

Regression methods in the calibration of low-cost sensors for ambient particulate matter measurements

Supplementary Material

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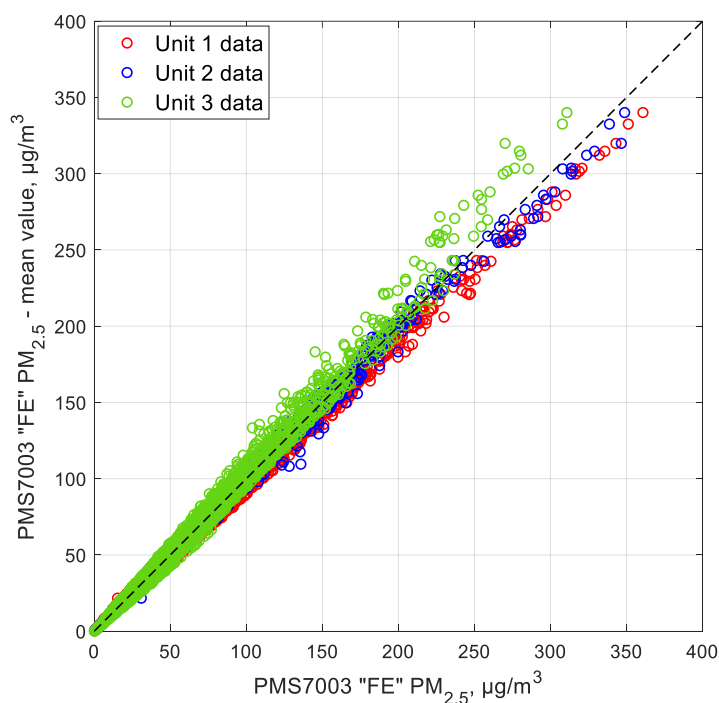


Fig. S1 Scatterplot of PM_{2.5} “FE” outputs from three PMS7003 units versus the mean values of the 1-hour averaged data. The black dashed line indicates the ideal (1:1) relationship.

Table S1 Pearson's correlation coefficients (r) for 1-minute raw outputs from PMS7003 sensor (mass concentrations and number of particles in bins) and combinations of bins

r	PM1 "FE"	PM2.5 "FE"	PM10 "FE"	PM1 "AE"	PM2.5 "AE"	PM10 "AE"	bin 1	bin 2	bin 3	bin 4	bin 5	bin 1 - bin 2	bin 1 - bin 3	bin 1 - bin 4	bin 1 - bin 5
PM1 "FE"	1														
PM2.5 "FE"	0.995	1													
PM10 "FE"	0.994	0.998	1												
PM1 "AE"	0.986	0.984	0.983	1											
PM2.5 "AE"	0.987	0.988	0.987	0.994	1										
PM10 "AE"	0.983	0.985	0.985	0.990	0.992	1									
bin 1	0.984	0.982	0.979	0.978	0.975	0.973	1								
bin 2	0.986	0.983	0.981	0.979	0.976	0.974	0.997	1							
bin 3	0.984	0.989	0.990	0.972	0.977	0.977	0.986	0.990	1						
bin 4	0.961	0.971	0.977	0.946	0.956	0.957	0.957	0.962	0.982	1					
bin 5	0.893	0.903	0.914	0.877	0.886	0.893	0.885	0.889	0.911	0.930	1				
bin 1 - bin 2	0.982	0.979	0.977	0.975	0.972	0.970	0.999	0.994	0.982	0.954	0.882	1			
bin 1 - bin 3	0.983	0.980	0.978	0.977	0.973	0.971	≈ 1	0.997	0.984	0.955	0.882	≈ 1	1		
bin 1 - bin 4	0.984	0.981	0.979	0.978	0.975	0.972	≈ 1	0.997	0.985	0.957	0.884	≈ 1	≈ 1	1	
bin 1 - bin 5	0.984	0.982	0.979	0.978	0.975	0.973	≈ 1	0.997	0.986	0.957	0.885	≈ 1	≈ 1	≈ 1	1

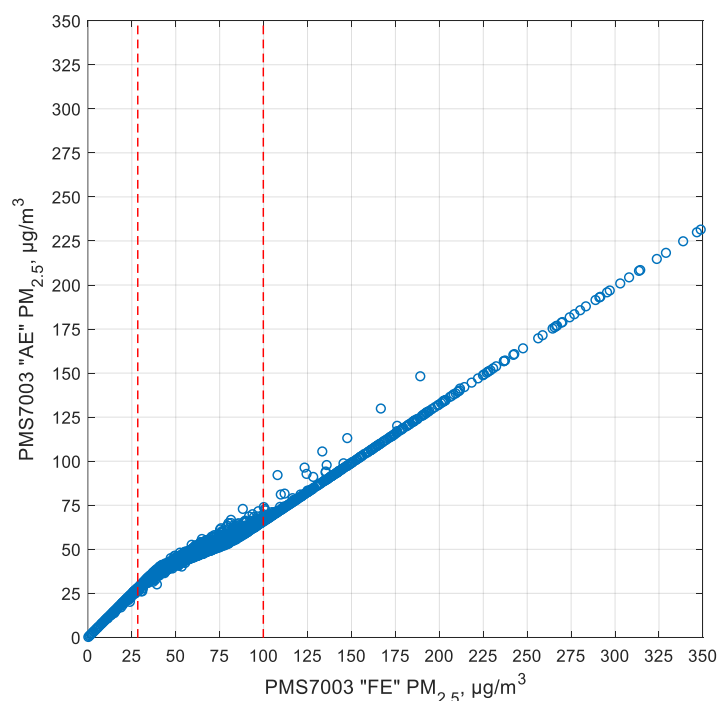


Fig. S2 Relationship between "FE" and "AE" outputs for PM_{2.5} data from PMS7003 sensor. The red dashed lines denote the thresholds where transfer functions changed the relationships of "FE" and "AE" signals. 1-hour data was plotted for clarity.

Table S2 Regression coefficients for univariate calibration models

Predictor in model	Intercept	Slope
PM ₁ “FE”	4.03	0.43
PM _{2.5} “FE”	4.58	0.27
PM ₁₀ “FE”	4.76	0.24
PM ₁ “AE”	1.59	0.65
PM _{2.5} “AE”	2.35	0.41
PM ₁₀ “AE”	2.75	0.33
bin 1	2.64	0.31
bin 2	2.81	1.01
bin 3	4.80	4.74
bin 4	5.69	49.87
bin 5	5.92	371.37
bin 1 - bin 2	2.58	0.44
bin 1 - bin 3	2.51	0.33
bin 1 - bin 4	2.62	0.31
bin 1 - bin 5	2.64	0.31

Table S3 Regression coefficients for multi-variable model obtained from stepwise regression algorithm

Variable	Coefficient
(Intercept)	2.92
PM ₁₀ “FE”	0.54
PM ₁ “AE”	-0.27
PM _{2.5} “AE”	0.44
PM ₁₀ “AE”	-0.26
bin 1 - bin 3	8.38
bin 1 - bin 5	-8.20
RH	-0.036
Temperature	0.217