FEBRUARY 14, 2007
12:00PM - 1:00PM
544 CAMPBELL HALL

Optional discussion: 1:00-2:00pm.
Reading assignment for discussion, go to: http://cips.Berkeley.edu/events/

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"THE WATER CONTENT OF THE MARTIAN SURFACE AS SEEN BY THE MARS EXPRESS OMEGA SPECTROMETER"

The Mars Express OMEGA spectrometer has been acquiring high spatial and spectral resolution visible-near infrared (VNIR) reflectance spectra of Mars for the past three years. These data span a wavelength range (300 - 5000 nm) that includes several absorptions related to the presence of H2O and OH, making it possible to locate and identify hydrated phases on the Martian surface. Detailed laboratory studies of the effects of dehydration on the strength of these absorptions in clay minerals, sulfates, zeolites, hydrated volcanic materials, and mixtures of these phases has resulted in a model that can estimate the water content of geologic materials using reflectance spectra. When applied to the OMEGA data, this model reveals that equatorial zones on Mars contain ~2 - 4 wt. % H2O, largely independent of albedo, whereas hydration increases with latitude in both the northern and southern hemispheres, approaching values of 15 wt. % H2O. Repeat observations suggest there is a hydrated component in the global soil that exchanges up to ~5 wt. % H2O with the atmosphere during the transition from northern spring to northern winter at high latitudes. Combining careful laboratory analyses with spacecraft data has led to the first quantitative map of the water content of the uppermost fraction of the Martian surface, which has helped to reveal areas with hydrated phyllosilicates and sulfates. Current and future work will focus on applying this model to data acquired by the CRISM spectrometer onboard the Mars Reconnaissance Orbiter spacecraft.