



Vertical aerosol distribution in the troposphere and stratosphere of Saturn from Cassini/VIMS data

E.D'Aversa (1),G.Bellucci (1),F.Altieri(1),F.G.Carrozzo (1),R.H.Brown (2)

(1) Istituto di Fisica dello Spazio Inteplanetario, IFSI/INAF, Via Fosso del Cavaliere 100 00133, Rome, Italy.(2) Lunar and Planetary Laboratory, University of Arizona, Tucson,AZ,USA (emiliano.daversa@ifsi-roma.inaf.it)

The aerosol content of the Saturn's atmosphere plays an essential role in determining its radiative and thermal balance. Moreover, the three-dimensional distribution of suspended particles can be useful as a tracer of atmospheric motions overall the planet. Observations acquired by Cassini/VIMS (Visual and Infrared Mapping Spectrometer), consisting in a large set of multispectral images obtained in the last 3 years, in different condition of illumination and spatial resolution, covering the 0.4-5 micron spectral range, are very promising in allowing a systematic retrieval of aerosols distribution in space and time. We use radiative transfer calculations and spectral inversion techniques in order to retrieve the vertical distribution of aerosols in the range of pressures prebed at VIMS wavelengths (from about 6 mbar to some bars, through the tropopause). Using a single scattering approximation, a preliminary analysis results in a double-layer vertical distribution, with a tropospheric main component at a pressure level of about 600 mbar, and a stratospheric minor component at about 20 mbar. Spatial variation of vertical profiles at planetary scale are detectable: moving from tropical to polar regions, the tropospheric layer appears eroded at the top, and the pick of the stratospheric layer moves upward. This behaviour is consistent with a meridional circulation with polar upwelling in the stratosphere and polar subsidence in the troposphere, in agreement with previously reported clues of polar phosphine depletion (Baines et al.,2007,Geophys.Res.Abstr.9,02109; Fletcher et al.,2008,Science,319,79-81).