

**ARE INTRUSION-RELATED GOLD
DEPOSITS OF PHANEROZOIC STYLE
LIKELY IN ARCHAEOAN
GREENSTONE BELTS?**

**LIKELIHOOD ASSESSED IN TERMS
OF CRITICAL PARAMETERS IN
NORSEMAN-WILUNA AND ABITIBI
BELT**

LIKLIHOOD OF IRGDS: ASSESSMENT 1

- Is there old thick metasomatised lithosphere below the greenstone belts at the time of gold mineralisation?
- Are there far back-arc environments with shelf sedimentary sequences adjacent to volcanic rocks?
- Are there felsic and mafic intrusions with mixed mantle and crustal signatures in the belts?
- Are these clearly synchronous?

NO

NO

POSSIBLY

NO

LIKELIHOOD OF IRGD'S: ASSESSMENT 2

- Are there Sn-W deposits in the belt associated with S-type granites?
- Are the gold deposits synchronous with any specific type of intrusion?
- Are any parts of the gold system at higher temperature than ambient (metamorphic) temperature of host rocks?
- Are there any significant base-metals associated with any parts of the gold system?

NO

NO

NO

NO

LIKELIHOOD OF IRGD'S: ASSESSMENT 3

- Do the deposits show clear evidence of marked lateral or vertical zoning in terms of Au: Ag and Au: base-metal ratios?
- Do the deposits comprise vertical extension veins implicating post-compressional relaxation?
- Do the deposits normally comprise subhorizontal extension veins and or conjugate sets implicating sub-horizontal compression?

NO

RARELY

YES

CONCLUSION

- It is very unlikely that any large Archaean gold deposits are IRGDs
- Relationships to granites are mainly indirect and structural not direct and genetic
- Most evidence is indirect from interpretations of stable isotopes or mineral compositions (e.g. white micas)
- Evidence for mixing is generally corrupted by lack of dating of proposed synchronous oxidised and reduced mineral assemblages: where dated (e.g. Wallaby, Kalgoorlie) these are of different ages