

New constraints on
Chewings-aged deformation and
metamorphism of ca. ≥ 1750 Ma
crust in the Reynolds Range,
central Australia

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TITLE

New constraints on Chewings-aged deformation and metamorphism of $ca. \geq 1750$ Ma crust in the Reynolds Range, central Australia

RUNNING TITLE

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ABSTRACT

U-Pb monazite and zircon geochronology from Proterozoic high-temperature, low-pressure granulite facies rocks within the Reynolds Range of the Arunta complex in central Australia provide constraints on the timing of magmatism, fabric development and metamorphism. Monazite age data preserves a Meso-Proterozoic age population (c.1570-1550 Ma) while zircon age analyses preserve a Paleo-Proterozoic age population (c.1775-1755 Ma). The varying response of zircon and monazite to differing conditions allows for constraints on magmatism and metamorphism. Long lived Chewings age metamorphism is constrained by monazite grains analysed from the Napperby Gneiss, metapelite and leucosomes of the Woodforde River valley. Zircon analyses defines the ca. 1765 Ma population and is from the same rock types as the monazite samples, zircon morphologies are commonly euhedral and commonly oscillatory zoned with thin to larger dark overgrowths prominent in garnet bearing leucosomes. Overgrowths commonly record younger ages than the cores with a cryptic record of c.1630-1620 Ma evident in rare grains that could support evidence for extensional tectonism in the Aileron province. Two fabrics, S3 and S4, are commonly seen in outcrop in the Napperby gneiss and Reynolds Range group and they define an intersection lineation that plunges gently to moderately to the ESE.

The main penetrative fabric within the Reynolds Range (S3; this study) is dated to be Chewings age, with this age established from monazite in cordierite, sillimanite bearing metapelite. This study shows that zircon and monazite should be used in conjunction with each other in order to establish a solid interpretation of tectonothermal events.

KEYWORDS

Keywords: U-Pb monazite geochronology; U-Pb zircon geochronology; Reynolds Range; Proterozoic Australia;

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