

HPLC pigments, EDDIES WB cruises from R/V Weatherbird II WB0409, WB0413, WB0506, WB0508 in the Sargasso Sea from 2004-2005 (EDDIES project)

Website: <https://www.bco-dmo.org/dataset/3023>

Data Type: Cruise Results

Version: 1

Version Date: 2007-03-13

Project

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

Program

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

Contributors	Affiliation	Role
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Abstract

HPLC pigments, EDDIES WB cruises from R/V Weatherbird II WB0409, WB0413, WB0506, WB0508 in the Sargasso Sea from 2004-2005.

Table of Contents

- [Coverage](#)
 - [Dataset Description](#)
 - [Acquisition Description](#)
 - [Processing Description](#)
 - [Parameters](#)
 - [Instruments](#)
 - [Deployments](#)
 - [Project Information](#)
 - [Program Information](#)
 - [Funding](#)
-

Coverage

Spatial Extent: N:31.756 E:-64.0818 S:29.7791 W:-69.4095

Temporal Extent: 2004-06-24 - 2005-08-25

Dataset Description

Pigments from HPLC analysis of bottle samples collected during EDDIES Weatherbird cruises

dates: 2004 - 2005
location: Sargasso Sea
project/cruise: EDDIES/WB0409 2004 Transect 1 (EDT1)
EDDIES/WB0413 2004 Transect 2 (EDT2)
EDDIES/WB0506 2005 Transect 1 (EDT3)
EDDIES/WB0508 2005 Transect 2 (EDT4)
platform: R/V Weatherbird II

Change history: YMMDD

070308: downloaded original data from EDDIES data Web site
(200609 DM FINAL_corrected.xls);
prepared for OCB database by Nancy Copley, OCB DMO
070313: added to OCB database by Cyndy Chandler, OCB DMO
event number is from cruise event log
070405: per Jason Perl, units for all pigment concentrations
changed from microgram/kilogram to microgram/liter

PI note: 080317: Recalibrated data are expected from NASA during the second half of 2008.

Acquisition Description

Methodology, protocols and PI-notes: [NASA/TM-2003- HPLC Protocols](#) (1 MB PDF)

J.L. Mueller, G.S. Fargion, C.R. McClain, C.C. Trees and J. Perl. 2003. "Ocean Optics Protocols For Satellite Ocean Color Sensor Validation, Revision 5, Volume V: Biogeochemical and Bio-Optical Measurements and Data Analysis Protocols". NASA Tech. Memo., NASA Goddard Space Flight Center, Greenbelt, Maryland. 43 pp. (PDF downloaded from <http://oceancolor.gsfc.nasa.gov/DOCS/>)

Technician: Jason Perl (jperl@chors.sdsu.edu)

Center for Hydro-Optics & Remote Sensing

San Diego State University Research Foundation

Technician notes:

note 1: Did not have a signal for Chl_a @ 450nm (sample too dilute to get a chromatogram peak)

note 2: Did not have a signal for Chl_a @ 450nm or 436nm (sample too dilute to get a chromatogram peak)

note 3: no ancillary data; default volume filter set to 4000mL

chl_a_fluor and pheo_fluor are values from a Turner Fluorometer. Each HPLC extract is run on the Fluorometer as a second measure of Chla. Chla, MVa, DVa using the C18 HPLC method, yield a single peak for Chla, measured at 436nm and 450nm. A regression equation, between the 2

wavelengths (based on calibration curves of 100% MVa and 100% DVa), is used to give values for each pigment within a single peak. Chla @436nm is reported for comparison with legacy data (that are often only listed simply Chla).

Processing Description

DMO notes:

Original Excel file downloaded from EDDIES Web site: [copy of original Excel file](#)

The comments in the data object were taken from the 061127 version of file readme_jason_notes.txt.

SID_Filter and SID_PI were identical but some samples were also included another sample designation that was a consecutive SID_PI. In these cases, the consecutive SID replaced the SID_PI.

[[table of contents](#) | [back to top](#)]

Parameters

Parameter	Description	Units
Cruise_ID	cruise ID designation code	alphanumeric
event	unique sampling event number	YYYYMMDDhhmm
date	date (GMT); start of sampling	YYYYMMDD
time	time of measurement (GMT)	hhmm
lon	longitude at start of measurement; negative denotes West	decimal degrees
lat	latitude at start of measurement; negative denotes South	decimal degrees
sta	station number	dimensionless
depth_n	depth; nominal	meters
run_ID_HPLC	sample run ID given by HPLC lab	alphanumeric
run_PI	sample run ID given by PI	alphanumeric
run_filt_ID	sample run filter ID	alphanumeric
vol_filt_ml	volume water filtered for analysis	milliliters
chl_a_fluor	chlorophyll-a by Fluorometric methods	microgram/liter
pheo_fluor	pheopigments measured by Fluorometric methods	microgram/liter

chl_a	HPLC Chlorophyllide a	microgram/liter
phide	HPLC Pheophorbide a	micrograms/liter
pheo	HPLC Pheophytin a	microgram/liter
chl_a_allomer	HPLC chlorophyll a allomer	microgram/liter
chl_a	HPLC chlorophyll a (measured at 436nm)	microgram/liter
chl_a_epimer	HPLC chlorophyll a epimer	microgram/liter
chl_c3	HPLC Chlorophyll_c3	microgram/liter
chl_c2	HPLC Chlorophyll_c2	microgram/liter
peridinin	HPLC Peridinin	microgram/liter
fucox_but	HPLC 19' - Butanoyloxyfucoxanthin	microgram/liter
fucox	HPLC fucoxanthin	microgram/liter
fucox_hex	HPLC 19' - Hexanoyloxyfucoxanthin	microgram/liter
neox	HPLC neoxanthin	microgram/liter
prasinox	HPLC Prasinoxanthin	microgram/liter
violax	HPLC violaxanthin	microgram/liter
diadinox	HPLC Diadinoxanthin	microgram/liter
allox	HPLC Alloxanthin	microgram/liter
diatox	HPLC Diatoxanthin	microgram/liter
lutein	HPLC Lutein	microgram/liter
zeax	HPLC Zeaxanthin	microgram/liter
chl_b	HPLC Chlorophyll b	microgram/liter
carotene	HPLC Total Carotenes (alpha + beta)	microgram/liter
chl_a_mv	Monovinyl chlorophyll a; based on the C18 method regression between 436nm and 450nm	microgram/liter
chl_a_dv	Divinyl chlorophyll a; based on the C18 method regression between 436nm and 450nm	microgram/liter
chl_a_tot	Total Chlorophyll a =chl_a +allomer +epimer +MVa +Dva	microgram/liter
comments	comments and notes	text

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

WB0409

Website	https://www.bco-dmo.org/deployment/57955
Platform	R/V Weatherbird II
Start Date	2004-06-23
End Date	2004-07-02
Description	EDT1 2004 Transect 1 cruise Funded by: NSF OCE-0241310

WB0413

Website	https://www.bco-dmo.org/deployment/57960
Platform	R/V Weatherbird II
Start Date	2004-08-02
End Date	2004-08-11
Description	EDT2 2004 Transect 2 cruise Funded by: NSF OCE-0241310

WB0506

Website	https://www.bco-dmo.org/deployment/57963
Platform	R/V Weatherbird II
Start Date	2005-07-06
End Date	2005-07-15
Description	EDT3 2005 Transect 1 cruise Funded by: NSF OCE-0241310

WB0508

Website	https://www.bco-dmo.org/deployment/57966
Platform	R/V Weatherbird II
Start Date	2005-08-17
End Date	2005-08-26
Description	EDT4 2005 Transect 2 Funded by: NSF OCE-0241310

[[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., Escube, 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 ³He 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 ³He 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*

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[[table of contents](#) | [back to top](#)]

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](#)]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0241310

[[table of contents](#) | [back to top](#)]