

Temperature data collected from loggers deployed at the Thalassia Experimental Network (TEN) sites in the Western Atlantic from 2018-2019

Website: <https://www.bco-dmo.org/dataset/784623>

Data Type: Other Field Results

Version: 1

Version Date: 2019-12-18

Project

» [Collaborative Research: The tropicalization of Western Atlantic seagrass beds](#) (Tropicalization Seagrass Beds)

Contributors	Affiliation	Role
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Abstract

Temperature data collected from loggers deployed at the Thalassia Experimental Network (TEN) sites in the Western Atlantic from 2018-2019.

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Coverage

Spatial Extent: N:32.2639 E:-64.8307 S:9.3516 W:-97.0348

Temporal Extent: 2018-04-18 - 2019-05-22

Dataset Description

Temperature data collected from loggers deployed at the Thalassia Experimental Network (TEN) sites.

Methods & Sampling

One logger was deployed at the initiation of the project, and continuously recorded temperature for the duration of the one-year subtidal caging experiment. The logger was cable-tied to a PVC post at the side of the array (next to the cages). Temperature readings were recorded every six minutes. Loggers were removed,

replaced, and data were downloaded three times throughout the experiment.

Where logger data was unavailable (e.g. if a logger failed for an extended period of time), data was taken from nearby HOBO loggers that were unassociated with TEN. When no alternative HOBO loggers were available, data was filled in by accessing (NOAA) buoy temperature data, product of the National Data Buoy Center.

Data Processing Description

Data Processing: Data was processed in the R Statistical Software (R version 3.6.1 (2019-07-05)). All data files were merged and QA/QC'd to ensure proper and consistent formatting. All files were cleaned by omitting time periods where the loggers were removed from the water.

Problem Report: Due to logistical challenges, the replacement of loggers to the field was occasionally delayed at some sites, with no alternative data available. There are thus some gaps in the temporal coverage of recorded data at certain sites.

BCO-DMO Processing:

- added latitude, longitude, and full site names from the site coordinates file provided to BCO-DMO;
- converted the latitude and longitude values from degrees-minutes-seconds to decimal degrees;
- formatted the date_time field to ISO8601 format.

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Data Files

File
TEN_temperature.csv (Comma Separated Values (.csv), 62.08 MB) MD5:2c630877e0a5fd09958b060183732f03
Primary data file for dataset ID 784623

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Parameters

Parameter	Description	Units
data_origin	Origin of each data reading. "HOB" indicates HOBO loggers deployed at the experimental array, "altHOB" indicates HOBO loggers deployed nearby, but not directly associated with, the TEN sites, and "NOAA_buoy" indicates data taken from a nearby National Oceanic and Atmospheric Administration (NOAA) buoy, product of the National Data Buoy Center	unitless
site	Site code; refer to "full_names" column for complete name	unitless
lat_dd	Site latitude in decimal degrees	degrees
lon_dd	Site longitude in decimal degrees	degrees
temp	Recorded sea surface temperature for a given time point	degrees Celsius
ISO_DateTime	Date and time (local) each reading was taken; format: yyyy-mm-ddTHH:MM:SS	unitless
full_names	Full name of the site	unitless

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Instruments

Dataset-specific Instrument Name	HOBO Pendant Temperature/Light 64K Data Logger
Generic Instrument Name	Onset HOBO Pendant Temperature/Light Data Logger
Dataset-specific Description	HOBO Pendant Temperature/Light 64K Data Logger; Part #UA-002-64; Onset Computer Corporation
Generic Instrument Description	The Onset HOBO (model numbers UA-002-64 or UA-001-64) is an in-situ instrument for wet or underwater applications. It supports light intensity, soil temperature, temperature, and water temperature. A two-channel logger with 10-bit resolution can record up to approximately 28,000 combined temperature and light measurements with 64K bytes memory. It has a polypropylene housing case. Uses an optical USB to transmit data. A solar radiation shield is used for measurement in sunlight. Temperature measurement range: -20 deg C to 70 deg C (temperature). Light measurement range: 0 to 320,000 lux. Temperature accuracy: +/- 0.53 deg C from 0 deg C to 50 deg C. Light accuracy: Designed for measurement of relative light levels. Water depth rating: 30 m.

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Deployments

TEN_2018-2019

Website	https://www.bco-dmo.org/deployment/784708
Platform	Thalassia Experimental Network
Start Date	2018-04-16
End Date	2019-05-22
Description	Thalassia Experimental Network (TEN) sites sampled in 2018-2019; several sites in the Western Atlantic - including sites in the following locations: Bocas del Toro, Panama; Lac Bay, Bonaire; Little Cayman, Cayman Islands; Carrie Bow, Belize; Puerto Morelos, Mexico; Andros, Bahamas; Eleuthera, Bahamas; Corpus Christi, Texas; Galveston, Texas; Naples, Florida; Crystal River, Florida; St. Joes, Florida; and Bermuda.

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Project Information

Collaborative Research: The tropicalization of Western Atlantic seagrass beds (Tropicalization Seagrass Beds)

Website: <https://marinegeo.si.edu/research/research-in-action/underwater-meadows-and-resilient-seas>

Coverage: Western Atlantic

NSF Award Abstract:

The warming of temperate marine communities is becoming a global phenomenon, producing new biotic interactions that can result in a series of cascading effects on ecosystem structure. For example, the poleward expansion of herbivore populations can lead to the consumption of habitat-forming vegetation, which alters the ecological services provided by coastal environments (a phenomenon known as tropicalization). Many of the habitats at risk, such as kelp forest and seagrass beds, provide foundational habitat that supports

complex food webs. Seagrass meadows along the Gulf of Mexico are currently experiencing an influx of tropical grazers, however a integrated understanding of how these communities might ultimately respond is lacking. This project describes the first experiment to quantify the disruptive effect of tropicalization on the ecology of a widely-distributed seagrass. A major contribution of this project will be the development of a seagrass research collaborative network to serve as a platform for broader scientific inquiry and future collaboration. The collaboration spans a total of 11 institutions, and this network will foster extensive collaborations among junior and senior scientists, as well as many undergraduate and graduate students. Given the geographic scope of this work, the research team will further pursue outreach opportunities across the network by hosting a series of public lectures and science café events promoting topics in marine ecology and conservation.

This study will develop a large-scale manipulative experiment across the Caribbean, premised upon a comparative network of 15 marine sites, which will quantify how temperature and light interact with grazer effects on the dominant tropical seagrass, *Thalassia testudinum*. Sites have been selected along a latitudinal gradient (from Bermuda to Panama), such that light and temperature vary, allowing the investigators to test for the effects of abiotic factors on the ecological effects of increased grazing (tropicalization simulated via artificial leaf clipping). At each of the 15 marine sites, grazing treatments will be crossed with nutrient manipulations in a factorial design for 18 weeks, after which seagrass structure and functioning will be assessed via measurements of areal productivity, shoot density, aboveground biomass, and carbohydrate storage. Experiments will be conducted both in the summer and winter seasons, when abiotic gradients are at their weakest and strongest, respectively. Emerging statistical techniques in hierarchical mixed modeling and structural equation modeling will further allow for integration of experimental and observational data.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1737247

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