

土壌中の有機炭素と熱・水ダイナミクス間のフィードバックのシミュレーション再現

The effect of the feedback cycle between the soil organic carbon and the soil hydrologic and thermal dynamics

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Biogeochemical feedback processes between soil organic carbon (SOC) in high-latitude organic soils and climate change is of great concern for projecting future climate. More accurate models of the SOC stock and its dynamics in organic soil are of increasing importance. As a first step toward creating a soil model that accurately represents SOC dynamics, we have created the Physical and Biogeochemical Soil Dynamics Model (PB-SDM) that couples a land surface model with a SOC dynamics model to simulate the feedback cycle of SOC accumulation and thermal hydrological dynamics of high-latitude soils. The model successfully simulated soil temperatures for observed data from a boreal forest near Fairbanks, and 2000 year simulations indicated that the effect of the feedback cycle of SOC accumulation on soil thickness would result in a significant differences in the amount of SOC.

Although it is still under development, the PB-SDM showed the significance of one of the feedback processes in high-latitude organic soil dynamics. Further development of the model has the potential to provide more insights into organic soil feedbacks in response to climate change.

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