Supplementary Information

Investigating similarities and differences of the penultimate and last glacial terminations with a coupled ice sheet – climate model

Aurélien Quiquet[1] and Didier M. Roche[1,2]

[1]Laboratoire des Sciences du Climat et de l'Environnement, LSCE/IPSL, CEA-CNRS-UVSQ, Université Paris-Saclay, F-91191 Gif-sur-Yvette, France
[2]Earth and Climate Cluster, Faculty of Earth and Life Sciences, Vrije Universiteit Amsterdam, Amsterdam, the Netherlands

Correspondence: A. Quiquet (aurelien.quiquet@lsce.ipsl.fr)

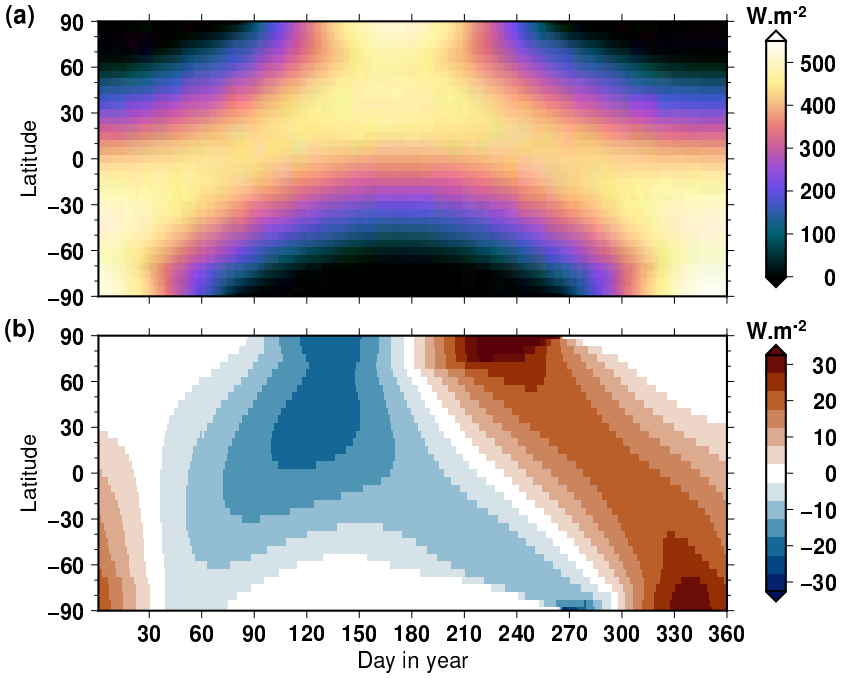

Figure S1. Insolation for the glacial spinup experiments. Daily insolation at 21 kaBP for the LGM experiment **(a)**. Daily anomalies at 140 kaBP for the PGM experiment, with respect to the LGM **(b)**.

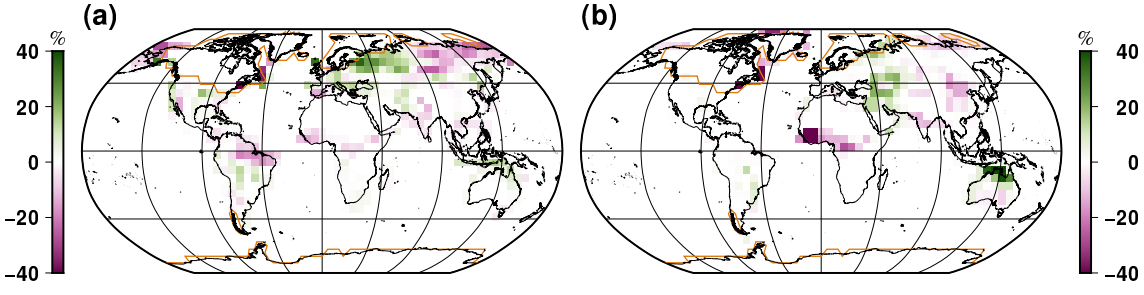

Figure S2. Vegetation fraction for glacial initial conditions. **(a)**: Tree fraction at 26 ka. **(b)**: Tree fraction at 142 ka. **(c)**: Grass fraction at 26 ka. **(d)**: Grass fraction at 142 ka. The orange line is the extent of the ice sheets.

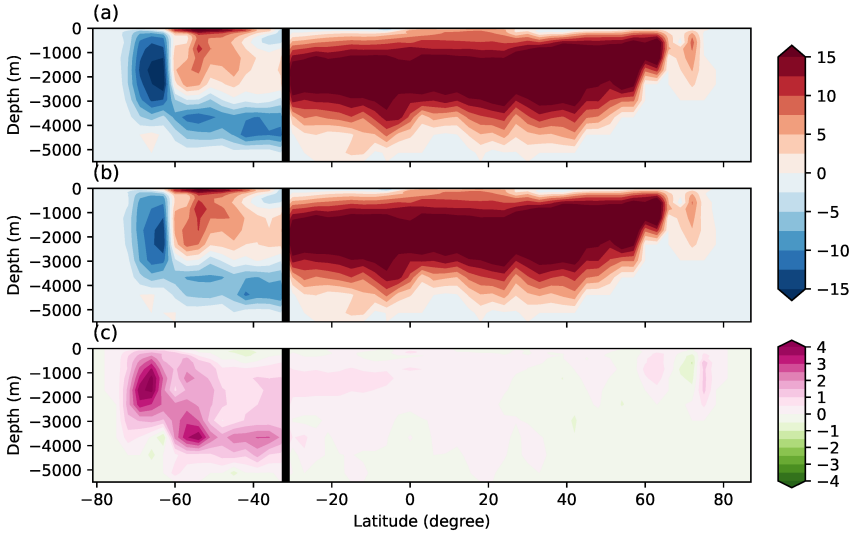

Figure S3. Simulated global (from 81 to 33 °South) and Atlantic stream function (in Sverdrup). At the LGM (21 kaBP, **a**), at the PGM (142 kaBP, **b**) and PGM anomaly with respect to the LGM (**c**).

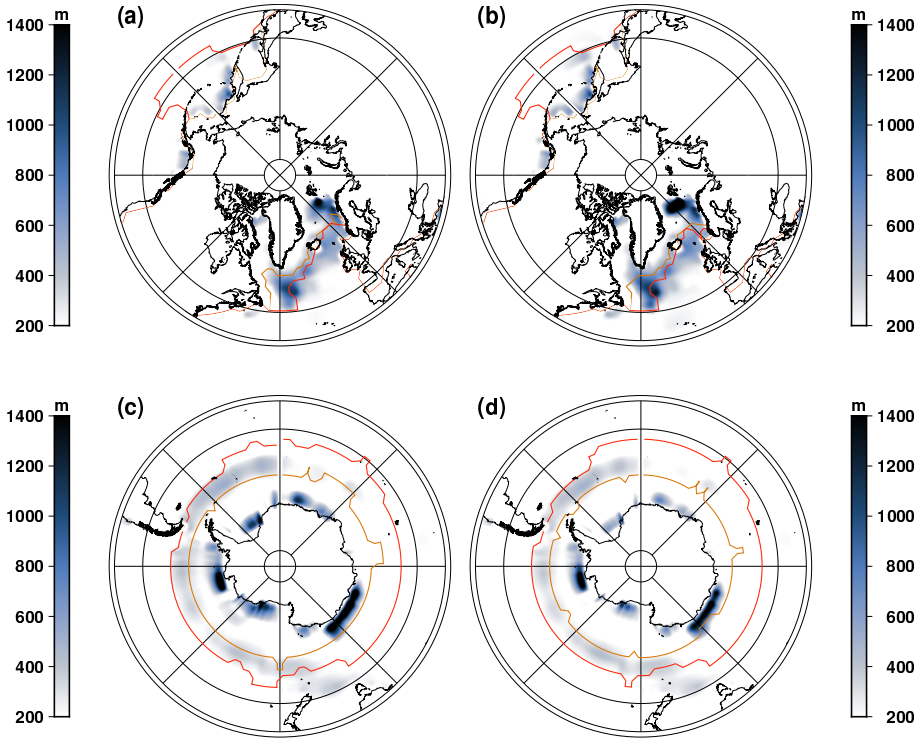

Figure S4. Mixed layer depth for glacial initial conditions. **(a)**: Northern Hemisphere winter (DJF) at 26 ka. **(b)**: Northern Hemisphere winter (DJF) 142 ka. **(c)**: Southern Hemisphere winter (JJA) at 26 ka. **(d)**: Southern Hemisphere winter (JJA) at 142 ka. The red line, respectively orange, stands for the maximal, respectively minimal, sea ice extent.

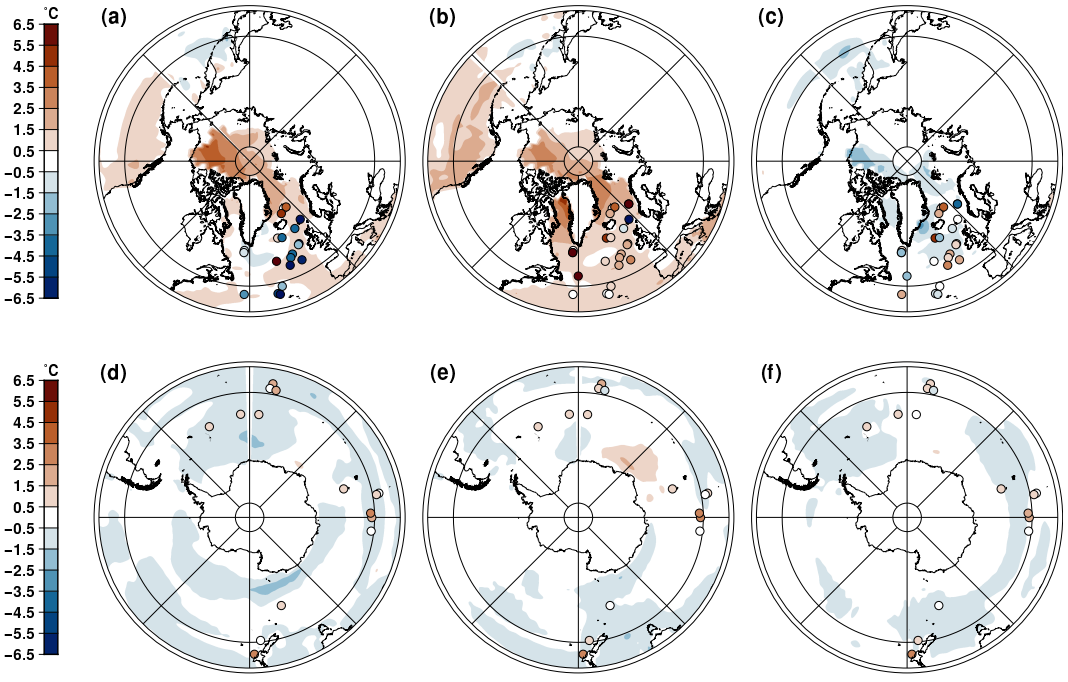

Figure S5. Last interglacial summer sea surface temperature anomalies with respect to the pre-industrial (0 kaBP). High latitudes anomalies in the Northern Hemisphere (respectively Southern Hemisphere) at 130 kaBP **(a)** (resp. **(d)**), 125 kaBP **(b)** (resp. **(e)**) and 120 kaBP **(c)** (resp. **(f)**). Proxy based reconstructions from Capron et al. (2017) are shown in circles. Summers are defined as the warmest three months. Anomalies are computed with the experiment that does not account for the freshwater flux feedback resulting from ice sheet melting.

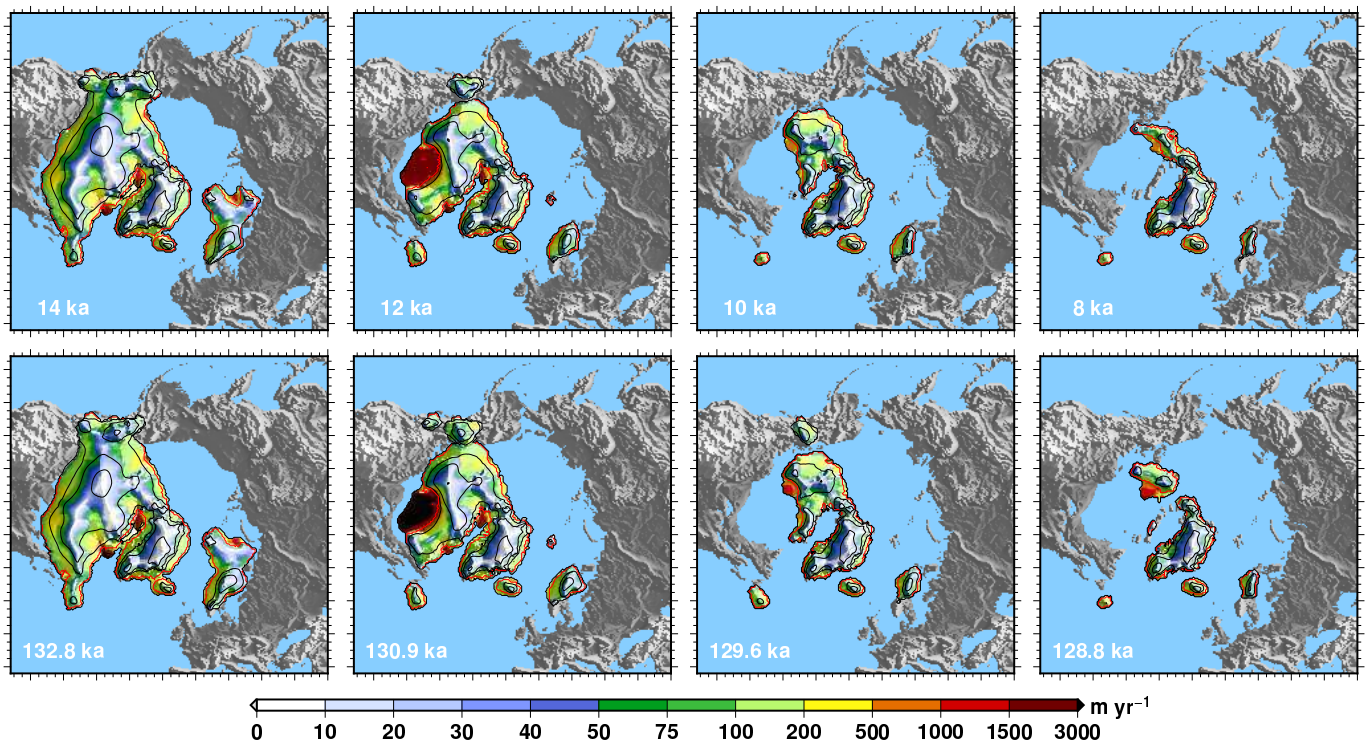

Figure S6. Simulated Northern Hemisphere ice sheets across the two terminations. Four selected snapshots are shown for TI (top) and TII (bottom). The dates for TII have been selected so that the simulated Northern Hemisphere ice volume is equal to the selected dates for TI. The black isocontours show the simulated ice elevation above contemporaneous eustatic sea level (contours separated by 1000 metres). The red contour is the ice sheet grounding line. The colour palette represent the amplitude of the simulated vertically averaged ice sheet velocity, draped over the surface topography. The experiments shown here include the freshwater flux feedback resulting from ice sheet melting.