



Evidence towards a strike-slip tectonic setting between 1710–1600 Ma in the Capricorn Orogen, Western Australia

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The Capricorn Orogen in Western Australia saw sporadic basin formation and related sedimentation, magmatism, metamorphism and deformation in the period between 1710–1600 Ma. New evidence from interpretation of geophysical datasets and detrital zircon geochronology and reinterpretation of previously acquired datasets provides insights into the tectonic setting for the Capricorn Orogen during this time.

Previous data and research had not been specific regarding the tectonic setting between 1710–1600 Ma. Some evidence points towards a compressional orogeny, such as, the presence of I-(S) type felsic magmatism which exhibits a magmatic foliation defined by phenocryst alignment in the western part of the Capricorn Orogen. In addition, the felsic magmatism largely sourced from reworking of continental crust and was associated with sub regional metamorphism. However, some features are less supportive of a compressional orogeny between 1710 and 1600 Ma. For instance, metamorphism during this period was high temperature but low-(moderate) pressure, magmatism varies in age with spatial location by younging to the south, and development of a cleavage is specific to certain regions of the Capricorn Orogen, but is lacking in others, particularly through the centre.

An alternative interpretation is that the region was broadly in a strike-slip tectonic setting during this period. New mapping of the location of the felsic magmatic bodies in the subsurface using geophysical datasets shows that there is a spatial link with similarly aged sedimentary and metasedimentary intervals present at surface. The sedimentary intervals, which are locally metamorphosed, could have been deposited in individual strike-slip controlled basins, which is somewhat supported by newly acquired detrital zircon geochronological data and corroborated by previously published geochronology from the region. The interpretations indicate that detritus was sourced from locally exposed intervals which may support the interpretation of discrete depocentres. The rhombic shapes of the magmatic units and sedimentary intervals indicates that a dextral strike-slip scenario is likely to have controlled much of the sedimentation and felsic magmatism during this period. While the tectonic setting was overall strike-slip, a variation in the stress field at the time caused a short-lived compressional phase in part of the Capricorn Orogen, causing localised deformation and metamorphism.