

**Letters of Intent: EPR**  
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**The Impact of Volcanic Setting and Ridge Segmentation on Hydrothermal Venting on the East Pacific Rise, 8°-11°N**

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Many studies have been conducted on the East Pacific Rise from 9°10' to 9°55'N revealing an apparently strong linkage between ridge segmentation, volcanic morphology, and hydrothermal venting. Hypotheses made from this initial work have formed the basis for much of our thinking about how fast-spreading ridge systems work. However, very few of these studies have extended beyond the overlapping spreading center to the south or the transform fault to the north of this segment. Furthermore, no systematic studies of hydrothermal plumes have been done since 1991 to examine changes in hydrothermal discharge on the scale of whole vent fields over the past decade. This proposal is designed to address our gaps in understanding of the basic patterns of volcanic, tectonic, and hydrothermal activity both along and across the ridge axis.

We propose a spatially complete sampling of hydrothermal plume distribution, intensity, and character along with high-resolution sonar mapping necessary to establish links between volcanic and hydrothermal processes. We plan to use the EM300 30 kHz multibeam system to obtain high-resolution bathymetry on the scale of individual volcanic and tectonic features within the entire ISS from 8°N to 11°N over the full width of the plate boundary zone at the EPR. Over the length of the ridge axis in the ISS, the DSL-120A side-scan sonar will obtain meter-scale imagery of the seafloor while simultaneously collecting hydrothermal plume data using MAPRs, SeaCATs, and an in situ chemical analyzer. This permits a very accurate co-location of the plume data with the features in the side-scan records. Finally, a series of ~20 CTD casts over the locations of observed plumes will calibrate and supplement the MAPR/in situ analyzer data. Integration of these datasets will allow us to correlate hydrothermal plumes with specific type of volcanic terrain on the ridge axis. This will allow us to see how volcanic morphology varies over several ridge segments, and compare the character of hydrothermal venting to the volcanic terrain.

This study directly pertains to the Ridge 2000 program fundamental goals (1.) understanding the impact of hydrothermal venting on ridge structure, composition, and morphology, and (2.) understanding the thermal and permeability structure of the crust. In addition to the science goals, this study also provides the RIDGE community with baseline data that will enable tectonic or magmatic events to be recognized, and the response of biological and hydrothermal systems to be studied.