

Catchment Yield Prediction in an Ungauged Basin Using PyTOPKAPI

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Abstract : This study extends the use of the Drainage Area Regionalization (DAR) method in generating synthetic data and calibrating PyTOPKAPI stream yield for an ungauged basin at a daily time scale. The generation of runoff in determining a river yield has been subjected to various topographic and spatial meteorological variables, which integers form the Catchment Characteristics Model (CCM). Many of the conventional CCM models adapted in Africa have been challenged with a paucity of adequate, relevance and accurate data to parameterize and validate the potential. The purpose of generating synthetic flow is to test a hydrological model, which will not suffer from the impact of very low flows or very high flows, thus allowing to check whether the model is structurally sound enough or not. The employed physically-based, watershed-scale hydrologic model (PyTOPKAPI) was parameterized with GIS-pre-processing parameters and remote sensing hydro-meteorological variables. The validation with mean annual runoff ratio proposes a decent graphical understanding between observed and the simulated discharge. The Nash-Sutcliffe efficiency and coefficient of determination (R^2) values of 0.704 and 0.739 proves strong model efficiency. Given the current climate variability impact, water planner can now assert a tool for flow quantification and sustainable planning purposes.

Keywords : catchment characteristics model, GIS, synthetic data, ungauged basin

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