

Review of

Assessing Bare Ice Albedo Simulated by MAR over the Greenland Ice Sheet (2000-2021) and Implications for Meltwater Production Estimates

by Antwerpen et al.

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General comments:

The paper presents results from a comparison of the bare ice extent and albedo simulated by the regional climate model MAR and derived from MODIS satellite imagery. Additionally, an energy balance model is used to estimate melt water production. Authors limit their investigations to the GrIS below 70°N in the time period 2000-2021.

Overall, the differences between model results and observations are quite substantial. The albedo parameterization scheme in MAR is identified as a major source of these differences. It is underlined that the impact of light-absorbing constituents in ice and accumulated surface melt water on the GrIS is not properly accounted for in the albedo parameterization scheme.

As discussed in the paper, already earlier evaluations of MAR results pointed to these deficiencies. Hence, what can we really learn from the paper presented here? What is the benefit for the modelling community?

I miss sensitivity studies with respect to the albedo parameterization scheme and it would have been very helpful to implement and test at least simple schemes that account for LAC and melt water signatures on the ice sheet. To know the impact of different parameterization schemes on bare ice extent and melt water production and a comparison to observations would be really interesting and very helpful.

The subject is appropriate for EGU sphere.

The title reflects the content of the paper, the abstract provides a complete summary and the paper is generally well structured.

The review of existing published work is good, the number of references is appropriate.

Overall, figures and tables are clear and their captions self-explanatory.

The use of the English language is very good.