

**Supplementary material for manuscript acp-2011-85:
Cloud condensation nuclei (CCN) from fresh and aged air pollution in the
megacity region of Beijing**

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Table S1: Characteristic CCN parameters (median values) listed for the entire campaign, for the focus periods of aged regional pollution and of fresh city pollution: midpoint activation diameters (D_a , D_t), maximum activated fractions (MAF_t , MAF_m), CDF standard deviations (σ_a , σ_t), heterogeneity parameters (σ_a/D_a , σ_t/D_t), hygroscopicity parameters (κ_a , κ_t), number concentrations of total aerosol particles ($N_{CN,tot}$) and with $D > 30$ nm ($N_{CN,30}$), number concentrations of cloud condensation nuclei ($N_{CCN,S}$), integral CCN efficiencies ($N_{CCN,S}/N_{CN,tot}$, $N_{CCN,S}/N_{CN,30}$), n_{ES} are the numbers of averaged CCN efficiency spectra. Subscripts a and t stand for parameters derived from 3-parameter and 2-parameter CDF fits to the measured CCN efficiency spectra, respectively.

S [%]	D_a [nm]	D_t [nm]	MAF_t	MAF_m	σ_a [nm]	σ_t [nm]	σ_a/D_a	σ_t/D_t	κ_a	κ_t	$N_{CN,tot}$ [10^3 cm^{-3}]	$N_{CN,30}$ [10^3 cm^{-3}]	$N_{CCN,S}$ [10^3 cm^{-3}]	$N_{CCN,S}/N_{CN,tot}$	$N_{CCN,S}/N_{CN,30}$	n_{ES}
Entire campaign																
0.07	190.4	196.5	0.84	0.85	10.4	25.3	0.055	0.128	0.47	0.43	13.59	11.13	1.54	0.11	0.14	269
0.26	85.0	87.0	0.92	0.93	6.6	9.0	0.077	0.111	0.32	0.30	14.16	11.00	5.58	0.44	0.52	285
0.46	61.5	61.9	0.95	0.96	4.9	5.1	0.077	0.082	0.28	0.27	14.27	11.10	7.23	0.59	0.70	271
0.66	51.5	52.3	0.95	0.97	5.0	6.1	0.096	0.117	0.23	0.22	14.00	11.07	7.94	0.67	0.78	278
0.86	44.1	44.4	0.97	0.98	4.7	4.9	0.103	0.110	0.22	0.21	14.03	11.10	9.34	0.75	0.86	269
All							0.080	0.110	0.30	0.28	14.00	11.00				1372
Aged regional pollution																
0.07	186.3	186.8	0.91	0.95	6.3	8.7	0.033	0.046	0.49	0.48	12.14	11.02	2.39	0.20	0.22	34
0.26	81.2	82.9	0.96	0.96	6.6	8.2	0.084	0.101	0.37	0.35	12.41	11.37	7.29	0.61	0.66	33
0.46	59.9	60.4	0.97	0.97	4.3	4.3	0.071	0.072	0.30	0.30	12.43	10.93	8.75	0.74	0.81	34
0.66	49.3	50.3	0.95	0.97	4.5	5.2	0.091	0.102	0.26	0.25	11.87	10.86	9.31	0.82	0.89	34
0.86	43.6	43.6	0.97	0.98	5.2	5.4	0.118	0.120	0.22	0.22	12.34	11.15	10.02	0.85	0.93	34
All							0.079	0.093	0.33	0.32	12.24	11.06				169
Fresh city pollution																
0.07	204.1	236.9	0.68	0.70	18.4	48.3	0.086	0.236	0.36	0.23	19.97	12.09	0.40	0.02	0.03	269
0.26	95.3	105.6	0.91	0.92	14.6	28.3	0.144	0.263	0.23	0.17	20.05	11.17	2.08	0.12	0.20	285
0.46	75.3	79.3	0.93	0.95	10.7	14.2	0.149	0.168	0.15	0.13	19.93	11.11	3.29	0.19	0.33	271
0.66	58.2	59.8	0.95	0.96	9.3	10.3	0.155	0.181	0.160	0.15	19.73	11.18	4.41	0.30	0.46	278
0.86	48.3	48.5	0.96	0.99	5.9	6.5	0.114	0.133	0.16	0.16	19.77	11.48	5.80	0.42	0.56	269
All							0.128	0.190	0.21	0.16	19.88	11.41				181

Table S2: Best-fit parameters of monomodal lognormal size distribution functions fitted to the median size distribution of aerosol particles (CN) for the entire campaign, the focus periods (aged regional pollution, fresh city pollution), and the median number size distribution observed during PRIDE-PRD2006 (entire campaign excluding biomass burning episode, Rose et al., 2010): integral number concentration (N_{CN}), count median or geometric mean diameter (D_g), and geometric standard deviation (σ_g).

Period	N_{CN} [cm^{-3}]	D_g [nm]	σ_g
Entire campaign	10200	94	2.1
Aged Regional Pollution	10300	125	1.9
Fresh City Pollution	16100	53	1.7
PRIDE-PRD2006	18638	68	1.9

Table S3: Mass concentrations and corresponding mass fractions of organic matter and inorganic ions determined by aerosol mass spectrometry (AMS). Apparent elemental and organic carbon (EC, OC) mass concentrations determined by thermo-optical measurements and mass fractions of EC and OC relative to the estimated total concentration of fine particulate matter ($PM1 \approx \Sigma AMS + EC$). Median values are listed for the entire campaign and for the focus periods of aged regional pollution and of fresh city pollution.

Compound	Mass Concentration ($\mu\text{g m}^{-3}$)			Mass Fraction		
	Entire Campaign	Aged Regional Pollution	Fresh City Pollution	Entire Campaign	Aged Regional Pollution	Fresh City Pollution
Organics	9.78	14.08	5.83	0.374	0.301	0.720
SO_4^{2-}	7.93	17.83	0.98	0.303	0.382	0.121
NH_4^+	5.24	8.29	0.59	0.200	0.177	0.073
NO_3^-	2.68	5.28	0.55	0.102	0.113	0.068
Cl^-	0.54	1.22	0.15	0.021	0.026	0.018
ΣAMS	26.2	46.7	8.1	1.00	1.00	1.00
EC	4.3	4.7	2.1	0.14	0.09	0.21
OC	5.7	6.4	3.6	0.19	0.12	0.35
$\Sigma AMS + EC$	30.5	51.4	10.2	1.00	1.00	1.00

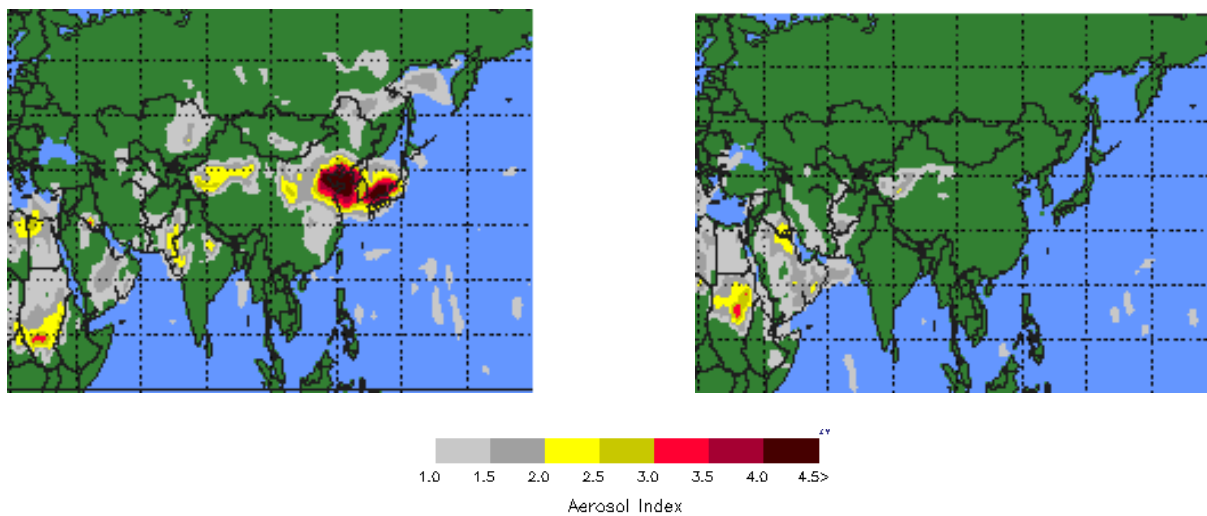


Figure S1. Total Ozone Mapping Spectrometer (TOMS) aerosol index images showing extraordinary dust event over Beijing on 17th April 2006 (left panel). No such event was observed during the fresh city pollution episode (right panel is representing 20th Aug 2006) of the present study confirming the absence of a dust event.