Chapter 3

Question:

*How does mineralogy influence the climate response of soil C cycling? On what time scales are these interactions important?*

Hypotheses:

1. Soil C ages will increase linearly [?] with increasing abundance of short-range order minerals (SRO).
   1. More depleted ∆14C in heavy fraction in soils with greater SRO abundance
2. Soil C transit times will increase linearly [?] with increasing mean annual temperature
   1. Free light fraction ∆14C closer to the atmosphere (smaller ∆∆14C)
3. Soil C transit times will increase with increasing SRO abundance, due to the role of organo-mineral complexes in regulating soil C cycling on decadal time scales.
   1. Correlation between SRO content and transit times

Chapter 4

Question:

How does vertical transport influence transit times?

[Relative rates of advective transport vs. dissolved? Role of H2O movement (hydraulic conductivity) vs. mineralogy?]

[How to publish a short communication about fitting lags when modeling 14C? Something in Radiocarbon? Should ask both Sue and Carlos]