Instructions: Please try not to change the order of Rows No. 1 through No. 410, as the information will be read by a computer computer program later on. Starting from No. 411, please first append the additional variable sections, then the non-measured variable sections, then the additional principal investigator sections (if there are more than three PIs), and then the platform sections (if there are more than 3 platforms). Please do not use special characters.

No	Metadata element name	Your input	Help reference no.
1	Submission Date	11/20/2017	1
2	Accession no. of related data sets	0157224, 0157264	2
3	Investigator-1 name	Rik Wanninkhof	3.1
4	Investigator-1 institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	3.2
5	Investigator-1 address	4301 Rickenbacker Causeway, Miami, FL 33149, USA	3.3
6	Investigator-1 phone	(305) 361-4379	3.4
7	Investigator-1 email	Rik.Wanninkhof@noaa.gov	3.5
8	Investigator-1 researcher ID		3.6
9	Investigator-1 ID type (ORCID, Researcher ID, etc.)		3.7
10	Investigator-2 name	Leticia Barbero	3.1
11	Investigator-2 institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	3.2
12	Investigator-2 address	4301 Rickenbacker Causeway, Miami, FL 33149, USA	3.3
13	Investigator-2 phone	(305) 361-4453	3.4
14	Investigator-2 email	Leticia.Barbero@noaa.gov	3.5
15	Investigator-2 researcher ID		3.6
16	Investigator-2 ID type (ORCID, Researcher ID, etc.)		3.7
17	Investigator-3 name	Denis Pierrot	3.1
18	Investigator-3 institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	3.2
19	Investigator-3 address	4301 Rickenbacker Causeway, Miami, FL 33149, USA	3.3
20	Investigator-3 phone	(305) 361-4443	3.4
21	Investigator-3 email	Denis.Pierrot@noaa.gov	3.5
22	Investigator-3 researcher ID		3.6
23	Investigator-3 ID type (ORCID, Researcher ID, etc.)		3.7
24	Data submitter name	Leticia Barbero	4.1
25	Data submitter institution	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	4.2
26	Data submitter address	4301 Rickenbacker Causeway, Miami, FL 33149, USA	4.3
27	Data submitter phone	(305) 361-4453	4.4
28	Data submitter email	Leticia.Barbero@noaa.gov	4.5
29	Data submitter researcher ID		4.6
30	Data submitter ID type (ORCID, Researcher ID, etc.)		4.7
31	Title	Monitoring of seawater CO2 parameters on the U.S. Shelf and North Atlantic ocean from Ships of Opportunity.	5
32	Abstract	Increasing amounts of atmospheric carbon dioxide from human industrial activities are causing changes in global ocean carbon chemistry. Through the SOOP program we measure air and ocean surface pCO2 and take discrete samples of other carbon parameters. This effort is in support of the coastal monitoring and research objectives of the NOAA Ocean Acidification Program (OAP) and the Climate Program Office (CPO).	6
33	Purpose	To measure key carbon, physical and biogeochemical parameters in surfacel waters and monitor changes over time.	7
34	Start date	3/6/2015	8.1
35	End date	11/3/2016	8.2
36	Westbd longitude		9.1
37	Eastbd longitude		9.2
38	Northbd latitude		9.3
39	Southbd latitude		9.4
40	Spatial reference system	WGS 84	10
41	Geographic names	Tropical Atlantic, Florida coast, Caribbean	11

42	**Location of organism collection**		12
43	**Funding agency name**	NOAA's Climate Program Office, NOAA's Ocean Acidification Program	13.1
44	**Funding project title**	CPO: Surface water pCO2 measurements from ships, OAP: Ship of Opportunity work in support of OA monitoring (SOOP-OA)	13.2
45	**Funding project ID (Grant no.)**		13.3
46	**Research projects**		14
47	**Platform-1 name**	M/V Equinox	15.1
48	**Platform-1 ID**	MLCE	15.2
49	**Platform-1 type**	Cruise Liner	15.3
50	**Platform-1 owner**	Royal Caribbean International	15.4
51	**Platform-1 country**		15.5
52	**Platform-2 name**		15.1
53	**Platform-2 ID**		15.2
54	**Platform-2 type**		15.3
55	**Platform-2 owner**		15.4
56	**Platform-2 country**		15.5
57	**Platform-3 name**		15.1
58	**Platform-3 ID**		15.2
59	**Platform-3 type**		15.3
60	**Platform-3 owner**		15.4
61	**Platform-3 country**		15.5
62	**EXPOCODE**	MLCE20150306, MLCE20150427, MLCE20160415, MLCE20161030	16
63	**Cruise ID**	EQNX_20150306, EQNX_20150427, EQNX_20160415, EQNX_20161030	17
64	**Section**	none	18
65	**Author list for citation**	Barbero, Leticia, Wanninkhof, Rik, Pierrot, Denis.	19
66	**References**		20
67	**Supplemental information**	Please consult accompanying Readme file for additional information on analysis of carbon parameters. The most up to date version of this dataset is available at http://www.aoml.noaa.gov/ocd/gcc/shortcruises.htm	21
68	**DIC: Variable abbreviation in data files**	DIC	22.1
69	**DIC: Observation type**	Underway (flow through)	22.2
70	**DIC: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	22.3
71	**DIC: Manipulation method (SPECIAL USE ONLY) (SPECIAL USE ONLY)**		22.4
72	**DIC: Variable unit**	micro-mol/kg	22.5
73	**DIC: Measured or calculated**	Measured	22.6
74	**DIC: Calculation method and parameters**		22.7
75	**DIC: Sampling instrument**	Flow through system	22.8
76	**DIC: Analyzing instrument**	Two systems consisting of a coulometer (UIC Inc.) coupled with a Dissolved Inorganic Carbon Extractor (DICE) inlet system. DICE was developed by Esa Peltola and Denis Pierrot of NOAA/AOML and Dana Greeley of NOAA/PMEL to modernize a carbon extractor called SOMMA (Johnson et al. 1985, 1987, 1993, and 1999; Johnson 1992)	22.9

77	**DIC: Detailed sampling and analyzing information**	Samples for total dissolved inorganic carbon (DIC) measurements were drawn according to procedures outlined in the Guide to best practices for ocean CO2 measurements (Dickson et al., 2007) from Niskin bottles into cleaned 294-ml glass bottles. Bottles were rinsed and filled from the bottom, leaving 6 ml of headspace; care was taken not to entrain any bubbles. After 0.2 ml of saturated HgCl2 solution was added as a preservative, the sample bottles were sealed with glass stoppers lightly covered with Apiezon-L grease and were stored at room temperature to be sent back to the lab for analysis after the cruise. The analysis was done by coulometry with two analytical systems (AOML3 and AOML4) used simultaneously. In the coulometric analysis of DIC, all carbonate species are converted to CO2 (gas) by addition of excess hydrogen ion (acid) to the seawater sample, and the evolved CO2 gas is swept into the titration cell of the coulometer with pure air or compressed nitrogen, where it reacts quantitatively with a proprietary reagent based on ethanolamine to generate hydrogen ions. In this process, the solution changes from blue to colorless, triggering a current through the cell and causing coulometrical generation of OH minus ions at the anode. The OH ions react with the H+, and the solution turns blue again. A beam of light is shone through the solution, and a photometric detector at the opposite side of the cell senses the change in transmission. Once the percent transmission reaches its original value, the coulometric titration is stopped, and the amount of CO2 that enters the cell is determined by integrating the total charge during the titration. The volume of the pipette used to deliver the sample in each system was determined with aliquots of distilled water at known temperature. The weights with the appropriate densities were used to determine the volume of the pipette. Calculation of the amount of CO2 injected was according to the CO2 handbook (Dickson et al., 2007).The instrument has a salinity sensor, but all DIC values were recalculated to a molar weight (micro-mol/kg) using density obtained from the CTD salinity. The DIC values were corrected for dilution by 0.2 ml of saturated HgCl2 used for sample preservation (Measured DIC*1.00037). A correction was also applied for the offset from the CRM. This additive correction was applied for each cell using the CRM value obtained in the beginning of the cell. Please consult the accompanying Readme file for additional details.	22.10
78	**DIC: Field replicate information**	19 samples each 500-ml, 6 sets of duplicate samples.	22.11
79	**DIC: Standardization technique description**	The coulometers were calibrated by injecting aliquots of pure CO2 (99.99%) by means of an 8-port valve outfitted with two sample loops with known gas volumes bracketing the amount of CO2 extracted from the water samples for the two AOML systems.	22.12.1
80	**DIC: Frequency of standardization**	The stability of each coulometer cell solution was confirmed three different ways: two sets of gas loops were measured at the beginning; also the Certified Reference Material (CRM), supplied by Dr. A. Dickson of UCSD, were measured at the beginning; and the duplicate samples at the beginning, middle, and end of each cell solution. The coulometer cell solution was replaced after 25 mg of carbon was titrated, typically after 9 to 12 hours of continuous use.	22.12.2
81	**DIC: CRM manufacturer**	Dr. A. Dickson of UCSD	22.12.3.1
82	**DIC: Batch number**	Batch 129, 144,123	22.12.3.2
83	**DIC: Poison used to kill the sample**	saturated HgCl2	22.13.1
84	**DIC: Poison volume**	0.2 ml	22.13.2
85	**DIC Poisoning correction description**	The DIC values were corrected for dilution by 0.2 ml of saturated HgCl2 used for sample preservation. The total water volume of the sample bottles was 288 ml (calibrated by Esa Peltola, AOML). The correction factor used for dilution was 1.00037.	22.13.3
86	**DIC: Uncertainty**		22.14
87	**DIC: Data quality flag description**	WOCE quality control flags are used: 2 = good value, 3 = questionable value, 4 = bad value, 5 = value not reported, 6 = mean of replicate measurements, 9 = sample not drawn.	22.15
88	**DIC: Method reference (citation)**	Dickson, A.G., Sabine, C.L. and Christian, J.R. (Eds.) 2007. Guide to best practices for ocean CO2 measurements. PICES Special Publication 3, 191 pp. Johnson, K.M., Kortzinger, A.; Mintrop, L.; Duinker, J.C.; and Wallace, D.W.R. (1999). Coulometric total carbon dioxide analysis for marine studies: Measurement and internal consistency of underway surface TCO2 concentrations. Marine Chemistry 67:123 to 44. Johnson, K.M., Wills, K.D.; Butler, D.B.; Johnson, W.K.; and Wong, C.S. (1993). Coulometric total carbon dioxide analysis for marine studies: Maximizing the performance of an automated gas extraction. Johnson, K.M. (1992). Operator Manual: Single-Operator Multiparameter Metabolic Analyzer (SOMMA) for Total Carbon Dioxide (CT) with Coulometric Detection. Brookhaven National Laboratory, Brookhaven, N.Y. Johnson, K.M.; Williams, P.J.; Brandstrom, L.; and McN. Sieburth, J. (1987). Coulometric total carbon analysis for marine studies: Automation and calibration. Marine Chemistry 21:117 to 33.	22.16
89	**DIC: Researcher Name**	Rik Wanninkhof	22.17.1
90	**DIC: Researcher Institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	22.17.2
91	**TA: Variable abbreviation in data files**	TAlk	23.1
92	**TA: Observation type**	Underway (flow through)	23.2

93	**TA: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	23.3
94	**TA: Manipulation method (SPECIAL USE ONLY)**		23.4
95	**TA: Variable unit**	micro-mol/kg	23.5
96	**TA: Measured or calculated**	Measured	23.6
97	**TA: Calculation method and parameters**		23.7
98	**TA: Sampling instrument**	Flow through system	23.8
99	**TA: Analyzing instrument**	Semi-automatic titration systems, System 1 consists of a Metrohm 765 Dosimat titrator, a pH meter (Orion 720A, ThermoScientific), a ROSS half cell pH glass electrode (Orion 9101BN, ThermoScientific) and a reference electrode (Orion 900200, ThermoScientific).	23.9
100	**TA: Type of titration**	Full Titration	23.10
101	**TA: Cell type (open or closed)**	Open	23.11
102	**TA: Curve fitting method**	Least-Square Analysis	23.12
103	**TA: Detailed sampling and analyzing information**	All of the samples were run using leftover water from the same sample bottles used for DIC and pH. Please refer to DIC for detailed information on sampling and conservation of samples. For each measurement, approximately 200 ml of water sample were titrated with an HCl solution provided by Dr. Andrew Dickson of UCSD (0.25175 moles per kilogram-solution). Please consult the accompanying Readme file for additional details.	23.13
104	**TA: Field replicate information**	19 samples each 500-ml, 6 sets of duplicate samples.	23.14
105	**TA: Standardization technique description**	2 CRM samples were run daily on each cell, before and after the seawater samples. The Total Alkalinity for the water samples was corrected using the daily averaged ratios between the certified and measured values of the 2 CRMs run on each cell. This TA titration system has a precision of 0.1 %. All the TA values were directly measured with reference to Certified Reference Material. The accuracy after correction is 0.1%. Please check attached pdf for more details.	23.15.1
106	**TA: Frequency of standardization**	All values were directly measured with reference to Certified Reference Material (Dickson, UCSD). 2 CRM samples were run daily on each cell.	23.15.2
107	**TA: CRM manufacturer**	Dr. A. Dickson of UCSD	23.15.3.1
108	**TA: Batch Number**	CRM batch: 129, 144, 120, 123	23.15.3.2
109	**TA: Poison used to kill the sample**	saturated HgCl2	23.16.1
110	**TA: Poison volume**	0.2 ml	23.16.2
111	**TA: Poisoning correction description**		23.16.3
112	**TA: Magnitude of blank correction**		23.17
113	**TA: Uncertainty**	The precision of this method is better than 0.1% and accuracy is 0.1%.	23.18
114	**TA: Data quality flag description**	WOCE quality control flags are used: 2 = good value, 3 = questionable value, 4 = bad value, 5 = value not reported, 6 = mean of replicate measurements, 9 = sample not drawn.	23.19
115	**TA: Method reference (citation)**	Millero, F. J., Zhang, J. Z., Lee, K., & Campbell, D. M. (1993). Titration alkalinity of seawater. *Marine Chemistry* , *44* (2), 153-165.	23.20
116	**TA: Researcher Name**	Rik Wanninkhof	23.21.1
117	**TA: Researcher Institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	23.21.2
118	**pH: Variable abbreviation in data files**	pH	24.1
119	**pH: Observation type**	Underway (flow through)	24.2
120	**pH: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	24.3
121	**pH: Manipulation method (SPECIAL USE ONLY)**		24.4
122	**pH: Measured or calculated**	Measured	24.5
123	**pH: Calculation method and parameters**		24.6
124	**pH: Sampling instrument**	Flow through system	24.7
125	**pH: Analyzing instrument**	Agilent 8453 spectrometer setup with a custom-made temperature-controlled cell holder	24.8
126	**pH: pH scale**	Total	24.9
127	**pH: Temperature of measurement**	20 (+/- 0.05) degrees Celsius	24.10

128	**pH: Detailed sampling and analyzing information**	The same sample bottle was used for pH, DIC and Talk analyses, with pH being analyzed first. The samples were fixed with HgCl2 (refer to DIC for more information on sampling and storage). Samples were thermostated at 20 (+/- 0.05) degrees Celsius in a water bath. Approximately 80 ml of sample were extracted from each DIC sample bottle by syringe before DIC analysis to determine the pH. Temperature for each sample was measured before analysis using a Hart Scientific Fluke 1523 reference thermometer. Absorbance blanks were taken for each sample and 10 micro liter of purified m-cresol purple (10 mmol kg-1) were added for the analysis. The equations of Liu et al, 2011 formulated using the purified m-cresol purple indicator were used to determine pH of the samples. pH samples were analyzed at 20C. Please check accompanying readme file for additional details.	24.11
129	**pH: Field replicate information**	19 samples each 500-ml, 6 sets of duplicate samples.	24.12
130	**pH: Standardization technique description**	The pH is calibration-free.	24.13.1
131	**pH: Frequency of standardization**		24.13.2
132	**pH: pH values of the standards**		24.13.3
133	**pH: Temperature of standardization**		24.13.4
134	**pH: Temperature correction method**		24.14
135	**pH: at what temperature was pH reported**	20 degrees Celsius	24.15
136	**pH: Uncertainty**	Please check attached pdf for more details	24.16
137	**pH: Data quality flag description**	WOCE quality control flags are used: 2 = good value, 3 = questionable value, 4 = bad value, 5 = value not reported, 6 = mean of replicate measurements, 9 = sample not drawn.	24.17
138	**pH: Method reference (citation)**	Liu, X.; Patsavas, M.C.; and Byrne, R. H. (2011). Purification and characterization of meta-cresol purple for spectrophotometric seawater pH measurements. Environmental Science and Technology, 45(11), 4862-4868. doi: 10.1021/es200665d	24.18
139	**pH: Researcher Name**	Rik Wanninkhof	24.19.1
140	**pH: Researcher Institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	24.19.2
141	**pCO2A: Variable abbreviation in data files**		25.1
142	**pCO2A: Observation type**		25.2
143	**pCO2A: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**		25.3
144	**pCO2A: Manipulation method (SPECIAL USE ONLY)**		25.4
145	**pCO2A: Variable unit**		25.5
146	**pCO2A: Measured or calculated**		25.6
147	**pCO2A: Calculation method and parameters**		25.7
148	**pCO2A: Sampling instrument**		25.8
149	**pCO2A: Location of seawater intake**		25.9
150	**pCO2A: Depth of seawater intake**		25.10
151	**pCO2A: Analyzing instrument**		25.11
152	**pCO2A: Detailed sampling and analyzing information**		25.12
153	**pCO2A: Equilbrator type**		25.13.1
154	**pCO2A: Equilibrator volume (L)**		25.13.2
155	**pCO2A: Vented or not**		25.13.3
156	**pCO2A: Water flow rate (L/min)**		25.13.4
157	**pCO2A: Headspace gas flow rate (L/min)**		25.13.5
158	**pCO2A: How was temperature inside the equilibrator measured .**		25.13.6
159	**pCO2A: How was pressure inside the equilibrator measured.**		25.13.7
160	**pCO2A: Drying method for CO2 gas**		25.14
161	**pCO2A: Manufacturer of the gas detector**		25.15.1
162	**pCO2A: Model of the gas detector**		25.15.2
163	**pCO2A: Resolution of the gas detector**		25.15.3
164	**pCO2A: Uncertainty of the gas detector**		25.15.4
165	**pCO2A: Standardization technique description**		25.16.1
166	**pCO2A: Frequency of standardization**		25.16.2
167	**pCO2A: Manufacturer of standard gas**		25.16.3.1

168	**pCO2A: Concentrations of standard gas**		25.16.3.2
169	**pCO2A: Uncertainties of standard gas**		25.16.3.3
170	**pCO2A: Water vapor correction method**		25.17
171	**pCO2A: Temperature correction method**		25.18
172	**pCO2A: at what temperature was pCO2 reported**		25.19
173	**pCO2A: Uncertainty**		25.20
174	**pCO2A: Data quality flag description**		25.21
175	**pCO2A: Method reference (citation)**		25.22
176	**pCO2A: Researcher Name**		25.23.1
177	**pCO2A: Researcher Institution**		25.23.2
178	**pCO2D: Variable abbreviation in data files**		26.1
179	**pCO2D: Observation type**		26.2
180	**pCO2D: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**		26.3
181	**pCO2D: Manipulation method (SPECIAL USE ONLY)**		26.4
182	**pCO2D: Variable unit**		26.5
183	**pCO2D: Measured or calculated**		26.6
184	**pCO2D: Calculation method and parameters**		26.7
185	**pCO2D: Sampling instrument**		26.8
186	**pCO2D: Analyzing instrument**		26.9
187	**pCO2D: Storage method**		26.10
188	**pCO2D: Seawater volume (mL)**		26.11
189	**pCO2D: Headspace volume (mL)**		26.12
190	**pCO2D: Temperature of measurement**		26.13
191	**pCO2D: Detailed sampling and analyzing information**		26.14
192	**pCO2D: Field replicate information**		26.15
193	**pCO2D: Manufacturer of the gas detector**		26.16.1
194	**pCO2D: Model of the gas detector**		26.16.2
195	**pCO2D: Resolution of the gas detector**		26.16.3
196	**pCO2D: Uncertainty of the gas detector**		26.16.4
197	**pCO2D: Standardization technique description**		26.17.1
198	**pCO2D: Frequency of standardization**		26.17.2
199	**pCO2D: Temperature of standardization**		26.17.3
200	**pCO2D: Manufacturer of standard gas**		26.17.4.1
201	**pCO2D: Concentrations of standard gas**		26.17.4.2
202	**pCO2D: Uncertainties of standard gas**		26.17.4.3
203	**pCO2D: Water vapor correction method**		26.18
204	**pCO2D: Temperature correction method**		26.19
205	**pCO2D: at what temperature was pCO2 reported**		26.20
206	**pCO2D: Uncertainty**		26.21
207	**pCO2D: Data quality flag description**		26.22
208	**pCO2D: Method reference (citation)**		26.23
209	**pCO2D: Researcher Name**		26.24.1
210	**pCO2D: Researcher Institution**		26.24.2
211	**Var1: Variable abbreviation in data files**	Depth_sampling	27.1
212	**Var1: Full variable name**	Depth of water at sample collection	27.2
213	**Var1: Observation type**	Flow-through (surface samples)	27.4
214	**Var1: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
215	**Var1: Variable unit**	meters	27.7
216	**Var1: Measured or calculated**		27.8
217	**Var1: Calculation method and parameters**		27.9
218	**Var1: Sampling instrument**		27.10

219	**Var1: Analyzing instrument**		27.11
220	**Var1: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
221	**Var1: Detailed sampling and analyzing information**		27.13
222	**Var1: Field replicate information**		27.14
223	**Var1: Uncertainty**		27.15
224	**Var1: Data quality flag description**		27.16
225	**Var1: Method reference (citation)**		27.17
226	**Var1: Biological subject (SPECIAL USE ONLY)**		27.18
227	**Var1: Species Identification code (SPECIAL USE ONLY)**		27.19
228	**Var1: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
229	**Var1: Researcher Name**	Rik Wanninkhof	27.21.1
230	**Var1: Researcher Institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	27.21.2
231	**Var2: Variable abbreviation in data files**	SST_C	27.1
232	**Var2: Full variable name**	Water temperature	27.2
233	**Var2: Observation type**	Flow-through	27.4
234	**Var2: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
235	**Var2: Variable unit**	degrees celsius (ITS-90)	27.7
236	**Var2: Measured or calculated**	Measured	27.8
237	**Var2: Calculation method and parameters**		27.9
238	**Var2: Sampling instrument**	SBE 38	27.10
239	**Var2: Analyzing instrument**		27.11
240	**Var2: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
241	**Var2: Detailed sampling and analyzing information**		27.13
242	**Var2: Field replicate information**		27.14
243	**Var2: Uncertainty**	plus or minus 0.001 degrees celsius	27.15
244	**Var2: Data quality flag description**	-999 indicates bad or missing data	27.16
245	**Var2: Method reference (citation)**		27.17
246	**Var2: Biological subject (SPECIAL USE ONLY)**		27.18
247	**Var2: Species Identification code (SPECIAL USE ONLY)**		27.19
248	**Var2: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
249	**Var2: Researcher Name**	Rik Wanninkhof	27.21.1
250	**Var2: Researcher Institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	27.21.2
251	**Var3: Variable abbreviation in data files**	SAL	27.1
252	**Var3: Full variable name**	Salinity	27.2
253	**Var3: Observation type**	Profile	27.4
254	**Var3: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	In-situ observation	27.5
255	**Var3: Variable unit**	practical salinity scale of 1978	27.7
256	**Var3: Measured or calculated**		27.8
257	**Var3: Calculation method and parameters**		27.9
258	**Var3: Sampling instrument**	SBE 45	27.10
259	**Var3: Analyzing instrument**		27.11
260	**Var3: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
261	**Var3: Detailed sampling and analyzing information**		27.13
262	**Var3: Field replicate information**		27.14
263	**Var3: Uncertainty**	plus or minus 0.005	27.15
264	**Var3: Data quality flag description**	-999 indicates bad or missing data	27.16

265	**Var3: Method reference (citation)**		27.17
266	**Var3: Biological subject (SPECIAL USE ONLY)**		27.18
267	**Var3: Species Identification code (SPECIAL USE ONLY)**		27.19
268	**Var3: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
269	**Var3: Researcher Name**	Rik Wanninkhof	27.21.1
270	**Var3: Researcher Institution**	Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration (NOAA)	27.21.2
271	**Var4: Variable abbreviation in data files**		27.1
272	**Var4: Full variable name**		27.2
273	**Var4: Observation type**		27.4
274	**Var4: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**		27.5
275	**Var4: Variable unit**		27.7
276	**Var4: Measured or calculated**		27.8
277	**Var4: Calculation method and parameters**		27.9
278	**Var4: Sampling instrument**		27.10
279	**Var4: Analyzing instrument**		27.11
280	**Var4: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
281	**Var4: Detailed sampling and analyzing information**		27.13
282	**Var4: Field replicate information**		27.14
283	**Var4: Uncertainty**		27.15
284	**Var4: Data quality flag description**		27.16
285	**Var4: Method reference (citation)**		27.17
286	**Var4: Biological subject (SPECIAL USE ONLY)**		27.18
287	**Var4: Species Identification code (SPECIAL USE ONLY)**		27.19
288	**Var4: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
289	**Var4: Researcher Name**		27.21.1
290	**Var4: Researcher Institution**		27.21.2
291	**Var5: Variable abbreviation in data files**		27.1
292	**Var5: Full variable name**		27.2
293	**Var5: Observation type**		27.4
294	**Var5: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**		27.5
295	**Var5: Variable unit**		27.7
296	**Var5: Measured or calculated**		27.8
297	**Var5: Calculation method and parameters**		27.9
298	**Var5: Sampling instrument**		27.10
299	**Var5: Analyzing instrument**		27.11
300	**Var5: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**		27.12
301	**Var5: Detailed sampling and analyzing information**		27.13
302	**Var5: Field replicate information**		27.14
303	**Var5: Uncertainty**		27.15
304	**Var5: Data quality flag description**		27.16
305	**Var5: Method reference (citation)**		27.17
306	**Var5: Biological subject (SPECIAL USE ONLY)**		27.18
307	**Var5: Species Identification code (SPECIAL USE ONLY)**		27.19
308	**Var5: Life stage of the Biological subject (SPECIAL USE ONLY)**		27.20
309	**Var5: Researcher Name**		27.21.1

310	Var5: Researcher Institution	27.21.2
311	Var6: Variable abbreviation in data files	27.1
312	Var6: Full variable name	27.2
313	Var6: Observation type	27.4
314	Var6: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)	27.5
315	Var6: Variable unit	27.7
316	Var6: Measured or calculated	27.8
317	Var6: Calculation method and parameters	27.9
318	Var6: Sampling instrument	27.10
319	Var6: Analyzing instrument	27.11
320	Var6: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)	27.12
321	Var6: Detailed sampling and analyzing information	27.13
322	Var6: Field replicate information	27.14
323	Var6: Uncertainty	27.15
324	Var6: Data quality flag description	27.16
325	Var6: Method reference (citation)	27.17
326	Var6: Biological subject (SPECIAL USE ONLY)	27.18
327	Var6: Species Identification code (SPECIAL USE ONLY)	27.19
328	Var6: Life stage of the Biological subject (SPECIAL USE ONLY)	27.20
329	Var6: Researcher Name	27.21.1
330	Var6: Researcher Institution	27.21.2
331	Var7: Variable abbreviation in data files	27.1
332	Var7: Full variable name	27.2
333	Var7: Observation type	27.4
334	Var7: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)	27.5
335	Var7: Variable unit	27.7
336	Var7: Measured or calculated	27.8
337	Var7: Calculation method and parameters	27.9
338	Var7: Sampling instrument	27.10
339	Var7: Analyzing instrument	27.11
340	Var7: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)	27.12
341	Var7: Detailed sampling and analyzing information	27.13
342	Var7: Field replicate information	27.14
343	Var7: Uncertainty	27.15
344	Var7: Data quality flag description	27.16
345	Var7: Method reference (citation)	27.17
346	Var7: Biological subject (SPECIAL USE ONLY)	27.18
347	Var7: Species Identification code (SPECIAL USE ONLY)	27.19
348	Var7: Life stage of the Biological subject (SPECIAL USE ONLY)	27.20
349	Var7: Researcher Name	27.21.1
350	Var7: Researcher Institution	27.21.2
351	Var8: Variable abbreviation in data files	27.1
352	Var8: Full variable name	27.2
353	Var8: Observation type	27.4
354	Var8: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)	27.5
355	Var8: Variable unit	27.7

356	**Var8: Measured or calculated**	27.8
357	**Var8: Calculation method and parameters**	27.9
358	**Var8: Sampling instrument**	27.10
359	**Var8: Analyzing instrument**	27.11
360	**Var8: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**	27.12
361	**Var8: Detailed sampling and analyzing information**	27.13
362	**Var8: Field replicate information**	27.14
363	**Var8: Uncertainty**	27.15
364	**Var8: Data quality flag description**	27.16
365	**Var8: Method reference (citation)**	27.17
366	**Var8: Biological subject (SPECIAL USE ONLY)**	27.18
367	**Var8: Species Identification code (SPECIAL USE ONLY)**	27.19
368	**Var8: Life stage of the Biological subject (SPECIAL USE ONLY)**	27.20
369	**Var8: Researcher Name**	27.21.1
370	**Var8: Researcher Institution**	27.21.2
371	**Var9: Variable abbreviation in data files**	27.1
372	**Var9: Full variable name**	27.2
373	**Var9: Observation type**	27.4
374	**Var9: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	27.5
375	**Var9: Variable unit**	27.7
376	**Var9: Measured or calculated**	27.8
377	**Var9: Calculation method and parameters**	27.9
378	**Var9: Sampling instrument**	27.10
379	**Var9: Analyzing instrument**	27.11
380	**Var9: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**	27.12
381	**Var9: Detailed sampling and analyzing information**	27.13
382	**Var9: Field replicate information**	27.14
383	**Var9: Uncertainty**	27.15
384	**Var9: Data quality flag description**	27.16
385	**Var9: Method reference (citation)**	27.17
386	**Var9: Biological subject (SPECIAL USE ONLY)**	27.18
387	**Var9: Species Identification code (SPECIAL USE ONLY)**	27.19
388	**Var9: Life stage of the Biological subject (SPECIAL USE ONLY)**	27.20
389	**Var9: Researcher Name**	27.21.1
390	**Var9: Researcher Institution**	27.21.2
391	**Var10: Variable abbreviation in data files**	27.1
392	**Var10: Full variable name**	27.2
393	**Var10: Observation type**	27.4
394	**Var10: In-situ observation / manipulation condition / response variable (SPECIAL USE ONLY)**	27.5
395	**Var10: Variable unit**	27.7
396	**Var10: Measured or calculated**	27.8
397	**Var10: Calculation method and parameters**	27.9
398	**Var10: Sampling instrument**	27.10
399	**Var10: Analyzing instrument**	27.11
400	**Var10: Duration (for settlement/colonization methods) (SPECIAL USE ONLY)**	27.12
401	**Var10: Detailed sampling and analyzing information**	27.13

402	**Var10: Field replicate information**	27.14
403	**Var10: Uncertainty**	27.15
404	**Var10: Data quality flag description**	27.16
405	**Var10: Method reference (citation)**	27.17
406	**Var10: Biological subject (SPECIAL USE ONLY)**	27.18
407	**Var10: Species Identification code (SPECIAL USE ONLY)**	27.19
408	**Var10: Life stage of the Biological subject (SPECIAL USE ONLY)**	27.20
409	**Var10: Researcher Name**	27.21.1
410	**Var10: Researcher Institution**	27.21.2
411	**Var11: Variable abbreviation in data files**	28.1
412	**Var11: Full variable name**	28.2
413	**Var12: Variable abbreviation in data files**	28.1
414	**Var12: Full variable name**	28.2