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### **Title**

Use of machine learning techniques for identification of robust teleconnections to East African rainfall variability in observations and models

### **Abstract**

Providing advance warning of East African rainfall variations is a particular focus of several groups including those participating in the Famine Early Warning Systems Network. Both seasonal and long-term model projections of climate variability are being used to examine the societal impacts of hydrometeorological variability on seasonal to interannual and longer time scales. The NASA / USAID SERVIR project, which leverages satellite and modeling-based resources for environmental decision making in developing nations, is focusing on the evaluation of both seasonal and climate model projections to develop downscaled scenarios for using in impact modeling. The utility of these projections is reliant on the ability of current models to capture the embedded relationships between East African rainfall and evolving forcing within the coupled ocean-atmosphere-land climate system. Previous studies have posited relationships between variations in El Niño, the Walker circulation, Pacific decadal variability (PDV), and anthropogenic forcing. This study applies machine learning methods (e.g. clustering, probabilistic graphical model, nonlinear PCA) to observational datasets in an attempt to expose the importance of local and remote forcing mechanisms of East African rainfall variability. The ability of the NASA Goddard Earth Observing System (GEOS5) coupled model to capture the associated relationships will be evaluated using Coupled Model Intercomparison Project Phase 5 (CMIP5) simulations.