

## **Growing season length and rainfall extremes analysis in Malawi**

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**Abstract** Malawi's agro-based economy, based largely on rain fed agriculture production, renders the country highly vulnerable to impacts of climate change and variability. Changes in the seasonal rainfall distribution can be used to predict the impacts of climate change and variability on agricultural productivity. In this study, extreme rainfall indices were analysed at 43 stations and a methodology was proposed for detecting rainfall onset, cessation and length of the growing season at 26 stations in Malawi. These indices were derived from daily rainfall records from 1961 to 2009. Geostatistical techniques and parametric and non-parametric statistics were applied to understand the levels of change in these indices and their distribution functions. The results show a countrywide shift in rainfall onset and cessation, but without significant changes in the length of the growing season; a decrease in total annual rainfall, annual maximum 1-day and 5-day rainfall amount, number of heavy and extreme rainfall days. However, there was an increase in the consecutive number of wet and dry days. Most indices analysed did not show any regionally consistent pattern and were not statistically significant at  $\alpha = 0.05$  level.

**Key words** rainfall extremes; rainfall indices; seasonal rainfall; trends; Malawi