Review of 2024-358, Rozanov

General:

The authors present a new retrieval scheme for aerosol extinction coefficient derived from profiles of limb-scatter radiance as applied specifically to OMPS-LP data. Advantages over their previous algorithm are shown in a convincing manner. While there are several differences between the two algorithm versions, the authors state the overruling factor is the normalization approach. The manuscript would benefit from a sensitivity analysis for typical error sources, even a limited one would be enlightening. Highlighting results from the Hunga eruption is very nice. I recommend publishing this article, after successfully addressing the comments below.

Specific:

Is there a missing affiliation in the list on the cover page, i.e. 3?

Lines 136-144: Need to include quantitative estimates of the retrieval errors.

Section 4: Should make it clear that there are only a finite number of wavelengths to use since OMPS-LP does not download the full spectrum. That would be why you are not suggest using slightly different wavelengths to reduce interference from atmospheric absorption/emission.

Line 199: Should be O_2 – B instead of O_2-A and wavelength is 688nm (Newnham & Ballard, 10.1029/98JD02799) (Visible absorption cross sections and integrated absorption intensities of molecular oxygen (O2 and O4) - Newnham - 1998 - Journal of Geophysical Research: Atmospheres - Wiley Online Library)

Line 200: Should be O_2-A instead of O_2-B

Line 204: O_2 has a band near 867nm

Figure 3: What solar irradiance spectra are used for these cases?

Figure 3: What do the aerosol profiles look like with the new algorithm for altitudes above 35km? This should help the OMPS team know how well the stray light correction scheme performs.

Line 244: The normalization range does seem to be too low in altitude. If the solar normalized radiances up to 50 km are good enough to estimate surface albedo, then the normalization range for the V1.0.9 retrieval should be raised, maybe above 45 km.

Line 253: What are the reflectance values for the various cases?

Line 254: “scaling of the a priori at the…reference tangent height” This appears to behave differently than trace gas retrievals from UV/VIS backscattered sunlight that use a normalizing spectra obtained from backscattered radiance spectra over a reference sector, typically a region with low trace gas amounts. The trace gas amounts from the reference sector are subtracted from the total trace gas.

Line 332: Is the same mean added to all three datasets to make the left panel of Fig. 8?