Simulating microbe-mineral interactions in the subsurface of Mars

Conference or Workshop Item

Simulating microbe-mineral interactions in the subsurface of Mars

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Methane was first observed in the martian atmosphere in 2003. This organic molecule has an expected atmospheric e-folding time of less than 600 years – pointing to a current or recent source of the gas. Several localised methane sources have been postulated, the most likely of which being either the hydration and serpentization of ultramafic silicate minerals, or the existence of methanogenic life in the planetary sub-surface. Release of the gas by clathrate hydrates has also been suggested; however clathrates are not a source in of themselves, but rather a mechanism of sequestration. If these proved to be linked to the episodic release of methane, an original methane source would still have to be identified.

This work is designed to assess the habitability potential of sub-surface Mars by investigating the viability of methanogenic Archaea living on, and interacting with, analogue rocks and minerals. We are quantifying this relationship using the Archaea strains *Methanosarcina barkeri* and *Methanobacterium formicicum* as models of such putative martian life.

We present here initial results from this study, demonstrating the effect on these microbes of a range of environmental conditions analogous to those thought to exist in the martian subsurface, including pH and water activity.