Mapping sub-micon ice grains on Rhea

Scipioni, F.; **Schenk, P.**; **Tosi, F.**; **Clark, R. N.**; **Dalle Ore, C.**; **Combe, J. P.**

Rhea is the second largest icy satellite of Saturn and it is mainly composed of water ice. Its surface is characterized by a leading hemisphere slightly brighter than the trailing side, a common characteristic across Saturn' mid-sized satellites. The leading/trailing asymmetry arises because of two different surface alteration processes: (i) the bombardment of charged particles from the interplanetary medium and driven by Saturn's magnetosphere which darkens the trailing side' surface, and (ii) the impact of E-ring water ice particles on the satellites' leading side. Both mechanisms have the further effect to form or implant sub-micron ice particles on the surface. We present here a preliminary work devoted to map for the first time the abundance of sub-micron ice grains across Rhea' surface. We pursue this goal by analyzing Cassini/VIMS data in the infrared sepctral range (0.8-5.1 μm), where the most diagnostic indicators for such particles occur: (i) asymmetry and (ii) minimum of the 2-μm absorption band in water ice; (iii) decrease in the ratio between the band depths at 1.50 and 2.02 μm; (iv) decrease in the strength of the reflectance maximum at 2.6 μm; (v) suppression of the Fresnel's reflection peak at 3.1 μm; and (vi) decrease of the 5-μm reflectance compared to that at 3.6 μm. Maps are created by dividing Rhea' surface into a 1°x1° grid and then

averaging the spectral indicators' values inside each angular bin. This work will be completed by mapping the variation of water ice absorption bands' depth at 1.25, 1.52 and 2.02 μm, and by comparing the result with ISS maps in the ultraviolet, visible and infrared ranges.

Publication:
American Geophysical Union, Fall Meeting 2015, abstract id.P31B-2071

Pub Date:
December 2015

Bibcode:
2015AGUFM.P31B2071S

Keywords:
6218 Jovian satellites;
PLANETARY SCIENCES: SOLAR SYSTEM OBJECTS;
6260 Neptunian satellites;
PLANETARY SCIENCES: SOLAR SYSTEM OBJECTS;
6280 Saturnian satellites;
PLANETARY SCIENCES: SOLAR SYSTEM OBJECTS;
6290 Uranian satellites;
PLANETARY SCIENCES: SOLAR SYSTEM OBJECTS