S. Atlantic light-profiling system data 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/3027
Data Type: Cruise Results
Version: 1
Version Date: 2007-11-17

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

Program
» Ocean Carbon and Biogeochemistry (OCB)

Contributors	Affiliation	Role
Siegel, David	University of California-Santa Barbara (UCSB-ICESS)	Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
S. Atlantic light-profiling system data from R/V Oceanus OC404-01, OC404-04, OC415-01, OC415-03 in the Sargasso Sea from 2004-2005.

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Coverage

Spatial Extent: **N**:37.1022 **E**:-58.752 **S**:28.7489 **W**:-69.41
Temporal Extent: 2004-06-13 - 2005-08-24

Dataset Description

Please refer to the separate document for the Methodology and PI notes. DMO note: appropriate wavelengths are listed with each parameter; 9.9E+35, -999, NA, and blank cells replaced with 'nd'; time_begin and time_end reformatted from hours and decimal minutes to hhmm

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Change history: YYMMDD
    061212: original data downloaded from Eddies website
            (OCEANUS_SPMR_Profiles.xls)
    071004: prepared for OCB database by N. Copley, OCB DMO
    071117: added to OCB database by C.chandler (BCO-DMO, WHOI)
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Parameters

Parameter	Description	Units
Cruise_ID	cruise ID designation code	dimensionless
staProx	station number (nearest CTD)	dimensionless
date_begin	date sampling begins	YYYYMMDD
yrday	day of year sampling began (GMT)	dimensionless
time_begin	time at start of profile	hhmm
time_end	time at end of profile	hhmm
lon	longitude, negative denotes West	decimal degrees
lat	latitude, negative denotes South	decimal degrees
lon_eddy	longitude of eddy negative denotes West	decimal degrees
lat_eddy	latitude of eddy negative denotes South	decimal degrees
dist_EC	radial distance from eddy center	kilometers
comments	comments	dimensionless
depth	depth, sample, best estimate, usually calculated from pressure	meters
ed305	downwelling irradiance at wavelength 305	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed324	downwelling irradiance at wavelength 324	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed340	downwelling irradiance at wavelength 340	microWatts/centimeter^2/nanometer (uW/cm^2/nm)

ed380	downwelling irradiance at wavelength 380	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed412	downwelling irradiance at wavelength 412	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed443	downwelling irradiance at wavelength 443	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed490	downwelling irradiance at wavelength 490	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed510	downwelling irradiance at wavelength 510	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed555	downwelling irradiance at wavelength 555	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed665	downwelling irradiance at wavelength 665	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
ed683	downwelling irradiance at wavelength 683	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
lu305	upwelling radiance at wavelength 305	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu325	upwelling radiance at wavelength 324	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu340	upwelling radiance at wavelength 340	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu380	upwelling radiance at wavelength 380	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu412	upwelling radiance at wavelength 412	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu443	upwelling radiance at wavelength 443	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu490	upwelling radiance at wavelength 490	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu510	upwelling radiance at wavelength 510	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu555	upwelling radiance at wavelength 555	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)

lu665	upwelling radiance at wavelength 665	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
lu683	upwelling radiance at wavelength 683	microWatts/meter^2/nanometer/steradian (uW/cm^2/nm/sr)
es325	downwelling surface irradiance at wavelength 305	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es340	downwelling surface irradiance at wavelength 324	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es380	downwelling surface irradiance at wavelength 340	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es412	downwelling surface irradiance at wavelength 380	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es443	downwelling surface irradiance at wavelength 412	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es490	downwelling surface irradiance at wavelength 443	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es509	downwelling surface irradiance at wavelength 490	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es554	downwelling surface irradiance at wavelength 510	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es565	downwelling surface irradiance at wavelength 555	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es665	downwelling surface irradiance at wavelength 665	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
es683	downwelling surface irradiance at wavelength 683	microWatts/centimeter^2/nanometer (uW/cm^2/nm)
kl305	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 305	meter^-1
kl325	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 324	meter^-1
kl340	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 340	meter^-1
kl380	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 380	meter^-1

kl412	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 412	meter^-1
kl443	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 443	meter^-1
kl490	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 490	meter^-1
kl510	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 510	meter^-1
kl555	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 555	meter^-1
kl665	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 665	meter^-1
kl683	up-welled (diffuse) attenuation coefficnent of lu at wavelenth 683	meter^-1
kd305	down-welled (diffuse) attenuation coefficient of ed at wavelength 305	meter^-1
kd325	down-welled (diffuse) attenuation coefficient of ed at wavelength 324	meter^-1
kd340	down-welled (diffuse) attenuation coefficient of ed at wavelength 340	meter^-1
kd380	down-welled (diffuse) attenuation coefficient of ed at wavelength 380	meter^-1
kd412	down-welled (diffuse) attenuation coefficient of ed at wavelength 412	meter^-1
kd443	down-welled (diffuse) attenuation coefficient of ed at wavelength 443	meter^-1
kd490	down-welled (diffuse) attenuation coefficient of ed at wavelength 490	meter^-1
kd510	down-welled (diffuse) attenuation coefficient of ed at wavelength 510	meter^-1
kd555	down-welled (diffuse) attenuation coefficient of ed at wavelength 555	meter^-1
kd665	down-welled (diffuse) attenuation coefficient of ed at wavelength 665	meter^-1

kd683	down-welled (diffuse) attenuation coefficient of ed at wavelength 683	meter^-1
rrs305	remote sensing reflectances (lw/ed) at wavelength 305	steradian^-1
rrs325	remote sensing reflectances (lw/ed) at wavelength 324	steradian^-1
rrs340	remote sensing reflectances (lw/ed) at wavelength 340	steradian^-1
rrs380	remote sensing reflectances (lw/ed) at wavelength 380	steradian^-1
rrs412	remote sensing reflectances (lw/ed) at wavelength 412	steradian^-1
rrs443	remote sensing reflectances (lw/ed) at wavelength 443	steradian^-1
rrs490	remote sensing reflectances (lw/ed) at wavelength 490	steradian^-1
rrs510	remote sensing reflectances (lw/ed) at wavelength 510	steradian^-1
rrs555	remote sensing reflectances (lw/ed) at wavelength 555	steradian^-1
rrs665	remote sensing reflectances (lw/ed) at wavelength 665	steradian^-1
rrs683	remote sensing reflectances (lw/ed) at wavelength 683	steradian^-1

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Instruments

Dataset-specific Instrument Name	Fluorometer
Generic Instrument Name	Fluorometer
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	Satlantic Micro-profiler II
Generic Instrument Name	Satlantic Micro-profiler II
Generic Instrument Description	The Satlantic Micro-Profiler II is a type of profiling radiometer system. The primary optical measurements are downwelling irradiance (Ed) and upwelling radiance (Lu).The Micro-Pro collects measurements in the following wavelengths: 305, 325, 340, 380, 412, 443, 490, 510, 555, 665, and 683. (Note the additional UV channel).

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Deployments

OC404-01

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)

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

OC415-01

Website	https://www.bco-dmo.org/deployment/57962
Platform	R/V Oceanus
Report	http://ocb.whoi.edu/EDDIES/CRUISES/2005/OC415_Draft_Cruise_Report_050722.pdf
Start Date	2005-06-20
End Date	2005-07-15
Description	EDDIES project 2005 Survey 1 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog

OC415-03

Website	https://www.bco-dmo.org/deployment/57965
Platform	R/V Oceanus
Report	http://ocb.whoi.edu/EDDIES/CRUISES/2005/OC415-3_CrRptDraft_091405.pdf
Start Date	2005-08-07
End Date	2005-08-26
Description	EDDIES project 2005 Survey 2 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog

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.

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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.

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