

Supplementary

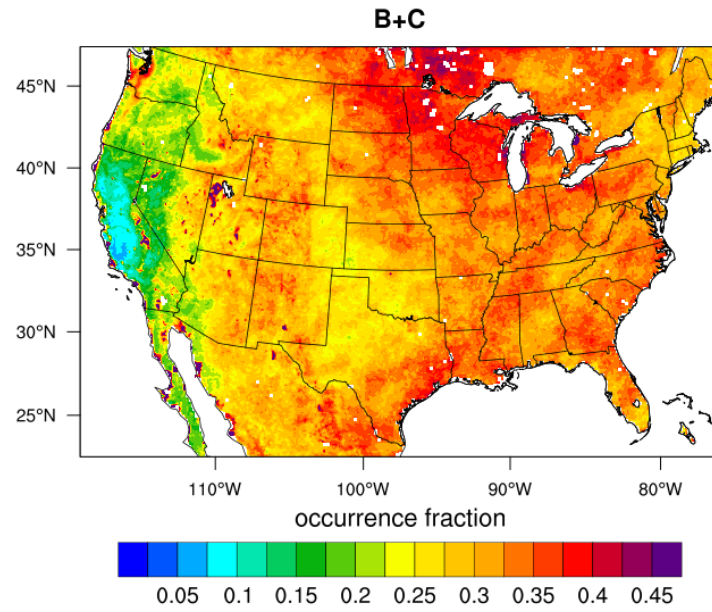


Fig. S1. Spatial distribution of sum of contingency category B and C between the WRF-generated clouds (CNTR simulation) and SatCORPS GOES retrievals averaged over the whole study period.

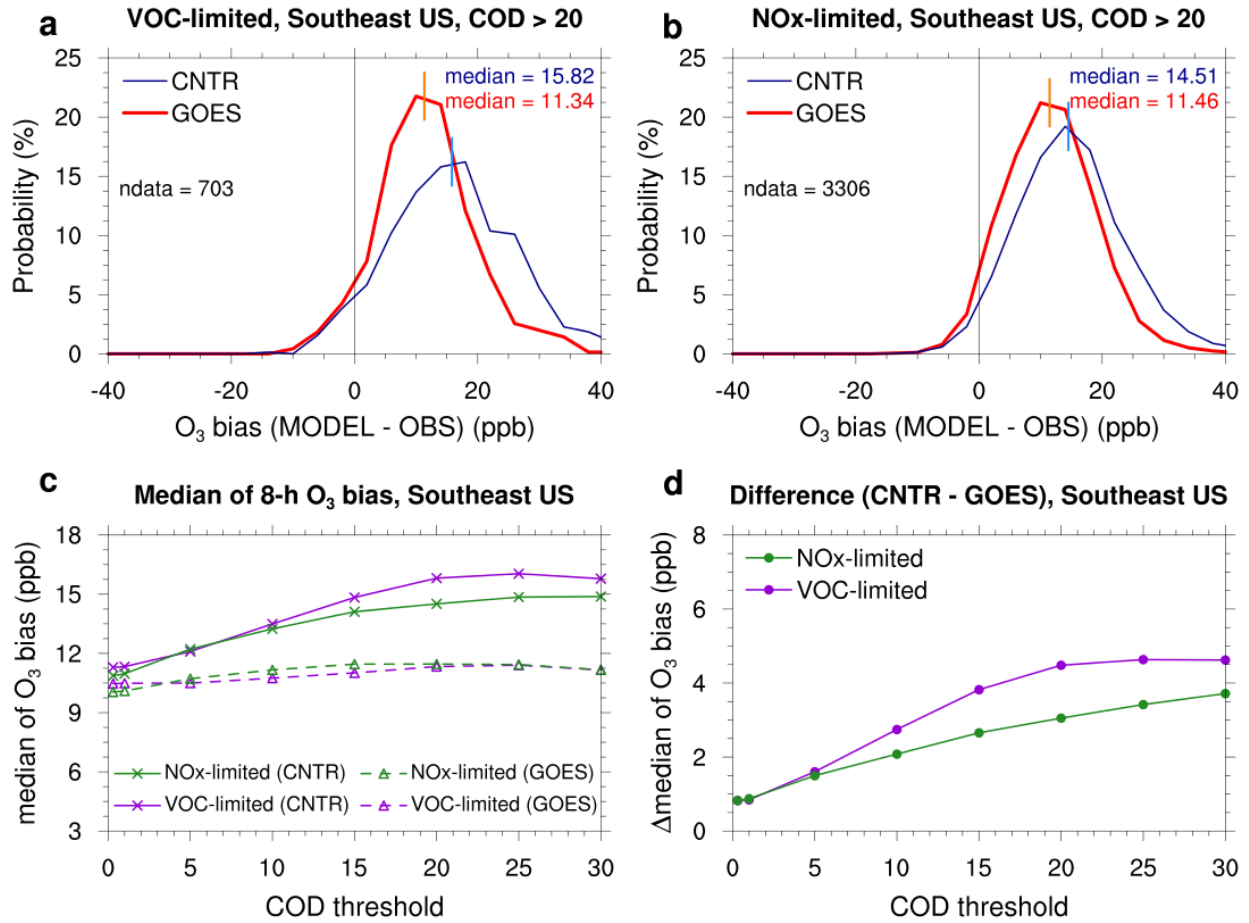


Fig. S2. Same as Fig. 7, but for the southeast US where the latitude is between 25°N and 40°N and the longitude is between 100°W and 70°W.

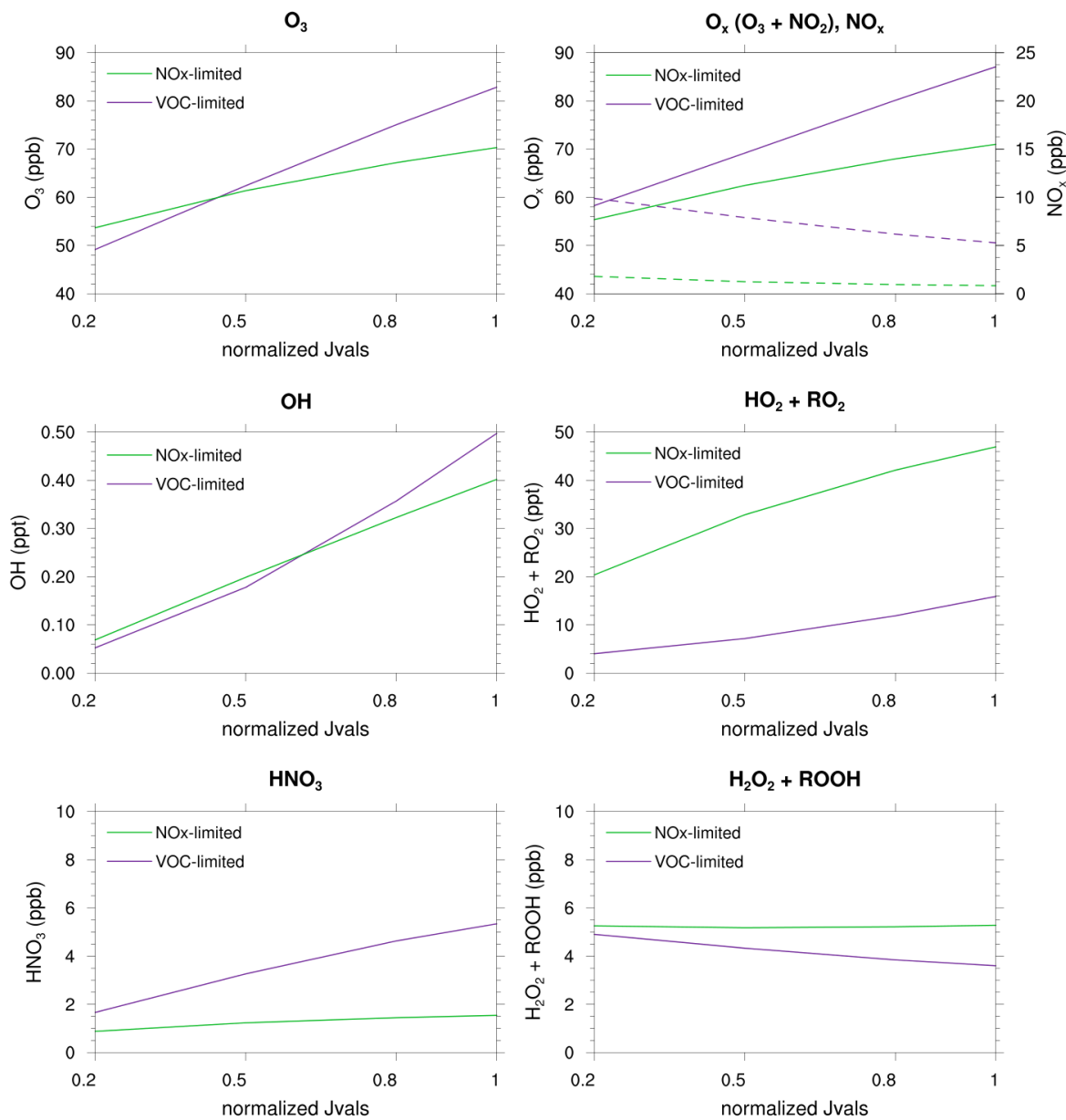


Fig. S3. Box modeling results. Sensitivity of various chemical species to the cloud attenuation of photolysis rates. For NO_x (dashed lines) in the upper right subfigure, read the right y-axis.

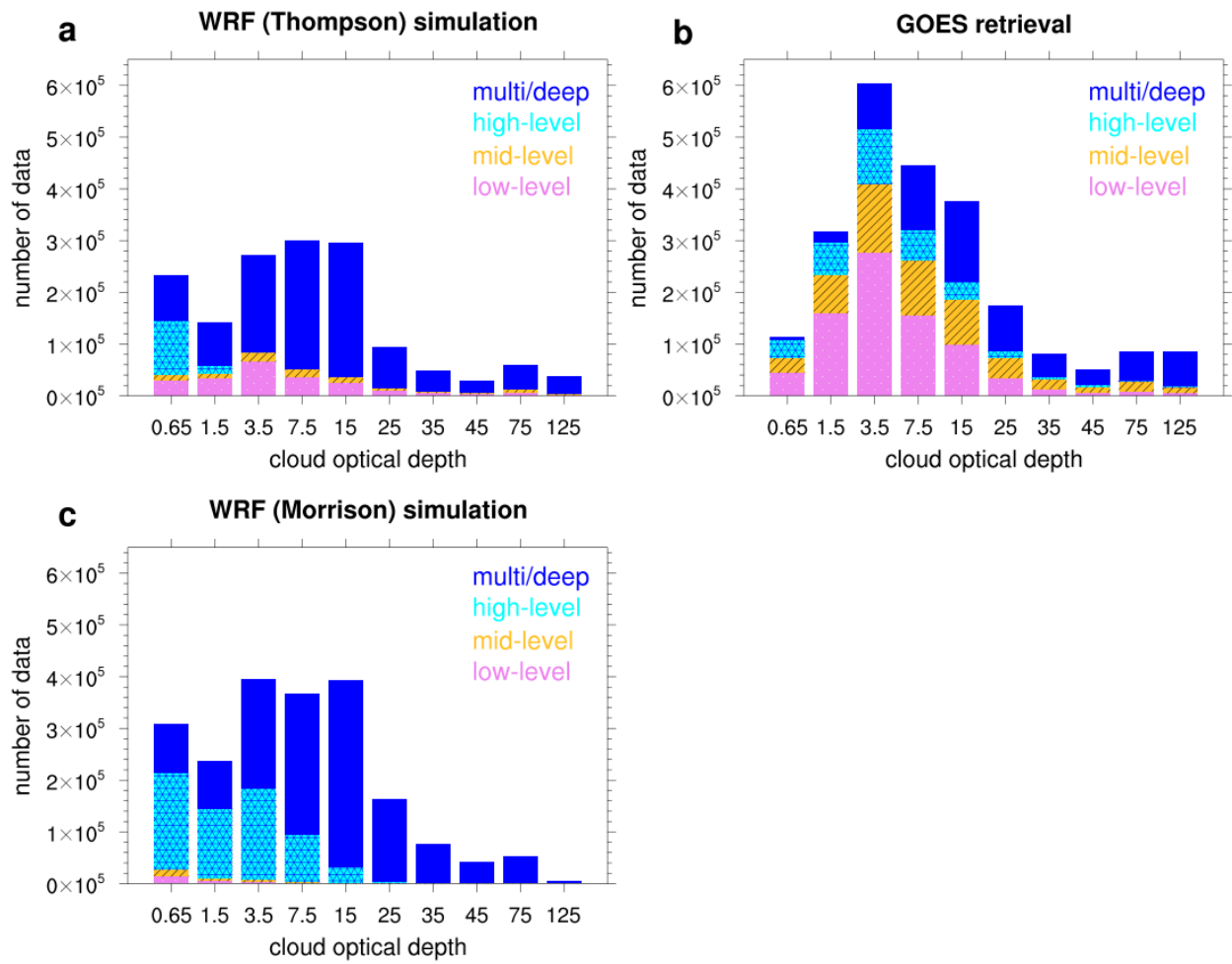


Fig. S4. Histogram of hourly cloud optical depth (COD) during the daytime (16–23 UTC) over CONUS (land only) for the period of 3–12 July 2013 from (a) WRF-Chem simulations with the Thompson microphysics, (b) GOES retrievals, and (c) WRF-Chem simulations with the Morrison microphysics for the same 10-day period.

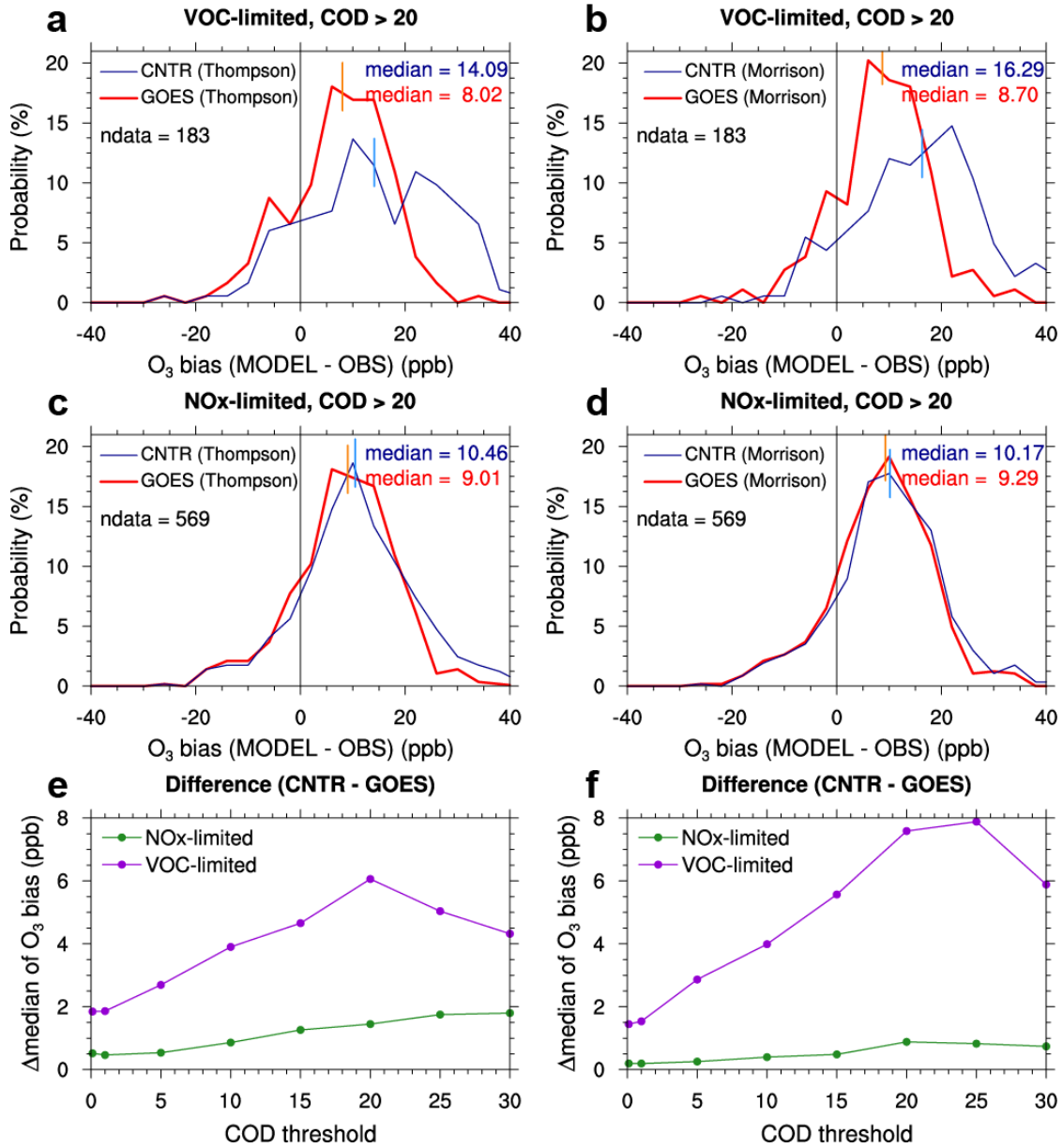


Fig. S5. (Left column) The results of 3–12 July 2013 WRF-Chem simulations with Thompson microphysics scheme. (a/c) Probability density function of 8-h O₃ bias (model value minus observation value) for VOC/NO_x-limited regime under cloudy sky conditions defined with COD threshold of 20 in the simulations with the Thompson microphysics scheme. (b/d) Same as (a/c), but for the simulations with the Morrison microphysics scheme. (e and f) Difference in median values of 8-h O₃ bias between the two simulations with respect to COD threshold (i.e., CNTR

minus GOES) for the simulations with the Thompson and with the Morrison microphysics schemes, respectively.