

METAMORPHIC AND GEOCHRONOLOGICAL CONSTRAINTS ON THE KIMBAN OROGENY, SOUTHERN EYRE PENINSULA.

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TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

KEY TO ABBREVIATIONS USED IN TEXT

ABSTRACT

	Page
1. INTRODUCTION	1
2. GEOLOGICAL BACKGROUND	3
2.1 The Kimban Orogen	3
2.2 The Lincoln Complex and Tournefort Dyke Swarm	3
2.3 Field setting of the Tournefort Dyke Swarm	4
2.4 Interpretations of structural evolution of the Kimban Orogen	5
3. METAMORPHIC GEOLOGY OF THE LINCOLN COMPLEX	8
3.1 Introduction	8
3.2 Petrography	8
3.2.1 Igneous textured dykes	8
3.2.2 Recrystallised mafic dykes.	9
3.2 Mineral chemistry	10
3.3 P-T estimates	11
3.4.1 Thermocalc	11
3.4.2 Methodology	11
3.4 Metamorphism in the Hutchison Group	14
3.5 Synthesis	14
4. ISOTOPE GEOCHRONOLOGY	16
4.1 Sm-Nd in metamorphic mineral systems	16
4.2 Eyre Peninsula data and interpretation	17
4.3 Synthesis	19
5. DISCUSSION AND CONCLUSIONS	20
5.1 Overview of main findings	20
5.2 Implications for evolution of the Kimban Orogen	21
5.3 Modern analogues of the Kimban Orogeny	22
5.4 Conclusions and recommendations	23

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REFERENCES

APPENDIX A

Sample location map and list of samples

APPENDIX B

Analyses of whole rock geochemistry

APPENDIX C

Mineral chemistry, geothermometry data, and an example of THERMOCALC P-T estimates

APPENDIX D

Summary of isotopic data

APPENDIX E

Geological Maps

LIST OF TABLES AND FIGURES

Figure:	Preceding page
1. Locality Map of the Gawler Craton.	2
2. Locality Map and generalised geology of south eastern Eyre Peninsula.	2
3. Geological Map of Lookout	Appendix E
4. Geological Map of Lookout	Appendix E
5. Formation of late stage strike-slip faulting during convergent orogenesis, resulting from the creation of topography.	6
6. Distribution of lineations in the Cleve subdomain.	6
7. A baric section across the Kimban Orogen	13
8. Sample A1028-99 whole rock - garnet - hornblende isochron	17
9. Sample A1028-110 whole rock - garnet - hornblende isochron	17
10. Sample A1028-110 whole rock - garnet isochron	18
11. Sample A1028-110 whole rock - hornblende isochron	18
12. Schematic representation of the partitioning of strike-slip and strike-normal movement in an obliquely convergent viscous wedge (modified after Platt, 1993)	22

Tables:

1. Summary of Lincoln Complex lithologies (modified after Parker, 1993)	3
2. Synopsis of P-T estimates for selected samples, constituting a transect across the Kimban Orogeny.	14

ABSTRACT

The Palaeoproterozoic Kimban Orogeny is responsible for widespread deformation throughout the Gawler Craton, but is best recorded in Hutchison Group metasediments and Lincoln Complex granitoids located near the east coast of southern Eyre Peninsula. Garnet-bearing granulite facies metabasic dykes of the Tournefort Dyke Swarm, emplaced during or prior to orogenesis, have been used to constrain the timing of peak metamorphism attributed to the Kimban Orogeny, via Sm-Nd mineral isochrons, at 1716 ± 14 Ma, approximately 100 Ma younger than previously believed. Estimates of P-T conditions recorded by the rocks were also calculated, in order to reconstruct a baric section across the Kimban Orogen. The dykes generally consist of the assemblages garnet-hornblende-plagioclase-ilmenite and garnet-hornblende-plagioclase-clinopyroxene-ilmenite. Peak assemblages involve garnet-orthopyroxene-clinopyroxene-plagioclase-hornblende-ilmenite. P-T estimates suggest a baric section across the Kimban Orogen is asymmetrical, and centred on the Kalinjala Mylonite Zone with metamorphic conditions of $840 \pm 95^\circ\text{C}$ and 10.1 ± 1.2 kbar adjacent to and within the Kalinjala Mylonite Zone, declining shallowly to the east to about 600°C and 5.4 ± 1.7 kbar about 24 kms across strike. This data in concert with structural evidence, suggests that the Kimban Orogen may have developed in an environment of oblique convergence, with associated strains partitioned between strike-slip movement along the Kalinjala Mylonite Zone, and a strike-normal component away from the zone, leading to the differential exhumation of granulite facies Lincoln Complex rocks east of the KMZ, and their juxtaposition against amphibolite-greenschist facies Hutchison Group rocks to the west.