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Atmospheric Chemistry and Physics Discussions

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

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We are grateful for the generous comments made by the Reviewer and are pleased to respond to the specific comments.

We have clarified the text concerning the size range of particles measured and have removed reference to the temporal resolution in the interest of clarity. These changes appear in the methodology section.

It would be a huge amount of work and of relatively limited value to generate size distribution clusters for each site individually. Apart from the heavy workload, it was

deliberate that this was not done as we believe that the findings of the work are more powerful having analysed data from all sites together (which the Reviewer also points out). The clustering methodology which we used identifies an optimal number of clusters, and we feel confident that the nine cluster solution well represents the typical size distributions in this data set. With regard to Figure 8, circles are clearly marked on the modes in the distributions and dotted coloured lines are included to guide the eye, as explained in the legend. Details of the mode fitting procedure and reference to the software package used is now included in Section 4.2.

It would be great to exclude the influence of fresh emissions of particulate matter, but this seems impractical as it would involve ideally the closure of sources, and if not, the relocation of some of the sampling sites. In the latter context, emissions between sampling sites, even though occurring at some distance from the sites, would still be influential, and avoiding this influence is an impossibility.

We have addressed the recommended technical corrections in as far as is practicable and while we understand the reasons for the minor adjustments to Figure 4 and 8 our choices have been made based on ease of use and the maximisation of impact for the given space while retaining the detail. The orientation of the heat maps in Figure 4 is such that a comparison between the Dp scales can be made between the left and right plots and the colour bars were omitted to de-clutter the whole figure. This omission can be accounted for by the instruction in the caption. With regards to Figures 8 onwards, it was very difficult to reduce several graphs down into one panel whilst still retaining the detail. This results in the apparent compromise of not using standardised scales meaning that we could maximise the visual impact of proportions of space and graph whilst still keeping the technical detail.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 31197, 2013.