

" A 3-D GRAVITY AND AEROMAGNETIC INTERPRETATION
OF THE BLACK HILL-CAMBRAI REGION "

by

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CONTENTS

LIST OF FIGURES

ABSTRACT

ACKNOWLEDGEMENTS

INTRODUCTION

1. REGIONAL GEOLOGY
2. PREVIOUS GEOPHYSICAL INVESTIGATIONS
 - a. PREVIOUS REPORTS
 - b. AEROMAGNETICS
 - c. GROUND MAGNETICS
 - d. GRAVITY
3. DATA COLLECTION AND REDUCTION
4. REGIONAL GRAVITY AND AEROMAGNETIC INTERPRETATION
5. REGIONAL REMOVAL
6. ANALYSIS OF DETAILED GRAVITY
7. CONCLUSIONS AND RECOMMENDATIONS
8. REFERENCES

APPENDICES

- A. 3-DIMENSIONAL MODELLING THEORY
- B. COMPUTER PROGRAMS
- C. DATA
 - C1. Gravity
 - C2. Density
 - C3. Base Stations

LIST OF FIGURES

-
1. LOCATION MAP (AREA OF STUDY)
 2. REGIONAL GEOLOGY
 3. 1957 AEROMAGNETICS 1;1,000,000
 4. 1970 AEROMAGNETICS 1;150,000
 5. 1978 AEROMAGNETICS 1;250,000
 6. GRAVITY STATION LOCATIONS OF PREVIOUS SURVEYS
 7. 1957 AEROMAGNETIC OVERLAY
 8. REGIONAL BOUGER GRAVITY
 9. STACKED GRAVITY PROFILE
 10. 2-D REGIONAL MODELLING AND DENSITY HISTOGRAM
 11. AEROMAGNETIC INTERPRETIVE OVERLAY
 12. 1978 AEROMAGNETICS CONTOURED
 13. DRILLHOLE LOCATION OVERLAY
 14. BOUGER GRAVITY OVERLAY
 15. 1978 AEROMAGNETICS GREYSCALE IMAGE
 16. REGIONAL AND RESIDUAL OF CAMBRAI INTRUSION
 17. CAMBRAI MODELLING
 18. BLACK HILL MODELLING

ABSTRACT

The western edge of the Murray Basin overlies Kanmantoo sediments and contains anomalously high and low Bouger Gravity values. From available geological information, the anomalies are due to acidic intrusions, basic intrusions, and thickening of tertiary sediments. A steeply flanked regional anomaly exists within the area. The anomaly is positive, 50 kilometres wide and has an amplitude of 25 mgals. This feature was modelled as a lopolith 5 kilometres thick with a feeder system extending to 30 km.

Previous work in the Black Hill-Cambrai area had been mainly qualitative in nature. Considerable time was needed in order to tie three previous surveys together and form a reliable database. This database was incorporated in the thesis, and further work was done to increase the coverage of the anomaly.

Gravity and magnetics results reveal the possibility of three basic intrusions that may be related at depth by a system of dykes. Two of the bodies, which are known as Cambrai and Black Hill, were studied in close detail. The regional gravity gradient needed to be removed and has been done so through the application of polynomial fitting with geological constraints.

Attempts were made to define the shape and depth extent of the structures by means of 3-D modelling. It was revealed that the anomalies were possibly due to plumes of basic material with inward dipping walls and also a circular feeder system. Dykes occur around the basic bodies, possibly associated with the feeder system, indicating an extensional regime existed at the time of the intrusions.

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