



## **Development of hydraulic properties and nitrate turnover processes in minerotrophic fen soil on different scales**

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Generally, it is recommended to remove the uppermost highly degraded peat layer from fens prior to rewetting to eliminate a potential source of organic pollutants for downstream water bodies. We investigated this material as a potential medium for denitrifying filters to further use the organic material. We are aiming to remove nitrate from tile drainage runoff at the outlet drainage dominated catchments to fulfill the requirements of the European Water Framework Directive. In a lysimeter scale long term mesocosm experiments we were aiming to reveal the peats behavior after disturbing and rewetting under constant flow conditions. Tracer experiments revealed a restructuring of the peat ending up at 20/80 percentage of mobile immobile pore volume. Additionally we observed the nitrate turnover. The turnover rate was determined by the hydraulic load. Absolute turnover rates were equal at lower and higher concentrations as well as flow rates, whereas the turnover reached higher percentages at lower concentrations. To further reveal the nitrate turnover processes flow through reactor experiments were conducted in an anaerobic environment. We found that strongly reducing conditions can be created in peat even at the presence of nitrate. Thus we can conclude that the minerotrophic peat with its high iron and sulfur concentrations also enables autotrophic denitrification oxidizing iron and sulfur. While the conditions are favorable to re-reduce iron and sulfur, thus an electron shuttling system developed transporting electrons from the organic material as initial e-donor to nitrate as terminal e- acceptor.