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

by

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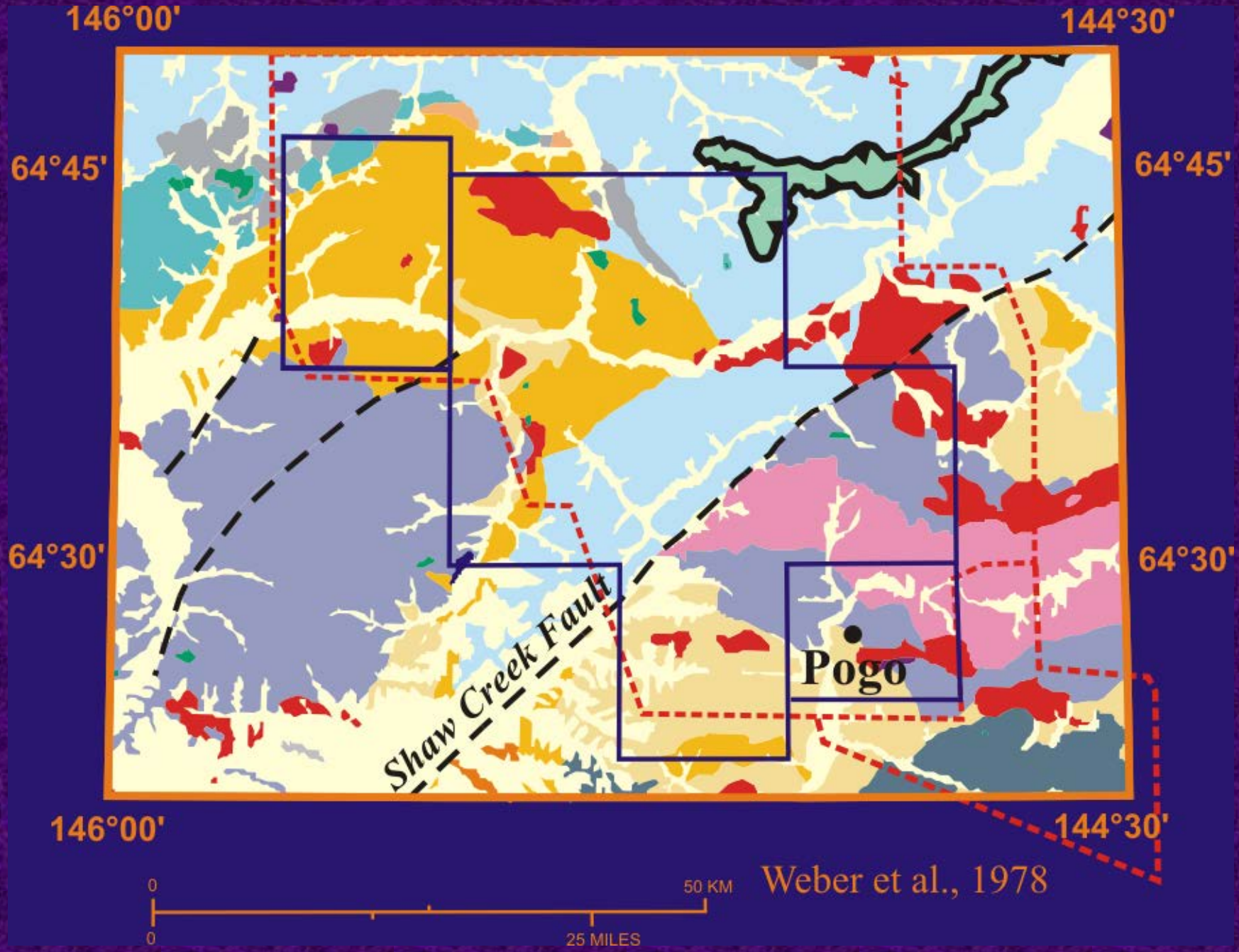
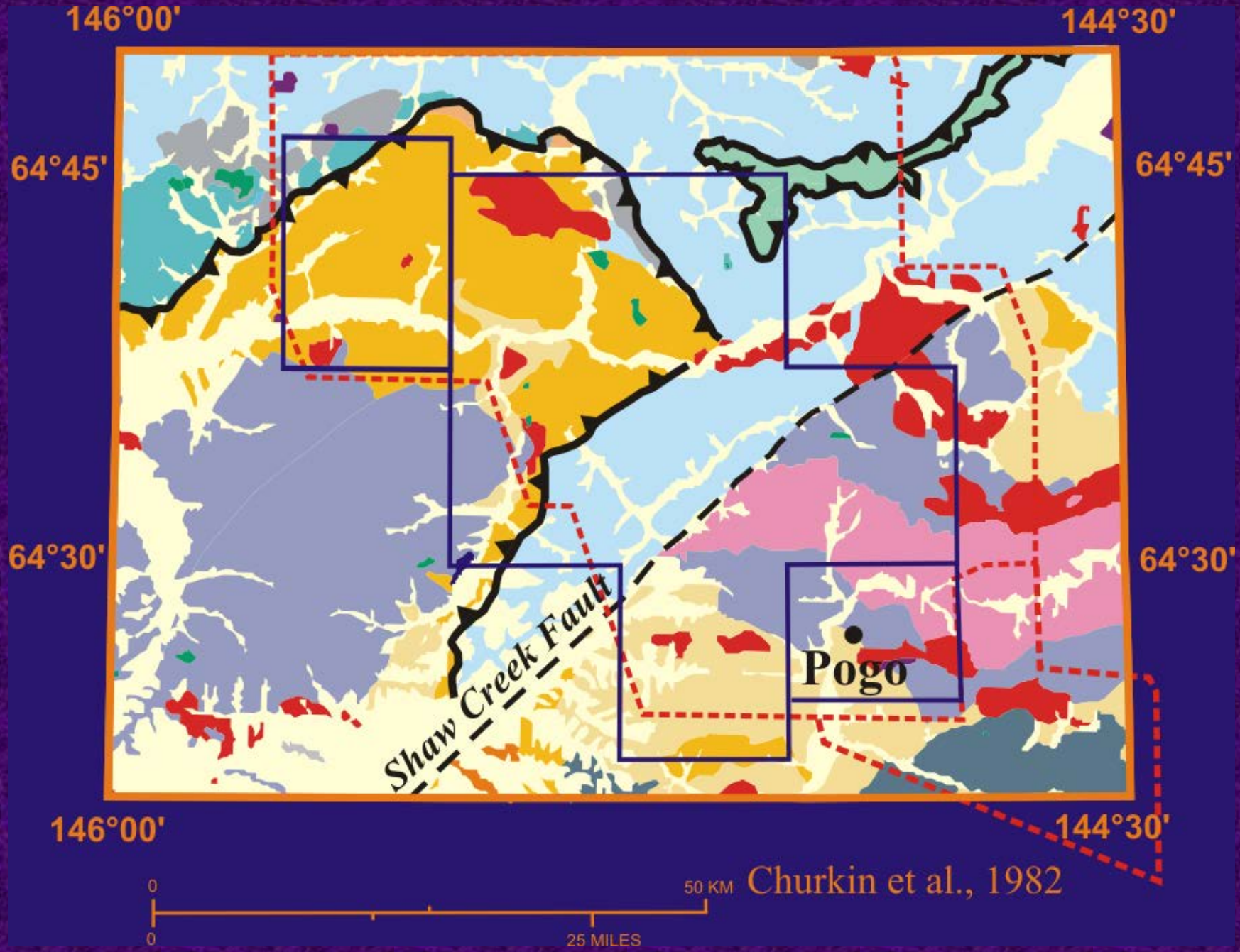
Alaska Miners Association Meeting, November 6, 2002

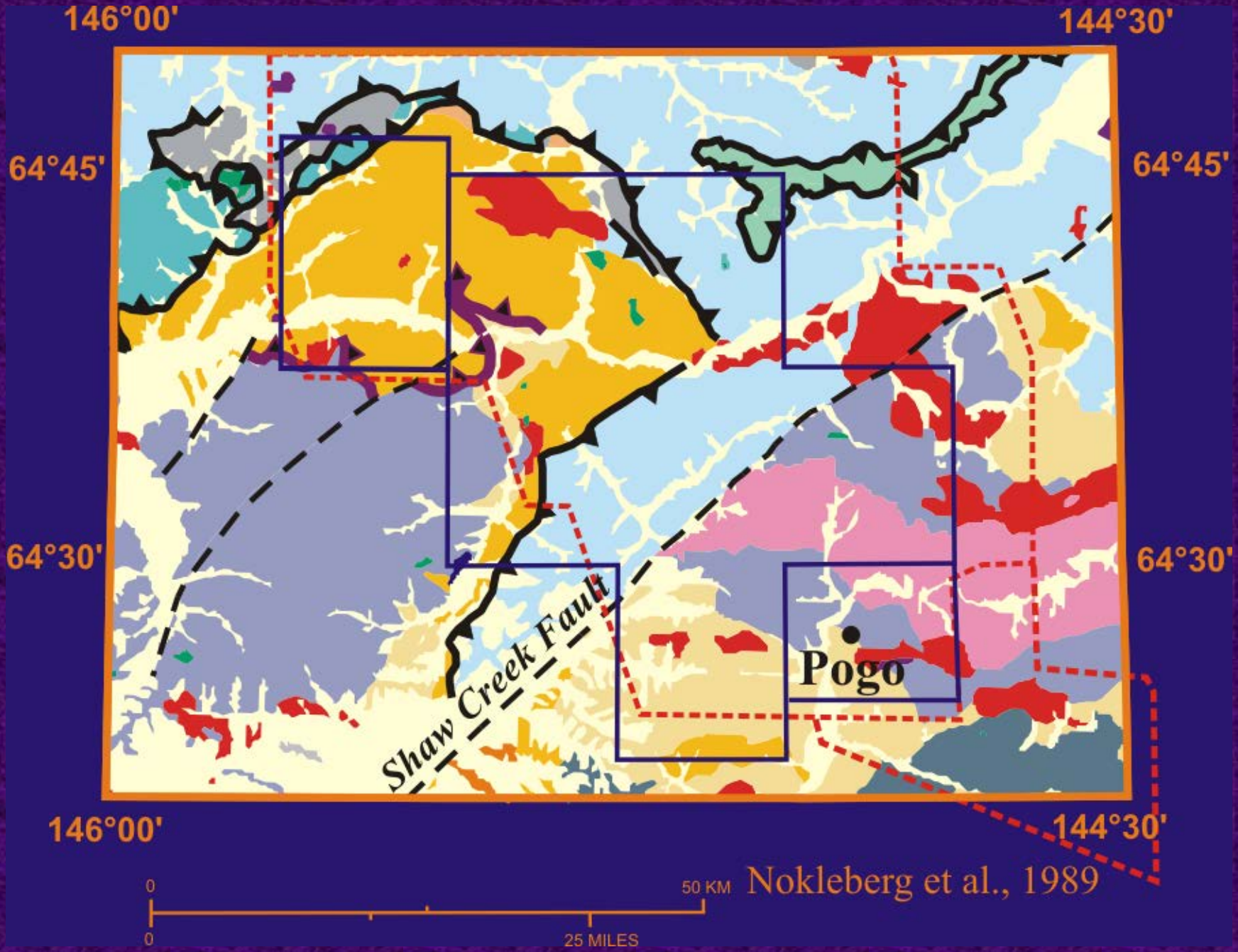
2002 Salcha River – Pogo Crew

Overview

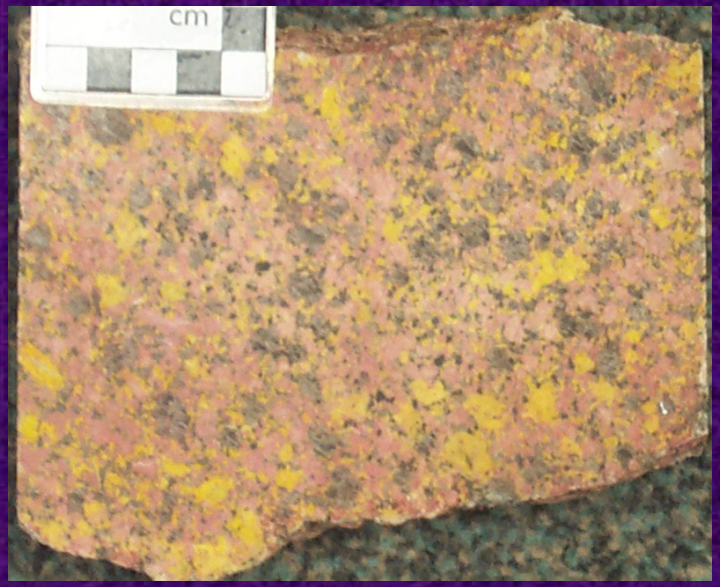
- Comparisons of existing geologic maps and interpretations to new data
- DGGS approach to geologic mapping
- Relationships between geology and mineral deposits


146°00'
144°30'
64°45'
64°30'
Shaw Creek Fault
Pogo
0
50 KM
0
25 MILES
Weber et al., 1978


146°00'
144°30'
64°45'
64°30'
Shaw Creek Fault
Pogo
0
50 KM
0
25 MILES
Churkin et al., 1982


146°00'
144°30'
64°45'
64°30'
Shaw Creek Fault
Pogo
0
50 KM
0
25 MILES
Nokleberg et al., 1989

Rock Staining

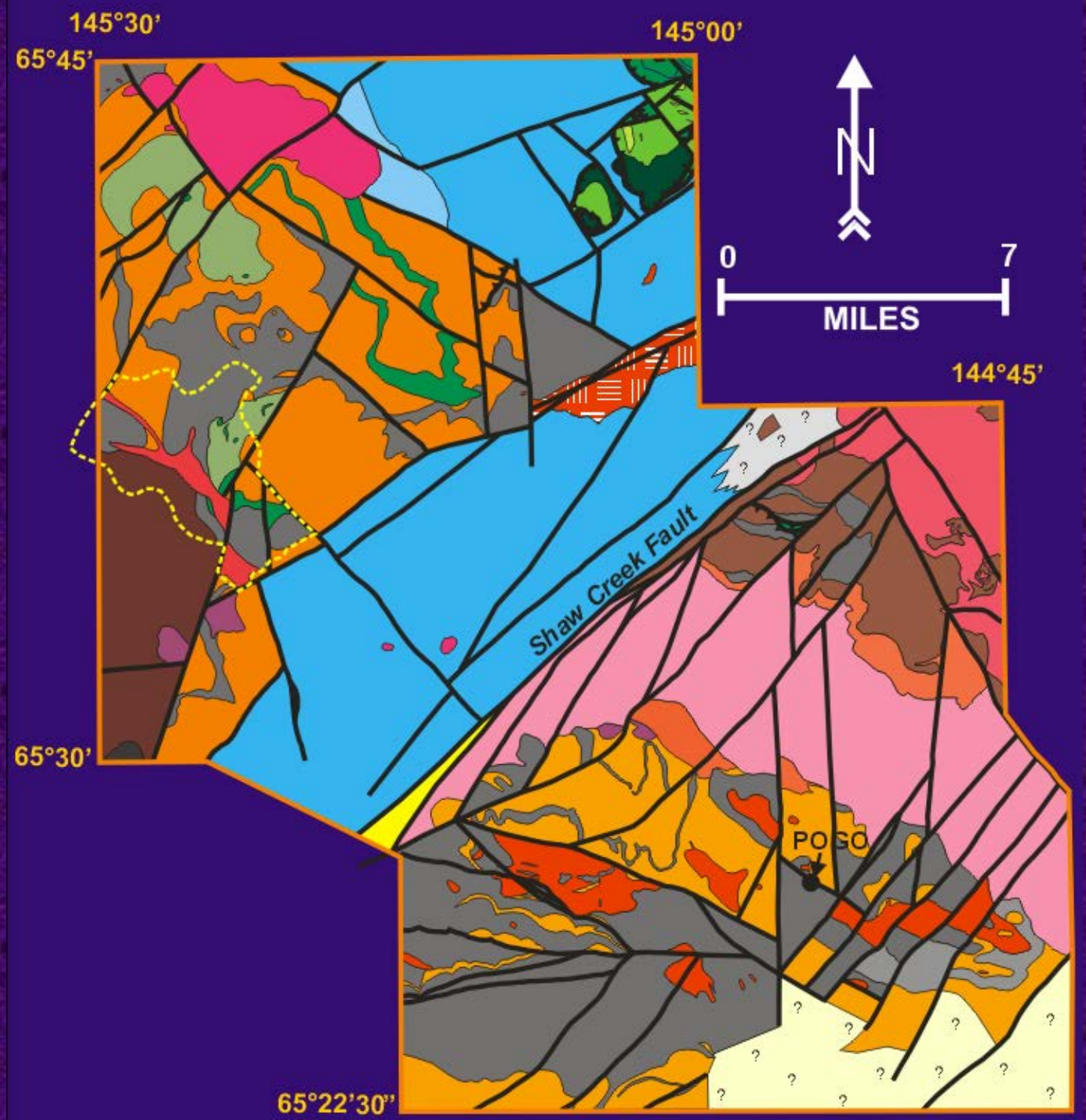


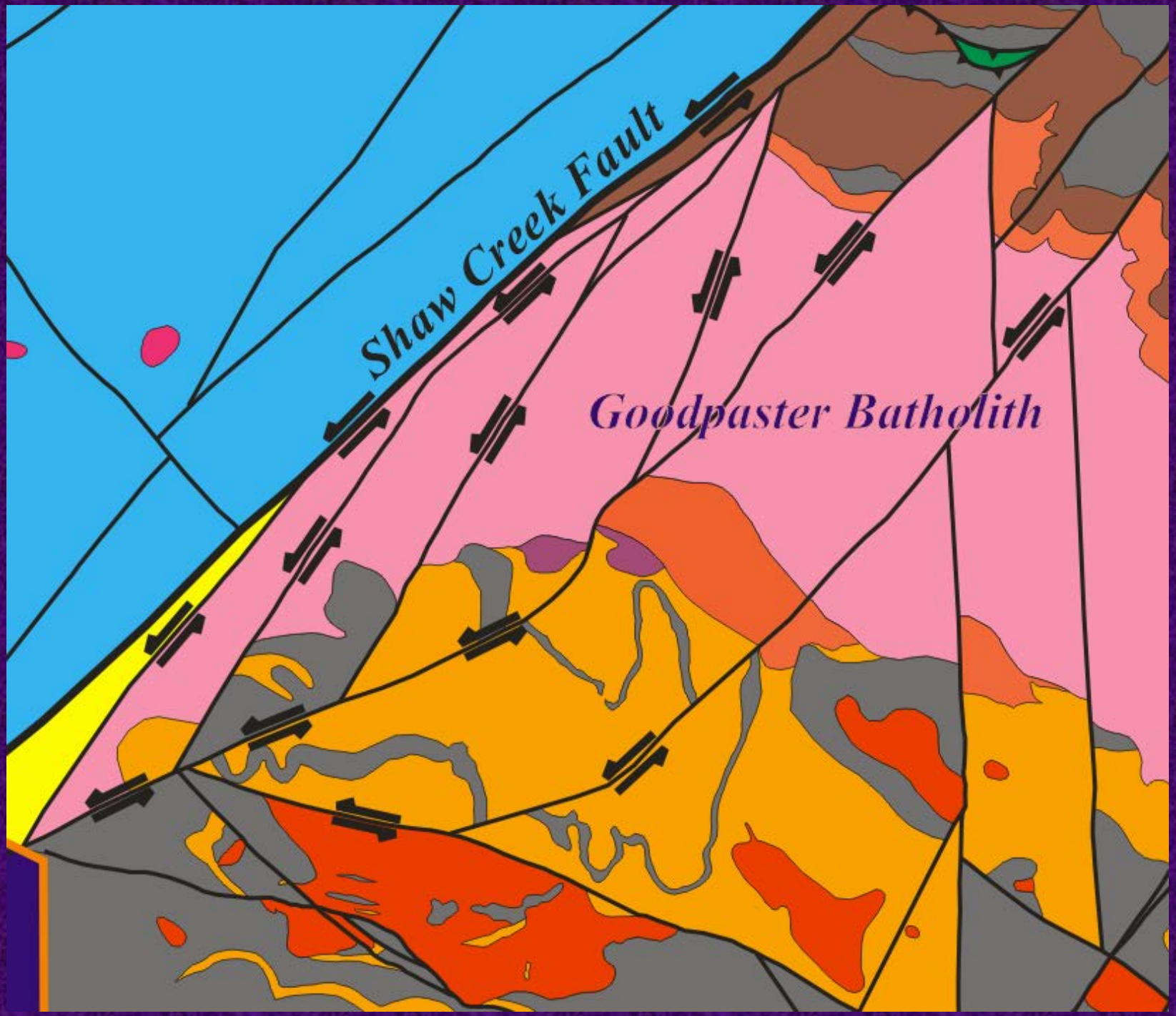
COLOR KEY:

Gray = quartz

Yellow = K-feldspar

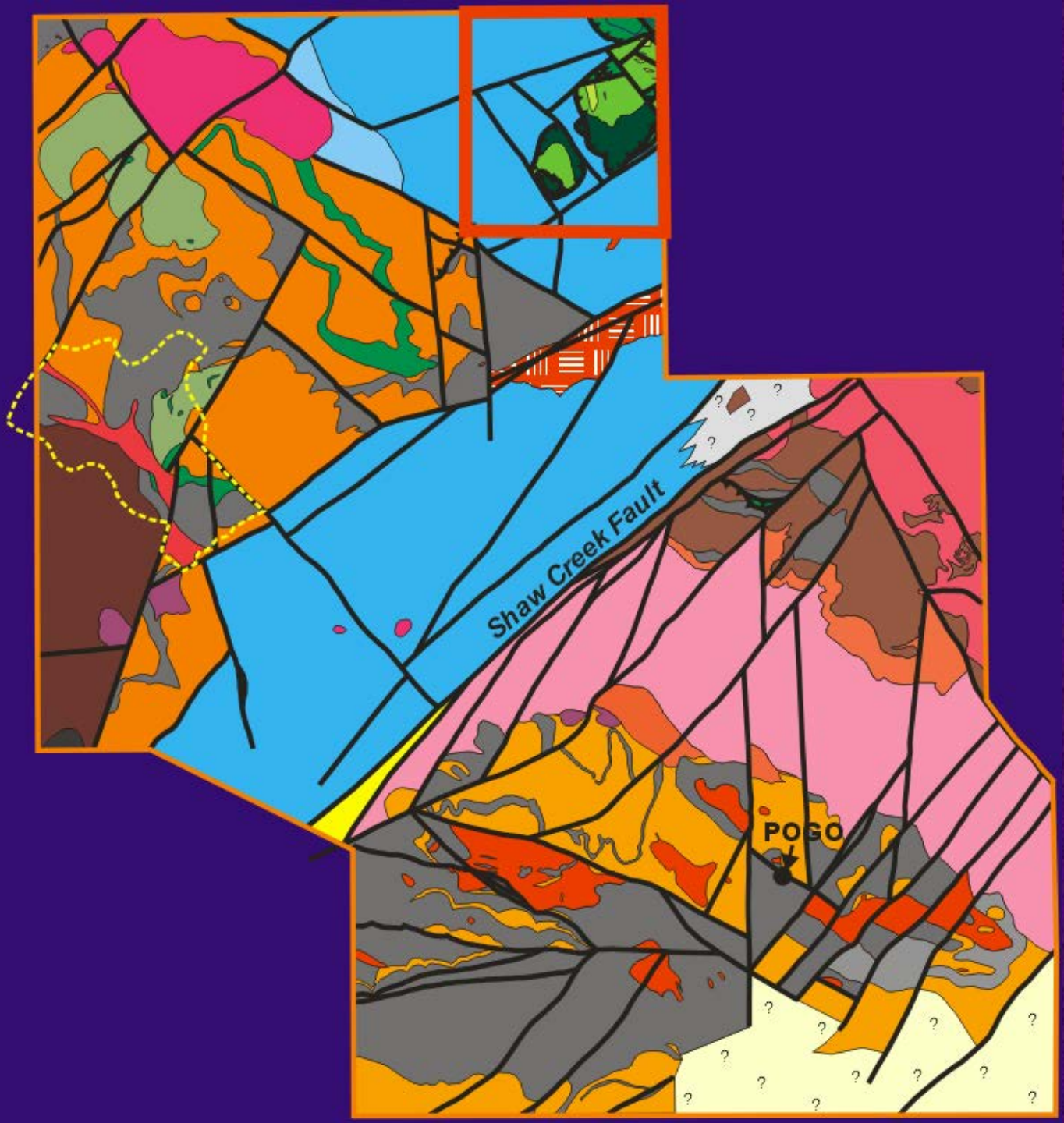
Pink = plagioclase feldspar


145°30'
145°00'
65°45'
N
0
7
MILES
144°45'
Shaw Creek Fault
65°30'
POGO
65°22'30"

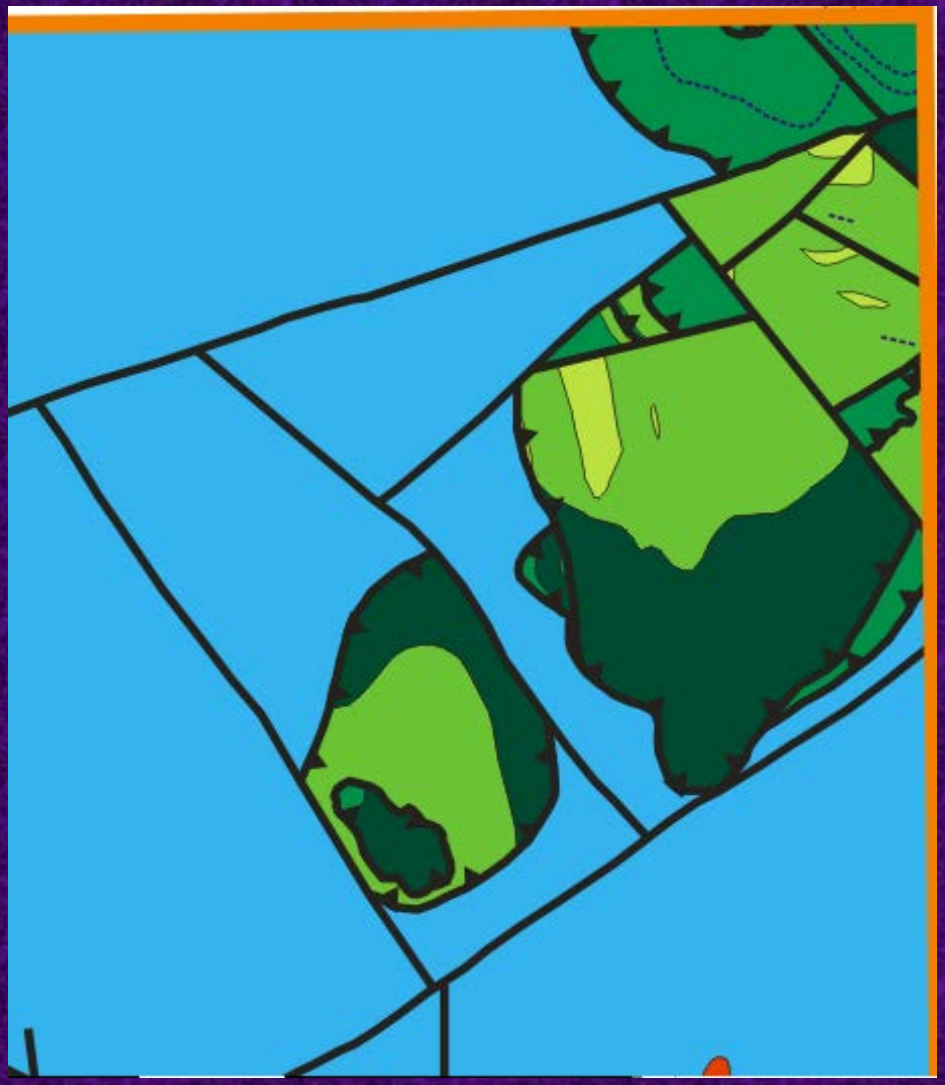

Shaw Creek Fault
Goodpaster Batholith

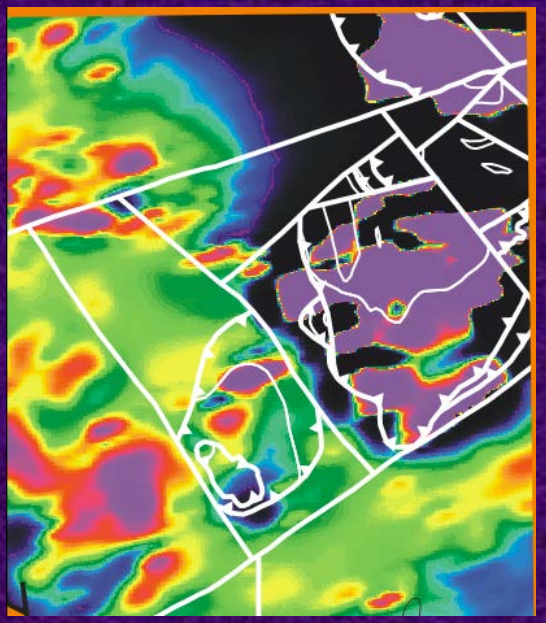
Mineral potential of the Central Big Delta Quadrangle

- Ultramafic-related PGE potential
- Gold potential

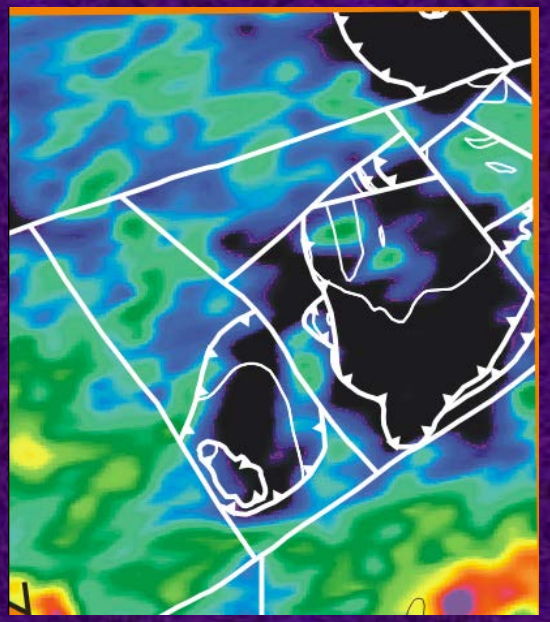

Shaw Creek Fault
POGO

Nail Ridge Ultramafic rocks – Type I

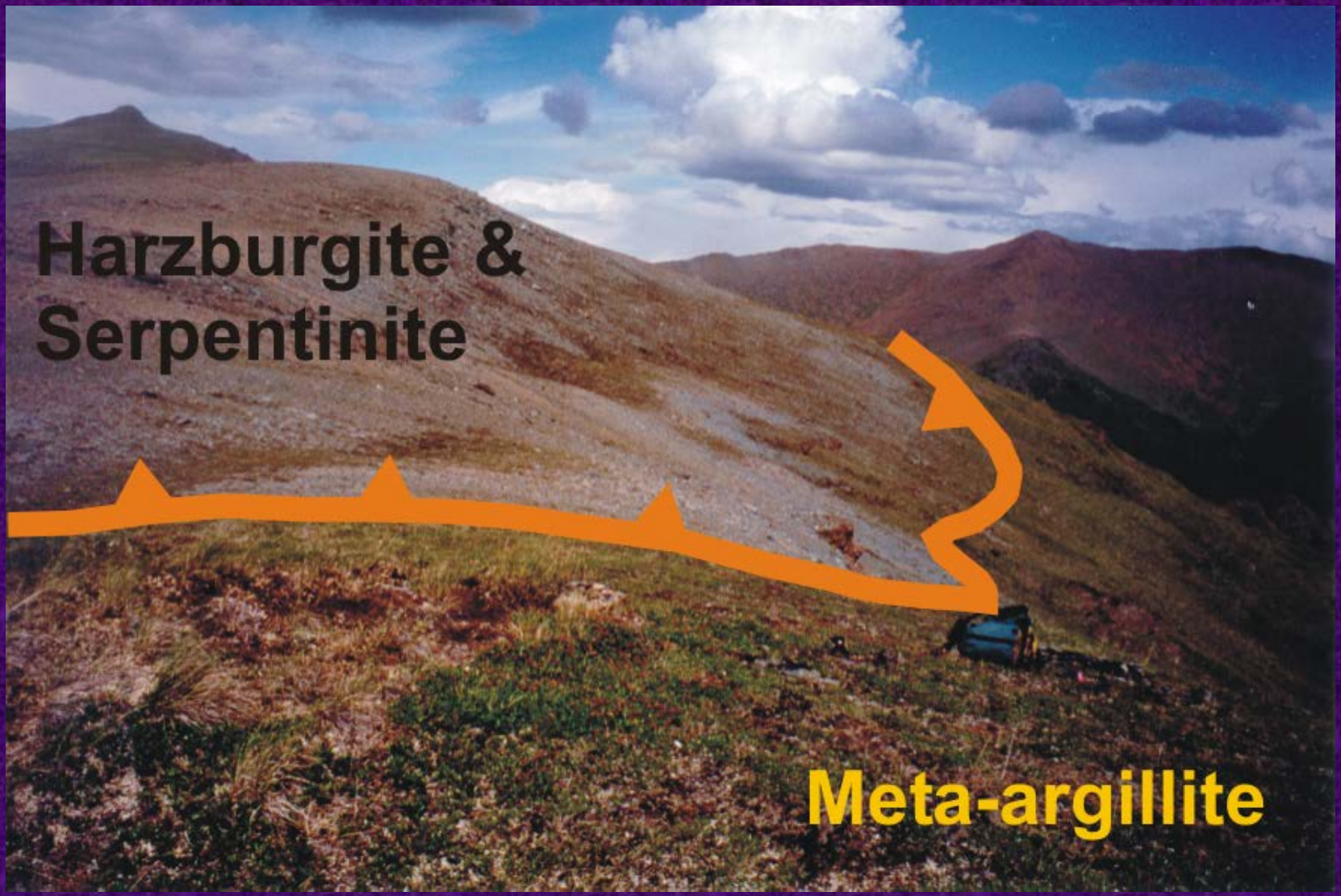




Total Field Magnetics



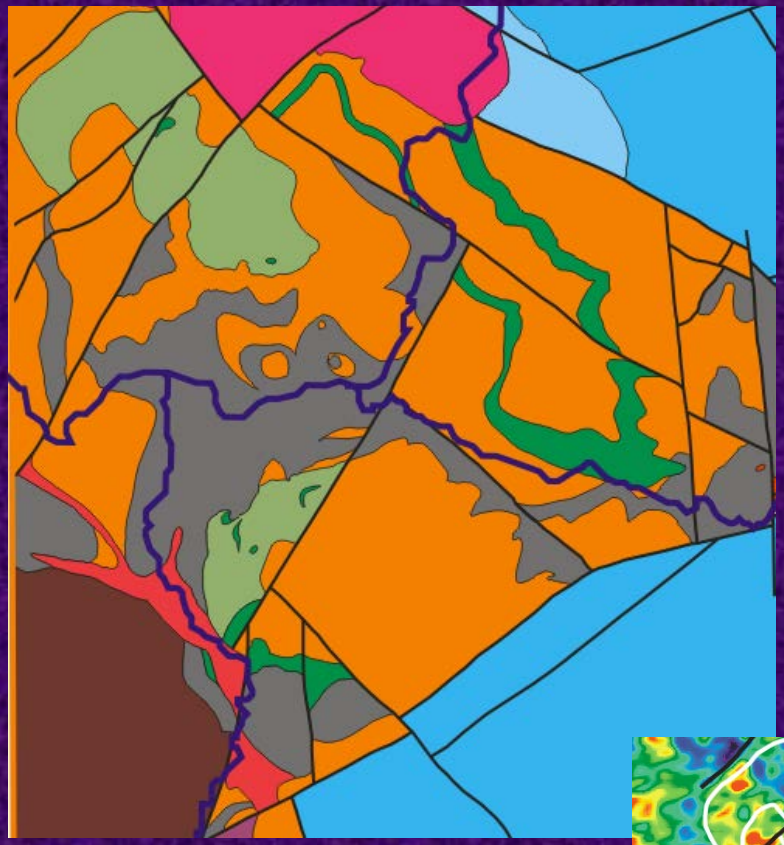
Potassium


Harzburgite &
Serpentinite
Meta-argillite


Shaw Creek Fault
POGO

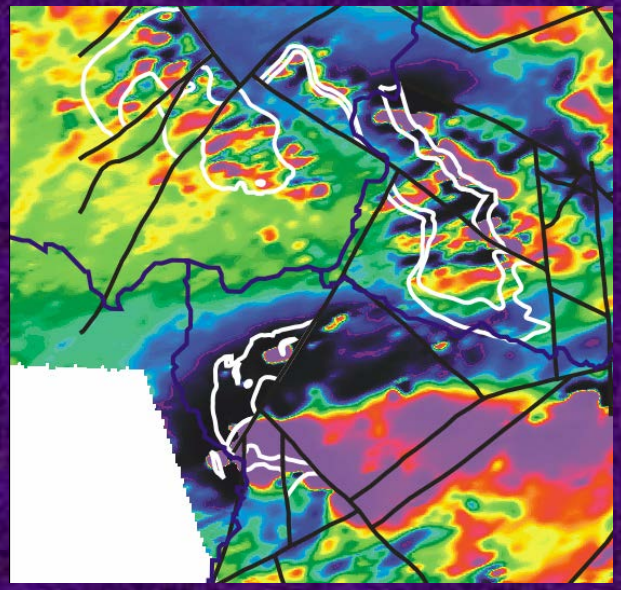
Ultramafic rocks folded within amphibolite facies rocks

Type II

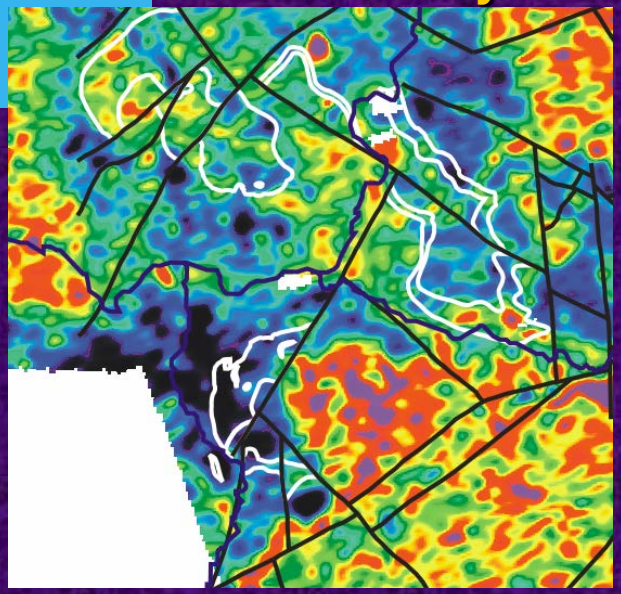


Ultramafic rocks (dark green unit) and associated amphibolite ± tonalitic orthogneiss ± hornblende gneiss ± clinopyroxenite ± gabbro (light green unit)

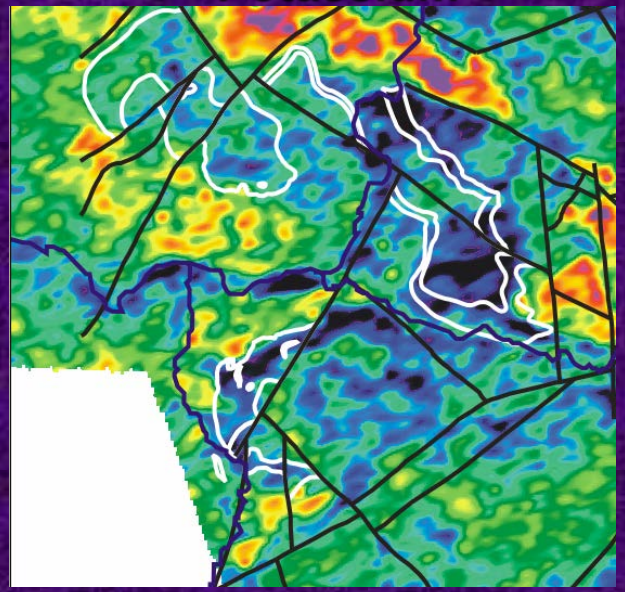
Total Field Magnetics



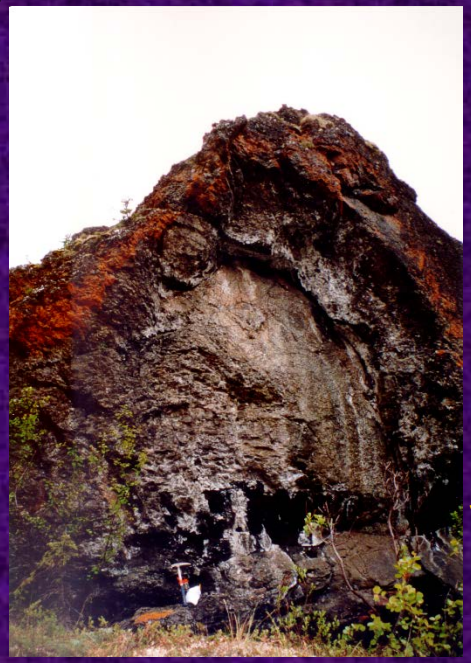
7200 Hz Resistivity



Potassium



Type II Ultramafic rocks



Serpentinite

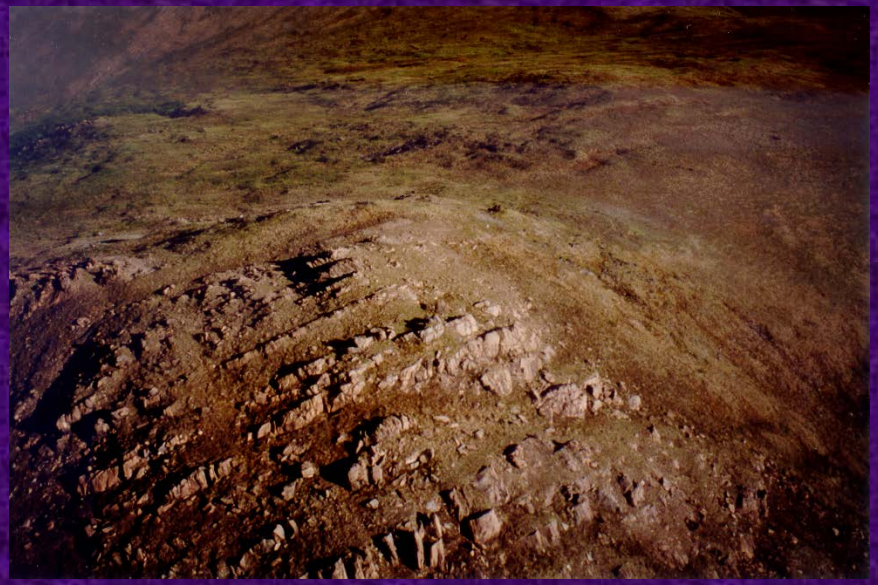
Talc-carbonate schist

Folded magnetic amphibolite

Foliation-parallel ultramafic rocks within amphibolite

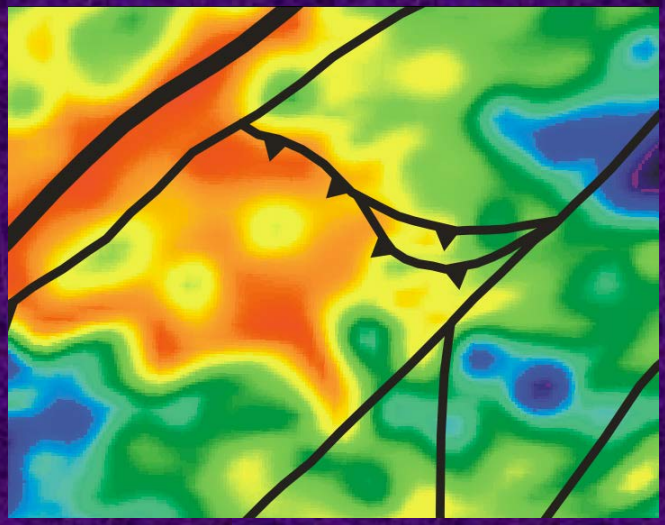

Shaw Creek Fault
POGO

Tectonized Harzburgite – Type III

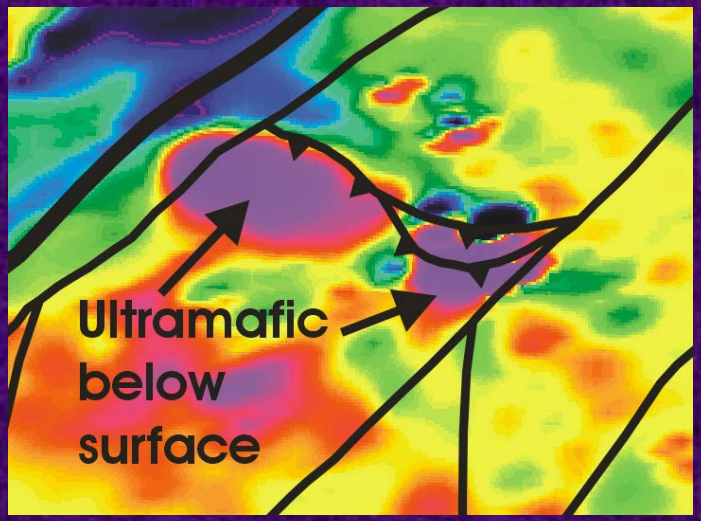


Ultramafic Rocks within Thrust Fault between Amphibolite Facies Rocks

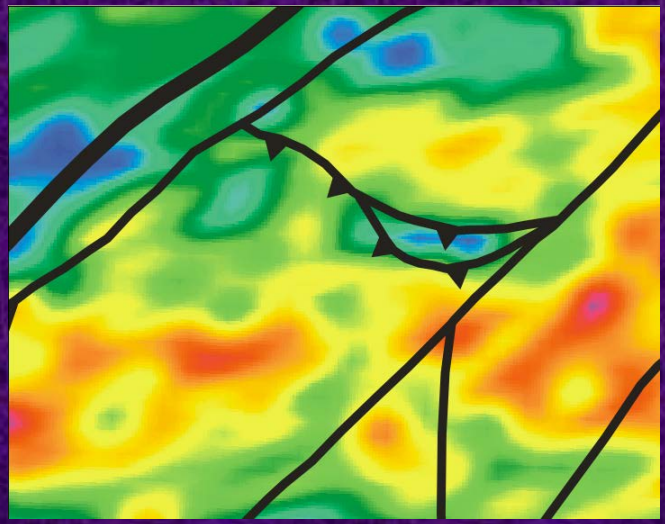
Harzburgite (dark green)



7200 Hz Resistivity



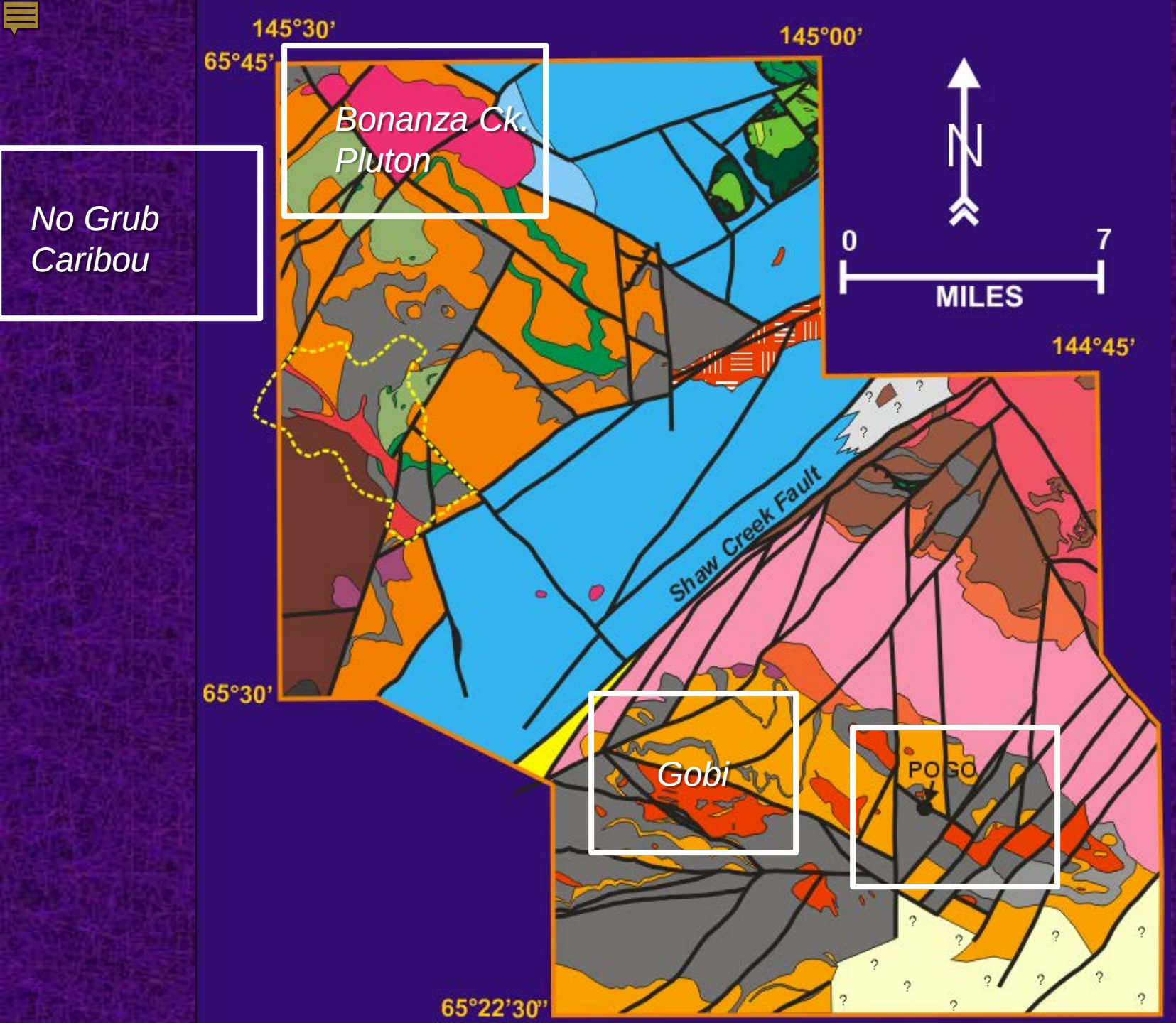
Total Field Magnetics



Potassium

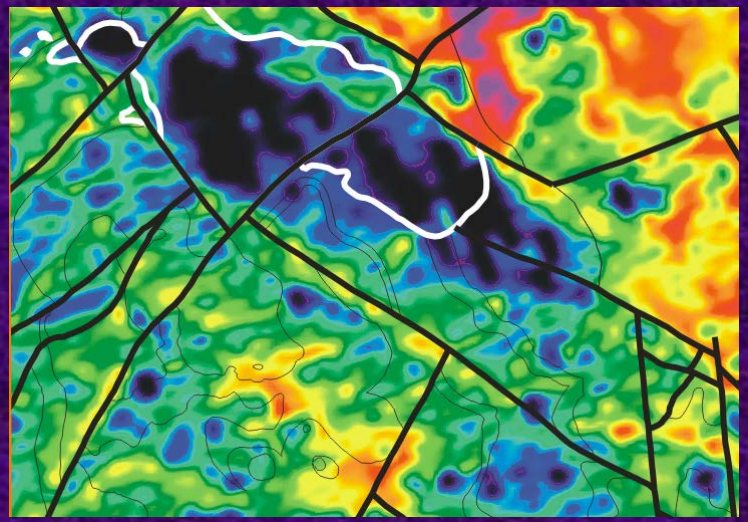
Low-Angle Fault Zone

Amphibolite-Facies over Amphibolite-Facies Rocks

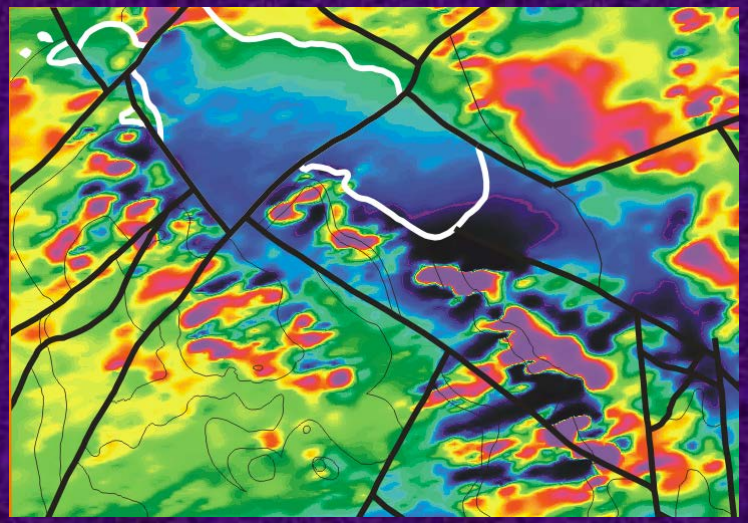

145°30'
65°45'
145°00'
Bonanza Ck.
Pluton
No Grub
Caribou
N
0
7
MILES
144°45'
Shaw Creek Fault
65°30'
Gobi
POGO
65°22'30"

Bonanza Creek pluton

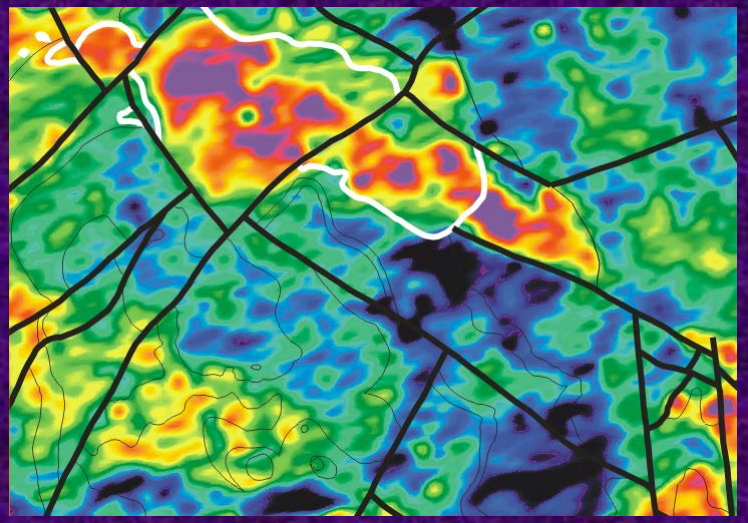
Bonanza Creek pluton (pink)



7200 Hz Resistivity



Total Field Magnetics



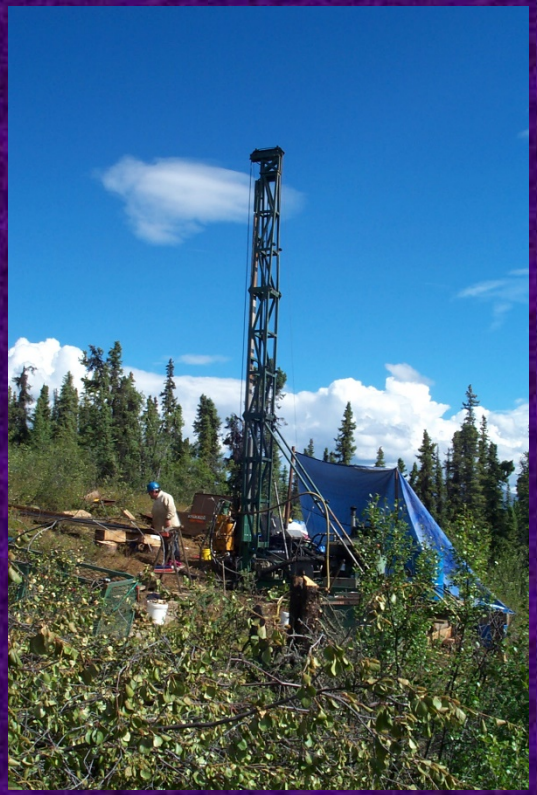
Potassium

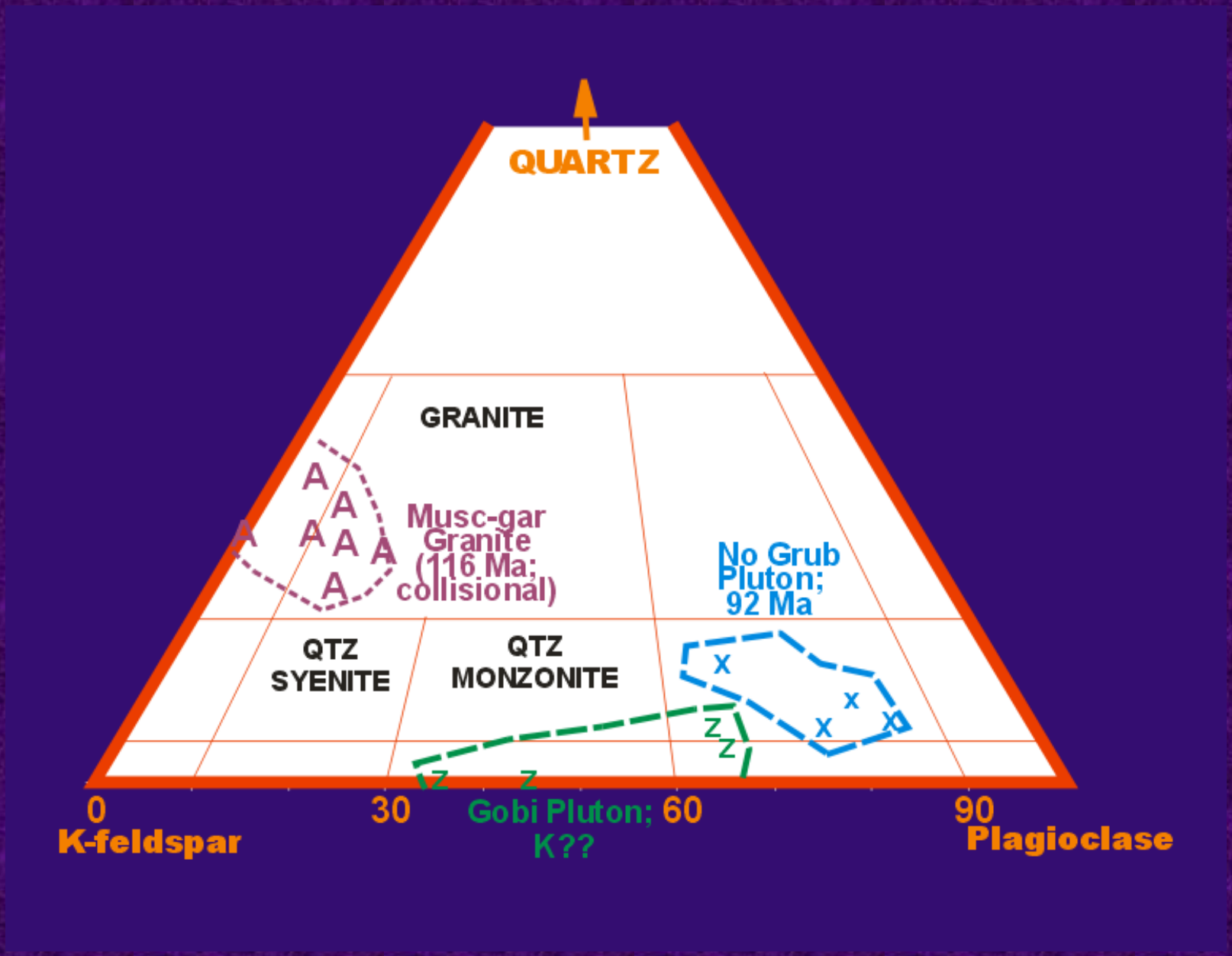
Bonanza Creek pluton

- 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: $^{40}Ar/^{39}Ar$ hornblende plateau age of 92.8 ± 0.6 Ma
- Broadly associated mineral potential: Mo (Au?)

Granite with molybdenite-quartz vein

Hook Target, Gobi Property
Summer 2002 Drilling Program

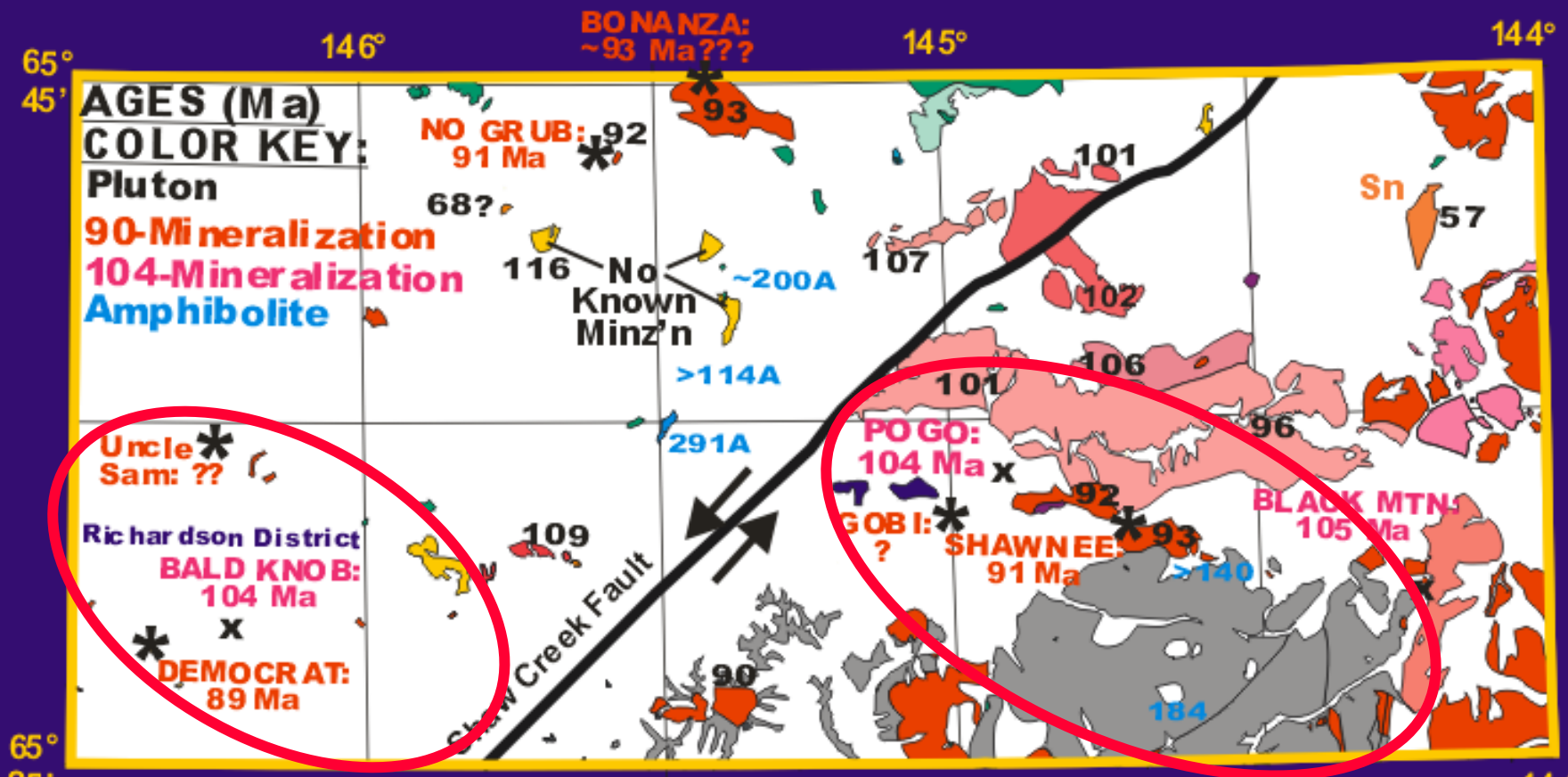



QUARTZ
GRANITE
Musc-gar Granite (116 Ma; collisional)
No Grub Pluton; 92 Ma
QTZ SYENITE
QTZ MONZONITE
Gobi Pluton; K??
0
30
60
90
K-feldspar
Plagioclase

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



- Tg - granite-- EXTENSION
- ~90 Ma & K?g: 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)