Geophysical Research Abstracts
Vol. 13, EGU2011-11245, 2011
EGU General Assembly 2011

Vertical distribution of water ice aerosols from OMEGA data

Mathieu Vincendon (1), Brigitte Gondet (1), Cedric Pilorget (1), Jean-Pierre Bibring (1), and Scott Murchie (2)
(1) Institut d Astrophysique Spatiale, Orsay, France (mathieu.vincendon@ias.u-psud.fr), (2) Johns Hopkins University/Applied Physics Laboratory, Maryland, USA.

The properties and distribution of water ice clouds follow a complex seasonal cycle on Mars. We used limb observations provided by the OMEGA imaging spectrometer to study atmospheric water ice through its near-infrared spectral properties. Water ice aerosols are characterized by a diagnostic scattering maximum at wavelengths between 3 μm and 3.6 μm. We have performed Mie and radiative transfer modeling of the scattering properties of water ice to simulate OMEGA observations of various cloud types. Model results show that the exact position of this maximum is particle size dependent, which provides a fast and efficient method to estimate the mean particle size of water ice aerosols layers. The large number of OMEGA limb observations acquired so far at various longitudes, latitudes and solar longitudes have been used to constrain the variability of water ice aerosols properties. The particle size generally correlates with altitude, with larger, micrometers size particles found at about 10 km while small particles (< 0.5 μm) are observed at higher altitudes. We report the first identification of a very high altitude water ice cloud layer with a maximum located at 75-80 km. This identification of a mesospheric water ice cloud has important implications on our understating of the Martian atmosphere, as CO2 is usually though to be the only constituent able to significantly condense at these altitudes.