

SHRIMP-RG U-Pb Zircon Dating for the Basin-Floor Fans of the Tanqua and Laingsburg Depocentres: A New Stratigraphic Framework for the Karoo Basin, South Africa

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Early to late Permian sedimentation in the southwest area of the Karoo Basin of South Africa is characterized by development of two neighboring but distinct loci of deposition; the Tanqua and Laingsburg depocenters. In both areas, sand-rich basin-floor fans were deposited in a deepwater environment, preserved in outstanding three-dimensional outcrops. Both systems shallow-up to deltaic shelf systems, culminating in sand-rich fluvial systems. Despite numerous recent studies on sedimentology and stratigraphy, depositional age of the majority of the deep marine, slope and shallow-marine sequence has been loosely constrained. A relative coarseness to the existing chronostratigraphic resolution has precluded the creation of a robust high-resolution sequence stratigraphic framework for the depositional systems. To obtain higher-resolution time constraints on the evolution of these depocenters, samples from six resedimented ash beds were collected from the deepwater systems in both depocenters for detrital zircon geochronometric analysis. Thirty U-Pb zircon-grain ages were determined for each sample using the Sensitive High Resolution Ion Microprobe Reverse Geometry (SHRIMP RG) at the USGS-Stanford Microanalytical Center. All samples are comprised predominantly of late Paleozoic zircon grain age populations, with three samples containing minor early Paleozoic, Proterozoic and/or Archean zircon grains. For the late Paleozoic population, samples from both of the depocenters include a few zircons younger than 255 +/- 1 Ma. These new data may have fundamental implications with respect to the understanding and timing of deposition in both depocenters, and also to the tectonism and subsidence history for this part of the Gondwana margin during the latest Permian.