



## **Analysis of instant rainfall in the Bouregreg and Chaouia regions of Morocco**

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For the design of flood-protection structures or storm water drainage systems in the Moroccan context, a large number of hydrological flood modeling studies are based on synthetic rainfall hyetograph. The synthetic rainfall hyetograph used in Morocco is generally double-triangle type, SCS and Chicago with a total storm duration chosen between 4h to 24h. These choices and methods have not been subject to a substantive and detailed study of the observed storms in the country.

This research concerns the catchments located in the north of Morocco and monitored by the Hydraulic Basin Agency of Bouregreg and Chaouia (HBABC). Rainfall data from 38 automatic rain gauges covering all the study area were used. The instantaneous data cover different periods between 1 to 7 years with a maximum of 12 years for 2 rain gauges.

The fundamental objective of this research is to carry out a statistical analysis of the temporal distributions of the observed storms in the study zone. This work is based on the same approach used by Huff for the development of synthetic hyetographs in Illinois at USA. This approach was initially used to characterize temporal rainfall in an area and was extended for the development of synthetic rainfall hyetographs (Azli & Rao, 2010).

In practice, storms were classified into four groups depending on whether the heaviest rainfall occurred in the first, second, third, or fourth quarter of the storm period (Pan, Wang, Liu, Huang, & Wang, 2017). This step allows to understand the temporal distribution of instantaneous rainfall in the study area. Afterwards, dimensionless rainfall hyetograph were developed for each group. Probability levels of 10 percent, 50 percent (the median), and 90 percent were interpolated from the sorted matrixes.