

Sample log of coral biopsy specimens for genetic analysis of algal symbionts collected from Galapagos and Panama by divers, 2014-2017 (Response of ETP to ENSO)

Website: <https://www.bco-dmo.org/dataset/716126>

Data Type: Other Field Results

Version: 1

Version Date: 2017-10-04

Project

» [Are Eastern Tropical Pacific reefs becoming more resilient to ENSO?](#) (Response of ETP to ENSO)

Program

» [Tropical Eastern Pacific Coral Reefs](#) (TEP Corals)

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Abstract

Sample log of coral biopsy specimens for genetic analysis of algal symbionts collected from Galapagos and Panama by divers, 2014-2017 (Response of ETP to ENSO)

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Coverage

Temporal Extent: 2014-08-17

Dataset Description

This dataset includes a sample log of coral specimens collected for genetic analysis of algal symbionts by divers near the Galapagos and Panama between August 2014 and March 2017.

Methods & Sampling

Samples were extracted for downstream DNA analyses using a bulk DNA extraction protocol. See protocols.io at [dx.doi.org/10.17504/protocols.io.dyq7vv](https://doi.org/10.17504/protocols.io.dyq7vv) or local PDF: "[Bulk gDNA extraction from coral samples](#)"

Data Processing Description

BCO-DMO Processing Notes:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- date format expanded to 4-digit year
- removed single quotes from Sample records
- replaced spaces with underscores in Location, Sample, and Species columns
- replaced - with hyphen, -
- blank cells were replaced by 'nd' (no data)

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Data Files

File
coral_biopsy_sample_log.csv (Comma Separated Values (.csv), 163.43 KB) MD5:c5a453355a0c9050dea3b03747702cb5 Primary data file for dataset ID 716126

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Parameters

Parameter	Description	Units
Country	country of collection	unitless
Site	collection site	unitless
Location	collection location	unitless
Sample	sample identifier	unitless
Depth	coral species	unitless
Species	collection depth	meters
Tag	sample tag number	unitless
Photo	photograph identification number	unitless
Collection_date	collection date formattee as m/d/yyyy	unitless
Dive	dive number	unitless
Diver	diver name	unitless
Notes	comments pertaining to collection and samples	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Camera
Dataset-specific Description	Used to photograph the specimens.
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

Dataset-specific Instrument Name	SCUBA
Generic Instrument Name	Self-Contained Underwater Breathing Apparatus
Generic Instrument Description	The self-contained underwater breathing apparatus or scuba diving system is the result of technological developments and innovations that began almost 300 years ago. Scuba diving is the most extensively used system for breathing underwater by recreational divers throughout the world and in various forms is also widely used to perform underwater work for military, scientific, and commercial purposes. Reference: http://oceanexplorer.noaa.gov/technology/diving/diving.html

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Project Information

Are Eastern Tropical Pacific reefs becoming more resilient to ENSO? (Response of ETP to ENSO)

Coverage: Tropical Eastern Pacific

Description from NSF award abstract:

The predicted 2014-2015 El Niño Southern Oscillation (ENSO) event may develop into one of the strongest in recent history, presenting a unique and urgent opportunity to investigate the impact of this extreme thermal anomaly on the resilience of coral reef ecosystems. Building on baseline data from >40 years of research in the Eastern Tropical Pacific (ETP), this team of researchers is uniquely poised to test hypotheses about coral reef resilience to the third strong event to hit this region. Ecological resilience is defined as both the ability of an ecosystem to continue functioning while under stress as well as the ability of a system to "bounce back" or restore structure and function following a disturbance. This project is guided by the overarching hypothesis that many ETP coral reefs are becoming more resilient in the face of multiple major ENSO disturbances as a result of adaptive processes. If the investigators are correct that reef systems can develop more tolerance and recover more rapidly when subjected to sequential thermal disturbances, this will drastically change predictions of the fate of global coral reef ecosystems over the next 100 years of climate change.

This RAPID funding will provide an unprecedented opportunity to further our understanding of the potential for increased resistance to, and accelerated early recovery from, the third major ENSO to hit the ETP. The investigators have developed hypotheses that can be tested by targeted sampling and experiments in the critical stages before, during and after this ENSO on reefs in Panamá (Uva, Saboga) and Galápagos (Darwin Floreana). These reefs span a gradient in aragonite saturation that provides a real-world model system for conditions expected throughout the tropics in a high-CO₂ world. Key mechanisms/hypotheses that the investigators will evaluate that may increase resilience, and therefore reduce mortality and limit the loss of ecosystem functioning following this ENSO, include: (1) increases in the relative abundance of thermotolerant symbionts will result in higher survival and faster recovery of multiple coral species across all depths; (2) recovery will be inversely related to pCO₂ with a threshold level beyond which recovery does not occur; (3) the maintenance of strong top-down control by intact herbivore communities will limit algal proliferation, and (4) the strengthening of nutrient-limitation in shallow regions will limit algal competitive abilities and aid coral recovery. At each site where there is a record of recovery the research team will make the following observations: (1) in situ measurement of physical parameters (temperature, conductivity, pH, dissolved

oxygen, photosynthetically active radiation, chlorophyll, turbidity, inorganic nutrients); (2) in situ measurement of carbonate chemistry and net ecosystem metabolism (calcification, production); (3) In situ measurements of coral and reef community responses including coral bleaching and mortality and the population responses of corallivores, bioeroders, herbivores, and benthic algal cover; (4) quantification of symbiont communities in major coral species before, during and after the bleaching event to compare with archived samples from the 1997-98 event; (5) bioassays of the strength of top-down (herbivory) and bottom-up (nutrient limitation) effects that may promote ecosystem resilience with critical limits. To further explore these limits, in the southern Galápagos, where there is a lack of resilience, the investigative team will deploy temperature loggers, conduct surveys of bleaching and mortality of remnant coral communities, and conduct bioassays of the strength of herbivory and nutrient limitation.

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Program Information

Tropical Eastern Pacific Coral Reefs (TEP Corals)

Coverage: Tropical eastern Pacific

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1447306

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