

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
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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.

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.

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]
yday_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/ft ² (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

We described patterns of nitrogen isotopes that change over spatial gradients of animal abundance, with isotopic enrichment patterns consistent with a role for animal excretion (Pfister et al, ms). We have quantified the microbes associated with intertidal mussels with metagenomics (Pfister et al. 2010 and 16S rRNA sequencing of the v4 region (Pfister et al, submitted). We used a novel experimental approach in which stable isotope tracers were added to exposed tidepools utilizing them as temporary mesocosms to quantify N transformation rates (Pather et al., L&O). Large tracer signals were observed over the typical 4-5 hr experimental period in both the dilution of the isotope label in its added form (NH₄⁺ or NO₃⁻) and the appearance of the label in products (e.g. NO₂⁻) The primary advantage was that all members of community participated in the experiment allowing us to recognize the complexity of nitrogen cycling in this system. This funding also supported long-term global change research on Tatoosh Island (Wootton &

Pfister 2012). Project Summary From Original Proposal 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 suggests an important secondary role of nitrifying microbes affiliated with these animals. We propose collaborative work to quantify the relative contribution of regenerated nitrogen on rocky shores through censuses and experiments across a gradient of mussel abundance. We 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. Relevant References: 2010. Pfister, C. A., F. Meyer, D. A. Antonopoulos. Metagenomic profiling of a microbial assemblage associated with the California mussel, *Mytilus californianus*: a node in networks of carbon and nitrogen cycling. PLoS ONE 5(5): e10518. doi:10.1371/ journal.pone.0010518. Metagenome data associated with this paper are uploaded to MGRAST server at <http://metagenomics.anl.gov/> 2012. Wootton, J. T. & C. A. Pfister. Carbon system measurements and potential climatic drivers at a site of rapidly declining ocean pH. PLoS ONE 7(12): e53396. doi:10.1371/ journal.pone.0053396. Data associated with this paper are uploaded to the World Ocean DataBase, <http://www.nodc.noaa.gov> in press. Pather, S., C. A. Pfister, M. Altabet, D. M. Post. Ammonium cycling in the rocky intertidal: remineralization, removal and retention. Limnology and Oceanography in review (1/2014). Pfister, C. A., M. Altabet, D. Post. Animal Regeneration and microbial retention of nitrogen along coastal rocky shores.

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Funding

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

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