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Modelling the impact of riparian forest changes on daily sediment yield: A case study in a meso-scale catchment in SE Germany.

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The newly developed sediment delivery model LAPSUS-D has been tested in the meso-scale catchment (60km2) of the Wilde Weisseritz in South-East Germany. LAPSUS-D is the first sediment delivery model that runs with a daily time step and only uses the following input parameters: a DEM, a land use map, a soil map and daily precipitation and discharge data. As the model is new and was calibrated only for a catchment in South-West Poland, the model is now run simultaneous with a widely used sediment delivery model WaTEM/SEDEM (developed in Leuven, Belgium) which simulates erosion and deposition processes on a yearly basis.
After a first assessment of the model performance in the German catchment, two scenarios to reduce the sediment yield at the outlet were run. The scenarios were made based on actual river restoration projects elsewhere in similar river settings, to make the scenarios a realistic option for the future. These scenarios were used to run both models to test how the new LAPSUS-D model performs. The comparison reveals the contrast between a yearly and RUSLE based model and the water balance model LAPSUS-D using daily input.
The water balance approach includes the effects of the water storage capacity. Locally decreasing water storage capacity causes increased run-off and erosion at lower positions in the landscape. This effect is not visible with the RUSLE approach. Furthermore, the position of the riparian forest scenarios results in differences in the sediment yield simulated by the LAPSUS-D model. While modeling the riparian forest scenarios at different locations in the catchment by the WaTEM/SEDEM causes no difference in sedimentation yield.