



NCAR
OPERATED BY UCAR

February 24, 2026

LWVG Overview

Will Wieder
LWVG Co-Chair





LMWG Andrew Slater Award



Drew was a key member of the LMWG community who brought a deep dedication, understanding, and joy to his research, which he shared with everyone around him. Since 2018, winners of the Slater award have been made to WG members who make meaningful contributions to the LMWG including:

- Creative applications of the model;
- Significant model development activities;
- Identifying major issues, biases, or gaps in CTSM; and a
- High level of engagement with the LMWG



LMWG Andrew Slater Award

2025 Danny Leung

2024 Linnia Hawkins

2023 Joshua Rady

Li,

Keer Zhang

2022 Claire Zarakas

2021 Yue Li

2020 Jessica Needham

2019 Katie Dagon

2018 Daniel Kennedy

CLM- U team:

Bowen Fang, Ca

Joyce Y

Yifan Cheng

Leah Birch

Meg F

Marys



CTSM5.4 release: What's New?

Since Dec 10 another 20 tags!
~ two per week!

- New **surface datasets** from CMIP7 data ... only available through the historical record (1850 - 2023), and are
 - Not available for future periods, Future periods will continue to use CMIP6 data from CESM2. (Historical ndep and aerosols from CESM2 too)
- Option to use **CRUJRA2024 DATM** with clm6 and clm5 physics options, this is the default data - atmosphere (DATM) for clm6.
 - CRUJRA dataset covers 1901 - 2023, whereas previous GSWP3 only covers 1901-2014
-



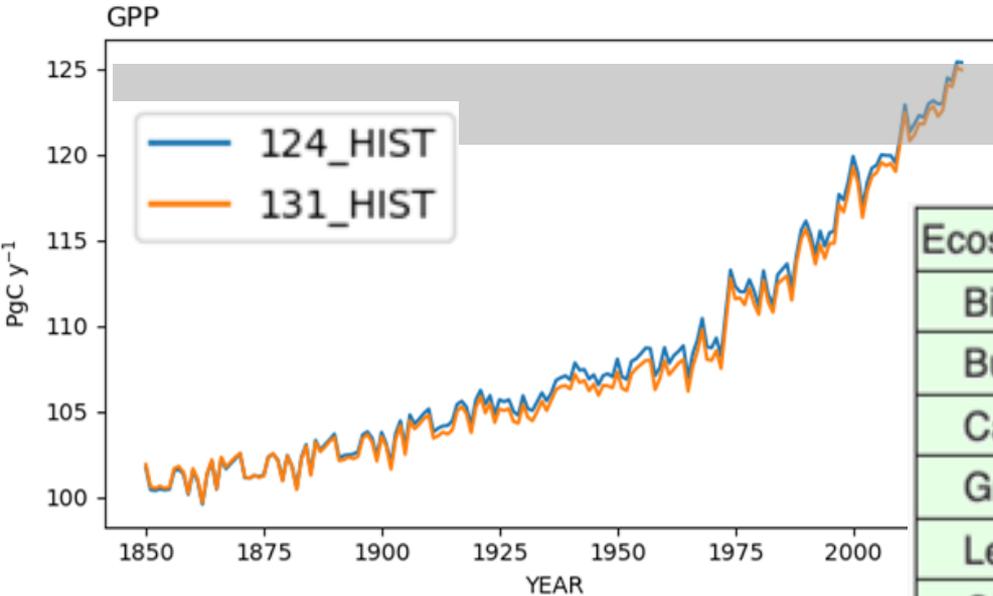
CLM6 has a good carbon cycle



CLM6 #131

CLM5.4 release

CLM5 GSWP3

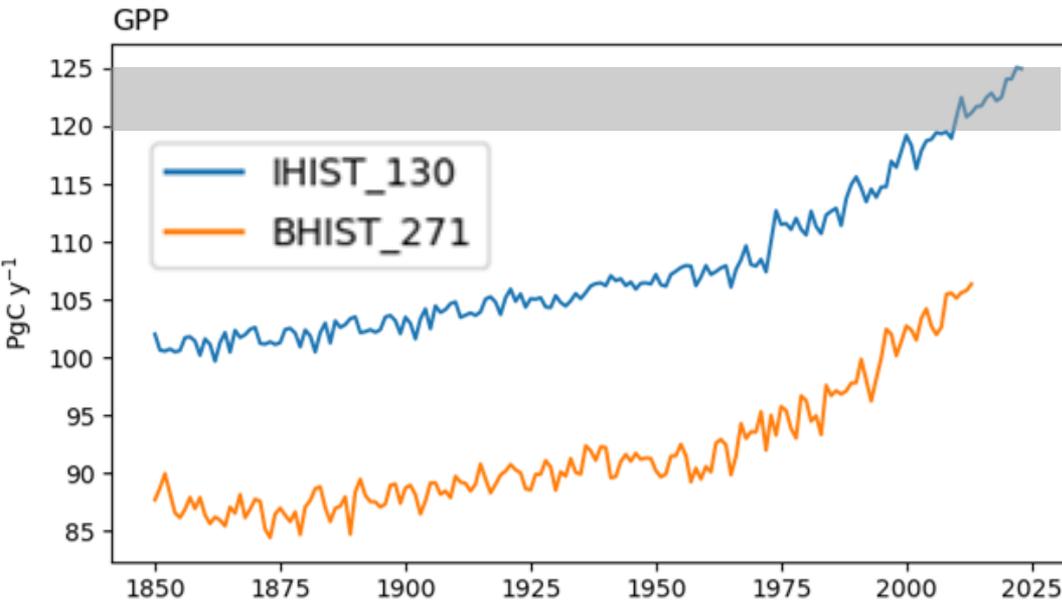


Ecosystem and Carbon Cycle	CLM6 #131	CLM5.4 release	CLM5 GSWP3
Biomass	Light Blue	Light Blue	Orange
Burned Area	Light Blue	Light Blue	Dark Grey
Carbon Dioxide	Light Blue	Light Orange	Light Blue
Gross Primary Productivity	Light Blue	Light Blue	Light Orange
Leaf Area Index	Light Blue	Light Blue	Light Orange
Global Net Ecosystem Carbon Balance	Light Orange	Light Orange	Dark Purple
Net Ecosystem Exchange	Light Blue	Light Blue	Light Orange
Ecosystem Respiration	Light Blue	Light Blue	Light Orange
Soil Carbon	Light Blue	Orange	Dark Purple
Nitrogen Fixation	Light Blue	Light Blue	Light Orange

See [CUPiD results](#) :
LDF & ILAMB!

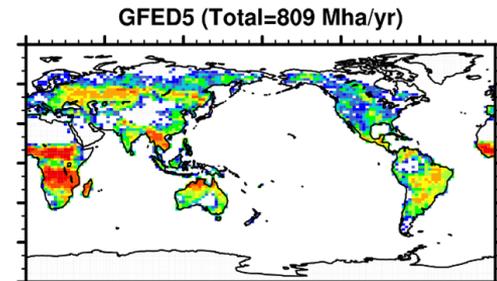


Land carbon cycle in CESM3 climate

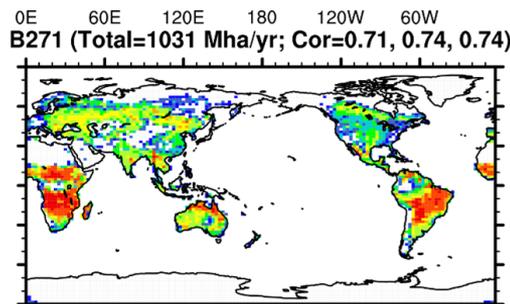


BHIST 271 vs IHIST 130

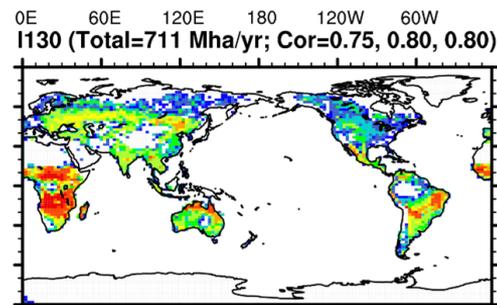
OBS
800
Mha/y



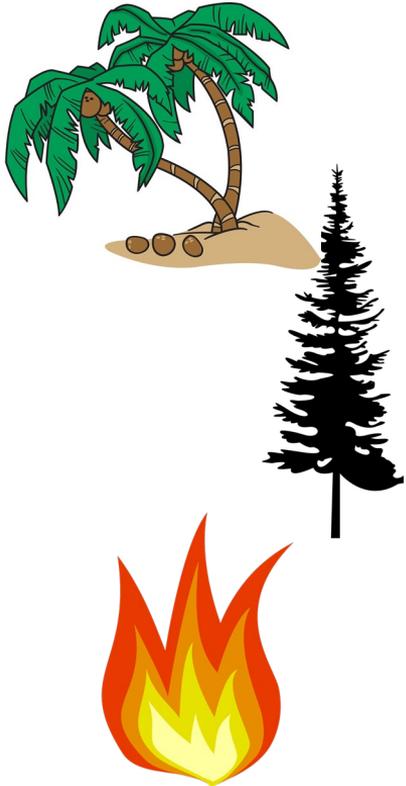
BHIST
1000
Mha/y



IHIST
700
Mha/y



Tuning Land Parameters?

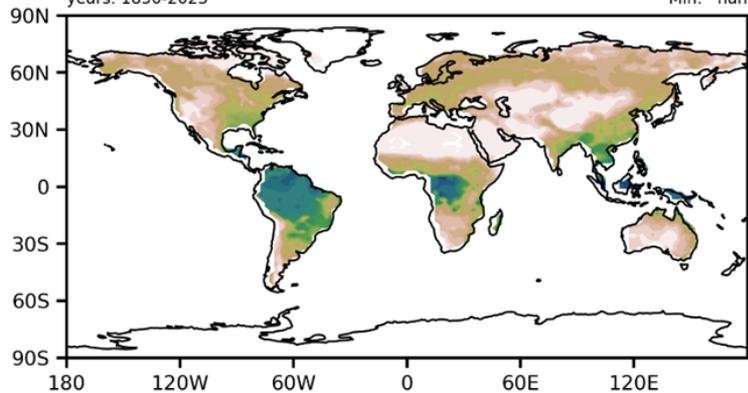


- Tropical Evergreen Forests = Decrease Medlyn Slope
 - Decrease ET and Increase LAI
 - See [283f vs d](#) & cesm_dev [300 vs. 299](#)
- Boreal Evergreen Forests
 - Increase LAI and GPP
 - See [283g vs d](#) & cesm_dev [307 vs 302](#)
- Fire: CLM6- CAM7 tuning
 - Reduce global burned area

GPP I- case

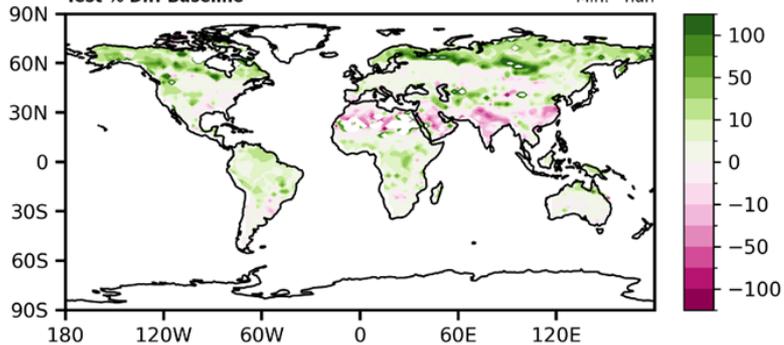
LMWG_dev #143 vs 125 (f19, BGC)

Test: l_143
years: 1850-2023
Max: nan
Min: nan

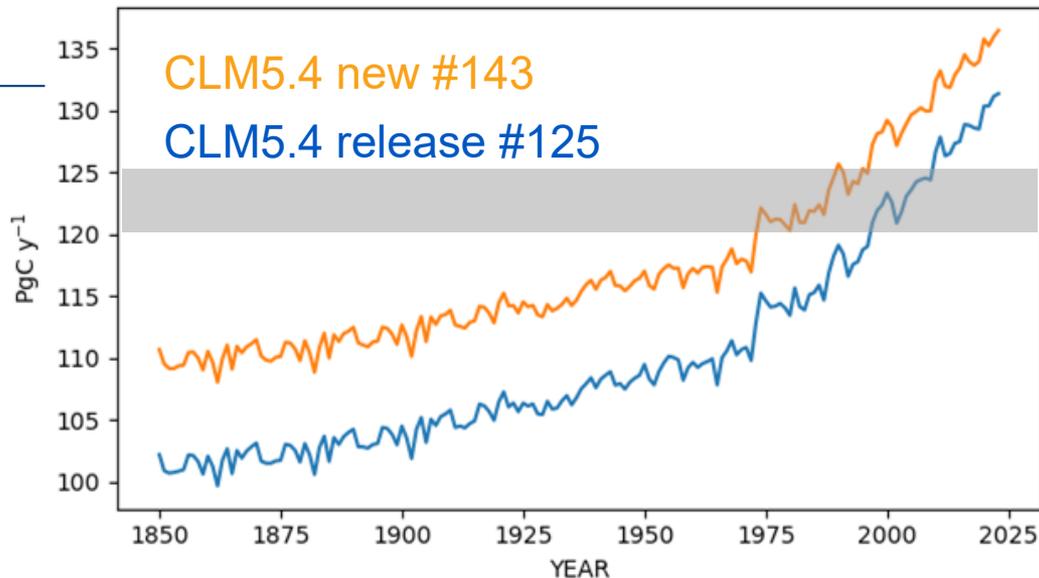


Test % Diff Baseline

Mean: nan
Max: nan
Min: nan



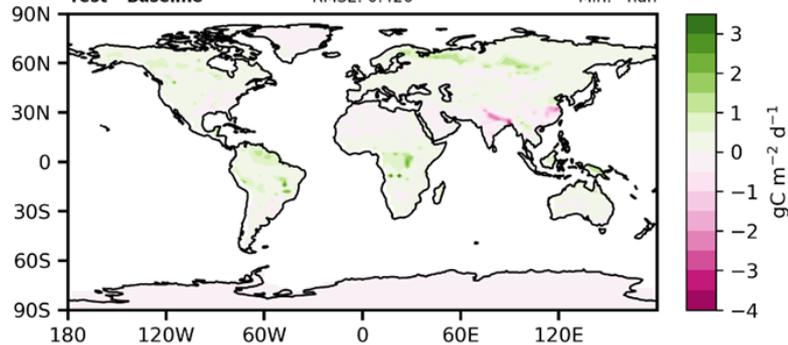
GPP



Test - Baseline

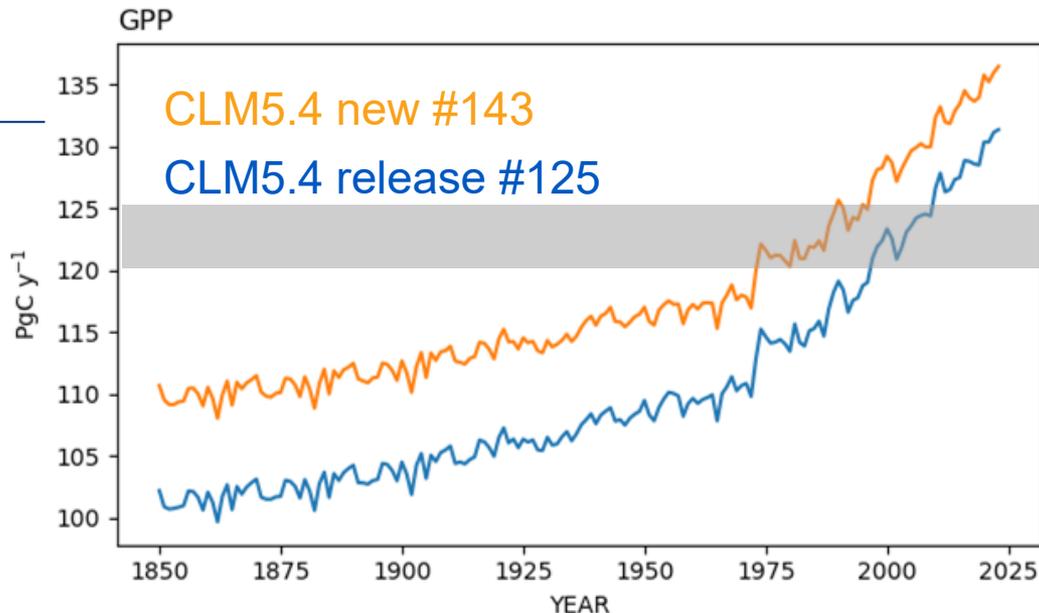
RMSE: 0.426

Mean: 0.10
Max: nan
Min: nan



GPP I- case

LMWG_dev [#143 vs 125](#) (f19, BGC)



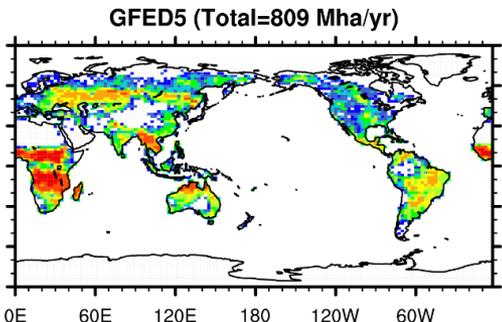
GPP B- case in 1850

'New' = 95 Pg C/y (#307, 308)

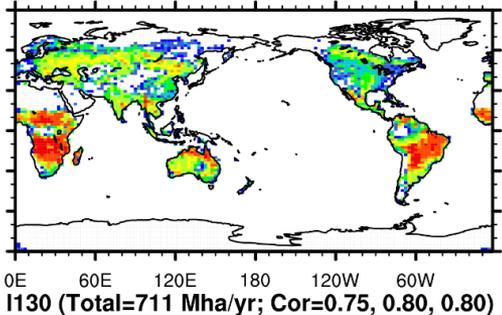
'Release' = 85 Pg C/y (#271, 276)

Burned area

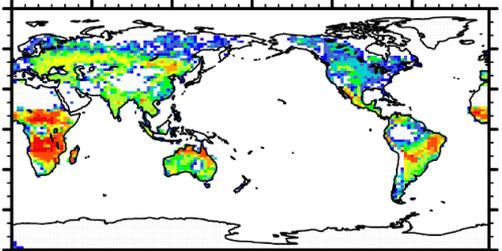
OBS
800
Mha/y



BHIST
1000
Mha/y

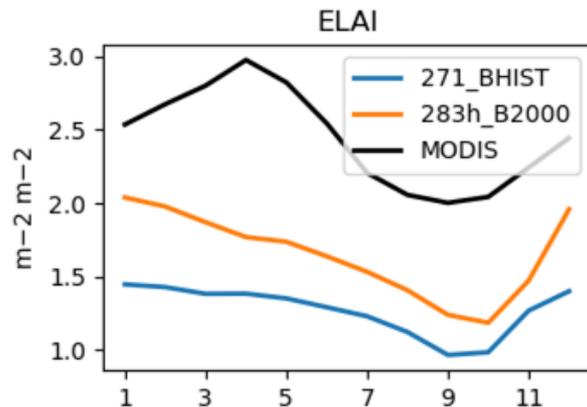
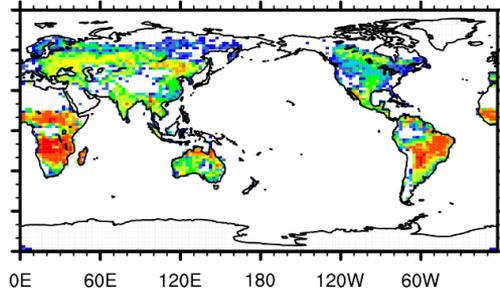


IHIST
700
Mha/y



BHIST*
800
Mha/y

B283h (Total=789 Mha/yr; Cor=0.70, 0.73, 0.73)



CLM6 has a good *enough* carbon cycle



- More robust C-cycle in land-only to improve coupled model results
- CLM6- CAM7 fire tunings
(including parameter file differences)

CLM6 #131
CLM5.4 release
CLM5 GSWP3

See [LDF results](#):
143 vs 125



Ecosystem and Carbon Cycle			
Biomass			
Burned Area			
Carbon Dioxide			
Gross Primary Productivity			
Leaf Area Index			
Global Net Ecosystem Carbon Balance			
Net Ecosystem Exchange			
Ecosystem Respiration			
Soil Carbon			
Nitrogen Fixation			

LMWG provides more than a well calibrated carbon cycle model



FATES*



Crop



Urban



Hillslope
Hydrology*

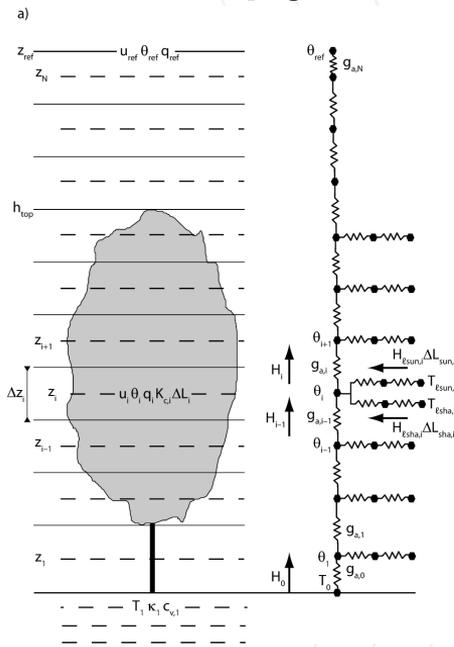


LMWG provides point scale capabilities



Work performed under Yellowstone permit #5870

Multi-layer canopy



MIMICS

LMWG provides post processing capabilities

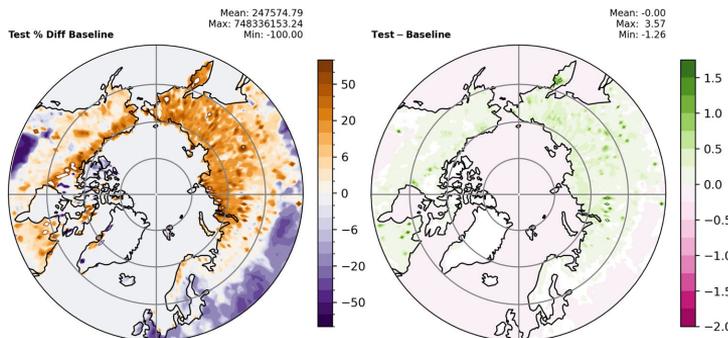
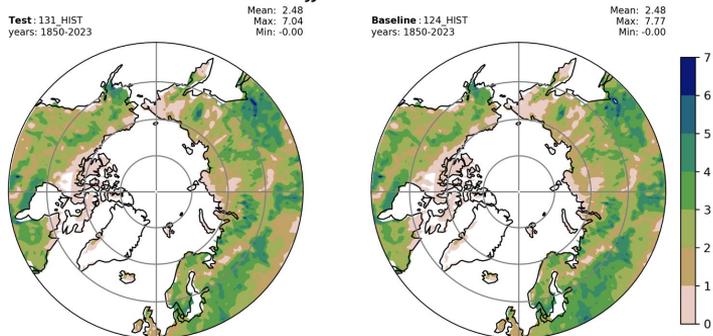


CUPID



LDF

ELAI - JJA - Arctic



ILAMB

	G ⁺	G ⁻	G ⁺
Ecosystem and Carbon Cycle			
Biomass			
Burned Area			
Carbon Dioxide			
Gross Primary Productivity			
Leaf Area Index			
Global Net Ecosystem Carbon Balance			
Net Ecosystem Exchange			
Ecosystem Respiration			
Soil Carbon			
Nitrogen Fixation			
Hydrology Cycle			
Evapotranspiration			
Evaporative Fraction			
Latent Heat			
Runoff			
Sensible Heat			
Terrestrial Water Storage Anomaly			
Snow Water Equivalent			
Permafrost			
Surface Soil Moisture			
Radiation and Energy Cycle			
Albedo			
Surface Upward SW Radiation			
Surface Net SW Radiation			
Surface Upward LW Radiation			
Surface Net LW Radiation			
Surface Net Radiation			
Ground Heat Flux			

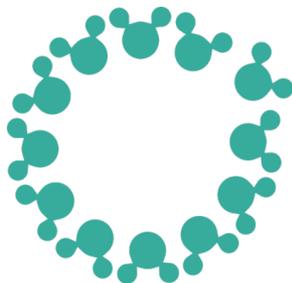
CESM3.x will enable water isotope tracers

NSF-CSSI Funded Project

*PI: Sylvia Dee (Rice U.) &
Jiang Zhu (NSF NCAR)*

*Co-PI: Peter Lauritzen &
Will Wieder (NSF NCAR)*

*Other Personnel: Bill Sacks &
Jesse Nusbaumer (NSF NCAR)*

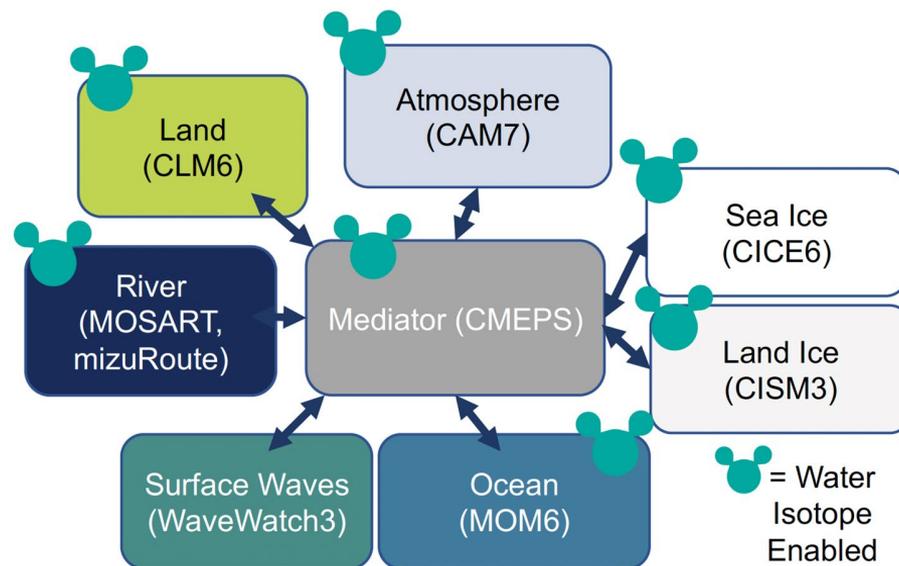


SCI-SWIM

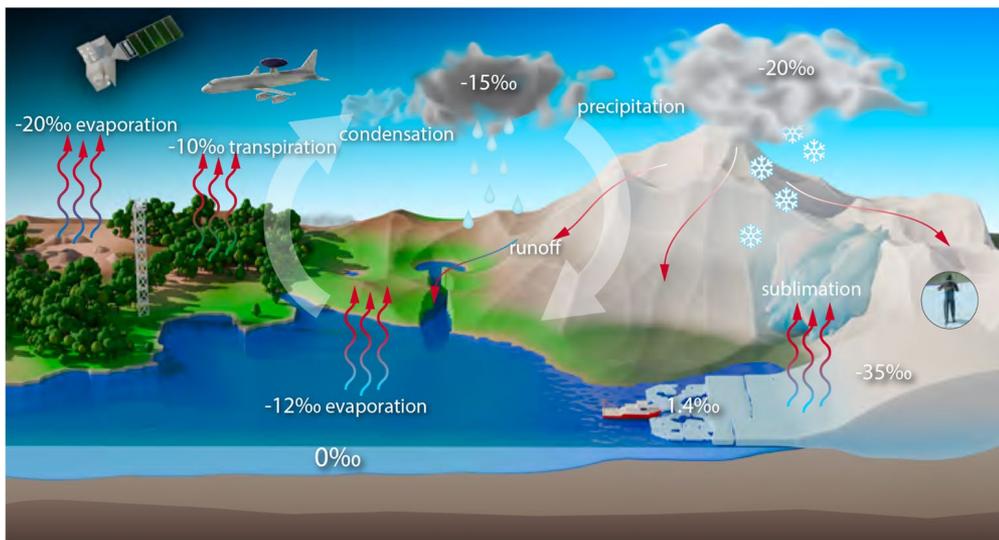
Sustainable Community Infrastructure
for Stable Water Isotope Modeling
Enabling Earth System Research

RICE UNIVERSITY

- Develop the next-generation water-isotope-enabled CESM using modern software design.
- Sustain long-term community use and codevelopment through open-source tools, clear documentation, and training.
- Replace the legacy iCESM1, which relies on physics more than a decade old.



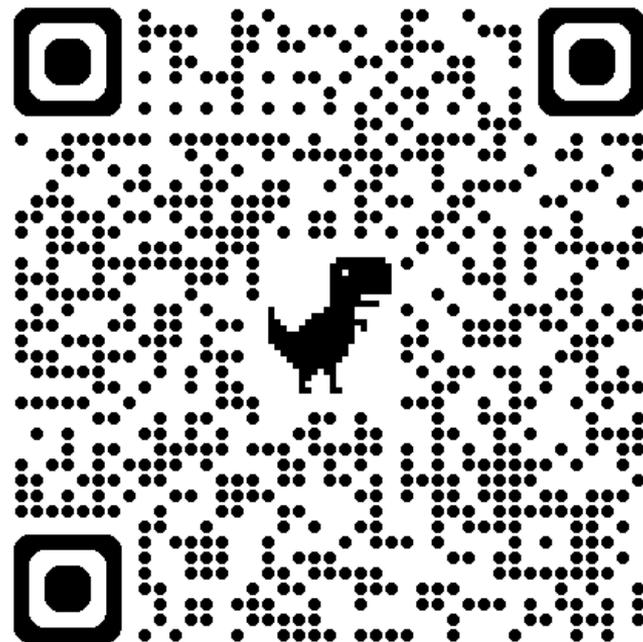
Please participate in this survey to help guide *iCESM development validation*, and *user support*.



iCESM User Survey

<https://forms.gle/gBftvVGEQeMwG2NGA>

(Link also available in the CESM Newsletter)



LMWG & BGCWG provide links to CESM

