

Deliniating the deep crustal fluid link between the
Paralana Enhanced Geothermal System and the
Beverley Uranium Mine using Magnetotellurics

Thesis submitted in accordance with the requirements of the University of Adelaide for
an Honours Degree in Geophysics.

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November 29, 2012



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ABSTRACT

The global demand for clean energy alternatives is constantly increasing, creating significant interest for more sustainable energy resources such as uranium and geothermal. Australia is host to over 25% of the world's known uranium resources as well as having significant geothermal potential.

The Mount Painter Domain, in the Northern Flinders Ranges in South Australia, is in a region of anomalously high heat flow generated by radiogenic decay of uranium and thorium rich granites. Two distinct uranium deposits have formed from dissolved uranium carried from the ranges by fluids, being deposited where reduction in sediment pH precipitates uranium.

In May 2012 a magnetotelluric profile was collected, extending from the Northern Flinders Ranges to the Lake Frome embayment to help constrain existing resistivity models. Precipitation of uranium at the Beverley Mine site is anomalous as no surface water flow is present, suggesting the presence of subsurface processes. This pathway is linked to a 50 Ω m conductive body at the brittle-ductile boundary of the mid-crust, directly under the Paralana geothermal prospect. 3D modelling of the Paralana geothermal prospect suggest deep conductive features connecting with features at the surface.

KEYWORDS

magnetotellurics, uranium exploration, fluids, three-dimensional inversion, geothermal, electromagnetic induction, graphite

Table of Contents

| | |
|--|-----------|
| Introduction | 6 |
| Background | 8 |
| Magnetotelluric Theory | 12 |
| Magnetotelluric Data | 13 |
| Methodology | 13 |
| Induction Arrows | 16 |
| Phase Tensors | 18 |
| Data Quality | 22 |
| Initial Processing | 22 |
| Modelling | 26 |
| 2D MT Inversion | 26 |
| 3D MT Inversion | 29 |
| Discussion | 32 |
| 2D MT Inversion | 32 |
| 3D MT Inversion | 34 |
| Comparison with TMI and Gravity | 35 |
| Conclusions | 38 |
| Acknowledgments | 38 |
| References | 38 |
| Appendix A: additional information – part I | 42 |

List of Figures

| | | |
|----|---|----|
| 1 | Topographic map of Paralana and surrounds | 9 |
| 2 | Stratigraphy of Paralana | 10 |
| 3 | Close up of station locations and model boundaries | 14 |
| 4 | Coherence plot of station PL04 | 15 |
| 5 | Induction arrows | 17 |
| 6 | Phase tensor ellipse | 19 |
| 7 | Phase tensors on a TMI image | 20 |
| 8 | Phase tensor pseudo section | 21 |
| 9 | Apparent resistivity and phase plots | 23 |
| 10 | Skew and ellipticity plots | 25 |
| 11 | A comparison between 2D models of the northern and southern lines | 28 |
| 12 | 3D models of Paralana | 31 |
| 13 | Gravity map of Paralana | 37 |