Dear Li Pan,

I had the opportunity to review the revised version of your manuscript as well as your replies to the referees' comments, and I appreciate the effort you put into addressing the comments and suggestions made by the referees.

However, after a thorough reevaluation of the revised manuscript, I regret to inform you that I believe the revisions made are not sufficient to address the concerns and issues raised by the referees. There are still several areas that require further attention and refinement.

Specifically, I would like to draw your attention to the following points that need further revision:

1. Requests for clarification or additional discussion raised by reviewers often indicate a lack of clarity of the manuscript or missing information, making it difficult for readers to follow the paper or argumentation. Therefore, additional explanations and clarifying statements should not only be provided in the author's response (e.g., RC1 comment on gravitational settling), but also be included in the revised version, except the authors consider a referee comment as inappropriate. In the latter case, a clear argument should be given in the author's response. Furthermore, a rephrasing of the initial text instead of a simple repetition often helps to increase clarity (e.g., RC1 comment on Fig. 6 and related discussion).
2. RC1 raised the point that the mass balance equation and associated processes did not mention the model's advection, diffusion, and physical processes. In your reply you wrote: "Although aerosols are affected by advection, diffusion, and physical processes, these processes are not specifically considered in the equations because they do not cause aerosols to leave/enter the system or change aerosol species." Unfortunately, this statement is not necessarily valid for a numerical model as the numerical schemes applied to solve advection, diffusion and other processes are not necessarily mass conserving, i.e., numerical artefacts might indeed lead to an artificial gain or loss of aerosol mass in the model, and this is exactly the referee's point. The same holds for the rather low model top. So to properly address this issue it needs to be shown and discussed how the model's advection, diffusion, physical processes and model top affect the aerosol mass balance, either by appropriate model experiments or by adding relevant references.
3. Both referees mentioned the lack of comparison / verification of your model results with observational data. As response to this point you added a short paragraph (lines 40-48) to the revised manuscript, listing a number of other studies which compared GEFS-aerosols with observational data. However, this paragraph still lacks a detailed discussion / summary of the outcome of the cited studies. Overall, the presentation of your data and results needs a more comprehensive discussion including results of relevant studies in the field.
4. RC1 suggested to show observations for sea salt near sea surface instead of AOD (Fig. 2). Such a figure has been included in the author's response to RC1, although without any discussion, but not in the revised version of the manuscript. Why? Please explain. Furthermore, I would suggest to add a figure showing the difference between GEFS and MERRA2. This would clearly facilitate the comparison.

5. RC1 suggested to show separate profile over land and sea in Fig. 10 and add some more discussion. I do not see any of this in the revised version, but also no related statement in the authors' response. Furthermore, you mentioned that for the evaluation of Fig. 11 the HIPPO experiment and CALIOP observations were used. However, it remains unclear to me how this evaluation has been done as I do not see any observational data plotted in Fig. 10 or 11.
6. In your response to RC1, last point related to L350-365, you provided the following paragraph, which is obviously copied from the model description section of your manuscript: "In GEFS-Aerosols: "The GOCART dry deposition protocol [Chin et al., 2000] was used for GEFS-Aerosols…." " How are these technical details related to the referee's comment? Please clarify and put your response into context. Furthermore, it would be beneficial to add a short statement to your paper that measurements of aerosol deposition fluxes are extremely challenging and therefore rather limited.

I understand that revising a manuscript can be a time-consuming process, and I sincerely appreciate your dedication to your research. However, to ensure that your work meets the high standards of our journal and contributes significantly to the field, I kindly request that you carefully address the issues mentioned above and **to revise your manuscript accordingly**. The list above is not exclusive, so please reconsider all points mentioned in the initial reviews, including RC2.

If you have any questions or need clarification on any of the points raised, please do not hesitate to contact me.

I look forward to receiving the next revised version of your manuscript.

Sincerely,

Andrea Stenke