

Fluorescent Dissolved Organic Matter (fDOM) data from Groves Creek salt marsh, Skidaway Island Georgia, USA, 2013-2015

Website: <https://www.bco-dmo.org/dataset/682889>

Data Type: Other Field Results

Version: 1

Version Date: 2017-02-21

Project

» [Tempo and mode of salt marsh exchange](#) (GrovesCreek)

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Abstract

This dataset includes both original and temperature corrected fluorescent Dissolved Organic Matter (fDOM) data from Groves Creek salt marsh, Skidaway Island Georgia, USA, from July 2013 to March 2015.

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Coverage

Spatial Extent: Lat:31.97 Lon:-81.02

Temporal Extent: 2013-07-26 - 2015-03-12

Methods & Sampling

fDOM fluorometry sampling:

fDOM concentrations at S2 and S8 were evaluated using Wetlabs FLCD shuttered fluorometers sampling at 15 minute intervals. The deployment scheme for the FLCD units was identical to that for the YSIs. The YSIs, fDOM (and chlorophyll) fluorometers were swapped out on the same schedules. At S2, the fluorometers were also mounted below the “moon pool” of the floating dock and were ~ 1m from the YSIs. At S8, they were collocated on the bottom frame with the other instruments.

Data Processing Description

Raw fDOM fluorescence output (counts) have been manipulated three ways:

Counts were converted to fDOM ppb quinine sulfate equivalents (QSEs) using the manufacturer calibration data provided for each unit.

Data were corrected for quenching of fluorescence at higher temperatures. Lab experiments showed that fluorescence of a given source water declined linearly by ~20% between 20-40C. A pooled regression correction was applied to all units to compensate for the lowered fluorescence response at higher temperatures. All fluorescence data are normalized to fluorescence at 20C.

Fluorescence offsets (as QSEs) between units during successive deployments were corrected using a multi-step procedure

- Obvious bad data were excised from the records
- Each individual deployment output was smoothed using a weighted 8 point local regression routine (Matlab 'rloess') to suppress spiky outliers.
- Each fluorometer output was then adjusted up or down based on their mean intercalibration and deployment overlap offsets to bring them all in rough alignment.
- The mean of the residual overlap gaps for each successive deployment was determined, and a Matlab pchip spline was applied to connect those points.
- Each deployment record was made to conform to the spline curve fit so that the overlapping endpoints had a mean difference -> 0 and possessed a smooth transition between successive deployments.
- The concatenated data file was linearly interpolated onto a 10 minute time vector to facilitate intercomparison of records.
- No attempt to date has been made to correct the fluorescence data for quenching due to turbidity in the water column.

BCO-DMO Processing notes:

- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- added station, lat, lon, date, time, ISO_DateTime columns
- ISO Date format generated from date and time values
- reduced decimal places of fDOM and temperature to 3 places

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Data Files

File
fDOM.csv (Comma Separated Values (.csv), 12.26 MB) MD5:228994c3c36a9a58f94f6128cd0fd527
Primary data file for dataset ID 682889

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Parameters

Parameter	Description	Units
station	station identifier	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
date	UTC date formatted as yyyy-mm-dd	unitless
time	UTC time; formatted as hh:mm	unitless
ISO_DateTime.UTC	Date/Time (UTC) ISO formatted based on ISO 8601:2004(E) with format YYYY-mm-ddTHH:MM:SS[.xx]Z	unitless
datenum_matlab	MATLAB formatted datenum	unitless
fDOM	Fluorescent Dissolved Organic Matter (fDOM); the optically active component of the dissolved organic matter in water. Excitation wavelength 370nm. Emission wavelength 460nm.	QSE (quinine sulfate equivalents) ppb
fDOM_temp_corrected	Temperature corrected Fluorescent Dissolved Organic Matter (fDOM) concentration	QSE (quinine sulfate equivalents) ppb

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Instruments

Dataset-specific Instrument Name	Wetlabs FLCD shuttered fluorometers
Generic Instrument Name	Fluorometer
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

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Deployments

Groves_Creek_2013-2015

Website	https://www.bco-dmo.org/deployment/682763
Platform	Groves Creek - SkIO
Start Date	2013-07-26
End Date	2015-03-11
Description	Studies of temporal and compositional changes in exported material in a saltmarsh, both the quantity and quality of dissolved organic matter (DOM) and particulate organic matter (POM) exported from Groves Creek.

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Project Information

Tempo and mode of salt marsh exchange (GrovesCreek)

Website: <http://www.skio.uga.edu>

Coverage: Salt marsh east of Savannah, Georgia, USA.

Description from NSF award abstract:

Salt marshes are critical mediators of the flux of material between the terrestrial and marine realms. The balance of material import, export, and transformation affects both the marsh itself and the surrounding estuary. Previous efforts to understand the role of marshes have concentrated either on examining temporal changes (often at low resolution) of bulk exports, or compositional changes in exported material with little regard for its temporal variability. Researchers working at the Skidaway Institute of Oceanography contend that both the quantity and quality of materials exchanged between marsh and estuary in tidally-dominated systems along the southeastern US coast vary significantly in response to semidiurnal, diurnal, tidal, meteorological and seasonal forcing, and that this variability must be included when considering the total contributions of marshes to carbon cycling along the land-ocean boundary. This study will utilize a three-pronged strategy to assess both the quantity and quality of dissolved organic matter (DOM) and particulate organic matter (POM) exported from Groves Creek, a well-characterized meso-tidal salt marsh in coastal Georgia. In particular, by evaluating how marsh function responds to a full spectrum of present environmental conditions, this project will provide tangible insight into how carbon cycling in these critical regions will respond to anticipated changes in those conditions.

This project is related to the project "Marine priming effect - molecular mechanisms for the biomineralization of terrigenous dissolved organic matter in the ocean" found at <https://www.bco-dmo.org/project/554157>.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1234704

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