

near surface

Evaluation of Greenland climate in CESM2

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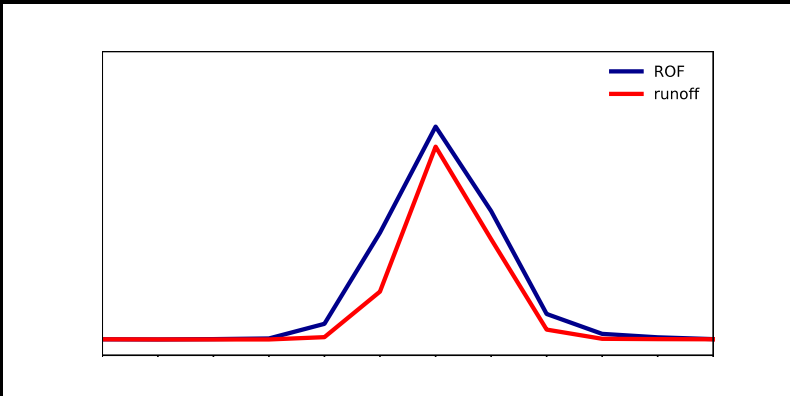
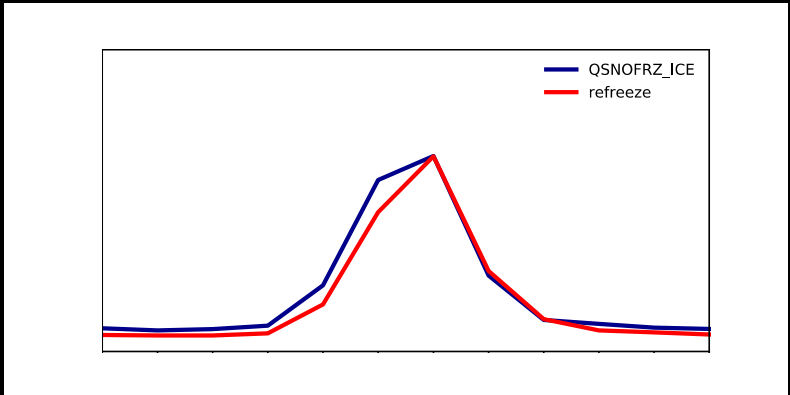
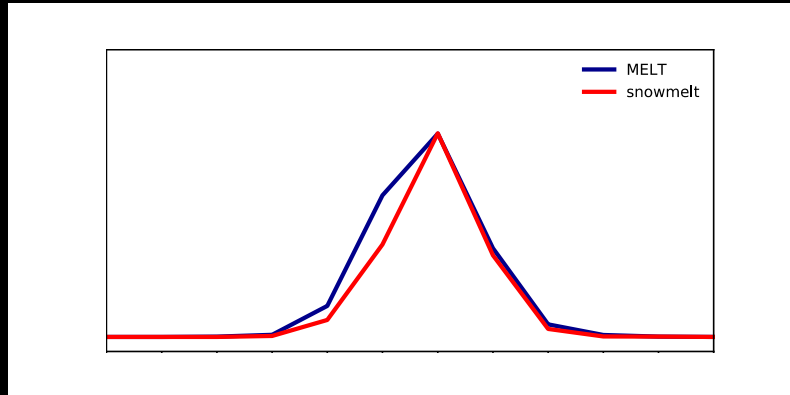
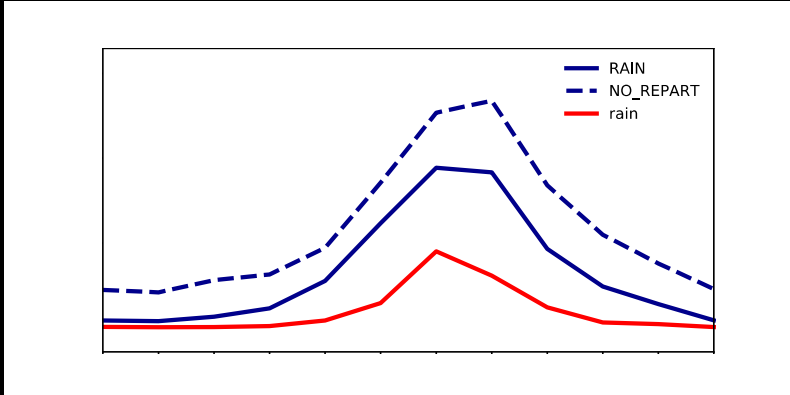
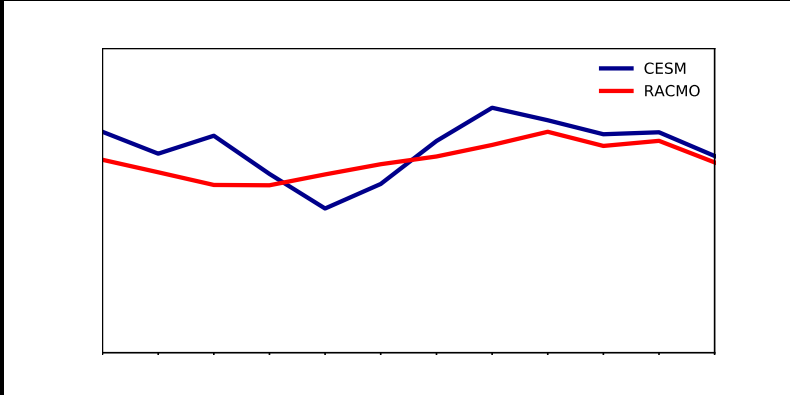
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#260

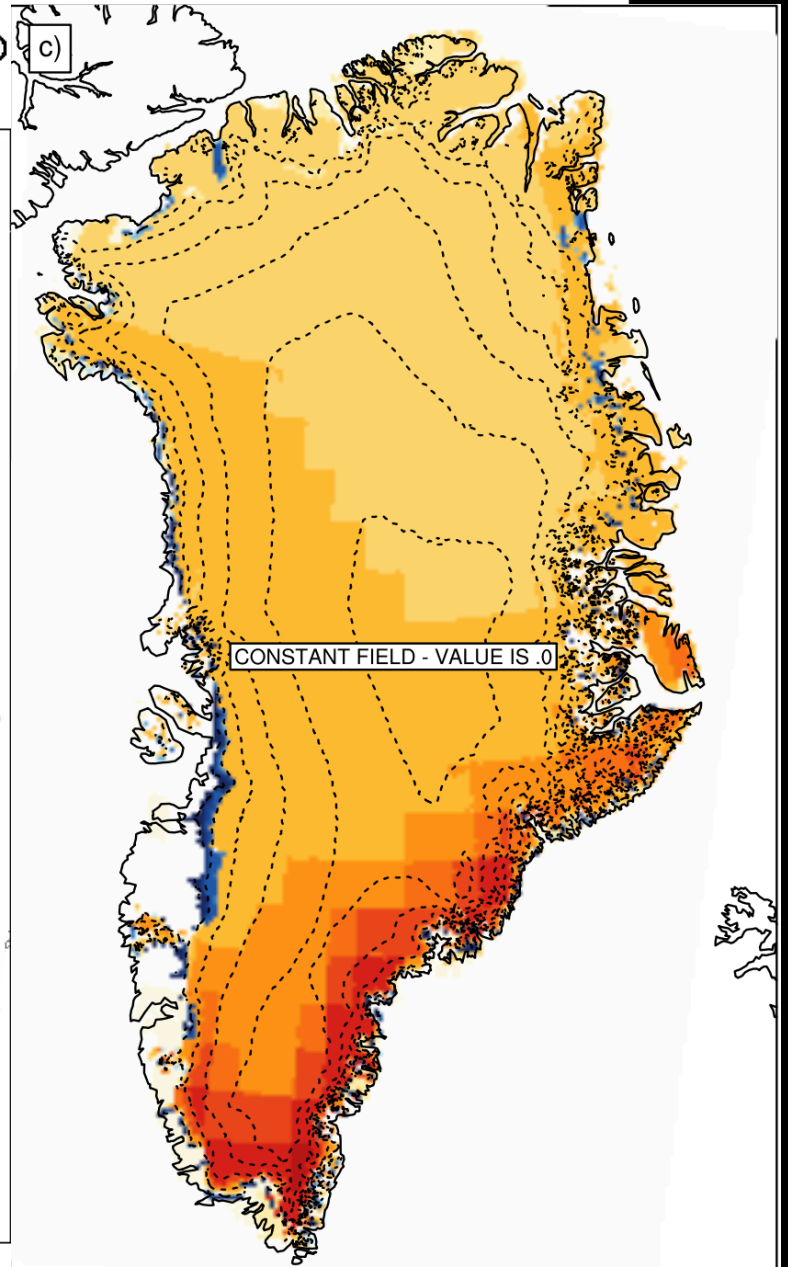
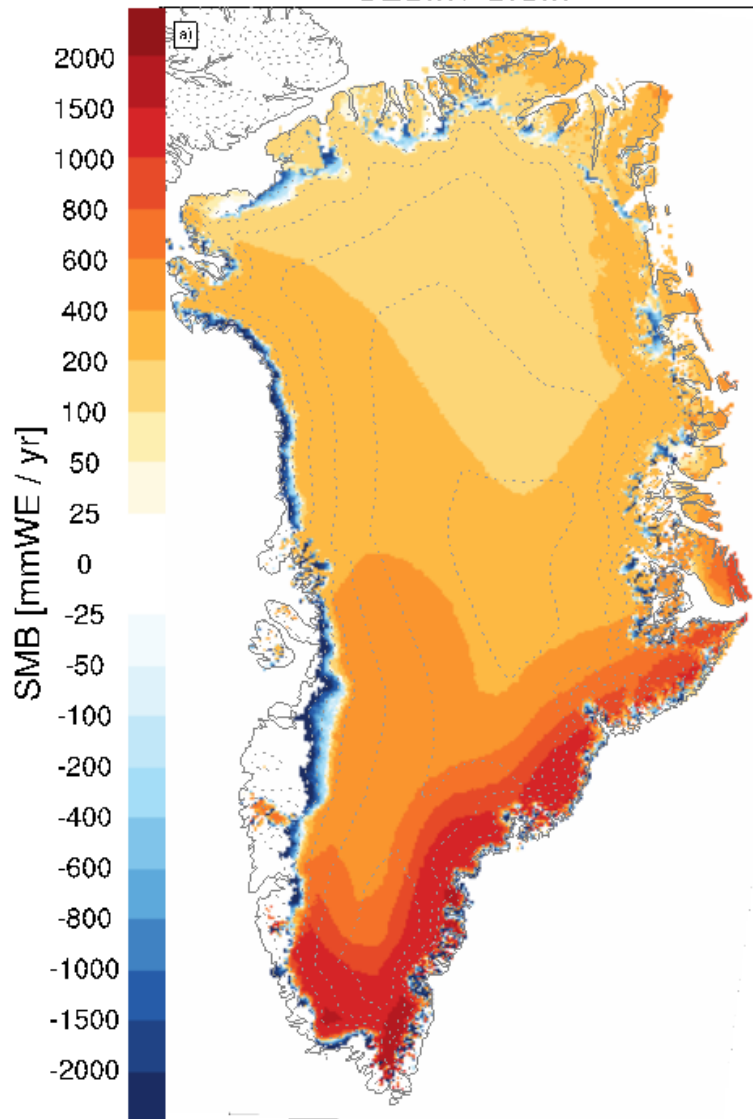
B1850 years 127 -- 156

Mass balance components



b.e20.B1850.f09_g17.pi_co

CESM / CISM



Recent CLM developments

- snow grain size
 - now function of temperature, ranging 54 - 204 microns
- SCF parameter NMELT back to 10
- reset initial snow height for glaciers

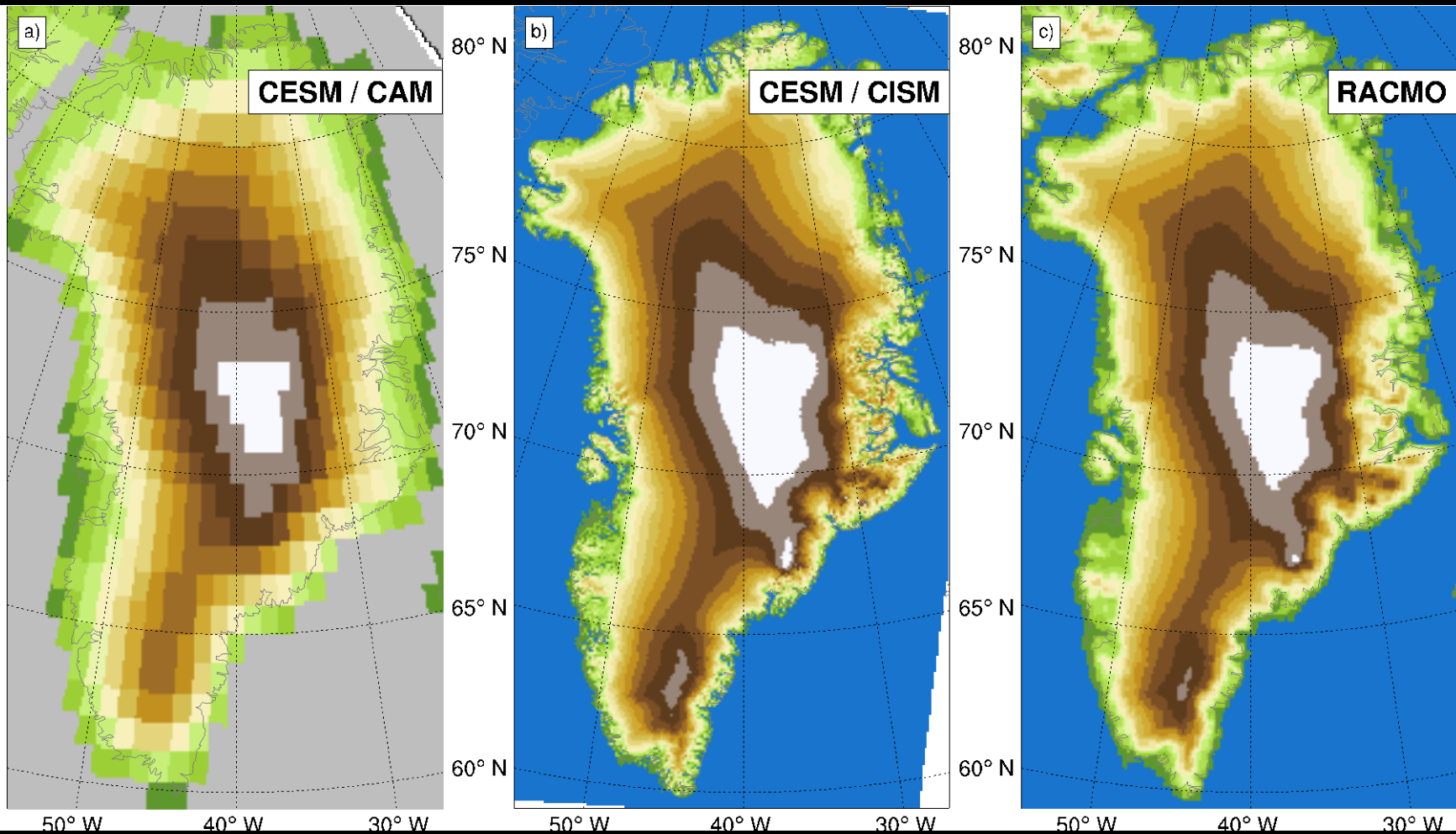
#190

BHIST years 1961 -- 1990

Summer climate (JJA)

Topography

m



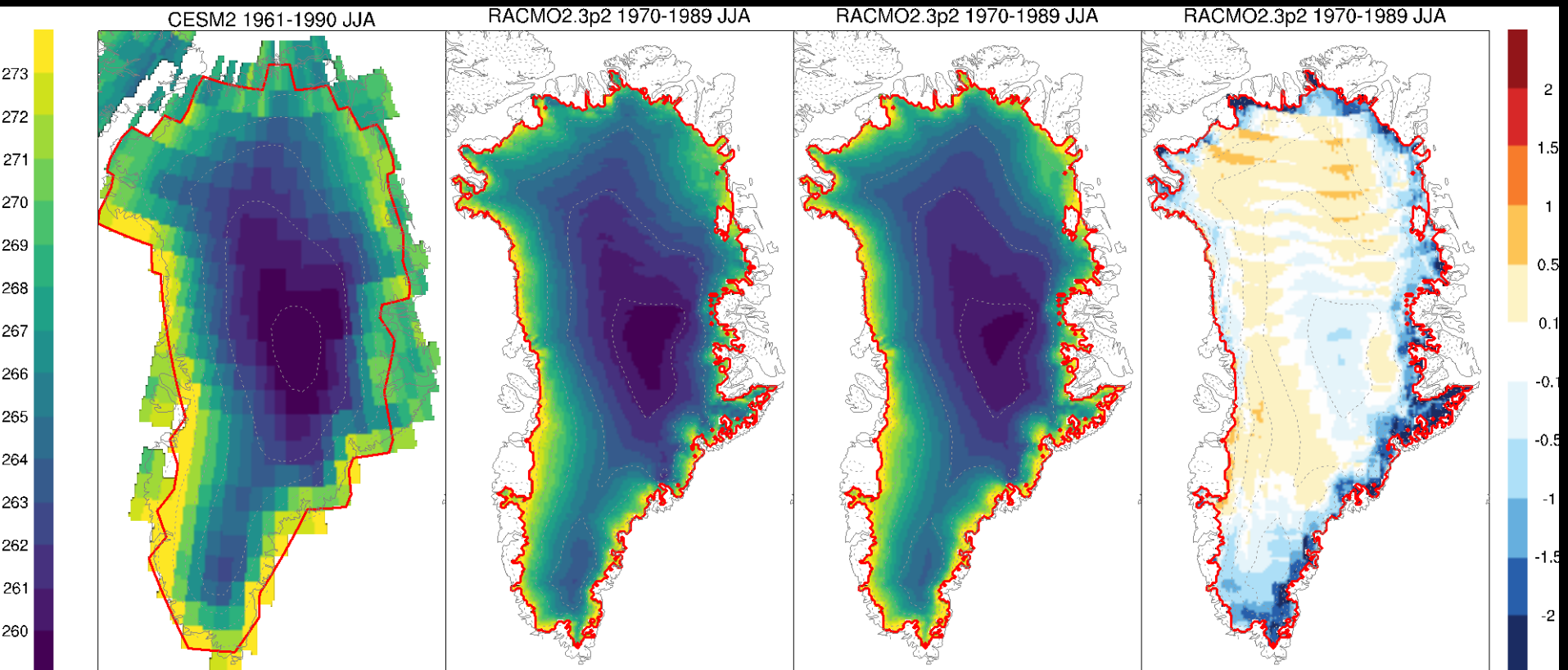
2m temperature

CESM #190

downscaled

RACMO

2 - 3



Shortwave down

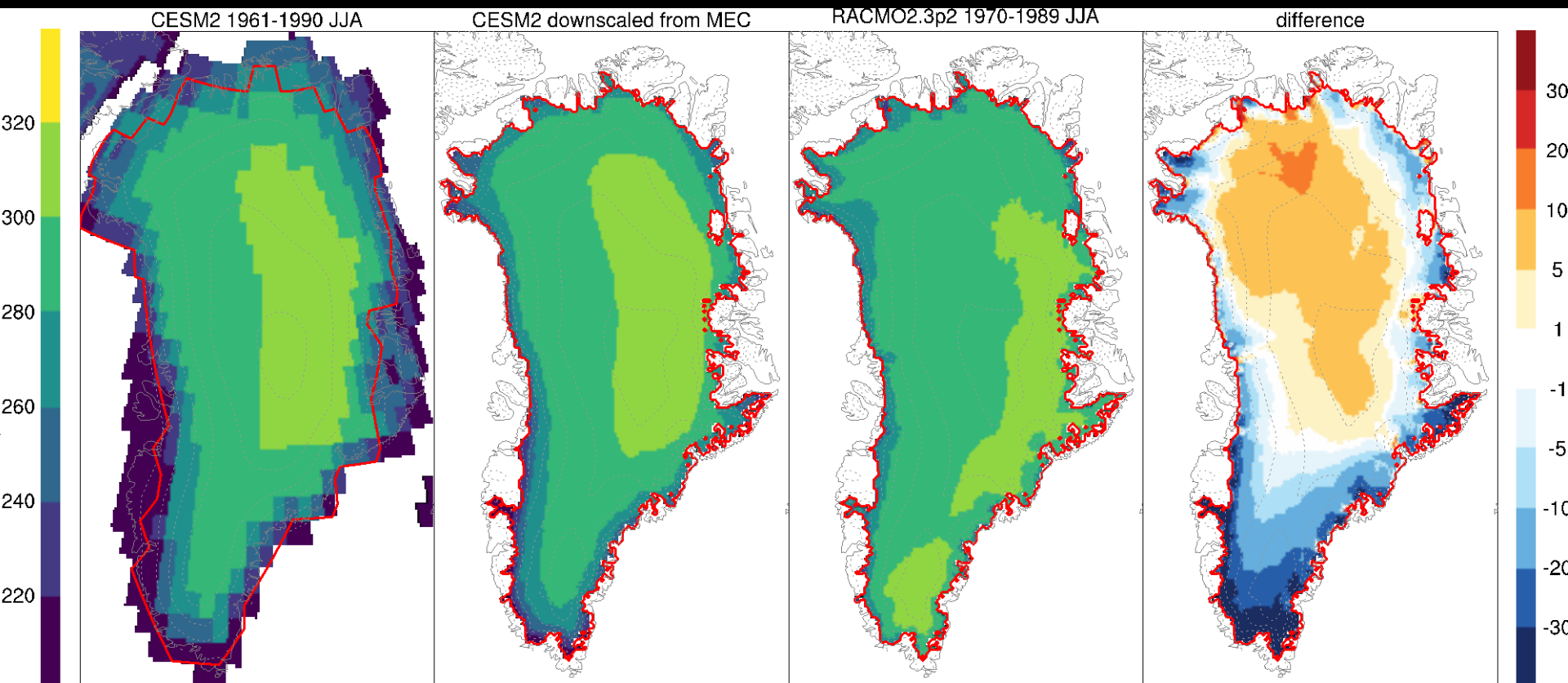
W/m^2

CESM #190

downscaled

RACMO

2 - 3



Shortwave net

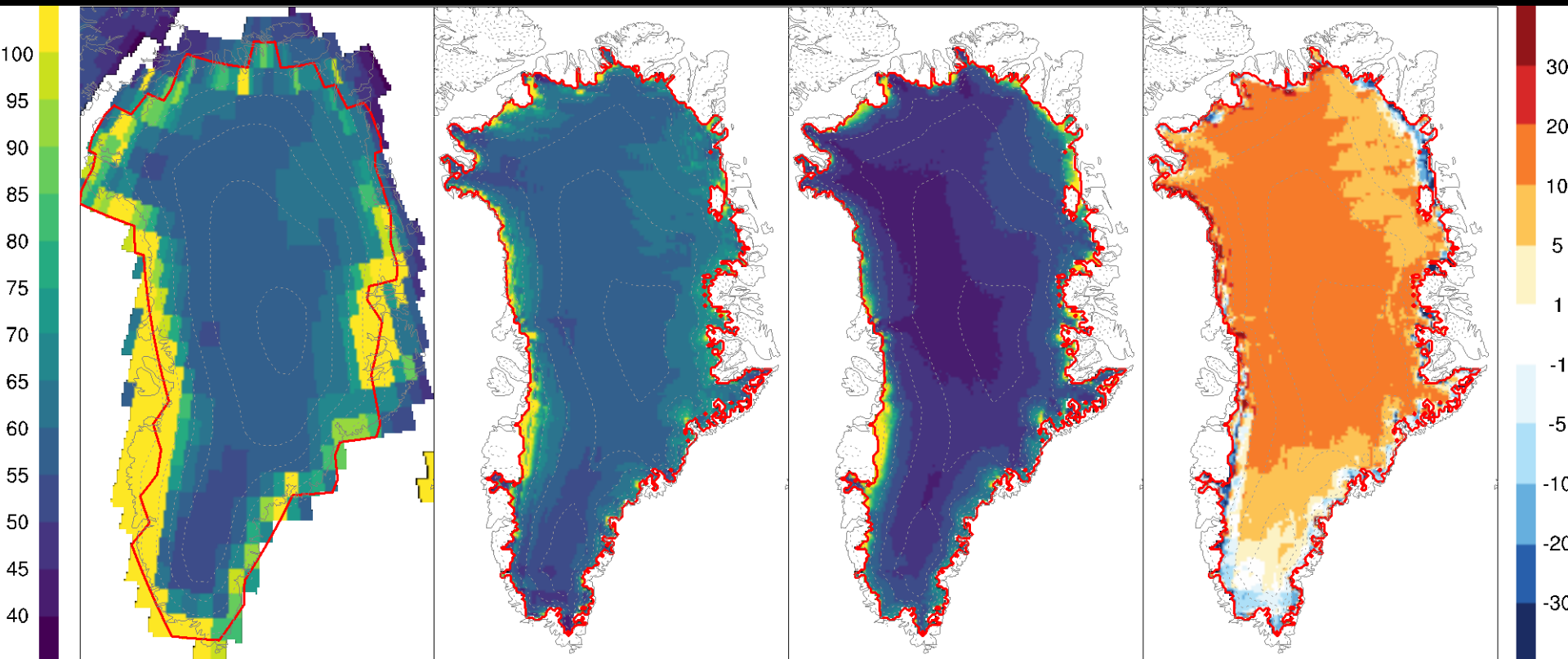
W/m²

CESM #190

downscaled

RACMO

2 - 3



Longwave down

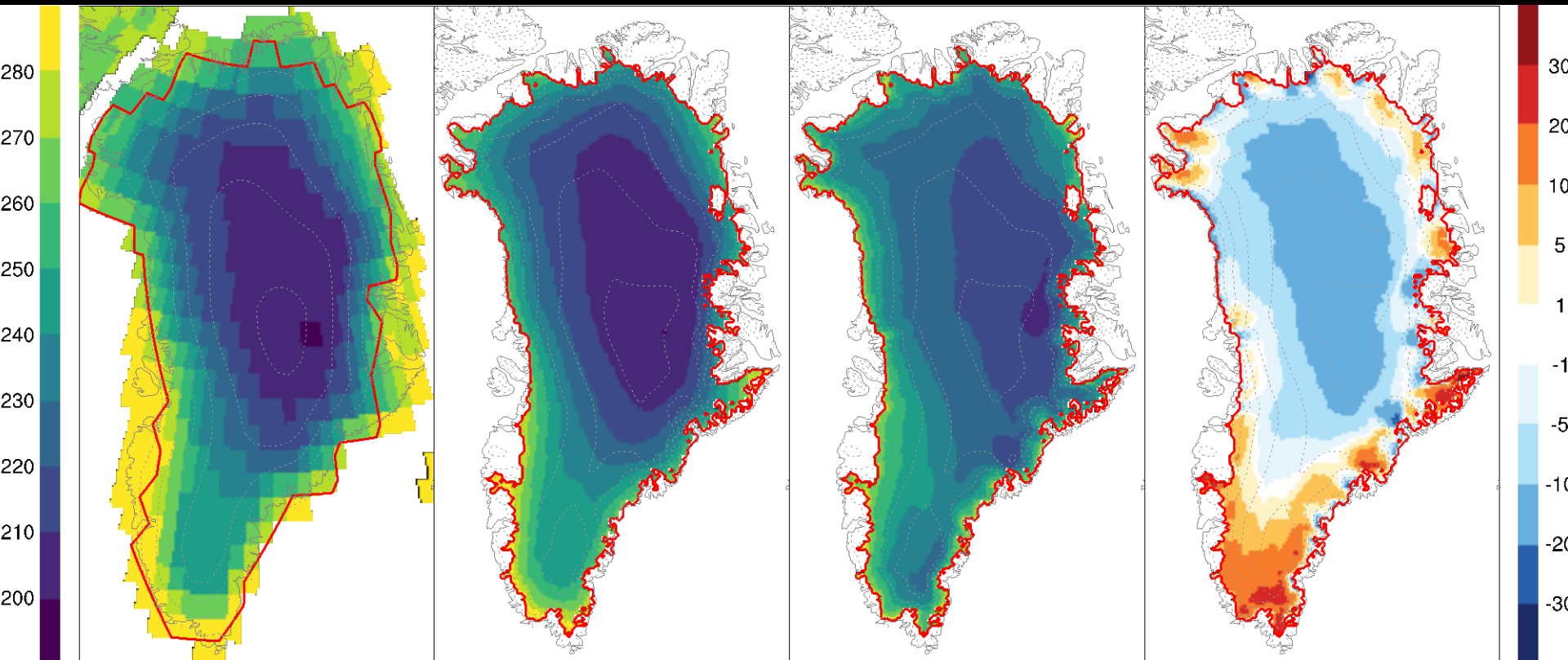
W/m^2

CESM #190

downscaled

RACMO

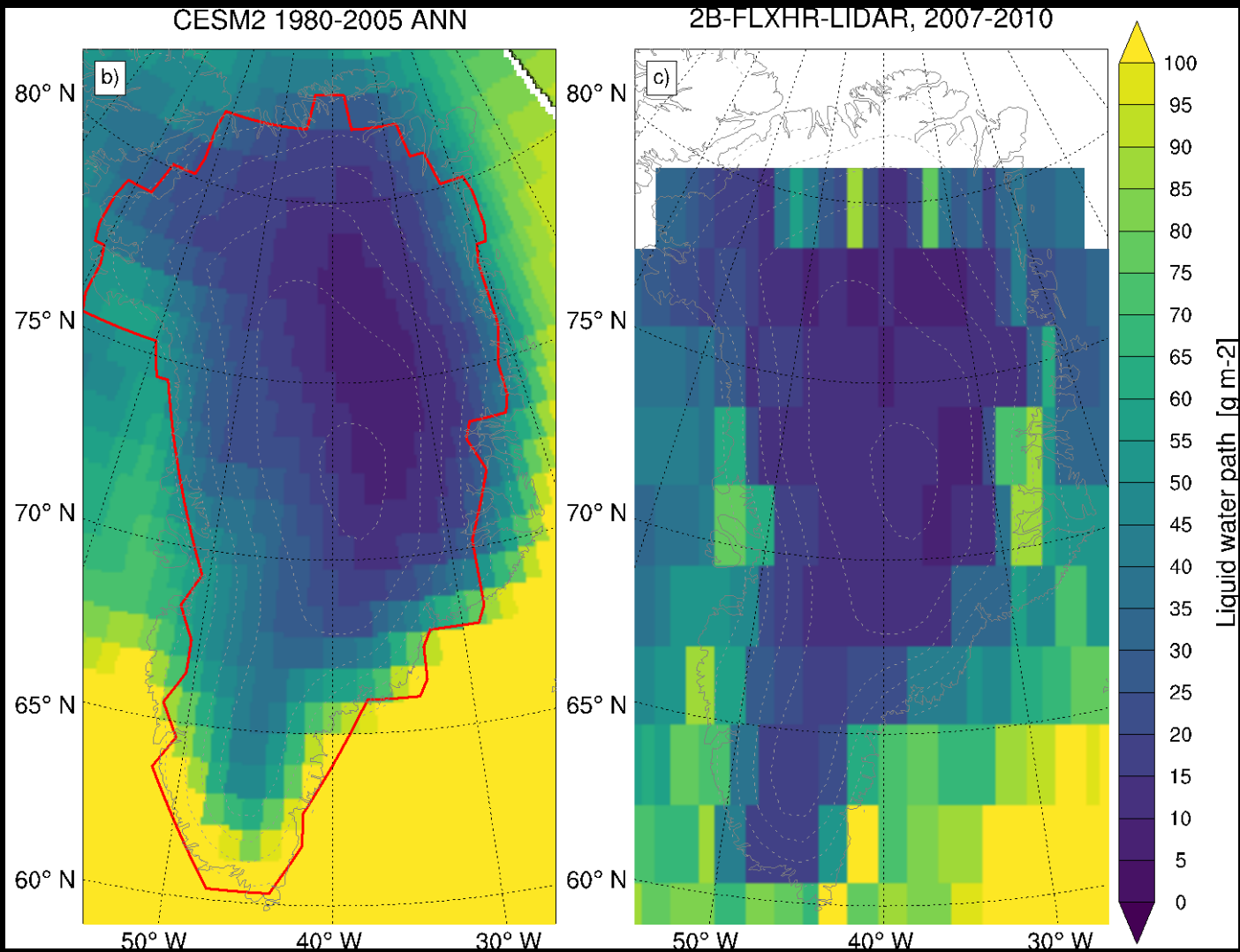
2 - 3



LWP

CESM2

CPR / CALIPSO



Longwave net

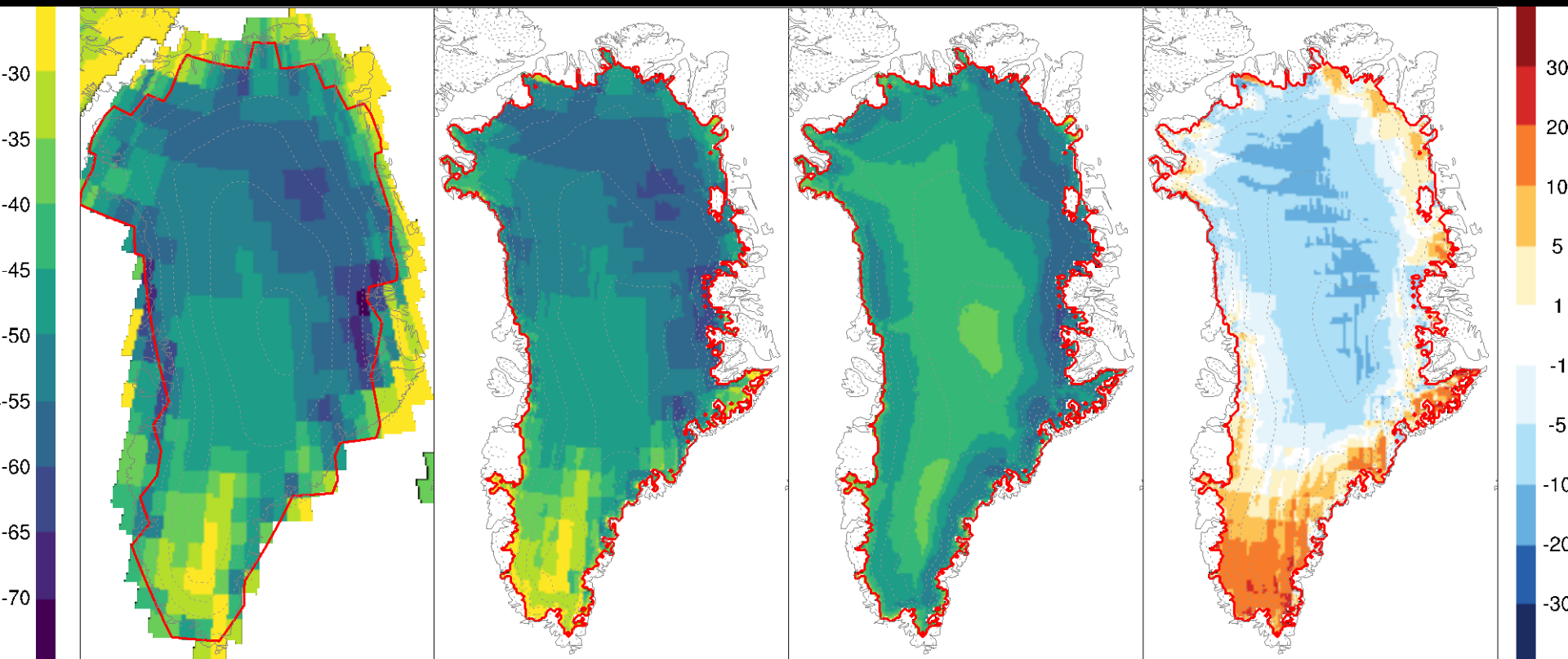
W/m^2

CESM #190

downscaled

RACMO

2 - 3



Net radiation

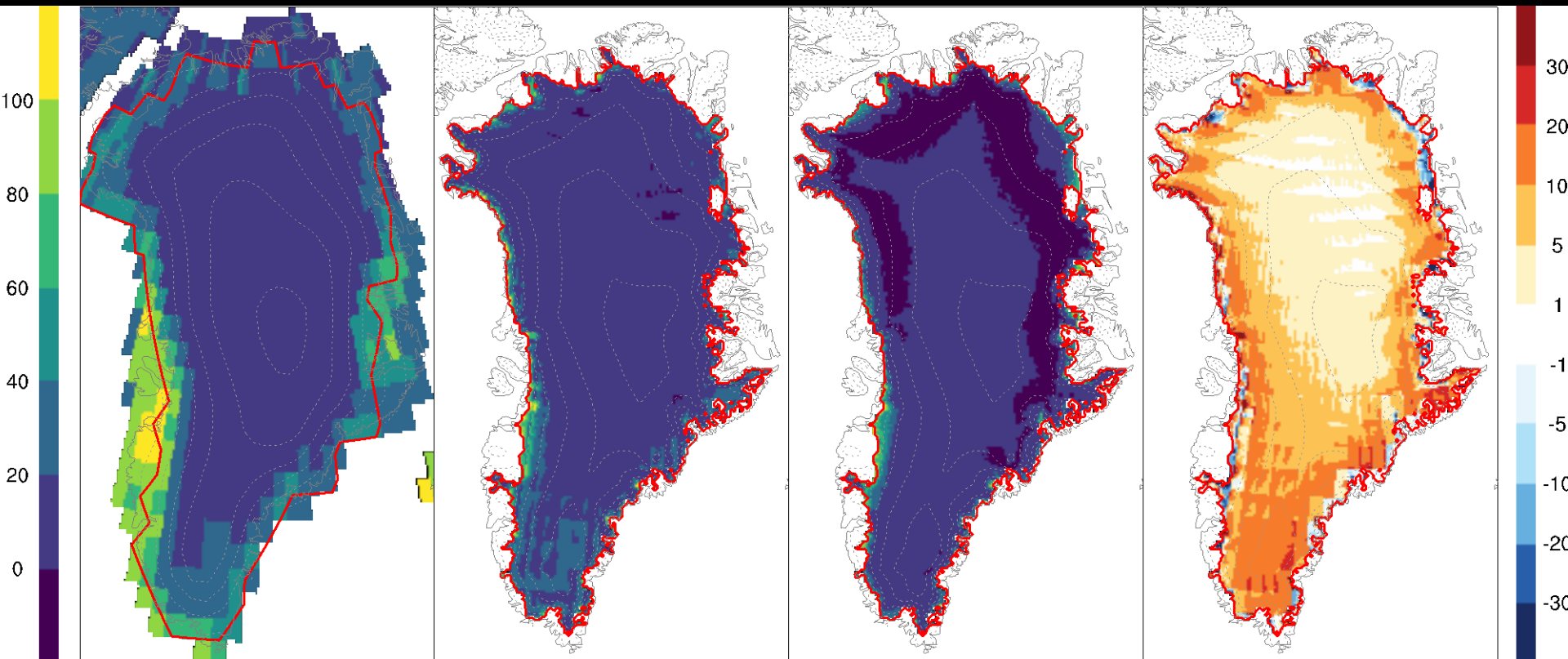
W/m^2

CESM #190

downscaled

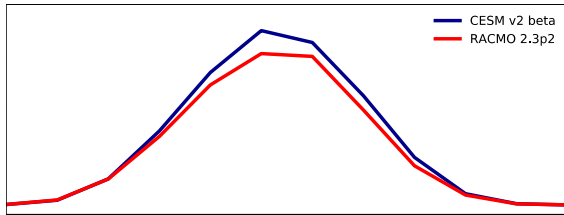
RACMO

2 - 3



Energy balance

— CESM
— RACMO



Sensible heat flux

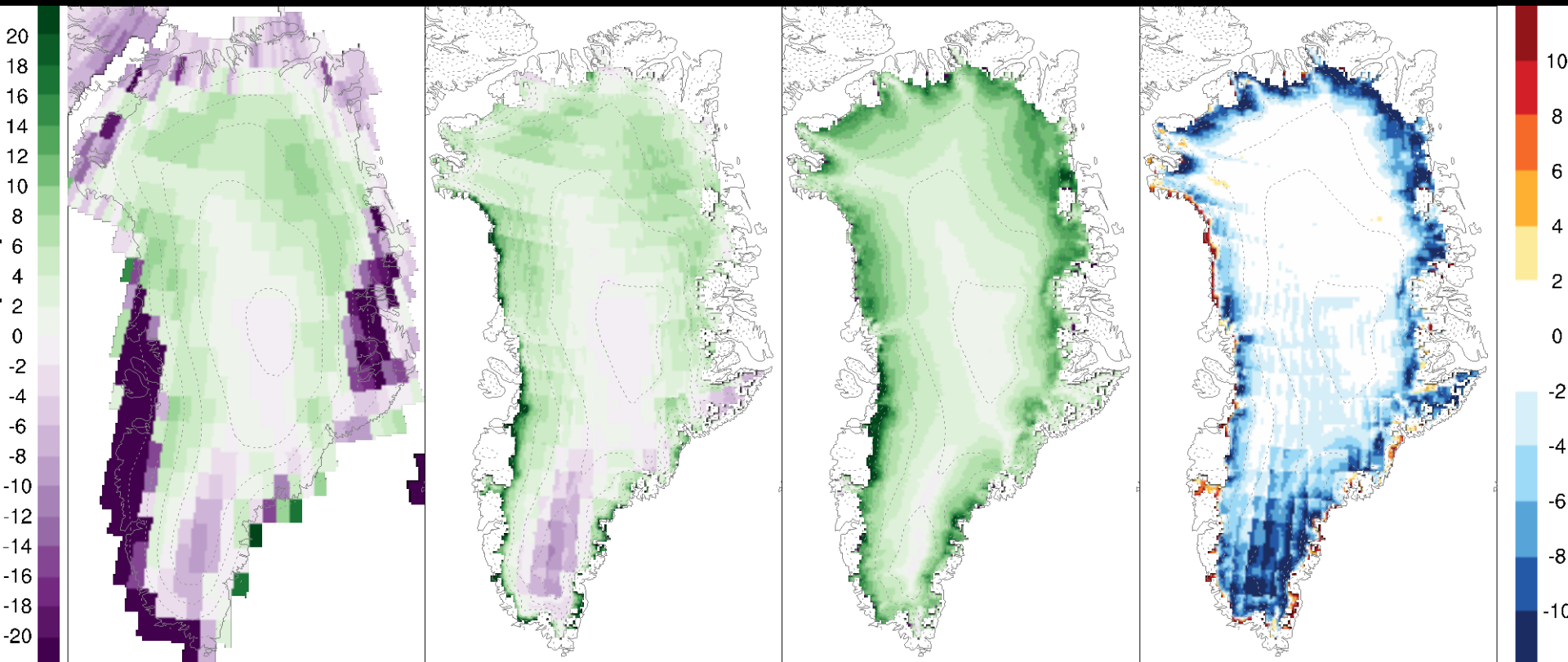
W/m^2

CESM #190

downscaled

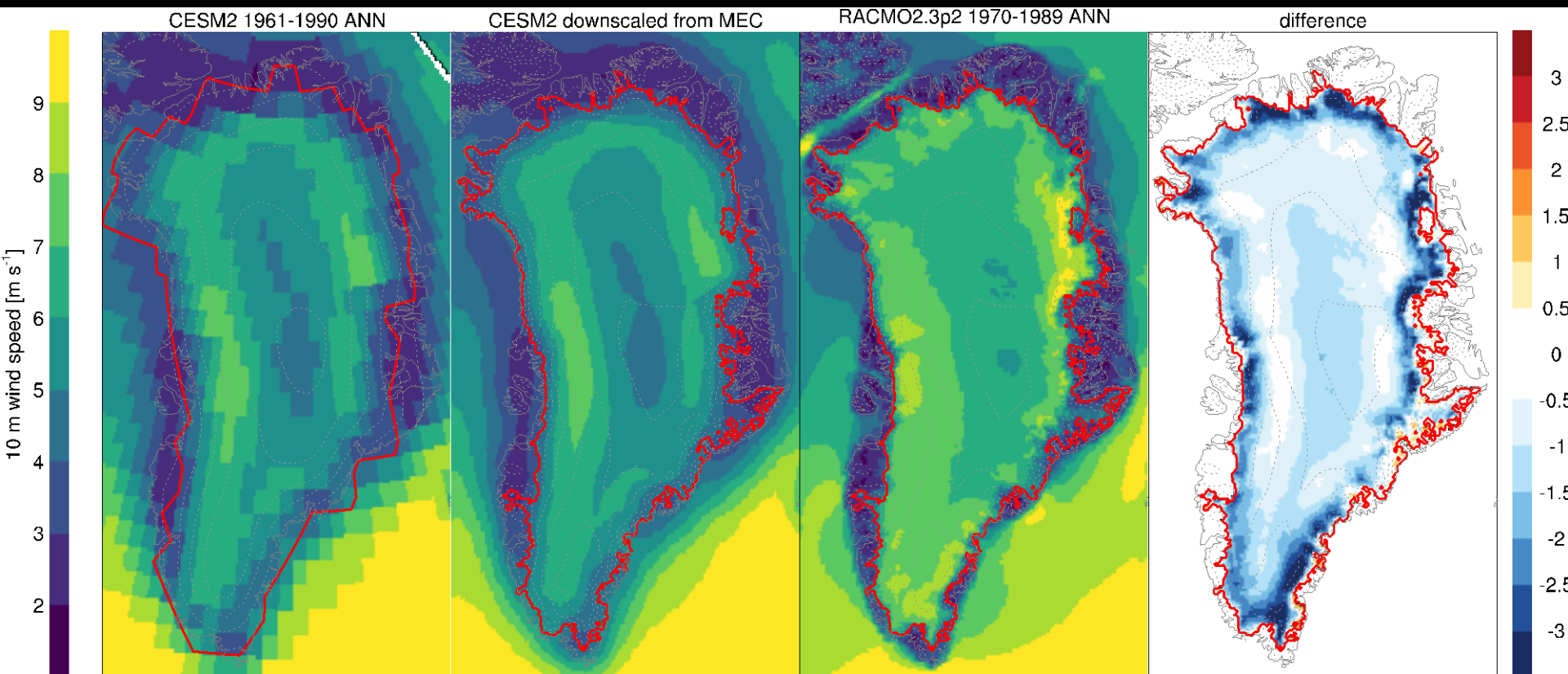
RACMO

2 - 3



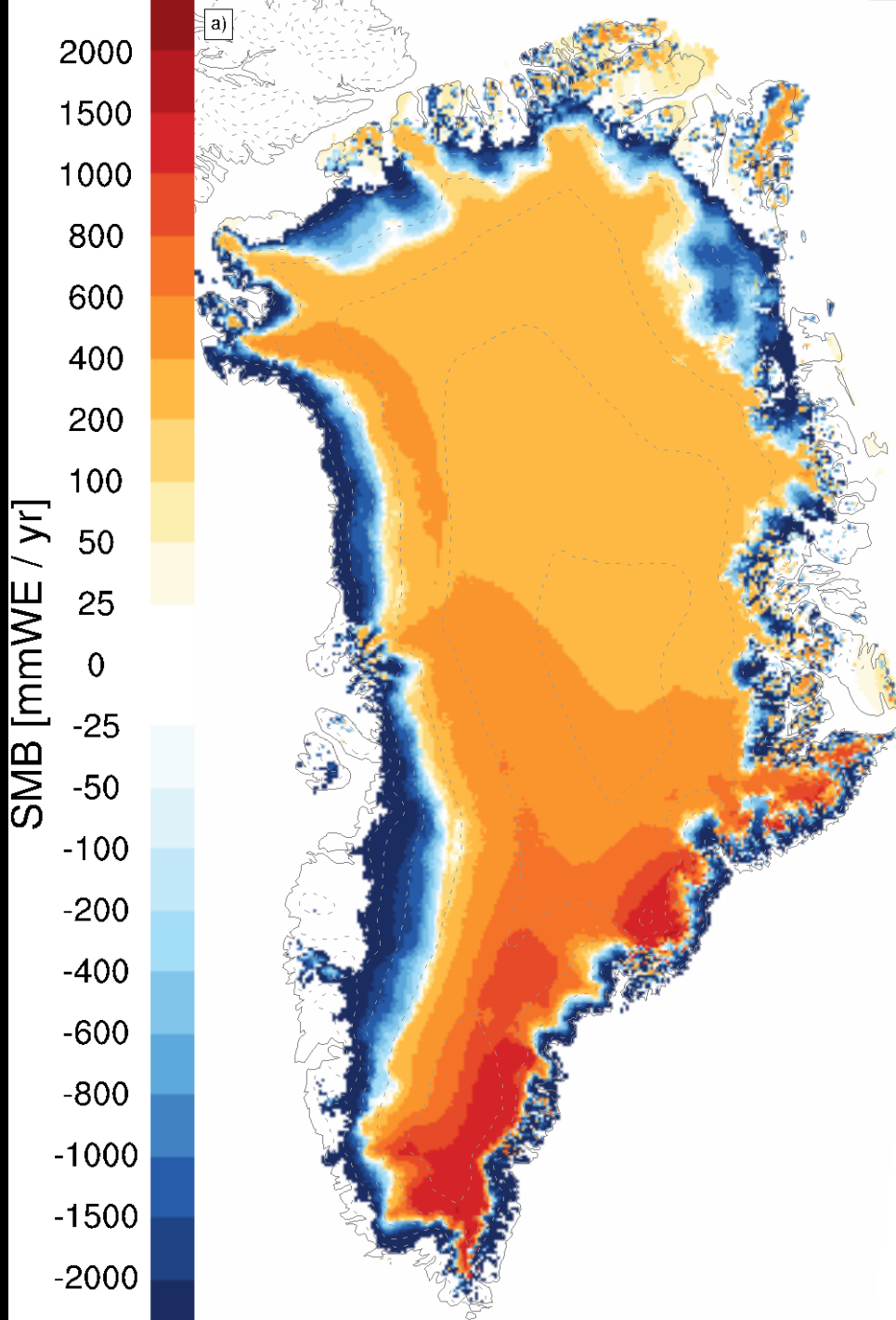
Surface winds

m/s



Outstanding issues

- rain bias
- bare ice sublimation still missing in SMB flux
- tundra snow pack problem



221 4xCO₂
years 1-45

Summary

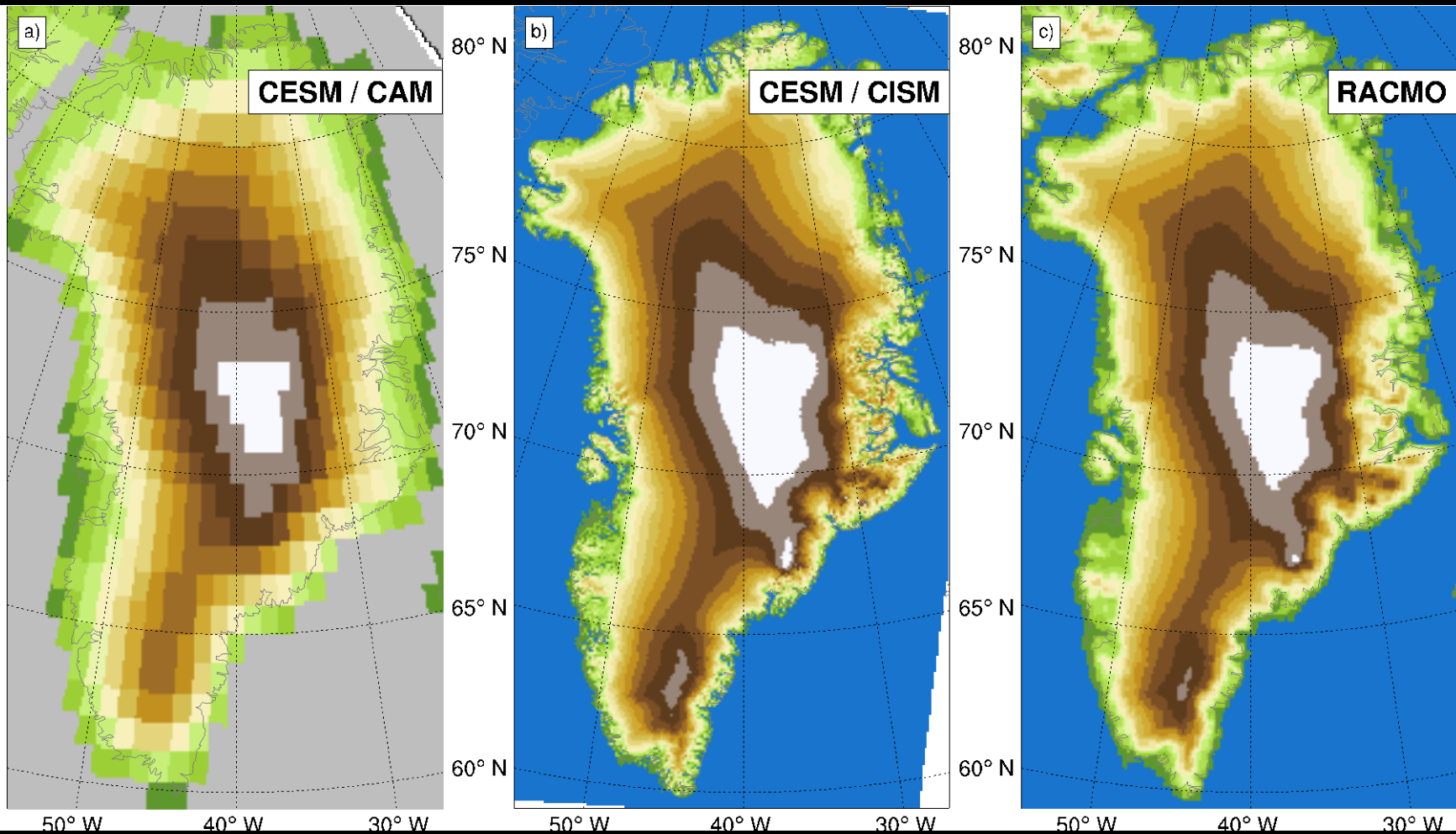
- CESM2 has a realistic Greenland SMB
- regionally, some compensating energy fluxes
 - e.g. South dome: excessive liquid cloud cover
 - how much is resolution related?
- rain bias
- ice sheet wants to advance into northern tundra
- ready for 1-way coupling
- manuscript on SMB & timeseries

Thanks

Extra slides

Topography

m



Greenland variable resolution

