



Compatibility of catchment observation using copulas

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The similarity of catchment responses is a fundamental issue for regionalization studies and Prediction in Ungauged Basins (PUB), and hydrograph attributes (i.e. Discharge Peak, Volume, and Duration) can reveal the signature of the rainfall runoff transformation and the synthesis of local scale processes. Here, we statistically investigate the possible relationships between the features of different Basin Scenarios (characterized via the Concentration Time and the Curve Number) and the corresponding dependence structures ruling the joint statistics of Discharge, Volume, and Duration. Given a large set of synthetic runoff time series, generated via a continuous rainfall-runoff model, recent non-parametric tests, based on empirical copulas, are used to compare the dependence structures associated with different soil uses and concentration times. The results indicate how the physical hydrological properties may affect the dependence structure similarities. The outcomes of the investigation could be particularly effective in two practical applications: (1) for determining the degree of similarity of the dependence structures associated with different hydrological scenarios, and (2) for enriching scanty databases, in order to improve the estimation of multivariate copulas.