Seawater temperature between Cabritte Horn and White Point on the south shore of St. John, US Virgin Islands, 1996-2018

Website: https://www.bco-dmo.org/dataset/827812
Data Type: Other Field Results
Version: 1
Version Date: 2020-10-28

Project
» RUI-LTREB Renewal: Three decades of coral reef community dynamics in St. John, USVI: 2014-2019 (RUI-LTREB)

Program
» Long Term Research in Environmental Biology (LTREB)

Contributors	Affiliation	Role
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Abstract
Seawater temperature between Cabritte Horn and White Point on the south shore of St. John, US Virgin Islands, 1996-2018. These data were used in the mortality and growth analysis, summarized by day.

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Coverage

Spatial Extent: **N**:18.31714 **E**:-64.7208 **S**:18.30702 **W**:-64.73152
Temporal Extent: 1996 - 2018

Methods & Sampling

From publication Limnology and Oceanography

Environmental conditions

Seawater temperature and rainfall were tested for their capacity to account for variation in the dynamics of small corals in the target size range. Seawater temperature was measured every 15–30 minutes using loggers deployed in two locations. Most measurements came from Yawzi Point, where temperature was recorded at 11-m depth using a Ryan Industries thermistor (± 0.3°C) from 1996 to June 1997, and from November 1997 to August 1999. From May 1997 to October 1997, and from August 1999 to August 2001, Optic Stowaway loggers (± 0.2°C) were used, and from August 2001 to the present, Hobo Aquapro loggers (± 0.2°C) were used. Gaps in the time-series of seawater temperature from Yawzi Point were created by periodic equipment malfunction, and these gaps were filled with records from 14-m depth at Tektite (~ 500 m southwest) that were recorded with Hobo Aquapro loggers. A representative year (2015–2016) of temperature records from

Yawzi Point and Tektite showed that the daily temperature differed by ≤ 0.1°C between these sites (mean = 0.043 ± 0.003°C, n = 368). Temperature was not consistently measured at the six sites at which small corals were surveyed, but records from 2016–2017 show that the mean (± SE) variation between Cabritte Horn (9 m depth, easternmost site) and White Point (5 m depth, westernmost site) was 0.14 ± 0.01°C (warmer to the west). Among site differences were less than the resolution of the loggers (± 0.2°C). Temperature records from Yawzi Point were averaged by day and used to create two summary statistics for the 12 months between 1 August and 31 July of the subsequent year for 22 years: mean temperature and an annualized summation of thermally extreme days.

The mean temperature was used to characterize the year between samplings. The extent to which temperature potentially was unfavorable to corals was evaluated by calculating the number of upwardly thermally extreme days over 12 months (in units of weeks). In this calculation, hot days were gauged relative to the local coral bleaching threshold for sea surface temperature (29.4°C), as determined by the United States National Oceanic and Atmospheric Administration (http://coralreefwatch.noaa.gov/vs/index.php). Days between 1 August and 31 July of the following year were ranked by the extent to which their daily mean temperature exceeded 29.4°C, with a rank of 0 for ≤ 29.4°, a rank of 1 for > 29.4°C but ≤ 30.4°C, and a rank of 2 for > 30.4 but ≤ 31.4°C (mean daily temperature did not exceed 31.4°C). Annualized summaries of thermal extremes were obtained by summing the daily ranks in each 12 month period and dividing by 7 to provide units of weeks.

Data Processing Description

BCO-DMO Processing Notes:
- data extracted to .csv from file "Flor L&O Edmunds 2020 (matrix paper).zip/Data in L&O Paper_21_Oct_2020.xlsx", sheet "seawater temperature".
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions

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Data Files

File	
L_O_seawater_temp.csv	(Comma Separated Values (.csv), 126.61 KB) MD5:a146e91d58e19ea7ac41ee1c739bff8c
Primary data file for dataset ID 827812	

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Related Datasets

IsSupplementTo

Edmunds, P. J. (2020) **Growth and mortality rates of small corals in St. John, US Virgin Islands, 1996-2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2020-10-28 doi:10.26008/1912/bco-dmo.827764.1 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
Date	date of measurement formatted as yyyy-mm-dd	unitless
Temp	daily seawater temperature	degrees Celsius

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Instruments

Dataset-specific Instrument Name	Optic Stowaway loggers and Hobo Aquapro loggers
Generic Instrument Name	Temperature Logger
Dataset-specific Description	Used to collect seawater temperature.
Generic Instrument Description	Records temperature data over a period of time.

Dataset-specific Instrument Name	Ryan Industries thermistor
Generic Instrument Name	Thermistor
Dataset-specific Description	Used to collect seawater temperature.
Generic Instrument Description	A thermistor is a type of resistor whose resistance varies significantly with temperature, more so than in standard resistors. The word is a portmanteau of thermal and resistor. Thermistors are widely used as inrush current limiters, temperature sensors, self-resetting overcurrent protectors, and self-regulating heating elements. Thermistors differ from resistance temperature detectors (RTD) in that the material used in a thermistor is generally a ceramic or polymer, while RTDs use pure metals. The temperature response is also different; RTDs are useful over larger temperature ranges, while thermistors typically achieve a higher precision within a limited temperature range, typically 90C to 130C.

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Project Information

RUI-LTREB Renewal: Three decades of coral reef community dynamics in St. John, USVI: 2014-2019 (RUI-LTREB)

Website: http://coralreefs.csun.edu/

Coverage: USVI

Describing how ecosystems like coral reefs are changing is at the forefront of efforts to evaluate the biological consequences of global climate change and ocean acidification. Coral reefs have become the poster child of these efforts. Amid concern that they could become ecologically extinct within a century, describing what has been lost, what is left, and what is at risk, is of paramount importance. This project exploits an unrivalled legacy of information beginning in 1987 to evaluate the form in which reefs will persist, and the extent to which they will be able to resist further onslaughts of environmental challenges. This long-term project continues a 27-year

study of Caribbean coral reefs. The diverse data collected will allow the investigators to determine the roles of local and global disturbances in reef degradation. The data will also reveal the structure and function of reefs in a future with more human disturbances, when corals may no longer dominate tropical reefs.

The broad societal impacts of this project include advancing understanding of an ecosystem that has long been held emblematic of the beauty, diversity, and delicacy of the biological world. Proposed research will expose new generations of undergraduate and graduate students to natural history and the quantitative assessment of the ways in which our planet is changing. This training will lead to a more profound understanding of contemporary ecology at the same time that it promotes excellence in STEM careers and supports technology infrastructure in the United States. Partnerships will be established between universities and high schools to bring university faculty and students in contact with k-12 educators and their students, allow teachers to carry out research in inspiring coral reef locations, and motivate children to pursue STEM careers. Open access to decades of legacy data will stimulate further research and teaching.

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Program Information

Long Term Research in Environmental Biology (LTREB)

Website: https://www.nsf.gov/funding/opportunities/ltreb-long-term-research-environmental-biology

Long Term Research in Environmental Biology (LTREB)

Supports research for a period of 10 years or longer to generate an extended time series of data with a focus on evolutionary biology, ecology and ecosystem science.

Synopsis
The Long Term Research in Environmental Biology (LTREB) Program supports the generation of extended time series of data to address important questions in evolutionary biology, ecology, and ecosystem science. Research areas include, but are not limited to, the effects of natural selection or other evolutionary processes on populations, communities, or ecosystems; the effects of interspecific interactions that vary over time and space; population or community dynamics for organisms that have extended life spans and long turnover times; feedbacks between ecological and evolutionary processes; pools of materials such as nutrients in soils that turn over at intermediate to longer time scales; and external forcing functions such as climatic cycles that operate over long return intervals.

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Funding

Funding Source	Award
NSF Division of Environmental Biology (NSF DEB)	DEB-1350146

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