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Impacts of future land use and land cover change on mid-21st-century surface ozone air quality: distinguishing between the biogeophysical and biogeochemical effects

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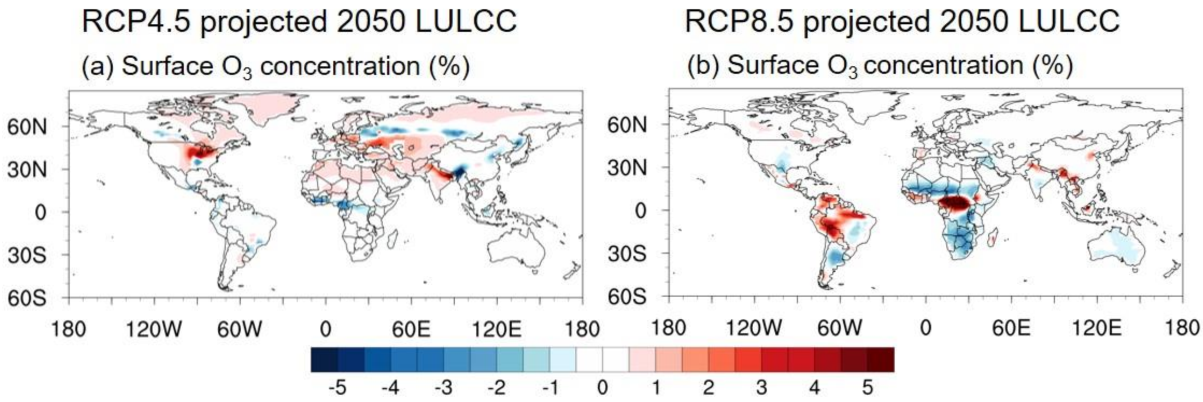

Figure S1. Relative changes of surface ozone from Off-line runs under RCP4.5 (left) and RCP8.5 (right) projected LULCC for the boreal summer (June-July-August) averaged for the final 10 years of simulations. Regions with dots indicate changes that are significant at the 90% confidence level. These are results from Off-line runs with prescribed meteorology; i.e., meteorological variables do not respond to LULCC.).

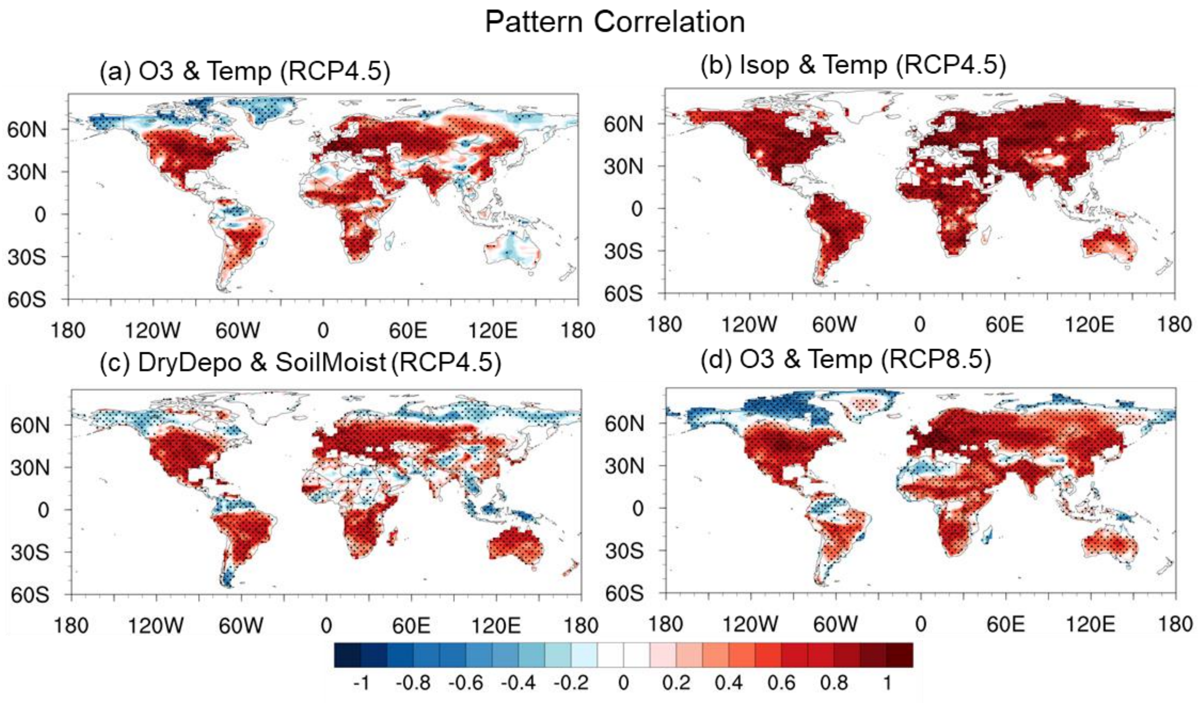

Figure S2. Simulated pattern correlation between changes of surface ozone and surface air temperature under two scenarios: RCP4.5 (a) and RCP8.5 (d), isoprene emission and surface air temperature (b), dry deposition velocity and soil moisture at the top 10 cm layer (c) in RCP4.5. Analysis is from On-line runs during the boreal summer averaged from the 10-year analysis. Regions with dots indicate changes that are significant at the 95% confidence level.

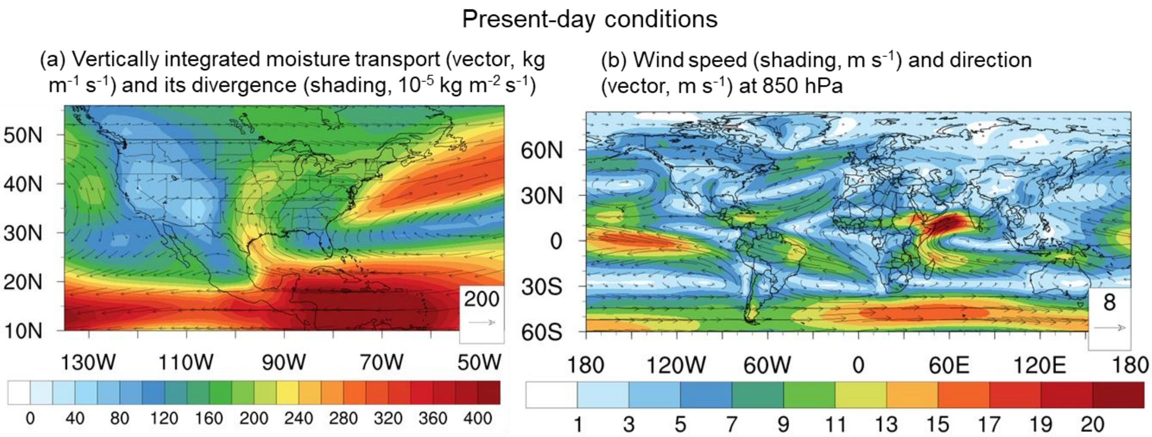

Figure S3. Present-day conditions in vertically integrated moisture transport and its divergence change (a), and present-day 850 hPa wind speed and direction (b) during the boreal summer over the US due to RCP4.5 projected LULCC.

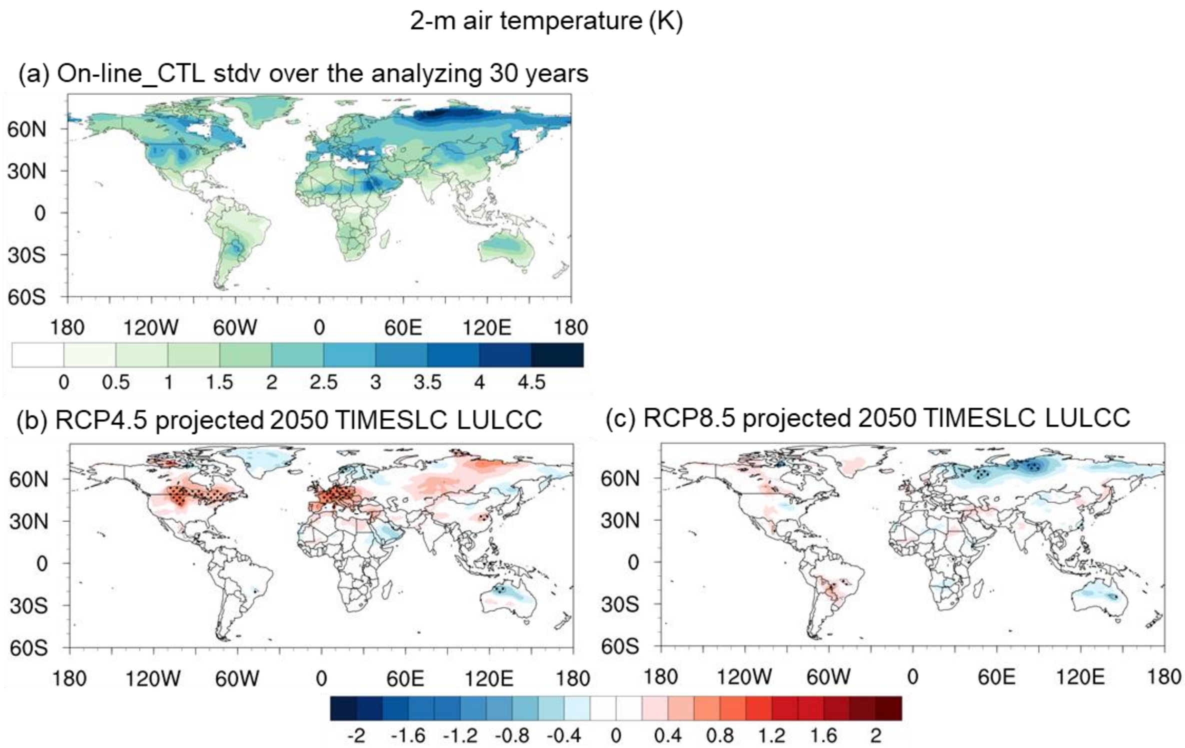

Figure S4. Standard deviations of 2-m air temperature in On-line_CTL run (a), compared with time-sliced changes induced by LULCC from On-line runs under two future scenarios: RCP4.5 (b) and RCP8.5 (c) during the boreal summer.

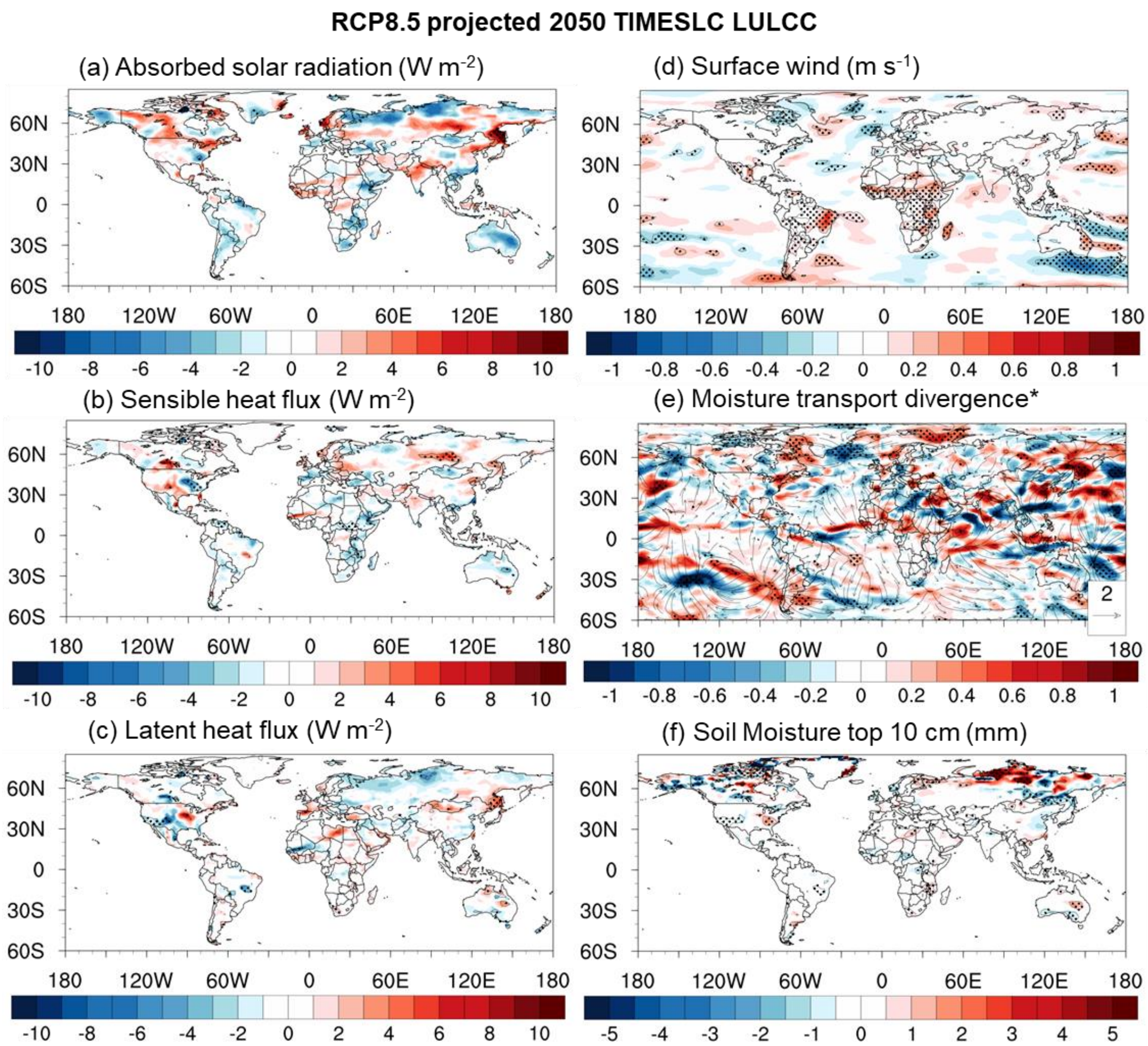

Figure S5. Changes in simulated surface net solar radiation, sensible and latent heat fluxes, surface wind, *vertically integrated moisture transport divergence (vector, kg m^{-1} s^{-1}, shading, 10^{-5} kg m^{-2} s^{-1}), and soil moisture at 10 cm layer during the boreal summer over due to RCP8.5 projected LULCC. Regions with dots indicate changes that are significant at the 95% confidence level.

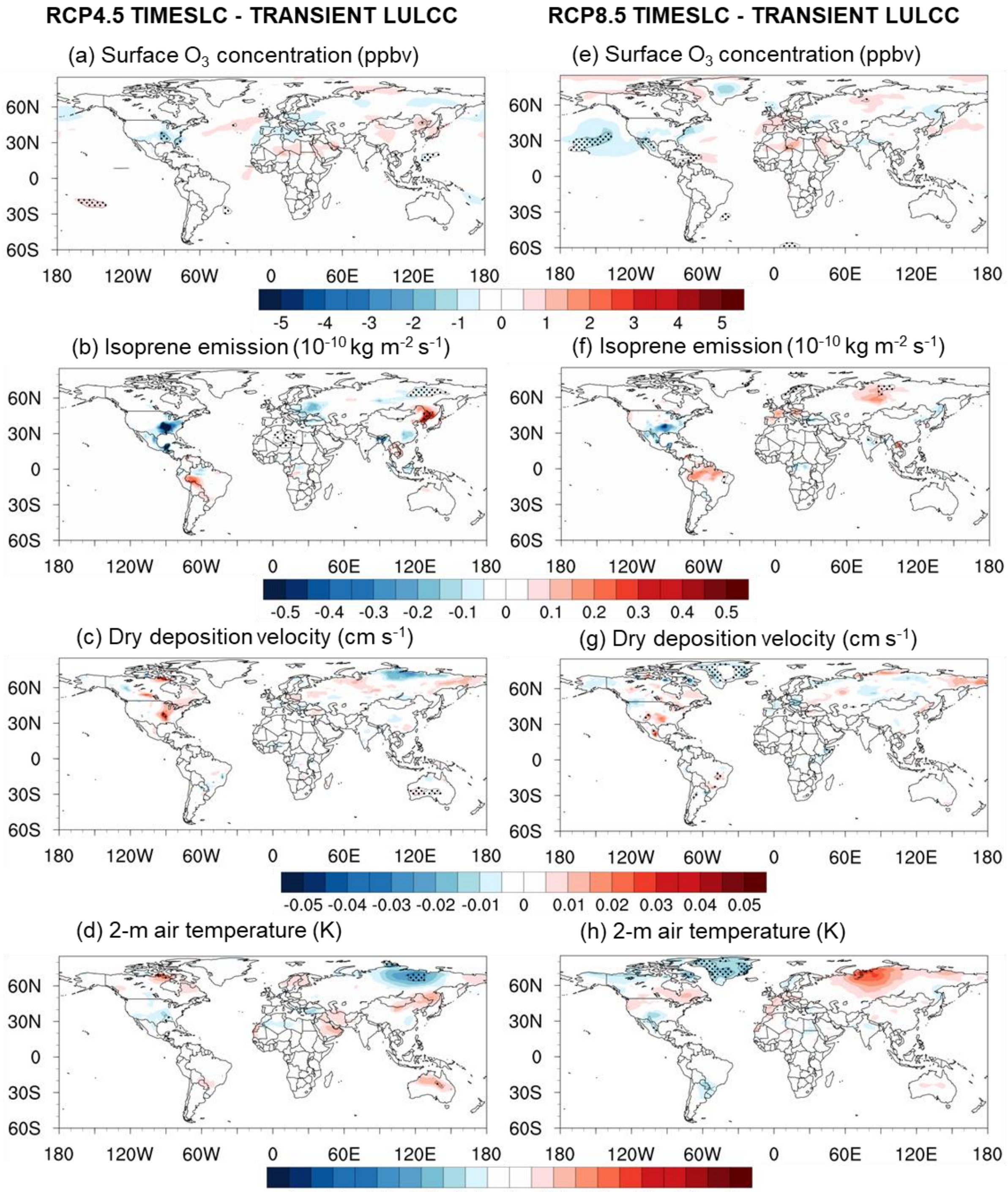

Fig. S6. Differences between the time-sliced vs. transient simulated results, as shown in Fig. 4 and Fig. 6 of the main text. Statistically significant differences (>95% confidence) are indicated with dots.