



Investigation of the spatial distribution of runoff generation and soil erosion processes by means of experimental methods

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Researchers have recognized during the last decades that forests may contribute to the flood and erosion dynamics depending on their management. This fact is becoming crucial when facing the expected climatic change. For this it is more and more important to get a spatially distributed quantitative understanding of the processes occurring within a forested catchment. For this, a combination experimental methods addressing different processes has been applied within a forested low mountain range catchment.

In the forested catchment of the Holzbach river, situated in the Hunsrück low mountain range in Rhineland-Palatinate, Germany, experimental measurements were carried out in order to assess the spatial variation and intensity of runoff-generation and soil erosion processes. The soils in this catchment are acidic Cambisols and Podzols as well as hydromorphic soils in areas where groundwater conducting geologic strata strike out.

The soil surfaces under coniferous forest are partially hydrophobic and thus overland-flow generation is supposed to be triggered especially at the beginning of rainfall events.

The used experimental methods are a slope-scale and a small-plot scale rainfall simulator, single-ring infiltrometer measurements and rill erosion experiments.

By means of the slope-scale rainfall simulator overland flow, as well as subsurface flow in two different depths is measured, whereas the plot scale rainfall simulator measures overland flow generation and suspended sediment load. The infiltration measurements with a single ring infiltration device with float-regulated water height delivers data on infiltration capacity of the soils. By means of the rill erosion experiments the effectiveness of the studied harvester tracks as flow paths for concentrated overland flow is tested as well as the erosion in these tracks.

The rill erosion experiments enable a comparison of the processes and erosion amounts produced in the rill or rut for a defined runoff inflow. The catchment of the rill is approximated in order to enable an estimation of the water amounts that might reach the rill during heavy rainfall events. The reaction of the rill catchment is tested by means of the rainfall simulation experiments and infiltration measurements.

By means of all these experimental measurements in combination with a detailed geomorphologic mapping, it becomes possible to determine the spatial distribution of overland-flow generating areas and the occurrence of possible soil erosion processes in the study area.