

Impact of the recent atmospheric circulation change in summer on the future surface mass balance of the Greenland ice sheet

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Introduction

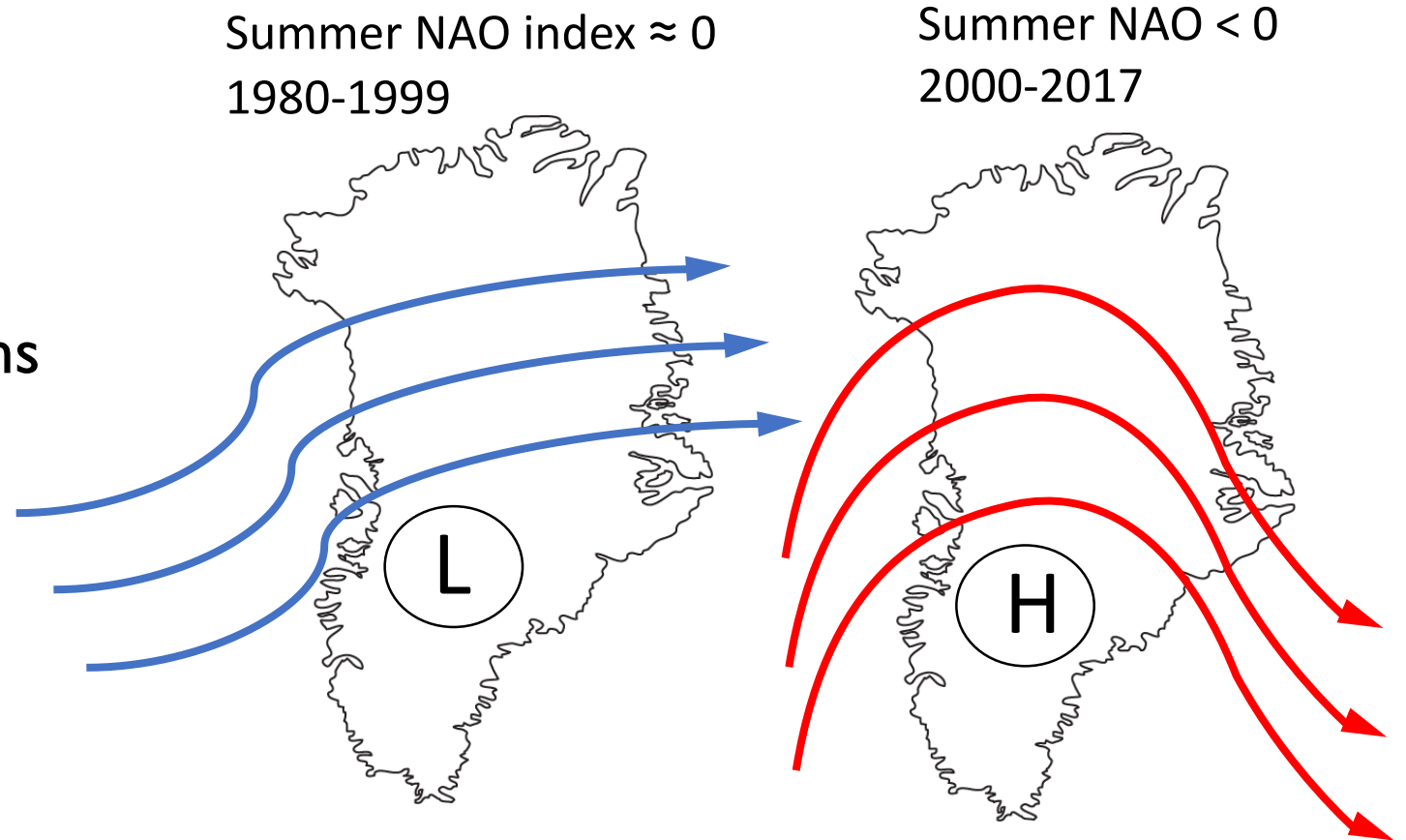


Time series (5-yr running mean) of the GrIS SMB (Gt yr⁻¹) over 1980–2015 from MAR forced with ERA-Interim reanalysis

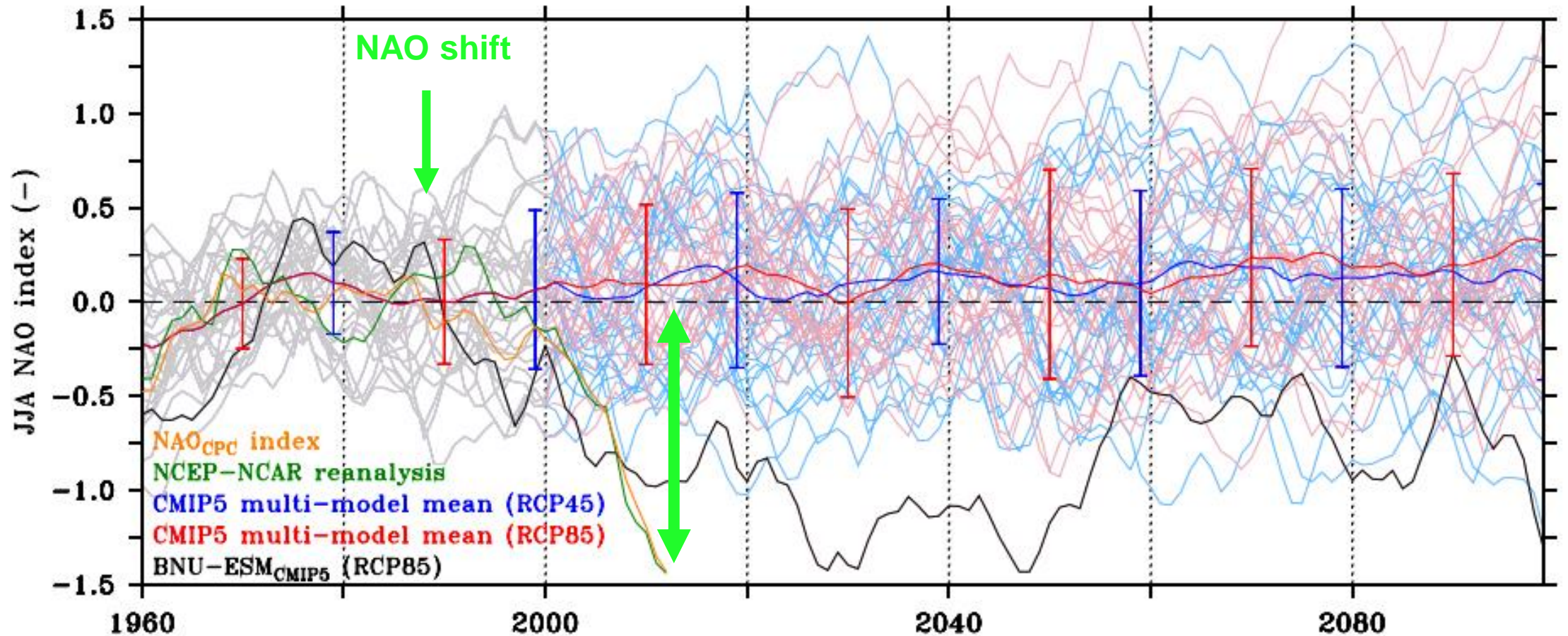
▶ Since 2000's : Decrease in SMB

Introduction

- ▶ Warm air advection
- ▶ More anticyclonic conditions



Introduction



Time series (10-yr running mean) of the JJA NAO index over 1960–2100 (Fettweis *et al.*, 2013)

→ Influence on such projections if this NAO negative shift persists ?

Warming experiments without circulation change

- ▶ MAR ERA 2000-2016 + 2°C
 - circulation change impact

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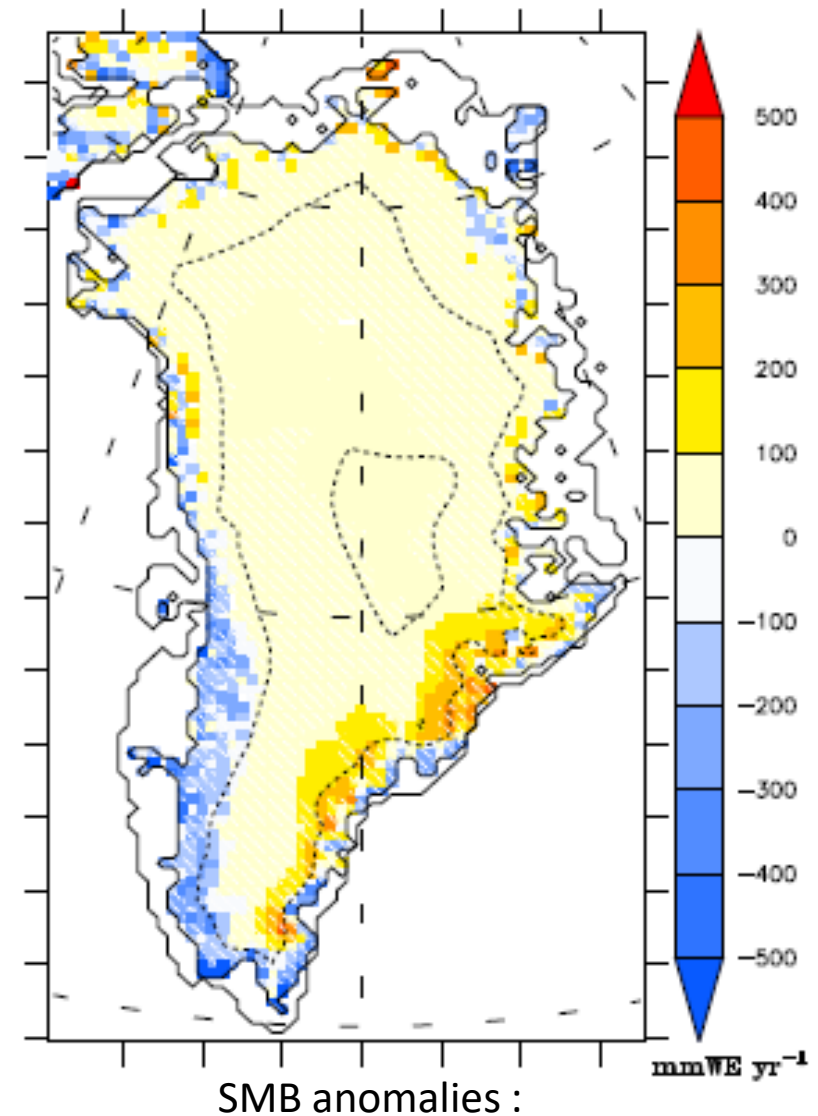
▶ MAR with ERA-Interim 80–99 +2 °C
≈ MAR with GCM +2 °C

MIROC5	2029 – 2049	} RCP4.5
CanESM2	2016 – 2036	
NorESM1	2033 – 2053	

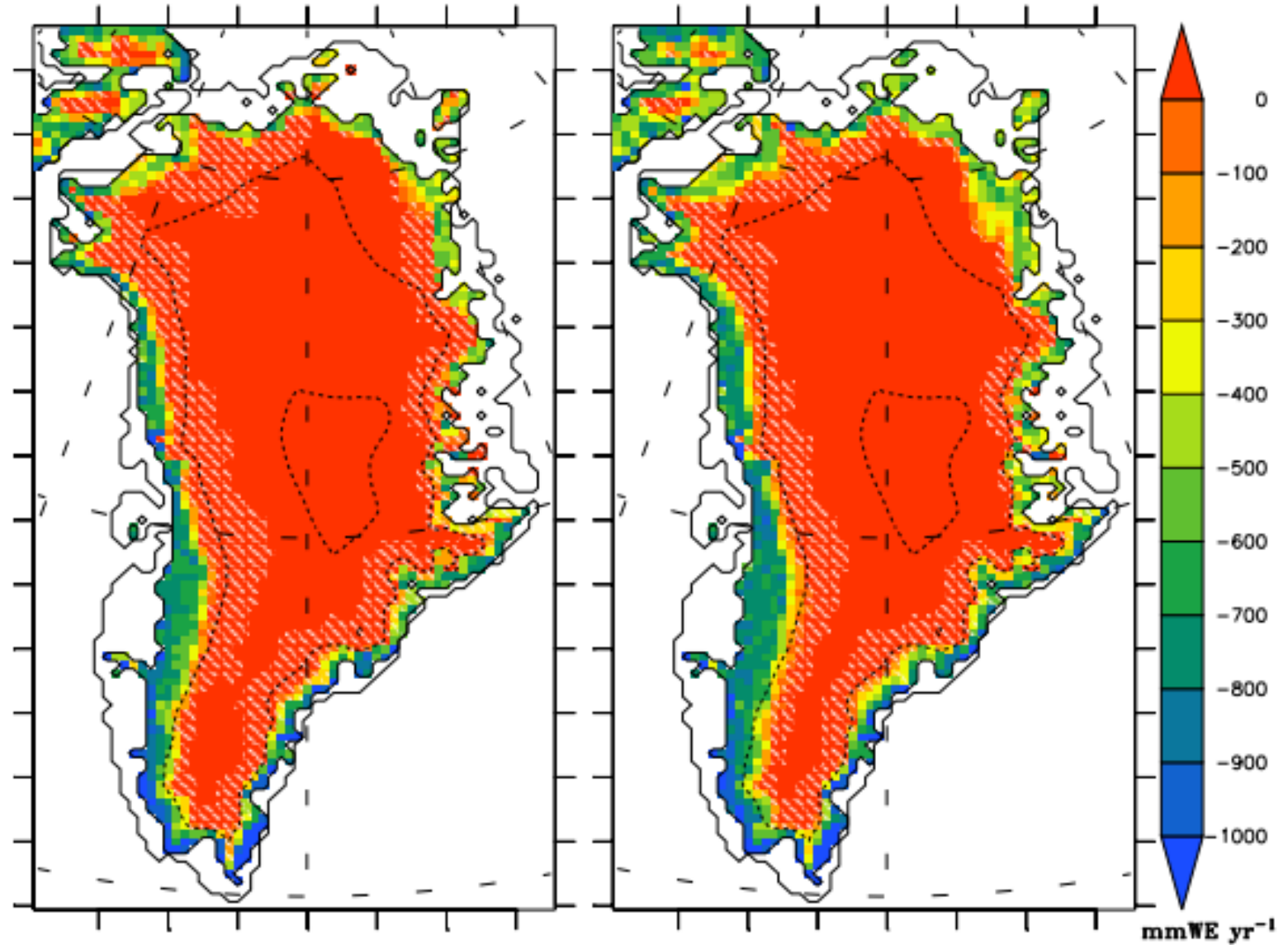
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Influence of a potential future circulation change



SMB anomalies : MAR ERA 1980 – 1999 +2°C

MAR ERA 2000 – 2016 +2°C

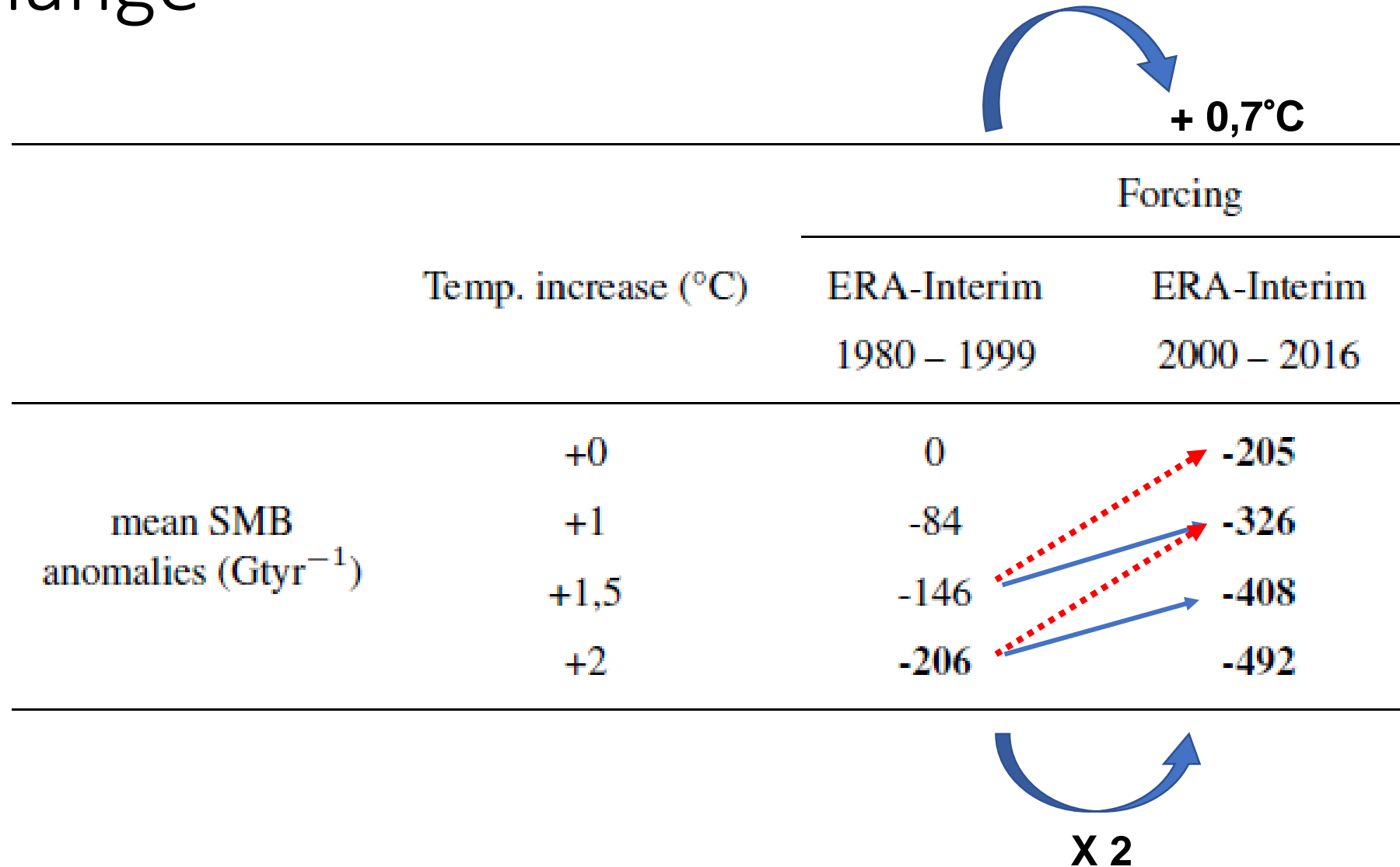
Influence of a potential future circulation change

	Temp. increase (°C)	Forcing	
		ERA-Interim 1980 – 1999	ERA-Interim 2000 – 2016
	+0	0	-205
mean SMB	+1	-84	-326
anomalies (Gtyr ⁻¹)	+1,5	-146	-408
	+2	-206	-492

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