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Link between the North Atlantic Oscillation and the surface mass balance components of the Greenland Ice Sheet under preindustrial and last interglacial climates: a study with a coupled global circulation model

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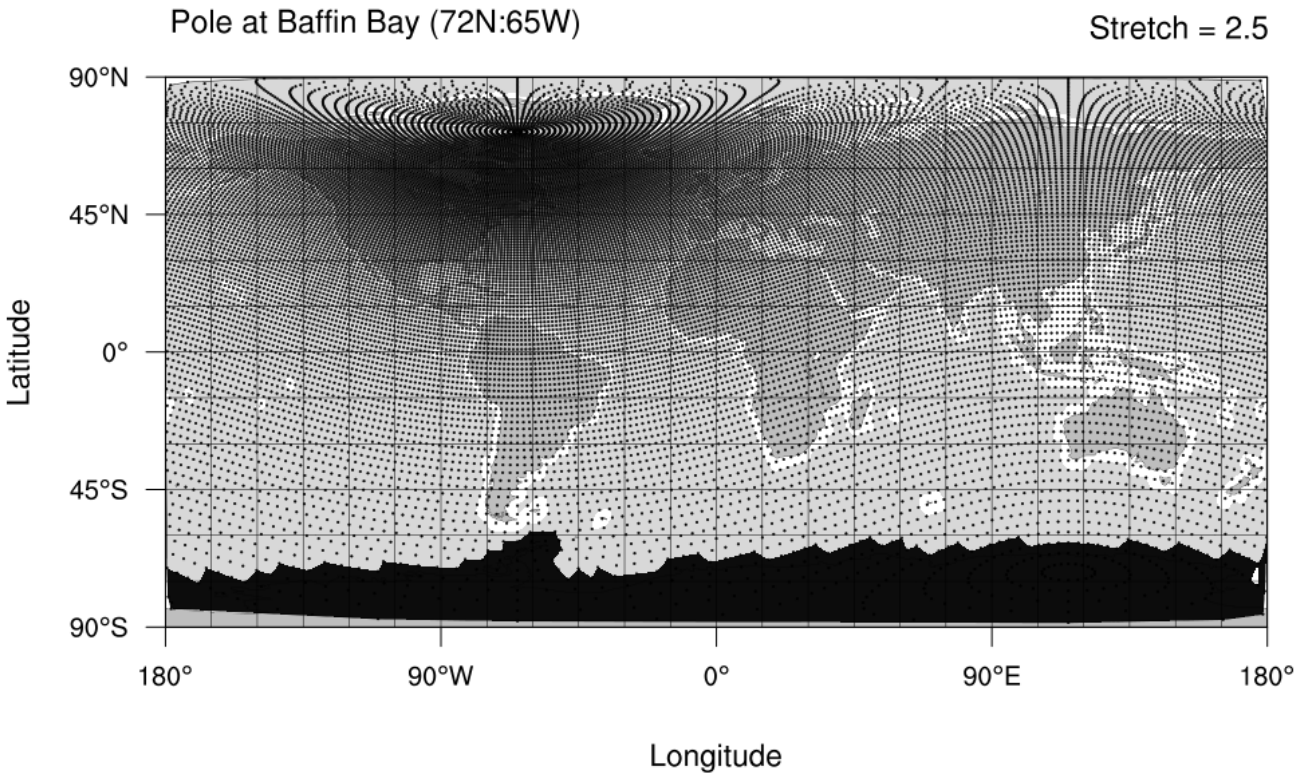

Fig. S1. The ARPEGE-Climat horizontal grid with its north pole tilted to Baffin Bay at 72N:65W and a stretch factor of 2.5 following the spherical harmonic-based functions on a transformed sphere (Courtier and Geleyn, 1988).

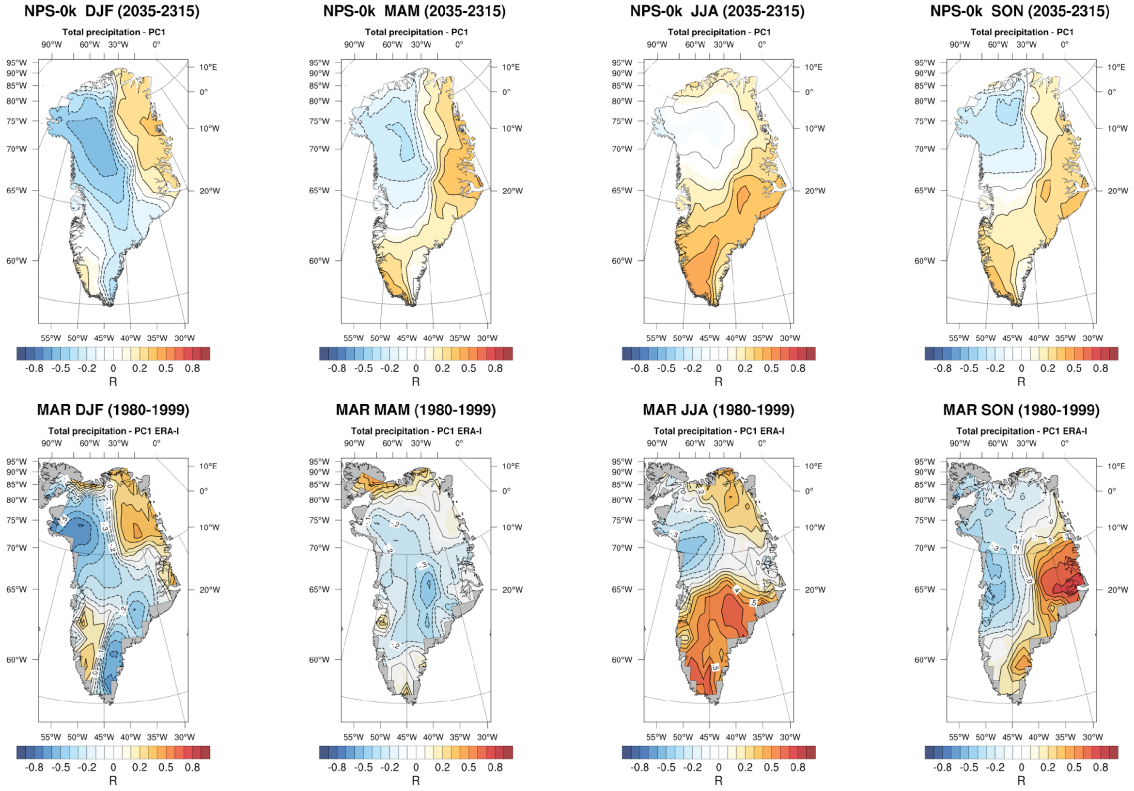

Fig. S2. Seasonal 2D correlations of total precipitation with the NAO index defined as the normalized leading PC derived from an EOF analysis of SLP over the extra-tropical North Atlantic (20°N–70°N; 90°W–40°E). (top) NPS-0k (years 1-280) simulation. (bottom) Correlation of total precipitation simulated by MAR with the NAO index computed from ERA-Interim (1980-1999).

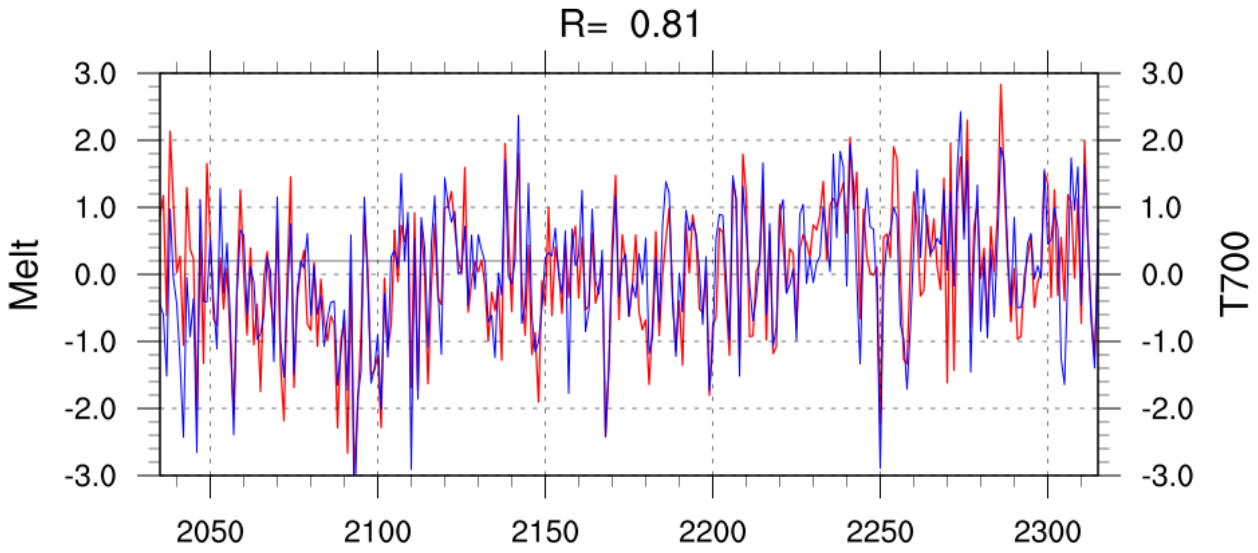

Fig. S3. Normalized time series of the annual GrIS melt simulated by NPS-0k (in red) and of the area-averaged temperature at 700 hPa (T700) in JJA over the latitude-longitude box (20°W: 70°W; 60°N:85°N) according to Fettweis et al. (2013a). This result suggests that variations of T700 simulated by NPS-0k could be chosen as a proxy for variations of surface melt. The correlation (R=0.81) obtained with CNRM-CM5.2 (years 1-280) is slightly lower than that obtained between the annual GrIS melt amount simulated by MAR over 1993-2012 and the JJA T700 from the NCEP-NCAR reanalysis (R=0.93).

Table S1. Seasonal (DJF and JJA) correlations between detrended accumulation, melting and SMB averaged on GrIS and the NAO index for MAR over 1980-1999 and NPS under all climates (years 1-280). The SMB and NAO time series are plotted in Figs. S4 (DJF) and S5 (JJA).

	Accumulation		Melting		SMB	
	DJF	JJA	DJF	JJA	DJF	JJA
MAR	-0.21	0.54	-	0.37	-0.21	0.40
NPS-0k	-0.22	0.48	-	0.51	-0.22	0.62
NPS-115k	-0.11	0.43	-	0.56	-0.11	0.62
NPS-130k	-0.04	0.48	-	0.43	-0.04	0.56

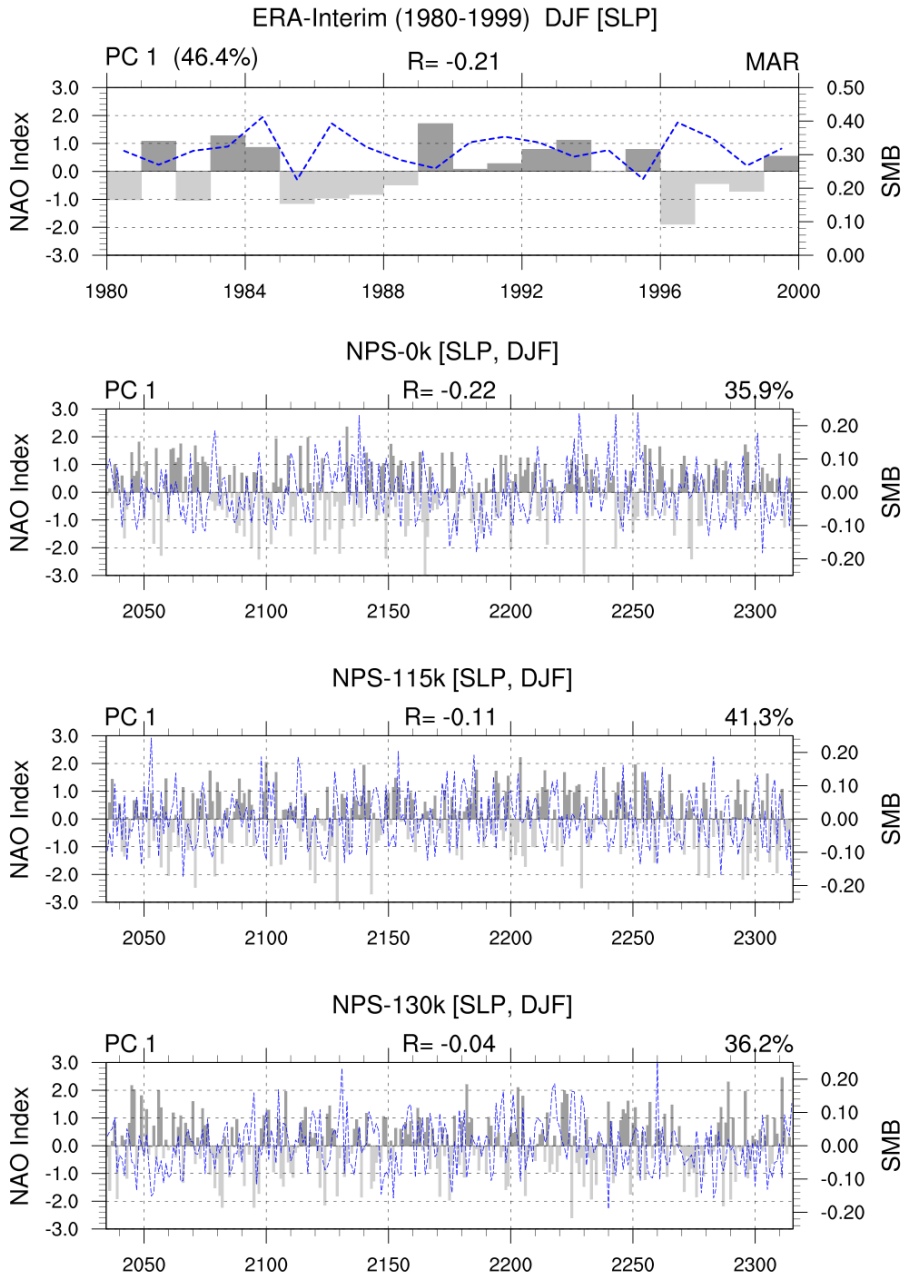

Fig. S4. (grey bars) Time series of the NAO index and (dashed lines) averaged SMB over Greenland for winter (DJF).

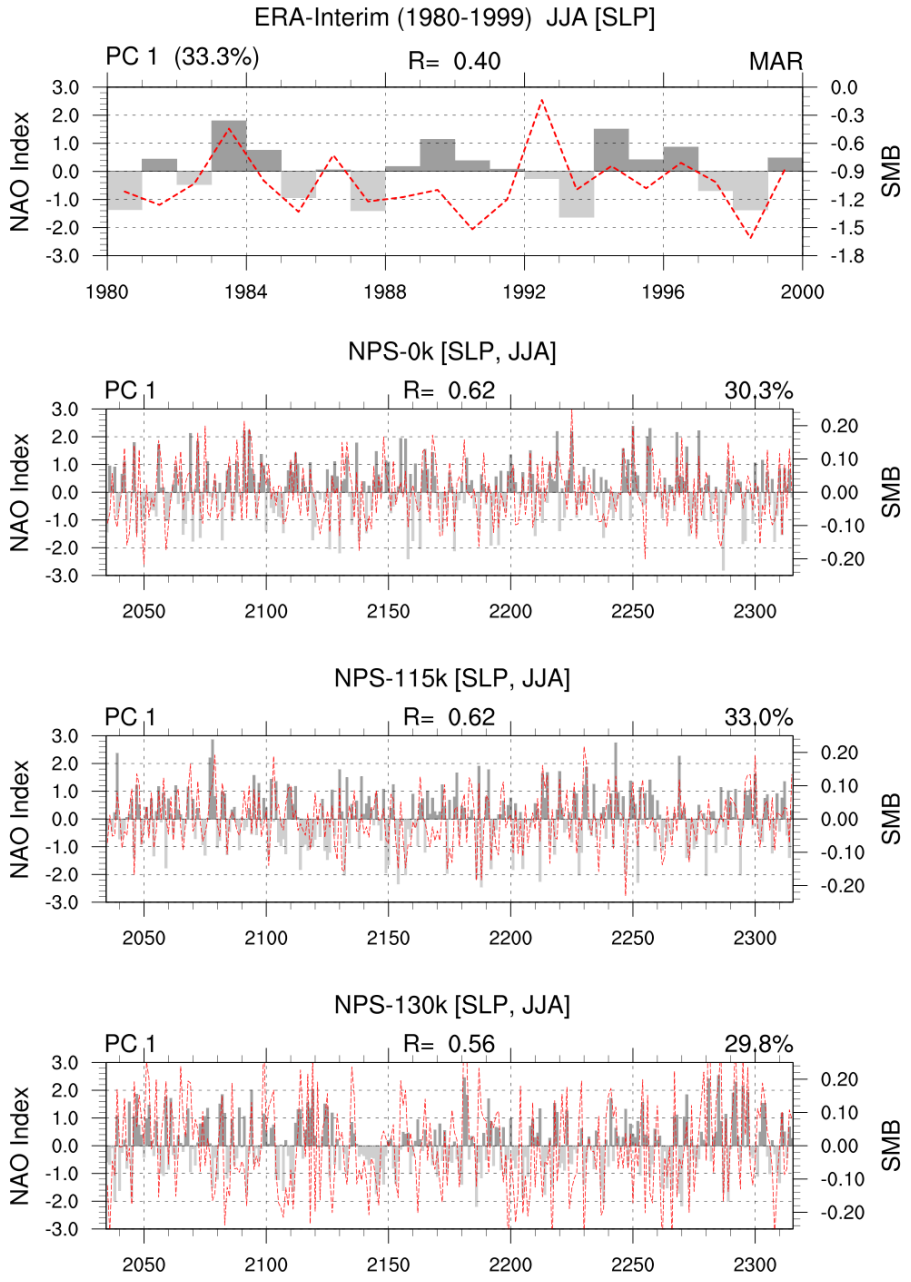

Fig. S5. Same as Fig. S4, but for summer (JJA).