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المستودع الرقمي للمدرسة العليا للري



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applied to northern Algeria

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**Abstract:**

Extreme hydrologic events are commonly described by several dependent characteristics, such as duration, volume and peak flow for floods. Traditionally in Algeria and North Africa, flood frequency analysis (FFA) is conducted as a univariate approach focusing separately on each single of flood characteristics. On the other hand, elsewhere, multivariate FFA studies have been conducted focusing on some FFA steps (especially modelling). The current study aims to consider complete multivariate FFA at-site case studies in northern Algeria using 11 hydrometric stations. It is also among the first studies dealing with multivariate FFA in a complete way by considering all the required steps of the analysis (multivariate outliers detection, multivariate assumptions testing and copula fitting) and on datasets from Algeria. Multivariate stationarity, homogeneity and independence assumptions have been well verified before modelling. The Weibull distribution is mostly selected as margin distribution for the duration, volume and peak flow series. Frank, Clayton and Gumbel copulas are commonly selected to describe the dependence structure on the three flood pairs of variables. These findings should be interesting in water management and flood risk assessment in these regions. Combining these flood characteristics enables the design of more efficient hydraulic structures.

**Key words:** Opula ; Daily flow ; Flood characteristics ; Multivariate assumptions ; Multivariate frequencyanalysis ; Northern Algeria

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