

Technical note

The analysis of 74 years of rainfall recorded by the Irwins on two farms south of Potchefstroom

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Abstract

Rainfall records for three rain gauges on the farm Limerick and three rain gauges on the farm Mealielands were recorded from 1924 until 1999 by Mr DJ Irwin and his son Mr NG Irwin. The observations from these two nests of rain gauges are used to analyse the trends in rainfall measurements over time and to analyse the correlation of rainfall measurements between these rain gauges. The results presented in this report highlight the fact that the observations of rainfall are different to one another in many cases, indicating that care should be taken when selecting a rain gauge to represent the rainfall over a particular area. Analysis of the annual totals of rainfall has also found that at least 15 years of observations are required to determine a representative MAP value. The analysis of the monthly rainfall data also indicates that the rainy season commences in November and ends towards the end of April. A study of the extreme daily rainfall events shows that many of the storms are localised and are confined to an area around the rain gauges. The length of the droughts on these two farms are not as long as the national figures which would indicate that more point rainfall estimates are required to understand fully the spatial extent of a drought.

Introduction

The Irwin family, Mr DJ Irwin and his son, Mr NG Irwin, recorded climate data that includes daily rainfall, temperature and frost measurements on two farms, Limerick and Mealielands, south of Potchefstroom and roughly 25 km west of the Vredefort dome (Visser, 1989), dating back to 1924. The three rain gauges at Limerick are 0436577CP, 0436577DP and 0436577EP and the three at Mealielands are 0436577FP, 0436577GP and 0436577HP and the locations are presented in Fig 1. The six rain gauges are within 6 km of each other with an altitude range of approximately 100 m. Mr DJ Irwin farmed maize on Limerick and Mr NG Irwin diversified and included crops such as sunflowers and groundnuts when he took over the farming on Limerick and when he acquired the farm Mealielands in the 1950s.

Rainfall data source

Mr Neville Irwin contacted the School of Bioresources Engineering and Environmental Hydrology (BEEH) at the University of Natal in the early 1980s and agreed to make the Limerick rainfall data available to a Water Research Commission (WRC)-funded project entitled *Mapping Mean Annual and Other Rainfall Statistics over Southern Africa* (Dent et al., 1988). This project utilised the data from Limerick (0436577CP) only at a monthly and annual time step as this was all that was required at the time. He then made contact with BEEH in 2000 and supplied them with the complete set of climate observations of the 6 sites that were compiled by

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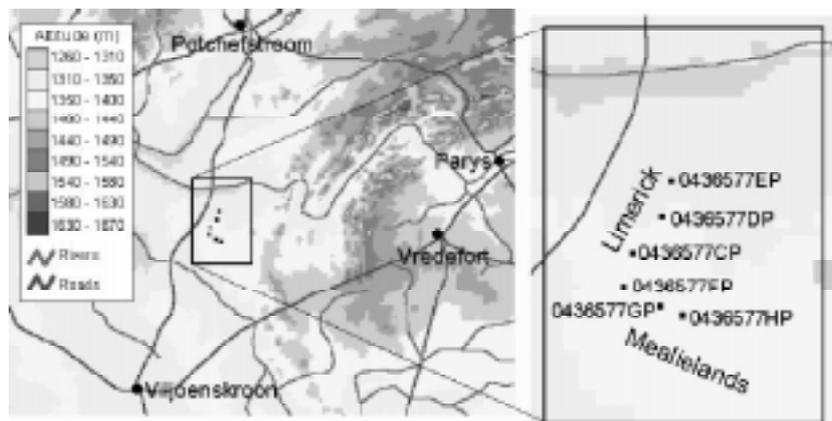


Figure 1

Location of the observation nests at Limerick and Mealielands

himself and his father. These daily observations are to be incorporated into a current WRC-funded project entitled *The Development of an Improved Gridded Database of Annual, Monthly and Daily Rainfall*. A copy of the records for 18 November 1999 are presented in Fig. 2 to highlight the diligence of the Irwin family in recording climatic data. The last entry marks the date on which Mr Neville Irwin retired after 45 years of farming.

The analysis of rainfall data

The current WRC-funded project (*The Development of an Improved Gridded Database of Annual, Monthly and Daily Rainfall*) has afforded the authors the opportunity to develop a suite of computer programs to analyse the distribution and behaviour of rainfall across Southern Africa. These six rainfall data sets that were recorded by the same persons and that are within a few kilometres apart will be used in this report to validate and verify the methodology that is applied to the Southern African rainfall database that