

# Paleoclimate Working Group Highlights for the Last Year

## ➤ CMIP5 Simulations

- Last Millennium simulation: 850 – 2005 AD
- Mid-Holocene (6000 yrs BP): 500 years
- Last Glacial Maximum (21,000 yrs BP) simulation: 1000 years

All with CCSM4 1-degree model; CMOR-ized & available from PCMDI and/or ESG

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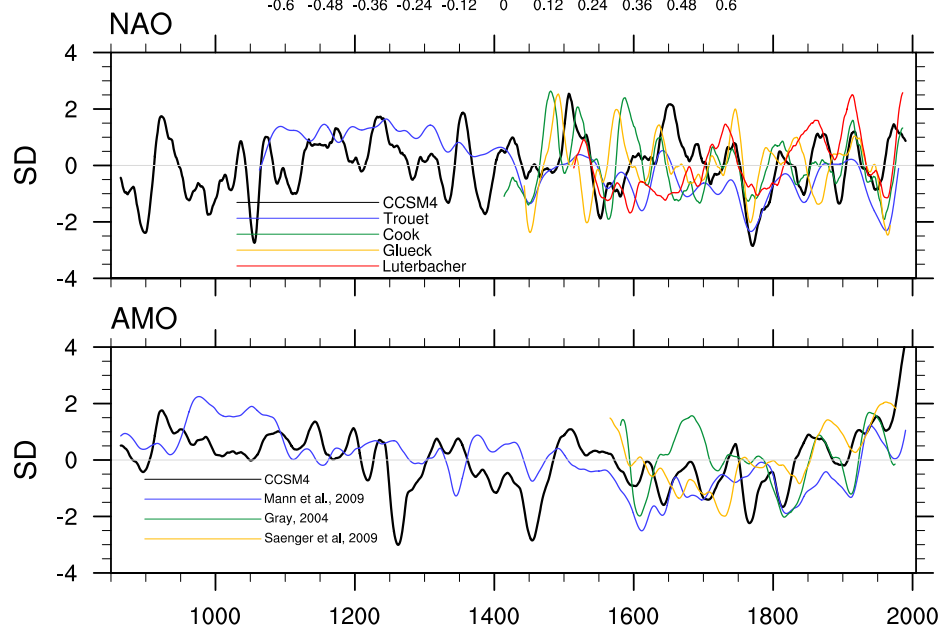
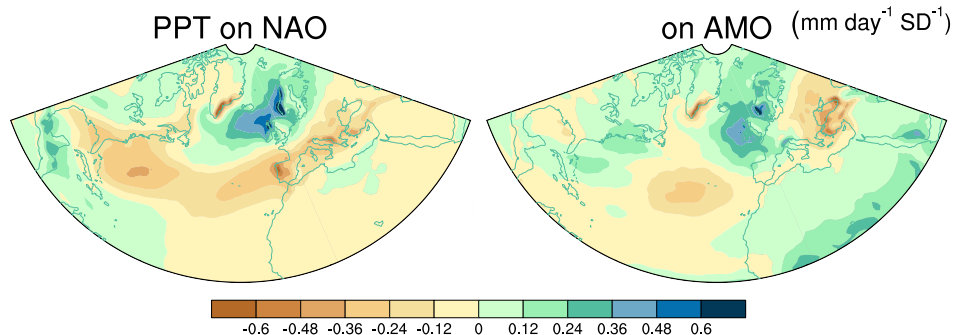
- ➔ CMIP5 Simulations
- ➔ Last Millennium simulation:

CCSM4 – 1 degree

850 – 2005 AD

Forcings: Solar,  
Volcanic, GHGs, Land  
use, and Orbital

Landrum et al., CCSM4 Special Issue, Journal of  
Climate, submitted.



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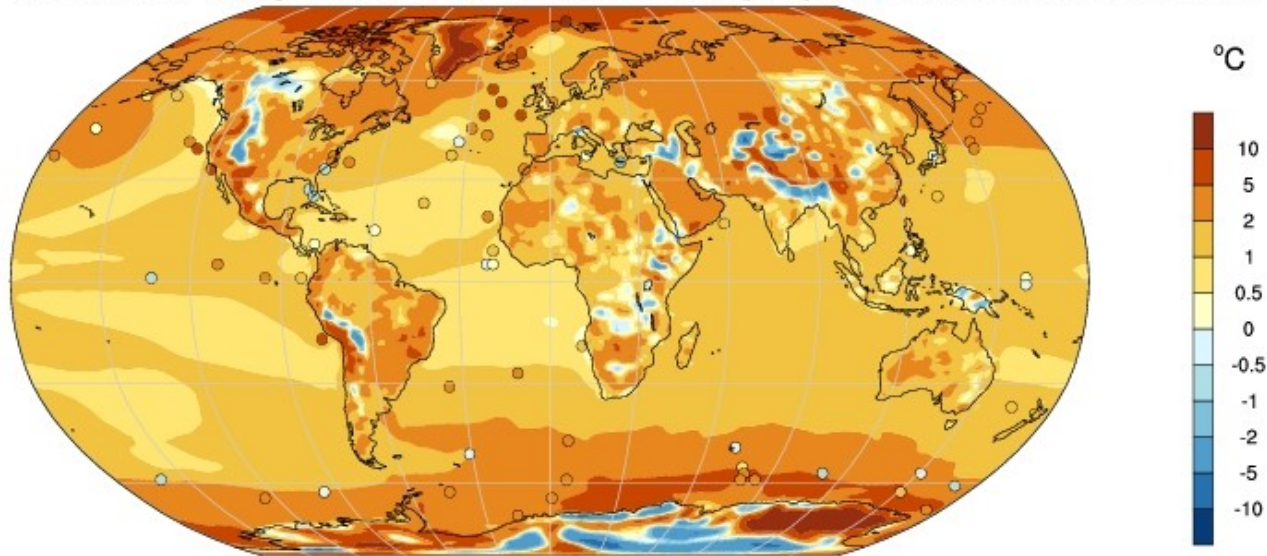
## ➤ Additional PMIP3 and Paleo simulations with CCSM4

- LGM CO<sub>2</sub> sensitivity simulation: 1100 years
- Permian-Triassic (251 million yrs ago) simulation: 1000+ years
- Mid-Pliocene (3 million yrs ago): 500 years

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- PMIP3/PlioMIP with CCSM4 1-degree model
- Mid-Pliocene (3 million yrs ago): 500 years

Pliocene MAT change from 1850 Pre-Industrial control (proxy record: PRISM3 Validation Data Set)



Rosenbloom and Otto-Bliesner,  
Geoscientific Model Development, in prep.

# Paleoclimate Working Group Future Community Simulations

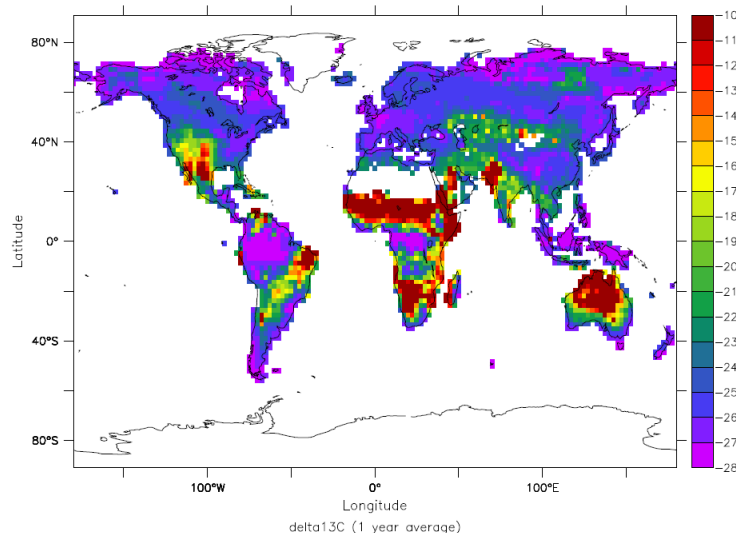
- PMIP3 Simulations
  - PlioMIP: Mid-Pliocene (3 million yrs ago): CESM (CAM5)-2 deg
- Joint with BGC WG
  - PCMIP: Coupled carbon-climate for past epochs: CESM-BGC-1 deg  
6000 yrs BP (Mid-Holocene) and 21,000 yrs BP (LGM)
- Joint with LIWG
  - PMIP3 Last Interglacial Transient (130,000-110,000 yrs BP):  
CESM(CAM5)-CISM-1 deg
  - Glacial Inception: CAM5,SOM-¼ deg; CAM5-CISM-1deg
- Cross WG Community Ensembles
  - Transient Last Millennium: Full and Single Forcings:  
CESM(CAM5)-2deg + WACCM5-2deg

# Paleoclimate Working Group Developments: Highlights for the Last Year

- Paleoclimate User's Guides
- Isotope-enabling CESM: water and carbon isotopes
  - Atmosphere-land: CU group (Noone, Nussberger, Wong), NCAR (Gettelman, Bardeen), DOE Berkeley (Riley), Bern (Joos, Bozbiyik)
  - Ocean: NCAR-UWisc (Brady, Zhang, Lindsay)

CLM4  $\delta^{13}\text{C}$ :  
signature of GPP

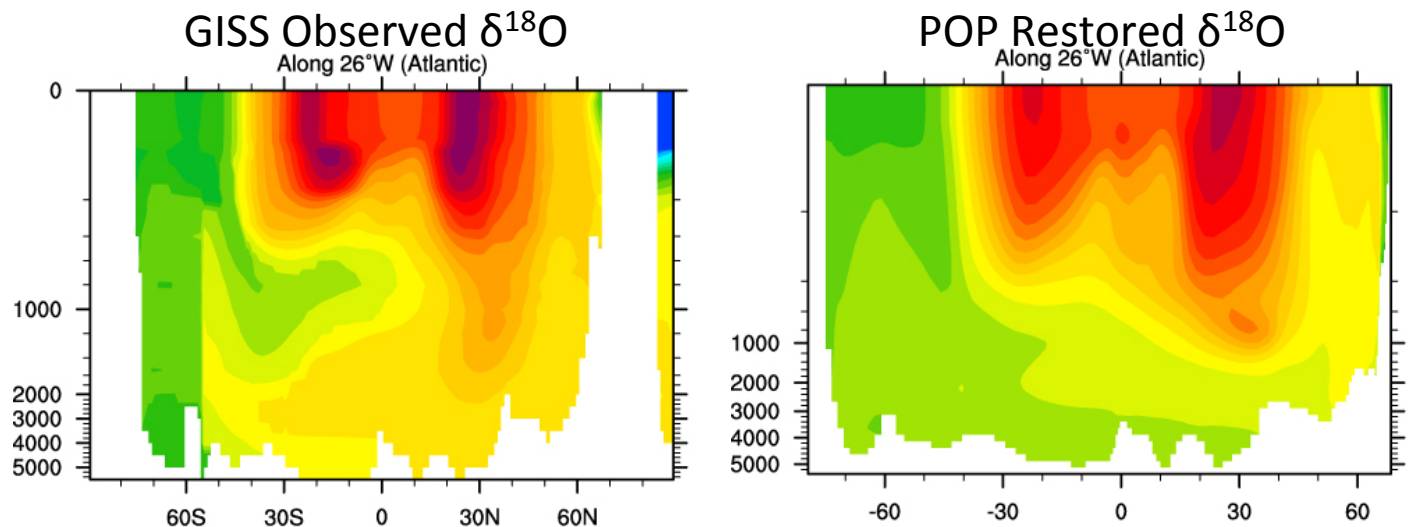
Figure of preliminary results courtesy  
of Joos and Bozbiyik



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  - Ocean: NCAR-UWisc (Brady, Zhang, Lindsay, Jahn)

Figure of preliminary results courtesy of Zhang and Brady



# Paleoclimate Working Group Future Developments

- Isotope-enabling CESM:CAM5: CSL proposal
  - Water isotopes
    - PI and LGM controls + N. Atlantic and Southern Ocean meltwater perturbations on these controls: CESM(CAM5)-water isotopes-2 deg
    - Dependence on atmospheric resolution, CAM5-water isotopes-FV 2 deg, 1 deg, ½ deg, ¼ deg
  - Carbon isotopes
    - Land and atmosphere spinups
    - Ocean implementation and spinup: BGC WG
    - PI and LGM controls: CESM(CAM5)-BGC-carbon isotopes-1 deg