Coral nursery water temperature during bleaching events in the Florida Reef Tract from 2014-2015 (EMUCoReS project)

Website: https://www.bco-dmo.org/dataset/640227
Data Type: Other Field Results
Version: 1
Version Date: 2016-03-11

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
Coral nursery ("the bowl") water temperatures during summer bleaching events in 2014 and 2015.

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Coverage

Spatial Extent: **Lat**:25.488 **Lon**:-80.109
Temporal Extent: 2014-01-01 - 2014-09-09

Methods & Sampling

Nursery Bowl water temperatures were recorded from January 1, 2014 to August 8, 2015.
Also see "Florida Reef Tract Coral Bleaching Response Plan" (http://dmoserv3.bco-dmo.org/data_docs/EMUCoReS/Coral-Bleaching-Response-Plan-6.pdf)

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Data Files

File
nursery_temps_rs.csv (Comma Separated Values (.csv), 999.17 KB) MD5:10345db4d877dbe807609c0e1b5d7254 Primary data file for dataset ID 640227

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Parameters

Parameter	Description	Units
date_local	local date of the measurement	mm-dd-yyyy
lat	latitude of measurement; in this case the Nursery Bowl	decimal degrees
lon	longitude of measurement; negative is West; in this case the Nursery Bowl	decimal degrees
time_local	local time of measurement	HH:MM:SS
temp	water temperature at the time of measurement	degrees Celsius
yrday_local	day of the year in local time	decimal year-day
year	year	2014 or 2015
ISO_DateTime_local	ISO time standard for submitting to the national archive.	YYYY-MM-DDTHH:MM:SS[.xx]

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Instruments

Dataset-specific Instrument Name	HOBO Pendant temperature logger
Generic Instrument Name	Temperature Logger
Dataset-specific Description	Onset Corporation UA-002-64
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. **Methods & Sampling** This dataset has no location associated with it, but it is at this location.

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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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