Calibration of infiltration module for physically based soil erosion modelling

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Soil infiltration is one of the most important soil properties influencing soil erosion by controlling surface flow rate. Physically based soil erosion models usually use simplifications assuming homogenous soil matrix. However soil infiltration is influenced by highly space and time variable processes such as soil crusting, compaction, drought cracks or biological activity as worm and rodent burrows. Soil erosion model Erosion 3D uses Green and Ampt approach for infiltration module and to include above mentioned processes correction parameter skinfactor is introduced to adjust saturated hydraulic conductivity. Skinfactor is empirically derived from rainfall simulation experiments. 151 experiments were processed on sandy loamy silt soils of Central Bohemia (Czechia) under different crop and vegetation stage conditions and initial moisture conditions, among which 26 experiments were on fresh seedbed conditions, with the same topsoil preparation. Skinfactor showed high variability, in the order from thousandths to tens and the seedbed condition subset doesn't show significantly lower variability than the whole dataset. Rather than with crop and vegetation stage or topsoil preparation the skinfactor correlates with initial soil moisture. During dry conditions real infiltration was lower than expected by the Green and Ampt equation and opposite during wet conditions. Effects influencing mainly initial phase of rainfall during dry conditions as air trapping or water repellency could partly explain the skinfactor behaviour.