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## Calcareous Chemoherm Buildups and Their Relation to Gas Venting at Cascadia Convergent Margin

### Details

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### Abstract

During recent research cruises within the TECFLUX program several distinct carbonate mounds were documented on the seafloor by very high-backscatter signals in high resolution side scan sonar recordings from the gas hydrate province of Cascadia. ALVIN and ROPOS investigations revealed steep-sided carbonate mounds, 50 to 300 m in diameter, which extend from the seafloor up to 100 m height. The carbonates are composed of Mg-calcite and aragonite, and carbon isotope values range from -54‰ to -42‰ PDB indicating methane as the major C-source. The chemoherm buildups appear internally stratified subparallel to their surfaces and show manifestations of active venting such as bacterial mats and chemosynthetic clams within distinct tectonic fractures. The intensity of fluid and gas venting seems to increase from bottom to the top following single cracks along the flank of the chemoherms. During the dives we collected a suite of carbonate lithologies that represent a diverse spectrum of formation processes. Many brecciated carbonates containing varying sizes of clasts, cements and clam shells were recovered at the flanks of the chemoherms. Pure aragonite carbonates occurring at the top of the mounds are characterized by dense macroscopic pores which may represent the plumbing system produced by escaping gas bubbles. This interpretation of the rock fabric is based on direct observation at bubble sites. Based on the correlation between the occurrence of chemoherms and the known fault pattern we speculate, that chemoherms represent sites where gas and fluid venting occurs over longer times and may represent a geological record of seepage.

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