

Experimental Design of the last deglaciation in MPI-ESM

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Core experiments

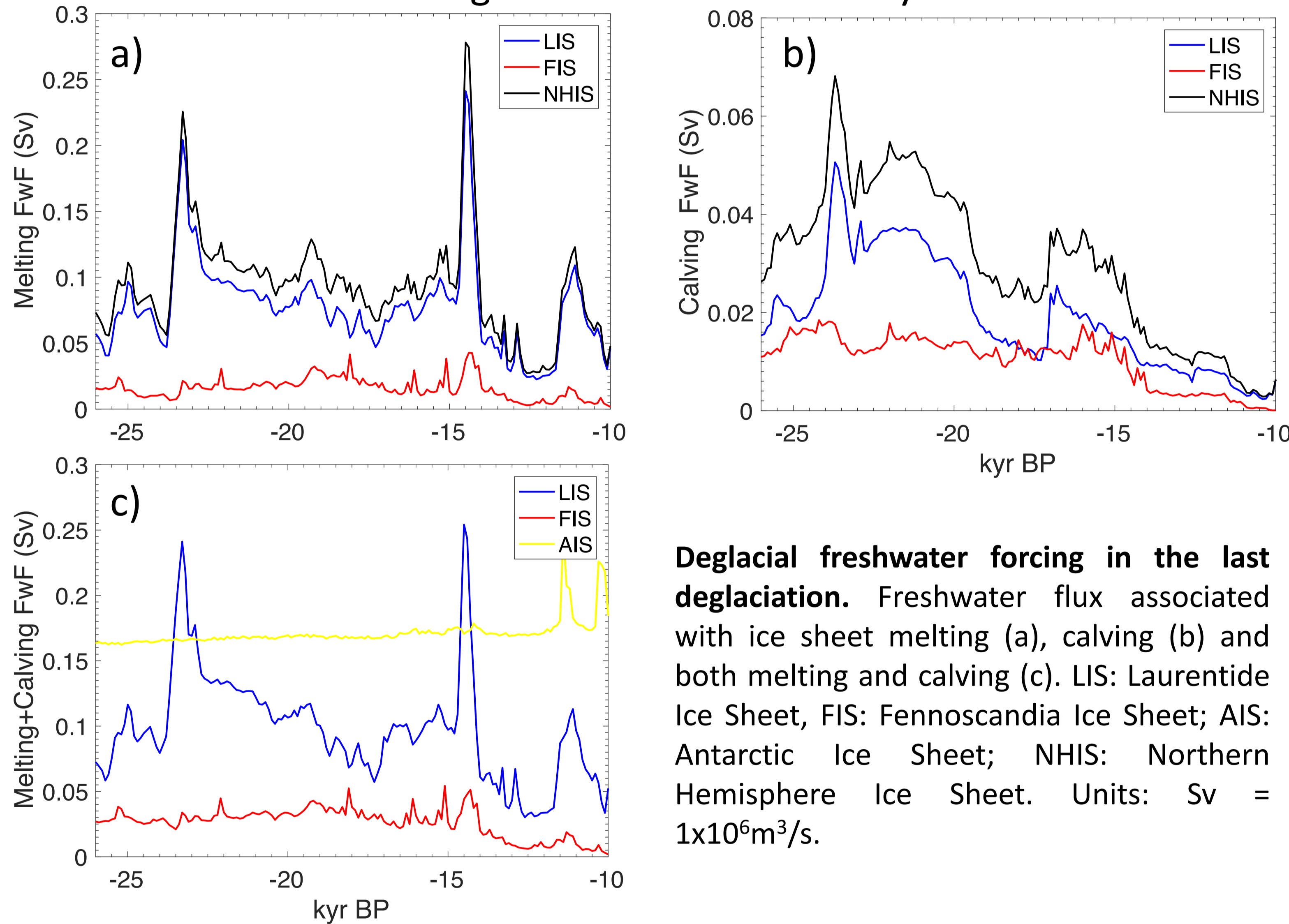
Control simulation	Boundary conditions	Description
Last Glacial Maximum (LGM; 21ka BP)	Initial Ocean State	Ocean with strong stratification forced by PMIP2 CCSM3 LGM forcing in MPIOM
	Orbital parameters	Eccentricity = 0.018994 Obliquity = 22.949° Perihelion - 180° = 114.42°
	Trace gases	Carbon dioxide (CO ₂) = 190 ppm Methane (CH ₄) = 375 ppb Nitrous oxide (N ₂ O) = 200 ppb
	Ice sheets, orography and coastlines	Ice sheet reconstruction from Tarasov (2012)
	Bathymetry	Associated with ice sheet
Transient simulation		
Deglacial simulation (21ka - 10ka BP)	Insolation	Berger (1978)
	Ice Sheet, orography, coastlines and bathymetry	Since ~21ka BP, ice sheet from Tarasov (2012)
	Freshwater flux history	Associated with ice sheet
	River routing	Associated with ice sheet CO ₂ Bereiter et al. (2015) CH ₄ Louergue et al. (2008) N ₂ O Schilt et al. (2010)
	Trace gases	
Single-forcing simulation		
Deglacial simulation (21ka - 10ka BP)	Insolation	Berger (1978)
	Trace gases	CO ₂ Bereiter et al. (2015)
	Ice sheets	Tarasov et al. (2012)
	Freshwater flux	Tarasov et al. (2012)
	Ice sheet + Freshwater flux	Tarasov et al. (2012)

Diagnostic experiments

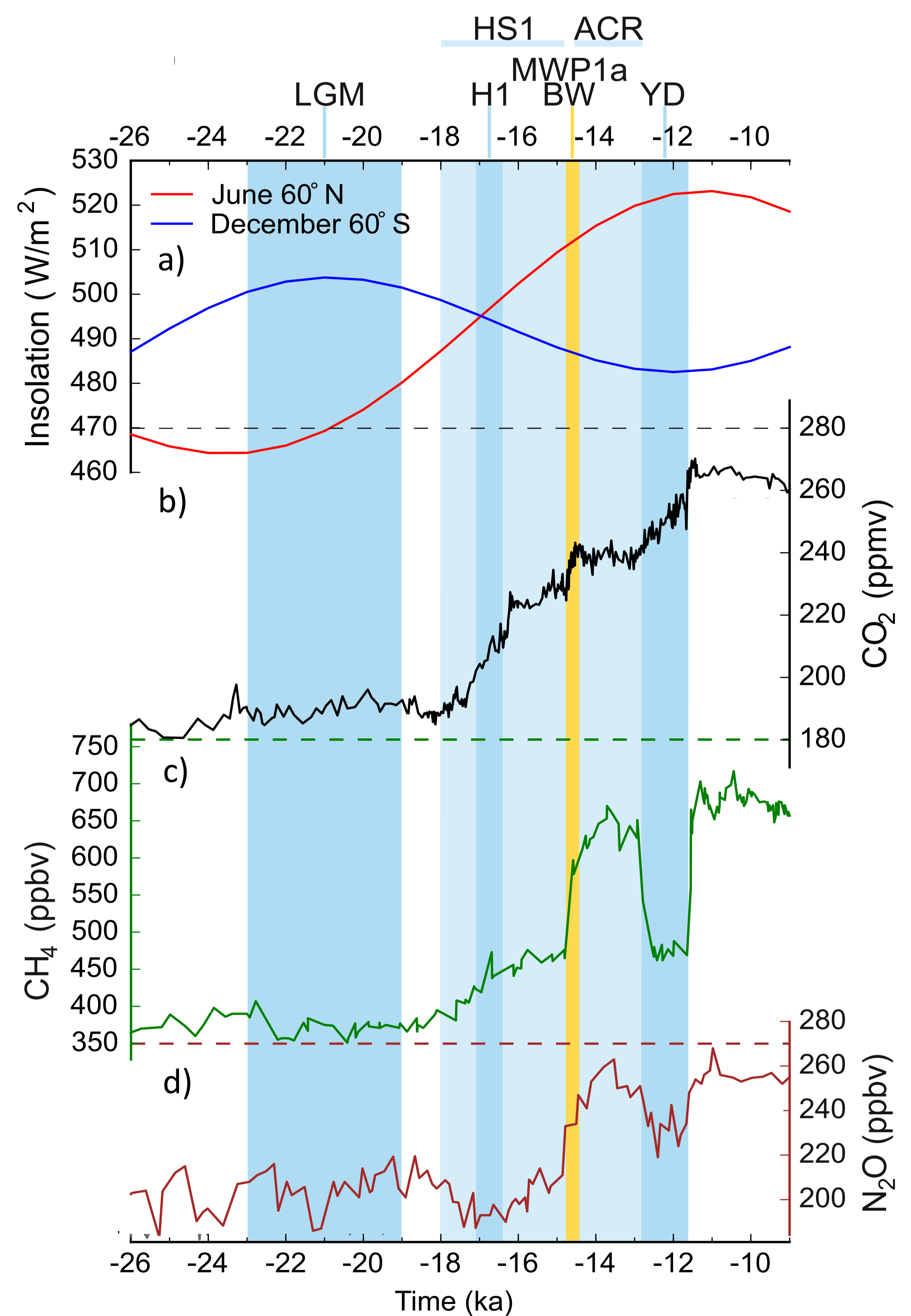
Experiment	CO ₂ (ppm) / GHG	Glacier Mask (GM)	Orbital Para. (OP)	Land Sea Mask (LSM)	Topography (TP)	Derived Effect
PI_CTL*	PI	PI	PI	PI	PI	Full PI
PI_185*	LGM	PI	PI	PI	PI	LGM GHG
GM	PI	LGM	PI	PI	PI	LGM Albedo
GM_GHG*	LGM	LGM	PI	PI	PI	GM + GHG
GM_OP	PI	LGM	LGM	PI	PI	GM + OP
GM_GHG_OP	LGM	LGM	LGM	PI	PI	GM + GHG + OP
GM_GHG_OP_LSM*	LGM	LGM	LGM	LGM	PI	GM + GHG + OP + LSM
LGM_CTL*	LGM	LGM	LGM	LGM	LGM	Full LGM

Simulations aiming to evaluate AMOC phase-bases during glacial-interglacial cycles. Simulations with * indicate the core experiments here.

Deglacial freshwater history



Deglacial insolation and GHG forcing



Topo Anomaly

Tarasov Ice Sheet

ICE6g Ice Sheet

