Before each field trip, the entire research team will meet to plan the trip, the lander deployment strategy, and organize the collection, preparation, and preservation of geochemical samples that will be obtained in the field. The inventory of the geochemical samples will be recorded in log books. The data obtained in the field will be archived after each deployment, and entries in the geochemistry log books will be used to identify these data and their archives.

The proposed research will generate detailed geochemical and numerical simulation data from field measurements and laboratory investigations with natural samples. Geochemical data will include both in situ electrochemical measurements and ancillary chemical analyses from external sampling as well as competitive ligand equilibration (CLE) analyses and separation experiments. In situ electrochemical data will include analytical checks using dissolved oxygen measurements in external standards, manganese calibrations before and after deployments, and surveys of baseline quality during the measurements. Quality control checks will be conducted on water samples collected independently and measured back to the laboratory with independent electrodes. Data from electrodes that do not satisfy these criteria will be discarded. Quality of sampling procedures (i.e. pore water and benthic chamber samples) will be tested by prepping blanks and standards as real samples and checking for eventual contaminations or losses. Data obtained will also be submitted to a rigorous quality control procedure before, during, and after their acquisition. Conventional geochemical measurements will include calibrations before and after the measurements to check for analytical consistency as well as quality control checks (measurements of accuracy) using certified reference materials when possible, external standards run as unknown samples, and blanks for contamination controls. In addition, calibration curves, minimum detection limits, and precision will be compared between series of measurements to ensure the data are obtained in a consistent fashion. All CLE measurements will be conducted in at least duplicates and submitted to rigorous quality controls as described in the body of the proposal. Similarly, separation of organic-Fe(III) complexes will be conducted in duplicates and validated with synthetic organic ligands spiked into control samples throughout the project. Codes and outputs of numerical simulations will be rigorously tested with benchmark examples before they are made available to the community. As done previously, electronic supplements in publications will be used to archive the numerical simulations that support publications. Both geochemical and modeling data that pass these rigorous quality tests will be archived and backed up on Georgia Tech servers, made available to the scientific community upon request according to the Division of Ocean Science's data sharing policy, and also submitted to the Biological and Chemical Oceanography Data Management Office (BCO-DMO) database (http://bcodmo.org) for dissemination to the oceanographic community.