

Soil organic matter dynamics: a cross-ecosystem approach

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Participants:

Kate Lajtha (AND), Alain Plante, Knute Nadelhoffer (ARC), Serita Frey (HFR), Heather Throop (JRN), Rich Bowden (HFR), 4 graduate students, 1 undergraduate.

Together with Alain Plante, Rich Bowden, and Knute Nadelhoffer, I organized a 2-day meeting in 2010 bring together scientists from several LTER sites interested in comparative SOM analysis. Our goal was to discuss the various tools and techniques that could and should be used in experimental SOM studies as well as to plan additional cross-site comparisons. The goal was to have scientists conducting quite different experiments, such as N fertilization studies, harvest or biodiversity studies, alien plant invasion measurements, or even DIRT studies, but who all wanted to examine soil organic matter as a response variable, could agree on some standard analytical techniques so that data set could be used in synthetic studies. We also wanted a time when the PIs of the different DIRT experiments could meet for a few hours to plan joint publication of existing data as well as to standardize other measurements to allow for future comparative analysis and publication. Thus participants included faculty and students involved in the Harvard Forest chronic N analysis, all the DIRT site lead scientists, an emerging scientist studying shrub invasions in grasslands, and forest clearing experiments.

Another goal was to discuss potential cross-site analyses that could use the power of the LTER network – a series of ecosystems that span broad gradients of soil textures and mineralogies, vegetation, and climate – to elucidate generalizations about soil organic matter dynamics and the role of soils in various ecosystems in the stabilization and/or destabilization of carbon.

Alain Plante presented recent techniques from his work in SOM molecular characterization and suggested several possible research goals for cross-site analysis. Rich Bowden shared results and techniques from N fertilization studies both at Harvard forest and elsewhere, and pointed out where simple analyses might not show interesting mechanisms for C stabilization. Kate Lajtha presented results from the crosssite DIRT synthesis that experimentally alters detrital inputs in forested ecosystems to examine the role of litter amount and chemistry on soil organic matter formation and accumulation. Representatives from Harvard Forest (Serita Frey's students; Serita was ill, and could not attend, at the last minute) were there and discussed the N fertilization experiment that explored potential measurements of effects of N on SOM dynamics.

I believe the workshop to be a success. Two papers are currently in preparation that compare density fractionation data across a number of LTER sites (Heather Throop and Kim Townsend as lead authors). A new LTREB proposal was submitted that

incorporates the recommendations of the group (Bormann lead PI). The group planned comparative analyses on soils from the Harvard Forest DIRT plots that will result in a special issue of Biogeochemistry by 2013, and that will involve other scientists suggested at this meeting.