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Tectonic Control of Archean Epigenetic Gold Mineralization in Kalgoorlie-
Menzies-Leonora Gold Corridor North of Kalgoorlie, Western Australia

Major gold deposits in the Kalgoorlie-Menzies-Leonora "gold corridor" lie within or marginal to an early rift that forms part of a complex, linear zone of crustal extension separating two volcano-sedimentary basins in the Eastern Goldfields province of the Archean Yilgarn block, Western Australia. Rifting was accompanied by ultramafic, mafic, and felsic igneous activity, and by the deposition of a distinctive suite of sedimentary rocks derived primarily from felsic volcanic source areas flanking the rift. Metamorphosed acid hydrothermal alteration assemblages rich in sulfate are found in ultramafic extrusive rocks at the rift margin near several of the largest mining centers; the alteration is similar to that associated with modern geothermal systems.

The early rift zone is a favored site for epigenetic gold mineralization due to a combination of factors including: the establishment of geothermal systems at rift margins; site preparation during penetrative, ductile deformation and dynamic-style metamorphism; accessibility to metasomatizing fluids during periodic reactivation; and the presence of multiple magma sources during prolonged tectonism.

The recognition of an extensional tectonic setting for gold deposits in the Kalgoorlie-Menzies-Leonora gold corridor, and the documentation of the lithotectonic features that characterize this environment lead to some understanding of the localization of gold from a regional standpoint. This study offers a distinct focus for exploration devoted to the discovery of blind gold deposits in covered areas of the Western Australian shield.