



Spatio-temporal development of water content assessed with STDR-technique and hydrological simulation

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The identifying of driving hydrologic factors in a catchment are of great importance for different applications, e.g. process understanding, flood forecasting and irrigation concepts. For the analysis of dominating processes in a head water catchment we measured water content in profile with the advanced technique of Spatial-TDR (STDR) and determined the main soil parameters on plot and field scale. STDR encompasses three components: a sampling three-rod-TDR, an appropriate wave-guide and an algorithm to reconstruct the water content profile along the wave-guide (60 cm length). By connecting up to 40 STDR sensors via a multiplexer, the representative soil moisture patterns may be observed at a scale of up to 900 m² and at a time resolution of 10 min, which allows the determination of the geostatistical properties of soil moisture at the field scale. Different experiments were realised in laboratory on a plot scale and in the study area on plot and field scale. The study area is located in the upper Weisseritz in Saxony, Germany. The landscape is characterized by gentle slopes with a rural landuse. The dominating soils were sandy loam with a high amount of gravel. By using the falsification principle the results were validated with the physical based hillslope model CATFLOW. Therefore the different experiments were realised with different set ups of soil profiles and hillslopes. It is expected that the knowledge of the soil patterns as derived by STDR technology and simulation results helps to advance the ability of current hydrological models to forecast flood events with operational hydrological models.