CESM Cross-Working Group

Isotopes

Many uses of Isotopes and Geotracers:

- To infer past climate changes.
- To trace ocean water masses
- To identify source regions of precipitation
- To analyze cloud processes
- To diagnose model biases
- To more directly compare to paleo data
- To make use of new datasets for model validation
- …

Status of isotopes and geotracers
iCESM1

	CAM5	CLM4	Runoff	POP2	OCN-Eco	CICE4	CISM2	CPL7
Water isotopes	✔	Soon	Soon	✔	–	Soon	planned	✔
Carbon ^{14}C	planned	✔	*prescribed*	✔	✔	–	–	planned
^{13}C	planned	✔	*prescribed*	–	✔	–	–	planned
Pa/Th	–	–	–	In progress	In progress	–	–	–
Nd	–	–		In progress	In progress	–	–	–
$^{14}N,^{15}N$				–	✔	–	–	–

1. **What important isotopes and geotracers are we missing?**
2. **CESM1 ➔ CESM2? What? How?**
    - *CAM5 to CAM5.5*
        - *dynamical core, physics, numerics, advection*
        - *Which convection scheme? Both?*
    - *WACCM5 to (WACCM5.5?) WACCM6*
        - *Chemistry coupling?*
    - *CLM4 to CLM4.5 to CLM5*
        - *RTM*
    - *POP2 to POPx*
        - *free surface*
    - *CICE4 to CICE5*
    - *CISM2*
    - *RTM*
- *BENCHMARKS*

1. **CESM CSL pre-CMIP6 community simulations?**
    - *CESM1 with water and carbon isotopes: Pre-industrial + 20th century + RCP8.5*
    - *Bomb spike + tritium + ff?*
    - *CAM5-SE with water isotopes at high-resolution*
        - *What are the precip water isotope distributions at high resolution*
        - *How high resolution? ¼ dgree? Forecast mode?*