

Particulate biogenic silica fluxes from sediment trap arrays deployed on R/V Melville cruise MV1008 in the Costa Rica Dome in 2010 (CRD FLUZIE project)

Website: <https://www.bco-dmo.org/dataset/557025>

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Project

» [Costa Rica Dome FLUX and Zinc Experiments](#) (CRD FLUZIE)

Programs

» [Integrated Marine Biogeochemistry and Ecosystem Research -US](#) (IMBER-US)

» [Ocean Carbon and Biogeochemistry](#) (OCB)

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Table of Contents

- [Dataset Description](#)
 - [Methods & Sampling](#)
 - [Data Processing Description](#)
- [Data Files](#)
- [Parameters](#)
- [Instruments](#)
- [Deployments](#)
- [Project Information](#)
- [Program Information](#)
- [Funding](#)

Dataset Description

Particulate biogenic silica fluxes from sediment trap arrays deployed in the Costa Rica Dome region of the Eastern Tropical Pacific Ocean during the MV1008 cruise in June and July 2010.

Methods & Sampling

Particle export was measured using a free-drifting sediment trap array. Prior to deployment, acrylic collector tubes fitted with entrance baffles comprised of 14 smaller tubes with tapered edges were filled with a saltwater brine (0.1-um filtered surface seawater, amended with 50 g L⁻¹ NaCl and 1% final concentration formalin). Tubes were deployed at two depths (90 or 100 m, and at 150 m) for ~four days of collection. After recovery, samples were filtered through a 200-um filter, and swimming zooplankton were sorted microscopically and removed from the >200-um fraction, which was then recombined with the <200-um fraction. Three different tubes thus cleared of swimmers were subsampled using a rotary splitter for measurement of biogenic silica concentration. These subsamples were filtered through 0.6-um polycarbonate membranes, placed in cryovials, and dried in an oven for ~24 h. On shore, quantification of biogenic silica concentration was done using a NaOH digestion procedure in Teflon tubes, which provides low and stable blanks. The calculation of biogenic silica export was done after correcting for the fraction of the tube subsampled and divided by the trap area and deployment time.

Data Processing Description

BCO-DMO Processing:

- Modified parameter names to conform with BCO-DMO naming conventions.
- Modified format of date-time fields.

[[table of contents](#) | [back to top](#)]

Data Files

File
biogenic_silica_sed_traps.csv (Comma Separated Values (.csv), 1.15 KB) MD5:76c3f0cd03307bb61ef741e30c6dff9f
Primary data file for dataset ID 557025

[[table of contents](#) | [back to top](#)]

Parameters

Parameter	Description	Units
cycle	Refers to the 4-day Lagrangian experiment during which the sample was taken.	integer
event_deploy	Number referring to the particular activity (event) on the FluZIE cruise.	integer
event_recover	Number referring to the particular activity (event) on the FluZIE cruise.	integer
lat_deploy	Latitude (in degrees North) of the sediment trap deployment.	decimal degrees
lon_deploy	Longitude (in degrees East) of the sediment trap deployment.	decimal degrees
lat_recover	Latitude (in degrees North) of the sediment trap recovery.	decimal degrees
lon_recover	Longitude (in degrees East) of the sediment trap recovery.	decimal degrees
ISO_DateTime_Local_deploy	Date and time (local time zone) of the sediment trap deployment; formatted according to the ISO 8601 standards.	YYYY-mm-ddTHH:MM:SS.xx
ISO_DateTime_Local_recover	Date and time (local time zone) of the sediment trap recovery; formatted according to the ISO 8601 standards.	YYYY-mm-ddTHH:MM:SS.xx
depth	Depth (in meters) that the sample was taken from.	meters
biogenic_silica_export	Biogenic silica export.	millimoles Si per meter squared per day (mmol Si m ⁻² d ⁻¹)
biogenic_silica_export_stdev	Standard deviation of biogenic silica export.	millimoles Si per meter squared per day (mmol Si m ⁻² d ⁻¹)

[[table of contents](#) | [back to top](#)]

Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Sediment Trap - Floating
Generic Instrument Description	Floating sediment traps are specially designed sampling devices deployed to float in the water column (as opposed to being secured to a mooring at a fixed depth) for periods of time to collect particles from the water column that are falling toward the sea floor. In general a sediment trap has a container at the bottom to collect the sample and a broad funnel-shaped opening at the top with baffles to keep out very large objects and help prevent the funnel from clogging. The 'Sediment Trap -Floating' designation is used for a floating type of sediment trap about which no other design details are known.

[[table of contents](#) | [back to top](#)]

Deployments

MV1008

Website	https://www.bco-dmo.org/deployment/58834
Platform	R/V Melville
Report	http://dmoserv3.who.edu/data_docs/CRD_FLUZiE/CRUISE_REPORT_Melville1008.pdf
Start Date	2010-06-22
End Date	2010-07-25
Description	Research on the cruise was aimed at acquiring a better understanding of plankton dynamics, carbon and nutrient fluxes, and potential trace element limitation in the Costa Rica Dome region of the eastern tropical Pacific. The specific science objectives were: 1) to assess grazing and trace metal/nutrient controls on primary production and phytoplankton standing stocks; 2) to quantify carbon and elemental fluxes and export rates from the euphotic zone; and 3) to measure microbial population, processes, stable isotope abundances associated with the OMZ and nitrite maxima. Operations included: 4-day sediment trap deployments, daily process experiments conducted on satellite-tracked drifters, CTD and trace-metal rosette sampling, shipboard grow-out experiments, net sampling for zooplankton biomass and grazing assessments, and MOCNESS stratified tows to 1000 m. BCO-DMO Note: March 2013 (CLC): The original CTD profile data (85 casts) have been submitted by R2R to NODC. Jim Moffett (USC) was a participant on this cruise and is interested in getting a copy of the full set of CTD cast data (deep and shallow casts). He plans to contact SIO ODF group or Mike Landry (Chief Scientist). Original cruise data are available from the NSF R2R data catalog.

[[table of contents](#) | [back to top](#)]

Project Information

Costa Rica Dome FLUX and Zinc Experiments (CRD FLUZiE)

Coverage: Costa Rica Dome, Eastern Tropical Pacific Ocean

Research was aimed at improved understanding of plankton dynamics, carbon and nutrient fluxes, and potential trace element limitation in the Costa Rica Dome region of the eastern tropical Pacific. The specific

science objectives of the 2010 R/V Melville cruise (MV1008) were:

- 1) to assess grazing and trace metal/nutrient controls on primary production and phytoplankton standing stocks;
- 2) to quantify carbon and elemental fluxes and export rates from the euphotic zone; and
- 3) to measure microbial population, processes, stable isotope abundances associated with the OMZ and nitrite maxima.

Additional information about MV1008 can be found in the [cruise report](#) (PDF).

NOTE: The original proposal and award abstract are not relevant. The project was originally funded by NSF as experimental tests of phytoplankton controls in the Arabian Sea. Piracy concerns in the region led to the cancellation of the research cruise in 2009, and a Change of Scope request was approved to focus the project on related issues in the Costa Rica Dome (CRD).

Though this project is not formally affiliated with any large program, it aligns with IMBER's emphasis on community ecology and biogeochemistry, and the OCB focus on carbon-based measurements of production, grazing and export processes.

[[table of contents](#) | [back to top](#)]

Program Information

Integrated Marine Biogeochemistry and Ecosystem Research -US (IMBER-US)

Website: <http://www.imber.info/>

Coverage: global

The BCO-DMO database includes data from IMBER endorsed projects lead by US funded investigators. There is no dedicated US IMBER project or data management office. Those functions are provided by US-OCB and BCO-DMO respectively.

The information in this program description pertains to the Internationally coordinated IMBER research program. The projects contributing data to the BCO-DMO database are those funded by US NSF only. The full IMBER data catalog is hosted at the Global Change Master Directory (GCMD).

IMBER Data Portal: The IMBER project has chosen to create a metadata portal hosted by the NASA's Global Change Master Directory (GCMD). The GCMD IMBER data catalog provides an overview of all IMBER endorsed and related projects and links to datasets, and can be found at URL <http://gcmd.nasa.gov/portals/imber/>.

IMBER research will seek to identify the mechanisms by which marine life influences marine biogeochemical cycles, and how these, in turn, influence marine ecosystems. Central to the IMBER goal is the development of a predictive understanding of how marine biogeochemical cycles and ecosystems respond to complex forcings, such as large-scale climatic variations, changing physical dynamics, carbon cycle chemistry and nutrient fluxes, and the impacts of marine harvesting. Changes in marine biogeochemical cycles and ecosystems due to global change will also have consequences for the broader Earth System. An even greater challenge will be drawing together the natural and social science communities to study some of the key impacts and feedbacks between the marine and human systems.

To address the IMBER goal, four scientific themes, each including several issues, have been identified for the IMBER project: Theme 1 - Interactions between Biogeochemical Cycles and Marine Food Webs; Theme 2 - Sensitivity to Global Change: How will key marine biogeochemical cycles, ecosystems and their interactions, respond to global change?; Theme 3 - Feedback to the Earth System: What are the roles of the ocean biogeochemistry and ecosystems in regulating climate?; and Theme 4 - Responses of Society: What are the relationships between marine biogeochemical cycles, ecosystems, and the human system?

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.

[[table of contents](#) | [back to top](#)]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0826626

[[table of contents](#) | [back to top](#)]