Nitrite (NO2) concentrations from multiple HOE-DYLAN cruises, R/V Kilo Moana KM1215, KM1216, KM1217, KM1218, KM1219, KM1220, at Station ALOHA from July to September 2012 (C-MORE project)

Website: https://www.bco-dmo.org/dataset/4054
Data Type: Cruise Results
Version: 1
Version Date: 2023-08-10

Project
» Center for Microbial Oceanography: Research and Education (C-MORE)

Contributors	Affiliation	Role
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Curless, Susan E.	University of Hawaii at Manoa	Technician
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Gegg, Stephen R.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager
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Abstract
In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. This dataset contains the nitrite measurements conducted during five cruises at station ALOHA, and were obtained at the nanomolar level using an autoanalyzer connected to a 2m LWCC, with methods developed by Mariona Segura-Noguera and Susan Curless.

Table of Contents

Coverage

Spatial Extent: **N**:22.824 **E**:-157.917 **S**:22.757 **W**:-158.073
Temporal Extent: 2012-07-09 - 2012-09-15

Dataset Description

Nitrite data from core casts, isopycnal casts, and beach casts for the HOE-DYLAN cruises.

In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to

observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. Special focus was given to time-space coupling because proper scale sampling of the marine environment is an imperative, but generally neglected aspect of marine microbiology.

Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN)

Methods & Sampling

Seawater samples were collected from Niskin bottles with acid-washed syringes to avoid ammonium contamination with air and ship fumes. Samples were kept frozen (-20 ºC) until analysis. Nitrite was measured at the nanomolar level following Bendschneider and Robinson (1952) method, using a flow-injection system coupled to a 2m Liquid Waveguide Capillary Cell for reading the color. Low nutrient seawater was used for working standards preparation, blanks and carrier. The absorbance-concentration relationship was linear up to at least 200 nM nitrite, with a method detection limit of 0.7 nM and an error of 1.5% at 50-100 nM and 2% at 150 nM.

BCO-DMO Processing Description

The date and time columns in the submitted file were combined to create an ISO datetime column named ISO_DateTime_UTC and of format YYYY-MM-DDThh:mmZ

[table of contents | back to top]

Data Files

File
HOE-DYLAN cruises - NO2 filename: 4054_v1_hoe_dylan_cruises_no2.csv (Comma Separated Values (.csv), 399.76 KB) MD5:66e09678d52e591f570dea09baffb43d Primary data file for dataset ID 4054, version 1

[table of contents | back to top]

Parameters

Parameter	Description	Units
cruise_id	cruise ID	text
ISO_DateTime_UTC	Date and time (UTC) formatted to ISO 8601 standard	unitless
sta	station number	unitless
cast	cast number	unitless
bot	rosette bottle number	unitless
lat	Station Latitude; South is negative	decimal degrees
lon	Station Longitude; West is negative	decimal degrees
press	pressure from CTD	dbar
temp	temperature from CTD	degrees Celsius
sal	salinity from CTD	PSS-78
O2	dissolved oxygen from CTD	micromoles/kilogram
fluor_re	rescaled fluorescence from CTD to estimate chlorophyll	micrograms/liter
NO2	nitrite	nanomoles/liter
NO2_sd	standard deviation of NO2	unitless

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Description	The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight 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
Generic Instrument Name	Fluorometer
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	Liquid Waveguide Capillary Cells
Generic Instrument Name	Liquid Waveguide Capillary Cells
Dataset-specific Description	These low level nutrient measurements were made with an LWCC (not the usual autoanalyzer). The methods were developed by Susan Curless and Mariona Segura-Noguera.
Generic Instrument Description	Liquid Waveguide Capillary Cells (LWCC) are optical sample cells that combine an increased optical pathlength (2-500 cm) with small sample volumes. They can be connected via optical fibers to a spectrophotometer with fiber optic capabilities. Similar to optical fibers, light is confined within the (liquid) core of an LWCC by total internal reflection at the core/wall interface. Ultra-sensitive absorbance measurements can be performed in the ultraviolet (UV), visible (VIS) and near-infrared (NIR) to detect low sample concentrations in a laboratory or process control environment. According to Beer's Law the absorbance signal is proportional to chemical concentration and light path length.

Dataset-specific Instrument Name	Niskin bottle
Generic Instrument Name	Niskin bottle
Generic Instrument Description	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24, or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

[table of contents | back to top]

Deployments

KM1215

Website	https://www.bco-dmo.org/deployment/59101
Platform	R/V Kilo Moana
Start Date	2012-07-08
End Date	2012-07-28
Description	In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. Special focus was given to time-space coupling because proper scale sampling of the marine environment is an imperative, but generally neglected aspect of marine microbiology. Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN)

KM1216

Website	https://www.bco-dmo.org/deployment/59102
Platform	R/V Kilo Moana
Start Date	2012-07-30
End Date	2012-08-03
Description	In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. Special focus was given to time-space coupling because proper scale sampling of the marine environment is an imperative, but generally neglected aspect of marine microbiology. Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN)

KM1217

Website	https://www.bco-dmo.org/deployment/59103
Platform	R/V Kilo Moana
Start Date	2012-08-05
End Date	2012-08-14
Description	In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. Special focus was given to time-space coupling because proper scale sampling of the marine environment is an imperative, but generally neglected aspect of marine microbiology. Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN)

KM1218

Website	https://www.bco-dmo.org/deployment/59104
Platform	R/V Kilo Moana
Start Date	2012-08-16
End Date	2012-08-20
Description	In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. Special focus was given to time-space coupling because proper scale sampling of the marine environment is an imperative, but generally neglected aspect of marine microbiology. Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN)

KM1219

Website	https://www.bco-dmo.org/deployment/59105
Platform	R/V Kilo Moana
Start Date	2012-08-22
End Date	2012-09-11
Description	In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. Special focus was given to time-space coupling because proper scale sampling of the marine environment is an imperative, but generally neglected aspect of marine microbiology. Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN)

KM1220

Website	https://www.bco-dmo.org/deployment/59106
Platform	R/V Kilo Moana
Start Date	2012-09-13
End Date	2012-09-17
Description	In the summer of 2012, C-MORE conducted a "continuous" long-term field experiment at Station ALOHA to observe and interpret temporal variability in microbial processes, and the consequences for ecological dynamics and biogeochemical cycling. Special focus was given to time-space coupling because proper scale sampling of the marine environment is an imperative, but generally neglected aspect of marine microbiology. Hawaii Ocean Experiment - Dynamics of Light and Nutrients (HOE-DYLAN)

[table of contents | back to top]

Project Information

Center for Microbial Oceanography: Research and Education (C-MORE)

Website: http://cmore.soest.hawaii.edu/

Coverage: North Pacific Subtropical Gyre (large region around 22 45 N, 158 W)

Project summary

The **Center for Microbial Oceanography: Research and Education** (C-MORE) is a recently established (August 2006; NSF award: EF-0424599) NSF-sponsored Science and Technology Center designed to facilitate a more comprehensive understanding of the diverse assemblages of microorganisms in the sea, ranging from the genetic basis of marine microbial biogeochemistry including the metabolic regulation and environmental controls of gene expression, to the processes that underpin the fluxes of carbon, related bioelements and energy in the marine environment. Stated holistically, C-MORE's primary mission is: *Linking Genomes to Biomes*.

We believe that the time is right to address several major, long-standing questions in microbial oceanography. Recent advances in the application of molecular techniques have provided an unprecedented view of the structure, diversity and possible function of sea microbes. By combining these and other novel approaches with more well-established techniques in microbiology, oceanography and ecology, it may be possible to develop a meaningful predictive understanding of the ocean with respect to energy transduction, carbon sequestration, bioelement cycling and the probable response of marine ecosystems to global environmental variability and climate change. The strength of C-MORE resides in the synergy created by bringing together experts who traditionally have not worked together and this, in turn, will facilitate the creation and dissemination of new knowledge on the role of marine microbes in global habitability.

The new Center will design and conduct novel research, broker partnerships, increase diversity of human resources, implement education and outreach programs, and utilize comprehensive information about microbial life in the sea. The Center will bring together teams of scientists, educators and community members who otherwise do not have an opportunity to communicate, collaborate or design creative solutions to long-term ecosystem scale problems. The Center's research will be organized around four interconnected themes:

- (Theme I) microbial biodiversity,
- (Theme II) metabolism and C-N-P-energy flow,
- (Theme III) remote and continuous sensing and links to climate variability, and
- (Theme IV) ecosystem modeling, simulation and prediction.

Each theme will have a leader to help coordinate the research programs and to facilitate interactions among the other related themes. The education programs will focus on pre-college curriculum enhancements, in service teacher training and formal undergraduate/graduate and post-doctoral programs to prepare the next generation of microbial oceanographers. The Center will establish and maintain creative outreach programs to

help diffuse the new knowledge gained into society at large including policymakers. The Center's activities will be dispersed among five partner institutions:

- Massachusetts Institute of Technology,
- Woods Hole Oceanographic Institution,
- Monterey Bay Aquarium Research Institute,
- University of California at Santa Cruz and
- Oregon State University

and will be coordinated at the University of Hawaii at Manoa.

Related Files:

Strategic plan (PDF file)

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Biological Infrastructure (NSF DBI)	DBI-0424599

[table of contents | back to top]