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A new method for separating tile drainage flow in a low land catchment using EMMA

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Low land catchments are characterised by flat topography and low hydraulic gradients. Artificial drainages influence water and matter transport substantially in areas with agricultural usage. They shorten the soil passage and thus change the matter retention potential as well as runoff dynamics of the catchment. In such catchments, drainages and surface runoff constitute important entry pathways for nutrients into water bodies, especially after strong precipitation events. In order to be able to develop effective measures for the reduction of nutrient inflow, the main entry pathways for the important hydrological periods (low flow and rain events) haven to be known.

The aim of the currently running, DFG funded project "*Separating surface runoff from tile drainage flow in agricultural lowland catchments based on diatoms to improve modeled runoff components and phosphorous transport*" is to further investigate prevalent processes in this context in a 50 km^2 low land catchment (Kielstau, Schleswig-Holstein, Germany) with the goal of improving existing models. The size and heterogeneity of the catchment do not allow a direct measurement of all flow components. Instead, naturally occurring chemical tracers are used to estimate the contribution of potential end members (surface runoff, drainage flow, soil water, ground water) to the total runoff (End Member Mixing Analysis). To this end, the end member are sampled regularly every 1-2 weeks and daily mixed samples as well as rain event based samples are taken at the catchment's outlet. In this project, diatoms are considered as biological tracers and are evaluated together with chemical tracers. Due to habitat preferences of certain species, indicator species for river- and drainage water could be determined. First results of the analyses are presented.

Using the insights gained with this method, existing SWAT models for water quality and nutrient transport are further improved