

The Mesoproterozoic Irumide belt of Zambia

B. De Waele ^{a,*}, A.B. Kampunzu ^b, B.S.E. Mapani ^c, F. Tembo ^d

^a *Tectonics Special Research Centre, Department of Applied Geology, Curtin University of Technology, G.P.O. Box U1987, Perth, WA 6845, Australia*

^b *Geology Department, University of Botswana, Private Bag 0022, Gaborone, Botswana*

^c *University of Namibia, Department of Geology, Private Bag 13301, Windhoek, Namibia*

^d *Geology Department, School of Mines, University of Zambia, P.O. Box 32379, Lusaka, Zambia*

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Abstract

The Mesoproterozoic Irumide belt is a northeast-trending structural province stretching from central Zambia to the Zambia–Tanzania border and northern Malawi. Mesoproterozoic and Neoproterozoic transcurrent shear zones within reactivated parts of the Palaeoproterozoic Ubendian belt define its northeastern limit. The northwestern margin is defined by the largely undeformed basement lithologies of the Bangweulu block. An intensely folded and sheared zone at the southeastern margin of the Mporokoso Group sedimentary depocentre on the Bangweulu block, interpreted to have developed above a thrust at the basement-cover interface, indicates that far-field effects of the Irumide Orogen also affected the southeastern part of the Bangweulu block sedimentary cover. To the west and southwest, Irumide and basement lithologies were reworked by the Damara–Lufilian–Zambezi Orogen within the Neoproterozoic Zambezi and Lufilian belts. The Choma–Kalomo block, previously regarded as the southwesterly continuation of the Irumide belt, is a distinct Mesoproterozoic province, while a succession of structurally juxtaposed tectonic terranes in eastern Zambia record a deformation event related to the Irumide Orogen. The lithological units identified in the Irumide belt include: (1) limited Neoarchaeic rocks emplaced between 2.73 and 2.61 Ga and representing the oldest rocks in the Bangweulu block; (2) ca. 2.05–1.85 Ga volcano-plutonic complexes and gneisses representing the most important components in the Bangweulu block; (3) an extensive quartzite–metapelite succession with minor carbonate forming the Muva Supergroup, and deposited at ca. 1.85 Ga; (4) granitoids emplaced between 1.65 and 1.55 Ga; (5) a minor suite of anorogenic plutons (nepheline syenite and biotite granite) restricted to the far northeastern Irumide belt and emplaced between 1.36 and 1.33 Ga; (6) voluminous syn- to post-kinematic Irumide granitoids emplaced between 1.05 and 0.95 Ga. Crustal shortening and thickening in the Irumide belt are shown by northwestward-directed thrusts and related folds and metamorphic parageneses recording a clockwise medium-pressure/medium-temperature *P–T–t* path. Metamorphic grades range from greenschist facies in the foreland to the northwest to upper amphibolite facies in the southeast, with local granulites. Peak metamorphism is diachronous across the belt and bracketed between 1.05 in the southeast and 1.02 Ga in the northwest.

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1. Introduction

The Irumide belt is a northeast-trending fold and thrust belt (Fig. 1) that stretches from central Zambia, where it is truncated by the Neoproterozoic Zambezi belt, to the

Zambia–Tanzania–Malawi border in the northeast, where it terminates against northwest-trending shear zones (Daly, 1986; Theunissen et al., 1996; Klerkx et al., 1998). The Irumide belt was first described by Ackermann (1936, 1950, 1960), Ackermann and Forster (1960) and Forster (1965) who referred to the granitic basement complex in the Irumide belt as “Die Mkushi Gneisse” and the extensive metasedimentary succession of quartzite and metapelite as “Die Muva”. To the northwest of the Irumide belt, a

* Corresponding author.

E-mail address: info@bdewaele.be (B. De Waele).