

Title: Assembling and reactivating the Proterozoic Capricorn Orogen: lithotectonic elements, orogenies, and significance

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Abstract: The Capricorn Orogen was initiated during Palaeoproterozoic suturing events that brought together the Archaean Yilgarn and Pilbara cratons to form the West Australian Craton. The orogen comprises Palaeoproterozoic plutonic and medium- to high-grade metamorphic rocks of the Gascoyne Complex, a series of Palaeoproterozoic volcano-sedimentary and sedimentary basins, including the Ashburton, Blair, Yeffida, Bryah, Padbury and Earahedy basins, and the deformed margins of the Pilbara and Yilgarn cratons. Major pulses of deformation and metamorphism took place during the ca. 2200 Ma Ophthalmian Orogeny, the 2000-1960 Ma Glenburgh Orogeny, the 1830-1780 Ma Capricorn Orogeny, and a more localized unnamed event at the end of the Palaeoproterozoic (similar to 1670-1620 Ma). The orogen has been the site of repeated intracratonic reactivation with renewed basin formation, magmatism and orogeny during the Mesoproterozoic and the Neoproterozoic. The exhumed Palaeoproterozoic components of the orogen are unconformably overlain by the intracratonic Mesoproterozoic Edmund and Collier Basins (Bangemall Supergroup), which have been deformed during the Neoproterozoic Edmundian Orogeny. The Ophthalmian and Glenburgh orogenies affected the northern and southern margins of the orogen, respectively. The former resulted in the development of a foreland basin along the Pilbara Craton margin, whereas the latter is associated with accretion of an allochthonous element, the Glenburgh Terrane of the Gascoyne Complex, to the northwestern margin of the Yilgarn Craton. Effects of the Capricorn Orogeny extended across the entire orogen and provide a younger limit for amalgamation of the Yilgarn and Pilbara cratons. A number of basins developed along both the northern and southern margin of the orogen during this event, and were filled with sediment eroded from the Yilgarn Craton, the Gascoyne Complex, and a presently unexposed early Palaeoproterozoic terrane. The Capricorn Orogeny corresponds with a major phase of continental collision both in Australia and world wide, which appears to mark a major phase of supercontinent assembly. Mineralization within the orogen includes a wide variety of deposit types that can be related to collisional settings, including the world-class iron orebodies of the Hamersley Basin. (C) 2003 Elsevier B.V. All rights reserved.

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