Review of "Improving regional air quality predictions in the Indo-Gangetic Plain – Case study of an intensive pollution episode in November 2017" by Roozitalab et al. (Paper #acp-2020-744).

The authors have made substantial changes in the revised manuscript and have addressed the reviewers' comments. There is clarity on the rationale of the study and the importance of different sources on extreme pollution episodes in the Indo-Gangetic Plain (IGP). I still have a major comment on the usage and evaluation of the model using CPCB data.

Main comments:

1. Even though on the CPCB website they mention quality control, the user has to be careful while using CPCB data. I have used CPCB data and I am sure the data is not quality controlled. I am not sure if the authors have spent time looking into the CPCB data. Quite often you will find very low values, abrupt changes in values, and high values after missing data. Most probably the CPCB data from Punjab might not have been quality checked or the filters have not been changed timely and failed to detect the high concentrations. I do not understand the logic for applying filters in the order 1,3, and 2 in the revised manuscript.

2. The authors show the changes in the statistics after applying the filters but have not implemented it in the revised manuscript. I would suggest using CPCB data after applying filters 1, 2, and 3.

3. I do not completely agree with the author's explanation about not using $PM_{2.5}$ data from CPCB stations. Using data from one location (US embassy) is not representative of the Delhi region. For MERRA-2, the Delhi region will fall into 4 MERRA-2 grids. The CPCB stations used in the study lie in 2 MERRA-2 grids. The averaged CPCB $PM_{2.5}$ concentrations within each grid can be compared with the MERRA-2 $PM_{2.5}$. Are the authors considering the model data to the nearest CPCB location and averaging for the same hours for which the observational data is available in the box and whisker plot? If more than one CPCB station lies in a WRF-Chem grid, do the authors average CPCB data before comparing it with the model?

Specific Comments:

1. Line 8: Mention the pollution episode days.
2. Line 20: "The model AODs were biased high …". Add the MB value.
3. Line 59: Add India's and WHO's standards for $PM_{2.5}$.
4. Line 69: Add India's standard for ozone.
5. Line 112: Correct $0.625^{o}\times0.5^{o}$ to $0.5^{o}\times0.625^{o}$. MERRA-2 data resolution is 0.5^{o} latitude $\times$ 0.625^{o} longitude. Make changes in other places in the manuscript.
6. Figure 2. Change the 'OBS' legend to 'MERRA-2'. Why wasn't WRF-Chem re-gridded to MERRA-2 resolution for comparison?
7. Are Figures 2e-2j hourly averaged values for the month of November? Please mention it in the caption.
8. Line 289-291: "It suggests, …" Avoid making such statements when you aren't sure about it.
9. Line 294: "These results show the need for improved estimates …". It will be worth discussing the paper by Pan et al, ACP 2020 on the usage of different biomass emissions.
10. Line 338: Replace 'was biased high' with 'simulated high $PM_{2.5}$' and 'biased low' with 'simulated low $PM_{2.5}$'. Figures 5b and 5c show the $PM_{2.5}$ concentrations.

11. Line 363: “On the other hand, it reduced the …” Add the bias increased over the rest of India.