Geophysical Research Abstracts, Vol. 9, 04287, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04287

Global modeling of aerosol transport and optical properties with ORISAM-TM4 model in sectional framework including organics, inorganics, dust and sea-salts

B Guillaume (1) C Liousse (1) R Rosset (1) M Mallet (1) N Poisson (2)

1. Laboratoire d'Aérologie, Toulouse, France
2. ADEME, Paris, France

Black carbon (BC) and primary organic carbon (OCp) are directly emitted by combustion sources whereas organic carbon aerosols further involve photooxydation reactions (OCsec). This complexity together with size effects, both linked to emissions and secondary organic formation due to organic gaseous precursors, is poorly represented in models.

To explore this complexity, a global aerosol model ORISAM-TM4 [Guillaume et al., 2007] has been developed by coupling a global chemistry-transport model TM4 [Van Velthoven et al., 1996] and the aerosol sectional model ORISAM (Organic and Inorganic Spectral Aerosol Model) [Bessagnet et al., 2004; Liousse et al., 2005; Cousin et al., 2005]. This modeling system allows us to take into account a sectional size-distribution (8-20 bins between 0.04μm and 10 μm), updated emission inventories for gases and primary particles and detailed aerosol chemical composition (BC and primary OC being the particle cores on which 6 organic/inorganic chemical species are absorbed/adsorbed). More recently, additional aerosol components have been incorporated in particle cores (sea-salts, dust), giving major contribution in the coarse particle mode. A simple model of coarse nitrate formation from heterogeneous processes [Hodzic et al., 2005] is also implemented. Simulations of global aerosol transport and optical properties have been performed with ORISAM-TM4 endowed with the RAD module [Mallet et al., 2005] for the complex internally-mixed aerosol (dust/organics/inorganics) over the detailed full size-spectrum. Sensitivity tests have

been run on external vs. internal mixing state models. A second series of tests were made on the impact of explicit vs. simply parametrized OC. Tentative validation of these results is performed against AERONET network and MODIS satellite data.