Scientific sampling event log from R/V Knorr cruise KN207-03 in the North Atlantic (transect from Ponta Delgada, Azores to Reykjavik, Iceland) in 2012 (NA-VICE project)

Website: https://www.bco-dmo.org/dataset/3739
Data Type: Cruise Results
Version: 1
Version Date: 2013-04-10

Project
» Lipid lubrication of oceanic carbon and sulfur biogeochemistry via a host-virus chemical arms race (NA-VICE)

Program
» Ocean Carbon and Biogeochemistry (OCB)

Contributors	Affiliation	Role
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Abstract
Scientific sampling event log from R/V Knorr cruise KN207-03 in the North Atlantic (transect from Ponta Delgada, Azores to Reykjavik, Iceland) in 2012. The scientific sampling event log was created using v1.0 of the Rolling Deck to Repository (R2R) event log application.

Table of Contents

Coverage

Spatial Extent: **N**:65.44701 **E**:-21.93818 **S**:37.73759 **W**:-35.07394
Temporal Extent: 2012-06-15 - 2012-07-18

Dataset Description

The scientific sampling event log was created using v1.0 of the Rolling Deck to Repository (R2R) event log application (ELOG with a cruise-specific custom configuration file to reflect names of members of the science party and instrumentation used during the cruise). The log includes a record of all scientific sampling events from the cruise.

Post-cruise corrections to locations, dates, and times have been made using the alongtrack data. Notes about corrections are recorded in the 'comment' column.

Methods & Sampling

The event log was created using the Rolling Deck to Repository (R2R) event log application (ELOG). The log

includes a record of all scientific sampling events from the cruise. In addition to event identification numbers unique for the cruise, the scientific sampling event log includes date and time (GMT), position (latitude and longitude), station and cast identifier as appropriate to the sampling event, sampling instrument name, name of person responsible for the sampling event, and a comment field to record additional information. See more information about the R2R event log.

Data Processing Description

BCO-DMO obtained a preliminary version of the event log from http://elog.whoi.edu:8012/KN207-03-SE/ and made the following modifications:
-'NaN' and blanks were replaced with 'nd' to indicate 'no data'.
-Divided the original dateTimeUTC column into date_utc and time_utc.
-Parameter names were modified to conform with BCO-DMO convention.

Post-cruise corrections to locations, dates, and times were made by the Chief Scientist. Where applicable, details are provided in the 'comment' column. Original event numbers remain unchanged and, thus, serve as an indicator of the date and time that each event was originally recorded.

[table of contents | back to top]

Data Files

File
KN207-03_event_log.csv (Comma Separated Values (.csv), 66.55 KB) MD5:4db44636f7408719932fde206d15e652 Primary data file for dataset ID 3739

[table of contents | back to top]

Parameters

Parameter	Description	Units
event	ID number for the event composed of date (YYYYmmdd), time (HHMM), and the event number (xxx). Record of the date/time when the event was originally logged. format: YYYYmmdd.HHMM.xxx	unitless
date_utc	Date (UTC), in YYYYmmdd format, that the event took place.	unitless
time_utc	Time (UTC), in HHMM format, that the event took place.	HHMM
station	Alpha-numeric code representing the sampling station.	dimensionless
cast	Cast number.	dimensionless
lat	Latitude in decimal degrees.	decimal degrees
lon	Longitude, in decimal degrees.	decimal degrees
depth_w	Water depth (in meters). Originally named 'Seafloor'.	meters
instrument	Name of instrument.	text
action	Activity performed with the instrument.	text
author	Name of person entering the event.	text
comment	Free-text comment entered about the sampling event and post-cruise corrections.	text
transect	Transect name.	dimensionless
ISO_DateTime_UTC	Date and time (UTC) formatted to ISO8601 standard. T indicates start of time string; Z indicates UTC.	YYYY-mm-ddTHH:MM:SS.ssZ

[table of contents | back to top]

Deployments

KN207-03

Website	https://www.bco-dmo.org/deployment/58868
Platform	R/V Knorr
Start Date	2012-06-15
End Date	2012-07-14
Description	Description from the WHOI Cruise Synopsis: The 30 day "NA-VICE" (North Atlantic Virus Infection of Coccolithophores Expedition) cruise in June-July 2012 aboard the R/V Knorr followed a transect from Ponta Delgada, Azores to Reykjavik, Iceland. The goal for this cruise was to transect the region of the NEA spring bloom and to extensively sample the bloom when it is encountered. The cruise track was modeled after a recent study in this area that documented intense coccolithophore (and other haptophyte) blooms across Rockall Hatton Plateau to the Iceland Basin (55-63°N latitude) and coincided with elevated POC and TEP. The science plan calls for sampling of 12 water depths at 20 station locations. In addition, three stations were occupied for several days to allow opportunities for extended experiments and sinking particulate carbon collection and flux determination. Given that the timing of the bloom is difficult to predict exactly, the precise cruise track was determined by remote sensing data (satellite and autonomous glider from Rutgers) analyzed by the PIs a few days before and during the cruise. The cruise was supported by NSF award OCE-1061883. Additional cruise information and original data are available from the NSF R2R data catalog.

[table of contents | back to top]

Project Information

Lipid lubrication of oceanic carbon and sulfur biogeochemistry via a host-virus chemical arms

race (NA-VICE)

Coverage: North Atlantic; Azores to Iceland

This project is also called "**NA-VICE**" (North Atlantic Virus Infection of Coccolithophores Expedition).

Project description from NSF award abstract:
Despite the critical importance of viruses in shaping marine microbial ecosystems, very little is known about the molecular mechanisms mediating phytoplankton-virus interactions. As a consequence, we currently lack biomarkers to quantify active viral infection in the oceans, significantly hindering our understanding of its ecological and biogeochemical impacts.

The coccolithophore *Emiliania huxleyi* (Prymnesiophyceae, Haptophyte) is a cosmopolitan unicellular photoautotroph whose calcite skeletons account for about a third of the total marine CaCO3 production. *E. huxleyi* forms massive annual spring blooms in the North Atlantic that are infected and terminated by lytic, giant double-stranded DNA containing coccolithoviruses. Findings that lytic viral infection of *E. huxleyi* recruits the hosts programmed cell death (PCD) machinery demonstrate that viruses employ a sophisticated, co-evolutionary “arms race” in mediating host-virus interactions. The investigators recently demonstrated that viral glycosphingolipids (vGSLs), derived from unexpected cluster of sphingolipid biosynthetic genes, a pathway never before described in a viral genome, play a crucial functional role in facilitating infection of *E. huxleyi*. The observations of vGSLs in the North Atlantic and Norwegian fjords further suggest that they may be novel, diagnostic biomarkers for viral infection of coccolithophore populations. At the same time, the discovery of vGSLs and a distinct, protective 802 lipid argues that a host-virus, co-evolutionary chemical arms race plays a pivotal role in regulating viral infection and in lubricating upper ocean biogeochemical fluxes of carbon and sulfur.

The focus of this collaborative research project is to elucidate the molecular, ecological, and biogeochemical links between vGSLs (and other polar lipids) and the global cycles of carbon and sulfur.

The team of investigators proposes a multi-pronged approach combing a suite of lab-based, mechanistic studies using several haptophyte-virus model systems along with observational studies and manipulative field-based experiments the Northeast Atlantic. Using these diagnostic markers, they will document active viral infection of natural coccolithophore populations and couple it with a suite of oceanographic measurements in order to quantify how viral infection (via vGSLs) influences cell fate, the dissolved organic carbon (DOC) pool, vertical export of particular organic (POC) and inorganic carbon (PIC; as calcium carbonate, CaCO3) (along with associated alkenone lipid biomarkers and genetic signatures of viruses and their hosts) and the upper ocean sulfur cycle (via the cycling of dimethylsulfide [DMS] and other biogenic sulfur compounds). Furthermore, given they are unique to viruses, the investigators propose that vGSLs can be used to trace the flow of virally-derived carbon and provide quantitative insights into a “viral shunt” that diverts fixed carbon from higher trophic levels and the deep sea.

The overarching hypothesis for this study is that vGSLs are cornerstone molecules in the upper ocean, which facilitate viral infection on massive scales and thereby mechanistically "lubricate" the biogeochemical fluxes of C and S in the ocean.

[table of contents | back to top]

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.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1061883

[table of contents | back to top]