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Constraining the Timing of Sedimentary In-Fills at the Vaalputs Radioactive Waste

Disposal Facility

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Vaalputs is a low level radioactive waste disposal facility located in a semi-arid part of the Northern Cape about 100 km SE of Springbok at between 30 ° 05 'and 30 ° 10' S and 18° 37' E at an altitude of ±1000 m. It is the only facility of its kind in Africa and is operated by the Nuclear Energy Corporation of South Africa (NECSA). The radioactive waste is disposed of in large, ~8 m deep trenches which exposed only the upper portions of the Vaalputs sedimentary sequences described by Brandt et al. [1]. The sequence consists of unconsolidated red sand (attributed to the Quaternary Gordonia Formation) and Cenozoic clay-rich beds interpreted as fluvial deposits deposited in semi-arid conditions as unchannelized floodouts. The red sand is the major interest in this study, being located at various positions in the stratigraphy; it occurs either as a surficial veneer or as infillings of cavities possibly related to bioturbation. In particular, we have identified a number of red sand "tongues" filling potholes-like structures whose origin and position in the stratigraphic sequence are not properly understood. The structural, compositional and textural characteristics of the red sands suggest that these tongue-like features developed under climatic conditions very different from those of today. A study of the textural-geochemical characteristics and ages of the sediment in-fills by optically stimulated luminescence (OSL) is expected to offer clues to the geomorphologic, including fluvial activity, and palaeoclimatic episodes that led to their development. Initial results on samples collected at various depths across a well-developed soil tongue and the adjacent wind-reworked surficial veneer indicate that these specimens are not very sensitive to dating, with low signal brightness and a large amount of scatter in the data, suggesting incomplete bleaching of the signal in the quartz grains.

References:

[1] Brandt et al. (2005) *SAJG* 108: 271-284

