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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The impact of a future H_2-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

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 HOx 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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