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## ® Earth system model prototype for seamless forecast construction: Evaluation/validation from weather to monthly time scales and tailored services development for sectors of development.

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Projection of Droughts in Africa within different extents of global warming as performed on The CHPC's Lengau Cluster

African temperatures are projected to rise rapidly under low mitigation climate change futures, at 1.5 to 2 times the global rate of temperature increase. This high regional climate sensitivity in combination with the relatively low adaptive capacity implies that the global climate change mitigation effort is of crucial importance to Africa. Against this background the Standard Precipitation Index (SPI) with 36-month accumulation time (relevant to agricultural and hydrological drought) was considered for six regional downscalings over Africa under a low mitigation scenario (RCP8.5) and for 1.5, 2 and 3 °C of global warming. The associated projected changes in maximum temperatures and very hot days were also considered. Using the Coordinated Regional Downscaling Experiment-Africa (CORDEX) regional climate models, we downscale six global climate models of the Coupled Model Inter-comparison Project Phase 5 (CMIP5) to high resolution with the aid of computing power from the south African (CHPC) Centre for High Performance Computing's Lengau Cluster. The analysis reveals that the southern African is already experiencing increased conditions of dryness and is likely heading towards a regional climate system that may well be associated with more frequently occurring droughts. Under 3 °C these increased conditions of drought are projected to occur within the presence of a drastic increase in maximum temperature and very hot days. Such a change, of a hot and drier climate system becoming even hotter and drier would offer very few options for climate change adaptation. It is likely that under 2 °C of global warming this general pattern of increased dryness will already be manifested over southern Africa, but this regional world is not projected to be significantly drier at 1.5 °C of warming compared to its present-day climate (indicating a benefit for southern Africa for the 1.5 °C global goal being achieved). For East Africa, increased wetness and potentially more floods are projected under 3 °C of warming, a pattern that may well be manifested (although with reduced amplitude) under 2 °C and 1.5 °C of warming. Associated increases in wetness are also projected across the Sahel, which under 1.5 °C may be a benefit, given that the detrimental effects of rising temperatures will be reduced.

### Student or Postdoc?

No. Not a student nor Postdoc.

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