

Answer to Referee #1:

The authors appreciate the time the reviewer have spent in assisting us to produce a high quality, understandable publication. All the requested corrections and suggestions are addressed and introduced to the revised version of the manuscript.

Comment: Page 15516, lines 4-5: when presenting the HR-ToF-AMS data, it would be good to add a brief statement on collection efficiency (CE) that I assume was applied for quantification. Did the author apply the standard CE = 0.5? Did they calculate their own CE? Please clarify on this subject.

Reply: A collection efficiency of 0.25 was applied compared to the volume concentration of DMPS. The CE is lower than the standard 0.5, which could be interpreted by the scavenged aerosol during long residence time in the sampling line (about 3m copper line, diameter 6mm) without extra suction flow. This was added in the text accordingly.

Page 15520, lines 17-20: the authors make the correct observation that the larger discrepancy between measured and calculated HGF for the smallest particles sizes is likely due to the fact that the AMS doesn't collect efficiently particles smaller than 50-60 nm due the aerodynamic lens design and cut-off. Perhaps add a brief statement somewhere here to explain this to the non-AMS expert reader; for example, you can re write as "...which is dominated by accumulation mode particles due to the cut-off of the standard aerodynamic lens for particles smaller than 80 nm (Williams et al., 2012)".

Reply: The text was corrected as: The HR-AMS measures the bulk chemical composition of submicron aerosol particles, which is dominated by accumulation mode particles due to the cut-off size of the standard aerodynamic lens for particles smaller than 80 nm (Williams et al., 2012).

Page 15520, lines 22-25: the authors should also note that the data on the y-axis of Fig 5 have a positive offset. Is this also related to the fact that the constant HGF and / or the mixing rule assumptions might be inadequate or there is something else going on? Later in the

paper (page 15521, lines 10-14) when discussing the results of Figure 6, the authors show that the correlations improve when applying an O:C dependent HGF as presented in Massoli et al. (2010). Is the data offset in the y-axis also improving? Based on the slope values, it seems to me that that is the case, and that the offset is reduced even further when the authors apply their own parameterization. Perhaps a little phrase to point this out would be a nice addition given that the slopes are not shown in Figure 6.

Reply: We thank the reviewer for pointing this out. However, we don't know how to draw the conclusions from the offsets becoming closer to zero.

All the data points in Fig. 5 go through the 1:1 line, so we cannot conclude that there is a systematic discrepancy between HTDMA-measured and AMS-derived HGF. For the same reason, it is also difficult to give argument on the mixing rule assumptions based on the offset. From Fig. 6, the reduced offset was due to the improved slope when keeping the root-mean-square deviation (RMSD) minimum. Hence, we rely more on slope of the fitting line or R^2 value.

Figures 5,6,7: for extra clarity, the captions of these Figures should add that the dashed line is the 1:1 line, given that the slopes are not shown.

Reply: The caption of Fig. 5, 6, 7 was corrected in the revised manuscript accordingly.

Reference:

Willians et al., Characterization of an aerodynamic lens for transmitting particles greater than 1 micrometer in diameter into the Aerodyne aerosol mass spectrometer, *Atmos. Meas. Tech.*, 6, 3271–3280, 2013, doi:10.5194/amt-6-3271-2013.