Supplement of Atmos. Chem. Phys. Discuss., 15, 25433–25475, 2015
http://www.atmos-chem-phys-discuss.net/15/25433/2015/
doi:10.5194/acpd-15-25433-2015-supplement


Atmospheric Chemistry and Physics Discussions
Open Access

*Supplement of*

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

**S. Strada and N. Unger**

*Correspondence to:* S. Susanna (susanna.strada@lsce.ipsl.fr)

**Supplementary Material**

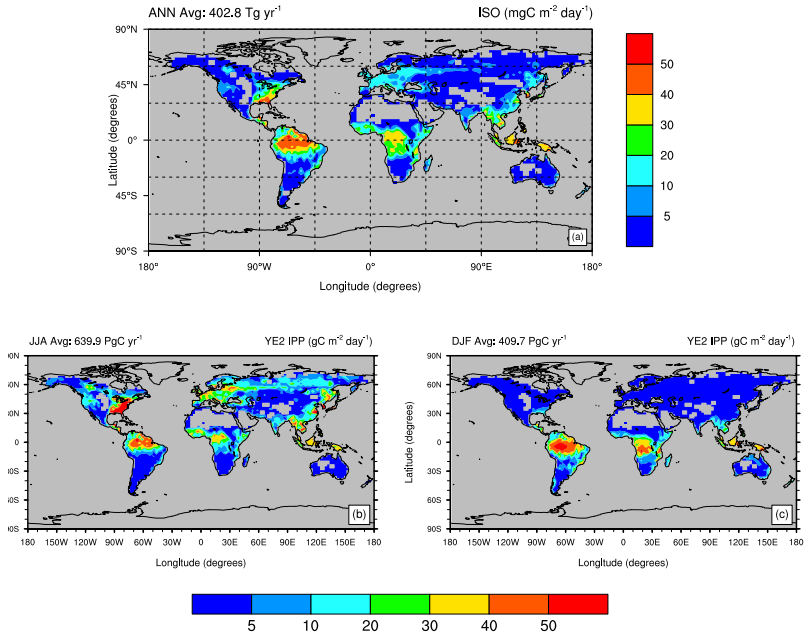


**Figure S1.** Annual and seasonal average isoprene source as simulated by the NASA ModelE2-YIBs model in the control present-day simulation (20 run years; $\sim$ 2000s). Global mean values are given in the upper left corner of each map. Only boreal summer (JJA) and winter (DJF) seasonal averages are shown.

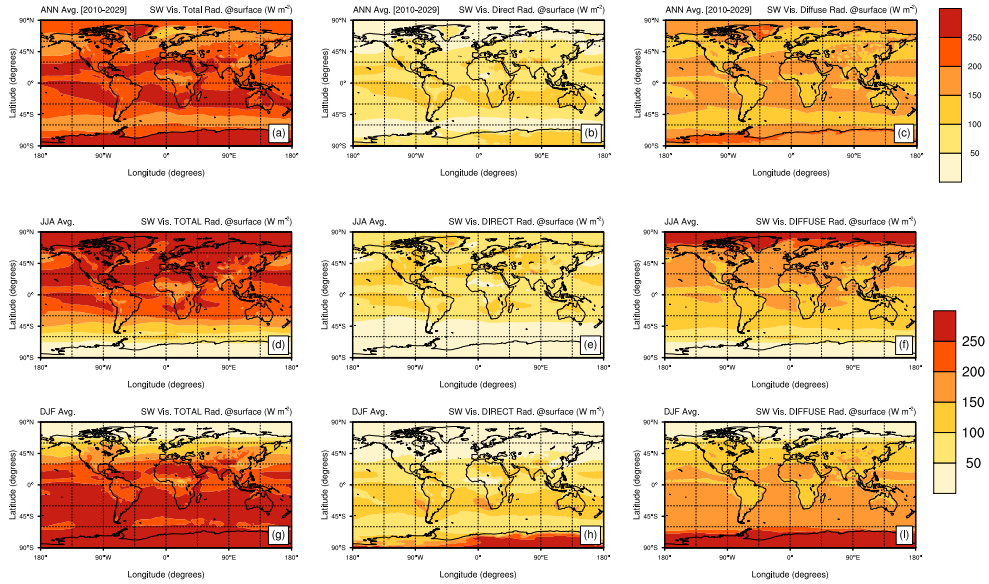


**Figure S2.** Annual and seasonal (boreal summer and winter) average short-wave visible (SW VIS) **(a, d, g)** total, **(b, e, h)** direct and **(c, f, i)** diffuse solar radiation as simulated by the NASA ModelE2-YIBs model in the control present-day simulation (20 run years; $\sim$ 2000s).

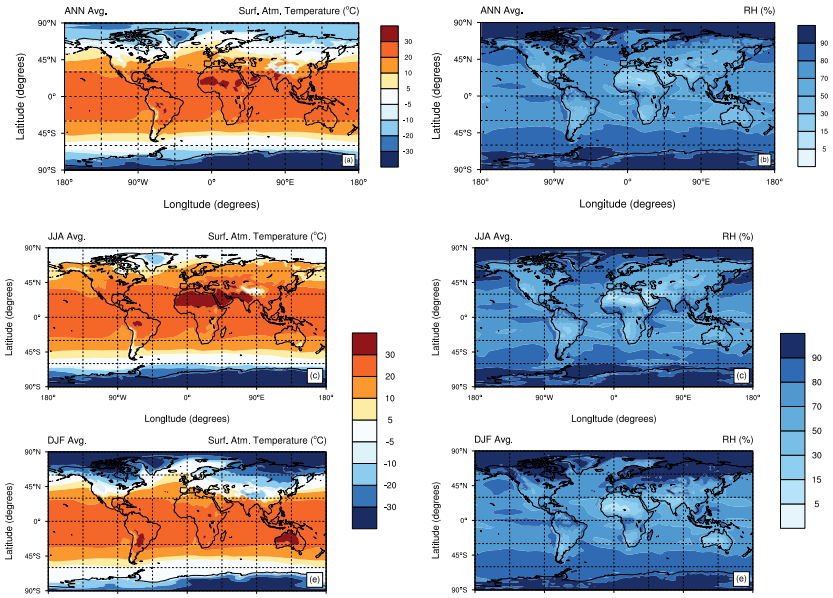


**Figure S3.** Annual and seasonal (boreal summer and winter) average: **(a, c, e)** surface atmospheric temperature (SAT, in °C) and **(b, d, f)** relative humidity (RH, in %) as simulated by the NASA ModelE2-YIBs model in the control present-day simulation (20 run years; $\sim$ 2000s).

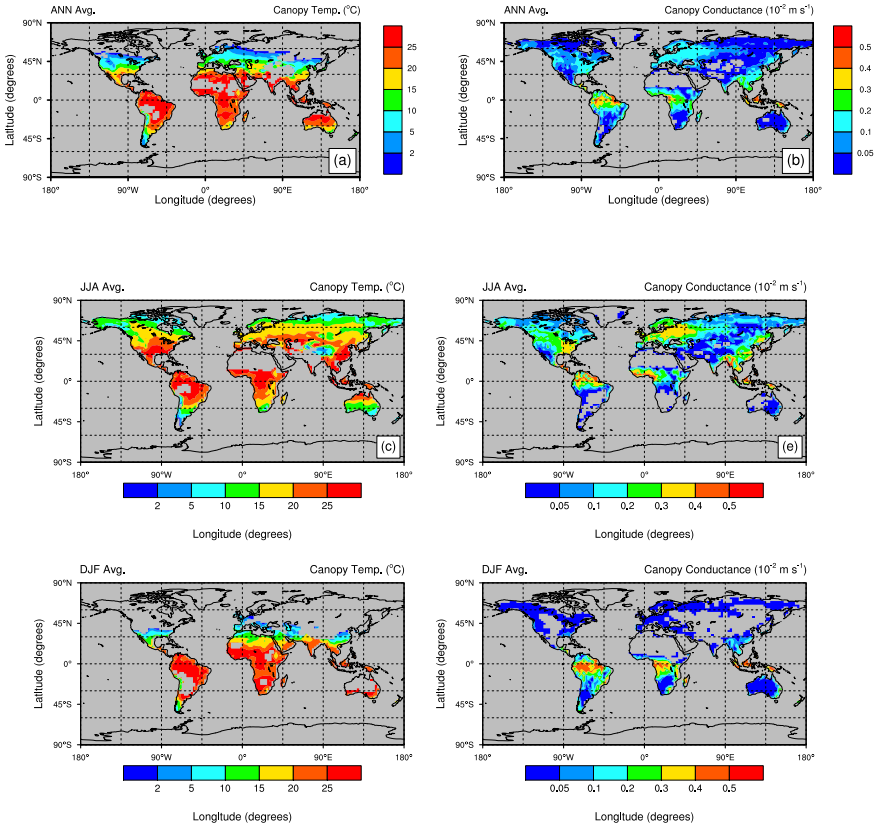


**Figure S4.** Annual and seasonal average: **(a)** canopy temperature (in °C) and **(b)** canopy conductance (in $10^{-2}\,\mathrm{m\,s^{-1}}$) as simulated by the NASA ModelE2-YIBs model in the control present-day simulation (20 run years; $\sim$ 2000s).

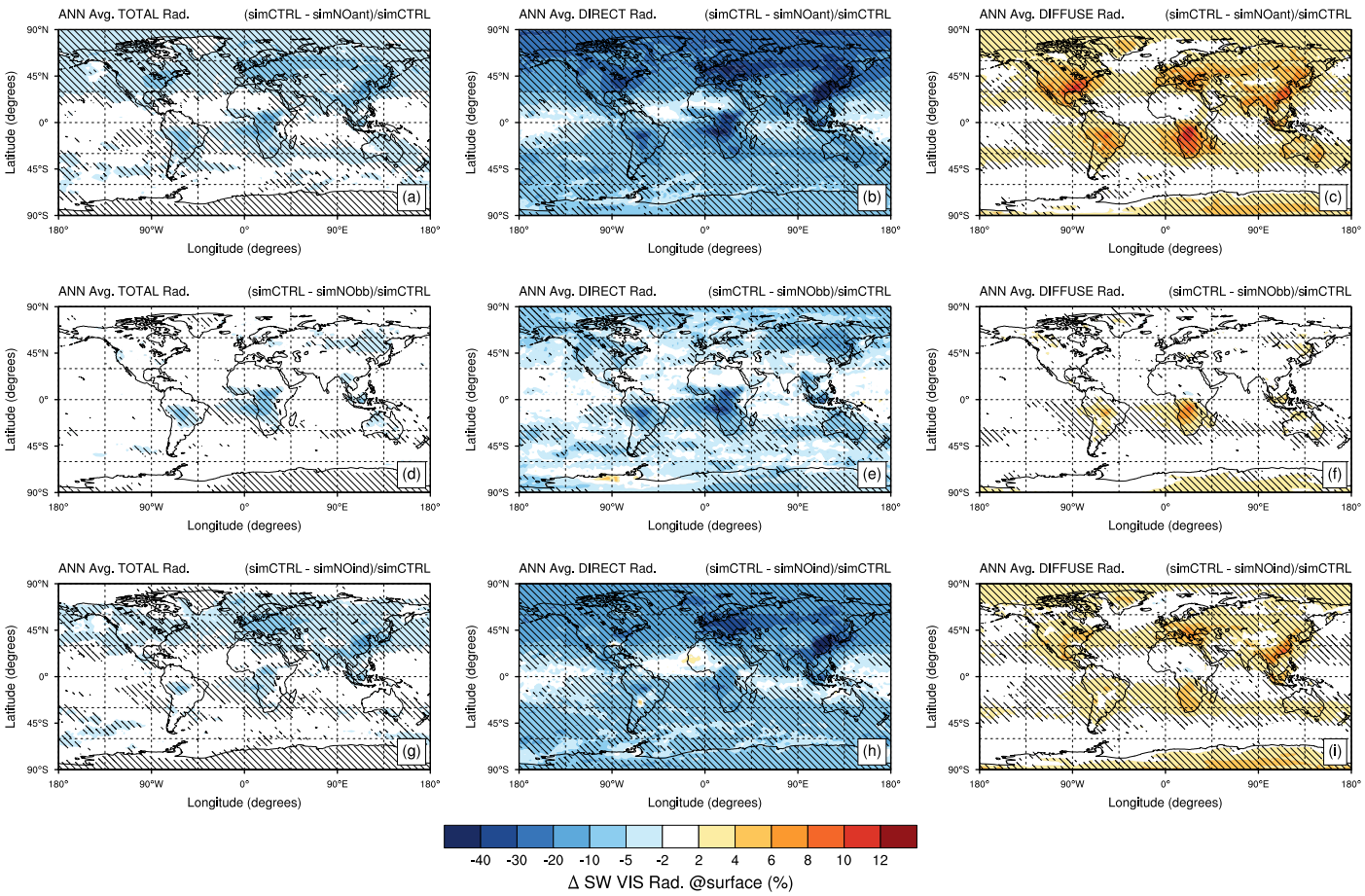


**Figure S5.** Spatial distribution of annual percentage change (in %) in short-wave visible (SW VIS) **(a, d, g)** total, **(b, e, h)** direct and **(c, f, i)** diffuse solar radiation. Changes are computed between the control experiment ("SimCTRL") and sensitivity experiments: **(a–c)** without all anthropogenic emissions ("SimNOant"); **(d–f)** without biomass burning emissions ("SimNObb"); and **(g–i)** without anthropogenic emissions except biomass burning ("SimNOind"). All experiments are set in a present-day climatic state. Shaded regions indicate areas where the change in solar radiation is significant at the 95% confidence level. The difference has been computed using last 20-year averages for each experiment.

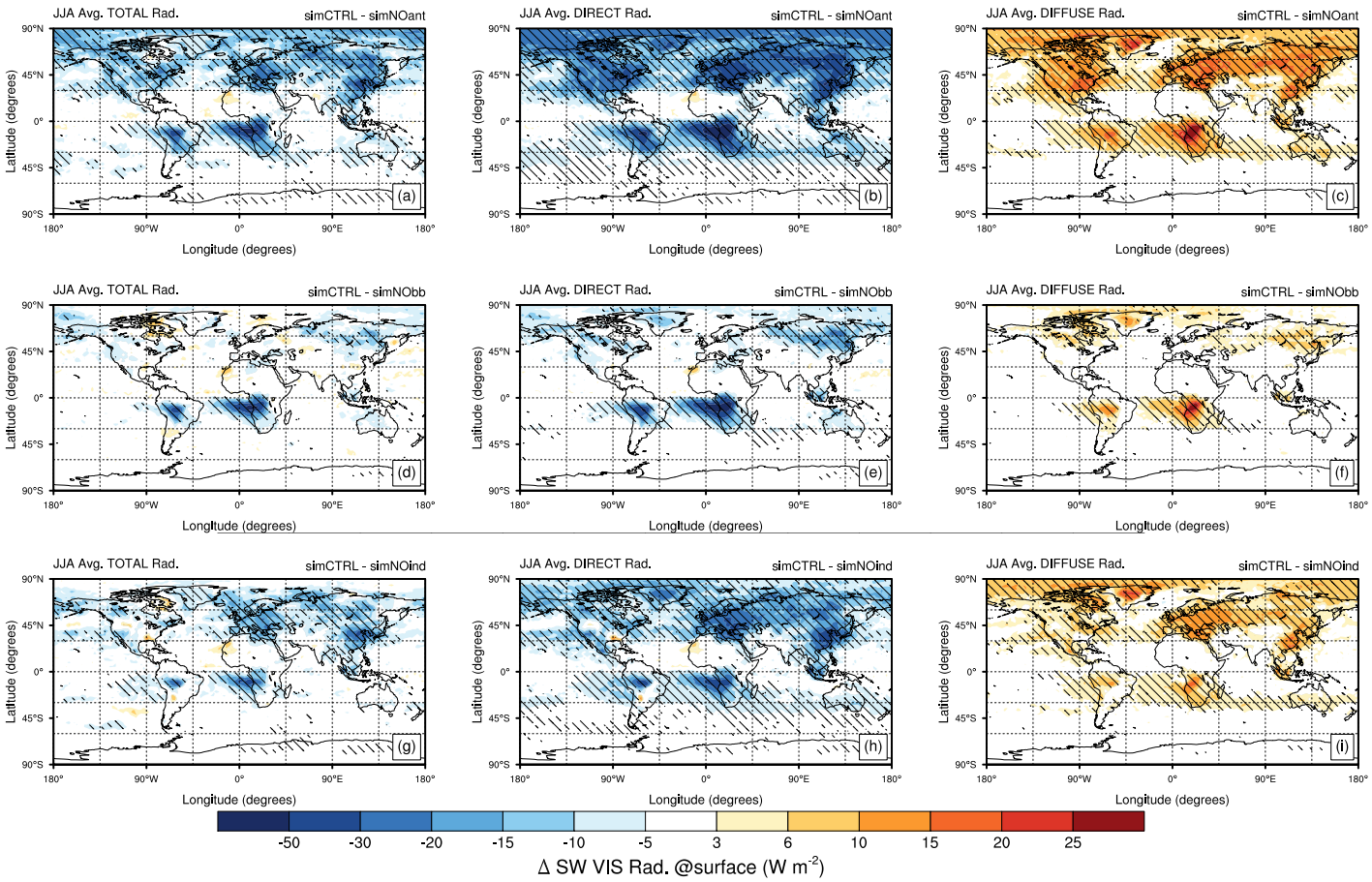


**Figure S6.** As Figure 4 for seasonal (boreal summer) absolute change in SW visible total, direct and diffuse solar radiation between the control experiment ("SimCTRL") and sensitivity experiments ("SimNOant", "SimNObb" and "SimNOind").

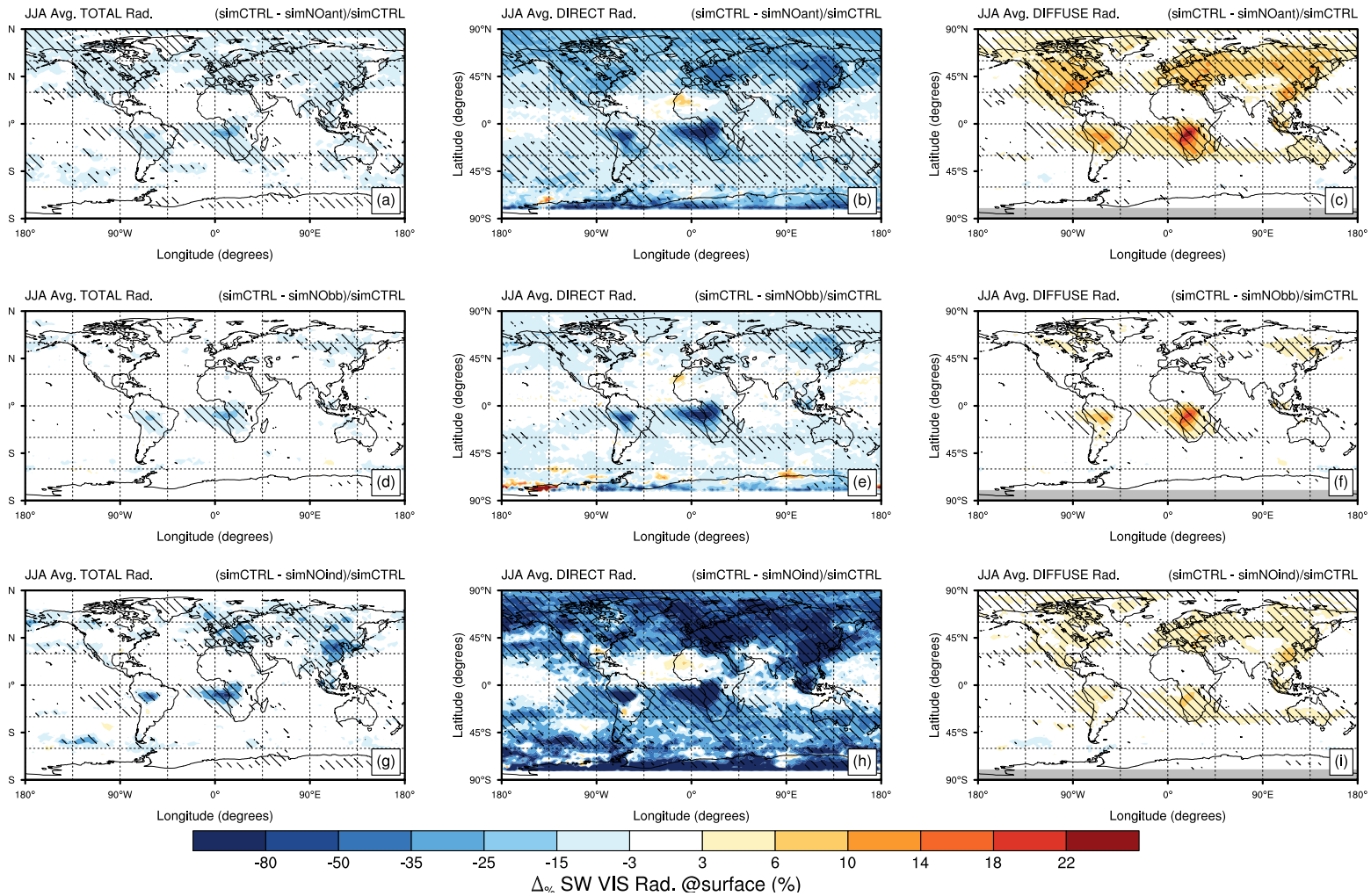


**Figure S7.** As Figure **S5** for seasonal (boreal summer) percentage change (in %) in SW visible total, direct and diffuse solar radiation between the control experiment ("simCTRL") and sensitivity experiments ("SimNOant", "SimNObb" and "SimNOind").

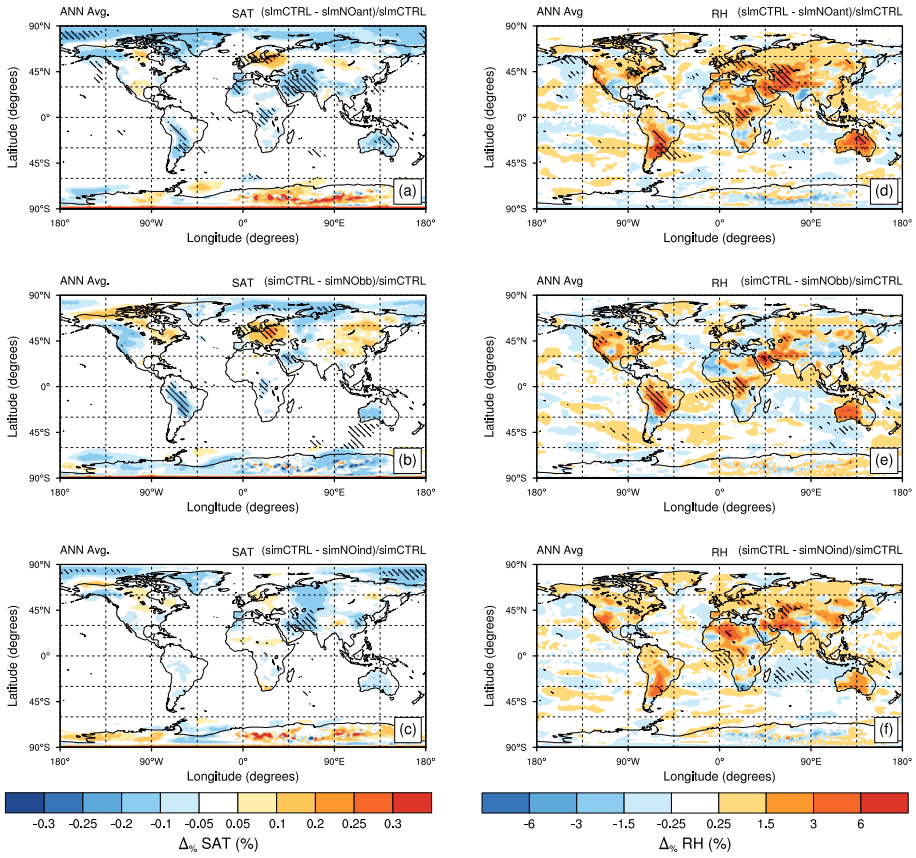


**Figure S8.** Spatial distribution of annual percentage change (in %) in surface atmospheric temperature (SAT; left column) and relative humidity (RH; right column) between the control experiment (“SimCTRL") and sensitivity experiments: **(a)** without all anthropogenic emissions (“SimNOant"); **(b)** without biomass burning emissions (“SimNObb"); and **(c)** without anthropogenic emissions except biomass burning (“SimNOind"). All experiments are set in a present-day climatic state. Shaded regions indicate areas where the change in SAT (RH) is significant at the 95% confidence level. The difference has been computed using last 20-year averages for each experiment.

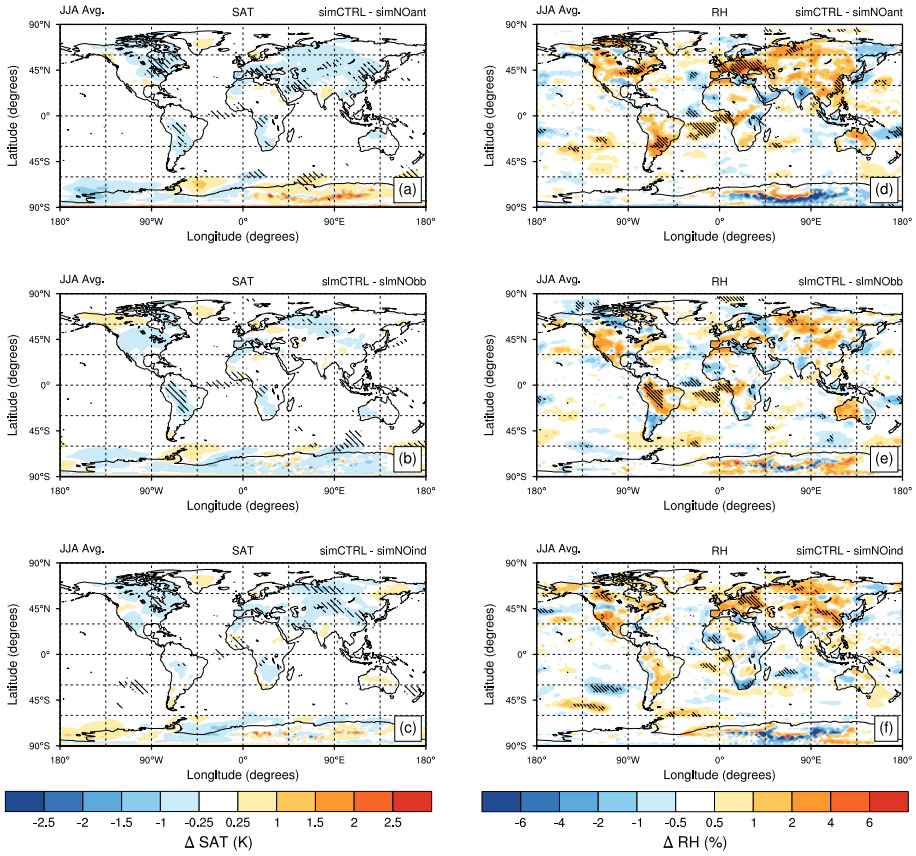


**Figure S9.** As Figure 5 for seasonal (boreal summer) absolute change in surface atmospheric temperature (SAT, in K; left column) and relative humidity (RH, in %; right column) between the control experiment ("SimCTRL") and sensitivity experiments ("SimNOant", "SimNObb" and "SimNOind").

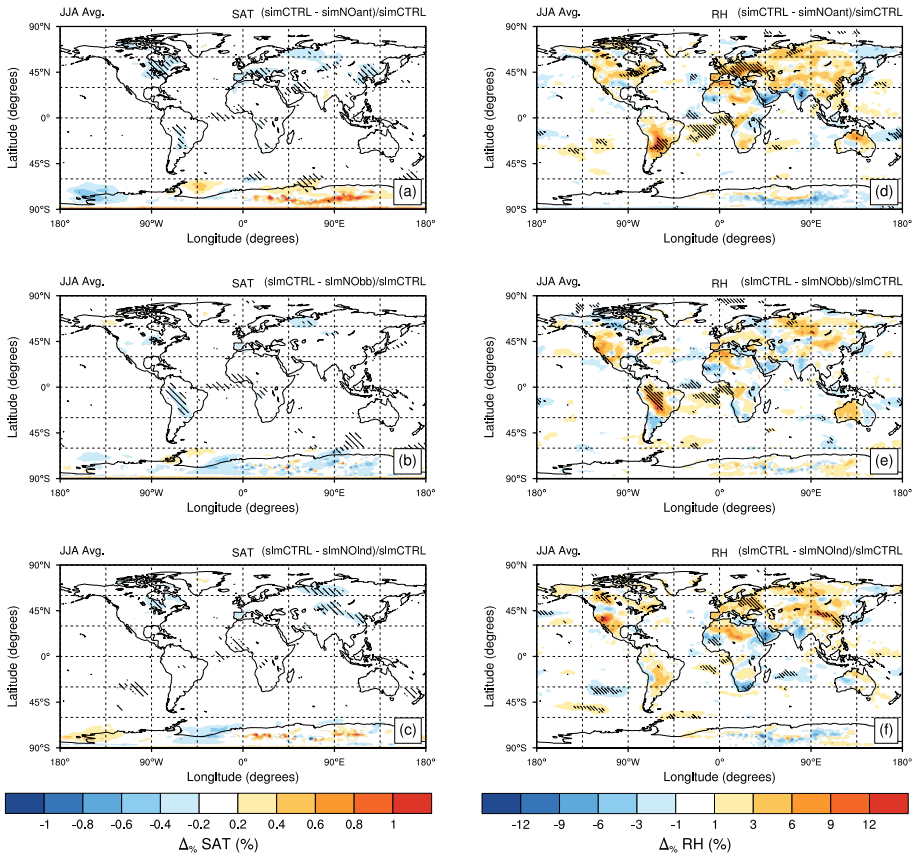


**Figure S10.** As Figure **S8** for seasonal (boreal summer) percentage change (in %) in surface atmospheric temperature (SAT; left column) and relative humidity (RH; right column) between the control experiment ("simCTRL") and sensitivity experiments ("SimNOant", "SimNObb" and "SimNOind").

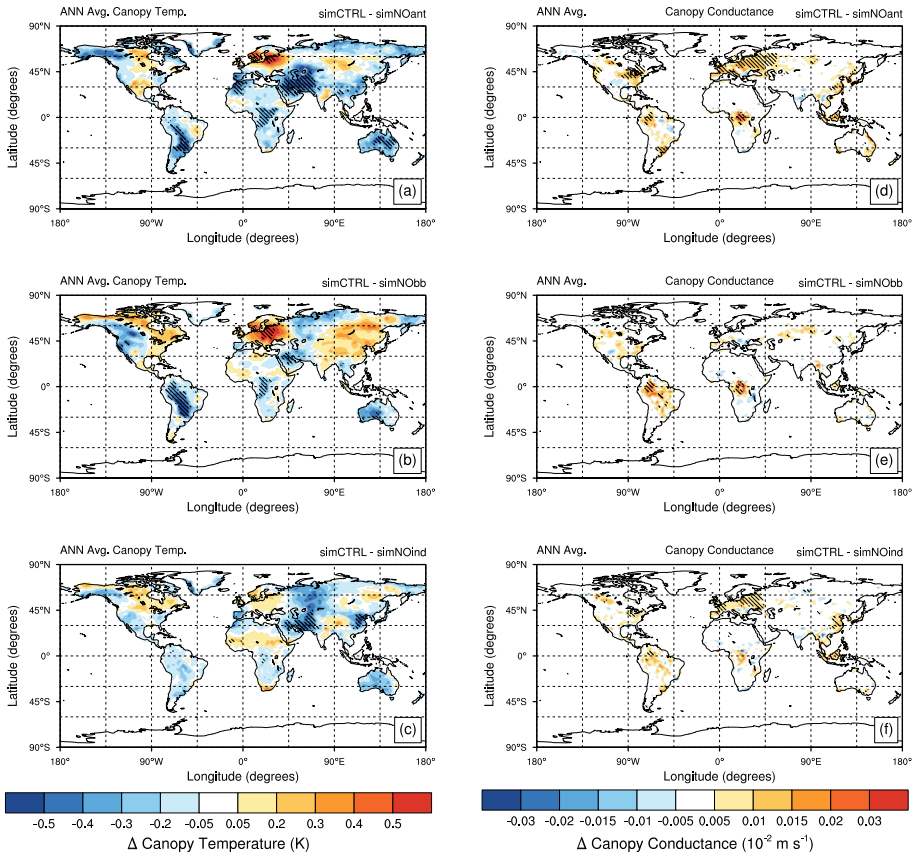


**Figure S11.** Spatial distribution of annual absolute change in canopy temperature (in K; right column) and canopy conductance (in $10^{-2}\,\mathrm{m\,s^{-1}}$; left column) between the control experiment ("simCTRL") and sensitivity experiments: **(a)** without all anthropogenic emissions ("SimNOant"); **(b)** without biomass burning emissions ("SimNObb"); and **(c)** without anthropogenic emissions except biomass burning ("SimNOind"). All experiments are set in a present-day climatic state. Shaded regions indicate areas where the change in canopy conditions are significant at the 95% confidence level. The difference has been computed using last 20-year averages for each experiment.

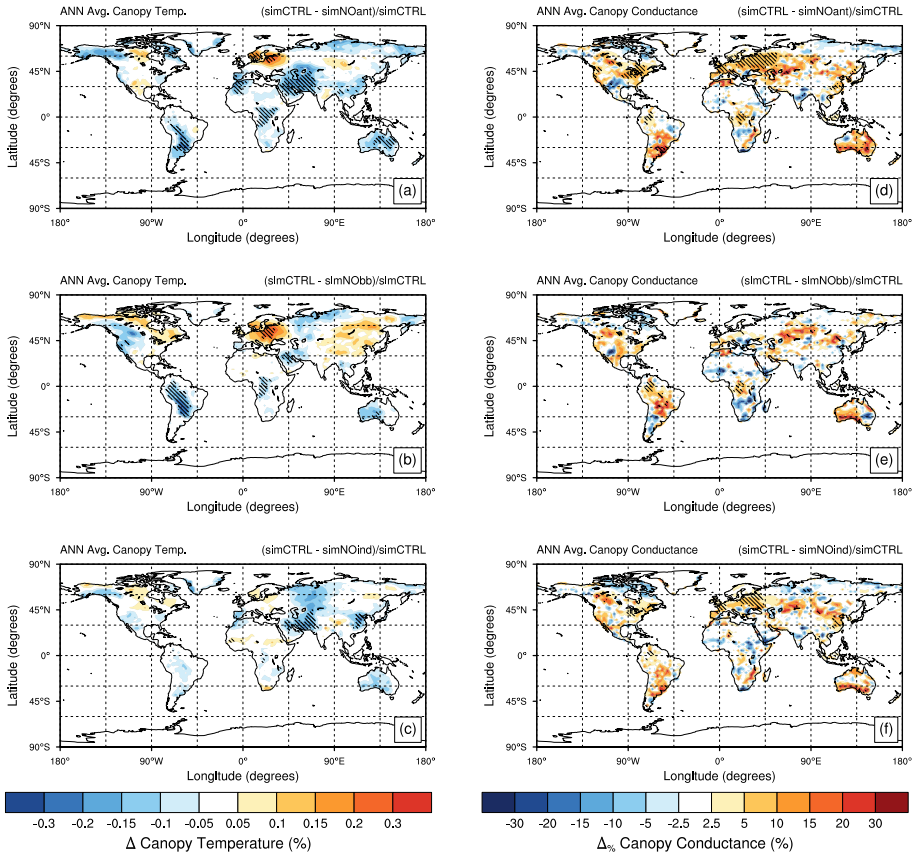


**Figure S12.** Spatial distribution of annual percentage change (in %) in canopy temperature and canopy conductance between the control experiment ("simCTRL") and sensitivity experiments: **(a)** without all anthropogenic emissions ("SimNOant"); **(b)** without biomass burning emissions ("SimNObb"); and **(c)** without anthropogenic emissions except biomass burning ("SimNOind"). All experiments are set in a present-day climatic state. Shaded regions indicate areas where the change in canopy conditions are significant at the 95% confidence level. The difference has been computed using last 20-year averages for each experiment.

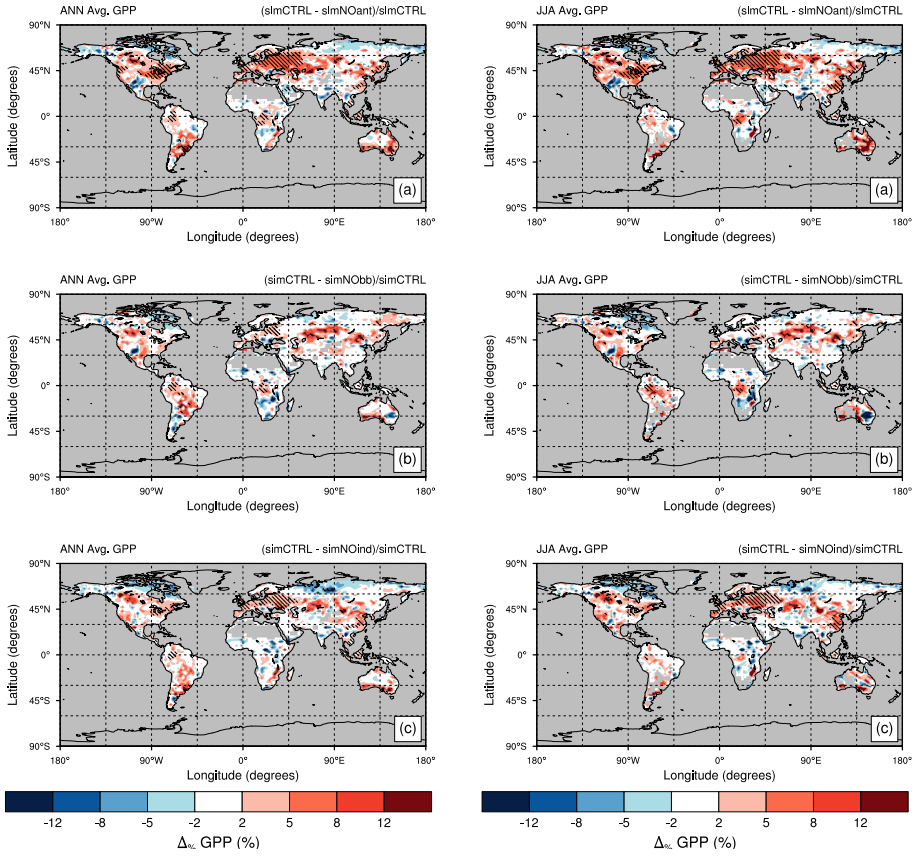


**Figure S13.** Spatial distribution of annual and seasonal (boreal summer) percentage change (in %) in Gross Primary Productivity (GPP) between the control experiment ("SimCTRL") and sensitivity experiments: **(a)** and **(d)** without all anthropogenic emissions ("SimNOant"); **(b)** and **(e)** without biomass burning emissions ("SimNObb"); and **(c)** and **(f)** without anthropogenic emissions except biomass burning ("SimNOind"). All experiments are set in a present-day climatic state. Shaded regions indicate areas where the changes are significant at the 95% confidence level. The difference has been computed using last 20-year averages for each experiment.

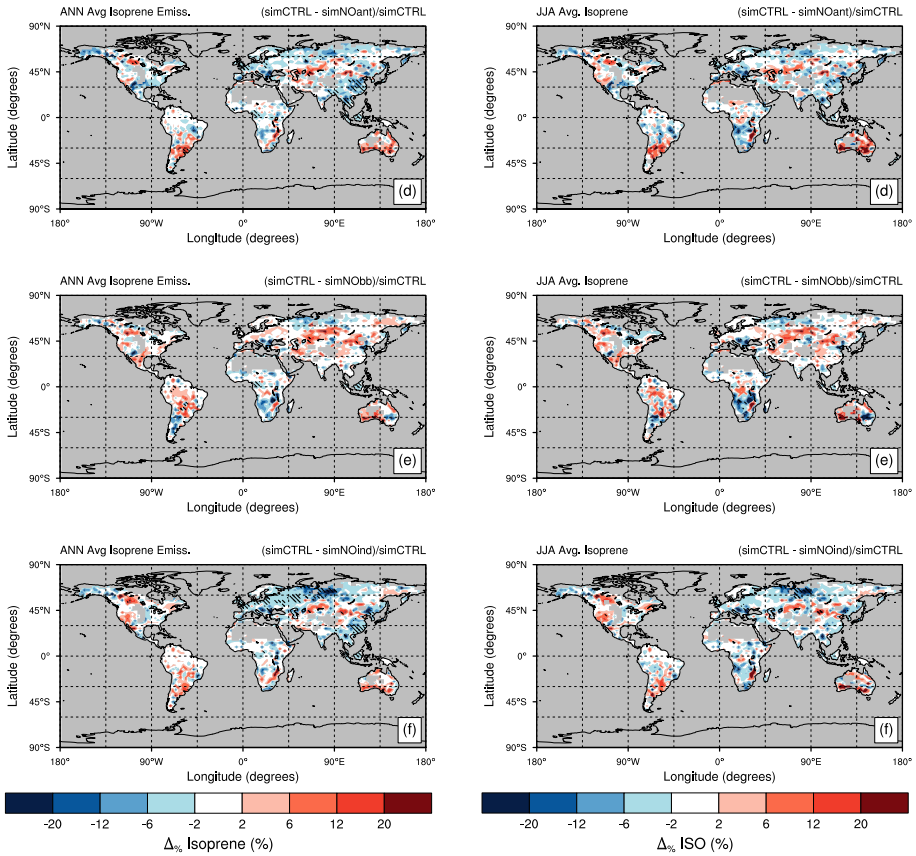


**Figure S14.** As Figure **S13** for percentage change (in %) in isoprene emission between the control experiment ("simCTRL") and sensitivity experiments ("SimNOant", "SimNObb" and "SimNOind").