Supplementary Information:

The Potential of Commercial Sensors for Spatially Dense Short-term Air Quality Monitoring Based on Multiple Short-term Evaluations of 30 Sensor Nodes in Urban Areas in Korea

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Figure S1. 1:1 plots between sensors for CO and NO$_2$ in summer. Red circles are results from the August experiment and green squares from the September experiments. Five sensors were randomly selected for this figure and the other sensors showed similar results.
Figure S2. 1:1 plots between sensors for CO and NO$_2$ in winter. Blue circles are results from the December experiment and purple squares from the January experiment. Five sensors were randomly selected for this figure and the other sensors showed similar results.
Figure S3. Same as Fig. S1 but for PM$_{2.5}$ and PM$_{10}$. Five sensors were randomly selected for this figure and the other sensors showed similar results.
Figure S4. Same as Fig. S2 but for PM$_{2.5}$ and PM$_{10}$. Five sensors were randomly selected for this figure and the other sensors showed similar results.
Figure S5. 1:1 plots between O₃ sensors in summer and winter. Red circles are results from the August, green squares from the September, blue circles from the December, and purple squares from the January experiments. Five sensors were randomly selected for this figure and the other sensors showed similar results.
Figure S6. Examples of intercomparison results among sensors for the entire periods (blue squares represent summer results and red circles winter). Left panel (a, b, c, d) shows the cases in which summer and winter data were consistent and right panel (e, f, g, h) shows the cases in which the consistencies differ with season. Except some CO sensors, the seasonal changes were not significant.
Figure S7. Time series of PM$_{2.5}$ and PM$_{10}$ measured with FEM instrument (FEM), and three sensors (Unit 22d0, 2336, and b610). Purple Air uses Plantower PMS sensor that we used in this study (figures were taken from the field evaluation report submitted by South Coast Air Quality Management District (AQ-SPEC) (http://www.aqmd.gov/docs/default-source/aq-spec/field-evaluations/purpleair---field-evaluation.pdf?sfvrsn=2). Gray tinted areas represent the conditions of low PM$_{2.5}$ and high PM$_{10}$ levels. In these cases, PM sensors consistently underestimate the PM$_{10}$ concentrations.
Figure S8. Time series of corrected NO$_2$ concentrations by simple linear correction and by multivariate regression correction: (a) corrected by linear fit results (summer); (b) multivariate regression method (summer); (c) linear fit results (winter); (d) multivariate regression correction (winter).

The results of Multivariate regression are as below.

Summer

\[
[\text{NO}_2]_{corr} = -0.122 \cdot [\text{NO}_2 \text{ signals} + 900] - 2.019 \cdot [\text{O}_3 \text{ in ppb}] + 3.282 \cdot [T \text{ in K}] + 0.369 \cdot [\text{RH}] - 888.986
\]

Winter

\[
[\text{NO}_2]_{corr} = 0.191 \cdot [\text{NO}_2 \text{ signals} + 900] - 0.5975 \cdot [\text{O}_3 \text{ in ppb}] + 0.631 \cdot [T \text{ in K}] + 0.029 \cdot [\text{RH}] - 116.293
\]
Figure S9. Time-series of corrected air quality data obtained from sensors and data from AQMS for the summer (left panel) and winter periods (right panel). AQMS (black stars) denotes the FRM/FEM instruments data and PKNU-AQ#4 (red line) represents the corrected sensor data.
Figure S10. Map of the air quality monitoring site with 29 sensor nodes deployed. Red circles represent the location of sensor nodes, and star denotes the location of air quality monitoring station operated by the government. The number 1 denotes the location of the sensor node that we used to compare the time-series of pollutants concentrations with AQMS data in the text (Fig. 3).
Figure S11. Examples of time series of sensor readings from the time at which sensors were turned on (data from the entire sensors are included): (a) O\textsubscript{3}, (b) CO, and (c) NO\textsubscript{2} sensors. Greenish shade area denotes an approximate stabilization period.