



## Drivers of future changes in East African precipitation

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Climate over East Africa is characterized by high interannual variations in precipitation numbers, contributing to a frequent succession of extreme dry and wet periods. Currently, there is a lack of understanding of the physical and dynamical processes contributing to this interannual variability. Furthermore, changes in precipitation amounts and future climate change over the region are highly debated in current literature. Most research has focused on identifying the relationship between precipitation amounts and El Niño Southern Oscillation or Indian Ocean Dipole events and its role in future climate. However, these processes do not explain the full precipitation variability over East Africa.

Here we analyse drivers of future precipitation changes over East Africa by applying a classification of circulation patterns on 15 historical (1981-2010) and 15 future (2071-2100; RCP8.5) regional climate simulations from the COordinated Regional climate Downscaling EXperiment (CORDEX) at a resolution of  $0.44^\circ$  by  $0.44^\circ$ . Typical circulation types are obtained for the historical and future period. Analyzing their precipitation amounts together with their frequency of occurrence provides an overview of the synoptic climatology for East Africa for the historical and future period.

For the future, we find that less than 23% of the total change signal can be attributed to changes in the frequency of occurrence of circulation types over East Africa. More than 77% relates to changes in precipitation without changing the circulation (e.g. changes in moisture content, local/mesoscale feedbacks, and changes in moisture influx).