FEBRARY 25, 2026

FATES and CLM

Where we are and where we want to go

Adrianna Foster
Scientist V

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LMWG Daily

FEBRUARY 25, 2026

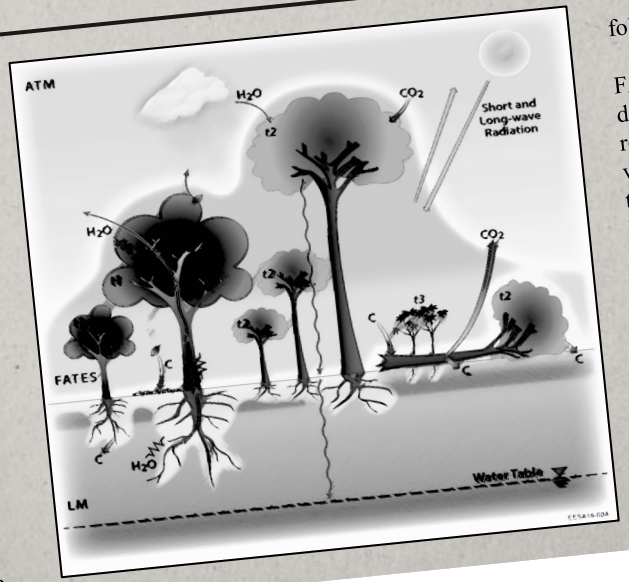
FATES WILL BE DEFAULT VEGETATION FOR CLM

A NEW VEGETATION MODEL

By Seymour Trees

In a statement to the Land Model Working Group, chair Will Wieder announced this Wednesday that the Functionally Assembled Terrestrial Ecosystem Simulator (FATES) will soon be the new default vegetation model for CLM.

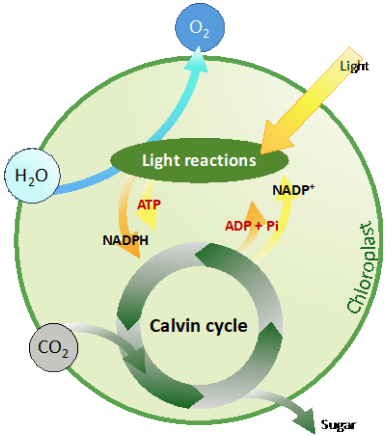
"This will be a new era for our land model," said Foster. Following the CLM6 release the following calibration.

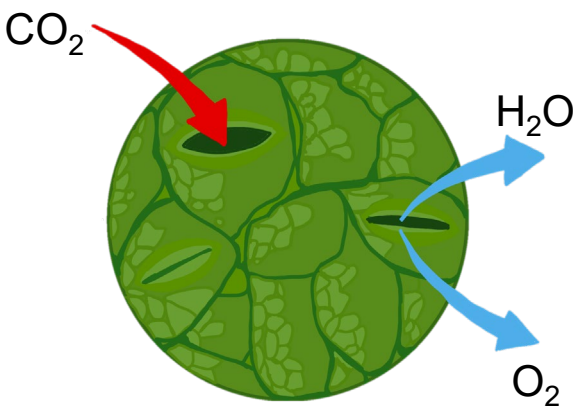


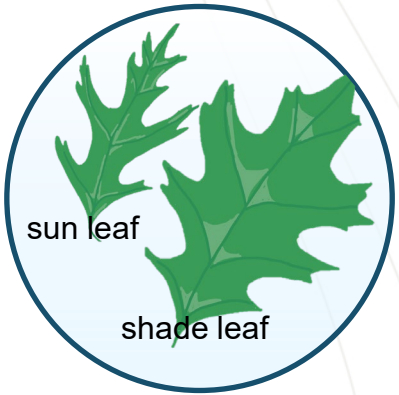
FATES is a vegetation demographic model that represents cohorts of plants of varying size and plant functional type (PFT) that exist on landscape "patches," which are fractions of a grid cell with similar time-since-disturbance.

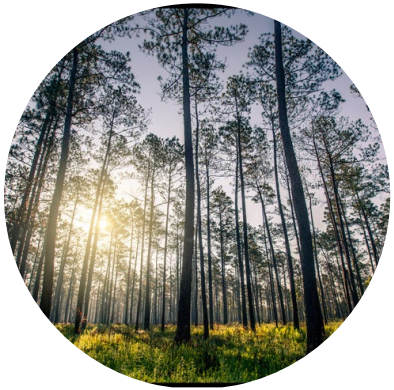
The use of FATES will allow for more process-based representation of plant competition, disturbances, and land-atmosphere interactions. "This update will allow us to ask interesting questions about

What is FATES?





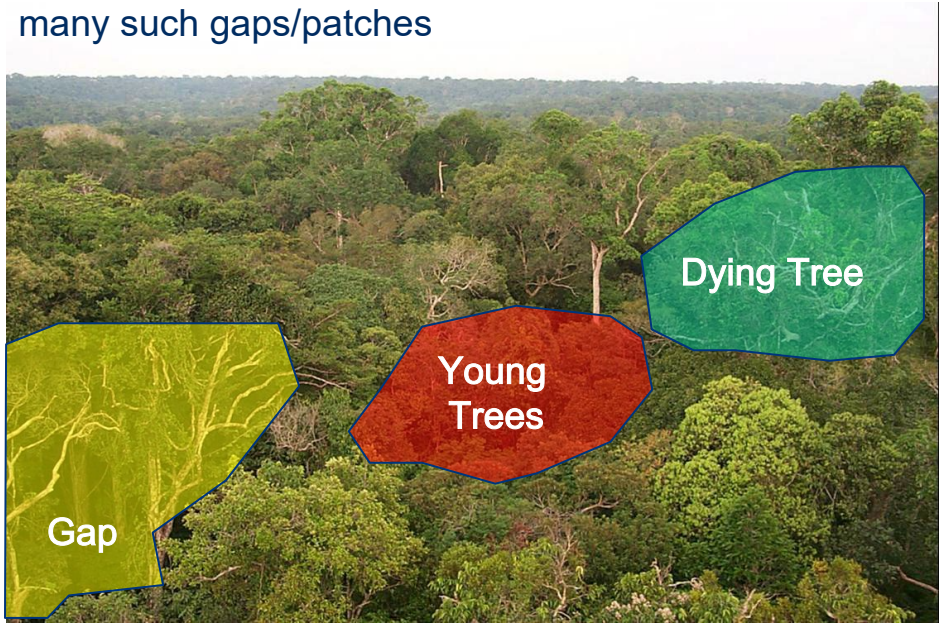


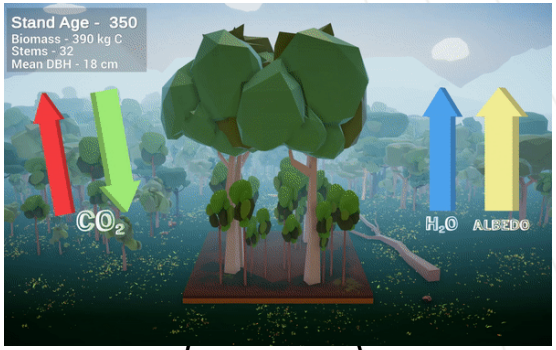


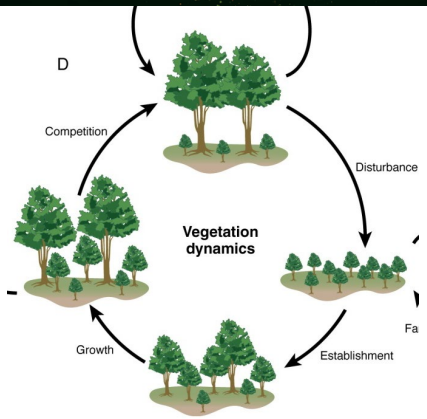
What is FATES?

Forests are a mosaic of patches

Forest dynamics are the average responses of many such gaps/patches







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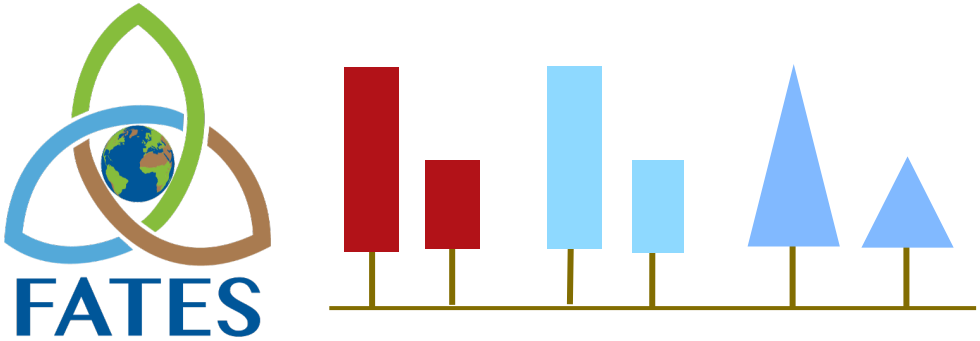
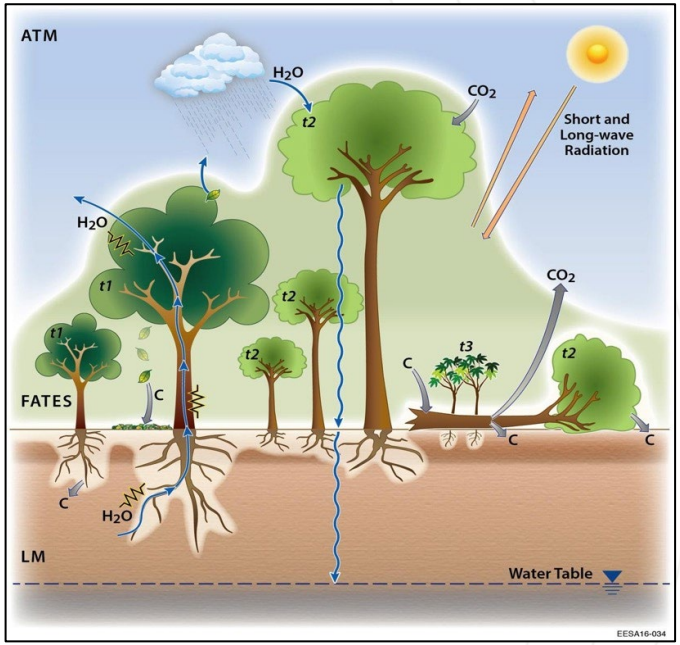


cohort - specific model

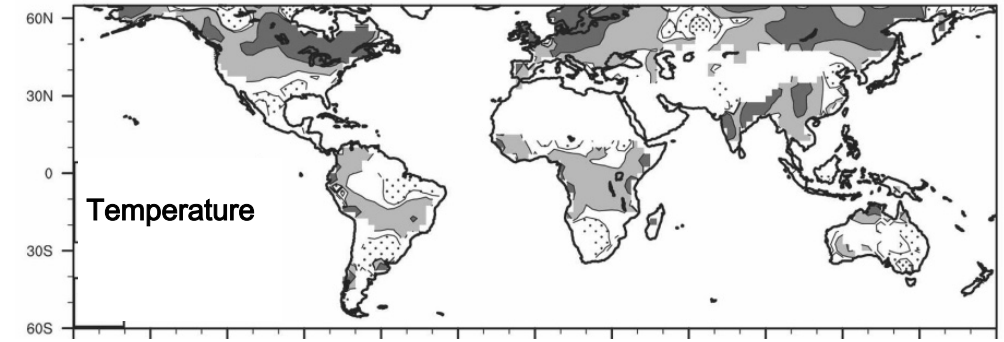
30 - minute photosynthesis and fluxes

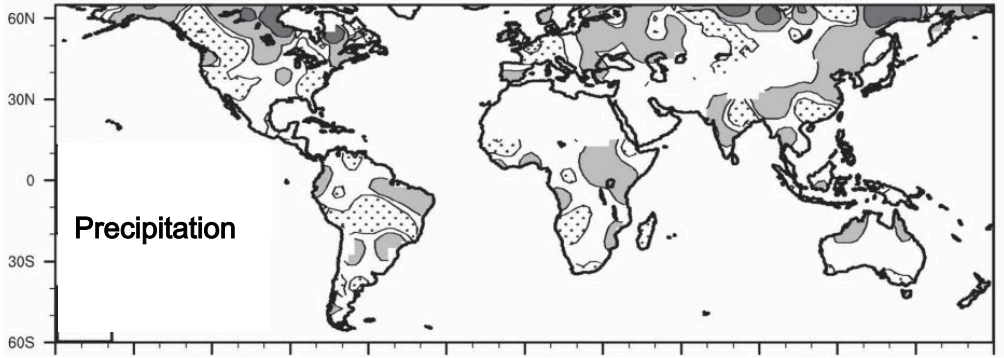
daily growth and allocation

dynamic vegetation!



Why FATES?



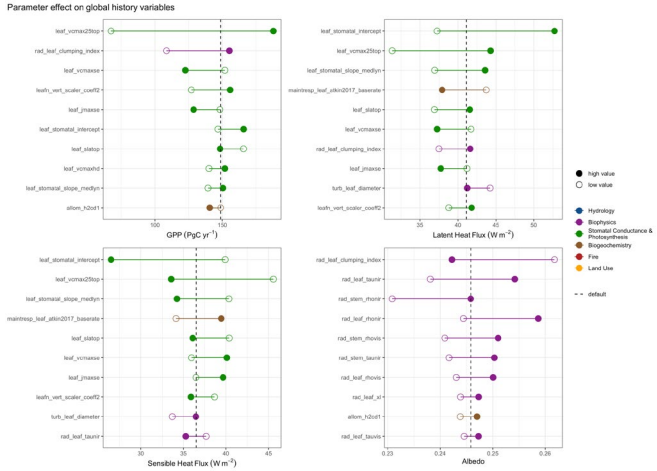


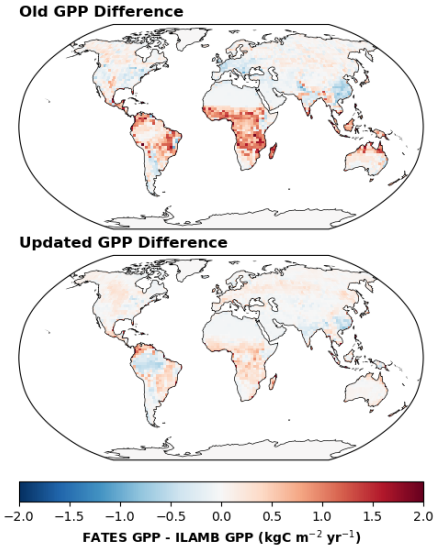
Liu et al. 2006 *Journal of Climate*

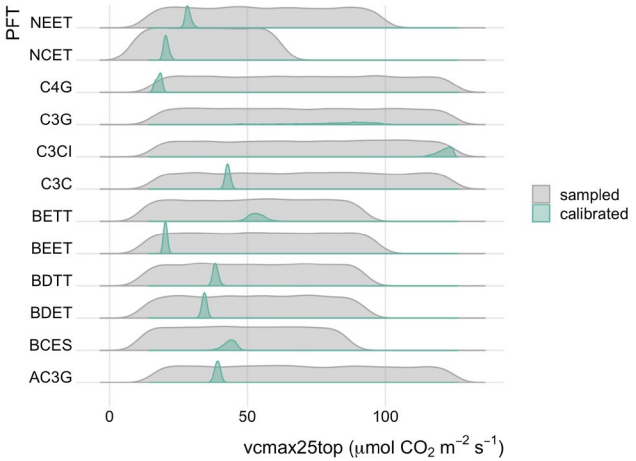
Forest height, structure, age, competition all feed back to climate!

How's it going?

Calibration







How's it going?

Calibration

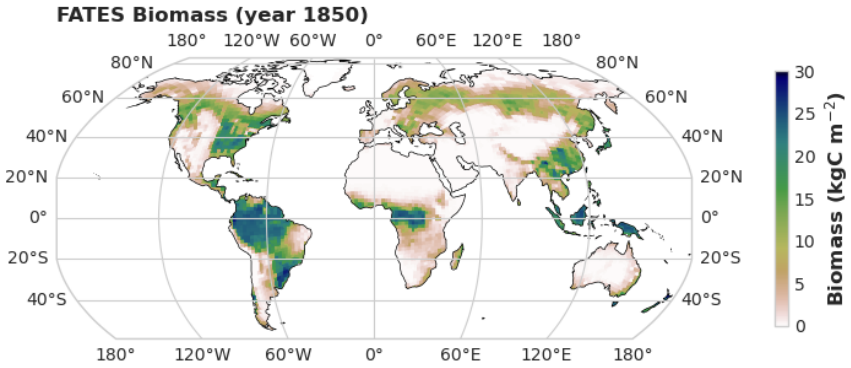
Global SP calibration

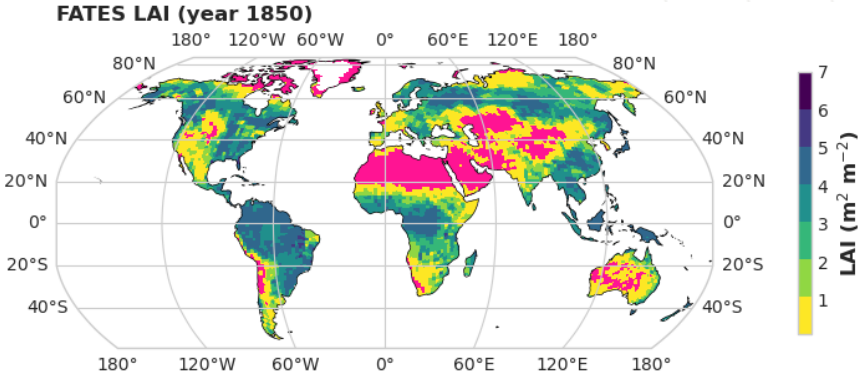
Global No - Comp calibration

Single - point calibration (Boreal Canada; Western Colorado; US NEON sites)

How's it going?

No-comp spinup





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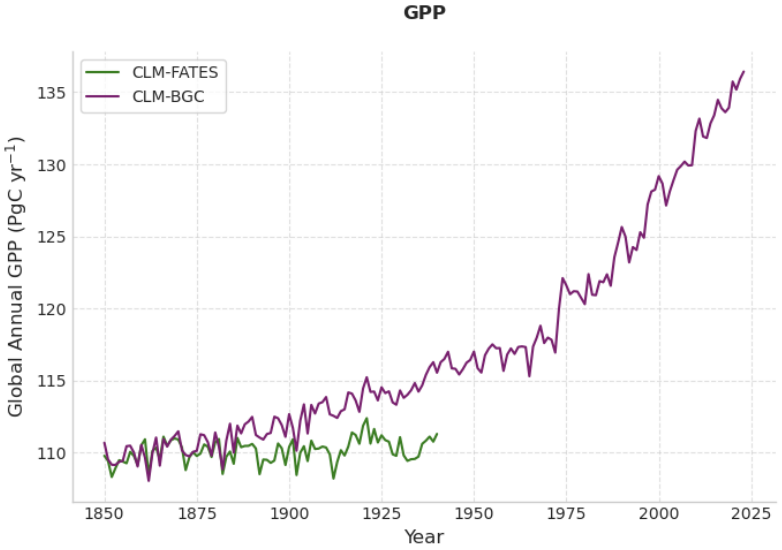

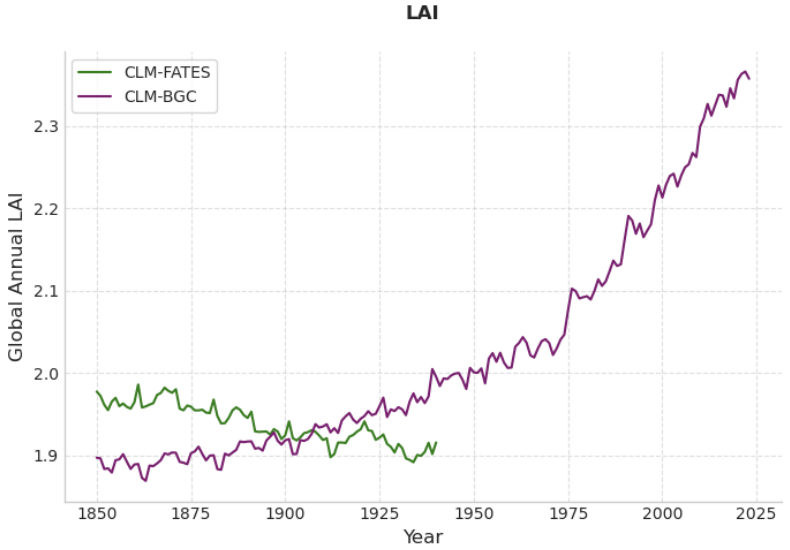

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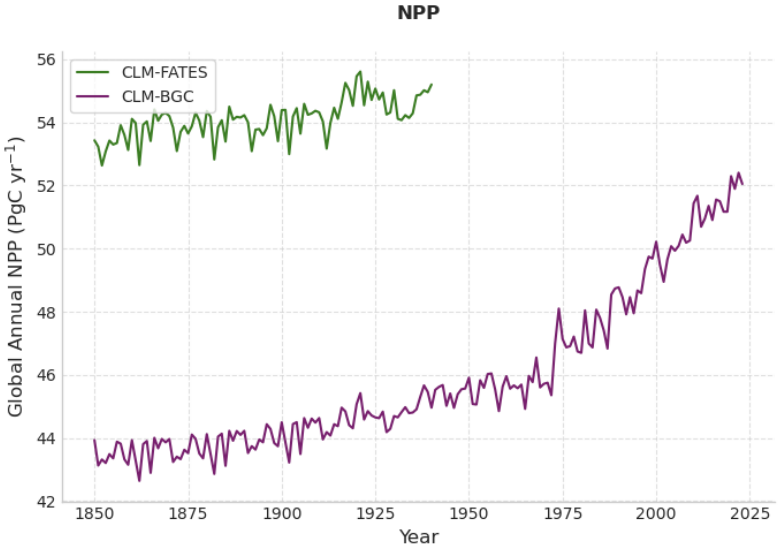

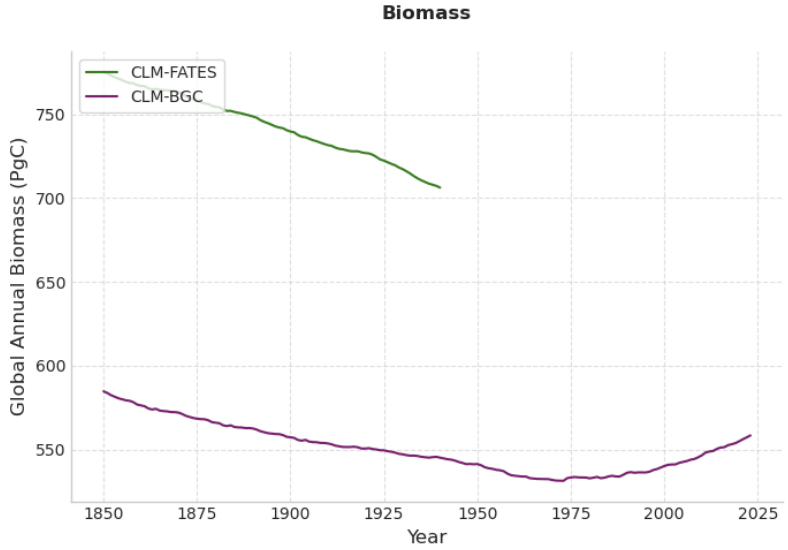

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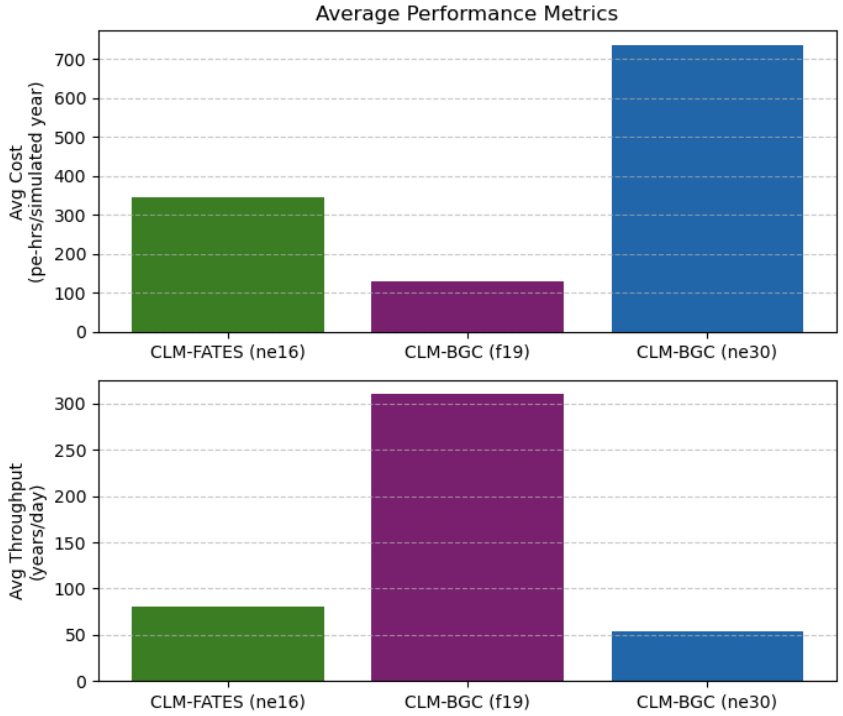


CLM- FATES ~2.7x slower than CLM - BGC

Near - term goals

“V0” CLM - FATES: By CLM6 release





FATES- CLM nutrient coupling : By October 2026



Single - point and global calibration workflows


Recalibration with Nitrogen coupling: ???

More FATES PFTs in Fixed BG mode:

Other projects & issues

Speed : FATES is slow… can we speed it up?

Coupling with multi - layer canopy model: How can we utilize the variability of FATES to improve land - atm. coupling?

FATES and crops

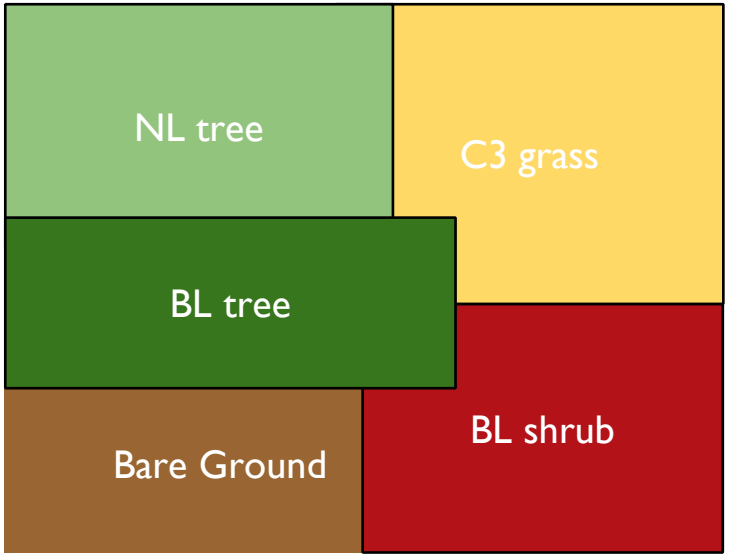
FATES- PHS

What other science do we want to do with CLM - FATES?

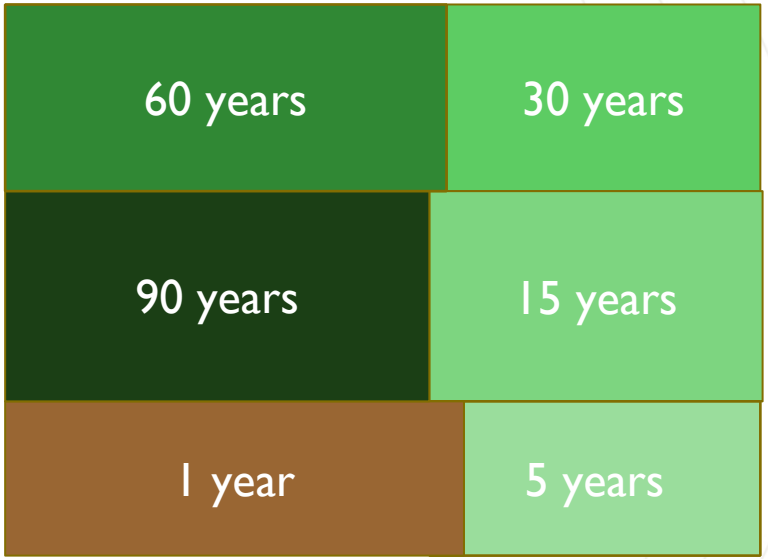
EXTRA SLIDES

Tiling

CLM (BL): tile by PFT



FATES: tile by age - since - disturbance



Tiling

Each tile contains cohorts of plants of different PFT and size