Supplementary Information

Observationally constrained representation of brown carbon emissions from wildfires in a chemical transport model

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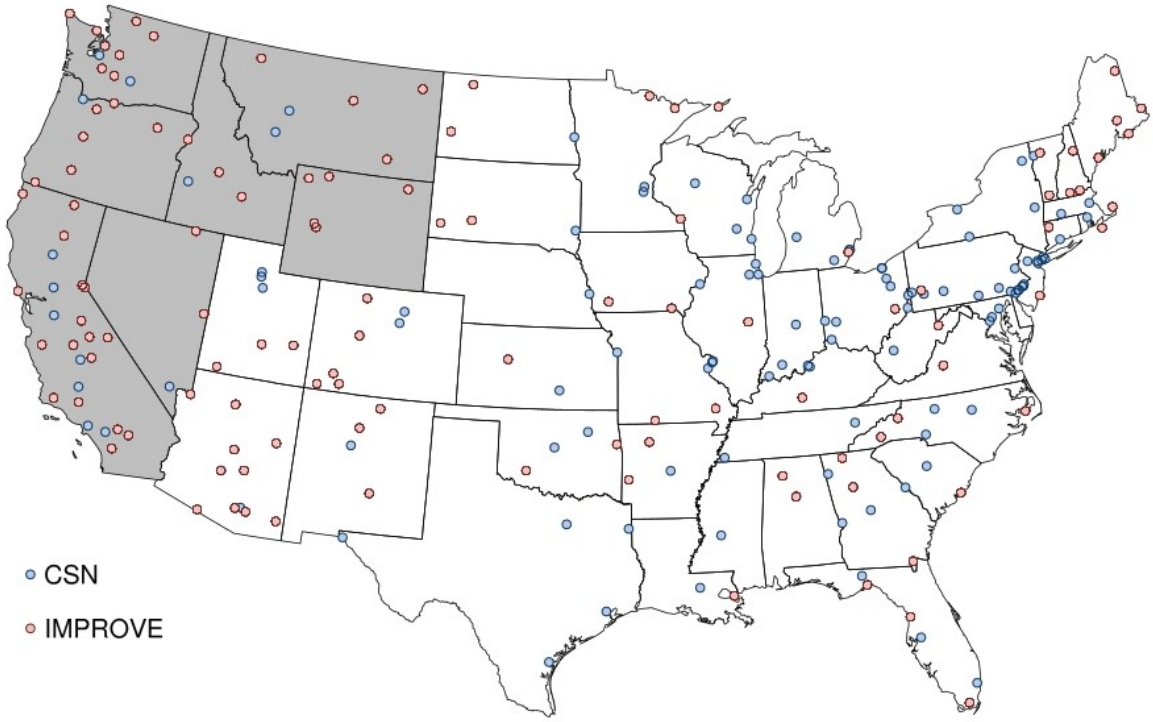

Fig. S1. Locations of IMPROVE and CSN observational sites with available data in August 2015. The grey shading represents states that were the most impacted by emissions from the Northwestern wildfires during August 2015.

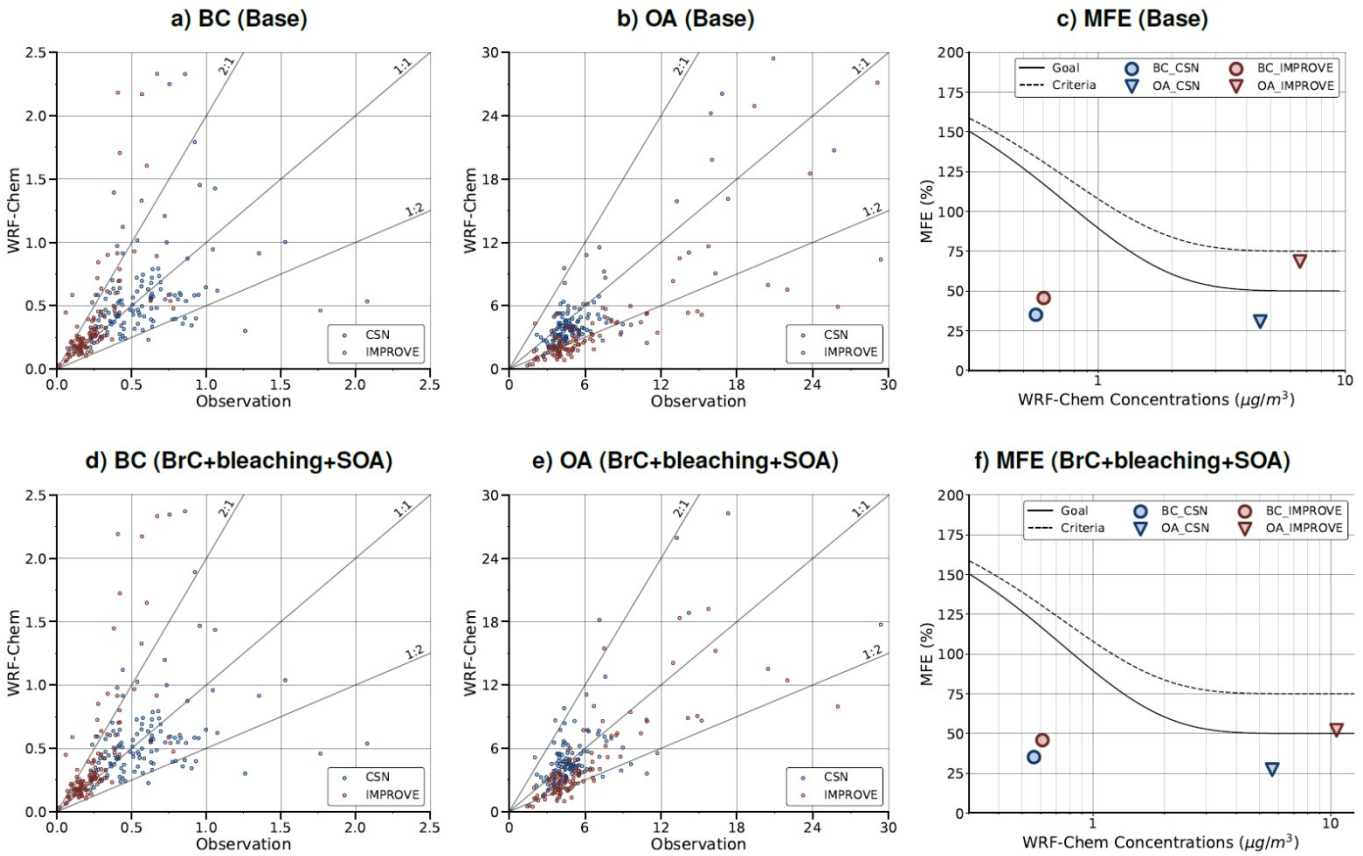

Fig. S2. Comparison between monthly average BC and OA surface concentrations (μg/m3) predicted by the model and obtained from IMPROVE and CSN observational data for August 2015, and the Mean Fractional Errors (MFE) with suggested accuracy levels by Boylan & Russell[1]. The top panels represent the Base simulation and the bottom panels represent the BrC+bleaching+SOA simulation.

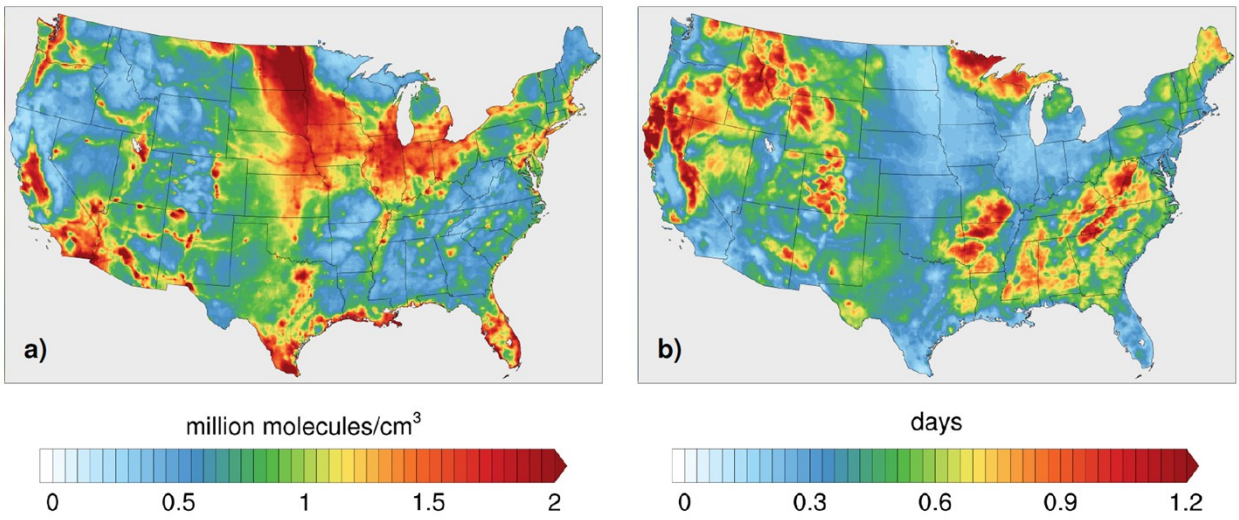

Fig. S3. (a) OH concentration averaged over the month of August 2015 and averaged over first 8 vertical layers. (b) BrC absorption half-life averaged over the month of August 2015 and averaged over first 8 vertical layers.

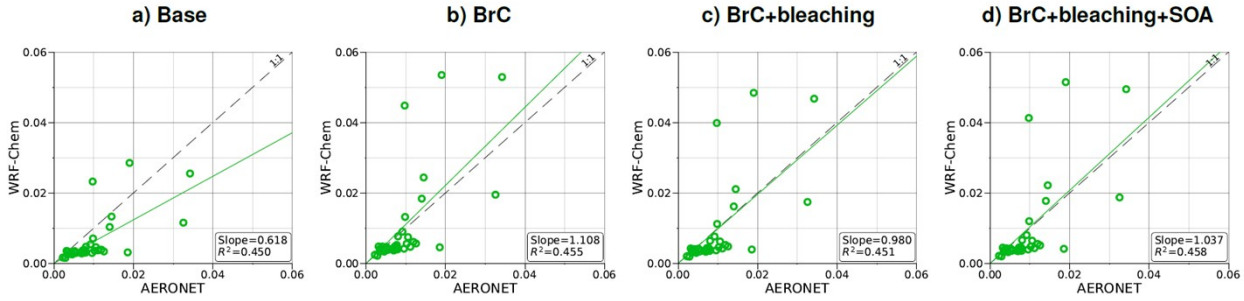

Fig. S4. Comparison between monthly average AAOD at 675 nm for August 2015 obtained from AERONET observations and WRF-Chem output with four different model treatments of wildfire carbonaceous aerosol emissions.

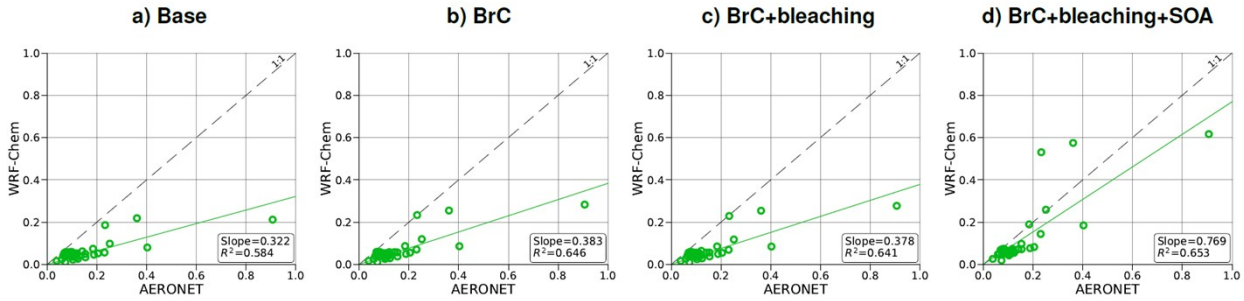

Fig. S5. Comparison between monthly average AOD at 675 nm for August 2015 obtained from AERONET observations and WRF-Chem output with four different model treatments of wildfire carbonaceous aerosol emissions.

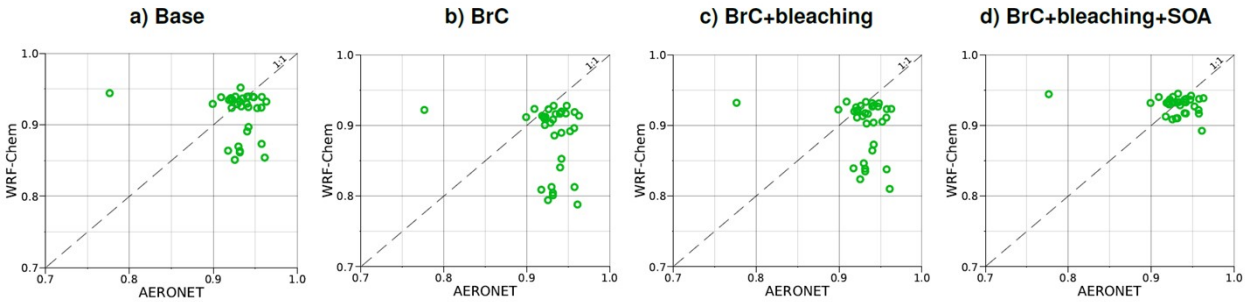

Fig. S6. Comparison between monthly average SSA at 675 nm for August 2015 obtained from AERONET observations and WRF-Chem output with four different model treatments of wildfire carbonaceous aerosol emissions.

References

1 J. W. Boylan and A. G. Russell, *Atmos. Environ.*, 2006, **40**, 4946–4959.