

# Scientific sampling event logs from two cruises/trips at the Richard B Gump Research Station at Moorea LTER in 2010 and 2011 (MCR LTER and Coral DOM projects)

**Website:** <https://www.bco-dmo.org/dataset/3684>

**Data Type:** Cruise Results

**Version:** 2

**Version Date:** 2014-01-02

## Project

- » [Moorea Coral Reef Long-Term Ecological Research site](#) (MCR LTER)
- » [The coupling between DOM, algae, and microbes on coral reef platforms](#) (Coral DOM)

## Programs

- » [Long Term Ecological Research network](#) (LTER)
- » [Emerging Topics in Biogeochemical Cycles](#) (ETBC)

Contributors	Affiliation	Role
<a href="#">Carlson, Craig</a>	University of California-Santa Barbara (UCSB-MSI)	Chief Scientist
<a href="#">Nelson, Craig E</a>	University of Hawaii at Manoa (SOEST)	Co-Chief Scientist, Contact
<a href="#">Rauch, Shannon</a>	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

## Abstract

Scientific sampling event logs recorded during the MCR10-1 cruise/trip (the Coral DOM 2010 Research Campaign) and the MCR11-1 cruise/trip (the Coral DOM 2011 Research Campaign) at the Richard B Gump Research Station at the Moorea Coral Reef LTER site.

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## Table of Contents

- [Coverage](#)
- [Dataset Description](#)
  - [Acquisition Description](#)
  - [Processing Description](#)
- [Parameters](#)

- [Deployments](#)
  - [Project Information](#)
  - [Program Information](#)
  - [Funding](#)
- 

## Coverage

**Spatial Extent:** Lat:-17.4907 Lon:-149.826

**Temporal Extent:** 2010-09-06 - 2011-09-20

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## Dataset Description

Log of events recorded during the MCR10-1 cruise/trip (the Coral DOM 2010 Research Campaign) and the MCR11-1 cruise/trip (the Coral DOM 2011 Research Campaign) at the Moorea Coral Reef LTER site.

## Acquisition Description

In 2010, various boats, including the following, were used to sample from the research station: Gump Safe boat, boats 609, 509, and 389.

**2011 Experiments** (codes in parentheses correspond to 'project\_code' column):

Benthic Tent Incubations (TentI - TentV) - 48h Duration; Continuous: Oxygen, pH, Temp, Salinity; Daily: DOC, FCM, DNA, start-end POM.

Niskin in situ incubations (NBE) - 24h Duration; Start-End DOC, FCM, DNA, DO...

Release-Remineralization (RR) - 24h Exudation, 48h Remineralization (with and without Sand, Light and Dark): DOC, DO, FCM, DNA.

Coral Damage (Sprout Soup) - 24h Exudation, 7 day incubation (daily water change + exudate spike).

Big Pillow Experiments (BPE) - 24h Exudation, 48h incubation (metagenomic filtration at 48h, maintain for later DOC timepoints and FCM.

Flow and Flux Surveys (FF)

Porewater Sampling (PW)

SandBag (SB) - Sand, Autoclaved Sand, incubated in offshore water in ~5L bags (unfiltered).

## 2011 Methodology:

FCM - 1.5ml sample, 90 uL PFA (8% or 32% stocks).

DOC - collected through 47mm combusted GF/F into acid-leached 60ml HDPE or combusted EPA.

nutrients - collected through 47mm combusted GF/F into triple-rinsed HDPE scint vials.

DNA - 500+ mL whole water collected onto Sterivex.

Oxygen (NBE T0) - After sampling DOC, FCM, additional offsh. water to fill, optode measure, close with spill.

Oxygen (NBE TF) - Before other samples, open niskin to laminar flow into BOD bottle, overfill 2X, DO meas.

POC (NBE) - 500-1000 mL collected through 25mm combusted GF/F.

POC (FF) - 4L collected through 25mm combusted GF/F.

Chlorophyll (FF) - 1L collected through 25mm combusted GF/F.

Fluorescein - 60ml initial line flush, then 10ml syringe sampled emptied 15ml falcon frozen -20.

## Processing Description

BCO-DMO made the following modifications:

- changed parameter names to conform to BCO-DMO conventions;
- replaced blanks and 'NA' with 'nd' to indicate no data;
- calculated date/time in GMT format from the local dates and times provided (local to French Polynesia (Papeete, Tahiti; UTC/GMT -10 hours; Time Zone Code TAHT));
- columns originally named 'Samples Collected' and 'Comments' were merged into a single comment field;
- 'et al.' used in si column when 3 or more people were listed.

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

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## Parameters

Parameter	Description	Units
cruiseid	Name of the research campaign/cruise/deployment.	dimensionless
year	4-digit year.	YYYY
lat_lab	Latitude of the research station; negative indicates south.	decimal degrees
lon_lab	Longitude of the research station; negative indicates west.	decimal degrees
event	Unique event ID number.	dimensionless
project_code	Code that identifies the project/experiment. (2011 data only). Codes: TentI - TentVI = Benthic Tube Incubations; RR = Release-Remineralization; SS = Coral Damage (Sprout Soup); NBE = Niskin in situ Incubations; FF = Flow and Flux Surveys; PW = Porewater Sampling; SB = SandBag; BPE = Big Pillow Experiments.	dimensionless
site_ID	Area of operation.	dimensionless
activity	Type of sampling activity or experiment.	dimensionless
sample_desig	Sample number designator. (2010 data only.)	dimensionless
date_local	Date in local time.	mm/dd/yy
time_start_local	Time at start of event; local to French Polynesia (Papeete Tahiti; UTC/GMT -10 hours; Time Zone Code TAHT).	HHMM
time_end_local	Time at end of event; local to French Polynesia (Papeete Tahiti; UTC/GMT -10 hours; Time Zone Code TAHT). (2011 data only.)	HHMM
ISO_DateTime_start.UTC	Date and time (UTC) formatted to ISO8601 standard. T indicates start of time string; Z indicates UTC.	YYYY-mm-ddTHH:MM:SS.ss
si	Initials of scientific investigator.	dimensionless
comment	Description of samples collected and other free-text comments about the event.	dimensionless

## Deployments

### MCR10-1

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58829">https://www.bco-dmo.org/deployment/58829</a>
<b>Platform</b>	Richard B Gump Research Station - Moorea LTER
<b>Start Date</b>	2010-09-05
<b>End Date</b>	2010-09-17
<b>Description</b>	Various boats, including the following, were used to sample from the research station: Gump Safe boat, boats 609, 509, and 389.

### MCR11-1

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/473348">https://www.bco-dmo.org/deployment/473348</a>
<b>Platform</b>	Richard B Gump Research Station - Moorea LTER
<b>Start Date</b>	2011-09-07
<b>End Date</b>	2011-09-14

## Project Information

### Moorea Coral Reef Long-Term Ecological Research site (MCR LTER)

**Website:** <http://mcr.lternet.edu/>

**Coverage:** Island of Moorea, French Polynesia

From <http://www.lternet.edu/sites/mcr/> and <http://mcr.lternet.edu/>: The Moorea Coral Reef LTER site encompasses the coral reef complex that surrounds the island of Moorea, French Polynesia (17° 30'S, 149° 50'W). Moorea is a small, triangular volcanic island 20 km west of Tahiti in the Society Islands of French Polynesia. An offshore barrier reef forms a system of

shallow (mean depth ~ 5-7 m), narrow (~0.8-1.5 km wide) lagoons around the 60 km perimeter of Moorea. All major coral reef types (e.g., fringing reef, lagoon patch reefs, back reef, barrier reef and fore reef) are present and accessible by small boat. The MCR LTER was established in 2004 by the US National Science Foundation (NSF) and is a partnership between the University of California Santa Barbara and California State University, Northridge. MCR researchers include marine scientists from the UC Santa Barbara, CSU Northridge, UC Davis, UC Santa Cruz, UC San Diego, CSU San Marcos, Duke University and the University of Hawaii. Field operations are conducted from the UC Berkeley Richard B. Gump South Pacific Research Station on the island of Moorea, French Polynesia. MCR LTER Data: The Moorea Coral Reef (MCR) LTER data are managed by and available directly from the MCR project data site URL shown above. The datasets listed below were collected at or near the MCR LTER sampling locations, and funded by NSF OCE as ancillary projects related to the MCR LTER core research themes. The following publications and data resulted from this project: 2012 Edmunds PJ. Effect of pCO<sub>2</sub> on the growth, respiration, and photophysiology of massive *Porites* spp. in Moorea, French Polynesia. *Marine Biology* 159: 2149-2160. doi:10.1594/PANGAEA.820375 [Porites growth\\_respiration\\_photophysDownload complete data for this publication \(Excel file\)](#)

## **The coupling between DOM, algae, and microbes on coral reef platforms (Coral DOM)**

**Coverage:** Moorea, French Polynesia

This project is part of the ETBC (Emerging Topics in Biogeochemical Cycles) program. From NSF award proposal: The proposed research will investigate the coupling between primary producers and the utilization of dissolved organic matter (DOM) by marine heterotrophic microbes on coral reefs. Previous metagenomic studies of the microbial communities associated with near-pristine and degraded coral reefs demonstrated a shift from a microbial food web similar to the open ocean (*Prochlorococcus* spp. and SAR11-like bacteria) to a community dominated by "super-heterotrophs", most closely related to known pathogens like *E. coli*, *Staphylococcus* spp., *Streptococcus* spp., *Enterobacter* spp. and *Vibrio* spp. This shift is associated with a decline in coral cover and an increase in coral disease prevalence. Our previous research has also shown that dissolved organic carbon (DOC) concentrations are lower on coral reef platforms compared to measurements of offshore waters (60-80  $\mu$ M). On degraded reefs, we have observed DOC measurements as low as 30 - 40  $\mu$ M, a value similar to concentrations observed in the deep Pacific Ocean. The observation of low DOC measurements on degraded reefs is decoupled from the high abundance of macroalgae, which one might expect would raise levels of DOC through the release of photosynthate into the water column. The data generated from the proposed research are key to understanding the microbial, chemical, and ecological dynamics on today's coral reefs. The proposed research

plan will consist of five inter-related objectives that will use a combination of field surveys, molecular characterization (microbes and DOM) and experimental approaches to assess the overall hypothesis. We propose to use a combination of archived samples from previous reef expeditions as well as conduct two field visits to reefs in French Polynesia (Moorea) and the Line Islands (Kiritimati) for focused sampling and experimentation. The biogeochemistry, local physical oceanography, and detailed reef ecology has been well characterized and continues to be monitored as part of the MCR-LTER program at Moorea. This environmental context will be useful in interpreting our experimental and field results at Moorea. We will also compare two field sites, Moorea and Kiritimati to ensure that our results are not specific to one region.

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

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## **Program Information**

### **Long Term Ecological Research network (LTER)**

**Website:** <http://www.lternet.edu/>

**Coverage:** United States

adapted from <http://www.lternet.edu/> The National Science Foundation established the LTER program in 1980 to support research on long-term ecological phenomena in the United States. The Long Term Ecological Research (LTER) Network is a collaborative effort involving more than 1800 scientists and students investigating ecological processes over long temporal and broad spatial scales. The LTER Network promotes synthesis and comparative research across sites and ecosystems and among other related national and international research programs. The LTER research sites represent diverse ecosystems with emphasis on different research themes, and cross-site communication, network publications, and research-planning activities are coordinated through the LTER Network Office. 2017 LTER research site map obtained from <https://lternet.edu/site/lter-network/>

### **Emerging Topics in Biogeochemical Cycles (ETBC)**

**Website:** <http://www.nsf.gov/pubs/2007/nsf07049/nsf07049.jsp>

**Coverage:** global

The original call for proposals for Emerging Topics in Biogeochemical Cycles (ETBC) was issued in September 2007 by the US NSF Directorate for Geosciences (NSF 07-049). The Geosciences Directorate (GEO) is substantially augmenting our past funding sources to explicitly support emerging areas of interdisciplinary research. We seek to foster transformational advances in our quantitative or mechanistic understanding of biogeochemical cycles that integrate physical-chemical-biological processes over the range of temporal and/or spatial scales in Earth's environments. We encourage submission of proposals that address emerging topics in biogeochemical cycles, the water cycle or their coupling, across the interfaces of atmosphere, land, and oceans. Proposals must cross the disciplinary boundaries of two or more divisions in Geosciences (e.g. ATM, EAR, OCE) or of at least one division in Geosciences and a division in another NSF directorate. Although funding programmatic disciplines continues to provide a robust and adaptable framework to build our understanding of the geosciences and the earth as a system, there are classes of emerging and challenging problems that require integration of concepts and observations across diverse fields. Our goal is to enhance such integration. Successful proposals need to develop intellectual excitement in the participating disciplinary communities. Also encouraged are proposals that have broader educational, diversity, societal, or infrastructure impacts that capitalize on this interdisciplinary opportunity.

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

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-0927411</a>

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