



Physical factors controls on heterotrophic soil respiration: a mechanistic modeling framework

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The rate of soil organic matter (SOM) decomposition is very sensitive to environmental factors, including wetness status, temperature, and ionic strength. In addition these environmental factors are coupled with one another according to complicated relationships that vary with soil physical and mineralogical properties. Therefore, prediction the response of soil organic matter dynamics to changes in environmental variables is one of the major open challenges in soil bio. In this presentation, we will introduce a physically-based modeling framework of aerobic microbial respiration that incorporates the individual and interactive roles of energy-status of soil water, volumetric water content, content of total dissolved solutes, and temperature. The applicability of the model is tested by comparison with multiple datasets representing wide range of soil textures and structures. Illustrative examples covering wide range of environmental conditions and dynamics will be presented.