Supplement of

Measurement report : Characteristics of airborne black carbon-containing particles during the 2021 summer COVID-19 lockdown in Yangzhou, China

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Table S1. Summary of descriptions of BCc particle types

Type group	Classification of particles	Description of species	Characteristics ion markers
BC-fresh	BCpure	Almost completely BC	$[C_n]^+$ and $[C_n]^-$
	BB	BC from biomass burning	$39[K]^+$ (peak area >1500) and two of the signals in $45[CHO_2]^-$, $59[C_2H_3O_2]^-$ and $73[C_3H_5O_2]^-$ (peak area >200)
	CC	BC from coal combustion	$7[Li]^+$ (peak area >200) or $23[Na]^+$, $27[Al]^{3+}$, $43[AlO]^-$ (peak area >200) or $80[SO_3]^-$, $97[HSO_4]^-$ (relative peak area >2%).
	VE	BC from traffic emission	$55[Mn]^+$ (peak area >200 without $[Na]^+$ and $[Al]^+$) or $40[Ca]^+$ (with abundant nitrate) or $79[PO_3]^-$ (with abundant nitrate) or $51[V]^+$ and $67[VO]^+$ (peak area >200).
	Mix	BC mixed more than one sources	Same as the above.
BC-aged	BC-S	BC internally mixed with sulfate	$97[HSO_4]^-$ (relative peak area >70%).
	BC-N	BC internally mixed with nitrate	$46[NO_2]^-$ and $62[NO_3]^-$ (relative peak area >70%).
	BC-SN	BC internally mixed with sulfate and nitrate	$46[NO_2]^-$ and $62[NO_3]^-$ are comparable with $97[HSO_4]^-$.
	BCOC-S	BC internally mixed with OC and sulfate	three of the signals in $37[C_3H]^+$, $43[C_2H_3O]^+$, $51[C_4H_3]^+$ and $63[C_5H_3]^+$ (relative peak area >2%) with sulfate.
	BCOC-N	BC internally mixed with OC and nitrate	three of the signals in $37[C_3H]^+$, $43[C_2H_3O]^+$, $51[C_4H_3]^+$ and $63[C_5H_3]^+$ (relative peak area >2%) with nitrate.
	BCOC-SN	BC internally mixed with OC, sulfate, and nitrate	three of the signals in $37[C_3H]^+$, $43[C_2H_3O]^+$, $51[C_4H_3]^+$ and $63[C_5H_3]^+$ (relative peak area >2%) with comparable nitrate and sulfate.
BC-other	BC-other	Remaining BCc particles that do not belong to the BCc types listed above	
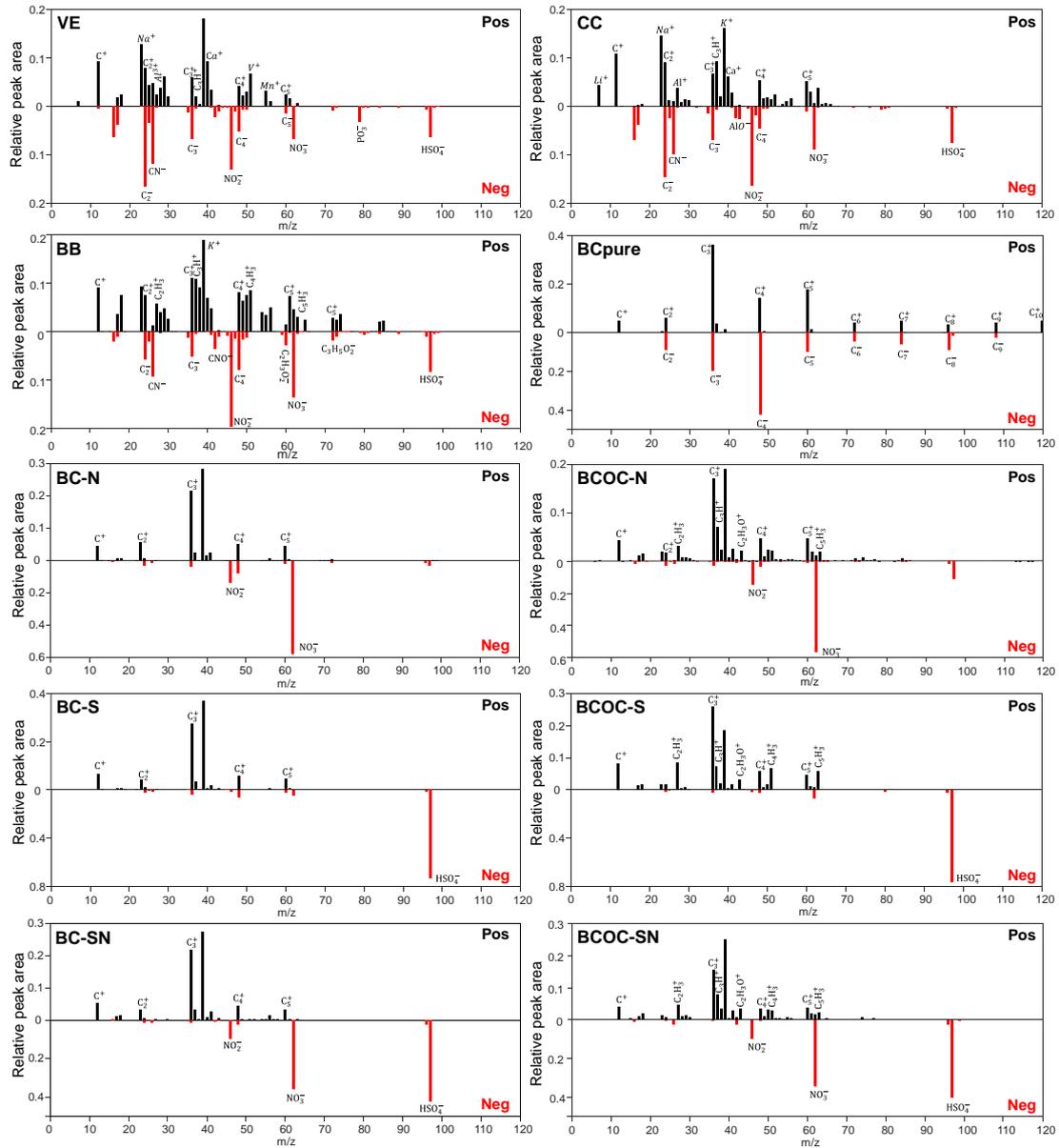
Figure S1. Average mass spectra of different types of BCc particles (Mass spectra of particles of Mix and BC-other types are not shown)
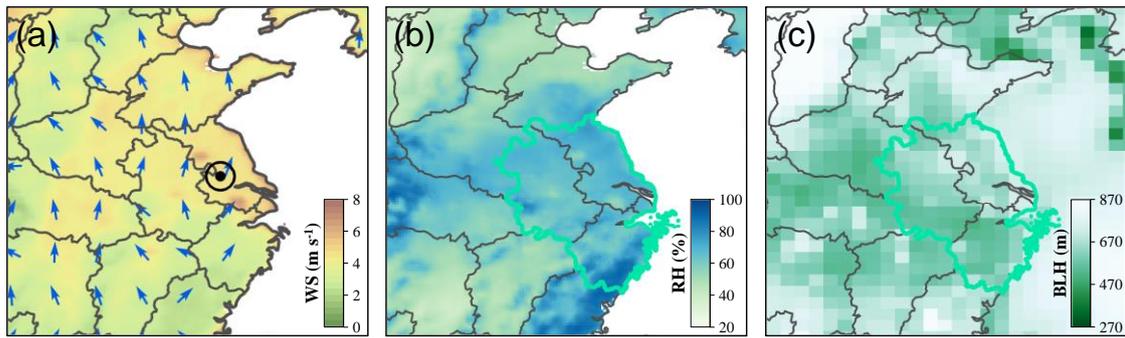
Figure S2. Meteorological conditions during the lockdown period (LD) based on the ERA5 reanalysis data. **(a)** Wind direction (WD, vectors) and wind speed (WS, contours) at 20 m. **(b)** Relative humidity (RH). **(c)** Boundary-layer height (BLH). The circle symbols in the maps indicate the location of Yangzhou and the green line regions represent the YRD area.
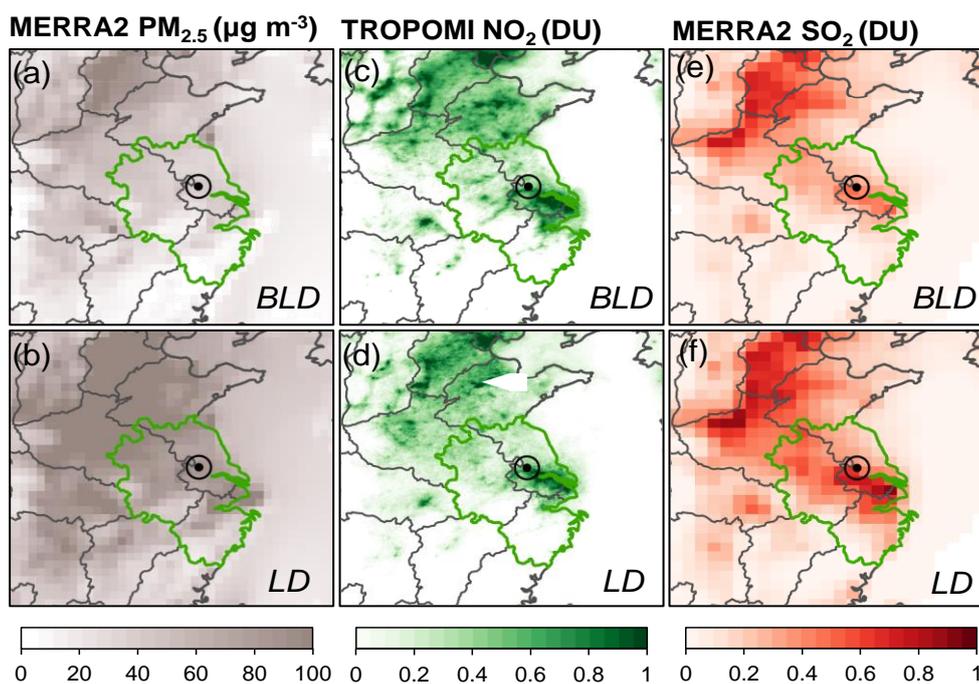
Figure S3. Spaceborne measurements of NO_2 from TROPOMI, SO_2 and $PM_{2.5}$ from MERRA-2. **(a, b)** Surface mass concentrations of $PM_{2.5}$ averaged over the BLD and LD periods. **(c, d)** Column-integrated NO_2 averaged over the BLD and LD periods. **(e, f)** Surface mass concentrations of SO_2 averaged over the BLD and LD periods. The circle symbols in the maps indicate the location of Yangzhou and the green line regions represent the YRD area. 1 DU = 0.4462 mmol m^{-2}.
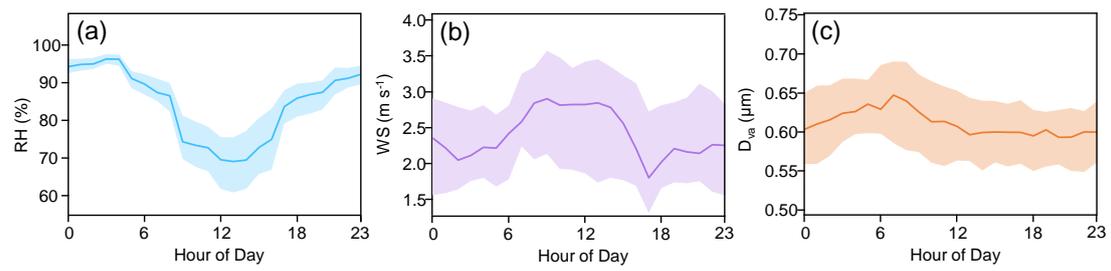
Figure S4. The diurnal variation of **(a)** relative humidity (RH), **(b)** wind speed (WS), and **(c)** vacuum aerodynamic dimeter (D_{va}) during the LD period (shaded area represents one standard deviation)