Niskin bottle basic hydrography from CTD from R/V Atlantic Explorer cruise AE1104 in the Sargasso Sea from 2011-2011 (SargassoSeaLipids project)

Website: https://www.bco-dmo.org/dataset/3598
Version: 12 January 2012
Version Date: 2012-01-12

Project
» Biogeochemical Impact and Fate of Non-phosphorus Membrane Lipids in the Sargasso Sea (SargassoSeaLipids)

Program
» Ocean Carbon and Biogeochemistry (OCB)

Contributors	Affiliation	Role
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Dataset Description

Niskin bottle data from cruise AE1104. Note: Until 26 November 2012 this cruise was identified by BIOS and R2R as AE-X1103. On 26 November 2012, the cruise ID was corrected by BIOS and R2R to be the new cruise ID AE1104. This change was also made at BCO-DMO on 26 November 2012.

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Data Files

File
X1103_Niskin.csv (Comma Separated Values (.csv), 6.58 KB) MD5:33a7a44c26f5a7cdd3074a5e996efafd Primary data file for dataset ID 3598

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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
press	sampling pressure	decibars
temp	Temperature	degrees Celsius
sal	Salinity	dimensionless
O2_ml_L	dissolved oxygen concentration	milliliters/liter
depth	depth	meter
potemp	potential temperature	degrees C
sigma_0	sigma 0 density	kilograms/meter^3
fluor	fluorescence	micrograms/liter

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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

AE1104

Website	https://www.bco-dmo.org/deployment/58751
Platform	R/V Atlantic Explorer
Report	http://strs.unols.org/Public/diu_cruise_view.aspx?cruise_id=123986
Start Date	2011-03-15
End Date	2011-03-21
Description	Until 26 November 2012 this cruise was identified by BIOS and R2R as AE-X1103. On 26 November 2012, the cruise ID was corrected by BIOS and R2R to be the new cruise ID AE1104. This change was also made at BCO-DMO on 26 November 2012. Original cruise data are available from the NSF R2R data catalog

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Project Information

Biogeochemical Impact and Fate of Non-phosphorus Membrane Lipids in the Sargasso Sea (SargassoSeaLipids)

Coverage: Sargasso Sea

Intact polar diacyglycerols (IP-DAGs) are the fatty-acid bearing lipid molecules that compose bacterial and eukaryotic cell membranes. As such, they are one of the most abundant classes of lipid molecules in plankton, and play a major role in the marine carbon cycle. However, until very recently, the molecular diversity of IP-DAGs was poorly understood; the structural identity and characteristics of IP-DAGs were inferred almost exclusively from their constituent fatty acids. These non-phosphorus containing IP-DAGs were largely unknown to chemical oceanography. In contrast, phospholipids, which have been the focus of considerable research, compose a disproportionally small fraction of total IP-DAGs. But we still lack even a cursory understanding of biochemical functions and geochemical fates of non-phosphorus IP-DAGs. Given that these molecules are among the most abundant lipid molecules on the planet, this represents a profound and unexpected gap in our understanding the marine carbon and phosphorus cycles.

In this project, researchers at the Woods Hole Oceanographic Institution will launch a pioneering study of these poorly understood compounds. Their approach will be guided by four questions: (1) How do non-phosphorus lipids contribute to variations in the C:N:P of particulate organic matter in the Sargasso Sea? (2) What are the relative degradation rates of phospholipids and non-phosphorus lipids in surface waters? (3) Which groups of microbes utilize the carbon and phosphorus from different IP-DAGs? (4) What are the relative contributions of different IP-DAGs to particulate organic matter export to the deep-sea?

These questions will be answered by using sophisticated HPLC/MS analyses and novel isotope tracing approaches in conjunction with long-standing methods for measuring the C:N:P of plankton and determining the degradation rates of organic molecules. The research team will establish whether these newly-recognized sulfolipids and betaine lipids molecules are a quantitatively important biochemical option for phytoplankton to affect flexible C:N:P stoichiometry in the face of nutrient stress. They will also elucidate the degradation rate, microbial fate, and export potential of the carbon and phosphorus from IP-DAGs. This will shed new light on the broader roles of these molecules in the cycling of these elements by the planktonic community.

This project contains components that are specifically designed to meet the NSF criteria for "advancing discovery and understanding while promoting teaching, training and learning." The project will support the training of a graduate student and postdoctoral fellow. In addition, the research team will work with the non-profit Zephyr Foundation in Woods Hole to design educational 'units' based on the team's research that will be tailored to student in grades 6 - 12. The Foundation will present these units as part of their hands-on marine science field trip series that is delivered to over 200 students and their teachers per year.

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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-1031143

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