Economic potential on Hall Peninsula, Baffin Island, Nunavut

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BUREAU GÉOSCIENTIFIQUE CANADA-NUNAVUT
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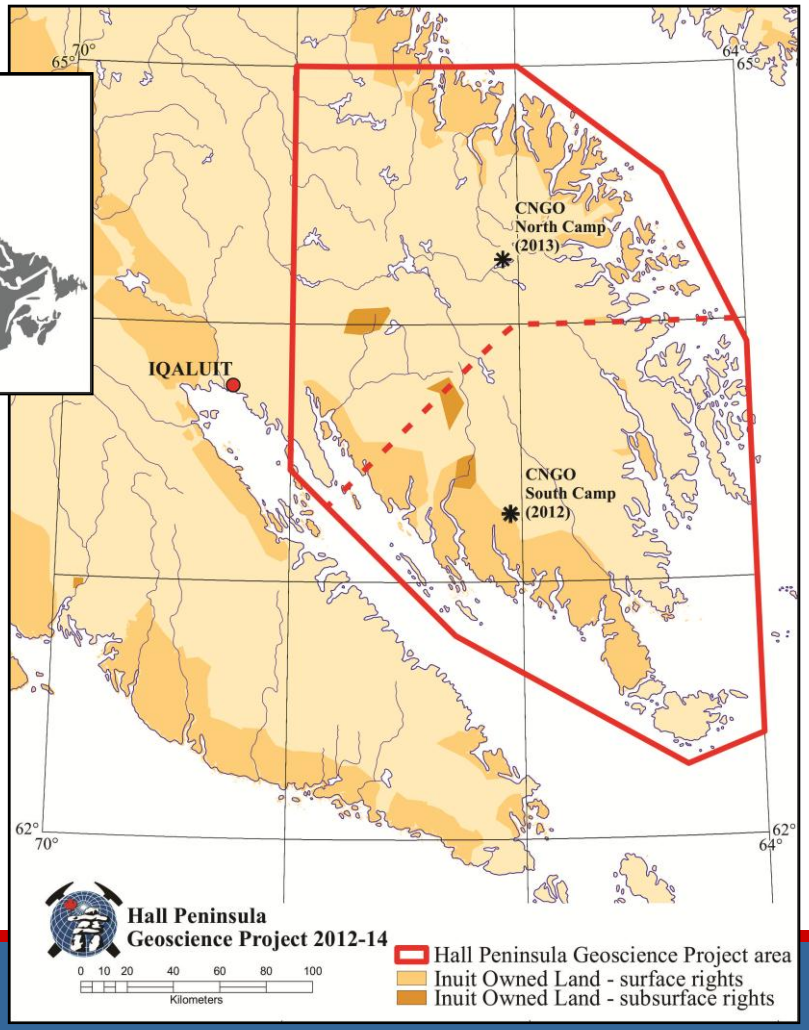
April 8, 2014

Hall Peninsula Integrated Geoscience Project

Gather geoscience information to aid in accurately interpreting the tectonostratigraphic and metamorphic evolution of Hall Peninsula, and evaluate the potential for economic resources in this area.

- Collaborative effort
  - 7 Canadian universities
  - 2 PhD, 5 MSc, 1 BSc
  - Nunavut Arctic College
  - GSC - Ottawa
  - AANDC
  - GN

- Field mapping in 2012 and 2013
  - Bedrock at 1:250,000
  - Surficial sediment at 1:100,000
  - Detailed thematic studies

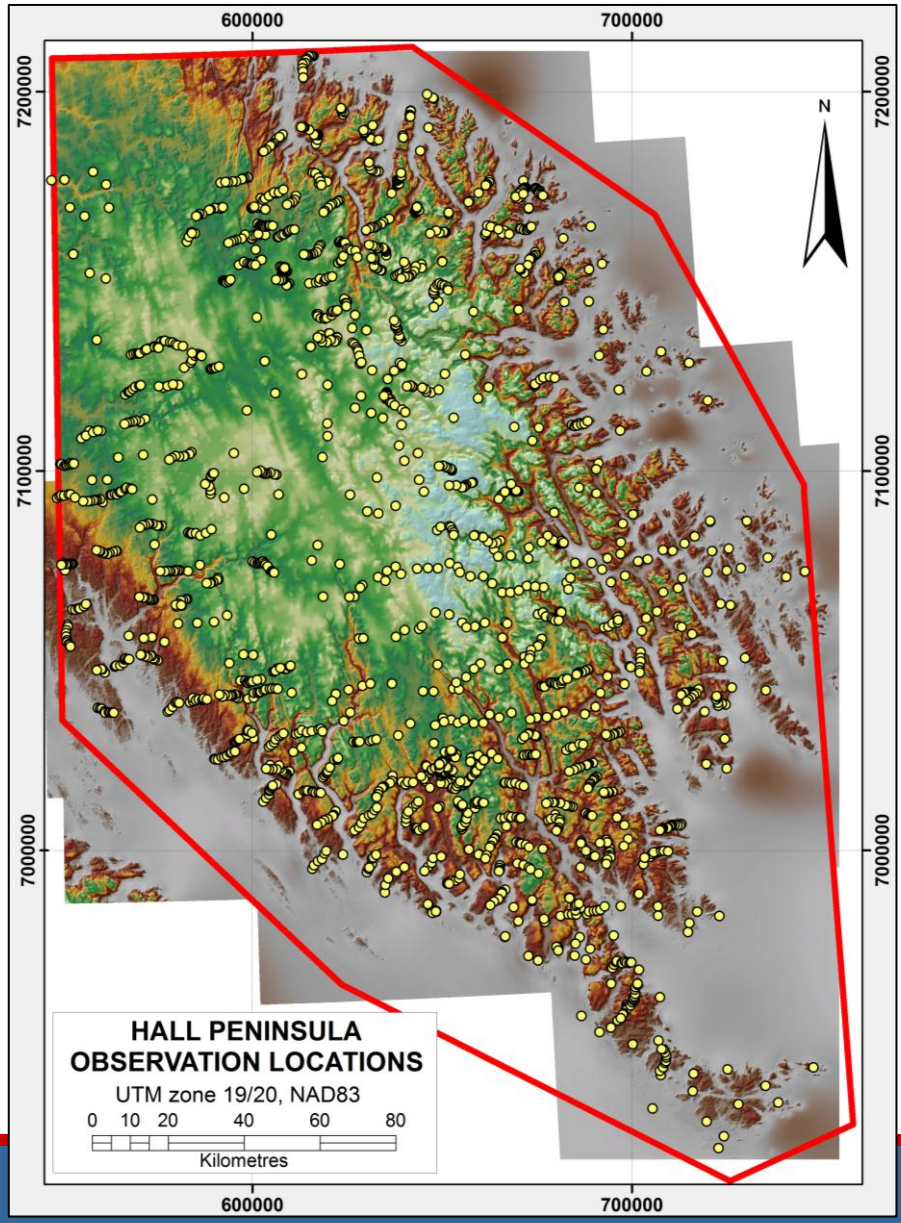


Hall Peninsula Integrated Geoscience Project

The project has increased the amount of bedrock geoscience information for the area through:

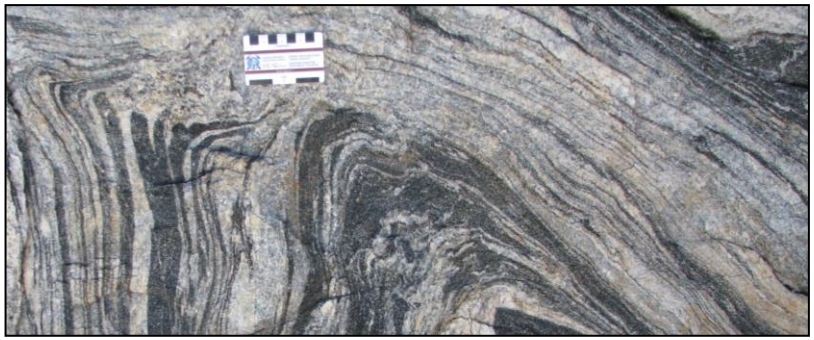
- 1898 observation stations
- 1506 rock samples
- 14 New U/Pb Zircon ages (with more being done)
- Geochemistry, mineral chemistry, geochronology, structural and metamorphic history interpretations

2012 & 2013 Summary of Activities

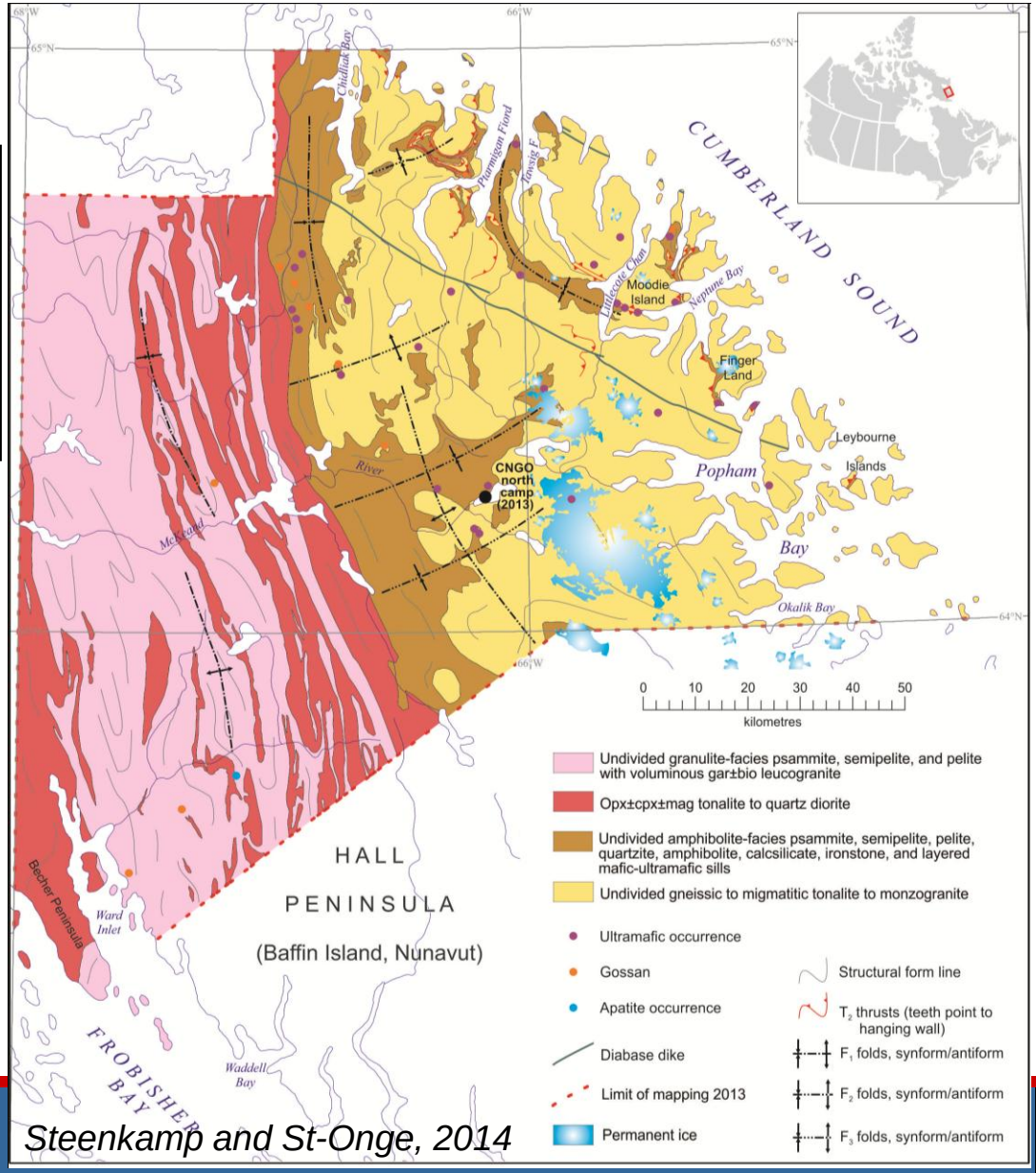


Hall Peninsula Geology - East

- Archean basement orthogneiss
  - tonalite to monzogranite



- Overlain by supracrustal strata
  - quartzite, psammite, pelite, ironstone, amphibolite, calc-silicate units
  - record amphibolite-facies metamorphism

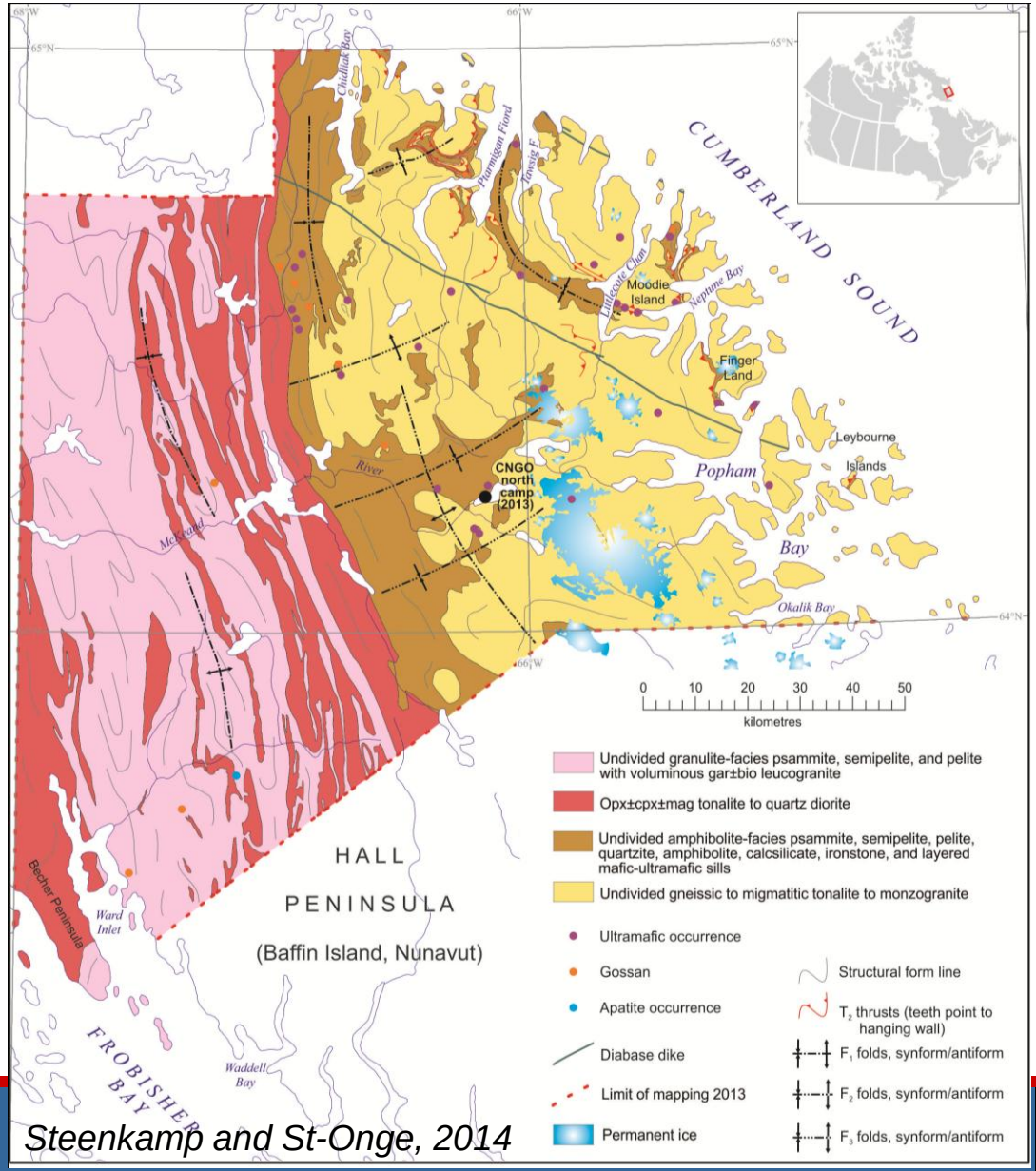


Steenkamp and St-Onge, 2014

Hall Peninsula Geology - West

- Supracrustal strata
  - psammite to pelite
  - granulite-facies metamorphism

- Tonalite to quartz diorite intrusions
  - Opx±Cpx±Mag

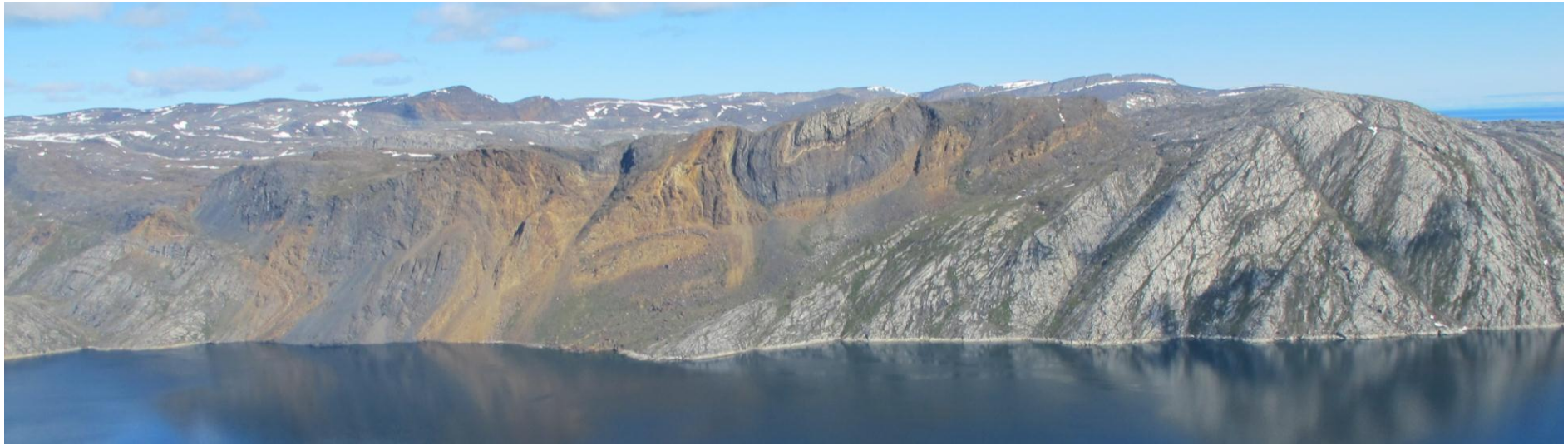


Steenkamp and St-Onge, 2014

Bedrock Field Interpretations

1. Paleoproterozoic sedimentary strata suggest gradational change from shallow marine to shelf or slope-rise depositional setting within proximity to a local rifting environment.

2. Increasing metamorphic grade from E to W, and fold and thrust geometry likely represent a transition from an orogenic foreland to hinterland, related to the terminal collision of the Trans-Hudson Orogen.



Steenkamp and St-Onge, 2014

Economic Potential on Hall Peninsula

NEW DATA:

43 geochemical assay results from 34 locations

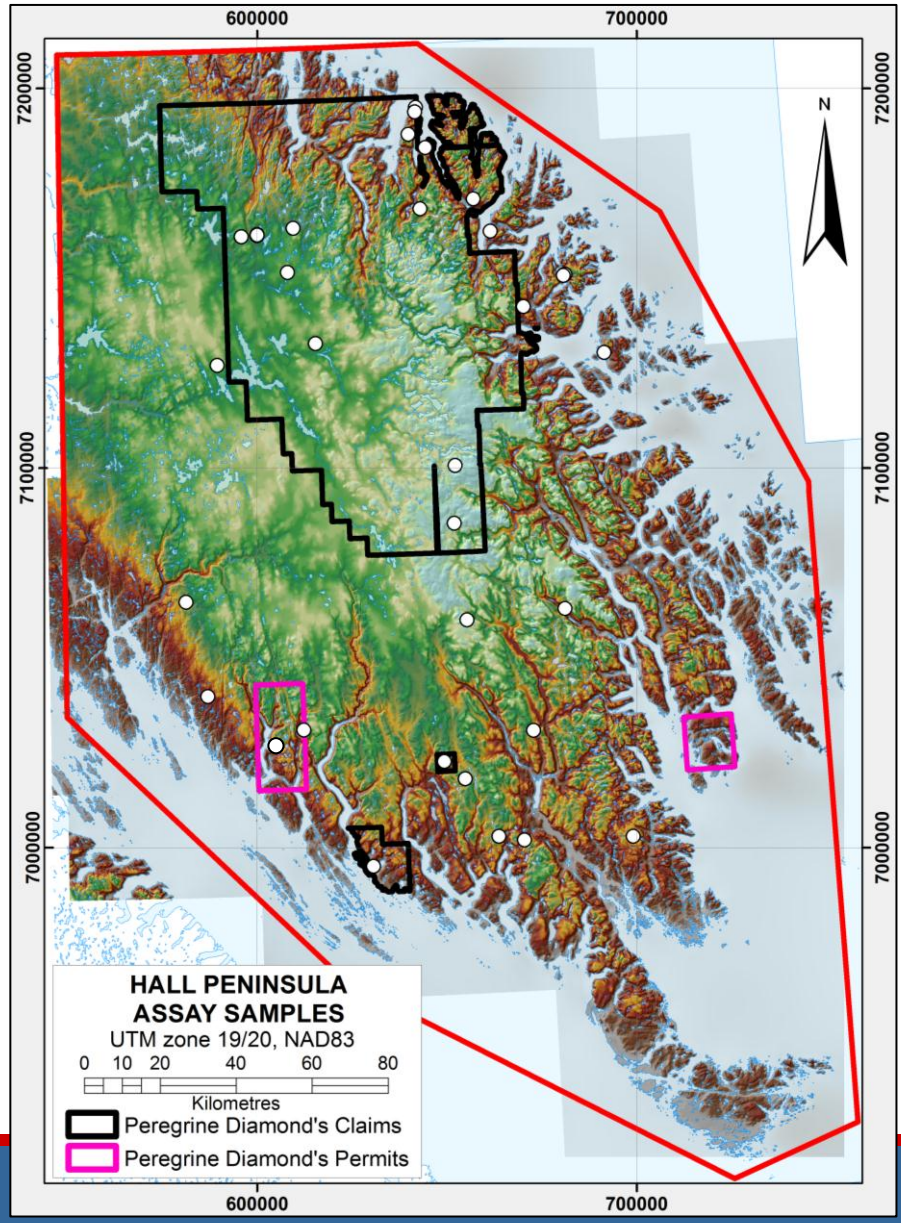
Full dataset published and available for download next week at www.CNGO.ca

Highlights:

13SUB-S055A

Altered Ultramafic Intrusions

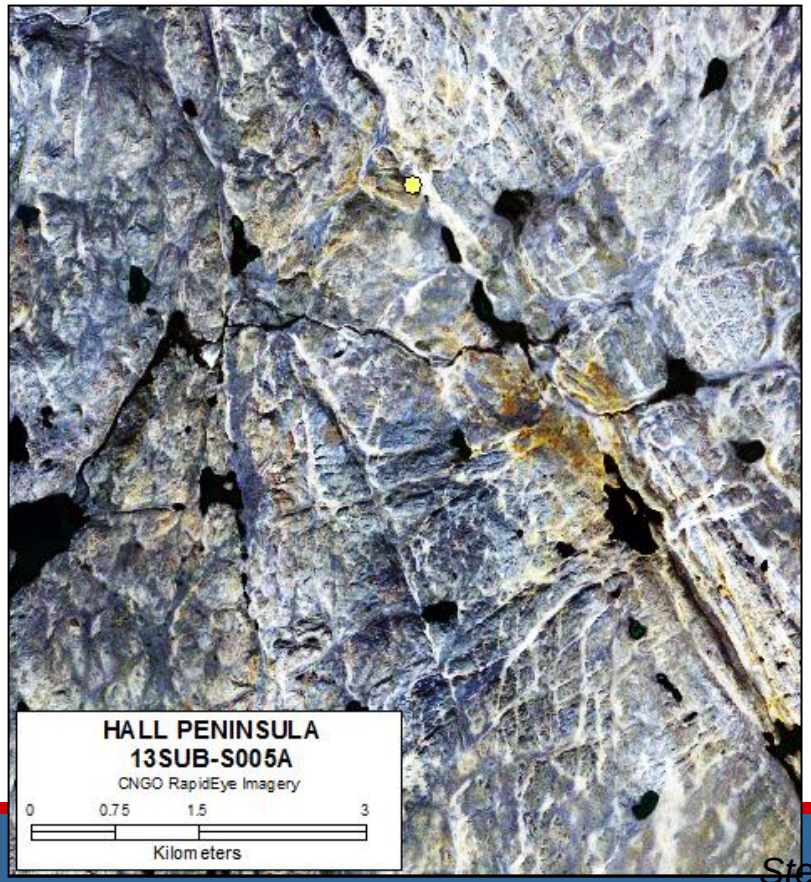
Layered Mafic-Ultramafic Intrusions

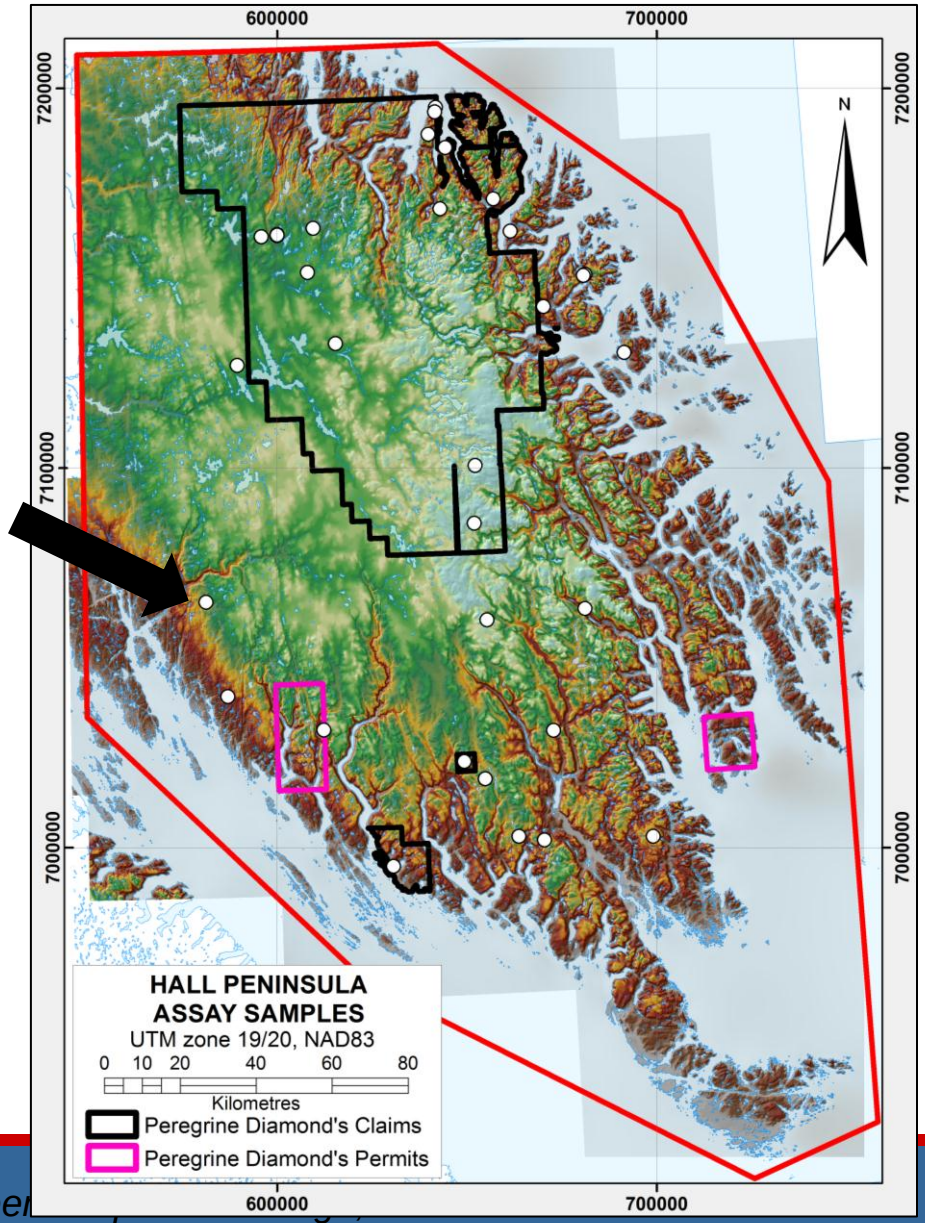


Sample 13SUB-S055A

Gossanous graphite-pyrite-pyrrhotite schist

In contact with metagabbro and psammitic metasediments





Sample 13SUB-S055A

Fe_2O_3	49.06	wt %	**Highest in dataset**
LOI	29.28	wt %	
Co	207	ppm	**Highest in dataset**
Ni	1140	ppm	
Cu	290	ppm	
As	< 5	ppm	
Mo	153	ppm	
Ag	0.7	ppm	
Pb	7	ppm	
Bi	2.3	ppm	**Highest in dataset**
U	7.89	ppm	**Highest in dataset**
Pd	10.5	ppb	
Pt	6.9	ppb	
Au	16	ppb	

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Mo	153	ppm	* Only sample *
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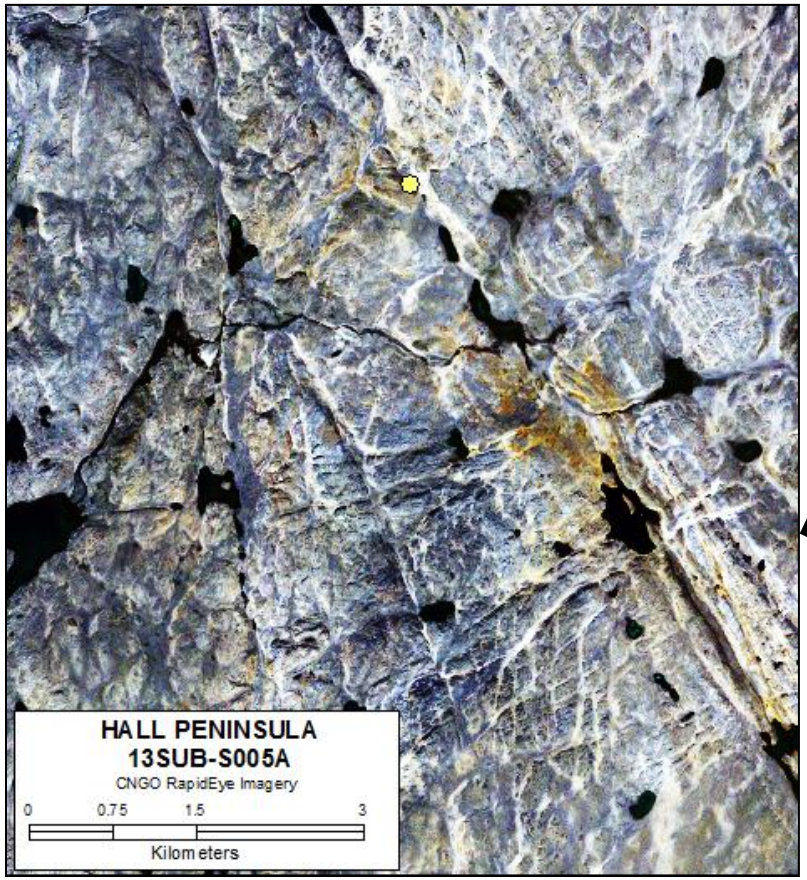
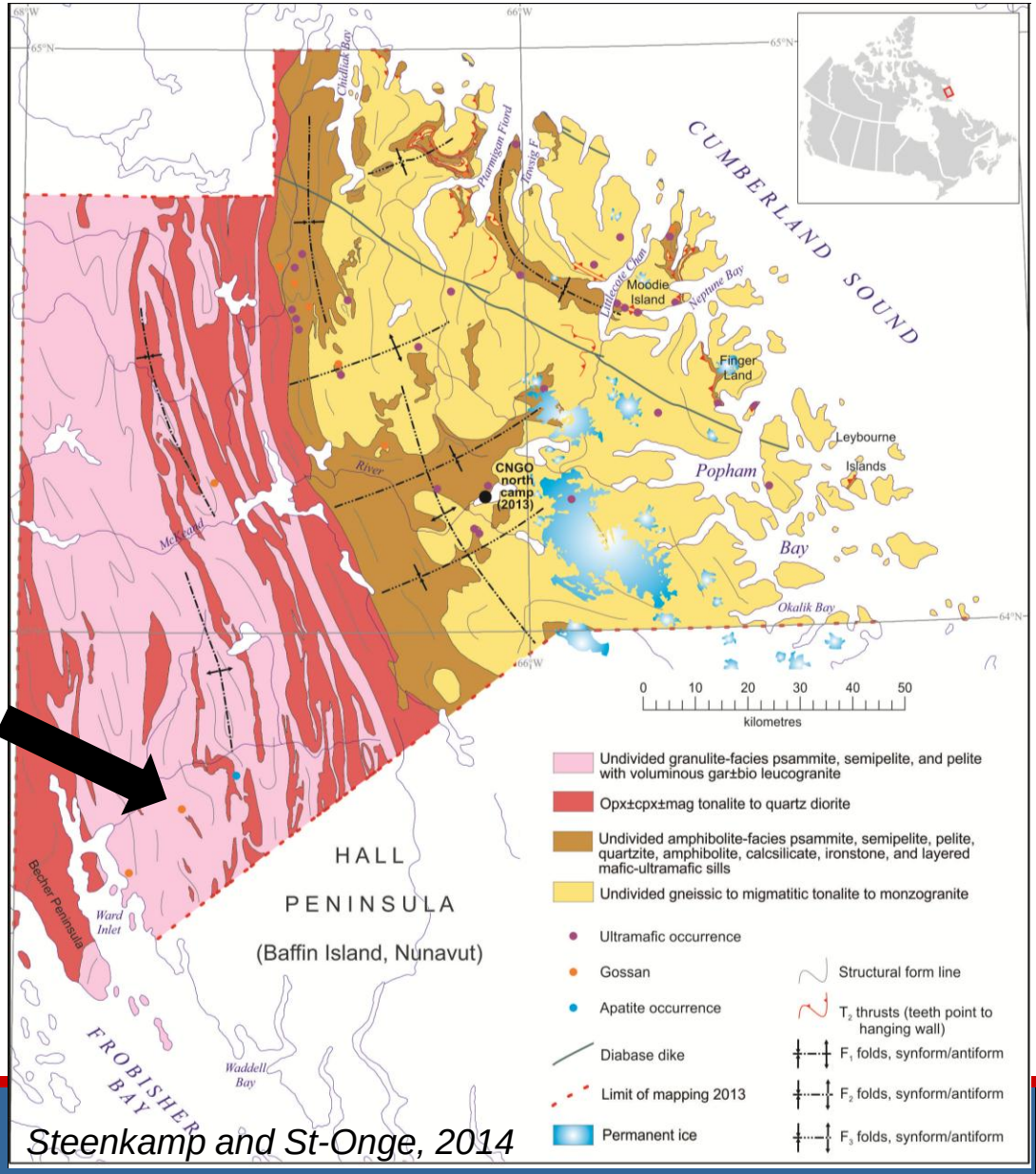
Bi	2.3	ppm	Highest in dataset
U	7.89	ppm	Highest in dataset
Pd	10.5	ppb	
Pt	6.9	ppb	
Au	16	ppb	

Fresh surface

Sample 13SUB-S055A

Gossanous alteration continues along strike to the SE.





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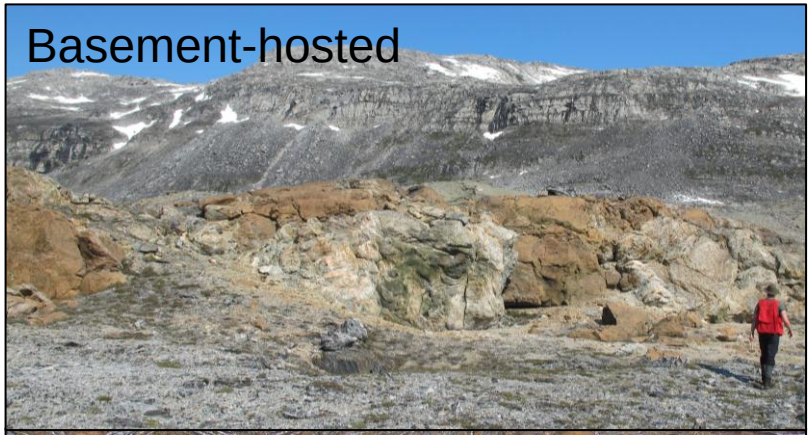
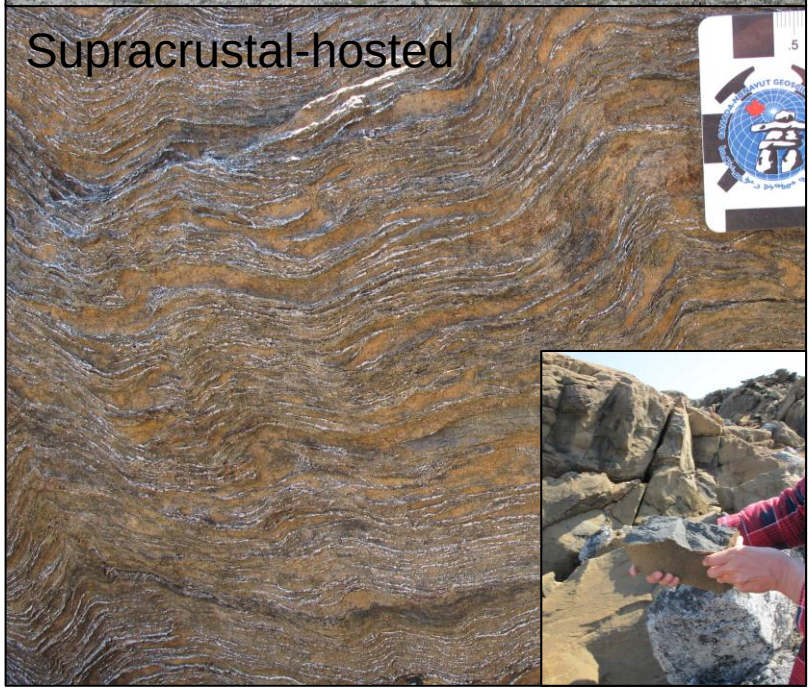
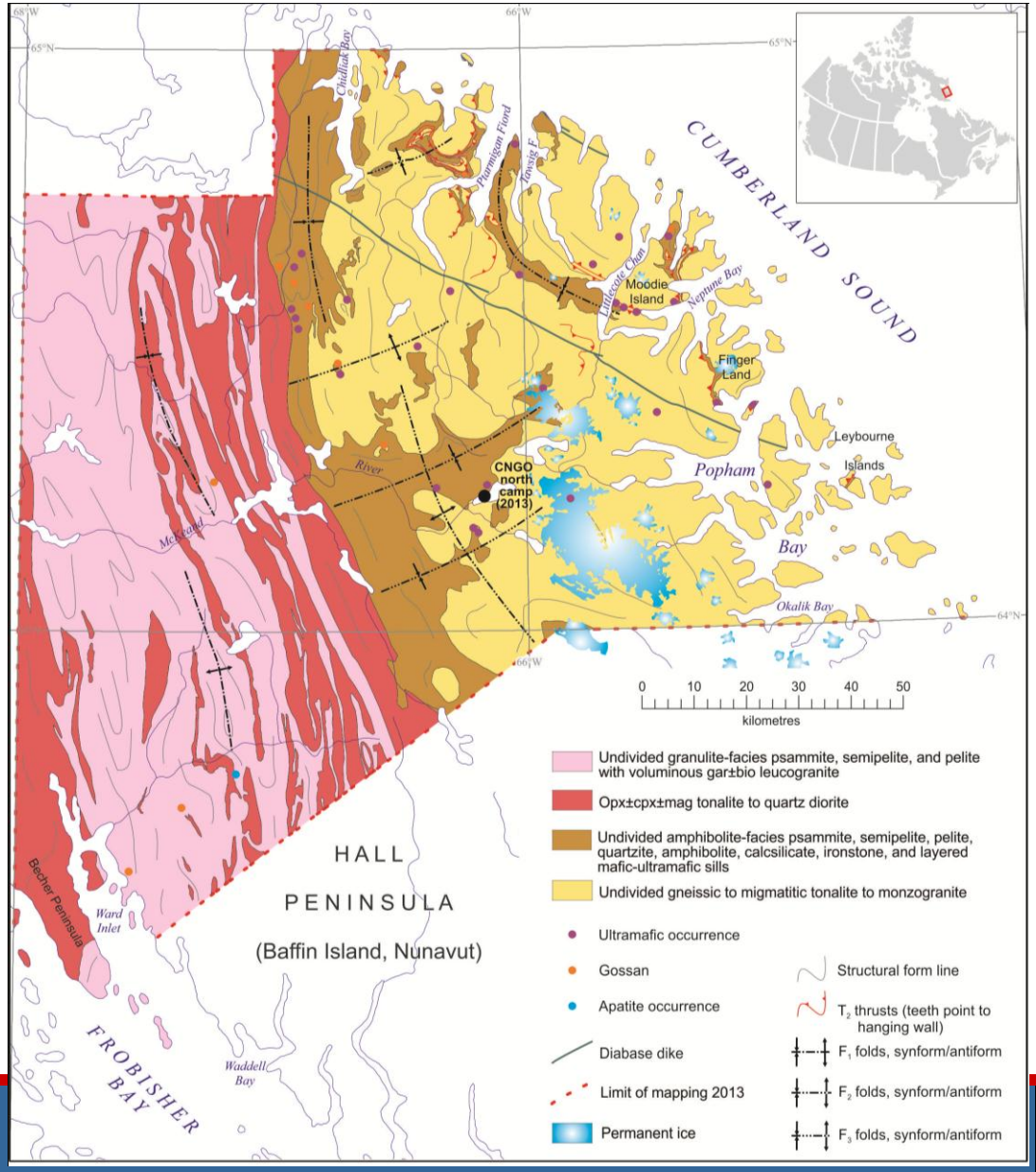
Altered ultramafic samples



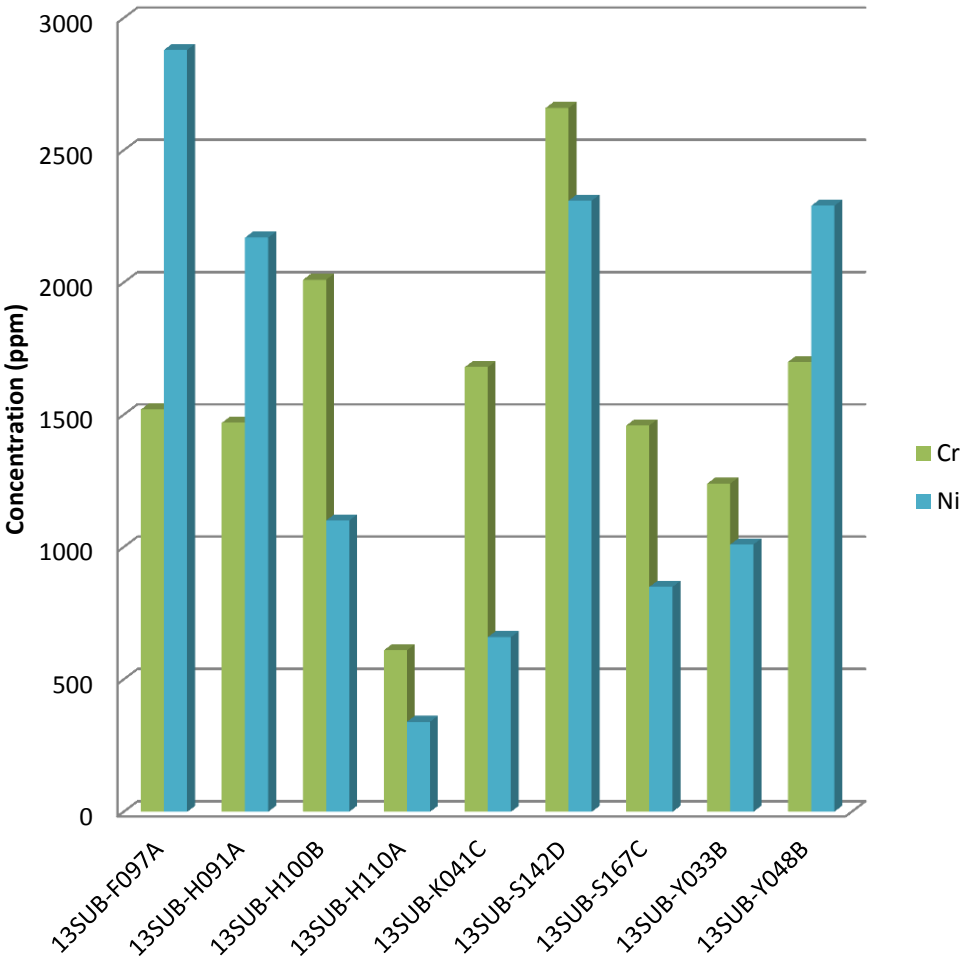


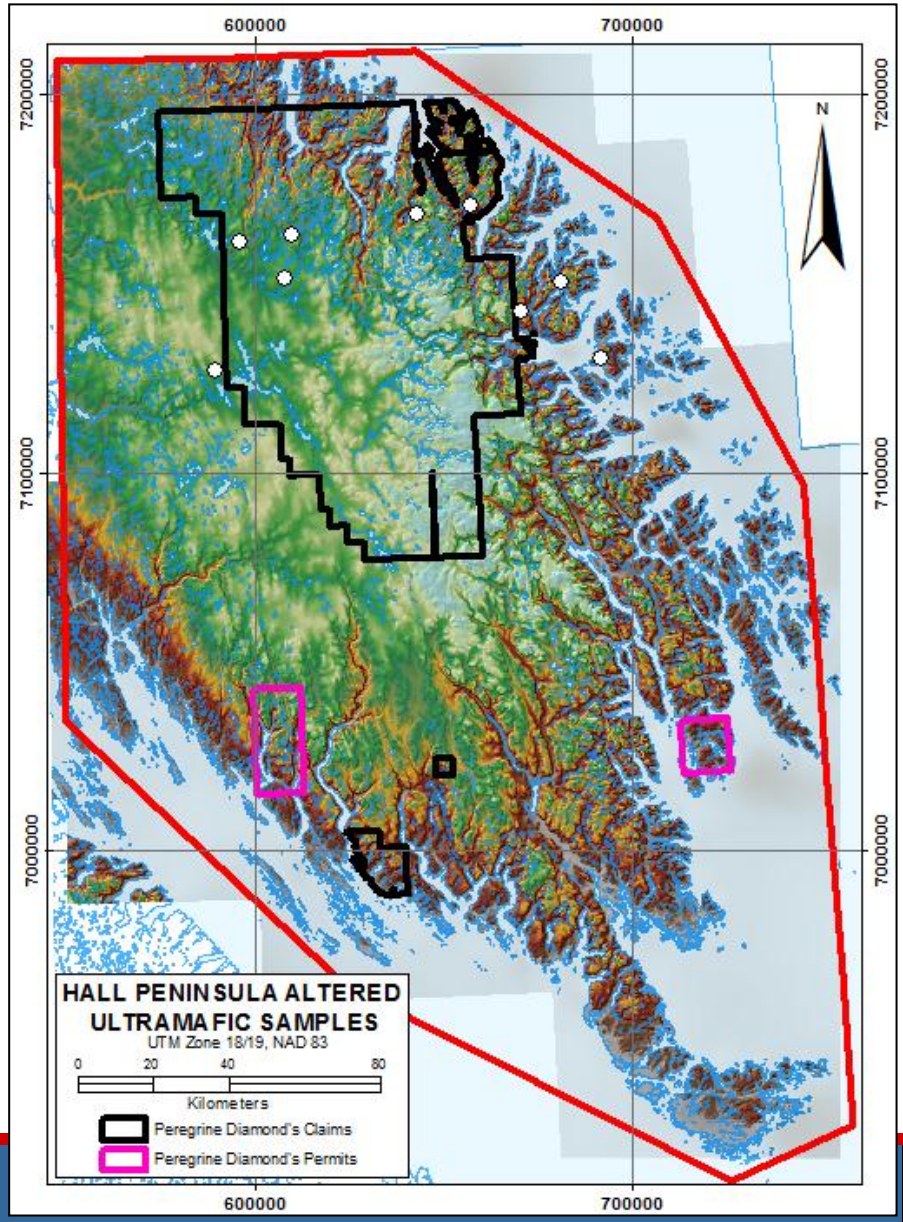


Steenkamp et al., 2013

Altered ultramafic samples

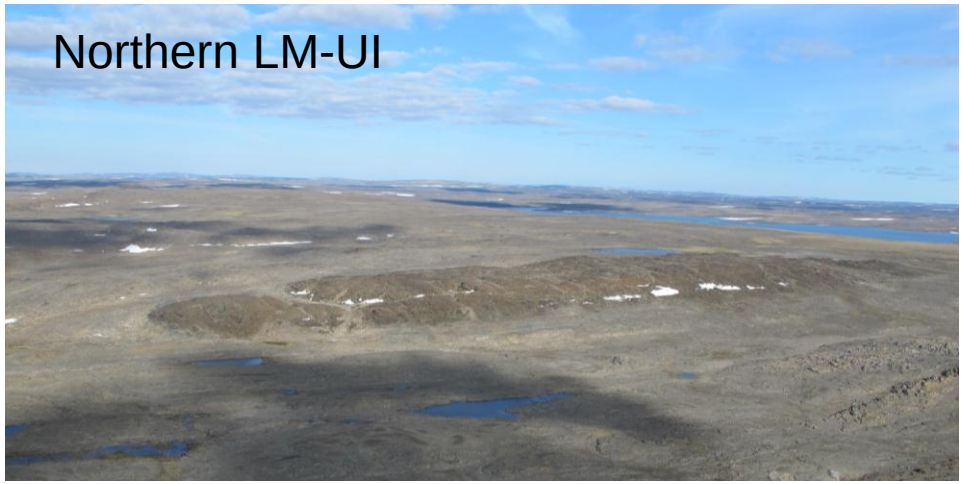
Highest Ni and Cr concentrations in the dataset

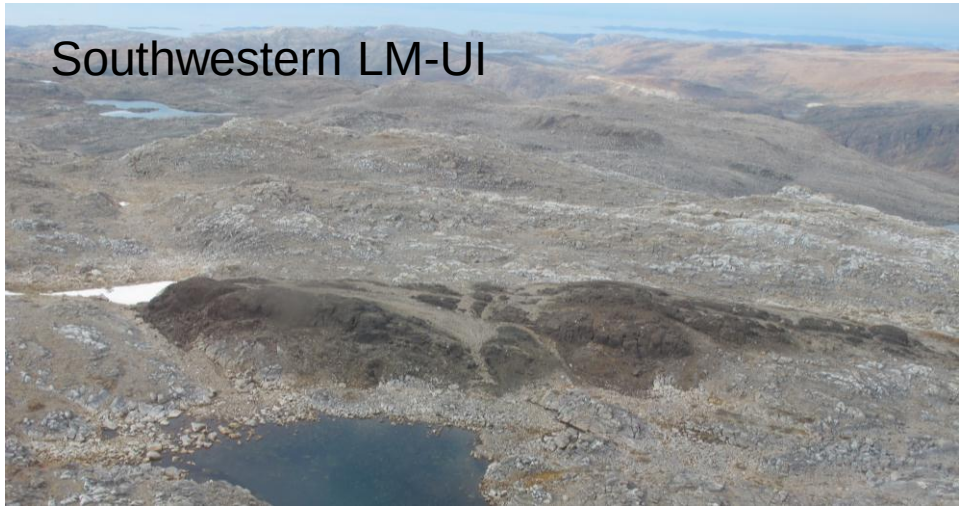


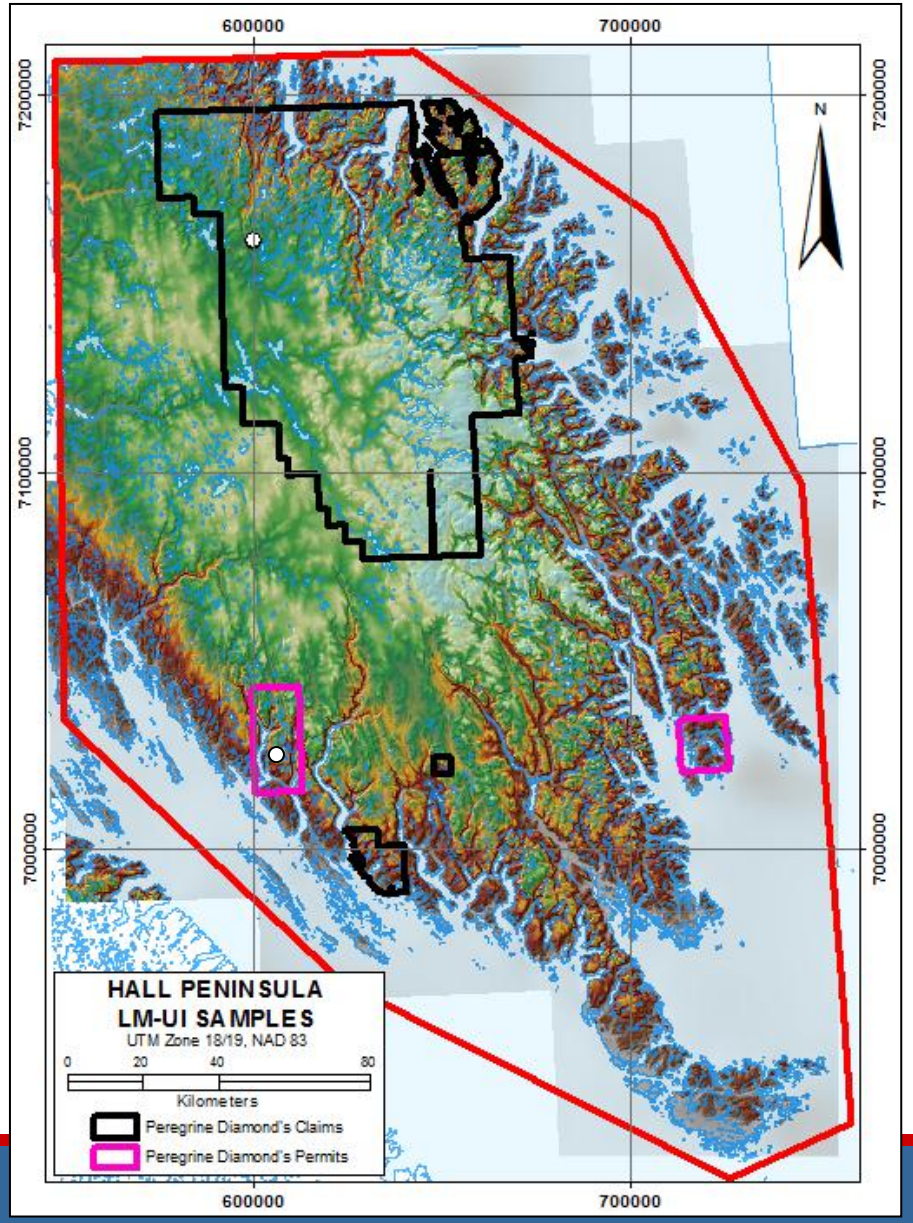


Layered Mafic-Ultramafic Intrusions

Not pervasively altered

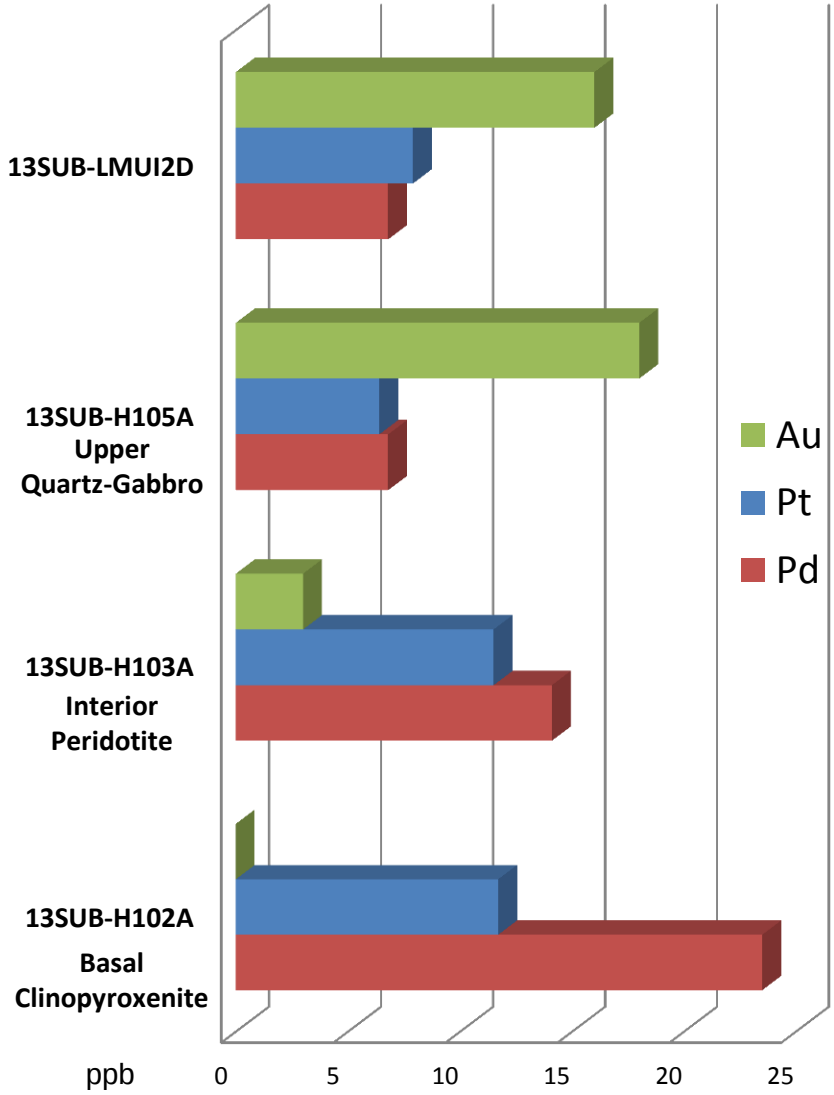


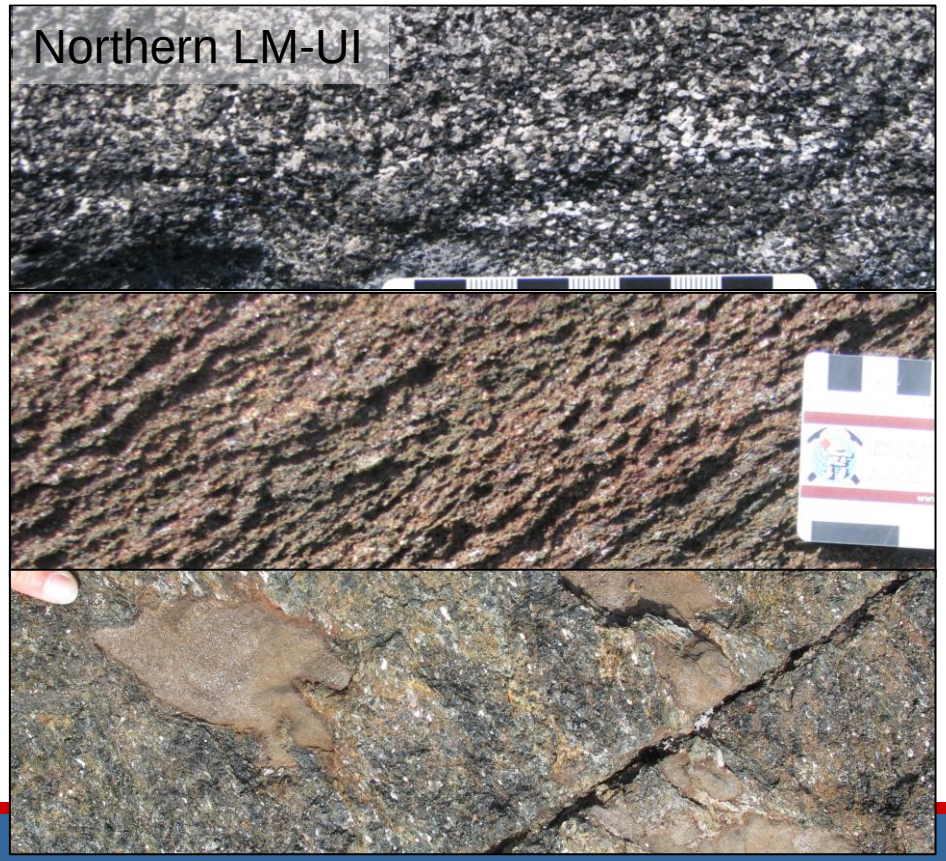




Steenkamp et al., 2013

Layered Mafic-Ultramafic Intrusions

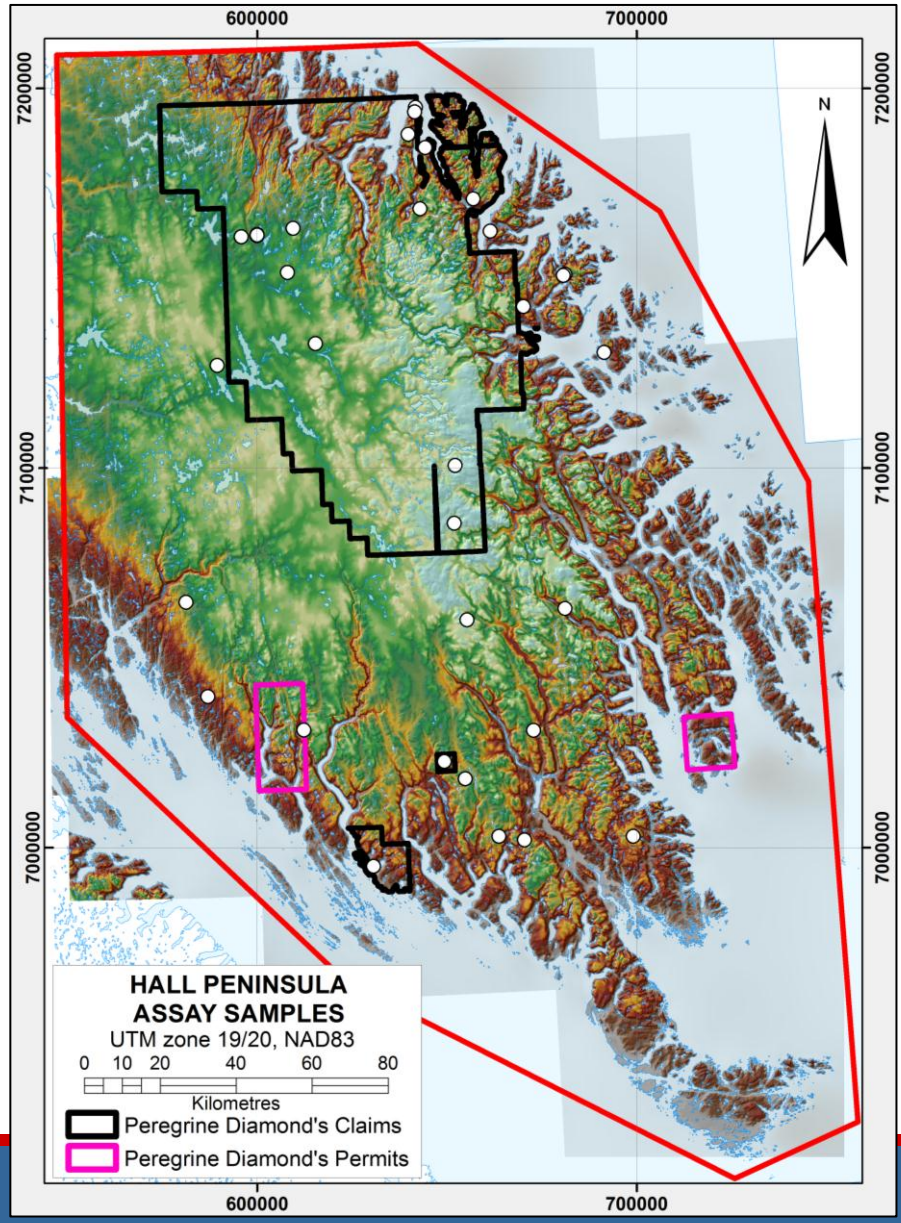




Age? Similar to Raglan deposits…

Geochemical Assay Dataset

- Provides a first glimpse into metal potential on Hall Peninsula.
- Some areas of interest lie outside of claim and permit boundaries



Other Interesting Finds

New kimberlite dike discovered (CH-64)

See Tommy Tremblay's presentation for more on Hall Peninsula till geochemistry

KIM's from crushed sample (381g)

0.5 to 1.0 mm						0.25 to 0.5 mm						
GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	Total KIMs
0	0	0	0	0	3	0	0	2	1	17	21	44

Other Interesting Finds

Granitic Pegmatites

- Relatively late, cross-cut through basement and supracrustal strata
- Contain biotite, muscovite, and/or tourmaline
- Potential source of Rare Earth elements.
- MSc project starting soon…

Thank you!

Hall Peninsula Geoscience Crew

Peregrine Diamonds Ltd.

De Beers Canada Exploration

Universal Helicopters

University of Alberta

Dalhousie University

Université Laval

University of Manitoba

University of Ottawa

University of Saskatchewan

University of Waterloo