Isotopic ratios d18O and d13C from coral mini core samples collected on Kiritimati in the Northern Line Islands in April of 2016 (RAPID Kiritimati project)

Website: https://www.bco-dmo.org/dataset/660040
Data Type: Other Field Results
Version:
Version Date: 2017-03-23

Project
» RAPID: Tracking coral reef impacts of the 2014/2015 El Nino event (RAPID Kiritimati)

Contributors	Affiliation	Role
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Table of Contents

Coverage

Spatial Extent: **N**:1.974833 **E**:-157.452483 **S**:1.954383 **W**:-157.48835

Dataset Description

This dataset includes stable isotope ratios (d18O and d13C) from mini-core coral samples taken at Kiritimati in the Northern Line Islands on 01 Apr 2016.

Methods & Sampling

Mini-cores of a 1" diameter were recovered from large living coral colonies using a hydraulic drilling rig (Nemo Powertools drill). Oxygen isotopic (d18O and d13C) content of the coral skeletal aragonite were sampled every 1mm down-core.

Cores were taken from the following locations on 1 April 2016:

Kiritimati, Drill Site, 1.954383 -157.488350
Kiritimati Lagoon Site, 1.974833 -157.452483

Data Processing Description

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date
* modified parameter names to conform with BCO-DMO naming conventions
* d13C and d18O values rounded to three decimal places
* column added for sample_id and data from all samples concatenated
* added lat, lon, and date of sampling

[table of contents | back to top]

Data Files

File
MINICORE.csv (Comma Separated Values (.csv), 10.76 KB) MD5:ee69cb2caaf62df5e452391159bc6613 Primary data file for dataset ID 660040

[table of contents | back to top]

Parameters

Parameter	Description	Units
depth	Depth of sample in core	mm
d18O	Ratio of stable isotopes oxygen-18 (18O) and oxygen-16.	dimensionless
d13C	Ratio of stable isotopes 13C to 12C.	dimensionless
sample_id	Sample ID of core	unitless
lat	Latitude of sample	decimal degrees
lon	Longitude of sample	decimal degrees
date	Date (local) in format yyyy-mm-dd	unitless

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	Nemo Powertools drill
Generic Instrument Name	Drill Core
Generic Instrument Description	A core drill is a drill specifically designed to remove a cylinder of material, much like a hole saw. The material left inside the drill bit is referred to as the core. Core drills are used frequently in mineral exploration where the coring may be several hundred to several thousand feet in length. The core samples are recovered and examined by geologists for mineral percentages and stratigraphic contact points. This gives exploration companies the information necessary to begin or abandon mining operations in a particular area.

Dataset-specific Instrument Name	ThermoFisher Delta V Plus
Generic Instrument Name	Mass Spectrometer
Dataset-specific Description	ThermoFisher Delta V Plus mass spectrometer with Kiel prep device.
Generic Instrument Description	General term for instruments used to measure the mass-to-charge ratio of ions; generally used to find the composition of a sample by generating a mass spectrum representing the masses of sample components.

[table of contents | back to top]

Deployments

RAPID_Kiritimati_2014-2016

Website	https://www.bco-dmo.org/deployment/660088
Platform	Kiritimati
Start Date	2014-09-03
End Date	2016-03-31
Description	This deployment includes sampling sites on Kiritimati Island. Kiritimati Island, Drill Site, 01°57.263'N, -157°29.301'W Kiritimati Lagoon Site, 01°58.490'N, -157°27.149'W Kiritimati Island, Bay of Wrecks, 01°55.797'N, -157°20.029'W Cassidy Airport is a separate deployment.

[table of contents | back to top]

Project Information

RAPID: Tracking coral reef impacts of the 2014/2015 El Nino event (RAPID Kiritimati)

Coverage: Christmas Island (2N, 157W)

Extracted from the NSF award abstract:

As anthropogenic climate change intensifies, coral reefs face growing threats from associated decreases in ocean pH and increases in ocean temperature. While such stressors increase steadily through time, coral reefs also experience natural climate extremes, such as El Niño events, that rapidly reshape reef structure and function over a period of months. The El Niño event forecast for 2014/2015 presents the opportunity to study how such events affect coral reef ecosystems. This research will identify which species are most resilient to high temperature stress, and determine whether the presence of specific types of algal endosymbionts in the corals is predictive of the capacity of their coral hosts to survive temperature stress. By studying the reefs at remote sites with documented gradients in human use and pollution, the investigators will be able to tease apart the influence of El-Nino induced temperature changes from local impacts on the reef. This information will ultimately help to identify which components of the coral reef ecosystem are most vulnerable and provide a prognosis for the survival of different types of corals and endosymbionts in a warming world.

This project focuses on reefs at Christmas Island (2N, 157W) - a site that is predicted to be heavily affected by warming during El Niño. In September 2014, roughly 3 months prior to peak El Niño warming, the investigators will install an array of ocean monitoring equipment around Christmas Island. During that field trip, they will also conduct extensive ecological surveys of the reef, collect coral, water and sediment samples for the analysis of Symbiodinium communities that will be analyzed at the University of Hawaii using high throughput sequencing approaches, and characterize ocean geochemistry at both windward and leeward sites on Christmas Island. These activities will be repeated in subsequent trips during peak El Niño conditions, and post El Niño conditions, to allow the investigators to monitor the acute responses of the environment and ecosystem and their near-term recovery, respectively. During the last trip, they will drill several coral colonies to assess how the corals record such a large thermal stress in terms of skeletal morphological and skeletal geochemistry changes.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1446274

[table of contents | back to top]