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

EBIS-AmeriFlux Bulk $^{14}$C Data

Hanson et al., in prep
SPRUCE experiment: warming x CO$_2$ in a black spruce peat bog, Minnesota
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Observed vs. modeled soil respiration: changes over time

Bond-Lamberty and Thomson, 2010

Fully-forced CLM4 (offline)

Thornton et al., in prep.