

Bacterial communities and their geochemical constrains in continental serpentinites from northern China

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Serpentinites are widely distributed in China. The process of serpentinization can produce raw materials, such as the fluids containing abundant molecular hydrogen and methane, for the chemosynthetic microorganisms to gain metabolic energy and to generate biomass. Microbial activities may also transform the composition and structure of the related rocks and ecosystems.

Clostridia, Betaproteobacteria, Alphaproteobacteria, Gammaproteobacteria, Bacilli and Actinobacteria were identified as the prominent members of the bacterial communities in the serpentinites from northern China by the 16S rRNA high-throughput sequencing. Clostridia and Betaproteobacteria have been reported in other serpentinite-hosted microbiome in previous studies.

Abundant lizardite, chrysotile and antigorite were detected by XRD and SEM. Fe and Cr were widespread according to the element analysis, and they were considered to be the potential elements associated with the generation of hydrogen and methane. Further investigations on isotope composition of gas inclusions and carbonates as well as metagenomic identification would be continued. The total content of carbon (< 1.02%) was very low, so it was difficult to extract organic matter for biomarker analysis but worth trying. For the age-old serpentinites, it is very important to distinguish the information of serpentinization from the effects of diageneses and tectonism by geochemical characterization.

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