Evaluation of Greenland climate in CESM2

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#260

B1850 years 127 -- 156
Mass balance components

- CESM
- RACMO

- MELT
- snowmelt

- QSNOFZ_ICE
- refreeze

- RPF
- runoff
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
2m temperature

CESM #190
downscaled
RACMO
2 - 3
Shortwave down
W/m²

CESM #190
downscaled
RACMO
2 - 3

CESM2 1961-1990 JJA
CESM2 downscaled from MEC
RACMO 2.3p2 1970-1989 JJA
difference
Longwave down
W/m²

CESM #190  
downscaled  
RACMO  
2 - 3
Longwave net
W/m²

CESM #190  |  downscaled  |  RACMO  |  2 - 3
Net radiation
W/m²

CESM #190  downscaled  RACMO  2 - 3
Energy balance

![Graph showing energy balance between CESM and RACMO](image)
Sensible heat flux
W/m²

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
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
Greenland variable resolution