



## **Addressing Challenges of regional climate modeling over the Greater Horn of Africa: Africa Regional Climate Model Inter-comparison Project (AFRMIP)**

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The Greater Horn of Africa (GHA) has distinct climate characteristics compared to the rest of the continent. The GHA is replete with complex terrain comprising of some of the known tropical glacier covered high mountains of Kilimanjaro, Kenya and Rwenzori as well as the Great Rift Valley System (GRVS). The region also has several freshwater lakes that include Lake Victoria (second largest freshwater lake), and Lake Tanganyika (the second largest deepest freshwater lake). As a whole the complex GHA terrain presents an enabling environment where local and large scale climate systems frequently interact to create highly variable climate in both space and time. At the same time, inter-annual variability of the GHA climate is linked to perturbations in the global SSTs, especially over the equatorial Pacific and Indian Ocean basins, and to some extent, the Atlantic Ocean. These three global oceans, all at the same time or each at different times, intriguingly influence the interannual variability of the GHA climate. Interactions and feedbacks among these multiple climate drivers over the region present challenges in quantitative understanding of regional climate variability and changes based on typical empirical techniques. Therefore, there is need to also employ physically-based, regional climate models (RCMs) that can offer scope and capability to unveil cause-effect relationships between regional climate variability and individual or combination of processes. However, representation of the multiple sources of forcing to the GHA climate also poses a great challenge to RCMs as well.

This presentation will give an overview of the AFRMIP project, whose primary objective is to undertake a systematic and comprehensive audit of the deficiencies and uncertainties in regional model simulations of the GHA climate. The project specifically seeks to build a coalition of a regional climate modeling community to address the following issues; (i) representation of the GHA-relevant physical processes in the current RCMs (ii) appropriate adjustments to current physics parameterizations in order to customize RCMs for optimal simulation of the GHA climate (ii) representation of natural variability and anthropogenic changes over the GHA by different RCMs.