



Photochemistry in Neptune's atmosphere: Constraints with Herschel Space Observatory's water observations

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In order to obtain a vertical profile of the main hydrocarbons and oxygen bearing compounds, Neptune's atmosphere has been investigated using a one dimensional, steady state photochemical model. This model includes a complete photochemical scheme that allows interaction between hydrocarbons and oxygen compounds, that studies in a very detailed way transport processes (molecular and turbulent diffusion) and condensation processes, that takes into account an influx of external oxygen and uses updated values obtained by laboratory measurements for reaction rates and photoabsorption cross sections. This work is an application of the Jupiter 1D steady state model presented in González et al. (2010) using the same chemical reaction list and taking into account some differences like heliocentric distance, temperature profile, diffusion (molecular and turbulent) rates and external oxygen influx. This work is in the frame of the Herschel Space Observatory and the Key-Programme Guaranteed Time "Water and related chemistry in the Solar System" (Hartogh et al. 2009) and the data obtained is compared with PACS (Photodetector Array Camera and Spectrometer) and HIFI (Heterodyne Instrument for the Far Infrared) observations of Neptune's atmosphere obtained in 2009 and 2010 respectively.

González et al., accepted for publication in *Advances in Geosciences* (2010)

Hartogh et al., *Planetary and Space Science* 57 (2009) 1596-1606