



## **Role of Soil moisture in the Predictability of Summer Rainfall over West Africa and South Asian Monsoon rainfall**

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Soil moisture plays a key role in the water and energy cycle through the evaporation and rainfall over land. In complex topography regions such as South Asia and West Africa the role of the soil moisture in modulating local rainfall becomes more vital, which is analyzed in the current study for the summer (June-September; JJAS) season. We obtained soil moisture Global Land Data Assimilation System (GLDAS) dataset for the period 2000-17, which is high resolution (0.25 deg) at global grids. We noticed that the MAY soil moisture variability in the tropical western African region is important for the successive JJAS rainfall locally and as well as remotely for the South Asian region. The linear relationship between one-month lead (MAY) soil moisture and JJAS rainfall shows that dry conditions may prevail in the western Africa for dry Soil moisture conditions and similar is notice remotely for the South Asian region. The relationship of SMAI and monsoon rainfall becomes more significant if we remove El Niño Southern Oscillation (ENSO) affect from SMAI. The mechanism and physical links between the antecedent soil moisture and successive rainfall are illustrated using Moist Static Energy (MSE). MSE and soil moisture have the similar anomaly composites for May and June-September as dry and wet. Other than MSE the Potential Evapotranspiration (PET) is in good agreement in terms of anomaly with soil moisture anomaly both for West Africa and South Asia. We also used REGgional Climate Model (RegCM) for a case study of 2007 flood case happened West Africa by using 10-ensemble members based on time lag approach. We found that that May soil initialization is important for the improvement of the extreme events. Please fill in your abstract text.