# Pigments, chlorophyll-a and phaeophytin sampled from Niskin bottles from R/V Oceanus OC404-01, OC404-04 in the Sargasso Sea in 2004 (EDDIES project)

**Website**: https://www.bco-dmo.org/dataset/3040
**Version**: 20 June 2007
**Version Date**: 2007-06-20

**Project**
» Eddies Dynamics, Mixing, Export, and Species composition (EDDIES)

**Program**
» Ocean Carbon and Biogeochemistry (OCB)


| Contributors | Affiliation | Role |
|---|---|---|
| Bates, Nicholas | Bermuda Biological Station for Research (BBSR) | Principal Investigator |
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## Table of Contents



## Dataset Description

**PI:** Nick Bates
**of:** Bermuda Biological Station for Research (BBSR)
**dataset:** pigments chlorophyll-a and phaeophytin sampled from Niskin bottles
**platform:** R/V Oceanus

Methodology: see Chapter 14: Determination of Chlorophyll & Phaeopigments in 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)

Technician: Rod Johnson (rod@sargasso.bbsr.edu)

[ table of contents | back to top ]

## Parameters

| Parameter | Description | Units |
|---|---|---|
| sta | station number | dimensionless |
| event | unique sampling event number composite of GMT date and time | YYYYMMDDhhmm |
| date | sampling date (GMT) | YYMMDD |
| time | sampling time (GMT) | HHMM |
| lon | longitude, negative denotes West | decimal degrees |
| lat | latitude, negative denotes South | decimal degrees |
| depth_n | sample depth, nominal | meters |
| SID_chla | sample ID, chlorophyll-a | dimensionless |
| chl_a_fluor_ugL | chlorophyll-a | micrograms/liter |
| phaeo | phaeophytin | micrograms/liter |
| F0 | initial fluorescence | relative |
| Fa | fluorescence after acidification | relative |
| Fo_blank | initial fluorescence minus fluorescence of a blank | relative |
| Fa_blank | fluorescence after acidification minus fluorescence of a blank | relative |

[ table of contents | back to top ]

## Instruments

| | |
|---|---|
| **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

**OC404-01**

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|---|---|
| **Website** | https://www.bco-dmo.org/deployment/57956 |
| **Platform** | R/V Oceanus |
| **Report** | http://ocb.whoi.edu/EDDIES/CRUISES/2004/OC404-1_Draft_Cruise_Report.pdf |
| **Start Date** | 2004-06-11 |
| **End Date** | 2004-07-03 |
| **Description** | 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)<br><br>**Methods & Sampling**<br>PI: Nick Bates of: Bermuda Biological Station for Research (BBSR) dataset: pigments chlorophyll-a and phaeophytin sampled from Niskin bottles 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: see Chapter 14: Determination of Chlorophyll & Phaeopigments in 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) Technician: Rod Johnson (rod@sargasso.bbsr.edu) Change history: YYMMDD 050610: original data contributed by Rod Johnson (rod@sargasso.bbsr.edu); added to OCB database by Cyndy Chandler, OCB DMO 070313: change parameter names to be consistent within EDDIES 070620: add event, date, time, lon and lat from cruise event log (Copley, OCB) |

**OC404-04**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/57961 |
| **Platform** | R/V Oceanus |
| **Report** | http://ocb.whoi.edu/EDDIES/CRUISES/2004/OC404-4_Draft_Cruise_Report.pdf |
| **Start Date** | 2004-07-25 |
| **End Date** | 2004-08-12 |
| **Description** | EDDIES project 2004 Survey 2 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog<br><br>**Methods & Sampling**<br>PI: Nick Bates of: Bermuda Biological Station for Research (BBSR) dataset: chlorophyll-a and phaeophytin pigments sampled from Niskin bottles 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: see Chapter 14: Determination of Chlorophyll & Phaeopigments in 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) Technician: Rod Johnson (rod@sargasso.bbsr.edu) Change history: YYMMDD 061213: downloaded original data from EDDIES data web site; 070112: added to OCB database by Nancy Copley and Cyndy Chandler, OCB DMO 070313: change parameter names to be consistent within EDDIES 070524: added data for stations 49-68; event, date and position are from log DMO note: The local SID_chla data match data reported in the bottle_SID object |

[ table of contents | back to top ]

## Project Information

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

**Website**: 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.

Benitez-Nelson, C.R. and McGillicuddy, D.J.. "Mesoscale Physical-Biological-Biogeochemical Linkages in the Open Ocean: An Introduction to the Results of the E-Flux and EDDIES Programs.," Deep Sea Research II, v.55, 2008, p. 1133.

Benitez-Nelson, C.R. and McGillicuddy, D.J.. "Mesoscale Physical-Biological-Biogeochemical Linkages in the Open Ocean: An Introduction to the Results of the E-Flux and EDDIES Programs," Deep-Sea Research II, v.55, 2008, p. 1133.

Bibby, T.S., Gorbunov, M.Y., Wyman, K.W., Falkowski, P.G.. "Photosynthetic community responses to upwelling in mesoscale eddies in the subtropical North Atlantic and Pacific Oceans," Deep-Sea Research Part II: Topical Studies in Oceanography, v.55, 2008, p. 1310.

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.

Carlson, C.A., del Giorgio, P., Herdl, G.. "Microbes and the dissipation of energy and respiration: From cells to ecosystems," Oceanography, v.20, 2007, p. 89.

Davis, C.S., and McGillicuddy, D.J.. "Transatlantic Abundance of the N2-Fixing Colonial Cyanobacterium Trichodesmium," Science, v.312, 2006, p. 1517.

Ewart, C.S., Meyers, M.K., Wallner, E., McGillicuddy, D.J., Carlson, C.A.. "Microbial Dynamics in Cyclonic and Anticyclonic Mode-Water Eddies in the Northwestern Sargasso Sea," Deep Sea Research II, v.55, 2008, p. 1334.

Ewart, C.S., Meyers, M.K., Wallner, E., McGillicuddy, D.J., Carlson, C.A.. "Microbial Dynamics in Cyclonic and Anticyclonic Mode-Water Eddies in the Northwestern Sargasso Sea," Deep-Sea Research II, v.55, 2008, p. 1334.

Goldthwait, S.A. and Steinberg, D.K.. "Elevated biomass of mesozooplankton and enhanced fecal pellet flux in

cyclonic and mode-water eddies in the Sargasso Sea," Deep-Sea Research Part II: Topical Studies in Oceanography, v.55, 2008, p. 1360.

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 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 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.

Ledwell, J.R., McGillicuddy, D.J., 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.

Li, Q.P. and Hansell, D.A.. "Intercomparison and coupling of MAGIC and LWCC techniques for trace analysis of phosphate in seawater," Analytical Chemica Acta, v.611, 2008, p. 68.

Li, Q.P., Hansell, D.A., McGillicuddy, D.J., Bates, N.R., Johnson, R.J.. "Tracer-based assessment of the origin and biogeochemical transformation of a cyclonic eddy in the Sargasso Sea," Journal of Geophysical Research, v.113, 2008, p. 10006.

Li, Q.P., Hansell, D.A., Zhang, J.-Z.. "Underway monitoring of nanomolar nitrate plus nitrite and phosphate in oligotrophic seawater," Limnology and Oceanography: Methods, v.6, 2008, p. 319.

Li, Q.P., Zhang, J.-Z., Millero, F.J., Hansell, D.A.. "Continuous colorimetric determination of trace ammonium in seawater with a long-path liquid waveguide capillary cell," Marine Chemistry, v.96, 2005, p. 73.

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.

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

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

Mourino B., and McGillicuddy, D.J.. "Mesoscale Variability in the Metabolic Balance of the Sargasso Sea," Limnology & Oceanography, v.51, 2006, p. 2675.

[ table of contents | back to top ]

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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 CO2 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.

[ table of contents | back to top ]