Temperature and light time series in the Strait of Juan de Fuca, fall 2009 (Regenerated Nitrogen project)

Website: https://www.bco-dmo.org/dataset/514182
Data Type: Other Field Results
Version: 1
Version Date: 2014-07-08

Project
» The Role of Regenerated Nitrogen for Rocky Shore Productivity (Regenerated Nitrogen)

Contributors	Affiliation	Role
Pfister, Catherine	University of Chicago	Principal Investigator
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Abstract
Temperature and light levels for 41 intertidal locations at 5 sites in the Strait of Juan de Fuca, 2009.

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Coverage

Spatial Extent: **N**:48.394 **E**:-122.7774 **S**:48.1441 **W**:-124.74
Temporal Extent: 2009-04-25 - 2010-08-27

Dataset Description

Temperature and light levels for 41 intertidal locations at 5 sites in the Strait of Juan de Fuca, 2009.

Data Processing Description

Time was corrected and outlying values were removed.

BCO-DMO Processing:
Data was submitted as R data, with 2.2 million records.
Converted to .tsv file.

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Data Files

File
templight_date0.csv (Comma Separated Values (.csv), 324.98 MB) MD5:7ec3e048494c031f49dca9a3cd6861aa Primary data file for dataset ID 514182

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Related Publications

Kandur, A. S. (2014). The distribution of Mytilus californianus in the Strait of Juan de Fuca (Doctoral dissertation, The University of Chicago).
Related Research

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Parameters

Parameter	Description	Units
station	sampling place name	text - no units
sta_id	station code	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
site	place id number	integer
year	year	yyyy
month_local	month; local time	mm
day_local	day of month; local time	dd
time_local	local time of day	hhmm.fraction of minute
ISO_DateTime_Local	date/time (local) ISO formatted	yyyy-mm-ddThh:mm:ss[.xx]
yrday_local	local day and decimal time eg. 326.5 for the 326th day of the year or November 22 at 1200 hours (noon)	unitless
temp	temperature of seawater	degrees Celsius
light	light intensity	0-30,000 lumens/ft2 (0 to 320,000 lux)
pos_hor	horizontal position within a grid of loggers - Tatoosh I. only	unitless
pos_vert	vertical position within a grid of loggers	unitless
tide	tide height above mean lower low water (MLLW)	meters
temp_diff	temperature difference from what reference?	degrees Celsius
time_dif	time difference since when?	minutes? seconds?
date_start	local date at start of data collection	yyyy-mm-dd
date_end	local date at end of data collection	yyyy-mm-dd

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Water Temperature Sensor
Dataset-specific Description	HOBO Pendant Temperature/Light Data Logger 64K - UA-002-64 deployed in the intertidal zone. Sampling intervals varied but averaged around 10 min. The HOBO Pendant Temperature/Light Data Logger is a waterproof, two-channel logger with 10-bit resolution and can record up to approximately 3,500 (8K model) or 28,000 (64K model) combined temperature and light readings or internal logger events. The logger uses a coupler and optical base station with USB interface for launching and data readout by a computer.
Generic Instrument Description	General term for an instrument that measures the temperature of the water with which it is in contact (thermometer).

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Deployments

Pfister_shore_2008-10

Website	https://www.bco-dmo.org/deployment/511644
Platform	Pfister shore
Start Date	2008-07-02
End Date	2010-08-22
Description	Caged mussel growth study

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Project Information

The Role of Regenerated Nitrogen for Rocky Shore Productivity (Regenerated Nitrogen)

Website: http://pfisterlab.uchicago.edu

Coverage: coastal northeast Pacific Ocean

NSF Award Abstract:
A fundamental and persistent question in a multitude of ecosystems is the extent to which new versus regenerated nutrients support ecosystem productivity. In coastal marine systems, nitrate derived from upwelling (= new nitrogen) and ammonium regeneration in coastal waters and sediments (= regenerated nitrogen) are major nitrogen sources that fuel coastal ocean productivity. Because inorganic nitrogen availability clearly regulates production in a large number of areas, understanding nitrogen supply is essential. In open coast regions away from river mouths, nitrate inputs are determined by large-scale physical processes promoting upwelling of deep, nutrient-rich water including wind direction and intensity. In contrast, regenerated nitrogen (mainly ammonium) is generally the result of local animal and microbial processes. Along marine rocky shores, where upwelling is typically used as a proxy for productivity, we know very little about the dynamics of regenerated nutrients and their potential contribution to productivity at larger scales; only upwelling is typically used as a proxy for productivity. Associations of the abundant California mussel, Mytilus californianus, with water nutrients, algal productivity, stable isotope signatures, and microbial genetics indicate potentially strong regeneration of nitrogen by these animals and suggest an important secondary role of

nitrifying microbes affiliated with these animals.

In this project, the investigators will quantify the relative contribution of regenerated nitrogen on rocky shores through censuses and experiments across a gradient of mussel abundance. They will use stable nitrogen and oxygen isotopes of ammonium, nitrite, and nitrate to disentangle the contribution of different biological processes versus upwelling to the nitrogen supply and uptake of rocky shore regions. This includes both natural abundance and tracer addition studies.

Broader Impacts. Regenerated nitrogen supply, as opposed to new nitrogen via upwelling, is a local process dependent upon an intact animal community. However, mussels and other nearshore animals may be particularly vulnerable to a changing thermal environment, toxic algal blooms, and ocean acidification. Given the dramatic changes to the coastal nitrogen cycle in recent years, and potential changes to currents, upwelling, ocean chemistry, and El Niño frequencies portended by global changes to our climate, we to know the relative effect of local versus larger scale oceanic events on the nitrogen cycle. The proposed work links biological interactions in situ with its implications for coastal productivity.

In addition to expected publications in high quality journals, educational activities will continue to focus on graduate and undergraduate education and mentoring. The proposal will fund two graduate students and two undergraduates per year. The PI's will work closely with government (Olympic Marine National Sanctuary) and tribal (Makah Tribe) representatives to communicate this research. We will also work with Makah Museum Board of Trustees and the Makah Higher Education Committee to identify Makah students as research assistants. All three PI's teach broadly across their respective campuses, instructing almost every type of undergraduate major.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0928232

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