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Landscape scale patterns in the character of natural organic matter in a Swedish boreal stream network

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This abstract defines landscape-scale patterns in the character of natural organic matter (NOM) and tests for relationships to catchment soil, vegetation and topography. The drainage network of a boreal catchment, subcatchment size 0.12-78 km2, in northern Sweden was sampled in August 2002 during a period of stable low water flow. The NOM was characterized with UV/Vis spectroscopy, fluorescence, XAD-8 fractionation (%humic substances), gel permeation chromatography (apparent molecular weight), and elemental composition (C:N). The largest spatial variation was found for C:N, absorbance ratio, and specific visible absorptivity. The lowest variation was in fluorescence index, %humic substances and molecular retention time. But the variation in total organic carbon (TOC), iron and aluminium concentration was more than twice that of C:N. Between headwater and downstream sites no significant changes were distinguished in the NOM character. At stream reaches, junctions and lakes little change (<10%) in NOM character was observed. Common factor analysis and partial least squares regression (PLS) revealed that the spatial variation in surface coverage of lakes and mires could explain some of the variation of TOC and NOM character. Our suggestion is that the mosaic of landscape elements (different amounts of water from lakes, forest soil and mires) delivers NOM with varying characteristics to a channel network that mixes conservatively downstream, with possible small changes at some stream reaches, junctions and lakes.