

Short communication

First rainfall data from the KZN Drakensberg escarpment edge (2002 and 2003)

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Abstract

Rainfall measured on the KwaZulu-Natal Drakensberg escarpment, the first from above 2 800 m a.s.l., are presented from two locations. Total rainfall at the top of Sani Pass (2 850 m a.s.l.) in the southern Drakensberg was 742 mm in 2002, while the January months of 2002 and 2003 averaged 109 mm. Rainfall on Sentinel Peak (3 165 m a.s.l.) in the northern KZN Drakensberg during 2003 totalled 765 mm and 145 mm was measured in January 2003. Recorded rainfall was marginally lower than, but within 6% of, rainfall recorded at adjacent lower altitude Drakensberg stations over the same period. The number of rain days increased marginally with altitude and the data suggest that even though the amount of rainfall on the escarpment is similar to that at lower altitude, the frequency of rainfall events is higher on the escarpment. Although 2002 and 2003 were dryer than normal years in the region, comparisons between these data and prior estimations, where rainfall was expected to range between 1 500 and 2 000 mm/a, shows that totals for the summit of the escarpment could have been over-estimated in the past. Measurement of rainfall is ongoing.

Keywords: KwaZulu-Natal Drakensberg, rainfall, Lesotho

Introduction

Rainfall data and accurate rainfall estimation in the Drakensberg and adjacent Lesotho highlands are of fundamental importance in geomorphological, hydrological and botanical research and form a basis for palaeoenvironmental reconstruction. For example, Partridge (1997) predicts precipitation at the Last Glacial Maximum (approx. 18 000 B.P.) to be in the region of 70% of current values. However, contemporary meteorological data are sparse (Boelhouwers and Meiklejohn, 2002) and measured rainfall data for the Drakensberg escarpment region (above 2 500 m a.s.l.) do not exist on record. Rainfall estimation for the escarpment zone has been a topic of research in the past, notably by Tyson et al. (1976) and Schulze (1979). All rainfall data for the high Drakensberg are derived by projection from stations at lower altitudes. No rainfall records from the top of the escarpment have been forthcoming in recent years to verify these estimates, and most contemporary geomorphological research in the Drakensberg cite the values given by Tyson et al. (1976) and/or Schulze (1979) (e.g. Boelhouwers, 1988; 1991; 1994; Grab, 1994; 1996; 1999; 2002; Sumner, 2003). This paper presents the first measured rainfall data from the southern and northern KwaZulu-Natal Drakensberg escarpment as part of ongoing meteorological monitoring in the high mountain regions at the South Africa-Lesotho border.

Previous research

The most comprehensive and most cited rainfall analyses for the escarpment area come from the 1970s. Tyson et al. (1976) indi-

cate that mean annual rainfall increases with altitude, and that the top of the escarpment should receive over 2 000 mm of rain annually. Stations in the Drakensberg are noted to experience an average of 16 to 18 rainy days in December and January, and the summer months November to March account for 70% of the annual rainfall, while May to August for less than 10%.

Schulze (1979) sketched a transect through the Central Drakensberg depicting mean annual rainfall and mean January rainfall from Hoffenthal in KZN to Mothelsessane in Lesotho. At Cleft Peak, situated on a transect and on the escarpment edge at 2 880 m a.s.l., rainfall was only recorded for an unspecified short duration, and the monthly data synthesised to 21 years using Cathedral Peak 2A as base station. Schulze (1979) found a clearly defined relationship between altitude and rainfall, with the rainfall attaining a maximum before the highest altitude is reached. On the escarpment, mean annual rainfall is predicted at over 1800mm, just 200 mm less than the estimate from Tyson et al. (1976). Mean January rainfall is estimated at over 250 mm (Schulze, 1979). From these two studies, contemporary rainfall exceeding 1 500 mm/a is typically quoted for the escarpment (e.g. Boelhouwers, 1991; Grab, 2002) and the value applied as a basis for palaeoenvironmental extrapolations.

Equipment and calibration

In this study, rainfall at the escarpment edge is measured at two locations using a Davis-MC Systems (D-MCS) automated tipping-bucket rain-gauge. The gauges are at the top of Sani Pass in the southern Drakensberg, and on Sentinel Peak in the northern Drakensberg. Both sites have established South African Weather Service stations at lower altitudes using standard SAWS manual-recording rain-gauges. As with the SAWS stations, daily rainfall is measured over a 24 h cycle from 08:00 to 08:00 the following day. A rain day is defined as one on which at least 0.5 mm of rainfall is measured (Schulze, 1979).

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