

Abstract

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Title: Berkeley Lab Terrestrial Ecosystem Science SFA: Belowground carbon cycling

In the Berkeley Lab Terrestrial Ecosystem Science SFA, we conduct basic research on the role of soils in terrestrial biogeochemistry and climate feedbacks. Our goals are to improve process-level understanding of ecosystem-climate interactions and to develop next-generation predictive capacity suitable for Earth System Models. Current research in the SFA is centered around a coordinated set of model, field, and laboratory experiments to quantify and characterize the relative roles of different soil organic-matter stabilization and destabilization processes and soil-plant-microbe-nutrient interactions, and how they may shape ecosystem responses to climate change. We are using field manipulations of soil temperature across the soil profile to evaluate the influence of soil depth and mineralogy, soil biota, and soil microclimate on soil carbon dynamics, and applying these research results and observations to develop and test new model structures and parameters. In this phase of the SFA, we aim to improve process-level understanding of the controls of soil carbon turnover and stocks and develop the belowground component of ESMs and fine scale models. This poster will present three whole-profile soil warming experiments, in a grassland, a coniferous forests, and an Arctic tundra ecosystem (the latter research is part of the DOE NGEE Arctic project) and give an overview of microbial, mineralogical, biogeochemical, and modeling work being carried out in the SFA. More detail is given in separate posters on each of those four areas.