTD Data Processing

By using the post cruise sensors calibrations; time drifts were estimated for the temperature and conductivity sensors (for estimated time drifts see the appropriate sections below). The processing module sequence used at sea is done again to include the time drifts as well the pressure correction. After this step the following Matlab scripts based on PMEL programs are applied to the CTD data:

- FILL_SURFACE was used to copy the first good value of salinity, potential temperature, oxygen and oxygen current back to the surface. The program then calculated temperature and conductivity, and zeroed doc/dt of oxygen current for those records.

- DESPIKE1 removed spikes from primary oxygen current and oxygen temperature data, as well as removing spikes from the primary conductivity sensor. Data were linearly interpolated over de-spiked records. Conductivity was back calculated, and sigma-theta and potential temperature were recomputed for the interpolated records.
- DESPIKE2 removed spikes from secondary sensors in the same method as DESPIKE1.
- Package slowdown and reversals due to ship roll can move mixed water in tow in front of the CTD sensors. This mixture can create artificial density inversions and other artifacts. In addition to the SEASOFT module LOOPEDIT, DELOOP, computes values of density locally referenced between every 1 dbar of pressure to compute N^2 = (- g/p) (dp/dz) and linearly interpolated measured parameters over those records where $N^2 \leq$ -1.0 e -05 s^{-2}.

5.2 CTD Pressure

Pressure sensor calibration coefficients derived from the pre-cruise calibrations were applied to raw pressure data during each cast. Residual pressure offsets (the difference between the first and last submerged pressures) were examined to check for calibration shifts (see Figure 5 and Table 9). Pressure sensor, s/n 0957, was used during the cruise. It is clear that the pressure offset needs to be corrected before final calibration of the data is complete, that way an offset of 1.6 dbar was introduced in the configuration file. The on deck pressure before and after each CTD cast was not monitored during the cruise, hence the pressure offset values was estimated by comparing surface values of this cruise with values from earlier cruises using the same pressure sensor.

Near surface pressure values (which is taken as the near-surface pressure at the markscan and the last fired bottle pressure) showed little variability over the cruise besides a few stations that were started or ended deeper (4.77 ± 0.73 dbar before and 4.64 ± 0.26 dbar after).

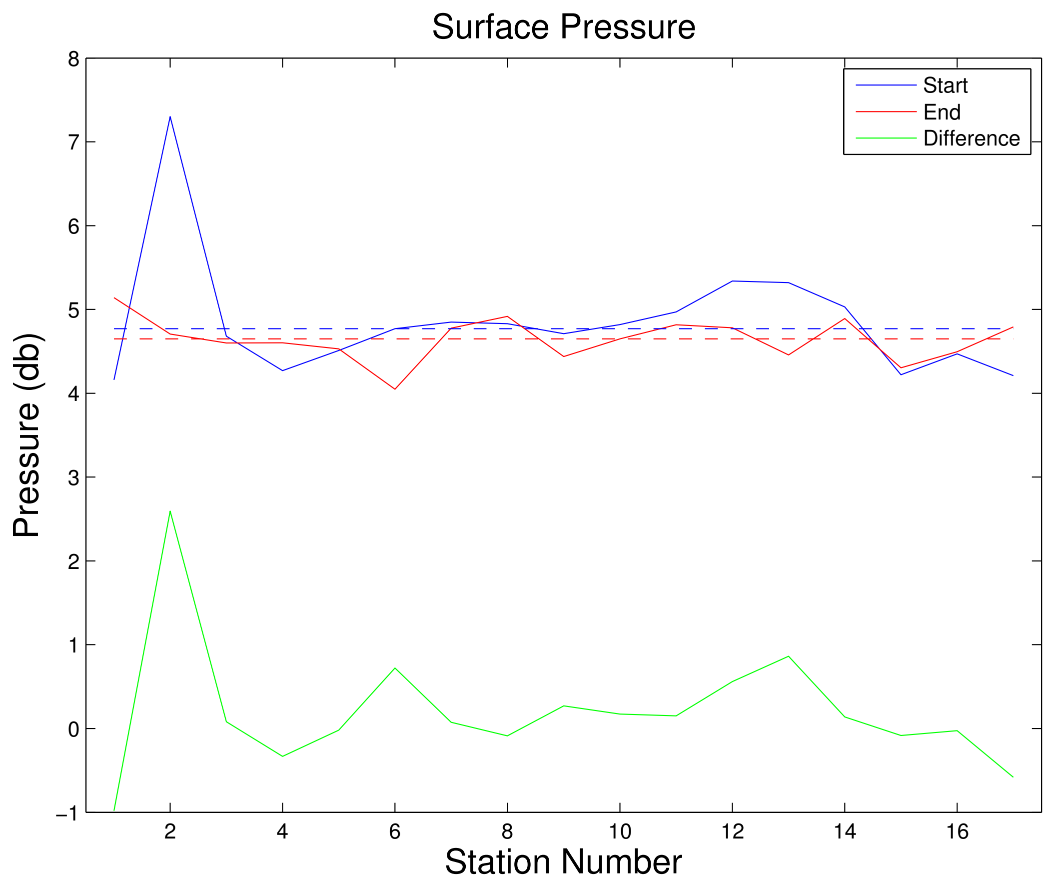


Figure 5: Pressure differences vs. station number. The sea surface pressure values measured at the start of the downcast (blue), at the end of the upcast (red) and their respective difference (green).

Table 9: Near surface Pressure values and scan number used to remove surface soak and on-deck values.

Station	Markscan	Deck Prs Start	Deck Prs End	Sfc Prs Start	Sfc Prs End
1	913	-999.0000	-999.0000	4.1600	5.1410
2	2422	-999.0000	-999.0000	7.3000	4.7070
3	2024	-999.0000	-999.0000	4.6800	4.6000
4	391	-999.0000	-999.0000	4.2700	4.6030
5	1313	-999.0000	-999.0000	4.5100	4.5300
6	359	-999.0000	-999.0000	4.7700	4.0490
7	899	-999.0000	-999.0000	4.8500	4.7760
8	164	-999.0000	-999.0000	4.8300	4.9170
9	1306	-999.0000	-999.0000	4.7100	4.4390
10	143	-999.0000	-999.0000	4.8200	4.6480
11	23	-999.0000	-999.0000	4.9700	4.8180
12	156	-999.0000	-999.0000	5.3400	4.7800
13	1017	-999.0000	-999.0000	5.3200	4.4580
14	899	-999.0000	-999.0000	5.0300	4.8910
15	151	-999.0000	-999.0000	4.2200	4.3030
16	1271	-999.0000	-999.0000	4.4700	4.4960
17	835	-999.0000	-999.0000	4.2100	4.7920

5.3 CTD Temperature

Temperature sensor calibration coefficients derived from the pre-cruise calibrations were applied to raw primary and secondary temperature data during each cast. Data accuracy, reproducibility and stability were examined by tabulating the difference between the two different temperature sensors over a range of pressures (bottle trip locations) for each cast. These comparisons are summarized in Figure 6, which shows a median temperature difference between the two sensors of 0.0003 °C and a standard deviation of 0.0003 °C.

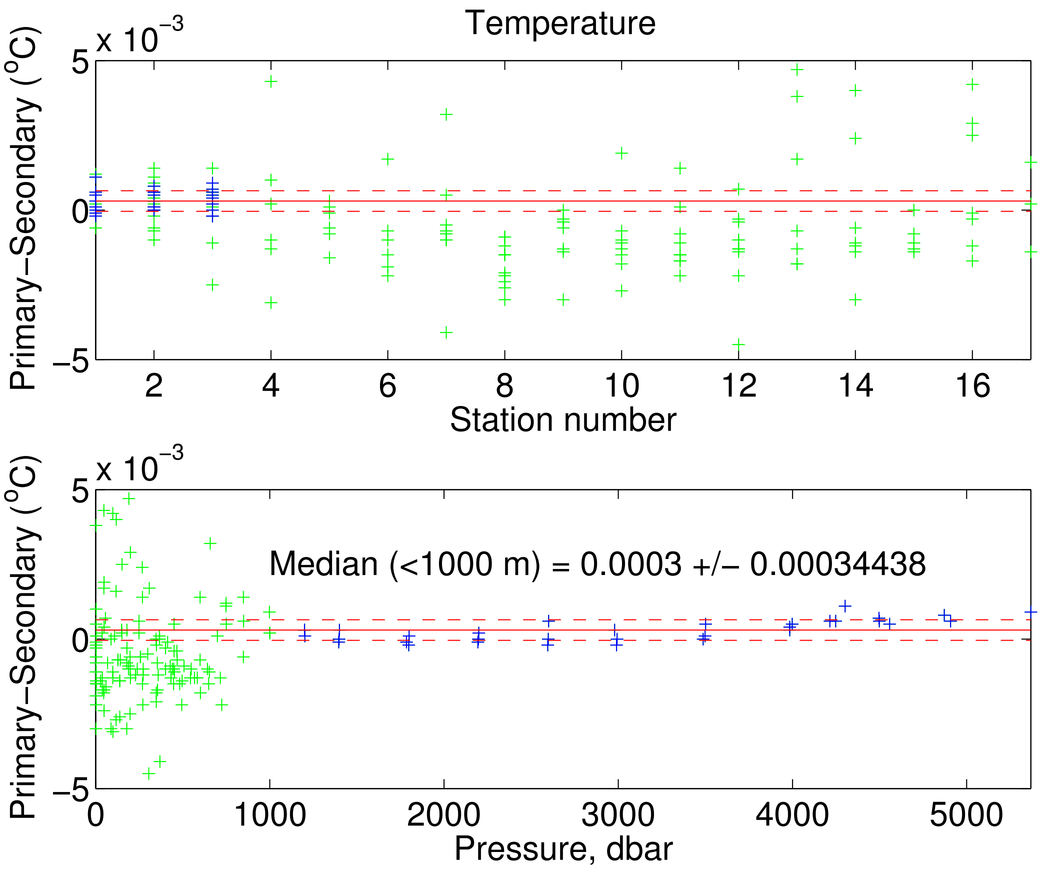


Figure 6: Temperature differences (after corrections) between sensors by station number (top) and pressure (bottom). The green represents the surface data down to 1000 dbar. The blue represents data below 1000 dbar. The red solid line represents the median with the red dashed representing the standard deviation (same for top and bottom).

5.4 Conductivity

Conductivity sensor calibration coefficients derived from the pre-cruise calibrations were applied to raw primary and secondary conductivities. Comparisons between the primary and secondary sensors and between each of the sensors to conductivity calculated from bottle salinities were used to derive conductivity corrections. Uncorrected C1-C2 are shown in Figure 7 to help identify sensor drift. The sensors show a median difference of -0.0015 mS/cm and a standard deviation of 0.0003 mS/cm. Both sensors showed reasonable values for the residuals. The primary sensor was used for all the final data values (Figure 8).

Despite the large variability of the data in the upper 1000 m, the bottle values are kept in the database and used for the final calibration. However, the bottle data below 1000 m is weighted more heavily to calculate the new conductivity coefficients. The bottle and instrument differences are compared to a normal distribution using 2.8 * standard deviation to find clear outliers. After these procedures 156 data points (94.0 %) were used in the final calculations.

In order to calibrate the CTD conductivity data against the sample conductivity we assume a constant additive correction (offset), multiplicative correction (slope), time drift correction (represented by station number) and where needed, a linear pressure-dependent term. A non-linear function is used to derive these coefficients and are applied to

$$C_{new} = [m * C_{CTD} + (p_1 * station) + b + pcor * P]$$

with

s/n 2980
Sta 1-17
m=1.0001534
p_1=0
b=-0.0021878
$pcor$=-6.2313415e-07

where C_{bottle} is bottle conductivity (mS/cm), C_{CTD} is pre-cruise calibrated CTD conductivity (mS/cm), m is the conductivity slope, b is the offset (mS/cm), P is the pressure, $pcor$ is the pressure correction coefficient, $station$ is the station number and p_1 is the polynomial coefficient. The fit is also weighted in such way that the final solution is preferentially forced to fit the data below a specified depth, in this case 1000 dbar.

The coefficients estimated by the equation above were then applied to the CTD conductivities and the final results (Figure 8 to Figure 12) show a residual of -5.7 · 10-4 psu (-4.1· 10-4 psu for the data below 1000 dbar) and a standard deviation of 0.0044 psu (0.0012 psu for the data below 1000 dbar). Also 39.7% of the residuals for the data are within the confidence limits determined by the WOCE (± 0.002 psu) and this number increases to 73.3%

if we consider only the data below 1000 dbar.

A final verification about the quality of the data was made by comparing the results of this cruise with some historical data (Figure 13 and Figure 14). Water mass properties are very stable, specially for deeper layers of the ocean, that way by comparing these values we can have a very good estimative of the quality of these data.

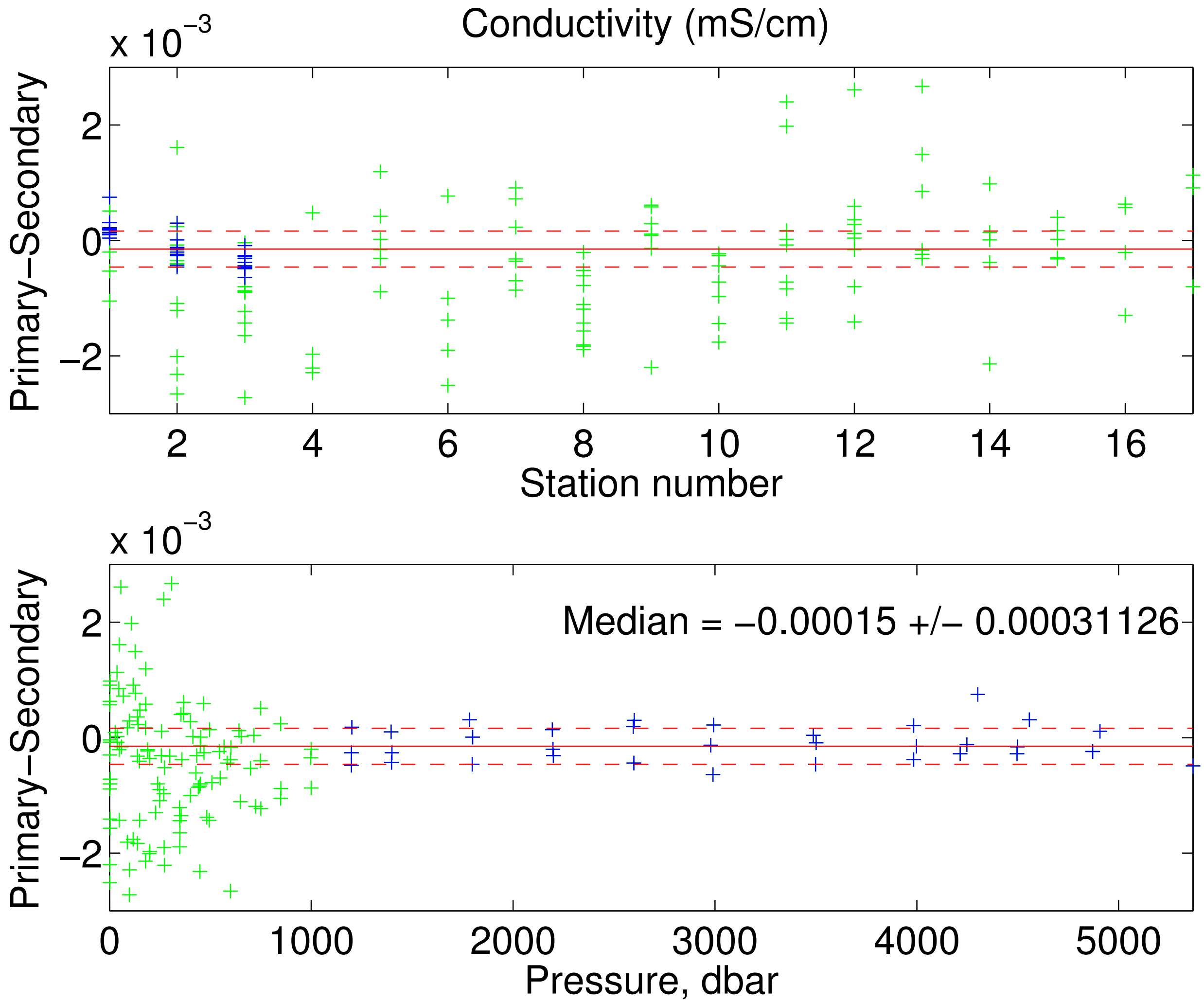


Figure 7: Conductivity (mS/cm) differences between sensors by station (top) and pressure (bottom). The red solid line represents the median with the red dashed representing the standard deviation.

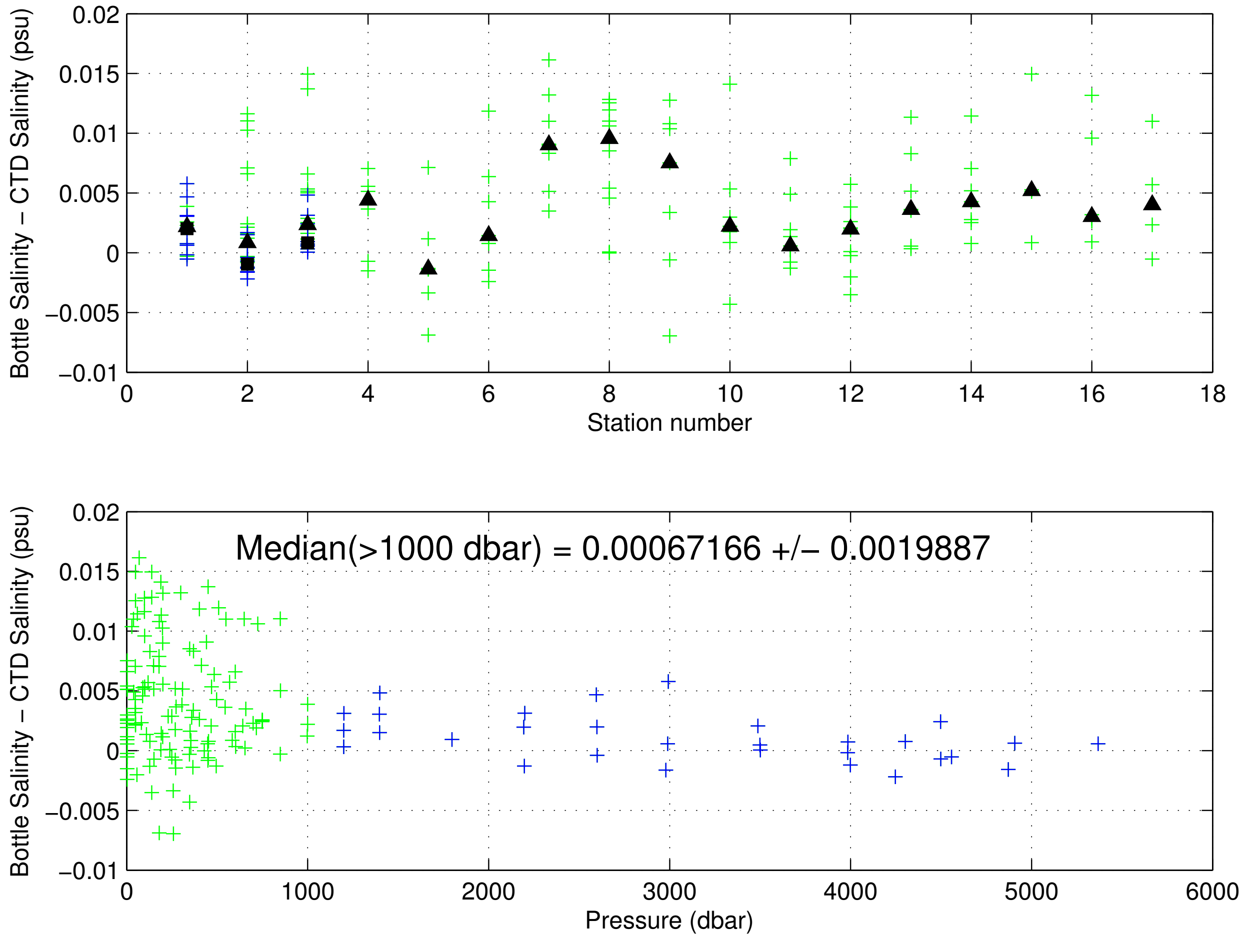


Figure 8: Bottle and uncalibrated secondary CTD salinity differences plotted against pressure. The green crosses represent all data points and the blue are the data points below 1000 dbar. The median was calculated using only the data below 1000 dbar.

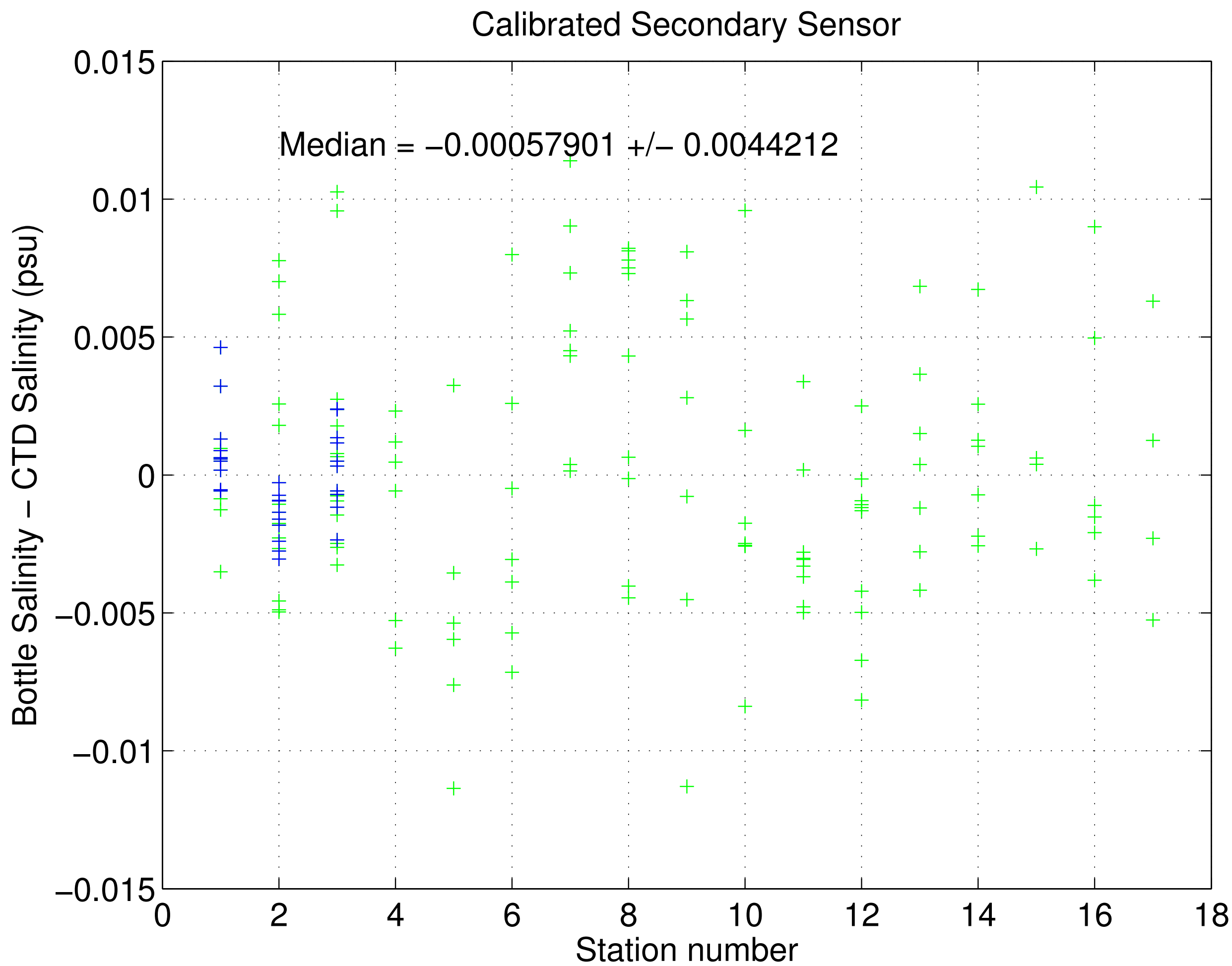


Figure 9: Bottle and calibrated secondary CTD salinity differences plotted vs. station.

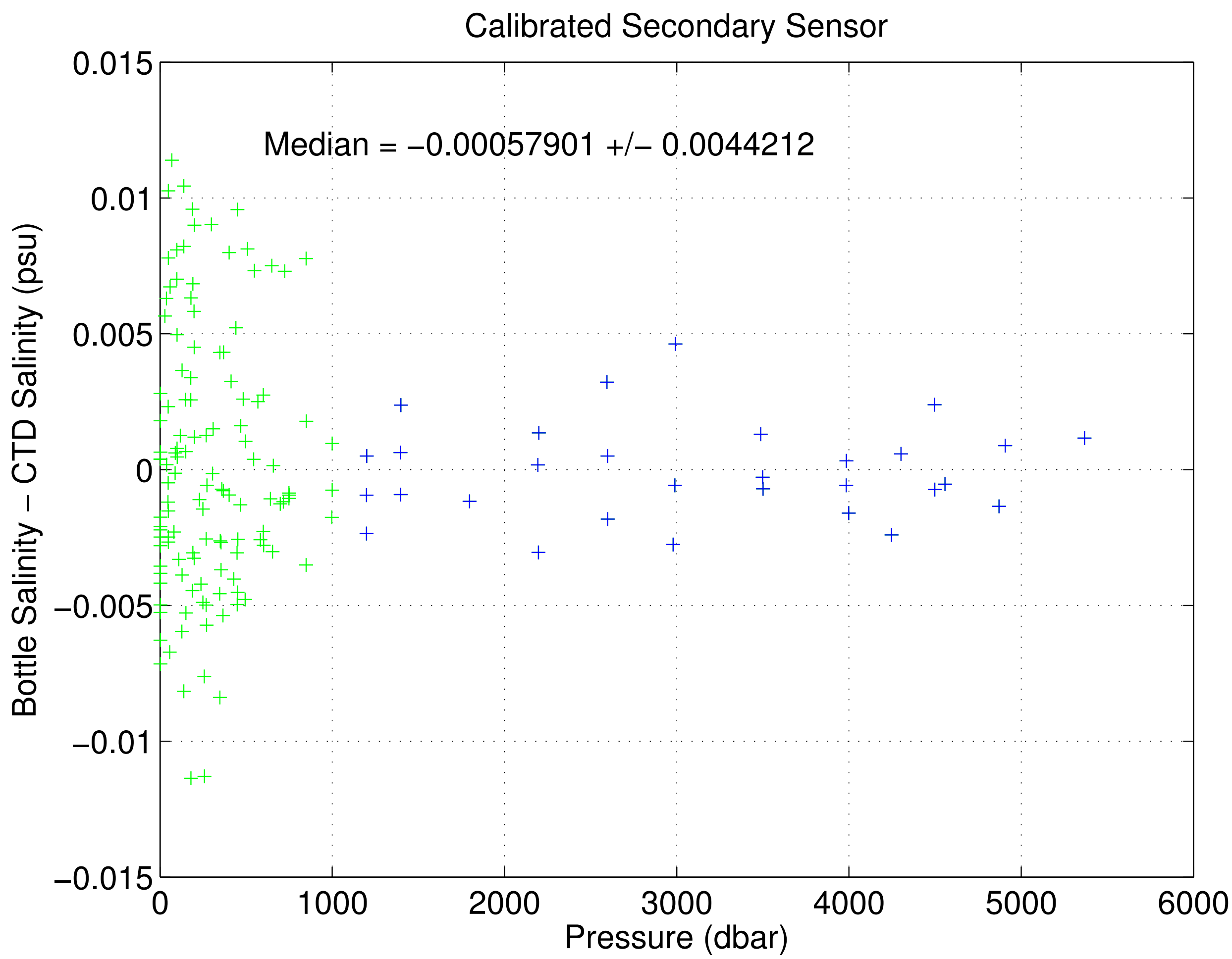


Figure 10: Bottle and calibrated secondary CTD salinity differences plotted vs. pressure.

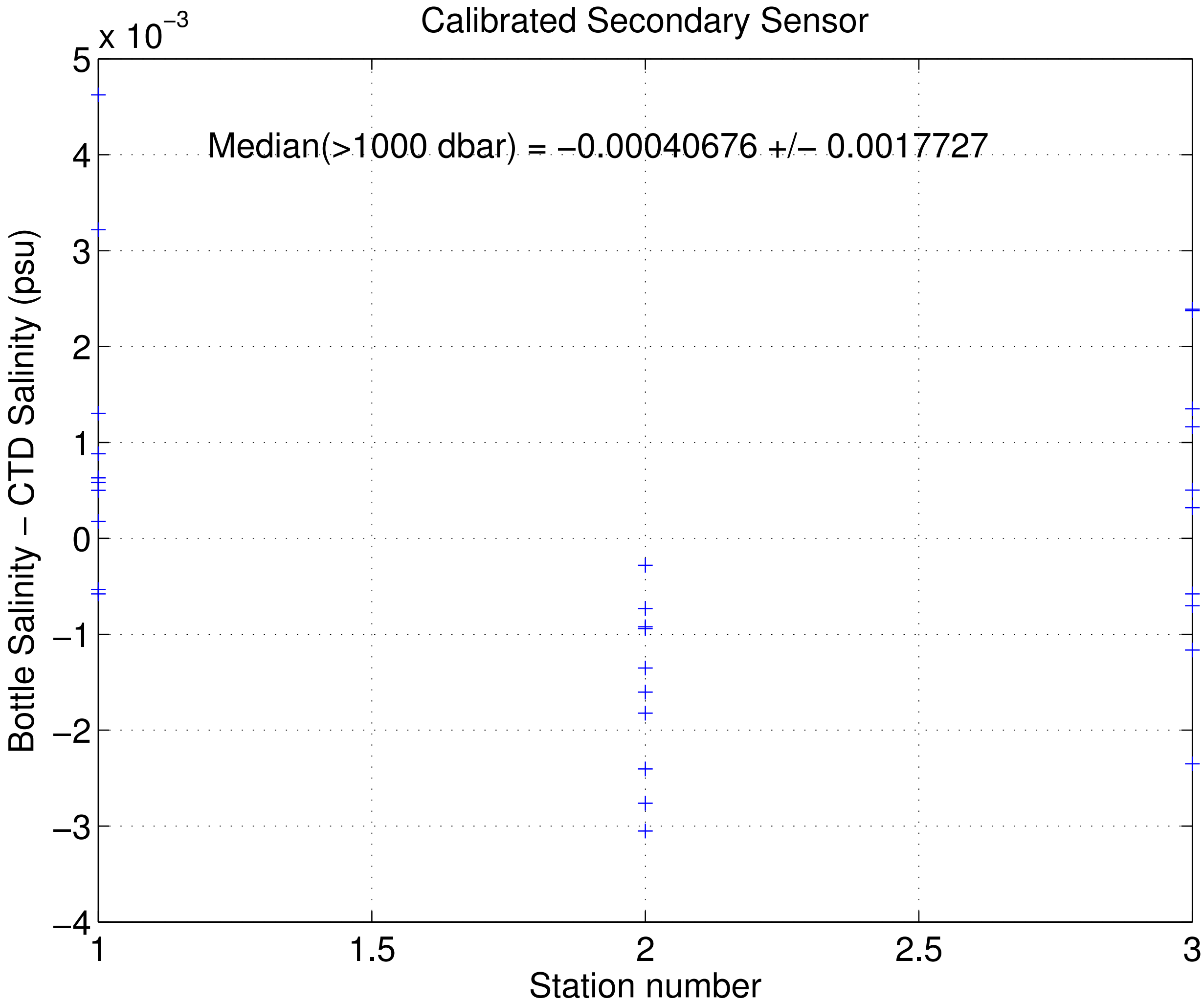


Figure 11: Bottle and calibrated secondary CTD salinity differences plotted vs. station below 1000 dbar.

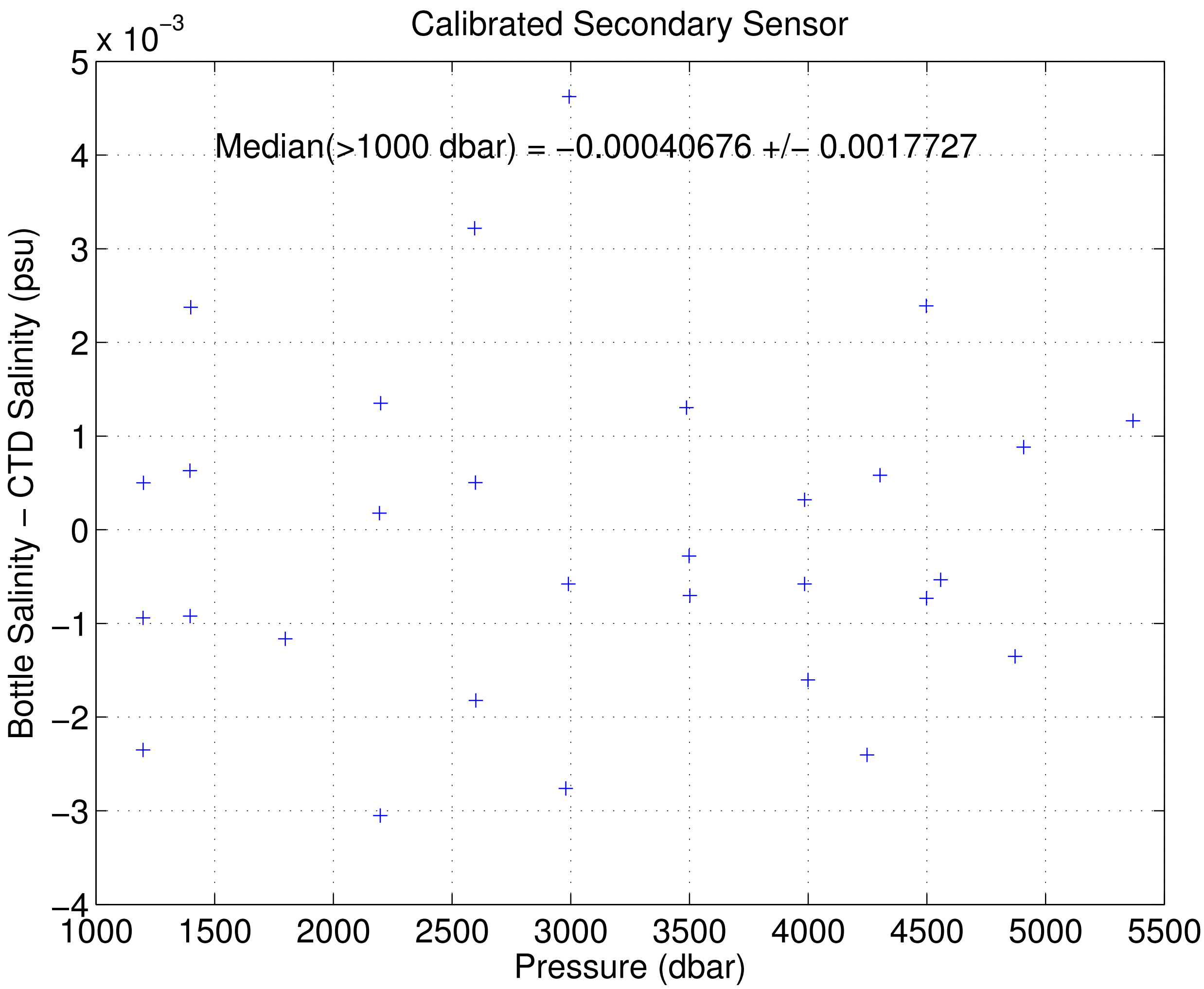


Figure 12: Bottle and calibrated secondary CTD salinity differences plotted vs. pressure below 1000 dbar.

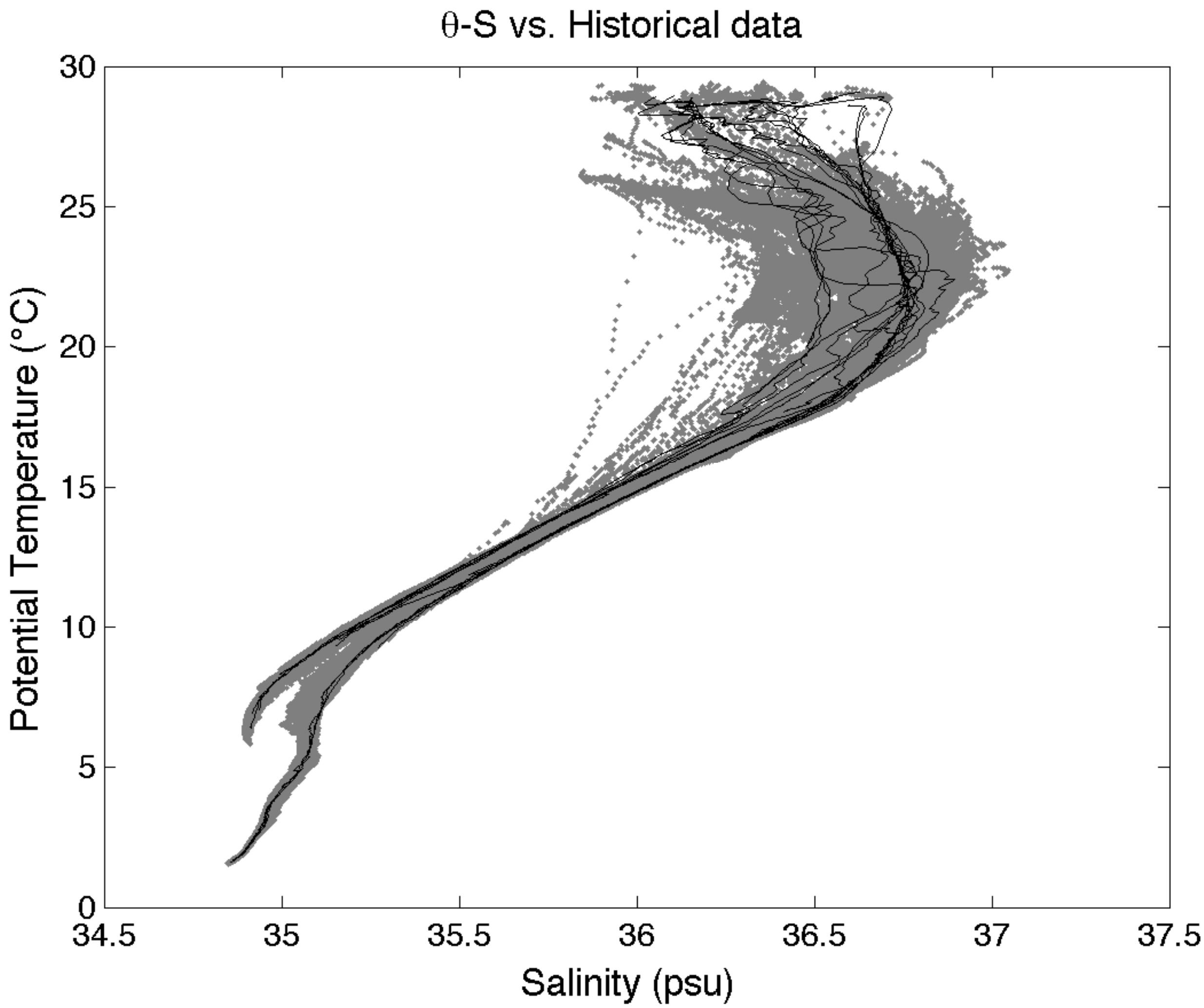


Figure 13: Potential Temperature - Salinity diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

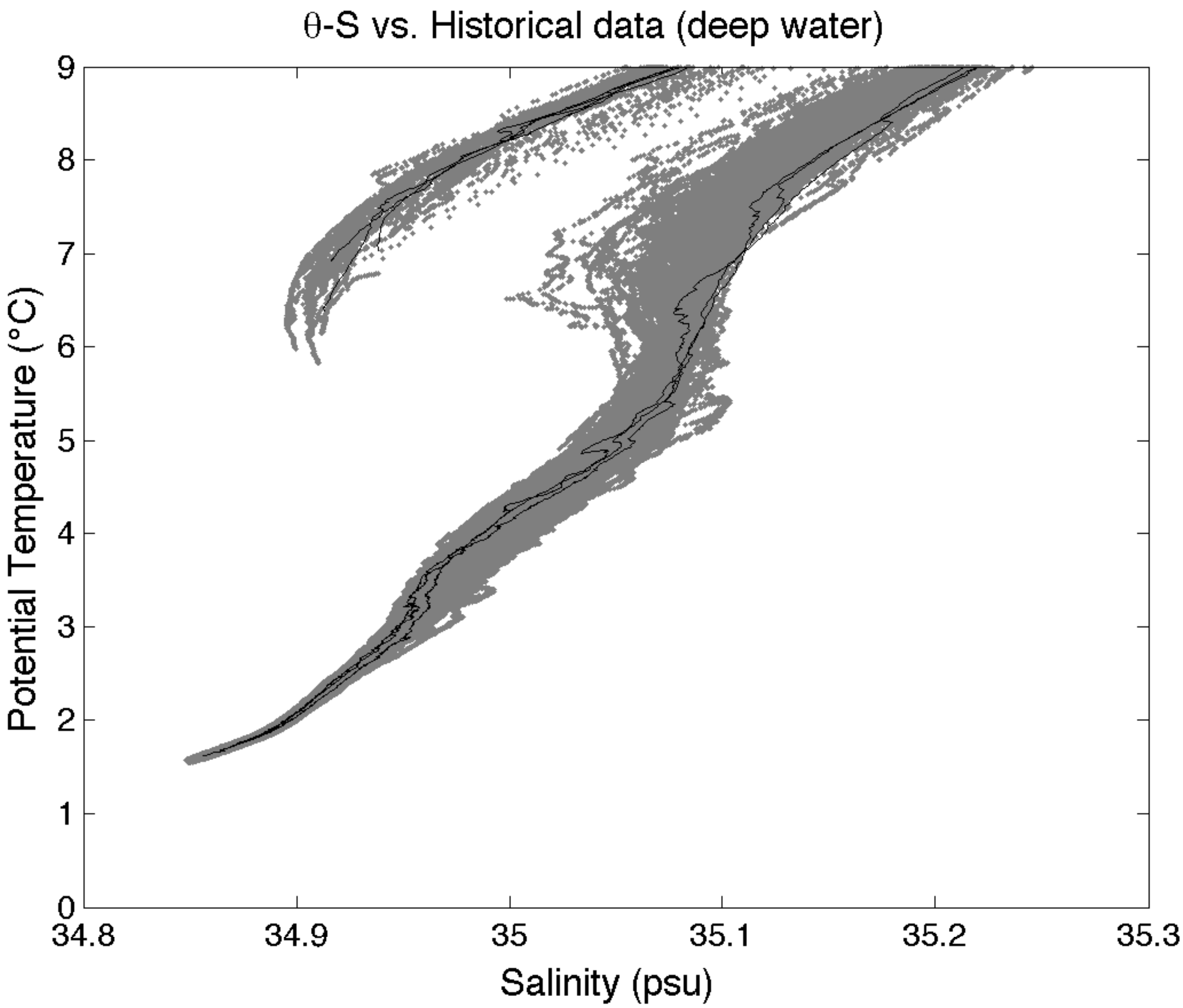


Figure 14: Potential Temperature - Salinity diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

5.5 Dissolved Oxygen

Three SBE43 dissolved O_2 (DO) sensors were used on this leg (Table 3). The DO sensors were calibrated to dissolved O2 check samples by matching the up cast bottle trips to down cast CTD data along neutral density surfaces, calculating CTD dissolved O_2, and then minimizing the residuals using a non-linear least-squares fitting procedure.

The algorithm used for converting oxygen sensor current and probe temperature measurements as described, requires a non-linear least squares regression technique in order to determine the best fit coefficients of the model for oxygen sensor behavior to the water sample observations. A Matlab® sub-routine called `oxfit.m` from the AOML CTD/CAL TOOLBOX performs a non-linear least squares regression using the Gauss-Newton algorithm with Levenberg-Marquardt modifications for global convergence. This algorithm is independent of the first coefficients guess and demonstrates excellent convergence. This `oxfit.m` routine includes an optional time drift term (related with the station number), allowing all stations to be calibrated without breaking into discrete groupings. The Owens and Millard (1985) algorithm was modified as follows:

$$O\ (ml/l) = \{Soc * (V + V_{offset} + tau(T,S) * \frac{\delta v}{\delta t}) + p1 * station\}$$
$$*(1.0 + A * T + B * T^2 + C * T^3) * OXSAT(T,S) * e^{E*(\frac{P}{K})}$$

with

S/N 1348	
	Sta 1-17
Soc	0.4724155
V_offset	-0.5368447
tau	1.20
A	0.0031217
B	-0.0000516
C	0.0000006
E	0.0388230
$p1$	0.0

where Soc, tau, V_{offset}, A, B, C, E and $p1$ are the calibration coefficients shown above and V is the instrument voltage (V). T, S and P are the temperature, salinity and pressure measured by the CTD. K is the temperature in the absolute scale, $station$ is the station number, and $OXSAT$ is the oxygen saturation.

A comparison between the primary and secondary sensors (Figure 15) was evaluated. The sensors show a median difference of 1.25 $umol/kg$ and a standard deviation of 2.95 $umol/kg$. The secondary sensor was chosen (Figure 16) and the uncalibrated sensor shows a median difference of 3.76 *umol/kg* and a standard deviation of 1.98 *umol/kg* compare to the oxyen bottle data.

Also, analogous to the conductivity, the data is compared with a normal distribution using 2.8 * standard deviation to remove outliers. After these procedures 86 data points (81.9%) were used in the final calculations.

By minimizing the differences between the oxygen samples and the CTD oxygen estimated from the equation described in this section, the new coefficients above were calculated and then applied to the CTD original data (Figure 17 to Figure 20). The residual is 0.012 *umol/kg* and the standard deviation 0.63 *umol/kg*. Also 100 % of the residuals for the data are within the confidence limits determined by the WOCE (± 1% of the dissolved oxygen measured).

A final verification about the quality of the data, like in the salinity data, was made by comparing the results of this cruise with some historical data available at the location of the Abaco section and the other sections (Figure 21 & Figure 22). Again by investigating water mass properties, particularly for deeper layers of the ocean, we can have an estimative of the quality of these data.

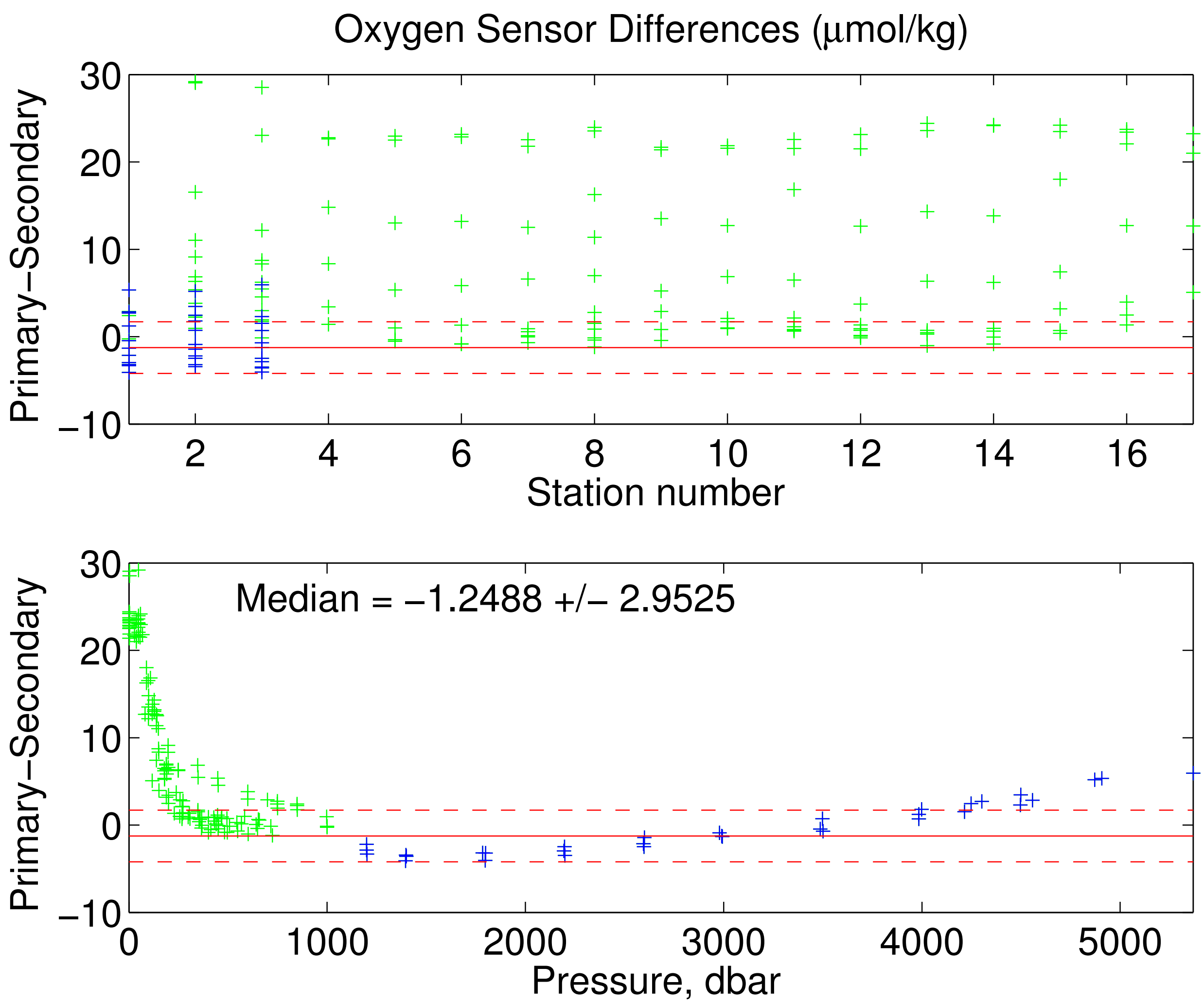


Figure 15: Dissolved oxygen differences between sensors by station (top) and by pressure (bottom). Sensor changes at station 15 and 24. The red solid line represents the median with the red dashed representing the standard deviation.

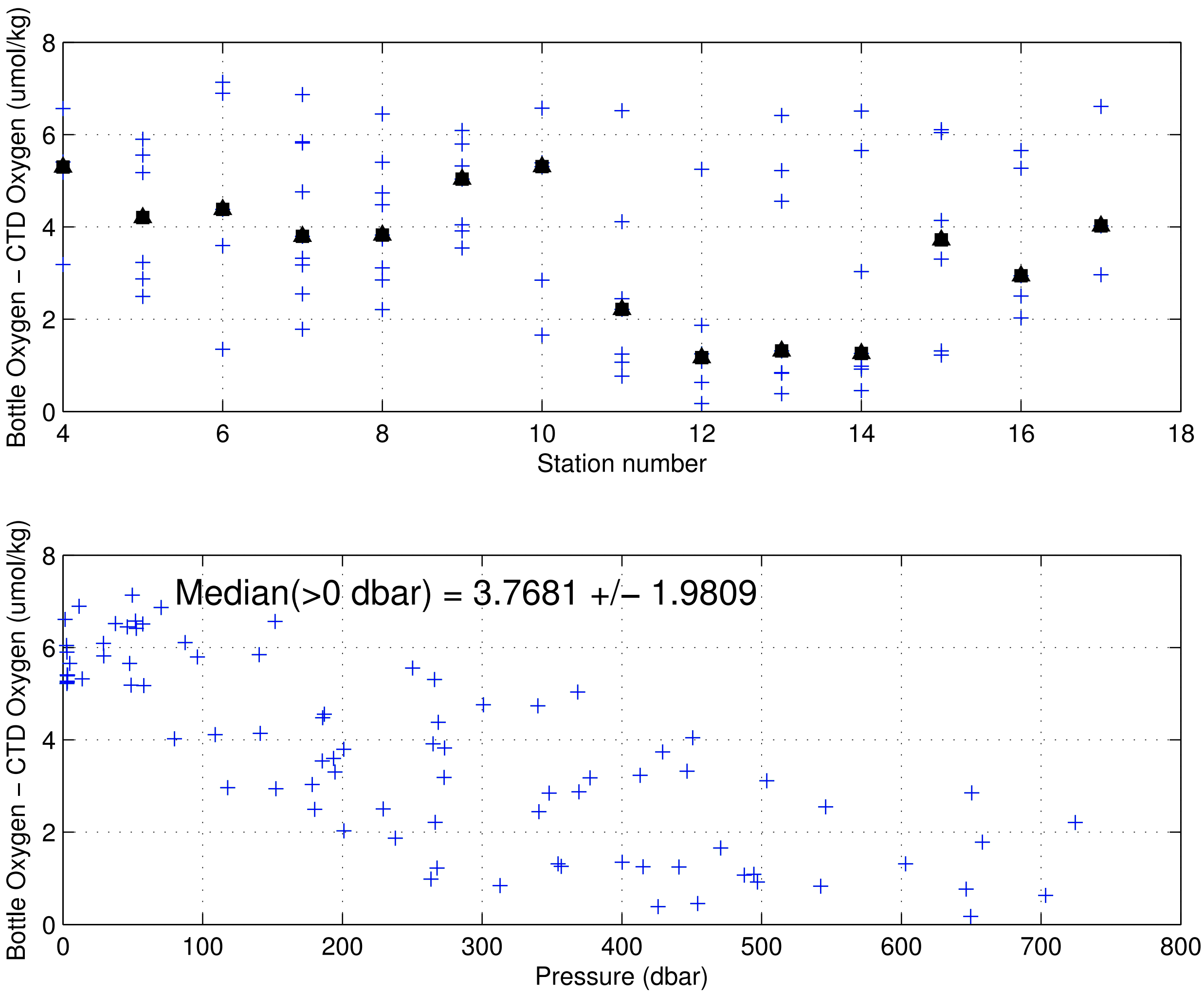


Figure 16: Bottle and uncalibrated secondary CTD oxygen differences plotted against station number. The green crosses represent all data points and the blue are the data points below 1000 dbar. The median was calculated using only the data below 1000 dbar.

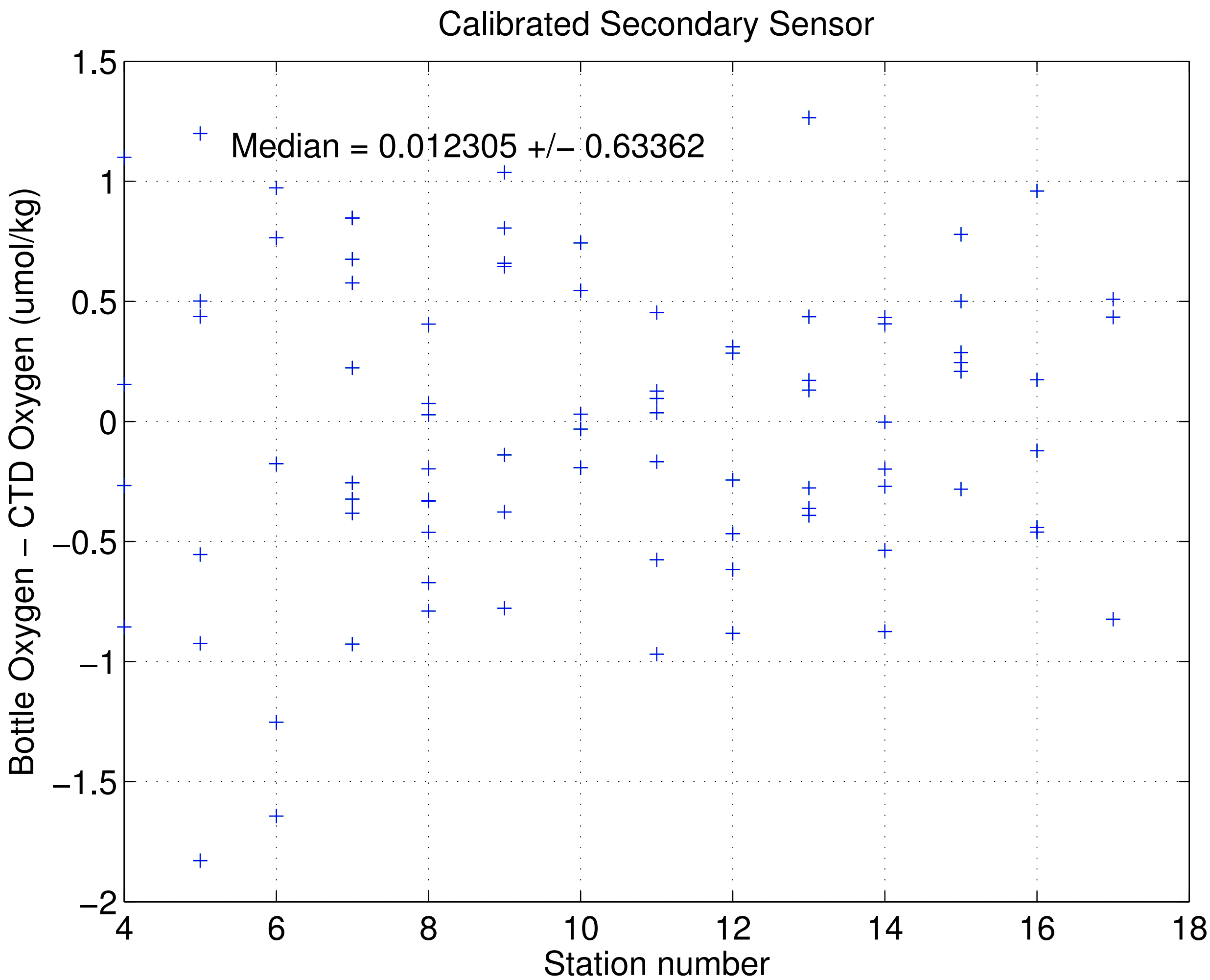


Figure 17: Bottle and calibrated secondary CTD oxygen differences plotted vs. station.

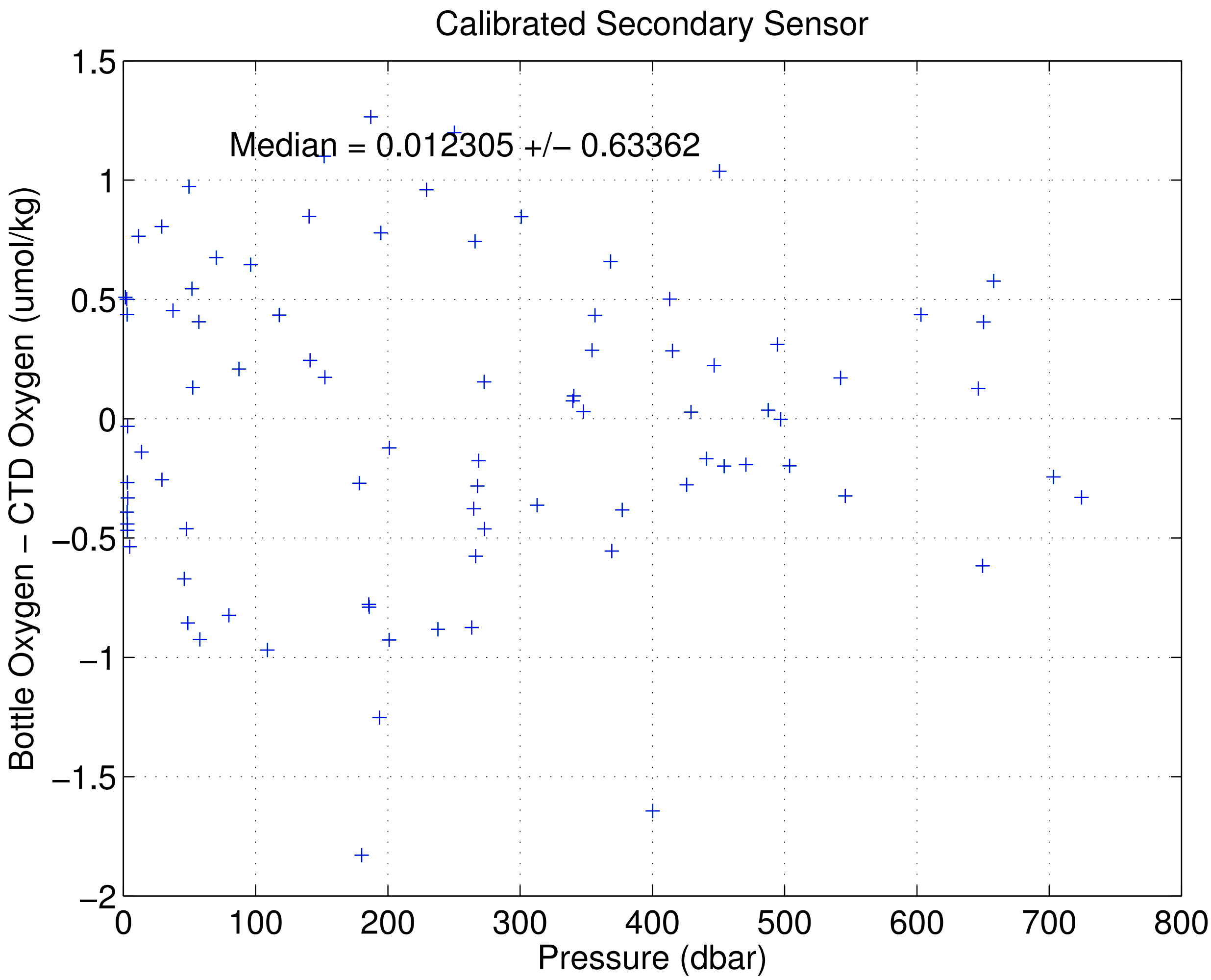


Figure 18: Bottle and calibrated secondary CTD oxygen differences plotted vs. pressure.

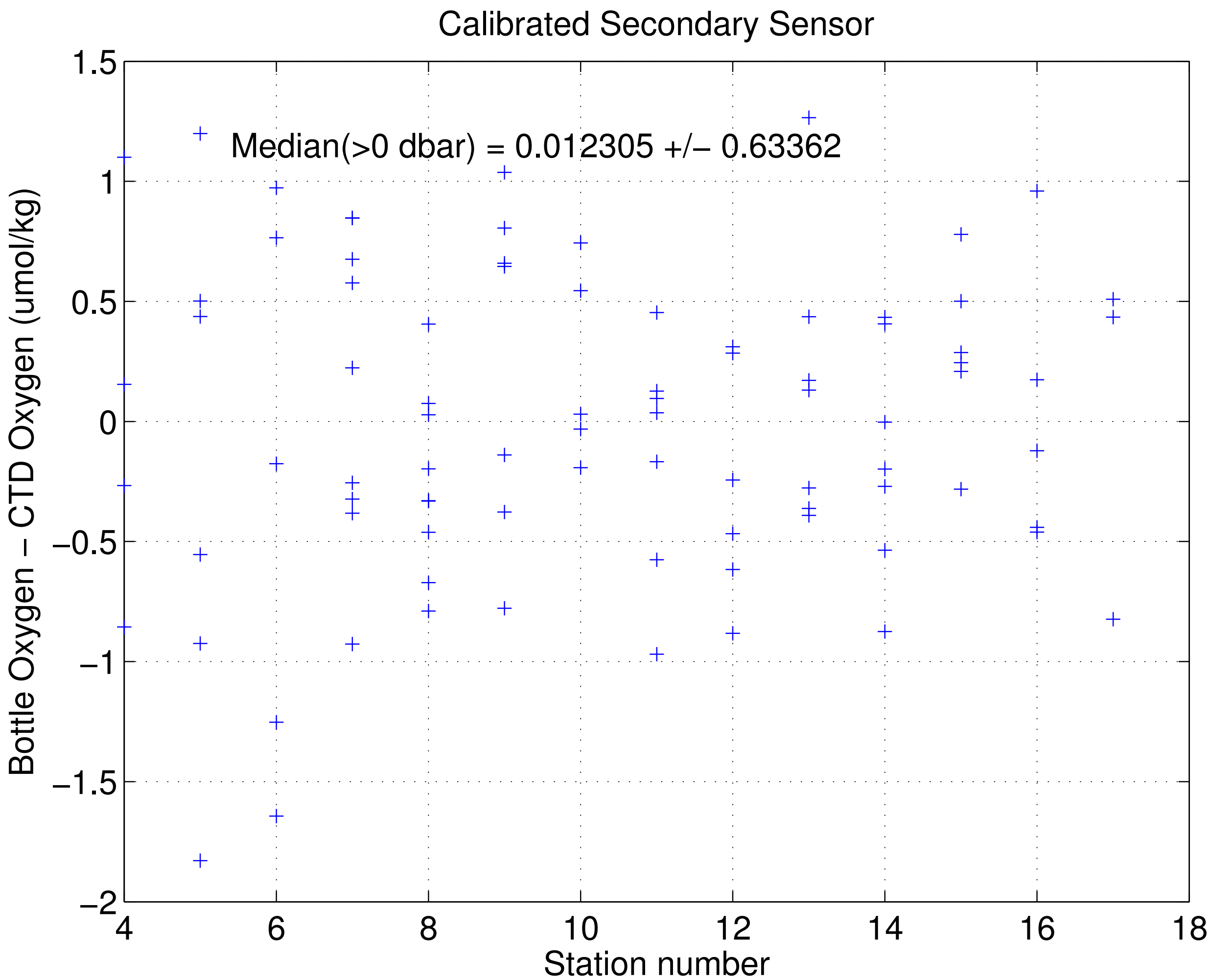


Figure 19: Bottle and calibrated secondary CTD oxygen differences plotted vs. station below 1000 dbar.

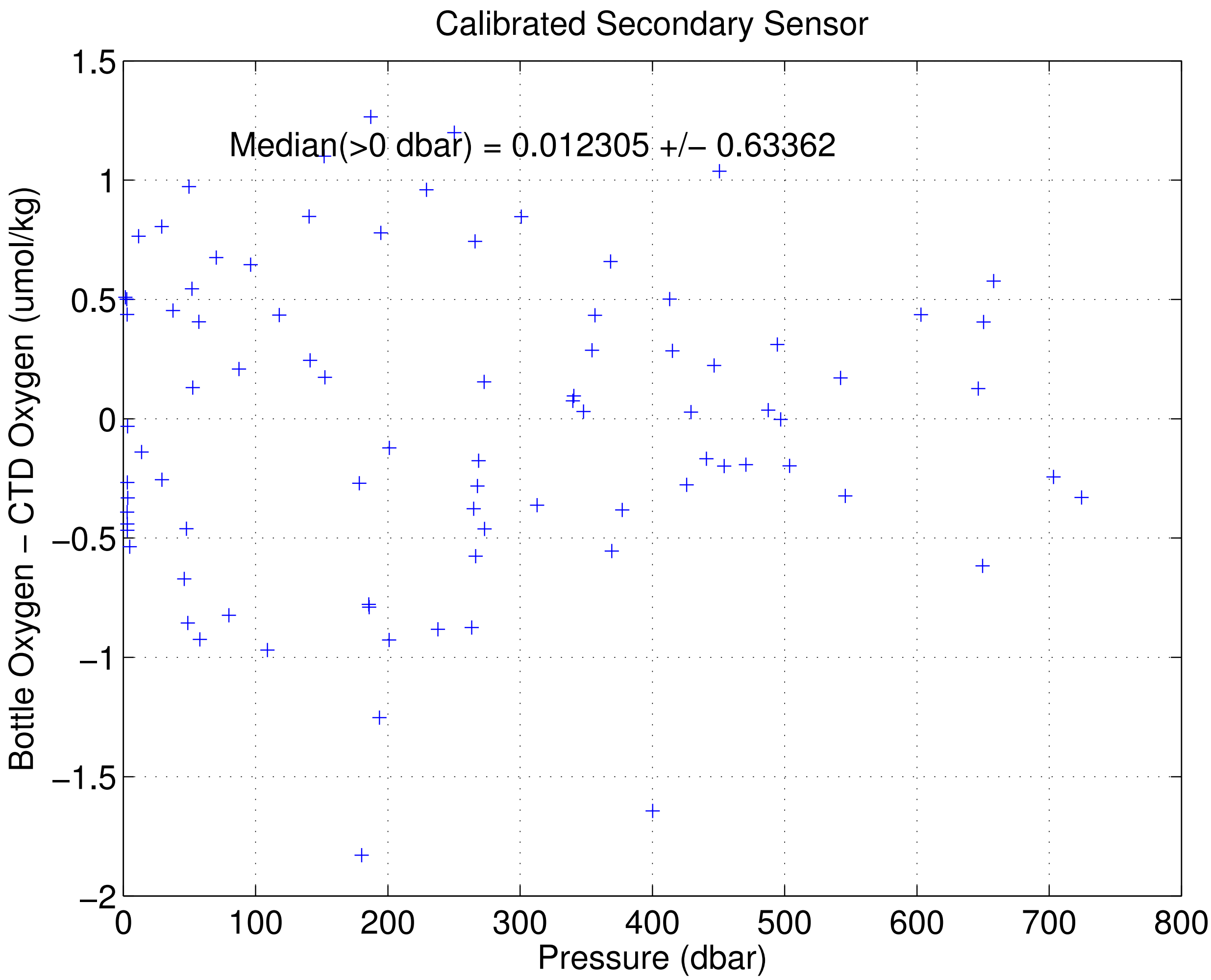


Figure 20: Bottle and calibrated secondary CTD oxygen differences plotted vs. pressure below 1000 dbar.

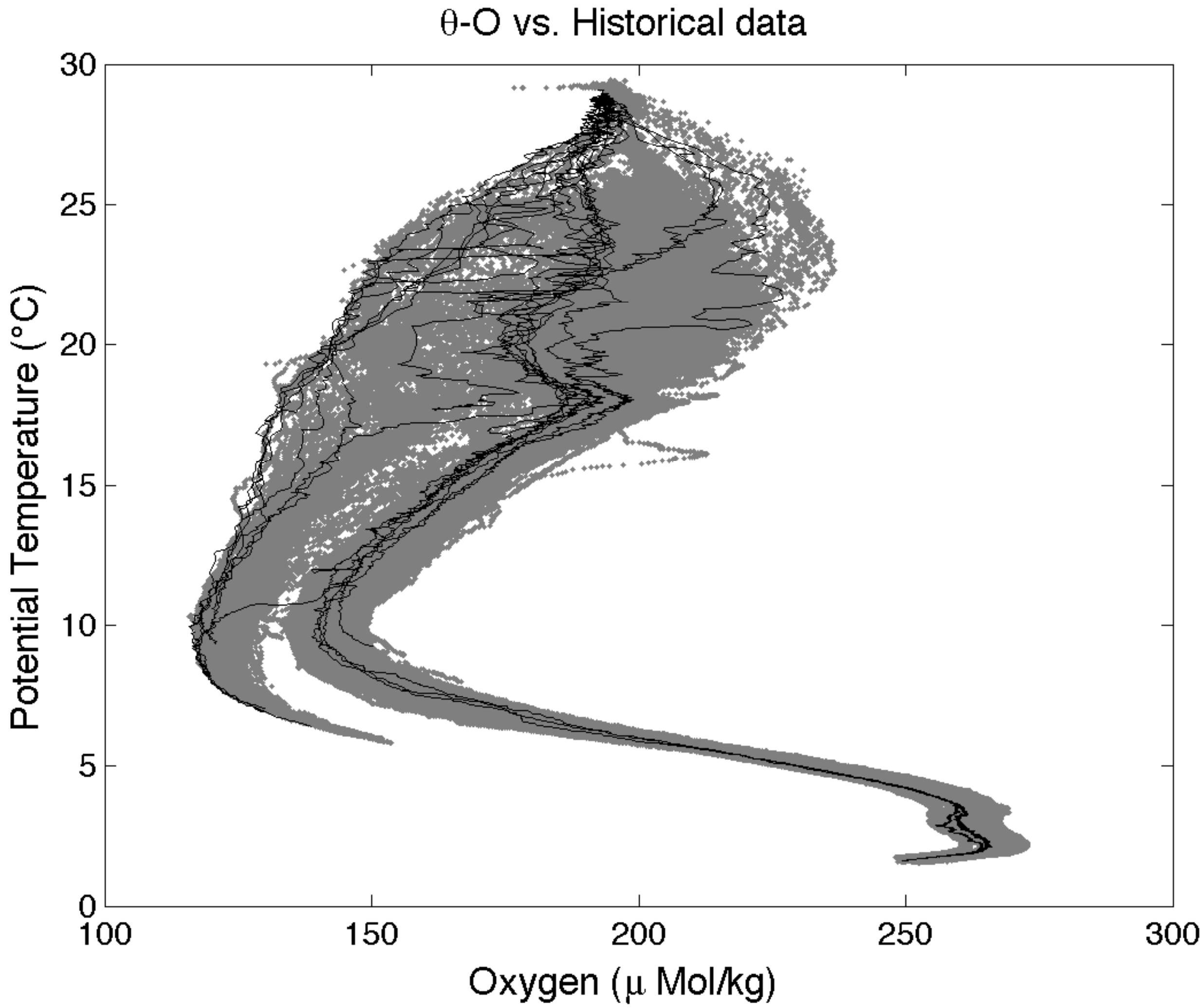


Figure 21: Potential Temperature - Oxygen diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

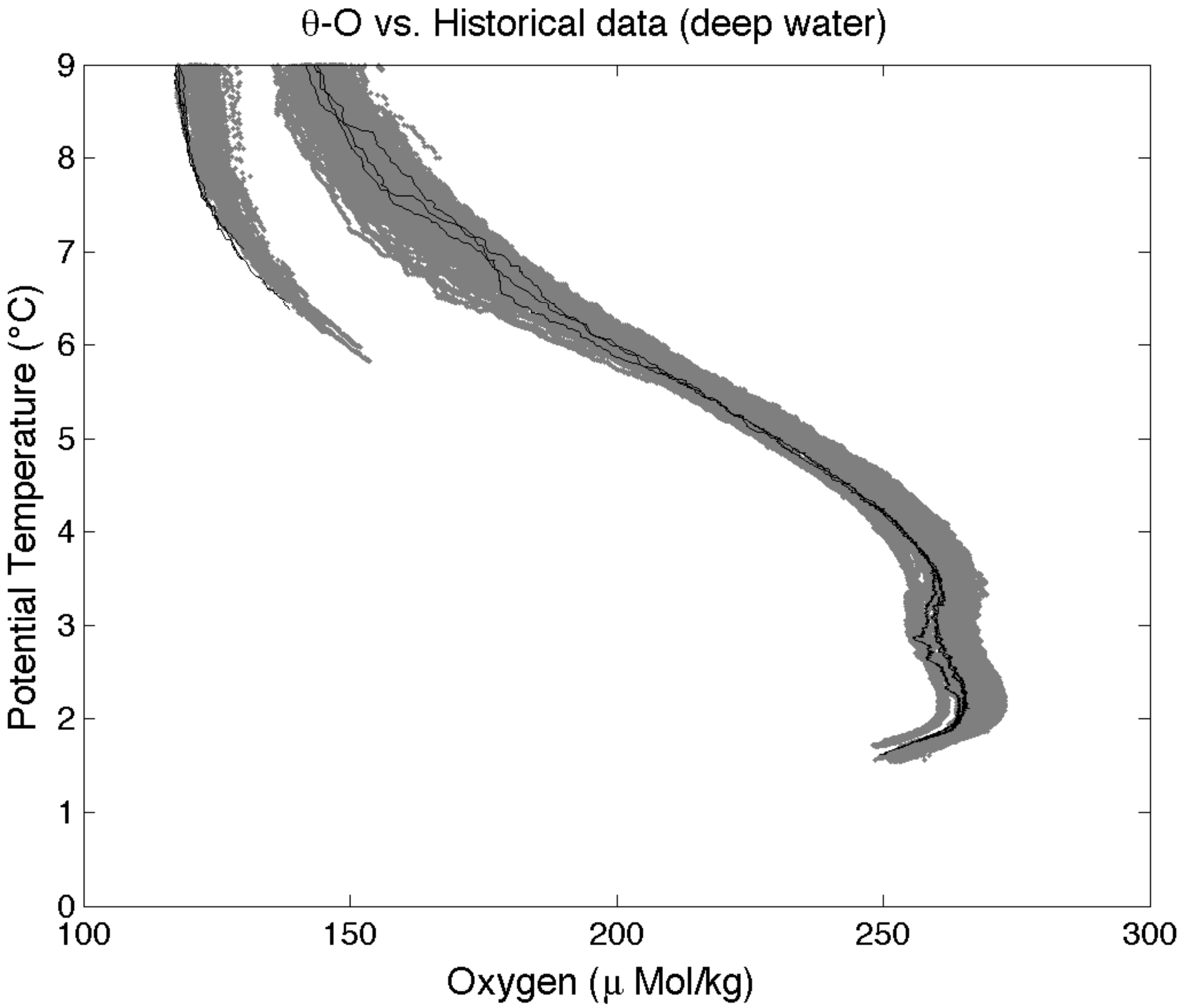


Figure 22: Potential Temperature - Oxygen diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

6 Final CTD Data Presentation

The final calibrated data files were used to produce the tables and station profile plots presented in Appendix A for each CTD station. The table on the top is in "standard depths" followed by the a table of the bottle trip depths. The corresponding profile plot is shown on the following page. Niskin bottle depths are presented on the right side of the profile plot. Bottle salinity and oxygen values are plotted as points in the three smaller plots.

Vertical sections of potential temperature, CTD salinity, neutral density, and CTD oxygen are contoured with pressure as the vertical axis and, for Abaco sections longitude as horizontal axis (Figure 23 to Figure 26). Nominal vertical exaggerations are 400:1 below 1000 dbar (lower panels) and 200:1 above 1000 dbar (upper panels). For the Northwest Providence Channel Sections latitude is used as horizontal axis (Figure 31 to Figure 34).

Post-cruise calibrations were applied to CTD data associated with bottle data using Matlab sub-routines (`apply_calibration.m`). WOCE quality flags were appended to bottle data records. "Bad values" (WOCE quality control value = 4) were flagged if the bottle samples failed the initial quality control and were not used for the calibration (which meant they typically fell outside 2.57 standard deviations of the difference between samples and uncalibrated CTD values). A second pass is applied, using the value of 2.5 times the standard deviation of the difference between calibrated CTD values and bottle samples, where bottle values may be flagged as "bad values" or as questionable (WOCE quality control value = 3).

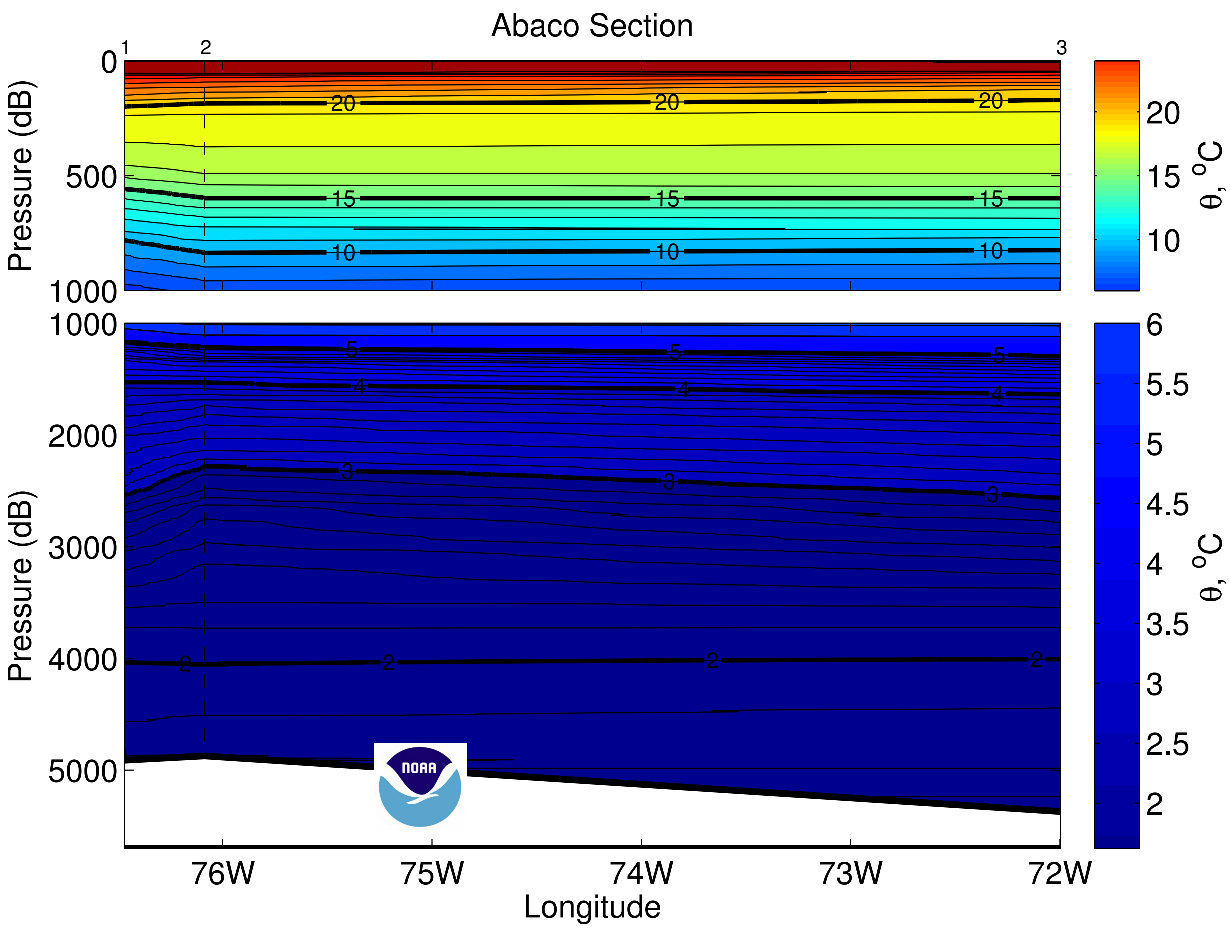


Figure 23: Potential Temperature (°C) section for the Abaco Section. Dashed vertical lines are the CTD station locations.

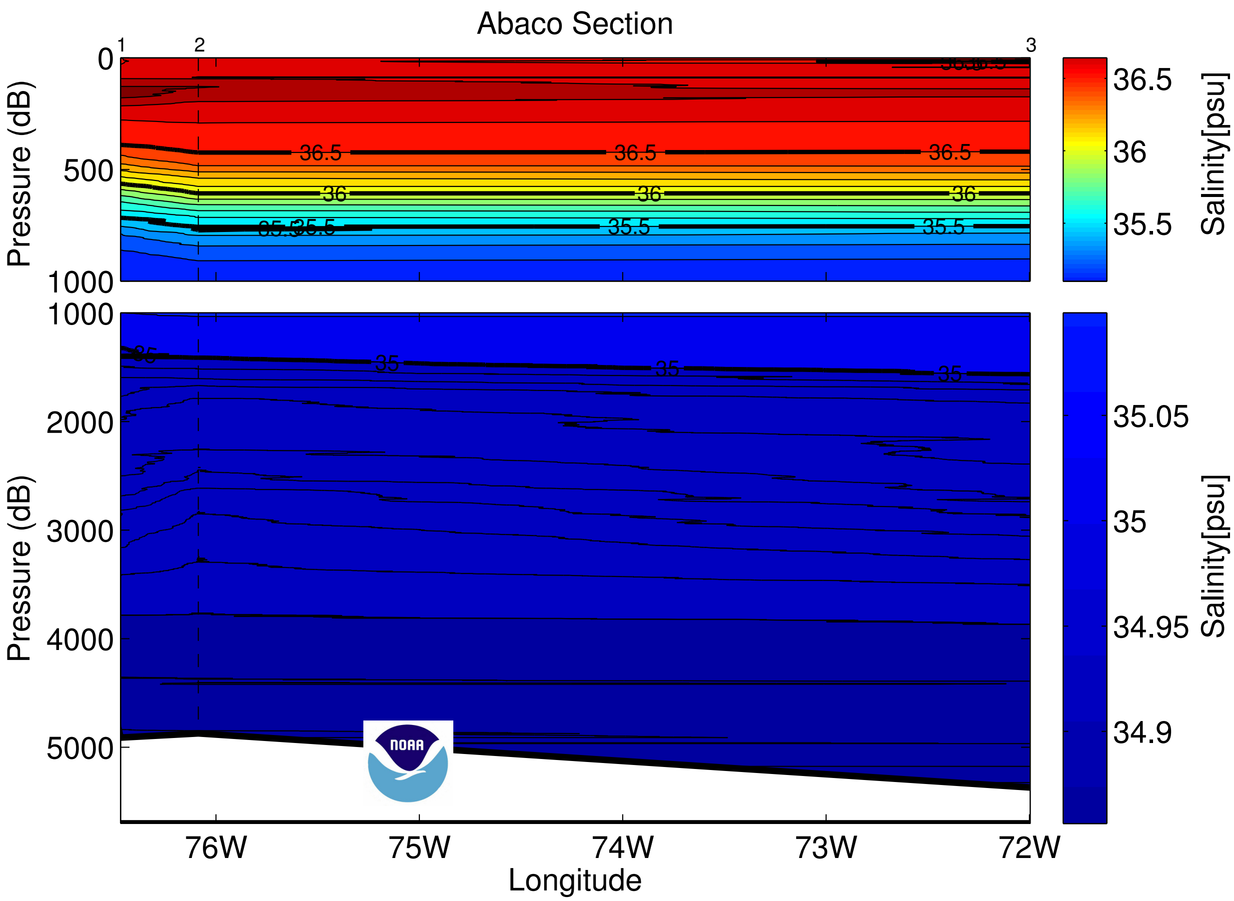


Figure 24: Salinity (PSS 78) section for the Abaco section. Dashed vertical lines are the CTD station locations.

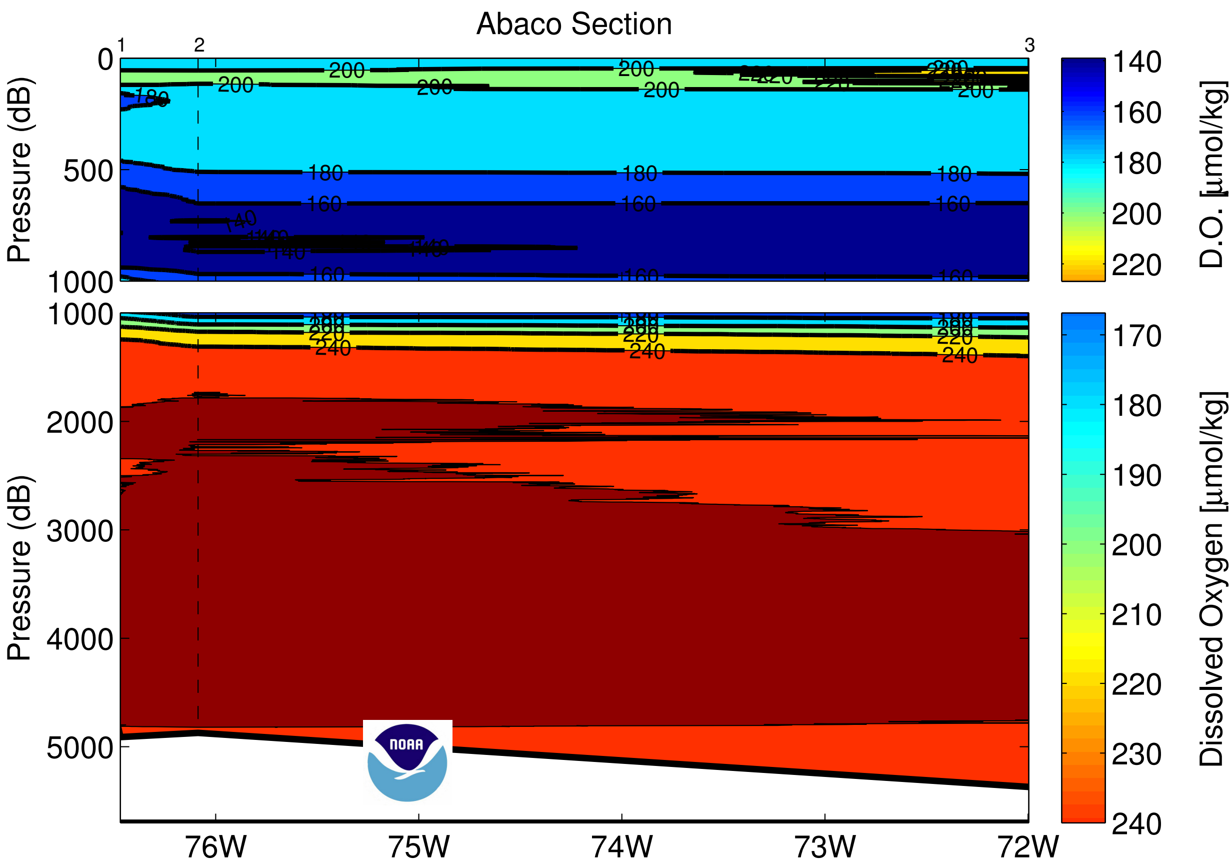


Figure 25: Dissolved Oxygen ($umol/kg$) section for the Abaco Section. Dashed vertical lines are the CTD station locations.

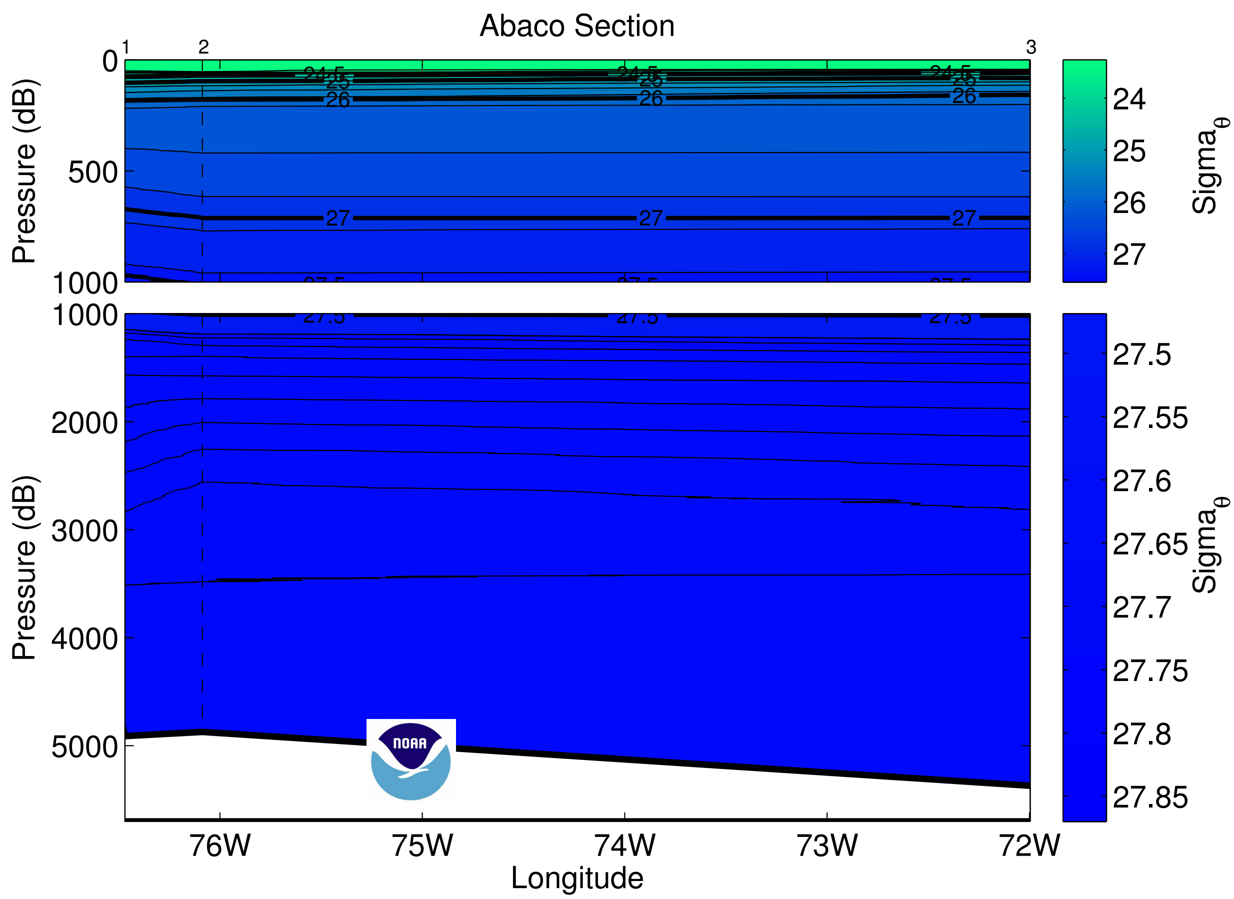


Figure 26: Neutral density (kg/m3) section for the Abaco Section. Dashed vertical lines are the CTD station locations.

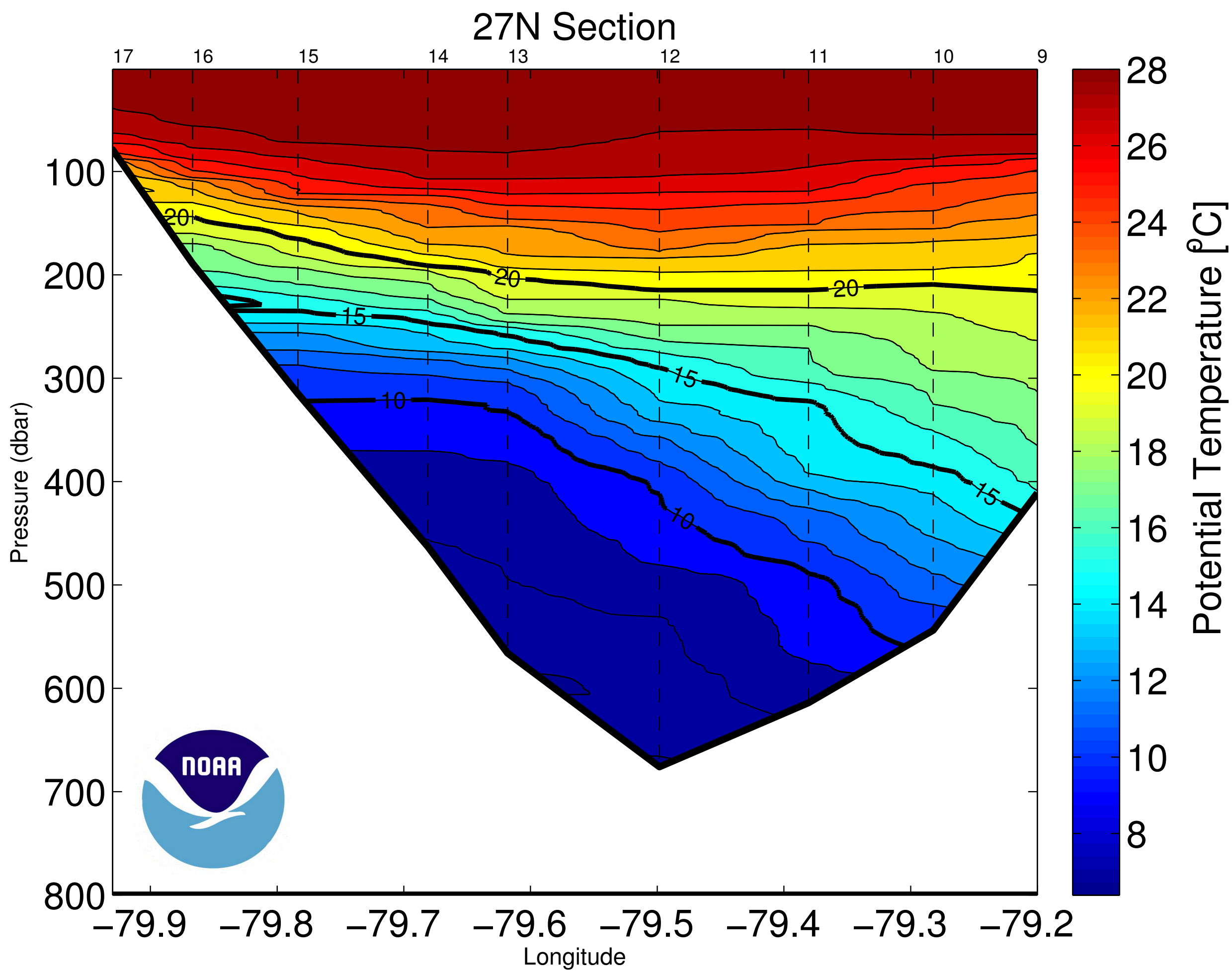


Figure 27: Potential Temperature (°C) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

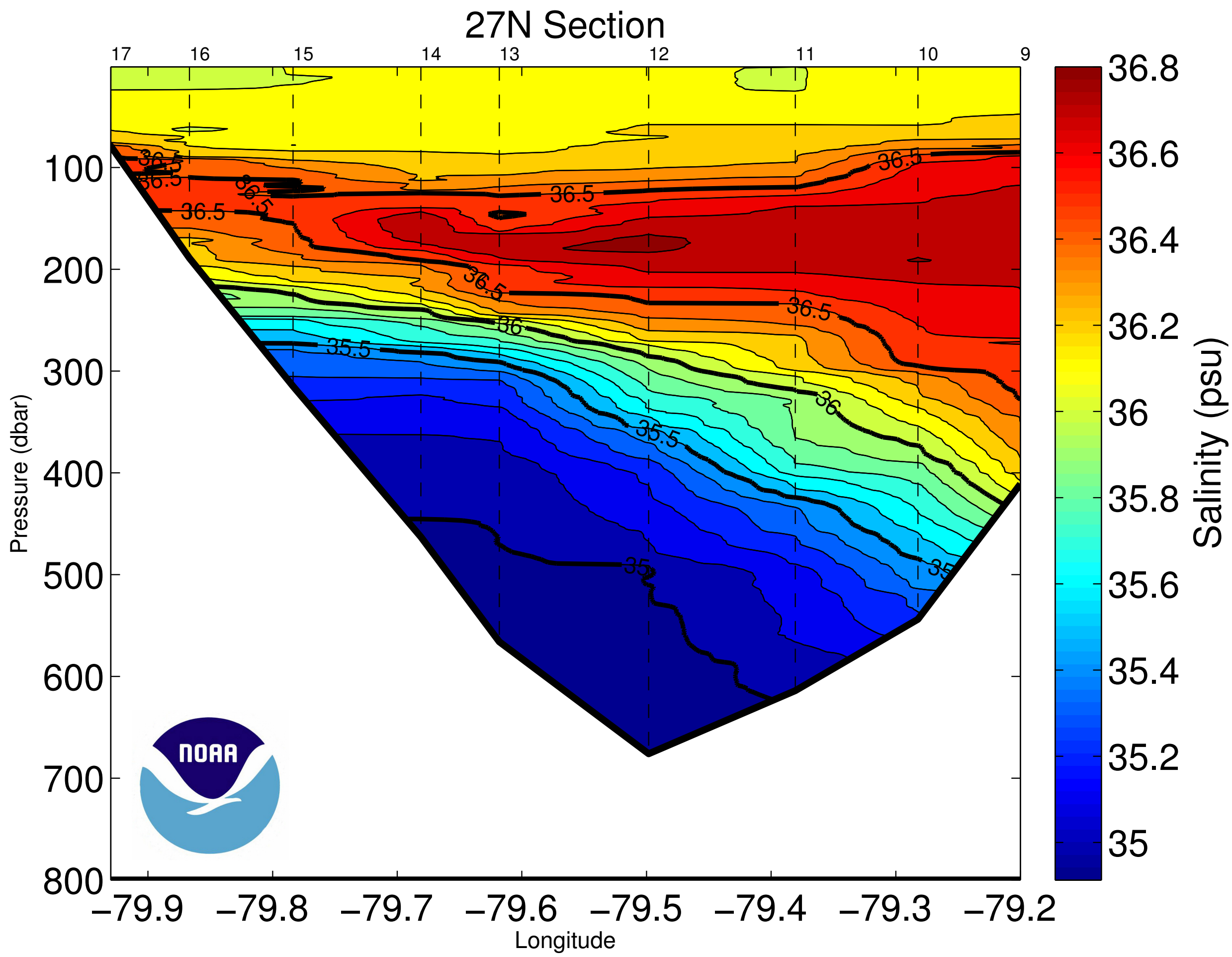


Figure 28: Salinity (PSS 78) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

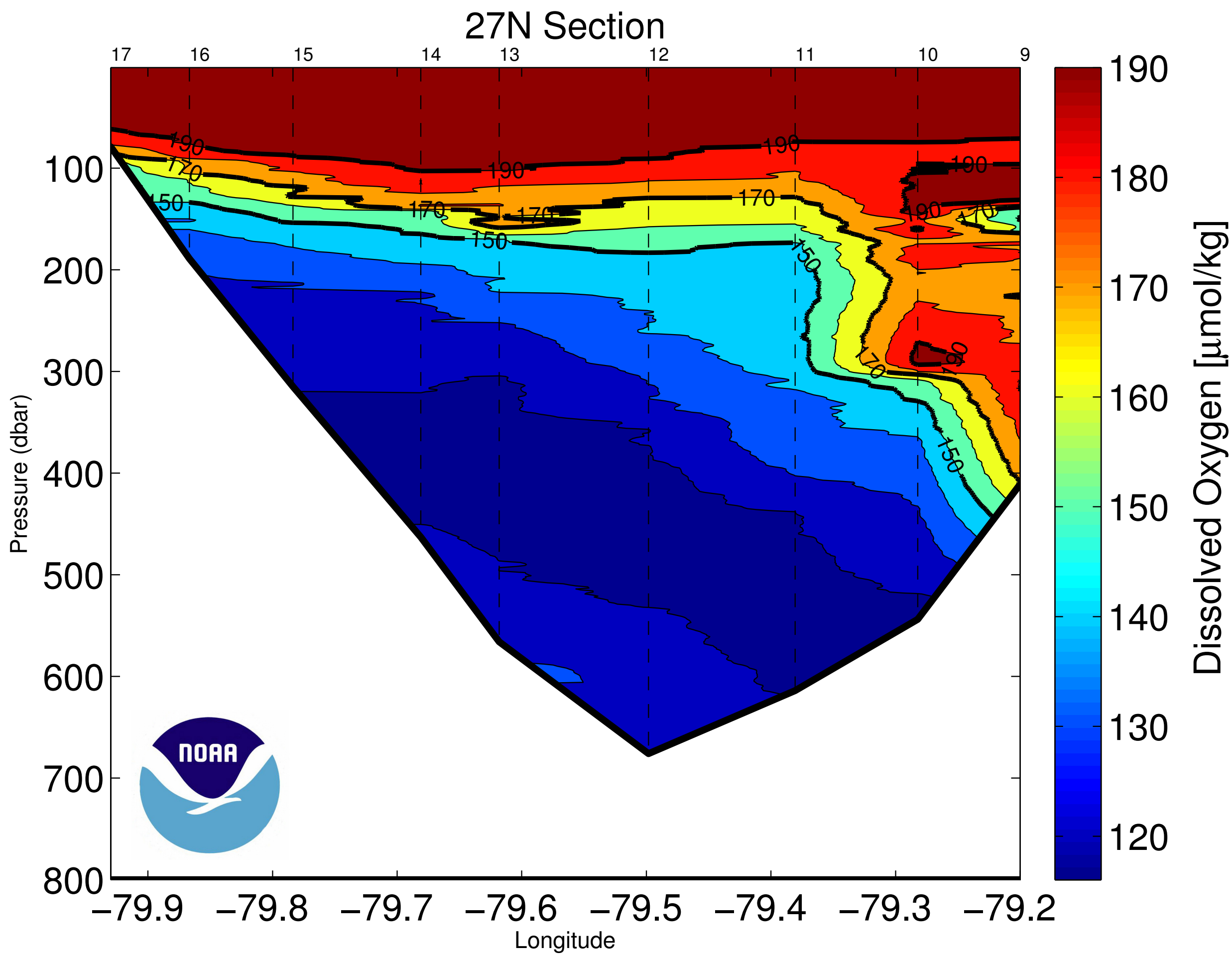


Figure 29: Dissolved Oxygen ($umol/kg$) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

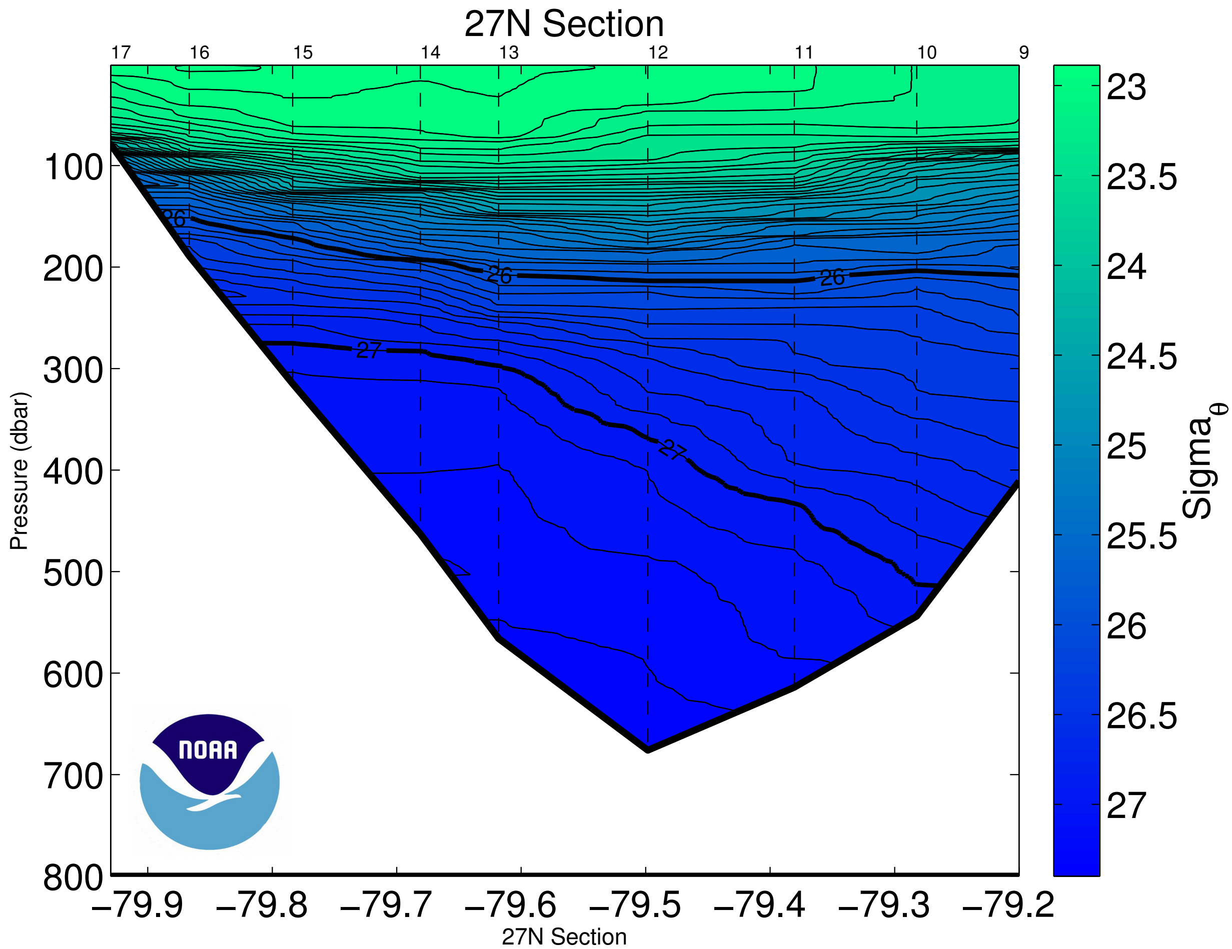


Figure 30: Neutral density (kg/m3) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

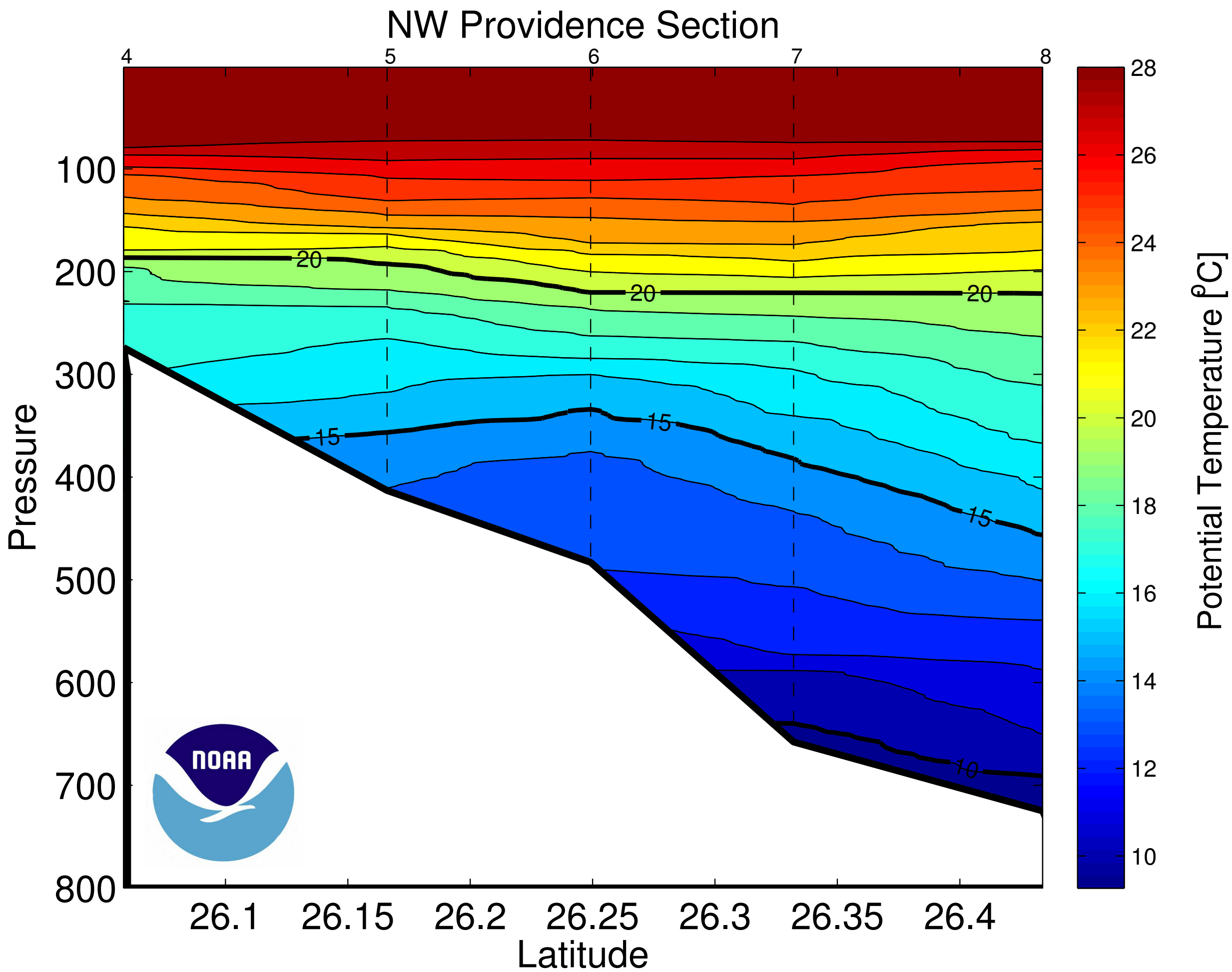


Figure 31: Potential Temperature (°C) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

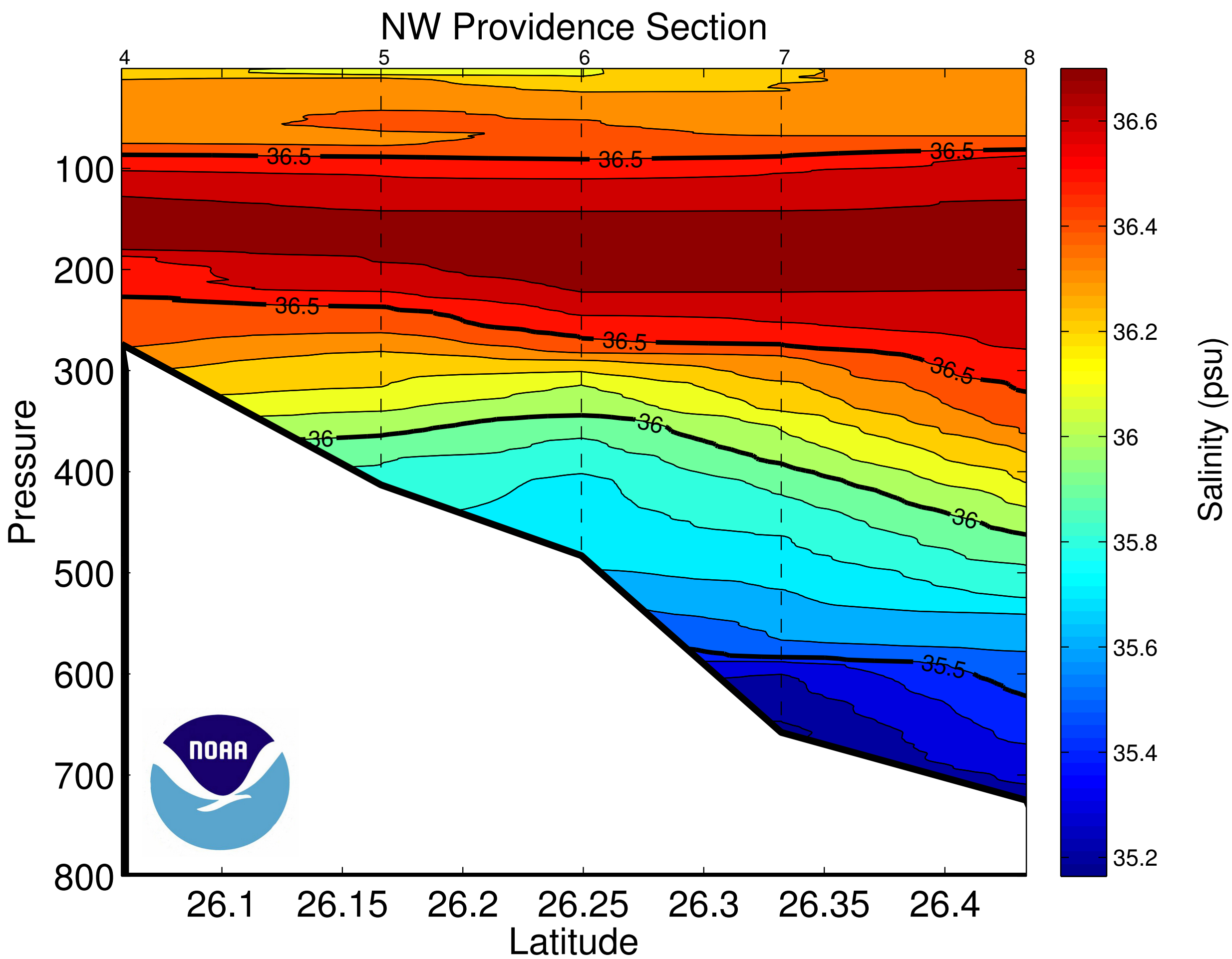


Figure 32: Salinity (PSS 78) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

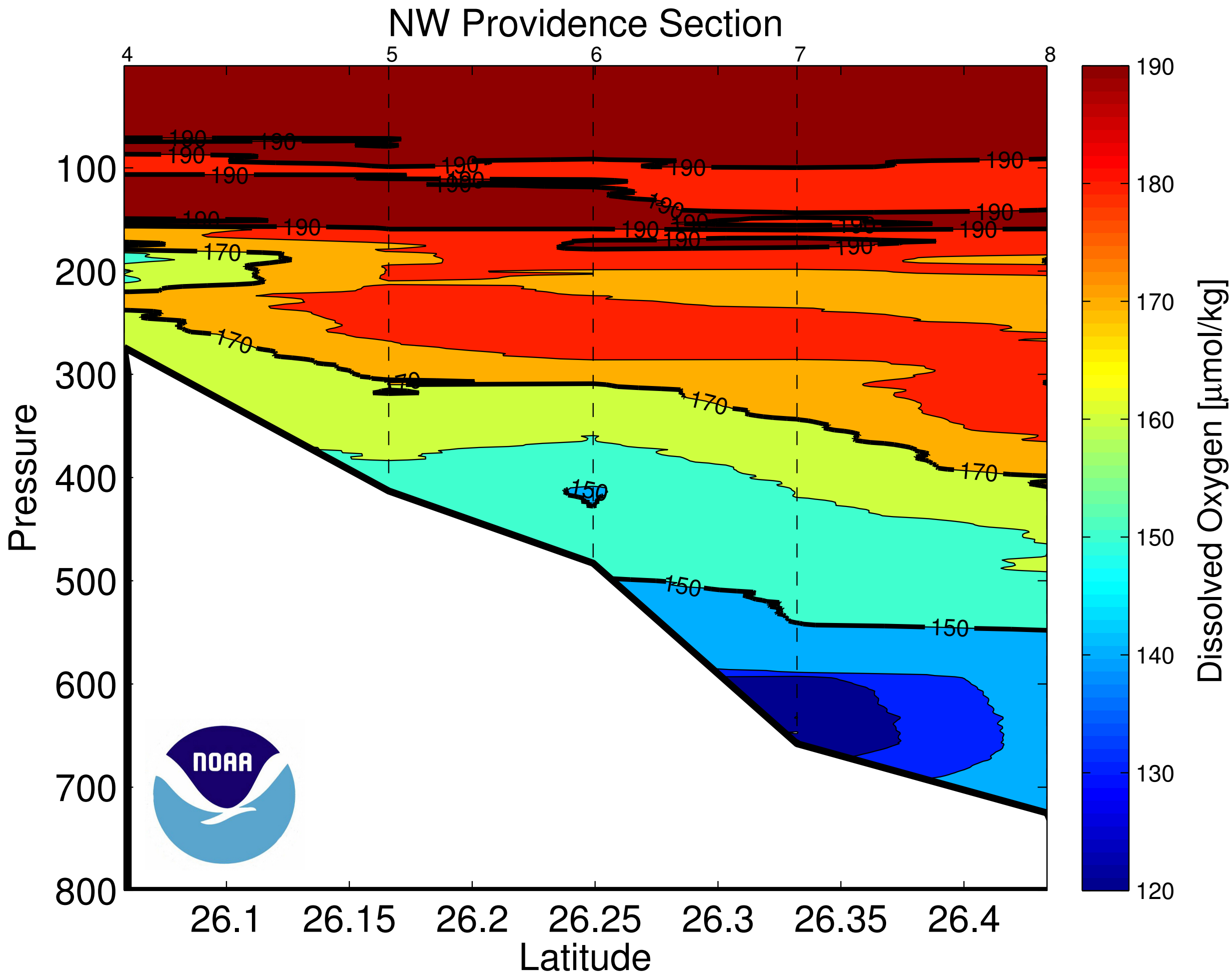


Figure 33: Dissolved Oxygen ($umol/kg$) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

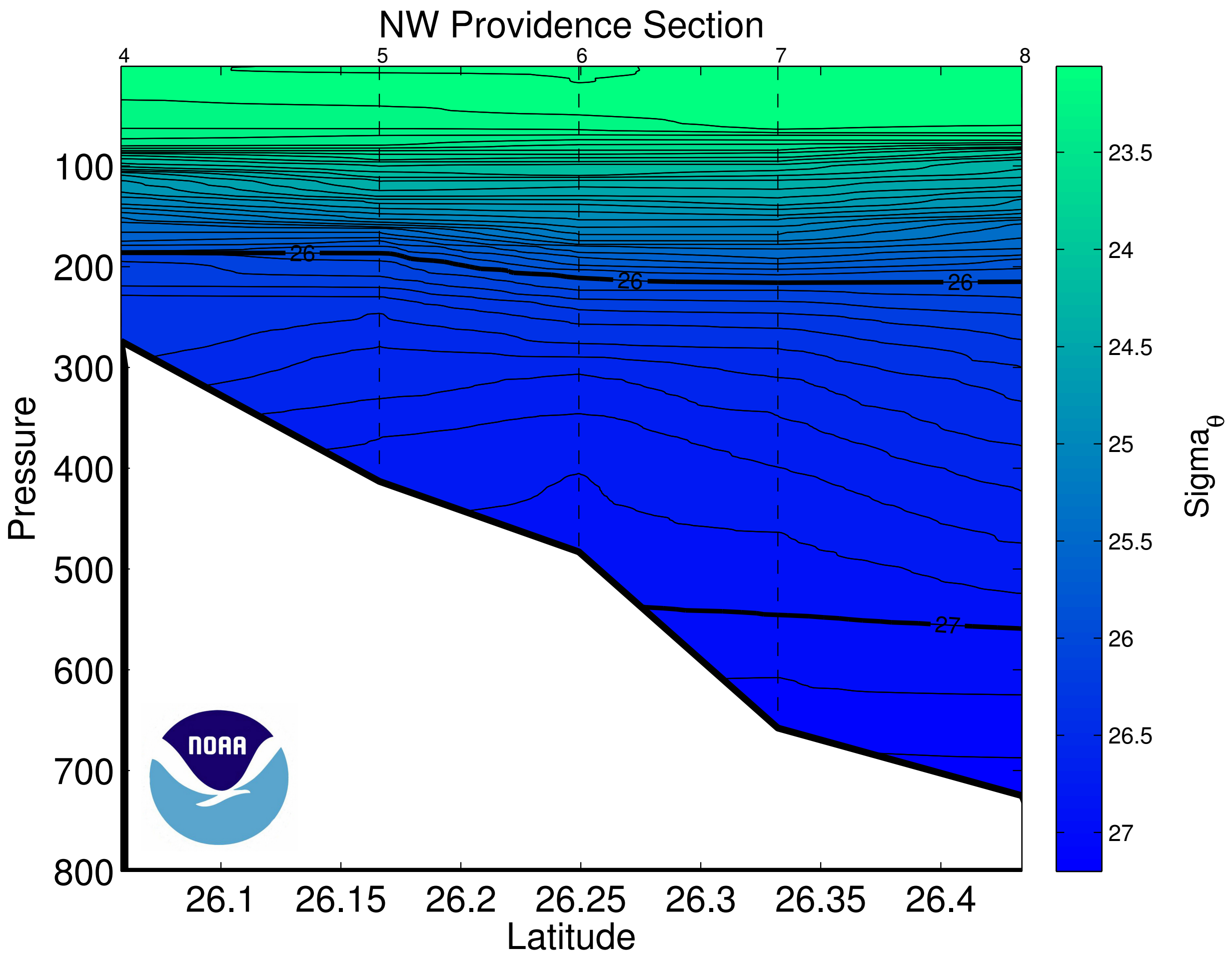


Figure 34: Neutral density (kg/m3) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

7 *Acknowledgements*

The successful completion of the cruise relied on dedicated assistance from many individuals on shore and on the NERC ship RRS Discovery. Funded investigators in the project and members of the Western Boundary Time Series, and the RAPID/MOC programs were instrumental in planning and executing the cruise. The participants in the cruise showed dedication and camaraderie during their 16 days at sea. Officers and crew of the Discovery exhibited a high degree of professionalism and assistance to accomplish the mission and to make us feel at home during the voyage.

The U.S. Western Boundary Time Series Program is sponsored by NOAA's Office of Climate Observation. The U.S. Meridional Overturning Heat transport and Circulation Array is sponsored by the National Science Foundation's Physical Oceanography Program. The UK RAPID/MOC program is sponsored by the National Environmental Research Council (NERC). In particular, we wish to thank program managers Diane Stanitski (NOAA), David Legler (NOAA), Mike Johnson (NOAA), Eric Itsweire (NSF/OCE), and Meric Srokosz (NERC) for their financial support in the effort.

8 References

Bacon, S., F. Culkin, N. Higgs, P. Ridout, 2007: IAPSO standard seawater: Definition of the uncertainty in the calibration procedure, and stability of recent batches, *J. Atmos. Ocean. Technol.*, **24**, 1785-1799.

Carpenter, J. H., 1965a: The accuracy of the Winkler method for dissolved oxygen analysis, *Limnology and Oceanography*, **10**, 135-140.

Carpenter, J. H., 1965b: The Chesapeake Bay Institute Technique for the Winkler dissolved oxygen method, *Limnology and Oceanography*, **10**, 141-143.

Culberson, C. H., G. Knapp, M. C. Stalcup, R. T. Williams, and F. Zemlyak, 1991: A Comparison of methods for the determination of dissolved oxygen in seawater. *Woods Hole Oceanogr. Inst. WHPO*, **91-2**, 77p.

Friederich, G., L. A. Codispoti, and C. M. Carole, 1991: An easy-to-construct automated Winkler titration system, *Monterey Bay Aquarium Research Institute Technical Report*, **91**, 31.

Kawano, T., M. Aoyama, T. Joyce, H. Uchida, Y. Takatsuki, and M. Fukasawa, 2006: The latest batch-to-batch difference table of standard seawater and its application to the WOCE onetime sections, *J. Oceanogr.*, **62**, 777-792.

Landgdon, C., 2010: Determination of dissolved oxygen in seawater by Winkler titration using the amperometric technique, *IOCCP Report*, **14-134**, 18p.

Latif, M., and T. P. Barnett, 1996: Decadal climate variability over the North Pacific and North America: Dynamics and predictability, *J. Climate*, **9**, 2407-2423.

Molinari, R. L., R. A. Fine, W. D. Wilson, R. G. Curry, J. Abell, and M. S. McCartney, 1998: The arrival of recently formed Labrador Sea Water in the Deep Western Boundary Current at 26.5°N, *Geophys. Res. Lett.*, **25**, 2249-2252.

van Sebille, E., M. O. Baringer, W. E. Johns, C. S. Meinen, L. M. Beal, M. F. de Jong, and H. M. van Aken, 2011: Propagation pathways of classical Labrador Sea water from its source region to 26Â°N, *J. Geophys. Res.*, **116**, C12027

Vaughan, S. L., and R. L. Molinari, 1997: Temperature and salinity variability in deep western boundary current, *J. Phys. Oceanogr.*, **27**, 749-761.

Weiss, R. F., 1970: The solubility of nitrogen, oxygen and argon in water and seawater, *Deep-Sea Res.*, **17**, **4**, Pages 721-735.

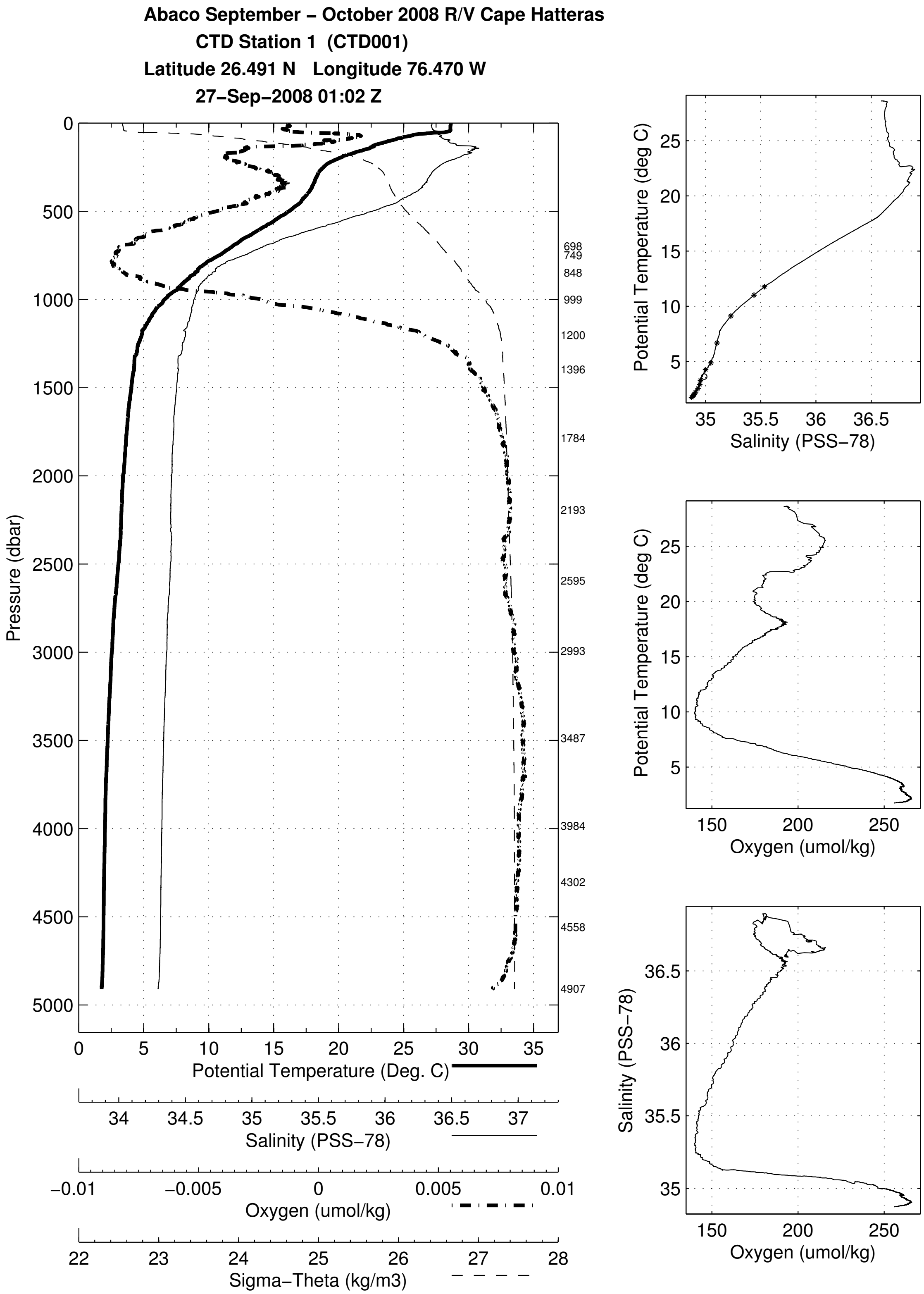
Sea-Bird Electronics, Inc., 2010: Application Note No. 31: Computing temperature and conductivity slope and offset correction coefficients from laboratory calibrations and salinity bottle samples. Retrieved from http://www.seabird.com/application_notes/AN31.htm.

A Hydrographic - CTD Data

Abaco September - October 2008 R/V Cape Hatteras
CTD Station 1 (CTD001)
Latitude 26.491N Longitude 76.470W
27-Sep-2008 01:02Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	$\mu mol \cdot kg^{-1}$	$m^2 \cdot s^{-2}$	$kg \cdot m^{-3}$
1	28.631	28.630	36.600	193.8	0.004	23.389
10	28.628	28.626	36.598	193.1	0.045	23.390
20	28.608	28.603	36.598	192.9	0.090	23.397
30	28.610	28.603	36.601	194.1	0.135	23.400
50	28.313	28.301	36.636	196.0	0.224	23.526
75	25.354	25.337	36.655	215.2	0.319	24.489
100	24.006	23.985	36.700	206.8	0.400	24.934
125	22.806	22.780	36.755	197.7	0.472	25.329
150	22.081	22.051	36.868	181.5	0.535	25.623
200	20.034	19.996	36.753	174.0	0.644	26.101
250	18.879	18.835	36.637	183.3	0.737	26.315
300	18.385	18.332	36.585	190.8	0.825	26.403
400	17.665	17.597	36.474	187.7	0.995	26.501
500	16.274	16.193	36.225	171.8	1.157	26.646
600	14.072	13.983	35.860	156.7	1.304	26.856
700	11.893	11.799	35.535	142.4	1.432	27.044
800	9.764	9.670	35.280	140.6	1.543	27.227
900	8.214	8.117	35.151	151.2	1.637	27.375
1000	6.700	6.603	35.099	185.5	1.715	27.551
1100	5.638	5.539	35.072	214.1	1.778	27.668
1200	4.946	4.844	35.045	234.8	1.831	27.729
1300	4.569	4.461	35.021	244.8	1.881	27.753
1400	4.364	4.249	35.001	249.6	1.929	27.760
1500	4.172	4.050	34.990	253.3	1.977	27.773
1750	3.826	3.684	34.971	258.5	2.094	27.796
2000	3.578	3.417	34.958	260.8	2.210	27.812
2500	3.251	3.046	34.950	259.8	2.441	27.841
3000	2.789	2.543	34.926	262.5	2.664	27.867
3500	2.515	2.222	34.908	265.4	2.882	27.880
4000	2.360	2.015	34.896	264.0	3.100	27.887
4500	2.309	1.908	34.887	263.0	3.326	27.889

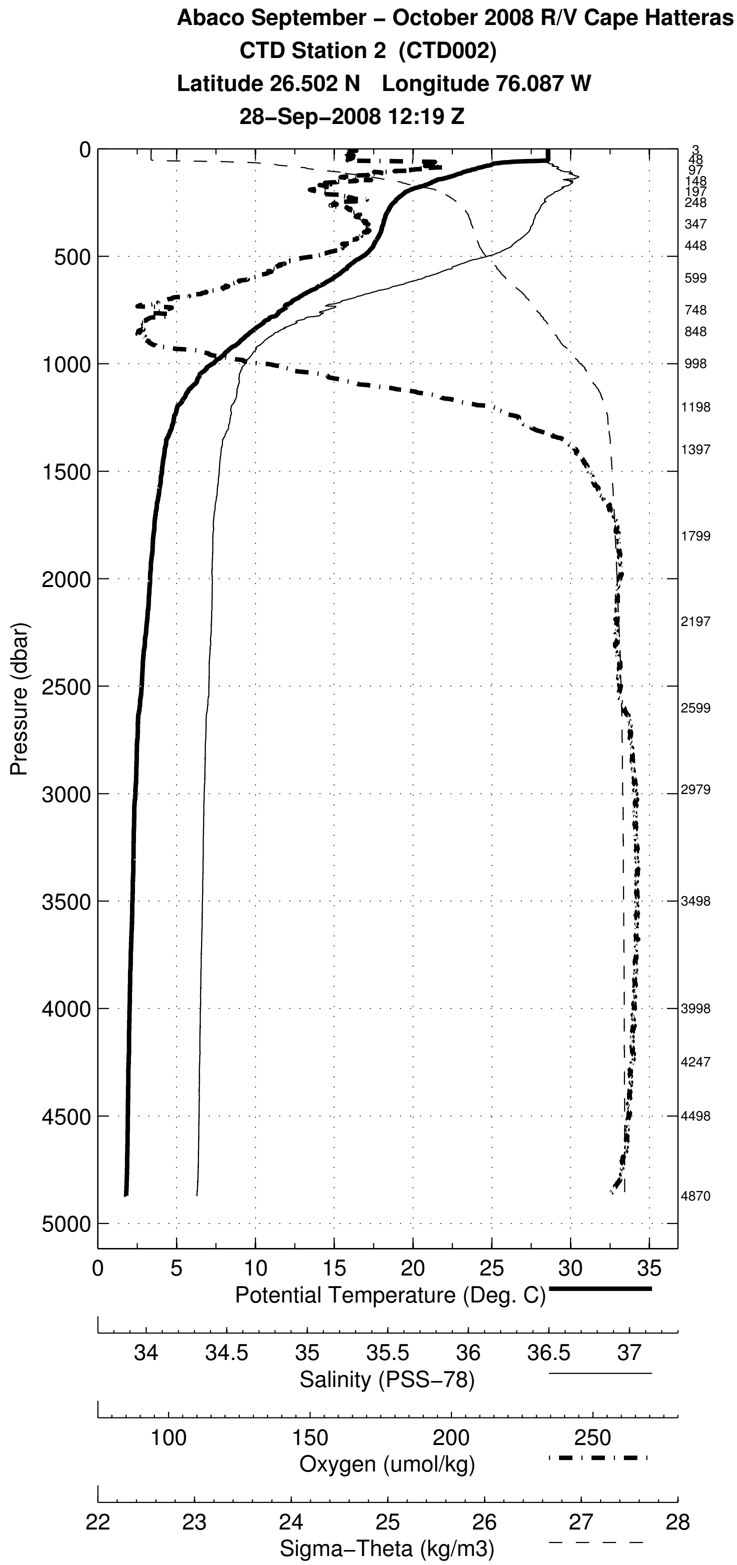
Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	$\mu mol \cdot kg^{-1}$
4908	1	2.205	1.758	34.873	−999.0
4558	2	2.312	1.903	34.887	−999.0
4302	3	2.320	1.942	34.892	−999.0
3984	4	2.365	2.023	34.896	−999.0
3487	5	2.526	2.234	34.910	−999.0
2993	6	2.804	2.558	34.933	−999.0
2595	7	3.130	2.919	34.948	−999.0
2194	8	3.481	3.303	34.955	−999.0
1784	9	3.781	3.637	34.988	−999.0
1396	10	4.385	4.270	35.000	−999.0
1201	11	4.985	4.882	35.047	−999.0
999	12	6.780	6.683	35.104	−999.0
848	13	9.221	9.124	35.229	−999.0
749	15	11.110	11.014	35.439	−999.0
699	16	11.872	11.779	35.534	−999.0

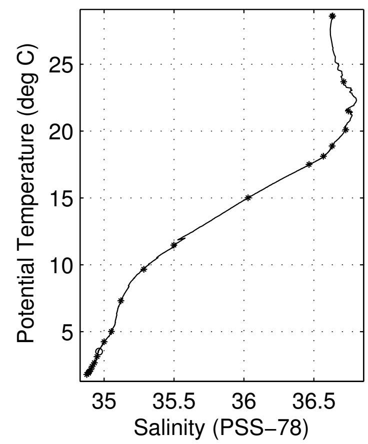

Abaco September − October 2008 R/V Cape Hatteras
CTD Station 1 (CTD001)
Latitude 26.491 N Longitude 76.470 W
27−Sep−2008 01:02 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS−78)
Oxygen (umol/kg)
Sigma−Theta (kg/m3)
698
749
848
999
1200
1396
1784
2193
2595
2993
3487
3984
4302
4558
4907
Potential Temperature (deg C)
Salinity (PSS−78)
Potential Temperature (deg C)
Oxygen (umol/kg)
Salinity (PSS−78)
Oxygen (umol/kg)

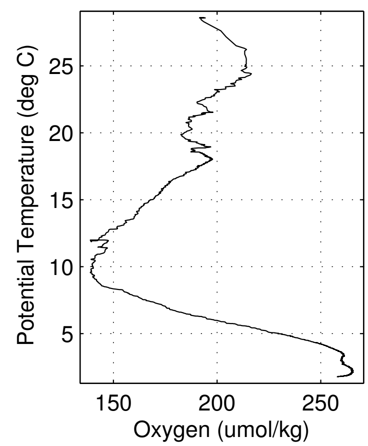
Abaco September - October 2008 R/V Cape Hatteras
CTD Station 2 (CTD002)
Latitude 26.502N Longitude 76.087W
28-Sep-2008 12:19Z

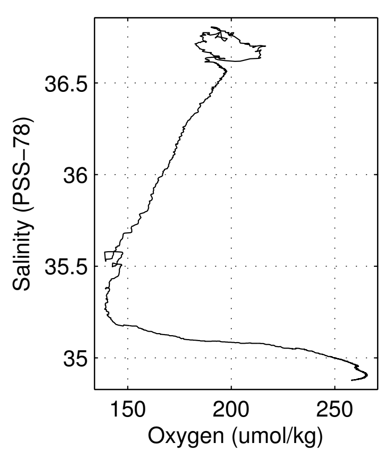
Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$	DynHt $m^2 \cdot s^{-2}$	SigT $kg \cdot m^{-3}$
1	28.577	28.577	36.643	192.3	0.004	23.440
10	28.578	28.575	36.642	192.9	0.044	23.440
20	28.582	28.577	36.642	192.7	0.089	23.439
30	28.585	28.578	36.642	192.2	0.133	23.439
50	28.590	28.578	36.643	193.6	0.222	23.439
75	24.965	24.948	36.677	213.8	0.317	24.625
100	23.670	23.649	36.715	206.9	0.395	25.044
125	22.613	22.588	36.785	194.3	0.464	25.407
150	21.438	21.409	36.775	194.2	0.525	25.733
200	19.573	19.536	36.686	184.7	0.630	26.171
250	18.818	18.773	36.631	187.5	0.723	26.327
300	18.380	18.327	36.594	194.4	0.810	26.412
400	17.938	17.868	36.537	196.3	0.981	26.482
500	16.895	16.811	36.343	184.1	1.147	26.591
600	15.066	14.973	36.024	167.7	1.301	26.768
700	12.630	12.533	35.642	146.6	1.437	26.984
800	10.705	10.605	35.384	140.7	1.556	27.146
900	9.084	8.981	35.213	141.8	1.660	27.288
1000	7.392	7.290	35.121	170.2	1.747	27.473
1100	6.167	6.064	35.087	197.3	1.817	27.613
1200	5.156	5.052	35.052	228.3	1.874	27.710
1300	4.795	4.685	35.038	238.7	1.926	27.741
1400	4.361	4.246	35.001	249.8	1.975	27.760
1500	4.197	4.074	34.991	253.0	2.023	27.772
1750	3.734	3.594	34.961	260.0	2.140	27.797
2000	3.477	3.317	34.955	261.0	2.253	27.819
2500	2.987	2.788	34.938	261.2	2.471	27.855
3000	2.623	2.381	34.915	265.0	2.681	27.872
3500	2.490	2.198	34.906	265.3	2.894	27.880
4000	2.360	2.016	34.896	264.7	3.112	27.887
4500	2.306	1.905	34.889	263.1	3.338	27.890

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$
4871	1	2.243	1.799	34.877	−999.0
4498	2	2.307	1.906	34.888	−999.0
4248	3	2.325	1.953	34.889	−999.0
3999	4	2.360	2.016	34.894	−999.0
3499	5	2.491	2.199	34.906	−999.0
2979	6	2.664	2.423	34.915	−999.0
2600	7	2.883	2.675	34.931	−999.0
2198	8	3.314	3.138	34.950	−999.0
1799	9	3.665	3.521	34.965	−999.0
1397	10	4.369	4.254	35.000	−999.0
1199	11	5.125	5.021	35.053	−999.0
998	12	7.425	7.322	35.121	−999.0
849	13	9.777	9.676	35.285	−999.0
748	15	11.583	11.485	35.499	−999.0
599	16	15.101	15.008	36.030	−999.0
448	17	17.585	17.508	36.466	−999.0
347	18	18.179	18.118	36.568	−999.0
249	19	18.933	18.888	36.632	−999.0
197	20	20.127	20.089	36.729	−999.0
149	21	21.526	21.497	36.747	−999.0
98	22	23.710	23.689	36.713	−999.0
48	23	28.594	28.583	36.631	−999.0
3	24	28.597	28.597	36.635	−999.0


Abaco September – October 2008 R/V Cape Hatteras
CTD Station 2 (CTD002)
Latitude 26.502 N Longitude 76.087 W
28–Sep–2008 12:19 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS–78)
Oxygen (umol/kg)
Sigma–Theta (kg/m3)


Potential Temperature (deg C)
Salinity (PSS–78)


Potential Temperature (deg C)
Oxygen (umol/kg)

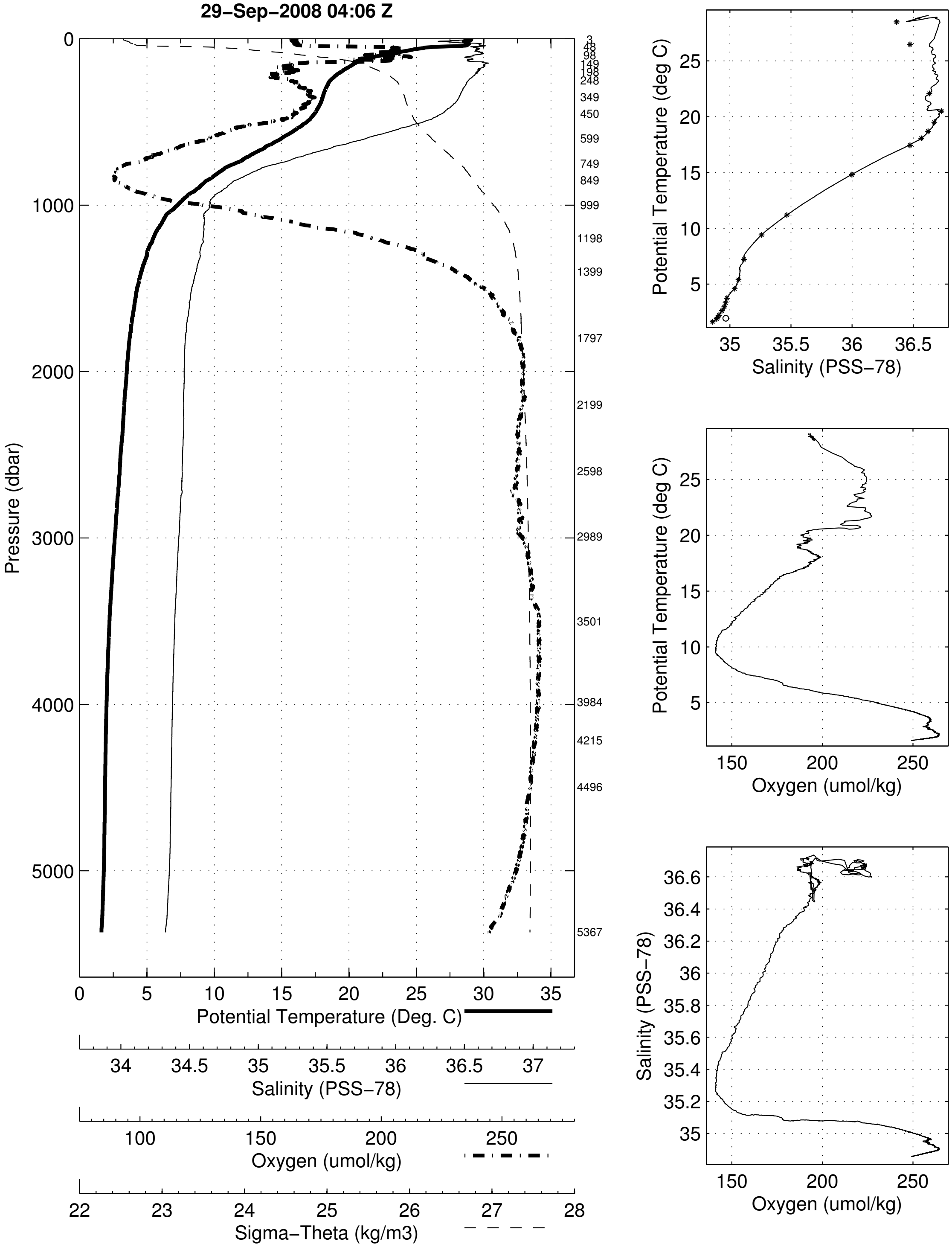

Salinity (PSS–78)
Oxygen (umol/kg)

Abaco September - October 2008 R/V Cape Hatteras
CTD Station 3 (CTD003)
Latitude 26.502N Longitude 71.997W
29-Sep-2008 04:06Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	29.075	29.075	36.626	192.3	0.005	23.261
10	28.783	28.781	36.518	193.8	0.046	23.278
20	28.619	28.614	36.505	195.4	0.092	23.324
30	28.931	28.924	36.694	193.1	0.137	23.362
50	26.182	26.171	36.658	217.9	0.223	24.231
75	24.132	24.116	36.656	223.9	0.307	24.861
100	22.534	22.514	36.645	219.3	0.379	25.322
125	21.005	20.981	36.628	210.0	0.441	25.739
150	20.410	20.382	36.721	191.7	0.495	25.973
200	19.428	19.391	36.669	192.0	0.594	26.196
250	18.669	18.624	36.619	192.0	0.685	26.356
300	18.320	18.267	36.588	196.0	0.771	26.422
400	17.884	17.814	36.528	195.6	0.941	26.489
500	16.957	16.873	36.357	186.0	1.107	26.587
600	15.078	14.985	36.024	168.2	1.262	26.765
700	12.774	12.677	35.670	152.1	1.399	26.977
800	10.509	10.410	35.370	141.4	1.517	27.169
900	8.855	8.754	35.201	145.3	1.618	27.315
1000	7.391	7.289	35.114	166.7	1.703	27.468
1100	6.250	6.146	35.083	192.8	1.774	27.600
1200	5.571	5.463	35.075	215.9	1.835	27.679
1300	5.107	4.994	35.057	230.4	1.890	27.722
1400	4.706	4.587	35.035	240.1	1.941	27.750
1500	4.396	4.271	35.009	248.3	1.991	27.765
1750	3.942	3.800	34.977	256.8	2.112	27.789
2000	3.665	3.502	34.965	259.8	2.229	27.809
2500	3.247	3.043	34.955	258.5	2.459	27.845
3000	2.852	2.605	34.933	259.3	2.683	27.867
3500	2.510	2.218	34.910	264.2	2.902	27.882
4000	2.345	2.001	34.897	263.9	3.119	27.889
4500	2.291	1.890	34.889	261.5	3.343	27.891
5000	2.256	1.795	34.879	257.5	3.577	27.891

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
5368	1	2.126	1.622	34.858	−999.0
4497	2	2.292	1.892	34.891	−999.0
4215	3	2.309	1.941	34.966	−999.0
3985	4	2.349	2.006	34.898	−999.0
3502	5	2.505	2.212	34.909	−999.0
2990	6	2.870	2.624	34.934	−999.0
2598	7	3.185	2.972	34.954	−999.0
2200	8	3.502	3.322	34.964	−999.0
1798	9	3.883	3.736	34.975	−999.0
1399	10	4.706	4.587	35.038	−999.0
1199	11	5.513	5.406	35.070	−999.0
1000	12	7.322	7.221	35.114	−999.0
849	13	9.504	9.404	35.259	−999.0
750	15	11.284	11.187	35.466	−999.0
600	16	14.906	14.813	35.998	−999.0
450	17	17.519	17.442	36.474	−999.0
350	18	18.120	18.058	36.566	−999.0
249	19	18.730	18.685	36.622	−999.0
198	20	19.538	19.502	36.673	−999.0
150	21	20.529	20.500	36.731	−999.0
99	22	22.098	22.078	36.632	−999.0
48	23	26.481	26.470	36.473	−999.0
3	24	28.503	28.503	36.363	−999.0

Abaco September – October 2008 R/V Cape Hatteras
CTD Station 3 (CTD003)
Latitude 26.502 N Longitude 71.997 W
29–Sep–2008 04:06 Z

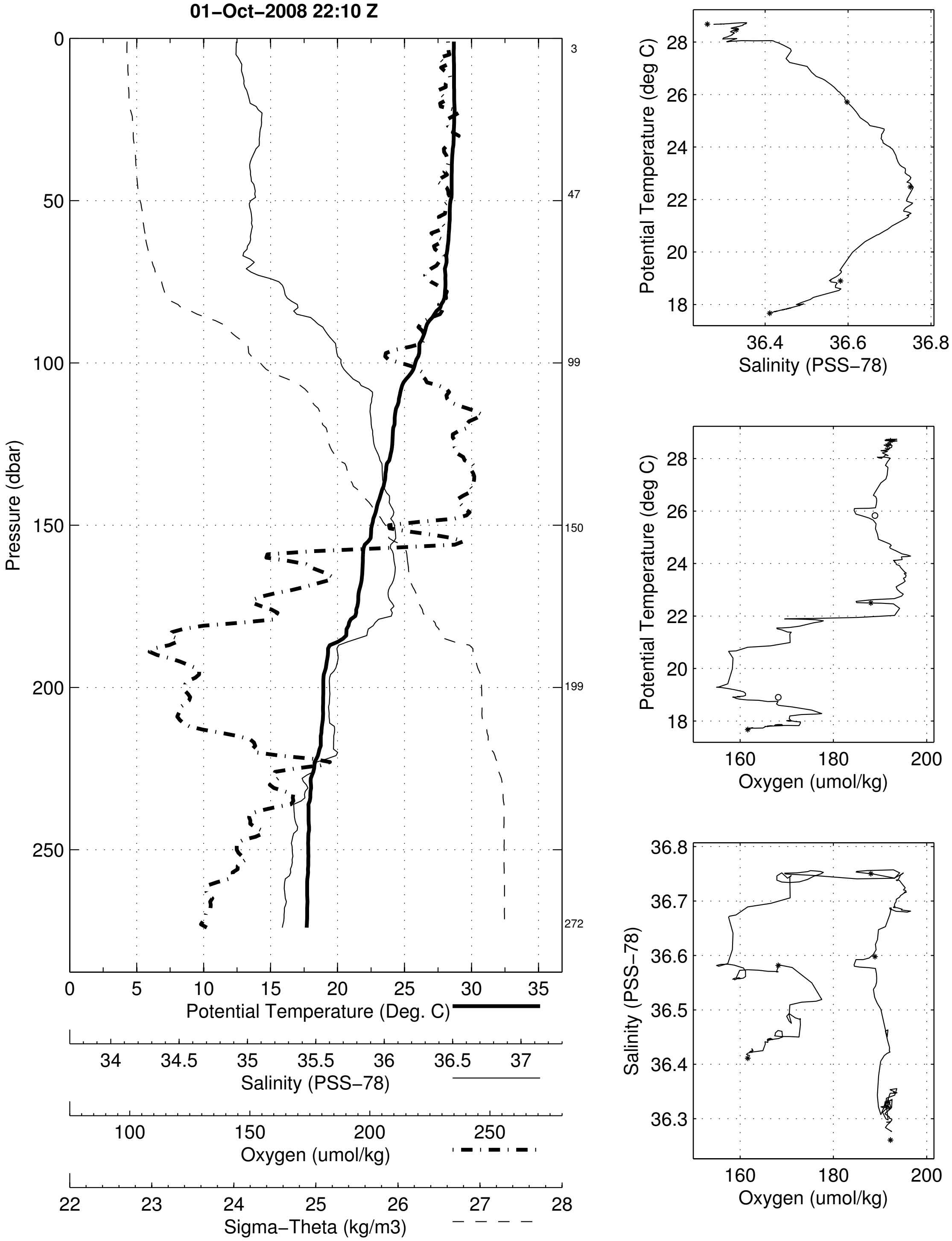


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 4 (CTD004)
Latitude 26.058N Longitude 78.849W
01-Oct-2008 22:10Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.676	28.676	36.278	192.3	0.005	23.132
10	28.690	28.688	36.293	191.9	0.047	23.140
20	28.717	28.712	36.319	191.3	0.095	23.151
30	28.677	28.670	36.348	193.6	0.141	23.187
50	28.441	28.429	36.321	192.5	0.235	23.247
75	28.073	28.055	36.406	190.1	0.350	23.434
100	25.826	25.804	36.592	186.4	0.451	24.297
125	24.111	24.084	36.692	193.1	0.533	24.898
150	22.591	22.560	36.753	184.9	0.605	25.391
200	18.969	18.933	36.558	159.4	0.717	26.230
250	17.855	17.812	36.446	165.8	0.805	26.427

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
273	2	17.717	17.670	36.411	161.6
200	4	18.934	18.898	36.582	168.2
151	6	22.514	22.483	36.750	188.0
100	8	25.740	25.717	36.598	188.9
48	10	28.476	28.465	36.330	191.6
3	12	28.682	28.681	36.261	192.3

Abaco September − October 2008 R/V Cape Hatteras
CTD Station 4 (CTD004)
Latitude 26.058 N Longitude 78.849 W
01−Oct−2008 22:10 Z

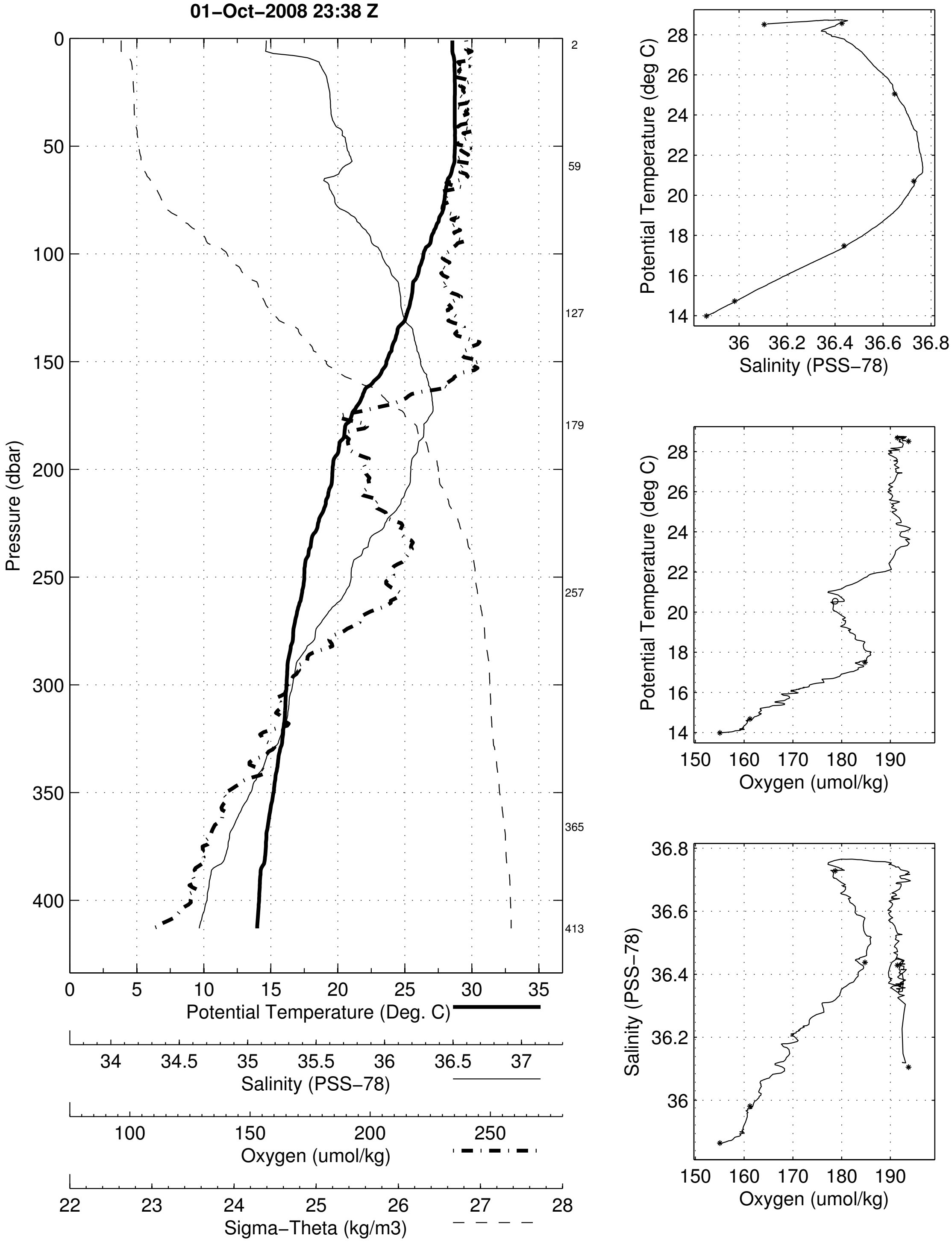


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 5 (CTD005)
Latitude 26.166N Longitude 78.801W
01-Oct-2008 23:38Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.546	28.546	36.121	192.5	0.005	23.058
10	28.690	28.687	36.305	193.1	0.048	23.149
20	28.734	28.729	36.357	193.0	0.095	23.174
30	28.735	28.728	36.369	192.5	0.142	23.183
50	28.752	28.740	36.432	192.4	0.235	23.227
75	27.969	27.951	36.386	190.1	0.350	23.453
100	26.423	26.400	36.566	189.9	0.454	24.089
125	25.332	25.305	36.642	190.7	0.546	24.489
150	23.651	23.620	36.717	194.0	0.626	25.055
200	19.646	19.610	36.679	180.3	0.742	26.147
250	17.541	17.498	36.449	183.6	0.830	26.506
300	16.220	16.171	36.223	171.1	0.906	26.649
400	14.188	14.129	35.892	159.2	1.047	26.849

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
413	2	14.046	13.985	35.864	155.0
366	4	14.780	14.724	35.981	161.2
257	6	17.526	17.482	36.438	184.8
180	8	20.739	20.705	36.728	178.7
128	10	25.078	25.050	36.648	201.6
59	12	28.577	28.563	36.428	191.4
3	16	28.514	28.513	36.105	193.7

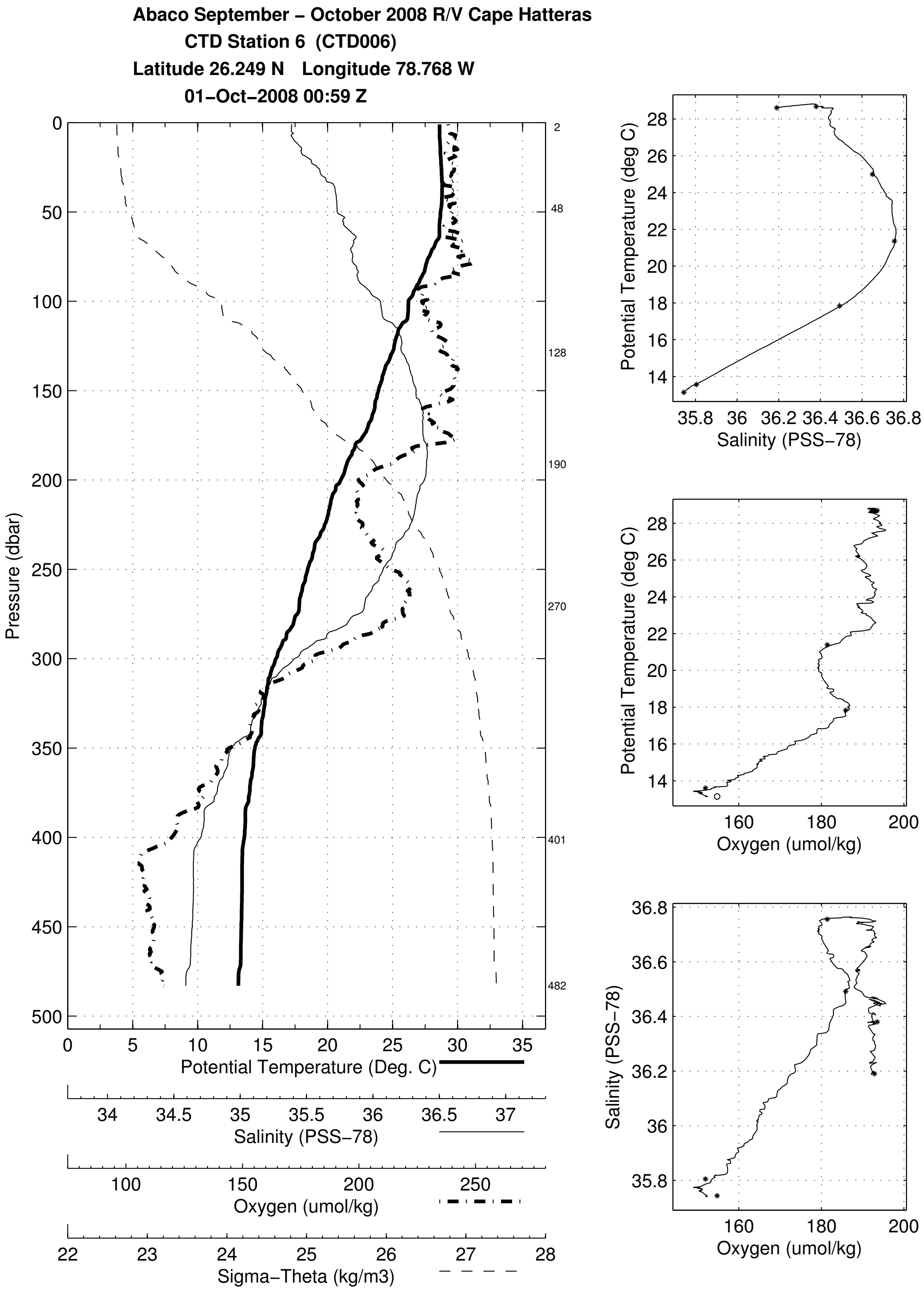
Abaco September − October 2008 R/V Cape Hatteras
CTD Station 5 (CTD005)
Latitude 26.166 N Longitude 78.801 W
01−Oct−2008 23:38 Z



Abaco September - October 2008 R/V Cape Hatteras
CTD Station 6 (CTD006)
Latitude 26.249N Longitude 78.768W
01-Oct-2008 00:59Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.616	28.615	36.189	192.1	0.005	23.086
10	28.638	28.636	36.201	192.3	0.048	23.088
20	28.716	28.711	36.262	192.4	0.095	23.108
30	28.784	28.777	36.321	192.4	0.143	23.131
50	28.703	28.691	36.382	192.6	0.237	23.205
75	27.831	27.813	36.448	193.4	0.351	23.546
100	26.242	26.219	36.565	188.4	0.454	24.146
125	25.142	25.114	36.653	191.7	0.545	24.556
150	23.944	23.912	36.716	191.8	0.626	24.968
200	21.054	21.015	36.750	179.5	0.759	25.823
250	18.508	18.464	36.576	184.0	0.857	26.363
300	16.062	16.014	36.200	173.7	0.938	26.668
400	13.656	13.598	35.805	153.5	1.073	26.894

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
483	2	13.207	13.139	35.744	154.7
401	4	13.616	13.558	35.805	151.9
271	6	17.880	17.833	36.492	185.9
191	8	21.393	21.356	36.756	181.4
129	10	25.019	24.991	36.651	202.5
48	12	28.689	28.678	36.380	193.5
2	16	28.611	28.610	36.190	192.8

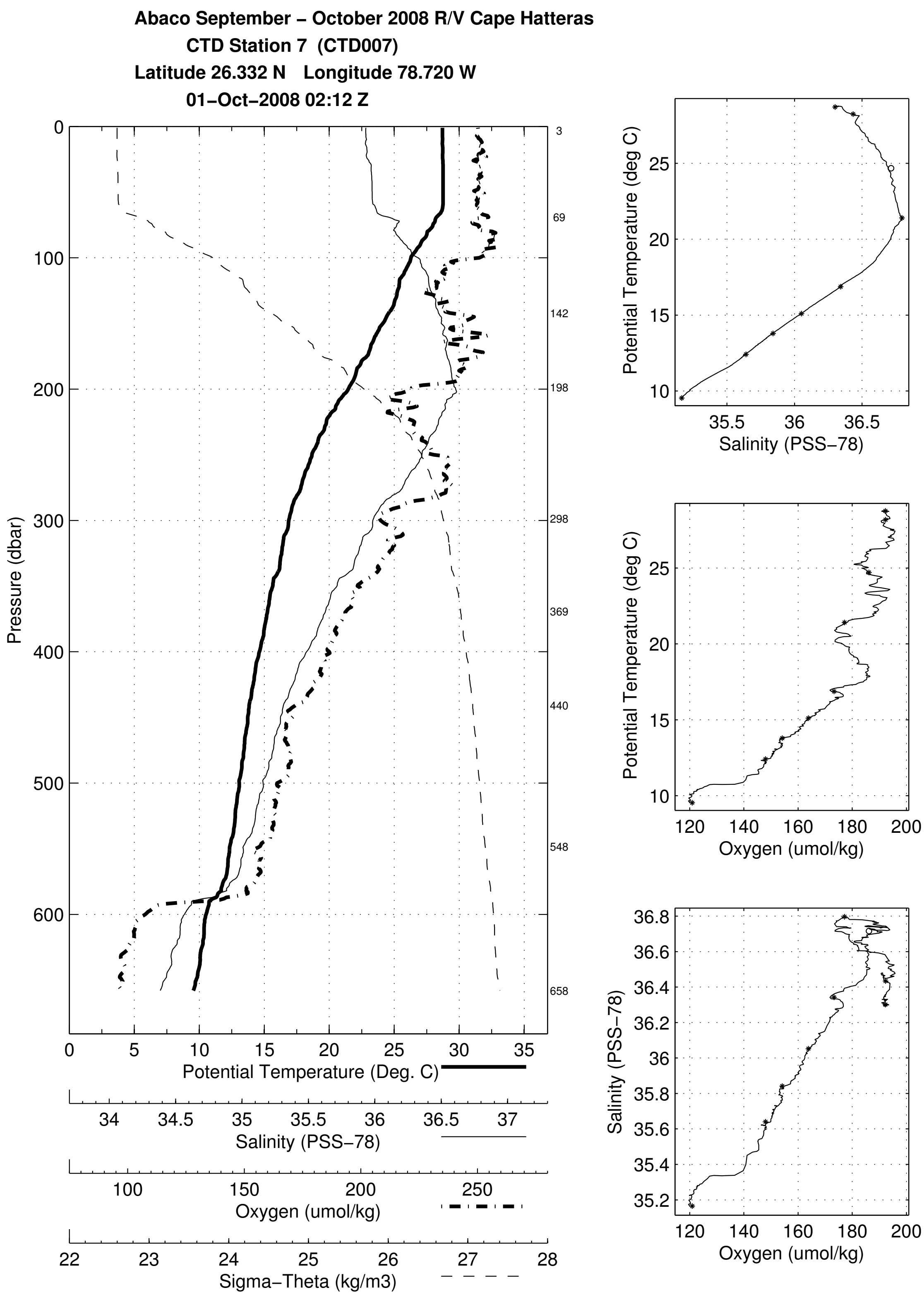


Abaco September – October 2008 R/V Cape Hatteras
CTD Station 6 (CTD006)
Latitude 26.249 N Longitude 78.768 W
01–Oct–2008 00:59 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS–78)
Oxygen (umol/kg)
Sigma–Theta (kg/m3)
Potential Temperature (deg C)
Salinity (PSS–78)
Potential Temperature (deg C)
Oxygen (umol/kg)
Salinity (PSS–78)
Oxygen (umol/kg)

Abaco September - October 2008 R/V Cape Hatteras
CTD Station 7 (CTD007)
Latitude 26.332N Longitude 78.720W
01-Oct-2008 02:12Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.712	28.712	36.296	191.8	0.005	23.134
10	28.727	28.725	36.299	192.3	0.047	23.132
20	28.736	28.731	36.302	192.5	0.095	23.132
30	28.763	28.756	36.325	192.6	0.142	23.141
50	28.773	28.761	36.331	191.7	0.237	23.144
75	27.991	27.974	36.466	191.9	0.353	23.506
100	26.305	26.283	36.583	192.1	0.456	24.139
125	25.287	25.260	36.652	180.9	0.546	24.511
150	24.154	24.122	36.711	189.3	0.629	24.901
200	21.499	21.460	36.790	178.4	0.765	25.730
250	18.709	18.665	36.604	183.0	0.865	26.334
300	16.929	16.879	36.334	172.2	0.948	26.568
400	14.680	14.619	35.969	161.9	1.094	26.803
500	13.141	13.071	35.731	151.4	1.224	26.945
600	10.598	10.524	35.297	124.8	1.343	27.092

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
658	2	9.615	9.539	35.165	120.9
549	4	12.491	12.416	35.640	148.0
441	6	13.854	13.790	35.842	154.2
369	8	15.151	15.094	36.052	163.8
299	10	16.924	16.875	36.342	173.3
199	12	21.437	21.398	36.796	177.1
142	16	24.705	24.674	36.716	186.2
69	18	28.254	28.238	36.434	192.3
3	20	28.709	28.709	36.301	192.3



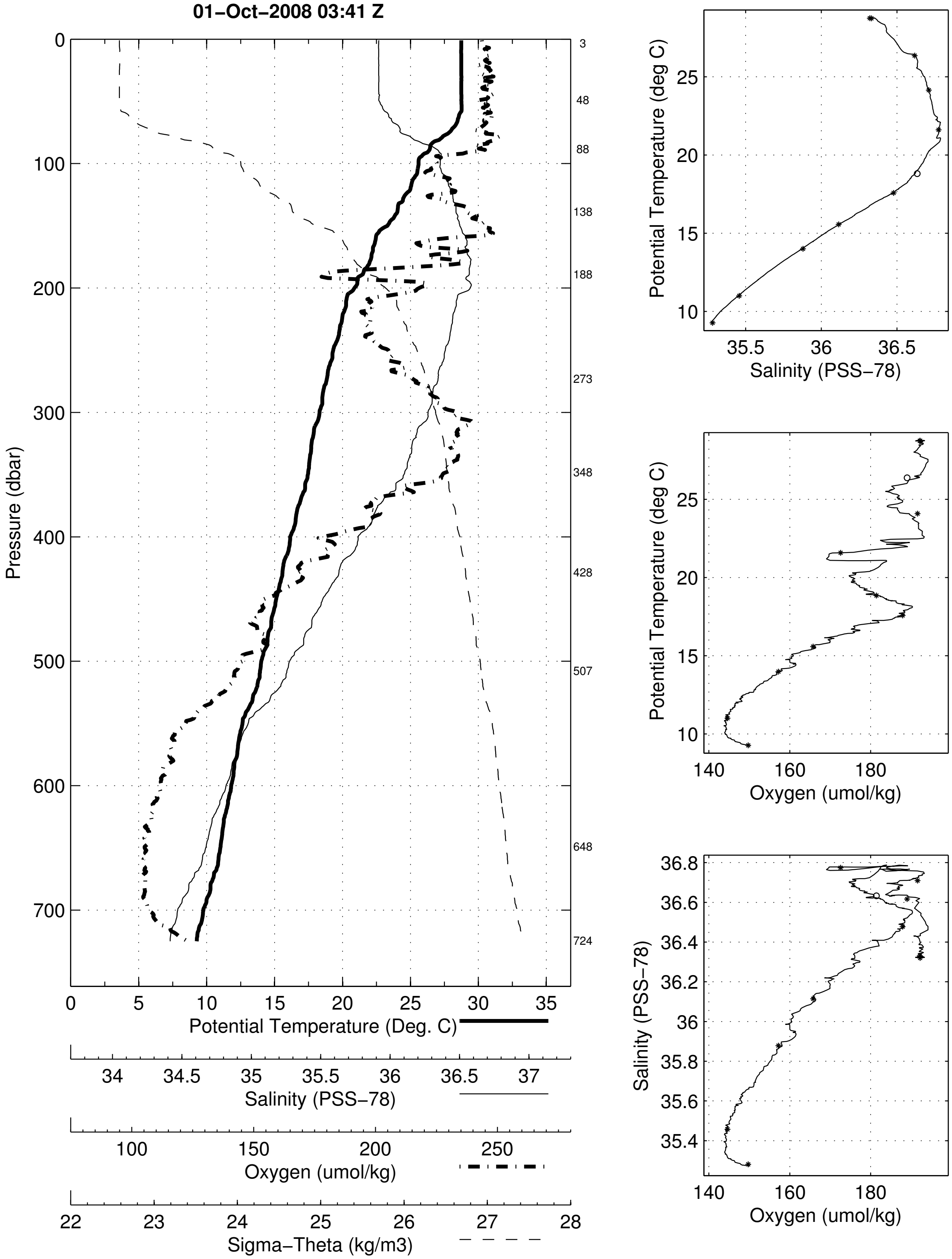
Abaco September − October 2008 R/V Cape Hatteras
CTD Station 7 (CTD007)
Latitude 26.332 N Longitude 78.720 W
01−Oct−2008 02:12 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS−78)
Oxygen (umol/kg)
Sigma−Theta (kg/m3)
Potential Temperature (deg C)
Salinity (PSS−78)
Potential Temperature (deg C)
Oxygen (umol/kg)
Salinity (PSS−78)
Oxygen (umol/kg)

Abaco September - October 2008 R/V Cape Hatteras
CTD Station 8 (CTD008)
Latitude 26.434N Longitude 78.666W
01-Oct-2008 03:41Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$	DynHt $m^2 \cdot s^{-2}$	SigT $kg \cdot m^{-3}$
1	28.746	28.746	36.323	191.7	0.005	23.143
10	28.736	28.733	36.323	192.3	0.047	23.147
20	28.742	28.737	36.323	192.0	0.094	23.146
30	28.754	28.747	36.323	193.3	0.142	23.143
50	28.763	28.751	36.326	191.6	0.237	23.143
75	27.856	27.838	36.432	192.3	0.352	23.525
100	25.614	25.592	36.632	185.3	0.449	24.393
125	24.656	24.629	36.695	184.6	0.535	24.736
150	23.335	23.304	36.730	191.8	0.611	25.158
200	20.921	20.883	36.783	182.8	0.735	25.884
250	19.361	19.316	36.658	178.5	0.837	26.207
300	18.360	18.307	36.571	188.3	0.927	26.399
400	16.215	16.150	36.219	169.2	1.090	26.651
500	14.095	14.021	35.874	158.0	1.233	26.858
600	11.885	11.805	35.555	146.5	1.357	27.057
700	9.839	9.756	35.311	144.8	1.466	27.237

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$
725	2	9.352	9.269	35.281	149.7
649	4	11.070	10.987	35.457	144.6
508	6	14.071	13.996	35.879	157.2
429	8	15.630	15.563	36.114	165.8
348	10	17.638	17.578	36.478	187.9
273	12	18.859	18.810	36.633	181.4
189	16	21.644	21.606	36.774	172.6
139	18	24.174	24.145	36.710	191.6
88	20	26.369	26.349	36.617	189.0
49	22	28.752	28.740	36.331	192.2
3	24	28.743	28.742	36.320	192.3

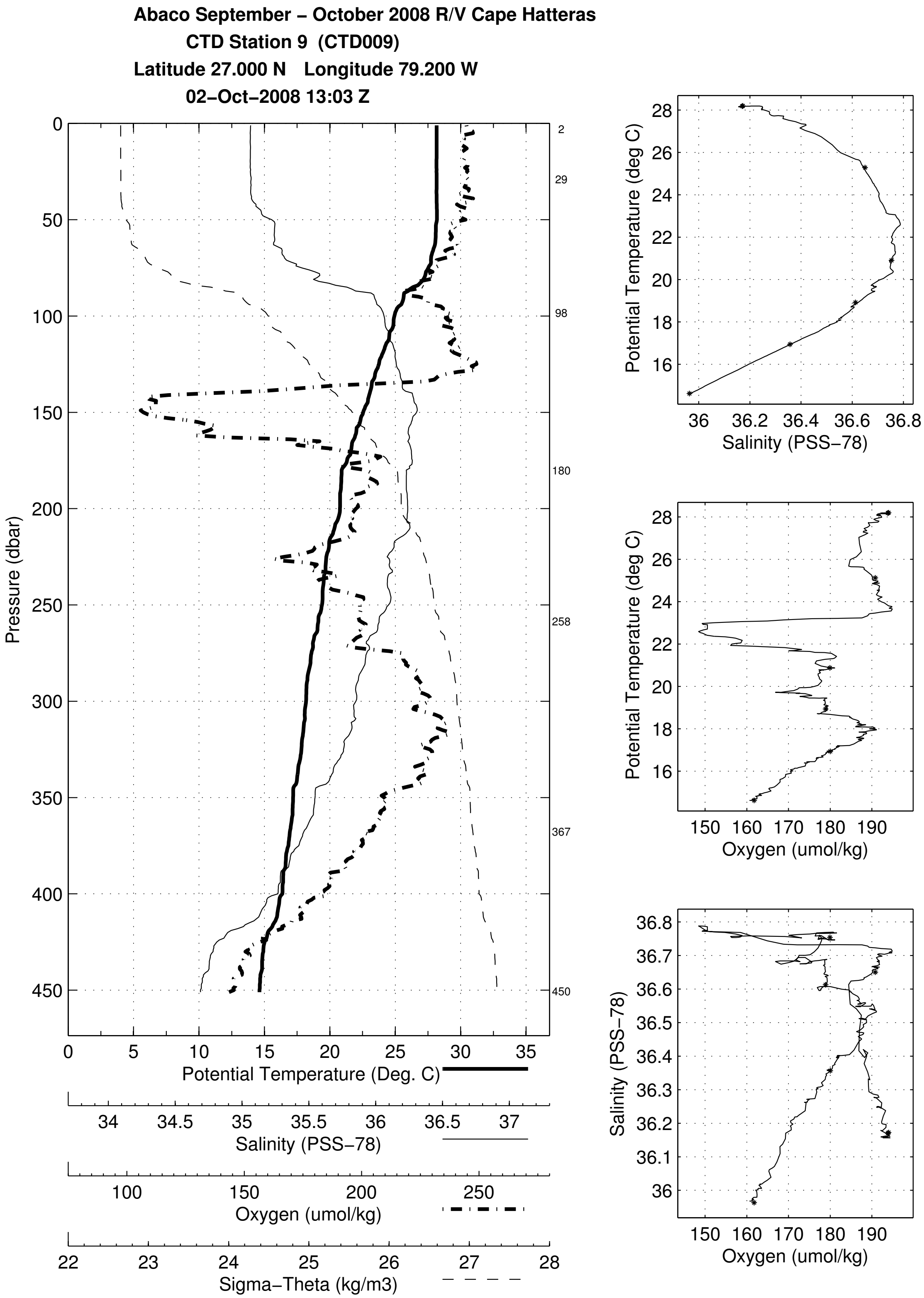
Abaco September − October 2008 R/V Cape Hatteras
CTD Station 8 (CTD008)
Latitude 26.434 N Longitude 78.666 W
01−Oct−2008 03:41 Z



Abaco September - October 2008 R/V Cape Hatteras
CTD Station 9 (CTD009)
Latitude 27.000N Longitude 79.200W
02-Oct-2008 13:03Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$	DynHt $m^2 \cdot s^{-2}$	SigT $kg \cdot m^{-3}$
1	28.161	28.161	36.158	193.4	0.005	23.213
10	28.160	28.157	36.156	192.9	0.047	23.213
20	28.160	28.155	36.156	193.2	0.093	23.214
30	28.165	28.158	36.159	193.2	0.140	23.214
50	28.197	28.185	36.238	193.3	0.233	23.265
75	27.535	27.517	36.352	189.0	0.346	23.570
100	24.951	24.929	36.663	191.4	0.441	24.620
125	23.774	23.747	36.708	194.8	0.520	25.011
150	22.570	22.539	36.785	148.8	0.590	25.421
200	20.812	20.774	36.752	178.2	0.707	25.890
250	19.444	19.398	36.679	178.7	0.807	26.202
300	18.235	18.182	36.556	188.3	0.897	26.419
400	16.442	16.377	36.261	174.2	1.059	26.630

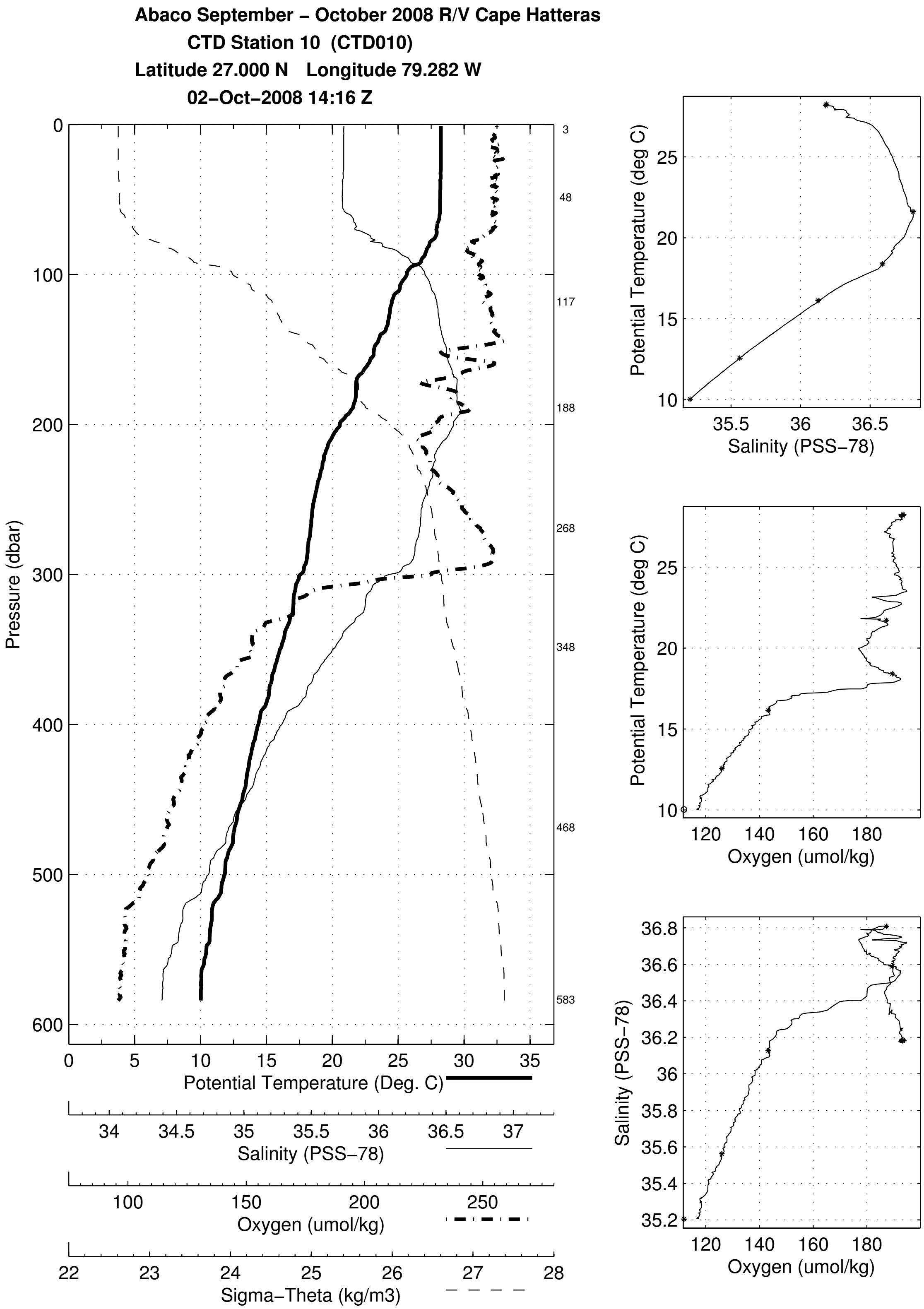
Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$
451	2	14.690	14.621	35.963	161.8
368	4	17.001	16.939	36.357	180.0
258	6	18.966	18.920	36.613	178.9
180	8	20.941	20.907	36.754	179.9
98	10	25.301	25.280	36.650	190.8
29	12	28.200	28.193	36.172	194.0
3	16	28.180	28.180	36.170	193.8


Abaco September − October 2008 R/V Cape Hatteras
CTD Station 9 (CTD009)
Latitude 27.000 N Longitude 79.200 W
02−Oct−2008 13:03 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS−78)
Oxygen (umol/kg)
Sigma−Theta (kg/m3)
Potential Temperature (deg C)
Salinity (PSS−78)
Potential Temperature (deg C)
Oxygen (umol/kg)
Salinity (PSS−78)
Oxygen (umol/kg)

Abaco September - October 2008 R/V Cape Hatteras
CTD Station 10 (CTD010)
Latitude 27.000N Longitude 79.282W
02-Oct-2008 14:16Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$	DynHt $m^2 \cdot s^{-2}$	SigT $kg \cdot m^{-3}$
1	28.239	28.239	36.183	193.3	0.005	23.206
10	28.240	28.237	36.181	192.4	0.047	23.205
20	28.241	28.236	36.182	193.5	0.093	23.206
30	28.240	28.233	36.182	193.1	0.140	23.207
50	28.195	28.183	36.174	193.4	0.233	23.218
75	27.843	27.825	36.328	190.4	0.348	23.451
100	25.684	25.662	36.618	189.6	0.449	24.360
125	24.395	24.368	36.689	192.3	0.532	24.810
150	23.195	23.164	36.733	184.2	0.608	25.200
200	20.614	20.576	36.770	180.4	0.731	25.958
250	18.674	18.630	36.612	185.5	0.826	26.349
300	17.623	17.571	36.426	180.0	0.911	26.470
400	14.455	14.395	35.850	133.9	1.066	26.760
500	11.898	11.832	35.456	122.7	1.196	26.976

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu mol \cdot kg^{-1}$
583	2	10.091	10.022	35.205	111.9
469	4	12.623	12.559	35.562	126.0
348	6	16.181	16.125	36.127	143.3
269	8	18.440	18.392	36.588	189.5
189	10	21.654	21.617	36.808	187.3
118	12	24.711	24.788	−999.000	−999.0
48	16	28.188	28.177	36.180	193.4
3	18	28.256	28.255	36.186	193.5

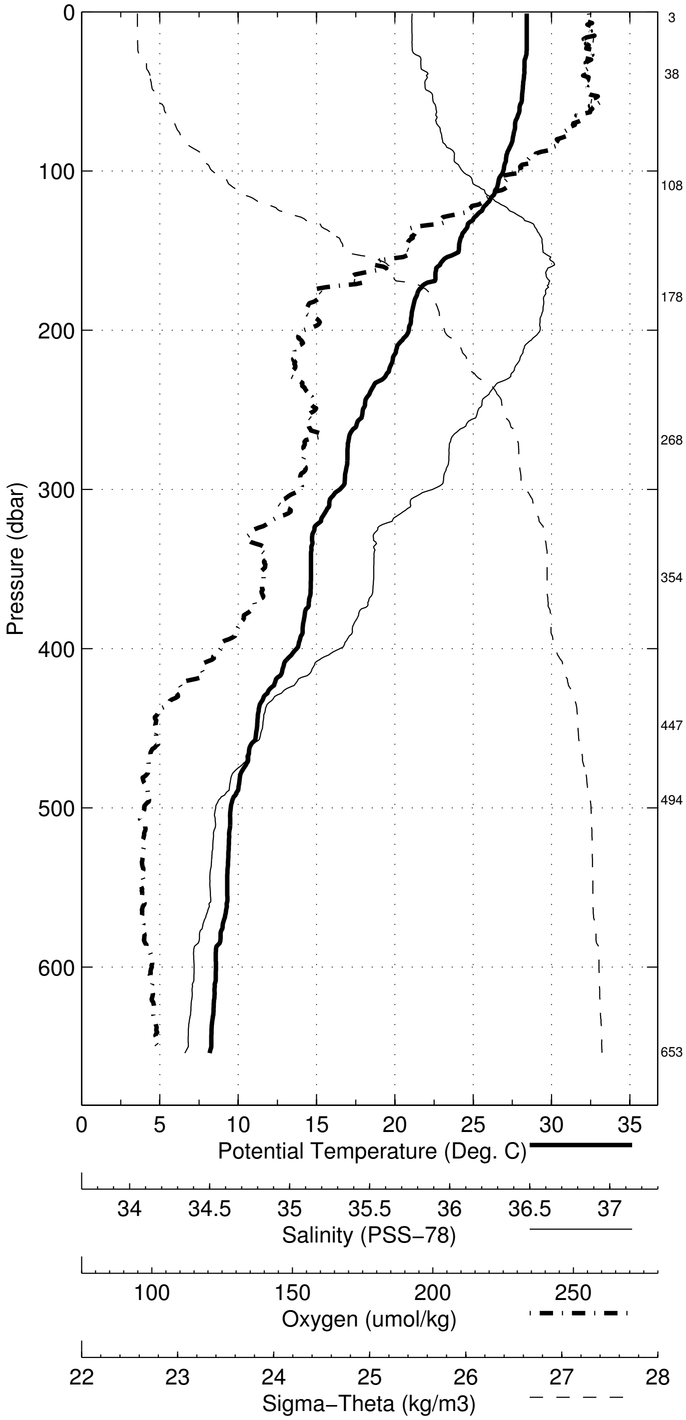

Abaco September – October 2008 R/V Cape Hatteras
CTD Station 10 (CTD010)
Latitude 27.000 N Longitude 79.282 W
02–Oct–2008 14:16 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS–78)
Oxygen (umol/kg)
Sigma–Theta (kg/m3)
Potential Temperature (deg C)
Salinity (PSS–78)
Potential Temperature (deg C)
Oxygen (umol/kg)
Salinity (PSS–78)
Oxygen (umol/kg)

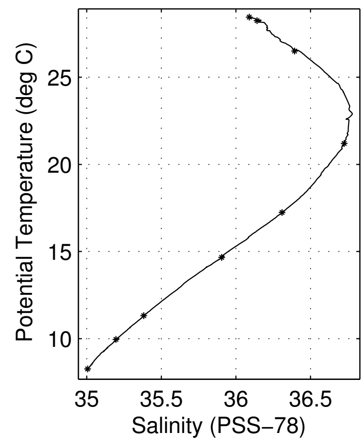
Abaco September - October 2008 R/V Cape Hatteras
CTD Station 11 (CTD011)
Latitude 26.997N Longitude 79.381W
02-Oct-2008 15:31Z

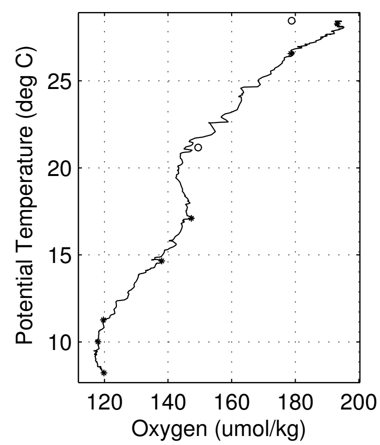
Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.421	28.421	36.092	193.6	0.005	23.078
10	28.419	28.417	36.091	193.2	0.048	23.078
20	28.418	28.413	36.092	193.0	0.096	23.080
30	28.296	28.289	36.135	193.9	0.143	23.153
50	28.160	28.148	36.177	193.5	0.237	23.231
75	27.632	27.614	36.230	189.4	0.351	23.446
100	26.944	26.920	36.336	182.0	0.459	23.750
125	25.583	25.555	36.564	172.2	0.558	24.353
150	24.108	24.076	36.726	163.0	0.639	24.926
200	20.922	20.883	36.712	144.7	0.763	25.830
250	18.002	17.959	36.412	146.8	0.862	26.365
300	16.537	16.487	36.191	144.2	0.944	26.551
400	13.789	13.731	35.743	130.6	1.086	26.818
500	9.583	9.525	35.142	117.5	1.200	27.143
600	8.642	8.577	35.038	118.8	1.301	27.215

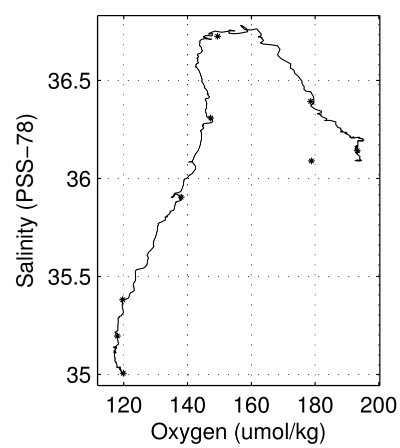
Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
653	2	8.340	8.270	35.006	119.8
495	4	10.013	9.955	35.196	118.0
448	6	11.376	11.319	35.381	119.7
355	8	14.720	14.666	35.904	138.0
269	10	17.288	17.243	36.309	147.3
179	12	21.229	21.194	36.726	149.5
109	16	26.521	26.496	36.394	178.6
39	18	28.254	28.245	36.142	193.2
3	20	28.446	28.446	36.090	178.9

Abaco September − October 2008 R/V Cape Hatteras
CTD Station 11 (CTD011)
Latitude 26.997 N Longitude 79.381 W
02−Oct−2008 15:31 Z





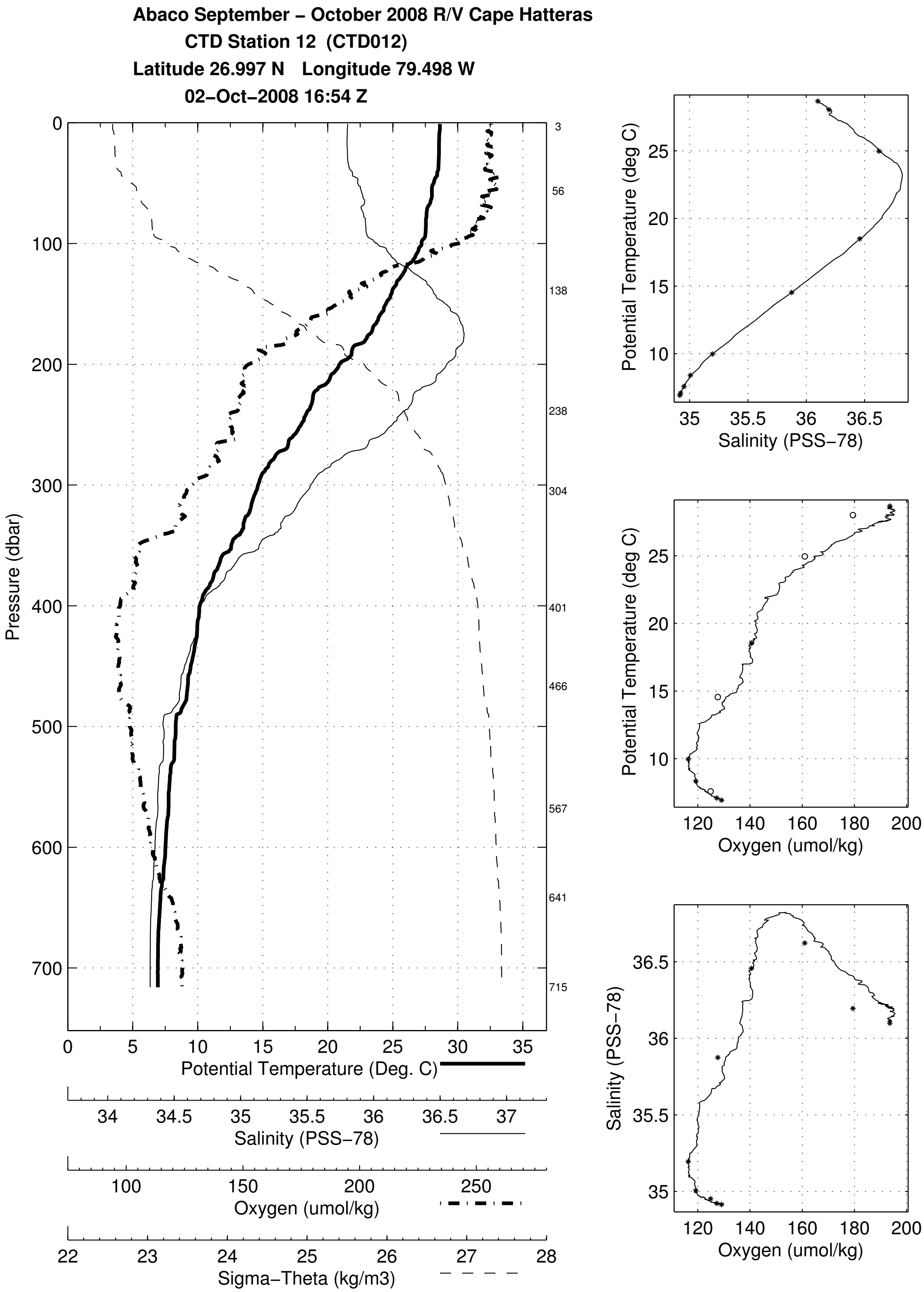




Abaco September - October 2008 R/V Cape Hatteras
CTD Station 12 (CTD012)
Latitude 26.997N Longitude 79.498W
02-Oct-2008 16:54Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.632	28.632	36.115	194.0	0.005	23.025
10	28.577	28.575	36.113	194.0	0.048	23.042
20	28.559	28.554	36.112	194.3	0.096	23.049
30	28.548	28.540	36.115	193.4	0.145	23.055
50	28.163	28.151	36.176	194.4	0.240	23.229
75	27.618	27.600	36.211	192.9	0.354	23.436
100	27.239	27.216	36.295	187.2	0.465	23.624
125	25.819	25.791	36.520	171.0	0.565	24.246
150	24.505	24.473	36.708	161.9	0.651	24.793
200	20.932	20.894	36.716	143.5	0.788	25.830
250	17.991	17.948	36.385	139.6	0.886	26.347
300	14.682	14.637	35.892	131.6	0.963	26.740
400	10.193	10.145	35.219	116.8	1.085	27.098
500	8.353	8.300	34.996	118.8	1.186	27.225
600	7.575	7.514	34.946	123.6	1.276	27.303
700	6.995	6.927	34.916	129.7	1.360	27.363

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
716	2	6.996	6.926	34.915	129.1
642	4	7.146	7.084	34.922	127.2
568	6	7.635	7.578	34.952	124.9
466	8	8.456	8.406	35.007	119.3
402	10	10.029	9.982	35.196	116.3
305	12	14.570	14.524	35.875	127.7
239	16	18.543	18.501	36.457	140.5
139	18	25.005	24.974	36.622	160.9
56	20	28.059	28.046	36.195	179.4
3	22	28.669	28.668	36.098	193.5

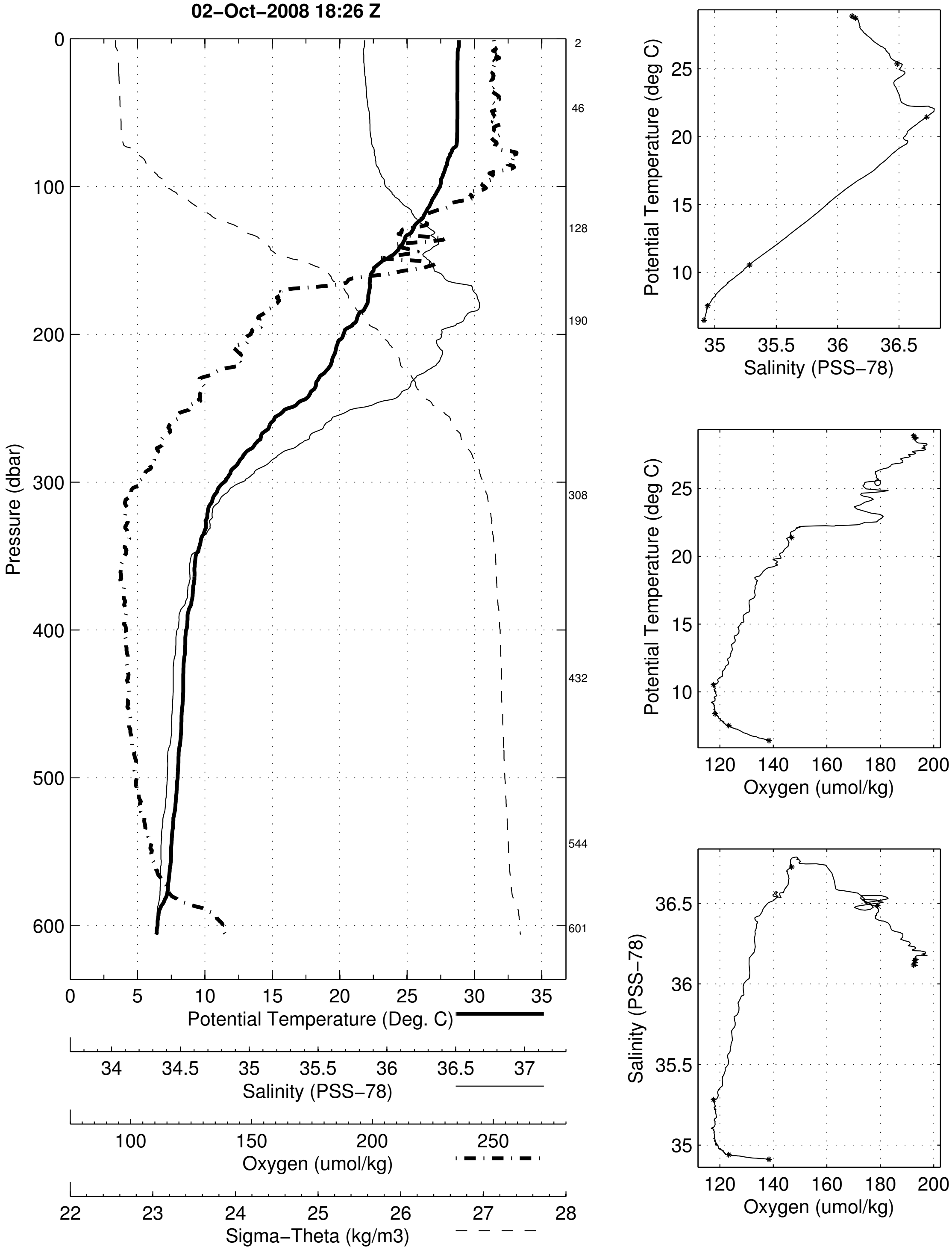

Abaco September – October 2008 R/V Cape Hatteras
CTD Station 12 (CTD012)
Latitude 26.997 N Longitude 79.498 W
02–Oct–2008 16:54 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS–78)
Oxygen (umol/kg)
Sigma–Theta (kg/m3)
Potential Temperature (deg C)
Salinity (PSS–78)
Potential Temperature (deg C)
Oxygen (umol/kg)
Salinity (PSS–78)
Oxygen (umol/kg)

Abaco September - October 2008 R/V Cape Hatteras
CTD Station 13 (CTD013)
Latitude 26.994N Longitude 79.618W
02-Oct-2008 18:26Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.848	28.847	36.120	192.8	0.005	22.956
10	28.756	28.753	36.113	192.7	0.049	22.983
20	28.747	28.742	36.118	193.2	0.098	22.990
30	28.745	28.738	36.127	192.3	0.146	22.998
50	28.751	28.739	36.147	192.7	0.244	23.013
75	28.372	28.354	36.175	194.2	0.365	23.162
100	27.469	27.446	36.241	190.9	0.479	23.509
125	25.715	25.688	36.448	179.3	0.581	24.224
150	23.218	23.187	36.495	176.6	0.667	25.014
200	20.313	20.275	36.566	143.5	0.793	25.883
250	16.190	16.149	36.067	131.2	0.888	26.535
300	11.451	11.413	35.406	120.9	0.953	27.016
400	8.642	8.599	35.032	118.2	1.052	27.207
500	8.023	7.971	34.976	120.3	1.144	27.259
600	6.536	6.481	34.915	137.7	1.229	27.422

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
602	2	6.520	6.464	34.911	138.4
544	4	7.587	7.532	34.941	123.3
432	6	8.461	8.416	34.520	118.2
308	8	10.587	10.550	35.282	117.7
191	10	21.481	21.444	36.725	146.8
128	12	25.396	25.368	36.486	179.0
47	16	28.748	28.737	36.145	192.9
3	18	28.892	28.892	36.118	192.5

Abaco September – October 2008 R/V Cape Hatteras
CTD Station 13 (CTD013)
Latitude 26.994 N Longitude 79.618 W
02–Oct–2008 18:26 Z

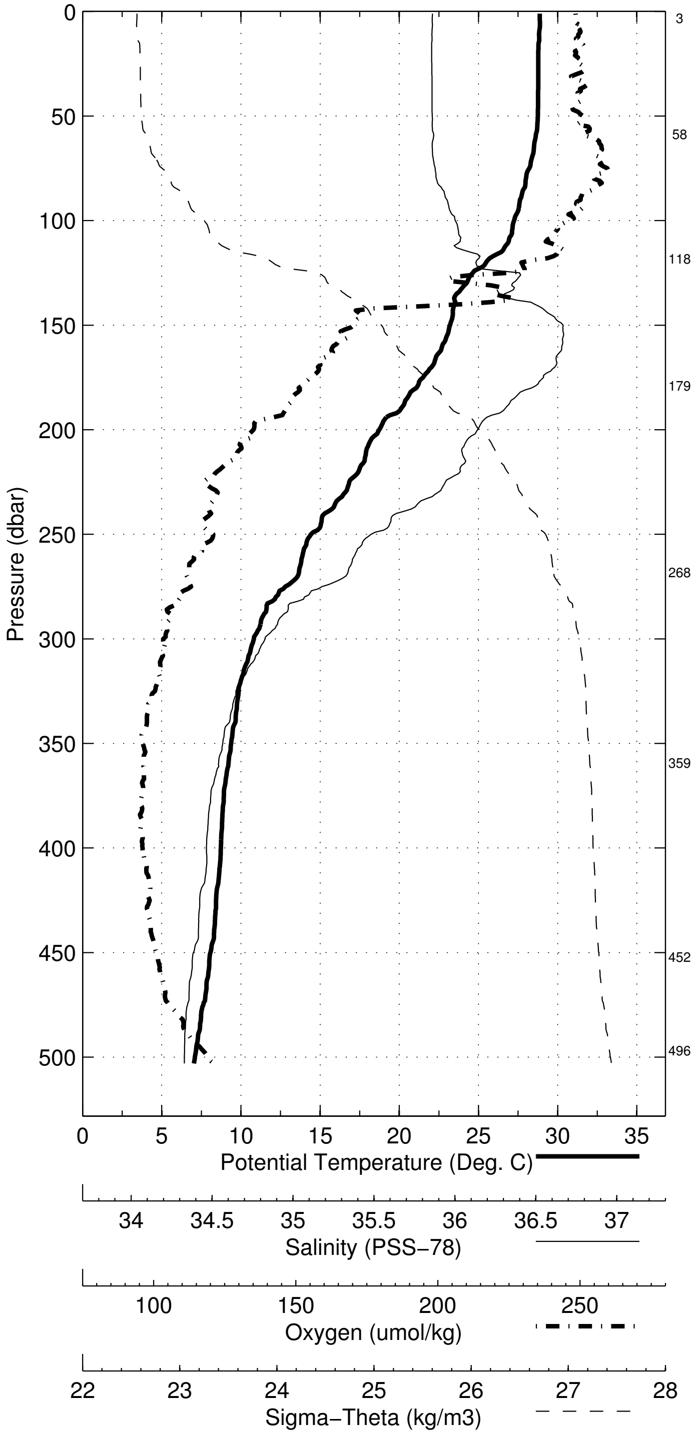


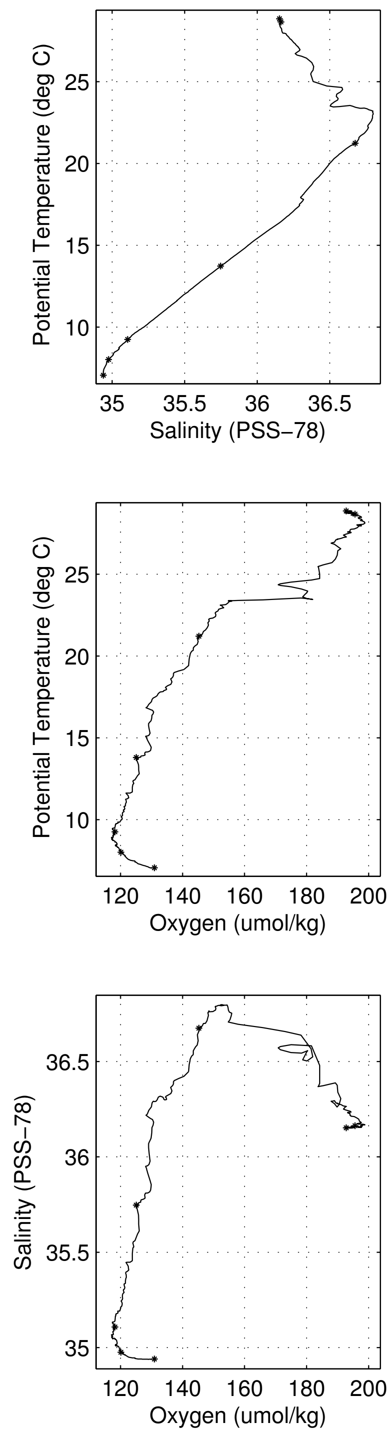
Abaco September - October 2008 R/V Cape Hatteras
CTD Station 14 (CTD014)
Latitude 26.995N Longitude 79.681W
02-Oct-2008 19:37Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.872	28.872	36.155	193.1	0.005	22.975
10	28.831	28.828	36.153	194.0	0.049	22.988
20	28.782	28.777	36.152	193.2	0.097	23.004
30	28.777	28.770	36.153	193.2	0.146	23.007
50	28.760	28.748	36.154	194.4	0.243	23.016
75	28.219	28.201	36.169	198.7	0.363	23.208
100	27.266	27.243	36.268	191.8	0.476	23.595
125	24.670	24.643	36.583	181.6	0.577	24.647
150	23.235	23.204	36.797	154.4	0.653	25.238
200	18.764	18.729	36.377	136.9	0.772	26.144
250	14.460	14.422	35.855	129.9	0.854	26.758
300	10.849	10.812	35.334	121.2	0.914	27.069
400	8.777	8.734	35.046	117.6	1.012	27.197
500	7.144	7.096	34.938	129.0	1.101	27.357

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
497	2	7.104	7.056	34.940	130.9
452	4	8.060	8.014	34.975	120.1
359	6	9.283	9.243	35.107	118.2
268	8	13.767	13.728	35.747	125.0
179	10	21.271	21.237	36.676	145.3
118	12	25.528	25.601	−999.000	−999.0
59	16	28.664	28.650	36.163	195.6
3	18	28.854	28.853	36.153	192.8

Abaco September − October 2008 R/V Cape Hatteras
CTD Station 14 (CTD014)
Latitude 26.995 N Longitude 79.681 W
02−Oct−2008 19:37 Z



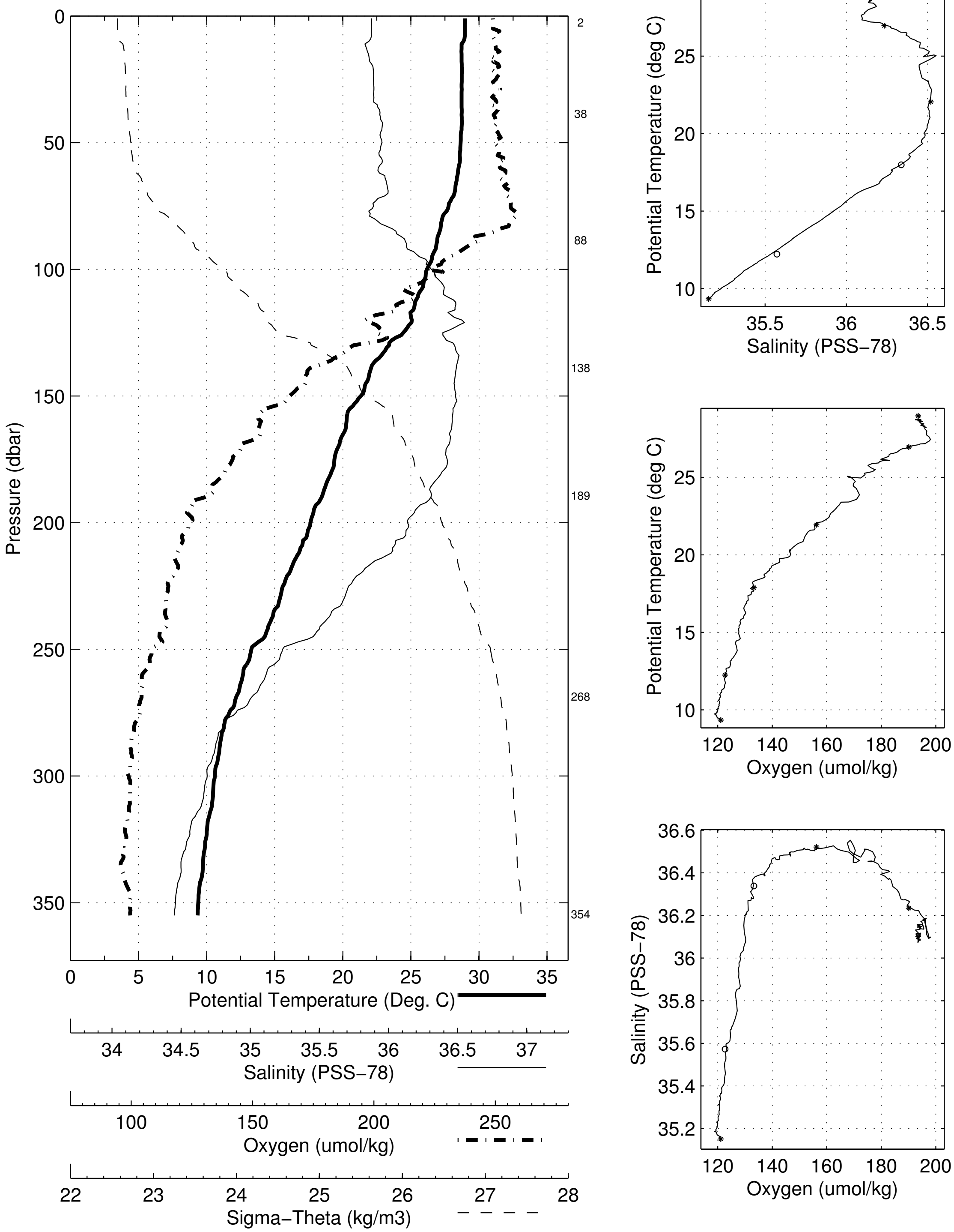


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 15 (CTD015)
Latitude 27.000N Longitude 79.784W
02-Oct-2008 20:53Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen μmol·kg^{-1}	DynHt m^2·s^{-2}	SigT kg·m^{-3}
1	28.963	28.963	36.105	193.1	0.005	22.907
10	28.868	28.866	36.092	193.5	0.049	22.929
20	28.744	28.739	36.112	194.3	0.098	22.987
30	28.729	28.722	36.115	194.2	0.147	22.995
50	28.667	28.655	36.155	193.4	0.244	23.047
75	27.791	27.774	36.115	196.6	0.363	23.307
100	26.197	26.174	36.393	179.8	0.469	24.030
125	24.469	24.442	36.449	169.7	0.560	24.606
150	21.344	21.314	36.510	152.5	0.630	25.557
200	17.656	17.622	36.279	132.8	0.732	26.345
250	13.313	13.277	35.676	125.1	0.807	26.860
300	10.640	10.604	35.313	120.4	0.863	27.091

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen μmol·kg^{-1}
354	2	9.379	9.339	35.152	121.1
269	4	12.260	12.225	35.573	122.7
189	6	18.017	17.984	36.338	133.3
139	8	22.071	22.044	36.521	156.2
89	10	26.986	26.966	36.234	190.1
39	12	28.777	28.794	−999.000	−999.0
3	16	28.970	28.969	36.101	193.6

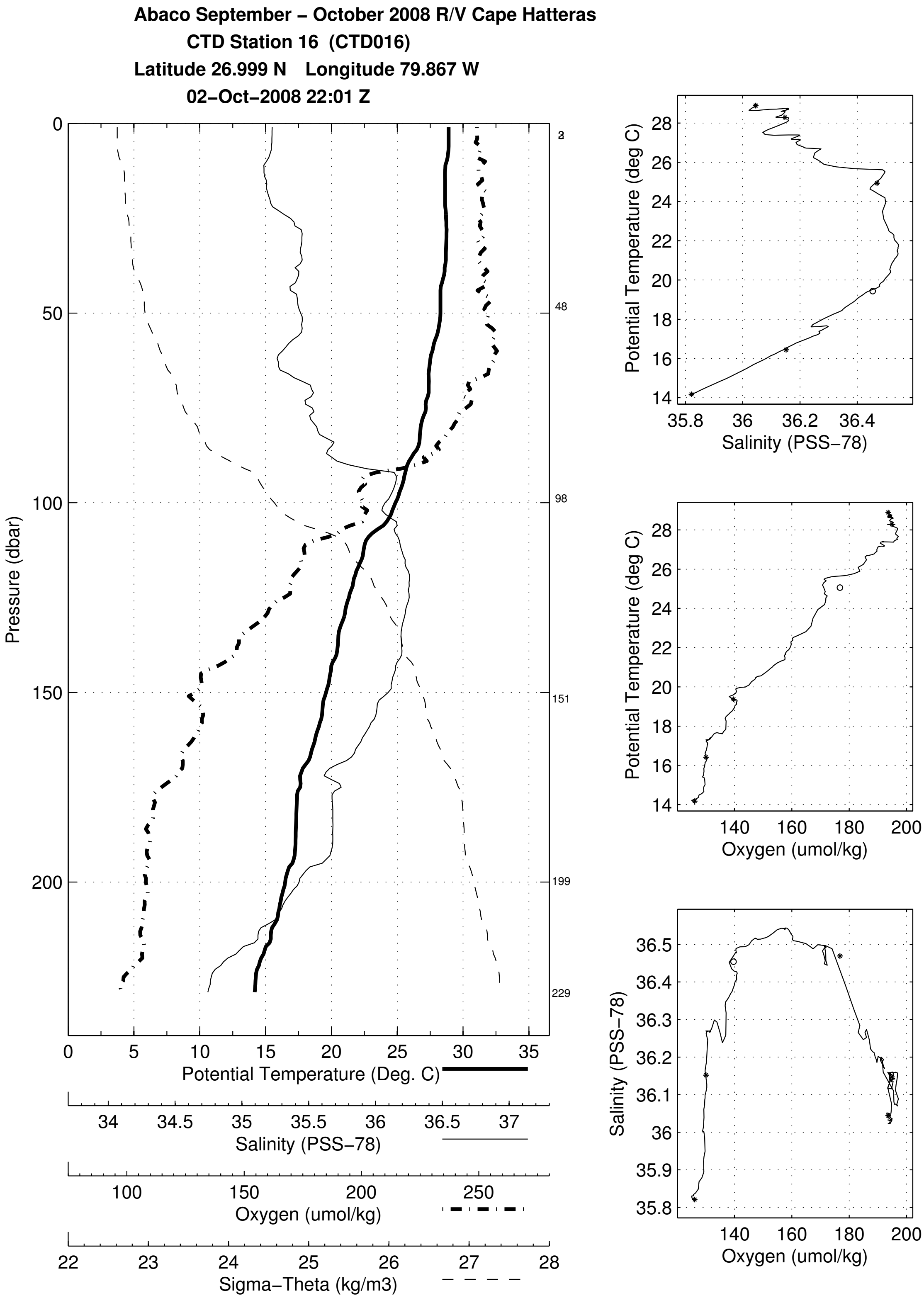
Abaco September − October 2008 R/V Cape Hatteras
CTD Station 15 (CTD015)
Latitude 27.000 N Longitude 79.784 W
02−Oct−2008 20:53 Z



Abaco September - October 2008 R/V Cape Hatteras
CTD Station 16 (CTD016)
Latitude 26.999N Longitude 79.867W
02-Oct-2008 22:01Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.905	28.905	36.052	193.3	0.005	22.886
10	28.753	28.751	36.032	194.9	0.050	22.922
20	28.641	28.636	36.044	194.2	0.099	22.970
30	28.740	28.732	36.159	194.4	0.147	23.024
50	28.295	28.283	36.154	195.5	0.243	23.170
75	27.191	27.174	36.196	191.2	0.356	23.563
100	24.879	24.857	36.456	171.6	0.454	24.486
125	21.349	21.324	36.543	156.4	0.525	25.580
150	19.610	19.582	36.467	139.4	0.581	25.992
200	16.516	16.483	36.149	130.0	0.671	26.519

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
229	2	14.207	14.173	35.821	126.1
200	4	16.473	16.440	36.152	130.1
152	6	19.456	19.429	36.454	139.7
99	8	24.955	24.934	36.469	176.8
48	10	28.295	28.284	36.147	194.9
3	12	28.892	28.891	36.044	193.6
3	16	28.887	28.886	36.046	216.3

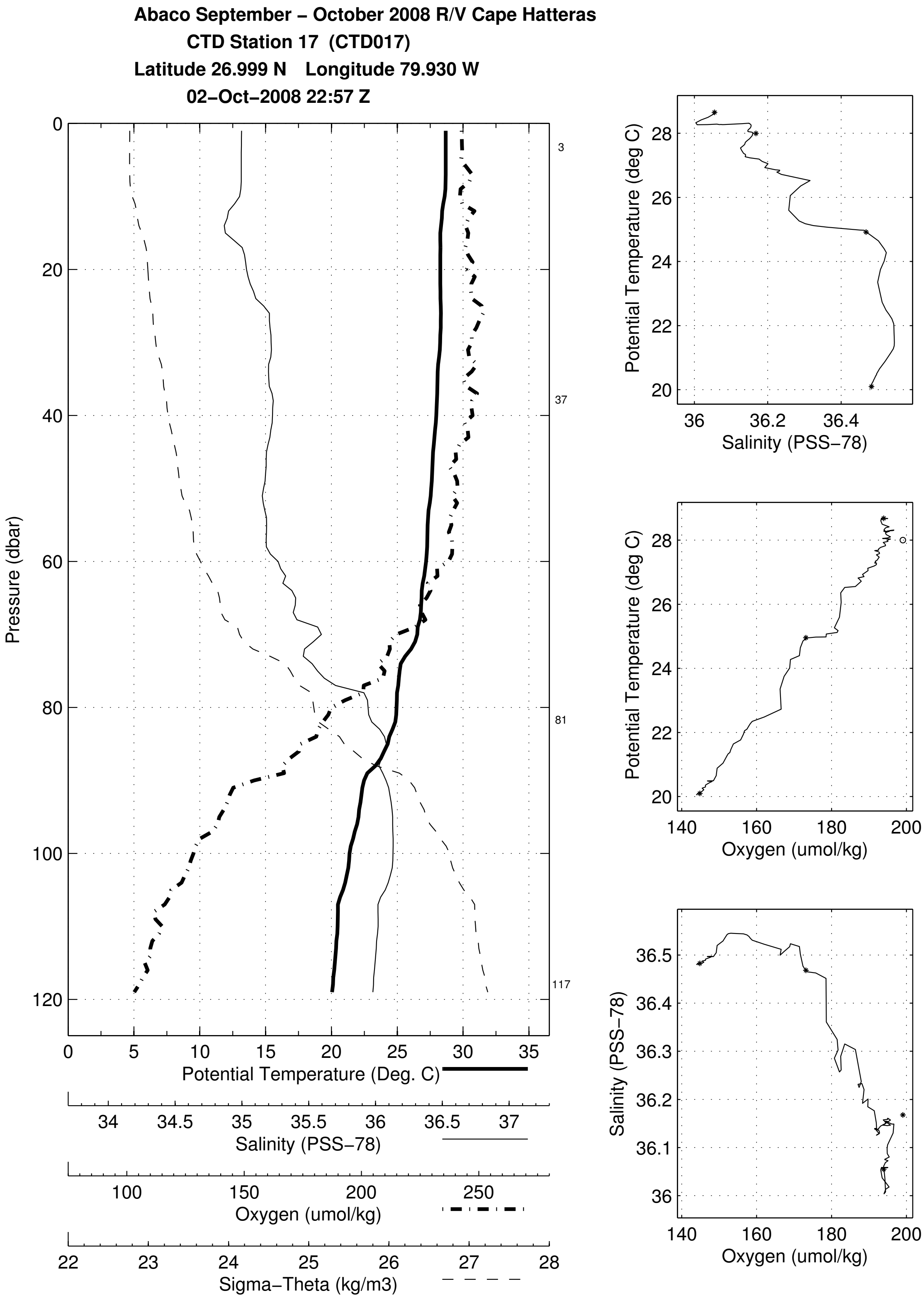


Abaco September − October 2008 R/V Cape Hatteras
CTD Station 16 (CTD016)
Latitude 26.999 N Longitude 79.867 W
02−Oct−2008 22:01 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS−78)
Oxygen (umol/kg)
Sigma−Theta (kg/m3)
Potential Temperature (deg C)

Abaco September - October 2008 R/V Cape Hatteras
CTD Station 17 (CTD017)
Latitude 26.999N Longitude 79.930W
02-Oct-2008 22:57Z

Pressure	Temp90	PoTemp90	Salinity	Oxygen	DynHt	SigT
dbar	°C	°C	PSS-78	μmol·kg^{-1}	m^2·s^{-2}	kg·m^{-3}
1	28.679	28.679	36.060	193.4	0.005	22.967
10	28.606	28.604	36.053	193.2	0.049	22.988
20	28.276	28.272	36.075	194.1	0.097	23.114
30	28.264	28.257	36.154	195.0	0.144	23.178
50	27.589	27.578	36.130	192.8	0.236	23.383
75	25.193	25.176	36.303	181.8	0.342	24.272
100	21.392	21.373	36.545	152.8	0.417	25.568

Pressure	Niskin	Temp90	PoTemp90	Salinity	Oxygen
dbar		°C	°C	PSS-78	μmol·kg^{-1}
118	2	20.121	20.099	36.483	144.9
82	4	24.937	24.919	36.468	173.2
38	6	28.002	27.993	36.168	199.1
3	8	28.650	28.649	36.055	193.9


Abaco September − October 2008 R/V Cape Hatteras
CTD Station 17 (CTD017)
Latitude 26.999 N Longitude 79.930 W
02−Oct−2008 22:57 Z
Pressure (dbar)
Potential Temperature (Deg. C)
Salinity (PSS−78)
Oxygen (umol/kg)
Sigma−Theta (kg/m3)
Potential Temperature (deg C)
Salinity (PSS−78)
Potential Temperature (deg C)
Oxygen (umol/kg)
Salinity (PSS−78)
Oxygen (umol/kg)

B WOCE Summary File

Table 10: Abaco Cruise – WOCE Summary File

SHIP/CRS EXPOCODE	WOCE SECT	STN	CAST	CAST TYPE	CAST DATE	UTC TIME	EVENT CODE	LAT	LON	NAV	UNC DPH	HT ABV BTM	WIRE OUT	MAX PRS	NO. BTLS	PARA-METERS	COMMENTS
WBTSCH	AB0809	1	1	ROS	09282013	0002	BE	26.491N	76.470W	GPS							
WBTSCH	AB0809	1	1	ROS	09282013	0002	BO	26.491N	76.470W	GPS	4820	21	4872	4910	15	1,2	
WBTSCH	AB0809	1	1	ROS	09282013	0313	EN	26.491N	76.470W	GPS							
WBTSCH	AB0809	2	1	ROS	09292013	1119	BE	26.502N	76.087W	GPS							
WBTSCH	AB0809	2	1	ROS	09292013	1119	BO	26.502N	76.087W	GPS	4785	20	4830	4873	23	1,2	nisk 9 sampled out of order
WBTSCH	AB0809	2	1	ROS	09292013	1443	EN	26.502N	76.087W	GPS							
WBTSCH	AB0809	3	1	ROS	09302013	0306	BE	26.502N	71.997W	GPS							
WBTSCH	AB0809	3	1	ROS	09302013	0306	BO	26.502N	71.997W	GPS	5267	22	5369	5370	23	1,2	
WBTSCH	AB0809	3	1	ROS	09302013	0648	EN	26.502N	71.997W	GPS							
WBTSCH	AB0809	4	1	ROS	10022013	2110	BE	26.058N	78.849W	GPS							
WBTSCH	AB0809	4	1	ROS	10022013	2110	BO	26.058N	78.849W	GPS	271	146	274	274	6	1,2	
WBTSCH	AB0809	4	1	ROS	10022013	2130	EN	26.058N	78.849W	GPS							
WBTSCH	AB0809	5	1	ROS	10022013	2238	BE	26.166N	78.801W	GPS							
WBTSCH	AB0809	5	1	ROS	10022013	2238	BO	26.166N	78.801W	GPS	410	219	-999	413	7	1,2	
WBTSCH	AB0809	5	1	ROS	10022013	2307	EN	26.166N	78.801W	GPS							
WBTSCH	AB0809	6	1	ROS	10022013	2359	BE	26.249N	78.768W	GPS							
WBTSCH	AB0809	6	1	ROS	10022013	2359	BO	26.249N	78.768W	GPS	479	211	482	483	7	1,2	
WBTSCH	AB0809	6	1	ROS	10032013	0027	EN	26.249N	78.768W	GPS							
WBTSCH	AB0809	7	1	ROS	10022013	0112	BE	26.332N	78.720W	GPS							
WBTSCH	AB0809	7	1	ROS	10022013	0112	BO	26.332N	78.720W	GPS	653	210	658	658	9	1,2	
WBTSCH	AB0809	7	1	ROS	10022013	0150	EN	26.332N	78.720W	GPS							
WBTSCH	AB0809	8	1	ROS	10022013	0241	BE	26.434N	78.666W	GPS							
WBTSCH	AB0809	8	1	ROS	10022013	0241	BO	26.434N	78.666W	GPS	719	190	719	725	11	1,2	
WBTSCH	AB0809	8	1	ROS	10022013	0323	EN	26.434N	78.666W	GPS							
WBTSCH	AB0809	9	1	ROS	10032013	1203	BE	27.001N	79.200W	GPS							
WBTSCH	AB0809	9	1	ROS	10032013	1203	BO	27.001N	79.200W	GPS	447	207	455	451	7	1,2	
WBTSCH	AB0809	9	1	ROS	10032013	1232	EN	27.001N	79.200W	GPS							
WBTSCH	AB0809	10	1	ROS	10032013	1316	BE	27.000N	79.282W	GPS							
WBTSCH	AB0809	10	1	ROS	10032013	1316	BO	27.000N	79.282W	GPS	579	199	591	584	8	1,2	nisk 12 did not close properly
WBTSCH	AB0809	10	1	ROS	10032013	1350	EN	27.000N	79.282W	GPS							
WBTSCH	AB0809	11	1	ROS	10032013	1431	BE	26.997N	79.381W	GPS							
WBTSCH	AB0809	11	1	ROS	10032013	1431	BO	26.997N	79.381W	GPS	648	56	655	654	9	1,2	
WBTSCH	AB0809	11	1	ROS	10032013	1505	EN	26.997N	79.381W	GPS							
WBTSCH	AB0809	12	1	ROS	10032013	1554	BE	26.997N	79.498W	GPS							
WBTSCH	AB0809	12	1	ROS	10032013	1554	BO	26.997N	79.498W	GPS	710	263	730	716	10	1,2	
WBTSCH	AB0809	12	1	ROS	10032013	1633	EN	26.997N	79.498W	GPS							
WBTSCH	AB0809	13	1	ROS	10032013	1726	BE	26.994N	79.618W	GPS							
WBTSCH	AB0809	13	1	ROS	10032013	1726	BO	26.994N	79.618W	GPS	597	258	620	606	8	1,2	
WBTSCH	AB0809	13	1	ROS	10032013	1759	EN	26.994N	79.618W	GPS							
WBTSCH	AB0809	14	1	ROS	10032013	1837	BE	26.995N	79.681W	GPS							
WBTSCH	AB0809	14	1	ROS	10032013	1837	BO	26.995N	79.681W	GPS	266	389	521	503	8	1,2	nisk 12 did not close properly
WBTSCH	AB0809	14	1	ROS	10032013	1906	EN	26.995N	79.681W	GPS							
WBTSCH	AB0809	15	1	ROS	10032013	1953	BE	27.000N	79.784W	GPS							
WBTSCH	AB0809	15	1	ROS	10032013	1953	BO	27.000N	79.784W	GPS	3	9	364	355	7	1,2	nisk 12 did not close properly
WBTSCH	AB0809	15	1	ROS	10032013	2021	EN	27.000N	79.784W	GPS							
WBTSCH	AB0809	16	1	ROS	10032013	2101	BE	26.999N	79.867W	GPS							
WBTSCH	AB0809	16	1	ROS	10032013	2101	BO	26.999N	79.867W	GPS	228	176	236	229	7	1,2	
WBTSCH	AB0809	16	1	ROS	10032013	2123	EN	26.999N	79.867W	GPS							
WBTSCH	AB0809	17	1	ROS	10032013	2157	BE	26.999N	79.930W	GPS							
WBTSCH	AB0809	17	1	ROS	10032013	2157	BO	26.999N	79.930W	GPS	117	169	121	119	4	1,2	nisk 2 leaking
WBTSCH	AB0809	17	1	ROS	10032013	2210	EN	26.999N	79.930W	GPS							

C WOCE Bottle Summary File

Table 11: Abaco Cruise – WOCE Bottle Summary File

SHIP/CRS EXPOCODE	WOCE SECT	STN	CAST	BTL#	BTL# Flag	DATE	UTC TIME	LAT	LON	DEPTH	CTD PRS	CTD TMP	CTD SAL	SAL FLAG	BTL SAL	SAL FLAG	CTD OXY	OXY FLAG	BTL OXY	OXY FLAG
WBTSCH	AB0809	1	1	1	2	20080927	0228	26.491N	76.470W	4820	4908	2.205	34.872	2	34.873	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	2	2	20080927	0228	26.491N	76.470W	4480	4558	2.311	34.888	2	34.887	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	3	2	20080927	0228	26.491N	76.470W	4231	4302	2.319	34.891	2	34.892	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	4	2	20080927	0228	26.491N	76.470W	3922	3984	2.365	34.897	2	34.896	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	5	2	20080927	0228	26.491N	76.470W	3436	3487	2.526	34.908	2	34.910	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	6	2	20080927	0228	26.491N	76.470W	2953	2993	2.804	34.928	2	34.933	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	7	2	20080927	0228	26.491N	76.470W	2562	2595	3.131	34.945	2	34.948	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	8	2	20080927	0228	26.491N	76.470W	2168	2194	3.482	34.955	2	34.955	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	9	2	20080927	0228	26.491N	76.470W	1765	1784	3.781	34.966	2	34.988	4	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	10	2	20080927	0228	26.491N	76.470W	1382	1396	4.385	34.999	2	35.000	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	11	2	20080927	0228	26.491N	76.470W	1189	1201	4.985	35.047	2	35.047	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	12	2	20080927	0228	26.491N	76.470W	991	999	6.780	35.103	2	35.104	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	13	2	20080927	0228	26.491N	76.470W	841	848	9.222	35.232	2	35.229	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	14	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	15	2	20080927	0228	26.491N	76.470W	743	749	11.108	35.440	2	35.439	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	16	2	20080927	0228	26.491N	76.470W	693	699	11.872	35.535	2	35.534	2	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	17	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	18	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	19	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	20	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	21	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	22	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	23	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	1	1	24	2	20080927	0228	26.491N	76.470W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	1	2	20080928	1350	26.502N	76.087W	4785	4871	2.242	34.878	2	34.877	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	2	2	20080928	1350	26.502N	76.087W	4422	4498	2.307	34.889	2	34.888	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	3	2	20080928	1350	26.502N	76.087W	4178	4248	2.324	34.891	2	34.889	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	4	2	20080928	1350	26.502N	76.087W	3936	3999	2.360	34.896	2	34.894	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	5	2	20080928	1350	26.502N	76.087W	3447	3499	2.491	34.906	2	34.906	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	6	2	20080928	1350	26.502N	76.087W	2939	2979	2.664	34.918	2	34.915	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	7	2	20080928	1350	26.502N	76.087W	2567	2600	2.882	34.933	2	34.931	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	8	2	20080928	1350	26.502N	76.087W	2172	2198	3.314	34.953	2	34.950	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	9	2	20080928	1350	26.502N	76.087W	1780	1799	3.665	34.957	2	34.965	4	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	10	2	20080928	1350	26.502N	76.087W	1383	1397	4.369	35.001	2	35.000	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	11	2	20080928	1350	26.502N	76.087W	1187	1199	5.124	35.054	2	35.053	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	12	2	20080928	1350	26.502N	76.087W	989	998	7.424	35.122	2	35.121	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	13	2	20080928	1350	26.502N	76.087W	842	849	9.775	35.277	2	35.285	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	14	2	20080928	1350	26.502N	76.087W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	15	2	20080928	1350	26.502N	76.087W	742	748	11.582	35.500	2	35.499	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	16	2	20080928	1350	26.502N	76.087W	595	599	15.101	36.032	2	36.030	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	17	2	20080928	1350	26.502N	76.087W	445	448	17.586	36.471	2	36.466	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	18	2	20080928	1350	26.502N	76.087W	345	347	18.179	36.573	2	36.568	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	19	2	20080928	1350	26.502N	76.087W	247	249	18.933	36.637	2	36.632	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	20	2	20080928	1350	26.502N	76.087W	196	197	20.127	36.723	2	36.729	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	21	2	20080928	1350	26.502N	76.087W	148	149	21.526	36.744	2	36.747	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	22	2	20080928	1350	26.502N	76.087W	97	98	23.698	36.706	2	36.713	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	23	2	20080928	1350	26.502N	76.087W	48	48	28.594	36.634	2	36.631	2	-999.0	9	-999.0	9
WBTSCH	AB0809	2	1	24	2	20080928	1350	26.502N	76.087W	3	3	28.598	36.633	2	36.635	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	1	2	20080929	0542	26.502N	71.997W	5267	5368	2.125	34.856	2	34.858	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	2	2	20080929	0542	26.502N	71.997W	4421	4497	2.292	34.889	2	34.891	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	3	2	20080929	0542	26.502N	71.997W	4146	4215	2.308	34.893	2	34.966	4	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	4	2	20080929	0542	26.502N	71.997W	3922	3985	2.348	34.897	2	34.898	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	5	2	20080929	0542	26.502N	71.997W	3450	3502	2.504	34.910	2	34.909	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	6	2	20080929	0542	26.502N	71.997W	2949	2990	2.871	34.935	2	34.934	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	7	2	20080929	0542	26.502N	71.997W	2566	2598	3.185	34.954	2	34.954	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	8	2	20080929	0542	26.502N	71.997W	2174	2200	3.501	34.963	2	34.964	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	9	2	20080929	0542	26.502N	71.997W	1778	1798	3.883	34.976	2	34.975	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	10	2	20080929	0542	26.502N	71.997W	1385	1399	4.705	35.036	2	35.038	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	11	2	20080929	0542	26.502N	71.997W	1188	1199	5.513	35.073	2	35.070	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	12	2	20080929	0542	26.502N	71.997W	991	1000	7.322	35.115	2	35.114	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	13	2	20080929	0542	26.502N	71.997W	842	849	9.503	35.257	2	35.259	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	14	2	20080929	0542	26.502N	71.997W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9

WBTSCH	AB0809	3	1	15	2	20080929	0542	26.502N	71.997W	744	750	11.284	35.466	2	35.466	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	16	2	20080929	0542	26.502N	71.997W	595	600	14.904	35.995	2	35.998	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	17	2	20080929	0542	26.502N	71.997W	447	450	17.518	36.464	2	36.474	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	18	2	20080929	0542	26.502N	71.997W	347	350	18.120	36.568	2	36.566	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	19	2	20080929	0542	26.502N	71.997W	247	249	18.729	36.623	2	36.622	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	20	2	20080929	0542	26.502N	71.997W	197	198	19.541	36.676	2	36.673	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	21	2	20080929	0542	26.502N	71.997W	149	150	20.528	36.730	2	36.731	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	22	2	20080929	0542	26.502N	71.997W	98	99	22.099	36.631	2	36.632	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	23	2	20080929	0542	26.502N	71.997W	48	48	26.446	36.463	2	36.473	2	-999.0	9	-999.0	9
WBTSCH	AB0809	3	1	24	2	20080929	0542	26.502N	71.997W	3	3	28.503	36.366	2	36.363	2	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	1	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	2	2	20081001	2218	26.058N	78.849W	271	273	17.718	36.412	2	36.411	2	161.5	2	161.6	2
WBTSCH	AB0809	4	1	3	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	4	2	20081001	2218	26.058N	78.849W	198	200	18.935	36.580	2	36.582	2	155.0	2	168.2	4
WBTSCH	AB0809	4	1	5	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	6	2	20081001	2218	26.058N	78.849W	150	151	22.514	36.756	2	36.750	2	186.9	2	188.0	2
WBTSCH	AB0809	4	1	7	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	8	2	20081001	2218	26.058N	78.849W	99	100	25.743	36.597	2	36.598	2	180.5	2	188.9	4
WBTSCH	AB0809	4	1	9	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	10	2	20081001	2218	26.058N	78.849W	48	48	28.472	36.328	2	36.330	2	192.5	2	191.6	2
WBTSCH	AB0809	4	1	11	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	12	2	20081001	2218	26.058N	78.849W	3	3	28.681	36.267	2	36.261	2	192.5	2	192.3	2
WBTSCH	AB0809	4	1	13	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	14	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	15	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	16	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	17	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	18	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	19	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	20	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	21	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	22	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	23	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	4	1	24	2	20081001	2218	26.058N	78.849W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	1	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	2	2	20081001	2349	26.166N	78.801W	410	413	14.046	35.861	2	35.864	2	154.5	2	155.0	2
WBTSCH	AB0809	5	1	3	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	4	2	20081001	2349	26.166N	78.801W	363	366	14.780	35.987	2	35.981	2	161.7	2	161.2	2
WBTSCH	AB0809	5	1	5	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	6	2	20081001	2349	26.166N	78.801W	255	257	17.526	36.445	2	36.438	2	183.6	2	184.8	2
WBTSCH	AB0809	5	1	7	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	8	2	20081001	2349	26.166N	78.801W	178	180	20.739	36.739	2	36.728	2	180.5	2	178.7	4
WBTSCH	AB0809	5	1	9	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	10	2	20081001	2349	26.166N	78.801W	127	128	25.083	36.654	2	36.648	2	185.5	2	201.6	4
WBTSCH	AB0809	5	1	11	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	12	2	20081001	2349	26.166N	78.801W	59	59	28.579	36.410	2	36.428	2	192.4	2	191.4	2
WBTSCH	AB0809	5	1	13	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	14	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	15	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	16	2	20081001	2349	26.166N	78.801W	3	3	28.515	36.109	2	36.105	2	193.3	2	193.7	2
WBTSCH	AB0809	5	1	17	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	18	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	19	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	20	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	21	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	22	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	23	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	5	1	24	2	20081001	2349	26.166N	78.801W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	1	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	2	2	20081001	0110	26.249N	78.768W	479	483	13.208	35.741	2	35.744	2	149.6	2	154.7	4
WBTSCH	AB0809	6	1	3	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	4	2	20081001	0110	26.249N	78.768W	398	401	13.617	35.797	2	35.805	2	153.6	2	151.9	2
WBTSCH	AB0809	6	1	5	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	6	2	20081001	0110	26.249N	78.768W	269	271	17.883	36.498	2	36.492	2	186.1	2	185.9	2
WBTSCH	AB0809	6	1	7	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	8	2	20081001	0110	26.249N	78.768W	190	191	21.451	36.759	2	36.756	2	182.7	2	181.4	2

WBTSCH	AB0809	6	1	9	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	10	2	20081001	0110	26.249N	78.768W	128	129	25.020	36.655	2	36.651	2	185.3	2	202.5	4
WBTSCH	AB0809	6	1	11	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	12	2	20081001	0110	26.249N	78.768W	48	48	28.688	36.380	2	36.380	2	192.5	2	193.5	2
WBTSCH	AB0809	6	1	13	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	14	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	15	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	16	2	20081001	0110	26.249N	78.768W	2	2	28.613	36.198	2	36.190	2	192.1	2	192.8	2
WBTSCH	AB0809	6	1	17	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	18	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	19	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	20	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	21	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	22	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	23	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	6	1	24	2	20081001	0110	26.249N	78.768W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	1	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	2	2	20081001	0228	26.332N	78.720W	653	658	9.612	35.165	2	35.165	2	120.3	2	120.9	2
WBTSCH	AB0809	7	1	3	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	4	2	20081001	0228	26.332N	78.720W	544	549	12.492	35.633	2	35.640	2	148.3	2	148.0	2
WBTSCH	AB0809	7	1	5	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	6	2	20081001	0228	26.332N	78.720W	437	441	13.855	35.836	2	35.842	2	153.9	2	154.2	2
WBTSCH	AB0809	7	1	7	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	8	2	20081001	0228	26.332N	78.720W	366	369	15.155	36.048	2	36.052	2	164.2	2	163.8	2
WBTSCH	AB0809	7	1	9	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	10	2	20081001	0228	26.332N	78.720W	297	299	16.925	36.333	2	36.342	2	172.4	2	173.3	2
WBTSCH	AB0809	7	1	11	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	12	2	20081001	0228	26.332N	78.720W	197	199	21.438	36.792	2	36.796	2	178.1	2	177.1	2
WBTSCH	AB0809	7	1	13	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	14	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	15	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	16	2	20081001	0228	26.332N	78.720W	141	142	24.706	36.691	2	36.716	4	185.4	2	186.2	2
WBTSCH	AB0809	7	1	17	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	18	2	20081001	0228	26.332N	78.720W	69	69	28.255	36.423	2	36.434	2	191.6	2	192.3	2
WBTSCH	AB0809	7	1	19	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	20	2	20081001	0228	26.332N	78.720W	3	3	28.709	36.301	2	36.301	2	192.5	2	192.3	2
WBTSCH	AB0809	7	1	21	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	22	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	23	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	7	1	24	2	20081001	0228	26.332N	78.720W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	1	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	2	2	20081001	0357	26.434N	78.666W	719	725	9.355	35.274	2	35.281	2	150.0	2	149.7	2
WBTSCH	AB0809	8	1	3	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	4	2	20081001	0357	26.434N	78.666W	644	649	11.071	35.450	2	35.457	2	144.2	2	144.6	2
WBTSCH	AB0809	8	1	5	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	6	2	20081001	0357	26.434N	78.666W	504	508	14.072	35.871	2	35.879	2	157.4	2	157.2	2
WBTSCH	AB0809	8	1	7	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	8	2	20081001	0357	26.434N	78.666W	425	429	15.631	36.118	2	36.114	2	165.7	2	165.8	2
WBTSCH	AB0809	8	1	9	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	10	2	20081001	0357	26.434N	78.666W	345	348	17.640	36.473	2	36.478	2	187.8	2	187.9	2
WBTSCH	AB0809	8	1	11	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	12	2	20081001	0357	26.434N	78.666W	271	273	18.860	36.608	2	36.633	4	181.9	2	181.4	2
WBTSCH	AB0809	8	1	13	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	14	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	15	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	16	2	20081001	0357	26.434N	78.666W	188	189	21.645	36.779	2	36.774	2	173.4	2	172.6	2
WBTSCH	AB0809	8	1	17	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	18	2	20081001	0357	26.434N	78.666W	138	139	24.177	36.702	2	36.710	2	184.4	2	191.6	2
WBTSCH	AB0809	8	1	19	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	20	2	20081001	0357	26.434N	78.666W	88	88	26.372	36.617	2	36.617	2	186.3	2	189.0	4
WBTSCH	AB0809	8	1	21	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	22	2	20081001	0357	26.434N	78.666W	48	49	28.754	36.323	2	36.331	2	192.8	2	192.2	2
WBTSCH	AB0809	8	1	23	2	20081001	0357	26.434N	78.666W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	8	1	24	2	20081001	0357	26.434N	78.666W	3	3	28.744	36.320	2	36.320	2	192.6	2	192.3	2
WBTSCH	AB0809	9	1	1	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	2	2	20081002	1317	27.000N	79.200W	447	451	14.690	35.968	2	35.963	2	160.7	2	161.8	2

WBTSCH	AB0809	9	1	3	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	4	2	20081002	1317	27.000N	79.200W	365	368	17.001	36.357	2	36.357	2	179.4	2	180.0	2
WBTSCH	AB0809	9	1	5	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	6	2	20081002	1317	27.000N	79.200W	257	258	18.967	36.624	2	36.613	2	179.3	2	178.9	2
WBTSCH	AB0809	9	1	7	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	8	2	20081002	1317	27.000N	79.200W	179	180	20.942	36.747	2	36.754	2	180.7	2	179.9	2
WBTSCH	AB0809	9	1	9	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	10	2	20081002	1317	27.000N	79.200W	98	98	25.302	36.642	2	36.650	2	190.2	2	190.8	2
WBTSCH	AB0809	9	1	11	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	12	2	20081002	1317	27.000N	79.200W	29	29	28.201	36.166	2	36.172	2	193.2	2	194.0	2
WBTSCH	AB0809	9	1	13	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	14	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	15	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	16	2	20081002	1317	27.000N	79.200W	3	3	28.183	36.167	2	36.170	2	193.9	2	193.8	2
WBTSCH	AB0809	9	1	17	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	18	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	19	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	20	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	21	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	22	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	23	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	9	1	24	2	20081002	1317	27.000N	79.200W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	1	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	2	2	20081002	1430	27.000N	79.282W	579	583	10.093	35.207	2	35.205	2	115.9	2	111.9	4
WBTSCH	AB0809	10	1	3	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	4	2	20081002	1430	27.000N	79.282W	465	469	12.624	35.561	2	35.562	2	126.2	2	126.0	2
WBTSCH	AB0809	10	1	5	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	6	2	20081002	1430	27.000N	79.282W	346	348	16.183	36.135	2	36.127	2	143.3	2	143.3	2
WBTSCH	AB0809	10	1	7	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	8	2	20081002	1430	27.000N	79.282W	267	269	18.441	36.590	2	36.588	2	188.8	2	189.5	2
WBTSCH	AB0809	10	1	9	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	10	2	20081002	1430	27.000N	79.282W	187	189	21.655	36.798	2	36.808	2	179.9	2	187.3	2
WBTSCH	AB0809	10	1	11	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	12	2	20081002	1430	27.000N	79.282W	117	118	24.714	36.670	2	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	13	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	14	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	15	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	16	2	20081002	1430	27.000N	79.282W	48	48	28.186	36.183	2	36.180	2	192.9	2	193.4	2
WBTSCH	AB0809	10	1	17	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	18	2	20081002	1430	27.000N	79.282W	3	3	28.257	36.188	2	36.186	2	193.5	2	193.5	2
WBTSCH	AB0809	10	1	19	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	20	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	21	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	22	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	23	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	10	1	24	2	20081002	1430	27.000N	79.282W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	1	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	2	2	20081002	1544	26.997N	79.381W	648	653	8.341	35.009	2	35.006	2	119.7	2	119.8	2
WBTSCH	AB0809	11	1	3	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	4	2	20081002	1544	26.997N	79.381W	491	495	10.016	35.200	2	35.196	2	118.0	2	118.0	2
WBTSCH	AB0809	11	1	5	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	6	2	20081002	1544	26.997N	79.381W	444	448	11.378	35.384	2	35.381	2	119.8	2	119.7	2
WBTSCH	AB0809	11	1	7	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	8	2	20081002	1544	26.997N	79.381W	352	355	14.722	35.908	2	35.904	2	137.9	2	138.0	2
WBTSCH	AB0809	11	1	9	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	10	2	20081002	1544	26.997N	79.381W	267	269	17.287	36.314	2	36.309	2	147.9	2	147.3	2
WBTSCH	AB0809	11	1	11	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	12	2	20081002	1544	26.997N	79.381W	178	179	21.230	36.722	2	36.726	2	142.2	2	149.5	4
WBTSCH	AB0809	11	1	13	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	14	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	15	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	16	2	20081002	1544	26.997N	79.381W	108	109	26.521	36.397	2	36.394	2	179.6	2	178.6	2
WBTSCH	AB0809	11	1	17	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	18	2	20081002	1544	26.997N	79.381W	38	39	28.256	36.142	2	36.142	2	192.8	2	193.2	2
WBTSCH	AB0809	11	1	19	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	20	2	20081002	1544	26.997N	79.381W	3	3	28.448	36.093	2	36.090	2	188.4	2	178.9	4

WBTSCH	AB0809	11	1	21	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	22	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	23	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	11	1	24	2	20081002	1544	26.997N	79.381W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	1	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	2	2	20081002	1710	26.997N	79.498W	710	716	6.997	34.917	2	34.915	2	129.3	2	129.1	2
WBTSCH	AB0809	12	1	3	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	4	2	20081002	1710	26.997N	79.498W	636	642	7.147	34.923	2	34.922	2	127.8	2	127.2	2
WBTSCH	AB0809	12	1	5	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	6	2	20081002	1710	26.997N	79.498W	563	568	7.637	34.949	2	34.952	2	122.1	2	124.9	4
WBTSCH	AB0809	12	1	7	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	8	2	20081002	1710	26.997N	79.498W	463	466	8.456	35.008	2	35.007	2	118.9	2	119.3	2
WBTSCH	AB0809	12	1	9	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	10	2	20081002	1710	26.997N	79.498W	398	402	10.029	35.197	2	35.196	2	116.1	2	116.3	2
WBTSCH	AB0809	12	1	11	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	12	2	20081002	1710	26.997N	79.498W	303	305	14.575	35.875	2	35.875	2	128.6	2	127.7	4
WBTSCH	AB0809	12	1	13	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	14	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	15	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	16	2	20081002	1710	26.997N	79.498W	237	239	18.544	36.461	2	36.457	2	141.4	2	140.5	2
WBTSCH	AB0809	12	1	17	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	18	2	20081002	1710	26.997N	79.498W	138	139	25.006	36.631	2	36.622	2	160.1	2	160.9	4
WBTSCH	AB0809	12	1	19	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	20	2	20081002	1710	26.997N	79.498W	56	56	28.059	36.202	2	36.195	2	187.3	2	179.4	4
WBTSCH	AB0809	12	1	21	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	22	2	20081002	1710	26.997N	79.498W	3	3	28.671	36.103	2	36.098	2	194.0	2	193.5	2
WBTSCH	AB0809	12	1	23	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	12	1	24	2	20081002	1710	26.997N	79.498W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	1	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	2	2	20081002	1841	26.994N	79.618W	597	602	6.521	34.914	2	34.911	2	138.0	2	138.4	2
WBTSCH	AB0809	13	1	3	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	4	2	20081002	1841	26.994N	79.618W	540	544	7.588	34.941	2	34.941	2	123.2	2	123.3	2
WBTSCH	AB0809	13	1	5	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	6	2	20081002	1841	26.994N	79.618W	429	432	8.463	35.009	2	34.520	4	118.5	2	118.2	6
WBTSCH	AB0809	13	1	7	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	8	2	20081002	1841	26.994N	79.618W	306	308	10.586	35.280	2	35.282	2	118.0	2	117.7	6
WBTSCH	AB0809	13	1	9	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	10	2	20081002	1841	26.994N	79.618W	189	191	21.477	36.719	2	36.725	2	145.6	2	146.8	2
WBTSCH	AB0809	13	1	11	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	12	2	20081002	1841	26.994N	79.618W	127	128	25.397	36.482	2	36.486	2	169.1	2	179.0	4
WBTSCH	AB0809	13	1	13	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	14	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	15	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	16	2	20081002	1841	26.994N	79.618W	47	47	28.750	36.146	2	36.145	2	192.7	2	192.9	2
WBTSCH	AB0809	13	1	17	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	18	2	20081002	1841	26.994N	79.618W	3	3	28.888	36.122	2	36.118	2	192.9	2	192.5	2
WBTSCH	AB0809	13	1	19	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	20	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	21	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	22	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	23	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	13	1	24	2	20081002	1841	26.994N	79.618W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	1	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	2	2	20081002	1950	26.995N	79.681W	493	497	7.105	34.939	2	34.940	2	130.9	2	130.9	2
WBTSCH	AB0809	14	1	3	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	4	2	20081002	1950	26.995N	79.681W	449	452	8.062	34.978	2	34.975	2	120.3	2	120.1	2
WBTSCH	AB0809	14	1	5	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	6	2	20081002	1950	26.995N	79.681W	357	359	9.284	35.108	2	35.107	2	117.8	2	118.2	2
WBTSCH	AB0809	14	1	7	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	8	2	20081002	1950	26.995N	79.681W	266	268	13.764	35.746	2	35.747	2	125.9	2	125.0	2
WBTSCH	AB0809	14	1	9	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	10	2	20081002	1950	26.995N	79.681W	178	179	21.274	36.673	2	36.676	2	145.5	2	145.3	2
WBTSCH	AB0809	14	1	11	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	12	2	20081002	1950	26.995N	79.681W	118	118	25.524	36.382	2	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	13	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	14	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9

WBTSCH	AB0809	14	1	15	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	16	2	20081002	1950	26.995N	79.681W	58	59	28.655	36.156	2	36.163	2	195.2	2	195.6	2
WBTSCH	AB0809	14	1	17	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	18	2	20081002	1950	26.995N	79.681W	3	3	28.854	36.155	2	36.153	2	193.3	2	192.8	2
WBTSCH	AB0809	14	1	19	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	20	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	21	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	22	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	23	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	14	1	24	2	20081002	1950	26.995N	79.681W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	1	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	2	2	20081002	2104	27.000N	79.784W	352	354	9.380	35.155	2	35.152	2	120.8	2	121.1	2
WBTSCH	AB0809	15	1	3	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	4	2	20081002	2104	27.000N	79.784W	267	269	12.255	35.530	2	35.573	4	123.0	2	122.7	2
WBTSCH	AB0809	15	1	5	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	6	2	20081002	2104	27.000N	79.784W	188	189	18.006	36.315	2	36.338	4	132.5	2	133.3	2
WBTSCH	AB0809	15	1	7	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	8	2	20081002	2104	27.000N	79.784W	138	139	22.073	36.511	2	36.521	2	156.0	2	156.2	2
WBTSCH	AB0809	15	1	9	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	10	2	20081002	2104	27.000N	79.784W	88	89	26.986	36.234	2	36.234	2	189.9	2	190.1	2
WBTSCH	AB0809	15	1	11	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	12	2	20081002	2104	27.000N	79.784W	38	39	28.778	36.158	2	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	13	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	14	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	15	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	16	2	20081002	2104	27.000N	79.784W	3	3	28.971	36.101	2	36.101	2	193.1	2	193.6	2
WBTSCH	AB0809	15	1	17	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	18	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	19	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	20	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	21	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	22	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	23	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	15	1	24	2	20081002	2104	27.000N	79.784W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	1	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	2	2	20081002	2211	26.999N	79.867W	228	229	14.208	35.822	2	35.821	2	125.2	2	126.1	2
WBTSCH	AB0809	16	1	3	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	4	2	20081002	2211	26.999N	79.867W	198	200	16.470	36.143	2	36.152	2	130.2	2	130.1	2
WBTSCH	AB0809	16	1	5	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	6	2	20081002	2211	26.999N	79.867W	151	152	19.454	36.434	2	36.454	4	139.5	2	139.7	2
WBTSCH	AB0809	16	1	7	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	8	2	20081002	2211	26.999N	79.867W	98	99	24.951	36.464	2	36.469	2	166.6	2	176.8	4
WBTSCH	AB0809	16	1	9	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	10	2	20081002	2211	26.999N	79.867W	48	48	28.297	36.149	2	36.147	2	195.3	2	194.9	2
WBTSCH	AB0809	16	1	11	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	12	2	20081002	2211	26.999N	79.867W	3	3	28.892	36.048	2	36.044	2	194.0	2	193.6	2
WBTSCH	AB0809	16	1	13	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	14	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	15	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	16	2	20081002	2211	26.999N	79.867W	3	3	28.887	36.048	2	36.046	2	188.7	2	216.3	4
WBTSCH	AB0809	16	1	17	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	18	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	19	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	20	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	21	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	22	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	23	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	16	1	24	2	20081002	2211	26.999N	79.867W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	1	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	2	2	20081002	2304	26.999N	79.930W	117	118	20.119	36.481	2	36.483	2	144.4	2	144.9	2
WBTSCH	AB0809	17	1	3	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	4	2	20081002	2304	26.999N	79.930W	81	82	24.924	36.470	2	36.468	2	174.0	2	173.2	2
WBTSCH	AB0809	17	1	5	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	6	2	20081002	2304	26.999N	79.930W	38	38	28.002	36.161	2	36.168	2	189.0	2	199.1	4
WBTSCH	AB0809	17	1	7	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	8	2	20081002	2304	26.999N	79.930W	3	3	28.651	36.060	2	36.055	2	193.4	2	193.9	2

WBTSCH	AB0809	17	1	9	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	10	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	11	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	12	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	13	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	14	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	15	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	16	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	17	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	18	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	19	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	20	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	21	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	22	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	23	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9
WBTSCH	AB0809	17	1	24	2	20081002	2304	26.999N	79.930W	-999	-999	-999.000	-999.000	9	-999.000	9	-999.0	9	-999.0	9