Geophysical Research Abstracts, Vol. 7, 00282, 2005
SRef-ID: 1607-7962/gra/EGU05-A-00282

Gas-Phase and Aqueous-Phase chemical reactions: incorporation and evaluation in an online global chemistry model.

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For the formulation of preliminary estimate of aerosol formation burdens and its role in climate change, it is necessary to know the relative importance of formation of aerosols and the incorporating chemistry (oxidation pathways in real atmosphere) in its generation. Such an understanding may, in turn, be gained largely from the use of a global climate model that incorporates a chemical model in order to describe the complex reaction system undergoing in the atmosphere, their subsequent transformation and dispersion the mechanism for their eventual removal from the atmosphere. For this purpose an "online" chemistry module, developed at IIT Delhi, has been incorporated in LMDZ (a variable grid GCM of Dynamic Meteorological lab, Paris) to simulate sulphur chemistry. The chemistry module includes emission, transport, gas/aqueous phase chemistry, and wet and dry removal processes. The prognostic chemical species are DMS, H_2S, DMSO, MSA, SO_2, NOx, CO, O_3, H_2O_2, sulphate aerosol mass and number for Aitken and accumulation modes, water vapor, and liquid water and their oxidation products. Due to strong interaction between the gas-phase and aerosol phase, the model (interactive gas phase) is fully coupled with aerosol module, which provides aerosol mass and number distribution. The module treats about 40 photochemical reactions describing their sources and sinks. This paper, presents a brief discussion of the gas and aqueous phase reactions mechanism included in this online global chemistry model.