Atmospheric
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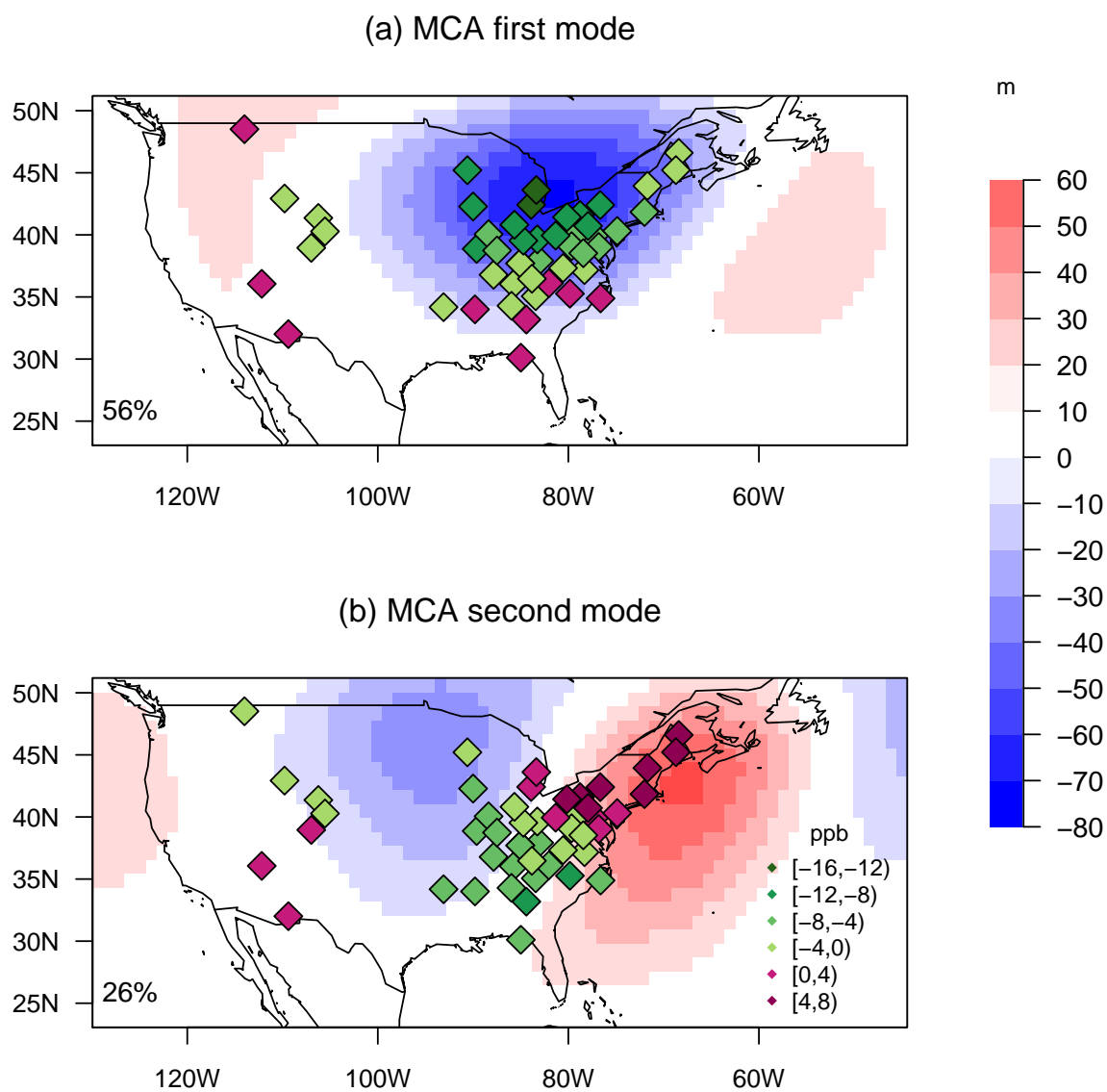
Supplement of

How waviness in the circulation changes surface ozone: a viewpoint using local finite-amplitude wave activity

Wenxiu Sun et al.

Correspondence to: Wenxiu Sun (ws299@cornell.edu)

**Figure S1.** As in Fig. 3, except for the first mode (a) and the second mode (b) from the Maximum Covariance Analysis of 500 hPa geopotential height (Z_{500}, in m) within the analysis domain and MDA8 ozone at selected CASTNET stations for JJA. Z_{500} is from the ERA-Interim reanalysis and ozone is measured at the CASTNET sites. The percent variance explained by each mode is given in the lower-left corner of each figure.
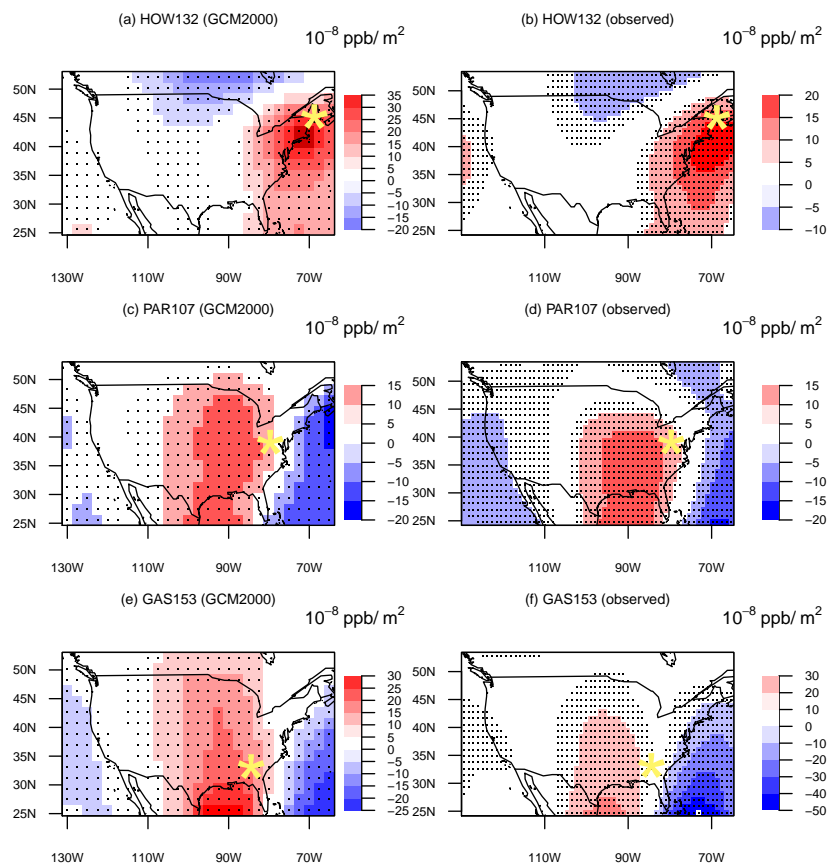
Figure S2. Regression coefficients between MDA8 ozone at representative sites (star sign) and AWA in the study region. The sites are HOW132 (68.7W, 45.2N), PAR107 (79.7W, 39.1N), GAS153 (84.4W, 33.2N) from north to south. The left column (a, c, e) is from the GCM2000 simulation. The right column (b, d, f) are results using CASTNET ozone and AWA from ERA-Interim reanalysis. Stippling represents where the regression coefficient is significant at 5% significance level.
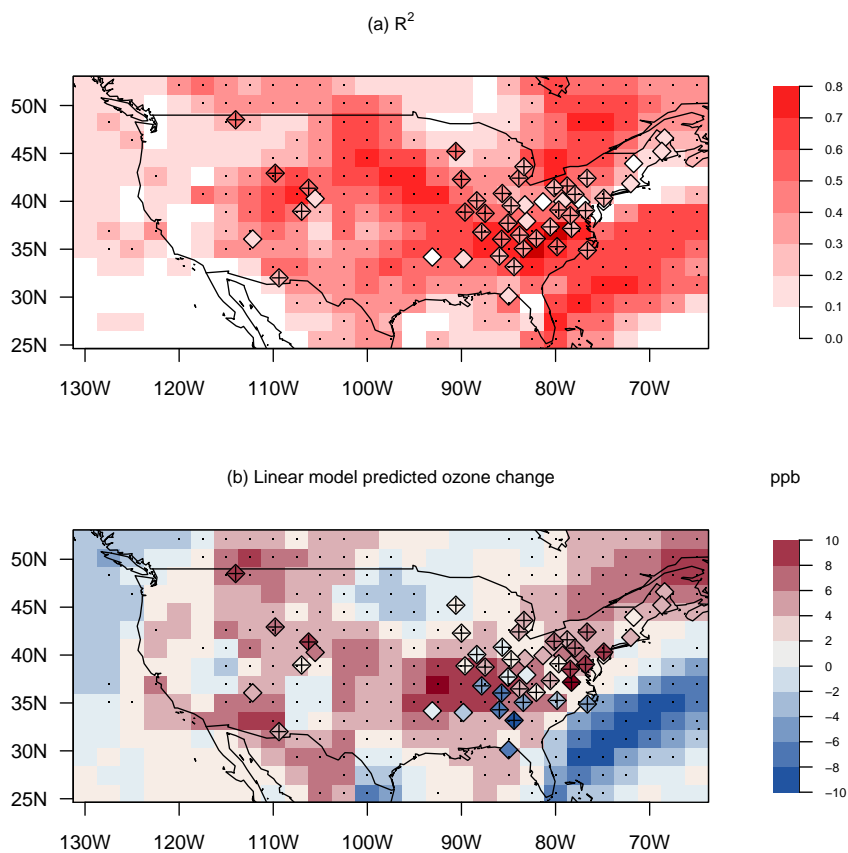
Figure S3. (a) MDA8 ozone's interannual variance explained (R^2) of the linear regression model using Z_{500} projection value as the explanatory variable, with modeled results in shades and observed results in diamonds. Plus signs and stippling represent where R^2 is significant (at 5% significance level) at CASTNET sites and model grids. (b) Change in MDA8 ozone between future climate (2100s) and present climate (2000s) predicted by linear regression models using GCM2000 Z_{500} and ozone fitted slope pattern (S) and regression coefficient (β) (shades) overlaid with predicted ozone change at CASTNET sites using reanalysis Z_{500} and CASTNET ozone fitted S and β (diamonds).
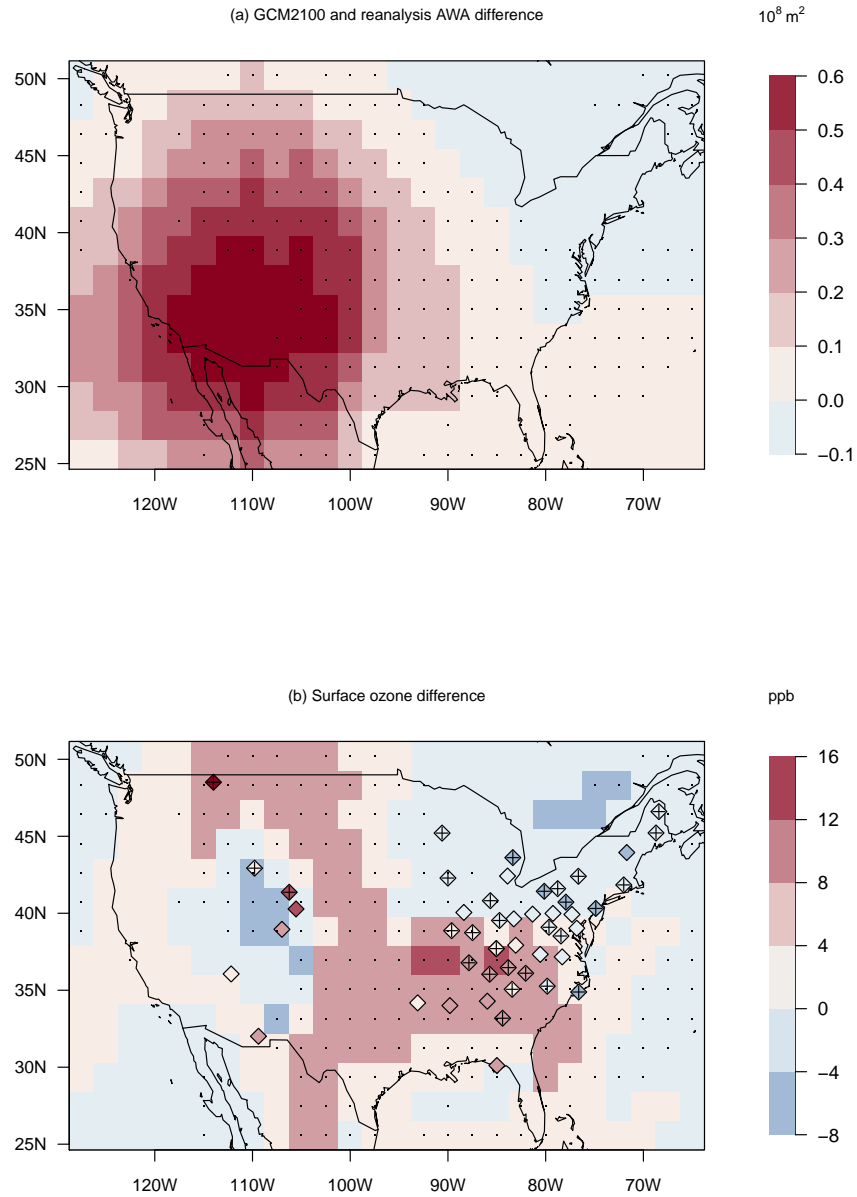
Figure S4. (a) JJA difference between AWA in the GCM2100 simulation and AWA in the ERA-Interim reanalysis. (b) Change in MDA8 ozone from the linear regression model derived from the GCM2000 simulation (shaded) or the measurements (diamonds) using the AWA difference projection as the explanatory variable, where the difference in AWA is calculated between the GCM2100 simulation and the ERA-Interim reanalysis.