



A review of the geology and geodynamic evolution of the Palaeoproterozoic Earraheedy Basin, Western Australia

Franco Pirajno^{a,b,*}, Roger M. Hocking^a, Steven M. Reddy^c, Amanda J. Jones^d

^a Geological Survey of Western Australia, East Perth, Australia

^b School of Earth and Geographical Sciences, The University of Western Australia, Crawley, Australia

^c Dept. Applied Geology, Curtin University of Technology, Perth, Australia

^d 27, Chadwick Street, Hilton WA 6163, Australia

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ABSTRACT

The Palaeoproterozoic Earraheedy Basin is one of a series of basins that extend for about 700 km east–west and are part of the Capricorn Orogen, situated between the Archaean Pilbara and Yilgarn Cratons. The Earraheedy Basin contains sedimentary rocks that were deposited on the northern passive continental margin of the Yilgarn Craton, probably as a result of continental breakup at 1.8 Ga. The sedimentary rocks of the Earraheedy Group are divided into two Subgroups, Toloo and Mingarra, each representing different depositional environments and aggregating about 3000 m in thickness. The Tooloo Subgroup consists of basal siliciclastic rocks with minor platform carbonates, overlain by a 600-m-thick succession of Fe-rich rocks (granular iron-formation and hematitic shales). The Mingarra Subgroup is predominantly siliciclastic, but includes stromatolite-bearing carbonate sequences and was deposited during a more active depositional regime. Far-field tectonic events at 1.76 and 1.65 Ga resulted in the deformation of the sedimentary package with progressive intensity from north to south, forming the Stanley Fold Belt and giving an overall asymmetric structure to the Basin. These events were followed by a large meteorite impact (Shoemaker Impact Structure), probably in the Neoproterozoic. The Earraheedy Basin is well endowed with Fe resources, represented by the granular iron-formation (Frere Formation, Tooloo Subgroup), particularly in the Stanley Fold Belt, where there was secondary enrichment.

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* Corresponding author. Geological Survey of Western Australia, East Perth, Australia.

E-mail addresses: franco.pirajno@dmp.wa.gov.au, franco.pirajno@uwa.edu.au (F. Pirajno).

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1. Introduction

The Earaaheedy Basin, together with the Yerrida, Bryah and Padbury basins, form a series of Palaeoproterozoic basinal structures that extend for about 700 km east–west along the southeastern margin of the Capricorn Orogen and the northern margin of the Yilgarn Craton and covers a total area of approximately 70 000 km² (Cawood and Tyler, 2004; Pirajno et al., 2004) (Fig. 1). The development of these

basins began at about 2.2 Ga and continued for at least 400 Myrs, to about 1.8 Ga and possibly as young as 1.65 Ga, recording periods of sedimentation and igneous activity. The present-day geometry of these basins is the combined result of tectonic movements that occurred during the ca. 2.0–1.96 Ga Glenburgh Orogeny (Occhipinti et al., 2004), the ca. 1.83–1.78 Ga Capricorn Orogeny (Cawood and Tyler, 2004 and references cited therein) and to a lesser extent the 1.79–1.76 Ga Yapungku Orogeny (Bagas, 2004) and the 1.68–1.62 Ga

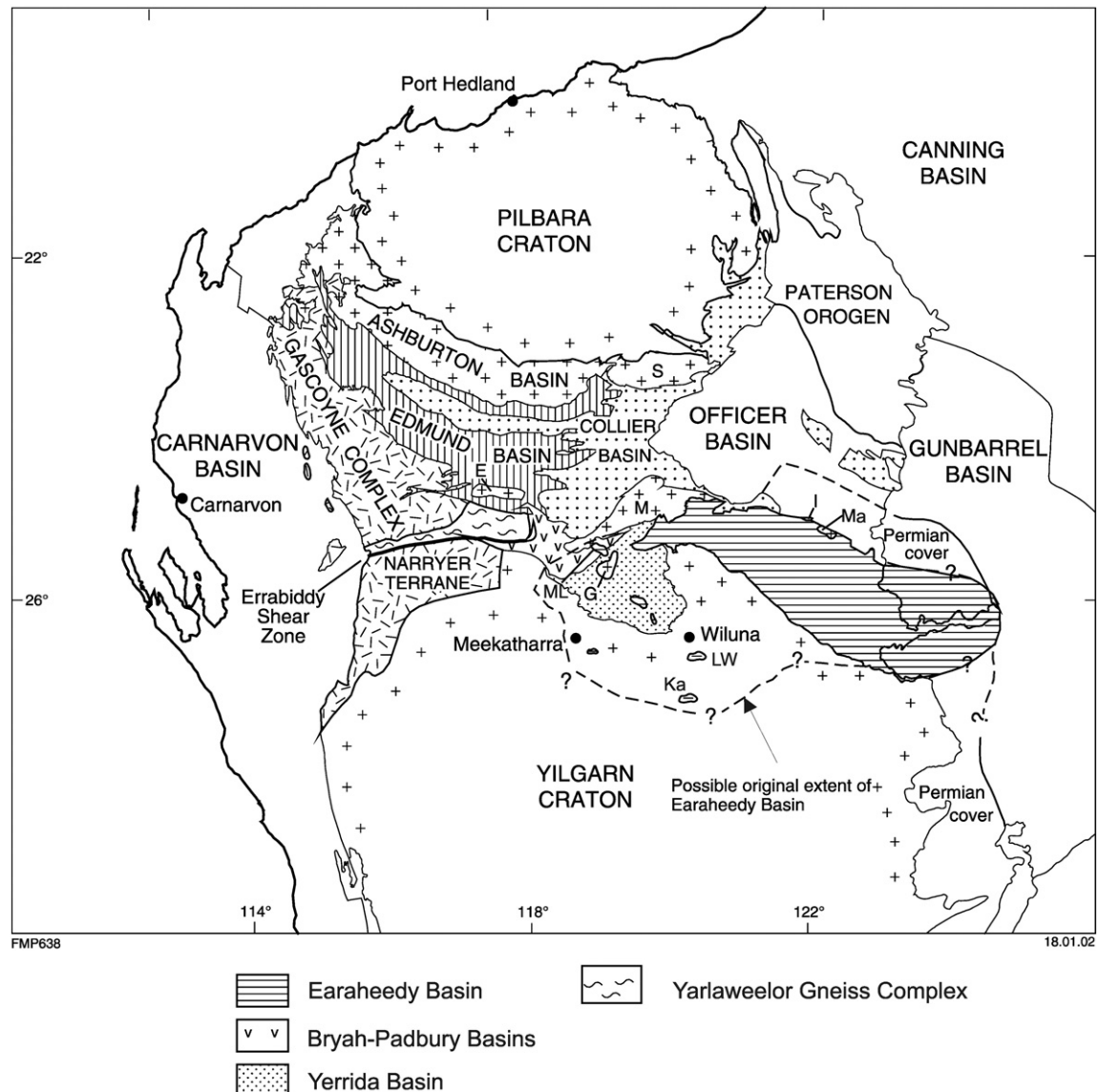


Fig. 1. Tectonic units of the Capricorn Orogen and position of the Earaaheedy Basin; E Egerton Inlier, M Marymia Inlier, S Sylvania Inlier, Ma Malmac Inlier, I Imbin Inlier; ML Mt Leake outlier, Ka Kaluweerie Hills outlier, LW Laurence Wells–Mt Wilkinson outliers. Modified from Pirajno et al. (2004).

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