Seeing the connectivity through a model - lessons learned from physically based soil erosion modeling

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Understanding the fate of sediments and attached matter is a key task of soil erosion research. Since soil erosion is event based and strongly related to the spatial distribution of land use and land management, process observation is difficult; transferability of measurements is strongly limited. In this regard physically based soil erosion models are an appropriate tool to overcome this gap. During the last decades the application of complex models was mainly restricted by data availabilities and computing requirements. Both is improving rapidly, which allows for new opportunities in testing the models according their ability to reproduce erosion and deposition patterns as well as sediment pass over into the stream network. By doing so new questions are raised:

- Is our process description sufficient to cover the most important effects in natural landscapes?
- Should soil and surface properties be considered as constant especially regarding different event magnitudes?

The present study will shed light into recent research with the EROSION 3D simulation model across spatial and temporal scales and will resultingly claim the demanded future developments in physically based soil erosion modeling.