

# Nutrient measurements from Niskin bottle samples from R/V Oceanus OC404-01, OC404-04, OC415-01, OC415-03 in the Sargasso Sea from 2004-2005 (EDDIES project)

**Website:** <https://www.bco-dmo.org/dataset/3052>

**Data Type:** Cruise Results

**Version:** 1

**Version Date:** 2007-10-04

## Project

» [Eddies Dynamics, Mixing, Export, and Species composition](#) (EDDIES)

## Program

» [Ocean Carbon and Biogeochemistry](#) (OCB)

Contributors	Affiliation	Role
<a href="#">McGillicuddy, Dennis J.</a>	Woods Hole Oceanographic Institution (WHOI)	Principal Investigator
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## Abstract

Nutrient measurements from Niskin bottle samples from R/V Oceanus OC404-01, OC404-04, OC415-01, OC415-03 in the Sargasso Sea from 2004-2005.

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## Dataset Description

**PI:** Dennis McGillicuddy

**of:** Woods Hole Oceanographic Institution (WHOI)

**dataset:** Nutrient measurements from Niskin bottle samples

**platform:** R/V Oceanus

Methodology: analyses performed by Paul Henderson (phenderson@whoi.edu) at WHOI Nutrients Facility; for sampling methodology, please refer to U.S. JGOFS BATS Method Manual Version 4 (1997). Bermuda Atlantic Time-Series Study April 1997. Anthony H. Knap, Anthony F. Michaels et al., 136 pp. (link to [BATS Method Manual version 4](#) local copy)

OCB DMO note: matched station number in cruise event log to add sampling location, date and time

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## Parameters

Parameter	Description	Units
sta	station number	dimensionless
SID_Nis	Niskin ID# (#&&&\$\$\$@ where # is leg#, &&&=cruise #, \$\$\$=ctd cast # and @@=niskin number)	dimensionless
SID_nuts	sample number	dimensionless
depth_n	depth, nominal	meters
press	pressure	decibars
SiO4	Silicate	micromoles/liter
PO4	Phosphate	micromoles/liter
NO3_NO2	Nitrate + Nitrite	micromoles/liter
NO2	Nitrite	micromoles/liter
event	unique sampling event number composite of GMT date and time	YYYYMMDDhhmm
date	start date of event (GMT)	YYYYMMDD
time	start time of event (GMT)	hhmm
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees

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## Instruments

<b>Dataset-specific Instrument Name</b>	Niskin Bottle
<b>Generic Instrument Name</b>	Niskin bottle
<b>Generic Instrument Description</b>	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.

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## Deployments

**OC404-01**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57956">https://www.bco-dmo.org/deployment/57956</a>
<b>Platform</b>	R/V Oceanus
<b>Report</b>	<a href="http://ocb.whoi.edu/EDDIES/CRUISES/2004/OC404-1_Draft_Cruise_Report.pdf">http://ocb.whoi.edu/EDDIES/CRUISES/2004/OC404-1_Draft_Cruise_Report.pdf</a>
<b>Start Date</b>	2004-06-11
<b>End Date</b>	2004-07-03
<b>Description</b>	<p>EDDIES 2004 Survey 1 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog (Cruise DOI: 10.7284/900337)</p> <p><b>Methods &amp; Sampling</b>  PI: Dennis McGillicuddy of: Woods Hole Oceanographic Institution (WHOI) dataset: Nutrient measurements from Niskin bottle samples dates: 12 June 2004 to 02 July 2004 (20040612-20040702) location: N: 37.934 S: 29.777 W: -68.703 E: -58.754 project/cruise: EDDIES/OC404-1 2004 Survey 1 platform: R/V Oceanus Methodology: analyses performed by Paul Henderson (<a href="mailto:phenderson@whoi.edu">phenderson@whoi.edu</a>) at WHOI Nutrients Facility; for sampling methodology, please refer to U.S. JGOFS BATS Method Manual Version 4 (1997). Bermuda Atlantic Time-Series Study April 1997. Anthony H. Knap, Anthony F. Michaels et al., 136 pp. (link to BATS Method Manual version 4 local copy) Change history: YMMDD 060313: downloaded oc404_1_nuts.dat from EDDIES data Web site; added to OCB database by Cyndy Chandler, OCB DMO 071004: downloaded oc404_1_nuts_final.txt from EDDIES data Web site and prepared for OCB 090420: add event number from cruise event log OCB DMO note: match station number in cruise event log to determine sampling location, date and time Analysis Note: files listing those data that were rerun: oc404-1 Nitrate oc404-1 Phosphate oc404-1 Silicate</p>

#### OC404-04

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57961">https://www.bco-dmo.org/deployment/57961</a>
<b>Platform</b>	R/V Oceanus
<b>Report</b>	<a href="http://ocb.whoi.edu/EDDIES/CRUISES/2004/OC404-4_Draft_Cruise_Report.pdf">http://ocb.whoi.edu/EDDIES/CRUISES/2004/OC404-4_Draft_Cruise_Report.pdf</a>
<b>Start Date</b>	2004-07-25
<b>End Date</b>	2004-08-12
<b>Description</b>	<p>EDDIES project 2004 Survey 2 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog</p> <p><b>Methods &amp; Sampling</b>  PI: Dennis McGillicuddy of: Woods Hole Oceanographic Institution (WHOI) dataset: Nutrient measurements from Niskin bottle samples dates: 26 July 2004 to 11 August 2004 (20040726-20040811) location: N: 31.942 S: 29.958 W: -66.603 E: -59.450 project/cruise: EDDIES/OC404-4 2004 Survey 2 platform: R/V Oceanus Methodology: analyses performed by Paul Henderson (<a href="mailto:phenderson@whoi.edu">phenderson@whoi.edu</a>) at WHOI Nutrients Facility; for sampling methodology, please refer to U.S. JGOFS BATS Method Manual Version 4 (1997). Bermuda Atlantic Time-Series Study April 1997. Anthony H. Knap, Anthony F. Michaels et al., 136 pp. (link to BATS Method Manual version 4 local copy) Change history: YMMDD 060314: downloaded oc404_4_nuts.dat from EDDIES data Web site; added to OCB database by Cyndy Chandler, OCB DMO; 071004: downloaded oc404_4_nuts_final.txt from EDDIES data Web site and prepared for OCB database 071010: corrected column label for Nitrite (NO<sub>2</sub>) data; had been incorrectly named Ammonium (NH<sub>4</sub>); confirmed this with Paul Henderson (WHOI Nutrients Facility) 090420: add event number from cruise event log OCB DMO note: match station number in cruise event log to determine sampling location, date and time Analysis Note: file listing all samples rerun: oc404-4 Nutrient reruns Samples that have a value of 0 are below detection limit (BDL). Some of the Phosphate samples from 550 to 650 seem high.</p>

#### OC415-01

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57962">https://www.bco-dmo.org/deployment/57962</a>
<b>Platform</b>	R/V Oceanus
<b>Report</b>	<a href="http://ocb.whoi.edu/EDDIES/CRUISES/2005/OC415_Draft_Cruise_Report_050722.pdf">http://ocb.whoi.edu/EDDIES/CRUISES/2005/OC415_Draft_Cruise_Report_050722.pdf</a>
<b>Start Date</b>	2005-06-20
<b>End Date</b>	2005-07-15
<b>Description</b>	<p>EDDIES project 2005 Survey 1 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog</p> <p><b>Methods &amp; Sampling</b>  PI: Dennis McGillicuddy of: Woods Hole Oceanographic Institution (WHOI) dataset: Nutrient measurements from Niskin bottle samples dates: 20 June 2005 to 14 July 2005 (20050620-20050714) location: N: 40.753 S: 28.733 W: -70.546 E: -61.920 project/cruise: EDDIES/OC415-1 2005 Survey 1 platform: R/V Oceanus Methodology: analyses performed by Paul Henderson (<a href="mailto:phenderson@whoi.edu">phenderson@whoi.edu</a>) at WHOI Nutrients Facility; for sampling methodology, please refer to U.S. JGOFS BATS Method Manual Version 4 (1997). Bermuda Atlantic Time-Series Study April 1997. Anthony H. Knap, Anthony F. Michaels et al., 136 pp. (link to BATS Method Manual version 4 local copy) Change history: YMMDD 071004: downloaded oc415_1_nuts.dat from EDDIES data Web site and prepared for OCB OCB DMO note: sampling location, date and time are taken from cruise event log; nominal depth added by DMO</p>

### OC415-03

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57965">https://www.bco-dmo.org/deployment/57965</a>
<b>Platform</b>	R/V Oceanus
<b>Report</b>	<a href="http://ocb.whoi.edu/EDDIES/CRUISES/2005/OC415-3_CrRptDraft_091405.pdf">http://ocb.whoi.edu/EDDIES/CRUISES/2005/OC415-3_CrRptDraft_091405.pdf</a>
<b>Start Date</b>	2005-08-07
<b>End Date</b>	2005-08-26
<b>Description</b>	<p>EDDIES project 2005 Survey 2 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog</p> <p><b>Methods &amp; Sampling</b>  PI: Dennis McGillicuddy of: Woods Hole Oceanographic Institution (WHOI) dataset: Nutrient measurements from Niskin bottle samples dates: 09 August 2005 to 25 August 2005 (20050809 - 20050825) location: N: 33.064 S: 29.279 W: -69.409 E: -63.165 project/cruise: EDDIES/OC415-3 2005 Survey 2 platform: R/V Oceanus Methodology: analyses performed by Paul Henderson (<a href="mailto:phenderson@whoi.edu">phenderson@whoi.edu</a>) at WHOI Nutrients Facility; for sampling methodology, please refer to U.S. JGOFS BATS Method Manual Version 4 (1997). Bermuda Atlantic Time-Series Study April 1997. Anthony H. Knap, Anthony F. Michaels et al., 136 pp. (link to BATS Method Manual version 4 local copy) Change history: YMMDD 071004: downloaded oc415_3_nuts.dat from EDDIES data Web site and prepared for OCB OCB DMO note: sampling location, date and time are taken from cruise event log; nominal depth added by DMO</p>

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## Project Information

### Eddies Dynamics, Mixing, Export, and Species composition (EDDIES)

**Website:** [http://science.whoi.edu/users/olga/eddies/EDDIES\\_Project.html](http://science.whoi.edu/users/olga/eddies/EDDIES_Project.html)

**Coverage:** Sargasso Sea

The original title of this project from the NSF award is: Collaborative Research: Impacts of Eddies and Mixing on Plankton Community Structure and Biogeochemical Cycling in the Sargasso Sea".

Prior results have documented eddy-driven transport of nutrients into the euphotic zone and the associated accumulation of chlorophyll. However, several key aspects of mesoscale upwelling events remain unresolved by the extant database, including: (1) phytoplankton physiological response, (2) changes in community structure, (3) impact on export out of the euphotic zone, (4) rates of mixing between the surface mixed layer and the base of the euphotic zone, and (5) implications for biogeochemistry and differential cycling of carbon and associated bioactive elements. This leads to the following hypotheses concerning the complex, non-linear biological regulation of elemental cycling in the ocean:

H1: Eddy-induced upwelling, in combination with diapycnal mixing in the upper ocean, introduces new nutrients into the euphotic zone.

H2: The increase in inorganic nutrients stimulates a physiological response within the phytoplankton community.

H3: Differing physiological responses of the various species bring about a shift in community structure.

H4: Changes in community structure lead to increases in export from, and changes in biogeochemical cycling within, the upper ocean.

## **Publications**

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Andrews, J.E., Hartin, C., Buesseler, K.O.. "7Be Analyses in Seawater by Low Background Gamma-Spectroscopy," *Journal of Radioanalytical and Nuclear Chemistry*, v.277, 2008, p. 253.

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## **Program Information**

### **Ocean Carbon and Biogeochemistry (OCB)**

**Website:** <http://us-ocb.org/>

**Coverage:** Global

The Ocean Carbon and Biogeochemistry (OCB) program focuses on the ocean's role as a component of the global Earth system, bringing together research in geochemistry, ocean physics, and ecology that inform on and advance our understanding of ocean biogeochemistry. The overall program goals are to promote, plan, and coordinate collaborative, multidisciplinary research opportunities within the U.S. research community and with international partners. Important OCB-related activities currently include: the Ocean Carbon and Climate Change (OCCC) and the North American Carbon Program (NACP); U.S. contributions to IMBER, SOLAS, CARBOOCEAN; and numerous U.S. single-investigator and medium-size research projects funded by U.S. federal agencies including NASA, NOAA, and NSF.

The scientific mission of OCB is to study the evolving role of the ocean in the global carbon cycle, in the face of environmental variability and change through studies of marine biogeochemical cycles and associated ecosystems.

The overarching OCB science themes include improved understanding and prediction of: 1) oceanic uptake and release of atmospheric CO<sub>2</sub> and other greenhouse gases and 2) environmental sensitivities of biogeochemical cycles, marine ecosystems, and interactions between the two.

The OCB Research Priorities (updated January 2012) include: ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on biogeochemical cycles; ocean carbon uptake and storage; and expanding low-oxygen conditions in the coastal and open oceans.

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0241310</a>

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