

Response to Anonymous Referee #1

*Using in situ measurements of aerosol size distribution, black carbon etc in a few stations in China, the authors developed a nice method to correct scattering coefficient measurement. This is a very interesting research and the results sound solid, so I suggest to accept this submission after a few minor revisions.*

responses: Thank you very much for your review of our manuscript. Your positive comments were very helpful and inspiring. Below we will respond to your comments one by one. Your comments are in bold italics, and my responses are in plain text. All the changes have been included in the newest version of our manuscript.

**1. L54-55, I'm a little confused why the absorption properties of particles can later the wavelength dependence of scattering**

Response: The absorption properties of particles exert impacts on the refractive indices, and the changes in the refractive index can result in a change of wavelength dependence of scattering (scattering Ångström exponent (SAE)) (Müller et al., 2011). As shown in Fig.1 of Bond et al. (2009), if particles have strong and wavelength-dependent absorption, the SAE value can be different. Therefore, the absorption properties of particles can alter the wavelength dependence of scattering (SAE) by affecting the refractive index.

**2. L81-82, I'm not comfortable for this statement, CF is physically related to refractive index and particle size, SAE cannot resolve all these influences, fortunately, HBF, the simultaneous measurement with SAE, can, to some extent, provide extra information on particle size. That's it, the sentence looks like HBF is physically related to CF, but it is not, according to my understanding.**

Response: Thanks for your comment. The sentence has been rephrased in the new manuscript.

**3. The authors used a RF method, maybe it is necessary to talk about more why RF is much better than the ordinary regression method.**

Response: Thanks for your suggestion. We give an introduction to the commonly used

linear regression method and point out that this method has the main disadvantage of inaccuracy. Moreover, compared with the limitations of ordinary regression method, the advantages of RF method are stated. With the use of Gucheng data, the comparison part with simple linear regression method shown in Müller et al., (2011) has been added in Sect.3.1. The results indicate that our RF method performs better than the ordinary regression method.

Reference:

- Bond, T. C., Covert, D. S., and Müller, T.: Truncation and angular-scattering corrections for absorbing aerosol in the TSI 3563 nephelometer, *Aerosol Sci. Tech.*, 43, 866-871, doi:10.1080/02786820902998373, 2009.
- Müller, T., Laborde, M., Kassell, G., and Wiedensohler, A.: Design and performance of a three-wavelength LED-based total scatter and backscatter integrating nephelometer, *Atmos. Meas. Tech.*, 4, 1291-1303, 2011.