Daily seawater temperature at Yawzi Point (St.John USVI) from 1991-2021

Website: https://www.bco-dmo.org/dataset/875694
Data Type: Other Field Results
Version: 1
Version Date: 2022-06-15

Project
» RUI: Pattern and process in four decades of change on Caribbean reefs (St John Coral Reefs)

Contributors	Affiliation	Role
Edmunds, Peter J.	California State University Northridge (CSUN)	Principal Investigator
Gerlach, Dana Stuart	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
These data describe seawater temperature in Great Lameshur Bay from 1991-2021. They are daily averages from temperature logger measurements made at Yawzi Point, St.John USVI.

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Coverage

Spatial Extent: **Lat**:18.3153 **Lon**:-64.7257
Temporal Extent: 1991-01-01 - 2021-07-18

Methods & Sampling

Seawater temperature was measured daily for 30 years in Great Lameshur Bay at a depth of ~9 meters. Loggers were located at Yawzi Point, ~900 meters from Cabritte Horn (the location of photoquadrat sampling). The loggers sampled at 0.0011Hz (Onset Computer Corp., HOBO U22-011, ± 0.2°C) or every 15 minutes (Edmunds & Gray, 2014). Records were collapsed by day and used to calculate annual summaries of mean temperature (this dataset), minimum temperature, maximum temperature, the number of hot days (i.e.,>29.3 °C), and the number of cold days (i.e.,≤26.0 °C).

For details on association with *Millepora* morphology, see Related Datasets section below.

Data Processing Description

Problem report: If data was missing from Yawzi Point, the seawater temperature values from the Tektite site location (~14 meters depth), were used instead. This depth difference has a negligible effect on the temperature at this location.

<u>BCO-DMO processing</u>
- added columns for latitude and longitude
- converted Date to YMD format
- added columns for site and location
- 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
temperature.csv(Comma Separated Values (.csv), 632.67 KB) MD5:11f625b3920f53180bf52bca0932a775 Primary data file for dataset ID 875694

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Related Publications

Edmunds, P. J., & Gray, S. C. (2014). The effects of storms, heavy rain, and sedimentation on the shallow coral reefs of St. John, US Virgin Islands. Hydrobiologia, 734(1), 143–158. doi:<u>10.1007/s10750-014-1876-7</u>
Methods

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Related Datasets

IsSupplementTo

Edmunds, P. J. (2022) **Morphology and features of Millepora colonies at Cabritte Horn (St.John, US Virgin Islands) from 1992-2021.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-06-13 doi:10.26008/1912/bco-dmo.875553.1 [<u>view at BCO-DMO</u>]
Relationship Description: Seawater temperatures from USVI were used to evaluate environmental effects on Millepora morphology

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Parameters

Parameter	Description	Units
Latitude	Latitude	decimal degrees
Longitude	Longitude	decimal degrees
Date	Date of temperature measurements	unitless
Mean_daily_temp	Seawater temperature	degrees Celsius (°C)
Site	Site of seawater sampling	unitless
Location	Geographical location	unitless

Instruments

Dataset-specific Instrument Name	Hobo U22-001 (Onset Computer Corp.)
Generic Instrument Name	Onset HOBO Pro v2 temperature logger
Dataset-specific Description	Seawater temperature was measured with loggers (mostly Onset Computer Corp., Hobo U22-001, ± 0.2°C).
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

Project Information

RUI: Pattern and process in four decades of change on Caribbean reefs (St John Coral Reefs)

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

Coverage: United States Virgin Islands, St. John: 18.318, -64.7253

NSF Award Abstract:

The coral reef crisis refers to the high rates of death affecting tropical reef-building corals throughout the world, and the strong likelihood that coral reefs will become functionally extinct within the current century. Knowledge of these trends comes from the monitoring of coral reefs to evaluate their health over time, with the most informative projects providing high-resolution information extending over decades. Such projects describe both how reefs are changing, and answer questions addressing the causes of the changes and the form in which reefs will persist in the future. This project focuses on coral reefs in United States waters, specifically around St. John in the US Virgin Islands. These reefs are protected within the Virgin Islands National Park, and have been studied more consistently and in greater detail than most reefs anywhere in the world. Building from 33 years of research, this project extends monitoring of these habitats by another five years, and uses the emerging base of knowledge, and the biological laboratory created by the reefs of St. John, to address the causes and consequences of the bottleneck preventing baby corals from repopulating the reefs. The work is accomplished with annual expeditions, staffed by faculty, graduate students, undergraduates, and teachers, coupled with analyses of samples at California State University, Northridge, and Florida State University, Tallahassee. The students and teachers assist with the research goals at the center of this project, but also engage in independent study and integrate with the rich and diverse societal context and natural history of the Caribbean. The scope of the science agenda extends to schools in California, where students are introduced to the roles played by marine animals in ecosystem health, concepts of long-term change in the biological world, and the role of science engagement in promoting positive environmental outcomes. In addition to generating a wide spectrum of project deliverables focusing on scientific discovery, the project promotes STEM careers and train globally aware scientists and educators capable of supporting the science agenda of the United States in the 21st Century.

This project leverages one of the longest time-series analyses of Caribbean coral reefs to extend the time-series from 33 to 38 years, and it tests hypotheses addressing the causes and consequences of changing coral reef community structure. The project focuses on reefs within the Virgin Islands National Park (VINP) and along the shore of St. John, US Virgin Islands, and is integrated with stakeholders working in conservation (VINP) and local academia (University of the Virgin Islands). Beginning in 1987, the project has addressed detail-oriented analyses within a small spatial area that complements the large-scale analyses conducted by the VINP. The results of these efforts create an unrivaled context within which ecologically relevant hypotheses can be tested to elucidate mechanisms driving ecological change. Building from image- and survey- based analyses, 33 years of data reveal the extent to which these reefs have transitioned to a low-abundance coral state, and the importance of the bottleneck preventing coral recruits from contributing to adult size classes. The intellectual merits of this project leverage these discoveries to address eight hypotheses: (H1) long-term changes are defining a cryptic regime change, with the low coral abundance reinforced by, (H2) enhanced community resilience, (H3) low post-settlement success, (H4) negative effects of peyssonnelid algal crusts (PAC) on juvenile corals, (H5) inability of juvenile corals to match their phenotypes to future conditions, (H6) impaired population growth caused by reduced genetic diversity, (H7) the premium placed on PAC-free halos around Diadema sea urchins for coral recruitment, and (H8) biotic homogenization occurring on a landscape-scale.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

Related Projects:

- Affiliated with MCR-LTER - https://www.bco-dmo.org/project/2222
- Serves as a new project that builds on NSF DEB-1350146 - RUI-LTREB Renewal: Three decades of coral reef community dynamics in St. John, USVI: 2014-2019 - https://www.bco-dmo.org/project/734983
- Overlaps with OCE 17-56678 (which focuses on soft corals with H. Lasker) - Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals - https://www.bco-dmo.org/project/752508
- LTREB Long-term coral reef community dynamics in St. John, USVI: 1987-2019 - https://www.bco-dmo.org/project/2272
- RUI: Pattern and process in four decades of change on Caribbean reefs - https://www.bco-dmo.org/project/835192
- RAPID: Hurricane Irma: Effects of repeated severe storms on shallow Caribbean reefs and their changing ecological resilience - https://www.bco-dmo.org/project/722163

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2019992