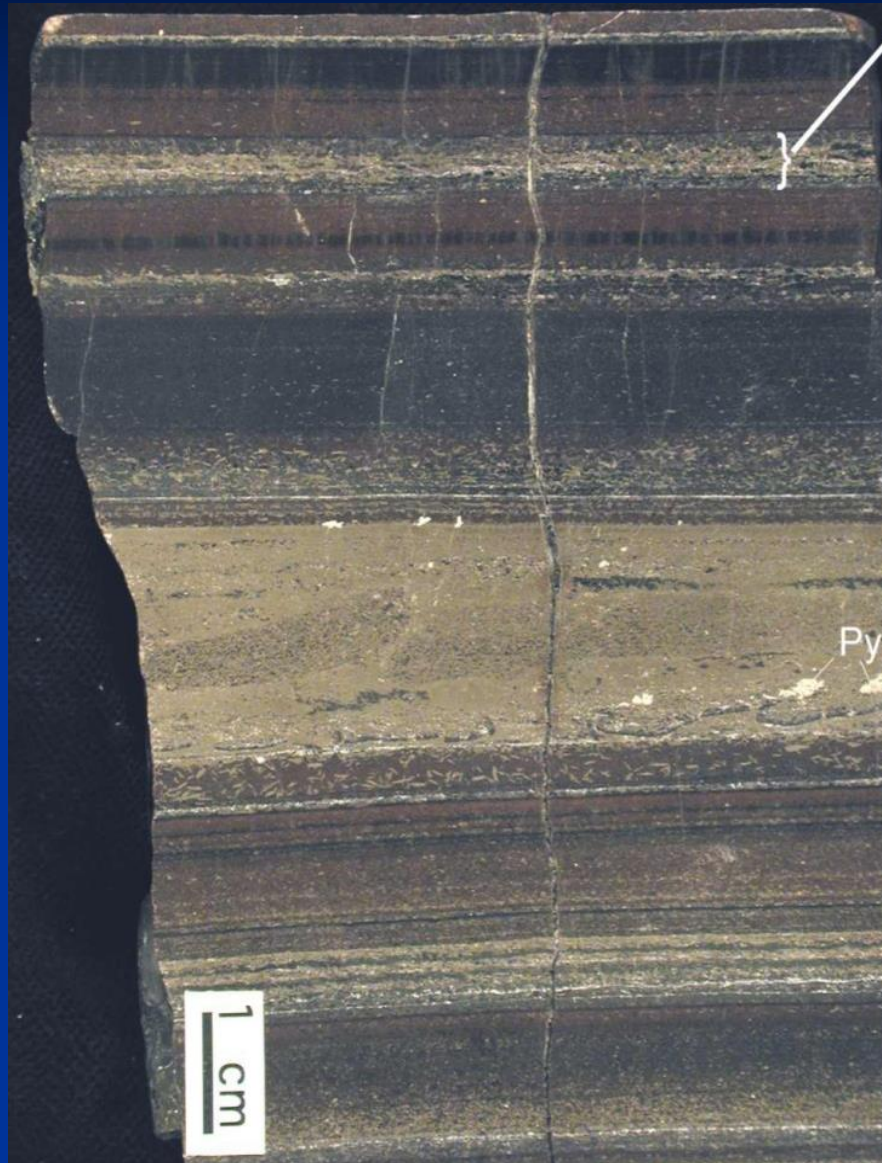


SEDEX Deposits

(Sedimentary Exhalative)

SEDEX Ore



Sphalerite &
Pyrrhotite

Interlaminated
Sphalerite &
Argillite

Argillite

Durchbewegt
Pyrrhotite

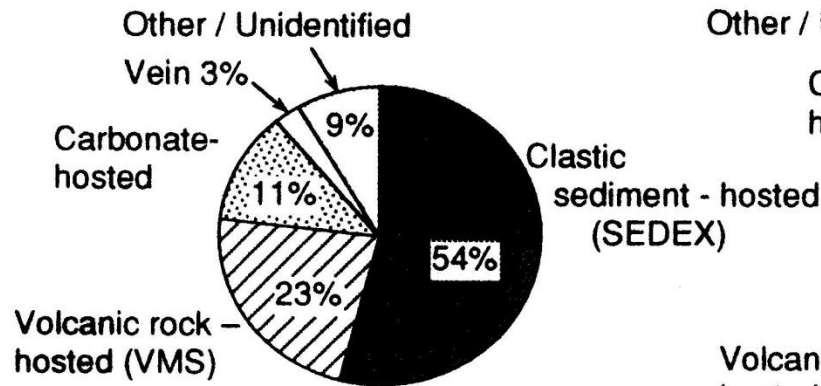
Pyrrhotite
lathes in
argillite

Interlaminated
Sphalerite
Pyrrhotite &
Argillite

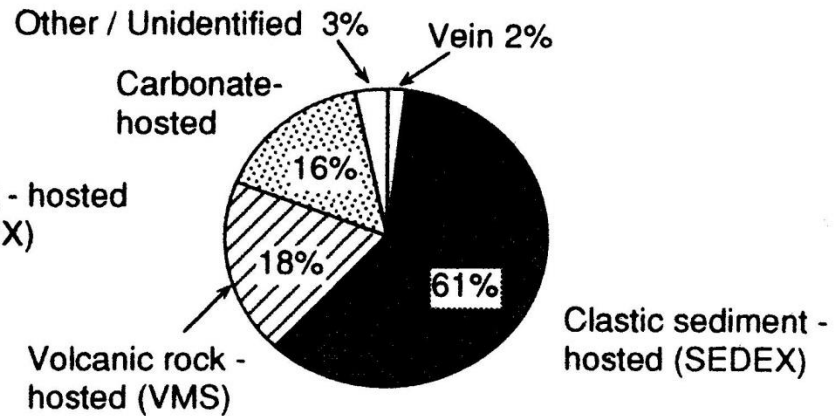
Interlaminated
Pyrrhotite
Sphalerite &
Galena

Zn-Pb Reserves and Production by Deposit Type

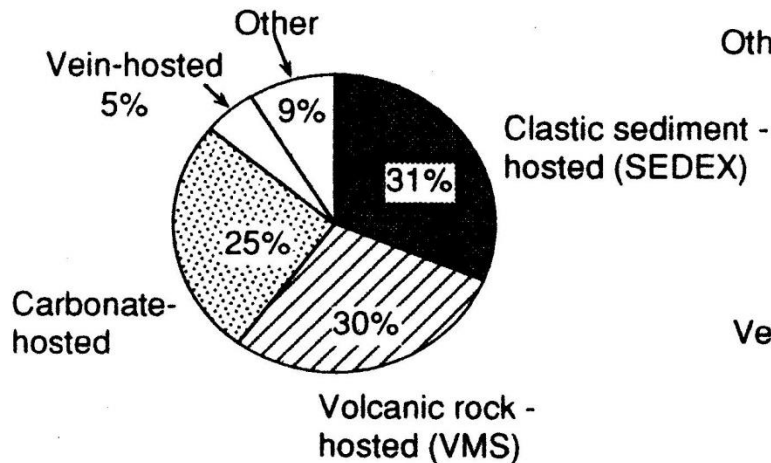
ZINC METAL RESERVES BY DEPOSIT TYPE



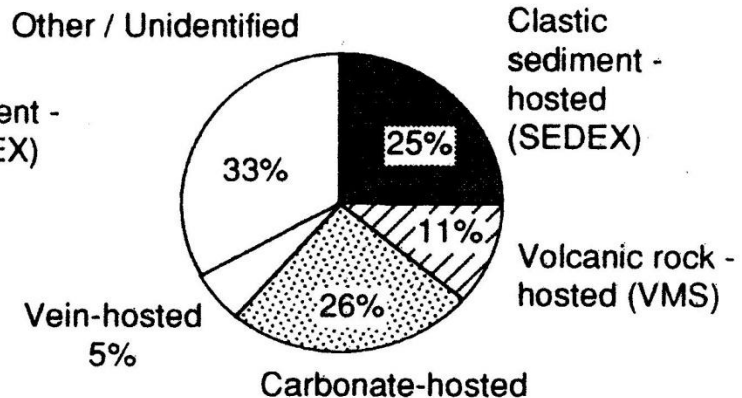
LEAD METAL RESERVES BY DEPOSIT TYPE



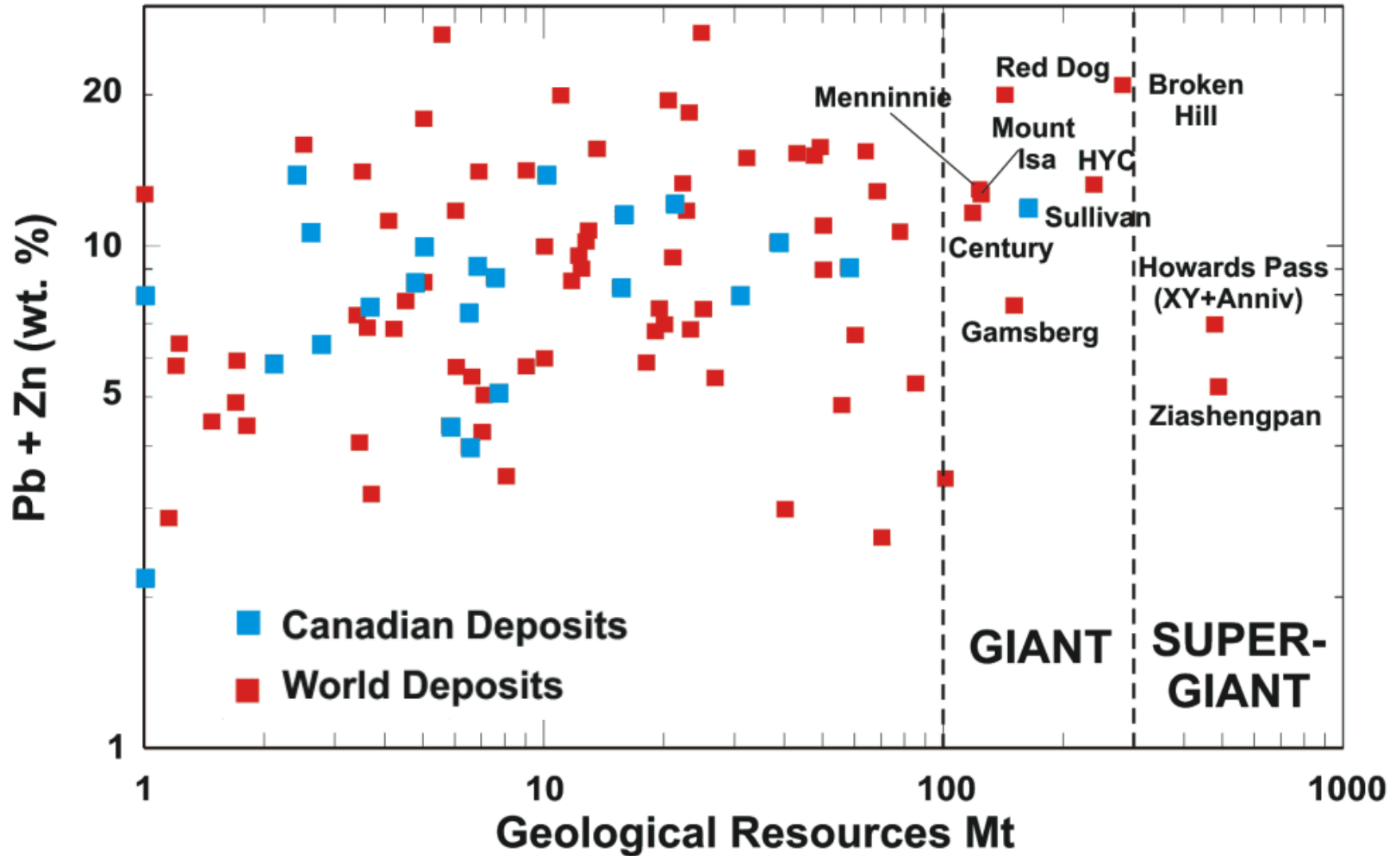
ZINC PRODUCTION BY DEPOSIT TYPE



LEAD PRODUCTION BY DEPOSIT TYPE



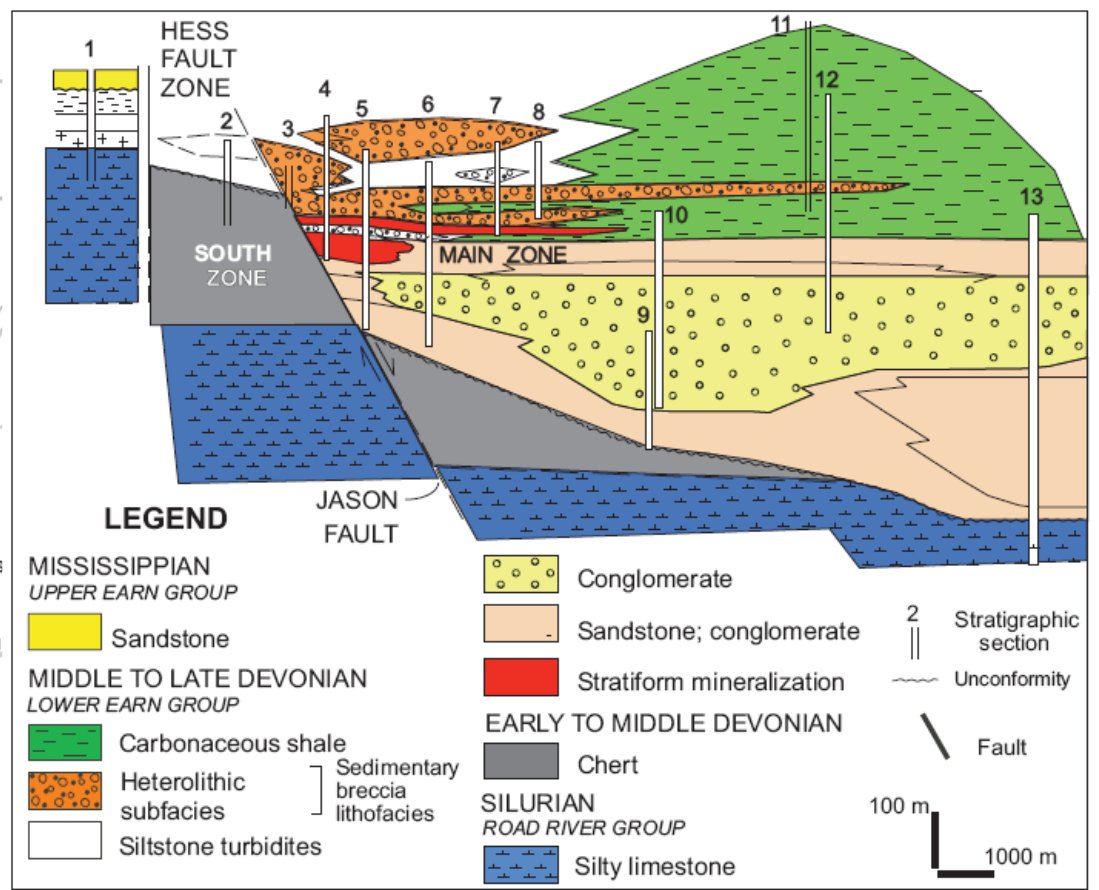
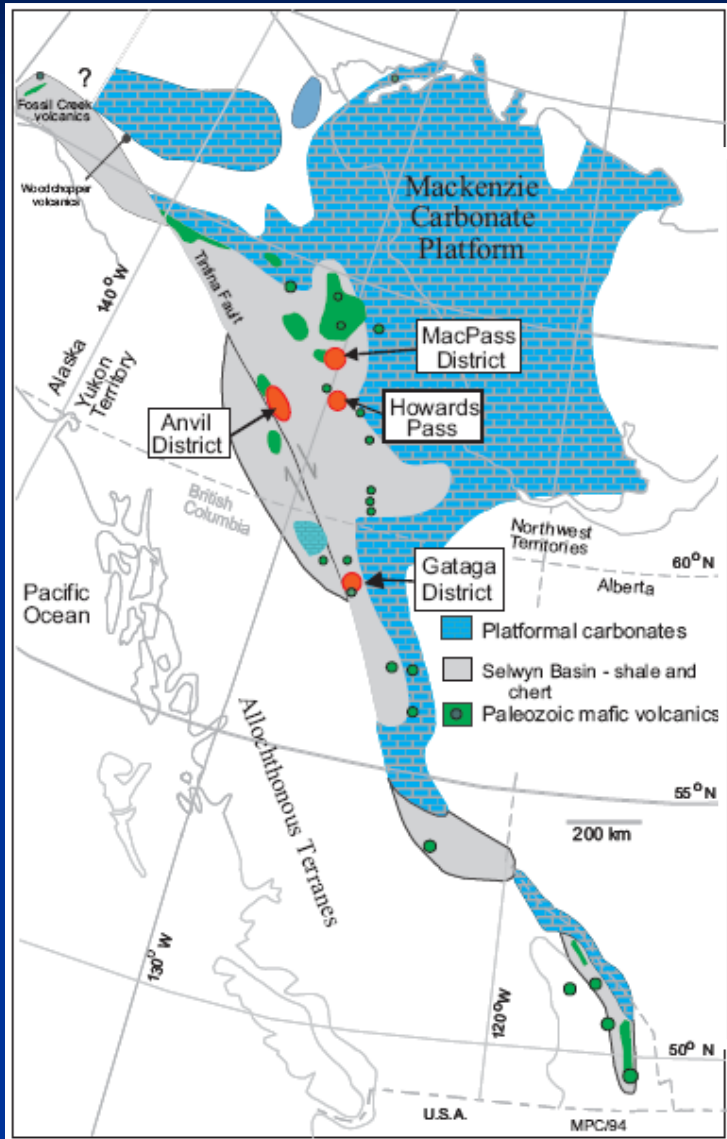
Grade and Tonnage of all SEDEX Deposits



Grade and Tonnage of some SEDEX Deposits

Country	Deposit	Tonnage of ore in Mt (reserves and past production)	Grade			By-products	Age
			Cu%	Pb%	Zn%		
Australia	Broken Hill	180	0.2	11.3	9.8	Ag 175 g t ⁻¹	Lower to Middle Prot
	McArthur River	237	0.2	4.1	9.2	Ag 41 g t ⁻¹	Middle Proterozoic
	Mount Isa	88.6	0.06	7.1	6.1	Ag 160 g t ⁻¹	Middle Proterozoic
Canada	Howard's Pass	100	—	1.5	6.0	—	Silurian
	Sullivan	160	—	6.6	5.9	Ag 68 g t ⁻¹ Sn, Cd, Cu, Au	Middle Proterozoic
Germany	Meggen	60	0.2	1.3	10.0	Baryte	Devonian
	Rammelsberg	30	1.0	9.0	19.0	Ag 103 g t ⁻¹ Baryte	Devonian
Ireland	Navan	70	—	2.6	10.1	—	Carboniferous
	Silvermines	18.4	—	2.8	7.4	Ag 21 g t ⁻¹ Baryte	Carboniferous
	Tynagh	12.3	0.4	4.9	4.5	Ag 58 g t ⁻¹	Carboniferous
RSA	Gamsberg	93.5	—	0.6	7.4	—	Middle Proterozoic

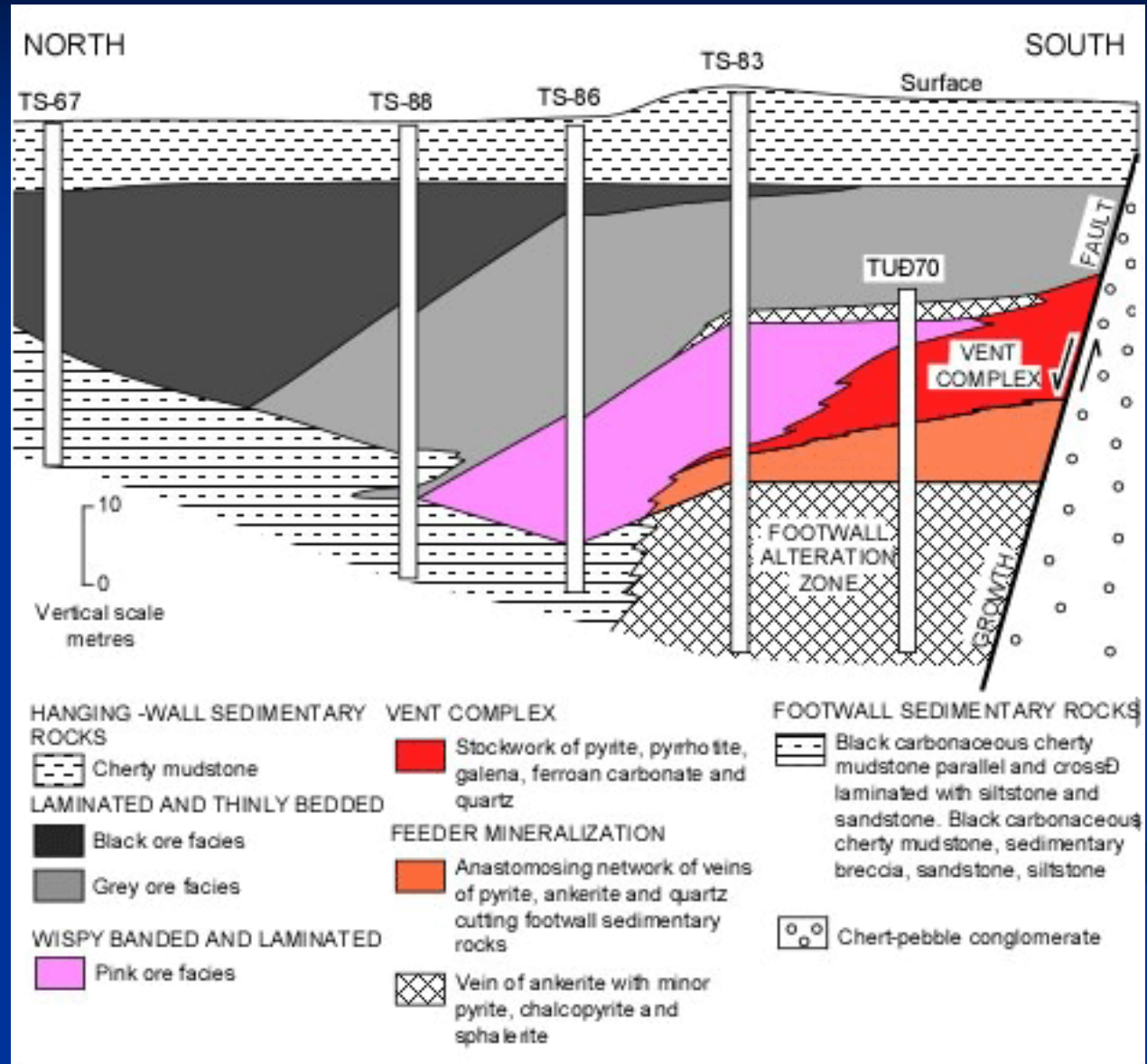
Sedex deposits of the Selwyn Basin



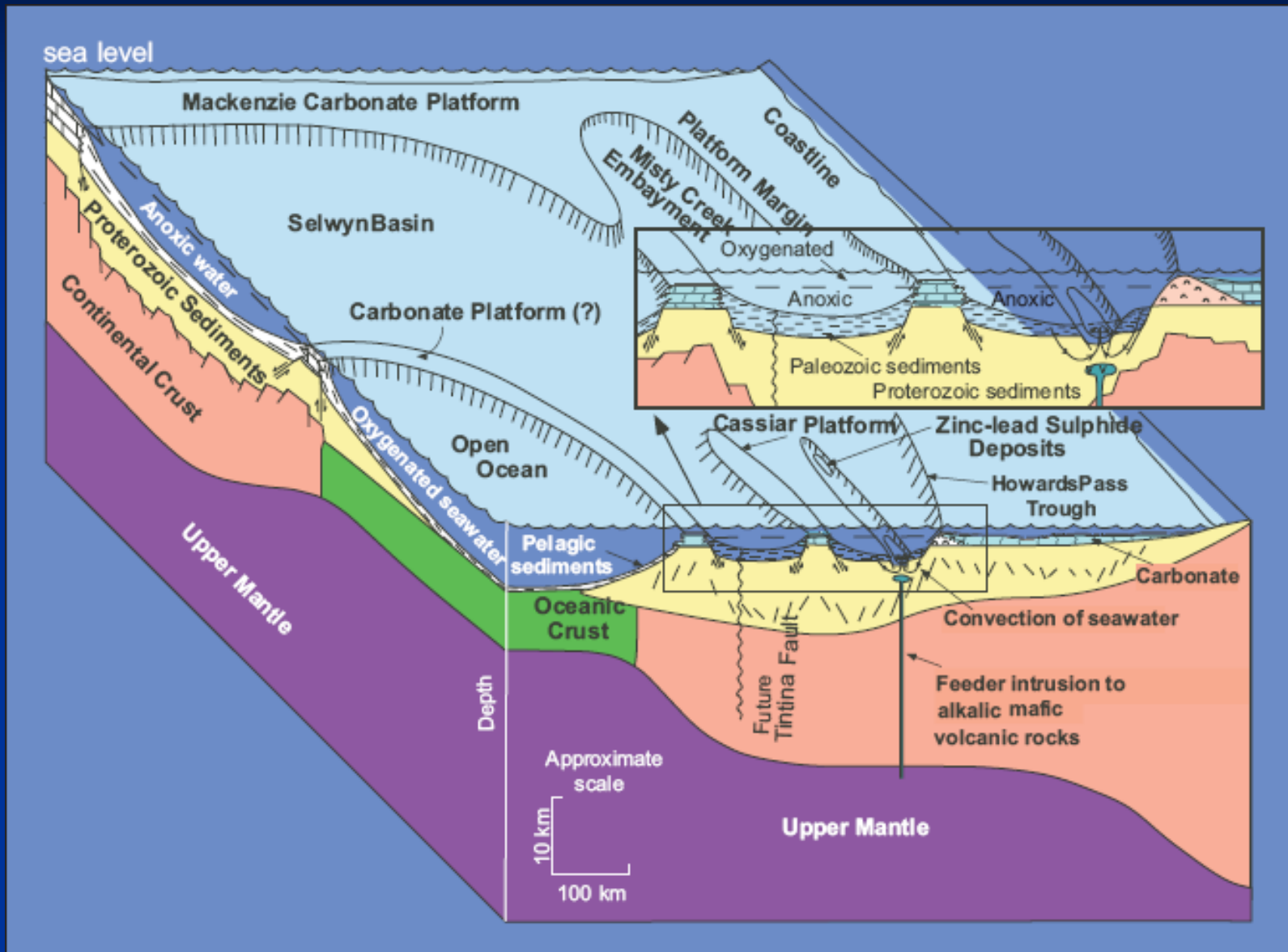
Tom SEDEX Deposit, Yukon

15.7 x10⁶ tons
7% Zn, 4.6% Pb,
49 ppm Ag

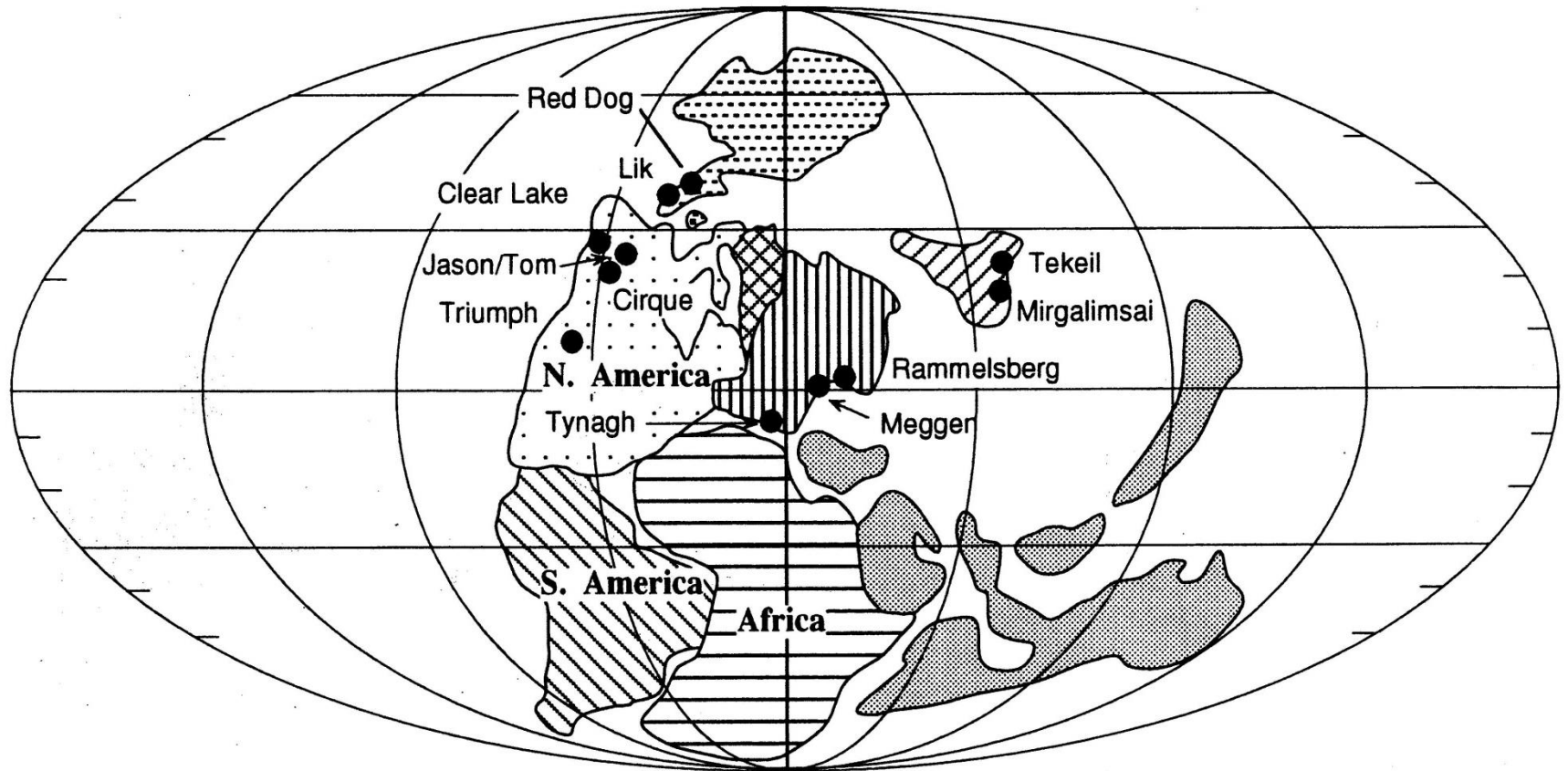
Stratified ores: **Black facies** (carbonaceous chert, sphalerite, galena); **Grey facies** (grey chert, barite, sphalerite); **Pink facies** (chert, pink, cream, black sphalerite, barite, galena)



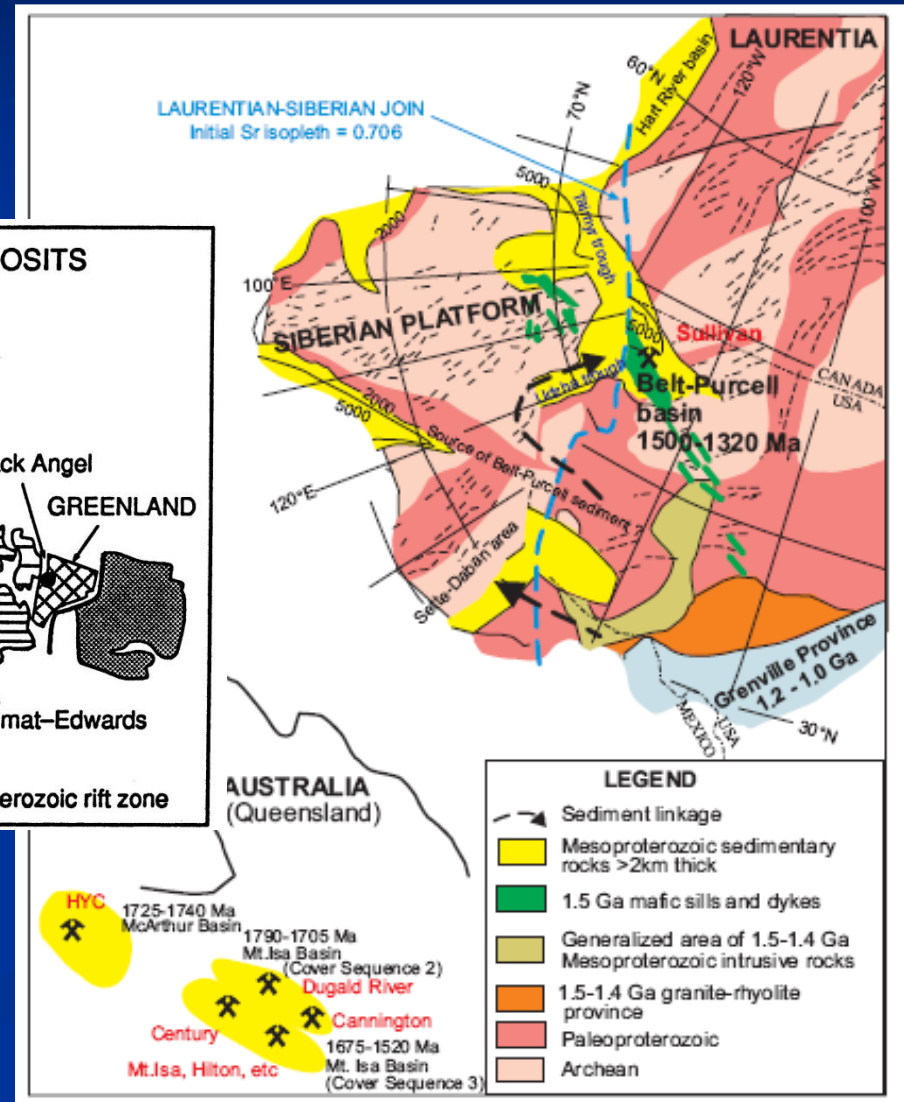
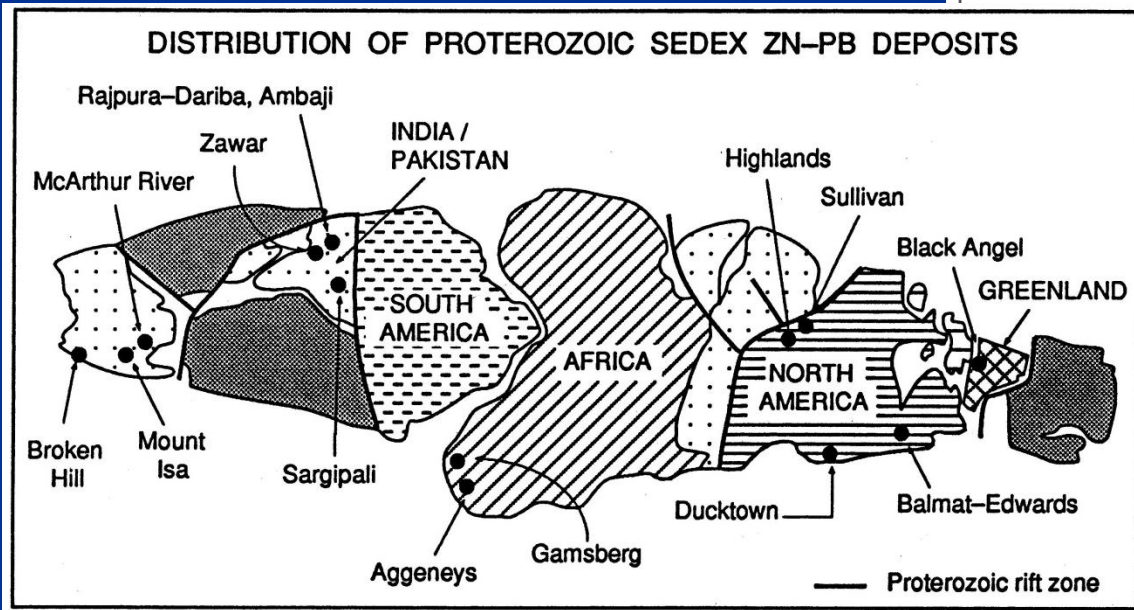
Selwyn Basin and Extensional tectonics



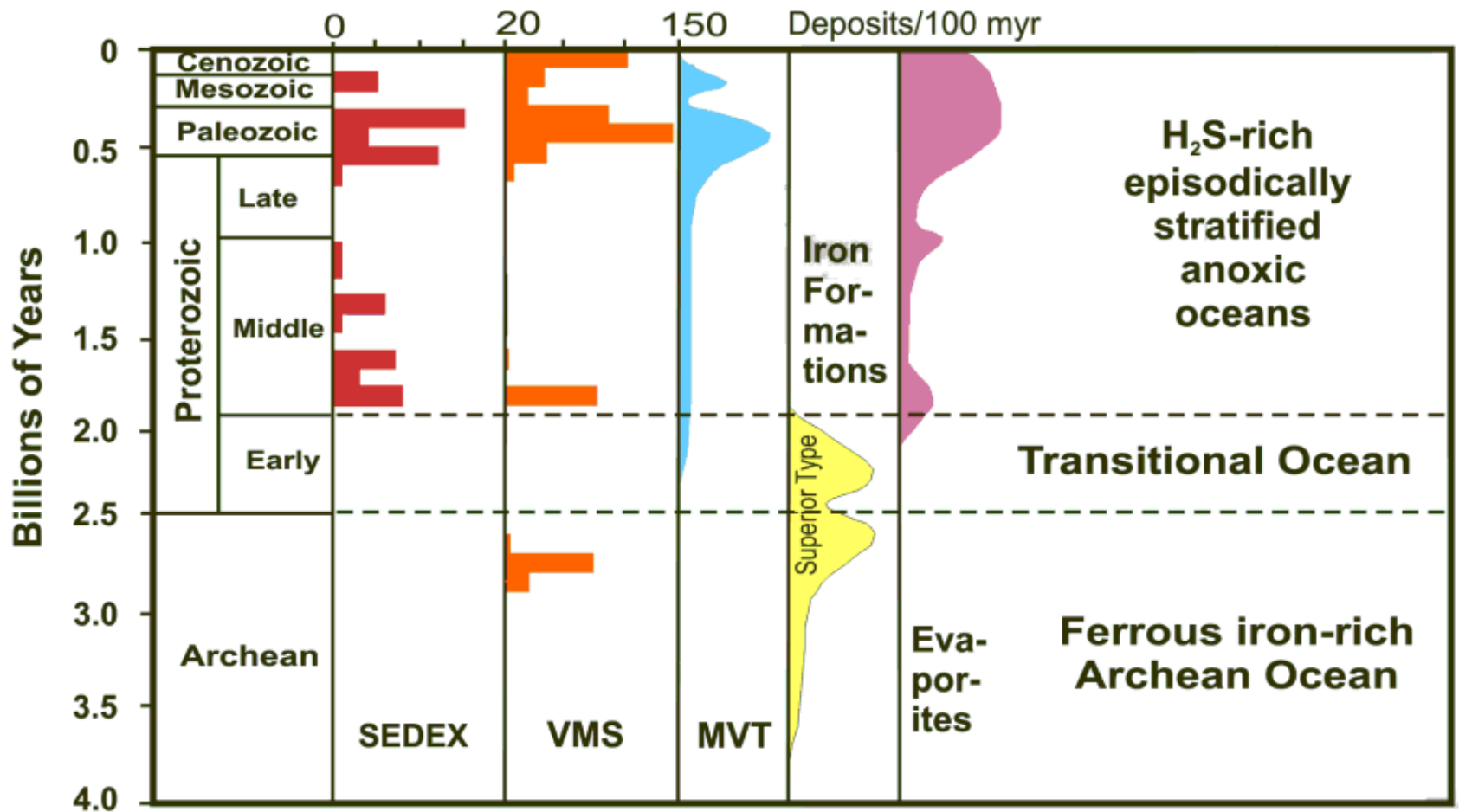
Distribution of Sedex Deposits relative to Late Devonian Paleogeography



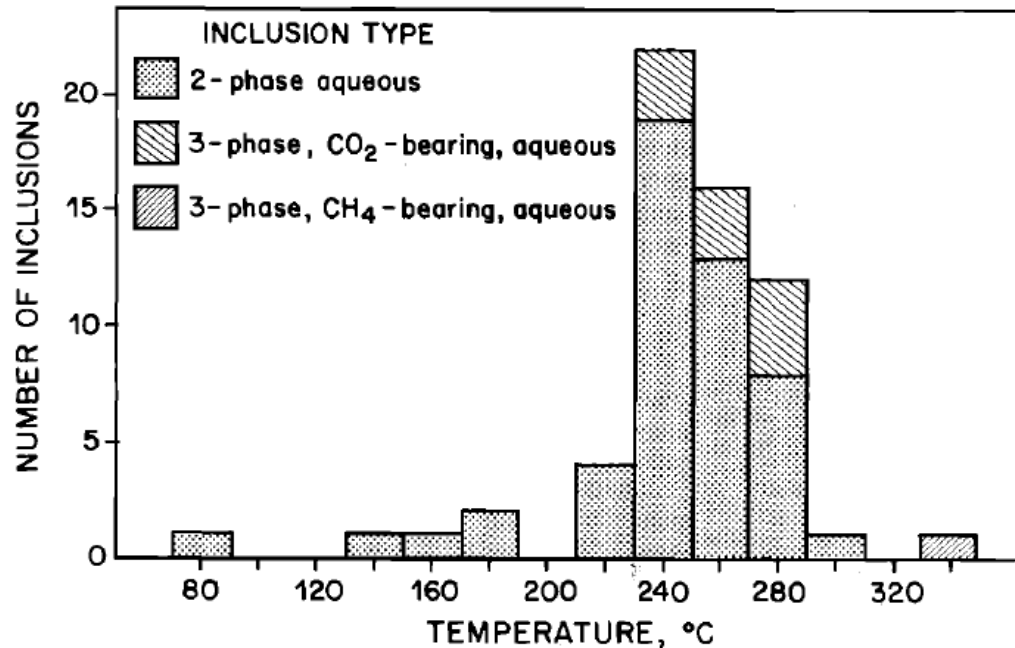
Distribution of Sedex Deposits relative to Proterozoic Paleogeography



Distribution of SEDEX Deposits with Time

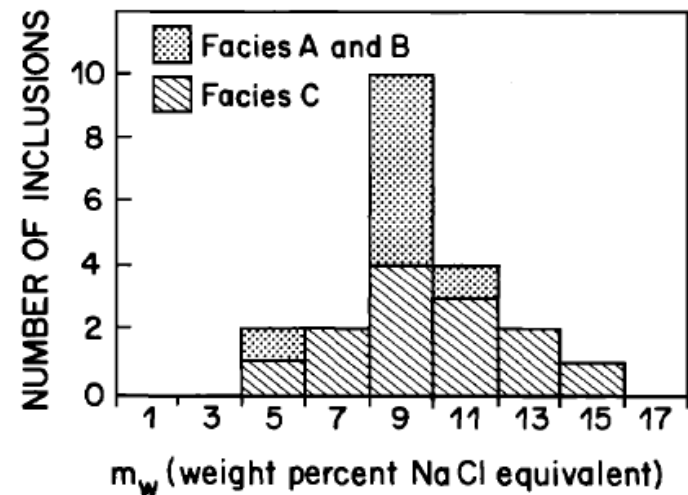


Fluid Inclusion Data, Jason Deposit

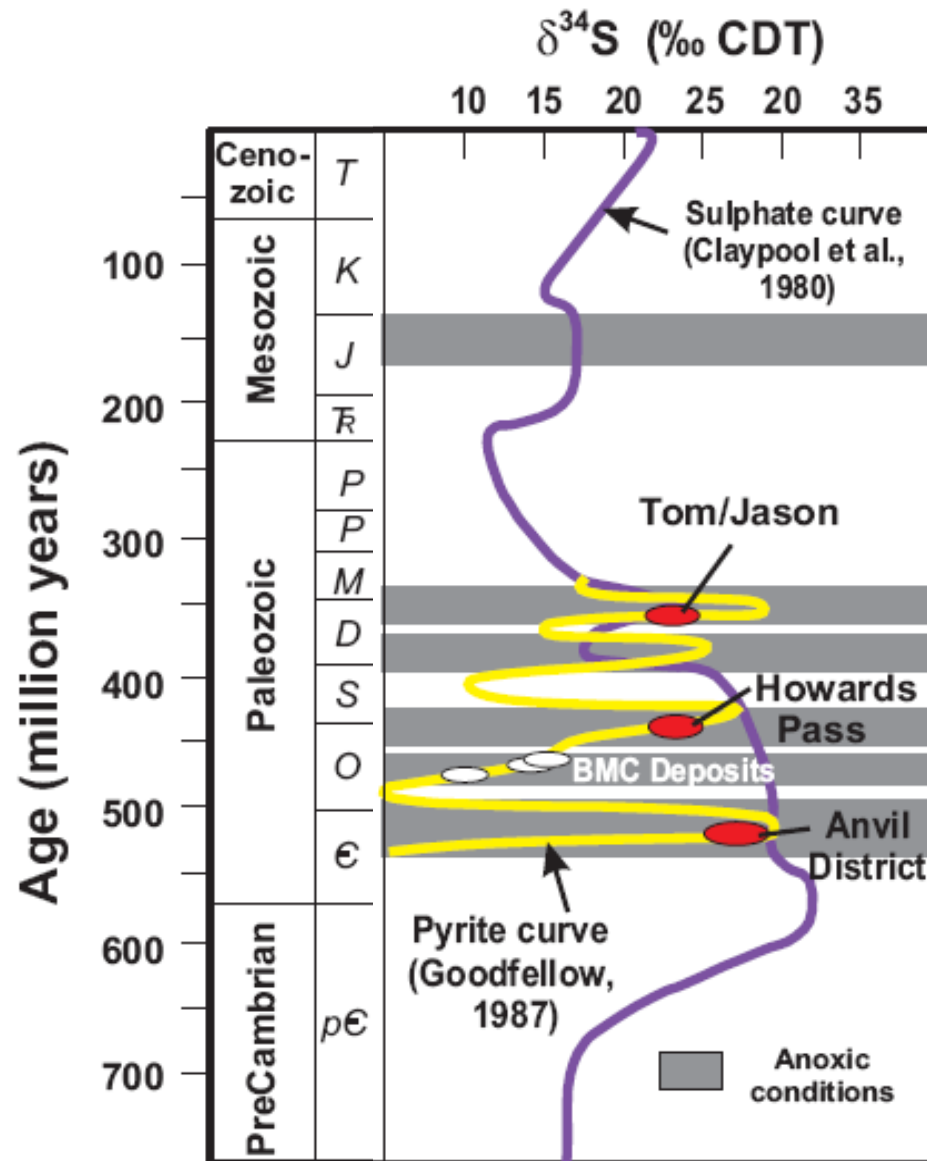


Note that the inclusions are CH₄ and CO₂-bearing because of interaction of the aqueous fluids with organic-rich sediments

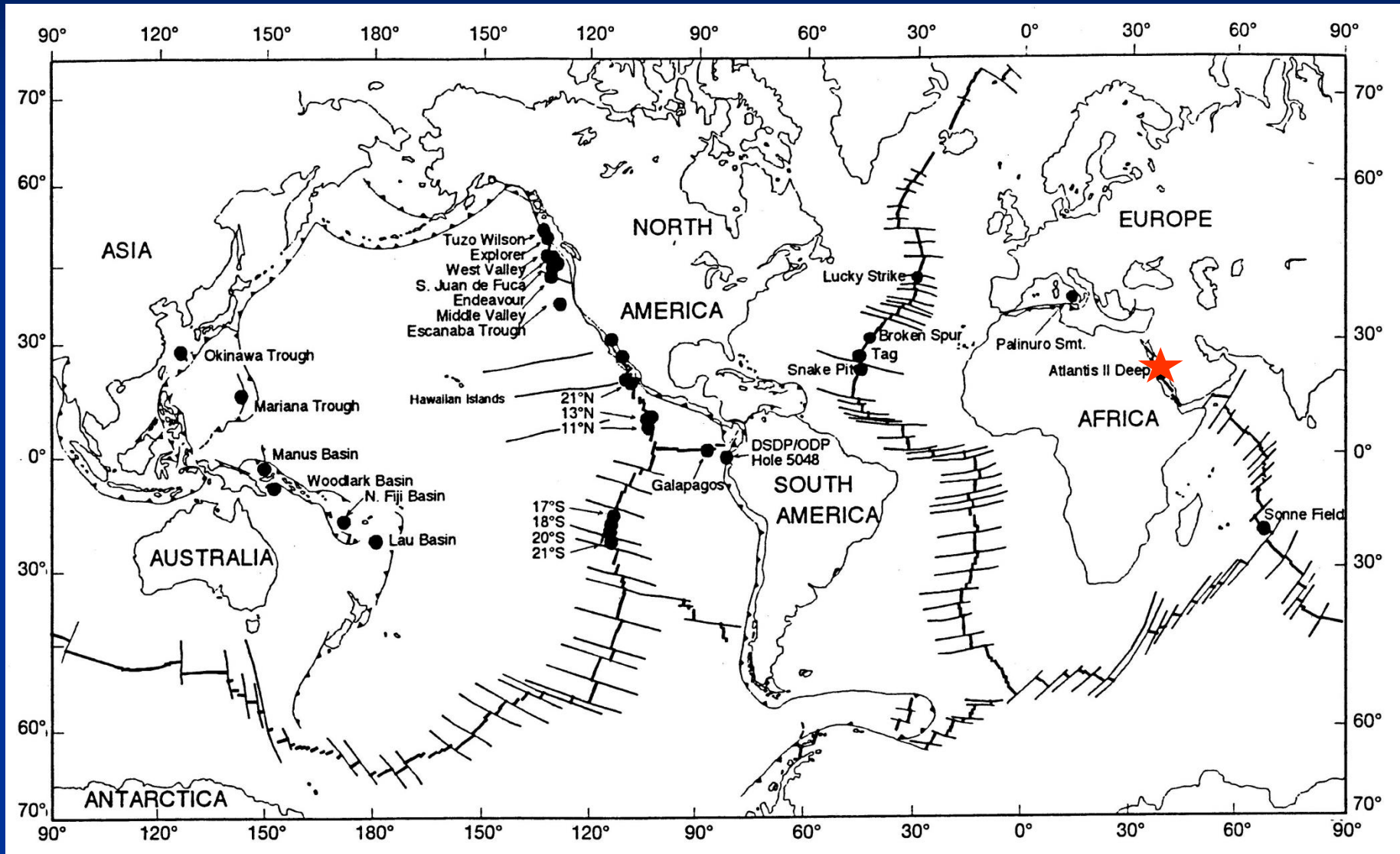
Gardner and Hutcheon (1985)



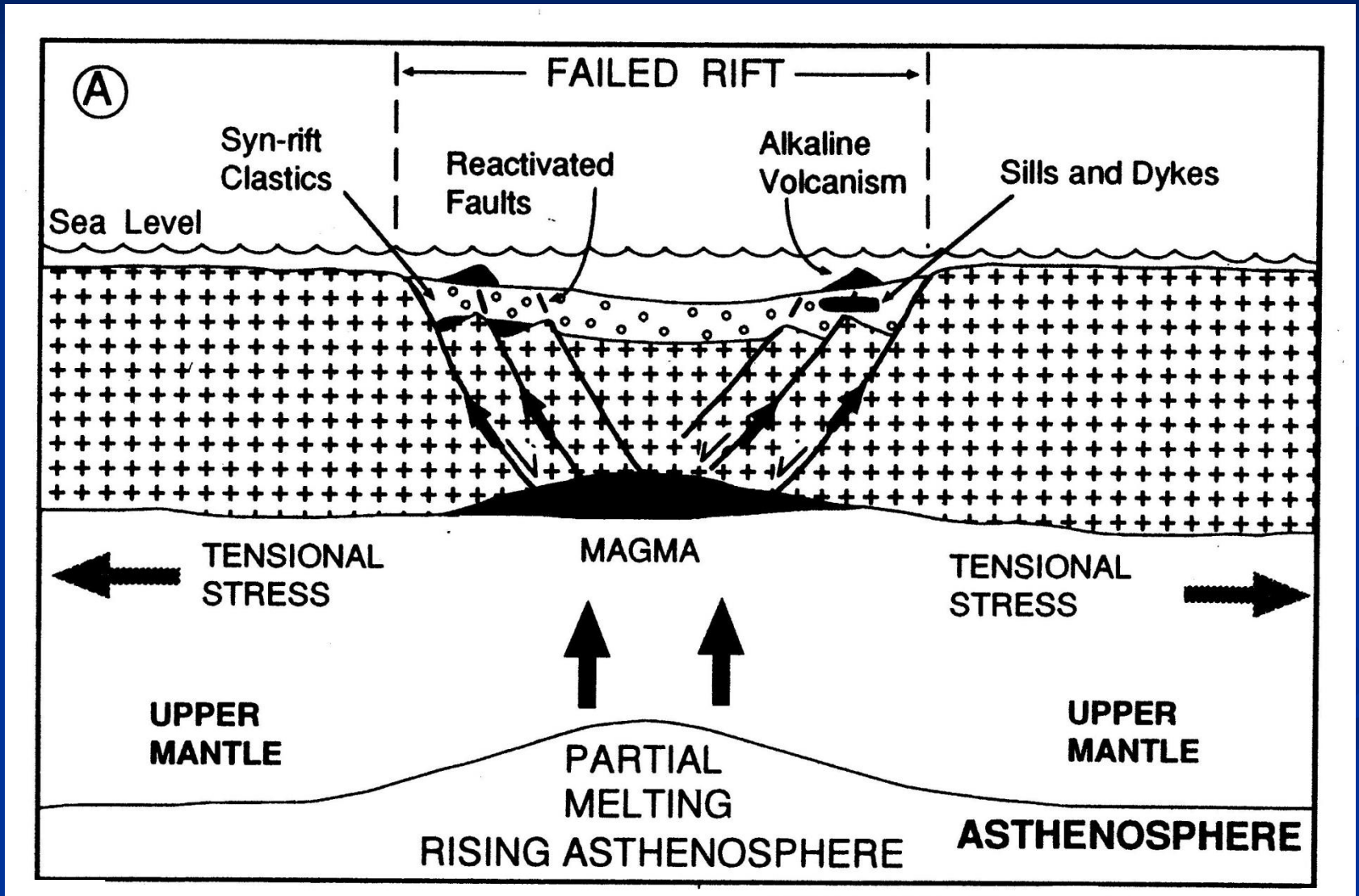
Marine $\delta^{34}\text{S}$ and SEDEX deposits



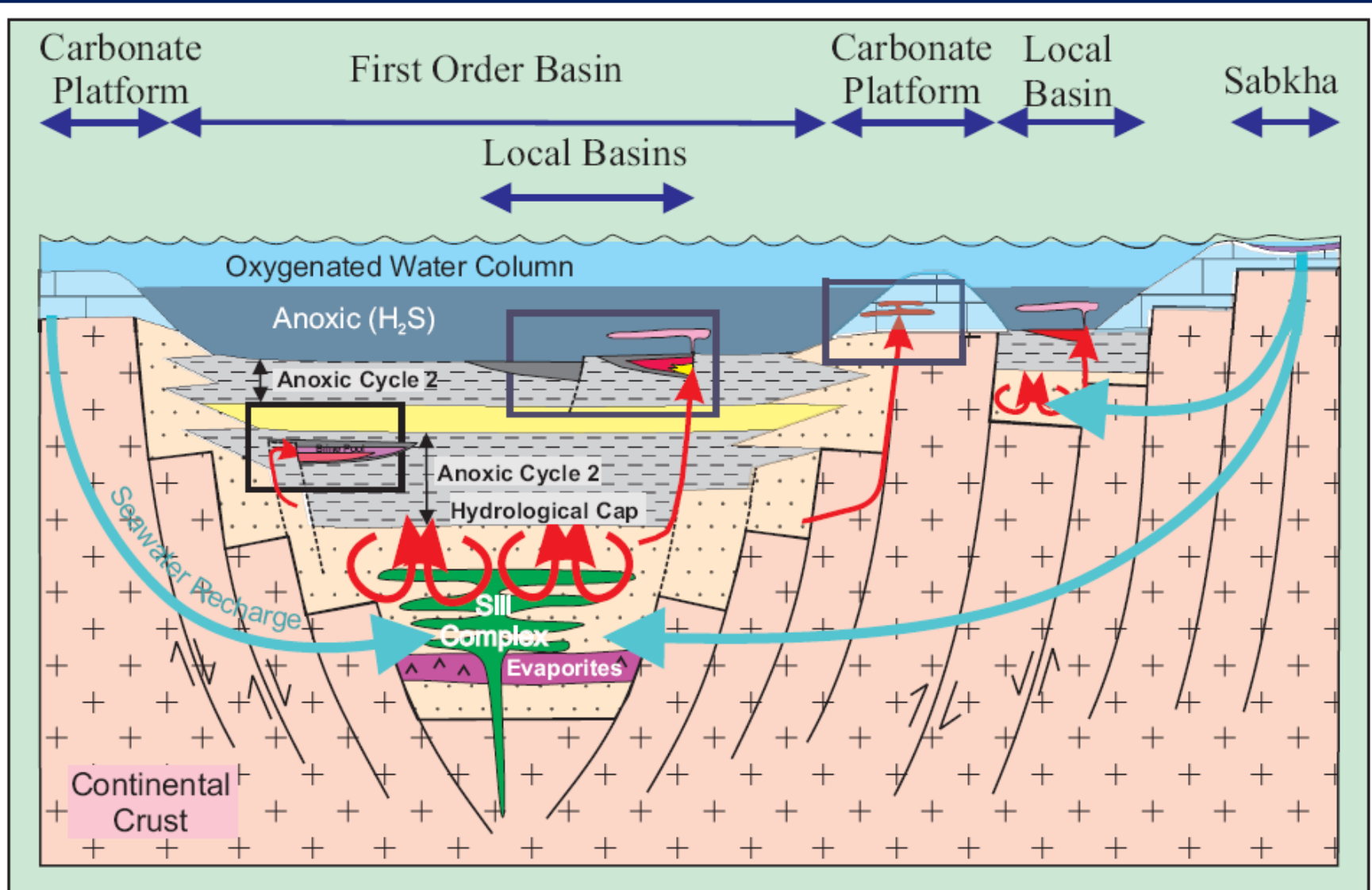
Atlantis II Deep a SEDEX Deposit in the making



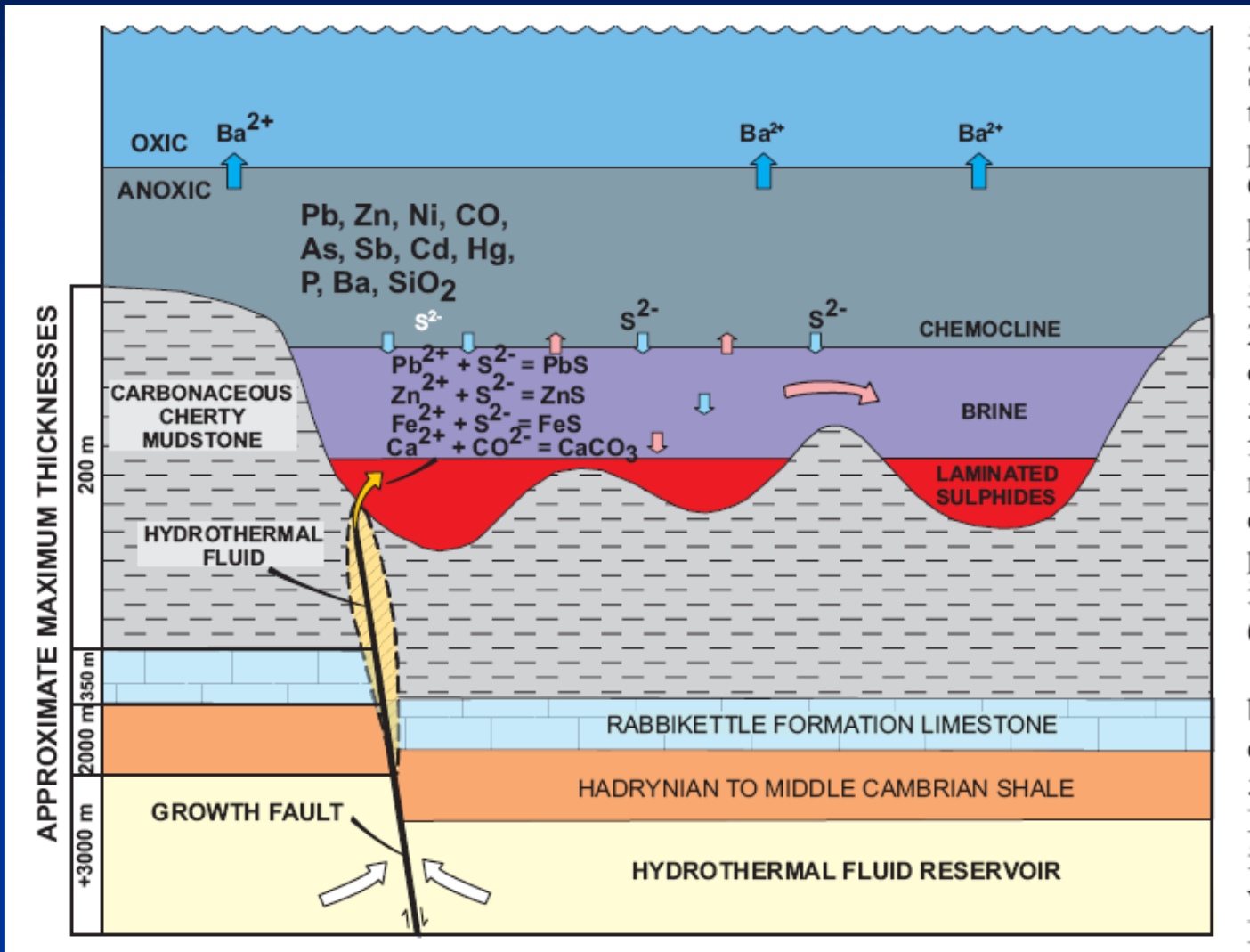
Creating the Environment for SEDEX Deposits



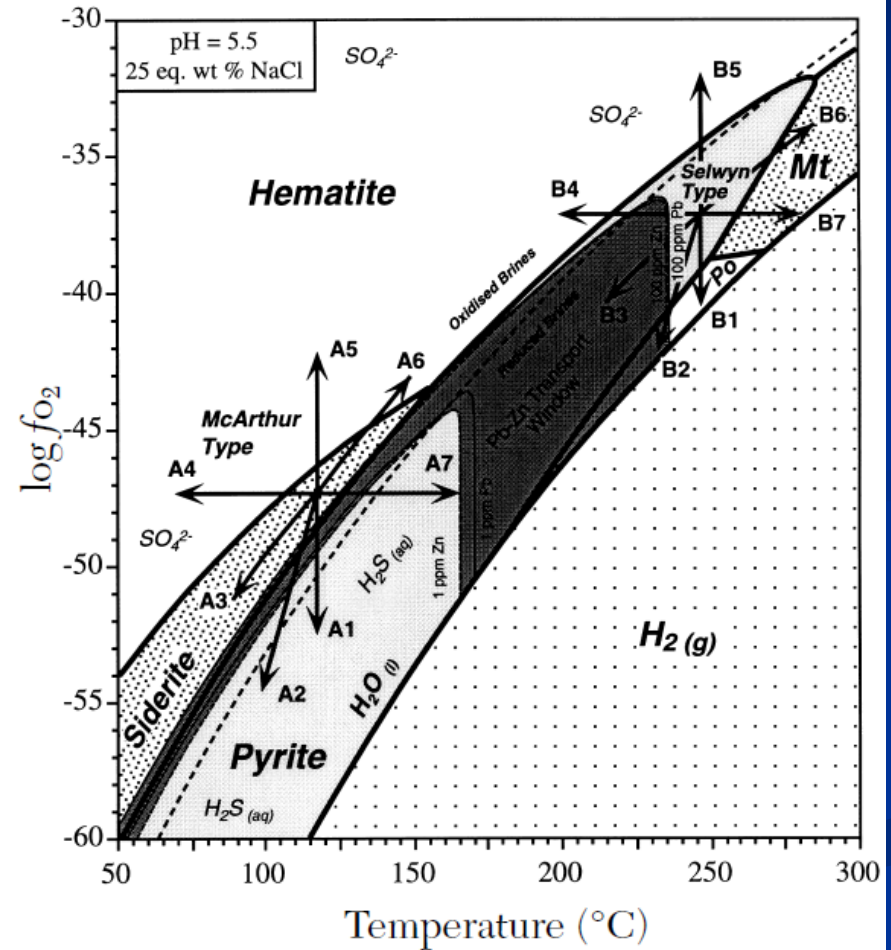
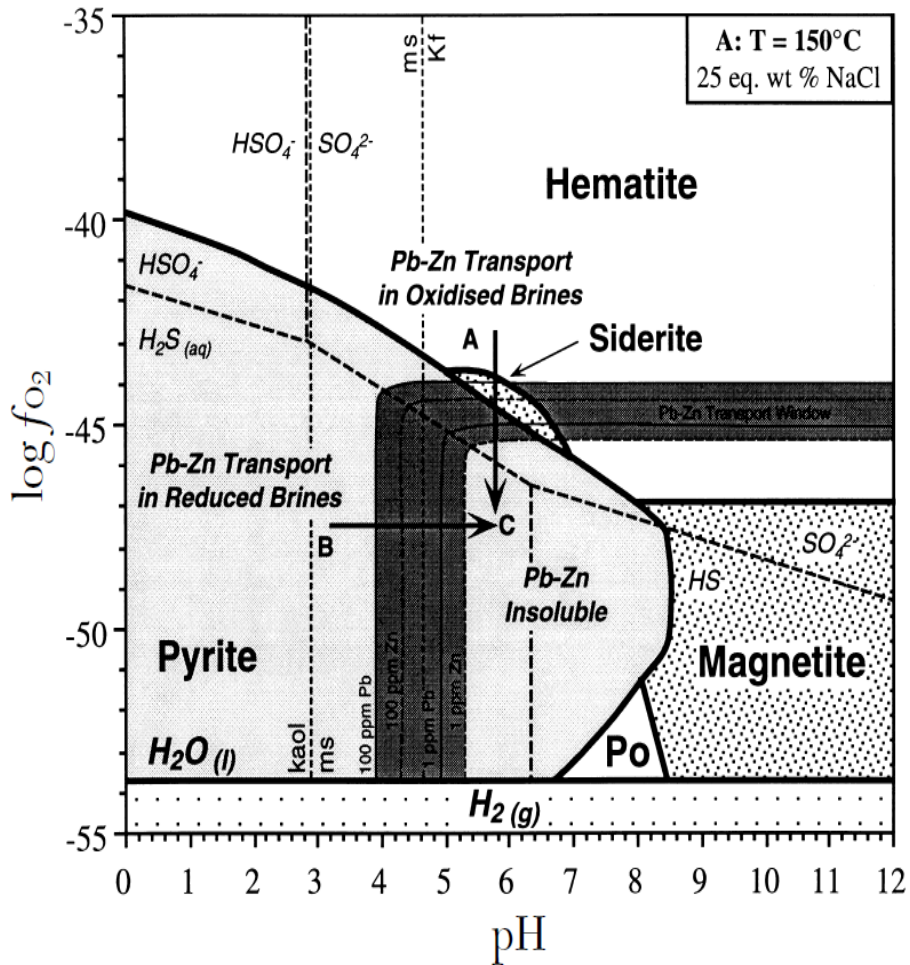
The Rift Environment



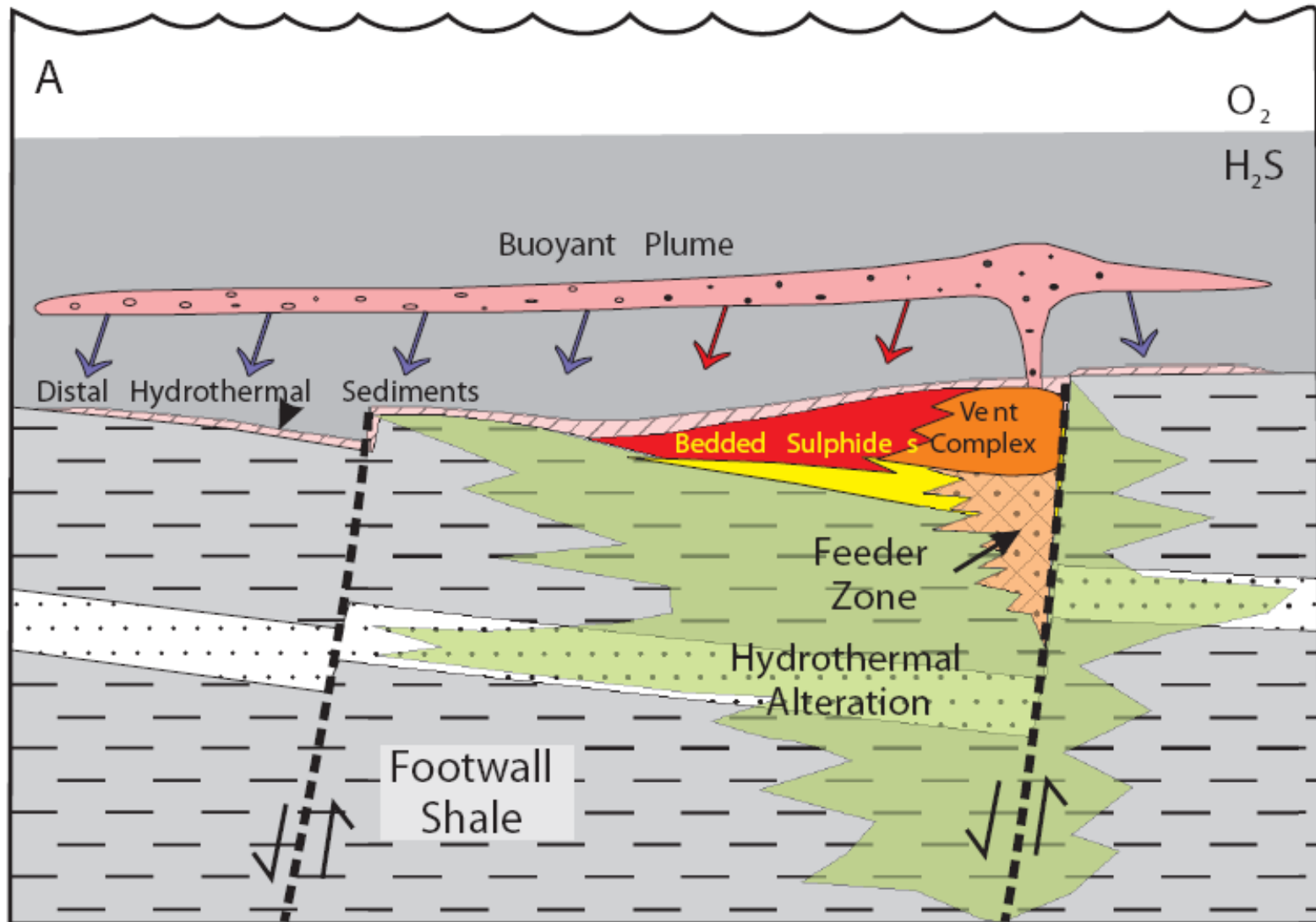
Towards a SEDEX model



Conditions of Metal Transport/Deposition



The ore-forming system



Genetic model for SEDEX Deposits

- Continental rifting – intracratonic basin at continent edge
- Low-latitude continental sediments/evaporites
- Evolution to anoxic marine basin
- Growth faults – ore fluids originate in basin
- Fluids oxidising, sediment buffered, 150 – 250°C
- Transport of Pb, Zn as Cl-complexes
- Deposition due either to reduction or T/pH decrease/increase

.

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