Geophysical Research Abstracts
Vol. 16, EGU2014-4739, 2014
EGU General Assembly 2014

Response of Basic Biochemical Processes to Temperature Change in Soil Microbial Communities: Testing of Basic Assumptions and Challenges to Current Methodologies

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A relatively new emphasis of thinking about soil C cycling processes is focused on the role of the microbial Carbon Use Efficiency (CUE). Using the physiological concepts of growth and maintenance energy requirements, it is assumed that with higher temperatures the demand for maintenance energy will increase, therefore C and energy available for growth will decrease, and more of the soil organic C returns to the atmosphere as CO_2. Evidence for these basic ideas is provided in numerous experiments.
We will discuss results from recent experiments using position-specific 13C-labeled metabolic tracers. In these experiments, we model the basic biochemical processes of the Central C Metabolic Network of a microbial community, and calculate energy production and CUE. In this presentation, we will discuss results from tests of the metabolic model and show results that suggest that temperature does not affect CUE but influences community processes.