Advances in Geologic Understanding of the Central Big Delta Quadrangle, Alaska

by

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Overview

- Comparisons of existing geologic maps and interpretations to new data
- DGGS approach to geologic mapping
- Relationships between geology and mineral deposits
Rock Staining

COLOR KEY:
Gray = quartz
Yellow = K-feldspar
Pink = plagioclase feldspar
Mineral potential of the Central Big Delta Quadrangle

- Ultramafic-related PGE potential
- Gold potential
Nail Ridge Ultramafic rocks – Type I

Total Field Magnetics

Potassium
Harzburgite & Serpentinite

Meta-argillite
Ultramafic rocks folded within amphibolite facies rocks

**Type II**

Ultramafic rocks (dark green unit) and associated amphibolite ± tonalitic orthogneiss ± hornblende gneiss ± clinopyroxenite ± gabbro (light green unit)
Type II Ultramafic rocks

- Serpentinite
- Talc-carbonate schist
- Folded magnetic amphibolite
- Foliation-parallel ultramafic rocks within amphibolite
Tectonized Harzburgite - Type III
Ultramafic Rocks within Thrust Fault between Amphibolite Facies Rocks

Harzburgite (dark green)

Ultramafic below surface

Total Field Magnetics

7200 Hz Resistivity

Potassium
Low-Angle Fault Zone

Amphibolite-Facies over Amphibolite-Facies Rocks
Bonanza Creek pluton

Bonanza Creek pluton (pink)
7200 Hz Resistivity
Total Field Magnetics
Potassium
Bonanza Creek pluton

- Shape: structurally-controlled body, oriented parallel to and along a major NW-trending fault zone; offset by late NE-trending faults
- Composition: granite to granodiorite
- Texture: equigranular to porphyritic
- Age: \(^{40}\text{Ar}/^{39}\text{Ar}\) hornblende plateau age of 92.8 ± 0.6 Ma
- Broadly associated mineral potential: Mo (Au?)

Granite with molybdenite-quartz vein
Gold Mineralization Models

- NW-trending high-angle faults (e.g., Richardson District; fault west of Pogo)
- 104 Ma mineralization (e.g., Black Mtn., Pogo, Bald Knob) questionably associated with calc-alkaline plutons
- \(~90\) Ma Alkalic pluton-related Au (e.g., Hook target(?), No Grub pluton)
- \(~90\) Ma Calc-alkaline pluton-related Au
Ages & types of Igneous Rocks & Mineralization

AGES (Ma)
COLOR KEY:
Pluton
90-Mineralization
104-Mineralization
Amphibolite

Tg - granite -- EXTENSION
~90 Ma & Kg: SUBDUCTION
Kg ~ 107-101 - granodiorite & granite - SUBDUCTION
Kcg - muscovite granite
~114? Ma -- COLLISIONAL

Foliated (Jurassic?) Pluton
Pgc - ultramafic rocks
Pu/Pzu - greenstone and chert
MDa - augen gneiss (~346 Ma)