Environmental data collected from biomimetic and other data loggers located in rocky intertidal zones of global oceans between July 1999 and October 2013

Website: https://www.bco-dmo.org/dataset/555780
Version: 13 April 2015
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Project
» Environmental signal analysis: Monitoring the impacts of climate change on rocky intertidal ecosystem across a cascade of scales (Monitoring Rocky Intertidal Ecosystems)

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Table of Contents

Coverage

Spatial Extent: **N**:50 **E**:150 **S**:-50 **W**:-150
Temporal Extent: 1999-07-01 - 2013-10-31

Dataset Description

Environmental data (water temp, air temp, etc.) from biomimic devices and other loggers located in the rocky intertidal zone.

Methods & Sampling

Biomimetic loggers (instruments that closely mimic the thermal characteristics of animals) that can be deployed in the field, have been deployed at multiple sites along the west coast of North America. Data from these devices is recorded at regular time intervals.

Data Processing Description

BCO-DMO processing notes:
- Re-sorted data provided in original Excel file containing site metadata.
- Replaced "N/A" and missing values with "nd" to indicate "no data".

- Replaced spaces with underscores.
- Modified parameter names to conform with BCO-DMO naming conventions.

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Data Files

File
rocky_intertidal_biomimic.csv (Comma Separated Values (.csv), 9.99 GB) MD5:eb8df91b079b7870767e5c9cc885423d Primary data file for dataset ID 555780

[|]

Parameters

Parameter	Description	Units
biomimic	Type of biomimic or logger.	text
country	Country name.	text
state_province	State/province name.	text
site_id	6-character site identification code (where the first two characters indicate the country, the next two characters indicate the state/province, and the last two characters represent the site).	text
site_name	Name of the site.	text
latitude	Latitude of the site.	decimal degrees
longitude	Longitude of the site.	decimal degrees
zone	Zone of the beach. Possible values: 0m, 1m, 2m, 5m, 10m, 14m, 20m, 30m, 40m, low, mid high.	text
sub_zone	Sub-zone of the beach. Possible values: backreef, lagoon, forereef, low, low mid, mid, high mid, high, terr.	text
wave_exp	Wave exposure (exposed or protected).	text
microsite_id	Microsite identification number (where the first four characters indicate the type of logger, and the next six characters are the site_id). Logger type codes: ABAP = Air Pressure (atm) ABAT = Air Temperature (degrees C) ABDP = Dew Point (degrees C) ABGS = Gust Speed (mph) ABPL = Water Pressure (atm) ABRA = Precipitation (inches) ABRH = Relative Humidity (%) ABSR = Solar Radiation (W/m^2) ABWD = Wind Direction (degrees) ABWS = Wind Speed (mph) ABWT = Water Temperature (degrees C) BMRB = robobarnacle body temperature (degrees C) BMRC = robocoral body temperature (degrees C) BMRM = robomussel body temperature (degrees C) BMRO = robooyster body temperature (degrees C) BMRS = roboseastar body temperature (degrees C) BMRT = robotidepool body temperature (degrees C)	text
organism	Organism related to the biomimic, or the type of logger.	unitless
filedate	4-digit year and month name of the data file.	unitless
data_description	Type of data (and units) reported from the biomimic or logger. (e.g. Air_Pressure_mbar, Air_Temp_C, DewPt_C, Gust_speed_m/s, Rain_mm, R_Humidity_%, Temp_C)	unitless
date	Year, month, and day of when the value was recorded (GMT time) in YYYY-mm-dd format.	unitless
time	Time, in hours and minutes, when the value was recorded (GMT time) in HH:MM format.	unitless
value	Value of the data reported; data type and units is dependent on logger type. Refer to 'data_description' for type of data and units.	refer to data_description
ISO_DateTime_UTC	Date and time (UTC) formatted to the ISO 8601 standard in YYYY-mmddTHH:MM:SS.xxZ format.	yyyy-MM-dd'T'HH:mm:ss'Z'

[table of contents | back to top]

Deployments

rocky_intertidal_devices

Website	https://www.bco-dmo.org/deployment/555805
Platform	Helmuth_Lab
Start Date	1999-07-04
End Date	2013-10-23

Project Information

Environmental signal analysis: Monitoring the impacts of climate change on rocky intertidal ecosystem across a cascade of scales (Monitoring Rocky Intertidal Ecosystems)

Website: http://www.northeastern.edu/helmuthlab/database/

Coverage: Global

Project description from NSF award abstract:
The rocky intertidal zone is a model ecosystem for evaluating the impacts of weather, climate, and climate change on natural ecosystems, as animals and plants living in this habitat frequently live very close to their thermal tolerance limits. Moreover, two organisms exposed to identical physical environments can experience radically different conditions at the level of the niche. Environmental signals measured at large spatial and temporal scales must be translated to the level of an organism's niche to hindcast, nowcast, and forecast the effects of climate and weather on the survival, reproduction and ecological interactions of organisms. The investigator has developed models and sensors for several species of intertidal organisms, specifically the mussel *Mytilus californianus* and the predatory seastar *Pisaster ochraceus*. Data relevant to mussels has been collected nearly continuously at a series of 9 sites along the west coast of North America since 1999, and these data show that patterns of physiological stress are likely to be far more complex than those predicted based on measurements at the habitat level (i.e. by buoy or satellite). Increases in body temperature have been observed over the last 5 years that are not reflected by onshore or offshore water or air temperature measurements, but instead are the result of complex interactions between multiple environmental parameters. Moreover, preliminary results suggest that predator and prey may experience markedly different patterns of temperature in space and in time. This result has significant implications for where and when we look for evidence of the impacts of climate change. The investigator will continue monitoring intertidal temperatures, currently the only long-terms series of its kind, and will expand the study to include the predatory seastar *Pisaster* through the use of thermally-matched sensors. He will use these data to test a series of hypotheses relating to patterns of risk of high and low temperature extremes. Data will also serve as an important source of information for physiological, ecological and biogeographic studies conducted by labs throughout the US. The investigator will produce a searchable, publicly-accessible database where individual temperature records can be downloaded by researchers and applied to physiological and ecological studies.

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0926581