

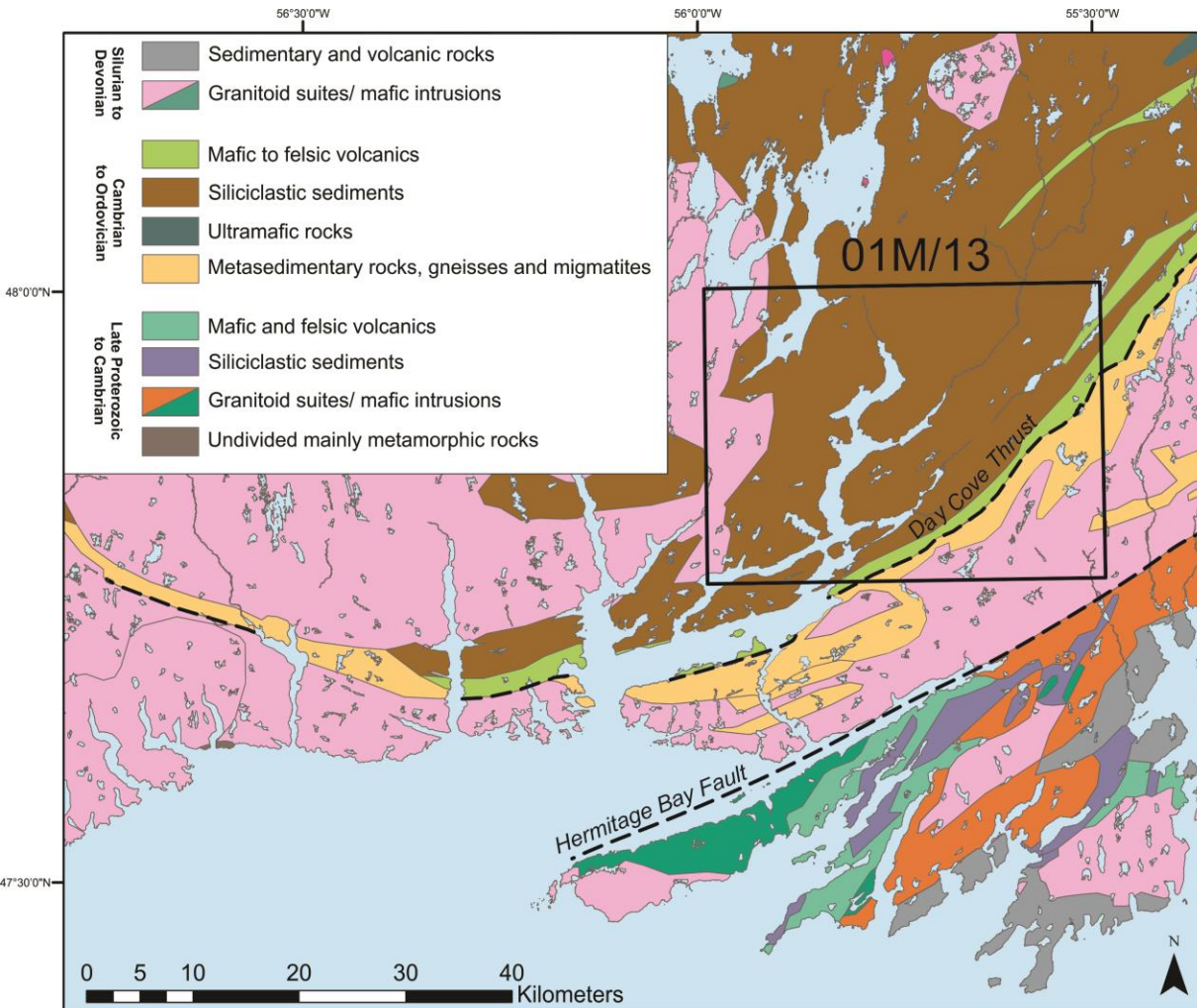


Newfoundland Labrador

**Geology, Geophysics & Gold in
the St. Alban's map area**

01M/13

Regional Geology south coast of Newfoundland



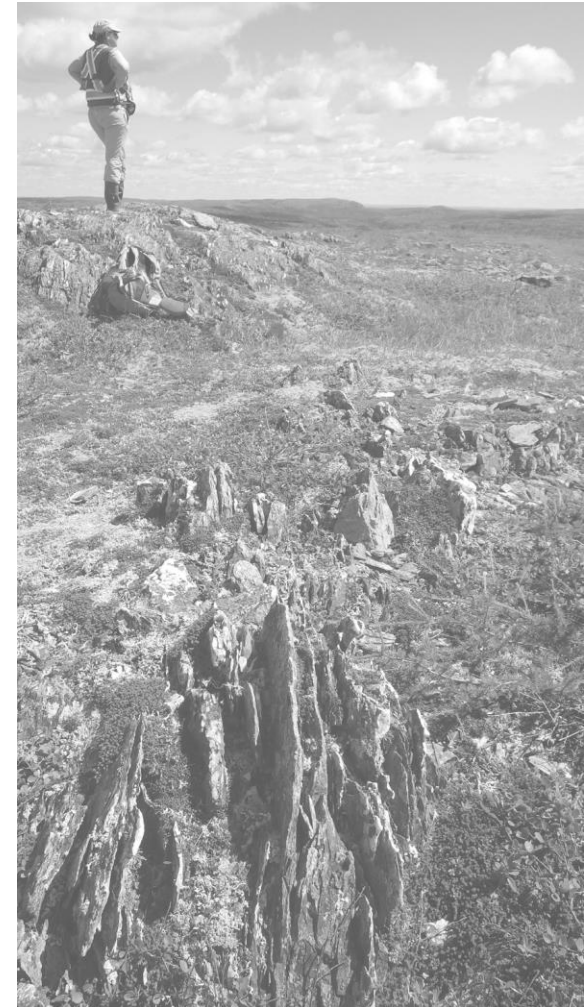
- Avalon Zone**
Avalonia microcontinent,
dominant late Proterozoic
- Gander Zone**
Ganderia, Proterozoic or
Early Paleozoic
basement?
- Dunnage Zone (Exploits)**
Remnants of Iapetus
Ocean
- Avalon Zone**
Cambrian-Ordovician
metasediments and
volcanic rocks

Orogenic Events

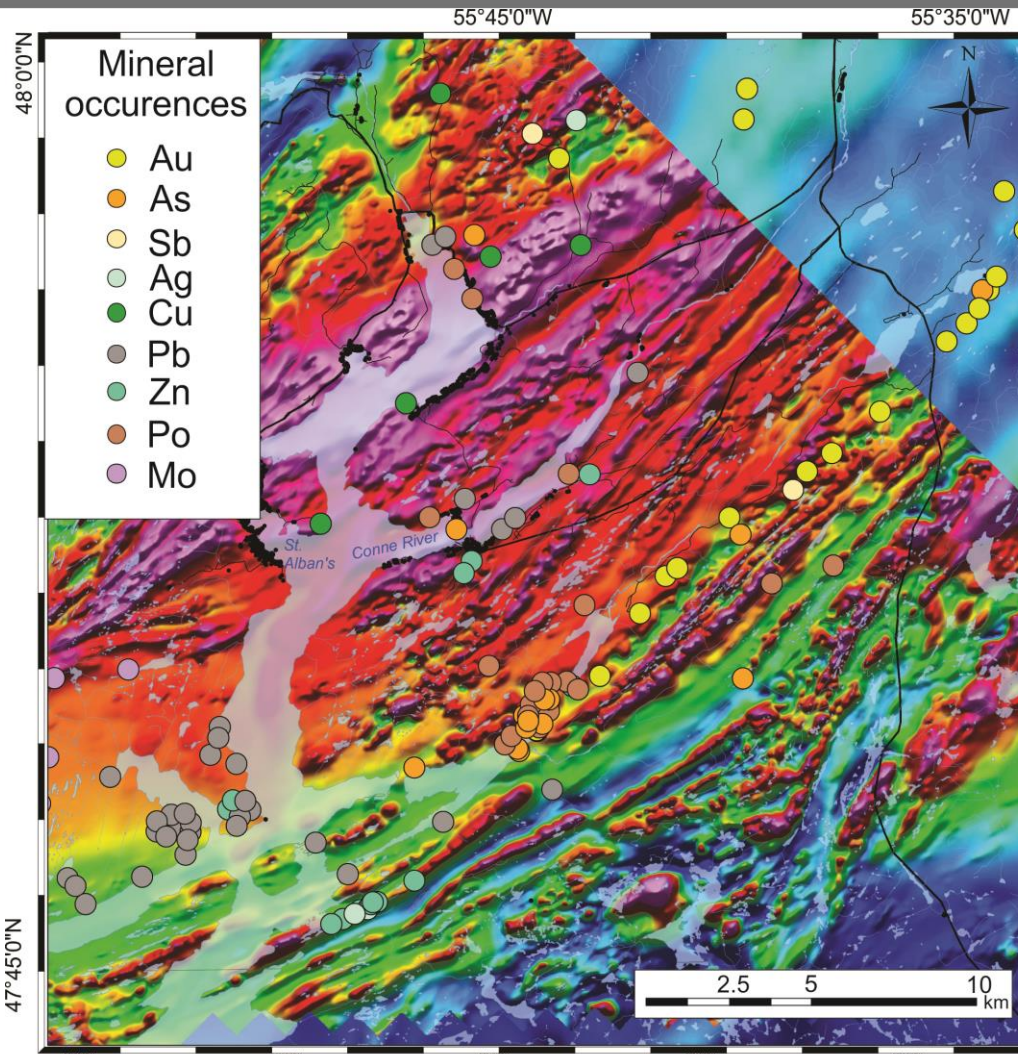
- Penobscot Orogeny (Early Ordovician): ophiolite obduction
- Back-arc rifting + sedimentation
- Salinic Orogeny (Late Ordovician to Early Silurian): closure of Exploits back-arc basin, accretion of Ganderia to Laurentia
- Acadian orogeny (Early Devonian): collision of Ganderia and Avalonia

St. Alban's map area

- new bedrock mapping project
- based on detailed geophysics
- geochemistry
- isotope geochemistry and geochronology (not yet...)
- mineral potential
 - Some exciting Au values



01M/13 – East and Central Residual magnetic field & MODS



Dunnage Zone

metasedimentary layering
well visible
magnetic highs often
graphitic schist/black shale
known Au showings align
along Little River area

Gander Zone

complex relationship
between gneiss (rel. high)
and intrusion (rel. low) visible
in geophysical signature

Overview of geological units

- Little Passage Gneiss, Neoproterozoic to Ordovician (Gander) amphibolite facies
separated by Day Cove thrust from
- Baie d'Espoir Group, Ordovician (Dunnage)
 - Salmon River Dam Fm.
 - St. Joseph's Cove Fm.
 - Riches Island Fm.
 - Isle Galet Fm.
- Intrusive rocks, post Ordovician

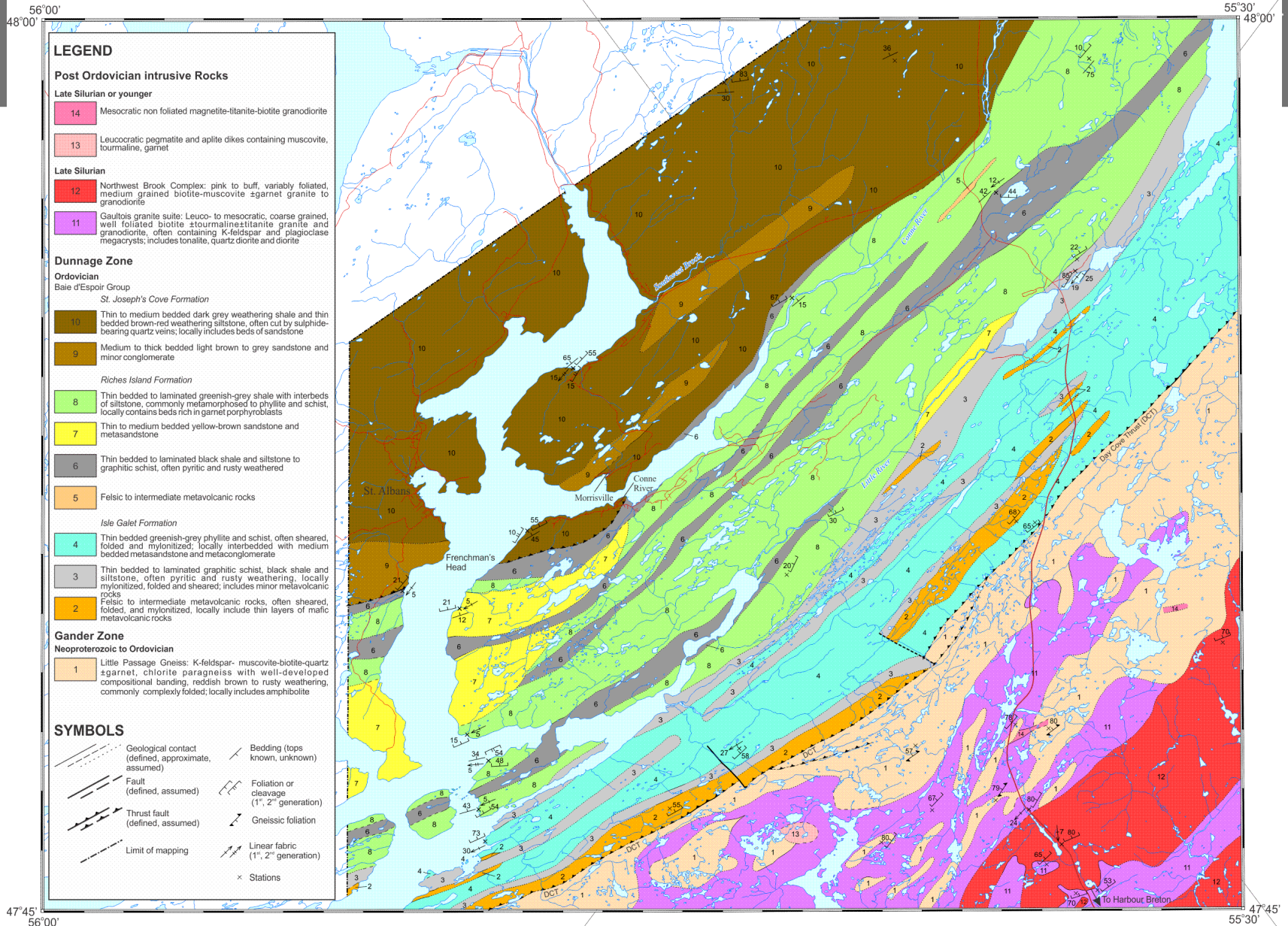


Increasing
deformation,
greenschist to
epidote-amphibole
facies

Geological map – East & Centre



 Newfoundland



Westhues (2017, in press)

St. Joseph's Cove Fm.



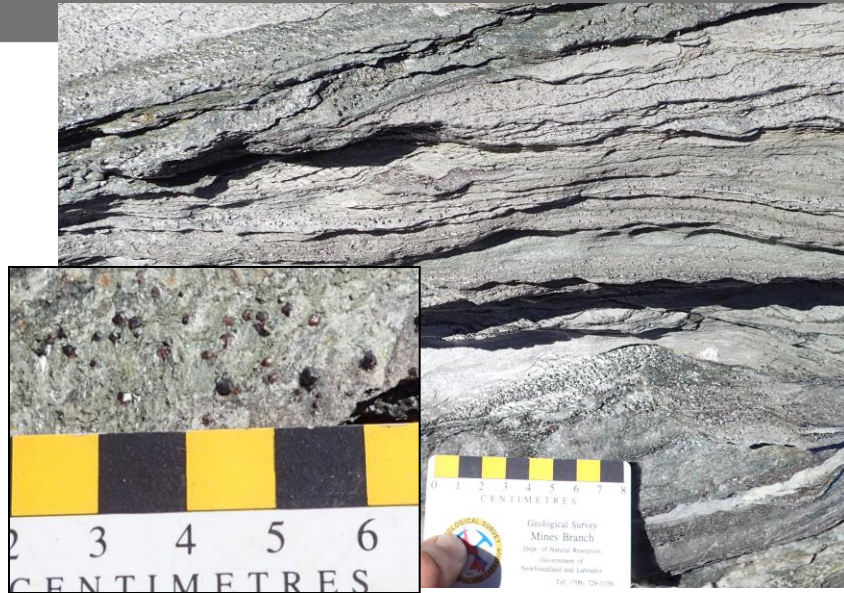
dominantly interbedded shale
and siltstone (turbidite)

two generations of cleavage and
related folding

large recumbant folds (F_2)

few sandstone channels

Riches Island Fm.



Ordovician brachiopods
Trilobite pygidium (Boyce et al. 1993):
Late Arenig (Dapingian 470 to 467 Ma)



shales & siltstone, phyllite and
schists

garnet-rich layers

black shales and graphitic
schists

few intermediate volcanic layers

Isle Galet Fm.

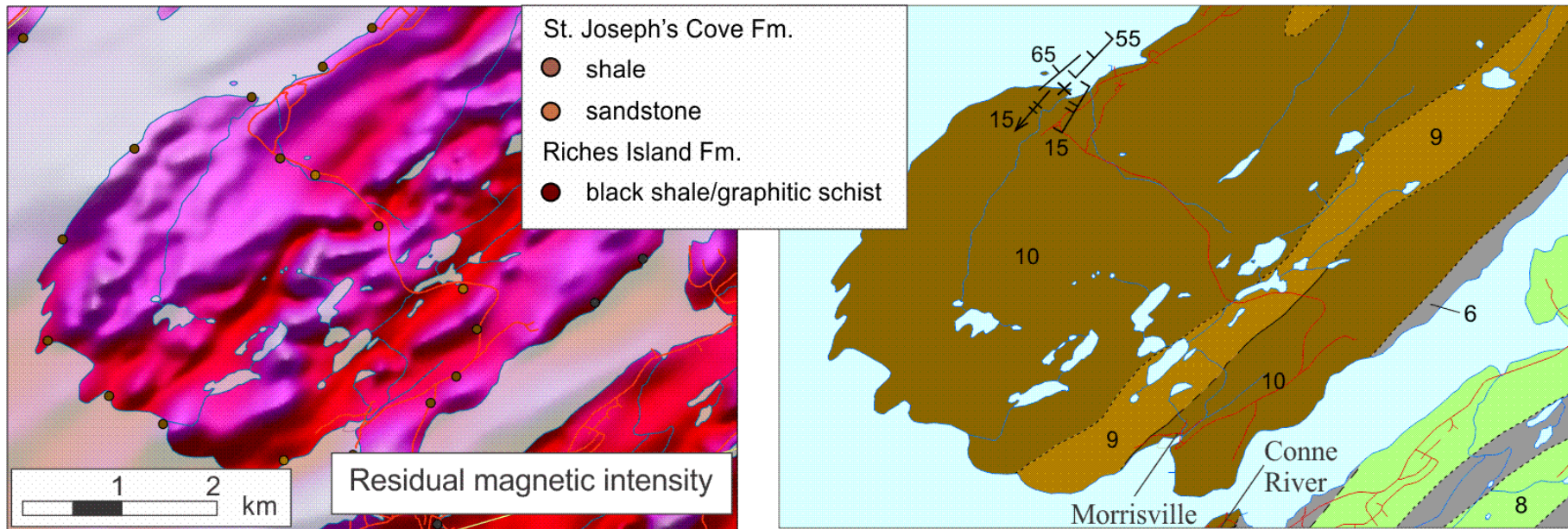


mostly schists, strongly deformed

metavolcanic layers common, felsic composition dominant

graphitic schists as marker horizons

St. Joseph's Cove Formation



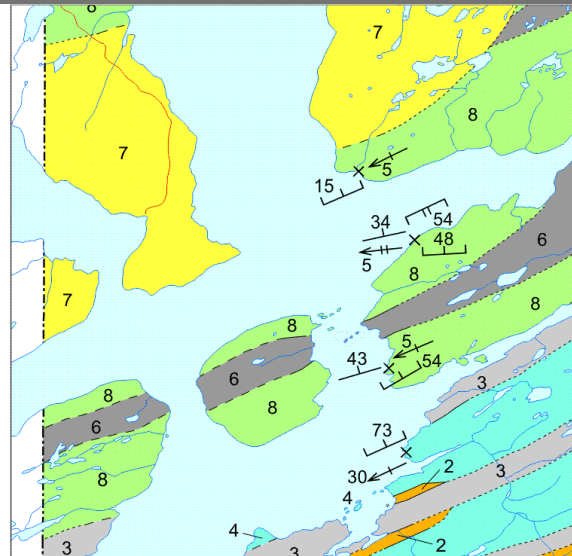
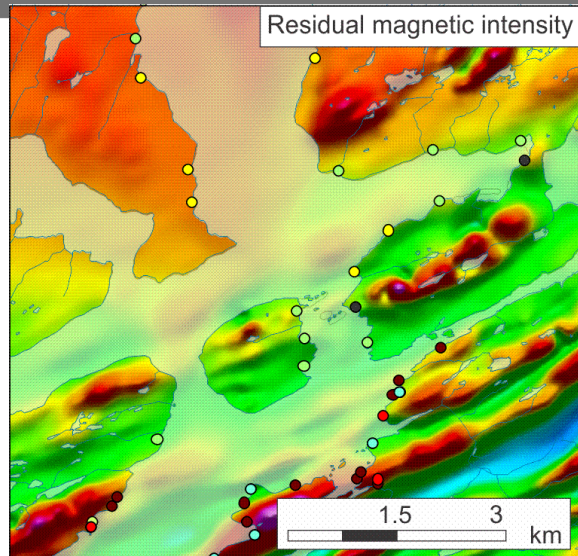
shale + siltstone

high residual magnetic intensity

sandstone

intermediate magnetic intensity

Riches Island & Isle Galet formations

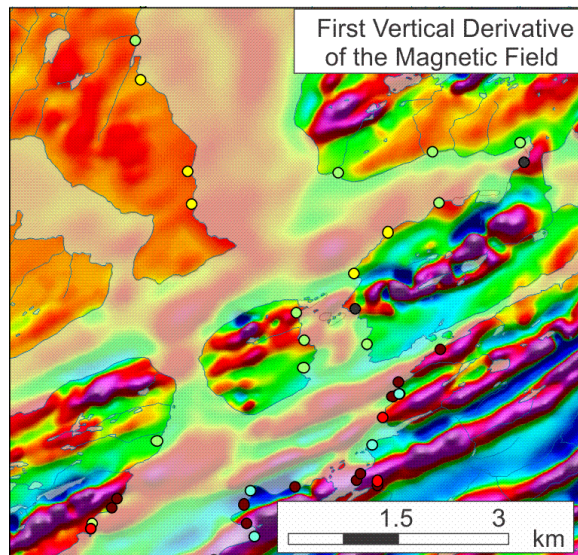


Riches Island Fm.

- shale, phyllite
- sandstone, psammitic schist
- black shale, graphitic schist

Isle Galet Fm.

- pelitic schist, phyllite
- graphitic schist, black shale
- felsic to mafic metavolcanic rocks



black shales and
graphitic schists:

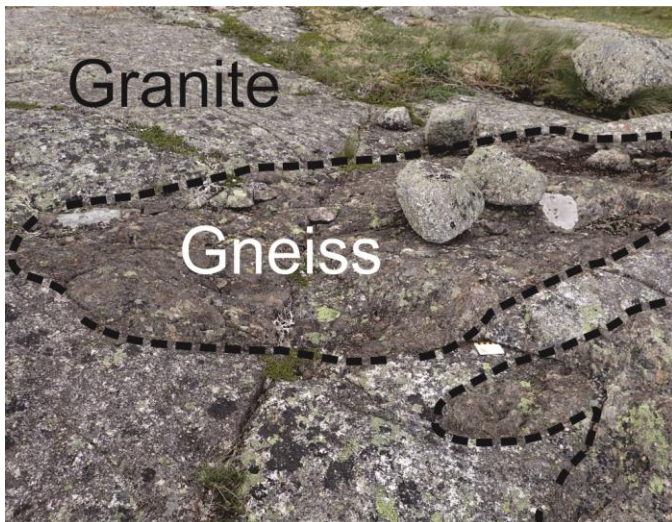
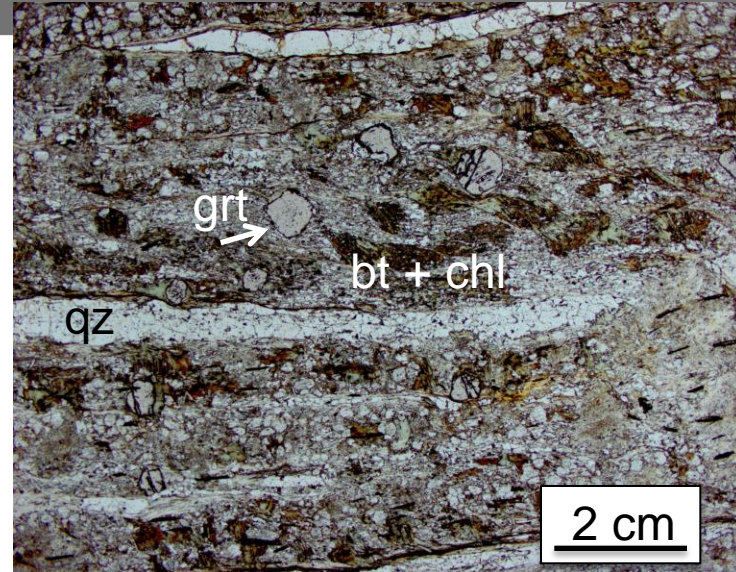
high magnetic
intensity

shale, sandstone,
metavolcanic
rocks:

medium to low
magnetic intensity

- **Little Passage Gneiss**
 - mainly paragneiss in St. Alban's map area
 - metamorphic peak at 423 Ma, protolith ?
- **Gaultois Granite**
 - mainly intermediate composition
 - intrusive age 421 Ma (syntectonic, Salinic Orogeny)
- **Northwest Brook Complex**
- **Pegmatite and aplite**

Little Passage Gneiss



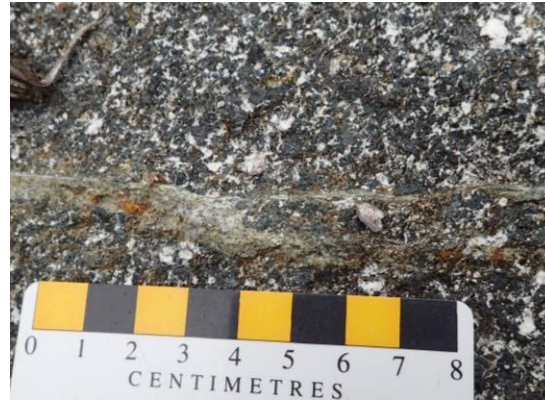
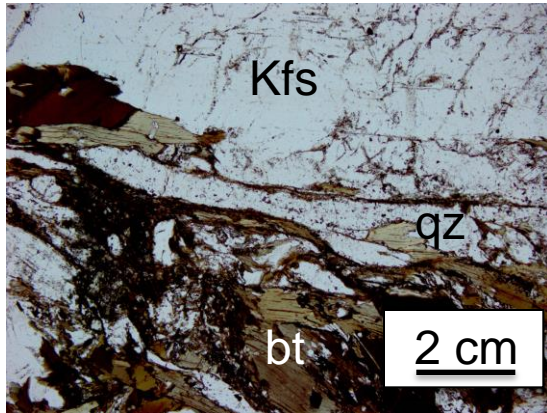
semipelitic to psammitic
paragneiss

Kfs-msc-bt(chl)-qz \pm grt

compositional layering on macro-
and microscale

characteristic rusty weathering

Gaultois Granite



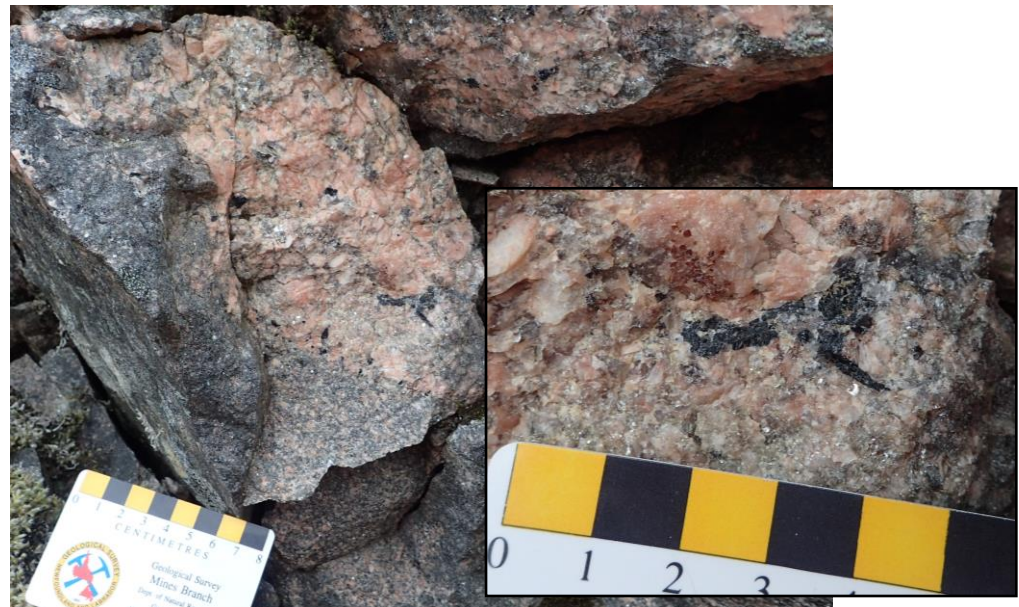
feldspar-megacrystic, lineated and
foliated intrusions
granodiorite, monzodiorite, tonalite
rare diorite + gabbro
alignment of bt, elongated qz
define regional SW foliation

Northwest Brook Granite + pegmatite/aplite

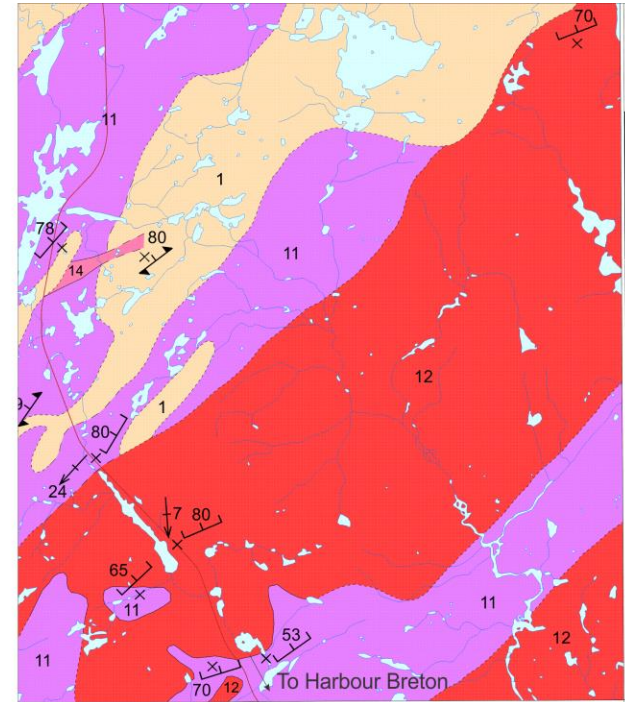
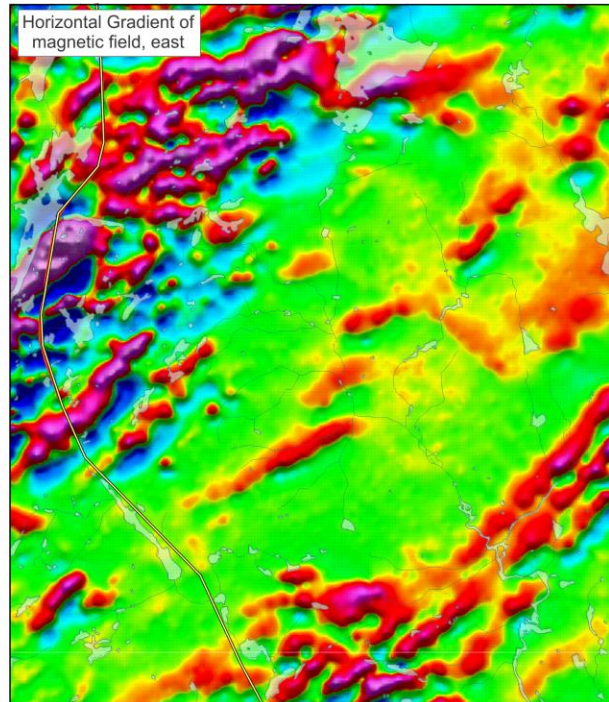
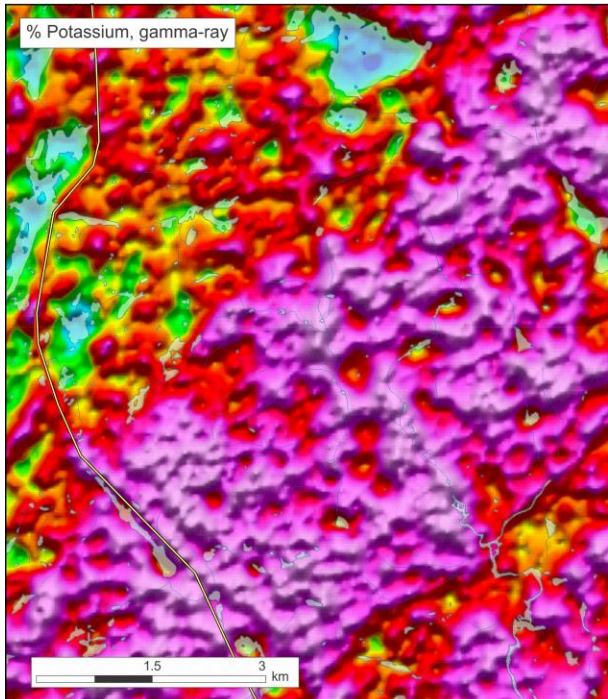


Northwest Brook Granite:
two-mica granite to syenite weakly
foliated intrusions
regional SW foliation, subparallel
to Gaultois Granite

tourmaline-garnet bearing
granitic pegmatite + aplite
locally up to 150 m wide
dykes

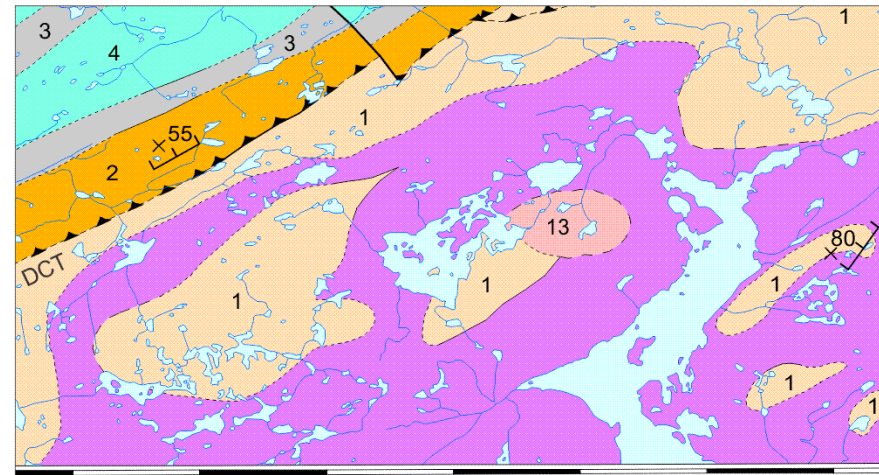
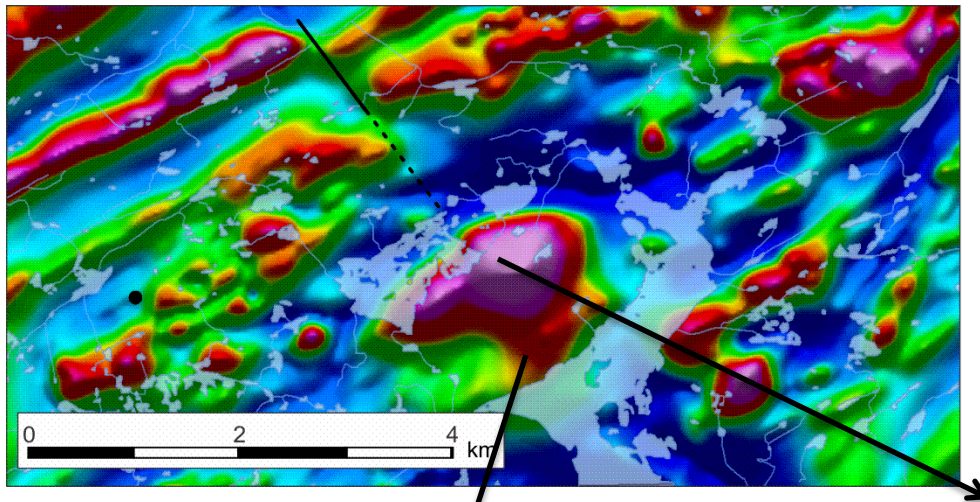


Radiometric and magnetic data

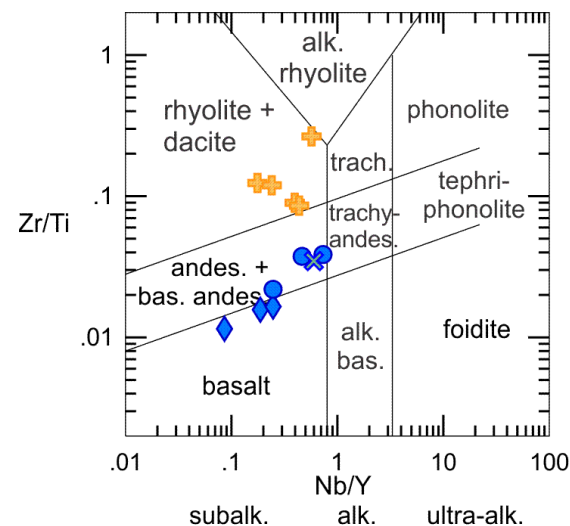


combination helps to separate granitic from intermediate intrusions and gneiss

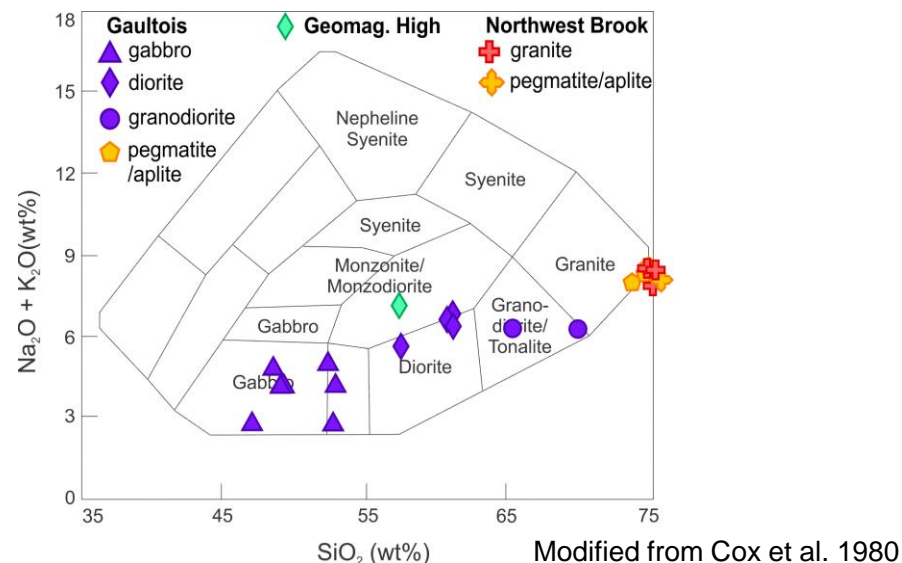
Younger (?) Intrusion – magnetic high



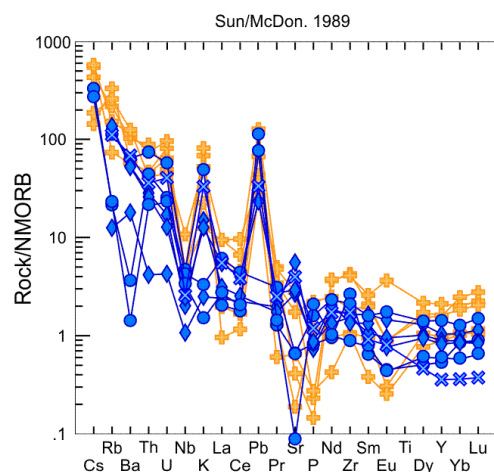
Preliminary geochemistry



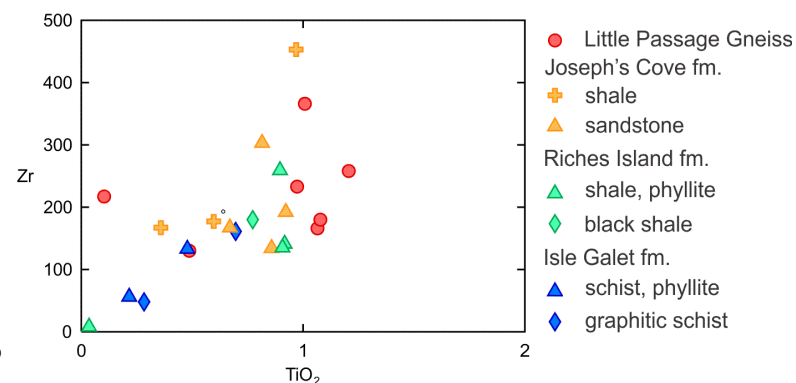
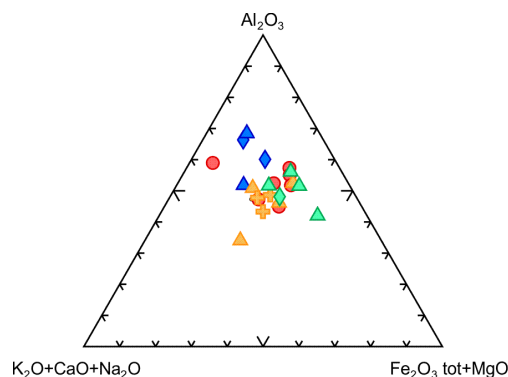
Isle Galet fm.
 + felsic volcanic
 • intermediate volcanic
 ♦ mafic volcanic
 Riches Island fm.
 × intermediate volcanic
 Pearce 1996 after
 Winchester and Floyd, 1977



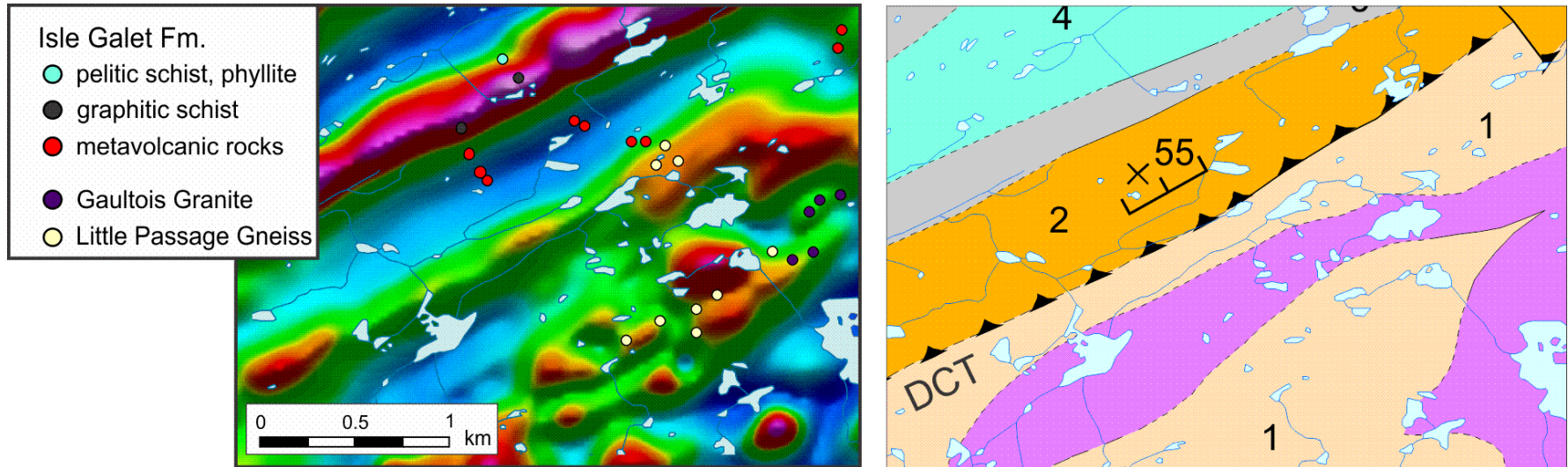
Modified from Cox et al. 1980



Sun & McDonald 1989



Day Cove Thrust – Zone boundary in southern NL



Contrast in magnetic intensity along thrust & detailed documentation of mylonite (Piasecki, 1988)

➤ argue for a major shear zone/thrust

Different intrusions in Gander (Silurian Gaultois, NWB) vs. Dunnage zone (Devonian North Bay Suite?)

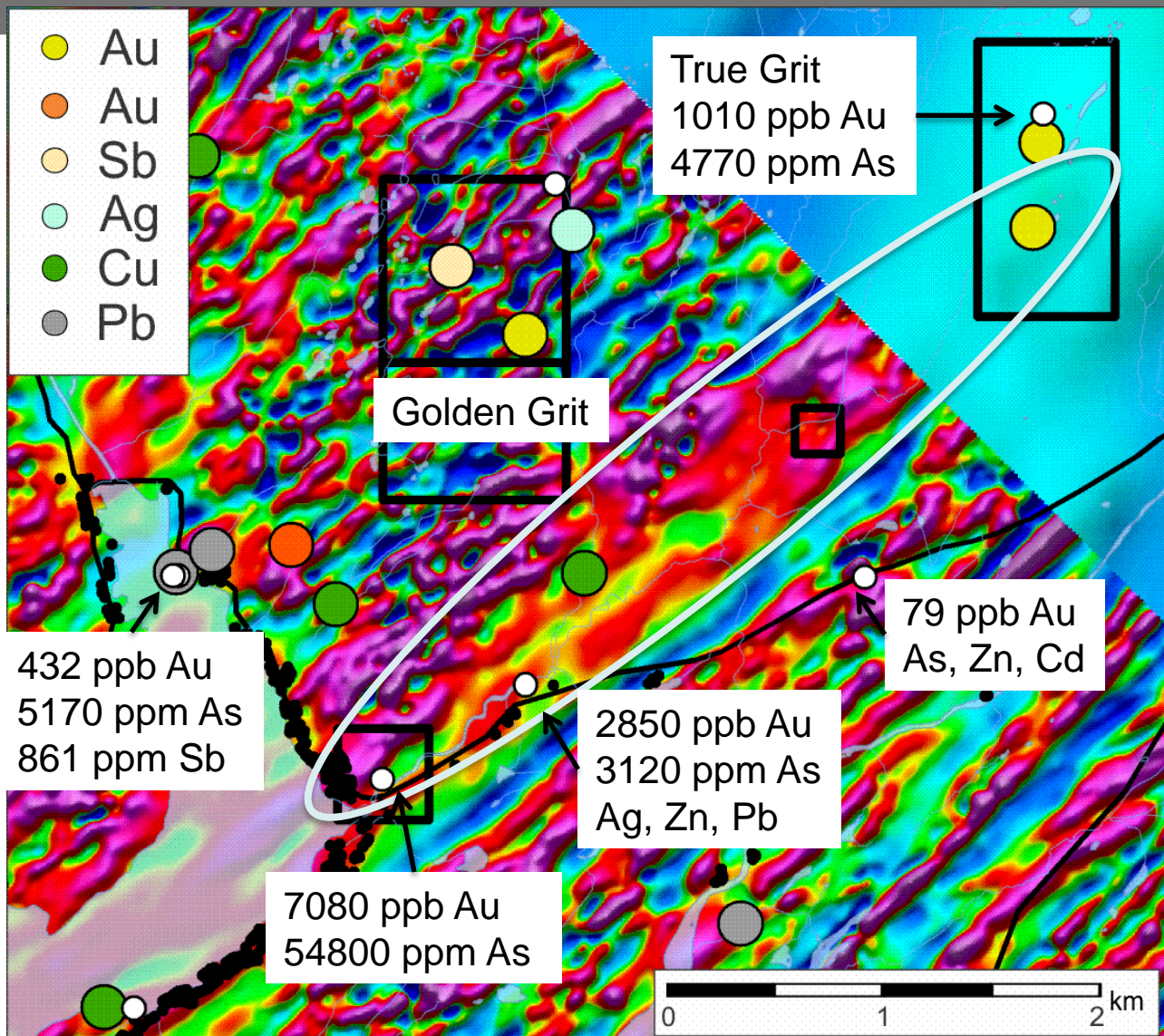
➤ separate histories until Salinic orogeny?

Mineralization



See Westhues (2017) Open File 001M/13/0872 for locations of assays

High Au in St. Joseph's Cove fm.

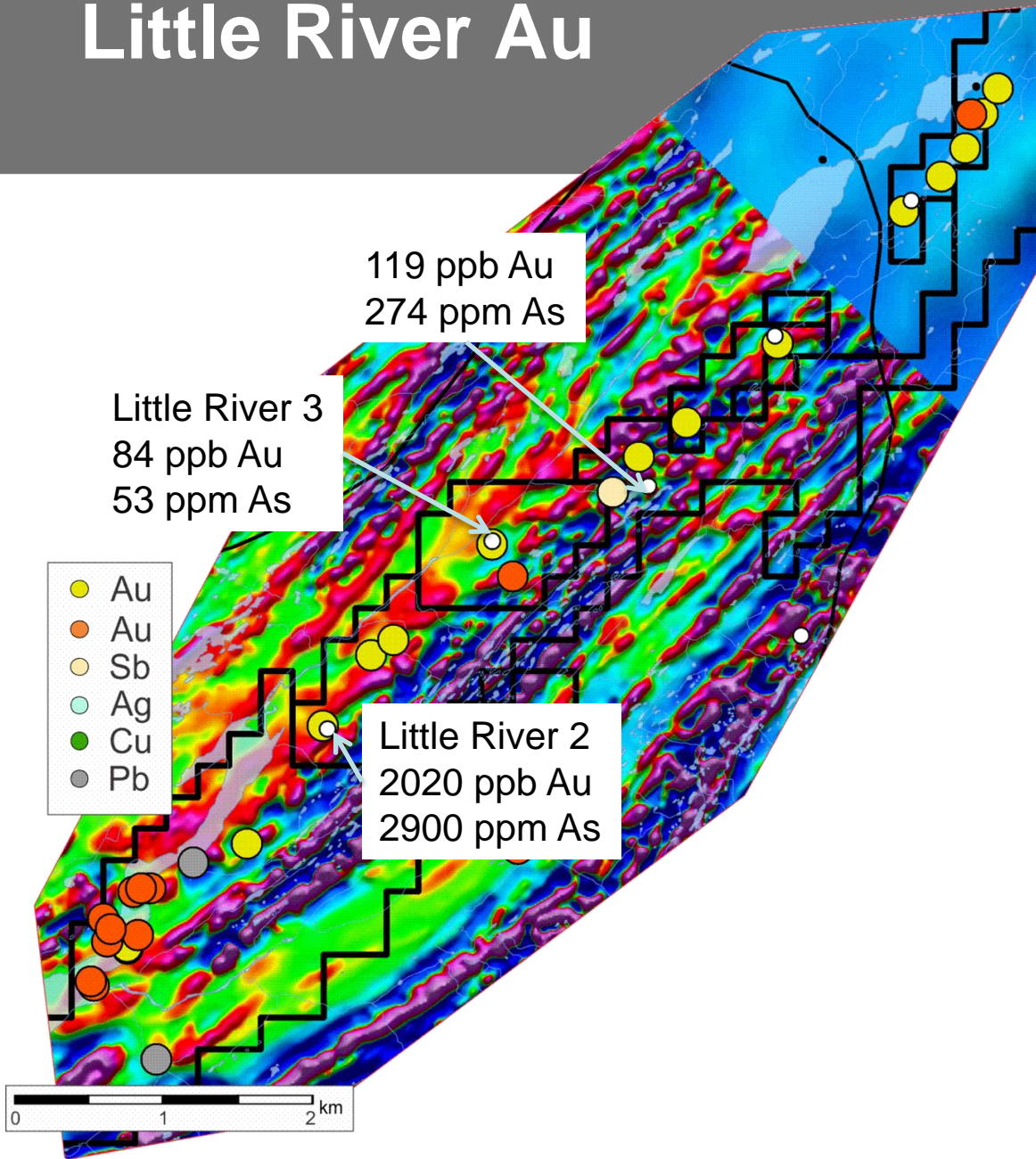


Trend between
True Grit and
Southeast Brook!

lower magnetic
intensity

➤ sandstone:
easier pathway
for metal-
bearing fluids?

Little River Au



linear trend within
Isle Galet
formation

mostly staked,
drilled in several
places

Au related to
lower magnetic
intensities
(volcanic rocks
and phyllites)

Future work

- Continue mapping – west half of map sheet
 - North Bay granite
 - Salmon River Dam formation
- Follow up some mineralisation trends
- Detailed petrography
- Incorporate 3D visualization into mapping?
- Geochronology (volcanic units, intrusions)
- Sm-Nd isotope geochemistry

Thank you!!!!

Newfoundland
Labrador

