



NOAA Data Report, OAR-AOML-77
<https://doi.org/10.25923/2dvd-cg65>

Hydrographic Measurements Collected Aboard The UNOLS Ship R/V Walton
Smith, 2016: Western Boundary Time Series Cruise – Florida Current

Cruise IDs: FC1603, FC1605, FC1607, FC1609, FC1612
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June 2020

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NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

Office of Oceanic and
Atmospheric Research

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Abstract

This report summarizes the five cruises along 27°N on the UNOLS ship R/V Walton Smith involving full-water-column CTD and lowered ADCP profiles, along with shipboard ADCP profiles, conducted within the Florida Straits to monitor the Florida Current. This report describes the processing of a Seabird Electronics Model 9/11+ CTD O2 system and water samples collected from up to 23 10-liter Niskin bottles lowered to the bottom. This report includes a description of the calibrations procedures and profiles of pressure, salinity (conductivity), temperature, and dissolved oxygen concentrations. Water samples were also collected at various depths and analyzed for salinity and oxygen concentrations to aid with CTD calibration. A total of 9 CTD-O2/LADCP stations were occupied during each of the five cruises.

1 *Introduction*

The Florida Current transport time series began in 1982, as NOAA recognized the importance of long-term monitoring of the current transport and water mass properties of the Florida Current across the Florida Straits to determine its inter-annual variability to determine 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). Monitoring of the Florida Current includes a submarine cable, GPS measurements using drop sondes, as well as hydrographic measurements. All of these programs are collaborating with scientific analysis and logistics including ship time.

Hydrographic surveys consisting of a repeat LADCP/CTD/rosette section in the Florida Straits was carried out during 2016 (Figure 1 and Tables 1 - 5). These cruises consist of one day cruises on the R/V Walton Smith departing and returning to Miami, FL. A total of five cruises were completed consisting of a total of 45 LADCP/CTD/Rosette stations. Water samples (up to 9 for each station), LADCP, 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. The salts collected and run during the FC1609 cruise were not usable for calibrations due to a bad autosal run. The calibrations coefficients from the previous cruise, FC1607, were used.

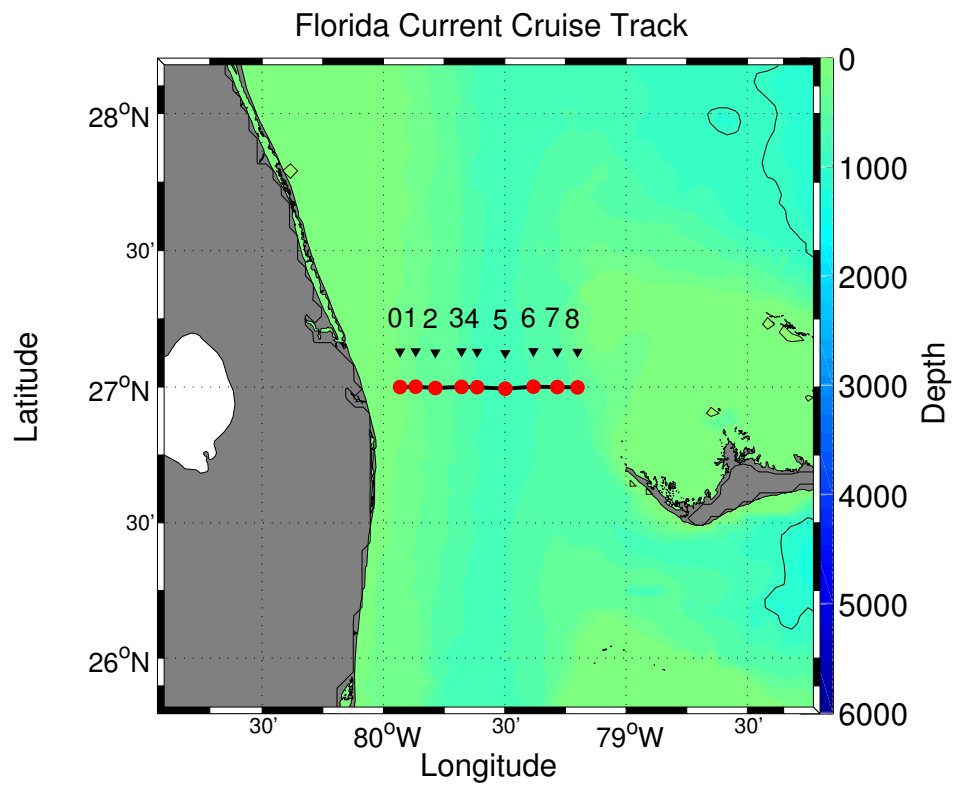


Figure 1: Florida Current CTD station locations. The landmasses are shaded. The red dots are the CTD stations.

Table 1: Florida Current (FC1603) – CTD Cast Summary

Station	Date	Time (GMT)	Latitude	Longitude	Depth
0	03/24/16	09:56:53	26.999N	79.930W	137
1	03/24/16	09:08:54	27.001N	79.868W	249
2	03/24/16	08:06:49	26.996N	79.783W	360
3	03/24/16	06:52:33	27.003N	79.683W	522
4	03/24/16	05:41:08	27.004N	79.619W	627
5	03/24/16	04:13:48	27.003N	79.501W	760
6	03/24/16	02:45:04	26.996N	79.383W	694
7	03/24/16	01:08:35	27.002N	79.290W	608
8	03/23/16	23:52:44	26.998N	79.208W	486

Table 2: Florida Current (FC1605) – CTD Cast Summary

Station	Date	Time (GMT)	Latitude	Longitude	Depth
0	05/17/16	08:19:58	26.988N	79.930W	149
1	05/17/16	07:17:51	26.998N	79.866W	261
2	05/17/16	05:19:34	27.005N	79.786W	369
3	05/17/16	03:43:50	27.004N	79.687W	525
4	05/17/16	02:30:35	27.001N	79.614W	648
5	05/17/16	00:50:47	27.001N	79.504W	757
6	05/16/16	23:17:42	27.003N	79.387W	677
7	05/16/16	22:02:16	27.000N	79.286W	615
8	05/16/16	21:02:46	27.002N	79.205W	486

Table 3: Florida Current (FC1607) – CTD Cast Summary

Station	Date	Time (GMT)	Latitude	Longitude	Depth
0	07/14/20	09:04:53	26.999N	79.930W	145
1	07/14/20	07:57:24	26.992N	79.865W	265
2	07/14/20	06:21:41	26.995N	79.784W	381
3	07/14/20	04:40:19	27.000N	79.685W	531
4	07/14/20	03:14:57	26.996N	79.614W	644
5	07/14/20	01:30:33	27.001N	79.502W	755
6	07/13/20	23:43:31	26.999N	79.385W	685
7	07/13/20	22:12:27	27.004N	79.283W	611
8	07/13/20	20:59:27	26.997N	79.202W	483

Table 4: Florida Current (FC1609) – CTD Cast Summary

Station	Date	Time (GMT)	Latitude	Longitude	Depth
0	09/16/20	01:38:28	26.998N	79.933W	141
1	09/16/20	00:32:56	26.996N	79.868W	261
2	09/15/20	23:10:37	26.995N	79.783W	382
3	09/15/20	21:38:11	26.997N	79.684W	533
4	09/15/20	20:20:25	26.998N	79.619W	636
5	09/15/20	18:38:56	27.002N	79.499W	757
6	09/15/20	16:52:19	26.999N	79.385W	673
7	09/15/20	15:26:09	26.993N	79.281W	611
8	09/15/20	14:14:19	27.006N	79.202W	476

Table 5: Florida Current (FC1612) – CTD Cast Summary

Station	Date	Time (GMT)	Latitude	Longitude	Depth
0	12/13/20	09:52:46	26.996N	79.931W	135
1	12/13/20	08:54:42	26.997N	79.868W	246
2	12/13/20	07:39:44	26.994N	79.785W	367
3	12/13/20	06:19:55	26.990N	79.686W	524
4	12/13/20	04:58:16	27.001N	79.620W	623
5	12/13/20	03:20:46	26.993N	79.499W	736
6	12/13/20	01:37:51	27.001N	79.384W	651
7	12/13/20	00:11:30	27.000N	79.284W	603
8	12/12/20	22:44:50	27.002N	79.200W	474

2 Additional Sampling

Discrete nutrient and dissolved inorganic carbon samples were taken during cruises, FC1603, FC1605, FC1609, FC1609, and FC1612. Tables 6-10 summarize the bottle trip locations for each cruise.

Table 6: FC1603: Discrete Carbon and Nutrient Sampling positions.

Niskin	Station								
	0	1	2	3	4	5	6	7	8
1	C,N(d)	C,N	C,N	C,N	C,N	C,N	C,N	C,N	N
2	C,N	C,N	C,N(d)	C,N	C,N(d)	C,N	C,N	C,N	C
3	C,N	C,N	C,N	C,N	C,N	C,N(d)		C,N	N
4	C,N(d)	C,N(d)	C,N	C,N	C,N	C,N		C,N(d)	C
5		C,N	C,N	C,N	C,N	C,N		C,N C	N
6			C,N	C,N(d)	C,N(d)	C,N		C,N(d)	C
7				C,N	C,N	C,N		C,N	N
8						C,N	C,N		C
9							C,N		N(d)
10							C,N		C
11							C,N		N(d)
12							C,N		C
13							C,N(d)		
14									
15							C,N(d)		

C - carbon sample, N - nutrient sample, (d) - nutrient duplicate sample

Table 7: FC1605: Discrete Carbon and Nutrient Sampling positions.

Niskin	Station								
	0	1	2	3	4	5	6	7	8
1	C,N(d)	C,N	C,N	C,N	C,N(d)	C,N	C,N	C,N	C,N
2	C,N	C,N	C,N	C,N	C,N		C,N(d)	C,N	C,N(d)
3	C,N	C,N	C,N(d)	C,N	C,N	C,N	C,N	C,N	C,N
4	C,N(d)	C,N(d)	C,N	C,N	C,N	C,N	C,N	C,N(d)	C,N
5		C,N	C,N	C,N(d,d)	C,N	C,N	C,N	C,N(d)	C,N(d)
6			C,N	C,N	C,N	C,N	C,N	C,N	C,N
7				C,N	C,N(d)	C,N(d)	C,N	C,N	
13						C,N	C,N(d)		

C - carbon sample, N - nutrient sample, (d) - nutrient duplicate sample

Table 8: FC1607: Discrete Carbon and Nutrient Sampling positions.

Niskin	Station								
	0	1	2	3	4	5	6	7	8
1	C,N	C,N	C,N	C,N	C,N	C,N		C,N	C,N
2	C,N(d)	C,N	C,N		C,N			C,N	C,N
3	C,N	C,N	C,N	C,N	C,N	C,N		C,N	C,N
4	C,N(d)	C,N	C,N(d)	C,N	C,N	C,N		C,N	C,N
5		C,N(d)	C,N	C,N	C,N(d)	C,N		C,N	C,N(d)
6			C,N	C,N	C,N	C,N		C,N(d)	C,N(d)
7				C,N	C,N(d)	C,N	C,N	C,N(d)	
13						C,N(d)	C,N(d)		
14							C,N		
15							C,N		
16							C,N		
17							C,N		
18							C,N(d)		
19							C,N		

C - carbon sample, N - nutrient sample, (d) - nutrient duplicate sample

Table 9: FC1609: Discrete Carbon and Nutrient Sampling positions.

Niskin	Station								
	0	1	2	3	4	5	6	7	8
1	C,N	C,N	C,N	C,N	C,N(d)	C,N	C,N	C,N	C,N
2	C,N	C,N	C,N	C,N(d)	C,N	C/N	C,N	C,N	C,N
3	C,N	C,N	C,N	C,N	C,N	C,N(d)		C,N(d)	C,N
4	C,N(d)	C,N	C,N	C,N	C,N	C,N	C,N	C,N	C,N
5		C,N(d)	C,N(d)	C,N	C,N	C,N	C,N(d)	C,N	C,N(d)
6			C,N(d)	C,N	C,N	C,N	C,N	C,N(d)	C,N(d)
7				C,N(d)	C,N	C,N	C,N	C,N	
13						C,N(d)	C,N		
14							C,N		

C - carbon sample, N - nutrient sample, (d) - nutrient duplicate sample

Note: No bottles fired at station 8.

Table 10: FC1612: Discrete Carbon and Nutrient Sampling positions.

Niskin	Station								
	0	1	2	3	4	5	6	7	8
1	C,N	C,N	C,N	C,N	C,N(d)	C,N	C,N(d)	C,N	C,N
2	C,N	C,N	C,N	C,N	C,N	C/N	C,N	C,N	C,N
3	C,N(d)	C,N	C,N	C,N	C,N	C,N	C,N	C,N	C,N
4	C,N	C,N	C,N(d)	C,N	C,N	C,N	C,N	C,N(d)	C,N(d)
5		C,N	C,N	C,N	C,N	C,N	C,N	C,N	C,N(d)
6			C,N	C,N(d)	C,N(d)	C,N	C,N(d)	C,N	C,N
7				C,N(d)	C,N	C,N(d)	C,N	C,N (d)	
13						C,N(d)	C,N		

C - carbon sample, N - nutrient sample, (d) - nutrient duplicate sample

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 the 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 cruises can be seen in Table 11.

Table 11: Equipment used during the 2016 Florida Straits cruises.

Instrument	SN	Stations	Use	Comment
AOML white frame		0-8		FC1603
AOML orange frame		0-8		FC1605, 1607, 1609, 1612
Sea-Bird SBE 32 24-palce Carousel Water Sampler	0975	0-8		FC1603
Sea-Bird SBE 32 24-palce Carousel Water Sampler	0980	0-8		FC1605, 1607, 1609, 1612
Sea-Bird SBE9plus CTD	0957	0-8		FC1603, 1605, 1607, 1609, 1612
Paroscientific Digiquartz Pressure Sensor	92973	0-8		
Sea-Bird SBE3plus Temperature Sensor	2946	0-8	Primary	FC1603, 1605, 1607, 1609, 1612
Sea-Bird SBE3plus Temperature Sensor	5855	0-8	Secondary	FC1603, 1605, 1607, 1609, 1612
Sea-Bird SBE35 Reference Temperature Sensor	97	0-8		FC1605, 1607, 1609
Sea-Bird SBE4C Conductivity Sensor	1346	0-8	Primary	FC1603, 1605, 1607, 1609, 1612
Sea-Bird SBE4C Conductivity Sensor	4346	0-8	Secondary	FC1603, 1605, 1607, 1609, 1612
Sea-Bird SBE43 Dissolved Oxygen Sensor	2082	0-8	Primary	FC1603, 1605, 1607, 1609, 1612
Sea-Bird SBE43 Dissolved Oxygen Sensor	0730	0-8	Secondary	FC1603, 1605, 1607, 1609, 1612
Simrad 807 Altimeter	gold	0-8	scale: 15.0	FC1605, 1607, 1609, 1612
Teledyne	black	0-6	scale: 15.0	FC1603
Valeport VA500	48591	0-4,7,8	scale: 15.0	FC1603
Valeport VA500	48592	6	scale: 15.0	FC1603 (failed)
Valeport VA500	48592	0	scale: 15.0	FC1605, FC1607 (failed)
Valeport VA500	48592	0-8	scale: 15.0	FC1612
RDI LADCP - 300 kHz Workhorse (AOML)	13493	0-8	Upward	FC1603
RDI LADCP - 300 kHz Workhorse (AOML)	1856	0-8	Downward	FC1603
RDI LADCP - 300 kHz Workhorse (AOML)	21584	0-8	Upward	FC1605, 1607, 1609, 1612
RDI LADCP - 300 kHz Workhorse (AOML)	20550	0-8	Downward	FC1605, 1607, 1609, 1612

3.1 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 \pm 50 ppm/ $^{\circ}$ C.

The pressure sensor used during the Florida Straits cruises was s/n 0975. Pre-cruise sensor calibrations were performed at Sea-Bird Electronics, Inc. in Bellevue, Washington. The following coefficient (Table 12) were entered into SEASAVE_R 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 (μ s). SEASAVE_R automatically implements this equation.

Table 12: Pre-Cruise Calibration coefficients for the pressure sensor.

s/n 0975
October 09, 2014
$c_1 = -4.701953e+04$
$c_2 = -3.199230e-01$
$c_3 = 1.464100e-02$
$d_1 = 3.748600e-02$
$d_2 = 0.000000e+00$
$t_1 = 3.002465e+01$
$t_2 = -3.417080e-04$
$t_3 = 4.277270e-06$
$t_4 = 2.793720e-09$
$t_5 = 0.000000e+00$
Slope = 0.99996
Offset = -2.7284
AD590M = 1.28150e-02
AD590B = -9.22501e+000

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 $\pm 0.004^\circ\text{C}$ per year and resolution of 0.0003°C at 24 samples per second. The SBE 3 thermometer has a fast response time of 0.070 seconds.

The temperature sensors (SBE 3plus) used during the Florida Straits cruises were serial numbers (s/n) 2946 and 5855. Pre-cruise sensor calibrations were performed at Sea-Bird Electronics, Inc. in Bellevue, Washington. The following coefficients (Table 13) were entered into SEASAVE_R using the configuration file. SEASAVE_R 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:

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

Table 13: Pre-Cruise Calibration coefficients for the temperature sensors.

s/n 2946	s/n 5855
July 08, 2015	December 08, 2015
$g = 4.34427068\text{e-}03$	$g = 4.35381035\text{e-}03$
$h = 6.39743464\text{e-}04$	$h = 6.30572657\text{e-}04$
$i = 2.18134662\text{e-}05$	$i = 1.97027743\text{e-}05$
$j = 1.93162948\text{e-}06$	$j = 1.40494714\text{e-}06$
$f_0 = 1000.0$	$f_0 = 1000.0$

3.3 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 $\pm 0.0003 \text{ S}\cdot\text{m}^{-1}$ /month and resolution of $0.00004 \text{ S}\cdot\text{m}^{-1}$ at 24 scans per second.

The conductivity sensors used during the Florida Straits cruises were serial numbers (s/n) 1387 and 4346. Pre-cruise sensor calibrations were performed at Sea-Bird Electronics, Inc. in Bellevue, Washington. The coefficients shown in Table 14 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:

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

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 R automatically implements this equation.

Table 14: Pre-Cruise Calibration coefficients for the conductivity sensors.

s/n 1387	s/n 4346
July 08, 2015	September 03, 2015
$g = -1.06595312e+01$	$g = -9.89434168e+00$
$h = 1.59664070e+00$	$h = 1.29474196e+00$
$i = -1.04867027e-03$	$i = -2.53357544e-03$
$j = 1.66232326e-04$	$j = 2.34955459e-04$
$CP_{cor} = -9.5700e-08$	$CP_{cor} = -9.5700e-08$
$CT_{cor} = 3.2500e-06$	$CT_{cor} = 3.2500e-06$

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/crystallinity 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 2082 and 0730 were used during the Florida Straits cruises. The following oxygen coefficients (Table 15) were entered into SEASAVE R using the configuration file:

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:

Table 15: Pre-Cruise Calibration coefficients for the dissolved oxygen sensors.

s/n 2082	s/n 0730
December 15, 2015	December 30, 2015
Soc = 0.4207	Soc = 0.5615
Voffset = -0.5332	Voffset = -0.5094
Tau20 = 1.05	Tau20 = 1.12
A = -3.3688e-03	A = -4.2715e-03
B = 2.1886e-04	B = 1.4677e-04
C = -3.2294e-06	C = -2.6947e-06
$E_{nominal}$ = 0.036	$E_{nominal}$ = 0.036

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

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 θ is the absolute temperature (K); and

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

SEASAVE R automatically implements this equation.

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

$$\begin{aligned} D &= 1 + H_1 * (e^{(\frac{P(i)}{H^2})} - 1) \\ C &= e(-1 * \left(\frac{Time(i) - Time(i-1)}{H3} \right)) \\ O_V(i) &= O_{volt}(i) + V_{offset} \\ O_{newvolts}(i) &= a * \frac{a}{D} \\ O_{finalvolts}(i) &= O_{newvolts}(i) - V_{offset} \end{aligned}$$

Where:

i = indexing variable (must be a continuous time series to work; can be performed on bin averaged data), where $i = 1:\text{end}$ (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.

3.5 Reference Temperature

The SBE 35RT is an accurate, ocean-range temperature sensor that is capable of measuring temperature in the ocean to depths of 6800 meters (22,300 ft). The SBE 35RT communicates via a standard RS-232 interface at 300 baud, 8 data bits, no parity. The SBE 35RT makes a temperature measurement each time a bottle fire confirmation is received, and stores the value in EEPROM. Each stored value contains the time and bottle position in addition to the temperature data, allowing comparison of the SBE 35RT record with CTD and water bottle data. Using one SBE 35RT eliminates the need for reversing thermometers, and provides higher accuracy temperature readings at lower cost. Calibration coefficients stored in EEPROM allow the SBE 35RT to transmit data in engineering units (Table 16). When configured in a real-time system, the SBE 35RT can use the system modem channel for two-way communications; it is not necessary to change cable connections to communicate with and retrieve data from the SBE 35RT. Retrieved from http://www.seabird.com/sites/default/files/documents/35RT_013.pdf (2015, February 12).

The sensor measurement ranges from -5 to 35°C. The SBE 35RT digital reversing thermometer has a typical accuracy/stability of $\pm 0.001^\circ\text{C}$ per year and resolution of 0.000025°C .

Table 16: Reference Temperature Calibration Date & Coefficients.

s/n 97
August 21, 2014
A0 = 4.214343e-03
A1 = -1.115737e-03
A2 = 1.719186e-04
A3 = -9.611143e-06
A4 = 2.0623e-07
Slope = 1.0000
Offset = 0.0000

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 up to 23, 10-liter Bullister-style bottles. This package was deployed on all stations/casts. 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. Some cruises included a fluorometer (not reported herein). The other underwater electronic components typically consisted of two RDI LADCPs (also not reported herein). A total of 54 CTD/rosette casts were made between all six cruises, 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 SBE911 plus deck unit in the computer lab. 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 300 kHz pointing down, the other 300 kHz transducer pointing up. The R/V Walton Smith's stern A-frame CTD winch was used with the 24-place 10-liter rosette for all station/casts. However, at most 23 water samples are collected due to the presence of an upward looking ADCP in place of one Niskin bottle.

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

- FC1609 - The salts collected and run were not usable for calibrations due to a bad autosal run. The calibrations coefficients from the previous cruise were used.

4.2 *Data Acquisition*

The CTD data acquisition system consisted of an SBE-11plus (V2) deck unit and a networked generic PC workstation located in the aft of the science lab. SBE Seasave software version 7.21 was used for data acquisition and to close bottles on the rosette.

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.

Prior to each cast the CTD was powered on and an on deck surface pressure was recorded and then powered off before deployment. The deck watch leader directed the winch operator to raise the package, the stern A-frame and rosette were extended outboard, and the package quickly lowered into the water and submerged to 10-15 meters of wire out. Tag lines were necessary for both deployments and 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, waiting for 2-3 minutes for sensors to stabilize, 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 150 m and no more than 60 m/min deeper than 150 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.

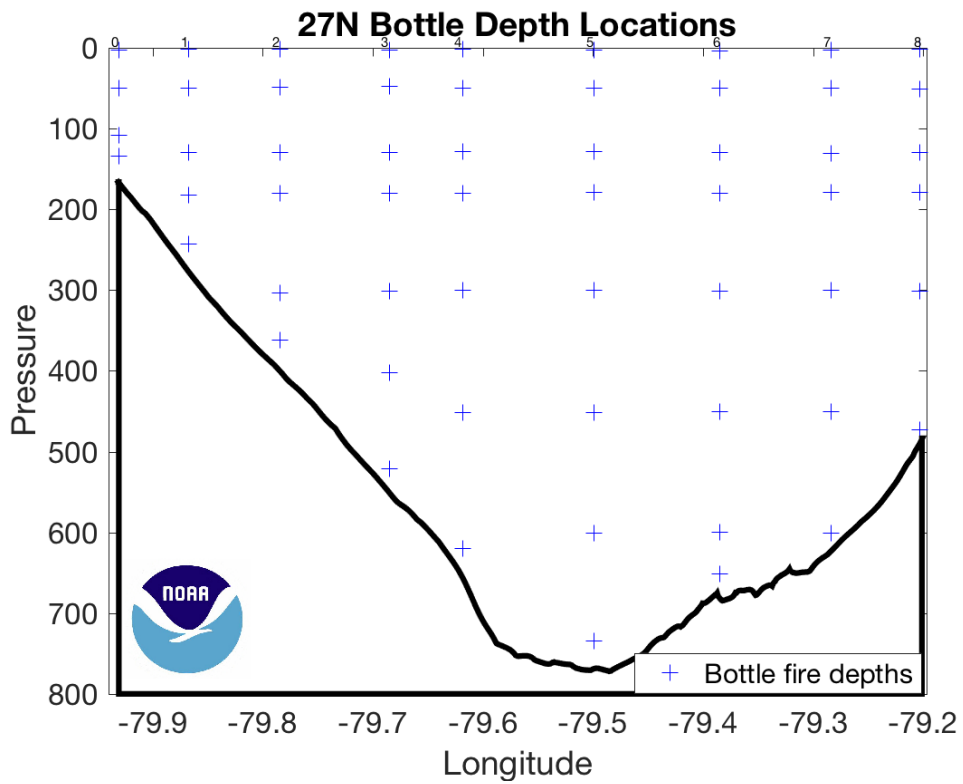


Figure 2: Nominal bottle locations for 27°N section in the Florida Straits.

4.3 Preliminary CTD Data Processing

Preliminary CTD data processing was performed using SEABIRD SBE Data Processing version 7.21k and AOML Matlab processing software. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were copied onto the CTD-PROC workstation, 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 R 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 R 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/m, c1 S/m, salinity (PSU), salinity 2 (PSU), oxygen voltage V, oxygen 2 voltage V, altimeter, optical sensor, oxygen umol/kg, oxygen 2 umol/kg, oxygen ml/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. Primary and secondary conductivity were automatically advanced by 0.073 seconds. Primary and secondary oxygen were advanced by 1.073.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.

-
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. TRANS converts the binary data file into ASCII format.
 11. 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 LOOPE-DIT, 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 $-1 \times 10^{-5} \text{ s}^{-2}$. 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 45 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 11.

Secondary temperature, conductivity and dissolved oxygen (T2, C2 and DO2) sensors served as calibration checks for the reported primary sensors. The sensors used for calibrations for each cruise are listed below in Section 5.

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

4.4.1 Salinity Analysis

A Guildline Autosol, model 8400B, located in the salt van outside of AOML, was used for all salinity measurements. The salinometer readings were logged on a computer using Ocean Scientific International's logging hardware and software. The Autosol's water bath temperature was set to 24°C, which the Autosol is designed to automatically maintain. The laboratory's temperature is typically set and maintained to just below 24°C, to help further stabilize reading values and improve accuracy. The room temperature was monitored by a digital thermometer. Salinity analyses were performed after samples had equilibrated to laboratory temperature, usually within a couple days after collection. The salinometer was standardized for each group of samples analyzed (usually 2 casts and up to 52 samples) using two bottles of standard seawater: one at the beginning and end of each set of measurements. The salinometer output was logged

to a computer file. The software prompted the analyst to flush the instrument's cell and change samples when appropriate. Prior to each run a sub-standard flush, approximately 200 ml, of the conductivity cell was conducted to flush out the DI water used in between runs. For each calibration standard, the salinometer cell was initially flushed 6 times before a set of conductivity ratio reading was taken. For each sample, the salinometer cell was initially flushed at least 3 times before a set of conductivity ratio readings were taken.

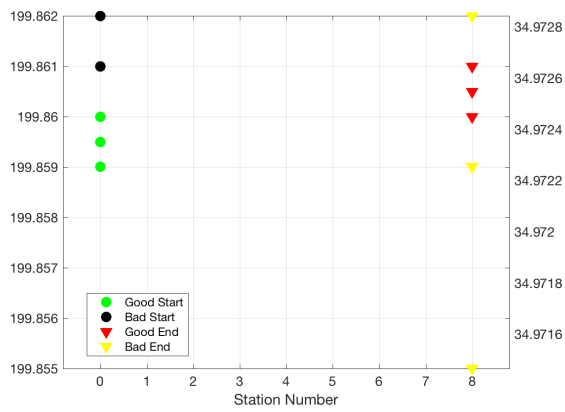
IAPSO Standard Seawater Batch P-158 was used to standardize all casts (Table 17).

Table 17: Nominal values for the batches of IAPSO standard seawater.

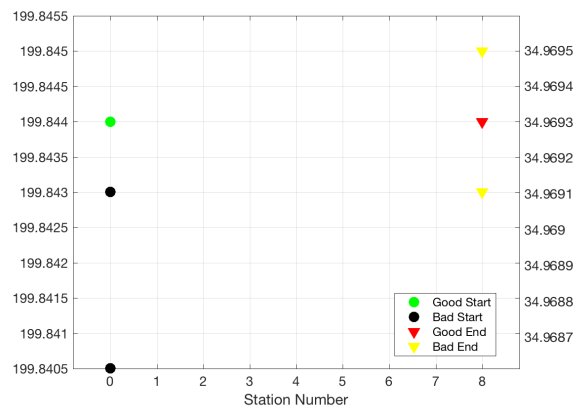
P-158
Use By: March 2018
K15: 0.99970
Salinity: 34.988

The salinity samples were collected in 200 ml Kimax high-alumina borosilicate bottles that had been rinsed at least three times with sample water prior to filling. The bottles were sealed with custom-made plastic insert thimbles and Nalgene screw caps. This assembly provides very low container dissolution and sample evaporation. Prior to sample collection, inserts were inspected for proper fit and loose inserts replaced to insure an airtight seal. Laboratory temperature was also monitored electronically throughout the cruise. PSS-78 salinity [UNES81] was calculated for each sample from the measured conductivity ratios. The offset between the initial standard seawater value and its reference value was applied to each sample. Then the difference (if any) between the initial and final vials of standard seawater was applied to each sample as a linear function of elapsed run time. The corrected salinity data was then incorporated into the cruise database. During the four Florida Straits cruises, a total of 315 salinity measurements were taken.

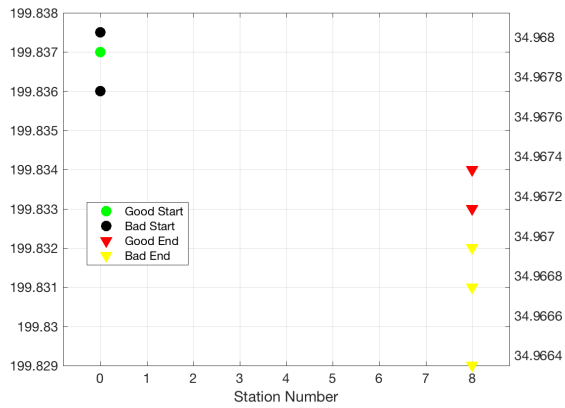
The running standard calibration values are shown in Figure . For FC1603 the autosal standards changed by 0.00002 in conductivity ratio (about 0.0004 in salinity). For FC1605 the autosal standards did not change. For FC1607 the autosal standards changed by 0.00003 in conductivity ratio (about 0.001 in salinity). For FC1609 the autosal standards changed by 0.01 in conductivity ratio (about 0.19 in salinity). For FC1612 the autosal standards changed by 0.00013 in conductivity ratio (about 0.0025 in salinity).



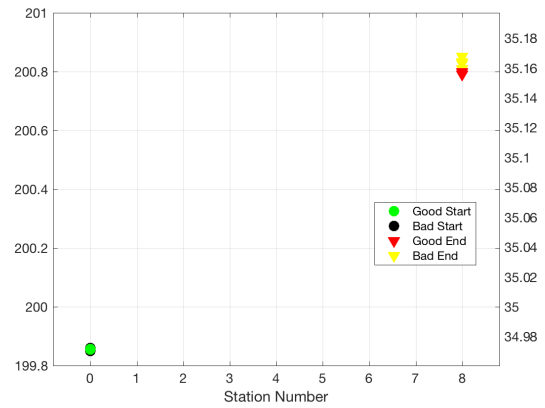
(a) FC1603



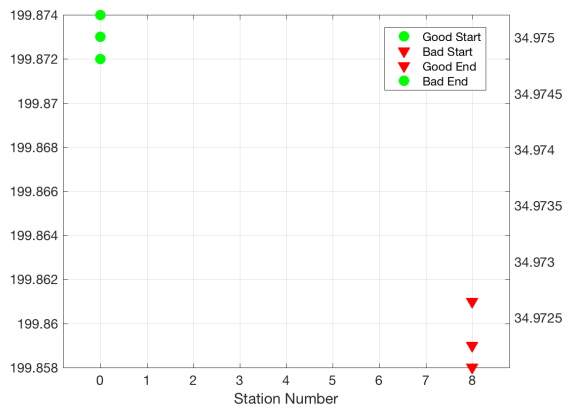
(b) FC1605



(c) FC1607



(d) FC1609



(e) FC1612

Figure 3: Standard vial calibrations throughout the cruise.

4.4.2 Oxygen Analysis

Dissolved oxygen analyses were performed with an automated titrator using amperometric end-point detection (Langdon, 2010). Sample titration, data logging, and graphical display were performed with a PC running a LabView program written by Ulises Rivero of AOML. Thiosulfate (17.5g per 500 ml) was dispensed by a 2 ml Gilmont burette driven with a stepper motor controlled by the titrator. Tests in the lab were performed to confirm that the precision and accuracy of the volume dispensed were comparable or superior to the Dosimat 665. The whole-bottle titration technique of Carpenter (1965), with modifications by Culberson et al. (1991), was used. Four replicate 10 ml iodate standards were run initially and if there requires any fill of new Thiosulfate and once again after bottle has reached half volume. The reagent blank determined as the difference between V1 and V2, the volumes of Thiosulfate required to titrate 1ml aliquots of the iodate standard. This method was found to produce a more reproducible blank value than the value determined as the intercept of a standard curve.

Dissolved oxygen samples were drawn from Niskin bottles into calibrated 125-150ml iodine titration flasks using silicon tubing. Bottles were rinsed three times and filled from the bottom, overflowing three volumes while taking care not to entrain any bubbles. The CTD temperatures were used to calculate $umol/kg$ concentrations. 1ml of $MnCl_2$ and 1ml of $NaOH/NaI$ were added immediately after drawing the sample was concluded using a ThermoScientific REPIPET II. The flasks were then stoppered and shaken well. Deionized water (DIW) was added to the neck of each flask to create a water seal. The total number of oxygen samples collected from the rosette was 339. A duplicate sample was taken at each station. The samples were stored in the lab in plastic totes at room temperature and run once back at AOML. The data was incorporated into the cruise database shortly after analysis. Thiosulfate normality was calculated from the laboratory temperature for each sample run.

The dispenser used for the standard solution (SOCOREX Calibrex 520) and the burette were calibrated gravimetrically just before the cruise. Oxygen flask volumes were determined gravimetrically with degassed deionized water at AOML. The correction for buoyancy was applied.

5 *Post-Cruise Calibrations*

Post cruise sensor calibrations were not 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.

The same pressure sensor as well as primary and secondary temperature, conductivity and oxygen sensors were used during the cruises as listed in Table 11. For all Florida Current cruises in 2016 the secondary T, C, and O were selected for final data reduction. In addition to the Seasave processing modules, a group of Matlab script files called AOML/CTDCAL Toolbox were used. These scripts were based on earlier work of different groups as well as in modern statistical tools. They cover all the steps of the CTD data processing from the preliminary comparisons between sensors or bottle samples to data reductions and final sensors calibrations.

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 dc/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 despiked 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 $N^2 \leq -1.0 \text{ e } -05 \text{ s}^{-2}$.

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 4 and Tables 18 - 22. All cruises used pressure sensor s/n 0957. Prior to each cruise a pressure offset of -0.588 was applied to the pressure configuration file for a total pressure offset of -3.3164. On deck pressures recorded before and after each cast are plotted in Figure 4.

For FC1603 the on deck pressure before and after the cast were stable at -0.048 ± 0.038 dbar and -0.059 ± 0.058 dbar, respectively (median \pm standard deviation). No pressure correction offset was necessary before final calibration of the data. 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 (3.75 ± 0.33 dbar before and 2.77 ± 0.47 dbar after).

For FC1605 the on deck pressure before and after the cast were stable at -0.025 ± 0.09 dbar and 0.061 ± 0.03 dbar, respectively. No pressure correction offset was necessary before final calibration of the data. Near surface pressure values showed a little variability over the cruise between the start and end surface pressure (2.55 ± 0.35 dbar before and 2.66 ± 0.39 dbar after).

For FC1607 the on deck pressure before and after the cast were stable at -0.006 ± 0.032 dbar and 0.17 ± 0.05 dbar, respectively. No pressure correction offset was necessary before final calibration of the data. Near surface pressure values showed little variability over the cruise between the start and end surface pressure (2.49 ± 0.28 dbar before and 3.11 ± 0.48 dbar after).

For FC1609 the on deck pressure before and after the cast were stable at 0.03 ± 0.05 dbar and 0.21 ± 0.28 dbar, respectively. No pressure correction offset was necessary before final calibration of the data. Near surface pressure values showed little variability over the cruise between the start and end surface pressure (1.98 ± 0.21 dbar before and 2.29 ± 0.51 dbar after).

For FC1612 the on deck pressure before the cast was stable at 0.06 ± 0.03 dbar. No pressure correction offset was necessary before final calibration of the data. Near surface pressure values showed little variability over the cruise between the start and end surface pressure (2.18 ± 0.18 dbar before and 2.48 ± 0.69 dbar after).

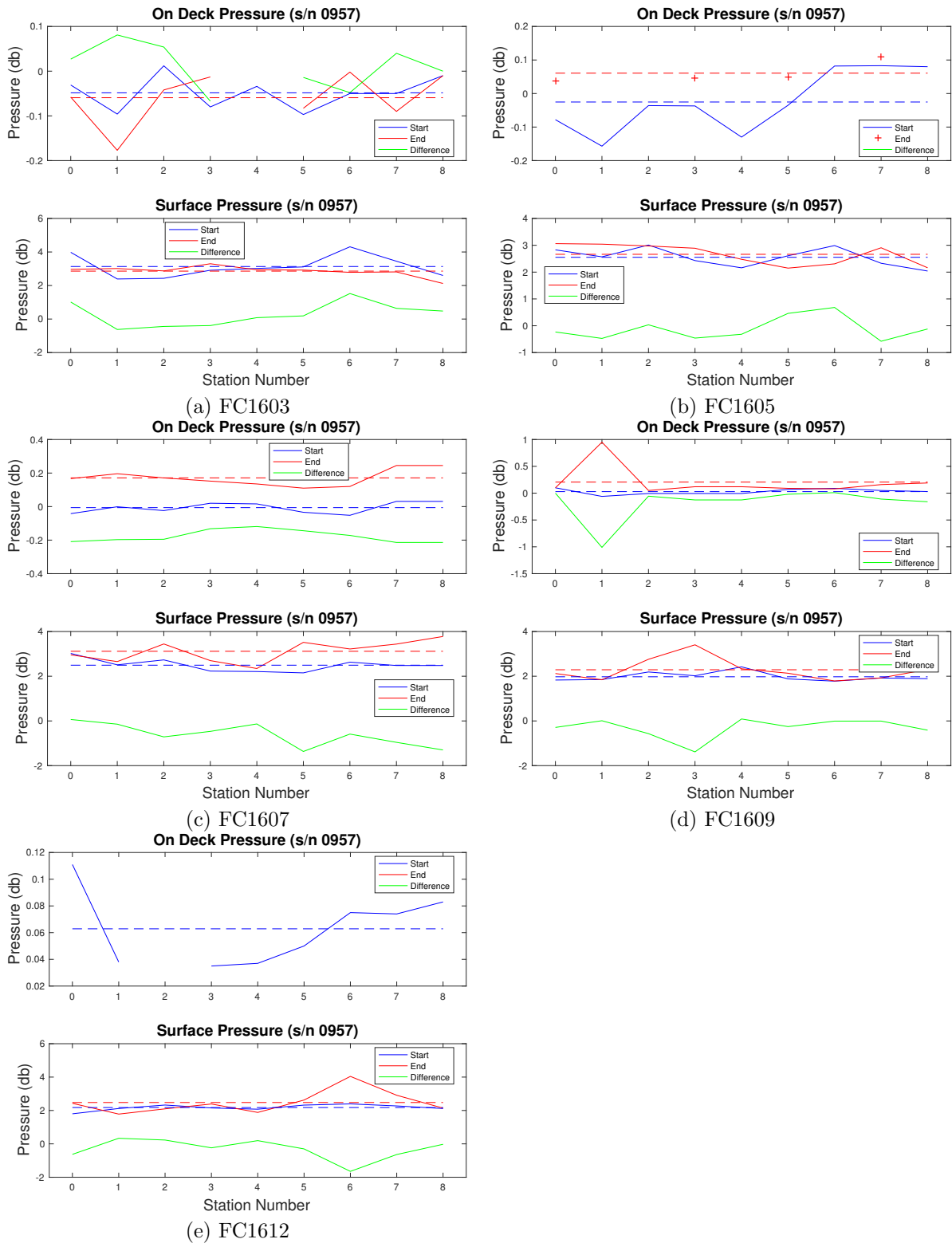


Figure 4: Pressure differences vs. station number. Top panel are the pressures measured on deck before the cast (blue). Bottom panel are the near sea surface pressure values measured at the start of the downcast (blue), at the end of the upcast (red) and their respective difference (green).

Table 18: 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
0	1543	-0.0310	-0.0580	3.9800	2.9660
1	1673	-0.0960	-0.1770	2.3900	3.0130
2	2173	0.0120	-0.0420	2.4300	2.8710
3	1545	-0.0800	-0.0129	2.9100	3.2990
4	2135	-0.0340	-999.0000	3.0200	2.9380
5	2122	-0.0970	-0.0830	3.1100	2.9210
6	2225	-0.0500	-0.0020	4.3100	2.7880
7	2232	-0.0500	-0.0900	3.4500	2.8120
8	1983	-0.0100	-0.0100	2.6000	2.1230

Table 19: 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
0	2772	-0.0780	0.0370	2.8300	3.0620
1	2639	-0.1570	-999.0000	2.5700	3.0420
2	4266	-0.0360	-999.0000	3.0100	2.9750
3	2754	-0.0370	0.0460	2.4300	2.8900
4	3047	-0.1300	-999.0000	2.1600	2.4780
5	2508	-0.0350	0.0500	2.6100	2.1490
6	2241	0.0820	-999.0000	2.9900	2.3080
7	2389	0.0830	0.1100	2.3300	2.9080
8	3372	0.0800	-999.0000	2.0400	2.1610

Table 20: 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
0	1898	-0.0420	0.1670	3.0200	2.9560
1	1773	-0.0010	0.1960	2.5100	2.6550
2	1851	-0.0240	0.1710	2.7300	3.4430
3	1853	0.0200	0.1520	2.2300	2.6980
4	1668	0.0160	0.1350	2.2100	2.3450
5	2498	-0.0340	0.1100	2.1500	3.5160
6	2077	-0.0520	0.1200	2.6300	3.2190
7	1325	0.0310	0.2450	2.4800	3.4380
8	1325	0.0310	0.2450	2.4800	3.7780

Table 21: 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
0	2701	0.1000	0.1000	1.8300	2.1210
1	2123	-0.0600	0.9500	1.8500	1.8410
2	3135	-0.0060	0.0500	2.1900	2.7580
3	2336	-0.0060	0.1200	2.0200	3.4050
4	2242	-0.0060	0.1200	2.4200	2.3330
5	1919	0.0700	0.0900	1.8800	2.1340
6	2706	0.0900	0.0800	1.7800	1.7880
7	2266	0.0500	0.1600	1.9200	1.9260
8	2043	0.0300	0.1900	1.8900	2.3030

Table 22: 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
0	2090	0.1110	-999.0000	1.8010	2.4290
1	2121	0.0380	-999.0000	2.1190	1.7840
2	1441	-999.0000	-999.0000	2.3270	2.0980
3	1114	0.0350	-999.0000	2.1510	2.3890
4	1052	0.0370	-999.0000	2.0770	1.8830
5	1908	0.0500	-999.0000	2.3230	2.6250
6	2000	0.0750	-999.0000	2.3940	4.0420
7	2422	0.0740	-999.0000	2.2730	2.9110
8	1801	0.0830	-999.0000	2.1170	2.1420

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 5, which shows the median temperature difference between the two sensors. For FC1603 there was a median of 0.0025 °C and a standard deviation of 0.003 °C. For FC1605 there was a median of $5.5 \cdot 10^{-4}$ °C and a standard deviation of 0.011 °C. For FC1607 there was a median of 0.0018 °C and a standard deviation of 0.009 °C. For FC1609 there was a median of 0.0016 °C and a standard deviation of 0.01 °C. For FC1612 there was a median of 0.0016 °C and a standard deviation of 0.03 °C. The secondary sensor, s/n 5855, was used for all cruises.

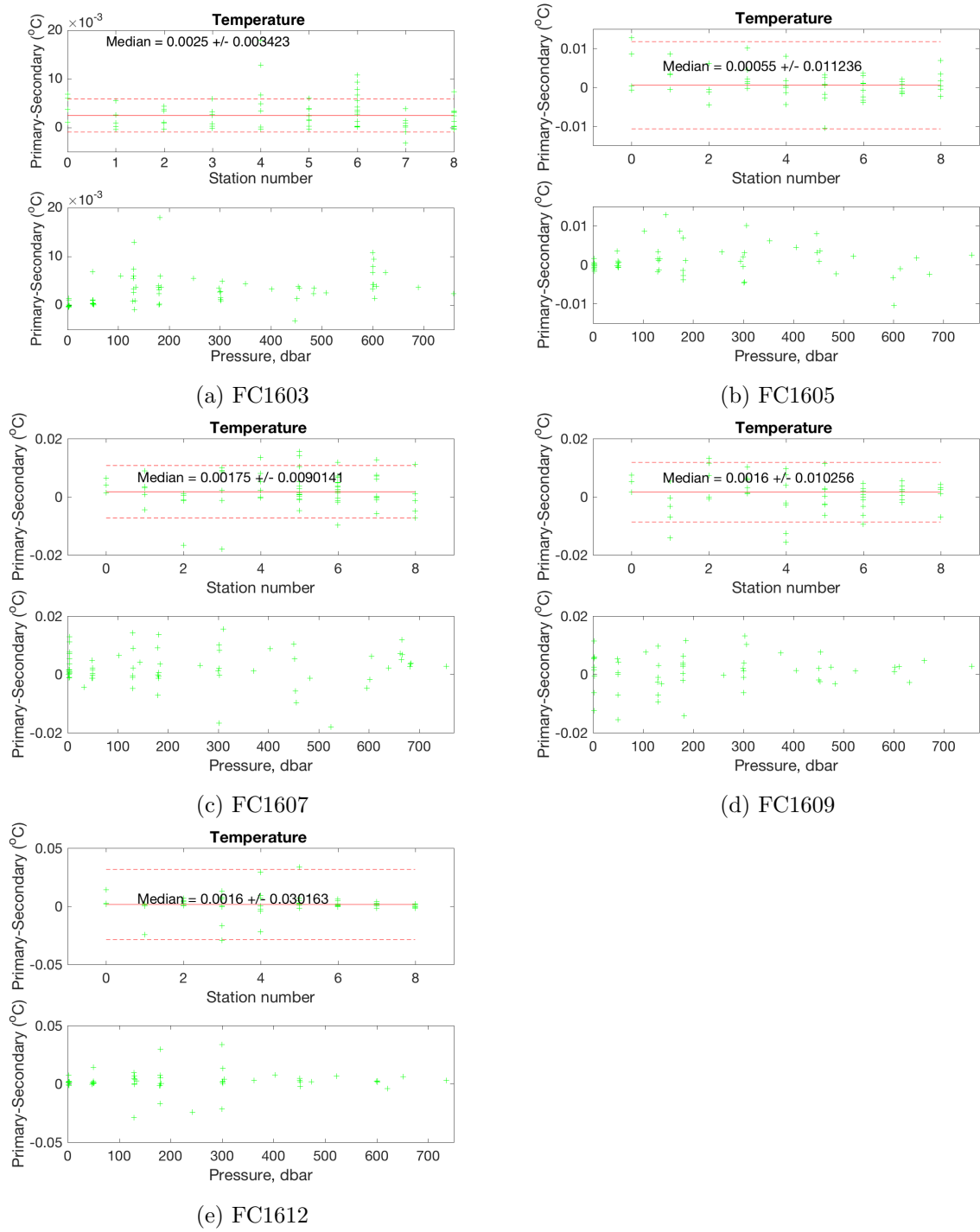


Figure 5: Temperature differences (after pressure corrections) between sensors by station number (top) and pressure (bottom). The green represents the surface data down to 1000 dbar. The blue represents data below 1000 dbar. The red solid line represents the median with the red dashed representing the standard deviation (same for top and bottom).

A SBE 35RT reference temperature was used during three of the cruises, FC1605, FC1607 and FC1609, as a check to monitor the behavior of the primary and secondary temperature sensors. This typically allows for corrections to be made if there are any significant pressure dependencies or offsets, but was uncertain if it would be significant in the high variability of the Florida Current.

In order to calibrate the CTD temperature data against the reference temperature we derived the slope correction, m , and offset correction, b , using a least squares fit. This was done as a function of CTD pressure and delta T, where delta T is the CTD temperature minus the reference temperature. The corrections for the slope and offset are then applied to the CTD pressure, P_{CTD} , to calculate the temperature correction (T_{cor}),

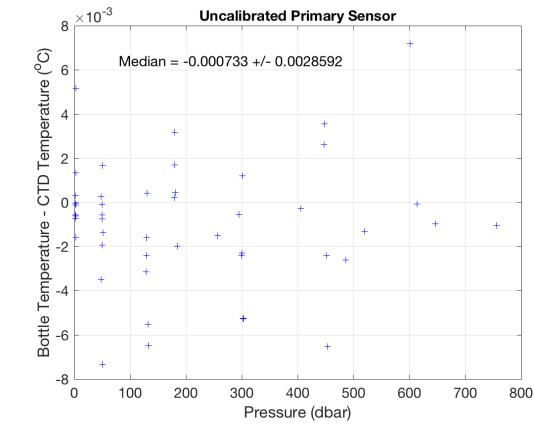
$$T_{cor} = [m * P_{CTD} + b]$$

and T_{cor} is applied to calculate the calibrated CTD temperature,

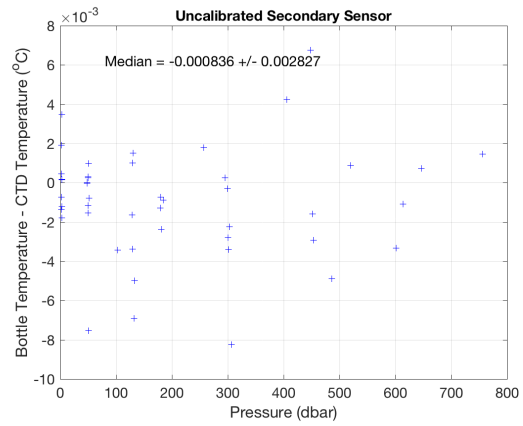
$$T_{new} = T_{CTD} - T_{cor}$$

where T_{CTD} is the CTD temperature and T_{new} is the calibrated CTD temperature.

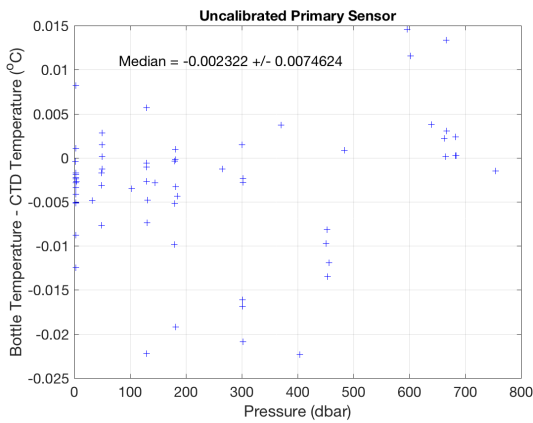
There was little, if any, improvement in the median and standard deviation between the uncalibrated and calibrated values between the CTD temperature and reference temperature Figure 6 & 7. Looking at the T-S plots in Figure 8 it is not clear which sensor to pick between the calibrated or uncalibrated sensor or the primary or secondary sensor. Although there is a minimal improvement with the application of the reference temperature correction, it is not obvious in the high variability of the Florida Straits and the noise between the residuals of CTD temperature sensors and the residuals of the CTD temperature sensors and the reference temperature that the reference temperature correction is necessary.



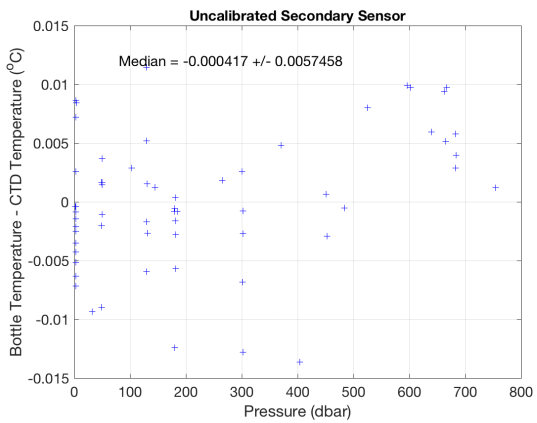
(a) FC1605



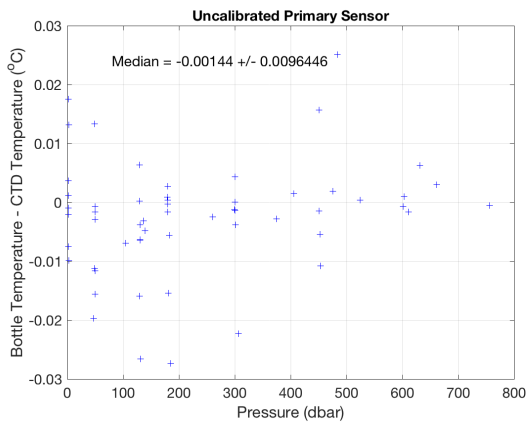
(b) FC1605



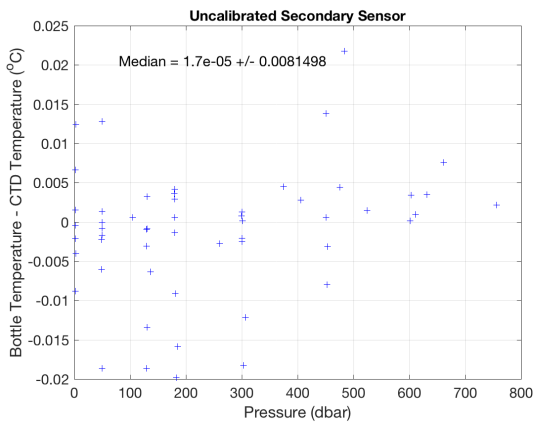
(c) FC1607



(d) FC1607

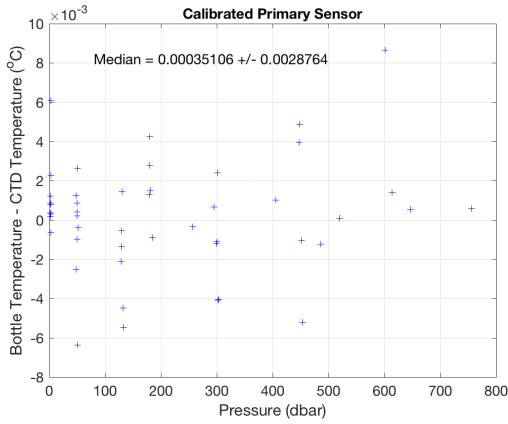


(e) FC1609

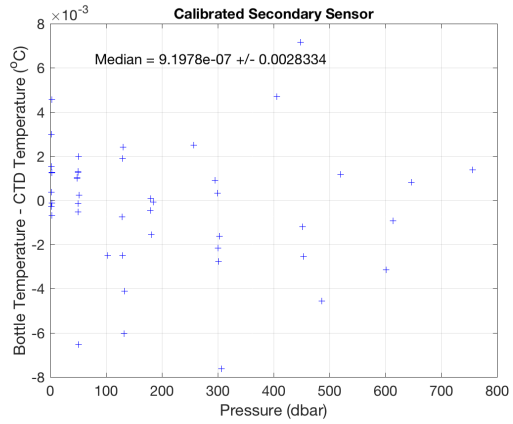


(f) FC1609

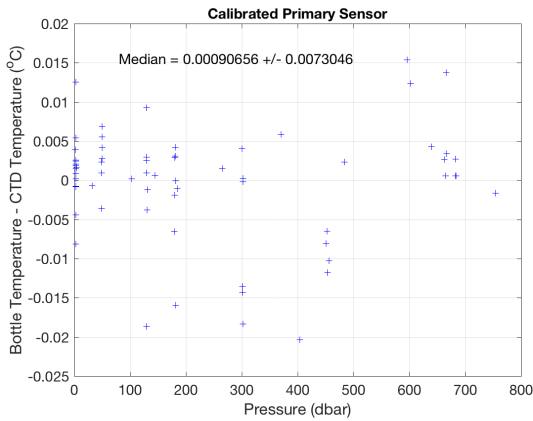
Figure 6: Reference temperature (labeled as Bottle Temperature) and uncalibrated primary and secondary CTD temperature differences plotted vs. pressure.



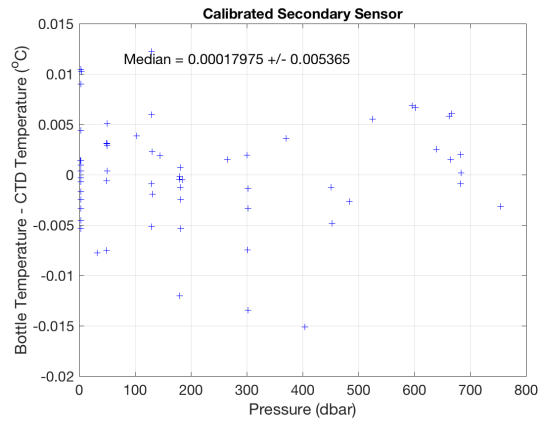
(a) FC1605



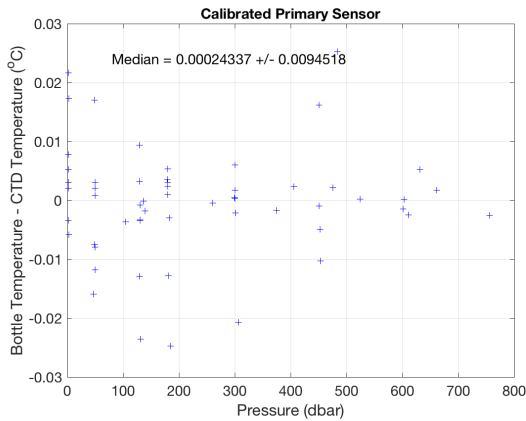
(b) FC1605



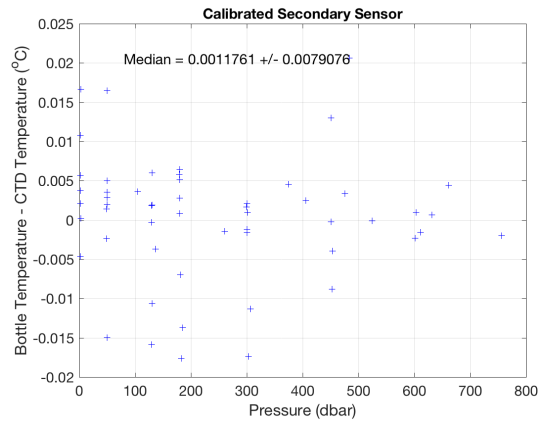
(c) FC1607



(d) FC1607

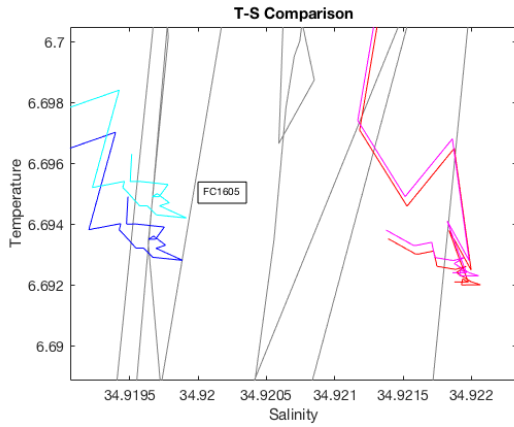


(e) FC1609

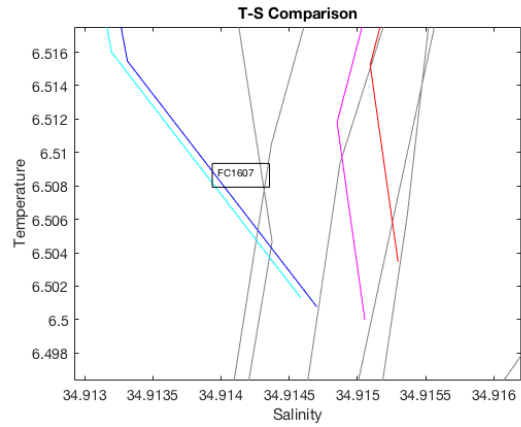


(f) FC1609

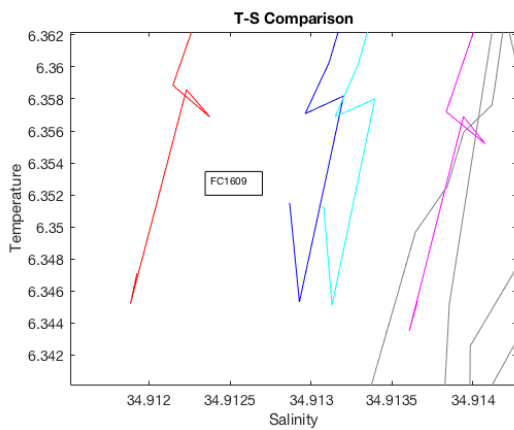
Figure 7: Reference temperature (labeled as Bottle Temperature) and calibrated primary and secondary CTD temperature differences plotted vs. pressure.



(a) FC1605



(b) FC1607



(c) FC1609

Figure 8: T-S plot comparison of temperature calibrated with the reference temperature (primary - blue, secondary - red) and uncalibrated temperature (primary - cyan, secondary - magenta) and historical in grey.

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 9 to help identify sensor drift. The AOML/CTDCAL Toolbox automatically applies a quality control to the data based on comparison with a normal distribution.

For FC1603 the sensors show a median difference of 0.001 mS/cm and a standard deviation of 0.004 mS/cm (Figure 9). Both sensors showed reasonable values for the residuals. The secondary sensor, s/n 4346, was used for all the final data values (Figure 10).

For FC1605 the sensors show a median difference of -0.002 mS/cm and a standard deviation of 0.012 mS/cm (Figure 9). Both sensors showed reasonable values for the residuals. The secondary sensor, s/n 4346, was used for all the final data values (Figure 10).

For FC1607 the sensors show a median difference of -0.001 mS/cm and a standard deviation of 0.01 mS/cm (Figure 9). Both sensors showed reasonable values for the residuals. The secondary sensor, s/n 4346, was used for all the final data values (Figure 10).

For FC1609 the sensors show a median difference of -0.0004 mS/cm and a standard deviation of 0.012 mS/cm (Figure 9). Both sensors showed reasonable values for the residuals. The secondary sensor, s/n 4346, was used for all the final data values (Figure 10).

For FC1612 the sensors show a median difference of -0.003 mS/cm and a standard deviation of 0.034 mS/cm (Figure 9). Both sensors showed reasonable values for the residuals. The secondary sensor, s/n 4346, was used for all the final data values (Figure 10).

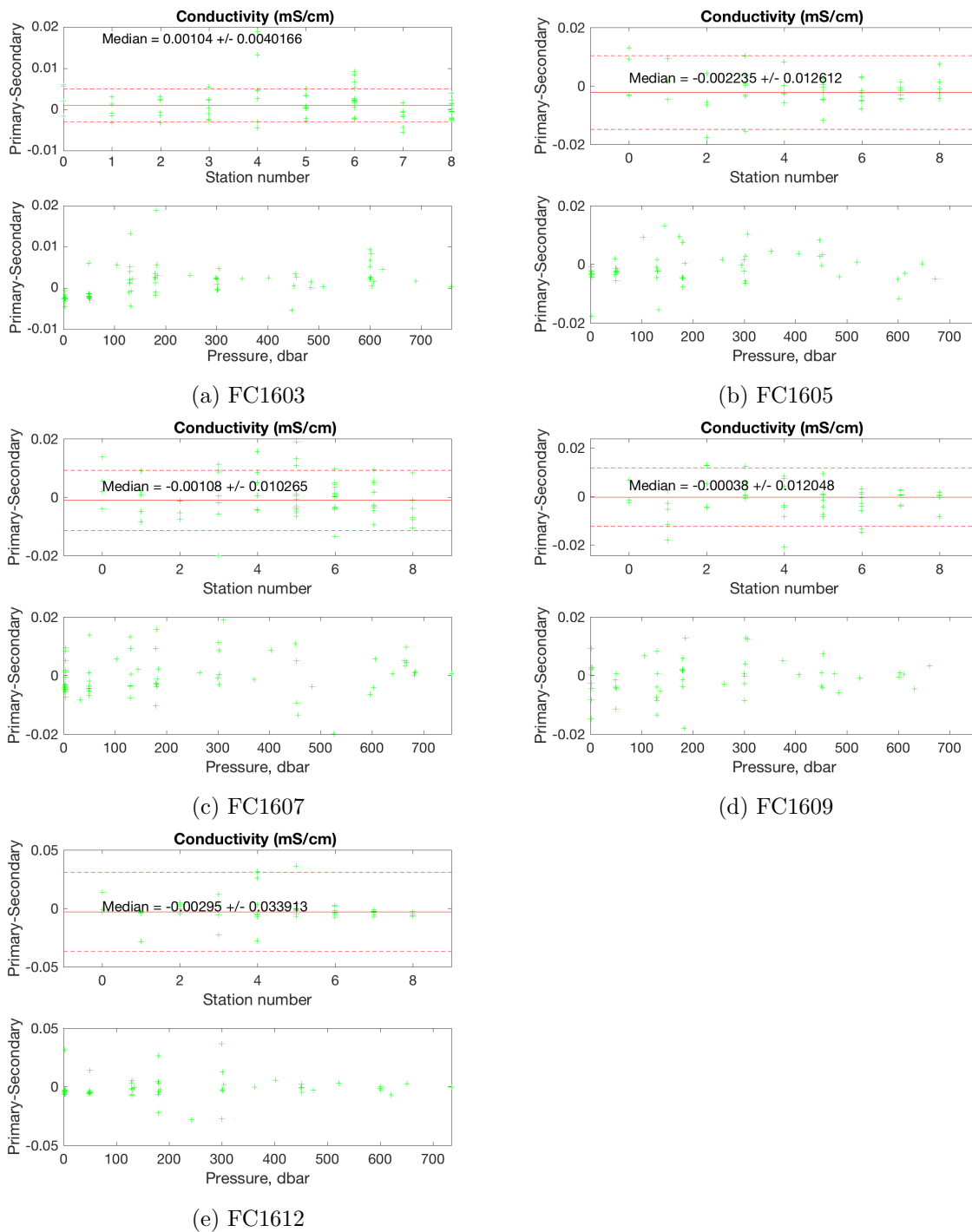


Figure 9: Conductivity (mS/cm) differences between sensors by station (top) and pressure (bottom). The red solid line represents the median with the red dashed representing the standard deviation.

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

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

where C_{bottle} is bottle conductivity (S/m), C_{CTD} is pre-cruise calibrated CTD conductivity (S/m), m is the conductivity slope, b is the offset (S/m), 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. Final calibration coefficients are listed in Tables 23 & ??.

FC1603 s/n 4346	FC1605 s/n 4346	FC1607/FC1609 s/n 4346	FC1612 s/n 4346
$m= 0.99998231$	$m= 0.99950459$	$m= 0.99951290$	$m= 0.99945284$
$p_1= 0$	$p_1= 0$	$p_1= 0$	$p_1= 0$
$b= 0.00702846$	$b= 0.03024969$	$b= 0.03426927$	$b= 0.03325286$
$pcor= 1.82865E-06$	$pcor= -1.83410E-05$	$pcor= -2.13010E-05$	$pcor= -2.51855E-05$

Table 23: Conductivity calibration coefficients applied for final calibration.

For FC1603 the coefficients estimated by the equation above were then applied to the CTD conductivities and the final results (Figure 11 to Figure 12) show a median of $-1.8 \cdot 10^{-3}$ psu and a standard deviation of 0.008 psu. After data reduction 51 data points (96.2 %) were used in the final calculations.

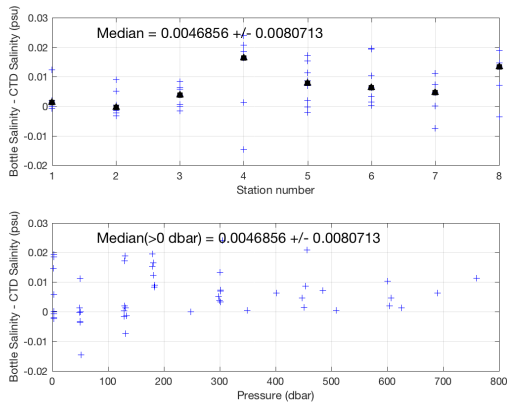
For FC1605 the coefficients estimated by the equation above were then applied to the CTD conductivities and the final results (Figure 11 to Figure 12) show a median of $-3.3 \cdot 10^{-4}$ psu and a standard deviation of 0.005 psu. After data reduction 56 data points (96.6 %) were used in the final calculations.

For FC1607 the coefficients estimated by the equation above were then applied to the CTD conductivities and the final results (Figure 11 to Figure 12) show a median of $2.0 \cdot 10^{-4}$ psu and a standard deviation of 0.005 psu. After data reduction 50 data points (89.3 %) were used in the final calculations.

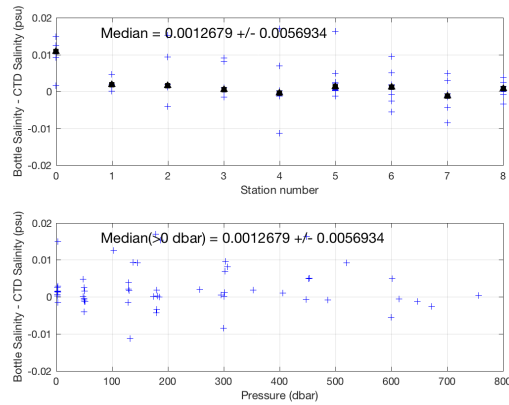
For FC1609 the secondary coefficients from FC1607 were applied due to the unusable salts.

For FC1612 the coefficients estimated by the equation above were then applied to the CTD conductivities and the final results (Figure 11 to Figure 12) show a median of $-1.2 \cdot 10^{-3}$ psu and a standard deviation of 0.007 psu. After data reduction 56 data points (96.6 %) were used in the final calculations.

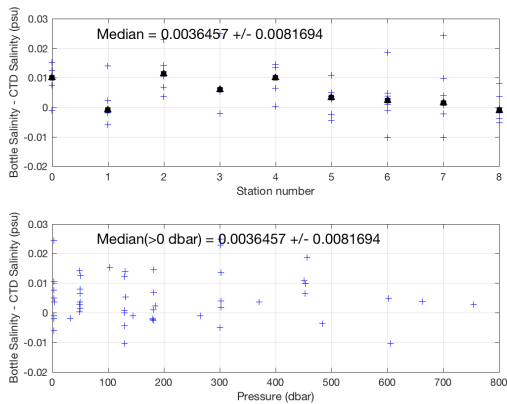
A final verification about the quality of the data was made by comparing the results of this cruise with some historical data (Figure 13 & 14).



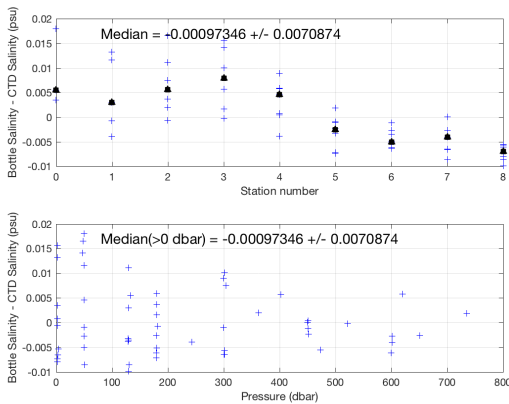
(a) FC1603



(b) FC1605

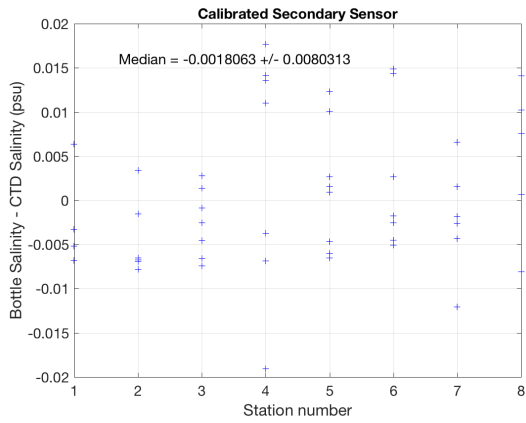


(c) FC1607

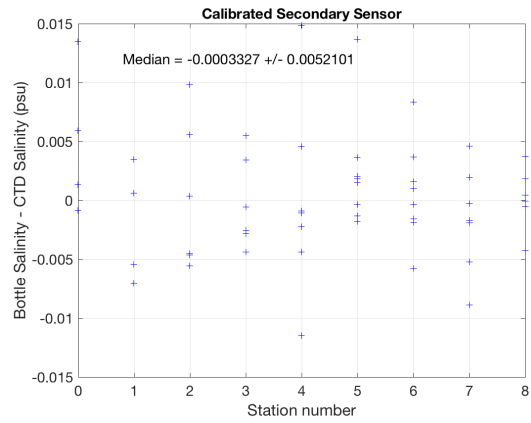


(d) FC1612

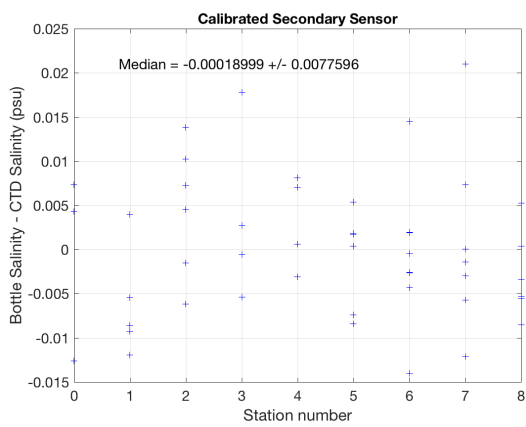
Figure 10: Bottle and uncalibrated CTD salinity differences plotted against pressure. The green crosses represent all data points and the blue are the data points below 1000 dbar. The median was calculated using only the data below 1000 dbar.



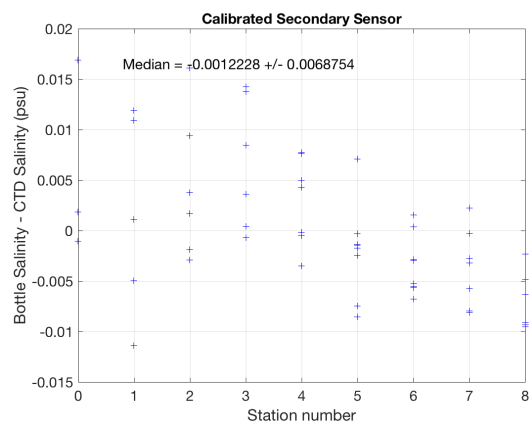
(a) FC1603



(b) FC1605

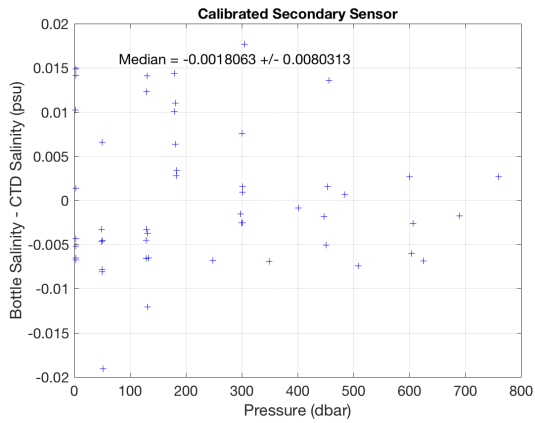


(c) FC1607

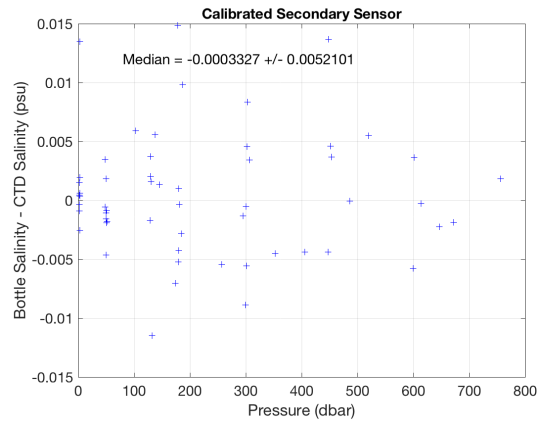


(d) FC1612

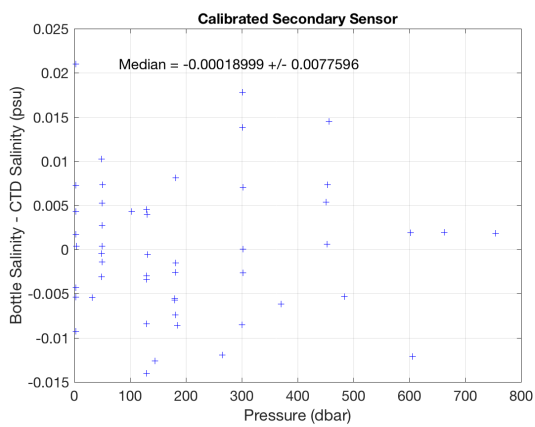
Figure 11: Bottle and calibrated CTD salinity differences plotted vs. station.



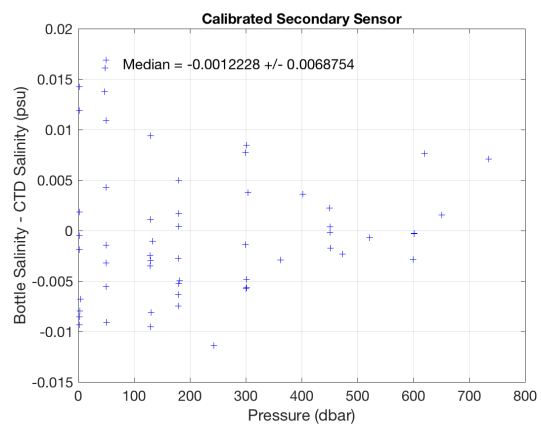
(a) FC1603



(b) FC1605

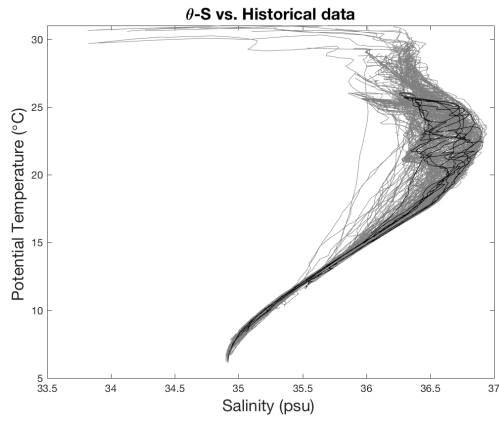


(c) FC1607

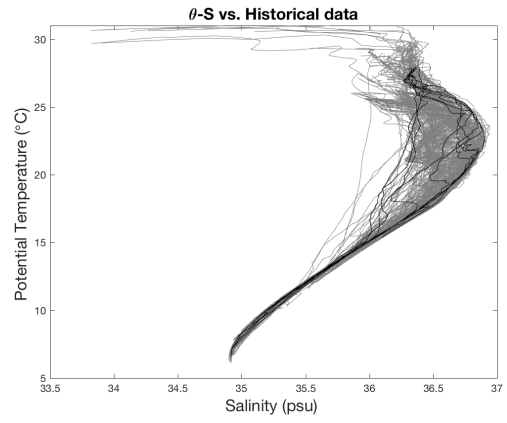


(d) FC1612

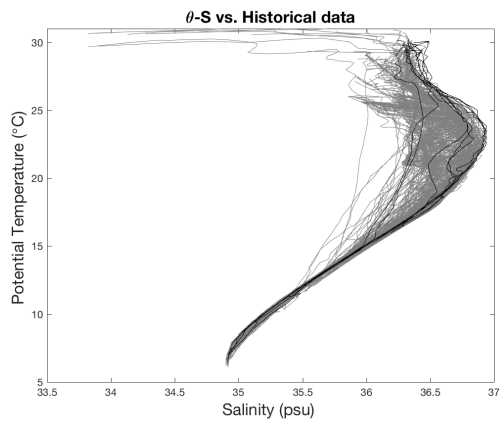
Figure 12: Bottle and calibrated CTD salinity differences plotted vs. pressure.



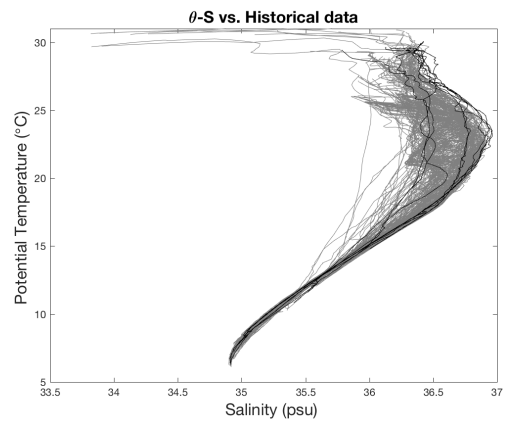
(a) FC1603



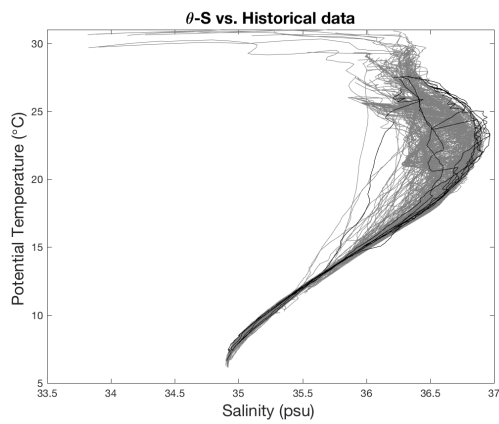
(b) FC1605



(c) FC1607

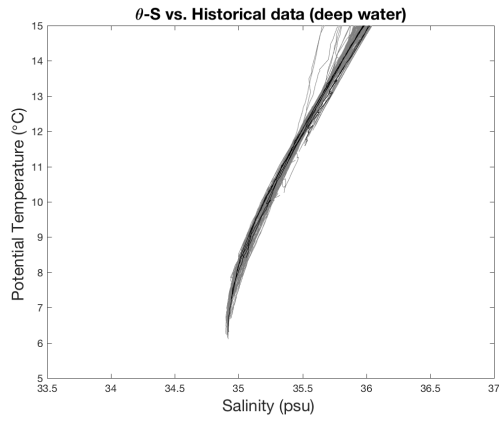


(d) FC1609

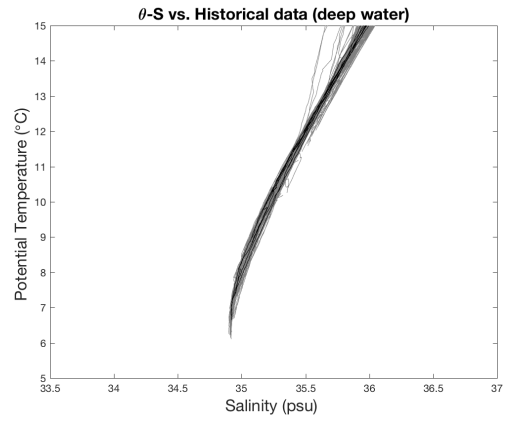


(e) FC1612

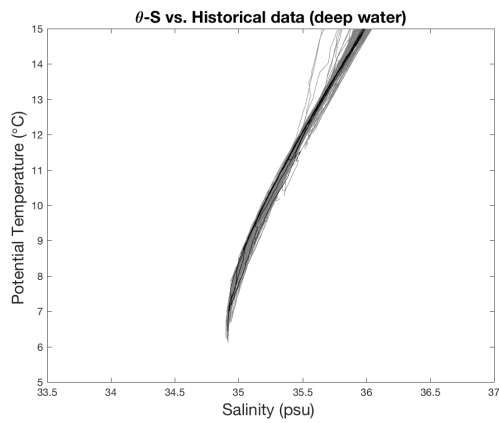
Figure 13: Potential Temperature - Salinity diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.



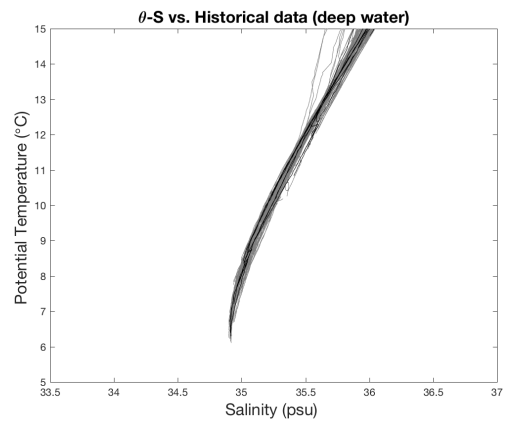
(a) FC1603



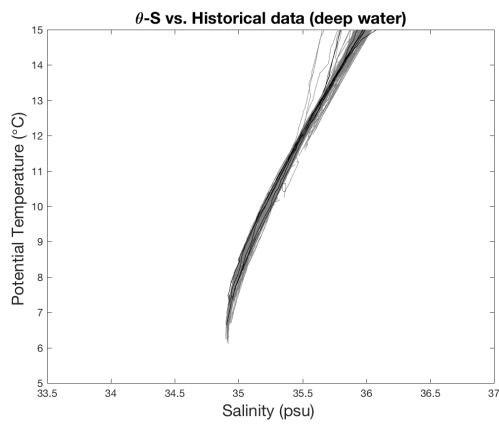
(b) FC1605



(c) FC1607



(d) FC1609



(e) FC1612

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 O₂ (DO) sensors were used these four cruises (Table 11). Due to a hysteresis problem with the oxygen sensors 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 O₂, 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:

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

with

	FC1603	FC1605	FC1607
	S/N 0730	S/N 0730	S/N 0730
<i>Soc</i>	0.566019980	0.541294025	0.488267634
<i>V_{offset}</i>	-0.495404240	-0.516325152	-0.424176112
<i>A</i>	-0.006280407	0.006345816	0.010550174
<i>B</i>	0.000469110	-0.000556466	-0.000425503
<i>C</i>	-1.075967E-05	1.186222E-05	4.888569E-06
<i>E</i>	0.046172313	0.052787427	0.044571586
<i>tau</i>	0.616230391	-0.619156161	2.001462886
<i>p1</i>	0	0	0

	FC1609	FC1612
	S/N 0730	S/N 0730
<i>Soc</i>	0.564038109	0.536252550
<i>V_{offset}</i>	-0.516615022	-0.466475905
<i>A</i>	-0.000919575	0.005426887
<i>B</i>	-0.000023630	-0.000340010
<i>C</i>	5.491871E-07	5.776411E-06
<i>E</i>	0.051700182	0.037837434
<i>tau</i>	-1.055809482	0.358011527
<i>p1</i>	0	0

where Soc , τ , 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.

For FC1603 a comparison between the primary and secondary sensors (Figure 15) was evaluated. The sensors show a median difference of $1.62 \text{ } \mu\text{mol}/\text{kg}$ and a standard deviation of $0.51 \text{ } \mu\text{mol}/\text{kg}$. The secondary sensor, s/n 0730, was used for all the final data values (Figure 16). After data reduction 51 data points (87.93%) 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 18). The median is $-0.067 \text{ } \mu\text{mol}/\text{kg}$ and the standard deviation $0.84 \text{ } \mu\text{mol}/\text{kg}$.

For FC1605 a comparison between the primary and secondary sensors (Figure 15) was evaluated. The sensors show a median difference of $0.03 \text{ } \mu\text{mol}/\text{kg}$ and a standard deviation of $0.34 \text{ } \mu\text{mol}/\text{kg}$. The primary sensor, s/n 0730, was used for all the final data values (Figure 16). After data reduction 52 data points (89.66%) 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 18). The median is $0.029 \text{ } \mu\text{mol}/\text{kg}$ and the standard deviation $0.84 \text{ } \mu\text{mol}/\text{kg}$.

For FC1607 a comparison between the primary and secondary sensors (Figure 15) was evaluated. The sensors show a median difference of $1.09 \text{ } \mu\text{mol}/\text{kg}$ and a standard deviation of $0.98 \text{ } \mu\text{mol}/\text{kg}$. The secondary sensor, s/n 0730, was used for all the final data values (Figure 16). After data reduction 51 data points (91.07%) 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 18). The median is $0.015 \text{ } \mu\text{mol}/\text{kg}$ and the standard deviation $1.41 \text{ } \mu\text{mol}/\text{kg}$.

For FC1609 a comparison between the primary and secondary sensors (Figure 15) was evaluated. The sensors show a median difference of $1.55 \text{ } \mu\text{mol}/\text{kg}$ and a standard deviation of $0.96 \text{ } \mu\text{mol}/\text{kg}$. The primary sensor, s/n 0730, was used for all the final data values (Figure 16). After data reduction 54 data points (94.7%) 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 18). The median is $0.025 \text{ } \mu\text{mol}/\text{kg}$ and the standard deviation $1.07 \text{ } \mu\text{mol}/\text{kg}$.

For FC1612 a comparison between the primary and secondary sensors (Figure 15) was evaluated. The sensors show a median difference of $3.09 \text{ } \mu\text{mol}/\text{kg}$ and a standard deviation of $1.32 \text{ } \mu\text{mol}/\text{kg}$. The primary sensor, s/n 0730, was used for all the final data values (Figure 16). After data reduction 54 data points (94.74%) 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 18). The median is $0.04 \text{ } \mu\text{mol}/\text{kg}$ and the standard deviation $1.19 \text{ } \mu\text{mol}/\text{kg}$.

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 Florida Straits section (Figure 19 & 20).

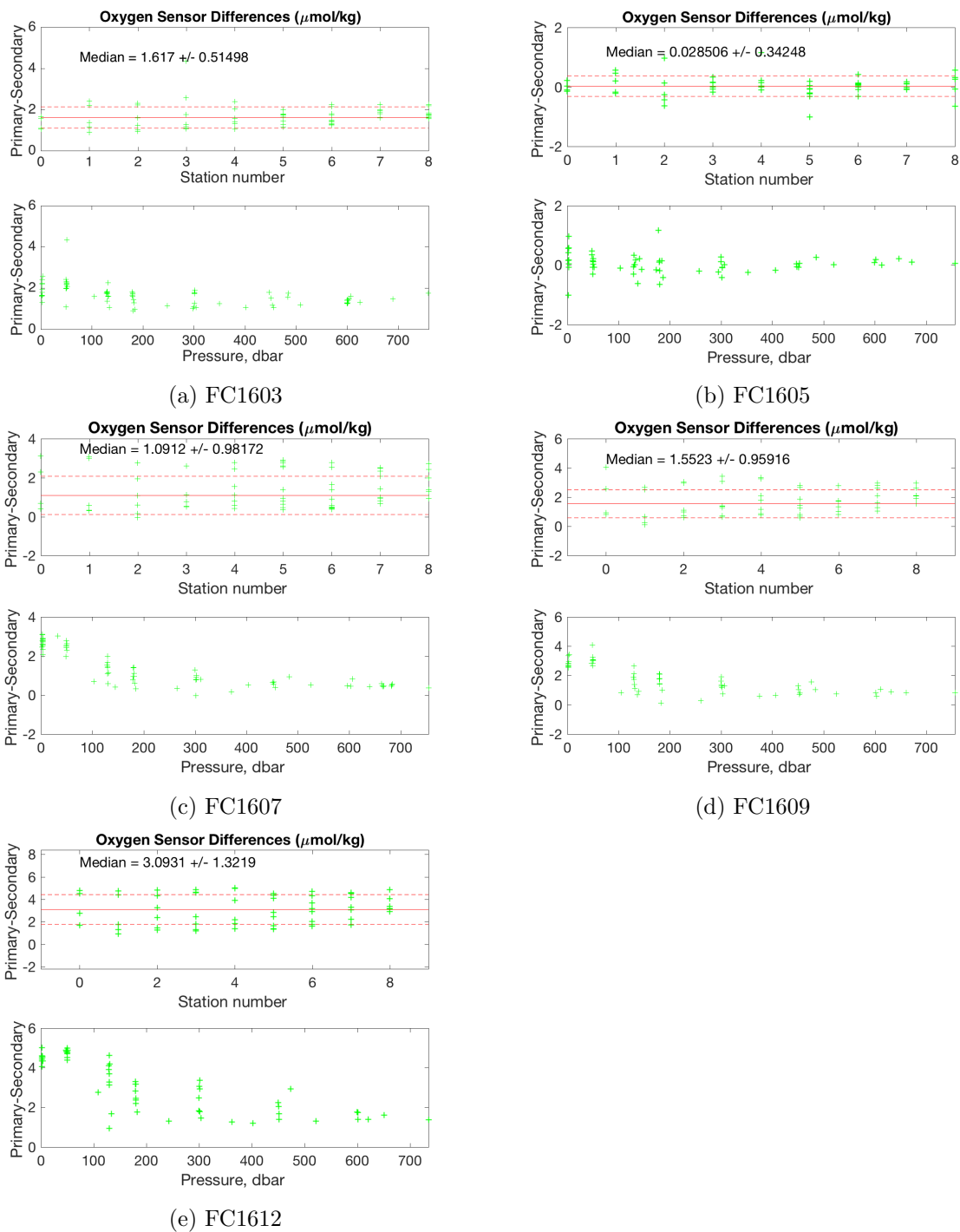
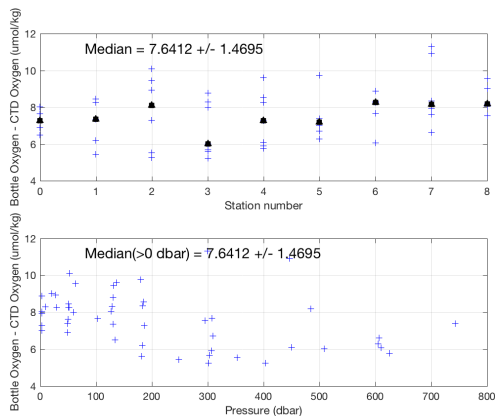
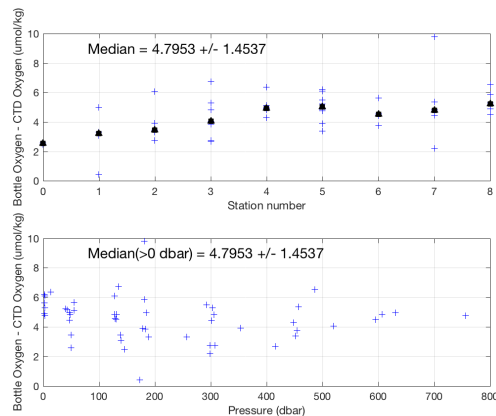


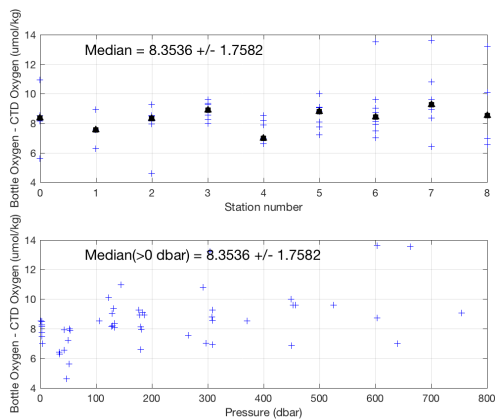
Figure 15: Dissolved oxygen differences between sensors by station (top) and by pressure (bottom). The red solid line represents the median with the red dashed representing the standard deviation.



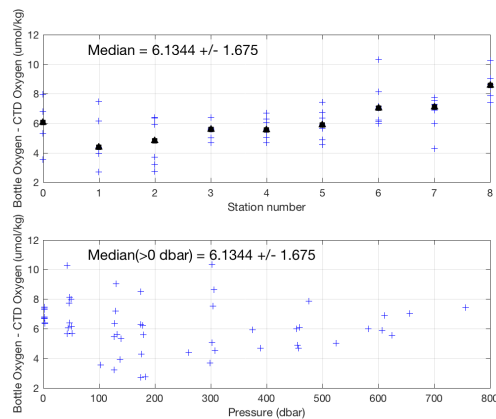
(a) FC1603



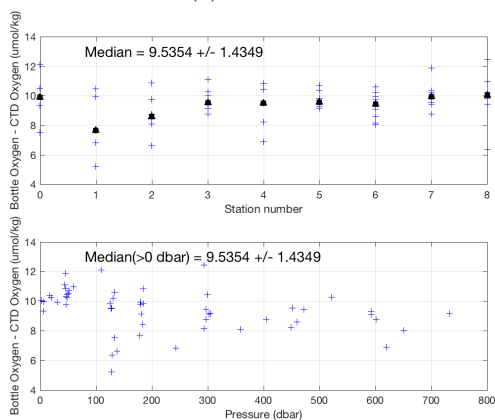
(b) FC1605



(c) FC1607

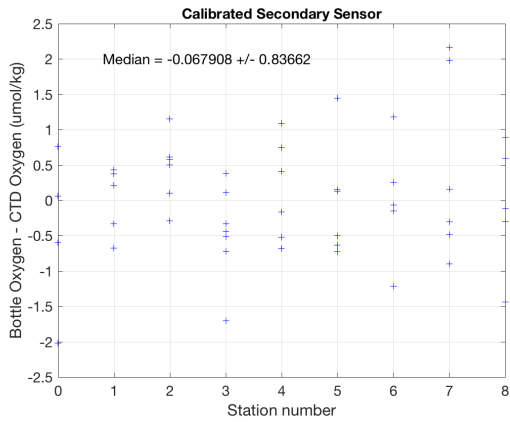


(d) FC1609

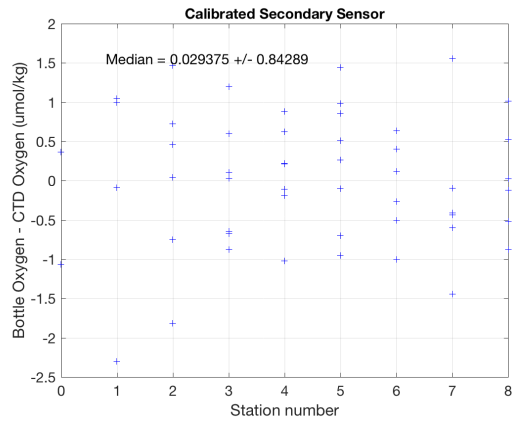


(e) FC1612

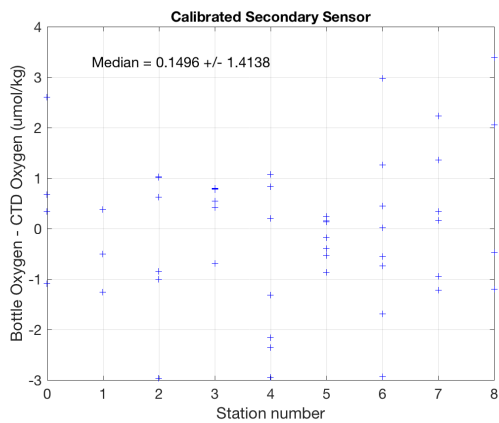
Figure 16: Bottle and uncalibrated CTD oxygen differences plotted against station number. The green crosses represent all data points and the blue are the data points below 1000 dbar. The median was calculated using only the data below 1000 dbar.



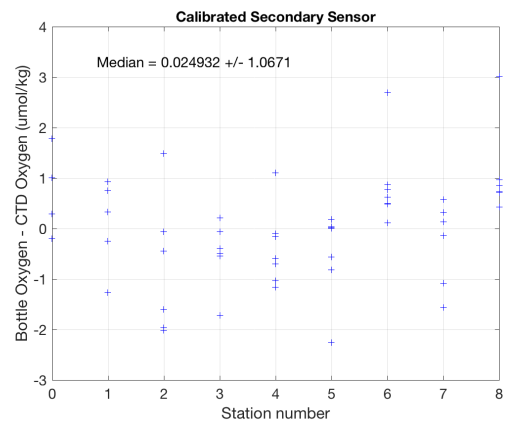
(a) FC1603



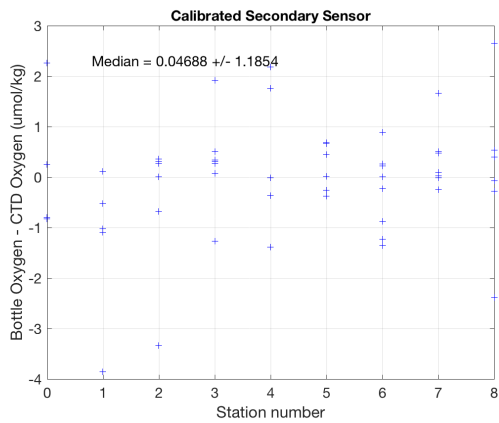
(b) FC1605



(c) FC1607

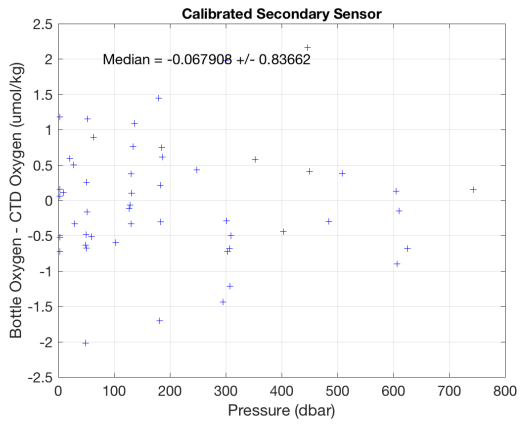


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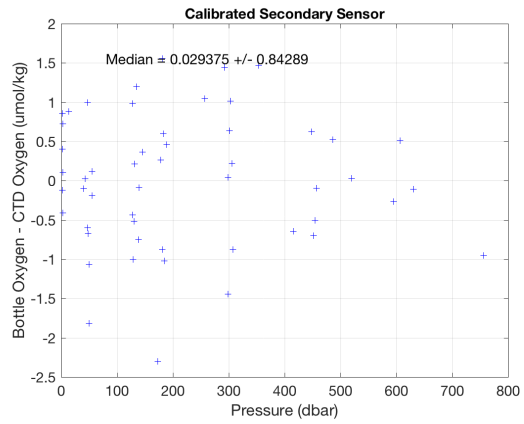


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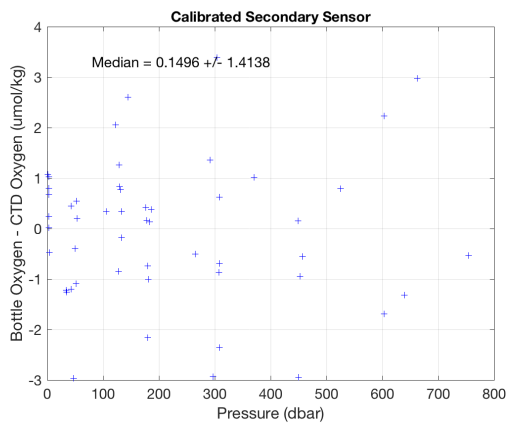
Figure 17: Bottle and calibrated CTD oxygen differences plotted vs. station.



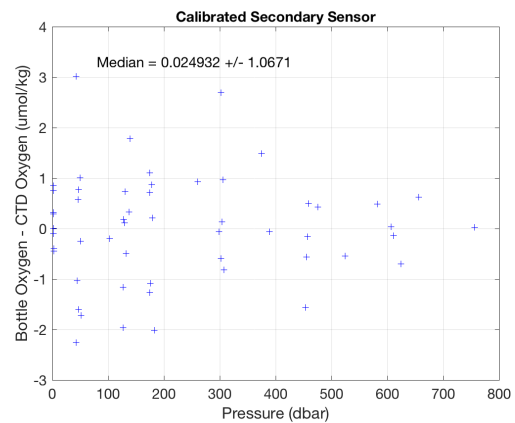
(a) FC1603



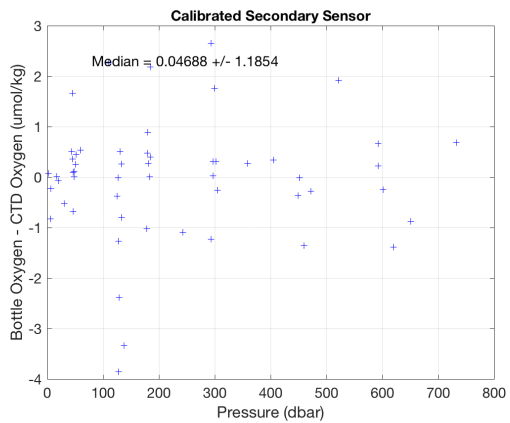
(b) FC1605



(c) FC1607

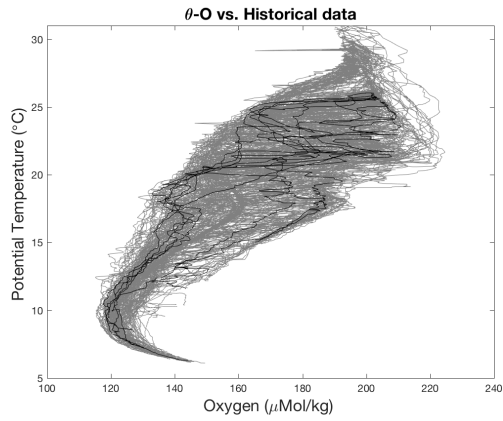


(d) FC1609

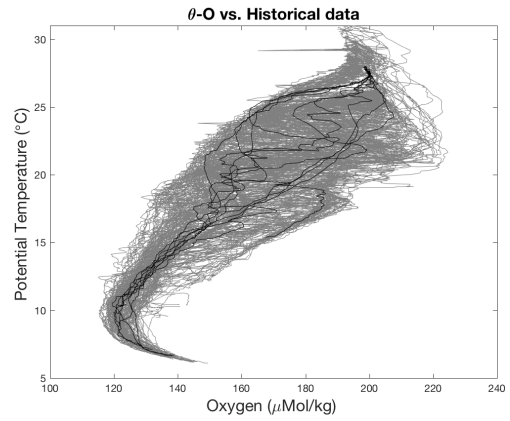


(e) FC1612

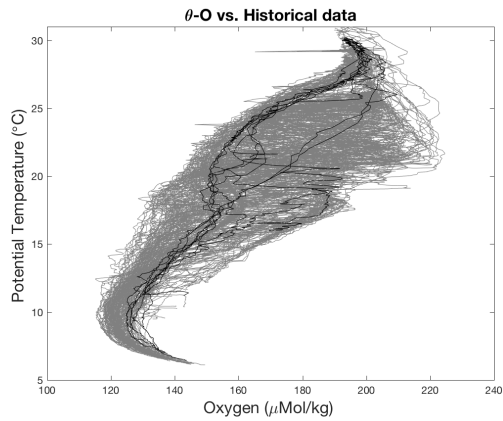
Figure 18: Bottle and calibrated CTD oxygen differences plotted vs. pressure.



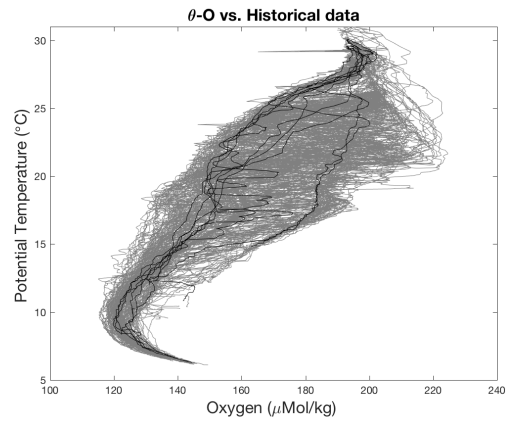
(a) FC1603



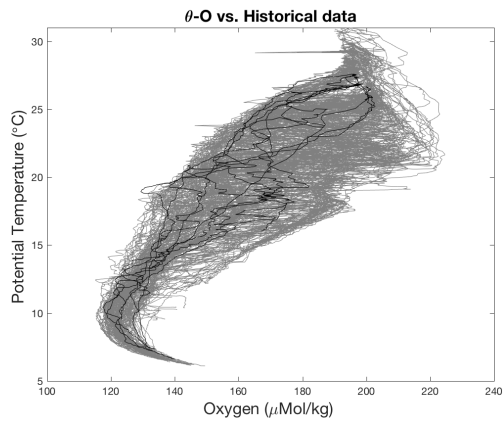
(b) FC1605



(c) FC1607

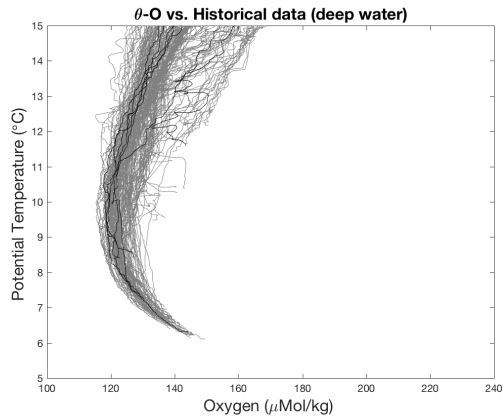


(d) FC1609

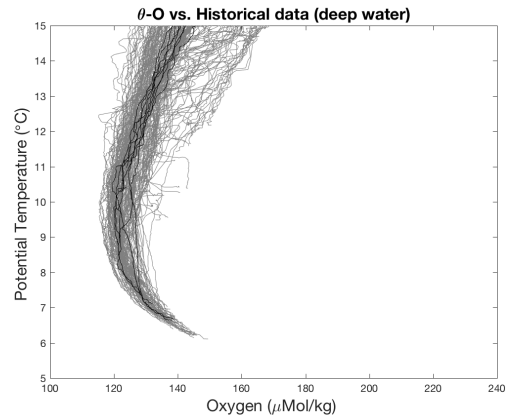


(e) FC1612

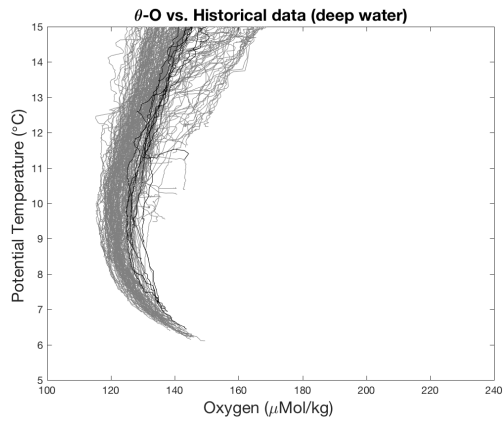
Figure 19: Potential Temperature - Oxygen diagram for all stations. The solid black lines are the data collected during this cruise; the solid gray lines are data from the historical database.



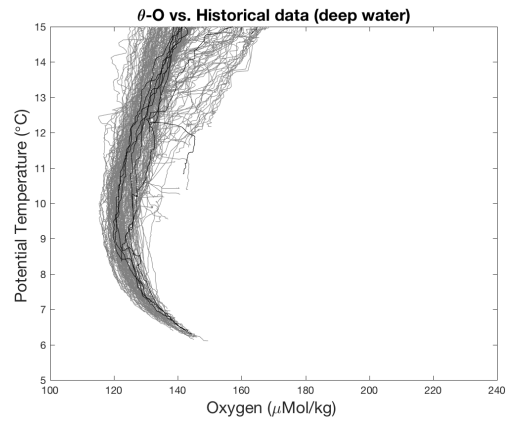
(a) FC1603



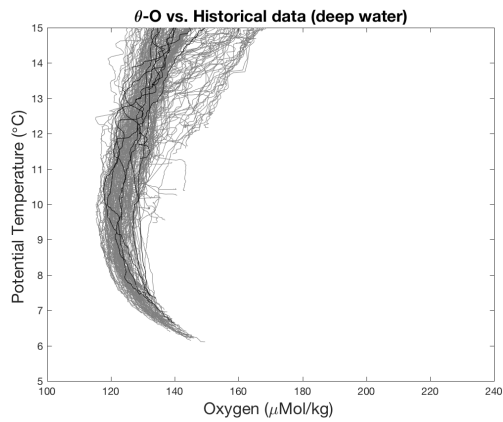
(b) FC1605



(c) FC1607



(d) FC1609



(e) FC1612

Figure 20: 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, potential density, and CTD oxygen are contoured with pressure as the vertical axis. The Florida Current Section uses longitude as the horizontal axis (Figure 21 to Figure 24).

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).

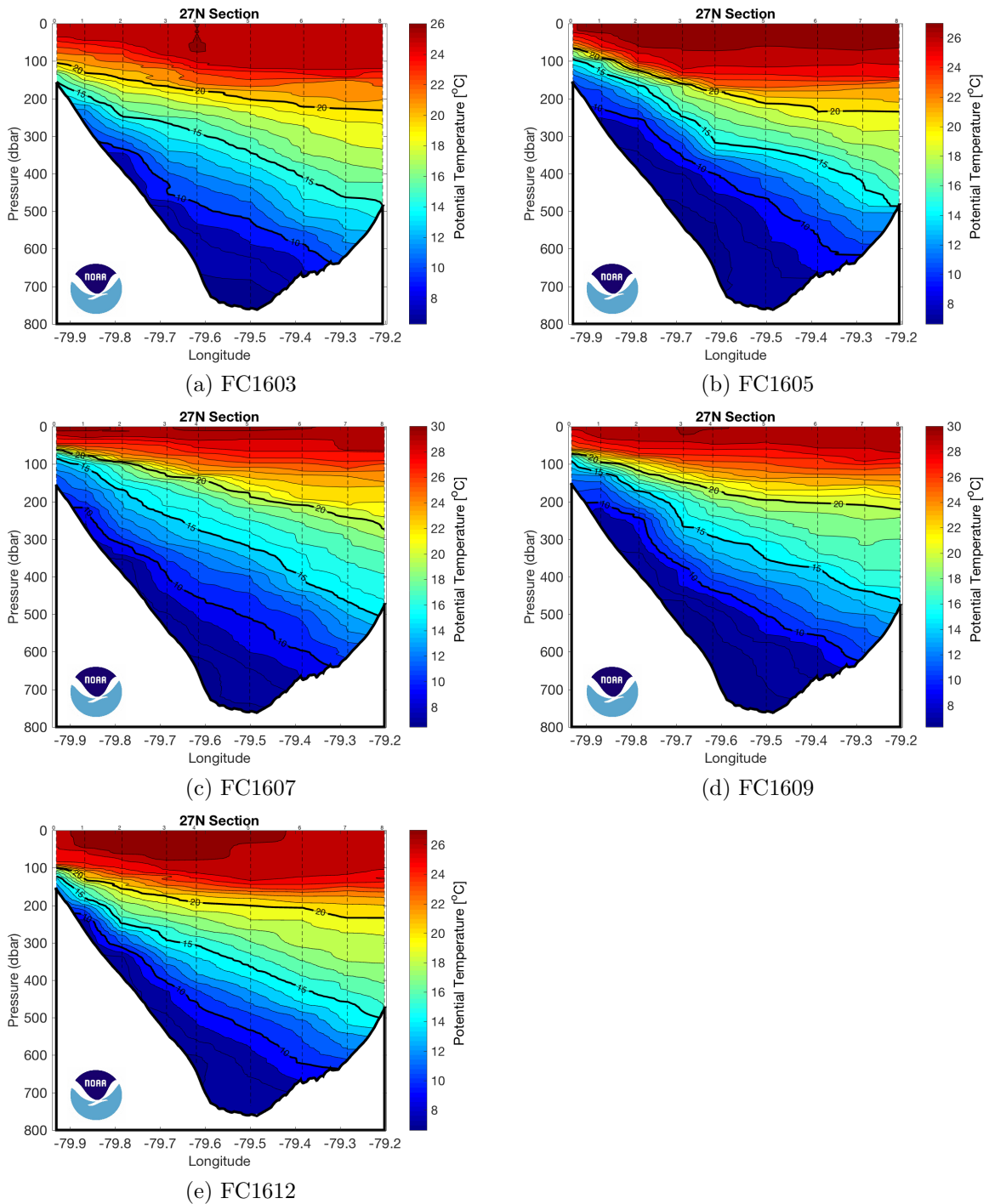


Figure 21: Potential Temperature (°C) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

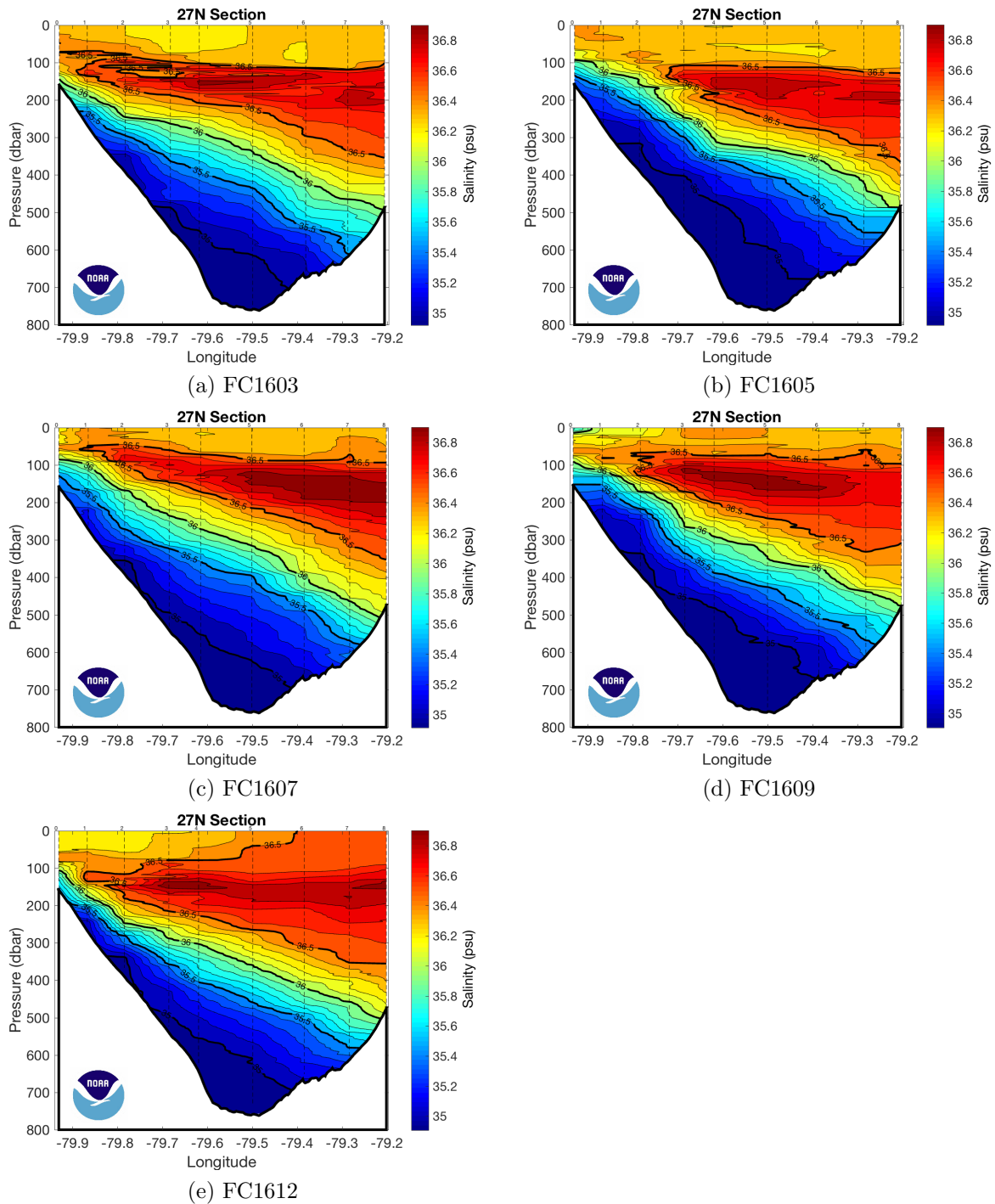


Figure 22: Salinity (PSS 78) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

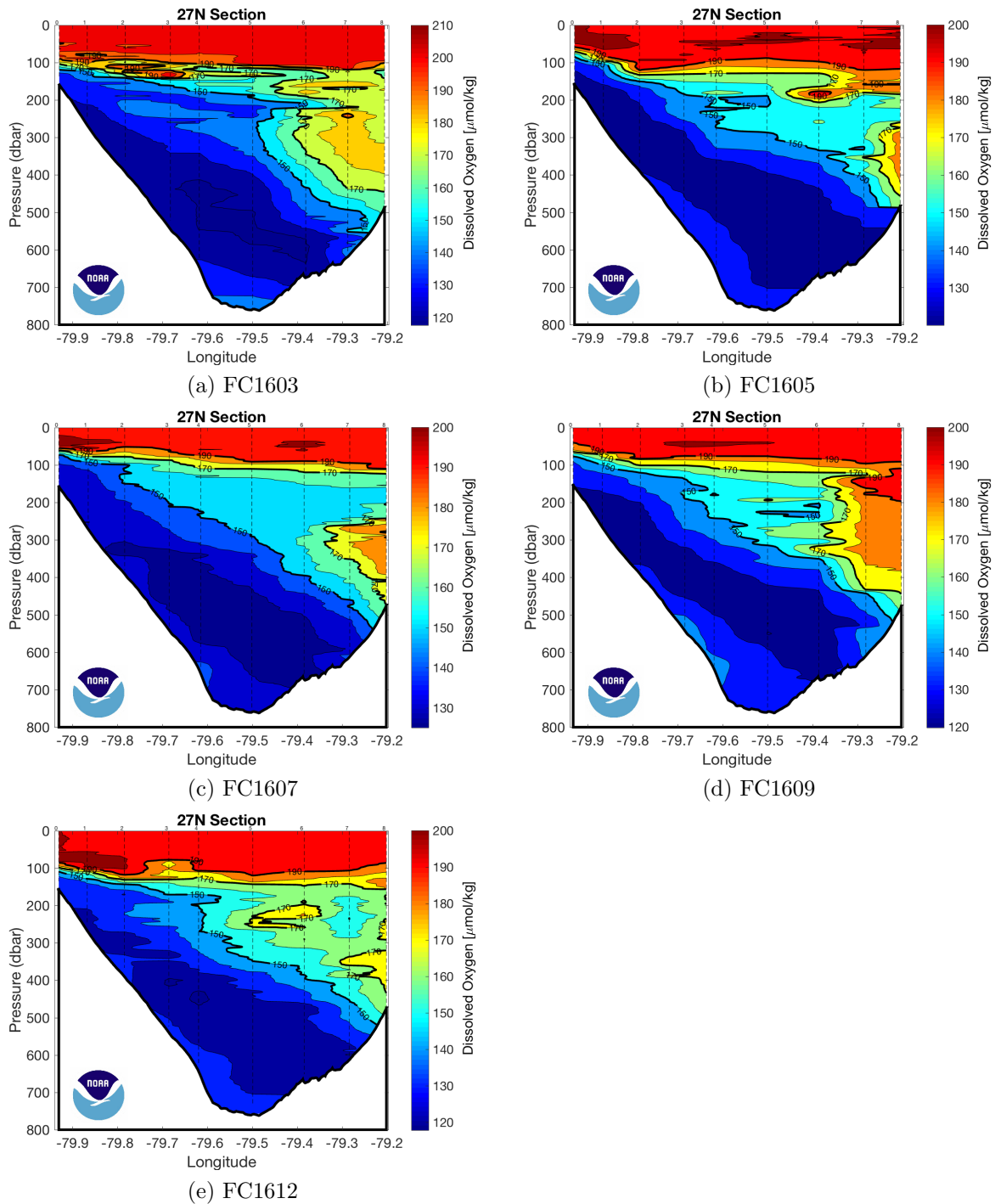


Figure 23: Dissolved Oxygen ($\mu\text{mol/kg}$) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

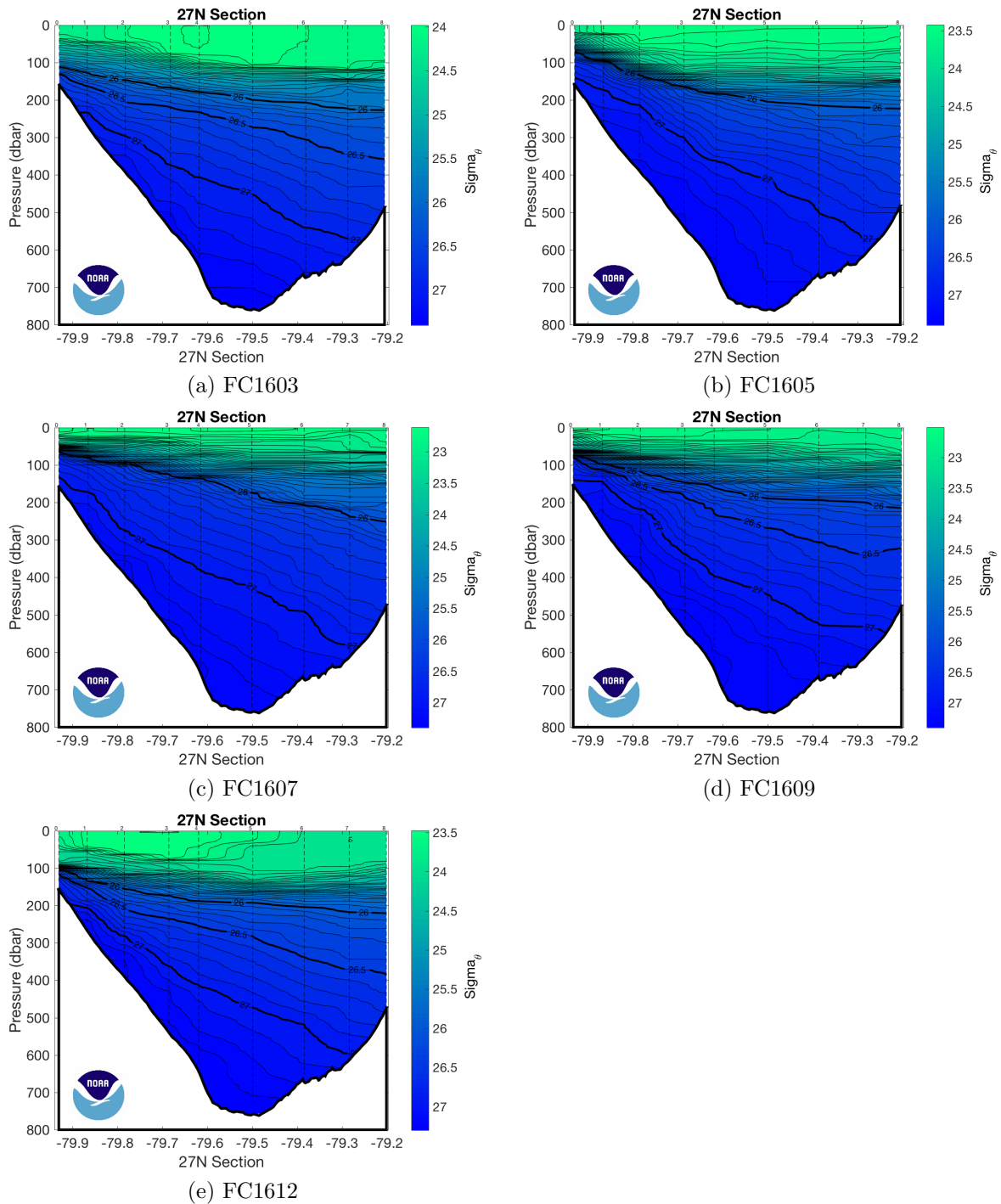


Figure 24: Neutral density (kg/m^3) section for the Florida Current North section. Dashed vertical lines are the CTD station locations.

7 Acknowledgements

The successful completion of the cruise relied on dedicated assistance from many individuals on shore and on the UNOLS ship Walton Smith. 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, Ryan Smith, Grant Rawson, Andy Stefanick, Tom Sevilla, Marc Weekley, Renellys Perez, and Erik Valdes showed dedication and camaraderie during the cruise. Officers and crew of the Walton Smith 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 James Todd (NOAA), David Legler (NOAA), Eric Itsweire (NSF/OCE), and Meric Srokosz (NERC) for their financial support in the effort. This research was also carried out in part under the auspices of the Cooperative Institute of Marine and Atmospheric Studies (CIMAS), a Cooperative Institute of the University of Miami and the National Oceanic and Atmospheric Administration (NOAA), cooperative agreement #NA10OAR4320143. Additional support was provided by OAA's Atlantic Oceanographic and Meteorological Laboratory.

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A Hydrographic - CTD Data

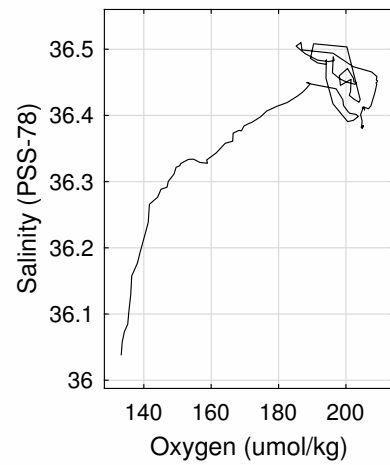
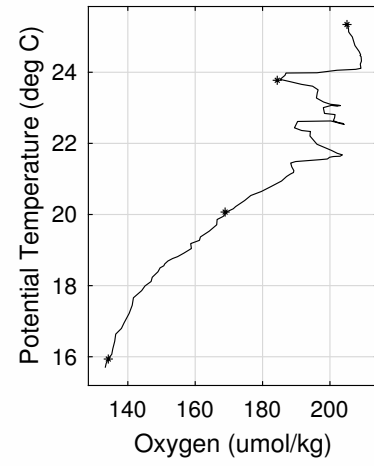
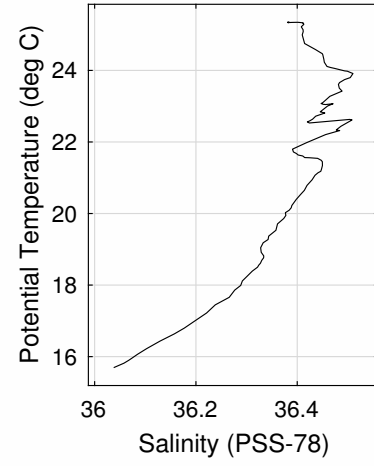
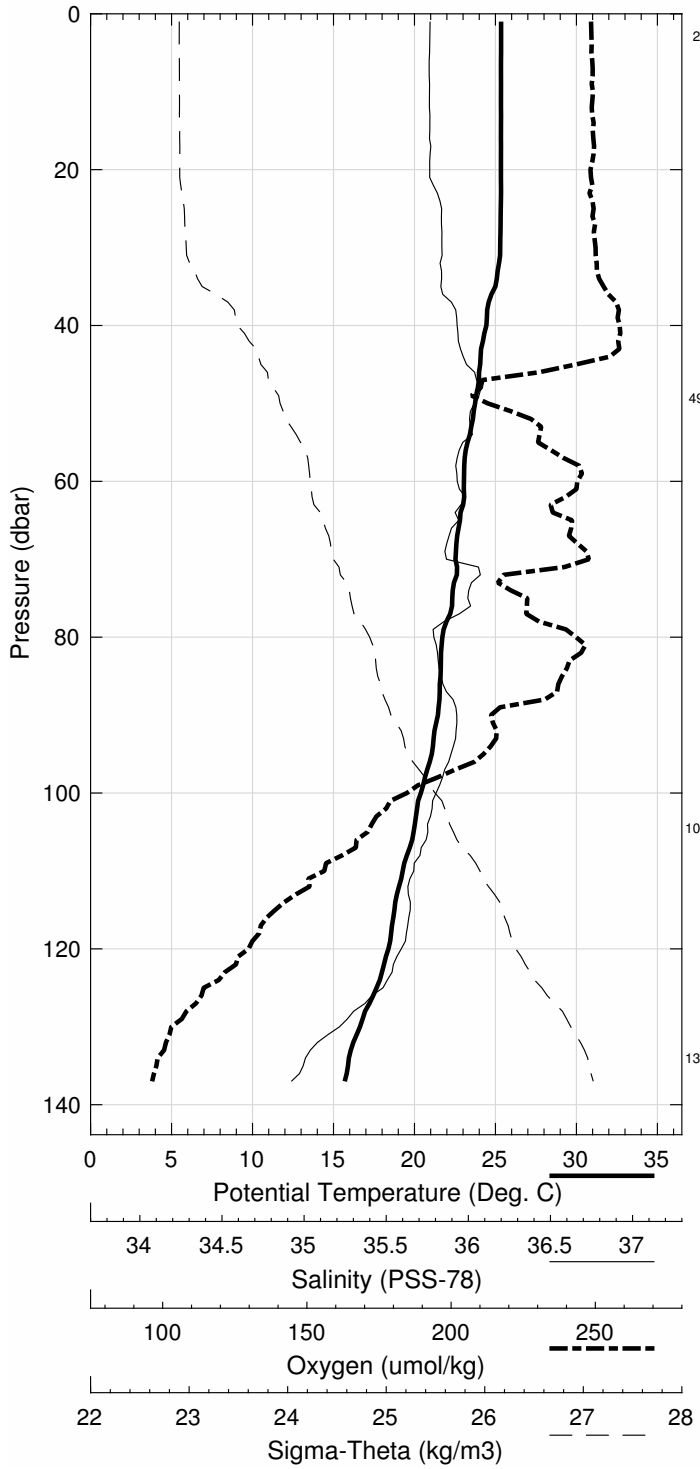
A.1 FC1603

Florida Straits 2016 R/V Walton Smith
CTD Station 0 (CTD000)
Latitude 26.998N Longitude 79.929W
24-Mar-2016 09:51Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.349	25.349	36.383	204.6	0.004	24.280
10	25.344	25.342	36.382	204.9	0.036	24.281
20	25.343	25.339	36.382	204.5	0.073	24.282
30	25.300	25.293	36.412	205.3	0.109	24.319
50	23.754	23.743	36.493	187.8	0.176	24.849
75	22.349	22.334	36.477	194.2	0.249	25.246
100	20.412	20.393	36.398	174.7	0.312	25.724
125	17.679	17.658	36.266	141.7	0.362	26.326

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
134	1	15.961	15.940	36.068	134.2
105	2	20.092	20.072	36.384	168.9
49	3	23.794	23.783	36.507	184.4
3	4	25.345	25.347	-999.000	-999.0

Florida Staits March 2016 R/V Walton Smith
 CTD Station 0 (CTD000)
 Latitude 26.998 N Longitude 79.929 W
 24-Mar-2016 09:51 Z

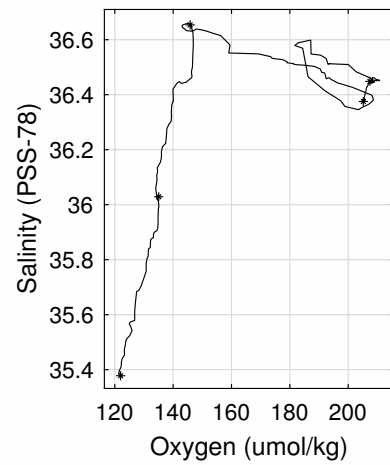
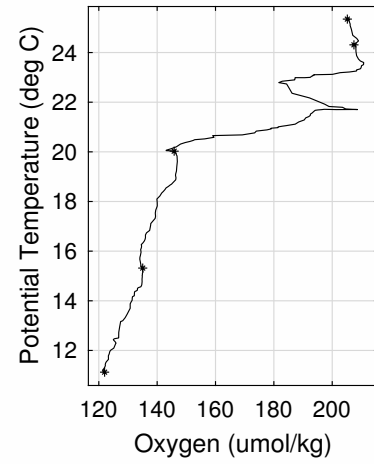
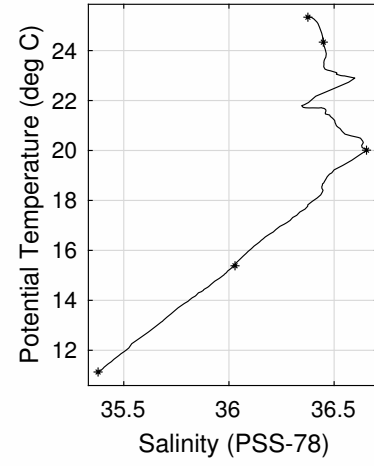
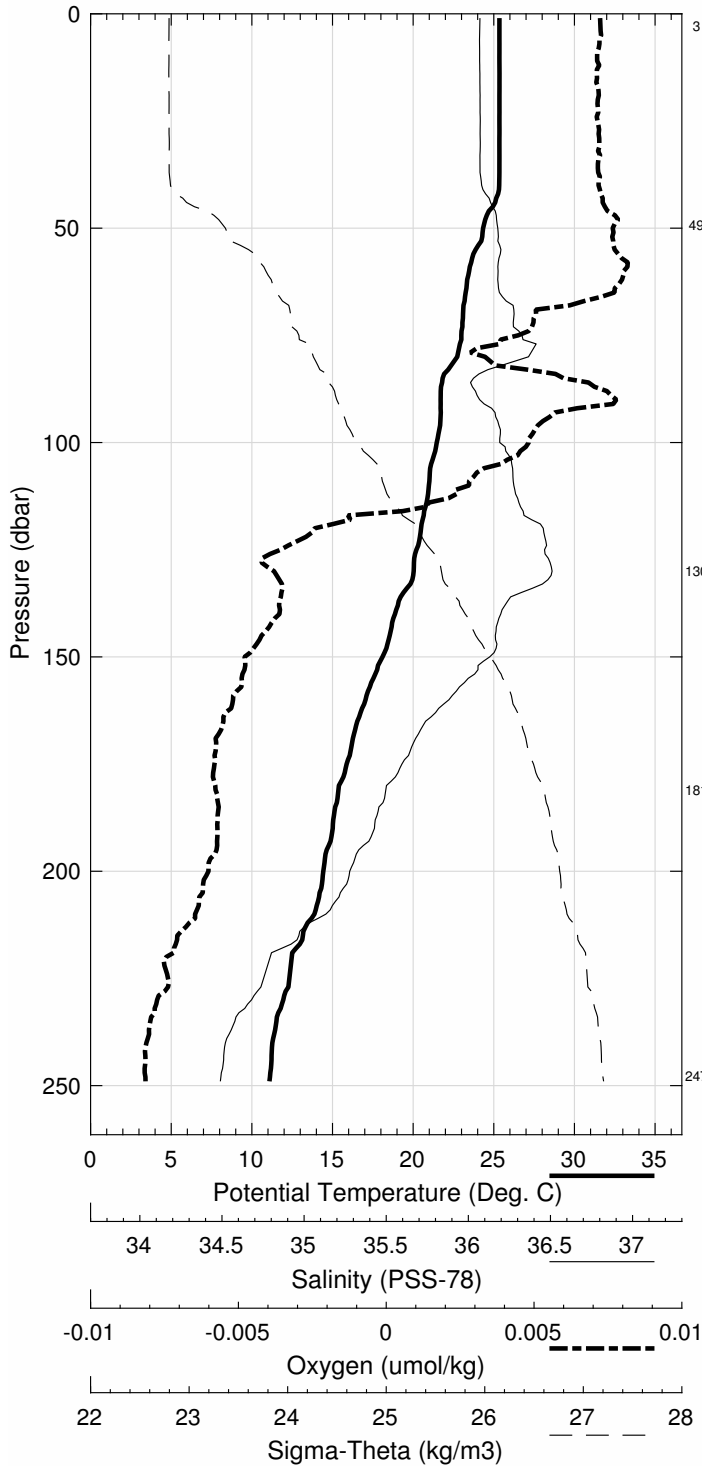


Florida Straits 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.998N Longitude 79.867W
 24-Mar-2016 09:00Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.349	25.349	36.382	205.7	0.004	24.279
10	25.350	25.348	36.381	205.1	0.036	24.278
20	25.354	25.350	36.382	205.2	0.073	24.279
30	25.353	25.347	36.383	205.5	0.109	24.281
50	24.348	24.337	36.451	208.0	0.180	24.639
75	23.003	22.987	36.544	190.5	0.257	25.109
100	21.482	21.463	36.458	192.5	0.324	25.477
125	20.226	20.202	36.631	146.6	0.381	25.952
150	18.126	18.100	36.420	139.9	0.429	26.335
200	14.459	14.429	35.880	133.2	0.504	26.776

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
248	1	11.162	11.131	35.378	122.0
181	2	15.412	15.384	36.029	135.1
130	3	20.037	20.013	36.654	145.8
49	4	24.349	24.338	36.449	207.4
3	5	25.338	25.337	36.375	205.2

Florida Staits March 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.998 N Longitude 79.867 W
 24-Mar-2016 09:00 Z

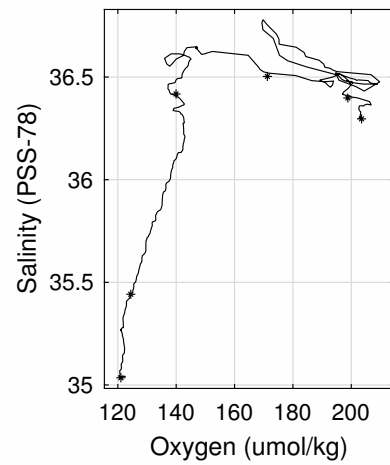
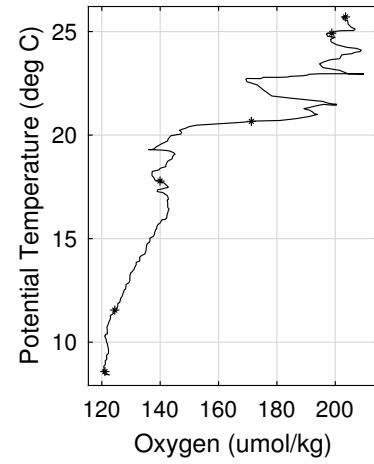
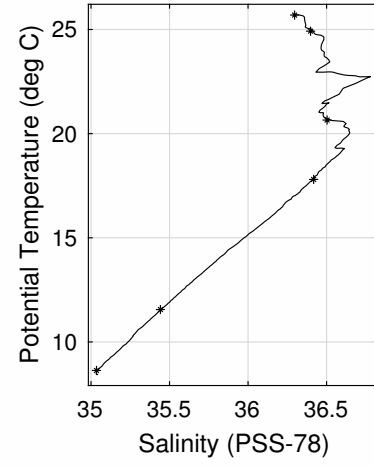
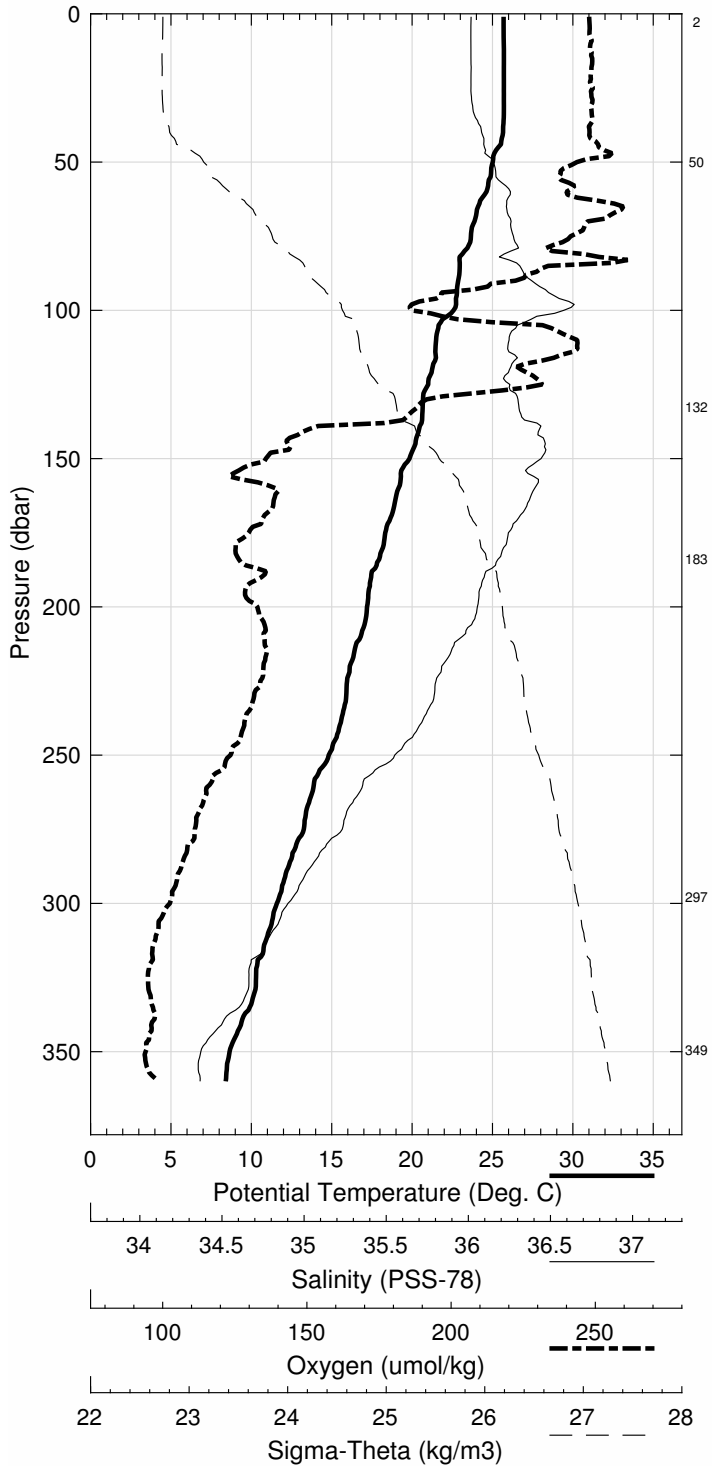


Florida Straits 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.993N Longitude 79.783W
 24-Mar-2016 07:57Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.692	25.692	36.300	202.6	0.004	24.111
10	25.704	25.702	36.300	202.9	0.038	24.107
20	25.712	25.707	36.300	202.9	0.076	24.106
30	25.715	25.708	36.305	203.2	0.114	24.109
50	25.026	25.015	36.402	200.3	0.189	24.397
75	23.674	23.659	36.497	199.2	0.271	24.877
100	22.598	22.578	36.731	169.7	0.343	25.369
125	21.026	21.001	36.481	193.9	0.405	25.621
150	19.864	19.836	36.625	142.8	0.461	26.046
200	17.229	17.195	36.329	141.2	0.549	26.488
250	14.851	14.813	35.946	136.3	0.623	26.742
300	11.626	11.587	35.450	125.0	0.685	27.017

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
350	1	8.668	8.630	35.035	121.1
298	2	11.593	11.555	35.442	124.4
184	3	17.834	17.803	36.418	140.0
133	4	20.677	20.652	36.503	171.3
50	5	24.930	24.919	36.398	198.8
3	6	25.693	25.692	36.296	203.5

Florida Staits March 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.993 N Longitude 79.783 W
 24-Mar-2016 07:57 Z

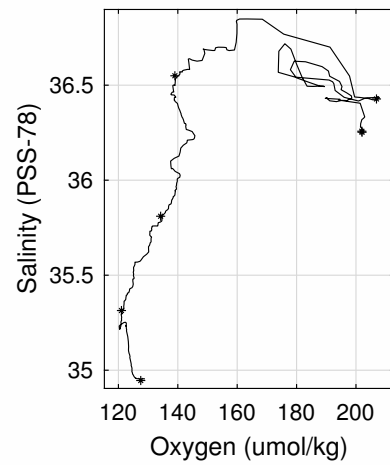
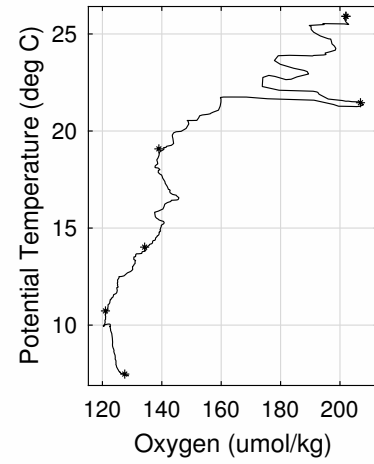
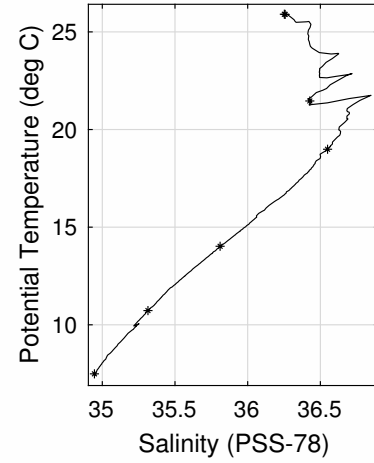
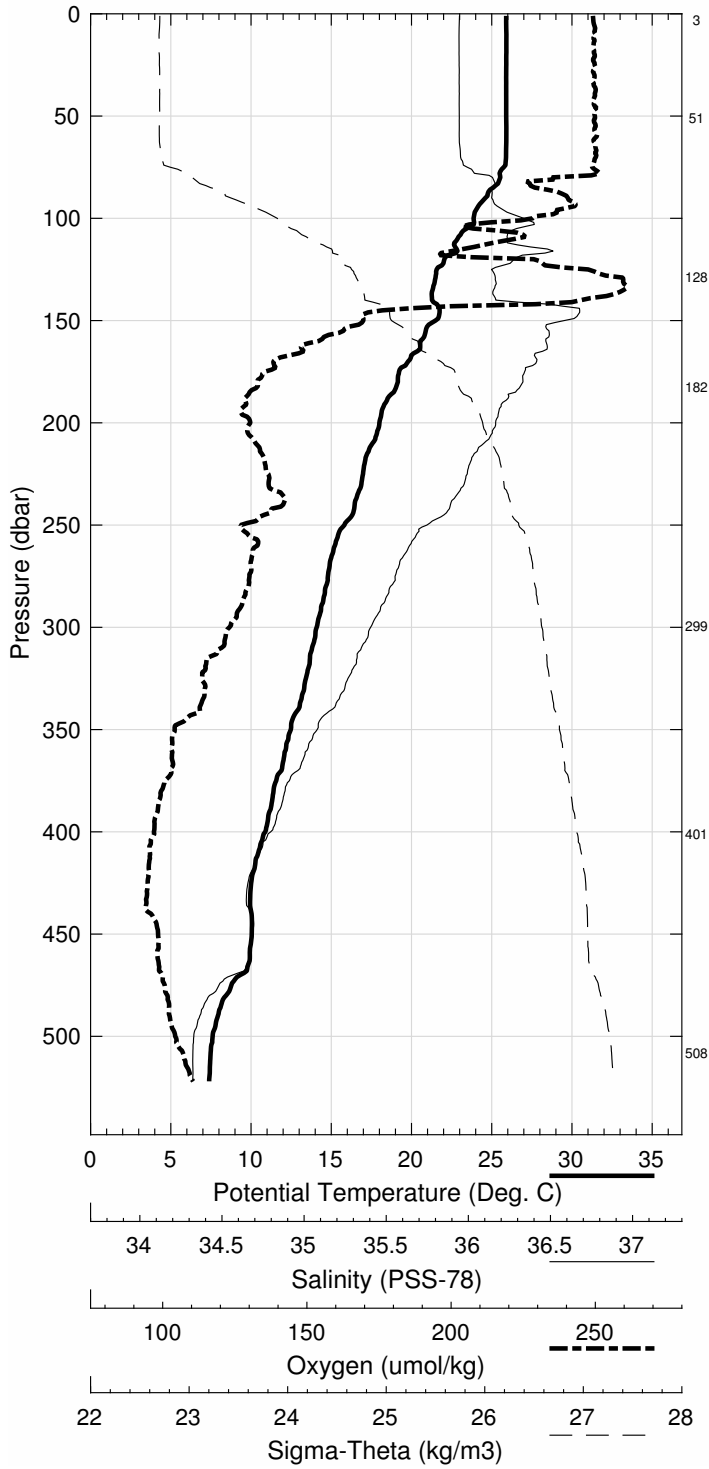


Florida Straits 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.999N Longitude 79.683W
 24-Mar-2016 06:40Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.901	25.901	36.260	201.7	0.004	24.015
10	25.916	25.914	36.258	202.2	0.039	24.010
20	25.912	25.907	36.258	202.1	0.078	24.012
30	25.908	25.901	36.258	202.0	0.117	24.014
50	25.913	25.902	36.259	202.1	0.195	24.014
75	25.767	25.750	36.298	201.6	0.293	24.091
100	23.890	23.868	36.574	190.7	0.380	24.873
125	21.594	21.569	36.417	200.8	0.450	25.416
150	21.522	21.493	36.773	159.9	0.512	25.708
200	18.034	17.999	36.437	139.3	0.611	26.373
250	15.855	15.815	36.100	137.6	0.690	26.637
300	14.133	14.089	35.825	135.5	0.759	26.806
400	10.939	10.889	35.336	121.8	0.880	27.057
500	7.656	7.606	34.959	125.7	0.980	27.300

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
508	1	7.539	7.489	34.946	127.5
401	2	10.777	10.728	35.314	121.0
300	3	14.066	14.022	35.810	134.2
183	4	19.023	18.991	36.550	139.0
129	5	21.488	21.463	36.427	206.9
51	6	25.916	25.905	36.252	202.0
3	7	25.896	25.895	36.258	202.0

Florida Straits March 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.999 N Longitude 79.683 W
 24-Mar-2016 06:40 Z

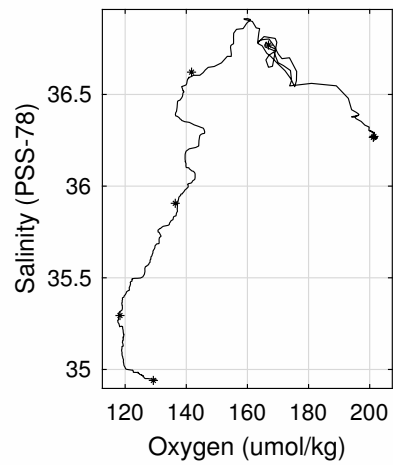
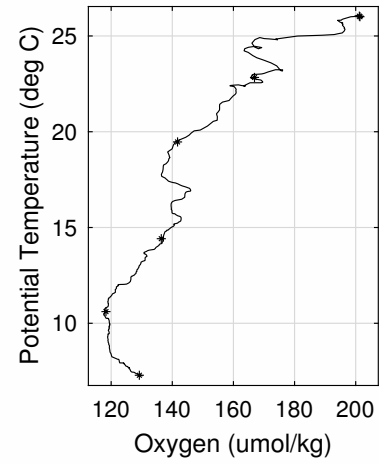
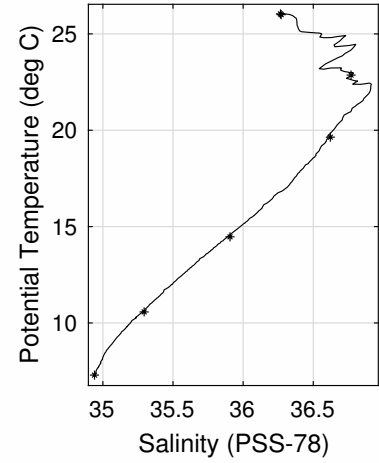
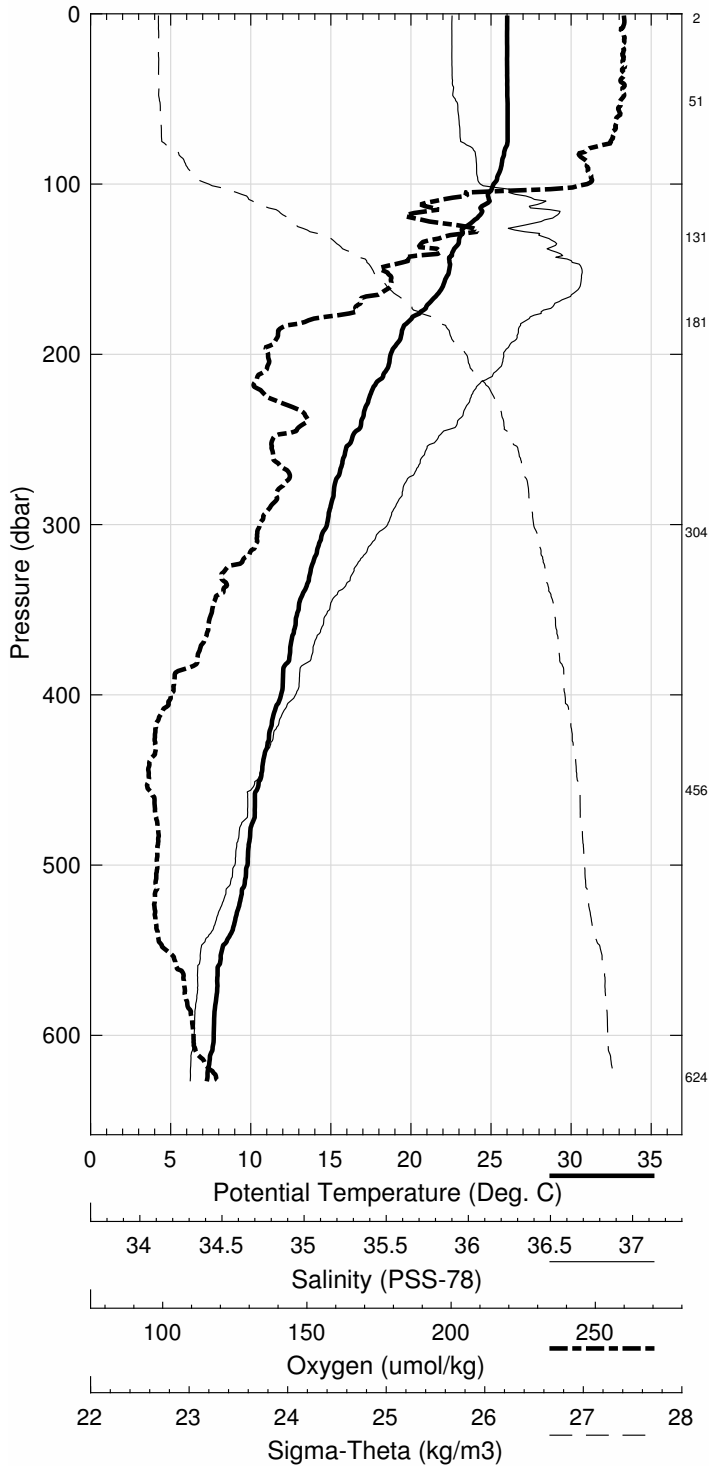


Florida Straits 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
 Latitude 27.000N Longitude 79.618W
 24-Mar-2016 05:26Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	26.010	26.010	36.261	202.1	0.004	23.982
10	26.005	26.003	36.260	201.8	0.039	23.983
20	26.013	26.008	36.260	202.0	0.078	23.981
30	26.009	26.003	36.259	202.2	0.118	23.983
50	26.039	26.027	36.276	201.7	0.196	23.988
75	26.052	26.036	36.303	199.7	0.295	24.006
100	25.180	25.158	36.402	195.6	0.389	24.353
125	23.465	23.439	36.587	174.2	0.470	25.009
150	22.429	22.398	36.912	158.8	0.537	25.558
200	18.770	18.734	36.519	139.0	0.644	26.251
250	16.350	16.310	36.186	139.8	0.728	26.588
300	14.804	14.758	35.937	137.5	0.799	26.748
400	11.943	11.891	35.475	121.7	0.925	26.979
500	9.858	9.799	35.171	119.3	1.035	27.119
600	7.748	7.687	34.967	125.8	1.130	27.294

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
625	1	7.356	7.294	34.940	129.2
456	2	10.628	10.572	35.294	118.3
305	3	14.515	14.469	35.906	136.4
181	4	19.675	19.642	36.622	141.7
131	5	22.890	22.863	36.769	166.9
51	6	26.050	26.039	36.266	201.2
3	7	25.999	25.998	36.271	201.4

Florida Straits March 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
 Latitude 27.000 N Longitude 79.618 W
 24-Mar-2016 05:26 Z

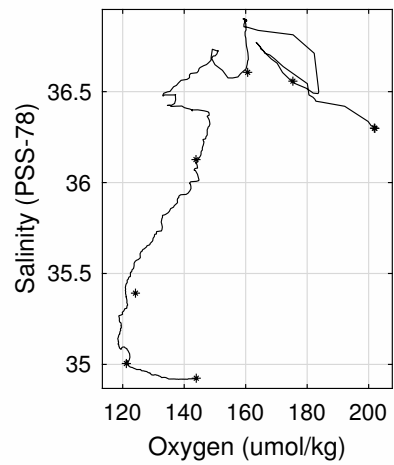
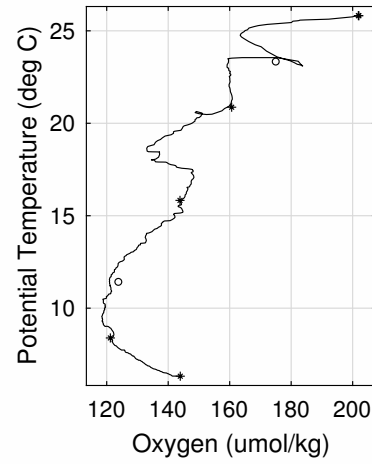
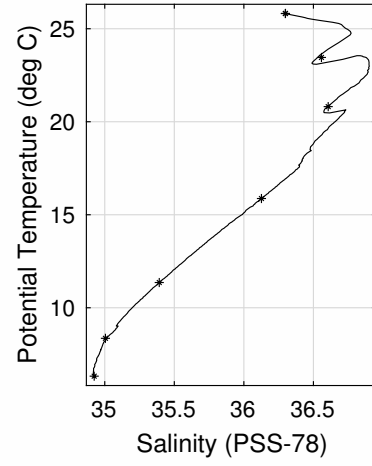
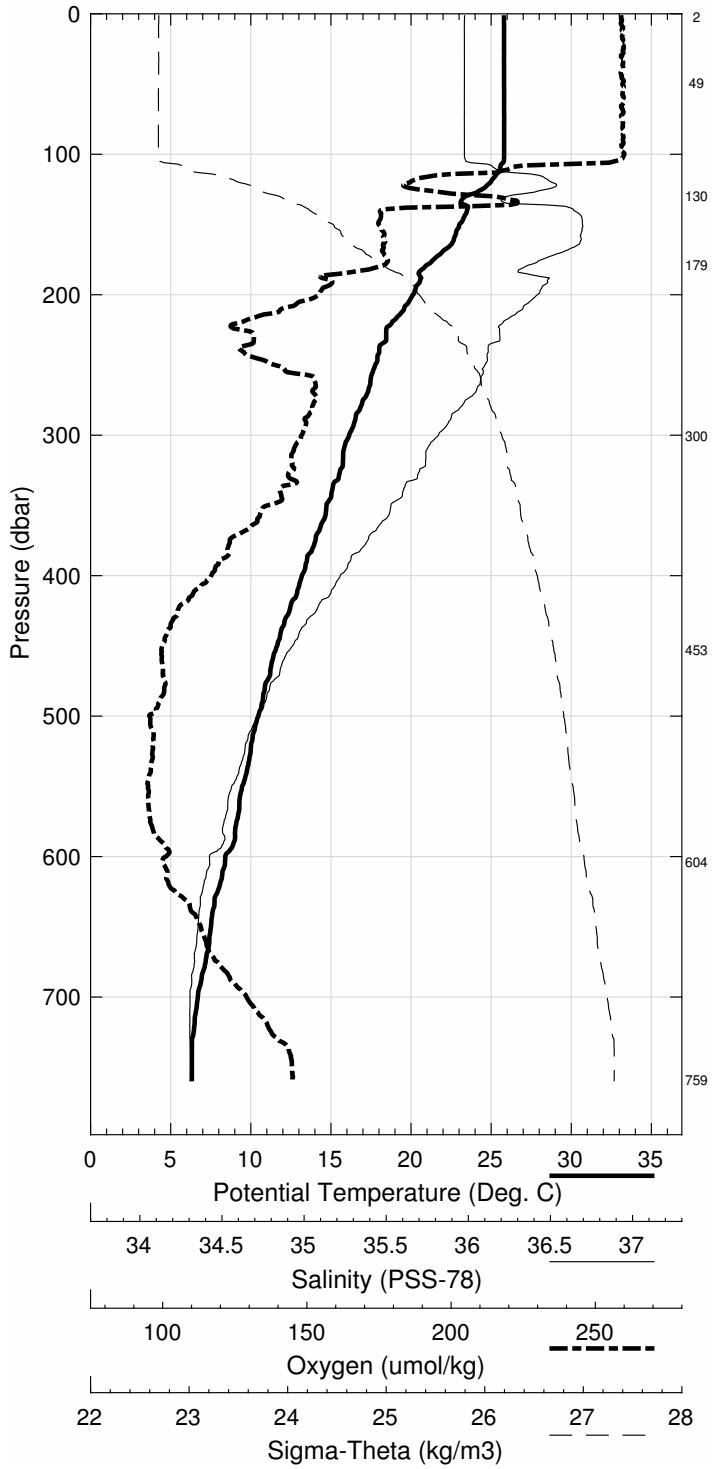


Florida Straits 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.999N Longitude 79.500W
 24-Mar-2016 03:56Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.803	25.802	36.306	202.0	0.004	24.081
10	25.809	25.807	36.304	202.4	0.038	24.078
20	25.808	25.803	36.304	202.0	0.077	24.079
30	25.809	25.802	36.305	201.8	0.115	24.080
50	25.817	25.805	36.304	202.1	0.192	24.079
75	25.831	25.814	36.304	202.2	0.288	24.076
100	25.831	25.809	36.305	202.5	0.385	24.078
125	24.450	24.423	36.716	166.2	0.474	24.814
150	23.042	23.011	36.900	159.2	0.546	25.372
200	20.151	20.114	36.672	148.7	0.664	26.008
250	17.806	17.763	36.408	140.9	0.757	26.410
300	16.188	16.140	36.173	145.6	0.837	26.618
400	13.239	13.182	35.677	129.7	0.977	26.881
500	10.537	10.476	35.265	118.7	1.095	27.076
600	8.472	8.407	35.018	121.6	1.199	27.226
700	6.760	6.693	34.920	135.9	1.286	27.398

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
759	1	6.393	6.322	34.924	143.9
604	2	8.422	8.357	35.005	121.2
454	3	11.414	11.356	35.392	124.2
301	4	15.920	15.872	36.126	143.8
179	5	20.847	20.812	36.606	160.6
130	6	23.484	23.457	36.558	175.4
49	7	25.835	25.824	36.299	201.9
3	8	25.816	25.816	36.298	202.0

Florida Straits March 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.999 N Longitude 79.500 W
 24-Mar-2016 03:56 Z

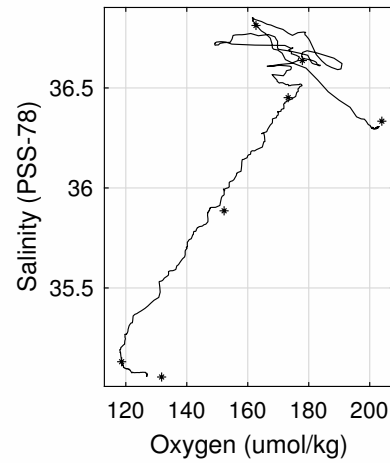
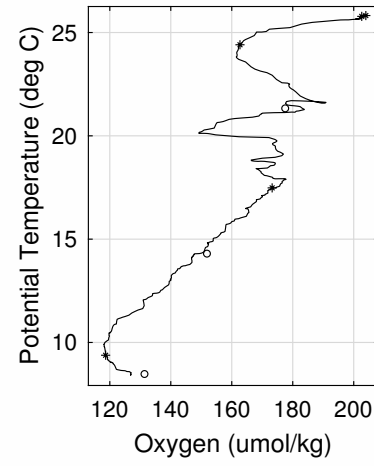
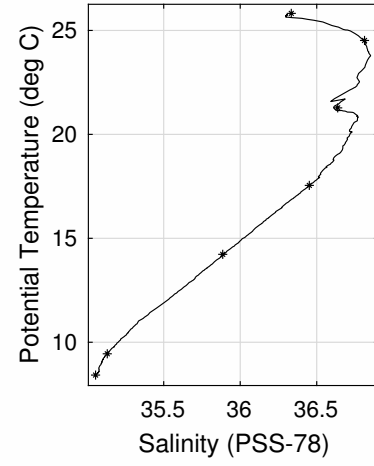
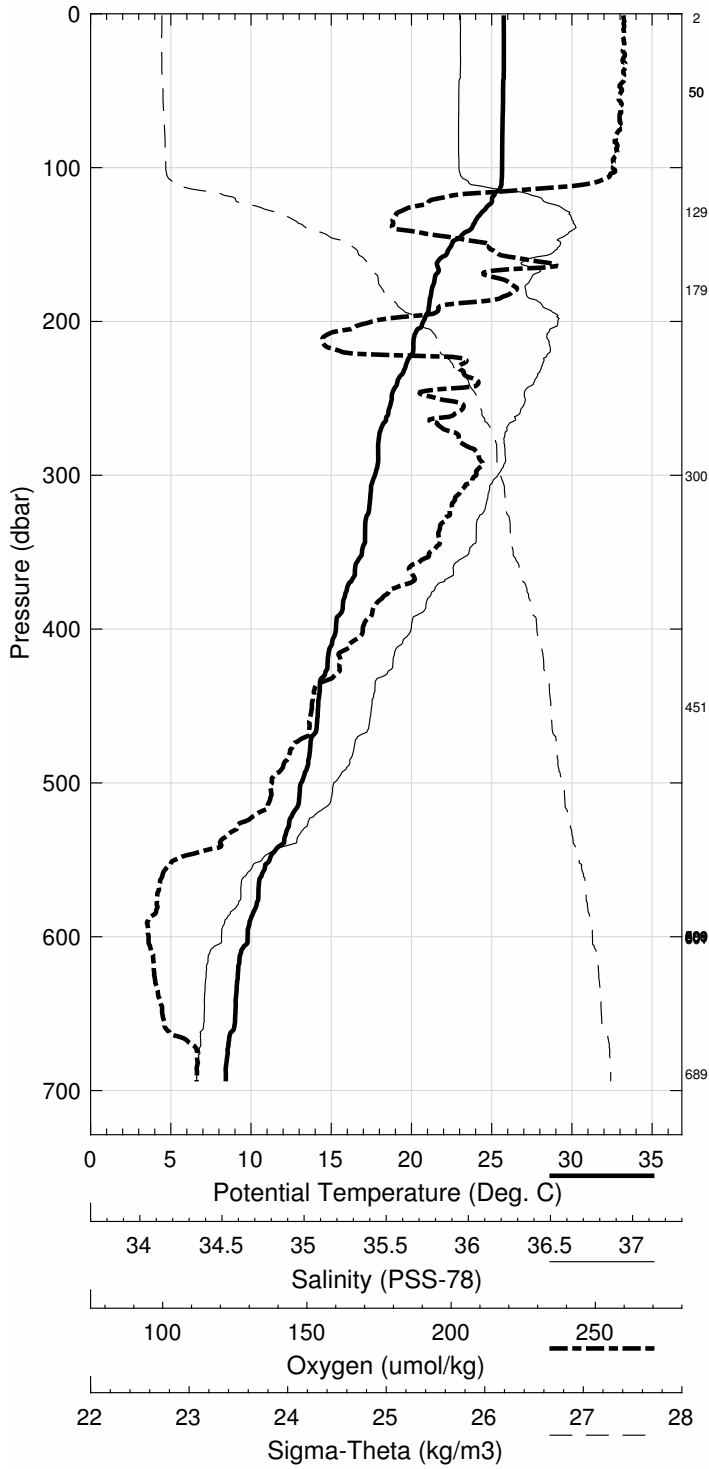


Florida Straits 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
 Latitude 26.994N Longitude 79.382W
 24-Mar-2016 02:30Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.753	25.753	36.306	202.7	0.004	24.097
10	25.757	25.754	36.306	202.7	0.038	24.096
20	25.762	25.757	36.306	202.8	0.076	24.095
30	25.761	25.755	36.306	202.6	0.115	24.096
50	25.717	25.705	36.298	202.4	0.191	24.105
75	25.688	25.671	36.297	202.2	0.287	24.115
100	25.670	25.648	36.299	200.7	0.382	24.124
125	24.770	24.742	36.773	165.8	0.473	24.760
150	22.535	22.505	36.778	179.0	0.545	25.426
200	20.774	20.735	36.766	158.0	0.666	25.911
250	18.816	18.771	36.612	169.5	0.764	26.313
300	17.770	17.718	36.483	176.5	0.850	26.478
400	15.354	15.291	36.073	156.4	1.005	26.735
500	13.191	13.120	35.706	140.2	1.141	26.916
600	9.858	9.787	35.177	118.3	1.257	27.126

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
690	1	8.496	8.421	35.055	131.7
600	2	9.514	9.445	35.131	118.6
600	3	9.467	10.295	-999.000	-999.0
600	4	9.497	10.323	-999.000	-999.0
600	5	9.432	10.260	-999.000	-999.0
601	6	9.323	10.155	-999.000	-999.0
601	7	9.290	10.124	-999.000	-999.0
602	8	9.273	10.109	-999.000	-999.0
451	9	14.298	14.230	35.886	152.2
301	10	17.598	17.546	36.452	173.2
180	11	21.310	21.275	36.637	177.9
129	12	24.546	24.518	36.812	162.7
51	13	25.794	25.824	-999.000	-999.0
51	14	25.794	25.825	-999.000	-999.0
3	15	25.822	25.821	36.334	204.0

Florida Straits March 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
 Latitude 26.994 N Longitude 79.382 W
 24-Mar-2016 02:30 Z

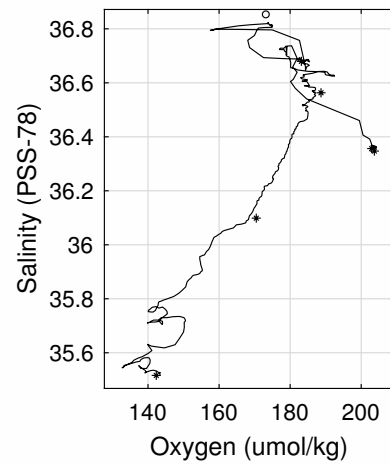
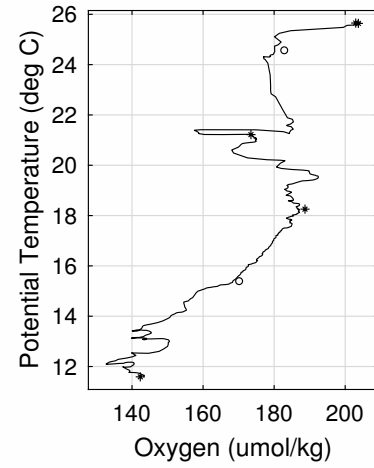
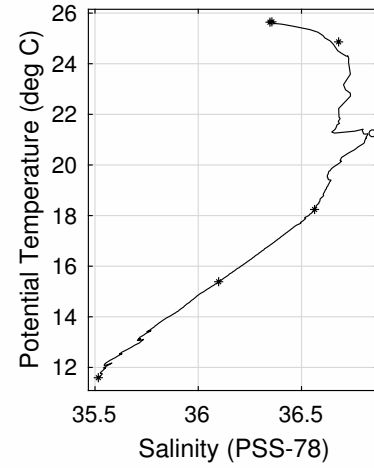
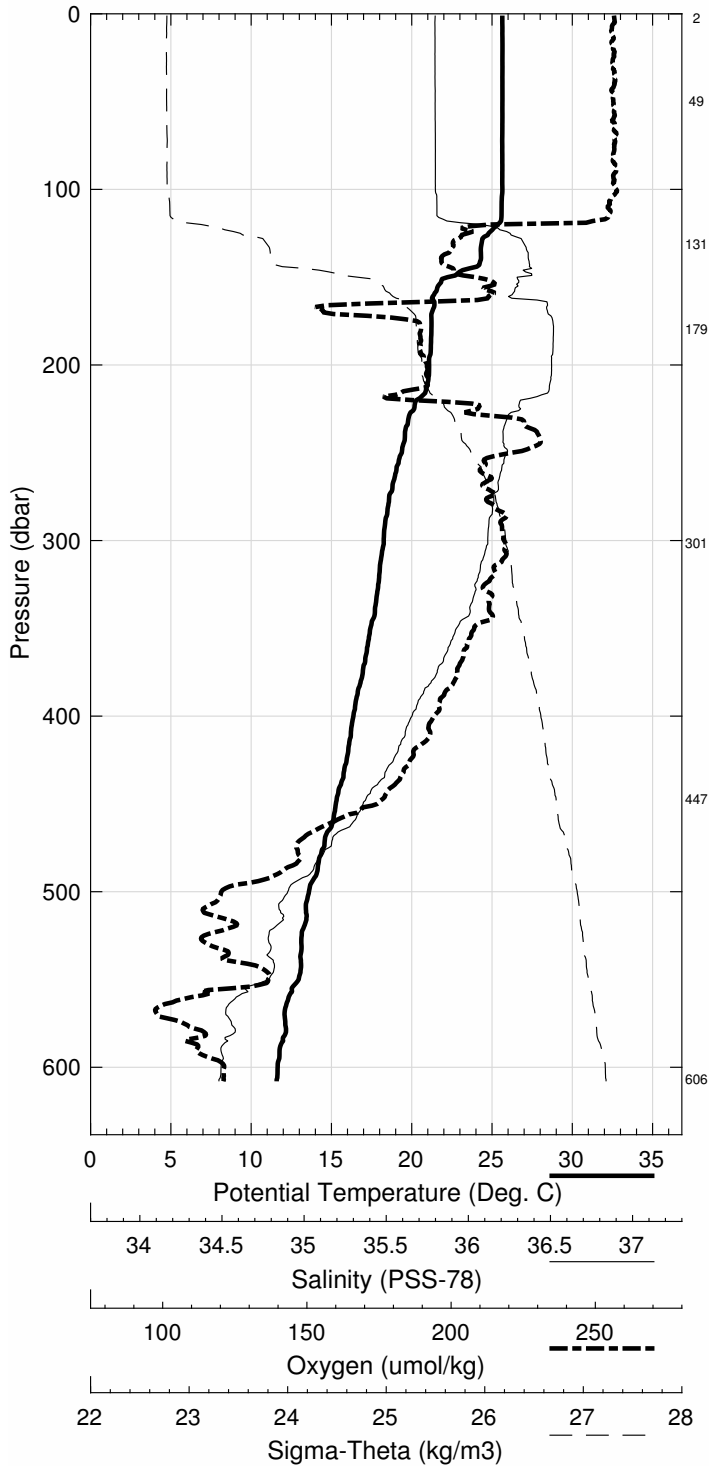


Florida Straits 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.999N Longitude 79.288W
 24-Mar-2016 00:52Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.641	25.641	36.361	203.8	0.004	24.172
10	25.648	25.646	36.360	203.4	0.037	24.170
20	25.655	25.651	36.360	203.6	0.075	24.169
30	25.657	25.650	36.360	203.9	0.112	24.169
50	25.658	25.647	36.361	203.7	0.188	24.170
75	25.655	25.639	36.361	203.9	0.282	24.174
100	25.667	25.645	36.362	204.2	0.376	24.172
125	24.813	24.786	36.652	181.1	0.468	24.656
150	22.259	22.229	36.680	182.3	0.545	25.430
200	21.119	21.080	36.814	174.8	0.660	25.854
250	19.425	19.379	36.642	187.9	0.764	26.178
300	18.309	18.256	36.566	186.8	0.854	26.408
400	16.432	16.367	36.270	175.9	1.017	26.640
500	13.670	13.597	35.786	143.0	1.161	26.880
600	11.729	11.650	35.526	143.4	1.285	27.065

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
607	1	11.673	11.594	35.516	142.3
447	2	15.456	15.386	36.099	170.5
302	3	18.294	18.241	36.563	188.7
180	4	21.241	21.206	36.849	173.5
131	5	24.892	24.863	36.680	183.2
50	6	25.664	25.653	36.357	203.0
3	7	25.642	25.641	36.347	203.7

Florida Straits March 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.999 N Longitude 79.288 W
 24-Mar-2016 00:52 Z

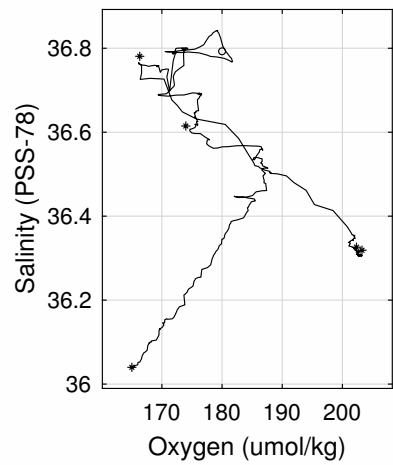
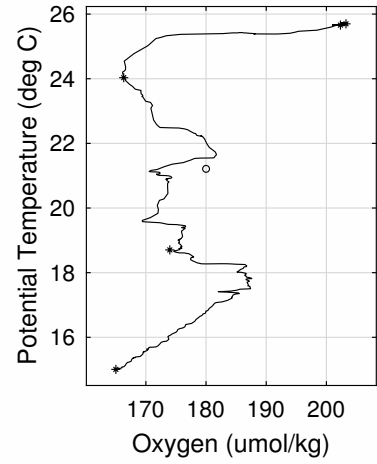
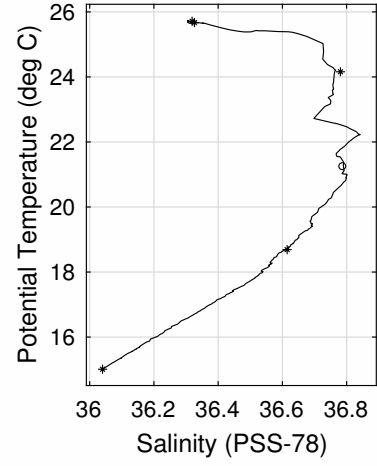
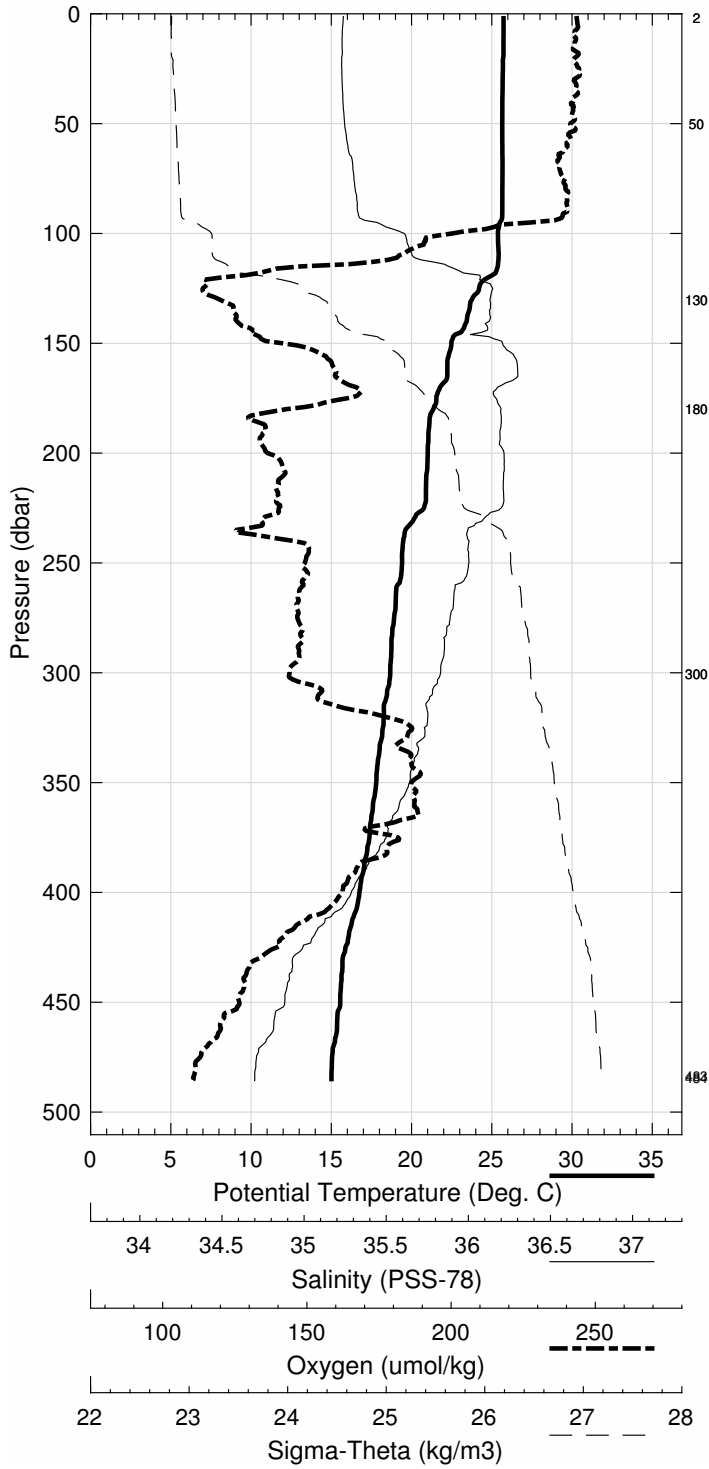


Florida Straits 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 26.998N Longitude 79.206W
 23-Mar-2016 23:37Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	25.732	25.732	36.310	202.9	0.004	24.106
10	25.735	25.733	36.307	202.7	0.038	24.103
20	25.715	25.711	36.305	202.8	0.076	24.109
30	25.683	25.677	36.306	202.6	0.114	24.120
50	25.663	25.652	36.314	202.3	0.190	24.134
75	25.680	25.664	36.343	201.8	0.285	24.152
100	25.406	25.384	36.496	190.7	0.379	24.354
125	24.235	24.208	36.766	166.1	0.465	24.917
150	22.511	22.481	36.796	174.0	0.537	25.446
200	21.046	21.007	36.800	172.5	0.655	25.863
250	19.457	19.411	36.693	176.2	0.759	26.209
300	18.727	18.673	36.607	174.7	0.851	26.334
400	16.821	16.754	36.334	179.9	1.018	26.598

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
485	1	15.086	15.011	36.040	165.0
484	2	15.096	15.634	-999.000	-999.0
301	3	18.742	18.689	36.615	174.0
301	4	18.745	19.028	-999.000	-999.0
180	5	21.255	21.220	36.790	180.2
180	6	21.262	21.411	-999.000	-999.0
130	7	24.186	24.158	36.781	166.3
130	8	24.224	24.312	-999.000	-999.0
50	9	25.683	25.672	36.326	202.3
50	10	25.683	25.713	-999.000	-999.0
2	11	25.713	25.712	36.319	203.3
2	12	25.713	25.714	-999.000	-999.0

Florida Straits March 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 26.998 N Longitude 79.206 W
 23-Mar-2016 23:37 Z



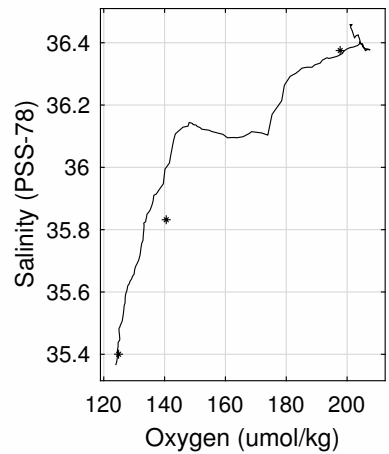
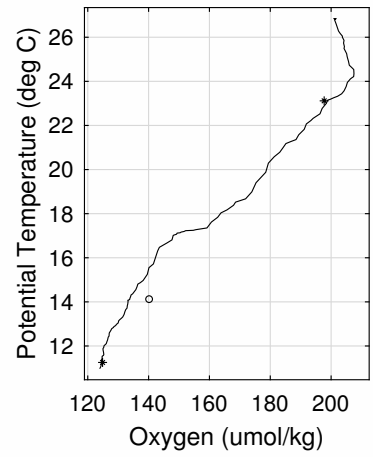
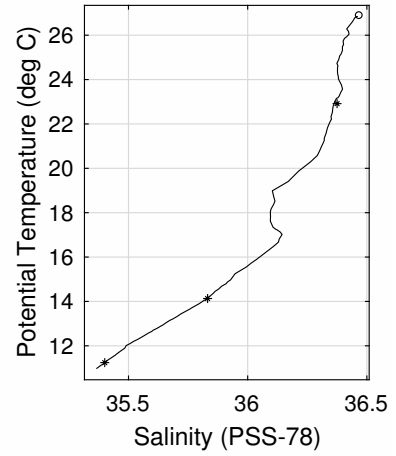
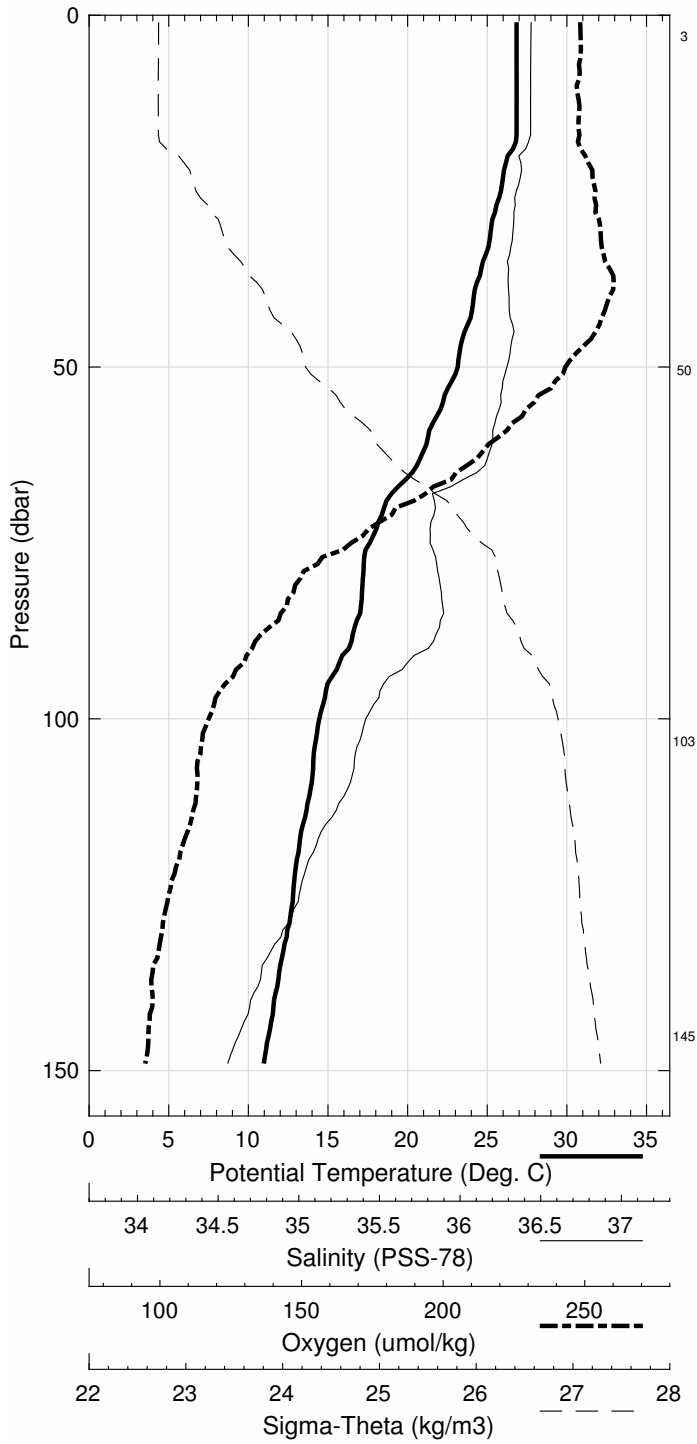
A.2 FC1605

Florida Straits 2016 R/V Walton Smith
CTD Station 0 (CTD000)
Latitude 26.987N Longitude 79.930W
17-May-2016 08:13Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	26.841	26.841	36.460	201.5	0.004	23.869
10	26.847	26.845	36.458	200.9	0.040	23.866
20	26.285	26.280	36.415	202.4	0.080	24.013
30	25.263	25.256	36.396	205.1	0.118	24.318
50	23.159	23.148	36.372	198.9	0.184	24.932
75	17.633	17.621	36.095	160.7	0.244	26.205
100	14.468	14.453	35.863	135.2	0.283	26.757
125	12.826	12.809	35.623	128.1	0.314	26.914

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
145	1	11.260	11.242	35.400	124.9
103	2	14.147	14.132	35.832	140.5
51	3	22.926	22.916	36.375	197.7
3	4	26.855	26.854	36.471	-999.0

Florida Staits May 2016 R/V Walton Smith
 CTD Station 0 (CTD000)
 Latitude 26.987 N Longitude 79.930 W
 17-May-2016 08:13 Z

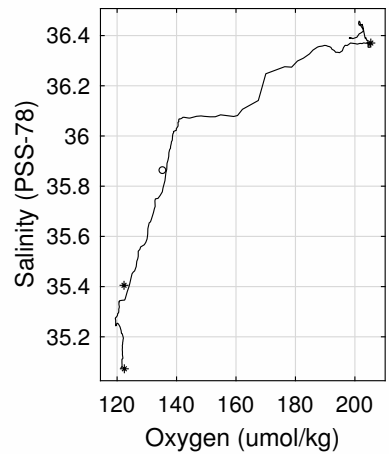
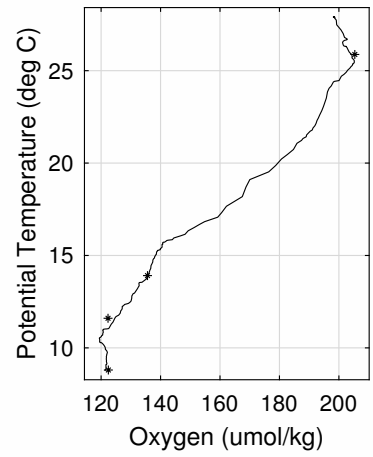
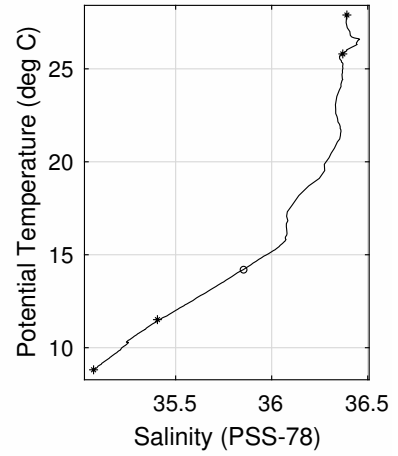
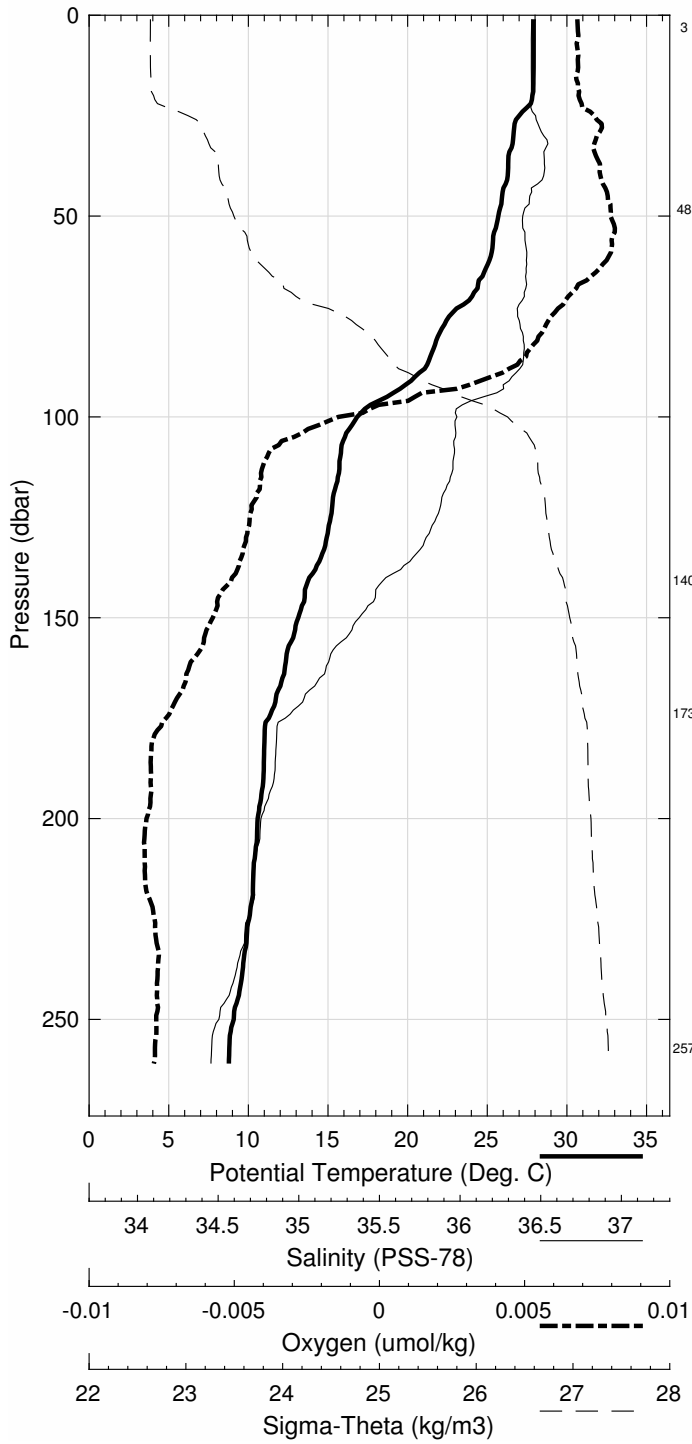


Florida Straits 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.995N Longitude 79.865W
 17-May-2016 07:08Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.914	27.914	36.391	198.3	0.004	23.469
10	27.915	27.912	36.390	198.5	0.044	23.469
20	27.837	27.832	36.390	198.6	0.088	23.495
30	26.648	26.641	36.440	201.9	0.130	23.918
50	25.705	25.694	36.354	204.4	0.207	24.151
75	22.614	22.598	36.333	193.5	0.294	25.061
100	16.846	16.830	36.084	154.8	0.353	26.387
125	15.184	15.165	36.000	138.7	0.390	26.707
150	13.152	13.131	35.683	131.9	0.422	26.896
200	10.606	10.582	35.280	119.8	0.476	27.069
250	9.109	9.081	35.107	121.6	0.525	27.189

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
257	1	8.839	8.812	35.073	122.4
174	2	11.532	11.510	35.405	122.3
141	3	14.156	14.136	35.860	135.6
48	4	25.813	25.802	36.370	205.4
3	5	27.896	27.896	36.392	-999.0

Florida Staits May 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.995 N Longitude 79.865 W
 17-May-2016 07:08 Z

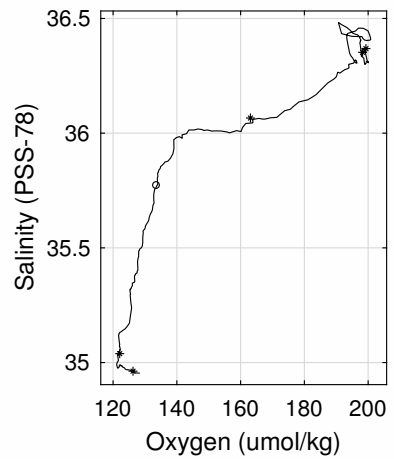
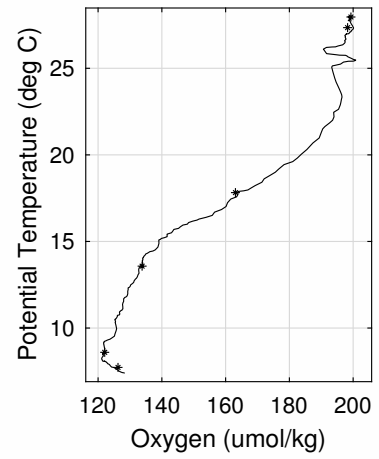
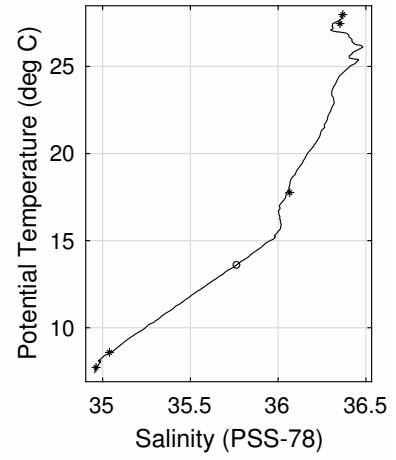
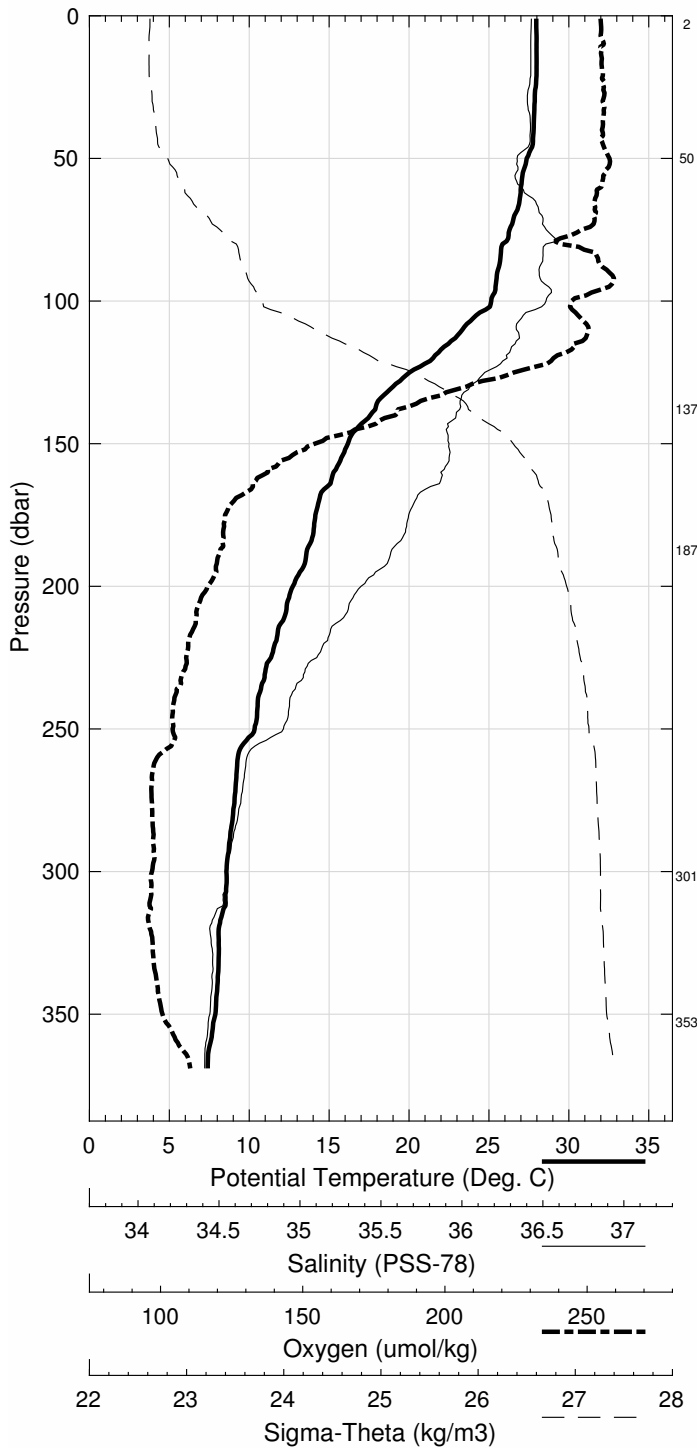


Florida Straits 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.999N Longitude 79.785W
 17-May-2016 05:05Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.963	27.963	36.371	198.5	0.004	23.438
10	27.979	27.977	36.368	199.1	0.044	23.432
20	27.983	27.978	36.368	198.9	0.089	23.431
30	27.875	27.868	36.353	198.9	0.133	23.456
50	27.374	27.362	36.309	200.0	0.221	23.587
75	26.305	26.288	36.435	195.2	0.325	24.026
100	25.165	25.143	36.434	193.5	0.418	24.382
125	20.058	20.035	36.169	183.7	0.493	25.644
150	16.196	16.172	36.014	149.7	0.542	26.488
200	12.756	12.728	35.632	131.3	0.607	26.937
250	10.366	10.336	35.295	125.3	0.661	27.124
300	8.601	8.569	35.044	121.8	0.707	27.221

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
353	1	7.760	7.724	34.962	126.2
302	2	8.620	8.588	35.039	122.1
187	3	13.572	13.546	35.769	133.8
138	4	17.781	17.757	36.066	163.1
50	5	27.469	27.457	36.352	198.3
3	6	27.976	27.976	36.369	199.3

Florida Staits May 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.999 N Longitude 79.785 W
 17-May-2016 05:05 Z

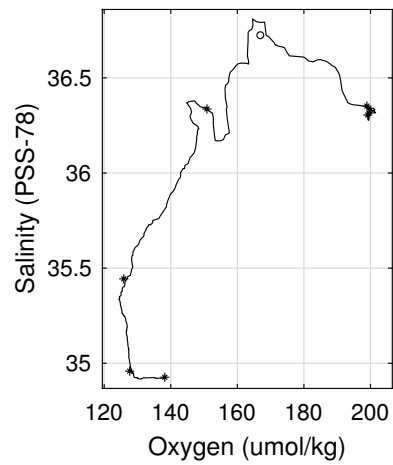
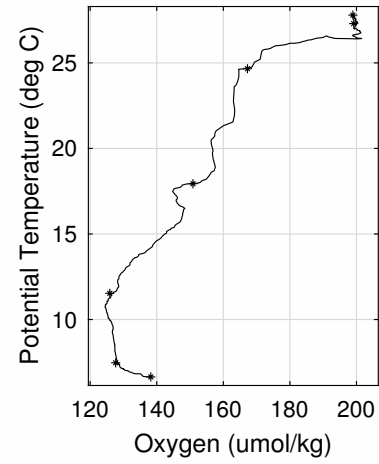
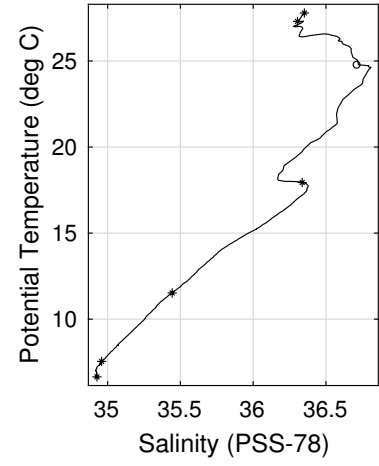
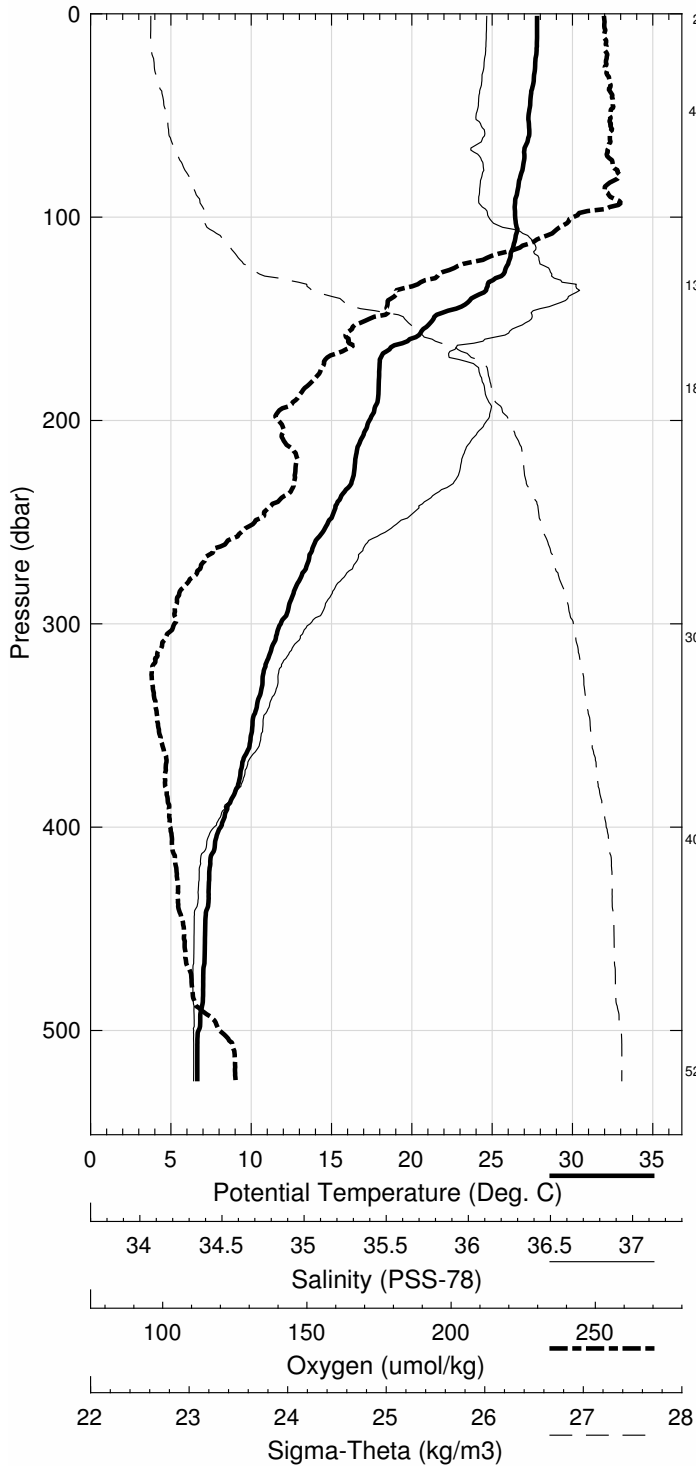


Florida Straits 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.998N Longitude 79.686W
 17-May-2016 03:29Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.796	27.795	36.356	198.8	0.004	23.482
10	27.797	27.795	36.353	198.8	0.044	23.480
20	27.755	27.750	36.349	199.3	0.088	23.491
30	27.616	27.609	36.332	199.3	0.132	23.525
50	27.276	27.264	36.303	199.6	0.218	23.615
75	26.941	26.924	36.338	200.2	0.325	23.751
100	26.455	26.432	36.365	193.7	0.427	23.927
125	25.880	25.852	36.658	174.2	0.523	24.331
150	21.381	21.351	36.574	160.2	0.599	25.596
200	17.390	17.356	36.356	145.3	0.695	26.470
250	14.827	14.789	35.925	141.4	0.770	26.732
300	11.878	11.838	35.491	128.2	0.833	27.002
400	8.139	8.098	35.022	127.5	0.932	27.276
500	6.768	6.721	34.922	135.6	1.013	27.396

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
520	1	6.695	6.647	34.927	138.2
406	2	7.586	7.546	34.958	127.7
307	3	11.563	11.524	35.444	125.9
184	4	17.972	17.940	36.337	150.9
134	5	24.745	24.716	36.718	167.2
48	6	27.313	27.302	36.305	199.2
3	7	27.792	27.792	36.352	198.9

Florida Staits May 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.998 N Longitude 79.686 W
 17-May-2016 03:29 Z

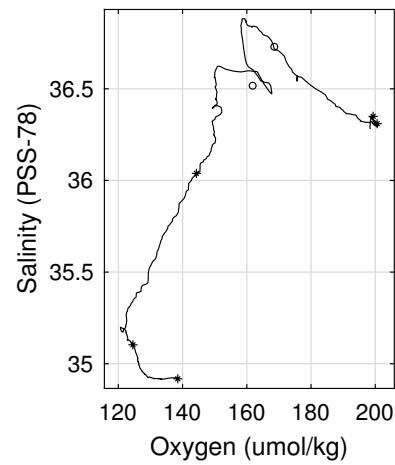
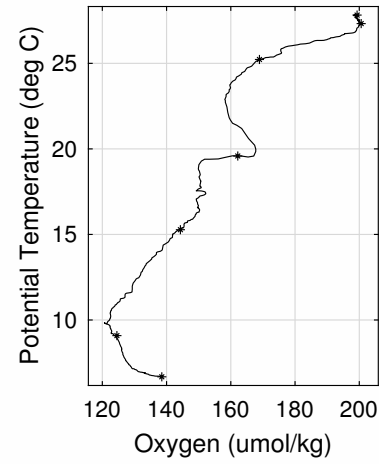
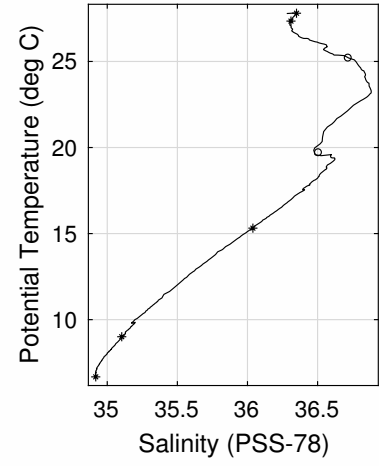
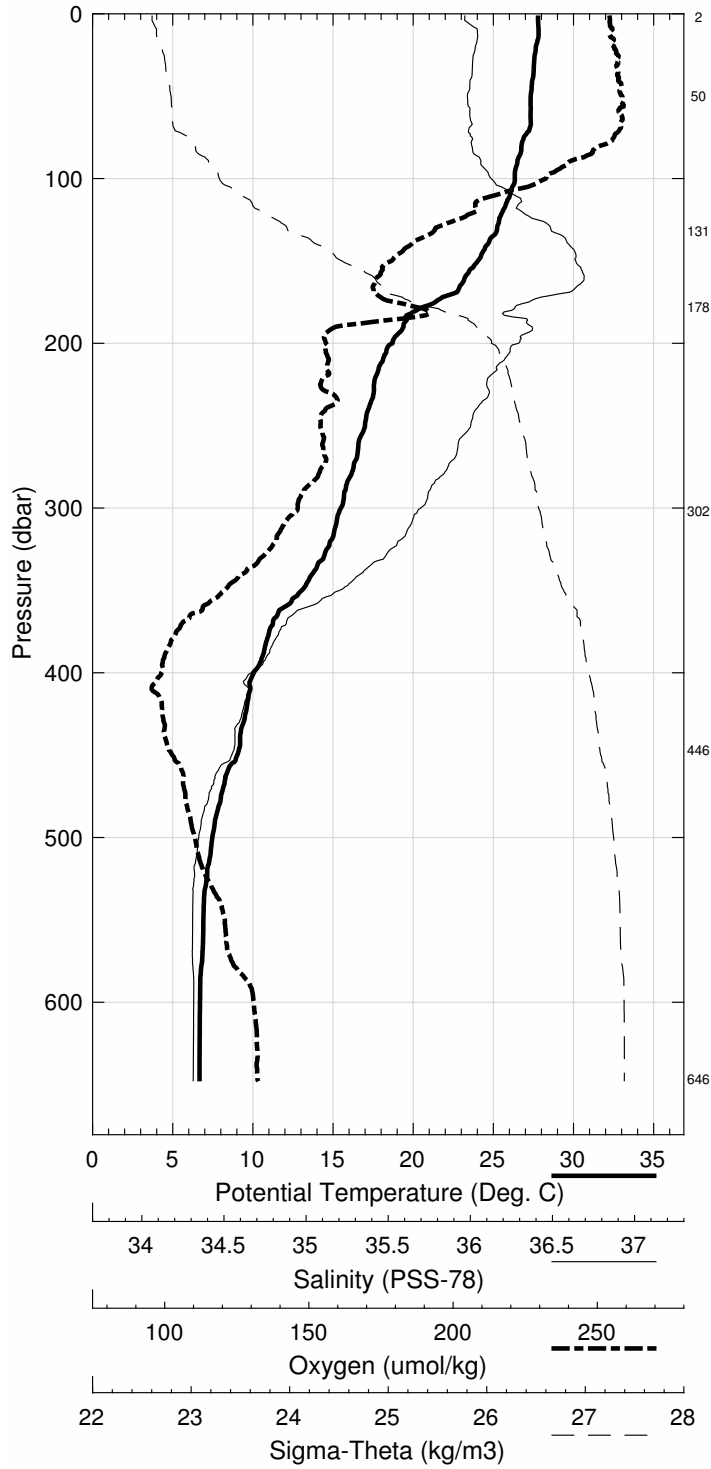


Florida Straits 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
 Latitude 26.998N Longitude 79.614W
 17-May-2016 02:15Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.788	27.788	36.284	198.3	0.004	23.430
10	27.822	27.820	36.346	198.7	0.044	23.467
20	27.655	27.650	36.336	199.2	0.088	23.514
30	27.543	27.536	36.322	199.9	0.132	23.541
50	27.340	27.328	36.296	200.5	0.219	23.589
75	26.914	26.897	36.320	199.1	0.326	23.745
100	26.361	26.338	36.416	187.5	0.428	23.995
125	25.396	25.368	36.647	172.3	0.521	24.474
150	24.063	24.031	36.841	161.3	0.602	25.026
200	18.743	18.708	36.553	150.2	0.720	26.284
250	17.034	16.992	36.313	149.3	0.803	26.524
300	15.537	15.490	36.061	145.4	0.879	26.681
400	10.106	10.058	35.211	122.3	1.003	27.107
500	7.517	7.467	34.948	128.0	1.097	27.311
600	6.753	6.696	34.923	138.0	1.177	27.400

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
647	1	6.737	6.675	34.918	138.5
447	2	9.056	9.007	35.103	124.5
302	3	15.363	15.316	36.039	144.3
178	4	19.693	19.660	36.511	162.2
132	5	25.188	25.159	36.723	168.9
50	6	27.357	27.346	36.310	200.6
2	7	27.803	27.803	36.350	199.3

Florida Straits May 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
 Latitude 26.998 N Longitude 79.614 W
 17-May-2016 02:15 Z

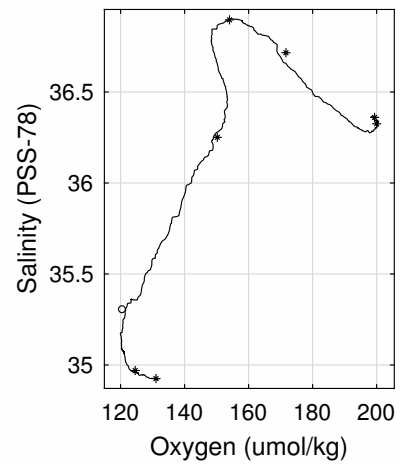
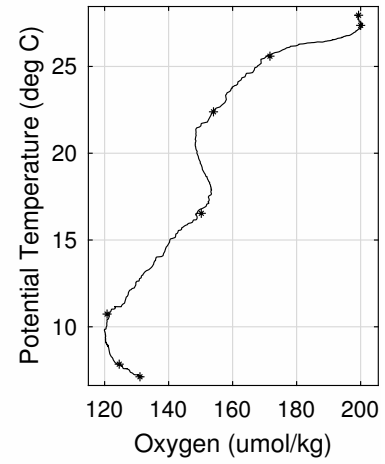
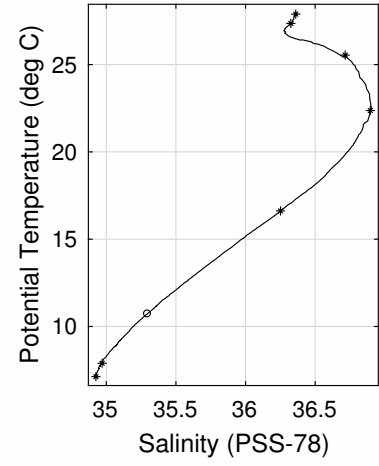
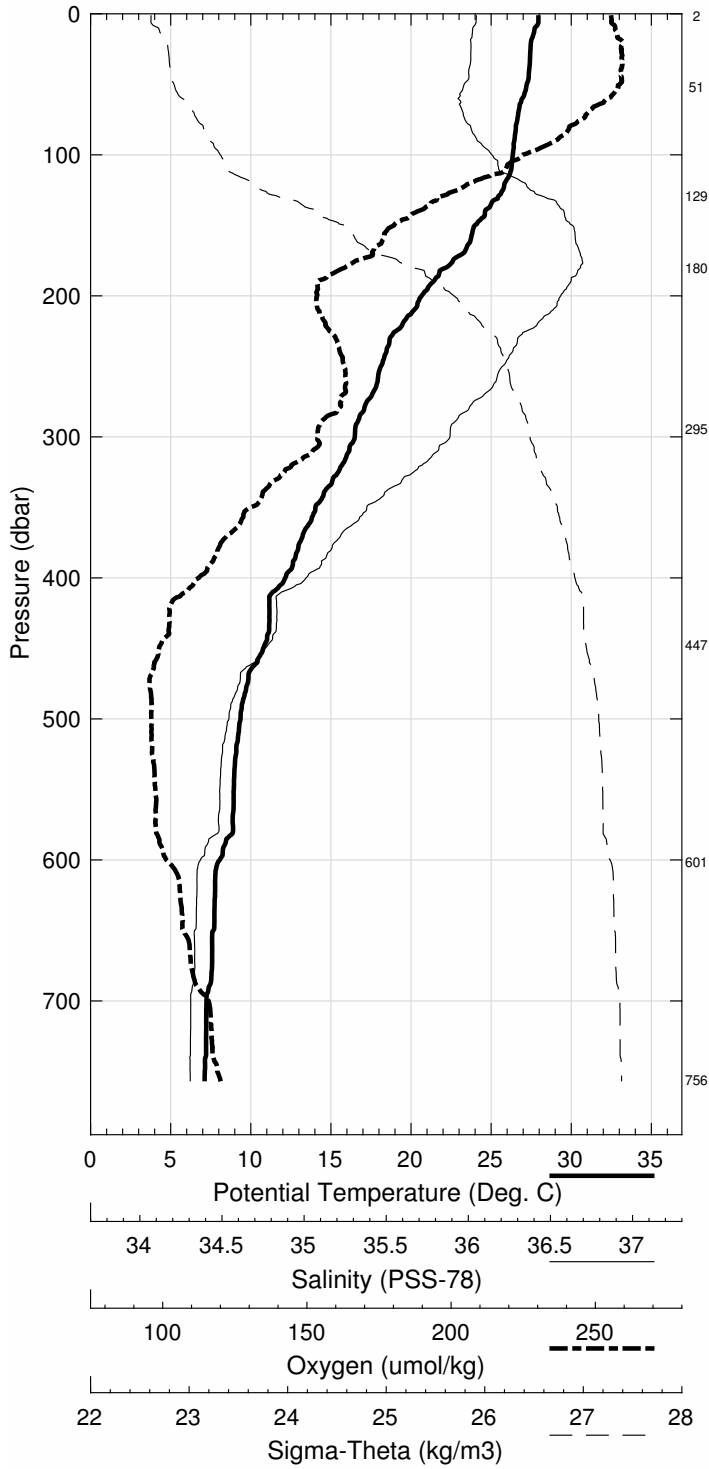


Florida Straits 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.997N Longitude 79.501W
 17-May-2016 00:33Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.951	27.951	36.367	198.5	0.004	23.439
10	27.722	27.720	36.349	199.2	0.044	23.501
20	27.492	27.488	36.339	200.5	0.088	23.569
30	27.440	27.433	36.339	200.4	0.131	23.587
50	27.235	27.223	36.305	200.0	0.217	23.629
75	26.651	26.634	36.309	193.4	0.322	23.821
100	26.376	26.353	36.445	183.4	0.422	24.013
125	25.760	25.733	36.639	172.4	0.517	24.354
150	24.010	23.978	36.852	161.5	0.599	25.051
200	20.695	20.657	36.792	148.5	0.727	25.953
250	18.161	18.117	36.498	153.1	0.821	26.391
300	16.535	16.486	36.233	148.6	0.903	26.583
400	12.202	12.148	35.508	128.3	1.039	26.955
500	9.413	9.356	35.119	120.3	1.148	27.153
600	8.123	8.060	34.976	122.8	1.247	27.246
700	7.304	7.235	34.926	130.0	1.337	27.328

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
756	1	7.201	7.126	34.925	131.0
602	2	7.958	7.896	34.970	124.6
448	3	10.738	10.683	35.300	120.8
295	4	16.666	16.618	36.251	150.2
181	5	22.405	22.369	36.896	154.0
130	6	25.572	25.543	36.716	171.7
52	7	27.370	27.358	36.325	200.0
2	13	27.891	27.890	36.361	199.4

Florida Straits May 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.997 N Longitude 79.501 W
 17-May-2016 00:33 Z

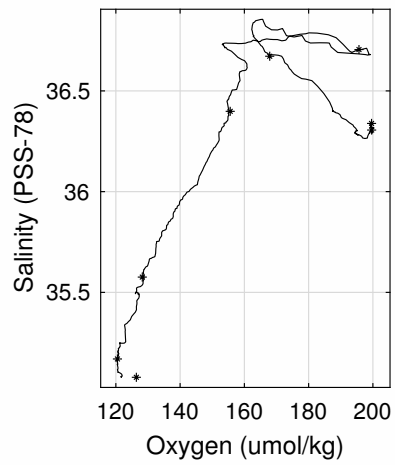
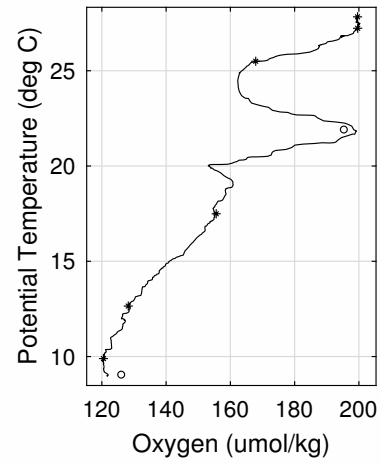
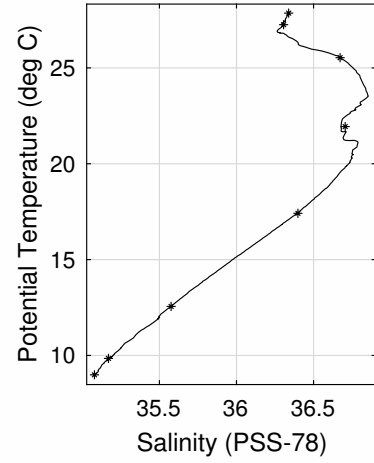
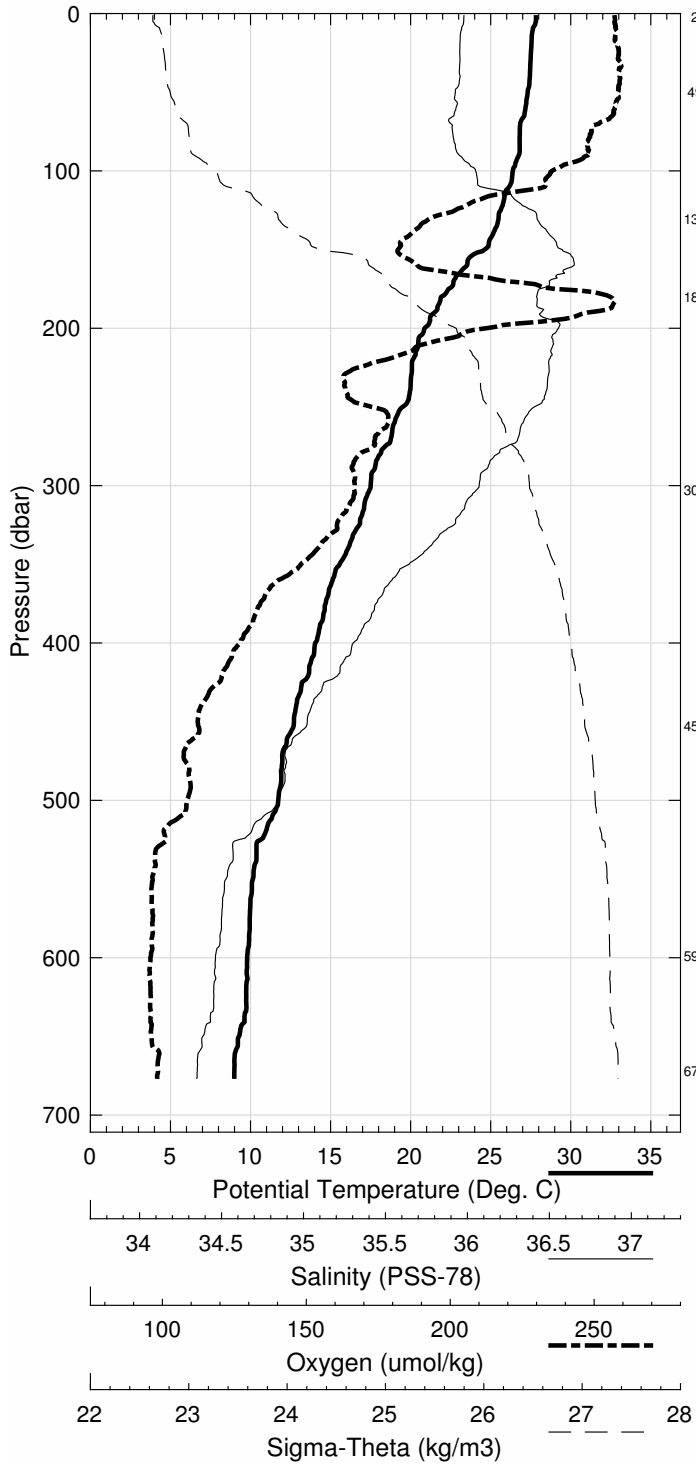


Florida Straits 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
 Latitude 27.000N Longitude 79.385W
 16-May-2016 23:01Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.830	27.829	36.336	199.1	0.004	23.456
10	27.636	27.634	36.325	199.3	0.044	23.511
20	27.548	27.543	36.317	199.7	0.088	23.535
30	27.496	27.489	36.318	200.0	0.131	23.553
50	27.325	27.313	36.296	199.7	0.218	23.593
75	26.837	26.820	36.282	195.2	0.324	23.742
100	26.405	26.382	36.391	188.5	0.427	23.963
125	25.654	25.626	36.659	172.1	0.522	24.402
150	24.649	24.617	36.799	162.4	0.607	24.818
200	20.909	20.871	36.781	177.4	0.738	25.886
250	19.542	19.496	36.667	158.0	0.841	26.167
300	17.553	17.502	36.408	155.1	0.929	26.473
400	14.100	14.041	35.815	135.7	1.078	26.808
500	11.798	11.733	35.463	126.7	1.204	27.000
600	9.860	9.790	35.167	120.4	1.314	27.118

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
672	1	9.065	8.990	35.079	126.4
599	2	9.916	9.846	35.170	120.5
453	3	12.619	12.557	35.576	128.2
303	4	17.467	17.416	36.399	155.6
180	5	21.975	21.939	36.705	195.7
131	6	25.561	25.532	36.672	167.9
50	7	27.267	27.255	36.306	199.6
2	13	27.858	27.857	36.339	199.6

Florida Straits May 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
 Latitude 27.000 N Longitude 79.385 W
 16-May-2016 23:01 Z

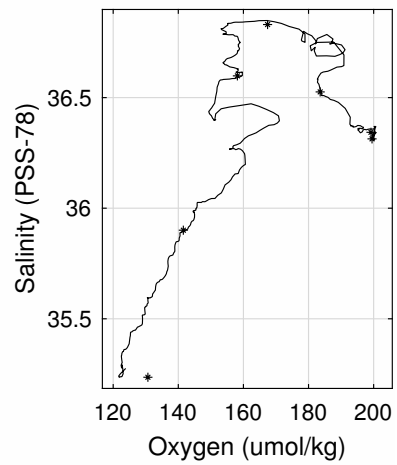
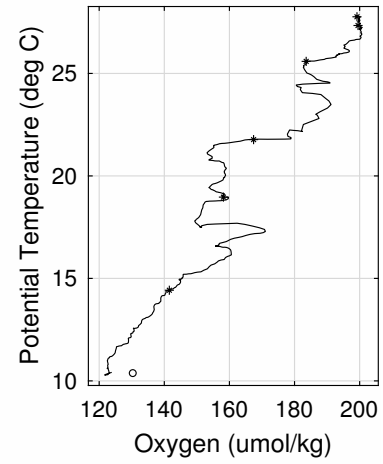
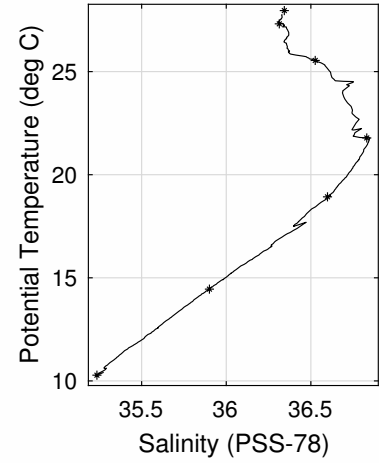
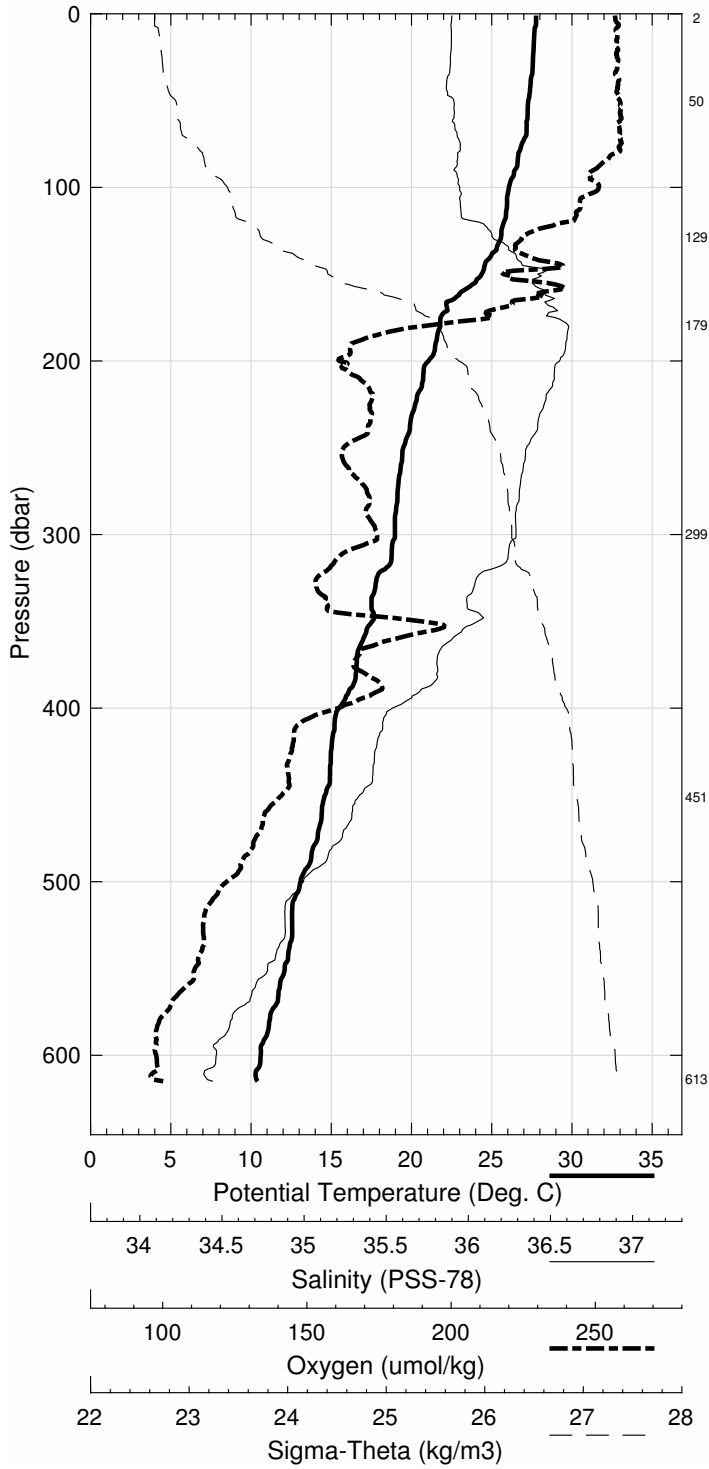


Florida Straits 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.998N Longitude 79.285W
 16-May-2016 21:48Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.765	27.765	36.332	199.5	0.004	23.473
10	27.667	27.665	36.330	199.6	0.044	23.505
20	27.615	27.611	36.329	200.0	0.088	23.522
30	27.562	27.555	36.325	199.9	0.131	23.537
50	27.292	27.280	36.340	200.3	0.218	23.637
75	26.891	26.874	36.370	200.5	0.324	23.790
100	26.092	26.069	36.367	196.8	0.425	24.043
125	25.631	25.603	36.501	186.0	0.520	24.290
150	24.396	24.364	36.712	180.8	0.606	24.829
200	21.105	21.066	36.807	153.3	0.733	25.852
250	19.535	19.489	36.663	154.1	0.837	26.166
300	19.021	18.967	36.615	159.6	0.931	26.265
400	15.531	15.468	36.069	153.2	1.098	26.692
500	13.164	13.093	35.677	134.5	1.238	26.898
600	10.677	10.603	35.291	122.7	1.360	27.073

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
614	1	10.353	10.278	35.236	130.7
452	2	14.519	14.451	35.901	141.5
300	3	18.981	18.927	36.598	158.1
179	4	21.818	21.783	36.830	167.4
129	5	25.570	25.542	36.526	183.6
50	6	27.328	27.316	36.313	199.5
3	7	27.960	27.959	36.343	199.2

Florida Staits May 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.998 N Longitude 79.285 W
 16-May-2016 21:48 Z

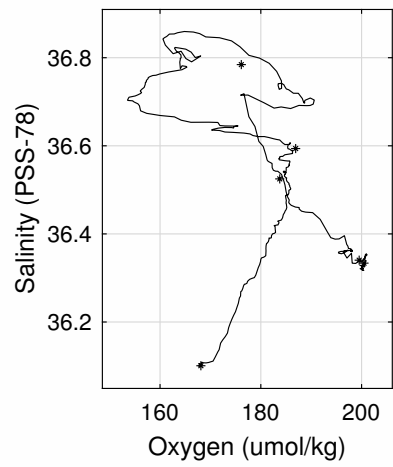
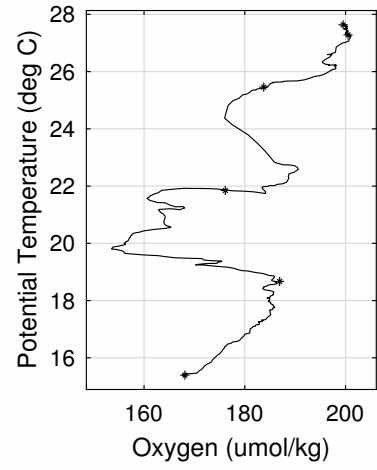
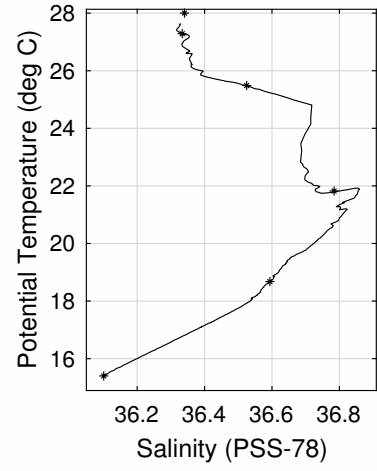
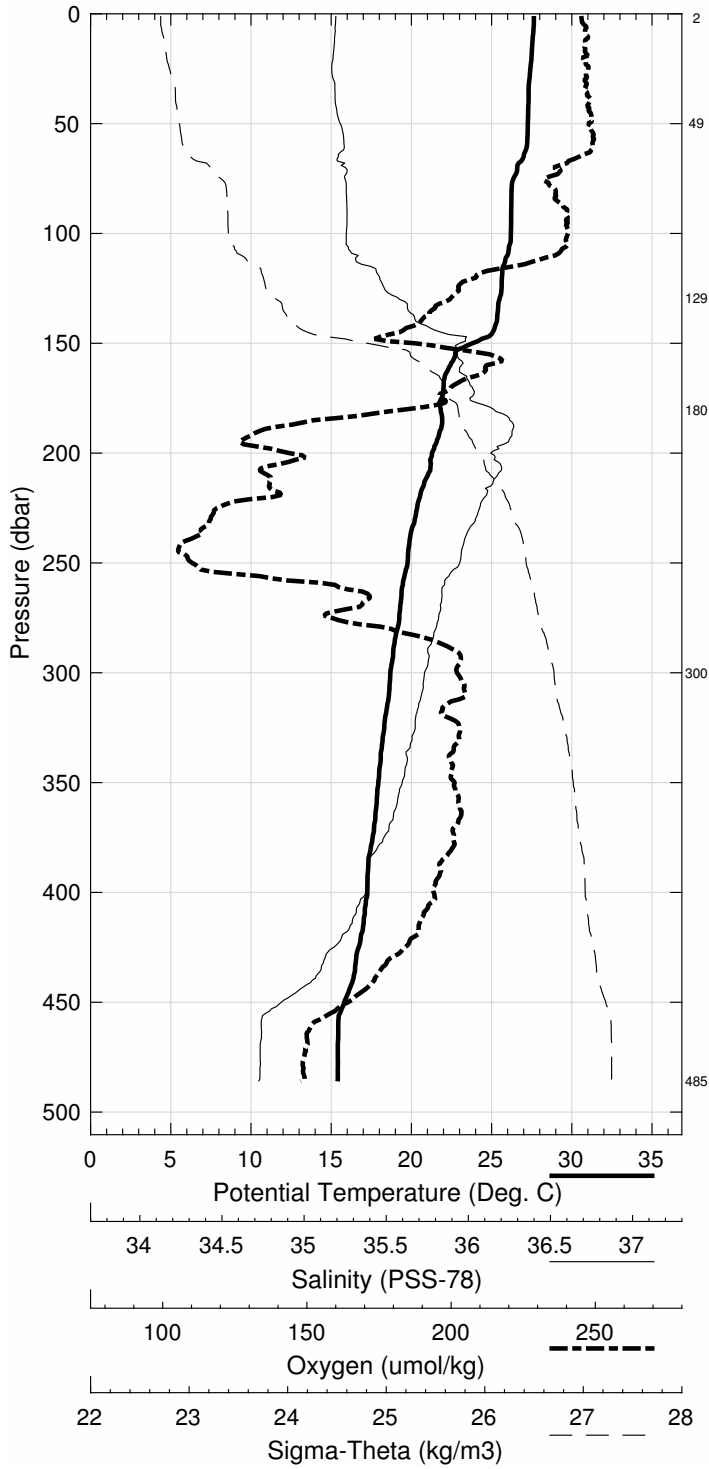


Florida Straits 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 27.001N Longitude 79.204W
 16-May-2016 20:49Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.634	27.634	36.329	199.6	0.004	23.514
10	27.576	27.573	36.326	200.3	0.044	23.532
20	27.490	27.485	36.321	199.7	0.087	23.556
30	27.360	27.353	36.322	200.0	0.130	23.601
50	27.267	27.256	36.343	200.3	0.216	23.647
75	26.378	26.361	36.356	195.5	0.320	23.943
100	26.225	26.202	36.361	198.1	0.419	23.997
125	25.648	25.620	36.474	185.6	0.514	24.265
150	23.827	23.795	36.698	180.6	0.602	24.988
200	21.315	21.276	36.791	166.3	0.727	25.782
250	19.805	19.759	36.698	155.2	0.832	26.121
300	18.739	18.685	36.593	185.4	0.927	26.320
400	17.318	17.250	36.418	182.7	1.097	26.543

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
486	1	15.477	15.401	36.101	168.1
300	2	18.731	18.677	36.594	186.9
180	3	21.859	21.823	36.784	176.1
130	4	25.514	25.485	36.525	183.8
50	5	27.297	27.285	36.334	200.5
2	6	28.002	28.002	36.340	199.5

Florida Straits May 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 27.001 N Longitude 79.204 W
 16-May-2016 20:49 Z



A.3 FC1607

Florida Staits July 2016 R/V Walton Smith

CTD Station 0 (CTD000)

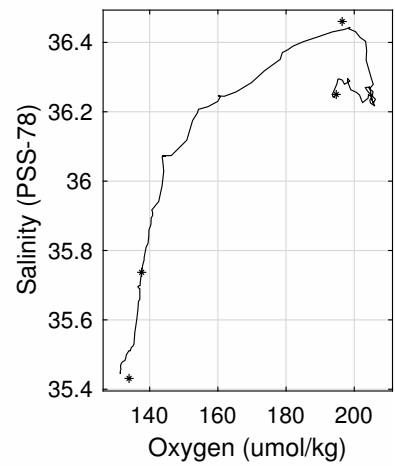
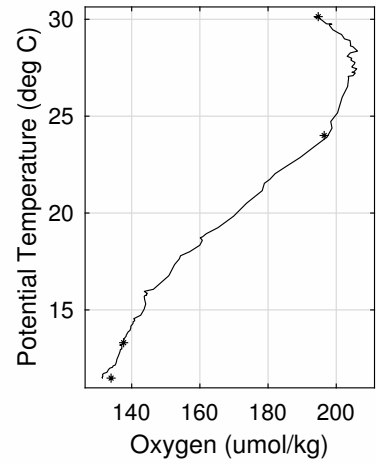
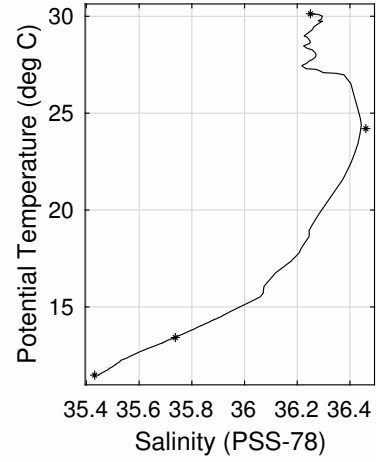
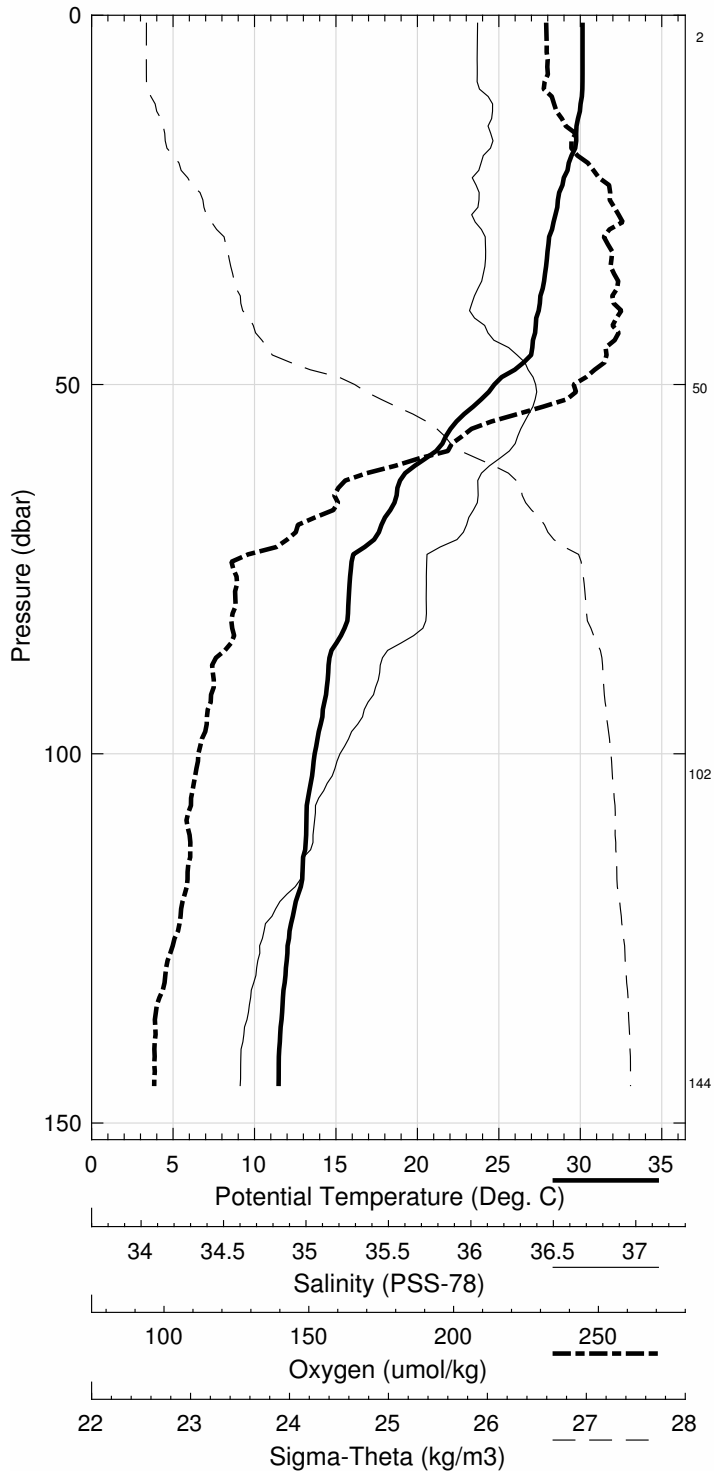
Latitude 26.998N Longitude 79.930W

14-Jul-2016 09:00Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	30.137	30.137	36.244	194.0	0.005	22.612
10	30.128	30.125	36.250	193.6	0.052	22.621
20	29.296	29.291	36.256	200.7	0.103	22.909
30	28.094	28.087	36.270	203.2	0.151	23.321
50	24.733	24.722	36.440	198.4	0.236	24.514
75	15.928	15.916	36.072	144.0	0.291	26.592
100	13.707	13.693	35.781	138.4	0.324	26.856
125	12.133	12.117	35.520	134.6	0.354	26.970

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
145	1	11.499	11.481	35.431	134.0
103	2	13.434	13.420	35.737	137.6
50	3	24.214	24.203	36.460	196.5
3	4	30.130	30.129	36.250	194.7

Florida Staits July 2016 R/V Walton Smith
 CTD Station 0 (CTD000)
 Latitude 26.998 N Longitude 79.930 W
 14-Jul-2016 09:00 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 0 (CTD000)

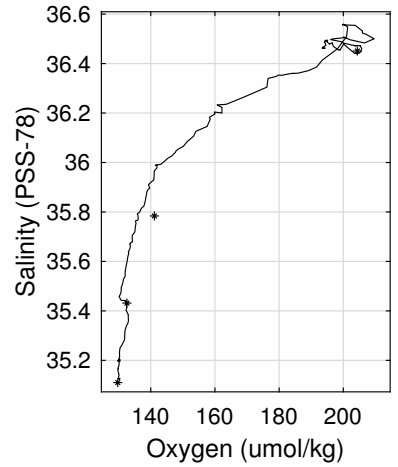
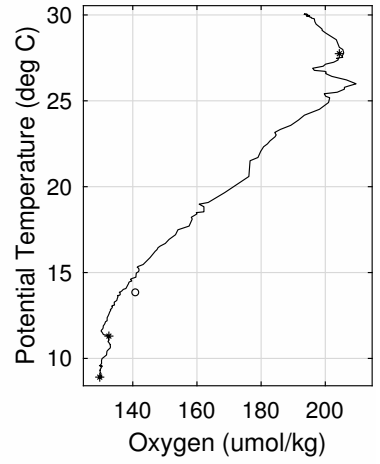
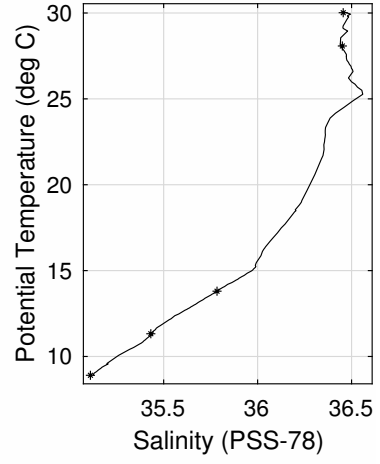
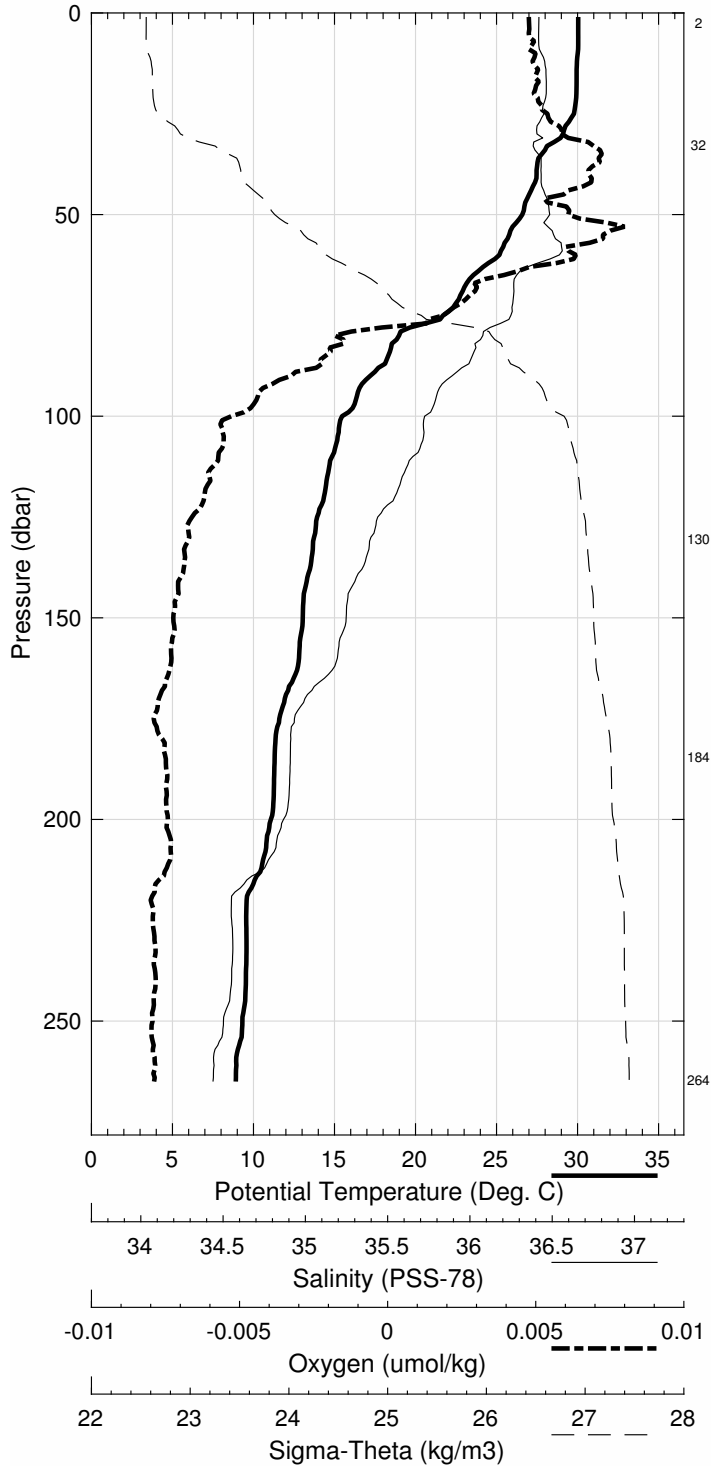
Latitude 26.998N Longitude 79.930W

14-Jul-2016 09:00Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	30.137	30.137	36.244	194.0	0.005	22.612
10	30.128	30.125	36.250	193.6	0.052	22.621
20	29.296	29.291	36.256	200.7	0.103	22.909
30	28.094	28.087	36.270	203.2	0.151	23.321
50	24.733	24.722	36.440	198.4	0.236	24.514
75	15.928	15.916	36.072	144.0	0.291	26.592
100	13.707	13.693	35.781	138.4	0.324	26.856
125	12.133	12.117	35.520	134.6	0.354	26.970

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
145	1	11.499	11.481	35.431	134.0
103	2	13.434	13.420	35.737	137.6
50	3	24.214	24.203	36.460	196.5
3	4	30.130	30.129	36.250	194.7

Florida Staits July 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
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 14-Jul-2016 07:48 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 2 (CTD002)

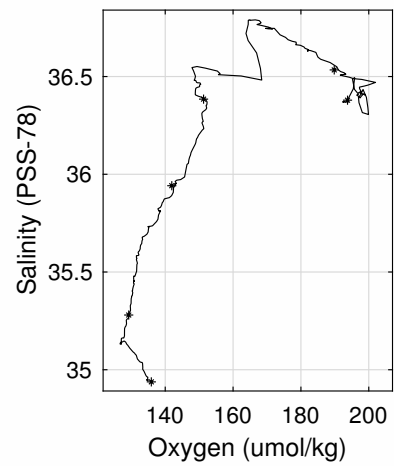
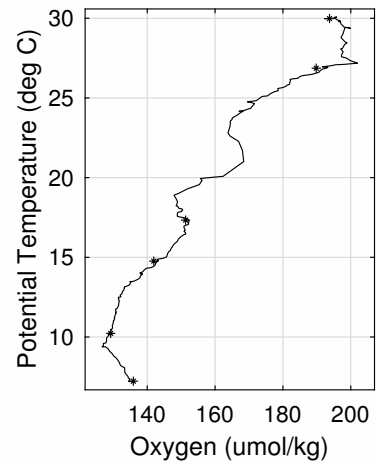
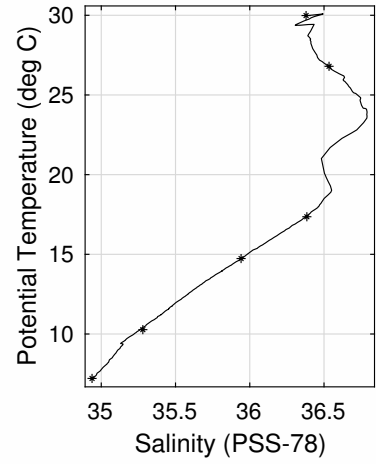
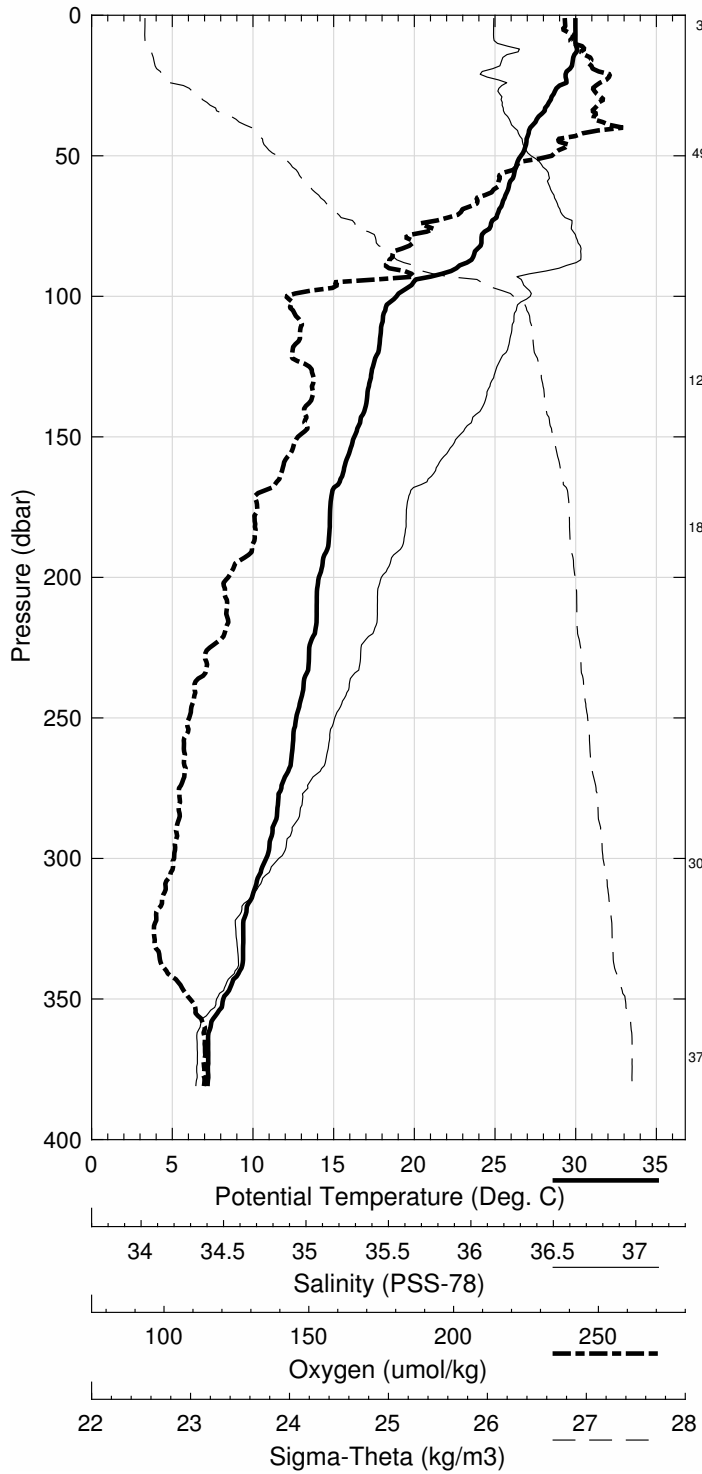
Latitude 26.992N Longitude 79.784W

14-Jul-2016 06:12Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.981	29.981	36.371	192.6	0.005	22.761
10	29.985	29.982	36.389	194.0	0.051	22.774
20	29.440	29.435	36.316	198.1	0.101	22.905
30	28.464	28.457	36.406	198.9	0.149	23.302
50	26.619	26.608	36.550	190.6	0.232	24.011
75	24.746	24.730	36.744	170.4	0.322	24.743
100	18.914	18.896	36.546	147.9	0.387	26.230
125	17.456	17.435	36.386	151.6	0.429	26.474
150	16.303	16.278	36.199	149.8	0.467	26.606
200	14.110	14.081	35.831	138.6	0.535	26.813
250	12.716	12.681	35.608	132.4	0.598	26.928
300	10.855	10.819	35.339	129.9	0.654	27.073

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
371	1	7.247	7.212	34.938	135.9
302	2	10.309	10.273	35.280	129.2
182	3	14.762	14.735	35.941	141.9
130	4	17.380	17.358	36.384	151.3
49	5	26.811	26.799	36.534	189.8
3	6	29.984	29.983	36.379	193.7

Florida Straits July 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.992 N Longitude 79.784 W
 14-Jul-2016 06:12 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 3 (CTD003)

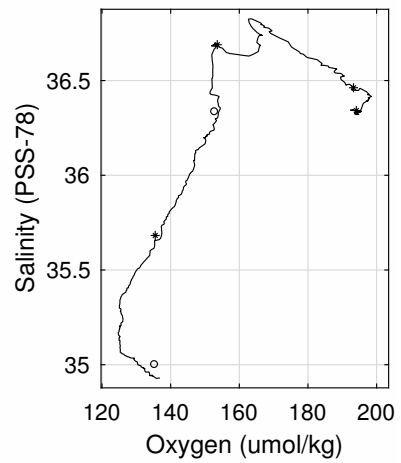
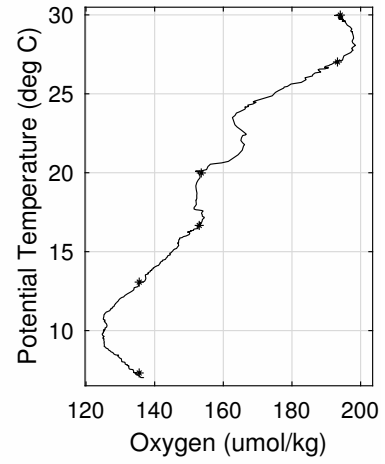
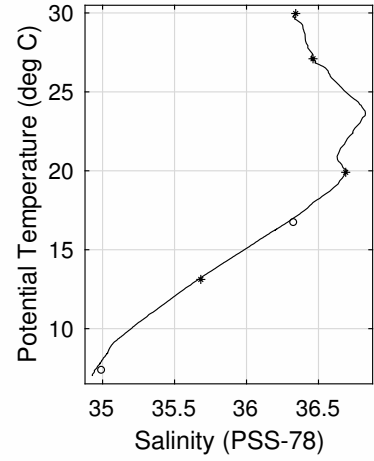
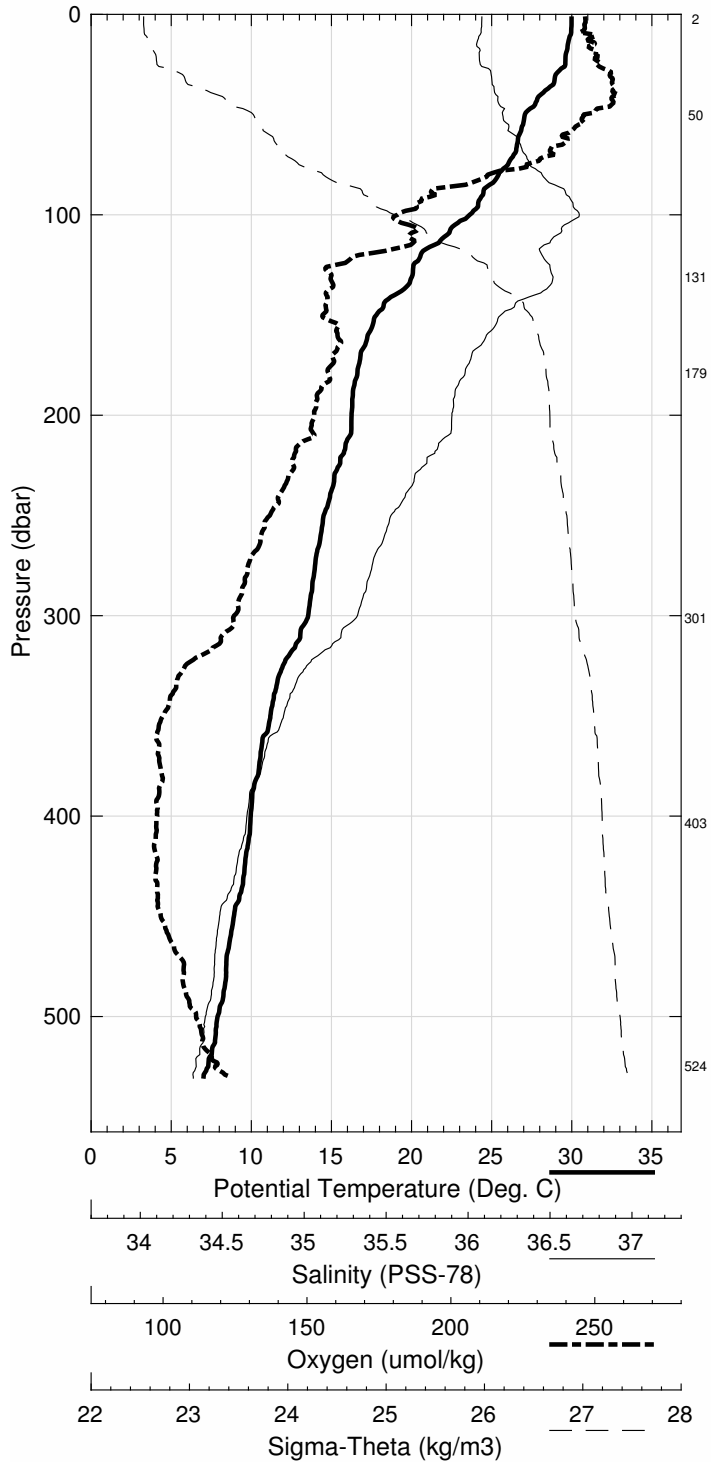
Latitude 26.996N Longitude 79.685W

14-Jul-2016 04:29Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.987	29.987	36.348	193.2	0.005	22.741
10	29.946	29.944	36.340	194.5	0.051	22.750
20	29.628	29.623	36.335	194.9	0.101	22.856
30	29.003	28.996	36.393	197.1	0.151	23.112
50	27.083	27.072	36.449	192.9	0.240	23.787
75	26.030	26.013	36.581	183.8	0.339	24.222
100	23.650	23.629	36.826	163.4	0.420	25.135
125	20.140	20.116	36.681	153.5	0.480	26.014
150	17.828	17.802	36.440	151.5	0.527	26.425
200	16.289	16.256	36.201	150.2	0.603	26.612
250	14.549	14.512	35.901	143.1	0.674	26.774
300	13.590	13.547	35.736	137.4	0.740	26.851
400	10.007	9.960	35.193	125.2	0.852	27.110
500	7.943	7.892	34.989	131.4	0.949	27.281

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
525	1	7.375	7.324	34.997	135.5
404	2	9.935	10.489	-999.000	-999.0
301	3	13.160	13.118	35.682	135.5
179	4	16.710	16.681	36.332	153.0
131	5	19.930	19.906	36.689	153.6
50	6	27.109	27.098	36.462	193.3
3	7	29.964	29.963	36.342	194.1

Florida Staits July 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.996 N Longitude 79.685 W
 14-Jul-2016 04:29 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 4 (CTD004)

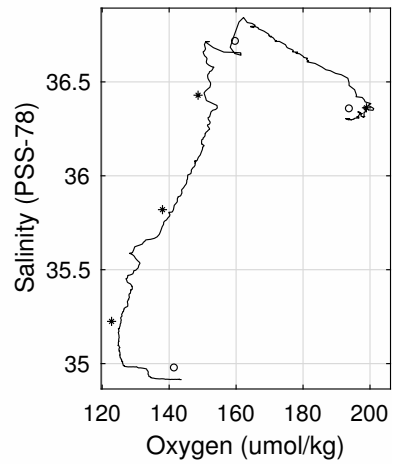
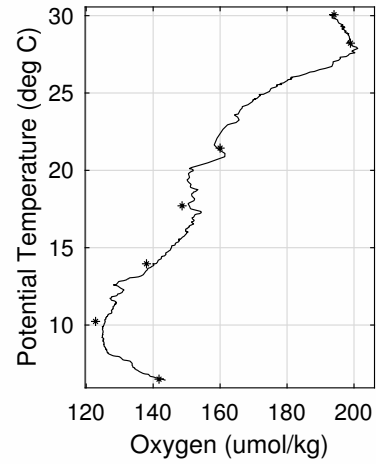
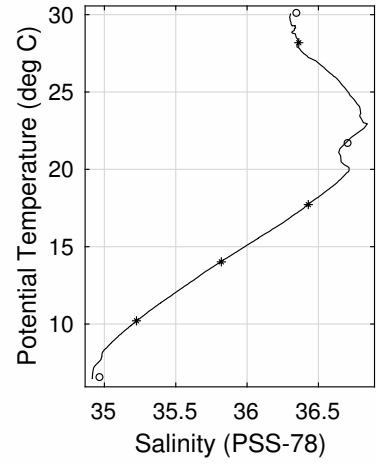
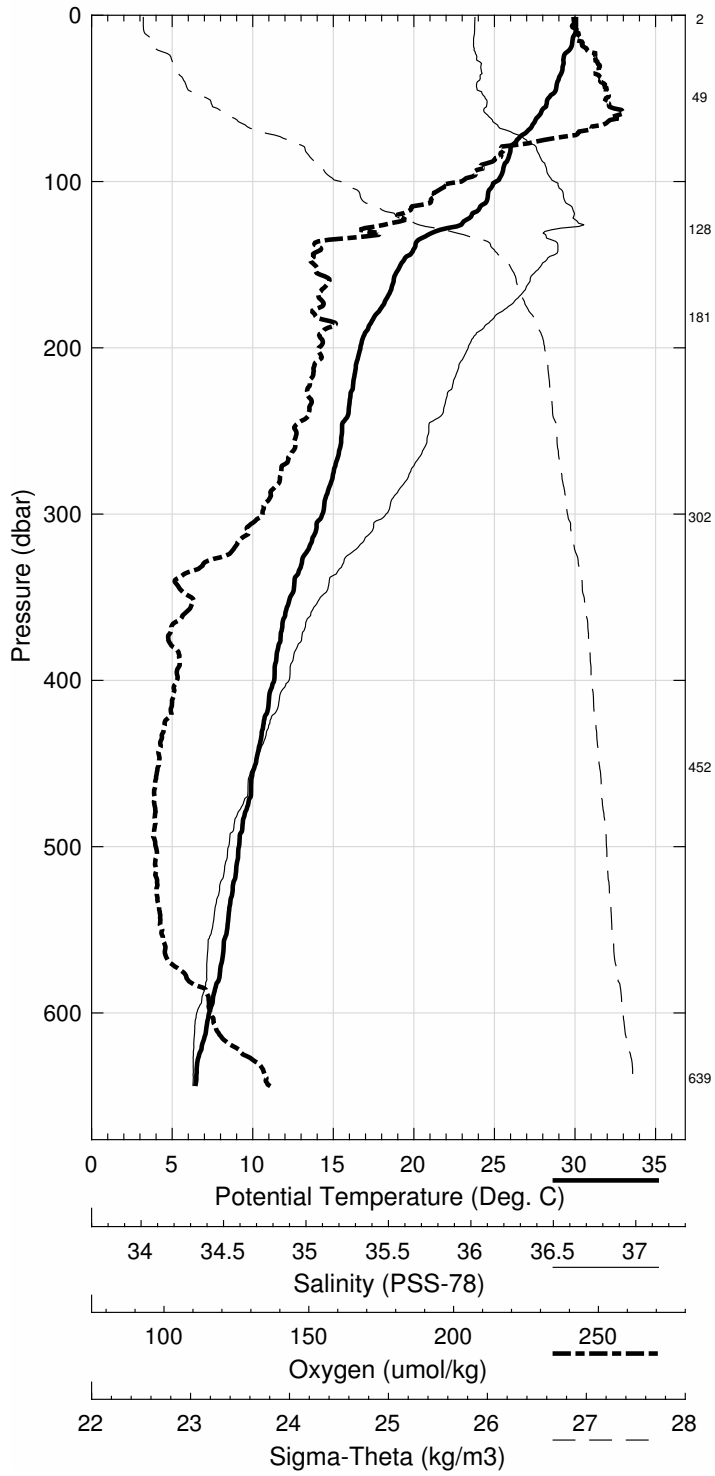
Latitude 26.992N Longitude 79.615W

14-Jul-2016 03:01Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	30.063	30.063	36.306	193.0	0.005	22.684
10	30.038	30.035	36.303	193.0	0.052	22.691
20	29.721	29.716	36.302	195.1	0.103	22.800
30	29.269	29.262	36.336	197.2	0.152	22.979
50	28.348	28.336	36.357	198.2	0.248	23.305
75	26.409	26.392	36.560	188.2	0.355	24.087
100	25.123	25.102	36.698	174.7	0.445	24.594
125	23.042	23.016	36.816	163.3	0.522	25.307
150	19.207	19.180	36.635	150.9	0.575	26.225
200	16.716	16.683	36.272	151.6	0.659	26.567
250	15.582	15.543	36.078	147.9	0.733	26.682
300	14.367	14.323	35.867	142.4	0.802	26.788
400	11.380	11.329	35.389	128.5	0.923	27.018
500	9.199	9.143	35.090	125.1	1.030	27.166
600	7.356	7.296	34.933	133.9	1.124	27.324

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
639	1	6.556	6.497	34.973	141.8
453	2	10.264	10.210	35.225	122.8
302	3	14.063	14.019	35.820	138.0
182	4	17.752	17.721	36.429	148.6
129	5	21.658	21.632	36.712	160.0
49	6	28.199	28.187	36.362	198.9
2	7	30.043	30.042	36.353	194.0

Florida Straits July 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
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 14-Jul-2016 03:01 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 5 (CTD005)

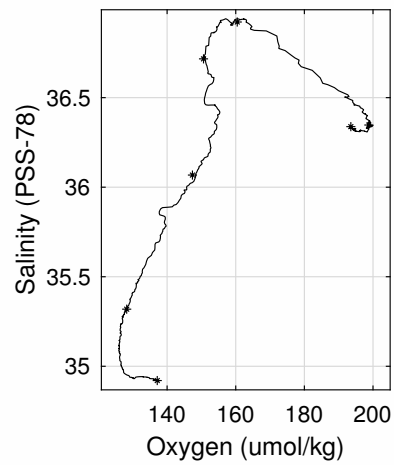
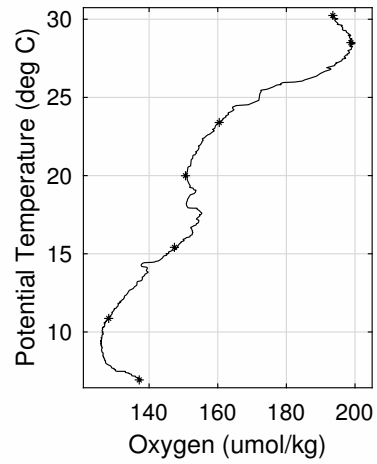
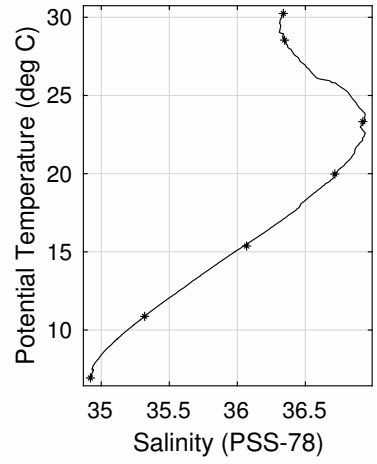
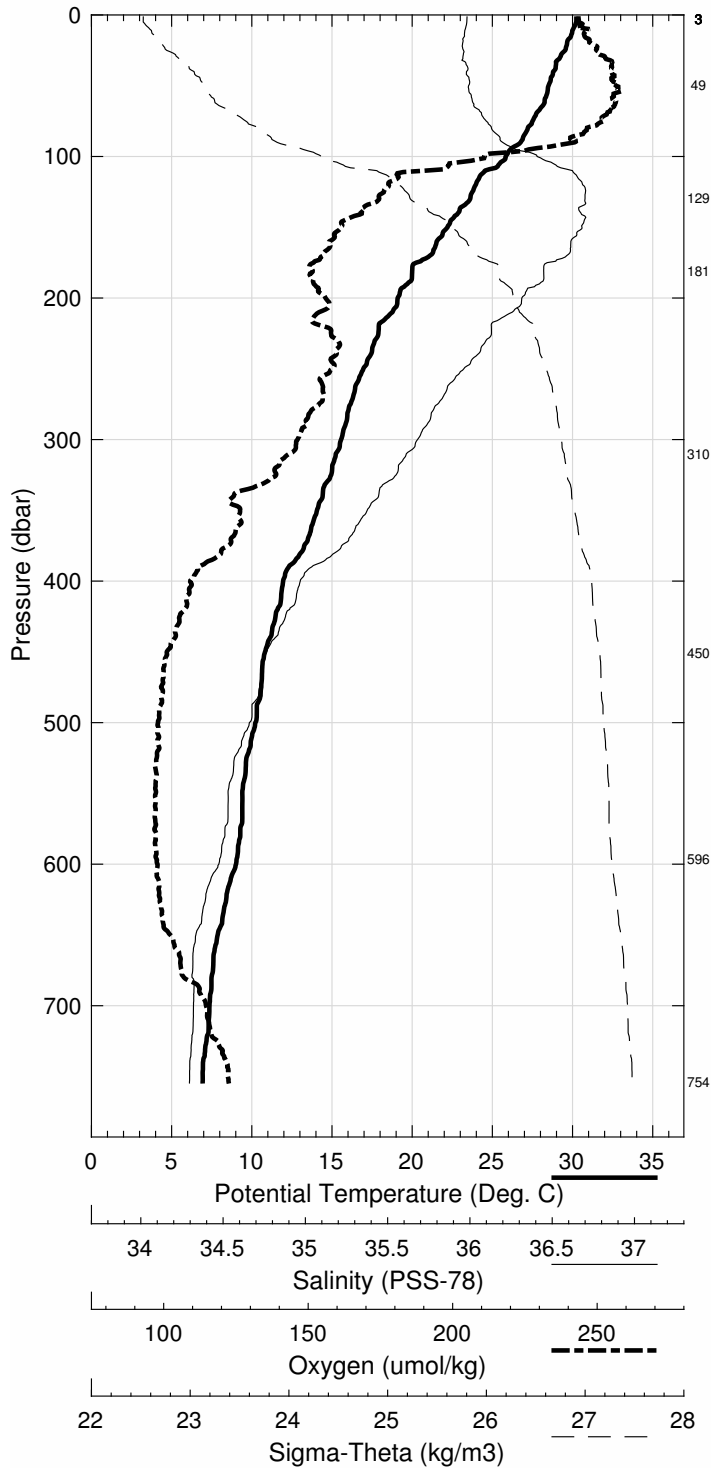
Latitude 26.996N Longitude 79.501W

14-Jul-2016 01:13Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	30.241	30.240	36.335	193.2	0.005	22.645
10	30.041	30.038	36.326	195.0	0.052	22.707
20	29.663	29.658	36.312	195.3	0.103	22.827
30	29.226	29.219	36.313	197.5	0.152	22.977
50	28.514	28.502	36.342	199.2	0.247	23.239
75	27.521	27.504	36.433	197.3	0.360	23.635
100	25.844	25.822	36.692	178.2	0.459	24.366
125	23.780	23.753	36.939	162.4	0.537	25.184
150	22.233	22.203	36.921	155.5	0.603	25.621
200	19.130	19.094	36.614	153.0	0.708	26.231
250	16.995	16.954	36.318	154.1	0.793	26.538
300	15.614	15.567	36.082	148.6	0.869	26.679
400	12.007	11.954	35.484	131.5	1.002	26.974
500	10.281	10.221	35.224	126.4	1.114	27.089
600	9.083	9.016	35.068	126.4	1.219	27.169
700	7.430	7.360	34.939	134.1	1.312	27.320

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
754	1	7.009	6.936	34.920	137.1
596	2	9.147	9.979	-999.000	-999.0
451	3	10.930	10.874	35.319	128.2
310	4	15.422	15.373	36.068	147.4
181	5	20.011	19.977	36.717	150.6
129	6	23.359	23.332	36.922	160.4
50	7	28.551	28.539	36.347	198.8
4	13	30.244	30.243	36.338	193.5
4	14	30.238	30.239	-999.000	-999.0
3	15	30.216	30.218	-999.000	-999.0
4	16	30.183	30.184	-999.000	-999.0
4	17	30.153	30.154	-999.000	-999.0
4	18	30.144	30.146	-999.000	-999.0
4	19	30.132	30.133	-999.000	-999.0

Florida Straits July 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.996 N Longitude 79.501 W
 14-Jul-2016 01:13 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 6 (CTD006)

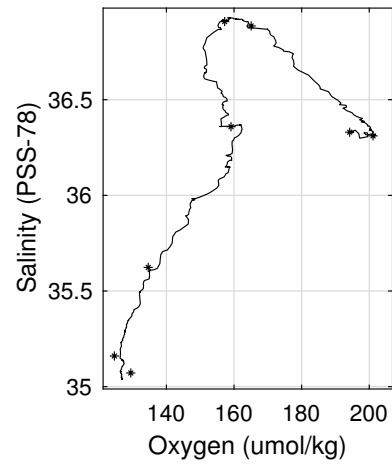
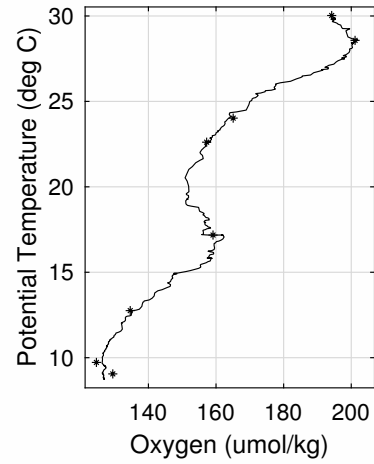
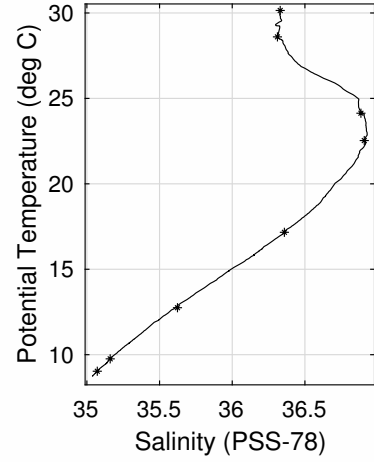
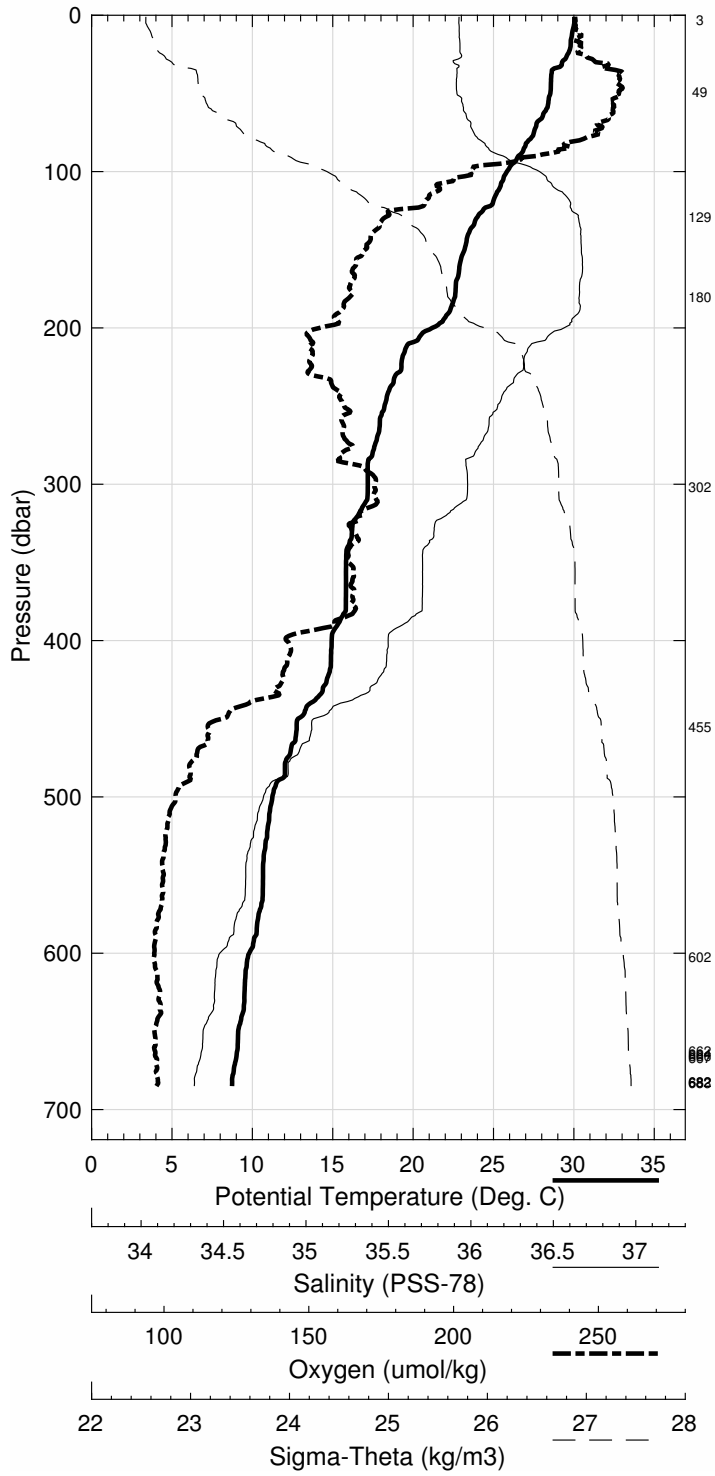
Latitude 26.995N Longitude 79.384W

13-Jul-2016 23:29Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	30.029	30.029	36.327	194.1	0.005	22.712
10	29.918	29.915	36.328	194.9	0.051	22.751
20	29.800	29.795	36.332	195.2	0.102	22.795
30	29.272	29.265	36.300	197.4	0.152	22.951
50	28.548	28.536	36.317	201.3	0.246	23.208
75	27.530	27.512	36.399	197.6	0.359	23.606
100	25.855	25.832	36.719	177.2	0.458	24.384
125	24.365	24.338	36.876	164.1	0.542	24.961
150	23.227	23.196	36.923	160.3	0.612	25.335
200	21.223	21.184	36.838	153.0	0.738	25.843
250	18.264	18.220	36.516	156.9	0.833	26.379
300	17.231	17.180	36.369	161.9	0.916	26.522
400	14.994	14.933	35.982	147.7	1.066	26.744
500	11.307	11.244	35.375	129.8	1.197	27.023
600	9.874	9.804	35.162	126.4	1.309	27.112

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
683	1	8.814	9.774	-999.000	-999.0
683	2	8.826	9.785	-999.000	-999.0
682	3	8.833	9.791	-999.000	-999.0
667	4	9.006	9.937	-999.000	-999.0
666	5	9.053	9.981	-999.000	-999.0
665	6	9.095	10.020	-999.000	-999.0
663	7	9.106	9.032	35.072	129.5
602	13	9.827	9.756	35.160	124.6
456	14	12.812	12.749	35.623	134.6
302	15	17.214	17.163	36.359	159.1
181	16	22.570	22.534	36.908	157.2
130	17	24.160	24.133	36.885	165.1
49	18	28.613	28.601	36.311	201.1
3	19	30.148	30.147	36.330	194.2

Florida Staits July 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
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 13-Jul-2016 23:29 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 7 (CTD007)

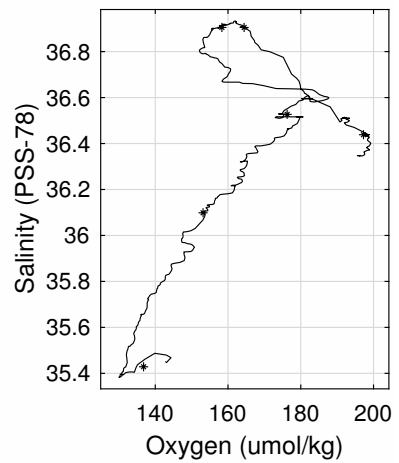
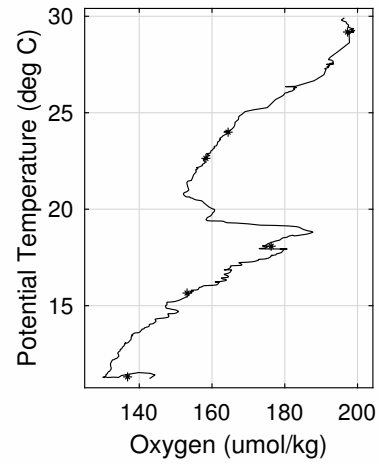
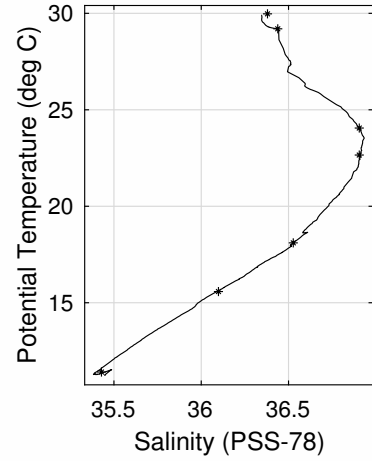
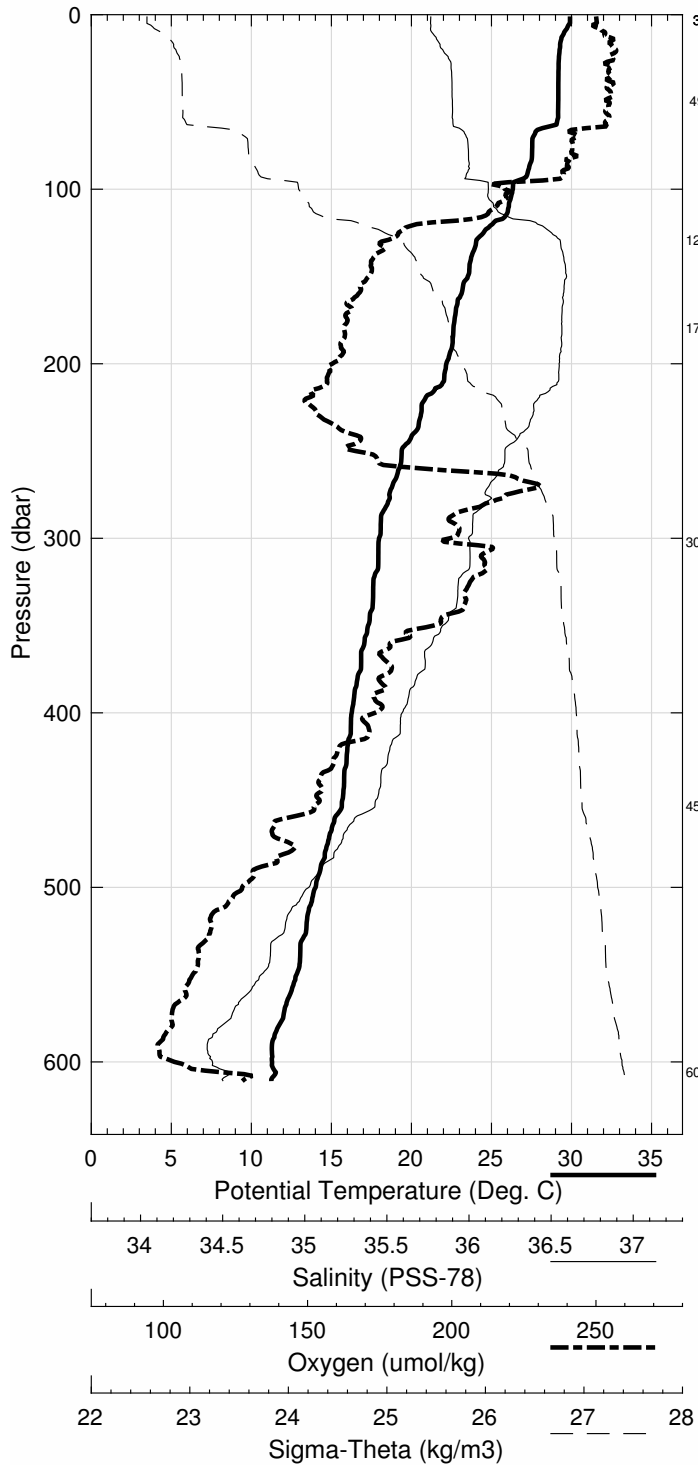
Latitude 27.002N Longitude 79.283W

13-Jul-2016 22:01Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.906	29.906	36.347	196.2	0.005	22.769
10	29.550	29.547	36.351	197.5	0.050	22.894
20	29.262	29.257	36.398	199.2	0.099	23.028
30	29.201	29.194	36.435	198.6	0.147	23.077
50	29.184	29.172	36.441	198.2	0.243	23.088
75	27.566	27.548	36.508	192.6	0.357	23.677
100	26.358	26.335	36.596	182.4	0.460	24.132
125	24.526	24.499	36.868	166.3	0.549	24.907
150	23.550	23.519	36.933	161.9	0.621	25.249
200	22.221	22.180	36.901	156.4	0.751	25.612
250	19.438	19.392	36.667	159.9	0.860	26.194
300	18.027	17.975	36.510	174.1	0.950	26.435
400	16.334	16.269	36.224	162.8	1.113	26.627
500	14.087	14.013	35.821	142.8	1.261	26.819
600	11.372	11.295	35.405	132.5	1.389	27.037

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
606	1	11.488	11.409	35.429	136.8
454	2	15.651	15.580	36.099	153.1
302	3	18.156	18.103	36.527	176.3
180	4	22.692	22.656	36.905	158.3
129	5	24.082	24.055	36.905	164.4
50	6	29.210	29.198	36.438	197.2
3	7	29.974	29.973	36.380	212.2
3	13	29.970	29.971	-999.000	-999.0
3	14	30.137	30.138	-999.000	-999.0

Florida Straits July 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 27.002 N Longitude 79.283 W
 13-Jul-2016 22:01 Z



Florida Staits July 2016 R/V Walton Smith

CTD Station 8 (CTD008)

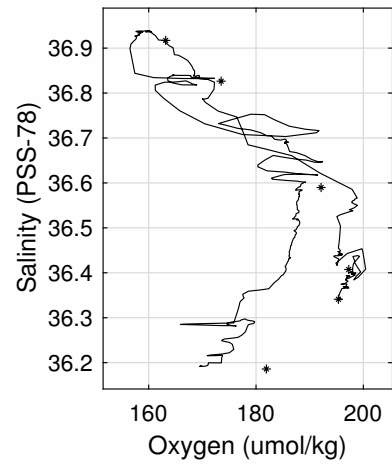
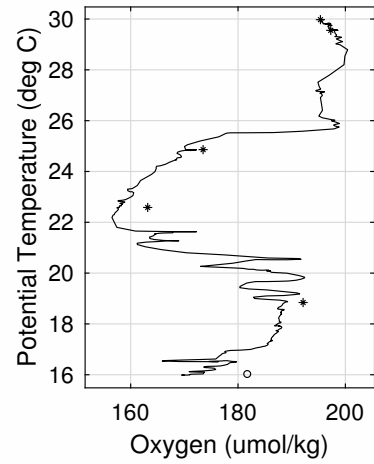
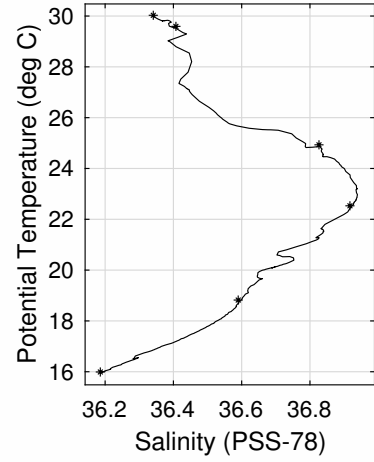
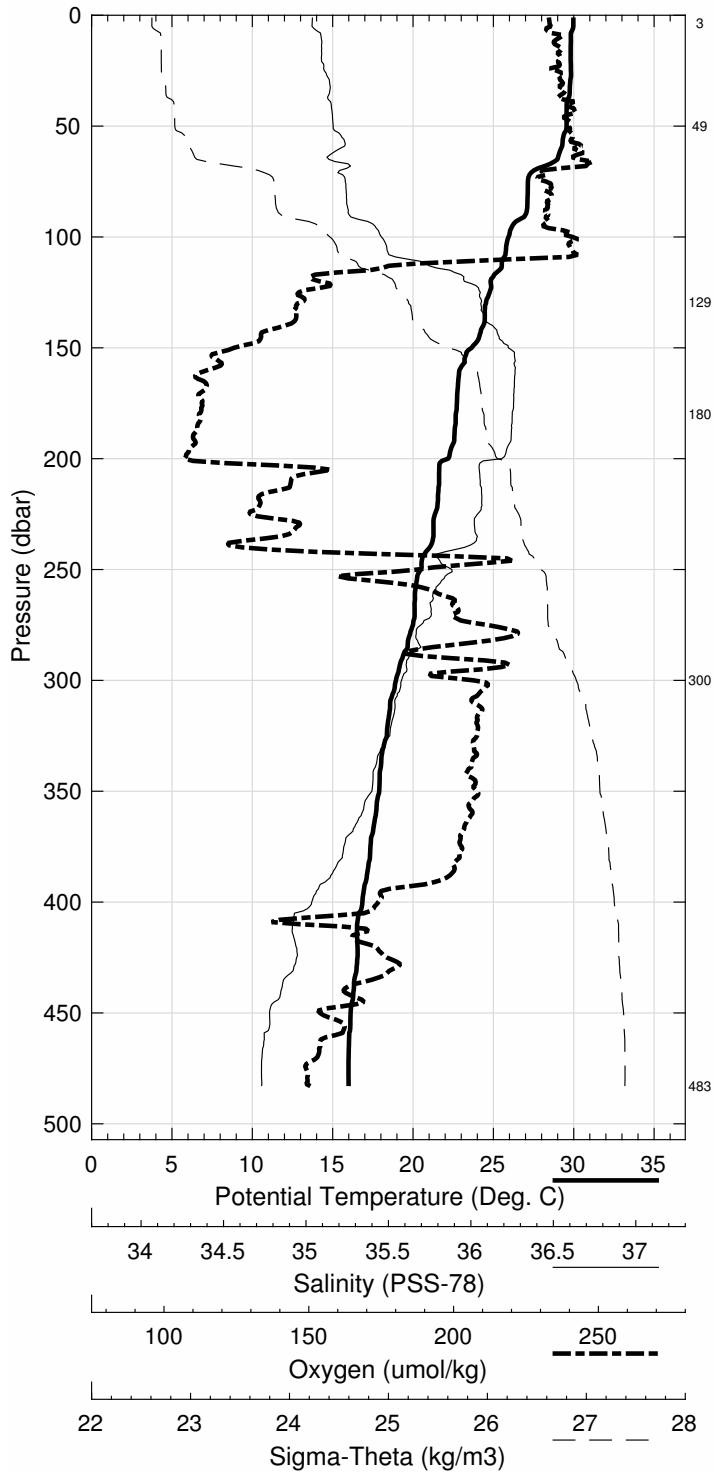
Latitude 26.997N Longitude 79.201W

13-Jul-2016 20:48Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.976	29.976	36.341	195.7	0.005	22.741
10	29.819	29.817	36.367	196.9	0.051	22.814
20	29.812	29.807	36.368	196.9	0.101	22.818
30	29.788	29.780	36.392	197.2	0.152	22.845
50	29.566	29.554	36.403	197.8	0.251	22.930
75	27.166	27.148	36.438	195.5	0.367	23.754
100	25.960	25.938	36.545	198.3	0.468	24.219
125	24.794	24.767	36.836	168.8	0.555	24.801
150	23.677	23.645	36.918	161.8	0.631	25.200
200	22.227	22.187	36.899	156.5	0.760	25.609
250	20.528	20.481	36.752	181.6	0.875	25.970
300	18.992	18.938	36.604	187.7	0.976	26.264
400	16.915	16.848	36.339	177.4	1.145	26.579

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
483	1	16.068	15.990	36.186	181.9
300	2	18.876	18.822	36.590	192.1
180	3	22.567	22.531	36.917	163.2
130	4	24.959	24.931	36.826	173.5
50	5	29.606	29.593	36.407	197.3
4	6	30.031	30.030	36.341	195.3

Florida Straits July 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 26.997 N Longitude 79.201 W
 13-Jul-2016 20:48 Z



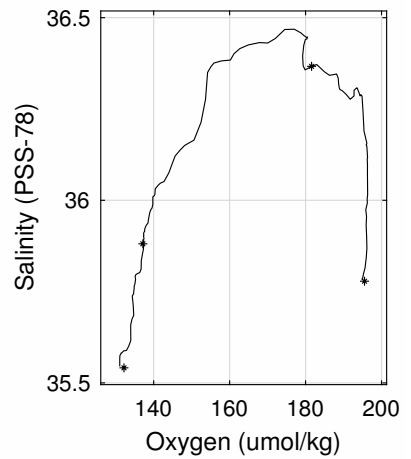
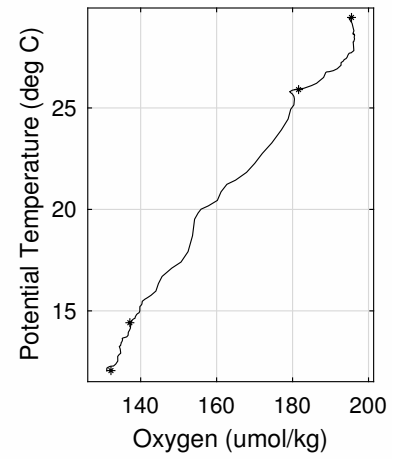
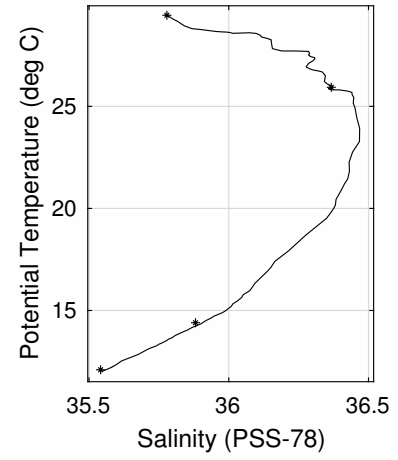
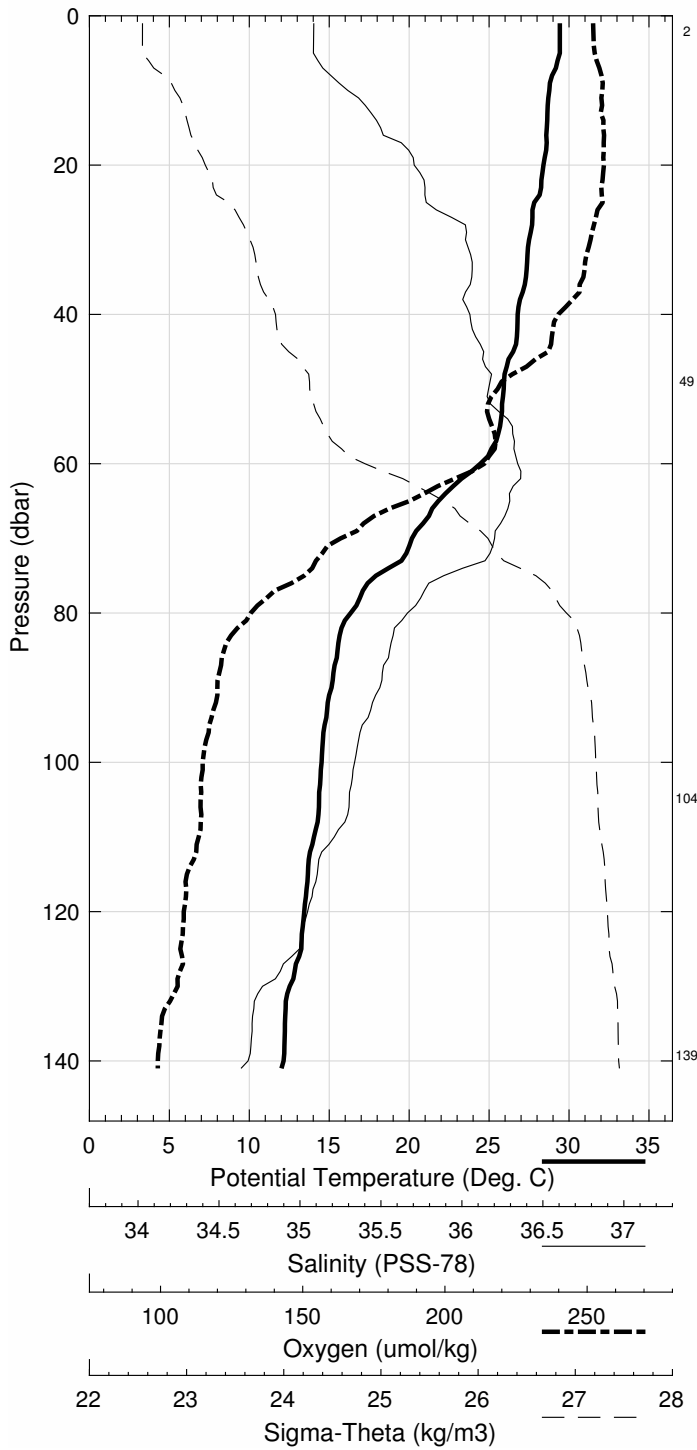
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Florida Staits September 2016 R/V Walton Smith
CTD Station 0 (CTD000)
Latitude 26.997N Longitude 79.933W
16-Sep-2016 01:32Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.426	29.425	35.785	194.7	0.005	22.511
10	28.769	28.767	35.898	196.1	0.052	22.816
20	28.404	28.399	36.117	196.3	0.101	23.103
30	27.507	27.500	36.286	194.4	0.147	23.525
50	25.925	25.914	36.362	180.8	0.229	24.088
75	17.932	17.919	36.214	152.5	0.303	26.222
100	14.537	14.523	35.920	137.6	0.338	26.786
125	13.271	13.253	35.738	134.4	0.368	26.913

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
139	1	12.115	12.096	35.541	132.2
105	2	14.416	14.400	35.881	137.2
49	3	25.944	25.933	36.367	181.6
2	4	29.461	29.461	35.778	195.5

Florida Staits September 2016 R/V Walton Smith
 CTD Station 0 (CTD000)
 Latitude 26.997 N Longitude 79.933 W
 16-Sep-2016 01:32 Z

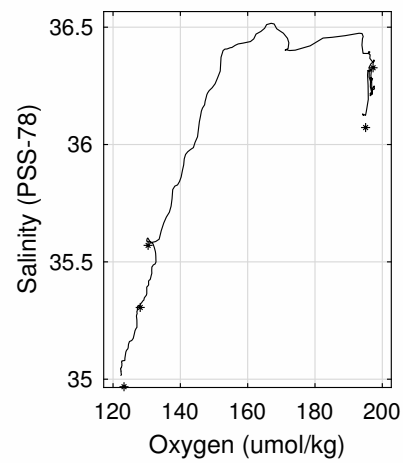
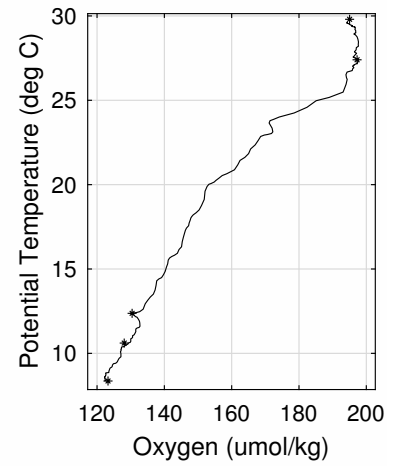
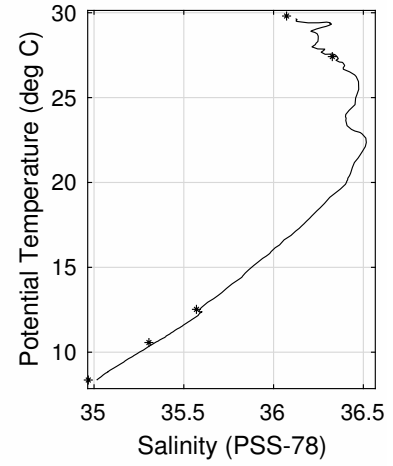
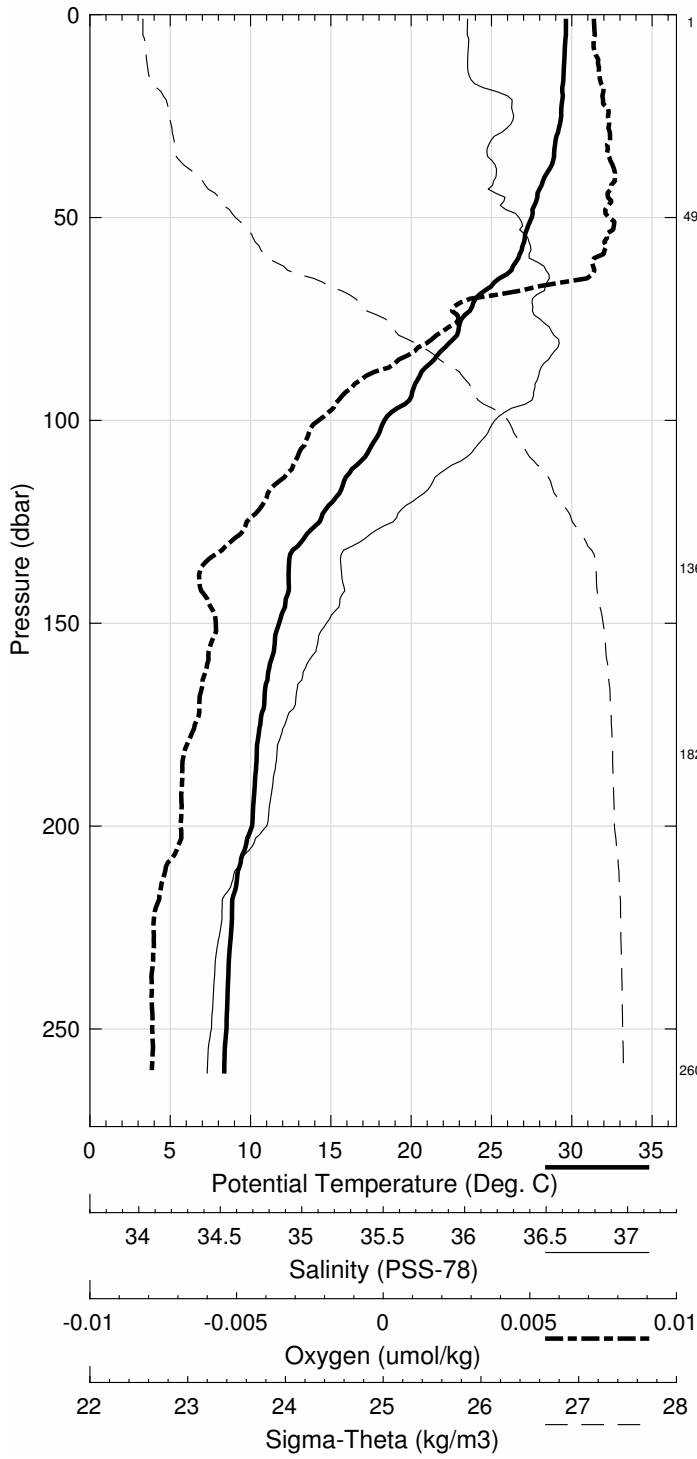


Florida Staits September 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.993N Longitude 79.868W
 16-Sep-2016 00:23Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.637	29.636	36.125	194.2	0.005	22.694
10	29.553	29.551	36.127	194.6	0.051	22.724
20	29.453	29.448	36.296	195.6	0.102	22.886
30	29.049	29.042	36.238	196.9	0.151	22.980
50	27.519	27.507	36.345	196.7	0.244	23.567
75	23.143	23.128	36.434	172.2	0.338	24.984
100	18.354	18.336	36.242	149.4	0.398	26.140
125	14.319	14.301	35.808	137.7	0.438	26.748
150	11.795	11.775	35.524	132.7	0.466	27.039
200	10.116	10.093	35.269	127.0	0.516	27.146
250	8.529	8.502	35.033	122.3	0.561	27.223

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
260	1	8.388	8.361	34.968	123.3
182	2	10.591	10.569	35.306	128.1
137	3	12.543	12.525	35.570	130.4
50	4	27.428	27.416	36.327	197.3
2	5	29.807	29.807	36.072	195.0

Florida Straits September 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.993 N Longitude 79.868 W
 16-Sep-2016 00:23 Z

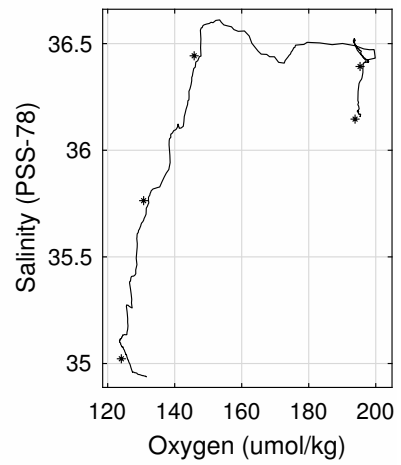
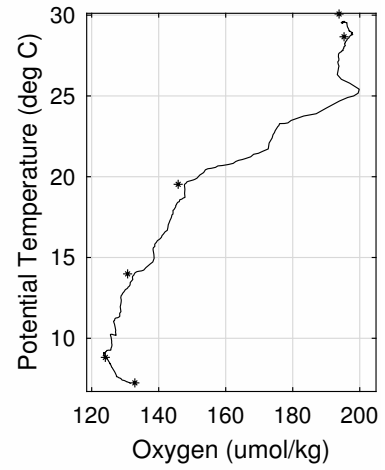
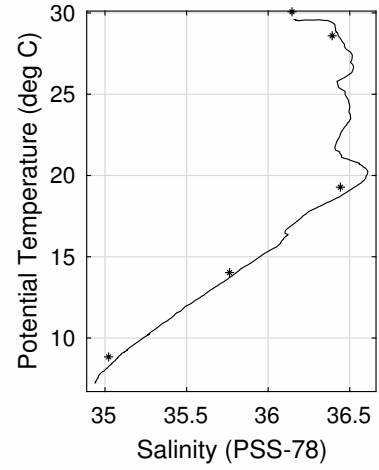
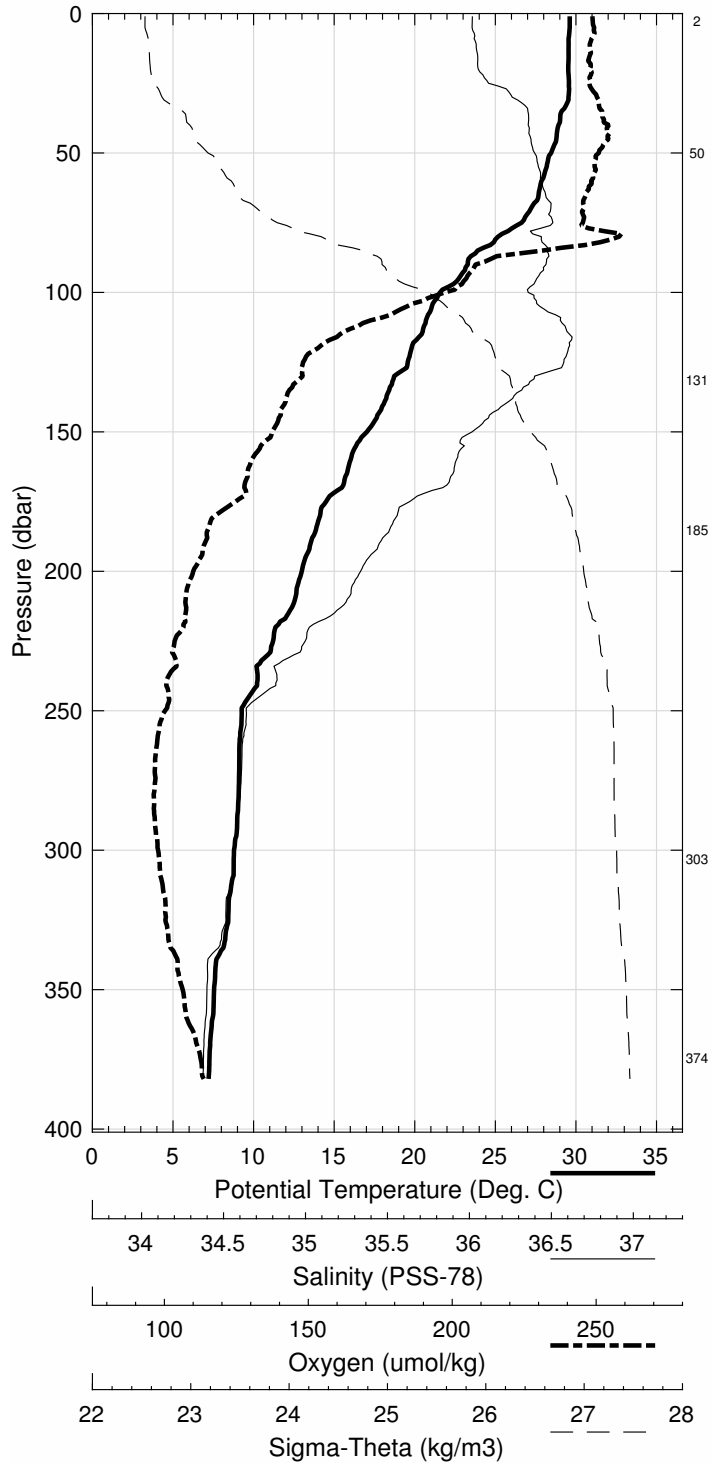


Florida Staits September 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.991N Longitude 79.783W
 15-Sep-2016 23:00Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.615	29.615	36.159	195.1	0.005	22.727
10	29.546	29.544	36.173	194.9	0.051	22.762
20	29.530	29.525	36.186	194.7	0.102	22.778
30	29.545	29.538	36.340	195.9	0.152	22.889
50	28.473	28.461	36.441	196.2	0.247	23.326
75	26.646	26.629	36.524	193.6	0.354	23.985
100	21.591	21.571	36.412	171.0	0.433	25.412
125	19.587	19.564	36.574	147.9	0.489	26.078
150	17.053	17.028	36.158	142.9	0.534	26.397
200	13.017	12.989	35.653	130.0	0.603	26.901
250	9.288	9.260	35.135	125.4	0.656	27.182
300	8.815	8.782	35.078	124.2	0.702	27.214

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
375	1	7.283	7.247	34.877	132.9
303	2	8.871	8.838	35.022	124.1
185	3	14.052	14.025	35.764	130.7
132	4	19.304	19.280	36.443	145.8
50	5	28.609	28.597	36.393	195.3
3	6	30.072	30.071	36.146	193.8

Florida Straits September 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.991 N Longitude 79.783 W
 15-Sep-2016 23:00 Z

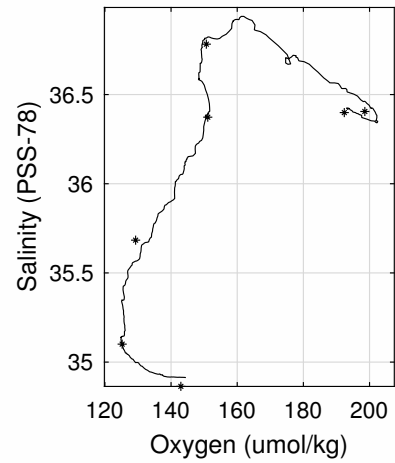
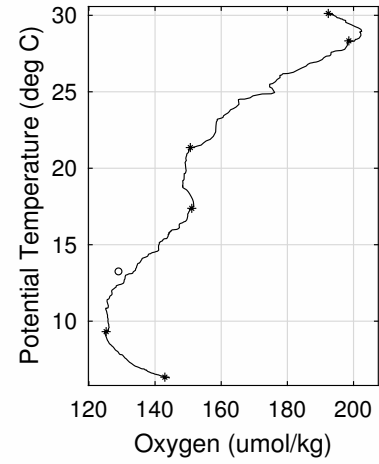
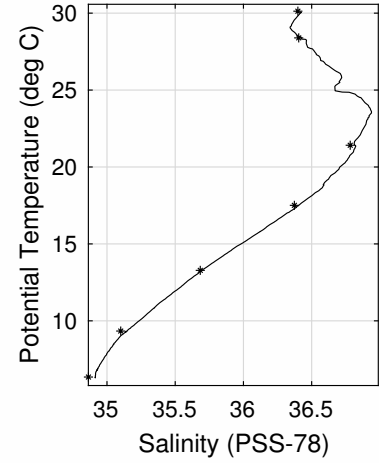
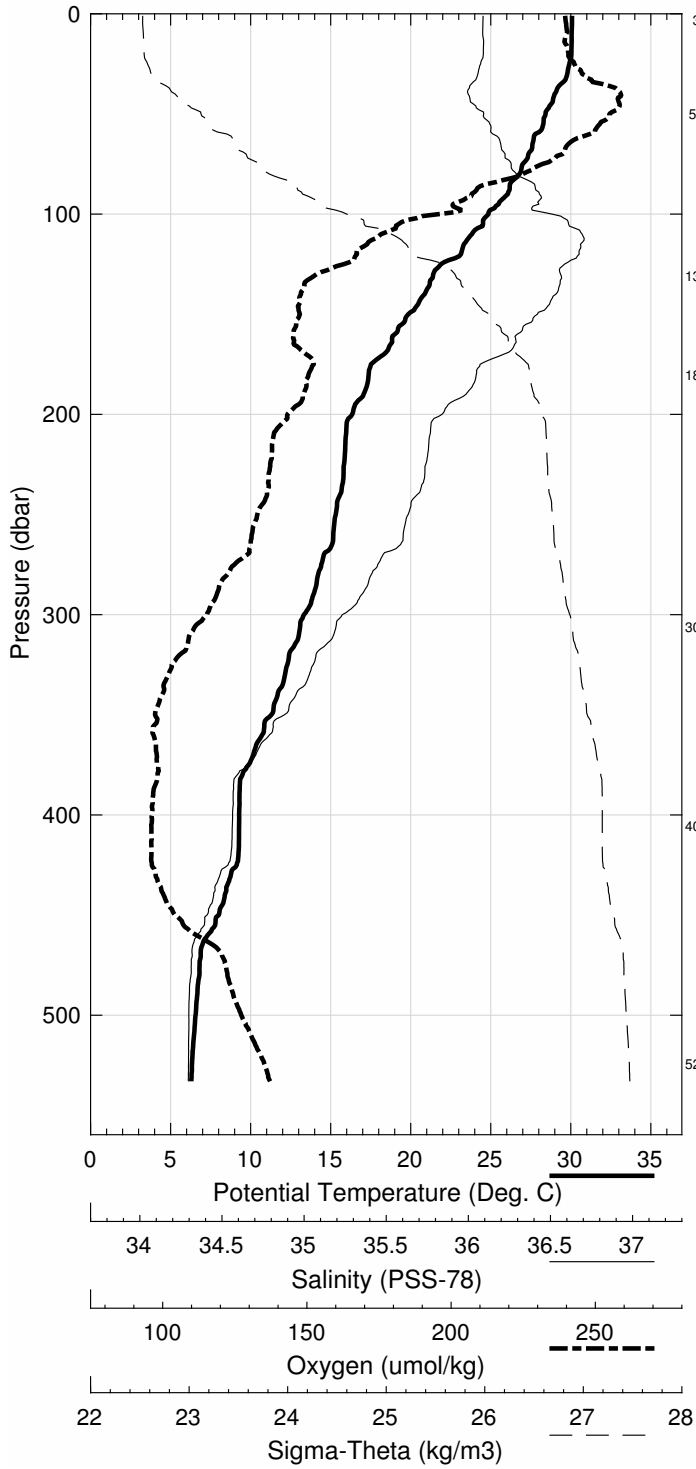


Florida Staats September 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.993N Longitude 79.684W
 15-Sep-2016 21:26Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	30.076	30.076	36.422	193.2	0.005	22.766
10	30.056	30.053	36.420	193.4	0.051	22.773
20	30.043	30.038	36.423	193.8	0.102	22.780
30	29.785	29.778	36.395	196.0	0.152	22.848
50	28.435	28.423	36.425	200.5	0.248	23.327
75	27.009	26.992	36.565	189.4	0.356	23.900
100	24.879	24.857	36.774	172.4	0.448	24.726
125	21.912	21.887	36.838	156.7	0.518	25.647
150	19.875	19.848	36.699	149.4	0.572	26.099
200	16.375	16.343	36.211	147.3	0.656	26.600
250	15.355	15.316	36.038	142.4	0.729	26.702
300	13.368	13.326	35.701	134.1	0.796	26.870
400	9.326	9.281	35.140	125.0	0.905	27.182
500	6.603	6.556	34.916	139.7	0.991	27.414

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
524	1	6.395	6.347	34.864	143.0
406	2	9.382	9.336	35.101	125.2
306	3	13.324	13.281	35.684	129.3
181	4	17.538	17.508	36.373	151.1
131	5	21.440	21.414	36.782	150.7
50	6	28.404	28.392	36.405	198.6
3	7	30.128	30.128	36.399	192.4

Florida Straits September 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.993 N Longitude 79.684 W
 15-Sep-2016 21:26 Z

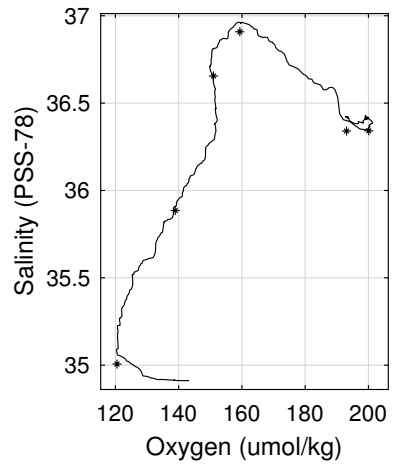
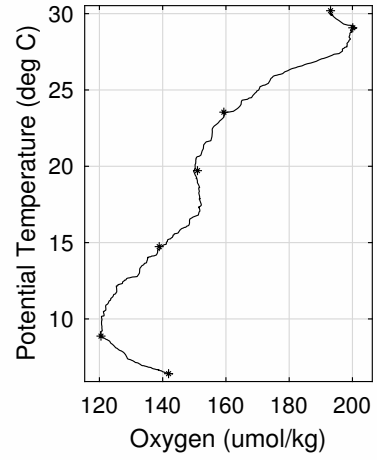
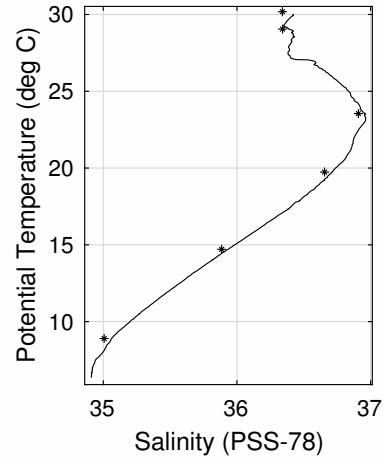
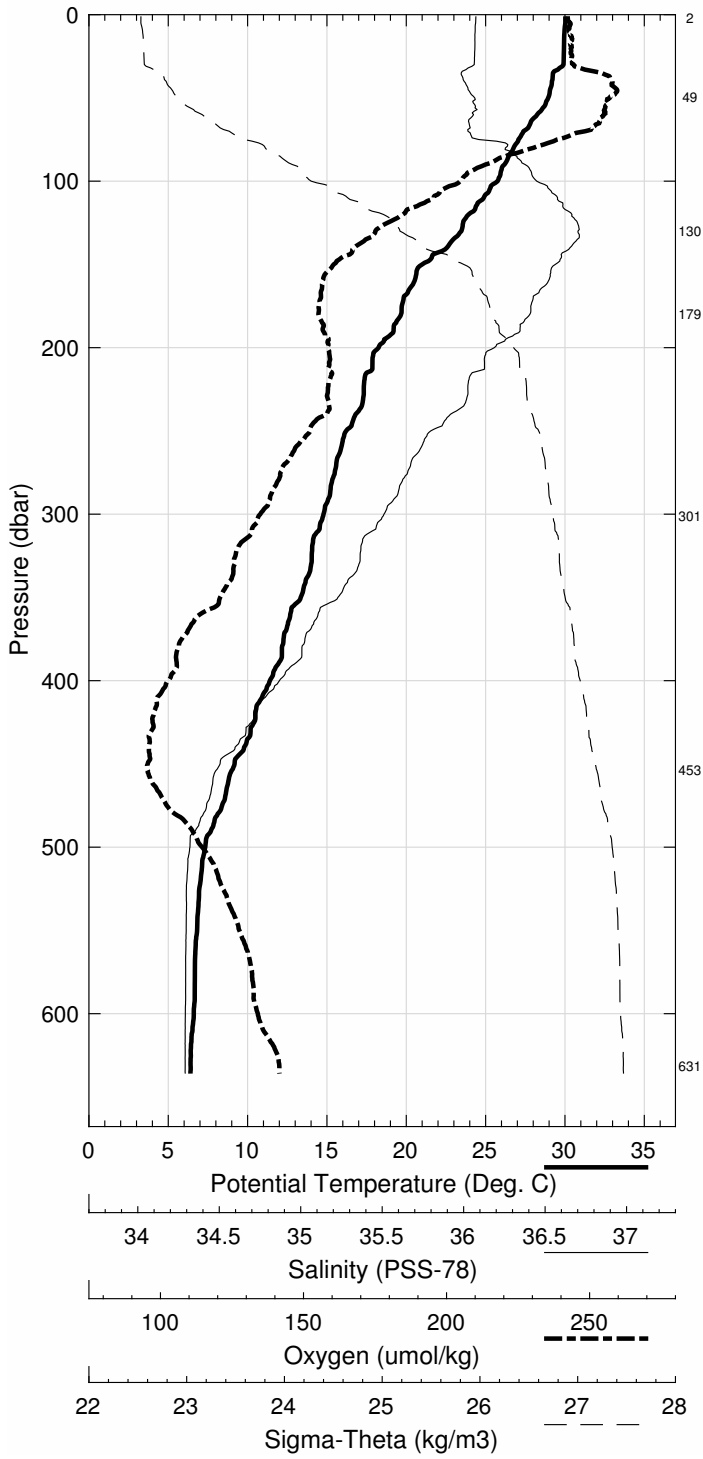


Florida Staats September 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
 Latitude 26.994N Longitude 79.619W
 15-Sep-2016 20:07Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	30.025	30.025	36.424	192.7	0.005	22.786
10	29.972	29.970	36.420	192.9	0.051	22.802
20	29.942	29.937	36.419	193.2	0.101	22.812
30	29.917	29.909	36.416	193.8	0.151	22.819
50	28.952	28.940	36.418	200.0	0.249	23.150
75	27.083	27.066	36.439	190.9	0.360	23.781
100	25.775	25.753	36.741	174.2	0.454	24.425
125	23.609	23.583	36.953	161.7	0.532	25.244
150	21.029	21.000	36.837	152.5	0.595	25.893
200	18.288	18.253	36.520	151.4	0.692	26.374
250	16.249	16.208	36.189	148.4	0.772	26.615
300	14.830	14.784	35.946	139.8	0.844	26.749
400	11.454	11.403	35.402	124.0	0.971	27.014
500	7.378	7.329	34.936	129.8	1.070	27.322
600	6.664	6.608	34.912	139.4	1.148	27.404

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
632	1	6.484	6.426	34.852	141.9
454	2	8.950	8.900	35.006	120.5
301	3	14.754	14.708	35.885	138.9
180	4	19.770	19.737	36.655	151.0
130	5	23.571	23.544	36.908	159.3
49	6	29.062	29.050	36.341	200.1
2	7	30.181	30.180	36.340	193.1

Florida Straits September 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
 Latitude 26.994 N Longitude 79.619 W
 15-Sep-2016 20:07 Z

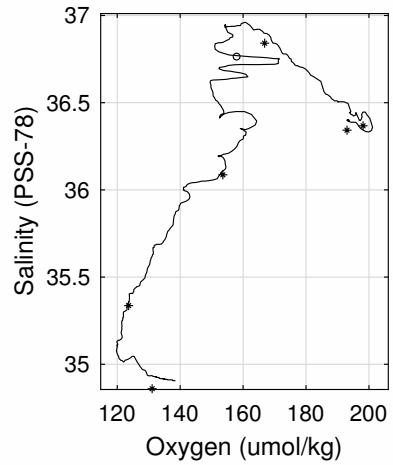
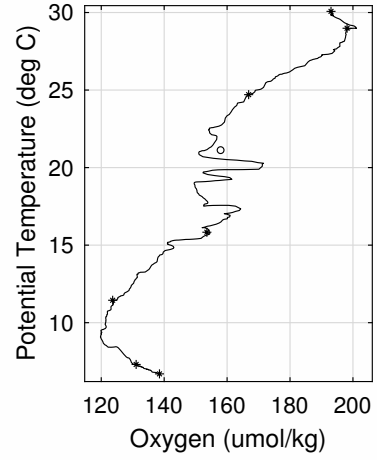
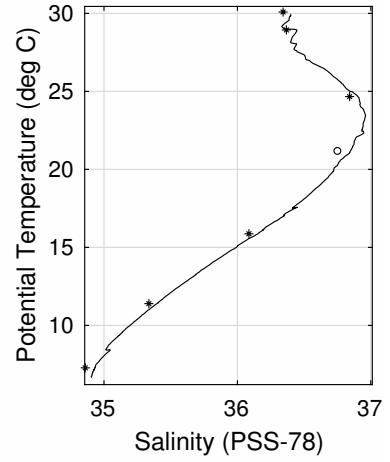
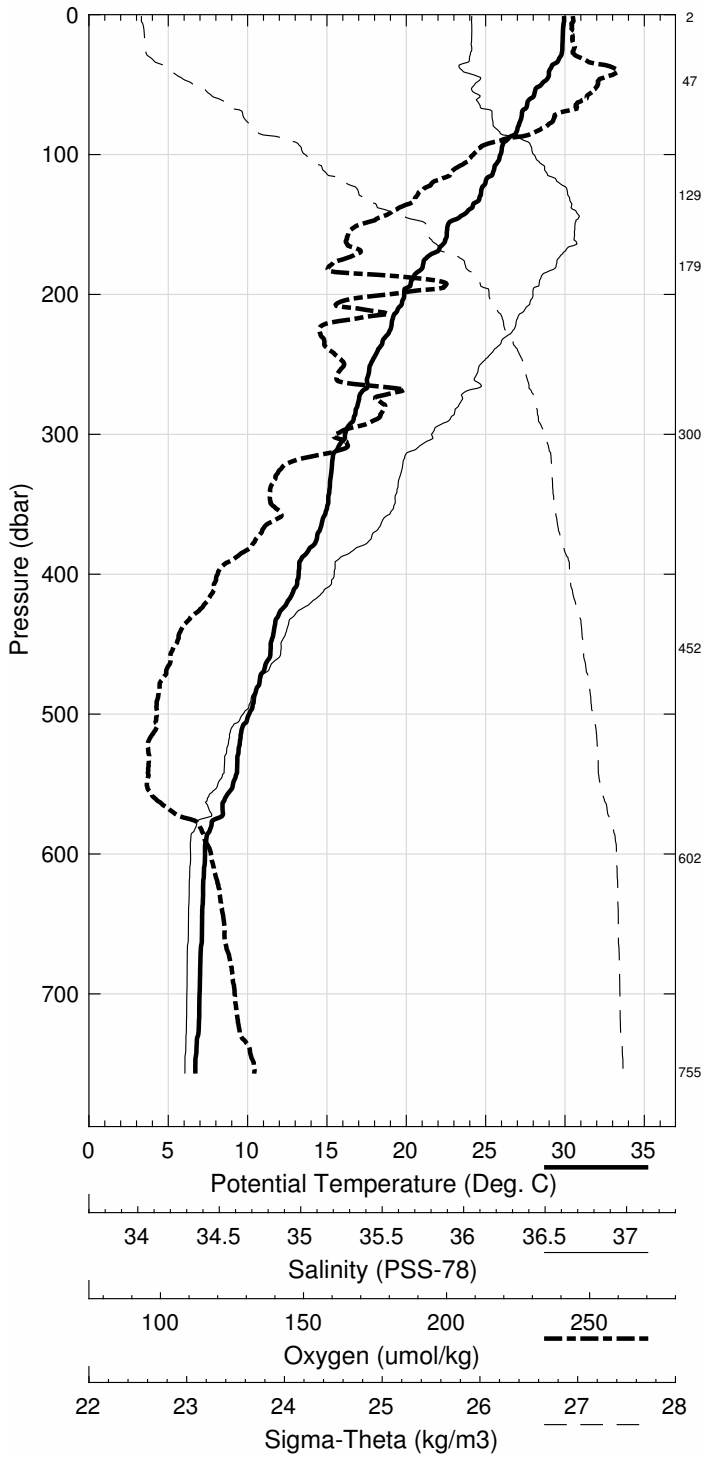


Florida Staats September 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.998N Longitude 79.500W
 15-Sep-2016 18:22Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.944	29.944	36.400	193.4	0.005	22.795
10	29.881	29.879	36.400	193.3	0.050	22.818
20	29.851	29.846	36.398	193.5	0.101	22.827
30	29.715	29.708	36.388	194.3	0.151	22.867
50	28.521	28.509	36.414	197.7	0.247	23.291
75	27.233	27.216	36.508	190.0	0.355	23.784
100	25.954	25.931	36.723	176.2	0.452	24.356
125	24.759	24.732	36.896	167.6	0.536	24.857
150	22.666	22.635	36.938	156.7	0.609	25.510
200	19.904	19.867	36.719	161.4	0.722	26.109
250	17.797	17.753	36.445	153.9	0.813	26.440
300	16.182	16.133	36.190	152.3	0.892	26.633
400	13.273	13.217	35.684	132.0	1.032	26.879
500	10.156	10.096	35.208	121.4	1.149	27.098
600	7.376	7.316	34.935	130.8	1.246	27.323
700	7.042	6.973	34.916	134.9	1.330	27.356

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
756	1	6.774	6.702	34.832	138.5
603	2	7.337	7.278	34.860	131.1
453	3	11.453	11.394	35.336	123.6
300	4	15.919	15.871	36.086	153.6
180	5	21.146	21.112	36.758	158.3
130	6	24.694	24.666	36.841	166.8
48	7	28.950	28.939	36.367	198.1
2	13	30.086	30.086	36.342	193.0

Florida Straits September 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.998 N Longitude 79.500 W
 15-Sep-2016 18:22 Z

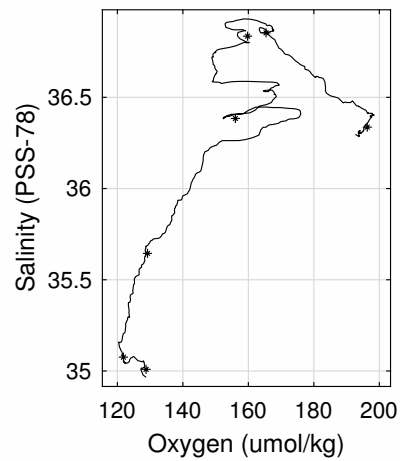
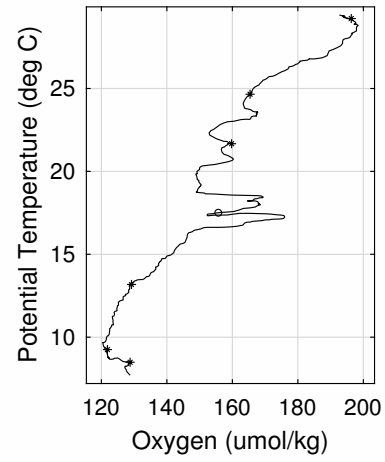
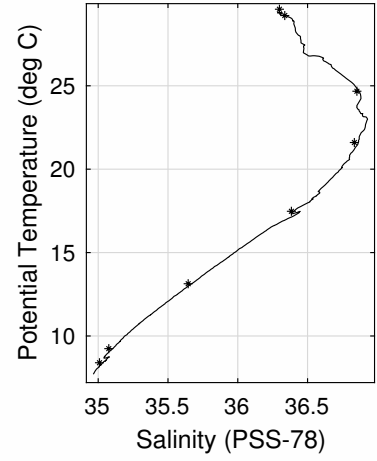
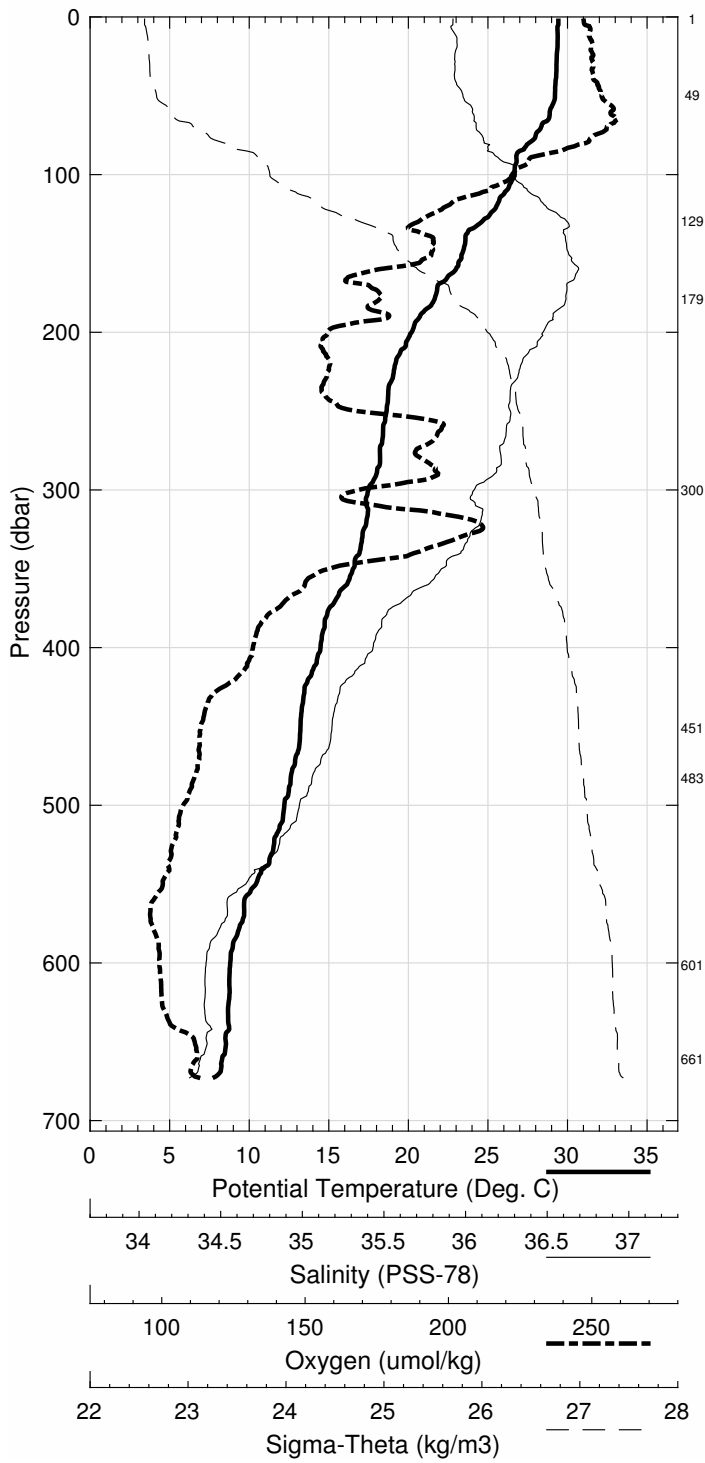


Florida Staits September 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
 Latitude 26.996N Longitude 79.386W
 15-Sep-2016 16:37Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.425	29.424	36.296	192.7	0.005	22.895
10	29.380	29.378	36.301	193.6	0.050	22.914
20	29.370	29.365	36.313	193.9	0.099	22.927
30	29.312	29.305	36.304	194.3	0.148	22.941
50	29.223	29.211	36.346	195.6	0.246	23.004
75	28.019	28.002	36.442	194.5	0.363	23.479
100	26.679	26.656	36.615	180.8	0.466	24.045
125	25.173	25.145	36.824	167.4	0.557	24.676
150	23.415	23.384	36.878	167.2	0.630	25.247
200	20.241	20.204	36.750	149.9	0.749	26.043
250	18.676	18.631	36.585	154.9	0.842	26.328
300	17.543	17.492	36.402	155.1	0.928	26.472
400	14.539	14.478	35.892	137.6	1.082	26.774
500	12.271	12.204	35.521	125.9	1.212	26.954
600	8.870	8.804	35.050	122.0	1.323	27.189

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
661	1	8.466	8.395	35.009	128.8
602	2	9.309	9.240	35.076	121.8
483	3	12.576	13.173	-999.000	-999.0
451	4	13.196	13.132	35.645	129.2
300	5	17.528	17.476	36.384	156.0
179	6	21.634	21.599	36.835	159.8
130	7	24.701	24.673	36.854	165.4
50	13	29.223	29.211	36.337	196.3
2	14	29.590	29.590	36.298	-999.0

Florida Straits September 2016 R/V Walton Smith
CTD Station 6 (CTD006)
Latitude 26.996 N Longitude 79.386 W
15-Sep-2016 16:37 Z

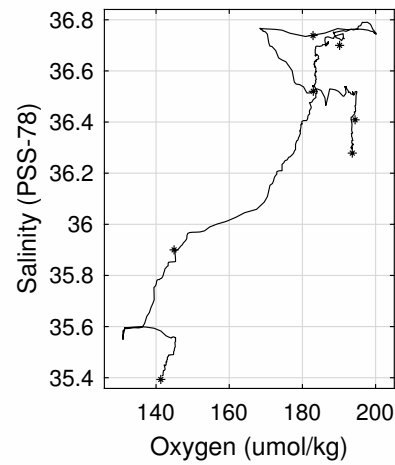
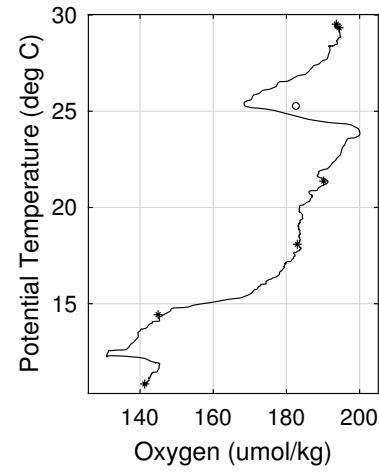
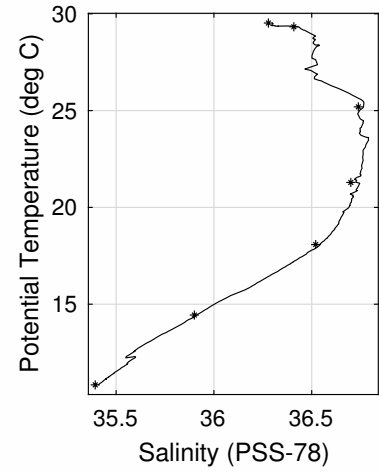
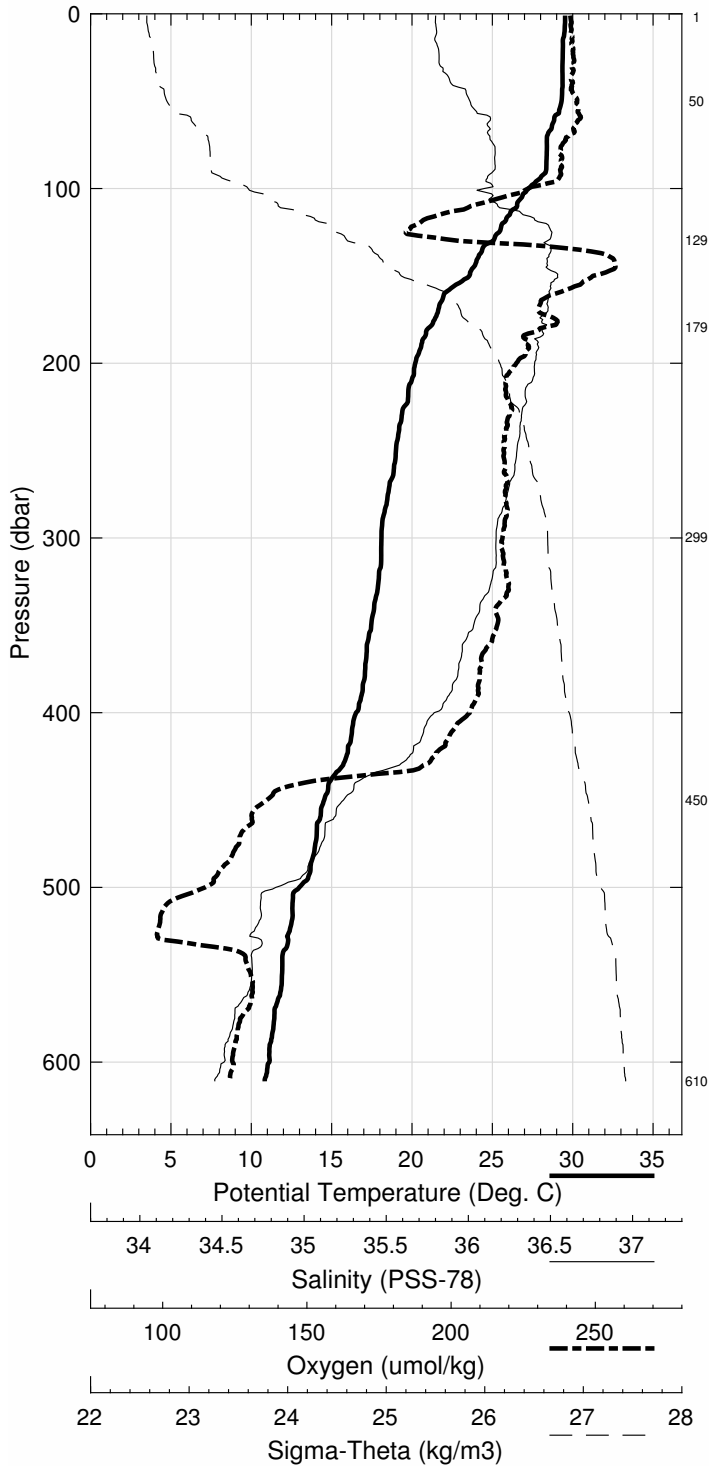


Florida Staats September 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.991N Longitude 79.281W
 15-Sep-2016 15:12Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.526	29.525	36.298	193.3	0.005	22.862
10	29.497	29.495	36.302	193.4	0.050	22.875
20	29.390	29.385	36.310	193.8	0.099	22.918
30	29.368	29.360	36.318	193.5	0.149	22.932
50	29.317	29.305	36.437	194.3	0.247	23.040
75	28.410	28.392	36.533	192.0	0.363	23.419
100	27.271	27.248	36.494	186.9	0.473	23.764
125	25.449	25.421	36.767	168.4	0.567	24.548
150	23.597	23.565	36.789	196.7	0.646	25.126
200	20.239	20.201	36.697	185.1	0.763	26.003
250	19.045	19.000	36.626	183.2	0.861	26.265
300	18.151	18.099	36.542	183.0	0.949	26.429
400	16.584	16.518	36.293	178.1	1.113	26.621
500	13.054	12.984	35.654	138.2	1.254	26.903
600	11.200	11.123	35.446	142.3	1.372	27.100

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
611	1	10.911	10.834	35.393	141.3
450	2	14.508	14.440	35.900	144.9
300	3	18.133	18.081	36.520	183.0
180	4	21.323	21.288	36.700	190.2
130	5	25.221	25.192	36.738	182.9
50	6	29.340	29.328	36.409	194.4
2	7	29.523	29.522	36.279	193.6

Florida Straits September 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.991 N Longitude 79.281 W
 15-Sep-2016 15:12 Z

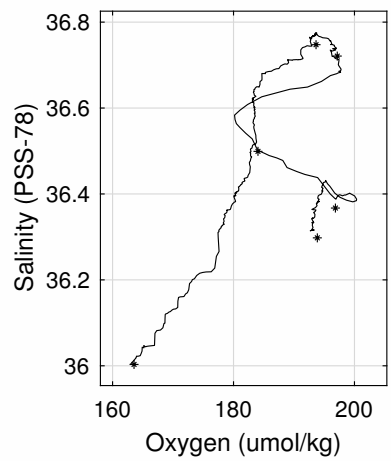
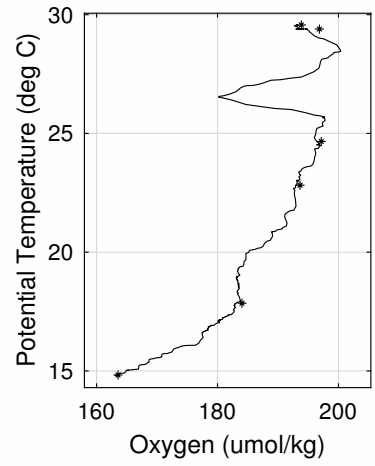
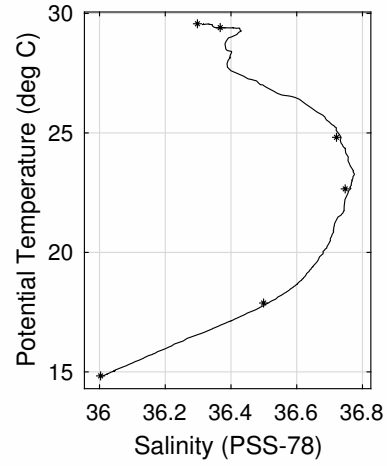
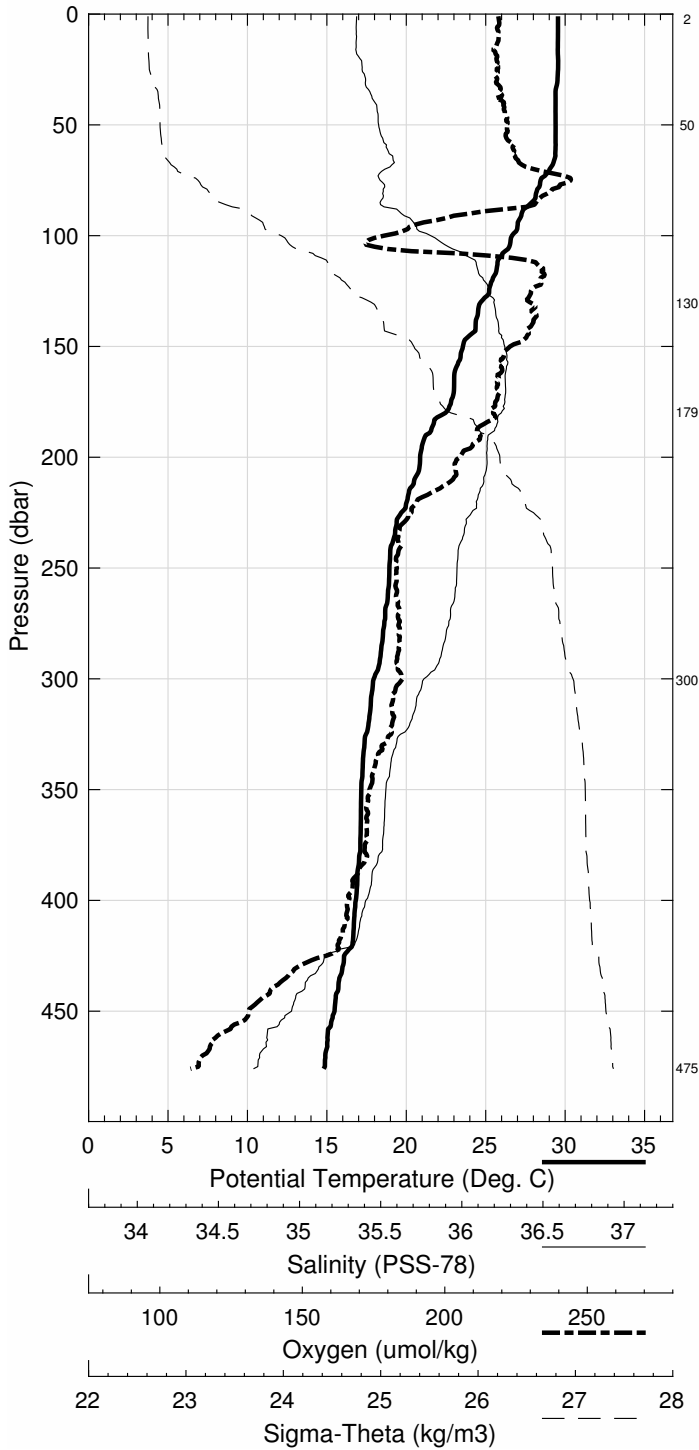


Florida Staits September 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 27.004N Longitude 79.202W
 15-Sep-2016 14:02Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	29.551	29.551	36.317	193.2	0.005	22.867
10	29.551	29.548	36.317	193.3	0.050	22.868
20	29.559	29.554	36.326	193.0	0.100	22.873
30	29.526	29.519	36.344	193.1	0.150	22.899
50	29.411	29.399	36.383	194.0	0.248	22.969
75	28.473	28.455	36.388	200.4	0.369	23.289
100	26.677	26.654	36.541	182.0	0.477	23.990
125	25.243	25.216	36.721	196.4	0.567	24.576
150	23.594	23.563	36.766	194.4	0.646	25.109
200	20.908	20.870	36.712	189.5	0.776	25.833
250	18.982	18.937	36.621	183.3	0.877	26.277
300	18.002	17.950	36.521	183.8	0.966	26.450
400	16.886	16.819	36.345	178.5	1.127	26.590

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
476	1	14.905	14.832	36.003	163.5
301	2	17.935	17.883	36.499	184.0
180	3	22.695	22.658	36.747	193.6
130	4	24.846	24.817	36.721	197.2
50	5	29.421	29.409	36.367	196.8
2	6	29.569	29.569	36.298	193.9

Florida Staits September 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 27.004 N Longitude 79.202 W
 15-Sep-2016 14:02 Z



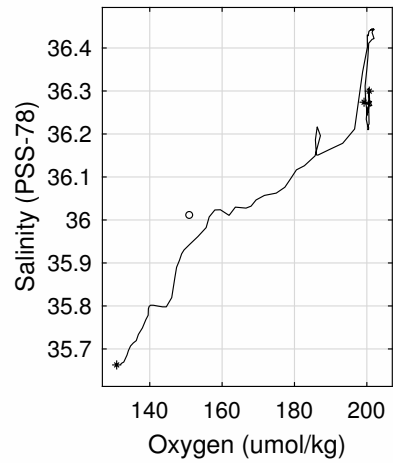
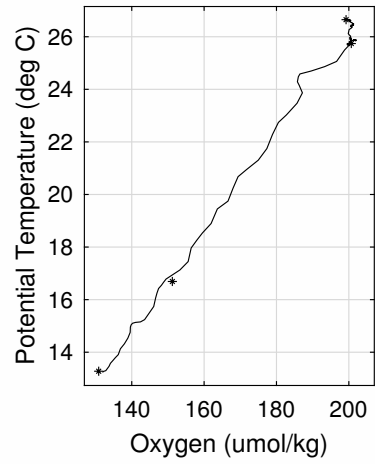
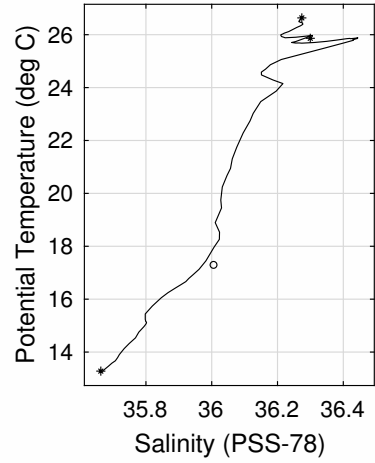
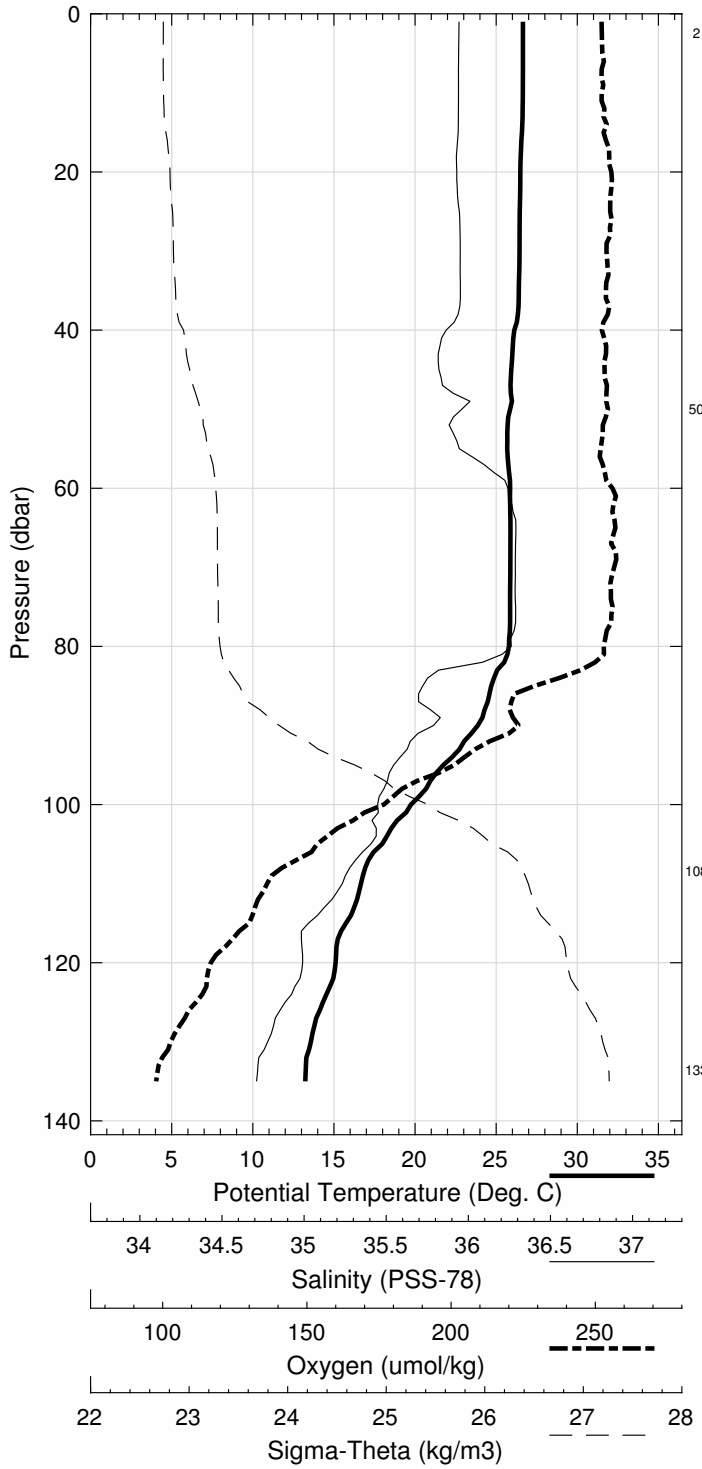
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Florida Staits December 2016 R/V Walton Smith
CTD Station 0 (CTD000)
Latitude 26.995N Longitude 79.931W
13-Dec-2016 09:48Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	26.650	26.650	36.273	199.8	0.004	23.789
10	26.645	26.643	36.271	199.8	0.041	23.790
20	26.494	26.490	36.266	201.3	0.082	23.835
30	26.447	26.440	36.277	200.5	0.122	23.858
50	25.871	25.860	36.281	200.8	0.202	24.044
75	25.875	25.858	36.444	201.5	0.297	24.167
100	19.766	19.748	36.028	166.6	0.381	25.612
125	14.339	14.321	35.749	138.0	0.424	26.698

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
134	1	13.298	13.280	35.663	130.9
108	2	17.272	17.253	36.009	151.2
50	3	25.875	25.864	36.300	200.7
2	4	26.635	26.635	36.274	199.2

Florida Staits December 2016 R/V Walton Smith
 CTD Station 0 (CTD000)
 Latitude 26.995 N Longitude 79.931 W
 13-Dec-2016 09:48 Z

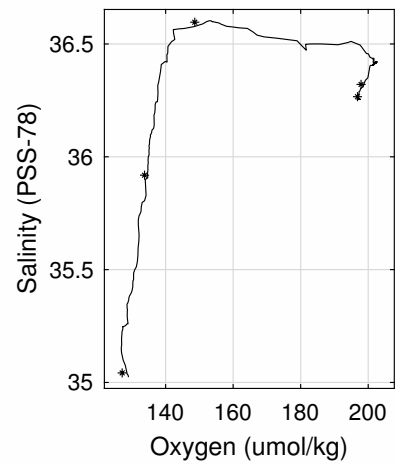
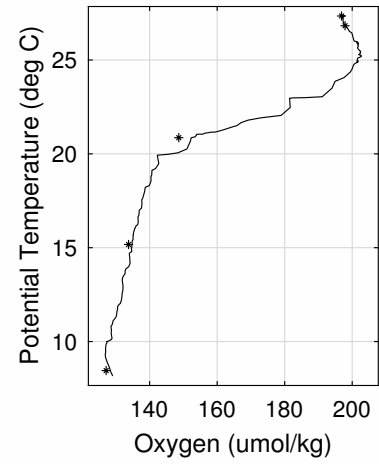
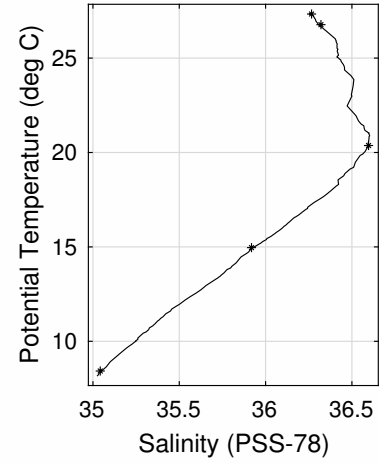
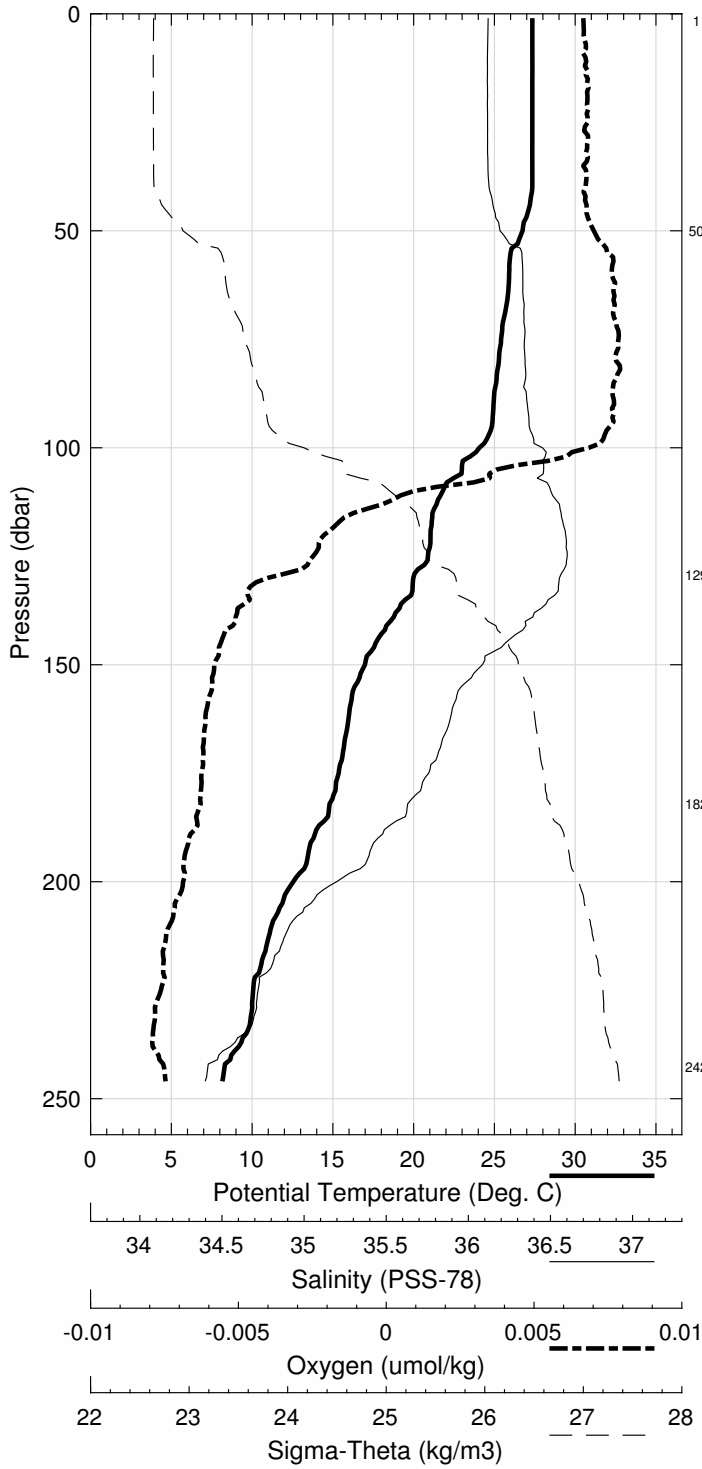


Florida Staits December 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.995N Longitude 79.867W
 13-Dec-2016 08:47Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.348	27.348	36.258	196.8	0.004	23.553
10	27.351	27.348	36.255	197.1	0.043	23.551
20	27.351	27.346	36.255	197.4	0.087	23.552
30	27.352	27.345	36.255	197.4	0.130	23.553
50	26.750	26.739	36.310	198.5	0.216	23.788
75	25.429	25.412	36.416	202.4	0.311	24.285
100	24.088	24.067	36.495	197.6	0.399	24.754
125	20.907	20.883	36.603	152.9	0.463	25.747
150	17.007	16.982	36.233	136.9	0.511	26.465
200	12.576	12.549	35.597	131.9	0.581	26.945

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
243	1	8.453	8.427	35.042	127.1
182	2	14.990	14.962	35.918	133.8
129	3	20.395	20.370	36.596	148.6
50	4	26.783	26.771	36.321	197.9
2	5	27.335	27.334	36.266	196.8

Florida Straits December 2016 R/V Walton Smith
 CTD Station 1 (CTD001)
 Latitude 26.995 N Longitude 79.867 W
 13-Dec-2016 08:47 Z



Florida Staits December 2016 R/V Walton Smith

CTD Station 2 (CTD002)

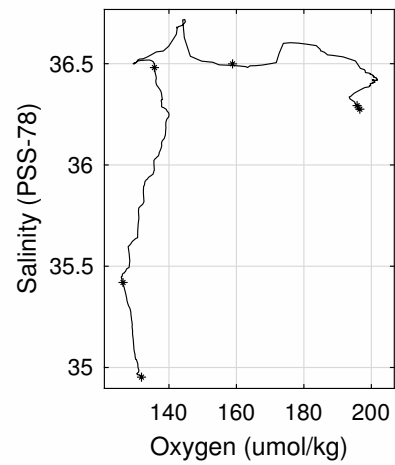
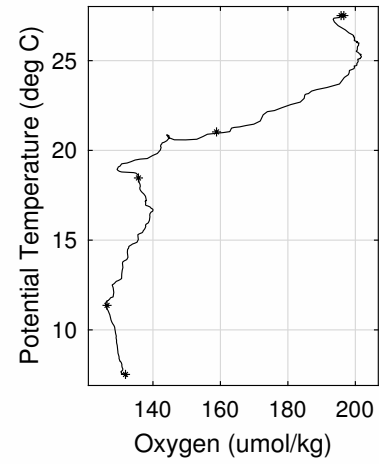
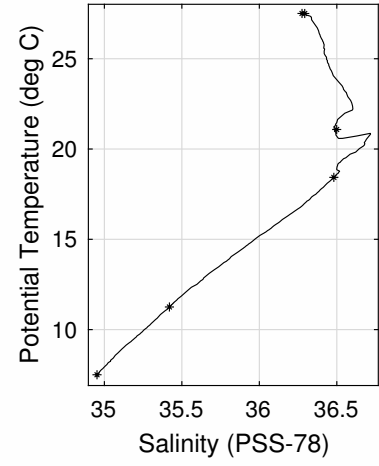
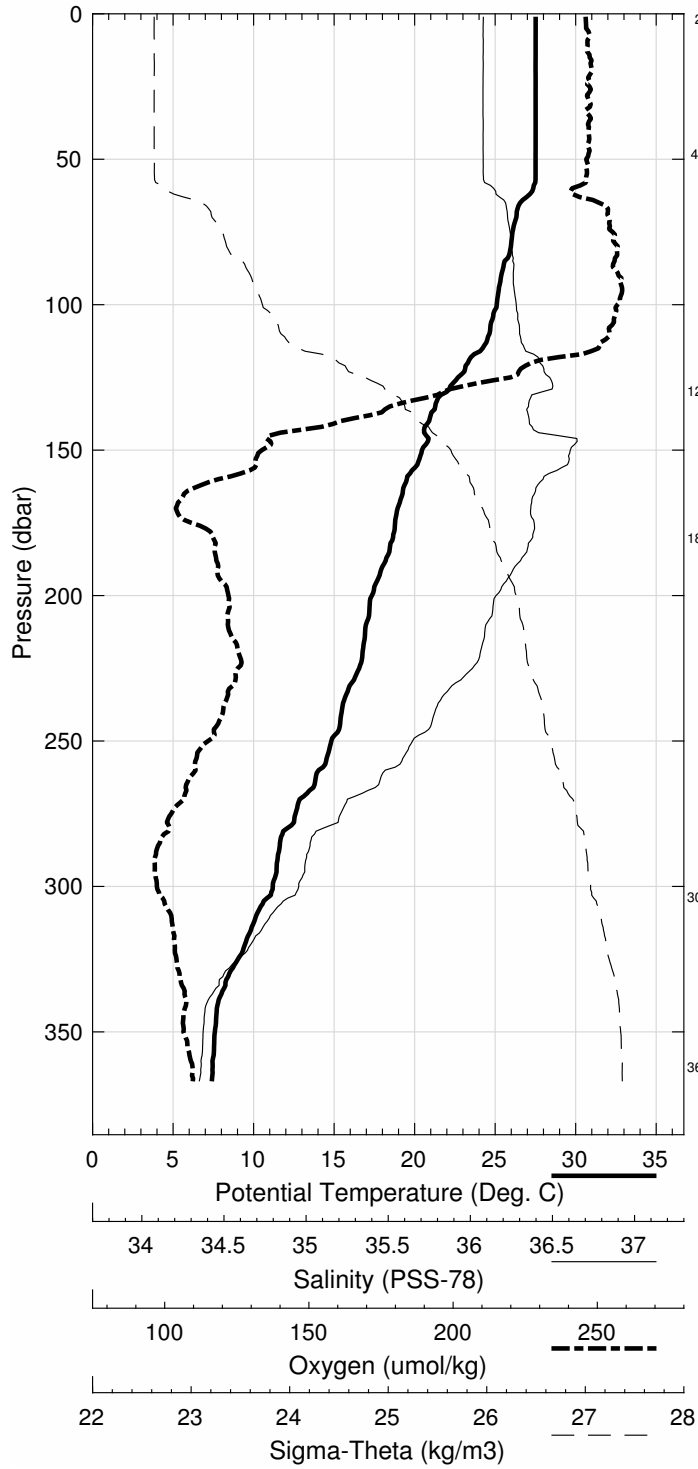
Latitude 26.991N Longitude 79.784W

13-Dec-2016 07:31Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.516	27.515	36.278	195.9	0.004	23.514
10	27.515	27.513	36.278	196.2	0.044	23.515
20	27.515	27.510	36.277	196.8	0.087	23.515
30	27.519	27.512	36.276	196.4	0.131	23.514
50	27.522	27.510	36.277	196.0	0.219	23.516
75	26.094	26.077	36.403	200.2	0.323	24.068
100	25.119	25.097	36.432	201.0	0.415	24.394
125	22.716	22.691	36.589	183.7	0.497	25.229
150	20.482	20.453	36.685	143.3	0.557	25.926
200	17.378	17.344	36.337	137.9	0.650	26.458
250	14.865	14.827	35.946	134.6	0.726	26.740
300	11.229	11.191	35.413	126.3	0.786	27.062

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
362	1	7.535	7.499	34.952	131.9
304	2	11.291	11.253	35.420	126.4
180	3	18.463	18.431	36.481	135.7
130	4	21.107	21.082	36.499	158.9
48	5	27.517	27.505	36.293	195.8
2	6	27.509	27.508	36.275	196.6

Florida Straits December 2016 R/V Walton Smith
 CTD Station 2 (CTD002)
 Latitude 26.991 N Longitude 79.784 W
 13-Dec-2016 07:31 Z

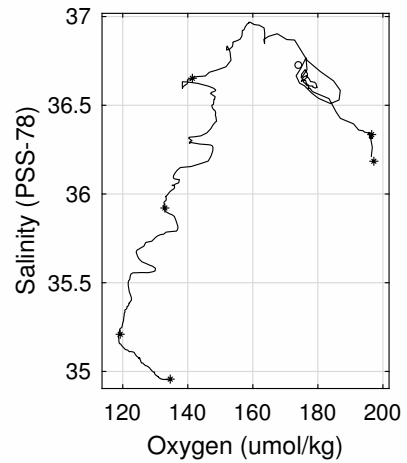
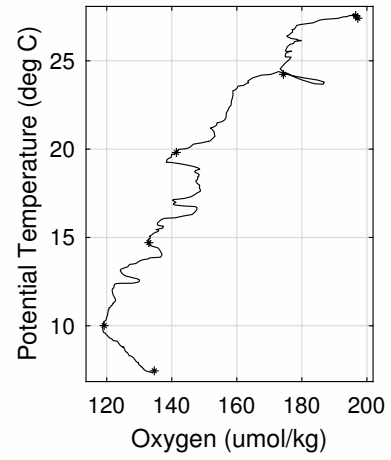
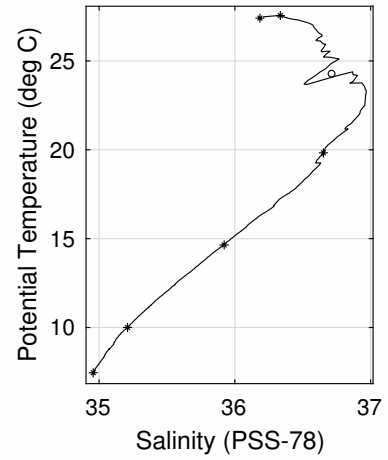
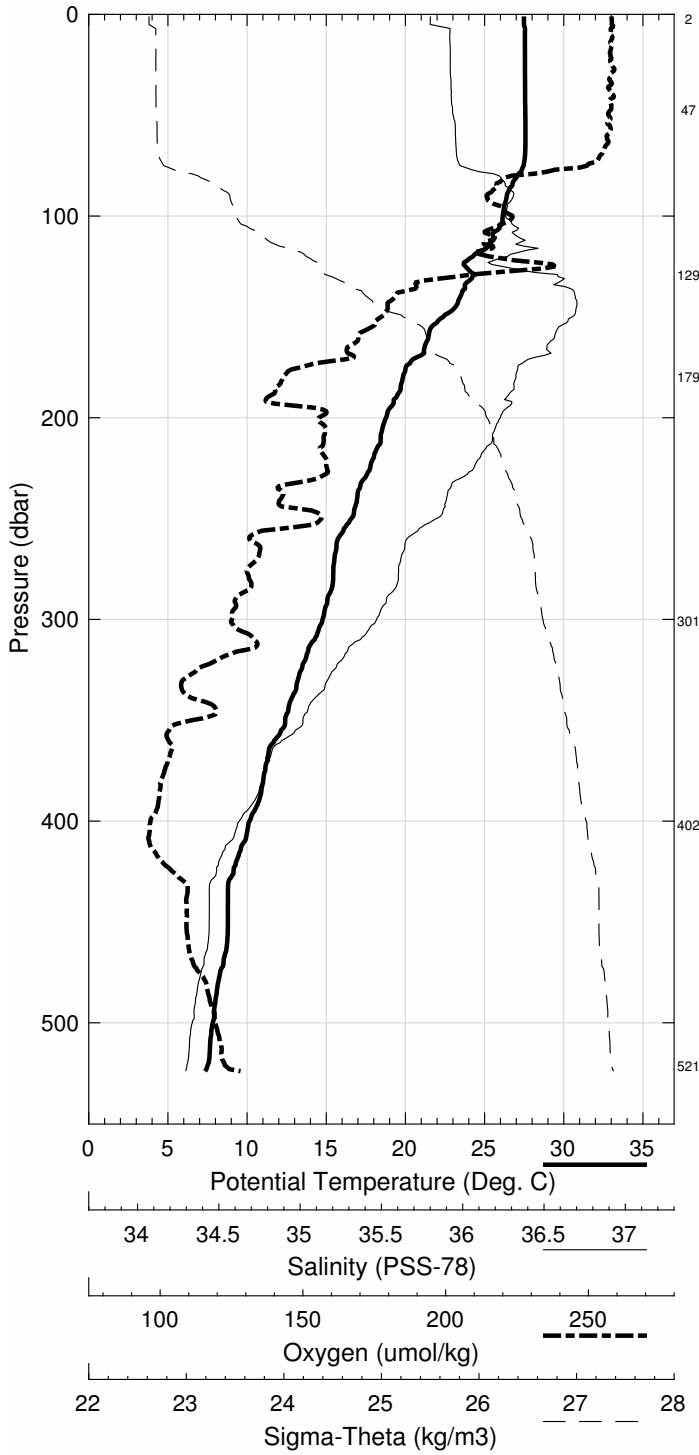


Florida Staits December 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.986N Longitude 79.685W
 13-Dec-2016 06:09Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.486	27.485	36.213	196.4	0.004	23.475
10	27.547	27.545	36.313	196.0	0.044	23.531
20	27.553	27.549	36.316	196.2	0.087	23.532
30	27.557	27.550	36.316	196.4	0.131	23.532
50	27.585	27.573	36.330	195.9	0.218	23.535
75	27.481	27.463	36.366	192.3	0.327	23.597
100	26.173	26.150	36.602	179.8	0.425	24.195
125	23.820	23.794	36.584	186.9	0.511	24.902
150	22.419	22.389	36.943	157.7	0.581	25.585
200	18.817	18.781	36.573	147.2	0.685	26.280
250	16.617	16.576	36.244	147.7	0.769	26.570
300	14.810	14.765	35.936	132.7	0.841	26.746
400	10.202	10.155	35.229	119.0	0.961	27.104
500	7.883	7.832	34.987	129.8	1.055	27.289

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
522	1	7.508	7.456	34.957	134.6
402	2	10.050	10.003	35.210	119.2
301	3	14.692	14.647	35.921	133.0
180	4	19.863	19.830	36.652	141.4
129	5	24.248	24.220	36.721	174.3
47	6	27.567	27.556	36.335	196.6
2	7	27.411	27.411	36.185	197.2

Florida Straits December 2016 R/V Walton Smith
 CTD Station 3 (CTD003)
 Latitude 26.986 N Longitude 79.685 W
 13-Dec-2016 06:09 Z



Florida Staits December 2016 R/V Walton Smith

CTD Station 4 (CTD004)

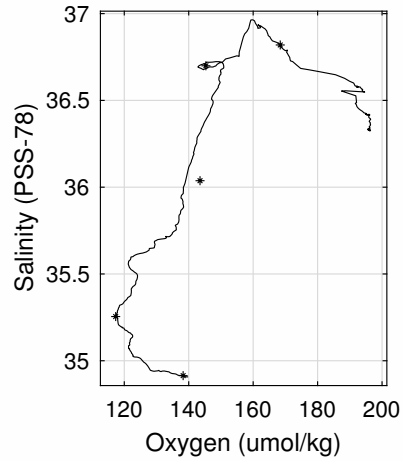
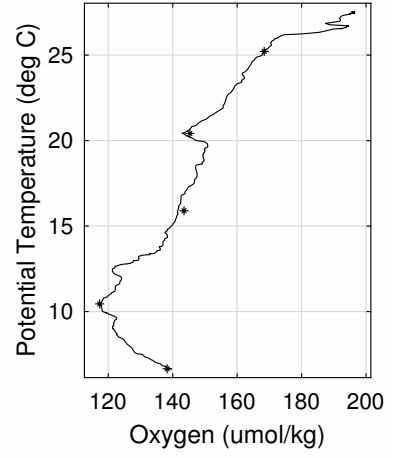
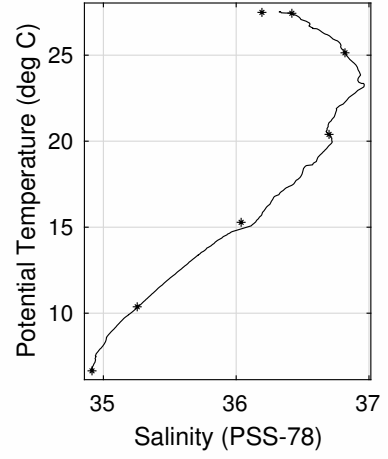
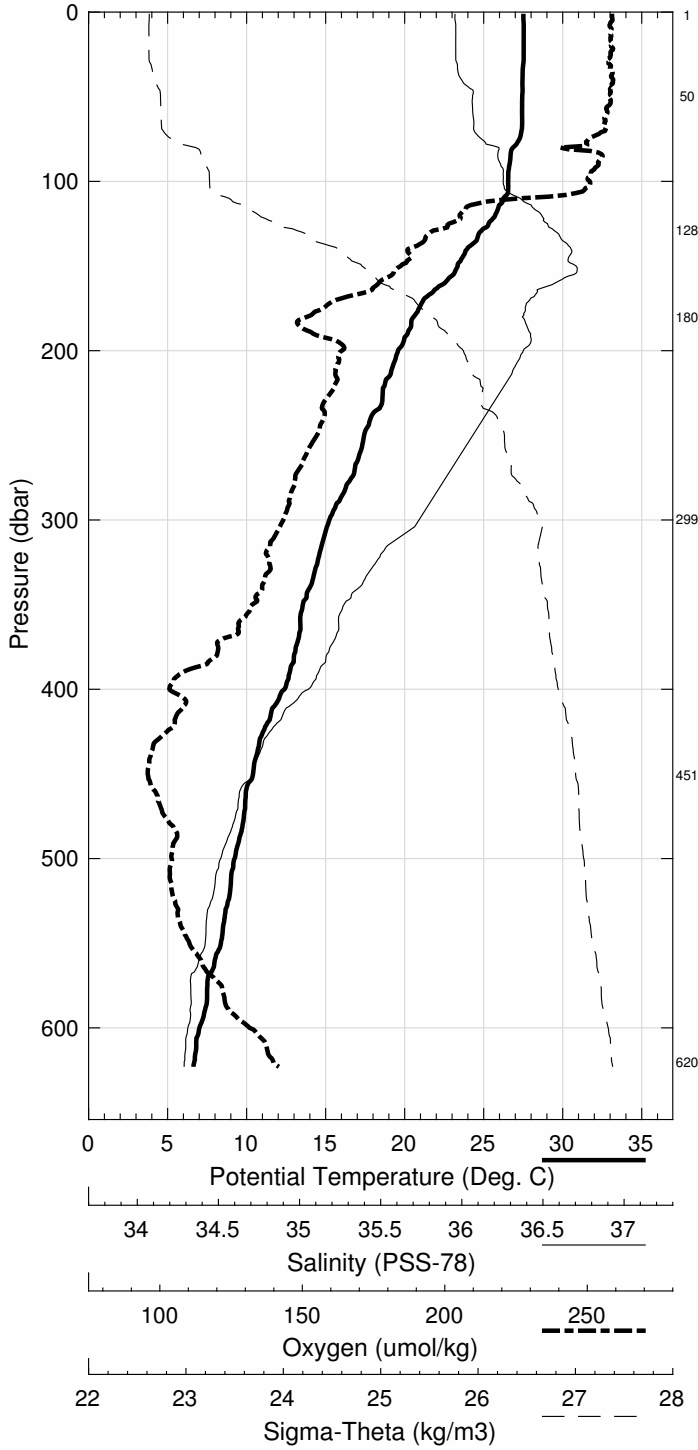
Latitude 26.998N Longitude 79.619W

13-Dec-2016 04:45Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.513	27.513	36.325	196.2	0.004	23.550
10	27.535	27.532	36.328	196.2	0.043	23.547
20	27.535	27.531	36.328	195.9	0.087	23.547
30	27.522	27.515	36.334	195.5	0.130	23.557
50	27.450	27.438	36.416	196.2	0.216	23.643
75	27.278	27.261	36.464	192.2	0.323	23.737
100	26.571	26.549	36.577	192.5	0.422	24.050
125	25.334	25.306	36.809	168.6	0.514	24.615
150	23.389	23.358	36.958	160.4	0.589	25.315
200	19.612	19.575	36.681	150.5	0.702	26.157
250	17.475	17.433	36.417	146.2	0.791	26.498
300	15.279	15.233	36.136	140.5	0.867	26.796
400	12.447	12.393	35.557	121.2	0.997	26.946
500	9.292	9.236	35.098	121.7	1.105	27.157
600	7.070	7.012	34.926	134.9	1.198	27.359

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
620	1	6.708	6.650	34.914	138.3
451	2	10.427	10.373	35.255	117.3
300	3	15.331	15.284	36.037	143.5
180	4	20.430	20.396	36.699	145.3
129	5	25.166	25.138	36.819	168.4
50	6	27.447	27.435	36.419	204.0
2	7	27.488	27.488	36.194	-999.0

Florida Staits December 2016 R/V Walton Smith
 CTD Station 4 (CTD004)
 Latitude 26.998 N Longitude 79.619 W
 13-Dec-2016 04:45 Z

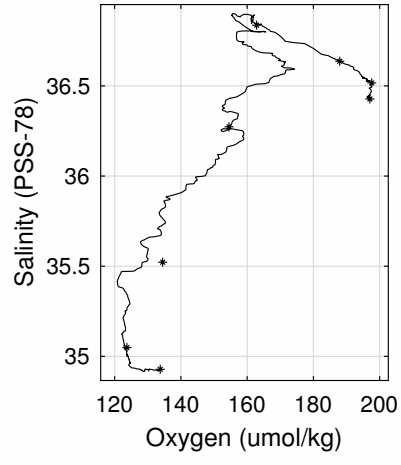
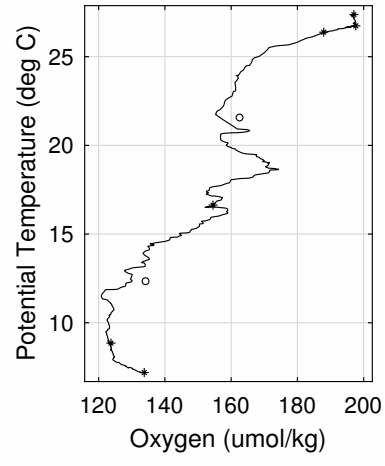
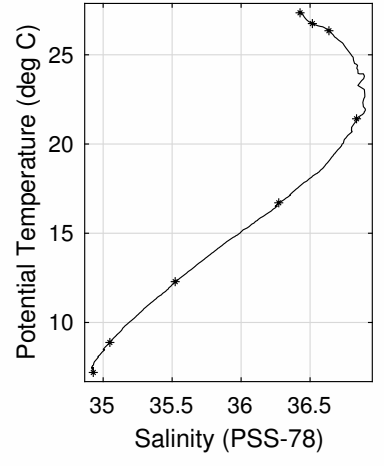
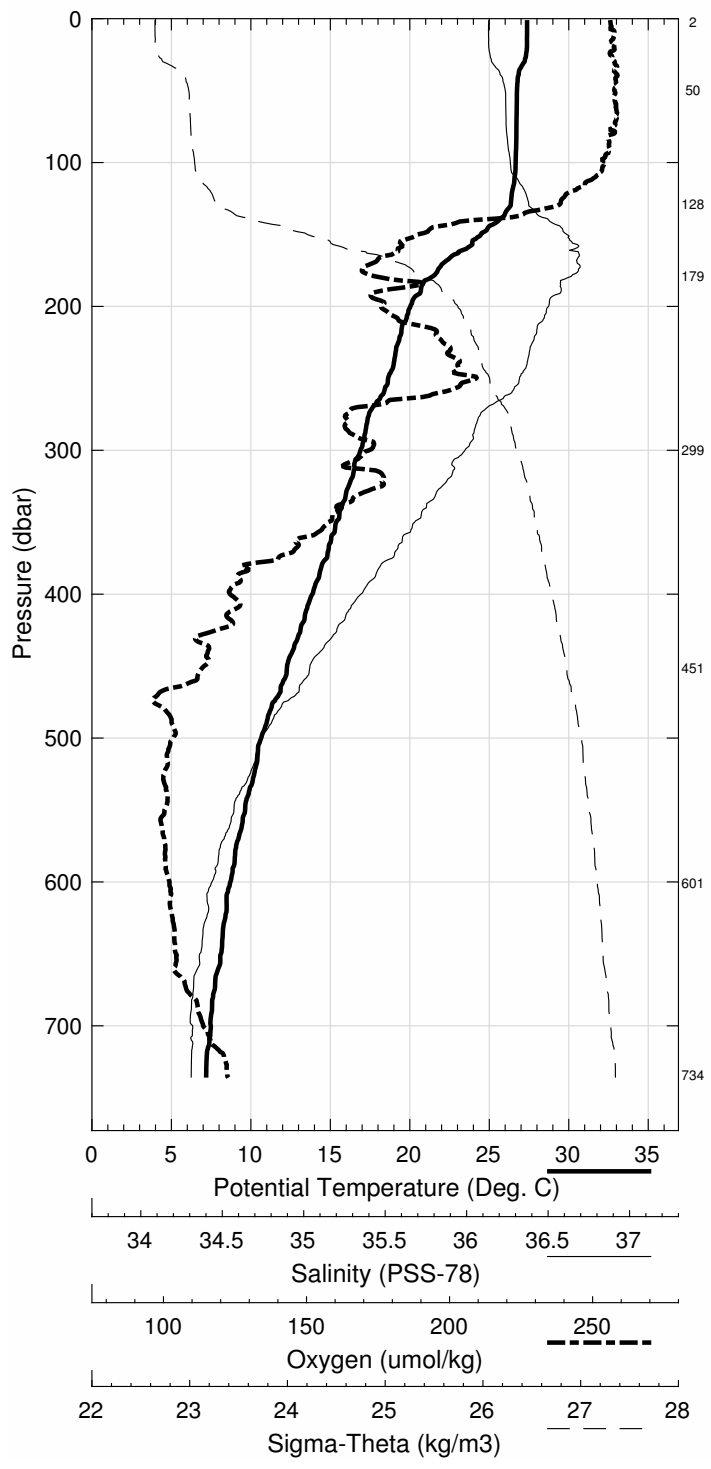


Florida Staits December 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.990N Longitude 79.499W
 13-Dec-2016 03:06Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	27.378	27.378	36.436	196.3	0.004	23.678
10	27.378	27.375	36.435	197.0	0.042	23.678
20	27.375	27.370	36.436	196.9	0.084	23.680
30	27.223	27.216	36.450	197.2	0.126	23.741
50	26.753	26.742	36.520	197.0	0.207	23.946
75	26.725	26.708	36.524	196.8	0.306	23.960
100	26.681	26.658	36.545	194.9	0.405	23.992
125	26.414	26.386	36.633	188.5	0.503	24.144
150	24.512	24.479	36.834	164.5	0.591	24.886
200	20.072	20.035	36.740	158.5	0.712	26.080
250	18.679	18.635	36.592	174.3	0.806	26.332
300	16.947	16.897	36.315	156.5	0.889	26.549
400	13.928	13.869	35.785	133.6	1.035	26.822
500	10.708	10.646	35.281	124.2	1.158	27.058
600	8.777	8.712	35.027	123.6	1.263	27.185
700	7.551	7.480	34.929	129.1	1.358	27.295

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
735	1	7.272	7.199	34.928	133.8
601	2	8.946	8.880	35.049	123.7
452	3	12.349	12.288	35.522	134.5
300	4	16.756	16.706	36.273	154.5
179	5	21.450	21.414	36.837	162.9
129	6	26.378	26.349	36.637	187.9
50	7	26.761	26.750	36.517	197.6
3	13	27.354	27.353	36.427	197.0

Florida Straits December 2016 R/V Walton Smith
 CTD Station 5 (CTD005)
 Latitude 26.990 N Longitude 79.499 W
 13-Dec-2016 03:06 Z

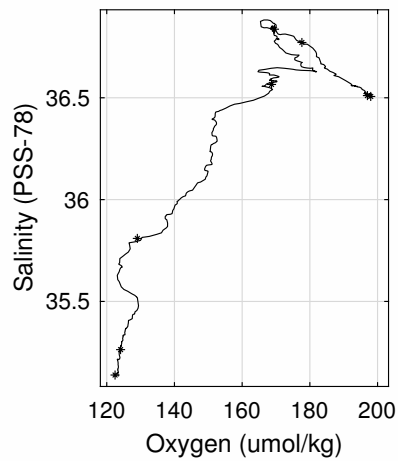
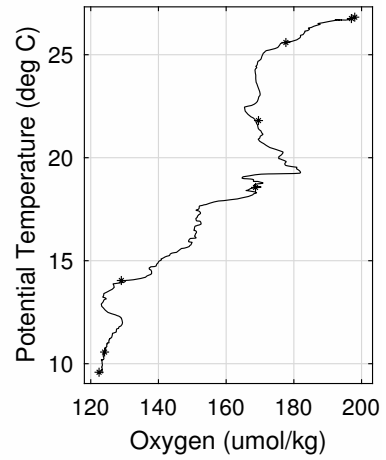
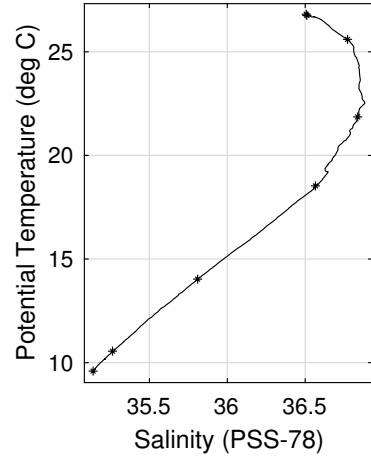
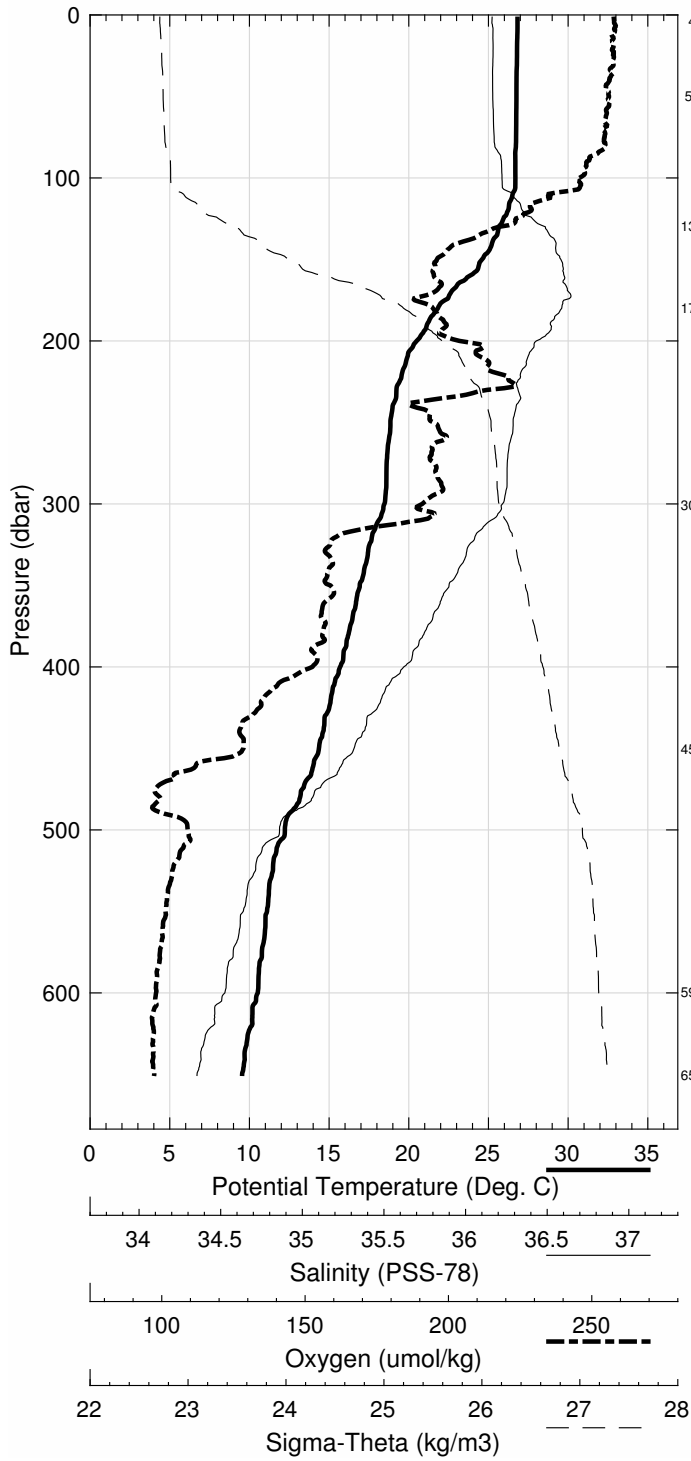


Florida Staits December 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
 Latitude 26.998N Longitude 79.384W
 13-Dec-2016 01:23Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	26.824	26.824	36.514	197.9	0.004	23.915
10	26.822	26.820	36.517	198.2	0.040	23.919
20	26.799	26.795	36.518	197.9	0.080	23.927
30	26.792	26.786	36.517	197.8	0.119	23.929
50	26.768	26.756	36.516	197.1	0.199	23.938
75	26.751	26.734	36.523	196.4	0.299	23.951
100	26.713	26.690	36.560	192.3	0.398	23.992
125	25.968	25.940	36.702	181.9	0.494	24.337
150	24.626	24.594	36.835	169.3	0.578	24.853
200	20.532	20.493	36.720	172.9	0.706	25.942
250	18.893	18.848	36.612	168.7	0.803	26.293
300	18.522	18.469	36.562	166.9	0.893	26.351
400	15.753	15.689	36.100	149.1	1.055	26.665
500	12.291	12.224	35.519	128.9	1.193	26.949
600	10.598	10.524	35.263	123.8	1.309	27.066

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
651	1	9.668	9.592	35.139	122.5
600	2	10.627	10.553	35.263	124.1
451	3	14.097	14.030	35.810	129.0
301	4	18.584	18.530	36.565	168.7
180	5	21.894	21.858	36.837	169.6
130	6	25.627	25.598	36.771	177.6
50	7	26.768	26.756	36.511	197.0
4	13	26.814	26.813	36.506	198.0

Florida Staits December 2016 R/V Walton Smith
 CTD Station 6 (CTD006)
 Latitude 26.998 N Longitude 79.384 W
 13-Dec-2016 01:23 Z

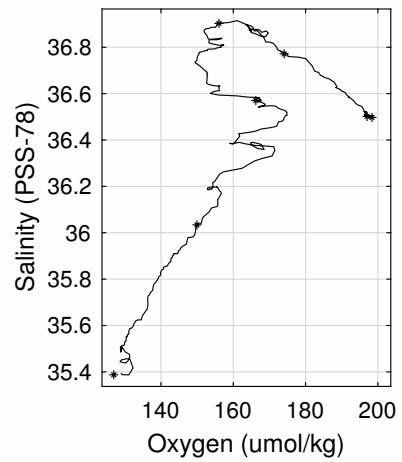
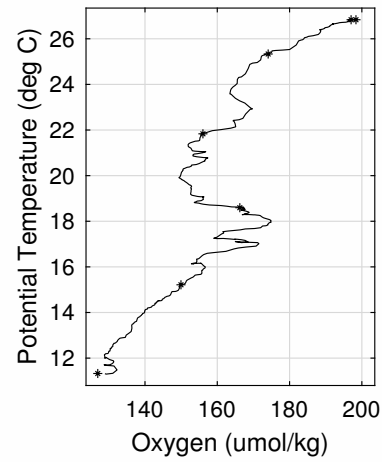
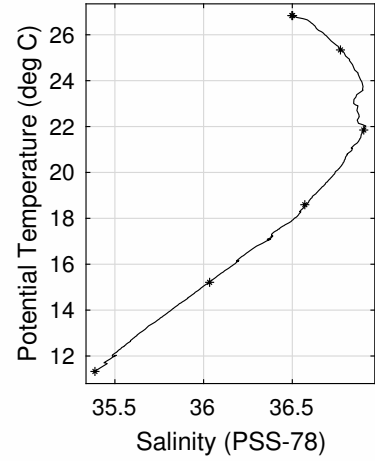
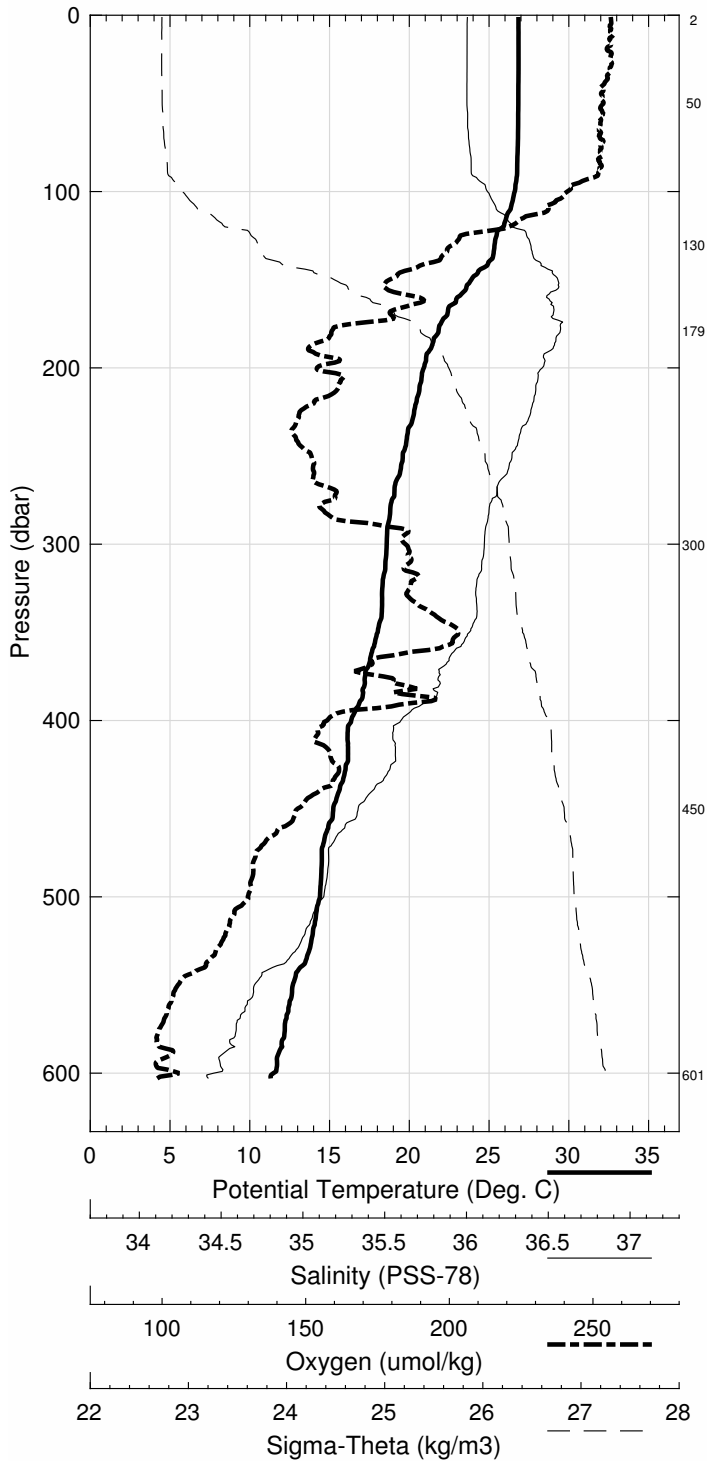


Florida Staits December 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.998N Longitude 79.284W
 12-Dec-2016 23:58Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	26.844	26.844	36.506	198.1	0.004	23.903
10	26.849	26.847	36.505	198.3	0.040	23.901
20	26.851	26.846	36.505	197.6	0.080	23.901
30	26.853	26.847	36.504	197.9	0.120	23.901
50	26.846	26.834	36.504	197.1	0.200	23.904
75	26.814	26.797	36.516	196.8	0.301	23.925
100	26.630	26.607	36.592	191.5	0.400	24.043
125	25.497	25.470	36.760	175.1	0.493	24.528
150	23.920	23.888	36.894	164.3	0.575	25.110
200	20.947	20.908	36.827	153.3	0.697	25.911
250	19.636	19.589	36.697	152.4	0.800	26.166
300	18.636	18.582	36.579	166.8	0.892	26.335
400	16.422	16.357	36.221	154.8	1.063	26.604
500	14.475	14.400	35.889	142.7	1.210	26.789
600	11.559	11.481	35.417	132.3	1.341	27.012

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
601	1	11.405	11.327	35.387	126.9
450	2	15.281	15.211	36.034	150.0
301	3	18.647	18.594	36.570	166.2
179	4	21.884	21.849	36.903	156.0
131	5	25.368	25.339	36.771	174.1
50	6	26.848	26.836	36.502	197.0
3	7	26.837	26.837	36.497	198.4

Florida Straits December 2016 R/V Walton Smith
 CTD Station 7 (CTD007)
 Latitude 26.998 N Longitude 79.284 W
 12-Dec-2016 23:58 Z

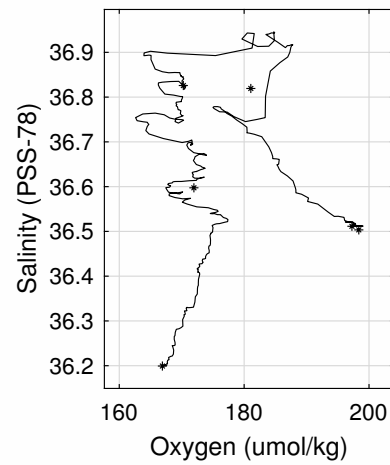
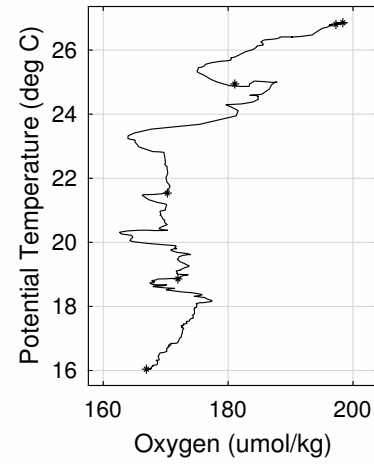
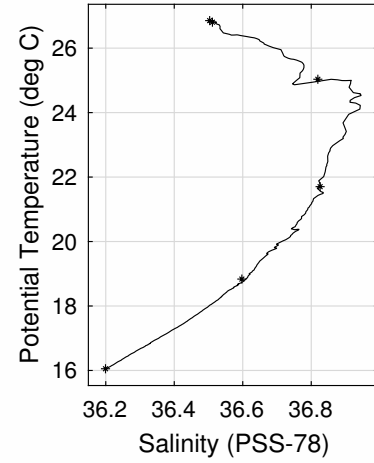
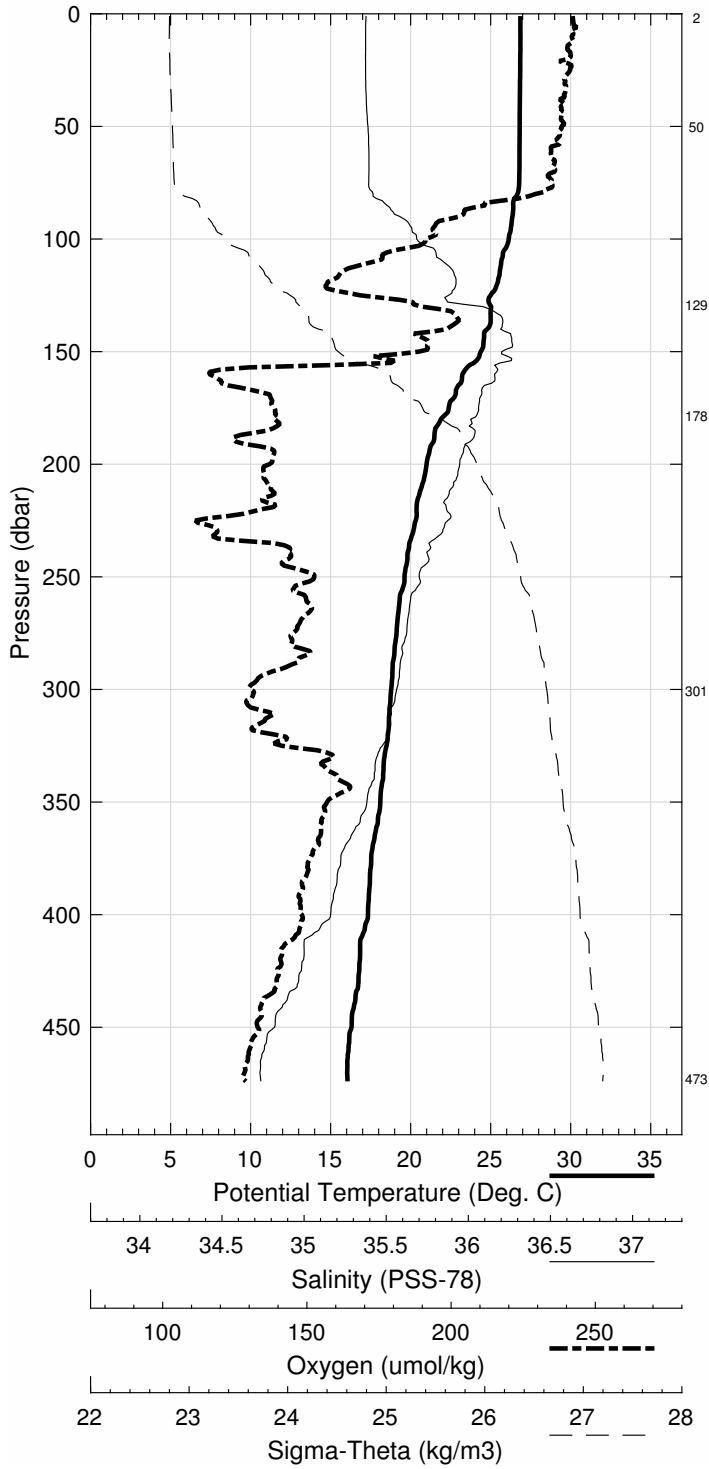


Florida Staits December 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 27.001N Longitude 79.201W
 12-Dec-2016 22:34Z

Pressure dbar	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$	DynHt $\text{m}^2\cdot\text{s}^{-2}$	SigT $\text{kg}\cdot\text{m}^{-3}$
1	26.857	26.856	36.513	198.6	0.004	23.904
10	26.862	26.859	36.512	198.5	0.040	23.902
20	26.852	26.847	36.511	198.2	0.080	23.906
30	26.838	26.831	36.512	198.0	0.120	23.911
50	26.823	26.811	36.519	197.6	0.200	23.923
75	26.797	26.780	36.521	196.6	0.300	23.934
100	26.149	26.126	36.663	184.6	0.396	24.249
125	25.023	24.996	36.756	178.4	0.484	24.671
150	24.412	24.380	36.914	183.9	0.563	24.977
200	21.034	20.995	36.790	169.7	0.689	25.858
250	19.663	19.617	36.670	174.0	0.793	26.138
300	18.835	18.781	36.603	167.9	0.887	26.303
400	17.400	17.332	36.408	172.8	1.061	26.515

Pressure dbar	Niskin	Temp90 °C	PoTemp90 °C	Salinity PSS-78	Oxygen $\mu\text{mol}\cdot\text{kg}^{-1}$
473	1	16.129	16.053	36.199	166.9
301	2	18.889	18.835	36.597	172.0
179	3	21.738	21.702	36.826	170.3
130	4	25.063	25.035	36.819	181.1
51	5	26.817	26.805	36.511	197.3
2	6	26.855	26.854	36.503	198.4

Florida Straits December 2016 R/V Walton Smith
 CTD Station 8 (CTD008)
 Latitude 27.001 N Longitude 79.201 W
 12-Dec-2016 22:34 Z



B WOCE Summary File

B.1 FC1603

Table 24: Florida Current Cruise – WOCE Summary File

SHIP/CRS EXPOCODE	WOCE SECT	STN	CAST	CAST TYPE	CAST DATE	UTC TIME	EVENT CODE	LAT	LOE	NAV	UNC DPH	HT ABV BTM	MAX PRS	NO. BTLS	PARA- METERS
FCTSWs	FC1603	0	1	ROS	03/24/2016	09:51:29	BE	26.996N	79.928W	GPS					
FCTSWs	FC1603	0	1	ROS	03/24/2016	09:55:38	BO	26.999N	79.930W	GPS	3	3	137	4	1,2
FCTSWs	FC1603	0	1	ROS	03/24/2016	10:04:41	EN	27.005N	79.932W	GPS					
FCTSWs	FC1603	1	1	ROS	03/24/2016	09:00:18	BE	26.994N	79.866W	GPS					
FCTSWs	FC1603	1	1	ROS	03/24/2016	09:07:39	BO	27.000N	79.868W	GPS	3	4	249	5	1,2
FCTSWs	FC1603	1	1	ROS	03/24/2016	09:19:06	EN	27.008N	79.869W	GPS					
FCTSWs	FC1603	2	1	ROS	03/24/2016	07:57:24	BE	26.988N	79.780W	GPS					
FCTSWs	FC1603	2	1	ROS	03/24/2016	08:05:34	BO	26.995N	79.783W	GPS	3	19	360	6	1,2
FCTSWs	FC1603	2	1	ROS	03/24/2016	08:21:19	EN	27.009N	79.789W	GPS					
FCTSWs	FC1603	3	1	ROS	03/24/2016	06:40:39	BE	26.994N	79.681W	GPS					
FCTSWs	FC1603	3	1	ROS	03/24/2016	06:51:18	BO	27.002N	79.683W	GPS	3	2	522	7	1,2
FCTSWs	FC1603	3	1	ROS	03/24/2016	07:09:42	EN	27.017N	79.688W	GPS					
FCTSWs	FC1603	4	1	ROS	03/24/2016	05:27:07	BE	26.994N	79.616W	GPS					
FCTSWs	FC1603	4	1	ROS	03/24/2016	05:39:53	BO	27.004N	79.619W	GPS	620	20	627	7	1,2
FCTSWs	FC1603	4	1	ROS	03/24/2016	05:59:59	EN	27.018N	79.625W	GPS					
FCTSWs	FC1603	5	1	ROS	03/24/2016	03:56:20	BE	26.993N	79.496W	GPS					
FCTSWs	FC1603	5	1	ROS	03/24/2016	04:12:33	BO	27.003N	79.501W	GPS	753	8	760	8	1,2
FCTSWs	FC1603	5	1	ROS	03/24/2016	04:34:31	EN	27.016N	79.506W	GPS					
FCTSWs	FC1603	6	1	ROS	03/24/2016	02:30:31	BE	26.990N	79.379W	GPS					
FCTSWs	FC1603	6	1	ROS	03/24/2016	02:43:49	BO	26.996N	79.383W	GPS	684	13	694	15	1,2
FCTSWs	FC1603	6	1	ROS	03/24/2016	03:06:27	EN	27.007N	79.389W	GPS					
FCTSWs	FC1603	7	1	ROS	03/24/2016	00:52:42	BE	26.996N	79.284W	GPS					
FCTSWs	FC1603	7	1	ROS	03/24/2016	01:07:20	BO	27.001N	79.290W	GPS	602	91	608	7	1,2
FCTSWs	FC1603	7	1	ROS	03/24/2016	01:27:09	EN	27.008N	79.297W	GPS					
FCTSWs	FC1603	8	1	ROS	03/23/2016	23:38:04	BE	26.998N	79.203W	GPS					
FCTSWs	FC1603	8	1	ROS	03/23/2016	23:51:29	BO	26.998N	79.208W	GPS	2	2	486	12	1,2
FCTSWs	FC1603	8	1	ROS	03/24/2016	00:11:13	EN	27.001N	79.215W	GPS					

Note: Parameter 1 - salinity sampled, Parameter 2 - oxygen sampled

B.2 FC1605

Table 25: Florida Current Cruise – WOCE Summary File

SHIP/CRS EXPOCODE	WOCE SECT	STN	CAST	CAST TYPE	CAST DATE	UTC TIME	EVENT CODE	LAT	LOE	NAV	UNC DPH	HT ABV BTM	MAX PRS	NO. BTLS	PARA- METERS
FCTSWs	FC1605	0	1	ROS	05/17/2016	08:13:19	BE	26.984N	79.929W	GPS					
FCTSWs	FC1605	0	1	ROS	05/17/2016	08:18:43	BO	26.988N	79.930W	GPS	144	12	149	4	1,2
FCTSWs	FC1605	0	1	ROS	05/17/2016	08:27:44	EN	26.994N	79.931W	GPS					
FCTSWs	FC1605	1	1	ROS	05/17/2016	07:09:12	BE	26.987N	79.864W	GPS					
FCTSWs	FC1605	1	1	ROS	05/17/2016	07:16:36	BO	26.997N	79.866W	GPS	255	13	261	5	1,2
FCTSWs	FC1605	1	1	ROS	05/17/2016	07:29:51	EN	27.010N	79.868W	GPS					
FCTSWs	FC1605	2	1	ROS	05/17/2016	05:05:40	BE	26.988N	79.782W	GPS					
FCTSWs	FC1605	2	1	ROS	05/17/2016	05:18:19	BO	27.004N	79.786W	GPS	137	251	369	6	1,2
FCTSWs	FC1605	2	1	ROS	05/17/2016	05:38:28	EN	27.025N	79.791W	GPS					
FCTSWs	FC1605	3	1	ROS	05/17/2016	03:30:11	BE	26.989N	79.684W	GPS					
FCTSWs	FC1605	3	1	ROS	05/17/2016	03:42:35	BO	27.004N	79.687W	GPS	516	17	525	7	1,2
FCTSWs	FC1605	3	1	ROS	05/17/2016	04:02:18	EN	27.023N	79.692W	GPS					
FCTSWs	FC1605	4	1	ROS	05/17/2016	02:15:24	BE	26.992N	79.613W	GPS					
FCTSWs	FC1605	4	1	ROS	05/17/2016	02:29:20	BO	27.001N	79.614W	GPS	642	9	648	7	1,2
FCTSWs	FC1605	4	1	ROS	05/17/2016	02:47:54	EN	27.013N	79.618W	GPS					
FCTSWs	FC1605	5	1	ROS	05/17/2016	00:33:31	BE	26.991N	79.497W	GPS					
FCTSWs	FC1605	5	1	ROS	05/17/2016	00:49:32	BO	27.000N	79.504W	GPS	750	9	757	8	1,2
FCTSWs	FC1605	5	1	ROS	05/17/2016	01:12:59	EN	27.016N	79.511W	GPS					
FCTSWs	FC1605	6	1	ROS	05/16/2016	23:01:49	BE	26.996N	79.383W	GPS					
FCTSWs	FC1605	6	1	ROS	05/16/2016	23:16:27	BO	27.003N	79.387W	GPS	667	14	677	8	1,2
FCTSWs	FC1605	6	1	ROS	05/16/2016	23:39:21	EN	27.015N	79.394W	GPS					
FCTSWs	FC1605	7	1	ROS	05/16/2016	21:49:10	BE	26.995N	79.284W	GPS					
FCTSWs	FC1605	7	1	ROS	05/16/2016	22:01:01	BO	27.000N	79.286W	GPS	609	11	615	7	1,2
FCTSWs	FC1605	7	1	ROS	05/16/2016	22:20:12	EN	27.004N	79.291W	GPS					
FCTSWs	FC1605	8	1	ROS	05/16/2016	20:50:04	BE	27.001N	79.203W	GPS					
FCTSWs	FC1605	8	1	ROS	05/16/2016	21:01:31	BO	27.001N	79.205W	GPS	482	9	486	6	1,2
FCTSWs	FC1605	8	1	ROS	05/16/2016	21:16:08	EN	27.004N	79.208W	GPS					

Note: Parameter 1 - salinity sampled, Parameter 2 - oxygen sampled

B.3 FC1607

Table 26: Florida Current Cruise – WOCE Summary File

SHIP/CRS EXPOCODE	WOCE SECT	STN	CAST	CAST TYPE	CAST DATE	UTC TIME	EVENT CODE	LAT	LOE	NAV	UNC DPH	HT ABV BTM	MAX PRS	NO. BTLs	PARA- METERS
FCTSWs	FC1607	0	1	ROS	07/14/2016	09:00:25	BE	26.996N	79.931W	GPS					
FCTSWs	FC1607	0	1	ROS	07/14/2016	09:04:53	BO	26.999N	79.930W	GPS	144	10	145	4	1,2
FCTSWs	FC1607	0	1	ROS	07/14/2016	09:14:48	EN	27.005N	79.930W	GPS					
FCTSWs	FC1607	1	1	ROS	07/14/2016	07:49:05	BE	26.984N	79.865W	GPS					
FCTSWs	FC1607	1	1	ROS	07/14/2016	07:57:24	BO	26.992N	79.865W	GPS	263	9	265	5	1,2
FCTSWs	FC1607	1	1	ROS	07/14/2016	08:09:59	EN	27.002N	79.865W	GPS					
FCTSWs	FC1607	2	1	ROS	07/14/2016	06:12:22	BE	26.984N	79.784W	GPS					
FCTSWs	FC1607	2	1	ROS	07/14/2016	06:21:41	BO	26.995N	79.784W	GPS	368	21	381	6	1,2
FCTSWs	FC1607	2	1	ROS	07/14/2016	06:38:27	EN	27.012N	79.783W	GPS					
FCTSWs	FC1607	3	1	ROS	07/14/2016	04:29:18	BE	26.988N	79.684W	GPS					
FCTSWs	FC1607	3	1	ROS	07/14/2016	04:40:19	BO	27.000N	79.685W	GPS	521	16	531	7	1,2
FCTSWs	FC1607	3	1	ROS	07/14/2016	05:00:30	EN	27.018N	79.685W	GPS					
FCTSWs	FC1607	4	1	ROS	07/14/2016	03:01:41	BE	26.984N	79.614W	GPS					
FCTSWs	FC1607	4	1	ROS	07/14/2016	03:14:57	BO	26.996N	79.614W	GPS	634	16	644	7	1,2
FCTSWs	FC1607	4	1	ROS	07/14/2016	03:36:56	EN	27.014N	79.614W	GPS					
FCTSWs	FC1607	5	1	ROS	07/14/2016	01:13:25	BE	26.987N	79.499W	GPS					
FCTSWs	FC1607	5	1	ROS	07/14/2016	01:30:33	BO	27.001N	79.502W	GPS	748	7	755	14	1,2
FCTSWs	FC1607	5	1	ROS	07/14/2016	01:55:26	EN	27.021N	79.505W	GPS					
FCTSWs	FC1607	6	1	ROS	07/13/2016	23:29:29	BE	26.989N	79.384W	GPS					
FCTSWs	FC1607	6	1	ROS	07/13/2016	23:43:31	BO	26.999N	79.385W	GPS	661	4	685	14	1,2
FCTSWs	FC1607	6	1	ROS	07/14/2016	00:09:43	EN	27.016N	79.387W	GPS					
FCTSWs	FC1607	7	1	ROS	07/13/2016	22:01:44	BE	26.999N	79.283W	GPS					
FCTSWs	FC1607	7	1	ROS	07/13/2016	22:12:27	BO	27.004N	79.283W	GPS	601	11	611	9	1,2
FCTSWs	FC1607	7	1	ROS	07/13/2016	22:34:30	EN	27.015N	79.280W	GPS					
FCTSWs	FC1607	8	1	ROS	07/13/2016	20:48:14	BE	26.995N	79.200W	GPS					
FCTSWs	FC1607	8	1	ROS	07/13/2016	20:59:27	BO	26.997N	79.202W	GPS	480	8	483	6	1,2
FCTSWs	FC1607	8	1	ROS	07/13/2016	21:14:45	EN	27.000N	79.203W	GPS					

Note: Parameter 1 - salinity sampled, Parameter 2 - oxygen sampled

B.4 FC1609

Table 27: Florida Current Cruise – WOCE Summary File

SHIP/CRS EXPOCODE	WOCE SECT	STN	CAST	CAST TYPE	CAST DATE	UTC TIME	EVENT CODE	LAT	LOE	NAV	UNC DPH	HT ABV BTM	MAX PRS	NO. BTLS	PARA- METERS
FCTSWs	FC1609	0	1	ROS	09/16/2016	01:33:13	BE	26.995N	79.932W	GPS					
FCTSWs	FC1609	0	1	ROS	09/16/2016	01:38:28	BO	26.998N	79.933W	GPS	138	11	141	4	1,2
FCTSWs	FC1609	0	1	ROS	09/16/2016	01:47:58	EN	27.005N	79.933W	GPS					
FCTSWs	FC1609	1	1	ROS	09/16/2016	00:24:00	BE	26.988N	79.867W	GPS					
FCTSWs	FC1609	1	1	ROS	09/16/2016	00:32:56	BO	26.996N	79.868W	GPS	258	6	261	5	1,2
FCTSWs	FC1609	1	1	ROS	09/16/2016	00:44:38	EN	27.005N	79.868W	GPS					
FCTSWs	FC1609	2	1	ROS	09/15/2016	23:00:18	BE	26.985N	79.783W	GPS					
FCTSWs	FC1609	2	1	ROS	09/15/2016	23:10:37	BO	26.995N	79.783W	GPS	372	18	382	6	1,2
FCTSWs	FC1609	2	1	ROS	09/15/2016	23:27:30	EN	27.011N	79.784W	GPS					
FCTSWs	FC1609	3	1	ROS	09/15/2016	21:26:21	BE	26.986N	79.684W	GPS					
FCTSWs	FC1609	3	1	ROS	09/15/2016	21:38:11	BO	26.997N	79.684W	GPS	520	18	533	7	1,2
FCTSWs	FC1609	3	1	ROS	09/15/2016	21:57:28	EN	27.015N	79.684W	GPS					
FCTSWs	FC1609	4	1	ROS	09/15/2016	20:07:43	BE	26.988N	79.619W	GPS					
FCTSWs	FC1609	4	1	ROS	09/15/2016	20:20:25	BO	26.998N	79.619W	GPS	627	13	636	7	1,2
FCTSWs	FC1609	4	1	ROS	09/15/2016	20:40:47	EN	27.016N	79.618W	GPS					
FCTSWs	FC1609	5	1	ROS	09/15/2016	18:22:45	BE	26.991N	79.501W	GPS					
FCTSWs	FC1609	5	1	ROS	09/15/2016	18:38:56	BO	27.002N	79.499W	GPS	750	10	757	8	1,2
FCTSWs	FC1609	5	1	ROS	09/15/2016	19:01:33	EN	27.017N	79.498W	GPS					
FCTSWs	FC1609	6	1	ROS	09/15/2016	16:37:22	BE	26.990N	79.386W	GPS					
FCTSWs	FC1609	6	1	ROS	09/15/2016	16:52:19	BO	26.999N	79.385W	GPS	656	18	673	9	1,2
FCTSWs	FC1609	6	1	ROS	09/15/2016	17:17:10	EN	27.013N	79.385W	GPS					
FCTSWs	FC1609	7	1	ROS	09/15/2016	15:13:02	BE	26.987N	79.281W	GPS					
FCTSWs	FC1609	7	1	ROS	09/15/2016	15:26:09	BO	26.993N	79.281W	GPS	606	9	611	7	1,2
FCTSWs	FC1609	7	1	ROS	09/15/2016	15:45:48	EN	27.002N	79.281W	GPS					
FCTSWs	FC1609	8	1	ROS	09/15/2016	14:02:51	BE	27.002N	79.202W	GPS					
FCTSWs	FC1609	8	1	ROS	09/15/2016	14:14:19	BO	27.006N	79.202W	GPS	472	10	476	6	1,2
FCTSWs	FC1609	8	1	ROS	09/15/2016	14:31:06	EN	27.012N	79.204W	GPS					

Note: Parameter 1 - salinity sampled, Parameter 2 - oxygen sampled

B.5 FC1612

Table 28: Florida Current Cruise – WOCE Summary File

SHIP/CRS EXPOCODE	WOCE SECT	STN	CAST TYPE	CAST DATE	UTC TIME	EVENT CODE	LAT	LOE	NAV	UNC DPH	HT ABV BTM	MAX PRS	NO. BTLS	PARA- METERS
FCTSWs	FC1612	0	ROS	12/13/2016	09:48:51	BE	26.992N	79.931W	GPS					
FCTSWs	FC1612	1	ROS	12/13/2016	09:52:46	BO	26.996N	79.931W	GPS	133	21	135	4	1,2
FCTSWs	FC1612	0	ROS	12/13/2016	10:02:29	EN	27.004N	79.931W	GPS					
FCTSWs	FC1612	1	ROS	12/13/2016	08:47:55	BE	26.990N	79.867W	GPS					
FCTSWs	FC1612	1	ROS	12/13/2016	08:54:42	BO	26.997N	79.868W	GPS	241	23	246	5	1,2
FCTSWs	FC1612	1	ROS	12/13/2016	09:07:25	EN	27.009N	79.868W	GPS					
FCTSWs	FC1612	2	ROS	12/13/2016	07:31:37	BE	26.986N	79.784W	GPS					
FCTSWs	FC1612	2	ROS	12/13/2016	07:39:44	BO	26.994N	79.785W	GPS	359	29	367	6	1,2
FCTSWs	FC1612	2	ROS	12/13/2016	07:57:23	EN	27.010N	79.785W	GPS					
FCTSWs	FC1612	3	ROS	12/13/2016	06:09:40	BE	26.981N	79.685W	GPS					
FCTSWs	FC1612	3	ROS	12/13/2016	06:19:55	BO	26.990N	79.686W	GPS	518	20	524	7	1,2
FCTSWs	FC1612	3	ROS	12/13/2016	06:38:45	EN	27.004N	79.687W	GPS					
FCTSWs	FC1612	4	ROS	12/13/2016	04:45:43	BE	26.992N	79.618W	GPS					
FCTSWs	FC1612	4	ROS	12/13/2016	04:58:16	BO	27.001N	79.620W	GPS	615	22	623	7	1,2
FCTSWs	FC1612	4	ROS	12/13/2016	05:19:47	EN	27.016N	79.620W	GPS					
FCTSWs	FC1612	5	ROS	12/13/2016	03:06:24	BE	26.984N	79.499W	GPS					
FCTSWs	FC1612	5	ROS	12/13/2016	03:20:46	BO	26.993N	79.499W	GPS	729	21	736	8	1,2
FCTSWs	FC1612	5	ROS	12/13/2016	03:44:25	EN	27.005N	79.500W	GPS					
FCTSWs	FC1612	6	ROS	12/13/2016	01:24:12	BE	26.994N	79.385W	GPS					
FCTSWs	FC1612	6	ROS	12/13/2016	01:37:51	BO	27.001N	79.384W	GPS	646	18	651	8	1,2
FCTSWs	FC1612	6	ROS	12/13/2016	02:00:15	EN	27.013N	79.384W	GPS					
FCTSWs	FC1612	7	ROS	12/12/2016	23:58:55	BE	26.995N	79.284W	GPS					
FCTSWs	FC1612	7	ROS	12/13/2016	00:11:30	BO	27.000N	79.284W	GPS	597	20	603	7	1,2
FCTSWs	FC1612	7	ROS	12/13/2016	00:33:22	EN	27.006N	79.288W	GPS					
FCTSWs	FC1612	8	ROS	12/12/2016	22:34:16	BE	26.999N	79.203W	GPS					
FCTSWs	FC1612	8	ROS	12/12/2016	22:44:50	BO	27.002N	79.200W	GPS	470	14	474	6	1,2
FCTSWs	FC1612	8	ROS	12/12/2016	23:03:12	EN	27.009N	79.195W	GPS					

Note: Parameter 1 - salinity sampled, Parameter 2 - oxygen sampled

C WOCE Bottle Summary File

C.1 FC1603

FCTSW	FC1603	8	1	3	2	20160323	2358	26.999N	79.210W	298	301	18.741	36.607	2	36.615	2	175.4	2	174.0	6
FCTSW	FC1603	8	1	4	2	20160323	2358	26.999N	79.211W	299	301	18.743	36.602	2	-999.000	9	-999.0	9	-999.0	9
FCTSW	FC1603	8	1	5	2	20160324	0001	27.000N	79.212W	179	180	21.253	36.760	2	36.790	2	162.1	2	180.2	4
FCTSW	FC1603	8	1	6	2	20160324	0001	27.000N	79.212W	179	180	21.259	36.761	2	-999.000	9	-999.0	9	-999.0	9
FCTSW	FC1603	8	1	7	2	20160324	0003	27.000N	79.212W	129	130	24.179	36.767	2	36.781	2	166.4	2	166.3	2
FCTSW	FC1603	8	1	8	2	20160324	0003	27.000N	79.212W	130	130	24.220	36.758	2	-999.000	9	-999.0	9	-999.0	9
FCTSW	FC1603	8	1	9	2	20160324	0006	27.001N	79.213W	50	50	25.683	36.334	2	36.326	2	201.4	2	202.3	6
FCTSW	FC1603	8	1	10	2	20160324	0006	27.001N	79.214W	50	50	25.683	36.330	2	-999.000	9	-999.0	9	-999.0	9
FCTSW	FC1603	8	1	11	2	20160324	0010	27.001N	79.215W	2	2	25.713	36.309	2	36.319	2	202.7	2	203.3	2
FCTSW	FC1603	8	1	12	2	20160324	0010	27.001N	79.215W	2	2	25.714	36.304	2	-999.000	9	-999.0	9	-999.0	9

C.2 FC1605

C.3 FC1607

FCTSWWS	FCI607	7	1	5	2	20160713	2228	27.012N	79.281W	129	129	24.083	36.908	2	36.905	2	164.1	2	164.4	2
FCTSAWS	FCI607	7	1	6	2	20160713	2231	27.013N	79.281W	49	50	29.209	36.440	2	36.438	2	198.5	2	197.2	2
FCTSAWS	FCI607	7	1	7	2	20160713	2234	27.015N	79.280W	3	3	29.966	36.359	2	36.380	2	188.8	2	212.2	4
FCTSAWS	FCI607	7	1	13	2	20160713	2234	27.015N	79.280W	3	3	29.957	36.356	2	-999.000	9	188.8	2	-999.0	9
FCTSAWS	FCI607	7	1	14	2	20160713	2234	27.015N	79.280W	3	3	30.130	36.367	2	-999.000	9	188.8	2	-999.0	9
FCTSAWS	FCI607	8	1	1	2	20160713	2100	26.998N	79.202W	480	483	16.070	36.191	2	36.186	2	159.1	2	181.9	4
FCTSAWS	FCI607	8	1	2	2	20160713	2104	26.998N	79.202W	298	300	18.875	36.598	2	36.590	2	188.7	2	192.1	2
FCTSAWS	FCI607	8	1	3	2	20160713	2107	26.999N	79.203W	179	180	22.575	36.923	2	36.917	2	148.7	2	163.2	4
FCTSAWS	FCI607	8	1	4	2	20160713	2109	26.999N	79.203W	129	130	24.964	36.830	2	36.826	2	171.4	2	173.5	2
FCTSAWS	FCI607	8	1	5	2	20160713	2111	26.999N	79.203W	50	50	29.607	36.402	2	36.407	2	198.5	2	197.3	2
FCTSAWS	FCI607	8	1	6	2	20160713	2114	27.000N	79.203W	4	4	30.020	36.341	2	36.341	2	195.8	2	195.3	2

C.4 FC1609

C.5 FC1612

