CTD data from daily sampling at the Santa Monica Pier (SMP), Santa Monica Bay, CA from 2018 to 2019

Website: https://www.bco-dmo.org/dataset/883908
Data Type: Other Field Results
Version: 1
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Project
» Protistan, prokaryotic, and viral processes at the San Pedro Ocean Time-series (SPOT)

Contributors	Affiliation	Role
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Abstract
This is a compiled dataset containing CTD data from daily sampling at the Santa Monica Pier (SMP) from 2018 to 2019. These data were published in Ollison et al (2022). These data were collected as part of a study of high frequency (daily) changes in relative abundance dynamics of the metabolically active protistan community were followed via expressed 18S V4 rRNA genes (RNA) throughout two algal blooms during the spring of 2018 and 2019 in Santa Monica Bay (central Southern California Bight) to examine the environmental factors that influence protistan community dynamics during algal blooms.

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Coverage

Spatial Extent: **Lat**:34.009 **Lon**:-118.497
Temporal Extent: 2018-04-16 - 2019-05-05

Methods & Sampling

Blooms were targeted in Santa Monica Bay during spring 2018 and 2019 using local meteorological information to anticipate coastal upwelling events (Figure S1, Ollison et al., 2022). Sampling from the Santa Monica Pier (SMP) was conducted daily at 0900 (PST/PDT) from the same location and orientation on the SMP from the 16th through the 30th in April 2018 (15 days), and in 2019 from the 13th April through 6th May (22 days; no sample was collected on the 14th April 2019). Sampling periods are henceforth referred to as 2018 and 2019, respectively.

An RBR Concerto (https://rbr-global.com) was deployed in surface water for 15 minutes at the time of each sample collection to obtain temperature, conductivity, chlorophyll *a* fluorescence, and dissolved oxygen concentrations (Table S1, Ollison et al., 2022). A 20 µm mesh plankton net was drift towed from the pier (15 min), and samples were examined via light microscopy to identify the dominant planktonic taxa and their relative abundances.

See "Related Datasets" section for surface water sampling methods and results of 18S rRNA sequencing, and nutrient analyses.

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Related Publications

Ollison, G. A., Hu, S. K., Hopper, J. V., Stewart, B. P., Smith, J., Beatty, J. L., Rink, L. K., & Caron, D. A. (2022). Daily dynamics of contrasting spring algal blooms in Santa Monica Bay (central Southern California Bight). Environmental Microbiology. Portico. https://doi.org/10.1111/1462-2920.16137
Results

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Related Datasets

IsRelatedTo

Caron, D., Ollison, G. A., Hu, S. K. (2022) **Nutrients (phosphate and nitrite+nitrate) from daily sampling at the Santa Monica Pier (SMP), Santa Monica Bay, CA from 2018 to 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-11-17 http://lod.bco-dmo.org/id/dataset/883916 [view at BCO-DMO]
Relationship Description: Data collected as part of targeted sampling of blooms in the Santa Monica Bay during spring 2018 and 2019.

Caron, D., Ollison, G. A., Hu, S. K. (2022) **Sampling information and sequence accessions for 18S-V4 sequences from surface water collected at the Santa Monica Pier (SMP) Santa Monica Bay, CA from 2018 to 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-11-17 http://lod.bco-dmo.org/id/dataset/883924 [view at BCO-DMO]
Relationship Description: Data collected as part of targeted sampling of blooms in the Santa Monica Bay during spring 2018 and 2019.

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Parameters

Parameter	Description	Units
date	sampling date	unitless
time	sampling time	unitless
lat	latitude	decimal degrees
lon	longitude	decimal degrees
conductivity	conductivity values	microSiemens per centimeter (mS/cm)
temperature	temperature values	degrees Celsius (deg C)
pressure	pressure values	decibars (dbar)
dissolvedosaturation	dissolved oxygen concentration	milligrams per liter (mg/L)
chlorophylla	chlorphyll a concentration	micrograms per liter (ug/L)
salinity	salinity value	Practical Salinity Units (PSU)

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Instruments

Dataset-specific Instrument Name	RBR Concerto
Generic Instrument Name	CTD - fixed
Dataset-specific Description	RBR Concerto (https://rbr-global.com): Instrument used in this study to record continuous measures of conductivity, salinity, chlorophyll fluorescence, and temperature.
Generic Instrument Description	A reusable instrument that always simultaneously measures conductivity and temperature (for salinity) and pressure (for depth). This term applies to CTDs that are fixed and do not measure by profiling through the water column. For profiling CTDs, see https://www.bco-dmo.org/instrument/417.

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Project Information

Protistan, prokaryotic, and viral processes at the San Pedro Ocean Time-series (SPOT)

Coverage: San Pedro Channel off the coast of Los Angeles

Planktonic marine microbial communities consist of a diverse collection of bacteria, archaea, viruses, protists (phytoplankton and protozoa) and small animals (metazoan). Collectively, these species are responsible for virtually all marine pelagic primary production where they form the basis of food webs and carry out a large fraction of respiratory processes. Microbial interactions include the traditional role of predation, but recent research recognizes the importance of parasitism, symbiosis and viral infection. Characterizing the response of pelagic microbial communities and processes to environmental influences is fundamental to understanding and modeling carbon flow and energy utilization in the ocean, but very few studies have attempted to study all of these assemblages in the same study. This project is comprised of long-term (monthly) and short-term (daily) sampling at the San Pedro Ocean Time-series (SPOT) site. Analysis of the resulting datasets investigates co-occurrence patterns of microbial taxa (e.g. protist-virus and protist-prokaryote interactions, both positive and negative) indicating which species consistently co-occur and potentially interact, followed by examination gene expression to help define the underlying mechanisms. This study augments 20 years of baseline studies of microbial abundance, diversity, rates at the site, and will enable detection of low-frequency changes in composition and potential ecological interactions among microbes, and their responses to changing environmental forcing factors. These responses have important consequences for higher trophic levels and ocean-atmosphere feedbacks. The broader impacts of this project include training graduate and undergraduate students, providing local high school student with summer lab experiences, and PI presentations at local K-12 schools, museums, aquaria and informal learning centers in the region. Additionally, the PIs advise at the local, county and state level regarding coastal marine water quality.

This research project is unique in that it is a holistic study (including all microbes from viruses to small metazoa) of microbial species diversity and ecological activities, carried out at the SPOT site off the coast of southern California. In studying all microbes simultaneously, this work aims to identify important ecological interactions among microbial species, and identify the basis(es) for those interactions. This research involves (1) extensive analyses of prokaryote (archaean and bacterial) and eukaryote (protistan and micro-metazoan) diversity via the sequencing of marker genes, (2) studies of whole-community gene expression by eukaryotes and prokaryotes in order to identify key functional characteristics of microorganismal groups and the detection of active viral infections, and (3) metagenomic analysis of viruses and bacteria to aid interpretation of transcriptomic analyses using genome-encoded information. The project includes exploratory metatranscriptomic analysis of poorly-understood aphotic and hypoxic-zone protists, to examine their stratification, functions and hypothesized prokaryotic symbioses.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1737409

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