

Review Summary:

The authors have diligently addressed the comments of this reviewer. There are still some clarifications requested.

Detailed Comments:

Line 250 (track changes version): the word “Perceived” here does not seem quite right. A better word could be “Resulting”, or even no word at all.

Line 331 (track changes version): “These are ...” seems to directly repeat the previous phrase?

Figure 7 (original line 502): While the authors are correct that temperature uncertainty and water vapor uncertainty of ERA5 are expected to differ, there is no attempt by the authors to compare their determination of bending angle uncertainty with previous determinations of ERA5 uncertainty. Discrepancies between these results and the ERA5 literature may be present and require some explanation. Comparisons between ERA5 and radiosonde below 10 km altitude show roughly constant or gradually decreasing relative humidity uncertainty of ERA5 towards the surface, assuming radiosonde as “truth” (e.g. Gamage et al., Figure 2; Virman et al., Figure 4). Bending angle is sensitive to specific humidity. A constant relative humidity uncertainty with altitude would result in an increasing specific humidity or bending angle uncertainty with decreasing altitude as seen in Figure 7, but the sharp uncertainty reduction in the lowest ~1-2 km is not consistent with the radiosonde comparisons. What are possible explanations for the discrepancy between these results and the prior literature? Is there a sharp reduction in ERA5 temperature uncertainty near the surface that counteracts the increasing specific humidity uncertainty towards the surface in ERA5, so that bending angle uncertainty shows the pattern in Figure 7?

References:

Gamage et al. (2020), A 1D Var Retrieval of Relative Humidity Using the ERA5 Dataset for the Assimilation of Raman Lidar Measurements, Journal Of Atmospheric And Oceanic Technology, doi: 10.1175/JTECH-D-19-0170.1.

Virman et al. (2021), Radiosonde comparison of ERA5 and ERA-Interim reanalysis datasets over tropical oceans, Tellus A, doi: 10.1080/16000870.2021.1929752.