Bubble flux measurements and concentrations at two sites on the Virginia Eastern Shore, July 2017

Website: https://www.bco-dmo.org/dataset/772793
Data Type: Other Field Results
Version: 1
Version Date: 2019-07-11

Project
» Toward an Improved Understanding of Blue Carbon: The Role of Seagrasses in Sequestering CO2 (Seagrass Blue Carbon)

Contributors	Affiliation	Role
Long, Matthew H.	Woods Hole Oceanographic Institution (WHOI)	Principal Investigator
Burdige, David J.	Old Dominion University (ODU)	Co-Principal Investigator
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Abstract
Bubble flux measurements and concentrations at two sites on the Virginia Eastern Shore, July 2017.

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Coverage

Spatial Extent: **N**:37.344 **E**:-75.798 **S**:37.266 **W**:-75.835
Temporal Extent: 2017-07-14 - 2017-07-21

Dataset Description

Bubble flux measurements and concentrations at two sites on the Virginia Eastern Shore, July 2017.

Methods & Sampling

Gas fluxes from simple inverted bubble traps described in:

Oxygen % of samples was determined by isotope ratio mass spectrometry (IRMS) and an oxygen optode.

These data will be published in Long MH, Sutherland K, Wankel SD, Burdige DJ, Zimmerman RC. Ebullition of Oxygen from Seagrasses under Supersaturated Conditions. In Revision: Limnology and Oceanography.

Data Processing Description

BCO-DMO Processing:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- reduced precision of O2_Ar and d18O to match input
- split date_time column into separate date, time and ISO_DateTIme_Local columns
- added lat and lon columns from associated dataset

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Data Files

File
bubble_flux.csv (Comma Separated Values (.csv), 3.43 KB) MD5:28c59a378893779ace06475d679dcd06 Primary data file for dataset ID 772793

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Parameters

Parameter	Description	Units
date_local	sampling date	unitless
time_local	sampling time (local)	unitless
ISO_DateTime_Local	date and time in ISO format: yyyy-mm-ddTHH:MM:SS	unitless
Site	sampling location	unitless
Traps	number of bubble traps deployed	traps
Deployment_duration	duration of bubble trap deployment	hours
Gas_Flux	gas flux measurement	microMol/meter^2/hour (mMol/m2/h)
Gas_Flux_stdev	standard deviation of gas flux measurement	microMol/meter^2/hour (mMol/m2/h)
Gas_samples	number of gas samples analyzed	samples
O2_Optode	oxygen concentration from optode	percent
O2_Optode_stdev	standard deviation of oxygen concentration from optode	percent
O2_Ar	ratio of oxygen to argon	unitless
O2_Ar_stdev	standard deviation of ratio of oxygen to argon	unitless
d18O	ratio oxygen 16 to oxygen 18 corrected to PDB standard	parts per thousand (ppt)
d18O_stdev	standard deviation of delta 18O	parts per thousand (ppt)
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees

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Project Information

Toward an Improved Understanding of Blue Carbon: The Role of Seagrasses in Sequestering CO2 (Seagrass Blue Carbon)

Coverage: Chesapeake Bay, Northern Gulf of Mexico, and Bahamas Banks

NSF abstract:

This research will develop a quantitative understanding of the factors controlling carbon cycling in seagrass meadows that will improve our ability to quantify their potential as blue carbon sinks and predict their future response to climate change, including sea level rise, ocean warming and ocean acidification. This project will advance a new generation of bio-optical-geochemical models and tools (ECHOES) that have the potential to be transform our ability to measure and predict carbon dynamics in shallow water systems.

This study will utilize cutting-edge methods for evaluating oxygen and carbon exchange (Eulerian and eddy covariance techniques) combined with biomass, sedimentary, and water column measurements to develop and test numerical models that can be scaled up to quantify the dynamics of carbon cycling and sequestration in seagrass meadows in temperate and tropical environments of the West Atlantic continental margin that encompass both siliciclastic and carbonate sediments. The comparative analysis across latitudinal and geochemical gradients will address the relative contributions of different species and geochemical processes to better constrain the role of seagrass carbon sequestration to global biogeochemical cycles. Specifically the research will quantify: (i) the relationship between C stocks and standing biomass for different species with different life histories and structural complexity, (ii) the influence of above- and below-ground metabolism on carbon exchange, and (iii) the influence of sediment type (siliciclastic vs. carbonate) on Blue Carbon storage. Seagrass biomass, growth rates, carbon content and isotope composition (above- and below-ground), organic carbon deposition and export will be measured. Sedimentation rates and isotopic composition of PIC, POC, and iron sulfide precipitates, as well as porewater concentrations of dissolved sulfide, CO2, alkalinity and salinity will be determined in order to develop a bio-optical-geochemical model that will predict the impact of seagrass metabolism on sediment geochemical processes that control carbon cycling in shallow waters. Model predictions will be validated against direct measurements of DIC and O2 exchange in seagrass meadows, enabling us to scale-up the density-dependent processes to predict the impacts of seagrass distribution and density on carbon cycling and sequestration across the submarine landscape.

Status, as of 09 June 2016: This project has been recommended for funding by NSF's Division of Ocean Sciences.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1635403
NSF Division of Ocean Sciences (NSF OCE)	OCE-1633951

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