



A high-resolution record of late Quaternary aeolian activity at Witpan, South Africa: Palaeoclimatic and palaeoenvironmental implications

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The southwest Kalahari contains numerous landforms, many of aeolian origin, that have been interpreted as evidence of different climatic regimes over late Quaternary timescales. Early attempts at dating hinged around scarce and frequently questionable radiocarbon determinations. The advent of luminescence dating heralded the first opportunity to directly date many of the Kalahari's sediments, and thus for the first time reconstructions of periods of aeolian activity in the Kalahari were constructed.

It is becoming increasingly apparent that this data set has limitations – the samples are sparsely scattered across a subcontinent, most are taken from only the upper layers of the dunes, and many dates rely on multiple-aliquot procedures with accordingly large errors. With improving field and laboratory methodologies that it may now be possible to reapproach the interpretations of late Quaternary aeolian palaeoenvironmental and palaeoclimatic record.

We have used a high-resolution 3D sampling strategy on the depositional aeolian features at Witpan, a 5-km long pan-lunette complex surrounded by linear dunes. The use of a lightweight hydraulic auger allowed vertical sampling through total dune profiles with an optical age sampling interval of up to 50cm. Additional field survey and laboratory analyses provided full contextualisation of the pan-dune complex and its setting within the linear dune landscape.

The results highlight the temporal and spatial complexity of late Quaternary aeolian sedimentation within even a small landscape unit, and have extended the southwest-

ern Kalahari aeolian record in both younger and older directions. Whereas the entirety of the lunette represents late Holocene deposition, the surrounding linear dunes include intense deposition at around 11ka, more recent deposition of lesser intensity, and spatially variable preservation of older dune cores of c 60ka. The implications of these preservation regimes for effective palaeoenvironmental and palaeoclimatic reconstructions on a wider scale are considered.