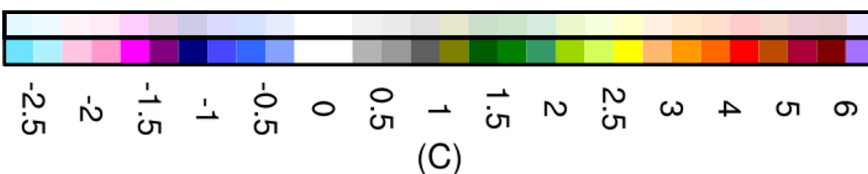
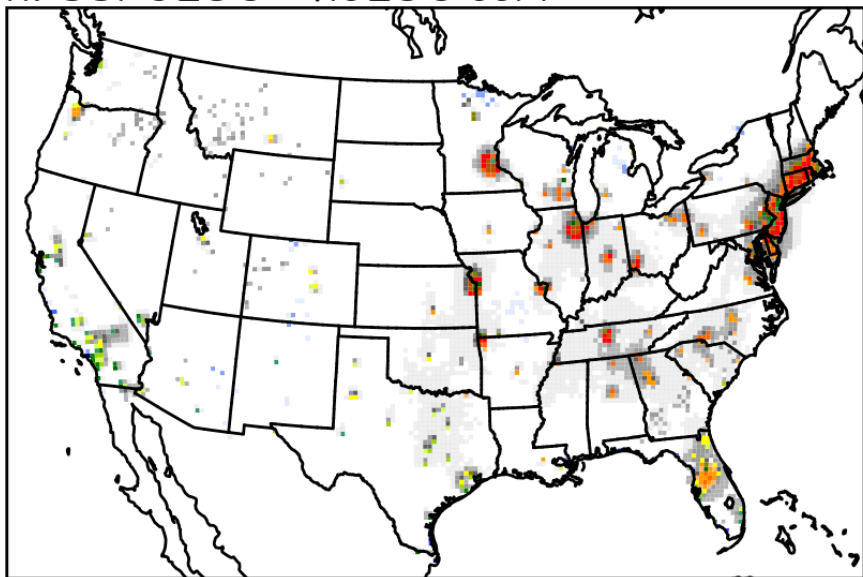


SSP-Based Land-Use Change Scenarios: A Critical Uncertainty in Future Regional Climate Change Projections

h. SSP5LUC - noLUC JJA



Difference in the summer average near-surface mean temperature projections at the end of the 21st Century between WRF simulations using LUCs based on SSP5 and simulations with no future LUC. Urbanized areas have significantly more warming.

Scientific Achievement

In most regional climate modeling (RCM) experiments, projections of future climate are produced assuming the current spatial distribution of different land cover types (e.g. urban, cropland, forest, etc.) will stay the same, even for long-term futures. To better understand the role this assumption plays in future projections, we assessed the combined effects of greenhouse-gas-forced climate change and projected land-use changes (LUCs).

Significance and Impact

- Local-to-regional projections of temperature and precipitation change are strongly influenced by urban and agricultural land-use changes.
- Urban land expansion has a greater influence on contiguous United States climate change projections than agricultural land expansion.
- In future urban areas, the temperature increase caused by greenhouse gas warming is doubled by warming effects from urban land expansion.

Research Details

We produced and examined RCM simulations with and without future LUCs that are consistent with Shared Socioeconomic Pathways 3 (SSP3) and SSP5 and related to Representative Concentration Pathway (RCP) 8.5, and examined their differences at the end of the 21st Century.

Bukovsky, M.S., J. Gao, L. Mearns, B. O'Neill, 2020: SSP-based land use change scenarios: a critical uncertainty in future regional climate change projections. *Earth's Futures*. <http://dx.doi.org/10.1029/2020EF001782>



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