

# GEM

## *Geo-mapping: Nunavut highlights and GEM-2 outlook, 2014-2020*

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Natural Resources  
Canada

Ressources naturelles  
Canada

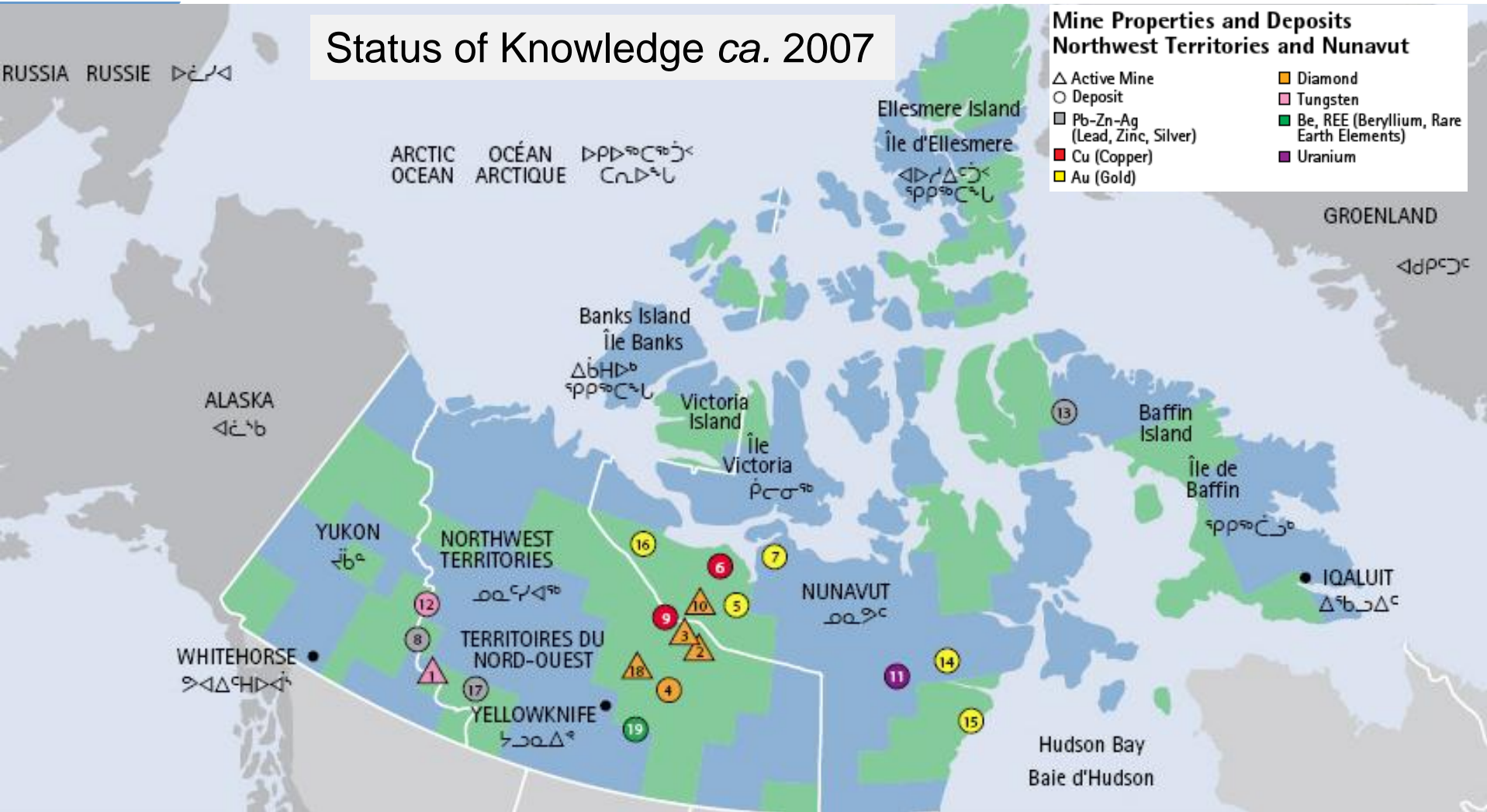
Canada

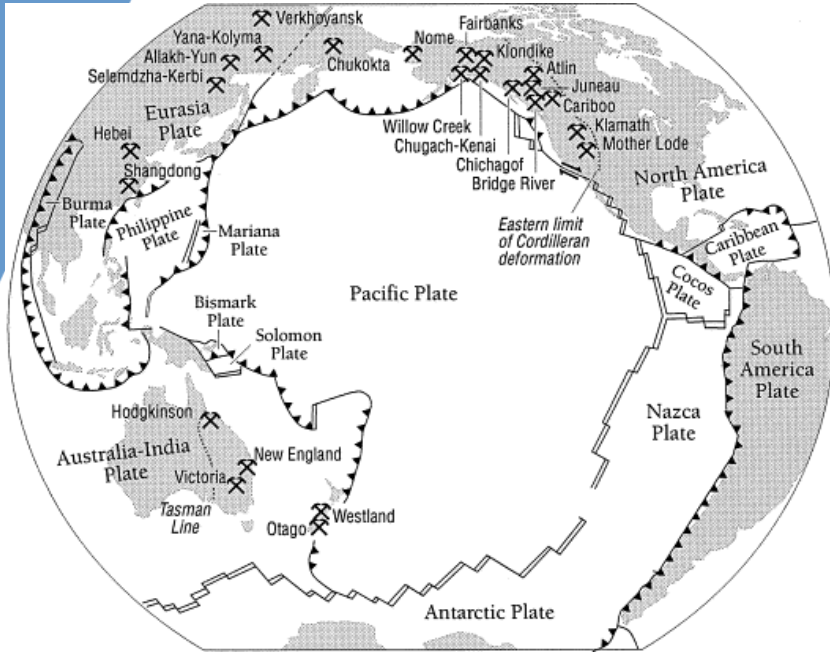
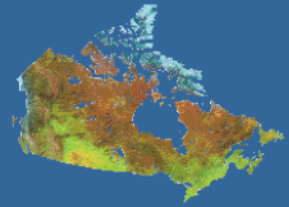


### Status of Knowledge ca. 2007

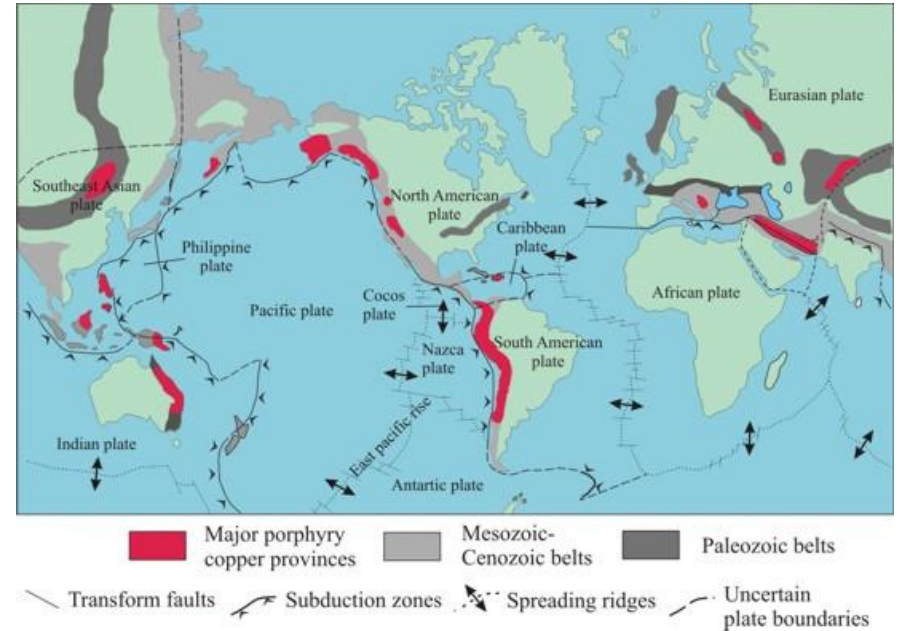
#### Mine Properties and Deposits Northwest Territories and Nunavut

- △ Active Mine
- Deposit
- Pb-Zn-Ag (Lead, Zinc, Silver)
- Cu (Copper)
- Au (Gold)
- Diamond
- Tungsten
- Be, REE (Beryllium, Rare Earth Elements)
- Uranium



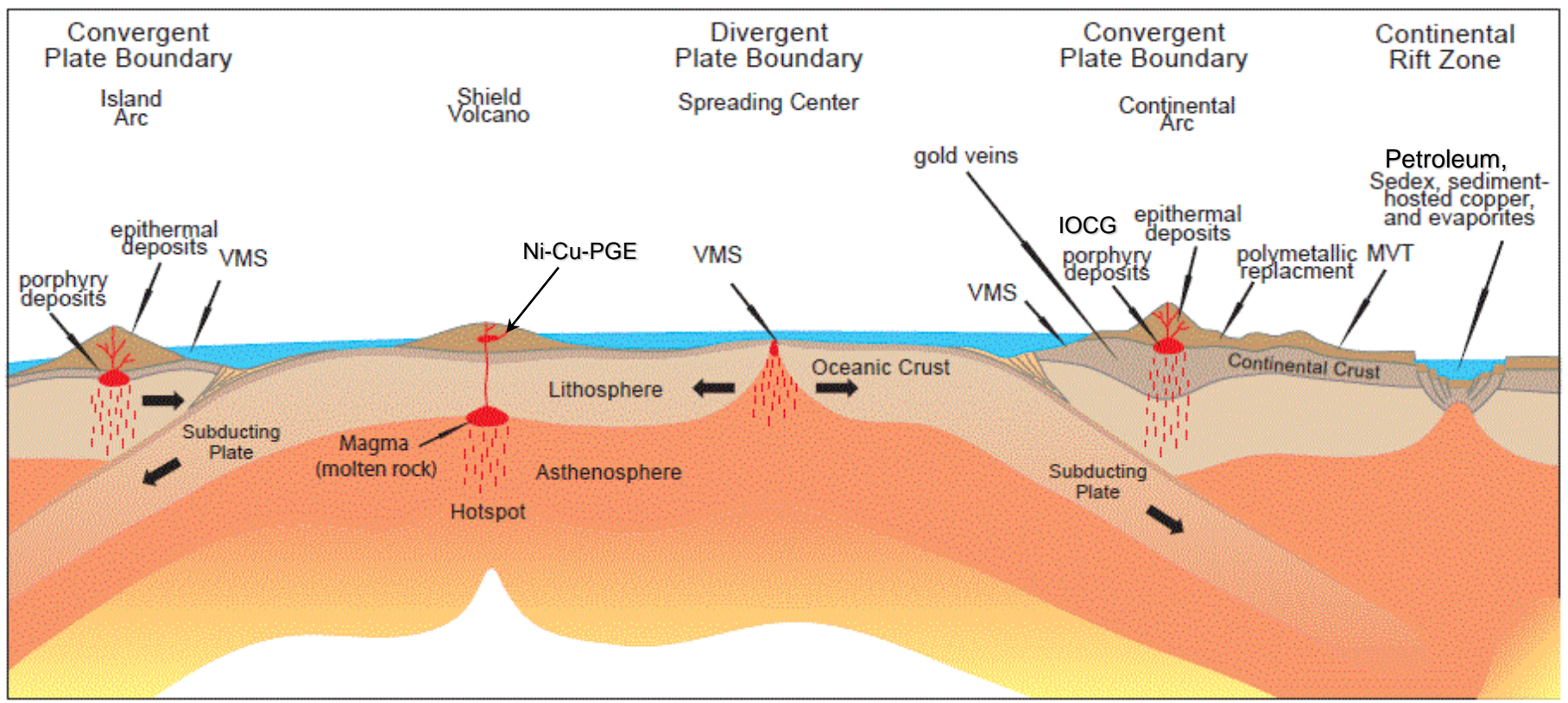
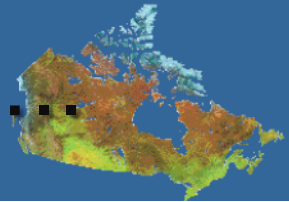


**Gold deposits**

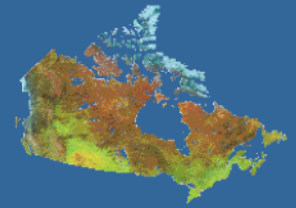


**Porphyry Cu-Mo-Au deposits**

.....as a guide to resource potential in Canada



.....linked to prospective geological environments:  
 .....we find the haystacks



5 **Traditional framework mapping** in under-explored/greenfields areas: new geophysics, bedrock, surficial maps, databases, interpretations, models

**Emerging metalotects:** upgrading regional knowledge around known mineralized environments using innovative methods

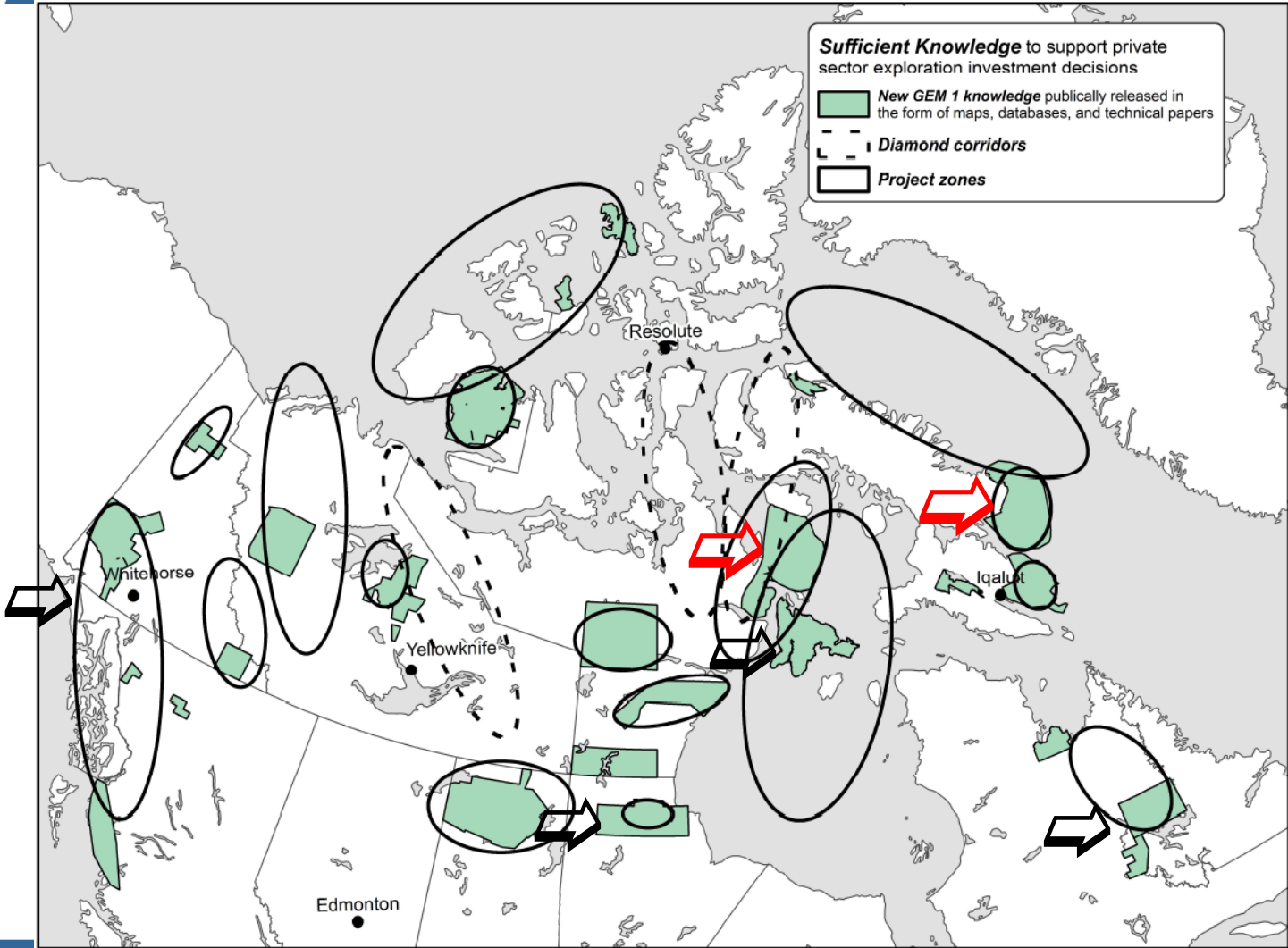
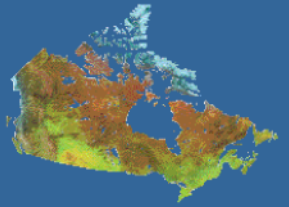
**Greenfields reconnaissance:** upgrading regional geoscience in areas with little pre-existing knowledge through new approaches

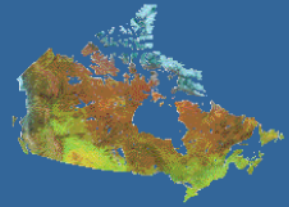
Assess potential

→ land use decisions

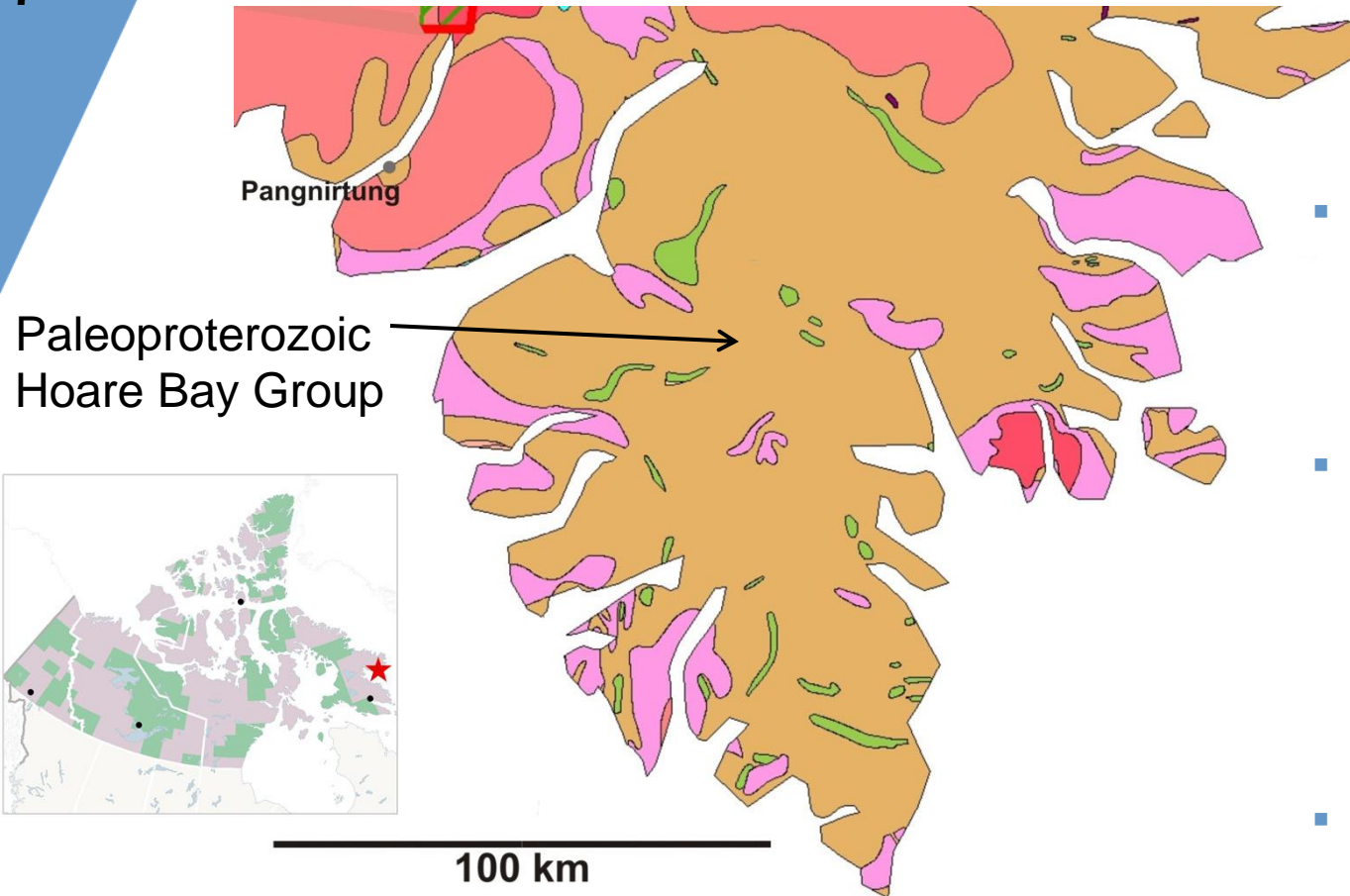
→ investment decisions

→ exploration targeting

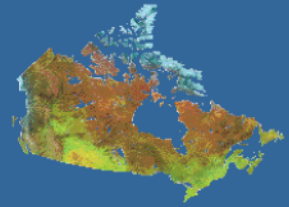




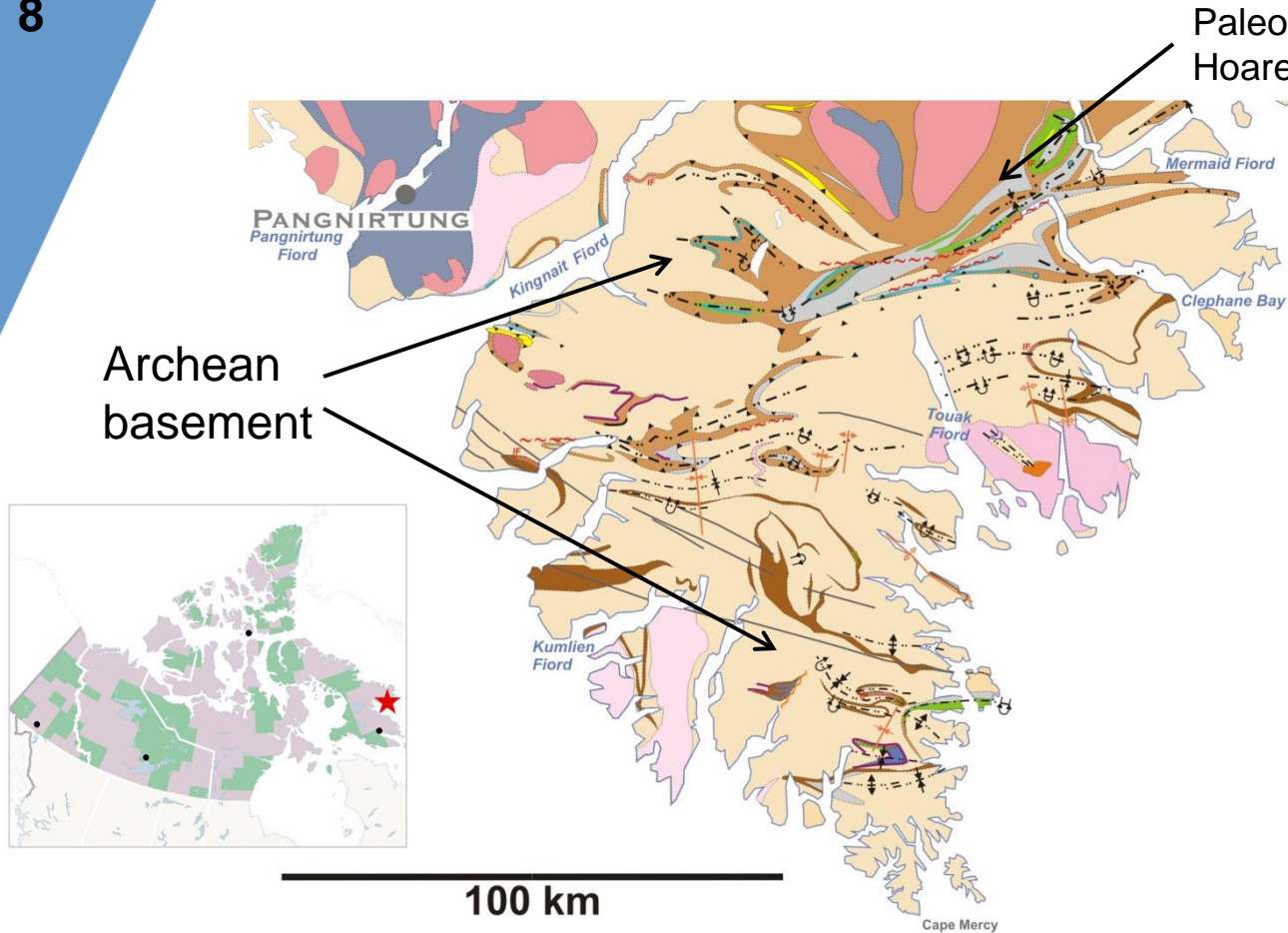
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- Based on observations from original heli-reconnaissance.
- Rudimentary and sparse state of knowledge not adequate to stimulate exploration.
- Modern concepts suggest potential.



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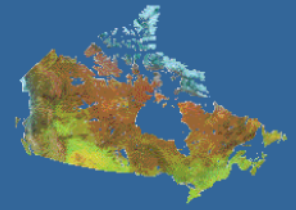
Paleoproterozoic  
Hoare Bay Group

Archean  
basement

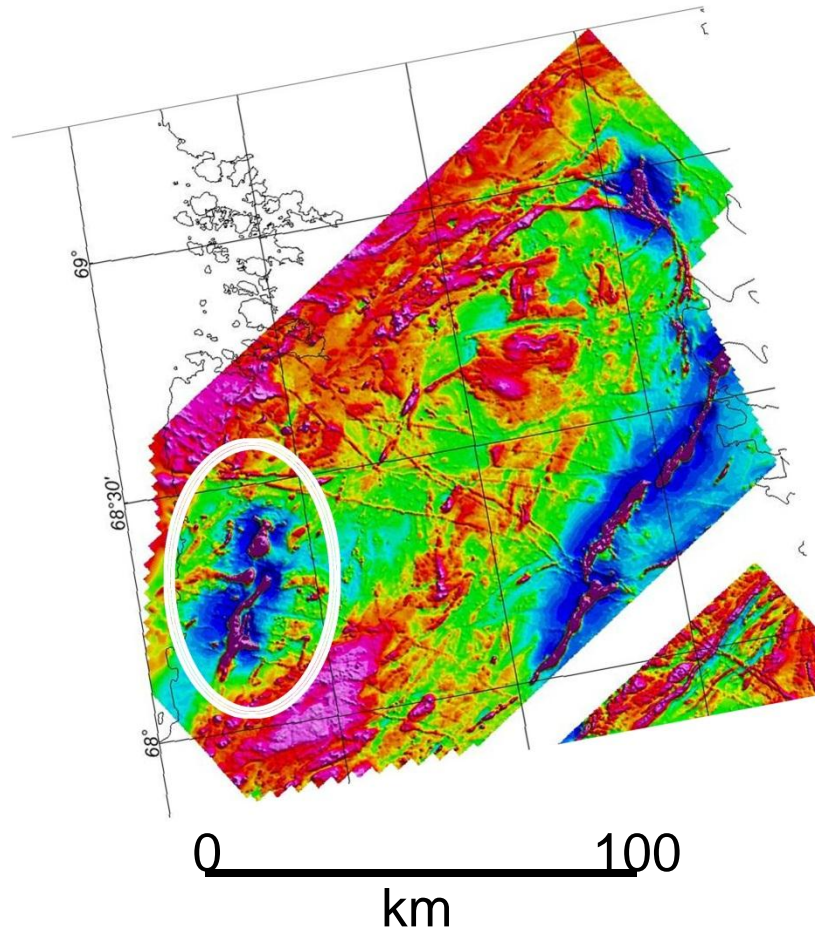
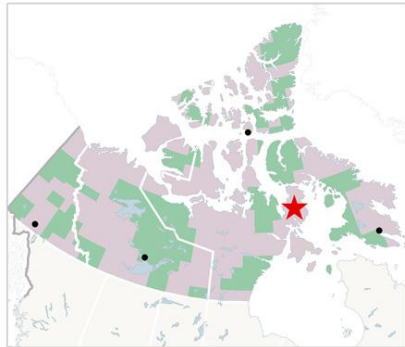
- Regional-scale fieldwork conducted in 2009 and 2010.
- New regional scale geoscience maps produced.
- Results presented at public forums underpinned by modern geological framework and data.



## Western Melville Peninsula: new nickel potential

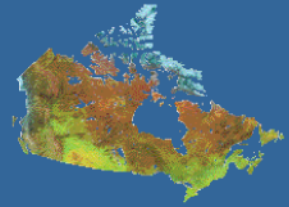


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- With the use of modern geoscience mapping methods such as high-resolution geophysics and field work, GEM has identified what could be a new belt of nickel potential.

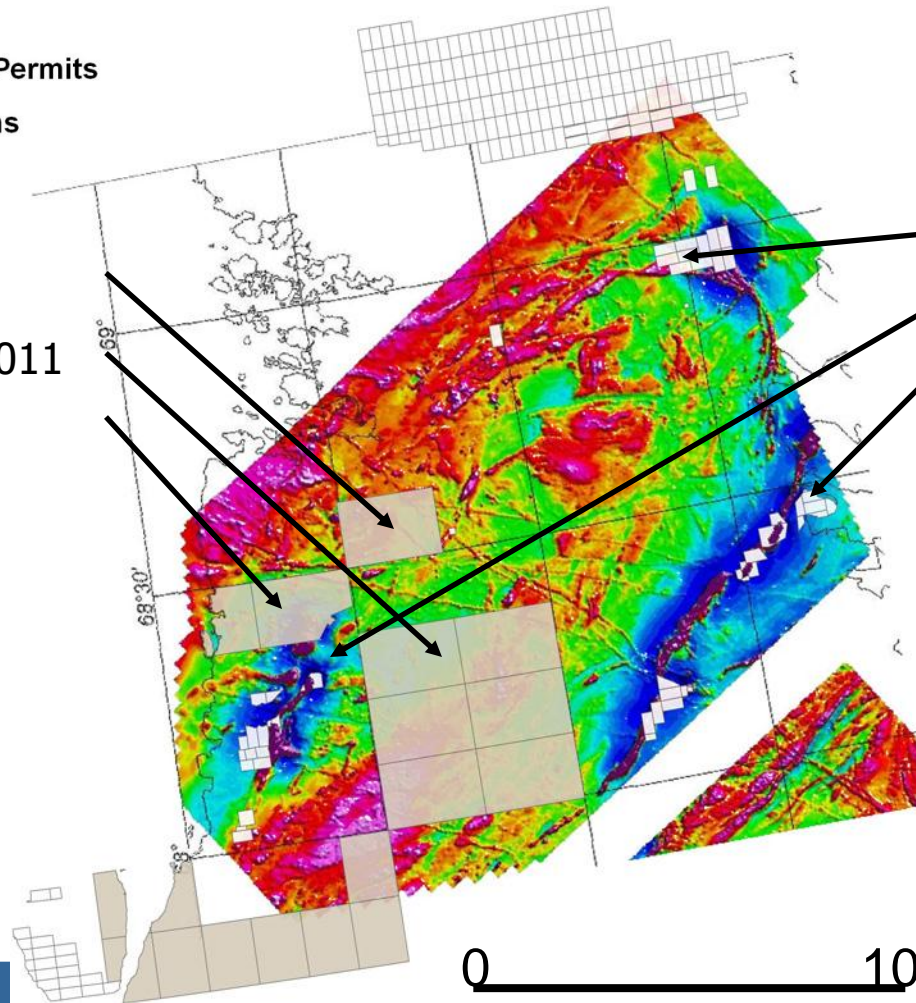
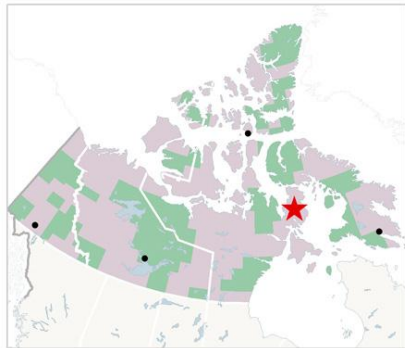
## Western Melville Peninsula: industry uptake



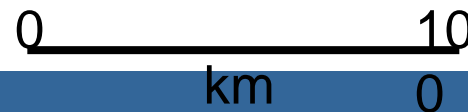
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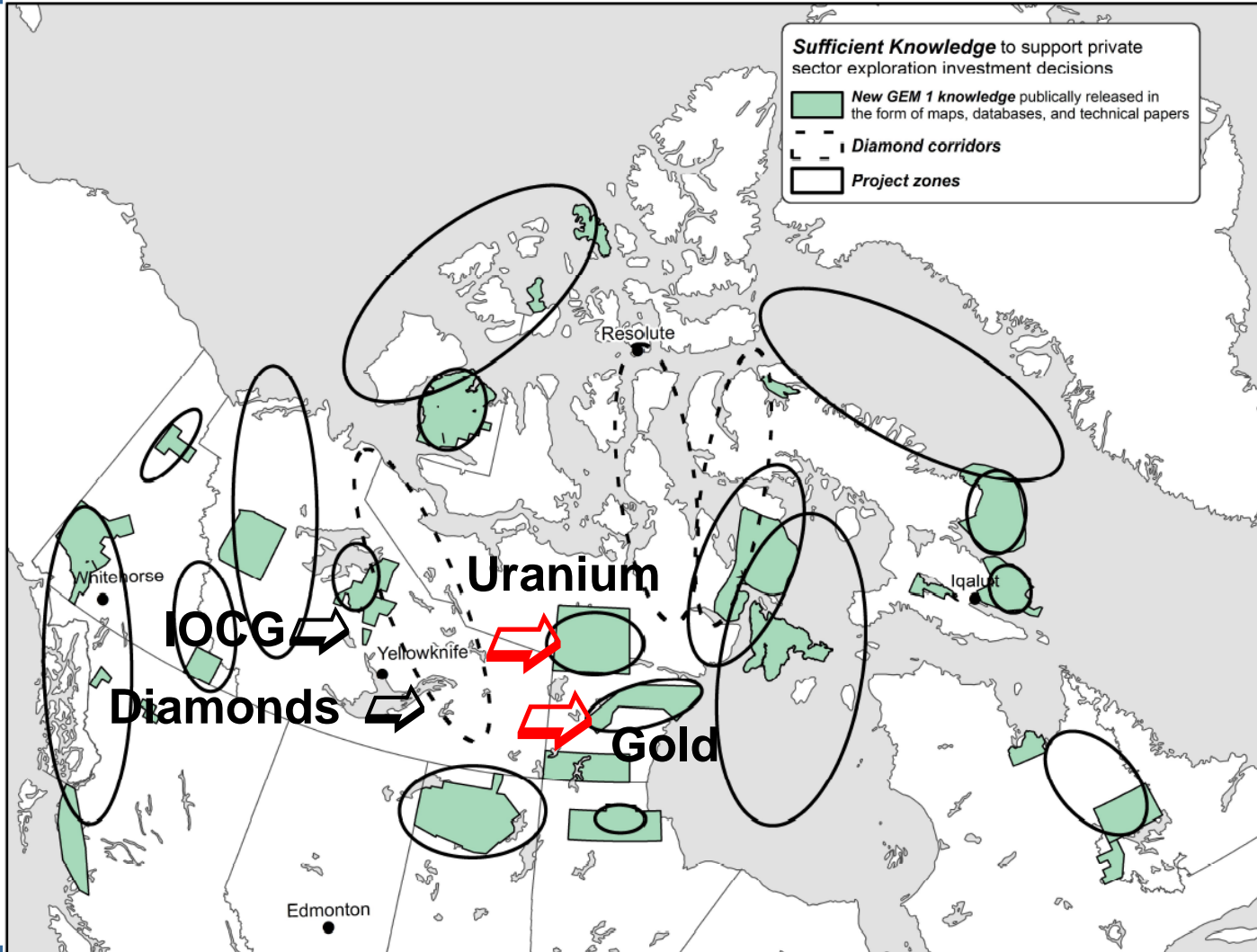
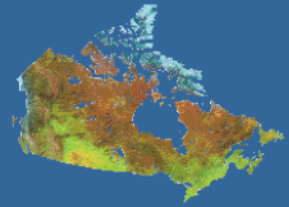
- Prospecting Permits
- Mineral Claims

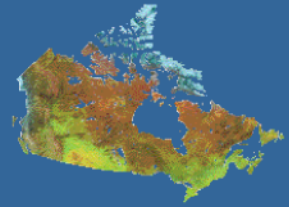
Prospect permits  
issued February 2011



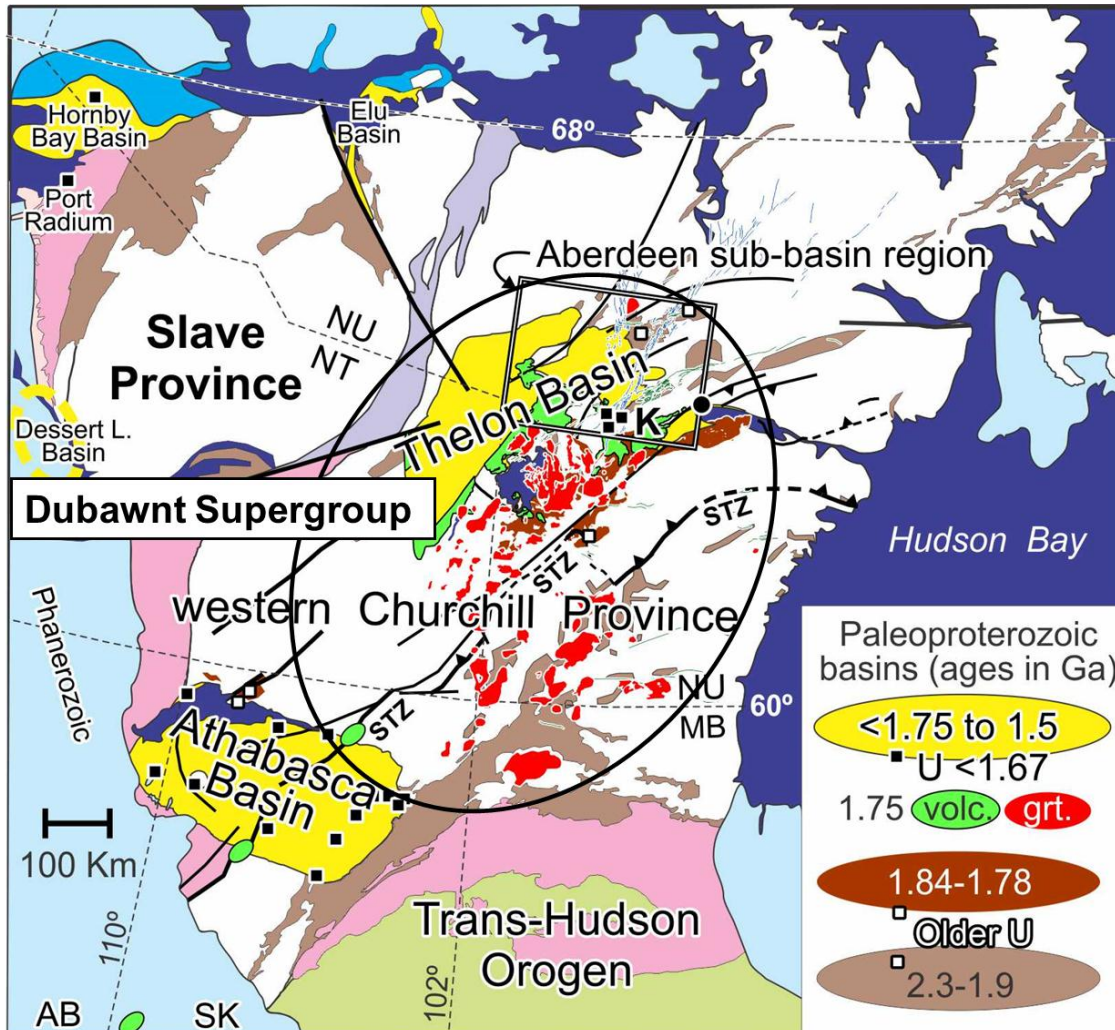
August 2011  
mineral claims.

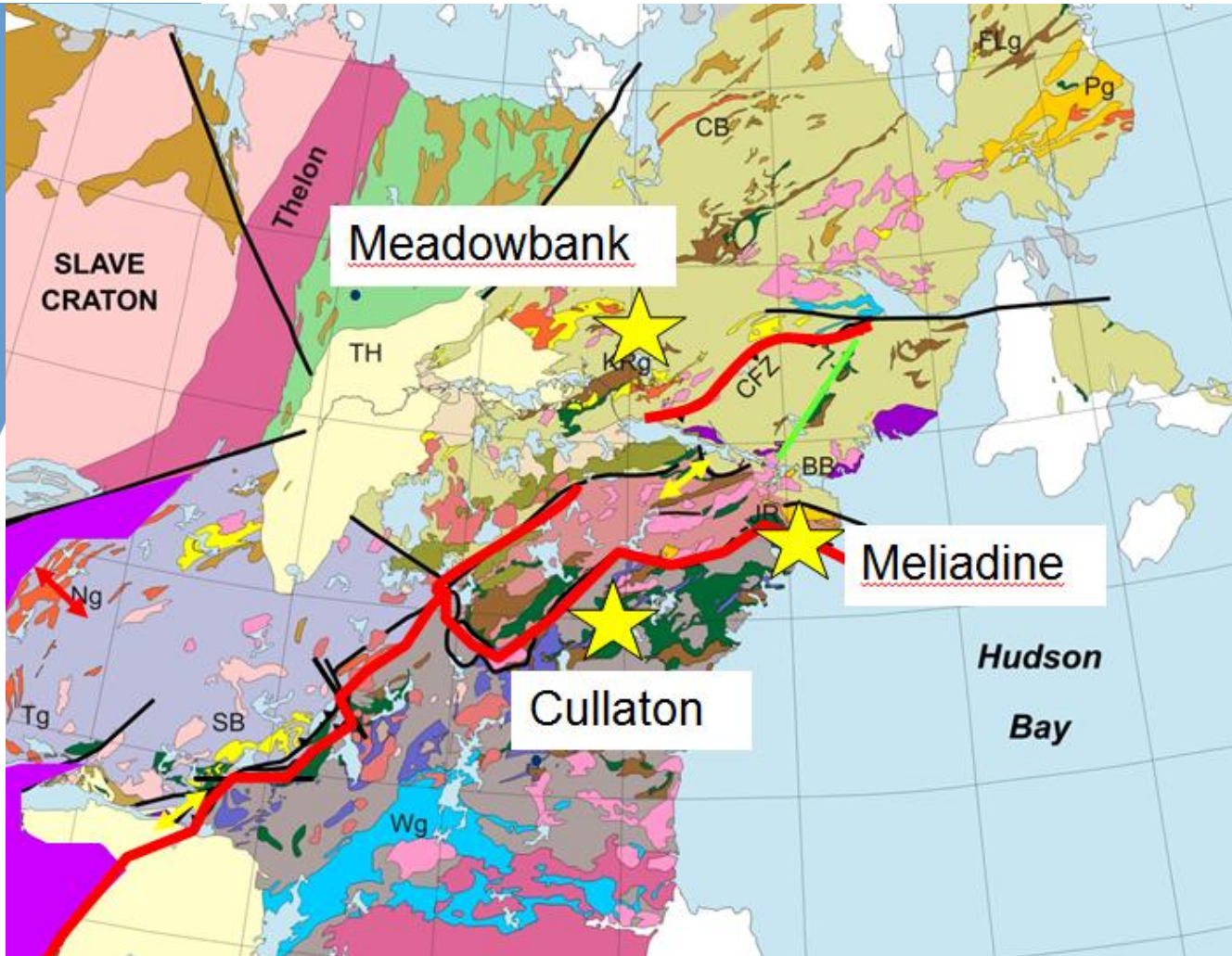
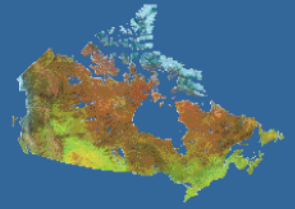




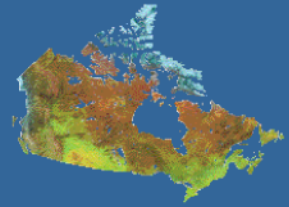


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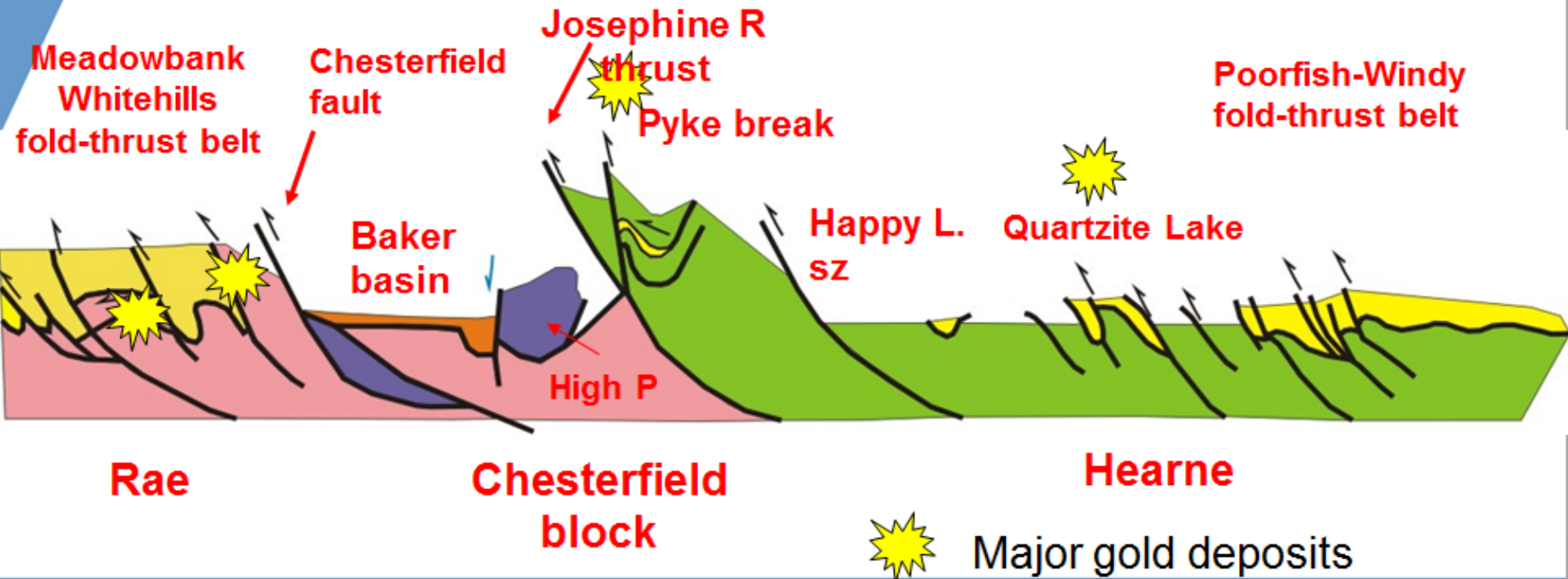


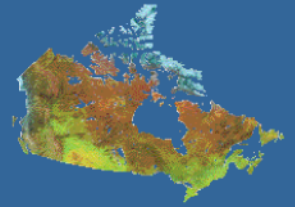
*Where are the major structures in this heavily drift-covered region?*



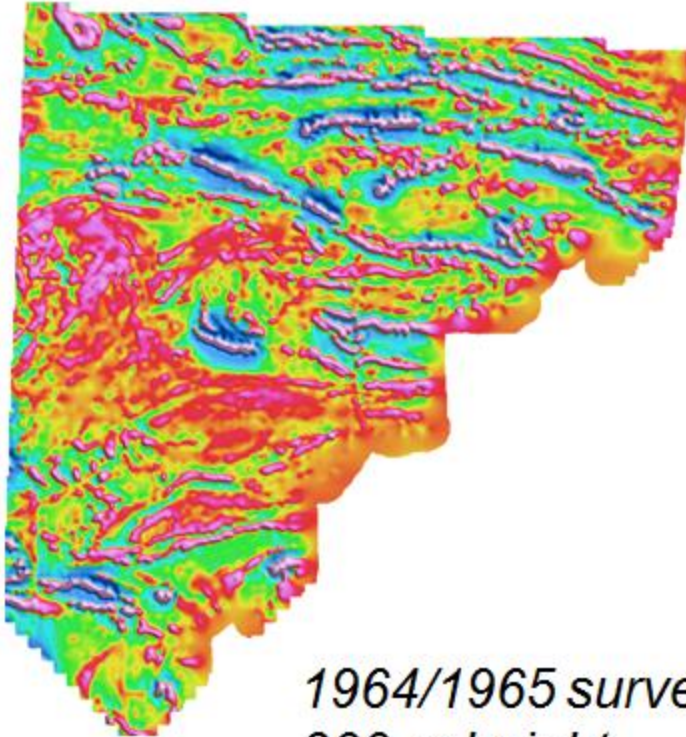
14

Is there a relationship between focusing of gold mineralization and the first order breaks bounding the Chesterfield block?

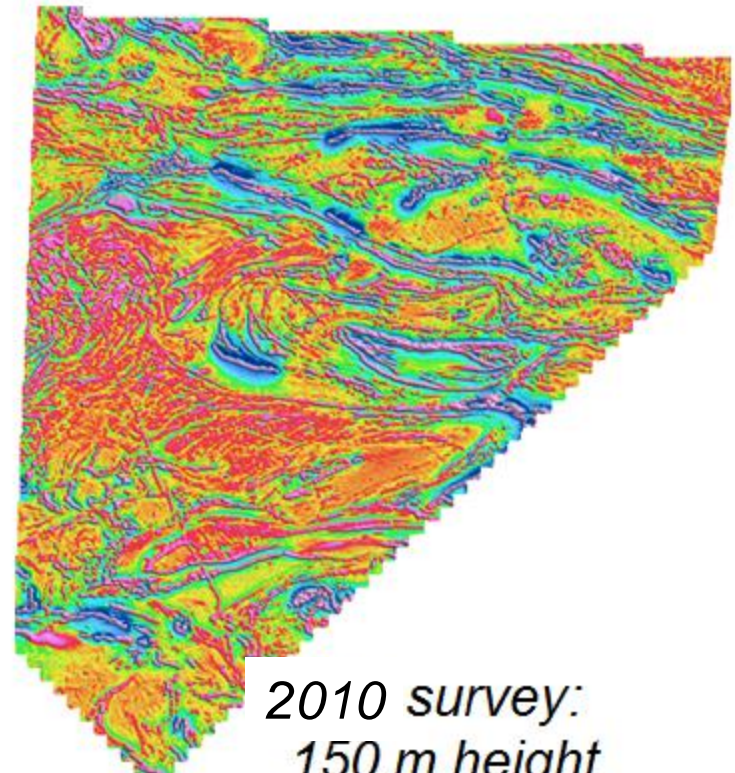




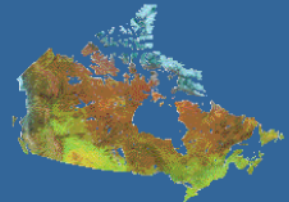
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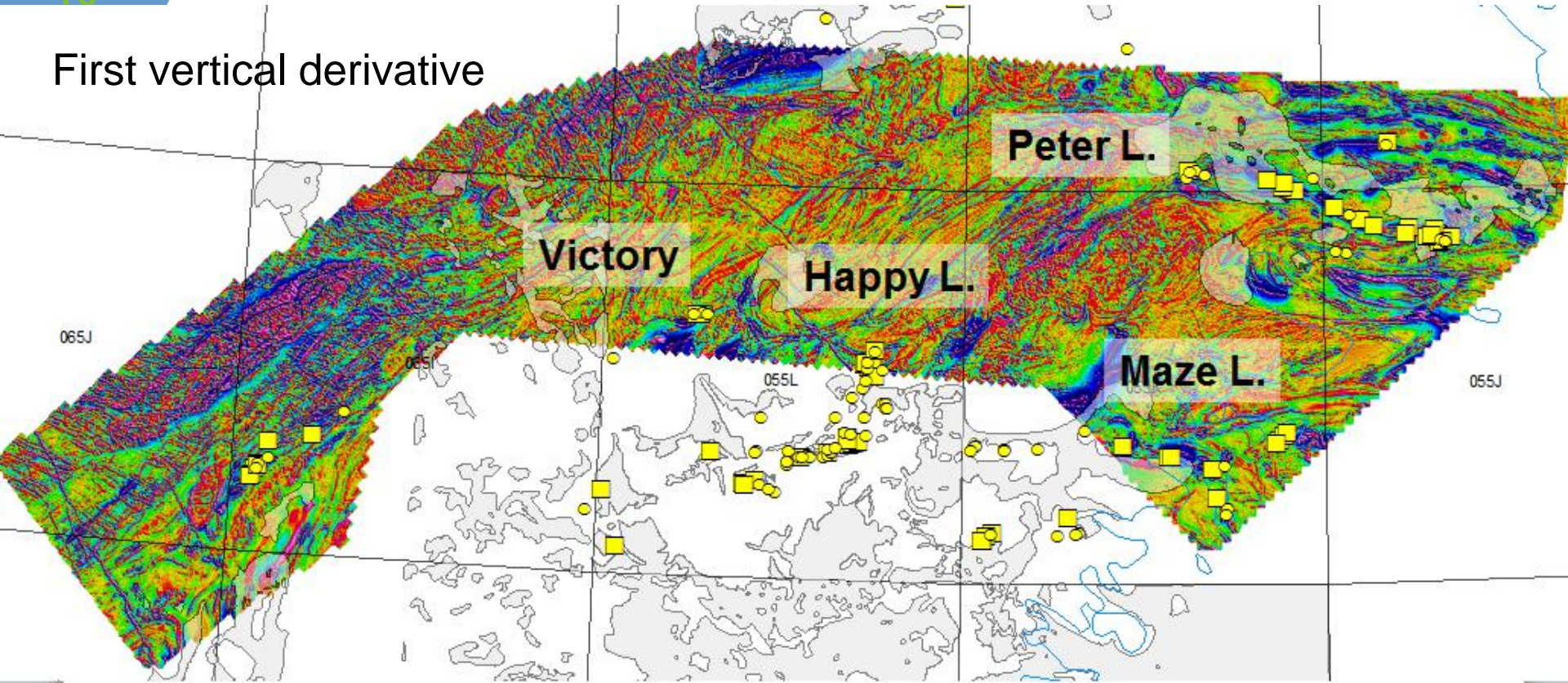
*1964/1965 survey:  
300 m height  
800 m line spacing*



*2010 survey:  
150 m height  
400 m line spacing*

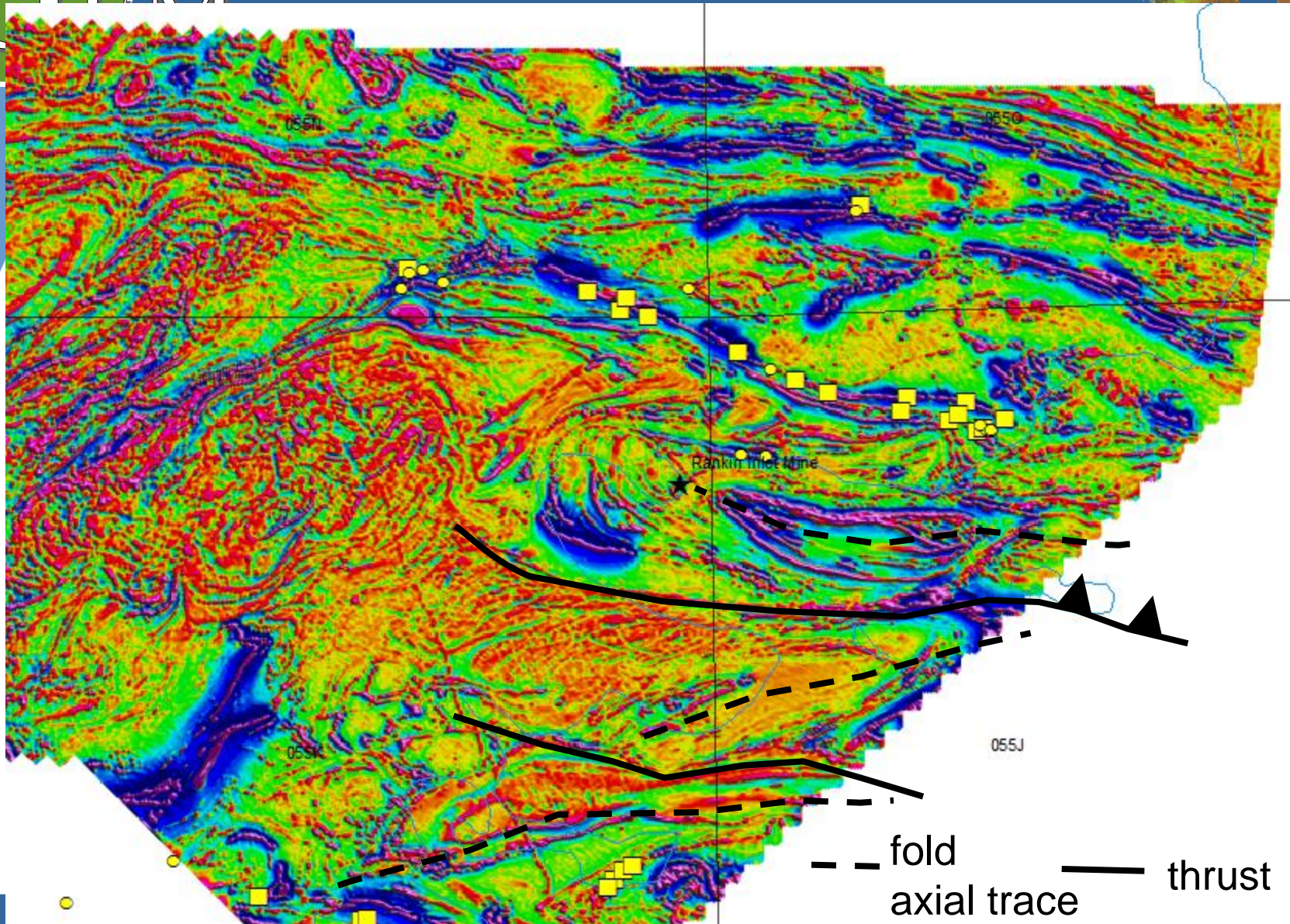


## First vertical derivative

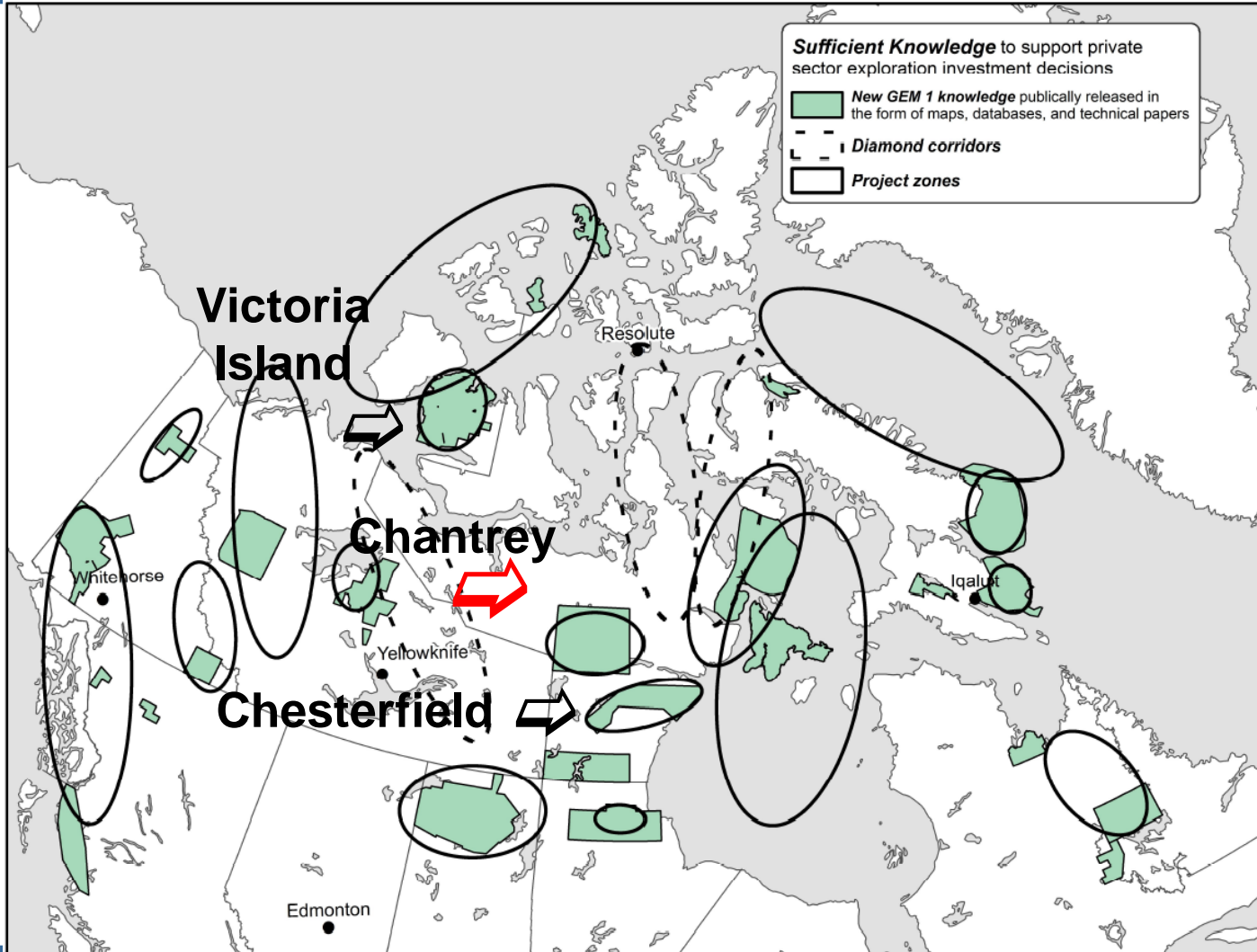
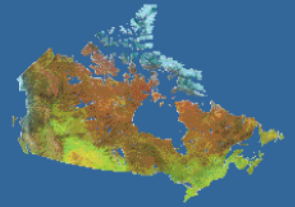




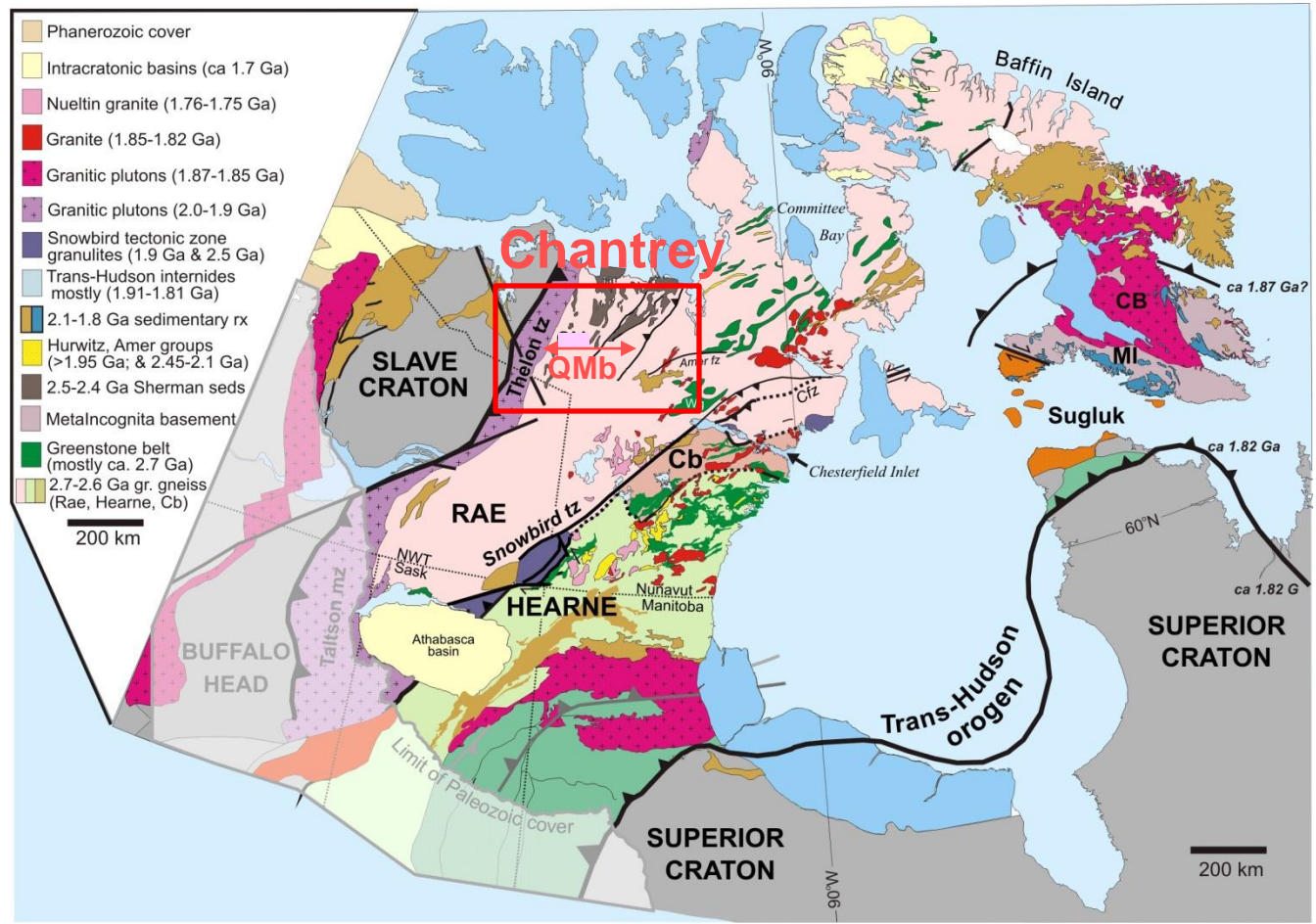
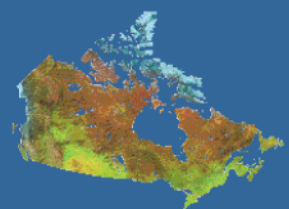
# Au hosting unit trajectory?



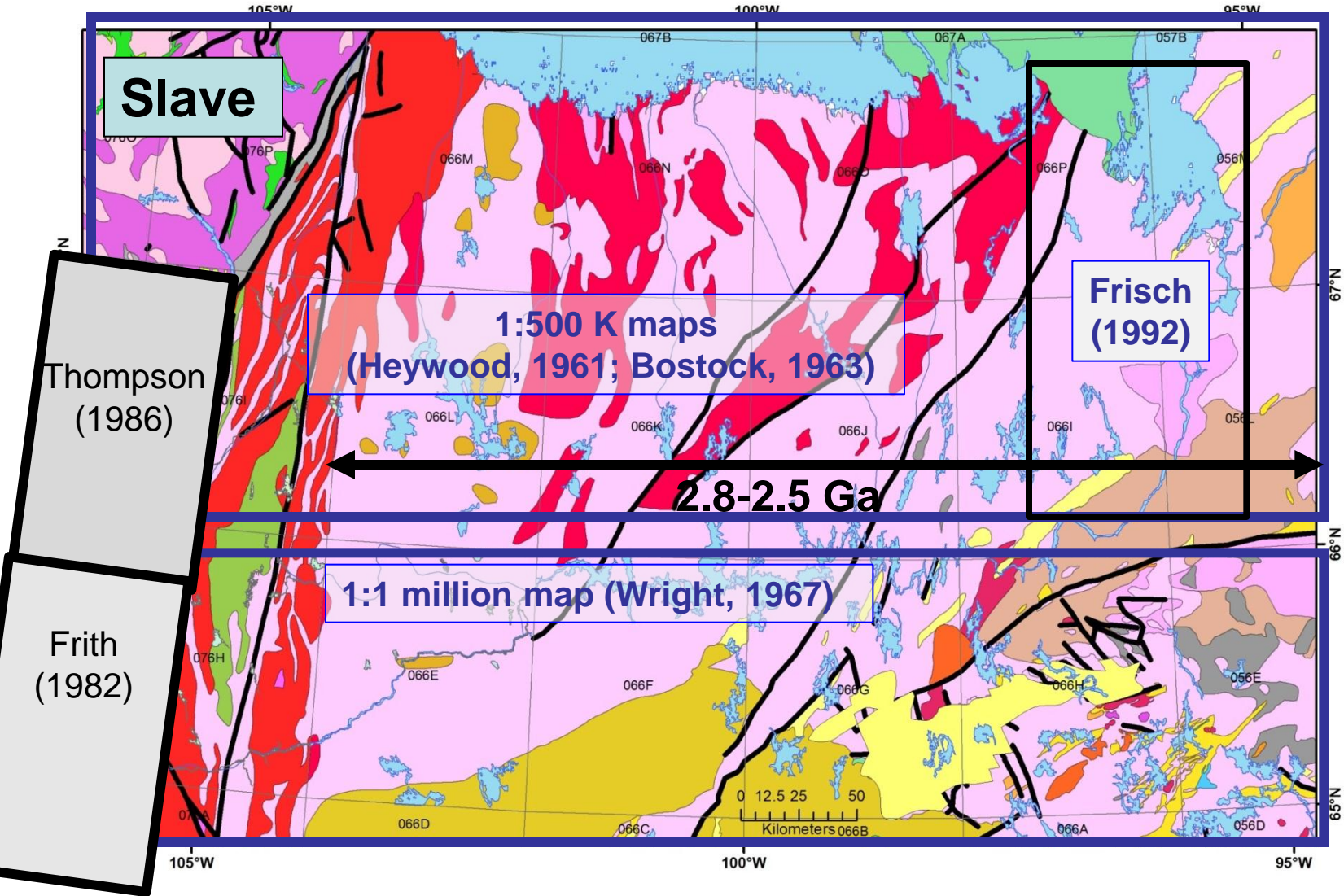
--- fold axial trace  
— thrust



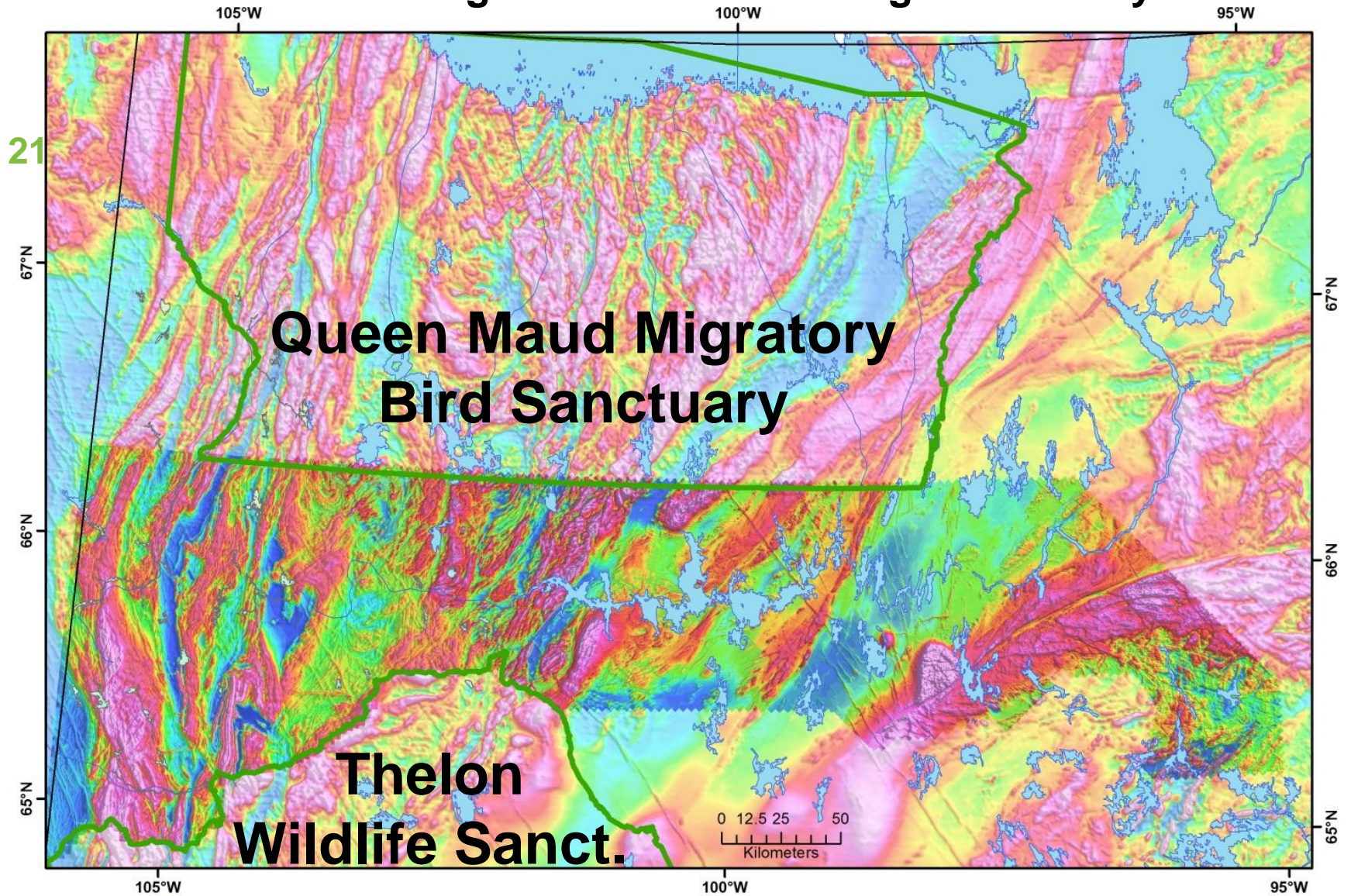
## Geomapping Frontiers – Chantrey project



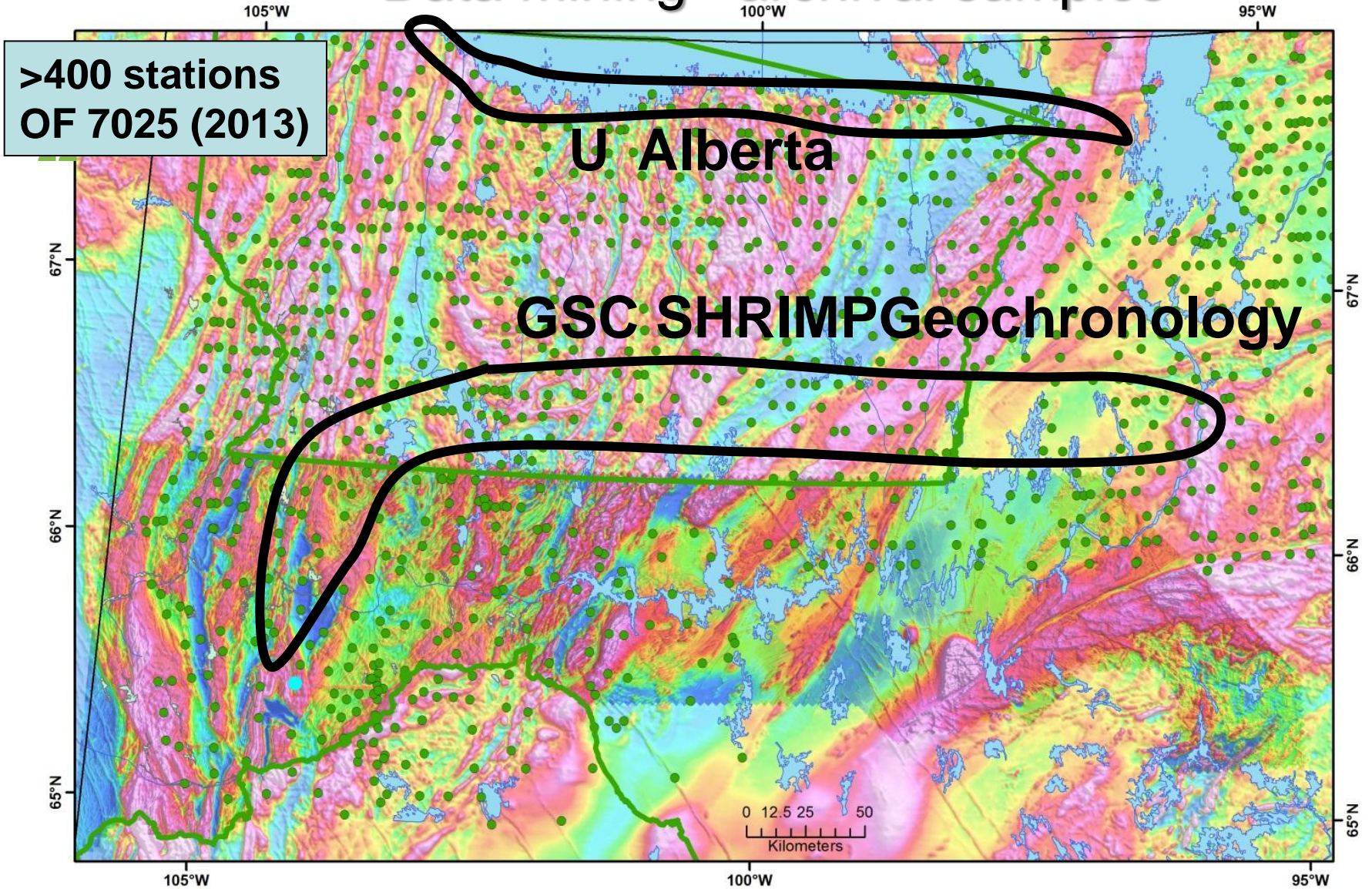
# Early mapping



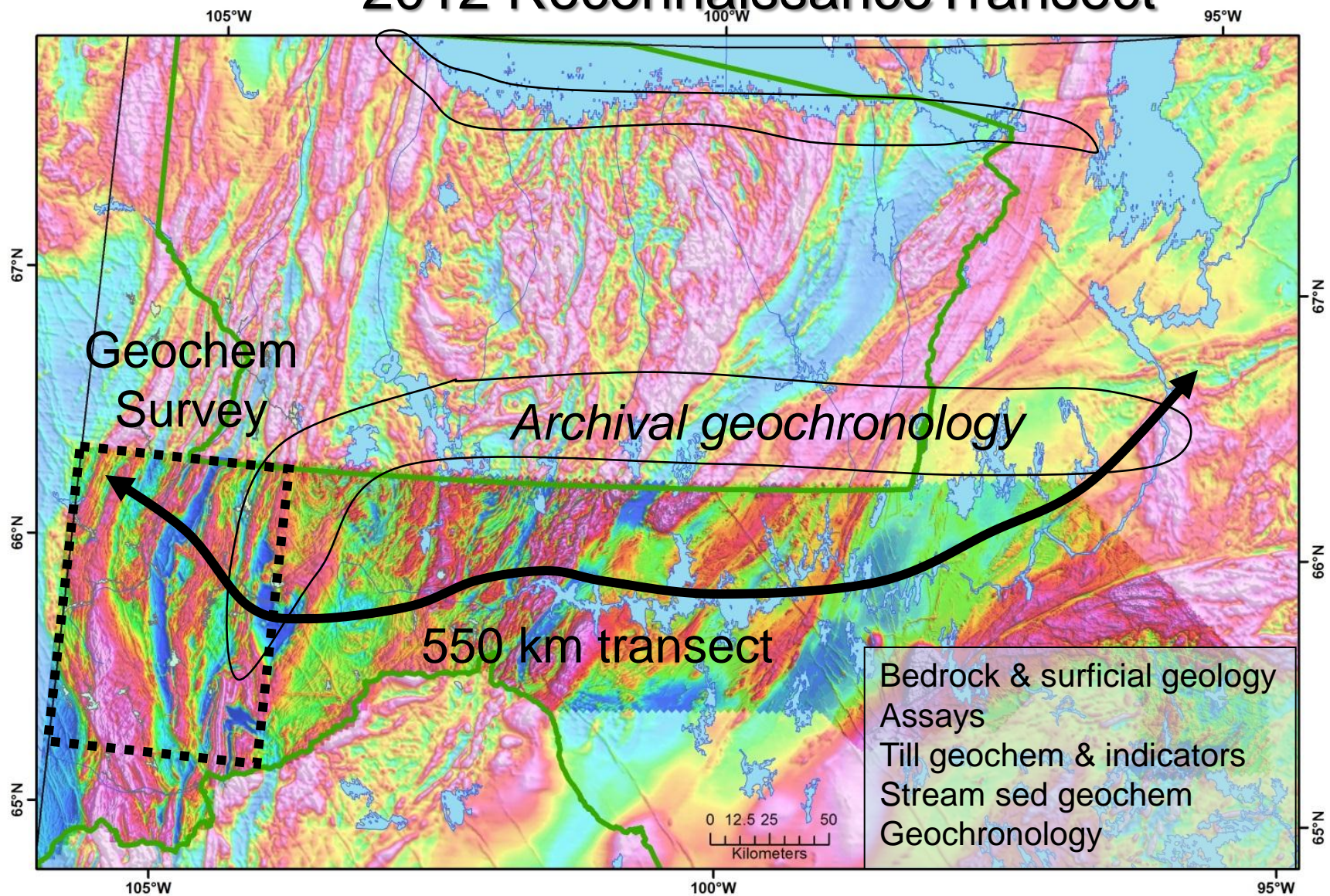
~ 500 km high-resolution aeromagnetic survey



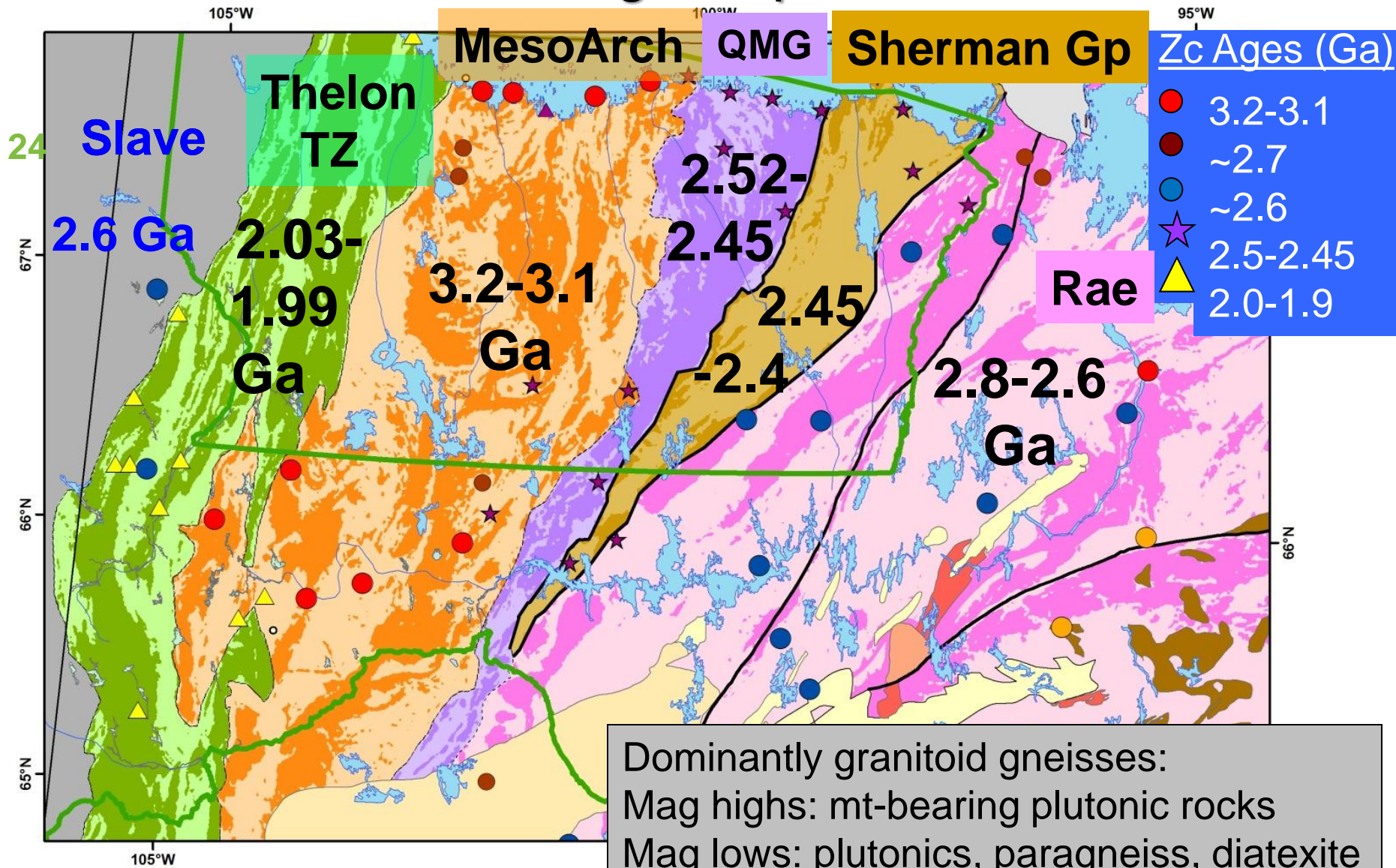
# Data mining– archival samples



# 2012 Reconnaissance Transect



# RPM-age map

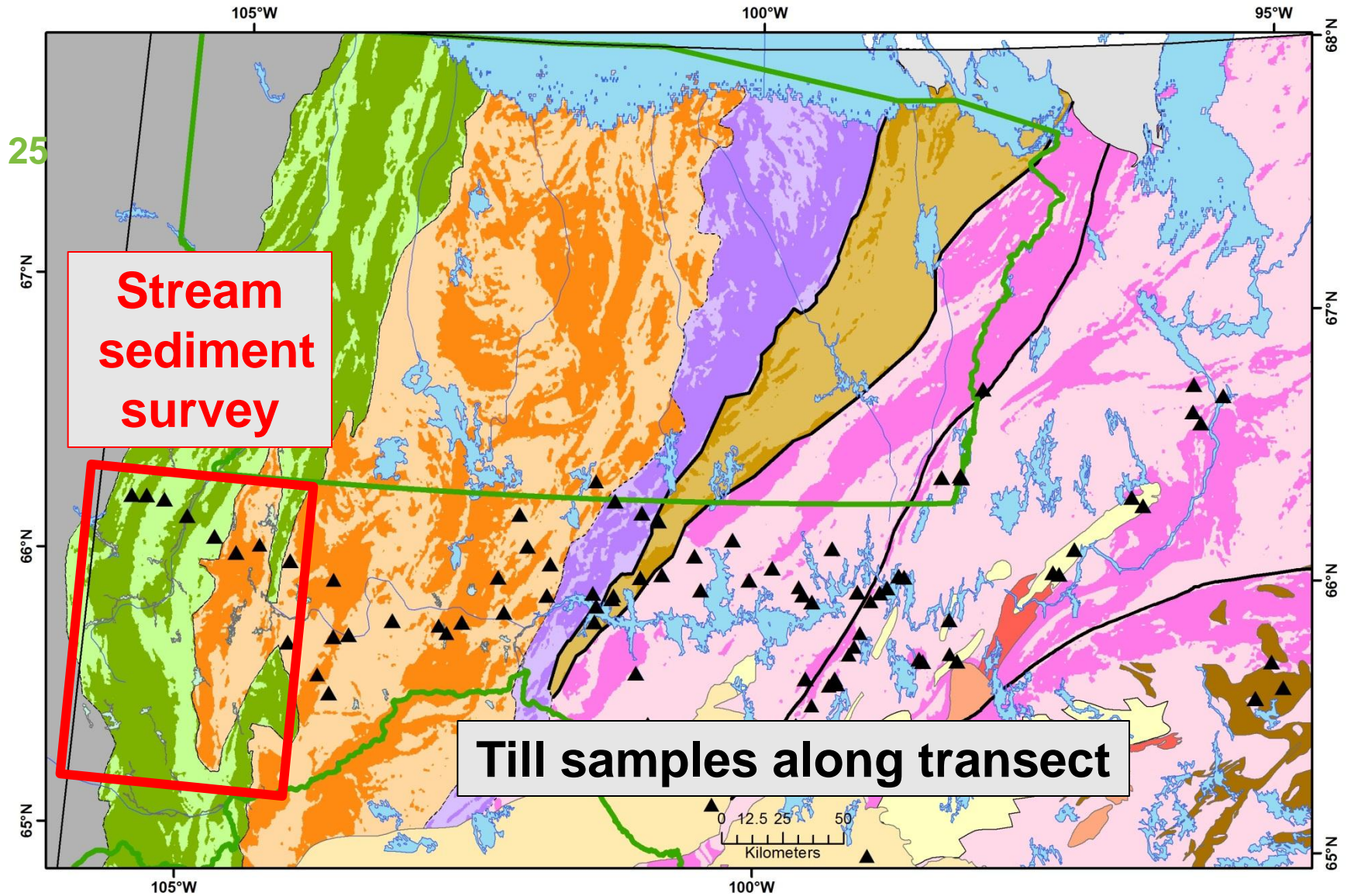


Dominantly granitoid gneisses:  
 Mag highs: mt-bearing plutonic rocks  
 Mag lows: plutonics, paragneiss, diatexite

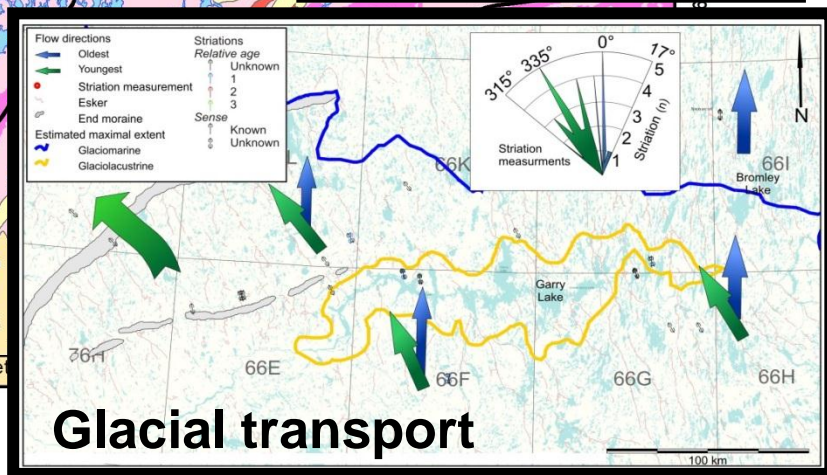
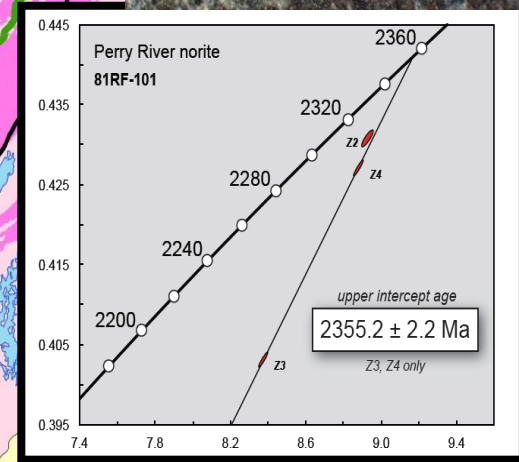
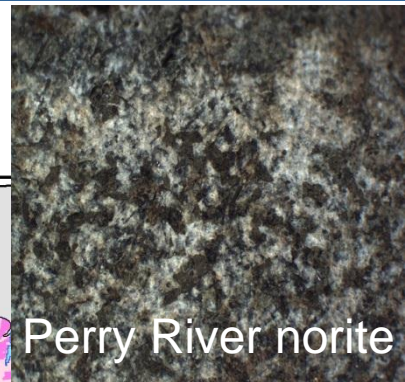
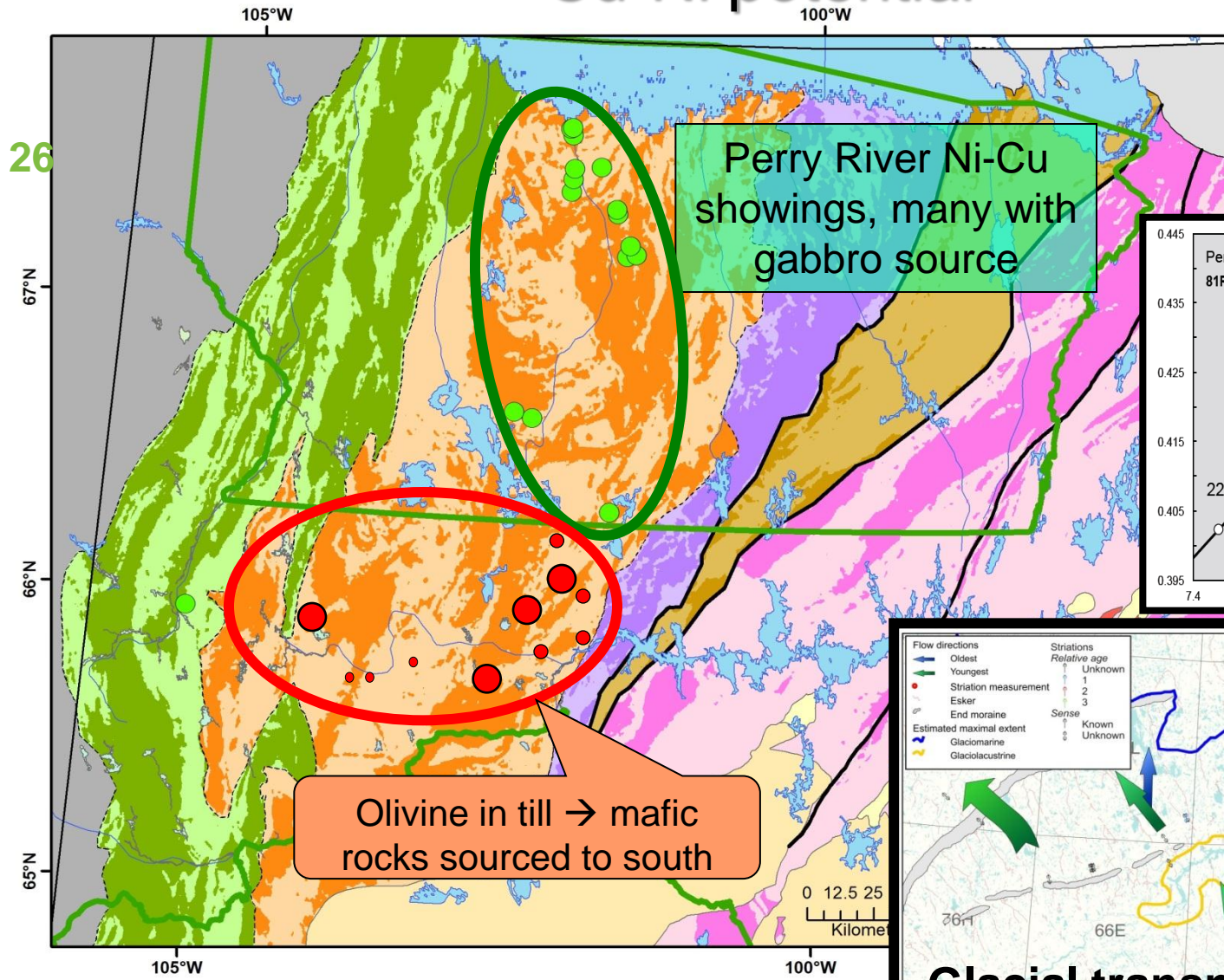




# Economic Potential



# Cu-Ni potential



## Glacial transport

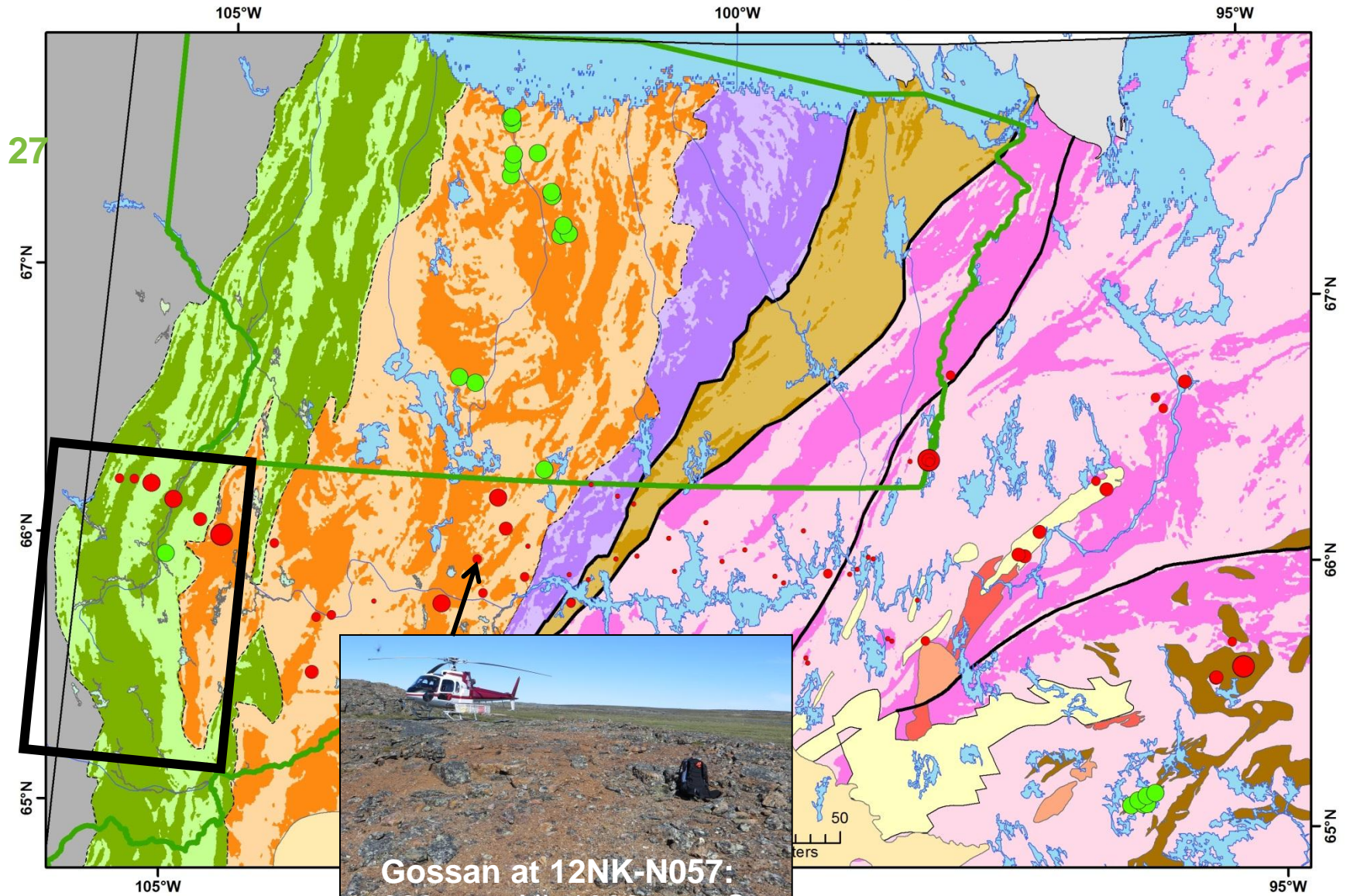


Natural Resources Canada

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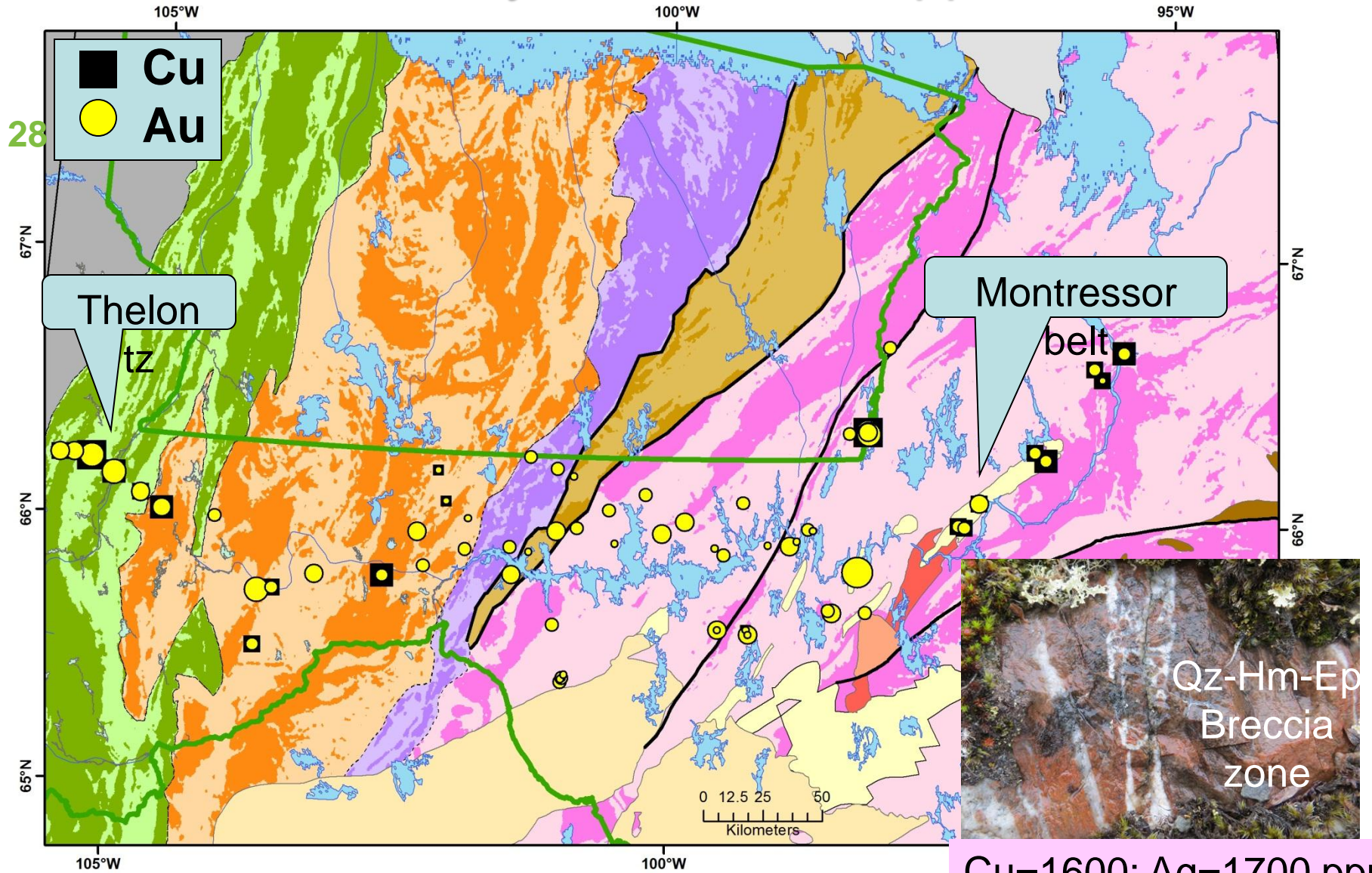
# Nickel in till & gossans



**Gossan at 12NK-N057:**  
660 ppm Ni, 1060 ppm Cu,  
2310 ppm Cr



# Till analyses: Gold & Copper

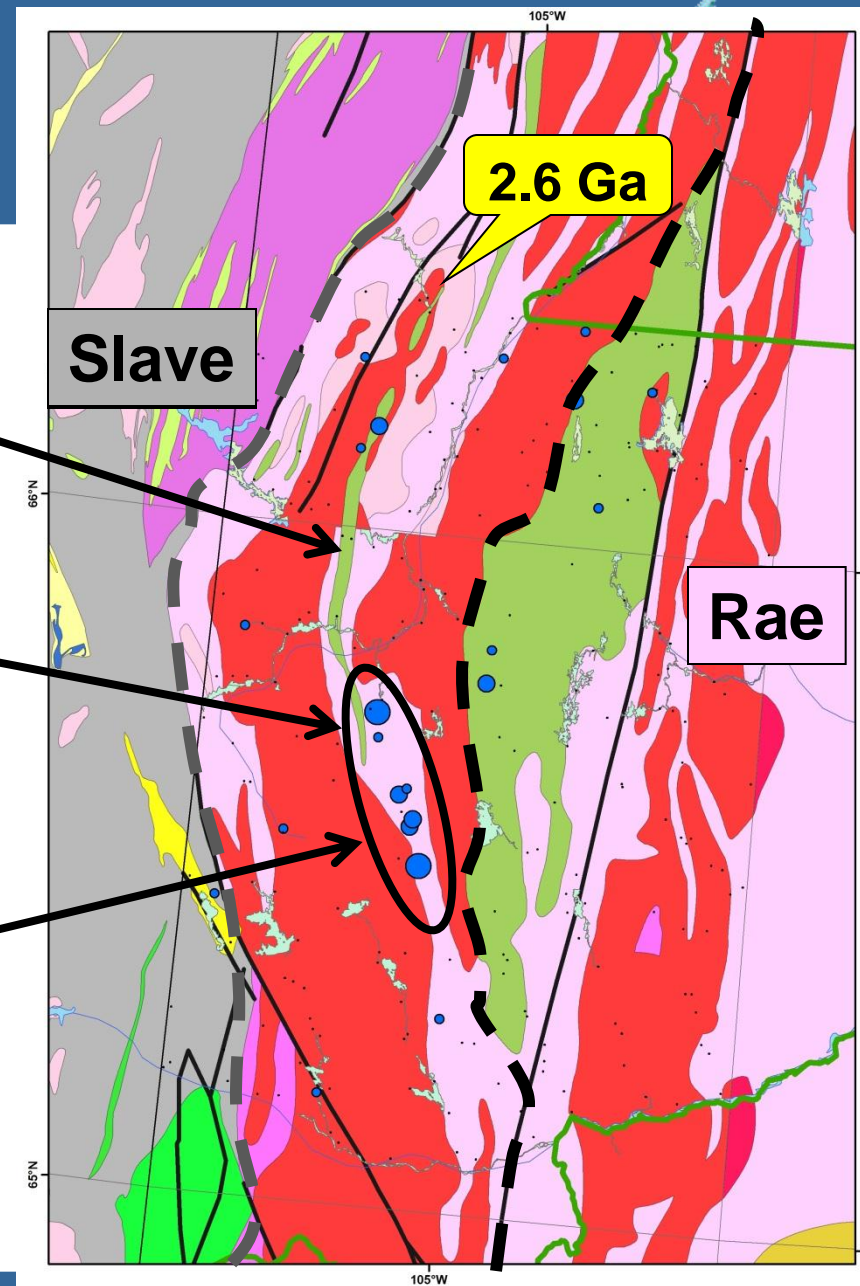


Cu=1600; Ag=1700 ppm

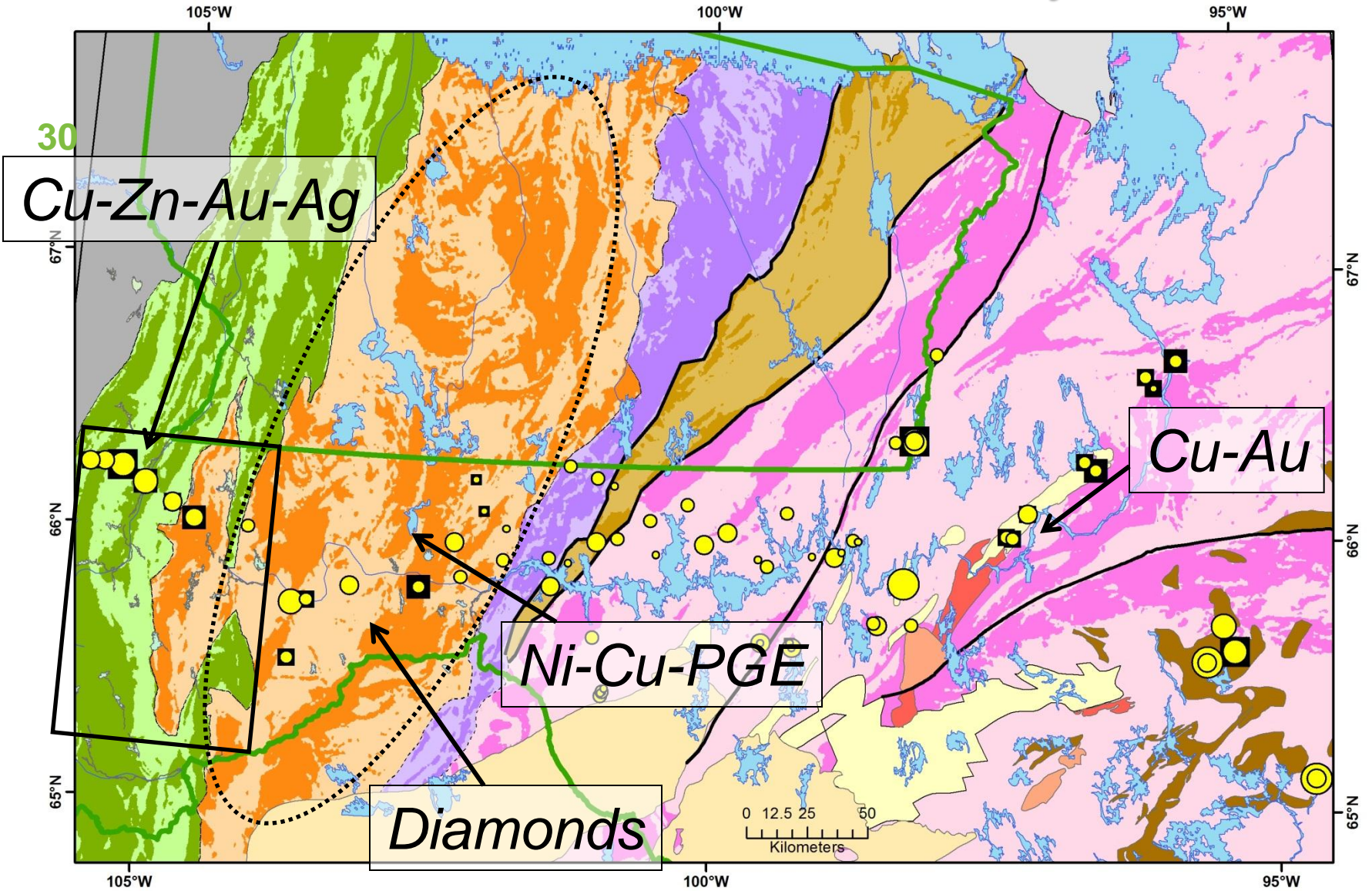


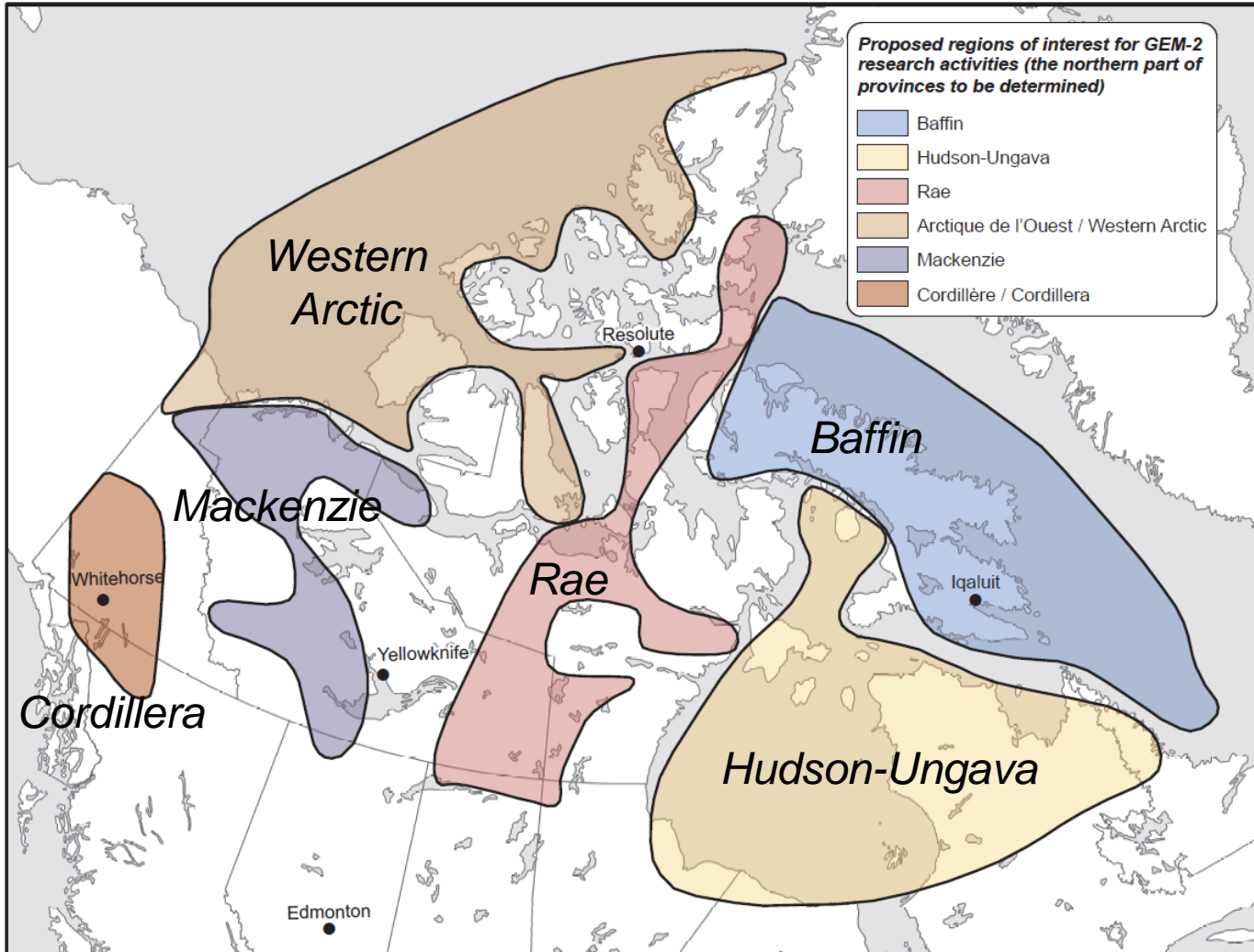
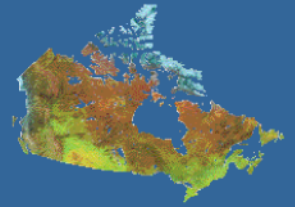
# GEM Metal anomalies

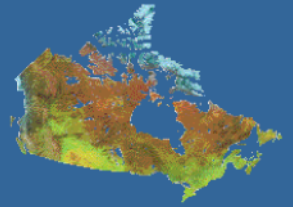
- On strike with a greenstone belt: Slave vs Rae?
- Anomalies in base metals, precious metals are concentrated in linear belt
- Pyrite: 15,000-90,000 grains
- Arsenopyrite: 2000 grains
- Loellingite: 3000 grains



# Mineral Potential - Summary



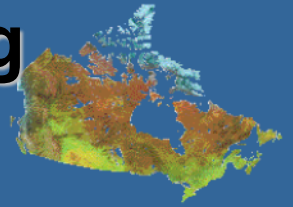




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- A variety of approaches was used in GEM-1:
  - **framework mapping** to upgrade areas with known potential
  - focused mapping in **emerging metallotect** regions
  - **greenfields reconnaissance** to prioritize large unknown regions
- GEM-2 announcement in August 2013 during PM's northern tour
- Remaining knowledge gaps → GEM-2 regions of interest
- Co-planning through partner, stakeholder engagement
- Ramp up in 2014; full implementation 2015-2018
- Phased approach leading to pan-Arctic syntheses





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- Continued focus on summer employment/skills training through field operations
- Continued priority on capacity building: attracting youth to careers in science & technology

