

# Case History of a Heavy Indicator Mineral Survey, Nickel Exploration in Quebec

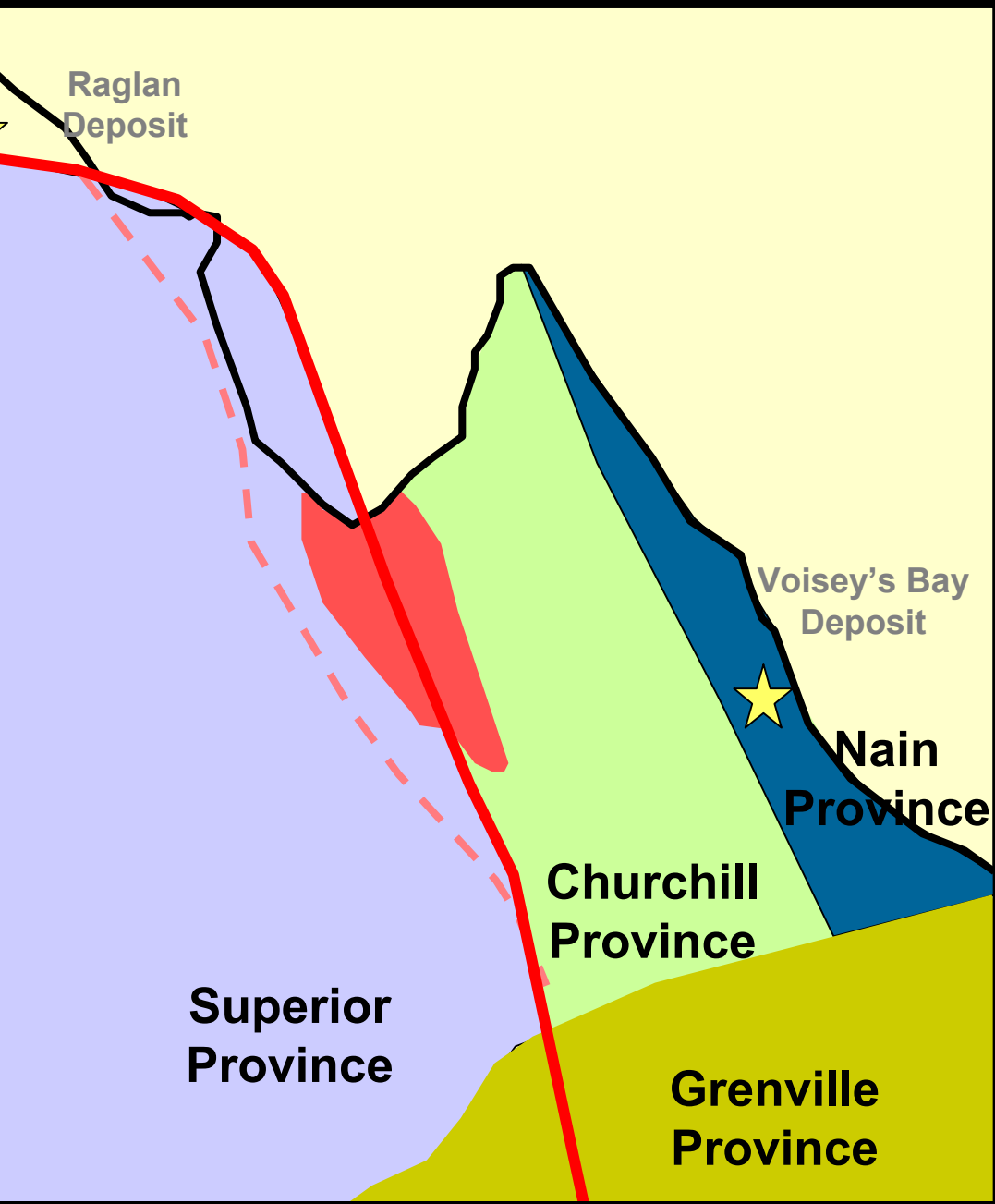
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# Québec Project Location



# Québec 7 Conceptual Target



-  WMC Interpreted Craton Margin
-  Historically accepted Craton Margin
-  WMC Quebec 7 Exploration Licenses

*(After Margeson and Stollenwerk, 2002)*

# Québec 7, Papavoine Gossan

## Mafic Sill

- Mafic sill ~400m thick
- Troctolite & Olivine-Gabbro Norite, 4 distinct units
- Mineralization at basal and hanging wall contacts
- Intercepts of 5 – 50 m  
2% combined Cu+Ni,  
50 - 300 ppb Pt+Pd

Migmatite footwall  
Paragneiss & Granitoid



# Québec 7, Papavoine Prospect



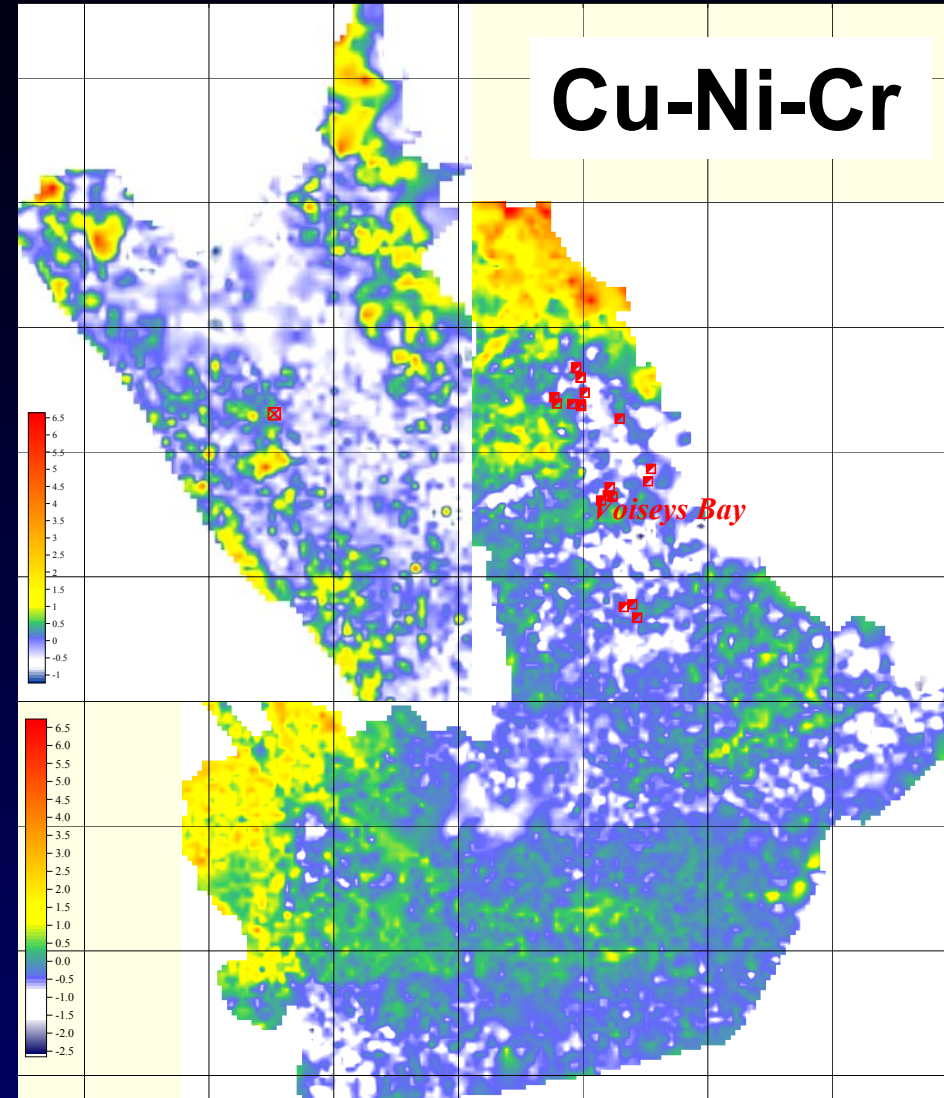
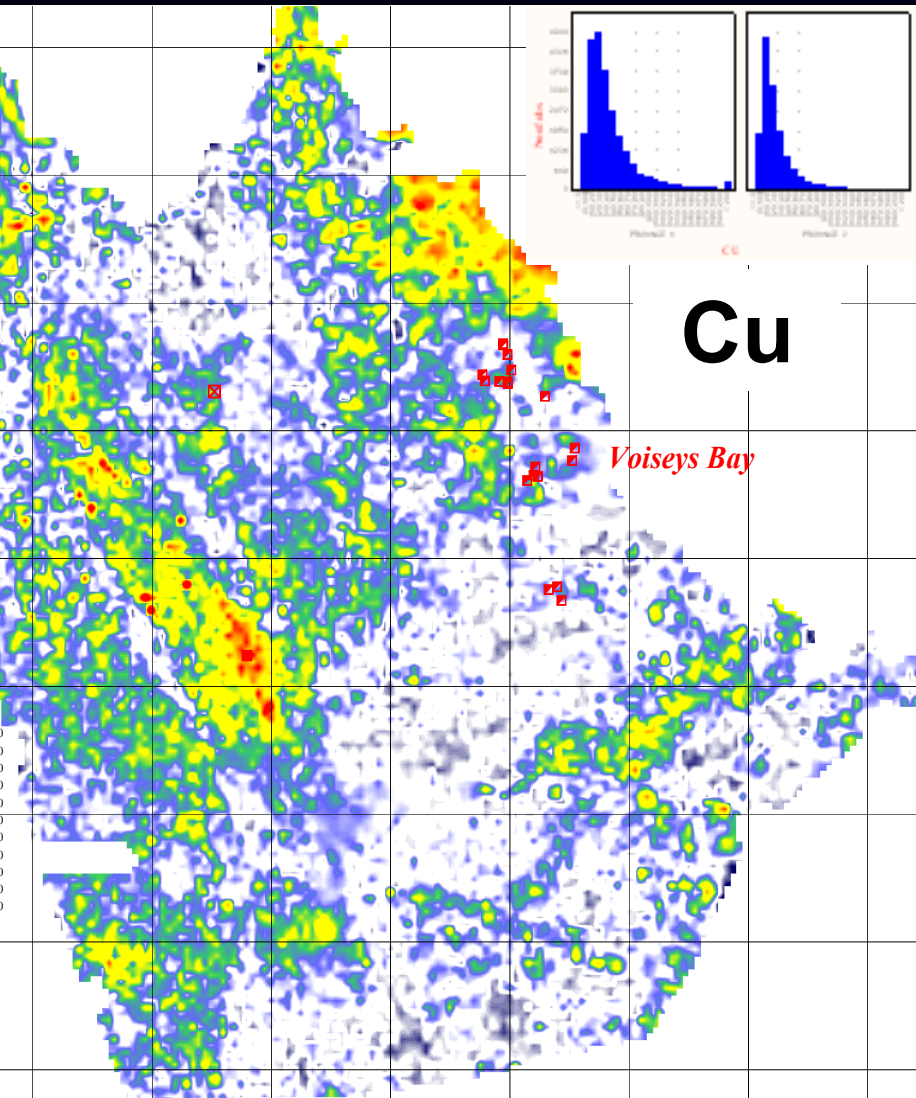
(McKinnon Matthews, 2000, Margeson and Stollenwerk, 2000)

# Québec 7, Geochemistry

1. Geochemical response at known Papavoine prospect
  2. Exploration for Ni-Cu-PGE mineralization
  3. Geologic provenance information
- Regional Lake sediment, public data
  - Fine fraction stream sediment survey
  - Heavy indicator mineral survey
  - Water chemistry



# Regional Lake Sediment Geochemistry



# WMC 2000 Geochemical Sampling



**1. Sediment Shoveled into screen and pan**



**2. Wet Sieve -2mm fraction, coarse discarded**



**3. 10 kg -2mm collected**



**4. Water poured off**



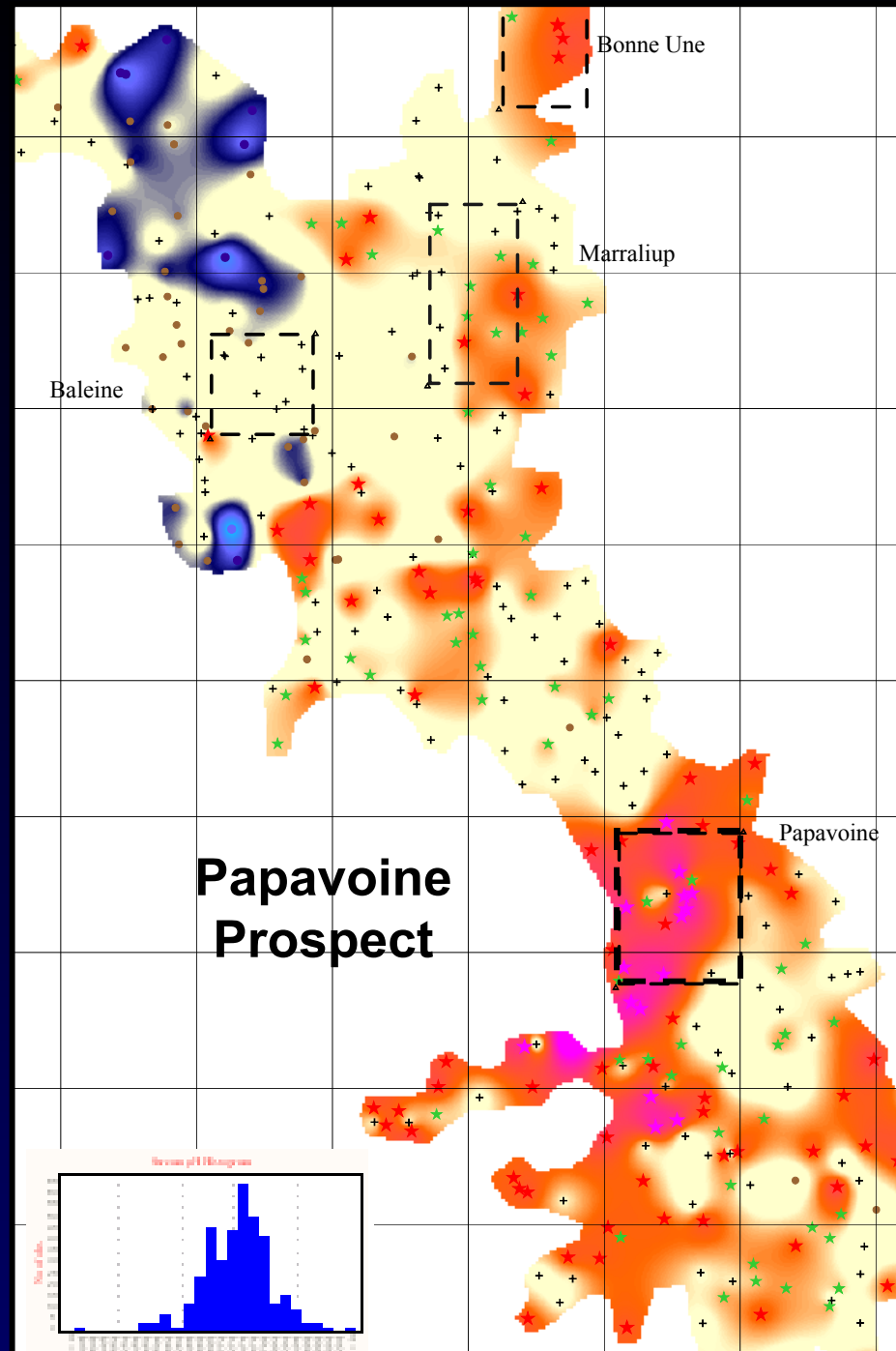
**5. Sample bagged for HMC mineralogy and analysis**



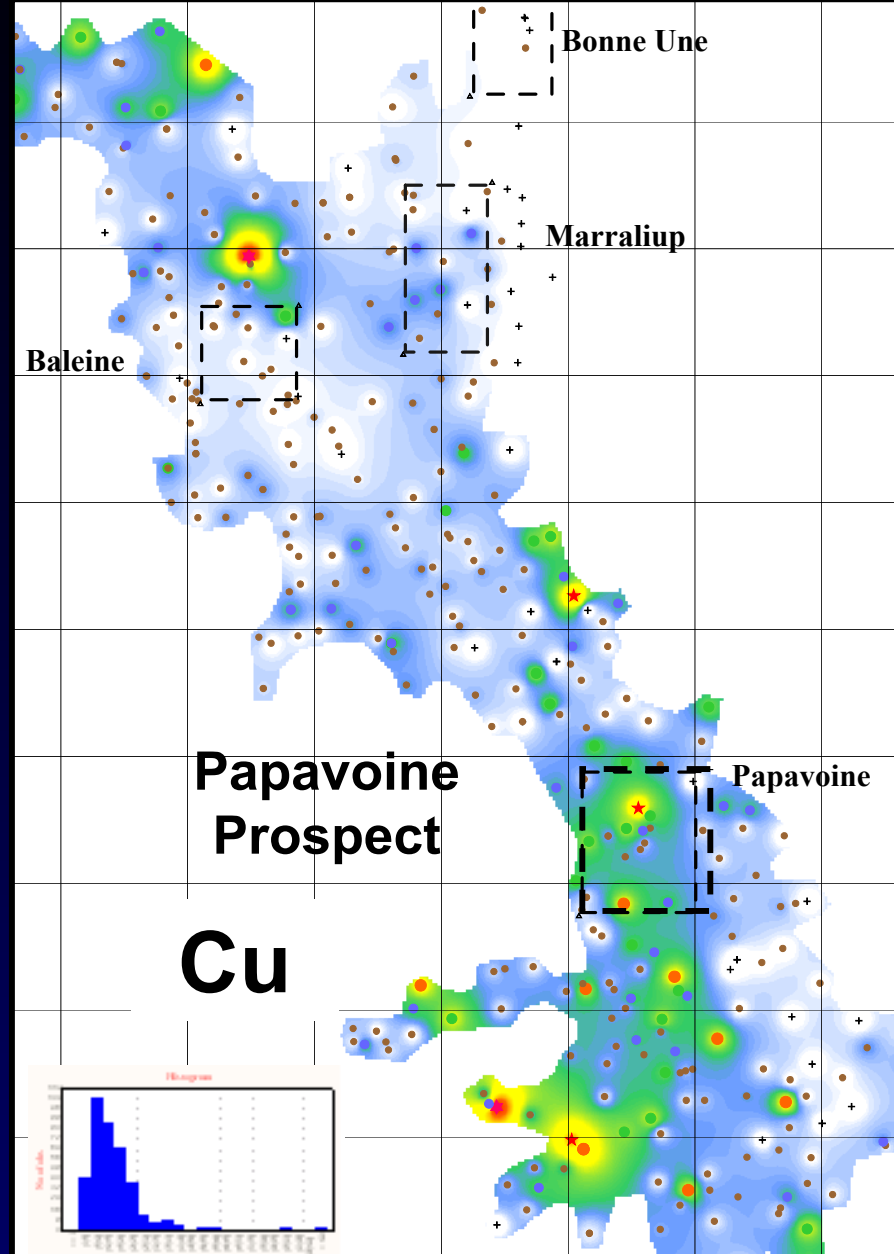
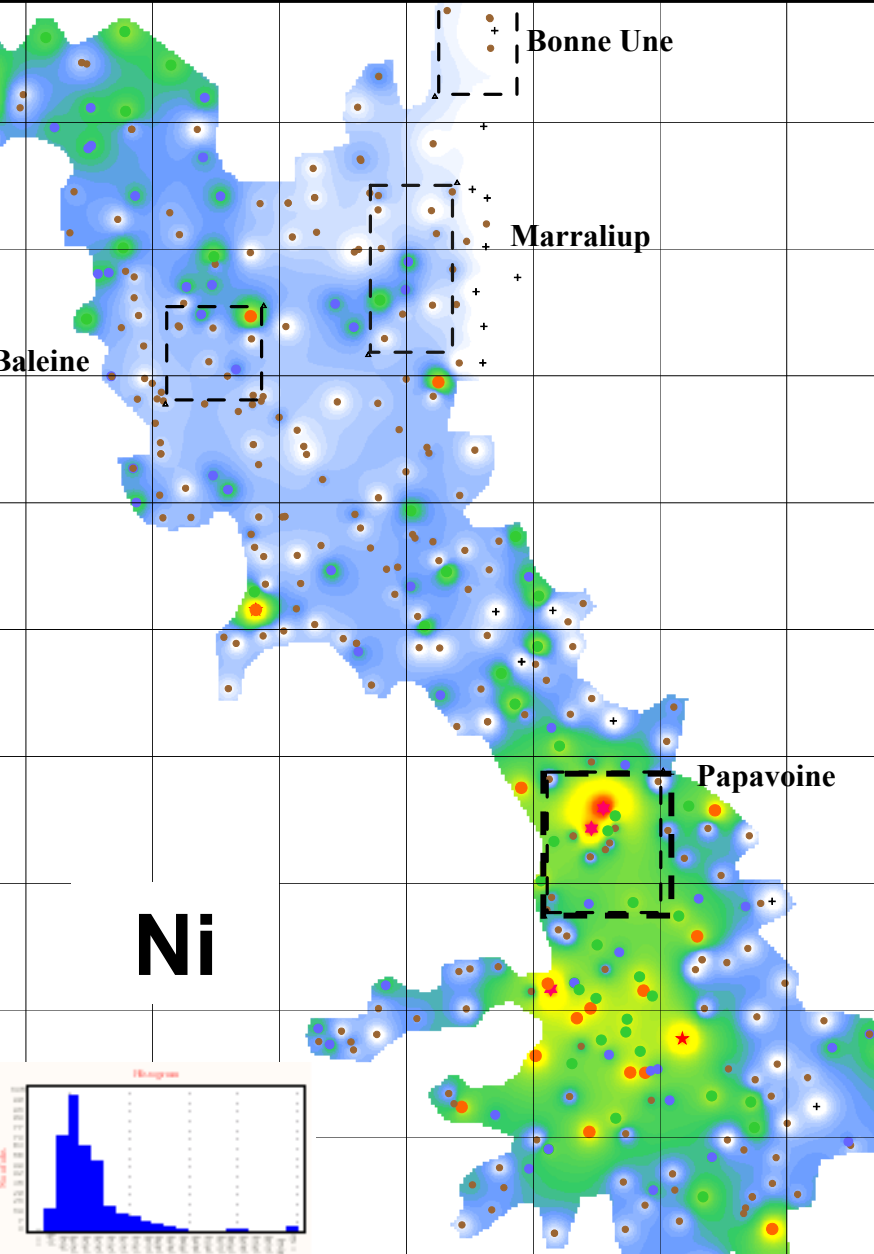
# Stream Water pH

< 6.4

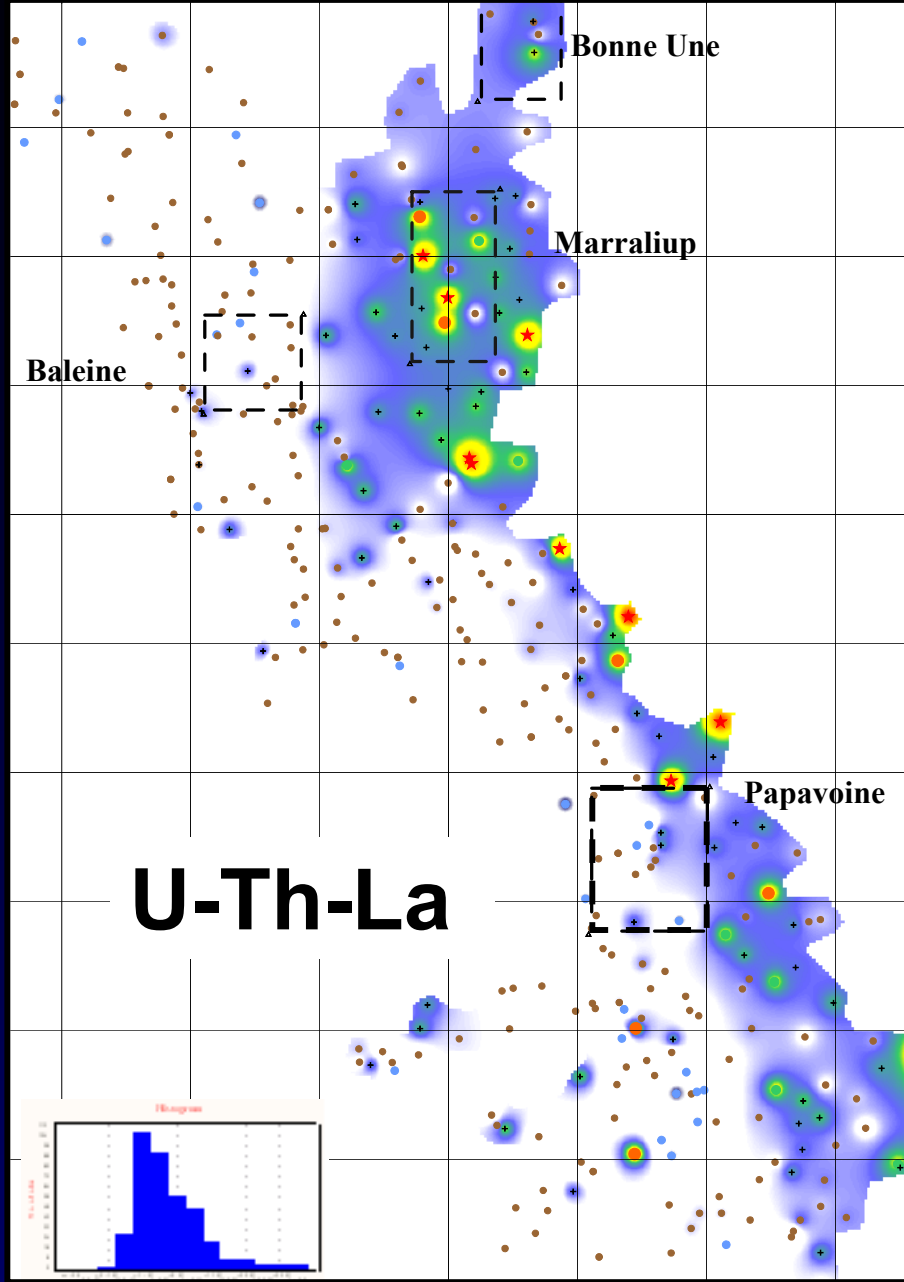
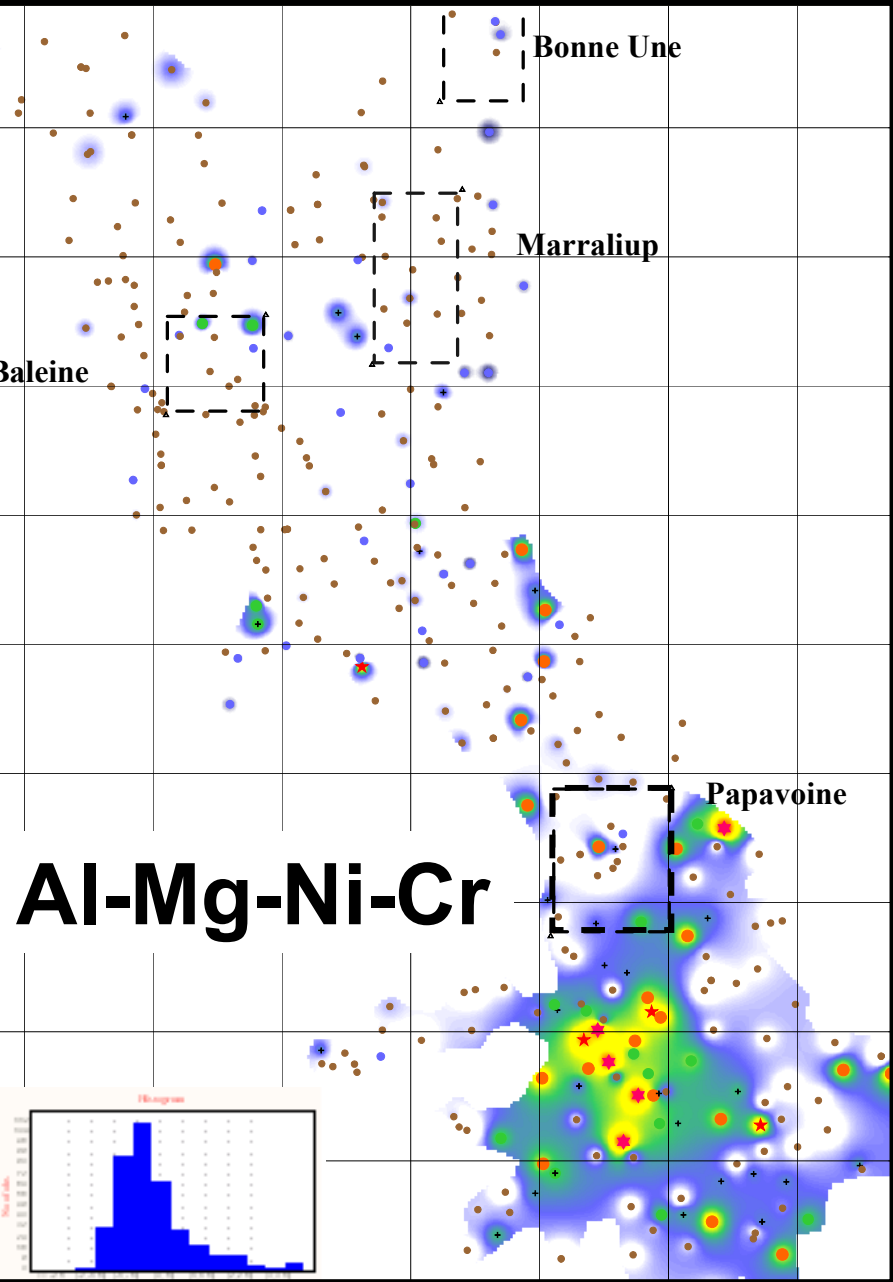
< 7



# Fine Fraction Stream Sediment Geochemistry

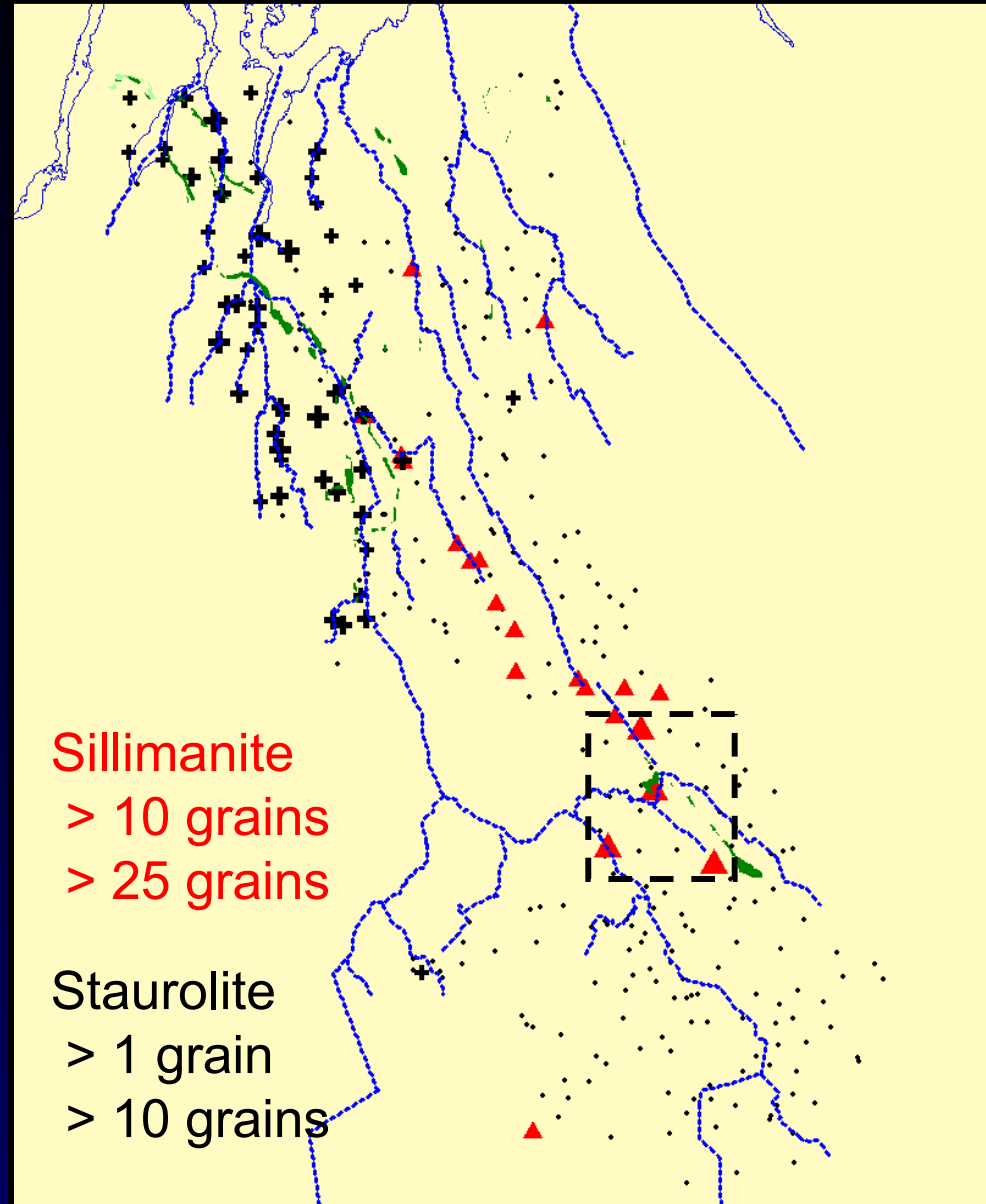


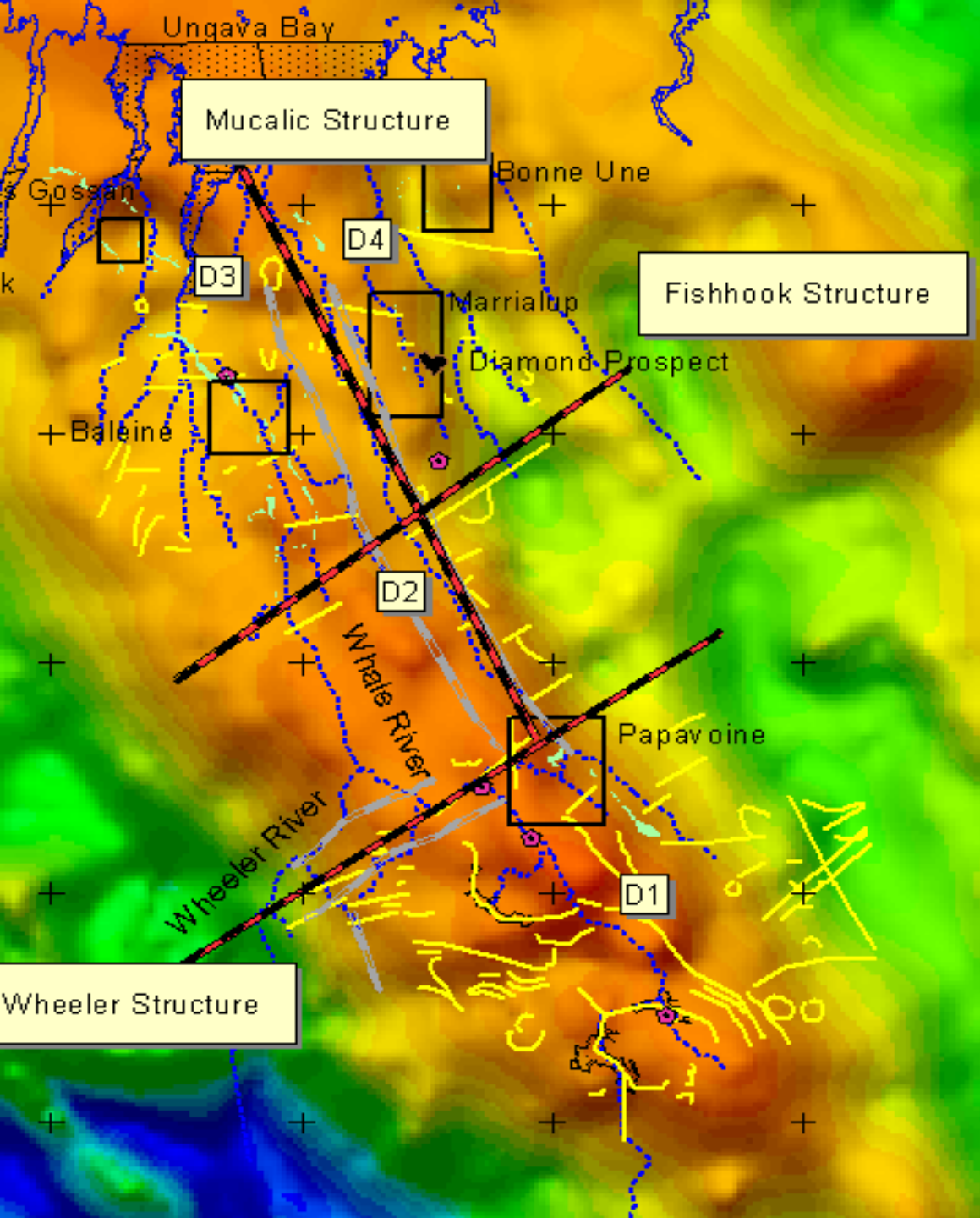
# Fine Fraction Stream Sediment Geochemistry



# RIM – Geologic Provenance

- Mafic –ultramafic sills defined by chromite, fayalite (rare forsterite), Cr diopside
- Sillimanite/staurolite/kyanite divide geologic domains

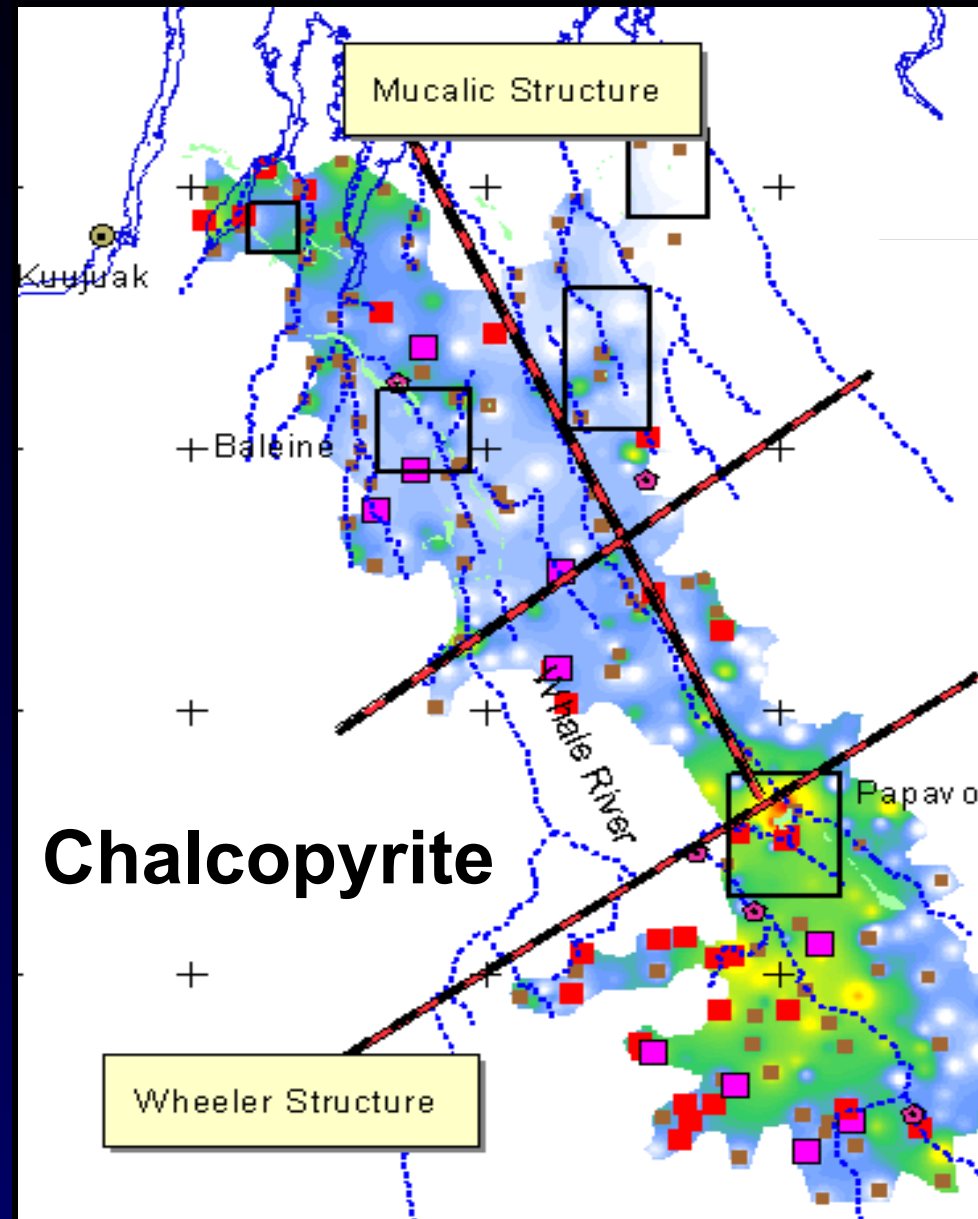




# Regional Gravity

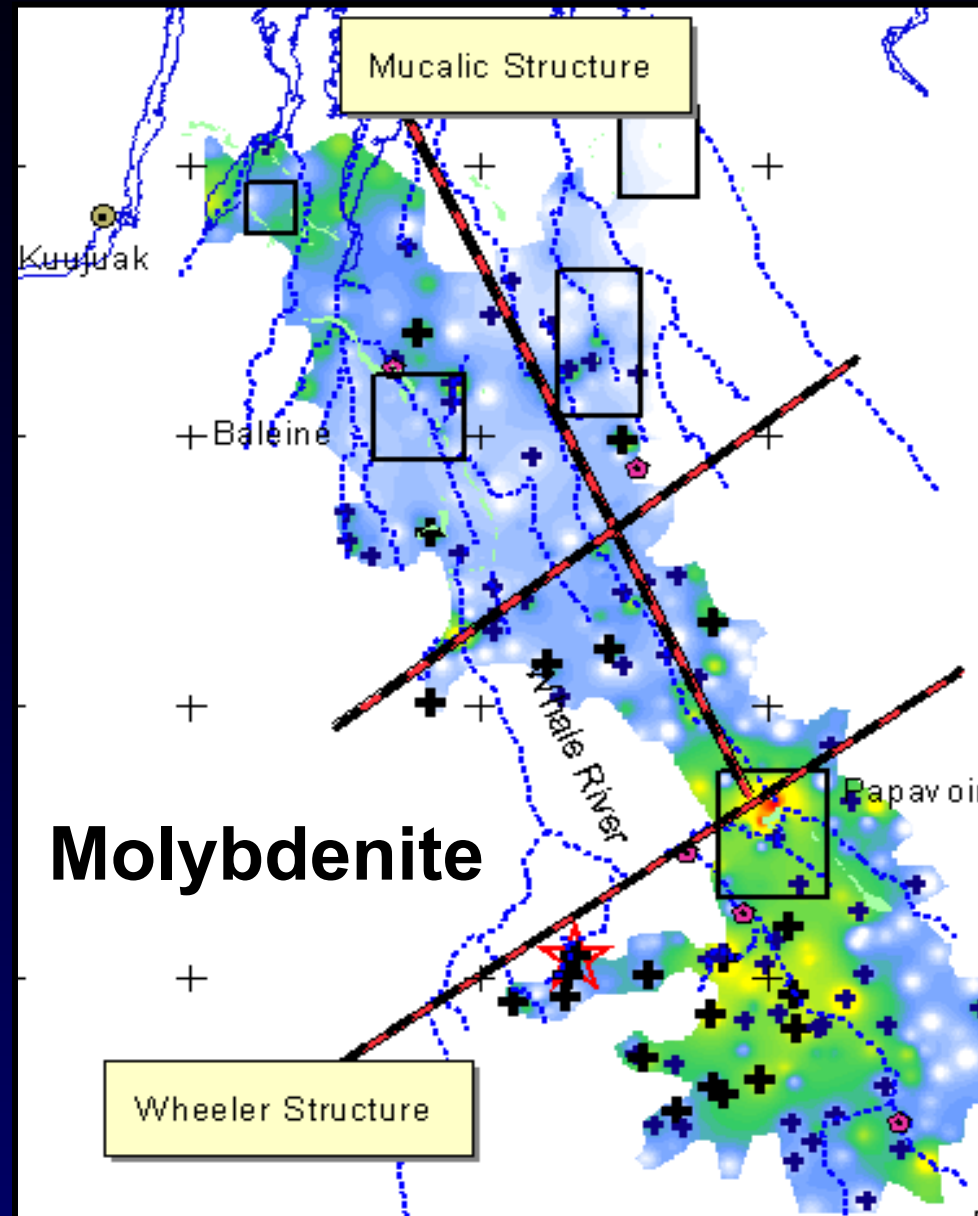
# RIM – Papavoine Prospect

- RIM at Papavoine gossan
  - 20 km down-drainage (to major lake)
  - Chalcopyrite
  - Sillimanite
  - Orthopyroxene
  - Paucity of cumulus and hybrid alteration minerals (Averill)
- Water
  - Low pH
  - Au-Ni-Cu
- Stream sediments
  - Cu-Ni-Cr-Mg-Co
- Lake sediments
  - Cu-Ni (weak)



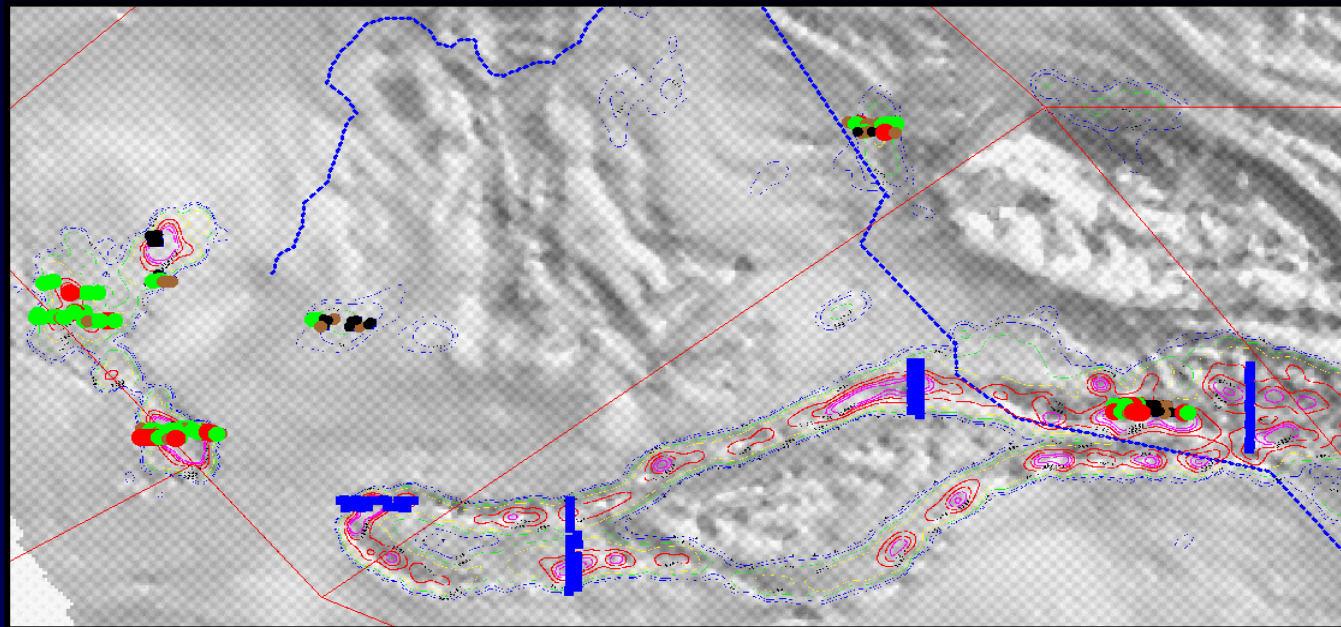
# Lac Loquin Geochemistry

- RIM at Papavoine gossan
  - Regionally extensive anomaly (70 x 50km)
  - Chalcopyrite
  - Molybdenite, Aspy
  - Chromite
- Stream sediments
  - Cu-Ni-Cr-Al-Mg
- Water
  - Low pH
- Lake sediments
  - Cu-Ni-Cr-Au



# Lac Loquin Rock & Soil Geochemistry

- AEM contours with magnetics (vd1, greyscale)
- Sinuuous conductive horizon
- 35 x 7 km
- Pd, Pt concentrations elevated (30 ppb) along outer fringe of EM highs
- Au (200 ppb)
- Cu (350 ppm)
- Mo (100 ppm)
- S (5%)
- Cr (1000 ppm)



- Pyrrhotite-bearing, graphitic meta-sediments enriched in Cu-Pt-Pd-Au.



# Resistate Indicator Mineral Survey

- Direct identification of diagnostic minerals indicating geologic provenance.
  - Permissive Mafic –ultramafic sills defined by chromite, fayalite (rare forsterite), Cr diopside.
  - Sillimanite/staurolite/ kyanite divide geologic domains with sediment U-Th-REE
- Significant Ni mineralization identified at Papavoine gossan
  - Low pH, stream sediment Ni
  - Chalcopyrite, orthopyroxene (lack hercynite, alteration minerals)
- Minerals available for diagnostic mineral chemistry, evaluation of isotopic signatures (S) and fluid inclusion studies.