



Modelling nutrient reduction targets – model structure complexity vs. data availability

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In most parts of Europe, macronutrient concentrations and loads in surface water are currently affected by human land use and land management choices. Moreover, current macronutrient concentration and load levels often violate European Water Framework Directive (WFD) targets and effective measures to reduce these levels are sought after by water managers. Identifying such effective measures in specific target catchments should consider the four key processes release, transport, retention, and removal, and thus physical catchment characteristics as e.g. soils and geomorphology, but also management data such as crop distribution and fertilizer application regimes. The BONUS funded research project Soils2Sea evaluates new, differentiated regulation strategies to cost-efficiently reduce nutrient loads to the Baltic Sea based on new knowledge of nutrient transport and retention processes between soils and the coast. Within the Soils2Sea framework, we here examine the capability of two integrated hydrological and nutrient transfer models, HYPE and Mike SHE, to model runoff and nitrate flux responses in the 100 km² Norsminde catchment, Denmark, comparing different model structures and data bases. We focus on comparing modelled nitrate reductions within and below the root zone, and evaluate model performances as function of available model structures (process representation within the model) and available data bases (temporal forcing data and spatial information). This model evaluation is performed to aid in the development of model tools which will be used to estimate the effect of new nutrient reduction measures on the catchment to regional scale, where available data – both climate forcing and land management – typically are increasingly limited with the targeted spatial scale and may act as a bottleneck for process conceptualizations and thus the value of a model as tool to provide decision support for differentiated regulation strategies.