R in soil erosion modelling - Parameter determination and estimation for EROSION-3D

Jonas Lenz (1), Hana Beitlerová (2), and Arno Buchholz (1)

(1) TU Bergakademie Freiberg, Bohrtechnik und Fluidbergbau, Boden- und Gewässerschutz, Freiberg, Germany (jonaspunktlenz@gmail.com), (2) VÚMOP - Research Institute for Soil and Water Conservation

The physically based soil erosion modelling tool EROSION-3D uses modelling parameters which get determined from data of rainfall simulations on soils. Up to now these parameters are determined manually by iteratively adjusting the parameter values in EROSION-2D so that modelling results meet measured values. This process is very time consuming and leaves some uncertainties in determined parameters, as the iteration process is ended on the user own discretion.

This presentation shows a conceptual study how the EROSION-3D parameter skinfactor can be determined by the use of R-Scripts. A database of 726 rainfall experiments (Seibert et al., 2011) is used as example to show the necessary pre-processing of data. The development of estimation methods from a deeper analysis of determined parameter is discussed.

This study may act as starting point to increase reproducibility of soil erosion modelling parameters also for other soil erosion modelling tools and shows a possible way to allow easy exchange and interaction between working groups perfoming rainfall simulations or soil erosion modelling.

References: Seibert, S.; Auerswald, K.; Fiener, P.; Disse, M.; Martin, W.; Haider, J.; Michael, A.; Gerlinger, K. (2011): Surface runoff from arable land - a homogenized data base of 726 rainfall simulation experiments. CRC/TR32 Database (TR32DB). DOI: 10.1594/GFZ.TR32.2