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The impact of vegetation on dissolved organic carbon quality and quantity in peatlands

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Rising dissolved organic carbon (DOC) concentrations in surface waters has prompted much research given its role in the carbon cycle, impact on aquatic ecosystems and implications for water treatment. Several hypotheses have been presented regarding the drivers of the increased DOC at the regional scale including decreasing sulphur deposition. However, local variations are apparent in DOC concentrations in peatlands which could potentially be influenced by land management activities. We present some pilot data from the plot to small catchment scale which suggests that vegetation type is a dominant control at the local scale: Calluna was associated with the highest DOC concentrations, Molinia and Sphagnum with the lower concentrations and sedges with intermediate concentrations. Furthermore, some controlled laboratory leaching experiments suggests that both the quantity and quality of dissolved organic carbon varies with vegetation type. The quality of DOC is important as controls its fate, impacts the aquatic ecosystem and has important implications for water treatment. The differences in DOC concentration and quality are attributable to the different physical, chemical and biological mechanisms and their relative dominance associated with each vegetation type. Given management activities and climate change alter vegetation cover we suggest that further understanding of the impact of vegetation on carbon cycling is required to minimize DOC loss from peatland catchments. This would provide the potential to reduce DOC export from peatlands through vegetation manipulation.