

# Ultrahigh Temperature Metamorphism: testing Models for Collision vs. Extension

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**ULTRAHIGH TEMPERATURE METAMORPHISM: TESTING MODELS FOR  
COLLISION VS. EXTENSION**

**METAMORPHISM: COLLISION VS. EXTENSION**

**ABSTRACT**

The Warumpi Province has been interpreted to be exotic and accreted to the Northern Australian Craton (NAC) during the Liebig Orogeny at c.1640Ma. However, phase equilibria modelling of melt-deficient, Mg-Al rich granulite facies rocks at Hill 830, in the Mount Liebig area show contradictory evidence of a decompressional pressure-temperature path and a high metamorphic gradient of  $90^{\circ}\text{Ckbar}^{-1}$ . This interpretation in conjunction with abundant c. 1780- 1740Ma and c. 1640Ma magmatism in the southern Aileron and Warumpi Provinces, indicate that the tectonic regime at c. 1640Ma may instead be a south-migrating, extensional scenario, compared to the previously accepted collisional regime; speculating that the Warumpi Province is not 'exotic' to the NAC.

**KEYWORDS**

Ultrahigh temperature metamorphism, Warumpi Province, Liebig Orogeny, Grenvillian-aged reworking, Phase forward equilibria modelling, Pseudosection, U-Pb monazite geochronology

## TABLE OF CONTENTS

Ultrahigh temperature metamorphism: testing models for Collision vs. Extension.....	1
Metamorphism: Collision vs. Extension .....	1
Abstract.....	1
Keywords.....	1
List of Figures and Tables .....	3
Introduction .....	4
Geological Setting and background to existing thermobarometry .....	6
Regional Geological Setting.....	6
Documented c. 1640Ma Magmatism in the Arunta Region.....	9
Study Area.....	10
Background to existing thermobarometry .....	11
Methods .....	15
Bulk Rock and Mineral Chemistry.....	15
Geochronology .....	16
Phase forward equilibria modelling .....	17
Results .....	19
Metamorphic Petrology.....	19
Geochronology .....	32
Pressure-temperature conditions .....	35
Discussion.....	42
Age of metamorphism and deformation.....	42
Pressure-temperature conditions and evolution .....	44
Heat source and tectonic implications.....	47
Regional implications.....	49
Conclusions .....	51
Acknowledgments .....	52
References .....	52
Appendix A: Whole-Rock Geochemical Analysis.....	58
Appendix B: La-ICPMS monazite Standard Analysis .....	59
Appendix C: LA-ICPMS monazite Unknown Analysis .....	63
Appendix D: Elemental Microprobe Maps .....	68

## LIST OF FIGURES AND TABLES

**Figure 1:** Simple geological map showing the Warumpi Province.

**Figure 2:** Simple geological map showing sample locations and units of significance.

**Figure 3:** ESRI image of Hill 830.

**Figure 4:** Outcrop Images of Hill 830

**Figure 5:** Thin section images of samples at Hill 830.

**Figure 6:** Outcrop Images of enclosing migmatites.

**Figure 7:** Thin section images of samples that enclose Hill 830.

**Figure 8:** Elemental microprobe map of Sample 830-5G (Map B) .

**Figure 9:** Elemental microprobe map of Sample 830-5G (Map D) .

**Figure 10:** Elemental microprobe map of Sample 830-6E (Map A) .

**Figure 11:** Elemental microprobe map of Sample 830-6E (Map D) .

**Figure 12:** Elemental microprobe map of Sample 830-14 (Map A) .

**Figure 13:** *In situ* LA-ICPMS monazite U-Pb geochronology.

**Figure 14:** Calculated TM(O) and TM(H<sub>2</sub>O) pseudosections for sample 830-6e.

**Figure 15:** Calculated P-T pseudosection for sample 830-6e.

**Figure 16:** Calculated TM(O) and TM(H<sub>2</sub>O) pseudosection for sample 830-14.

**Figure 17:** Calculated P-T pseudosection for sample 830-14.

**Table 1:** Summary of previous studies in the Southern Aileron and Warumpi Provinces.

**Table 2:** Summary of location, lithologies and analyses performed on each sample.

**Table 3:** Chemistry of minerals from electron microprobe analysis.