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Downscaling a perturbed physics ensemble over the CORDEX Africa domain

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We present here the methodology and the results of 5-member ensemble simulation of the climate of Africa for the period 1950-2100 using climate modelling system PRECIS over the CORDEX Africa domain.

The boundary conditions for the regional model simulations were selected from a 17-member perturbed physics ensemble based on the HadCM3 global climate model (Murphy et al. 2007) following the methodology described in McSweeney et al 2012. Such an approach was selected in order to provide a good representation of the overall ensemble spread over a number of sub regions while at the same time avoiding members which have demonstrate particularly unrealistic characteristics in their baseline climate.

In the simulations a special attention was given to the representation of some inland water bodies, such as lake Victoria, whose impact on the regional climate was believed to be significant thus allowing for the representation of some regional processes (e.g. land-lake breezes) that were not represented in the global models. In particular the SSTs of the lakes were corrected to better represent the local climatological values.

The results suggest that RCM simulations improve the fit to observations of precipitation and temperature in most of the African sub-regions (e.g. North Africa, West Sahel). Also, the range of RCM projections is often different to those from the GCMs in these regions. We discuss the reasons for and links between these results and their implications for use in informing adaptation policy at regional level.