Data Management Plan

Primary Investigator: C.R.German
Institution: WHOI
Project: Hydrothermal Estuaries: What Sets the Hydrothermal Flux of Fe & Mn to the Oceans?
Co-PIs: G.Xu, J.Fitzsimmons, J.Breier, B.Toner, W.Jenkins
NSF Division: OCE **Solicitation Info:** NSF OCE-Chem Oce **Submission Date:** 08/15/2018

Overview: 1. Water column in situ sensor surveys (AUV- and CTD-rosette)
2. Local-scale (1-100km) physical plume dispersion modelling.
3. Biogeochemical analyses of water column samples (dissolved, soluble, colloidal, particulate)
4. Global-scale biogeochemical modeling

Data description: 10 AUV Sentry dives and 18 CTD casts yielding ≤200 sample sets for biogeochemical analysis. Model outputs from regional-scale physical plume model and global biogeochemical model.

Data analysis summary: A physical plume dispersion model will be established in Y1 and refined in Y2 and Y3. Up to 200 samples collected in Y1, at sea, will be subject to detailed biogeochemical analyses in Y2-Y3. Data will be integrated with the plume dispersion model in Y3 to reveal rates and processes active in hydrothermal plumes. Global scale modelling in Y3 will also provide revised estimates of the global impact of venting on ocean biogeochemistry .

Includes field work? Yes
Description of field work: Three week field program to include 10 Sentry AUV dives and 18 CTD casts to study biogeochemical cycling processes over a length-scale of 1-100km down-source within a dispersing hydrothermal plume.

Expected data product #1
Data type: Observational
Responsible investigator: C.R.German
Product description: Water column in situ sensor data: survey data will be collected from the Sentry AUV and the CTD-rosette to characterise the 3D dispersion of the Endeavour Segment hydrothermal plume as determined during the field program. Sentry data will be archived, as is routine for the National Deep Submergence Facility with WHOI and MGDS. CTD data will be collected from a user-provided CTD-rosette but we will plan for all data to be archived through the UNOLS R2R system following the same protocol as UNOLS systems.
Preservation plan: In situ sensor data from the Sentry AUV will be banked, as is done with all NDSF vehicles, in the NDSF Data Archive at WHOI which, in turn, shares data with MGDS.
The CTD rosette to be provided for this cruise is a trace metal clean system from Texas A&M. We will work with UNOLS - specifically the Vessel Operator and and the Rolling Deck to Repository (R2R) project to follow their guidelines.

Timeline for data release: Two Years from acquisition/analysis

Expected data product #2
Data type: Model
Responsible investigator: G.Xu
Product description: Physical Plume Dispersion Model Outputs: A physical plume dispersion model will be implemented for the proposed study area in Y1 to predict plume dispersion trajectories and guide sampling during the field program at the end of Y1. The model will be further validated using in situ sensor data in Y2 (see Data Product #1) and again in Y3 using the He3/4 analytical data to be generated in Y2 (see Data Product #3). All files will be in the NetCDF format and will contain 4D fluid velocity, tracer concentration ± dilution factor values in the modeled domain. MGDS has experience archiving directly related data sets (including from the R2K program).
Preservation plan: MGDS
Timeline for data release: Immediate Release

Expected data product #3
Data type: Analytical
Responsible investigator: J.Fitzsimmons, J.Breier, W.Jenkins, C.German, B.Toner, E.Achterberg, M.Gledhill
Product description: Biogeochemical Analytical Data Sets: Analytical data sets for samples collected during the Y1 field program will be generated for trace elements in soluble (<0.02µm), dissolved (<0.2µm), colloidal (0.02-0.2µm) and particulate (>0.2µm, >5µm) size classes by Fitzsimmons & Breier. Particulate speciation studies will be conducted on a subset of all colloidal and particulate samples (Toner). Fe binding ligand titrations will be conducted on a subset of samples from Sentry and all samples from the CTD casts which will also be analysed for siderophores (Achterberg & Gledhill). Additional supporting data from the CTD casts will include He isotope analyses on all samples (Jenkins & German) and for DOC, POC and dissolved oxygen (Fitzsimmons). All data will be deposited and archived with the Biological and Chemical Oceanography Data Management Office (BCO-DMO) with the exception of the ligand and siderophore data which will be banked through GEOMAR (Germany)
Intended repository: BCO-DMO
Timeline for data release: Two Years from acquisition/analysis

Expected data product #4
Data type: Model
Responsible investigator: A.Tagliabue, C.German
Product description: Biogeochemical models of global-scale Fe distributions: data acquired over the course of the program will be integrated into global-scale biogeochemical model to study hydrothermal Fe impacts on the ocean during our Y3 project synthesis activities. This work will be an international collaboration with Dr A.Tagliabue (U.Liverpool, U.K.). Model outputs will be global-scale 4D files in the same NetCDF format as Data Product #2. Because the majority of this work will be conducted in the UK under NERC Funding, the final data products will be archived with the British Oceanographic Data Centre (BODC).
Preservation plan: British Oceanographic Data Centre (international partner to BCO-DMO for GEOTRACES)
Timeline for data release: Two Years from acquisition/analysis