EPSC Abstracts,
Vol. 4, EPSC2009-308, 2009
European Planetary Science Congress,

SO_2 in the Venusian Lower Atmosphere

A. Duricic, M.G. Firneis and J. J. Leitner

Institute for Astronomy, University of Vienna, Austria,
duricic@astro.univie.ac.at

Introduction

The distribution of SO_2 below the clouds is an unsettled matter because various entry probes and earth observed values show big differences for the same altitude levels.
It is impossible to avoid the question if some of these values are just inaccurate or if there is a possibility that the data vary due to topology.
Since we cannot answer this question without a further in-situ mission we have to face the problem with the best data set we possess up to now [1].
A new analysis of the vertical profiles with a "best of" data set is compared to the Vega 1 and Vega 2 results.
For the analysis of the SO_2 vertical profile two models have been formulated. While one model considers the fast decrease of SO_2 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 SO_2 in the whole lower atmosphere.
It is important to note that SO_2 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 density of the atmosphere is highest at the surface and so is the mass. This leads to two very different results.
The first model stands in good agreement with the Vega mission data and the second model can be used as an upper limit of SO_2 in the atmosphere.

The results yield a good estimation of how much SO_2 is existent and is a good indicator for the present activity of volcanoes on Venus

References

[1] Bertaux, J. et al. (1996) *JGR,* 101*,* 12709–12745.

[2] de Bergh, C. et al. (2006) *Planetary and Space Sci.,* 54*,* 1389-1397.

[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