Supplement of Atmos. Chem. Phys., 16, 4213–4234, 2016
http://www.atmos-chem-phys.net/16/4213/2016/
doi:10.5194/acp-16-4213-2016-supplement

Atmospheric Chemistry and Physics Open Access EGU

Supplement of

Potential sensitivity of photosynthesis and isoprene emission to direct radiative effects of atmospheric aerosol pollution

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Table S1. Absolute and percent changes in regional annual average of aerosol column burden (ACB) as simulated by NASA ModelE2-YIBs for sulfate (SO_4), nitrate and secondary organic aerosol (SOA) in: eastern North America, Eurasia, north-eastern China, north-western Amazon Basin and central Africa (see green boxes on Fig. 1a in the manuscript). Changes are computed between the control experiment (SimCTRL) and sensitivity experiments: SimNOant, without all anthropogenic emissions; SimNObb, without biomass burning emissions; and SimNOind, without anthropogenic emissions except biomass burning. The acronym "ns" indicates differences that are not statistically significant at the 95 % confidence level (based on a Student's t-test).

Region	Species	SimCTRL − SimNOant	SimCTRL − SimNObb	SimCTRL − SimNOind
Eastern	SO_4	$3.24\,mg\,m^{-2}$	$-0.14\,mg\,m^{-2}$	$3.25\,mg\,m^{-2}$
North America		73.26 %	3.26 %	73.54 %
(70°–100° W; 36°–52° N)	NO_3	$15.02\,mg\,m^{-2}$	$3.44\,mg\,m^{-2}$	$12.72\,mg\,m^{-2}$
		93.19 %	21.36 %	78.88 %
	SOA	$2.14\,mg\,m^{-2}$	$0.39\,mg\,m^{-2}$	$0.87\,mg\,m^{-2}$
		78.87 %	14.34 ,%	31.90 %
Eurasia	SO_4	$2.60\,mg\,m^{-2}$	$-0.08\,mg\,m^{-2}$	$2.69\,mg\,m^{-2}$
(−10° W–80° E; 40°–65° N)		64.70 %	−2.11 %	67.05 %
	NO_3	$14.28\,mg\,m^{-2}$	$3.35\,mg\,m^{-2}$	$11.95\,mg\,m^{-2}$
		93.65 %	21.97 %	78.36 %
	SOA	$2.05\,mg\,m^{-2}$	$0.30\,mg\,m^{-2}$	$1.39\,mg\,m^{-2}$
		77.06 %	11.16 %	52.18 %
North-eastern	SO_4	$3.77\,mg\,m^{-2}$	ns	$3.81\,mg\,m^{-2}$
China		77.29 %	ns	78.22 %
(100°–120° E; 10°–35° N)	NO_3	$8.42\,mg\,m^{-2}$	$1.97\,mg\,m^{-2}$	$7.06\,mg\,m^{-2}$
		85.56 %	20.03 %	71.72 %
	SOA	$2.01\,mg\,m^{-2}$	$0.32\,mg\,m^{-2}$	$1.38\,mg\,m^{-2}$
		86.31 %	13.77 ,%	59.13 %
North-western	SO_4	$0.19\,mg\,m^{-2}$	$0.04\,mg\,m^{-2}$	$0.21\,mg\,m^{-2}$
Amazon Basin		16.88 %	3.83 %	18.46 %
(73°–65° W; 5° S–5° N)	NO_3	$3.91\,mg\,m^{-2}$	$1.48\,mg\,m^{-2}$	$3.14\,mg\,m^{-2}$
		78.76 %	29.87 %	63.22 %
	SOA	$1.81\,mg\,m^{-2}$	$0.54\,mg\,m^{-2}$	$0.55\,mg\,m^{-2}$
		79.94 %	23.70 %	29.19 %
Central Africa	SO_4	$1.05\,mg\,m^{-2}$	$0.58\,mg\,m^{-2}$	$0.72\,mg\,m^{-2}$
(10°–25° E; 10° S–5° N)		56.48 %	29.97 %	39.91 %
	NO_3	$6.53\,mg\,m^{-2}$	$2.98\,mg\,m^{-2}$	$4.75\,mg\,m^{-2}$
		82.12 %	37.50 %	59.63 %
	SOA	$4.42\,mg\,m^{-2}$	$2.14\,mg\,m^{-2}$	$1.10\,mg\,m^{-2}$
		89.97 %	43.62 ,%	22.30 %

Table S2. As Table **S1** for absolute and percent changes in regional annual effective radiative forcing (ERF).

Region	Species	SimCTRL − SimNOant	SimCTRL − SimNObb	SimCTRL − SimNOind
Eastern	SO_4	$-1.06\,W\,m^{-2}$	$0.04\,W\,m^{-2}$	$-1.05\,W\,m^{-2}$
North America		78.97 %	2.72 %	78.37 %
(70°–100° W; 36°–52° N)	NO_3	$-1.29\,W\,m^{-2}$	$-0.27\,W\,m^{-2}$	$-1.10\,mg\,m^{-2}$
		93.90 %	19.76 %	79.90 %
	SOA	-0.23,W m^{-2}	$0.05\,W\,m^{-2}$	$0.08\,W\,m^{-2}$
		72.55 %	15.94 ,%	25.34 %
Eurasia	SO_4	$-0.86\,W\,m^{-2}$	$0.02\,W\,m^{-2}$	$-0.86\,W\,m^{-2}$
(−10° W–80° E; 40°–65° N)		70.79 %	−1.70 %	71.02 %
	NO_3	$-1.25\,W\,m^{-2}$	$-0.26\,W\,m^{-2}$	$-1.05\,W\,m^{-2}$
		94.79 %	19.79 %	79.69 %
	SOA	$-0.23\,W\,m^{-2}$	$-0.04\,W\,m^{-2}$	$-0.15\,W\,m^{-2}$
		71.31 %	11.73 %	45.34 %
North-eastern	SO_4	$-1.43\,W\,m^{-2}$	ns	$-1.43\,W\,m^{-2}$
China		81.71 %	ns	82.09 %
(100°–120° E; 10°–35° N)	NO_3	$-0.74\,W\,m^{-2}$	$-0.16\,W\,m^{-2}$	$-0.63\,W\,m^{-2}$
		85.76 %	18.41 %	73.01 %
	SOA	$-0.14\,W\,m^{-2}$	$-0.03\,W\,m^{-2}$	$-0.10\,W\,m^{-2}$
		77.69 %	14.35 ,%	56.20 %
North-western	SO_4	$-0.09\,W\,m^{-2}$	$-0.02\,W\,m^{-2}$	$-0.09\,W\,m^{-2}$
Amazon Basin		25.63 %	6.35 %	25.83 %
(73°–65° W; 5° S–5° N)	NO_3	$-0.31\,W\,m^{-2}$	$-0.12\,W\,m^{-2}$	$-0.25\,W\,m^{-2}$
		78.52 %	29.69 %	62.87 %
	SOA	$-0.15\,W\,m^{-2}$	$-0.06\,W\,m^{-2}$	$-0.06\,W\,m^{-2}$
		75.32 %	28.66 %	29.53 %
Central Africa	SO_4	$-0.42\,W\,m^{-2}$	$-0.19\,W\,m^{-2}$	$-0.28\,W\,m^{-2}$
(10°–25° E; 10° S–5° N)		65.80 %	30.33 %	44.78 %
	NO_3	$-0.55\,W\,m^{-2}$	$-0.29\,W\,m^{-2}$	$-0.38\,W\,m^{-2}$
		83.39 %	43.45 %	58.13 %
	SOA	$-0.30\,W\,m^{-2}$	$-0.16\,W\,m^{-2}$	$-0.08\,W\,m^{-2}$
		88.09 %	47.98 ,%	22.91 %

Table S3. Absolute and percent changes in seasonal average shortwave visible (SW VIS) solar radiation, canopy temperature, gross primary productivity (GPP), and isoprene emission in: eastern North America, Eurasia and north-eastern China (green boxes on Fig. 1a in the manuscript). Changes are computed between the control experiment (SimCTRL) and sensitivity experiments: SimNOant, without all anthropogenic emissions; SimNObb, without biomass burning emissions; and SimNOind, without anthropogenic emissions except biomass burning. Only boreal summer (JJA) and winter (DJF) seasonal averages are presented. The acronym "ns" indicates differences that are not statistically significant at the 95 % confidence level (based on a Student's t-test).

Region	Variable		Season	SimCTRL − SimNOant	SimCTRL − SimNObb	SimCTRL − SimNOind
Eastern	SW VIS Solar Radiation	Total	JJA	$-14.63\,\mathrm{W\,m^{-2}}$	$-3.15\,\mathrm{W\,m^{-2}}$	$-4.76\,\mathrm{W\,m^{-2}}$
North America				−5.62 %	−1.21 %	−1.83 %
(70°–100° W; 36°–52° N)			DJF	$-10.76\,\mathrm{W\,m^{-2}}$	ns	$-9.83\,\mathrm{W\,m^{-2}}$
				−6.33 %	ns	−5.79 %
		Direct	JJA	$-28.26\,\mathrm{W\,m^{-2}}$	$-5.10\,\mathrm{W\,m^{-2}}$	$-11.29\,\mathrm{W\,m^{-2}}$
				−26.22 %	−4.73 %	−10.48 %
			DJF	$-14.18\,\mathrm{W\,m^{-2}}$	$-1.81\,\mathrm{W\,m^{-2}}$	$-12.78\,\mathrm{W\,m^{-2}}$
				−35.00 %	−4.47 %	−31.55 %
		Diffuse	JJA	$13.62\,\mathrm{W\,m^{-2}}$	$1.85\,\mathrm{W\,m^{-2}}$	$6.53\,\mathrm{W\,m^{-2}}$
				8.91 %	1.27 %	4.27 %
			DJF	$3.42\,\mathrm{W\,m^{-2}}$	ns	$2.95\,\mathrm{W\,m^{-2}}$
				2.65 %	ns	2.28 %
	Canopy Temperature		JJA	−0.66 K	−0.47 K	−0.40 K
				−0.22 %	−0.16 %	−0.14 %
			DJF	ns	ns	ns
				ns	ns	ns
	GPP		JJA	$0.54\,\mathrm{Pg\,C\,yr^{-1}}$	ns	$0.21\,\mathrm{Pg\,C\,yr^{-1}}$
				5.83 %	ns	2.32 %
			DJF	ns	ns	ns
				ns	ns	ns
	Isoprene		JJA	ns	ns	ns
				ns	ns	ns
			DJF	ns	ns	ns
				ns	ns	ns

Table S3. Continued.

Region	Variable		Season	SimCTRL − SimNOant	SimCTRL − SimNObb	SimCTRL − SimNOind
Eurasia	SW VIS Solar Radiation	Total	JJA	$-14.29\,\mathrm{W\,m^{-2}}$	$-2.09\,\mathrm{W\,m^{-2}}$	$-11.42\,\mathrm{W\,m^{-2}}$
(-10° W–80° E; 40°–65° N)				$-5.30\,\%$	$-0.78\,\%$	$-4.24\,\%$
			DJF	$-7.79\,\mathrm{W\,m^{-2}}$	ns	$-7.18\,\mathrm{W\,m^{-2}}$
				$-6.26\,\%$	ns	$-5.77\,\%$
		Direct	JJA	$-26.29\,\mathrm{W\,m^{-2}}$	$-4.22\,\mathrm{W\,m^{-2}}$	$-20.19\,\mathrm{W\,m^{-2}}$
				$-26.77\,\%$	$-4.30\,\%$	$-20.57\,\%$
			DJF	$-7.98\,\mathrm{W\,m^{-2}}$	ns	$-7.44\,\mathrm{W\,m^{-2}}$
				$-39.76\,\%$	ns	$-37.10\,\%$
		Diffuse	JJA	$12.00\,\mathrm{W\,m^{-2}}$	$2.14\,\mathrm{W\,m^{-2}}$	$8.77\,\mathrm{W\,m^{-2}}$
				$7.01\,\%$	$1.25\,\%$	$5.13\,\%$
			DJF	ns	ns	ns
				ns	ns	ns
	Canopy Temperature		JJA	$-0.46\,\mathrm{K}$	ns	$-0.32\,\mathrm{K}$
				$-0.16\,\%$	ns	$-0.11\,\%$
			DJF	ns	ns	ns
				ns	ns	ns
	GPP		JJA	$1.84\,\mathrm{Pg\,C\,yr^{-1}}$	$0.48\,\mathrm{Pg\,C\,yr^{-1}}$	$1.06\,\mathrm{Pg\,C\,yr^{-1}}$
				$5.89\,\%$	$1.54\,\%$	$3.41\,\%$
			DJF	ns	ns	ns
				ns	ns	ns
	Isoprene		JJA	$-1.63\,\mathrm{Tg\,C\,yr^{-1}}$	ns	$-2.43\,\mathrm{Tg\,C\,yr^{-1}}$
				$-2.21\,\%$	ns	$-3.29\,\%$
			DJF	ns	ns	ns
				ns	ns	ns
North-eastern China	SW VIS Solar Radiation	Total	JJA	$-14.36\,\mathrm{W\,m^{-2}}$	ns	$-12.17\,\mathrm{W\,m^{-2}}$
(100°–120° E; 10°–35° N)				$-6.41\,\%$	ns	$-5.43\,\%$
			DJF	$-12.77\,\mathrm{W\,m^{-2}}$	ns	$-11.01\,\mathrm{W\,m^{-2}}$
				$-6.34\,\%$	ns	$-5.47\,\%$
		Direct	JJA	$-22.36\,\mathrm{W\,m^{-2}}$	ns	$-19.34\,\mathrm{W\,m^{-2}}$
				$-27.43\,\%$	ns	$-23.79\,\%$
			DJF	$-21.08\,\mathrm{W\,m^{-2}}$	ns	$-18.91\,\mathrm{W\,m^{-2}}$
				$-30.76\,\%$	ns	$-27.59\,\%$
		Diffuse	JJA	$8.00\,\mathrm{W\,m^{-2}}$	ns	$7.22\,\mathrm{W\,m^{-2}}$
				$5.61\,\%$	ns	$5.07\,\%$
			DJF	$8.31\,\mathrm{W\,m^{-2}}$	$1.78\,\mathrm{W\,m^{-2}}$	$7.90\,\mathrm{W\,m^{-2}}$
				$6.26\,\%$	$1.34\,\%$	$5.95\,\%$
	Canopy Temperature		JJA	$-0.35\,\mathrm{K}$	ns	ns
				$-0.12\,\%$	ns	ns
			DJF	ns	ns	ns
				ns	ns	ns
	GPP		JJA	$0.26\,\mathrm{Pg\,C\,yr^{-1}}$	ns	$0.20\,\mathrm{Pg\,C\,yr^{-1}}$
				$3.03\,\%$	ns	$2.37\,\%$
			DJF	ns	ns	ns
				ns	ns	ns
	Isoprene		JJA	$-1.12\,\mathrm{Tg\,C\,yr^{-1}}$	ns	$-1.04\,\mathrm{Tg\,C\,yr^{-1}}$
				$-3.85\,\%$	ns	$-3.57\,\%$
			DJF	$-0.60\,\mathrm{Tg\,C\,yr^{-1}}$	ns	$-0.48\,\mathrm{Tg\,C\,yr^{-1}}$
				$-7.15\,\%$	ns	$-5.77\,\%$

Table S4. As Table **S3** for absolute and percent changes in seasonal average shortwave visible (SW VIS) solar radiation, canopy temperature, gross primary productivity (GPP), and isoprene emission in: north-western Amazon Basin and central Africa (green boxes on Fig. 1a in the manuscript). Boreal summer (JJA), autumn (SON) and winter (DJF) seasonal averages are reported.

Region	Variable		Season	SimCTRL − SimNOant	SimCTRL − SimNObb	SimCTRL − SimNOind
North-western	SW VIS Solar Radiation	Total	JJA	$-5.21\,\mathrm{W\,m^{-2}}$	$-3.33\,\mathrm{W\,m^{-2}}$	$-3.59\,\mathrm{W\,m^{-2}}$
Amazon Basin				$-2.36\,\%$	$-1.51\,\%$	$-1.63\,\%$
(73°–65°W; 5°S–5°N)			SON	$-5.18\,\mathrm{W\,m^{-2}}$	$-2.46\,\mathrm{W\,m^{-2}}$	$-2.18\,\mathrm{W\,m^{-2}}$
				$-2.32\,\%$	$-1.10\,\%$	$-0.98\,\%$
			DJF	$-3.47\,\mathrm{W\,m^{-2}}$	$-2.11\,\mathrm{W\,m^{-2}}$	$-1.96\,\mathrm{W\,m^{-2}}$
				$-1.53\,\%$	$-0.93\,\%$	$-0.87\,\%$
		Direct	JJA	$-9.98\,\mathrm{W\,m^{-2}}$	$-5.87\,\mathrm{W\,m^{-2}}$	$-6.87\,\mathrm{W\,m^{-2}}$
				$-10.12\,\%$	$-5.95\,\%$	$-6.96\,\%$
			SON	$-9.75\,\mathrm{W\,m^{-2}}$	$-4.66\,\mathrm{W\,m^{-2}}$	$-4.80\,\mathrm{W\,m^{-2}}$
				$-9.92\,\%$	$-4.74\,\%$	$-4.88\,\%$
			DJF	$-5.93\,\mathrm{W\,m^{-2}}$	$-3.45\,\mathrm{W\,m^{-2}}$	$-3.94\,\mathrm{W\,m^{-2}}$
				$-6.05\,\%$	$-3.52\,\%$	$-4.01\,\%$
		Diffuse	JJA	$4.76\,\mathrm{W\,m^{-2}}$	$2.54\,\mathrm{W\,m^{-2}}$	$3.28\,\mathrm{W\,m^{-2}}$
				$3.89\,\%$	$2.08\,\%$	$2.68\,\%$
			SON	$4.57\,\mathrm{W\,m^{-2}}$	$2.20\,\mathrm{W\,m^{-2}}$	$2.62\,\mathrm{W\,m^{-2}}$
				$3.66\,\%$	$1.76\,\%$	$2.10\,\%$
			DJF	$2.47\,\mathrm{W\,m^{-2}}$	$1.34\,\mathrm{W\,m^{-2}}$	$1.97\,\mathrm{W\,m^{-2}}$
				$1.93\,\%$	$1.05\,\%$	$1.54\,\%$
	Canopy Temperature		JJA	ns	$-0.53\,\mathrm{K}$	ns
				ns	$-0.18\,\%$	ns
			SON	$-0.34\,\mathrm{K}$	$-0.58\,\mathrm{K}$	ns
				$-0.19\,\%$	$-0.19\,\%$	ns
			DJF	$-0.09\,\mathrm{K}$	$-0.09\,\mathrm{K}$	$-0.07\,\mathrm{K}$
				$-0.03\,\%$	$-0.03\,\%$	$-0.02\,\%$
	GPP		JJA	$0.09\,\mathrm{Pg\,C\,yr^{-1}}$	$0.16\,\mathrm{Pg\,C\,yr^{-1}}$	$0.07\,\mathrm{Pg\,C\,yr^{-1}}$
				$2.97\,\%$	$5.25\,\%$	$2.39\,\%$
			SON	$0.11\,\mathrm{Pg\,C\,yr^{-1}}$	$0.17\,\mathrm{Pg\,C\,yr^{-1}}$	$0.08\,\mathrm{Pg\,C\,yr^{-1}}$
				$4.18\,\%$	$6.43\,\%$	$2.98\,\%$
			DJF	$0.04\,\mathrm{Pg\,C\,yr^{-1}}$	$0.03\,\mathrm{Pg\,C\,yr^{-1}}$	$0.03\,\mathrm{Pg\,C\,yr^{-1}}$
				$1.36\,\%$	$1.15\,\%$	$1.14\,\%$
	Isoprene		JJA	ns	$0.55\,\mathrm{Tg\,C\,yr^{-1}}$	ns
				ns	$3.46\,\%$	ns
			SON	ns	$1.00\,\mathrm{Tg\,C\,yr^{-1}}$	ns
				ns	$6.66\,\%$	ns
			DJF	ns	ns	ns
				ns	ns	ns

Table S4. Continued.

Region	Variable		Season	SimCTRL − SimNOant	SimCTRL − SimNObb	SimCTRL − SimNOind
Central Africa	SW VIS Solar Radiation	Total	JJA	$-28.22\,\mathrm{W\,m^{-2}}$	$-24.60\,\mathrm{W\,m^{-2}}$	$-13.78\,\mathrm{W\,m^{-2}}$
(10°–25°E; 10°S–5°N)				−14.34 %	−12.50 %	−7.00 %
			SON	$-10.71\,\mathrm{W\,m^{-2}}$	$-7.58\,\mathrm{W\,m^{-2}}$	$-4.34\,\mathrm{W\,m^{-2}}$
				−5.23 %	−3.70 %	−2.12 %
			DJF	$-22.96\,\mathrm{W\,m^{-2}}$	$-20.52\,\mathrm{W\,m^{-2}}$	$-11.71\,\mathrm{W\,m^{-2}}$
				−11.75 %	−10.50 %	−5.99 %
		Direct	JJA	$-44.16\,\mathrm{W\,m^{-2}}$	$-36.52\,\mathrm{W\,m^{-2}}$	$-18.88\,\mathrm{W\,m^{-2}}$
				−68.66 %	−56.75 %	−29.35 %
			SON	$-17.57\,\mathrm{W\,m^{-2}}$	$-11.03\,\mathrm{W\,m^{-2}}$	$-7.03\,\mathrm{W\,m^{-2}}$
				−22.68 %	−14.25 %	−9.08 %
			DJF	$-24.23\,\mathrm{W\,m^{-2}}$	$-19.43\,\mathrm{W\,m^{-2}}$	$-10.35\,\mathrm{W\,m^{-2}}$
				−38.18 %	−30.60 %	−16.31 ,%
		Diffuse	JJA	$15.93\,\mathrm{W\,m^{-2}}$	$11.91\,\mathrm{W\,m^{-2}}$	$5.10\,\mathrm{W\,m^{-2}}$
				12.02 %	8.99 %	3.85 %
			SON	$6.86\,\mathrm{W\,m^{-2}}$	$3.45\,\mathrm{W\,m^{-2}}$	$2.70\,\mathrm{W\,m^{-2}}$
				5.39 %	2.17 %	2.12 %
			DJF	$1.27\,\mathrm{W\,m^{-2}}$	$-1.09\,\mathrm{W\,m^{-2}}$	$-1.36\,\mathrm{W\,m^{-2}}$
				0.96 %	−0.83 %	−1.03 %
	Canopy Temperature		JJA	−0.36 K	−0.32 K	−0.16 K
				−0.12 %	−0.11 %	−0.05 %
			SON	−0.11 K	ns	ns
				−0.06	ns	ns
			DJF	−0.34 K	−0.33 K	−0.13 K
				−0.11 %	−0.11 %	−0.04 %
	GPP		JJA	$0.12\,\mathrm{Pg\,C\,yr^{-1}}$	$0.10\,\mathrm{Pg\,C\,yr^{-1}}$	ns
				2.66 %	2.22 %	ns
			SON	$0.14\,\mathrm{Pg\,C\,yr^{-1}}$	$0.08\,\mathrm{Pg\,C\,yr^{-1}}$	ns
				2.3 %	1.43 %	ns
			DJF	$0.14\,\mathrm{Pg\,C\,yr^{-1}}$	$0.17\,\mathrm{Pg\,C\,yr^{-1}}$	ns
				1.97 %	2.33 %	ns
	Isoprene		JJA	ns	ns	ns
				ns	ns	ns
			SON	ns	ns	ns
				ns	ns	ns
			DJF	$-1.99\,\mathrm{Tg\,C\,yr^{-1}}$	$-1.16\,\mathrm{Tg\,C\,yr^{-1}}$	$-1.06\,\mathrm{Tg\,C\,yr^{-1}}$
				−6.03 %	−3.52 %	−3.21 %

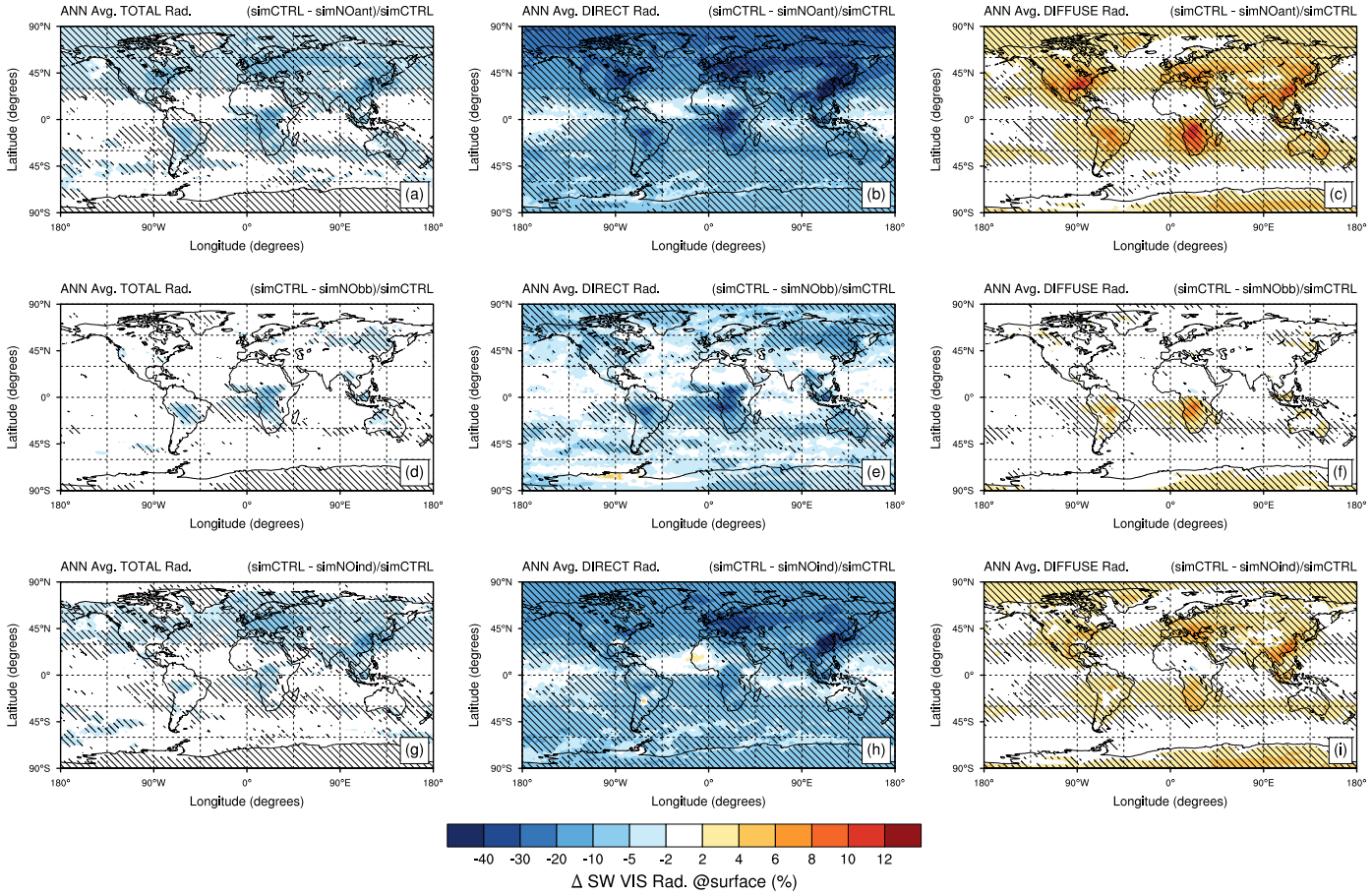

Figure S1. Spatial distribution of annual percentage change (in %) in short-wave visible (SW VIS) **(a, d, g)** total, **(b, e, h)** direct and **(c, f, i)** diffuse solar radiation. Changes are computed between the control experiment (SimCTRL) and sensitivity experiments: **(a–c)** without all anthropogenic emissions (SimNOant); **(d–f)** without biomass burning emissions (SimNObb); and **(g–i)** without anthropogenic emissions except biomass burning (SimNOind). The difference has been computed using last 20 year averages for each experiment. All experiments are set in a present-day climatic state. Shaded regions indicate areas where changes in solar radiation are significant at the 95% confidence level.

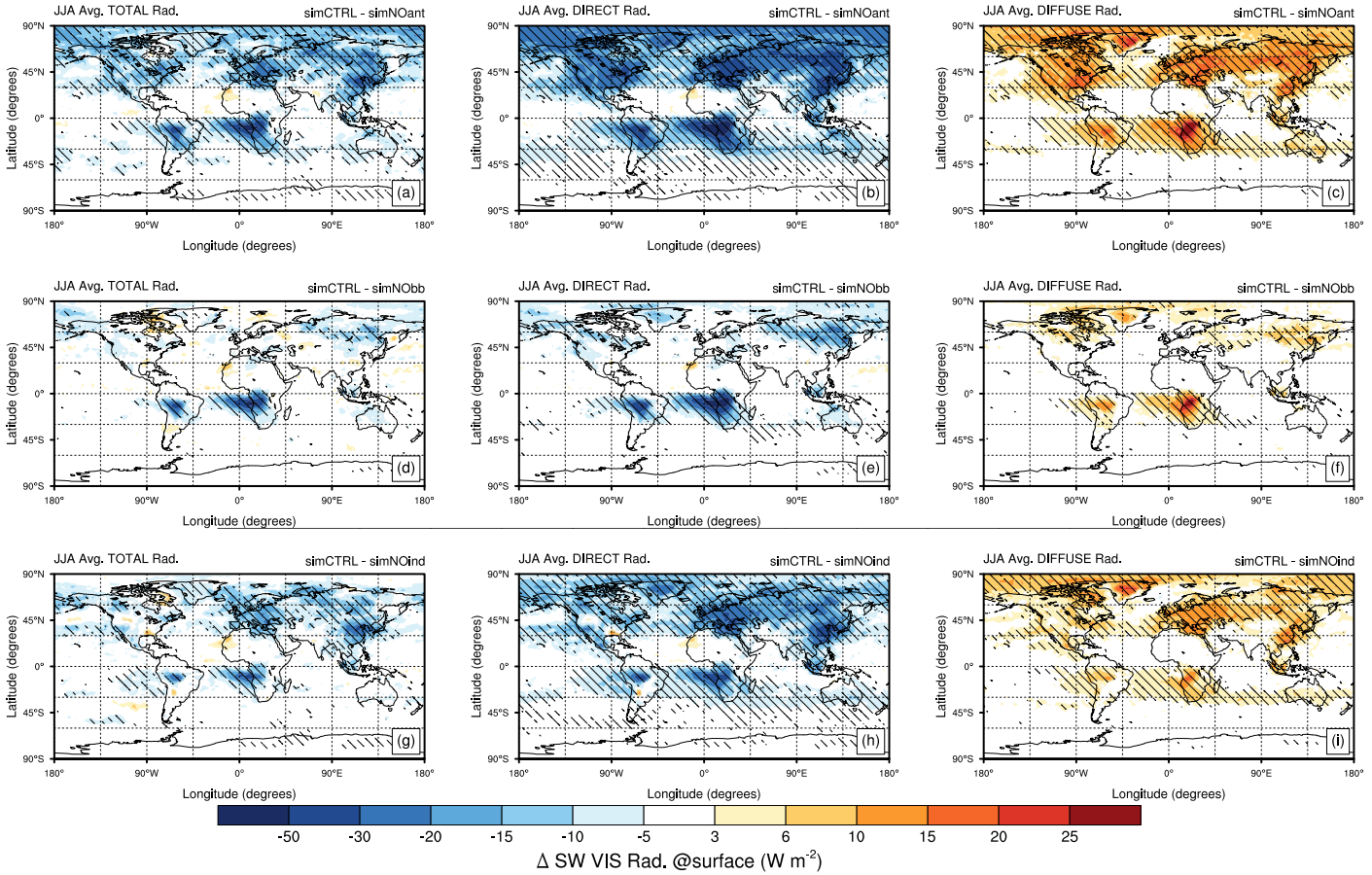

Figure S2. As Figure **S1** for seasonal (boreal summer, JJA) absolute change in SW visible total, direct and diffuse solar radiation between the control experiment (SimCTRL) and sensitivity experiments (SimNOant, SimNObb and SimNOind).

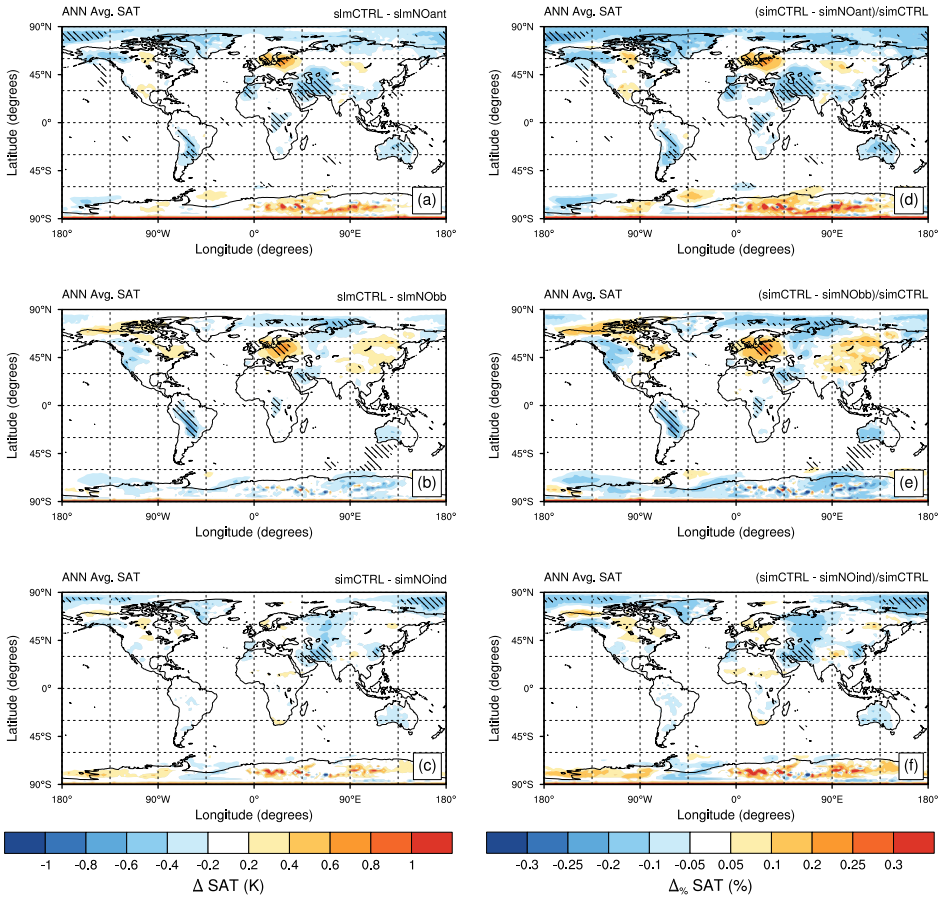

Figure S3. Spatial distribution of annual absolute (in K, left column panels) and percentage change (in %, right column panels) in surface atmospheric temperature (SAT) between the control experiment (SimCTRL) and sensitivity experiments: **(a)** and **(d)** without all anthropogenic emissions (SimNOant); **(b)** and **(e)** without biomass burning emissions (SimNObb); **(c)** and **(f)** without anthropogenic emissions except biomass burning (SimNOind). The difference has been computed using last 20 year averages for each experiment. All experiments are set in a present-day climatic state. Shaded regions indicate areas where changes are significant at the 95% confidence level.

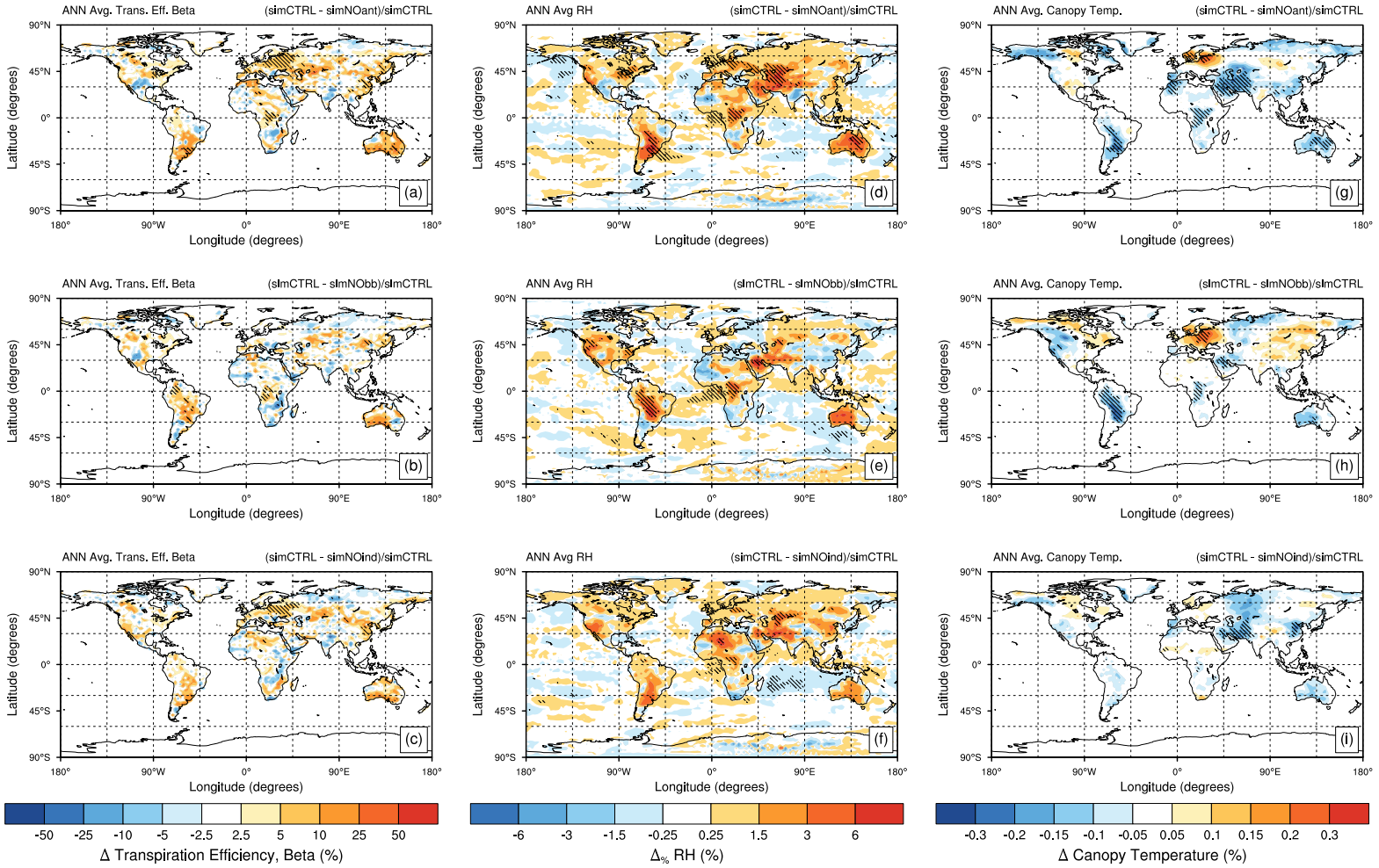

Figure S4. Spatial distribution of annual percentage change (in %) in transpiration efficiency (beta, left column panels), relative humidity (RH; middle column panels) and canopy temperature (right colu,n panel) between the control experiment (SimCTRL) and sensitivity experiments: **(a, d, g)** without all anthropogenic emissions (SimNOant); **(b, e, h)** without biomass burning emissions (SimNObb); **(c, f, i)** without anthropogenic emissions except biomass burning (SimNOind). The difference has been computed using last 20 year averages for each experiment. All experiments are set in a present-day climatic state. Shaded regions indicate areas where changes in are significant at the 95% confidence level.

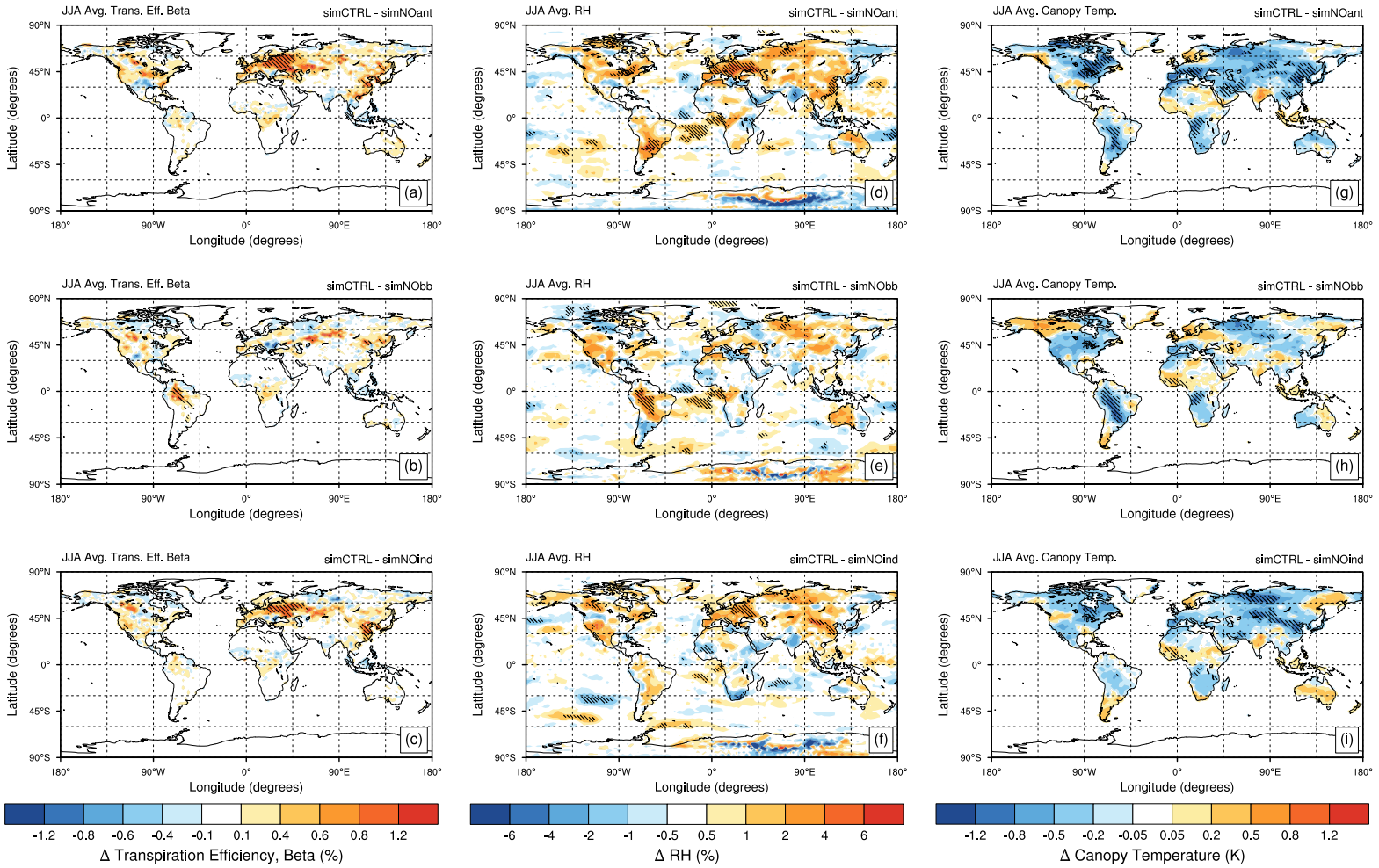

Figure S5. Spatial distribution of seasonal (boreal summer, JJA) absolute change in transpiration efficiency (beta, in%; left column panels), relative humidity (RH, in %; middle column panels) and canopy temperature (in K; right column panels) between the control experiment (SimCTRL) and sensitivity experiments: **(a, d, g)** without all anthropogenic emissions (SimNOant); **(b, e, h)** without biomass burning emissions (SimNObb); **(c, f, i)** without anthropogenic emissions except biomass burning (SimNOind). The difference has been computed using last 20 year averages for each experiment. All experiments are set in a present-day climatic state. Shaded regions indicate areas where changes are significant at the 95% confidence level.

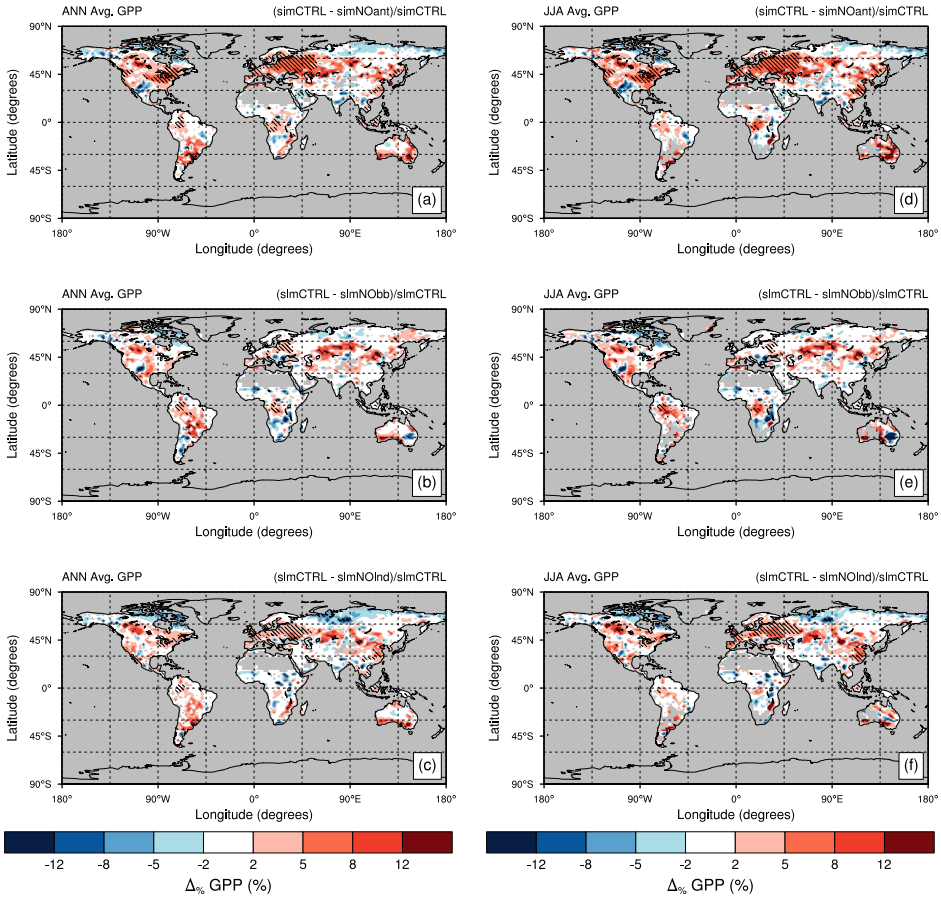

Figure S6. Spatial distribution of annual (left column panels) and seasonal (boreal summer, JJA; right column panels) percentage change (in %) in Gross Primary Productivity (GPP) between the control experiment ("SimCTRL") and sensitivity experiments: **(a)** and **(d)** without all anthropogenic emissions ("SimNOant"); **(b)** and **(e)** without biomass burning emissions ("SimNObb"); **(c)** and **(f)** without anthropogenic emissions except biomass burning ("SimNOind"). The difference has been computed using last 20 year averages for each experiment. All experiments are set in a present-day climatic state. Shaded regions indicate areas where changes in GPP are significant at the 95% confidence level.

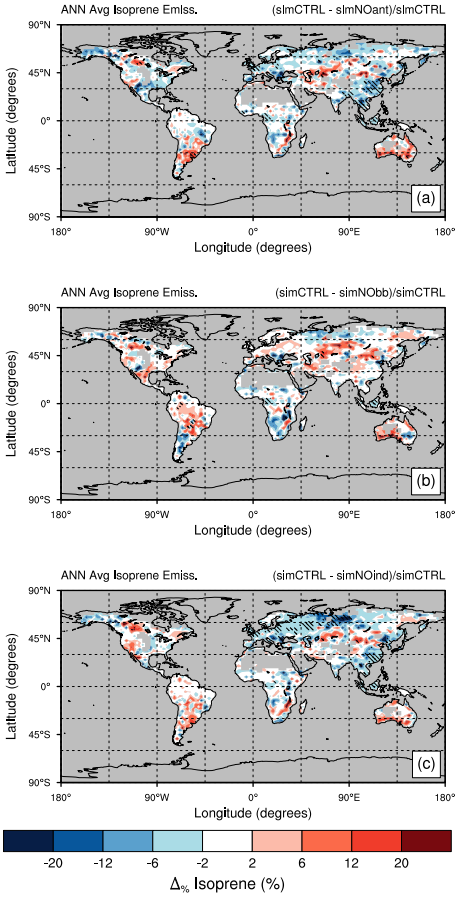

Figure S7. Spatial distribution of annual percentage change (in %) in isoprene emission between the control experiment (SimCTRL) and sensitivity experiments: **(a)** without all anthropogenic emissions (SimNOant); **(b)** without biomass burning emissions (SimNObb); and **(c)** without anthropogenic emissions except biomass burning (SimNOind). The difference has been computed using last 20 year averages for each experiment. All experiments are set in a present-day climatic state. Shaded regions indicate areas where changes in isoprene emissions are significant at the 95% confidence level.

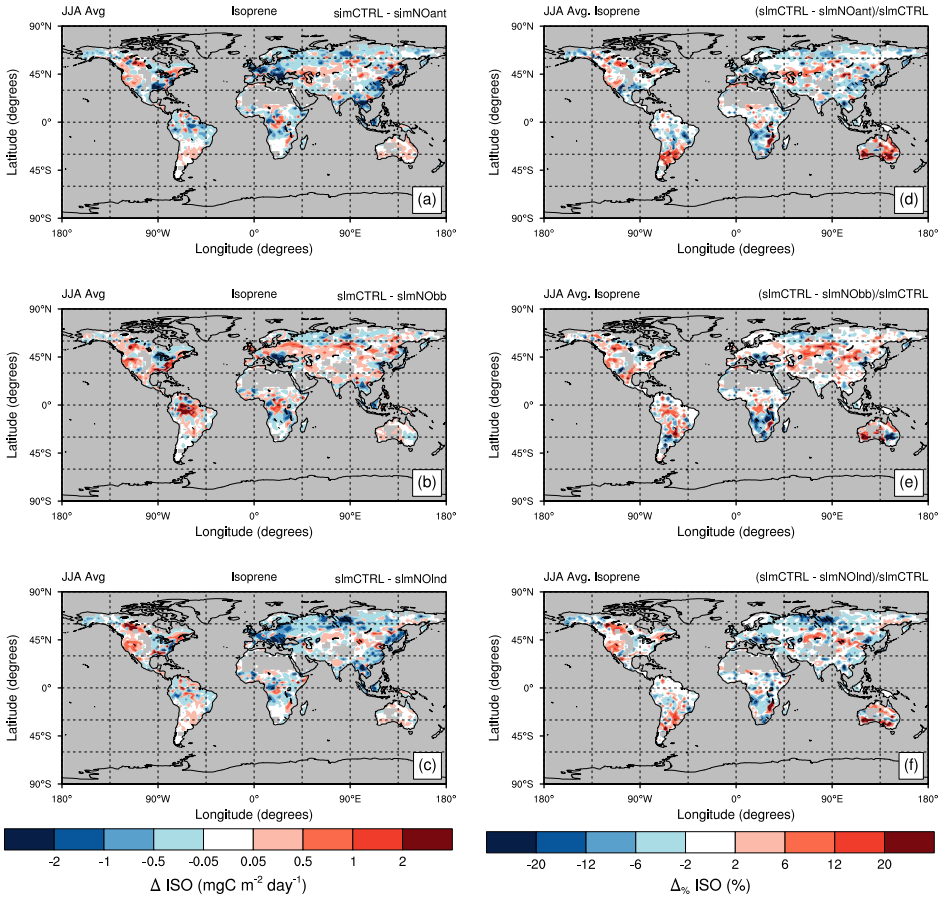

Figure S8. Spatial distribution of seasonal (boreal summer, JJA) absolute (in $\mathrm{mg\,C\,m^{-2}\,day^{-1}}$) and percentage (in $\%$) change in isoprene emission between the control experiment (SimCTRL) and sensitivity experiments: **(a)** and **(d)** without all anthropogenic emissions (SimNOant); **(b)** and **(e)** without biomass burning emissions (SimNObb); **(c)** and **(f)** without anthropogenic emissions except biomass burning (SimNOind). The difference has been computed using last 20 year averages for each experiment. All experiments are set in a present-day climatic state. Shaded regions indicate areas where changes in isoprene emissions are significant at the 95% confidence level.