Supplementary Information for "Co-emission of volcanic sulfur and halogens amplifies volcanic effective radiative forcing"

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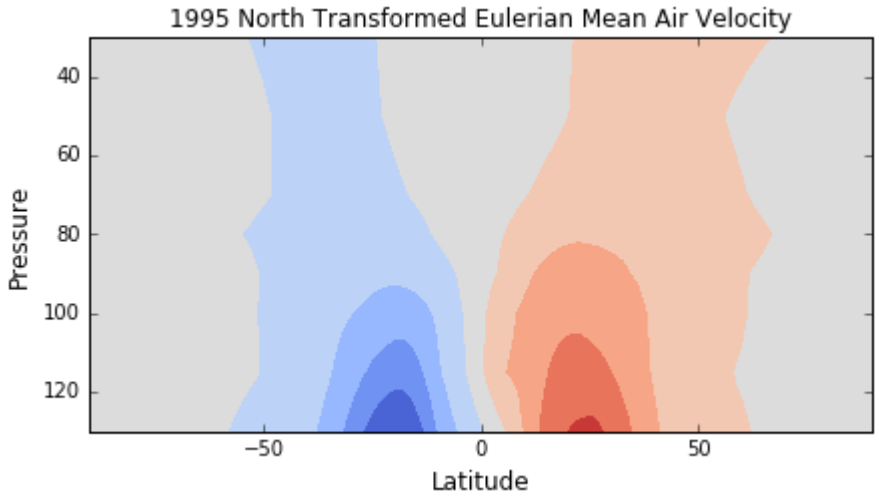


Figure S1. Northward transformed eulerian mean air velocity (ms^{-1}) for the control simulation, averaged over the full 20 years. The poleward velocity reduces with altitude.

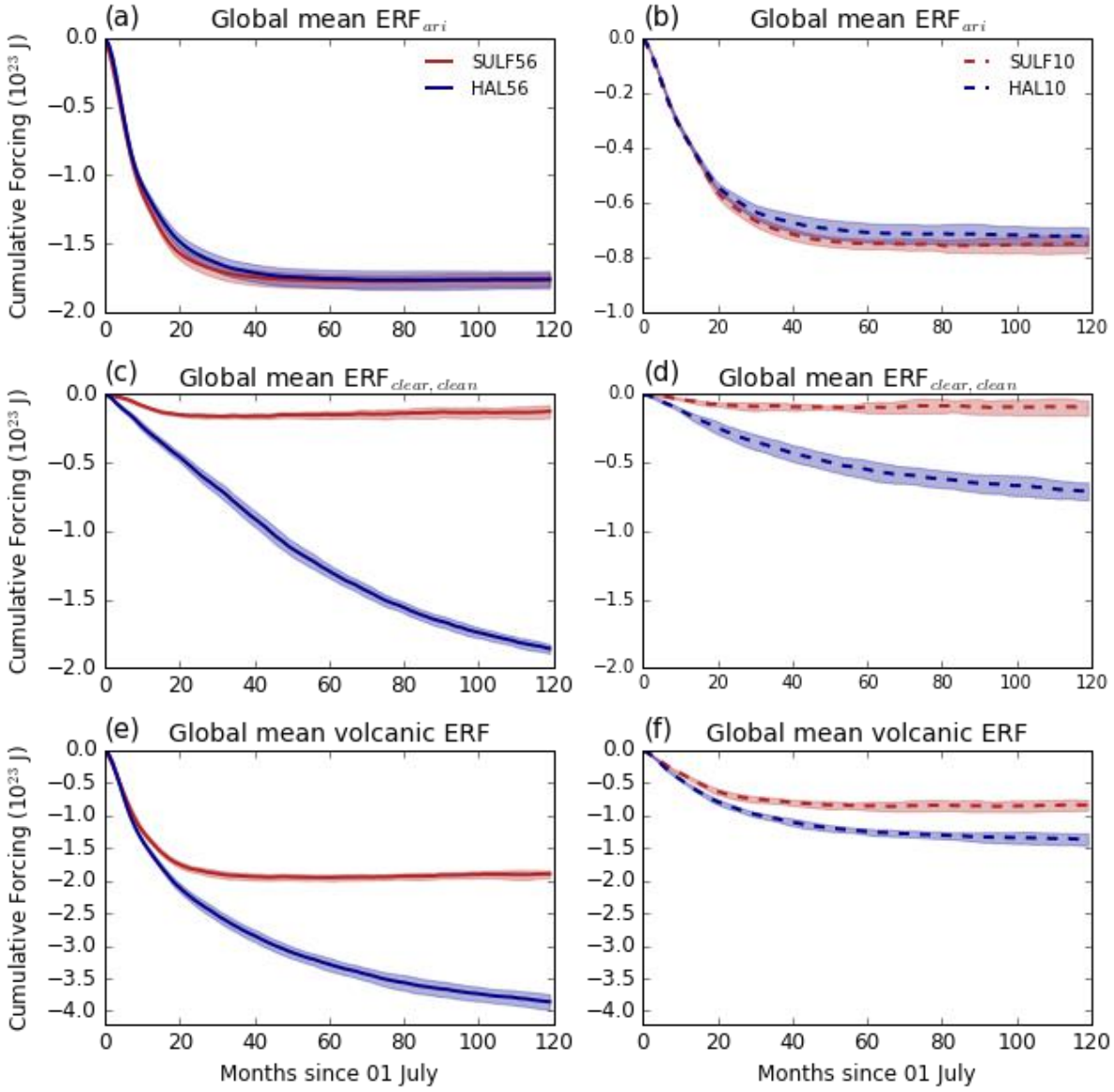
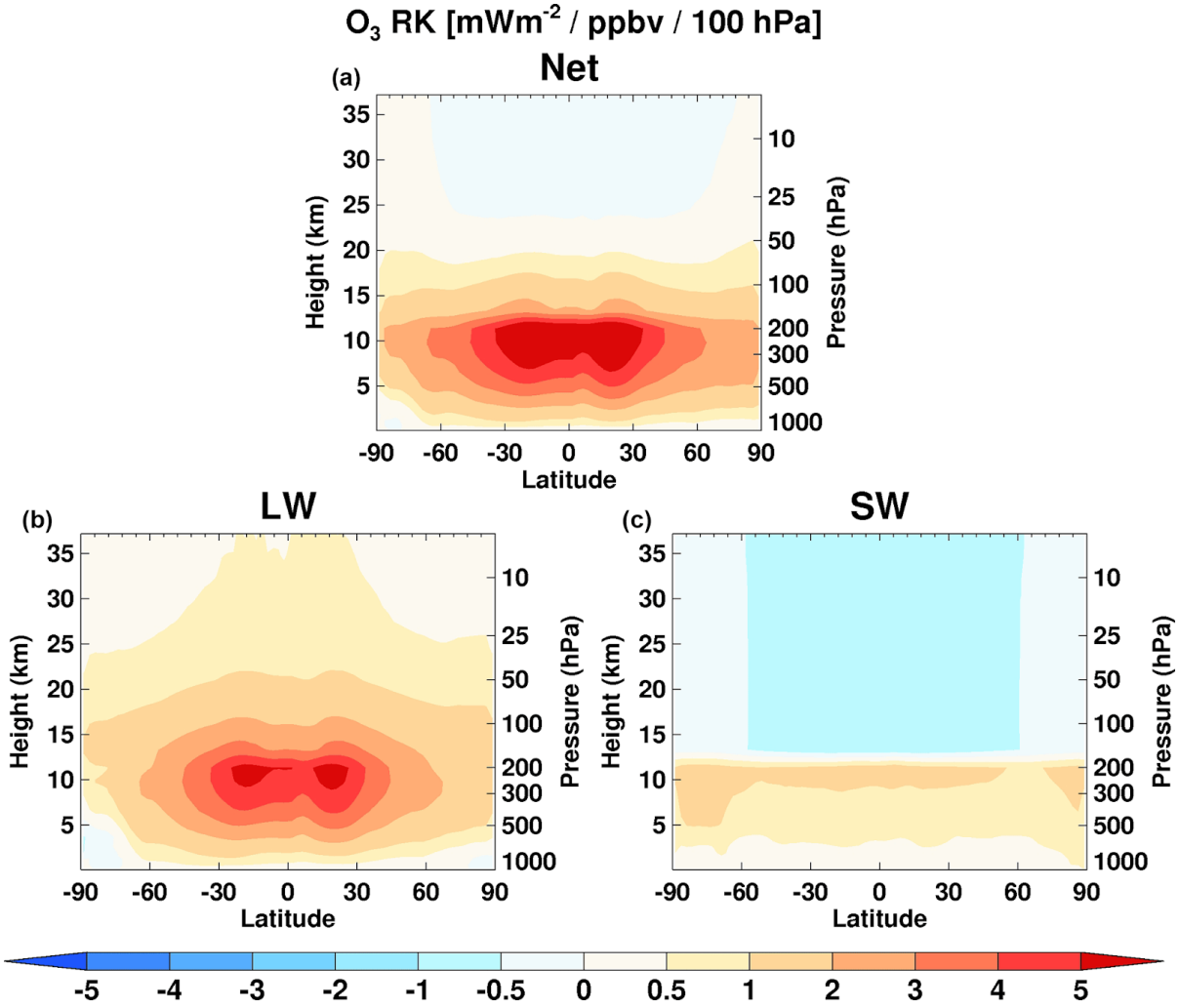


Figure S2. Cumulative global mean TOA ERF_{ari} in SULF56 & HAL56 (a) and SULF10 & HAL10 (b), $ERF_{clear,clean}$ in SULF56 & HAL56 (c) and SULF10 & HAL10 (d), Volcanic ERF in SULF56 & HAL56 (e) and SULF10 & HAL10 (f),



25 **Figure S3.** Annual zonal mean whole atmosphere ozone radiative kernel from (Rap et al., 2015) under all-sky conditions for (a) net (LW + SW), (b) LW, and (c) SW components. Figure taken from Iglesias-Suarez et al. (2018).

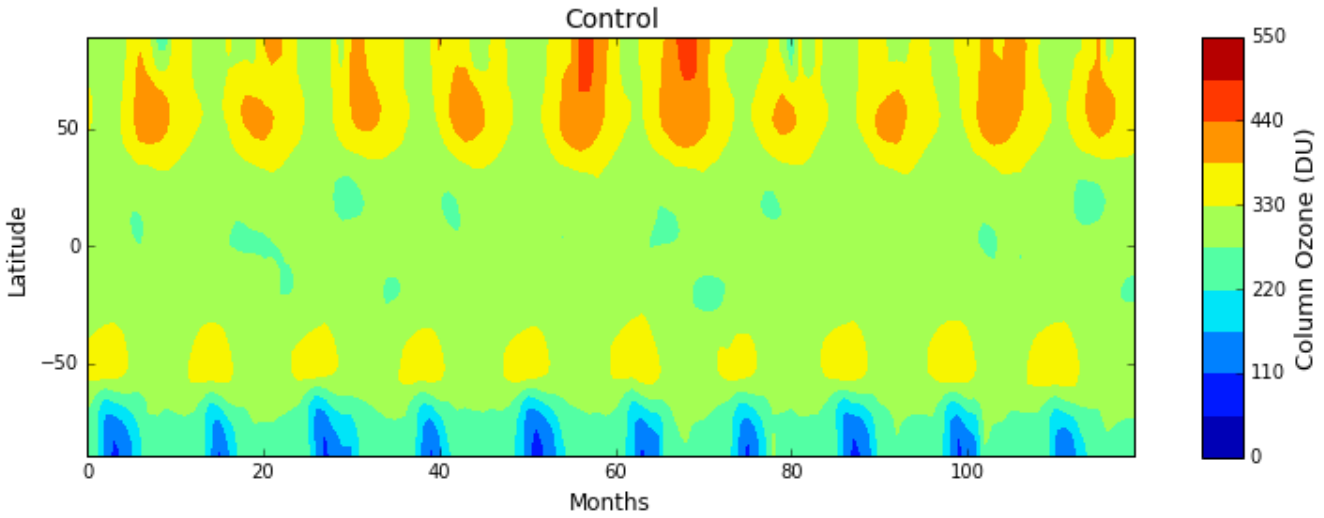


Figure S4 Zonal mean column ozone in the control simulation. Ozone hole conditions are simulated when the column ozone < 220 DU.