

Interactive comment on “Comparison of surface mass balance of ice sheets simulated by positive-degree-day method and energy balance approach” by Eva Bauer and Andrey Ganopolski

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Thanks for pointing out the issue of resolution. Certainly resolution matters, in particular of the ice sheets, when modeling the ice sheet evolution. The present study is undertaken with a widely tested model version which is designed for long-term transient simulations of the climate evolution during the Quaternary. This Earth system model of intermediate complexity includes fully interactively coupled models for the atmosphere, the ocean, the vegetation and the ice sheets of the NH. Here transient simulations are used to contrast the SEB approach and PDD method rather than using equilibrium simulations. The simulations show that the two different descriptions of the ablation process lead to very different evolutions of the ice volume. We evaluated the

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simulated ice volume changes against global sea level data. To our knowledge, data for evaluating the size of the ablation area over the time period of the glacial cycle are not available. Likely, having more observational data, the model can be developed further and processes can be described in more detail and with finer resolution. So, view this study simply as an exercise to test descriptions of the ablation process which meet basic requirements for the simulation of glacial-interglacial climate changes. This study is done with a type of forerunner model as a contribution for developing a more detailed and internally consistent Earth system model.

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