Weather Clim. Dynam. Discuss., referee comment RC1
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Comment on wcd-2022-12

Anonymous Referee #1

Referee comment on "Quantifying stratospheric biases and identifying their potential sources in subseasonal forecast systems" by Zachary D. Lawrence et al., Weather Clim. Dynam. Discuss., https://doi.org/10.5194/wcd-2022-12-RC1, 2022

A very thorough and useful study into the stratospheric biases present in the current seasonal forecast systems. I note that a further study is planned to detail how these biases might impact forecast skill, and I think this paper will nicely underpin future research in that area. A couple of minor points:

1) Line 153 states "8 high-top and 6 low-top models". Yet there are 9 high-top and 6 low-top models in Table 1, and 9 high-top and 5 low-top models in Figure 1 (ECCC-low is in Table 1 but not Figure 1). I suspect the text should read "9 high-top and 6 low-top models", and then give a reason for ECCC-low not being included in Figure 1.

2) Line 197 notes "apparent differences" between high and low top models. Please state whether these differences are statistically significant. Actually this point is also relevent to Figure 2 -- please add stipling to Figure 2 to show the regions where the high-top and low-top model biases are significantly different from each other.

3) Line 217: You note that KMA is not used in the high-top composite as it is very similar to UKMO. But then you are not using all the information that you have. I would suggest that, if these models really are very similar, you treat them as a single ensemble -- i.e. combine the ensemble members from UKMO and KMA, and then form an ensemble mean from those. That way you use more information (we know increased ensemble size is good) and still avoid biasing your composite.

4) Line 380: I assume the magnitude of SSWs is computed for each ensemble member, and then averaged? If you are looking at zonal wind changes in the ensemble mean then the changes may be too small simply due to different central dates in different ensemble members.