Supplement of

The evolution of aerosols mixing state derived from a field campaign in Beijing: implications to the particles aging time scale in urban atmosphere

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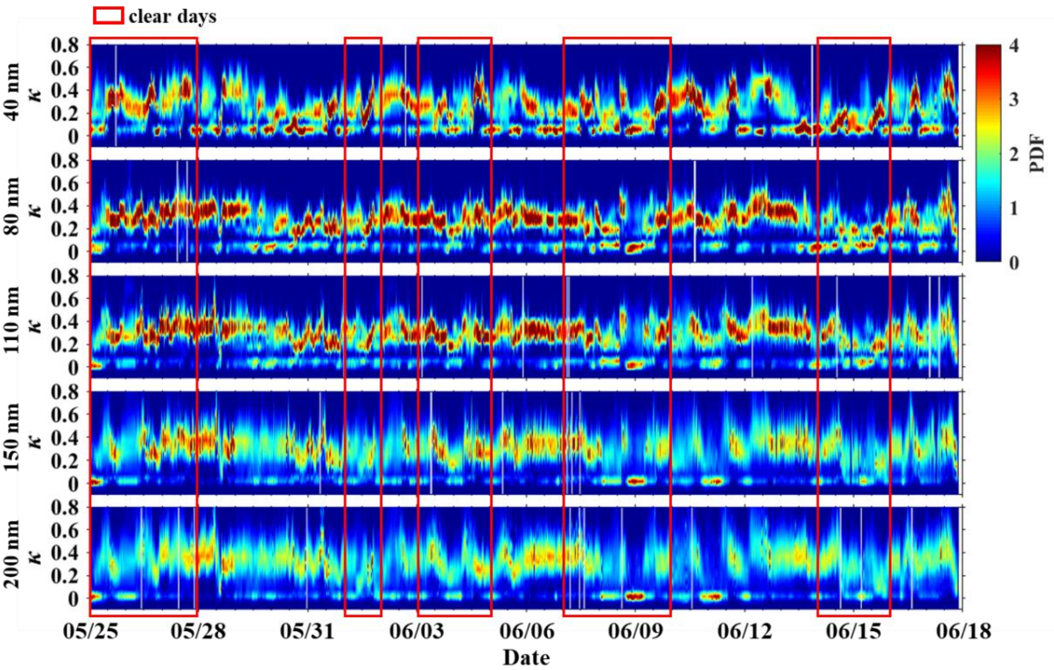

Figure S1. Time series of the probability density function of hygroscopic parameter (*κ*-PDF). Red rectangles denote clear days, and others are cloudy days.

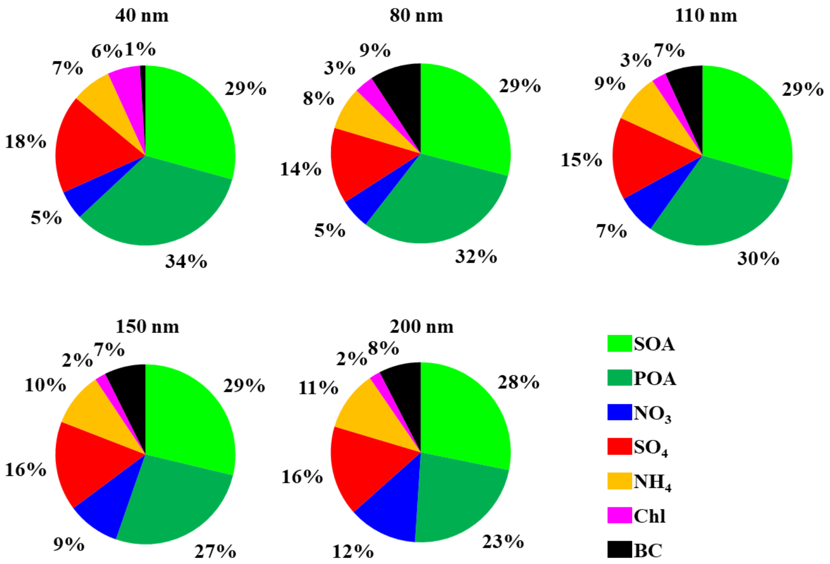

Figure S2. The size-resolved chemical mass fraction at five particle sizes.

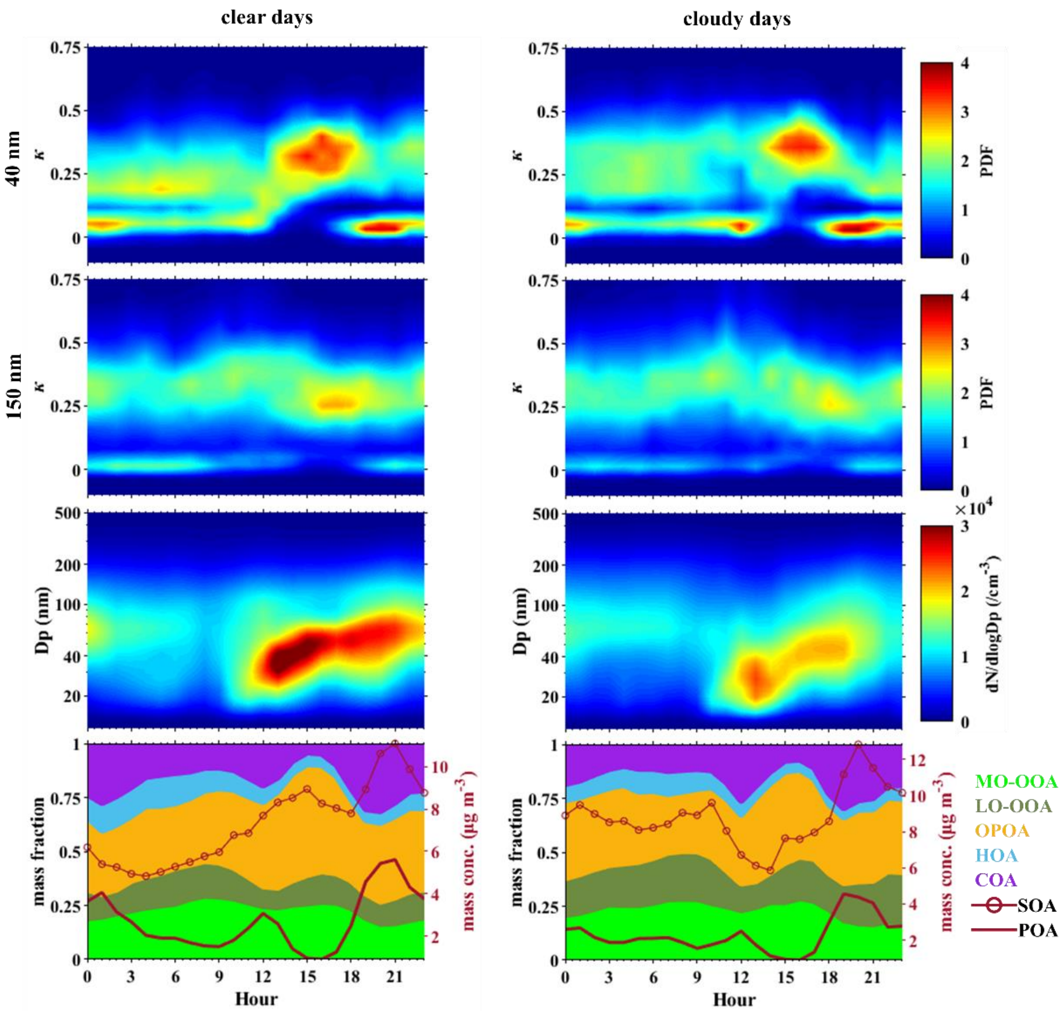

Figure S3. Averaged diurnal variations in κ-PDF for 40 and 150 nm particles, particle number size distribution, mass fraction of five organic aerosols and mass concentration of primary and secondary organic aerosols on clear and cloudy days.

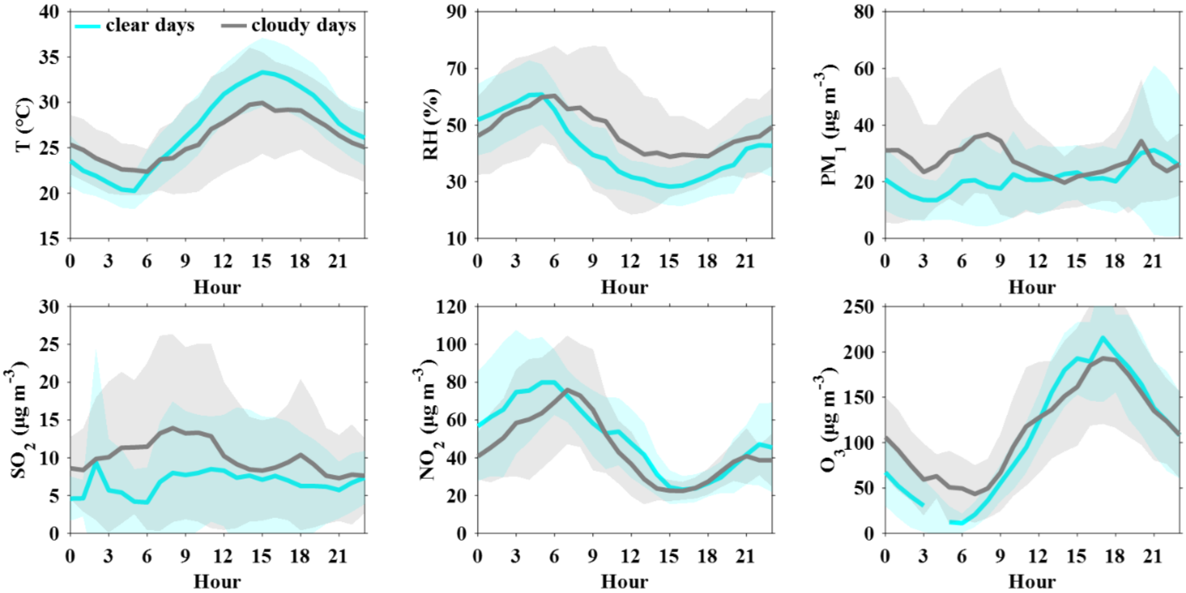

Figure S4. Diurnal variations of ambient temperature (T), relative humidity (RH) and PM_1 mass concentrations on clear and cloudy days.

Table S1. The aging timescale of particles reported in literatures.

Region	Model	Aerosol type	Aging timescale	Rreference
global (model default)	GCM	carbonaceous Aerosol	1.15 days	Cooke et al., 2002
	GISS-GCM	carbonaceous Aerosol	1.15 days	Chung and Seinfeld, 2002
	GISS-GCM	BC	1 day	Koch and Hansen, 2005
	TOMAS	carbonaceous aerosol	1.5 days	Pierce et al., 2007
	GEOS-Chem	carbonaceous aerosols	1.2 days	Yu and Luo, 2009
	GEOS-4	carbonaceous aerosols	2.5 days	Colarco et al., 2010
	GFDL-AM3	BC	20 days	Liu et al., 2011
	RegCM4	carbonaceous Aerosol	1.15 days	Ghosh et al., 2021
south-western Germany	KAMM/DRAIS	soot	daytime: 2-8 h nighttime: 10-40 h	Riemer et al., 2004
global	GEOS-Chem	carbonaceous aerosols	3.1 days	Huang et al., 2013
central-eastern China	NAQPMS+APM	BC	12 h-7 days	Chen et al., 2017
Beijing			2 h	
south Asia	RegCM4	carbonaceous aerosol	7.6-167.6 h	Ghosh et al., 2021
Mexico City	ATOFMS	soot	3 h	Moffet and Prather, 2009
California	SP2	BC	~4 h	Akagi et al., 2012
Los Angeles	SP2	BC	~3 h	Krasowsky et al., 2016
Beijing	environmental chamber approach	BC	2.3 h & 4.6 h	Peng et al., 2016
Houston			9 h & 18 h	

Rreference:

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