

Plan Overview

A Data Management Plan created using DMPTool

Title: Atmospheric CO2 Concentrations, Mauna Loa Observatory, Hawaii, 2011-2013

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Funder: National Science Foundation (nsf.gov)

Funding opportunity number: 8276

Template: NSF-AGS: Atmospheric and Geospace Sciences

Last modified: 05-30-2014

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Atmospheric CO₂ Concentrations, Mauna Loa Observatory, Hawaii, 2011-2013

Products of research

Describe the types of data and products that will be generated in the research, such as physical samples, space and/or time-dependent information on chemical and physical processes, images, spectra, final or intermediate numerical results, theoretical formalisms, computational strategies, software, and curriculum materials.

Air samples at Mauna Loa Observatory will be collected continuously from air intakes located at five towers – a central tower and four towers located at compass quadrants. Raw data files will contain continuously measured CO₂ concentrations, calibration standards, reference standards, daily check standards, and blanks. The sample lines located at compass quadrants were used to examine the influence of source effects associated with wind directions [3,4]. In addition to the CO₂ data, we will record weather data (wind speed and direction, temperature, humidity, precipitation, and cloud cover). Site conditions at Mauna Loa Observatory will also be noted and retained. The final data product will consist of 5-minute, 15-minute, hourly, daily, and monthly average atmospheric concentration of CO₂, in mole fraction in water-vapor-free air measured at the Mauna Loa Observatory, Hawaii. Data are reported as a dry mole fraction defined as the number of molecules of CO₂ divided by the number of molecules of dry air multiplied by one million (ppm). The final data product has been thoroughly documented in the open literature [2] and in Scripps Institution of Oceanography Internal Reports [1].

Data format

Describe the format in which the data or products are stored (e.g. hardcopy logs and/or instrument outputs, ASCII, XML files, HDF5, CDF, etc). What metadata will be part of the data sets produced?

The data generated (raw CO₂ measurements, meteorological data, calibration and reference standards) will be placed in comma-separated-values in plain ASCII format, which are readable over long time periods. The final data file will contain dates for each observation (time, day, month and year) and the average CO₂ concentration. The final data product distributed to most users will occupy less than 500 KB; raw and ancillary data, which will be distributed on request, will occupy less than 10 MB. Metadata will be comprised of two formats—contextual information about the data in a text based document and ISO 19115 standard metadata in an xml file. These two formats for metadata were chosen to provide a full explanation of the data (text format) and to ensure

compatibility with international standards (xml format). The standard XML file will be more complete; the document file will be a un-readable summary of the XML file.

Access to data, and data sharing practices and policies

Describe your plans for providing access to data, including websites maintained by your research group and contributions to public databases. If maintenance of a web site or database is the direct responsibility of your group, provide information about the period of time the web site or database is expected to be maintained. Also describe your practice or policies regarding the release of data—for example whether data are available before or after formal publication and the approximate duration of time that the data will be kept private. Describe your policies (where applicable) for protection of propriety data, privacy and confidentiality, intellectual property, or other rights or requirements.

The data product will be updated monthly due to updates to the record, revisions due to recalibration of standard gases, and due to errors. The date of the update will be included in the data file and will be part of the data file name. Versions of the data product that have been revised due to errors / updates (other than new data) will be retained in an archive system. A revision history document will describe the revisions made. Daily and monthly backups of the data files will be retained at the Keeling Group Lab (<http://scrippsco2.ucsd.edu> , accessed 05/2011), at the Scripps Institution of Oceanography Computer Center, and at the Woods Hole Oceanographic Institution's Computer Center.

Policies and provisions for re-use, re-distribution and production of derivatives

Describe your policies regarding the use of data provided via general access or sharing. If you plan to provide data on a website, will the site contain disclaimers, or conditions regarding the use of the data in other publications or products? If the data or products are copyrighted, how will this be noted on the website?

The final data product will be release to the public as soon as the recalibration of standard gasses has been completed and the data have been prepared, typically within six months of collection. There is no period of exclusive use by the data collectors. Users can access documentation and final monthly CO2 data files via the Scripps CO2 Program website (<http://scrippsco2.ucsd.edu>). The data

will be made available via ftp download from the Scripps Institution of Oceanography Computer Center. Raw data (continuous concentration measurements, weather data, etc.) will be maintained on an internally accessible server and made available on request at no charge to the user.

Archiving of data

Describe whether and how data will be archived and how preservation of access will be handled. For example, will hardcopy logs, instrument outputs, and physical samples be stored in a location where there are safeguards against fire or water damage? Is there a plan to transfer digitized information to new storage media or devices as technological standards or practices change? Will there be an easily accessible index that documents where all archived data are stored and how they can be accessed? If the data will be archived by a third party, please refer to their preservation plans (if available).

Our intent is that the long-term high quality final data product generated by this project will be available for use by the research and policy communities in perpetuity. The raw supporting data will be available in perpetuity as well, for use by researchers to confirm the quality of the Mauna Loa Record. The investigators have made arrangements for long-term stewardship and curation at the Carbon Dioxide Information and Analysis Center (CDIAC), Oak Ridge National Laboratory (see letter of support). The standardized metadata record for the Mauna Loa CO₂ data will be added to the metadata record database at CDIAC, so that interested users can discover the Mauna Loa CO₂ record along with other related Earth science data. CDIAC has a standardize data product citation [5] including DOI, that indicates the version of the Mauna Loa Data Product and how to obtain a copy of that product.
