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# Predicting the rainy season over southern West Africa from global predictors and climate model output: a MOS approach

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ABSTRACT: As 75%of annual precipitation over the Sahel and Guinea Coast region are confined to the rainy season between June and September, prediction of this season is largely relevant in terms of fresh water availability for vegetation and human activity. Therefore, we present various global near-surface predictors of summertime rainfall for different regions of West Africa. The most important predictability arises from more regional information such as the SST in the tropical and subtropical Atlantic or the large-scale surface pressure field over the West African subcontinent. However, there are some teleconnections to the tropical Pacific, involving ENSO and the Walker circulation.

The extratropical circulation modes such as the NAO play a minor role over the north western part of West Africa. Based on the whole 20th century validation period the impact of increasing GHG is barely apparent. The same goes for all India rainfall and the QBO.

Using multiple regression and cross validation a forecast model for the rainy season is developed by which we gain insight into the optimal number of relevant predictors. Thus, predictors which result from statistical correlation rather than physical relationship are discarded. The remaining predictors, partly derived from the EOF space, account for around 55 % of the simulated interannual variability. In terms of the observations, the forecast model is composed of the global predictors mentioned above and the simulated seasonal rainfall from different global climate models. Then, the method reveals a forecast potential of slightly more than 50 % for the observed interannual variations in summertime rainfall over southern West Africa. Given the strong autocorrelation of tropical SST, our approach could be used for operational seasonal forecasting with reasonable computing time.