



Titan's temperature and abundance vertical profiles at 15°S and 80°N

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We present our analysis of Titan limb spectra recorded by the Cassini Composite InfraRed Spectrometer (CIRS) during Tb flyby (December 13, 2004) and T3 flyby (February 14, 2005). Tb limb spectra were acquired above a latitude of 15°S and T3 limb spectra above 80°N. The geometry of limb observations allows us to retrieve vertically-resolved information on temperature, and on abundance profiles of molecules with emission features presenting a good signal-to-noise ratio like C₂H₂, C₂H₆, C₄H₂, C₃H₄, C₃H₈, C₂H₄, HCN, HC₃N and CO₂. For Tb, a set of 8 limb spectra was used (giving information in the 250-480 km range) along with a nadir averaged spectrum giving additional information at lower levels (200-250 km). For T3, a set of 8 limb spectra was used probing between 170 and 500 km. Emission intensities of molecular bands depend on both temperature and abundance profiles. Temperature was deduced from the emission of the ν_4 methane band centered at 1305 cm⁻¹ (7.7 μ m), using an inversion algorithm of the transfer equation combining both nadir and limb spectra. The retrieved thermal profiles were then used to model the observed spectra in the range 600-1000 cm⁻¹. An inversion algorithm combining both nadir and limb spectra permits to retrieve the vertical mixing ratio distribution of molecules mentioned above, up to 500 km (depending on the molecule). We will present the different mixing ratio profiles retrieved at 15°S and 80°N and discuss the observed differences.