Geophysical Research Abstracts
Vol. 14, EGU2012-10231, 2012
EGU General Assembly 2012

Titan VIMS local surface-atmosphere separation using multi-viewing angle observations

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The reflective properties of the surface and atmosphere of Titan in the visible and near-IR wavelengths can be probed by the VIMS instrument onboard Cassini. This wavelength range makes it possible to constrain several properties of the surface of Titan such as albedo or ice composition. However, Titan atmosphere contains aerosols and methane which prevent direct remote observation of its surface, even within methane near-IR windows. We are currently working on the development of a local surface-atmosphere separation method. Using observations of a given location acquired with various photometric angles, we can disentangle the surface and atmosphere contributions. We use a 3D spherical Monte-Carlo radiative transfer code which does not rely on simplifying assumptions regarding multiple scattering or sphericity. We will present preliminary tests and results of our approach. While the primary objective of this model is surface properties retrieval, it will also be used to better constrain atmospheric properties such as spatial and seasonal variations of aerosols optical depths