# CTD Profiles near Station ALOHA from R/V Kilo Moana KM1016, KM1110 in the North Pacific Subtropical Gyre near Station ALOHA from 2010-2011 (DIAZOTROPHS-CO2 project)

**Website**: https://www.bco-dmo.org/dataset/4006
**Version**: 6 August 2013
**Version Date**: 2013-08-06

**Project**
» Oceanic diazotroph community structure and activities in a high carbon dioxide world (DIAZOTROPHS-CO2)

**Program**
» Ocean Carbon and Biogeochemistry (OCB)

| Contributors | Affiliation | Role |
|---|---|---|
| Church, Matthew J. | University of Hawai'i (UH) | Principal Investigator |

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## Dataset Description

The dataset contains CTD casts taken during two deployments -- KM1016 (August 2010 ) and KM110 (March 2011 ). It includes  biogeochemical measurements used to characterize the area around Station ALOHA (22° 45’N, 158° 00’W) An assessment of dinitrogen fixation rates and nifH community structure appears as a separate dataset.

### Methods & Sampling

Sampling and analytical methods were conducted following the field and laboratory protocols used by the Hawaii Ocean Time-series. These protocols can be found at:
http://hahana.soest.hawaii.edu/hot/protocols/protocols.html

### Data Processing Description

The processing of the data was followed by the standard procedures of the HOT program:
http://hahana.soest.hawaii.edu/hot/protocols/protocols.html

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## Data Files

| File |
| --- |
| **N2fix_CO2_CTD_profiles.csv** (Comma Separated Values (.csv), 3.45 MB)<br>MD5:7221ec34949a91977f81602cdcf70e89<br>Primary data file for dataset ID 4006 |

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## Parameters

| Parameter | Description | Units |
|---|---|---|
| cruise_id | Cruise Id | text |
| sta | Station Id | integer |
| date | date sampling began | YYYYMMDD |
| time | time sampling began | hhmm |
| lon | longitude; negative denotes West | decimal degrees |
| lat | latitude; negative denotes South | decimal degrees |
| press | pressure; from CTD | decibars |
| temp | temperature; from CTD; ITS-90 | degrees Celsius |
| sal | salinity; from CTD; PSS-78 (PSU) | dimensionless |
| fluor | fluorescence | milligrams/meter^3 |
| O2 | oxygen; dissolved from SBE 43 | umol/kg |
| pig_tot | total concentration of chlorophyll pigment | micrograms/liter |
| PAR | Photosynthetically Active Radiation | volts |
| q_flag | WOCE CTD format quality word containing an integer for each parameter which corresponds to the quailty of that measurement | bytes |
| year | Year of sample | YYYY |
| month | month of sample | MM |
| day | day of sample | DD |

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## Deployments

**KM1016**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/59055 |
| **Platform** | R/V Kilo Moana |
| **Report** | http://dmoserv3.bco-dmo.org/jg/serv/BCO-DMO/DIAZOTROPHS_CO2/726342.html1%7Bdir=dmoserv3.whoi.edu/jg/dir/BCO-DMO/DIAZOTROPHS_CO2/,info=dmoserv3.bco-dmo.org/jg/info/BCO-DMO/DIAZOTROPHS_CO2/CO2_experimental%7D?cruise_id_eq_km1016 |
| **Start Date** | 2010-08-20 |
| **End Date** | 2010-08-30 |
| **Description** | Cruise information and original data are available from the NSF R2R data catalog. |

**KM1110**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/59056 |
| **Platform** | R/V Kilo Moana |
| **Report** | http://dmoserv3.bco-dmo.org/jg/serv/BCO-DMO/DIAZOTROPHS_CO2/726342.html1%7Bdir=dmoserv3.whoi.edu/jg/dir/BCO-DMO/DIAZOTROPHS_CO2/,info=dmoserv3.bco-dmo.org/jg/info/BCO-DMO/DIAZOTROPHS_CO2/CO2_experimental%7D?cruise_id_eq_km1110 |
| **Start Date** | 2011-03-12 |
| **End Date** | 2011-03-23 |

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## Project Information

**Oceanic diazotroph community structure and activities in a high carbon dioxide world (DIAZOTROPHS-CO2)**

The North Pacific Subtropical Gyre (NPSG) is the largest ocean ecosystem on Earth, playing a prominent role in global carbon cycling and forming an important reservoir of marine biodiversity. Nitrogen (N2) fixing bacteria (termed diazotrophs) provide a major source of new nitrogen to the oligotrophic waters of the NPSG, thereby exerting direct control on the carbon cycle. Oceanic uptake of CO2 causes long-term changes in the partial pressure of CO2 (pCO2) in the seawater of this ecosystem. Therefore, understanding how carbon system perturbations may influence ocean biogeochemistry is an important and timely undertaking.

In this project, the investigators will examine how natural assemblages of N2 fixing microorganisms respond to perturbations in seawater carbon chemistry. Laboratory and field-based experiments will be placed in the context of monthly time series measurements on the activities and abundances of N2 fixing microorganism abundances. Together, the project will provide insight into the dependence of N2 fixing microorganism physiology on variations in CO2. The broad objectives of the research are: (1) Quantify the responses and consequences of changes in seawater pCO2 on the growth and community structure of naturally-occurring assemblages of ocean diazotrophs; (2) Identify why and how changes in seawater pCO2 influence the growth and carbon acquisition strategies of two model marine diazotrophs (Trichodesmium and Crocosphaera); and (3) Quantify temporal variability in diazotroph community structure and activities at Station ALOHA.

This is a Collaborative Research 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-0850827 |


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