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Atmospheric Chemistry and Physics Discussions

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

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Response to specific comments by Referee #1

1. Figure 3 only gives some indications that UV-A could be the most probably radiation band concerning the formation of new particles and we donŠt claim in this MS report our results as a proof that UV-A is the responsible radiation band for the formation of new aerosols. The referee pointed out that the average ratio of two normalized values could be larger than one, even on average, although the mean values are equal. For that reason we calculated the mean average values for the ratios of UV-B, global, PAR, refl. PAR or refl. global radiation divided by UV-A. All average mean ratios are smaller as one (exact values are: 0.899, 0.981, 0.977, 0.999 and 0.983 respectively)

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and these results support our theory that UV-A could be more important as any other radiation bands.

2. We agree complete with the referee that the existing particle surface has a dominant influence on the concentration of the condensing vapour and should be included in the calculation of a nucleation parameter. We tried this in different ways but a simple division with the existing surface area decreased the correlation between the nucleation parameter values and the time the bursts of the new particles occurred. At the moment we analysing the data of the year 2000 and we work on a new improved nucleation parameter including the number concentration of the existing particles as the condensational sink.

3. The presented negative correlation with H2O is a phenomenon we found in analysing the data of the year 1999 and also of the year 2000. High concentration of H2O entails high concentration of OH radicals - depending on the UV solar irradiance. Further these radicals maybe included in some chemical reactions decreasing the amount of the condensing vapour. This hypothesis is still very unclear and more work is needed to gain information about the role of the concentration of the water molecules in the gas phase concerning the production of new particles but it does not automatically lead to non-aqueous aerosols. Obviously the SO2 concentration should correlate with the amount of new particles but the data in both years show no indications that SO2 has higher values during event days than on non-event days. This does not mean that SO2 is not involved in the growing of the new particles or that non-sulphate particles are produced but it may be possible that the concentration of SO2 has no influence of the formation of new aerosols.

Special comments:

1. We agree that the symbols in Fig. 11 and in our opinion also in Fig. 3 are to small for reading, but for our excuse we have to point out that both figures were original plotted in two figures (e.g. Fig. 11 a and 11 b). The decision to put both figures into one was made by the production office of the ACP journal.

2. Fig. 9 is included in this MS report to highlight the importance of large number

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concentration of existing particles in the formation of new particles and out of this reason thereŠs no point in showing the number density of 3-5 nm particles at this place.

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