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1 Late Quaternary aeolian activity along the west coast of South Africa

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Extensive aeolian deposits extend from Cape Town northward to the Namib Sand Sea, and yield a significant palaeoenvironmental archive recording the dynamics of millennial scale fluctuations in regional and hemispheric atmospheric circulation cells. This study applies optically stimulated luminescence dating techniques (OSL) to the aeolian features of the west coast, and allows for an unprecedented look at the environmental history of the region.

In total, 89 samples from 22 cores were taken from aeolian deposits along a north – south transect extending up the west coast of South Africa from Elands Bay (32˚26'S, 18˚14'E) to Kleinsee (29˚14'S, 16˚59'E). By sampling a variety of relict accumulating and migrating dune forms, a detailed history of the dynamics of dune emplacement has been determined. Broadly, OSL ages from the accumulating dune forms exhibits five distinct peaks, suggesting phases of activity/deposition at 3 – 5, 16 – 23.5, 31 – 33, 43 – 48.5 and 61 – 74.5 ka BP, while ages obtained from migrating dune forms exhibit a largely coeval inverse relationship to these phases, with periods of activity/deposition occurring at 4 – 8, 11 – 16 and 21 – 28 ka BP.

The spatial and temporal extent of the data have allowed for correlations to be made with evidence from marine cores from the Southeast Atlantic (e.g. Shi *et al.*, 2001; Stuut *et al.*, 2002), and a more coherent regional environmental history to be devel-

oped. Of the phases of aeolian activity/deposition preserved in accumulating dune forms, phases from 16 – 23.5, 31 – 33, 43 – 48.5 and 61 – 74.5 ka BP are associated with periods of increased windiness and fluvial sediment supply correlating with high-latitude cooling (Petit *et al.*, 1999), invigorated glacial circulation systems (e.g. Nicholson and Flohn, 1980), and increased humidity along the west coast (e.g. Parkington *et al.*, 2000; Scott *et al.*, 2004; Shi *et al.*, 2001; Stuut *et al.*, 2002).

Rather than indicating periods of increased aeolian "activity", ages from migrating forms represent a complex history of dunefield development. The oldest ages, between 21 – 83 ka BP, were obtained from the cores of the reticulate dunes, and, as they were deposited in high wind – high humidity environments, it is likely that they represent palaeo-nebkhas that accumulated around the vegetation that would have been growing in the region. The 11 – 16 ka BP phase of dune development occurred during the still humid, but notably less windy Lateglacial period. Aeolian deposits from this phase represent the transition to dormancy of a highly mobile dunefield.

The mid-Holocene phase of activity/deposition recorded in both accumulating and migrating forms occurs during a period of low wind strength and potentially limited sediment supply. It is thus more likely to indicate widespread reactivation of aeolian deposits as a response to the period of increased aridity that is recorded in the palaeoecological proxies from the Elands Bay region (Meadows *et al.*, 1996; Parkington *et al.*, 2000)

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