

Review of the revised manuscript “Sensitivities of modelled water vapor in the lower stratosphere: temperature uncertainty, effects of horizontal transport and small-scale mixing” by Liubov Poshyvailo et al.

The authors addressed the comments very well and the manuscript now reads well. The expanded analysis on vertical diffusivity is also interesting. I recommend publication after addressing the following very minor suggestions and technical errors.

1. Should there be a distinction between the terminology “tropical entry H₂O” and “stratospheric H₂O”? The two appears to be used interchangeably, but they refer to slightly different quantities so I found myself trying to figure out which. For example, the Abstract notes “difference of up to around 1 ppmv” in tropical entry H₂O due to transport across the 15NS barrier (also mentioned in the Conclusions section). The description of Figure 9a refers to the 1ppmv impact on stratospheric H₂O. Figure 6b seems to show a mean difference of ~0.5 ppmv in the domain 20S-20N, 380-420K, which is essentially the tropical entry H₂O.
2. Are the temperature, zonal wind and pressure level contours in Figure 3 derived from ERA-Interim reanalysis? I believe they are the same across the four (DJF and JJA) panels, correct?
3. It looks as though Figure 16 shows potential vorticity contours in black (not grey) and temperature contours in white (not violet).
4. In Section 4.2 (which I like), the authors mention the study by Ueyama et al. (2015) who varied the vertical diffusivity coefficient by 2 (not 3) orders of magnitude (from 0.001 to 0.1 m²/s) and found a moistening effect of ~0.5 ppmv.