

# ***Interactive comment on “Variations in tropospheric submicron particle size distributions across the European continent 2008–2009” by D. C. S. Beddows et al.***

**D. C. S. Beddows et al.**

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We thank the Reviewer for the complimentary comments and are pleased to respond to the specific points as follows:

We agree with the Reviewer that the use of the word “cluster” could be confusing and have modified the abstracts so as to refer to “clusters of particle size distributions” in order to overcome the problem. The potential confusion over the word “group” has also been clarified by a minor modification to the abstract so that instead of referring to “the first category” we now refer to the “first group” which relates back to the main groups

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referred to in the previous sentence.

The reference to Arctic Haze has been amended from “resulting in Arctic Haze” to “contributing to Arctic Haze”. Particles arriving in the Arctic after a South to North trajectory have grown to well in excess of 100 nm diameter, which implies they could make a significant contribution to light scattering and hence Arctic Haze.

A reference is given in the paper to a publication (Beddows et al., 2009) in which the cluster analysis method is explained in detail, and in the interest of brevity we prefer not to repeat it here.

In terms of literature beyond our own work, there is a huge literature in this field, but we believe that we have cited the most relevant papers.

Regarding harmonization of the data, this is described in the earlier paper of Asmi et al., (2011) to which we refer, and we have clarified details in our methodology section.

The Reviewer suggests that we include more recent data in our data analysis. Unfortunately this is not possible. The data analysis work presented in our paper has been hugely time consuming, even though it benefitted from the prior harmonization of the data in its use for the Asmi et al., (2011) paper. While we would very much like to have analysed a more recent data set, the resources available to us are far too limited to allow this.

We have revised Figure 6 which we believe to be a highly valuable outcome of the work as it demonstrates average rates of particle growth, and we prefer to keep it in the main text of the article.

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