Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC2
https://doi.org/10.5194/amt-2020-470-RC2, 2021
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Comment on amt-2020-470

Chris McLinden (Referee)

Referee comment on "Systematic comparison of vectorial spherical radiative transfer models in limb scattering geometry" by Daniel Zawada et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2020-470-RC2, 2021

Review of Systematic Comparison of Vectorial Spherical Radiative Transfer Models in Limb Scattering Geometry by Daniel Zawada et al.

This paper compares simulations from seven different RT model in limb geometry under different levels of complexity: single-scattering, multiple scattering, polarization, and refraction. An added element here, relative to other published comparisons, is refraction. For the cases chosen, all models generally compared very well, within 1%, with a handful of exceptions.

This paper is clear, well written, useful for the limb satellite remote sensing community, and should be published.

Line 36: Incorrect reference - this paper should be cited doi:10.1029/2009JD012488

Table 1: what was the rationale for choosing these combinations? Are these indicative of OSIRIS, SCIA, ALTIUS, etc…?

Table 1: What about using SZAs through sunrise/sunset (e.g., 85-95) – some useful information can be gleaned analyzing limb observations through this period. See, e.g., Atmos. Chem. Phys., 8, 5529–5534, 2008

Line 369: "Both SASKTRAN (HR and MC) and GSLS make the assumption that V is

identically 0" … I assume this is what is assumed here, and not a limitation of the models. That is, they can handle a 4x4 phase matrix. Please claify.

Table 2 / line ~245: what is the aerosol OD? Provide at a reference wavelength, or add to table 2. I assume the extinction of number density profile is provide with the other reference material? If not, please add.

In a future work it would be good to compare under more demanding conditions, such as larger SZA and higher aerosol loadings and/or clouds, non-Lambertian surfaces

Is it useful to compare the multiple-scattered component by itself (I – Iss) ?

Mention some general findings related to the 1700 nm comparisons where the signal would be dominated by aerosol scattering.