Recommendation: Publish after minor revision

The manuscript, *"Scattering properties and Lidar Characteristics of Asian Dust Particles Based on Realistic Shape Models,"* investigates the dependence of the lidar ratio (S) and backscattering depolarization ratio (δ) on dust particle sizes, realistic shapes, and mineral compositions. The results from this study will be valuable for future research on light scattering by naturally occurring nonspherical particles and lidar-based remote sensing. I recommend that this manuscript be published with minor revisions.

Comments:

1. Please capitalize the 'p' in the title "properties" to maintain consistency with the other words in the title.
2. Page 6 (48): The sentence, *'If lidar backscattering is dominated by single scattering, δ is close to zero for spherical or quasi-spherical particles like smoke aerosols and water droplets,'* is only partially accurate. Theoretical calculations show that even a small deviation from perfect sphericity can produce a finite depolarization ratio. Additionally, the term 'smoke aerosols' can refer to both fresh and aged soot, which may form super-aggregates with irregular shapes. Therefore, the near-zero depolarization ratio observed for soot particles may also be due to their high imaginary refractive index, which reduces their depolarizing ability. I encourage the authors to revise this statement accordingly.
3. Page 16 (48): The term 'scattering phase matrix P' is somewhat unusual. Most textbooks refer to this simply as the 'scattering matrix,' which includes the phase function as its first element. Please review this usage.
4. Page 19 (48): The statement *'Fig. 4 can serve as a benchmark for future studies on mineral dust scattering properties'* is somewhat surprising. To me, this appears to be a basic phase function calculation without a clear or coherent explanation. Similar plots are widely available in the literature. Furthermore, the graphs represent scattering calculations at different size parameters, which are dimensionless quantities. From the figure, what I observe is that larger particles (with higher size parameters) exhibit stronger forward scattering, which is expected, as scattering in the forward direction is roughly proportional to the particle diameter to the fourth power (D^4)-a well-known behavior in the scientific community.
5. In line 405, page 23 (of 48): A space is needed after "P11(π)".
6. Line 514, page 29 (48): The expression for the size parameter is written incorrectly-specifically, the factor of 2 is missing.
7. In the caption of Fig. 7, please correct the sentence: 'The color of each dot corresponds to *the imaginary of the imaginary index*.'