Supplementary Material for

Enhancing particle number concentration modelling accuracy in China by incorporating various nucleation parameterization schemes into the CMAQ version 5.3.2 model

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Table S1. The range of values for each independent variable in the TIMN nucleation rate lookup table.

Variables	Range	Number of points	Values at each point
$[H_2SO_4]$ (cm^{-3})	5×10^5 - 5×10^9	32	$[H_2SO_4]$ $(i) = 5\times10^5\times10^{(i-1)/10}$, $i=1, 31$; $[H_2SO_4]$ $(32) = 5\times10^9$
T (K)	190 - 304	39	T $(j) = 190 + 3\times(j-1)$, $j = 1, 39$
RH (%)	0.5 - 99.5	26	$RH(1) = 0.5$, $RH(k) = 4\times(k-1)$, $k = 2, 25$; $RH(26) = 99.5$
S $(\mu m^2 cm^{-3})$	20 - 200	2	$S(1) = 20$, $S(2) = 200$
$[NH_3]$ (cm^{-3})	10^5 - 10^{12}	33	$[NH_3](1) = 10^5$; $[NH_3](m) = 10^8\times10^{(m-1)/10}$, m=2, 32; $[NH_3](33) = 10^{12}$
Q (ions cm^{-3} s^{-1})	2 - 100	8	$Q(n) = 2\times1.5^{(n-1)}$, n = 1,7; $Q(8) = 100$

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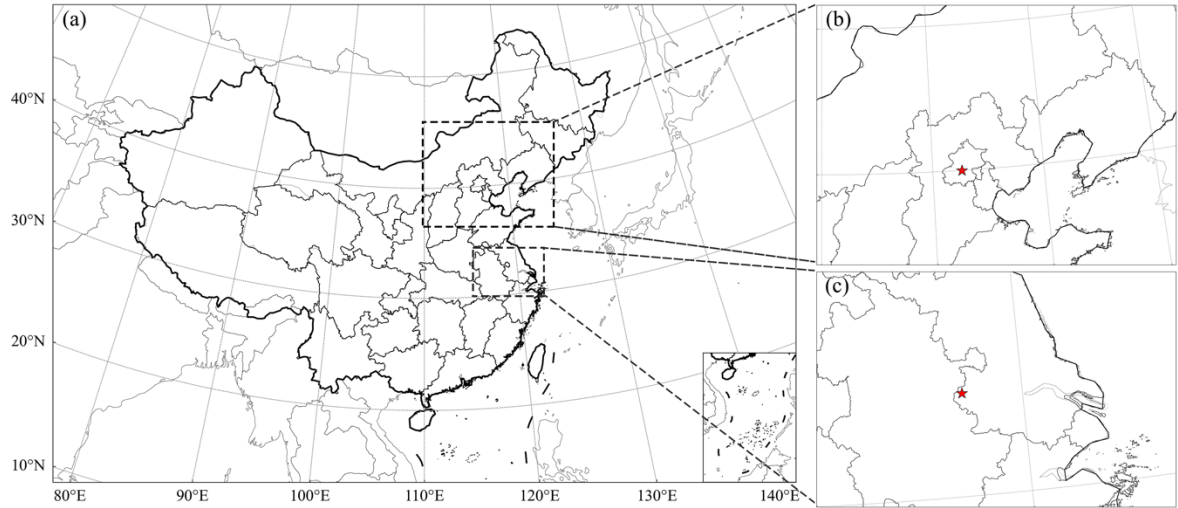
Figure S1. (a) WRF/CMAQ modeling domain. (b) Beijing observation station. (c) Nanjing observation station.
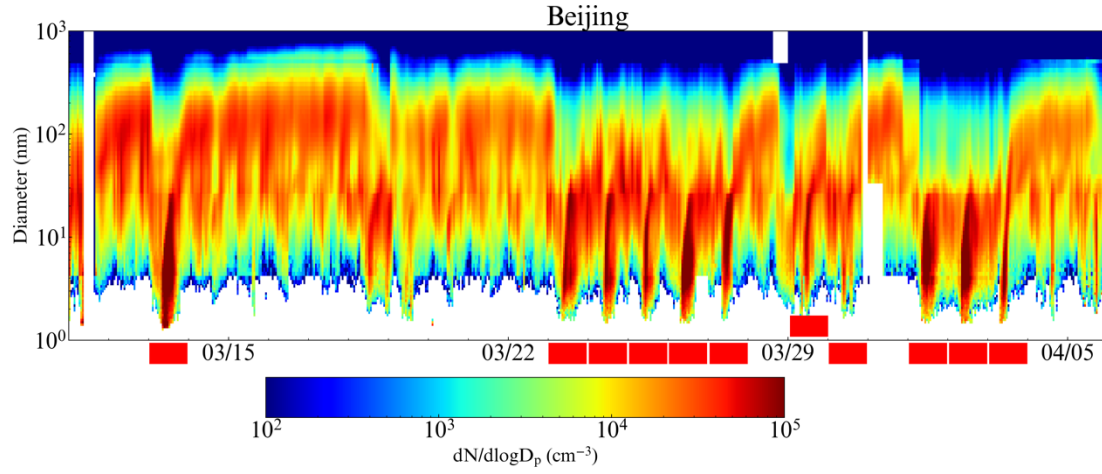
Figure S2. The observation of aerosol size distribution in 2016 in Beijing. Red rectangles are NPF days.

Figure S3. The average diel variation of the hourly contributions (%) in whole episodes, NPF days and non-NPF days.