We thank Referee 1 for the careful and thorough review of our manuscript and for the valuable comments and suggestions. In the following, we provide a point-by-point response to each comment raised by the reviewer.

1. Page 4, Figure 1: The instrument datasets listed for creating GOZCARDS are SAGE-I, SAGE-II, HALOE, and Aura MLS. However, UARS MLS and ACE-FTS were also included in the GOZCARDS ozone database according to Lucien et al. (2015) (reference listed in Table 3). Please verify whether these two instruments were unintentionally omitted from Figure 1 or whether they are no longer included in the latest version of the dataset.

   We verified that the current GOZCARDS version uses SAGE-I, SAGE-II, HALOE and Aura MLS and not the UARS MLS or ACE-FTS data. This was confirmed directly by Lucien Froidevaux.

2. Page 5, Figure 2: OMPS-NP data have been used in several merged datasets, such as SBUV/NASA (MOD), SBUV/NOAA (COH), and MSR-2. For clarification, more detailed information should be provided to distinguish the different OMPS-NP satellites. For example, it would be better to replace “OMPS-NP” with “OMPS-NP (Suomi-NPP)” for the SBUV/NASA (MOD) dataset. More detailed information should also be provided for the “OMPS” instrument used in MSR-2.

   Thank you for pointing this out. The specific OMPS satellite information was added to Fig. 2.

3. Page 6, Table 1: Similar to comment #2, more detailed information is needed for “OMPS” in the instrument column for MSR-2. In addition, for NOAA/SBUV (COH), the OMPS-NP instrument from NOAA-20 is missing in Table 1, although it appears in Figure 2.

   We added the missing NOAA-20 instrument to Table 1.

4. Page 8, Figure 8: It is not clear from either the figure caption or the text in Section 3.1 what “reference” value was used to define the differences before calculating the trends in those differences. In other words, was the reference based on MLS Level-3 or Level-2 data (e.g., by first converting individual profiles)? This information would help readers better interpret the sign of the trends in the differences and the impact of coordinate conversion on the derived ozone trends.

   Page 8, Figure 3 shows the trend of the differences (post-gridded - pre-gridded) between MLS data converted at L3 (conversion after gridding) and L2 (conversion before gridding). We clarified this in the revised version.
   “Zonal mean decadal trends of differences between MLS L3 data converted after and before gridding (post-gridded - pre-gridded) in % per decade from 2005 to 2022 at altitudes of 25, 30, 35 and 40~km (panels a to d).”

5. Lines 153-154, “It ranges from 0.5 to 0.75%/decade between 60^0 S and 60^0 N and above 20km”. This statement is applicable for 2000 to 2024 period, but not for 1985 to 1995 period (Figure 4a). The sentence should be revised for clarity.

We revised the sentence for clarity and added additional sentences to explain the differences between both periods.
"In the period between 1985 through 1995, the uncertainties show higher values from close to the tropopause up to 25 km for latitudes above 50° N/50° S. Above this altitude and in the zonal band between these latitudes, the uncertainties are comparable in magnitude with those from the later period"

6. Lines 156-157, "and the results are shown for the period after 1996 (ODS peak) and 2000 in Figure 5." This sentence implies that the total ozone data periods shown in Figure 5 are 1996–2024 and 2000–2024 (red and blue lines). However, the Figure 5 caption indicates "until 1995 and since 2000" (i.e., 1985–1995 and 2000–2024). Please clarify the wording for consistency.

   We fixed the figure caption to correctly say "since 1996 and 2000", to mirror the text, stating now "results are shown for the period since 1996 (ODS peak) and 2000 in Fig. 5.".

7. Page 10, Equation (2), there are typos in the "inflection time" corresponding to the linear trend coefficients, β13(z,t)(t-t1), and β16(z,t)(t-t2). The terms t1, and t2 should be corrected to t0, and t1, respectively.

   We fixed the t1 and t2 terms, in order to agree with Eqs. (3), (4) and (5).

8. Lines 174-175, A special term, $L_{Gap}(t)$, is used for the 1996-1999 period due to "the sparse sampling of the merged ozone profile datasets". During this period, the main contributing satellite measurements came from SAGE II and HALOE (see Figure 1). Since there were no major volcanic eruptions (Figure A1) or extended periods of instrument problems during that time, could the authors elaborate further on the cause of sparse sampling, and did the sparse measurements mainly occur in specific latitude or altitude regions?

   We changed the text to better coincide with the SPARC LOTUS Report. The gap period was introduced because the trend inflection point varies in dependence on the altitude and latitude (Laine et al., 2014) making a selection of a single inflection point sub-optimal.
   "Note that the term with $L_{Gap}(t)$ does not contain a linear trend coefficient during the gap period (1996–1999). This is needed to reduce the influence of the selection of a turnaround point between ozone decline and recovery because the timing of the trend reversal varies with latitude and altitude (Laine et al. 2014). By introducing a transition period rather than a single inflection year, the regression model allows for a more gradual change between the two trend segments."

9. Page 14, Figure 6. The regression coefficients of the proxy terms are shown as functions of latitude and altitude, but there is no information regarding the statistical significance of those coefficients. It would be helpful to use hatching to indicate insignificant coefficients (similar to Figure 3). This would provide additional insight into the remarkably different

impacts of the three volcanic aerosol proxies (Figure 6i, j, k). A related question concerns Figure 6k, the El Chichon aerosol proxy appears to result in ozone increases in the mid-latitude lower stratosphere (below 20km). Is this feature an artifact of MLR fit or has it been reported in previous studies?

The significance of the regression coefficients was added to Fig. 6.
There are studies that show that El Chichon might contribute to an ozone increase (Chehade et al. 2014). We included the following text in the section about the additional proxy data and a note that the El Chichon regression coefficients are mostly not significant statistically.
" Volcanic eruptions have different impacts on stratospheric circulation, chemistry, and ozone distribution, depending on magnitude, season, and latitude of the event (Stolarski et al., 2006; Chehade et al., 2014; Weber et al., 2018, 2022). This variable response is illustrated in panels i-k of Fig. 6. The Australian wildfire (end of 2019) and HTHH had a stronger initial impact in the SH than in the NH because the volcanic aerosols (and stratospheric water vapour) were transported mostly in the SH resulting in an ozone loss (band of negative values in panel i). The Pinatubo eruption had a stronger impact in the NH (boreal winter) as illustrated by the band of negative coefficients from the tropics to the polar region (panel j, Aquila et al. (2014)). The dynamic response to the El Chichón eruption showed the opposite effect. Due to changes in the SH circulation the dynamical ozone increase exceeded the chemical ozone loss caused by the eruption (see panel k, Zerefos et al. (1994); Angell (1997)). However, nearly all El Chichon coefficients are not statistically significant at 95% confidence level."

10. Line 285, "SH trends are lower and remain at about +0.5DU/decade". The trend value appears to be a typo. It should be approximately 1 to 1.5 DU/decade (or ~0.5 %/decade).

We fixed this mix up between DU/decade and %/decade. This was indeed 1.5 DU/decade and 0.5%/decade.

11. Line 354, "in % per decade Fig. A7) can can be compared". Please correct the typos, for example, "in % per decade (Fig. A7) can be compared".

We corrected the typos as suggested.

12. Lines 359-360, "The larger variations in SH trend profiles, ….. is due to the smaller positive trends seen in GOZCADRS compared to all other merged datasets." The smaller positive GOZCARDS trends mainly occur above 25 km. Below 20 km the larger variations in trend profiles are mainly associated with SAGE-SCIA-OMPS and SAGE-OSIRIS-OMPS. For clarification, I recommend revising the sentence to specify the altitude range, for example, "The larger variations in SH trend profiles for altitudes **above 25 km**, …, is due to the smaller positive trends seen in GOZCARDS….".

We added the suggested altitude range to the text.
"The larger variations in SH trend profiles for altitudes above 25 km, seen in panel a)

of Fig. 10 (see also Figs. A7-A9) is due to the smaller positive trends seen in GOZCARDS compared to all other merged datasets."

13. Lines 417-418, "For the stratospheric column calculations, data were screened out if more than three of the five layers above the tropopause had missed data". Conventionally there should be no missing data above the tropopause when calculating stratospheric column ozone. Which five layers were used for screening criteria, and how were the missing data treated (e.g. interpolation) before calculating the stratospheric column ozone?

This was indeed confusing and we changed the wording and sentences in the manuscript as follows:
"The ozone profile datasets generally start at an altitude of 10 km (Table 1) which can be an issue when the tropopause is lower than 10 km, particularly at higher latitudes. For the stratospheric column calculations, data were screened out if the three lowest 1 km layers above the tropopause had missing data. In combination with the larger uncertainties of limb measurements below 20 km, this selection criterion causes larger spreads in the profile and stratospheric column trends. "
At higher latitudes, some ozone profile measurements contain missing values above the tropopause. To account for this issue, we applied a screening criterion based on the missing 1 km layers above the tropopause. Stratospheric columns were only calculated when at least 3 km above the tropopause was valid ozone data. Missing data inbetween two valid data points (if any at all) was handled by the merged datasets themselves. No interpolation was done or needed in this analysis.
Because missing values in these high-ozone layers could potentially affect the resulting column values and the derived ozone trends, we additionally compared our approach with the method described by Sofieva et al. (2026). Here we first calculate the ozone trends of the profile ozone datasets and then integrate the columns. The comparison of both layer and column ozone trends is presented in Figure A6. The results show that the two methods produce very similar trends, particularly for the Full Regression analysis, indicating that the treatment of missing values has only a minor impact on the overall trend estimates. Therefore, results obtained with both methods are provided.