Observational and experimental constraints on soil organic matter model for CLM

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Efforts underway

- Comparison of CLM4 soil respiration to global dataset from Bond-Lamberty and Thomson (2010)

- Site-level evaluation of fluxes and stocks at ~40 sites (AmeriFlux and Fluxnet Canada)

- Code architectural changes to allow multiple litter/soil models

Efforts planned for 2010-2011

- Evaluation against EBIS-Oak Ridge and EBIS-AmeriFlux

- Implementation of surface and mineral soil litter and SOM pools

- Evaluation of turnover times against ^{14}C database

- Measurement of SOM dynamics with depth in tundra soil columns

- A-priori modeling for SPRUCE warming x CO2 experiment (Minnesota)

Efforts 2012 and beyond

- Refine structure and derive parameters for new litter – soil model.
  - Augment surface/mineral soil split to include variation with depth, as dictated by obs
  - Introduce ^{14}C tracer in CLM
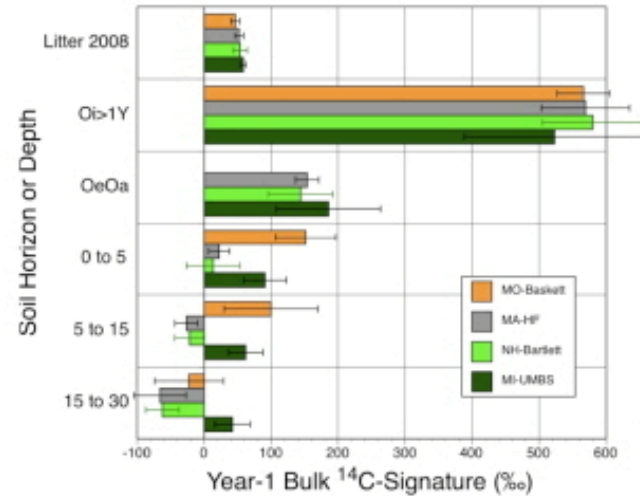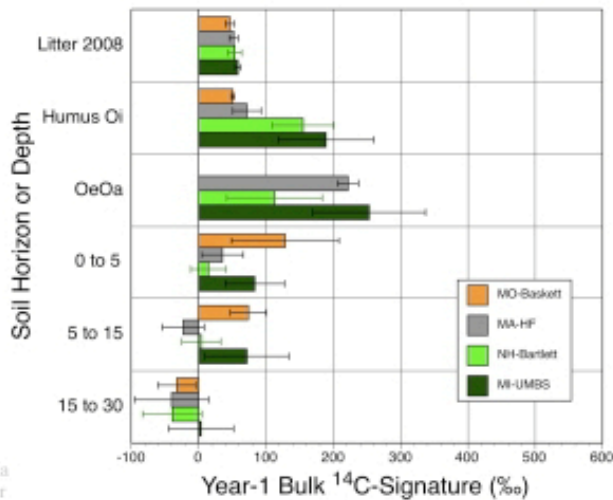 - Evaluate new model against ^{14}C database
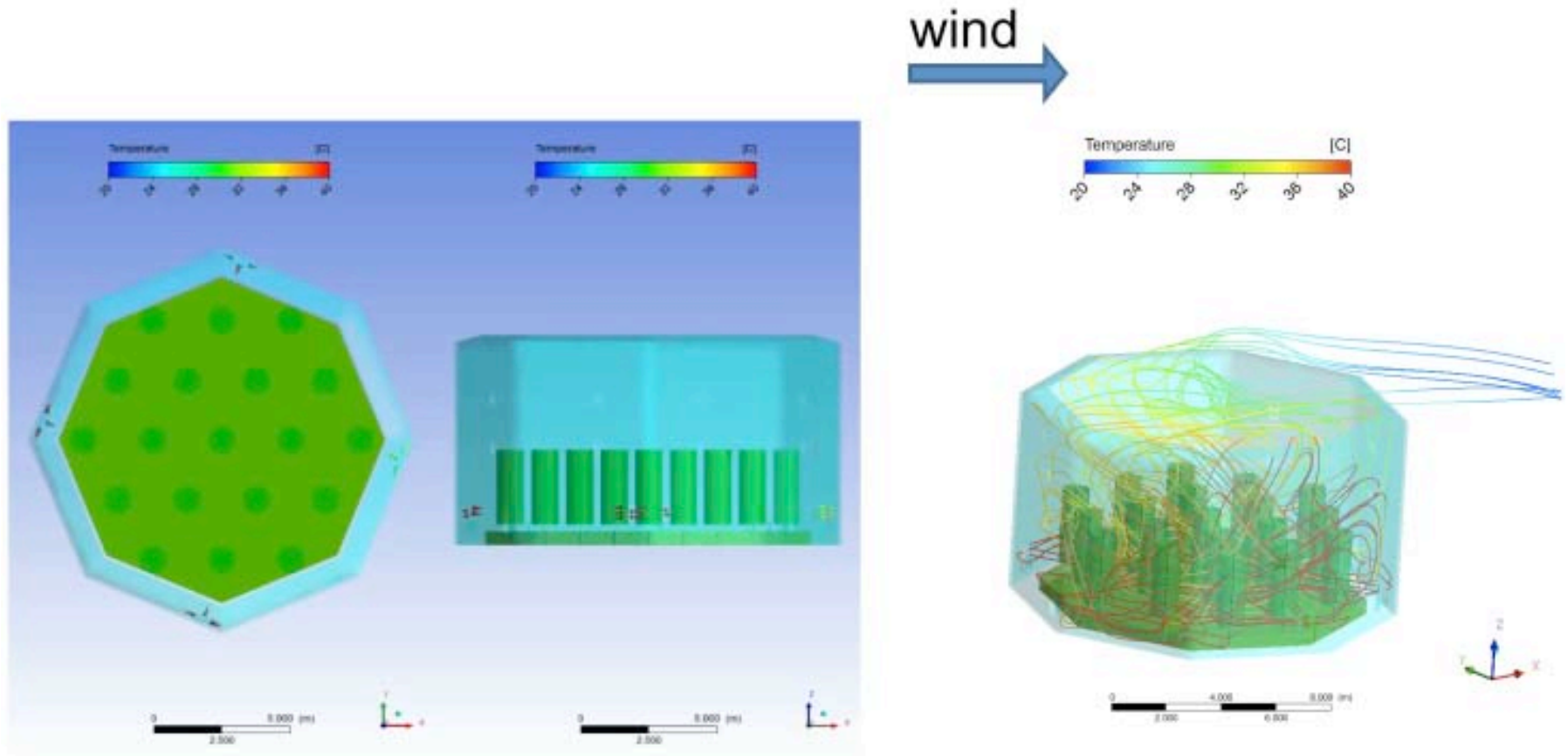
Example results from tracer experiments
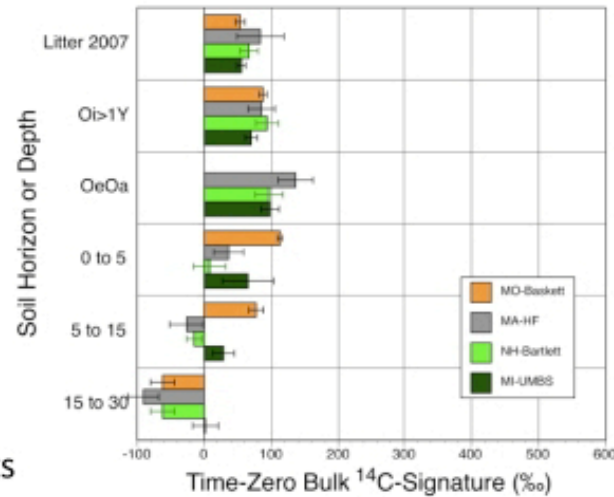
Hanson et al., in prep

SPRUCE experiment: warming x CO_2 in a black spruce peat bog, Minnesota
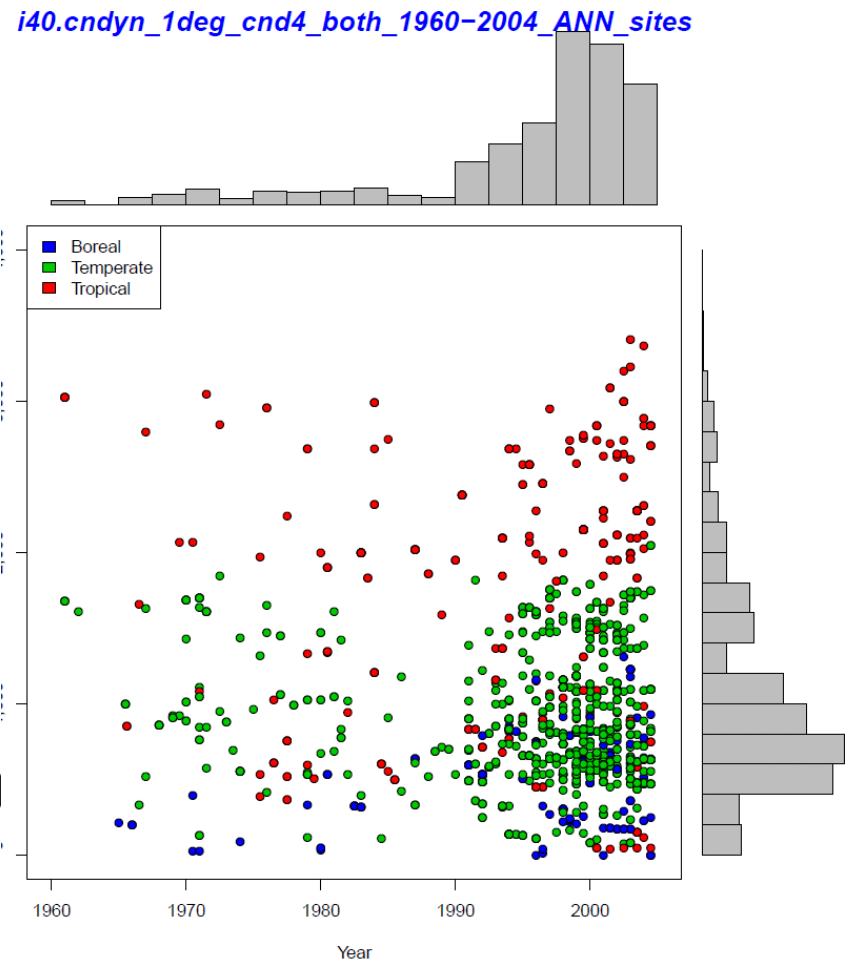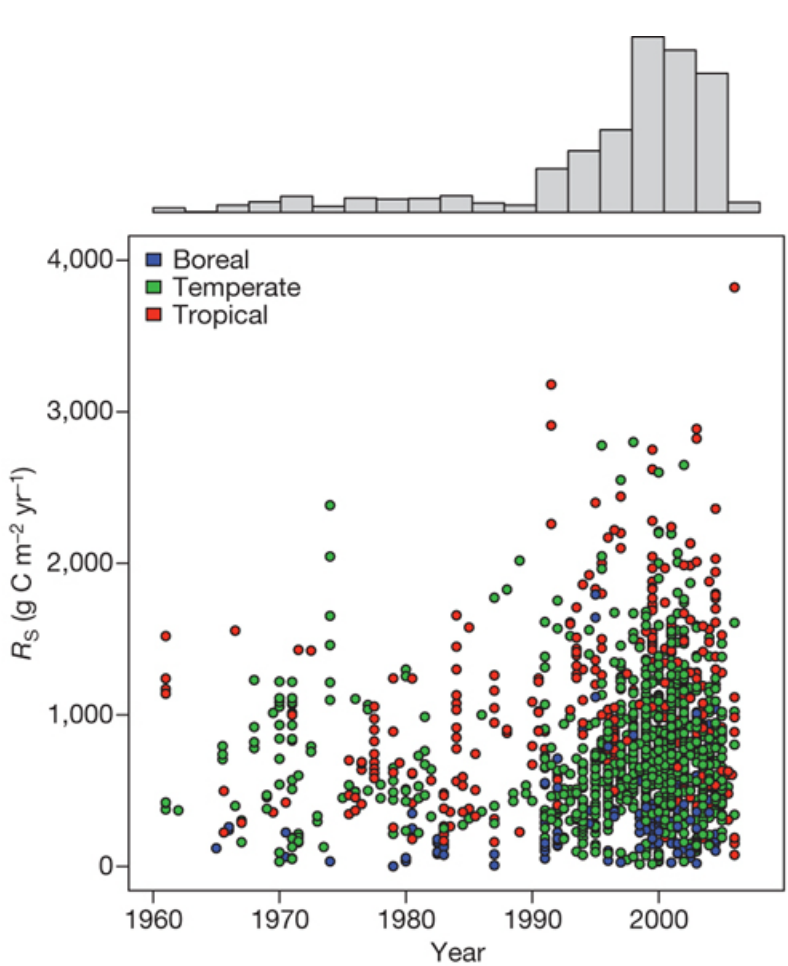
SPRUCE experiment: warming x CO_2 in a black spruce peat bog, Minnesota

Completed Prototype

Observed vs. modeled soil respiration: changes over time

i40.cndyn_1deg_cnd4_both_1960−2004_ANN_sites

Bond-Lamberty and Thomson, 2010   Fully-forced CLM4 (offline)

Thornton et al., in prep.