**Table 1.** Location of study sites with mean climate conditions, soil order, and dominant AM and ECM tree species in the selected study plots by basal area

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Site** | **Location** | **MAT (**°C) | **MAP (mm)** | **Dominant Soil Order** | **Dominant AM**  **Tree Species** | **Dominant ECM**  **Tree Species** |  |  |
| Treehaven (TREE) | Lincoln County, WI  45.49369 °N  -89.58571 °W | 4.8 | 797 | Spodosol | *Acer rubrum*  *Acer saccharum* | *Pinus strobus*  *Picea mariana* |  |  |
| Bartlett Experimental Forest (BART) | Carroll County, NH  44.063889 °N  -71.287375 °W | 6.2 | 1325 | Spodosol | *Acer rubrum*  *Fraxinus americana* | *Fagus grandifolia* *Tsuga canadensis* |  |  |
| Harvard Forest (HARV) | Worcester County, MA  42.53691 °N  -72.17265 °W | 7.4 | 1199 | Inceptisol | *Acer rubrum*  *Fraxinus americana* | *Tsuga canadensis*  *Quercus rubra* |  |  |
| Smithsonian Environmental Research Center (SERC) | Anne Arundel County, MD  38.890131 °N  -76.560014 °W | 13.6 | 1075 | Ultisol | *Liriodendron tulipifera*  *Liquidambar styraciflua* | *Quercus alba*  *Fagus grandifolia* |  |  |
| Oak Ridge National Lab (ORNL) | Anderson County, TN  35.964128 °N  -84.282588 °W | 14.4 | 1340 | Ultisol | *Liriodendron tulipifera*  *Acer rubrum* | *Quercus alba*  *Quercus montana* |  |  |
| Dead Lake (DELA) | Greene County, AL  32.541727 °N  -87.803877 °W | 17.6 | 1372 | Ultisol | *Acer rubrum*  *Celtis laevigata* | *Pinus taeda*  *Quercus michauxii* |  |  |
| Lenoir Landing (LENO) | Choctaw County, AL  31.853861 °N  -88.161181 °W | 18.1 | 1386 | Inceptisol | *Liquidambar styraciflua*  *Platanus occidentalis* | *Quercus pagoda*  *Quercus laurifolia* |  |  |

Table 2: Effects of mycorrhizal dominance (% ECM basal area), climate decomposition index (CDI), soil oxalate-extractable iron content (FeOx) and the interaction between mycorrhizal dominance and CDI on the proportions of total soil C and N in each SOM fraction, and the concentrations of fPOM, oPOM, and MAOM C and N in mineral soil (mg C within each fraction per gram of bulk soil) from plots located within seven forests in the National Ecological Observatory Network (NEON). Interactions terms were only included in final models when they were found to significantly influence SOM fractions. Standardized estimates are presented to allow comparison of the strengths of different drivers within models. Standardized standard errors follow in parentheses. Statistical significance indicates with asterisks: \*: p< 0.05 \*\*:p<0.001. For mycorrhizal dominance, a negative estimate reflects lower values of the response variable with increasing ECM tree dominance. Site included as a random intercept; for random effect variance see Table S2.

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| --- | --- | --- | --- | --- | --- |
|  |  | **Proportion of C** | **Concentration of C** | **Proportion of N** | **Concentration of N** |
| ***SOM fraction*** | ***Predictor*** | Std β (Std SE) | Std β (Std SE) | Std β (Std SE) | Std β (Std SE) |
| **fPOM** | (Intercept) | -0.00 (0.13)\*\* | -0.01 (0.22)\* | 0.00 (0.12)\*\* | -0.01 (0.21)\*\* |
|  | % ECM | 0.28 (0.13)\* | 0.16 (0.12) | 0.20 (0.13) | 0.09 (0.12) |
|  | CDI | -0.14 (0.15) | -0.48 (0.23)\* | -0.40 (0.14)\* | -0.49 (0.23)\* |
|  | FeOx | -0.50 (0.15)\* | 0.08 (0.16) | -0.24 (0.15) | 0.01 (0.17) |
|  | % ECM x CDI | *na* | *na* | *na* | *na* |
|  |  |  |  |  |  |
| **oPOM** | (Intercept) | 0.00 (0.18)\* | 0.00 (0.19)\* | -0.03 (0.13) | 0.00 (0.20)\* |
|  | % ECM | 0.33 (0.15)\* | 0.20 (0.13) | 0.18 (0.14) | 0.09 (0.13) |
|  | CDI | 0.12 (0.20) | -0.44 (0.21)\* | -0.40 (0.16)\* | -0.48 (0.22)\* |
|  | FeOx | -0.17 (0.18) | 0.25 (0.17) | 0.09 (0.16) | 0.30 (0.18) |
|  | % ECM x CDI | *na* | *na* | -0.28 (0.13)\* | *na* |
|  |  |  |  |  |  |
| **MAOM** | (Intercept) | 0.02 (0.14)\*\* | 0.00 (0.24)\*\* | 0.02 (0.11) | 0.00 (0.18)\* |
|  | % ECM | -0.42 (0.13)\* | -0.07 (0.10) | -0.23 (0.12) | -0.08 (0.11) |
|  | CDI | 0.02 (0.18) | -0.69 (0.25)\* | 0.50 (0.13)\*\* | -0.32 (0.20) |
|  | FeOx | 0.50 (0.16)\* | 0.62 (0.15)\*\* | 0.09 (0.14) | 0.88 (0.15)\*\* |
|  | % ECM x CDI | *na* | *na* | 0.24 (0.11)\* | *na* |

Table 3. Effects of mycorrhizal dominance (% ECM basal area), climate decomposition index (CDI), and soil oxalate-extractable iron content (FeOx) on the ratio of carbon to nitrogen in each SOM density fraction from plots located within seven forests in the National Ecological Observatory Network (NEON). Standardized estimates are presented to allow comparison of the strengths of different drivers within models. Standardized standard errors follow in parentheses. Statistical significance indicates with asterisks: \*: p< 0.05; \*\*:p<0.001. For mycorrhizal dominance, a positive estimate reflects higher C:N with increasing ECM tree dominance. Site included as a random intercept; for random effect variance see Table S3.

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| --- | --- | --- | --- |
|  |  | **C:N** |  |
| ***SOM fraction*** | ***Predictor*** | Std β (Std SE) |
| **fPOM** | (Intercept) | 0.00 (0.17)\*\* |
|  | % ECM | 0.41 (0.13)\* |
|  | CDI | 0.12 (0.20) |
|  | FeOx | -0.44 (0.17)\* |
|  |  |  |
| **oPOM** | (Intercept) | 0.00 (0.20)\*\* |
|  | % ECM | 0.49 (0.13)\*\* |
|  | CDI | 0.20 (0.22) |
|  | FeOx | -0.23 (0.17) |
|  |  |  |
| **MAOM** | (Intercept) | 0.00 (0.16)\*\* |
|  | % ECM | -0.17 (0.08)\* |
|  | CDI | -0.76 (0.17)\*\* |
|  | FeOx | -0.01 (0.11) |

Table 4. Effects of mycorrhizal dominance (% ECM basal area), climate decomposition index (CDI), and soil oxalate-extractable iron content (FeOx) on MAOM δ13C and Δ14C from plots located within seven forests in the National Ecological Observatory Network (NEON). Standardized estimates are presented to allow comparison of the strengths of different drivers within models. Standardized standard errors follow in parentheses. Statistical significance indicated with asterisks: \*: p< 0.05, \*\*:p<0.001. For mycorrhizal dominance, a positive estimate reflects higher C:N with increasing ECM tree dominance. Site included as a random intercept; for random effect variance see Table S4.

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| --- | --- | --- | --- |
|  | **δ13C** | **Δ14C** |  |
| ***Predictor*** | Std β (Std SE) | Std β (Std SE) |
|  |  |  |
| (Intercept) | 0.00 (0.15)\*\* | 0.00 (0.16) |
| % ECM | -0.02 (0.15) | -0.09 (0.10) |
| CDI | -0.44 (0.20)\* | -0.46 (0.41) |
| FeOx | 0.64 (0.19)\* | 0.20 (0.14) |