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Impact of agricultural management practices on DOC leaching – results of a long-term lysimeter study

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Dissolved organic carbon (DOC) fluxes are recently increasing in surface waters of humid climate regions. Due to its substantial importance for leaching processes, aquatic foodwebs, and drinking water purification a better understanding of sources and pathways of DOC is needed. Therefore this study aims to analyse and simulate DOC fluxes in agricultural ecosystems with selected crop rotations. A data set of 24 lysimeters of the UFZ Lysimeter station at Falkenberg (Saxony-Anhalt) covering nine years of DOC investigation has been selected and examined. The data set covers a wide range of climatic conditions with deviating management practices for grasslands and agricultural crop rotations.

The monthly DOC concentrations assessed in the leached water range from 2.4 to 34.1 mg /l. DOC concentrations depend on temperature, precipitation and discharge. The type of crop grown on the lysimeter is an important trigger for DOC leaching – especially lysimeters used as pasture, or planted with rape and carrots exhibit high DOC concentrations. Management practices and fertilizer application modify the leaching of DOC and offer potentials to reduce DOC losses. The results form the basis of further process simulation studies and upscaling of the results to the small catchment scale.