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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterization of ultrafine particle number concentration and new particle formation in urban environment of Taipei, Taiwan" *by* H. C. Cheung et al.

Anonymous Referee #3

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Characterization of ultrafine particle number concentration and new particle formation in urban environment of Taipei, Taiwan

"General Comments":

The topic of this paper is of interest but some parts of the data analysis needs to be revised. This paper can be published in ACP but after the major revision considering the comments below.

"specific comments"

Methodology:

"Observation site and instrumentation" section:

Was the loss due to diffusion inside the SMPS system corrected? If yes, which methods were used? Did you find the diffusion loss of the particular system you used yourself or you applied the correction using the data available in literature? If no, why the loss due to diffusion was not corrected as your result can be influenced by diffusion loss particularly when you are considering particles in nucleation mode.

It is stated that the PSL test were conducted for the size accuracy test of the SMPS. Which PSL diameter(s) were used and why? How much error from the PSL nominal diameter was acceptable?

Results and Discussion:

"Relationship between PNC and other parameters" section:

How did you identify groups A and B in your data? Which method did you use in order to find the number of groups and divide the data into those groups? It seems that it was done only visually and no quantitative methods were applied to find the groups in data. How reliable this grouping can be if this is the case?

It is stated that "Vehicle exhaust emission was suggested to be a major source contributing the group "A" pollution..." How did you come into this conclusion?

"Observation of new particle formation" section:

95% confidence interval needs to be plotted in Fig.5.

Second peak in PNC were attributed to the afternoon rush hour. Why no peak was observed in the morning due to morning rush hour?

UVB*SO2 was used as a proxy to the H2SO4, however, this term does not consider the condensation sink (CS). CS needs to be calculated and UVB*SO2/CS should be used as a proxy for sulphuric acid [1].

It is stated that " ...the variations of Nnucl and UVB*SO2 were qualitatively agreed". Is it a right approach to correlate two sets of quantitative data qualitatively? Correlation should be calculated quantitatively using the proper statistical methods.

It is also stated that ".... results suggest that H2SO4 was playing an important role for the particle formation process....". How did you come to this conclusion? H2SO4 may be involved in the particle growth but may or maynot play a role in the formation based on your results.

References 1. Salma, I., et al., Production, growth and properties of ultrafine atmospheric aerosol particles in an urban environment. Atmospheric Chemistry and Physics Discussions, 2010. 10(6): p. 13689-13721.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 8985, 2013.