

LODE-GOLD DEPOSITS IN ARCHAEOAN AMPHIBOLITE-FACIES SETTINGS: HYPOZONAL OROGENIC DEPOSITS OR SKARN DEPOSITS?

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Although most lode-gold deposits in Archaean granitoid-greenstone terranes are sited in greenschist-facies host rocks, an increasing number have been discovered in amphibolite-facies terranes. These deposits have spatially associated wallrock alteration zones which are typified by relatively high-T amphibole and/or diopside - biotite (or phlogopite) assemblages, in places with plagioclase and/or garnet and/or cordierite, rather than the low-T sericite-carbonate-albite - (ñ chlorite) assemblages that typify lode-gold deposits in the greenschist-facies terranes and have been termed orogenic gold deposits.

There are a number of interlinked controversial aspects to these amphibolite-hosted deposits, namely: i) whether they are metamorphosed, originally lower-T deposits or essentially syn-metamorphic and/or syn-magmatic deposits, ii) whether all the calc-silicate alteration is directly related to gold deposition or whether some represents an earlier generation of alteration, and iii) if they are syn-metamorphic and/or syn-magmatic deposits, whether they should be classified as gold skarns, with an implication of a direct magmatic fluid contribution, or the high-T equivalents of the more-typical orogenic lode-gold deposits sited in greenschist-facies host rocks, as suggested in the crustal continuum model.

Most field, textural and thermobarometric data favour a syn- to late-metamorphic timing for deposition of the majority of the amphibolite-hosted deposits and their associated alteration zones. Within this context, the controversy concerning whether the deposits are skarns or hypozonal orogenic gold deposits is discussed in terms of both analogies to Phanerozoic gold skarns (e.g. host rocks, structural controls, depth of ore deposition, thermal state of wallrocks with respect to skarns, alteration extent and zonation, grain size variation and strain-state of alternation minerals, and metal associations) and to the fluids which deposited the gold ores, as deduced from fluid inclusion and thermodynamic studies. The interpretations have implications for exploration criteria in Archaean greenstone belts and elsewhere.