NOAA Data Report, OAR AOML - 53

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

James A. Hooper V
Molly O. Baringer

Atlantic Oceanographic and Meteorological Laboratory
Miami, Florida
January 2016

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / Office of Oceanic and Atmospheric Research

NOAA Data Report OAR AOML - 53

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

James A. Hooper V
University of Miami / Cooperative Institute for Marine and Atmospheric Studies
NOAA/ Atlantic Oceanographic and Meteorological Laboratory
Miami, Florida

Molly O. Baringer
NOAA/ Atlantic Oceanographic and Meteorological Laboratory
Miami, Florida

January 2016

UNITED STATES
DEPARTMENT OF COMMERCE

Penny Pritzker
Secretary

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

Dr. Kathryn D. Sullivan
Undersecretary for Oceans and
Atmosphere/Administrator

Office of Oceanic and
Atmospheric Research

Mr. Craig McLean
Assistant Administrator

## Disclaimer

NOAA does not approve, recommend, or endorse any proprietary product or material mentioned in this document. No reference shall be made to NOAA or to this document in any advertising or sales promotion, which would indicate or imply that NOAA approves, recommends, or endorses any proprietary product or proprietary material herein or which has as its purpose any intent to cause directly or indirectly the advertised product to be used or purchased because of this document.

The findings and conclusion on this report are those of the authors and do not necessarily represent the views of the funding agency.

# *Contents*

**Table of Contents** **iv**

**List of Figures** **vi**

**List of Tables** **vii**

**Abstract** **viii**

**1 Introduction** **1**

**2 Cruise Narrative** **5**

**3 Standards and Pre-Cruise Calibrations** **5**
3.1 **Conductivity** . . . . . 6
3.2 **Temperature** . . . . . 7
3.3 **Pressure** . . . . . 8
3.4 **Dissolved Oxygen** . . . . . 9

**4 Data Acquisition** **12**
4.1 **System Problems** . . . . . 12
4.2 **Data Acquisition Procedure** . . . . . 13
4.3 **Shipboard CTD Data Processing** . . . . . 17
4.4 **CTD Calibration Procedures** . . . . . 19
4.4.1 **Salinity Analysis** . . . . . 19
4.4.2 **Oxygen Analysis** . . . . . 19

**5 Post-Cruise Calibrations** **20**
5.1 **CTD Data Processing** . . . . . 20
5.2 **CTD Pressure** . . . . . 21
5.3 **CTD Temperature** . . . . . 23
5.4 **Conductivity** . . . . . 25
5.5 **Dissolved Oxygen** . . . . . 34

**6 Final CTD Data Presentation** **44**

**7 Acknowledgements** **57**

**8 References** **58**

**A Hydrographic - CTD Data** **59**

**B WOCE Summary File** **94**

**C WOCE Bottle Summary File** **96**

# *List of Figures*


1 Abaco, Florida Straits, and NWPC CTD station and mooring locations. Land masses are shaded green. . . . . 4
2 Bottle locations for 26.5°N Deep Western Boundary Current section east of Abaco Island. . . . . 14
3 Bottle locations for along the Northwest Providence Channel section. . . . . 15
4 Bottle locations for 27°N section in the Florida Straits. . . . . 16
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). . . . . 22
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). . . . . 24
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. . . . . 26
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. . . . . 27
9 Bottle and calibrated secondary CTD salinity differences plotted vs. station. 28
10 Bottle and calibrated secondary CTD salinity differences plotted vs. pressure. 29
11 Bottle and calibrated secondary CTD salinity differences plotted vs. station below 1000 dbar. . . . . 30
12 Bottle and calibrated secondary CTD salinity differences plotted vs. pressure below 1000 dbar. . . . . 31
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. . . . . 32
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. . . . . 33
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. . . . . 36
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. . . . . 37
17 Bottle and calibrated secondary CTD oxygen differences plotted vs. station. 38
18 Bottle and calibrated secondary CTD oxygen differences plotted vs. pressure. 39

19 Bottle and calibrated secondary CTD oxygen differences plotted vs. station below 1000 dbar. . . . . 40
20 Bottle and calibrated secondary CTD oxygen differences plotted vs. pressure below 1000 dbar. . . . . 41
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. . . . . 42
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. . . . . 43
23 Potential Temperature (°C) section for the Abaco Section. Dashed vertical lines are the CTD station locations. . . . . 45
24 Salinity (PSS 78) section for the Abaco section. Dashed vertical lines are the CTD station locations. . . . . 46
25 Dissolved Oxygen ($umol/kg$) section for the Abaco Section. Dashed vertical lines are the CTD station locations. . . . . 47
26 Neutral density (kg/m3) section for the Abaco Section. Dashed vertical lines are the CTD station locations. . . . . 48
27 Potential Temperature (°C) section for the Florida Current North section. Dashed vertical lines are the CTD station locations. . . . . 49
28 Salinity (PSS 78) section for the Florida Current North section. Dashed vertical lines are the CTD station locations. . . . . 50
29 Dissolved Oxygen ($umol/kg$) section for the Florida Current North section. Dashed vertical lines are the CTD station locations. . . . . 51
30 Neutral density (kg/m3) section for the Florida Current North section. Dashed vertical lines are the CTD station locations. . . . . 52
31 Potential Temperature (°C) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations. . . . . 53
32 Salinity (PSS 78) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations. . . . . 54
33 Dissolved Oxygen ($umol/kg$) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations. . . . . 55
34 Neutral density (kg/m3) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations. . . . . 56

# *List of Tables*


1 Cruise participants of R/V Cape Hatteras. . . . . 2
2 Abaco Cruise – CTD Cast Summary . . . . . 3
3 Equipment used during AB0809 . . . . . 6
4 Calibration coefficients for the conductivity sensors. . . . . 7
5 Calibration coefficients for the temperature sensors. . . . . 7
6 Calibration coefficients for the pressure sensor. . . . . 8
7 Calibration coefficients for the dissolved oxygen sensors. . . . . 9
8 Nominal values for the batches of IAPSO standard seawater. . . . . 20
9 Near surface Pressure values and scan number used to remove surface soak and on-deck values. . . . . 23
10 Abaco Cruise – WOCE Summary File . . . . . 95
11 Abaco Cruise – WOCE Bottle Summary File . . . . . 97

**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 |

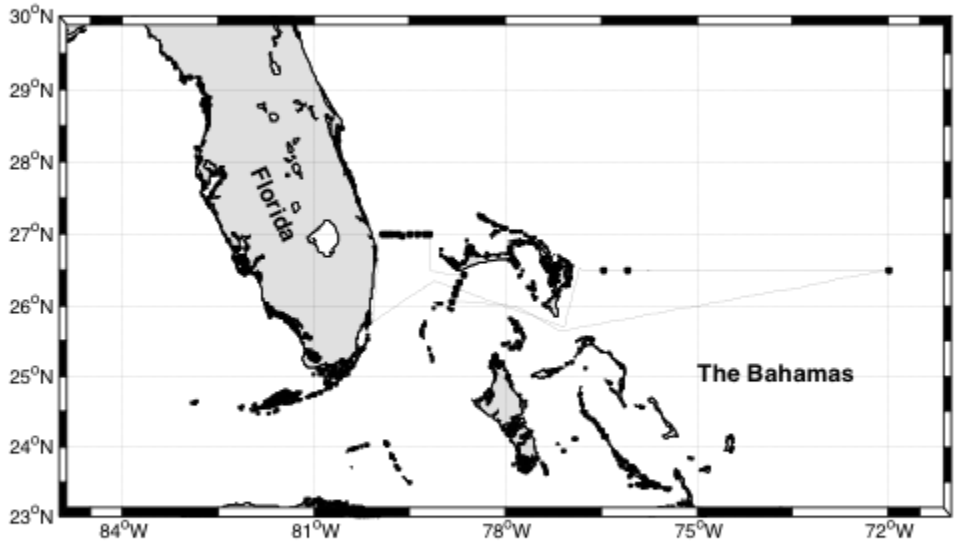



Figure 1: Abaco, Florida Straits, and NWPC CTD station and mooring locations. Land masses are shaded green.

# 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 $\pm 0.0003$ S·m$^{-1}$/month and resolution of 0.00004 S·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 | s/n 2980 |
|---|---|
| July 16, 2008 | 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 | s/n 4799 |
|---|---|
| June 19, 2008 | 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 ($\mu$s). 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<br>July 07, 2008 | s/n 0154<br>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):

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

where $\theta$ is the absolute temperature (K); and

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

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.

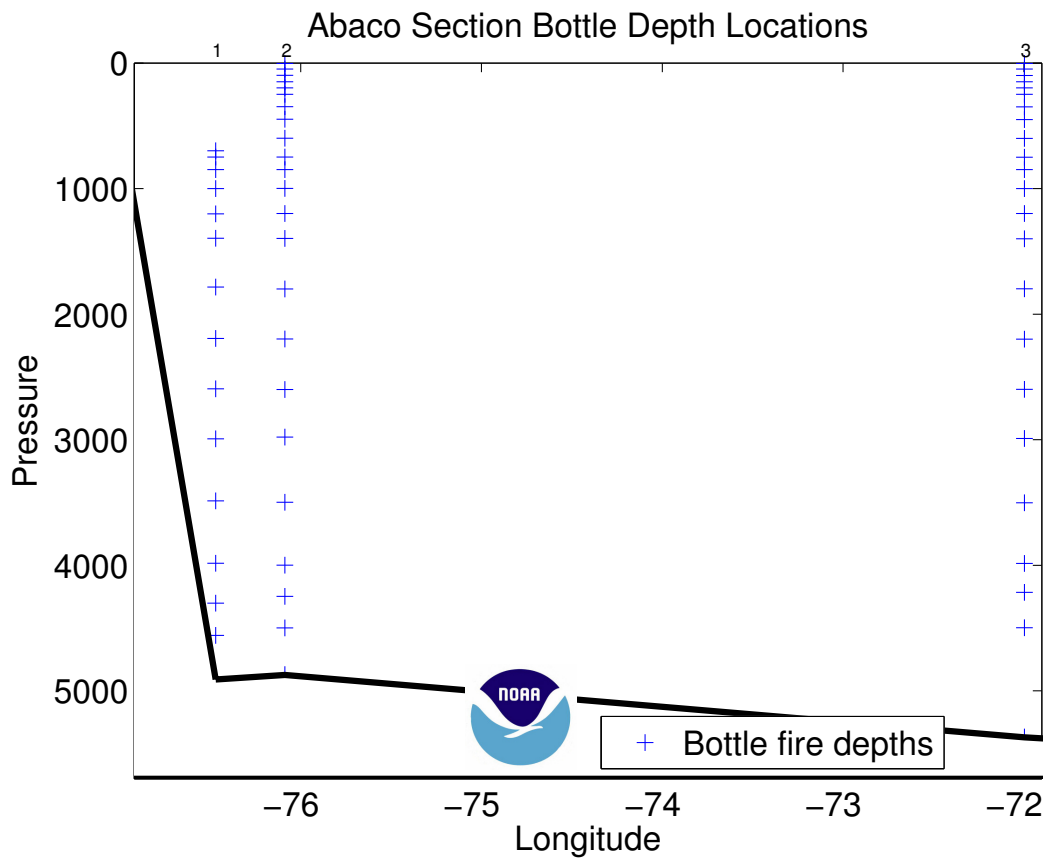



Figure 2: Bottle locations for 26.5°N Deep Western Boundary Current section east of Abaco Island.

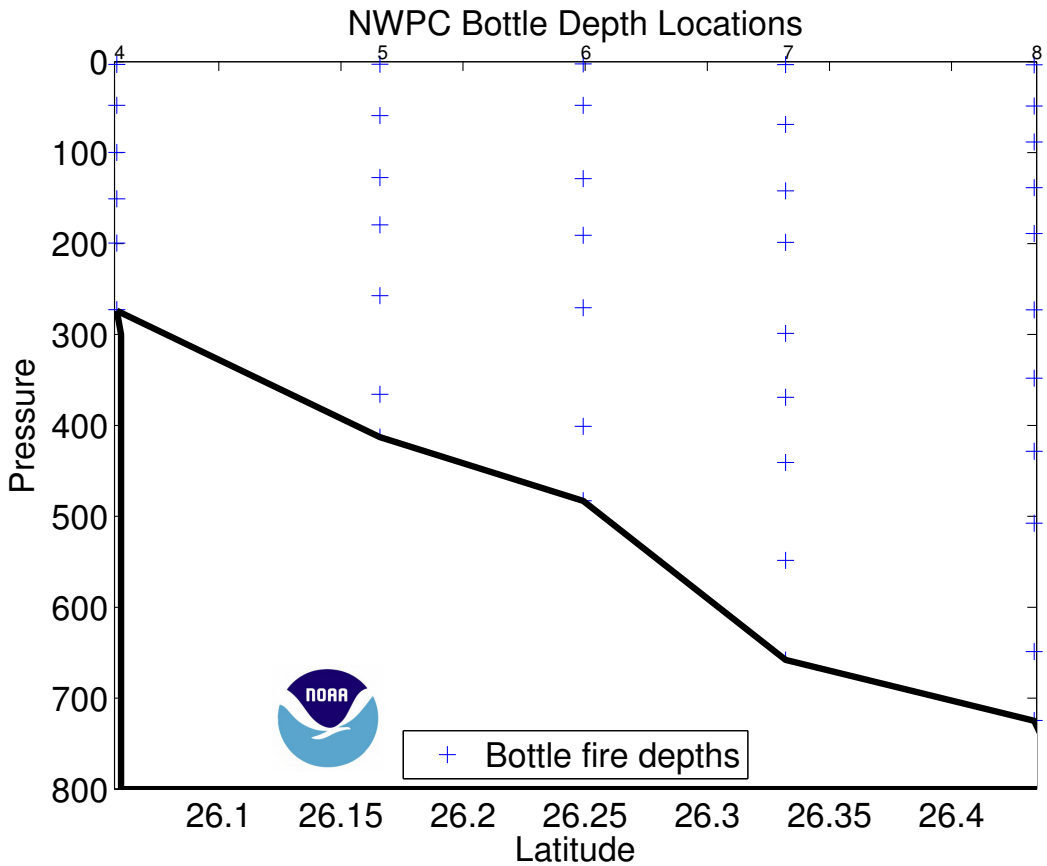



Figure 3: Bottle locations for along the Northwest Providence Channel section.

Figure of the 27N line

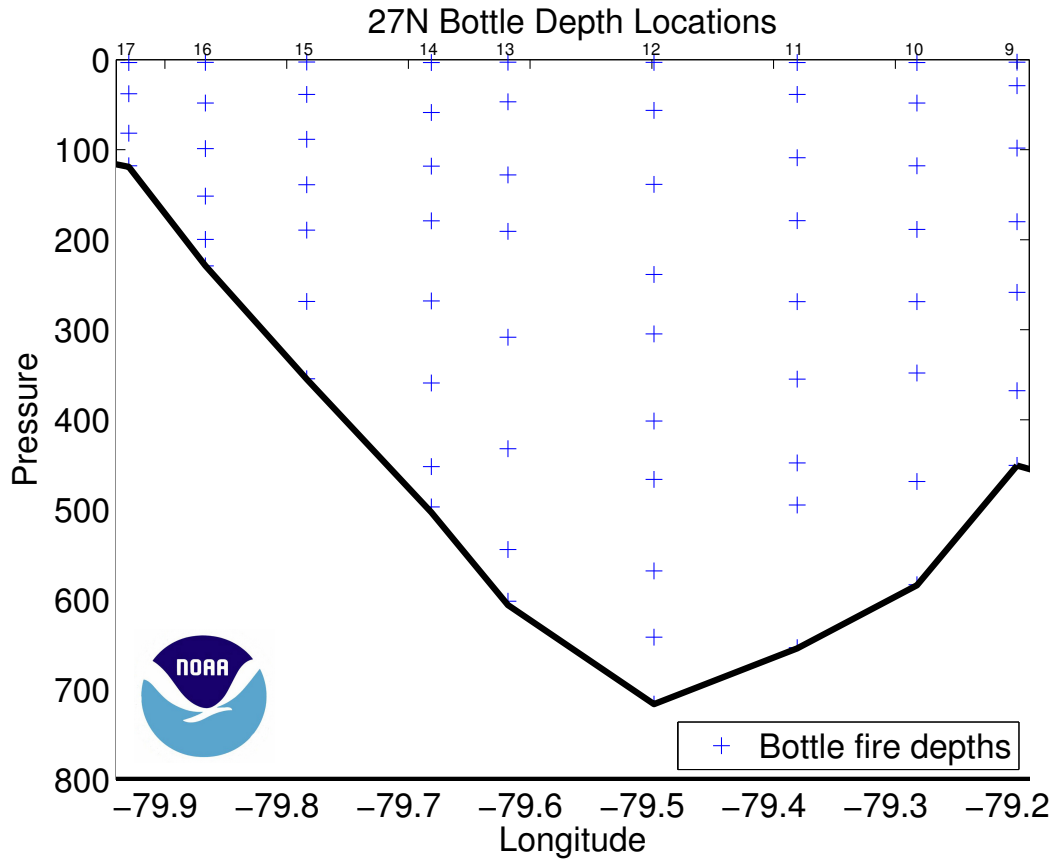



Figure 4: Bottle locations for 27°N section in the Florida Straits.

## 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 $\pm$ 0.73 dbar before and 4.64 $\pm$ 0.26 dbar after).

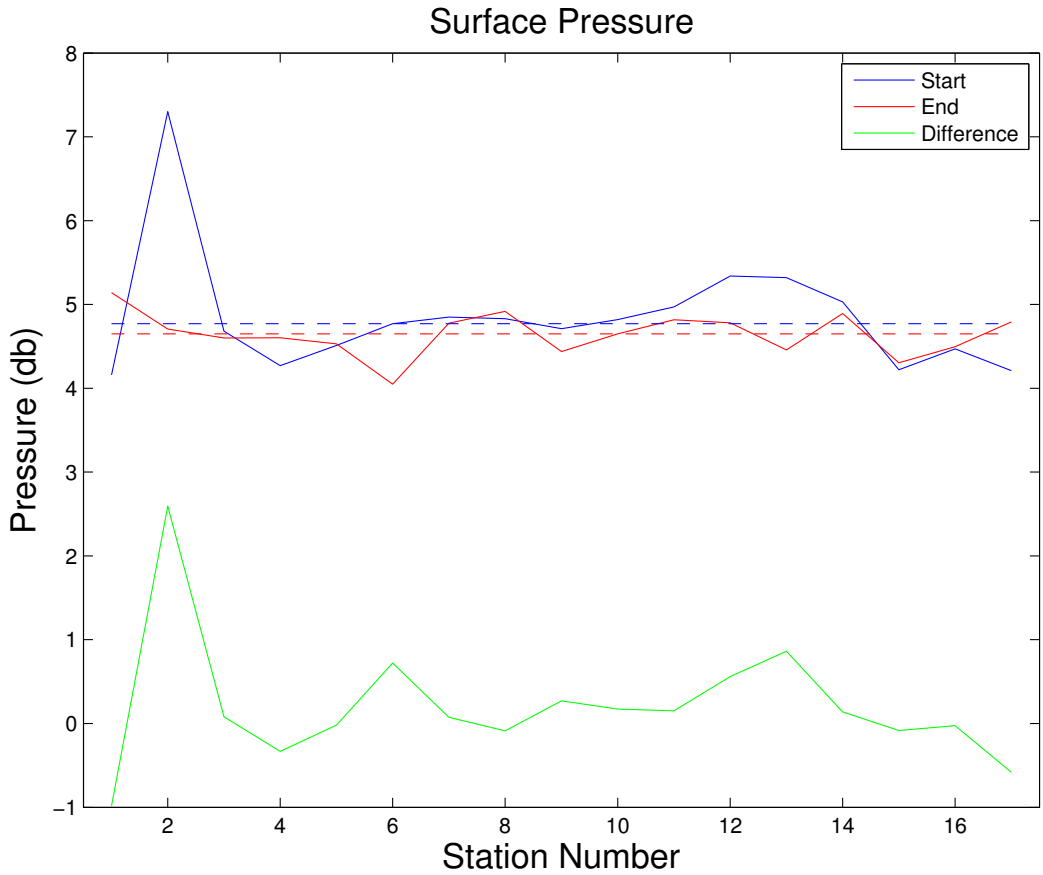



Figure 5: Pressure differences vs. station number. The sea surface pressure values measured at the start of the downcast (blue), at the end of the upcast (red) and their respective difference (green).

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.

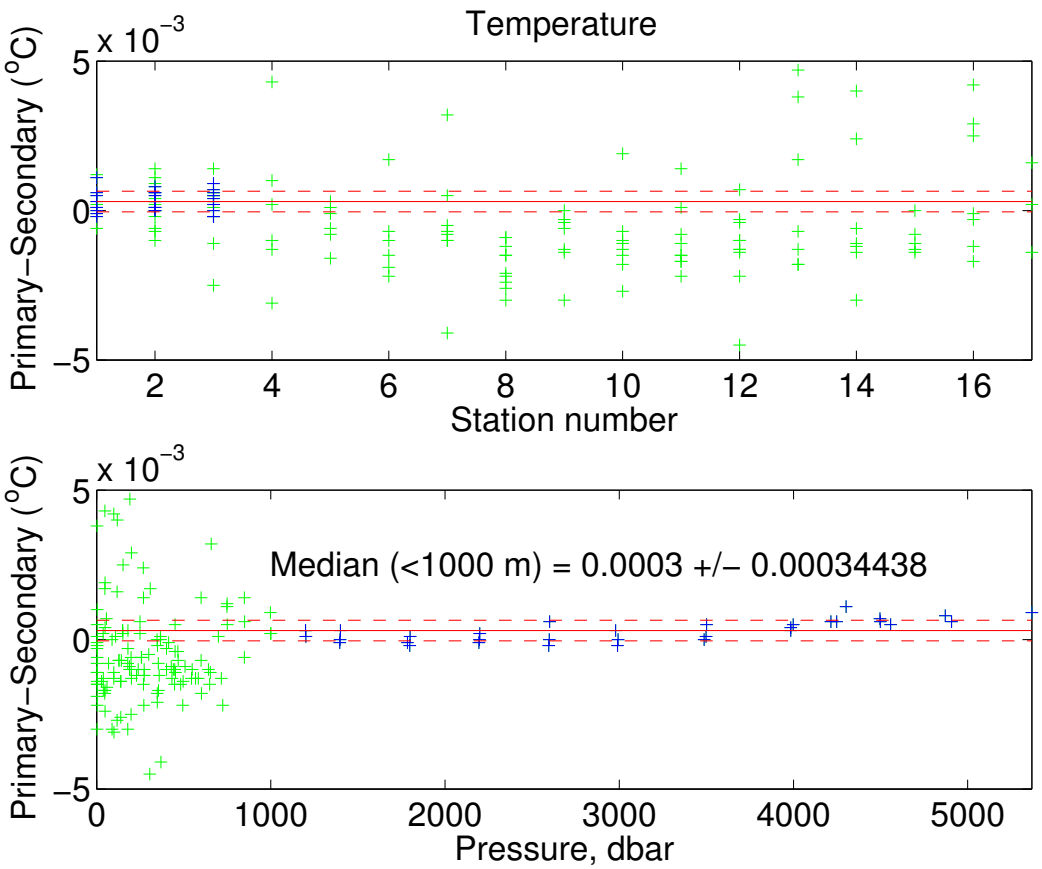



Figure 6: Temperature differences (after corrections) between sensors by station number (top) and pressure (bottom). The green represents the surface data down to 1000 dbar. The blue represents data below 1000 dbar. The red solid line represents the median with the red dashed representing the standard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

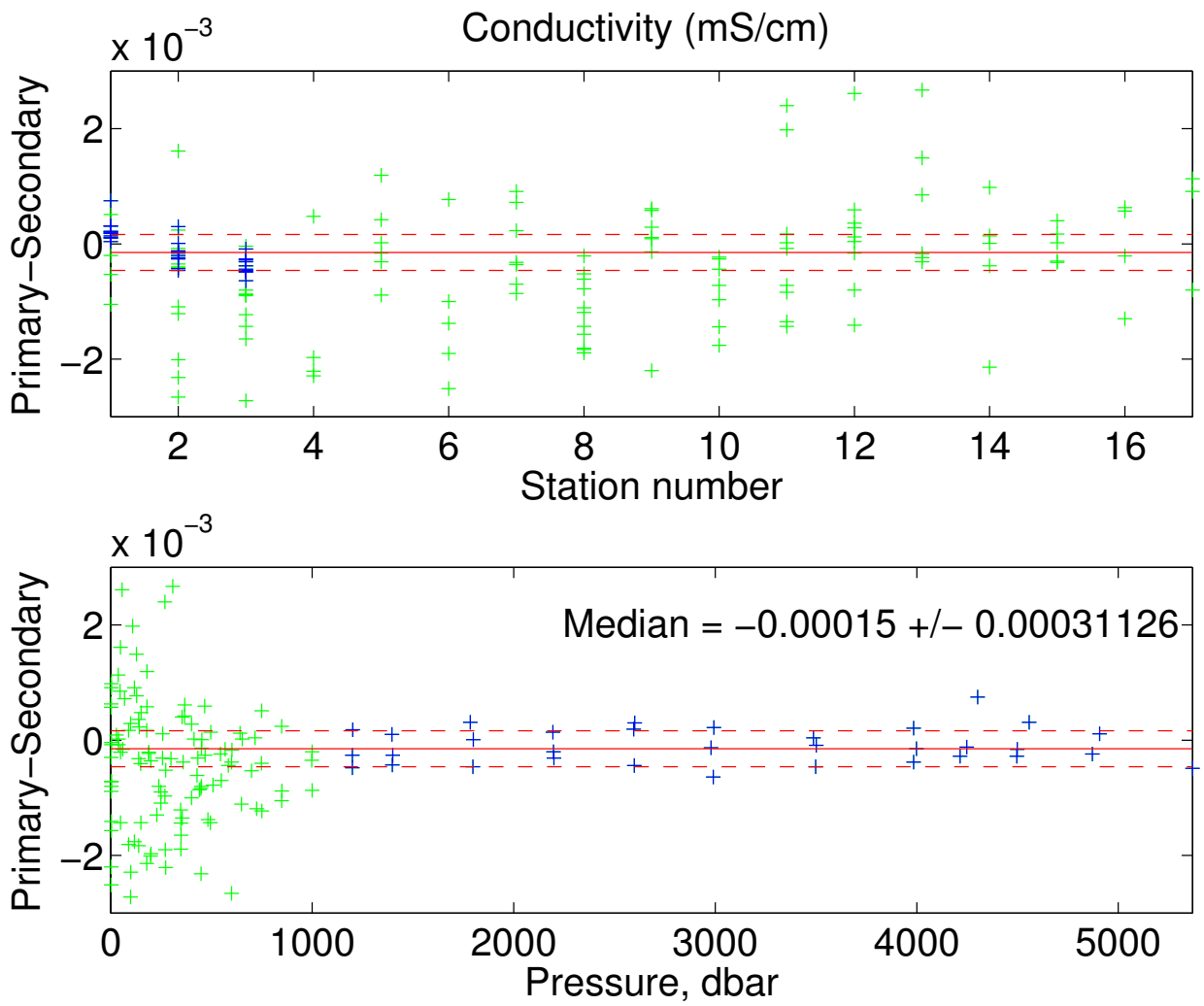



Figure 7: Conductivity (mS/cm) differences between sensors by station (top) and pressure (bottom). The red solid line represents the median with the red dashed representing the standard deviation.

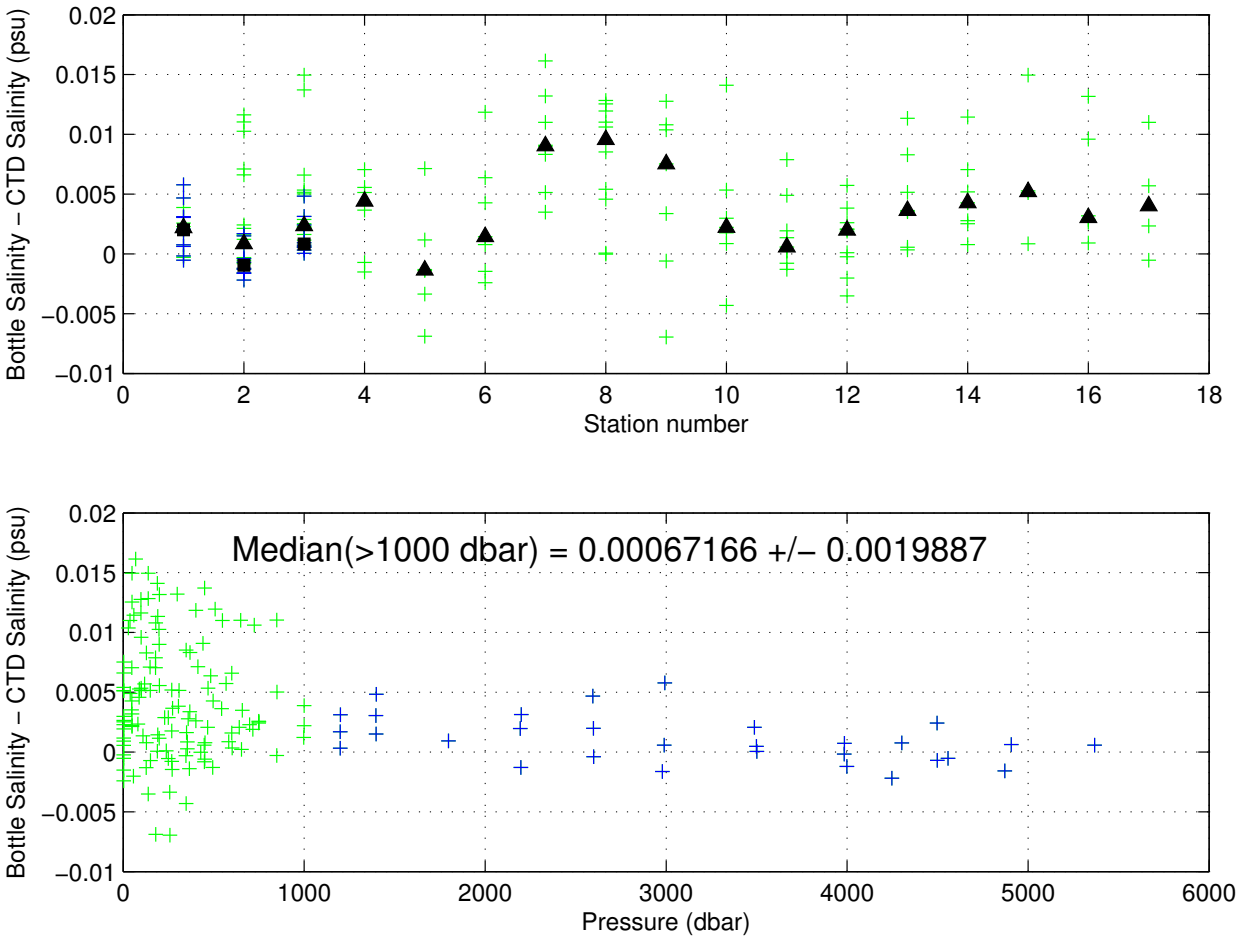



Figure 8: Bottle and uncalibrated secondary CTD salinity differences plotted against pressure. The green crosses represent all data points and the blue are the data points below 1000 dbar. The median was calculated using only the data below 1000 dbar.

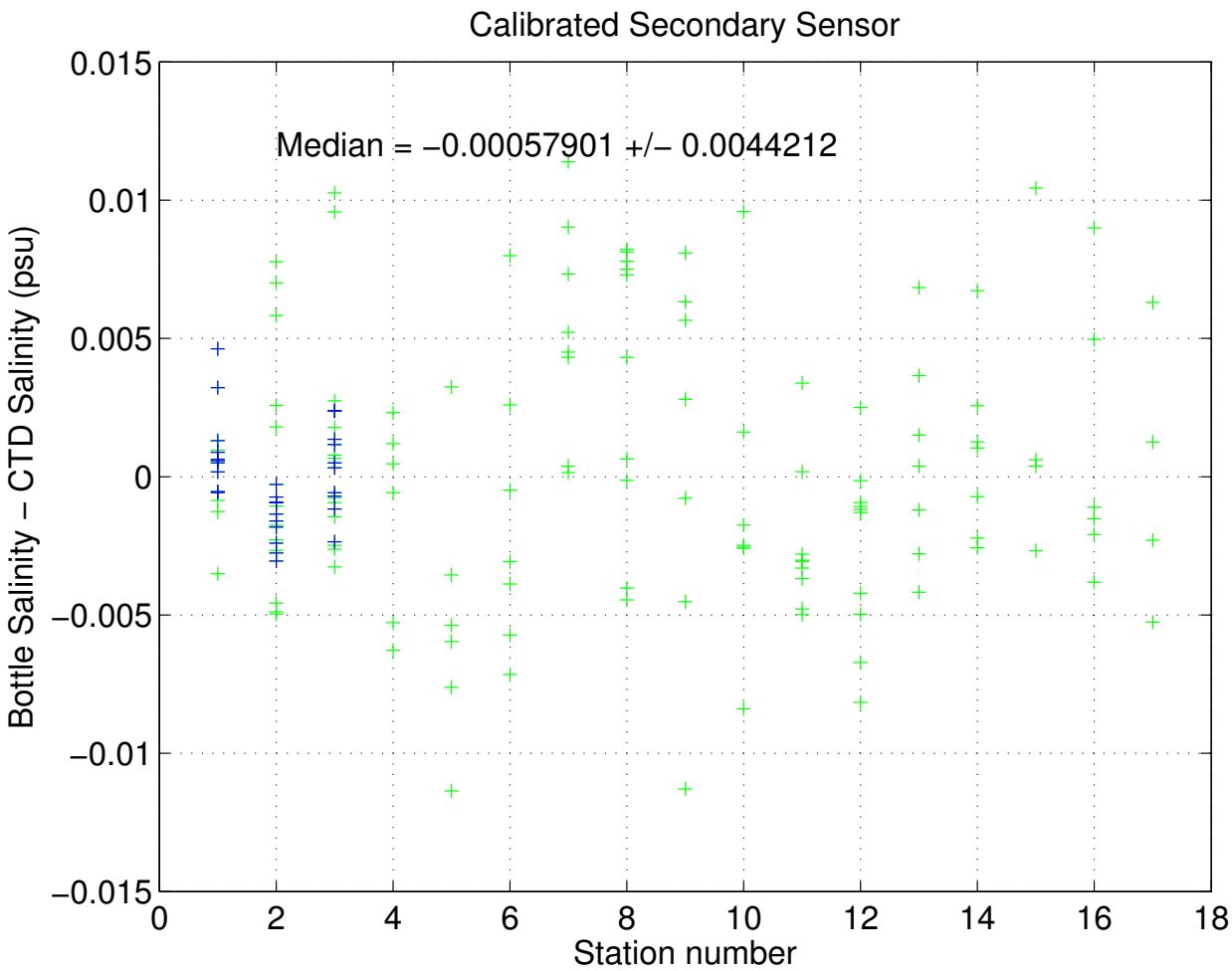



Figure 9: Bottle and calibrated secondary CTD salinity differences plotted vs. station.

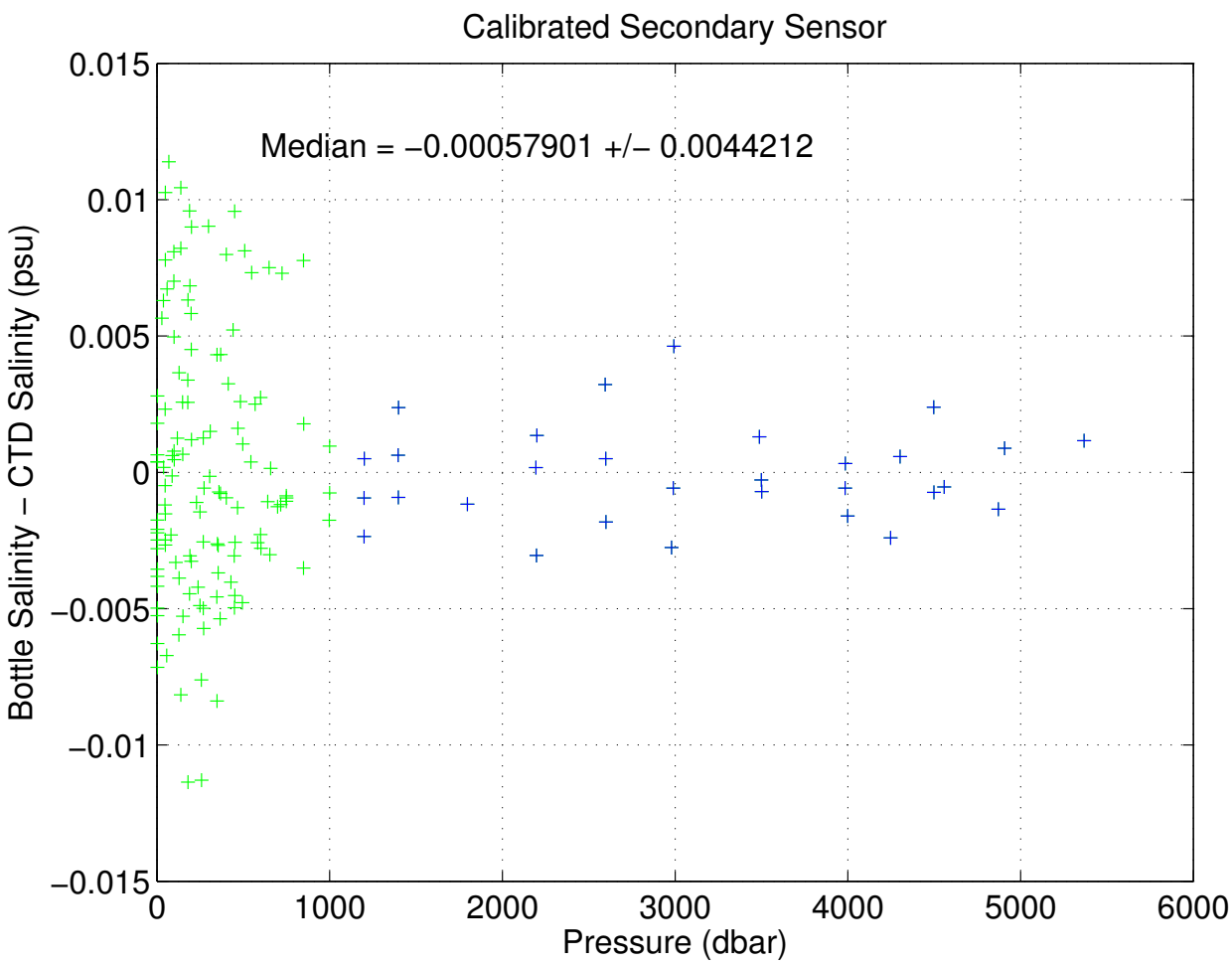



Figure 10: Bottle and calibrated secondary CTD salinity differences plotted vs. pressure.

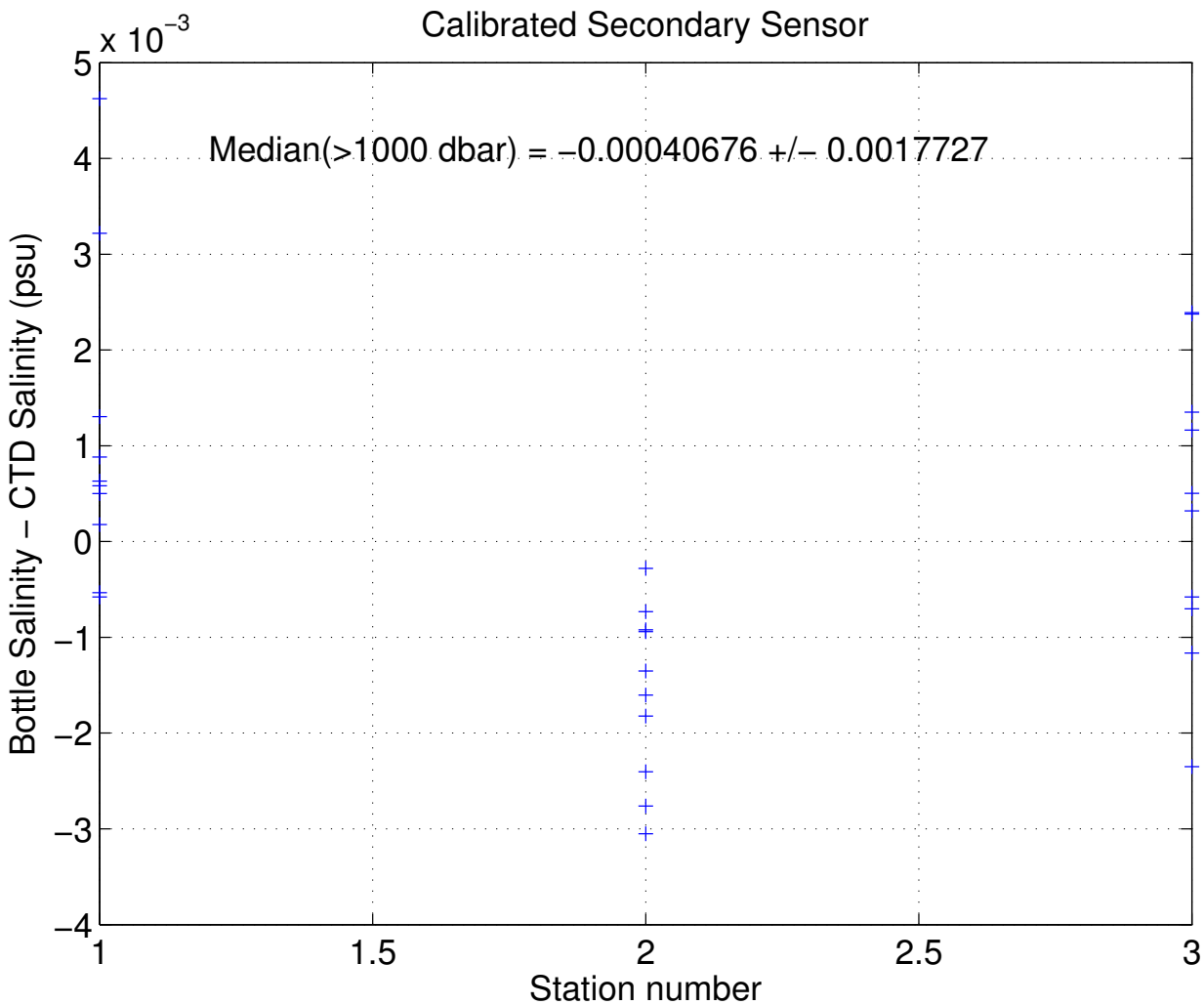



Figure 11: Bottle and calibrated secondary CTD salinity differences plotted vs. station below 1000 dbar.

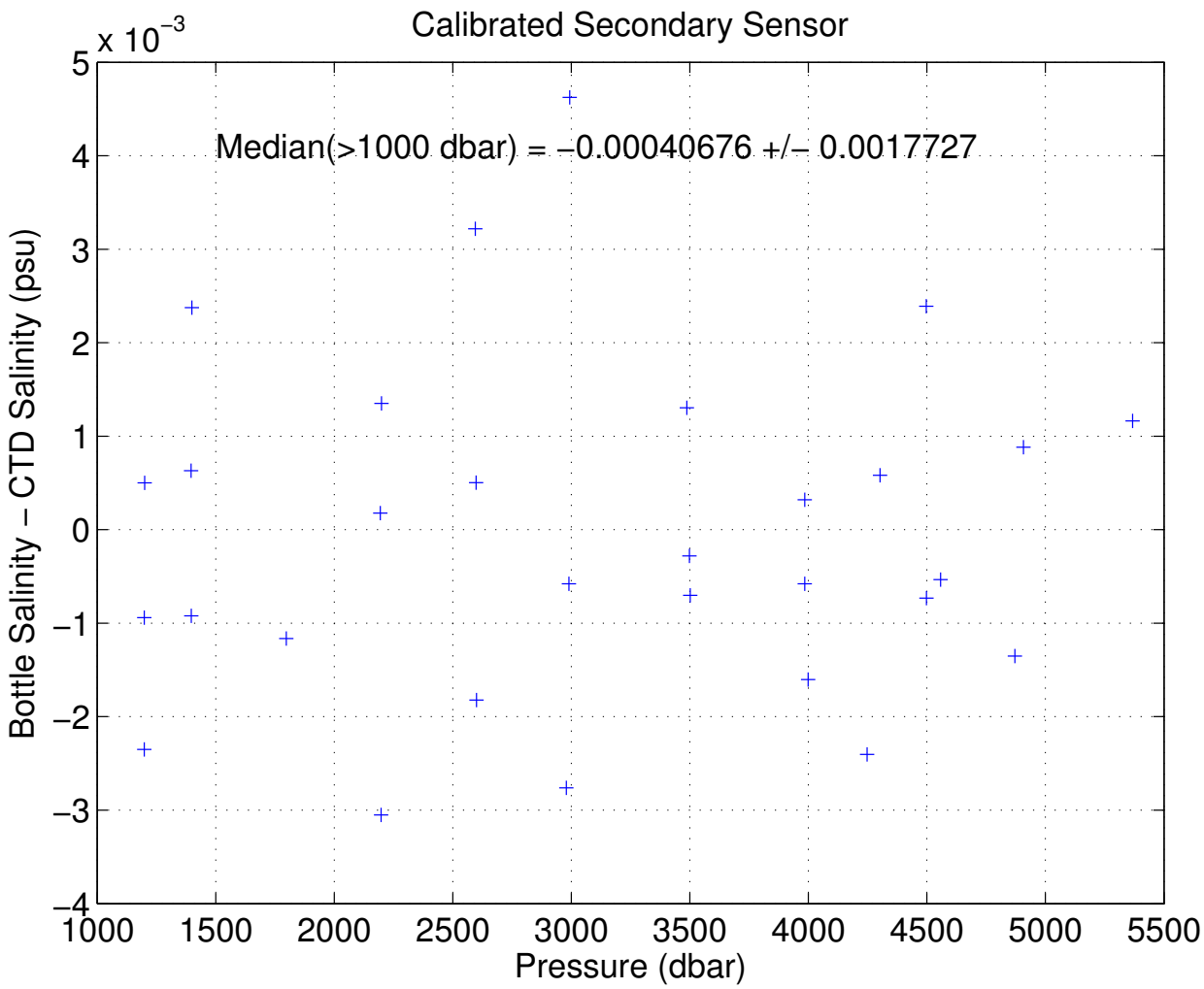



Figure 12: Bottle and calibrated secondary CTD salinity differences plotted vs. pressure below 1000 dbar.

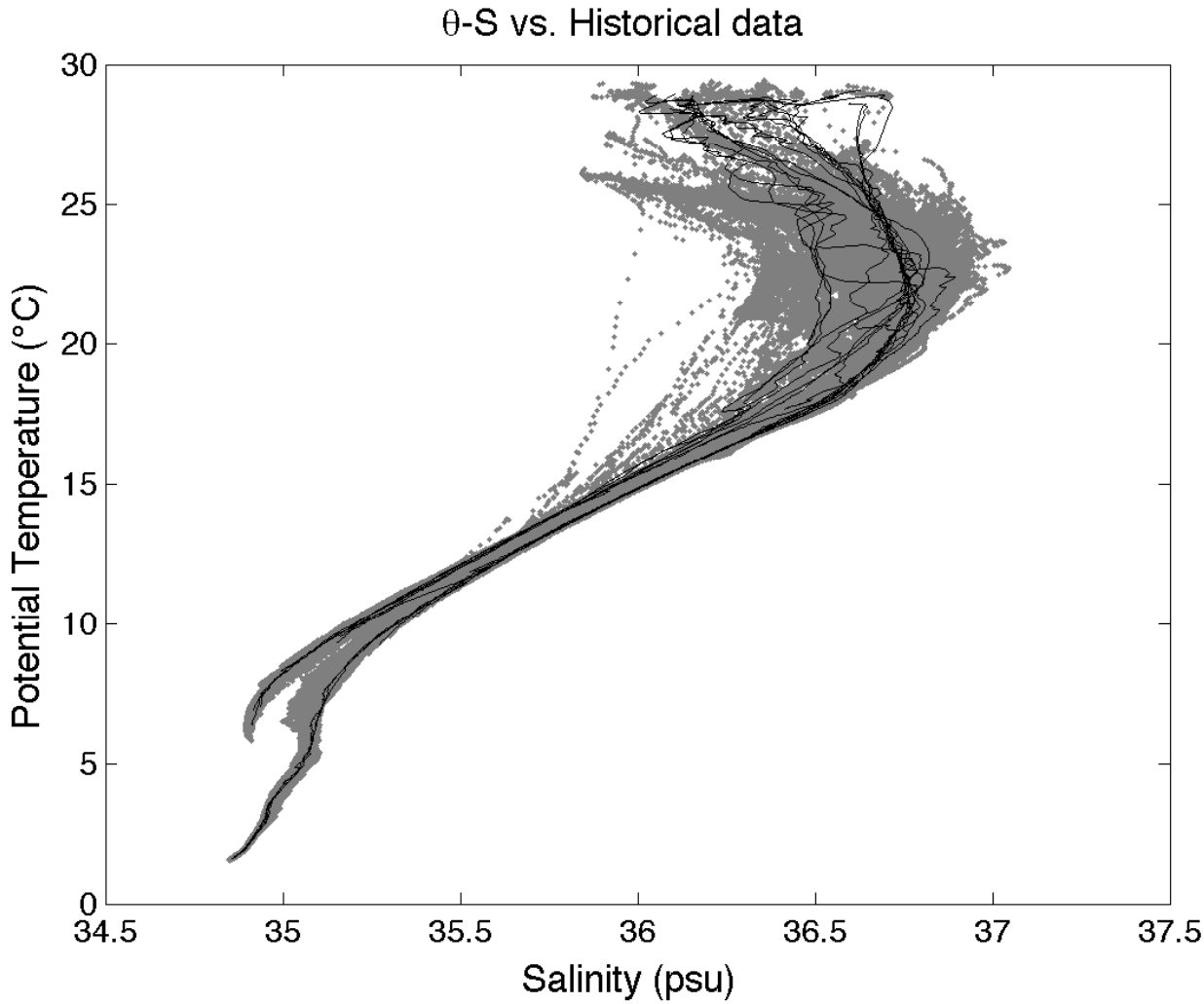



Figure 13: Potential Temperature - Salinity diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

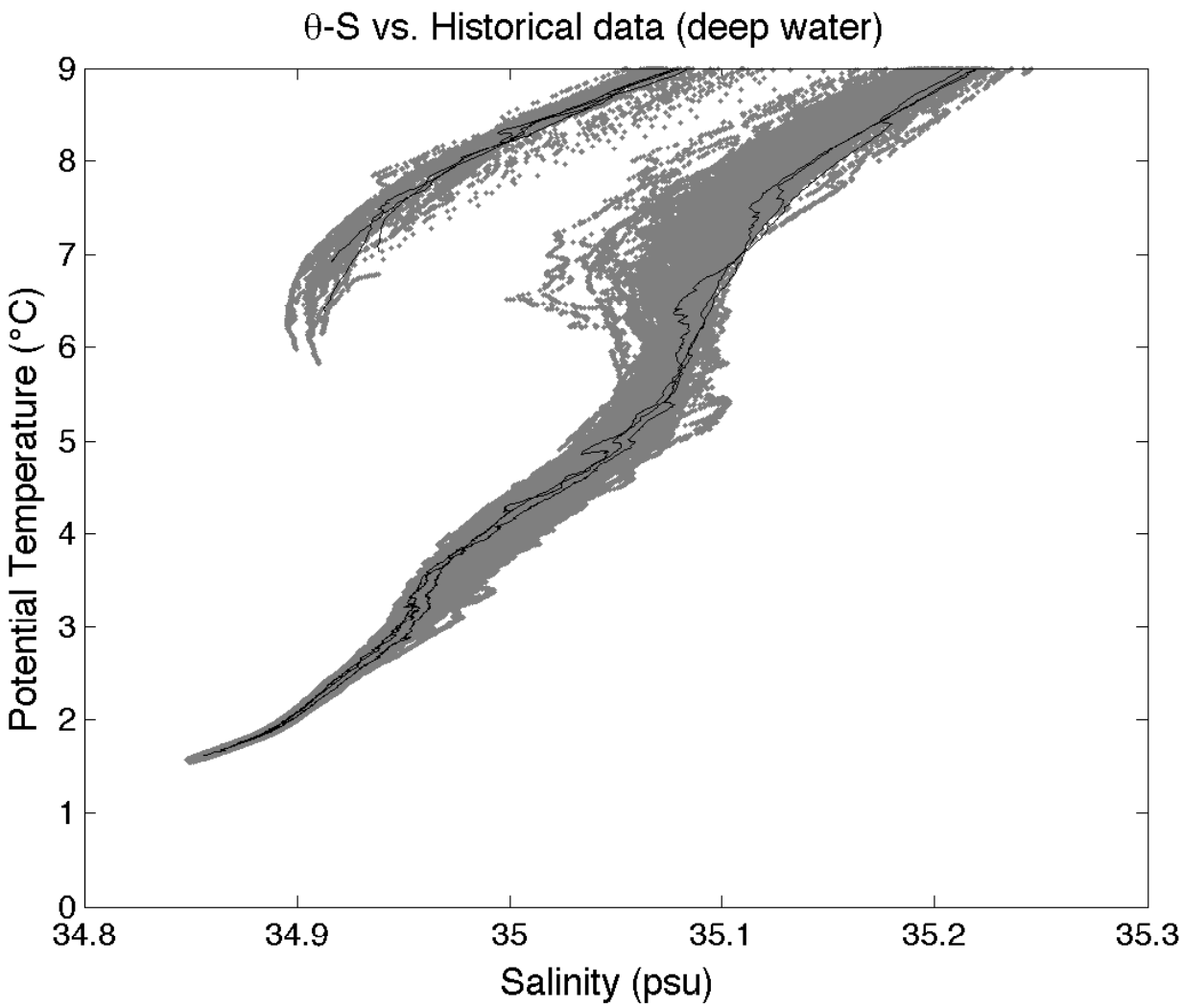



Figure 14: Potential Temperature - Salinity diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

## 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.

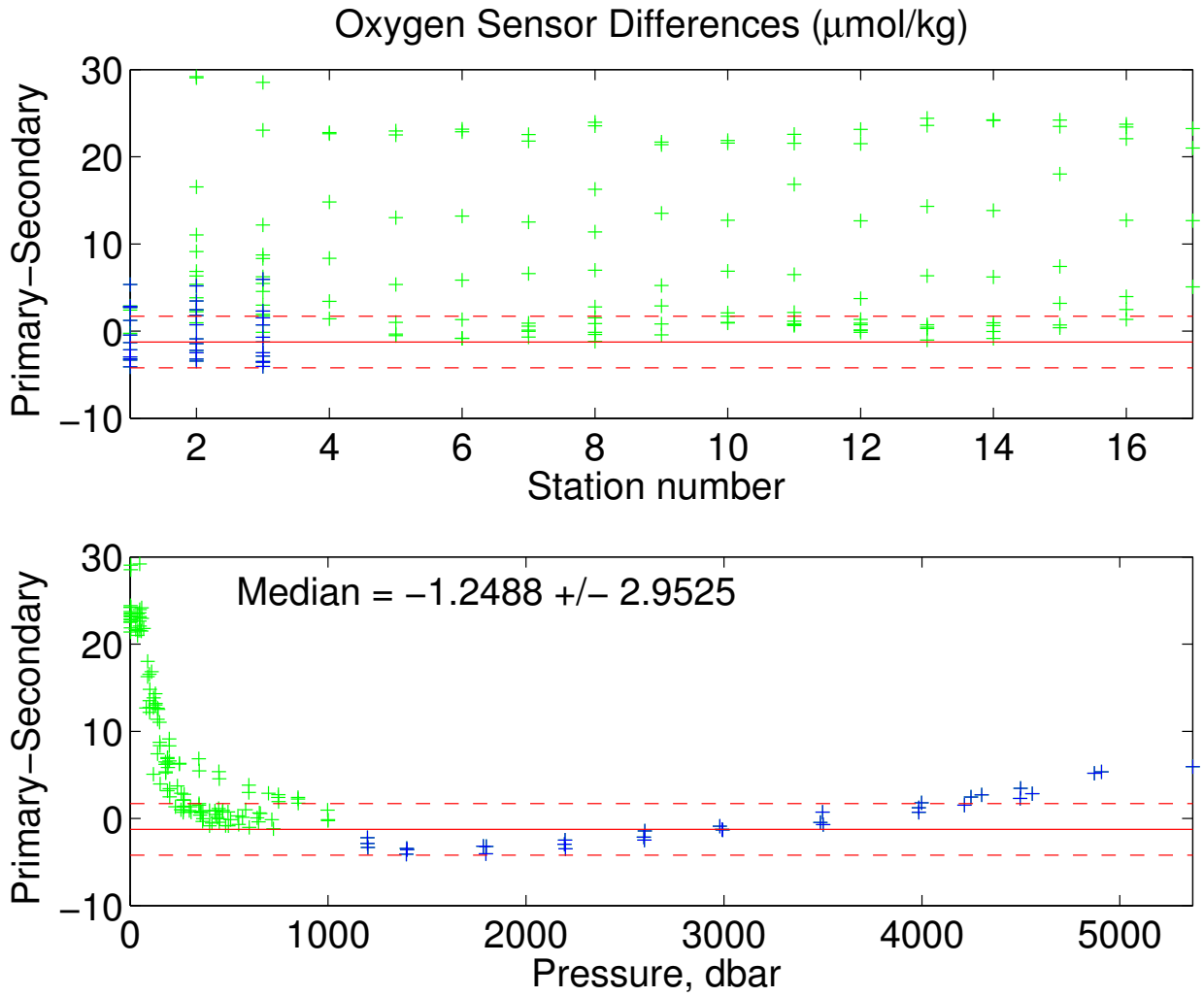



Figure 15: Dissolved oxygen differences between sensors by station (top) and by pressure (bottom). Sensor changes at station 15 and 24. The red solid line represents the median with the red dashed representing the standard deviation.

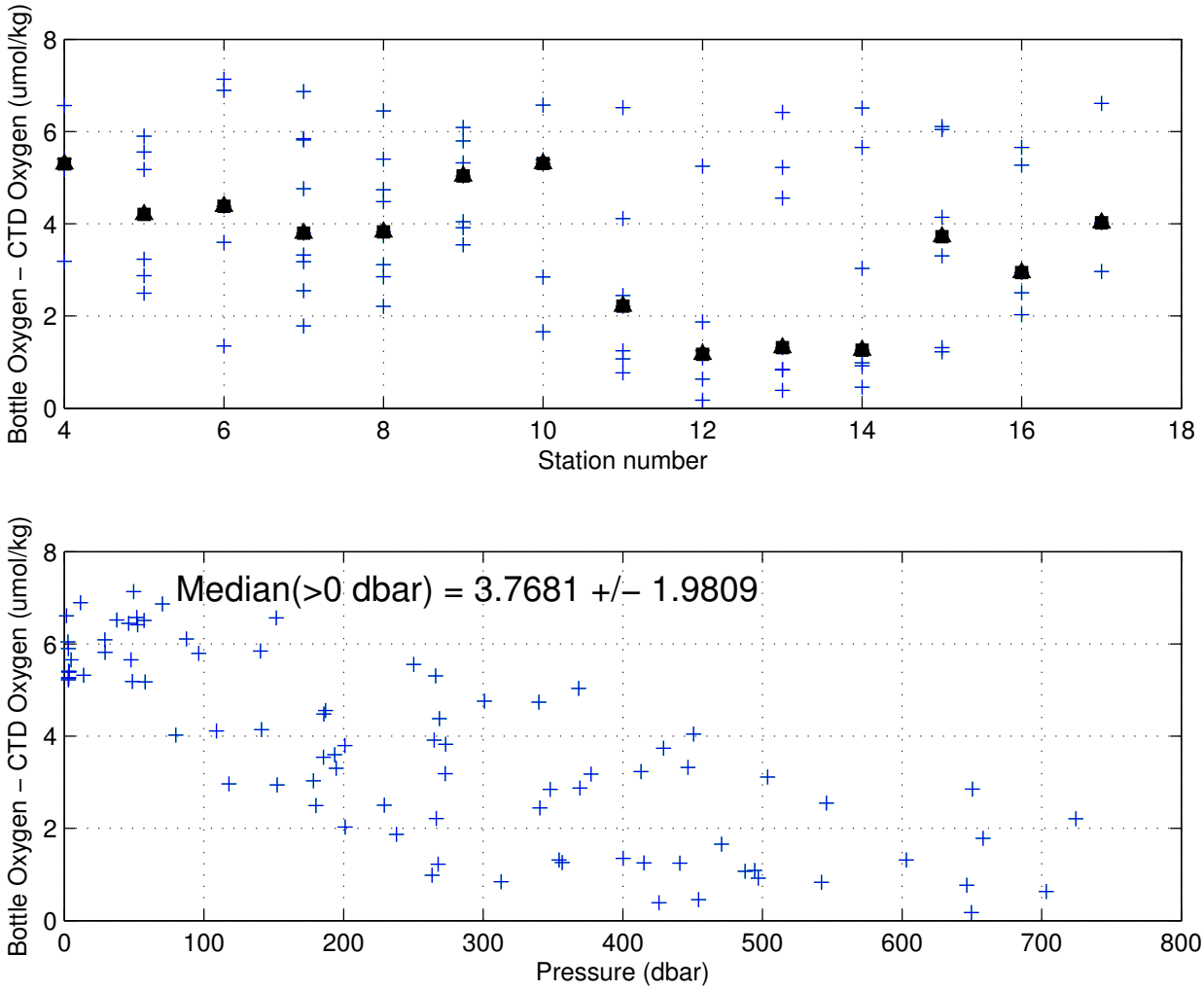



Figure 16: Bottle and uncalibrated secondary CTD oxygen differences plotted against station number. The green crosses represent all data points and the blue are the data points below 1000 dbar. The median was calculated using only the data below 1000 dbar.

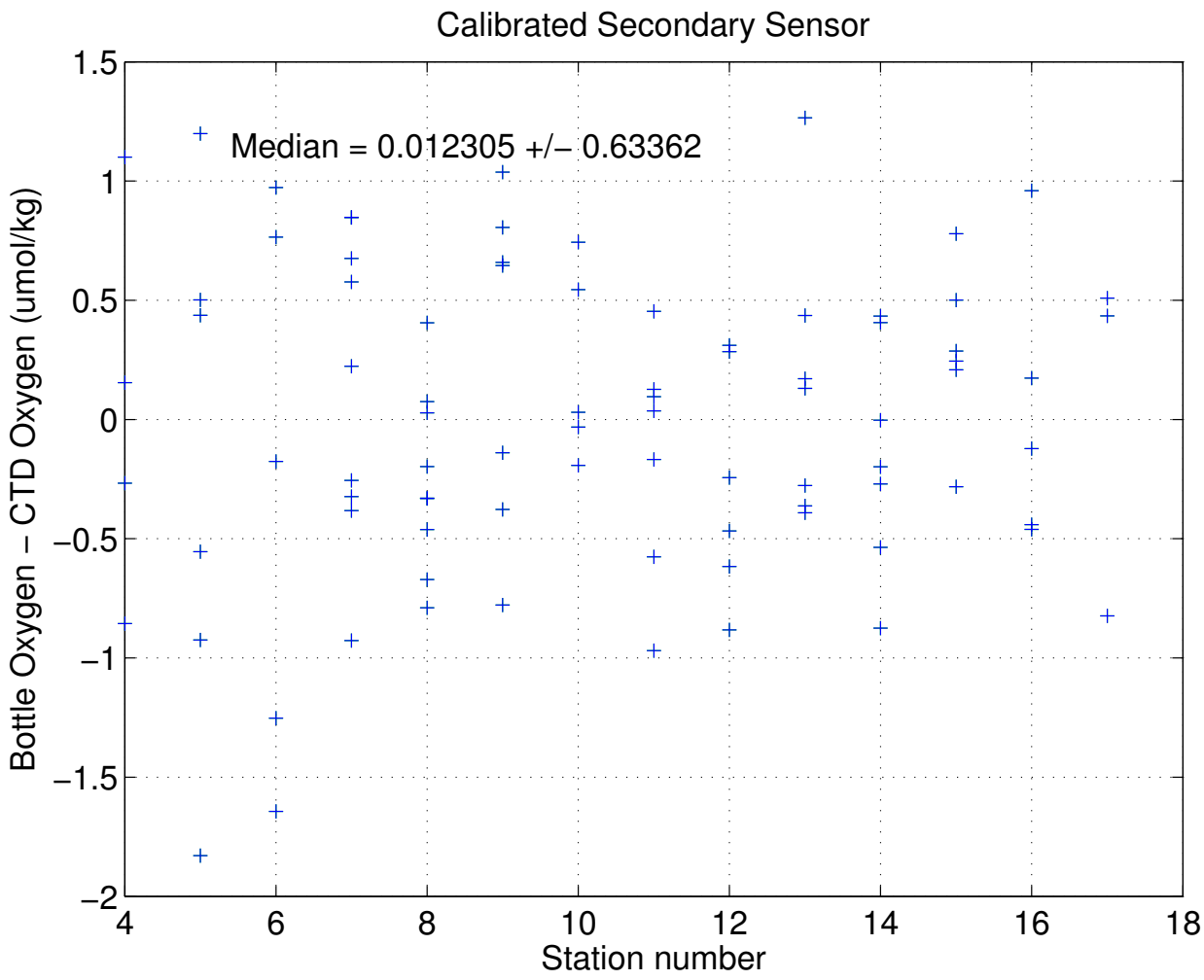



Figure 17: Bottle and calibrated secondary CTD oxygen differences plotted vs. station.

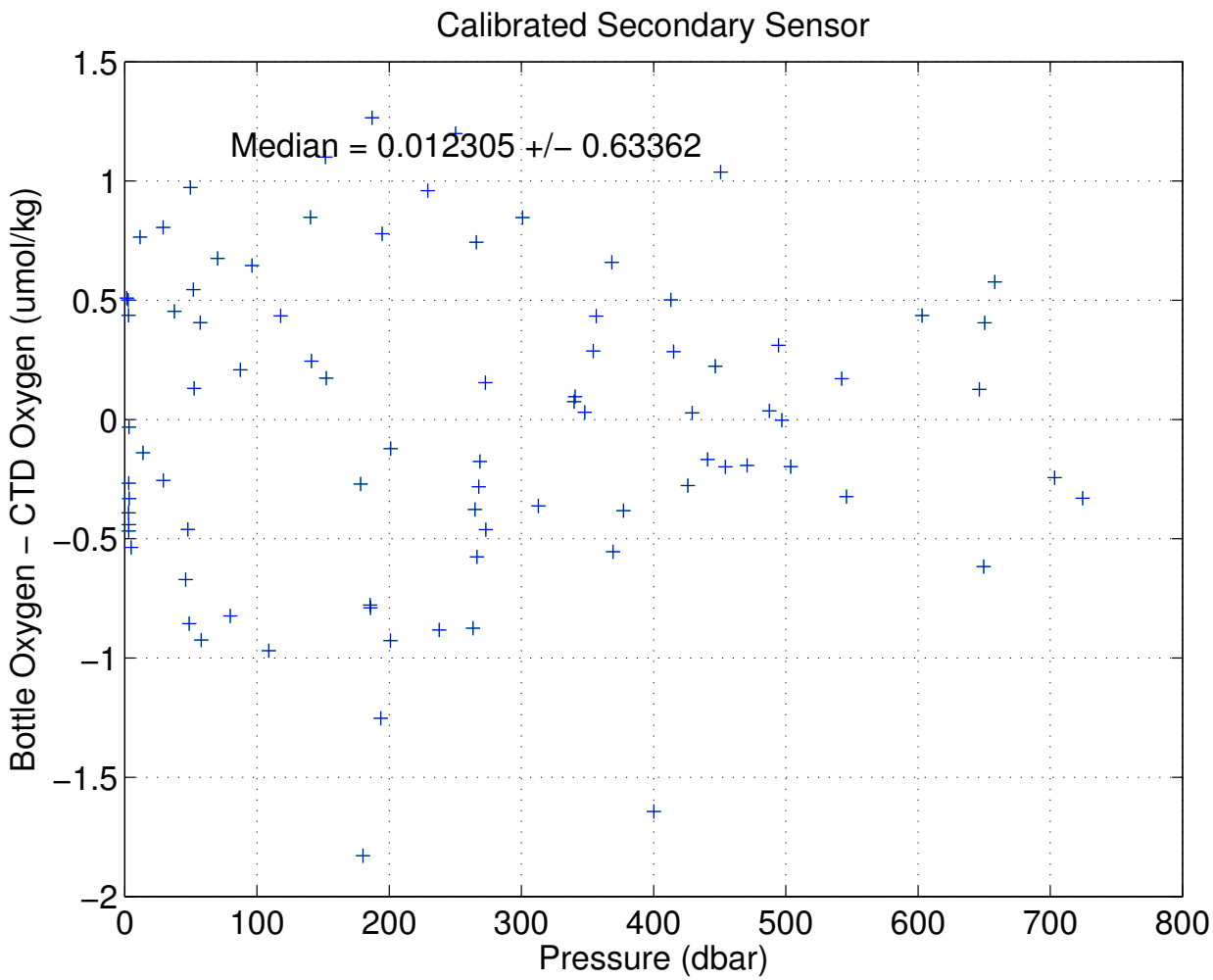



Figure 18: Bottle and calibrated secondary CTD oxygen differences plotted vs. pressure.

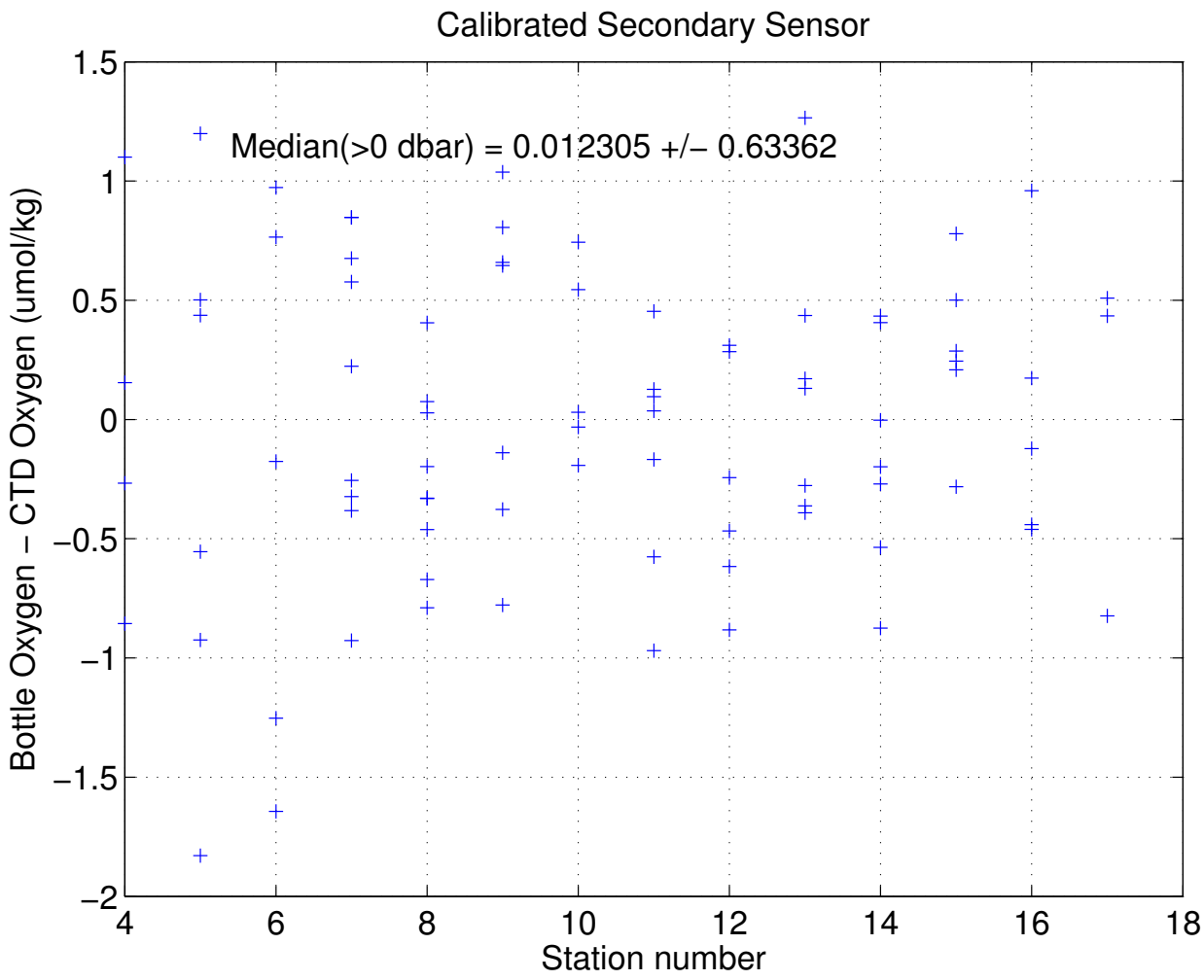



Figure 19: Bottle and calibrated secondary CTD oxygen differences plotted vs. station below 1000 dbar.

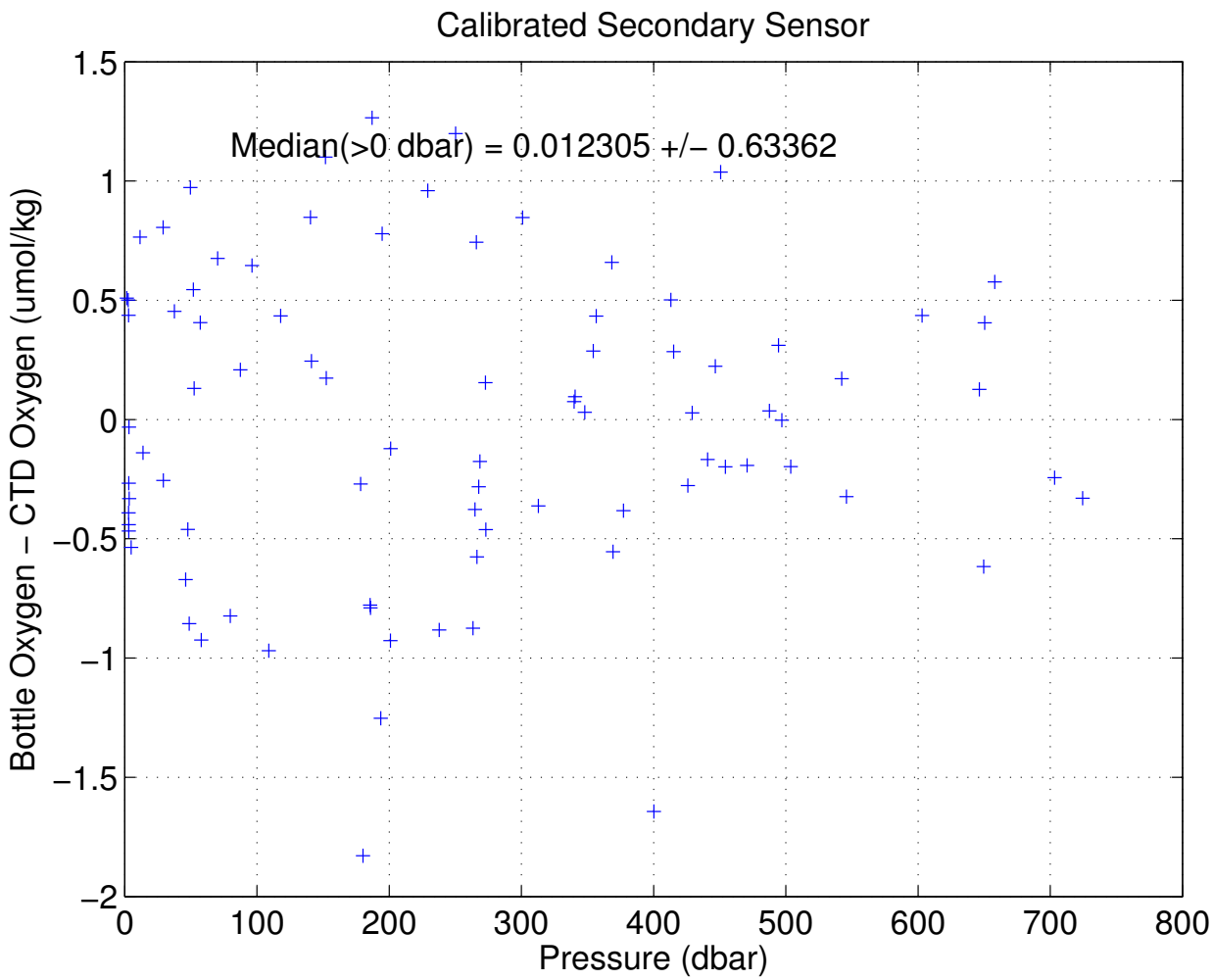



Figure 20: Bottle and calibrated secondary CTD oxygen differences plotted vs. pressure below 1000 dbar.

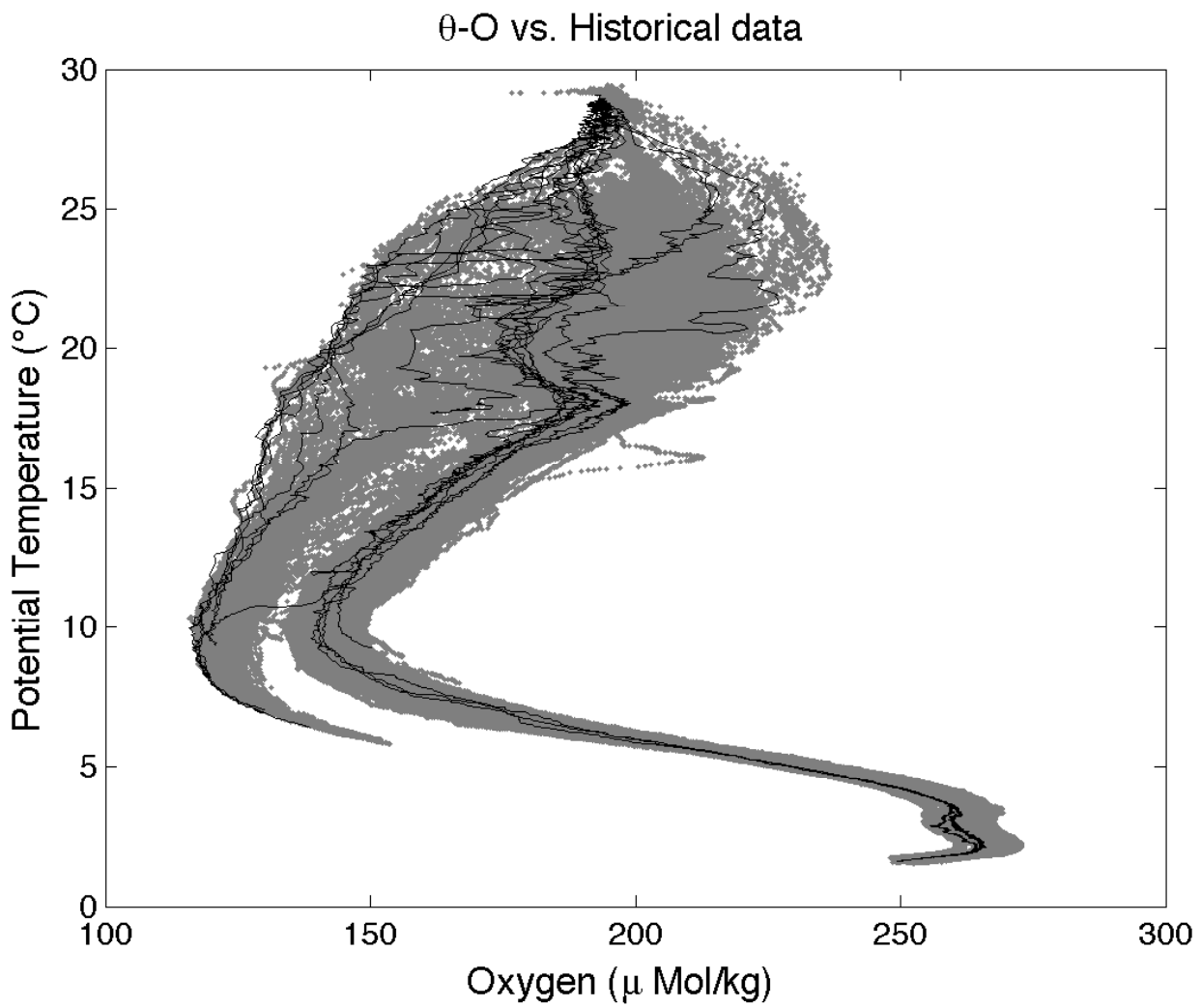



Figure 21: Potential Temperature - Oxygen diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

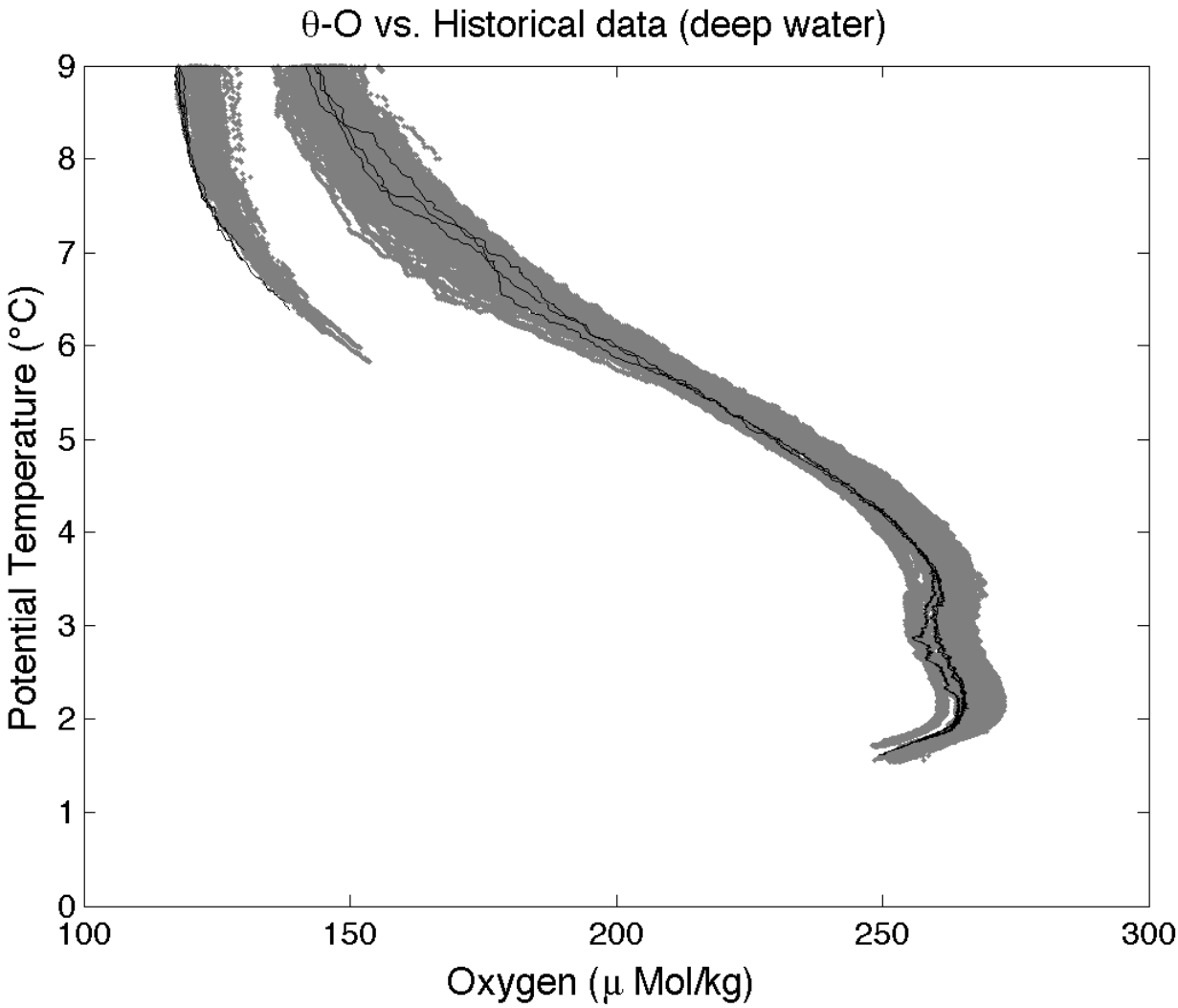



Figure 22: Potential Temperature - Oxygen diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.

# 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).

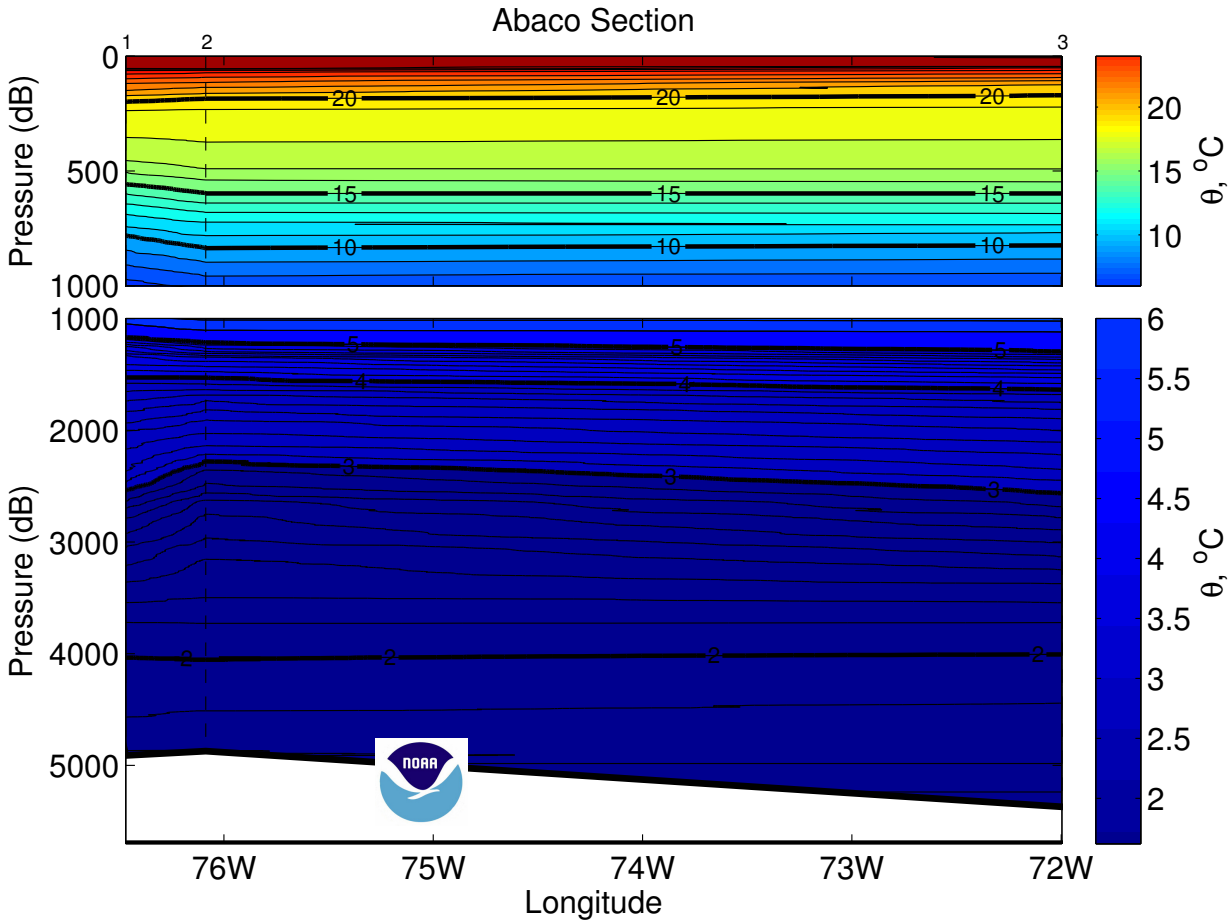



Figure 23: Potential Temperature (°C) section for the Abaco Section. Dashed vertical lines are the CTD station locations.

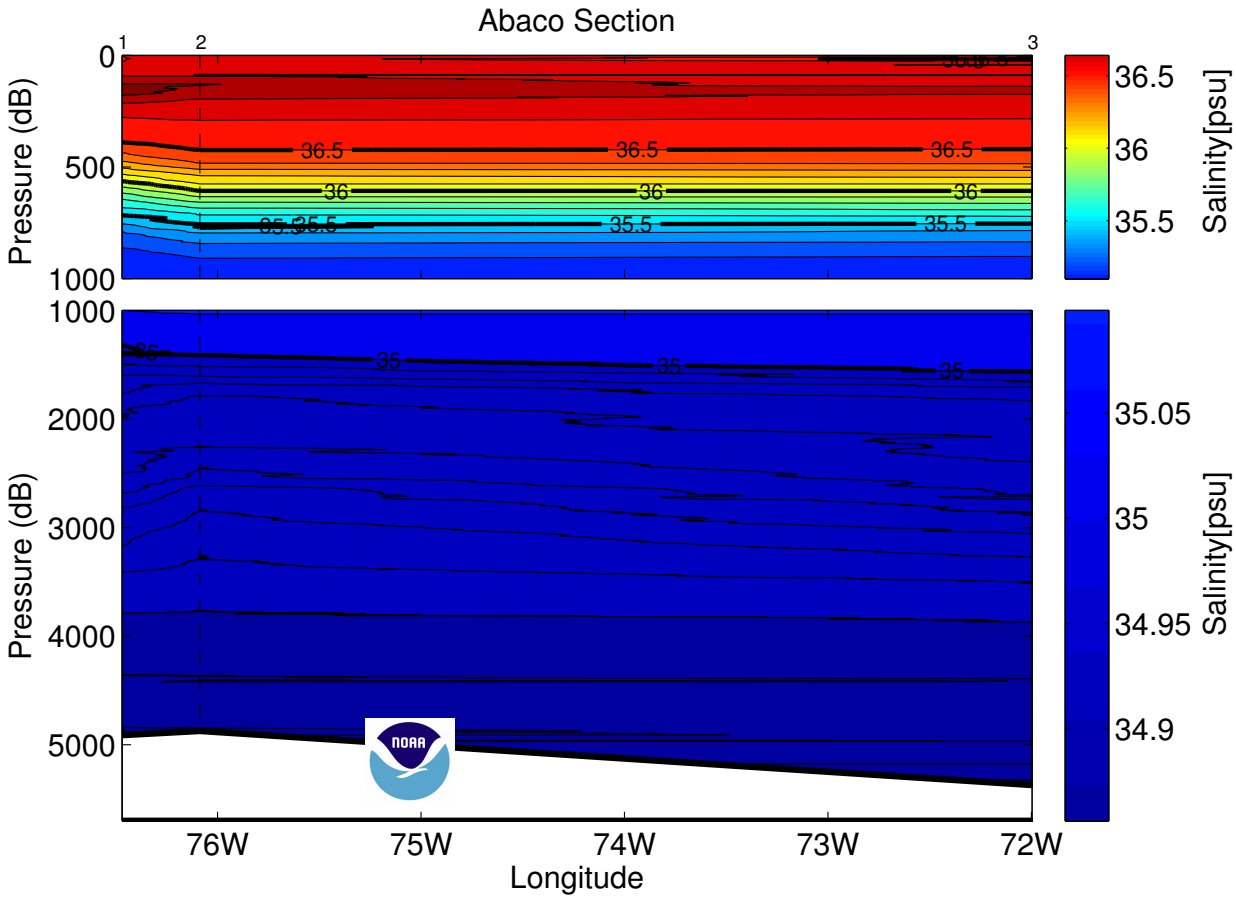



Figure 24: Salinity (PSS 78) section for the Abaco section. Dashed vertical lines are the CTD station locations.

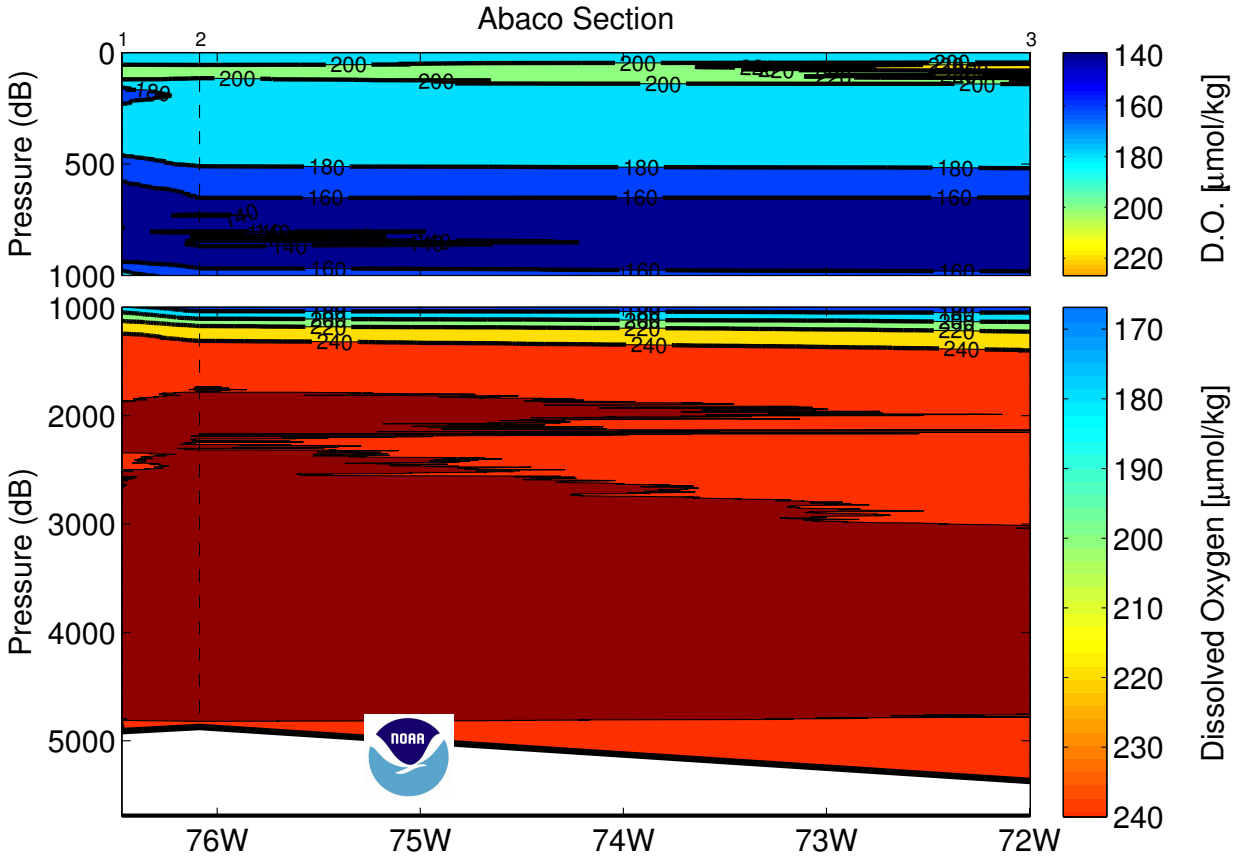



Figure 25: Dissolved Oxygen ($umol/kg$) section for the Abaco Section. Dashed vertical lines are the CTD station locations.

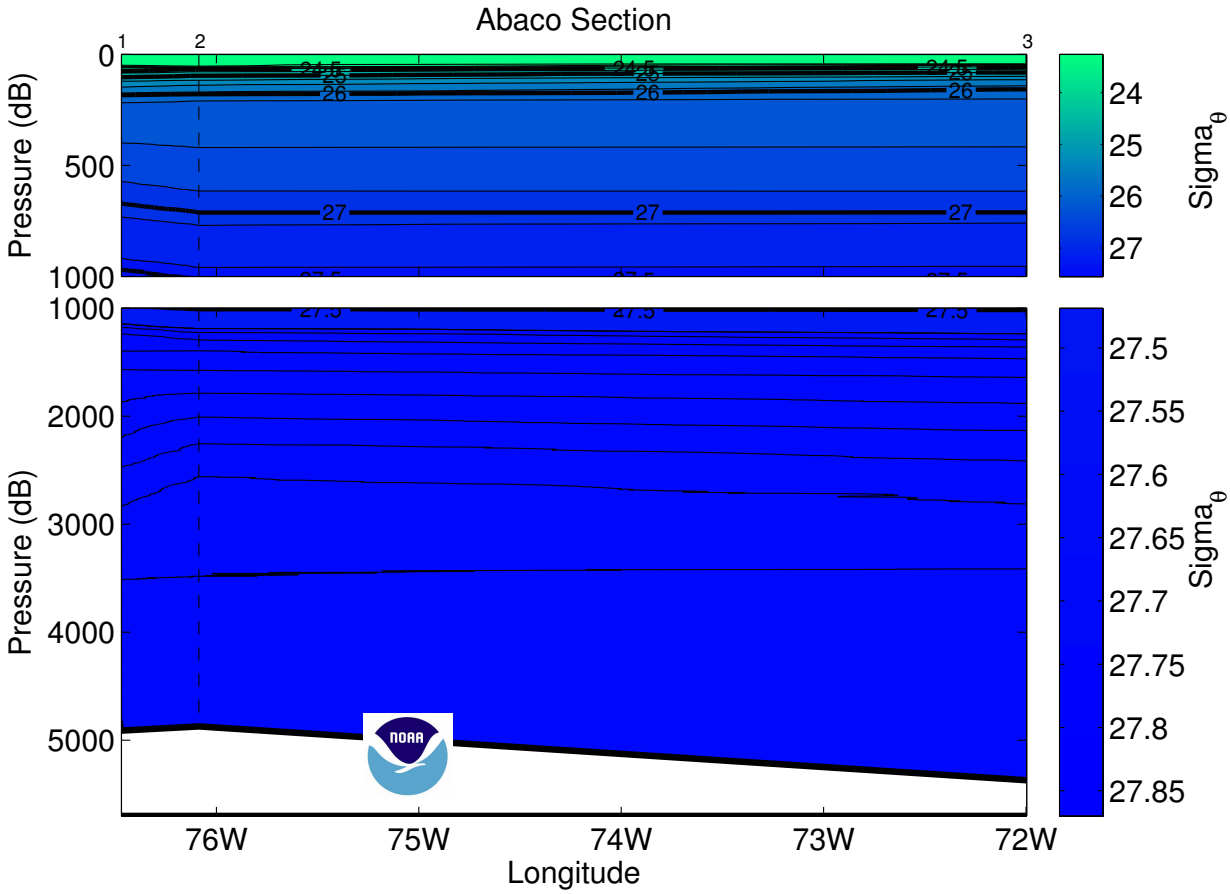



Figure 26: Neutral density (kg/m3) section for the Abaco Section. Dashed vertical lines are the CTD station locations.

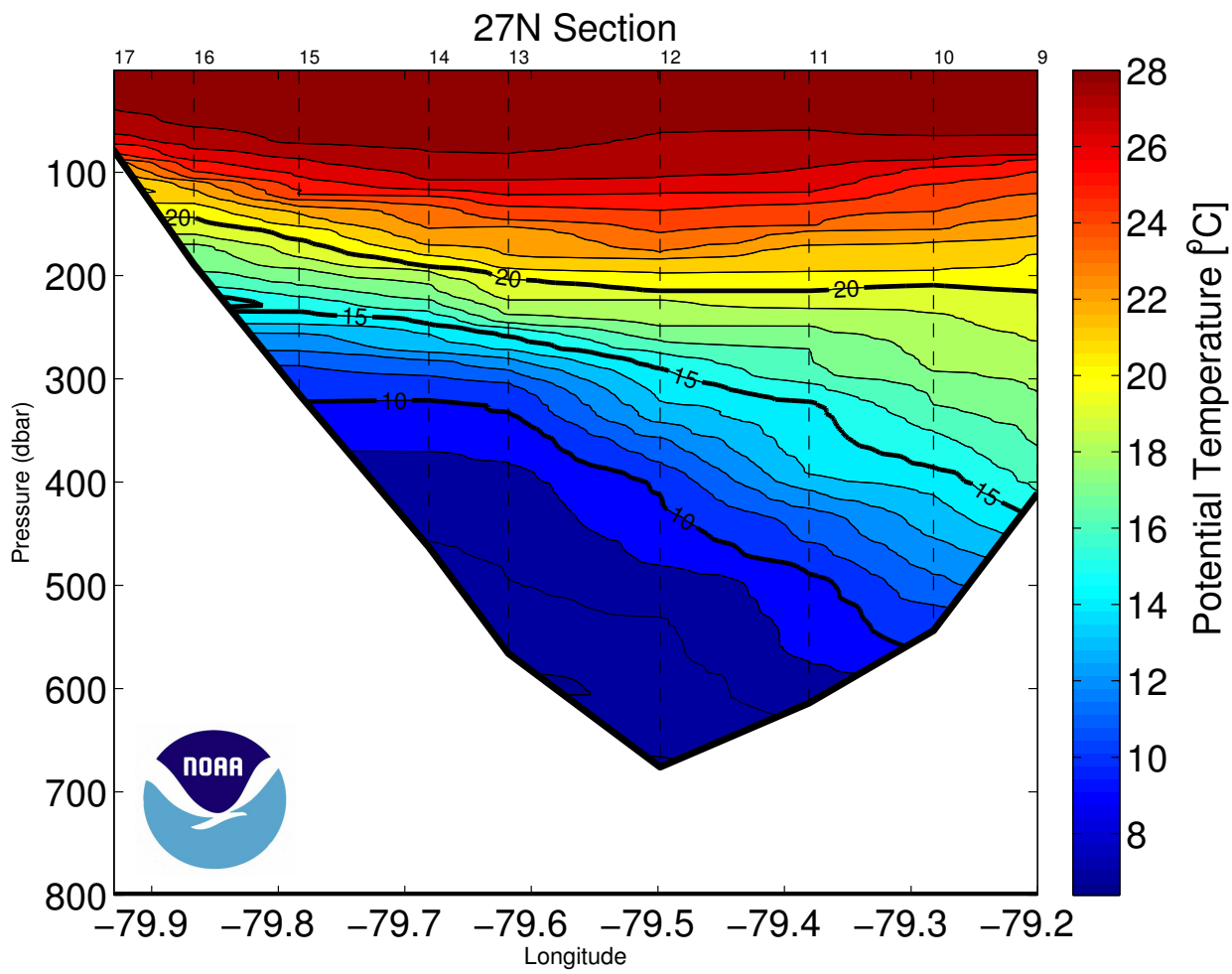



Figure 27: Potential Temperature (°C) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

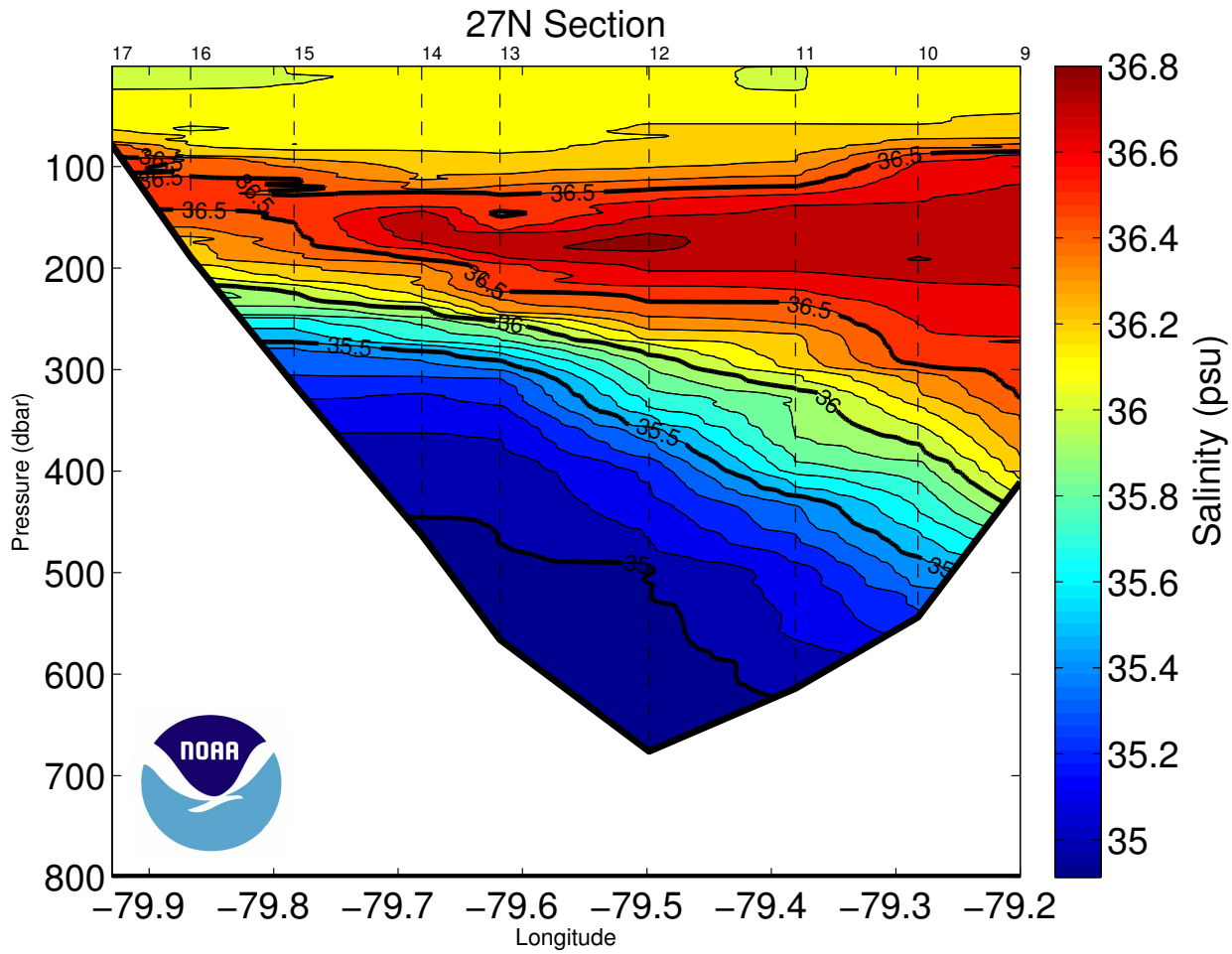



Figure 28: Salinity (PSS 78) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

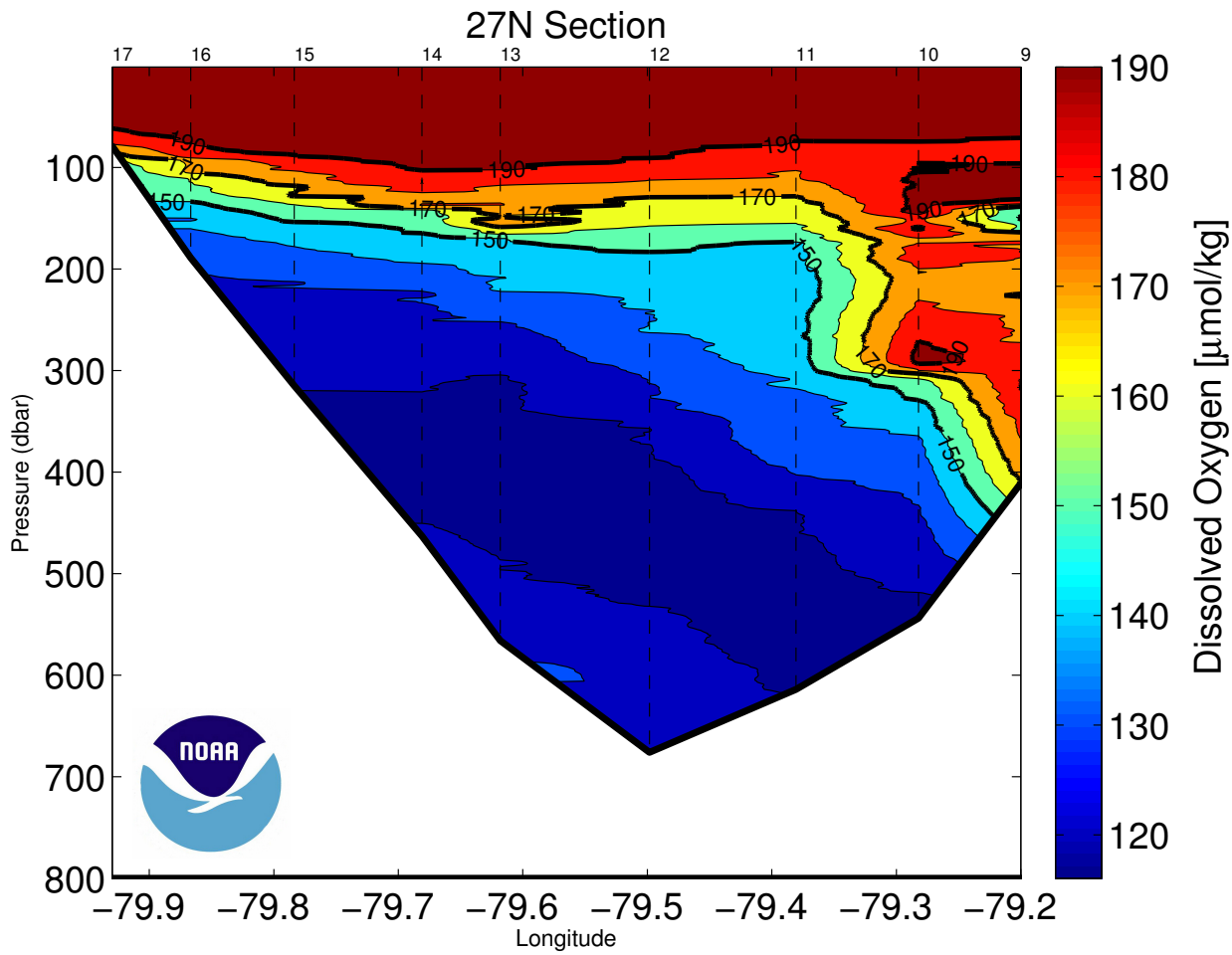



Figure 29: Dissolved Oxygen ($umol/kg$) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

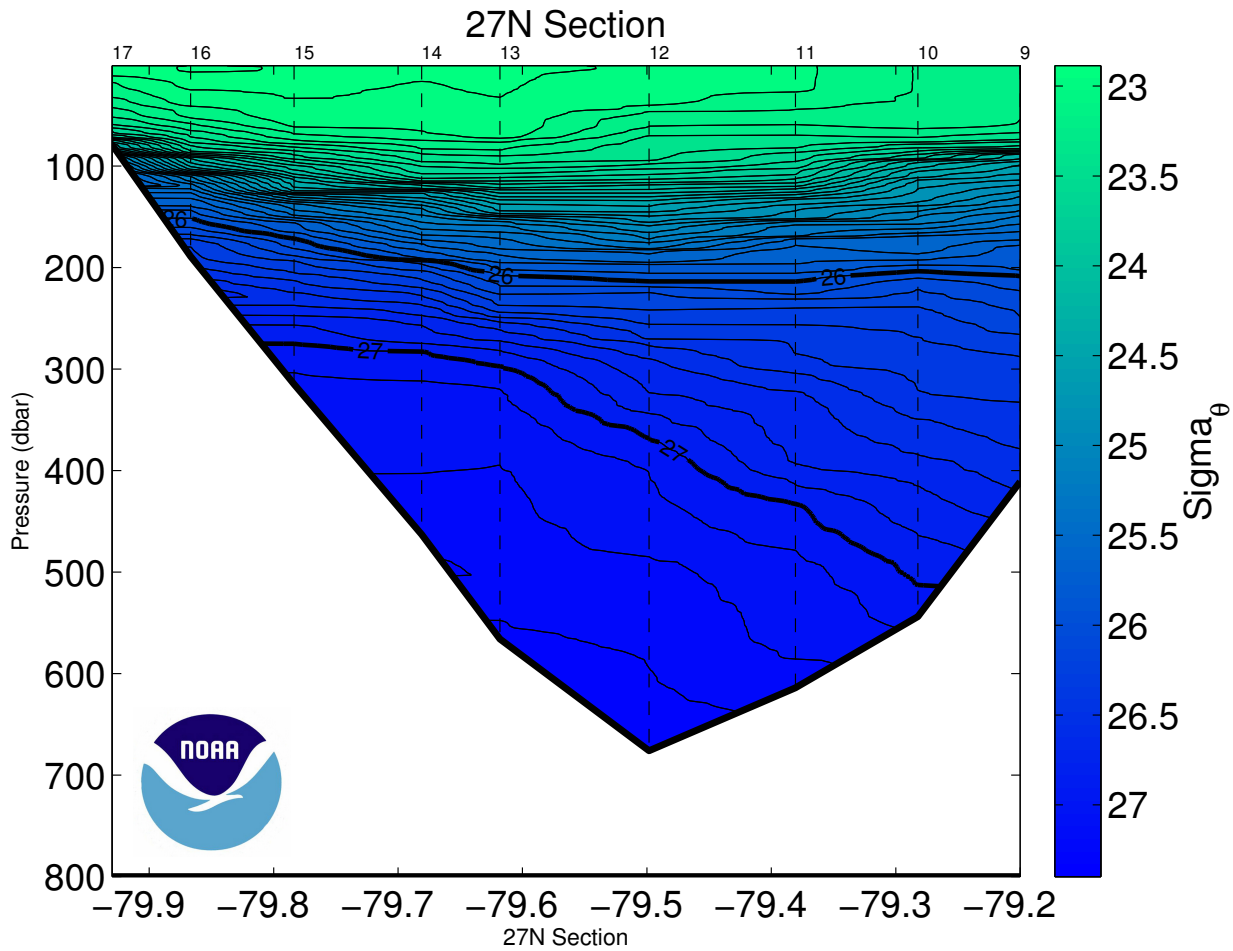



Figure 30: Neutral density (kg/m3) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

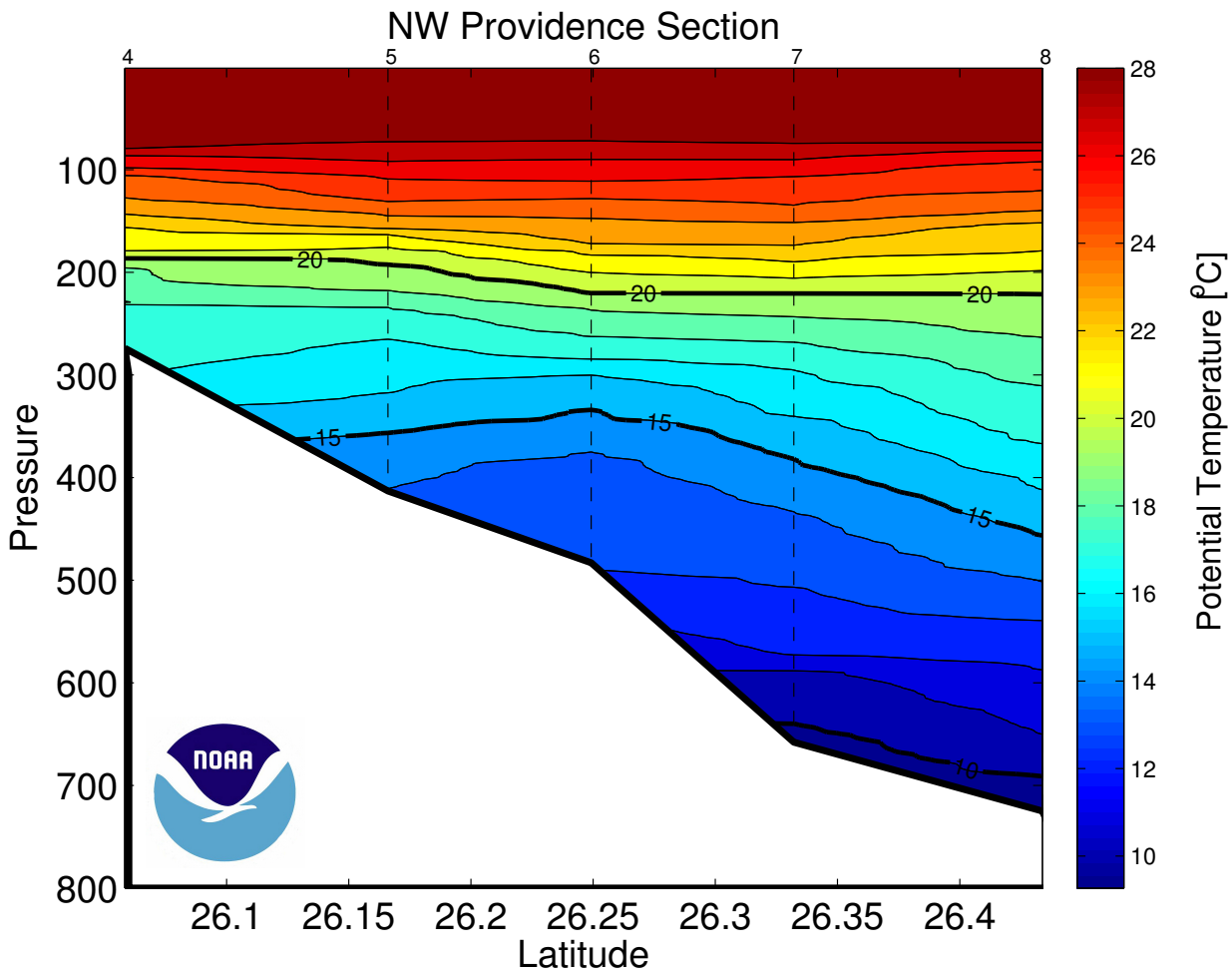



Figure 31: Potential Temperature (°C) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

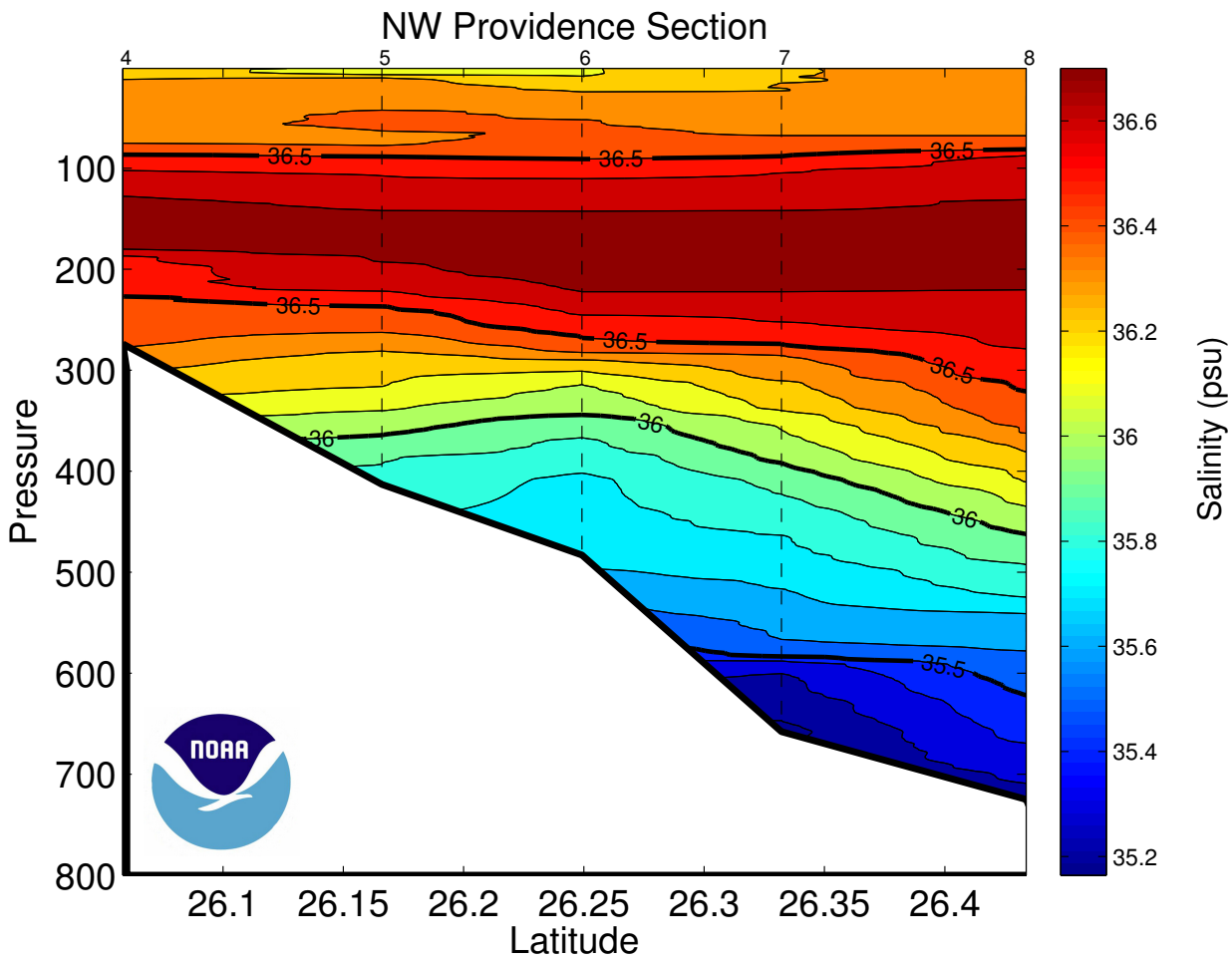



Figure 32: Salinity (PSS 78) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

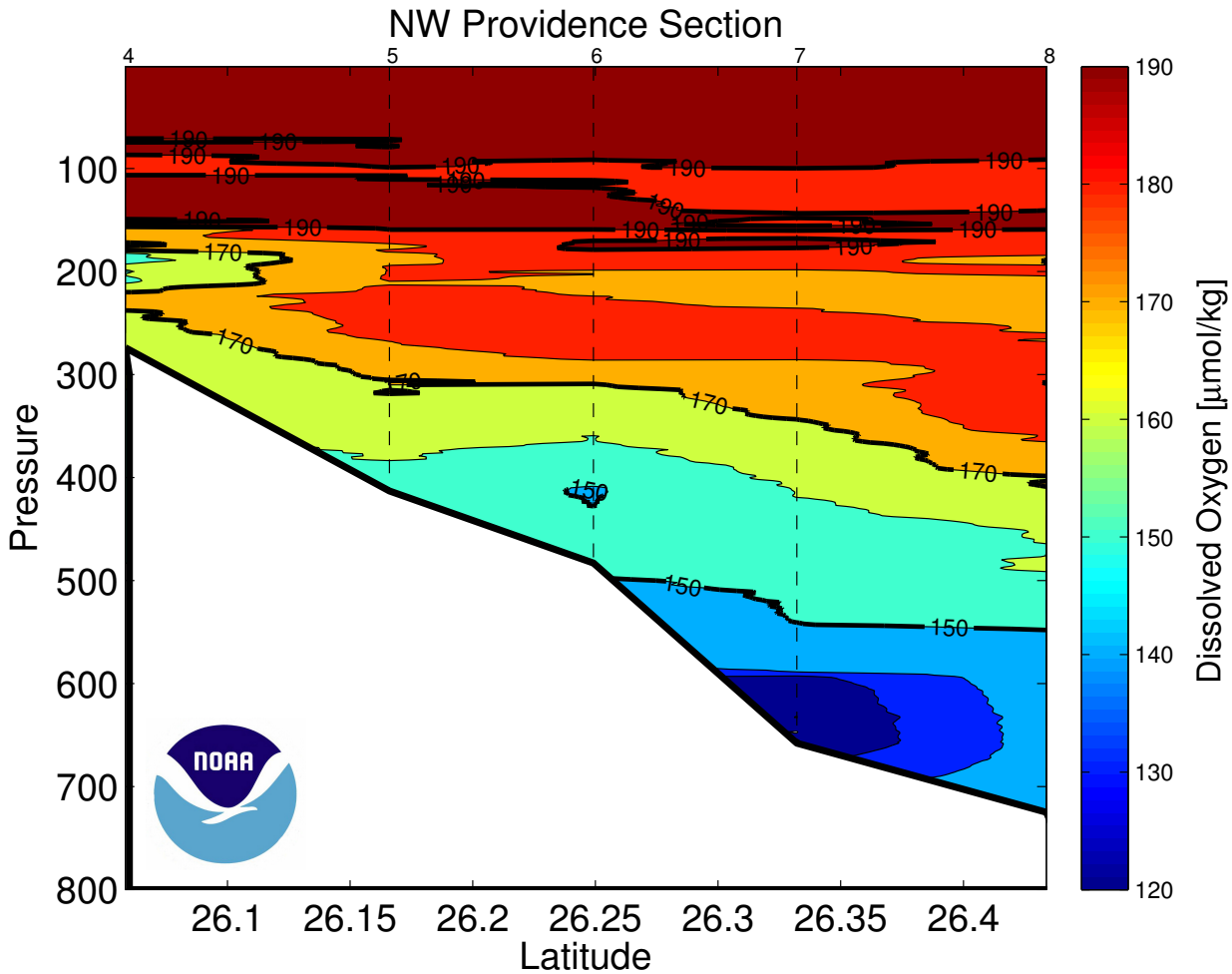



Figure 33: Dissolved Oxygen ($umol/kg$) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

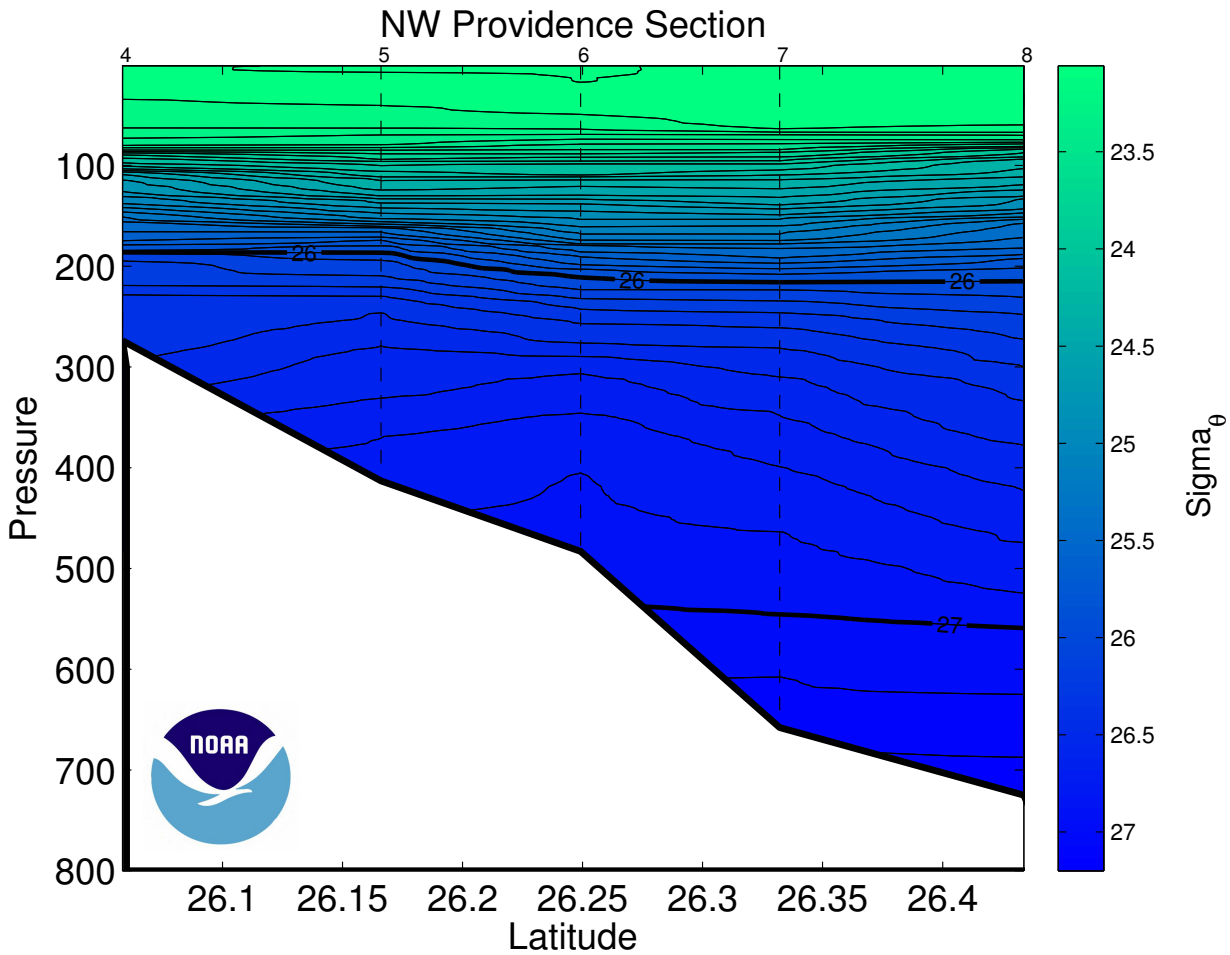



Figure 34: Neutral density (kg/m3) section for the Northwest Providence Channel section. Dashed vertical lines are the CTD station locations.

# 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.

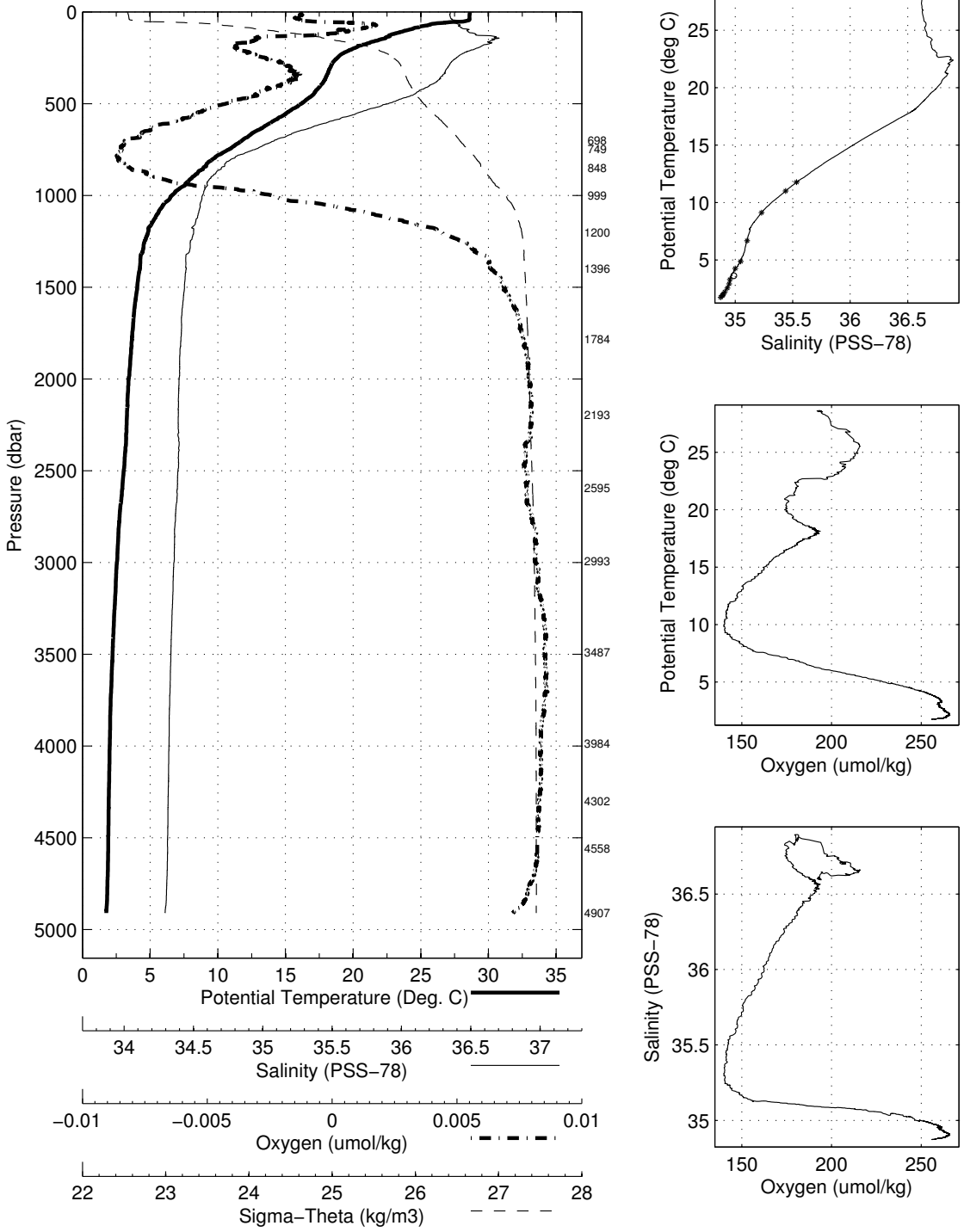
# A Hydrographic - CTD Data

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

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT kg·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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**

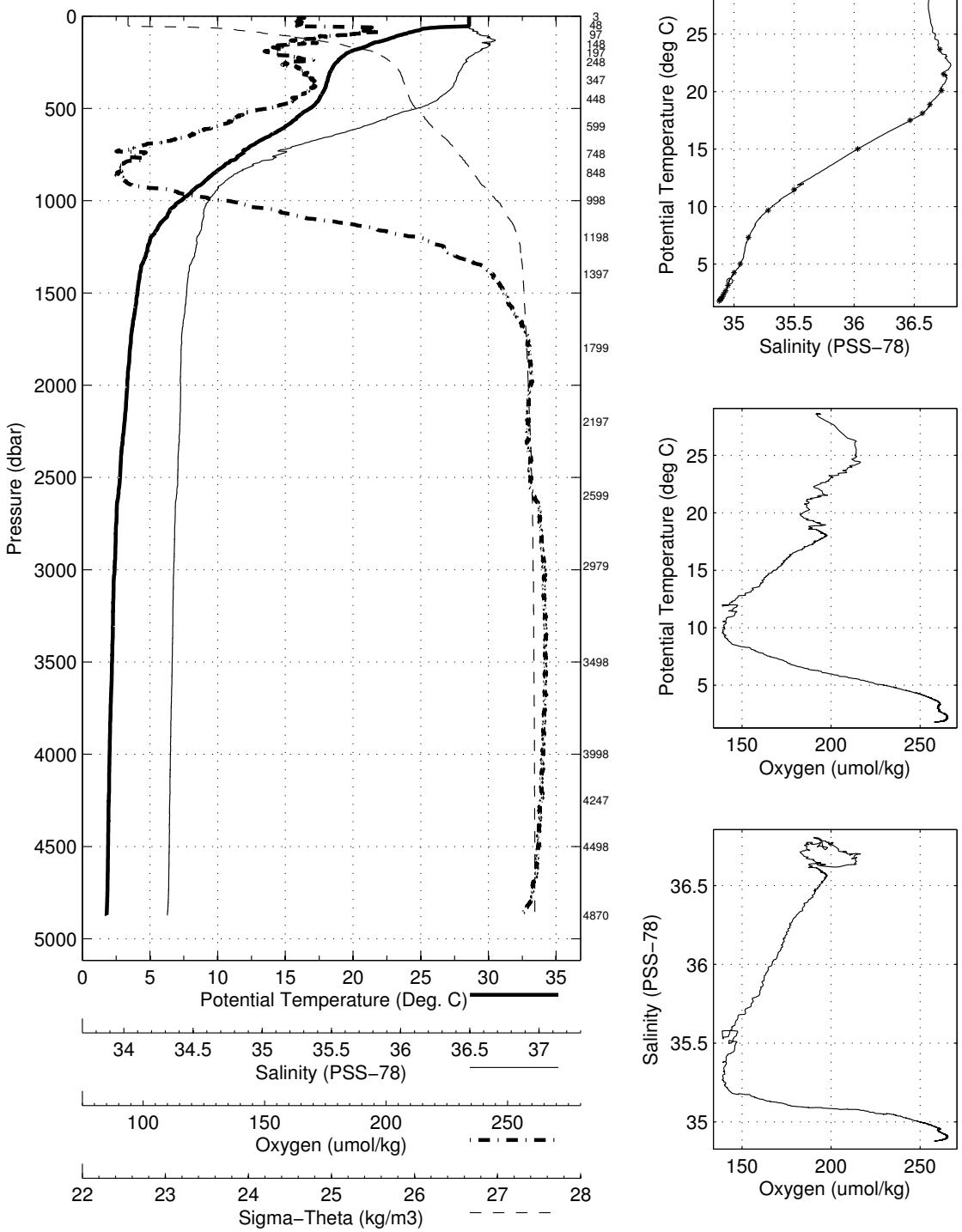


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 2 (CTD002)
Latitude 26.502N Longitude 76.087W
28-Sep-2008 12:19Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT kg·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·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**

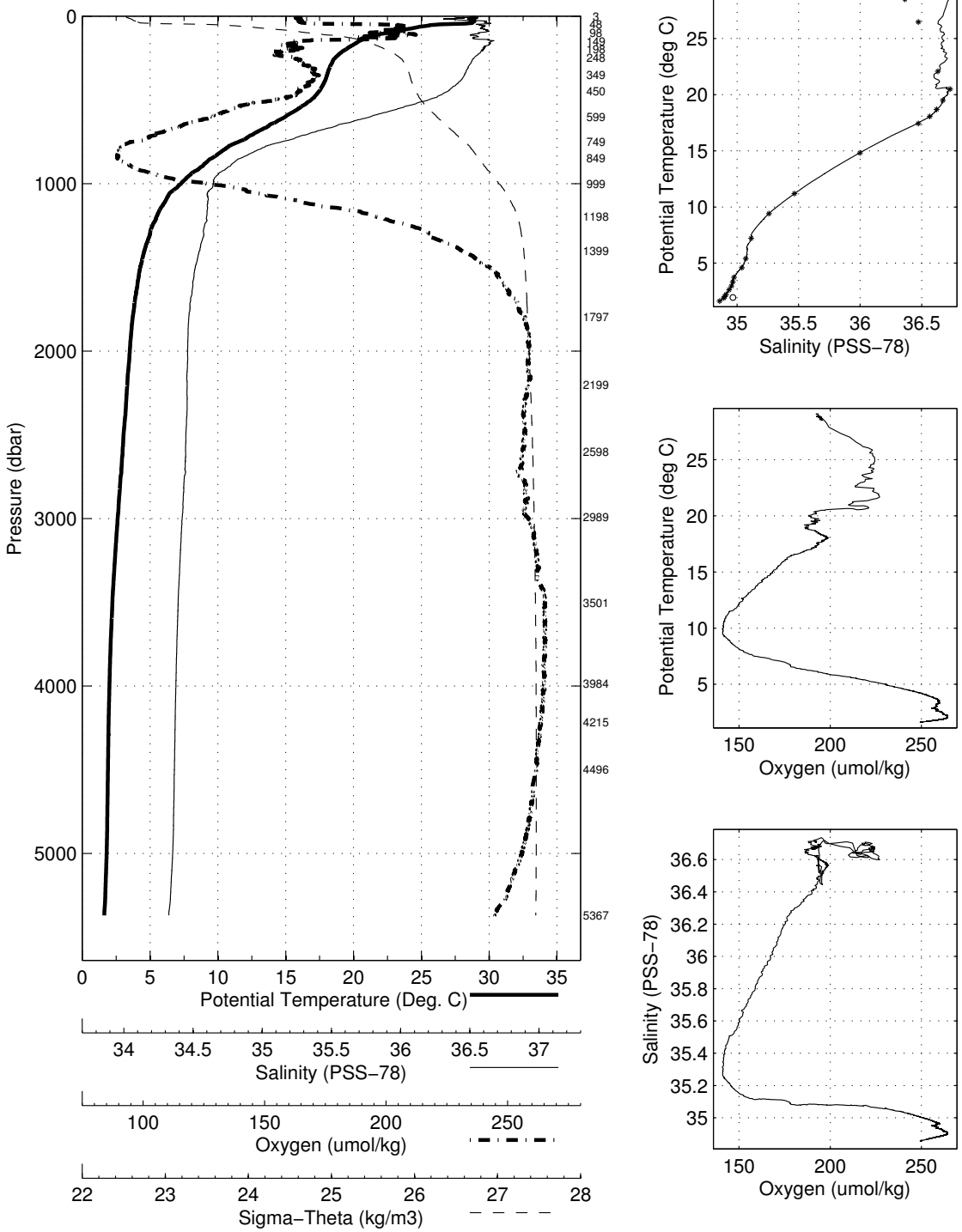


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 3 (CTD003)
Latitude 26.502N Longitude 71.997W
29-Sep-2008 04:06Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**

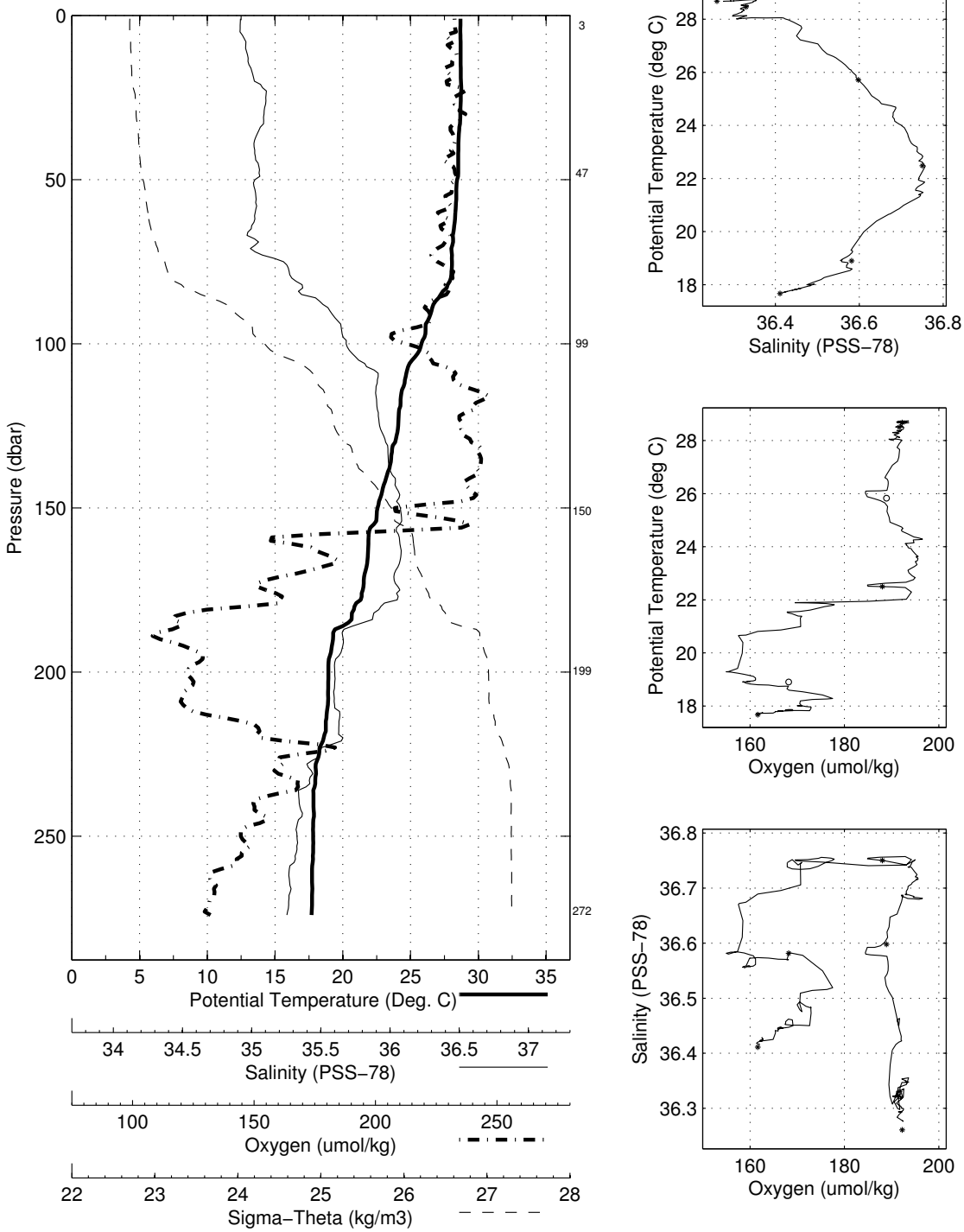


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 4 (CTD004)
Latitude 26.058N Longitude 78.849W
01-Oct-2008 22:10Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**

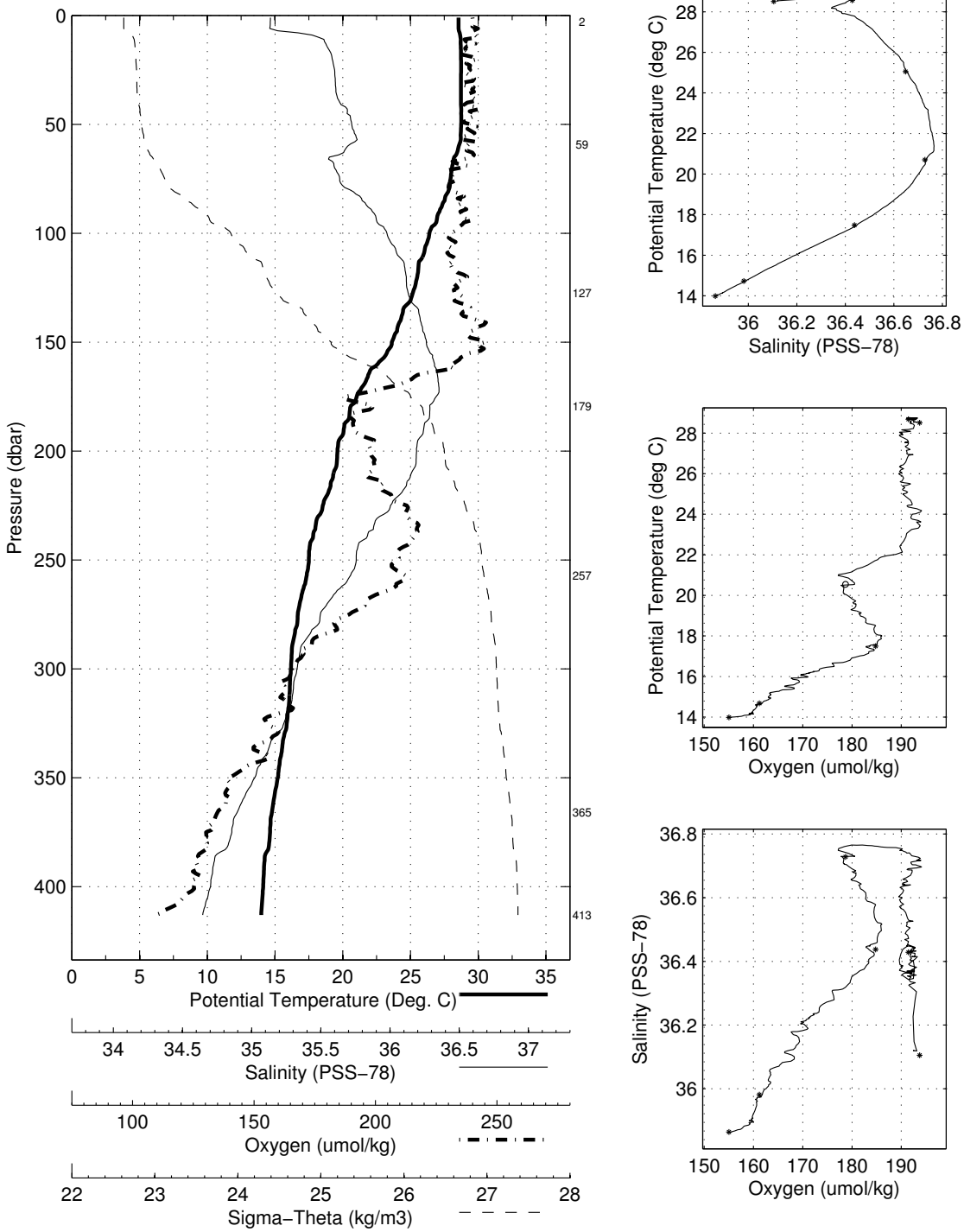


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 5 (CTD005)
Latitude 26.166N Longitude 78.801W
01-Oct-2008 23:38Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**

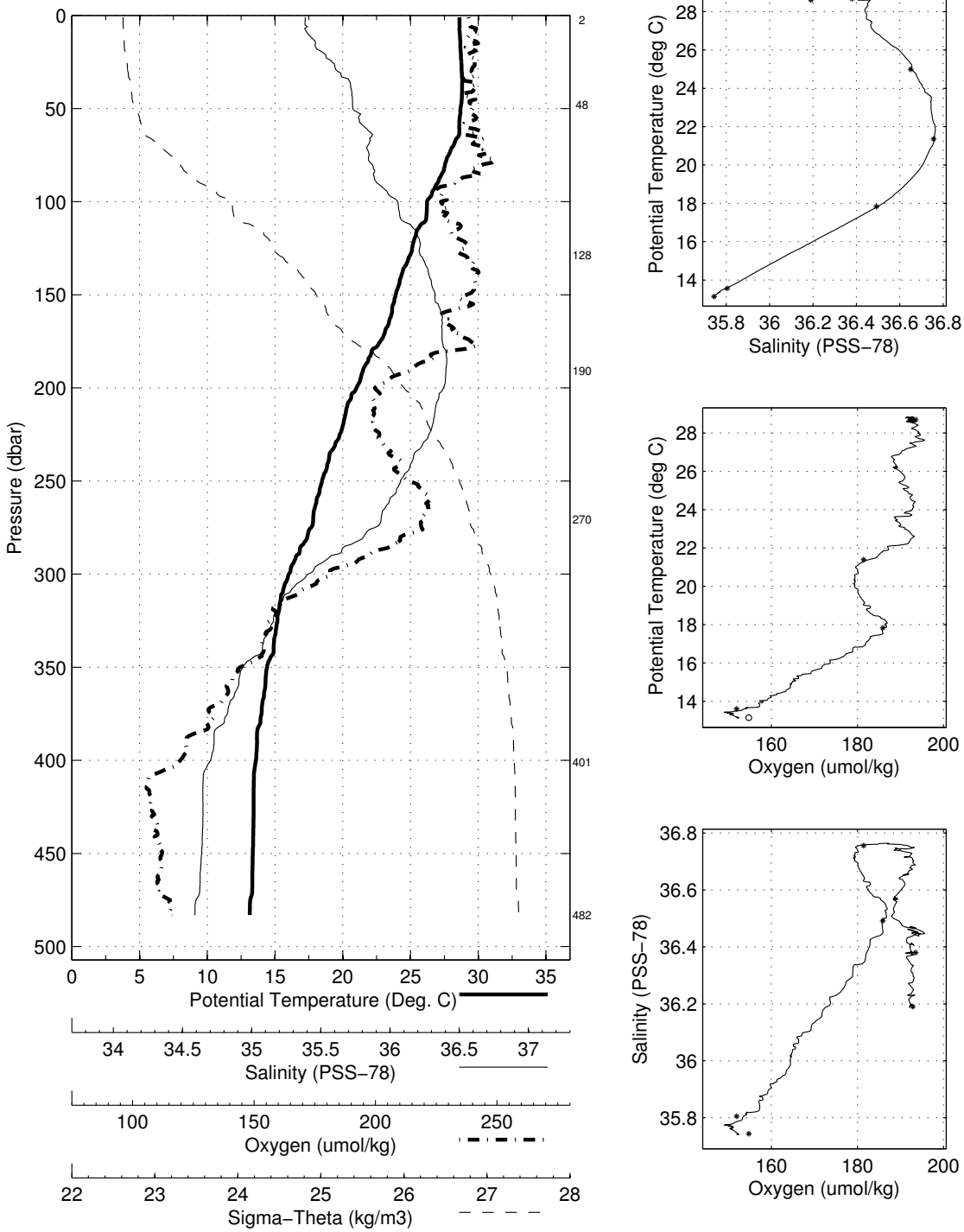


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 6 (CTD006)
Latitude 26.249N Longitude 78.768W
01-Oct-2008 00:59Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**

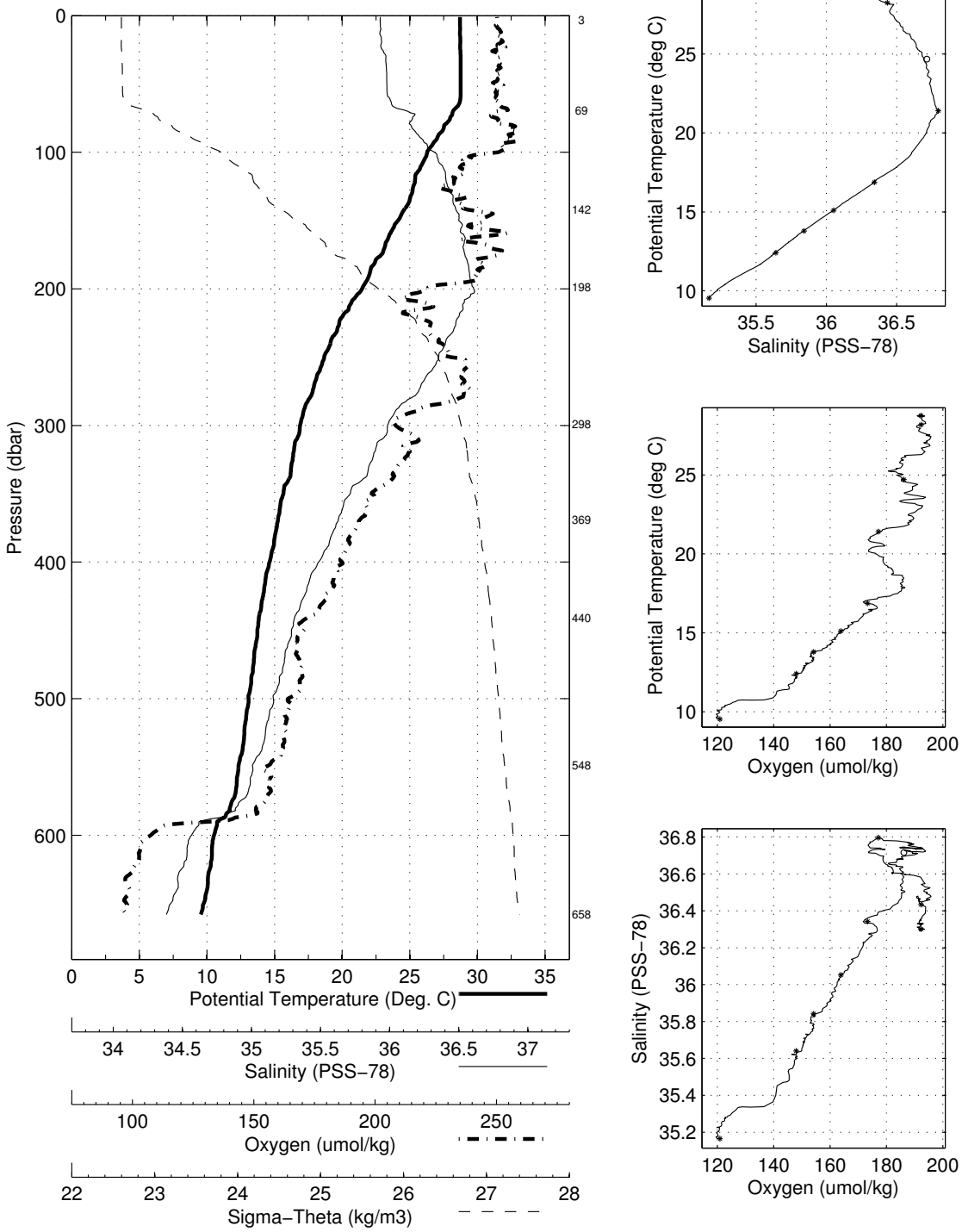


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 7 (CTD007)
Latitude 26.332N Longitude 78.720W
01-Oct-2008 02:12Z

| 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 | 28.712 | 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu mol \cdot kg^{-1}$ |
|---|---|---|---|---|---|
| 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**

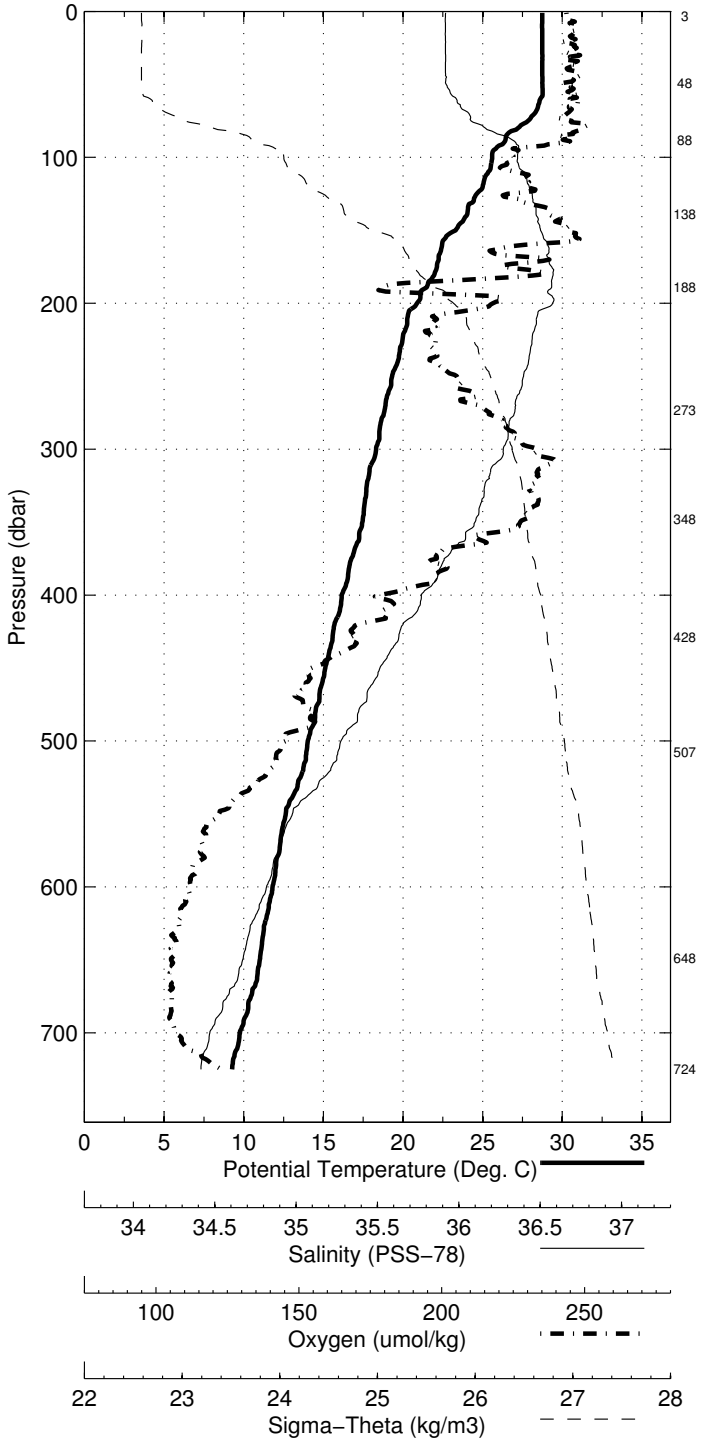


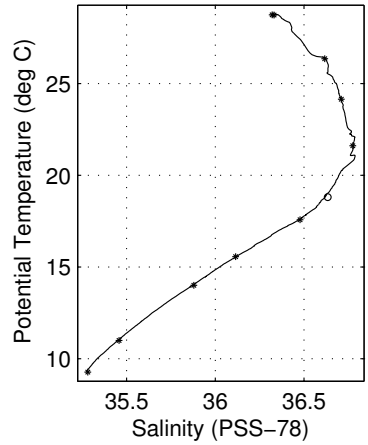
Abaco September - October 2008 R/V Cape Hatteras
CTD Station 8 (CTD008)
Latitude 26.434N Longitude 78.666W
01-Oct-2008 03:41Z

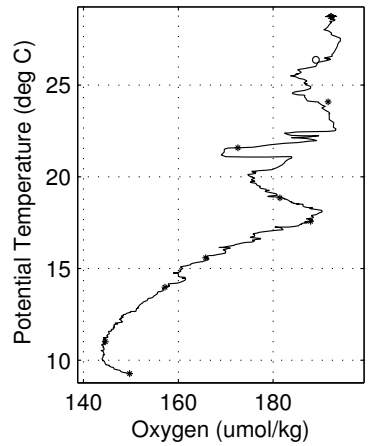
| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT kg·m$^{-3}$ |
|---|---|---|---|---|---|---|
| 1 | 28.746 | 28.746 | 36.323 | 191.7 | 0.005 | 23.143 |
| 10 | 28.736 | 28.733 | 36.323 | 192.3 | 0.047 | 23.147 |
| 20 | 28.742 | 28.737 | 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 |

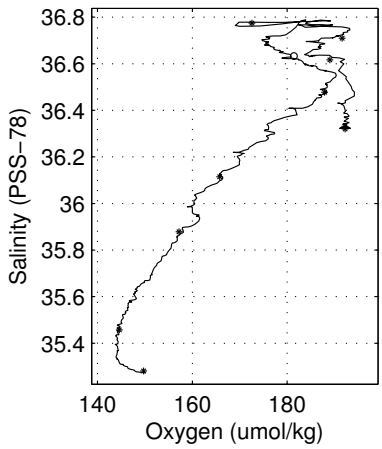
| Pressure dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ |
|---|---|---|---|---|---|
| 725 | 2 | 9.352 | 9.269 | 35.281 | 149.7 |
| 649 | 4 | 11.070 | 10.987 | 35.457 | 144.6 |
| 508 | 6 | 14.071 | 13.996 | 35.879 | 157.2 |
| 429 | 8 | 15.630 | 15.563 | 36.114 | 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**



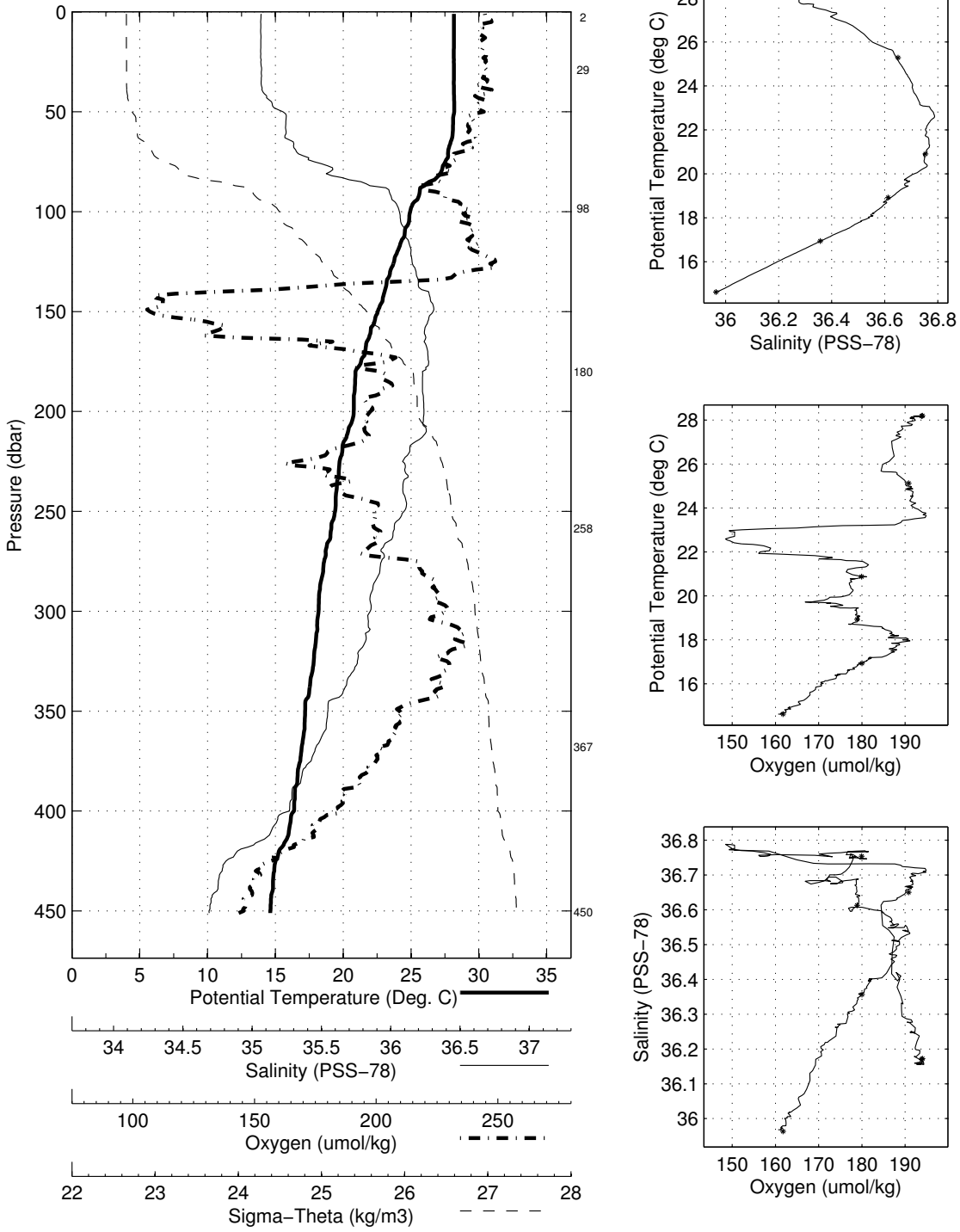



Abaco September - October 2008 R/V Cape Hatteras
CTD Station 9 (CTD009)
Latitude 27.000N Longitude 79.200W
02-Oct-2008 13:03Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT kg·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·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**

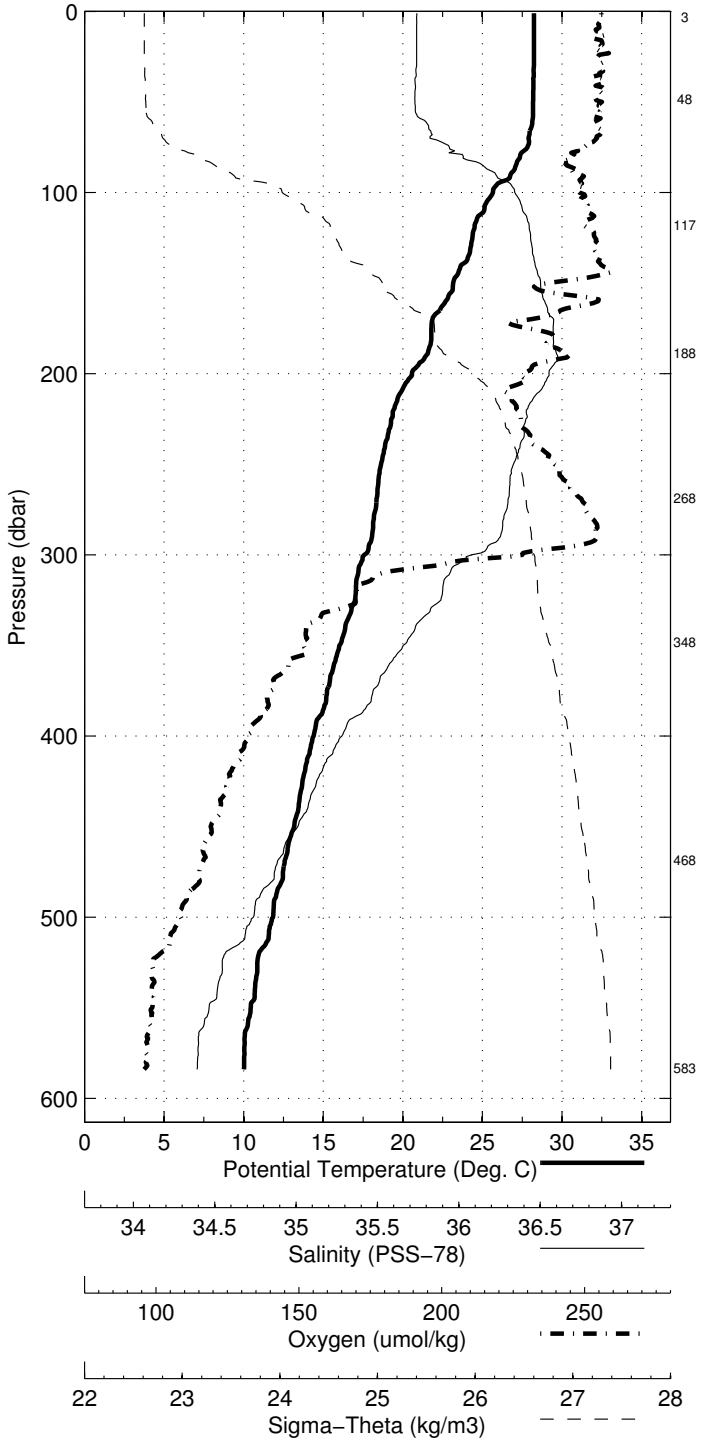


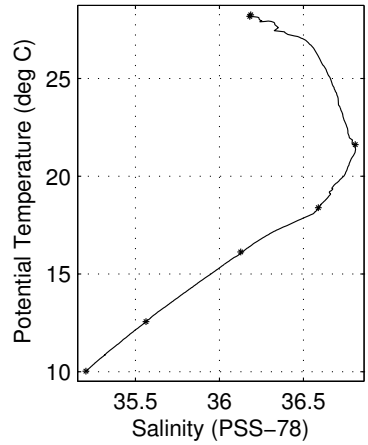
Abaco September - October 2008 R/V Cape Hatteras
CTD Station 10 (CTD010)
Latitude 27.000N Longitude 79.282W
02-Oct-2008 14:16Z

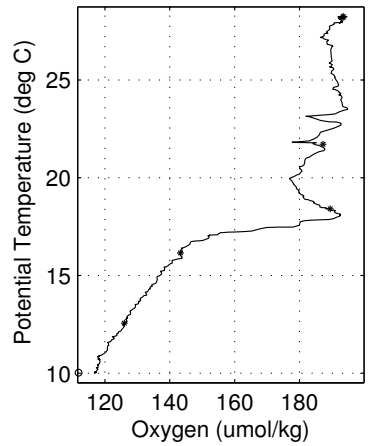
| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT kg·m$^{-3}$ |
|---|---|---|---|---|---|---|
| 1 | 28.239 | 28.239 | 36.183 | 193.3 | 0.005 | 23.206 |
| 10 | 28.240 | 28.237 | 36.181 | 192.4 | 0.047 | 23.205 |
| 20 | 28.241 | 28.236 | 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 |

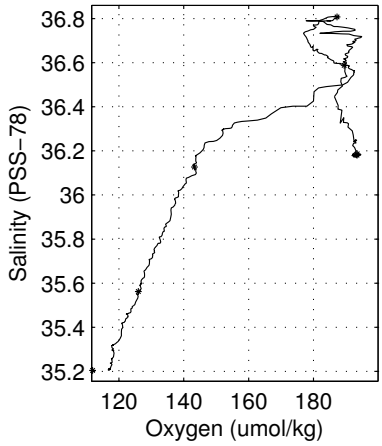
| Pressure dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ |
|---|---|---|---|---|---|
| 583 | 2 | 10.091 | 10.022 | 35.205 | 111.9 |
| 469 | 4 | 12.623 | 12.559 | 35.562 | 126.0 |
| 348 | 6 | 16.181 | 16.125 | 36.127 | 143.3 |
| 269 | 8 | 18.440 | 18.392 | 36.588 | 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**



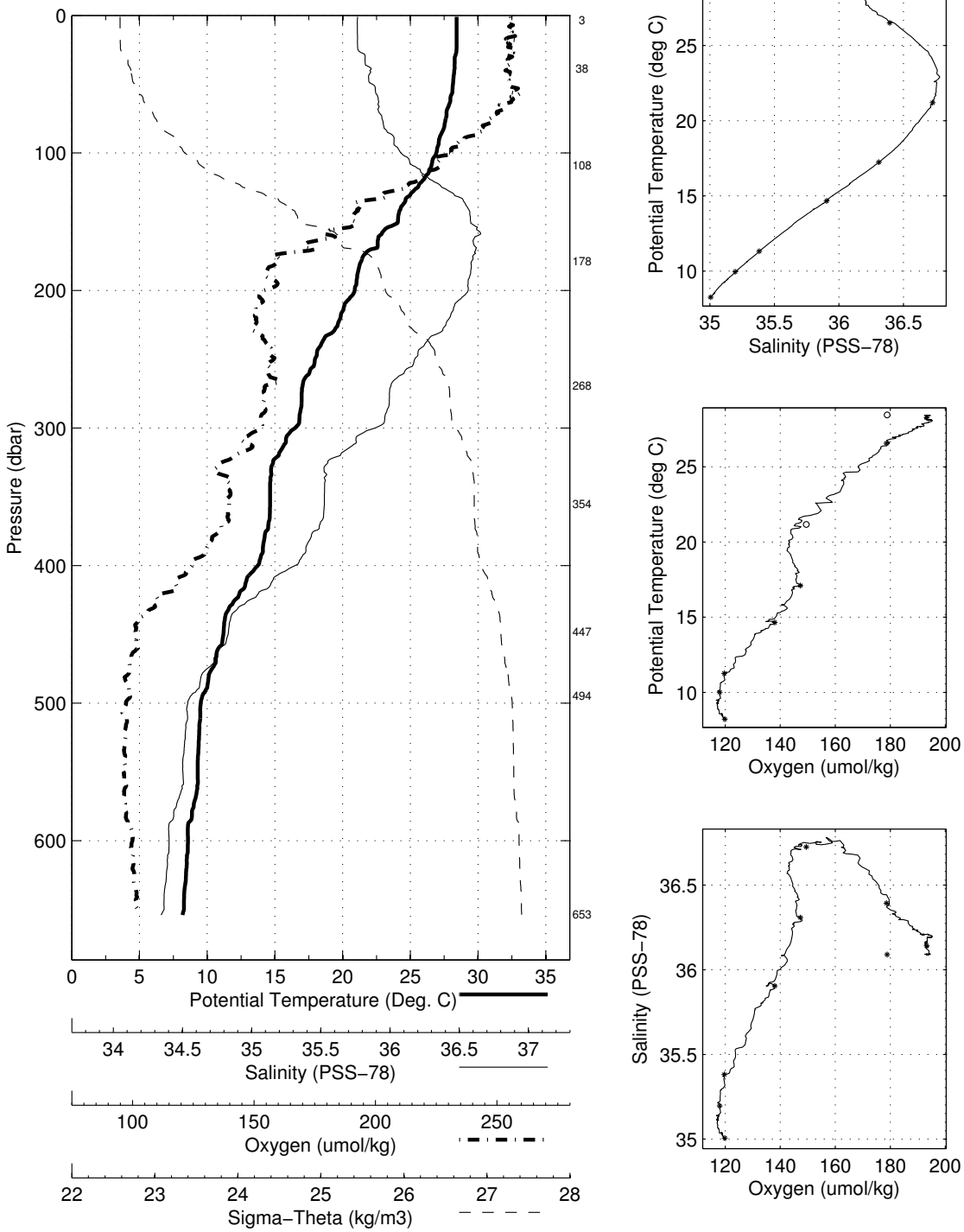



Abaco September - October 2008 R/V Cape Hatteras
CTD Station 11 (CTD011)
Latitude 26.997N Longitude 79.381W
02-Oct-2008 15:31Z

| 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 | 28.421 | 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu mol \cdot kg^{-1}$ |
|---|---|---|---|---|---|
| 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**

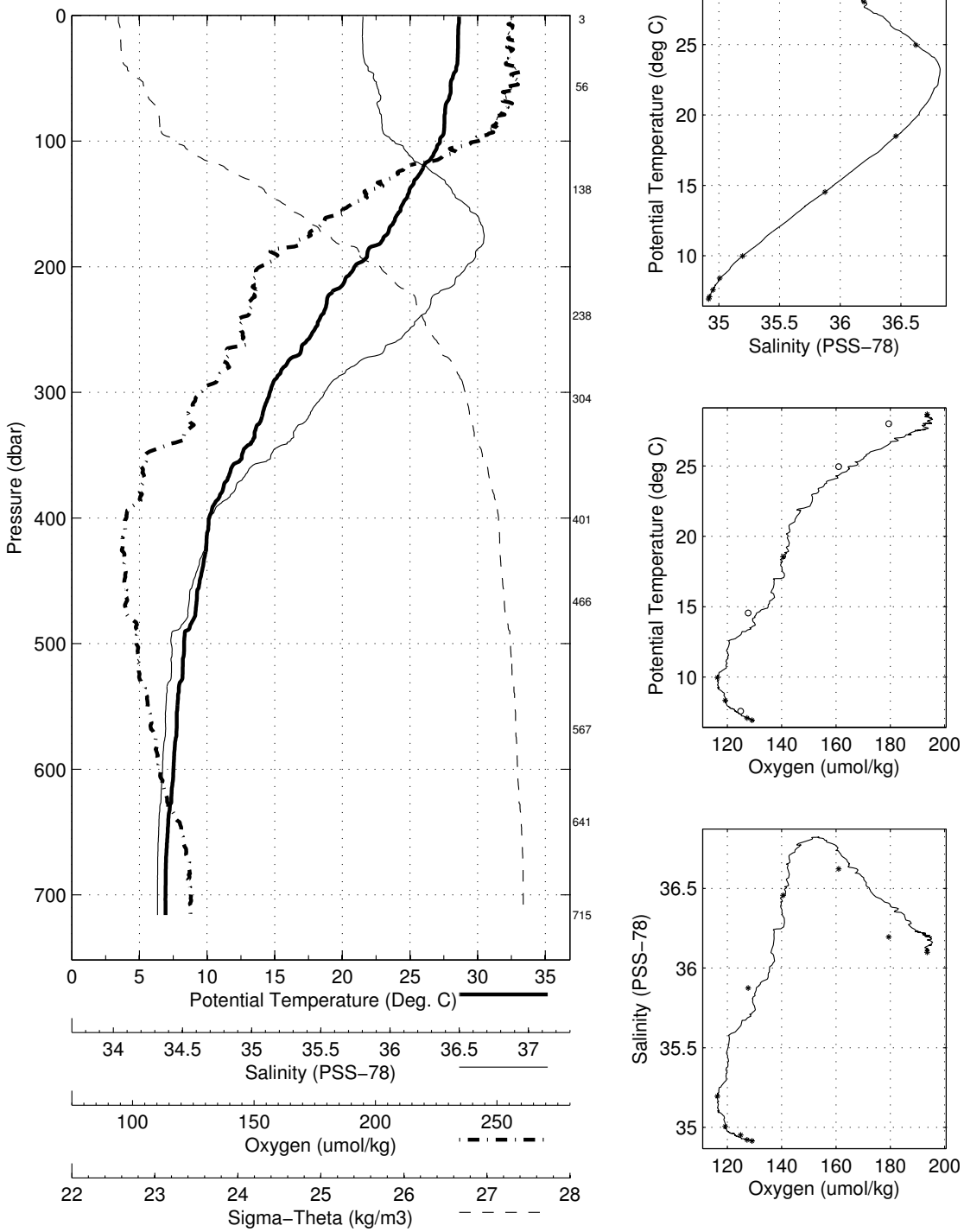


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 12 (CTD012)
Latitude 26.997N Longitude 79.498W
02-Oct-2008 16:54Z

| Pressure 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 | 28.632 | 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu mol \cdot kg^{-1}$ |
|---|---|---|---|---|---|
| 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**

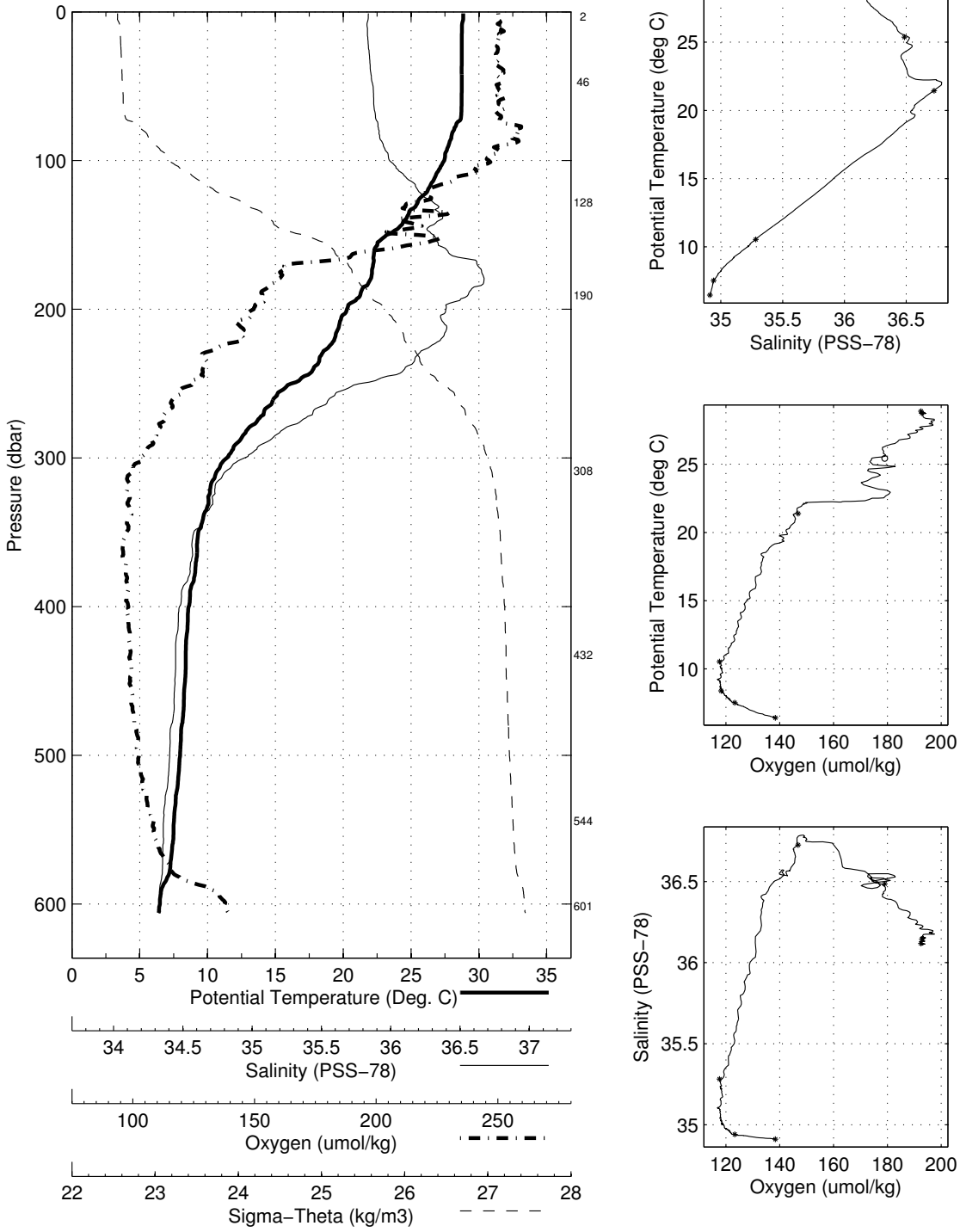


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 13 (CTD013)
Latitude 26.994N Longitude 79.618W
02-Oct-2008 18:26Z

| 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 | 28.848 | 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu mol \cdot kg^{-1}$ |
|---|---|---|---|---|---|
| 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**

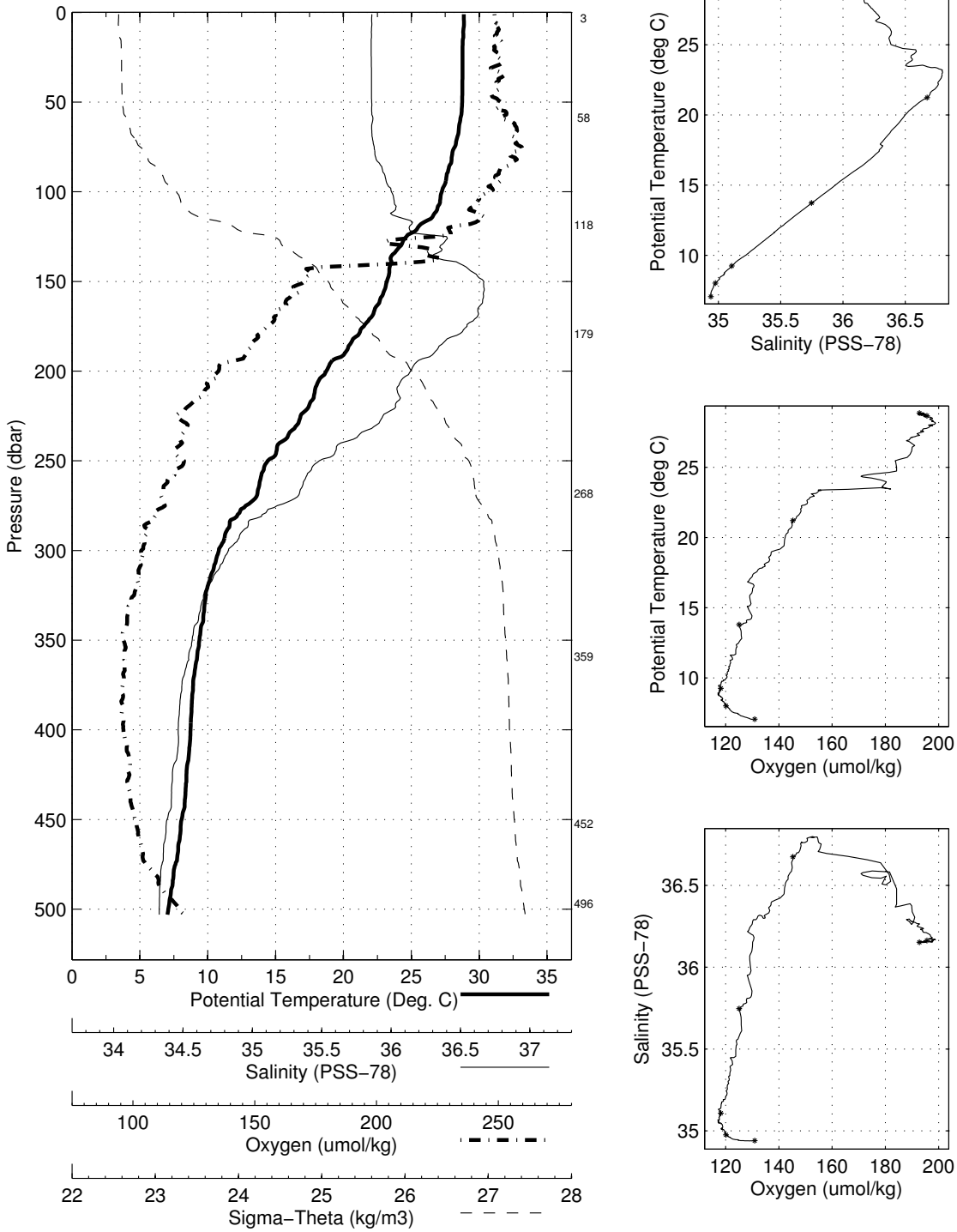


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 14 (CTD014)
Latitude 26.995N Longitude 79.681W
02-Oct-2008 19:37Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**

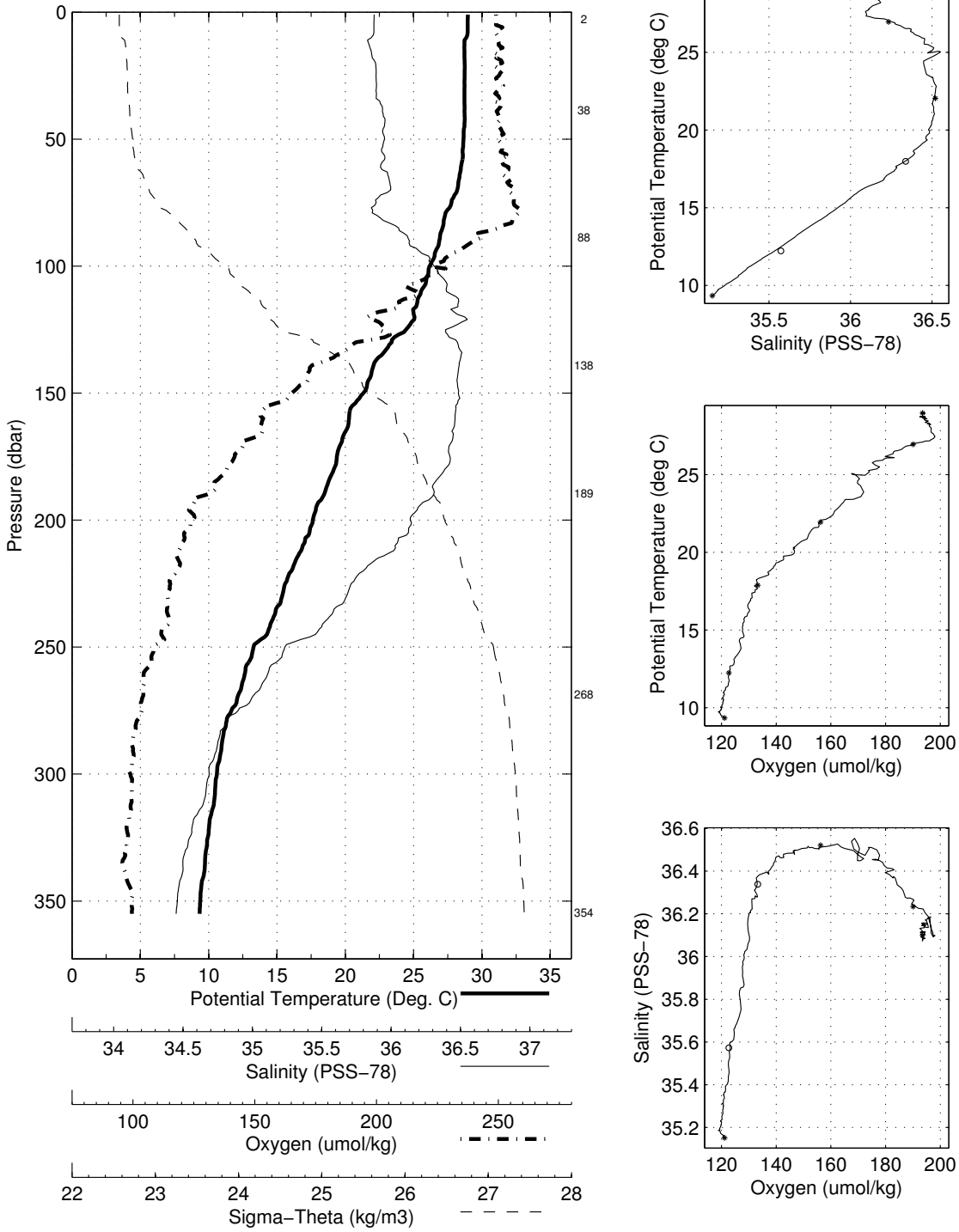


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 15 (CTD015)
Latitude 27.000N Longitude 79.784W
02-Oct-2008 20:53Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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 $\mu$mol·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**

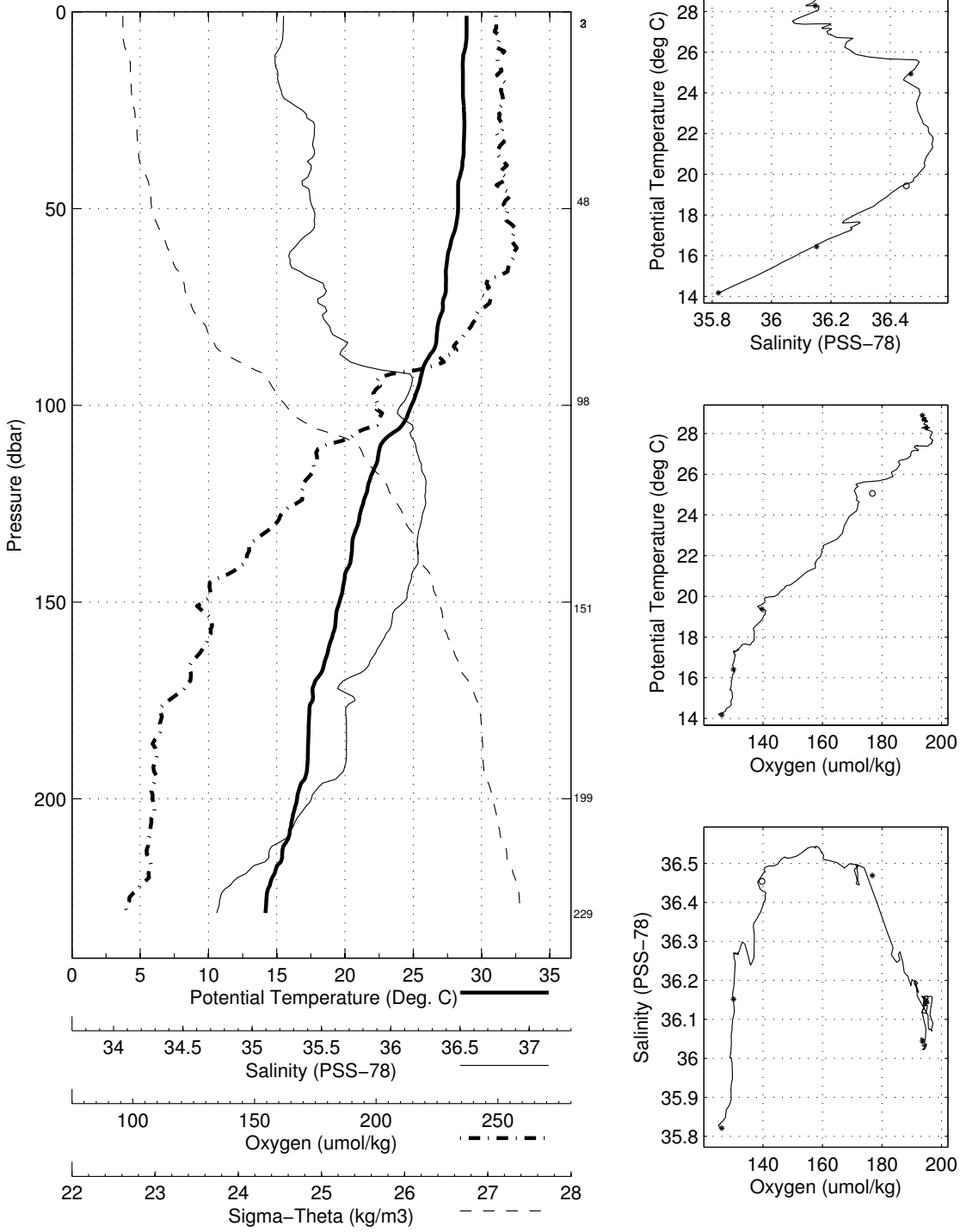


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 16 (CTD016)
Latitude 26.999N Longitude 79.867W
02-Oct-2008 22:01Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**

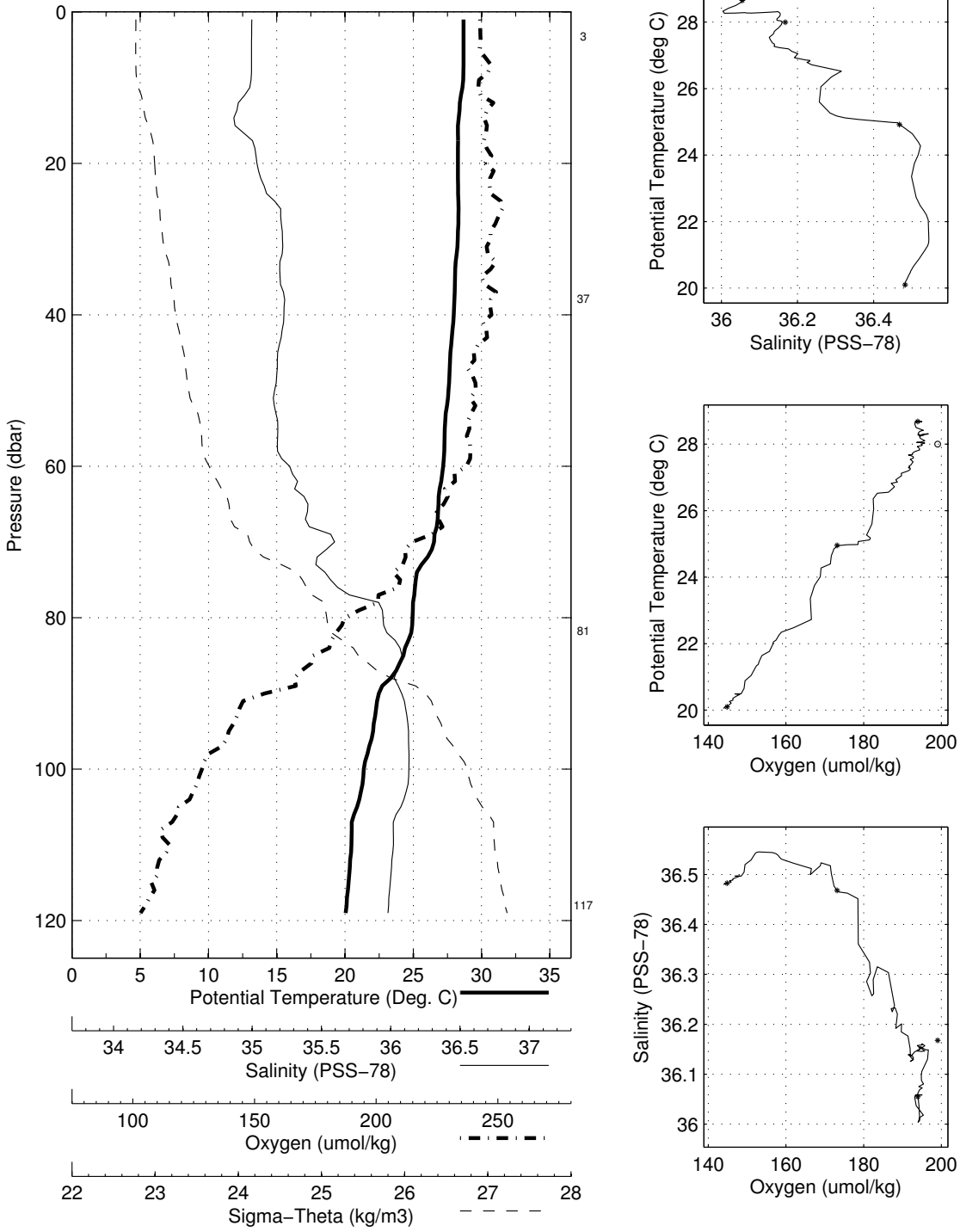


Abaco September - October 2008 R/V Cape Hatteras
CTD Station 17 (CTD017)
Latitude 26.999N Longitude 79.930W
02-Oct-2008 22:57Z

| Pressure dbar | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·kg$^{-1}$ | DynHt m$^2$·s$^{-2}$ | SigT 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 dbar | Niskin | Temp90 °C | PoTemp90 °C | Salinity PSS-78 | Oxygen $\mu$mol·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**



# 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 |