Porphyry Integration Project

Integrating Exploration Data Sets in BC Porphyry Districts to Identify Effective Tools for BC Deposits in Emerging Districts

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Premise:

Over the past 15 years, and particularly the past 5 years, there have been several important additions to the publicly-available digital, geophysical data sets over porphyry-hosting terranes within BC. The Geoscience BC QUEST projects added broad geophysical surveys (mag-EM and gravity) over key parts of the Triassic-Jurassic arc terranes in BC, in an effort to engage and support mineral explorers in BC.

Also, there have been several comprehensive geological compilations over BC porphyry districts by the BC Geological Survey, several research projects focused on BC porphyries, and recent exploration and development success on BC porphyry deposits. This has all helped to fuel on-going interest in BC's porphyry deposits, as well as develop the scientific understanding of their characteristcs. It also allows, for the first time, public interrogation of certain exploration data sets.

The different types of porphyry deposits in BC (different classes) have different characteristics that make each unique. These include differences in igneous chemistry associations, metal enrichments, mineralization styles, and silicate zoning associated with mineralization. Even within porphyry classes these differences exist. So then, how do these different features manifest in exploration data sets? And for companies exploring in known or emerging porphyry districts, what features in the data sets will lead them to the deposits within those districts?
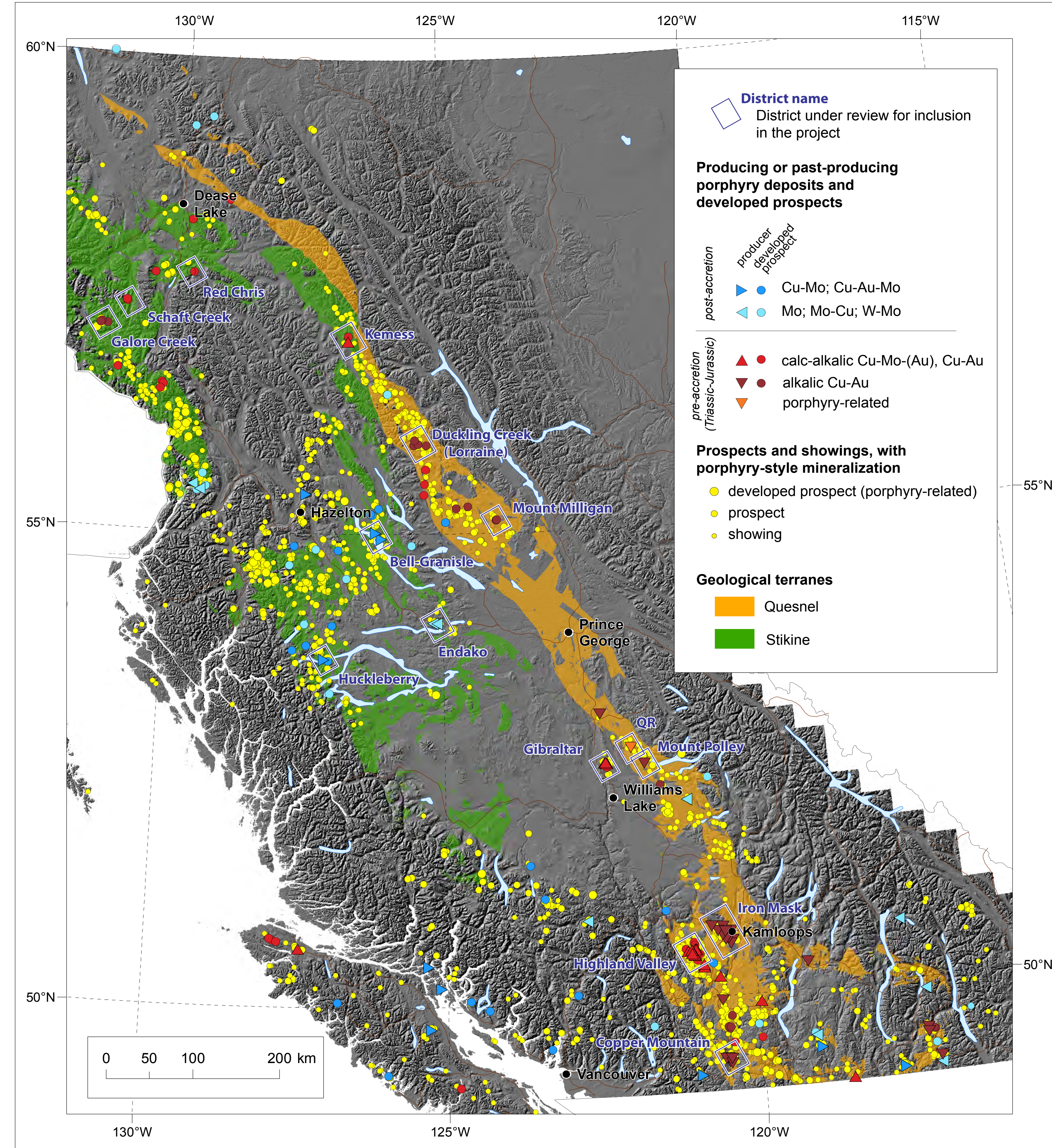
By evaluating the high-quality data sets in known porphyry districts over known deposits, we hope to gain insight into the subtle features and correlations that may exist in the geophysical, geochemical, and geological maps and data that point to the locations of the known deposits. These ideas may then be applied by explorers in emerging districts to make better-t exploration decisions to guide them to future deposits.
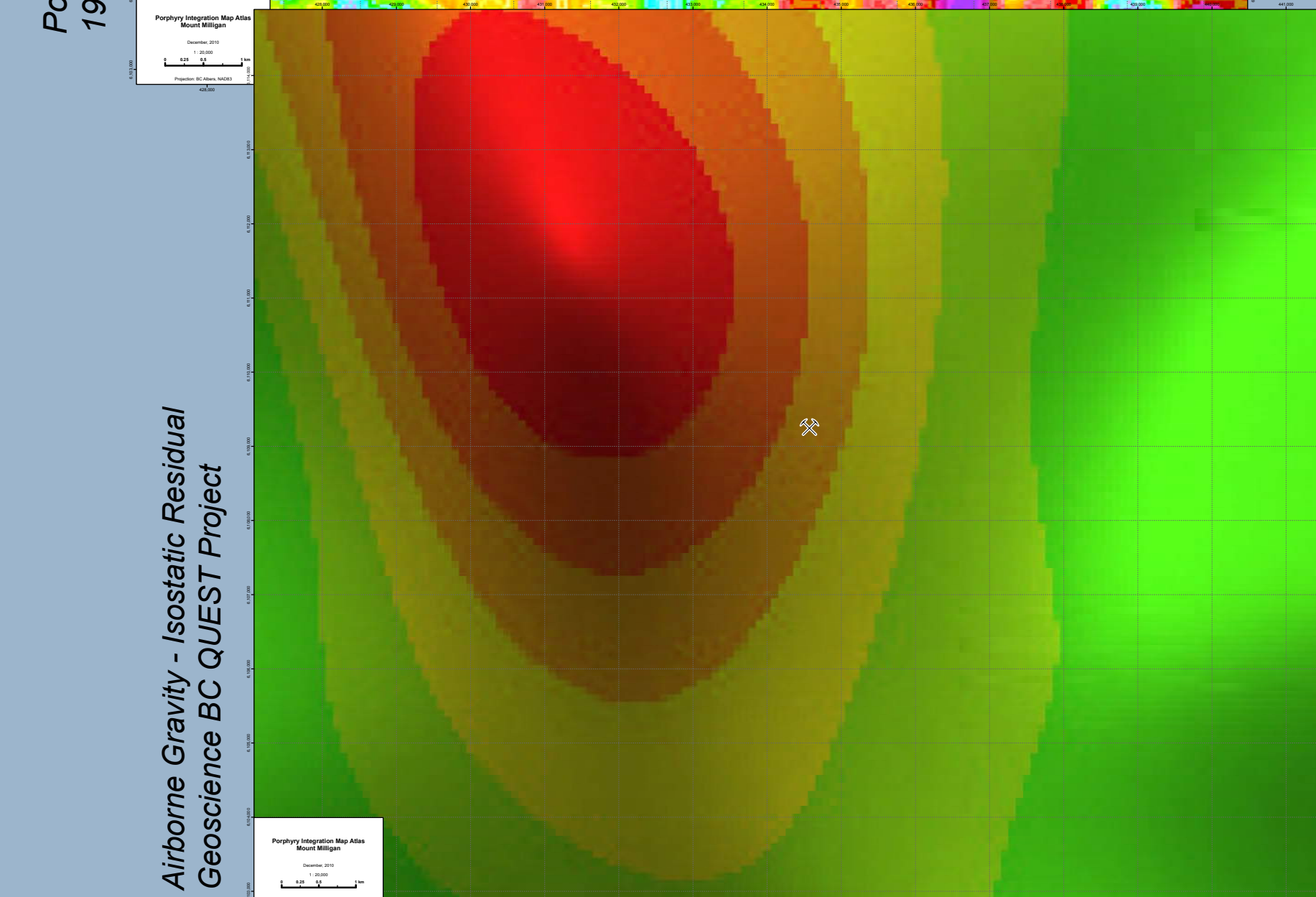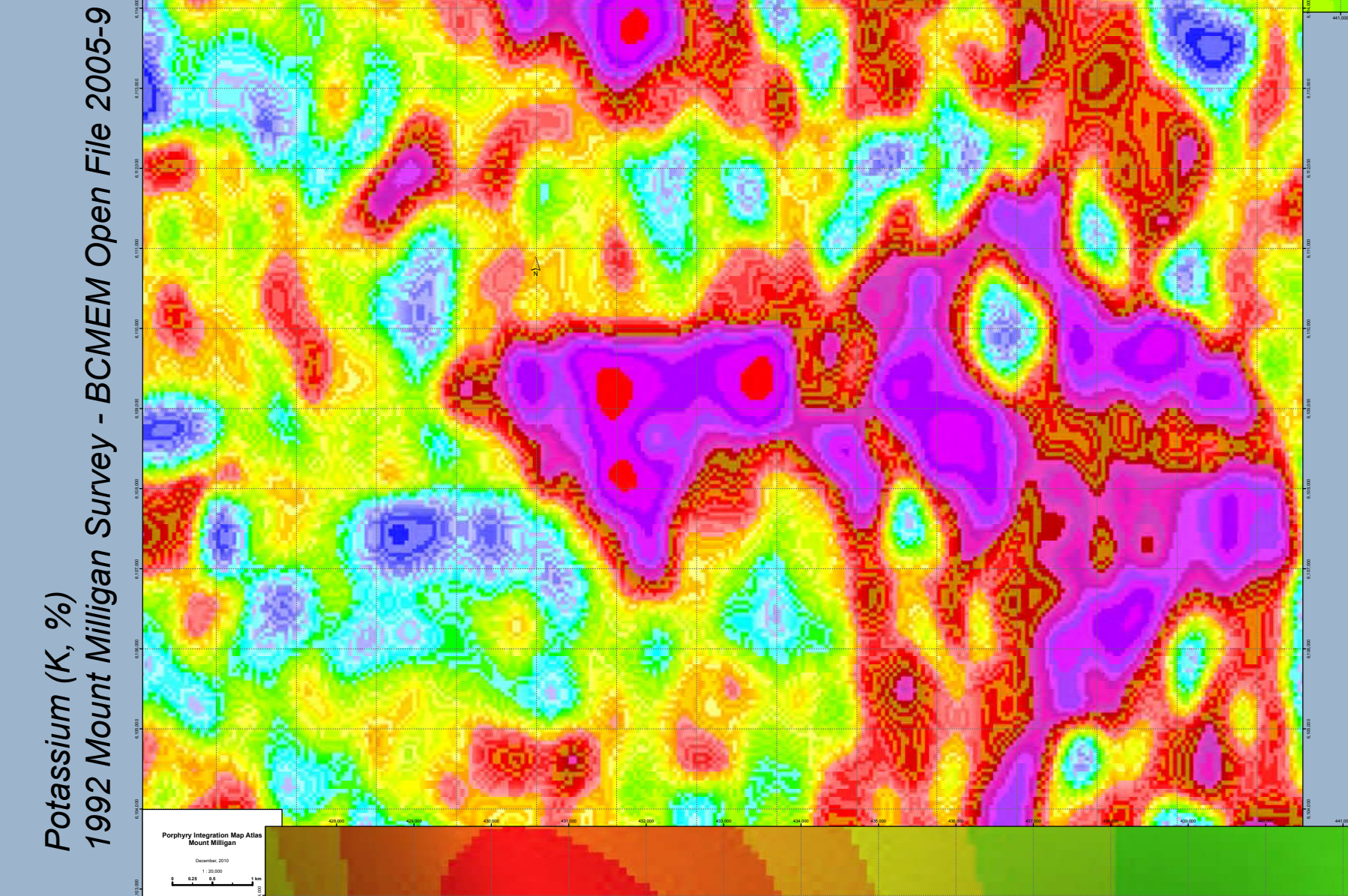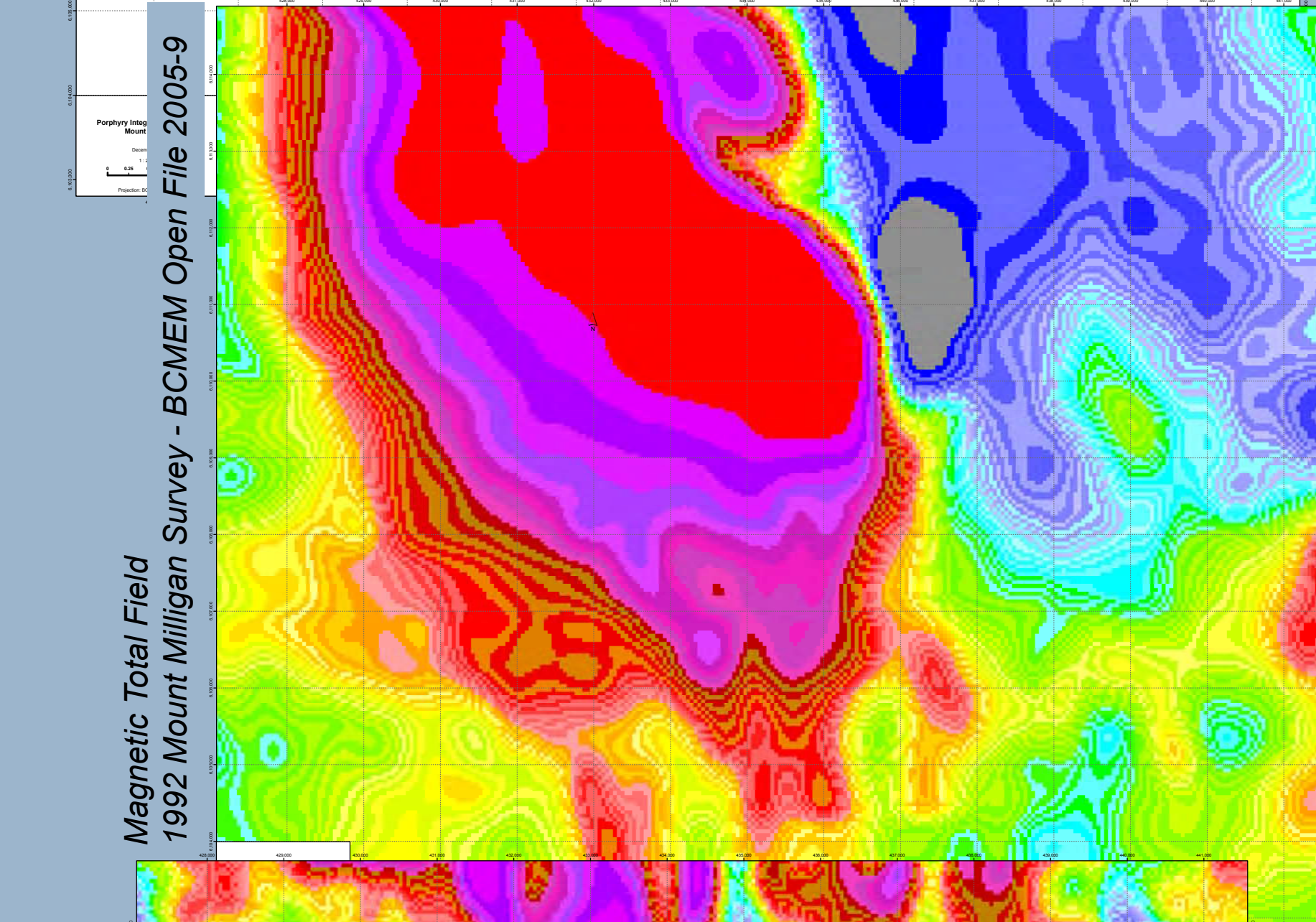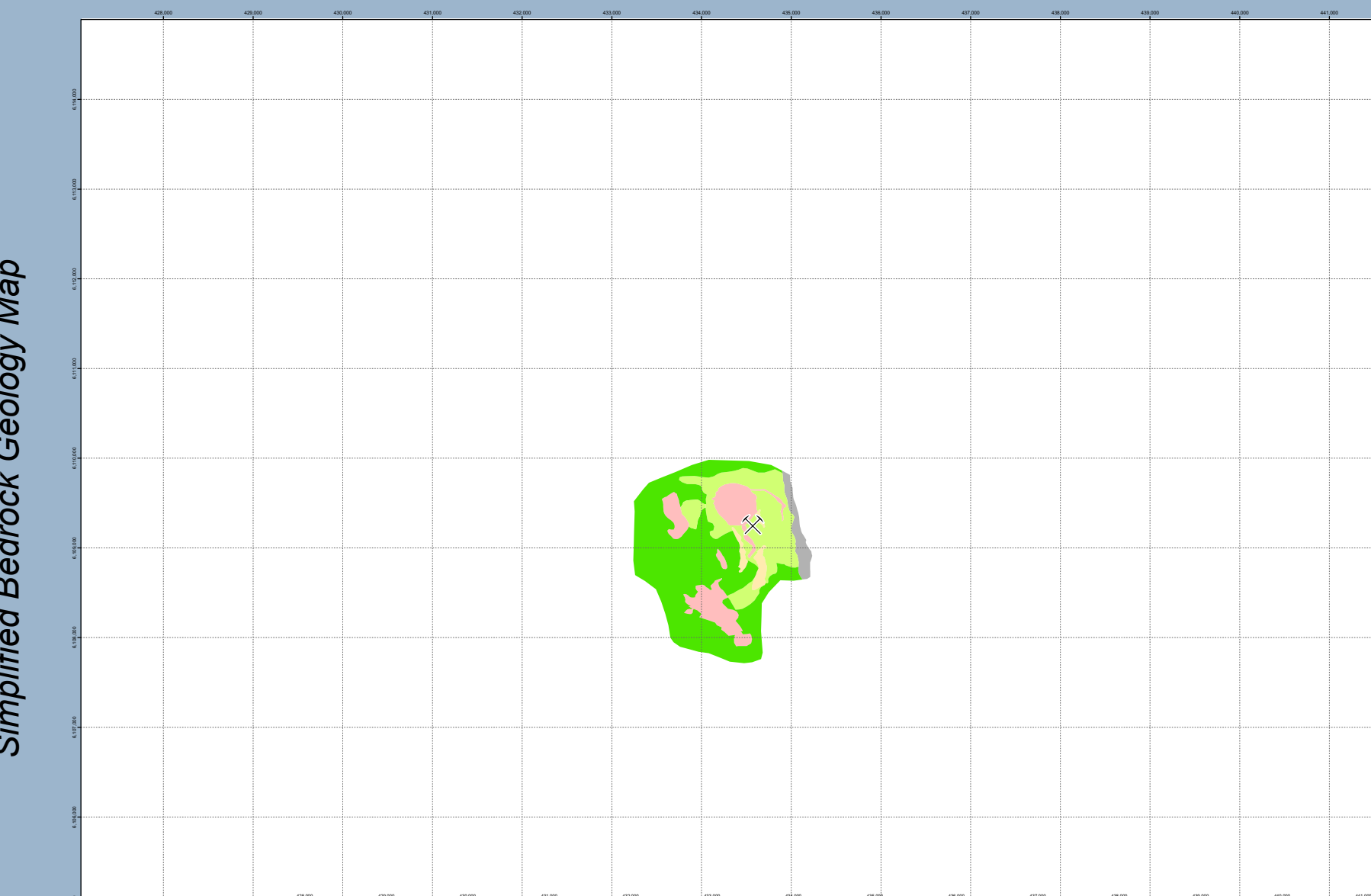
Guiding Questions:

At the district-scale, what geological, geophysical, and geochemical features identify deposit locations?

Why to these features exist?
ie. what are the geological controls?

Are these observations applicable to guiding exploration in other districts for similar deposit types?
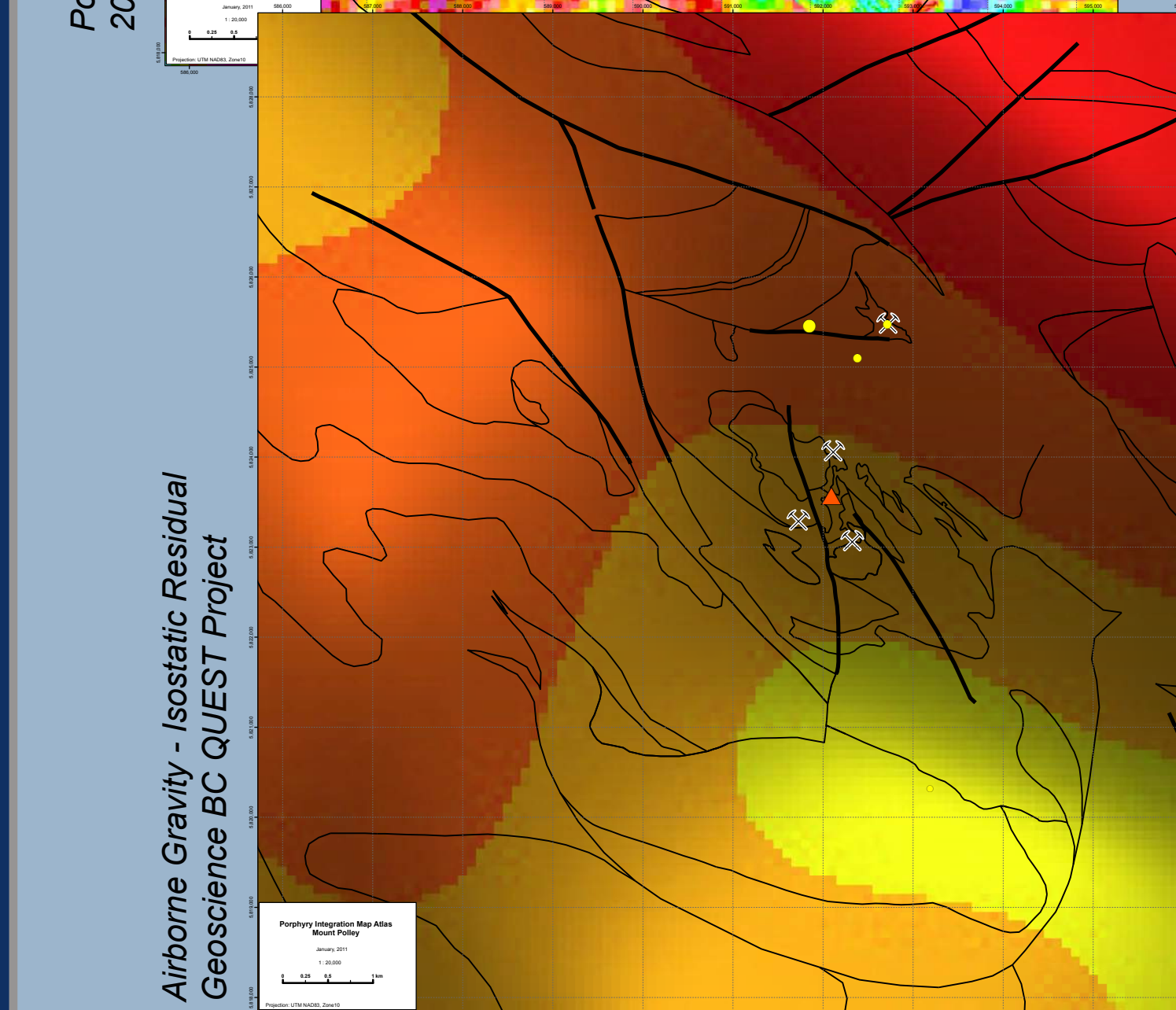
Project Team:

Geology module:
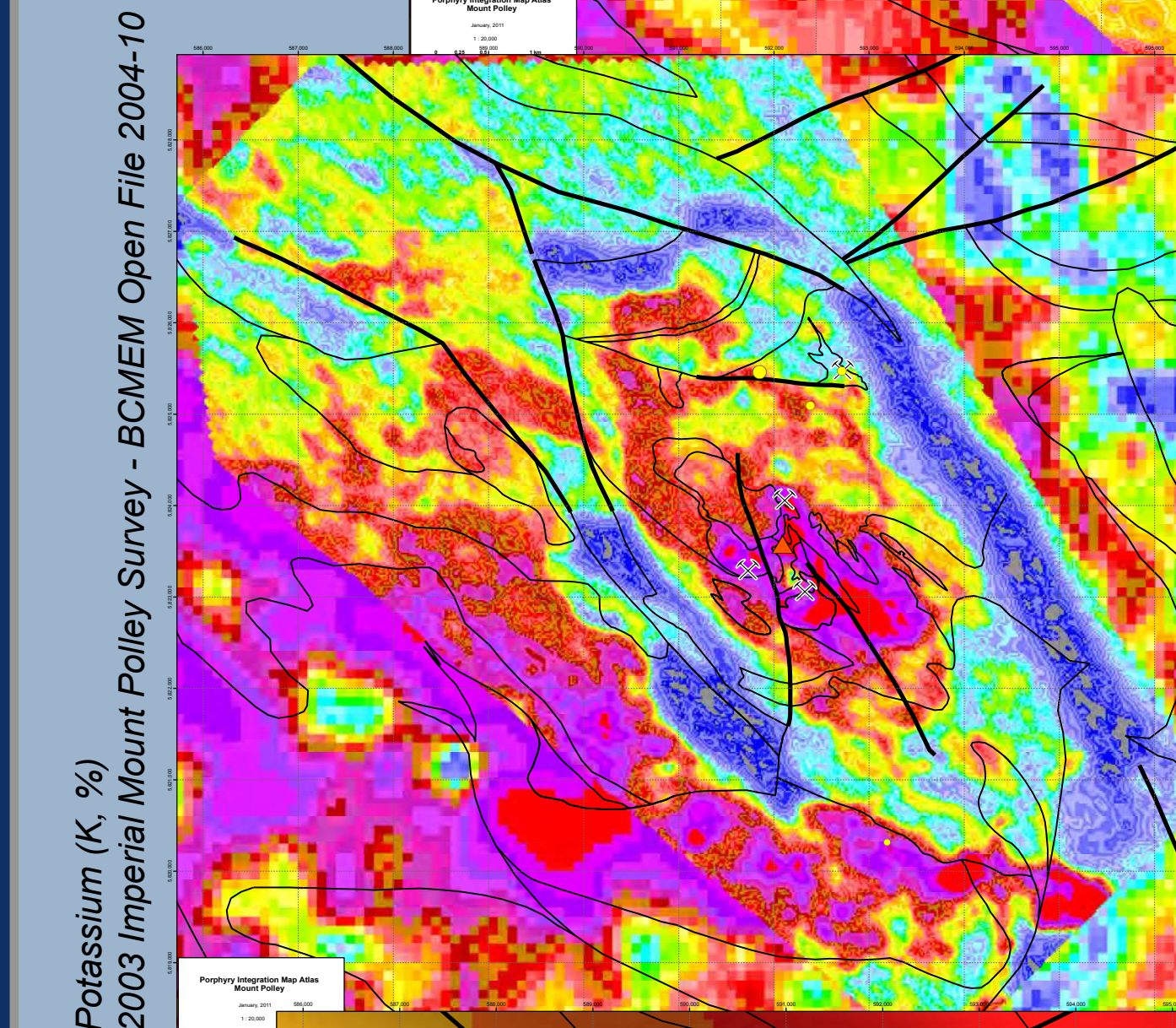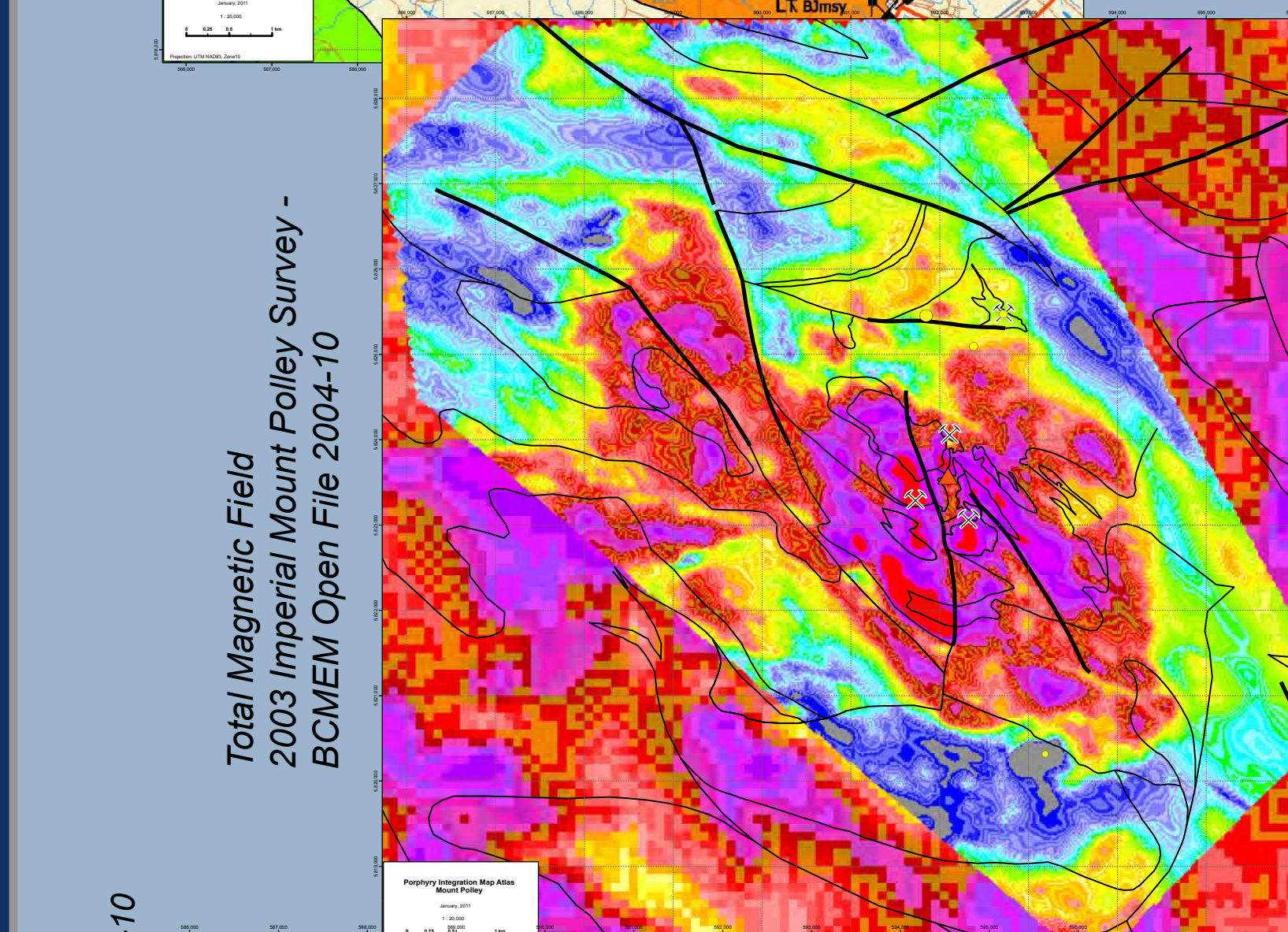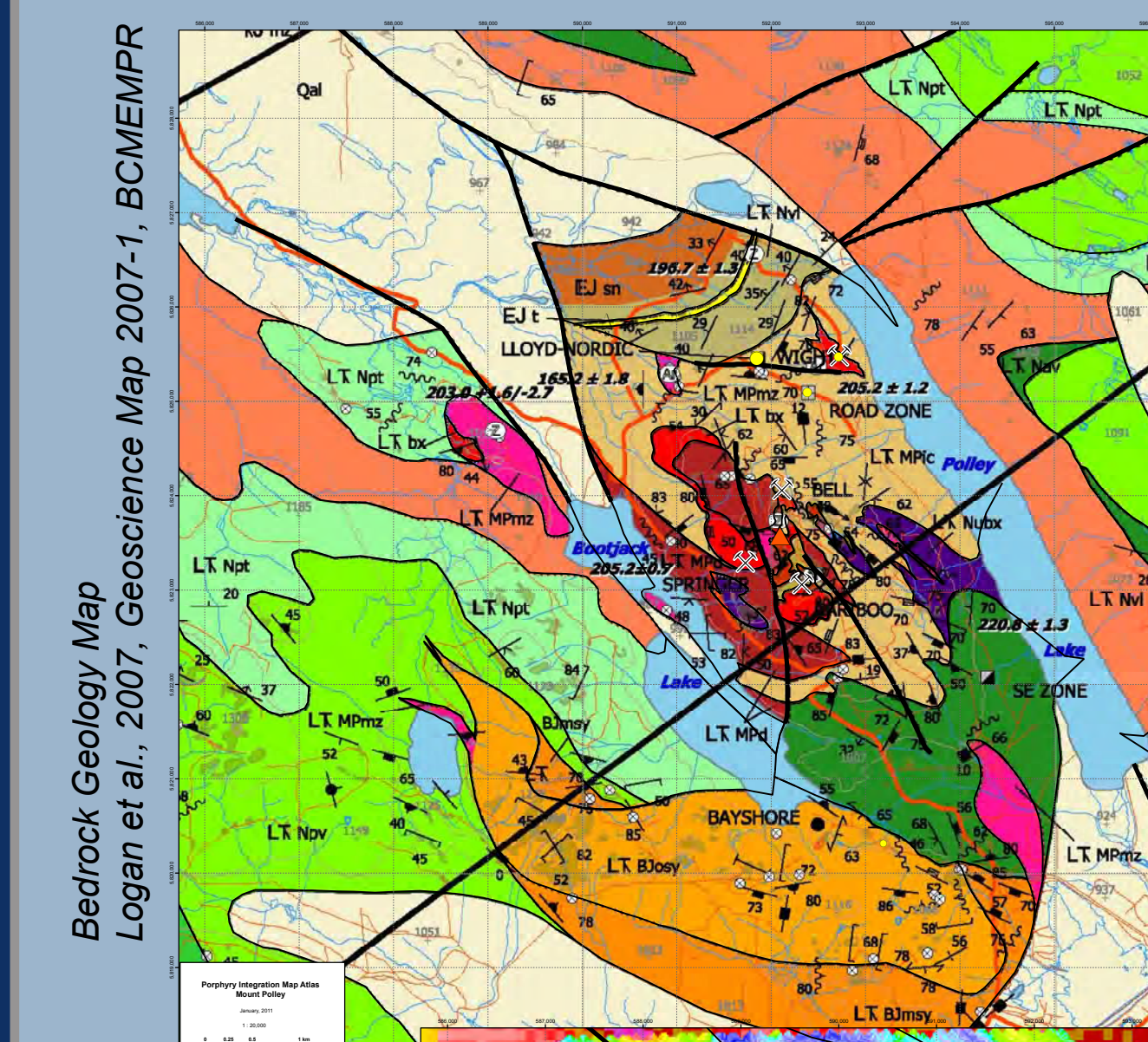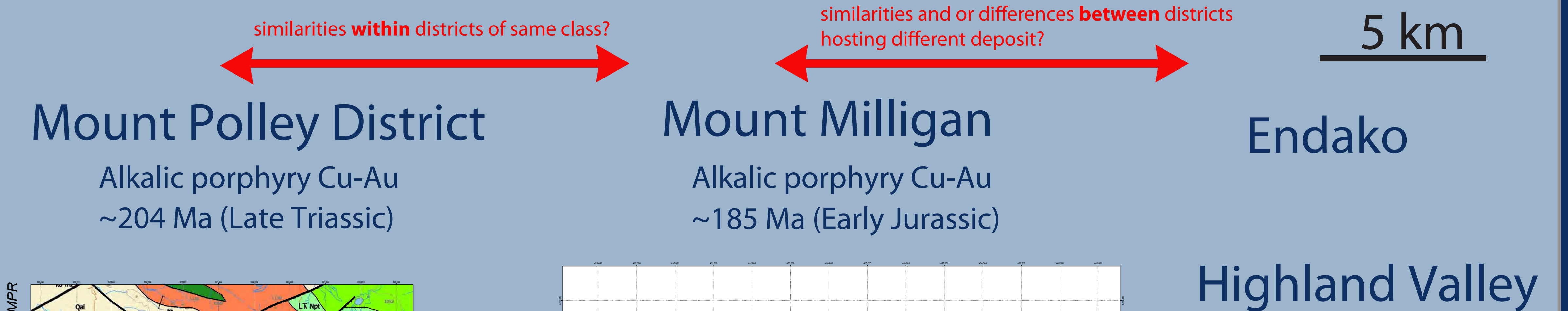Fionnuala Devine (Merlin Geosciences)
Thomas Bissig (MDRU)

Geochemistry module:
Dave Heberlein (Heberlein Geoconsulting)
Fred Blaine (MDRU)

Geophysics module:
Peter Kowalczyk (PK Geophysics)
Dianne Mitchinson (MDRU)

Affiliated Projects:

Geochemical Models for BC porphyry deposits
Fred Blaine, Mineral Deposit Research Unit

Integrating Geology, Physical Rock Properties and Geophysics to Improve Geophysical Inversion Models of BC Porphyry Deposits
Dianne Mitchinson, Mineral Deposit Research Unit

District name — District under review for inclusion in the project

Producing or past-producing porphyry deposits and developed prospects

post-accretion
▶ Cu-Mo; Cu-Au-Mo
▶ Mo; Mo-Cu; W-Mo

pre-accretion (Triassic-Jurassic)
▲ calc-alkalic Cu-Mo-(Au), Cu-Au
▼ alkalic Cu-Au
▼ porphyry-related

Prospects and showings, with porphyry-style mineralization
● developed prospect (porphyry-related)
● prospect
● showing

Geological terranes
■ Quesnel
■ Stikine

Data sets we are seeking to compile and integrate
(if available publicly, or through company participation):

◆ Regional mapping (GSC, BCGS)
◆ District-scale geology
◆ Alteration studies and mapping
◆ Surficial geology
◆ Grade/tonnage shell contours to outline deposits (Company contributions) – Cu, Au
◆ Remote sensing data
◆ Stable Isotope data

◆ Regional Geochemical Survey (RGS) data
◆ Re-analysis of RGS archive (eg. GBC-funded projects)
◆ Stream sediment surveys
◆ Soil surveys, orientation surveys
◆ Lithogeochemical data

◆ Regional aeromagnetic surveys (GSC/BCGS/GB)
◆ Airborne magnetic surveys - district-scale
◆ Airborne electromagnetic surveys
◆ IP surveys, including TITAN
◆ Rock property data

Contact:

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We are building up the database of publicly-available data over these districts. Where possible, if company-held data sets are available to add to the data package, we are seeking company participation through data-sharing agreements.

Comparisons and contrasts: signatures of BC's Porphyry Districts

similarities **within** districts of same class?

similarities and or differences **between** districts hosting different deposit?

5 km

Mount Polley District
Alkalic porphyry Cu-Au
~204 Ma (Late Triassic)

Mount Milligan
Alkalic porphyry Cu-Au
~185 Ma (Early Jurassic)

Endako

Highland Valley

District working groups will be meeting over the coming year to discuss and interpret the integrated data sets. Watch for deliverable products over the coming year.