

Response to Dr. James Hudson's comments

Again first we would like to appreciate Dr. Hudson's detailed comments. All miscellaneous corrections are made following Dr. Hudson's suggestions. Responses to the comments that require some explanation are written here.

Since Korea is a Peninsula, is it always necessary to refer to the Korean Peninsula rather than just Korea? This only excludes the islands that are also part of Korea.

The word 'Korea' is usually regarded as more of a political term (e.g., North Korea, South Korea) while 'Korean Peninsula' is informative of the geographical setting, which is more important characteristics when it comes to the description of the measurement location.

p8 L3. I am not aware that this is the Twomey equation.

We probably were misled to think that this was the Twomey equation. Twomey derived an equation that predicts the activated droplet number concentration from updraft speed and CCN spectrum and this equation was in fact referred to as Twomey equation. The supersaturation - CCN concentration relationship here was actually referred to as "Twomey relationship" in several occasions (e.g., Grabowski et al., 2011; Kogan and Belochitski, 2012; Onishi and Takahashi, 2012). So we changed the word 'equation' to 'relationship.'

p8 L18. N0.4% and N0.8% need to be exchanged because 725 is greater than 695. 967 cannot be Dg.

p8 L19-20. These first three numbers are not ratios. 729 is not k.

*The numbers indicate **the amount of data** used for this section, e.g., to produce Figs. 5 and 6.*

p9 L20. Perhaps diesels/trucks have different traffic patterns than automobiles. Perhaps they continue to drive throughout the night and do not drive much more during daylight. I know that in Los Angeles large trucks are not permitted on freeways during much of the daylight hours, especially rush hours. Even without laws trucks may prefer nighttime rather than daytime driving for the sake of economy. This might be reflected in the anomalous 0-9 AM data.

Seoul does not have any legislation on diesel vehicle traffic limitation. Still your suggestion is very insightful indeed. However, we do not have any statistical data to verify it.

p10 L15. More explanation of how data other than maximums and minimums are treated; i.e., proportionally.

We inserted the following phrase at the end of the sentence: (p10, L14-15 in the newly revised manuscript) "and converting the other values in between proportionally."

p.15. L3-5. What about larger particles?

Larger particles are likely to contribute more if their scattering capabilities are similar to smaller particles but we do not have direct size information for this measurement. Therefore we can only speculate based on the measured values of aerosol number concentrations.

p.16. L2. Define AE.

AE is defined in the previous page (p14, L21 in newly revised manuscript).

Fig1. What about the error bars for CN and D_g? Could probably delete for N_{0.6%} and N_{0.6%/NCN}.

The error bars for CN and D_g were already included in the previously revised manuscript. We think that the figure is still understandable with all the error bars included and decide to keep the error bars for all variables, including N_{0.6%} and N_{0.6%/NCN}.

Fig. 3. Isn't this a regression line?

Yes, This is. To clarify "The solid line is the linear regression line." is included in the figure caption.

Fig. 13. Explanatory of what? What are these lines?

The dashed lines are included to illustrate that the particles found at the highest altitude (>4500m) tend to scatter less light. The related sentence in the text is at p15, L11-12 in newly revised manuscript.

References

- Grabowski, W. W., Andrejczuk, M., and Wang, L.-P.: Droplet growth in a bin warm-rain scheme with Twomey CCN activation, *Atmos. Res.*, 99, 290-301, 2011.
- Kogan, Y. L., and Belochitski, A.: Parameterization of cloud microphysics based on full integral moments, *J. Atmos. Sci.*, 69, 2229-2242, 2012.
- Onishi, R., and Takahashi, K.: A Warm-Bin-Cold-Bulk Hybrid Cloud Microphysical Model, *J. Atmos. Sci.*, 69, 1474-1497, 2012.