Monday morning Poster Session
T11B-1240 and 1241

Off-axis Hydrothermal Activity on the East Pacific Rise near 9 28N, Faulted and/or Topographic Control of Hydrothermal Discharge?

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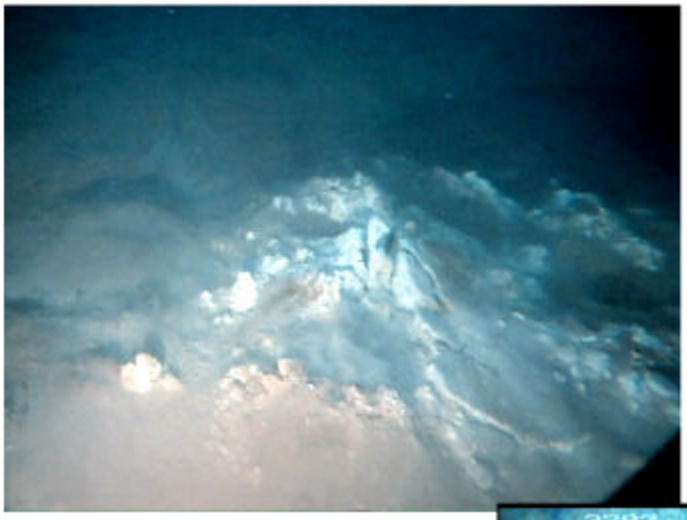
In May 2002 during two ALVIN dives, we mapped over 100 sediment mounds which appear to be hydrothermal in origin. We also measured diffuse hydrothermal flow characterized by 150-250 millidegree anomalies along the face of a large fault scarp. The diffuse flow occurred over a large area of the scarp face which was covered by brown floc, probably bacterial in origin. This hydrothermal area occurs 32 km west of the spreading axis. While off-axis hydrothermal activity had been documented at slow- and intermediate-rate spreading centers, it had been oddly undocumented at fast-spreading centers. The hydrothermal field occurs on a large abyssal hill, bounded by the longest (~40 km) and highest (>200 m) fault scarp within a large area (typical scarps on the EPR are <50 m in height and <10 km in length). This scarp may be the product of unusually deep faulting and be a preferred location for fault-controlled off-axis hydrothermal activity. If so, mapping large abyssal hills and unusually high fault scarps may provide a strategy for finding the elusive off-axis hydrothermal fields of the EPR. Heat flow measurements indicate a similar pattern of hydrothermal circulation on the northern Juan de Fuca Ridge (Johnson et al 93). Our findings are also consistent with the modeling work of Lowell (1980). **We are speculating here that hydrothermal activity might be enhanced along the highest portions of unusually long fault scarps which may act as either chimneys or as deep conduits for mining heat.**

Most of the mounds lie at the margins of crater-like depressions in the sediments, approximately 1 m across, and appear to contain ejected chunks of sediment. Eleven sediment push cores were collected in the mounds, within the craters, and in ambient surrounding sediments . Chemical and mineralogical analyses of the cores will provide more information about how and why these apparent hydrothermal "blow out" features have formed (see Haymon et al., neighboring poster). Temperature gradients of ~0.4 ºC/m. were measured in the sediments near and within the mounds. Other samples collected during the dives include 3 "slurp" samples of mossy material on the fault scarp, and rock samples with moss-covered surfaces. This ubiquitous material is probably bacterial in origin, its growth perhaps enhanced by diffuse hydrothermal flow along the fault scarp.

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