Summary of archive incubation experiment

Rationale:

* Measuring 14C of respired CO2 (14C-CO2) from incubations of archived soils could improve soil carbon models by providing data at additional time points, a powerful constraint for tuning model parameters.

Research question:

* Air-drying, storage, and subsequent rewetting of soils may alter the relative contribution of “faster” versus “slower” pools of soil carbon to respiration
* We sought to test these possible effects by comparing 14C-CO2 from soils incubated with and without air-drying and storage

Results:

* 14C-CO2 from air-dried and rewetted soils was significantly different from control soils (= NOT air-dried)
* Air-drying and rewetting seems to drive observed differences, rather storage
* Treatment differences in 14C-CO2 were greater for grassland soils than for forest soils

Conclusions:

* While significant, differences suggest an offset of between 5 and 10 years, so likely acceptable in many modeling contexts
* Our data suggest that air-drying and rewetting increases the utilization of older substrate by soil microbes