Underway Data Acquisition System (UDAS) data from R/V Point Sur cruise PS1312 along the Central California coast from June to July of 2013 (Diatom Group Si Prod project)

Website: https://www.bco-dmo.org/dataset/701571
Data Type: Cruise Results
Version:
Version Date: 2017-08-29

Project
» Group-Specific Diatom Silica Production in a Coastal Upwelling System (Diatom Group Si Prod)

Contributors	Affiliation	Role
Krause, Jeffrey W.	Dauphin Island Sea Lab (DISL)	Principal Investigator
Brzezinski, Mark A.	University of California-Santa Barbara (UCSB)	Scientist
York, Amber D.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Table of Contents

Coverage

Spatial Extent: **N**:38.32676 **E**:-121.8024 **S**:36 **W**:-123.98623
Temporal Extent: 2013-06-27 - 2013-07-05

Dataset Description

This dataset contains temperature, conductivity, turbidity, fluorometry, and meteorological data from the Underway Data Acquisition System (UDAS) on the R/V Point Sur cruise PS13-12 between 2013-06-27 to 2013-07-05.

Methods & Sampling

The Underway Data Acquisition System (UDAS) on the R/V Point Sur consists of a suite of meteorological and sea surface sensors sampling at ~ 1 Hz, the entire duration the vessel is away from the dock. A constant flow of seawater (originating from an intake on the ship's seachest, just below the sea surface, ~ 2.5m) feeds the sensors and drains into a sink/drain in the Main Lab where it may be sampled by scientists or plumbed to science supplied equipment. The meteorological sensors are located on the mast above the Wheelhouse. All data is interfaced and collected on one computer located in the ET lab, via SCS, a data collection application developed by NOAA.

Acquisition description source (Moss Landing Marine Laboratories): https://marineops.mlml.calstate.edu/PS-UDAS (now broken as of 2017-08-30)

Data Processing Description

Cleaning steps performed by data contributor before being sent to BCO-DMO:
- All daily csv files combined to master file.
- "-999" = "no data"
- All "NaN" turned to "-999"
- combined Latitude & Longitude degrees, minutes, seconds into Decimal degrees
-- Eliminated columns:
-- Ashtech GPS coordinates (No long data recorded)
-- Rel_STBD_WD (no dynamic range, nearly all data ~270)
-- Rel STBD WS (no dynamic range, all data 0)
-- As in original excel sheet the following were omitted: SSC, SWDI, LWDI, PIR PSP, PIR dome C, PIR case C, PIR V therm, AVG Circ C, Battery V
- Eliminated the following data points and changed to -999
- Air temp F (3 values, 449, 454, 486)
-- Air temp C (3 values, 231, 234, 252)
-- Solar radiation (2 values, 13934, 1991)
-- SST (94 values recorded from 68 to -83)
- Salinity (8 values >40)
-- Xmiss% (325 values, % <0)
-- Fluoro (1 value <0)

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date (can't use spaces, slashes, percent signs)
* modified parameter names to conform with BCO-DMO naming conventions
* -999 values changed to "nd" for no data so they are recognized in our system
* ISO timestamp added based on YMD, and HMS fields
* SST, Salinity, SST_TSAL rounded to three decimal places, lat/lon rounded to 5 decimal places

[table of contents | back to top]

Data Files

File
UDAS.csv(Comma Separated Values (.csv), 5.16 MB) MD5:c378876cea0cae1893b61362f8c59db8
Primary data file for dataset ID 701571

[table of contents | back to top]

Parameters

Parameter	Description	Units
Tag	Tag from acquisition system	unitless
Call_Sign	Call sign	unitless
YMD	Date (UTC) in format YYYYMMDD	unitless
HMS	Time (UTC) in format HHMMSS	unitless
ISO_DateTime_UTC	ISO timestamp based on the ISO 8601:2004(E) standard in format YYYY-mm-ddTHH:MM:SSZ (UTC)	unitless
Lat_Furuno_Degree	Latitude	decimal degrees
Lon_Furuno_Degree	Longitude	decimal degrees
Ashtech_Heading	Ashtech Instrument	degrees
Gyro_Heading	Ship's Gyroscope heading	degrees
Average_Raw_Gyro	Ship's Gyroscoe heading (average of raw)	degrees
COG	Course over ground	degrees
SOG	Speed over ground	knots
True_STBD_WD	True Starboard Wind Direction	degrees
True_STBD_WS	True Starboard Wind Speed	knots
Rel_PORT_WD	Relative Port Wind Direction	degrees
Rel_PORT_WS	Relative Port Wind Speed	knots
True_PORT_WD	True Port Wind Direction	degrees
True_PORT_WS	True Port Wind Speed	knots
Air_temp_F	Air temperature	Degrees Fahrenheit
Air_temp_C	Air temperature	Degrees Celsius
Barometer_mBar	Barometric pressure	millibars
Barometer_in_Hg	Barometric pressure	inches of mercury
Humidity_percent	Air humidity	relative percent
Solar_radiation	Solar Radiation	W/m2
STW	Speed Through the Water	Knots
SST	Sea Surface Temperature	degrees Celsius
Salinity	Salinity	practical salinity units (PSU)
SST_TSAL	Sea Surface Temperature used in salinity calculation	degrees Celsius
Xmiss_V	Light transmission	volts (V)
Xmiss_percent	Transmission	percent (%)
Xmiss_BAC	Transmission Beam Attenuation Coefficient	per meter (1/m)
SPAR_V	Surface Photosynthetically Active Radiation, PAR	volts (V)
SPAR	Surface Photosynthetically Active Radiation, PAR	microeinsteins per square meter per second (uE/m2/s)
Fluoro	Chlorophyll fluroescence	milligrams per meter cubed (mg/m3)

Instruments

Dataset-specific Instrument Name	Fluorometer Wetlabs ECO Chla
Generic Instrument Name	Fluorometer
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	Biospherical Par Model (QSR2200)
Generic Instrument Name	LI-COR Biospherical PAR Sensor
Generic Instrument Description	The LI-COR Biospherical PAR Sensor is used to measure Photosynthetically Available Radiation (PAR) in the water column. This instrument designation is used when specific make and model are not known.

Dataset-specific Instrument Name	Wind Speed (RMYoung 05108)
Generic Instrument Name	Meteorological Station
Dataset-specific Description	R.M. Young company Heavy Duty Wind Monitor-HD Model 05108
Generic Instrument Description	MET station systems are designed to record meteorological information on board ships or mounted on moorings. These are commonly referred to as EMET (Electronic Meteorological Packages) or IMET (Improved Meteorological Packages) systems. These sensor packages record measurements of sea surface temperature and salinity, air temperature, wind speed and direction, barometric pressure, solar and long-wave radiation, humidity and precipitation.

Dataset-specific Instrument Name	Air Temp/RH (RMYoung 41382)
Generic Instrument Name	Meteorological Station
Dataset-specific Description	R.M. Young Company Temperature Probes Model 41342
Generic Instrument Description	MET station systems are designed to record meteorological information on board ships or mounted on moorings. These are commonly referred to as EMET (Electronic Meteorological Packages) or IMET (Improved Meteorological Packages) systems. These sensor packages record measurements of sea surface temperature and salinity, air temperature, wind speed and direction, barometric pressure, solar and long-wave radiation, humidity and precipitation.

Dataset-specific Instrument Name	Barometer (RMYoung 61302)
Generic Instrument Name	Meteorological Station
Dataset-specific Description	R.M. Young Company Model 61302 Barometric Pressure Sensor
Generic Instrument Description	MET station systems are designed to record meteorological information on board ships or mounted on moorings. These are commonly referred to as EMET (Electronic Meteorological Packages) or IMET (Improved Meteorological Packages) systems. These sensor packages record measurements of sea surface temperature and salinity, air temperature, wind speed and direction, barometric pressure, solar and long-wave radiation, humidity and precipitation.

Dataset-specific Instrument Name	Li-Core Model Pyranometer (Radiation)
Generic Instrument Name	Photosynthetically Available Radiation Sensor
Generic Instrument Description	A PAR sensor measures photosynthetically available (or active) radiation. The sensor measures photon flux density (photons per second per square meter) within the visible wavelength range (typically 400 to 700 nanometers). PAR gives an indication of the total energy available to plants for photosynthesis. This instrument name is used when specific type, make and model are not known.

Dataset-specific Instrument Name	Sea Water Temp/Salinity (SBE 21)
Generic Instrument Name	Sea-Bird SeaCAT Thermosalinograph SBE 21
Generic Instrument Description	A platinum-electrode conductivity sensor and a thermistor mounted in a corrosion-resistant plastic and titanium housing designed to be continuously plumbed into a vessel's pumped seawater supply. The instrument may be interfaced to a remote SBE 38 temperature sensor mounted either on the hull or in the seawater inlet. Data are both stored in internal memory and output to a serial port for external logging. Conductivity is measured in the range 0-7 S/m with an accuracy of 0.001 S/m and a resolution of 0.0001 S/m. Housing temperature is measured in the range -5-35C with an accuracy of 0.01 C and a resolution of 0.001 C. Remote temperature is measured in the range -5-35C with an accuracy of 0.001 C and a resolution of 0.0003 C. More information at http://www.seabird.com/products/spec_sheets/21data.htm.

Dataset-specific Instrument Name	Xmiss Wetlabs CST
Generic Instrument Name	Transmissometer
Dataset-specific Description	unknown if 25cm or 10cm
Generic Instrument Description	A transmissometer measures the beam attenuation coefficient of the lightsource over the instrument's path-length. This instrument designation is used when specific manufacturer, make and model are not known.

[<u>table of contents</u> | <u>back to top</u>]

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

[<u>table of contents</u> | <u>back to top</u>]

Project Information

Group-Specific Diatom Silica Production in a Coastal Upwelling System (Diatom Group Si Prod)

Coverage: In-, and off-shore, between Monterey Bay and Bodega Bay, CA

This study will examine the distribution of silica production among diatom species, using a novel combination of existing approaches, to evaluate the contributions of specific species or genera to total diatom silica production. Specific hypotheses regarding the distribution of silica production among species of diatoms will be tested by exploiting the strong contrasts in diatom community structure and silica production between a coastal upwelling system and in an oligotrophic subtropical gyre. Several lines of evidence support the idea that the diatoms responsible for the majority of silica production shifts from the most numerically abundant species in coastal systems to relatively rare, but very large, cells in offshore oligotrophic environments. This shift alters the role of diatoms in regional food webs and because many processes determining the role of phytoplankton groups in biogeochemical cycles are a function of cell size, such a shift has strong implications for regional differences in the contribution of diatoms to upper-ocean carbon cycling and the biological pump.

This study also seeks to understand of the role of silicon limitation in regulating diatom silica production at the species level. Si limitation of silica production has been detected in every system examined to date, ranging from the high Si waters of the Antarctic, to coastal upwelling systems and the oligotrophic subtropical gyres. Field studies of Si limitation are rarely accompanied by examination of the species present. When studies do have taxonomic data the lack of information on the performance of individual species makes it impossible to allocate the measured rates among cells, potentially leading to erroneous conclusions about the contribution of specific diatom groups to community composite rates.

The project will test five hypotheses. Each is related to the general theme of using species-specific data to

improve understanding of the factors regulating diatoms' role in marine food webs. By combining bulk measures of silica production using the radioisotope 32Si with quantitative measures of silicon deposition rates by individual cells using the fluorescent probe 2-(4-pyridyl)-5((4-(2-dimethylaminoethyl-aminocarbamoyl)-methoxy)phenyl)oxazole, or PDMPO, the following will be determined: species-specific diatom contributions to total community silica production, regional differences in the distribution of silica production among diatom species as a function of cell size, species-specific kinetic parameters governing the ability of species to compete for dissolved silicon, and whether dominance of a particular diatom group or species can be explained by knowledge of their capacity to utilize Si and their numerical abundance (as opposed to other factors such as grazing or limitation by other nutrients).

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1155663

[table of contents | back to top]