

Using NEON data to explore plot to continental scale patterns in soil organic carbon dynamics

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As part of its mission to shed light on how ecosystems are responding to environmental change, the National Ecological Observatory Network (NEON) is measuring soil organic carbon (SOC) pools at 47 terrestrial sites distributed across the United States. This includes data from one-time, deep (1-2 m) sampling, paired with soil taxonomic and geochemical characterization, along with periodic surface soil sampling (30 cm) that includes measurements of stable isotopes, inorganic N transformation rates, pH, and microbial communities. Together, this suite of soil data has the potential to reveal new insights into patterns and drivers of SOC dynamics across environmental gradients from plot-to-continental scales. Here, we briefly describe spatial and temporal aspects of NEON soil sampling, then present preliminary findings that highlight types of biogeochemical questions that can be addressed using NEON's growing soil database. Early NEON data demonstrate broad climatic controls on SOC pools, stoichiometry, and stable isotopes. However, they also suggest that biota (both plant and microbial communities) and geomorphology/geochemistry influence variation within and between sites. The possibilities to further explore interactions between biotic and abiotic drivers, probe links between microbial community traits and SOC, track responses to episodic and longer-term disturbances, and provide data to help improve soil biogeochemical models are exciting aspects of ongoing NEON soil sampling efforts. Ways to find and download NEON data, all of which are publicly available, will be highlighted.