Answer to RC1

We thank anonymous reviewer #1 for reviewing our manuscript and for the very fruitful comments and suggestions, which allowed us to strengthen our article.

RC1 : Regarding seasonal variation of proxies: It is concluded that this study gets better results compared to LOTUS19 due to the continuous improvement of satellite and ground-based records and due to the updated version of the LOTUS regression trend model which now takes into account the seasonal variation of the predictors. Some readers may not understand what you mean by "seasonal variation of proxies". The lines 392-399 point to lines 248-249 (section 3) for the seasonal variation of the predictors, but Section 3 does not explain what you mean by seasonal and non-seasonal variation of the proxies. It would be good to clarify how you let the proxy to have a seasonal and non-seasonal variation. If for example, by "seasonal variation of QBO at 30 hPa from 01/2000 to 12/2020" one should understand that it is the monthly time series of equatorial winds at 30 hPa from January 2000 to December 2020, and that the respective non-seasonal variation of QBO is something different, that should be explained. Potentially a Supplement with some graphs might help. My point is that the readers should know how a proxy with seasonal and non-seasonal variation looks like.

Answer: As emphasized also by RC2, the seasonal variation of regressed coefficients in the LOTUS regression model needs some clarification and reformulation. In the former version of the LOTUS regression model used in LOTUS19 report, it was assumed that there was no seasonal dependence of the coefficients retrieved from the regression. In the new version of the model, seasonal terms were added with varying numbers of Fourier components in order to evaluate the seasonal variation of the derived regression model data. Section 3 was rewritten and new equations were added in order to better explain trend computation with the updated LOTUS trend model.

RC1: Line 297: Interestingly, the trends from SAGEII-SCIA-OMPS data change to negative above 2 hPa which was also not the case in LOTUS19.
Indeed, the SAGEII-SCIA-OMPS record displays a small negative trend above 47km in the 20°S-20°N and 35°N-60°N latitude ranges. These trends are however not significant.

RC1: Line 427: correct "CMI" to "CCMI".
Done

RC1: Line 437: Remove one "set of".
Done

RC1: Figs 2 and 4: It is not easy to follow each line between too many error bars. Potentially the error bars could be lighter, and the trend lines thicker. Also, the minor tick marks in vertical axes of pressure [hPa] are barely seen. The minor tick marks in fig 7 cannot be easily seen as well.
Figures 2 and 4 have been improved accordingly

RC1: Fig 3: Is there improvement when the Ozone-MOD is not included?
According to Figue 2, SBUV-MOD shows a discrepancy with the records mainly in the upper stratosphere in the 20°S-20°N latitude range and to a lower extend in the middle stratosphere. Since the uncertainty of overall trends in the upper and middle stratosphere is

due to spread of individual trend estimates (see Figure 6), exclusion of exceptional value by SBUV-MOD would reduce the uncertainty

RC1: Fig 4: I would put the plots side by side as in other figures, i.e., Lauder (left), MLO (middle), Alpine stations (right).
Figure 4 has been redrawn accordingly.

RC1: Fig 7: On the vertical axis on the right plot, the 102 is on top of the axis and the 100 is at the bottom. Shouldn't they be upside down?
Figure 7 has been redrawn accordingly.

RC1: References: the status of papers marked as "to be submitted" and "in review" should be updated before publication.
This will be down. Thank you for the reminder.