



HAL
open science

Tropical sources and sinks of carbonyl sulfide observed from space

Norbert Glatthor, Michael Höpfner, Ian T. Baker, Joe Berry, Elliott Campbell, Stephan R. Kawa, Gisele Krysztofiak, Björn-Martin Sinnhuber, Gabriele Stiller, Jim Stinecipher, et al.

► **To cite this version:**

Norbert Glatthor, Michael Höpfner, Ian T. Baker, Joe Berry, Elliott Campbell, et al.. Tropical sources and sinks of carbonyl sulfide observed from space. EGU General Assembly 2016, Apr 2016, Vienne, Austria. insu-03573520

HAL Id: insu-03573520

<https://insu.hal.science/insu-03573520>

Submitted on 15 Feb 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License



Tropical sources and sinks of carbonyl sulfide observed from space

Norbert Glatthor (1), Michael Höpfner (1), Ian T. Baker (2), Joe Berry (3), Elliott Campbell (4), Stephan R. Kawa (5), Gisele Krysztofiak (6), Björn-Martin Sinnhuber (1), Gabriele Stiller (1), Jim Stinecpher (7), and Thomas von Clarmann (1)

(1) Karlsruher Institut für Technologie (KIT), Institut für Meteorologie und Klimaforschung, Karlsruhe, Germany (norbert.glatthor@kit.edu), (2) Colorado State University, Atmospheric Science Department, Fort Collins, Colorado, USA, (3) Department of Global Ecology, Carnegie Institution, Stanford, California, USA, (4) Sierra Nevada Research Institute, University of California, Merced, California, USA, (5) NASA Goddard Space Flight Center, Greenbelt, Maryland, USA, (6) University of Orleans, LPC2E, CNRS, Orleans, France, (7) Environmental Systems Graduate Group, University of California, Merced, California, USA

According to current budget estimations the seasonal variation of carbonyl sulfide (COS) is governed by oceanic release and vegetation uptake. Its assimilation by plants is assumed to be similar to the photosynthetic uptake of CO₂ but, contrary to the latter process, to be irreversible. Therefore COS has been suggested as co-tracer of the carbon cycle. Observations of COS, however, are sparse, especially in tropical regions. We use the comprehensive data set of spaceborne measurements of the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) to analyze its global distribution. Two major features are observed in the tropical upper troposphere around 250 hPa: enhanced amounts over the western Pacific and the Maritime Continent, peaking around 550 pptv in boreal summer, and a seasonally varying depletion of COS extending from tropical South America to Africa. The large-scale COS depletion, which in austral summer amounts up to -40 pptv as compared to the rest of the respective latitude band, has not been observed before and reveals the seasonality of COS uptake through tropical vegetation. The observations can only be reproduced by global models, when a large vegetation uptake and a corresponding increase in oceanic emissions as proposed in several recent publications is assumed.