

Publication**A conceptual-model-based sediment connectivity assessment for patchy agricultural catchments****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 4660236**Author(s)** Batista, Pedro V. G.; Fiener, Peter; Scheper, Simon; Alewell, Christine**Author(s) at UniBasel** [Alewell, Christine](#) ; [Batista, Pedro](#) ; [Scheper, Simon](#) ;**Year** 2022**Title** A conceptual-model-based sediment connectivity assessment for patchy agricultural catchments**Journal** Hydrology and Earth System Sciences**Volume** 26**Number** 14**Pages / Article-Number** 3753-3770

The accelerated sediment supply from agricultural soils to riverine and lacustrine environments leads to negative off-site consequences. In particular, the sediment connectivity from agricultural land to surface waters is strongly affected by landscape patchiness and the linear structures that separate field parcels (e.g. roads, tracks, hedges, and grass buffer strips). Understanding the interactions between these structures and sediment transfer is therefore crucial for minimising off-site erosion impacts. Although soil erosion models can be used to understand lateral sediment transport patterns, model-based connectivity assessments are hindered by the uncertainty in model structures and input data. Specifically, the representation of linear landscape features in numerical soil redistribution models is often compromised by the spatial resolution of the input data and the quality of the process descriptions. Here we adapted the Water and Tillage Erosion Model and Sediment Delivery Model (WaTEM/SE-DEM) using high-resolution spatial data (2 m x 2 m) to analyse the sediment connectivity in a very patchy mesoscale catchment (73 km²) of the Swiss Plateau. We used a global sensitivity analysis to explore model structural assumptions about how linear landscape features (dis)connect the sediment cascade, which allowed us to investigate the uncertainty in the model structure. Furthermore, we compared model simulations of hillslope sediment yields from five sub-catchments to tributary sediment loads, which were calculated with long-term water discharge and suspended sediment measurements. The sensitivity analysis revealed that the assumptions about how the road network (dis)connects the sediment transfer from field blocks to water courses had a much higher impact on modelled sediment yields than the uncertainty in model parameters. Moreover, model simulations showed a higher agreement with tributary sediment loads when the road network was assumed to directly connect sediments from hillslopes to water courses. Our results ultimately illustrate how a high-density road network combined with an effective drainage system increases sediment connectivity from hillslopes to surface waters in agricultural landscapes. This further highlights the importance of considering linear landscape features and model structural uncertainty in soil erosion and sediment connectivity research.

Publisher Copernicus**ISSN/ISBN** 1027-5606 ; 1607-7938**edoc-URL** <https://edoc.unibas.ch/93022/>**Full Text on edoc** No;**Digital Object Identifier DOI** 10.5194/hess-26-3753-2022**ISI-Number** 000826517300001**Document type (ISI)** Article