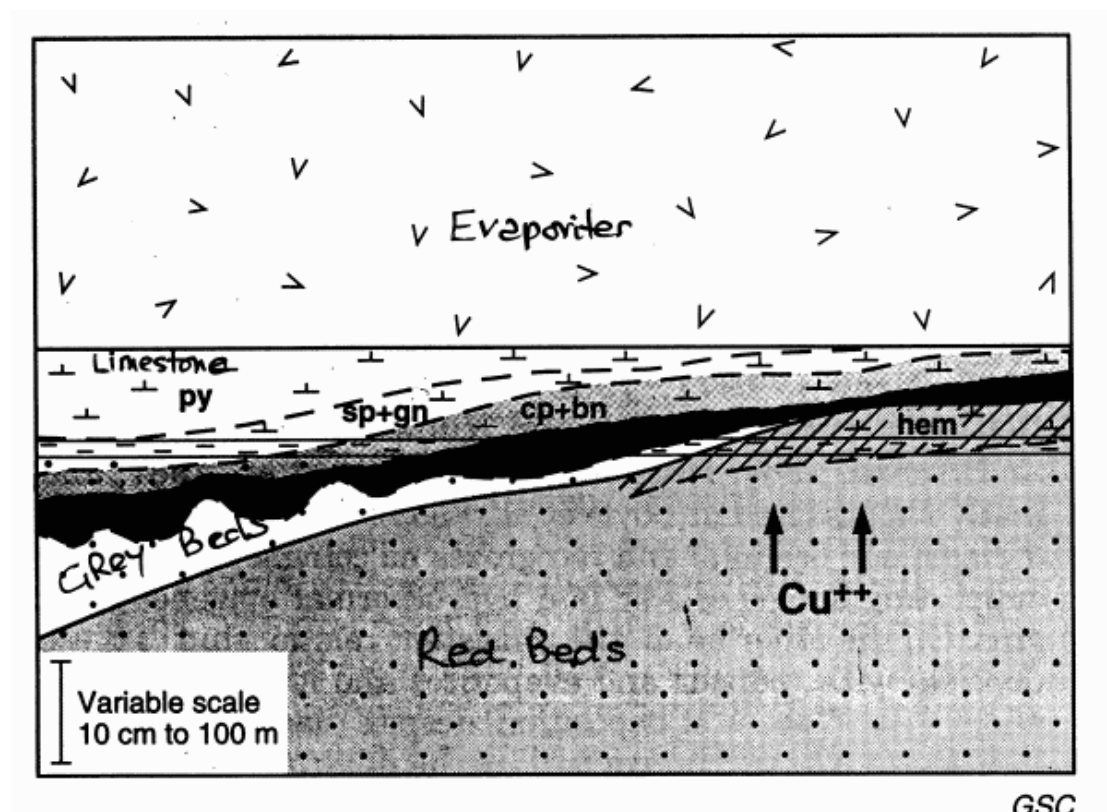
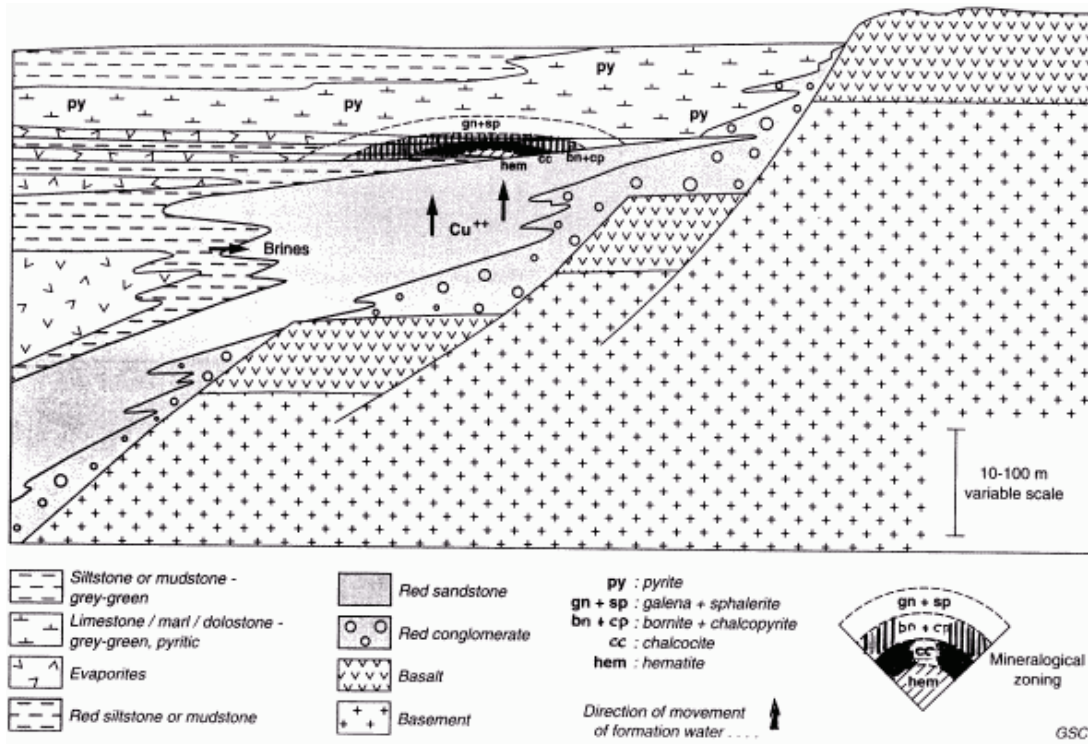


Model 30b Sediment-hosted Cu	
Alternative Model Name	Sediment-hosted copper ('diagenetic sedimentary sediment-hosted Stratiform copper') Subdivided into two sub-types: 1) Kupferschiefer (marine), and 2) Red Bed (none-marine)
Commodities	Cu (Co, Ag)
% Global Production	Kupferschiefer are 2 nd most important Cu deposits in World, average 44 Mt @ 1.8% Cu Redbed – (only Kazak very large, but no details)
% Australian Production	??????
World Class Deposit Size	10 th quartile ~10 Mt Cu
World Class Deposit Examples	Kupferschiefer, Zambian Cu belt, Redstone (Canada) White Pine, Nifty, Mt Gunson
Geological Setting	Intracratonic rift Fault bounded graben/trough, or basin margin or epicontinental shallow-marine basin near palaeo-equator Partly evaporitic on the flanks of basement highs; sabkha terrains. Basal sediments highly permeable Kupferschiefer-type: Anoxic rocks at the base of a marine or large-scale saline lacustrine transgressive cycle overlying or interbedded with continental redbeds Redbed-type: Mixed red and grey fining-upward stream deposits. Post 2.3 Ga
Age	2.3 Ga to Recent
Components:	
<i>Source</i>	1. Redbeds or mafic volcanics in underlying rift successions 2. Deeper in crust if metamorphic fluids are involved
<i>Transport/Pathway</i>	Porosity in clastics, upward & lateral fluid migration, marginal basin faults may be important 1. Cool sulphate rich-brines (according to Aus IMM) 2. May include metamorphic fluids (Simmonds)
<i>Trap</i>	Mostly chemical trap in the form of oxidation-reduction front
<i>Other</i>	Basement highs concentrating fluids? Oszczepalski (1999) - on regional scale high-grade mineralisation cross cuts stratification
Critical Elements	<ul style="list-style-type: none"> • Arid climate near palaeo-equator (probably evaporitic) (2) • Continental rift zones (2) • Long-lived & large scale fluid flow systems for World class deposits (cf MVT) (1) • Reducing carbonaceous shales in contact with red beds (1) • Younger than 2.3 Ga (1) • Configuration of basement (for Kupferschiefer) (3)

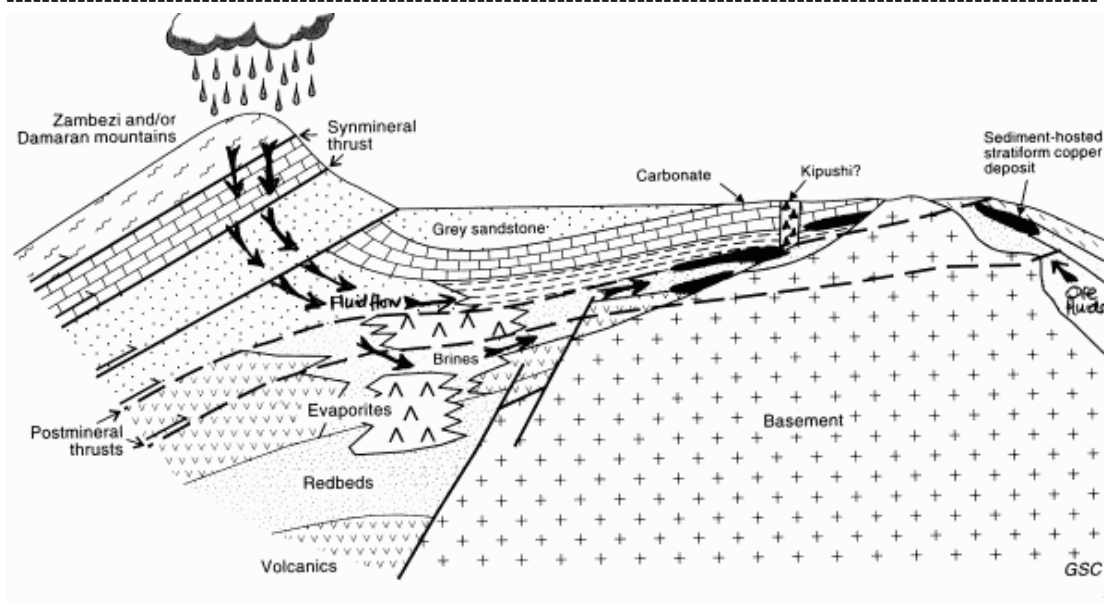
Other Comments	Substantial amount of Australian and world copper continues to come from this type of deposit. Large and significant copper mines at Mount Isa (is this this deposit type?), Gunpowder (Mammoth) in northwest Qld and the deposits in the Mount Gunson area, SA + old mines at Burra & Kapunda in SA
Key References	<p>Eckstrand, O.R., Sinclair, W.D. & Thorpe R.I. 1995. Geology of Canadian Mineral Deposit Types. Geological Survey Canada Geology of Canada, 8, 223-240.</p> <p>Brown, A.C. 1997. World-class sediment hosted stratiform copper deposits: characteristics, genetic concepts and metallogenesis. Australian Journal of Earth Sciences, 44, 317-328.</p> <p>Geology and Metallogeny of Copper Deposits (editors Friedrich et al.) 1986. Special Publication 4, Springer-Verlag.</p> <p>Oszczepalski, S. 1999. Origin of the Kupferschiefer polymetallic mineralisation in Poland. Mineralium Deposita, 34, 599-613.</p>



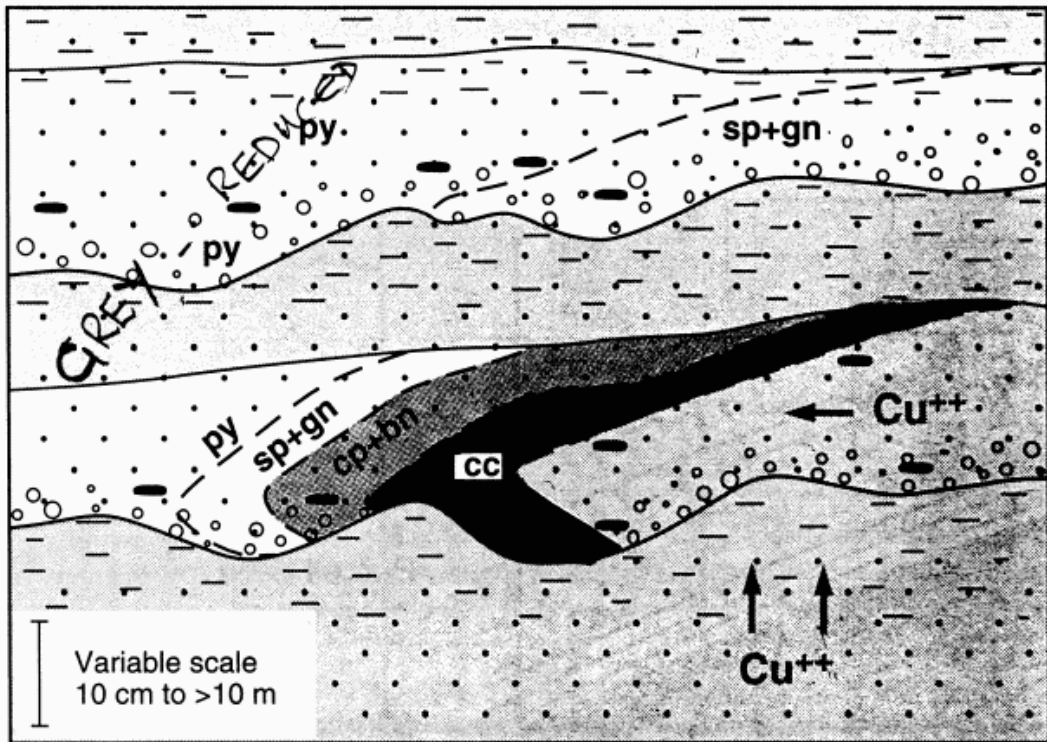
BASIC KUPFER CU MODEL ((from GSC volume P. 228)



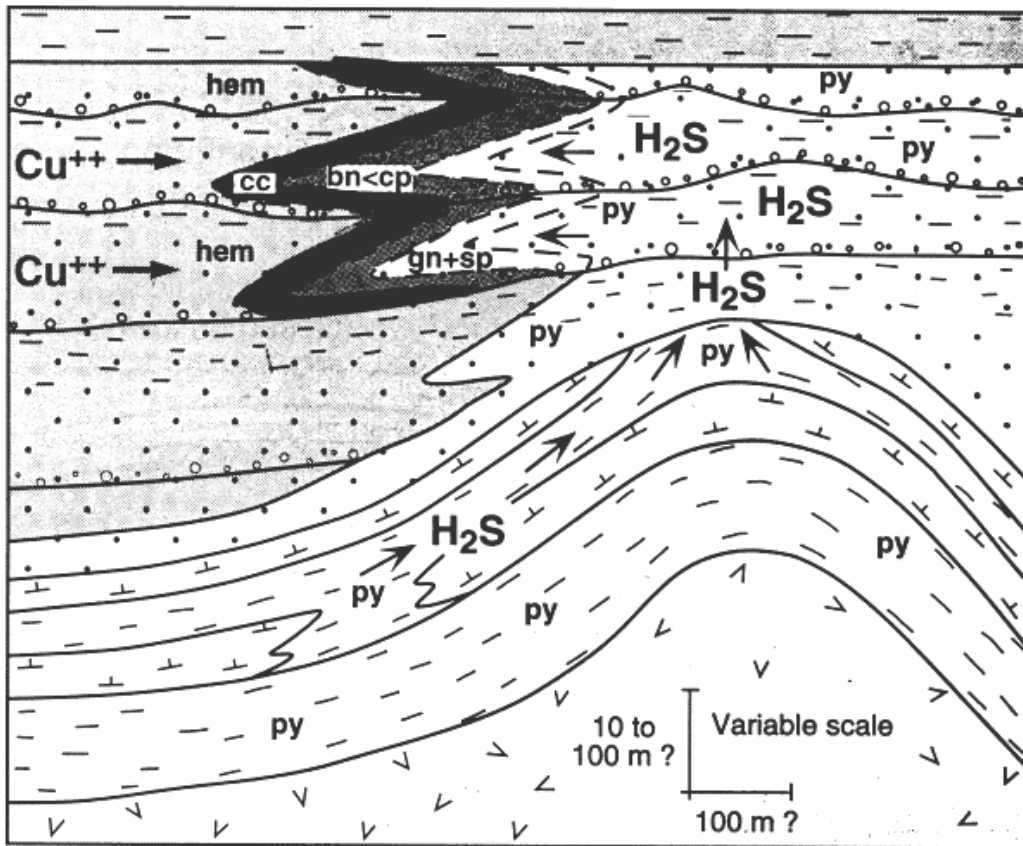
ESSENTIAL FEATURES OF KUPFER, TYPE CU DEPOSIT (from GSC volume p230) – source of fluids from basin



ZAMBIAN STYLE CU DEPOSITS (from GSC volume p230) – gravity driven MVT style



GSC



TWO EXAMPLES OF RED BED TYPE CU (from GSC volume p 237)

upper Metals migrate in porous sst & drop out when hit reductants (OM, pyrite)

lower Kazakhstan model mobile oxalic metal brines and mobile reductants