



1 Influences of dissolved organic carbon (DOC) on water chemistry in two forested catchments

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Stream water mirrors watershed processes in the form of solute contents and flow output. The present study was conducted on two first order streams, Fanbergsbäcken (Fan) and a reference stream (Ref), in adjacent forested catchments during the growing season in 2003. Three sampling points in each stream were monitored. The aim of the study was to investigate the impact of dissolved organic carbon (DOC) on metal concentrations in stream water due to the complex forming ability of different DOC fractions.

The seasonal fluctuations of pH and DOC were negatively correlated in both streams (Fan $r = -0.85$, Ref $r = -0.51$), probably due to a high content of acidic groups in the DOC. In Fan, the DOC content was generally higher and the pH correspondingly lower than in Ref. Differences could also be seen in the size fractionations of the DOC. Compared to Ref, where similar amounts were found in both fractions, the DOC was to a greater extent made up by high molecular weight (HMW) compounds (>1kDa) in Fan. On average, 70-80% of Al, 55-90% of Fe, 30-60% of Ca and 20-55% of Mg were recovered in the HMW fractions. The percentages were higher in Fan, where higher levels of HMW DOC were found compared to Ref. The carboxylic content was determined by titration and was found to be positively correlated to DOC (Fan $r = 0.95$, Ref $r = 0.87$) and to the HMW fractions of Al (Fan $r = 0.80$, Ref $r = 0.90$), Fe (Fan $r = 0.90$, Ref $r = 0.79$), Ca (Fan $r = 0.78$, Ref $r = 0.88$) and Mg (Fan $r = 0.69$, Ref

r=0.86).

Oxalate and lactate were the dominating LMW organic acids in both Fan and Ref with peak concentrations of 3.4 and 4.6 μM , respectively. Low concentrations of pyruvate, malonate, maleate, succinate, citraconate, malate, ketoglutarate, tartrate, cis-aconitate, trans-aconitate and citrate were also found at almost every sampling occasion. Over the entire season, oxalate was positively correlated to DOC at the first two sampling points in both streams, while lactate showed no correlation to DOC at all and is therefore likely to originate from a separate source.

The study confirms that the levels and the properties of DOC have large impacts on the concentrations and distributions of Al, Fe, Ca and Mg in stream water.