



Supplement of

Satellite-derived constraints on the effect of drought stress on biogenic isoprene emissions in the southeastern US

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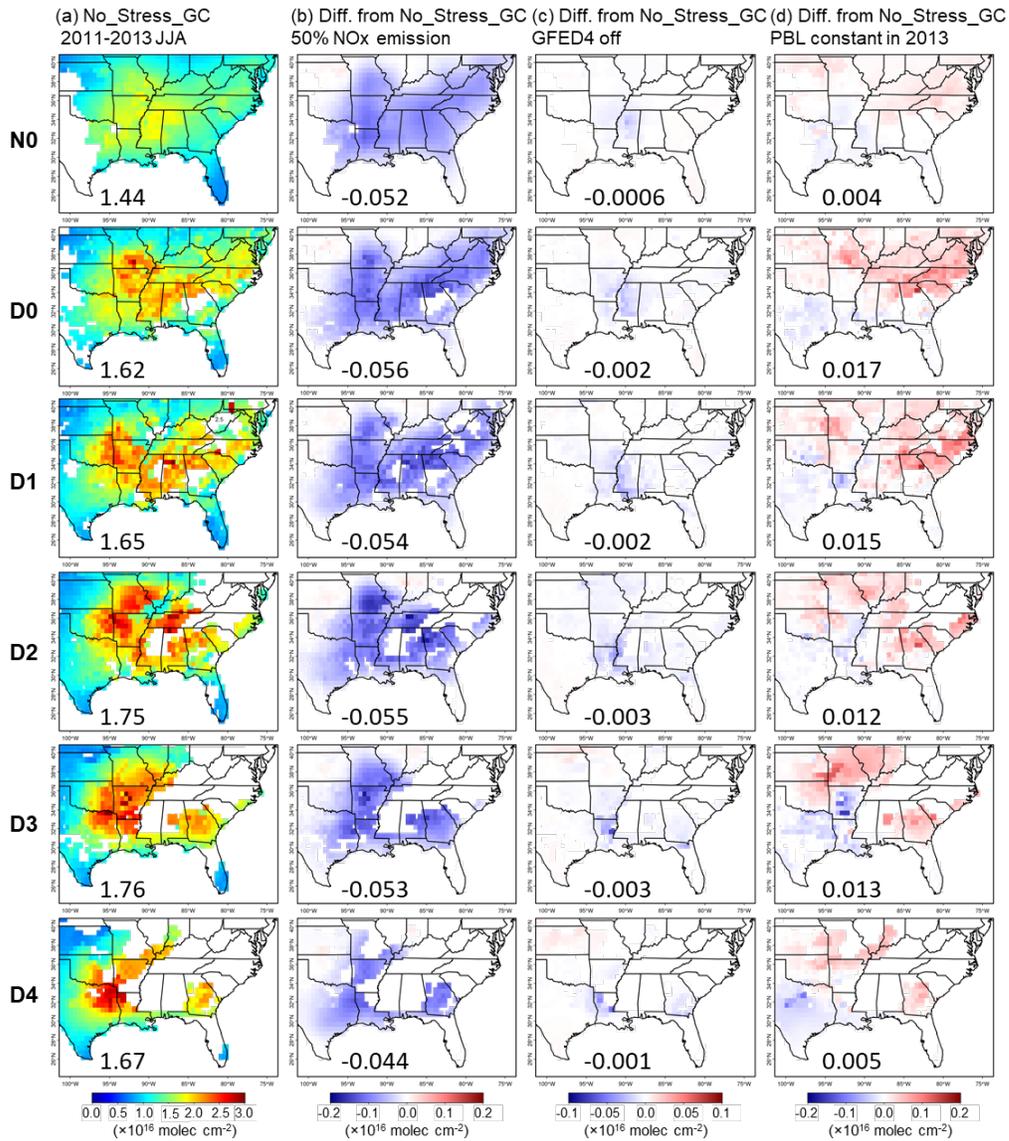


Figure R1: (a) No_Stress_GC simulated HCHO columns in JJA 2011-2013 at each USDM level. (b-d) Sensitivity tests of HCHO column changes when (b) NEI2011 NOx emissions are reduced by 50% in the SE US, (c) GFED4 wildfire emissions are turned off, and (d) keep PBL in 2011-2012 (drought years) the same as in 2013 (non-drought year). The numbers in each panel indicate the regional mean values.

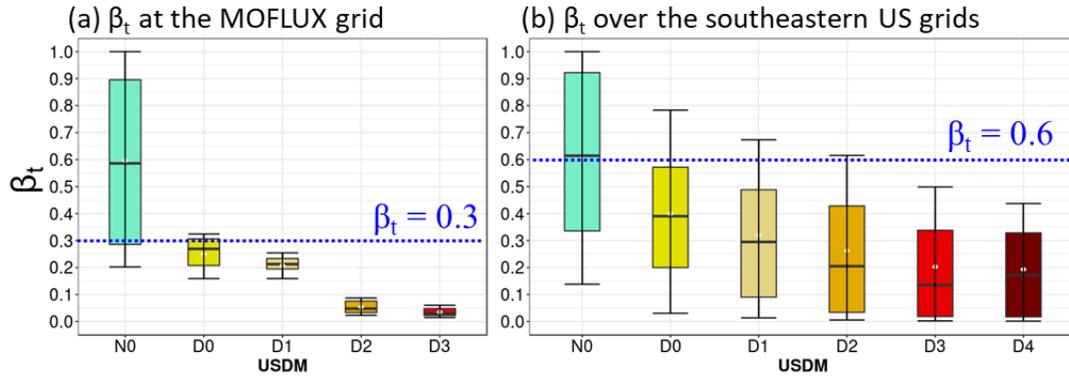


Figure S2. Boxplot of β_t statistical distributions at the MOFLUX grid during May-September 2012 (a) and over the southeastern US grids during 2005-2017 JJA (b).

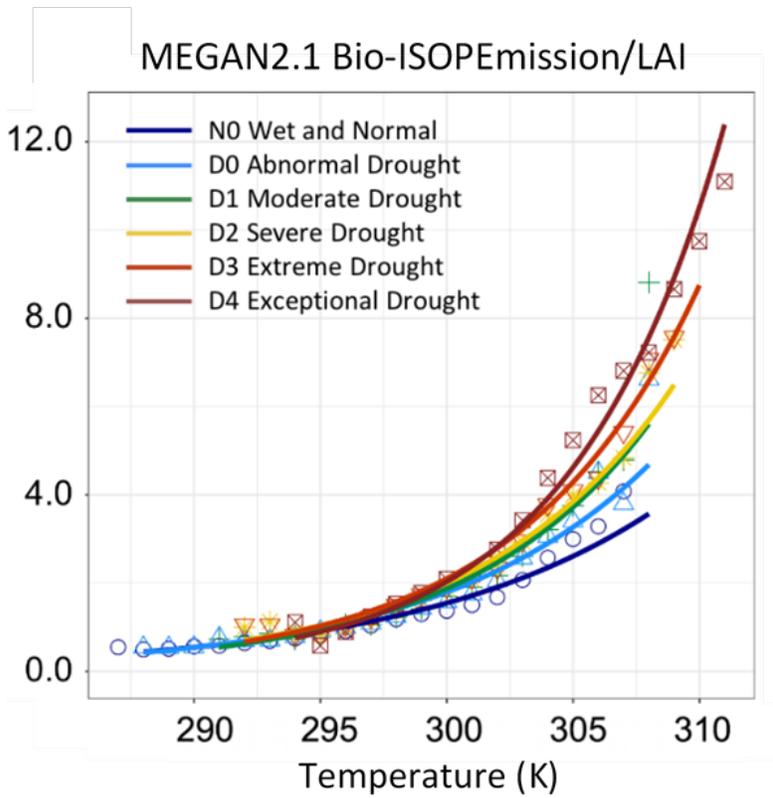


Figure S3. Temperature (K) response of the ratio between MEGAN2.1 biogenic isoprene emissions ($10^{-10} \text{ kg m}^{-2} \text{ s}^{-1}$) and LAI (ratio Bio-ISOPEmission/LAI) for different drought levels in JJA 2005-2017.

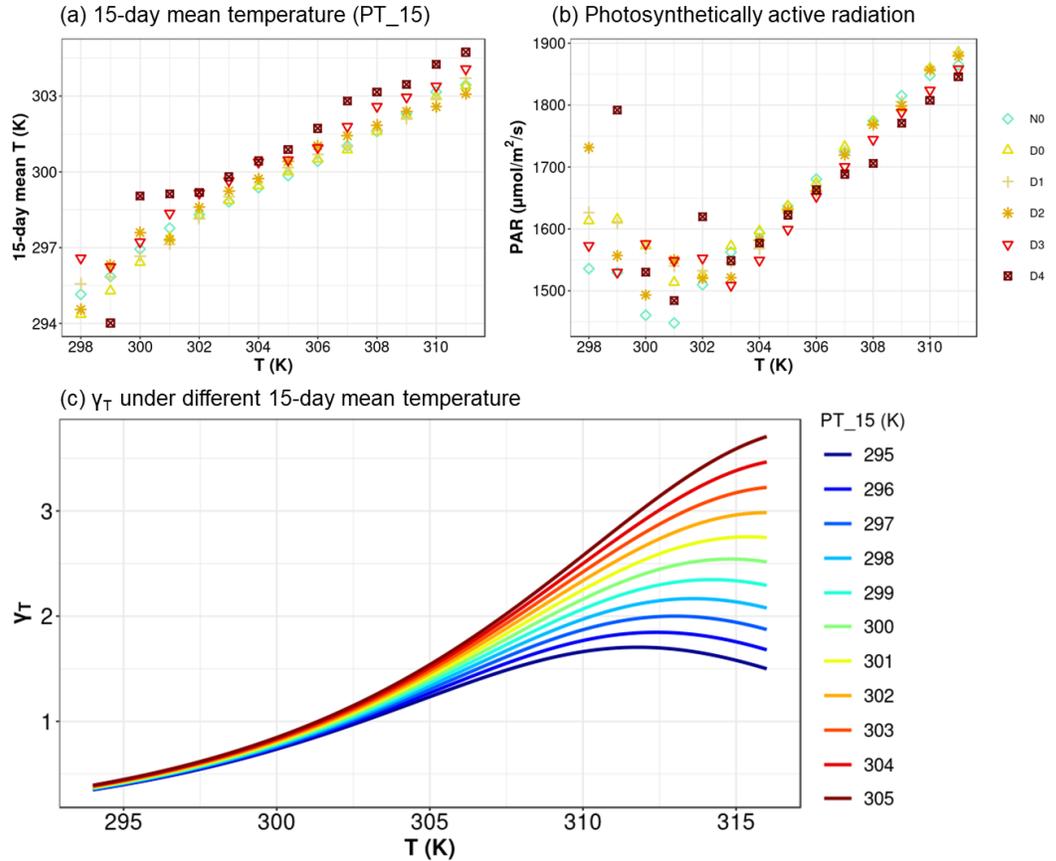


Figure S4. Surface temperature (T) binned 15-day mean surface temperature (PT_15; a) and photosynthetically active radiation (PAR; b) during midday hours (13:30 LT) at each USDM level from archived MERRA2 meteorology over the SE US. (c) Temperature factor (γ_T) in MEGAN2.1 changes with surface temperature under different PT_15 values.

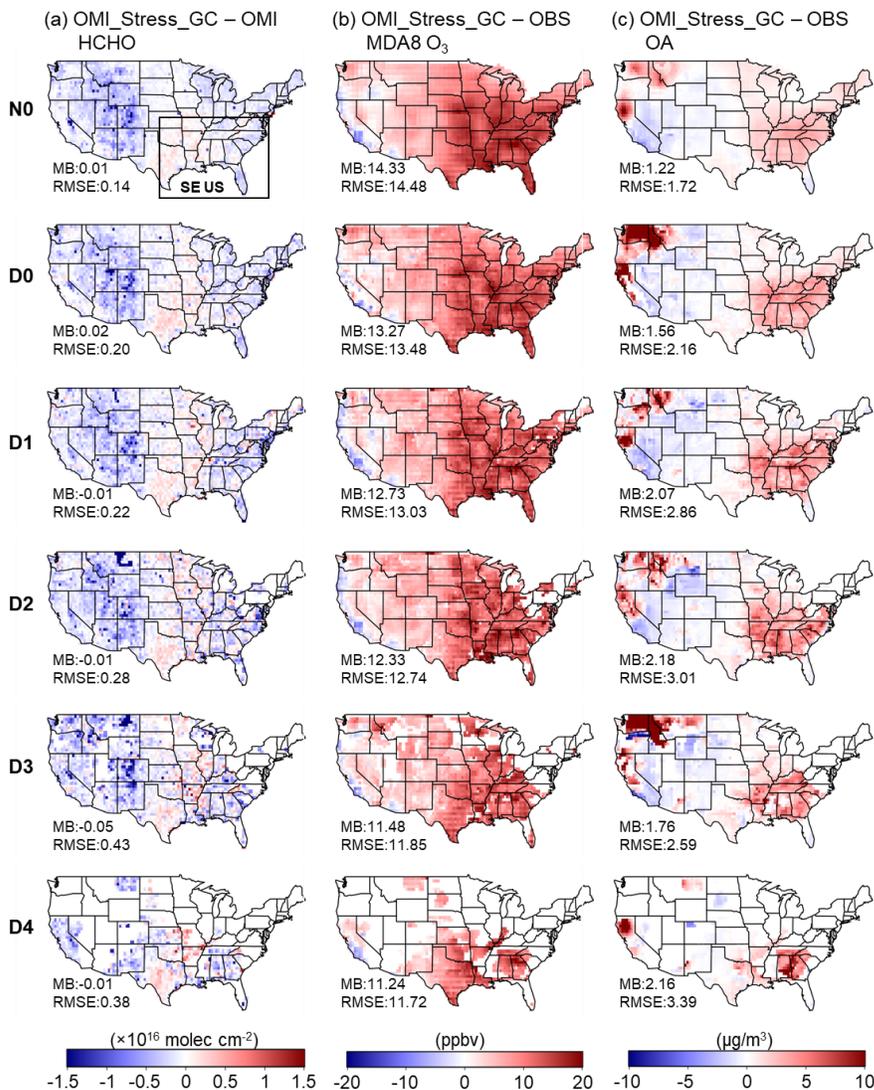


Figure S5: Mean differences between OMI_Stress_GC simulated and observed HCHO columns (a), MDA8 ozone (b), and OA (c). Numbers at the bottom-left corner of each panel indicate the SE US (black box) regional mean bias (MB) and root mean square error (RMSE).

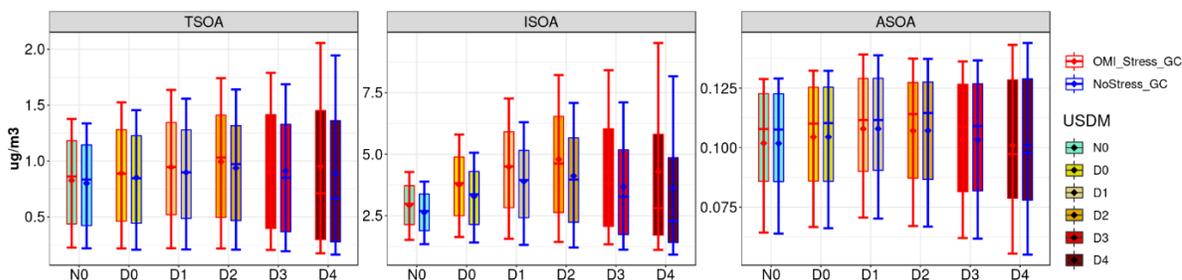


Figure S6. Boxplot of three SOA components in GEOS-Chem ComplexSOA scheme for NoStress_GC and OMI_Stress_GC simulations. ASOA, TSOA, and ISOA stand for anthropogenic, terpene and isoprene SOA, respectively.