Analytical Instrumentation for *in-situ* Biogeochemical Research

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In order to fully understand biogeochemical reactions that affect any environment, the utilization of in-situ analytical tools are key to understanding the chemistry of these complex systems. Bringing analytical instruments into the field that have been traditionally left in the lab, will offer a clearer picture of biogeochemical reactions in real time. Traditionally samples are taken from the field and later analyzed in a lab where the context of the sample may have been compromised.

This poster will show future directions of new analytical tools being developed to solve a myriad of biogeochemical environments by direct analysis. These new systems are voltammetric and chromatographic in nature and will allow the determination of the standard biogeochemicals in-situ including and not limited to, oxygen, sulfide, iron, iron sulfide, and manganese directly on one sensor in real time in about 3-5 seconds. These new instruments are capable of analyzing any ion in the environment including mercury to heavy metals from acid mine drainage areas down to the parts per trillion level. This poster will show the cutting edge systems being developed to quickly ascertain a particular site of interest that will allow the user to make a judgment on deploying the long-term instruments for monitoring diurnal cycling of pertinent biogeochemicals over time. New deployable instruments that have been developed will illustrate how data can be collected over time and how that data can be transmitted directly to a cloud server system. What makes these systems unique are the low power electronics and the new electrode systems that can be deployed for many months to years with little user servicing. These are just some of the new exciting directions that will be presented on how electrochemistry can be used to understand the complex biogeochemistry around us.