

Insights on habitat chemistry from *in situ* voltammetry

*George W. Luther, III**, Tommy S. Moore, Katherine Mullaugh, Shufen Ma, Mustafa Yucel, Heather Nees, Timothy M. Shank, Richard A. Lutz, Costa Vetriani, Donald B. Nuzzio, Charles R. Fisher

We used temperature probes and solid state voltammetric electrodes to monitor H₂S, O₂ as well as Fe and S species found near organisms that reside in diffuse flow areas near hydrothermal vents at the East Pacific Rise (9°50' N EPR) and Lau Basin. We have performed measurements directly with an electrochemical system from DSV *Alvin* and ROV *Jason II*. Also, we have collected similar data with an autonomous electrochemical analyzer that has been deployed for several days to weeks at locations from the East Pacific Rise. We will present data from before and after the 2006 eruption from the East Pacific Rise and compare those data to data from Lau Basin.

The measurements from the DSV and ROV show chemical differences (e.g.; extent of H₂S and the detection of S₂O₃²⁻) between the Lau Basin and EPR sites. These sites also have different chemosynthetic macrofaunal communities. The EPR has mussels and tubeworms whereas Lau Basin has mussels and snails. At the EPR site, we will show differences in chemistry and macrofauna before and after the early 2006 eruption. Lau Basin data come from vent areas covering significant distances (~ 500 nautical miles) relative to the EPR. We will show that sulfide content in diffuse flow waters decreases from north to south at Lau Basin.

Time-series electrochemical data were collected in diffuse flow water areas and in different years at EPR sites dominated by *Riftia pachyptila*, *Bathymodiolus thermophilus* or *Tevnia jerichonana*. We will show marked chemical differences between the different communities. Additionally, chemical conditions can change rapidly; e.g., as much as three orders of magnitude for H₂S concentration in a period of minutes. Changes in chemistry can also be both in phase and out of phase with the tides.

**Presenting Author: College of Marine & Earth Studies, University of Delaware, Lewes, DE 19958, luther@udel.edu*