## Supplement of

## Global tropospheric ozone trends, attributions, and radiative impacts in 1995–2017: an integrated analysis using aircraft (IAGOS) observations, ozonesonde, and multi-decadal chemical model simulations

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**Figure S1.** Comparison of spatial distributions of the total global anthropogenic NO<sub>x</sub>, CO, and NMVOC emissions (excluding aircraft emissions) trends over 1995-2014 in the CEDSv2 inventory (left) and the CEDS<sub>CMIP6</sub> inventory (right). The linear trends are estimated from the ordinary linear regression method.



Figure S2. Same as Figure 4 but for individual sites.



Figure S3. Same as Figure 5 but for 95<sup>th</sup> percentile ozone trends.



**Figure S4.** Comparison of the annual and zonal mean ozone trends in seven CMIP6 models with the GEOS-Chem model for the period 1995 to 2014. Black lines represent the 1995–2014 climatological annual mean tropopause from MERRA-2 reanalysis.



**Figure S5.** Comparison of the annual mean tropospheric ozone column (950-250 hPa) trends in seven CMIP6 models with the GEOS-Chem model for the period 1995 to 2014.





**Figure S7.** Evolution of GEOS-Chem stratospheric ozone burden and stratosphere-troposphere exchange (STE) ozone flux estimated by two methods in 1995-2017. Please see Section 3.3 in the text for more information.



**Figure S8.** Annual zonal mean values of the radiative kernel (mW m<sup>-2</sup> DU<sup>-1</sup>) for (a) SW radiative forcing and (b) LW radiative forcing from Skeie et al. (2020). The annual global mean values are shown inset.

## References

Skeie, R. B., Myhre, G., Hodnebrog, Ø., Cameron-Smith, P. J., Deushi, M., Hegglin, M. I., Horowitz, L. W., Kramer, R. J., Michou, M., Mills, M. J., Olivié, D. J. L., Connor, F. M. O., Paynter, D., Samset, B. H., Sellar, A., Shindell, D., Takemura, T., Tilmes, S., and Wu, T.: Historical total ozone radiative forcing derived from CMIP6 simulations, npj Climate and Atmospheric Science, 3, 32, 10.1038/s41612-020-00131-0, 2020.