



First analysis of the Titan Cassini/CIRS spectra : vertical profiles of temperature and abundance of some hydrocarbons and nitriles

S. Vinatier (1), B. Bézard (1), T. Fouchet (1), B. J. Conrath (2), R. K. Achterberg (3), P.N. Romani (4), F.M. Flasar (4), and The CIRS Investigation Team

(1) LESIA, Observatoire de Paris-Meudon, France, (2) Cornell University, USA (3) SSAI, USA, (4) NASA/GSFC, USA

We present a preliminary analysis of spectra obtained by the CIRS (Composite In-fraRed Spectrometer) instrument on Cassini during the second Titan flyby on December 13, 2004. We mainly focused on limb spectra to determine the vertical temperature profile and the abundance profiles of some hydrocarbons (C_2H_2 , C_2H_6 , C_2H_4) and one nitrile (HCN). The line-of-sight altitudes span the range 250 to 480 km. The determination of abundance profiles requires the knowledge of the temperature profile as a first step. We retrieved it from the emission observed in the ν_4 methane band centered at 1305 cm^{-1} (7.7 microns), using an inversion algorithm of the radiative transfer equation. A set of 8 limb spectra (giving information in the 250-480 km range) and an averaged spectrum at nadir (constraining the profile in the range 200-250 km) was used. The retrieved profile clearly shows a stratopause at an altitude of about 310 km and of temperature around 185 K. This retrieved thermal profile was then used to model the observed spectra in the range $600\text{-}1000\text{ cm}^{-1}$. We will present the vertical profiles of the gaseous absorbers present in this range as derived from the best fit of all limb and nadir spectra simultaneously.