



The quality and value of seasonal precipitation forecasts for an early warning of large-scale droughts and floods in West Africa

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Seasonal precipitation forecasts are a crucial source of information for an early warning of hydro-meteorological extremes in West Africa. However, the current seasonal forecasting system used by the West African weather services in the framework of the West African Climate Outlook forum (PRESAO) is limited to probabilistic precipitation forecasts of 1-month lead time. To improve this provision, we use an ensemble-based quantile-quantile transformation for bias correction of precipitation forecasts provided by a global seasonal ensemble prediction system, the Climate Forecast System Version 2 (CFS2). The statistical technique eliminates systematic differences between global forecasts and observations with the potential to preserve the signal from the model. The technique has also the advantage that it can be easily implemented at national weather services with low capacities. The statistical technique is used to generate probabilistic forecasts of monthly and seasonal precipitation amount and other precipitation indices useful for an early warning of large-scale drought and floods in West Africa. The evaluation of the statistical technique is done using CFS hindcasts (1982 to 2009) in a cross-validation mode to determine the performance of the precipitation forecasts for several lead times focusing on drought and flood events depicted over the Volta and Niger basins. In addition, operational forecasts provided by PRESAO are analyzed from 1998 to 2015. The precipitation forecasts are compared to low-skill reference forecasts generated from gridded observations (i.e. GPCC, CHIRPS) and a novel in-situ gauge database from national observation networks (see Poster EGU2017-10271). The forecasts are evaluated using state-of-the-art verification techniques to determine specific quality attributes of probabilistic forecasts such as reliability, accuracy and skill. In addition, cost-loss approaches are used to determine the value of probabilistic forecasts for multiple users in warning situations. The outcomes of the hindcasts experiment for the Volta basin illustrate that the statistical technique can clearly improve the CFS precipitation forecasts with the potential to provide skillful and valuable early precipitation warnings for large-scale drought and flood situations several months in ahead. In this presentation we give a detailed overview about the ensemble-based quantile-quantile-transformation, its validation and verification and the possibilities of this technique to complement PRESAO. We also highlight the performance of this technique for extremes such as the Sahel drought in the 80ties and in comparison to the various reference data sets (e.g. CFS2, PRESAO, observational data sets) used in this study.