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**ABSTRACT TITLE:** Multi-Scale Modeling of Eco-Hydrologic Processes in Arctic Ecosystems

**ABSTRACT:** Arctic and sub-Arctic ecosystems contain a vast amount of organic carbon stored within frozen soils. This environment is highly sensitive to climate change in a warming world, making the carbon stored in the frozen soil vulnerable to released to the atmosphere as CO<sub>2</sub> and CH<sub>4</sub>. Arctic ecosystems consist of complex and interconnected hydrologic, thermal, biogeochemical, geomorphic and vegetation processes. Any change or disturbance in any part of the system produces impacts on the entire system through complex process interactions and feedbacks. Model- and observation-based studies of these complex processes are required to understand and assess the impact of climate change on these sensitive environments. The Department of Energy's Next Generation Ecosystem Experiments (NGEE-Arctic) project is working to improve the Community Earth System Model (CESM) with process rich representation of Arctic ecosystems. We are developing a multi-scale modeling framework to model eco-hydrologic processes in the Arctic