Geophysical Research Abstracts
Vol. 13, EGU2011-12652, 2011
EGU General Assembly 2011

The Molecular Hydrogen Mole Fraction Profile in Titan's Atmosphere: A Case for Magnetospheric Power Input?

Darrell F. Strobel

Johns Hopkins University, Earth & Planetary Sciences, Baltimore, United States (strobel@jhu.edu, +1-410-516-7933)

The third most abundant species in Titan's atmosphere is molecular hydrogen. In the troposphere and lower stratosphere the mole fraction is 0.001 based on Voyager IRIS, Cassini CIRS infrared measurements and the Huygens GCMS, whereas the Cassini INMS measures the thermospheric H_2 mole fraction profile above 950 km. Strobel (Icarus, 208, 878-886, doi:10.1016/j.icarus.2010.03.003, 2010) concluded that the combined measurements imply a downward H_2 flux into Titan's surface comparable to the H_2 escape flux out of the atmosphere (rate $\sim 1 \times$ e28 s-^{1}) and required larger photochemical production rates of H_2 than obtained by previous photochemical models. Further detailed model calculations indicate the source must be in the upper atmosphere presumably associated with magnetospheric energetic particle deposition.