Seasonal precipitation forecasts for selected regions in West Africa using circulation type classifications in combination with further statistical approaches – Conceptual framework and first results

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Providing valuable forecasts of the seasonal precipitation amount for the upcoming rainy season is one of the big challenges for the national weather services in West Africa. Every year a harmonized forecast of the seasonal precipitation amount for the West African region is issued by the national weather services within the PRESAO framework. The PREASO forecast is based on various statistical approaches ranging from a simple subjective analog method based on the experiences of a meteorological expert to objective regression-based approaches by using various sources of input information such as predicted monsoon winds or observed sea surface temperature anomalies close to the West African coastline. The objective of this study is to perform an evaluation of these techniques for selected West African regions and to introduce classification techniques in the current operational practices and to combine these approaches with further techniques for an additional refinement of the forecasting procedure. We use a fuzzy-rule based technique for a classification of (sub-) monthly large-scale atmospheric and oceanic patterns which are combined to further statistical approaches such as an analog method and a data depth approach for the prediction of the (sub-) seasonal precipitation amounts and additional precipitation indices. The study regions are located from the Edges of the Sahel region in the North of Burkina Faso to the coastline of Ghana. A novel precipitation archive based on daily observations provided by the meteorological services of Burkina Faso and Ghana is the basis for the predictands and is used as reference for model evaluation. The performance of the approach is evaluated over a long period (e.g. 50 years) using cross-validation techniques and sophisticated verification measures for an evaluation of a probability forecast. The precipitation forecast of the classification techniques are also compared to the techniques of the PREASAO community, the precipitation forecasts of a global ensemble prediction system, the Climate Forecast System Version 2. In addition, an event-based comparison is performed for the year 2013 using the precipitation forecasts from a regional ensemble prediction system which refines the CFS2 forecasts by using the Weather and Research Forecasting model. In this poster presentation a detailed overview about the various techniques is given including first outcomes of this investigation.