Monthly average temperatures at coral reefs (Curaco, Grenada, Puerto Rico), measured by Hobo temperature loggers from 2008-2011

Website: https://www.bco-dmo.org/dataset/3973
Data Type: Other Field Results
Version: 1
Version Date: 2013-09-06

Project
» Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function (Climate_Corals_Bleach_Disease)

Contributors	Affiliation	Role
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Abstract
This dataset reports monthly average temperatures at coral reefs (Curaco, Grenada, Puerto Rico), measured by Hobo temperature loggers from 2008-2011.

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Coverage

Spatial Extent: **N**:17.93495 **E**:-61.75907 **S**:12.02697 **W**:-69.07888
Temporal Extent: 2008-01 - 2011-02

Dataset Description

Montly average, minimum, and maximum temperatures at Caribbean reefs recorded from 2008 to 2011. Reefs located at Curacao, Grenada, and Puerto Rico.

Methods & Sampling

Hobo temperature loggers (Onset- V.2; accuracy to 0.01 degree C), set to record temp. every two hours, were deployed at 10 m in each one of the surveyed reefs in Curacao, Grenada, and Puerto Rico, except for Media Luna and Turrumote reefs in Puerto Rico. At Media Luna and Turrumote, temperature loggers were deployed at 1 and 15 meters.

Data Processing Description

BCO-DMO Processing Notes:
- 'nd' entered to indicate 'no data'.
- Modified parameter names to conform with BCO-DMO naming conventions.
- Added lat and lon from the metadata provided.
- Replaced abbreviated reef names with full names.

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Data Files

File
reef_temp_monthly_avg.csv (Comma Separated Values (.csv), 22.36 KB) MD5:2b4413d1cfed5b0a0417822d94b67c4e Primary data file for dataset ID 3973

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Parameters

Parameter	Description	Units
location	Name of the country where the reefs are located.	text
reef	Name of the reef.	text
lat	Latitude of the reef.	decimal degrees
lon	Longitude of the reef.	decimal degrees
year	4-digit year when the measurement was recorded.	unitless
month	2-digit month when the measurement was recorded.	unitless
temp_mean	Average monthly temperature.	degrees Celsius
temp_stdev	Standard deviation of the average monthly temperature.	degrees Celsius
temp_min	Minimum monthly temperature.	degrees Celsius
temp_max	Maximum monthly temperature.	degrees Celsius

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Instruments

Dataset-specific Instrument Name	Onset Pro v2 temperature logger
Generic Instrument Name	Onset HOBO Pro v2 temperature logger
Generic Instrument Description	The HOBO Water Temp Pro v2 temperature logger, manufactured by Onset Computer Corporation, has 12-bit resolution and a precision sensor for ±0.2°C accuracy over a wide temperature range. It is designed for extended deployment in fresh or salt water. Operation range: -40° to 70°C (-40° to 158°F) in air; maximum sustained temperature of 50°C (122°F) in water Accuracy: 0.2°C over 0° to 50°C (0.36°F over 32° to 122°F) Resolution: 0.02°C at 25°C (0.04°F at 77°F) Response time: (90%) 5 minutes in water; 12 minutes in air moving 2 m/sec (typical) Stability (drift): 0.1°C (0.18°F) per year Real-time clock: ± 1 minute per month 0° to 50°C (32° to 122°F) Additional information (http://www.onsetcomp.com/) Onset Computer Corporation 470 MacArthur Blvd Bourne, MA 02532

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Deployments

Coral_Bleaching_Dives_Weil

Website	https://www.bco-dmo.org/deployment/59046
Platform	Caribbean_Coral_Reefs
Start Date	2008-01-01
End Date	2011-12-31
Description	Coral reef surveys as part of the project "Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function".

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Project Information

Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function (Climate_Corals_Bleach_Disease)

Coverage: Puerto Rico, Grenada, Caracao, Grand Cayman

The investigators requested RAPID funding to assess the impact of the 2010 Caribbean bleaching event on coral gene expression, immune function and coral reef communities. 2010 is currently tracking as the warmest year ever on record, potentially creating one of the largest thermal anomalies in the Caribbean basin and in the southeastern Caribbean, exceeding the previous record-breaking temperatures of 2005. These investigators will perform coral surveys at selected sites in the southeastern Caribbean and sample collections in Puerto Rico during and after this transient event to compare coral health measures with previously collected pre-event data. The study will integrate several levels of data, from remote temperature sensing satellite records, to coral health, cover and diversity surveys, to studies of individual coral immune function and microbial assemblages. The scale of this thermal event is significant enough that the investigators hypothesize levels of disease will increase following this event, as was observed after the 2005 Caribbean bleaching event and the 2002 Australian bleaching event. The RAPID study will also test the hypothesis that this large scale thermal anomaly will stress corals in Puerto Rico and down-regulate immune gene expression in thermally sensitive species (Montastrea spp), but potentially up-regulate expression in a thermally resilient species (Gorgonia ventalina). The investigators also hypothesize that this expected level of coral bleaching will change the surface microbial communities of both species toward more Vibrio-based communities, and this is the first step in increased

disease susceptibility to opportunistic pathogens.

This project is relevant to an understanding of the resilience of marine ecosystems and the impact of ocean warming events on coral physiology and biodiversity. Current understanding of the impacts of warm thermal anomalies is largely restricted to the bleaching response of the corals themselves, with much less known about how warm temperatures change the functioning of the coral holobiont via the microbial constituents and/or the immune responses of corals. There is tremendous value in following the physiology and gene expression of corals in the field through an extreme and transient event like this. Laboratory studies could never truly duplicate these field conditions, particularly with respect to disruptions to the natural resident microbial community that is so critical to the coral holobiont.

This RAPID project will focus on objectives for which pre-event data/samples exist:
(1) Monitoring levels of coral disease, coral species diversity and coral cover in Puerto Rico, Grenada, Trinidad, the Mexican Yucatan, and Panama.
(2) Assessment of coral immune responses and immune gene expression in a resilient gorgonian (Gorgonia ventalina) and a susceptible scleractinian (Montastraea spp). Sampling will occur pre-bleaching, during the heating event and after recovery.
(3) Assessment of changes in total microbial community before, during and after the heating event in the two above mentioned species.

This project is associated with the project titled "Influence of Temperature and Acidification on the Dynamics of Coral Co-Infection and Resistance" (OCE-0849776).

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1105143

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