# Oxygen profiles from sediment core samples collected in the back barrier island bays on Virginia's Eastern Shore in July 2017

**Website**: https://www.bco-dmo.org/dataset/745987
**Data Type**: Other Field Results
**Version**: 1
**Version Date**: 2018-10-15

**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 oxygen profiles from sediment core samples collected in the back barrier island bays on Virginia's Eastern Shore in July 2017.

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## Coverage

**Spatial Extent**: **N**:37.344 **E**:-75.798 **S**:37.266 **W**:-75.835
**Temporal Extent**: 2017-07-12 - 2017-07-21

## Dataset Description

This dataset includes oxygen profiles from sediment core samples collected in the back barrier island bays on Virginia's Eastern Shore in July 2017.

### Methods & Sampling

Sediment cores were collected by divers, sealed in the field with rubber stoppers and returned to the lab for processing. Pore waters were collected by inserting rhizon samplers (Seeberg-Elverfeldt et al., 2005) through pre-drilled holes in the core tubes. Samples were collected in gas-tight glass syringes and filtered through 0.45 µm nylon filters into storage vials. Oxygen profiles in the cores were collected with polarographic microelectrodes (Luther et al., 2008) using a DLK 70 WebPstat electrochemical analyzer (AIS, Inc.) and a computer-controlled micro-profiler.

### 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
- added columns for site, lat, and lon
- reformatted collection date and time from m/d/yyyy H:MM to YYYY-MM-DDTHH:MM:SS (ISO 8601:2004E)
- transformed table to flat format by reproducing rows core, profile, datetime_collected and scanned to columns for each depth/O2 record

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## Data Files

| File |
|---|
| **ES_2017_O2_profiles.csv** (Comma Separated Values (.csv), 14.21 KB) MD5:205e8363cb9f00f85d4e7a6ce6b5e181<br>Primary data file for dataset ID 745987 |

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## Related Publications

Luther, G. W., Glazer, B. T., Ma, S., Trouwborst, R. E., Moore, T. S., Metzger, E., … Brendel, P. J. (2008). Use of voltammetric solid-state (micro)electrodes for studying biogeochemical processes: Laboratory measurements to real time measurements with an in situ electrochemical analyzer (ISEA). Marine Chemistry, 108(3-4), 221–235. doi:10.1016/j.marchem.2007.03.002
*Methods*

Seeberg-Elverfeldt, J., Schlüter, M., Feseker, T., & Kölling, M. (2005). Rhizon sampling of porewaters near the sediment-water interface of aquatic systems. Limnology and Oceanography: Methods, 3(8), 361–371. doi:10.4319/lom.2005.3.361
*Methods*

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## Parameters

| Parameter | Description | Units |
|---|---|---|
| site | sample collection site identifier | unitless |
| lat | latitude; north is positive | decimal degrees |
| lon | longitude; east is positive | decimal degrees |
| core | core number | unitless |
| profile | profile replicate identifier | unitless |
| ISO_DateTime_Local_collected | local date and time sample was collected; formatted as YYYY-MM-DDTHH:MM:SS (ISO 8601:2004€ ) | unitless |
| ISO_DateTime_Local_scan | local date and time of scan; formatted as YYYY-MM-DDTHH:MM:SS (ISO 8601:2004€ ) | unitless |
| depth_cm | depth of oxygen reading within the core sample | centimeters |
| O2_uM | dissolved oxygen concentration | microMoles |

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## Instruments

| | |
|---|---|
| **Dataset-specific Instrument Name** | DLK 70 WebPstat electrochemical analyzer |
| **Generic Instrument Name** | Oxygen Microelectrode Sensor |
| **Dataset-specific Description** | Oxygen was measured with polarographic microelectrodes using a DLK 70 WebPstat electrochemical analyzer (AIS, Inc.) and a computer-controlled micro-profiler. |
| **Generic Instrument Description** | Any microelectrode sensor that measures oxygen. |

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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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