

Photochemistry, Mixing and Transport in Jupiter's Stratosphere Constrained by Cassini: an Indirect Clue of Jupiter's Auroral Ion-Neutral Chemistry?

Vincent Hue⁽¹⁾, F. Hersant⁽²⁾, T. Cavalié⁽³⁾, M. Dobrijevic⁽²⁾, J. A. Sinclair⁽⁴⁾

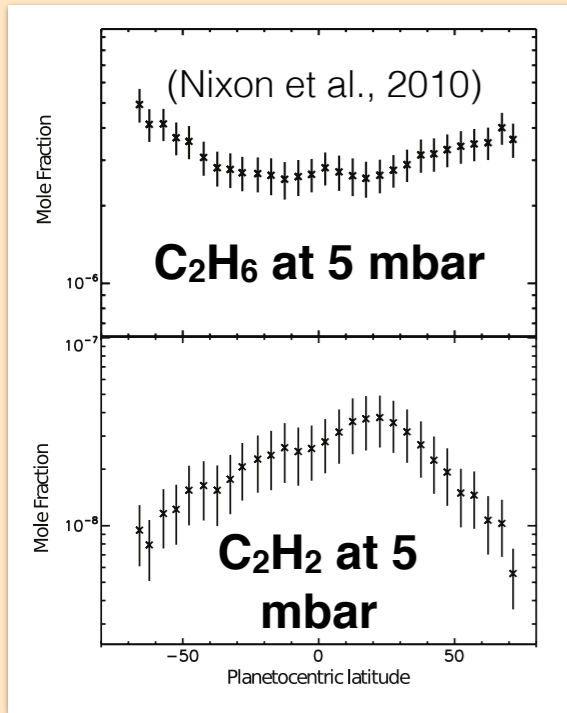
⁽¹⁾Southwest Research Institute, San Antonio, TX; ⁽²⁾Laboratoire d'astrophysique de Bordeaux, Univ. Bordeaux, CNRS, B18N, Allée Geoffroy Saint-Hilaire, 33615 Pessac, France.; ⁽³⁾LESIA, Observatoire de Paris, CNRS, Université Paris 06, Université Paris-Diderot, 5 place Jules Janssen, 92195 Meudon, France; ⁽⁴⁾Jet Propulsion Laboratory/California Institute of Technology, 4800 Oak Grove Dr, Pasadena, CA 91109, United States



The problem we are trying to solve

Abundances measured by Cassini/CIRS:

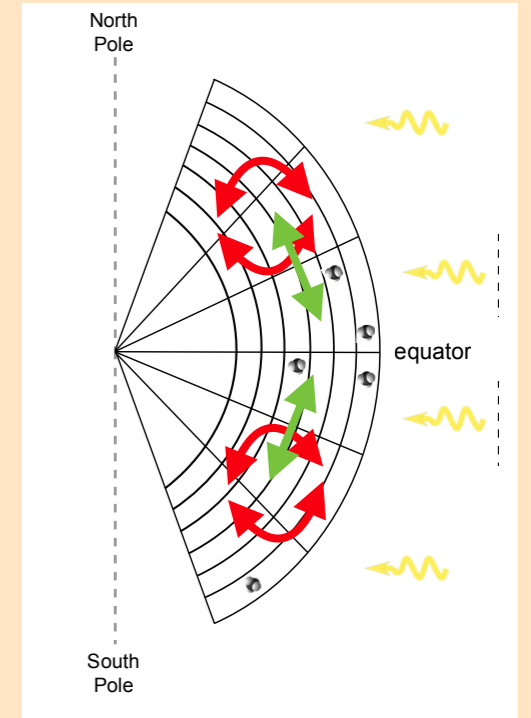
=> **Anti-correlation C₂H₆/C₂H₂ at high latitudes?**



Is the anti-correlation at high latitudes caused by stratospheric dynamics coupled with chemistry?

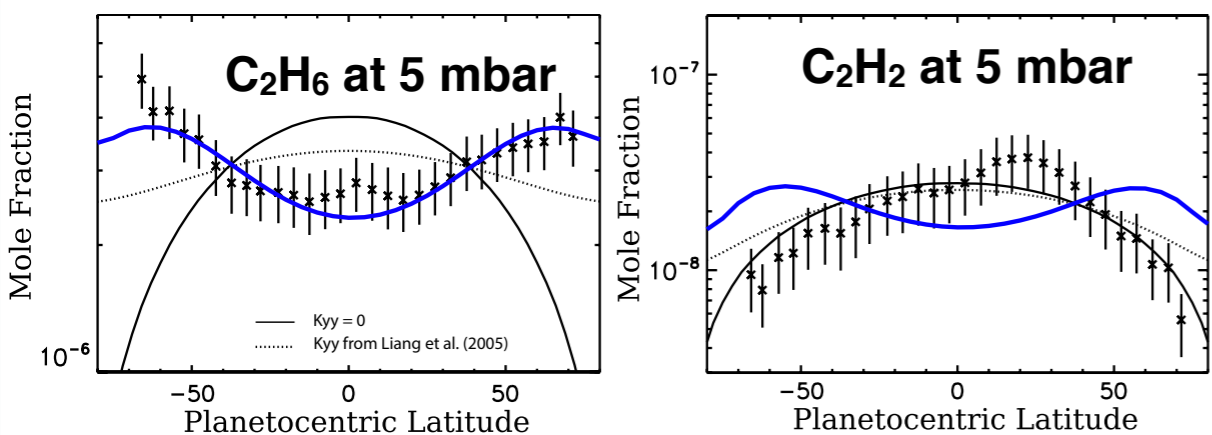
=> **We have developed a 2D-photochemical model with transport to assess on this**

Diffusion: post-SL9 dust migration
molecular distribution over time
Advection: ad-hoc circulation to fit the abundance distribution



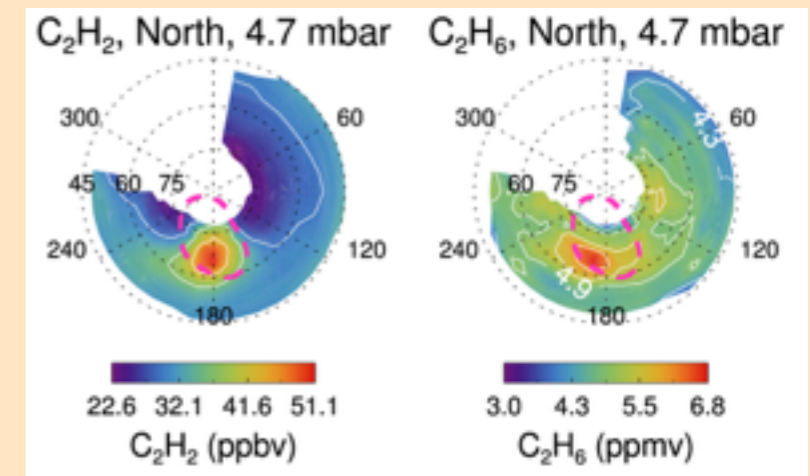
Results

Conclusion - Perspective



Hue et al. (2018)

- Can't fit both C₂H₂ and C₂H₆ at the same time with only neutral chemistry and transport
- Missing chemical pathway (Ion-neutral chemistry, aerosol chemistry)?
- Supported by recent observations



Sinclair et al. (2018)