

Effect of clouds and temperatures on model radiances in the night time Venusian atmosphere near 4.3 μm

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Abstract

Visual and Infrared Thermal Imaging Spectrometer (VIRTIS-M) observations of Venus at the 4.3 and 4.8 micron CO₂ absorption bands allow to study the night time thermal structure of the planet's upper troposphere and lower mesosphere from 50 to 105 km (i.e. [1]). However there are significant cloud layers in the regions of interest whose spatial structure mixes with the thermal structures of the atmosphere. Our purpose is to study the impact of the different particle sizes and vertical distributions of aerosols on model radiances by comparing with measurements obtained from the VIRTIS-M instrument. We will show how changes in the vertical temperature profile and the cloud properties produce changes in the model radiances. We compare these results with typical spectra found in the polar region in different locations within the atmospheric polar vortex and the surrounding cold collar. This region of the thermal spectrum has been notably less explored than the spectral windows that occur shortward of 2.3 micron [2]. In the presentation, we will emphasize the various aspects of the radiative transport modeling that may affect the accuracy and efficiency of the model radiances.

Acknowledgements

This work was supported by the Spanish MICIIN project AYA2009-10701 with FEDER funds, by Grupos Gobierno Vasco IT-464-07 and by Universidad País Vasco UPV/EHU through program UFI11/55.

References

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