Answer to Anonymous Reviewer 1.

We would like to thank the reviewer for his thorough assessment of our work and the feedback. We will accompany the adjusted changes and will provide some comments below. The final individual remarks to every point will be published together with the revisions.

This study investigates the impact of temporal variability in climatic forcing to drive a snowpack model over Greenland. The idea is that for many time periods of interest, climatic datasets of daily or higher resolution are not available, but are needed to drive snowpack models. Therefore different strategies may be needed to obtain consistent results using this sparse forcing with a model that is tuned based on high-resolution climatic data. It is a valuable study that should be published with only minor revisions.

The experimental setup is interesting, and serves to demonstrate the importance of accounting for variability in the climatic forcing. However, I get the impression that a lot of details are provided for the different ordering of years (Figs. 1 & 2, 28 panels each), when in fact, it is determined that the shuffling of the years does very little to change the esimated SMB in the end. I would recommend relegating all of these panels to an Appendix, and rather show two representative cases of the forcing and resulting SMB in one figure. This allows you to make the point, and if the reader is interested they can check the other cases in the Appendix. But importantly, then it brings the focus more to your main point, which is the intra-annual variability.

Thank you for this remark. We will try to streamline and shorten the section about the ordering of the years, nevertheless, this was hardly ever investigated for different models and it is a key part of the study that we think is necessary before looking in the removal of intra-annual variability by using climatologies. Fig 1&2 will be adjusted to accompany fewer panels in the main manuscript and potentially moving the rest to an appendix.

With regards to the intra-annual forcing, the findings here are quite valuable. It is clear that if a model is tuned with historical daily input fields, forcing it by climatological averages of daily input fields can result in strong biases in the simulated SMB. The study nicely diagnoses that precip is the key factor here, while climatological averages of other variables do not increase the bias much. The proposed method to reduce this bias is also valuable and nicely tested.

However, I am less convinced by the idea that imposing a little bit of precipitation each day is problematic. By using daily forcing, the model is already being driven by forcing that is "not realistic", since it does not capture some of the strongest variability in the fields - namely the diurnal cycle. And yet, it can be tuned to do a good job against an RCM.

We would like to thank the reviewer for the appreciation of our work. Within the given albedo routines, we found daily precipitation to be an issue. It is possible that the effects are reduced for models that are tuned for climatological data. We accept that for the diurnal cycle qualitatively similar results as for the inter-annual variability on different temporal scales are to be expected. Resolving the diurnal cycle – though desirable comprises with our wish for numerical efficiency. Additionally, BESSI uses relatively large boxes of around one meter at the top, which would dampen any diurnal cycle imprint on the snowpack anyway.

My suspicion is that if BESSI were tuned against the climatological SMB of RACMO while driven by climatological-average variables, it would still be able to produce a reasonable estimate of climatological SMB. Based on the analysis given here, one could guess that the optimal albedo

In principle we can tune BESSI for the climatological mass balance of RACMO for example. Though this is part of the multi-objective optimization conducted, in this study we did not tune against only the climatological mass balance. The albedo parameters are lower in case of tuning for climatological SMB, but the effect is less than expected as nevertheless within our tuning we only allow for a single albedo value for fresh snow over the entire ice sheet. We will look into detail if it is possible to also run the model with a calibration based on climatology.

Minor comments:
L7: "However, using daily averages as forcing ..." <= This could use some clarification. What kind of data were you using before, that were not daily averages? I.e., what are you contrasting to here?
L43: weather => whether
L45: Global Circulation => General Circulation
L48: prior => previously
L70: We use => As forcing, we use
L83: (rows) => (rows in Fig. 1)
L134: where found => were found
L156: I note here that the SMB changes drastically when a frequency of 30 days is imposed - SMB goes down to 87 kg/m2/yr from 255 kg/m2/yr, so it seems you can get any SMB you want bracketing the 'right' value using historical forcing. So, it is not clear why the bias remains at "10-25%" (L165) using this approach.
We will make this clear as 10-25% is a result of the natural based forcing not on the regular frequencies of 2/4/8/15/30 days.
L166: decreases with precipitation frequency => decreases with decreasing precipitation frequency [right?]
yes
L195: physical more => physically
Fig. 8: The meaning of this figure is not really clear to me. As I'm not really sure what is being shown, I cannot offer suggestions for improvement.
We will improve the figure and figure description
L212: physical not reasonable => not physically reasonable