*Supplement of*

# Evaluation of Calibration Performance for a Low-cost Particulate Matter Sensor Using Colocated $NO_2$ and Distance $NO_2$

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**Figure S1: Geographical locations of an air quality monitoring site (06-065-8001) and 14 PurpleAir PA-II units. The red dot represents BAM-1020 instrument, and the black dots represent 14 PurpleAir PA-II units.**

**Table S1 Distance of PurpleAir PA-II units from BAM-1020 instrument at the monitoring site of 06-065-8001**

| Sensor Name | RIVR_Co-loc1 | RIVR_Co-loc2 | RIVR_Co-loc3 | RIVR_Co-loc4 | RIVR_Co-loc5 | RIVR_Co-loc6 |
|---|---|---|---|---|---|---|
| Distance (m) | 82.09 | 8.61 | 82.09 | 82.09 | 82.09 | 82.09 |
| Sensor Name | RIVR_Co-loc7 | RIVR_Co-loc8 | RIVR_Co-loc9 | RIVR_Co-loc10 | RIVR_Co-loc11 | RIVR_Co-loc12 |
| Distance (m) | 9.10 | 82.09 | 22.13 | 9.61 | 11.22 | 14.82 |
| Sensor Name | RIVR_Co-loc13 | RIVR_Co-loc14 | RIVR_Co-loc15 | RIVR_Co-loc16 | RIVR_Co-loc17 | |
| Distance (m) | 17.05 | 18.44 | 26.33 | 36.35 | 44.78 | |

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**Table S2 Summary of MLR models and their p-values and VIF values with the selected combinations of features**

| | MLR model | p-values | VIF |
|---|---|---|---|
| 1 | $0.459PM_{2.5} + 13.293$ | (0.000) | X |
| 2 | $0.465PM_{2.5} + 0.0745T + 13.293$ | (0.000, 0.000) | (1.008, 1.008) |
| 3 | $0.468PM_{2.5} - 0.0563RH + 13.293$ | (0.000, 0.000) | (1.147, 1.147) |
| 4 | $0.502PM_{2.5} - 0.0658RH - 0.00244PM_{2.5} \times RH + 13.568$ | (0.000, 0.000, 0.000) | (1.413, 1.205, 1.234) |
| 5 | $0.474PM_{2.5} + 0.0532T - 0.0293RH + 13.293$ | (0.000, 0.000, 0.000) | (1.180, 1.599, 1.819) |
| 6 | $0.494PM_{2.5} + 0.0417\mathrm{T} - 0.0434\,RH - 0.00211PM_{2.5} \times RH + 13.568$ | (0.000, 0.000, 0.000, 0.000) | (1.498, 1.669, 1.992, 1.288) |
| 7 | $0.489PM_{2.5} + 0.0376\mathrm{T} - 0.0454\,RH - 0.00154PM_{2.5} \times T - 0.00289PM_{2.5} \times RH + 13.629$ | (0.000, 0.000, 0.000, 0.000, 0.000) | (1.613, 1.709, 2.008, 2.149, 2.078) |
| 8 | $0.485PM_{2.5} + 0.0546\mathrm{T} - 0.0379\,RH - 0.00215PM_{2.5} \times T - 0.00304PM_{2.5} \times RH + 0.00167T \times RH + 13.927$ | (0.000, 0.000, 0.000, 0.000, 0.000, 0.000) | (1.643, 2.159, 2.148, 2.369, 2.097, 1.439) |
| 9 | $0.495PM_{2.5} + 0.0494\mathrm{T} - 0.0399\,RH - 0.00207PM_{2.5} \times T - 0.00279PM_{2.5} \times RH +$ | (0.000, 0.000, 0.000, 0.000, 0.000, 0.000) | (2.570, 2.314, 2.186, 2.385, 2.290, 1.465, 2.402) |

| | | | |
|---|---|---|---|
| | $0.00178T \times RH + 0.00005PM_{2.5} \times T \times RH + 13.934$ | | |
| 10 | $0.450PM_{2.5} + 0.0465NO_2 + 13.293$ | (0.000, 0.000) | (1.106, 1.106) |
| 11 | $0.445PM_{2.5} + 0.0465NO_2 + 0.0009PM_{2.5} \times NO_2 + 13.235$ | (0.000, 0.000, 0.000) | (1.382, 1.106, 1.278) |
| 12 | $0.446PM_{2.5} + 0.111T + 0.112NO_2 + 13.293$ | (0.000, 0.000, 0.000) | (1.109, 1.245, 1.365) |
| 13 | $0.437PM_{2.5} + 0.112T + 0.113NO_2 + 0.00144PM_{2.5} \times NO_2 + 13.196$ | (0.000, 0.000, 0.000, 0.000) | (1.393, 1.253, 1.367, 1.287) |
| 14 | $0.443PM_{2.5} + 0.116T + 0.114NO_2 + 0.00155PM_{2.5} \times T + 0.00234PM_{2.5} \times NO_2 + 13.169$ | (0.000, 0.000, 0.000, 0.000, 0.000) | (1.498, 1.280, 1.367, 1.860, 1.821) |
| 15 | $0.442PM_{2.5} + 0.119T + 0.120NO_2 + 0.00136PM_{2.5} \times T + 0.00234PM_{2.5} \times NO_2 + 0.00103T \times NO_2 + 13.293$ | (0.000, 0.000, 0.000, 0.000, 0.000, 0.003) | (1.509, 1.362, 1.672, 2.027, 1.849, 1.355) |
| 16 | $0.464PM_{2.5} + 0.0924T - 0.0180RH + 0.0990NO_2 - 0.00146PM_{2.5} \times RH + 13.483$ | (0.000, 0.000, 0.000, 0.000, 0.000) | (1.859, 2.363, 2.278, 1.578, 1.351) |
| 17 | $0.452PM_{2.5} + 0.100T - 0.0116RH + 0.103NO_2 - 0.00164PM_{2.5} \times RH + 0.00179PM_{2.5} \times NO_2 + 13.385$ | (0.000, 0.000, 0.002, 0.000, 0.000, 0.000) | (2.239, 2.461, 2.390, 1.590, 1.380, 1.423) |
| 18 | $0.452PM_{2.5} + 0.103T - 0.0129RH + 0.111NO_2 - 0.00158PM_{2.5} \times RH + 0.00179PM_{2.5} \times NO_2 + 0.00131T \times NO_2 + 13.480$ | (0.000, 0.000, 0.001, 0.000, 0.000, 0.000, 0.000) | (2.239, 2.516, 2.410, 1.858, 1.394, 1.423, 1.276) |
| 19 | $0.456PM_{2.5} + 0.111T - 0.00783RH + 0.100NO_2 - 0.00167PM_{2.5} \times T - 0.00227PM_{2.5} \times RH + 0.00213T \times RH + 0.000939RH \times NO_2 + 13.890$ | (0.000, 0.000, 0.048, 0.000, 0.000, 0.000, 0.000, 0.002) | (1.976, 3.023, 2.633, 1.620, 2.394, 2.348, 1.658, 1.429) |
| 20 | $0.456PM_{2.5} + 0.112T - 0.0097RH + 0.110NO_2 - 0.00185PM_{2.5} \times T - 0.00240PM_{2.5} \times RH + 0.00199T \times RH + 0.0059T \times NO_2 + 0.00145RH \times NO_2 + 13.984$ | (0.000, 0.000, 0.015, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000) | (1.977, 3.025, 2.668, 1.966, 2.468, 2.406, 1.703, 1.756, 1.684) |

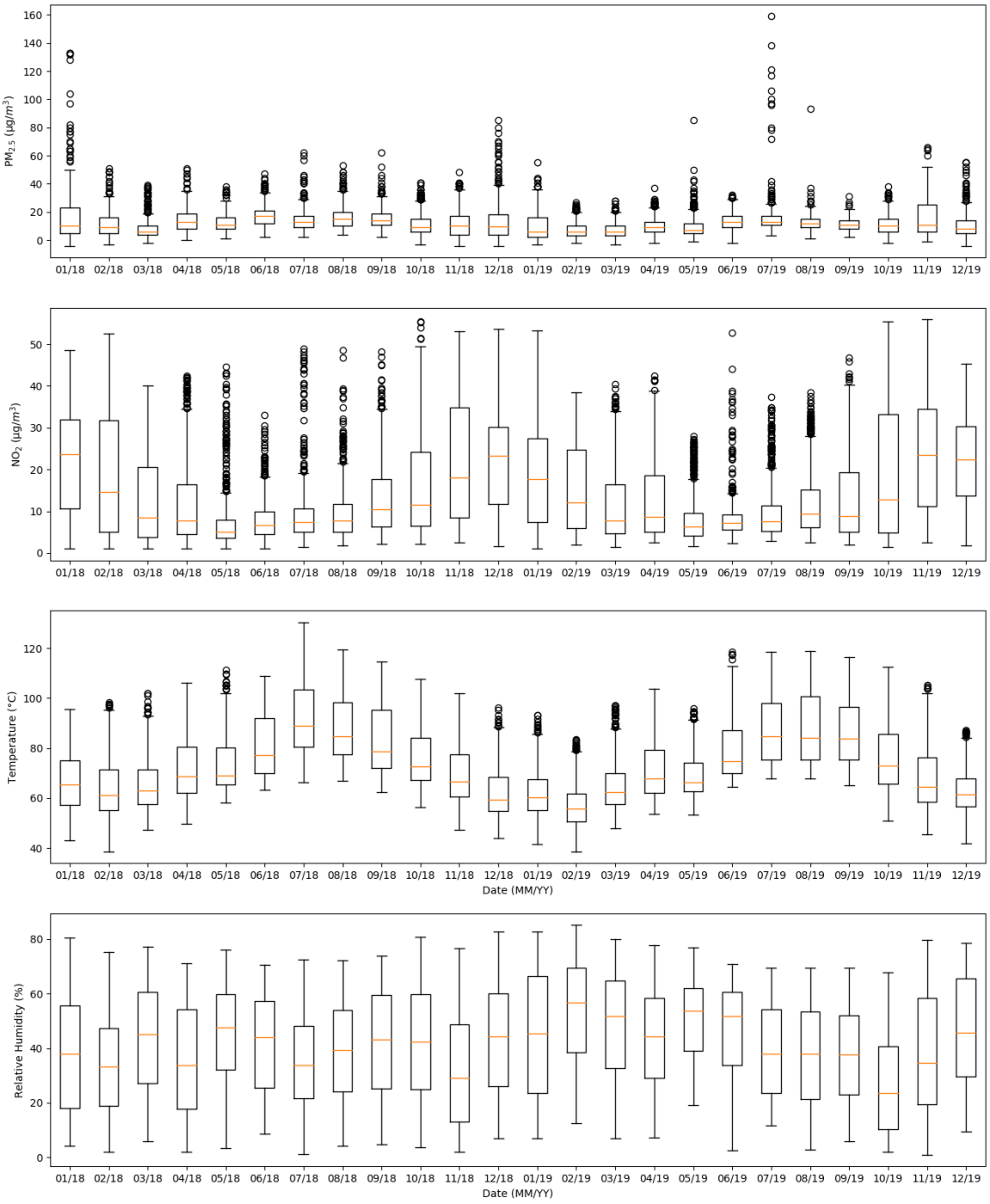


**Figure S2 Distributions of $PM_{2.5}$ (regulatory monitor), $NO_2$ (regulatory monitor), temperature (PA-II), and relative humidity (PA-II) for each month over 2-year period**