

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-324

Anonymous Referee #2

Referee comment on "Projected increases in wildfires may challenge regulatory curtailment of PM_{2.5} over the eastern US by 2050" by Chandan Sarangi et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-324-RC2>, 2022

The authors applied fire-climate-ecosystem model to study the effects on increasing wildfires on summer PM_{2.5} over the US. Although some good results obtained, I am more worried about the real accuracy of the model simulations, especially in the irregular wildfires occurred in the western United States, which needs to be well verified. In addition, additional analyses are needed to make the results more robust.

Major comments:

The authors are suggested to summarize the previous studies related to PM_{2.5} changes in the US, especially those focusing on wildfires in the Introduction.

My biggest concern is the accuracy of the model simulation results, especially for the western US, which is essential for the current study. The author simply compared the model results with a single satellite remote sensing product. Note that the sampling frequency of these two is different since there are a large number of missing values in satellite products under cloudy conditions. I suggest using ground-based observations to evaluate the model simulations from different spatiotemporal scales over North America since a rich ground-based observation network of PM_{2.5} concentrations and its components are available, e.g., EPA, and IMPROVE, etc.

Another concern is that compared with summer (JJA), wildfires in recent years mostly occurred in dry autumn, e.g., California fire in 2020, which has been burning for nearly two months (September and October).

Section 3.1: Suggest comparing different satellite PM_{2.5} and component datasets over the US since many open datasets are available. In addition, it is suggested to add a validation of a single wildfire year or month, e.g., a severe and continuous wildfire occurred in western US in September 2020.

Section 3.2: It will be very interesting to take a look at the Fire Burnt Area, PM2.5 changes, and related contributions caused by wildfires in the past decade (2010-2020). Wildfires in the west of US have been burning more frequently in recent years, much higher than in the first decade.

Minor comments:

Line 172: Please spell out the JJA and check such issue throughout the paper.

Line 193: Figure 1

Lines 216-217: Again, sampling frequency is also a potential reason resulting in the differences that should be discussed.

Figure 5: Confusing. Are these temporal trends? If not, what the significant confidence level here used and how to calculate?