

## ***Interactive comment on “Wintertime radiative effects of black carbon (BC) over Indo-Gangetic Plain as modelled with new BC emission inventories in CHIMERE” by Sanhita Ghosh et al.***

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Reply to Referee #1 on their previous comment and request for further comments if any

Dear Referee:

Thank you for your valuable comments and suggestions for the manuscript previously. Specific changes were made in response to the comments (please see below) and were posted in Author's response file uploaded on September 24, 2020. We also uploaded the revised manuscript with suggestions implemented on September 24, 2020.

C1

Please let us know of any of your comments further.

Referee #1: It is interesting to learn that bottom up emissions associated results near megacities are found to be 30-50% lower as compared to constrained. I am not really sure how one can generalise this. Nevertheless, I do not have any concerned at this stage accepting this paper for discussion phase of the ACP. Figure quality is very poor and difficult to visualise due to choice of colours.

Response:

Thank you for the suggestion. As per Reviewer's suggestion, figures have been improved, specifically in their color scales, to represent better the spatial features. It is also to be noted that the degree of comparison is examined with the estimated BC concentration from five simulations subjected to the same aerosol physical and chemical processes with CHIMERE. The mentioned "30-50%" correspond to BC radiative effect values. Please note that Figure 6 for radiative effects is provided only for Constrained simulation (using the BC distribution, which is found to represent well the observed values).

The BC radiative effects from the bottomup simulations (using bottom-up BC emissions, e.g., Smog-India) is found to be lower than that from Constrained simulation (using constrained BC emissions). We have evaluated the performance of the new BC emissions (bottom-up and constrained), with a state-of-the-art chemical transport model, towards their adequacy to represent the BC distribution and thereby, the climatic impacts over the IGP in the Indian subcontinent.

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C2