Hydrological functional unit identification - linking observables and concepts towards a minimal adequate catchment representation

C. Jackisch

Institute of Water and River Basin Management, Karlsruhe Institute of Technology KIT, Germany

Understanding catchment structures and properties as most probable result of past work during their evolution under the continuous depletion of gradients opens a connection of landscape properties to dominating processes. While a qualitative description from the expert's perspective can comprehend most of these; a distinct objective delineation into functional units, their topology and their connectivity appears far more problematic as a) spatio-temporal scale, b) degrees of freedom and c) aspects of self-organisation have to be brought in accordance.

Our study highlights several conceptual approaches aiming to link hydrological landscape understanding, observation and modelling. Moreover, a GIS-based case study for the Attert basin is presented, which shows that from a multitude of possible class combinations, already very few cover the vast majority of the catchment. Consequently, dominating processes, prevailing topologies, most insightful data demands and possible non ad hoc model representations are outlined.

The result is a step towards a minimal adequate catchment representation. To base this on physical descriptions with truly observable parameters, we further revise most insightful data for functional unit identification and observation and if and how it can be derived in the landscape and from products available.