

A Review of « *Brief communication: Surface energy balance differences over Greenland between ERA5 and ERA-Interim* » by Krebs-Kanzow et al.

Overview and general comment

Authors present here a comparison of a part of surface energy balance components between both ERA-Interim and ERA5 reanalysis with the aim to adapt SMB calculation by EBMs to the highlighted differences. Originality of the comparison come from the focus on the area below 2000m of the ice sheet to better compare the datasets over the ablation area, and the use of a temperature lapse rate to correct the 2m-temperature of differences in surface elevation when interpolated on a common 1km-grid. The comparison is clear, straightforward and well-written.

Major Comments

A complete analyse of the surface energy budget components (longwave radiation too) should be presented, at least in supplements if it doesn't add significant conclusions.

Emissivity is calculated on the respective grid of both reanalysis, which implies that when downscale to 1km-grid, there is no correction relative to the elevation differences whereas ϵ is depending on the temperature. It would help to have an idea of this influence as you are considering a lapse rate to correct the temperature.

To estimate different lapse rates to correct temperature of surface elevation differences, authors calculate local lapse rates for each grid. Why don't use directly these lapse rates to correct temperature? Depending of the results, this could be add in the comparison (Figure S5) in the supplements.

AWS data in ablation area are used to compare both reanalysis. These observations are sometimes biased (instrument or sensors malfunction,...). Are these data preprocessed before used for the comparison? If no, this could influence the realised evaluation.

In Figure 3 and associated comments in the main text, please precise if averaged variable are obtained from the respective original grid of the reanalysis, or if it's calculated after interpolation? (Please precise in the main text and in the caption.) In both case, is the spatial resolution differences could explain part of differences in the 4 variables?

There are too few assumptions to understand and explain differences between both datasets. This could help to adapt EBMs models.

Minor Comments

P1, L11-12 : “[...] The associated reduction in Greenland Ice Sheet's surface mass balance (SMB) leads to more runoff [...] ”: SMB does not lead to more runoff, but runoff leads to more negative SMB.

P1, L13: EBMs = Energy balance models and not surface mass balance models. Please clarify used acronyms.

P2, L24: ERA5 start at least in 1950. This had to be corrected everywhere else.

P2, L26: Precise SMB derived from EBMs.

P2, L54-55: Two times respective and respectively in the same sentence.

P3, L70: 1°C is inconsistent with the use of kelvin everywhere else (same in figure 1, 3 and similar figures in the supplements).

P3, L84: Please precise that the bias of 0.74 is in summer.

P4, Figure 1: Color scales are not symmetrical.

P4, Figure 2: unit is missing in subplot 2.

P6, Figure 3: I suggest to also add comparison for other surface elevation classes, at least in supplements.