Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

A revised chemistry of atmospheric Carbonyl Sulphide studied by 1-D photochemical model simulation

S.O. DANIELACHE[1,2*], M. SHINKAI[1],

[1]Sophia University, Tokyo 102-0094, Japan (sebastian.d@sophia.ac.jp)
[2]Earth-Life Science Institute, Tokyo institute of Technology, Tokyo 152-8550, Japan

Introduction

Carbonyl sulfide (OCS) is the most abundant reduced sulfur compound in the atmosphere. Stratospheric oxidation of OCS produces a sulfate aerosol layer between 17 and 30 km. This stratospheric sulfur aerosol (SSA) also known as the Junge layer affects the planet's Albedo and catalysis the hydrolysis of N_2O_5, promoting mid-latitude ozone depletion. While volcanic eruptions are an important source of stratospheric sulfate, they are sporadic and the source of sulfur in volcanically quiescent times has been a matter of debate for many applications sulfur stable isotopes has provided evidence for OCS as a acceptable source of the SSA [1]. A recent study by Schmidt *et al*., [2] has reported a revised reaction rate constant between OCS and the OH radical, this reaction is covers 80% of the tropospheric depletion of OCS. We also calculated by *ab-initio* methodology the kinetic properties of the OCS+ $O^{(1D)}$ reaction. This pathway has not been considered in previous studies. Additionally, we consider the historical variation of anthropogenic emissions of OCS and its tropospheric precursor CS_2.

Model Development and Application

In order to calculate the OCS atmospheric vertical profile, we developed a one-dimensional photochemical model that takes into account chemistry, transport, deposition, stable isotopes and high-resolution absorption spectrum. This last feature is important since the main isotopic imprint of the stratospheric oxidation pathway is produced by photodissociation. The combination of the updated kinetic data with different emission scenarios present a new hypothesis that challenges the current understanding of the stratospheric sulfur aerosol.

[1] Schimidt *et al*. (2013) *Atmos. Chem. Phys*., **13**, 1511–1520.
[2] Schimidt *et al*. (2017) *Chem. Phys. Lett*., **675**, 111–117.