Station CTD profiles from R/V Hugh R. Sharp HRS1610 in the Mid-Atlantic coastal waters from August 2016 (CyanateInTheSea project)

Website: https://www.bco-dmo.org/dataset/920405
Data Type: Cruise Results
Version: 1
Version Date: 2024-02-19

Project
» Cyanate in the Sea: Sources, Sinks, and Quantitative Significance (CyanateInTheSea)

Contributors	Affiliation	Role
Mulholland, Margaret	Old Dominion University (ODU)	Chief Scientist, Principal Investigator, Contact
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Abstract
Standard station CTD profiles (1-db binned) measurements (down casts) with water sampling (up casts).

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Coverage

Location: Mid-Atlantic coastal waters, 33-38º N, 73-79º W
Spatial Extent: **N**:37.6683 **E**:-73.366333 **S**:33.3306 **W**:-78.5848
Temporal Extent: 2016-08-07 - 2016-08-17

Methods & Sampling

Standard hydrographic measurements of temperature, salinity, oxygen, and chlorophyll (Chl) fluorescence were made using a Seabird SBE 911 conductivity-temperature-depth (CTD) unit combined with a fluorometer and an oxygen sensor mounted to a rosette sampler equipped with 12 ten-liter Teflon-coated Niskin bottles during a cruise from August 6 to 16, 2016, aboard the R/V Hugh R. Sharp.

BCO-DMO Processing Description

- Changed date values from %m/%d/%Y format to %Y-%m-%d format
- "No data" values in the primary data file are represented by blank values in cells (NAs were removed from the original data presentation)

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Data Files

File
920405_v1_HRS1610_CTD_Data.csv (Comma Separated Values (.csv), 3.07 MB) MD5:d5004703407915759b0ef70d4f73029f Primary data file for dataset ID 920405, version 1

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Related Publications

Selden, C. R., Chappell, P. D., Clayton, S., Macías-Tapia, A., Bernhardt, P. W., & Mulholland, M. R. (2021). A coastal N2 fixation hotspot at the Cape Hatteras front: Elucidating spatial heterogeneity in diazotroph activity via supervised machine learning. Limnology and Oceanography, 66(5), 1832–1849. Portico. https://doi.org/10.1002/lno.11727
Results

Zhu, Y., Mulholland, M.R., Bernhardt, P., Neeley A.R., Tapia, A.M., and Echevarría, M.A. (2024). Summertime phytoplankton composition and nitrogen uptakes across contrasted North Atlantic Ocean regimes off Cape Hatteras. Frontiers in Microbiology
Results

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Related Datasets

IsRelatedTo

Mulholland, M. (2024) **Bottle sample data from CTD casts from R/V Hugh R. Sharp HRS1610 in the Mid-Atlantic coastal waters from August 2016 (CyanateInTheSea project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2024-02-16 doi:10.26008/1912/bco-dmo.920383.1 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
Station	Station number (1-41)	unitless
Cast	CTD cast number	unitless
ISO_DateTime_UTC	Datetime of CTD cast in UTC	unitless
Latitude	Latitude of cast location in decimal degrees; a positive value indicates a Northern coordinate	decimal degrees
Longitude	Longitude of cast location in decimal degrees; a negative value indicates a Western coordinate	decimal degrees
Depth	Depth value converted from pressure	meters (m)
Pressure	Pressure value from CTD	decibar (db)
Temperature_downcast	Temperature value from CTD downcast [ITS-90]	Celcius (C)
Temperature_upcast	Temperature value from CTD upcast [ITS-90]	Celcius (C)
Conductivity_downcast	Conductivity value from CTD downcast	Siemens per meter (S/m^1)
Conductivity_upcast	Conductivity value from CTD upcast	Siemens per meter (S/m^1)
Salinity_downcast_1	Salinity value from CTD downcast	practical salinity unit (PSU)
Salinity_upcast_1	Salility value from CTD upcast	practical salinity unit (PSU)
Oxygen_1	Oxygen 1 value from SBE 43 sensor	milliliter per liter (ml/L^1)
Oxygen_2	Oxygen 2 value from SBE 43 sensor	milligram per liter (mg/L^1)
Fluorescence	Fluorescence value from WET Labs ECO-AFL/FL	milligram per cubic meter (mg/m^3)
Density_sigma_downcast	Density sigma value converted from CTD downcast parameters	kilograms per cubic meter (kg/m^3)
Density_sigma_upcast	Density sigma value converted from CTD upcast parameters	kilograms per cubic meter (kg/m^3)
Potential_temperature_1	Potential temperature 1 converted from Gibbs-SeaWater (GSW) equation	Celcius (C)
Potential_temperature_2	Potential temperature 2 converted from Gibbs-SeaWater (GSW) equation	Celcius (C)
Salinity_downcast_2	Salinity value from downcast	practical salinity unit (PSU)
Salinity_upcast_2	Salinity value from upcast	practical salinity unit (PSU)

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Instruments

Dataset-specific Instrument Name	Seabird 911 CTD
Generic Instrument Name	CTD Sea-Bird 911
Dataset-specific Description	Standard hydrographic measurements of temperature, salinity, oxygen, and chlorophyll (Chl) fluorescence were made using a Seabird SBE 911 conductivity-temperature-depth (CTD) unit.
Generic Instrument Description	The Sea-Bird SBE 911 is a type of CTD instrument package. The SBE 911 includes the SBE 9 Underwater Unit and the SBE 11 Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 and SBE 11 is called a SBE 911. The SBE 9 uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 and SBE 4). The SBE 9 CTD can be configured with auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). More information from Sea-Bird Electronics.

Dataset-specific Instrument Name	Fluorometer (ECO-AFL/FL, WET Labs)
Generic Instrument Name	Fluorometer
Dataset-specific Description	Fluorescence measurements were made using a Seabird SBE 911 conductivity-temperature-depth (CTD) unit combined with a fluorometer and an oxygen sensor mounted to a rosette sampler.
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	Oxygen sensor
Generic Instrument Name	Oxygen Sensor
Dataset-specific Description	Oxygen measurements were made using a Seabird SBE 911 conductivity-temperature-depth (CTD) unit combined with a fluorometer and oxygen sensor mounted to a rosette sampler.
Generic Instrument Description	An electronic device that measures the proportion of oxygen (O2) in the gas or liquid being analyzed

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Deployments

HRS1610

Website	https://www.bco-dmo.org/deployment/715332
Platform	R/V Hugh R. Sharp
Start Date	2016-08-05
End Date	2016-08-18
Description	Additional cruise information is available from the Rolling Deck to Repository (R2R): http://www.rvdata.us/catalog/HRS1610

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Project Information

Cyanate in the Sea: Sources, Sinks, and Quantitative Significance (CyanateInTheSea)

Coverage: Western North Atlantic Coastal waters (mid- and south Atlantic Bight)

NSF Award Abstract:

Nitrogen is a critical nutrient in the world's oceans because, among other things, it is a major component of living organisms and can be a driver in primary productivity. Nitrogen is present in the ocean in a number of organic and inorganic forms, which vary in their ease in being assimilated by marine organisms. Cyanate is a simple form of organic nitrogen present in the ocean, although its abundance and importance to the ocean nitrogen cycle is poorly understood. Using newly developed and tested methods for measuring ambient cyanate concentrations and its uptake in seawater, researchers will analyze the distribution, sources, and geochemistry of cyanate in shelf waters of the Atlantic Ocean. Results from this project will elucidate the importance of cyanate in the marine nitrogen cycle and transform understanding of cyanate production and assimilation in the sea. This project will provide a unique opportunity for both graduate student research and undergraduate training, and will likely expose underrepresented groups to marine sciences.

Although physiological and genomic evidence suggest that marine microbes can utilize a broad array of inorganic and organic nitrogen compounds, cyanate's role in the marine nitrogen cycle has not yet been examined. As one of the simplest organic nitrogen compounds, cyanate has likely been present in the environment over Earth's long history. Evidence suggests that cyanate metabolism appeared early on in bacterial genomes and thus, the study of cyanate assimilation in the contemporary ocean may illuminate microbial processes with deep evolutionary roots. However, a decade since discovering the genomic capacity for cyanate utilization in marine cyanobacteria, little is still known about cyanate distributions in the environment, how it is produced, and how widespread cyanate utilization is among marine microbes. To further understanding of cyanate's role in the marine nitrogen cycle, a combination of geochemical approaches will be used to assess: 1) the distribution of cyanate in the marine environment, 2) potential sources of cyanate and the timescales at which cyanate is produced, 3) the rate of cyanate removal via microbial uptake and spontaneous decomposition, and 4) the geochemical coupling between cyanate production and consumption. Results generated from this study will be important for augmenting knowledge of the marine nitrogen cycle, refining biogeochemical models, and further understanding of the functioning of marine microbial communities.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1459698

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