Water temperature, salinity, and other data from CTD taken from the RV Sikuliaq in the Pacific Ocean between San Diego, California and Manzanillo, Mexico from 2016-12-21 to 2017-01-13.

Website: https://www.bco-dmo.org/dataset/732092
Data Type: Cruise Results
Version: 1
Version Date: 2018-03-27

Project
» Dimensions: Diversity, assembly and function of microbial communities on suspended and sinking particles in a marine Oxygen Deficient Zone (ETNP_ParticleOmics)

Program
» Dimensions of Biodiversity (Dimensions of Biodiversity)

Contributors	Affiliation	Role
Rocap, Gabrielle	University of Washington (UW)	Principal Investigator
Devol, Allan	University of Washington (UW)	Co-Principal Investigator
Switzer, Megan	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Coverage

Spatial Extent: **N**:25.20052 **E**:-104.55518 **S**:14.00056 **W**:-112.72028
Temporal Extent: 2016-12-21 - 2017-01-13

Dataset Description

Hydrographic data were collected using a Seabird CTD Niskin Bottle Rosette, deployed at a wire speed between 40 and 60 meters per minute.

Nutrient samples were filtered (GFF glass fiber) before analysis and analyzed using the US-JGOFS protocols (http://usjgofs.whoi.edu/protocols_rpt_19.html) at the UW Marine Chemistry Laboratory.

The Seabird CTD Niskin Bottle Rosette included the following sensors: Seabird 911 Conductivity Temperature Density meter; Seabird SBE 43 Dissolved Oxygen Sensor; WETLabs ECO Chlorophyll Fluorometer; Biospherical/Licor PAR/Irradiance Sensor; WETLabs C- Star Transmissometer.

CTD data were processed using Seabird proprietary data conversion software and factory calibration coefficients; dissolved oxygen voltage was aligned using a time advance of 2.33 seconds; downcast data were averaged into 1 meter bins. CTD data has been reprocessed and aligned and outliers have been removed. All data are considered final.

This data is available at National Centers for Environmental Information (NCEI).

NCEI Accession: 0164968

Link: https://www.nodc.noaa.gov/cgi-bin/OAS/prd/accession/details/164968

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Data Files

File
732092.csv (Comma Separated Values (.csv), 94 bytes) MD5:8e36921f411c77335edf404b98a6cf85 Primary data file for dataset ID 732092

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Related Datasets

IsSupplementTo

Moffett, J. W. (2020) **Iron, manganese and nutrient data from four cruises in the eastern tropical North Pacific, 2012 to 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2020-11-02 doi:10.26008/1912/bco-dmo.828183.1 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
NCEI_accession	Accession number for dataset at National Centers for Environmental Information (NCEI)	no units
URL	URL to dataset landing page at NCEI	no units

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Bottle
Generic Instrument Description	A container, typically made of glass or plastic and with a narrow neck, used for storing drinks or other liquids.

Dataset-specific Instrument Name	
Generic Instrument Name	CTD - profiler
Generic Instrument Description	The Conductivity, Temperature, Depth (CTD) unit is an integrated instrument package designed to measure the conductivity, temperature, and pressure (depth) of the water column. The instrument is lowered via cable through the water column. It permits scientists to observe the physical properties in real-time via a conducting cable, which is typically connected to a CTD to a deck unit and computer on a ship. The CTD is often configured with additional optional sensors including fluorometers, transmissometers and/or radiometers. It is often combined with a Rosette of water sampling bottles (e.g. Niskin, GO-FLO) for collecting discrete water samples during the cast. This term applies to profiling CTDs. For fixed CTDs, see https://www.bco-dmo.org/instrument/869934.

Dataset-specific Instrument Name	
Generic Instrument Name	CTD-fluorometer
Generic Instrument Description	A CTD-fluorometer is an instrument package designed to measure hydrographic information (pressure, temperature and conductivity) and chlorophyll fluorescence.

Dataset-specific Instrument Name	
Generic Instrument Name	Nutrient Autoanalyzer
Generic Instrument Description	Nutrient Autoanalyzer is a generic term used when specific type, make and model were not specified. In general, a Nutrient Autoanalyzer is an automated flow-thru system for doing nutrient analysis (nitrate, ammonium, orthophosphate, and silicate) on seawater samples.

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Deployments

SKQ201617S

Website	https://www.bco-dmo.org/deployment/828218
Platform	R/V Sikuliaq
Start Date	2016-12-20
End Date	2017-01-16
Description	Cruise DOI: 10.7284/907444 See more cruise information from the Rolling Deck to Repository (R2R): https://www.rvdata.us/search/cruise/SKQ201617S

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Project Information

Dimensions: Diversity, assembly and function of microbial communities on suspended and sinking particles in a marine Oxygen Deficient Zone (ETNP_ParticleOmics)

Coverage: Eastern Tropical North Pacific

Extracted from the NSF award abstract:

Marine oxygen deficient zones (ODZs) are waters that are functionally devoid of oxygen. Without oxygen, some microbes are capable of converting nitrogen in the water into N2 gas, which then leaves the ocean and enters the atmosphere. This loss of an important nutrient from the ocean has impacts on phytoplankton growth and marine food webs. While oxygen deficient zones occupy a very small percentage of the ocean, they account for as much as half of the oceanic loss of N as N2. Moreover, the size of these regions is predicted to expand during this century due to climate change. The microbes that are capable of producing N2 gas are extremely diverse, and use several different biochemical pathways to carry out this process. They may occur both free-floating in the water and attached to small particles that are suspended or sinking from the surface waters and providing them a carbon source. However the importance of these two lifestyles (free-living vs particle attached) in terms of contributions to N loss from the oceans is not well understood. This project will identify the major organisms that result in N2 gas production on both suspended and sinking particles, the chemical reactions they carry out, and the rates at which this occurs. This information will be used to improve global climate models to better predict rates of N loss in a future ocean. Elementary and middle school teachers enrolled in a Masters in Science for Science Teachers program will be involved in the project and the graduate students and post-doctoral researchers supported by the project will have opportunities to participate in their classrooms. Underserved populations will also be integrated into the research at the undergraduate and middle school level through a series of summer internships.

ODZs have very complex elemental cycles, implying great microbial diversity. Intertwined with the microbial complexity of ODZ regions is the relatively unexplored interplay between free-living bacteria and those living on either suspended or sinking particles. Determining how these communities and niches interact and relate is one of the most challenging components of ODZ system studies today. Current climate models portray the dynamics of particles in the ODZs and throughout the deep ocean through prescribed functions based on sparse data from the oxic ocean with microbes represented only by the net chemical reactions of the community. However, in reality a phylogenetically and metabolically diverse group of microbes, likely acting in consortia, are responsible for the nitrogen transformations that ultimately result in the production of N2. To explore the processes maintaining the genetic diversity and functional redundancy in N loss processes, four research areas will be integrated: the community phylogenetic diversity (both taxonomic and genomic diversity) the genetic diversity of the proteins that carry out key N transformation processes (as seen through quantitative proteomics), the resulting biogeochemical functions (15N labeled nitrogen transformation rate measurements) and predictions about how this diversity and corresponding function may change in response to climate change (biogeochemical modeling). The approach will be to assay both phylogenetic (16S rRNA tag sequencing) and functional genetic diversity (genomics) on sinking particles collected using large-volume sediment traps. Phylogenetic and genomic studies will be intimately tied to measurements of activity - who is doing key biogeochemical transformations (proteomics) and what are the in situ rates at which they are doing them (using novel incubation systems). Data will then be used to model how diversity and corresponding function change on a range of time and space scales, from the sinking of a single particle to seasonal cycles. To understand the relationship of community diversity and function on suspended and sinking particles, a series of three cruises will be conducted in the Eastern Tropical North Pacific ODZ.

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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 Environmental Biology (NSF DEB)	DEB-1542240

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