A GEOPHYSICAL INVESTIGATION OF THE LAKE HARRIS KOMATIITE, SOUTH AUSTRALIA.

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Australian National Grid Reference
Gairdner Sheet (SH53-15) 1: 250 000
Kingoonya Sheet (SH53-11) 1: 250 000
Childara Sheet (SH53-14) 1: 250 000
Tarcoola Sheet (SH53-10) 1: 250 000
Abstract

The Archaean and Proterozoic basement of the Gawler Craton is poorly understood, due mainly to the sparse outcrop. A high resolution aeromagnetic survey has been carried out to help increase the knowledge of this area and encourage exploration. The Lake Harris Komatiite, approximately 500 km northwest of Adelaide forms a prominent linear magnetic anomaly which was drilled on the basis of this survey.

Petrographic studies reveal that the komatiite is serpentinised. This low-temperature hydrothermal metamorphic process is important in understanding the magnetic properties of the komatiite as the degree of serpentinisation is proportional to the magnetic susceptibility. Magnetite is formed during this process as a by product of the breakdown of olivine into serpentine and chlorite. Various nickel sulphides were also formed during this process. Shear zones in the komatiite have been subsequently altered by hydrothermal fluids which have deposited native copper.

A series of linear magnetic features are visible on the aeromagnetic map of the komatiite. The vertical gradient was used to model these features, interpreted to be komatiite flows. The vertical gradient enhances near surface anomalies and improves the resolution of such bodies. Modelling reveals that the komatiite has been folded twice, the first tightly on an east west fold axis; the second is a gentle north trending fold caused by doming when the Glenloth Granite intruded the komatiite. These folds are offset by a series of dip slip and strike slip north west trending faults.

The results of this study indicate that the best exploration targets in this area would be komatiite hosted Ni - Au deposits or hydrothermal Au -Cu deposits.
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Gridding and contouring algorithms: John Paine
Transformations of the magnetic data: Zhiqun Shi
Image processing and regional - residual separation: Shanti Rajagopalan
Interactive modelling program GAMMA: John Paine
Interactive modelling program POTENT: Richard Almond