



## **An innovative approach for detecting the effect of climate change on the hydrometeorological extremes**

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In a future climate, extreme hydrometeorological events are expected to increase in magnitude and frequency. However, changes in the extreme event characteristics on a relatively short time-scale could be attributed to either climate fluctuations or the effect of anthropogenic climate change. How to distinguish between these two cases is still a field of research. This study presents a novel technique to detect systematic changes in the hydrometeorological extremes in Africa, as part of the eXtreme Climate Facilities project (XCF) lead by the African Risk Capacity (ARC).

In a first step, we introduce the Extreme Climate Index (ECI), an objective, multi-hazard index constructed to identify intense droughts, storms, and heat waves. Subsequently, a new method that estimates the probability of anthropogenic climate change to be the cause of the changes in the hydrometeorological extremes is introduced. This technique is applied to the case of XCF, which is aimed at designing a new financial tool to mitigate the anthropogenic effect on extremes. The method is calibrated with synthetic datasets as well as with the results of the pre-industrial experiment of the CMIP5 database. At the same time, this analysis explores the extent to which such a technique is generally applicable to the identification of systematic changes in the hydrometeorological extremes.