

10. Data Management Plan

Products of research

The proposed work will produce a compilation of more than 40 years of tritium-³He observations from a variety of field programs and historical data sets for the North Atlantic and North Pacific. This data set will consist of a collection of vertical profiles of tritium and ³He merged with standard hydrographic data, pressure, temperature, salinity, and O₂ concentrations, and WOCE quality macronutrients (NO₃, PO₄ and SiO₃). The data will be organized by date and location. The size of the final data file will be approximately 200 MB. Results from the Community Earth System Model (CESM) ocean tracer simulations conducted over the course of this grant will also be made available. The model output will include global, three-dimensional monthly fields of the same variables available in the observational data set, namely, temperature, salinity, tritium, ³He, O₂ and macronutrient (NO₃, PO₄ and SiO₃) concentrations plus air-sea tritium, ³He and O₂ fluxes from our main hindcast simulation (~65 years). This data set will contain 12x65 files of approximately 256 MB each, for a total storage size of approximately 200 GB.

Data format and standards

The compilation of tritium-³He field observations will be stored in a flat ASCII format that can be read easily by different software packages or imported into relational databases for searches and queries. In addition to the observational data, the ASCII data files will contain quality flags associated with each data record. Model output from CESM will be stored in gridded, self-describing netCDF format. Ivan Lima will be responsible for creating the data sets, maintaining data storage and backup systems, as well as interfacing with data repository personnel. The Biological and Chemical Oceanography Data Management Office (BCO-DMO) will provide data storage, access, and metadata authoring services for our project. BCO-DMO is an open-source, community resource that manages and serves data and related information produced by investigators funded by the National Science Foundation's (NSF) Biological and Chemical Oceanography Sections. All data will be described and documented in accordance with BCO-DMO best practices by Ivan Lima using existing BCO-DMO metadata authoring tools. Ivan Lima will also work with William Jenkins and BCO-DMO personnel on quality control of the tritium-³He observational data set. All processing steps will be documented, including data corrections, coordinate transformations, interpolations and unit conversions.

Policies for access and sharing

The produced data sets and documentation will be made available with as few restrictions as possible and will be uploaded to BCO-DMO once we have documented our work in the form of manuscripts submitted for publication. BCO-DMO makes the data publicly available upon receipt and stores and serves the data online through web-based tools that allow searching and displaying of data online. Under BCO-DMO's terms of use, all data sets and supporting documentation are freely available for scholarly use by the academic and scientific communities with the express understanding that users will properly acknowledge the originating investigators. Use or reproduction of any material hosted by BCO-DMO for commercial purposes without prior written permission from BCO-DMO is prohibited.

Policies and provisions for re-use

The compilation of 40 years of quality controlled tritium-³He observations and the accompanying model simulations will constitute a unique data set that will be of great interest to

chemical and biological oceanographers, and climate scientists interested in the role of ocean biogeochemistry and circulation in the global climate system. Extensive documentation will be included with the data set to foster its use by investigators from different fields. BCO-DMO will also work with the Woods Hole Oceanographic Institution/Marine Biological Laboratory (WHOI-MBL) library to provide a formal citation, including a digital object identifier (DOI) for the submitted data sets to facilitate their dissemination, tracking of re-use and to give proper credit to the project and investigators.

Archiving of data

Ivan Lima will follow BCO-DMO guidelines and use BCO-DMO tools to prepare the data and create accurate and complete documentation for long-term preservation. BCO-DMO will ensure submission of the data sets and documentation produced to the appropriate national data center (National Oceanographic Data Center - NODC) for long-term archival.