SUPPLMENTAL INFORMATION FOR:

APPLICATION OF AN ENSEMBLE-TRAINED SOURCE APPORTIONMENT APPROACH AT A SITE IMPACTED BY MULTIPLE POINT SOURCES

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This document contains Tables S1, S2, S3A-G, S4A-F, S5A-G, and S6.

Table S1. Source Categories used in the Ensemble-based SA, and binning of individual emissions sources from the underlying SA approaches

Ensemble Source Categories	**CMAQ-TR Sources**	**CMB Sources**	**CMB-MM Sources**	**PMF Sources**	**PMF-MM Sources**
GV	• On-road gasoline • Aircraft • Gasoline engine - leisure craft • Paved road dust • Unpaved road dust • Non-road gasoline	• Gasoline vehicle exhaust	• Spark ignition gasoline exhaust • Gasoline smoker exhaust • Road dust	• Gasoline vehicle exhaust	• Mobile factor (split using GV/DV ratios from other methods)
DV	• On-road diesel • Non-road diesel	• Diesel vehicle exhaust	• Diesel exhaust	• Diesel vehicle exhaust	• Mobile factor (split using GV/DV ratios from other methods)
DUST	• Other fugitive dust • Construction dust	• Dust	• Vegetative detritus	• Resuspended soil 1 • Resuspended soil 2	• Resuspended soil
BURN	• Wood/bark industrial combustion • Agricultural burning • Wildfire • Prescribed fire • Fireplaces • Yard waste burning	• Biomass burning	• Wood smoke	• Biomass burning	• Wood combustion
METAL	• Metal industry	• Steel processing • Primary lead smelting (industrial		• Industrial copper • Industrial lead • Industrial zinc	

Ensemble Source Categories	CMAQ-TR Sources	CMB Sources	CMB-MM Sources	PMF Sources	PMF-MM Sources
		lead and zinc) • Copper processing		• Steel processing	
SOC		• Secondary organic carbon	• Other OC	• OC from secondary sulfate, nitrate, and ammonium factors	• Secondary organic aerosol
Unassigned	• Meat cooking		• Natural gas combustion		• Winter combustion • Point source 1 • Point source 2
	• Distillate oil combustion • Pulp, paper and wood processing • Cement kilns • Mineral industrial process • Petroleum and solvent evaporation • Other industrial process • Natural gas - other • Natural gas - residential heating • Coal burning				

Table S2. Source Specific OC to $PM_{2.5}$ Ratios used for the Molecular Marker Results

Source Apportionment Model	Source Category	OC to $PM_{2.5}$ Ratio	Citation
CMB-MM	Spark Ignition	0.27	(Lough, Schauer et al. 2005; Bae, Schauer et al. 2006)
	Gasoline Smoker	0.58	(Lough, Schauer et al. 2005; Bae, Schauer et al. 2006)
	Road Dust	0.14	(Hildemann, Markowski et al. 1991; Bae, Schauer et al. 2006)
	Diesel Exhaust	0.30	(Schauer, Kleeman et al. 1999; Bae, Schauer et al. 2006)
	Vegetative Detritus	0.32	(Hildemann, Markowski et al. 1991; Bae, Schauer et al. 2006)
	Wood Smoke	0.56	(Schauer, Kleeman et al. 2001; Bae, Schauer et al. 2006)
	Secondary Organic Aerosol	0.58	(Bae, Schauer et al. 2006)
	Natural Gas Combustion	0.85	(Rogge, Hildemann et al. 1993; Bae, Schauer et al. 2006)
PMF-MM	Diesel Vehicles	0.23	(Zheng, Cass et al. 2007; USEPA 2010)
	Gasoline Vehicles	0.68	(Zheng, Cass et al. 2007; USEPA 2010)
	Dust	0.49	(Chow, Watson et al. 2004; Zheng, Cass et al. 2007)
	Biomass Burning	0.70	(Schauer, Kleeman et al. 2001; Chow, Watson et al. 2004; Zheng, Cass et al. 2007)

Table S3A. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Gasoline Vehicle Impacts for PMF, CMB, PMF-MM, CMB-MM, and CMAQ-TR

		PMF		CMB-MBSPs-MI (CMB)		PMF-MM		CMB-MM		CMAQ-TR	
CMB-MBSPs-MI (CMB)	R =	0.52									
	b =	1.08	±0.049								
	m =	3.54	±0.15								
PMF-MM	R =	0.43		0.17							
	b =	-0.08	±0.02	-0.022	±0.008						
	m =	0.57	±0.05	-0.008	±0.0002						
CMB-MM	R =	0.48		0.21		0.62					
	b =	1.74	±0.11	0.57	±0.09	1.99	±0.05				
	m =	3.92	±0.31	0.75	±0.03	5.61	±0.36				
CMAQ-TR	R =	0.56		0.65		0.21		0.03			
	b =	0.89	±0.26	1.07	±0.29	1.70	±0.30	1.44	±0.16		
	m =	0.72	±0.18	0.21	±0.07	1.97	±1.59	0.005	±0.01		
CMB-EBSPs	R =	0.66		0.65		0.40		0.42		0.16	
	b =	1.1	±0.06	0.75	±0.05	2.5	±0.1	-1.4	±0.12	-23	±29
	m =	2.5	±0.09	0.65	±0.01	4.6	±0.38	0.64	±0.03	14	±16

Table S3B. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Diesel Vehicle Impacts for PMF, CMB, PMF-MM, CMB-MM, and CMAQ-TR

		PMF		CMB-MBSPs-MI (CMB)		PMF-MM		CMB-MM		CMAQ-TR	
CMB-MBSPs-MI (CMB)	R =	0.27									
	b =	-0.068	±0.019								
	m =	1.00	±0.062								
PMF-MM	R =	0.05		0.17							
	b =	-0.70	±0.19	-0.050	±0.012						
	m =	1.51	±0.27	0.72	±0.077						
CMB-MM	R =	-0.03		0.48		0.28					
	b =	-0.16	±0.07	5.5E-06	±1.0E-04	-0.027	±0.005				
	m =	0.48	0.08	0.30	±0.02	0.45	±0.03				
CMAQ-TR	R =	-0.49		-0.11		-0.54		0.12			
	b =	0.90	±0.17	0.89	±0.15	0.95	±0.30	0.79	±0.16		
	m =	-0.05	±0.17	-0.03	±0.07	-0.47	±1.1	-0.02	±0.24		
CMB-EBSPs	R =	0.15		0.85		0.02		0.44		0.24	
	b =	-0.3	±0.1	0.42	±0.03	1.1	±0.04	0.24	±0.05	100	±770
	m =	2.0	±0.15	1.1	±0.04	-0.15	±0.04	3.6	±0.25	-110	±890

Table S3C. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Dust Impacts for PMF, CMB, PMF-MM, CMB-MM, and CMAQ-TR

		PMF		CMB-MBSPs-MI (CMB)		PMF-MM		CMB-MM		CMAQ-TR	
CMB-MBSPs-MI (CMB)	R =	0.81									
	b =	-0.030	±0.0071								
	m =	0.57	±0.024								
PMF-MM	R =	0.74		0.81							
	b =	-0.11	±0.06	0.10	±0.026						
	m =	1.78	±0.16	2.92	±0.23						
CMB-MM	R =	0.06		-0.10		0.17					
	b =	-0.28	±0.076	0.21	±0.007	0.026	±0.0006				
	m =	1.6	±0.26	-0.40	±0.03	0.24	±0.01				
CMAQ-TR	R =	-0.11		-0.29		-0.19		0.05			
	b =	0.49	±0.13	0.75	±0.10	0.84	±0.18	0.76	±0.08		
	m =	0.69	±0.19	0.46	±0.29	0.08	±0.12	0.02	±0.21		
CMB-EBSPs	R =	0.76		0.86		0.84		0.08		-0.19	
	b =	0.06	±0.01	0.09	±0.01	0.14	±0.01	0.12	±0.01	-4.2	±5.7
	m =	0.49	±0.02	0.90	±0.02	0.20	±0.01	1.4	±0.07	5.0	±6.3

Table S3D. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Biomass Burning Impacts for PMF, CMB, PMF-MM, CMB-MM, and CMAQ-TR

		PMF		CMB-MBSPs-MI (CMB)		PMF-MM		CMB-MM		CMAQ-TR	
CMB-MBSPs-MI (CMB)	R =	0.35									
	b =	-0.0031	±0.0018								
	m =	1.56	±0.079								
PMF-MM	R =	0.0012		0.40							
	b =	-0.14	±0.012	0.004	±0.002						
	m =	0.43	±0.03	0.56	±0.12						
CMB-MM	R =	-0.01		0.55		0.89					
	b =	-0.017	±0.037	1.8E-05	±1.2E-04	0.25	±0.01				
	m =	1.28	±0.09	0.73	±0.09	1.65	±0.09				
CMAQ-TR	R =	-0.14		-0.34		0.58		0.34			
	b =	0.01	±0.07	0.25	±0.06	-1.1	±0.76	0.23	±0.06		
	m =	0.96	±0.13	0.01	±0.02	6.4	±2.1	0.03	±0.06		
CMB-EBSPs	R =	0.87		0.58		0.13		0.16		0.07	
	b =	0.19	±0.05	0.35	±0.02	0.52	±0.03	0.55	±0.03	0.47	±0.08
	m =	0.63	±0.02	0.28	±0.02	0.34	±0.06	0.15	±0.02	0.26	±0.03

Table S3E. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for SOC Impacts for PMF, CMB, PMF-MM, CMB-MM, and CMAQ-TR

		PMF		CMB-MBSPs-MI (CMB)		PMF-MM		CMB-MM[a]		CMAQ-TR	
CMB-MBSPs-MI (CMB)	R =	0.11									
	b =	3.7E-09	±9.2E-06								
	m =	5.9E-09	±2.5E-05								
PMF-MM	R =	0.25		0.07							
	b =	0.013	±0.004	-0.001	±0.001						
	m =	-0.05	±0.014	0.63	±0.15						
CMB-MM[a]	R =	0.41		0.51		0.10					
	b =	-	-	-	-	-					
	m =	-	-	-	-	-	-				
CMAQ-TR	R =	0.27		-0.25		0.46		0.39			
	b =	0.03	±0.02	3.15	±1.7E+04	0.04	±0.06	-	-		
	m =	0.43	±0.15	-6.0E+08	±4.5E+12	0.16	±0.36	-	-		
CMB-EBSPs	R =	0.09		0.72		-0.0013		0.45		-0.22	
	b =	0.91	±0.05	0.83	±0.03	1.4	±0.1	-	-	1.4	±0. 14
	m =	0.63	±0.12	1.2	±0.10	-0.14	±0.1	-	-	-0.29	±0.09

[a] Since CMB-MM does not estimate uncertainties for SOC, the CMB-MM SOC results were not included in the York Regression analyses.

Table S3F. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Metals Processing Impacts for PMF, CMB, and CMAQ-TR

		PMF		CMB-MBSPs-MI (CMB)		CMAQ-TR	
CMB-MBSPs-MI (CMB)	R =	0.49					
	b =	-0.13	±0.0				
	m =	1.04	±0.03				
CMAQ-TR	R =	0.38		0.40			
	b =	0.89	±0.14	0.78	±0.13		
	m =	0.07	±0.12	0.13	±0.10		
CMB-EBSPs	R =	0.69		0.65		0.21	
	b =	-0.12	±0.02	0.1	±0.02	-12	±13
	m =	1.14	±0.03	1.37	±0.03	14	±13

Table S3G. Number of samples (N) used in the correlation analyses presented in Tables S3A-S3F

	PMF	CMB-MBSPs-MI (CMB)	PMF-MM	CMB-MM	CMAQ-TR	CMB-EBSPs
PMF	655					
CMB-MBSPs-MI (CMB)	410	433				
PMF-MM	106	68	123			
CMB-MM	135	84	114	148		
CMAQ-TR	55	34	9	33	58	
CMB-EBSPs	643	429	109	138	55	673

Table S4A. Comparison of Original and Updated Uncertainties (μg/m^3) for Gasoline Vehicles for July 2001 and January 2002

	CMAQ-TR	PMF	PMF-MM	CMB-MBSPs-MI (CMB)	CMB- MM
Average Impact ($\bar{S}$)	2.50	2.19	0.09	4.46	4.36
N	55	55	9	34	31
Original Uncertainty (σ)	-	1.40	0.08	0.664	0.50
Updated Uncertainty ($\hat{\sigma}$)	1.58	1.60	1.76	2.19	3.38
$\hat{\sigma}/\bar{S}$	0.63	0.73	19.80	0.49	0.78

Table S4B. Comparison of Original and Updated Uncertainties (μg/m^3) for Diesel Vehicles for July 2001 and January 2002

	CMAQ-TR	PMF	PMF-MM	CMB-MBSPs-MI (CMB)	CMB- MM
Average Impact ($\bar{S}$)	0.89	1.26	0.11	0.60	0.32
N	55	55	9	34	31
Original Uncertainty (σ)	-	0.95	0.09	0.47	0.12
Updated Uncertainty ($\hat{\sigma}$)	0.44	0.72	0.55	0.78	0.50
$\hat{\sigma}/\bar{S}$	0.49	0.57	5.09	1.31	1.58

Table S4C. Comparison of Original and Updated Uncertainties (μg/m^3) for Dust for July 2001 and January 2002

	CMAQ-TR	PMF	PMF-MM	CMB-MBSPs-MI (CMB)	CMB- MM
Average Impact ($\bar{S}$)	1.34	1.00	1.20	0.30	0.18
N	55	55	9	33	31
Original Uncertainty (σ)	-	0.72	0.52	0.18	0.06
Updated Uncertainty ($\hat{\sigma}$)	0.78	0.81	0.97	0.59	0.80
$\hat{\sigma}/\bar{S}$	0.58	0.80	0.81	1.94	4.43

Table S4D. Comparison of Original and Updated Uncertainties (μg/m^3) for Biomass Burning for July 2001 and January 2002

	CMAQ-TR	PMF	PMF-MM	CMB-MBSPs-MI (CMB)	CMB- MM
Average Impact ($\bar{S}$)	3.13	1.95	0.48	1.34	0.85
N	55	55	9	34	31
Original Uncertainty (σ)	-	0.87	0.21	0.87	0.29
Updated Uncertainty ($\hat{\sigma}$)	2.50	1.80	1.12	2.22	1.20
$\hat{\sigma}/\bar{S}$	0.80	0.92	2.32	1.67	1.42

Table S4E. Comparison of Original and Updated Uncertainties (μg/m^3) for SOC for July 2001 and January 2002

	CMAQ-TR	PMF	PMF-MM	CMB-MBSPs-MI (CMB)	CMB- MM
Average Impact ($\bar{S}$)	1.25	0.29	0.28	0.14	1.64
N	55	55	9	34	31
Original Uncertainty (σ)	-	0.010	0.13	0.42	-
Updated Uncertainty ($\hat{\sigma}$)	1.03	0.76	0.53	0.97	1.08
$\hat{\sigma}/\bar{S}$	0.83	2.64	1.89	6.93	0.66

Table S4F. Comparison of Original and Updated Uncertainties (μg/m^3) for Metal Processing, for July 2001 and January 2002

	CMAQ-TR	PMF	CMB-MBSPs-MI (CMB)
Average Impact ($\bar{S}$)	1.02	2.18	1.96
N	55	55	34
Original Uncertainty (σ)	-	1.56	0.53
Updated Uncertainty ($\hat{\sigma}$)	1.19	1.37	0.90
$\hat{\sigma}/\bar{S}$	1.17	0.63	0.46

Table S5A. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Gasoline Vehicle Impacts for CMB-MBSP-MI, CMB-EBSPs, CMB-MBSP-MC, CMB-PMF-MI, and CMB-PMF-MC

		CMB-MBSPs- MI		CMB-EBSPs		CMB-MBSPs-MC		CMB-PMF-MI	
CMB-EBSPs	R=	0.65							
	b=	0.75	±0.05						
	m=	0.65	±0.01						
CMB-MBSPs- MC	R=	0.93		0.61					
	b=	6.5E-07	±1.5E-04	-0.82	±0.09				
	m=	1.15	±0.01	1.32	±0.03				
CMB-PMF-MI	R=	0.89		0.39		0.85			
	b=	0.017	±0.041	-1.2	±0.15	-0.037	±0.049		
	m=	0.82	±0.02	1.67	±0.08	0.79	±0.02		
CMB-PMF-MC	R=	0.76		0.53		0.75		0.67	
	b=	-0.073	±0.03	-1.4	±0.08	-0.21	±0.04	-0.18	±0.06
	m=	0.74	±0.02	1.11	±0.03	0.78	±0.02	0.97	±0.03

Table S5B. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Diesel Vehicle Impacts for CMB-MBSP-MI, CMB-EBSPs, CMB-MBSP-MC, CMB-PMF-MI, and CMB-PMF-MC

		CMB-MBSPs- MI		CMB-EBSPs		CMB-MBSPs-MC		CMB-PMF-MI	
CMB-EBSPs	R=	0.85							
	b=	0.42	±0.03						
	m=	1.1	±0.04						
CMB-MBSPs-MC	R=	0.89		0.82					
	b=	-4.4E-08	±1.8E-05	-0.39	±0.036				
	m=	0.77	±0.04	0.81	±0.04				
CMB-PMF-MI	R=	0.92		0.80		0.95			
	b=	-0.046	±0.077	-0.17	±0.083	0.068	±0.081		
	m=	0.78	±0.07	0.58	±0.05	0.86	±0.09		
CMB-PMF-MC	R=	0.88		0.82		0.96		0.92	
	b=	0.066	±0.058	-0.03	±0.06	0.11	±0.07	0.05	±0.12
	m=	0.80	±0.06	0.63	±0.04	0.96	±0.09	1.1	±0.14

Table S5C. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Dust Impacts for CMB-MBSP-MI, CMB-EBSPs, CMB-MBSP-MC, CMB-PMF-MI, and CMB-PMF-MC

		CMB-MBSPs- MI		CMB-EBSPs		CMB-MBSPs-MC		CMB-PMF-MI	
CMB-EBSPs	R=	0.86							
	b=	0.09	±0.01						
	m=	0.90	±0.02						
CMB-MBSPs-MC	R=	0.63		0.76					
	b=	9.1E-06	±1.2E-04	0.089	±0.011				
	m=	1.8	±0.04	1.3	±0.03				
CMB-PMF-MI	R=	0.94		0.85		0.53			
	b=	0.035	±0.013	-0.062	±0.0014	0.016	±0.014		
	m=	0.93	±0.05	1.05	±0.04	0.44	±0.03		
CMB-PMF-MC	R=	0.75		0.82		0.92		0.59	
	b=	0.09	±0.009	0.009	±0.008	-0.08	±0.011	-0.05	±0.02
	m=	1.2	±0.03	1.18	±0.02	0.90	±0.02	1.7	±0.08

Table S5D. Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Biomass Burning Impacts for CMB-MBSP-MI, CMB-EBSPs, CMB-MBSP-MC, CMB-PMF-MI, and CMB-PMF-MC

		CMB-MBSPs- MI		CMB-EBSPs		CMB-MBSPs-MC		CMB-PMF-MI	
CMB-EBSPs	R=	0.58							
	b=	0.35	±0.02						
	m=	0.28	±0.02						
CMB-MBSPs-MC	R=	0.74		0.53					
	b=	6.7E-07	±5.6E-05	-0.070	±0.089				
	m=	0.94	±0.05	2.1	±0.12				
CMB-PMF-MI	R=	0.77		0.53		0.85			
	b=	0.56	±0.054	-0.14	±0.14	0.11	±0.095		
	m=	0.88	±0.06	3.1	±0.23	1.1	±0.08		
CMB-PMF-MC	R=	0.48		0.38		0.71		0.76	
	b=	1.1	±0.05	-0.15	±0.11	0.34	±0.10	0.15	±0.12
	m=	1.8	±0.05	3.2	±0.14	1.3	±0.07	1.2	±0.08

Table S5E Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for SOC Impacts for CMB-MBSP-MI, CMB-EBSPs, CMB-MBSP-MC, CMB-PMF-MI, and CMB-PMF-MC

		CMB-MBSPs- MI		CMB-EBSPs		CMB-MBSPs-MC		CMB-PMF-MI	
CMB-EBSPs	R=	0.72							
	b=	0.83	±0.03						
	m=	1.2	±0.10						
CMB-MBSPs- MC	R=	0.58		0.59					
	b=	-9.5E-09	±1.0E-05	-0.70	±0.11				
	m=	0.84	±0.14	0.73	±0.10				
CMB-PMF-MI	R=	0.58		0.72		0.60			
	b=	0.007	±0.26	0.013	±0.26	0.22	±0.21		
	m=	0.69	±0.28	0.30	±0.14	0.60	±0.27		
CMB-PMF-MC	R=	0.81		0.91		0.67		0.75	
	b=	0.16	±0.19	-0.38	±0.28	0.40	±0.18	-0.14	±0.65
	m=	0.82	±0.20	0.65	±0.14	0.69	±0.24	1.8	±1.1

Table S5F Pearson Correlation Coefficients (R) and Intercepts (b), Slopes (m), and Standard Errors Calculated using York Regression for Metals Processing Impacts for CMB-MBSP-MI, CMB-EBSPs, CMB-MBSP-MC, CMB-PMF-MI, and CMB-PMF-MC

		CMB-MBSPs- MI		CMB-EBSPs		CMB-MBSPs-MC		CMB-PMF-MI	
CMB-EBSPs	R=	0.65							
	b=	0.1	±0.02						
	m=	1.37	±0.03						
CMB-MBSPs- MC	R=	0.37		0.42					
	b=	-2.3E-04	±7.7E-05	-0.022	±0.002				
	m=	0.03	±0.002	0.06	±0.003				
CMB-PMF-MI	R=	0.53		0.64		0.66			
	b=	1.3E-05	±2.32E-04	-0.035	±0.035	0.003	±0.002		
	m=	2.1	±0.07	1.3	±0.04	22	±0.97		
CMB-PMF-MC	R=	0.84		0.75		0.76		0.80	
	b=	0.08	±0.015	-0.34	±0.031	0.55	±0.011	-0.21	±0.034
	m=	1.3	±0.02	1.7	±0.04	40	±1.8	2.1	±0.06

Table S5G. Number of samples (N) used in correlation analyses presented in Tables S5A-S5F

	CMB-MBSPs-MI	CMB-EBSPs	CMB-MBSPs-MC	CMB-PMF-MI	CMB-PMF-MC
CMB-MBSPs-MI	433				
CMB-EBSPs	429	673			
CMB-MBSPs-MC	240	333	341		
CMB-PMF-MI	203	231	169	235	
CMB-PMF-MC	352	526	315	200	536

Table S6. Comparison of CMB SA results using different metals processing profiles

	CMB-MBSPs-MI	CMB-MBSPs-MC	CMB-PMF-MI	CMB-PMF-MC	CMB-EBSPs
χ^2_{CMB} [a]	4.66±5.66	31.87±72.33	2.64±7.06	8.98±7.21	2.60±2.83
% Mass[b]	90.81±14.84	87.75±13.60	91.21±12.93	91.46±15.05	93.84±16.16
N	433	341	235	536	673
GV	3.98±0.56	3.57±0.60	2.54±0.98	2.77±0.49	3.81±0.84
DV	0.78±0.56	0.56±0.58	0.82±0.94	0.75±0.87	1.15±0.38
DUST	0.34±0.17	0.67±0.13	0.27±0.13	0.55±0.10	0.42±0.09
BURN	1.23±1.13	2.21±1.22	2.55±1.48	3.38±1.55	0.98±0.39
SOC	0.21±0.63	0.14±0.53	0.66±0.76	0.90±0.66	1.26±0.60
STEEL	1.69±0.53	-	1.54±0.48	-	-
CU	0.02±0.05	-	0.38±0.11	-	-
PB	-	-	0.47 ±0.20	-	-
ZN	-	-	0.94±0.19	-	-
PB+ZN	0.02±0.02	-	1.41±0.27	-	-
METAL[c]	1.73±0.54	0.17±0.11	3.34±0.56	2.16±0.31	2.10±0.60

[a] χ^2 output by CMB. Considers both measurement and source profile uncertainty
[b] Ratio of modeled-to-measured $PM_{2.5}$ mass
[c] Composite/total metals processing impacts.