# Supplementary Information for: Impact of future aircraft NOx emissions on atmospheric composition and climate: dependence on background conditions

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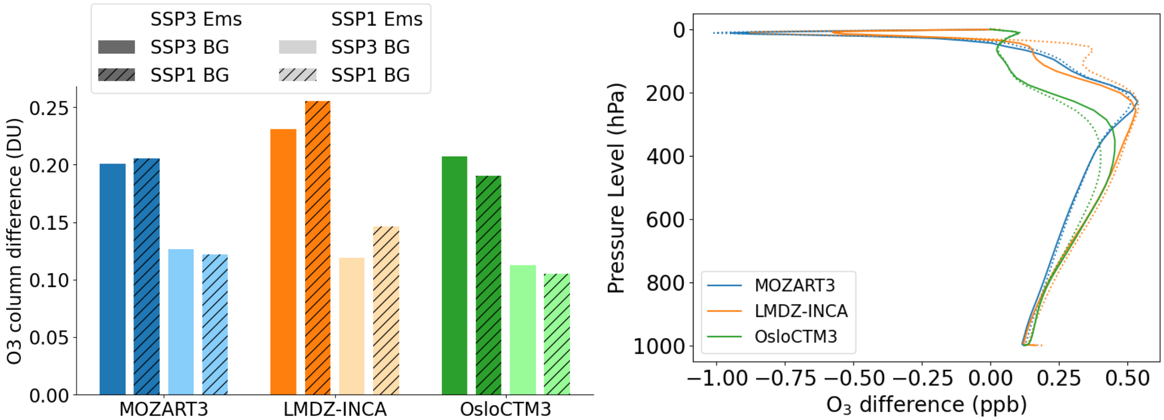


**Fig S1: Change in ozone mixing ratio for a 20% reduction in aviation $NO_x$ emissions a) ozone column difference in DU, b) vertical ozone mixing ratio distribution.**

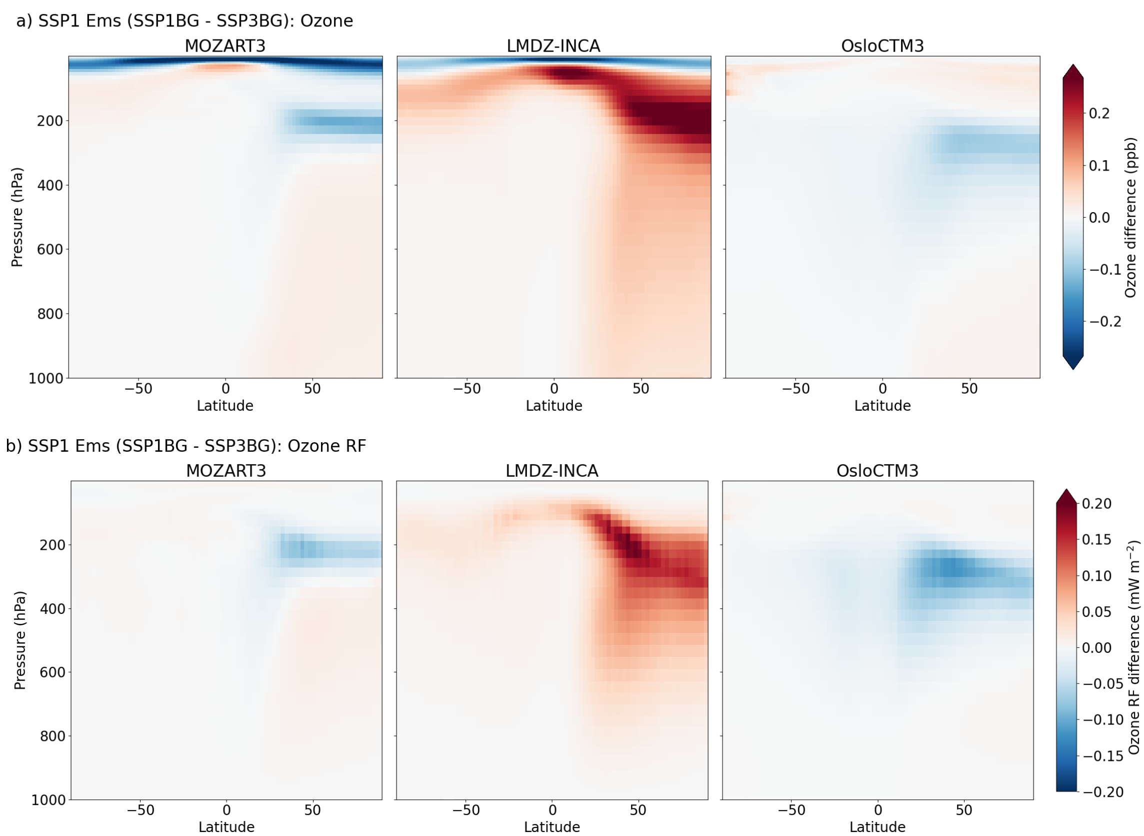


**Fig S2: Difference between (a) ozone mixing ratio and (b) ozone RF for a 20% reduction in aircraft NOx emissions, in SSP1 and SSP3 backgrounds. Positive means that there is greater ozone reduction in SSP1 than in SSP3 background. As Fig 4 but for the SSP1 emissions experiments.**

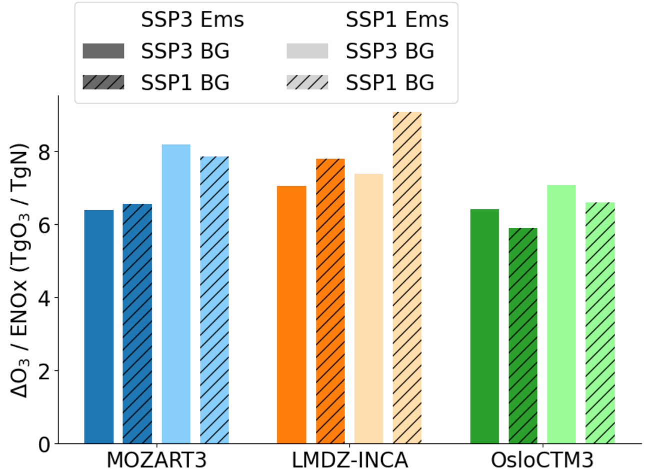


**Fig S3: Ozone sensitivity to NOx emissions (change in burden / change in NOx emissions, TgO3 / (TgN yr$^{-1}$)).**

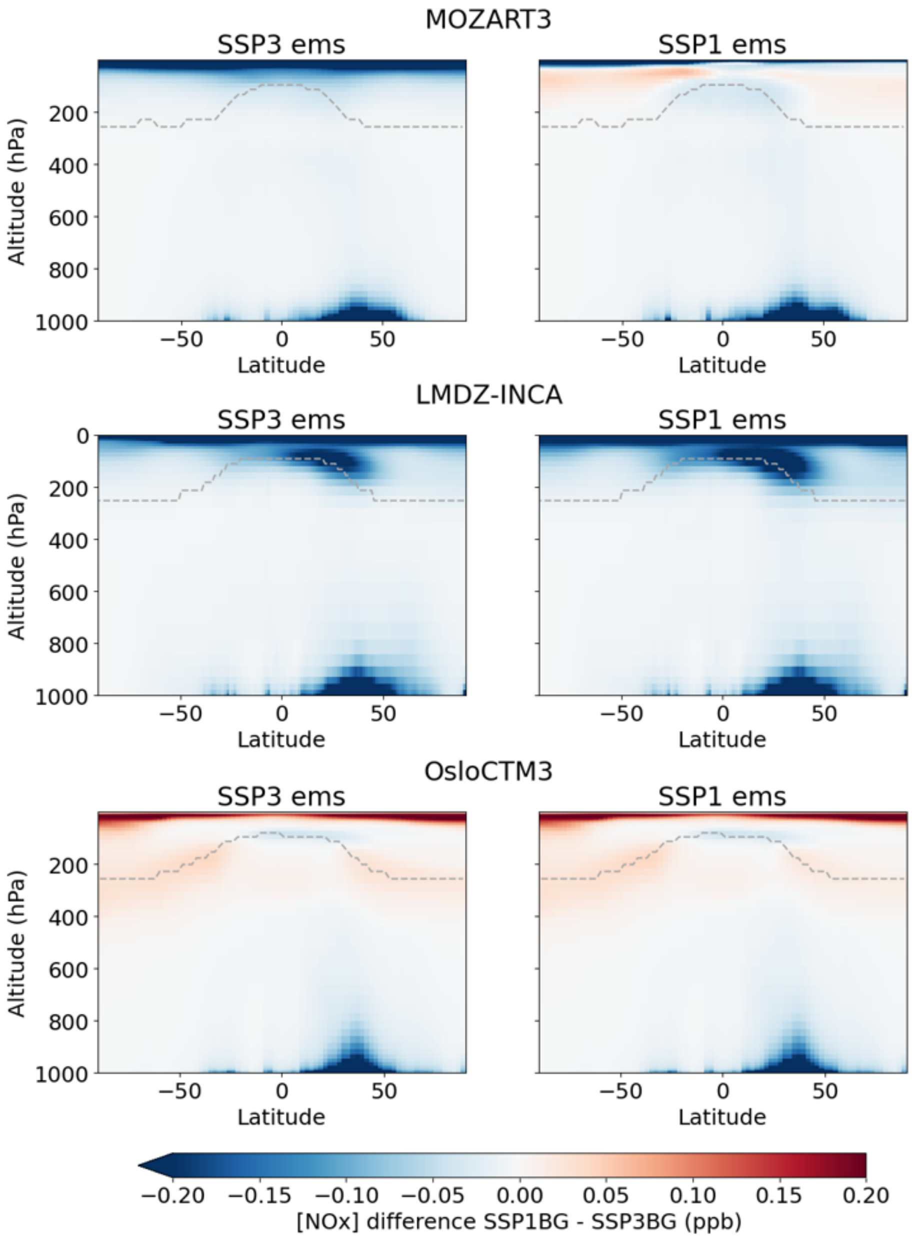


**Fig S4: NOx ($NO_2$ + NO) concentration differences between SSP3 and SSP1 background scenarios (SSP1 – SSP3), for SSP3 aviation emissions (left) and SSP1 aviation emissions (right). Blue colour corresponds to lower concentration in SSP1.**

**Table S1: Net NOx component radiative forcing (data for bar chart in Fig 5). All units are mW $m^{-2}$. Bold numbers in net NOx column show multi-model mean.**

| | Short-term $O_3$ | $CH_4$ | Long-term $O_3$ | Strat. $H_2O$ | Net NOx RF |
|---|---|---|---|---|---|
| **SSP3BG_SSP3AIR** | | | | | |
| LMDZ-INCA | 45.15 | -25.01 | -12.13 | -3.93 | 4.08 |
| MOZART3 | 41.38 | -18.77 | -9.10 | -2.95 | 10.56 |
| OsloCTM3 | 37.45 | -19.50 | -9.46 | -3.06 | 5.44 |
| | | | | | **6.70** |
| **SSP3BG_SSP1AIR** | | | | | |
| LMDZ-INCA | 23.20 | -15.51 | -7.52 | -2.43 | -2.27 |
| MOZART3 | 24.50 | -12.25 | -5.94 | -1.92 | 4.38 |
| OsloCTM3 | 20.33 | -12.26 | -5.95 | -1.92 | 0.20 |
| | | | | | **0.77** |
| **SSP1BG_SSP3AIR** | | | | | |
| LMDZ-INCA | 48.30 | -31.53 | -11.60 | -3.75 | 1.42 |
| MOZART3 | 41.27 | -21.96 | -8.08 | -2.62 | 8.62 |
| OsloCTM3 | 33.50 | -21.88 | -8.05 | -2.60 | 0.97 |
| | | | | | **3.67** |
| **SSP1BG_SSP1AIR** | | | | | |
| LMDZ-INCA | 27.40 | -21.01 | -7.73 | -2.50 | -3.84 |
| MOZART3 | 24.24 | -14.50 | -5.34 | -1.73 | 2.68 |
| OsloCTM3 | 18.36 | -13.94 | -5.13 | -1.66 | -2.38 |
| | | | | | **-1.18** |

**Table S2: Net NOx component effective radiative forcing (ERF). All units are mW m$^{-2}$. Bold numbers in net NOx column show multi-model mean. These are calculated from the RFs in Table S1 using ERF/RF ratios from Lee et al. (2021) (see caveats therein).**

| | **Short-term $O_3$** | **$CH_4$** | **Long-term $O_3$** | **Strat. $H_2O$** | **Net NOx ERF** |
|---|---|---|---|---|---|
| **SSP3BG_SSP3AIR** | | | | | |
| LMDZ-INCA | 61.86 | -29,51 | -14,32 | -4.63 | 13.40 |
| MOZART3 | 56.68 | -22,14 | -10,74 | -3.48 | 20.32 |
| OsloCTM3 | 51.31 | -23,01 | -11,16 | -3.61 | 13.53 |
| | | | | | **15.75** |
| **SSP3BG_SSP1AIR** | | | | | |
| LMDZ-INCA | 31.78 | -18,30 | -8,88 | -2.87 | 1.73 |
| MOZART3 | 33.56 | -14,45 | -7,01 | -2.27 | 9.82 |
| OsloCTM3 | 27.85 | -14,46 | -7,02 | -2.27 | 4.10 |
| | | | | | **5.22** |
| **SSP1BG_SSP3AIR** | | | | | |
| LMDZ-INCA | 66.17 | -37,20 | -13,69 | -4.43 | 10.85 |
| MOZART3 | 56.55 | -25,92 | -9,54 | -3.09 | 18.01 |
| OsloCTM3 | 45.90 | -25,81 | -9,50 | -3.07 | 7.51 |
| | | | | | **12.12** |
| **SSP1BG_SSP1AIR** | | | | | |
| LMDZ-INCA | 37.54 | -24,79 | -9,12 | -2.95 | 0.67 |
| MOZART3 | 33.21 | -17,11 | -6,30 | -2.04 | 7.77 |
| OsloCTM3 | 25.15 | -16,45 | -6,05 | -1.96 | 0.68 |
| | | | | | **3.04** |