

Trends in precipitation and spatiotemporal variations of rainfall regimes in Africa since 1951

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In this contribution the hydroclimatic variability over Africa in the period 1951 to 2000 is examined on the basis of a newly available 0.5° lat-long gridded global data set of monthly precipitation observations for the period 1951 to 2000. In a first step long-term precipitation changes have been investigated in terms of linear trends determined for monthly and seasonal precipitation sums. The statistical significance of these trends has been tested with the non-parametric Mann-Kendall trend test. To get deeper insight into temporal variations of drought severity the standardized precipitation index (SPI) has been calculated for assessment periods of varying length and respective linear trends have been estimated. Finally, major African rainfall regimes have been determined by means of a non-hierarchical cluster analysis of long-term averages of monthly precipitation sums for the period 1951-2000. Spatiotemporal variations of these clusters have been analysed by comparing the two subintervals 1951-1975 and 1976-2000 concerning the percentage of land area designated to major rainfall regime types. Major findings arising from these analyses may be summarized as widespread significant negative trends in precipitation sums in the 2nd half of the 20th century and as well corresponding significant increases in drought severity that appear most striking in sub-Saharan regions and in northern parts of southern Africa. Moreover, the comparison of the spatial distribution of major rainfall regime types between subintervals 1951-1975 and 1976-2000 shows a distinct expansion of arid and semi-arid climates on the cost of more humid climates especially in sub-Saharan and southern Africa.