

## Identification of unusual weather states causing heavy areal precipitation in West Africa

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Precipitation extremes are usually caused by unusual weather states. The identification of unusual weather states therefore is a basic prerequisite for downscaling and forecasting this kind of extreme event. Recently, a new promising technique has been proposed for the identification of unusual weather states based on the notion of data depth. This technique is used to measure the centrality of a weather state. The less central a given weather state is, the less frequent the state is and the more unusual this weather state becomes. In this investigation we test the methodology for the identification of unusual weather states that can cause heavy areal precipitation in West Africa. The test region is located in the Upper Volta basin of West Africa. The meteorological information is selected from the NCEP/NCAR. The investigation period ranges from 1961 to 2011 to incorporate a number of precipitation extremes for the evaluation of the methodology. We highlight the basic idea of this new concept for the identification of unusual weather states for the test region. We illustrate which kind of large-scale atmospheric information simulated by a general circulation model seem to be most suitable information for describing unusual weather states that can cause long-lasting and large-area precipitation extremes. Finally, we demonstrate the performance of this downscaling technique in comparison to other statistical techniques.