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The stoichiometry of peatlands

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Stoichiometric principles have been developed and successfully applied to freshwater and marine ecosystems, which are characterized by short-lived, structurally simple organisms, simple food webs and an environment which allows rapid movement of water and elements. The application has been less successful in peatlands, and other terrestrial ecosystems: not surprising given their long-lived, structurally complex organisms, slow rates of organic matter decomposition, complex food webs and low hydraulic conductivities slowing water and element movement.
I examine some aspects of what we know about stoichiometry in peatlands, especially involving nutrients such as C, N, P, K, Ca and Mg. I follow the cascade of stoichiometry from peatland plants through litter and into decomposing peat, drawing upon data from the Mer Bleue peatland and peatlands in Ontario. There are consistent patterns in stoichiometries, such as C:N, N:P and C:P across diverse peatlands, whereas patterns involving K, Ca and Mg show greater variability. Most of the changes in stoichiometry occur in the early stages of decomposition, from Von Post values 1 through 4. Peatlands are affected by disturbances, such as elevated atmospheric deposition of N and P, and I look at how these changes affect stoichiometric relationships. Finally, I present data on the changes in the stoichiometry of C, H and O, from plants through peat to coal beds.
I conclude that while ecological stoichiometry in peatlands is not as ‘simple’ as in aquatic ecosystems, it offers contributions to our understanding of how peatlands function and respond to disturbance.