

Event log from the R/V Oceanus OC1504A, a cruise along the Oregon/California Coastal Upwelling Zone, between 34-44N and 120-124W during 2015

Website: <https://www.bco-dmo.org/dataset/651685>

Data Type: Cruise Results

Version: 1

Version Date: 2016-07-13

Project

» [Linking physiological and molecular aspects of diatom silicification in field populations](#) (Diatom Silicification)

Contributors	Affiliation	Role
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Abstract

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Coverage

Spatial Extent: N:44.62575 E:-120.81017 S:34.551 W:-124.48169

Temporal Extent: 2015-04-19 - 2015-05-01

Dataset Description

Event log from OCE1504A cruise, Molecular Underpinnings of Silicification in the California Current (MUSiCC). A sample ID key of all samples included in the dataset can be found below:

Sample Collection Abbreviation	Description
dSi	dissolved silicon
chl	chlorophyll
bSi	biogenic silicon
nut	macronutrients
BM	cellular biomass collected on 1.2 μm polycarbonate filter
BM-E	cellular biomass collected on 1.2 μm polycarbonate filter after Si enrichment
phyto	Bouin's fixed whole seawater
POC/PON	particulate organic carbon and nitrogen
Sterivex	0.2 μm pore size
Anotop	0.02 μm pore size
TEP	transparent exopolymers
Glut	0.5% glutaraldehyde fixed whole seawater
Sytox	Sytox stained samples for live/dead enumeration by flow cytometry (40 μm pre-filtered seawater)
LNA	cellular biomass concentrated on 1.2 μm polycarbonate filters and fixed in 0.5% paraformaldehyde
FIRe	photosynthetic measurements using fast repetition rate fluorometry

For related datasets, click on the project link at the top of the page.

Methods & Sampling

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 (UTC), position (latitude and longitude), station and samples collected, activity (CTD cast), bottom depth, and a comment field to record additional information.

Data Processing Description

DMO Notes:

- Parameter names were converted to lowercase and/or to standard BCO-DMO naming conventions
- removed "consecutive sample number" "latitude (mm.mmm)" "Longitude (dd)" "Latitude (DD)" "Longitude (mm.mmm)" columns. "Consecutive Sample Number" was removed at the request of the Kim Thamatrakoln, PI.
- replaced all "," with ";"
- reformatted all column names, replacing spaces with "_" and changing names to comply with BCO-DMO standards.
- added "nd" to blank fields, and fields with "~" or "?" after clarifying their meaning with PI.

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Data Files

File
event_log.csv (Comma Separated Values (.csv), 4.68 KB) MD5:32f94cf101db09378df565e2e3bc627b
Primary data file for dataset ID 651685

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Parameters

Parameter	Description	Units
cruise	Cruise name associated with OC1504A.	unitless
event	ID number for the event.	unitless
activity	Activity performed with the instrument.	unitless
date_local	Local date that the event took place; format dd-bbb-yy.	unitless
time_local	Local time that the event took place; format HH:MM.	unitless
time_utc	Time (UTC) that the event took place; format HH:MM.	unitless
date_utc	Date (UTC) that the event took place; format dd-bbb-yy.	unitless
station	Alpha-numeric code representing the sampling station.	unitless
depth_w	Bottom depth	meters
lat	Latitude in decimal degrees.	decimal degrees
lon	Longitude in decimal degrees.	decimal degrees
samples_collected	Types of samples collected.	unitless
comments	Free text comments about the sampling event and post-cruise corrections.	unitless

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Deployments

OC1504A

Website	https://www.bco-dmo.org/deployment/560135
Platform	R/V Oceanus
Report	https://musicc2015.wordpress.com
Start Date	2015-04-19
End Date	2015-05-02
Description	Data for the project "Linking physiological and molecular aspects of diatom silicification in field populations" (PIs Kimberlee Thamatrakoln and Mark Brzezinski) were collected on this cruise.

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Project Information

Linking physiological and molecular aspects of diatom silicification in field populations (Diatom Silicification)

Coverage: Oregon/California Coastal Upwelling Zone, between 34-44N and 120-124W

Description from NSF award abstract:

Diatoms, unicellular, eukaryotic photoautotrophs, are among the most ecologically successful and functionally diverse organisms in the ocean. In addition to contributing one-fifth of total global primary productivity, diatoms are also the largest group of silicifying organisms in the ocean. Thus, diatoms form a critical link

between the carbon and silicon (Si) cycles. The goal of this project is to understand the molecular regulation of silicification processes in natural diatom populations to better understand the processes controlling diatom productivity in the sea. Through culture studies and two research cruises, this research will couple classical measurements of silicon uptake and silica production with molecular and biochemical analyses of Silicification-Related Gene (SiRG) and protein expression. The proposed cruise track off the West Coast of the US will target gradients in Si and iron (Fe) concentrations with the following goals: 1) Characterize the expression pattern of SiRGs, 2) Correlate SiRG expression patterns to Si concentrations, silicon uptake kinetics, and silica production rates, 3) Develop a method to normalize uptake kinetics and silica production to SiRG expression levels as a more accurate measure of diatom activity and growth, 4) Characterize the diel periodicity of silica production and SiRG expression.

It is estimated that diatoms process 240 Teramoles of biogenic silica each year and that each molecule of silicon is cycled through a diatom 39 times before being exported to the deep ocean. Decades of oceanographic and field research have provided detailed insight into the dynamics of silicon uptake and silica production in natural populations, but a molecular understanding of the factors that influence silicification processes is required for further understanding the regulation of silicon and carbon fluxes in the ocean. Characterizing the genetic potential for silicification will provide new information on the factors that regulate the distribution of diatoms and influence in situ rates of silicon uptake and silica production. This research is expected to provide significant information about the molecular regulation of silicification in natural populations and the physiological basis of Si limitation in the sea.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1333929
NSF Division of Ocean Sciences (NSF OCE)	OCE-1334387

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