

***Interactive comment on* “The impact of a future H₂-based road transportation sector on the composition and chemistry of the atmosphere – Part 2: Stratospheric ozone” by D. Wang et al.**

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C: This continues the approach from the part 1 of this activity. The model is now slightly different, uses WACCAM dynamics to drive MOZART-3. MOZART-3 includes stratosphere, mesosphere and thermosphere and the appropriate chemistry to represent these atmospheric zones. The scenarios are similar to that employed in part 1 and there is not much different. Again, the paper is of the quality of technical report submitted to a funding agency of impact assessment. These types of papers always present a problem in that there is no new science, model development or methodologies and generally report results from a selected number of scenarios designed to estimate the

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impacts. Again, as is the case for the Part 1 paper, it may be useful to have this available in open literature in addition to reports submitted to the funding agencies to expose this to wider audience. This is purely a model based assessment and the comparison is to other model runs. The results seem reasonable and what one would expect under the various scenarios. The Part1 discussed the affect of H₂ emissions on CH₄ lifetime and it was said to increase by 7 to 9% in the model used in those simulations (CAM-CHEM). It is interesting that there is no discussion on CH₄ lifetimes in this paper, where one would expect CH₄ to play a role in the chemistry of the lower stratosphere. How much of the changes in HO_x chemistry in the lower stratosphere in this model are due to the increase in CH₄ tropospheric lifetime?

R: We used a fixed boundary condition for methane in these studies, but will further discuss this effect in the revised paper.

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