

Interactive comment on “Particle formation and growth at five rural and urban sites” by C.-H. Jeong et al.

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The authors thank Roy M. Harrison for the valuable comments and suggestions. The responses to your comments are marked in italics.

General Comments

The paper describes simultaneous measurements of particle size distributions at five widely separated locations spanning around 350 kilometres. Four of the sites are rural and the other urban in Toronto. Within a relatively short campaign of less than three weeks there are a number of observations of nucleation events which are much more prevalent at the rural than the urban site. There are interesting observations, one of which is analysed in detail of simultaneous nucleation affecting all of the sites. Useful conclusions are drawn over factors influencing nucleation. Although these broadly

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confirm the results of other studies, given the relatively small volume of published literature and the extensive nature of this work, it represents a valuable new contribution to the literature. The study appears to be well conceived and technically sound. The conclusions appear to be well founded. The contrast between the urban Toronto site and the more rural sites is valuable.

There are a number of technical issues which warrant amendments to the paper.

(a) It is only by careful reading of the experimental section that the reader learns that this is a relatively short study conducted during the summer. It seems quite likely that observations would be different in the Canadian winter and consequently it would be valuable to highlight the season-specific nature of the work in the abstract.

We will modify the first sentence in the Abstract: “...measured at five urban and rural sites during the summer of 2007 in Southern Ontario, Canada as...”

(b) The experimental section implies that windspeeds at Ridgetown were all greater than 7 metres per second whereas the wind rose (Figure 2) indicates this not to be the case. It is not clear why this piece of information is highlighted in the Experimental section when other sites showed windspeeds in higher categories.

Figure 2b does show that higher wind speeds were more prevalent at the Ridgetown site. We will modify the sentence (ACPD P11619, L21-22): “The wind rose analysis at Ridgetown indicated strong southwesterly winds.”

(c) It would be useful to point out that the mode in the size distribution at around 60 nm at Egbert and Ridgetown is likely to correspond to accumulation mode regional aerosol. This appears to be obscured by aerosol from other sources at the other sites.

We agree and will modify the following sentences (ACPD P11625, L15-16): "...with an accumulation mode at 60 nm, likely due to a background of regional aerosol. The accumulation mode was prominent due to the less frequent nucleation and..."

(d) Both the abstract and conclusions make a speculative statement about particle formation events contributing to the production of cloud condensation nuclei and thus potentially influencing regional climate. The paper provides no evidence on this topic and these statements amount to little more than speculation. They add nothing to the paper and would be best omitted.

These statements were intended to provide context and indicate for the potential implications of the results. We agree that as such they do not belong in the abstract or conclusion section. We deleted those sentences (APCD P11616, L23-24 and P11638, L5-6) in the Abstract and the Conclusions: "These particle formation events may contribute to the production of cloud condensation nuclei, thus potentially influencing regional climate." and "These anthropogenically and biogenically-formed particles may contribute to the production of cloud condensation nuclei, thus influencing regional climate."

The paper is pleasingly free of minor errors and both the tables and figures are clearly presented.

Thank you

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