



Annual precipitation and maximum daily flow relationship in Southern Spain basins

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Flood management requires peak-flow forecasting at different time scales depending on the planning scale. For flood alert systems, quick forecasting of instantaneous values conditioned to the previously registered values is needed as the time interval available for decision-making decreases. But for medium and long-term planning purposes, maximum annual daily flow on a N-years basis usually constitutes an adequate reference variable in order to select and program preventive and conservational actions within basins.

In Mediterranean basins, the main proportion of the annual precipitation comes from rainfall generated by the influence and evolution of cyclonic fronts, the amount due to local phenomena being usually negligible on an annual basis. Forecasting of extreme flow values can be made from the stochastic characterization of the daily river flow series at the study point, but also by deriving its distribution function from the previous stochastic characterization of the amount of precipitation at the relevant temporal scale, provided that a sufficiently approximate relationship is found between river flow and precipitation variables at the relevant resulting scales. A potential (approximate to 2) relationship between the annual precipitation at the basin scale and the maximum annual daily flow in a mountainous basin in Southern Spain was found by the authors. The present study extends such analysis to other basins in Andalusia (Spain) and relates the parametric functions to certain morphological features of the fluvial network. These relationships, although local, provide us with a simple yet accurate enough method for the estimation of extreme flood values in areas with short time series of river flow data.