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Simulation of the seasonal and spatial variability of the concentrations and chemical composition of ultrafine particulate matter over Europe

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Table S1. PMCAMx-UF daily prediction skill metrics of $PV_{0.1}$ in ($\mu m^3\ cm^{-3}$) during 5 June - 8 July 2012 for the 12 measurement sites.

Station	**Mean Predicted** ($\mu m^3\ cm^{-3}$)	**Mean Observed** ($\mu m^3\ cm^{-3}$)	**NMB** (%)	**NME** (%)
Dresden	0.42	0.59	-29	32
Kosetice	0.39	0.26	53	57
Hohenpeissenberg	0.21	0.26	-19	36
Mace Head	0.05	0.06	-15	64
Finokalia	0.39	0.36	6	29
Vavihill	0.47	0.28	66	69
Helsinki	0.44	0.48	-9	29
Melpitz	0.41	0.33	24	38
Hyytiala	0.23	0.23	-0.5	46
Waldhof	0.50	0.31	63	66
Aspvreten	0.48	0.23	109	115
Varrio	0.10	0.10	-4	49

Table S2. PMCAMx-UF daily prediction skill metrics of $PV_{0.1}$ in ($\mu m^3\ cm^{-3}$) during 1-30 January 2009 for the 12 measurement sites.

Station	**Mean Predicted** ($\mu m^3\ cm^{-3}$)	**Mean Observed** ($\mu m^3\ cm^{-3}$)	**NMB** (%)	**NME** (%)
Dresden	0.26	1.05	-76	76
Kosetice	0.24	0.46	-47	52
Hohenpeissenberg	0.15	0.19	-18	36
Mace Head	0.02	0.09	-80	80
Finokalia	0.07	0.14	-52	60
Vavihill	0.24	0.21	13	59
Helsinki	0.18	0.35	-47	59
Melpitz	0.27	0.28	-3	46
Hyytiala	0.16	0.07	130	174
Waldhof	0.26	0.27	-5	40
Aspvreten	0.11	0.08	28	99
Varrio	0.09	0.02	399	424

Table S3. Average predicted total concentration of $PM_{0.1}$ secondary organic aerosol ($\mu g\ m^{-3}$) and its anthropogenic, biogenic and extremely low volatility fractions during 5 June - 8 July 2012.

Site	Mean total SOA ($\mu g\ m^{-3}$)	Anthropogenic SOA (%)	Biogenic SOA (%)	ELSOA (%)
Athens	0.26	64.7	27.6	7.7
Patra	0.19	59.5	29.5	11.0
Finokalia	0.16	72.6	20.6	6.8
Montseny	0.34	53.9	29.4	16.7
Paris	0.18	49.7	28.8	21.5
Zurich	0.22	50.0	30.2	19.8
Ispra	0.35	53.3	29.8	16.9
Bucharest	0.41	53.5	35.6	10.9
Helsinki	0.28	39.7	35.1	25.2
Birmingham	0.13	49.6	26.0	24.4

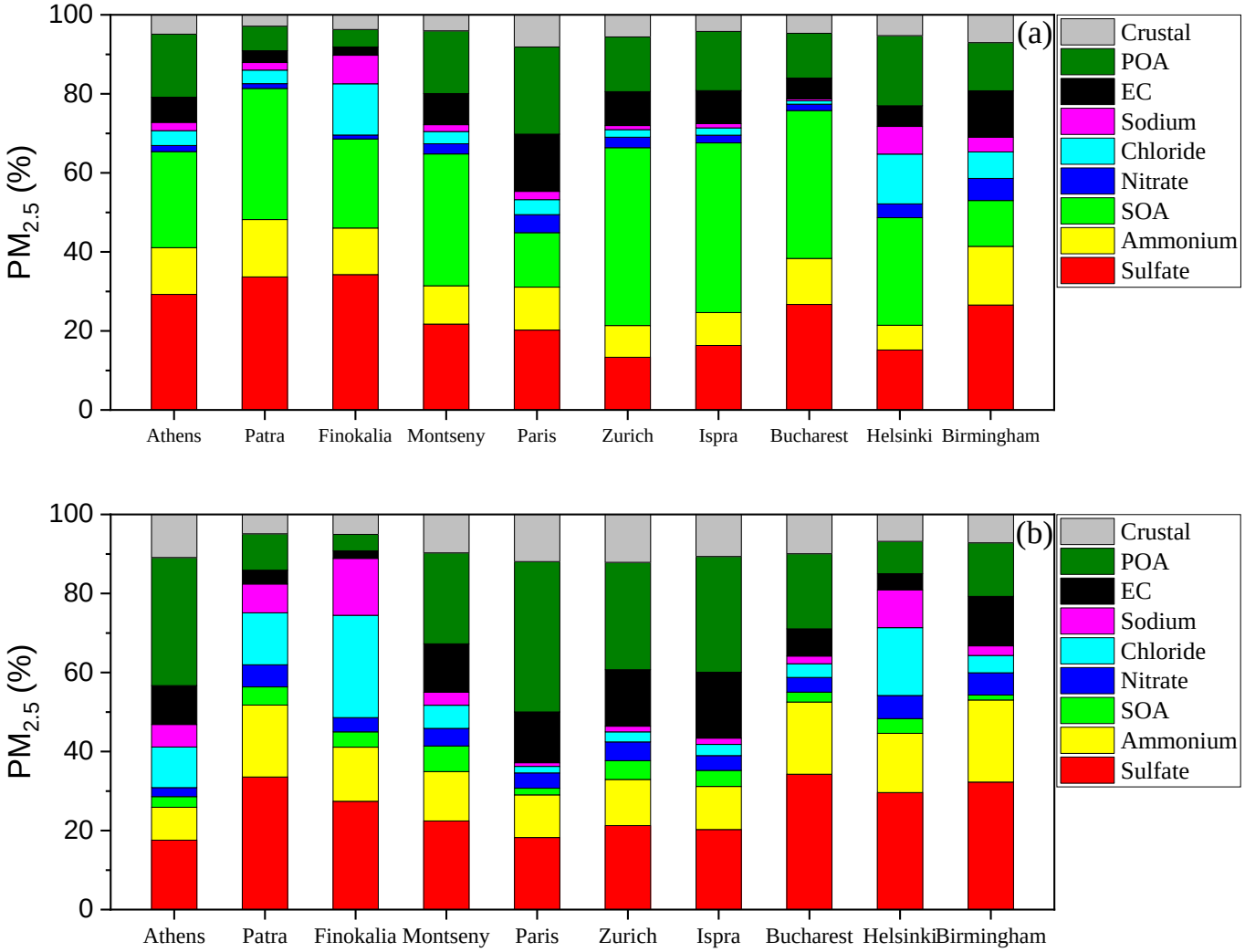

Figure S1. Predicted chemical composition of $PM_{2.5}$ in the areas studied during the (a) summer and (b) winter period. POA (dark green) and SOA (green) stand for primary and secondary organic aerosol.

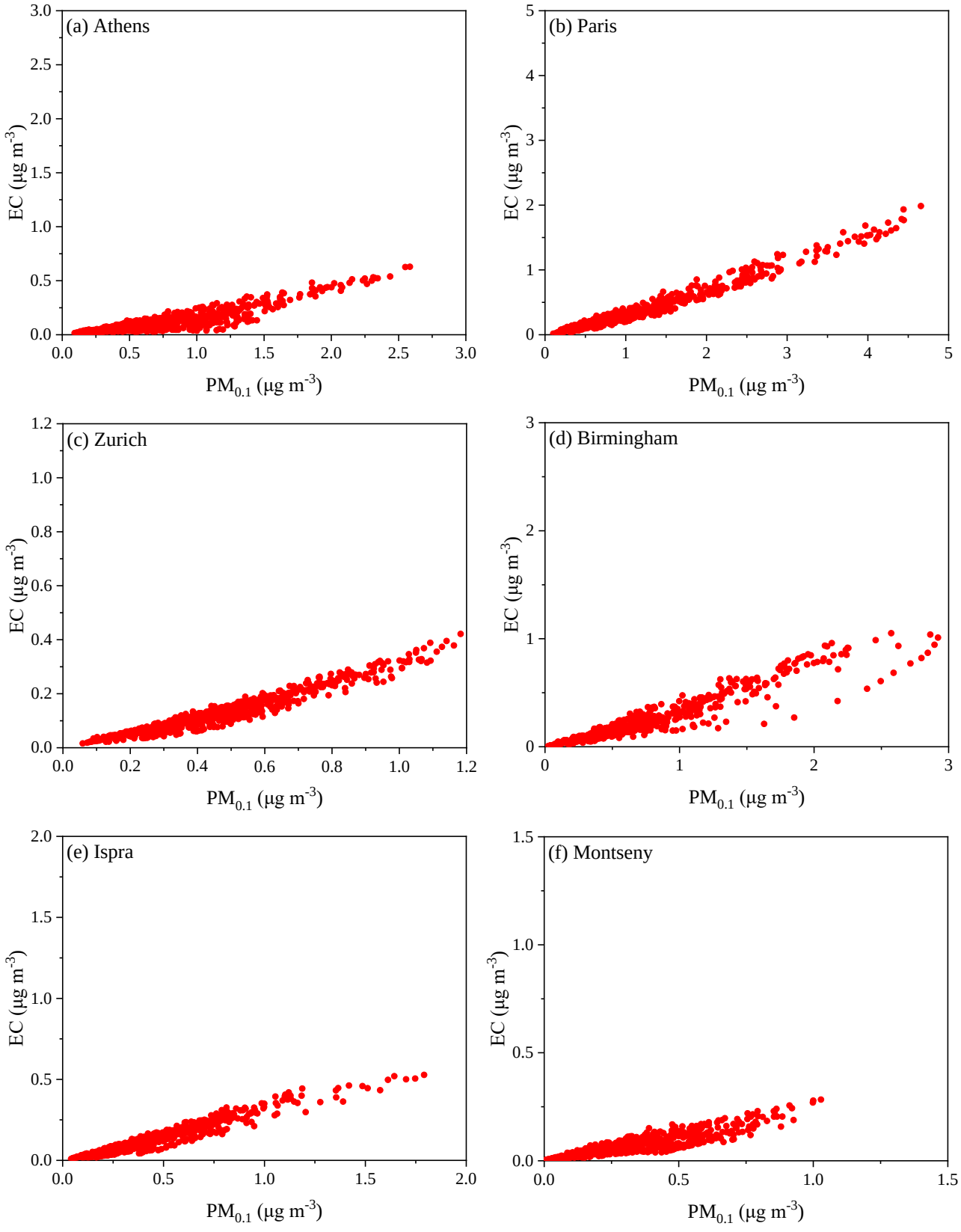

Figure S2. Correlation plots for predicted total $PM_{0.1}$ and EC in major cities during the period of 1-30 January 2009.

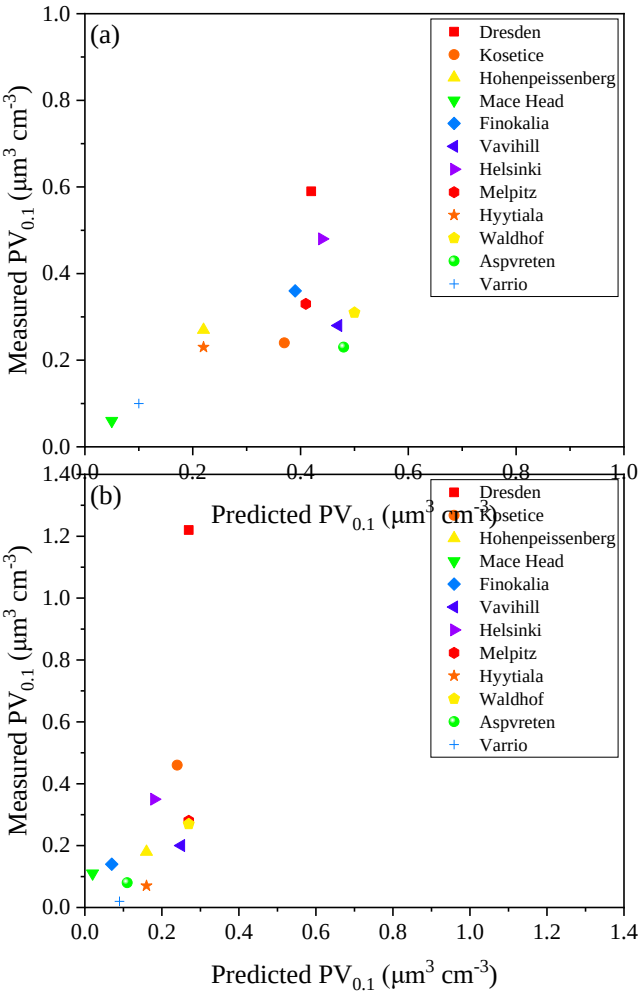

Figure S3. Mean predicted and measured total volume concentrations in µm^3 cm^{-3} for the (a) summer and (b) winter period in different sites.

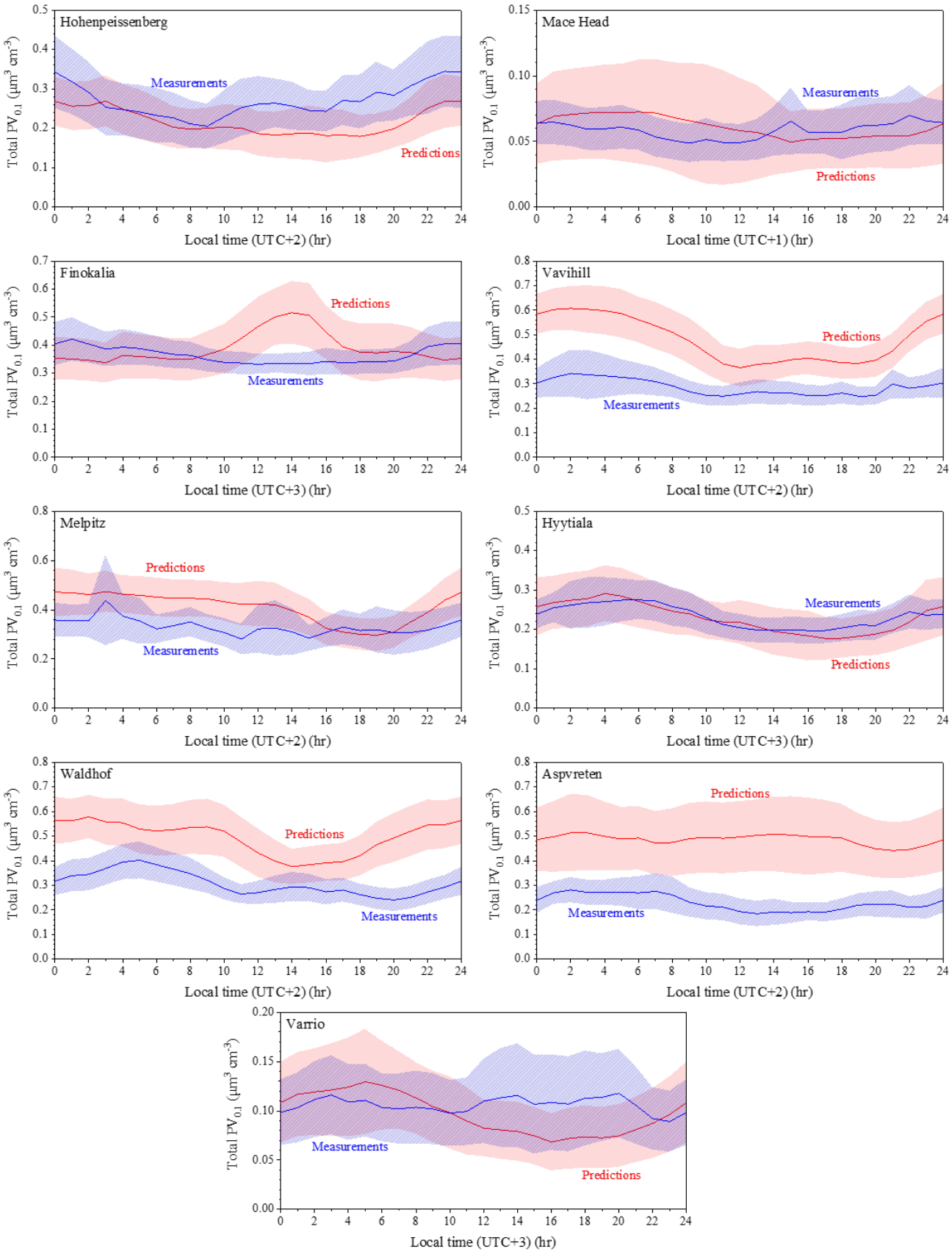

Figure S4. Average diurnal profile of predicted and measured total volume concentrations in $\mu m^3\ cm^{-3}$ for the period of 5 June - 8 July 2012 in different sites.

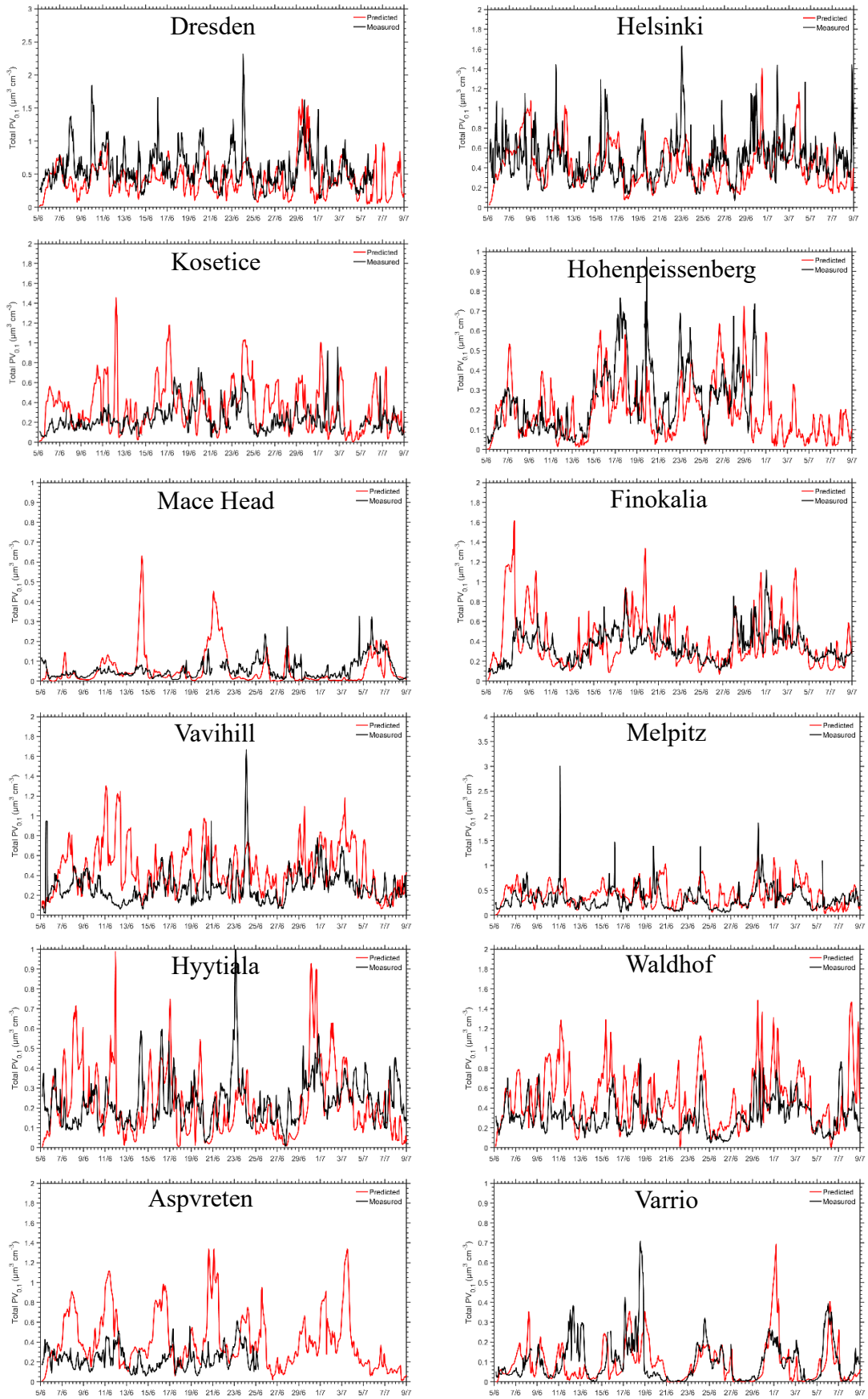

Figure S5. Timeseries of predicted and measured total volume concentrations in μm^3 cm^{-3} for the period of 5 June - 8 July 2012 in different sites.

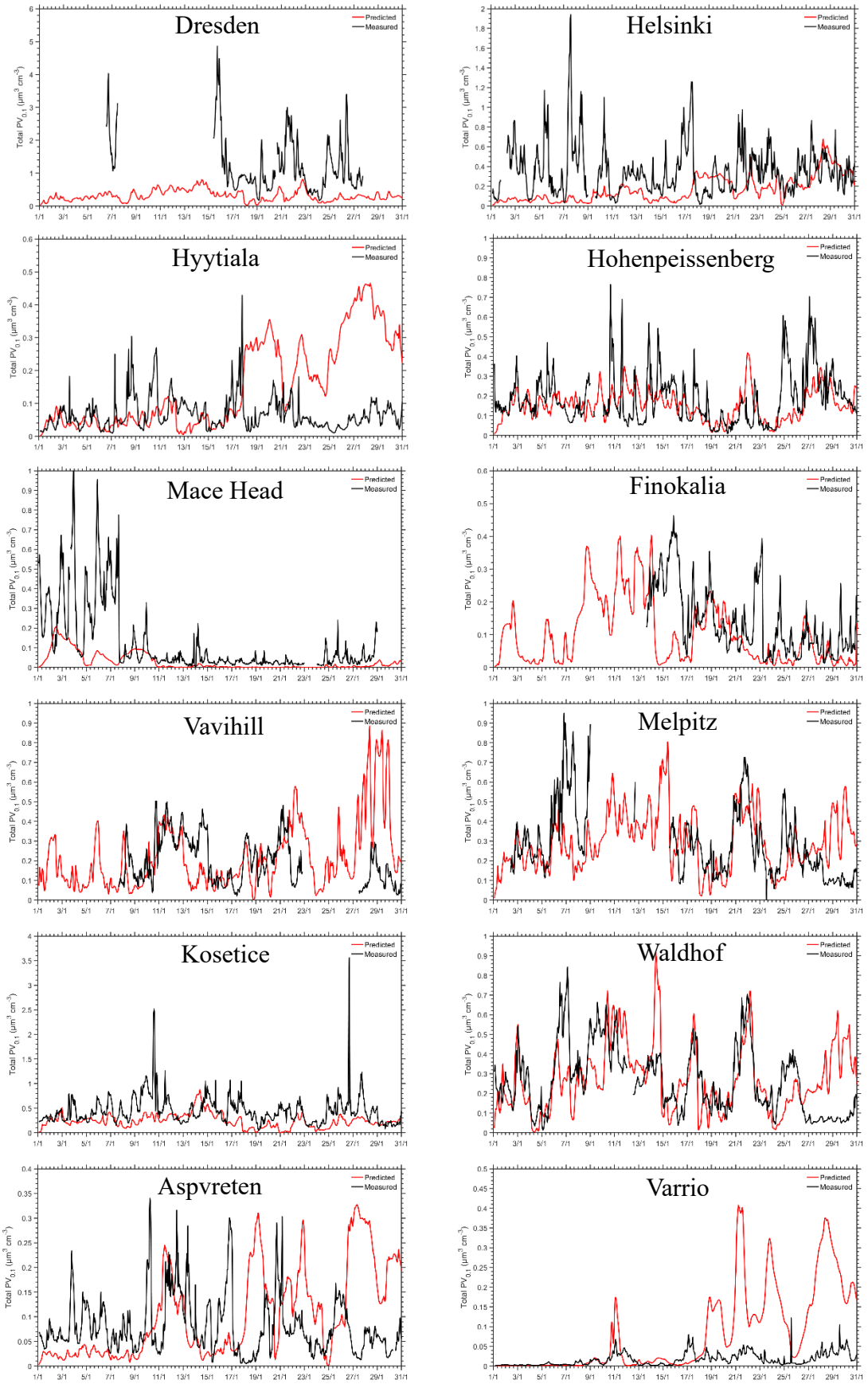

Figure S6. Timeseries of predicted and measured total volume concentrations in μm^3 cm^{-3} for the period of 1-30 January 2009 in different sites.

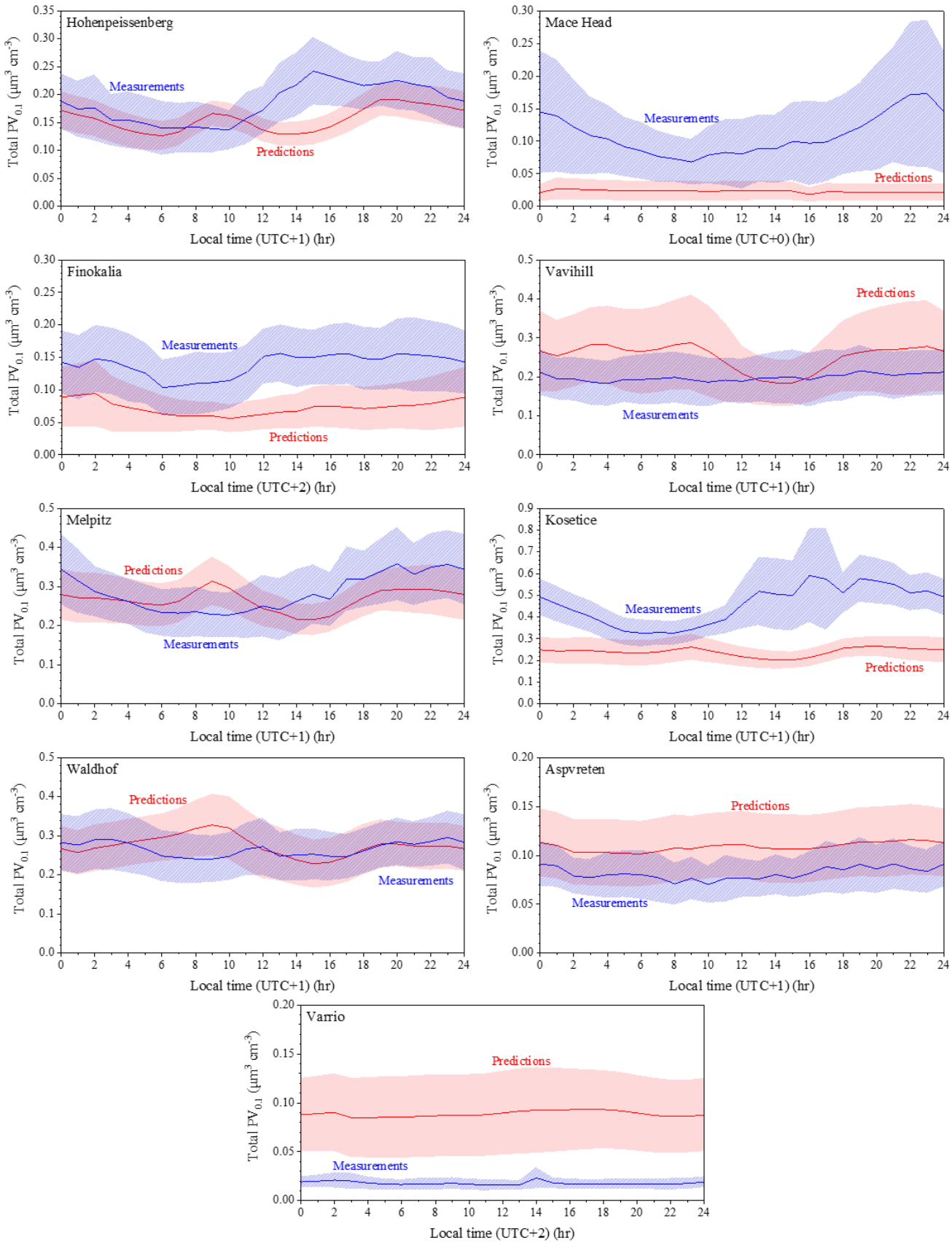

Figure S7. Average diurnal profile of predicted and measured total volume concentrations in $\mu m^3\ cm^{-3}$ for the period of 1-30 January 2009 in different sit

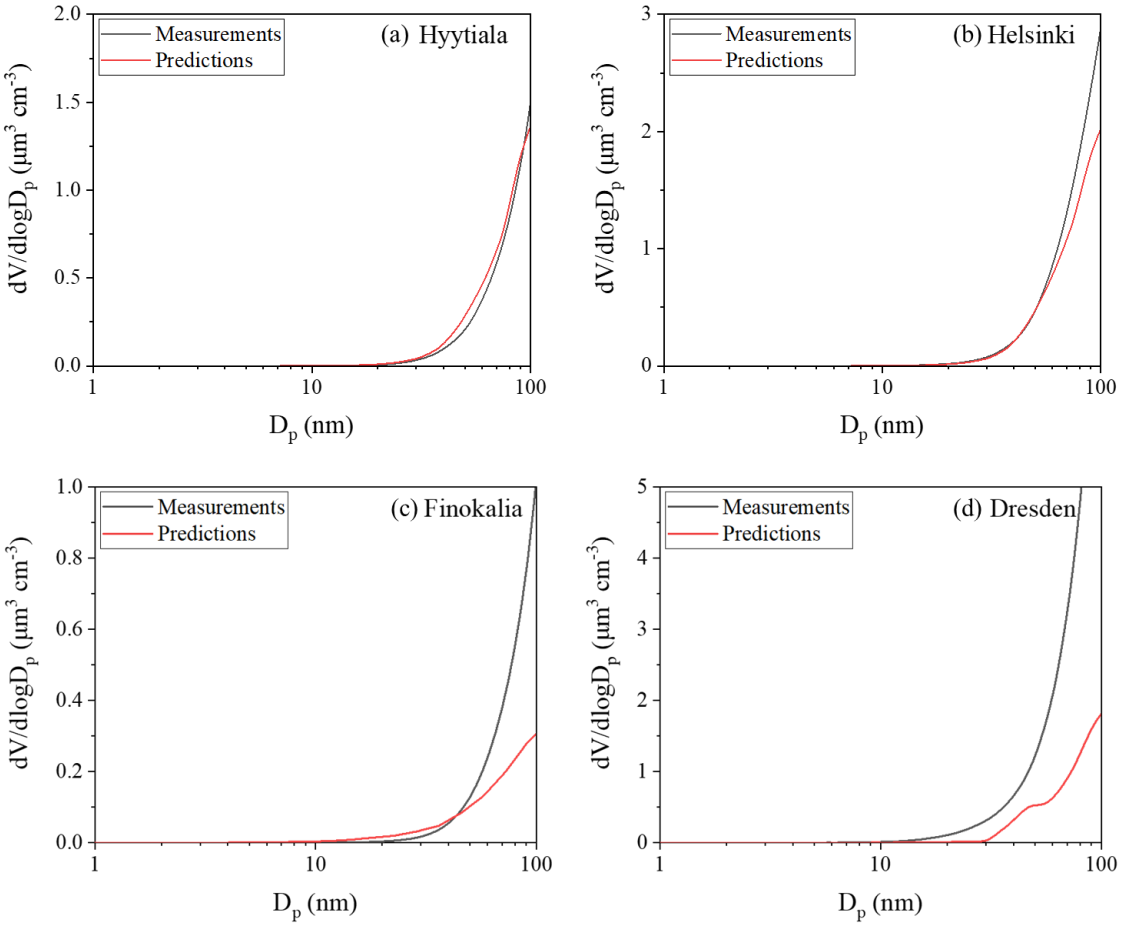

Figure S8. Average volume distributions for predicted and measured $PM_{0.1}$ in: (a) Hyytiala during the summer; (b) Helsinki during the summer; (c) Finokalia during the winter and (d) Dresden during the winter.

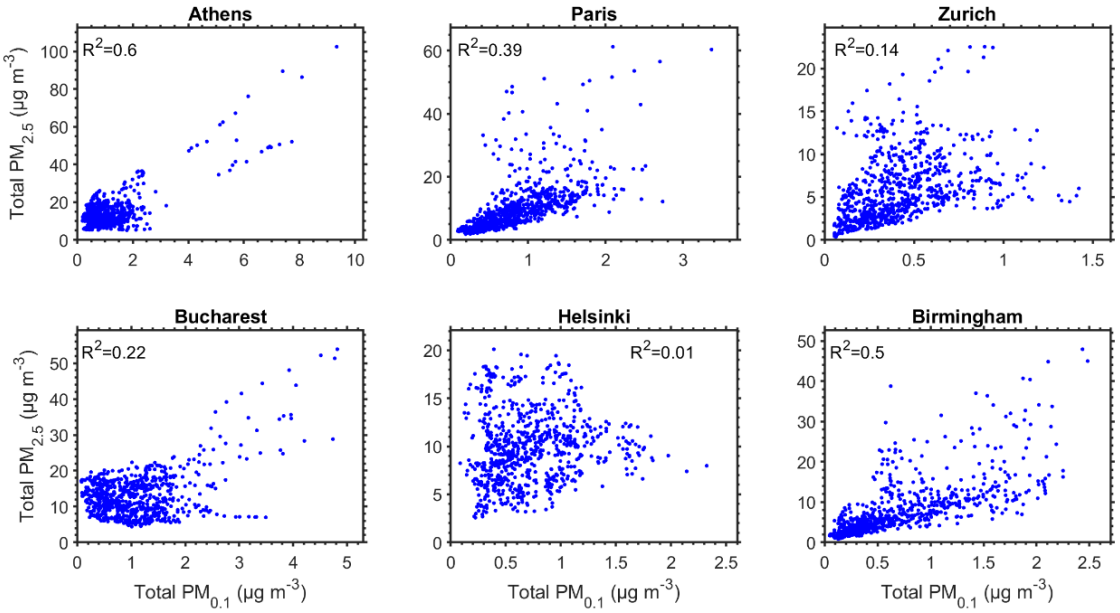

Figure S9. Correlation plots for predicted $PM_{2.5}$ and $PM_{0.1}$ in major cities during the period of 5 June - 8 July 2012. R^2 values correspond to the square of the samples Pearson's correlation coefficient R.

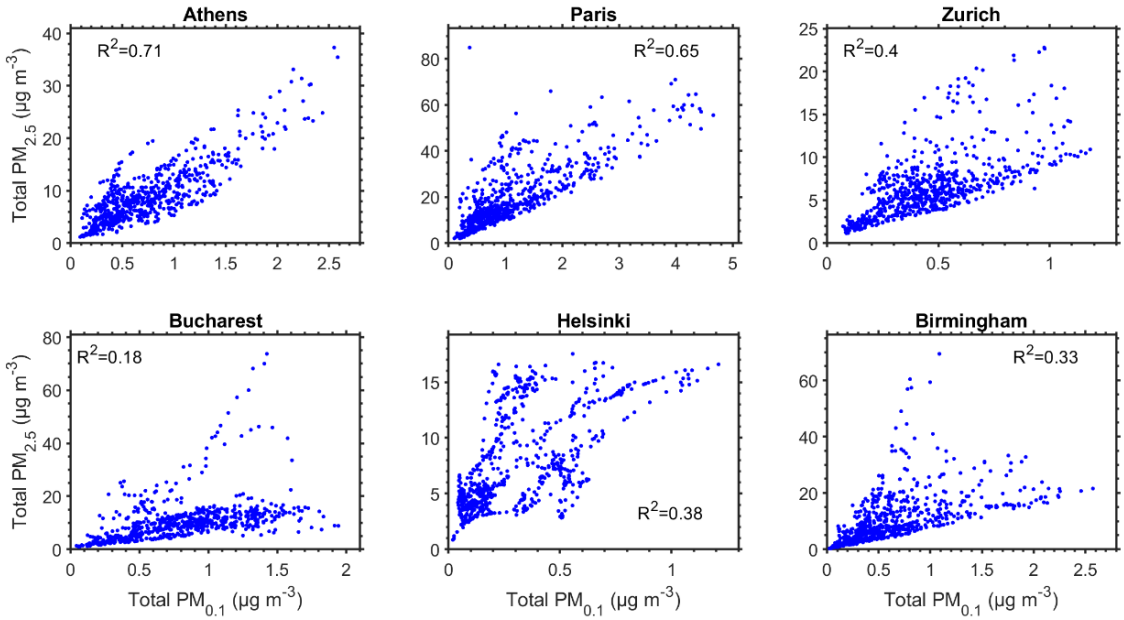

Figure S10. Correlation plots for predicted $PM_{2.5}$ and $PM_{0.1}$ in major cities during the period of 1-30 January 2009. R^2 values correspond to the square of the samples Pearson's correlation coefficient R.