

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

Anonymous Referee #1

Received and published: 11 May 2011

See supplemental pdf file, ACP 2011-131, Number-size distributions EU.pdf, for formatted comments and suggestions. Formatting did not transfer to text below.

The authors present a very comprehensive and extensive data set that has been uniformly quality assured, processed and analyzed. The data is put in proper geophysical 4-dimensional context. They provide an appropriate initial, internal statistical analysis. The limitations of the data set and their initial analysis is well posed and, as they note, it is ready for second level analysis and use by the larger community.

The graphics is excellent in terms of content, ease of interpretation (excepting a few) and attention getting, eye-candy as well. Fig. 12, 13, 15 take a while longer to digest

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but I have no further suggestions. The inset in 13 helps a lot.

A statement, even a general statement, regarding the uncertainty of the main Aitken and accumulation mode statistics in the tables would be in order. If this could be put in the context of synoptic or seasonal variability that would be adequate, ie. very much less than, less than, comparable to, etc.

Specifics:

Page 8911 “The number size distributions of particles are higher in summer than in other seasons, especially for the Aitken mode particles with dry diameters from 50 to 100 nm. This elevated number size distributions are accompanied by a slightly larger diameter of median distribution Aitken mode.” There is some room for confusion in the text here. I suggest that it be clearly specified whether you are referring to the particle number concentration that is “greater than” (lower or less than) or the modal, mean or median diameter that is larger (smaller). Adjectives such as “higher” should be avoided where possible. “Smaller” should not be used to refer to concentration, only diameter. Eg.: The number concentrations of particles are greater in summer than in other seasons, especially for the Aitken mode particles with dry diameters from 50 to 100 nm. These elevated concentrations are accompanied by a slightly larger median diameter of the Aitken mode.

Page 8912 At high-altitude sites (defined as height over 1000m above mean sea level), aerosol number size distributions are similar, even there are...

At high-altitude sites (defined as height over 1000m above mean sea level), aerosol number size distributions are similar, even though there are...

Page 8916 It would be good to put this in context for cloud physicists with a sentence stating the critical cloud supersaturation and assumed (say sulfate) chemistry associated with 50 and 100 nm size limits. I know you said you would ignore this point and you did refer to McFiggans but a sentence from his work would be worth it in my

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opinion.

Bimodal does not need to be hyphenated. There are very little seasonal changes. . .
Change to: There are very few seasonal changes. . . . Or There is very little seasonal
change. . . .

Page 8917 widely distributed over the concentration axis with a bimodal
histogram. . . . Might as well use bimodal consistently rather than two-modal here and
later also.

Page 8920 The particle concentrations nearer to sources are known to show a weekly
cycle in number concentrations (van Dingenen et al., 2004; Rodriguez et al., 2007), but
the relative remoteness of most of the stations and annual averaging have could have
removed an anthropogenic weekly signal from our analysis.

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number concentrations (van Dingenen et al., 2004; Rodriguez et al., 2007), but the
relative remoteness of most of the stations and annual averaging could have removed
an anthropogenic weekly signal from our analysis.

Page 8921 The question of representability is dependent on which kind of repre-
sentability is actually expected by the data user.

“representativeness” would seem to be the better term (as used by Henne et. al. in
their title) even though it is less mellifluous than representability.

In table 4 it would be convenient for the uninitiated, geographically challenged, if full
station names were added before the code.

Page 8968 fig 8 The lines are distracting. Color coding is clear enough particularly for
the seasonal histograms. “equal log” rather than “log-evenly” seems more commonly
used.

Fig 13 caption The color coded numbers in the plot indicate the coordinates of the

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geometric means of both concentrations for each station.

Please also note the supplement to this comment:

[http://www.atmos-chem-phys-discuss.net/11/C3177/2011/acpd-11-C3177-2011-
supplement.pdf](http://www.atmos-chem-phys-discuss.net/11/C3177/2011/acpd-11-C3177-2011-supplement.pdf)

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

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