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## Ecohydrological modelling of water discharge and nitrate loads in a mesoscale lowland catchment, Germany

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**Abstract.** The aims of this study are to identify the capacities of applying an ecohydrological model for simulating flow and to assess the impact of point and non-point source pollution on nitrate loads in a complex lowland catchment, which has special hydrological characteristics in comparison with those of other catchments. The study area Kielstau catchment has a size of approximately 50 km<sup>2</sup> and is located in the North German lowlands. The water quality is not only influenced by the predominating agricultural land use in the catchment as cropland and pasture, but also by six municipal wastewater treatment plants.

Ecohydrological models like the SWAT model (Soil and Water Assessment Tool) are useful tools for simulating nutrient loads in river catchments. Diffuse entries from the agriculture resulting from fertilizers as well as punctual entries from the wastewater treatment plants are implemented in the model set-up.

The results of this study show good agreement between simulated and measured daily discharges with a Nash-Sutcliffe efficiency and a correlation coefficient of 0.76 and 0.88 for the calibration period (November 1998 to October 2004); 0.75 and 0.92 for the validation period (November 2004 to December 2007). The model efficiency for daily nitrate loads is 0.64 and 0.5 for the calibration period (June 2005 to May 2007) and the validation period (June 2007 to December 2007), respectively. The study revealed that SWAT performed satisfactorily in simulating daily flow and nitrate loads at the lowland catchment in Northern Germany.

Full Article in PDF (PDF, 369 KB)

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