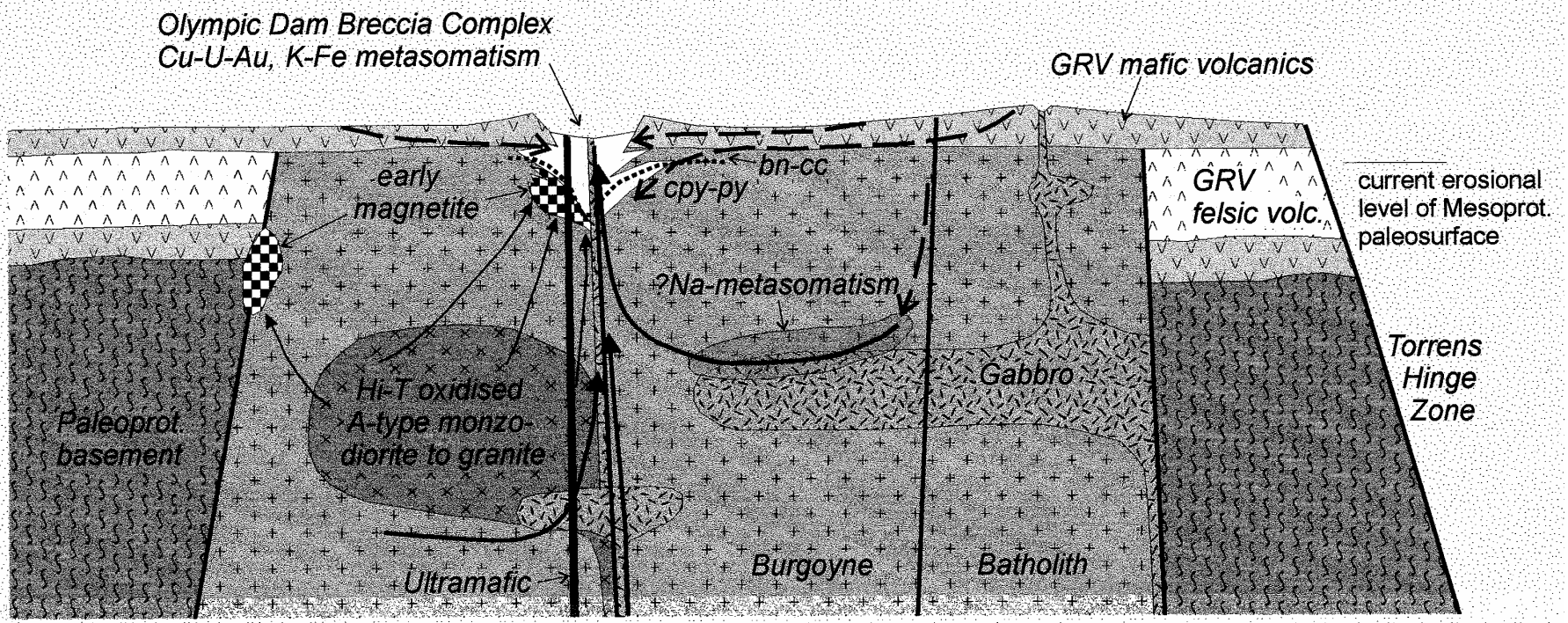
Model 29b	Iron-oxide hosted Cu-Au-U
Alternative Model Name	
Description	Cu±Au±U deposits in iron oxide breccia complex
Commodities	Major: Cu, U, Au; minor: Ag, LREE
% Global Production	Significant fraction of world U production; small for Cu, Au
% Australian Production	Significant fraction of Australian Cu and U production
World Class Deposit Size	2000 Mt @ 1.6 % Cu, 0.6 kg/t U_3O_8, 0.6 g/t Au, 3.5 g/t Ag
World Class Deposit Examples	Olympic Dam
Geological Setting	Intracratonic or continental margin rifts filled with anorogenic mafic and felsic magmatism caused by mafic underplating. For Phanerozoic deposits continental arc and/or back arc extension setting
Age	Most important deposits are Palaeo- and Mesoproterozoic. Possible Phanerozoic analogues include: Bafq-Seghand district in Iran, Avnik district in Turkey, Cortez Mountains and Buena Vista Hills in Nevada, La Serean-Copiapo iron district and El Laco region in Chile.
Components:	
Source	Fluids: saline groundwater and/or playa lake. Magmatic related to anorogenic magmatism or deeply circulating meteoric water. Metals: mafic and felsic volcanic acquifer for ground and lake water. Oxidised I-type granitoids Energy: Anorogenic magmatism and high palaeo-geothermal gradient
Transport/Pathway	Transtensional and extensional faults; diatreme-related vent zones; permeable near-surface aquifers ± saline lake. Zones of regional Na (±K)-Fe metasomatism indicative of fluid flow zones
Trap	Structural: breccia complex, array of brittle faults Chemical: Pre-existing Fe-oxide–rich bodies; redox interface, e.g. between oxidised surficial waters/groundwater reservoirs and high temperature reduced fluids
Other	In the Stuart Shelf area The Olympic Dam style of mineralisation shows regional association with iron-oxide (magnetite) hosted relatively poorer deposits, skarn related deposits (Emmie Bluff)
Critical Elements	• Intracratonic or continental margin extensional and/or transtensional zones (1) • Anorogenic bimodal felsic and mafic volcanism & hypabyssal intrusions (1) • High-temperature, fractionated, I- type oxidised felsic magmas (1) • Diatreme ± maar volcanic environments; playa lakes (2) • Pre-existing or paragenetically early Fe-oxide–rich bodies (2) • Redox interface e.g. surficial waters/groundwater reservoirs (1)
Other Comments	
Key References	Reeve, J.S., Cross, K.C., Smith, R.N. & Oreskes, N., 1990. Olympic Dam

	Copper-Uranium-Gold-Silver Deposit. In: Hughes, F.E. (editor), Geology of Mineral Deposits of Australia and Papua New Guinea, 1009-1035. Hitzman, M. W., Oreskes, N., & Einaudi, M. T., 1992. Geologic characteristics and tectonic setting of Proterozoic iron oxide (Cu-U-Au-REE) deposits. Precambrian Research., 58, 241-287. Johnson, J.P. & McCulloch, M.T., 1995. Sources of mineralising fluids for the Olympic Dam deposit (South Australia). Chemical Geology, 121, 177-199. Haynes, D.W., Cross, K.C., Bills, R.T. & Reed, M.H., 1995. Olympic Dam ore genesis: a fluid-mixing model. Economic Geology, 90, 281-307.

b

OLYMPIC DAM - STYLE CU-AU SYSTEM



Fluids (intermediate redox) sourced mainly from felsic magmas

Fluids (intermediate redox) reacted with mafic/ultramafic rocks/magmas

Meteoric waters (oxidised, cool)

Geology based on Reeve et al. (1990) & Haynes et al. (1995)