

## ***Interactive comment on “Systematic bias in evaluating chemical transport models with maximum daily 8-hour average (MDA8) surface ozone for air quality applications” by Katherine R. Travis and Daniel J. Jacob***

**Anonymous Referee #2**

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I find the the paper well written and presented, results clearly explained.

Although the scopes are overall valuable, I believe that the paper is too limited in the analysis in its current shape.

The authors focused on the results of one model applied to a rather 'narrow' dataset to derive conclusions that have been known for a while (I would actually say that the PBL transition is THE long standing issue for atmospheric dispersion models at al scales). The authors have the merit of having managed to isolate the portion of data

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that serves to clearly illustrates their points (daily cycle and PBL transition), but have not substantiate their conjectures with additional model runs (for instance switching deposition on/off to check the conjectures of section 5) and/or additional observation (longer time periods, data from another region, ...), and/or other models.

My impression is that the paper, as it stands, lacks of robustness and seems more a technical report on GEOS-Chem than a stand-alone scientific publication. I would therefore invite the authors to expand the analysis to other data or sensitivity runs in support of your conclusions.

**SPECIFIC COMMENTS** Section 4. How does the model perform for precipitation? from my understanding (but I might be wrong) you look at ozone performance conditioned to rain or no rain condition. But you need first to check if the model is 'doing the right (or wrong) thing for the right reason', and thus you should give information to the reader on how the model catches rainy conditions.

How is 'rainy conditions' defined (threshold, number of hours, ...)? how many occurrences are there over the examined periods?

Additional references for the authors to consider: MAkar et al., Nature Communications volume 8, Article number: 15243 (2017);

Dennis et al, ON THE EVALUATION OF REGIONAL-SCALE PHOTOCHEMICAL AIR QUALITY MODELING SYSTEMS

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2019-78>, 2019.

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