

Poster #1-64

LBLN TES SFA Development and Application of Explicit Biotic and Abiotic Models for Soil Organic Matter Dynamics

William J. Riley^{1*}, Rose A. Abramoff¹, Katerina Georgiou¹, Jinyun Tang¹, and Margaret S. Torn¹

¹Lawrence Berkeley National Laboratory, Berkeley, CA

Contact: wjriley@lbl.gov

BER Program: TES

Project: LBNL TES SFA

In the LBNL TES SFA we are developing land model components to improve understanding, analyses, and predictive capability of the complex, inter-connected processes that affect Soil Organic Matter (SOM) dynamics. This poster describes new approaches to represent soil microbial physiology, substrate use, enzymatic and microbial temperature and moisture sensitivity, and mineral surface and plant interactions. We will describe recent applications of these models to our whole-soil profile warming experiment, long-term fallow observations, and analyses of future SOM dynamics. We are also working to integrate these conceptual advances into the new DOE E3SM land model (ELM) using the integrated BeTR reactive transport solver. Broadly, our results indicate that explicit representations of the aforementioned processes improve prediction of SOC dynamics under multiple simultaneous stressors, thereby providing more realistic scenarios of future C cycle dynamics.