MOCNESS tow CTD data from R/V Oceanus OC415-01, OC415-03 cruises in the Sargasso Sea in 2005 (EDDIES project)

Website: https://www.bco-dmo.org/dataset/3068
Version: 18 January 2008
Version Date: 2008-01-18

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

Program
» Ocean Carbon and Biogeochemistry (OCB)

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Dataset Description

CTD data from MOCNESS plankton tows

Methods & Sampling

MOCNESS CTD

Methodology: none provided with data

Change history: YYMMDD
070626: downloaded original merged data from EDDIES data web site;
071206: prepared for OCB database by Nancy Copley (OCB DMO)
090828: added to database by Cyndy Chandler (OCB DMO)
100630: Cruise 415-1 tow 12 had some bad position data (found with stats)

OC415-1 12 189.592674 20050708 1413 687
30.8667 0.0667 replaced with position data from previous record
30.879 -66.3008

OC415-1 12 189.564873 20050708 1333 19
30.8962 -56 replaced with position data from previous record
30.8962 -66.2867

The following notes apply to both OC415-1 and OC415-3:

CTD sensor metadata for MOCNESS tows: m_415_17 through m_415_28
Temperature Probe # 1678 Conductivity Probe # 199
Pressure Probe # 105 Oxygen Probe # 130349

Transmissometer # 243 Fluorometer # 1

To view the final data acquisition screen for each MOCNESS tow:

Cruise ID = OC415-1

MOC-1	MOC-2	MOC-3	MOC-4
MOC-5	MOC-6	MOC-7	MOC-8
MOC-9	MOC-10	MOC-11	MOC-12
MOC-13	MOC-14	MOC-15	MOC-16

Cruise ID = OC415-3

MOC-17	MOC-18	MOC-19	MOC-20
MOC-21	MOC-22	MOC-23	MOC-24
MOC-25	MOC-26	MOC-27	MOC-28

Unless otherwise indicated, these data have not been post-processed, and include some bad lat/lon points. Bad positions are fixed as they are identified. **Original raw MOCNESS tow CTD data** MOCNESS tow CTD files (123 MB) MOCNESS tow CTD files (90 MB) For additional information, contact the chief scientist for the cruise or data set PI. Parameter Description Units

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Cruise_ID Cruise identification, dimensionless e.g. OC415-1, for Oceanus cr. 415, leg 1 tow MOCNESS tow number dimensionless date_local 8 digit year month day, local time YYYYMMDD yrday_local year day, Julian Calendar local time decimal day time_local time of day; local time using 24 hour clock. HHmm.m lat latitude, negative = South decimal degrees lon longitude, negative = West decimal degrees press depth of sample meters echo unknown unknown temp temperature degrees C. potemp potential temperature (1) degress C. sal salinity calculated from conductivity; dimensionless if salinity exceeds 50 or is less than 0 o/oo, salinity is set to 50. sigma_0 potential density(1) at the surface kg/m3-1000 angle angle of net frame relative to degrees vertical (0-89 dgrees) flow consecutive flow counts counts hzvel horizontal net velocity m/min meters/minute vtvel vertical net velocity m/min meters/minute vol volume filtered meters^3 net sequential MOCNESS net number integer fluor fluorescence (0-5 volts) volts trans_V light transmission (0-5 volts) volts oxycurrent oxygen sensor current oxytemp oxygen sensor temperature oxygen oxygen; dissolved milliliters/liter nd indicates missing or no data **Background information provided by DMO:** The MOCNESS is based on the Tucker Trawl principle (Tucker, 1951). The particular MOCNESS system from which these CTD data came is the MOCNESS-1 which has nine rectangular nets (1m x 1.4 m) that are opened and closed sequentially by commands through conducting cable from the surface (Wiebe et al., 1976). "The underwater unit sends a data frame, comprised of temperature, depth, conductivity, net-frame angle, flow count, time, number of open net, and net opening/closing, to the deck unit in a compressed hexadecimal format every 2 seconds and from the deck unit to a microcomputer every 4 seconds... Temperature (to approximately 0.01 deg C) and conductivity are measured with SEABIRD sensors. Normally, a modified T.S.K.-flowmeter is used... Both the temperature and conductivity sensors and the flowmeter are mounted on top of the frame so that they face horizontally when the frame is at a towing angle of 45deg... Calculations of salinity (to approximately 0.01 o/oo S), potential temperature (theta), potential density (sigma), the oblique and vertical velocities of the net, and the approximate volume filtered by each net are made after each string of data has been received by the computer." (Wiebe et al., 1985) In addition, data may be collected from four other sensors attached to the frame: the Transmissometer, the Fluorometer, the Downwelling light sensor, and the Oxygen sensor. A SeaBird underwater pump was also included in the sensor suite. References (1) Fofonoff and Millard, 1983, UNESCO technical papers in Marine Sciences, #44 Tucker, G.H., 1951. Relation of fishes and other organisms to the scattering of underwater sound. Journal of Marine Research, 10: 215-238. Wiebe, P.H., K.H. Burt, S. H. Boyd, A.W. Morton, 1976. The multiple opening/closing net and environmental sensing system for sampling zooplankton. Journal of Marine Research, 34(3): 313-326 Wiebe, P.H., A.W. Morton, A.M. Bradley, R.H. Backus, J.E. Craddock, V. Barber, T.J. Cowles and G.R. Flierl, 1985. New developments in the MOCNESS, an apparatus for sampling zooplankton and micronekton. Marine Biology, 87: 313-323.

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Data Files

File
MOCNESS_CTD.csv (Comma Separated Values (.csv), 7.77 MB) MD5:c99991afd3b05a303343af9a6bb08861 Primary data file for dataset ID 3068

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Parameters

Parameter	Description	Units
Cruise_ID	cruise identification, e.g. OC415-1, for R/V OCeanus cruise 415-1.	dimensionless
tow	MOCNESS tow number	dimensionless
date_local	8 digit year month day, local time YYYYMMDD	yyyymmdd
yrday_local	year day, Julian Calendar local time decimal day	YYY.YYYYYY
time_local	time of day, local time, using 2400 clock format	HHmm
lat	latitude, in decimal degrees, North is positive, negative denotes South	decimal degrees
lon	longitude, in decimal degrees, East is positive, negative denotes West	decimal degrees
press	depth of sample	meters
echo	unknown	unknown
temp	temperature	degrees C
potemp	potential temperature (1)	degrees C
sal	salinity calculated from conductivity; if salinity exceeds 50 or is less than 0 o/oo, salinity is set to 50.	dimensionless
sigma_0	potential density (1)	kg/m3-1000
angle	angle of net frame relative to degrees vertical (0-89 degrees)	degrees
flow	consecutive flow counts	counts
hzvel	horizontal net velocity m/min	meters/minute
vtvel	vertical net velocity m/min	meters/minute
vol	volume filtered	meters^3
net	sequential MOCNESS net number	integer
fluor_V	fluorescence (0-5 volts)	volts
trans_V	light transmission (0-5 volts)	volts
oxycurrent	oxygen sensor current	
oxytemp	oxygen sensor temperature	
oxygen	dissolved oxygen	milliliters/liter

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Instruments

Dataset-specific Instrument Name	CTD MOCNESS
Generic Instrument Name	CTD MOCNESS
Generic Instrument Description	The CTD part of the MOCNESS includes 1) a pressure (depth) sensor which is a thermally isolated titanium strain gauge with a standard range of 0-5000 decibars full scale, 2) A Sea Bird temperature sensor whose frequency output is measured and sent to the surface for logging and conversion to temperature by the software in the MOCNESS computer (The system allows better than 1 milli-degree resolution at 10 Hz sampling rate), and 3) A Sea Bird conductivity sensor whose output frequency is measured and sent to the surface for logging and conversion to conductivity by the software in the computer (The system allows better than 1 micro mho/cm at 10 Hz sampling rate). The data rate depends on the speed of the computer and the quality of the cable. With a good cable, the system can operate at 2400 baud, sampling all variables at 2 times per second. One sample every 4 seconds is the default, although the hardware can operate much faster. (From The MOCNESS Manual)

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Deployments

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

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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

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

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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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