Supporting Information for "Comparing the importance of iodine and isoprene in tropospheric photochemistry"

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Introduction This supplemental material covers additional figures and description of results for the paper Comparing the importance of iodine and isoprene in tropospheric photochemistry.

Text S1. - Additional plots for tropospheric changes

Iodine has a negligible impact on tropospheric CO concentration (figure S1). Iodine's impacts CO via CO lifetime, as iodine has a negligible impact on tropospheric OH, a negligible change in CO is also the result. Isoprene significantly increases global CO concentrations, and as with OH and O_3, the increase is more pronounced in the southern

hemisphere. The increase in CO concentration from isoprene emissions is due to the oxidation and subsequent reactions of isoprene.

Isoprene increases NO_x in remote regions and decreases NO_x over tropical regions (figure S2). This is through conversion of NO_x into NO_y (figure S3) in the tropical locations which is then transported and subsequently reacts in remote regions, increasing NO_x there. Increase in NO_x and NO_y from iodine emissions are likely a result of nitrogenated iodine compounds. For figure S3 NO_y was defined as the sum of species (with GEOS-Chem species name where needed) NO, NO_2, NO_3, HNO_2 HNO_3, HNO_4, $BrNO_2$, $BrNO_3$, $ClNO_2$, $ClNO_3$, ethanal nitrate (ETHLN), ethyl nitrate (ETNO3), monoterpene organic nitrate (HONIT), isoprene nitrates and dinitrates (ICN, IDN, IHN1, IHN2, IHN3, IHN4, INPB, INPD, ITCN, ITHN), hydroxynitrate from methacrolein (MCRHN, MCRHNB), methyl nitrate (MENO3), organic nitrate from monoterpene (MONITA, MONITS, MONITU), peroxymethacroyl nitrate (MPAN), methyl peroxy nitrate (MPN), hydroxynitrate from methyl vinyl ketone (MVKN), N_2O_5, n-propyl nitrte (NPRNO3), peroxyacetylnitrate (PAN), peroxypropionylnitrate (PPN), propanone nitrate (PROPNN) and alkylnitrates greater than or equal to C4 (R4N2).

Text S2. - Seasonal plots for ratio of iodine and isoprene changes to surface ozone

Figures S4 - S7 show the seasonal variation in each region and globally from figure **??**. These are northern hemisphere seasons, with winter defined as December, January and

February. Spring is defined as March, April and May. Summer is June, July and August. Autumn is September, October, November.

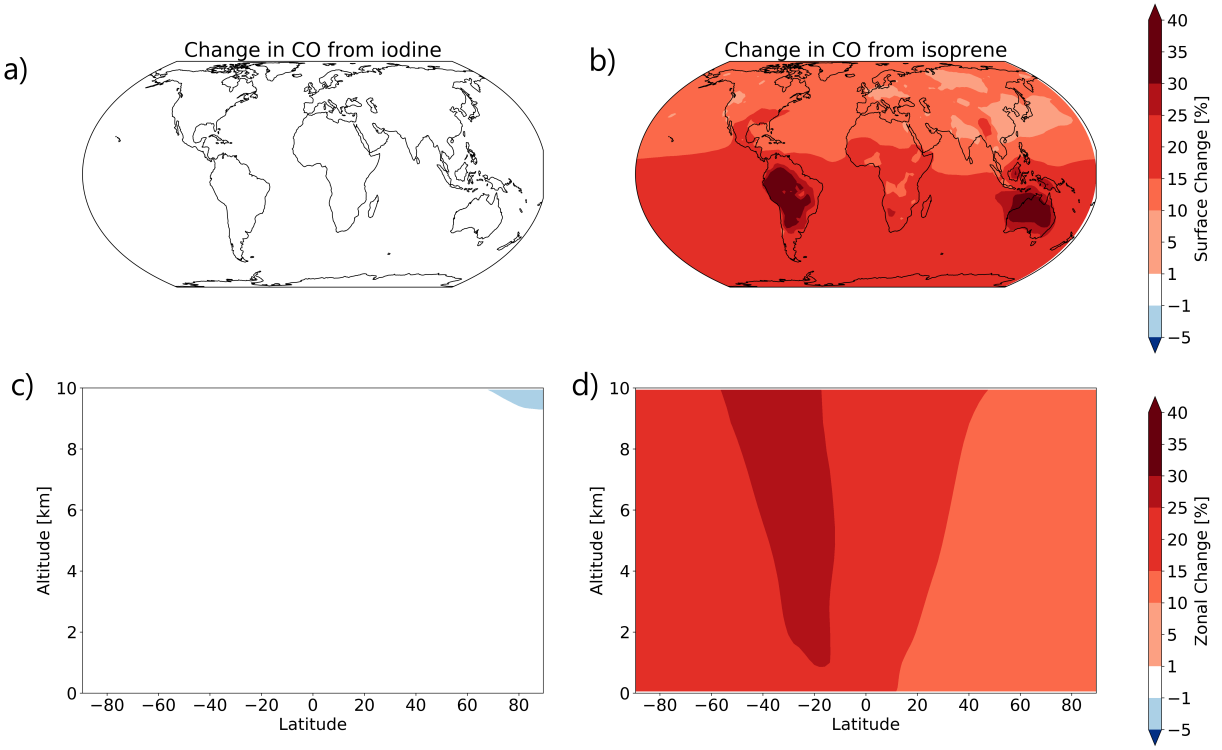

Figure S1. Annual average percentage change in surface [a) and b)] and zonal [c) and d)] CO from iodine emissions [a) and c)] and isoprene emissions [b) and d)].

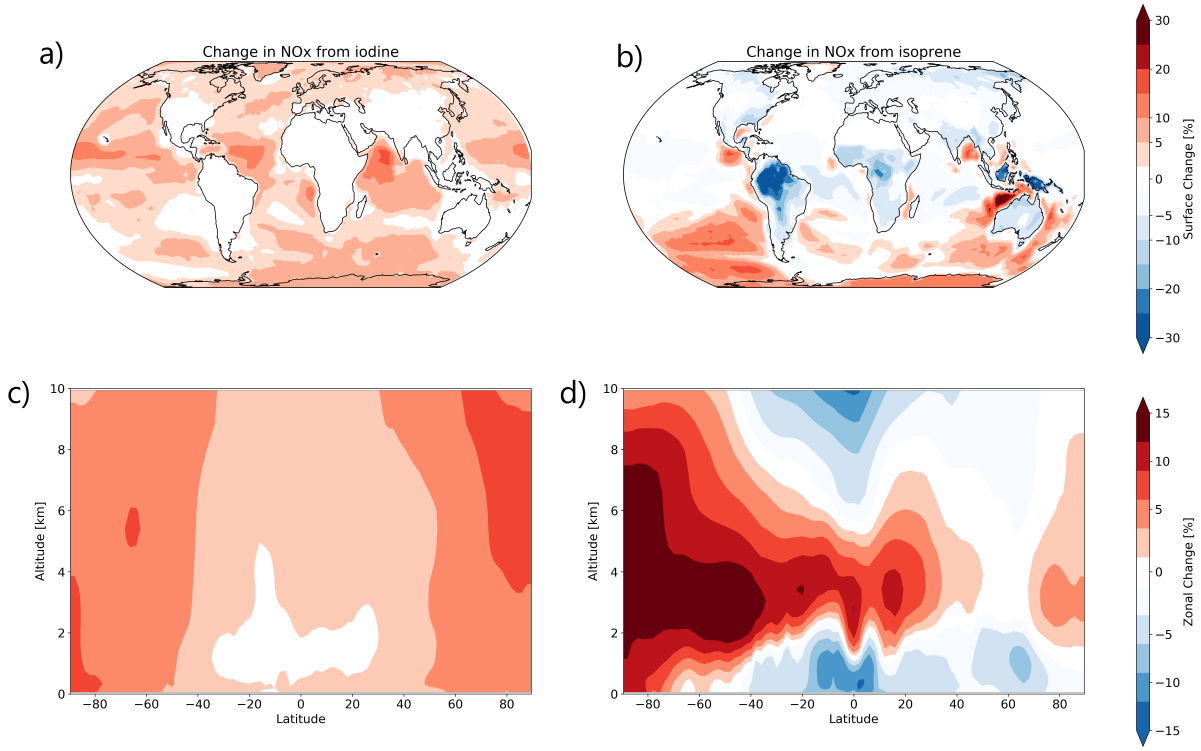

Figure S2. Annual average percentage change in surface [a) and b)] and zonal [c) and d)] NO_x ($NO + NO_2$) from iodine emissions [a) and c)] and isoprene emissions [b) and d)].

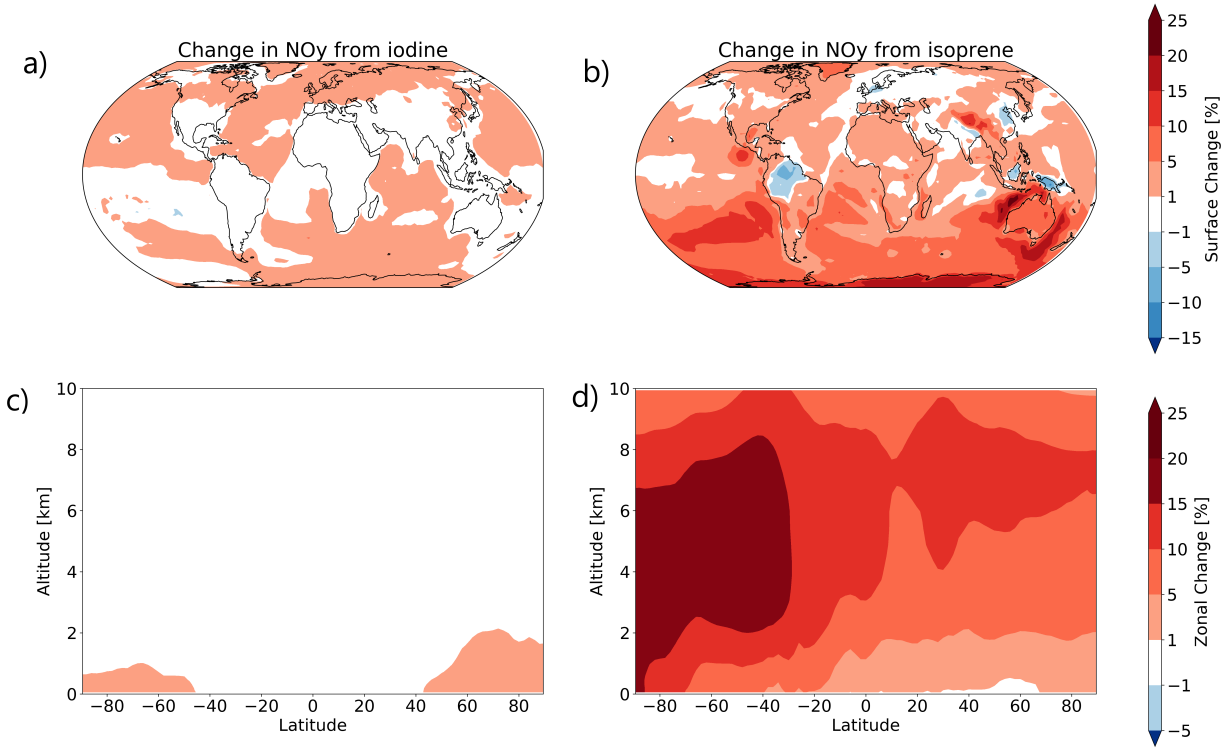

Figure S3. Annual average percentage change in surface [a) and b)] and zonal [c) and d)] NO_y from iodine emissions [a) and c)] and isoprene emissions [b) and d)].

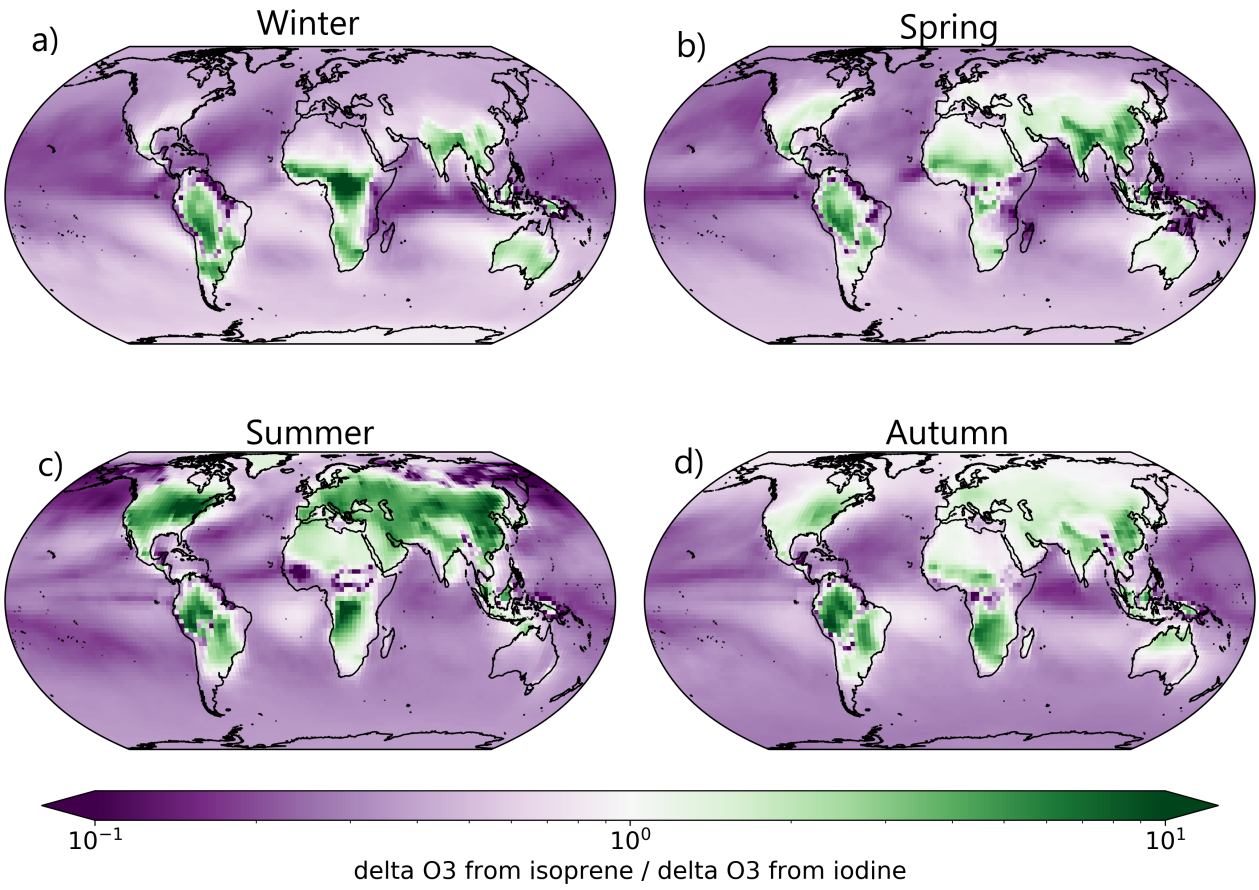

Figure S4. Global seasonal surface ratio of magnitude of change in O_3 from isoprene to magnitude of change in O_3 from iodine. Red contour lines represent value of the ratio as 1 (iodine and isoprene have the same magnitude impact on surface O_3)

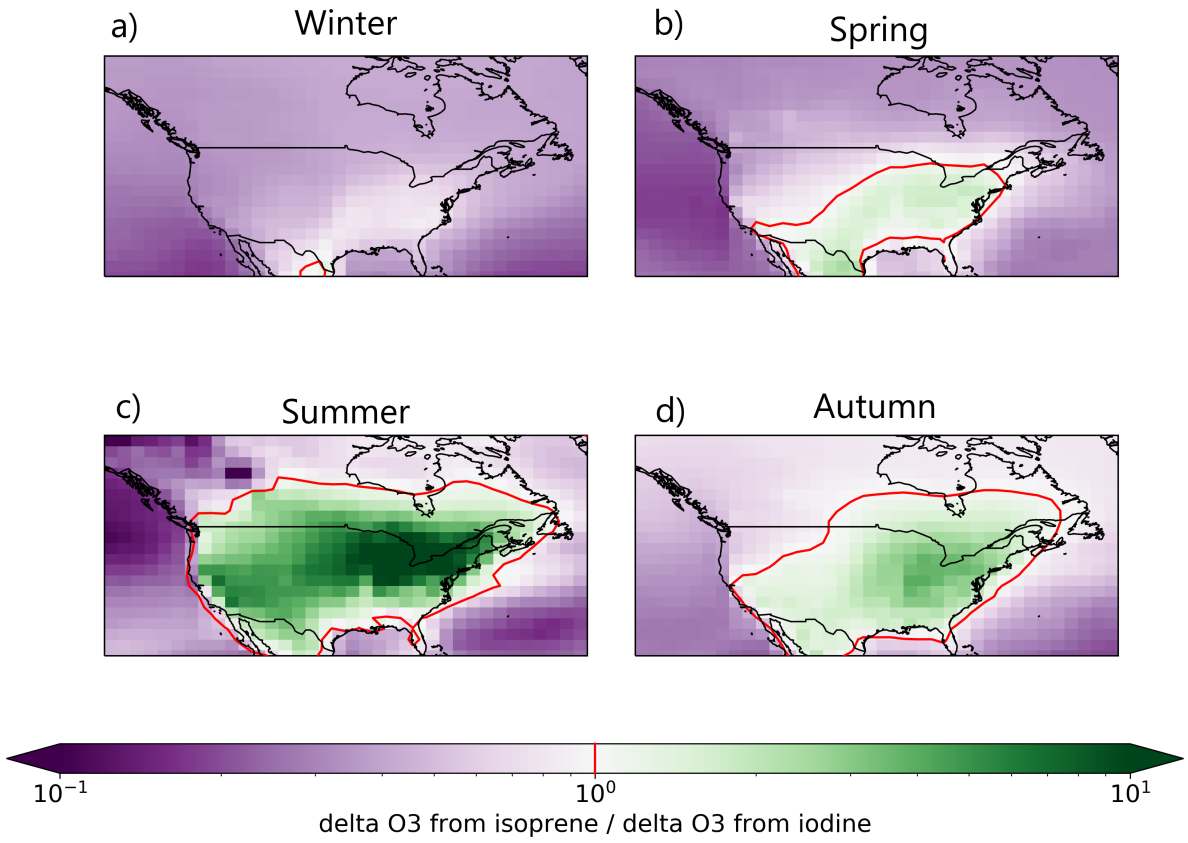

Figure S5. Seasonal surface ratio of magnitude of change in O_3 from isoprene to magnitude of change in O_3 from iodine over North America. The red contour line represents value of 1 (iodine and isoprene have the same magnitude impact on surface O_3)

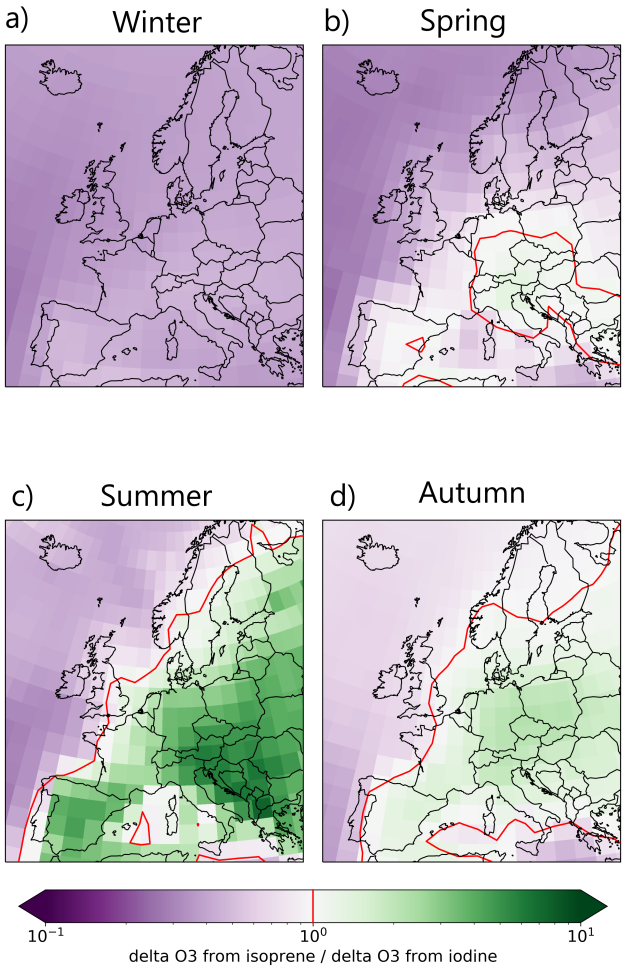

Figure S6. Seasonal surface ratio of magnitude of change in O_3 from isoprene to magnitude of change in O_3 from iodine over Europe. The red contour line represents value of 1 (iodine and isoprene have the same magnitude impact on surface O_3)

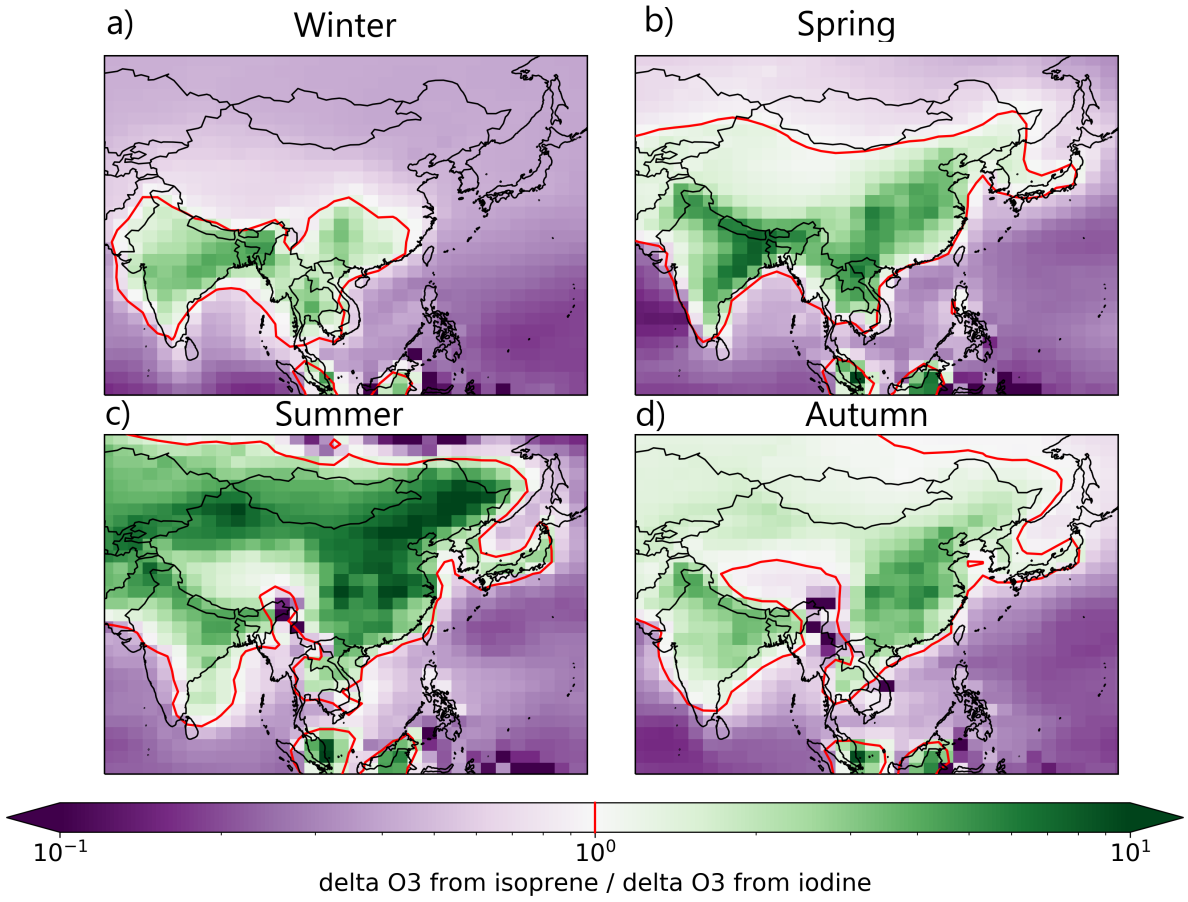

Figure S7. Seasonal surface ratio of magnitude of change in O_3 from isoprene to magnitude of change in O_3 from iodine over Asia. The red contour line represents value of 1 (iodine and isoprene have the same magnitude impact on surface O_3)