Nighttime surface chlorophyll-a concentrations at the MBARI OA1 Buoy (36° 37.373’ N, 121 ° 54.000’ W) from June to October 2018

Website: https://www.bco-dmo.org/dataset/822494
Data Type: Other Field Results
Version: 1
Version Date: 2020-08-29

Project
» Collaborative Research: RUI: Building a mechanistic understanding of water column chemistry alteration by kelp forests: emerging contributions of foundation species (Kelp forest biogeochemistry)

Contributors	Affiliation	Role
Nickols, Kerry J.	California State University Northridge (CSUN)	Principal Investigator, Project Coordinator
Dunbar, Robert B.	Stanford University	Co-Principal Investigator
Hirsh, Heidi	Stanford University	Scientist, Contact
Monismith, Stephen G.	Stanford University	Scientist
Mucciarone, David	Stanford University	Scientist
Takeshita, Yuichiro	Monterey Bay Aquarium Research Institute (MBARI)	Scientist
Traiger, Sarah	United States Geological Survey (USGS)	Scientist
Soenen, Karen	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Nighttime surface chlorophyll-a concentrations at the MBARI OA1 Buoy (36° 37.373’ N, 121 ° 54.000’ W) from June to October 2018

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Coverage

Spatial Extent: **Lat**:36.62288 **Lon**:-121.9
Temporal Extent: 2018-06-07 - 2018-10-04

Dataset Description

These data are published in Hirsh *et al.,* see related publications section.

Methods & Sampling

Nighttime surface chlorophyll-a concentrations (µg/L) at the OA1 Buoy (operated by MBARI) during the mooring deployment period, June 7 to October 4, 2018. Francisco Chavez and the Biological Oceanography Group at MBARI provided the chlorophyll a fluorescence data from the OA 1 buoy.

Data Processing Description

The factory calibration was used to convert fluorescence to chlorophyll a concentrations without further modification. Daytime chlorophyll a concentrations were removed to avoid bias in the data from non-photochemical quenching.

BCO-DMO processing notes:

- Converted Timestap to ISO format, and timezone from Pacific Standard Time (PST) to UTC
- Added latitude and longitude of sampling location

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Data Files

File
chl_a.csv(Comma Separated Values (.csv), 1.53 MB) MD5:1fddb447d44f1e132256e27c18209440 Primary data file for dataset ID 822494

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Related Publications

Hirsh, H. K., Nickols, K. J., Takeshita, Y., Traiger, S. B., Mucciarone, D. A., Monismith, S., & Dunbar, R. B. (2020). Drivers of Biogeochemical Variability in a Central California Kelp Forest: Implications for Local Amelioration of Ocean Acidification. Journal of Geophysical Research: Oceans, 125(11). Portico. https://doi.org/10.1029/2020jc016320 https://doi.org/10.1029/2020JC016320
Results

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Parameters

Parameter	Description	Units
ISO_DateTime_UTC	Sampling date and time in ISO format (yyyy-mm-ddThh:mm:ssZ) in UTC (coordinated Universal Time)	yyyy-MM-dd'T'HH:mm:ss'Z'
Chla_Nighttime	Chlorophyll a concentration based on fluorescence	microgram per liters (ug/L)
Latitude	Latitude of sampling location, south is negative	decimal degrees
Longitude	Longitude of sampling location, west is negative	decimal degrees

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Instruments

Dataset-specific Instrument Name	WETStar Fluorometer
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.

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Deployments

OA1

Website	https://www.bco-dmo.org/deployment/822507
Platform	MBARI OA1 Buoy
Start Date	2018-06-07
End Date	2018-10-04
Description	Offshore from Hopkins Marine Station

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Project Information

Collaborative Research: RUI: Building a mechanistic understanding of water column chemistry alteration by kelp forests: emerging contributions of foundation species (Kelp forest biogeochemistry)

Coverage: Central California 36.6 N 122 W

NSF Award Abstract:
Kelp forest ecosystems are of ecological and economic importance globally and provide habitat for a diversity of fish, invertebrates, and other algal species. In addition, they may also modify the chemistry of surrounding waters. Uptake of carbon dioxide (CO2) by giant kelp, Macrocystis pyrifera, may play a role in ameliorating the effects of increasing ocean acidity on nearshore marine communities driven by rising atmospheric CO2. Predicting the capacity for kelp forests to alter seawater chemistry requires understanding of the oceanographic and biological mechanisms that drive variability in seawater chemistry. The project will identify specific conditions that could lead to decreases in seawater CO2 by studying 4 sites within the southern Monterey Bay in Central California. An interdisciplinary team will examine variations in ocean chemistry in the context of the oceanographic and ecological characteristics of kelp forest habitats. This project will support an early career researcher, as well as train and support a postdoctoral researcher, PhD student, thesis master's student, and up to six undergraduate students. The PIs will actively recruit students from underrepresented groups to participate in this project through Stanford University's Summer Research in Geosciences and Engineering (SURGE) program and the Society for Advancement of Hispanics/Chicanos and Native Americans in Science (SACNAS). In addition, the PIs and students will actively engage with the management community (Monterey Bay National Marine Sanctuary and California Department of Fish and Wildlife) to advance products based on project data that will assist the development of management strategies for kelp forest habitats in a

changing ocean.

This project builds upon an extensive preliminary data set and will link kelp forest community attributes and hydrodynamic properties to kelp forest biogeochemistry (including the carbon system and dissolved oxygen) to understand mechanistically how giant kelp modifies surrounding waters and affects water chemistry using unique high-resolution measurement capabilities that have provided important insights in coral reef biogeochemistry. The project sites are characterized by different oceanographic settings and kelp forest characteristics that will allow examination of relationships between kelp forest inhabitants and water column chemistry. Continuous measurements of water column velocity, temperature, dissolved oxygen, pH, and photosynthetically active radiation will be augmented by twice-weekly measurements of dissolved inorganic carbon, total alkalinity, and nutrients as well as periods of high frequency sampling of all carbonate system parameters. Quantifying vertical gradients in carbonate system chemistry within kelp forests will lead to understanding of its dependence on seawater residence time and water column stratification. Additional biological sampling of kelp, benthic communities, and phytoplankton will be used to 1) determine contributions of understory algae and calcifying species to bottom water chemistry, 2) determine contributions of kelp canopy growth and phytoplankton to surface water chemistry, and 3) quantify the spatial extent of surface chemistry alteration by kelp forests. The physical, biological, and chemical data collected across multiple forests will allow development of a statistical model for predictions of kelp forest carbonate system chemistry alteration in different locations and under future climate scenarios. Threshold values of oceanographic conditions and kelp forest characteristics that lead to alteration of water column chemistry will be identified for use by managers in mitigation strategies such as targeted protection or restoration.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1737096
NSF Division of Ocean Sciences (NSF OCE)	OCE-1737176

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