CESM Paleoclimate Working Group Status and Plans

Status of Paleoclimate WG
2014-2016 CSL Simulations

Development: ~9M Yellowstone core hours

- Water isotope development in CESM; ocean BGC carbon isotope spinup; climate-ice sheet simulations*; coupled runs with present/LGM water-isotopes; hosing runs for present/LGM with water isotopes*.

Production: ~12M Yellowstone core hours ➔ ESG

- Additional LME simulations: 3 more ozone-aerosol members[ESG], 3 more full-forcing members[ESG], solar member with 2.5x variability, solar member with WACCM. Second 850CE control with 6-hourly CAM output[ESG], 1%CO_2[ESG], abrupt 4xCO_2[ESG]
- Volcanic sensitivity simulations for Tambora and Samalas to month of eruption. Tambora-size eruptions in the 21st century.
- Idealized glacial cycle simulations (Erb and Jackson, UT-Austin)
- Pliocene sensitivity simulations to CO2, orbital configuration, PlioMIP2 gateways.
- *PlioMIP2 simulation*
- *LME with water isotopes enabled (Joint with UArizona)*

Plans for Paleoclimate WG
2016-2018 CSL Simulations

- Due in mid-September 2016

- CSL Yellowstone allocation (110M with supplement) to cover CMIP6 DECK and Tier 1 simulations
  - PaleoWG CMIP6 simulations (CESM2 FV1x1) include *past1000, midHolocene, lgm, lig127k, pliocene;* total of ~4000 years.

- CSL Cheyenne for additional PaleoWG science and development (total for all WGs: 200-250 M core-hours/yr)

  - PMIP4 Tier2 simulations ???
  - Other???

Some new features

Using CISM for Paleo

- CISM features for long-term (1000+ years) and paleo time periods – spinup, acceleration
- Diagnosis of parameterization reliability for long-term simulations – basal sliding, isostasy

Predictive vegetation

- Dynamic vegetation ???

Water and carbon isotopes

iCESM Timeline to CESM2/CMIP6

June 2016	July 2016	August 2016	September 2016
CAM5.3 Latest Isotope-enabled version	**CAM5.4** Targeted for adding Isotopes to MG2	**CAM5.5** Targeted for adding Isotopes to CLUBB scheme	**CAM6** Isotopes validated against all other model changes.
CLM4.0 Latest Isotope-enabled version, water isotopes only	**CLM5 w/BeTR** Targeting to add water Isotopes w/simplified treatment	**CLM5** Targeting to add full fractionation	**CLM5** Isotopes added to BeTR scheme with full treatment
CICE4 Water isotopes working w/CICE4 physics only, dev. Version of CICE5	**CICE5** Target for working with w/CICE5 physics	**CICE5** Further testing with CICE5 physics	**CICE5** Validation/testing
POP2 Water isotopes in development tag, Carbon in Trunk	**POP2** Targeting for adding water isotopes to Trunk	**POP2** Testing/Evaluation	**POP2** Water isotopes in Trunk
RTM Water isotopes in development tag	**RTM → MOSART** Targeting for adding to MOSART		**MOSART** Water Isotopes added and evaluated