Present research is concentrating on the extension of the palaeoclimatic record to 300,000 BP through the use of Th/U dating on cave speleothems, and the dating of ‘drier’ episodes using thermoluminescence and optical luminescence on dune sediments.

PALYGORSKITE AND DOLOMITE IN LATE NEOGENE PALUSTRINE SEDIMENTS, NORTHWESTERN TRANSVAAL, SOUTH AFRICA

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The fluvial sediments of the Rooibokkraal Formation and associated lacustrine argillites comprising the Zuuverdiend Member accumulated in parts of the northwestern Transvaal on the margin of the Kalahari region, probably during the late Neogene period. The accumulation of thin, yet widespread sedimentary cover and formation of diverse duricrusts associated with the Rooibokkraal Formation is discussed in the context of regional calcretization in response to changing environmental conditions.

Landscape processes in the area changed from active fluvial channel and distal ephemeral lacustrine processes to those dominated by pedogenic calcretization. The development of thick calcrete profiles within gravelly and sandy sediments and weathered granitoid bedrock occurred initially in areas surrounding poorly-drained depressions. Preferential removal of Ca during a long period of calcrete formation in these areas concentrated Mg in groundwater-feeding poorly-drained areas. Further evaporative concentration of magnesium during periodic emergence of the palustrine margins of ephemeral lakes resulted in breakdown of smectitic clays and neoformation of palygorskite. Permanent desiccation of palustrine mudflats led to development of replacive, pedogenic powder dolocrete within the palygorskite/smectite clay deposits.

Although accumulation of the Rooibokkraal Formation was probably contemporaneous with part of the Kalahari Group succession, no lithostratigraphic correlation has been attempted. It is suggested that a broader lithostratigraphic grouping is needed before attempting to correlate Cainozoic sediments in the region.