Air and water temperatures collected at intertidal locations in three regions on the coast of the Gulf of Maine, 2011 (GOM Biodiversity project)

Website: https://www.bco-dmo.org/dataset/527019
Version: 2014-08-11

Project
» Context-Dependency of Marine Biodiversity-Ecosystem Function Relationships (GOM Biodiversity)

Contributors	Affiliation	Role
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Dataset Description

Intertidal samples collected during the spring, summer, and fall of 2011 along the coast of the Gulf of Maine at locations near Nahant, Massachusetts (42.4264 N, 70.9194W; Boothbay, Maine (43.8920 N, 69.4773 W); and Lubec, Maine (44.8408 N, 67.0156 W). Data were collected at three sites in each of those three regions.

Related dataset: GoM - nitrates_phosphates

Methods & Sampling

Data were collected using shaded TidbiT dataloggers anchored to the rocky substratum in the mid-intertidal zone.

Data are average temperature readings in degrees C for each region and represent the average temperatures of the three sites in each region. The positions here are representative of the pooled sites for each region.

Data Processing Description

DMO Notes:

- original files: temp_water.csv temp_air_day.csv, temp_air_night.csv
- rearranged the temperature data so that the region and type of temperature reading are displayed as columns
- added lat, lon columns
- reformated date from m/d/yyyy to yyyy/mm/dd
- added conventional header with dataset name, PI name, version date

- renamed parameters to BCO-DMO compatible names
- replaced spaces with underscores
- reduced temperature significant digits to tenths of a degree

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Data Files

File
temp.csv (Comma Separated Values (.csv), 72.42 KB) MD5:83c90b77f2bfe4b8c31d9459d7618836 Primary data file for dataset ID 527019

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Parameters

Parameter	Description	Units
region	geographic region of sampling	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
temp_type	type of temperature reading: seawater; air at day or air at night	unitless
date	sample date	yyyy/mm/dd
temp	temperature	degrees Celsius
year	year	
month	month	
day	day	
yrday	The day of year for a specified year with Jan. 1 = yearday 1	

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Instruments

Dataset-specific Instrument Name	Onset Pro v2
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

Bracken_GoM_2011

Website	https://www.bco-dmo.org/deployment/527034
Platform	Bracken_shore
Start Date	2011-05-21
End Date	2013-11-04

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Project Information

Context-Dependency of Marine Biodiversity-Ecosystem Function Relationships (GOM Biodiversity)

Coverage: Gulf of Maine rocky shorelines: Nahant, Massachusetts to Lubec, Maine

Description from NSF award abstract:
Because species mediate key biogeochemical processes and play unique ecological roles, changes in the diversity and composition of species in an ecosystem can alter how that system functions. A growing body of work has demonstrated that changes in biodiversity can have profound effects on the functioning of marine ecosystems. However, key unresolved issues remain with respect to relationships between marine biodiversity and ecosystem functioning. In particular, few studies have evaluated interactions between producer diversity and herbivore diversity, especially in the field. Furthermore, the vast majority of experiments have evaluated the consequences of biodiversity changes at only one location, so there is very little knowledge of how diversity-function relationships are modified by environmental context. This study will examine, in the field, how environmental context shapes marine diversity-function relationships and particularly the interaction between changes in consumer and producer diversity in intertidal ecosystems at three sites spanning 500 km of the New England coastline. These factorial experiments will manipulate seaweed and grazer diversity at East Point, Massachusetts; Chamberlain Point, Maine; and Quoddy Head, Maine. The research asks the following questions:
1) How does seaweed diversity influence key marine ecosystem processes such as primary and secondary productivity?
2) How does herbivore diversity affect the top-down impacts of molluscan grazers on intertidal seaweed

assemblages?
3) What are the feedbacks between grazer and seaweed diversity in driving intertidal community and ecosystem structure and function? And
4) How does environmental context modify the top-down and bottom-up effects of biodiversity change on intertidal ecosystem functioning?

This study will make important intellectual contributions to marine ecology by considering feedbacks between diversity change at two adjacent trophic levels. The work will be conducted at multiple sites which span a range of nearshore oceanographic and climatic conditions, enhancing the generality of the work and allowing for evaluation of the effects of environmental context on diversity-function relationships. Biodiversity is changing at all scales, from local to global, and it is essential to understand the consequences of these changes in order to better predict and ameliorate their impacts on communities and ecosystems. This research will provide a more holistic understanding of the links between diversity, trophic interactions and ecosystem function that will facilitate more effective conservation and management strategies in marine, as well as other, ecosystems. It will provide training and research experience for students at all educational levels. The investigators will involve graduate and undergraduate students in all phases of the research and will also offer a summer research internship each year to a high school student from the Coastal Ocean Science Academy (COSA) that is taught by the Northeastern University Marine Science Center's Outreach staff. COSA students are primarily from under-represented groups in the greater Boston area. Finally, the results of the research will be communicated to the public through the outreach and public education program at the Center.

Publications produced as a result of this research:
Bracken, M.E.S. and N.H.N. Low. 2012. Realistic losses of rare species disproportionately impact higher trophic levels. Ecology Letters, 15, 461-467. doi:10.1111/j.1461-0248.2012.01758.x

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0961364

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