

Home

Online Library ACP

- ▣ Recent Final Revised Papers
- ▣ [Volumes and Issues](#)
- ▣ Special Issues
- ▣ Library Search
- ▣ Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
4.927

ISI
indexed



- ▣ [Volumes and Issues](#)
- ▣ [Contents of Issue 22](#)
- ▣ [Special Issue](#)

Atmos. Chem. Phys., 9, 8917-8934, 2009

www.atmos-chem-phys.net/9/8917/2009/

© Author(s) 2009. This work is distributed under the Creative Commons Attribution 3.0 License.

Sensitivity studies of different aerosol indirect effects in mixed-phase clouds

U. Lohmann¹ and C. Hoose²

¹Institute of Atmospheric and Climate Science, ETH Zurich, Switzerland

²University of Oslo, Department of Geosciences, Oslo, Norway

Abstract. Aerosols affect the climate system by changing cloud characteristics. Using the global climate model ECHAM5-HAM, we investigate different aerosol effects on mixed-phase clouds: The glaciation effect, which refers to a more frequent glaciation due to anthropogenic aerosols, versus the de-activation effect, which suggests that ice nuclei become less effective because of an anthropogenic sulfate coating. The glaciation effect can partly offset the indirect aerosol effect on warm clouds and thus causes the total anthropogenic aerosol effect to be smaller. It is investigated by varying the parameterization for the Bergeron-Findeisen process and the threshold coating thickness of sulfate ($\text{SO}_4\text{-crit}$), which is required to convert an externally mixed aerosol particle into an internally mixed particle. Differences in the net radiation at the top-of-the-atmosphere due to anthropogenic aerosols between the different sensitivity studies amount up to 0.5 W m^{-2} . This suggests that the investigated mixed-phase processes have a major effect on the total anthropogenic aerosol effect.

- ▣ [Final Revised Paper](#) (PDF, 1085 KB)
- ▣ [Discussion Paper](#) (ACPD)

Citation: Lohmann, U. and Hoose, C.: Sensitivity studies of different aerosol indirect effects in mixed-phase clouds, Atmos. Chem. Phys., 9, 8917-8934, 2009. [▣ Bibtex](#) [▣ EndNote](#) [▣ Reference Manager](#)



Search ACP

Library Search

Author Search

News

- ▣ [Sister Journals AMT & GMD](#)
- ▣ [Public Relations & Background Information](#)

Recent Papers

01 | ACP, 03 Dec 2009: Increase of upper troposphere/lower stratosphere wave baroclinicity during the second half of the 20th century

02 | ACPD, 03 Dec 2009: Aerosol analysis using a Proton-Transfer-Reaction Thermo-Desorption Mass Spectrometer (PTR-TD-MS): a new approach to study processing of organic aerosols

03 | ACP, 03 Dec 2009: Retrieval of atmospheric