

Dear Editors and Reviewers,

Thank you very much for your detailed and constructive comments and suggestions for our manuscript. We found the comments very helpful for improving our manuscript and have revised the manuscript accordingly.

Below are the major revisions that we have made:

1. We have used new versions of MODIS data (i.e., STC-MODSCAG/STC-MODDRFS and SPIReS) as the benchmarking datasets covering the entire Tibetan Plateau. Following the suggestion of Reviewers 1 and 2, we have added a comparison between the original (ELM_Control) and new versions (ELM_New) of ELM and MODIS data.
2. We have performed additional analysis of the impacts of snow grain shape and mixing state of LAP-snow on energy budget and water cycle and stressed the importance of topographic effects.
3. We have added more details about the variable definitions, model assumptions on snow grain size and LAP concentrations, statistical methods and metrics, remote sensing data, experimental configurations, and mechanistic explanations on the results.
4. We have improved the figure quality by using discrete colors and different colors for the pixels with no snow cover and modified the figure captions with more details.

Timbo Stillinger has put in a lot of effort to generate the new version of SPIReS dataset and helped improve the manuscript, so we have added him as a coauthor; all coauthors agreed to this addition. The itemized responses to the comments and suggestions from the editors and reviewers are provided below in blue font. We hope our responses address the concerns raised in the last round of review and look forward to your decision on the publication of our manuscript.

Best regards,

Dalei Hao (on the behalf of all authors)

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