

Discussing the Source, Transport, and Deposition of Ore Bodies Using Samples from Fire Creek Mine, NV

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Types of Ore Bodies

- There are many different classifications of gold (Au) ore bodies
 - Lode/orogenic
 - High-grade, thin, vein and fault hosted. Primarily hosted in qtz. veins which contain native Au or gold sulfides.
 - Intrusive
 - Rely on gold being in the hydrothermal fluid associated with granitic magma bodies
 - Placer
 - Secondary ore body formed by alluvial processes
- The Fire Creek Mine is classified as a low-sulfidation epithermal deposit
 - Formed from hydrothermal fluids, dominated by meteoric water
 - Low temperature (~200° C)

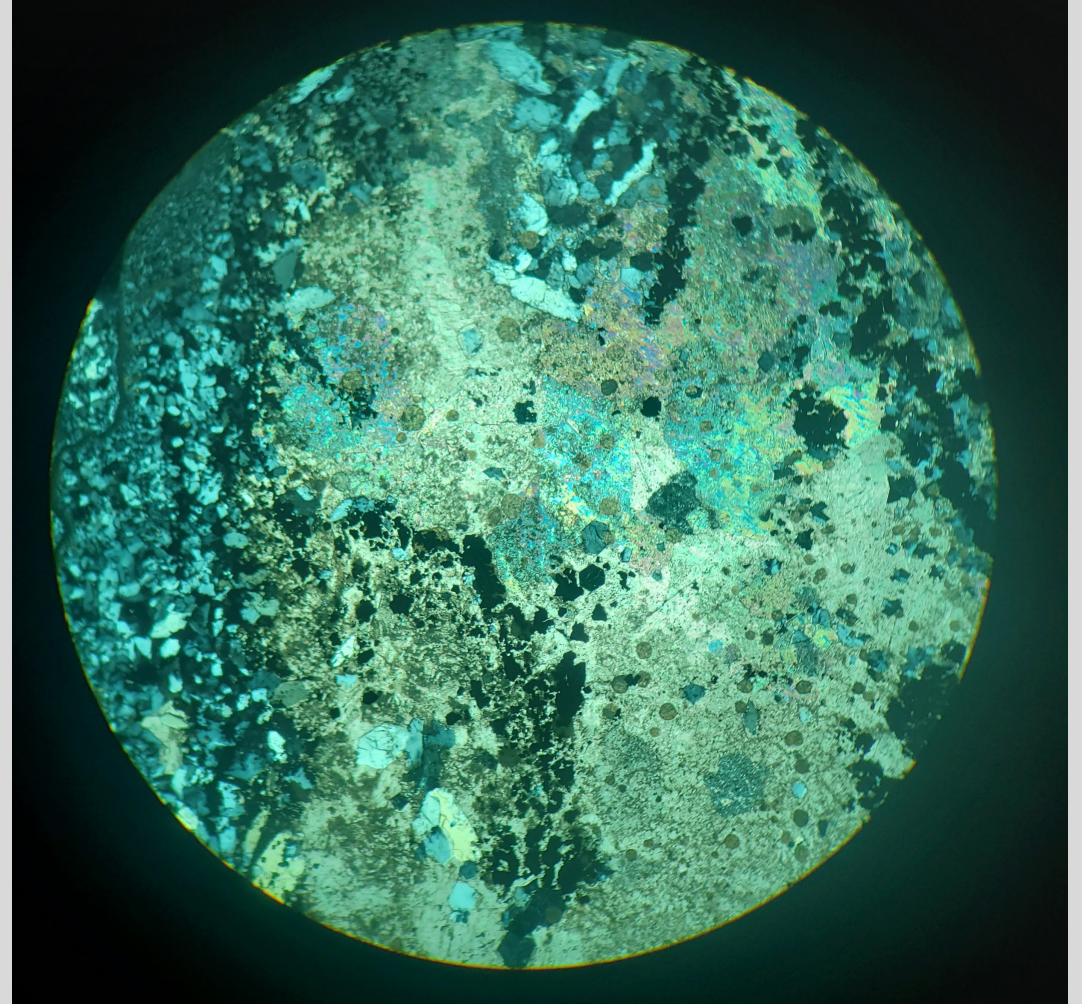
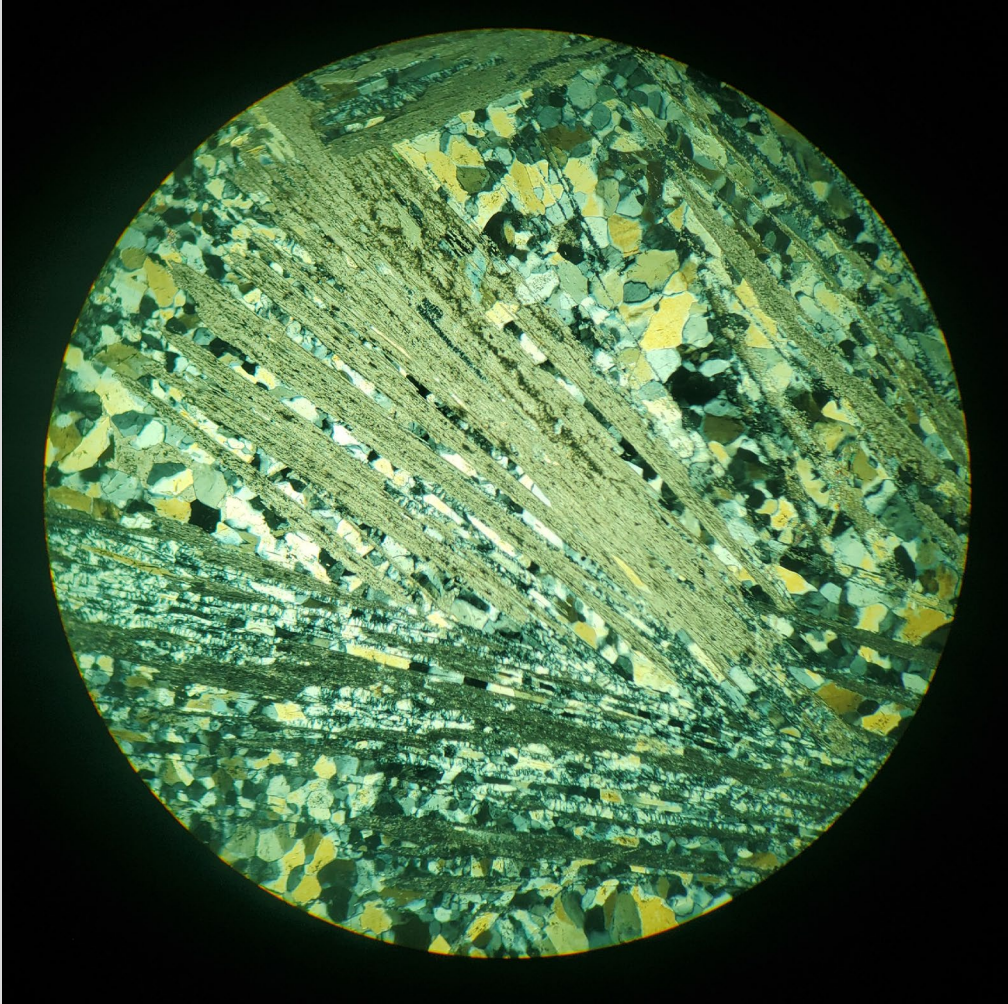
Regional Geologic Context

- The northern Great Basin has a complex and varied geologic history
- Cenozoic tectonics was dominated by crustal extension
- Cenozoic Magmatism is well known, which allows us to separate assemblages
 - Interior andesite-rhyolite (Eocene to early Miocene)
 - Western andesite (early Miocene to early Pliocene)
 - Bimodal basalt-rhyolite (middle Miocene to Holocene)
- This presentation will focus on samples collected from Fire Creek Mine, which are members of the Bimodal basalt-rhyolite assemblage.

Local Geologic Context

- Majority of local features are structurally controlled veins.
 - Are placed primarily along faults
 - Are generally thin, less than three ft
 - Host rocks are usually restricted to more competent units
- Mineralogy of veins
 - Contains Colloidal silica, Chalcedony, Quartz, Calcite
 - May contain: Pyrite, Chlorite, Arsenopyrite, and Clays
 - Electrum is natively present along layers within veins

Local Geologic Context



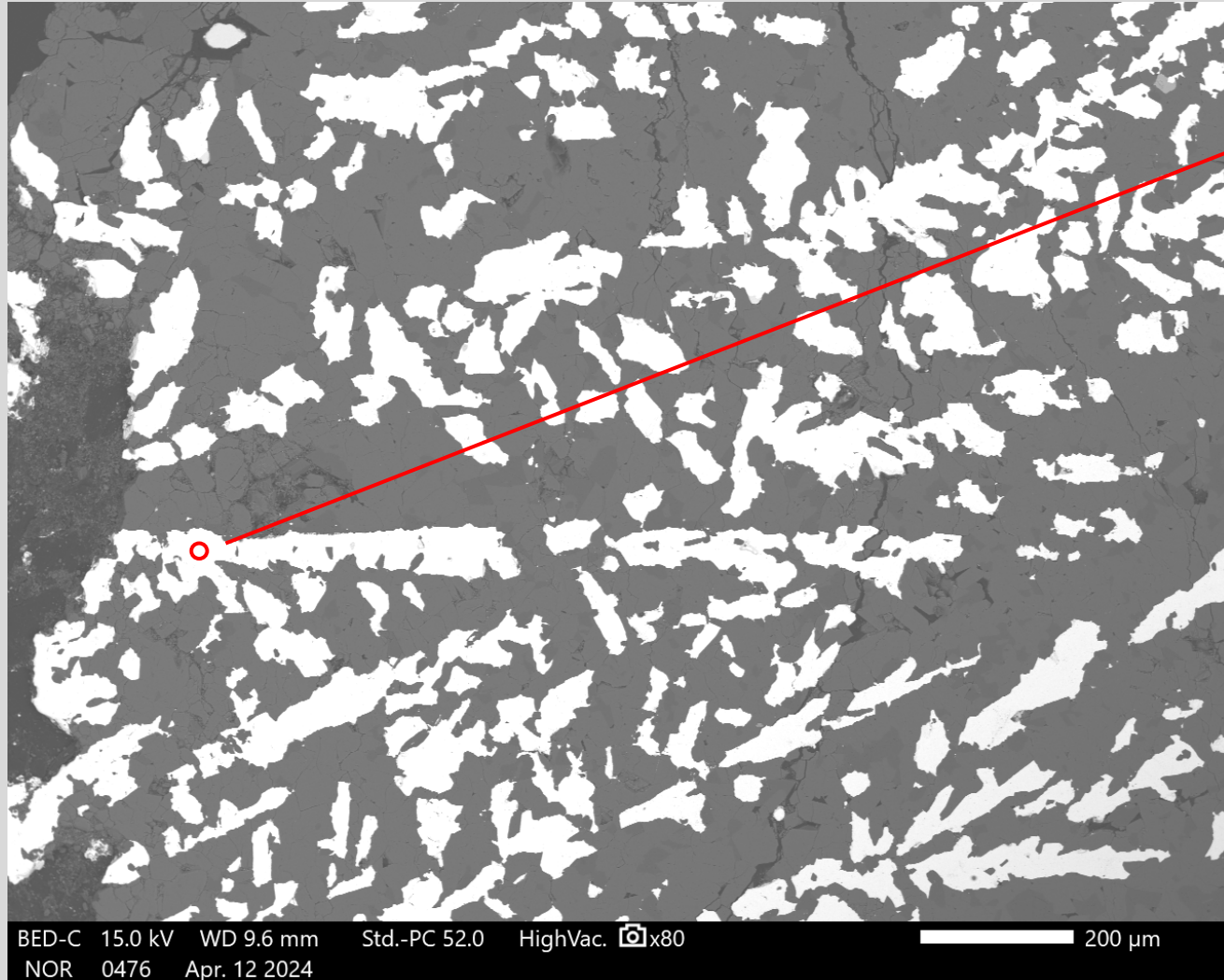
Guiding Question

- Does concentration of Au vary within the dendritic structure as you go further towards the edge?

Methods

- Took pre-made thin section to NDSU Electron Microscopy Core
- Thin section was attached to plate using tape
- Plate was mounted into holder
- Seven photos were taken using Backscatter Electron Detection (BED-C)
 - SEM model: JEOL JSM-IT200-LA
- Each photo had 5 points taken for chemical analysis
 - 46 seconds per point
- Data was exported and then added to an excel spreadsheet to determine overall trends of Au concentration

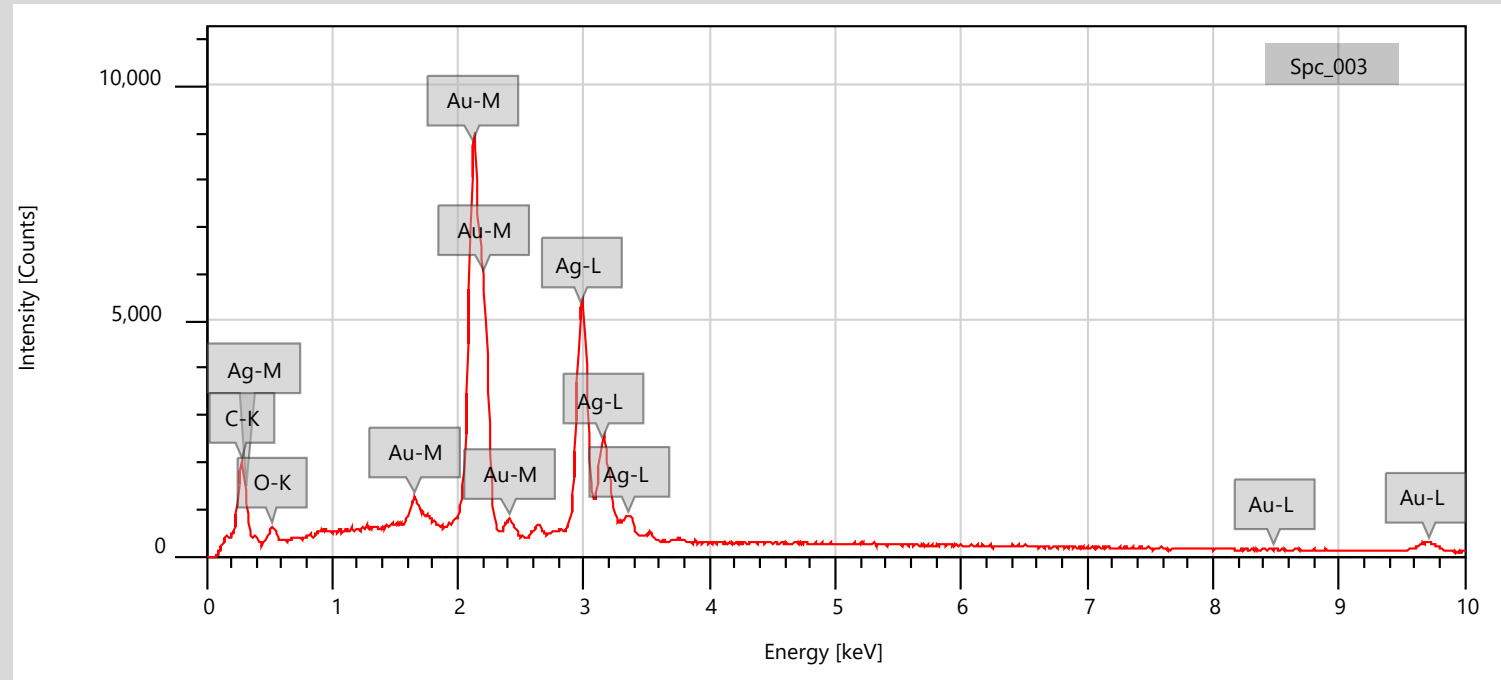
Example Image



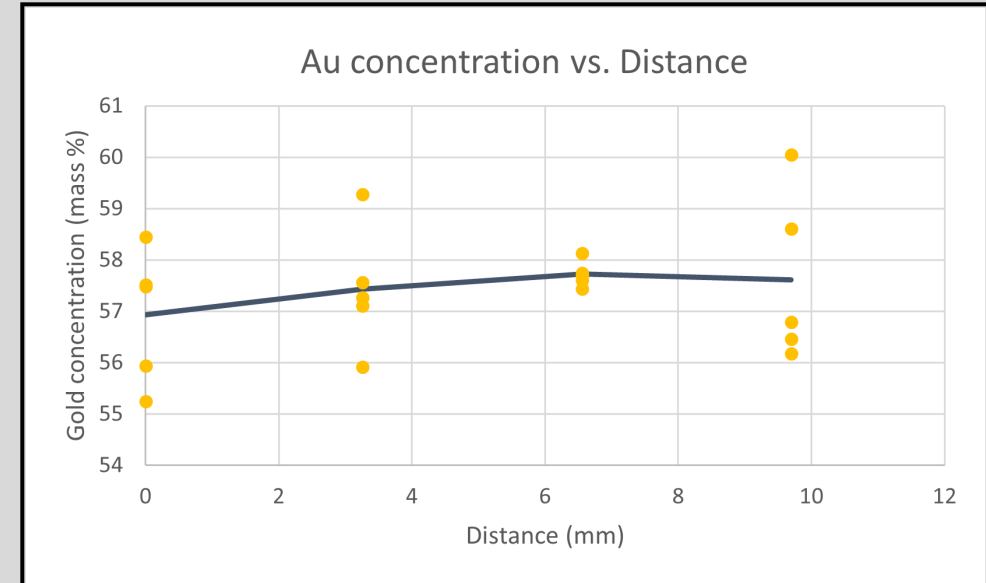
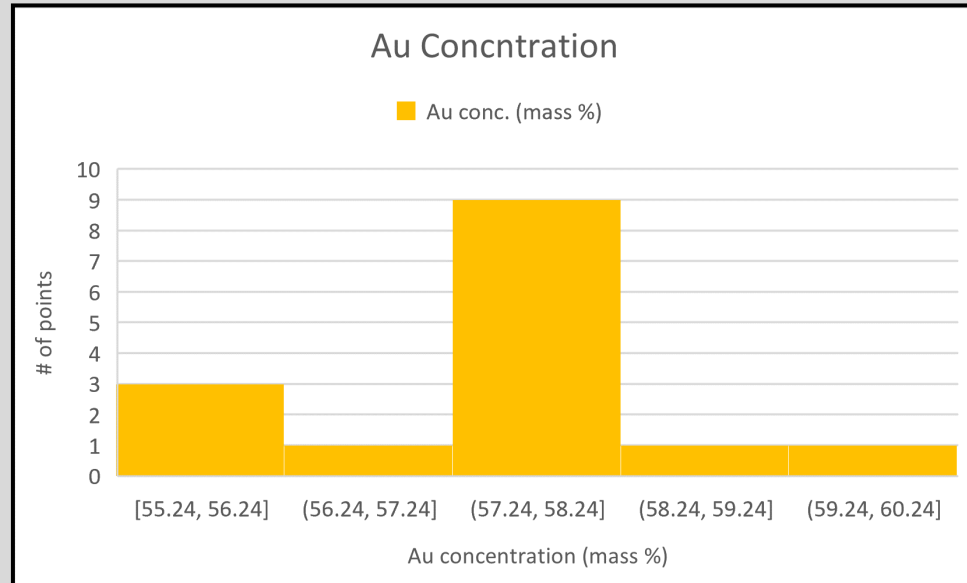
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- Bright areas are Electrum
- Grey areas are vein qtz/cc

Example of Data



Results



- Standard Error was +/- 0.25%
- Majority of points sampled fell between 57.24% and 58.24% Au
- Au concentration did not show an overall increase or decrease in concentration over distance

Recommendations

- Add further analysis to determine if trends are local
- Request for further sampling from other veins within Fire Creek Mine
- SEM analysis to determine composition of vein mineralogy

Acknowledgements

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- The rest of the NDSU Microscopy Core