Niskin bottle basic hydrography from the CTD rosette from R/V Oceanus OC443 cruise in April 2008 (LipidCycling project)

Website: https://www.bco-dmo.org/dataset/3596
Version: 11 January 2012
Version Date: 2012-01-11

Project
» Sources and Biogeochemical Cycling of Intact Membrane Lipids in the Upper Ocean (LipidCycling)

Program
» Ocean Carbon and Biogeochemistry (OCB)

Contributors	Affiliation	Role
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Dataset Description

CTD measurements at bottle sample depths.

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Data Files

File
OC443_Niskin.csv (Comma Separated Values (.csv), 50.50 KB) MD5:cb2ffea261abf5a882288f432db1a1c9 Primary data file for dataset ID 3596

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Parameters

Parameter	Description	Units
cruise	Cruise identifier	dimensionless
cast	CTD cast number	dimensionless
date	Date of sample	YYYYMMDD
lon	longitude	decimal degrees
lat	latitude	decimal degrees
time	time of cast	hhmm
prmax	pressure maximum	dimensionless
depth	sampling depth	meters
press	sampling pressure	decibars
temp	Temperature	degrees Celsius
potemp	Potential Temperature	degrees Celsius
sigma_0	Potential Density	kilograms/meter^3
sal	Salinity	PSU
	dissolved oxygen concentration	micromol/kilogram
sta		station number

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Instruments

Dataset-specific Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Description	The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

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.

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Deployments

OC443

Website	https://www.bco-dmo.org/deployment/58725
Platform	R/V Oceanus
Start Date	2008-04-04
End Date	2008-04-13
Description	The cruise was funded by NSF award OCE-0646944. Original cruise data are available from the NSF R2R data catalog.

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Project Information

Sources and Biogeochemical Cycling of Intact Membrane Lipids in the Upper Ocean (LipidCycling)

Coverage: North Atlantic and North Pacific

The project description is from the NSF award abstract.

Cell membranes make up 10-25% of the carbon biomass in the upper ocean. These important structural components of planktonic cells are dominated by intact polar lipids (IPLs), and a significant fraction of the organic carbon that is exported from the upper ocean is derived from IPLs. The primary tool for analyzing IPLs has been the gas chromatographic (GC) analysis of their constituent fatty acids. This approach has provided many valuable fatty acid biomarkers for specific groups of planktonic organisms. Yet GC is insensitive to an immense degree of structural diversity associated with the larger IPL molecules since fatty acids must be cleaved from polar "headgroups" prior to GC analysis.

In this project, researchers at the Woods Hole Oceanographic Institution will study IPLs in the upper ocean with the goal of definitively answering the following two research questions: (1) Do the major classes of IPLs present in the upper ocean have specific taxonomically- or functionally-defined biological sources? and (2) Do the major classes of IPLs in the upper ocean turnover at rates that are consistent with those of the living biomass from which they are derived?

The research team will apply new high performance liquid chromatography/mass spectrometry (HPLC/MS) methods that allow IPLs to be identified and quantified while still in intact form. This approach has revealed a broad and unrecognized diversity of IPL molecules in the upper ocean. The source organisms of these IPLs are largely unknown, representing a significant gap in our understanding of the upper ocean carbon cycle. Furthermore, IPLs have an immense potential as new biogeochemical tracers for specific groups of microbial plankton.

The project will involve three distinct approaches. First, HPLC/MS will be used to characterize the distribution of IPLs in major taxonomic groups of plankton. These groups isolated by flow cytometry from natural seawater collected during four cruises in the North Atlantic and North Pacific. Second, on these cruises the team will conduct incubations to trace 13C-labeled CO2 and organic compounds into specific IPL molecules. This information will allow us to constrain functionally-defined sources of IPLs. Last, researchers will use isotope tracer incubations to target the headgroups of IPLs and thereby determine the turnover rates of the intact molecules. This information will be used to establish whether IPLs are a signal of living or senescent biomass.

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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-0646944

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