

Poster# 67

Constraining Belowground Carbon Turnover Times in Terrestrial Ecosystems: Insights Gained through Radiocarbon Analysis and Interpretation at AmeriFlux Network Sites

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Land-model data comparisons show that models tend to underestimate mean transit time of carbon in terrestrial ecosystems relative to measurement-based estimates largely through an underestimation of soil carbon turnover times. Radiocarbon measurements of multiple quantified pools and fluxes combined with the belowground carbon and radiocarbon modeling tool, SoilR, can provide more robust estimates for transit times than simple, single pool models reliant on assumptions of steady-state and a single time-lag. In addition, this approach can constrain carbon cycles contributing to measured transit times. Well-instrumented sites provide an excellent opportunity to combine existing data, new measurements, and modeling to constrain terrestrial ecosystem turnover times and the mechanisms behind them. Existing soil radiocarbon and carbon stock data from sites in the AmeriFlux Network are being synthesized and reanalyzed using a belowground carbon radiocarbon-modeling tool, SoilR. Current work focuses on five temperate deciduous forests. Of these, four sites were part of the Enriched Background Isotope Study, a ¹⁴C-enriched litter decomposition experiment, which will provide additional data for SoilR model validation. These observed soil profiles are also being compared to model values from CLM and ALM. Additional data, archived samples, and new sampling sites are of interest for future efforts.