Environmental data collected by CTD during a deployment of the Environmental Sample Processor (ESP) in Fall, 2014 in Monterey Bay, CA

Website: https://www.bco-dmo.org/dataset/662378
Data Type: Other Field Results
Version:
Version Date: 2016-10-25

Project
» Bacterial Taxa that Control Sulfur Flux from the Ocean to the Atmosphere (OceanSulfurFluxBact)

Program
» Dimensions of Biodiversity (Dimensions of Biodiversity)

Contributors	Affiliation	Role
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Coverage

Spatial Extent: **Lat**:36.835 **Lon**:-121.901

Dataset Description

Temperature, salinity, depth, chlorophyll, light transmission, and computed dissolved oxygen concentration from a CTD on the Environmental Sample Processor mooring in Monterey Bay during the fall of 2014.

Methods & Sampling

The ESP was fitted with an SBE 16plus CTD (Sea-Bird, Bellevue, WA, USA) and a Turner Cyclops 7 fluorometer (Turner Designs, Sunnyvale, CA, USA) for depth, temperature, salinity and chlorophyll (Chl a) measurements and deployed near Station M0 (36.835 N, 121.901W) at a depth of 8.1m (±0.7). These data were collected from 8 September to 15 October 2014.

For detailed methodology, see Varaljay, et al. Single-taxon field measurements of bacterial gene regulation controlling DMSP fate. The ISME Journal (2015), 1-10. doi:10.1038/ismej.2015.23

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
- split Datetime into separate columns and calculated ISO_DateTime field
- added lat and lon of ESP mooring for mapping purposes

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Data Files

File
ctd.csv (Comma Separated Values (.csv), 707.06 KB) MD5:0640febdf10d3f860c128def2de4f5d2 Primary data file for dataset ID 662378

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Parameters

Parameter	Description	Units
year	year; Pacific time zone	year
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
month	month; Pacific time zone	months
day	day of month; Pacific time zone	days
time	time; Pacific time zone	hours-minutes-seconds
temp	temperature	degrees Celsius
sal	salinity	PSU
depth	depth	meters
chl_a	chlorophyll	milligrams/meter^3 (mg/m^3)
trans	light transmission	percent
DO_comp	computed dissolved oxygen	milliliters/liter (ml/L)
ISO_DateTime_Local	Date/Time (Local) ISO formatted based on ISO 8601:2004(E) with format YYYY-mm-ddTHH:MM:SS[.xx]Z	year;month;day;hour;minute;second

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Instruments

Dataset-specific Instrument Name	SBE 16plus
Generic Instrument Name	CTD Sea-Bird SEACAT
Dataset-specific Description	for depth, temperature, salinity
Generic Instrument Description	The CTD SEACAT recorder is an instrument package manufactured by Sea-Bird Electronics. The first Sea-Bird SEACAT Recorder was the original SBE 16 SEACAT developed in 1987. There are several model numbers including the SBE 16plus (SEACAT C-T Recorder (P optional))and the SBE 19 (SBE 19plus SEACAT Profiler measures conductivity, temperature, and pressure (depth)). More information from Sea-Bird Electronics.

Dataset-specific Instrument Name	Turner Cyclops 7 fluorometer (Turner Designs, Sunnyvale, CA, USA)
Generic Instrument Name	Fluorometer
Dataset-specific Description	for chlorophyll measurements
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.

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Deployments

Moran_Monterey_2014

Website	https://www.bco-dmo.org/deployment/662989
Platform	Univ_Georgia
Start Date	2014-09-08
End Date	2014-09-08
Description	Microbial collections and environmental data collected by moored ESP and CTD.

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Project Information

Bacterial Taxa that Control Sulfur Flux from the Ocean to the Atmosphere (OceanSulfurFluxBact)

Surface ocean bacterioplankton preside over a divergence point in the marine sulfur cycle where the fate of dimethylsulfoniopropionate (DMSP) is determined. While it is well recognized that this juncture influences the

fate of sulfur in the ocean and atmosphere, its regulation by bacterioplankton is not yet understood. Based on recent findings in biogeochemistry, bacterial physiology, bacterial genetics, and ocean instrumentation, the microbial oceanography community is poised to make major advances in knowledge of this control point. This research project is ascertaining how the major taxa of bacterial DMSP degraders in seawater regulate DMSP transformations, and addresses the implications of bacterial functional, genetic, and taxonomic diversity for global sulfur cycling.

The project is founded on the globally important function of bacterial transformation of the ubiquitous organic sulfur compound DMSP in ocean surface waters. Recent genetic discoveries have identified key genes in the two major DMSP degradation pathways, and the stage is now set to identify the factors that regulate gene expression to favor one or the other pathway during DMSP processing. The taxonomy of the bacteria mediating DMSP cycling has been deduced from genomic and metagenomic sequencing surveys to include four major groups of surface ocean bacterioplankton. How regulation of DMSP degradation differs among these groups and maps to phylogeny in co-occurring members is key information for understanding the marine sulfur cycle and predicting its function in a changing ocean. Using model organism studies, microcosm experiments (at Dauphin Island Sea Lab, AL), and time-series field studies with an autonomous sample collection instrument (at Monterey Bay, CA), this project is taking a taxon-specific approach to decipher the regulation of bacterial DMSP degradation.

This research addresses fundamental questions of how the diversity of microbial life influences the geochemical environment of the oceans and atmosphere, linking the genetic basis of metabolic potential to taxonomic diversity. The project is training graduate students and post-doctoral scholars in microbial biodiversity and providing research opportunities and mentoring for undergraduate students. An outreach program is enhance understanding of the role and diversity of marine microorganisms in global elemental cycles among high school students. Advanced Placement Biology students are participating in marine microbial research that covers key learning goals in the AP Biology curriculum. Two high school students are selected each year for summer research internships in PI laboratories.

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Program Information

Dimensions of Biodiversity (Dimensions of Biodiversity)

Website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503446

Coverage: global

(adapted from the NSF Synopsis of Program)
Dimensions of Biodiversity is a program solicitation from the NSF Directorate for Biological Sciences. FY 2010 was year one of the program. [MORE from NSF]

The NSF Dimensions of Biodiversity program seeks to characterize biodiversity on Earth by using integrative, innovative approaches to fill rapidly the most substantial gaps in our understanding. The program will take a broad view of biodiversity, and in its initial phase will focus on the integration of genetic, taxonomic, and functional dimensions of biodiversity. Project investigators are encouraged to integrate these three dimensions to understand the interactions and feedbacks among them. While this focus complements several core NSF programs, it differs by requiring that multiple dimensions of biodiversity be addressed simultaneously, to understand the roles of biodiversity in critical ecological and evolutionary processes.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1342694

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