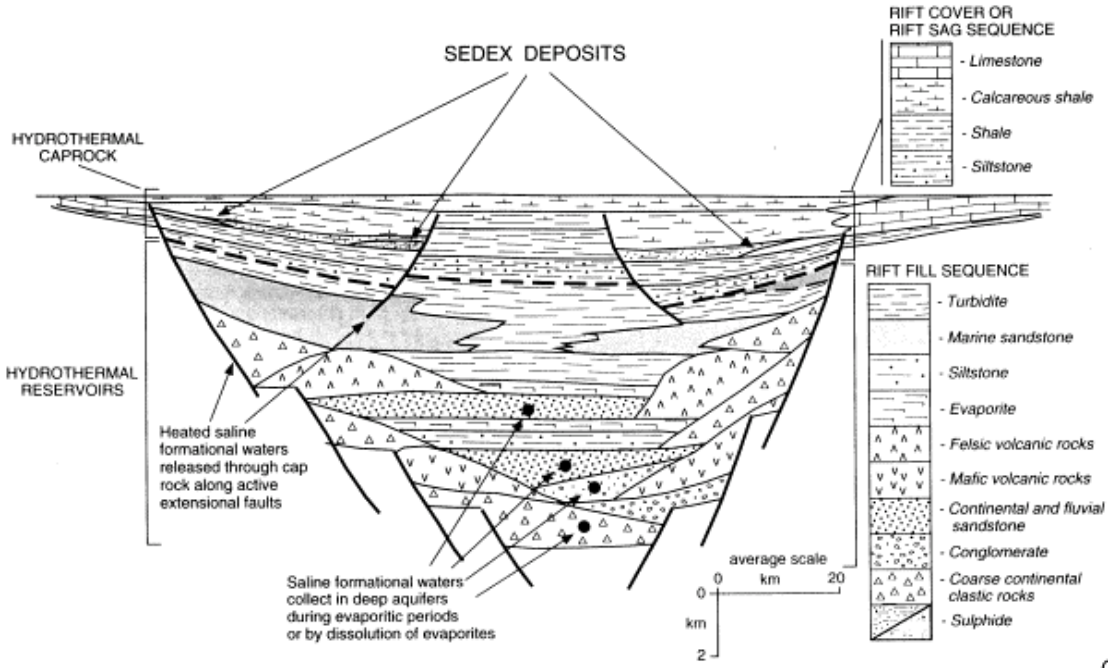
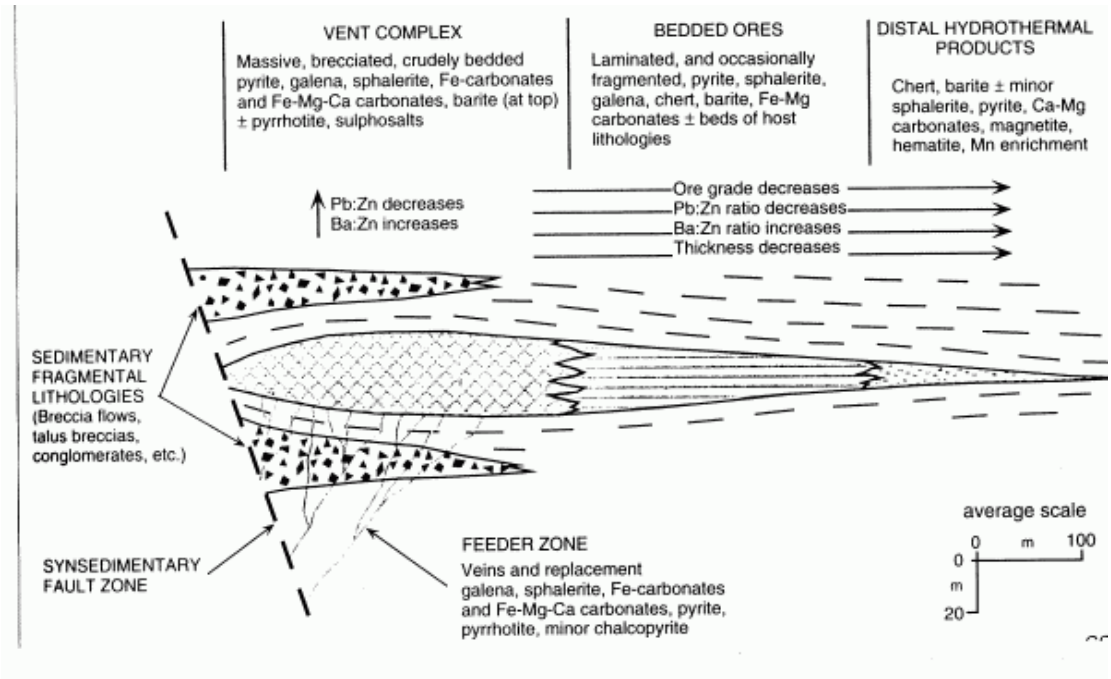
Model 31a	Sediment-hosted stratiform Pb-Zn-Ag
Alternative Model Name	Includes stratiform (Mt Isa and Broken Hill types) and stratabound (Irish) varieties
Commodities	Pb, Zn, Ag
% Global Production	15% (Century will increase this)
% Australian Prod.	
World Class Deposit Size	>14 Mt combined metal (10th quartile all 99) Australian ~100 Mt @ 10% Zn+Pb
World Class Deposit Examples	McArthur River – Mt Isa & related Irish, Sullivan – ?Meggen & Rammelsberg
Geological Setting	Intracratonic Early rift clastics + igneous rocks capped by later sag carbonates & shales (McArthur only) - Fault controlled smaller (3rd-order) basins within 1st and 2nd order basins (10 to 100's km size) (Irish only) - Settings in which magmatic activity contemporaneous with sedimentation, also strong structural control
Age	Australian deposits are Palaeoproterozoic to Neoproterozoic Others range from Palaeoproterozoic - Cambrian - Carboniferous. Mineralisation may be: 1) syn-depositional, or 2) early diagenetic (replacive), or 3) later diagenetic, or 4) epigentic (??) [(1) & 2) for most deposits]
Components:	
Source	Pb – underlying felsic rocks (clastics & igneous) Zn – underlying Carbonates; sulfur not biogenic
Transport/Pathway	Large scale oxidising low temp low pH brines/basinal fluids Seismic pumping along growth faults at deposit Faults & vents (feeders) from below Footwall feeders *not* recognised in Australian examples Irish – fluids tectonically driven (transtensional or compressional)
Trap	Laterally restricted sub-basins Laminated C-rich (dolomitic) shales, interbedded turbidites and breccias Diagenetic replacement along porous beds preferred, but chemical mixing ore fluid/seawater on basin floor (CODES) Irish – some epigenetic in breccias ALL occurred several hundreds metres below sea bed
Other	
Critical Elements	• Basinal brines (1) • Porous black 'shales' (1) • Within few kms of major, long-lived regional (strike-slip?) faults (1) • Underlying evaporite-rich sections (2) • Underlying felsic (oxidising brines) (2) • Syn-mineralisation tectonics (to drive fluids) (1?)

Other Comments	Presence of cherts and/ or sedimentary exhalites. Ore beds in stacked layers for Stratiform deposits Still major controversy between syngenetic, diagenetic, and epigenetic models for individual deposits
Key References	Eckstrand, O.R., Sinclair, W.D. & Thorpe R.I., 1995. Geology of Canadian Mineral Deposit Types. Geological Survey Canada Geology of Canada, 8, 130-152. Eldridge, C.S., Williams, N. & Walshe, J.L., 1993. Sulphur isotope variability in sediment-hosted massive sulphide deposits as determined using the ion microprobe SHRIMP II: a study of the HYC deposit at McArthur River, Northern Territory, Australia. Economic Geology, 88, 1-26. Large, R.R., Bull, S.W., Cooke, D.R. & McGoldrick, P.J., 1998. A genetic model for the HYC deposit, Australia: based on regional sedimentology, geochemistry, and sulfide-sediment relationships. Economic Geology, 93, 1345-1368. Gustafson, L.B. & Williams, N., 1981. Sediment-hosted stratiform deposits of copper, lead, and zinc. Seventy-Fifth Anniversary Volume, Economic Geology, 139-178. Several papers in 1998 Economic Geology, 93/8 (Special issue on the McArthur River-Mt Isa-Cloncurry Mineral Province).



SIMPLIFIED REGIONAL SETTING (from GSC Geology of Canadian Mineral Dep.Types)



SIMPLIFIED MAIN FEATURES OF DEPOSIT (from GSC Geology of Can. Mineral Dep.Types)