



Inward stepping intraplate activity: An example from the Capricorn Orogen, Western Australia.

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The Capricorn Orogen in Western Australia preserves a relatively brief period of continent assembly in the early Paleoproterozoic, followed by a ~ 1.5 billion year evolution characterised by episodic intraplate tectonic events. These intraplate events include the ca. 1.8 Ga Capricorn Orogeny, the ca. 1.65 Ga Mangaroon Orogeny, the ca. 1.38 to 1.1 Ga Mutherbukin Tectonic Event, the ca. 1 Ga Edmondian Orogeny, and the ca. 570 Ma Mulka Tectonic Event. Two regional intraplate basins were deposited between 1.62 and 1.465 Ga (Edmund Basin) and at ca. 1.20-1.07 Ga (Collier Basin). The timing of these events is clearly linked in time with tectonic events at the contemporaneous plate margins of the Columbia, Rodinia and Gondwana supercontinents. The processes that drive focused activity in the Capricorn Orogen during these periods are less clear. Recent regional scale studies incorporating extensive geological mapping, geochemistry and geochronology have served to define the extent and character of these events at the surface. Here we present new geophysical analyses that extend these interpretations beneath cover, and serve to more fully define these tectonic events. The interpretations show a distinct pattern that each tectonic event is encompassed within the region affected by the previous tectonic event, with progressively narrower regions being involved. There is also a tendency towards less extensive magmatism with each event. We interpret these observations in terms of lithospheric cooling, and the growth of strong lithosphere built on the lithospheric cores of the Pilbara and Yilgarn Cratons.