

VENUS EXPRESS

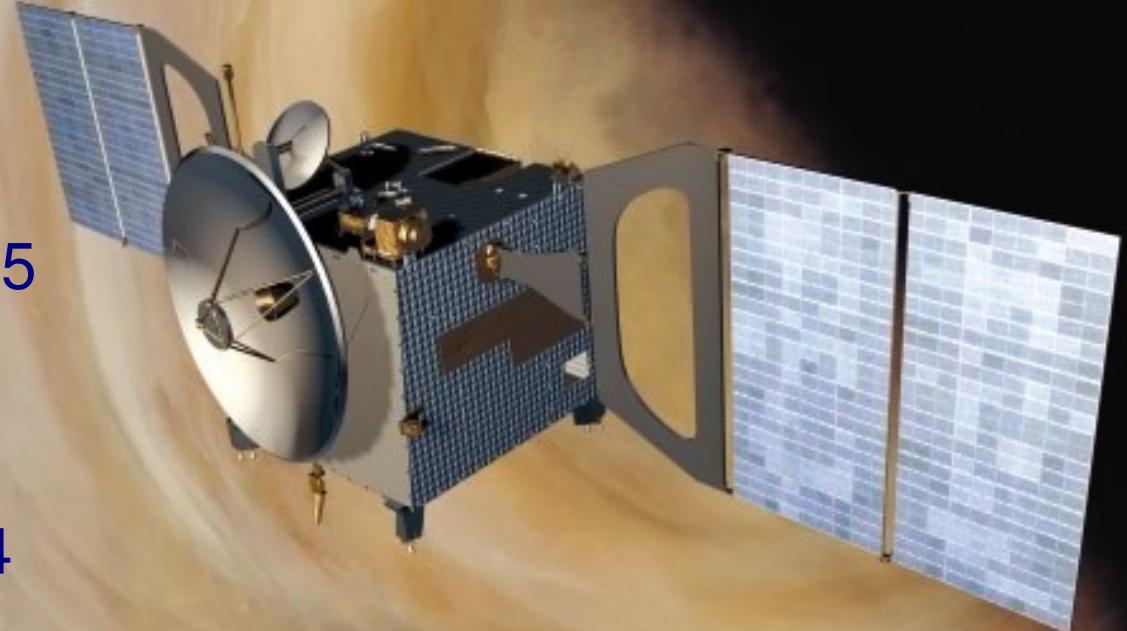
**datasets, results:
some examples**

VENUS-EXPRESS

Launched Nov. 9 2005

Arrived April 2006

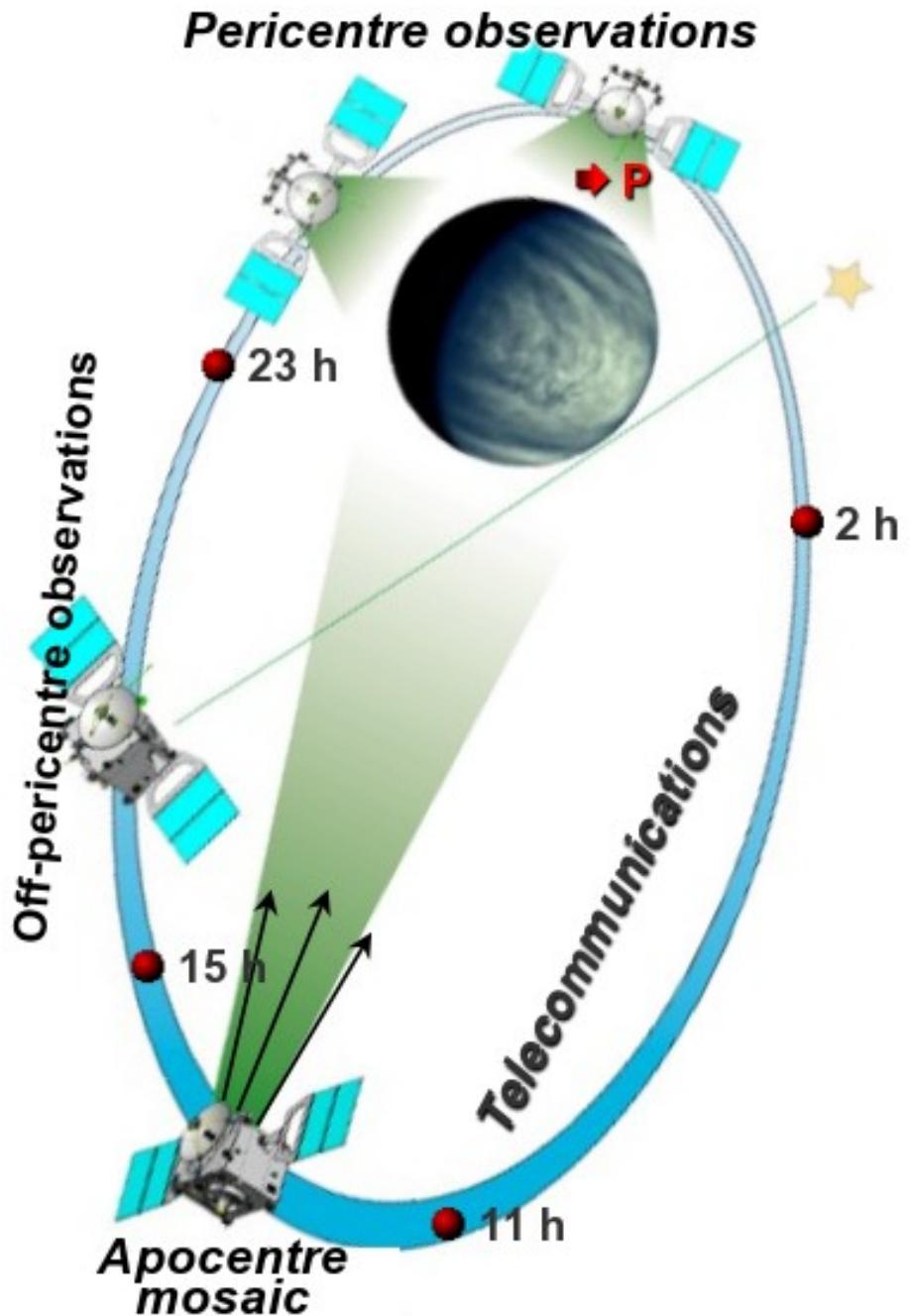
Ended December 2014



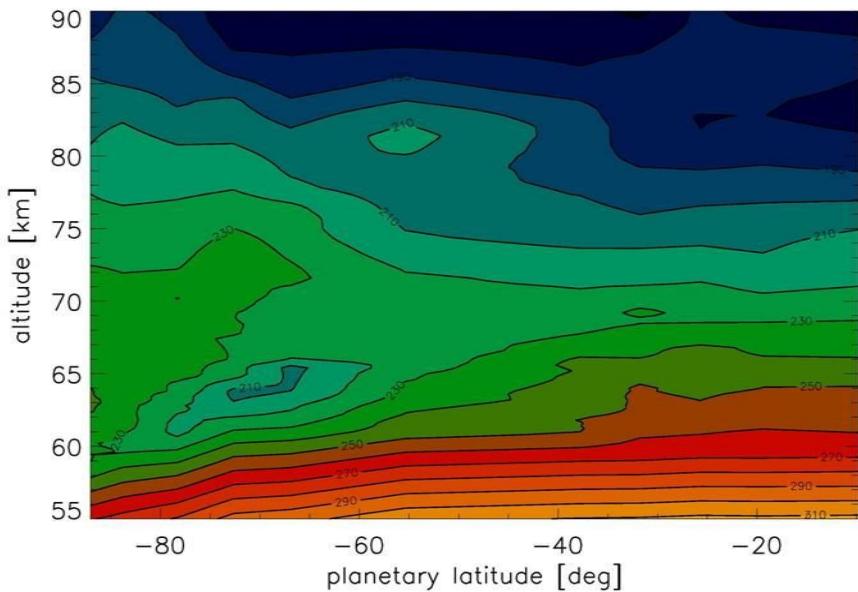
- VMC (Venus Monitoring Camera – UV, visible, IR)
- VIRTIS (Visible and Infrared Thermal Imaging Spectrometer - 0,25 to 5 microns)
- PFS (Planetary Fourier Spectrometer - 0.9 to 45 microns)
- VeRa (Venus Radio Science)
- SPICAV-SOIR (Spectroscopy for Investigation of Characteristics of the Atmosphere of Venus – UV and IR)
- ASPERA (plasmas), MAG (magnetometers)

Orbit, observation strategy

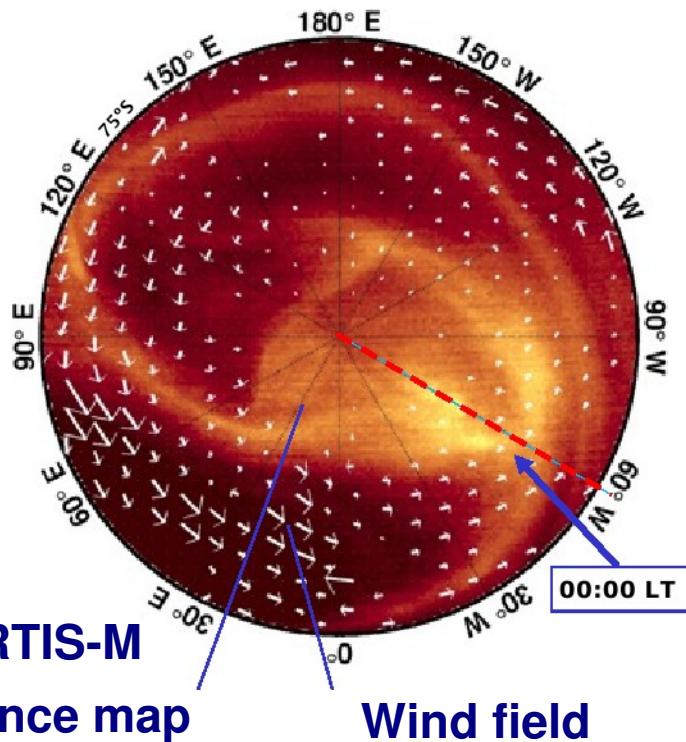
- 24h, polar
- Pericenter: 200-300 km
- Apocenter: 66000 km



Venus atmosphere: some examples of results

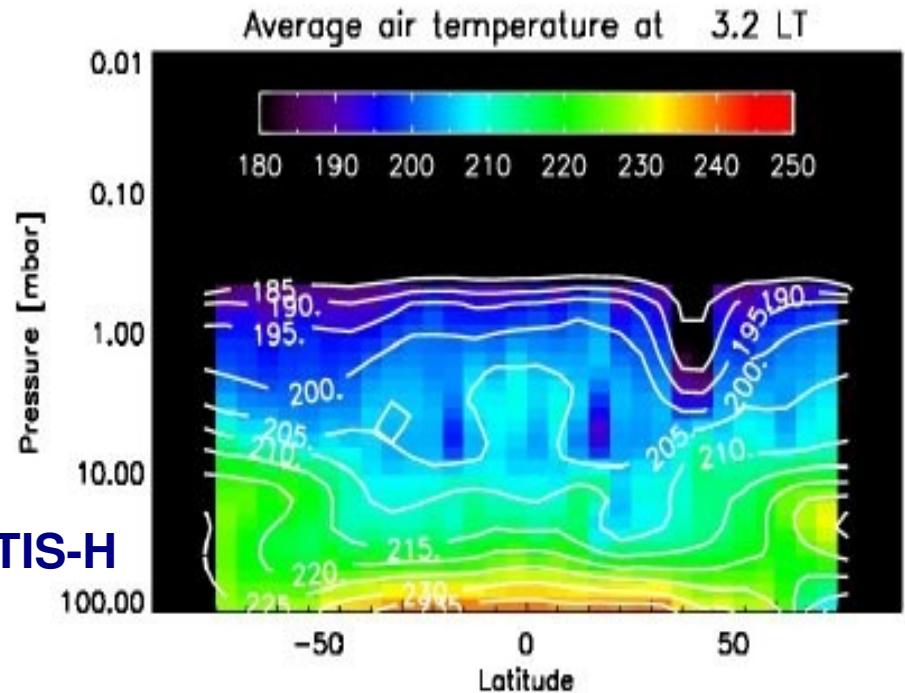


VeRa

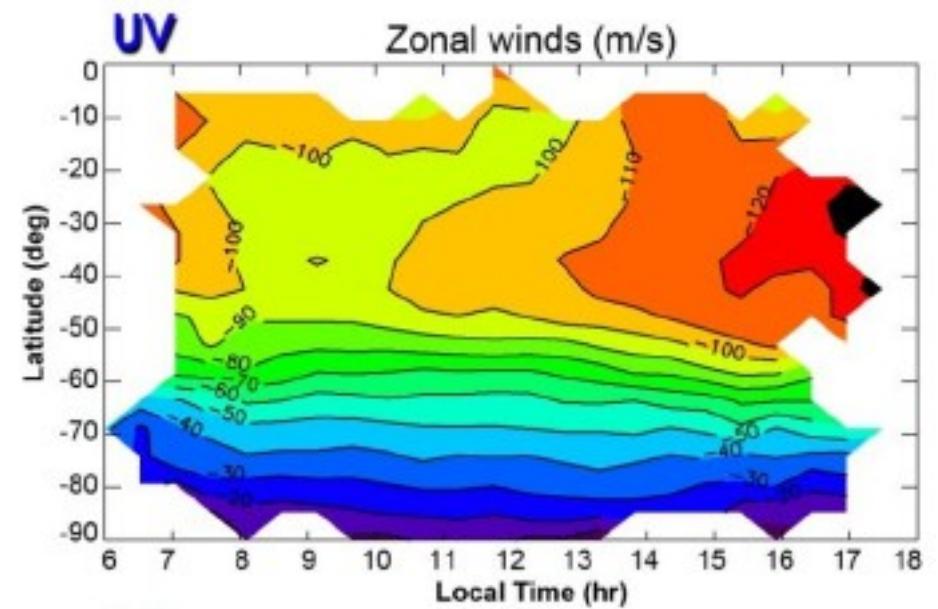


VIRTIS-M
radiance map

Wind field

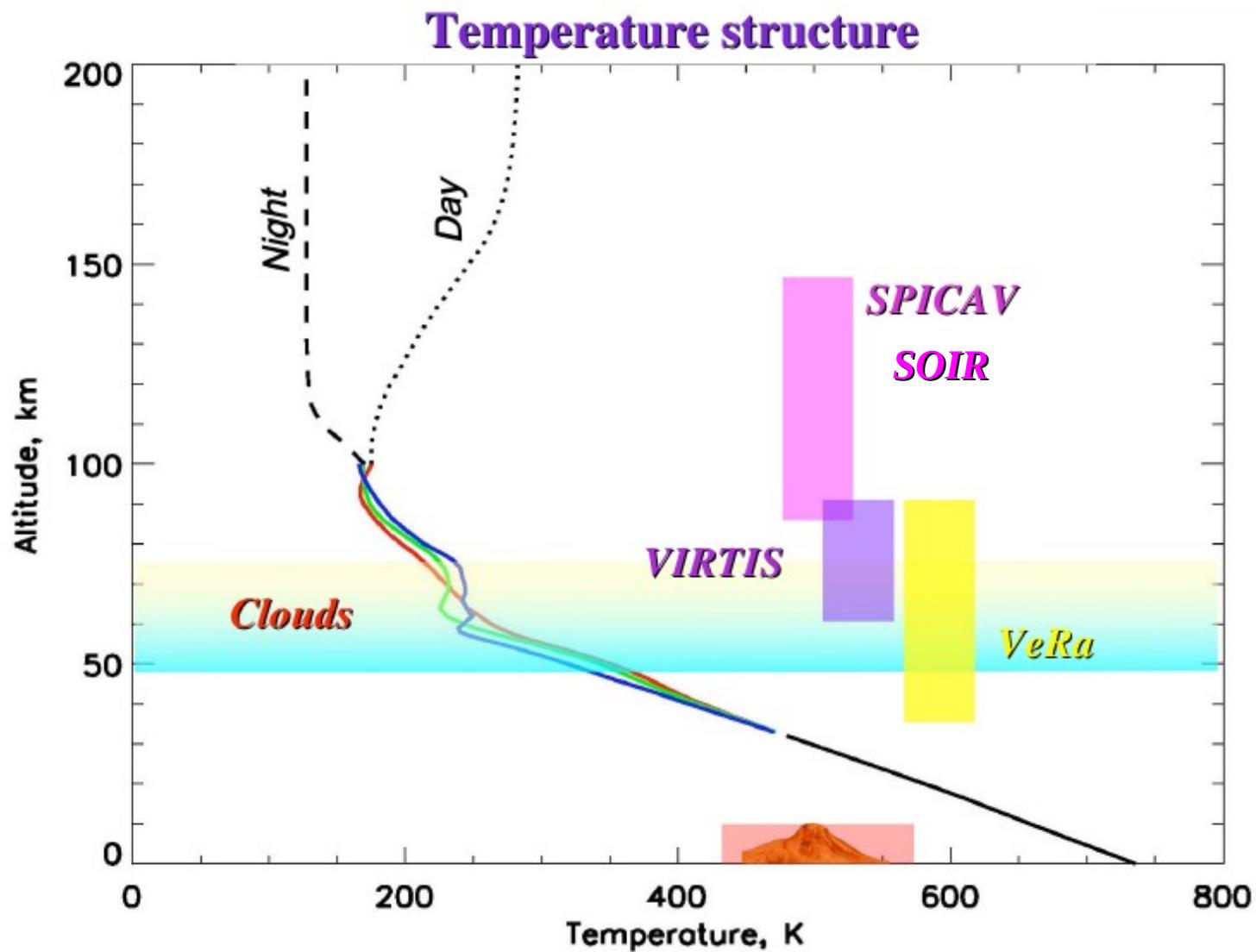


VIRTIS-H

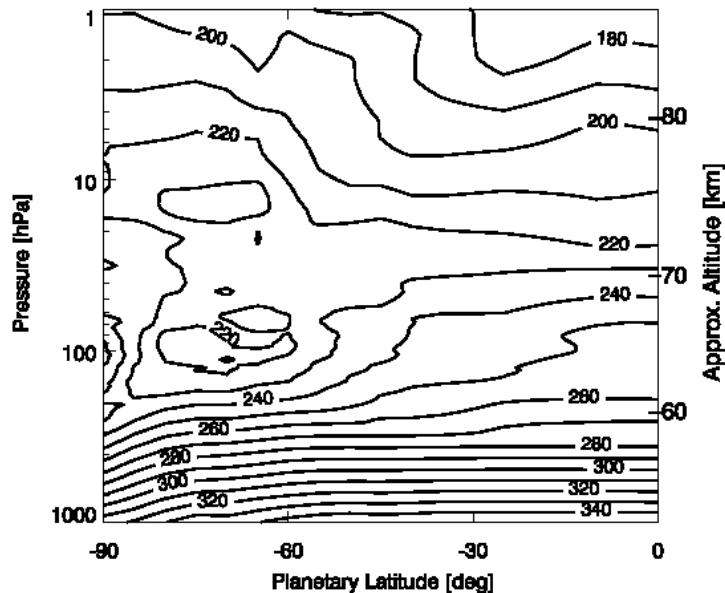


VIRTIS-M cloud-tracking zonal wind field

Temperature

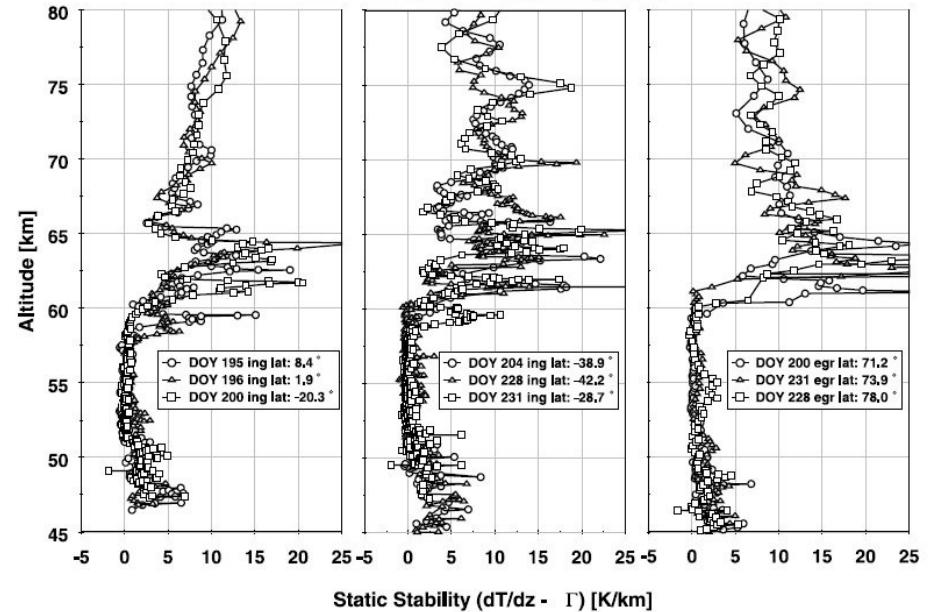


VeRa, Tellmann et al., 2009

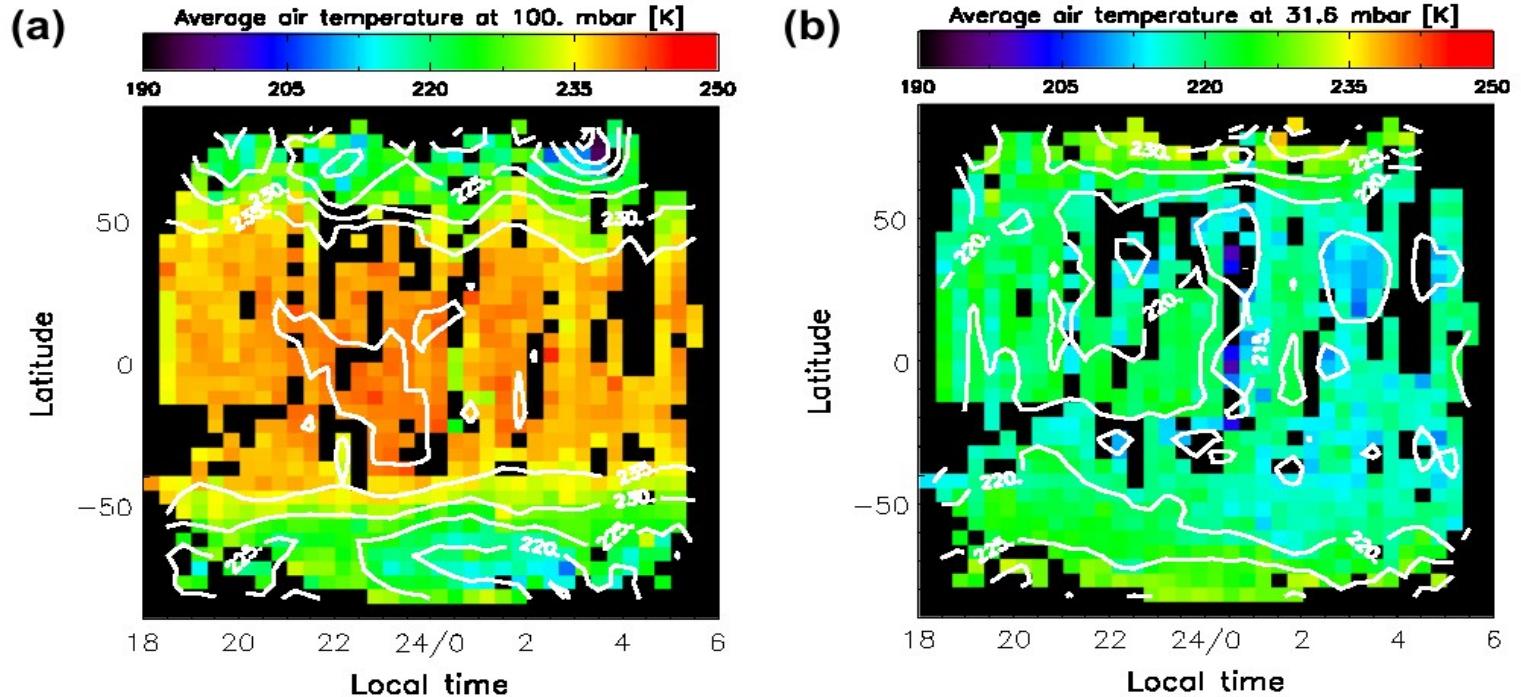


Temperature

OCC1: July 14 - August 19, 2006

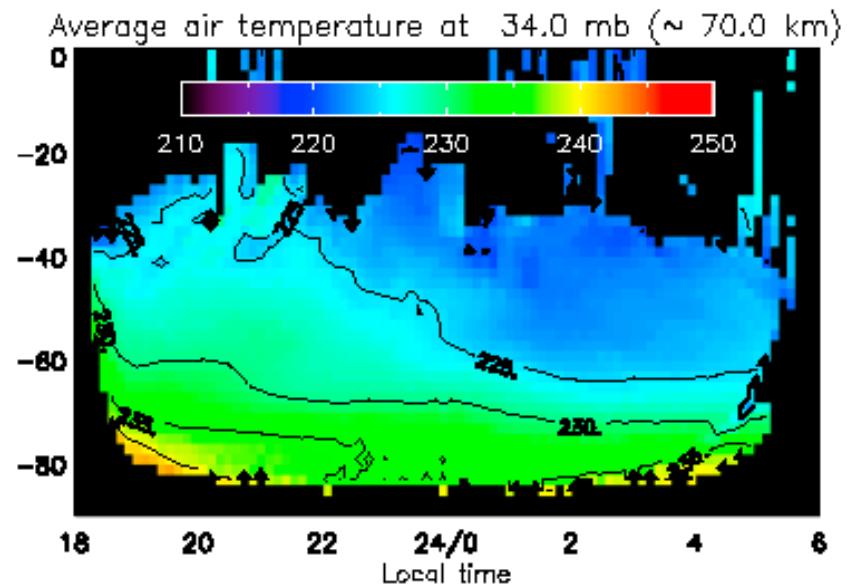
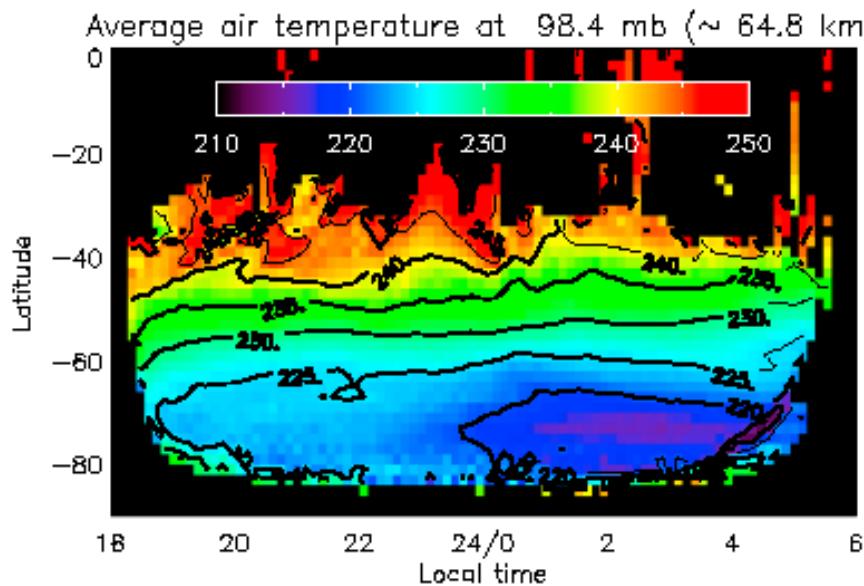


VIRTIS-H, Migliorini et al., 2012

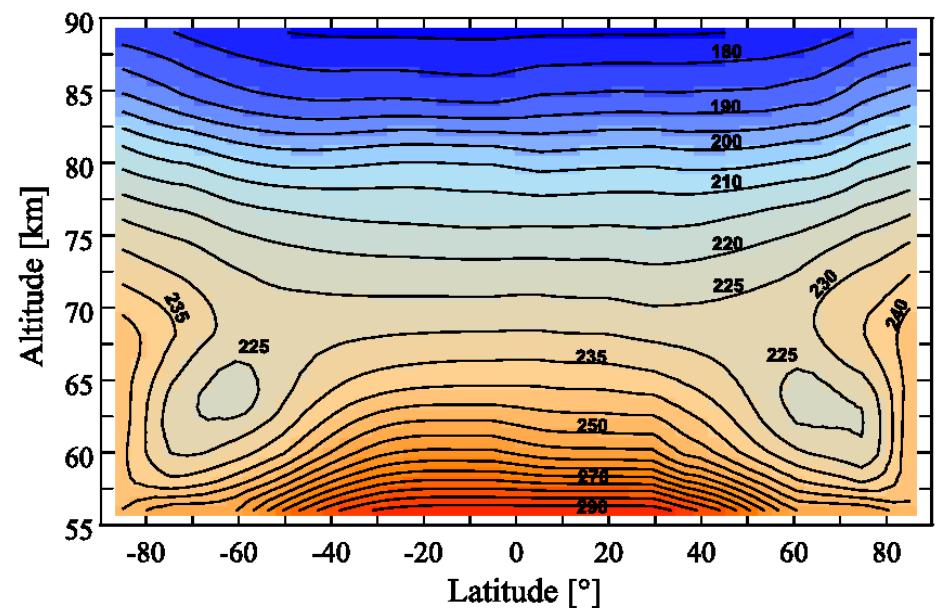
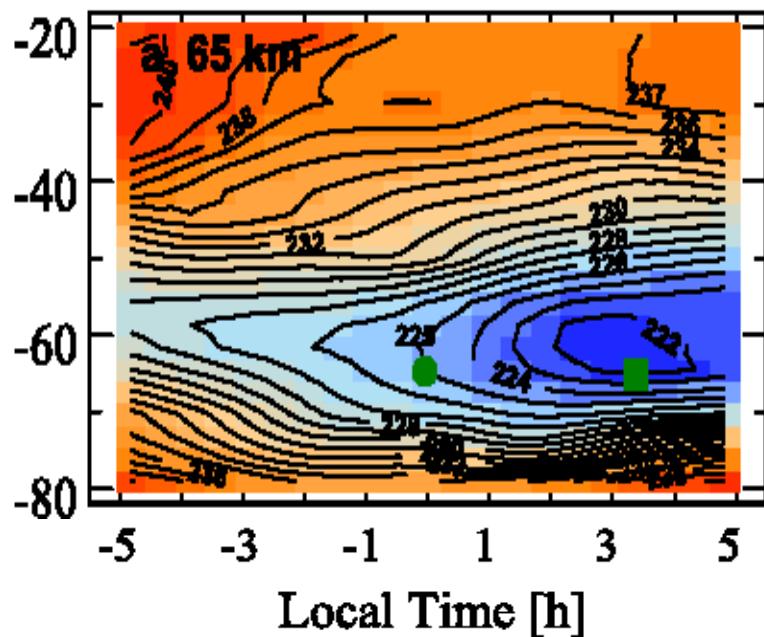


Temperature

VIRTIS-M, Grassi et al., 2014

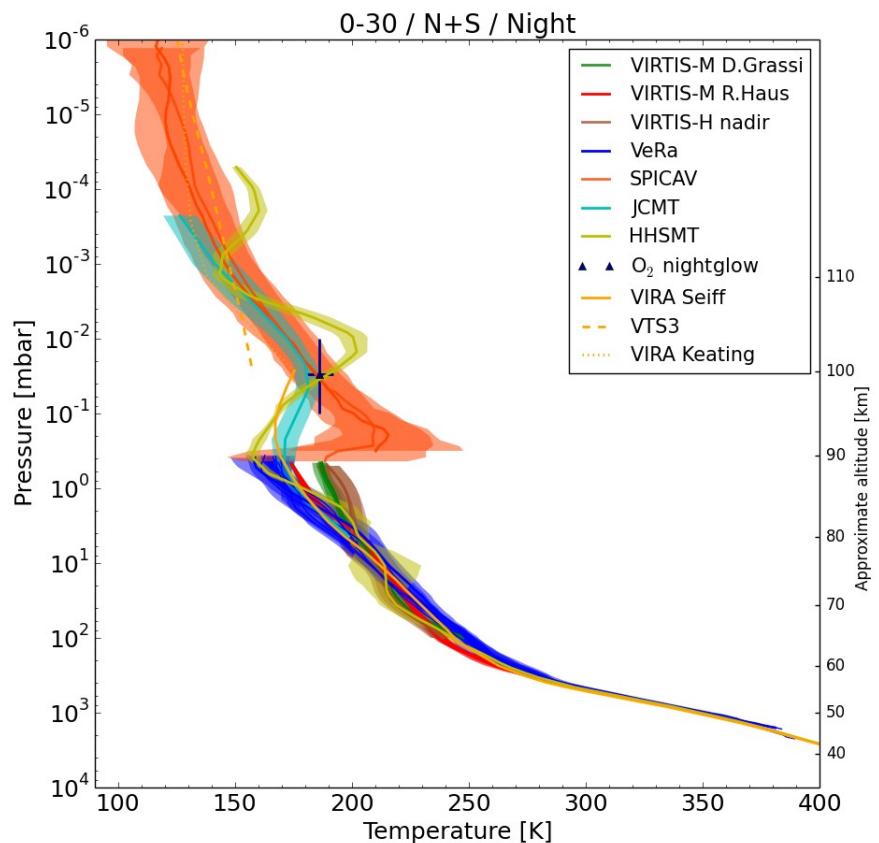


VIRTIS-M, Haus et al., 2013, 2014



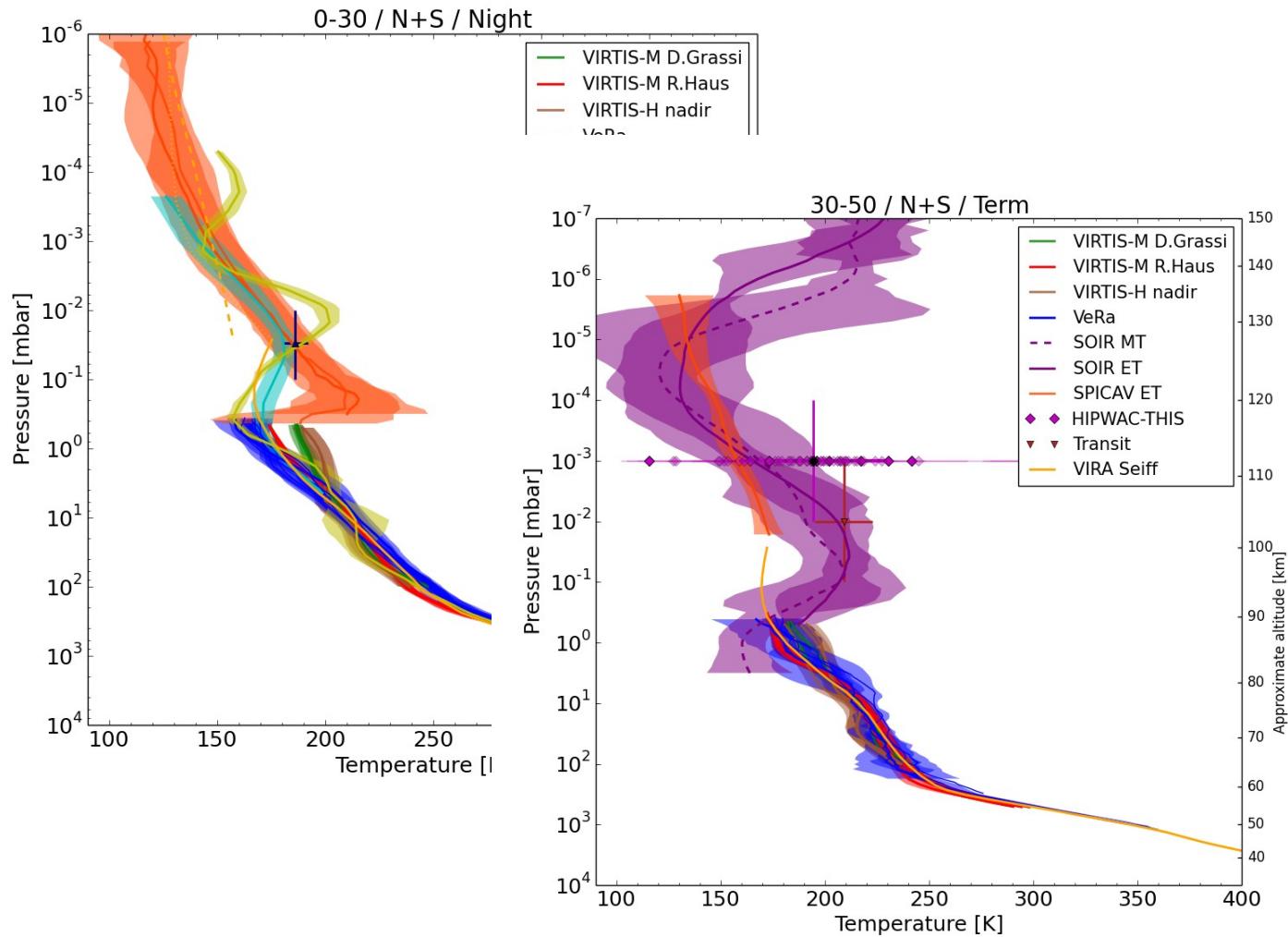
Temperature

Example of comparisons



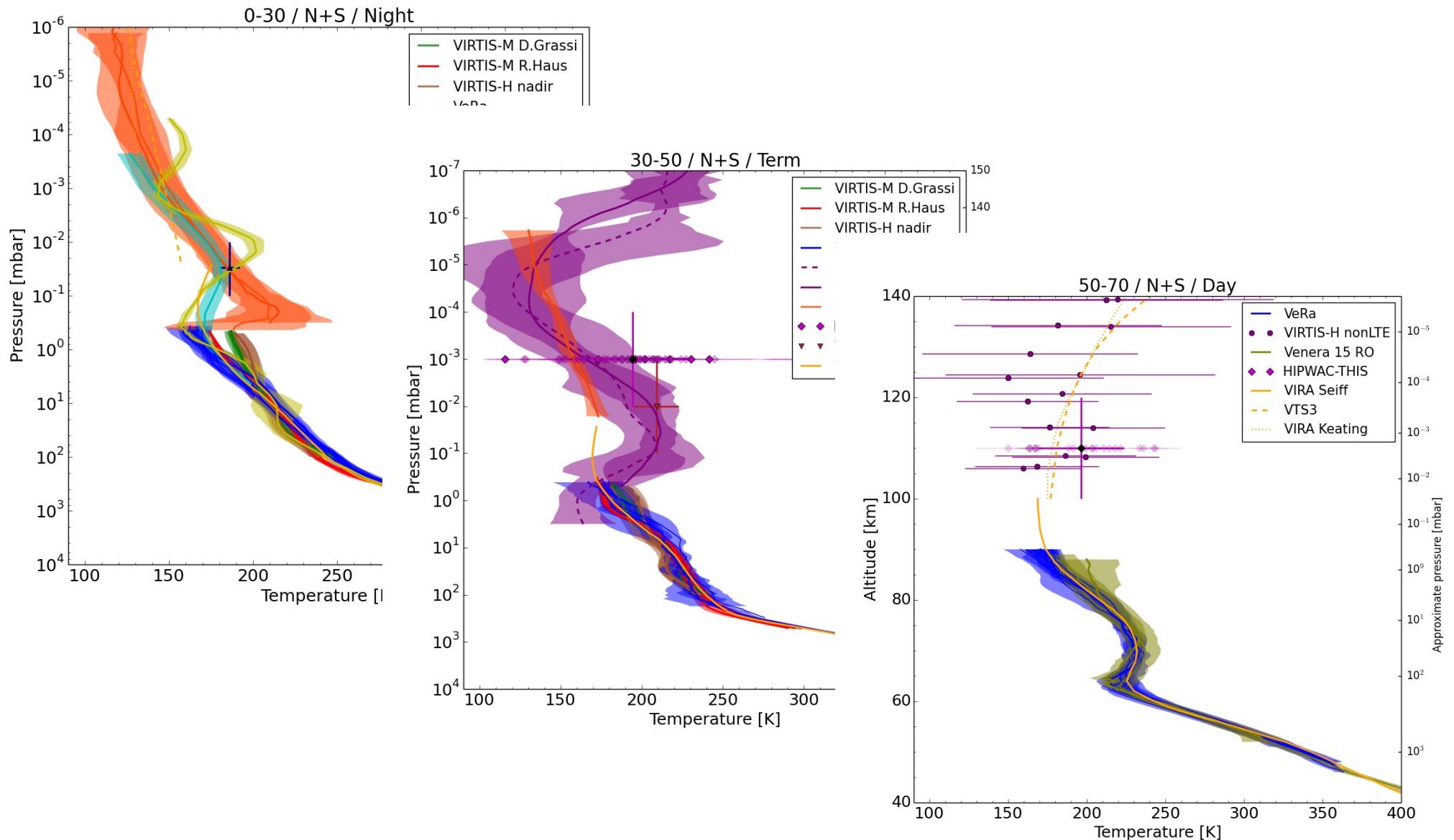
Temperature

Example of comparisons

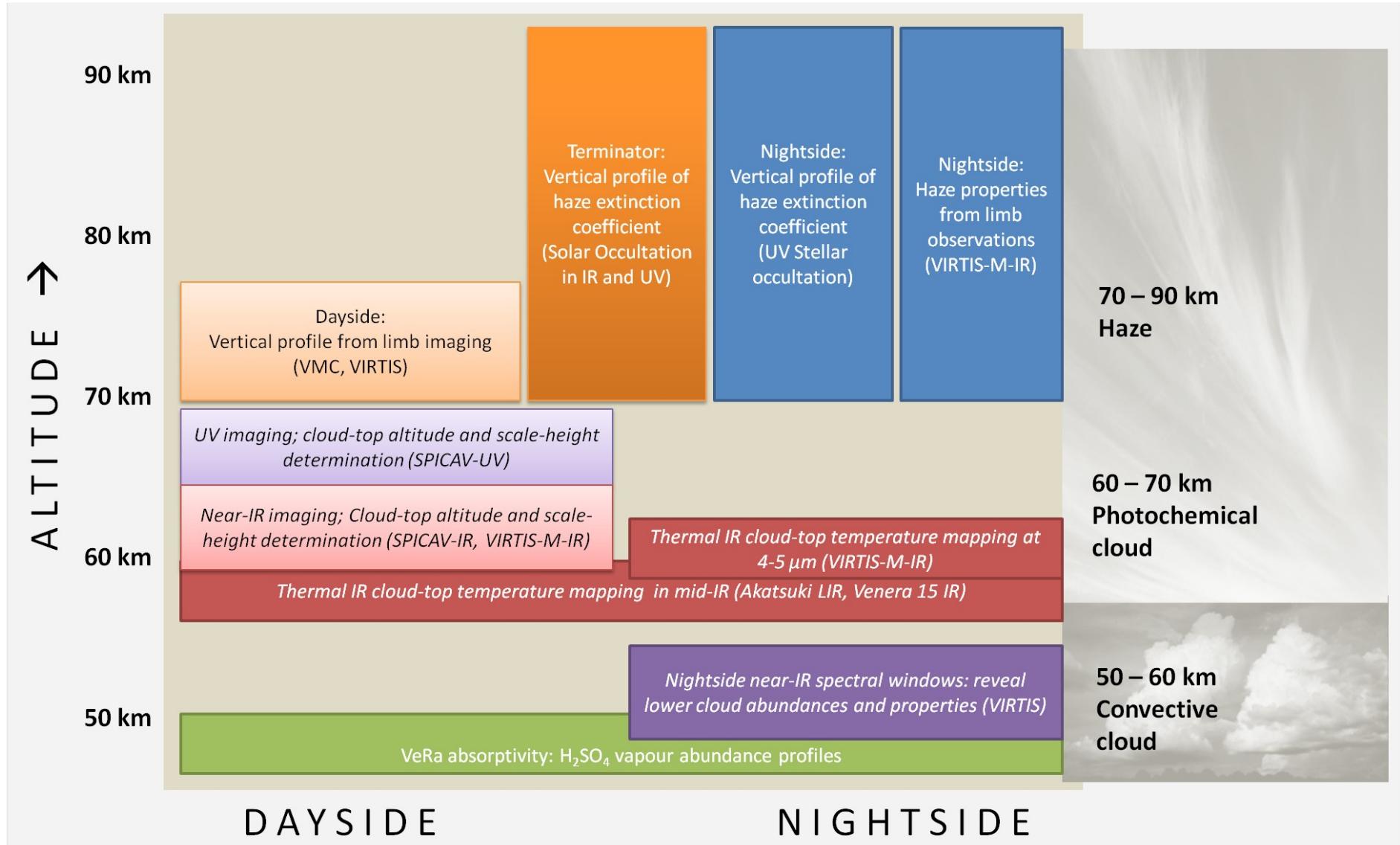


Temperature

Example of comparisons

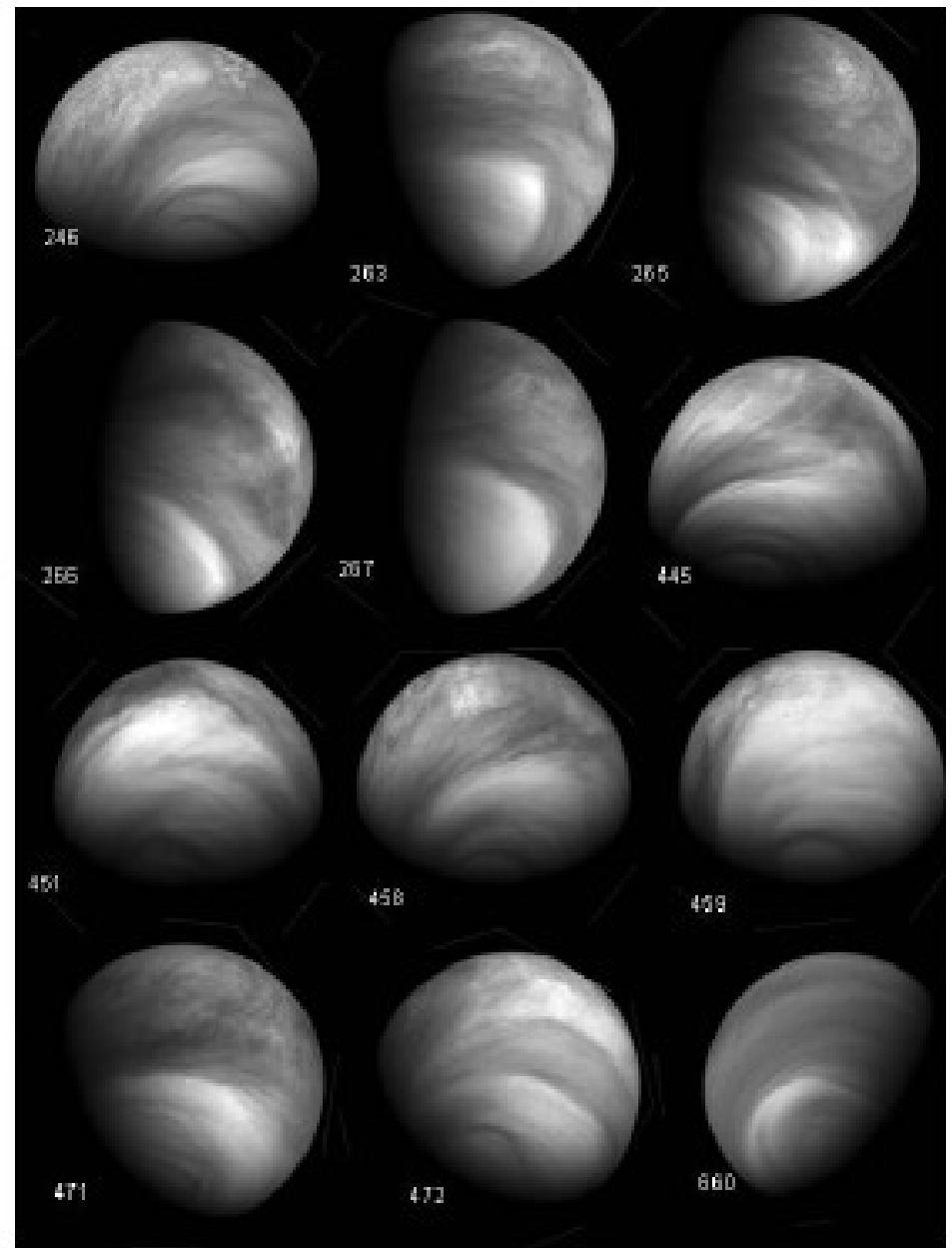
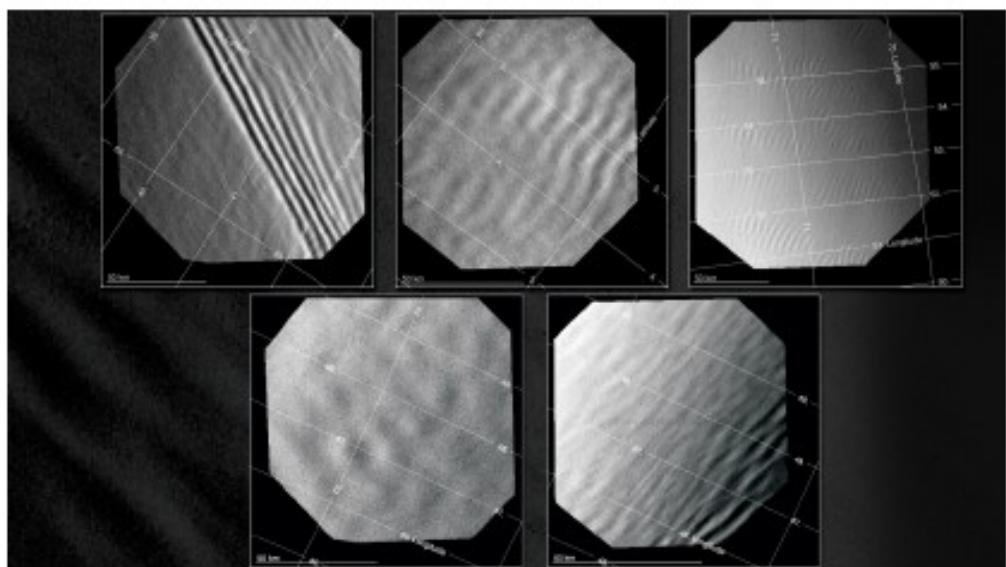


Clouds



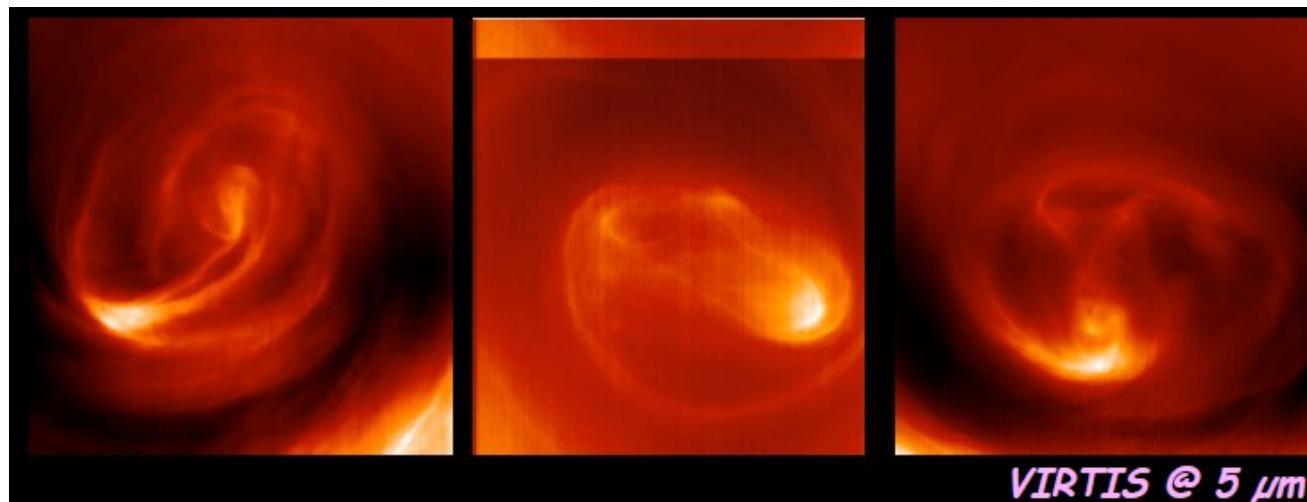
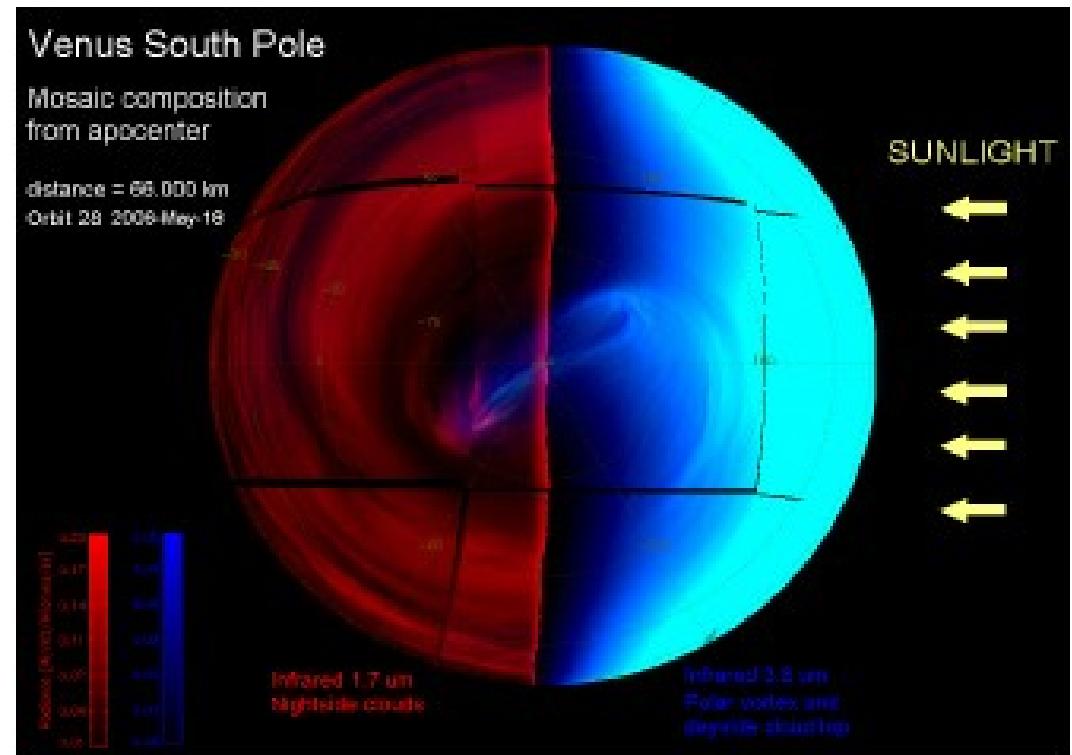
Clouds

Morphology images (VMC, UV)



Clouds

Morphology images (VIRTIS, IR)



Clouds

Cloud top altimetry

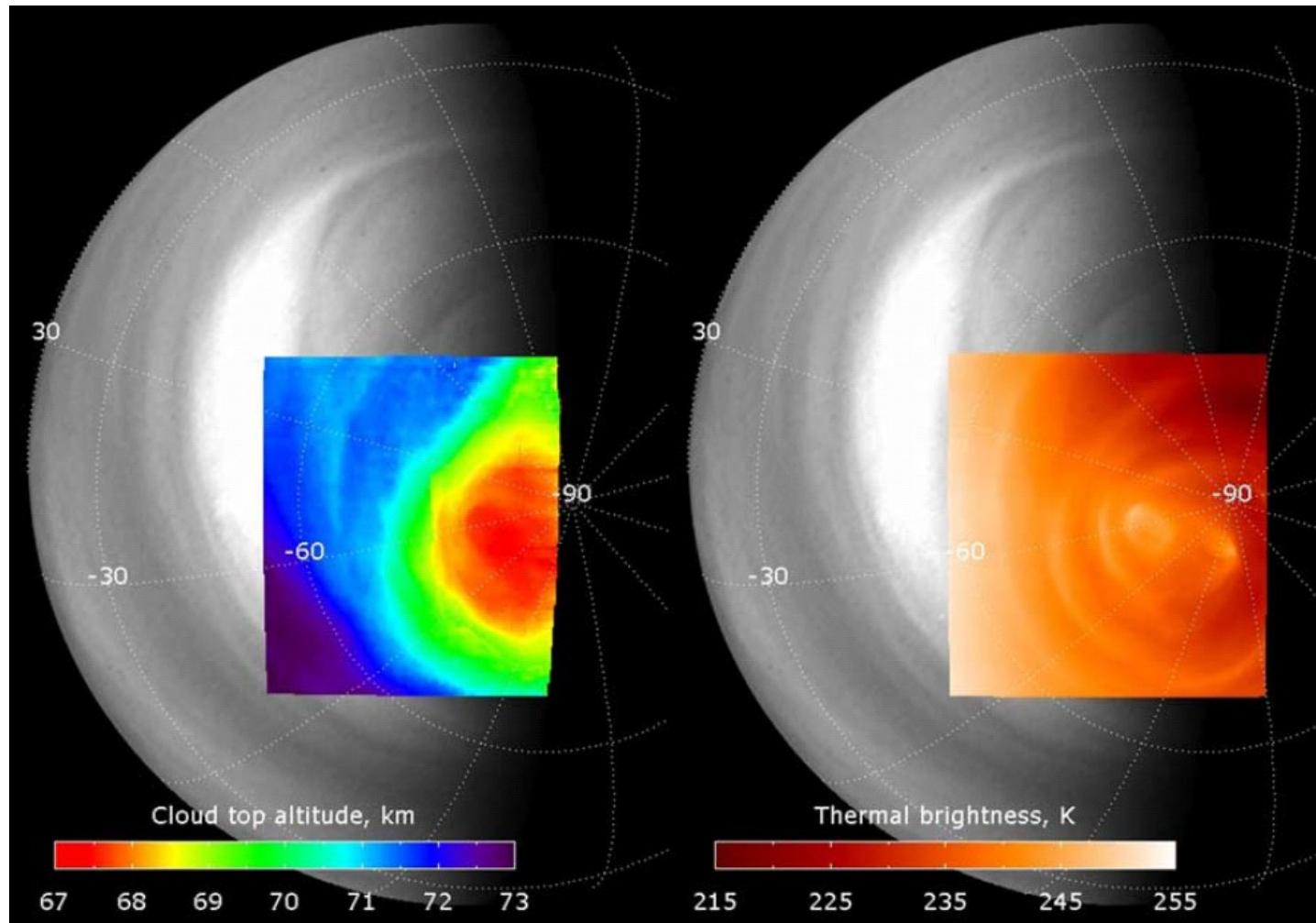


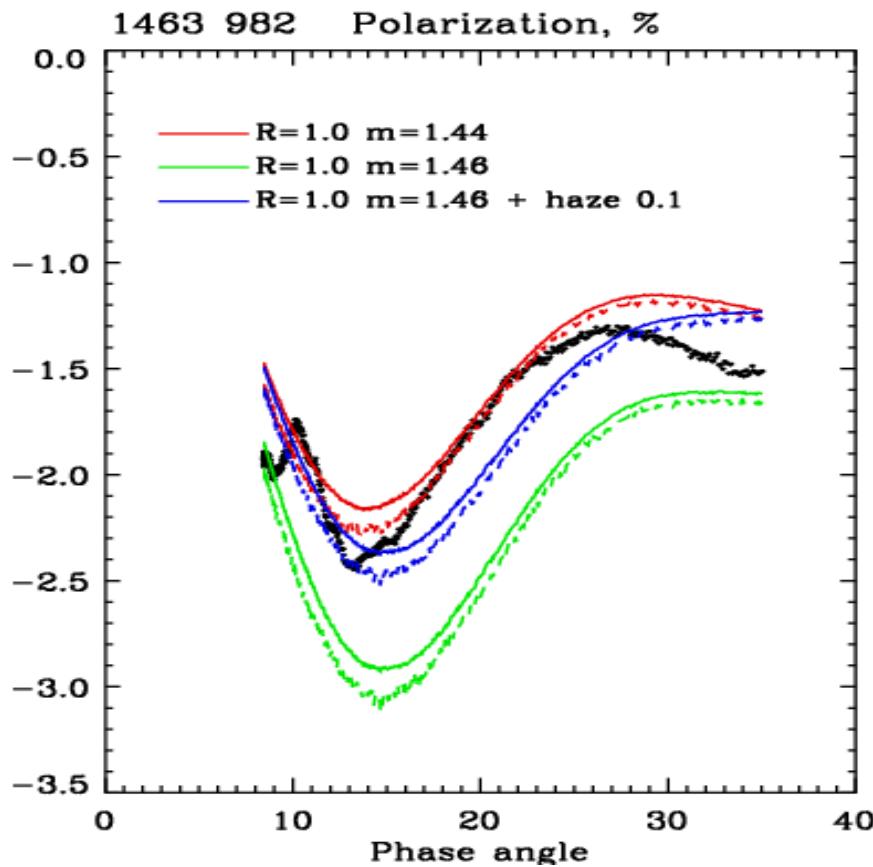
Figure 5. Comparison of the (left) cloud top altimetry with (right) thermal IR ($5 \mu\text{m}$) VIRTIS image, both overplotted on the simultaneously captured VMC UV image (orbit 674).

VMC

Ignatiev et al., 2009

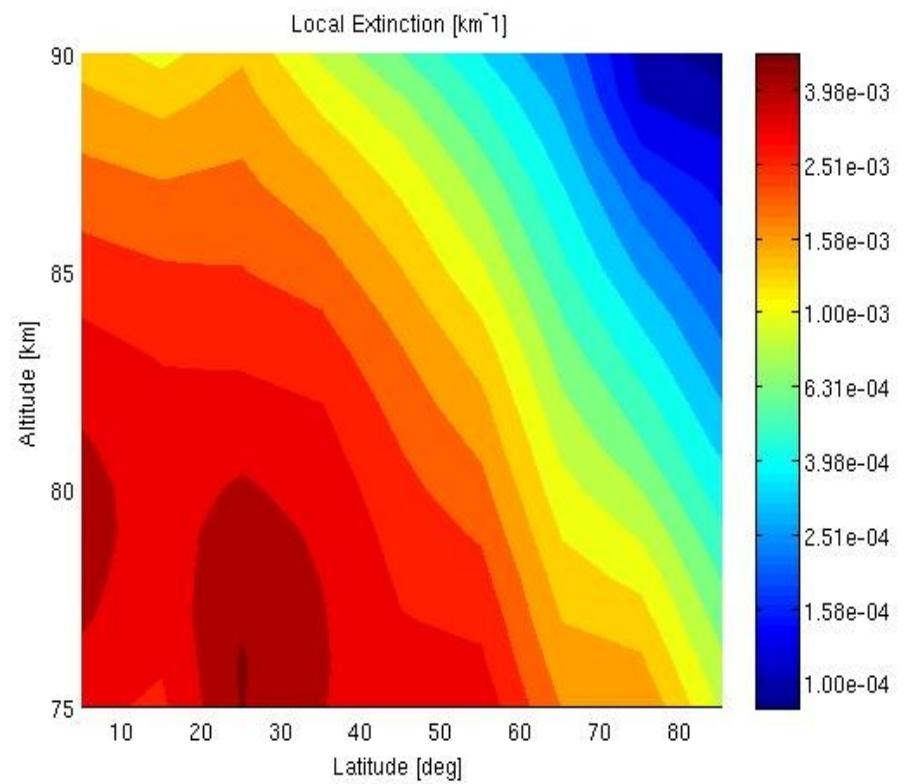
Clouds

Polarimetry



VMC
Petrova et al. 2014

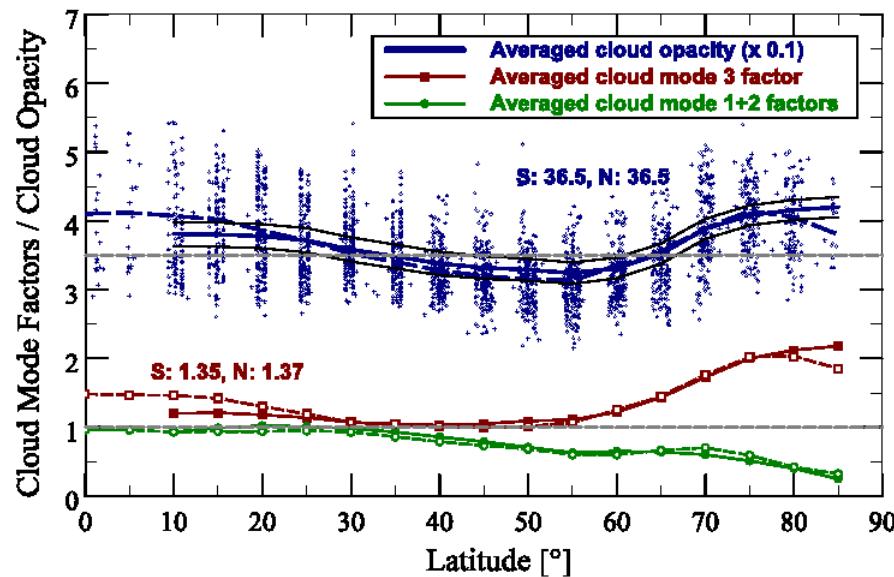
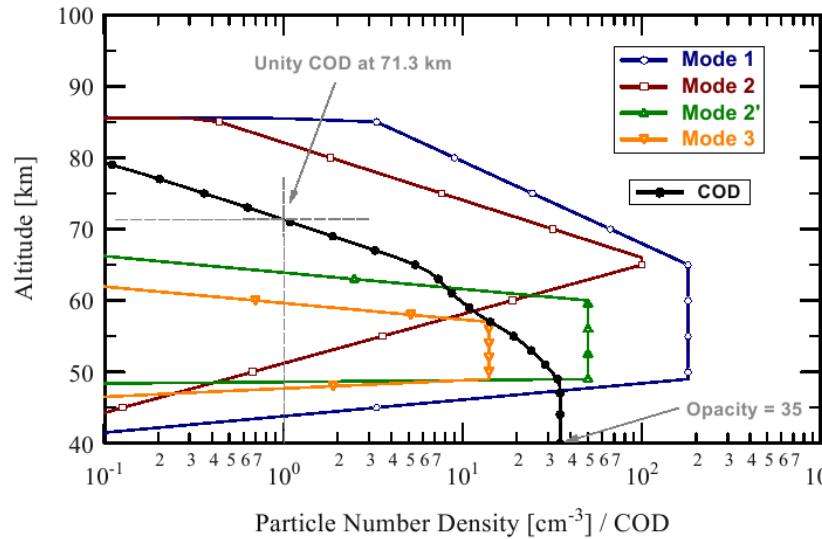
Hazes



SPICAV
Wilquet et al 2014

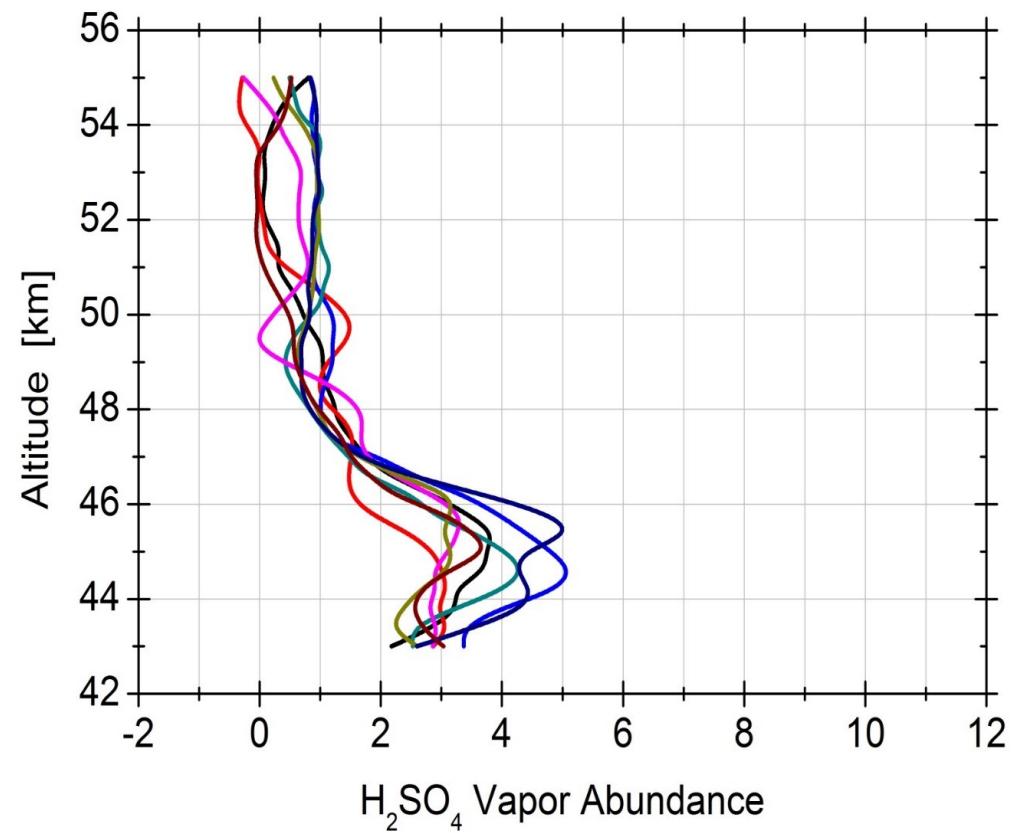
Clouds

Cloud model retrieval



VIRTIS, Haus et al. 2014

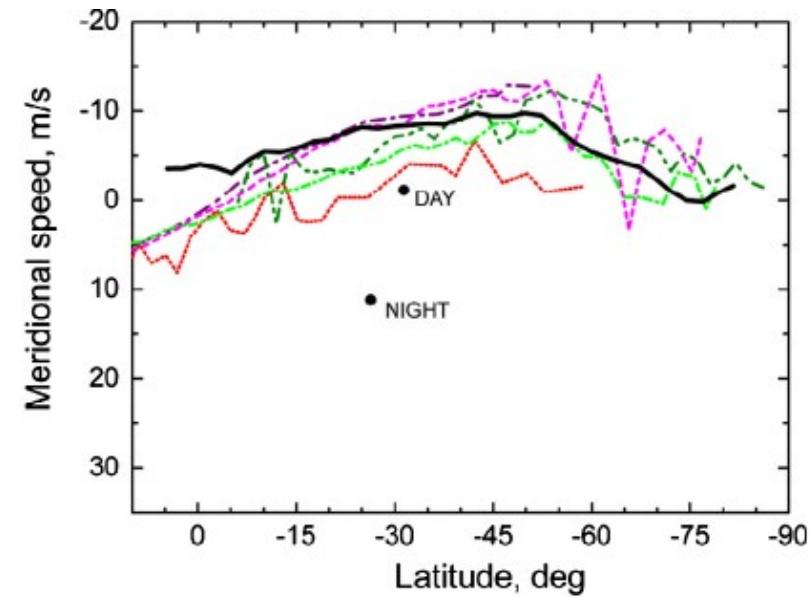
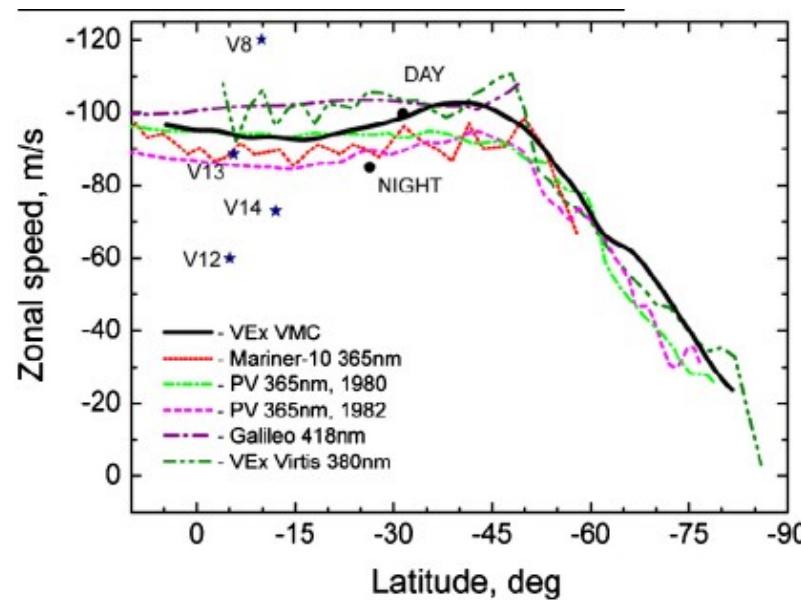
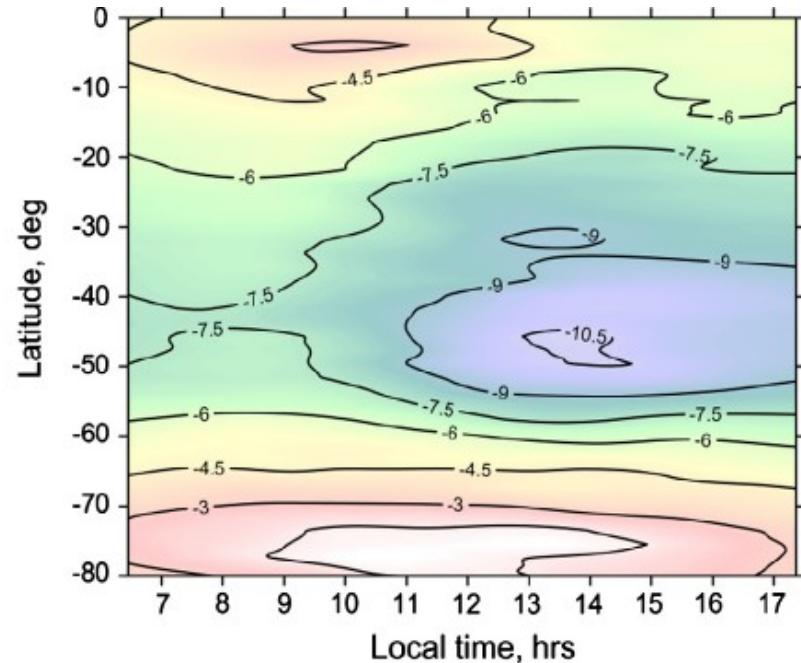
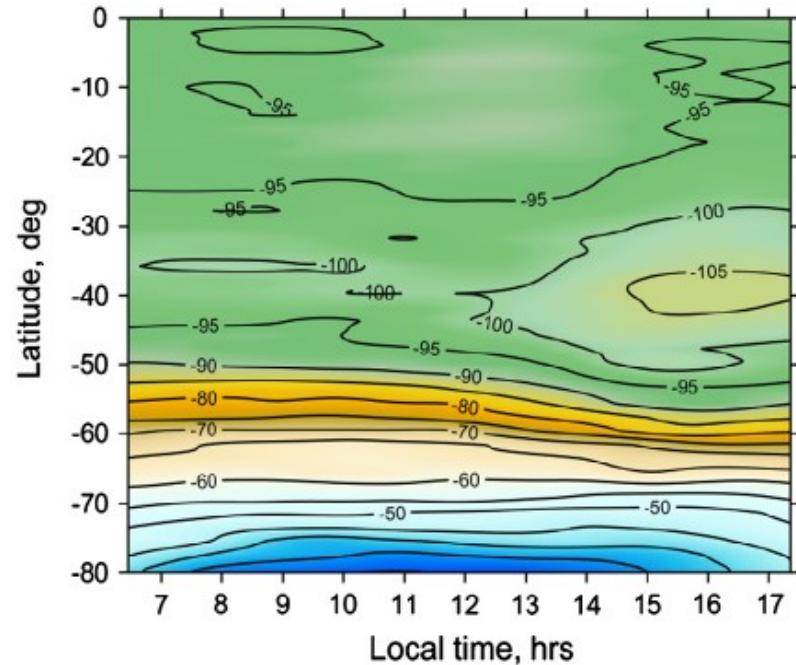
H_2SO_4 vapor



VeRa
Oschlisniok et al

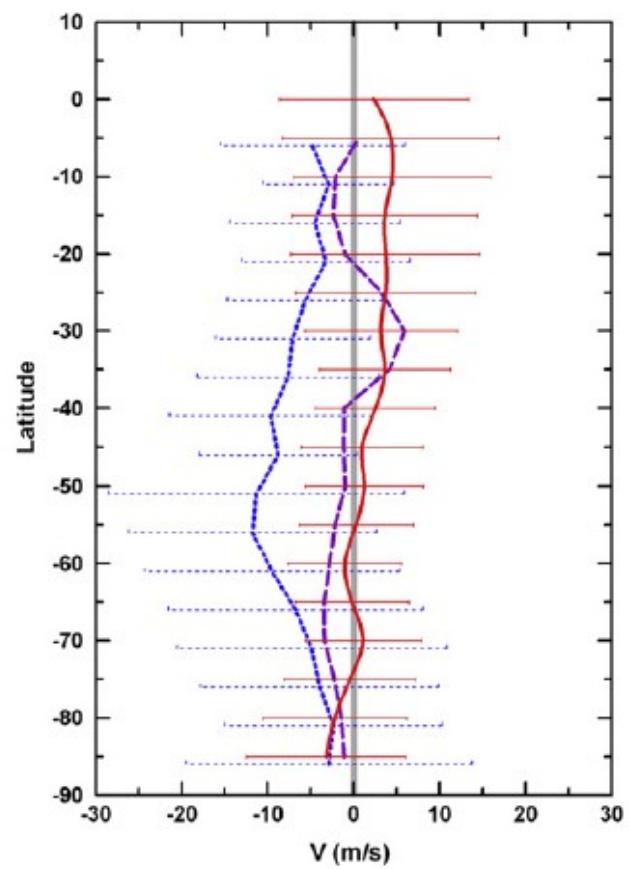
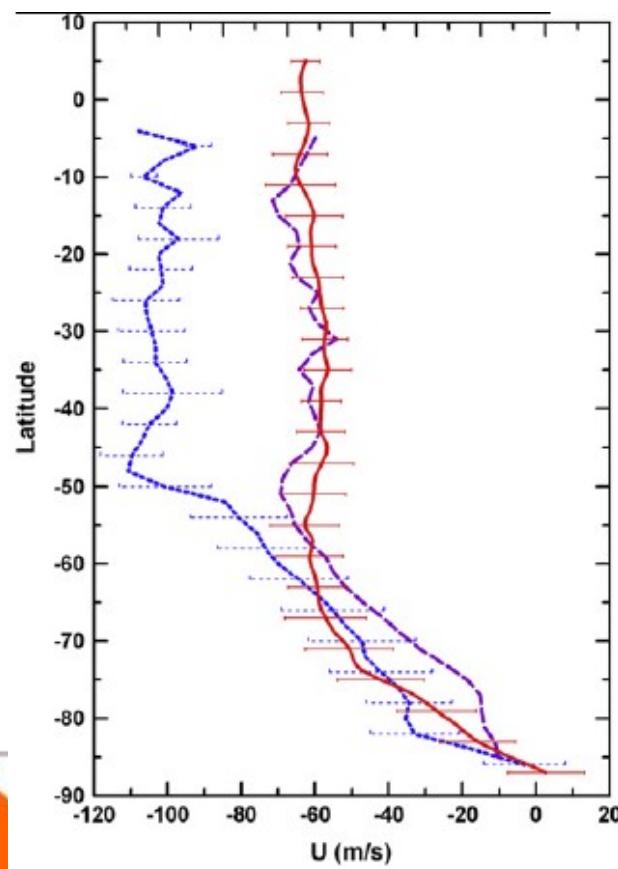
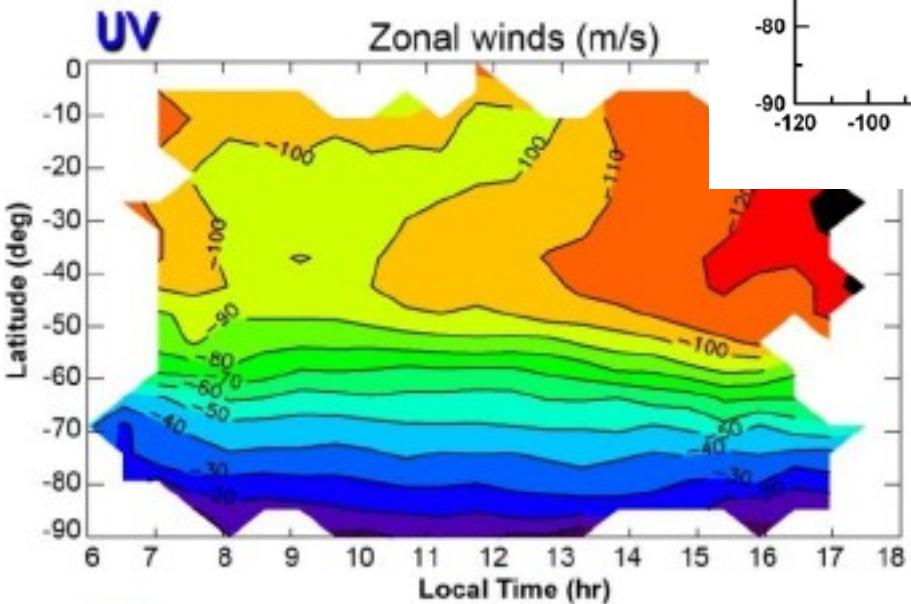
Wind

VMC UV images, Khatuntsev et al., 2013



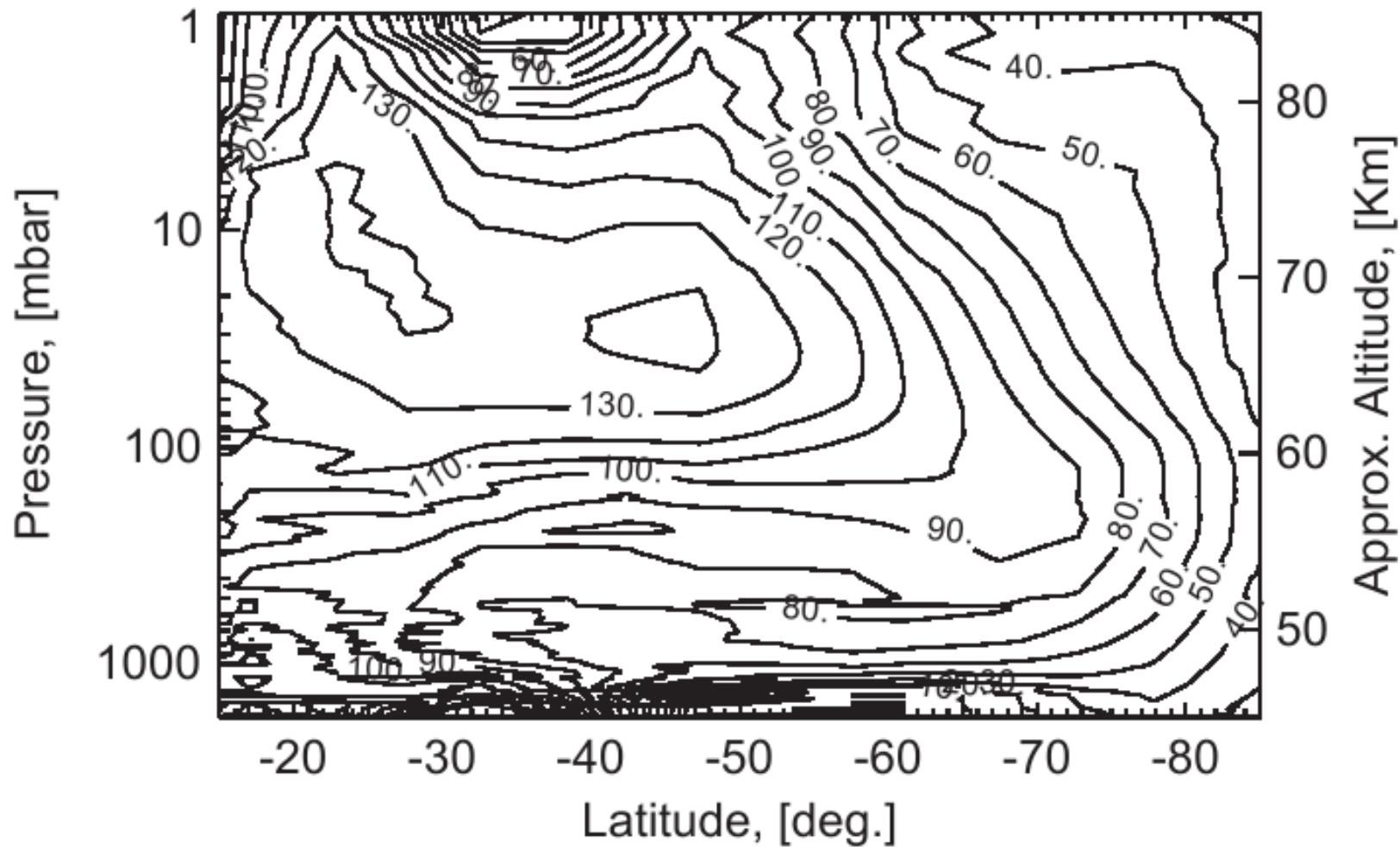
Wind

VIRTIS visible and IR images, Hueso et al., 2012

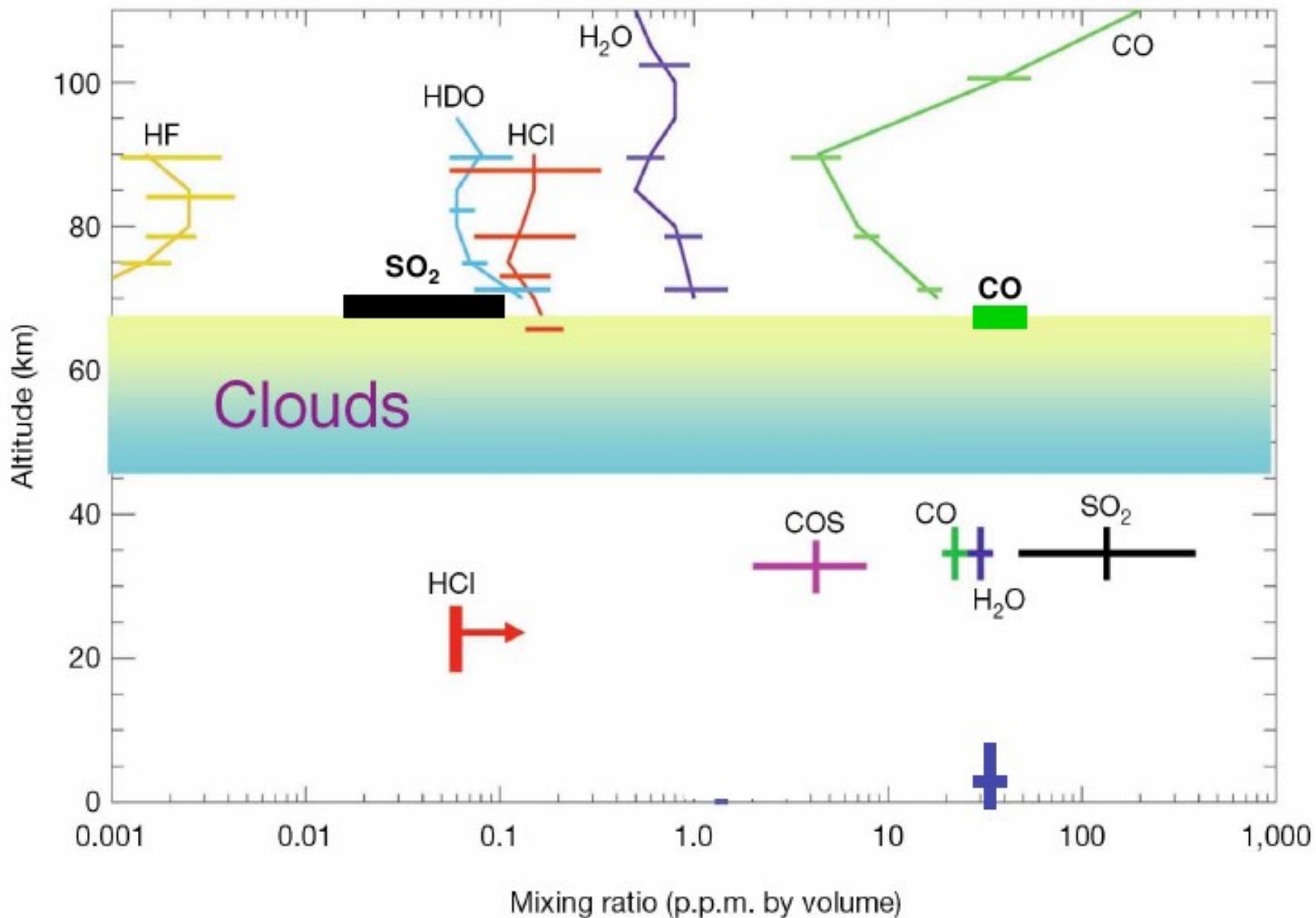


Wind

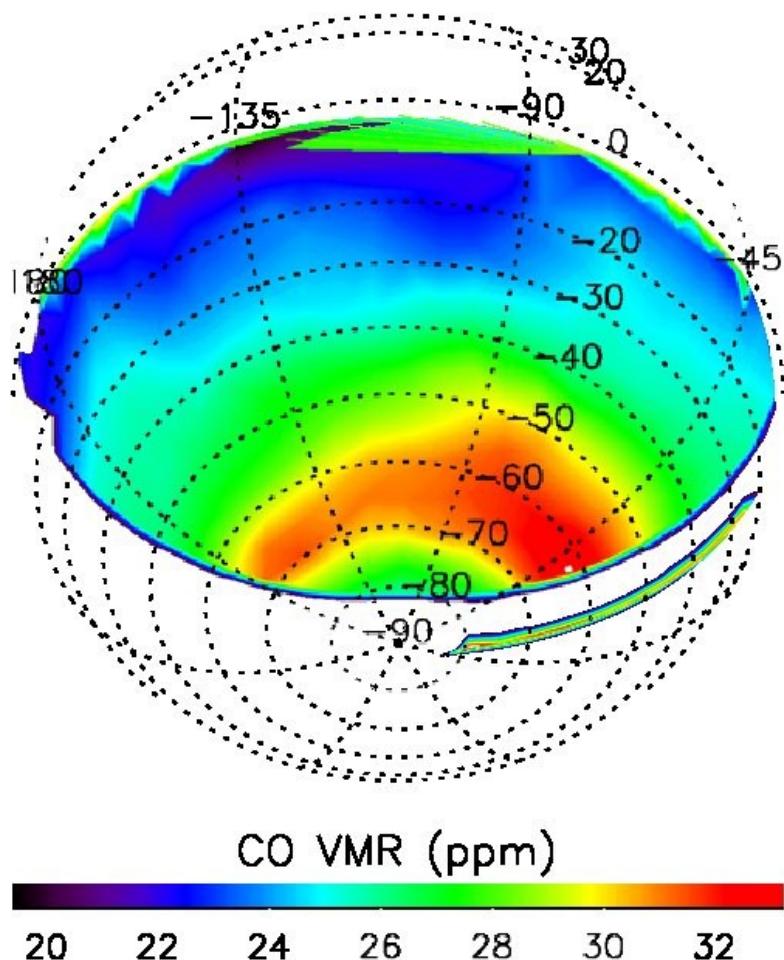
Thermal winds from VeRa T maps, Piccialli et al., 2012



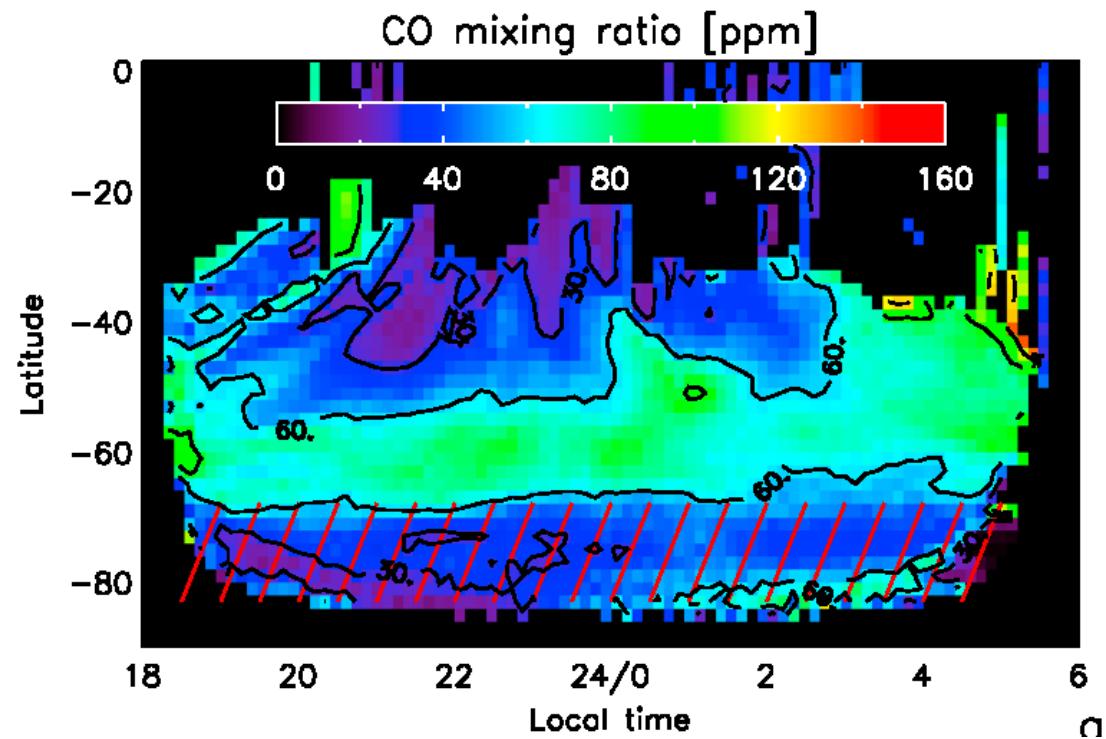
Composition



Composition

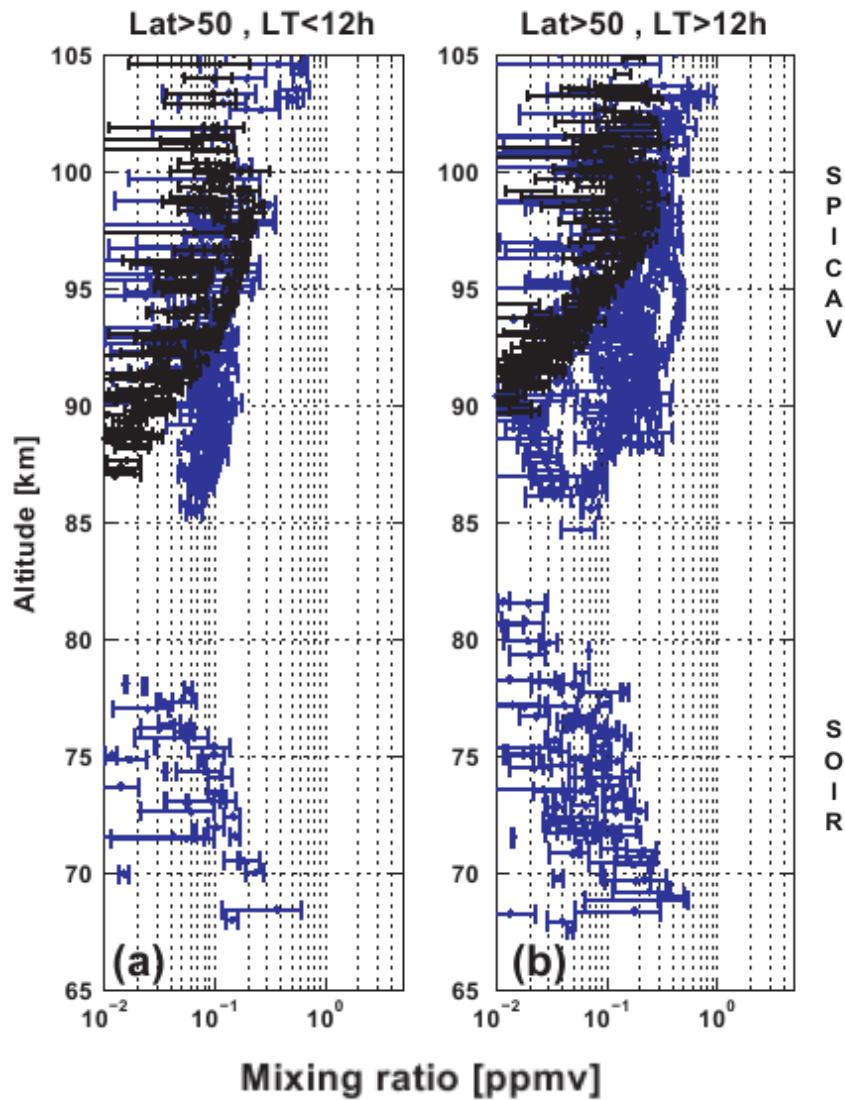


VIRTIS, 2.3 microns
CO around 35 km
(Tsang et al., 2008)

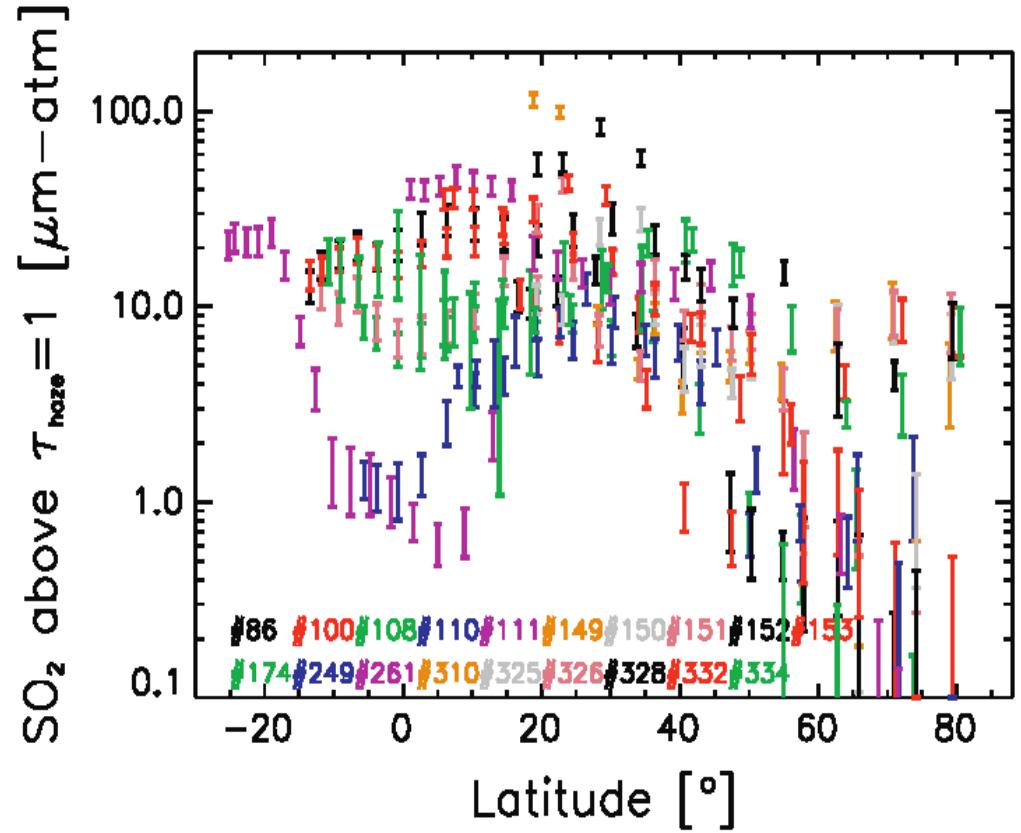


VIRTIS, 4.3-5 microns
CO around 72 km
(Grassi et al., 2014)

Composition

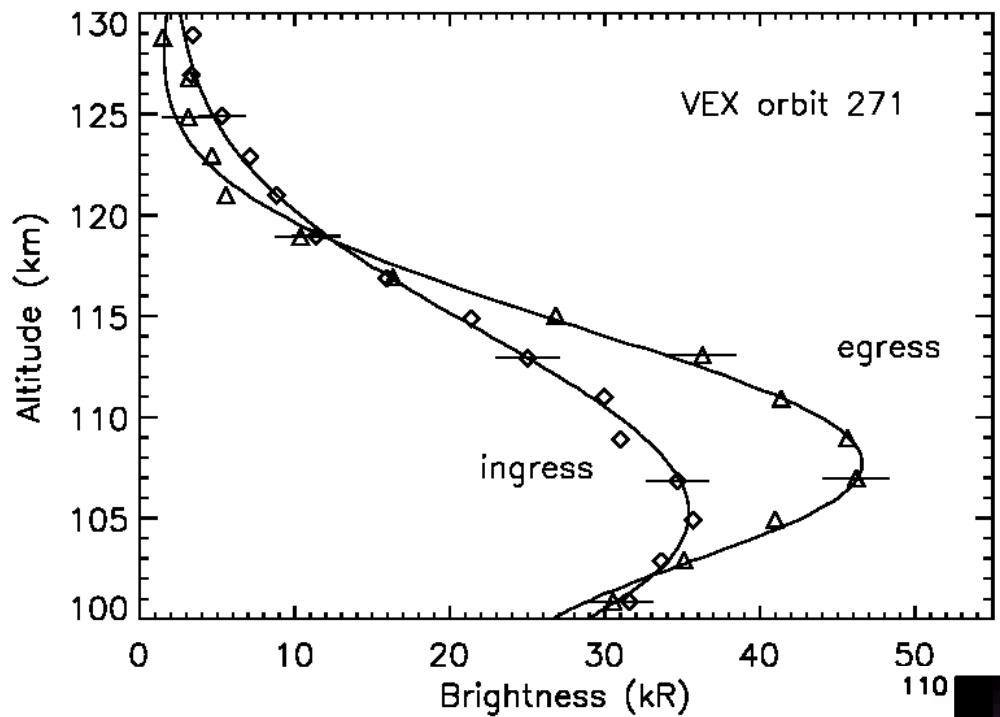


SPICAV-UV / SOIR-IR, solar occultations
Belyaev et al 2012



SPICAV-UV, nadir
Marcq et al 2011

Composition



NO UV nightglow, SPICAV
Gerard et al, 2008

O₂ IR nightglow, VIRTIS
Gerard et al, 2014

