

All cruise CTD profiles, at 1 decibar intervals, from R/V Melville cruise MV1008 in the Costa Rica Dome in 2010 (CRD FLUZiE project)

Website: <https://www.bco-dmo.org/dataset/516029>

Data Type: Cruise Results

Version: 1

Version Date: 2014-05-28

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)

| Contributors | Affiliation | Role |
|------------------------------------|---|------------------------|
| Landry, Michael R. | University of California-San Diego (UCSD-SIO) | Principal Investigator |
| Rauch, Shannon | Woods Hole Oceanographic Institution (WHOI BCO-DMO) | BCO-DMO Data Manager |

Abstract

CTD profiles from the MV1008 cruise in the Costa Rica Dome region of the Eastern Tropical Pacific Ocean.

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Coverage

Spatial Extent: N:10.4158 E:-86.7203 S:6.6225 W:-92.9965

Temporal Extent: 2010-06-23 - 2010-07-24

Dataset Description

CTD profiles from the MV1008 cruise in the Costa Rica Dome region of the Eastern Tropical Pacific Ocean.

Acquisition Description

These data are from ship processed CTD data, R/V Melville, July 2010. Sampling instruments consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT), dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (Wetlabs), fluorometer (Wetlabs CDOM), and PAR sensor (Biospherical).

Processing Description

Data were extracted at 1 decibar intervals.

BCO-DMO processing notes:

- Original data were joined to the MV1008 event log to obtain ISO_DateTime_UTC for each event.
- Lat and lon were formatted to display 4 decimal places.
- Missing values were replaced with 'nd' to indicate 'no data'.

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Parameters

| Parameter | Description | Units |
|------------------------|---|-----------------------------------|
| event | Event number. | integer |
| cast | CTD cast number. | integer |
| lat | Latitude in degrees North. | decimal degrees |
| lon | Longitude in degrees East. | decimal degrees |
| event_ISO_DateTime_UTC | Date and time of the event (UTC) formatted to ISO 8601 standard; added by BCO-DMO from the MV1008 event log. format: YYYY-mm-ddTHH:MM:SS.xx | unitless |
| press | Pressure. | decibars |
| temp | Water temperature measured by CTD. | degrees Celsius (C) |
| sal | Salinity measured by CTD. | practical salinity units (PSU) |
| O2 | Dissolved oxygen measure by CTD. | micromoles per kilogram (umol/kg) |
| trans_v | Transmissometer (light transmission). | volts |
| fluor_v | Fluorometer voltage measurement. | volts |
| time_elapsed | Time elapsed during the CTD cast. | seconds |
| PAR | Photosynthetically Available Radiaton (PAR). | microEinsteins (uE) |

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Instruments

| | |
|---|--|
| Dataset-specific Instrument Name | SBE3plus |
| Generic Instrument Name | Sea-Bird SBE-3 Temperature Sensor |
| Dataset-specific Description | The SBE9plus CTD contained dual SBE3plus temperature sensors. |
| Generic Instrument Description | The SBE-3 is a slow response, frequency output temperature sensor manufactured by Sea-Bird Electronics, Inc. (Bellevue, Washington, USA). It has an initial accuracy of +/- 0.001 degrees Celsius with a stability of +/- 0.002 degrees Celsius per year and measures seawater temperature in the range of -5.0 to +35 degrees Celsius. more information from Sea-Bird Electronics |

| | |
|---|---|
| Dataset-specific Instrument Name | SBE4C |
| Generic Instrument Name | Sea-Bird SBE-4 Conductivity Sensor |
| Dataset-specific Description | The SBE9plus CTD contained dual SBE4C conductivity sensors. |
| Generic Instrument Description | The Sea-Bird SBE-4 conductivity sensor is a modular, self-contained instrument that measures conductivity from 0 to 7 Siemens/meter. The sensors (Version 2; S/N 2000 and higher) have electrically isolated power circuits and optically coupled outputs to eliminate any possibility of noise and corrosion caused by ground loops. The sensing element is a cylindrical, flow-through, borosilicate glass cell with three internal platinum electrodes. Because the outer electrodes are connected together, electric fields are confined inside the cell, making the measured resistance (and instrument calibration) independent of calibration bath size or proximity to protective cages or other objects. |

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|---|---|
| Dataset-specific Instrument Name | PAR Sensor |
| Generic Instrument Name | LI-COR Biospherical PAR Sensor |
| Dataset-specific Description | The SBE9plus CTD contained a Biospherical PAR sensor. |
| Generic Instrument Description | The LI-COR Biospherical PAR Sensor is used to measure Photosynthetically Available Radiation (PAR) in the water column. This instrument designation is used when specific make and model are not known. |

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| Dataset-specific Instrument Name | CTD SBE 9 |
| Generic Instrument Name | CTD Sea-Bird 9 |
| Dataset-specific Description | Sampling instruments consisted of a Sea-Bird Electronics SBE9plus CTD with dual pumps (SBE5), dual temperature (SBE3plus), reference temperature (SBE35RT), dual conductivity (SBE4C), dissolved oxygen (SBE43), transmissometer (Wetlabs), fluorometer (Wetlabs CDOM), and PAR sensor (Biospherical). |
| 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 | WetLabs Transmissometer |
| Generic Instrument Name | Transmissometer |
| Dataset-specific Description | The SBE9plus CTD contained a WetLabs transmissometer. |
| Generic Instrument Description | A transmissometer measures the beam attenuation coefficient of the lightsource over the instrument's path-length. This instrument designation is used when specific manufacturer, make and model are not known. |

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|---|--|
| Dataset-specific Instrument Name | SBE43 |
| Generic Instrument Name | Sea-Bird SBE 43 Dissolved Oxygen Sensor |
| Dataset-specific Description | The SBE9plus CTD contained an SBE43 dissolved oxygen sensor. |
| Generic Instrument Description | The Sea-Bird SBE 43 dissolved oxygen sensor is a redesign of the Clark polarographic membrane type of dissolved oxygen sensors. more information from Sea-Bird Electronics |

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| Dataset-specific Instrument Name | Wetlabs CDOM |
| Generic Instrument Name | CTD-fluorometer |
| Dataset-specific Description | The SBE9plus CTD contained a WetLabs fluorometer. |
| Generic Instrument Description | A CTD-fluorometer is an instrument package designed to measure hydrographic information (pressure, temperature and conductivity) and chlorophyll fluorescence. |

Deployments

MV1008

| | |
|--------------------|---|
| Website | https://www.bco-dmo.org/deployment/58834 |
| Platform | R/V Melville |
| Report | http://dmoserv3.whoi.edu/data_docs/CRD_FLUZiE/CRUISE_REPORT_Melville1008.pdf |
| Start Date | 2010-06-22 |
| End Date | 2010-07-25 |
| Description | <p>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.</p> |

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.

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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.

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Funding

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

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