Geophysical Research Abstracts
Vol. 12, EGU2010-12755, 2010
EGU General Assembly 2010

Phyllosilicates and other hydrous minerals on Mars as seen by MEx/OMEGA and MRO/CRISM: global scale distribution and the discovery of hydrous mineral deposits in northern plain craters.

John Carter (1), Francois Poulet (1), Jean-Pierre Bibring (1), and Scott Murchie (2)
(1) IAS, CNRS/Université Paris XI, 91405 Orsay. France. (john.carter@ias.u-psud.fr), (2) APL, Laurel, MD. USA.

The advent of spaceborne, near-infrared hyperspectral instruments for Mars has opened a new era of discovery through the coupled analysis of surface mineralogy and geomorphology. Major findings include the detection of hydrous minerals such as phyllosilicates in the southern highlands of Mars, which has lead to a better understanding of the planet's past aqueous environment and evolution.
Two near-infrared hyperspectral experiments are currently operating around Mars: ESA's OMEGA (Observatoire pour la Minéralogie, l'Eau, les Glaces et l'Activité) and NASA's CRISM (Compact Reconnaissance Imaging Spectrometer for Mars). Both instruments operate at similar wavelengths. CRISM has a higher spatial and spectral resolution at the expense of limited coverage of the planet's surface, while OMEGA has achieved near-global mapping at a resolution better than 5 km/pixel. OMEGA and high resolution imager HRSC have allowed the identification of several targets of interest on Mars, as well as preliminary interpretation of large scale geological structures. The later arrival of CRISM and higher resolution imaging instruments HiRISE and CTX has changed our view of the planet as it has become possible to identify specific hydrous minerals within sub-meter scale features on the surface.
Hundreds of new phyllosilicate-bearing sites are reported over the ancient southern highlands of Mars confirming that these highlands were altered by liquid water on an extensive scale. Phyllosilicates identified are found in various geological settings and exhibit a variety of chemical compositions. A few examples from our survey will be presented.
Of special interest are the new detections of phyllosilicates and other hydrous minerals in craters of the northern plains of Mars. The various hydrous and mafic mineral species identified and their local settings suggest that large crater impacts may have excavated altered material from the crust. A possible implication for Mars is the alteration of the ancient crust by liquid water early in the planet's history (> 4 Ga) on a planetary scale.