



Multi-decadal trends in DOC and potential drivers on 70 watercourses across a range of catchment scales in Sweden

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Increases in the concentration of dissolved organic carbon have been reported for many watercourses in North America and North Europe. There has also been much speculation about the causes and potential environmental implications of these increases. Warming, changes in atmospheric deposition, and changes in hydrology have all been postulated as causes. In Sweden, 73 watercourses have been monitored regularly for water chemistry between 1980 and 2005. Even longer time series are available for some of these water courses. These were analyzed for the patterns in dissolved organic carbon using several techniques, LOESS smoothing and multivariate patterns to discern the overall patterns and correlations structures, followed by PLS and GAM modeling to try to distinguish the independent significance of three different categories of potential drivers: temperature, precipitation and other water chemistry, especially sulfate, which has been declining due to decreased atmospheric emissions since ca 1990. There was a marked synchronicity across the 73 watercourses, which ranged in size from under one to several hundred km². There was a sustained increase in DOC during the 1990s, but a period of decline in the 1980's and since 2000. While temperature, precipitation and sulfate were all significant in GAM models of DOC, the overall patterns in precipitation best related to the swings in DOC over 25 years.