Letters of Intent: Lau Basin
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Sampling and initial characterization of hydrothermal fluids, deposits, microfauna and megafauna at vent fields along the Eastern Lau Spreading Center

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We plan to submit a proposal to use an ROV or occupied submersible (e.g., JASON II) to sample hydrothermal fluids, deposits, and associated biological organisms (microfauna and megafauna) at vent fields located along the Eastern Lau Spreading Center. We are assuming that, as outlined in the implementation plan, previous cruises will have identified locations of buoyant plume(s) using tow-yos and hydrocasts, and/or vent sites using camera tows. Our goal will be to characterize the following for each of ~3 to 6 vent fields: fluid chemistry (e.g., range and variation of Cl, H2S, H2, CO2, pH, Fe, Mn, organics at each site); vent deposit mineralogy and bulk geochemistry; molecular and physiological diversity of microbes associated with diffuse and high temperature fluids and active chimneys; range, abundance, distribution, and reproductive status of dominant megafaunal organisms present in vent fields and of larvae/plankton in water column above vents. In addition we will generate maps showing the distributions of vent structure types and morphologies and their relations to substrate, and the range and distribution of megafauna. This information can then be used by the RIDGE community, in conjunction with data collected on other cruises, to identify the “bull’s-eye” of the Lau IS site.

(Note: There is some overlap between the general goals of this proposal and that to be submitted by Childress et al., because of the importance of obtaining basic chemical and biological information to select the bull's eye site. The overlap will ensure that the key biological data critical to the bull's eye decision and research progress at the Lau Basin ISS will be collected and analyzed if either group is funded. Each group has different specific goals and approaches, and in the event both proposals are funded, the PI's will work cooperatively to meet both general and specific goals, with an appropriate budget modification that reflects the overlap in megafaunal work).