

Response to reviewer (RC2)

We thank the reviewer for taking the time to provide us with helpful comments that we believe have substantially improved our paper. We address each concern of the reviewer on a point-by-point basis as follows:

1) Is Eq. (1) necessary? Remove it, if it is unnecessary.

Reply: The equation was removed from the manuscript.

2) The discussion on the efficiency of computational methods only focuses on the shape aspect. Actually, the refractive index has large impact on the efficiency comparison between FDTD and DDA.

Reply: A sentence was modified and reference Yurkin et al. (2007) was added (Page 6 Line 19-20).

3) It might be better to have a table of the refractive indices at the 10 wavelengths.

Reply: A table for the refractive index was added (Table 1). Because we only showed the plots for the results of 3 wavelengths (wavelengths for lidar measurements) with one relative humidity (50 %) for water soluble, the refractive indices were listed only for the corresponding 3 wavelengths to avoid the reader's confusion.

4) A reference is required for the Maxwell-Garnett mixing rule.

Reply: Reference was added (Page 7 Line 11).

5) The results are presented for single particles. It is unclear to obtain the size averaged results from the simulated results. More discussion is required on the comparison between simulations and observations/measurements.

Reply: In the revised manuscript, we expanded the part of discussion in

section 3 and in summary. We are preparing another paper regarding the retrieval of soot particles from satellite measurements by using size averaged optical properties. We would like to discuss this issue in our future work if we obtain the reviewer's approval.

6) In summary, it might be better to summarize the new knowledge gained from the present modeling study.

Reply: Our new findings about single scattering properties were summarized (Page 13 Line 1-14).