

Effect of altitude on erosive characteristics of concurrent rainfall events in the northern KwaZulu-Natal Drakensberg

W Nel^{1*}, DA Reynhardt¹ and PD Sumner²

¹Department of Geography and Environmental Science, University of Fort Hare, Alice 5700, South Africa

²Department of Geography, Geoinformatics and Meteorology, University of Pretoria, Pretoria 0002, South Africa

Abstract

High-resolution rainfall data from two stations in the northern KwaZulu-Natal Drakensberg provide insight into the effect of altitude on individual rainfall event characteristics. The effect of altitude on the duration and erosivity (rainfall intensity and kinetic energy) of concurrent rainfall on the escarpment and in the foothills is analysed using 5-min interval data for the calendar year 2003. A cumulative total of 229 rainfall events, measured at the Royal Natal National Park station (1 392 m a.m.s.l.) and a temporary station on the escarpment at Sentinel Peak (3 165 m a.m.s.l.), were considered, of which 79 rainfall events were found to fall concurrently at the two stations. The data indicate that the concurrent events generate rainfall for longer on the escarpment, but that the amount of rain produced as well as the intensity at which it falls is less than that in the foothills, both in summer and winter. The escarpment appears to limit erosivity, with only 11 events meeting the set criteria for erosivity in the foothills but failing to meet the same criteria on the escarpment. This decrease in erosivity contrasts with previous models for the Drakensberg that demonstrate higher erosivity in the upper reaches, but concurs with studies in mountainous regions elsewhere which found that erosivity decreases with altitude. It is tentatively suggested that the difference in rainfall characteristics could be related to the sources of precipitation and the manner in which the escarpment zone affects the formation and distribution of rainfall. The paper also highlights the need for further research into the association between rainfall structure and synoptic conditions and the effect that the escarpment has on modifying large-scale rain-producing systems in the KwaZulu-Natal Drakensberg.