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Predictability of Wet and Dry spells in West Africa

Understanding and predicting wet and dry spells is particularly important in West Africa where the population is highly vulnerable to severe weather events related to precipitation. Several recent events, in 2007 over the Sahel, or in 2009 in Burkina Faso, have illustrated the high impact of the wet spells. Dry spells have a high impact on crops and livestock, especially during the onset of the rainfall period and during the end of the growing season. The predictability of these two extreme events is, however, still low and this remains one of the greatest challenges for researchers and forecasters in that region. In this study, we analyse the 10-day cumulated precipitation and Standardized Precipitation Index to detect and characterize extreme wet and dry events over the Sahel in conjunction with regional and synoptic atmospherical characteristics. Several main components of the West African Monsoon are taken into account such as the Saharan Heat Low (SHL), the African Easterly Waves (AEW) activity, the monsoon flow, and the African Easterly Jet. Results show that some components such as AEWs and the SHL play an important role for the stability of the atmosphere and for the advection of humidity toward the Sahel, whereas the SST is crucial to provide humidity in the low troposphere. In general, the role of the humidity in the mid-troposphere seems to be one of the most important factors. Finally the predictability appears quite low in comparison with similar mid-latitude studies. The origins of these mistakes are investigated.

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