Reference carbon and nitrogen concentrations, and isotope ratios from alfalfa, nylon-6, bovine liver, and enriched alanine

Website: https://www.bco-dmo.org/dataset/746325
Data Type: Other Field Results
Version: 1
Version Date: 2018-09-11

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

Contributors	Affiliation	Role
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Abstract
This dataset includes results of carbon and nitrogen analyses on reference materials including alfalfa, nylon-6, bovine liver, and enriched alanine. The reference materials were analyzed for Carbon, Nitrogen, delta-13C, and delta-15N by the Stable Isotope Facility, U.C. Davis using a PDZ Europa ANCA-GSL elemental analyzer interfaced to a PDZ Europa 20-20 isotope ratio mass spectrometer (Sercon Ltd., Cheshire, UK).

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Coverage

Spatial Extent: **N**:37.343211 **E**:-75.732307 **S**:29.853211 **W**:-84.551509
Temporal Extent: 2017-05 - 2017-07

Dataset Description

This dataset includes results of carbon and nitrogen analyses on reference materials including alfalfa, nylon-6, bovine liver, and enriched alanine. The reference materials were analyzed for Carbon, Nitrogen, delta-13C, and delta-15N by the Stable Isotope Facility, U.C. Davis using a PDZ Europa ANCA-GSL elemental analyzer interfaced to a PDZ Europa 20-20 isotope ratio mass spectrometer (Sercon Ltd., Cheshire, UK).

Data Processing Description

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions

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Data Files

File
references_CN.csv (Comma Separated Values (.csv), 9.07 KB) MD5:59fde7ba8cc040663c3942a636876985 Primary data file for dataset ID 746325

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Parameters

Parameter	Description	Units
Reference	type of material used as a reference	unitless
Analysis	analysis (sample) identifier	unitless
Weight_ug	sample weight	micrograms
C_Amount_ug	mass of Carbon in the sample	micrograms
d13C	the ratio of stable isotopes 13C:12C	unitless
N_Amount_ug	mass of Nitrogen in the sample	micrograms
d15N	the ratio of stable isotopes 15N:14N	unitless

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Instruments

Dataset-specific Instrument Name	PDZ Europa ANCA-GSL elemental analyzer
Generic Instrument Name	Elemental Analyzer
Dataset-specific Description	Used for chemical and isotope analyses.
Generic Instrument Description	Instruments that quantify carbon, nitrogen and sometimes other elements by combusting the sample at very high temperature and assaying the resulting gaseous oxides. Usually used for samples including organic material.

Dataset-specific Instrument Name	PDZ Europa 20-20 isotope ratio mass spectrometer (Sercon Ltd., Cheshire, UK)
Generic Instrument Name	Isotope-ratio Mass Spectrometer
Dataset-specific Description	Used for chemical and isotope analyses.
Generic Instrument Description	The Isotope-ratio Mass Spectrometer is a particular type of mass spectrometer used to measure the relative abundance of isotopes in a given sample (e.g. VG Prism II Isotope Ratio Mass-Spectrometer).

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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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