

Supplement

Dark brown carbon and aerosol mixing impacts on absorbing aerosol optical depth in the southeastern United States

5 **Table S1.** AERONET site names and locations.

	Site Name	Latitude and Longitude
1	Appalachian State	(36.215, -81.694)
2	Boyd County	(38.427, -82.700)
3	Cape Romain	(32.941, -79.657)
4	Research Triangle Park	(35.880, -78.870)
5	Georgia Tech	(33.780, -84.399)
6	Mammoth Cave	(37.132, -86.148)
7	Leland	(33.402, -90.893)
8	Mingo	(36.972, -90.143)
9	Centreville	(32.903, -87.249)
10	SEARCH-OLF	(30.549, -87.375)
11	Yorkville	(33.928, -85.045)
12	St. Louis University	(38.636, -90.231)
13	UAHuntsville	(34.725, -86.644)
14	Upper Buffalo	(35.826, -93.203)

Table S2. Mean bias (MB) between AERONET and model simulation aerosol optical depth at 550 nm wavelength.

Simulation Name	Base	D-BrC	Maxwell-Garnett	Maxwell-Garnett, D-BrC	Core-shell	Core-shell, D-BrC	Explicit Mie	Explicit Mie, D-BrC
All sites	-0.128	-0.128	-0.128	-0.128	-0.135	-0.135	-0.127	-0.127
App	-0.0783	-0.0783	-0.0785	-0.0785	-0.0782	-0.0779	-0.0782	-0.0782
Boyd	-0.0842	-0.0842	-0.0845	-0.0845	-0.076	-0.0757	-0.0838	-0.0838
Cape	-0.155	-0.155	-0.155	-0.155	-0.155	-0.162	-0.155	-0.155
EPA	-0.104	-0.104	-0.105	-0.105	-0.104	-0.104	-0.104	-0.104
Geo	-0.112	-0.113	-0.113	-0.114	-0.121	-0.12	-0.113	-0.113
Imp	-0.163	-0.163	-0.164	-0.164	-0.164	-0.164	-0.163	-0.163
Lel	-0.155	-0.155	-0.155	-0.155	-0.165	-0.17	-0.154	-0.154
Mingo	-0.0697	-0.0697	-0.0707	-0.0707	-0.0936	-0.0936	-0.0675	-0.0675
SE-CTR	-0.135	-0.135	-0.136	-0.136	-0.142	-0.142	-0.135	-0.135
SE-OLF	-0.121	-0.121	-0.122	-0.122	-0.137	-0.137	-0.121	-0.121
SE-YOR	-0.0525	-0.0525	-0.0529	-0.0529	-0.0600	-0.0560	-0.0516	-0.0516
St Louis	-0.152	-0.152	-0.152	-0.152	-0.150	-0.150	-0.150	-0.150
UAH	-0.110	-0.110	-0.111	-0.111	-0.110	-0.110	-0.110	-0.110
UppBuf	-0.226	-0.226	-0.226	-0.226	-0.245	-0.244	-0.226	-0.226

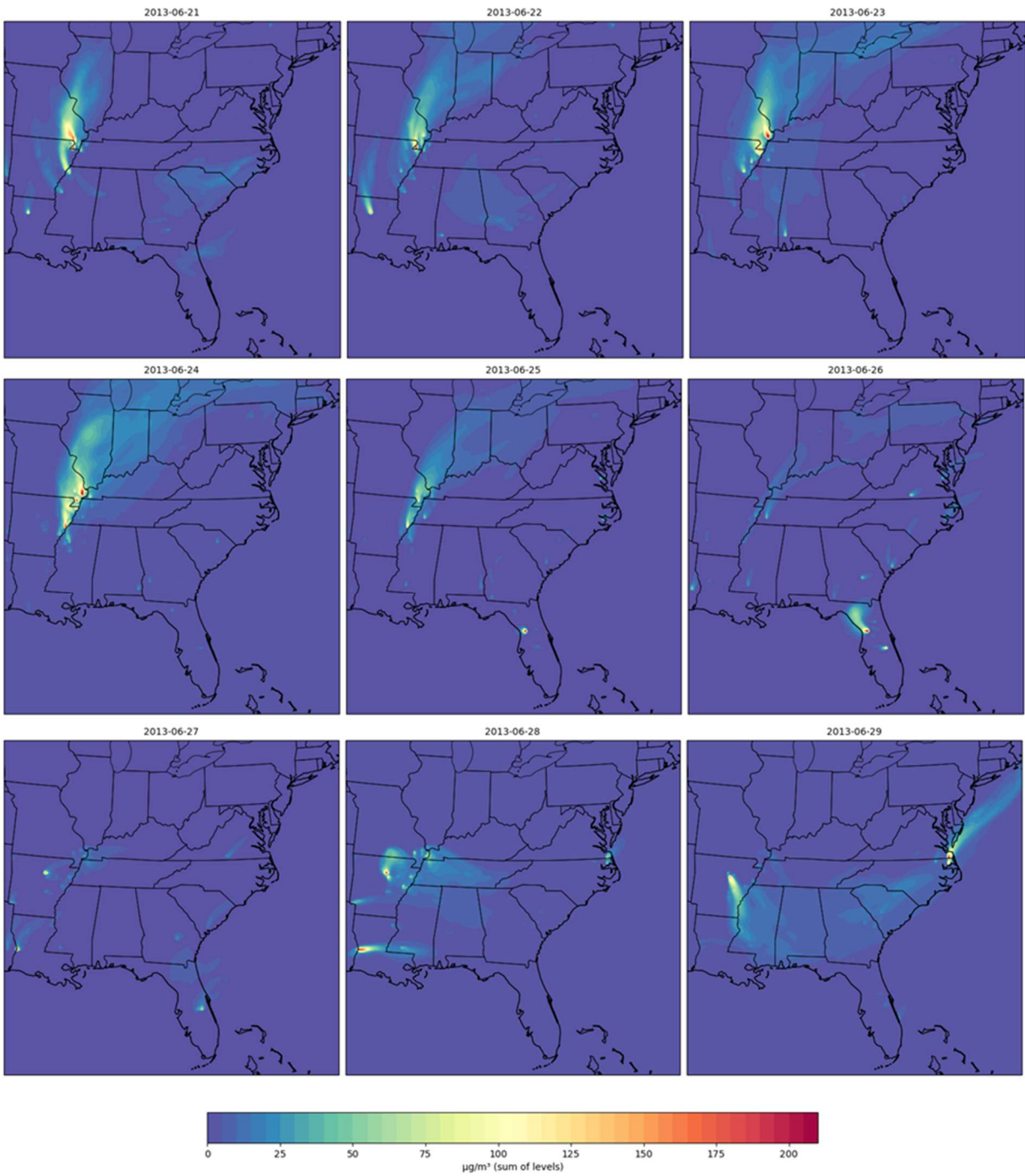
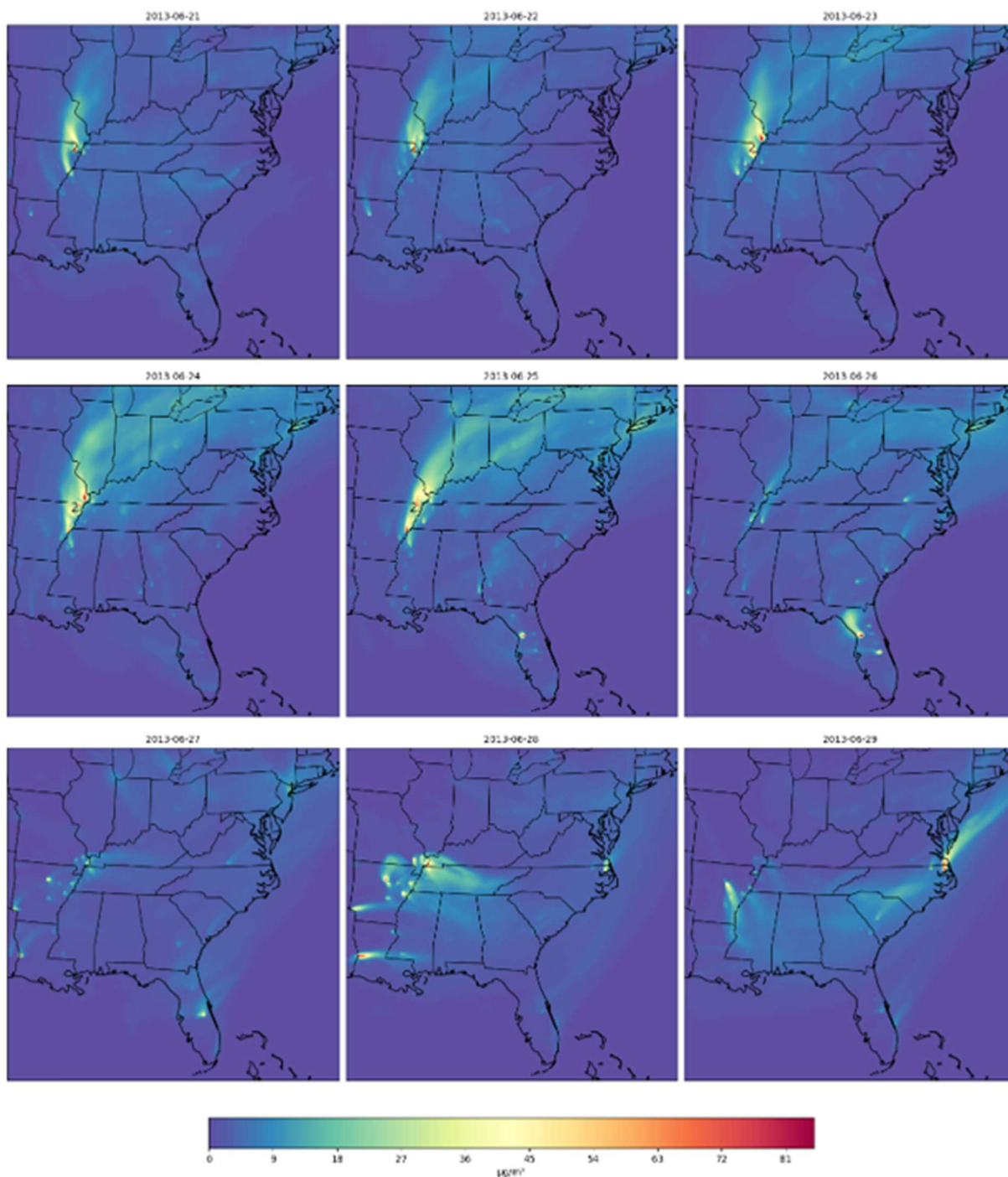


Figure S1. Predicted daily average total column dark brown carbon concentration simulated by WRF-Chem between June 21st and June 30th 2013.



15 **Figure S2.** Predicted daily average total column black carbon concentration simulated by WRF-Chem between June 21st and June 30th 2013.