

Data Management Plan

The data management procedures in this project will adhere to and are guided by the requirements of the Division of Ocean Sciences Sample and Data Policy as described in document NSF 17-037 (<https://www.nsf.gov/pubs/2017/nsf17037/nsf17037.jsp>)

Data and sample collection

Field studies:

The field work includes the collection of sediment cores and associated environmental data. GPS, temperature, salinity, and flow velocity are measured at Destin Inlet, Pensacola Beach and Marathon Key. Samples are collected during each field campaign in project years 1, 2 and 3.

Lab studies:

The data collection in the laboratory studies includes results produced by chamber and column experiments. These experiments generate data that characterize the water column and sediment and data that include information on the particle and solute layers forming within the sediment.

Analyses

Field data and samples:

- **Site characterization** data include gas flow, temperature, oxygen and carbon dioxide readings.
- **Sediment** samples are analyzed for grain size spectrum, permeability, porosity, Chl a content, and C and N content. Sedimentary pigments are measured by EEMs fluorescence spectroscopy.
- **Porewater particle content** is characterized using image analysis (abundance, dimensions, color, type), flow cytometer analyses (cell counts), particulate organic carbon (POC), and total nitrogen content (TN)
- **Porewater dissolved organic matter (DOM)** is characterized using Excitation–emission matrix (EEM) fluorescence spectroscopy and total organic carbon (TOC) and total nitrogen content (TN). Pigments are measured by high performance liquid chromatography (HPLC). In samples with high DOM concentration, DOM is also analyzed with pyrolysis-GC-MS and GC/MS in selected ion monitoring mode.

Lab data and samples:

Experimental settings: Readings of oxygen, temperature and conductivity sensors provide key environmental data for the laboratory experiments.

Flux chamber experiments produce data on sediment and gas fluxes

- Sediment samples are analyzed for grain size spectrum, permeability, porosity, and organic content.

Velocity gradient column experiments measure the same parameters as listed for the flux chamber experiments. In addition, these experiments produce data on sediment oxygen consumption and carbon dioxide production.

Data processing:

The Shimadzu combustion carbon/nitrogen analyzer TOC_{VCSH} software produces calibrated C and N content data. Likewise, the software of the Shimadzu HPLC system generates calibrated spectra that are interpreted using the calibration standards. Raw data are processed using OriginLab, SigmaPlot, ImageJ and Excel software to produce tables, figures and macros for automated data processing.

Documentation and metadata

Metadata will be compiled using NOAA's Metadata Enterprise Resource Management Aid and according to the guidelines provided by the Biological and Chemical Oceanography Data Management Office (BCO-DMO) (<https://www.bco-dmo.org/>). A Dataset Metadata Form will be completed for each dataset contributed to BCO-DMO.

Field data units: GPS data (Lat/Long), flow velocity profiles (direction, cm s⁻¹), salinity (mg L⁻¹), temperature (°C), oxygen (μmol L⁻¹), and chlorophyll (μg L⁻¹).

Sediment data units: grain size (μm), permeability (m²), porosity (%), Chl a content (μg L⁻¹), and C and N content (μmol L⁻¹). Sedimentary pigments (μg L⁻¹).

Porewater particulate matter data units: Particulate matter max concentration depth (mm), particle size (μm), particle color (RGB values), particle C and N content (μmol g⁻¹).

Porewater dissolved matter data units: dissolved matter max concentration depth (mm), salinity (mg L⁻¹), pH (unitless), C content (μmol L⁻¹), N content (μmol L⁻¹), pigment content (μg L⁻¹), excitation-emission matrices (nm x nm), GC/MS (abundance x m/z)

Respiration data: oxygen (μmol L⁻¹), carbon dioxide (μmol L⁻¹)

Data availability

Metadata files, full data sets, and derived data products will be made publicly accessible within two years of collection. The Biological and Chemical Oceanography Data Management Office (BCO-DMO, <https://www.bco-dmo.org/>) is used as the primary data management archive. When the award is initialized, BCO-DMO will be contacted and the project will be registered by submitting project metadata. Updates on the status of metadata and data archival will be included in the Annual Project Reports, and the compliance with this Data Management Plan will be documented in the Final Project Report. For data submissions that are due after the Final Report, we will report plans for final data submission.

Publication of data and analyses

Results of this project will be presented at international science conferences (e.g. ASLO, AGU) and published in peer-reviewed papers submitted to international scientific journals. With these publications, subsets of the data will be made available also as in Web Appendices that several journals now manage (e.g. L&O).