Organic matter composition of the dominant plants in and around three marsh ponds in PIE-LTER (Rowley, MA) from 2014.

Website: https://www.bco-dmo.org/dataset/738188

Data Type: Other Field Results

Version: 1

Version Date: 2018-06-05

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
Ake, Hannah	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract

Organic matter composition of the dominant plant communities in and around three high marsh ponds within PIE-LTER. Data were collected in the summer of 2014.

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Coverage

Spatial Extent: **Lat**:42.738349 **Lon**:-70.809432

Temporal Extent: 2014 - 2014

Dataset Description

Organic matter composition of the dominant plant communities in and around three high marsh ponds within PIE-LTER. Data were collected in the summer of 2014.

Acquisition Description

The three ponds are located in the high marsh (1.43-1.46 m above North American Vertical Datum of 1988) of the Plum Island Ecosystems – Long Term Ecological Research (PIE-LTER) site. Leaves from *S. alterniflora*, *S. patens*, *R. maritima*, and *Ulva* were collected in August 2014 from across the marsh platform and all three ponds; tissues were combined in combusted (450 °C) glass jars to form species-specific composite samples. Benthic microalgae (BMA) were collected from ponds 1 and 2, as part of a separate study (July 2016), by placing combusted glass slides on surface sediments for one week and scraping attached material onto combusted glass fiber filters. All samples were frozen (-20 °C) until analysis for TOC, TN, $\delta^{13}C$, and $\delta^{15}N$. Samples were prepared for elemental and isotopic analyses by drying to constant mass (60 °C) and fuming with hydrochloric (HCl) acid to remove carbonates (Hedges and Stern 1984). Analyses were performed by the Stable Isotope Laboratory at the Marine Biological Laboratory (Woods Hole, MA). Isotopic data are reported in the conventional δ-notation in units of per mil (‰).

Processing Description

BCO-DMO Data Processing Notes:

-reformatted column names to comply with BCO-DMO standards
-filled in blank cells with "nd"

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Related Publications

Spivak, A. C., Gosselin, K. M., & Sylva, S. P. (2018). Shallow ponds are biogeochemically distinct habitats in salt marsh ecosystems. Limnology and Oceanography. doi:10.1002/lno.10797

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Parameters

Parameter	Description	Units
Plant	Plant species; Alterniflora = Spartina alterniflora Ruppia = Ruppia maritima Patens = Spartina patens Pond BMA = pond benthic microalgae	unitless
Pond	Site number	unitless
TOC	Percent total organic carbon	percent
d13C	d13C in units of per mil	per mil
TN	Percent total nitrogen	percent
d15N	d15N in units of per mil	per mil

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Deployments

Plum_Island

Website	https://www.bco-dmo.org/deployment/669365
Platform	shoreside Massachusetts
Start Date	2012-07-27
End Date	2012-08-15
Description	Plum Island, MA; LTER sites

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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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