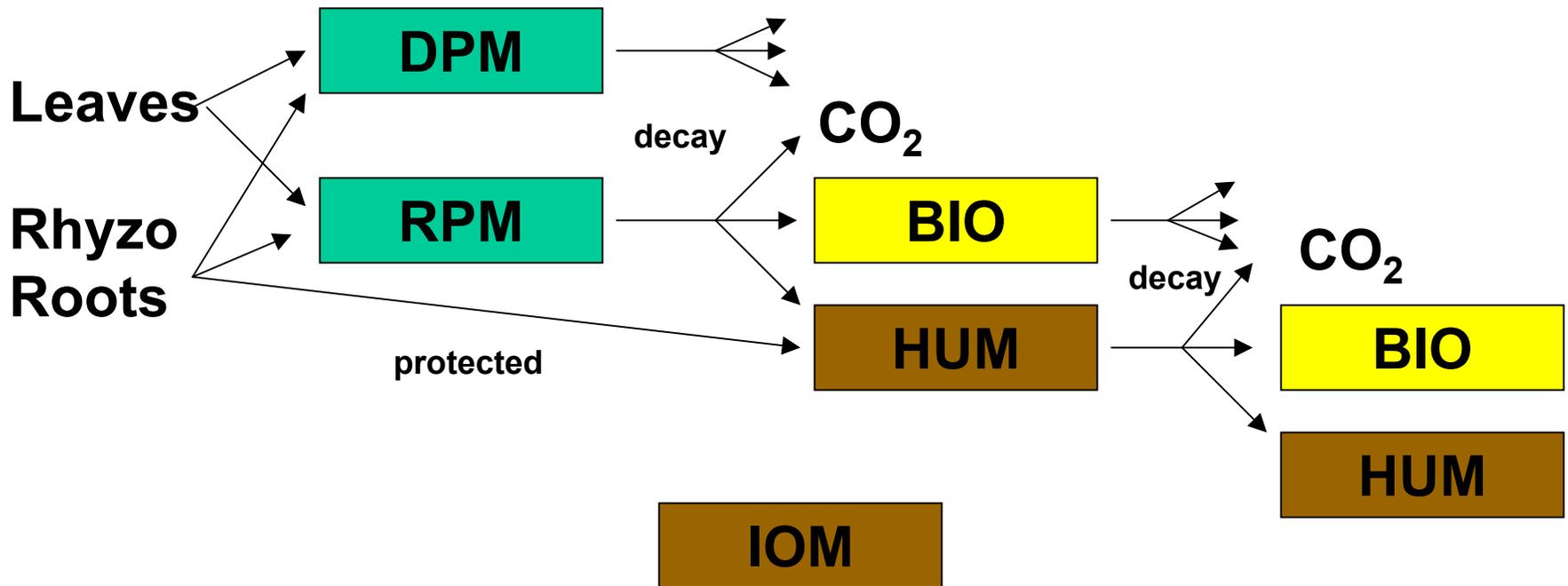


Structure of the Rothamsted Carbon Model



RPM : Resistant Plant Material

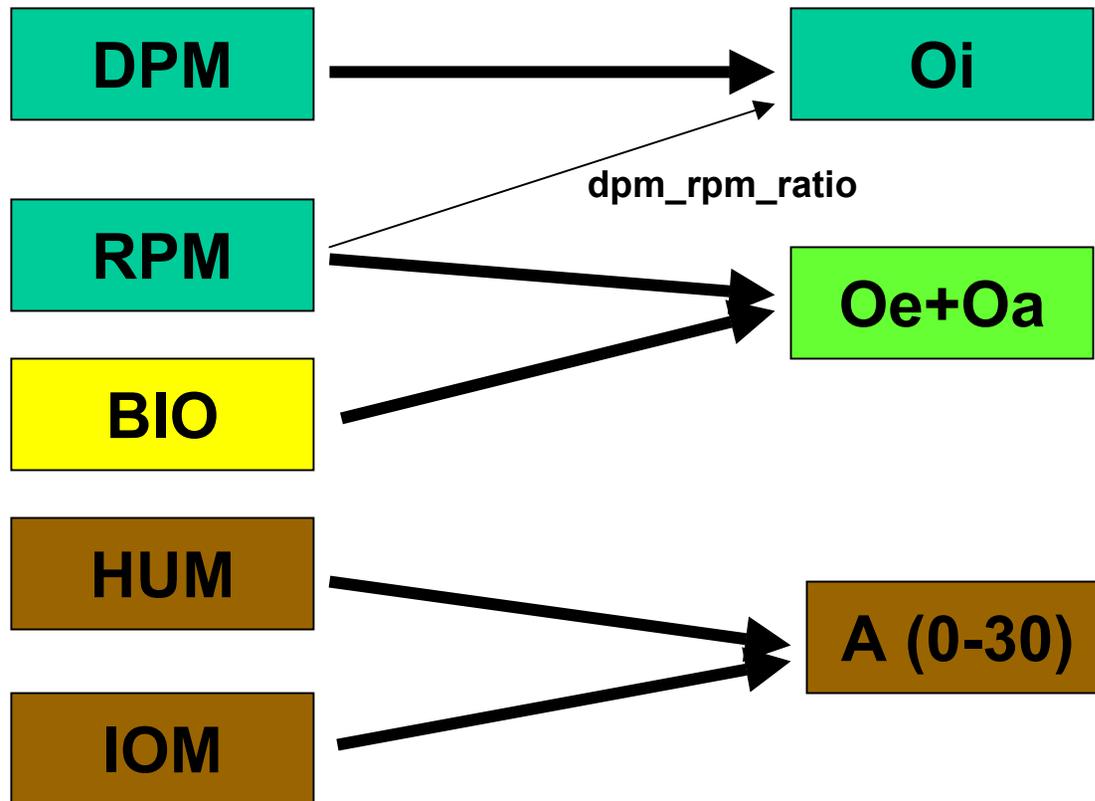
DPM : Decomposable Plant Material

BIO : Microbial Biomass

HUM : Humified OM

IOM : Inert OM

Recategorization of Rothamsted Compartments



RPM : Resistant Plant Material

DPM : Decomposable Plant Material

BIO : Microbial Biomass

HUM : Humified OM

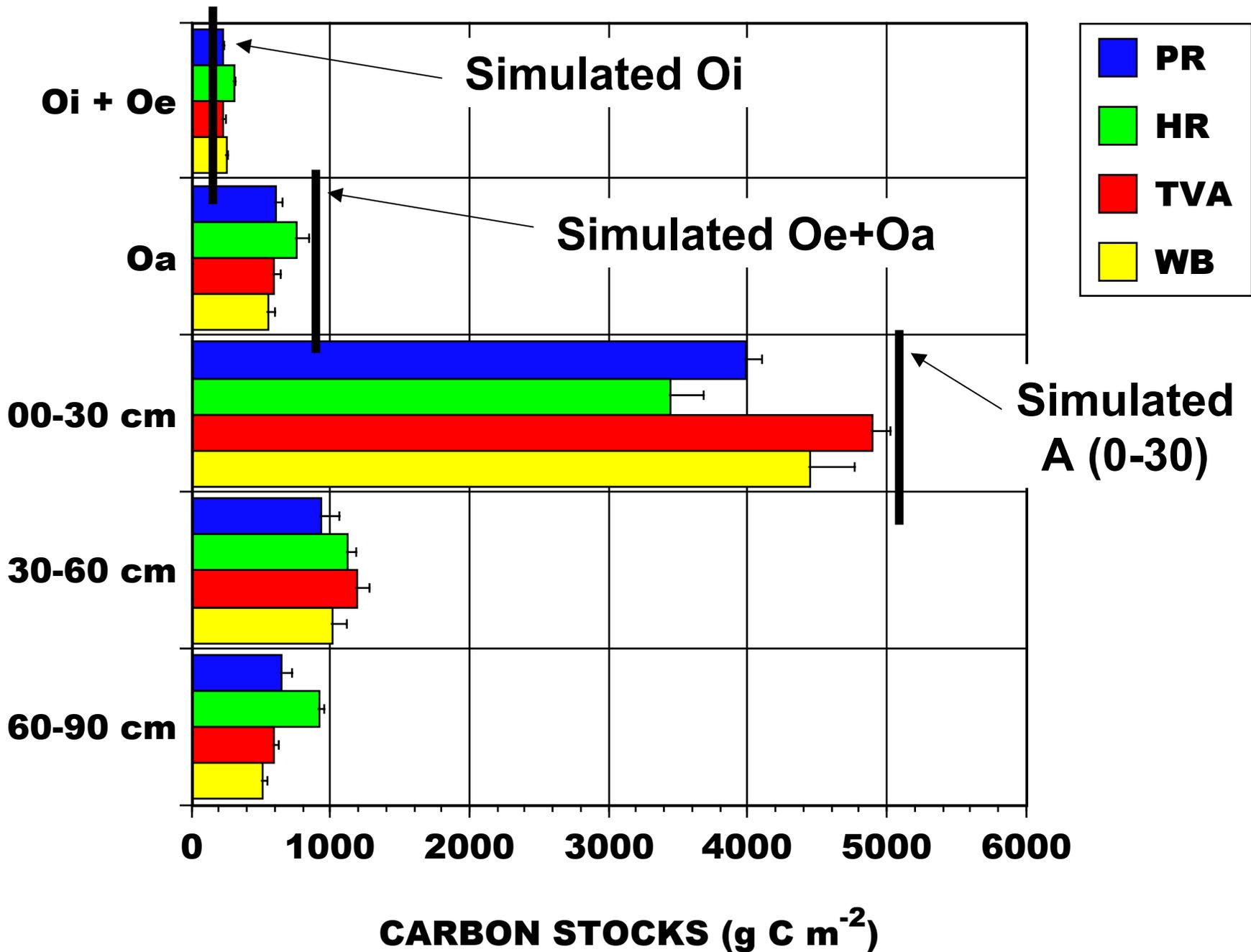
IOM : Inert OM

Assumptions

- **Rhyzo + Root input = 2.2 t C ha⁻² y⁻¹**
- **Leaf input = 2.2 t C ha⁻² y⁻¹**
- **Rhyzodeposits not separated from root inputs**
- **Root to HUM fraction = 0.25**
- **Clay content = 23.4%**
- **Climate average used throughout**

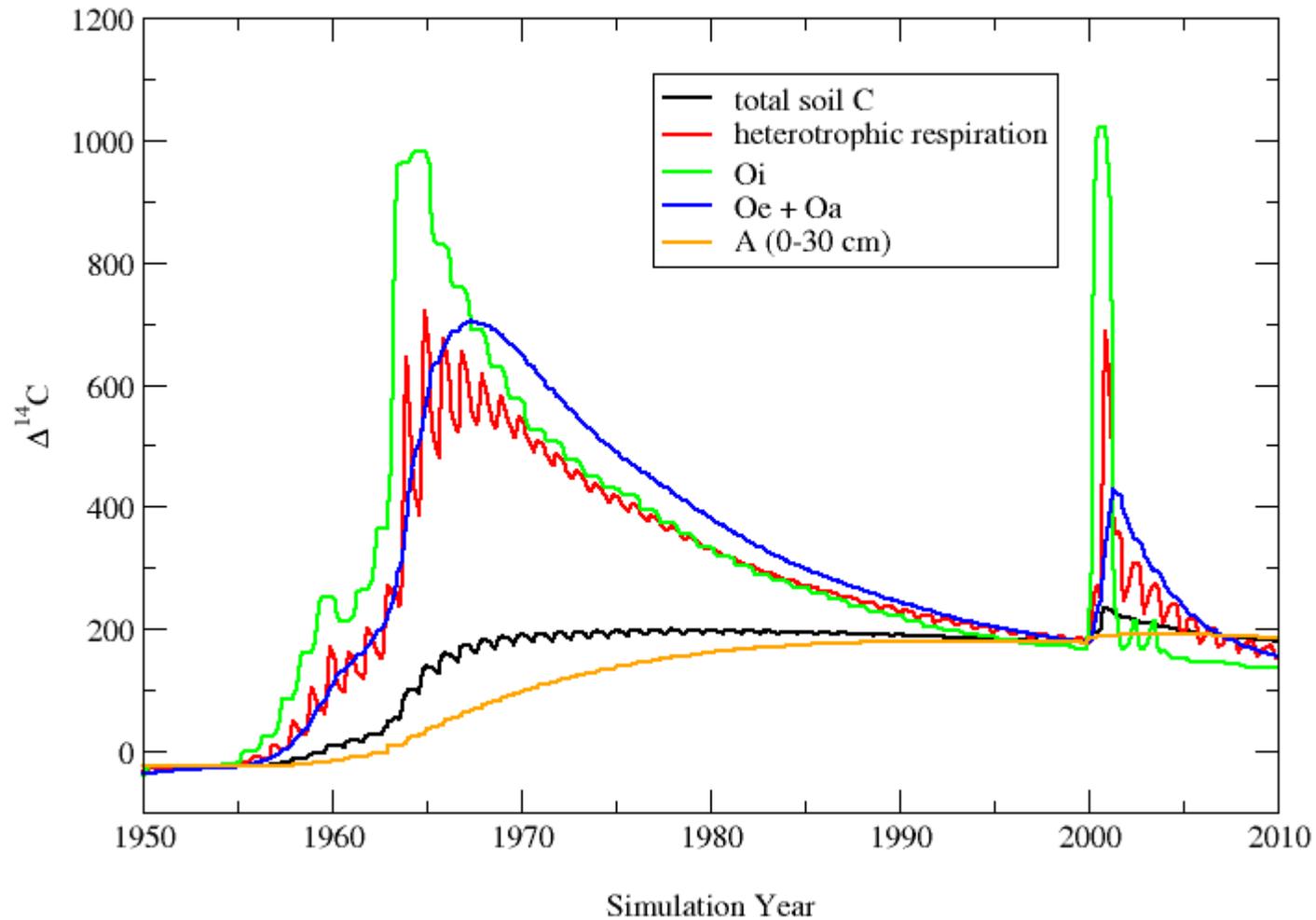
Equilibrium Pools

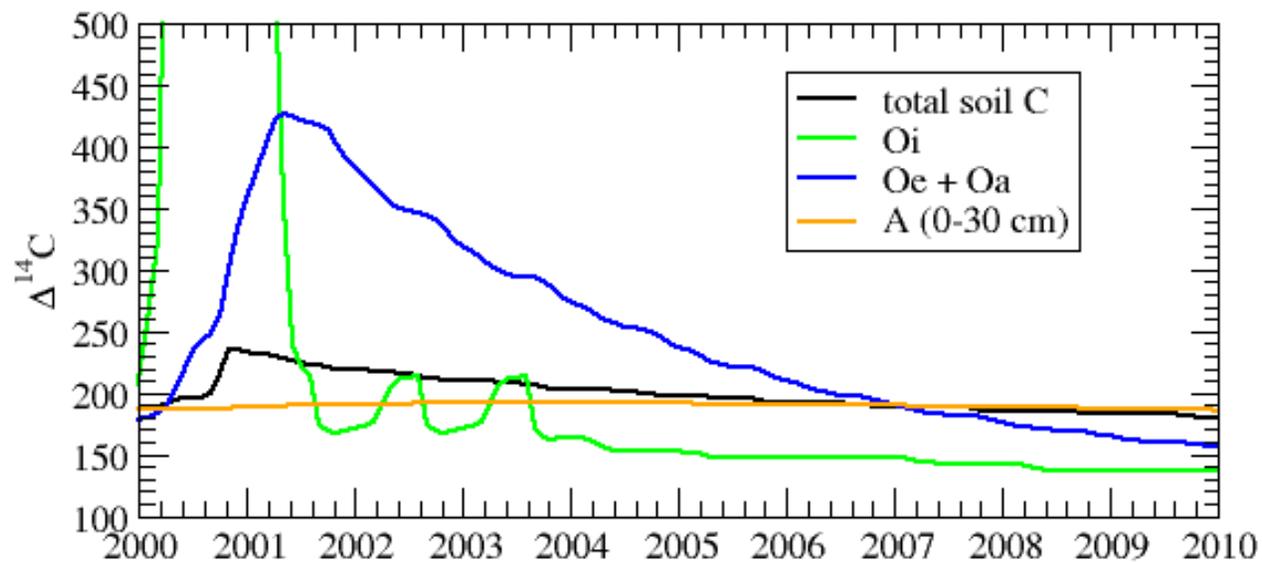
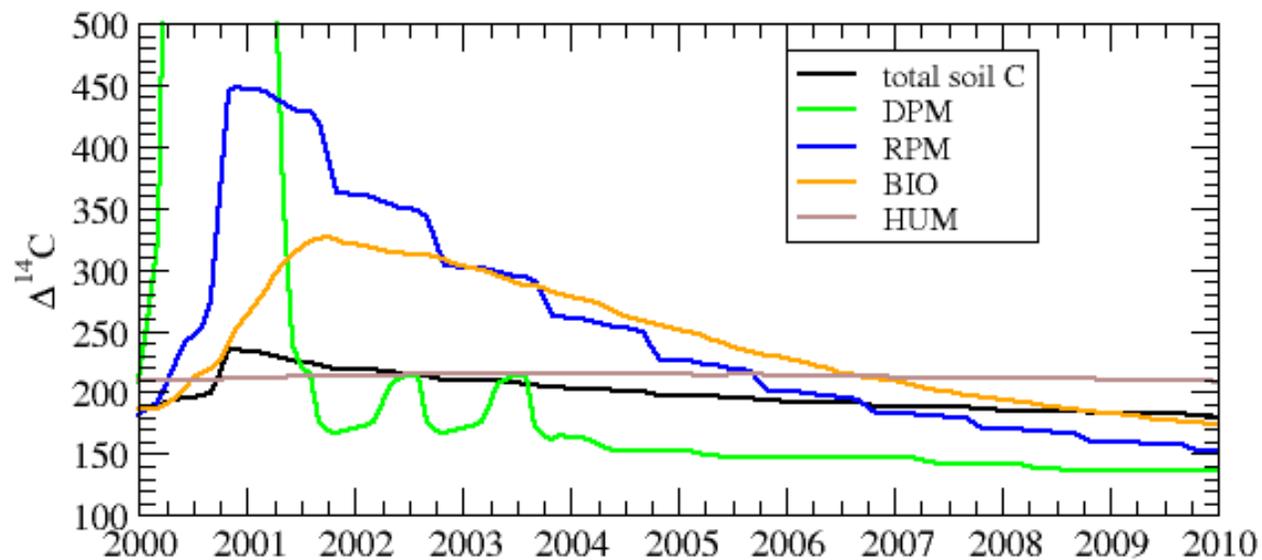
Compartment	Model	WBW
DPM + associated RPM (O _i)	2.0	2.8
RPM + BIO (O _e + O _a)	9.8	9.4
HUM + IOM (A)	50.7	44.2



Rothamsted Model Output

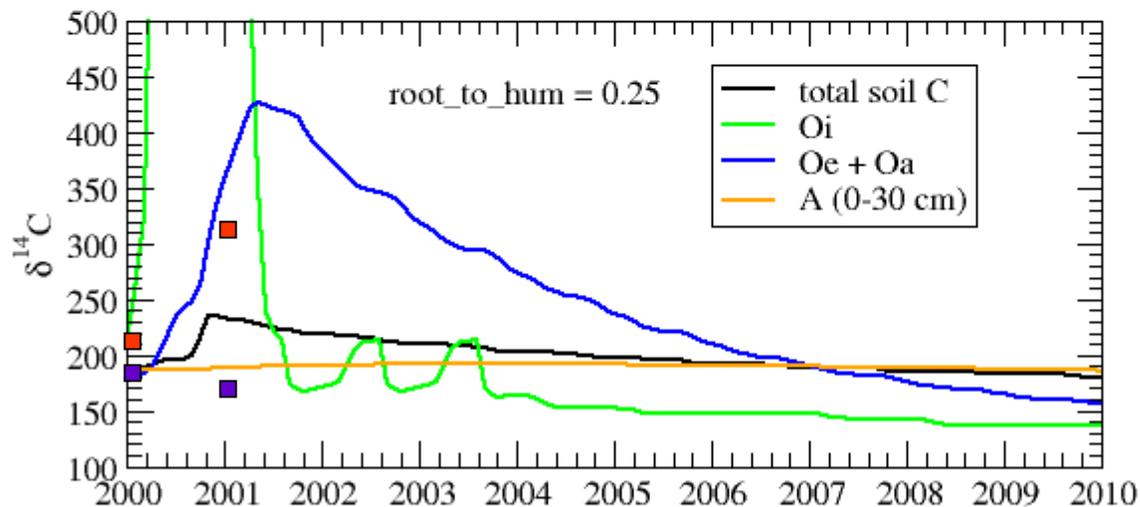
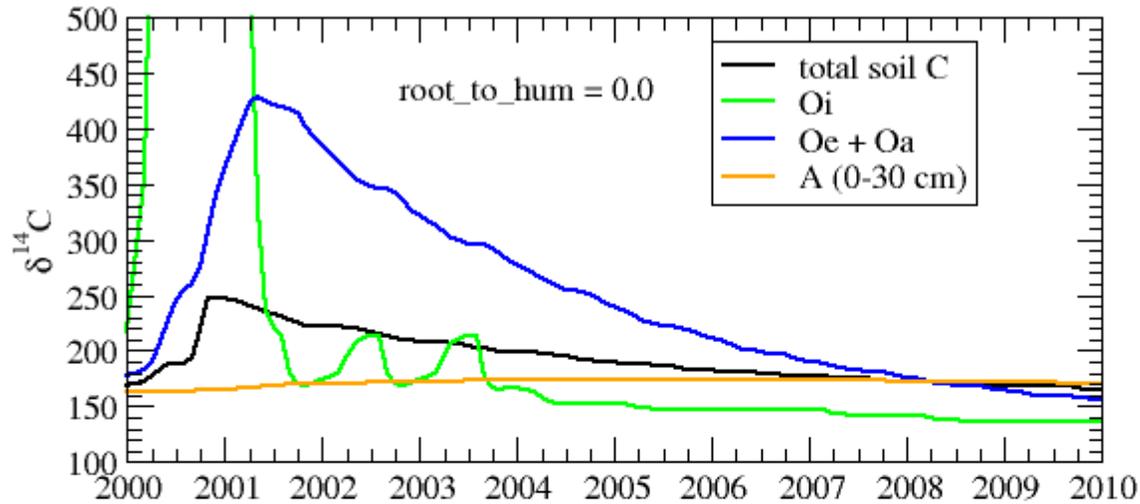
1 application of $\Delta^{14}\text{C} = +1000$ leaves, +200 roots





Simulation Year

Sensitivity to amount of physical protection



Simulation Year

Questions

- What is the magnitude of root and rhizosphere inputs?
 - 2.2 t C ha⁻¹ y⁻¹ required to get correct mass
- What fraction of root inputs are physically protected as HUM?
 - Currently using 0.25, affects $\Delta^{14}\text{C}$ of HUM
- Can we infer the the fraction of rhyzo vs. root inputs?
 - Rhizodeposits => BIO ?
- What is the $\Delta^{14}\text{C}$ of recent root inputs?

Data Allows More Model Complexity

- **Explicit treatment of litter decomposition separate from soil.**
- **Splitting dynamics of O, A, deeper layers requires additional information**
 - **Interactions between layers**
 - **Degree of mixing of POM between O and A**
 - **Partitioning of root and rhizodeposits**
 - **DOC transport becomes more important**
 - **Environmental controls on rates are different for each layer**
- **Fractionation of soil C is necessary**

Next Generation SOM Model

- **Aggregate formation and turnover explicitly considered**
 - **Are we getting enough tracer into A to make useful estimates?**
 - **Current experiment too short term for adequate treatment of IOM?**
- **Are parent material differences useful contrasts for generalizing?**