

# Organic matter and nutrients; del-15N, del-13C, POC, POM from R/V Oceanus OC404-01, OC404-04 in the Sargasso Sea from 2004-2004 (EDDIES project)

**Website:** <https://www.bco-dmo.org/dataset/3045>

**Data Type:** Cruise Results

**Version:** 2 November 2007

**Version Date:** 2007-11-02

## Project

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

## Program

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

Contributors	Affiliation	Role
<a href="#">Hansell, Dennis</a>	University of Miami Rosenstiel School of Marine and Atmospheric Science (UM-RSMAS)	Principal Investigator
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## Dataset Description

Organic matter and nutrients including del-15N, del-13C, POC and POM from EDDIES Oceanus cruises are reported by Dennis Hansell of the Rosenstiel School of Marine & Atmospheric Science (RSMAS).

Methodology: none provided with data; see Li and Hansell (2008)

OCB DMO note: the original data file included Type B (B indicates bottle sample) and bottom depth reported as 700 meters for all stations (the target depth of the casts); depth\_n added to enable merge with bottle data. Parameter quality flags are integer values ranging from 0 through 8: 0 is very good; 1 is OK; 4 is questionable; 8 is bad.

Publication: Qian P. Li and Dennis A. Hansell. 2008. Nutrient distributions in baroclinic eddies of the oligotrophic North Atlantic and inferred impacts on biology, Deep Sea Research Part II: Topical Studies in Oceanography, Volume 55, Issues 10-13, Mesoscale Physical-Biological-Biogeochemical Linkages in the Open Ocean: Results from the E-FLUX and EDDIES Programs, May-June 2008, Pages 1291-1299, ISSN 0967-0645, DOI: 10.1016/j.dsr2.2008.01.009 (<http://dx.doi.org/10.1016/j.dsr2.2008.01.009>)

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## Parameters

<b>Parameter</b>	<b>Description</b>	<b>Units</b>
sta	station number	dimensionless
date	sampling date	YYYYMMDD
time	sampling time	HHMM
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees
depth_n	sample depth, nominal	meters
depth	sample depth	meters
depth_QF	sample depth quality flag	dimensionless
temp	temperature, from CTD, ITS-90	degrees Celsius
temp_QF	CTD temperature quality flag	dimensionless
salinity	CTD salinity, PSS-78	dimensionless
salinity_QF	CTD salinity quality flag	dimensionless
O2_umol_kg	CTD oxygen	micromoles/kilogram
O2_umol_kg_QF	CTD oxygen quality flag	dimensionless
fluor_CTD	CTD relative fluorescence	RFU
fluor_QF	relative fluorescence quality flag	dimensionless
irrad	irradiance	microEinsteins/meter <sup>2</sup> /second
irrad_QF	irradiance quality flag	dimensionless
density	density	kilograms/meter <sup>3</sup>
density_QF	density quality flag	dimensionless
O2_satP	CTD oxygen saturation	percent
O2_satP_QF	CTD oxygen saturation quality flag	dimensionless
DNN	total dissolved inorganic nitrogen	micromolar
DNN_QF	DNN quality flag	dimensionless
DIP	dissolved inorganic Phosphorus	micromolar
DIP_QF	DIP quality flag	dimensionless
TDN	total dissolved Nitrogen	micromolar
TDN_QF	TDN quality flag	dimensionless
TOC	total organic Carbon	micromolar
TOC_QF	TOC quality flag	dimensionless
POC_ug_L	particulate organic Carbon	micrograms/liter
POC_ug_L_QF	POC quality flag	dimensionless
dC13_POM	delta 13C of particulate organic matter carbon relative to PDB (Pee Dee Belemnite standard)	relative notation
dC13_POM_QF	dC13_POM quality flag	dimensionless
PON_ug_L	particulate organic Nitrogen	micrograms/liter
PON_ug_L_QF	PON quality flag	dimensionless
dN15_POM	delta 15N of particulate organic matter nitrogen relative to atmospheric N2	relative notation
dN15_POM_QF	dN15_POM quality flag	dimensionless

## 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.

## 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 Hansell of: Rosenstiel School of Marine &amp; Atmospheric Science (RSMAS) dataset: Organic matter and nutrients; del-15N, del-13C, POC, POM 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: none provided with data Change history: YYMMDD 061117: downloaded original data from EDDIES data web site; 061201: added to OCB database by Nancy Copley and Cyndy Chandler, BCO DMO 070117: change unit information 070521: units modified per Qian Li (RSMAS, Miami) OCB DMO note: the original data file included Type B (B indicates bottle sample) and bottom depth reported as 700 meters for all stations (the target depth of the casts); depth_n added to enable merge with bottle data Parameter quality flags are integer values ranging from 0 through 8: 0 is very good; 1 is OK; 4 is questionable; 8 is bad</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 Hansell of: Rosenstiel School of Marine &amp; Atmospheric Science (RSMAS), University of Miami dataset: Organic matter and nutrients; del-15N, del-13C, POC, POM dates: 26 July 2004 to 11 Aug 2004 (20040726-20040811) location: N: 31.942 S: 29.958 W: -66.603 E: -59.452 project/cruise: EDDIES/OC404-4 2004 Survey 2 platform: R/V Oceanus Methodology: none provided with data Change history: YMMDD 061117: downloaded original data from EDDIES data web site; 061201: added to OCB database by Nancy Copley and Cyndy Chandler, BCO DMO 070117: change unit information 070521: units modified per Qian Li (RSMAS, Miami) 071102: station 41 longitude corrected to -64.921 from -54.921 DMO note: the original data file included Type B (B indicates bottle sample) and bottom depth reported as 700 meters for all stations (the target depth of the casts); depth_n added to enable merge with bottle data; Parameter quality flags are integer values ranging from 0 through 8: 0 is very good; 1 is OK; 4 is questionable; 8 is bad</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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Buesseler, K.O., Lamborg, C., Cai, P., Escoube, R., Johnson, R., Pike, S., Masque, P., McGillicuddy, D.J., Verdeny, E.. "Particle Fluxes Associated with Mesoscale Eddies in the Sargasso Sea," *Deep Sea Research II*, v.55, 2008, p. 1426.

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Jenkins, W.J., McGillicuddy, D.J., and Lott III, D.E.. "The Distributions of, and Relationship Between <sup>3</sup>He and Nitrate in Eddies," *Deep Sea Research II*, v.55, 2008, p. 1389.

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Ledwell, J.R., McGillicuddy, D.J., and Anderson, L.A.. "Nutrient Flux into an Intense Deep Chlorophyll Layer in a Mode-water Eddy.," *Deep Sea Research II*, v.55, 2008, p. 1139.

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seawater with a long-path liquid waveguide capillary cell," Marine Chemistry, v.96, 2005, p. 73.

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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-0241340</a>

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