Atmos. Chem. Phys. Discuss., 4, S2615–S2617, 2004
www.atmos-chem-phys.org/acpd/4/S2615/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Organic aerosol and global climate modelling: a review" *by* M. Kanakidou et al.

U. Lohmann (Referee)

ulrike.lohmann@env.ethz.ch

Received and published: 19 November 2004

This timely review of the global modelling of organic aerosols should definitely be published in ACP subject to minor comments stated below:

Section 2,

page 5862: viruses, bacteria and plant debris maybe climate relevant because they are effective ice nuclei (see compilation of laboratory data by Diehl and Wurzler, JAS, 2004)

I would introduce a paragraph before: "Note that BC is an....", the transition is not smooth. Also, please define the acronym BC here already.

Section 12:

page 5940: There has been some work on ice-nucleating abilities of organic arosols that you could cite:

In situ measurements revealed that organic-containing aerosols are less abundant than sulphate aerosols in ice cloud particles, suggesting that organics do not freeze preferentially (Cziczo et al., GRL, 2004). A model study explained this finding by the disparate water uptake of organic aerosols, and suggests that organics are unlikely to significantly modify cirrus formation unless they are present in very high concentrations (compared to sulphate-rich particles) at low temperatures and hamper water condensation (Kaercher and Koop, ACPD, 2004).

page 5941: When discussing the study by Kiehl et al. (2000), you should mention that their sensitivity studies are limited to only the first indirect aerosol effect.

It's not true that the climate model simulations did not include the absorption of black carbon, that is included in every climate model simulation that specifies optical properties of aerosols.

The impact of the semi-direct effect was discussed by Lohmann and Feichter, GRL (2001), Kristjansson, JGR (2002) and by Penner et al., JGR (2003). All papers found that the semi-direct effect is only of minor importance at the top-of-the-atmosphere. The sign of this effect is, however, uncertain. Penner et al. (2003) and Johnson et al., QJRMS (2004) pointed out that the semi-direct effect can result in a cooling depending on the location of BC in the vertical with respect to the cloud.

References: The Lohmann et al. (2000) reference that you refer to in the paper needs to be added in the list of references. You may also want to mention this study already in the first paragraph of the introduction together with the other papers by Liousse, Cooke, Hansen, Penner, Jacobsen and Chung and Seinfeld, as it clearly states the climate relevance of organic aerosols.

ACPD

4, S2615–S2617, 2004

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 5855, 2004.

ACPD

4, S2615–S2617, 2004

Interactive Comment