

## **A study of microbial carbon utilization in the deep ultramafic biosphere**

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The Cedars is an active site of terrestrial serpentinization in northern California. Serpentinizing environments have high pH values and low Eh values due to alteration of peridotite to serpentine. High pH values could create a difficult environment for life because the dominant source of inorganic carbon (carbonate ion and rock) is thought to be biologically inaccessible in these environments. Low Eh values in serpentinized areas imply that there is no electron acceptor available for cellular respiration. Serpentinizing environments occur at subduction zones, in ophiolites, and at mid-ocean ridges and are believed to play a role in the origin of life. Studying microbial metabolisms occurring in serpentinizing areas can, therefore, provide insight about survival in the deep subsurface and early life on Earth. This study examines if microbes from The Cedars use carbon monoxide as an electron donor and carbon source, and if microbial methane was produced heterotrophically when the microbes were supplied with  $^{13}\text{C}$  labeled acetate to act as an organic carbon source. The experiment consisted of two sets of geomicrobiological microcosms using ultrabasic reducing water from The Cedars to test aerobic carbon monoxide use and anaerobic methane use. Data from live microcosms was compared to killed controls to determine if the observed processes were microbial or abiogenic. Results show that there is no carbon monoxide utilization by biogenic or abiogenic processes. Methane detected in some live and some killed control experiments was not enriched in  $^{13}\text{C}$ , meaning the labeled acetate could not have been the organic carbon source.