PAR data from stable isotope experiments conducted in Massachusetts from 2012.

Website: https://www.bco-dmo.org/dataset/669741
Data Type: experimental
Version: 1
Version Date: 2016-12-08

Project
» Eutrophication Effects on Sediment Metabolism and Benthic Algal-bacterial Coupling: An Application of Novel Techniques in a LTER Estuary (Benthic_PP_at_TIDE)

Contributors	Affiliation	Role
Spivak, Amanda	Woods Hole Oceanographic Institution (WHOI)	Principal Investigator
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Abstract
PAR data from stable isotope experiments conducted in Massachusetts from 2012.

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Coverage

Temporal Extent: 2013-06-22 - 2013-10-16

Dataset Description

Photosynthetically active radiation (PAR; mmol photons m-2 s-1) was recorded with a LI-COR underwater spherical quantum sensor (LI-193) and datalogger (LI-1400) situated in the middle of the fiberglass tank during each of the stable isotope labeling experiments in June, August, and October.

Related References:

Spivak, AC and J Ossolinski. 2016. Limited effects of nutrient enrichment on bacterial carbon sources in salt marsh tidal creek sediments. Marine Ecology Progress Series. 544:107-130. 10.3354/meps11587

Methods & Sampling

Photosynthetically active radiation (PAR; umol photons m-2 s-1) was recorded with a LI-COR underwater spherical quantum sensor (LI-193) and datalogger (LI-1400) situated in the middle of the fiberglass tank.

Data Processing Description

BCO-DMO Data Processing Notes:

-reformatted column names to comply with BCO-DMO standards.
-added ISO_DateTime_UTC column
-replaced all blank cells with "nd"

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Data Files

File
PAR_data.csv (Comma Separated Values (.csv), 95.36 KB) MD5:809cbbe2607b914eae0465938a1ae34f Primary data file for dataset ID 669741

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Related Publications

Spivak, A., & Ossolinski, J. (2016). Limited effects of nutrient enrichment on bacterial carbon sources in salt marsh tidal creek sediments. Marine Ecology Progress Series, 544, 107–130. doi:10.3354/meps11587
Methods

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Parameters

Parameter	Description	Units
date	Date of sampling; mm/dd/yy	unitless
time	Time of sampling; HH:MM	unitless
PAR_H2O	Photosynthetically active radiation in water tank	nmol photons m-2 s-1
PAR_daytime	Photosynthetically active radiation; sampled in daytime	nmol photons m-2 s-1
PAR_lnH2O	Natural log of photosynthetically active radiation in tank	log
PAR_lndaytime	Natural log of photosynthetically active radiation during daytime	log
ISO_DateTime_UTC	Date/Time (UTC) ISO formatted	unitless

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Instruments

Dataset-specific Instrument Name	LI-COR underwater spherical quantum sensor (LI-193) and datalogger (LI-1400)
Generic Instrument Name	Photosynthetically Available Radiation Sensor
Dataset-specific Description	Situated in the middle of a fiberglass tank.
Generic Instrument Description	A PAR sensor measures photosynthetically available (or active) radiation. The sensor measures photon flux density (photons per second per square meter) within the visible wavelength range (typically 400 to 700 nanometers). PAR gives an indication of the total energy available to plants for photosynthesis. This instrument name is used when specific type, make and model are not known.

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Deployments

Spivak_2012

Website	https://www.bco-dmo.org/deployment/668449
Platform	shoreside Massachusetts
Start Date	2012-09-01
End Date	2015-08-15

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Project Information

Eutrophication Effects on Sediment Metabolism and Benthic Algal-bacterial Coupling: An Application of Novel Techniques in a LTER Estuary (Benthic_PP_at_TIDE)

Coverage: Plum Island Estuary, Rowley Massachusetts

Extracted from the NSF award abstract:
This project will address how rates of benthic microalgal production respond to eutrophication and geomorphological changes in human-impacted tidal creeks. Excess nutrient loading increases benthic algal biomass and likely stimulates production rates but the magnitude of nutrient and geomorphological effects on rates of production is unknown. Will changes in benthic algal productivity affect algal-bacterial coupling? Furthermore, how is algal-bacterial coupling affected by geomorphological changes, which may be exacerbated by excess nutrient loading but can also occur in pristine marshes?

This project will take advantage of the infrastructure of the TIDE project, a long-term saltmarsh eutrophication experiment at the Plum Island Ecosystem - Long Term Ecological Research site in Northeastern Massachusetts. Specifically, the PIs will measure benthic metabolism and examine algal- bacterial coupling in fertilized and ambient nutrient tidal creeks in the first field season. The following field season, they will compare sediment metabolism and carbon dynamics on slumped tidal creek walls (i.e. areas where low marsh has collapsed into the tidal creek) to that on the bottom of tidal creeks. In both years, gross and net production will be determined using an innovative triple oxygen isotope technique and traditional dissolved oxygen and inorganic carbon flux measurements. Comparisons between these methods will be useful in informing studies of sediment metabolism. Lipid biomarkers will be used to characterize the sources of organic matter to creek sediments, and stable isotope analysis of bacterial specific biomarkers to identify the sources of organic

carbon utilized by sediment bacteria. The biomarkers will reveal whether sediment bacteria use organic matter substrates, such as benthic microalgal carbon, selectively or in proportion to availability. Overall, results from the proposed study will provide important information about how sediment carbon dynamics in shallow tidal creeks respond to long term eutrophication. Furthermore, findings will enhance understanding of the role of tidal creeks in coastal biogeochemistry.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1233678

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