

Investigation of soil water budget in the unsaturated soil zone is commonly performed for determination of the complex relationships between the different components of the water budget. A main focus of this work was on acquisition and evaluation of percolation water and soil moisture dynamics depending on the site properties (climate, soils, land use).

A network consisting of 14 lysimeter and soil moisture measuring stations was established in the region of the Trier-Bitburger-Mulde (SW-Eifel, Germany). During a period of four hydrological years precipitation, infiltration, percolation water and soil moisture were collected weekly on the stations comprising the different regional characteristics of soil textures and land use patterns. The analysis of the weekly data sets enabled to point out seasonal variations of percolation water and soil water dynamics (as time-depth function).

Comparison of simultaneously collected data sets of percolation water, soil moisture, and evapotranspiration shows significant fluctuations, which result from the complex relationships between the site properties. Hereby, the soil properties and in particular the secondary macropores (root channels, shrinkage- /frost cracks) have a striking influence on the variability of the water flows in the unsaturated soil zone.

The results of the GIS-based regionalisation of the annual amount of percolation water prove the influence of topography (relief conditions, especially slope and aspect) on percolation and soil water dynamics in low mountain ranges.