

[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
4.865

ISI
indexed

[Volumes and Issues](#) [Contents of Issue 1](#)

Atmos. Chem. Phys., 2, 1-16, 2002

www.atmos-chem-phys.net/2/1/2002/

© Author(s) 2002. This work is licensed under a Creative Commons License.

Nucleation events in the continental boundary layer: Influence of physical and meteorological parameters

M. Boy and M. Kulmala

Dept. of Physics, University of Helsinki, P.O. Box 64, FIN-00014, UHEL, Finland

Abstract. The relationship between nucleation events and numerous physical and meteorological parameters was analysed using data collected at the Station for Measuring Forest Ecosystem-Atmosphere Relations (SMEAR II) in Hyytiälä, Finland. To do this, measurements of solar radiation (ultraviolet [UV], global, photosynthetically active radiation [PAR], net, reflected global radiation and reflected PAR), gas concentrations, temperature, humidity, wind direction, horizontal and vertical wind speed, horizontal and vertical wind variances and particle concentrations were collected over a 4 year period. For the year 1999 a detailed analysis of data were completed by examining parameters in order to determine the physical and meteorological conditions favourable to the formation of new particles. A comparison of different wavelength bands during the bursts of new particles led to the suggestion, that UV-A solar radiation seems to be the most probable radiation band concerning the photochemical reactions involved in the production of condensable vapours. Furthermore a high correlation between the daily curves of UV-A irradiance and the concentration of 3 - 5 nm particles was found throughout the year and examples will be given for two days. During the whole year the concentration of H₂O is very low at times nucleation occurs compared to the average of the corresponding month. Especially in June and July many non-event days with high solar irradiance show high amounts of water molecules. To combine these results a "nucleation parameter" was calculated for the year 1999, by dividing UV-A solar radiation by the concentration of H₂O and temperature. Throughout the year nearly all nucleation event days reach a value of the "nucleation parameter" of at least $5.4 \times 10^{-25} \text{ W m molecules}^{-1} \text{ K}^{-1}$. Non-event days with high values ($> 2.7 \times 10^{-25} \text{ W m molecules}^{-1} \text{ K}^{-1}$) are mostly accompanied by high concentrations of existing particles.

[Final Revised Paper](#) (PDF, 2798 KB) [Discussion Paper](#) (ACPD)

Citation: Boy, M. and Kulmala, M.: Nucleation events in the continental boundary layer: Influence of physical and meteorological parameters, Atmos. Chem. Phys., 2, 1-16, 2002. [Bibtex](#) [EndNote](#) [Reference Manager](#)

[Search ACP](#)Library Search [»](#)Author Search [»](#)[News](#)

- [Sister Journals AMT & GMD](#)
- [Financial Support for Authors](#)
- [Journal Impact Factor](#)
- [Public Relations & Background Information](#)

[Recent Papers](#)

01 | ACP, 11 Mar 2009: Measurements of Pollution In The Troposphere (MOPITT) validation through 2006

02 | ACP, 11 Mar 2009: Air-sea fluxes of biogenic bromine from the tropical and North Atlantic Ocean

03 | ACPD, 10 Mar 2009: Characterization of organic ambient aerosol during MIRAGE 2006 on three platforms

04 | ACPD, 10 Mar 2009: Regional differences in