



The non-linear response of aeolian sand dunes to changing climatic conditions and vegetation cover

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Partially vegetated dunes have been viewed as relics from a drier and/or windier past. However, research in the southwest Kalahari (e.g. Wiggs et al, 1995; Bullard et al, 1996) confirmed our understanding that sediment movement can occur under vegetation canopies and that dune morphology is tied to the dynamics of vegetation, showing a staggered and/or damped response to a changing climatic, grazing or burning regime. Evidence suggested that dunes which are stripped of vegetation through natural or human disturbance exhibit an order of magnitude increase in surface sediment activity. A threshold vegetation cover below which dune activity markedly increased was recognised at about 14%. Questions remain as to the rate of vegetation recovery after such disturbances and how quickly the regulatory effect of vegetation on dune dynamics can be re-established. This paper reports findings of a 15-year programme monitoring dune activity under a re-establishing vegetation cover after a severe disturbance in the southwest Kalahari.

Results indicate that even in prime growing conditions it can take up to a decade for disturbed vegetation to re-establish and regain control of dune dynamics. However, there is a contrast in the recovery rate on different landscape components with vegetation renewal in interdunes being twice as rapid as that measured in crestral regions. These results are discussed in the context of (i) the non-linear response of dunes to changing climatic forcings; and (ii) the calibration of models of dune dynamics with regard to future predicted climatic warming and drying.