

## Comment on acp-2022-652

Anonymous Referee #2

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Referee comment on "Aerosol–precipitation elevation dependence over the central Himalayas using cloud-resolving WRF-Chem numerical modeling" by Pramod Adhikari and John F. Mejia, Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-652-RC2>, 2022

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### General comments:

The Himalayan ecosystem has been of immense interest to scientists today for its great role in weather pattern of the region wherein millions of people in particular the mountain farmers are directly affected from the extreme and unpredictable weather. Rainfall in particular has been drastically affected in the region. Several have studied and presented results pertaining to the connection of aerosols with rainfall pattern. This study also presents much similar results with an attempt to focus additionally on the elevation-dependent rainfall. While the focus is more on the simulated results, the selection of appropriate PBL scheme, and model evaluation vaguely presented and no discussion on altitudinal profile of aerosols in the region. How appropriate it may be to compare with the AOD of cloud-free conditions. Dealing with uncertainty is a great deal in such studies even then uncertainties arising from rain data, model evaluation, boundary conditions and PBL scheme could also have been focussed. The manuscript is well structured and well written. A few concerns are given below:

### Specific comments:

- Several references are cited. Some requires critical discussion in particular .
- In figure 13 (a), surface temperature is high and seen extended up to about 5000 m. The cloud fraction (figure 11) and precipitation (figure 8) do not seem to be in conformity.
- Table 1 needs detailed information.