

Impact of Wildfires on Near Surface **Climate and GPP in E3SM**

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Update 1: 20-year simulation with GFED4s fire aerosol emissions during 1997-2016

(Tg/yr)

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Tsigaridis et al. 2014

Update 2: MISR smoke plume height during fire peak seasons

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MDPI



remote sensing

Article

A Global Analysis of Wildfire Smoke Injection Heights Derived from Space-Based **Multi-Angle Imaging**

MariaVal Martin ^{1,†,*}, Ralph A. Kahn ^{2,†} and Mika G. Tosca ^{3,4}

Martin et al. 2018; Zhu et al., 2018

GFED4s Dry Matter Emission





Update 3: New strategy to amplify fire emissions in fire affected area during fire peak seasons



Fire affected area: sorted by top 1/3 of fire AOD

Update 4: Increase in atmospheric absorption with elevated emissions causes stronger cooling at surface



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Complex response of GPP to changed soil moisture (via precipitation) and diffusive light



Update 5: New prognostic fire model in E3SM V3



Fire Suppression

- Cattle density (FAO) Global soil wetness or VPD Fragmentation index - Road condition: gROADSv1 - Cropland cover: LUH2
 - Lake and River

Elevated trace gas and aerosol emissions