

## ***Interactive comment on “The evolution of the global aerosol system in a transient climate simulation from 1860 to 2100” by P. Stier et al.***

**P. Stier et al.**

Received and published: 28 May 2006

### **Response to the reviewers**

We would like to thank the reviewers for their helpful comments that substantially improved the manuscript. We very much appreciated the detailed remarks and hope to have addressed all raised issues in our comments on the individual reviews. In addition, we performed the following modifications in the revised manuscript. All page, column, and line numbers refer to the revised manuscript in the submitted form.

- We extended the short explanation on the evolution of the interactive DMS emissions to (p 5 c 2 l 1):

“This global mean reduction is the consequence of a regionally inhomogeneous

reduction of the DMS sea surface concentration, attributable to dynamical changes of the ocean mixed layer under a warming climate and the resulting less favourable nutrient and light supply for phytoplankton growth and the associated DMS production. The evolution of the global DMS cycle will be discussed in an accompanying publication (K2006).”

- We updated the Dentener et al. (2006), Kloster et al. (2006) and Roeckner et al. (2006) references.

- We added the following sub-section titles:

3.4 Aerosol mixing state

3.5 Aerosol radiative properties and perturbations

- We have updated the introduction of previous AOGCM studies including aerosol effects to (p 2 c1 l 12):

“In early transient coupled atmosphere-ocean global circulation model (AOGCM) climate simulations, the radiative impact of anthropogenic aerosols has been neglected. Later, modified surface albedos as proxy of the radiative effects of sulfate aerosols have been included (Mitchell et al., 1995; Meehl et al., 1996). The consideration of prognostic sulfur cycle schemes in coupled AOGCM climate simulations remains the exception (Roeckner et al., 1999; Tett et al., 2002; Johns et al., 2003). While other anthropogenic aerosol components, in particular of carbonaceous aerosols, have received considerable attention (e.g. Penner et al., 2001; Menon et al., 2002; Jacobson, 2002), only recently they are becoming

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

---

Interactive  
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

included in transient coupled AOGCM simulations (Takemura et al., 2005). The relative importance of carbonaceous is projected to increase according to recent emission scenarios (e.g. SRES: Nakicenovic et al., 2000).”

---

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 12775, 2005.