Stratigraphy and morphotectonics of Karoo deposits of the northern Selous Basin, Tanzania

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Abstract

Late Permian Karoo deposits of the northern Selous Basin in south-central Tanzania comprise conglomerates and diamictitic boulder beds of alluvial and scarp-foot fan origin. These merge with grey to greenish sandstones, siltstones and black shales of deltaic and lacustrine environments. Microflora assemblages indicate a late Permian age. Lateral changes and interfingering of various lithofacies units are common. Depositional development was controlled by syndepositional faulting and variations of gradients resulting from fault movements. The position of the fault scarp separating the basin area from the elevated basement horst to the west roughly corresponded with the present boundary between the Selous Basin and the Precambrian metamorphics of the Uluguru Mountains.

The late Permian Karoo succession of this part of the Selous Basin apparently overlaps older Karoo deposits contained in the north-northeast trending narrow graben structures. It is therefore regarded as a new depositional event which was initiated by renewed tensional tectonism in late Permian time. During this tectonic episode the narrow early Karoo graben structures were expanded into much broader rift basins. Material eroded from the rift shoulders and associated highlands was literally dumped across the fault scarps, forming debris aprons and scarp-foot fans. Rivers emanating from the highlands formed large alluvial fans and, further afield, deltas issued into freshwater lakes.

Some of these late Permian faults were rejuvenated by late Cretaceous to early Tertiary tectonism. Thermal waters circulating along fractures converted feldspars, biotites and hornblendes to prehnite. Further tectonic adjustments in mid Tertiary time led to the present-day morphology.