

Insights into the formation of the Stuart Shelf iron-oxide-copper-gold (uranium) system from magnetotellurics.

The University of Adelaide, 2010

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Abstract

The Gawler Craton, South Australia, is host to many economic ore resources. Of which, iron oxide copper-gold deposits, such as Olympic Dam, Carrapateena and Wirrda Well, stand out due to the quality and abundance of their ore resources. Understanding the mechanisms of their formation is vital for defining exploration models for future development. 166 stations of magnetotelluric data at periods between 10^1 - 10^4 seconds have been used to produce three, 2D models that provide insight into the electrical conductivity of the sub-surface beneath the Stuart Shelf. Links between corresponding regions of conductivity across profiles are shown by faults. It is suggested here that the faults are the fluid flow pathways for the mineralizing hydrothermal fluids. These fluids have been derived from the mantle and the surface in two phases of fluid flow causing both deposition and destruction of graphite respectively.