

Estimation of hydrological dynamics and ecohydrological effects in the Karst region of southwest China

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Abstract Temporal and spatial distributions of hydrological processes are key drivers on Karst ecological systems through changing soil moisture dynamics, nutrient cycling and vegetation cover. This study investigates Karst basin hydrological processes through modelling of the interactions between hydrology, rock and soil, and vegetation. A distributed hydrological model was developed by integrating hydrological dynamics of porous and fissure flows. A small Karst basin, with detailed observation data of hydro-geological conditions and eco-hydrological processes, was selected for model calibration and validation. The results show that the new model is able to capture the sharp rise and decrease of the underground streamflow hydrograph. The simulated soil moisture content and evapotranspiration reveal impacts of epikarst and vegetation cover on hydrology.

Key words Karst; ecohydrology; vegetation; distributed ecohydrological model