Supplement of

Sensitivity of dynamic aging on the climate effects of black carbon aerosols over East Asia in summer

Peng Gao et al.

Correspondence to: Bingliang Zhuang (blzhaung@nju.edu.cn)

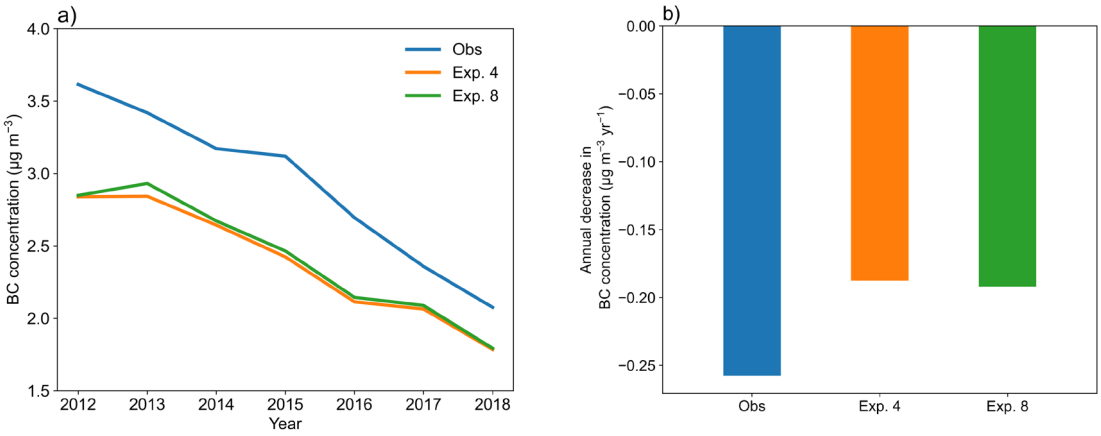

Figure S1. Time series of the annual mean BC surface concentration (a) from observations and model simulations in the Exps. 4 and 8 over 33 CBNET sites and their annual decreasing trend (b) during 2012–2018. Detailed information about the observations can be found in (Shen et al., 2023).

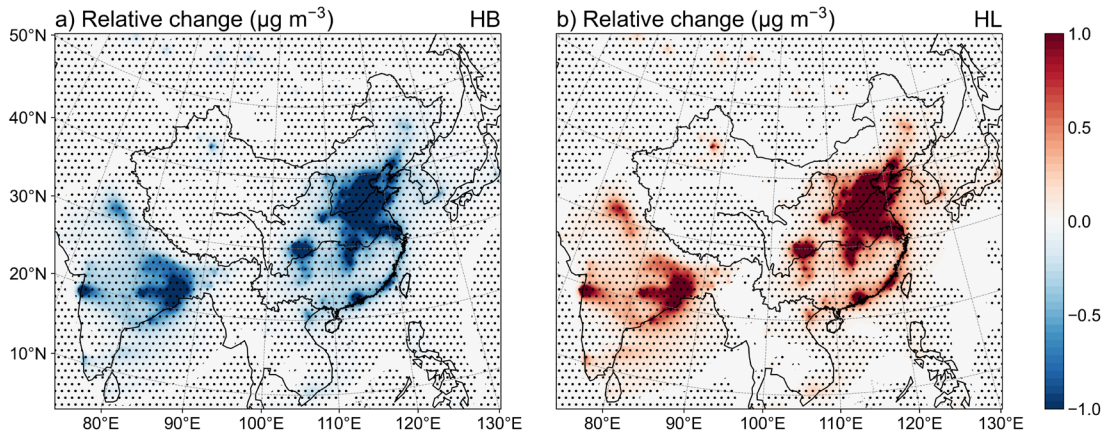

Figure S2. Relative changes in the surface concentration of hydrophobic BC (HB) and hydrophilic BC (HL) (a and b, mg m^{-2} day^{-1}) over East Asia in summer during 2008–2020 between the Exp. 8 and Exp. 4.

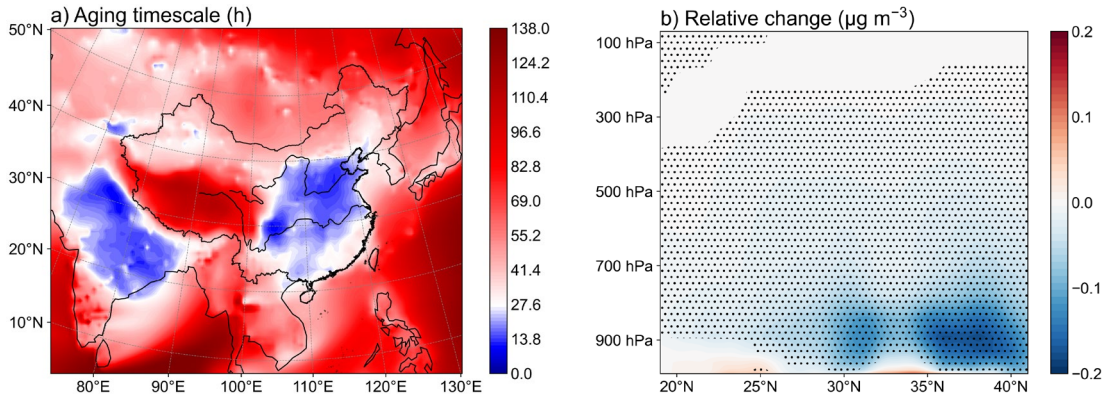

Figure S3. Spatial distribution of the BC aging timescale (b, h) averaged from the surface to 850 hPa over East Asia in summer during 2008–2020. Relative changes in the BC concentration (b, μg m^{-3}) in the altitude-latitude section averaged from 112° to 122°E over East Asia in summer during 2008–2020 between the Exp. 8 and Exp. 4. Black-dotted regions denote statistically significant differences at the 90% confidence level based on a Student's *t*-test.

Site ID	Lon.	Lat.	Station name	Land surface	Obs. BC (μg m^{-3})	Exp. 4 (μg m^{-3})	Exp. 8 (μg m^{-3})
51058	88	47.1	Akdala	Baseline	0.29	0.12	0.11
51462	87.56	43.86	Urumqi	Urban	2.14	1.67	1.72
51747	83.7	39	Tazhong	Remote	1.09	0.11	0.12
52203	93.5	42.8	Hami	Rural	2.47	0.33	0.32
52418	94.7	40.2	Dunhuang	Urban	3.61	0.10	0.10
52859	101	36.3	Waliguan	Baseline	0.30	0.16	0.15
53276	112.9	42.4	Zhurihe	Urban	0.58	0.21	0.20
53787	113	37.1	Yushe	Urban	2.29	3.23	3.29
54084	127.6	44.7	Longfengshan	Baseline	1.88	1.64	1.57
54102	116.1	44	Xilinhaote	Remote	0.31	0.14	0.12
54135	122.3	43.6	Tongliao	Urban	3.08	1.05	1.04
54339	122.6	41.1	Anshan	Urban	2.98	4.41	4.45
54342	123.3	41.4	Shenyang	Urban	7.90	3.38	3.38
54346	123.5	41.2	Benxi	Urban	6.60	3.30	3.31
54351	124	41.9	Fushun	Urban	4.25	3.36	3.31
54421	117.1	40.7	Shangdianzi	Baseline	2.02	0.90	0.89
54511	116.5	39.8	Guanxiangtai	Urban	5.43	6.39	6.39
54662	121.6	38.9	Dalian	Urban	2.47	3.02	3.14
54725	117.5	37.5	Huimin	Urban	1.83	4.93	5.15
55591	91.1	29.7	Lasa	Urban	2.52	0.18	0.17
56294	104	30.7	Chengdu	Urban	8.27	5.61	5.49
56449	99.7	28	Shangri-La	Baseline	0.22	0.15	0.13
57083	113.7	34.8	Zhengzhou	Urban	7.60	6.41	6.61
57131	109	34.4	Xi’an	Rural	5.73	4.46	4.50
57957	110.3	25.3	Guilin	Urban	2.91	1.63	1.61
58363	122	31.5	Dongtan	Rural	1.64	1.96	2.09
58448	119.7	30.3	Lin’an	Baseline	2.95	2.26	2.33
58506	116	29.6	Lushan	Rural	0.99	3.70	3.84

59431	108.5	22.8	Nanning	Urban	3.26	2.59	2.63
59481	113.4	23	Panyu	Rural	4.12	3.71	3.83
59493	114	22.5	Shenzhen	Urban	2.19	3.03	3.15
W3467	103.8	36	Gaolanshan	Rural	1.30	0.87	0.87
Z9736	111.7	29.2	Changde	Rural	2.39	3.76	3.85

Table S1. The statistics of observed and simulated BC surface concentration averaged over 2012–2018 at 33 stations. The observation data are derived from Shen et al. (2023).

Reference

Shen, W., Wang, M., Liu, Y., Dong, X., Zhao, D., Yue, M., Tian, P., and Ding, D.: Evaluating BC Aging Processes in the Community Atmosphere Model Version 6 (CAM6), J. Geophys. Res.: Atmos., 128, https://doi.org10.1029/2022jd037427, 2023.