Geophysical Research Abstracts
Vol. 21, EGU2019-11985, 2019
EGU General Assembly 2019

Ecohydrology constrains microtopography development in small basin peatlands

Lorna Harris, Chantel Markle, Paul Moore, Taylor North, and Mike Waddington
School of Geography and Earth Sciences, McMaster University, Hamilton, Ontario, Canada

Microtopography (hummocks and hollows) is common in many northern peatlands. These small-scale spatial differences in peatland structure represent alternate dry and wet stable states, with shifts in microform state as a response to environmental change ensuring the long-term stability of these carbon-rich ecosystems. Ecohydrological feedbacks that facilitate peatland resilience are described in hypotheses and models for microform development, but these models are typically limited to peatlands with idealised ecohydrological conditions. The ecohydrology of small peatlands in shallow bedrock depressions is variable and distinct, and the effect of these conditions on microform development is uncertain.

We examine the spatial distribution, relative elevation, hydrology, and vegetation of microforms in several basin peatlands of varying surface area (0.10 to 1.06 ha) and maximum depth (1.16 to 2.85 m), within the rock barrens landscape of eastern Georgian Bay in Ontario, Canada. We find a larger difference in relative elevation (greater microtopography) in peatlands with a larger surface area. Raised hummocks are uncommon in all peatlands, and mostly absent in some smaller sites. Species composition does not differ significantly for microforms within sites, with most recorded vascular plant species tolerant of large fluctuations in water table. We suggest the development of microforms within these small basin peatlands is constrained by the ecohydrological setting, with large fluctuations in water table preventing the development of raised hummocks. This limited spatial heterogeneity, and particularly the lack of hummocks composed of moss species that are tolerant of prolonged drier conditions (e.g. Sphagnum fuscum), is likely to reduce the resilience of these peatlands to environmental change.