Constraining Future Warming from Paleoclimate Simulations

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Ack.: A. Winguth, J. Kiehl, C. Shields, M. Rothstein & CESM Paleo Working Group
Uncertain projections of future warming

Atmospheric CO₂

Surface temperature change
(relative to 1986–2005)

IPCC AR5 Synthesis Report, 2014
CAM4/5/6 simulations as an example

- **Surface Temperature (°C)**
  - CAM4
  - CAM5
  - CAM6

- **ECS (°C)**
  - CAM4/5/6 simulations as an example
Past hothouse climates are the only benchmark for high CO\textsubscript{2} projections

Modified after Foster, Royer & Lunt, 2017
Early Eocene as a benchmark

previous simulations
- GISS
- ECHAM
- HadCM
- FAMOUS
- CCSM3_H
- CCSM3_W
- CCSM3_KS

early Eocene records
Thanks!

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