



The contribution of fluvial fluxes to the greenhouse gas emissions from Peatlands - the composition and degradability of DOM

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The aim of these experiments was to better constrain the composition of dissolved organic matter (DOM), and what affect the hydrological conditions of the river have on the composition and degradability. The composition of the DOM was compared to other organic matter from an upland peat dominated catchment, to add information to the carbon budget of the ecosystem.

Various analytical techniques, including thermal, calorific and elemental, were applied to solid DOM collected monthly from an upland headwater stream, along with samples of peat, vegetation, litter and particulate organic matter (POM) from the same catchment. A sub-set of the samples were also analysed with solid-state ^{13}C NMR, which was used to look at the carbon functional groups in the compounds.

The results showed that the DOM was compositionally distinct from the other samples, even the POM, especially in regard to the oxidation state of the matter. A principal component analysis showed a three end-member mixing system, with the end members differing significantly in their degree of unsaturation, aromaticity and oxidative ratio.

The composition of the solid DOM was also compared with the initial rates of DOC degradation in water samples taken at the same time as the DOM, and compared to the hydrological and meteorological conditions on the sampling day and during the previous week. It was found that there was a link between the degradability in the light (total degradation), in the dark (biodegradation) and the difference between the two (photodegradation), and that the flow conditions of the river influence the composition and therefore the degradability of the DOM.