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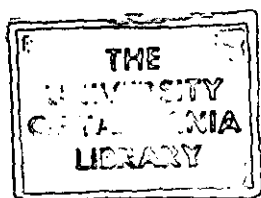
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A STRUCTURAL, GEOPHYSICAL, ISOTOPIC AND
GEOCHEMICAL APPRAISAL OF THE CSA DEPOSIT, COBAR,
AUSTRALIA: IMPLICATIONS FOR THE DEFORMATION OF THE
COBAR BASIN AND MINERAL POTENTIAL.

STUART JEFFREY



Thesis
JEFFREY
M. Ec. Geol
Geol
1994

DEDICATED TO MARGOT.
YOUR ASSISTANCE WAS INSPIRATIONAL.
YOUR TOLERANCE REMARKABLE.
THANK YOU.

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ABSTRACT

Since the discovery of base and precious metals in Cobar during the latter part of last century much time and effort has been spent researching the geological origins of and factors influencing the Cobar style of deposit. Models have taken three forms, epigenetic, syngenetic, and structural. Problems faced by those working in the Cobar District include

- 1) relating structures to mineralisation and mineralising events,
- 2) understanding the source of sulfides and quartz veining, and the relationship between the two, and
- 3) using geophysics to enhance the knowledge of the basin.

The first of these problems has been clarified by the author conducting detailed surface and underground mapping of the CSA deposit and comparing the results with those of previous workers. The structural mapping showed a pattern consistent with other Cobar deposits and identified structural elements not previously recorded. As a result the timing relationships of these structures was redefined such that three deformation events were identified, D1 being basin closure, D2 being sulfide injection into pipe like fracture zones formed by sinistral deformation, and D3 being simultaneous strike slip west block up movement and quartz injection.

The problem of the significance of quartz veining has been resolved by review of a range of isotopic and geochemical data. Isotopic and geochemical data confirmed sulfide remobilisation by

D3, a metamorphic origin for the quartz, but either a sedimentary or igneous origin for the sulfides. Previous work had suggested the sulfides to be of metamorphic origin based on their being hosted by quartz filled structures. However the structural reinterpretation clearly demonstrates that the quartz occupies structures that displace and hence post date mineralisation.

Regional and local gravity models presented are based on the recovery of an old gravity survey not previously compiled and systematically interpreted. It is shown through the models that it is possible for the mineralised systems to have a relief of more than 2km given certain geological parameters, some of which are based on assumption. Consequently, there is still a need to review and refine the models and assumptions used as there is likely to be more than one valid geological solution to the Cobar Basin geometry. Future use of this data, coupled with some increase in coverage may well change existing regional assumptions about the Cobar Basin.