

Welcome

PMIP Session

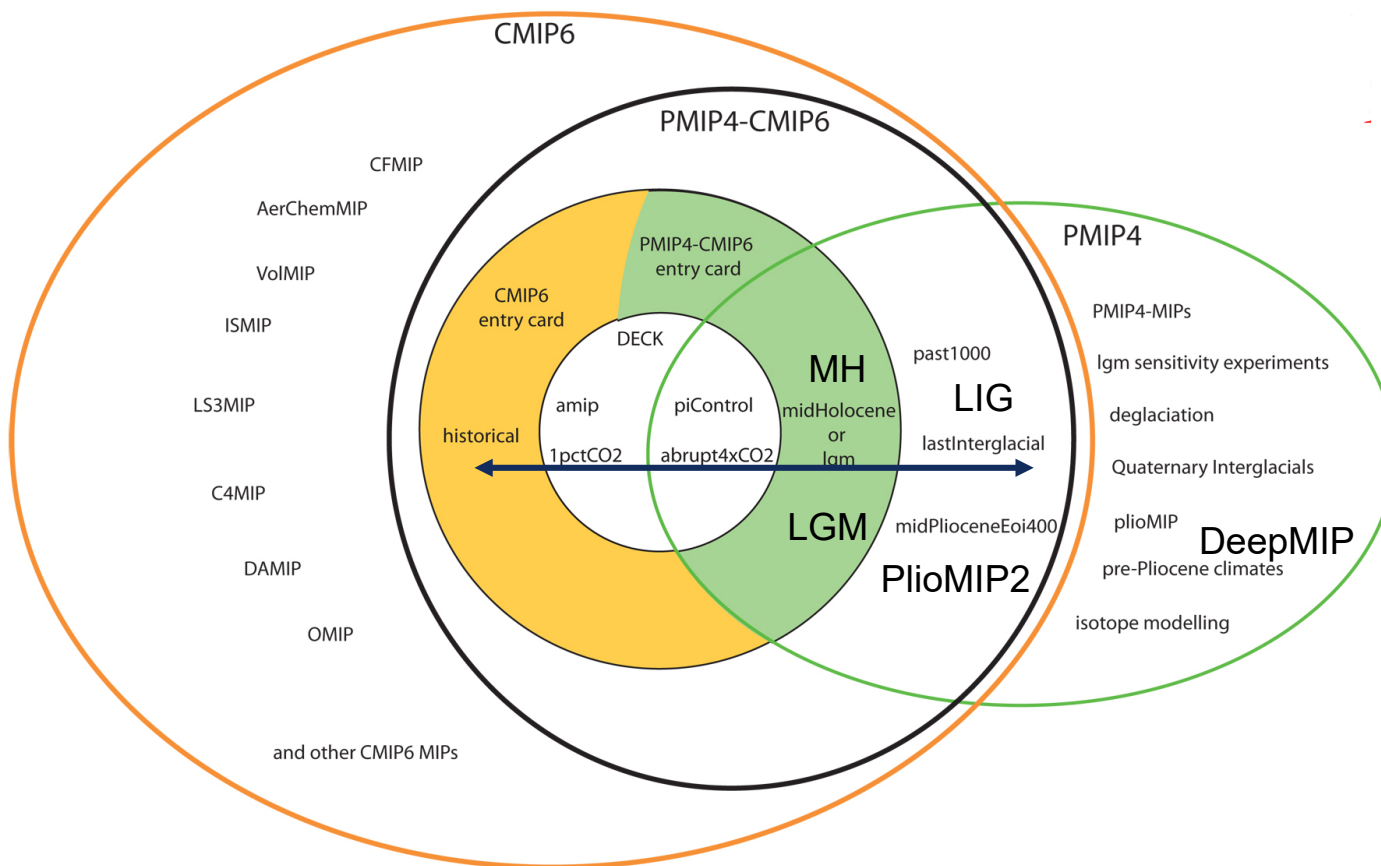
Bette Otto -Bliesner
NCAR



February 12, 2020



CMIP6 and PMIP4 Paleoclimate Model (plus Data) Intercomparison Projects



<https://www.climate-of-the-past.net/>

The CMIP6 - PMIP4 *lig127k* simulations

Large -scale features and comparisons with proxy data

Bette Otto -Bliesner, and many, many others
NCAR et al.

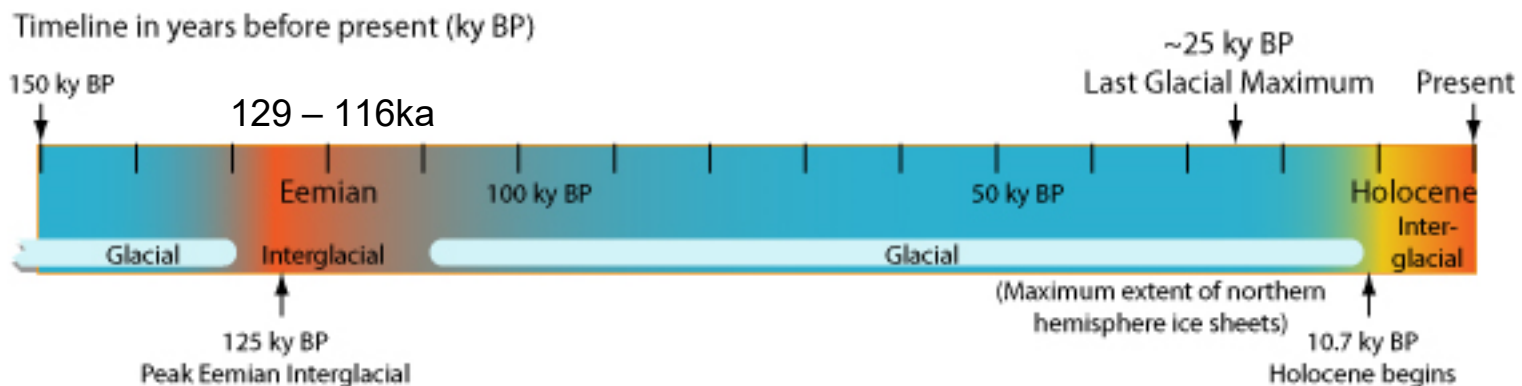


February 12, 2020

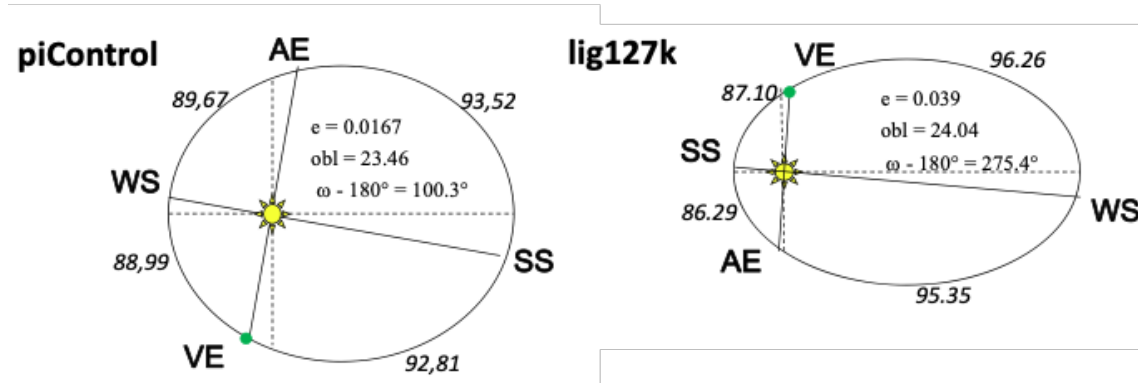


CMIP6-PMIP4 Tier 1 *lig127k* simulations

- First time a Last Interglacial simulation included in CMIP
- Why? Geologic record indicates warm Arctic and high sea level
- 127 kyr BP time slice chosen through consensus of modeling and data community
- 17 climate models have completed (10 uploaded to CMIP6 ESGF, so far)
- Equilibrium Climate Sensitivity (ECS) varies from 2.1 to 5.6°C
- New syntheses of marine and terrestrial proxies



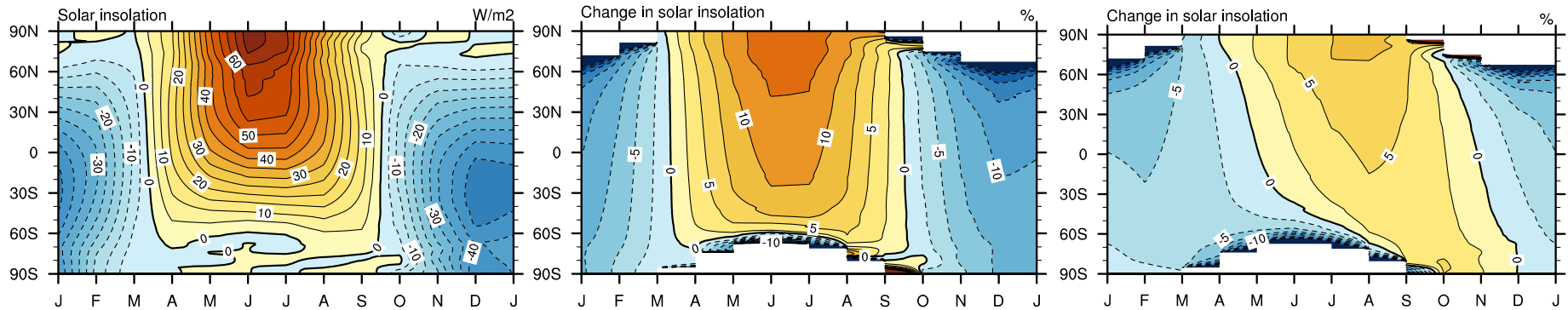
FORCING: Orbital configuration -> Insolation anomalies



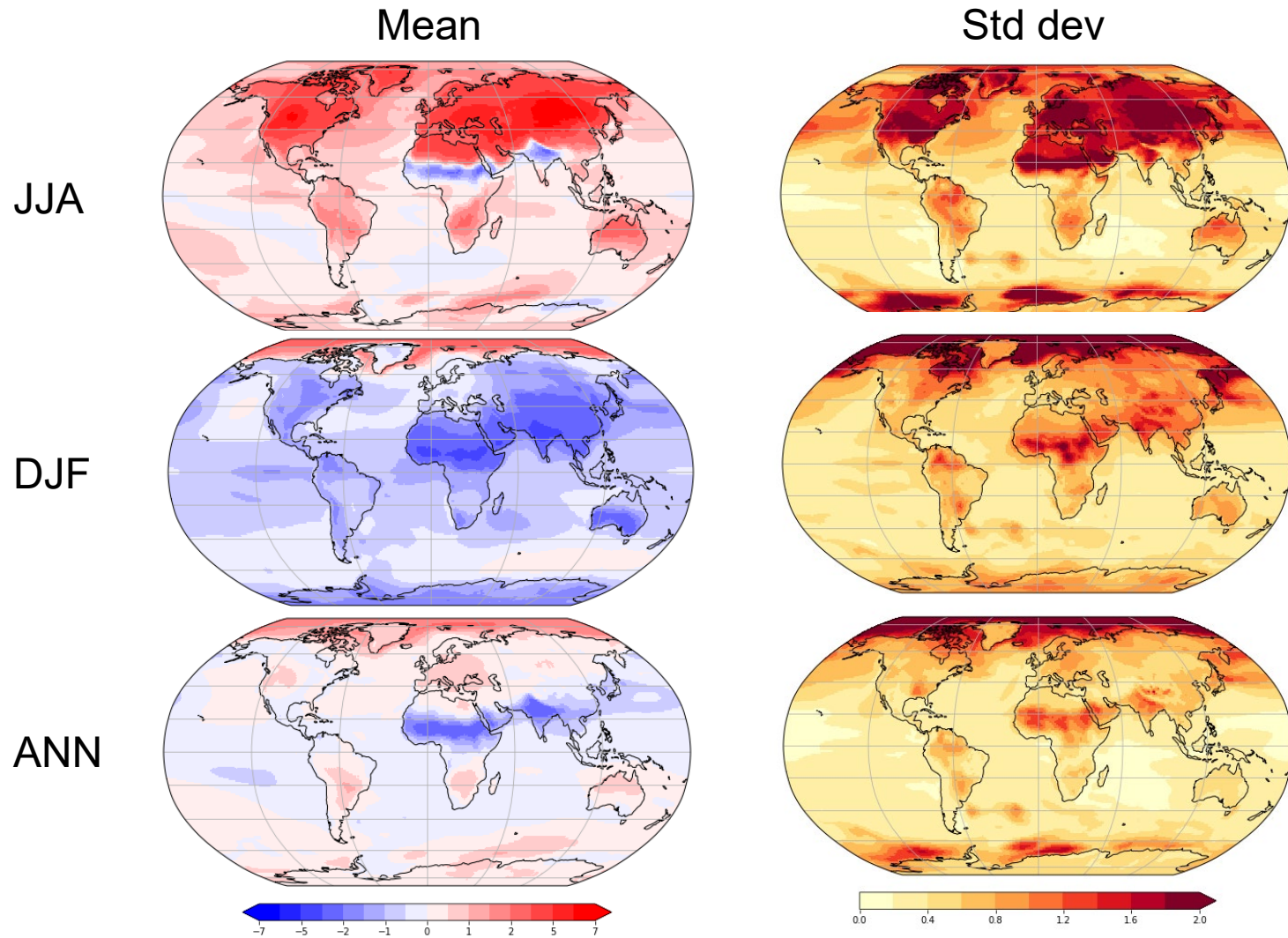
127ka - PI

127ka - PI

6ka - PI

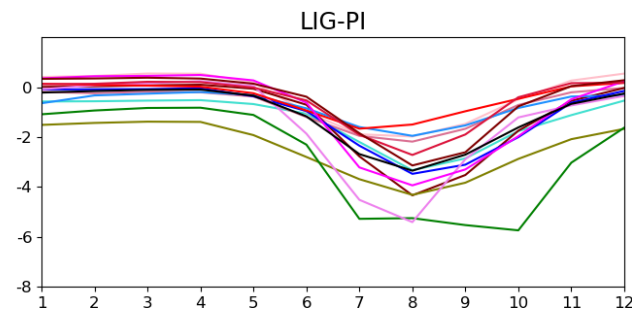
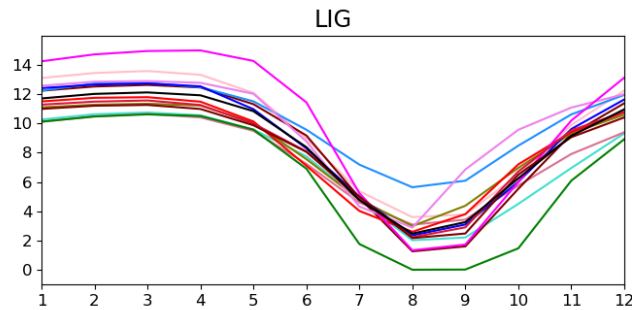
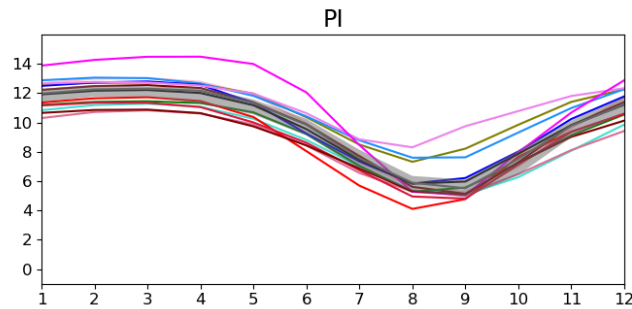


Multi -model ensemble: Surface Temperature

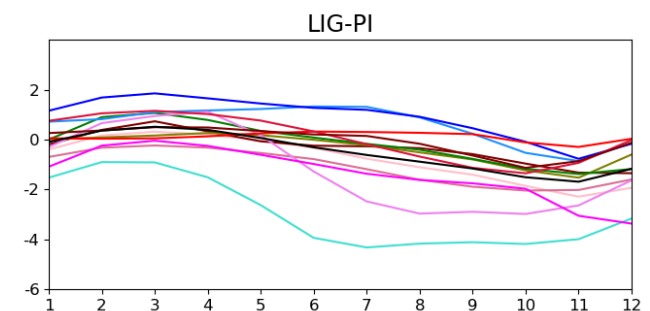
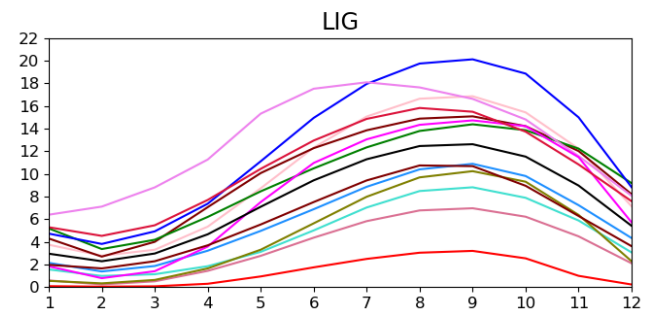
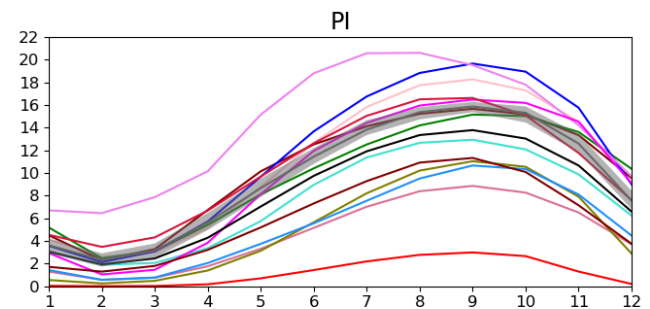


Multi -model ensemble: Seasonal cycle of sea ice area

Northern Hemisphere

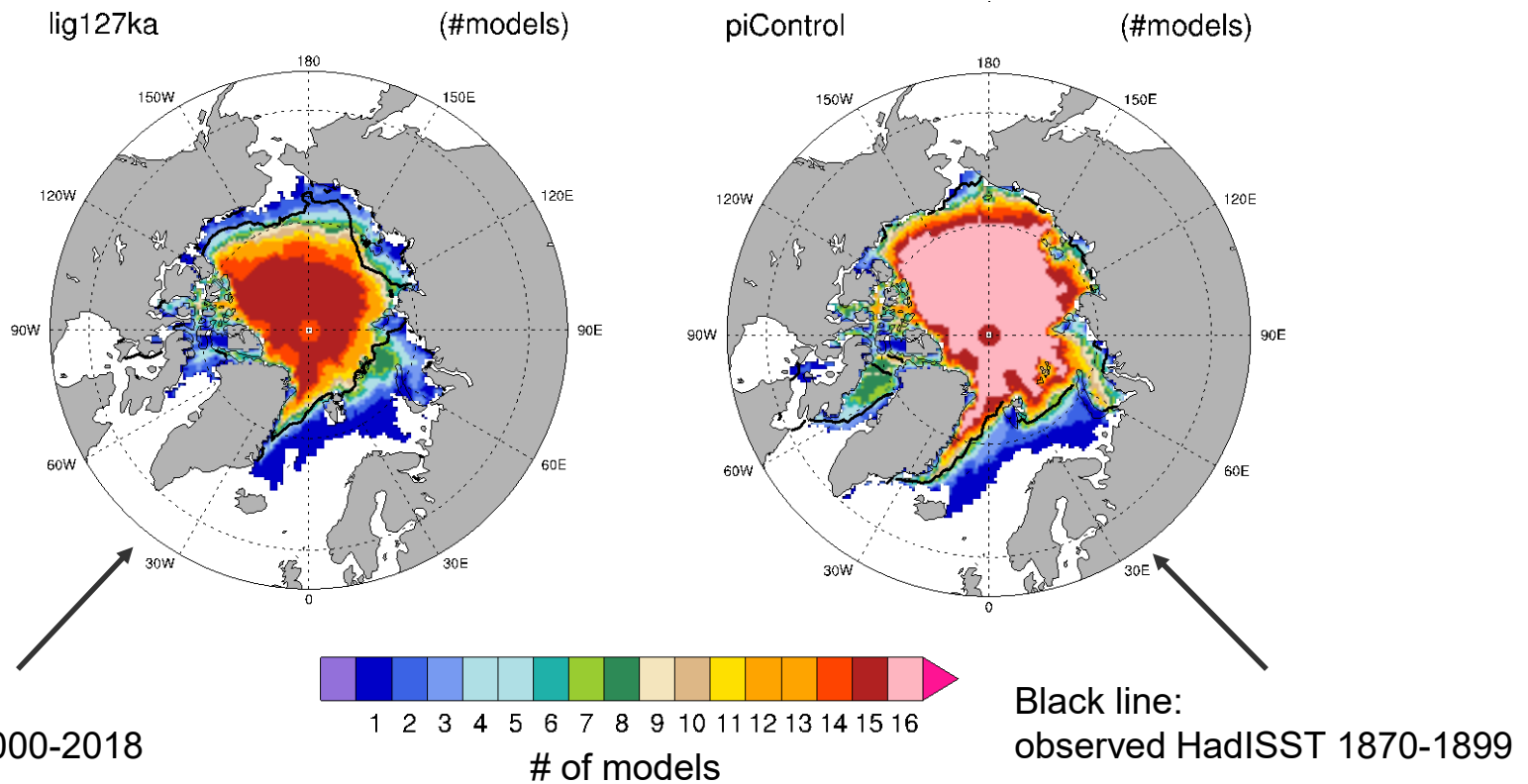


Southern Hemisphere

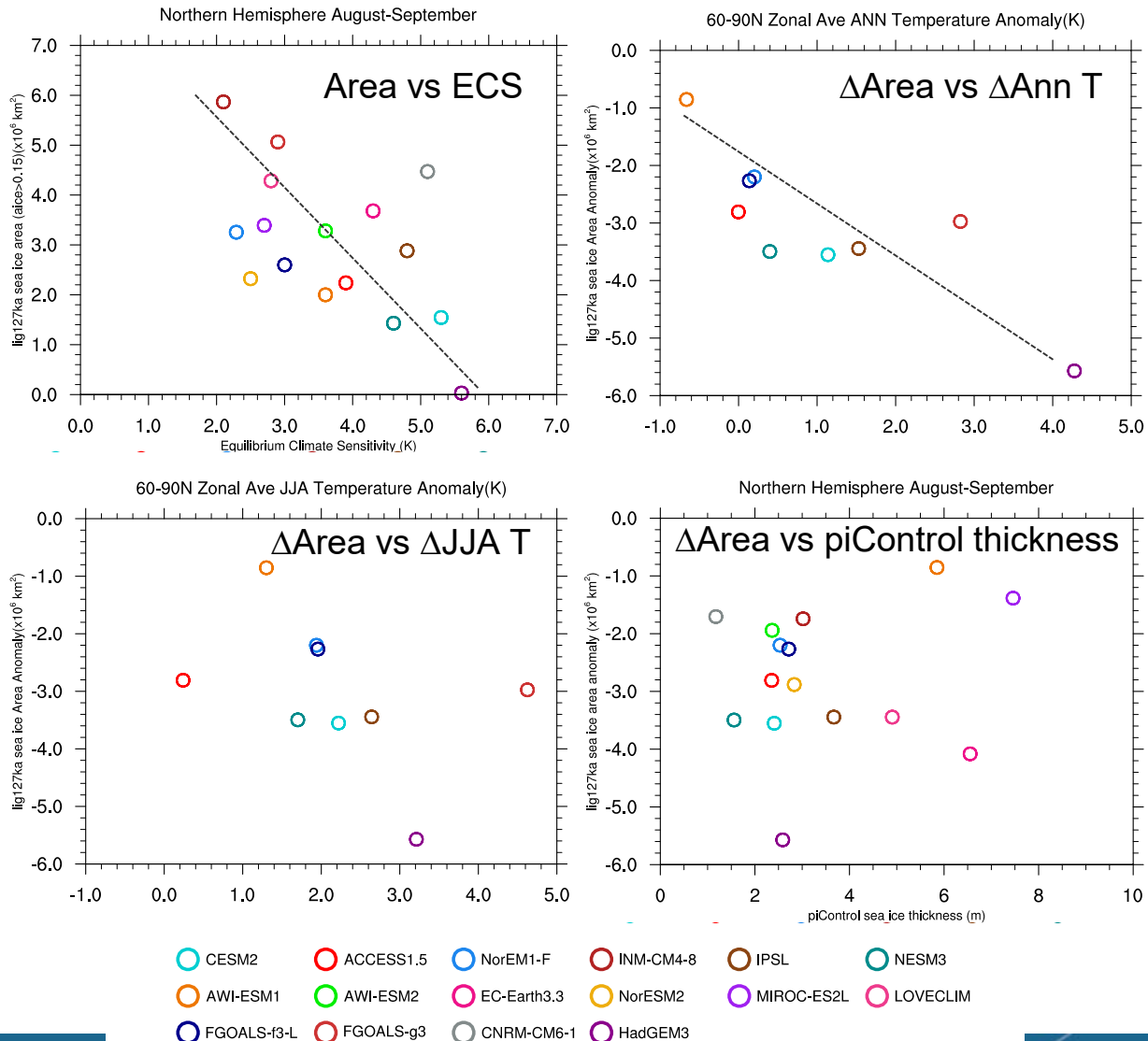


Multi-model ensemble: Arctic sea ice in Aug -Sep

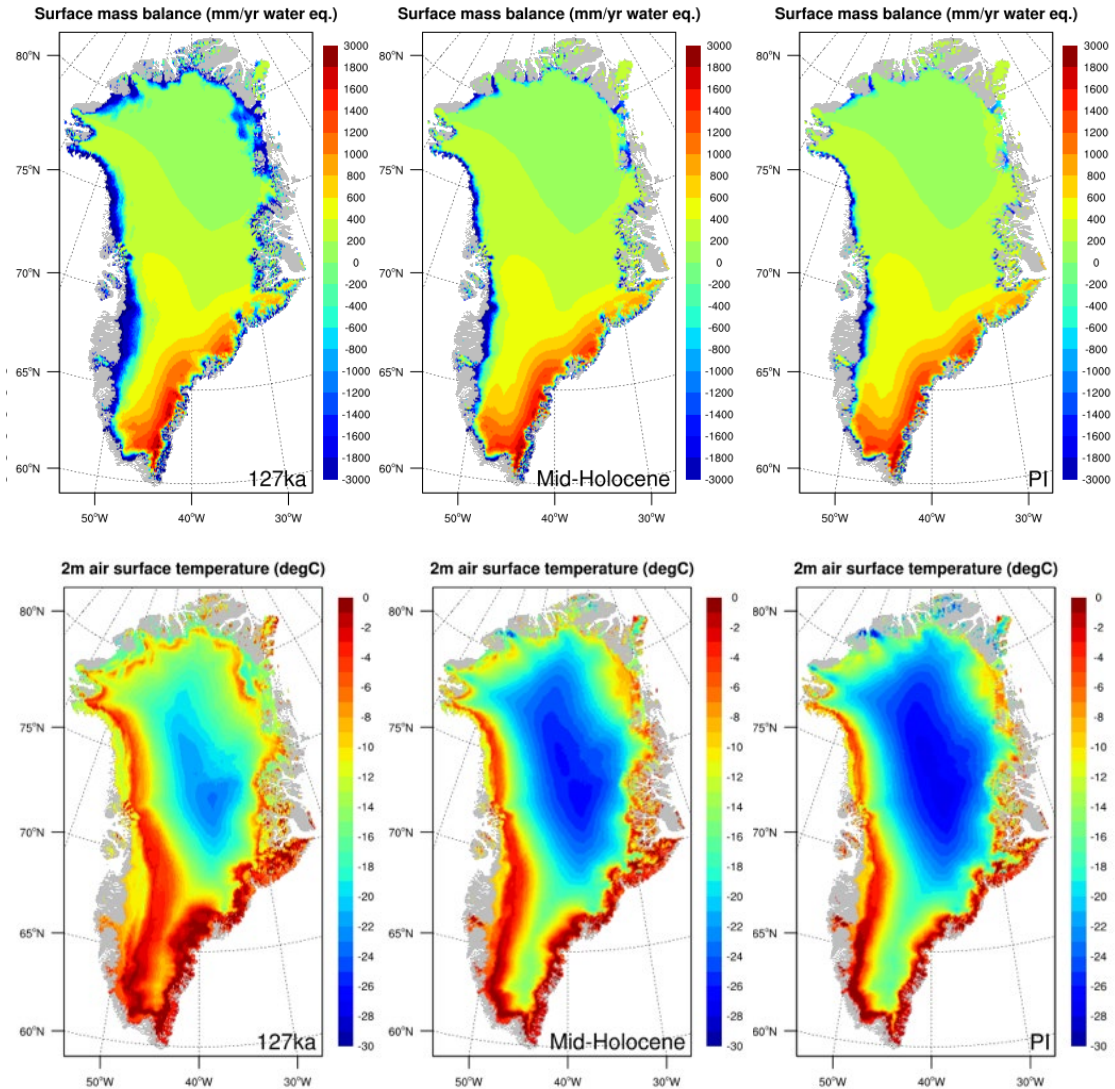
of models that simulate at least 15% of the area covered by sea ice



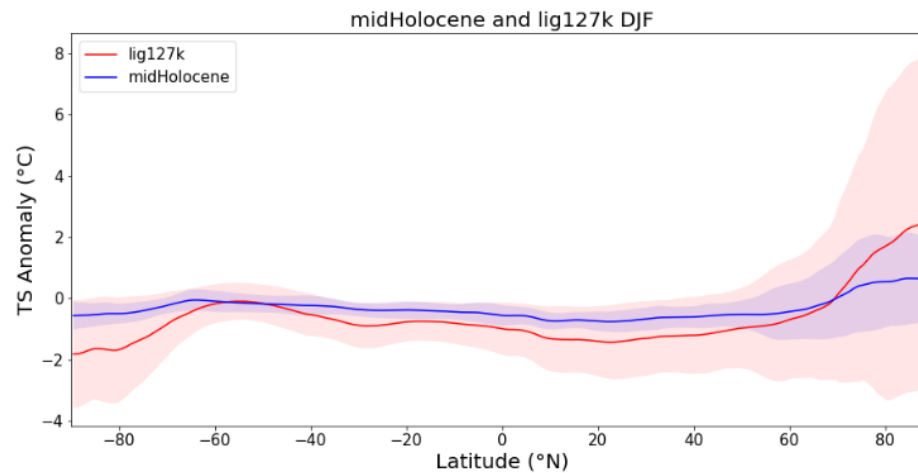
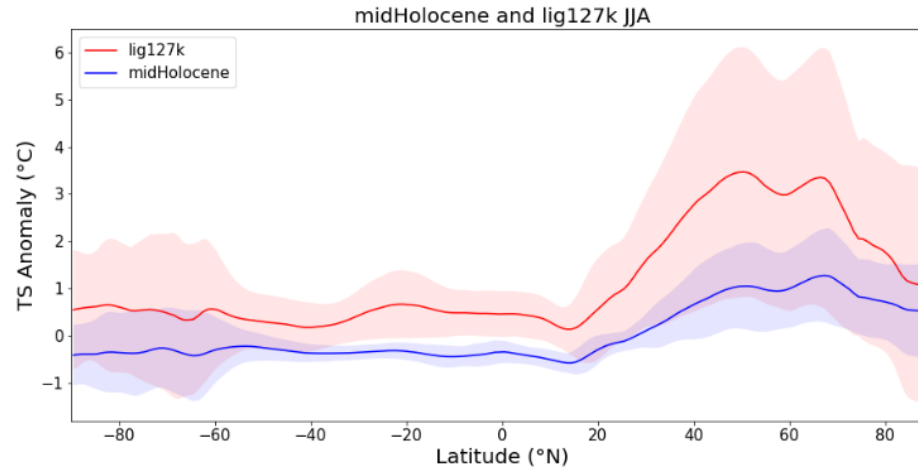
Multi -model ensemble: *lig127k* Arctic minimum sea ice



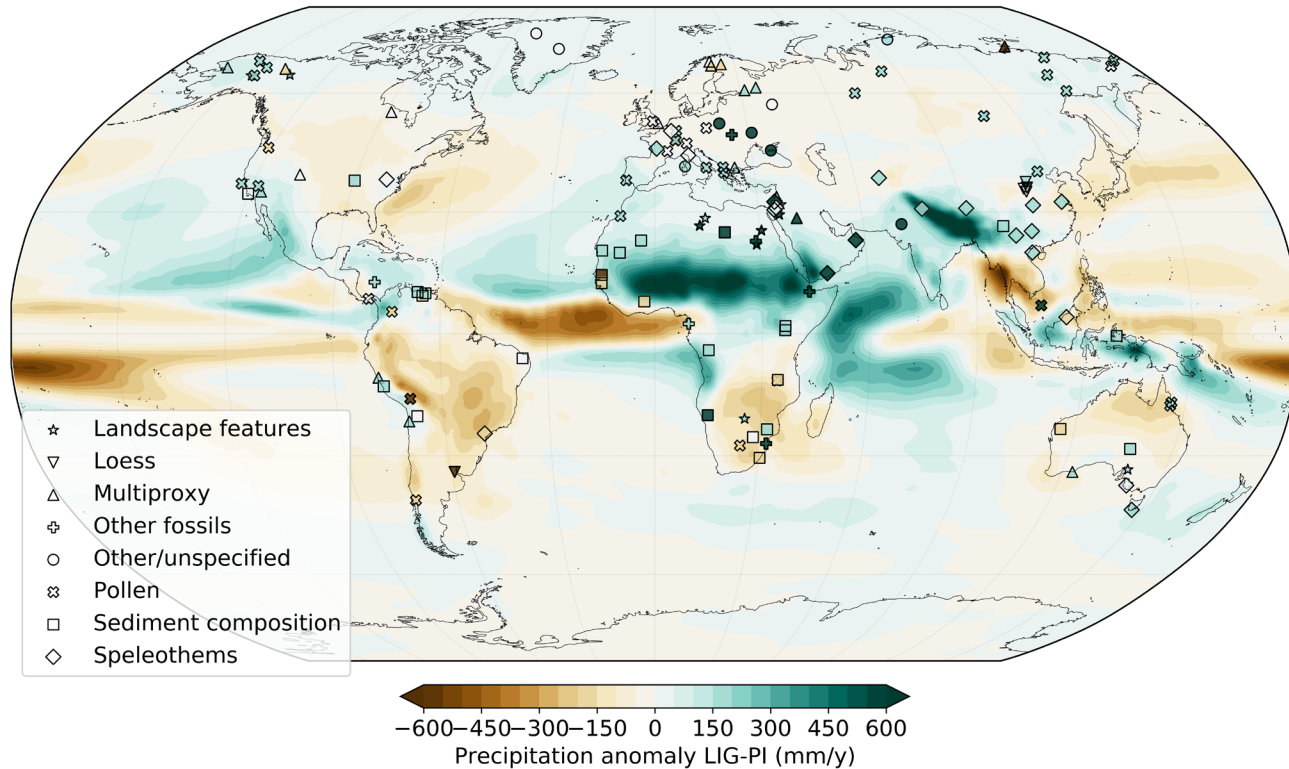
CESM2: Greenland Ice Sheet



lig127k vs midHolocene : Surface Temperature

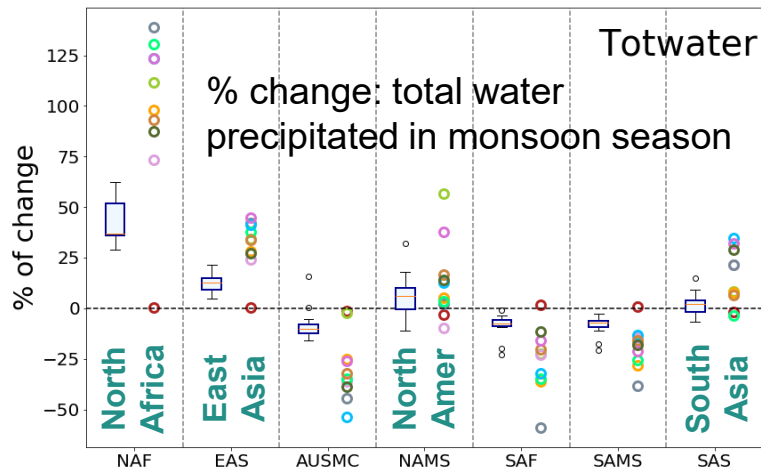
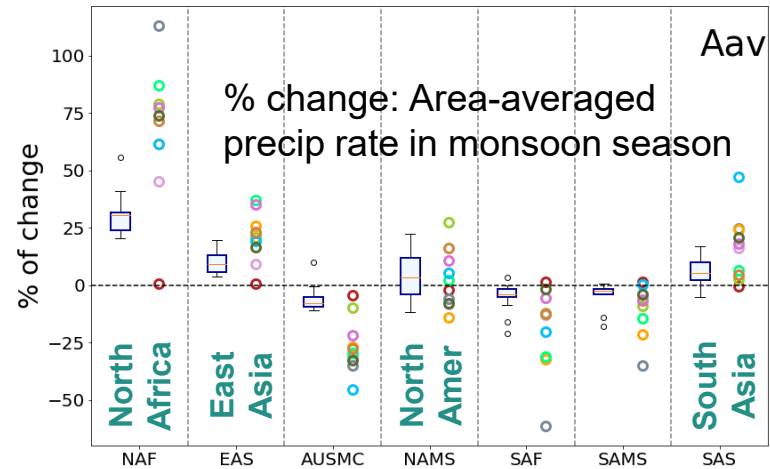
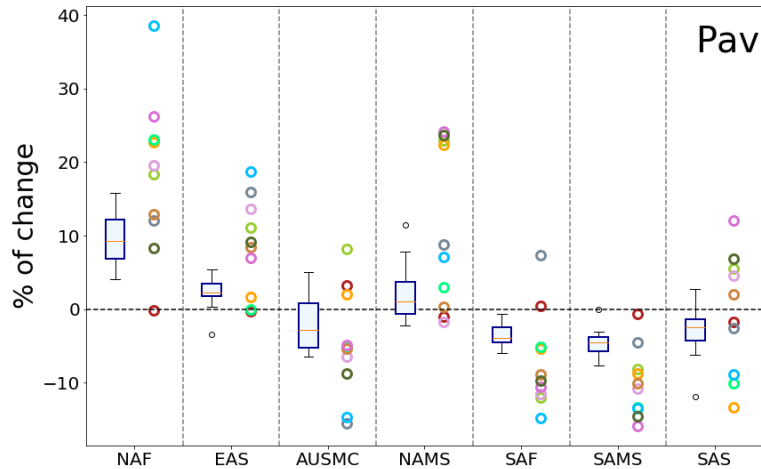


Multi -model ensemble: Precipitation



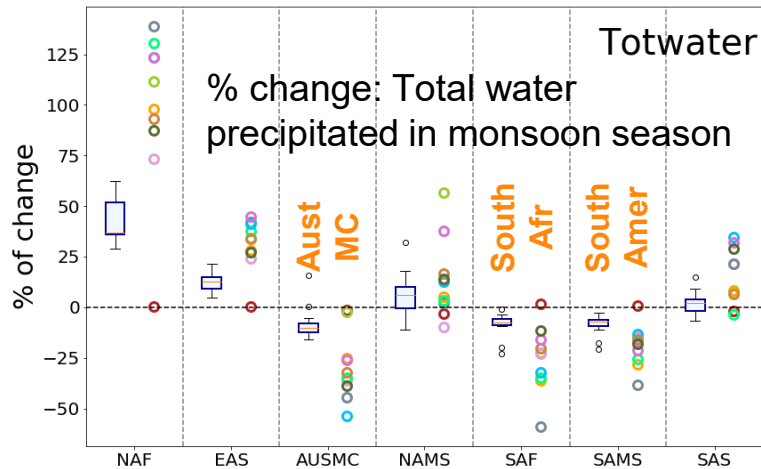
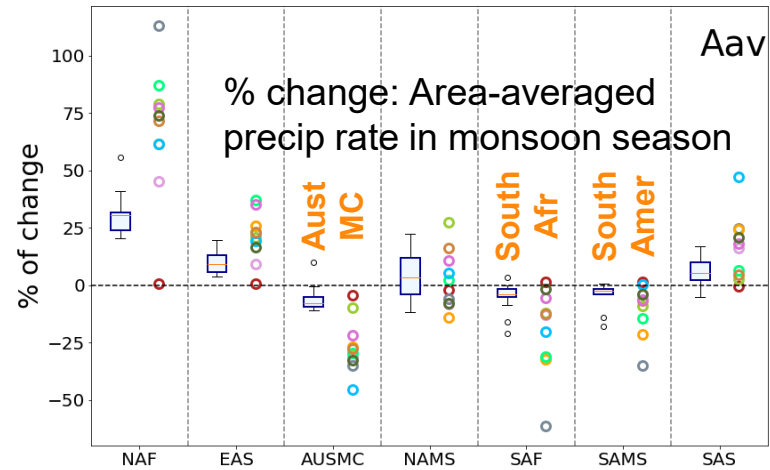
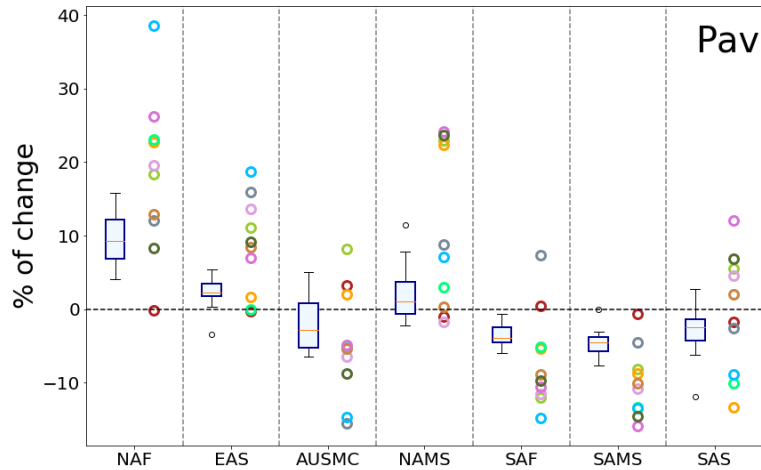
Proxy reconstruction from Scussolini et al., 2019

Multi -model ensemble: NH Monsoons

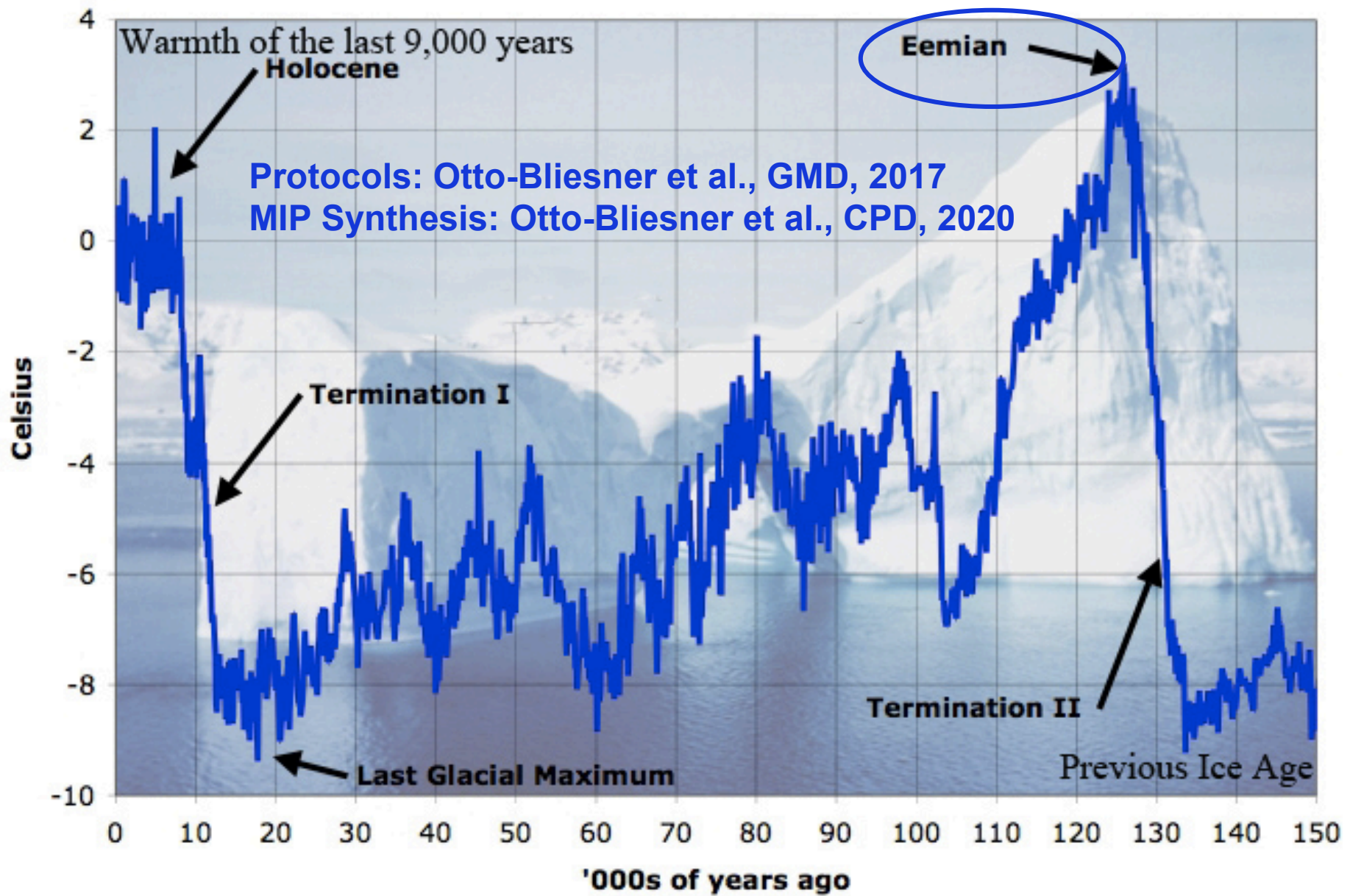


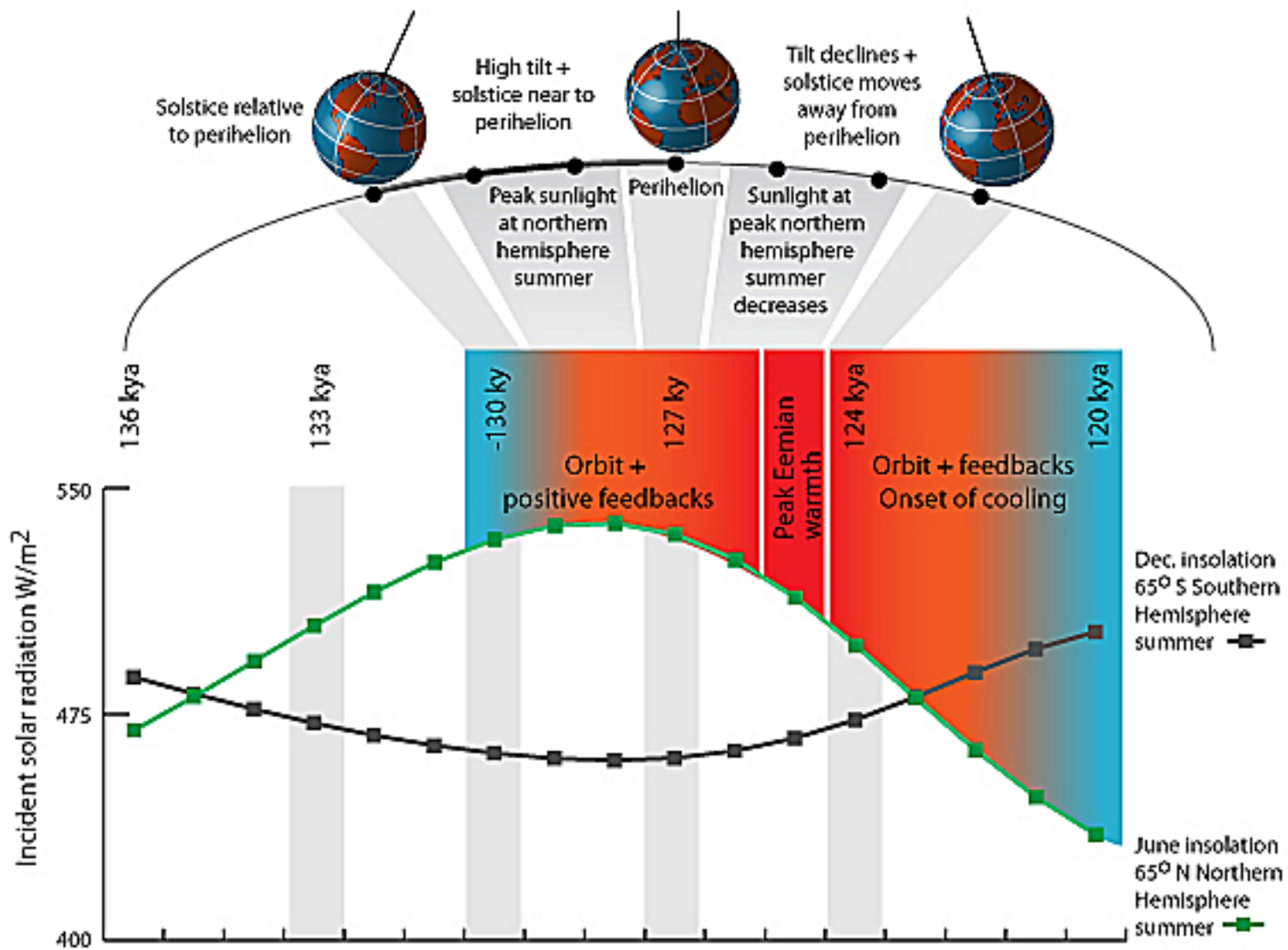
- AWI-ESM-1-1-LR 5
- CESM2
- FGOALS-f3-L
- FGOALS-g3
- GISS-E2-1-G
- HadGEM3-GC31
- IPSL-CM6A-LR
- NESM3
- NorESM1-F

Multi -model ensemble: SH Monsoons



Thank you





Eemian Orbital Changes

Solstice relative to perihelion



High tilt + solstice near to perihelion



Tilt declines + solstice moves away from perihelion



Peak tilt 24.2° (131 kya)

Peak sunlight at northern hemisphere summer



Sunlight at peak northern hemisphere summer decreases

Eemian Timeline (years before present)

