

Interactive comment on “Aerosol-induced high precipitation events near the Himalayan foothills” by Goutam Choudhury et al.

Anonymous Referee #2

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The work is novel and the results are interesting. I feel that the manuscript should consider the following points:

Major Comments:

- 1) L 21- you mention "net orographic precipitation". Is it any different from "orographic precipitation"? Is there something that's missing?
- 2) Is there any specific reason for selecting the MSE values only for lower levels? The proper reason should be described in the manuscript. Why not mid or upper levels? Do they also show similar pattern of variation as lower level MSE?
- 3) L 121-122- you explain that there is a hint towards a connection between the aerosol accumulation and increase in lower level MSE within and around the domain because

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of AECI effect. A comment on the cause of this connection after this point will help in better understanding.

4) First you show that AOD and MSE have similar pattern of variations and have statistically significant correlation. Then you try to verify it meteorologically by analyzing BLH, CAPE, OLR, and precipitation pattern. Why do you bring CAPE into picture? Is CAPE related to the aerosols in such scenarios? Is there any feedback process involved? Please include proper explanation in the manuscript.

5) The main inference from this study is that the aerosols enhance the "instability" and moisture supply providing the extra energy for extreme precipitation events over the Himalayan Foothills, downwind of polluted IGP. However, the title of this manuscript is "Aerosol-induced high precipitation events near the Himalayan foothills". The word "induced" can be misleading. Please change it to "enhanced" or something similar.

6) The conclusion is missing an overall explanation of AECI mechanism in context of the high precipitation events over the Himalayan region. The second point (L 182-184) describes it in very short, but it needs to be explained properly.

7) L 195- Please include a reference of Figure S1 of the supplementary.

Minor Comments:

- 1) The work by Fan et al. (2015) is the base of your present work on the Himalayan Foothills. However, the results from Fan et al. (2015) were based on modelling studies and it should be mentioned in the introduction when you discuss about AECI mechanism in L22.
- 2) L 57- "Section 3 discuss" to "Section 3 discusses"
- 3) L 63- the domain is "inspired from" to "inspired by"
- 4) L 70- "toMODIS" to "to MODIS"
- 5) L 94- "underestimation" to "the underestimation"

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- 6) L 129- "general" to "general,"
- 7) L 138- "radiative" to "the radiative"
- 8) L 158- "ample" to "an ample" & "HP event" to "the HP event"
- 9) L 166- "cell" to "cells"
- 10) L 167- "large amount" to "huge amount"
- 11) L 189- "vicinity of the domain (IGP)" to "vicinity (IGP) of the domain"

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