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Neoarchaean magmatism and metamorphism of the western granulites in the central domain of the Mozambique belt, Tanzania: U–Pb shrimp geochronology and *PT* estimates

S.P. Johnson[a,*,1], H.N.C. Cutten[a], S. Muhongo[b], B. De Waele[c]

[a] *Tectonics Special Research Centre, Department of Geology and Geophysics, The University of Western Australia, 35 Stirling Highway, Crawley 6009 WA, Australia*
[b] *Department of Geology, University of Dar es Salaam, PO Box 35052, Dar es Salaam, Tanzania*
[c] *Tectonics Special Research Centre, Department of Applied Geology, Curtin University of Technology, GPO Box U1987, Perth 6845 WA, Australia*

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Abstract

U–Pb sensitive high resolution ion microprobe (SHRIMP) dating of zircons from charnockitic and garnet–biotite gneisses from the central portion of the Mozambique belt, central Tanzania indicate that the protolith granitoids were emplaced in a late Archaean, ca. 2.7 Ga, magmatic event. These ages are similar to other U–Pb and Pb–Pb ages obtained for other gneisses in this part of the belt. Zircon xenocrysts dated between 2.8 and 3.0 Ga indicate the presence of an older basement. Major and trace element geochemistry of these high-grade gneisses suggests that the granitoid protoliths may have formed in an active continental margin environment. Metamorphic zircon rims and multifaceted metamorphic zircons are dated at ca. 2.6 Ga indicating that these rocks were metamorphosed some 50–100 my after their emplacement. Pressure and temperature estimates on the charnockitic and garnet–biotite gneisses were obscured by post-peak metamorphic compositional homogenisation; however, these estimates combined with mineral textures suggest that these rocks underwent isobaric cooling to 800–850 °C at 12–14 kbar. It is considered likely that the granulite facies mineral assemblage developed during the ca. 2.6 Ga event, but it must be considered that it might instead represent a pervasive Neoproterozoic, Pan African, granulite facies overprint, similar to the ubiquitous eastern granulites further to the east.

Keywords: Archaean Tanzania craton; East African Orogen; Granulite facies; Mozambique belt; SHRIMP geochronology; Tectonometamorphism

1. Introduction

The Mozambique belt of East Africa (Holmes, 1951), or the East African Orogen (EAO) of Stern (1994), is a composite Proterozoic orogen that stretches from northeastern Africa (i.e. the Arabian-Nubian Shield, ANS) through East Africa and south-

* Corresponding author. Tel.: +81-468-67-9791; fax: +81-468-66-5306.
E-mail address: sjohnson@jasmtec.go.jp (S.P. Johnson).
[1] Present address: Institute For Frontier Research on Earth Evolution, Japan Marine Science and Technology Center, 2-15 Natsushima-cho, Yokosuka, Kanagawa 237-0061, Japan.

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