



SO₂ vertical profile on Venus

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Introduction

The distribution of SO₂ below the clouds of Venus is an unsettled matter because various entry probes and earth observed values show big differences for the same altitude levels.

A new analysis of the SO₂ vertical profile with a “best of” data set [1] is compared to the Vega 1 and Vega 2 results.

For the analysis of the SO₂ vertical profile two models have been formulated. While one model considers the fast decrease of SO₂ with descending altitude and starts with 0 ppmV at the surface, the other model starts with 25 ppmV, as indicated by Vega 1.

Although there is a lack of information on the lowest 10 kms of the atmosphere, an analysis should be done to understand the geological evolution and a possible activity on Venus.

Vertical Profiles

The two models produce two different vertical profiles and with those it was possible to calculate the mass of SO₂ in the whole lower atmosphere.

It is important to note that SO₂ nearly disappears at 69 km height [1,3] while 99,6% of the whole mass is still contained in the lower atmosphere.

The difference in the results is based on the different surface values, which have been used.

The first model stands in good agreement with the Vega mission data and the second model can be used as an upper limit of SO₂ in the atmosphere.

The results yield a good estimation of how much SO₂ is existent and give new discussion points about volcanic activity on Venus and a possible still unknown SO₂ destroying mechanism.

References

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- [3] Esposito L.W. et al., (1997) *Venus II : Geology, Geophysics, Atmosphere, and Solar Wind Environment*. Edited by Stephen W. Bougher, D.M. Hunten, and R.J. Philips. Tucson, AZ : University of Arizona Press, 415-458