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Global–regional nested simulation of particle number concentration by combing microphysical processes with an evolving organic aerosol module

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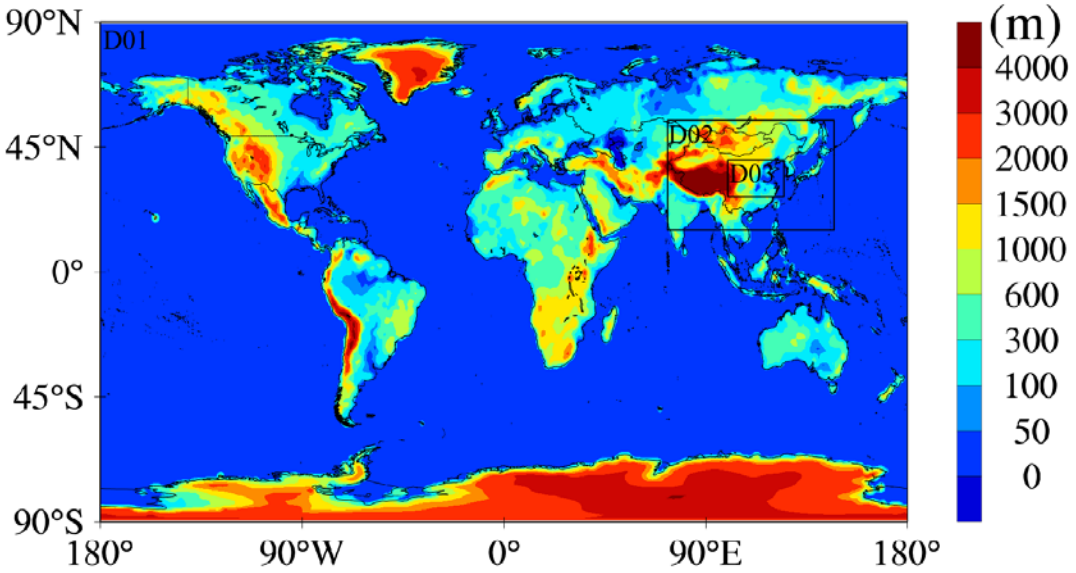

Fig.S1 The nested domains (black box) and terrain height (shaded color).

Table S1 Observed mean number concentration of condensation nuclei larger than 10 nm (CN10, in # cm^{-3}) at 34 surface stations around the globe.

	Location	Time	Lon	Lat	H	CN10	**Ref.**
1	Aspvereten, Sweden	Jan 2001–Dec 2001	17.4	58.8	20	2000	J
2	Harwell, United Kingdom	May 1998–Nov 2000	-1.3	51.5	125	3000	J
3	Hohenpeissenberg, Germany	Apr 1998–Aug 2000	11	47.8	988	2500	J
4	Melpitz, Germany	Dec 1996–Nov 1997	12.9	51.5	86	9000	J
5	Ispra, Italy	Feb 2000–Dec 2000	8.6	45.8	209	5600	J
6	Thompson Farm, New Hamshire, US	2001-2005	-71	43.1	75	7250	K
7	Lamont, Oklahoma, US	1996-2004	-97.5	36.5	318	5200	L
8	Bondville, Illinois, US	1994-2005	-88.3	40.1	230	3700	L
9	Sable Island, Nova Scotia, Canada	1992-1999	-60	43.9	5	850	L
10	Trinidad Head, California, US	2002-2005	-124.2	41.1	107	590	L
11	American Samoa	1995-2005	-170.5	14.2	42	220	L
12	South Pole	1995-2005	102	90	2810	100	L
13	Point Barrow, Alaska, US	1995-2005	-156.6	71.3	11	110	L
14	Point Barrow, AK, USA	2000-2006	-156.6	71.32	11	231	A
15	Pallas-Sammaltunturi, Finland	1997–2004	24.12	67.97	560	802	A
16	V¨arri¨o, Finland	1998–2006	29.58	67.77	400	823	B
17	Hyyti¨al¨a, Finland	1996–2006	24.28	61.85	180	2016	B
18	Uto, Baltic Sea	Mar 2003–Dec 2006	21.28	59.78	8	2921	B
19	Aspvreten, Sweden	Jun 2000–Dec 2006	17.4	58.77	25	2567	B
20	Mace Head, Ireland	1991–1994	-9.9	53.33	5	1907	A
21	Melpitz, Germany	Jan 2006–Dec 2006	12.9	51.5	86	4664	C
22	Sable Island, NS, Canada	1993–1996	-60	43.9	5	869	D
23	Thompson Farm, NH, USA	2001–2005	-70.95	43.11	75	7039	F
24	Trinidad Head, California	2003–2006	-124.2	41.05	107	918	A
25	Bondville, IL, USA	2000–2006	-88.3	40.1	230	5038	A
26	Southern Great Plains, OK, USA	2000–2006	-97.5	36.8	314	5064	A
27	American Samoa, USA	1994–1996	-170.6	-14.24	42	270	A
28	Botsalano game reserve, S. Africa	Jul 2006–Jun 2007	25.75	-25.54	1424	2340	G
29	Bago State forest, Australia	Jul 2005–Oct 2006	148.15	-35.66	1200	1800	H
30	Cape Grim, Australia	2000–2006	144.69	-40.68	94	1203	A
31	Neumayer, Antarctica	2000–2006	-8.25	-70.65	42	324	A
32	South Pole, Antarctica	1991–1998	-24.8	-89.98	2810	156	A
33	*Shangdianzi, Beijing, China*	2008-2009	117.12	40.65	240	12000	N
34	Waliguan, Qinghai, China	2005-2007	100.9	36.28	3816	2030	M

Source of CN10 data: A (http://wdca.jrc.ec.europa.eu); B (Dal Maso et al., 2008); C (http://tarantula.nilu.no/projects/ccc/create/index.htm); D (http://www.cmdl.noaa. gov/aero); F (Ziemba et al., 2006); G (Laakso et al., 2008); H (Suni et al., 2008); I (Venzac et al., 2008); J(Van Dingenen et al., 2004); K(http://airmap.unh.edu); L(http://www.cmdl.noaa.gov); M(Kivekäs et al., 2009); N(Shen et al., 2011).

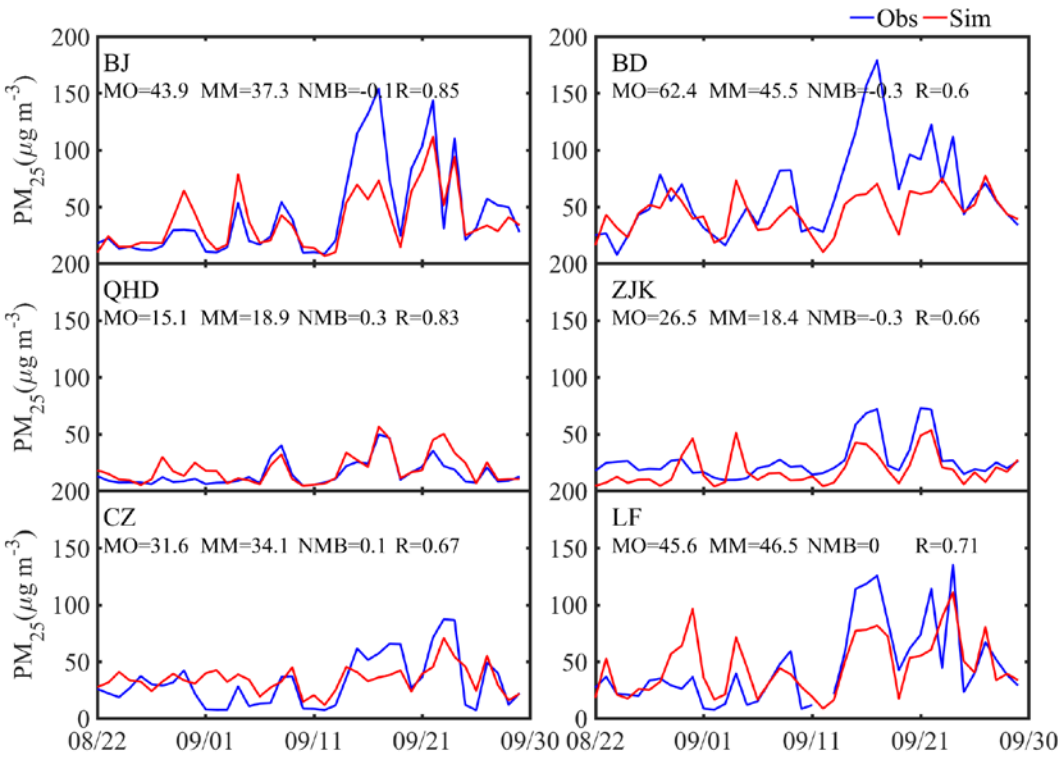

Fig.S2 Comparison of the simulated and observed concentrations of fine particulate matter in Beijing (BJ), Baoding (BD), Qinhuangdao (QHD), Zhangjiakou (ZJK), Cangzhou (CZ), and Langfang (LF). The observations were shown with blue lines and simulations with red lines.

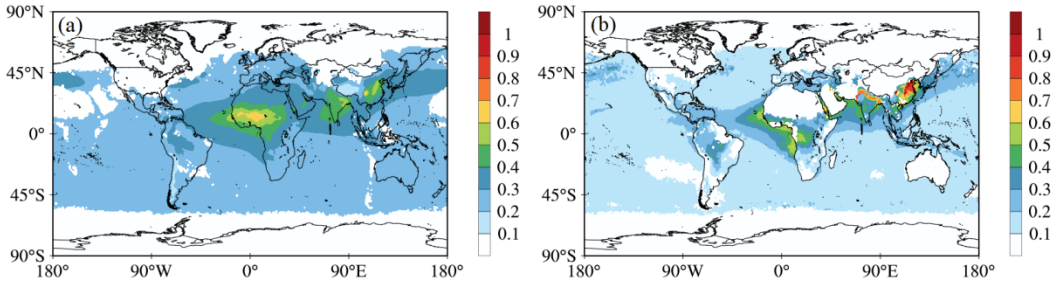

Fig.S3 (a) The simulated and (b) MODIS aerosol optical depth.