Wind speed, temperature, and PAR observations from Massachusetts from 2012-2015.

Website: https://www.bco-dmo.org/dataset/669760

Data Type: Other Field Results

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

Wind speed, temperature, and PAR observations from Massachusetts from 2012-2015.

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Coverage

Temporal Extent: 2014-06-20 - 2014-11-25

Dataset Description

Atmospheric conditions were recorded by three meteorological towers at PIE-LTER. Wind speed (m s-1) and temperature (deg C, T15min) were measured 14 m above the marsh (42.742 deg N, 70.830 deg W). Wind speed was scaled to 10m height (wnd10). Photosynthetically active radiation (PAR15min; umol m-2 s-1) was recorded by two towers that were deployed at different times between May-November (42.724 deg N, 70.856 deg W and 42.739 deg N, 70.827 deg W).Raw benthic chlorophyll and phaeophytin data from each experimental time point in June, August, and October 2013.

Acquisition Description

Data are from the PIE-LTER database and information on instrumentation can be found at http://ecosystems.mbl.edu/PIE/data/MON/MON-PR-Met15min2014.html

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

Processing Description

Wind data were scaled from 14m to 10m; temperature and PAR data are 15 minute averages.The file includes raw and log10-transformed benthic chlorophyll and phaeophytin data.

BCO-DMO Data Processing Notes:

-reformatted column names to comply with BCO-DMO standards.

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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

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Parameters

Parameter	Description	Units
date	Date of sampling; mm/dd/yyyy	unitless
time	Time of sampling; HH:MM	unitless
wind_speed	Wind speed was measured 14 m above the marsh; caled to 10m height	m s-1
temperature	Temperature was measured 14 m above the marsh.	celsius
PAR	Recorded by two towers that were deployed at different times between May and November	umol m-2 s-1
ISO_DateTime_UTC	Date/Time (UTC) ISO formatted	unitless

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Instruments

Dataset-specific Instrument Name	PAR sensor
Generic Instrument Name	Photosynthetically Available Radiation Sensor
Dataset-specific Description	Recorded by two towers that were deployed at different times between May-November
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.

Dataset-specific Instrument Name	Wind speed measured
Generic Instrument Name	Vector-Averaging Wind Recorder
Dataset-specific Description	Wind speed (m s-1) and temperature (deg C, T15min) were measured 14 m above the marsh. Wind speed was scaled to 10m height.
Generic Instrument Description	The Vector-Averaging Wind Recorder (VAWR) is a system designed by researchers at Woods Hole Oceanographic Institution (WHOI) to make surface meteorological measurements. The standard WHOI Vector Averaging Wind Recorder (VAWR) of the late 1980s through early 1990s was mounted on a toroid buoy (Dean and Beardsley, 1988). In addition to wind speed and direction, the VAWR could also be configured to record water temperature and conductivity data from sensors mounted at 1 meter depth on the mooring bridle of the buoy (Trask et al., 1995). References: Dean, JP and RC Beardsley. 1988. A vector-averaging wind recorder (VWAR) system for surface meteorological measurements in CODE (Coastal Ocean Dynamics Experiment). Published by Woods Hole Oceanographic Institution in Woods Hole Mass. Series: CODE technical report no. 44., WHOI-88-20, WHOI Technical report (Woods Hole Oceanographic Institution). 74 pp. Trask, Richard P.; Way, Bryan S.; Ostrom, William M.; Allsup, Geoffrey P.; Weller, Robert A. 1995. Arabian Sea mixed layer dynamics experiment : mooring deployment cruise report R/V Thomas Thompson cruise number 40, 11 October-25 October 1994. (WHOI DLA URI: http://hdl.handle.net/1912/482)

Dataset-specific Instrument Name	Temperature sensor
Generic Instrument Name	Air Temperature Sensor
Dataset-specific Description	Measured air temperature
Generic Instrument Description	Measures air temperature

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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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