

This is a nice paper that should be published after a few modifications. The one difficult claim, which is not well supported by the discussion or the figures, is that there was transport from the tropics into the Northern Hemisphere along the 750 K isentrope. Here are the detailed comments.

313-315 This claim by the authors is not substantiated by either Figs 3 e) or f). The northward extension of scattering ratios near 1 (purple) are not at all obvious and certainly not along the 750 K contour.

412-414 This seems like a stretch given there was no clear evidence of transport from the tropics along the 750 K isentrope. Could this be a filament from the polar vortex as it dissipates in the spring? Where did the air come from? Were there any back trajectory calculations?

Indeed, the evidence provided may be insufficient for such inference. We opted to remove it.

Other comments/corrections.

Figure 1a) b) Where is the triangle marking Ruang?

The triangle visibility has been improved.

276 ... Antarctic ...

OK

280-282 This statement is perhaps reasonable at $\text{SAOD} > 15\text{e-}3$, but less than this the difference is a factor of two or more, very obvious in the NH mid latitudes. Might be worth mentioning the regions of particularly larger discrepancies.

The SAOD retrieval from ATLID L1B data has been revised and updated with the latest baseline, which reduced the differences, in particular at NH midlatitudes.

281-283 This claim is questionable. Yes there is a faint signal in OMPS-LP, but this is not really supported by either SAGE III or ATLID.

The northern poleward propagation of aerosols is not obvious from the time-latitude SAOD pattern, in particular because of the highly-variable tropopause altitude in the subtropical “surf” zone, which creates an apparent discontinuity in stratospheric aerosol abundance between the tropics and midlatitudes in both hemispheres. Otherwise, the presence of Ruang aerosols in the northern extratropics is cross-confirmed by ATLID and NDACC lidars.

Figure 2 Why does the SAGE III data stop in July. Just not available yet?

All the data sets, including SAGE III have been updated.

319 Probably the reason is because it wasn't there.

Distinct local maxima of scattering ratio exhibited by the collocated profiles in NH provide a strong support for the presence of Ruang aerosols at these latitudes, which is corroborated by OMPS-LP and SAGE III observations.

338 Isn't it a black dotted line?

This regards Fig. 4 not Fig. 3.

341 The structure of the zonal mean is not vastly different, it just doesn't capture the fine scale structure, nor would a zonal mean be so expected.

Sentence rephrased.

351 Isn't it the opposite with the zonal mean exhibiting somewhat lower scattering ratios than the local measurements?

Yes, thank you, correction made.

455 Is there a reference for 0.4 Tg of sulfur?

Yes, the proper reference has been included.