

# Dissolved Organic Matter, nutrients and CTD data collected during R/V Oceanus cruise OC404-01 and R/V Weatherbird II cruise WB0409 in the Sargasso Sea in June 2004 (EDDIES project)

**Website:** <https://www.bco-dmo.org/dataset/3046>

**Version:** 24 May 2007

**Version Date:** 2007-05-24

## 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

Dissolved Organic Matter, nutrients and CTD data are reported by Dennis Hansell of the Rosenstiel School of Marine & Atmospheric Science (RSMAS), University of Miami.

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

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

Parameter	Description	Units
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
SiO4	silicate	micromolar
SiO4_QF	silicate 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

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## Instruments

<b>Dataset-specific Instrument Name</b>	CTD Sea-Bird SBE 911plus
<b>Generic Instrument Name</b>	CTD Sea-Bird SBE 911plus
<b>Generic Instrument Description</b>	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

<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.

<b>Dataset-specific Instrument Name</b>	Shimadzu TOC-V Analyzer
<b>Generic Instrument Name</b>	Shimadzu TOC-V Analyzer
<b>Dataset-specific Description</b>	Shimadzu TOC-Vcsh high temperature combustion system
<b>Generic Instrument Description</b>	A Shimadzu TOC-V Analyzer measures DOC by high temperature combustion method.

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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 Hansell of: Rosenstiel School of Marine &amp; Atmospheric Science (RSMAS), University of Miami dataset: Dissolved Organic Matter, nutrients and CTD data dates: 12 June 2004 to 02 July 2004 (20040612-20040702) location: N: 37.9345 S: 29.7775 W: -68.7028 E: -58.7542 project/cruise: EDDIES/OC404-1 2004 Survey 1 platform: R/V Oceanus Methodology: none provided with data Change history: YMMDD 050512: downloaded original data from EDDIES data web site; added to OCB database by Cyndy Chandler, OCB DMO 070524: units modified per Qian Li (RSMAS, Miami) 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>

#### WB0409

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57955">https://www.bco-dmo.org/deployment/57955</a>
<b>Platform</b>	R/V Weatherbird II
<b>Start Date</b>	2004-06-23
<b>End Date</b>	2004-07-02
<b>Description</b>	<p>EDT1 2004 Transect 1 cruise Funded by: NSF OCE-0241310</p> <p><b>Methods &amp; Sampling</b>  PI: Dennis Hansell of: Rosenstiel School of Marine &amp; Atmospheric Science (RSMAS), University of Miami dataset: Dissolved Organic Matter, nutrients and CTD data dates: 24 June 2004 to 02 July 2004 (20040624-20040702) location: N: 31.219 S: 29.779 W: -66.178 E: -64.082 project/cruise: EDDIES/WB0409 2004 Transect 1 (EDT1) platform: R/V Weatherbird II Methodology: none provided with data Change history: YMMDD 050701: downloaded original data file from EDDIES data web site; added to OCB database by Cyndy Chandler, OCB DMO 070524: 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>

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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

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

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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Davis, C.S., and McGillicuddy, D.J.. "Transatlantic Abundance of the N<sub>2</sub>-Fixing Colonial Cyanobacterium *Trichodesmium*," *Science*, v.312, 2006, p. 1517.

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Greenan, B.J.W.. "Shear and Richardson number in a mode-water eddy," *Deep-Sea Research Part II: Topical Studies in Oceanography*, v.55, 2008, p. 1161.

Jenkins, W.J., McGillicuddy, D.J., and Lott III, D.E.. "The Distributions of, and Relationship Between  $^3\text{He}$  and Nitrate in Eddies," *Deep Sea Research II*, v.55, 2008, p. 1389.

Jenkins, W.J., McGillicuddy, D.J., Lott III, D.E.. "The Distributions of, and Relationship Between  $^3\text{He}$  and Nitrate in Eddies," *Deep-Sea Research II*, v.55, 2008, p. 1389.

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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McGillicuddy, D.J., et. al.. "Eddy/Wind Interactions Stimulate Extraordinary Mid-Ocean Plankton Blooms," *Science*, v.316, 2007, p. 1021.

McGillicuddy, D.J., Ledwell, J.R., and Anderson, L.A.. "Response to Comment on "Eddy/Wind Interactions Stimulate Extraordinary Mid-Ocean Plankton Bloom".," *Science*, v.320, 2008.

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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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