A study of the sulfide assemblage below the J-M Reef, Stillwater Complex, Montana

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Location
Problem: orthomagmatic or hydromagmatic?

‘Downers’ Model
Magmatic sulfide accumulation
Problem: orthomagmatic or hydromagmatic?

‘Uppers’ Model
Vapor refining
Results: Igneous sulfides (PZ)

Abbreviations:
Opx orthopyroxene; Cpx clinopyroxene; Ol olivine; Py pyrite; Ccp chalcopyrite; Pn pentlandite; Po pyrrhotite
Results: High-T sulfides (BZ and GN-I)

Abbreviations:
- Opx orthopyroxene
- Cpx clinopyroxene
- Bt biotite
- Pl plagioclase
- Qz quartz
- Cal calcite
- Py pyrite
- Ccp chalcopyrite
- Pn pentlandite
- Po pyrrhotite
- Sp sphalerite
- Mag magnetite
Results: Native Copper (GN-I)

Abbreviations:
- Opx orthopyroxene
- Cpx clinopyroxene
- Pl plagioclase
- Qz quartz
- Carb carbonate
- Py pyrite
- Pn pentlandite
- Po pyrrhotite
- Cu native copper
Results: Sphalerite (GN-I)

Abbreviations:
Sp sphalerite; Pl plagioclase; Hbl hornblende; Qz quartz; Cal calcite
Results: Quantitative sulfide data
Results: Sulfide distribution

Gabbronorite Zone I
(n = 24)

Peridotite Zone
(n = 25)
Conclusions

- Much Py and Ccp
- Native Copper
- High-T veins
- Igneous and high-T assemblages

- Little Py and Ccp
- Much Pn
- Igneous and high-T assemblages
Acknowledgements