

# Mesozooplankton biomass from MOCNESS tows collected during R/V Oceanus cruises OC415-01, OC415-03, OC404-01, OC404-04 in the Sargasso Sea, 2004-2005 (EDDIES project)

Website: <https://www.bco-dmo.org/dataset/3211>

Version: 7 July 2011

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## Project

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

## Program

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

Contributors	Affiliation	Role
<a href="#">Steinberg, Deborah K.</a>	Virginia Institute of Marine Science (VIMS)	Principal Investigator
<a href="#">Goldthwait, Sarah A.</a>	Humboldt State University (Humboldt)	Scientist
<a href="#">Chandler, Cynthia L.</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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## Dataset Description

Zooplankton biomass estimates were determined from 1 m<sup>2</sup>, 150 micron mesh MOCNESS (Multiple Opening/Closing Net and Environmental Sensing System) tows. The following discrete depth intervals were sampled on the upcast: 0-50, 50-100, 100-150, 150-200, 200-300, 300-400, 400-500, 500-600, and 600-700 m. Generally paired tows during the day (9:30-15:00 local time) and night (21:30-03:00) were performed at each station. A single tow generally covered 5-15 km. The nominal position (lat\_n and lon\_n) for each tow is the position at the mid depth 200-300m sampling interval. Table 1 ([pg 1362 PDF](#)) of Goldthwait and Steinberg (2008) is a sequential list of all MOCNESS mesozooplankton tows and includes eddy identification number and location.

Each sample was size-fractionated using nested sieves of 0.15 mm, 0.5 mm, 1 mm, 2mm, and 5 mm mesh. Zooplankton in each size class were transferred onto pre-weighed 0.15 mm nitex mesh filters and rinsed with deionized water. Samples were then dried for 24 hours at 60 degrees C and weighed.

Data were prepared by Sarah Goldthwait of Humboldt State University (<https://fresca.calstate.edu/faculty/98>)

Publication: Goldthwait, S. and D.K. Steinberg. 2008. Elevated Biomass of Mesozooplankton and Enhanced Fecal Pellet Flux in Cold-Core and Mode-Water Eddies in the Sargasso Sea. Deep Sea Research Part II: Topical Studies in Oceanography 55: pp. 1360-1377. DOI: <http://dx.doi.org/10.1016/j.dsr2.2008.01.003>

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## Data Files

**File**

**zoop\_biomass.csv**(Comma Separated Values (.csv), 56.33 KB)  
MD5:47cec169740b8affadbd5c9f44b0e88e

Primary data file for dataset ID 3211

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## Parameters

Parameter	Description	Units
Cruise_ID	cruise designation code	dimensionless
date	date (UTC) at start of tow in YYYYMMDD format	unitless
lat	latitude, average during tow (negative denotes South)	decimal degrees
lon	longitude, average during tow (negative denotes West)	decimal degrees
time	time (UTC) at start of tow	hhmm
depth_end	depth at end of tow	meters
depth_begin	depth at beginning of tow	meters
vol_filt	volume filtered by net	meter <sup>3</sup>
zoop_bm_150	zooplankton dry weight; 150 to 500 microns	milligrams/meter <sup>3</sup>
zoop_bm_500	zooplankton dry weight; 500 to 1000 microns	milligrams/meter <sup>3</sup>
zoop_bm_1000	zooplankton dry weight; 1000 to 2000 microns	milligrams/meter <sup>3</sup>
zoop_bm_2000	zooplankton dry weight; 2000 to 5000 microns	milligrams/meter <sup>3</sup>
zoop_bm_5000	zooplankton dry weight; gt 5000 microns	milligrams/meter <sup>3</sup>
zoop_bm_total	zooplankton dry weight; total	milligrams/meter <sup>3</sup>
event_ID	event identification number; unique within EDDIES project	dimensionless
cruise_cast_net	cruise_cast_net is a sample identifier unique within the EDDIES project	dimensionless
lat_n	nominal latitude (same as mid-depth position for the tow)	decimal degrees
lon_n	nominal longitude (same as mid-depth position for the tow)	decimal degrees

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## Instruments

<b>Dataset-specific Instrument Name</b>	MOCNESS1
<b>Generic Instrument Name</b>	MOCNESS1
<b>Generic Instrument Description</b>	The Multiple Opening/Closing Net and Environmental Sensing System or MOCNESS is a family of net systems based on the Tucker Trawl principle. The MOCNESS-1 carries nine 1-m <sup>2</sup> nets usually of 335 micrometer mesh and is intended for use with the macrozooplankton. All nets are black to reduce contrast with the background. A motor/toggle release assembly is mounted on the top portion of the frame and stainless steel cables with swaged fittings are used to attach the net bar to the toggle release. A stepping motor in a pressure compensated case filled with oil turns the escapement crankshaft of the toggle release which sequentially releases the nets to an open then closed position on command from the surface. -- from the MOCNESS Operations Manual (1999 + 2003).

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## Deployments

### OC415-01

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

### OC415-03

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

### 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>	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

<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>	EDDIES project 2004 Survey 2 cruise Funded by: NSF OCE-0241310 Original cruise data are available from the NSF R2R data catalog

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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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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.

Jenkins, W.J., McGillicuddy, D.J., 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.

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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## 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-0351576</a>

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