

THE GEOLOGY OF THE GAWLER RANGE
VOLCANICS IN THE TOONDULYA BLUFF AREA
AND U-PB DATING OF THE YARDEA DACITE
AT LAKE ACRAMAN

by

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ABSTRACT

At Toondulya Bluff a sequence of "older" Gawler Range Volcanics dip in an easterly direction beneath the overlying Yardea Dacite, and are intruded by the comagmatic Hiltaba Granite. The volcanics occur as a series of tuffs and lava flows.

Geochemical evidence suggests these volcanics are related to each other by fractional crystallisation, with plagioclase, clinopyroxene, k-feldspar and titanomagnetite, and accessory zircon and apatite controlling differentiation trends. The Si-rich Hiltaba Granite and Yardea Dacite formed from the final, highly fractionated melts.

Geothermometry suggests the volcanics and granite crystallised at temperatures within the range of 680^o - 850^o C.

The initial magma from which the lithologies were derived, was formed by partial melting of a lower crustal source probably of granulitic composition.

Lake Acraman is believed to have been a site of meteoritic impact in the late Proterozoic (~600 Ma ago). Fragments of dacitic ejecta have been identified within the Bunyeroo Formation, Flinders Ranges and dating of these fragments gives an age of c.1575 Ma using single zircon ion probe dating techniques (Gostin et al in prep).

U/Pb dating of the Yardea Dacite at Lake Acraman reveals it to be of comparable age to these fragments (1603-1631 Ma).

The lower intercept of the discordia line reveals there has been no resetting of the U/Pb system in response to the postulated meteoritic impact.

(3)

CONTENTS

	Page No.
Abstract	1
Outline of the thesis	1
PART 1 - GEOLOGY OF THE GAWLER RANGE VOLCANICS IN THE TOONDULYA BLUFF AREA.	
CHAPTER 1 : INTRODUCTION	
1.1 Location of study area	2
1.2 Previous investigations	2
1.3 Methods of study	3
CHAPTER 2 : FIELD RELATIONSHIPS	
2.1 Regional geology	4
2.2 Lithological descriptions	5
2.2.1 Sparsely porphyritic dacite	5
2.2.2 Porphyritic rhyodacite	7
2.2.3 Rhyolite	7
2.2.4 Yardea Dacite	8
2.2.5 Hiltaba Granite	9
2.3 Structural investigations	10
CHAPTER 3 : PETROGRAPHY	
3.1 Introduction	11
3.2 Sparsely porphyritic dacite	11
3.2.1 Brown sparsely porphyritic dacite	11
3.2.2 Black sparsely porphyritic dacite	12
3.2.3 Red sparsely porphyritic dacite	12
3.3 Porphyritic rhyodacite	14
3.4 Rhyolite	14
3.5 Yardea Dacite	15
3.6 Hiltaba Granite	17
CHAPTER 4 : GEOCHEMISTRY	
4.1 Major and trace element variation	18
4.1.1 Major element variation	18
4.1.2 Trace element geochemistry	19
4.2 Comparative geochemistry	20
4.3 Geothermometry	22
4.3.1 Alkali feldspar geothermometry	22
4.3.2 Ilmenite-magnetite geothermometry	23
4.4 Petrogenesis	23
CHAPTER 5 : DISCUSSION AND SUMMARY	27

PART 2 - U/Pb DATING OF THE YARDEA DACITE
AT LAKE ACRAMAN.

CHAPTER 6	:	GEOCHRONOLOGY	
6.1		Introduction	29
6.2		Reasons for dating	30
6.3		Sampling and analytical procedures	31
6.4		Results	32
6.5		Interpretation of results	33

ACKNOWLEDGEMENTS

REFERENCES

APPENDICIES

- Appendix 1 Sample locality map and thin section descriptions.
- Appendix 2 Geochemical procedures, whole rock and trace element analyses and CIPW norms.
- Appendix 3 Comparative geochemistry
- Appendix 4 Mathematical modelling of major elements.
- Appendix 5 Geochronological procedures.

LIST OF TABLES, FIGURES AND PLATES IN THE TEXT

Tables

- 1 U-Pb Isotopic measurements for the Yardea Dacite

Figures

- 1 Geological map of the study area (enclosed at back of thesis)
- 2 Contoured stereoplot and rose diagram of joint patterns
- 3 Proposed eruptive sequence for the sparsely porphyritic dacites
- 4 Harker plots for major elements
- 5 Harker plots for trace elements
- 6 Selected major and trace element plots
- 7 Coryell variation diagram
- 8 Streckeisen classification
- 9 An-Ab-Or granitoid classification
- 10 Qtz-Ab-Or diagram
- 11 Ba-Rb-Sr diagram
- 12 Ga vs Al₂O₃ diagram
- 13 Coryell diagram for E and N-type MORB
- 14 Mantle growth curve (⁸⁷/⁸⁶Sr vs time)
- 15 NaAlSi₃O₈-KAlSi₃O₈ binary diagram
- 16 Ilmenite-magnetite geothermometry
- 17 Schematic model for evolution of Proterozoic post-orogenic igneous provinces
- 18 Geochronology sample locality map
- 19 Concordia diagrams for Yardea Dacite

6

Plates

- 1 Rectangular joint pattern
- 2 Vertical flow folding at base of black spd
- 3 Lenticular pyroclastic unit in red spd
- 4 Brown spd xenolith
- 5 Contact between brown and black spd's
- 6 Flow banding within rhyodacite
- 7 Flow brecciation within rhyodacite
- 8 Chlorite rich shards
- 9 Interstitial amygdules
- 10 Sphene and leucoxene with accessories
- 11 Corroded and sericitised plagioclase
- 12 Saussaritised plagioclase
- 13 Opaques haloed with actinolite
- 14 Two stage alteration of cpx
- 15 Fractured phenocrysts
- 16 Mafic plagioclase-rich xenoliths
- 17 Granophyric texture
- 18 Clear, euhedral zircon population
- 19 Opaque, metamict zircon population