

Interactive comment on “Nucleation events in the continental boundary layer: Influence of physical and meteorological parameters” by “M. Boy and M. Kulmala”

Anonymous Referee #1

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This MS reports interesting results on aerosol size distributions over remote forest areas. Analysis of the correlation between nucleation of aerosols and other parameters (temperature, winds, H₂O, NO_x and SO₂ vapor, solar radiation in different wave length bands) have been performed. The data set is unique and the method of the analysis is innovative. The MS fits to the scope of ACP and should be published after minor revisions.

Comments and suggestions:

1) The authors claim that UV-A is most probably the band concerning the photochemical reactions involved in production of the condensable vapours. This conclusion is based on Fig.2& 3 One may only conclude that the nucleation events do correlate

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with the radiation from Fig.2. But it is really not possible to sort out which band is most active. The figure 3 does not support a such kind conclusion. The average ratio of two normalized values can larger than 1, even on average, the mean values of both are equal: e.g. a ratio of 0.5 and 2 would produce an average of 1.25. The values calculated by the half-hour average ratios of UV-A to different wave length bands given in Fig.3 are only slightly larger than one and may be caused by such an artifacts.

2) Concerning the nucleation parameter: the nucleation rate depends predominantly on the concentration of condensing vapours. The production rate (presumably photolysis driven) and the loss rate of the such vapours control the final concentration, also the nucleation process. The main loss process should be the existing aerosol surface. Therefore, the author should also consider this loss rate in the nucleation parameter. It may make all the exceptions mentioned from pages 253 - 255 unnecessary and lead to a much more universal parameter.

3) In the introduction section, the authors cited a lot of works above the binary and ternary nucleation of aqueous sulfate solutions. Due to 1) the negative correlation with H₂O and 2) no correlation with SO₂, I would encourage the authors to make a statement about the chemical composition of the aerosols. Some discussions about the possibilities of non-aqueous and non-sulfate aerosols would be useful in the introduction and discussion section.

Special comments:

1) Symbols in Fig.11 are far too small for reading.

2) For Fig.9, the number density of particles between 3 - 5 nm is more useful than the total number density. One could then identify the nucleation events much better, as the total surface can be incorporated into the nucleation parameter.

Interactive comment on Atmos. Chem. Phys. Discuss., 1, 239, 2001.

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