Comment on egusphere-2022-1197
Anonymous Referee #1

Referee comment on "Mean age from observations in the lowermost stratosphere: an improved method and interhemispheric differences" by Thomas Wagenhäuser et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-1197-RC1, 2022

This paper makes a significant improvement to the calculation of mean age in the lowermost stratosphere from in situ trace gas measurements by quantifying the effect of extratropical entry into this region. This study builds on previous work that has shown the lowermost stratosphere to be composed of a mixture of air masses from different source regions with a large seasonal dependence. This mixture can have an important impact on mean age estimates, different in each hemisphere, and the interhemispheric contrast in mean ages that are revealed with this method are quite interesting. The techniques and methods used are well described and the uncertainties are clearly shown. The paper is laid out well and easy to read. Really excellent work! I have no significant suggestions for improvement, and only a very few minor comments listed below. I suggest publication in the present form.

Specific comments:

Line 192: add ‘of’ after ‘instead’

Table 2 could go in the supplement.

Line 246: ‘datasets were processed in three steps.’

Line 250: I don’t see this age correction formula in the Leedham Elvidge et al. paper. How was this derived?
Lines 313, 385, 390, 420: ‘extend’ should be ‘extent’