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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Scattering matrices of mineral dust aerosols: a refinement of the refractive index impact" *by* Yifan Huang et al.

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Comments for:

"Scattering matrices of mineral dust aerosols: a refinement of the refractive index impact" by Yifan Huang, Chao Liu, Yan Yin, Lei Bi

General comments:

This manuscript provides a good overview on the current state of mineral dust single scattering computations and addresses an important issue in the field of aerosol optics, namely the uncertainty in the particle refractive index.

Is there any specific justification for the Koch-fractal morphology compared to e.g.

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spheroids and super-ellipsoids? Is it more convenient or more accurate?

It would be interesting (but by no means necessary) to supplement this study with the derivatives of the phase matrices w.r.t. the refractive index.

Specific Notes:

- page 1, line 10: Change "Dust" to "Mineral dust".
- page 1, line 14: "This study reveals the importance of the dust RI for the model development of dust optical properties"
- Introduction in general: The IPCC has also identified aerosols as a major source of uncertainty in radiative forcing of the terrestrial climate. Maybe this can be added to the introduction with a suitable source to cite.
- p.2, l.4: "... mineral dust is widely distributed around the globe, ..."
- p.2, l.13: "For example, the measured phase functions of dust particles are distinctively different from the ...."
- p.2, l.20: " a simplified but optically equivalent model is more convenient and easier to process"
- p.3, l.14f: "..., to which much less attention has been devoted during the model development."
- p.5, l.15ff: Particle size distributions are a source of uncertainty as well. What is the reason for chosing the specific particle size distributions here?
- p.6: The proposed method finds the optimal theoretical particle properties in terms of the phase matrix alone. What is the impact on the other properties, such as extinction coefficient, albedo etc.? Is a similarly good match achieved?

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