

# **Changes in Precipitation and Drought Characteristics in Saxony, Germany**

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Changes in precipitation patterns and extremes are analysed in the context of global climate change and the increasing average precipitation over Central Europe. Saxony is situated in the transition zone between the more oceanic and the more continentally influenced climate regimes. Therefore it shows precipitation trends that are considerably different from the more western parts of Germany.

In an initial analysis of changes in precipitation characteristics, the periods 1951-1975 and 1976 to 2000 were compared regarding the annual distribution of monthly rainfall means and the frequency distribution of monthly precipitation. Based upon data from 100 stations across Saxony, an annual redistribution of precipitation patterns as well as a change in the probability distribution becomes visible. The summer maximum of monthly precipitation means shifted from June/July to July/August and the autumn minimum shifted from November to October. The winter months show significantly higher monthly precipitation means except for February that does not show significant changes in most parts of Saxony. Correspondingly, the frequency distribution of the summer half year has shifted to smaller classes; precipitation classes near or beyond normal conditions became less frequent. The winter precipitation distribution has shifted in the inverse direction – high precipitation classes are more frequent.

Following this fundamental analysis, changes in the frequency and intensity of heavy precipitation and drought events were analysed. Different indicators based on monthly and daily precipitation were calculated. Using the meteorological dry period concept, significant trends to more frequent and longer dry periods emerge during the summer half of the year. The situation is inverted in winter, where a trend to more humid conditions persists. When a dry period indicator with a threshold that depends on the duration of the dry period is applied, dry spell frequency trends are positive and those of dry period duration are negative. Droughts seem to be more often interrupted by days or periods with heavy precipitation. The severity of drought measured by the Rainfall Anomaly Index RAI has increased, especially in summer, whereas the intensity of wet anomalies measured by the same index has increased during the winter half of the year. Analysis of heavy precipitation events suggests that such events are becoming more frequent but not more intense during summer.