



Eemian Greenland ice sheet simulated with a higher-order model shows strong sensitivity to SMB forcing

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The Greenland ice sheet (GrIS) contributes increasingly to global sea level rise and its past history is a valuable reference for future sea level projections. We present ice sheet simulations for the Eemian interglacial period (approx. 125,000 years ago), the period with the most recent warmer-than-present summer climate over Greenland. The evolution of the Eemian GrIS is simulated with a 3D higher-order ice sheet model forced with surface mass balance (SMB) derived from regional climate simulations. Sensitivity experiments with different SMB, basal friction, and ice flow approximations are discussed. We find that the SMB forcing is the controlling factor setting the Eemian minimum ice volume, emphasizing the importance of a reliable SMB model. Our results suggest that when estimating the contribution from the GrIS to sea level rise during warm periods, such as the Eemian interglacial period, the SMB forcing is more important than the representation of ice flow.