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## Modeling lowland catchment hydrology: A comparison of model versions

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The hydrology of rural lowland catchments in Northern Germany is characterized by near-surface groundwater tables and extensive tile drainage. Previous research has shown that representing these characteristics with the hydrologic model SWAT (Soil and Water Assessment Tool) required an improvement of groundwater processes, which has been achieved by dividing the shallow aquifer into a fast and a slow shallow aquifer. The latest version of the Soil and Water Assessment Tool (SWAT+) features several improvements compared to previous versions of the model, e.g. the definition of landscape units that allow for a better representation of spatio-temporal dynamics. To evaluate the new model capabilities for lowland catchments, we assess the performance of SWAT+ in comparison to previous SWAT applications in the Kielstau Catchment in Northern Germany. The Kielstau Catchment is about 50 km<sup>2</sup> large, is dominated by agricultural land use, and has been thoroughly monitored since 2005. In particular, we explore the capabilities of SWAT+ in terms of watershed configuration and simulation of landscape processes by comparing two model setups. The first setup is comparable to previous SWAT models for the catchment, i.e. yields from hydrologic response units are summed up at subbasin level and added directly to the stream. In the second SWAT+ model, subbasins are divided into upland areas and floodplains and runoff is routed across the landscape before it reaches the streams. Model performance is assessed with regard to measured stream flow at the outlet of the catchment. Results from the new SWAT+ model confirm that two groundwater layers are necessary to represent stream flow in the catchment. The representation of routing processes from uplands to floodplains in the model further improved the simulation of stream flow. The outcomes of this study are expected to contribute to a better understanding and model representation of lowland hydrology.