Exploring the Greenland Ice Sheet's response to future atmospheric warming-threshold scenarios over 200 years

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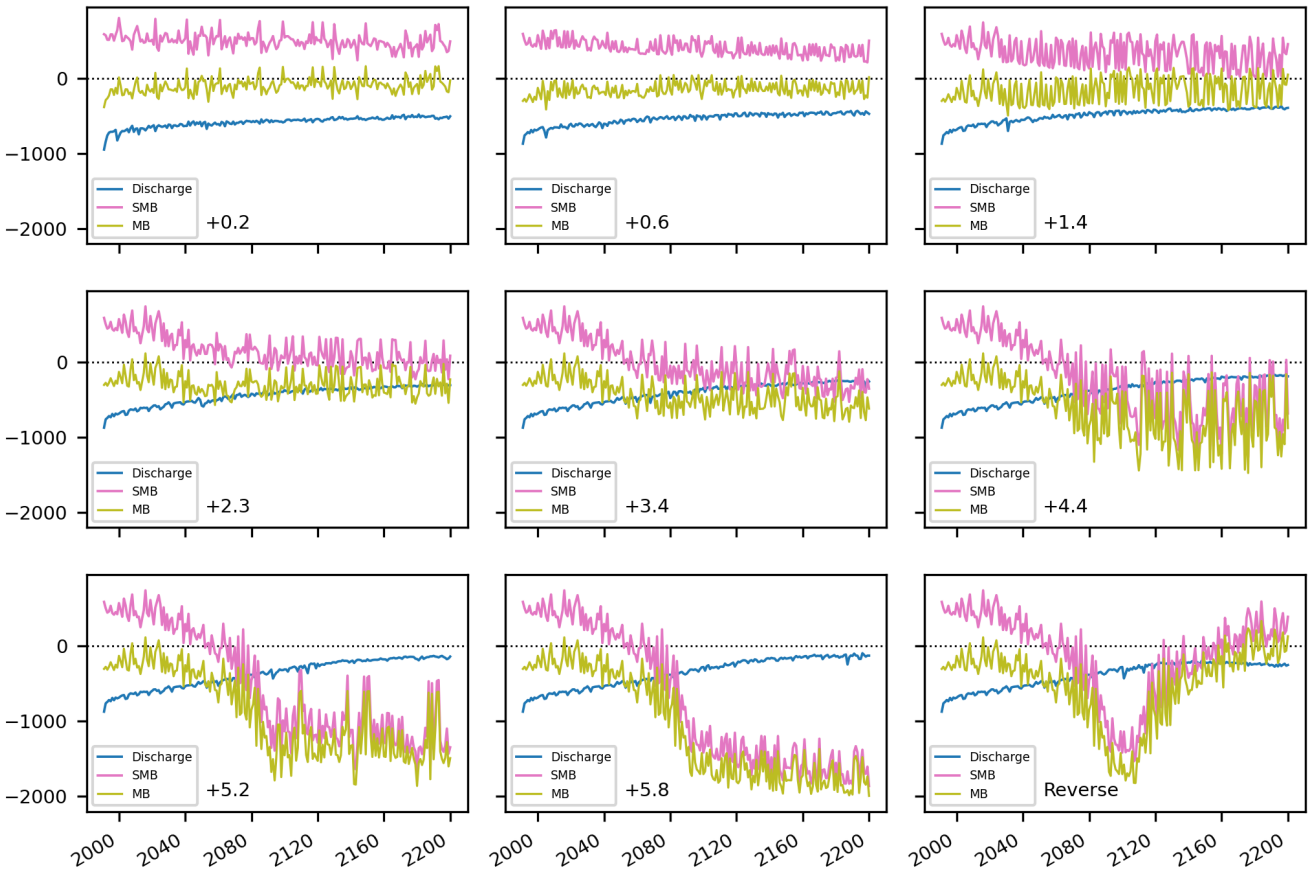

Figure S1. Mass balance (MB, Gt/yr) components (discharge and SMB) for experiments +0.2 to +5.8, and the reverse experiment.

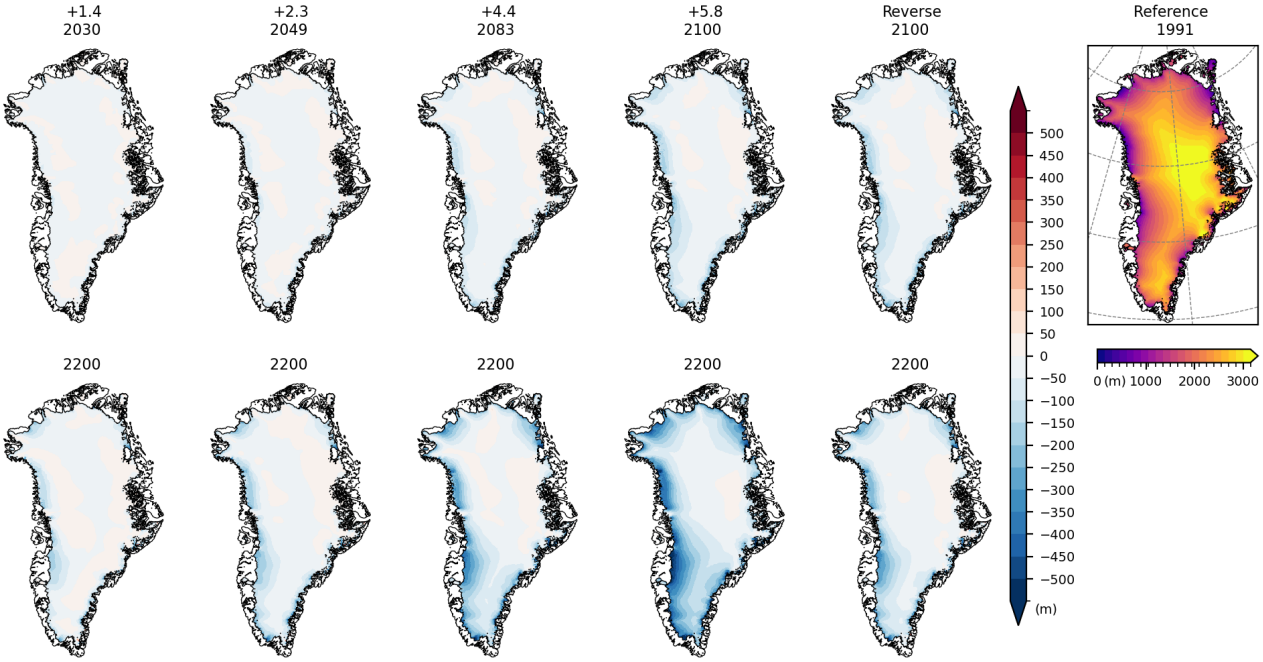

Figure S2. Surface elevation differences (m) with the reference (1991) on their respective evolutive ice masks. The first line exhibits elevations of the last year before the stabilization of the climate of +1.4, +2.3, +4.4, and +5.8°C, as well as before reversing the climate for the reverse experiment. The second line exhibits surface elevation of the last year of the same experiments (2200). The right panel is the surface elevation at the beginning of each experiment (1991).

Time Period	Global Warming (°C) in CESM2	Greenland Warming at 600hPa (°C)
1961-1990	+0.2	+0.00
1995-2004	+0.6	+1.04
2010-2019	+1.0	+1.51
2021-2030	+1.4	+2.04
2040-2049	+2.3	+2.98
2058-2067	+3.4	+4.04
2074-2083	+4.4	+5.00
2083-2092	+5.2	+5.96
2091-2100	+5.8	+6.85

Table S1. Global Warming in CESM2 since the preindustrail period and corresponding regional Greenland warming (65-16.2°W; 60.8-82.5°N following Delhasse et al. (2024) at 600hPa) since 1961-1990 used to define our experiments.

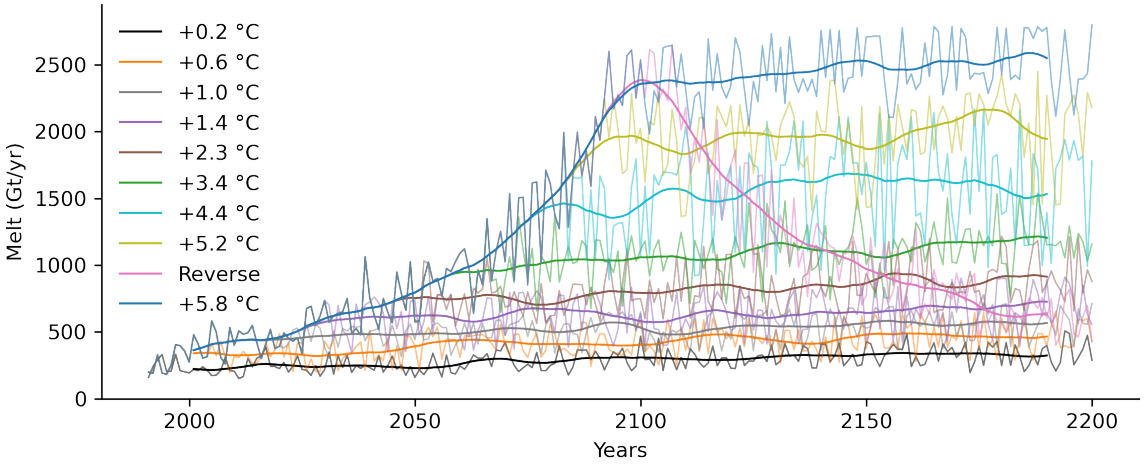

Figure S3. Projected meltwater production (Gt/yr) simulated by MAR-PISM driven by different climate warmings of CESM2. The thick lines represent the 21-year running mean.

References

Delhasse, A., Beckmann, J., Kittel, C., and Fettweis, X.: Coupling MAR (Modèle Atmosphérique Régional) with PISM (Parallel Ice Sheet Model) mitigates the positive melt–elevation feedback, The Cryosphere, 18, 633–651, 2024.