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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluation of modelling NO_2 concentrations driven by satellite-derived and bottom-up emission inventories using in-situ measurements over China" *by* Fei Liu et al.

Anonymous Referee #2

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This is an interesting paper focused on the evaluation of the CHIMERE predictions of NO2 using different NO2 emission estimates. It provides a test of the current MIX inventory for NO2 in terms of both magnitude and spatial distribution. The spatial distribution from a satellite based top-down inventory is also tested. The paper is able to make use of the new observations of NO2 available in China. The comparison and description of the NO2 observations is very good and this data set will be of interest to the science community. The conclusions that the MIX inventory totals for 2010 along with the updated 2015 satellite derived spatial distribution provide the most accurate prediction of 2015 surface NO2 concentrations is interesting. However the analysis is based on taking the observed NO2 concentrations and then applying, a model-based

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correction to “account for” know interferences in the instrument used for the NO2 measurements. These corrections can be as large as 40% (Figure 5). The impact of this correction and uncertainty associated with using the model-based values for the correction should be discussed. What is the uncertainty in the model based values? Are there observation-based approaches that can be used to test this? There are many super sites in China now and they measure the various elements of NOy and have better direct measurements of NO2. Could such data be used to give some confidence to the scaling applied to the monitored data (at least at one or more points?

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