

Supplementary Material

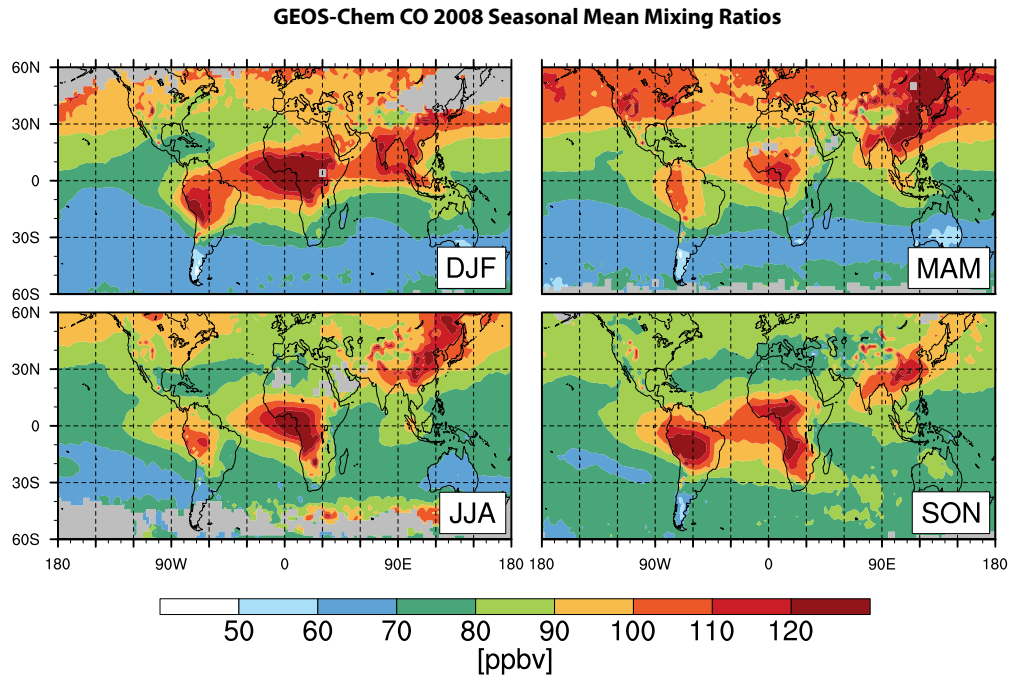


Figure S1a: Seasonal mean GEOS-Chem CO mixing ratios at 700-400 hPa for 2008. Gray indicates insufficient data (see text).

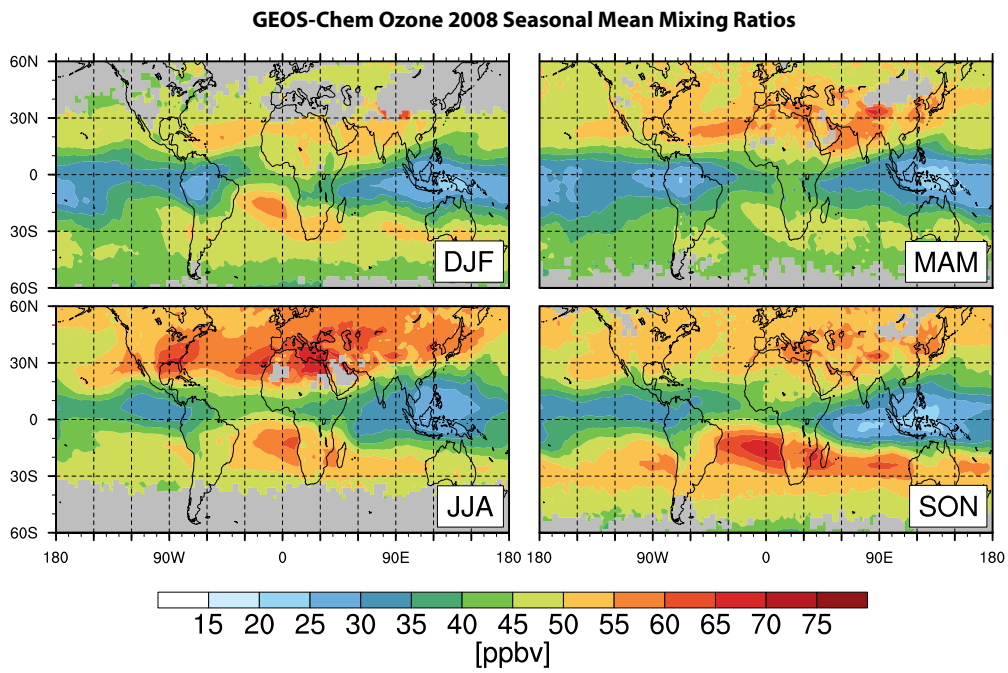


Figure S1b: Same as Figure S1a but for GEOS-Chem ozone mixing ratios at 700-400 hPa.

Combustion Source Influence 2008

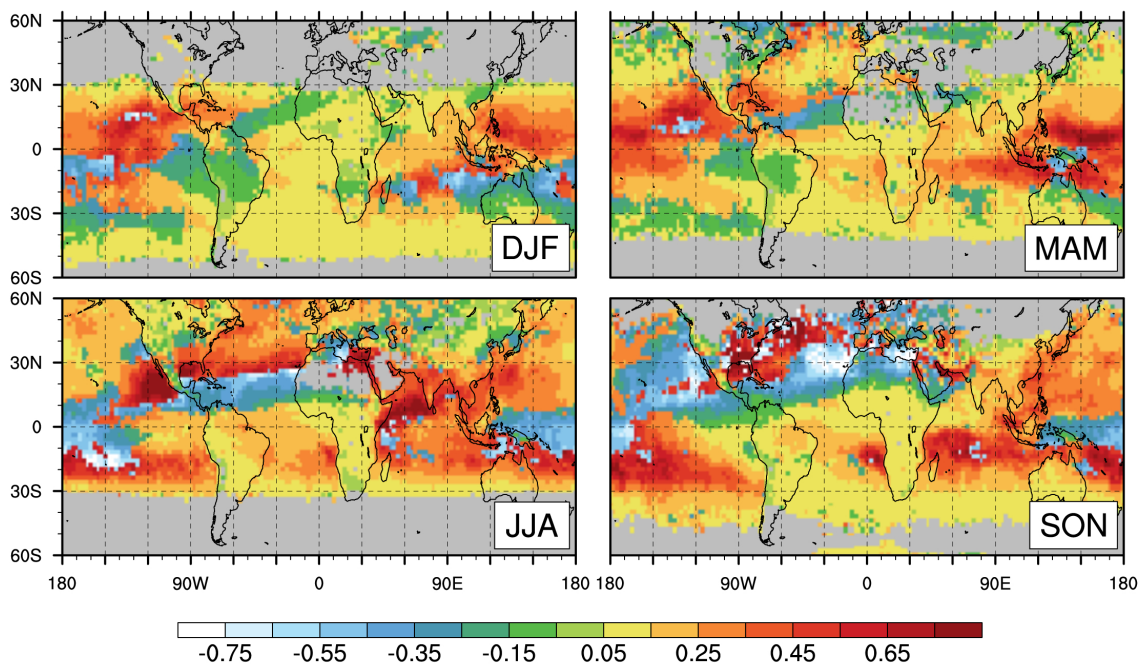


Figure S2a: $d\Delta O_3/dCO$ for a simulation without combustion sources in each season of 2008. Gray indicates insufficient data (see text).

Biogenic Source Influence 2008

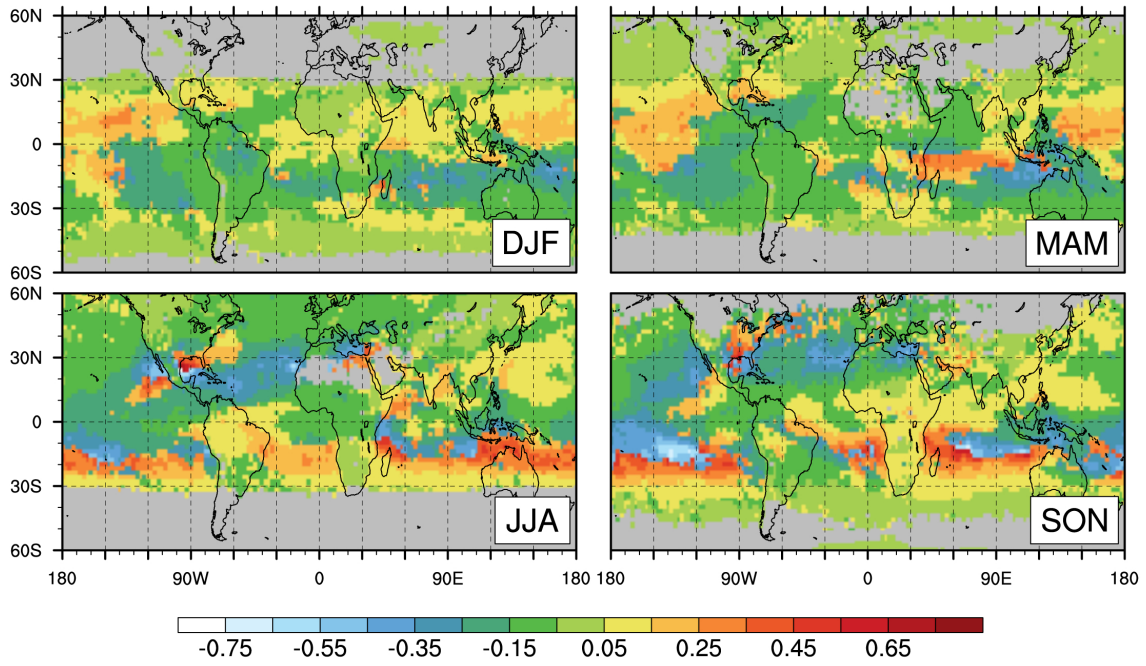


Figure S2b: Same as Figure S2a but for a simulation without biogenic sources.

Stratospheric Influence 2008

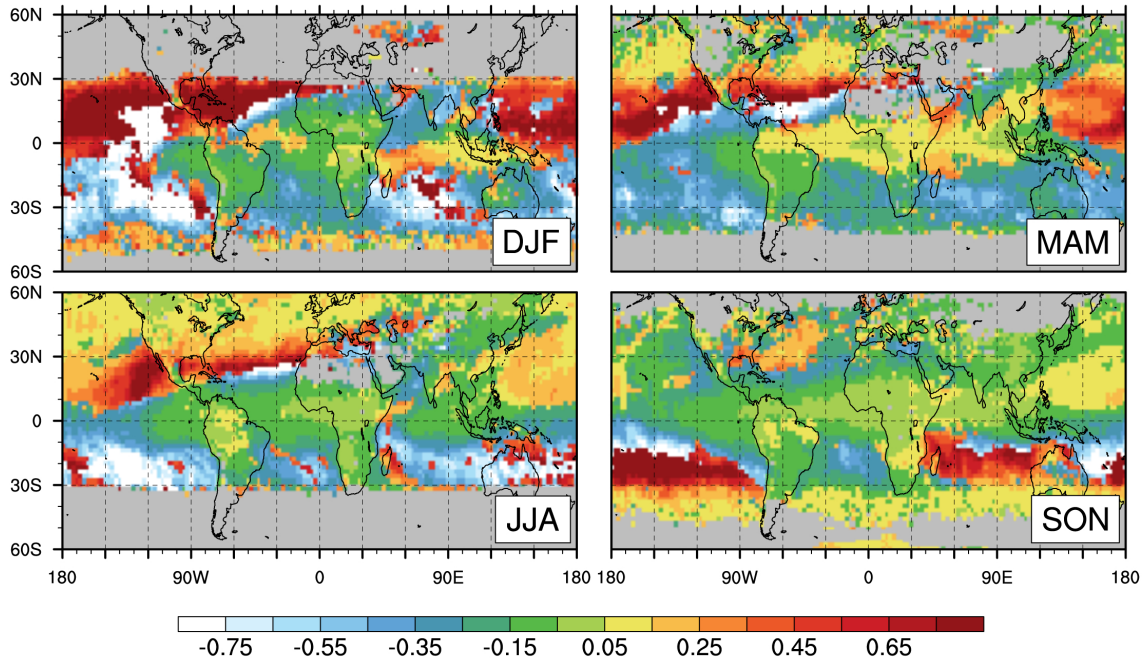


Figure S2c: Same as Figure S2a but for a simulation without stratospheric influence.

Lightning NO_x Emissions Influence 2008

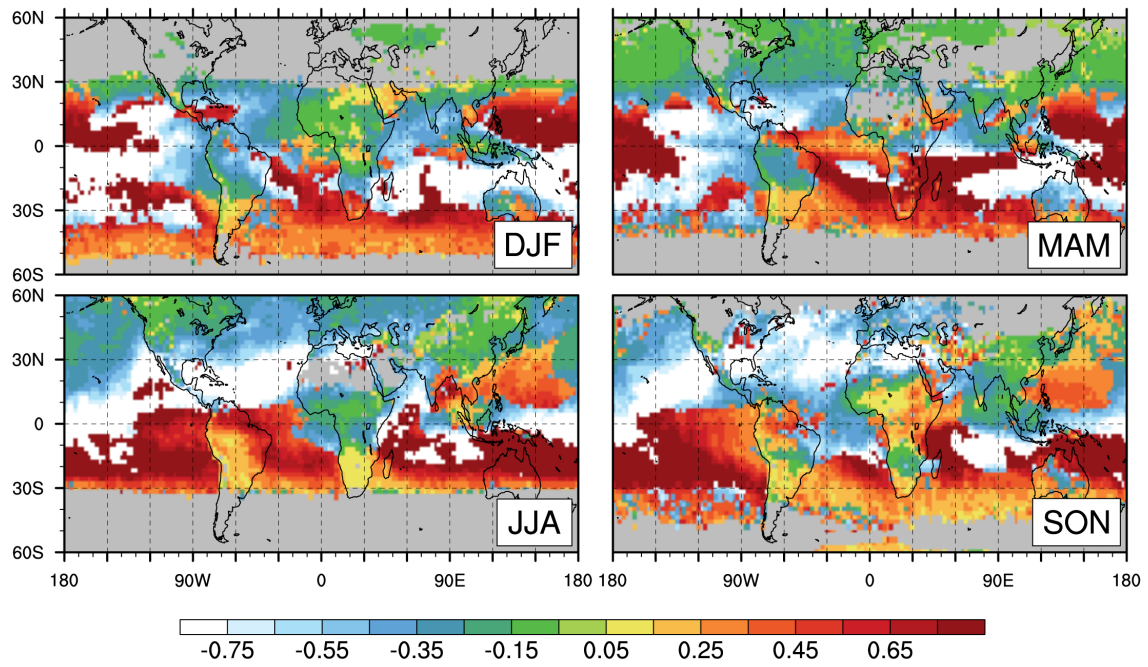


Figure S2d: Same as Figure S2a but for a simulation without lightning NO_x emissions.

Ozone from Combustion Sources

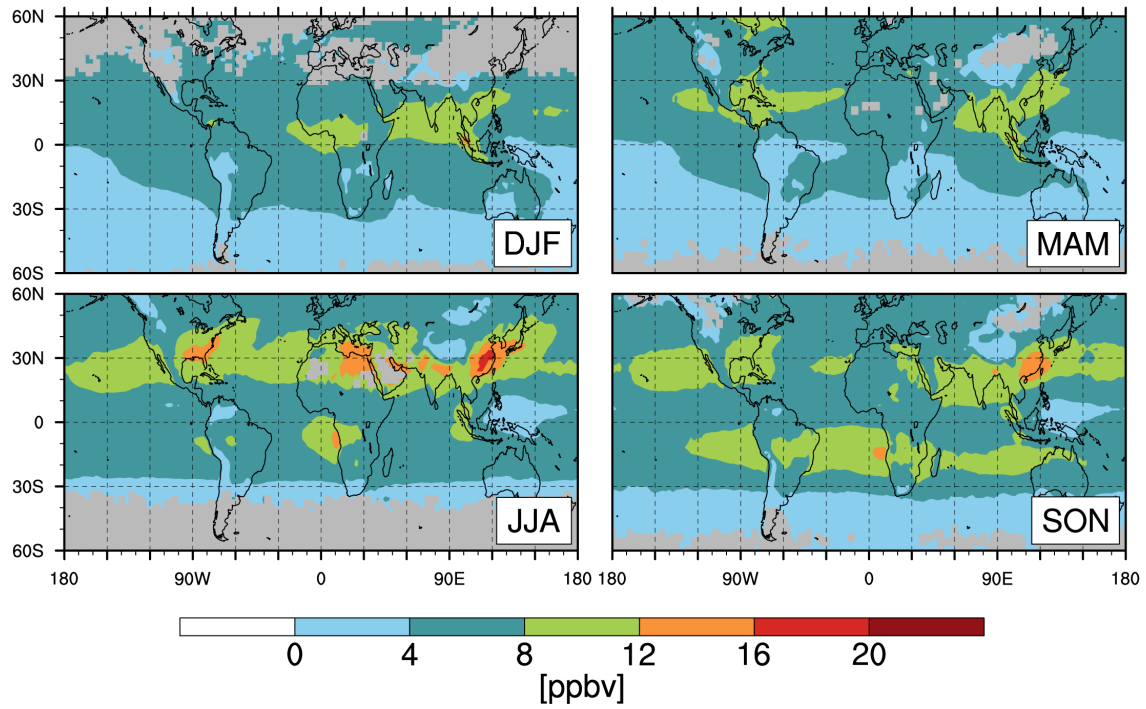


Figure S3a: Seasonal mean GEOS-Chem ozone mixing ratios enhancement from combustion sources at 700-400 hPa for 2008. The enhancement is the difference in ozone from the standard simulation and a simulation without combustion sources as in the right panel of Figure 4 (ΔO_3). Gray indicates insufficient data (see text).

Ozone from Biogenic Sources

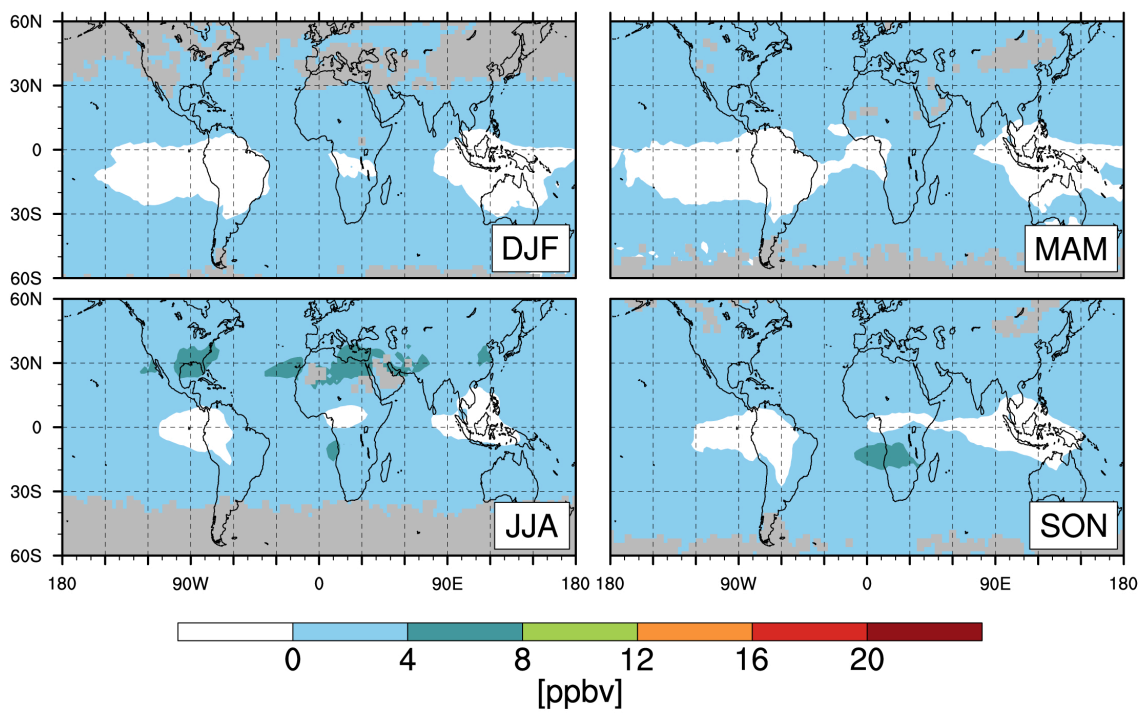


Figure S3b: Same as Figure S3a but for biogenic sources.

Ozone from Stratospheric Influence

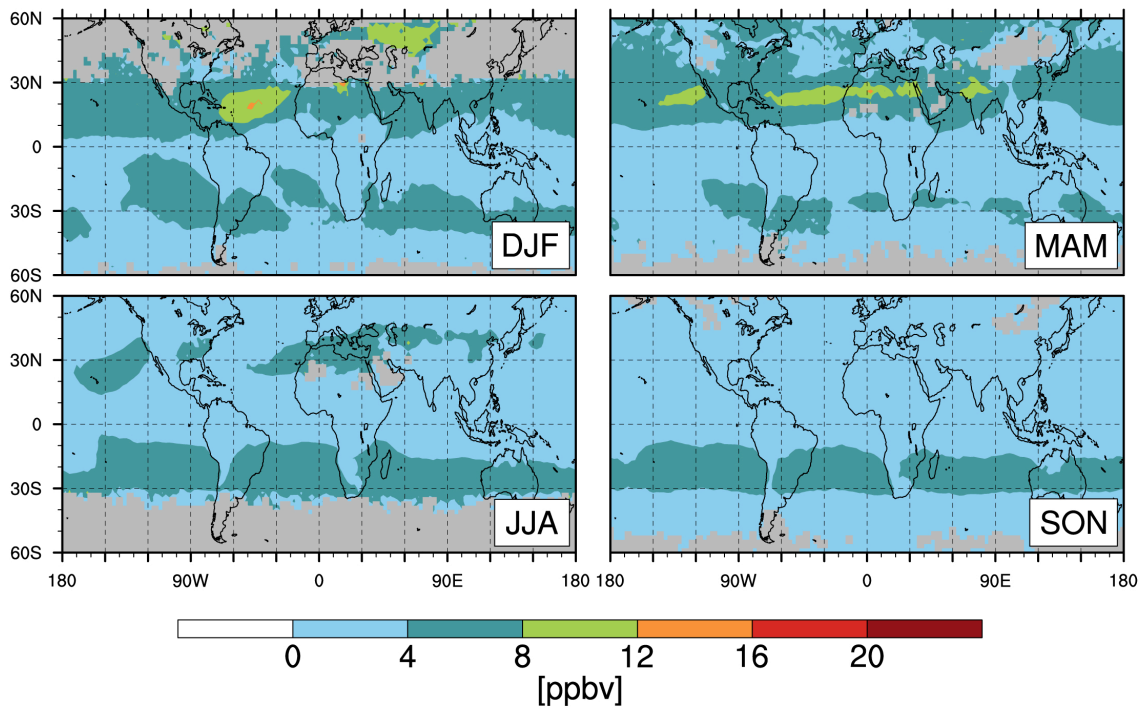


Figure S3c: Same as Figure S3a but for stratospheric influence.

Ozone from Lightning Emissions

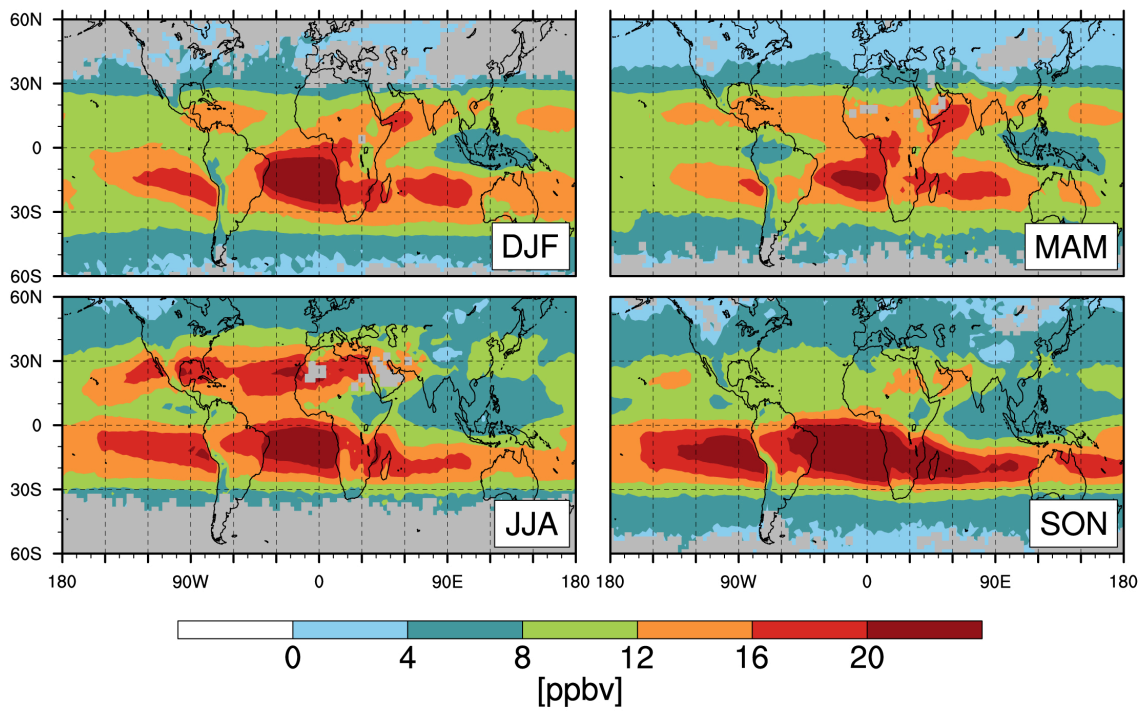


Figure S3d: Same as Figure S3a but for lightning NO_x emissions.

	a) North Atlantic JJA	b) South Atlantic DJF	c) East Pacific SON
AIRS CO	99.3	98.9	89.2
OMI ozone	58.9	50.0	52.5
GEOS-Chem standard CO	86.5	101.2	81.3
GEOS-Chem standard ozone	60.8	49.6	50.7
GEOS-Chem ozone without combustion sources	50.1	42.3	41.6
GEOS-Chem ozone without biogenic sources	56.9	48.5	48.3
GEOS-Chem ozone without stratospheric sources	57.4	46.2	48.0
GEOS-Chem ozone without lightning NO _x	47.6	25.2	41.1

Table S1: 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 5.