

# Climatic Change

## Potential impacts of climate change on extreme precipitation over four African coastal cities

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### Abstract

This study examines the impacts of climate change on characteristics of extreme precipitation events over four African coastal cities (Cape Town, Maputo, Lagos and Port Said) under two future climate scenarios (RCP4.5 and RCP8.5). Fourteen indices were used to characterise extreme precipitation and 16 multi-model simulation datasets from the Coordinated Regional Climate Downscaling Experiment (CORDEX) were analysed. The capability of the models to reproduce past characteristics of extreme precipitation over the cities was evaluated against four satellite datasets after quantifying the observation uncertainties over the cities. The models give realistic simulation of extreme precipitation characteristics over the cities, and in most cases, the magnitudes of the simulation biases are within the observation uncertainties. For both the RCP4.5 and RCP8.5 scenarios, the models project a decrease in wet days and an increase in dry spells over the four cities in the future. More intense daily precipitation is projected over Maputo, Lagos and Port Said. The intensity and frequency of extreme precipitation events are projected to increase over Lagos, but decrease over the other cities. A decrease in annual precipitation is projected over Cape Town, Maputo and Port Said, whilst an increase is projected over Lagos, where the water surplus from the more extreme precipitation events exceeds the deficit from the less wet days. A decrease in the number of widespread extreme events is indicated over all the cities. Wet-day percentile and all-day percentile methods signal opposite future changes in the extreme precipitation thresholds over the cities (except over Lagos). The results of this study may have application in managing the vulnerabilities of these coastal cities to extreme precipitation events under climate change.