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Animated illustration of plate reconstructions which effectively utilise digital information such as lithostratigraphy, geochronology and ore deposits to facilitate spatial assessment of crustal evolution.

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Effective illustration of geological information in both a spatial and time context is essential to investigations in the Precambrian. Structured geological attribute data, stored in online databases such as the DateView and StratDB systems developed for IGCP 509 and enhanced for IGCP 648, may be linked to GIS map featureclasses. These can now be superimposed on plate reconstruction models using software tools such as Paleogis and GPlates. Consistent, uniform symbolisation of geological units, geochronology, ore deposits, large igneous provinces and various tectonic features can be made to 'switch on' and 'switch off' at times appropriate for their geological context. The human brain's ability to work with the animations produced in this way permits one to better identify patterns and anomalies which should be considered in regional crust-evolution investigations.

Point attribute information such as for geochemistry or detrital zircon studies may also be linked to lithostratigraphic units and maps so as to better constrain geodynamic and structural context. Major peaks in detrital age distributions for samples and units may be linked to records in the DateView database so as to identify the geographic location of known samples which might represent potential provenance areas for the detrital grains. Changing patterns in provenance with time can then be investigated via links to plate reconstructions.

We illustrate examples of this methodology and system utilising examples from southern African geology from Archaean to Phanerozoic. Patterns provide insights into possible processes and their timing and permit one to assess and prioritise published competing models for the evolution of the Limpopo Belt, Vaalbara, the Cape and Karoo successions, and for Nuna to Rodinia supercontinent reconstructions.

Implementation of equivalent methodology to other parts of the world and the investigation of crustal evolution in time and space has the potential to greatly improve quantitative assessments of competing scenarios while also ensuring that data, once compiled, are readily available for use by future researchers.