Atmospheric
Chemistry
and Physics
Discussions

Interactive comment on "Evaluation of modelling NO₂ concentrations driven by satellite-derived and bottom-up emission inventories using in-situ measurements over China" *by* Fei Liu et al.

Anonymous Referee #3

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This manuscript describes results of a regional air quality model evaluation over China using the new ground-based NO2 network that was recently installed. The paper is of scientific importance because this is the first significant publication of data from this network. The model was run with both bottom-up and top-down emission inventories.

I have two major comments concerning the paper:

1) The paper states that the NO2 monitoring stations are located at least 50 m from stationary sources and at least 10 to 100 m from roadways. I don't think these restrictions are stringent enough to use stations this close to sources to evaluate a model at quarter-degree horizontal resolution (or even a few kilometer resolution!). If information

is available concerning the distances of each station from these types of sources, the stations should be screened to use only those a more substantial distance away from the sources. Model vs. observation result may change significantly as a result of such screening.

2) The paper concludes that the satellite-based DECSO emissions are too low, and the MIX emissions are too high. But, applying the MIX total emission with the DECSO spatial distribution yielded better results. The conclusions of the paper fail to address some "bigger picture" questions. What do these results imply about emissions derived from satellite data? Are the magnitudes to be trusted? What about air quality trends from satellite data? Are they meaningful? The conclusions need to be augmented to include more general implications of the results of this study.

Minor comments:

p. 3, lines 22- 23: Annual mean simulated surface NO2 is compared....

p. 5, line 20: what concentration is the grade II air quality standard for NO2?

p. 6, lines 29-30: the correction factor is largest (ideal value of 1.0) over polluted regions, where NO2 is a larger fraction....

p. 7 line 1: Hourly correction factors derived from CHIMERE.... Are the hourly factors for each hour of each day during the year, or are they means for each hour of the day computed over a season?

p. 8, lines 32 - 33: "negative representivity" May be able to reduce this by being more restrictive on the stations used with regard to proximity of sources.

p. 9, lines 12 -13: can you give any reasons why this is the case?

p. 11, line 27: "But the modelled NO2 is generally low compared to ground measurements. This is true for DECSO, but not for MIX.

p. 12, lines 9 - 10: Did you try a simulation with the MIX spatial distribution, but scaled

to the DECSO total emission? Given the greater spatial correlation with MIX, this might be worthwhile.

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