

Letters of Intent: EPR
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Time-Series Study of Exit-Fluid Temperatures at High-T Hydrothermal Vents - EPR 9° 46'-51'N

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We propose to study the complex network of hydrothermal circulation systems underlying the high-temperature vents within the axial summit trough of the East Pacific Rise (EPR) between 9° 46'-51'N. Our proposal involves three, sequential, 1-year deployments of self-recording high-temperature probes to be installed in the 13 primary hydrothermal vents present at the EPR ISS 'bull's eye'. Two (2) probes will be deployed at each vent. Deployment of the probes will be coordinated with the K. Von Damm EPR vent fluid sampling program that is currently funded.

Four (4) additional Alvin dives will be sufficient to deal with the installation and recovery of probes on a yearly basis, and these dives would be 'piggy backed' on the Von Damm program in order to efficiently sample and instrument the key vents at the EPR ISS. We also plan to deploy a tide gauge (in the event that one is not already deployed as part of the funded Tolstoy et al. microseismicity program), so that correlations between tides, and fluid temperatures can be assessed, and to enable deconvolution of tidal periods from the temperature probe data. We propose to obtain synchronous data from these sensor networks for a period of three years such that links between the microseismicity, vent fluid chemistry, vent biology and vent fluid temperature variations can be properly assessed.

We propose to coordinate our EPR temperature experiment with the currently funded programs of Von Damm, Tolstoy et al. and Lutz et al. who will be doing other key facets of the EPR ISS time series work. It is important to note that none of the currently funded PIs have within the scope of their field programs the deployment and analysis of self-recording probes to monitor the high-temperature vent fluids and their responses to various geological phenomena. The data we propose to collect will also be valuable for providing input to ongoing hydrothermal system modeling studies (e.g., W. Wilcock funded project).