EGUsphere, author comment AC3
https://doi.org/10.5194/egusphere-2022-207-AC3, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Reply on RC2

Aaron Pearlman et al.

Author comment on "Polarization performance simulation for the GeoXO atmospheric composition instrument: NO_2 retrieval impacts" by Aaron Pearlman et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-207-AC3, 2022

The referee is correct that particularly rotational Raman scattering can be significantly affected by polarization. Although in our previous comment, we partially addressed this in a general way by adding:

"Our simplified retrieval approach may have neglected factors used in operational retrievals that could be affected by instrument PS and contribute to additional retrieval errors related to estimates of aerosols, surface reflectance, and cloud parameters."

We now also include the following to be more explicit: "Rotational Raman scattering, which has been used in cloud height retrievals (e.g., Vasilkov et al., 2008), can be particularly sensitive to polarization. Other approaches for cloud height retrievals such as oxygen dimer absorption (Acarreta et al., 2003) should be much less sensitive. We do not account for the PS to cloud height retrievals. The PS to cloud optical thickness is implicitly accounted for within the effective cloud fraction estimation."