

# Crustal geoelectrical distribution of Kalgoorlie gold camp mineral system (Western Australia)

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## SUMMARY

The East Yilgarn craton (Western Australia) is a highly mineralized area that contains several large gold deposits, including the giant Kalgoorlie gold camp. Structural controls on gold deposition have resulted in the general acceptance in the Yilgarn craton covered by the concept of the “Mineral Systems”, according to which major faults between the fundamental crustal blocks are expected to control the movement of metal-bearing fluids within the system. For mapping such deep structures under cover, deep penetrating geophysical methods are required. Here we present the preliminary results of the broadband magnetotelluric experiment performed across the world class Kalgoorlie gold camp. The survey, with more than 100 MT sites with 5 km spacing, encompasses important orogenic gold deposits including the Golden Mile/Mt Charlotte, Kanowna Belle and Paddington. Data analysis shows a complicated 3D geoelectrical structure and therefore, impedance and tipper data were inverted accordingly using the modEM code. The resulting crustal conductivity distribution shows a series of conductive zones associated with known orogenic gold deposits. These zones appear to merge at depth and link to the conductive zone in the lower crust that trends oblique to the surface geology. The data suggest that orogenic gold mineral systems can be mapped into the deep crust using MT methods; and such surveys represent a valuable tool for exploring at the district scale for such deposits.

**Keywords:** 3D Magnetotelluric, Mineral system, Mineral exploration, Western Australia

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