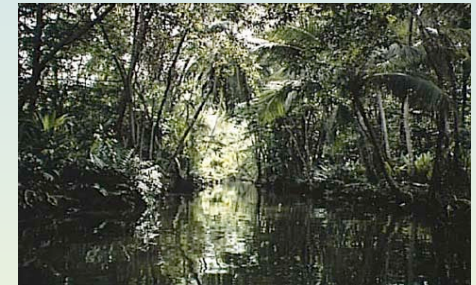


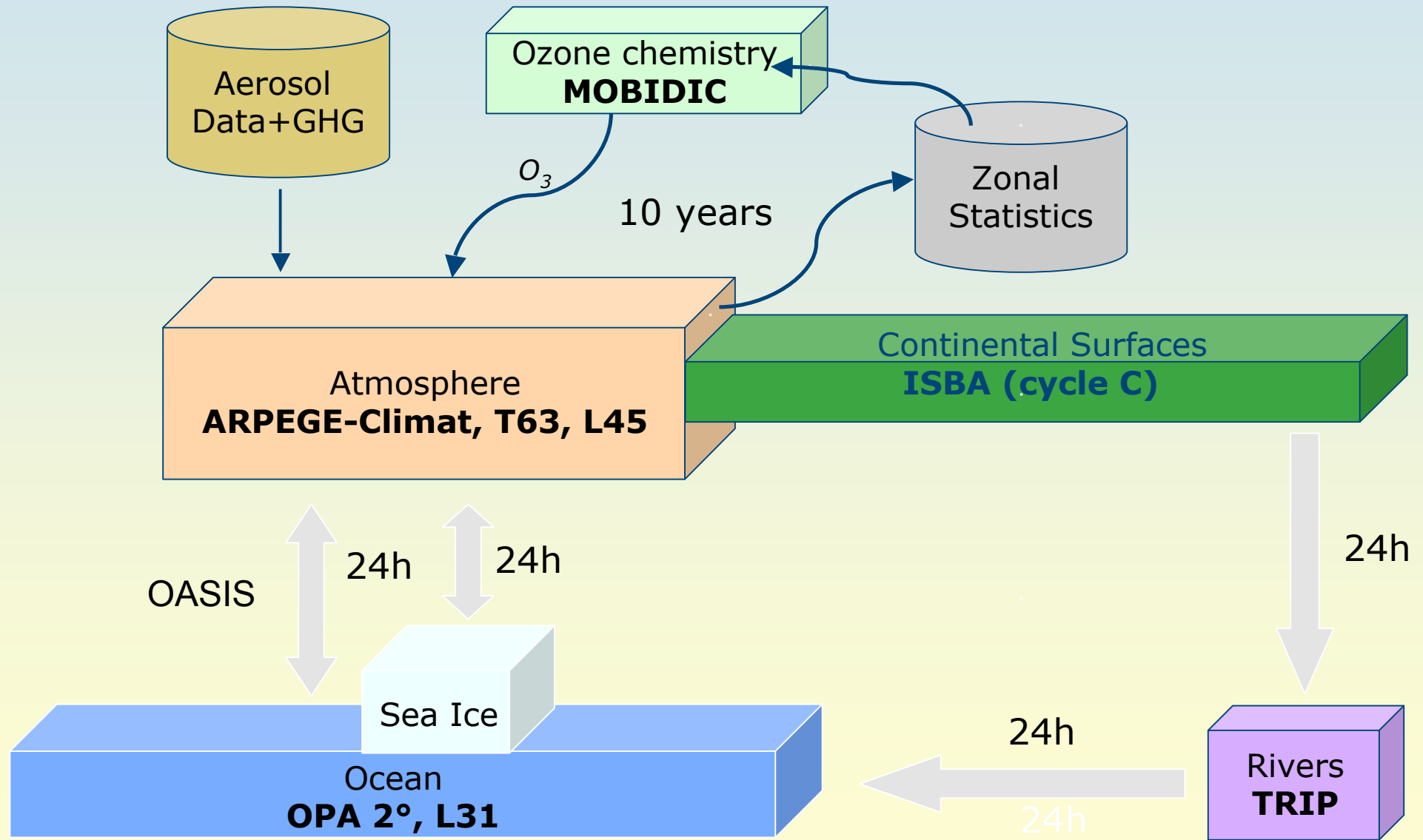
Simulations paléoclimatiques au CNRM-GAME



D. Salas-Mélia, A. Voldoire, J.F.
Royer, S. Tyteca et A. Rascol



CNRM-CM3



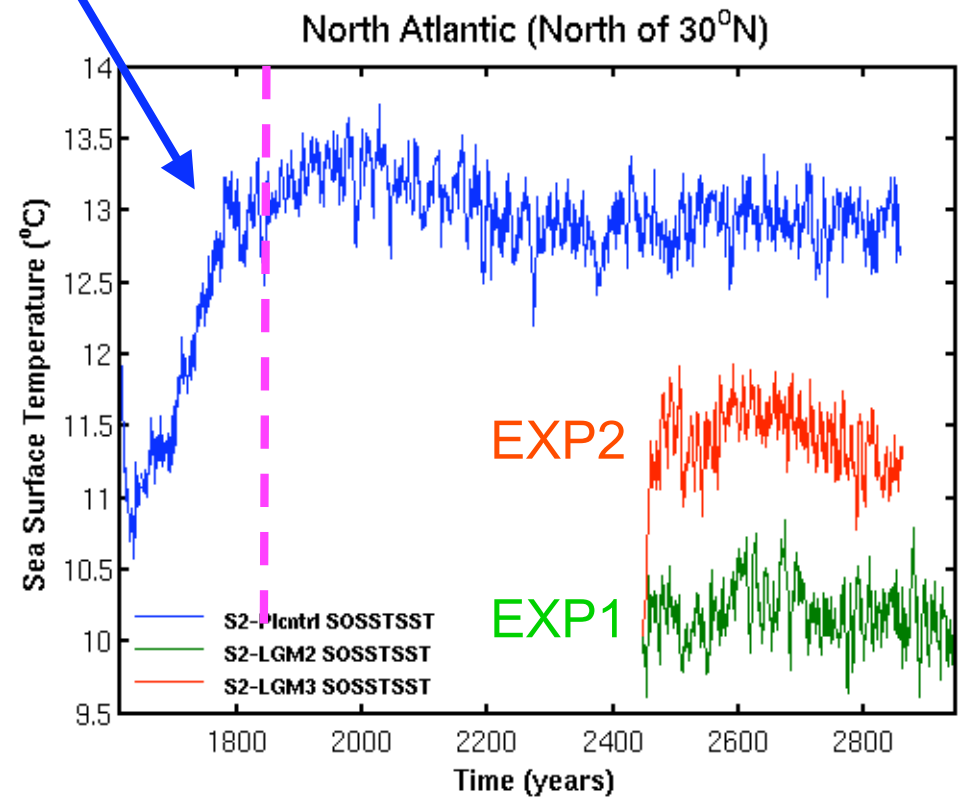
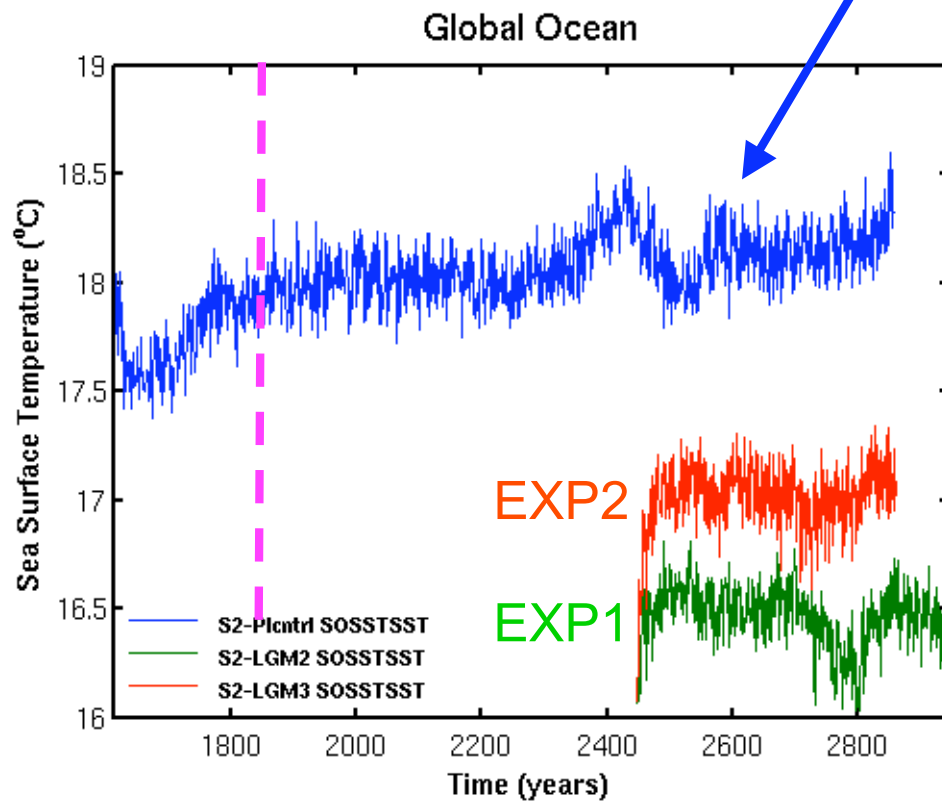
Simulation du dernier maximum glaciaire (21ky BP)

- Première version : CNRM-CM3.1 (IPCC-AR4)
 - Modification de l'orographie (calottes fennoscandienne + Laurentides)
 - ➔ se préparer à des simulations très longues avec calottes interactives
 - 500 ans, dérive $-0,4^{\circ}\text{C}$ / siècle
 - Étude de changements de cyclogénèse en Atl. Nord passé / présent / futur (modèles IPSL + CNRM) – thèse A. Laîné
- Deuxième version : CNRM-CM3.3 (Stream 2 ENSEMBLES)
 - Participation à PMIP2
 - Deux simulations de 500 ans, dérive faible $< -0.1^{\circ}\text{C}$
 - 1) calottes fennoscandienne + Laurentides d'épaisseur nulle !
 - 2) calottes réalistes
 - Analyses en cours dans le cadre de PMIP2

Simulation du dernier maximum glaciaire (21ky BP)

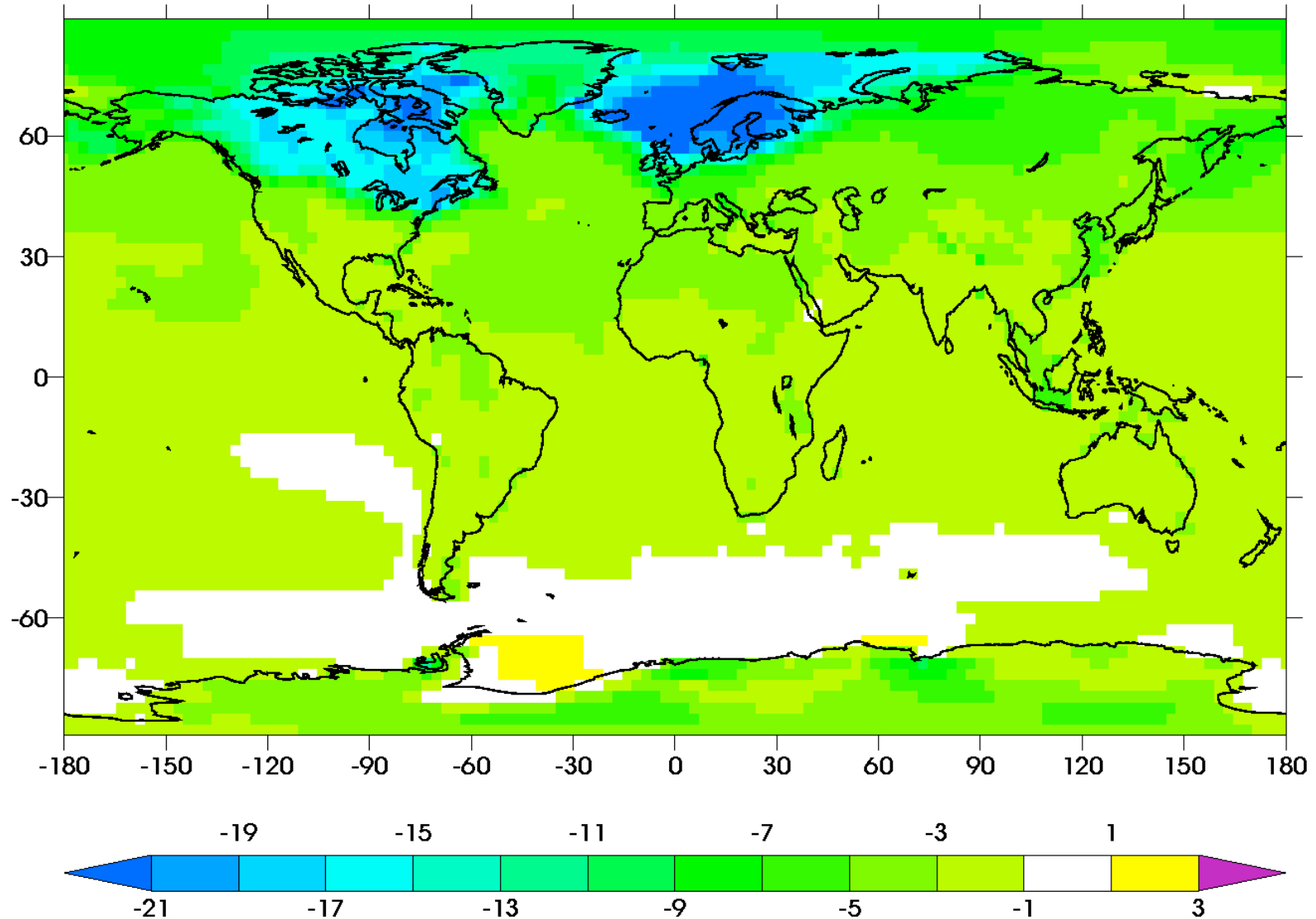
- SST

Préindustriel



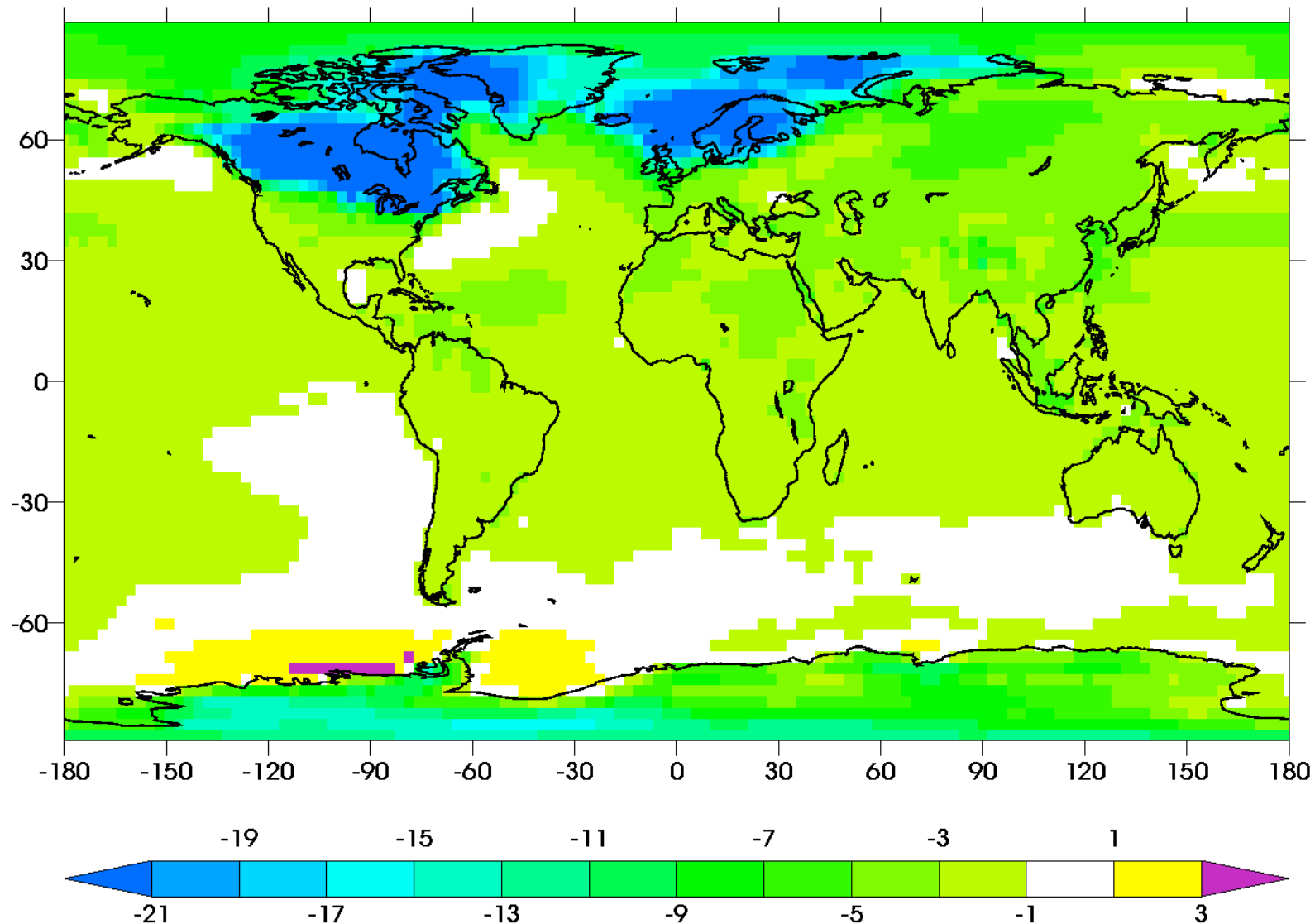
DMG – Préindustriel exp. 1 (années 131-150) – calottes F&L alt=0

tas: CNRM-CM3.3 / S2LG2 (2031-2050) - CNRM-CM3.3 / S2PI1 (1481-1500) C
Max 1.82571 Min -30.1624



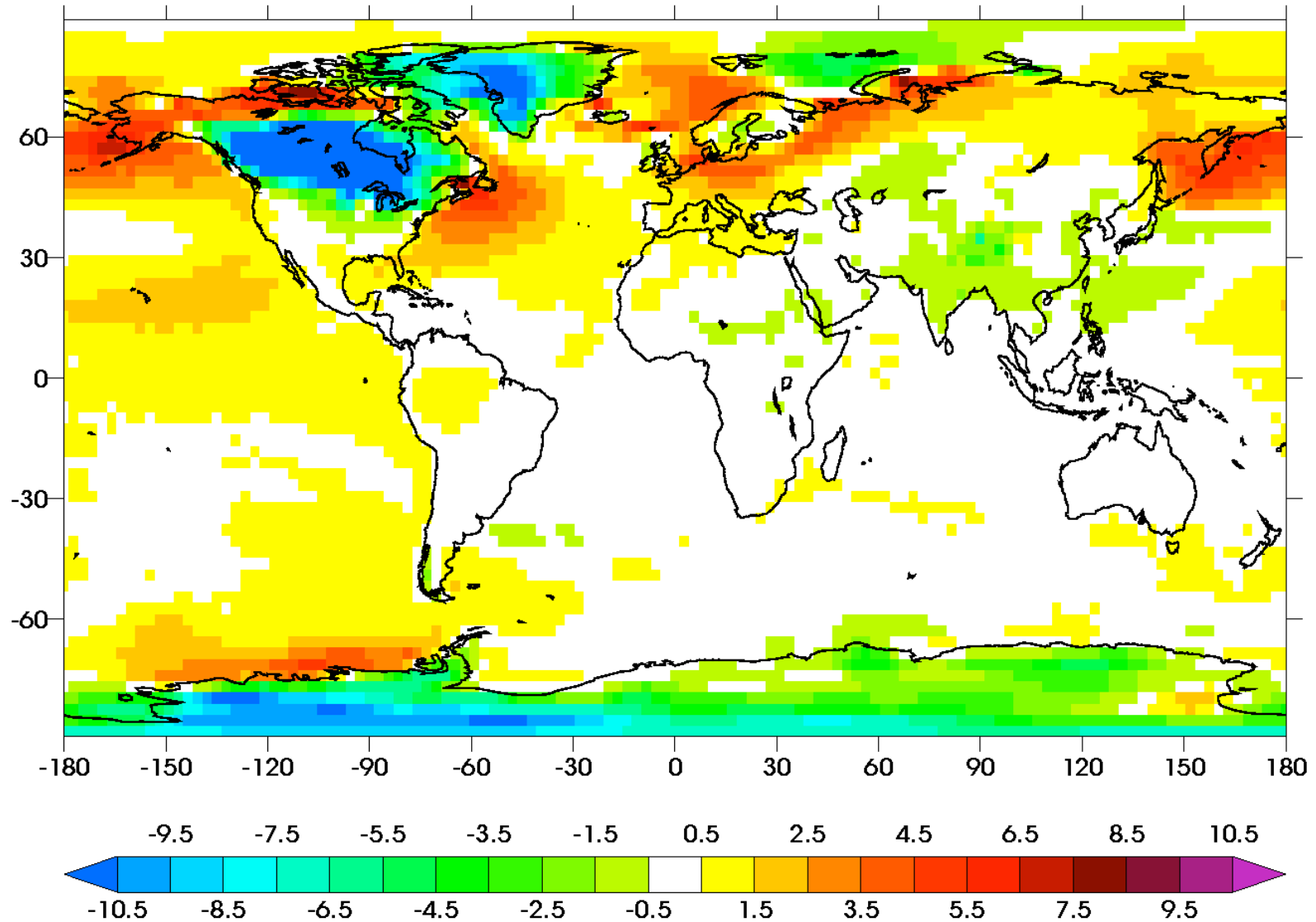
DMG – Préindustriel exp. 2 (années 131-150) – calottes F&L ok

tas: CNRM-CM3.3 / S2LG3 (2031-2050) - CNRM-CM3.3 / S2PI1 (1481-1500) C
Max 3.3946 Min -42.0015



DMG : exp. 2 – exp. 1 (années 131-150)

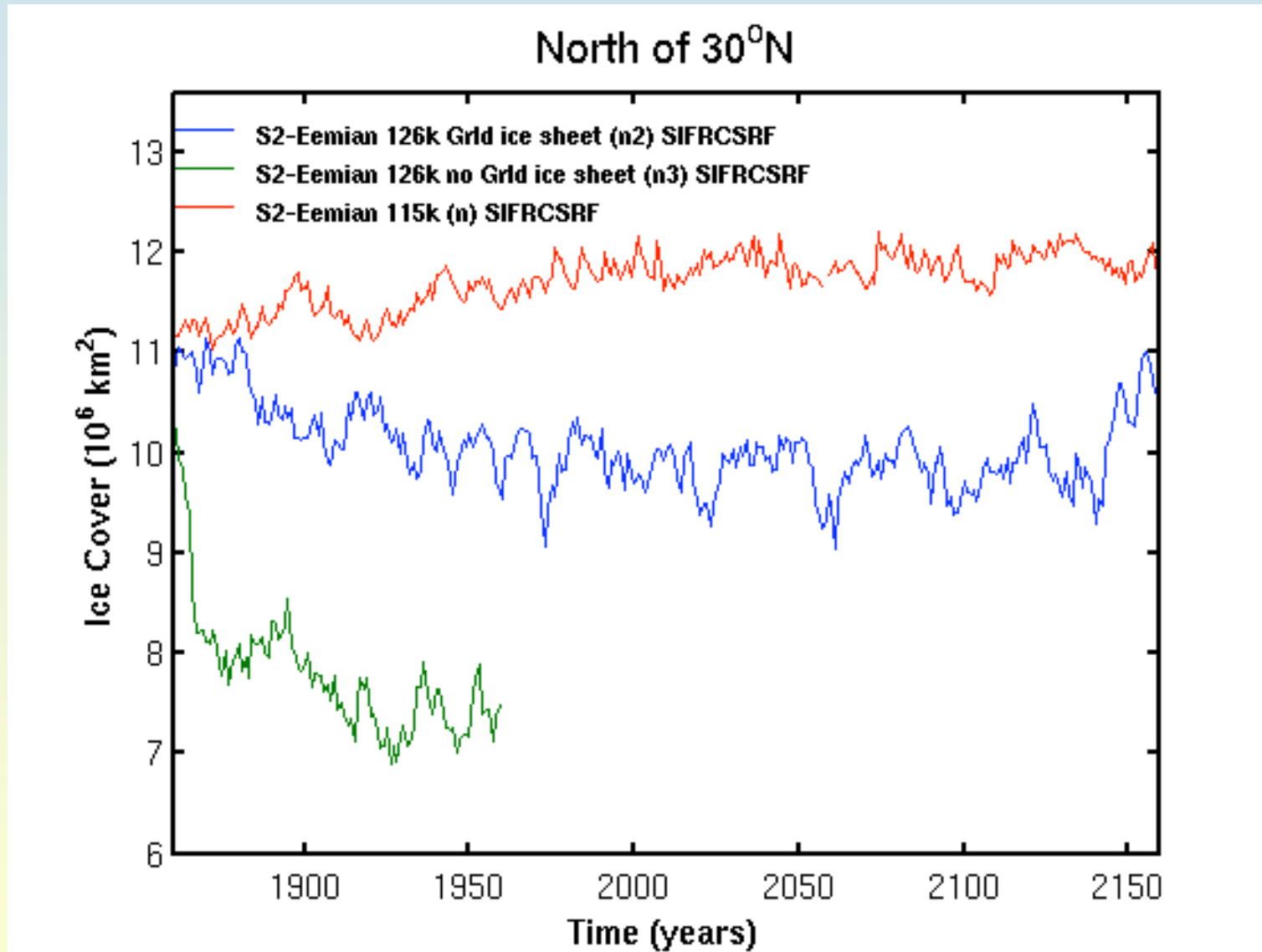
tas: CNRM-CM3.3 / S2LG3 (2031-2050) - CNRM-CM3.3 / S2LG2 (2031-2050) C
Max 7.83233 Min -25.1735



Simulations Eemien (131-115 ky BP)

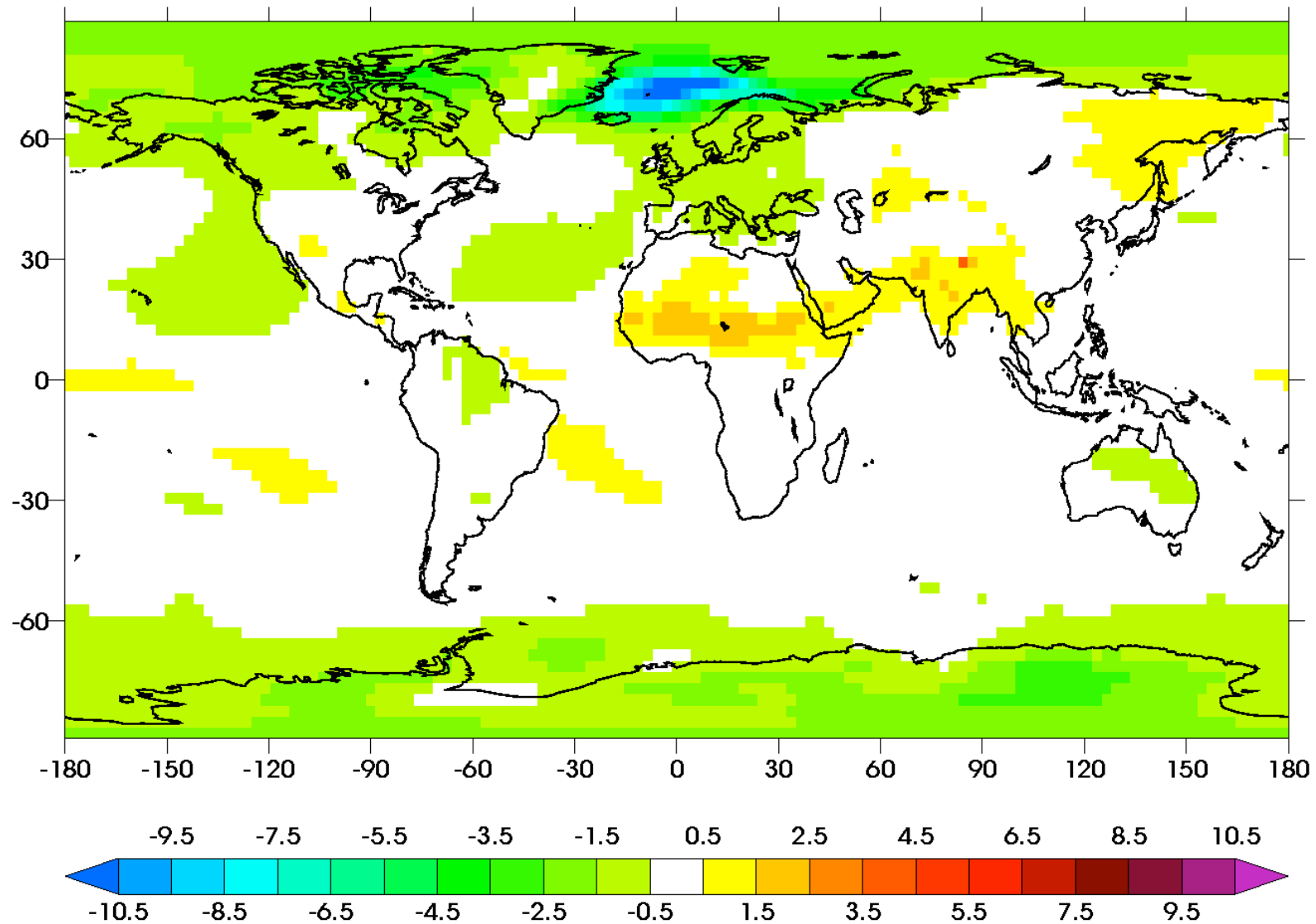
- Projet ANR / NEEM
 - Carottages au Groenland (North GRIP)
 - Estimation de changements de température et de bilan de masse au cours de l'Eemien (131-115 ky BP)
 - Modélisation climatique: IPSL-CM4 et CNRM-CM3 → peut-on simuler ces changements et les interpréter ? (influence de la couverture de glace de mer, modélisation isotopique...)

Etendue de glace de mer en Arctique (10^6 km^2)



Eemien 115k – Préindustriel (années 71-100)

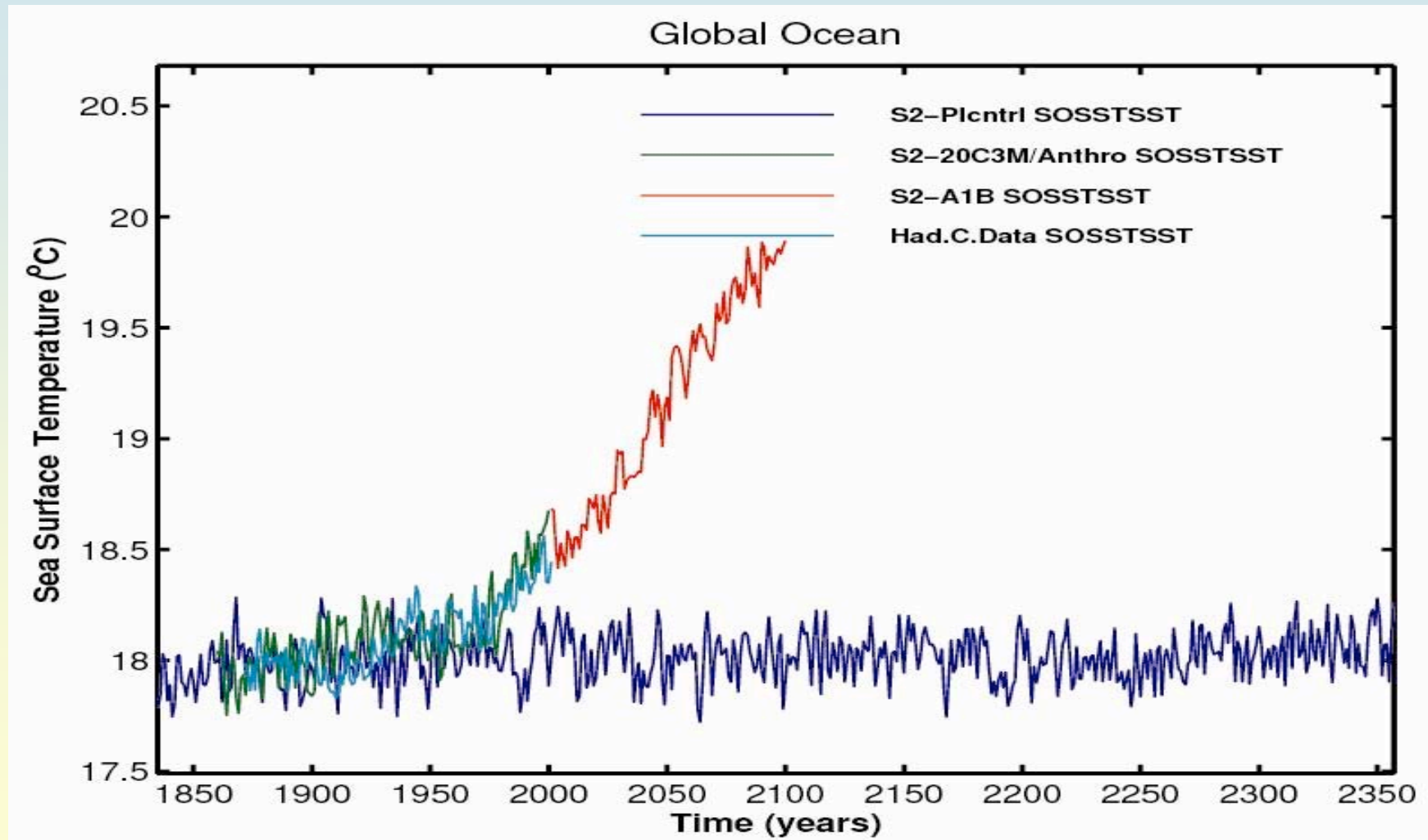
tas: CNRM-CM3.3 / S2115C (1871-1900) - CNRM-CM3.3 / S2PI1 (1321-1350) C
Max 4.34023 Min -12.5397



FIN

ENSEMBLES S2 simulations : 20C3M + 21C (A1B)

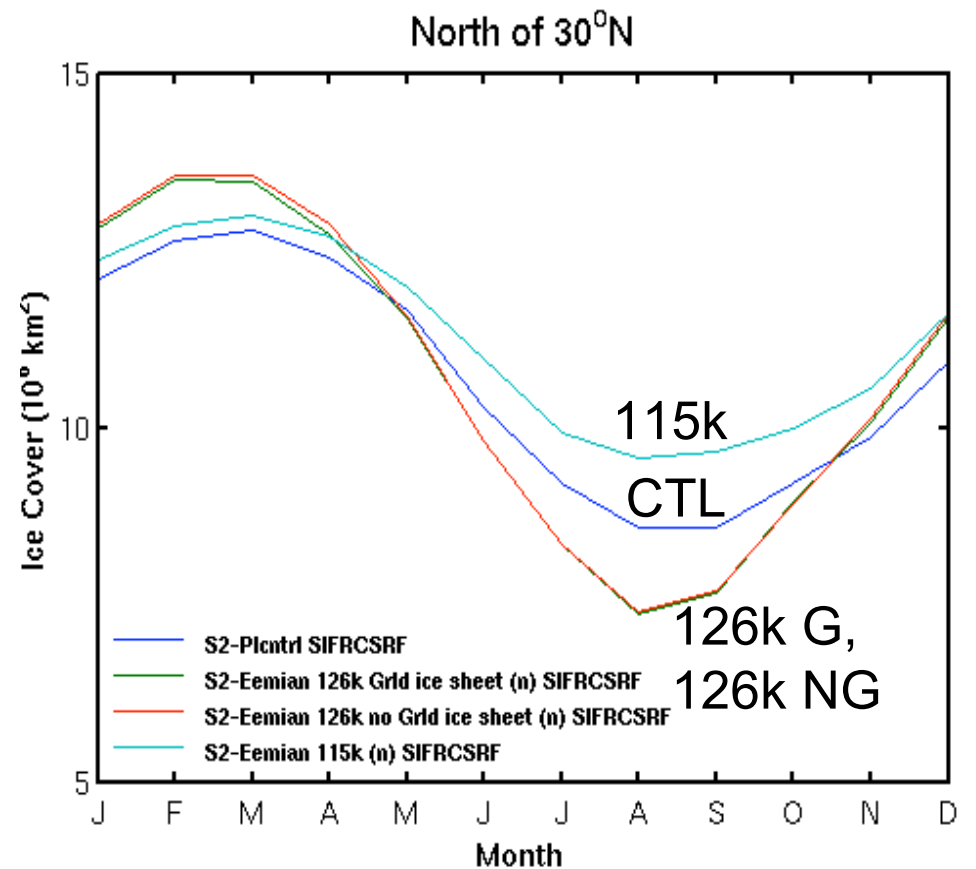
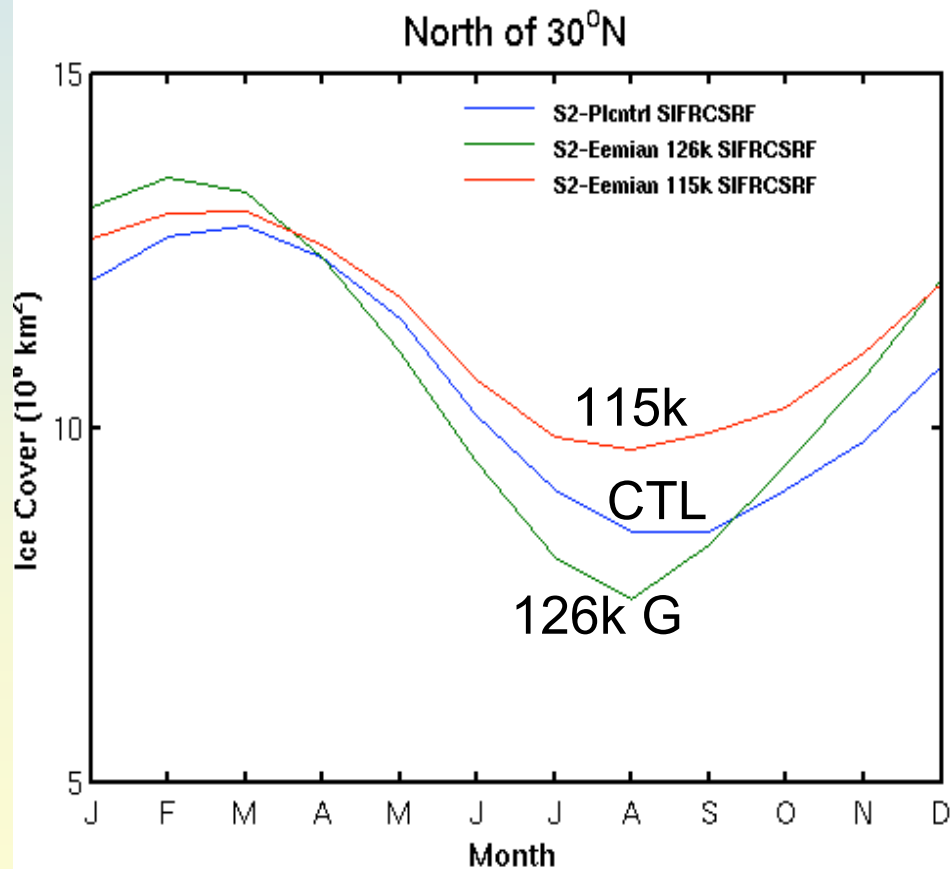
Simulated SST (global mean, year average)



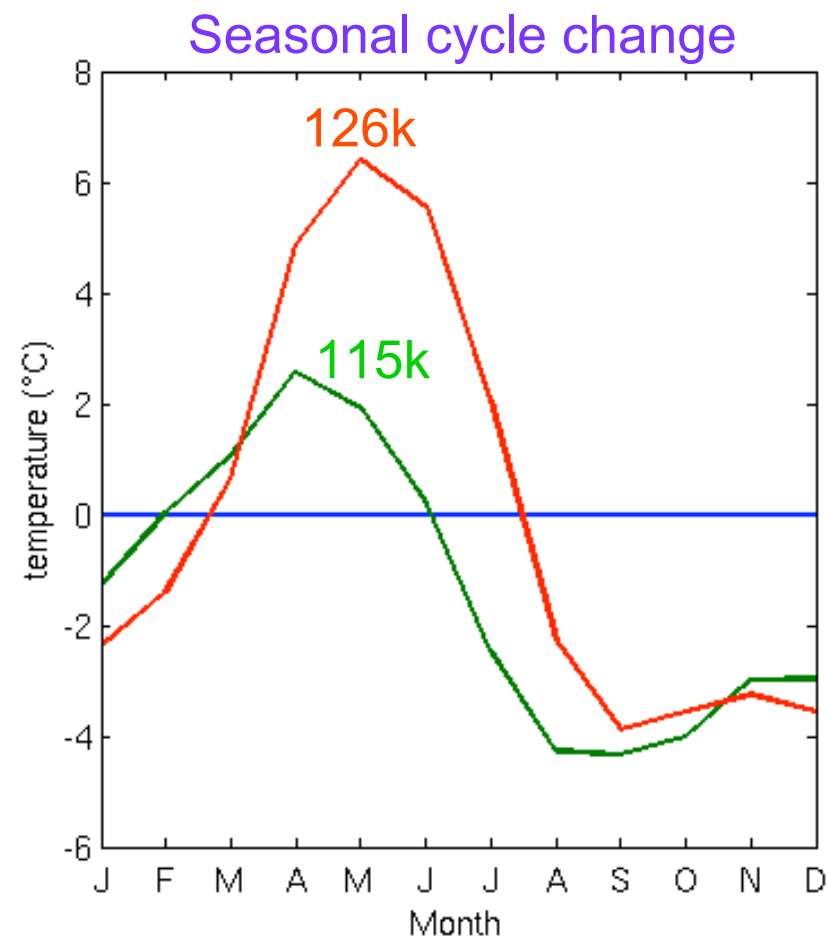
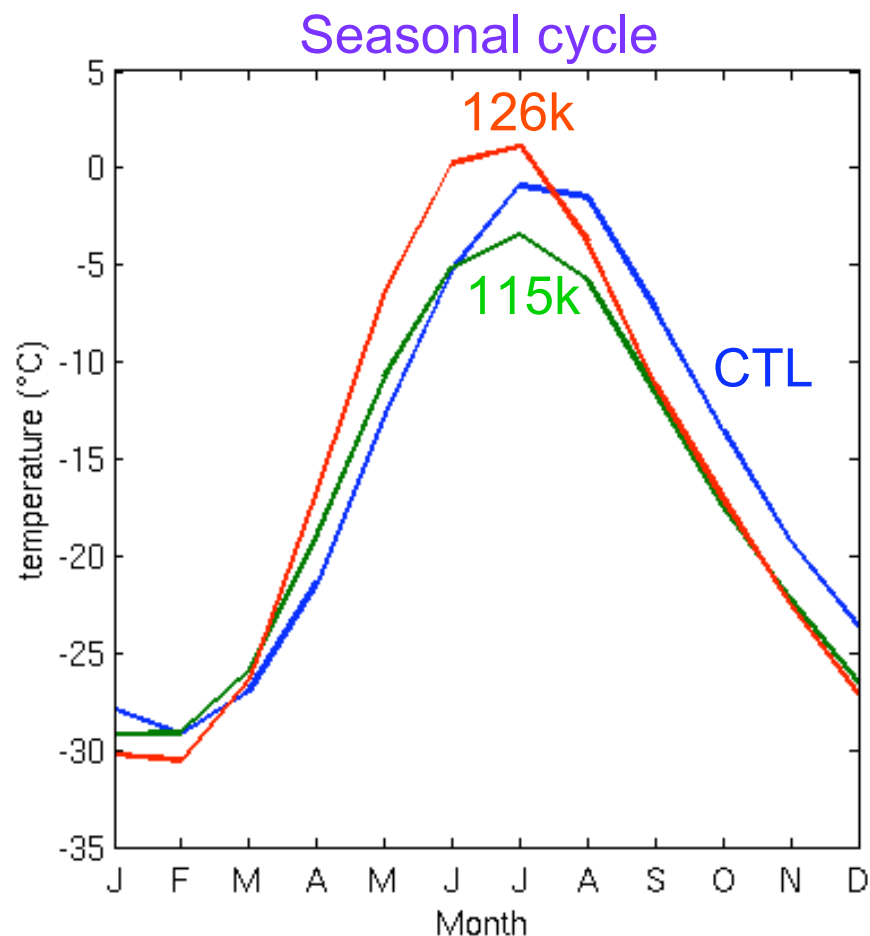
Simulated Arctic sea ice surface seasonal cycle (10^{12} km^2) Eemian simulations vs control experiment

• v0

• v1

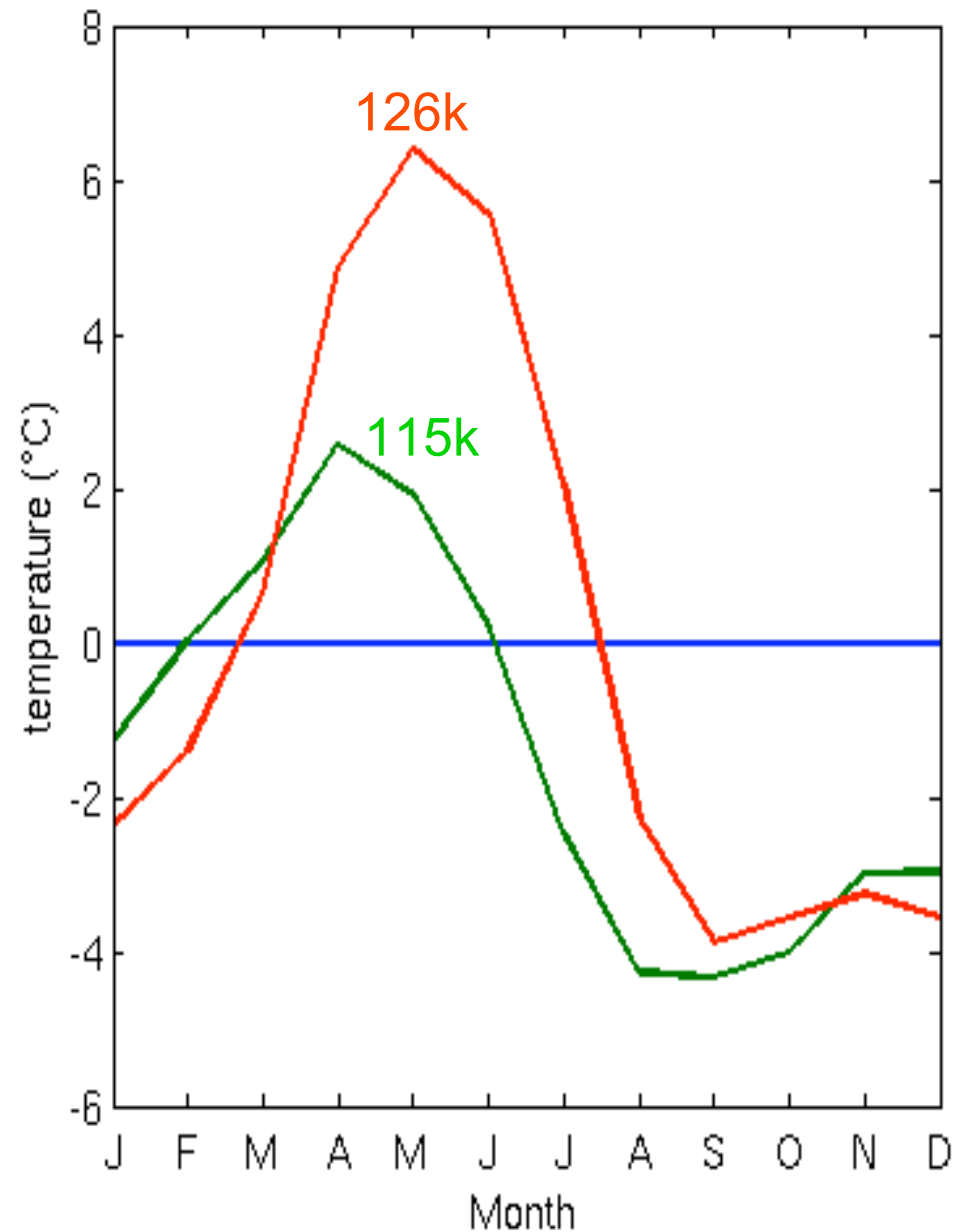
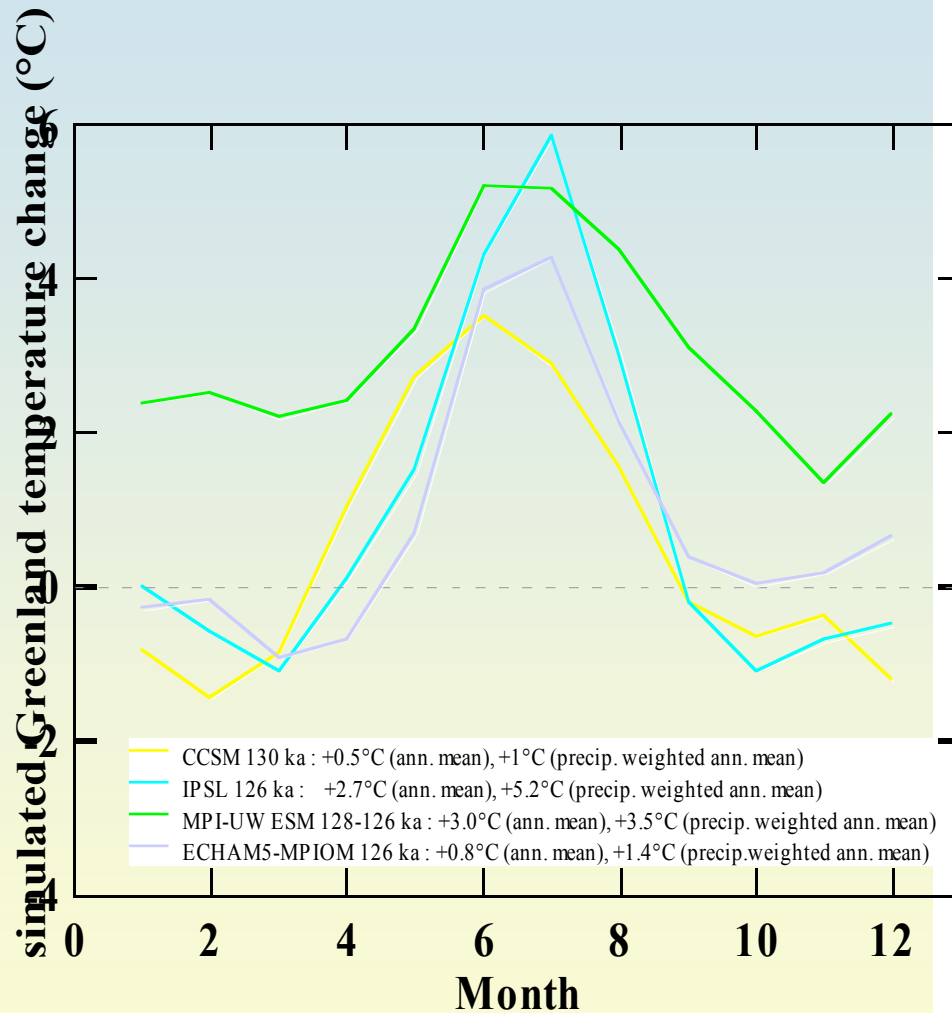


Simulated Greenland temperature (°C) Eemian simulations (v0) vs control experiment

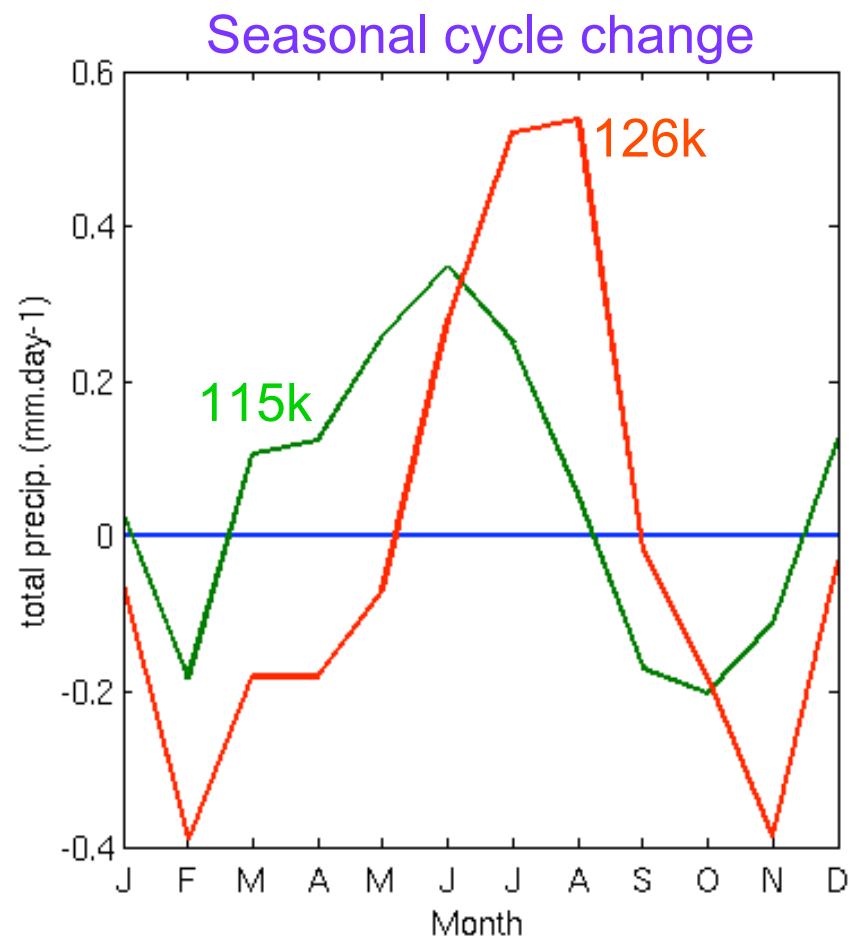
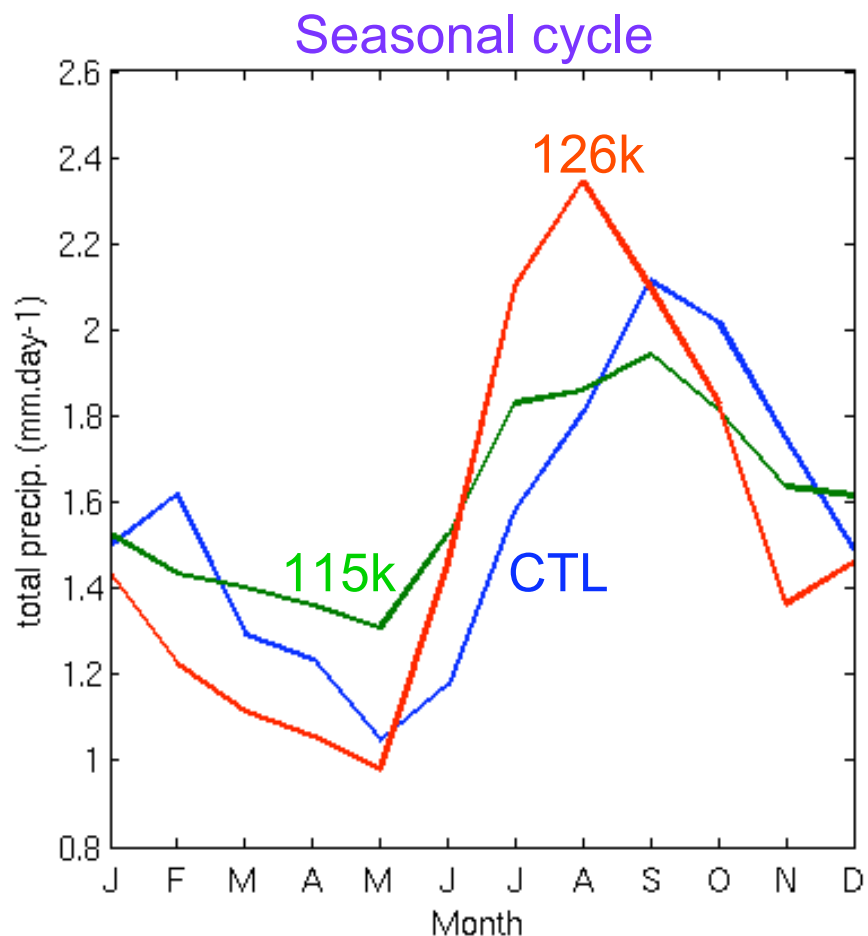


126ky BP -0.1°C
115ky BP -1.4°C

Simulated Greenland temperature (°C) Eemian simulations (v0) vs control experiment



Simulated Greenland precipitation ($\text{mm}\cdot\text{day}^{-1}$) Eemian simulations (v0) vs control experiment



126 ky BP -0.01 mm/day
 115 ky BP $+0.05$ mm/day

Table 1. Orbital characteristics for the 6 simulations considered in this study.

Period	Eccentricity (°)	Obliquity (°)	Precession (@-180°)	Length of the seasons	
				VE to AE (d)	AE to VE (d)
126 ka	0.0397	23.9	201	192	168
122 ka	0.0407	23.2	356	186	174
115 ka	0.0414	22.4	111	175	185
9.5 ka	0.0194	24.2	303	188	172
6 ka	0.0187	24.1	1	184	176
0 ka (ctrl)	0.0167	23.4	102	180	180