

## Relating Martian igneous lithologies

H. NEKVASIL<sup>1\*</sup>, F.M. MCCUBBIN<sup>2</sup>, A.D. HARRINGTON<sup>1</sup>  
AND W.R. WOERNER<sup>1</sup>

<sup>1</sup>Department of Geosciences, Stony Brook University, Stony Brook, NY 11794-2100, USA

(\*correspondence: Hanna.Nekvasil@sunysb.edu)

<sup>2</sup>Geophysical Laboratory, Carnegie Institution of Washington, 5251 Broad Branch Rd., NW Washington, DC 20015

Experimental mineral assemblages of a Backstay-like composition [1] with water contents between 1.5 and 2.6 wt% undergoing crystallization at 6.8-9.3 kbar (i.e., at the base of a 50-65 km thick crust) show good agreement with the cumulus and major melt inclusion mineral phases of the Chassigny dunite [2]. This suggests that ponding of martian mantle-derived melts at the base of the crust may be a viable process on Mars, one that could lead to derivative lavas on the surface and retention of cumulus assemblages at depth.

Recent experimental data on Humphrey [3, 4] and Irvine [5] compositions at several pressures make it possible to evaluate if any of these lithologies could be related through fractionation at the base of the crust to Backstay or other lithologies from Columbia Hills by representing either derivative or parental magmas.

The low potassium and high calcium contents of Humphrey make it very difficult to relate its derivative liquids to any of the other lithologies. The greater similarities of Irvine and Backstay make such a relationship more plausible. However, within the range of pressures and water contents investigated for these compositions, fractionation does not readily link Irvine and Backstay. Although, all compositions produce silica depletion with decreasing temperature under nominally dry conditions, and each composition has some characteristics consistent with a trend towards the Wishstone composition of Columbia Hills, no one composition can produce all the chemical characteristics of Wishstone. Additional lower pressure fractionation data are being collected which should aid in the assessment of possible fractionation relationships and indicate the nature of possible derivative lavas that may be found on the surface.

[1] McSween *et al.* (2006) *JGR-Planets* **111**, E09S91.  
[2] Elardo *et al.* (2008) LPSC Abstr. 1802 [3] McCubbin *et al.* (2008) *JGR* **113** (E11013). [4] Woerner *et al.* (2009) LPSC Abstr 2203 [5] Harrington *et al.* LPSC Abstr 2219.

## Impacts of marine biogenic compounds on CCN properties, predicted cloud droplet number and indirect forcing

A. NENES<sup>1,2</sup>

<sup>1</sup>Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA, USA

<sup>2</sup>Chemical and Biomolecular Engineering, Georgia Institute of Technology, Atlanta, GA, USA

The ocean surface layer contains large amounts of biosurfactants, which through the process of air-sea transfer can be present in large amounts in submicron marine aerosol and influence their ability to act as cloud condensation nuclei (CCN). In this study, we present measurements of the CCN-relevant properties of marine organic matter isolated from a variety of sources, and characterize their molar mass and surface tension depression characteristics. The potential impact of marine surfactants on droplet growth kinetics is also quantified. The measured properties are then introduced into global model simulations of the aerosol indirect effect. The sensitivity of marine cloud droplet number, cloud effective radius, autoconversion and indirect forcing to these organic surfactant effects is then quantified.