

Chlorophyll a data from R/V Seward Johnson and R/V Knorr cruises collected in the Tropical Eastern Pacific from 2007-2009 (ETP project)

Website: <https://www.bco-dmo.org/dataset/652973>

Data Type: Cruise Results

Version: final

Version Date: 2016-09-06

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
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Coverage

Spatial Extent: N:13.01877 E:-89.99778 S:8.99468 W:-105.01878

Temporal Extent: 2007-10-24 - 2008-12-31

Dataset Description

Chlorophyll-a data from CTD casts.

Related Data for the Tropical Eastern Pacific Project:

[Event Log data for CTDs](#)

[CTD data](#)

Methods & Sampling

A CTD-rosette was deployed between the surface (2 m) and a pre-determined depth. The CTD was lowered at a rate of 30 m/min for the first 100 m and thereafter at 60 m/min. On the downcast, the depths of the fluorescence maxima, top of the thermocline, base of the thermocline, and other features of interest were noted on the CTD log sheet. Niskin bottles were fired at these depths and other pre-determined depths on the upcast to collect samples for chlorophyll analysis. Chlorophyll samples were collected in 2 L amber bottles using tygon tubing without mesh for depths between surface and 2,700 m. Gloves were worn for sample

collection and bottles and caps were rinsed three times before sample collection. The sample bottles were immediately processed after collection. The collection bottle was gently swirled and 200 to 2,148 mL were filtered under low vacuum onto a 25 mm GF/F filter. Filters were immediately placed in 13 mm borosilicate test tubes containing 7 mL 90% v/v HPLC grade acetone and extracted in the dark for 24 h at -20 degrees C. After extraction, fluorescence was measured with a Turner Designs 10 AU fluorometer before and after acidification. The fluorometer was calibrated at sea using Chlorophyll a standards (Turner Designs). Chlorophyll a was determined using the methods of Parsons et al. (1984).

Reference: Parsons, T.R., Maïta, Y., Lalli, C.M., 1984. A Manual of Chemical and Biological Methods for Seawater Analysis. Pergamon Press, New York, pp. 107-110.

Data Processing Description

BCO-DMO Processing Notes:

- Some lat/lon values were corrected due to formatting errors.

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Data Files

File
etp_chl.csv (Comma Separated Values (.csv), 39.29 KB) MD5:3166e52f5841e26769c6a726bb68fee0 Primary data file for dataset ID 652973

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Parameters

Parameter	Description	Units
year	Year of cast in format yyyy	unitless
cruise_id	Cruise identifier	unitless
event	Event number	unitless
cast	Cast number	unitless
station	Station number	unitless
lat	latitude	decimal degrees
lon	longitude; west is negative	decimal degrees
depth	depth of sample	meters
chl_a	Chlorophyll a	micrograms per liter
phaeo	Phaeopigments	micrograms per liter
date_utc	cast date (UTC) in format mm/dd/yyyy	nd
time_utc	cast time (UTC) in format HHMM	unitless
date_local	cast date (PDT) in format mm/dd/yyyy	nd
time_local	cast time (PDT) in format HHMM	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	CTD Sea-Bird 9
Generic Instrument Description	The Sea-Bird SBE 9 is a type of CTD instrument package. The SBE 9 is the Underwater Unit and is most often combined with the SBE 11 Deck Unit (for real-time readout using conductive wire) when deployed from a research vessel. The combination of the SBE 9 and SBE 11 is called a SBE 911. The SBE 9 uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 and SBE 4). The SBE 9 CTD can be configured with auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorometer, altimeter, etc.). Note that in most cases, it is more accurate to specify SBE 911 than SBE 9 since it is likely a SBE 11 deck unit was used. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Seabird 9+ digital quartz pressure sensor
Generic Instrument Name	Pressure Sensor
Generic Instrument Description	A pressure sensor is a device used to measure absolute, differential, or gauge pressures. It is used only when detailed instrument documentation is not available.

Dataset-specific Instrument Name	Turner Designs 10 AU fluorometer
Generic Instrument Name	Turner Designs Fluorometer 10-AU
Generic Instrument Description	The Turner Designs 10-AU Field Fluorometer is used to measure Chlorophyll fluorescence. The 10AU Fluorometer can be set up for continuous-flow monitoring or discrete sample analyses. A variety of compounds can be measured using application-specific optical filters available from the manufacturer. (read more from Turner Designs, turnerdesigns.com, Sunnyvale, CA, USA)

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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-0526545

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