

# Trends in cloud cover from 1960 to 2005 over South Africa

**AC Kruger\***

*South African Weather Service, Private Bag X097, Pretoria 0001, South Africa*

## **Abstract**

Seasonal trends in low and total cloud cover, as well as for associated climate variables diurnal temperature range (DTR) and number of rain days, are investigated for South Africa. It is also investigated whether the observed trends and variability in cloud cover could be related to the El Niño-Southern Oscillation (ENSO) phenomenon, which has a major influence on the variability of summer rainfall in South Africa. These trends have not been investigated recently and in such detail. In the light of the climate change debate, updated studies of historical climate change are important, especially for regions and climate variables of which such studies are not published often. Seasonal trends of daily means were examined from quality-controlled data time series of 28 climate stations over South Africa, for the period 1960 to 2005. Regional trends could be determined by averaging series of stations showing similar trends, within areas delineated in such a way that the trend of the averaged series would be statistically significant. In this way the intra-seasonal spatial variability of same trend regions, as well as the spatial relationships between trends of the different climate variables under discussion, could be established. The main results, taking all seasons into account, is a general decrease in mean daily low cloud cover, and to a lesser extent total cloud cover, over most of South Africa, but an increase in the south and south-west of the country. However, the sizes of same trend regions show considerable variability between seasons. While trends in DTR and rain days are the opposite and the same, respectively, of trends in cloud cover in most cases, it is shown that this is not always the case. A region covering the northern, central and western interior of South Africa, with late-summer (JFM) cloud cover negatively correlated with equatorial Pacific sea-surface temperatures (SSTs), shows only a non-significant decrease in total and low cloud cover for JFM, which corresponds to a non-significant increase in equatorial Pacific SSTs during the same period.

**Keywords:** cloud cover, climate change, trends, diurnal temperature range, rainfall