

Experimental Approaches to Explore Surface Water/Groundwater Interactions at the Hillslope and Small Catchment Scale

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Understanding small scale processes, in particular water flow pathways, source areas and residence times, is essential for predicting water quantities (incl. floods and low flows) and water quality in a catchment. Recently considerable advances in hillslope process understanding have been achieved through various techniques, which contributed to conceptual process knowledge at the hillslope and small catchment scale. However, a unifying and generalized theory of process functioning across different hillslope types is still missing, but this seems necessary to improve process-based predictions at the hillslope scale.

This paper will discuss recent findings from process investigations using different experimental techniques (classical hydrometry, tracers, geophysics) in catchments in Germany (Black Forest Mountains; temperate climate) and Tanzania (Makanya catchment, South Pare Mountains; semi-arid climate). Particular attention will be paid to detect the relevance of small-scale hillslope processes for catchment scale.