Supplementary Material

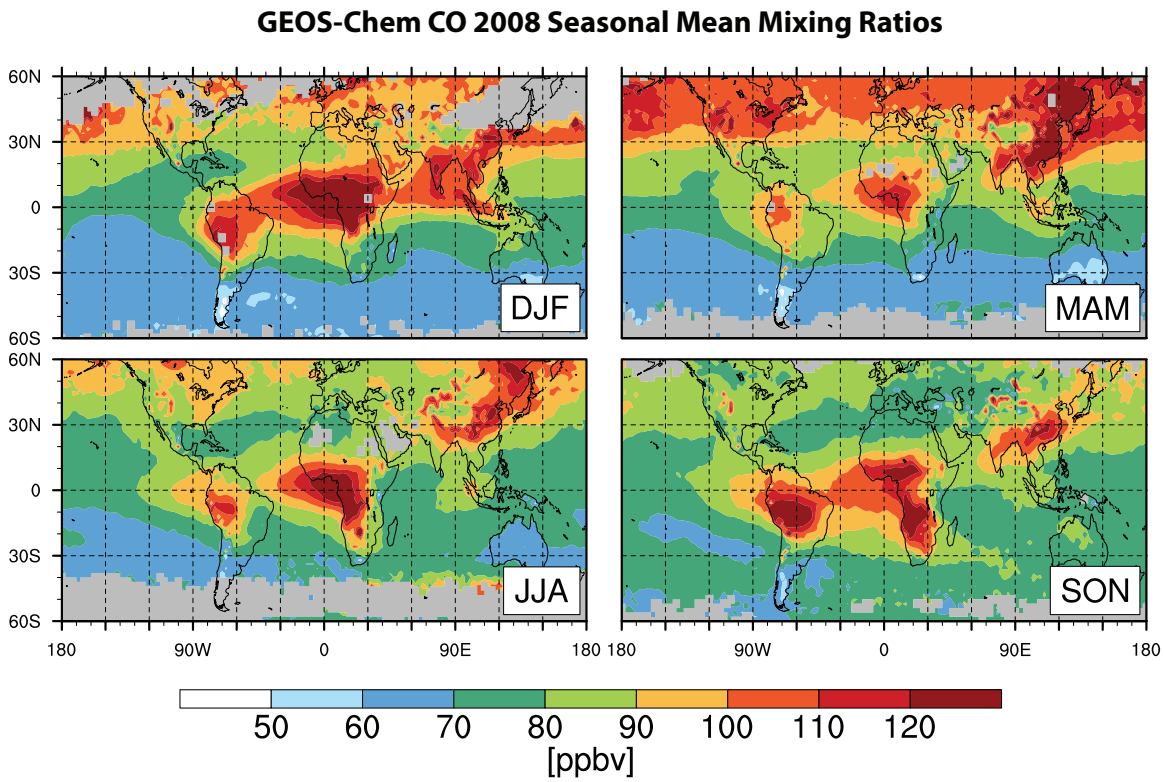

Figure S1a: Seasonal mean GEOS-Chem CO mixing ratios at 700-400 hPa for 2008. Gray indicates insufficient data (see text).

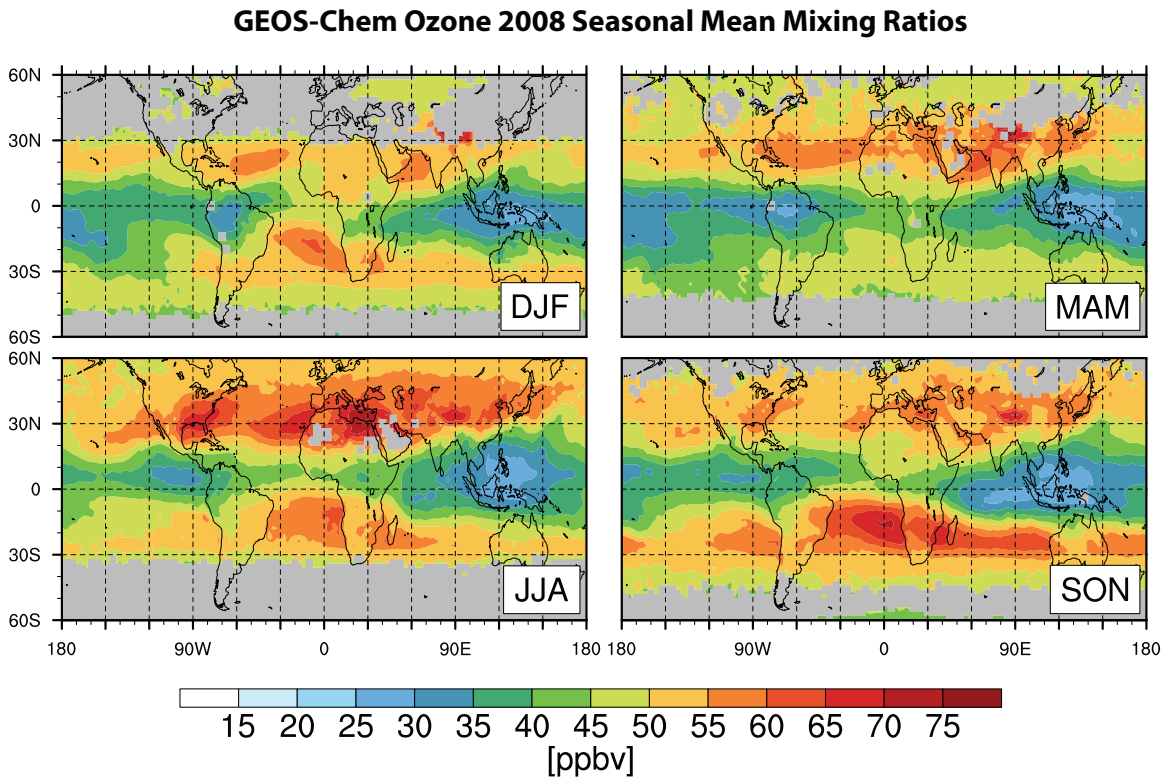

Figure S1b: Same as Figure S1a but for GEOS-Chem ozone mixing ratios at 700-400 hPa.

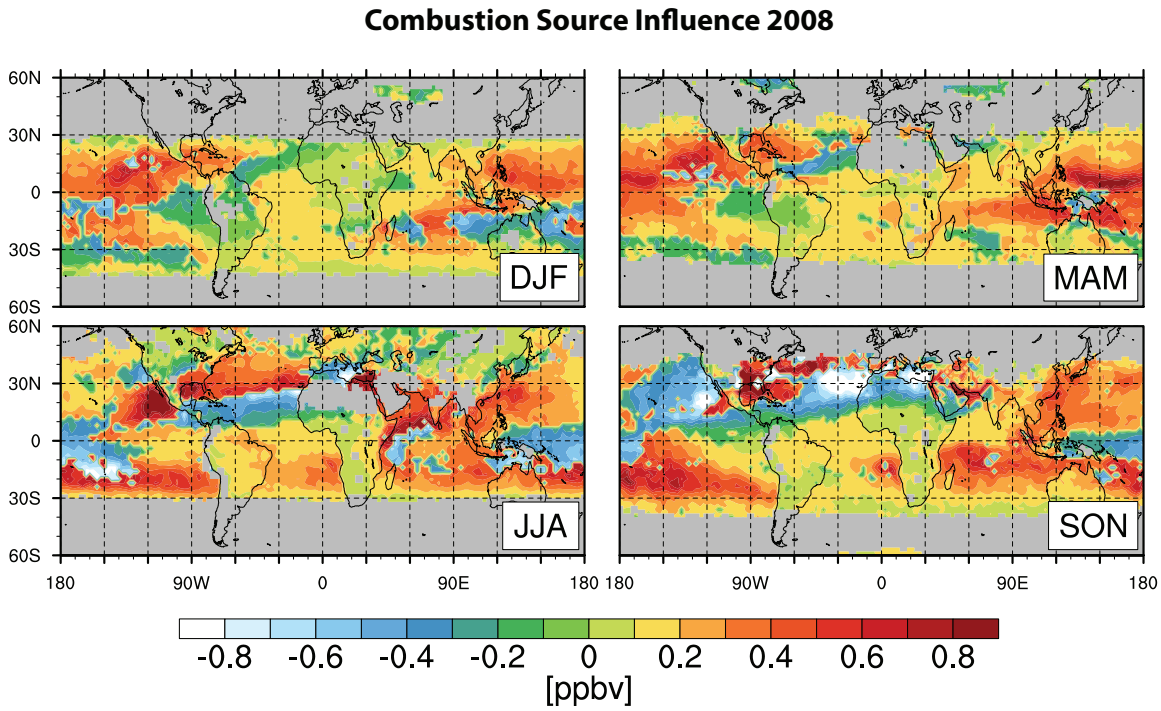

Figure S2a: $d\Delta O_3/dCO$ for a simulation without combustion sources in each season of 2008. Gray indicates insufficient data (see text).

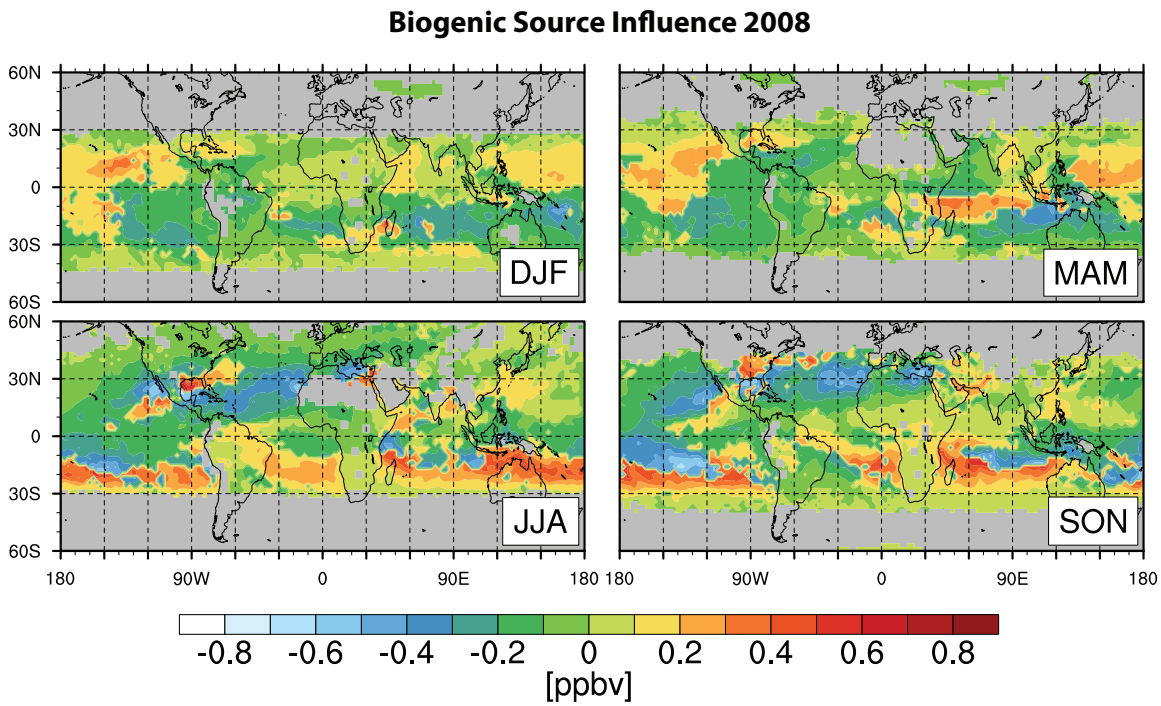

Figure S2b: Same as Figure S2a but for a simulation without biogenic sources.

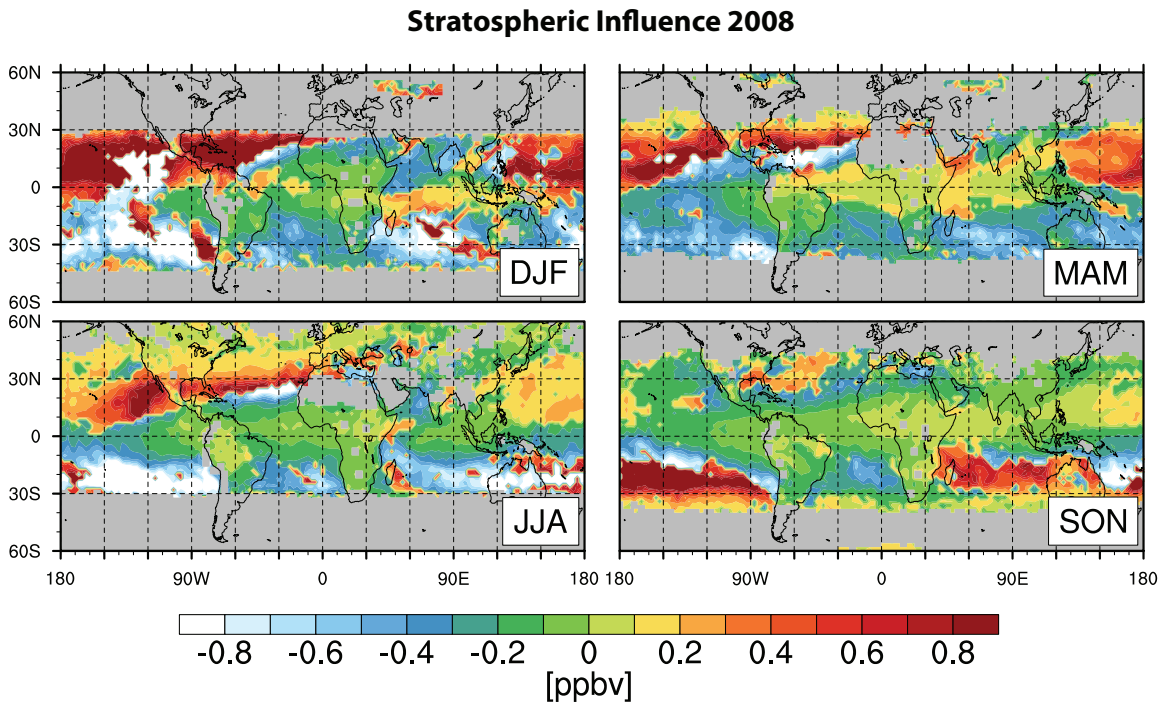

Figure S2c: Same as Figure S2a but for a simulation without stratospheric influence.

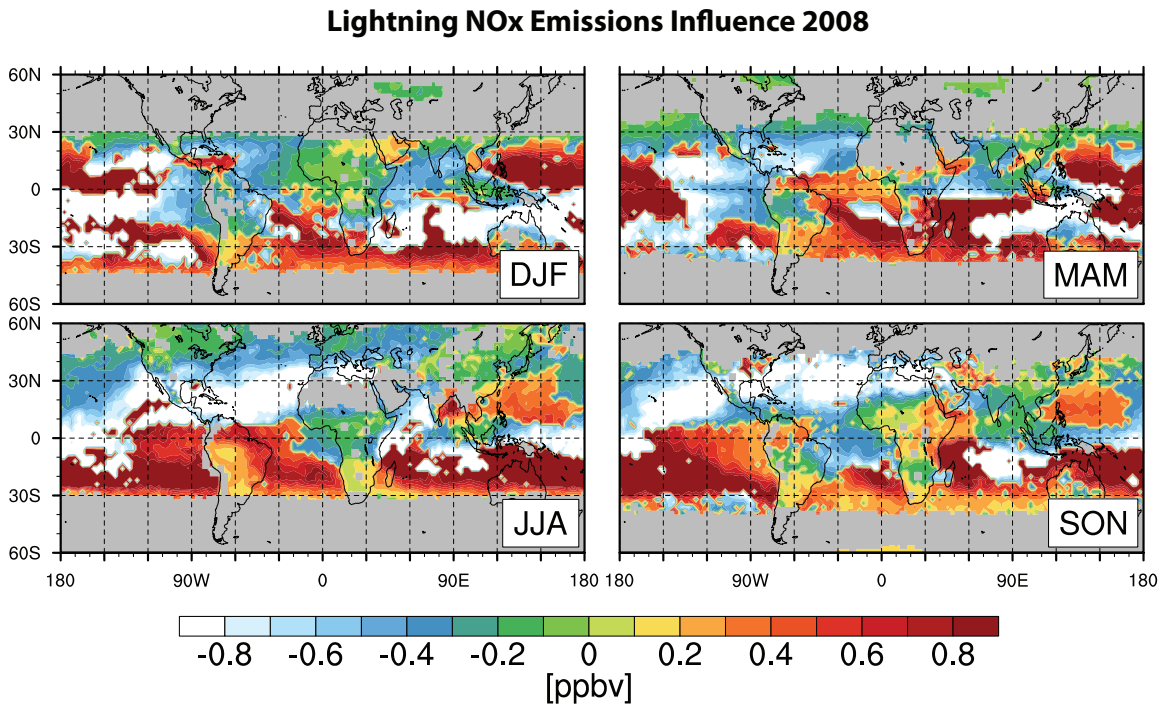

Figure S2d: Same as Figure S2a but for a simulation without lightning NO_x emissions.

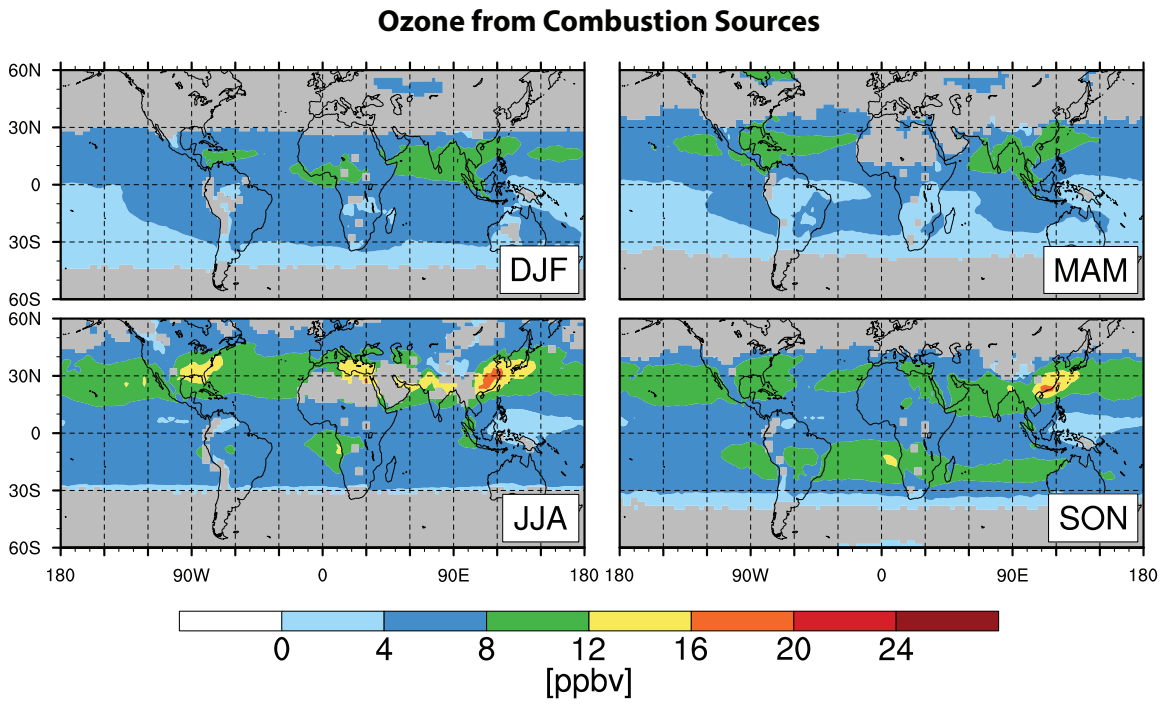

Figure S3a: Seasonal mean GEOS-Chem ozone mixing ratio enhancement from combustion sources at 700-400 hPa for 2008. The enhancement is the difference in ozone from the standard simulation and a simulation without combustion sources as in the right panel of Figure 5 (ΔO_3). Gray indicates insufficient data (see text).

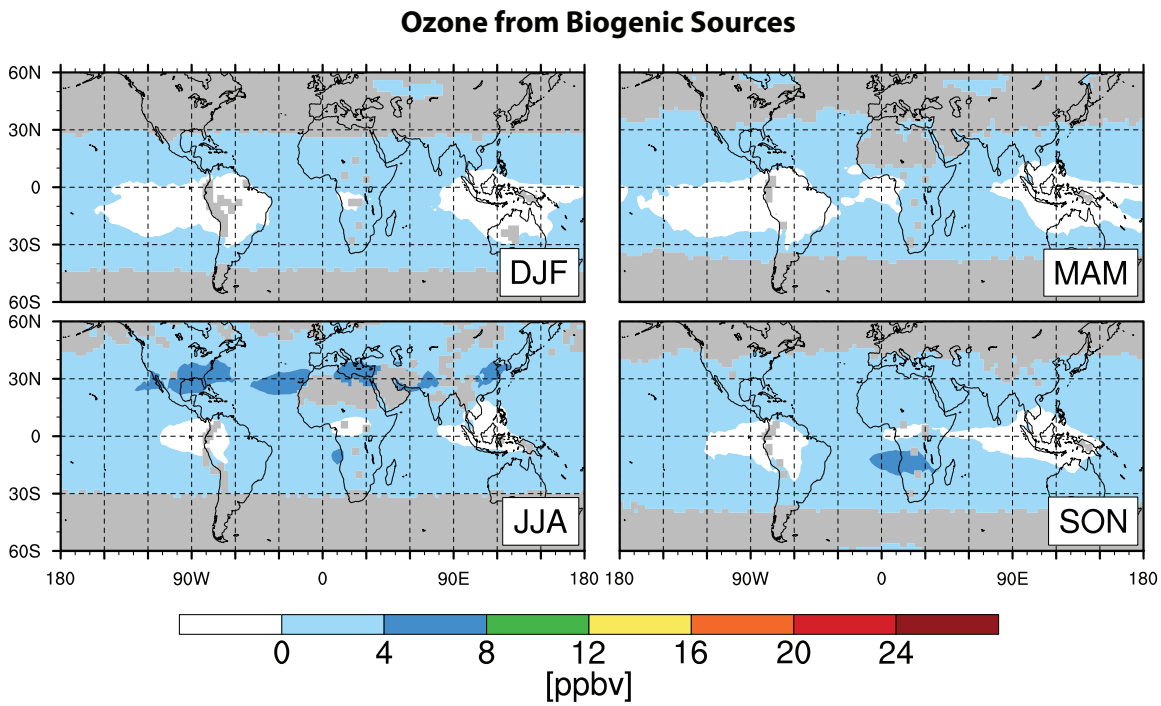

Figure S3b: Same as Figure S3a but for biogenic sources.

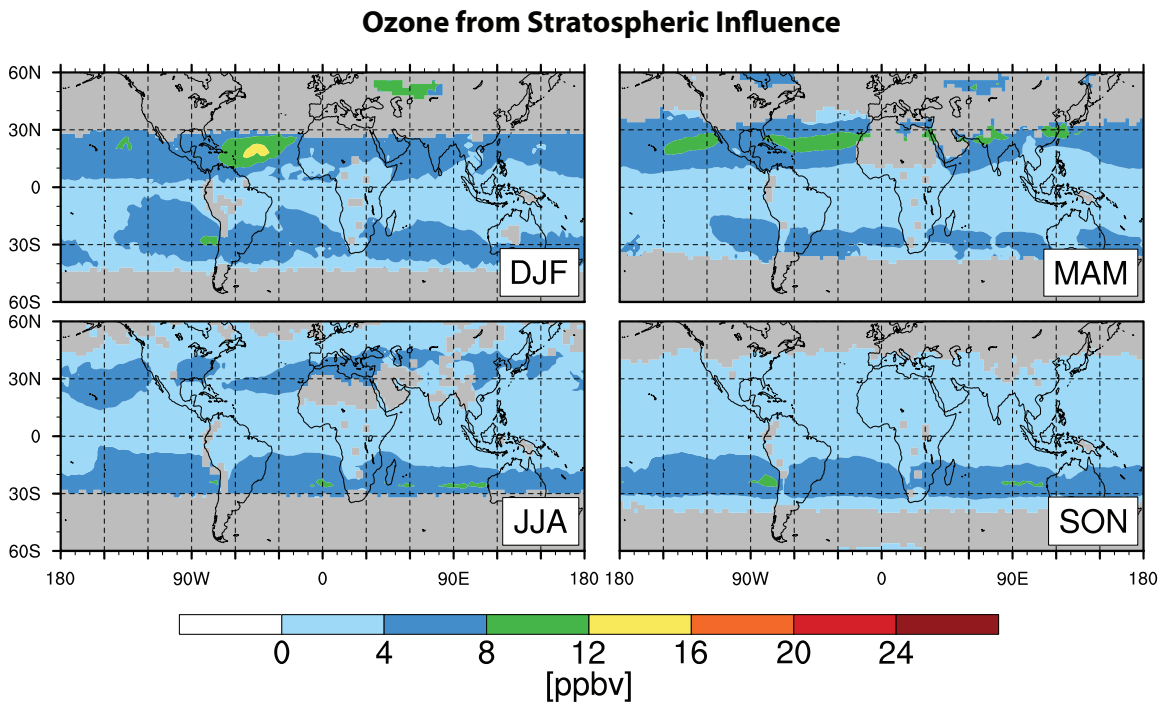

Figure S3c: Same as Figure S3a but for stratospheric influence.

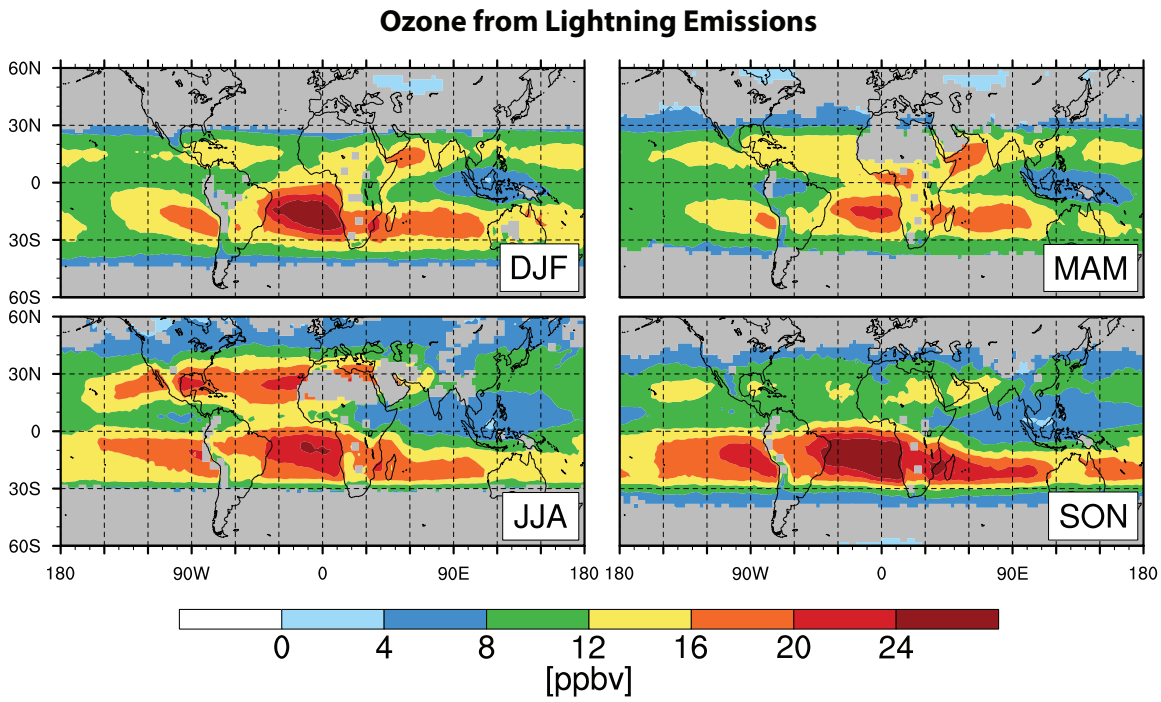

Figure S3d: Same as Figure S3a but for lightning NO_x emissions.

Station	DJF	MAM	JJA	SON
Windhoek, Namibia	0.41 (0.47)	0.21 (0.35)	0.56 (0.31)	0.76 (0.21)
	0.35 (0.40)	0.02 (0.60)	0.49 (0.29)	0.57 (0.46)
	n = 12	n = 16	n = 54	n = 22
Portland, USA			0.15 (0.38)	
			0.49 (0.30)	
			n = 11	
Dallas, USA			0.46 (0.42)	
			0.03 (0.48)	
			n = 25	
Atlanta, USA			0.33 (0.36)	
			0.84 (0.50)	
			n = 10	
Philadelphia, USA			0.49 (0.32)	
			0.23 (0.36)	
			n = 10	
London, UK			0.27 (0.35)	
			0.13 (0.57)	
			n = 12	
Frankfurt, Germany			0.39 (0.31)	
			0.27 (0.60)	
			n = 27	
Vienna, Austria			0.54 (0.25)	
			0.49 (0.56)	
			n = 28	
Tokyo, Japan			0.43 (0.58)	
			0.63 (0.62)	
			n = 13	
Hyderabad, India				0.61 (0.35)
				0.33 (0.37)
				n = 14

Table S1a: Ozone-CO correlations (and reduced major axis regression slopes in parentheses) from MOZAIC (green) and OMI/AIRS (yellow) at MOZAIC destination airports for each season of 2006. Also included below the statistics is the number of flights included in the analysis for each station and season (n). Gray indicates insufficient coincident data for statistical analysis (Section 2.5).

Station	DJF	MAM	JJA	SON
Windhoek, Namibia	0.19 (0.53)	0.20 (0.32)	0.70 (0.20)	0.28 (0.32)
	0.20 (0.60)	0.05 (0.49)	0.61 (0.19)	0.23 (0.36)
	n = 14	n = 16	n = 51	n = 13
Frankfurt, Germany			0.40 (0.24)	
			0.69 (0.51)	
			n = 19	
Hyderabad, India				0.09 (0.70)
				0.20 (0.89)
				n = 10

Table S1b: Same as Table S1a but for each season of 2008.

	a) North Atlantic JJA	b) South Atlantic DJF	c) East Pacific SON
AIRS CO	86.3	98.9	86.2
OMI ozone	59.9	50.0	50.5
GEOS-Chem standard CO	81.5	100.2	80.3
GEOS-Chem standard ozone	63.8	52.6	52.7
GEOS-Chem ozone without combustion sources	52.1	45.3	43.6
GEOS-Chem ozone without biogenic sources	59.9	51.5	50.3
GEOS-Chem ozone without stratospheric sources	58.4	48.2	50.0
GEOS-Chem ozone without lightning NO_x	49.6	30.2	42.1

Table S2: 2008 seasonal mean AIRS CO and OMI ozone mixing ratios (ppb) and the corresponding GEOS-Chem values for all simulations for each region analyzed in Section 4.2 and shown in Figure 6.