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Dynamics investigation in the Venus upper atmosphere

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Abstract.

The O_2 nightglow emissions in the infrared spectral range are important features to investigate dynamics at the mesospheric altitudes, in the planetary atmosphere. In this work, we analyzed the profiles obtained at limb by the VIRTIS spectrometer on board the Venus Express mission, acquired during the mission period from 2006-07-05 to 2008-08-15 to investigate possible gravity waves characteristics at the airglow altitudes. Indeed, several profiles present double peaked structures that can be interpreted as due to gravity waves. In analogy to the Earth's and Mars cases, we use a well-known theory to model the O_2 nightglow emissions affected by gravity waves propagation, in order to support this thesis and derive the waves properties. We discuss results from 30 profiles showing double peaked structures, focusing on vertical wavelength and wave amplitude of the possible gravity waves. On average, the double peaked profiles are compatible with the effects of gravity waves with a vertical wavelength ranging between 7 and 16 km, and wave amplitude of 3-14%. A comparison with gravity waves properties in the Mars and Earth's atmospheres, using the same theory, is also proposed (Altieri et al. 2014).
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References

Altieri, F., Migliorini, A., Zasova, L., et al. 2014, J. Geophys. Res. (Planets), 119, 2300