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Atmospheric Measurement Techniques Discussions

Interactive comment on "Light scattering at small angles by atmospheric irregular particles: modelling and laboratory measurements" *by* T. Lurton et al.

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You state (on page 7577 line 22 ff.) that scattering at 13.8° to 16° angle and 635nm wavelength is due to diffraction and thus the scattered intensity is independent with regard to the nature (refractive index) of the particle. This statement is wrong for particles larger than about 2-4 micrometers. Using Mie and diffraction algorithms, it can be verified that the diffraction contribution at 13.8°-16° is below ∼20% for spherical particles with sizes between 10 and 100 micrometers (and m=1.59+0i). Unfortunately, your theory is described as being independent of particle nature (page 7570 line 8 ff.). In my opinion, this should to be corrected throughout the paper.

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The imaginary part of the refractive index has significant impact on the scattering intensity around 15°. The weaker scattering by some particles compared to Mie particles, which is illustrated in Fig. 8, could be due to non-considered absorption. Have you considered the effect of the imaginary part in your study? Or can you verify that all your particles are nonabsorbing?

Furthermore, I find your result that the roughness reduces the scattered intensity at 15° by more than one order of magnitude for large particles (Fig. 8) quite surprising. If this is really a roughness effect, it should be possible to add some kind of validation and/or references to literature data.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 7565, 2013.