

## Supplementary Materials

**Paper title:** Long-Term Evaluation of Mid-cost Optical Particle Counters for PM<sub>2.5</sub> Monitoring in an Underground Subway Station: Insights from a 15-Month Study

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### Figure captions:

Figure S1. Correlation of hourly PM<sub>2.5</sub> between BAM and O-1-1 (a), O-1-2 (b), O-2-1 (c), O-2-2 (d), O-2-3 (e), and O-2-4 (f).

Figure S2. Correlation of daily PM<sub>2.5</sub> between BAM and O-1-1 (a), O-1-2 (b), O-2-1 (c), O-2-2 (d), O-2-3 (e), and O-2-4 (f).

Figure S3. Correlation of PM<sub>2.5</sub> (µg/m<sup>3</sup>) between BAM and O-2-3 with respect to 1-hour average data for 15 days.

Figure S4. Relationship between PM<sub>2.5</sub> concentrations obtained from O-2-3 and O-2-4 with relative humidity.

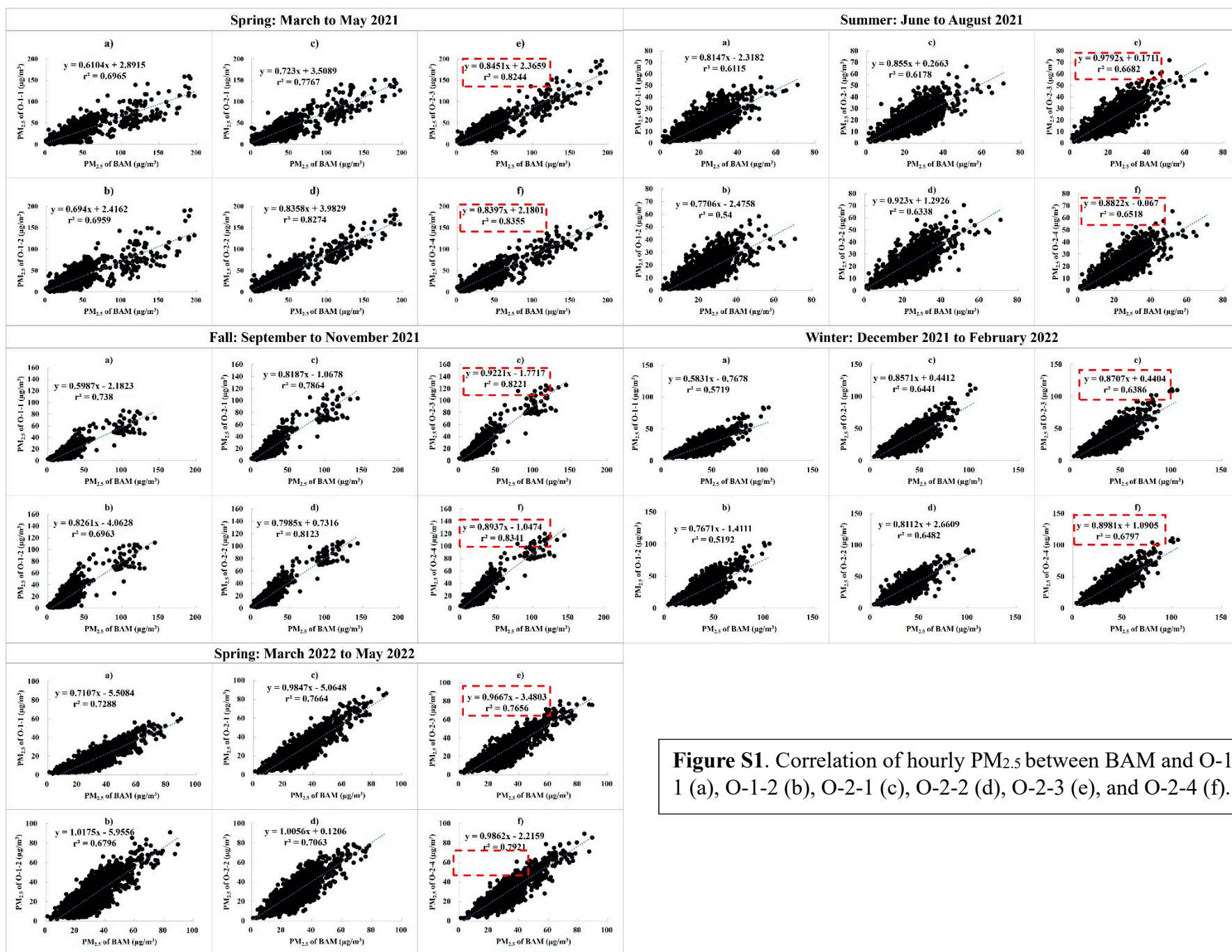
Figure S5. Pattern comparison between 5-minutes average and 1-hour average PM<sub>2.5</sub>.

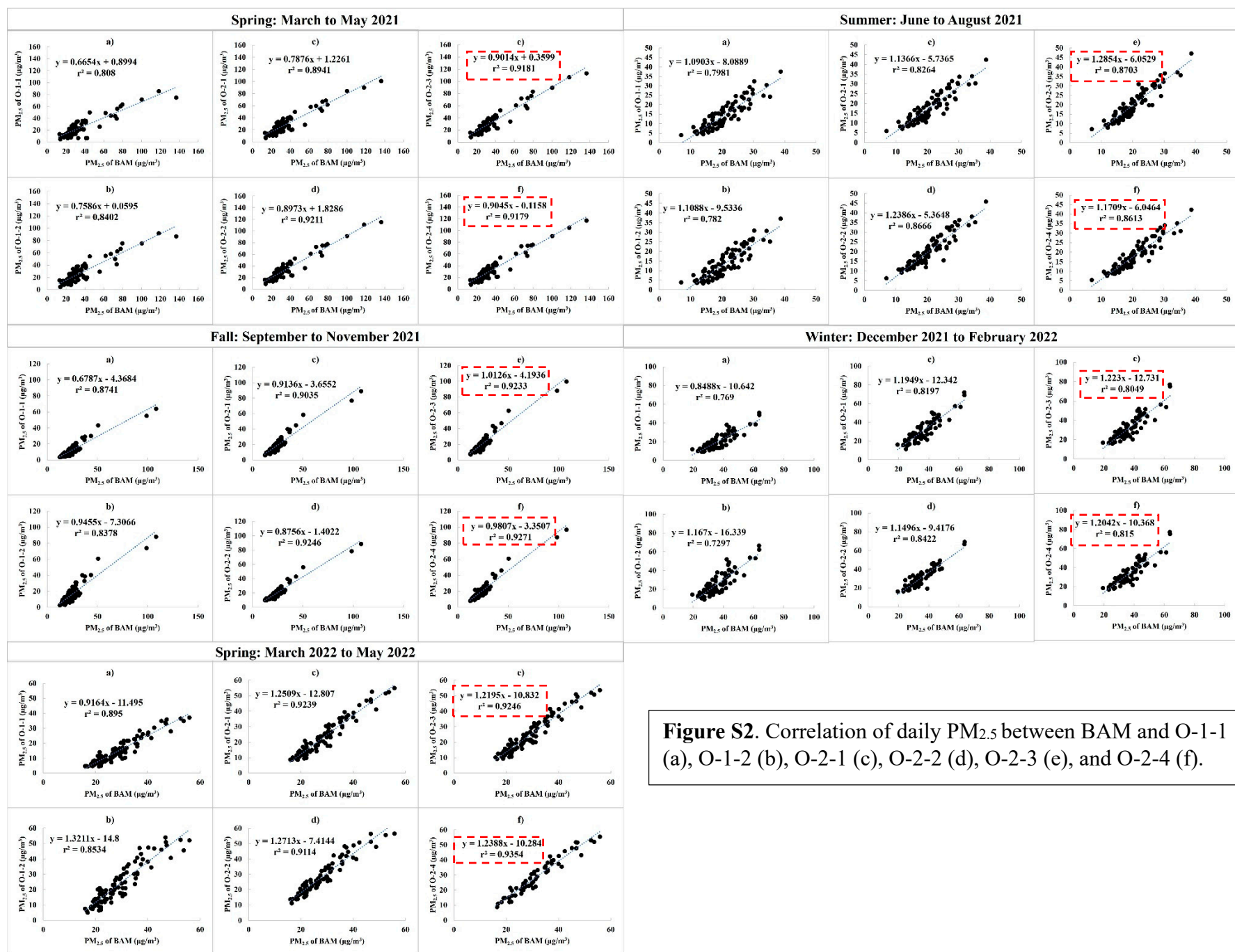
Figure S6. Variations of 5-min average PM<sub>2.5</sub> concentrations obtained by different OPCs at different spaces in the subway station for one week.

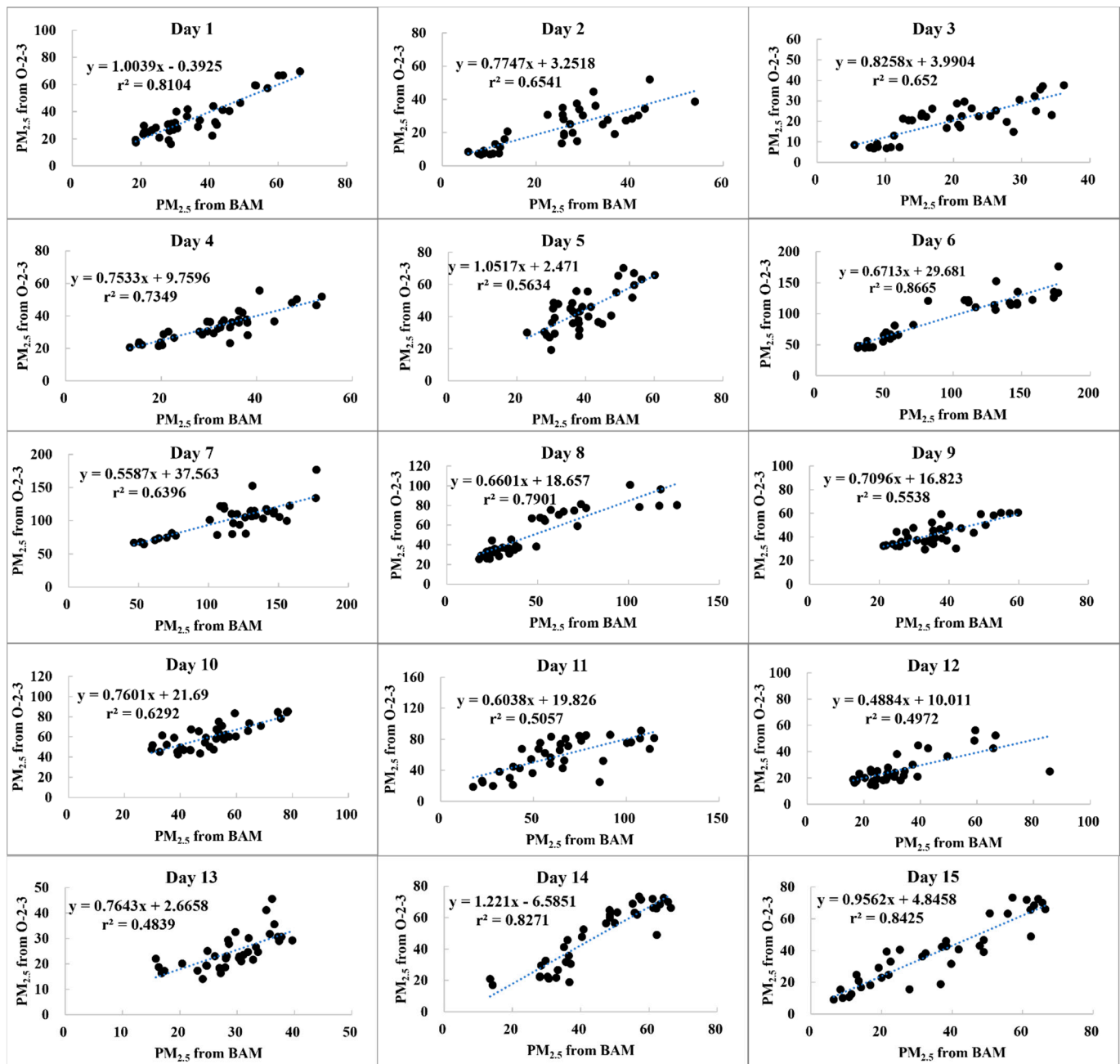
### Table caption:

Table S1. Average ratios of PM<sub>1</sub> associated with PM<sub>10</sub> and PM<sub>2.5</sub>

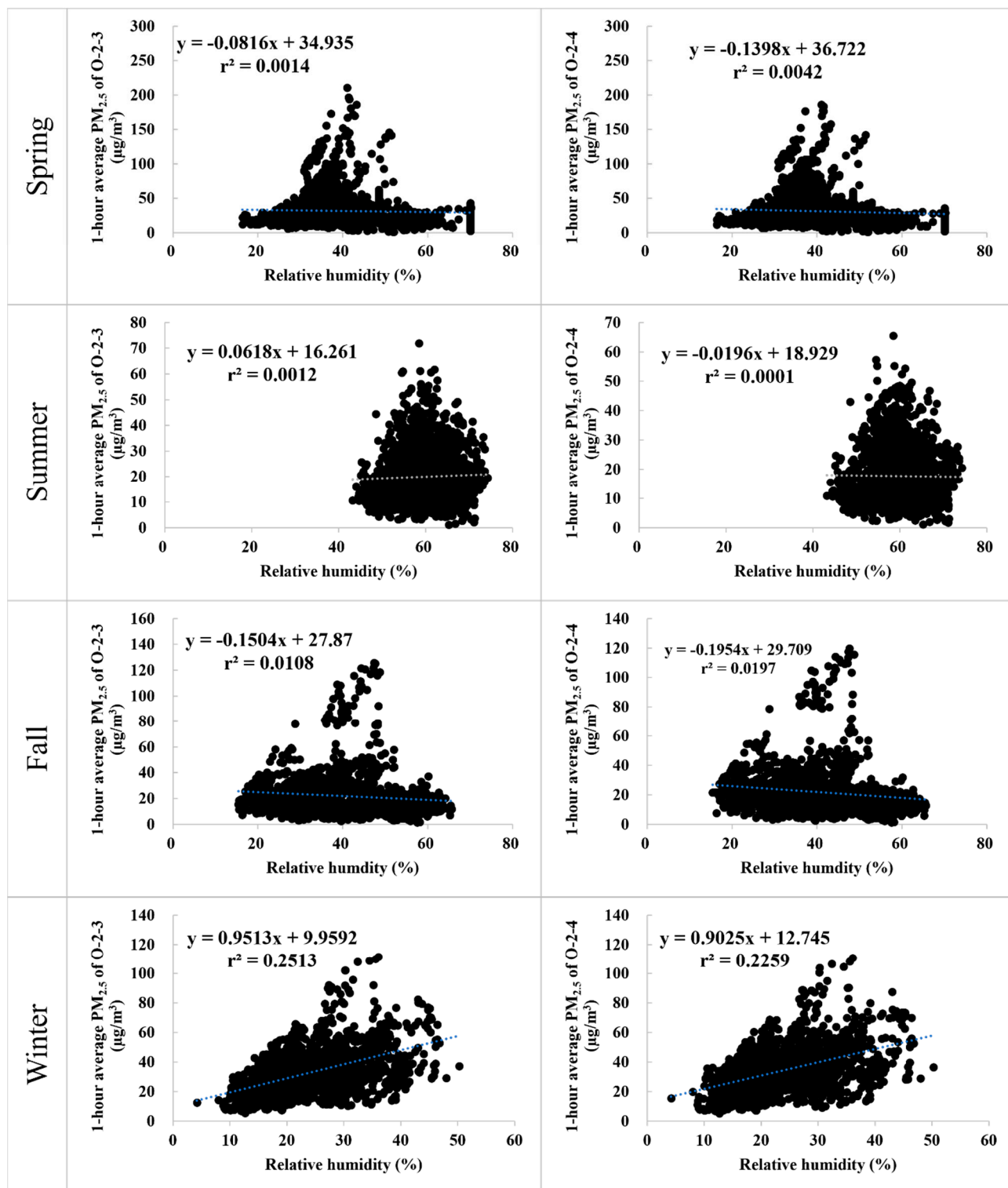
Table S2. Correlation between BAM and OPCs at the platform with respect to various Fine/Coarse particle ratios





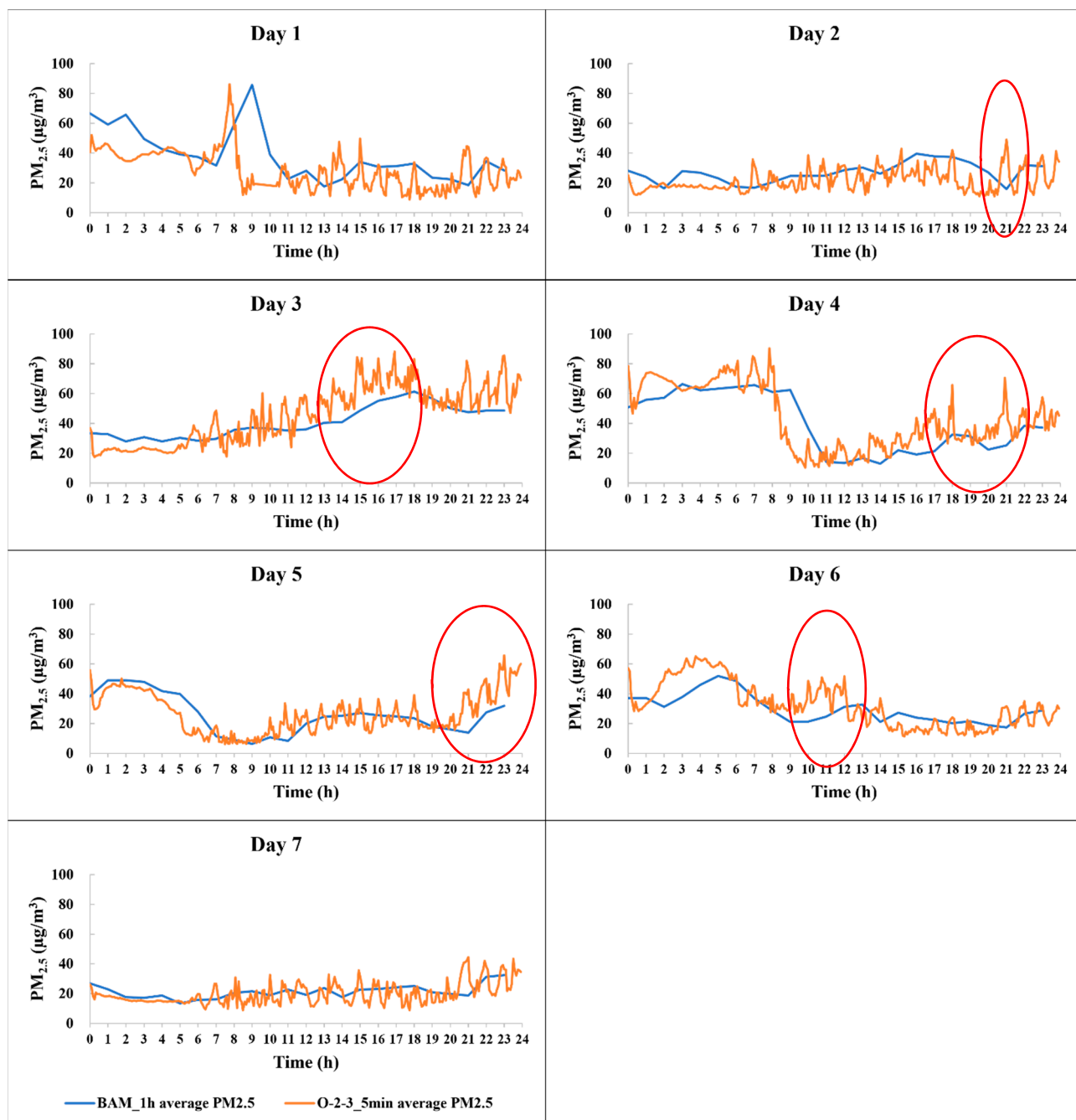


**Figure S3.** Correlation of PM<sub>2.5</sub> (µg/m³) between BAM and O-2-3 with respect to 1-hour average data for 15 days.

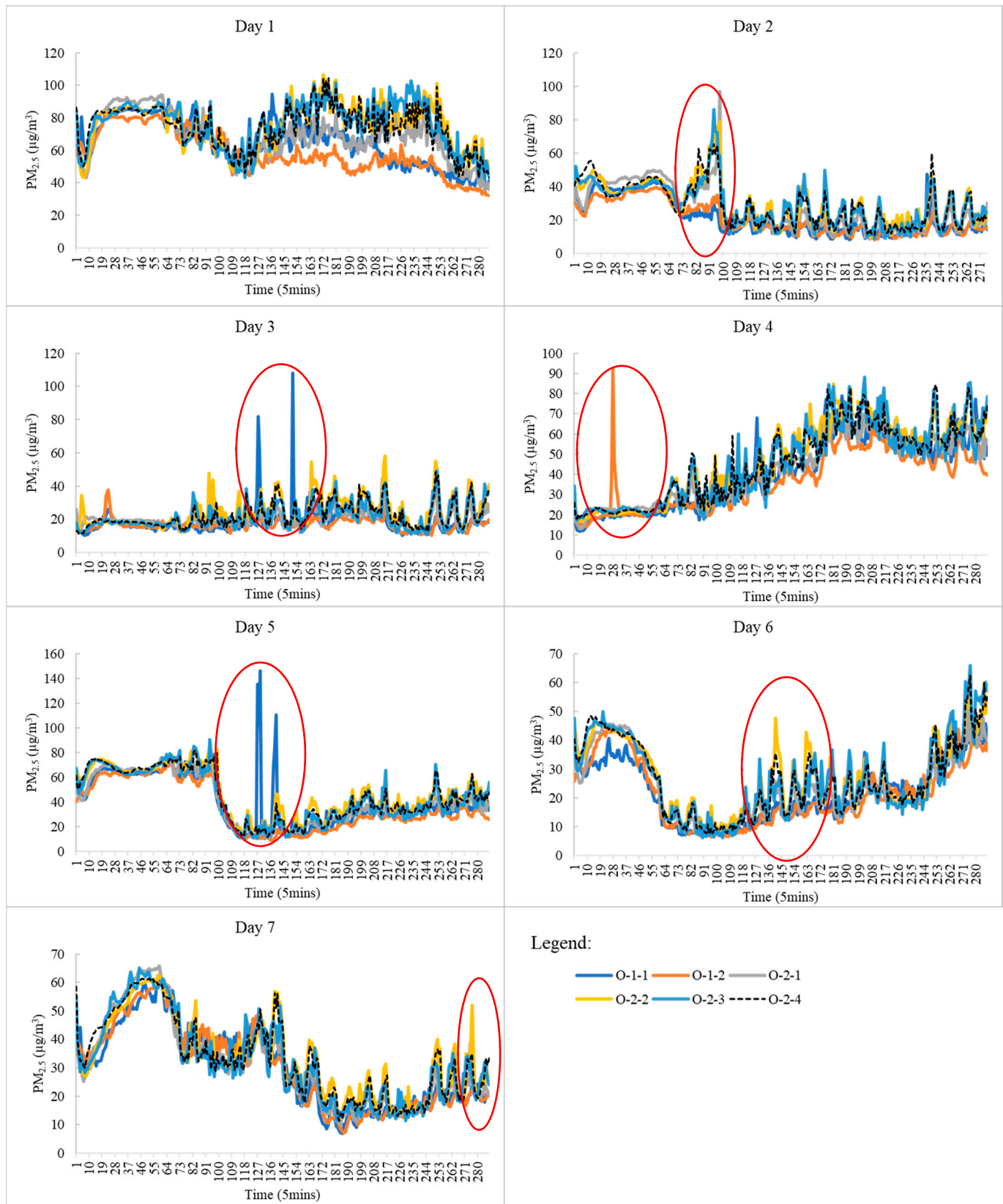


**Figure S4.** Relationship between  $PM_{2.5}$  concentrations obtained from O-2-3 and O-2-4 with relative humidity.





**Figure S5.** Pattern comparison between 5-minutes average and 1-hour average PM<sub>2.5</sub>.



**Figure S6.** Variations of 5-min average  $PM_{2.5}$  concentrations obtained by different OPCs at different spaces in the subway station for one week.

**Table S1.** Average ratios of PM<sub>1</sub> associated with PM<sub>10</sub> and PM<sub>2.5</sub>

<b>Location</b>	<b>OPC</b>	<b>PM<sub>1</sub>/PM<sub>2.5</sub> ratio (%)</b>	<b>PM<sub>1</sub>/PM<sub>10</sub> ratio (%)</b>
Concourse	O-1-1	84.1	58.9
	O-1-2	84.3	54.7
Platform	O-2-1	77.8	53.4
	O-2-2	73.5	49.2
	O-2-3	76.3	52.8
	O-2-4	75.3	50.8



**Table S2.** Correlation between BAM and OPCs at the platform with respect to various Fine/Coarse particle ratios

Fine/Coarse particle ratio	Correlation of BAM and O-2-3					Correlation of BAM and O-2-3				
	Spring 2021	Summer 2021	Fall 2021	Winter 2021	Spring 2022	Spring 2021	Summer 2021	Fall 2021	Winter 2021	Spring 2022
< 1	n = 157 m = 0.8907 r <sup>2</sup> = 0.9011	n = 5 m = 0.8898 r <sup>2</sup> = 0.9176	n = 44 m = 0.3794 r <sup>2</sup> = 0.4166	n = 36 m = 0.3622 r <sup>2</sup> = 0.3483	n = 70 m = 0.5306 r <sup>2</sup> = 0.4657	n = 223 m = 0.8525 r <sup>2</sup> = 0.913	n = 13 m = 0.3306 r <sup>2</sup> = 0.1484	n = 52 m = 0.5679 r <sup>2</sup> = 0.4785	n = 42 m = 0.4839 r <sup>2</sup> = 0.3676	n = 56 m = 0.6936 r <sup>2</sup> = 0.5688
1~2	n = 364 m = 0.7192 r <sup>2</sup> = 0.8056	n = 145 m = 0.4985 r <sup>2</sup> = 0.4313	n = 413 m = 0.6209 r <sup>2</sup> = 0.5385	n = 381 m = 0.5337 r <sup>2</sup> = 0.4782	n = 341 m = 0.5978 r <sup>2</sup> = 0.514	n = 306 m = 0.7529 r <sup>2</sup> = 0.8338	n = 210 y = 0.5282 r <sup>2</sup> = 0.5633	n = 436 m = 0.6039 r <sup>2</sup> = 0.4758	n = 445 m = 0.6225 r <sup>2</sup> = 0.5333	n = 233 m = 0.7065 r <sup>2</sup> = 0.6044
2~3	n = 185 m = 0.761 r <sup>2</sup> = 0.7989	n = 202 m = 0.7186 r <sup>2</sup> = 0.5744	n = 228 m = 0.8456 r <sup>2</sup> = 0.5789	n = 217 m = 0.7082 r <sup>2</sup> = 0.5757	n = 230 m = 0.8161 r <sup>2</sup> = 0.6434	n = 156 m = 0.7568 r <sup>2</sup> = 0.8149	n = 240 y = 0.7586 r <sup>2</sup> = 0.6031	n = 214 m = 0.881 r <sup>2</sup> = 0.6181	n = 202 m = 0.8769 r <sup>2</sup> = 0.6433	n = 147 m = 0.9081 r <sup>2</sup> = 0.756
> 3	n = 250 m = 0.9337 r <sup>2</sup> = 0.8023	n = 603 m = 0.9549 r <sup>2</sup> = 0.6415	n = 238 m = 0.9294 r <sup>2</sup> = 0.8825	n = 268 m = 1.01 r <sup>2</sup> = 0.7668	n = 436 m = 0.9689 r <sup>2</sup> = 0.8017	n = 226 m = 0.9002 r <sup>2</sup> = 0.8304	n = 557 y = 0.8542 r <sup>2</sup> = 0.6125	n = 169 m = 0.8928 r <sup>2</sup> = 0.9065	n = 210 m = 1.0206 r <sup>2</sup> = 0.8077	n = 265 m = 0.963 r <sup>2</sup> = 0.7901

Note: *n* is the number of PM values, *m* is the slope of linear regression equation, *r*<sup>2</sup> is the coefficient of determination.