

Particulate organic carbon and nitrogen measurements from CTD casts in the Monterey Bay area on RV/Point Sur cruise PS1312, June-July 2013

Website: <https://www.bco-dmo.org/dataset/768443>

Data Type: Cruise Results

Version: 1

Version Date: 2019-05-20

Project

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

Contributors	Affiliation	Role
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Abstract

Particulate organic carbon and nitrogen measurements from CTD casts in the Monterey Bay area on RV/Point Sur cruise PS1312, June-July 2013.

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Coverage

Spatial Extent: N:38.2548 E:-121.969 S:36.4502 W:-123.977

Temporal Extent: 2013-06-27 - 2013-07-05

Dataset Description

Particulate organic carbon and nitrogen measurements from CTD casts in the Monterey Bay area on RV/Point Sur cruise PS1312, June-July 2013

Methods & Sampling

Whole seawater was collected using Niskin bottles mounted on a CTD rosette. Water was filtered onto 25 mm pre-combusted GF/F filters, flash frozen in liquid nitrogen, and stored at -80C until analysis. Prior to analysis, samples were thawed and dried overnight at 60C. Filters were acidified in a glass desiccator with concentrated HCl overnight, then dried again for at least 24 h. Samples were then run on a CHN Elemental Analyzer.

Milligrams of particulate organic carbon and nitrogen were determined according to standard measurements.

The carbon and nitrogen content (mg) was then converted to a molar content (micromol) and divided by the volume of seawater filtered.

Data Processing Description

BCO-DMO Processing Notes:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- re-formatted date from m/d/yyyy to yyyy-mm-dd
- added ISO_DateTime_Local column
- calculated decimal degrees for lat and lon

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Data Files

File
DYEatom_POC_PON.csv (Comma Separated Values (.csv), 6.86 KB) MD5:46f6e39dbb03ec0e553cac2ed0fe634e Primary data file for dataset ID 768443

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Parameters

Parameter	Description	Units
ISO_DateTime_Local	Local date and time of sampling formatted as yyyy-mm-ddTHH:MM:SS	unitless
date_local	Local date formatted as yyyy-mm-dd	unitless
time_local	Local time (Pacific Standard Time)	unitless
station	station identifier	unitless
cast_CTD	CTD cast number	unitless
lat	latitude; north is positive	decimal degrees
lat_degree	latitude degrees	degrees
lat_min	latitude minutes	minutes
lon	longitude; east is positive	decimal degrees
lon_deg	longitude degrees	degrees
lon_min	longitude minutes	minutes
depth	sample depth	meters
PON	Particulate Organic Nitrogen concentration	micromol/liter (umol/L)
POC	Particulate Organic Carbon concentration	micromol/liter (umol/L)

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Instruments

Dataset-specific Instrument Name	CHN Elemental Analyzer, Na 1500 series 2, Carlo Erba Instruments
Generic Instrument Name	CHN Elemental Analyzer
Generic Instrument Description	A CHN Elemental Analyzer is used for the determination of carbon, hydrogen, and nitrogen content in organic and other types of materials, including solids, liquids, volatile, and viscous samples.

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Deployments

PS1312

Website	https://www.bco-dmo.org/deployment/701341
Platform	R/V Point Sur
Start Date	2013-06-27
End Date	2013-07-06
Description	Cruise DOI: 10.7284/903425

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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

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