Model 36	Orogenic Lode gold
Alternative Model Name	Slate Belt gold; Greenstone gold; turbidite-hosted gold
Description	Lode gold in massive persistent quartz veins mainly in regionally metamorphosed volcanic rocks, volcanic sediments and BIF.
Commodities	Au (Au/Ag >> 1)
% Global Production	~17,500 t (total from Woodall 1988 and Phillips & Hughes 1998) 16% of current annual world production
% Australian Production	~4000 t 70% of current Australian annual production
World Class Deposit Size	100 - 5000 t The 10th quantile for Archaean (118) deposits = 165 t The 10th quantile for Phanerozoic (334) deposits = 15 t The 10th quantile for top 30 Phanerozoic deposits = 222 t
World Class Deposit Examples	Muruntau (5,460 t); Golden Mile (~1400 t), Hollinger-McIntyre-Moneta (Can, 900 t), Jamestown (USA; 819 t); Bendigo (all small mines grouped together, 697 t); Grass Valley (USA Nevada; 416 t); Ballarat (408 t); Norseman (150 t), Kanowna Belle (133 t), Gympie Goldfield (110 t)
Geological Setting	Archaean greenstone/granite terrain, Cordilleran-style terrane accretion, continental margin mobile belts. Greenstones, metasedimentary turbidite packages, Fe-rich host rocks, S-type granites, I-type granites, dioritic lamprophyres
Age	Archaean - present
Source	Not important
Transport/Pathway	Low-moderate salinity, CO_2-bearing fluids Major regional structures often along terrane or block boundaries as fluid pathways
Trap	Structural: Brittle/ductile faults and shear zones, stockworks or breccias, fold hinges Physicochemical: desulphidation and fluid-rock interaction, phase separation resulting from fault-valve behaviour, fluid mixing?
Critical Elements	• Commonly near major regional faults/shear zones but located in secondary faults and/or near hinge zones of folds (2) • Structurally late, syn- post-peak metamorphic timing (4) • Low-moderate salinity, CO_2±CH_4-bearing fluids (1) • Strong correlation with Fe and/or C in host rocks (3) • Mineralisation may result from fluid-rock interaction, phase-separation, or fluid mixing (1)
Other Comments	• Associated with deformed metamorphic terrains. • Majority of deposits occur in rocks of greenschist grade or lower but can range from prehnite-pumpellyite to granulite facies. • Metamorphic or magmatic origin postulated for hydrothermal fluids. • Deposits typically contain pyrite ± arsenopyrite ± pyrrhotite and associated potassic and carbonate alteration. • Trace elements include Ag, As, B, Bi, Cu, Mo, Pb, Sb, Te, W,

	Zn • Isotopic data indicate a deep crustal source for primary ore fluid.
Key References	Yeats, C.J. & Vanderhor, F., 1998. Archaean lode-gold deposits. AGSO Journal, 17, 253-258. Groves D.I., Goldfarb R.J., Gebre-Mariam M., Hagemann S.G. & Robert, F., 1998. Orogenic gold deposits: A proposed classification in the context of their crustal distribution and relationship to other gold deposits. Ore Geology Reviews, 13: 7-27. Goldfarb R.J., Phillips G.N. & Nokleberg, W.J., 1998. Tectonic setting of synorogenic gold deposits of the Pacific Rim. Ore Geology Reviews, 13: 185-218. Phillips, G.N. & Hughes, M.J., 1998. Victorian gold deposits. AGSO Journal, 17: 213-216.

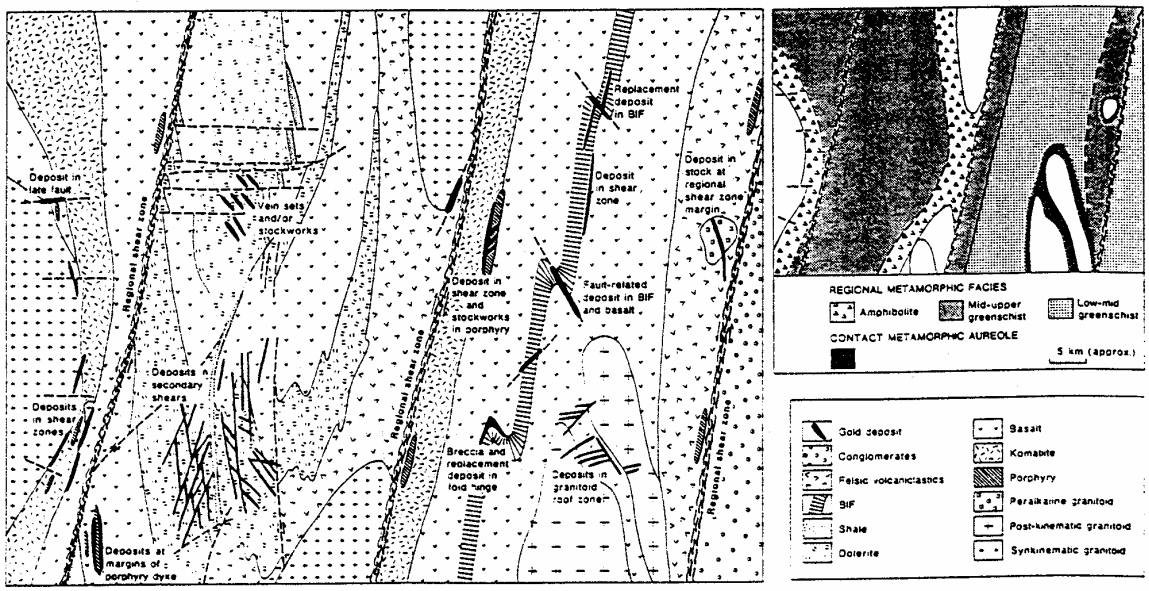

Figure 3. Schematic representation of the nature of Archaean lode-Au mineralisation, illustrating variable structural styles, host rocks and metamorphic settings (from Groves et al. 1990).