DATA MANAGEMENT PLAN

This Data Management Plan addresses NSF's policy on the dissemination and sharing of research results within a reasonable time. All data will be deposited in a long-lived, publically-accessible archive. This plan will make certain that the data produced during the period of this project is appropriately managed to ensure its usability, access and preservation.

A. Types of data (Samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project).

Multiple types of data will be generated as part of this project.

This research will result in the development of *physical sample collections*. Samples of calcium carbonate and barium carbonate will be precipitated in the lab. Water samples will be collected.

This research will result in the development of extensive *characterization datasets* of samples and standards. These datasets will include temperature, measurements of carbonate system parameters on water samples, and geochemical data on carbonates including stable isotopic ratios (Δ_{47}, $\delta^{13}C$, and $\delta^{18}O$ ratios).

This research will result in the determination of fractionation factors using models of physical chemistry. We will report scaled vibration frequencies for different isotopologues of DIC species and carbonate minerals, and estimated abundances of all isotopologues at different equilibration temperatures and bulk isotopic compositions.

B. Data and metadata standards

Each of the experimental datasets will include a description of standard reference materials, analysis protocols, replicate and variability analyses and relevant notes (see Eagle et al., 2010; Tripati et al., 2010 for examples). Contextual details needed to make the data meaningful will also be available, including sample ID numbers and precipitation conditions.

Each of the datasets from model calculations will include a description of the model and basis set used, and relevant notes (see Schauble et al., 2006; Wang et al., 2006 for examples). Contextual details needed to make the data meaningful will also be available.

File formats to be used will either be ASCII (.txt), comma-delimited text (.csv), Excel (.xls or .xlsx), or Word (.doc or .docx). These formats are chosen because they are widely used and accepted in the scientific community.

C. Policies for access and sharing and provisions for appropriate protection/privacy

The entire research team working on this project will be provided full and complete access to acquired datasets. This sharing of information is critical to ensure the success of this collaborative project.

Upon publication of research results in journals or conference proceedings, the research team will also make available on specific request by email or telephone, details on methods, samples, and data for other researchers working in this area. There will be no charge for access to sample characterization datasets or

this information.

In accordance with this policy, this plan does not include preliminary analyses (i.e., raw data as we measure samples), drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues.

D. Plans for archiving and preservation of access

Data will be made available within two years of when it was collected. The results, discussion and interpretation of the research results will be made publicly available via publication in refereed journal and conference proceedings and public presentations of the research at national and international conferences.

Datasets will be fully archived either as auxiliary tables or appendices in publications and/or in the NGDC (National Geophysical Data Center). It is expected that data sharing of this nature will help better disseminate the research results to the wider scientific community.

Samples synthesized during experiments may be completely consumed over the course of the project. If not, the samples will be catalogued and archived in the laboratory collections of the PI with carbonate samples stored in a dessicator. Samples will be made available on specific request depending on the planned use, and pending discussion with the PI and co-PI. There may be a shipping charge if samples are mailed to the requestor.