



Sources of SO and SO₂ in the Mesosphere of Venus

Y. L. Yung (1), X. Zhang (1), M. C. Liang (2,3,4), F. P. Mills (5), D. A. Belyaev (6,7)

(1) Division of Geological and Planetary Sciences, California Institute of Technology, USA, (2) Research Center for Environmental Changes, Academia Sinica, Taiwan, (3) Graduate Institute of Astronomy, National Central University, Taiwan, (4) Institute of Astronomy and Astrophysics, Academia Sinica, Taiwan, (5) RSPE/AMPL, Mills Rd., Australian National University, Australia, (6) LATMOS, CNRS/INSU/IPSL, Quartier des Garennes, France, (7) Space Research Institute (IKI), Russia
(yly@gps.caltech.edu)

Abstract

Venus Express and ground-based measurements of an inversion layer with enhanced concentrations of SO and SO₂ in the mesosphere of Venus (Belyaev et al., 2008; 2010; Clancy et al. 2008) suggests a new source of gaseous sulfur that was not included in the previous models of Venus (see, e.g., Mills et al. 2007). A one-dimensional photochemistry-transport model is used to simulate the whole chemical system including oxygen-, hydrogen-, chlorine-, sulfur-, and nitrogen-bearing species (see schematic in Figure 1). The evaporation of aerosols composed of sulfuric acid (model A) or polysulfur (model B) above 90 km could provide a new source of gaseous sulfur species (Zhang et al. 2010; 2011). The implications of the new model are discussed in light of recent measurements (Sandor et al. 2011). Future measurements are needed to confirm the model predictions.

1. Figure

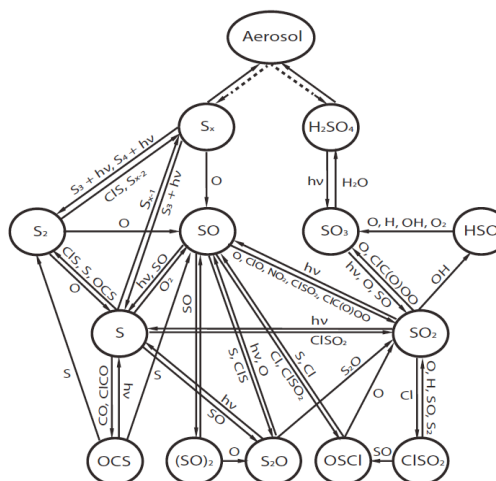


Figure 1: Important chemical pathways for sulfur species. For simplicity, the chlorosulfane chemistry and polysulfur chemistry are not shown here. See Mills and Allen (2007) and Yung et al. (2009) for detailed discussions.

References

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