

Distance education: what do terrestrial serpentinites tell us about methane on Mars?

Kate G. Woods and Richard Cox

Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia B3H 4R2

Serpentinization is an exothermic, shallow subsurface or surficial alteration process requiring liquid water. Serpentinites and their protoliths have been documented on Mars. Both water ice and carbon dioxide ice have been documented in the Martian polar ice caps, and there is increasingly strong evidence for seasonal meteoric water. Serpentinization produces molecular hydrogen, a reactant in the Sabatier abiotic methanation process. According to the European Space Agency, methane was detected in the Martian atmosphere in 2003 and 2006. In addition, spectroscopic analysis has shown the mineral contents of some of the Martian serpentinites. Proxy studies will be conducted using appropriate terrestrial serpentinite and current data from Martian examples. This presentation is a meta-analysis of existing publications on terrestrial analogues for Martian processes. Original research by the authors has commenced at Dalhousie University, and will serve as the foundation for an undergraduate honours thesis. This study begins with selective characterization of serpentinized mafic/ultramafic rocks from stratiform and podiform magmatic ore deposits and will eventually encompass ophiolitic and orogenic samples. Bulk chemical and mineralogical analyses will be completed using an electron microprobe at Dalhousie University. Stable isotope analysis will be carried out at the University of Ottawa; results will be compared against published Martian values. The goal of this study is to identify terrestrial serpentinite analogues for Martian examples. If successful, future work will consider implications for abiotic methanation and requisite liquid water on Mars. [Poster]