Supporting Information for

NO_2 concentration differences under clear versus cloudy skies and implications for applications of satellite measurements

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Table S2. Slope, r^2, Normalized Mean Change (NMC), and number of sites of the "all days vs. no clouds" bias.

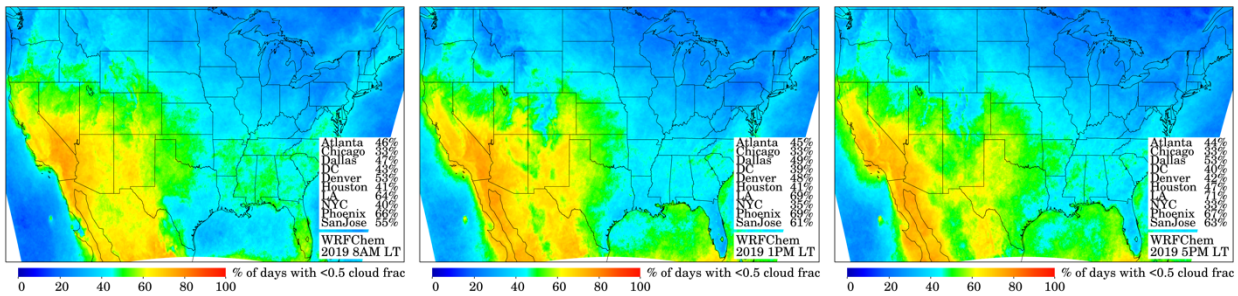

Figure S1. Percentage of days over the contiguous U.S. during 2019 with cloud fractions less than 0.3 as simulated by WRF-Chem at various local times: (Left) 8:30, (Center) 13:30, (Right) 17:30.

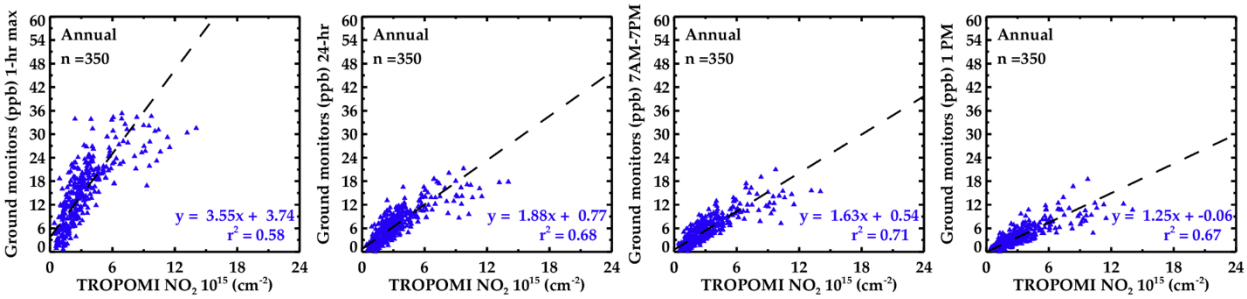

Figure S2. Scatterplots of various 2019 annual averages of surface NO_2 and the 2019 annual TROPOMI NO_2 13:30 measurements during clear skies (qa_value >0.75).

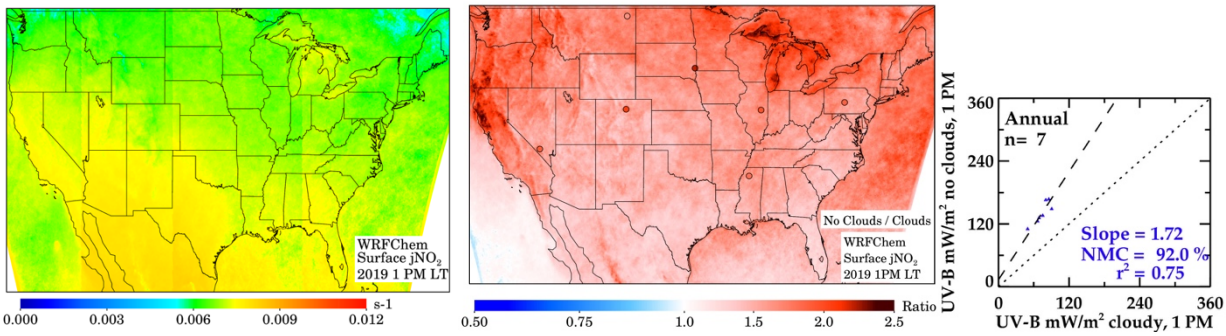

Figure S3. (Left) annualized surface jNO_2 from WRF-Chem. (Center) Ratio of the annualized surface jNO_2 from WRF-Chem during no cloud and cloudy days, with measurements of the ratio of surface UV-B radiation during no cloud and cloudy days overlaid. (Right) Measurements of UV-B radiation from the 7 NOAA SURFRAD Network (https://gml.noaa.gov/grad/surfrad/sitepage.html) during cloudy and no cloud days as quantified by TROPOMI.

Table S1. Slope, r^2, Normalized Mean Change (NMC), and number of sites of the "cloudy vs. all days" bias by further filtering out AQS data using various additional sensitivity analyses.

	Slope	r^2	NMC
Baseline (V2.4)	1.11	0.96	12.9%
V2.3.1	1.08	0.96	11.8%
V2.4 higher cloud filter	1.18	0.92	28.6%
V2.4 all sites	1.03	0.96	11.8%
V2.4 near road	0.95	0.93	6.1%
V2.4 no chemi	1.12	0.95	19.6%
V2.4 Summer	1.09	0.94	10.5%
V2.4 Winter	1.08	0.96	9.6%
V2.4 Spring	1.12	0.98	8.4%
V2.4 Fall	1.04	0.88	12.6%
V2.4 North	1.14	0.98	13.9%
V2.4 South	1.01	0.89	11.6%
V2.4 NorthEast	1.16	0.99	17.5%
V2.4 SouthEast	1.12	0.98	14.6%
V2.4 NorthWest	1.09	0.97	10.5%
V2.4 SouthWest	0.96	0.86	8.9%
V2.4 lowPopDensity	1.18	0.96	11.1%
V2.4 highPopDensity	1.08	0.93	15.5%
V2.4 lowRoadDensity	1.13	0.95	10.9%
V2.4 highRoadDensity	1.09	0.94	15.7%

Table S2. Slope, r^2, Normalized Mean Change (NMC), and number of sites of the "all days vs. no clouds" bias by further filtering out AQS data using various additional sensitivity analyses.

	Slope	r^2	NMC
Baseline (V2.4)	1.09	0.95	17.2%
V2.3.1	1.10	0.95	21.3%
V2.4 higher cloud filter	1.06	0.97	32.1%
V2.4 all sites	1.02	0.97	15.7%
V2.4 near road	0.93	0.98	8.4%
V2.4 no chemi	1.07	0.95	26.5%
V2.4 Summer	1.07	0.98	23.8%
V2.4 Winter	1.07	0.94	14.7%
V2.4 Spring	1.15	0.96	17.4%
V2.4 Fall	1.03	0.97	13.7%
V2.4 North	1.15	0.95	22.3%
V2.4 South	0.97	0.98	10.1%
V2.4 NorthEast	1.18	0.97	36.2%
V2.4 SouthEast	1.13	0.98	16.1%
V2.4 NorthWest	1.03	0.96	9.1%
V2.4 SouthWest	0.95	0.99	4.8%
V2.4 lowPopDensity	1.15	0.94	17.9%
V2.4 highPopDensity	1.05	0.92	17.3%
V2.4 lowRoadDensity	1.04	0.93	16.0%
V2.4 highRoadDensity	1.08	0.94	19.8%