

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 20](#)

Atmos. Chem. Phys., 9, 8079-8090, 2009

www.atmos-chem-phys.net/9/8079/2009/

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

A new parametrization for ambient particle formation over coniferous forests and its potential implications for the future

B. Bonn¹, M. Boy², M. Kulmala², A. Groth¹, K. Trawny¹, S. Borchert¹, and S. Jacobi³

¹Institute for Atmospheric and Environmental Sciences, Goethe University, Frankfurt, Germany

²Atmospheric Sciences Division, Department of Physics, University of Helsinki, Finland

³Hessian Agency for the Environment and Geology, Air Quality Department, Wiesbaden, Germany

Abstract. Atmospheric new particle formation is a general phenomenon observed over coniferous forests. So far nucleation is either parameterised as a function of gaseous sulphuric acid concentration only, which is unable to explain the observed seasonality of nucleation events at different measurement sites, or as a function of sulphuric acid and organic molecules. Here we introduce different nucleation parameters based on the interaction of sulphuric acid and terpene oxidation products and elucidate the individual importance. They include basic trace gas and meteorological measurements such as ozone and water vapour concentrations, temperature (for terpene emission) and UV B radiation as a proxy for OH radical formation. We apply these new parameters to field studies conducted at Finnish and German measurement sites and compare these to nucleation observations on a daily and annual scale. General agreement was found, although the specific compounds responsible for the nucleation process remain speculative. This can be interpreted as follows: During cooler seasons the emission of biogenic terpenes and the OH availability limits the new particle formation while towards warmer seasons the ratio of ozone and water vapour concentration seems to dominate the general behaviour. Therefore, organics seem to support ambient nucleation besides sulphuric acid or an OH-related compound. Using these nucleation parameters to extrapolate the current conditions to prognosed future concentrations of ozone, water vapour and organic concentrations leads to a significant potential increase in the nucleation event number.

[Final Revised Paper](#) (PDF, 470 KB) [Supplement](#) (226 KB) [Discussion Paper](#) (ACPD)

Citation: Bonn, B., Boy, M., Kulmala, M., Groth, A., Trawny, K., Borchert, S., and Jacobi, S.: A new parametrization for ambient particle formation over coniferous forests and its potential implications for the future, Atmos. Chem. Phys., 9, 8079-8090, 2009. [Bibtex](#) [EndNote](#) [Reference Manager](#)

Search ACP

Library Search

Author Search

News

- New Alert Service available
- Sister Journals AMT & GMD
- Financial Support for Authors
- Public Relations & Background Information

Recent Papers

01 | ACP, 09 Nov 2009:
Exploiting the weekly cycle as observed over Europe to analyse aerosol indirect effects in two climate models

02 | ACP, 06 Nov 2009:
Extreme Saharan dust event over the southern Iberian Peninsula in september 2007: active and passive remote sensing from surface and satellite

03 | ACP, 06 Nov 2009:
Direct estimates of emissions from the megacity of Lagos

