

Geosci. Model Dev. Discuss., referee comment RC3 https://doi.org/10.5194/gmd-2021-29-RC3, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

Comment on gmd-2021-29

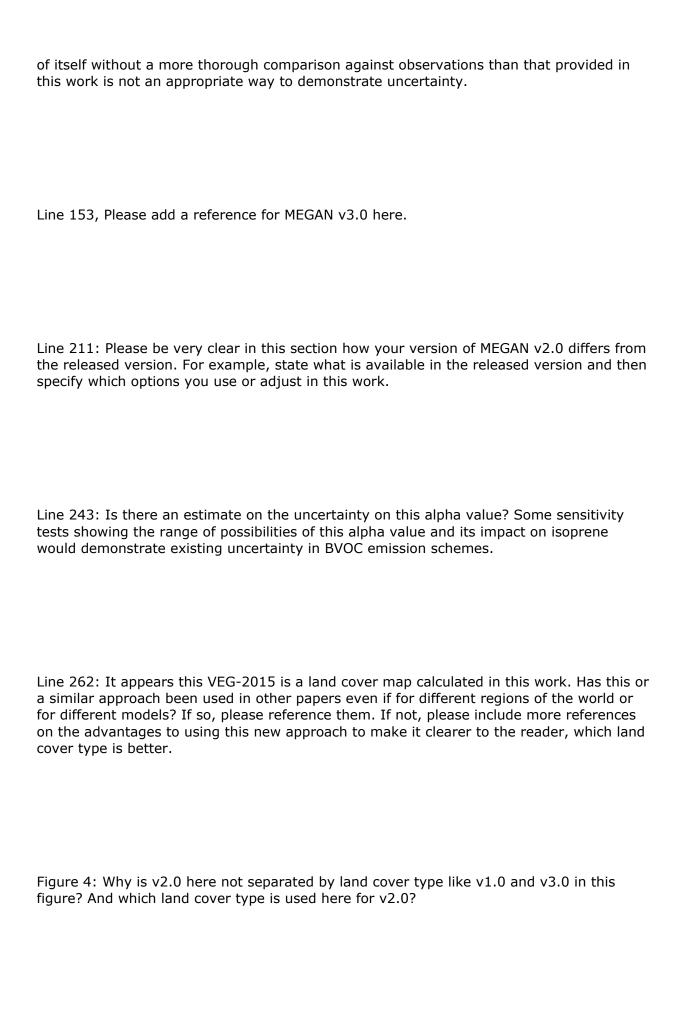
Anonymous Referee #3

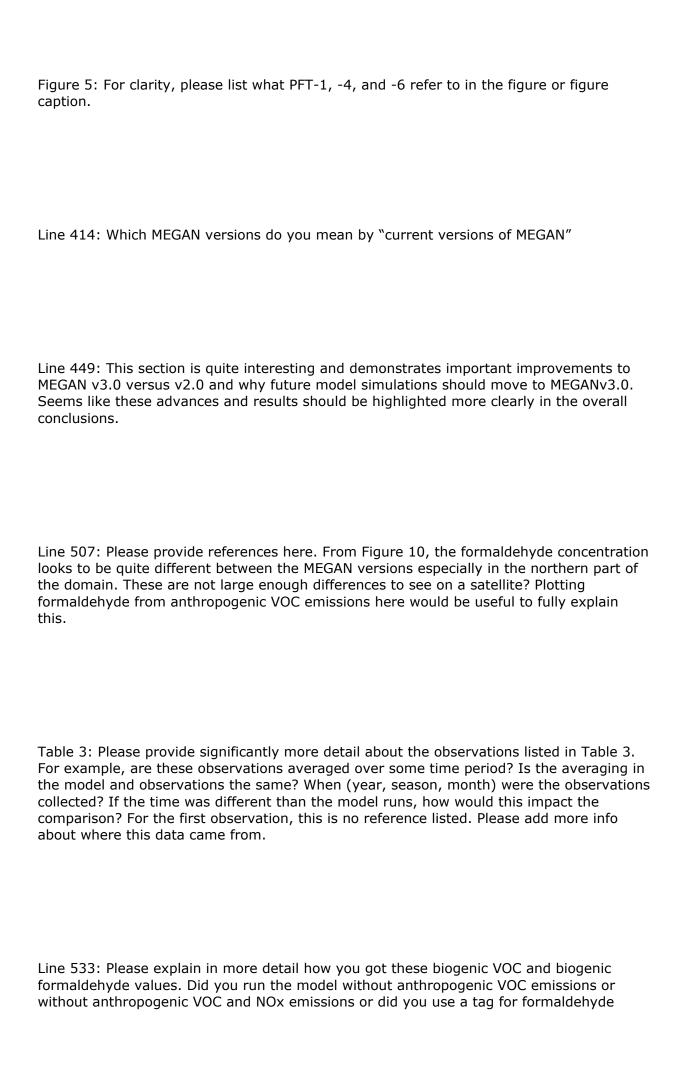
Referee comment on "Modeling sensitivities of BVOCs to different versions of MEGAN emission schemes in WRF-Chem (v3.6) and its impacts over eastern China" by Mingshuai Zhang et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-29-RC3, 2021

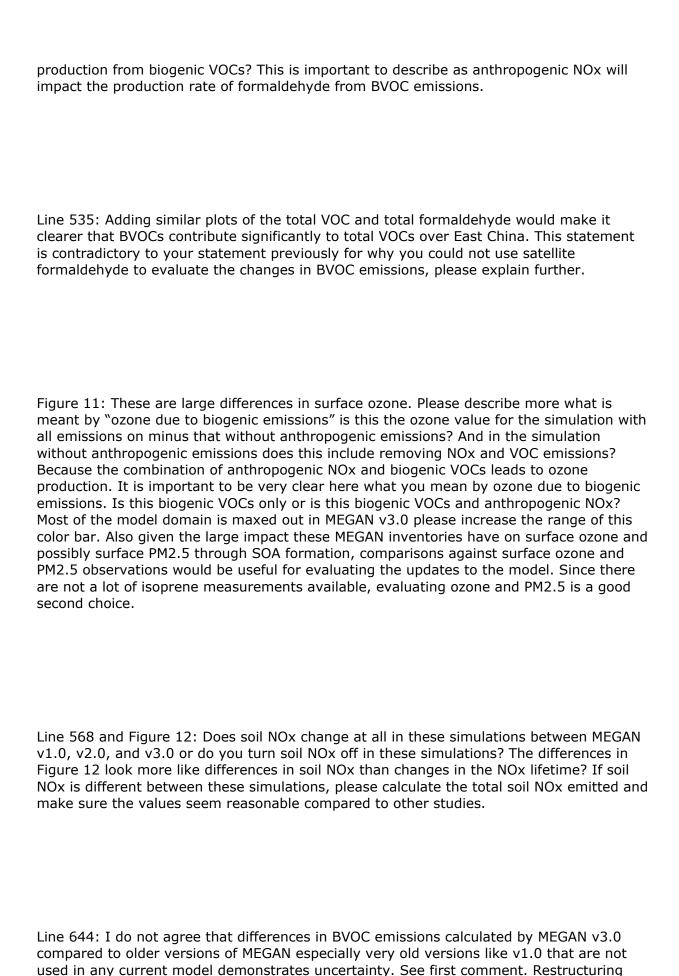
Adding the capability of MEGAN v3.0 into WRF-chem is a great advancement for the community. However, the paper needs to be restructured and more evaluation of the model updates against observations are needed. The main problem is that the overall conclusions of the paper (there are large uncertainties in the BVOC emission schemes) are not supported by the results of the paper. Differences between sequential updates of MEGAN v1, v2, and v3 does not demonstrate uncertainty as presumably the later versions are more accurate as explained further below. The paper could easily be restructured to show how the sequential updates of MEGAN v1, v2, and v3, which increase in process complexity, have led to improvements (or not) in BVOC emissions, ozone, and PM2.5. This restructuring should better emphasize the isoprene observations specified in Table 3 and compare to other observations such as ozone and PM2.5 that may be more readily available than isoprene as explained more below. Also as further explained below related to Figure 12, please confirm that soil NOx does not change between your MEGAN v1, v2, and v3 configurations?

Specific comments:

Line 35 and 61: Because the differences in BVOC emissions from MEGAN v1, v2, and v3 are sequentially improving, the differences between the versions do not demonstrate uncertainty in BVOC emissions, but instead model advances. Certainly, there is still a lot of uncertainty in BVOC emissions, but this paper does not really address these uncertainties. For example, testing the uncertainty in the MEGAN inputs like emission factors and vegetation types or comparing MEGAN to an entirely different BVOC emission scheme would be a way to evaluate uncertainty, but comparing MEGAN to older versions







this paper toward evaluating the differences in the MEGAN versions and determining



-Line 379 "Over the southwest domain"

-Line 395 "when estimating"

-Line 475 and 478 "Light-dependent"

-Line 504: "for use in this study"

-Line 588: "MEGAN v3.0 includes"

-Line 595: "Physical and chemical"

-Line 1201 "dataset"