Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06641, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06641
EGU General Assembly 2008

Uptake of Carbonyl sulfide by trees under elevated atmospheric carbon dioxide concentrations

J. Kesselmeier (1), L. Sandoval-Soto (1,2), V. Schmitt (3), and A. Wild (3)

(1) Max Planck Institute for Chemistry, Biogeochemistry Department, Joh.-J.-Becher-Weg 27, 55128 Mainz, Germany (jks@mpch-mainz.mpg.de), (2) Now at the Hochschule für Life Sciences FHNW, Gründenstrasse 40, 4132 Muttenz, Switzerland, (3) Institute for General Botany, University of Mainz, Müllerweg 6, 55128 Mainz, Germany

Carbonyl sulfide (COS, OCS) is a highly stable reduced sulfur gas species in the atmosphere. Due to its inertness within the troposphere it can be transported into the stratosphere where it contributes to form SO_2 and sulfate aerosol. Additionally it may be involved in heterogeneous reactions in stratospheric ozone chemistry. One of the major sinks for this trace gas is the vegetation. Enzymatic uptake von COS by plants is closely related to the gross primary productivity based on the metabolic conversion by the enzyme carbonic anhydrase. A set of experiments with European beech (Fagus sylvatica) as well as Holm oak (Quercus ilex) was performed to analyze the effects of elevated CO2 mixing ratios on the deposition velocities of CO2 and COS, the COS compensation point and carbonic anhydrase (CA) activity. After a growth time of 2-3 years we observed well understood adaptation of the CO2 assimilation steps. For the exchange of COS a shifted compensation point as well as a decrease in CA activity in case of holm oak was detected contrasting European beech which did not exhibit any adaptation except for CO2 assimilation. A comparison of deposition velocities for CO2 and COS demonstrates the close relation between the uptake of both gases.