



Relationship between peatland hydrology and biogeochemistry

N.T. Roulet (1,2)

(1) McGill University, Geography, Montreal, Quebec, Canada (nigel.roulet@mcgill.ca, 001-514-398-7437), (2) Global Environmental and Climate Change Centre< McGill University

The 'boreal forest' landscape is composed of upland forests, peatlands, some of which are treed, lakes, streams, and in North America, beaver ponds. Each of these landscapes present quite different biogeochemical environments due to differences in both abiotic and biotic processes and conditions. A significant amount of the carbon (C) in the boreal landscape is stored in peatlands, in part, due to the effect of the water storage on C cycling. The near saturated conditions affect the plants that can grow in peatlands and over the shorter term moisture variability controls the rate of C input to the peat. In the peat water limits the supply of electron donors and this has a profound effect on the C biogeochemistry. Near peat surface the moisture storage can be quite dynamic and mostly oxic conditions prevail, but redox conditions change significantly within a few tenth of a meter below the surface where water residence times increase orders of magnitude. This limits the supply of electron donors and other substrates that control the rate of C mineralization. Understanding the links among the moisture dynamics, the chemical thermodynamics of temporally variable saturated environments, and the quality of C is critical to determining the sensitivity of the C stored in peatlands to environmental change.