Number of gene markers identified in sediment in samples from Little Lagoon, Alabama collected from 2012-2013.

Website: https://www.bco-dmo.org/dataset/723948
Data Type: Other Field Results
Version: 1
Version Date: 2018-01-16

Project
» Groundwater Discharge, Benthic Coupling and Microalgal Community Structure in a Shallow Coastal Lagoon (LittleLagoonGroundwater)

Contributors	Affiliation	Role
Mortazavi, Behzad	National Science Foundation (NSF-DEB)	Principal Investigator, Contact
Burnett, William C.	Florida State University (FSU - EOAS)	Co-Principal Investigator
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Abstract
Number of gene markers identified in sediment in samples from Little Lagoon, Alabama collected from 2012-2013.

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Coverage

Temporal Extent: 2012 - 2013

Dataset Description

Number of gene markers identified in sediment.

Methods & Sampling

Little Lagoon is a shallow coastal lagoon that is tidally connected to the Gulf of Mexico but has no riverine inputs. The water in the lagoon is replenished solely from precipitation and groundwater inputs primarily on the East end (Su et al. 2012). Because of the rapid development in Baldwin County, a large amount of NO3- enters the Little Lagoon system through SGD (Murgulet & Tick 2008). In this region, there can be rapid changes in the depth to groundwater (Fig. 4.1 inset) and episodic SGD inputs to the lagoon (Su et al.2013). Within the lagoon, three sites were selected (East, Mouth, and West) to represent the gradient that exists across the lagoon from the input of groundwater. Sites were sampled on a near-monthly basis from February 2012 to February 2013.

Additional methodology can be found in:

Bernard, Rebecca & Mortazavi, Behzad & A. Kleinhuizen, Alice. (2015). Dissimilatory nitrate reduction to

ammonium (DNRA) seasonally dominates NO3− reduction pathways in an anthropogenically impacted sub-tropical coastal lagoon. Biogeochemistry. 125. 47-64. 10.1007/s10533-015-0111-6.

Data Processing Description

Data were flagged as below detection limits if no measurable rates were returned after calculations. See equations in methodology section of:

Bernard, Rebecca & Mortazavi, Behzad & A. Kleinhuizen, Alice. (2015). Dissimilatory nitrate reduction to ammonium (DNRA) seasonally dominates NO3− reduction pathways in an anthropogenically impacted sub-tropical coastal lagoon. Biogeochemistry. 125. 47-64. 10.1007/s10533-015-0111-6.

Statistical Analysis

To test the seasonal flux variability between sites in Little Lagoon, two-way ANOVAs with site and date as independent variables were performed. When data could not be transformed to meet ANOVA assumptions, Wilcoxon/Kruskal-Wallis nonparametric tests were used. When significant differences occurred, Tukey HSD or Steel-Dwass post hoc tests were used to determine significant interactions. A Principal component analysis (PCA) was conducted on all biogeochemical parameters to identify underlying multivariate components that may be influencing N fluxes. Spearman's rho correlation analysis was used to examine the relationship between the principal components and fluxes. Statistical significance of the data set was determined at $\alpha=0.05$ and error is reported as standard error. All statistical analyses were performed in SAS JMP 10 (SAS Institute Inc.).

BCO-DMO Data Processing Notes:

- Data reorganized into one table under one set of column names
- Units removed from column names
- Column names reformatted to meet BCO-DMO standards
- Information captured in original column names entered under column Value_Description
- Created column Year to describe to capture the metadata in the file name

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Data Files

File
gene_copies.csv (Comma Separated Values (.csv), 1.68 KB) MD5:6dbf5fc73eb0d488de9d4146bedca1c6 Primary data file for dataset ID 723948

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Related Publications

Bernard, R. J., Mortazavi, B., & Kleinhuizen, A. A. (2015). Dissimilatory nitrate reduction to ammonium (DNRA) seasonally dominates NO3 − reduction pathways in an anthropogenically impacted sub-tropical coastal lagoon. Biogeochemistry, 125(1), 47–64. doi:10.1007/s10533-015-0111-6
Methods

Murgulet, D., & Tick, G. R. (2008). Assessing the extent and sources of nitrate contamination in the aquifer system of southern Baldwin County, Alabama. Environmental Geology, 58(5), 1051–1065. doi:10.1007/s00254-008-1585-5
Methods

Su, N., Burnett, W.C., Eller, K.T., MacIntyre, H.L., Mortazavi, B., Leifer, J., Novoveska, L. (2012). Radon and radium isotopes, groundwater discharge and harmful algal blooms in Little Lagoon, Alabama. Interdisciplinary Studies on Environmental Chemistry, 6, 329–337.
Methods

Su, N., Burnett, W.C., MacIntyre, H.L., Liefer, J.D., Peterson, R.N., Viso, R. (2013). Natural radon and radium isotopes for assessing groundwater discharge into Little Lagoon, AL: implications for harmful algal blooms. Estuaries Coasts, 1–18
Methods

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Parameters

Parameter	Description	Units
Year	Year ID that samples were taken	unitless
Date	Month and day that samples were taken; MMM-DD	unitless
Value_Description	Description of the measurment taken; description includes relevant units for each sample taken. Descriptions include: bac amoA = gene marker for nitrification; nirK = gene marker for denitrification; nirS = gene marker for denitrification; nrfA = gene marker for dissimilatory nitrate reduction ot ammonium; dsrB = gene marker for sulfate reduction; nifH = gene marker for N2 fixation	unitless
Mouth	Number of gene markers identified in sediment at the site Mouth; location of site is 30.243683, -87.738407	g-1 sediment
Mouth_SE	Standard error for gene markers identified in sediment	g-1 sediment
East	Number of gene markers identified in sediment at the site East; location of site is 30.253347, -87.724729	g-1 sediment
East_SE	Standard error for gene markers identified in sediment	g-1 sediment
West	Number of gene markers identified in sediment at the site West; location of site is 30.247181, -87.767856	g-1 sediment
West_SE	Standard error for gene markers identified in sediment	g-1 sediment

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Deployments

LittleLagoon

Website	https://www.bco-dmo.org/deployment/528089
Platform	SmallBoat_FSU
Start Date	2010-04-05
End Date	2013-08-17
Description	The sampling sites were all accessed from small boats, here amalgamated to one deployment called LittleLagoon.

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Project Information

Groundwater Discharge, Benthic Coupling and Microalgal Community Structure in a Shallow Coastal Lagoon (LittleLagoonGroundwater)

Coverage: southern Alabama, east of Mobile

This project investigated the link between submarine groundwater discharge (SGD) and microalgal dynamics in Little Lagoon, Alabama. In contrast to most near-shore environments, it is fully accessible; has no riverine inputs; and is large enough to display ecological diversity (c. 14x 0.75 km) yet small enough to be comprehensively sampled on appropriate temporal and spatial scales. The PIs have previously demonstrated that the lagoon is a hot-spot for toxic blooms of the diatom *Pseudo-nitzchia spp.* that are correlated with discharge from the surficial aquifer. This project assessed variability in SGD, the dependence of benthic nutrient fluxes on microphytobenthos (MPB) abundance and productivity, and the response of the phytoplankton to nutrient enrichment and dilution. The work integrated multiple temporal and spatial scales and demonstrated both the relative importance of SGD vs. benthic recycling as a source of nutrients, and the role of SGD in structuring the microalgal community. (*paraphrased from Award abstract*)

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0962008

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