



Supplement of

Brief communication: Reduction in the future Greenland ice sheet surface melt with the help of solar geoengineering

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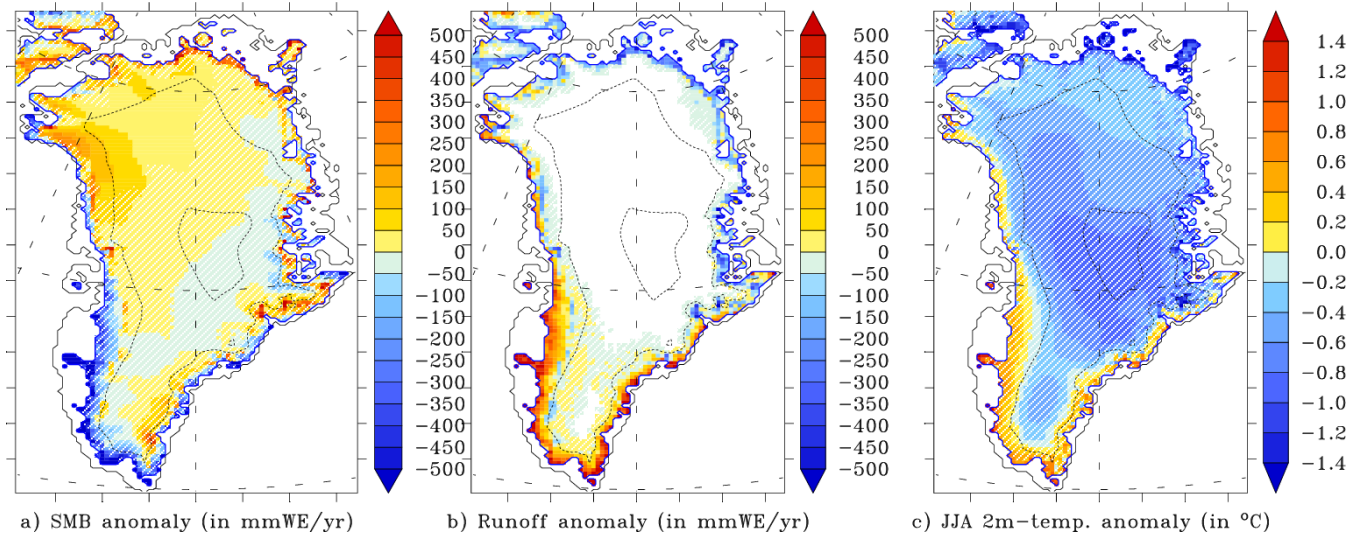


Fig. S1: a) Annual SMB (in mmWE/yr), b) meltwater runoff and c) summer 2m-temperature anomaly (in °C) of MAR forced by CNRM-ESM2-1 vs MAR forced by ERA5 over 1981-2010. The anomalies lower than the 1981-2010 interannual variability are hatched and then considered as not statistically significant according to Fettweis et al. (2013 and 2017). The ice-sheet margins are represented by a blue line.

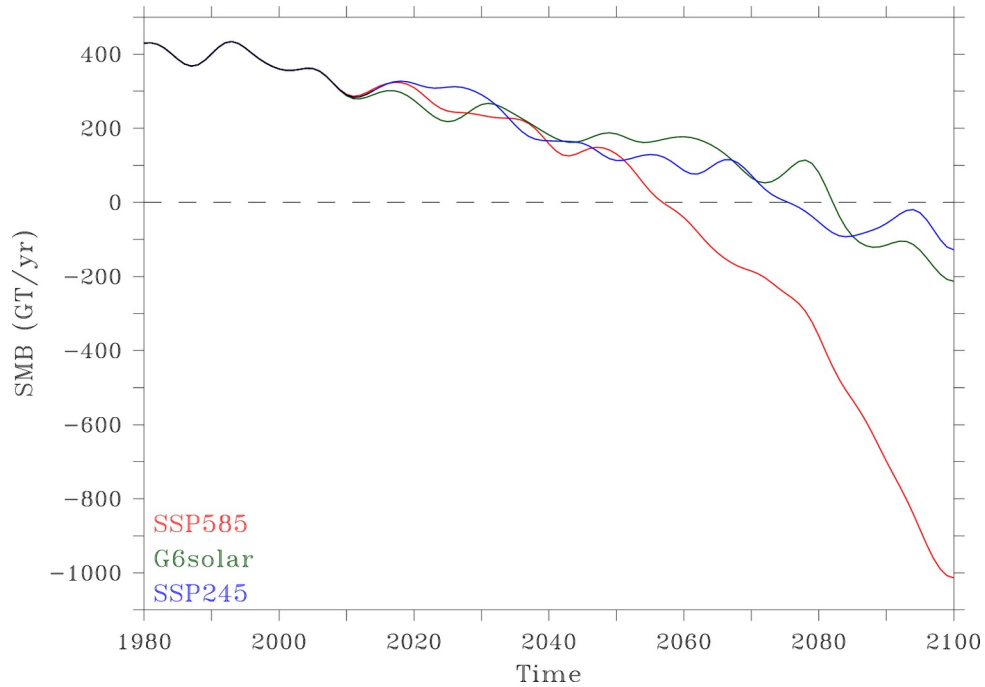


Fig. S2: Time series of the GrIS SMB in GT/yr (SMB anomalies are shown in Fig. 1b).

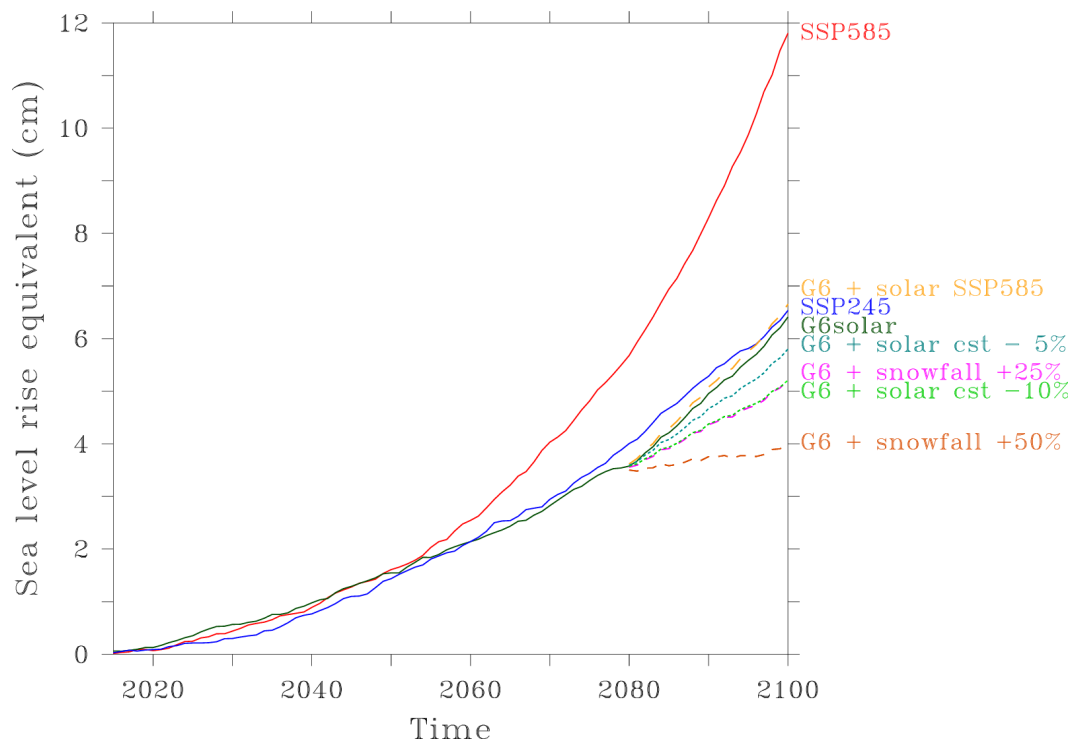


Fig. S3: Same as Fig 2 but from 2010.

	SMB (GT/yr)	Snowfall	Runoff	Meltwater	JJA T2m (°C)	JJA SWD (W/m ²)
MAR_ERA5	369±101	633±57	293±83	464±106	-7.8±0.9	282±6
MAR_CNRM-ESM2	381±104	650±66	308±72	452±95	-8.3±0.8	282±6

Table S1: Mean integrated values and standard deviation (i.e. the interannual variability) around this mean of SMB, snowfall, runoff, meltwater (in GT/yr) as well as mean summer (JJA) temperature (in °C) and summer solar radiation (in W/m²) as simulated by MAR forced by ERA5 and CNRM-ESM2-1 over 1981-2010.

G6 + solar SSP585	G6solar with the “fixed” solar constant of SSP585 in the MAR radiative scheme
G6 + solar cst - x %	G6solar with the solar constant of G6solar with an additional decrease of x % in the MAR radiative scheme
G6 + snowfall + x %	G6solar with the solar constant of G6solar with an artificial snowfall increase of x % as input of the MAR snow module

Table S2: List of the sensitivity experiments shown in Fig 2.