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Atmospheric Measurement Techniques Discussions

Interactive comment on "Comparisons of spectral aerosol absorption in Seoul, South Korea" *by* Jungbin Mok et al.

Anonymous Referee #1

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This manuscript by Mok et al., "Comparisons of spectral aerosol absorption in Seoul, South Korea", presents a comparison of SKYNET-retrieved SSA in the UV with the SSA derived from a combination of AERONET, MFRSR, and Pandora retrievals in Seoul, South Korea in spring and summer of 2016. There have been only a limited number of measurements / measurement campaigns focusing on absorption at UV wavelengths, therefore, the topic of this study is of great interest and relevance. The scope of the paper is both concise and specific, and my minor comments are mainly related to the need to clarify some of the issues. Before publication, the following points should be addressed:

GENERAL COMMENTS:

I was missing some more information and details about the measurements, for instance

regarding the following two points.

1) Figure 5 (and 7) shows a large variability for each SKYNET mean value, so apparently it is shown based on several measurements within 32 minutes, but what is the temporal resolution of SKYNET measurements? I think this was never mentioned.

2) Page 9, Line 25, here solar aureole corrections are mentioned. Please include few sentences to explain this correction in some detail. Also, this same issue applies also, to some extent, to Cimel measurements (diffuse light in FOV). Could you discuss the relative importance of this kind of uncertainty in both measurements?

The focus of the paper is on UV wavelengths and thus one should not perhaps concentrate too much on the longer wavelengths, however I cannot help wondering about the comparison in the Figure 5 and at the wavelengths > 400nm. Now the explanation was given that the larger scatter is due to the lower AOD and related larger uncertainty. However, it is not only the larger scatter, but also the systematic behavior that stands out, e.g. at 500 nm for largest AOD (red points) SKYNET is showing very little SSA variability. SKYNET value is close to 0.93, when AERONET SSA varies from 0.88 to 0.98. AOD is not very low in these cases at 500nm, when it is larger than 0.4 at 440nm. Is there any idea why this happens? Similar pattern and poor agreement seems to be true also at 675nm. Also, the vertical error bars are sometimes strikingly large. In your Figure 8 you show that AODs match well, so what could be the main reason to cause a variability this large SSA variability within a short period of measurements?

Page 9, Lines 14-26. Here are several possible explanations given for a larger scatter between AERONET and MFRSR -based SSA (n Figure 3b and 3c), if compared to UV-MFRSR and VIS-MFRSR (in Figure 3a). Could you please discuss the potential sources of absolute difference as well. For instance, your points 1 and 2 would both contribute so that MFRSR SSA is larger than AERONET SSA. Now, the scatter includes mainly points when MFRSR SSA is smaller than AERONET SSA. So a quantitative discussion about the possible sources of systematic biases, which differ

between these measurements, would be helpful for the reader to better understand not only the scatter, but also the mean overall differences.

Related to the above point and to your first point (fractional clouds). Would you see a reduced scatter between MFRSR and AERONET SSA, if you narrowed the 32 minutes averaging window? Given your arguments there, it should happen, so perhaps the role of this effect can be estimated?

SPECIFIC COMMENTS:

Figure 7, you list the wavelengths there in the caption, 673/675nm is missing.

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