Geophysical Research Abstracts
Vol. 12, EGU2010-4306, 2010
EGU General Assembly 2010

The impact of differences between two observed SST data-sets on the African Monsoon

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The African Sahel region shows a pronounced observed drying trend from the 1950's to the mid-1980's with some recovery toward climatology in recent years.
To study such trend a common tool are Atmospheric General Circulation Model (AGCM) runs forced by observed prescribed sea surface temperatures (SSTs). Different SST data-sets are available and some show marked decadal differences. In particular, two of the latest releases, the HadISST1.1 and the ERSST3 sea surface temperature data-sets, show marked decadal differences between each other especially in the equatorial Atlantic Ocean - a key area for the African Monsoon. Nevertheless, a possible effect of these differences has been generally overlooked. In this work we study the impact of the differences among the two SST data-sets on the mean state and on the decadal development of the African Monsoon by conducting ensemble experiments with two atmospheric general circulation models. The models forced by the HadISST1.1 SST data-set simulate a stronger African monsoon. The simulated rainfall response to the ERSST3 SSTs shows a more pronounced wetting along the Guinea Coast from the 1950's to the 1990's compared to the HadISST1.1 in both models. There is a model dependency in the response to the SST difference concerning the Sahelian rainfall trend.