

Data Management Plan

I. Title and Contact Information.

- a. **Title:** Collaborative Research: Planktonic Sources of Chromophoric Dissolved Organic Matter in Seawater
- b. **Point of Contact:** Christopher Osburn, NC State University, closburn@ncsu.edu

II. Types of Data.

a. Data Description. DOM biogeochemical and bacterial metabolic measurements from the proposed study will be stored as relevant corrected values. These include the calibration and verification of chemical analyses (absorption and fluorescence spectra; DOC/POC concentrations, C and N stable isotopes) using certified standards. Stable C isotope values will be calibrated and normalized on the Vienna PDB scale, while stable N isotopes will be calibrated to air. CDOM fluorescence will be calibrated in quinine sulfate units (QSU). Appropriate metadata will be stored with DOM data. Bacterial metabolic rates will include extracellular enzymatic activities measured via increase in fluorescence (MUF/MCA substrates) and change in substrate molecular weight (fluorescently labeled plankton extracts per volume and over time. Bacterial biomass production will be measured through 3-H leucine incorporation, converted to production of bacterial carbon per volume and time. It is expected that the results of the two cruises will be published as Ocean Data View maps; processed data used in those maps will constitute the data to be archived. Several hundred MB of data are expected to be generated. In addition to aforementioned results, individual EEMs of samples will be archived. This project will also result in the establishment algal culture strains which will be kept and maintained at least for the duration of the project period and made available to the scientific community upon request after project completion. Algal cell abundance and growth measurement will be stored together with the data derived on other chemical and biological information.

b. Existing and Ancillary Data. Existing BEPOM absorption and fluorescence data, and chlorophyll a data are held by the PIs was presented in the proposal. Ancillary data will consist of oceanographic CTD results (depth, temperature, salinity, density, dissolved oxygen), BEPOM and CDOM absorbance and fluorescence of discrete samples from New York Bight to be collected by Co-PI Ziervogel in October 2012.

III. Data and metadata formats, standards, and organization.

- a. **Formats.** Results from phytoplankton growth experiments will be stored on the computers of the PIs (e.g. as Excel spreadsheets). Raw data and processed results will also be stored on password-secured web platforms (e.g., Sakai). Field results will be organized geospatially in ASCII files, except for the fluorescence results which will be stored separately by station name (searchable by lat/long) as ASCII files. Associated metadata will describe the format of optical, biological, and chemical results. The complete data set from the proposed work will be made available through the Biological Chemical Oceanographic-Data Management Office (BCO-DMO). NetCDF conversion will be made where advised by database managers at BCO-DMO. ASCII format will ensure widest readability and ease of viewing data in spreadsheet (e.g. Excel) or technical computing (e.g., Matlab, SAS) software. OceanDataView files will be made available in addition to processed figures.
- b. **Metadata.** PI Osburn will use the BCO-DMO forms to submit metadata to the archive. He will consult with BCO-DMO staff to identify the most effective means of communicating excitation-emission matrix (EEM) specific metadata. Standard chemical oceanographic units will be used where appropriate for these data. DOC and POC concentrations are generally listed in units of micromoles per Liter, chlorophyll a concentration in micrograms per Liter, fluorescence in QSU, and absorption in inverse meters (m^{-1}).
- c. **Data Organization.** Osburn will manage a database of BEPOM and CDOM observations from phytoplankton culture experiments and the coastal Atlantic Ocean, locally stored at NC State and available through his website with links to formal data storage sites in the US (BCO-

- d. **Data quality.** Data guidelines will be posted so users are made aware of QA/QC policies used in the project. Data integrity will be monitored before and after transfer to BCO-DMO. Osburn will be the responsible party for data quality.

IV. Data Access and Sharing

- a. **Embargo Period.** A maximum of two years embargo time will be taken to ensure adequate time for original research collaborators to publish their results. After that period, data will be released to BCO-DMO.
- b. **Submittal Frequency.** The project will upload data files and collection-level metadata annually to BCO-DMO as soon as they have been quality controlled and processed, typically three months after the end of the collection period (ship cruise, field deployment, etc.). The underway data will be placed in the public domain through the R2R program for unrestricted open access after 60 days of the cruise end date. We do not anticipate requests for restricted access. BCO-DMO makes the data publicly available through their respective systems immediately upon receipt and subject to any approved embargo period.

V. Data Reuse

- a. **Expected users of the data** are CDOM scientists and stakeholders. For the latter, the optical properties of plankton confirmed in this study may be used for in situ sensor development and deployment.
- b. **Outside the original research community (i.e., project collaborators), users will be able to contact PI Osburn with questions regarding access and use of the data.** However, once the embargo period ends, it is expected that the project's data will become public domain. Two stipulations will be posted to potential users. First, the database and/or relevant publications originally presenting the project data will be acknowledged by any user. Footnotes and addenda to the database will be maintained regularly to track publications by the original research community and clearly identified to data reusers. To facilitate tracking of reuse and fair credit to data providers, BCO-DMO will provide a recommended formal citation for the data set, including a persistent identifier. Second, acknowledgement of NSF funding for the original data will be required by reusers.
- c. **Data will be described in accordance with BCO-DMO standards.** Osburn has worked closely with BCO-DMO (Cyndy Chandler) on building a CDOM database and has experience with posting spectral data in a manner to conform to BCO-DMO's standards of documentation and format.

Data Preservation.

PI Osburn will work closely with BCO-DMO curators to provide all information necessary for data preservation. All files will be backed up weekly and stored both onsite and offsite. An advantage of BCO-DMO storage is that the organization enables a map-based viewer that provides a convenient and accessible means of accessing the data produced from this project. Redundant storage in this clearinghouse will guarantee the widest dissemination possible to future access for the supported data, as well as the core data set.