Modeling Biogenic and Anthropogenic Secondary Organic Aerosol in China

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Supplementary Materials

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Table S1 Predicted seasonal average precursor contributions (%) to glyoxal SOA. GLY_A1 and GLY_A2: glyoxal SOA from oxidation of aromatics with OH reaction rate < 2×10^4 ppm^{-1} min^{-1} and > 2×10^4 ppm^{-1} min^{-1}, respectively; GLY_I: glyoxal from oxidation of isoprene; GLY_O: glyoxal from direct emissions and oxidation of other precursors

	GLY_A1	GLY_A2	GLY_I	GLY_O
Spring	17.4	7.2	24.4	50.9
Summer	7.3	5.0	52.5	35.2
Autumn	16.0	9.0	25.0	49.9
Winter	18.9	12.5	7.7	60.9

Table S2 Predicted seasonal average precursor contributions (%) to methylglyoxal SOA. MGLY_A1 and MGLY_A2: glyoxal SOA from oxidation of aromatics with OH reaction rate < 2×10^4 ppm^{-1} min^{-1} and > 2×10^4 ppm^{-1} min^{-1}, respectively; MGLY_I: glyoxal from oxidation of isoprene; MGLY_T: glyoxal from oxidation of monoterpene; MGLY_O: glyoxal from direct emissions and oxidation of other precursors

	MGLY_A1	MGLY_A2	MGLY_T	MGLY_I	MGLY_O
Spring	14.7	12.1	0.3	56.7	16.2
Summer	4.6	5.9	0.3	84.7	4.5
Autumn	14.2	15.4	0.3	56.6	13.5
Winter	22.7	28.9	0.2	22.5	25.7

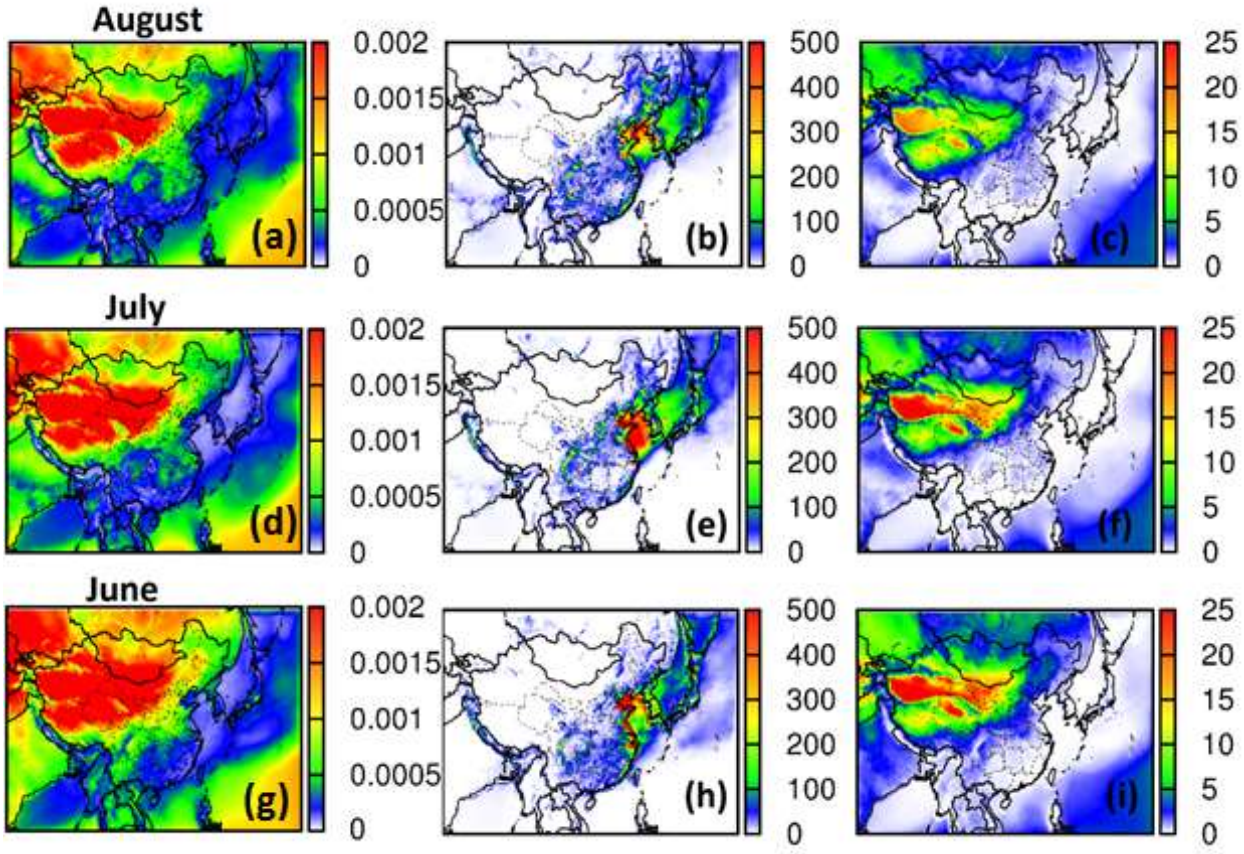

Figure S1 Summertime (a,d,g) uptake coefficients for isoprene epoxides; (b,e,h) aerosol water content (μg m^{-3}) and (c,f,i) molality of H^+ (mol kg^{-1} water).

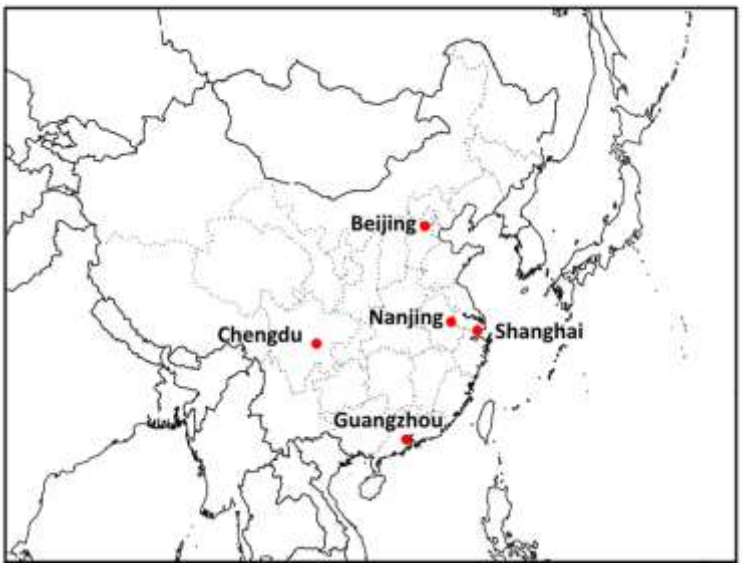

Figure S2 Location of major cities (Beijing, Nanjing, Shanghai, Chengdu and Guangzhou) mentioned in this study.

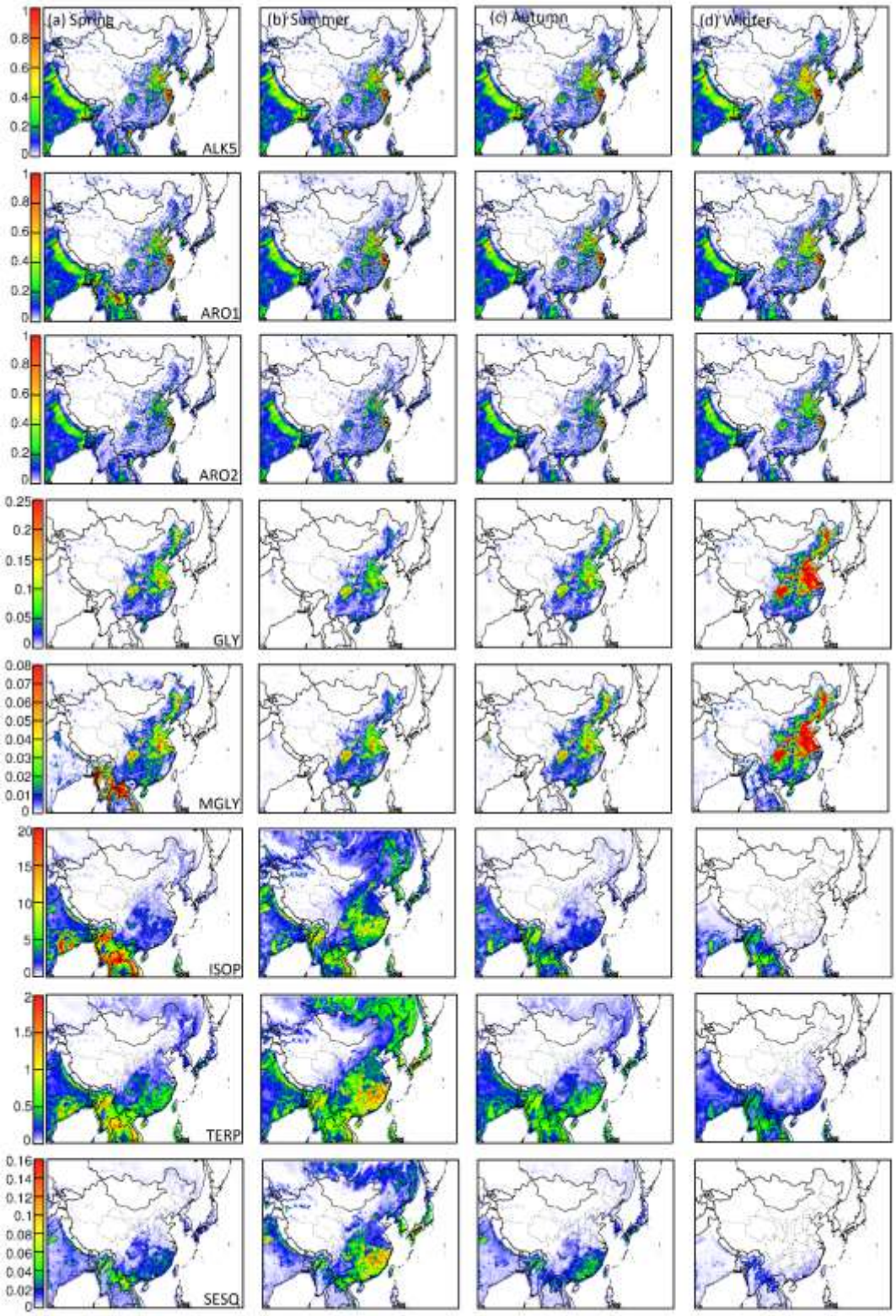

Figure S3 Predicted seasonal average of SOA precursor emission in (a) spring, (b) summer, (c) autumn, and (d) winter 2013. Units are moles s^{-1}.

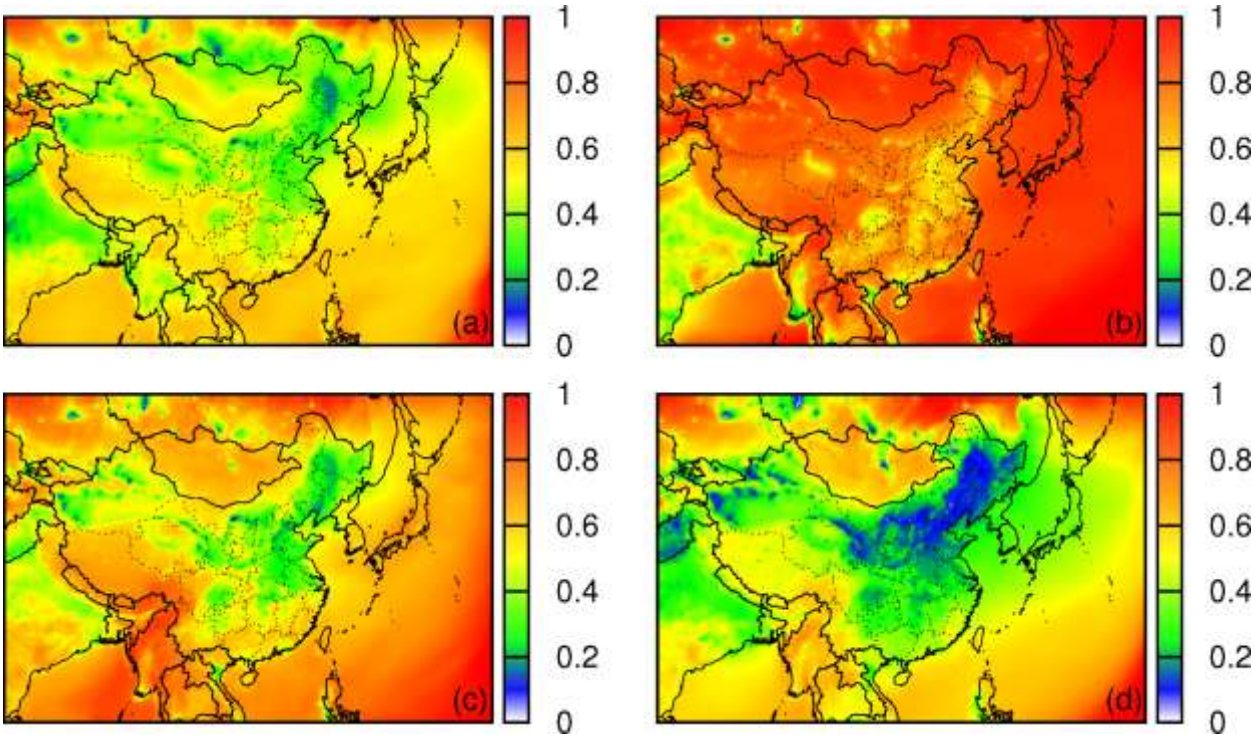

Figure S4 Fractional contributions of predicted SOA to total OA (SOA+POA) for (a) spring, (b) summer, (c) autumn, and (d) winter 2013

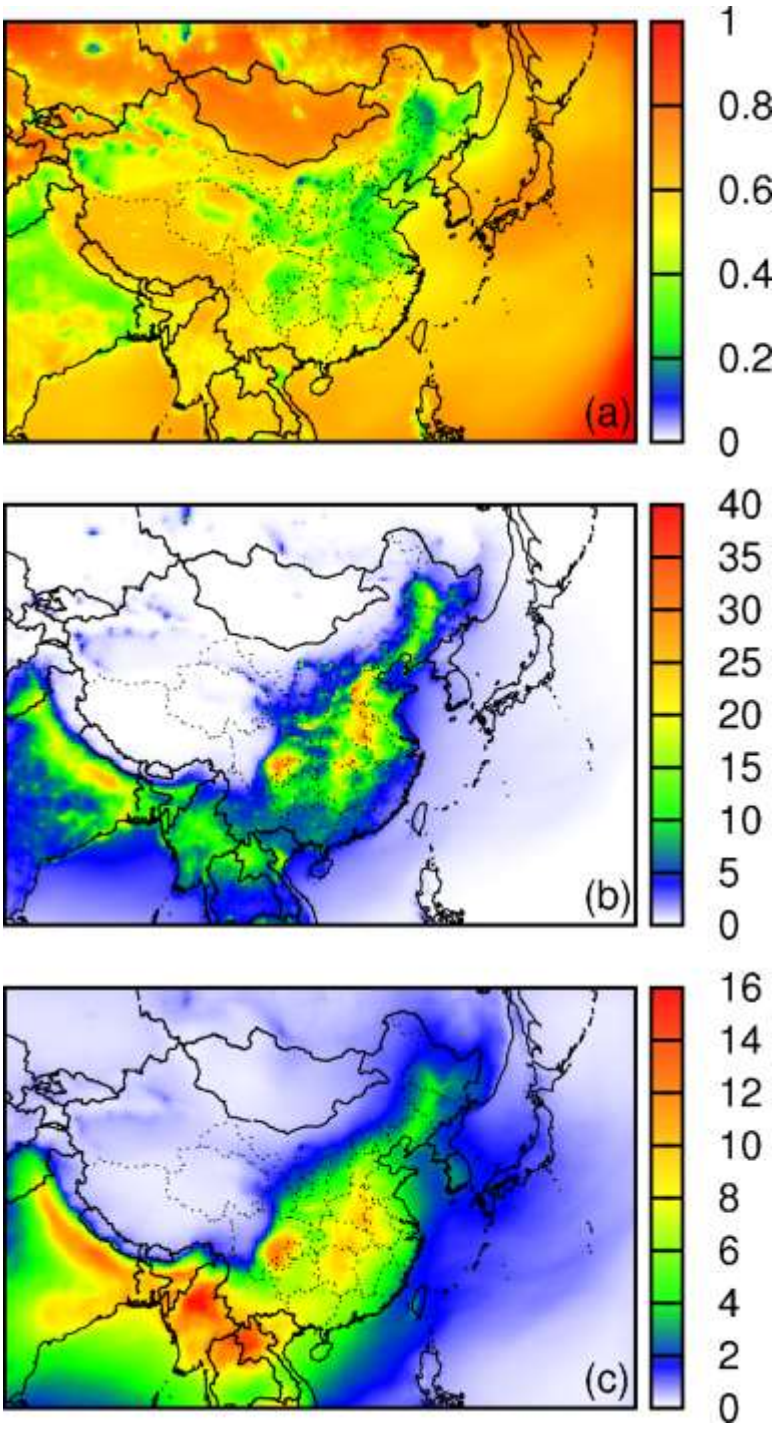

Figure S5 (a) Fractional contributions of predicted annual average SOA to total OA (SOA+POA), (b) annual average POA and (c) annual average SOA. Units are μg m^{-3}.

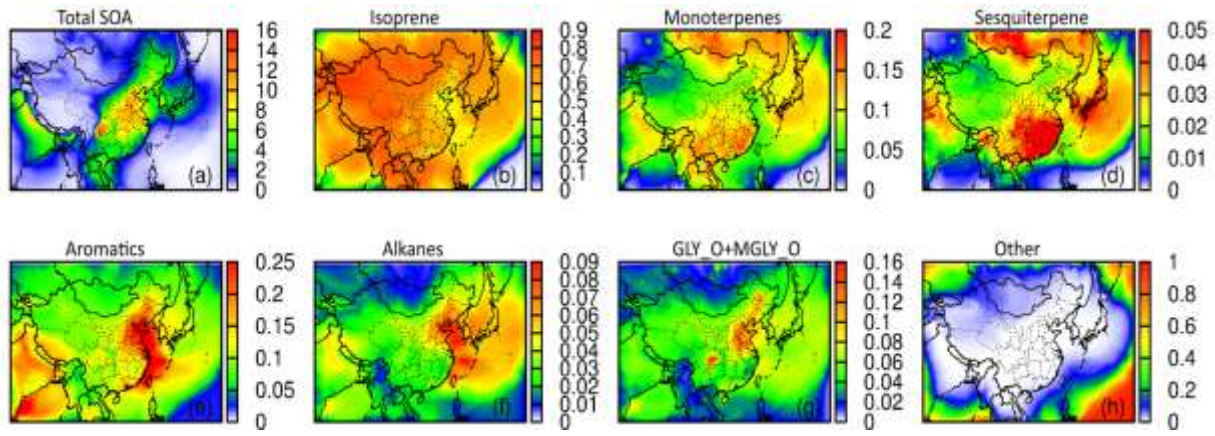

Figure S6 Predicted average SOA concentrations in summer 2013 and relative contributions of different precursors to total SOA.

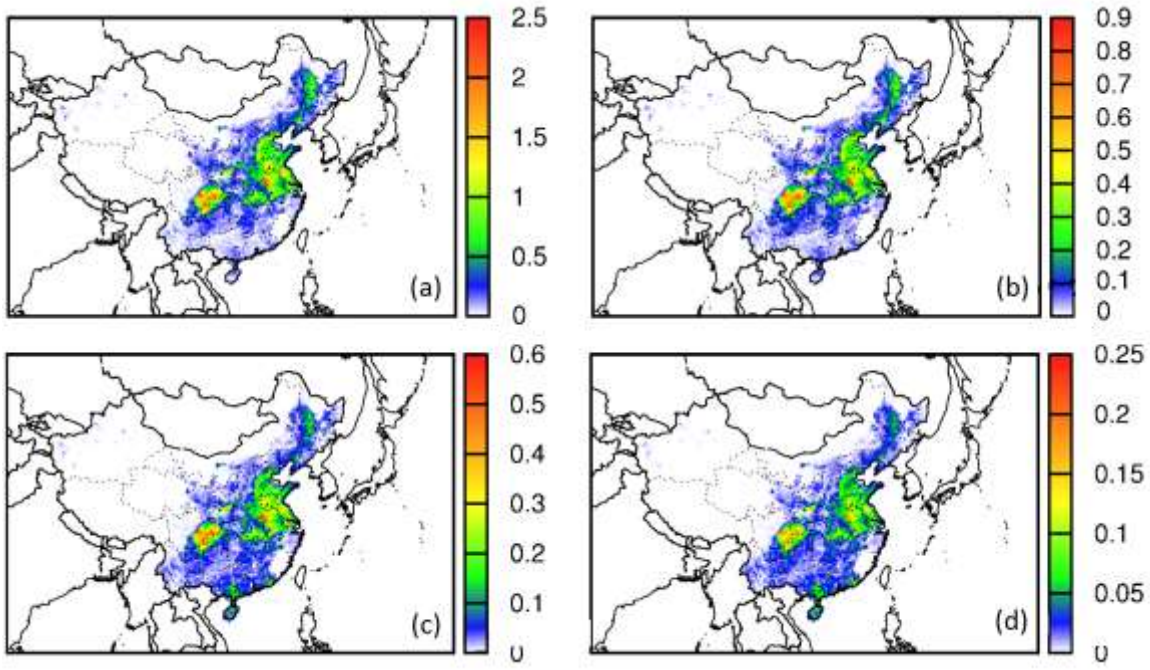

Figure S7 Monthly average emissions of GLY (a,c) and MGLY (b,d) in January and August, 2013.

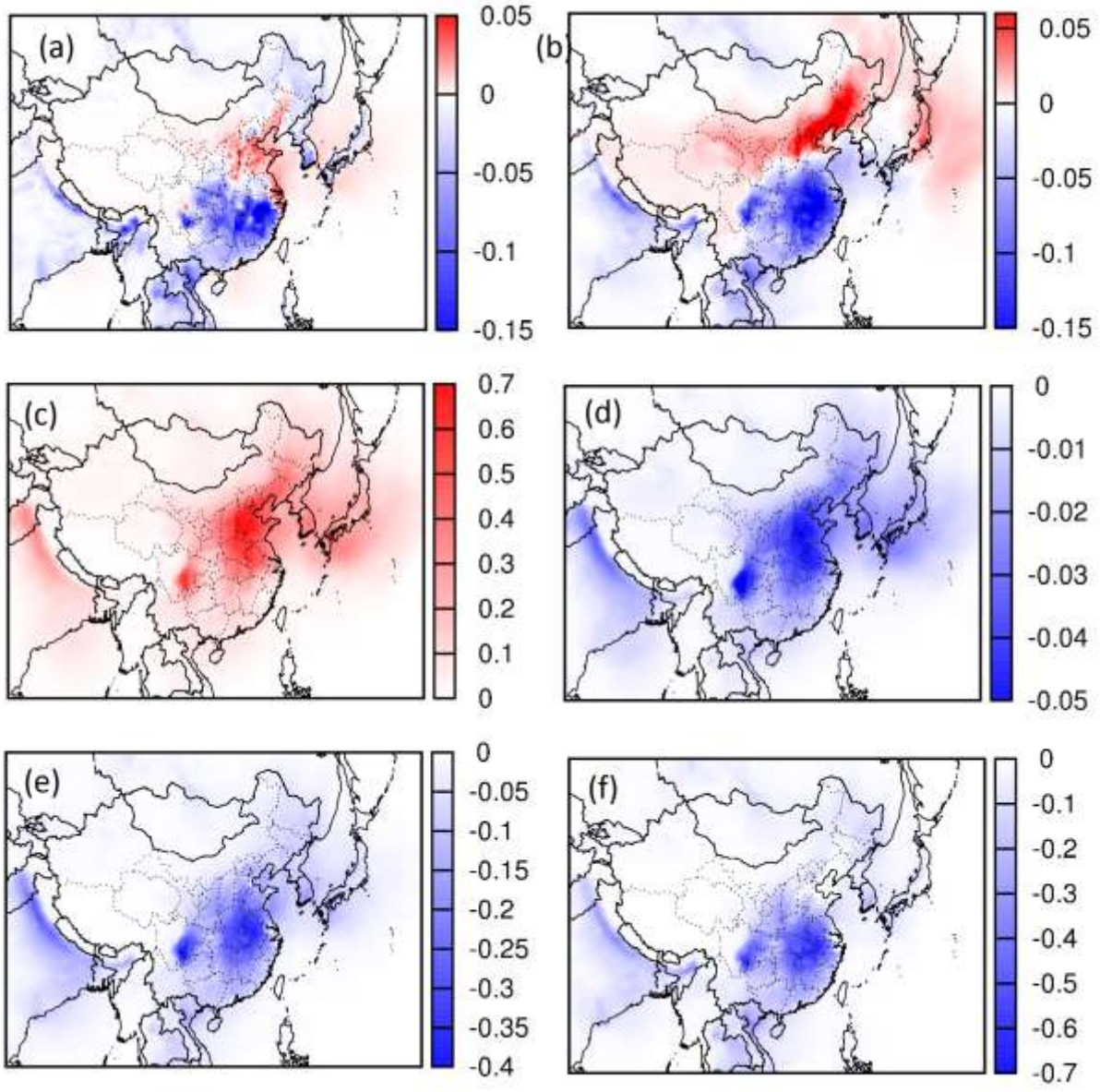

Figure S8 Predicted changes in the spaital distribution of August SOA components (a) semi-volatile, (b) oligomers, (c) IEPOX, (d) MAE, (e) GLY and (f) MGLY due to reduction of NOx emission by 50%. (sensitivity case – base case, units are μg m^{-3}).

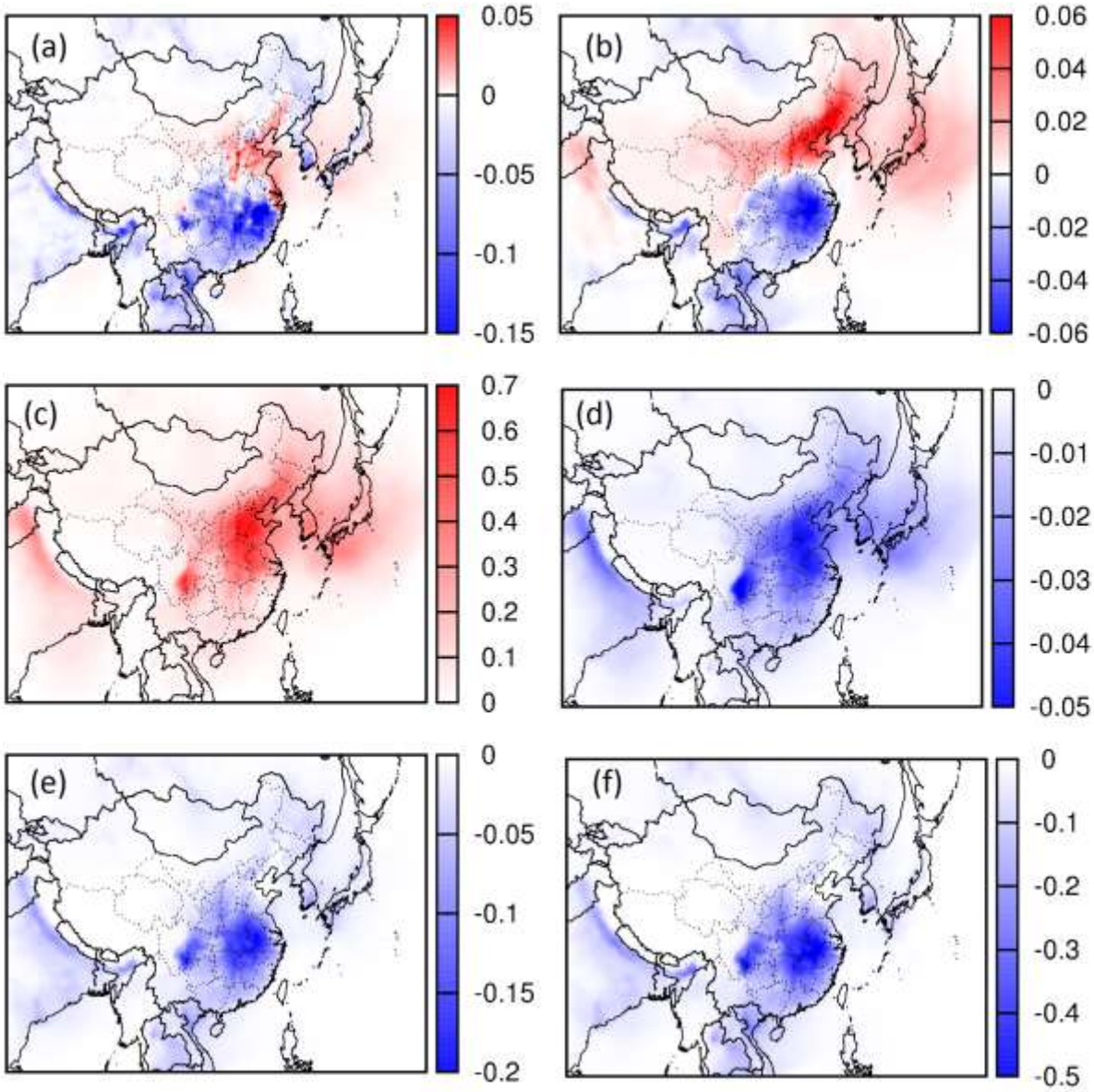

Figure S9 Predicted changes spaital distribution of August **isoprene** SOA components (a) semi-volatile, (b) oligomers, (c) IEPOX, (d) MAE, (e) GLY and (f) MGLY due to reduction of NOx emission by 50%. (sensitivity case – base case, units are μg m^{-3}).

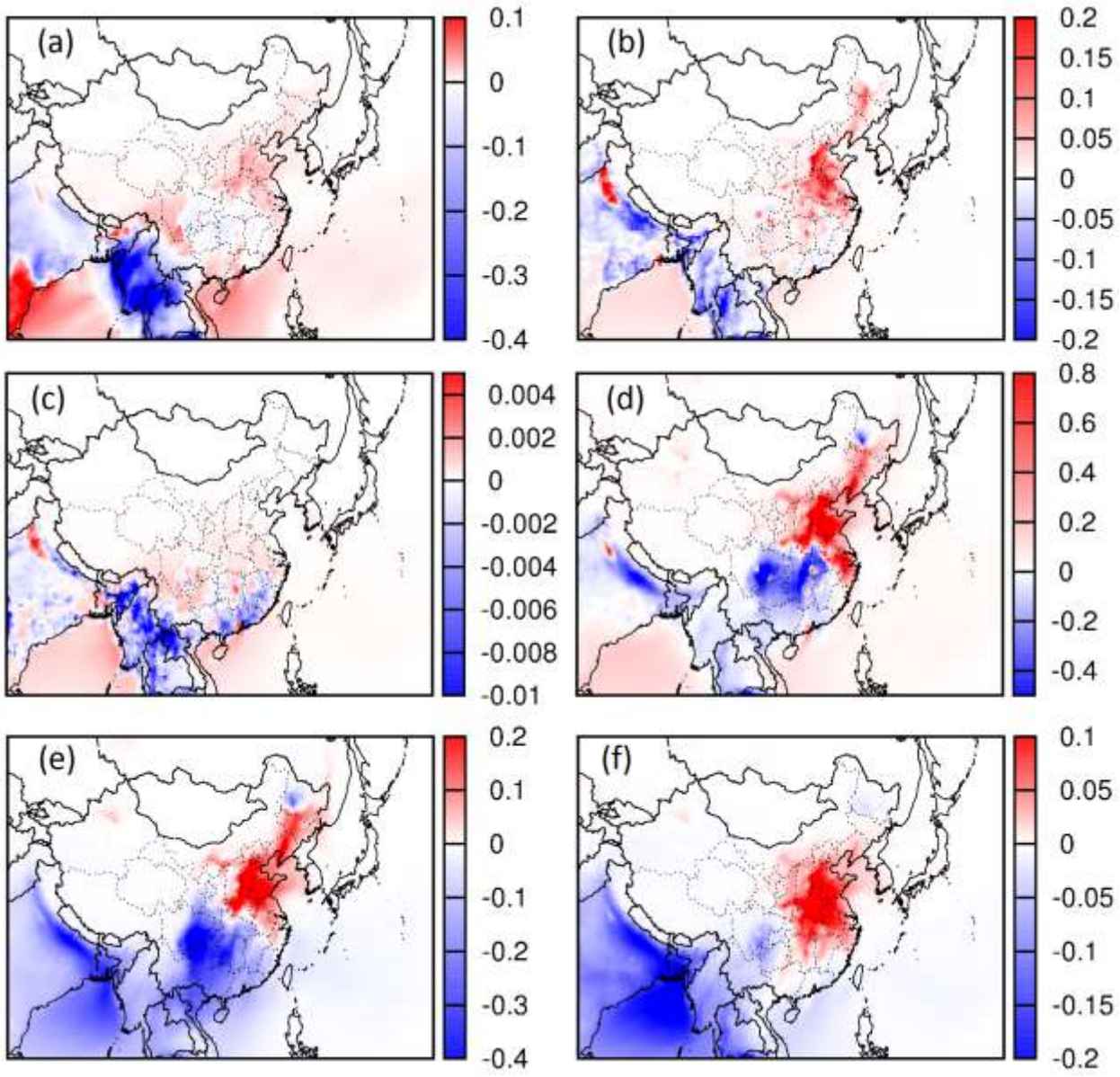

Figure S10 Predicted changes in spatial distribution of January SOA from different precursors, (a) ISOP, (b) TERP, (c) SESQ, (d) ARO1+ARO2, (e) ALK5, and (f) primary GLY+MGLY