

# Supplementary Material for Fine-Scale Columnar and Surface NO<sub>x</sub> Concentrations Over South Korea: Comparison of Surface Monitors, TROPOMI, CMAQ and CAPSS Inventory

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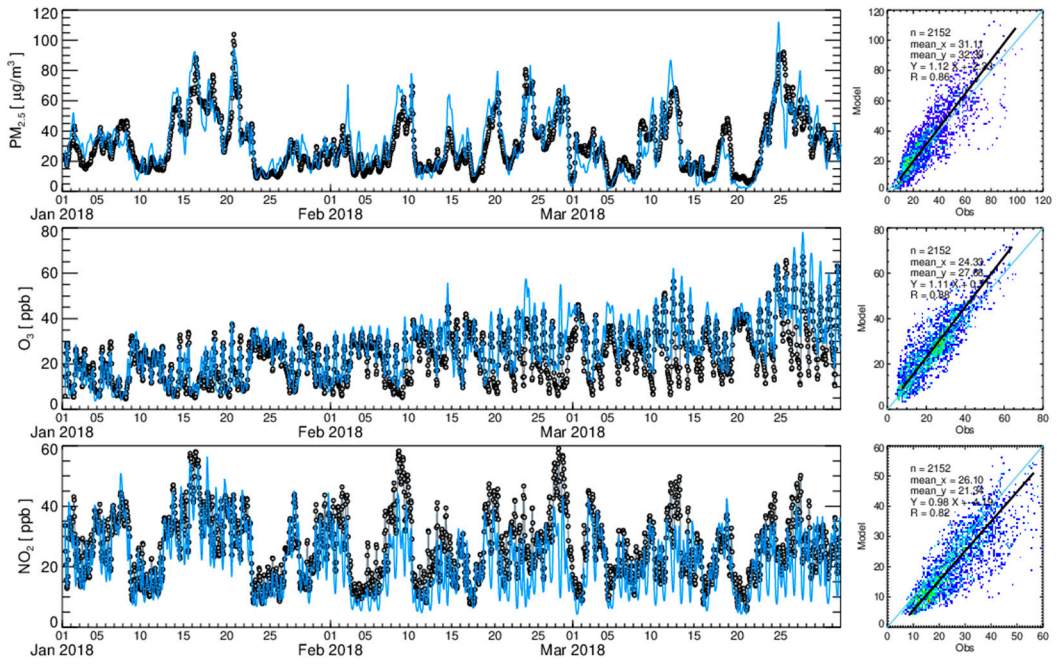
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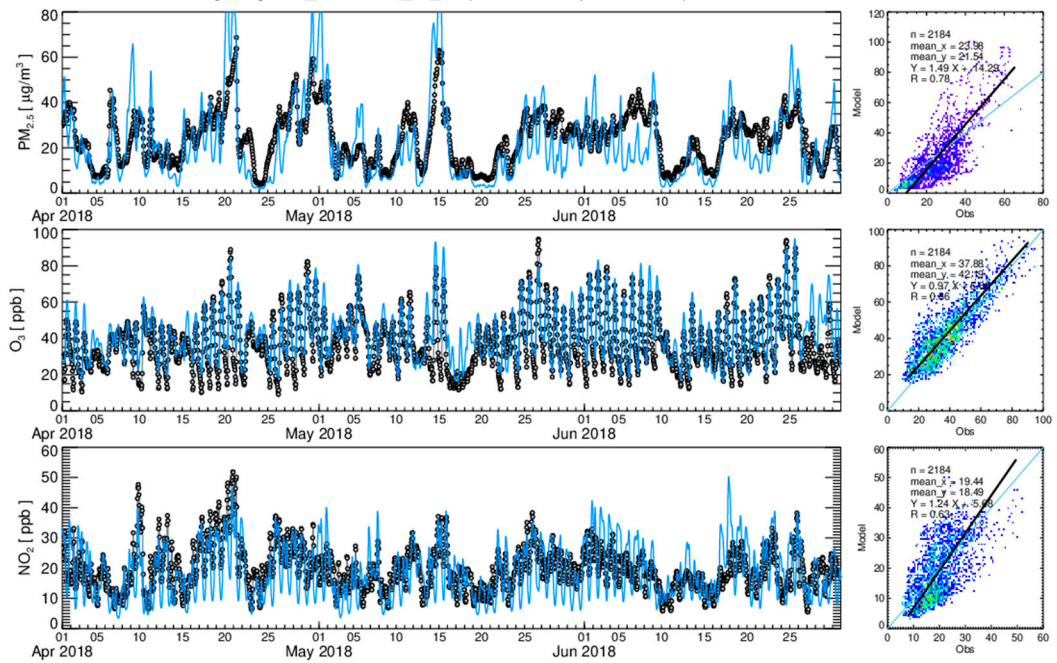
<sup>5</sup> Georgia Environmental Protection Division, Atlanta, 30354, GA, USA; Byeong.Kim@dnr.ga.gov

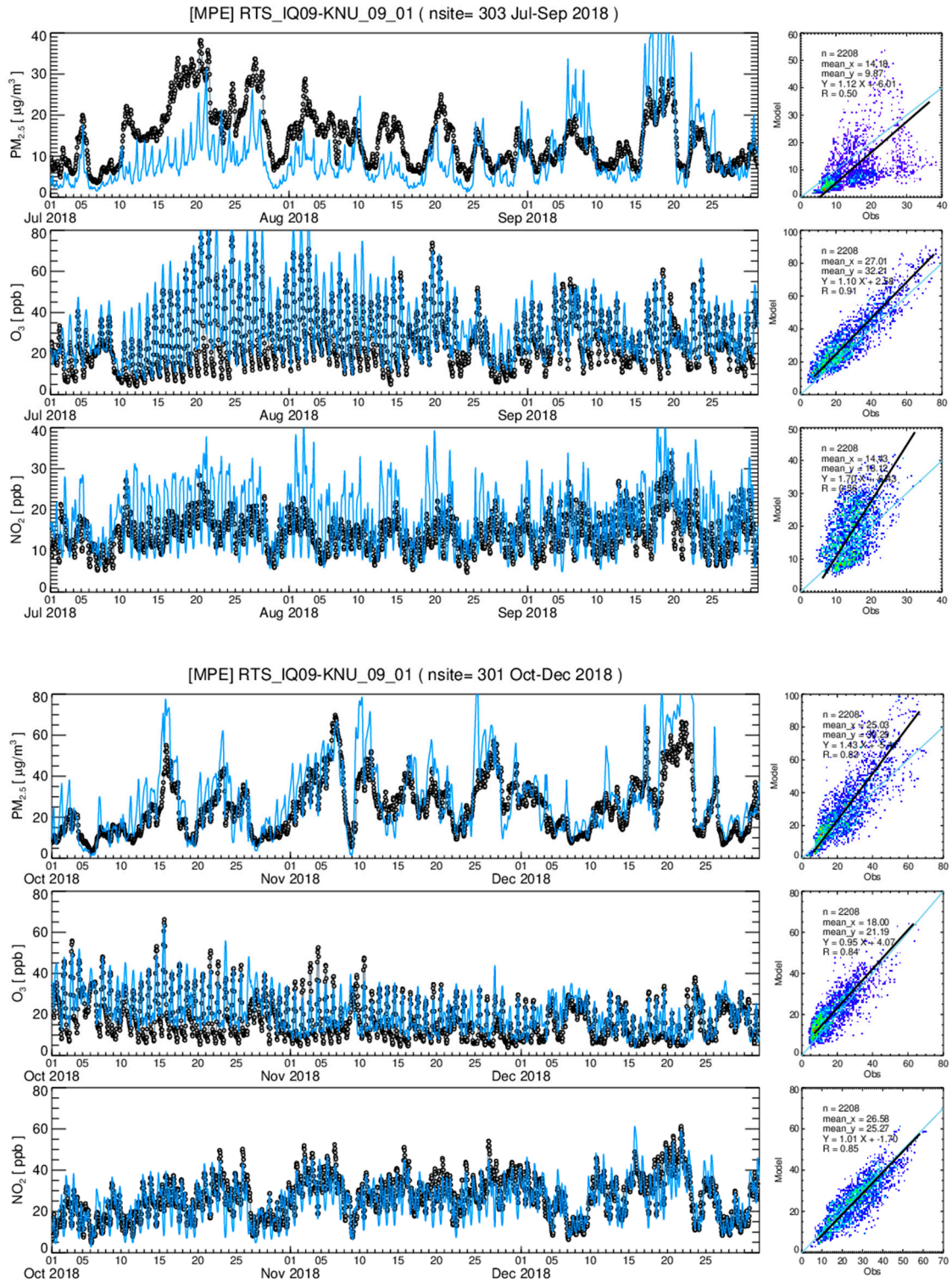
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[MPE] RTS\_IQ09-KNU\_09\_01 ( nsite= 310 Jan-Mar 2018 )



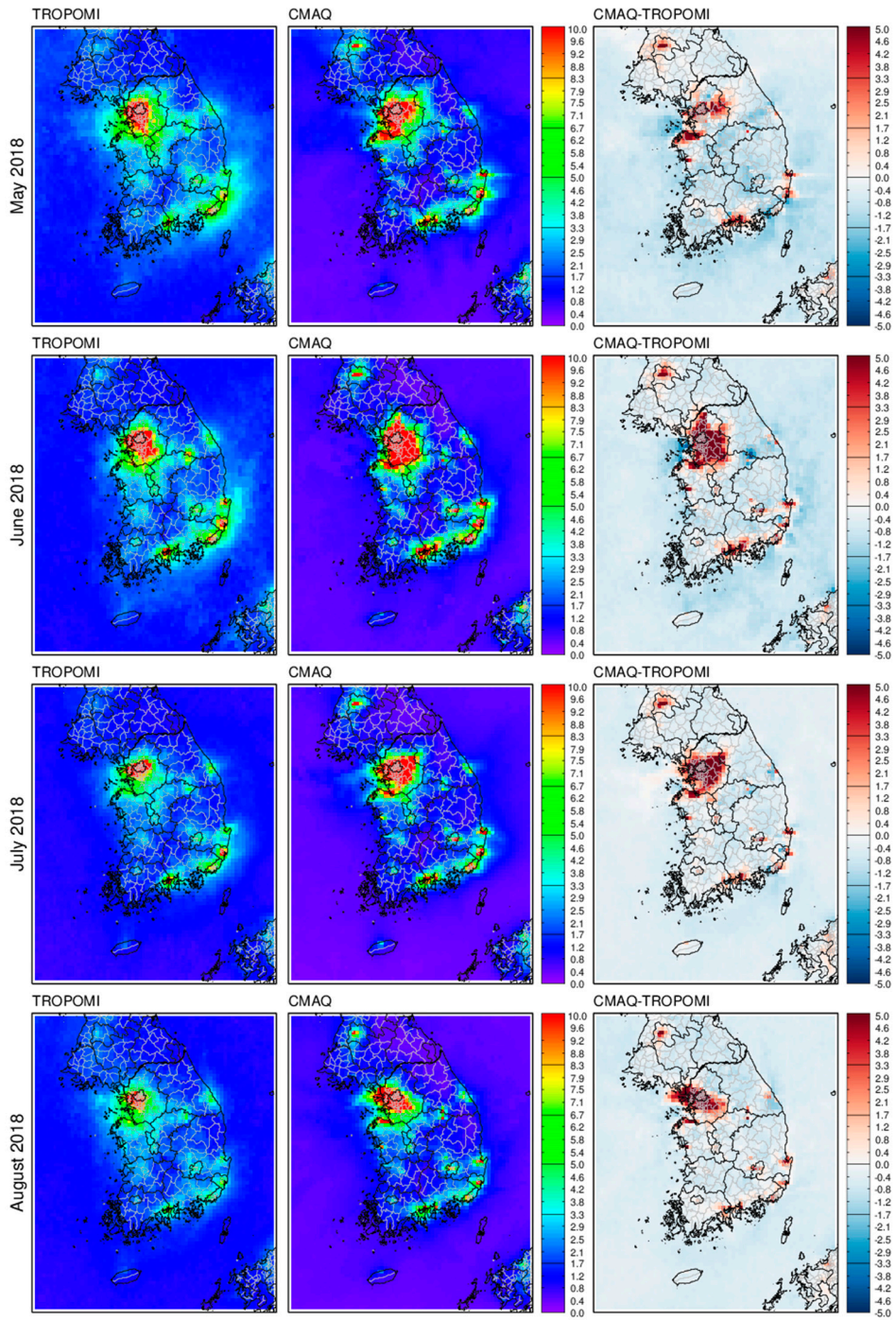
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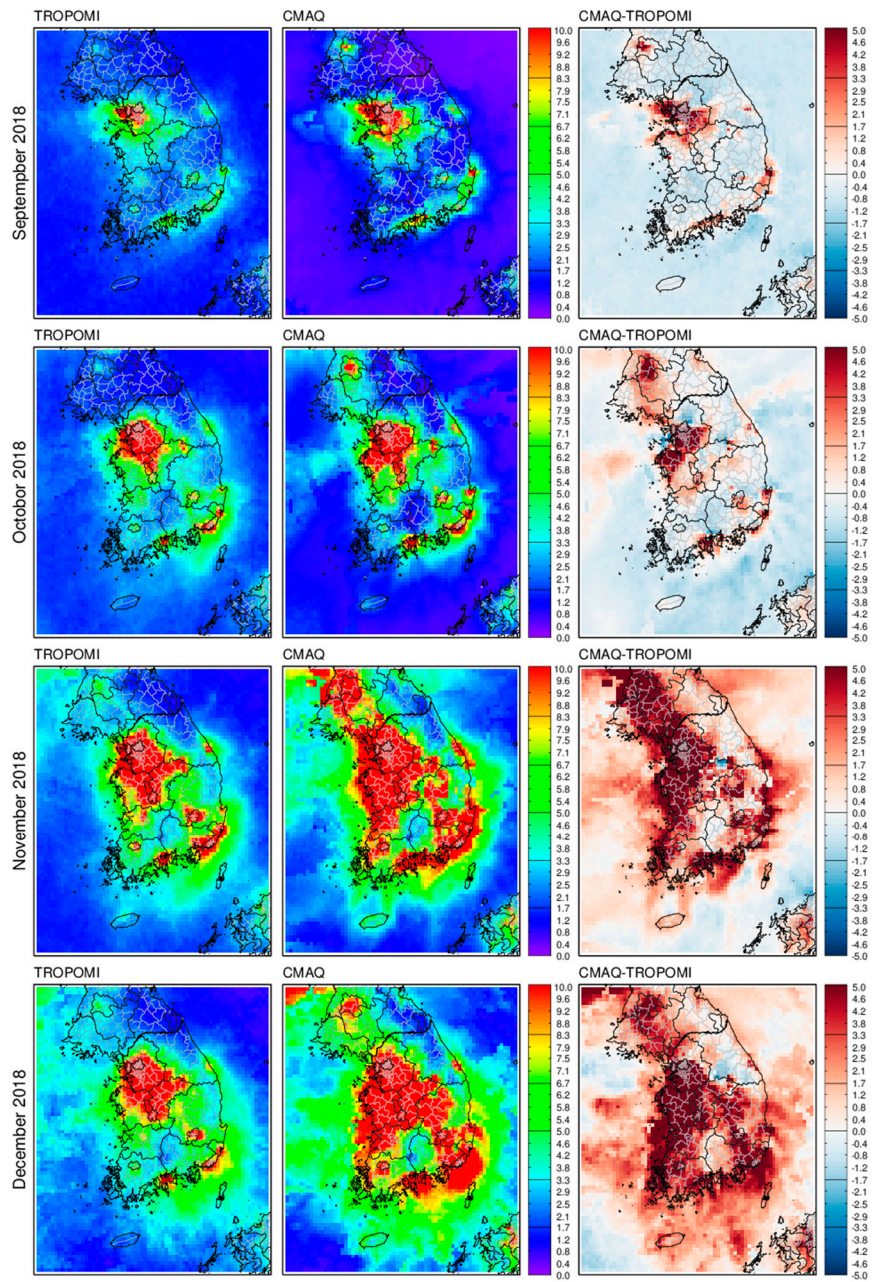


**Figure S1.** Model performance evaluations for PM<sub>2.5</sub>, O<sub>3</sub> and NO<sub>2</sub> concentration over South Korea. Black circles indicate surface observations, and blue lines indicate modeled concentrations.

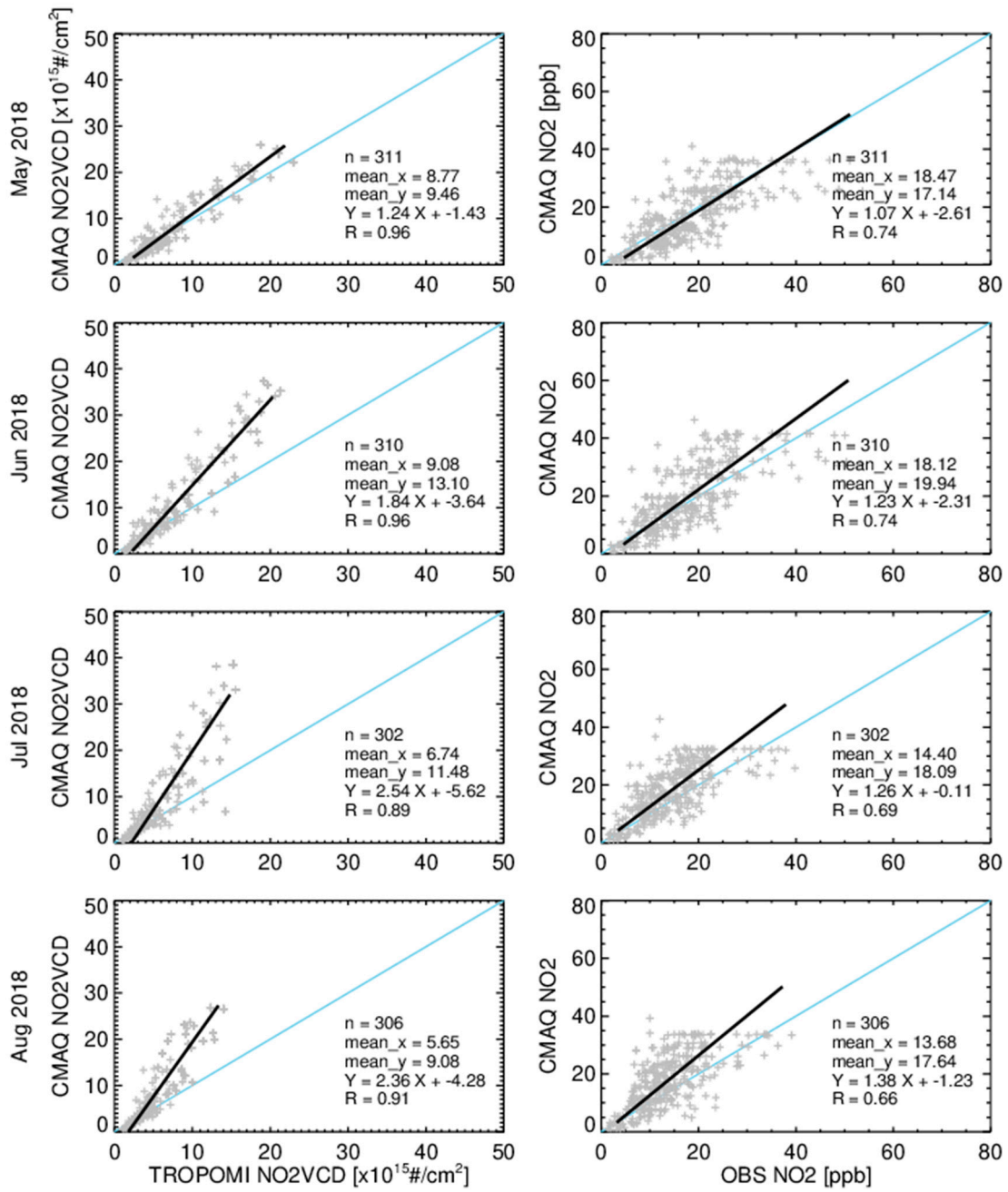
NO<sub>2</sub> VCD [ May-Aug 2018 ]



NO<sub>2</sub> VCD [ Sep-Dec 2018 ]



**Figure S2.** NO<sub>2</sub> column density distributions of TROPOMI, CMAQ and model biases (CMAQ-TROPOMI).



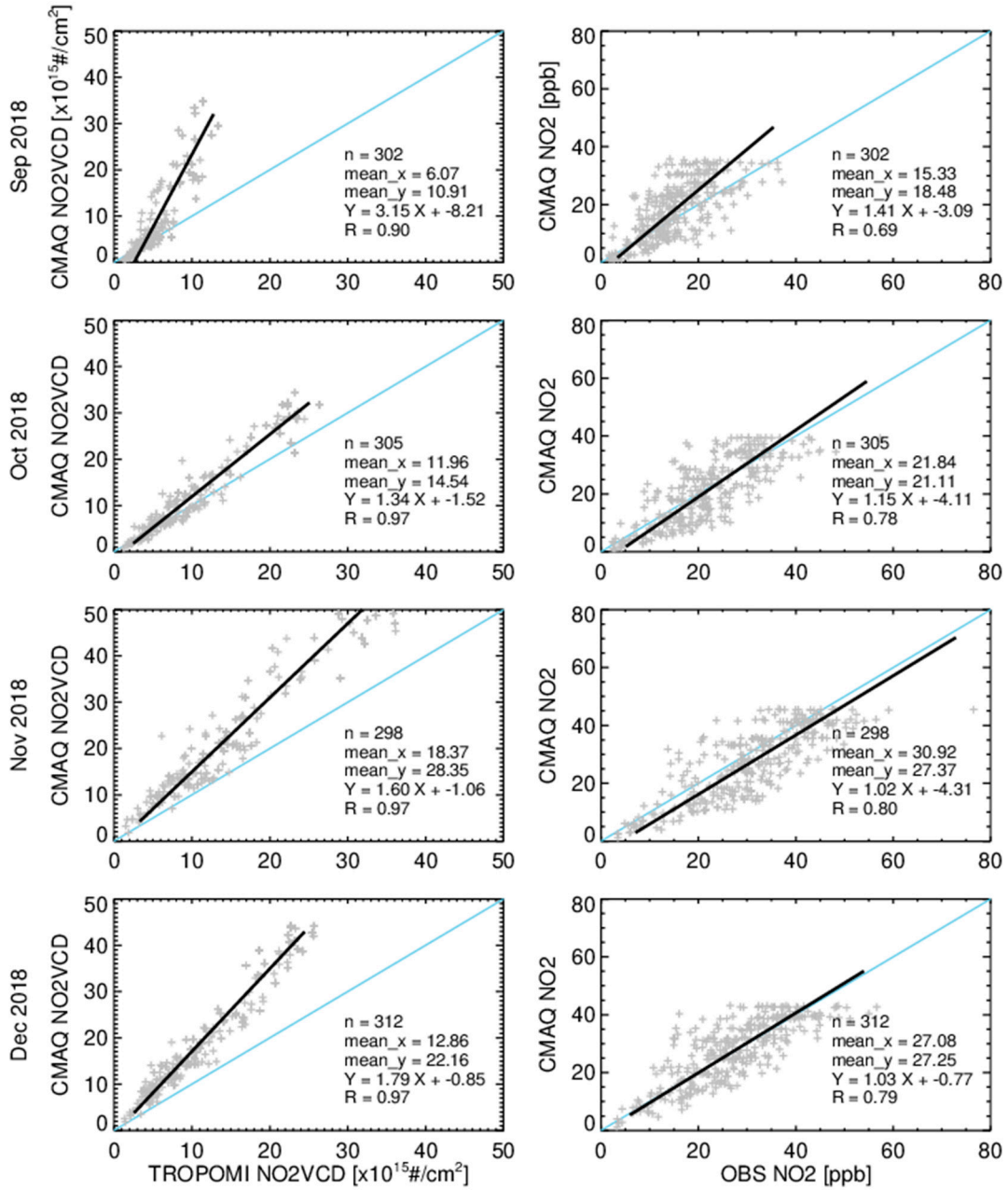
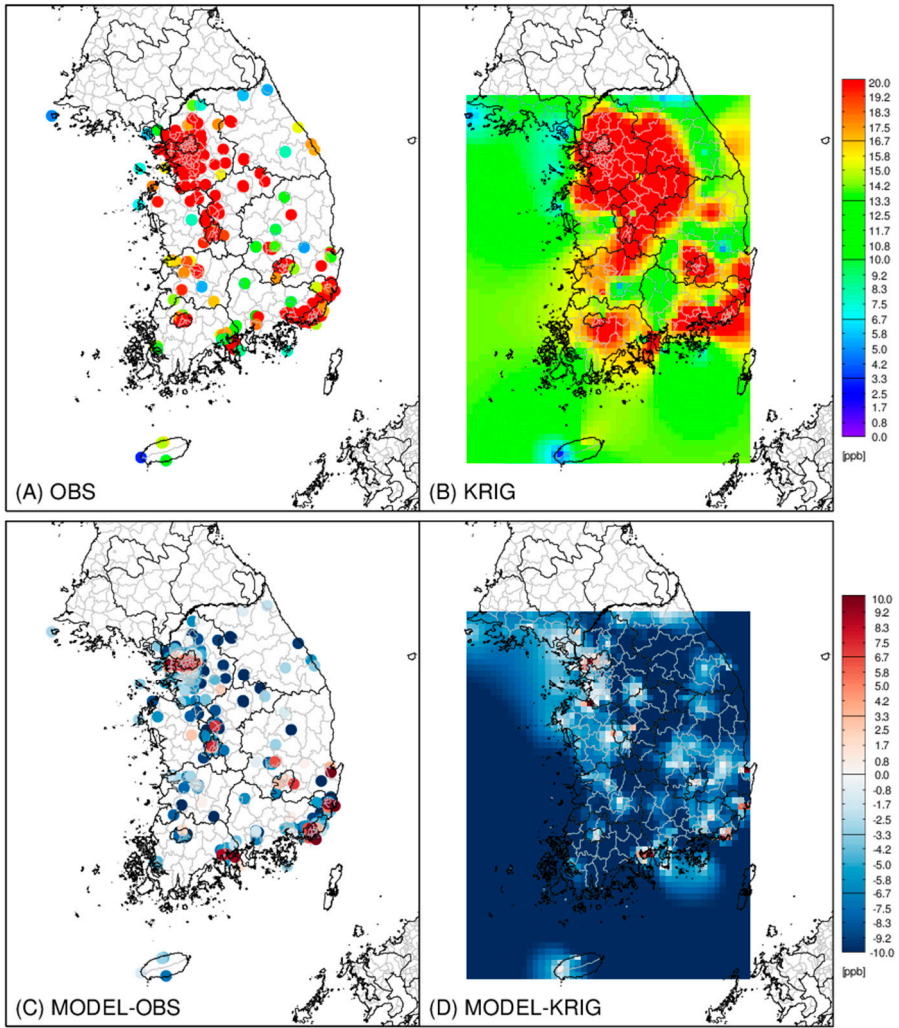


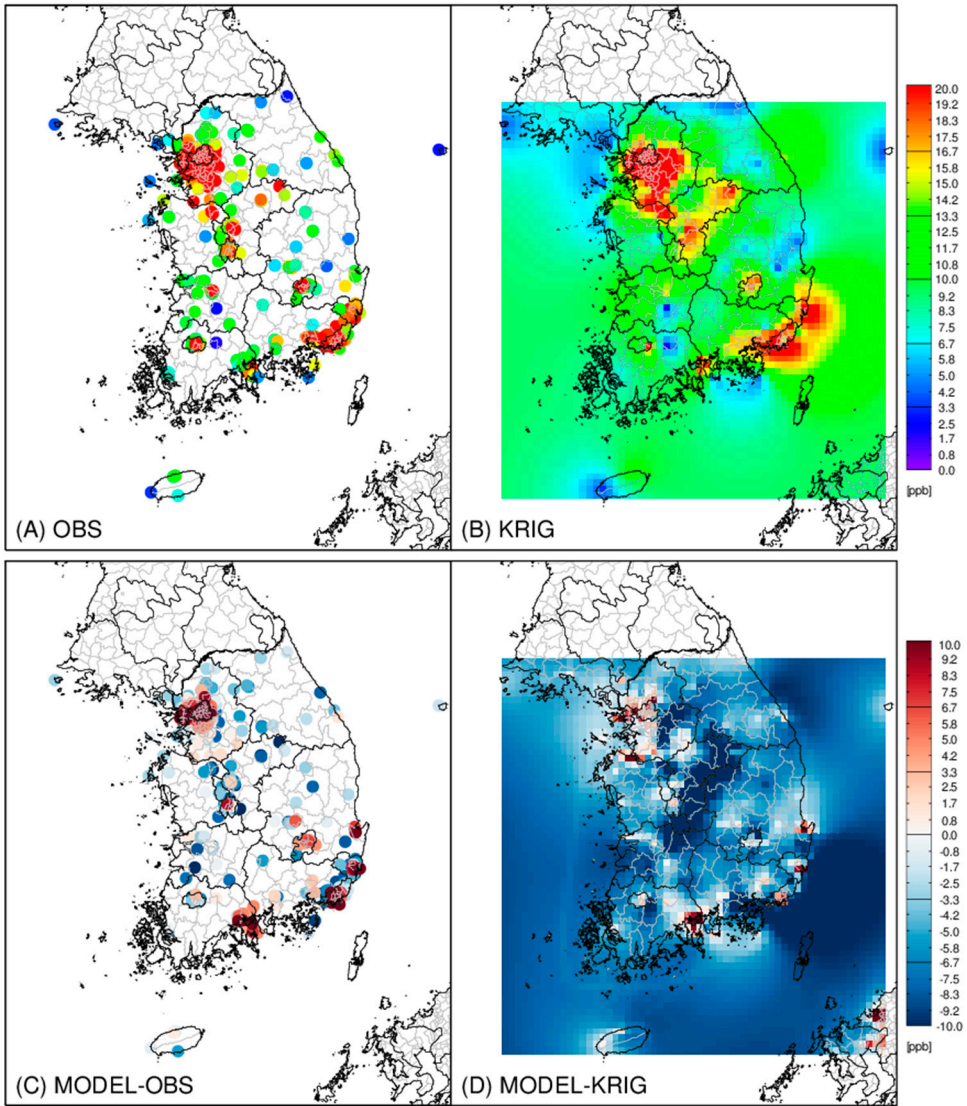
Figure S3 Comparisons of surface and columnar NO<sub>2</sub> concentration during May-December 2018.

Surface NO<sub>2</sub> (AirKorea & Krig) Jan-Mar 2018

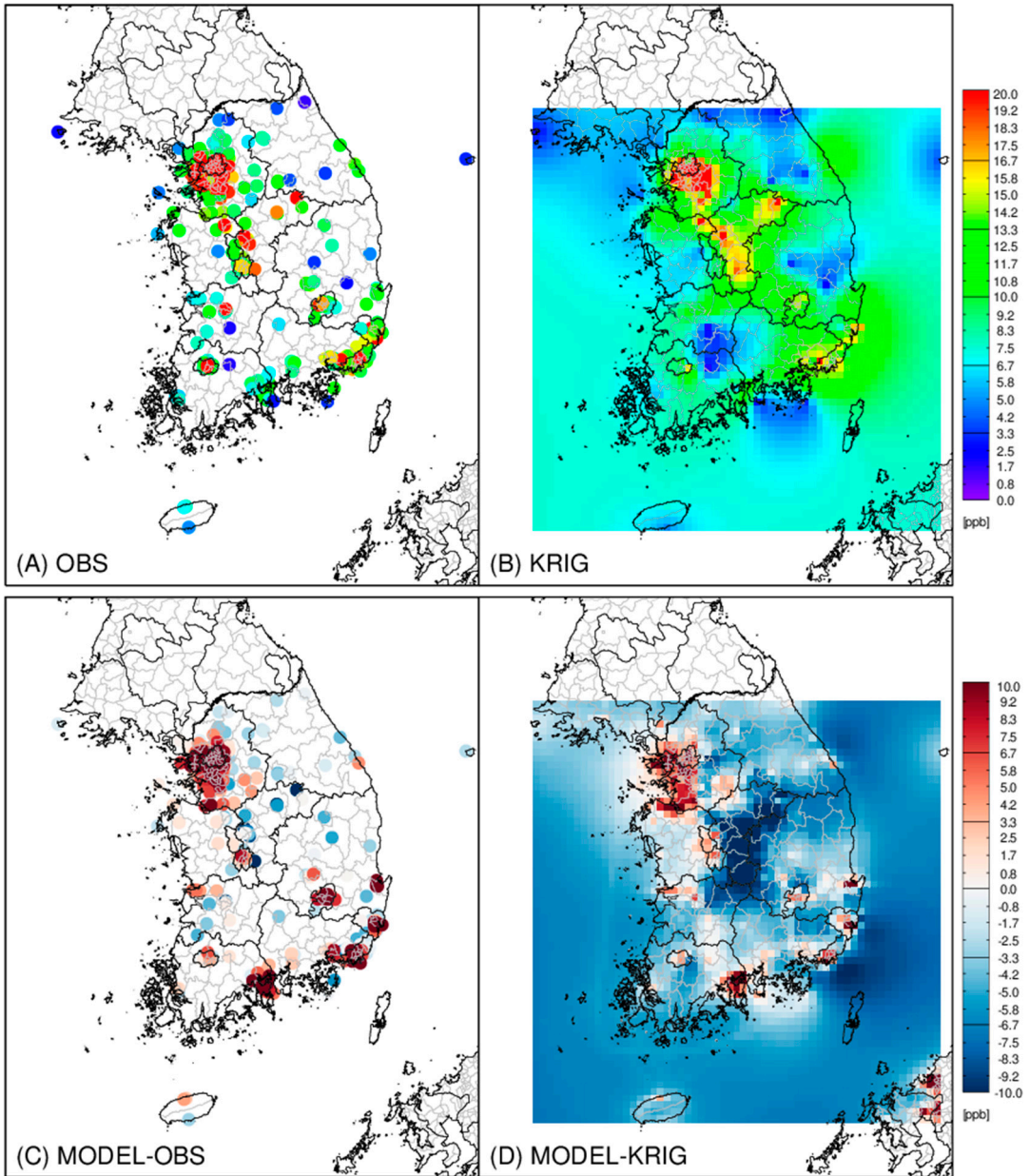




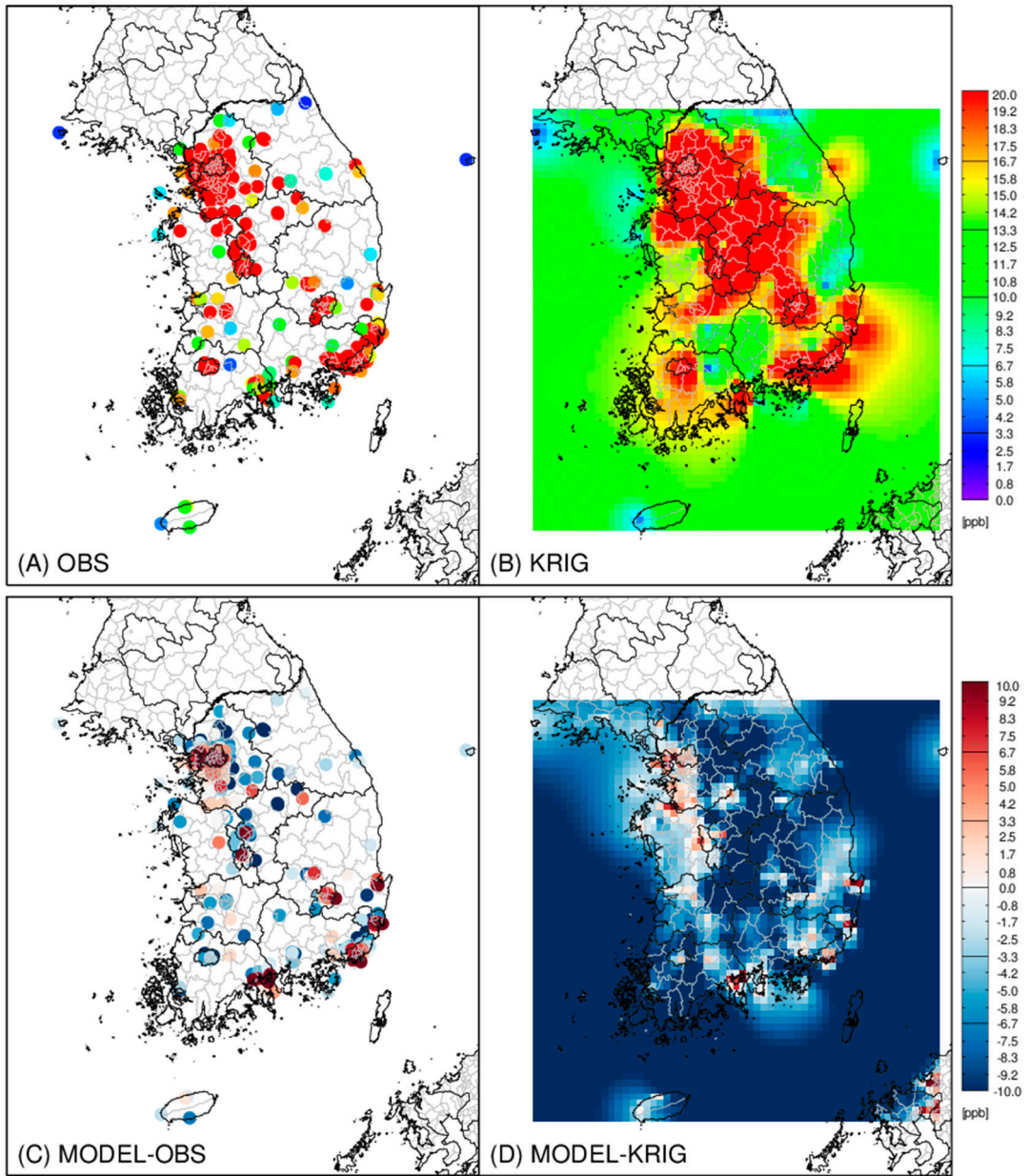
Surface NO<sub>2</sub> (AirKorea & Krig) Apr-Jun 2018



Surface NO<sub>2</sub> (AirKorea & Krig) Jul-Sep 2018

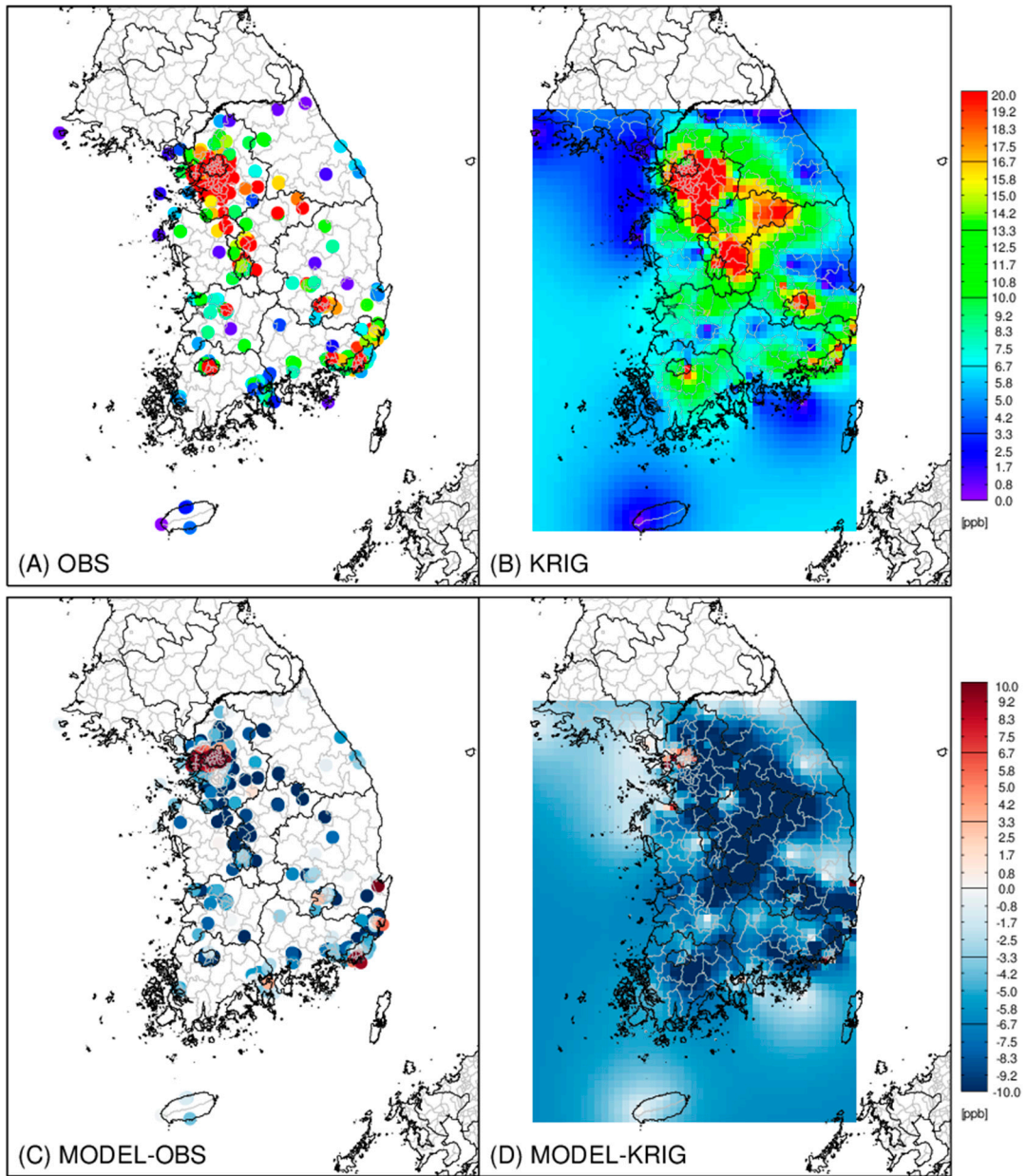


Surface NO<sub>2</sub> (AirKorea & Krig) Oct-Dec 2018

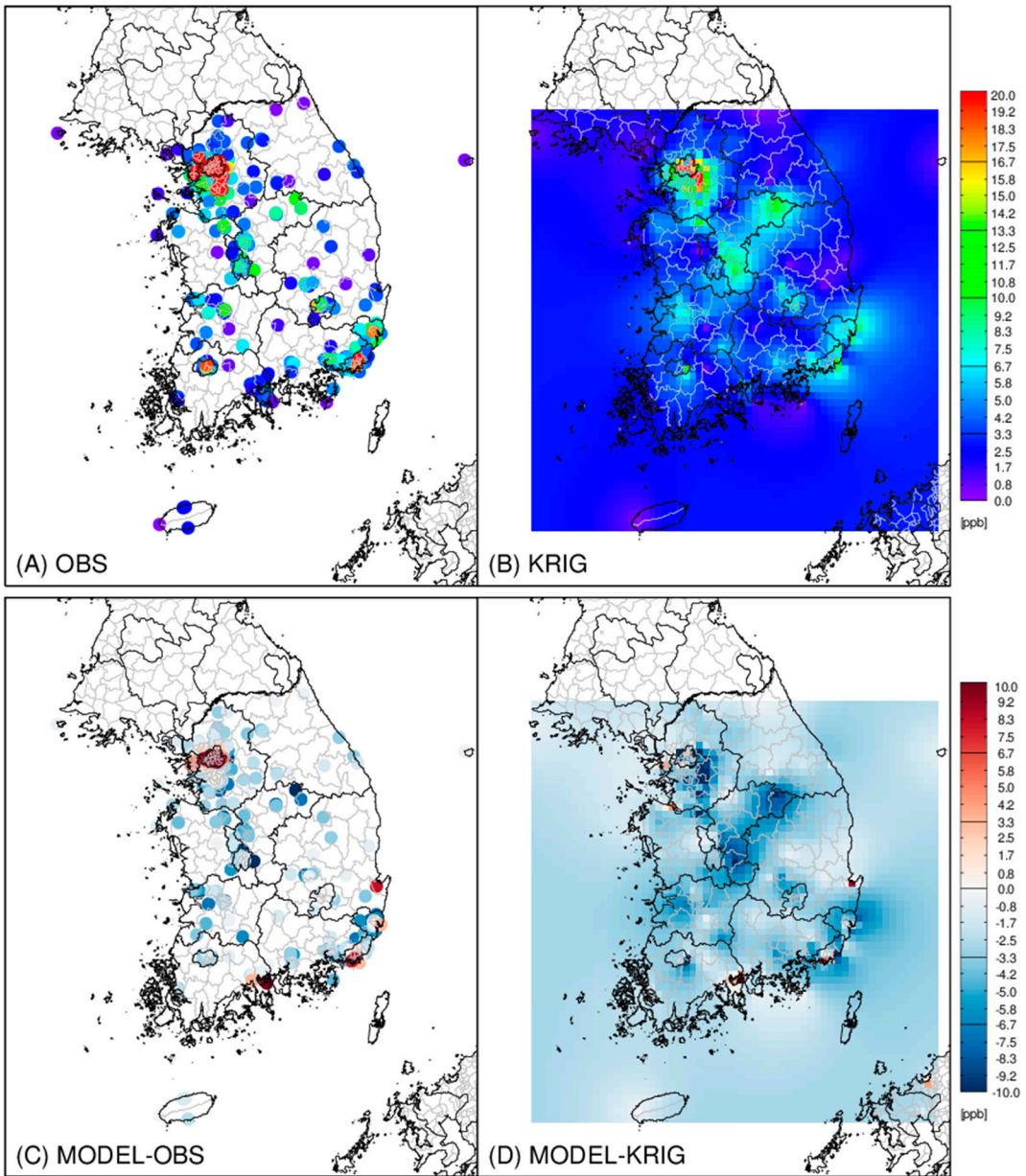


**Figure S4** Comparison of modeled and observed surface NO<sub>2</sub> concentration during January to March, April to June, July to September, and October to December, 2018.

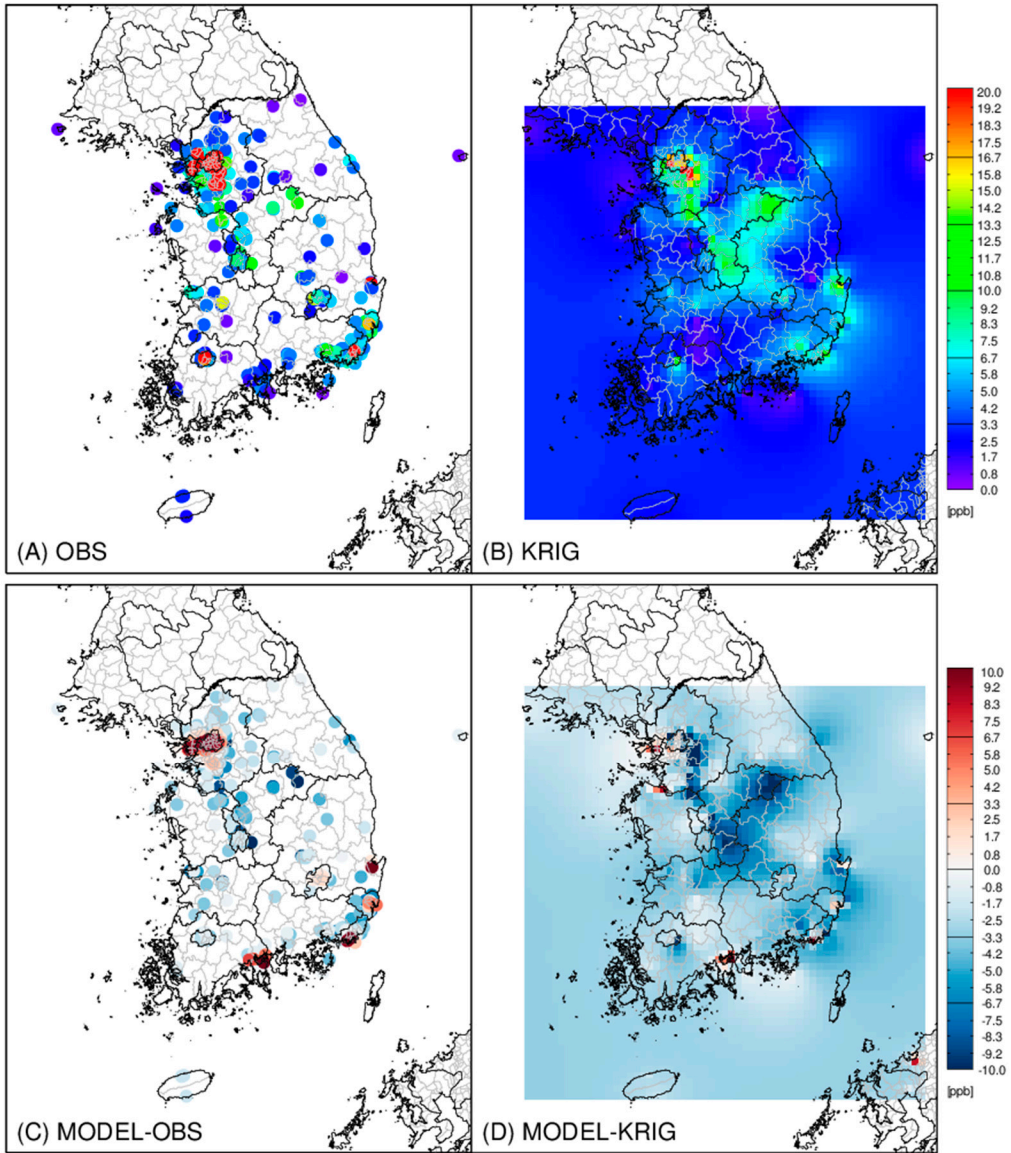
Surface NO (AirKorea & Krig) Jan-Mar 2018



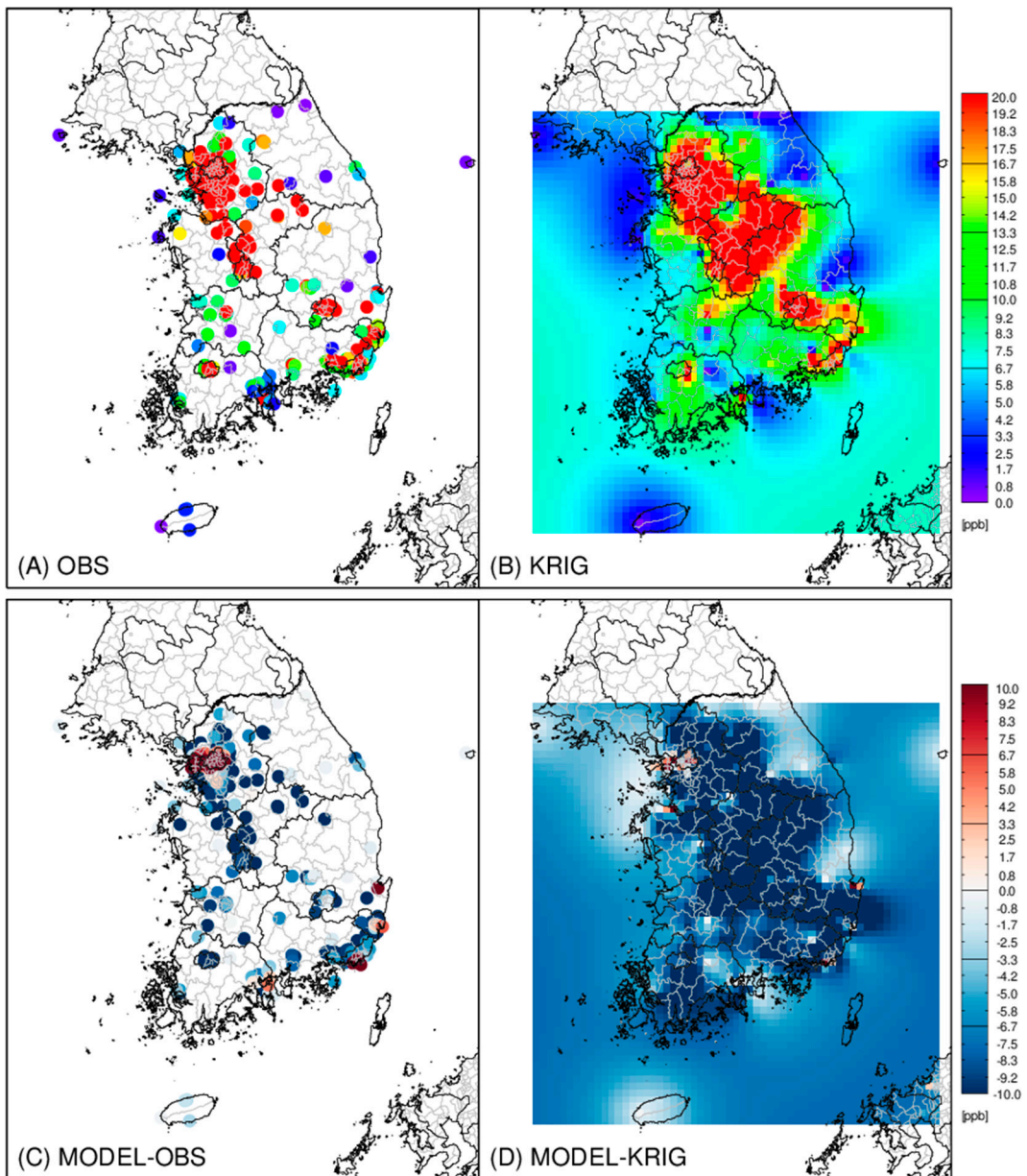
Surface NO (AirKorea & Krig) Apr-Jun 2018



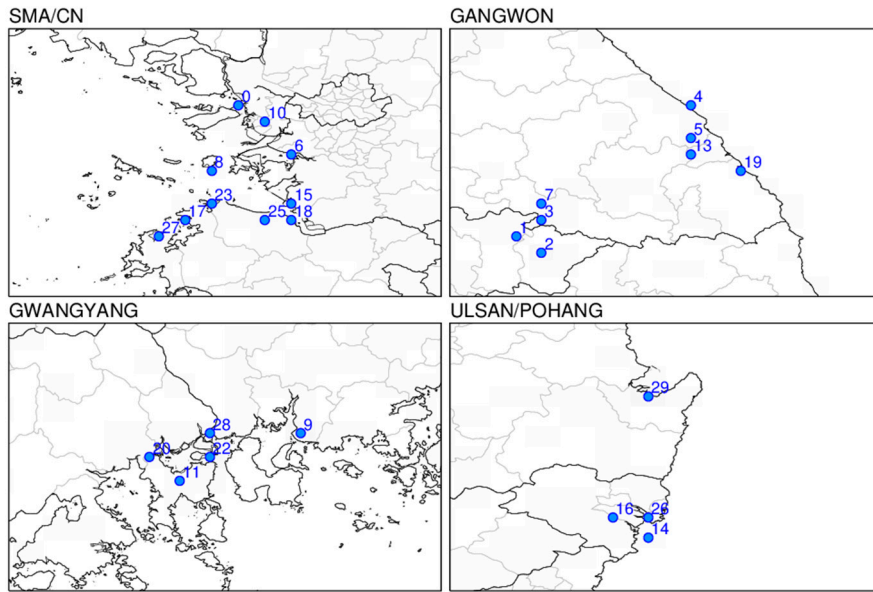
Surface NO (AirKorea & Krig) Jul-Sep 2018



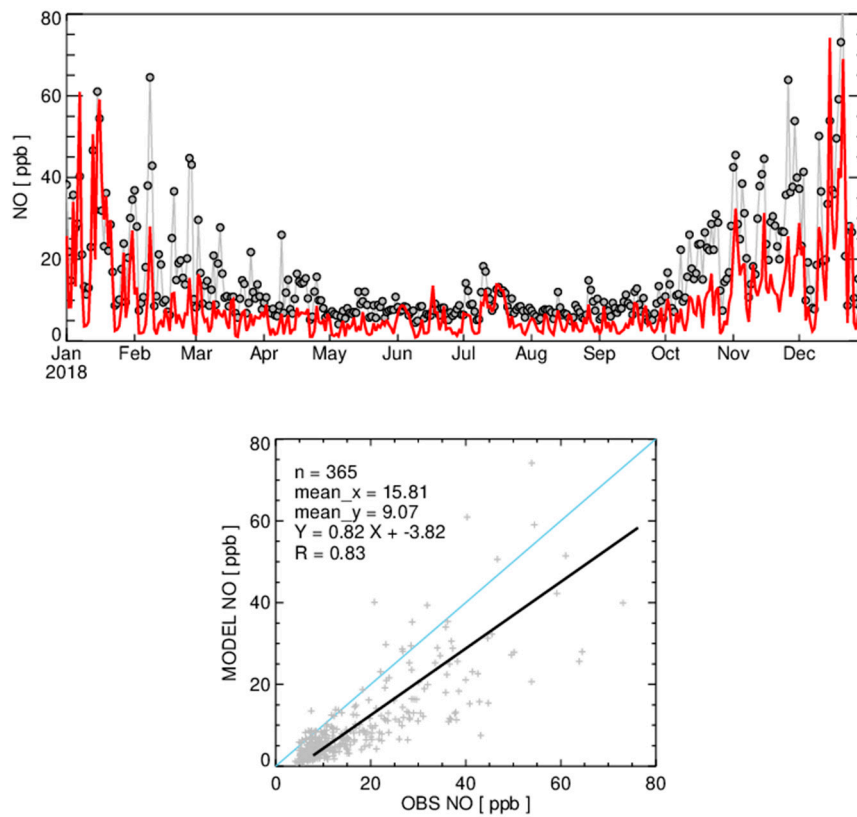
Surface NO (AirKorea & Krig) Oct-Dec 2018



**Figure S5** Comparison of modeled and observed surface NO concentration during January to March, April to June, July to September, and October to December, 2018.



**Figure S6.** Zoom-in of major points sources in Figure 7. Numbers indices point source IDs used in Figure7.



**Figure S7.** Seasonal variation of NO concentrations from AirKorea surface monitoring sites and CMAQ simulations.



### NO Diurnal Variation

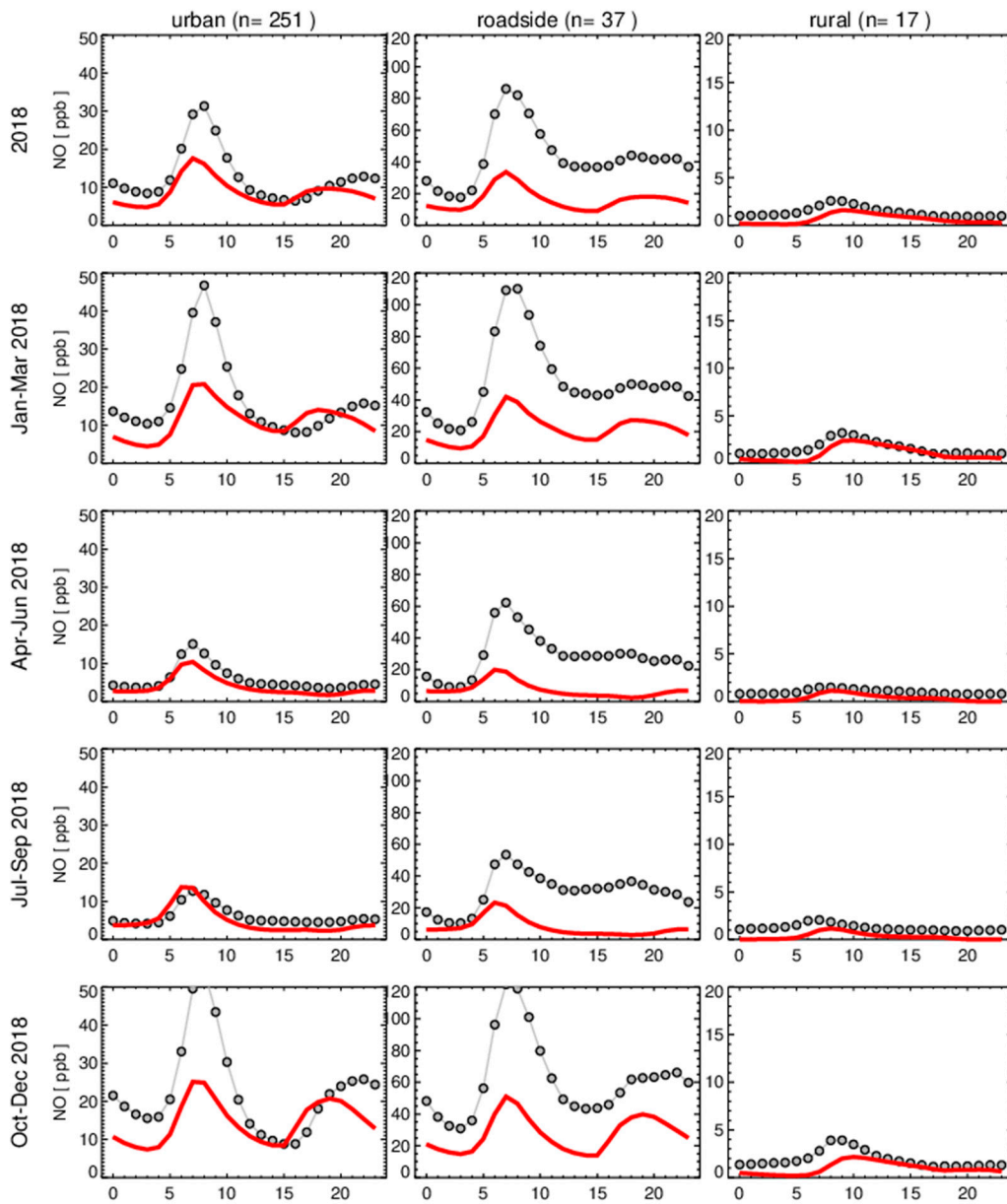


Figure S8. Diurnal variations of NO concentrations over urban, roadside and rural sites.



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