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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Hygroscopic growth of urban aerosol particles in Beijing (China) during wintertime: a comparison of three experimental methods" *by* J. Meier et al.

J. Meier et al.

meierj@tropos.de

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Thank you very much for your comments to the manuscript. In the following, your statements appear in italic face, our comments in standard face.

i) The true GFs from H-TDMA measurements should be presented and discussed. In my opinion, some statistics of the growth factors would be useful as these urban measurements could be compared with other available data.
A figure is added which includes the 'nearly hydrophobic', 'less hygroscopic' and 'more hygroscopic' growth factors and number fractions measured by the H-TDMA for the

three separated air masses A1, A2 and A3. A detailed discussion of the H-TDMA data set is discussed in Massling et al. (2008). The figure will explain in more detail, how strong the influence of each group on the mean growth factor GF is. Table A3 is now enlarged with the additional information of the growth factors and number fractions for each group and air mass. For the reader it will now be easier to compare these results with findings by other authors (like those published by Swietlicki et al., 2008).

ii) In addition, some kind of time series focusing on the measurement period could be presented.
We decided not to show any time series next to Figure 1. In case of hygroscopic growth factors measured by the H-TDMA there is no clear difference in between our selected air masses (A1, A2, A3) in the particle diameter range Dp = 30-80 nm. The change of air mass in hygroscopic properties can only be noticed for the particle diameter range Dp = 150-350 nm, as shown in Table A3 and Figure 5 (Figure we will added, please see previous comment).

iii) As the H-TDMA data are calculated to obtain the average GF, authors should discuss the uncertainty and potential errors related with the process should be analysed.
Potential uncertainties of presented mean growth factors were calculated based on Gaussian error propagation estimating a relative uncertainty of individual growth factors of below 7% and their corresponding number fractions of 10-15%. A comparison between H-TDMA and H-DMPS data is discussed in the manuscript.

On page 7, left panel, line 23 ->: The GFs of less and more hygroscopic fractions are discussed and compared with earlier data (Swietlicki et al., 2008), but none of this data is presented. The comments above would help this as well.
Thank you very much for this comment. As we will include the additional figure and additional explanations in the text, this point will be much clear in the future version of the manuscript.

Section 3.2., equation 2: Could you motivate the equation? It is not obvious that the nf

is put to third power and not GF.
I'm sorry but in online discussion version of this manuscript the number fractions nf1,2,3 are not put to third power, but the growth factors GF1,2,3. are. The formula describes the growth of a bulk particle composed of the individual growth groups weighted by their growth factors and number fractions.

Tables: Why do you use two type of table numbering (e.g. Table 05 and Table A1)?
In the final manuscript version tables without capital letters should appear within the text, whereas tables with a capital letter should appear in the appendix, as labelled as additional information for the reader.

Table A1: The first figure at column "Aerodynamic diameter" should have some range, e.g. <0.1
Yes, you're right, thank you very much. We changed it.

Table A4: The column "Dp" should have a size range instead of a single parameter.
Of course, with each Run we get another particle diameter, but especially for small particle diameters (< 75 nm) the difference is negligible. Only for larger particle diameters (> 400 nm) it could make sense to show a diameter range. But we have to note that our solubility model is not exact enough that we can show values for particle diameters with a preciseness of 2 digits. That is why a mean particle diameter is reported.

Fig. 07: Could you also include the H-TDMA data onto the subplots.
We understand that the information of H-TDMA measurements is very welcome. This is the reason, why the mean growth factor GF of H-TDMA measurements for the three MOUDI sampling periods I1, I2 and I3 in Figure 7 and Table A3 is added in the future version of the manuscript.