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Supplement of

Updated merged SAGE-CCI-OMPS+ dataset for the evaluation of ozone trends in the stratosphere

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1 Comparisons of deseasonalized anomalies

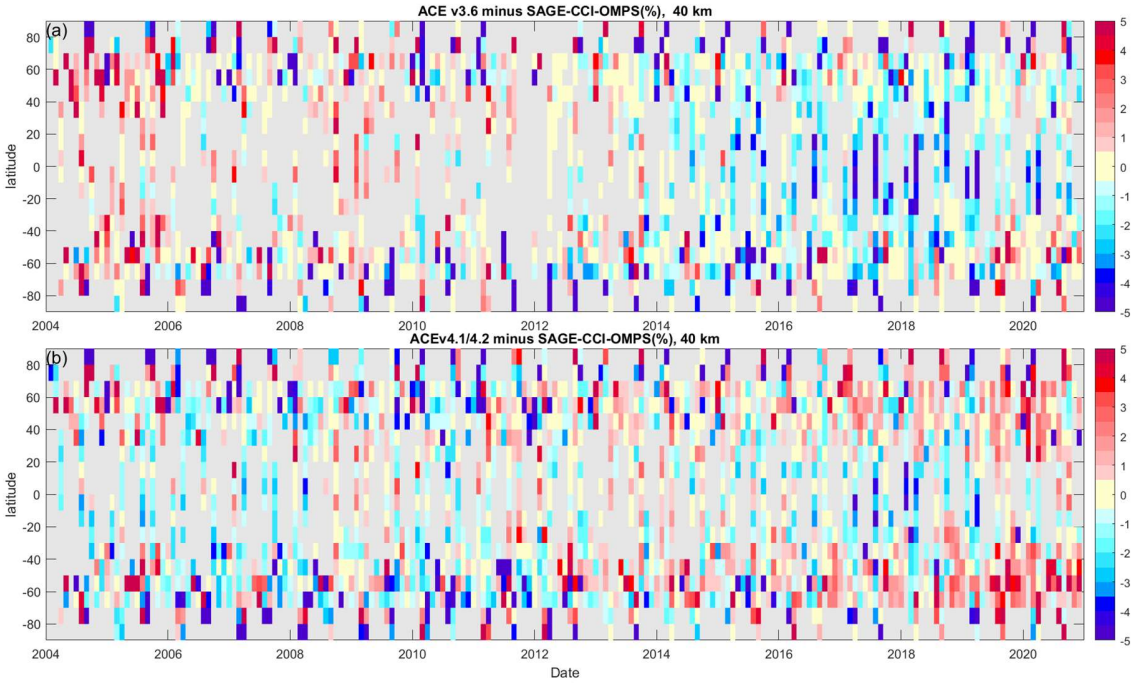

Figure S1. Difference of deseasonalized anomalies ACE-FTS minus SAGE-CCI-OMPS at 40 km, for ACE-FTS version 3.5/3.6 (panel (a)) and version 4.1/4.2 (panel (b)).

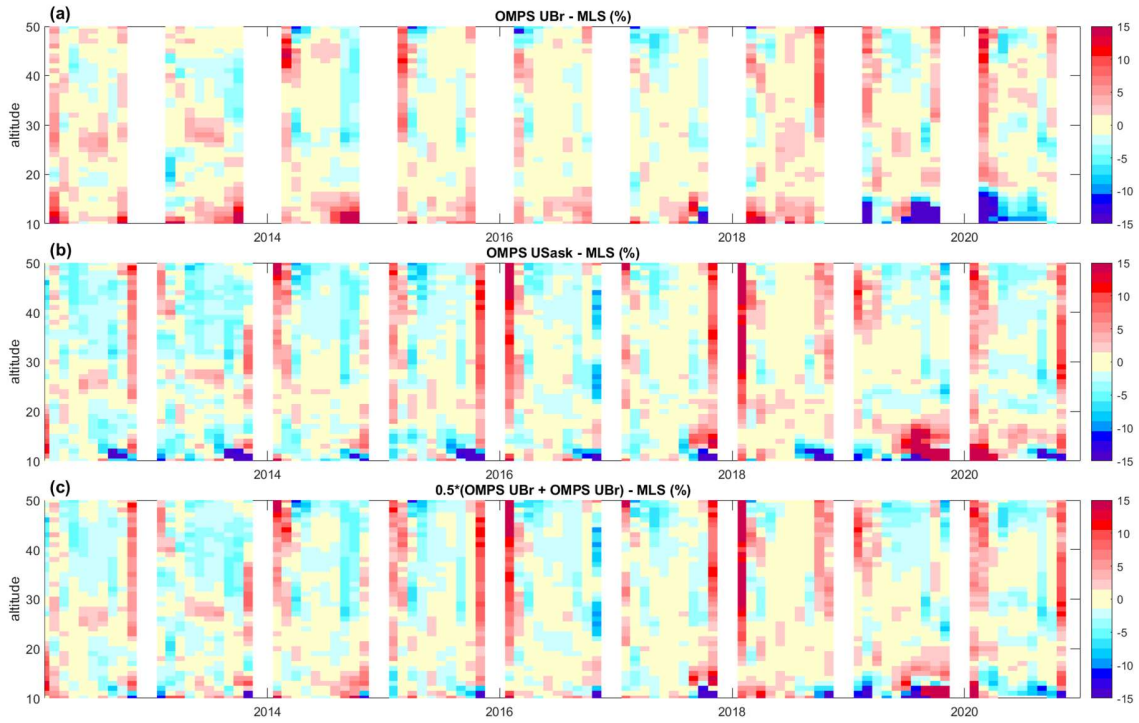

Figure S2. Difference between OMPS and MLS deseasonalized anomalies at 70°-80°N for (a)OMPS UBr, (b)OMPS USask, and (c) mean of OMPS UBr and USask datasets.

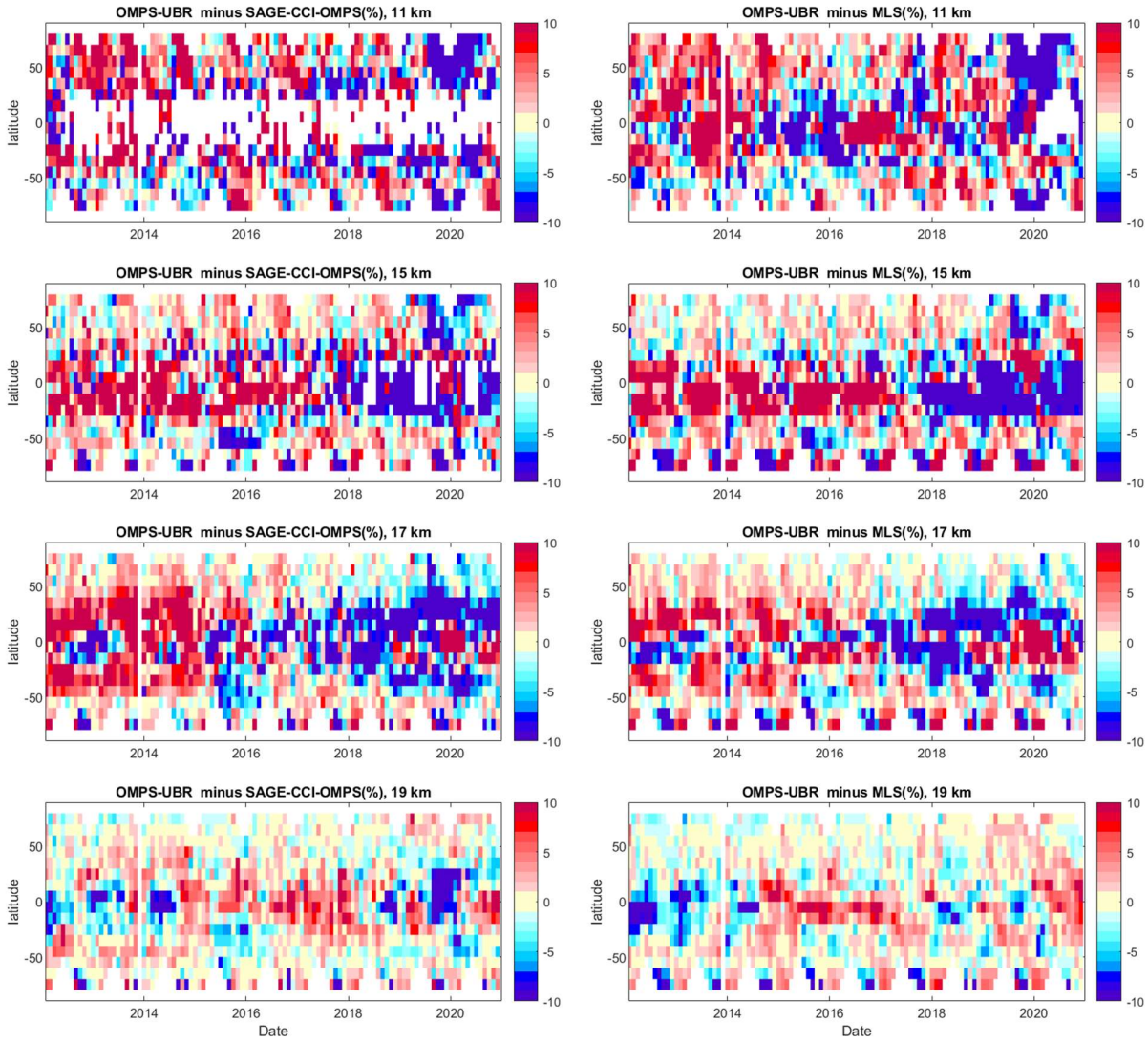

Figure S3. Difference between OMPS UBr deseasonalized anomalies and merged SAGE-CCI-OMPS anomalies (left) and MLS anomalies (right) at several levels in the UTLS.

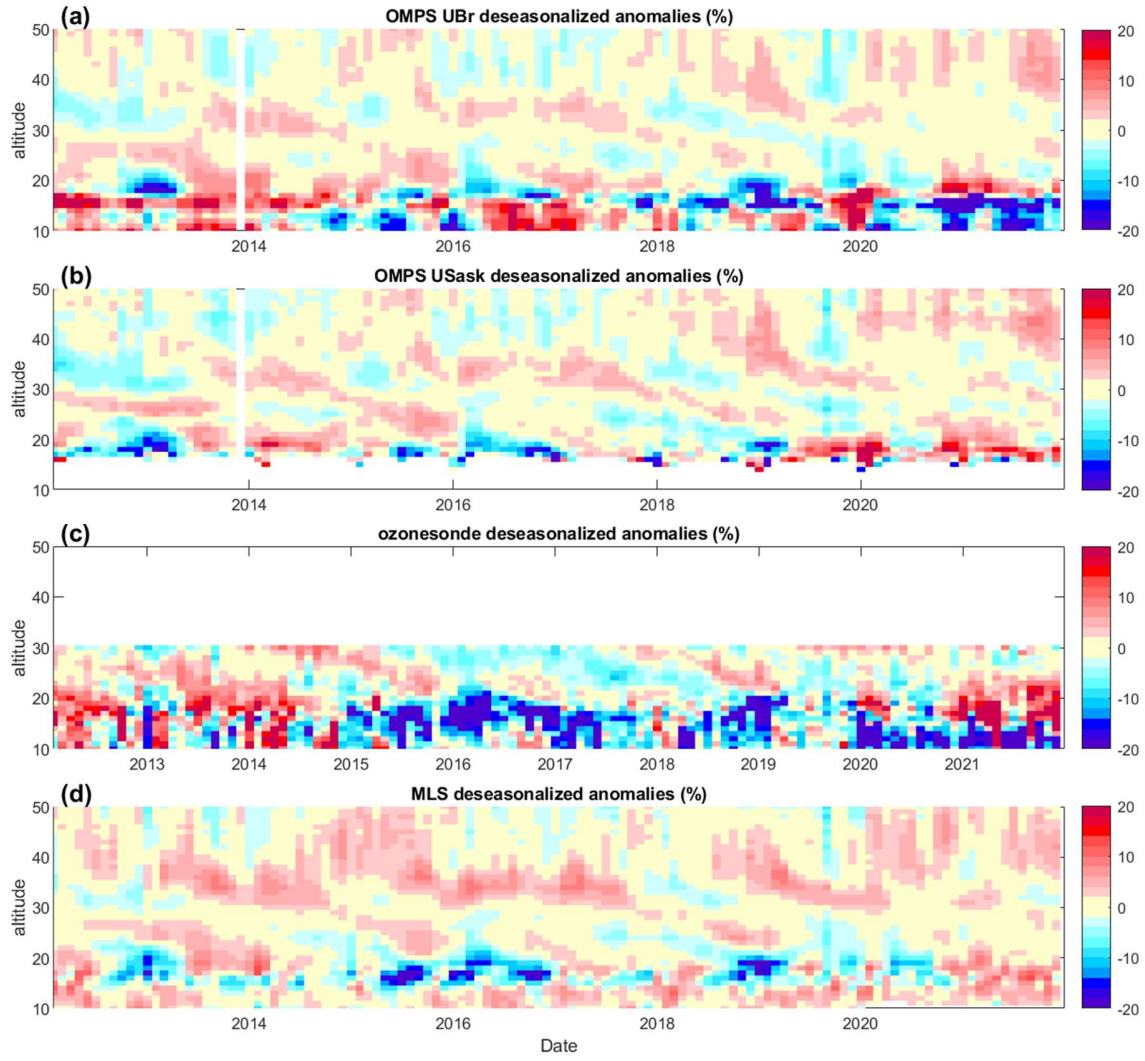

Figure S4. Deseasonalized anomalies at 20°S-20°N from (a) OMPS UBr, (b) OMPS USask, (c) ozonesondes, and (d) MLS.

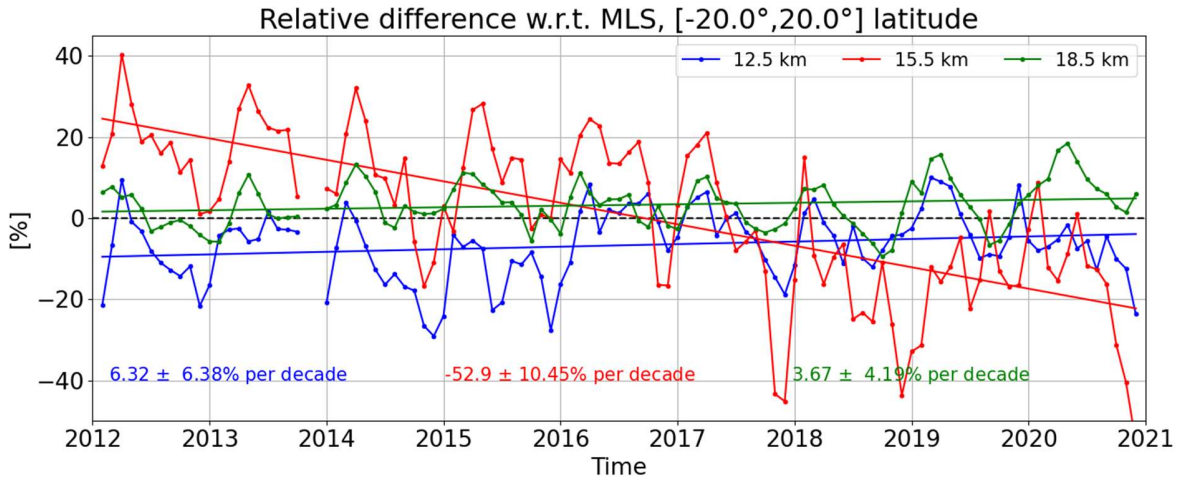

Figure S5. Relative difference OMPS UBr -MLS 20°S-20°N at three altitudes with linear trends reported.

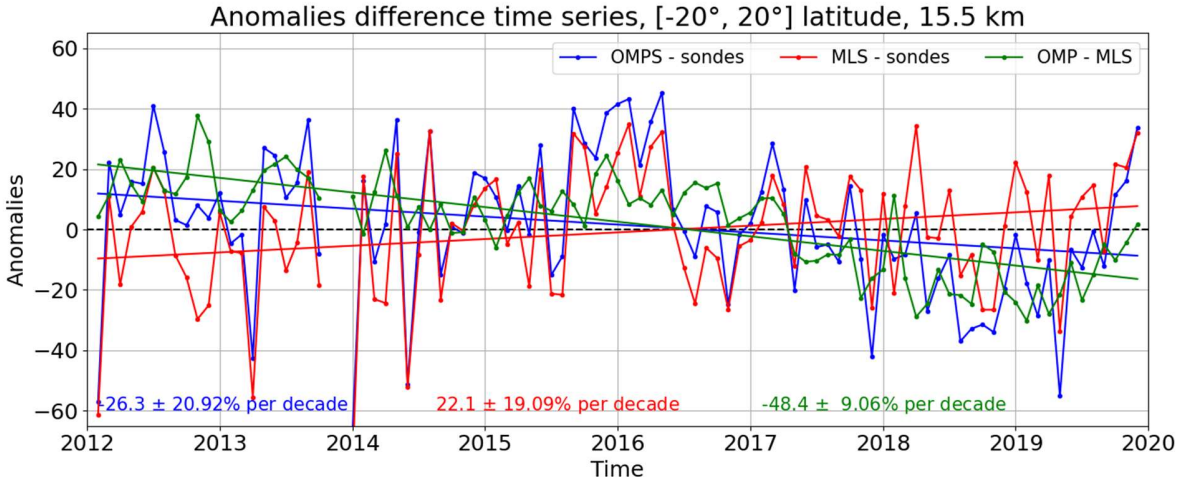

Figure S6. Difference in anomalies between OMPS UBr, MLS and sondes in 20°S-20°N at 15.5 km with linear trends reported.

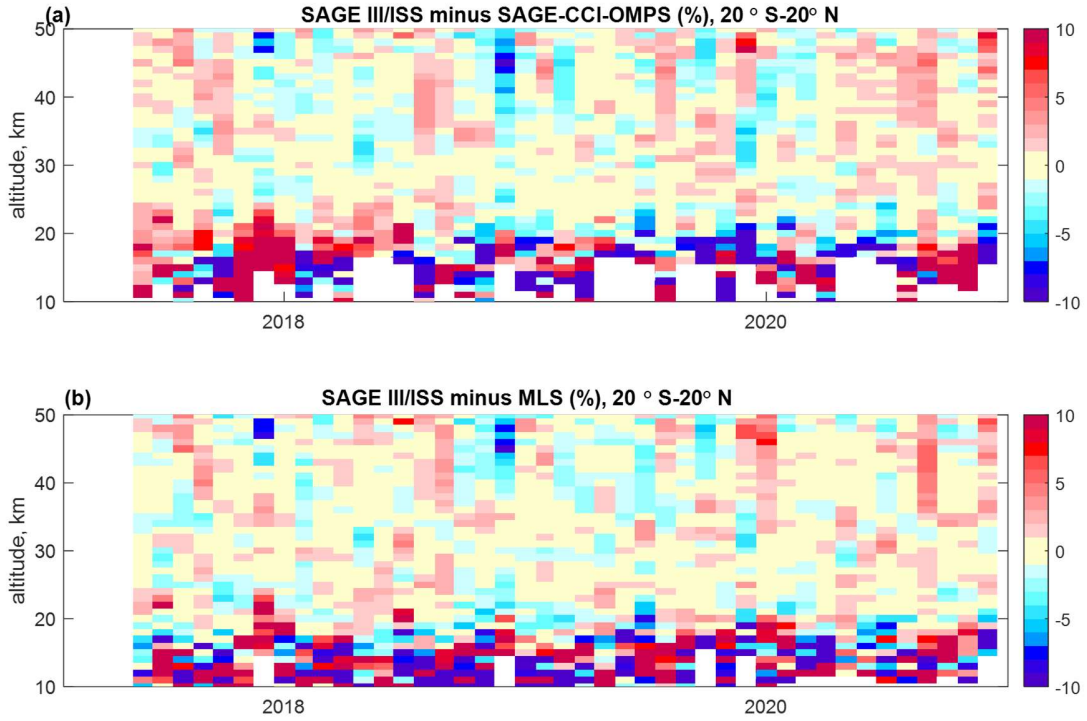

Figure S7. Difference between SAGE III/ISS deseasonalized anomalies and (a) merged SAGE-CCI-OMPS anomalies and (b) MLS anomalies at 20°S-20°N.

2 Sensitivity of trend analysis to the inclusion of new datasets

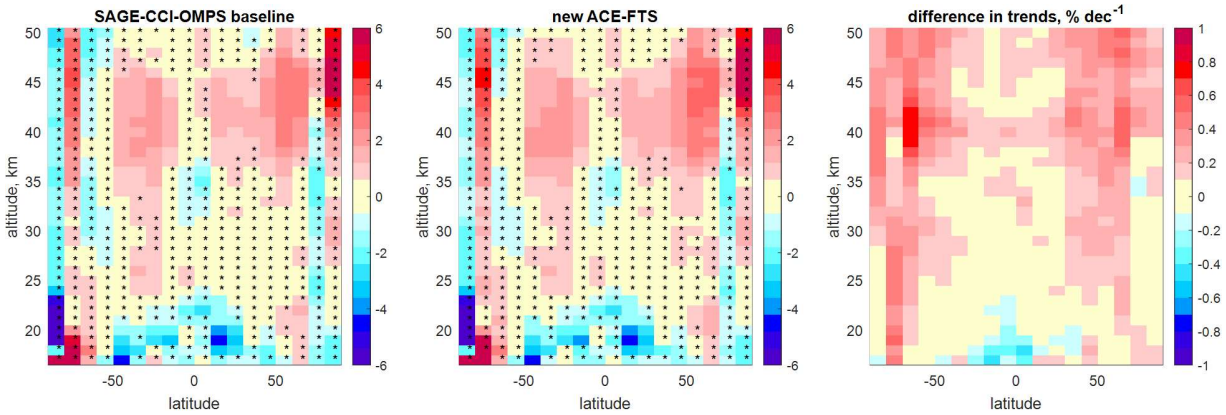

Figure S8. Ozone trends in 1997-2020 (% decade^{-1}) evaluated using the baseline SAGE-CCI-OMPS dataset (left) and the analogous merged dataset, in which ACE-FTS v4 is used instead of v3.5/3.6 (center). Stars indicate the latitude-altitude bins, in which trends are not statistically significant at 95% confidence level. Right panel shows the difference in ozone trends in % decade^{-1} (new minus baseline).

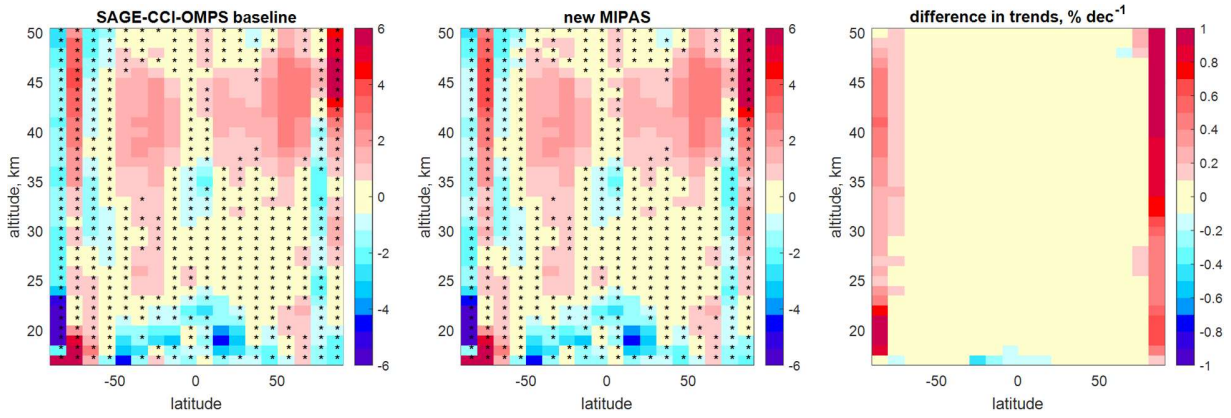

Figure S9. Ozone trends in 1997-2020 (% decade^{-1}) evaluated using the baseline SAGE-CCI-OMPS dataset (left) and the analogous merged dataset, in which MIPAS v8 is used instead of v7(center). Stars indicate the latitude-altitude bins, in which trends are not statistically significant at 95% confidence level. Right panel shows the difference in ozone trends in % decade^{-1} (new minus baseline).

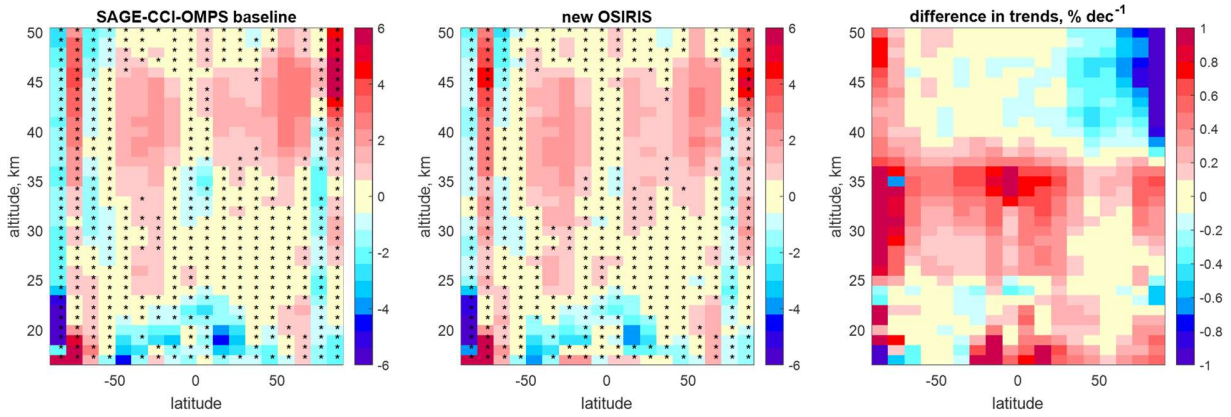

Figure S10. Ozone trends in 1997-2020 (% decade^{-1}) evaluated using the baseline SAGE-CCI-OMPS dataset (left) and the analogous merged dataset, in which OSIRIS v7 is used instead of v5.10(center). Stars indicate the latitude-altitude bins, in which trends are not statistically significant at 95% confidence level. Right panel shows the difference in ozone trends in % decade^{-1} (new minus baseline).

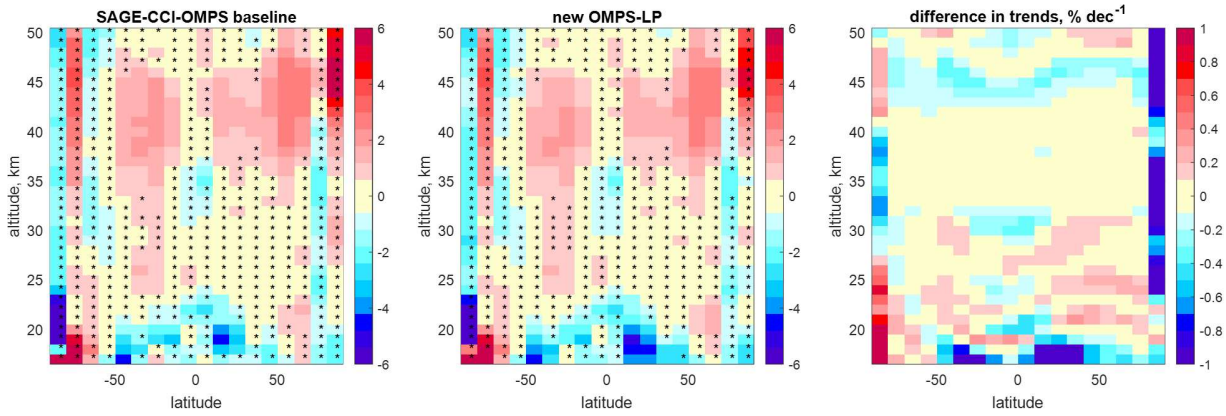

Figure S11. Ozone trends in 1997-2020 (% decade^{-1}) evaluated using the baseline SAGE-CCI-OMPS dataset (left) and the analogous merged dataset, in which the mean of OMPS USask and UBr datasets is used instead of OMPS USask(center). Stars indicate the latitude-altitude bins, in which trends are not statistically significant at 95% confidence level. Right panel shows the difference in ozone trends in % decade^{-1} (new minus baseline).

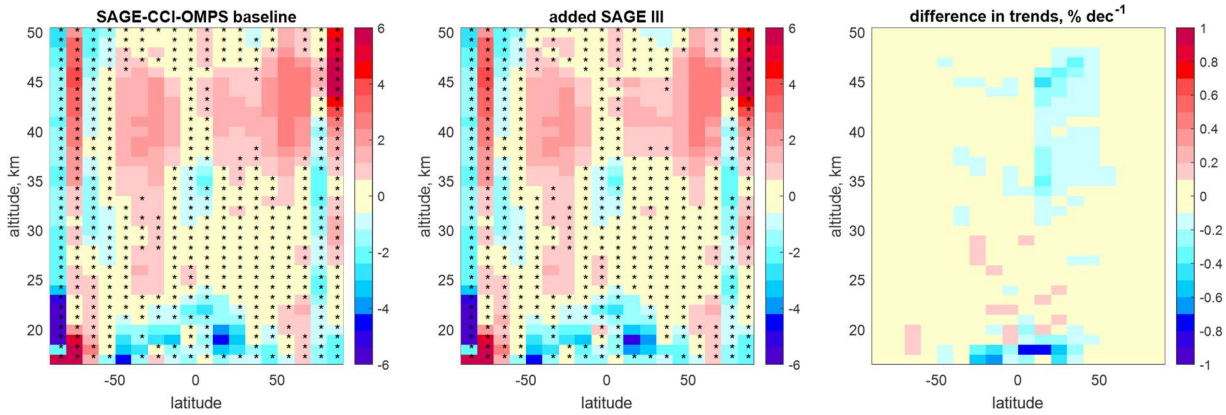

Figure S12. Ozone trends in 1997-2020 (% decade^{-1}) evaluated using the baseline SAGE-CCI-OMPS dataset (left) and the merged dataset with added SAGE III/ISS data. Stars indicate the latitude-altitude bins, in which trends are not statistically significant at 95% confidence level. Right panel shows the difference in ozone trends in % decade^{-1} (new minus baseline).

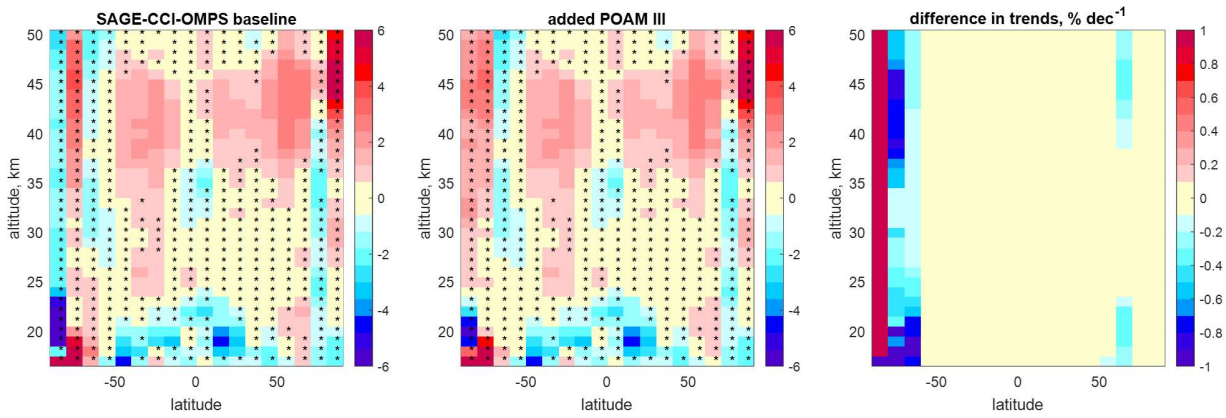

Figure S13. Ozone trends in 1997-2020 (% decade^{-1}) evaluated using the baseline SAGE-CCI-OMPS dataset (left) and the merged dataset with added POAM III data. Stars indicate the latitude-altitude bins, in which trends are not statistically significant at 95% confidence level. Right panel shows the difference in ozone trends in % decade^{-1} (new minus baseline).

3 Normalized seasonal cycle in ozone datasets

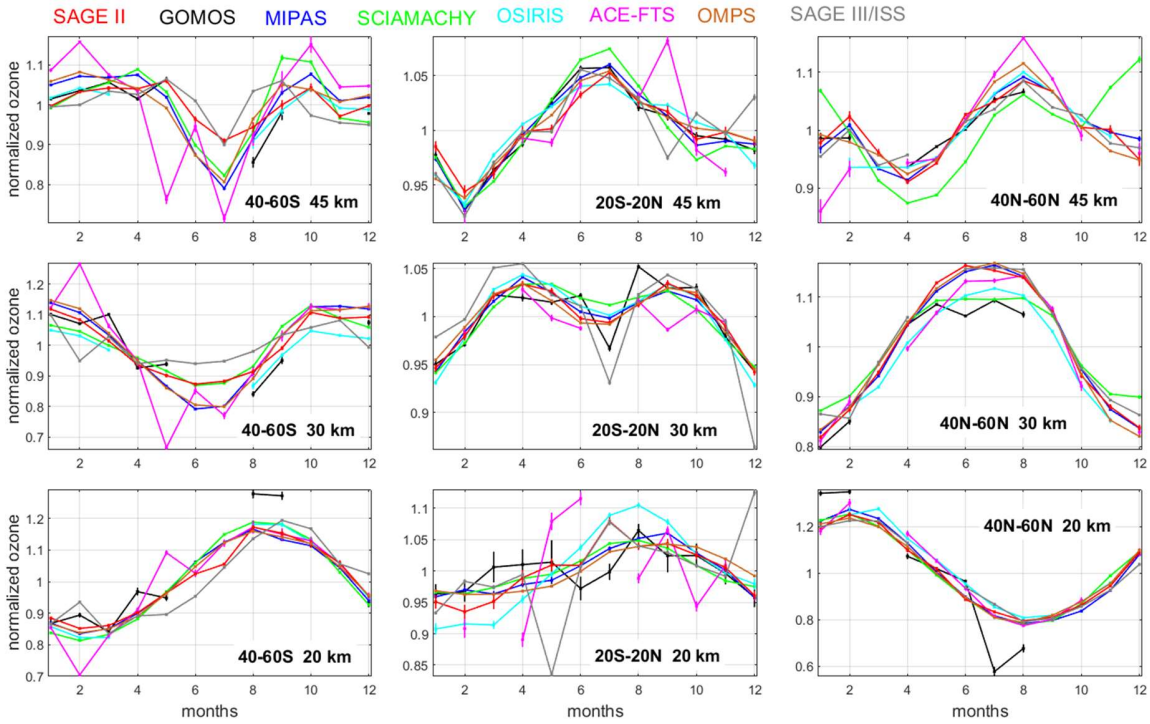

Figure S14. Ozone seasonal cycle normalized on the mean ozone value for latitudes 40–60°S (left), 20°S–20°N (center) and 40–60°N (right), for altitudes 45 km (top), 30 km center) and 20 km (bottom). Error bars indicate 2σ uncertainties.