Date, time, location, and depth range for MOCNESS tows from the R/V Seward Johnson, R/V Knorr in the Eastern Tropical North Pacific from 2007-10-25 to 2009-01-01

Website: https://www.bco-dmo.org/dataset/786098
Data Type: Cruise Results
Version: 1
Version Date: 2020-01-30

Project
» Collaborative Research: Zooplankton in the Redoxcline of the Cariaco Basin: Impact on Biogeochemical Cycling (ETP)

Program
» Ocean Carbon and Biogeochemistry (OCB)

Contributors	Affiliation	Role
Wishner, Karen	University of Rhode Island (URI-GSO)	Principal Investigator
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Abstract
Date, time, location, and depth range for MOCNESS tows

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Coverage

Spatial Extent: **N**:13.177 **E**:-90.001 **S**:8.964 **W**:-105.296
Temporal Extent: 2007-10-25 - 2009-01-01

Dataset Description

Vertically-stratified day and night MOCNESS tows usually from 1200 or 1000 m to the surface. Some tows covered smaller depth intervals in finer detail. See Wishner et al. 2013, 2018, and 2019 (online preprint in review) for more details.

Methods & Sampling

See Wishner et al. 2013, 2018, and 2019 (online preprint in review) for details and results. Sampling for

zooplankton occurred on the upcast portion of the tow. Samples were preserved in borate-buffered formaldehyde at sea. Zooplankton, especially copepods, were sorted and identified microscopically later in the lab.

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
- extracted cruise_id from file names
- combined Date_UTC and Time_In_UTC to create ISO_DateTime_UTC
- replaced comma with semicolon in Comments field

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Data Files

File
moc_event_log.csv (Comma Separated Values (.csv), 4.61 KB) MD5:9a90c4913e477644f8fea8b7ae641797 Primary data file for dataset ID 786098

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Related Publications

Maas, A. E., Frazar, S. L., Outram, D. M., Seibel, B. A., & Wishner, K. F. (2014). Fine-scale vertical distribution of macroplankton and micronekton in the Eastern Tropical North Pacific in association with an oxygen minimum zone. Journal of Plankton Research, 36(6), 1557–1575. doi:10.1093/plankt/fbu077
Results

Williams, R. L., Wakeham, S., McKinney, R., & Wishner, K. F. (2014). Trophic ecology and vertical patterns of carbon and nitrogen stable isotopes in zooplankton from oxygen minimum zone regions. Deep Sea Research Part I: Oceanographic Research Papers, 90, 36–47. doi:10.1016/j.dsr.2014.04.008
Results

Wishner, K. F., Outram, D. M., Seibel, B. A., Daly, K. L., & Williams, R. L. (2013). Zooplankton in the eastern tropical north Pacific: Boundary effects of oxygen minimum zone expansion. Deep Sea Research Part I: Oceanographic Research Papers, 79, 122–140. doi:10.1016/j.dsr.2013.05.012
Results

Wishner, K. F., Seibel, B. A., Roman, C., Deutsch, C., Outram, D., Shaw, C. T., … Riley, S. (2018). Ocean deoxygenation and zooplankton: Very small oxygen differences matter. Science Advances, 4(12), eaau5180. doi:10.1126/sciadv.aau5180
Results

Wishner, K. F., Seibel, B., & Outram, D. (2019). Ocean Deoxygenation and Copepods: Coping with Oxygen Minimum Zone Variability. doi:10.5194/bg-2019-394
Results

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Related Datasets

IsRelatedTo

Wishner, K., Outram, D., Seibel, B., Roman, C. (2021) **Abundances of copepod species in each net from MOCNESS tows in the Eastern Tropical North Pacific collected on four research cruises from 2007-2017.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-07-09 doi:10.26008/1912/bco-dmo.855395.1 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
cruise_id	identifier for the cruise as extracted from the file name	unitless
MOC	MOCNESS Number	unitless
Station	Station number	unitless
Tow_Type	type of tow	unitless
ISO_DateTime_UTC	Date and time following the ISO8601 format	unitless
Date_Local	local date in mmddyyyy format	unitless
Date_UTC	UTC date in mmddyyyy format	unitless
Time_In_UTC	UTC time in following format HHMM	unitless
Time_Out_UTC	UTC time out following format HHMM	unitless
Time_In_Local	Local time in following format HHMM. Cruise SJ07 was UTC-500. Cruise KN0819502 was UTC-600.	unitless
Time_Out_Local	local time out following format HHMM. Cruise SJ07 was UTC-500. Cruise KN0819502 was UTC-600.	unitless
Lat_In	latitude in decimal degrees with negative values indicating South	decimal degrees
Lon_In	longitude in decimal degrees with negative values indicating West	decimal degrees
Lat_Out	latitude in decimal degrees with negative values indicating South	decimal degrees
Lon_Out	longitude in decimal degrees with negative values indicating West	decimal degrees

Day_Night	Designator if cast was during the day or night	unitless
Min_Depth	minimum depth	meters (m)
Max_Depth	maximum depth	meters (m)
Comments	additional comments	unitless

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Instruments

Dataset-specific Instrument Name	MOCNESS
Generic Instrument Name	MOCNESS
Dataset-specific Description	1 m2 MOCNESS
Generic Instrument Description	The Multiple Opening/Closing Net and Environmental Sensing System or MOCNESS is a family of net systems based on the Tucker Trawl principle. There are currently 8 different sizes of MOCNESS in existence which are designed for capture of different size ranges of zooplankton and micro-nekton Each system is designated according to the size of the net mouth opening and in two cases, the number of nets it carries. The original MOCNESS (Wiebe et al, 1976) was a redesigned and improved version of a system described by Frost and McCrone (1974). (from MOCNESS manual)

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Deployments

SJ07

Website	https://www.bco-dmo.org/deployment/651160
Platform	R/V Seward Johnson
Start Date	2007-10-18
End Date	2007-11-17
Description	Cruise from Panama City to Panama City Figure 1. Station locations in the eastern tropical north Pacific overlaid on a MODIS (Moderate-resolution Imaging Spectroradiometer) image of ocean color during October 2007. Image courtesy of Inia Soto (USF). SJ07 Cruise Summary (ROSCOP)

KN195-02

Website	https://www.bco-dmo.org/deployment/651161
Platform	R/V Knorr
Start Date	2008-12-08
End Date	2009-01-06
Description	Figure 1. Station locations in the eastern tropical north Pacific overlaid on a MODIS (Moderate-resolution Imaging Spectroradiometer) image of ocean color during December 2008. Image courtesy of Inia Soto (USF). KN195-02 Cruise Summary (ROSCOP) See additional information from R2R: https://www.rvdata.us/search/cruise/KN195-02

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Project Information

Collaborative Research: Zooplankton in the Redoxcline of the Cariaco Basin: Impact on Biogeochemical Cycling (ETP)

Coverage: Eastern tropical Pacific

This project aims to characterize the spatial and interannual variability of physical, chemical, and biological properties between low productivity and high productivity regions of the eastern tropical Pacific. In particular, we will investigate the physiology of bacteria, phytoplankton, and zooplankton and food web interactions in relation to the oxygen minimum zone. Our results also will provide information on how marine carbon and nitrogen cycles are modified in suboxic regions of the ocean. Measurements include: ADCP, temperature, salinity, O2, pH, total DIC, fCO2, nutrients, CDOM, POC/N, methane oxidation rates, denitrification rates, chlorophyll, phytoplankton C&N uptake rates, bacteria abundance/growth rates/molecular fingerprinting, lipid biomarkers, microzooplankton grazing rates, mesozooplankton abundance, distribution, and physiology, and particle flux rates.

NSF abstract:

The CARIACO (CArbon Retention In A Colored Ocean) Program is a time-series programs, with the central goal to better understand seasonal to decadal time-scales of processes governing ocean biogeochemistry. The CARIACO site is situated in the tropics on a productive continental margin off Venezuela, the basin is anoxic, and the site is strongly connected to paleoclimate investigations. Thus, CARIACO has the additional goal of relating modern oceanographic processes with the production, transformation, and preservation of particulate matter in the sediment record.

Zooplankton composition, behavior, and physiological rates are important components of the biological pump. Recent findings from the Cariaco Basin and other regions with pelagic redoxclines (suboxic and anoxic interfaces) suggest that they are active regions of biogeochemical cycling, in which C may be directly transferred from bacterial production to zooplankton grazers.

The goals of this project are to determine the vertical and horizontal distributions of zooplankton in relation to the redoxcline during two seasons using discrete-depth net samples and a vertical-profiling laser-line scan camera system. Anaerobic and aerobic respiration and metabolites, excretion, and egestion rates will be experimentally determined for vertical migrators and resident species nearsurface and at suboxic and anoxic depths to determine whether zooplankton differ in their release of metabolic and egested products, due to differences in their metabolism and/or composition of food resources. Grazing experiments, in combination with lipid biomarkers and stable isotopic compositions, will be used to assess in situ diet and long-term feeding history of zooplankton. Fecal pellet composition will be compared with pellets in sediment traps. Time-series zooplankton samples also will be analyzed to obtain temporal information on zooplankton community dynamics and allow a seasonal estimate of the zooplankton contribution to elemental fluxes.

Intellectual Merit. One of the grand challenges of oceanography is to understand the processes that control the transformation and fate of organic carbon in marine systems. Meeting this challenge is hindered by a lack of basic information about factors that govern the response of biological activity to environmental forcing and climate change. In particular, the role of the marine biosphere in the global carbon cycle remains poorly

constrained, in part due to uncertainties about biological controls on the quality and quantity of carbon export. This project will contribute to our knowledge of the role of mesozooplankton in biogeochemical cycles, especially in relation to how processes may be modified in regions with anoxic or suboxic layers and strong redox gradients, and will help to correctly understand the links between water column processes and climate history as recorded in the varved sediments of the Cariaco Basin.

Broader Impacts. The zooplankton time-series will provide information on patterns of marine biodiversity and ecological interactions from a poorly known region. The CARIACO Program has an ongoing impact in technology transfer and human resource development in Venezuela. This project will help train personnel in Venezuela and will support several graduate students. The lead investigators and students will develop materials on the project for dissemination through the NSF-Center for Ocean Science Education Excellence (COSEE) located at USF.

Note [2019-12-17]: BCO-DMO Project page updated to reflect information at nfs.gov for this collaborative award.
* Project tile changed from "Eastern Tropical Pacific" to the NSF award title "Collaborative Research: Zooplankton in the Redoxcline of the Cariaco Basin: Impact on Biogeochemical Cycling."
* The other award number in this collaborative award added to the page OCE-0526502
* Person roles on the page updated to reflect the NSF award roles (PI or Co-PI) all others on the page changed to "Scientist" from "Co-PI" if not listed as a Co-PI on the NSF award.

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Program Information

Ocean Carbon and Biogeochemistry (OCB)

Website: http://us-ocb.org/

Coverage: Global

The Ocean Carbon and Biogeochemistry (OCB) program focuses on the ocean's role as a component of the global Earth system, bringing together research in geochemistry, ocean physics, and ecology that inform on and advance our understanding of ocean biogeochemistry. The overall program goals are to promote, plan, and coordinate collaborative, multidisciplinary research opportunities within the U.S. research community and with international partners. Important OCB-related activities currently include: the Ocean Carbon and Climate Change (OCCC) and the North American Carbon Program (NACP); U.S. contributions to IMBER, SOLAS, CARBOOCEAN; and numerous U.S. single-investigator and medium-size research projects funded by U.S. federal agencies including NASA, NOAA, and NSF.

The scientific mission of OCB is to study the evolving role of the ocean in the global carbon cycle, in the face of environmental variability and change through studies of marine biogeochemical cycles and associated ecosystems.

The overarching OCB science themes include improved understanding and prediction of: 1) oceanic uptake and release of atmospheric CO2 and other greenhouse gases and 2) environmental sensitivities of biogeochemical cycles, marine ecosystems, and interactions between the two.

The OCB Research Priorities (updated January 2012) include: ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on biogeochemical cycles; ocean carbon uptake and storage; and expanding low-oxygen conditions in the coastal and open oceans.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0526502

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