Stochastic Index estimation of flow duration curves on ephemeral basins

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Flow duration curves (FDC) and annual flow duration curves can be used for describe the flow river regime. FDCs represents frequency distribution of discharges, and can be derived from gauged data, AFDCs allow to introduce confidence intervals for the median AFDC, and to assign return periods to individual AFDCs. But in semiarid environments with ephemeral flows or little basins, where there are environmental problems caused by pollutant discharges, the presence of zeros in a registration creates a discontinuity that makes difficult to model this curves using common distributions.

Therefore this work combines the stochastic index model, that relates FDC and AFDC of daily flow series, and that permits to reproduce the mean, the median and variance of AFDC without regard persistency and seasonality of the series for recreate the curve of the non-zero period, with the theory of total probability, that allows to evaluate the percentage of time the river is dry.

Next regionalization of information is necessary to apply this model to ungauged stations and a cross-validation procedure for evaluate robustness of results is need.

This procedure is applied to a nested catchment in the Lazio region. Here heterogeneity of basins processes appears over a range of space and time scales. Then understanding of statistical and physical relationships that connect the components of the hydrological cycle across these scales is a basic requirement.