Data Management Plan

Types of data and software to be produced in the course of the project:

The proposed research will generate time-series data from multiple sensors deployed on the GEMS1.0 and GEMS2.0 systems including; current profiles, point turbulence measurements, dissolved gas concentrations (CO_2, O_2, N_2, Ar, H_2S, CH_4), salinity, temperature, pressure, pH, and irradiance as detailed in the Project Description. In addition, seawater bottle samples will be measured for TA, DIC, pH, H_2S, CH_4, N_2, Ar, salinity, temperature, and dissolved gas concentrations. All of these data will have associated metadata and, after preliminary processing, will also have associated statistics and quality assurance metrics. Existing MATLAB processing algorithms will also be expanded and improved for flux and profile extraction. Benthic fluxes of C, O, S, and N will be a key data product to disseminate to the scientific community.

During the project data will be stored as data files (.dat) on the Woods Hole Oceanographic Institution (WHOI) servers. The PIs back up data on portable hard drives daily when in the laboratory and field, and weekly using the Remote Access servers which will be used for data storage. Server data is backed up daily. The PIs additionally use cloud services (i.e. Google Drive) for data and analysis sharing between the PIs. Data will be quality checked and flux rates and profiles extracted as described in this proposal. Data that is found to be erroneous will be either interpolated or removed from analysis (to be replaced by -9999 values for ODM protocols) as described in analysis section of this proposal.

Standards to be used for data and metadata format and content:

Prior to the start of the project, the PIs will review our planned data collection protocols. We will work in advance with the Biological and Chemical Oceanography Data Management Office (BCO-DMO)[1] for advice on streamlining our data and metadata collection methods. The PIs are familiar with the BCO-DMO office (e.g. https://www.bco-dmo.org/person/560155, https://www.bco-dmo.org/person/637907) and their data sharing protocols and data standards. We have chosen to use BCO-DMO as the chemical flux and profile data in this proposal will be of great use to the BCO-DMO associated community. Our data management plan also includes sharing our findings via meetings and workshops, via outreach and educational activities, and timely publication in peer-reviewed scientific journals.

Policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements:

Per the policy of the NSF Division of Ocean Sciences, we will submit all other data and associated metadata to the BCO-DMO office; they will in turn make the data available online at http://bco-dmo.org/data/. Data will be analyzed, quality controlled, and uploaded after each field campaign and prior to the start of the next field campaign as detailed in the project description.

All data published in peer-reviewed articles will be deposited with the publisher, according to their policies and procedures, as well as the BCO-DMO database. Publications will be hosted on the ORCID database. We will create links to all publications and data on our individual websites and make lay-language summaries for each publication on the PIs websites.

A major goal of this proposal is the advancement of new technology and techniques. The PIs will provide instrument and sensor designs and analysis source code available on PI Long's website to distribute these advancements to the scientific community (e.g. https://www2.whoi.edu/staff/mlong/tech/).

Policies and provisions for re-use, re-distribution, and the production of derivatives:
Re-use and re-distribution will be encouraged (and facilitated by searchable on-line format through BCO-DMO). Re-use and production of derivatives will be subject to prevailing standards for ethical use; see for example www.creativecommons.org.

Plans for archiving data and other research products, and for preservation of access to them:
PI Long will have the primary responsibility for implementation of this data management plan (DMP) for the duration of the project. Final quality controlled in situ data will be published and permanently archived by BCO-DMO where it can be easily accessed through web-based clients or open source applications. All data will be openly available.

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[1]**Biological and Chemical Oceanography Data Management Office (BCO-DMO)**
http://bco-dmo.org
The Biological and Chemical Oceanography Data Management Office (BCO-DMO) was created in late 2006 to serve PIs funded by the NSF Geosciences Directorate (GEO) Division of Ocean Sciences (OCE) Biological and Chemical Oceanography Sections and (with augmented funding in 2010) Office of Polar Programs (OPP) Antarctic Sciences (ANT). BCO-DMO manages and serves oceanographic biogeochemical, ecological, and companion physical data and information developed in the course of scientific research and contributed by the originating investigators. The BCO-DMO data system facilitates data stewardship, dissemination, and storage on short and intermediate time-frames.