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Source-resolved variability of fine particulate matter and human exposure in an urban area

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Table S1. Outer (CONUS) boundary condition concentrations of major aerosol species.

Component	**Concentration** ($\mu g\ m^{-3}$)			
	West	East	South	North
Nitrate	0.01	0.01	0.03	0.03
Ammonium	0.14	0.25	0.24	0.16
Sulfate	0.64	1.12	0.81	0.68
Elemental carbon	0.04	0.05	0.09	0.03
Organic aerosol (Winter)	0.20	0.16	0.58	0.80
Organic aerosol (Summer)	0.80	0.80	0.80	0.80

Table S2. Comparison of total $PM_{2.5}$ performance with the use of old surrogates and new surrogates for onroad traffic and commercial cooking. Measurements from EPA-CSN and low-cost sensors (RAMPs) withing the inner 1 x 1 km modeling domain were used.

February 2017				
	Old Surrogates		New Surrogates	
	EPA-CSN	RAMPs	EPA-CSN	RAMPs
Observed Average ($\mu g\ m^{-3}$)	10.38	11.65	10.38	11.65
Predicted Average ($\mu g\ m^{-3}$)	10.36	11.32	10.52	13.50
Error ($\mu g\ m^{-3}$)	2.87	4.12	3.02	5.12
Fractional Error	0.29	0.31	0.30	0.38
Bias ($\mu g\ m^{-3}$)	-0.02	-0.33	0.18	1.85
Fractional Bias	0.06	0.08	0.07	0.24
July 2017				
	Old Surrogates		New Surrogates	
	EPA-CSN	RAMPs	EPA-CSN	RAMPs
Observed Average ($\mu g\ m^{-3}$)	11.24	12.58	11.24	12.58
Predicted Average ($\mu g\ m^{-3}$)	7.13	7.98	7.23	8.83
Error ($\mu g\ m^{-3}$)	4.70	5.32	4.67	4.89
Fractional Error	0.49	0.47	0.48	0.42
Bias ($\mu g\ m^{-3}$)	-4.11	-4.61	-4.01	-3.76
Fractional Bias	-0.41	-0.37	-0.39	-0.27

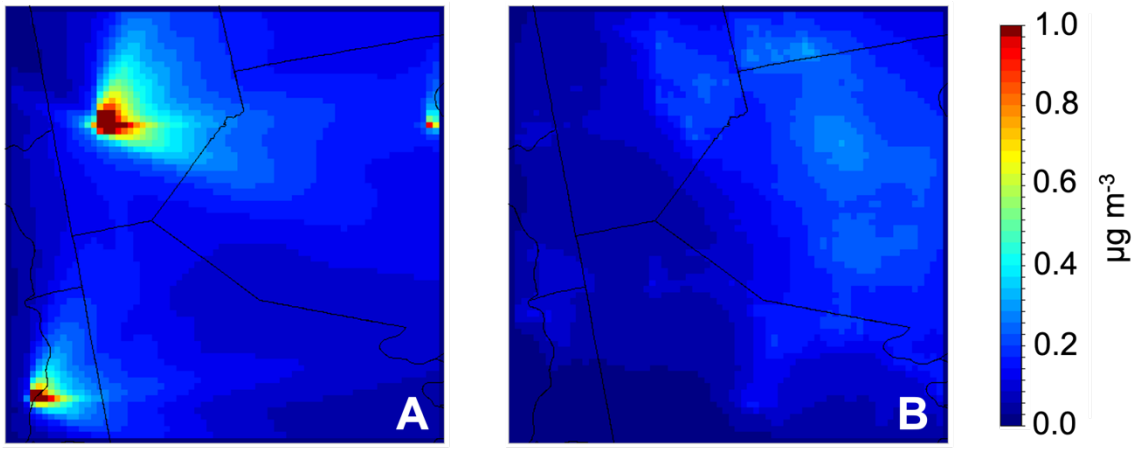

Figure S1 Average upper air concentration (13 simulated vertical layers above the ground layer) of local $PM_{2.5}$ from (**A**) power generation and (**B**) biomass burning in February 2017.

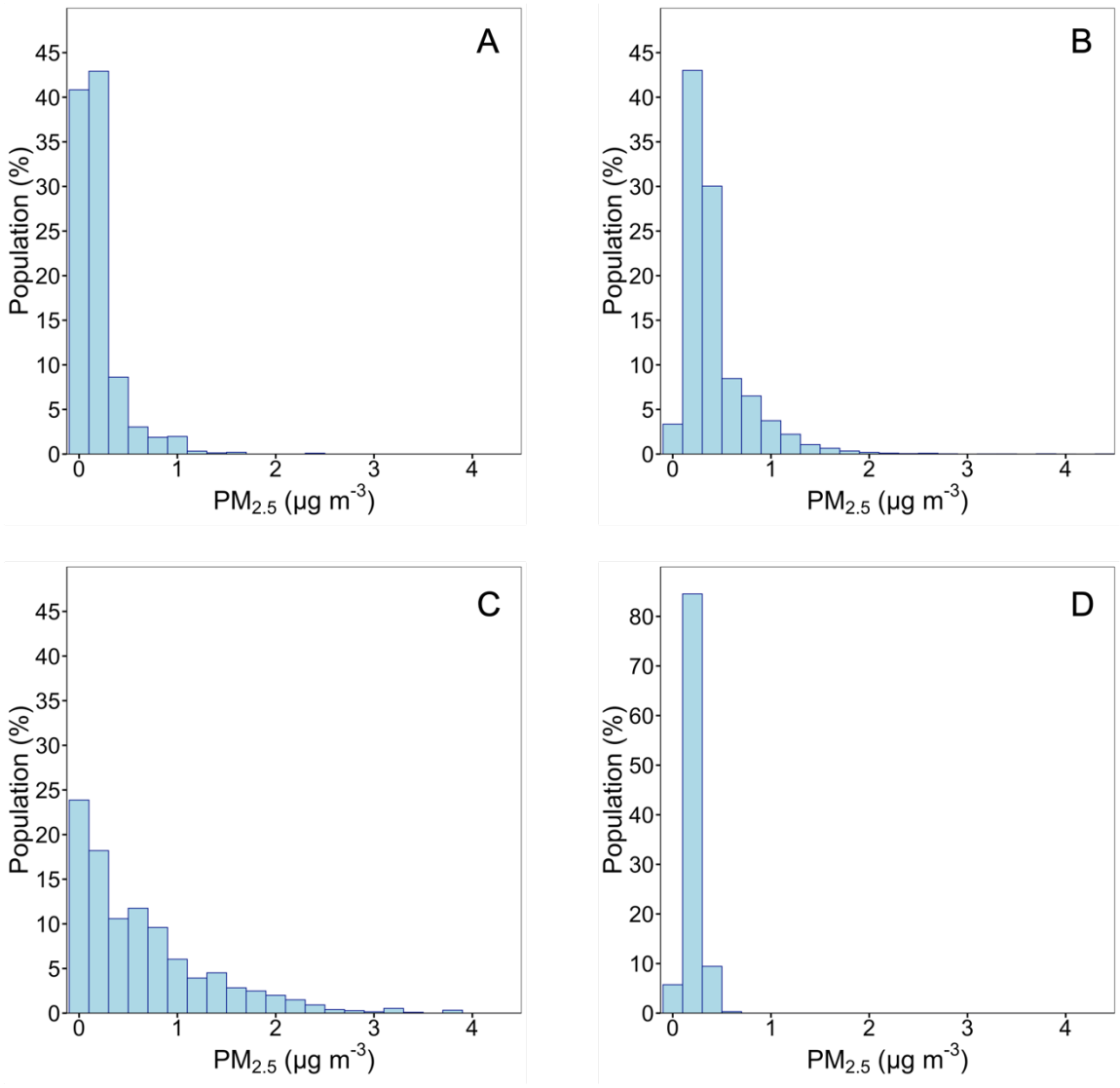

Figure S2 Population exposure histograms of the contribution to $PM_{2.5}$ concentrations from (**A**) commercial cooking, (**B**) industrial, (**C**) on-road traffic and (**D**) power generation sources during February 2017. A different scale for population is used for the distribution from power generation.

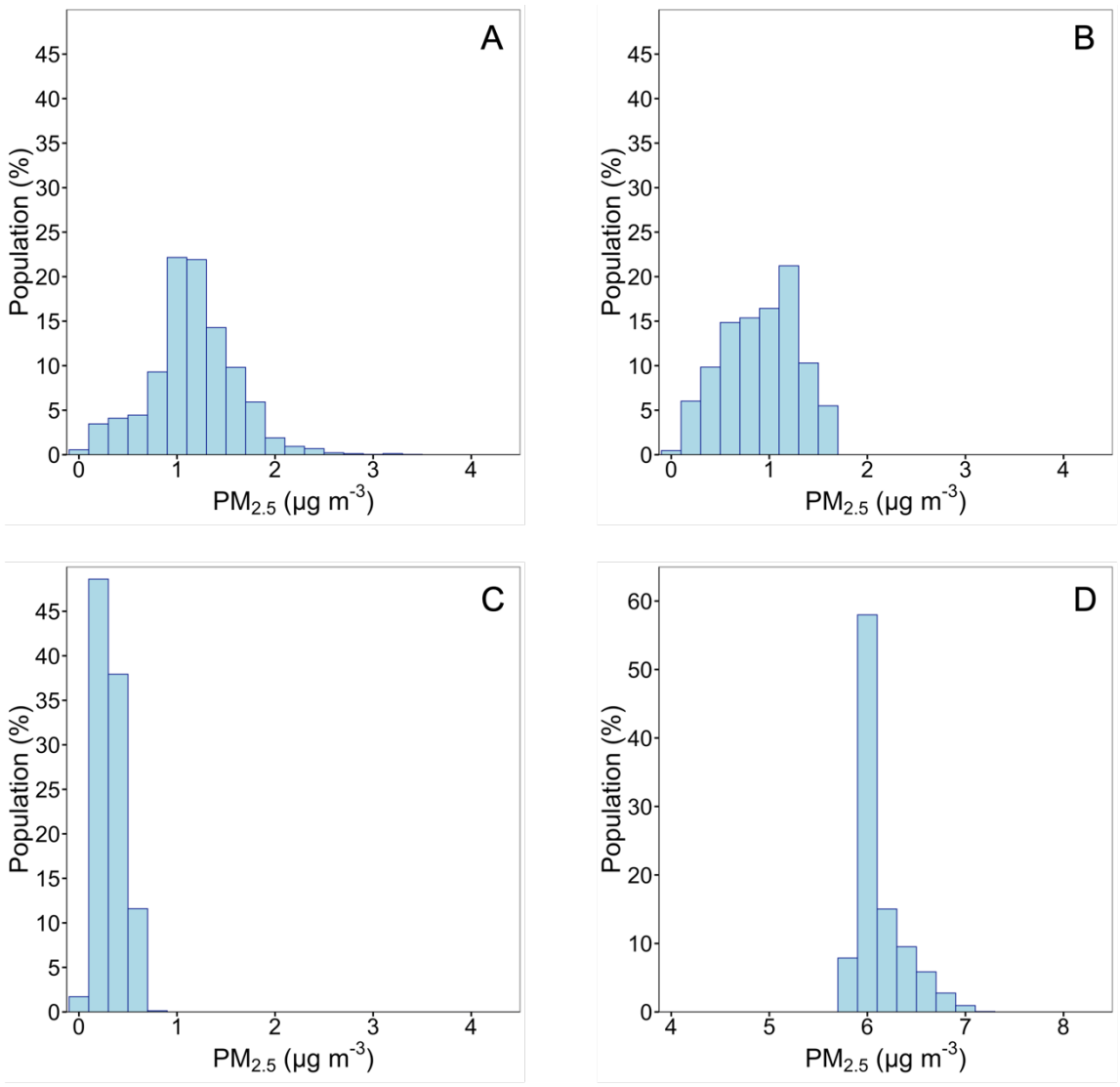

Figure S3 Population exposure histograms of the contribution to $PM_{2.5}$ concentrations from (**A**) biomass burning, (**B**) miscellaneous area sources and (**C**) all other sources during February 2017. Contributions from long-range transport (**D**) are shown with a different concentration scale.

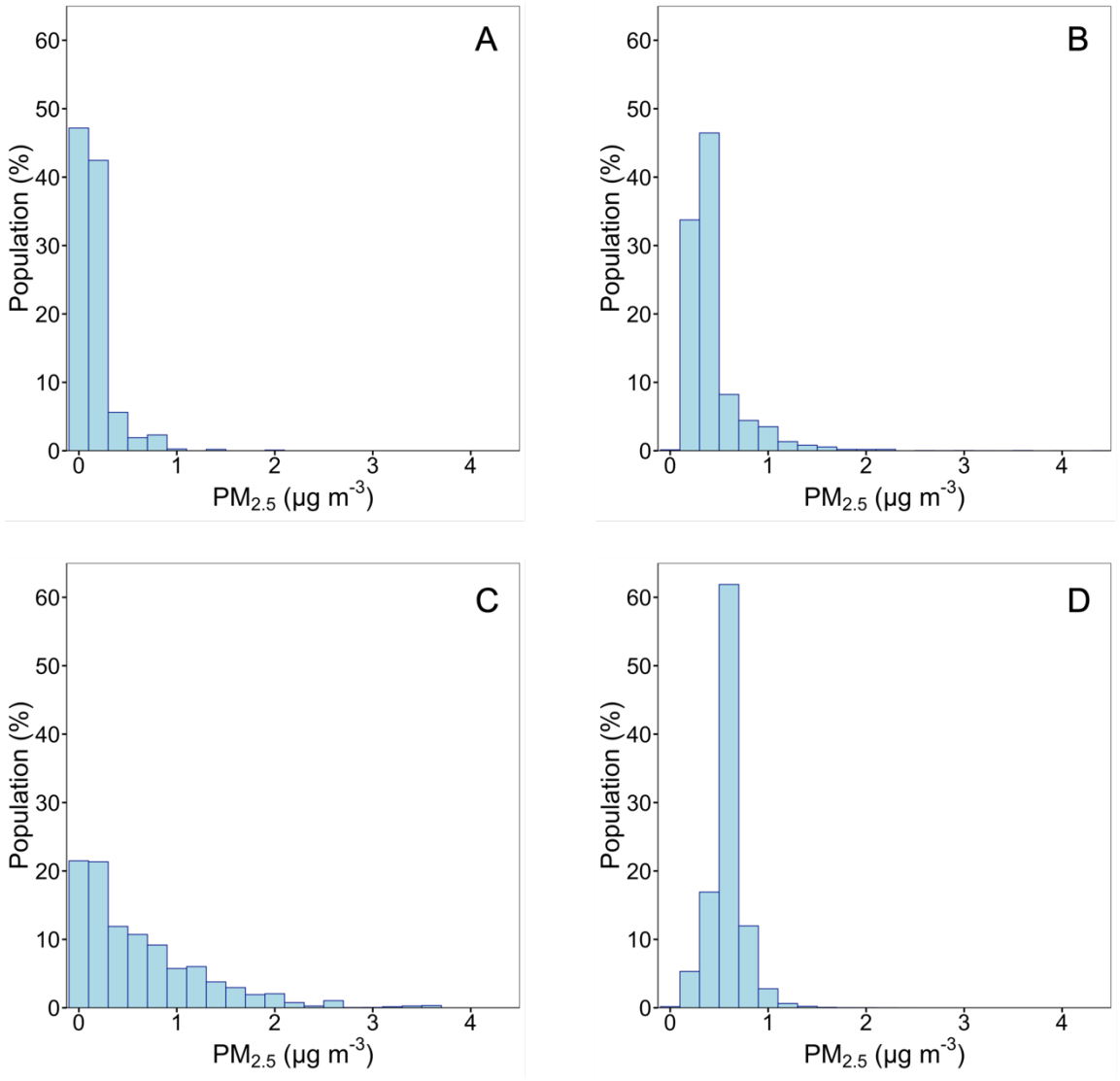

Figure S4 Population exposure histograms of the contribution to $PM_{2.5}$ concentrations from (**A**) commercial cooking, (**B**) industrial, (**C**) on-road traffic and (**D**) power generation sources during July 2017.

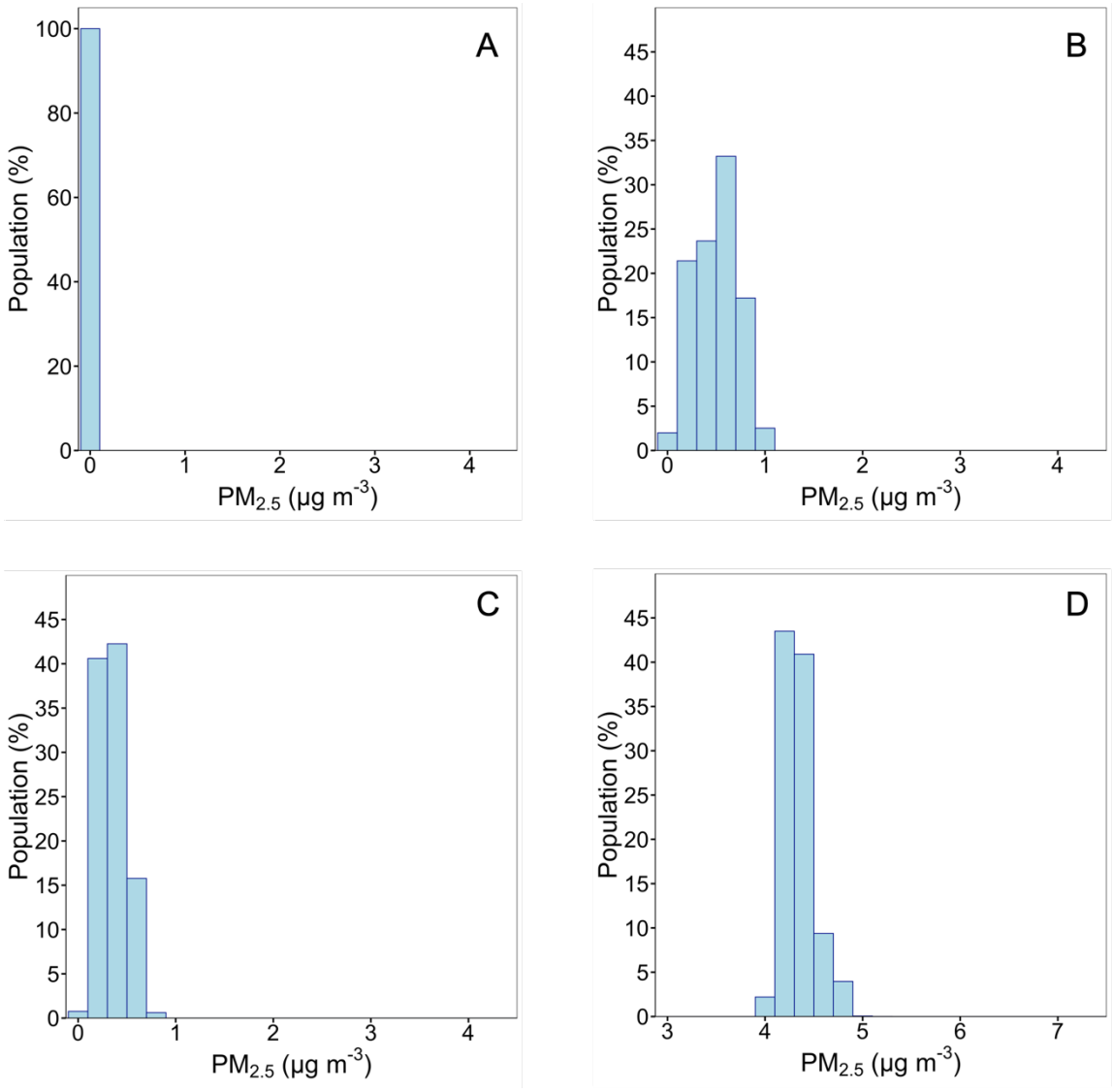

Figure S5 Population exposure histograms of the contribution to $PM_{2.5}$ concentrations from (**A**) biomass burning, (**B**) miscellaneous area sources and (**C**) all other sources during July 2017. Contributions from long-range transport (**D**) are shown with a different concentration scale.

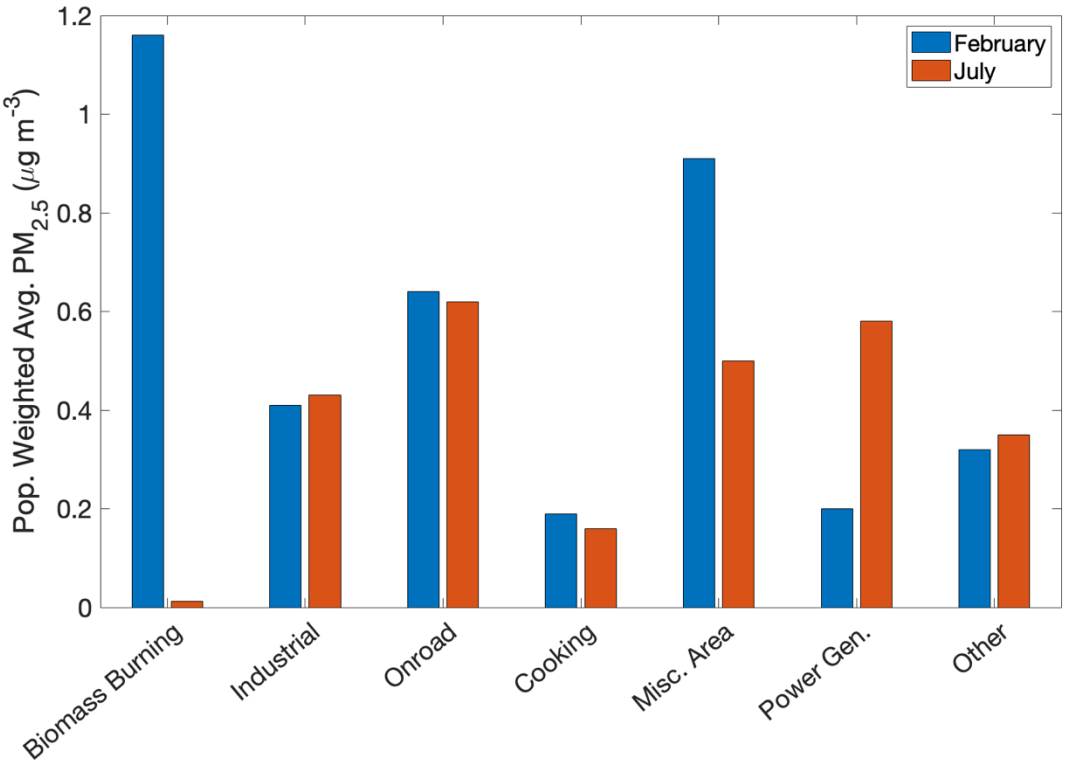

Figure S6 Absolute contributions from local sources to population weighted total $PM_{2.5}$ concentration for February and July 2017