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المستودع الرقمي للمدرسة العليا للري



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Regional flood frequency in North Africa

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المستودع الرقمي للمدرسة مبني على المنصة المفتوحة DSpace و يتم إدارته من طرف مديرية المكتبة للمدرسة العليا .

كل الحقوق محفوظة للمدرسة الوطنية العليا للري.

Abstract : The Maghreb countries located in North Africa are strongly impacted by floods, causing extended damage and numerous deaths. Up to now, the lack of accessibility of river discharge data prevented regional studies on potential changes in flood hazards or the development of regional flood frequency estimation methods. A database of daily river discharge data from 55 basins located in Algeria, Morocco and Tunisia, has been recently compiled, with on average 32 years of complete records over the time period 1970-2017. A peaks-over-threshold sampling of flood events is considered, first to detect trends on the annual frequency and the magnitude of floods. The trend analysis results indicated no significant changes in flood frequency nor magnitude, with only a few spurious trends detected in cases of isolated extreme or clustered events. Then, two regional estimation methods for flood quantiles were compared, based either on spatial proximity or catchment characteristics. The regional estimation from multiple catchment characteristics (including soil types, land use, elevation, geology, extracted from global databases) was performed comparing two multiple linear regression methods, Stepwise regression and Lasso regression, and two machine learning algorithms, Random Forests and Support Vector Machines. Results indicate a better performance of the regional estimation of flood quantiles with catchments characteristics than with spatial proximity, with a mean absolute error in cross-validation close to 40%. These encouraging results open the perspective of operational applications of these methods, in particular by increasing the number of basins considered.

Key words : Flood frequency ; North Africa

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