Towards improving predictivity of runoff and sediment transport for mountainous catchments through measurement of spatial patterns of hydrological behaviors

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n the last several decades, hydrologist have been argued spatial variability and scale dependencies of runoff and sediment transport for mountainous catchments. In this paper, we discussed issues and approaches for connecting findings of field-based observations and numerical hydrological modeling for improving predictability of runoff and sediment discharge transport for mountainous catchments. We proposed a method for identifying dominant processes of water and sediment movement as well as site- or catchment-specific conditions (e.g., topography, soil, and vegetation) for controlling specific processes using spatial patterns of runoff and sediment discharge in a given catchment. In our method, processes controlling runoff and sediment discharge simply classified into three based on mass balance such as (1) sum of inflow amount from upstream tributaries, (2) advection in a given channel segment, (3) storage change within a channel segment. We considered that if the first type of processes is dominated, the spatial patterns of runoff should be described as central limit theorem. While, second and/or third types of processes are dominated, the spatial pattern should be different from the previous one. This indicated that the observed data of spatial variability and spatial scale dependencies is essential to improve the predictivity of a numerical hydrological models through clarifying dominant processes and site-conditions.

Keywords: Characteristics of catchments, Catchment areas and water/sediment movement, umerical model

