



## **Impact of climate variability on extreme rainfall statistics in West Africa**

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West African countries are increasingly affected by flood causing widespread damages to populations, infrastructures and having severe consequences on food and health security. Floods have thus become a major concern for West African decision makers. However, the statistical indicators usually used to design hydraulic works (classically the intensity-duration-frequency curves) are somewhat dated and their predictive skills can be seriously questioned in a context of climate change, especially in West Africa where climate is characterized by a strong interannual and decadal variability.

The aim of this study is thus to revisit the analysis of extreme rainfall frequency in West Africa by accounting for the non-stationarity of the climate over the last hundred years. Based on data gathered during the AMMA project, daily rainfall distributions are compared for climatologically contrasted periods.

Two methods are used to study the extremes. The first (block maxima) selects maximum rainfall amount from the sub-periods and fits a GEV (Generalized Extreme Value) law. The second (peak over threshold) selects the values above a threshold and adjusts a GPD (Generalized Pareto distribution) law. The samples (block maxima and peak over threshold) and parameters of the GEV and GPD laws are compared for the different sub-periods in order to assess whether the decadal variability observed for annual rainfall totals translates into changes of the extreme distributions behaviour.

From the first results obtained in the region of Niamey (Niger, 13.5 °N), it cannot be concluded to a non-stationarity of the extremes distributions in contrast to the sharp decrease of the annual rainfall totals observed in the 1970s, 1980s and 1990s. This will be further investigated for other locations and shorter time steps.

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