

Challenges in modeling peatland responses

Moss growth
and physiology

Biogeochemistry

Vascular PFTs

Microtopography

Peat dynamics

Goal: Predict responses over northern
non-permafrost peatlands at high
resolution.

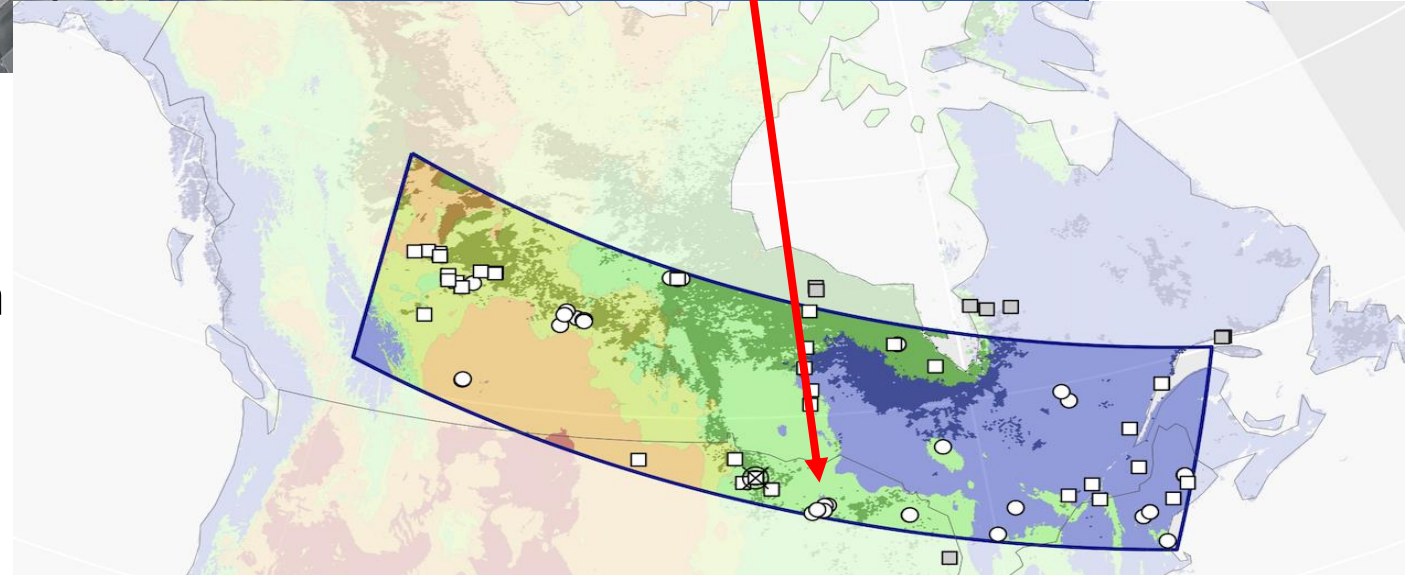
Are SPRUCE results **transferable**?



Different types
of peatlands

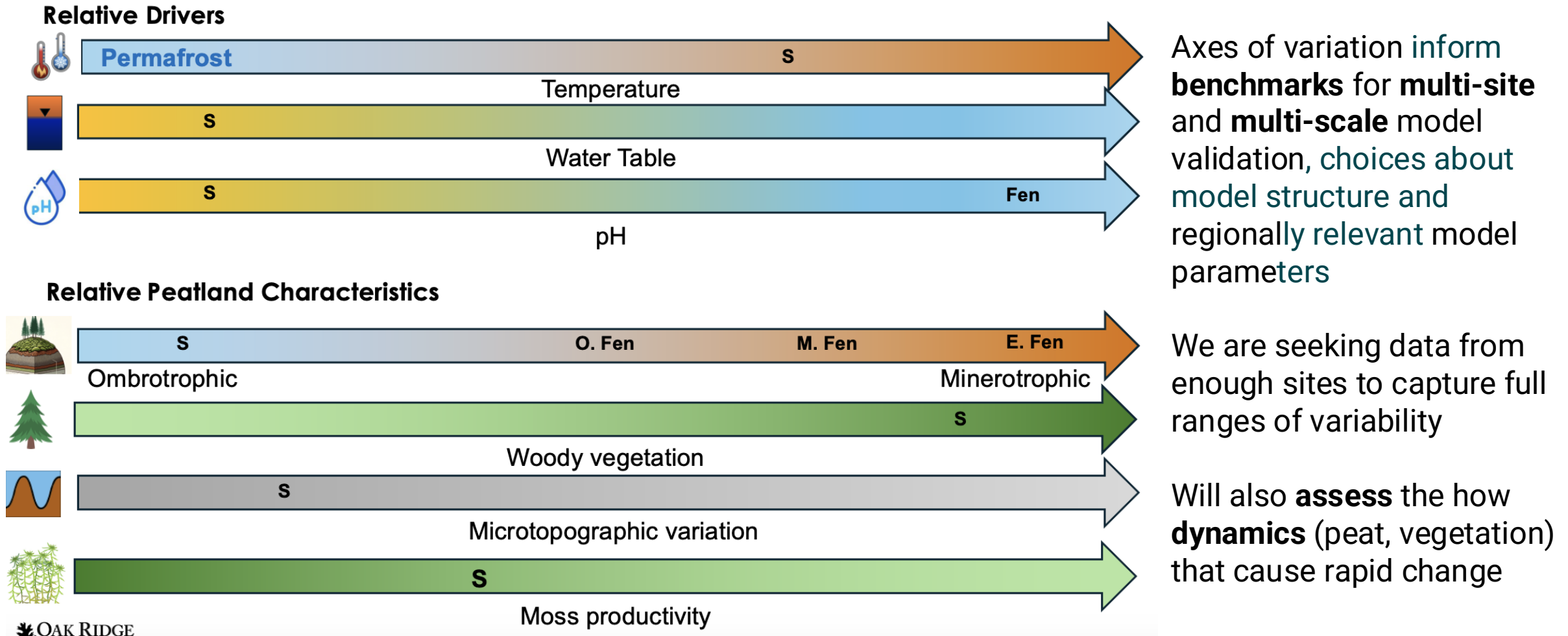
Lateral movement
of water, C and
nutrients

Disturbance



Integrating information from other sites

We must test ELM-Peatlands responses over key axes of variation.

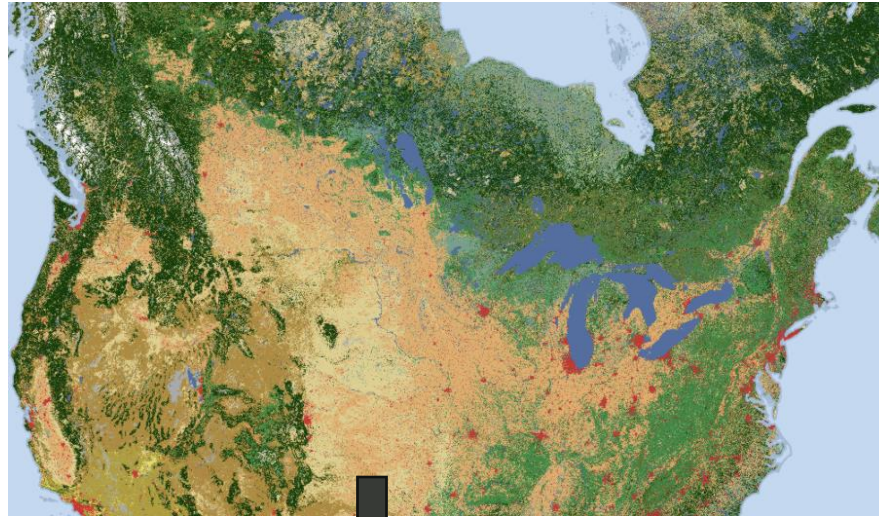


Required model inputs

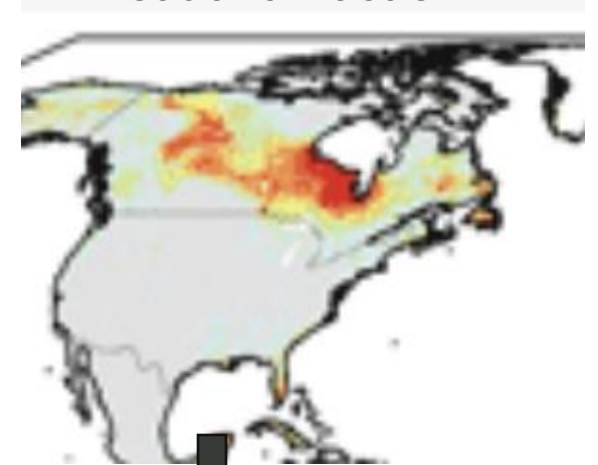
Meteorology



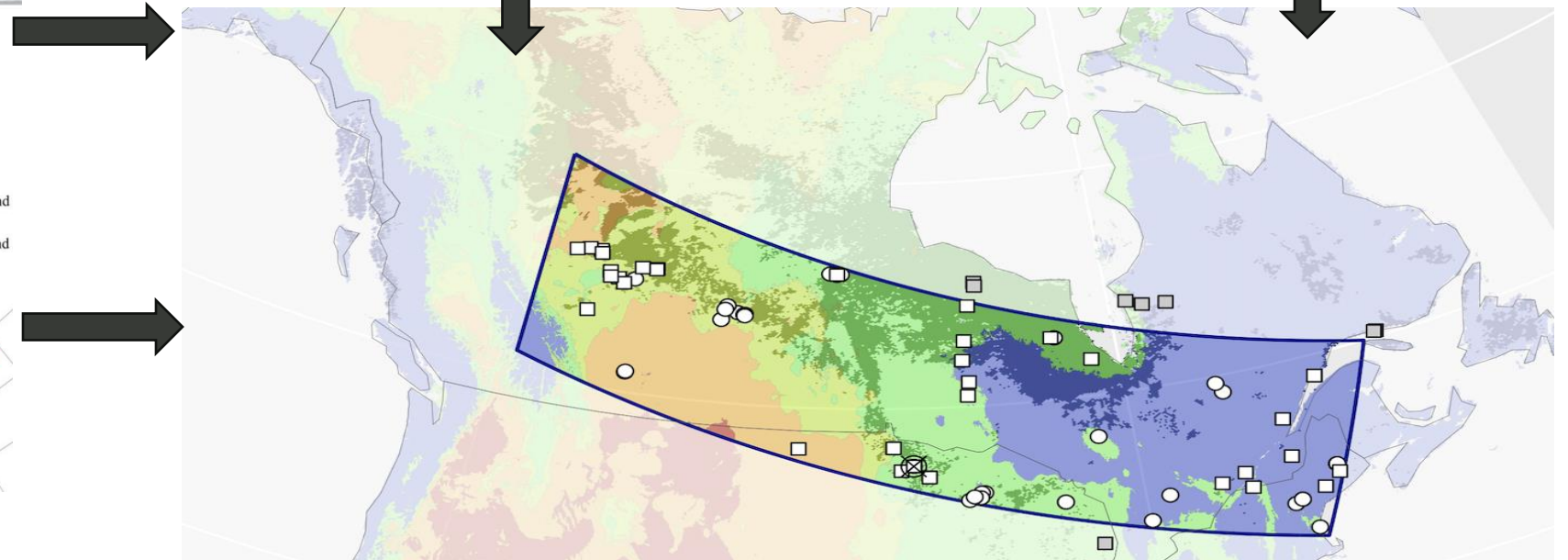
Land cover



Peatland fraction



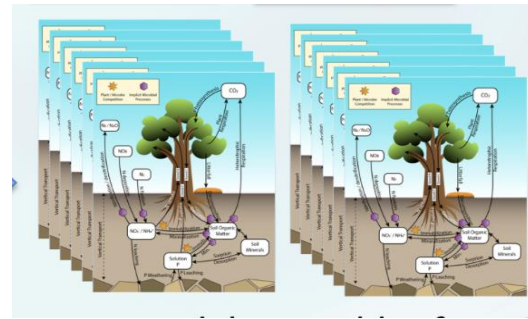
Wetland type



Optimization and scaling approach

ELM parameter optimization:

- One site at a time
- Analysis of optimized parameters
- Multi-site optimization (similar sites)
- Multi-site optimization (connected sites)



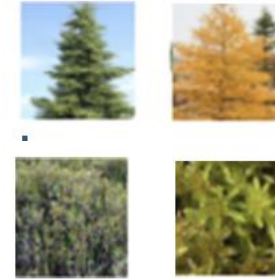
NGEE Arctic PFT parameters

 Not Vegetated	 Deciduous Alder Shrub
 Deciduous Dwarf Shrub	 Forb
 Evergreen Dwarf Shrub	 Graminoid
 Deciduous Low Shrub	 Bryophyte
 Deciduous Low to Tall Shrub	 Lichen

Column (peat) parameters

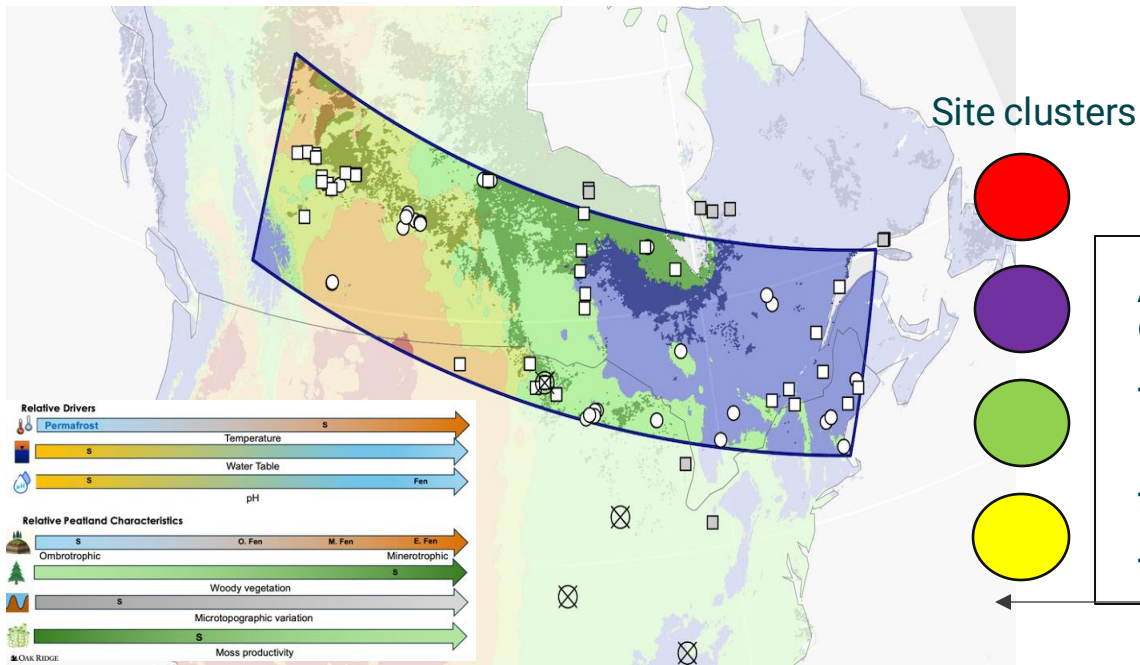


SPRUCE PFT parameters

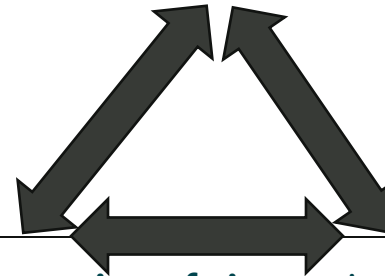


Regional benchmarking (e.g. International Land Model Benchmarking -> ILAMB)

- Remote sensing observations
- Synthesis datasets

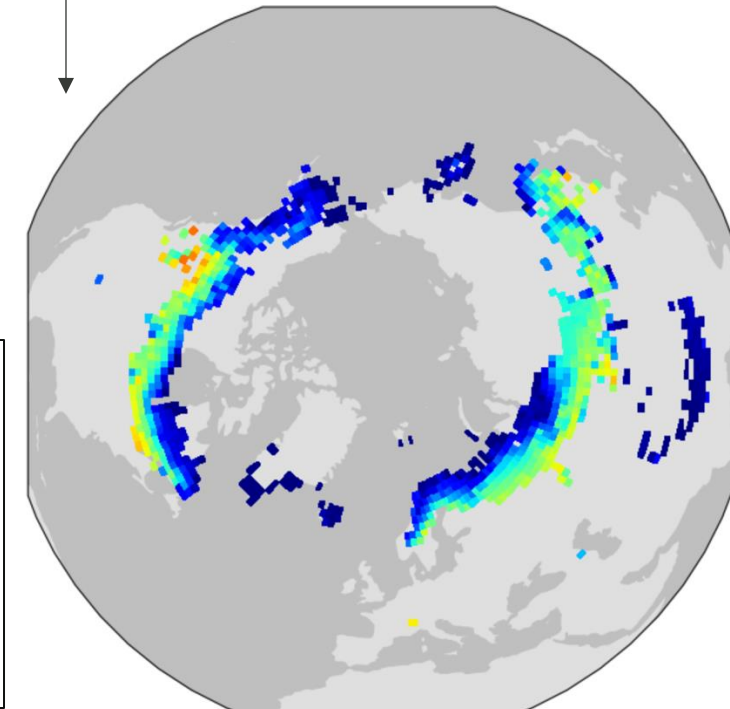


Site clusters



Aggregation of sites using clustering approach

- Determine number of PFTs, wetland types
- Capture axes of variation
- Calibrate simultaneously



<https://www.ilamb.org/>