15NO3 data, acetylene reduction assays, and NH4+ diffusion average summaries from samples collected in Little Lagoon, Alabama from 2012 to 2013.

Website: https://www.bco-dmo.org/dataset/723935

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

15NO3 data, acetylene reduction assays, and NH4+ diffusion average summaries from samples collected in Little Lagoon, Alabama from 2012 to 2013.

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Coverage

Spatial Extent: **Lat**:30.241929 **Lon**:-87.773756

Temporal Extent: 2012 - 2013

Dataset Description

Average summary data from samples collected in Little Lagoon, Alabama.

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 (Murgule & 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.

Acquisition Description

The methodology for these data can be found in the associated publication:

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.

Processing Description

Data Processing:

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

Additional processing 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.

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
- Created columns lat and lon to describe site locations
- Created column Year to describe to capture the metadata in the file name

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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

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

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.

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

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Parameters

Parameter	Description	Units
Year	Year ID that samples were taken	unitless
Value_Description	Month and day that samples were taken; MMM-DD	unitless
lat	Latitude	decimal degrees
lon	Longitude	decimal degrees
Site	Site where samples were taken	unitless
Avg_p14	Average ambient denitrification rates	umol N m-2 d-1
Avg_p14_SE	Standard error of average ambient denitrification rates	umol N m-2 d-1
Avg_DNF	Average denitrification rates	umol N m-2 d-1
Avg_DNF_SE	Standard error of average denitrification rates	umol N m-2 d-1

Avg_anammox	Average anerobic ammonium oxidation	umol N m-2 d-1
Avg_anammox_SE	Standard error of average anerobic ammonium oxidation	umol N m-2 d-1
Avg_D15	Average denitrification from added heavy labeled isotope	umol N m-2 d-1
Avg_D15_SE	Standard error of average denitrification from added heavy labeled isotope	umol N m-2 d-1
Ave_Pot_DNF	Average potential denitrification rates	umole m-2 d-1
Ave_Pot_DNF_SE	Standard error of average potential denitrification rates	umole m-2 d-1
Total_N2_fixation	Total nitrogen fixation	umole m-2 d-1
Total_N2_fixation_SE	Standard error of total nitrogen fixation	umole m-2 d-1
SRB_N2_fixation	Nitrogen fixation attributed to sulfate reducing bacteria	umole m-2 d-1
SRB_N2_fixation_SE	Standard error of nitrogen fixation attributed to sulfate reducing bacteria	umole m-2 d-1
Avg_D	Average D 15NO3 slurries	umole N m-2 d-1
error_propogate_29	Error for average D 15NO3 slurries; propogate 29	umole N m-2 d-1
Avg_A	Average A 15NO3 slurries	umole N m-2 d-1
error_propogate_30	Error for average A 15NO3 slurries; propogate 30	umole N m-2 d-1
Avg_ra_percent	Average ra percent	percent
Avg_DNRA	Average dissimilatory nitrate reduction to ammonium	umole N m-2 d-1
Avg_DNRA_SE	Standard error of average dissimilatory nitrate reduction to ammonium	umole N m-2 d-1

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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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