

DPS 2014

Emma M. Lewis<sup>1</sup>, Cristina M. Dalle Ore<sup>2, 3</sup>, Dale P. Cruikshank<sup>2, 3</sup>, Oliver L. White<sup>2</sup>

<sup>1</sup>. Swarthmore College, Swarthmore, PA

<sup>2</sup>. NASA Ames Research Center, Mountain View, CA

<sup>3</sup>. SETI Institute, Mountain View, CA

### **Amorphous and Crystalline H<sub>2</sub>O ice at Rhea's Inktomi Crater**

Abstract (2,250 Maximum Characters): We present the analysis of Cassini spectral data from spectral mapping of Saturnian icy moons Dione and Rhea, to investigate possible effects of impact crater formation on the relative abundances of crystalline and amorphous water ice in the moons' ice crusts. Both moons display morphologically young ray craters as well as older craters. Possible changes in ice properties due to crater formation are conjectured to be more visible in younger craters, and as such Rhea's well imaged ray crater Inktomi is analysed, as are older craters for comparison. We used data from Cassini's Visual and Infrared Mapping Spectrometer (VIMS). For each pixel in the VIMS maps, spectral data were extracted in the near-infrared range ( $1.75 \mu\text{m} < \lambda < 2.45 \mu\text{m}$ ). Analysis was begun by fitting a single Gaussian to the peak in absorption at  $2.0 \mu\text{m}$ , which was then subtracted from the data, leaving residuals with a minimum on either side of the original  $2.0\text{-}\mu\text{m}$  band. The spectra of the individual spatial pixels were then clustered by the differences between these minima, which are sensitive to changes in both ice grain size and crystallinity. This yielded preliminary maps which approximated the physical characteristics of the landscape and were used to identify candidates for further analysis. Spectra were then clustered by the properties of the  $1.5\text{-}\mu\text{m}$  band, to divide the map into regions based on inferred grain size. For each region, the predicted differences in minima from the Gaussian residuals, over a range of crystallinities, were calculated based on the found grain sizes. This model was used to find the crystallinity of each pixel via grain size and characteristics of the residual function. Preliminary results show a greater degree of crystallization of young crater interiors, particularly in Rhea's ray crater Inktomi, where ice showed crystalline ice abundances between 33% and 61%. These patterns in ice crystallization are possibly attributable to increased heat generated during crater formation.

PRESENTATION TYPE: Poster    CATEGORY: Other Icy Satellites |