Response to the Comments of Referees

Journal: Atmospheric Chemistry and Physics
Manuscript Number: egusphere-2025-2555
Title: How meteorological conditions influence aerosol-cloud interactions under different pollution regimes
Author(s): Jianqi Zhao, Xiaoyan Ma, Johannes Quaas, and Tong Yang

We thank the reviewers and the editor for providing helpful comments to improve the manuscript. We have revised the manuscript according to the comments and suggestions of the referees.
The referee's comments are reproduced (black) along with our replies (blue). All the authors have read the revised manuscript and agreed with the submission in its revised form.

Anonymous Referee #2

I thank the authors for their substantial effort in addressing the reviewers' comments and revising the manuscript. The added and revised figures, together with the expanded discussion, satisfactorily resolve my earlier concerns and lead to statistically robust results and more accurate arguments. The manuscript now makes more precise claims and appropriately acknowledges both the strengths and the limitations of the study, providing food for thought. I have only a few minor (mostly copy-editing) comments below. I recommend publication after these are addressed.

We sincerely thank you for your meticulous review of our manuscript and for the highly valuable comments and suggestions you provided. With the help of you and the other referee, we have addressed many shortcomings in the manuscript, effectively enhanced the rigor of our arguments, and significantly improved the overall quality of the paper. Regarding the new comments you raised, we have carefully checked and revised them, as detailed in the point-by-point response below.

Minor Comments

I'm not sure the frequent use of em-dashes in the text conforms to ACP style. Please confirm this during typesetting and carefully self-review the generated content.

We consulted the ACP guidelines regarding the use of em-dashes, as follows: "En dashes (–) are longer than hyphens (-) and serve numerous purposes. We recommend spaced en dashes for syntactic constructions, not em dashes (—). En dashes are used to indicate, among other things, relationships (e.g. ocean–atmosphere exchange), ranges (e.g. 12–20 months), and components of a mixture (e.g. dissolved in 5:1 glycerin–water). They are also used to link the names of two or more persons used as a modifier (e.g. Stefan–Boltzmann constant).".

Since we are currently unsure whether the em-dashes in our manuscript have been used inappropriately, we have not made any changes to them at this stage and will adjust them during the typesetting process according to the editor's requirements.

Figure 4. As per your responses, Nd, LWP, CTH, and CTT are also sampled using rigorous thresholds, right? Here you only mention precipitation. Please adjust the caption accordingly.

We have added the following note at the end of the caption for Figure 4: "The simulated data in the figure are processed using interpolation and spatio-temporal matching (the latter is applied only for comparison with satellite-retrieved data exhibiting spatio-temporal discontinuities), as detailed in Section 2.4. For each grid cell, the corresponding simulated result is displayed only when observational data is available".

Also, consider adding this statement, as in the response, to the main text (if not already included): "Specifically, a simulated value at a given grid point and time step was considered valid only if a corresponding valid observational value was available at the same location and time."

The fourth paragraph of Section 2.4 in the main text already includes this content: "Specifically, only when satellite data at a given grid cell and time is valid, the corresponding model output (at the nearest time step to the satellite data at the same grid cell) is included in the average calculation".

Figure 5. Please indicate in the caption that the quantities are study-period averages.

We have added this note to the caption of Figure 5: "… averaged over the simulation period…".