Water temperatures from 3 regions of the Florida Reef Tract April 2014-April 2016 (EMUCoReS project)

Website: https://www.bco-dmo.org/dataset/699988
Data Type: Other Field Results
Version: 1
Version Date: 2017-05-16

Project
» RAPID: A hyper-thermal anomaly in the Florida Reef Tract: An opportunity to explore the mechanisms underpinning patterns of coral bleaching and disease (EMUCoReS)

Contributors	Affiliation	Role
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Abstract
This dataset includes temperature data from three sites in the Florida Reef Tract, one each in the upper, middle and lower Keys.

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Coverage

Spatial Extent: **N**:24.992 **E**:-80.409 **S**:24.474 **W**:-81.744
Temporal Extent: 2014-04-01 - 2016-05-01

Methods & Sampling

Temperature data loggers were programmed to record hourly water temperatures and secured to the base of a *Dendrogyra cylindrus* colony at each site. Data loggers were changed out at each site visit and data was later downloaded.Gaps in data are due to lost pendant data loggers or data logger malfunction and are noted in data set as ‘nd’ (no data).

Also see the description of this ongoing study: Coral Bleaching Response Plan (http://dmoserv3.bco-dmo.org/data_docs/EMUCoReS/Coral-Bleaching-Response-Plan-6.pdf)

Data Processing Description

Temperature data were converted from Fahrenheit to Celsius as necessary.

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- blank cells were replaced with nd (no data)

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Data Files

File
water_temp.csv (Comma Separated Values (.csv), 5.50 MB) MD5:71d67c63aa7af448b28eec0924a09b44 Primary data file for dataset ID 699988

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Parameters

Parameter	Description	Units
region	region in the Florida Reef Tract	unitless
site	site within the Florida Reef Tract	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
year	year	unitless
depth	depth of temperature logger	meter
date_local	local date	unitless
time_local	local time	unitless
yrday_local	local year-day	unitless
ISO_DateTime_local	Date/Time (Local) ISO formatted: YYYY-MM-DDTHH:MM:SS	unitless
temp	water temperature	degrees Celsius

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Instruments

Dataset-specific Instrument Name	HOBO pendant temperature data loggers (Onset HOBO Inc., Bourne, Massachusetts USA)
Generic Instrument Name	Temperature Logger
Generic Instrument Description	Records temperature data over a period of time.

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Deployments

Coral_Bleaching_FRRP

Website	https://www.bco-dmo.org/deployment/640250
Platform	shoreside Florida_Coral_Reefs
Start Date	2014-01-01
End Date	2015-08-20
Description	Coral reef surveys as part of the project "RAPID: A hyper-thermal anomaly in the Florida Reef Tract: An opportunity to explore the mechanisms underpinning patterns of coral bleaching and disease". Single location entered: Florida Reef Tract, 24.8684, -80.6435 in order to 'ground' the datasets.

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Project Information

RAPID: A hyper-thermal anomaly in the Florida Reef Tract: An opportunity to explore the mechanisms underpinning patterns of coral bleaching and disease (EMUCoReS)

Coverage: Florida Reef Tract (24.868358, -80.643495)

Description from NSF award abstract:
Coral reefs are among the most biologically diverse and economically important ecosystems on the planet. However, coral reefs are in a state of global decline due to effects of climate change, disease outbreaks, and other stressors. Mass coral bleaching events, a breakdown of the association between corals and their symbiotic algae, are predicted to become more frequent and severe in response to climate change, and it is expected that subsequent disease outbreaks will become more common. Beginning in August 2014, nearly all coral species in the Florida Reef Tract have undergone severe bleaching, in some cases followed by coral mortality and/or disease outbreaks. This widespread, thermal-induced event presents a unique time-sensitive opportunity to explore the mechanisms underpinning the patterns of coral bleaching, disease, and recovery. The mechanisms linking patterns of bleaching, disease, mortality, and recovery remain relatively unexplored. This research will explore the influences that genotype combinations of host polyps, their algal symbionts, and associated bacterial have on bleaching/disease likelihood and recovery/mortality predisposition of coral specimens. By providing a mechanistic understanding of the processes that underlie coral bleaching and subsequent recovery this research will contribute to measures in support of preserving this invaluable natural resource. The study will further involve students from diverse backgrounds as well as provide project internship opportunities for high school students. A web based radio blog will disseminate project results and other relevant developments to the broad audiences

Mass coral bleaching events are predicted to become more frequent and severe in response to climate change, and it is expected that subsequent disease outbreaks will become more common. The lack of a baseline genetic datasets for coral holobionts prior to previous natural bleaching events has hindered our understanding of recovery patterns and physiological tolerance to thermal stress, also known as coral bleaching. An extensive pre-thermal stress baseline of genotypic identity of coral hosts, Symbiodinium, and associated bacterial community offers a unique opportunity to analyze changes associated with current bleaching event along the Florida coastline and to document holobiont compositions most and least resistant/resilient to bleaching and disease. Repeated sampling of the same coral colonies will allow the investigators to compare holobiont composition before, during and after bleaching of both healthy and diseased individuals. This bleaching event is a time-sensitive natural experiment to examine the dynamics of microbes (Symbiodinium and bacteria) associated with affected colonies, including their potential influence on disease susceptibility and resistance of reef corals. This effort would constitute the first time that high throughput sequencing of coral, Symbiodinium endosymbiont, and the coral-associated bacterial community genotypes are together used to explain patterns of disease, recovery, and mortality following natural bleaching. This study will likely change the way investigators study emerging wasting diseases of keystone species that define marine benthic communities.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1503483
NSF Division of Ocean Sciences (NSF OCE)	OCE-1503430

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