



Changes in flood hazards in North Africa and implications for flood frequency analysis

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Maghreb countries are strongly impacted by floods, causing twice as many deaths as in southern European countries in recent decades. However, due to the lack of data accessibility, there are no studies to analyze whether the frequency or intensity of floods are changing at the regional scale. In this work, a recent database of daily river discharge data from 58 basins located in Algeria, Morocco and Tunisia with on average 32 years of complete records over the time period 1970-2017 is considered to analyze the evolution of floods. A peaks-over-threshold sampling of flood events is considered, to detect trends on the annual frequency and the magnitude of floods. The results illustrate the complexity of conducting trend detection in a context of high inter-annual variability, with spurious trends detected in several cases due to isolated extreme events. Overall, few statistically significant trends are detected on the intensity of floods but an increase in flood frequency is detected in one-third of the basins. The results are interpreted in relation to land-use change, river regulation by dams and reservoirs, and climatic change. Recommendations concerning the use of frequency analysis approaches on floods in this region are given.