Supplementary Material for the paper

Formation of secondary organic aerosol from isoprene oxidation over Europe

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Table S1: Seasonal comparison of modelled versus observed particulate organic matter (OM) and modelled ratios of SOA/OM for the EMEP campaign 2002/2003. Model results from the base simulation S1. Ratio modelled to observed OM (M/O).

		MAM		JJA		SON		DJF	
Station	ID	M/O	SOA/ OM	M/O	SOA/ OM	M/O	SOA/ OM	M/O	SOA/ OM
Illmitz	AT02	0.62	0.32	0.91	0.61	0.73	0.27	0.28	0.18
Ghent	BE05	0.47	0.33	0.48	0.53	0.41	0.32	0.33	0.23
Kosetice	CZ03	0.39	0.46	0.52	0.60	0.49	0.36	0.33	0.24
Langenbru	DE02	0.35	0.40	0.55	0.66	0.44	0.42	0.23	0.27
Virolahti	FI17	0.52	0.35	0.28	0.60	0.21	0.34	0.41	0.42
Penicuik	GB46	0.41	0.48	0.68	0.68	0.40	0.50	0.29	0.31
Mace Head	IE31	0.31	0.43	0.23	0.42	0.39	0.52	0.21	0.25
S.P.C.	IT08	0.41	0.57	0.80	0.79	0.28	0.52	0.20	0.26
Kollumerw	NL09	0.40	0.37	0.55	0.63	0.43	0.37	0.35	0.27
Braganca	PT01	0.25	0.66	0.37	0.63	0.20	0.51	0.05	0.55
Aspvreten	SE12	0.82	0.21	0.35	0.54	0.49	0.27	0.44	0.26
Stara Lesna	SK04	0.31	0.50	0.30	0.61	0.19	0.40	0.16	0.29
Ispra	IT04	0.32	0.47	1.03	0.77	0.30	0.43	0.15	0.24
Average		0.43	0.43	0.54	0.62	0.38	0.40	0.26	0.29
STDEV		0.15	0.12	0.25	0.10	0.15	0.09	0.11	0.10

Table S2: Seasonal comparison of modelled versus observed particulate organic matter (OM) and modelled ratios of SOA/OM for the EMEP campaign 2002/2003. Model results from the base simulation S2. Ratio modelled to observed OM (M/O).

		MAM		JJA		SON		DJF	
Station	ID	M/O	SOA/ OM	M/O	SOA/ OM	M/O	SOA/ OM	M/O	SOA/ OM
Illmitz	AT02	0.59	0.29	0.85	0.59	0.74	0.28	0.26	0.09
Ghent	BE05	0.43	0.28	0.44	0.51	0.40	0.31	0.30	0.15
Kosetice	CZ03	0.31	0.53	0.51	0.60	0.52	0.40	0.29	0.12
Langenbru	DE02	0.34	0.38	0.54	0.65	0.46	0.44	0.20	0.16
Virolahti	FI17	0.45	0.26	0.29	0.61	0.21	0.34	0.28	0.15
Penicuik	GB46	0.40	0.48	0.66	0.67	0.44	0.54	0.28	0.29
Mace Head	IE31	0.33	0.49	0.26	0.54	0.47	0.61	0.22	0.28
S.P.C.	IT08	0.38	0.55	0.73	0.78	0.28	0.53	0.18	0.21
Kollumerw	NL09	0.38	0.35	0.54	0.63	0.45	0.40	0.32	0.21
Braganca	PT01	0.23	0.68	0.37	0.64	0.21	0.54	0.06	0.56
Aspvreten	SE12	0.48	0.23	0.36	0.55	0.48	0.27	0.36	0.12
Stara Lesna	SK04	0.29	0.48	0.31	0.63	0.21	0.47	0.14	0.15
Ispra	IT04	0.29	0.44	0.98	0.76	0.29	0.42	0.13	0.15
Average		0.38	0.42	0.53	0.63	0.40	0.43	0.23	0.20
STDEV		0.10	0.13	0.22	0.08	0.15	0.11	0.09	0.12

Table S3: Seasonal comparison of modelled versus observed particulate organic matter (OM) and modelled ratios of SOA/OM for the EMEP campaign 2002/2003. Model results from the base simulation S3. Ratio modelled to observed OM (M/O).

		MAM		JJA		SON		DJF	
Station	ID	M/O	SOA/ OM	M/O	SOA/ OM	M/O	SOA/ OM	M/O	SOA/ OM
Illmitz	AT02	0.55	0.23	0.73	0.52	0.69	0.24	0.26	0.10
Ghent	BE05	0.41	0.26	0.39	0.45	0.38	0.27	0.30	0.16
Kosetice	CZ03	0.33	0.36	0.41	0.49	0.45	0.32	0.30	0.14
Langenbru	DE02	0.32	0.32	0.44	0.57	0.41	0.37	0.20	0.16
Virolahti	FI17	0.43	0.22	0.24	0.53	0.20	0.30	0.29	0.19
Penicuik	GB46	0.35	0.40	0.56	0.62	0.36	0.45	0.26	0.25
Mace Head	IE31	0.27	0.38	0.20	0.40	0.36	0.49	0.19	0.22
S.P.C.	IT08	0.33	0.48	0.58	0.72	0.25	0.47	0.18	0.20
Kollumerw	NL09	0.35	0.30	0.44	0.54	0.40	0.33	0.32	0.19
Braganca	PT01	0.19	0.63	0.29	0.54	0.18	0.47	0.05	0.50
Aspvreten	SE12	0.47	0.20	0.29	0.45	0.46	0.23	0.37	0.13
Stara Lesna	SK04	0.24	0.38	0.23	0.50	0.17	0.36	0.14	0.16
Ispra	IT04	0.26	0.37	0.78	0.70	0.27	0.39	0.13	0.17
Average		0.35	0.35	0.43	0.54	0.35	0.36	0.23	0.20
STDEV		0.10	0.12	0.19	0.09	0.14	0.09	0.09	0.10

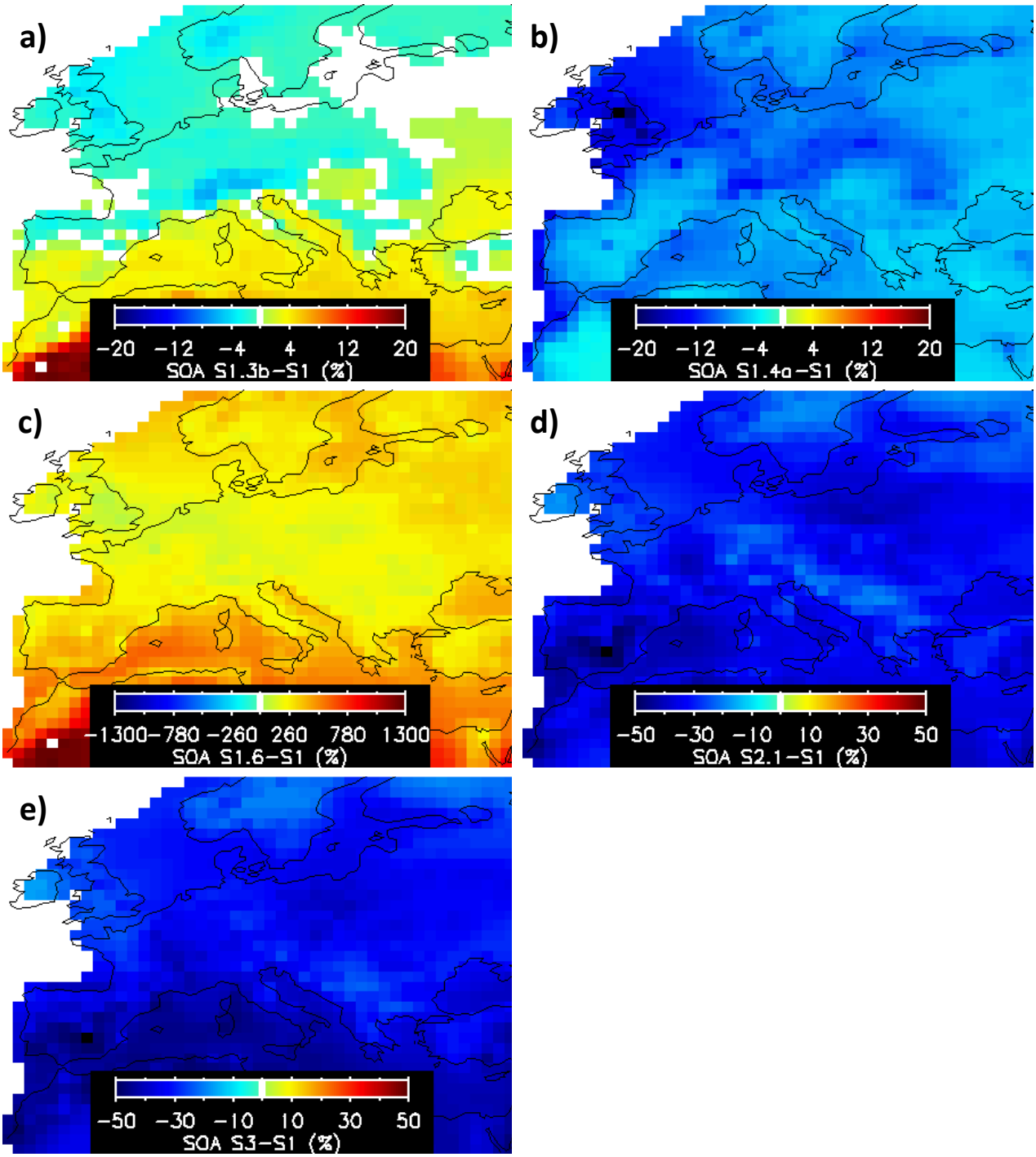

Figure S1: Relative differences of surface SOA between sensitivity cases and the reference simulation S1 over Europe for JJA 2002: a) S1.3b applying ΔH_{vap}=72.7 kJ mol^{-1} for the temperature dependence of K for isoprene oxidation products, b) S1.4a, with wet removal of isoprene gas phase oxidation products, H=10^5 Matm^{-1}, c) S1.6 applying irreversible sticking, d) S2.1, as S2 but without condensation on ammonium and sulphate aerosols, e) S3, as S1 but without SOA production from isoprene oxidation. Changes are only plotted for areas where SOA surface concentrations are above 0.25 µg m^{-3}. Thus white colours either indicate low concentrations or small changes.

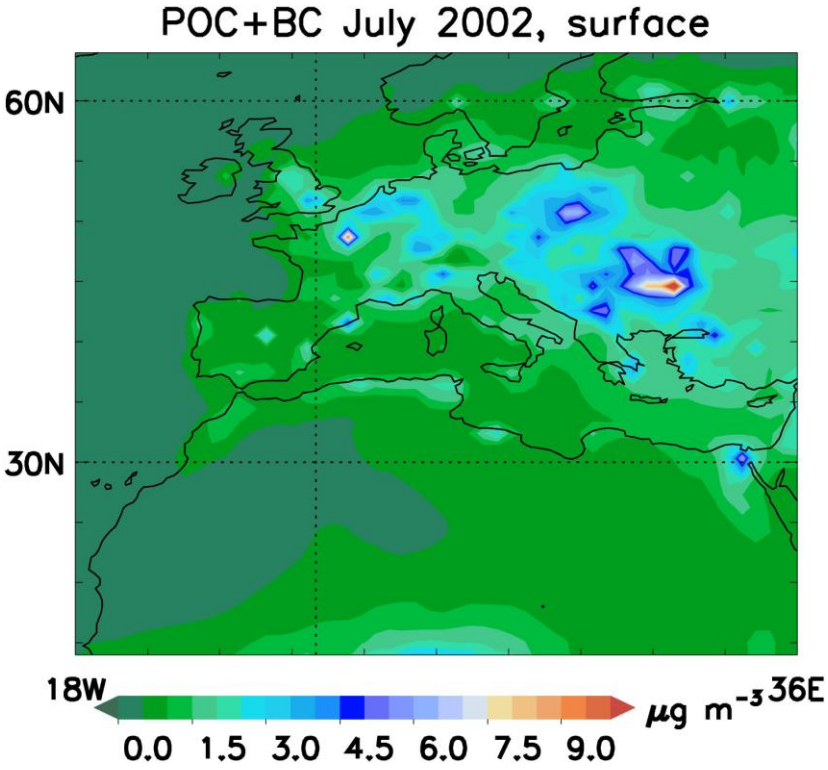

Figure S2: European distributions of surface concentration of primary carbonaceous aerosol (BC + POC) for base simulation S1, July 2002.

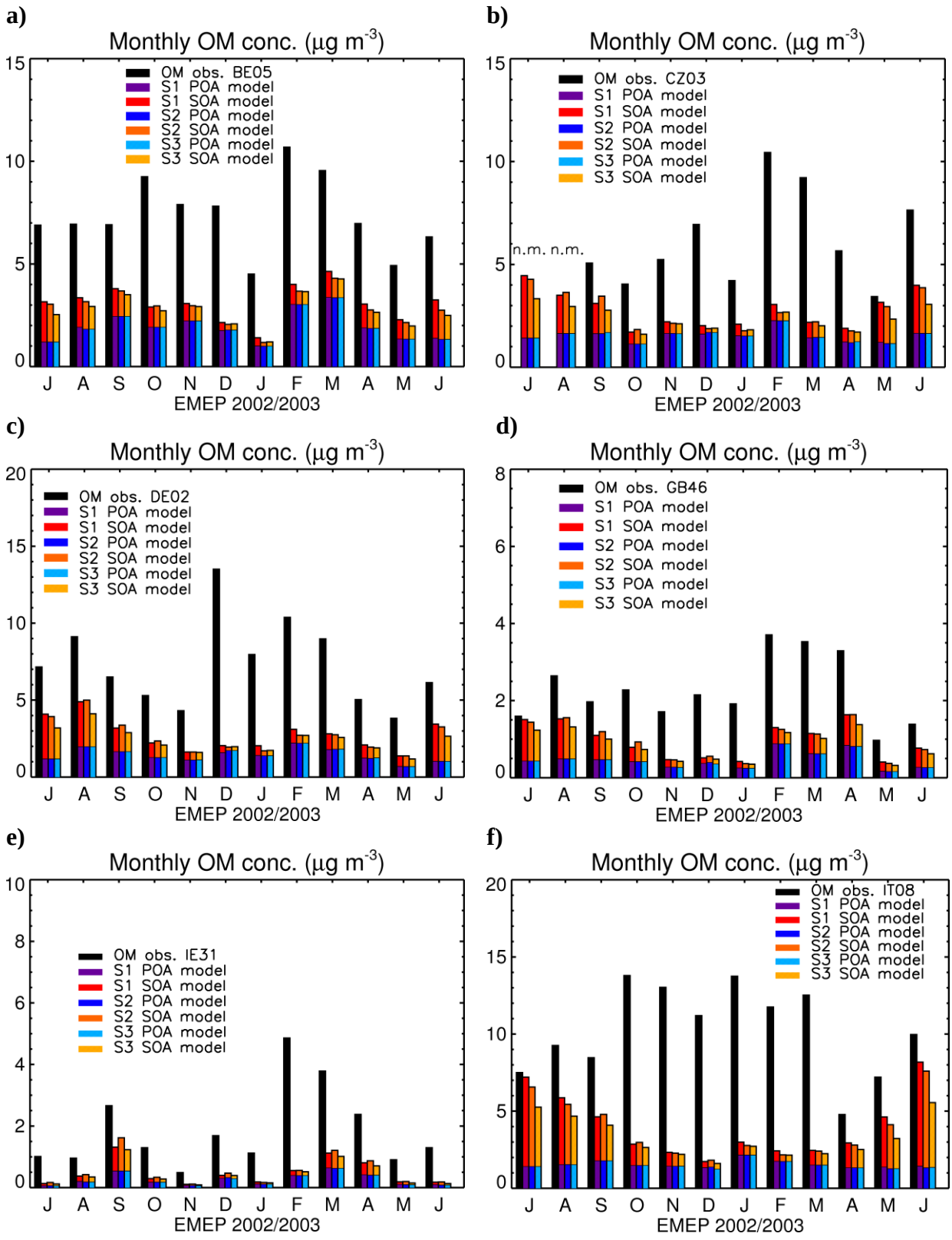

Figure S3: Continued.

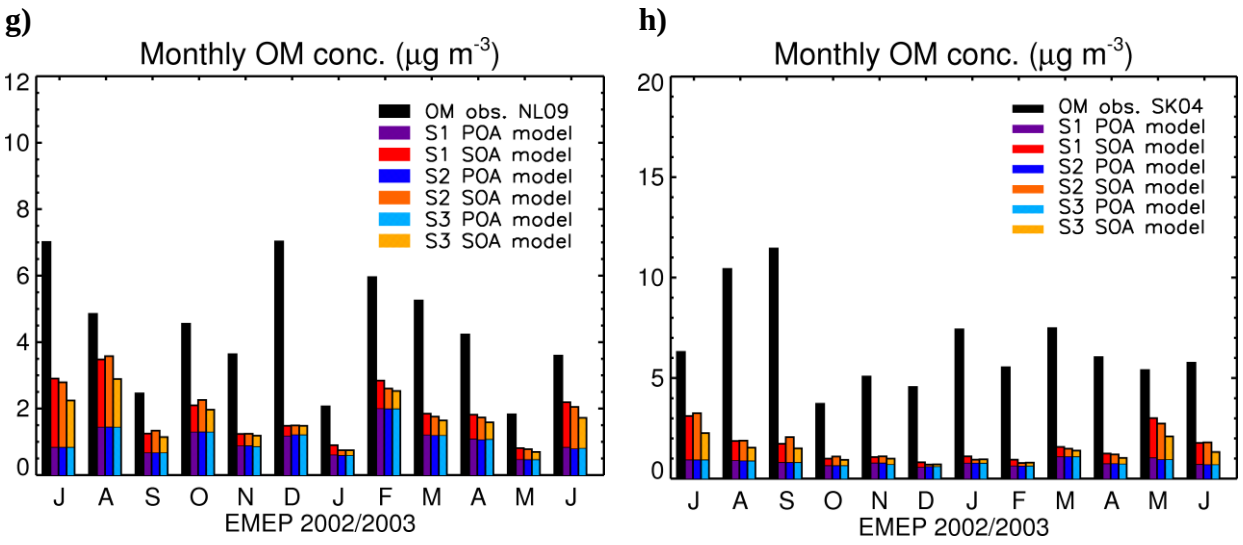

Figure S3: Comparison of monthly averaged OM concentrations for EMEP stations: a) BE05, Ghent [3º43'E, 51º03'N], b) CZ03, Košetice [15º05'E, 49º35'N], c) DE02, Langenbrügge [10º46'E, 52º48'N], d) GB46, Penicuik [3º13'W, 55º57'N], e) IE31, Mace Head [9º30'W, 53º10'N] f) IT08, S.P.C. (San Pietro Capofiume) [11º20'E, 44º29'N], g) NL09, Kollumerwaard [6º17'E, 53º20'N], h) SK04, Stara Lesna [20º17'E, 49º09'N].