

Answer to Anonymous Referee 2

We would like to thank the referee for his comments and feedback on the study. Please find the individual remarks below.

This is an original and interesting paper on the effect of climate variability at different timescales (daily to monthly) on the Greenland Ice Sheet surface mass balance, and has potentially important implications for the way that climate forcing data should be used in SMB simulations, as there can be quite large differences (up to several tens of percent) depending on the type and time resolution of forcing data used. I have a few minor comments for the authors' consideration, following which I recommend publication.

ERA-5 data are available back to 1950 and are based on a superior model. Why was the older and shorter ERA-I dataset used?

We are currently using ERA-5. However this study is based on simulations and a calibration of BESSI that stems from a previous paper and therefore uses ERA-interim. We do not expect our results to critically depend on this choice.

p.3, line 82 "Temporal continuity is only broken at the year break with arguably negligible consequences". Has this been checked for days near the beginning or end of the year, as weather conditions may be very inconsistent with different years spliced together?

The temporal continuity is broken due to the set-up. It has no effect on the numerical stability on the snow model, as also SMB response is limited we see negligible consequences. This may be a bigger issue if a similar study is to be conducted for the southern hemisphere as more feedbacks are active during the summer with for example the ice-albedo feedback.

p.8, l.133 "...which is in line with the low effect the dew point change has (fig. 4 k, l)" - it looks like there is quite a large change in the means of dew point relative to other climate variables, so can this point be clarified?

The dewpoint has the least impact if only its climatological average value is used to force BESSI (fig 4 l). We will clarify this in the revised version of our manuscript.

Re. Figure 4 caption comment "If transient variables are taken individually the precipitation lowers SMB the most", I don't fully follow this. To me the means look quite close for panels e & f for precipitation. Other climate variables have their respective climatological and transient forcings affecting their means by typically greater amounts.

Also, the labels "all climatological except" and "all transient except" at the top of Fig. 4 seem unclear and should be clarified.

We will improve the caption and labeling of figure 4. We will furthermore elaborate which graphs should be compared as the statement about precipitation is not from comparing the left and the right side, but rather the top with its respective line (a-e and b-f) in case of precipitation for example. In either case e and f deviate the most from a/b of all the individual variables.