Germanium (Ge) endowment constraints in Zn-Pb sediment-hosted mineral deposits

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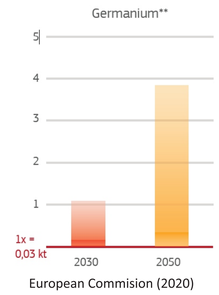
Why Ge research is important?

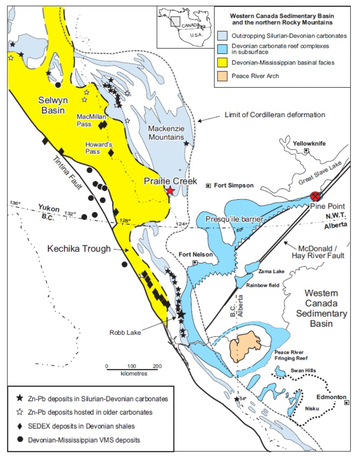
Ge is a crucial "mineral" in advancing technology, specially in the field of solar energy

Potential future supply risks exist due to the fact that Ge is primarily extracted as a by-product of Zn production.

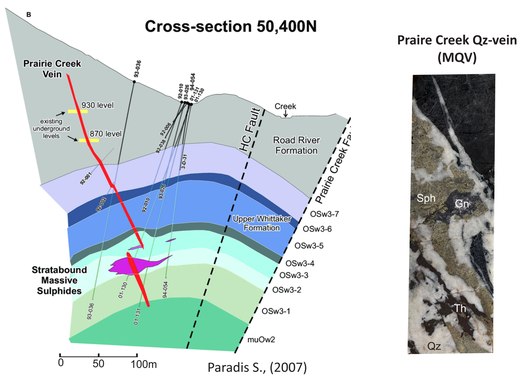


European Commision (2020)

The Zn-Pb (Ag-Ge) Prairie Creek Deposit (Northwest Territories, Canada)

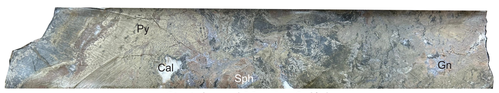


Paradis S., (2007)



Paradis S., (2007)

Praire Creek Qz-vein (MQV)

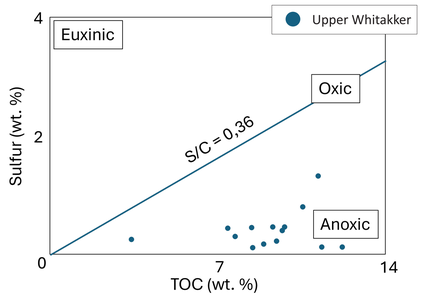


Stratabound Massive Sulfides (SMS)

Py: Pyrite, Cal: Calcite, Sph: Sphalerite, Gn: Galena, Th: Tetrahedrite-Tennantite

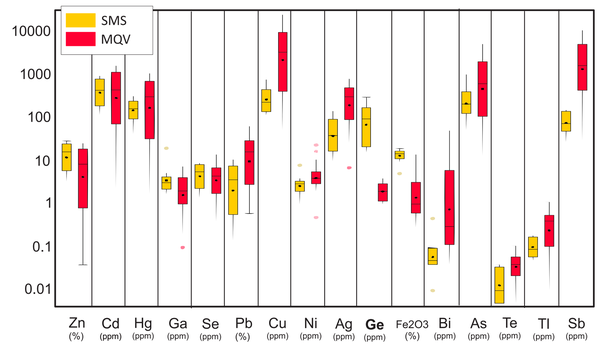
What does geochemistry tell us, so far?

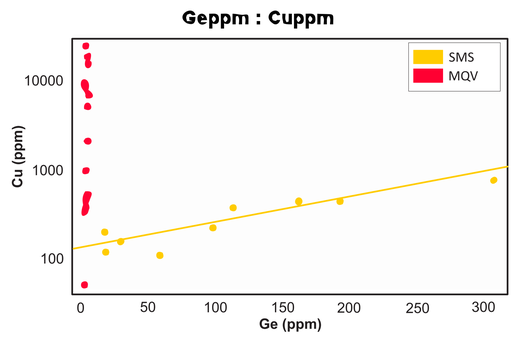
Host-rock



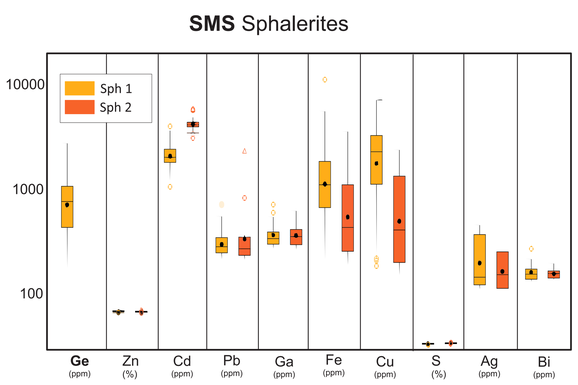
- While a low S/C ratio suggests an anoxic paleodeposition condition redox for Upper Whitakker, its Mo content of less than 10 ppm indicates a suboxic condition (?)

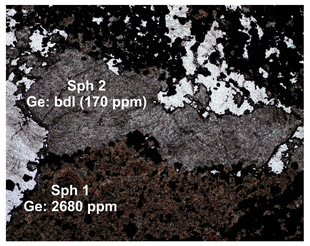
Ore bodies

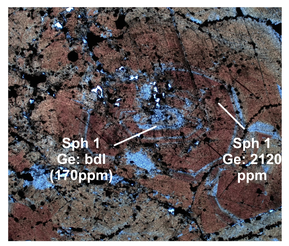


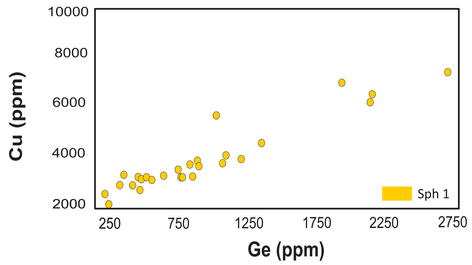


Sphalerite Chemistry



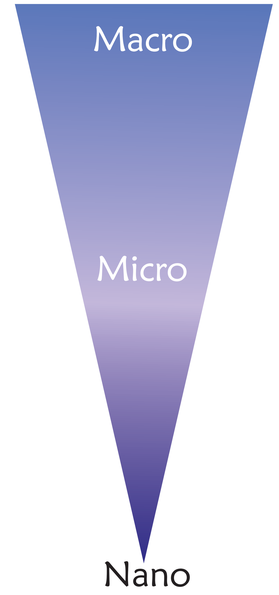






Methods

- Core-logging
- Sampling
- Whole-Rock Geocehmistry
- Petrography
- Isotopic studies (Pb, S, Ge)
- SEM
- LA-ICP-MS
- Fluid inclusions
- EMPA
- Atom Probe Tomography



Future Work

- Genetic model of the Praire Creek deposit
- Ge distribution (micro & nano scale)

Substitution mechanisms

- Favored drivers to enrichment?

Experiments

Insights into Ge behavior in hydrothermal fluids will guide mineral exploration strategies

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