



Lawrence Berkeley National Laboratory



EARTH &
ENVIRONMENTAL
SCIENCES

Different numerical implementations implies uncertain model parameterization and model responses

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Science summary

Demonstrate right model prediction for wrong reasons

Objective

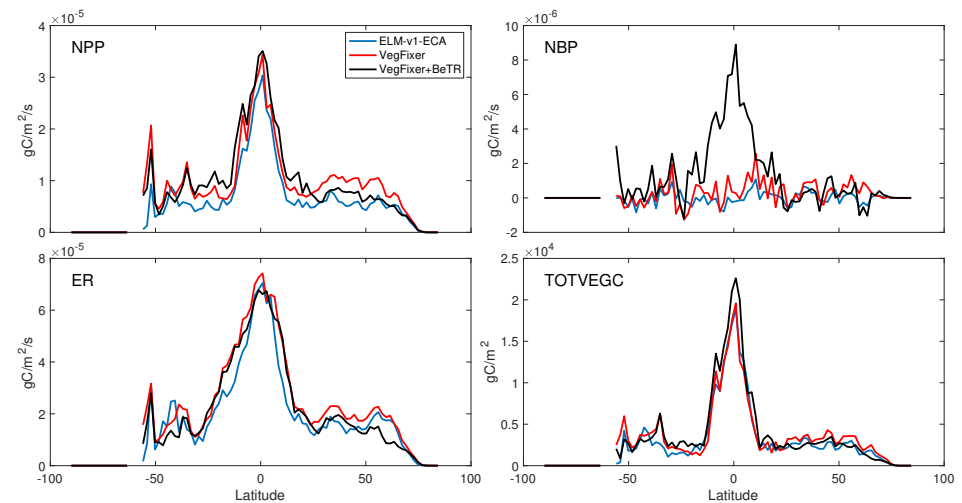
- Show numerical differences result in different model behavior with identical parameterization

Research

- ELM simulations with different numerical couplings of plant and soil BGC

Three coupling strategies:

1. ELM-v1-ECA
2. VegFix: Multi-flux limiter for vegetation resource allocation
3. VegFix + belowground bgc with betr reactive transport and Multi-flux limiter for nutrient coupling

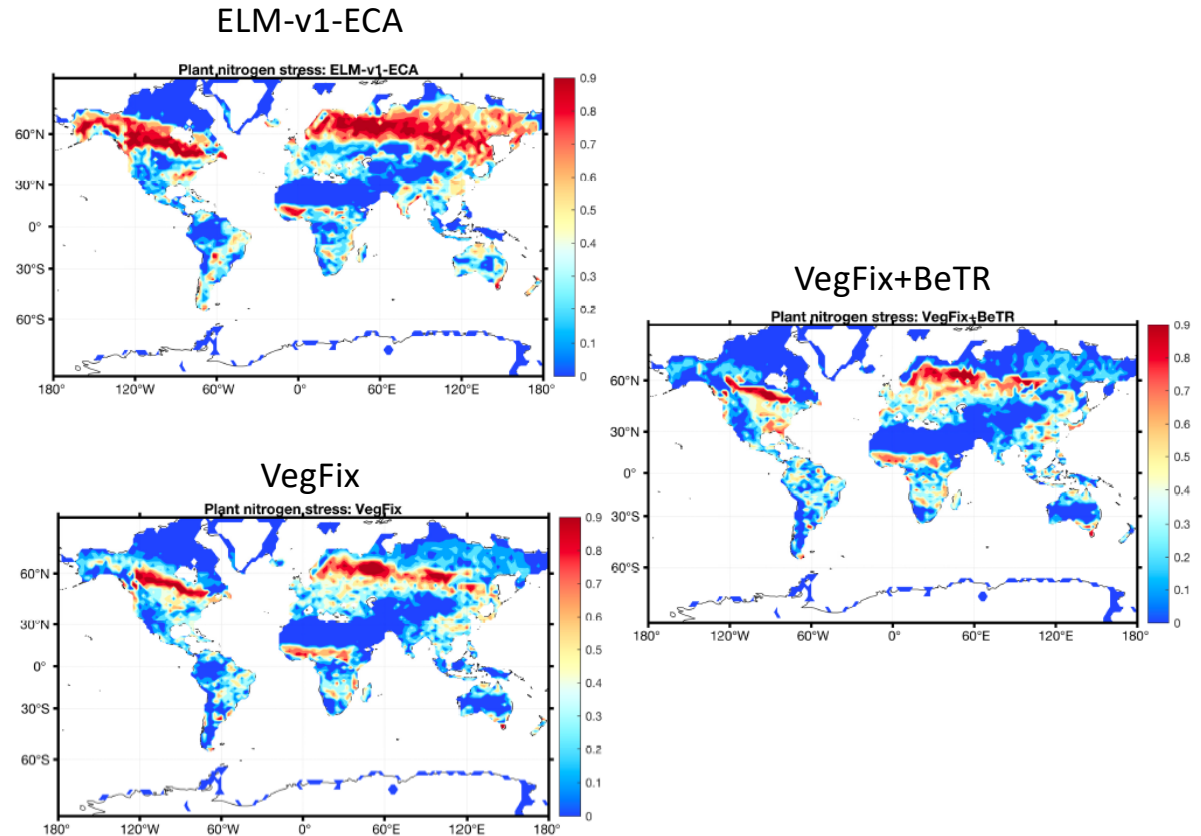


Impact

- Show that right model parameterization can be made wrong by improper numerical coupling
- A rarely considered aspect in model benchmark

Future research

- Identify the mechanisms that lead to the difference
 - ELM
 - Toy model
- Test to what degree the inter-model difference can be minimized by calibration
- Explore long term implications



Relationship to white paper

- *Impact of extremes on terrestrial ecosystems*
 - *how drought effect varies with different coupling strategies?*
- *Influence of energy and water on soil carbon turnover time*
 - *how contemporary and scenario simulations differ?*
 - *permafrost carbon?*
- *Vegetation physiological responses to increasing CO₂, surface energy budgets, nutrients, and atmospheric forcing*