This study has extended a PMCAMx parameterization made from woodstoves experiments to all biomass burning in the continental U.S. The authors work to identify the causes of differences between their base and new model runs, finding that differences in IVOC emissions are the leading cause of differences between the two model setups. The authors evaluate the model against observations and find some improvements. This paper was mainly reasonably written but there are a few sections that would benefit from more details or clarifications, as listed below. I recommend publication after these issues have been addressed.

General comments

Can the authors provide more discussion/justification for why they think using a parameterization based on woodstoves may be appropriate for all biomass burning, including wildfires that span many orders of magnitude? Are there other studies that examine the applicability/limitations of woodstoves (which usually use a small number of fuels) vs "real world" fires that can burn many different types of fuels at once?

I found it difficult to follow along what model details are (1) default, (2) part of the PMCAMx-SR, or (3) unique to this study's new parameterization. For example lines 151-154: I believe the details here are referring to situation (2) but I am not sure. I recommend going through and adding consistent statements to each that clearly indicate which situation the authors are describing (citing previous work is not terribly helpful to those not familiar with that work).

Lines 155-164: These acronyms (bbPOA, aSOA, etc) seem inconsistent. Why do the SOA-sv and SOA-iv not start w/ an 'a' for anthropogenic? Does long-range transport OA have an acronym? Similarly, what is the difference between SOA-sv and semivolatile aSOA (line 170)?

Line 172-173: What do the coauthors mean by 'chemical aging of bSOA'? Heterogeneous chemistry and subsequent losses? Please be more specific here.

Line 195: are fragmentation reactions explicitly simulated?

Line 197-198: provide a citation(s) for this statement.

Lines 241-252: please note from where these percentages are coming from (PMCAMx-SR?)

Line 267 and elsewhere: the domain average bbPOA values seem like they have limited value, since biomass burning air quality impacts tend to be regional, especially for small fires. Can the

authors provide a brief justification here as to why this is a valuable metric to include? (Regulatory reasons? Other?)

There needs to be either a brief description of the measurements used for comparison (STN, IMPROVE) in the methods section or more description where they are brought up in sect 6. Don't forget to define acronyms! Please include expected sensitivity of the measurements.

The STN and IMPROVE measurements are noted to be collected every ~3 days. How was the model to measurement comparison performed? Monthly averages of the measurements? 3 day averages of the model output? Section 6 in general does not have enough detail.

Figures/Tables
All figures: Suggest labeling the colorbars w/ $\mu g\ m^{-3}$ (or at least the right-most colorbars).

Technical comments
There are a few grammatical errors throughout; however these errors should be easily caught and fixed in the typesetting process.