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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Number size distributions and seasonality of submicron particles in Europe 2008–2009" *by* A. Asmi et al.

Anonymous Referee #2

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The authors present a very comprehensive and well-presented summary of measured aerosol size distributions about about 2 dozen sites in Europe, primarily in Northern Europe, but with some sites in Artic, Mountain, and Sourthern European sites. The article is well done and very comprehensive, and several of the plotting techniques and statistical analysis will set the standard for future data analyses of this type.

Minor comments:

Site classification - It is not clear what the point is of the detailed comparison to Henne (2010). Similarly, what is the point of figure 12. What would "agreement" or confirmation of Henne's classification scheme look like, in general, and in the context of figure

12? It seems the point is to ask whether Henne's classification scheme can predict the groupings that arise from the descriptive statistical analysis on the size distributions. But it is not clear to me what figure 12 would look like if Henne's scheme did apply. I believe more thought can be given to carefully describing in the text (a) why we may or may not expect the Henne (2010) classification to apply to Aitken and accumulation mode particles; (b) a rationale for the method of comparison and guiding the reader to what good comparison vs. poor agreement looks like; and (c) the result of the comparison.

Uncertainty - In a few places in the paper there are discussions of uncertainty. For example, line 16 on page 8993 in Appendix B. But it is not clear what it means for a monitoring instrument to "reproduce the same concentrations." If this were a laboratory experiment, the meaning would be clear. But I believe what is meant in this paper is that there is a lack of agreement between the monitor SMPS or DMPS system and the "gold standard" reference instrument. Without the reader going to the uncertainty article Wiedensohler (2010) is it difficult to establish the meaning. My suggestion is that (1) a longer summary of the uncertainty and QA method be given in the method section and (2) sections of the text referring to uncertainty have their wording clarified, to something referring to discrepancies with the reference instrument, rather than difficulty reproducing. . ..

Technical/editorial comments:

Typo – page 8898, line 5

Line 23, 8898 – "which article" in McFiggan's or in the current article? Also this sentence is awkward.

Figure 4 – it is difficult to tell the different intervals from one another, although the amount of information fit on the graphs already is very impressive. If the narrowest of the intervals was shown by cross-hatching rather than by colors, it may work better.

ACPD

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Figure 12 is unreadable until it is increased substantially in size using the pdf zoom feature.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 8893, 2011.