1999 Fall Meeting
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HR: 0830h
AN: **OS11A-04**
TI: Detailed Structural Characterization of Hydrate Ridge, Oregon Margin, and its Influence on Fluid Flow in Gas Hydrate Systems
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AB: Hydrate Ridge is a gas hydrate bearing thrust anticline located near the toe of the accretionary prism of the Cascadia subduction zone. Detailed structural mapping using multichannel seismic reflection data, deep-towed 4.5 kHz sub-bottom profiles, and SEABEAM swath bathymetry reveals the ridge and surrounding areas are highly deformed by extensional, compressional, and strike-slip structures and associated folds. The western flank and crest of Hydrate Ridge is dominated by N-S striking normal faults and slumps, whereas the eastern flank is composed of N-S striking seaward-vergent thrusts and low amplitude folds. To the north, the deformation is dominated by the Daisy Bank Fault, a NW striking left-lateral strike-slip fault that extends from the continental shelf to the abyssal plain, and to the south, a similar left-lateral strike-slip fault, the Alvin Canyon Fault, is the dominant structure. Seaward of the deformation front, several seaward-vergent protothrusts deform abyssal plain sediments. The presence of gas hydrates in such a structurally diverse and active tectonic setting make Hydrate Ridge a natural laboratory for examining the influence of geologic structure on fluid flow in gas hydrate systems. Using authigenic carbonate precipitation as a proxy for fluid discharge induced by the destabilization of gas hydrate, the locations of fluid venting sites can be identified. The distribution of these types of carbonates, as interpreted on high-resolution sidescan sonar imagery (see Zhou et al., this volume), is used in conjunction with the detailed structural mapping to identify structurally controlled fluid venting sites. The results indicate sites with the largest carbonate occurrences are located near the crests of anticlines, in regions of local tension, whereas
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DE: 3045 Seafloor morphology and bottom photography
DE: 8005 Folds and folding
DE: 8010 Fractures and faults
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