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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Air quality simulations of wildfires in the Pacific Northwest evaluated with surface and satellite observations during the summers of 2007 and 2008" *by* F. L. Herron-Thorpe et al.

Anonymous Referee #2

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The paper reports on the modeling of wildfire impacts on the Pacific Northwest and comparison with surface and satellite observations. As such it is a useful and timely study given the increased importance of wildfires to climate and air quality in the Western U.S. This paper is quite long and detailed in its presentation, but has some central themes that run throughout. It should be shortened and made more concise and would then be suitable for publication. Also, more emphasis should be place on analyzing why there are consist discrepancies between model chemistry and observations and what that says for how models could be improved or for how, or what, future observations

need to be made. Below are some general and specific comments and suggestions along those lines.

General Comments

The modeling approach used in this work used a number of dynamics and emissions modules, the descriptions of which was largely a parade of acronyms that did not mean much to someone like myself who has not done any wildfire modeling. I would suggest a flow chart here to aid in keeping it all straight. Almost all the results have the same pattern, and so should be lumped together and summarized as such. This will save a lot of space. Exceptions to this could then be limited to the cases that stand out from this trend. What were the quantitative definitions that accompany the categories: observed but not predicted; under-predicted; predicted well; over-predicted; and predicted but not observed?

Specific Comments

Abstract- It would be nice to see a sentence or two on how the modeling could be improved to better simulate wildfires in the future.

Lines 225-226. What were the criteria for deciding that the MODIS retrievals were “high quality”?

Line 311. It is not clear what a “VFM curtain” is, please elaborate.

Lines 346-347. Often negative values, while not physically possible, tell us how precise a measurement is. I assume that “screened” means that negative values were discarded. Does this skew the comparison?

Line 420. What does the term “under-biased” mean? It is unclear to me.

Lines 427-428. What is a “matched-threshold analysis”?

Lines 555-557. This sentence doesn’t seem to make any sense, I can’t tell what is meant here.

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Lines 644-645. In all the previous section the comparison text has been AOD, NO2, CO. Don't change it here, it will just confuse matters. Conclusions and Future work: It would be nice to have the authors opinion on whether current emissions inventory are adequate for regional modeling of wildfire, or whether, and what improvements are needed. The CO data would seem the most applicable for this purpose. Does the consistent under-estimating by the model imply that the inventories are low? Does this problem with low inventories account for some of the under-estimating of particle mass, hence AOD?

Figures- All the maps (Figures 2-7, and S1-10) should show the location of MBO on at least one panel.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 11103, 2014.