CTD data including temperature, salinity, oxygen, fluorescence, turbidity, transmissometer data from R/V Atlantis AT16 from the Northwest Atlantic Margin (Carbon Export project)

Website: https://www.bco-dmo.org/dataset/3683
Version: 2012-07-30

Project
» Particle Transport and Carbon Export over the Northwest Atlantic Margin (Carbon Export)

Program
» Ocean Carbon and Biogeochemistry (OCB)

Contributors	Affiliation	Role
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Dataset Description

Physical data collected by the CTD, which includes temperature, depth, salinity, oxygen, fluorescence, turbidity, and transmissometry along Line W.

This dataset is preliminary and not yet finalized by the PI.

Methods & Sampling

Samples were collected every two meters.

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Parameters

Parameter	Description	Units
cruise	The name of the cruise given by the Chief Scientist and/or the Ship's operator.	
station	Station number.	
cast	Cast number.	
longitude	Longitude in decimal degrees, where negative values denote western hemisphere.	decimal degrees
latitude	Latitude in decimal degrees, where negative values denote the southern hemisphere.	decimal degrees
date	Date in GMT.	mm/dd/yy
time	Time in GMT.	HHMM
depth	Water depth in meters.	meters
press	CTD pressure reported in decibars.	decibars
temp	Water temperature in degrees Celsius, measured from the CTD.	degrees
sal	Salinity measured from the CTD.	PSU
O2	Raw Oxygen values measured from the CTD, reported in milligrams per liter, originally reported as CTD_RawOxy.	milligrams per Liter
fluor	Fluorescence measurement reported in milligrams per liter.	milligrams per liter
trans	Percent light transmittance.	percent
turbidity	Water turbidity.	
ht_off_btm	Height off the bottom measured in meters. Originally reported as HOB.	meters

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Deployments

AT16

Website	https://www.bco-dmo.org/deployment/58835
Platform	R/V Atlantis
Start Date	2010-09-10
End Date	2010-10-05
Description	Science Objectives The overall goal of the project is to examine the transport and export of particulate organic carbon (POC) over the northwest Atlantic Ocean margin. Specific objectives are to examine the role of the Deep Western Boundary Current in along-margin transport of POC. It is hypothesized that along- and across-margin transport of POC is important for supply of organic carbon to deep-ocean sediments. Geochemical investigations of organic matter entrained in bottom and intermediate depth suspended particle (nepheloid) layers as well as sinking particles are planned as well as hydrographic surveys in order to place findings within the context of regional physical oceanography. Hydrographic surveys and sampling will occur along 3 across-margin transects in each case extending from the shelf-break to ~ 5000 m water depth (off Nova Scotia, off Cape Cod, and off Cape Hatteras). The assessments of particle dynamics will be coupled to an existing hydrographic observation program along an ocean section between Cape Cod and Bermuda ('Line W'). The 'Line W' program is focused on the physical characteristics of the region, and provides an accompanying framework for the study of carbon dynamics. A series of 3 across-margin transects are designed to capture the sources and movement of particulate matter. The proposed sampling program includes CTD hydrocasts and large-volume (up to 1000L) in-situ filtration with McLane submersible pumps. The science plan also calls for deployment of 2 sediment trap moorings and perhaps some sediment coring (multicorer). The intent is to obtain high vertical and spatial resolution filter samples for detailed analysis of particle abundance and characteristics within intermediate-depth and bottom nepheloid layers. The science implementation plan includes deployment of: Sea-Bird Electronics, Inc. CTD rosette equipped with transmissometer and optical back scatter sensor; Glider Autonomous Underwater Vehicle (AUV) equipped with CTD and optical backscatter sensor; Sea floor-tethered mooring with Deployment of McLane Mark-7 time-series sediment traps; ship's clean seawater intake and McLane submersible pumps (Water Transfer System, WTS). Funding for cruise AT16 is from NSF award number OCE-0851350. Cruise information and original data are available from the NSF R2R data catalog.

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Project Information

Particle Transport and Carbon Export over the Northwest Atlantic Margin (Carbon Export)

Coverage: Nova Scotian continental slope waters; Cape Hatteras margin slope waters

This award is funded under the American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

In this project researchers at the Woods Hole Oceanographic Institution (WHOI) seek to address two primary questions regarding the transport of organic carbon over the New England continental margin. Their first question addresses the relative importance of intermediate nepheloid layers versus benthic nepheloid layers for organic carbon transport. Their second question focuses on assessing the importance of interannual variability on particle transport. The researchers will collect both settling and suspended particles along the NW Atlantic ocean margin, and they will utilize both novel and established tracers of material transport to address their primary research questions. Their assessments of particle dynamics will be coupled to an existing hydrographic observation program along an ocean section between Cape Cod and Bermuda (Line W). This program is focused on the physical characteristics of the region, and provides an accompanying framework for the study of carbon dynamics.

The importance of the work to global carbon cycling lies in the fact that continental margins generally maintain high biological production and are physically dynamic environments. One potential fate of the biologically produced carbon is that it may be exported to the deep ocean, yet the magnitude of that exported carbon is

generally not well defined. Over the Northwest Atlantic margin, large-scale currents have the potential to be an important dispersal mechanism for organic carbon to the ocean interior. In a prior research project, the investigators hypothesized that the lateral transport of particulate organic carbon occurs via a bottom nepheloid layer (BNL) maintained by the Deep Western Boundary Current (DWBC). Although their research supports the notion that the DWBC transports a significant amount of organic carbon, their observations also indicate that intermediate nepheloid layers (INLs) emanating from the shelf-slope break and upper slope of the Mid Atlantic Bight may also be important vectors for carbon export.

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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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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0851350

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