

| No | Metadata element name | Your input |
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| 1 | Submission Date | 8/9/2019 |
| 2 | Accession no. of related data sets | |
| 3 | Investigator-1 name | Joe Salisbury |
| 4 | Investigator-1 institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 5 | Investigator-1 address | 8 College Road, Durham, NH 03824, USA |
| 6 | Investigator-1 phone | (603) 862-0849 |
| 7 | Investigator-1 email | Joe.Salisbury@unh.edu |
| 8 | Investigator-1 researcher ID | |
| 9 | Investigator-1 ID type (ORCID, Researcher ID, etc.) | |
| 10 | Investigator-2 name | Wei-Jun Cai |
| 11 | Investigator-2 institution | College of Earth, Ocean, and the Environment, University of Delaware |
| 12 | Investigator-2 address | 014 Lammot DuPont Lab, Newark, DE 19716 |
| 13 | Investigator-2 phone | 302-831-2839 |
| 14 | Investigator-2 email | wcai@udel.edu |
| 15 | Investigator-2 researcher ID | |
| 16 | Investigator-2 ID type (ORCID, Researcher ID, etc.) | |
| 17 | Investigator-3 name | Rik Wanninkhof |
| 18 | Investigator-3 institution | Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration |
| 19 | Investigator-3 address | 4301 Rickenbacker Causeway, Miami, FL 33149, USA |
| 20 | Investigator-3 phone | (305) 361-4379 |
| 21 | Investigator-3 email | Rik.Wanninkhof@noaa.gov |
| 22 | Investigator-3 researcher ID | |
| 23 | Investigator-3 ID type (ORCID, Researcher ID, etc.) | |
| 681 | PI-4 name | Shawn Shellito |
| 682 | PI-4 institution | University of New Hampshire |
| 683 | PI-4 address | 8 College Road, Durham NH 03824 |
| 684 | PI-4 phone | (603) 862-2999 |
| 685 | PI-4 email | shawn.shellito@unh.edu |
| | Investigator researcher ID | |
| | Investigator ID type (ORCID, Researcher ID, etc.) | |
| 686 | PI-5 name | Bror Jonsson |
| 687 | PI-5 institution | University of New Hampshire |
| 688 | PI-5 address | 8 College Road, Durham NH 03824 |
| 689 | PI-5 phone | (603)-862-3421 |
| 690 | PI-5 email | bror.jonsson@unh.edu |
| | Investigator researcher ID | |
| | Investigator ID type (ORCID, Researcher ID, etc.) | |
| 691 | PI-6 name | Chris Langdon |
| 692 | PI-6 institution | University of Miami |
| 693 | PI-6 address | 4600 Rickenbacker Causeway, Miami, FL 33149 |
| 694 | PI-6 phone | (305) 421-4614 |
| 695 | PI-6 email | clangdon@rsmas.miami.edu |
| | Investigator researcher ID | |
| | Investigator ID type (ORCID, Researcher ID, etc.) | |
| 696 | PI-7 name | Antonio Mannino |
| 697 | PI-7 institution | NASA Goddard Space Flight Center |
| 698 | PI-7 address | Mail Code 616.1, Greenbelt, MD 20771 |
| 699 | PI-7 phone | 301-286-0182 |
| 700 | PI-7 email | antonio.mannino-1@nasa.gov |
| | Investigator researcher ID | |
| | Investigator ID type (ORCID, Researcher ID, etc.) | |
| 701 | PI-8 name | Leticia Barbero |

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| 702 | PI-8 institution | Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration |
| 703 | PI-8 address | 4301 Rickenbacker Causeway, Miami, FL 33149, USA |
| 704 | PI-8 phone | (305) 361-4453 |
| 705 | PI-8 email | Leticia.Barbero@noaa.gov |
| | Investigator researcher ID | |
| | Investigator ID type (ORCID, Researcher ID, etc.) | |
| 706 | PI-9 name | David W. Townsend |
| 707 | PI-9 institution | University of Maine |
| 708 | PI-9 address | 341 Aubert Hall, Orono, ME 04469-5706 |
| 709 | PI-9 phone | (207)581-4367 |
| 710 | PI-9 email | davidt@maine.edu |
| | Investigator researcher ID | |
| | Investigator ID type (ORCID, Researcher ID, etc.) | |
| 711 | PI-10 name | Kumiko Azetsu-Scott |
| 712 | PI-10 institution | DFO- Fisheries and Oceans Canada |
| 713 | PI-10 address | Bedford Institute of Oceanography |
| 714 | PI-10 phone | 902-426-8572 |
| 715 | PI-10 email | Kumiko.Azetsu-Scott@dfo-mpo.gc.ca |
| | Investigator researcher ID | |
| | Investigator ID type (ORCID, Researcher ID, etc.) | |
| 24 | Data submitter name | Shawn Shellito |
| 25 | Data submitter institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 26 | Data submitter address | 8 College Road, Durham, NH 03824, USA |
| 27 | Data submitter phone | (603) 862-0849 |
| 28 | Data submitter email | shawn.shellito@unh.edu |
| 29 | Data submitter researcher ID | |
| 30 | Data submitter ID type (ORCID, Researcher ID, etc.) | |
| 31 | Title | ECO2 Discrete Sampling |
| 32 | Abstract | The East Coast Ocean Acidification (ECO2) Cruise on board the R/V Henry Bigelow from Newport, took place in the Gulf of Maine and then along the East US coast to Miami. The effort was in support of the coastal monitoring and research objectives of the NOAA Ocean Acidification Program (OAP). The cruise was designed to obtain a snapshot of key carbon, physical, and biogeochemical parameters as they relate to ocean acidification (OA) in the coastal realm. The cruise included a series of 14 transects approximately orthogonal to the Gulf of Maine and Atlantic coasts and a comprehensive set of underway measurements along the entire transect. |
| 33 | Purpose | To measure key carbon, physical and biogeochemical parameters in coastal waters of the Gulf of Maine and eastern coast of the US in relation to Ocean Acidification. |
| 34 | Start date | 2018-06-25 |
| 35 | End date | 2018-07-29 |
| 36 | Westbd longitude | -80.6 |
| 37 | Eastbd longitude | -61.3 |
| 38 | Northbd latitude | 44.4 |
| 39 | Southbd latitude | 26.6 |
| 40 | Spatial reference system | |
| 41 | Geographic names | |
| 42 | Location of organism collection | |
| 43 | Funding agency name | NOAA's Ocean Acidification Program |
| 44 | Funding project title | ECO2 Cruise |
| 45 | Funding project ID (Grant no.) | OAP1812-1527 |

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| 46 | Research projects | |
| 47 | Platform-1 name | RV Henry Bigelow |
| 48 | Platform-1 ID | 33HH 9305 |
| 49 | Platform-1 type | Research Vessel |
| 50 | Platform-1 owner | NOAA |
| 51 | Platform-1 country | USA |
| 52 | EXPCODE | 33HH20180625 |
| 53 | Cruise ID | HB-18-04 ECOA2 |
| 54 | Section | |
| 55 | Author list for citation | Salisbury, J. and Shellito S. 2019. ECOA 2 cruise station discrete data. National Oceanographic Data Center. |
| 56 | References | Salisbury, J.and Shellito S. 2017. ECOA Report. |
| 57 | Supplemental information | N/A |
| 58 | DIC: Variable abbreviation in data files | DIC_AOML |
| 59 | DIC: Observation type | Profile and surface underway |
| 60 | DIC: In-situ observation / manipulation condition / response variable | In-situ observation |
| 61 | DIC: Manipulation method | Acid |
| 62 | DIC: Variable unit | micromol/kg |
| 63 | DIC: Measured or calculated | Measured |
| | | Calculation of the amount of CO ₂ injected was according to the CO ₂ handbook (DOE 1994). The concentration of CO ₂ ([CO ₂]) in the samples was determined according to: [CO ₂] = Cal. Factor * $\frac{(\text{Counts} - \text{Blank} * \text{Run Time}) * K \text{ } \mu\text{mol/count}}{\text{pipette volume} * \text{density of sample}}$ |
| 64 | DIC: Calculation method and parameters | where Cal. Factor is the calibration factor, Counts is the instrument reading at the end of the analysis, Blank is the counts/minute determined from blank runs performed at least once for each cell solution, Run Time is the length of coulometric titration (in minutes), and K is the conversion factor from counts to micromoles. |
| 65 | DIC: Sampling instrument | Niskin bottle and flow through pump |
| 66 | 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) |

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| | <p>Samples for total dissolved inorganic carbon (DIC) measurements were drawn according to procedures outlined in the Handbook of Methods for CO₂ Analysis (DOE 1994) 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 for a maximum of 12 hours prior to analysis.</p> <p>The DIC analytical equipment was set up in a seagoing laboratory van. The analysis was done by coulometry with two analytical systems (AOML3 and AOML4) used simultaneously on the cruise. 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⁻ 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.</p> <p>The pipette volume was determined by taking aliquots at known temperature of distilled water from the volumes. The weights with the appropriate densities were used to determine the volume of the pipettes.</p> <p>Calculation of the amount of CO₂ injected was according to the CO₂ handbook (DOE 1994).</p> <p>The instrument has a salinity sensor, but all DIC values were recalculated to a molar weight (μmol/kg) using density obtained from the CTD's salinity. The DIC values were corrected for dilution by 0.2 ml of saturated HgCl₂ used for sample preservation. 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. The average correction was 2.13 μmol/kg.</p> <p>While both systems worked very well during the cruise, they occasionally had high blanks. Normally the blank is less than 30, but we were forced to run them with blanks in the 12-38 range.</p> <p>Several relatively minor problems occurred with AOML 3 during the cruise; (1) A power problem on 06/20/2015 with the coulometer was resolved by plugging several items into different outlets instead of all into the same power strip, (2) Pipette filling problem (liquid level sensor error) which started on 06/28/2015 was resolved on 07/08/2015 by replacing sample tubing and valve/inlet 13, (3) the coulometer was malfunctioning on 07/10/2015 and not responding to the computer/labview program and was switched out with an older version coulometer (AOML5), which was used for the remainder of the cruise, and (4) a field point communication error occurred on 07/16/2015 and was resolved by tightening the serial port connection to DICE 3. AOML 4 worked well during the cruise with no problems. Underway samples were collected from the flow thru system in the Wet Lab during transits between station lines. Discrete DIC samples were collected every hour with duplicates every fifth sample.</p> |
| 67 | DIC: Detailed sampling and analyzing information |
| 68 | DIC: Field replicate information |
| 69 | DIC: Standardization technique description |
| 70 | DIC: Frequency of standardization |
| 71 | DIC: CRM manufacturer |
| 72 | DIC: Batch number |
| 73 | DIC: Poison used to kill the sample |
| 74 | DIC: Poison volume |
| 75 | DIC Poisoning correction description |
| 76 | DIC: Uncertainty |
| 77 | DIC: Data quality flag description |

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| 78 | DIC: Method reference (citation) | DOE (U.S. Department of Energy). (1994). Handbook of Methods for the Analysis of the Various Parameters of the Carbon Dioxide System in Seawater. Version 2.0. ORNL/CDIAC-74. Ed. A. G. Dickson and C. Goyet. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tenn. Johnson, K.M., Körtzinger, 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 TCO ₂ concentrations. Marine Chemistry 67:123–44. 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's 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 21:117–33. |
| 79 | DIC: Researcher Name | Rik Wanninkhof ¹ , Leticia Barbero ^{1, 2} |
| 80 | DIC: Researcher Institution | Atlantic Oceanographic and Meteorological Laboratory, National Oceanic and Atmospheric Administration ¹ , University of Miami, CIMAS ² |
| 81 | TA: Variable abbreviation in data files | ALKALI |
| 82 | TA: Observation type | Laboratory experiment |
| 83 | TA: In-situ observation / manipulation condition / response variable | Manipulation condition |
| 84 | TA: Manipulation method | Acid |
| 85 | TA: Variable unit | umol/kg |
| 86 | TA: Measured or calculated | Measured |
| 87 | TA: Calculation method and parameters | |
| 88 | TA: Sampling instrument | Niskin bottle and flow through pump |
| 89 | TA: Analyzing instrument | Semi-automated total alkalinity titration system (AS-ALK2, Apollo Scitech). This system consists of two high precision Kioehn digital pumps which are equipped with 1 ml and 25 ml syringes. an Orion Star A211 pH meter (Thermo Scientific). and an Orion 8102BN ROSS combination pH electrode (Thermo Scientific). and a Gran titration |
| 90 | TA: Type of titration | |
| 91 | TA: Cell type (open or closed) | Open |
| 92 | TA: Curve fitting method | Linear least squares regression |
| | | Samples were measured within 24 hours of collection except for samples collected from station 19, which were poisoned with saturated HgCl ₂ . |
| 93 | TA: Detailed sampling and analyzing information | TA samples were collected directly from the Niskin bottle into 250 ml ground-glass borosilicate bottles without HgCl ₂ poisoning. TA was determined on 25 mL seawater samples by potentiometric titration, using 0.1 M hydrochloric acid and an open-cell titration system. All TA samples were analyzed in pre-thermostated glass cells. For each sample analysis, subsamples were sequentially analyzed at least twice until we obtained two replicates with a precision within 0.1%. |
| 94 | TA: Field replicate information | 50 duplicates were sampled during the cruise. |
| 95 | TA: Standardization technique description | The pH electrode was calibrated with three pH buffers (NBS) 4.01, 7.00, and 10.01. Recalibration was done every 12 to 24 hours. The concentration of HCl solution was standardized by the Certified Reference Material (CRM, batch#121 and batch#141). In addition, CRM was also used as sample to check the stability of the TA titration system every 12 hours or when necessary. |
| 96 | TA: Frequency of standardization | The concentration of hydrochloric acid was standardized once per day using the Certified Reference Material (CRM). |
| 97 | TA: CRM manufacturer | Dr. A. G. Dickson, Scripps Institution of Oceanography |
| 98 | TA: Batch Number | Batch#121 and batch#141 |
| 99 | TA: Poison used to kill the sample | N/A |
| 100 | TA: Poison volume | N/A |
| 101 | TA: Poisoning correction description | N/A |
| 102 | TA: Magnitude of blank correction | N/A |
| 103 | TA: Uncertainty | The precision of this method is better than 0.1% and accuracy is 0.1%. |
| 104 | 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. |

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| 105 | TA: Method reference (citation) | Gran, G. (1952). "Determination of the equivalence point in potentiometric titrations. Part II." Analyst 77(920): 661-671. Cai, W. J., X. P. Hu, W. J. Huang, L. Q. Jiang, Y. C. Wang, T. H. Peng and X. Zhang (2010). "Alkalinity distribution in the western North Atlantic Ocean margins." Journal of Geophysical Research 115: C08014. Huang, W. J., Y. C. Wang and W. J. Cai (2012). "Assessment of sample storage techniques for total alkalinity and dissolved inorganic carbon in seawater." Limnology and Oceanography: Methods 10: 711-717. Dickson, A. G., C. L. Sabine and J. R. Christian (2007). "Guide to Best Practices for Ocean CO2 Measurements." |
| 106 | TA: Researcher Name | Wei-Jun Cai |
| 107 | TA: Researcher Institution | University of Delaware |
| 108 | pH: Variable abbreviation in data files | PH_TOT |
| 109 | pH: Observation type | Laboratory experiment |
| 110 | pH: In-situ observation / manipulation condition / response variable | Manipulation condition |
| 111 | pH: Manipulation method | |
| 112 | pH: Measured or calculated | Measured |
| 113 | pH: Calculation method and parameters | |
| 114 | pH: Sampling instrument | Niskin bottle and flow through pump |
| 115 | pH: Analyzing instrument | The pH was measured using the spectrophotometric method on the total hydrogen ion concentration pH scale. The analyzing system consists of an Agilent 8453 UV-visible spectroscopy system, a high precision Klotz digital pump, a 10-cm light path quartz cell, a thermostated water bath, and a custom-made temperature-control system for spectrophotometer cell. |
| 116 | pH: pH scale | Total |
| 117 | pH: Temperature of measurement | 25 C. The temperature of measurement for each sample is 25 C |
| 118 | pH: Detailed sampling and analyzing information | Seawater was sampled directly from the Niskin bottle into a narrow neck 125 mL borosilicate glass bottle. After filling the bottle, we let several hundred mL of seawater overflow and then capped the bottle. While awaiting analysis, the samples were stored in the dark. Seawater was analyzed within 2 hours of collection. During analysis, the absorbance of a seawater blank was first measured at three wavelengths (578, 434, and 730 nm). Then the absorbance of the mixture of concentrated purified dye m-cresol purple (30 micro-liter, ~2 mmol/L, MCP) and seawater was measured at the same wavelengths. In addition, a double dye addition experiment was carried out at sea to evaluate the influence on pH due to the addition of dye into seawater. |
| 119 | pH: Field replicate information | 73 duplicates were sampled during the cruise. |
| 120 | pH: Standardization technique description | The pH data was guaranteed by purified m-cresol purple which was supplied by Dr. Robert H. Byrne at University of South Florida. |
| 121 | pH: Frequency of standardization | |
| 122 | pH: pH values of the standards | |
| 123 | pH: Temperature of standardization | |
| 124 | pH: Temperature correction method | |
| 125 | pH: at what temperature was pH reported | 20 C and 25 C. Reported at the temperature of measurement. |
| 126 | pH: Uncertainty | < 0.001 pH units |
| 127 | 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. Liu, X. W., M. C. Patsavas and R. H. Byrne (2011). "Purification and Characterization of meta-Cresol Purple for Spectrophotometric Seawater pH Measurements." Environmental Science & Technology 45(11): 4862-4868. |
| 128 | pH: Method reference (citation) | Clayton, T. D. and R. H. Byrne (1993). "Spectrophotometric seawater pH measurements - total hydrogen-ion concentration scale calibration of m-cresol purple and at-sea results." Deep-Sea Research Part I 40(10): 2115-2129. Dickson, A. G., C. L. Sabine and J. R. Christian (2007). "Guide to Best Practices for Ocean CO2 Measurements." |
| 129 | pH: Researcher Name | Wei-Jun Cai |
| 130 | pH: Researcher Institution | University of Delaware |
| 131 | pCO2A: Variable abbreviation in data files | |
| 132 | pCO2A: Observation type | |
| 133 | pCO2A: In-situ observation / manipulation condition / response variable | |
| 134 | pCO2A: Manipulation method | |
| 135 | pCO2A: Variable unit | |
| 136 | pCO2A: Measured or calculated | |
| 137 | pCO2A: Calculation method and parameters | |
| 138 | pCO2A: Sampling instrument | |
| 139 | pCO2A: Location of seawater intake | |
| 140 | pCO2A: Depth of seawater intake | |
| 141 | pCO2A: Analyzing instrument | |

142 pCO2A: Detailed sampling and analyzing information
143 pCO2A: Equilibrator type
144 pCO2A: Equilibrator volume (L)
145 pCO2A: Vented or not
146 pCO2A: Water flow rate (L/min)
147 pCO2A: Headspace gas flow rate (L/min)
148 pCO2A: How was temperature inside the equilibrator
measured .
149 pCO2A: How was pressure inside the equilibrator
measured.
150 pCO2A: Drying method for CO2 gas
151 pCO2A: Manufacturer of the gas detector
152 pCO2A: Model of the gas detector
153 pCO2A: Resolution of the gas detector
154 pCO2A: Uncertainty of the gas detector
155 pCO2A: Standardization technique description
156 pCO2A: Frequency of standardization
157 pCO2A: Manufacturer of standard gas
158 pCO2A: Concentrations of standard gas
159 pCO2A: Uncertainties of standard gas
160 pCO2A: Water vapor correction method
161 pCO2A: Temperature correction method
162 pCO2A: at what temperature was pCO2 reported
163 **pCO2A: Uncertainty**
164 pCO2A: Data quality flag description
165 pCO2A: Method reference (citation)
166 pCO2A: Researcher Name
167 pCO2A: Researcher Institution
168 **pCO2D: Variable abbreviation in data files**
169 pCO2D: Observation type
170 pCO2D: In-situ observation / manipulation condition /
response variable
171 pCO2D: Manipulation method
172 **pCO2D: Variable unit**
173 pCO2D: Measured or calculated
174 pCO2D: Calculation method and parameters
175 pCO2D: Sampling instrument
176 pCO2D: Analyzing instrument
177 pCO2D: Storage method
178 pCO2D: Seawater volume (mL)
179 pCO2D: Headspace volume (mL)
180 pCO2D: Temperature of measurement
181 pCO2D: Detailed sampling and analyzing information
182 pCO2D: Field replicate information
183 pCO2D: Manufacturer of the gas detector
184 pCO2D: Model of the gas detector
185 pCO2D: Resolution of the gas detector
186 pCO2D: Uncertainty of the gas detector
187 pCO2D: Standardization technique description
188 pCO2D: Frequency of standardization
189 pCO2D: Temperature of standardization
190 pCO2D: Manufacturer of standard gas
191 pCO2D: Concentrations of standard gas
192 pCO2D: Uncertainties of standard gas

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| 193 | pCO2D: Water vapor correction method | |
| 194 | pCO2D: Temperature correction method | |
| 195 | pCO2D: at what temperature was pCO2 reported | |
| 196 | pCO2D: Uncertainty | |
| 197 | pCO2D: Data quality flag description | |
| 198 | pCO2D: Method reference (citation) | |
| 199 | pCO2D: Researcher Name | |
| 200 | pCO2D: Researcher Institution | |
| 201 | Var1: Variable abbreviation in data files | Depth |
| 202 | Var1: Full variable name | CTD depth |
| 203 | Var1: Observation type | profile |
| 204 | Var1: In-situ observation / manipulation condition / response variable | In-situ observation |
| 205 | Var1: Variable unit | m |
| 206 | Var1: Measured or calculated | Measured |
| 207 | Var1: Calculation method and parameters | CTD |
| 208 | Var1: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 209 | Var1: Analyzing instrument | |
| 210 | Var1: Duration (for settlement/colonization methods) | |
| 211 | Var1: Detailed sampling and analyzing information | <p>A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECOA2/Cruise_Report.pdf. CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame (AOML's yellow frame), a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a PSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to cnv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5</p> |
| 212 | Var1: Field replicate information | |
| 213 | Var1: Uncertainty | |
| 214 | Var1: Data quality flag description | |
| 215 | Var1: Method reference (citation) | N/A |
| 216 | Var1: Biological subject | |
| 217 | Var1: Species Identification code | |
| 218 | Var1: Life stage of the biological subject | Joe Salisbury |
| 219 | Var1: Researcher Name | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 220 | Var1: Researcher Institution | |
| 221 | Var2: Variable abbreviation in data files | Pressure |
| 222 | Var2: Full variable name | CTD pressure |
| 223 | Var2: Observation type | profile |
| 224 | Var2: In-situ observation / manipulation condition / response variable | In-situ observation |
| 225 | Var2: Variable unit | dbars |
| 226 | Var2: Measured or calculated | Measured |
| 227 | Var2: Calculation method and parameters | CTD |
| 228 | Var2: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 229 | Var2: Analyzing instrument | |
| 230 | Var2: Duration (for settlement/colonization methods) | |

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| A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame, a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a PSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to csv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5 | |
| 231 | Var2: Detailed sampling and analyzing information |
| 232 | Var2: Field replicate information |
| 233 | Var2: Uncertainty |
| 234 | Var2: Data quality flag description |
| 235 | Var2: Method reference (citation) |
| 236 | Var2: Biological subject |
| 237 | Var2: Species Identification code |
| 238 | Var2: Life stage of the biological subject |
| 239 | Var2: Researcher Name |
| 240 | Var2: Researcher Institution |
| 241 | Var3: Variable abbreviation in data files |
| 242 | Var3: Full variable name |
| 243 | Var3: Observation type |
| 244 | Var3: In-situ observation / manipulation condition / response variable |
| 245 | Var3: Variable unit |
| 246 | Var3: Measured or calculated |
| 247 | Var3: Calculation method and parameters |
| 248 | Var3: Sampling instrument |
| 249 | Var3: Analyzing instrument |
| 250 | Var3: Duration (for settlement/colonization methods) |
| 251 | Var3: Detailed sampling and analyzing information |
| 252 | Var3: Field replicate information |
| 253 | Var3: Uncertainty |
| 254 | Var3: Data quality flag description |
| 255 | Var3: Method reference (citation) |
| 256 | Var3: Biological subject |
| 257 | Var3: Species Identification code |
| 258 | Var3: Life stage of the biological subject |
| 259 | Var3: Researcher Name |
| 260 | Var3: Researcher Institution |
| 261 | Var4: Variable abbreviation in data files |
| 262 | Var4: Full variable name |
| 263 | Var4: Observation type |
| 264 | Var4: In-situ observation / manipulation condition / response variable |
| 265 | Var4: Variable unit |
| 266 | Var4: Measured or calculated |
| 267 | Var4: Calculation method and parameters |
| 268 | Var4: Sampling instrument |
| 269 | Var4: Analyzing instrument |
| 270 | Var4: Duration (for settlement/colonization methods) |
| 271 | Var4: Detailed sampling and analyzing information |

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| 272 | Var4: Field replicate information | |
| 273 | Var4: Uncertainty | |
| 274 | Var4: 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. |
| 275 | Var4: Method reference (citation) | http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . |
| 276 | Var4: Biological subject | |
| 277 | Var4: Species Identification code | |
| 278 | Var4: Life stage of the biological subject | |
| 279 | Var4: Researcher Name | Joe Salisbury |
| 280 | Var4: Researcher Institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 281 | Var5: Variable abbreviation in data files | Temp_1 |
| 282 | Var5: Full variable name | CTD temperature primary |
| 283 | Var5: Observation type | profile |
| 284 | Var5: In-situ observation / manipulation condition / response variable | In-situ observation |
| 285 | Var5: Variable unit | deg c |
| 286 | Var5: Measured or calculated | Measured |
| 287 | Var5: Calculation method and parameters | CTD |
| 288 | Var5: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 289 | Var5: Analyzing instrument | |
| 290 | Var5: Duration (for settlement/colonization methods) | |
| 291 | Var5: Detailed sampling and analyzing information | A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame, a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a PSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to cnv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5 |
| 292 | Var5: Field replicate information | |
| 293 | Var5: Uncertainty | Calibration accuracy was examined by comparing T1-T2 over a range of station numbers and depths (bottle trip locations) for each cast. For the entire cruise, only one set of temperature sensors were used, both tracked each other very well. These comparisons show a median temperature difference between the two sensors of 0.0002 degree C. |
| 294 | Var5: 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. |
| 295 | Var5: Method reference (citation) | http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . |
| 296 | Var5: Biological subject | |
| 297 | Var5: Species Identification code | |
| 298 | Var5: Life stage of the biological subject | |
| 299 | Var5: Researcher Name | Joe Salisbury |
| 300 | Var5: Researcher Institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 301 | Var6: Variable abbreviation in data files | Temp_2 |
| 302 | Var6: Full variable name | CTD temperature secondary |
| 303 | Var6: Observation type | profile |
| 304 | Var6: In-situ observation / manipulation condition / response variable | In-situ observation |
| 305 | Var6: Variable unit | deg c |
| 306 | Var6: Measured or calculated | Measured |
| 307 | Var6: Calculation method and parameters | CTD |
| 308 | Var6: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 309 | Var6: Analyzing instrument | |
| 310 | Var6: Duration (for settlement/colonization methods) | |

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| 311 | Var6: Detailed sampling and analyzing information | <p>A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf.</p> <p>CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame, a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a EPSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to cnv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5</p> |
| 312 | Var6: Field replicate information | |
| 313 | Var6: Uncertainty | <p>Calibration accuracy was examined by comparing T1-T2 over a range of station numbers and depths (bottle trip locations) for each cast. For the entire cruise, only one set of temperature sensors were used, both tracked each other very well. These comparisons show a median temperature difference between the two sensors of 0.0002 degree C.</p> <p>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.</p> <p>http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf.</p> |
| 314 | Var6: Data quality flag description | |
| 315 | Var6: Method reference (citation) | |
| 316 | Var6: Biological subject | |
| 317 | Var6: Species Identification code | |
| 318 | Var6: Life stage of the biological subject | |
| 319 | Var6: Researcher Name | Joe Salisbury |
| 320 | Var6: Researcher Institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 321 | Var7: Variable abbreviation in data files | Sal_1 |
| 322 | Var7: Full variable name | CTD Primary Salinity |
| 323 | Var7: Observation type | profile |
| 324 | Var7: In-situ observation / manipulation condition / response variable | In-situ observation |
| 325 | Var7: Variable unit | PSU |
| 326 | Var7: Measured or calculated | calculated |
| 327 | Var7: Calculation method and parameters | CTD |
| 328 | Var7: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 329 | Var7: Analyzing instrument | |
| 330 | Var7: Duration (for settlement/colonization methods) | |
| 331 | Var7: Detailed sampling and analyzing information | <p>A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf.</p> <p>CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame, a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a EPSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to cnv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5</p> |
| 332 | Var7: Field replicate information | |
| 333 | Var7: Uncertainty | <p>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 check sample conductivities. These comparisons are summarized in Figure 3, which shows a median salinity difference between the sensors of 0.009 PSU.</p> <p>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.</p> <p>http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf.</p> |
| 334 | Var7: Data quality flag description | |
| 335 | Var7: Method reference (citation) | |
| 336 | Var7: Biological subject | |
| 337 | Var7: Species Identification code | |
| 338 | Var7: Life stage of the biological subject | |
| 339 | Var7: Researcher Name | Joe Salisbury |
| 340 | Var7: Researcher Institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 341 | Var8: Variable abbreviation in data files | Sal_2 |
| 342 | Var8: Full variable name | CTD Secondary Salinity |

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| 343 | Var8: Observation type | profile |
| 344 | Var8: In-situ observation / manipulation condition / response variable | In-situ observation |
| 345 | Var8: Variable unit | PSU |
| 346 | Var8: Measured or calculated | calculated |
| 347 | Var8: Calculation method and parameters | CTD |
| 348 | Var8: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 349 | Var8: Analyzing instrument | |
| 350 | Var8: Duration (for settlement/colonization methods) | |
| | | A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame (AOML's yellow frame), a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a EPSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to csv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5 |
| 351 | Var8: Detailed sampling and analyzing information | |
| 352 | Var8: Field replicate information | |
| 353 | Var8: Uncertainty | 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 check sample conductivities. These comparisons are summarized in Figure 3, which shows a median salinity difference between the sensors of 0.009 PSU. |
| 354 | Var8: 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. |
| 355 | Var8: Method reference (citation) | http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . |
| 356 | Var8: Biological subject | |
| 357 | Var8: Species Identification code | |
| 358 | Var8: Life stage of the biological subject | |
| 359 | Var8: Researcher Name | Joe Salisbury |
| 360 | Var8: Researcher Institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 361 | Var9: Variable abbreviation in data files | CTD_o2_1_conc |
| 362 | Var9: Full variable name | CTD oxygen concentration |
| 363 | Var9: Observation type | profile |
| 364 | Var9: In-situ observation / manipulation condition / response variable | In-situ observation |
| 365 | Var9: Variable unit | umol/kg |
| 366 | Var9: Measured or calculated | measured |
| 367 | Var9: Calculation method and parameters | SBE 43 |
| 368 | Var9: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 369 | Var9: Analyzing instrument | |
| 370 | Var9: Duration (for settlement/colonization methods) | |
| | | A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame, a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a EPSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to csv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5 |
| 371 | Var9: Detailed sampling and analyzing information | |
| 372 | Var9: Field replicate information | |
| 373 | Var9: Uncertainty | The DO sensors were compared to dissolved O2 check samples by matching the up cast bottle trips to CTD bottle files which produced an RMSE of 6.240 umol/kg |

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| 374 | Var9: 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. |
| 375 | Var9: Method reference (citation) | http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . |
| 376 | Var9: Biological subject | |
| 377 | Var9: Species Identification code | |
| 378 | Var9: Life stage of the biological subject | |
| 379 | Var9: Researcher Name | Joe Salisbury |
| 380 | Var9: Researcher Institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 381 | Var10: Variable abbreviation in data files | CTD_o2_2_conc |
| 382 | Var10: Full variable name | CTD oxygen concentration |
| 383 | Var10: Observation type | profile |
| 384 | Var10: In-situ observation / manipulation condition / response variable | In-situ observation |
| 385 | Var10: Variable unit | umol/kg |
| 386 | Var10: Measured or calculated | measured |
| 387 | Var10: Calculation method and parameters | SBE 43 |
| 388 | Var10: Sampling instrument | Sea-Bird SBE-911plus CTD system |
| 389 | Var10: Analyzing instrument | |
| 390 | Var10: Duration (for settlement/colonization methods) | |
| 391 | Var10: Detailed sampling and analyzing information | <p>A detailed and more complete description is available in the cruise report at: http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf.</p> <p>CTD/rosette casts were performed with a package consisting of a 24-place, 10-liter rosette frame (AOML's yellow frame), a 24-place water sampler/pylon (SBE32) and 24, 10-liter Bullister/Niskin-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 a EPSA-916 Altimeter. The CTDs supplied a standard Sea-Bird format data stream at a data rate of 24 frames/second. The SBE9plus CTD was connected to the SBE32 24-place pylon providing for single-conductor sea cable operation. Power to the SBE9plus CTD, SBE32 pylon, auxiliary sensors, and altimeter was provided through the sea cable from the SBE11plus deck unit in the computer lab. The raw CTD data and bottle trips acquired by SBE Seasave on the Windows 7 workstation were processed from hex files to csv files and then into bottle files. Post cruise data processing was completed on a Windows 7 machine running SEABIRD SBE DATA Processing version 7.22.5</p> |
| 392 | Var10: Field replicate information | |
| 393 | Var10: Uncertainty | The DO sensors were compared to dissolved O2 check samples by matching the up cast bottle trips to CTD bottle files which produced an RMSE of 6.240 umol/kg |
| 394 | Var10: 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. |
| 395 | Var10: Method reference (citation) | http://www.aoml.noaa.gov/ocd/gcc/ECO2/Cruise_Report.pdf . |
| 396 | Var10: Biological subject | |
| 397 | Var10: Species Identification code | |
| 398 | Var10: Life stage of the biological subject | |
| 399 | Var10: Researcher Name | Joe Salisbury |
| 400 | Var10: Researcher Institution | Ocean Processes Analysis Laboratory, University of New Hampshire |
| 401 | Var11: Variable abbreviation in data files | oxygen |
| 402 | Var11: Full variable name | bottle dissolved oxygen |
| 403 | Var11: Observation type | Profile and surface underway |
| 404 | Var11: In-situ observation / manipulation condition / response variable | In-situ observation |
| 405 | Var11: Variable unit | umol/kg |
| 406 | Var11: Measured or calculated | measured |
| 407 | Var11: Calculation method and parameters | |
| 408 | Var11: Sampling instrument | Niskin bottle and flow through pump |
| 409 | Var11: Analyzing instrument | Automated oxygen titrator using amperometric end-point detection (Langdon 2010). |
| 410 | Var11: Duration (for settlement/colonization methods) | |

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| 411 | Var11: Detailed sampling and analyzing information | <p>Samples were drawn from all casts and all Niskin bottles into volumetrically calibrated 125 ml iodine titration flasks using Tygon tubing with a silicone adaptor that fit over the petcock to avoid contamination of DOC samples. Bottles were rinsed three times and filled from the bottom, overflowing three volumes while taking care not to entrain any bubbles. The draw temperature was taken using a digital thermometer with a flexible thermistor probe that was inserted into the flask while the sample was being drawn during the overflow period. These temperatures were used to calculate concentrations, and a diagnostic check of Niskin bottle integrity. One ml of MnCl₂ and one ml of NaOH/Nal were added immediately after drawing of the sample was concluded using a Repipetor, the flasks were then stoppered and shaken well. DIW was added to the neck of each flask to create a water seal. The flasks were stored in the lab in plastic totes at room temperature for at least 1 hour before analysis. Twenty-four samples plus duplicates were drawn from each station except the shallow coastal stations where fewer samples were drawn depending on the depth or as directed by the chief scientist. Dissolved oxygen analyses were performed with an automated oxygen titrator using amperometric end-point detection (Langdon 2010). The titration of the samples and the data logging and graphical display was performed on a PC running a LabView program written by Ulises Rivero of AOML. The titrations were performed in a climate controlled lab at 18.5-20 degrees Celsius. Thiosulfate was dispensed by a 2 ml Gilmont syringe 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 to three replicate 10 ml iodate standards were run 13 times during the cruise. The reagent blank was determined at the beginning and end of the cruise. A titration was made to 1 ml of iodate standard. The volume of thiosulfate required for the titration is V1. An additional 1 ml of standard was added to the titrated sample and titrated again. The volume of thiosulfate used for the second titration is V2. The reagent blank was determined as the difference between V1 and V2.</p> |
| 412 | Var11: Field replicate information | 225 duplicate samples were drawn. |
| 413 | Var11: Uncertainty | The preliminary difference between replicates averaged 0.86 $\mu\text{mol kg}^{-1}$ for stations 1-120 (Leg 1) and 0.39 $\mu\text{mol kg}^{-1}$ for stations 121-184 (Leg 2). |
| 414 | Var11: 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. |
| 415 | Var11: Method reference (citation) | Carpenter, J.H. (1965). The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. Oceanogr. 10: 141-143 Culberson, C.H. and Huang, S. (1987). Automated amperometric oxygen titration. Deep-Sea Res. 34: 875-880. Culberson, C.H.; Knapp, G.; Stalcup, M.; Williams, R.T. and Zemlyak, F. (1991). A comparison of methods for the determination of dissolved oxygen in seawater. WHP Operations and Methods. Langdon, C. (2010). Determination of dissolved oxygen in seawater by Winkler titration using the amperometric technique. The GO-SHIP Repeat Hydrography Manual: A Collection of Expert Reports and Guidelines. E. M. Hood, C. L. Sabine and B. M. Sloyan, IOCCP Report Number 14, ICPO Publication Series Number 134. |
| 416 | Var11: Biological subject | <hr/> Chris Langdon Rosenstiel School of Marine and Atmospheric Science/University of Miami <hr/> Silicate Orthosilicic acid Profile and surface underway In-situ observation micro-mol/kg Measured The samples were analyzed for nitrate plus nitrite, silicate and phosphate using a Bran-Luebbe Autoanalyzer 3 according to the procedures described by Whitledge et al (1986). Nutrient samples were collected from Niskin bottles, after at least three seawater rinses. Sample analysis typically began within a few hours of sample collection after the samples had warmed to room temperature. Those samples not analyzed within 3 hours were refrigerated for later analysis. Samples were analyzed for phosphate (PO ₄ - 3), nitrate (NO ₃ -), nitrite (NO ₂ -) and orthosilicic acid (H ₄ SiO ₄). A mixed stock standard consisting of silicic acid, phosphate and nitrate was prepared by dissolving high purity standard materials (KNO ₃ , KH ₂ PO ₄ and Na ₂ SiF ₆) in deionized water using a two step dilution for phosphate and nitrate. This standard was stored at room temperature. A nitrite stock standard was prepared dissolving NaNO ₂ in distilled water, and this standard was stored in a refrigerator on the ship. Working standards were prepared fresh daily by diluting the stock solutions in low nutrient seawater. The mixed standards were verified against commercial standards, and in-lab standards. |
| 417 | Var11: Species identification code | |
| 418 | Var11: Life stage of the biological subject | |
| 419 | Var11: Researcher Name | |
| 420 | Var11: Researcher Institution | |
| 421 | Var12: Variable abbreviation in data files | |
| 422 | Var12: Full variable name | |
| 423 | Var12: Observation type | |
| 424 | Var12: In-situ observation / manipulation condition / response variable | |
| 425 | Var12: Variable unit | |
| 426 | Var12: Measured or calculated | |
| 427 | Var12: Calculation method and parameters | The samples were analyzed for nitrate plus nitrite, silicate and phosphate using a Bran-Luebbe Autoanalyzer 3 according to the procedures described by Whitledge et al (1986). Nutrient samples were collected from Niskin bottles, after at least three seawater rinses. Sample analysis typically began within a few hours of sample collection after the samples had warmed to room temperature. Those samples not analyzed within 3 hours were refrigerated for later analysis. Samples were analyzed for phosphate (PO ₄ - 3), nitrate (NO ₃ -), nitrite (NO ₂ -) and orthosilicic acid (H ₄ SiO ₄). A mixed stock standard consisting of silicic acid, phosphate and nitrate was prepared by dissolving high purity standard materials (KNO ₃ , KH ₂ PO ₄ and Na ₂ SiF ₆) in deionized water using a two step dilution for phosphate and nitrate. This standard was stored at room temperature. A nitrite stock standard was prepared dissolving NaNO ₂ in distilled water, and this standard was stored in a refrigerator on the ship. Working standards were prepared fresh daily by diluting the stock solutions in low nutrient seawater. The mixed standards were verified against commercial standards, and in-lab standards. |
| 428 | Var12: Sampling instrument | |
| 429 | Var12: Analyzing instrument | |
| 430 | Var12: Duration (for settlement/colonization methods) | |
| 431 | Var12: Detailed sampling and analyzing information | |
| 432 | Var12: Field replicate information | |
| 433 | Var12: Uncertainty | |

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| 434 | Var12: 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. |
| 435 | Var12: Method reference (citation) | Whitledge, T.E., D.M. Veidt, S.C. Mallow, C.J. Patton, C.D. Wirick. 1986. Automated nutrient analyses in seawater. Brookhaven National Laboratory, Publication BNL 38990, 177 p. |
| 436 | Var12: Biological subject | |
| 437 | Var12: Species Identification code | |
| 438 | Var12: Life stage of the biological subject | |
| 439 | Var12: Researcher Name | David Townsend and Maura Thomas |
| 440 | Var12: Researcher Institution | University of Maine |
| 441 | Var13: Variable abbreviation in data files | NO2+NO3 |
| 442 | Var13: Full variable name | Sum of nitrite and nitrate |
| 443 | Var13: Observation type | Profile and surface underway |
| 444 | Var13: In-situ observation / manipulation condition / response variable | In-situ observation |
| 445 | Var13: Variable unit | micro-mol/kg |
| 446 | Var13: Measured or calculated | Measured |
| 447 | Var13: Calculation method and parameters | |
| 448 | Var13: Sampling instrument | Niskin bottle and flow through pump |
| 449 | Var13: Analyzing instrument | The samples were analyzed for nitrate plus nitrite, silicate and phosphate using a Bran-Luebbe Autoanalyzer 3 according to the procedures described by Whitledge et al (1986). |
| 450 | Var13: Duration (for settlement/colonization methods) | |
| 451 | Var13: Detailed sampling and analyzing information | |
| 452 | Var13: Field replicate information | Nutrient samples were collected from Niskin bottles, after at least three seawater rinses. Sample analysis typically began within a few hours of sample collection after the samples had warmed to room temperature. Those samples not analyzed within 3 hours were refrigerated for later analysis. Samples were analyzed for phosphate (PO4- 3), nitrate (NO3-), nitrite (NO2-) and orthosilicic acid (H4SiO4). |
| 453 | Var13: Uncertainty | A mixed stock standard consisting of silicic acid, phosphate and nitrate was prepared by dissolving high purity standard materials (KNO3, KH2PO4 and Na2SiF6) in deionized water using a two step dilution for phosphate and nitrate. This standard was stored at room temperature. A nitrite stock standard was prepared dissolving NaNO2 in distilled water, and this standard was stored in a refrigerator on the ship. Working standards were prepared fresh daily by diluting the stock solutions in low nutrient seawater. The mixed standards were verified against commercial standards, and in-lab standards. |
| 454 | Var13: 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. |
| 455 | Var13: Method reference (citation) | Whitledge, T.E., D.M. Veidt, S.C. Mallow, C.J. Patton, C.D. Wirick. 1986. Automated nutrient analyses in seawater. Brookhaven National Laboratory, Publication BNL 38990, 177 p. |
| 456 | Var13: Biological subject | |
| 457 | Var13: Species Identification code | |
| 458 | Var13: Life stage of the biological subject | |
| 459 | Var13: Researcher Name | David Townsend and Maura Thomas |
| 460 | Var13: Researcher Institution | University of Maine |
| 461 | Var14: Variable abbreviation in data files | PO4 |
| 462 | Var14: Full variable name | phosphate |
| 463 | Var14: Observation type | Profile and surface underway |
| 464 | Var14: In-situ observation / manipulation condition / response variable | In-situ observation |
| 465 | Var14: Variable unit | micro-mol/kg |
| 466 | Var14: Measured or calculated | Measured |
| 467 | Var14: Calculation method and parameters | |
| 468 | Var14: Sampling instrument | Niskin bottle and flow through pump |
| 469 | Var14: Analyzing instrument | The samples were analyzed for nitrate plus nitrite, silicate and phosphate using a Bran-Luebbe Autoanalyzer 3 according to the procedures described by Whitledge et al (1986). |
| 470 | Var14: Duration (for settlement/colonization methods) | |
| 471 | Var14: Detailed sampling and analyzing information | |

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| 472 | Var14: Field replicate information | Nutrient samples were collected from Niskin bottles, after at least three seawater rinses. Sample analysis typically began within a few hours of sample collection after the samples had warmed to room temperature. Those samples not analyzed within 3 hours were refrigerated for later analysis. Samples were analyzed for phosphate (PO ₄ ³⁻), nitrate (NO ₃ ⁻), nitrite (NO ₂ ⁻) and orthosilicic acid (H ₄ SiO ₄). |
| 473 | Var14: Uncertainty | A mixed stock standard consisting of silicic acid, phosphate and nitrate was prepared by dissolving high purity standard materials (KNO ₃ , KH ₂ PO ₄ and Na ₂ SiF ₆) in deionized water using a two step dilution for phosphate and nitrate. This standard was stored at room temperature. A nitrite stock standard was prepared dissolving NaNO ₂ in distilled water, and this standard was stored in a refrigerator on the ship. Working standards were prepared fresh daily by diluting the stock solutions in low nutrient seawater. The mixed standards were verified against commercial standards, and in-lab standards. |
| 474 | Var14: 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. |
| 475 | Var14: Method reference (citation) | Whitledge, T.E., D.M. Veidt, S.C. Mallow, C.J. Patton, C.D. Wirick. 1986. Automated nutrient analyses in seawater. Brookhaven National Laboratory, Publication BNL 38990, 177 p. |
| 476 | Var14: Biological subject | David Townsend and Maura Thomas University of Maine |
| 477 | Var14: Species Identification code | |
| 478 | Var14: Life stage of the biological subject | |
| 479 | Var14: Researcher Name | |
| 480 | Var14: Researcher Institution | PN |
| 481 | Var16: Variable abbreviation in data files | particulate nitrogen |
| 482 | Var16: Full variable name | milligrams per cubic meter |
| 483 | Var16: Observation type | |
| 484 | Var16: In-situ observation / manipulation condition / response variable | |
| 485 | Var16: Variable unit | |
| 486 | Var16: Measured or calculated | Typically three depths (surface, mix layer, and depth inbetween) are sampled via niskin bottle. POC/PN samples are collected in 0.5, 1.04 or 2.2 Liter, brown polypropylene bottles. Samples are filtered on precombusted Whatman GF/F 25mm under low vacuum pressure (40 mm Hg) Filter is removed, folded in half with the particulate part inside the fold and wrapped in precombusted aluminum foil. Samples are stored in Liquid Nitrogen and transferred post cruise to a -80°C freezer until processed. |
| 487 | Var16: Calculation method and parameters | |
| 488 | Var16: Sampling instrument | |
| 489 | Var16: Analyzing instrument | |
| 490 | Var16: Duration (for settlement/colonization methods) | Hedges, J.I. and J.H. Stern. 1984. Carbon and nitrogen determinations of carbonate-containing solids. Limnol. Oceanogr. 29: 657-663. |
| 491 | Var16: Detailed sampling and analyzing information | |
| 492 | Var16: Field replicate information | |
| 493 | Var16: Uncertainty | |
| 494 | Var16: Data quality flag description | Antonio Mannino NASA Goddard Space Flight Center |
| 495 | Var16: Method reference (citation) | |
| 496 | Var16: Biological subject | |
| 497 | Var16: Species Identification code | |
| 498 | Var16: Life stage of the biological subject | POC |
| 499 | Var16: Researcher Name | |
| 500 | Var16: Researcher Institution | |
| 501 | Var17: Variable abbreviation in data files | |
| 502 | Var17: Full variable name | particulate organic carbon |
| 503 | Var17: Observation type | milligrams per cubic meter |
| 504 | Var17: In-situ observation / manipulation condition / response variable | |
| 505 | Var17: Variable unit | |
| 506 | Var17: Measured or calculated | |
| 507 | Var17: Calculation method and parameters | Typically three depths (surface, mix layer, and depth inbetween) are sampled via niskin bottle. POC/PN samples are collected in 0.5, 1.04 or 2.2 Liter, brown polypropylene bottles. Samples are filtered on precombusted Whatman GF/F 25mm under low vacuum pressure (40 mm Hg) Filter is removed, folded in half with the particulate part inside the fold and wrapped in precombusted aluminum foil. Samples are stored in Liquid Nitrogen and transferred post cruise to a -80°C freezer until processed. |
| 508 | Var17: Sampling instrument | |
| 509 | Var17: Analyzing instrument | |
| 510 | Var17: Duration (for settlement/colonization methods) | |

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|-----|---|---|
| 511 | Var17: Detailed sampling and analyzing information | Typically three depths (surface, mix layer, and depth inbetween) are sampled via niskin bottle. POC/PN samples are collected in 0.5, 1.04 or 2.2 Liter, brown polypropylene bottles. Samples are filtered on precombusted Whatman GF/F 25mm under low vacuum pressure (40 mm Hg) Filter is removed, folded in half with the particulate part inside the fold and wrapped in precombusted aluminum foil. Samples are stored in Liquid Nitrogen and transferred post cruise to a -80°C freezer until processed. |
| 512 | Var17: Field replicate information | |
| 513 | Var17: Uncertainty | |
| 514 | Var17: Data quality flag description | |
| 515 | Var17: Method reference (citation) | Hedges, J.I. and J.H. Stern. 1984. Carbon and nitrogen determinations of carbonate-containing solids. Limnol. Oceanogr. 29: 657-663. |
| 516 | Var17: Biological subject | |
| 517 | Var17: Species Identification code | |
| 518 | Var17: Life stage of the biological subject | |
| 519 | Var17: Researcher Name | Antonio Mannino |
| 520 | Var17: Researcher Institution | NASA Goddard Space Flight Center |
| 521 | Var18: Variable abbreviation in data files | DOC |
| 522 | Var18: Full variable name | Dissolved Organic Carbon |
| 523 | Var18: Observation type | Profile |
| 524 | Var18: In-situ observation / manipulation condition / response variable | In-situ observation |
| 525 | Var18: Variable unit | micromol/kg |
| 526 | Var18: Measured or calculated | Measured |
| 527 | Var18: Calculation method and parameters | |
| 528 | Var18: Sampling instrument | Niskin bottle |
| 529 | Var18: Analyzing instrument | |
| 530 | Var18: Duration (for settlement/colonization methods) | |
| 531 | Var18: Detailed sampling and analyzing information | Typically three depths (surface, mix layer, and depth inbetween) are sampled via niskin bottler. The samples were filtered under a gentle vacuum (<5 in Hg) through pre-combusted (6 hours at 450 degree C) 47mm GFF filters and separated into 2 or 3 (depending on depth) 40ml vials for DOC and one 125ml bottle for CDOM. The DOC vials were frozen and the CDOM bottles refrigerated. DOC and CDOM samples were analyzed by Antonio Mannino's laboratory at NASA Goddard. |
| 532 | Var18: Field replicate information | |
| 533 | Var18: Uncertainty | |
| 534 | Var18: 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. |
| 535 | Var18: Method reference (citation) | Mannino, A., M. E. Russ, and S. B. Hooker (2008), Algorithm development and validation for satellite-derived distributions of DOC and CDOM in the U.S. Middle Atlantic Bight, J. Geophys. Res., 113, C07051, doi:10.1029/2007JC004493 |
| 536 | Var18: Biological subject | |
| 537 | Var18: Species Identification code | |
| 538 | Var18: Life stage of the biological subject | |
| 539 | Var18: Researcher Name | Antonio Mannino |
| 540 | Var18: Researcher Institution | NASA Goddard Space Flight Center |
| 541 | Var19: Variable abbreviation in data files | CDOM |
| 542 | Var19: Full variable name | Colored dissolved organic matter at different wavelengths |
| 543 | Var19: Observation type | Profile |
| 544 | Var19: In-situ observation / manipulation condition / response variable | In-situ observation |
| 545 | Var19: Variable unit | milligrams per cubic meter |
| 546 | Var19: Measured or calculated | Measured |
| 547 | Var19: Calculation method and parameters | |
| 548 | Var19: Sampling instrument | Niskin bottle |
| 549 | Var19: Analyzing instrument | |
| 550 | Var19: Duration (for settlement/colonization methods) | |
| 551 | Var19: Detailed sampling and analyzing information | Typically three depths (surface, mix layer, and depth inbetween) are sampled via niskin bottler. The samples were filtered under a gentle vacuum (<5 in Hg) through pre-combusted (6 hours at 450 degree C) 47mm GFF filters and separated into 2 or 3 (depending on depth) 40ml vials for DOC and one 125ml bottle for CDOM. The DOC vials were frozen and the CDOM bottles refrigerated. DOC and CDOM samples were analyzed by Antonio Mannino's laboratory at NASA Goddard. |

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| 552 | Var19: Field replicate information | |
| 553 | Var19: Uncertainty | |
| 554 | Var19: 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. |
| 555 | Var19: Method reference (citation) | Mannino, A., M. E. Russ, and S. B. Hooker (2008), Algorithm development and validation for satellite-derived distributions of DOC and CDOM in the U.S. Middle Atlantic Bight, J. Geophys. Res., 113, C07051, doi:10.1029/2007JC004493 |
| 556 | Var19: Biological subject | |
| 557 | Var19: Species Identification code | |
| 558 | Var19: Life stage of the biological subject | |
| 559 | Var19: Researcher Name | Antonio Mannino |
| 560 | Var19: Researcher Institution | NASA Goddard Space Flight Center |
| 561 | Var19: Variable abbreviation in data files | HPLC_chl_a |
| 562 | Var19: Full variable name | chlorophyll a concentration via pigment scan |
| 563 | Var19: Observation type | |
| 564 | Var19: In-situ observation / manipulation condition / response variable | In-situ observation |
| 565 | Var19: Variable unit | milligrams per cubic meter |
| 566 | Var19: Measured or calculated | Measured |
| 567 | Var19: Calculation method and parameters | |
| 568 | Var19: Sampling instrument | |
| 569 | Var19: Analyzing instrument | |
| 570 | Var19: Duration (for settlement/colonization methods) | |
| 571 | Var19: Detailed sampling and analyzing information | Samples were taken with a niskin bottle from the surface, mix layer, and where applicable at a third depth between the surface and mix layer. The samples were run through precombusted (6 hours at 450 degree C) 25mm GFF filters, placed in precombusted aluminum foil, and stored in liquid nitrogen until analysis. |
| 572 | Var19: Field replicate information | |
| 573 | Var19: Uncertainty | |
| 574 | Var19: 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. |
| 575 | Var19: Method reference (citation) | Van Heukelem, L. and C.S. Thomas, 2001: Computer-assisted high-performance liquid chromatography method development with applications to the isolation and analysis of phytoplankton pigments. J.Chromatogr. A, 910, 31-49. |
| 576 | Var19: Biological subject | |
| 577 | Var19: Species Identification code | |
| 578 | Var19: Life stage of the biological subject | |
| 579 | Var19: Researcher Name | Antonio Mannino |
| 580 | Var19: Researcher Institution | NASA Goddard Space Flight Center |
| 581 | Var20: Variable abbreviation in data files | TSM |
| 582 | Var20: Full variable name | Total Suspended Matter |
| 583 | Var20: Observation type | |
| 584 | Var20: In-situ observation / manipulation condition / response variable | In-situ observation |
| 585 | Var20: Variable unit | milligrams per cubic meter |
| 586 | Var20: Measured or calculated | Measured |
| 587 | Var20: Calculation method and parameters | |
| 588 | Var20: Sampling instrument | Niskin bottle |
| 589 | Var20: Analyzing instrument | |
| 590 | Var20: Duration (for settlement/colonization methods) | |
| 591 | Var20: Detailed sampling and analyzing information | TSM sample seawater were filtered onto 0.7 µm (nominal size) GF/F filters. Pre-weighted and combusted GF/F's were used for the collection of the TSS samples. Special care was taken to avoid sea-salt retention in the filters; sample filters were rinsed several times with deionized water to remove sea salt. Samples were frozen until the end of the cruise and then dried when back in the lab. |

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| 592 | Var20: Field replicate information | |
| 593 | Var20: Uncertainty | |
| 594 | Var20: 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. |
| 595 | Var20: Method reference (citation) | D. Van der Linde, Protocol for Total Suspended Matter estimate. JRC Technical Note. June 1998. |
| 596 | Var20: Biological subject | |
| 597 | Var20: Species Identification code | |
| 598 | Var20: Life stage of the biological subject | |
| 599 | Var20: Researcher Name | Antonio Mannino |
| 600 | Var20: Researcher Institution | NASA Goddard Space Flight Center |
| 601 | Var21: Variable abbreviation in data files | ETS_GFF |
| 602 | Var21: Full variable name | electron transport system |
| 603 | Var21: Observation type | |
| 604 | Var21: In-situ observation / manipulation condition / response variable | In-situ observation |
| 605 | Var21: Variable unit | ug O2/d/L |
| 606 | Var21: Measured or calculated | Measured |
| 607 | Var21: Calculation method and parameters | |
| 608 | Var21: Sampling instrument | Niskin bottle |
| 609 | Var21: Analyzing instrument | |
| 610 | Var21: Duration (for settlement/colonization methods) | |
| 611 | Var21: Detailed sampling and analyzing information | ETS activity was determined both for the GF/F filter and the 0.4µm filter from each station. Three solutions were used for analysis. The first was a substrate made from NADH and NADPH (in a 3:1 ratio) and sodium succinate (these three components act as electron donors in the analysis), and a trace amount of Triton, all dissolved in a phosphate buffer. The phosphate buffer was made using Triton, PVP, MgSO4•7H2O, and a trace amount of NaCN. Sodium cyanide was only added to the PO4 buffer in the first batch made, and in subsequent solutions it was excluded, as it was deemed unnecessary and a potential health hazard. The third solution needed for analysis was a 4 mM INT solution, made from INT (described below) and milli-Q water. This acted as the artificial electron acceptor in the analysis. |
| 612 | Var21: Field replicate information | |
| 613 | Var21: Uncertainty | |
| 614 | Var21: 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. |
| 615 | Var21: Method reference (citation) | Packard, T. T., & Williams, P. L. B. (1981). Respiration and respiratory electron transport activity in sea surface seawater from the northeast Atlantic. Oceanol. Acta, 4, 351-358. Packard, T.T. (1985). Measurement of electron transport activity of microplankton. Adv. Aquat. Microbiol., 3, 207-261. |
| 616 | Var21: Biological subject | |
| 617 | Var21: Species Identification code | |
| 618 | Var21: Life stage of the biological subject | |
| 619 | Var21: Researcher Name | Kai Ziervogel |
| 620 | Var21: Researcher Institution | University of New Hampshire |
| 621 | Var22: Variable abbreviation in data files | ETS_0.4 |
| 622 | Var22: Full variable name | electron transport system |
| 623 | Var22: Observation type | |
| 624 | Var22: In-situ observation / manipulation condition / response variable | In-situ observation |
| 625 | Var22: Variable unit | ug O2/d/L |
| 626 | Var22: Measured or calculated | Measured |
| 627 | Var22: Calculation method and parameters | |
| 628 | Var22: Sampling instrument | Niskin bottle |
| 629 | Var22: Analyzing instrument | |

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| 610 | Var22: Duration (for settlement/colonization methods) | |
| 611 | Var22: Detailed sampling and analyzing information | ETS activity was determined both for the GF/F filter and the 0.4µm filter from each station. Three solutions were used for analysis. The first was a substrate made from NADH and NADPH (in a 3:1 ratio) and sodium succinate (these three components act as electron donors in the analysis), and a trace amount of Triton, all dissolved in a phosphate buffer. The phosphate buffer was made using Triton, PVP, MgSO4•7H2O, and a trace amount of NaCN. Sodium cyanide was only added to the PO4 buffer in the first batch made, and in subsequent solutions it was excluded, as it was deemed unnecessary and a potential health hazard. The third solution needed for analysis was a 4 mM INT solution, made from INT (described below) and milli-Q water. This acted as the artificial electron acceptor in the analysis. |
| 612 | Var22: Field replicate information | |
| 613 | Var22: Uncertainty | |
| 614 | Var22: 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. |
| 615 | Var22: Method reference (citation) | Packard, T. T., & Williams, P. L. B. (1981). Respiration and respiratory electron transport activity in sea surface seawater from the northeast Atlantic. <i>Oceanol. Acta</i> , 4, 351-358. Packard, T.T. (1985). Measurement of electron transport activity of microplankton. <i>Adv. Aquat. Microbiol.</i> , 3, 207-261. |
| 616 | Var22: Biological subject | |
| 617 | Var22: Species Identification code | |
| 618 | Var22: Life stage of the biological subject | |
| 619 | Var22: Researcher Name | Kai Ziervogel |
| 620 | Var22: Researcher Institution | University of New Hampshire |
| 621 | Var23: Variable abbreviation in data files | CH4 |
| 622 | Var23: Full variable name | methane |
| 623 | Var23: Observation type | |
| 624 | Var23: In-situ observation / manipulation condition / response variable | In-situ observation |
| 625 | Var23: Variable unit | nmol/L |
| 626 | Var23: Measured or calculated | Measured |
| 627 | Var23: Calculation method and parameters | |
| 628 | Var23: Sampling instrument | Niskin bottle |
| 629 | Var23: Analyzing instrument | |
| 630 | Var23: Duration (for settlement/colonization methods) | |
| 631 | Var23: Detailed sampling and analyzing information | Samples for pCO2/CH4 were drawn from Niskin bottles directly into 160 ml serum glass bottles using flexible silicon tubing. Bottles were rinsed, filled, and then overflowed by two volumes making sure not to entrain any air bubbles. Completely full bottles were spiked with saturated mercuric chloride and then had a crimp seal crimped onto the bottle to seal it. O-18 samples were collected in a similar manner but instead of being crimped the 60 ml brown glass bottles had screw caps tighten upon them and then 2 wraps of electrical tape wrapped around each cap seal. A total of 294 pCO2/CH4 samples were collected while a total of 183 O18 samples were collected. Data will be submitted along with all discrete samples on a master sampling sheet to NCEI. |
| 632 | Var23: Field replicate information | |
| 633 | Var23: Uncertainty | |
| 634 | Var23: 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. |
| 635 | Var23: Method reference (citation) | Punshon, S, O. Sherwood, E. Edinger, K. Azetsu-Scott (2019) Bottom water methane sources along the high latitude eastern Canadian continental shelf and their effects on the marine carbonate system. <i>Marine Chemistry</i> , 212, 83-95. |
| 636 | Var23: Biological subject | |
| 637 | Var23: Species Identification code | |
| 638 | Var23: Life stage of the biological subject | |
| 639 | Var23: Researcher Name | Kumiko Azetsu-Scott |
| 640 | Var23: Researcher Institution | DFO- Fisheries and Oceans Canada |
| 641 | Var24: Variable abbreviation in data files | pCO2_a_T22 |
| 642 | Var24: Full variable name | partial pressure of CO2 in water at temperature 22 Celcius |
| 643 | Var24: Observation type | |
| 644 | Var24: In-situ observation / manipulation condition / response variable | In-situ observation |

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| 645 | Var24: Variable unit | uatm |
| 646 | Var24: Measured or calculated | Measured |
| 647 | Var24: Calculation method and parameters | |
| 648 | Var24: Sampling instrument | Niskin bottle |
| 649 | Var24: Analyzing instrument | |
| 650 | Var24: Duration (for settlement/colonization methods) | |
| 651 | Var24: Detailed sampling and analyzing information | <p>Samples for pCO₂/CH₄ were drawn from Niskin bottles directly into 160 ml serum glass bottles using flexible silicon tubing. Bottles were rinsed, filled, and then overflowed by two volumes making sure not to entrain any air bubbles. Completely full bottles were spiked with saturated mercuric chloride and then had a crimp seal crimped onto the bottle to seal it. O-18 samples were collected in a similar manner but instead of being crimped the 60 ml brown glass bottles had screw caps tighten upon them and then 2 wraps of electrical tape wrapped around each cap seal. A total of 294 pCO₂/CH₄ samples were collected while a total of 183 O18 samples were collected. Data will be submitted along with all discrete samples on a master sampling sheet to NCEI.</p> |
| 652 | Var24: Field replicate information | |
| 653 | Var24: Uncertainty | |
| 654 | Var24: Data quality flag description | <p>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.</p> <p>Punshon, S. O. Sherwood, E. Edinger, K. Azetsu-Scott (2019) Bottom water methane sources along the high latitude eastern Canadian continental shelf and their effects on the marine carbonate system. Marine Chemistry, 212, 83-95.</p> |
| 655 | Var24: Method reference (citation) | |
| 656 | Var24: Biological subject | |
| 657 | Var24: Species Identification code | |
| 658 | Var24: Life stage of the biological subject | |
| 659 | Var24: Researcher Name | Kumiko Azetsu-Scott |
| 660 | Var24: Researcher Institution | DFO- Fisheries and Oceans Canada |
| 661 | Var25: Variable abbreviation in data files | δ18O |
| 662 | Var25: Full variable name | Oxygen 18 Oxygen isotope measurements |
| 663 | Var25: Observation type | |
| 664 | Var25: In-situ observation / manipulation condition / response variable | In-situ observation |
| 665 | Var25: Variable unit | % |
| 666 | Var25: Measured or calculated | Measured |
| 667 | Var25: Calculation method and parameters | |
| 668 | Var25: Sampling instrument | Niskin bottle |
| 669 | Var25: Analyzing instrument | |
| 670 | Var25: Duration (for settlement/colonization methods) | |
| 671 | Var25: Detailed sampling and analyzing information | <p>Samples for pCO₂/CH₄ were drawn from Niskin bottles directly into 160 ml serum glass bottles using flexible silicon tubing. Bottles were rinsed, filled, and then overflowed by two volumes making sure not to entrain any air bubbles. Completely full bottles were spiked with saturated mercuric chloride and then had a crimp seal crimped onto the bottle to seal it. O-18 samples were collected in a similar manner but instead of being crimped the 60 ml brown glass bottles had screw caps tighten upon them and then 2 wraps of electrical tape wrapped around each cap seal. A total of 294 pCO₂/CH₄ samples were collected while a total of 183 O18 samples were collected. Data will be submitted along with all discrete samples on a master sampling sheet to NCEI.</p> |
| 672 | Var25: Field replicate information | |
| 673 | Var25: Uncertainty | |
| 674 | Var25: Data quality flag description | <p>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.</p> <p>Walker, S. A., K. Azetsu-Scott, C. Normandeau, D. E. Kelley, R. Friedrich, R. Newton, P. Schlosser, J. L. McKay, W. Abdi, E. Kerrigan, S. E. Craig and D. W. R. Wallace (2015) Oxygen isotope measurements of seawater (H218O/ H216O): A comparison of cavity ring-down spectroscopy (CRDS) and isotope ratio mass spectrometry (IRMS), Limnol. Oceanogr.: Methods, DOI: 10.1002/lom3.10067</p> |
| 675 | Var25: Method reference (citation) | |
| 676 | Var25: Biological subject | |
| 677 | Var25: Species Identification code | |
| 678 | Var25: Life stage of the biological subject | |
| 679 | Var25: Researcher Name | Kumiko Azetsu-Scott |
| 680 | Var25: Researcher Institution | DFO- Fisheries and Oceans Canada |

| Help reference no. |
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