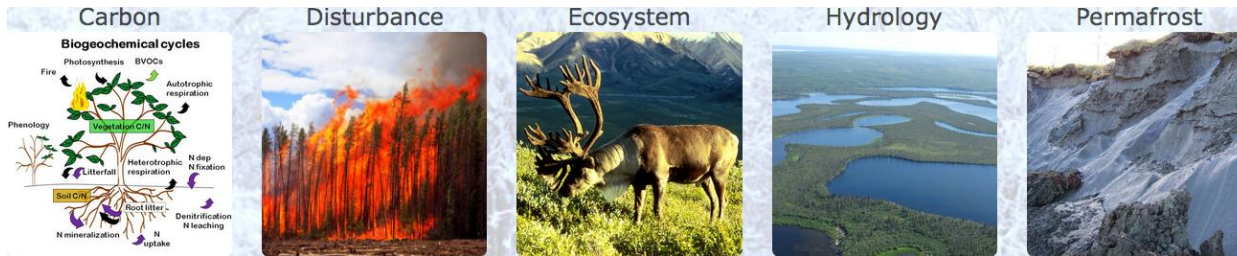


Motivation

Address Key

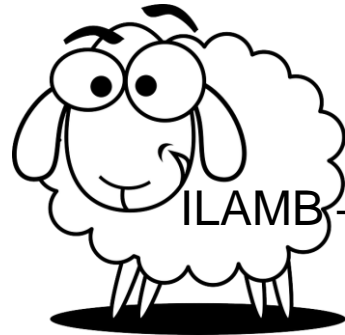


Indicators



- How are the magnitudes, fates, and land-atmosphere exchanges of **carbon pools** responding to environmental change, and what are the biogeochemical mechanisms driving these changes?
- What processes are contributing to changes in **disturbance** regimes and what are the impacts of these changes?
- How are flora and fauna responding to changes in biotic and abiotic conditions, and what are the impacts on **ecosystem** structure and function?
- What are the causes and consequences of changes in the **hydrologic system**, specifically the amount, temporal distribution, and discharge of surface and subsurface water?
- What processes are controlling changes in the distribution and properties of **permafrost** and what are the impacts of these changes?

Motivation



ILAMB – A Good Start

Comparison Over



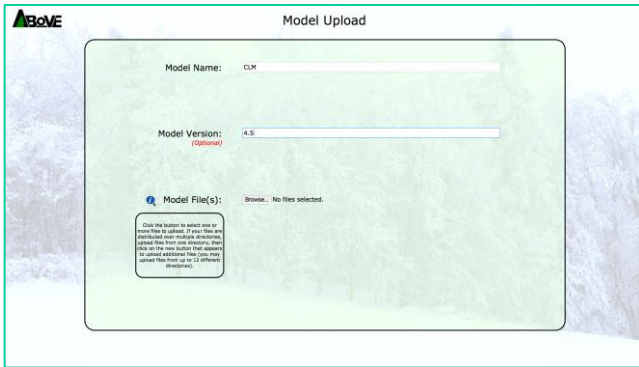
Domain



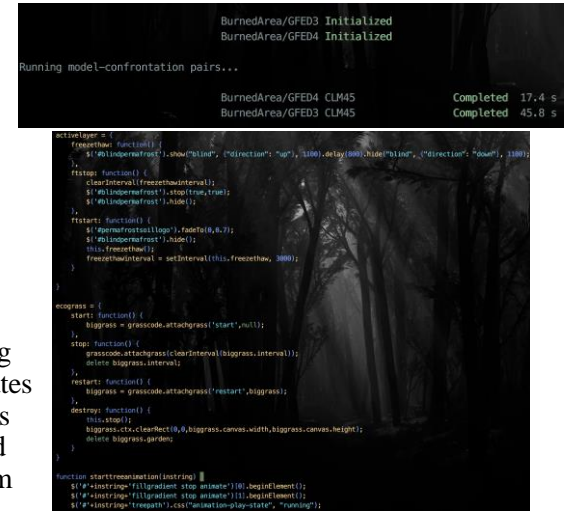
ABOVE Benchmarking System – Carbon Component

Variable	Dataset
Biomass	ICESat, GEDI
Carbon Dioxide Flux	CARVE, OCO2
Methane Flux	CARVE, Olefeldt Methane Synthesis
Gross Primary Production	Ameriflux, MODIS
Net Primary Production	Ameriflux, MODIS
Net Ecosystem Exchange	Ameriflux, MODIS, CARVE
Litter Carbon Magnitude	Long-Term Intersite Decomposition Experiment Team (LIDET)
Soil Respiration	Bond-Lamberty Database
Soil Carbon Magnitude	International Soil Carbon Network (ISCN), Northern Circumpolar Soil Carbon Database (NCSCD)
Soil Carbon Residence Time	Incubation Database (from Permafrost Carbon Network)
Carbon Inter-Pool Transfer	ICESat, LIDET, NCSCD

Process



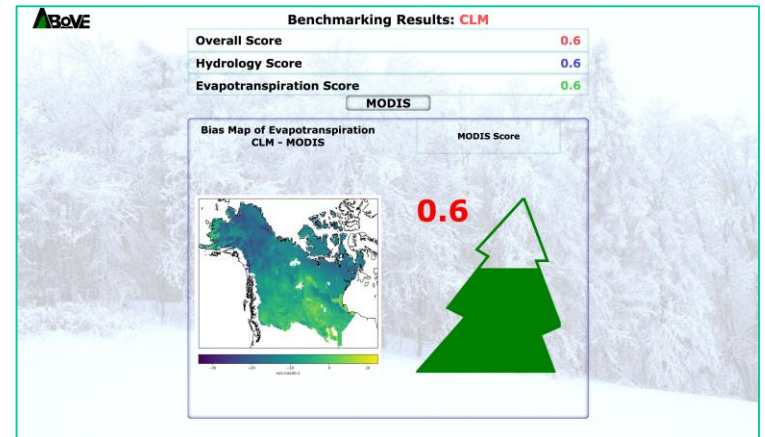
User Uploads Model to Benchmarking System



Benchmarking System Calculates Scores, Makes Graphics, and Builds Custom Webpage

User Views Results on Custom Webpage

User Updates Model Based on Benchmark Results



1. Load Structure
2. Load Model
3. Determine Matching Datasets
4. Load Data from Matching Datasets
5. Do Statistics with Loaded Information
6. Make full Scoring Structure
7. Generate Webpage and Plots

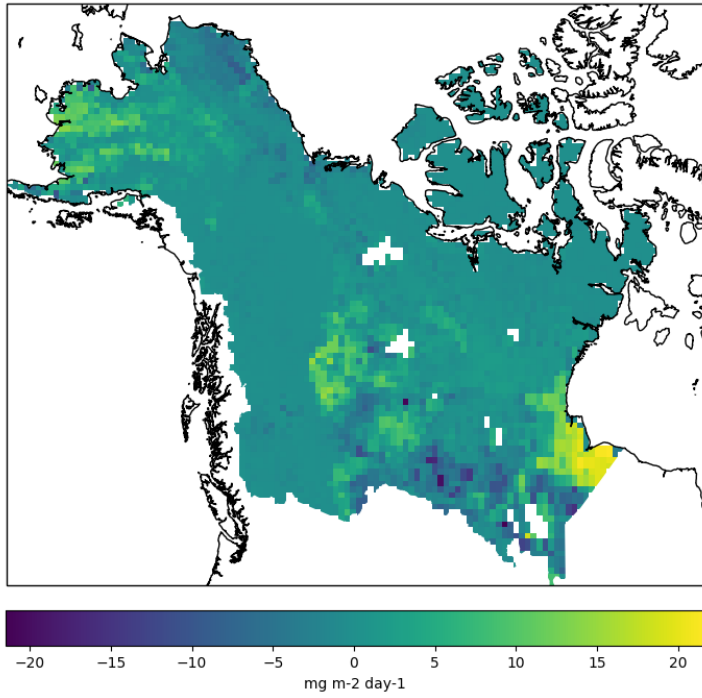
Loaded In This Step:

1. Basic Scoring Structure Shell
2. ModelOutput Class Shell
3. Model Output in ABoVE grid, Stats Shell
4. Observational Data in ABoVE grid
5. Full Statistics Dictionary
6. Full Scoring Structure
7. Plots, Webpage

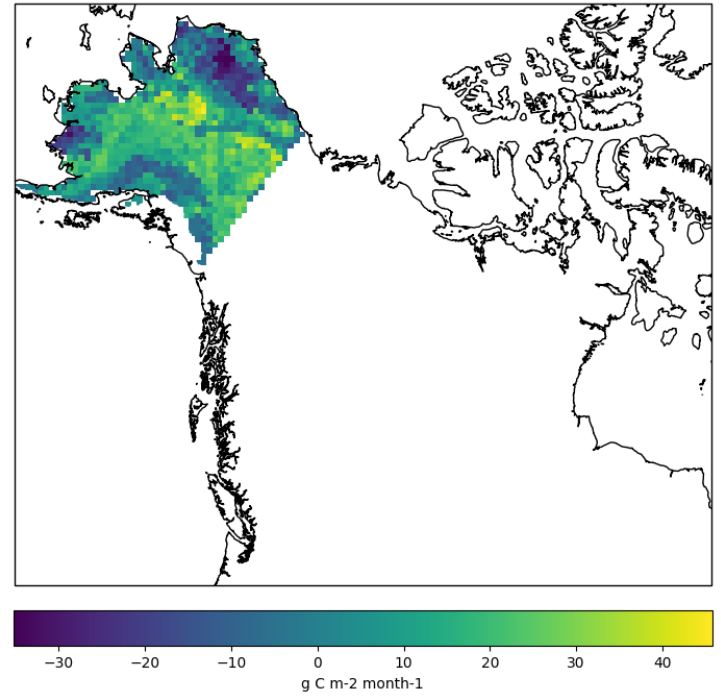
Used In This Step:

1. datasets.json and benchmarks.json
2. Model Output Files in “active” model directory
3. Observational Data NetCDF file (to get temporal coverage), Shell Structure
4. Observational Data NetCDF files or source GeoTiffs*
5. ABoVE gridded Model Output and Observational Data
6. Scoring Structure Shell, Statistics Dictionary
7. Full Scoring Structure, Web Coding Stuff

* If we're delving into using GeoTiffs, something may have gone wrong, and things get complex (but they should still work). The extraction of GeoTiff information to NetCDF is supposed to be done offline.



WetCHARTS CH₄ Flux Bias



CARVE NEE Bias