Geraldton-Onaman transect

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Research Associate

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METAL EARTH

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CANADA FIRST RESEARCH EXCELLENCE FUND

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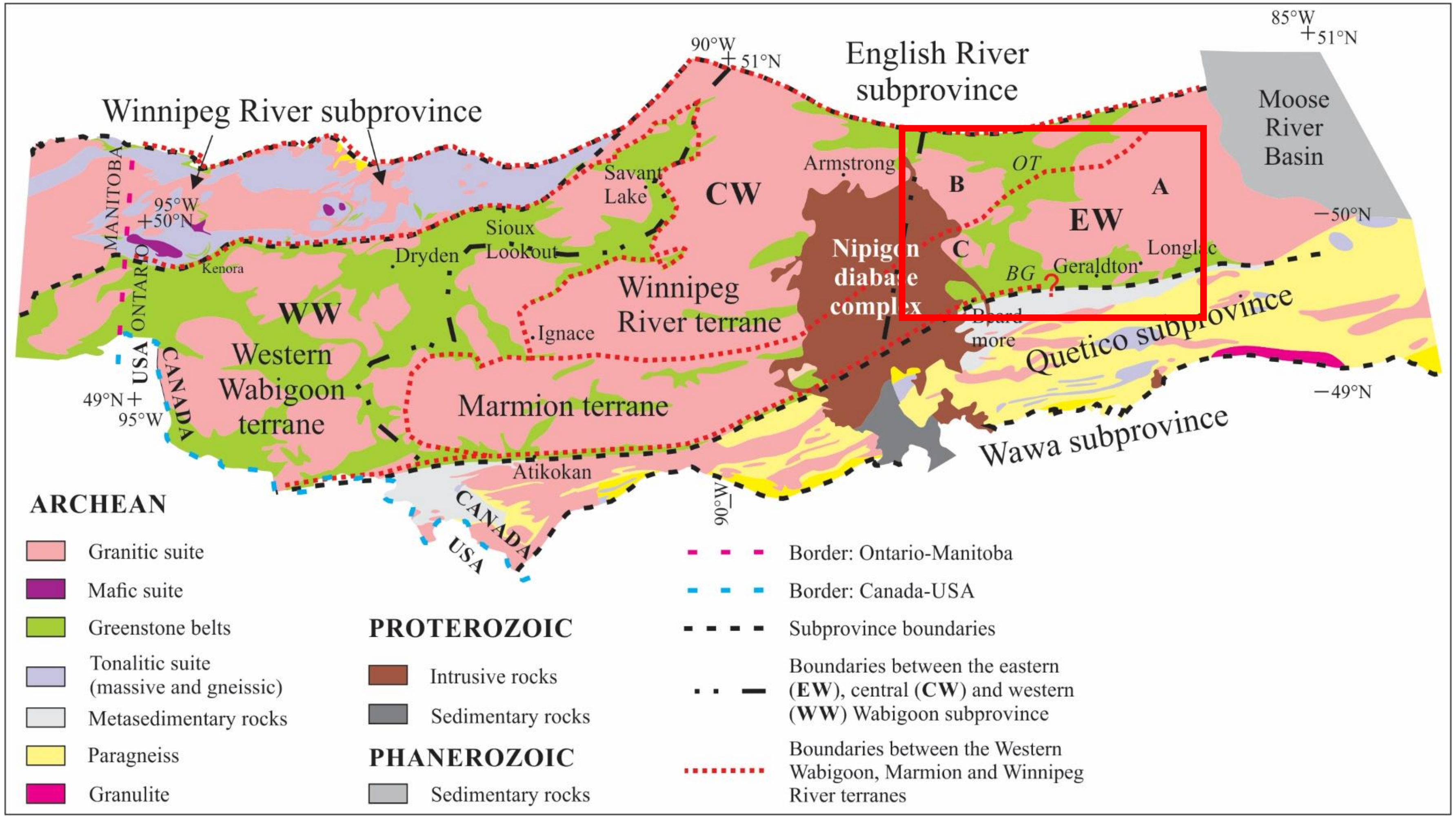
HARQUAIL SCHOOL OF EARTH SCIENCES ÉCOLE DES SCIENCES DE LA TERRE

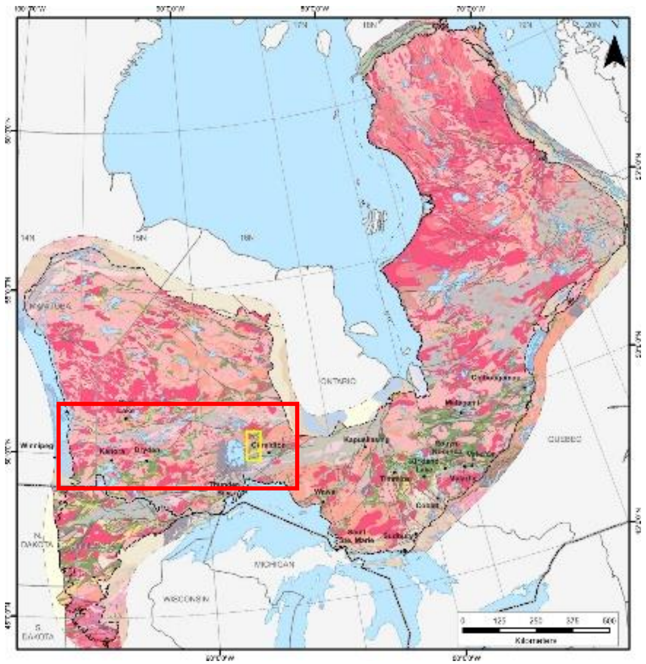
MERC Mineral Exploration Research Centre

Outline

- Geological background
- Research questions
- Preliminary results
    - PhD project on the stratigraphy, volcanology and geochemistry of the Onaman-Tashota greenstone belt – Keaton Strongman
    - Transect research
    - Geophysics
        - Mag map
        - Seismic section
- Future work
    - MSc1 – metamorphic study
    - MSc2 – Tashota shear zone and control on Au
    - PhD – next year mapping objectives
    - Transect work and personal interest research topics

Study area – Wabigoon subprovince





After Montsion et al., 2017 and Tóth, 2018

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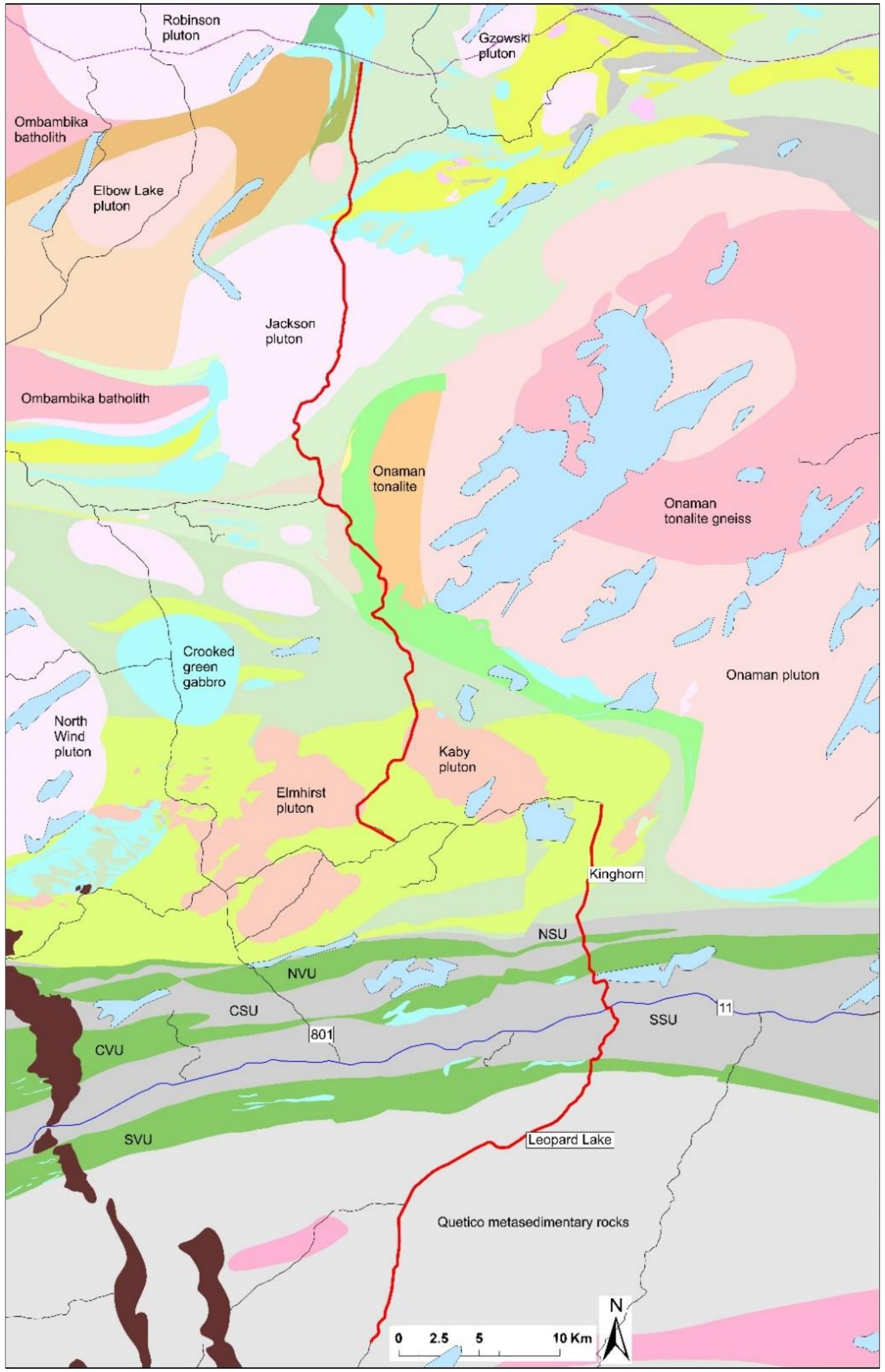
Geraldton-Onaman transect



Legend

PROTEROZOIC
- Diorite to quartz diorite

ARCHEAN
- Diorite to quartz diorite
- Tonalite to granodiorite
- Granodiorite to tonalite
- Tonalite to granodiorite

NEOARCHEAN
- Granit to granodiorite
- Granodiorite, monzogranite, monzonite
- Gabbro

Quetico subprovince
- Fine clastic sedimentary rocks

Beardmore-Geraldton belt
- Fine to coarse clastic sedimentary rocks
- Mafic to intermediate with lesser felsic volcanic rocks

Conglomerate assemblage (<2707 Ma)
- Coarse clastic sedimentary rocks

Albert-Gledhill assemblage (<2710 Ma)
- Coarse clastic sedimentary rocks
- Wacke

Humboldt assemblage (<2713 Ma)
- Intermediate to felsic tuff

Metcalfe-Venus assemblage (~ 2722-2734 Ma)
- Quartz porphyry
- Intermediate volcanic rocks (flows and pyroclastic)

Elmhirst-Rickaby assemblage (~ 2740 Ma)
- Tonalite to granodiorite, diorite to quartz diorite
- Calc-alkaline mafic and intermediate volcanic rocks
- Intermediate volcanic rocks (flows and pyroclastic)

Willett assemblage (~ 2740 Ma)
- Tholeiitic basalt and mafic volcanic rocks

Onaman assemblage (~ 2770-2780 Ma)
- Tonalite to granodiorite
- Tholeiitic basalt and mafic volcanic rocks
- Felsic to intermediate volcanic rocks

MESOARCHEAN

Toronto assemblage (~ 2922 Ma)
- Felsic to intermediate volcanic rocks

Tashota assemblage (~ 2968-2975 Ma)
- Intermediate to felsic volcanic rocks
- Mafic volcanic rocks

- Transect
- Railway
- Secondary road
- 11 Trans Canada Highway 11

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005; OGS online database on Mineral deposit inventory in July, 2018

Geological architecture

Mesoarchean

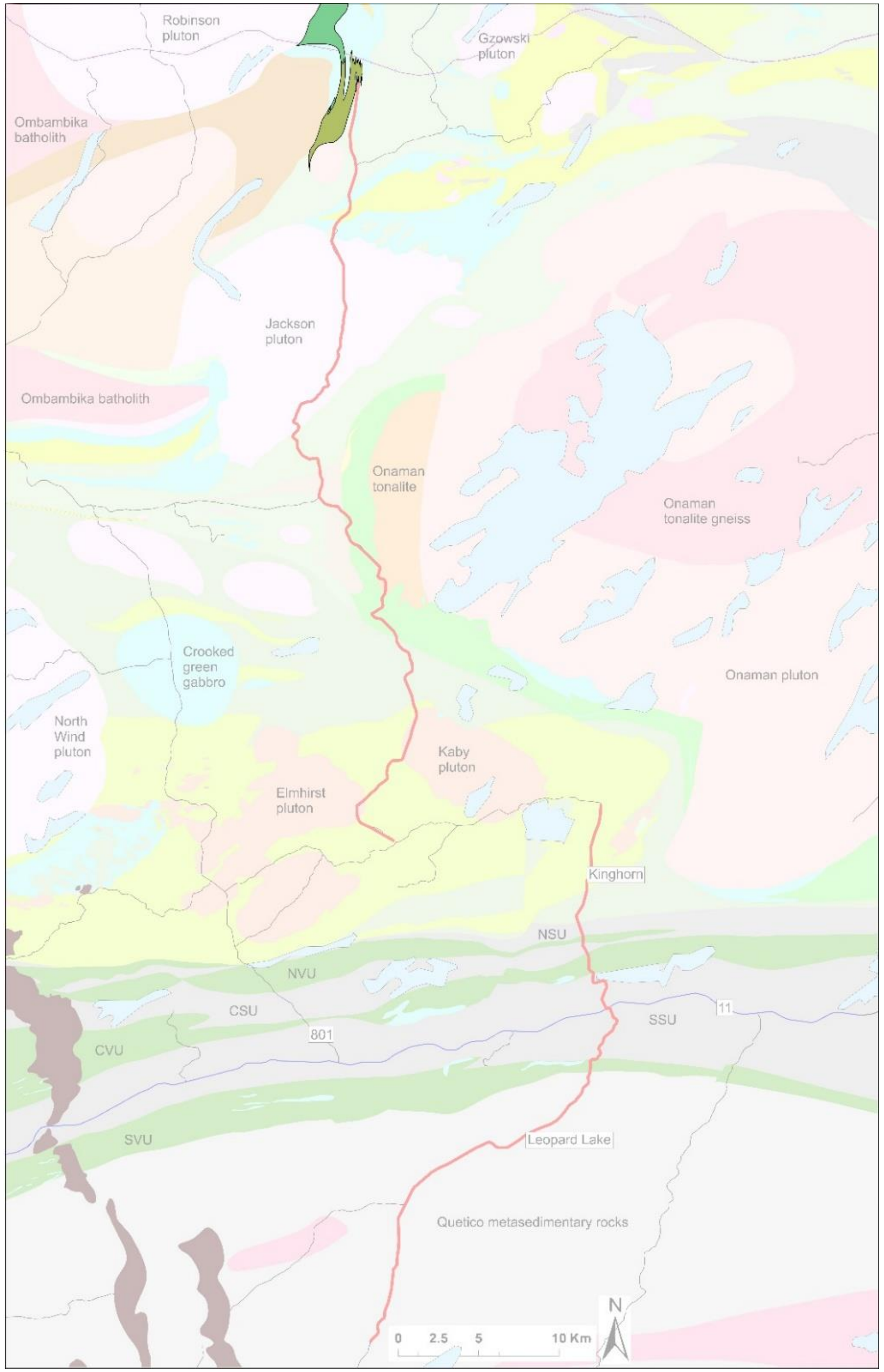
Tashota assemblage

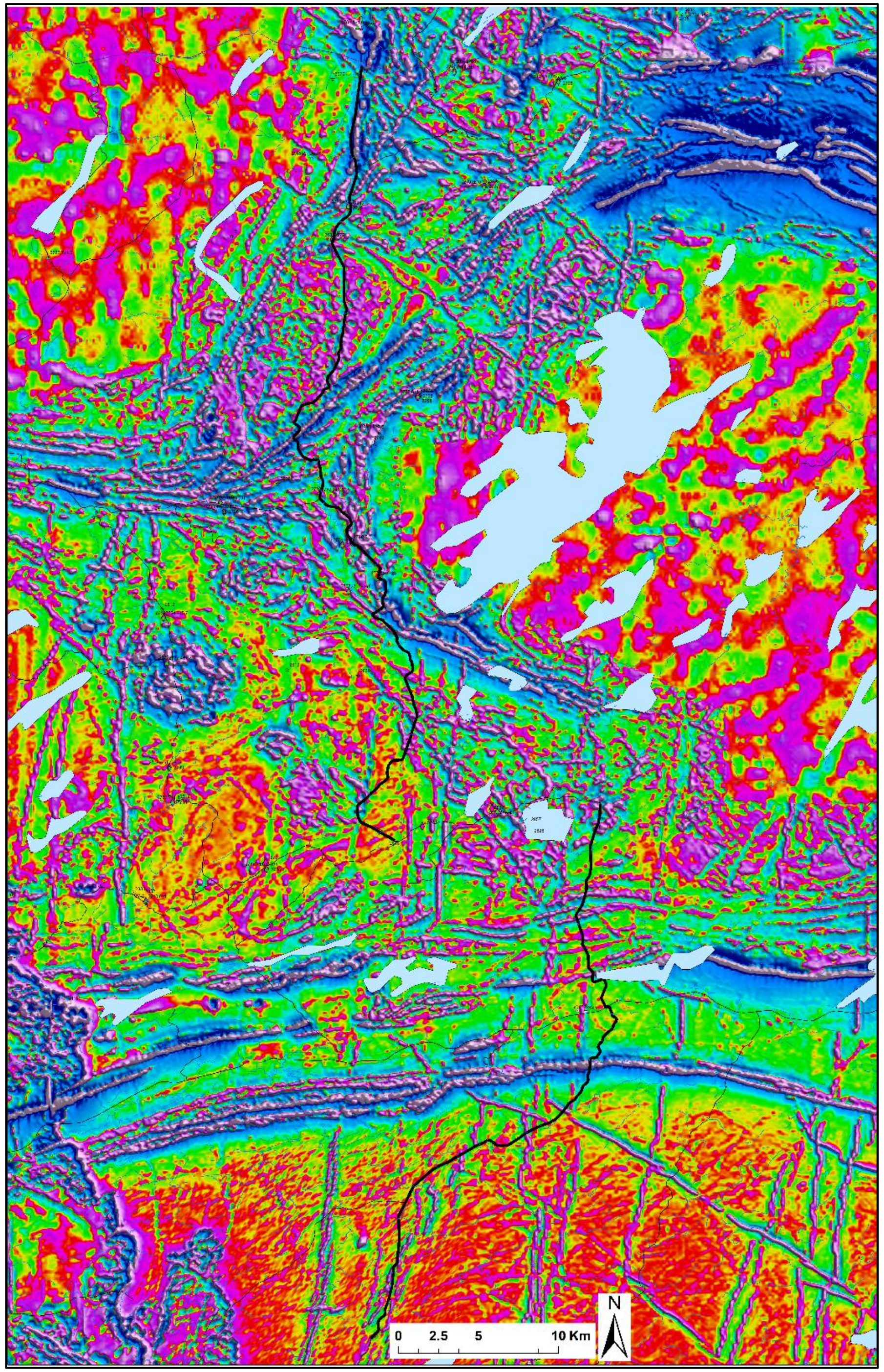
- 2975-2968 Ma
- Mainly fine grained dacitic tuff interlayered with amphibolitic basalt flows
- Intruded by gabbroic sheets

Tashota assemblage (~ 2968-2975 Ma)

- Intermediate to felsic volcanic rocks
- Mafic volcanic rocks

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005; mag maps courtesy of Esi Eshagi





Geological architecture

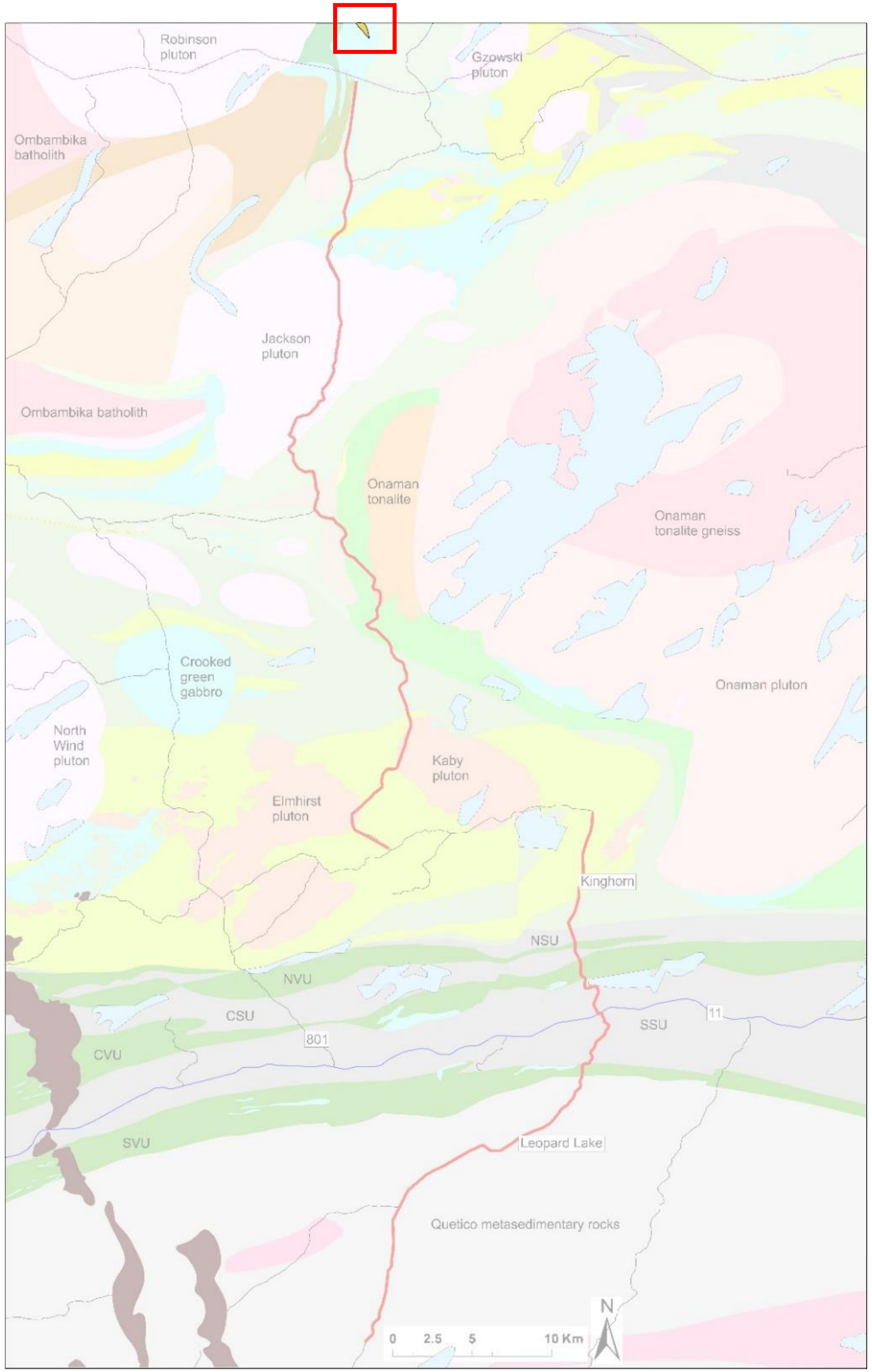
Mesoarchean

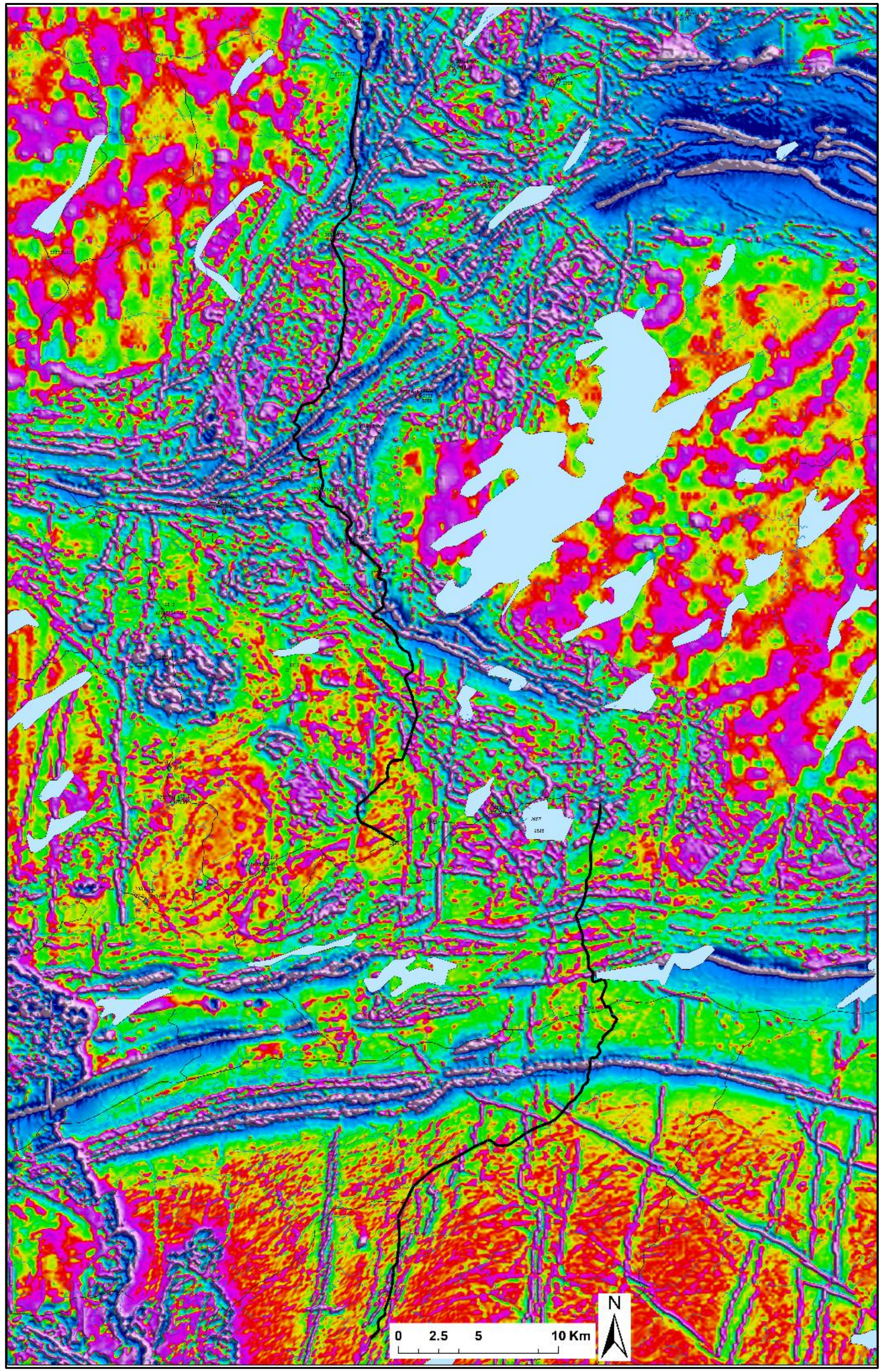
Toronto assemblage

- 2922 Ma
- Massive to pillowed basalt
- Overlain by felsic to intermediate flows and pyroclastic rocks
- Locally spinifex-textured komatiite

Toronto assemblage (~ 2922 Ma)

Felsic to intermediate volcanic rocks





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Geological architecture

Neoarchean

Onaman assemblage

- 2780-2770 Ma
- Massive to pillowed tholeiitic basalt flows
- Interlayered with chert and oxide facies iron formation
- Overlain by calc-alkalic felsic flows and pyroclastic rocks
- Coeval to tonalite to granodiorite pluton

Onaman assemblage (~ 2770-2780 Ma)

- Tonalite to granodiorite
- Tholeiitic basalt and mafic volcanic rocks
- Felsic to intermediate volcanic rocks

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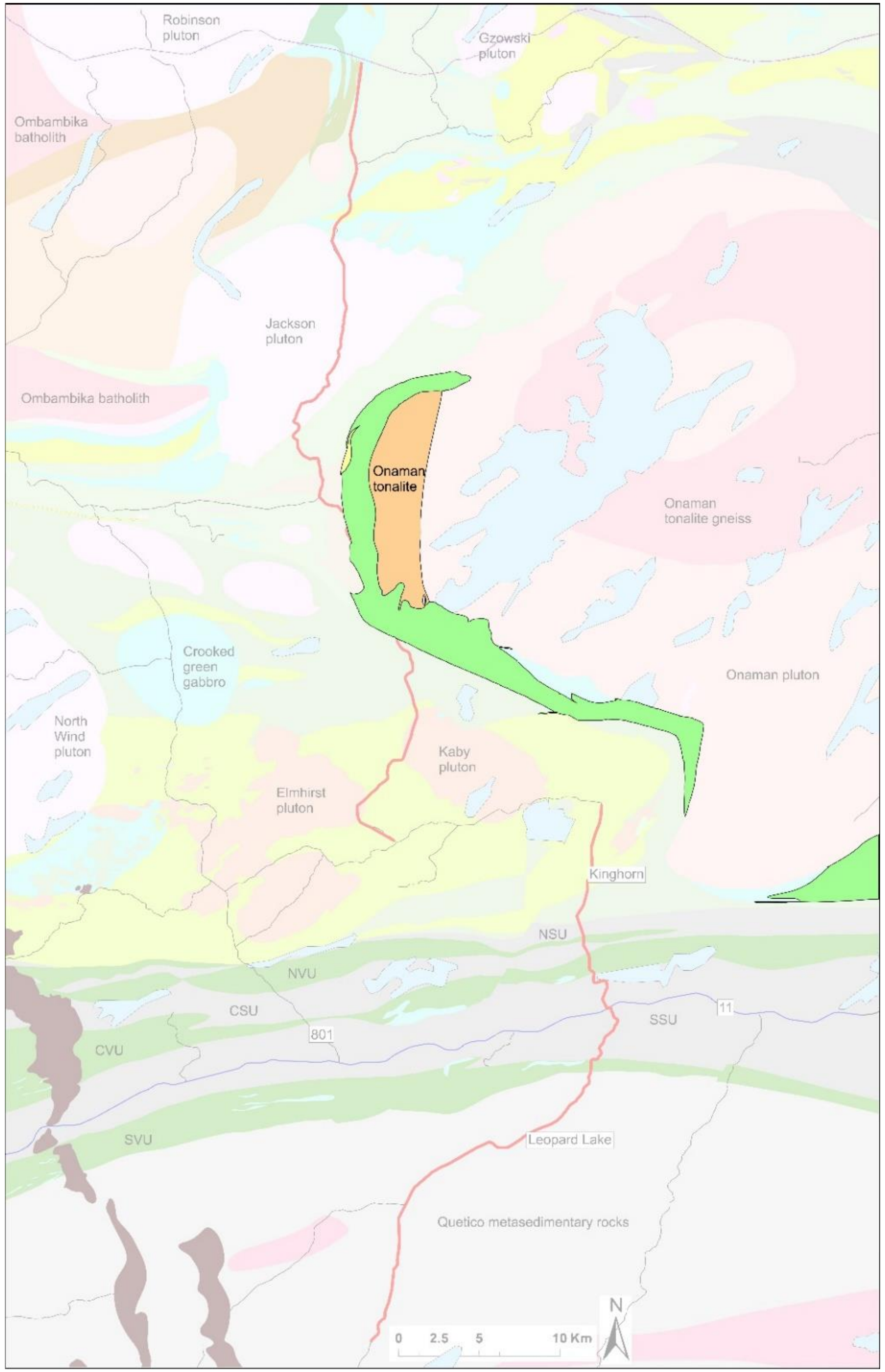
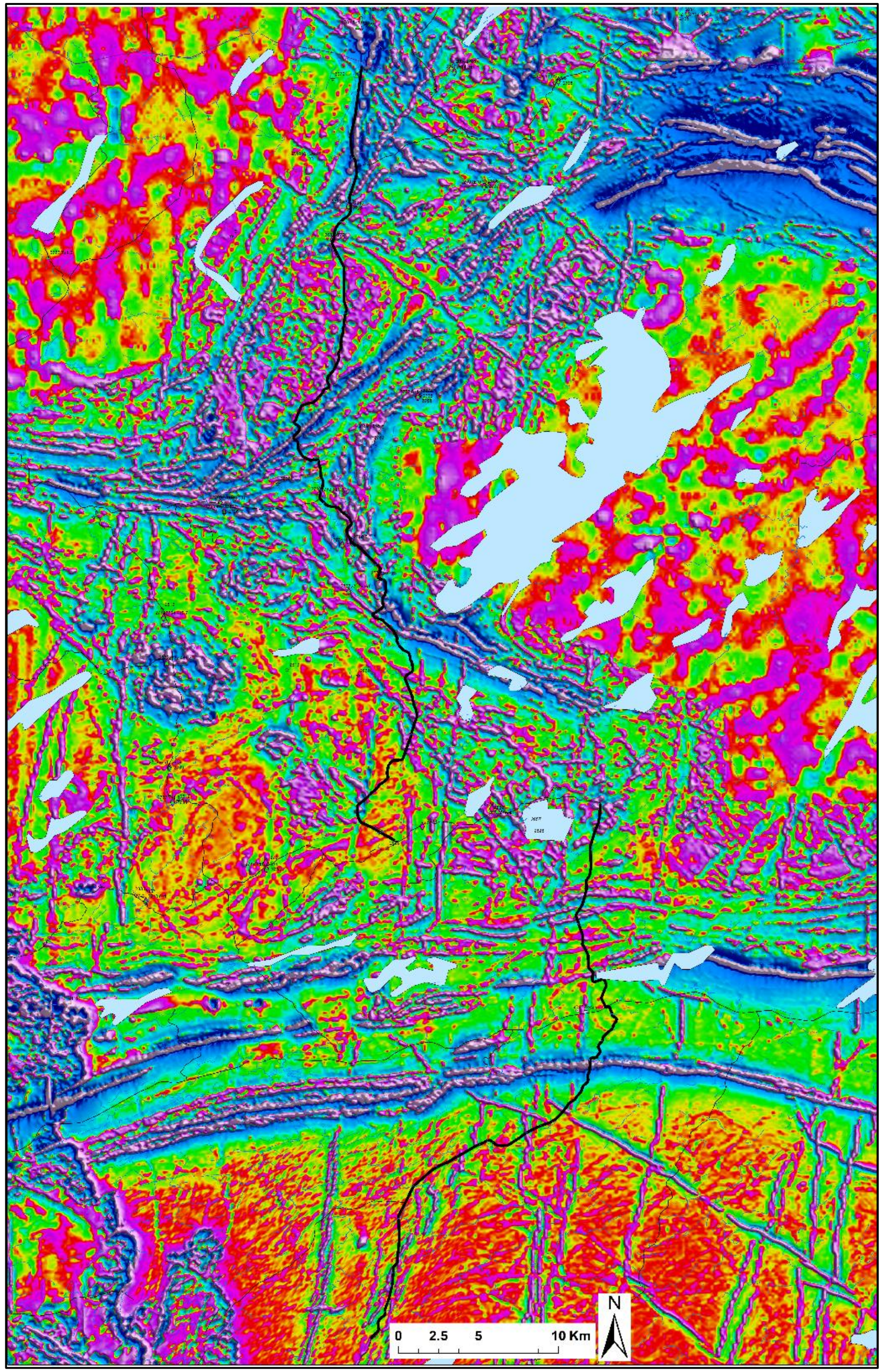




Geological architecture

Neoarchean

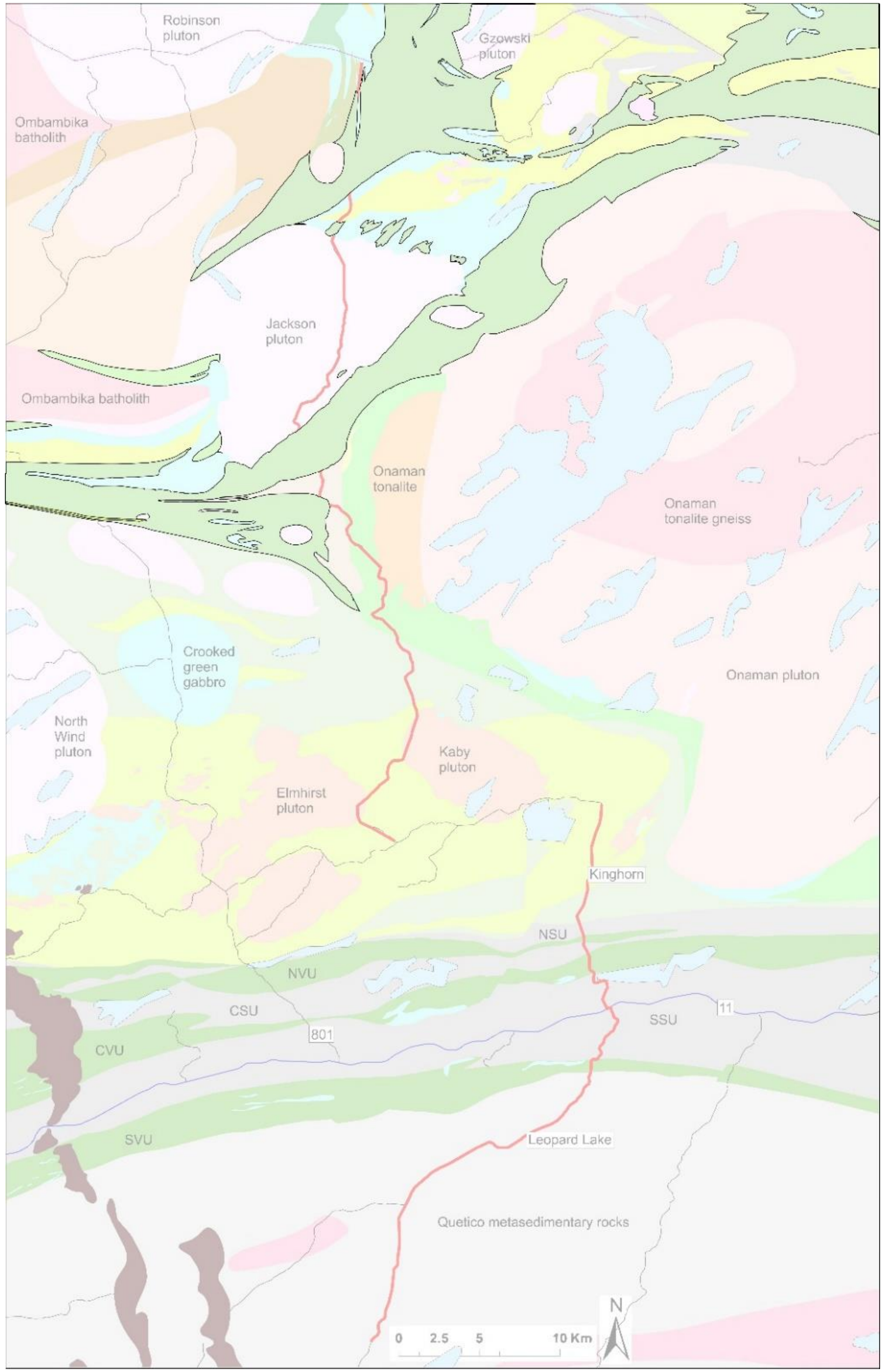
Willett assemblage

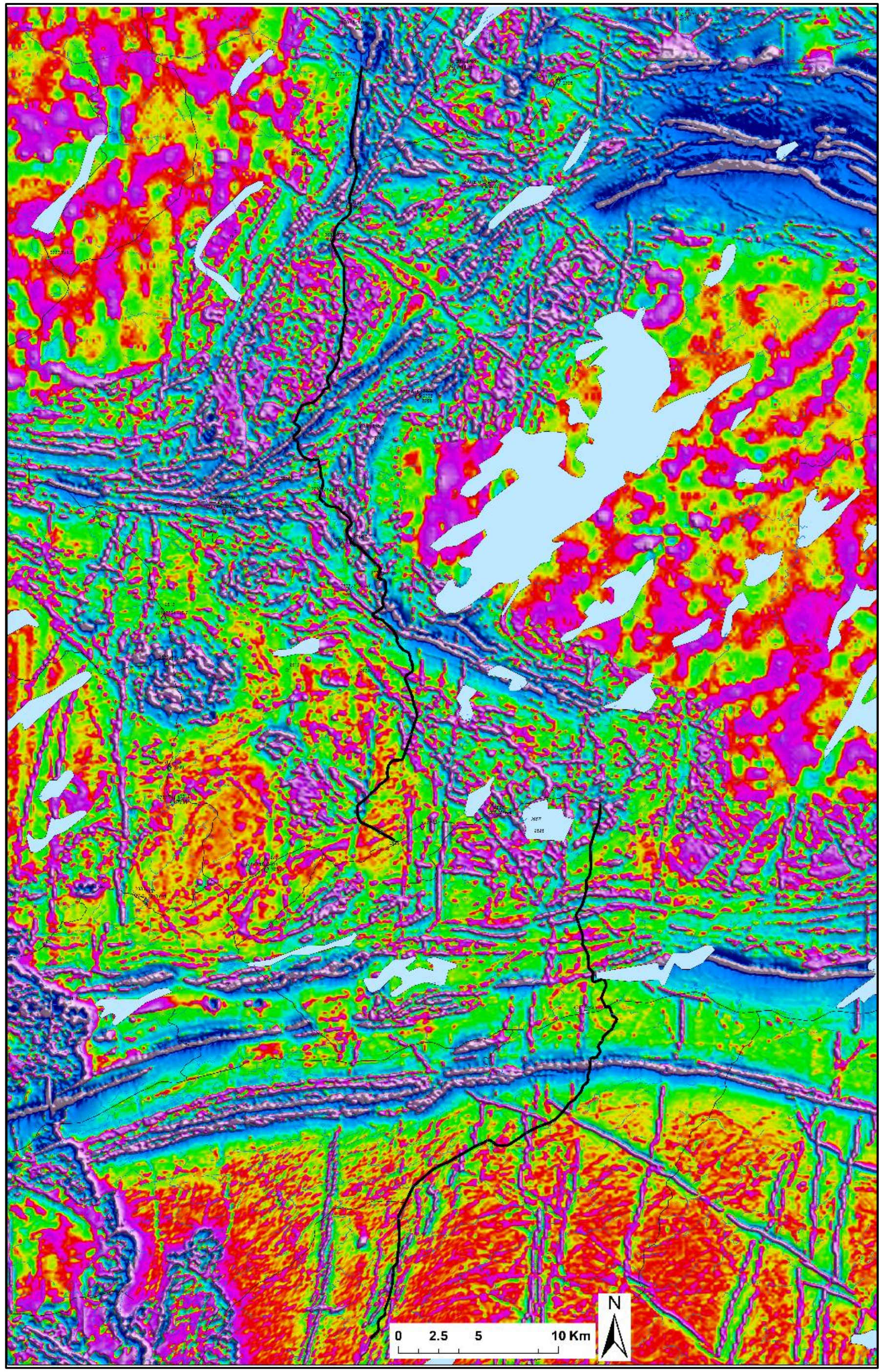
- 2740 Ma
- Massive to pillowed tholeiitic basalt flows
- Interbeds of dacitic tuff (resedimented?)
- Interlayered with rare chert and oxide facies iron formation

Willett assemblage (~ 2740 Ma)

Tholeiitic basalt and mafic volcanic rocks

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005





Geological architecture

Neoarchean

Elmhirst-Rickaby assemblage

- ~2740 Ma
- Massive to pillowed calc-alkalic basalt and andesite flows
- Overlain by dacite to rhyolite flows
- Subvolcanic quartz and feldspar porphyry and tonalite-diorite plutons

Elmhirst-Rickaby assemblage (~ 2740 Ma)

- Tonalite to granodiorite, diorite to quartz diorite
- Calc-alkaline mafic and intermediate volcanic rocks
- Intermediate volcanic rocks (flows and pyroclastic)

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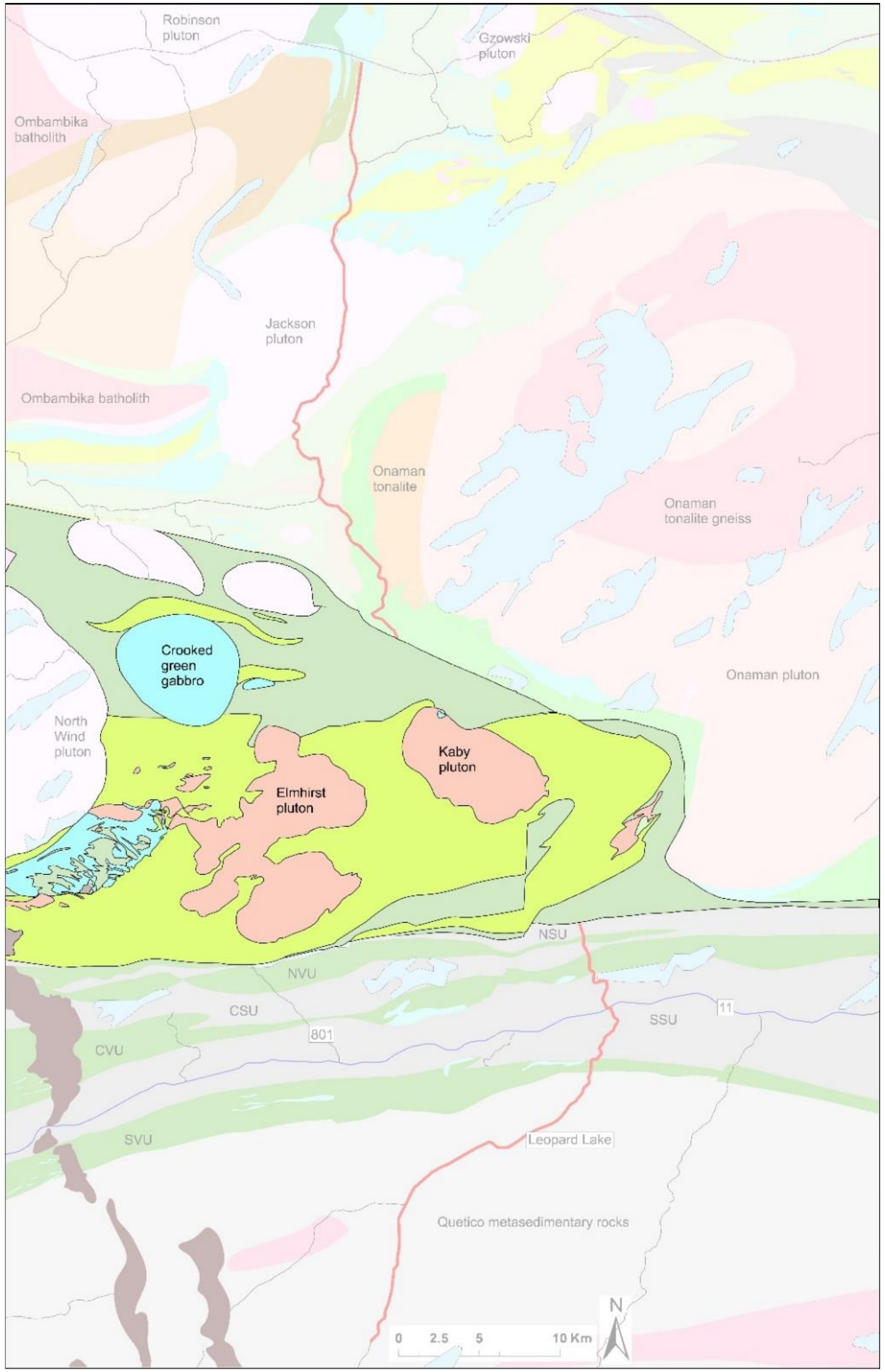
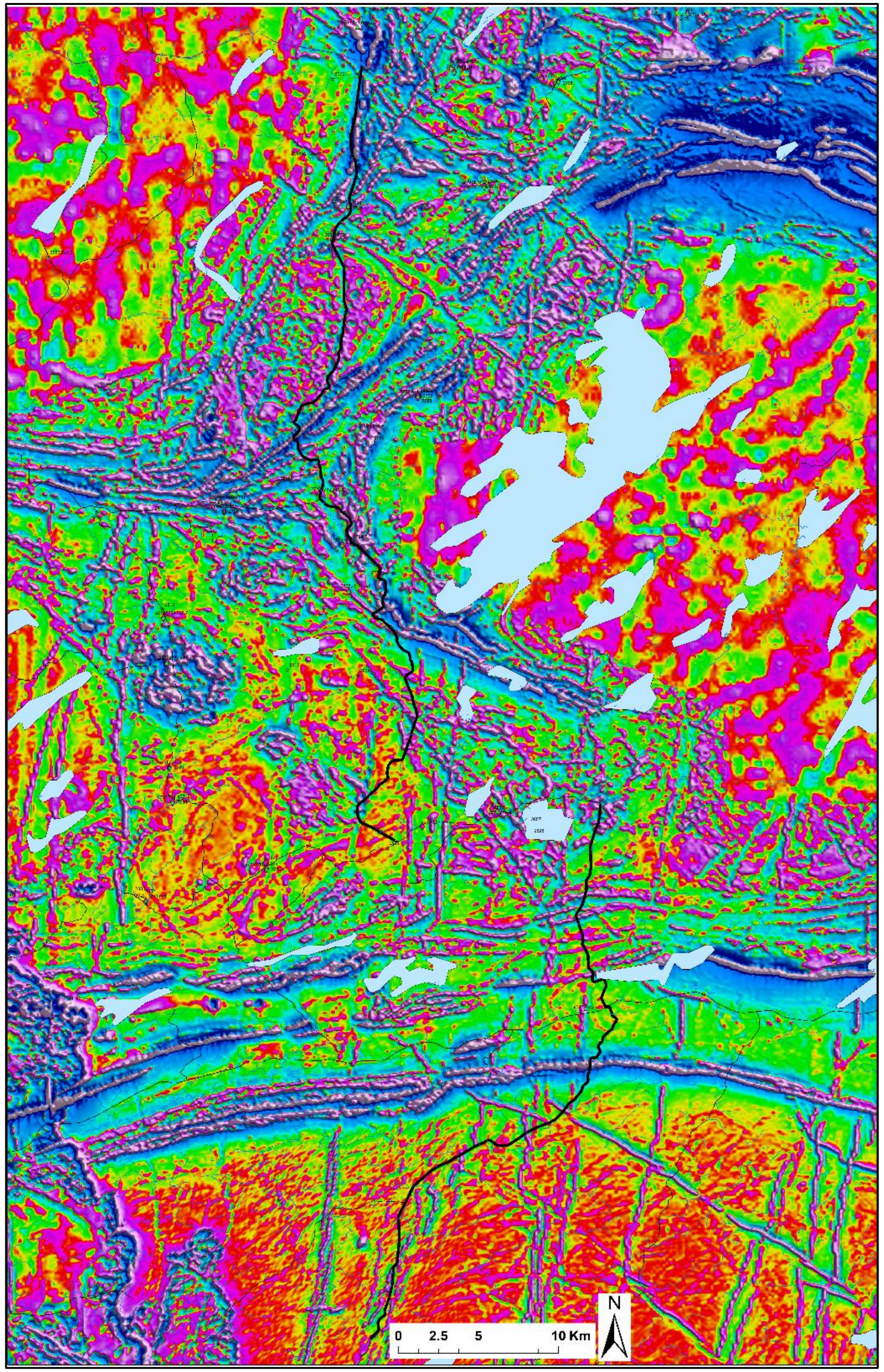




Geological architecture

Neoarchean

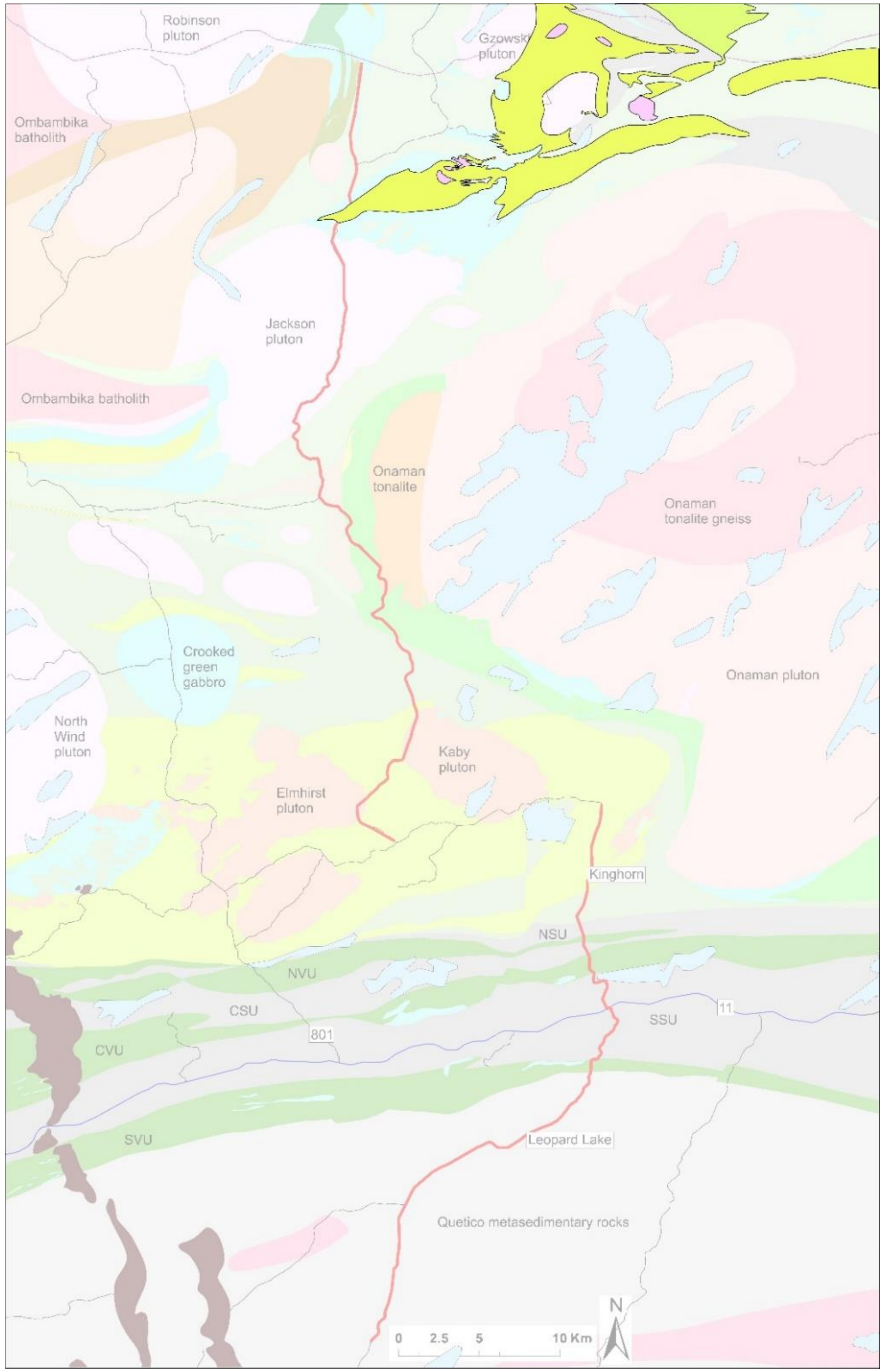
Metcalfe-Venus assemblage

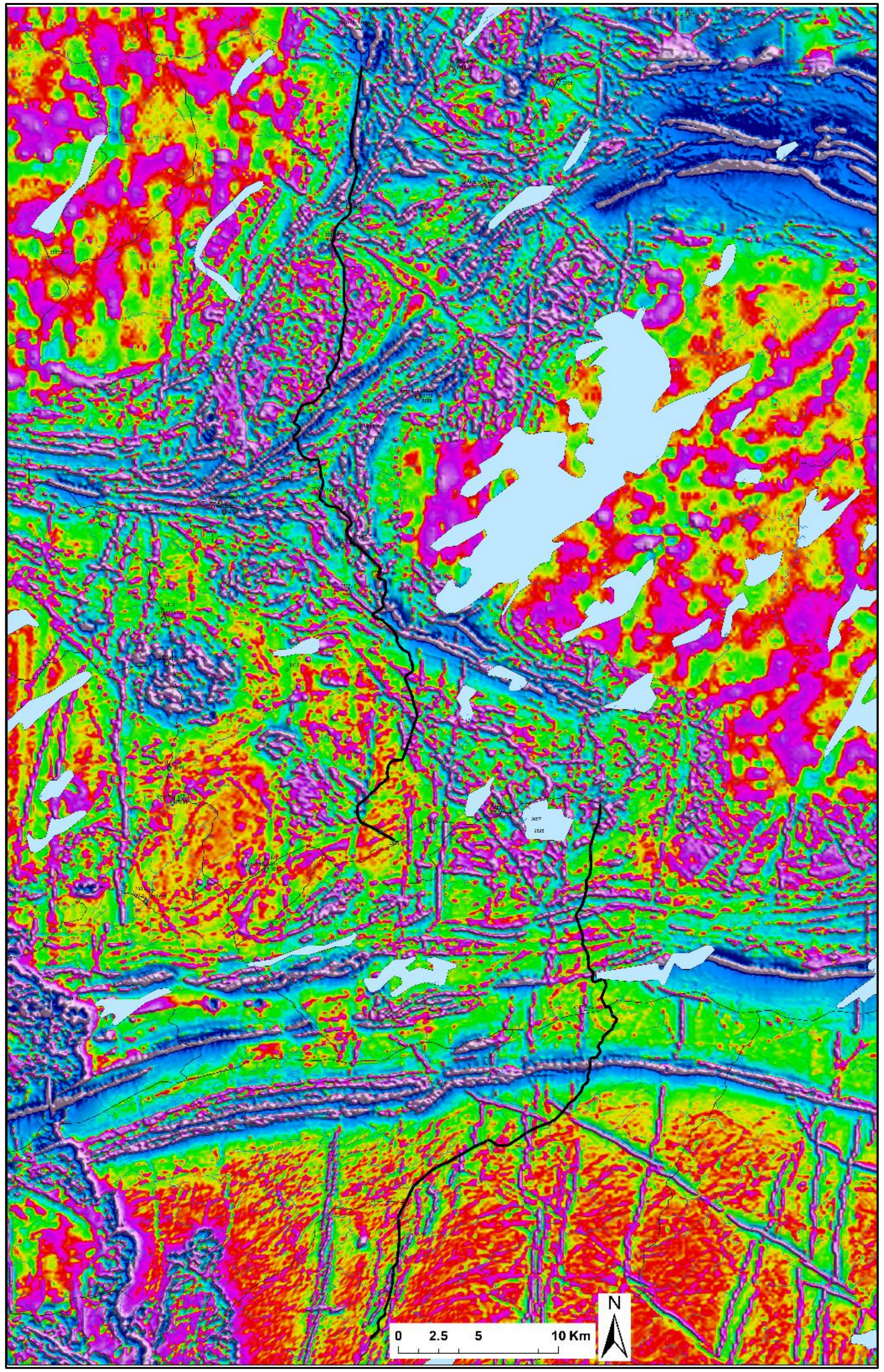
- 2734-2722 Ma
- Calc-alkaline dacite to locally rhyolite flows, flow breccia and pyroclastic rocks
- Quartz porphyry intrusions

Metcalfe-Venus assemblage (~ 2722-2734 Ma)

- Quartz porphyry
- Intermediate volcanic rocks (flows and pyroclastic)

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005





Geological architecture

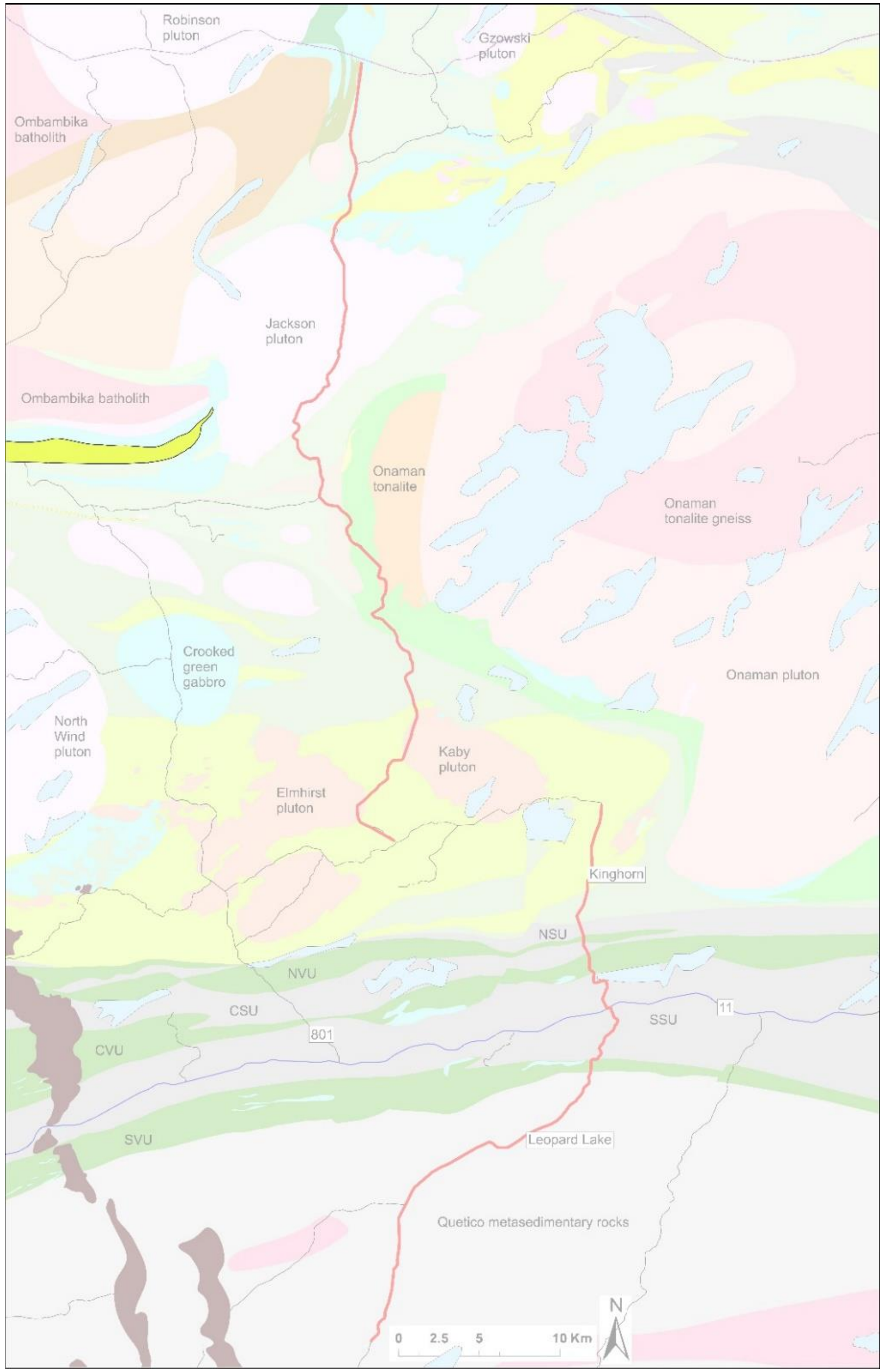
Neoarchean

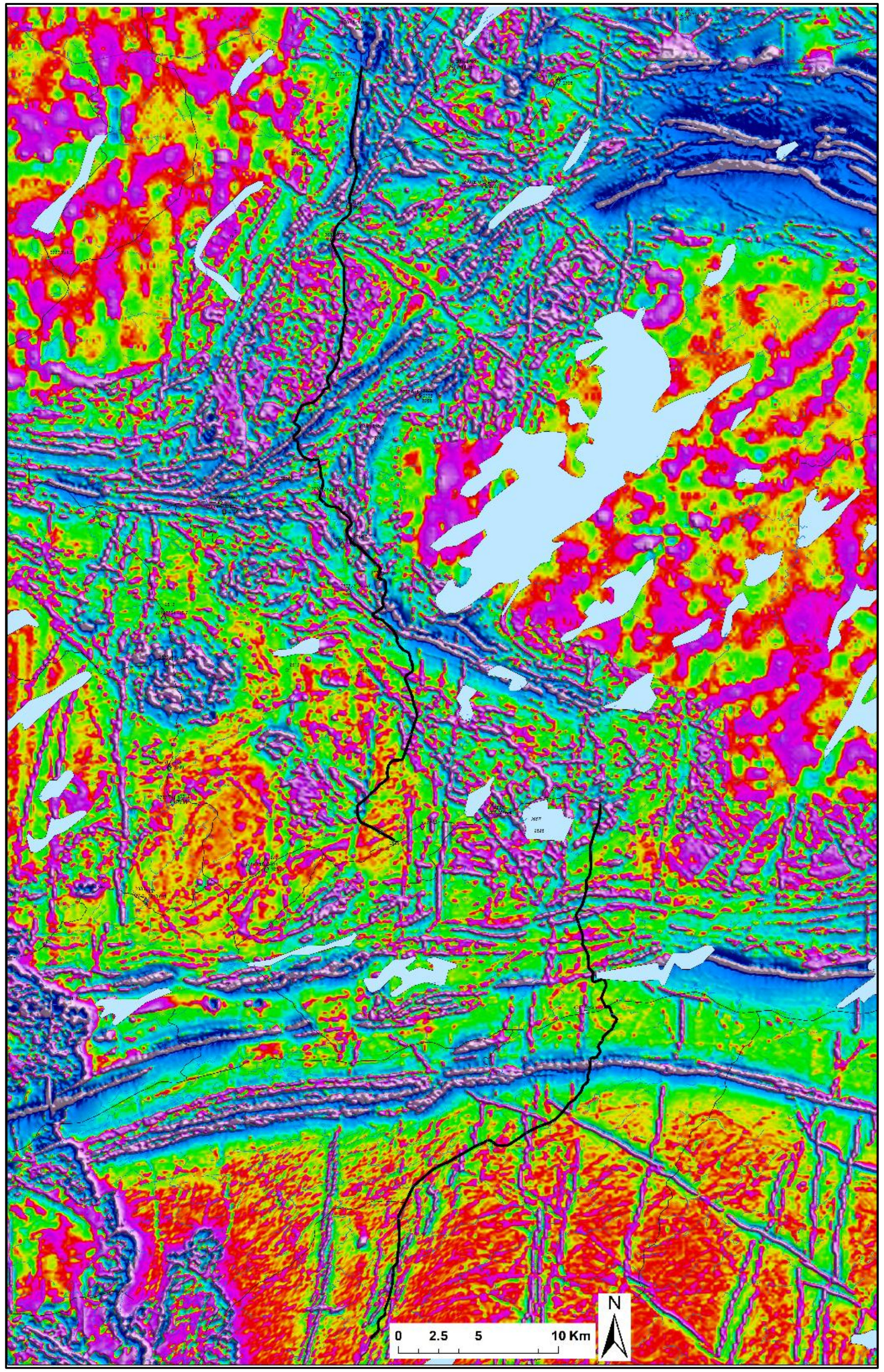
Humboldt assemblage

- <2713 Ma
- Quartz porphyritic dacite
- Minor volcaniclastic rocks

Humboldt assemblage (<2713 Ma)

Intermediate to felsic tuff





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Geological architecture

Neoarchean

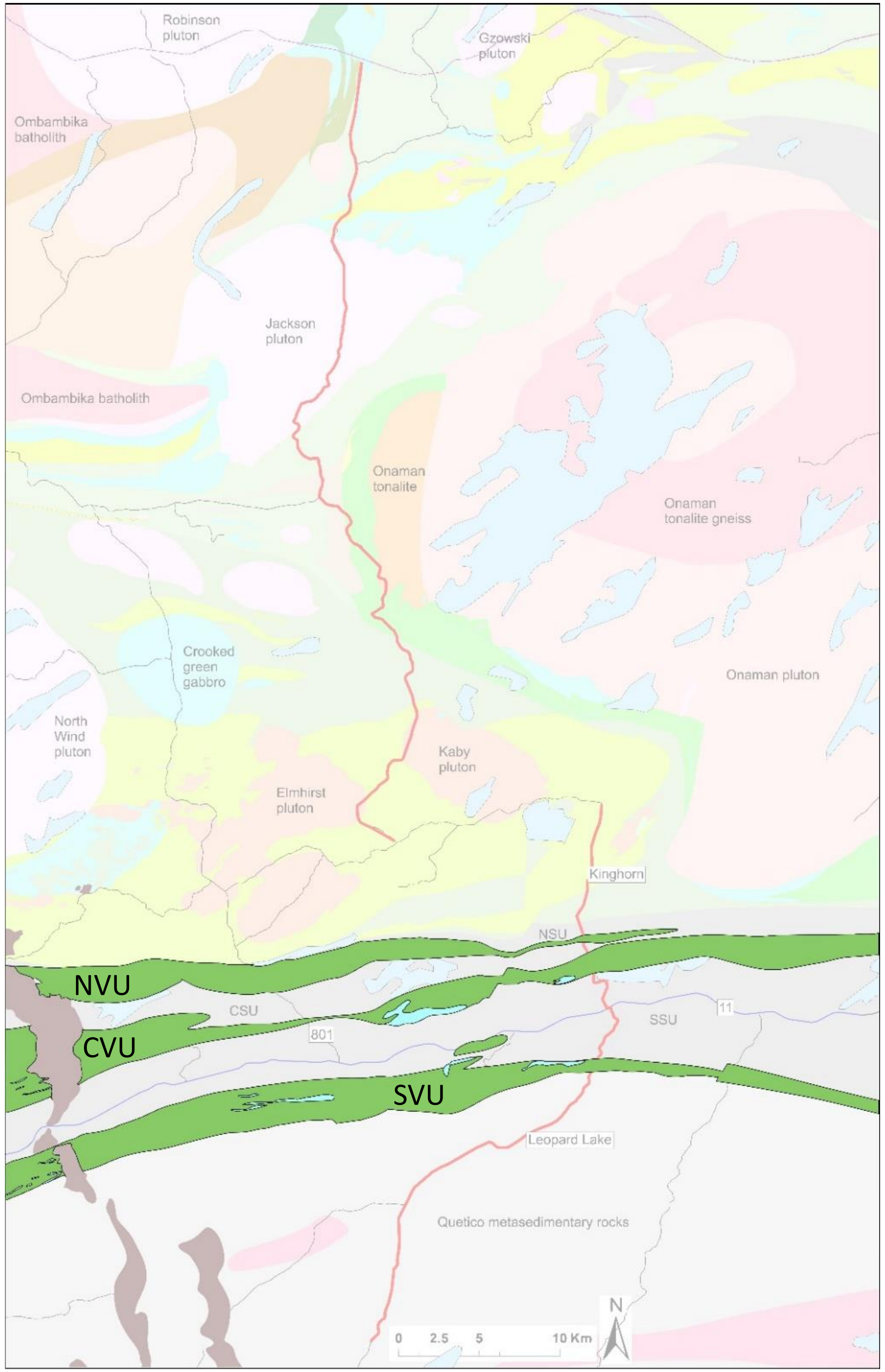
BGB metavolcanic rocks

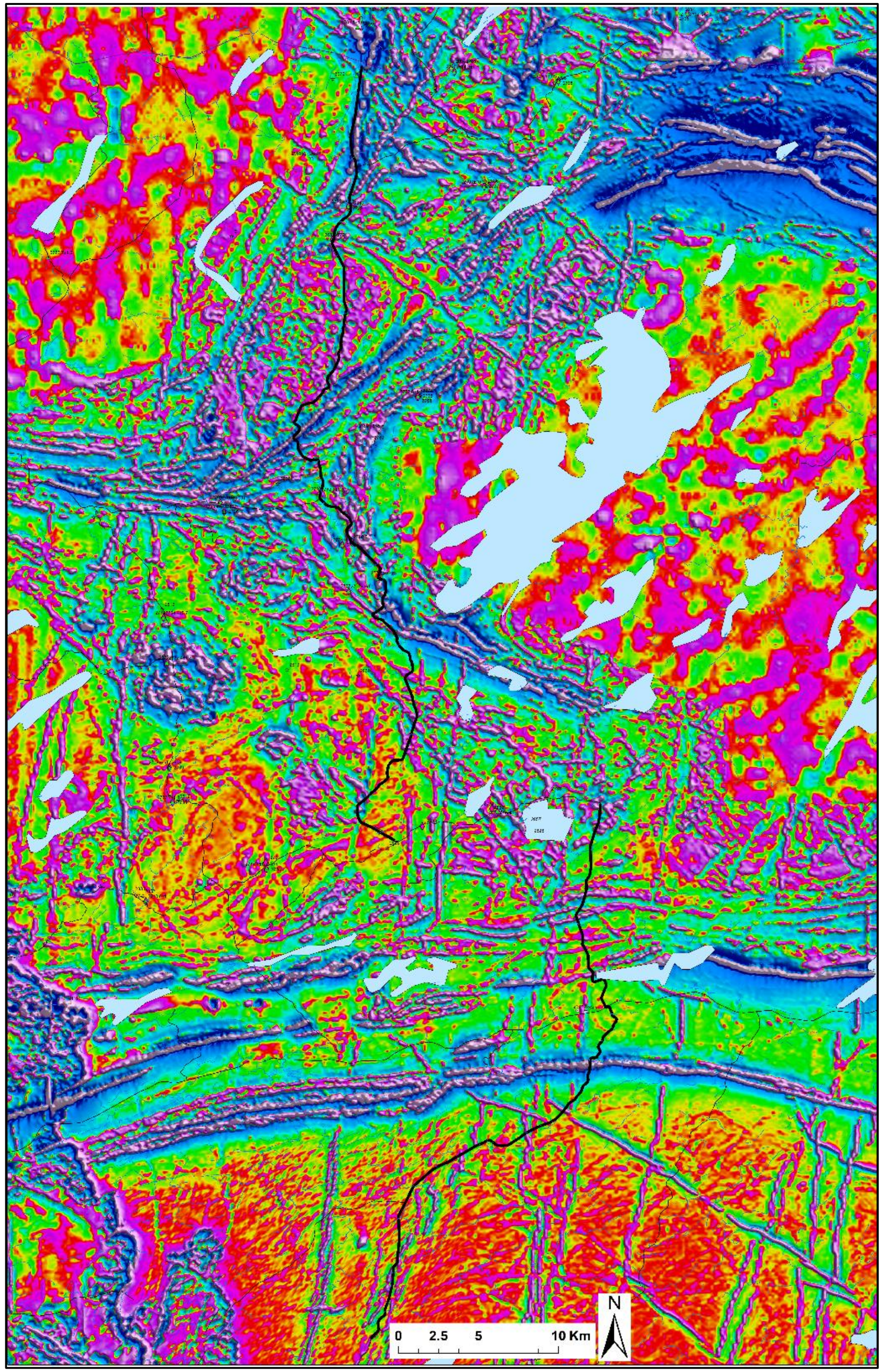
- ~2725 Ma
- **NVU:** tholeiitic, mafic to felsic, pyroclastic rocks and flows – back arc
- **CVU:** calc-alkaline and tholeiitic, mafic to intermediate, massive to pillowed, amygdaloidal flows and pyroclastic rocks – island arc
- **SVU:** tholeiitic, massive, pillowed and amygdaloidal andesite and basalt flows – oceanic crust

Beardmore-Geraldton belt

Mafic to intermediate with lesser felsic volcanic rocks

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005; Tomlinson et al., 1996





Geological architecture

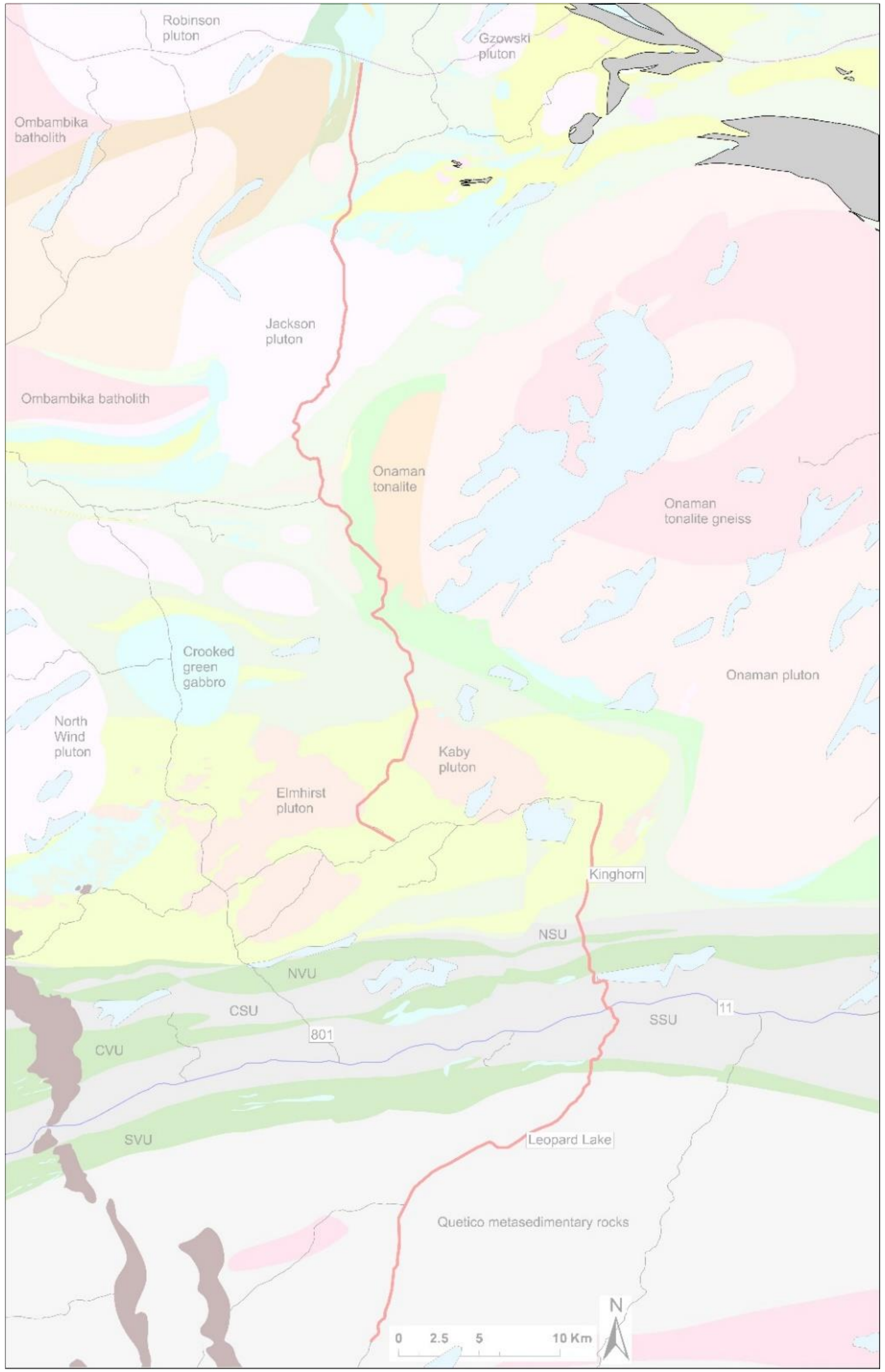
Neoarchean

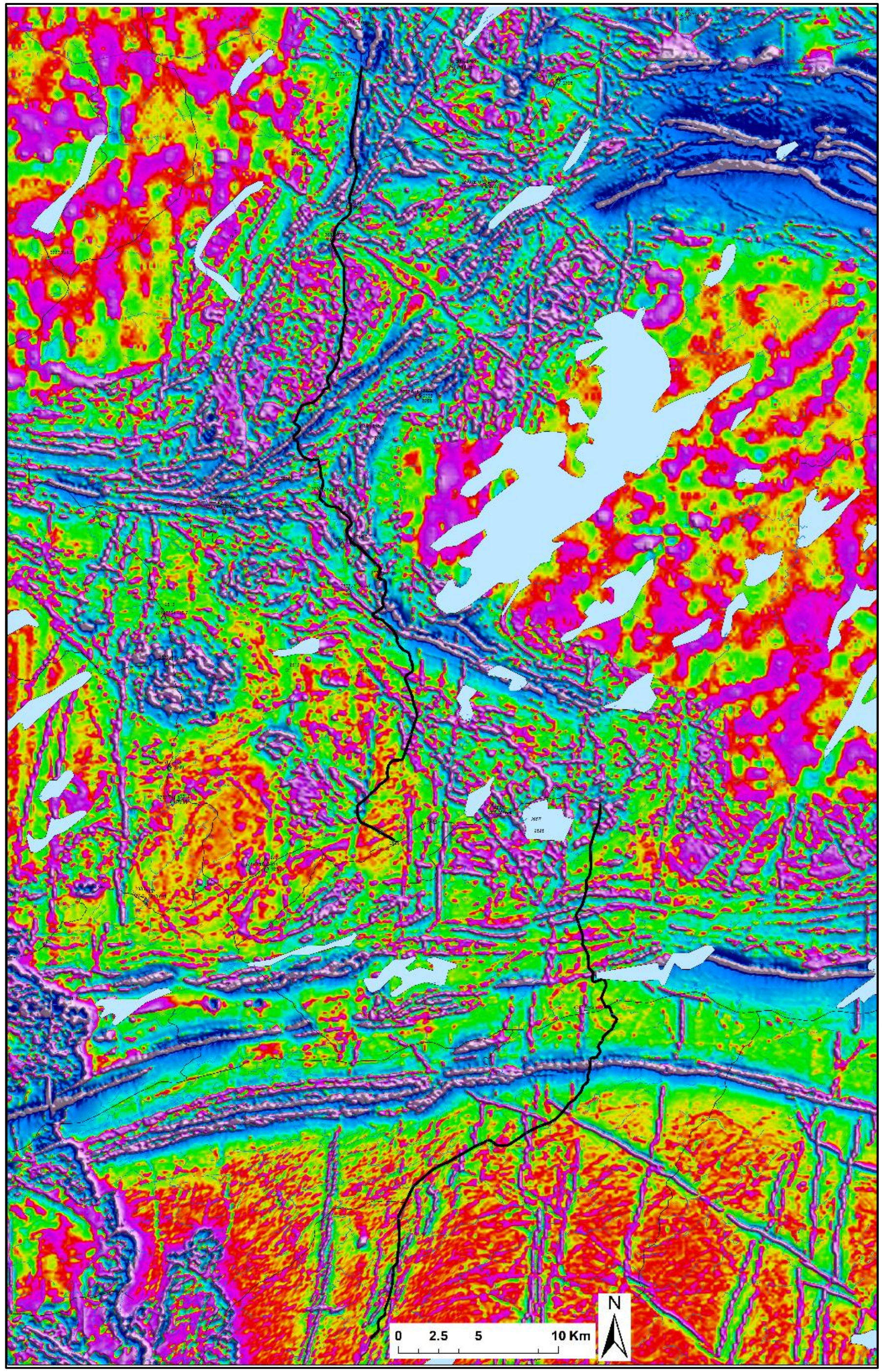
Albert-Gledhill assemblage

- <2710 Ma
- Siltstone to fine sandstone with rare conglomeratic interbeds
- Eroded from intermediate to felsic volcanic rocks

Albert-Gledhill assemblage (<2710 Ma)

- Coarse clastic sedimentary rocks
- Wacke





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Geological architecture

Neoarchean

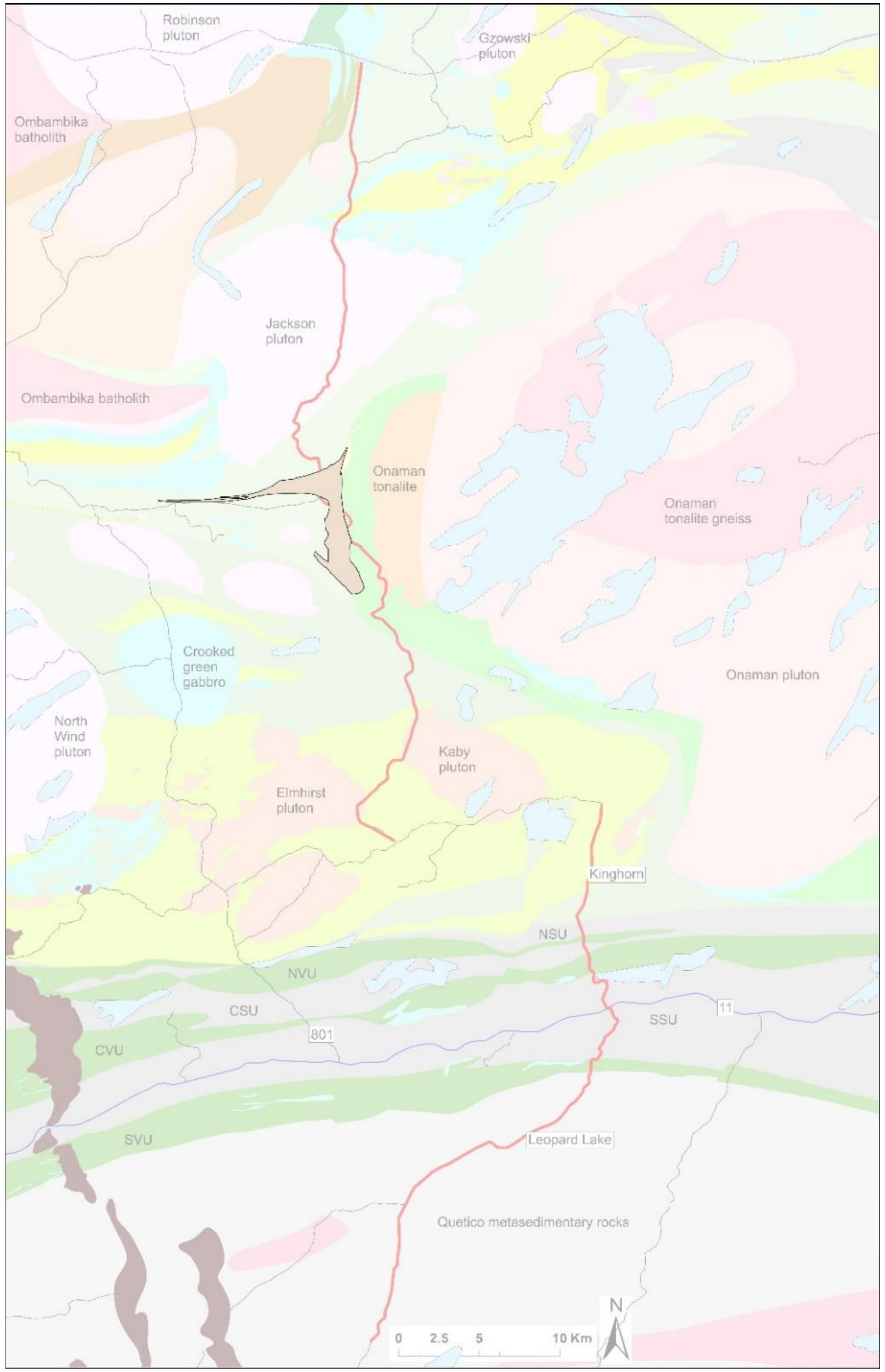
Conglomerate assemblage

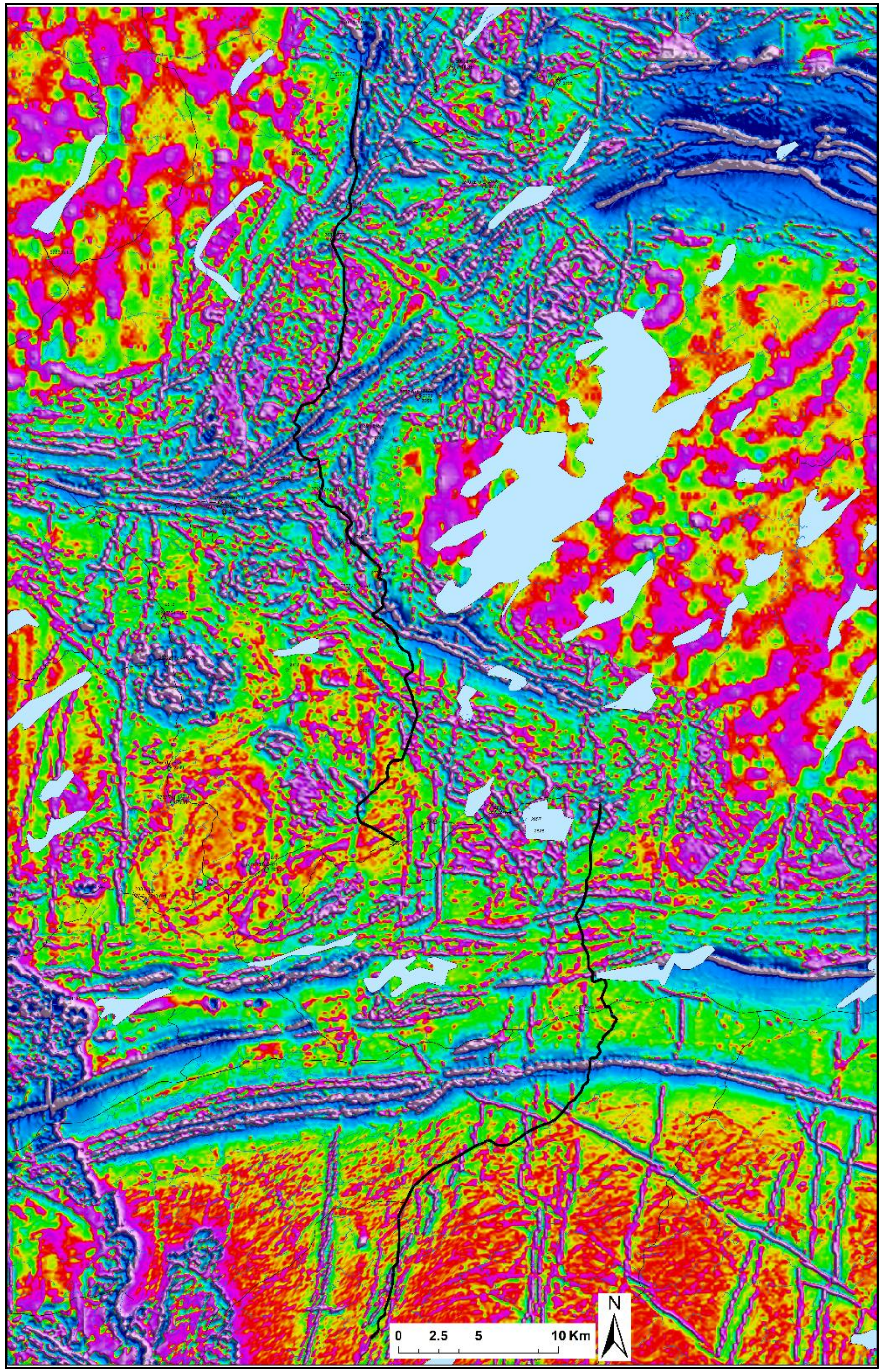
- <2707 Ma
- Conglomerate and sandstone
- Unconformably on Willett and Onaman assemblages
- Concurrent with Albert-Gledhill assemblage

Conglomerate assemblage (<2707 Ma)

Coarse clastic sedimentary rocks

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005





Geological architecture Neoarchean

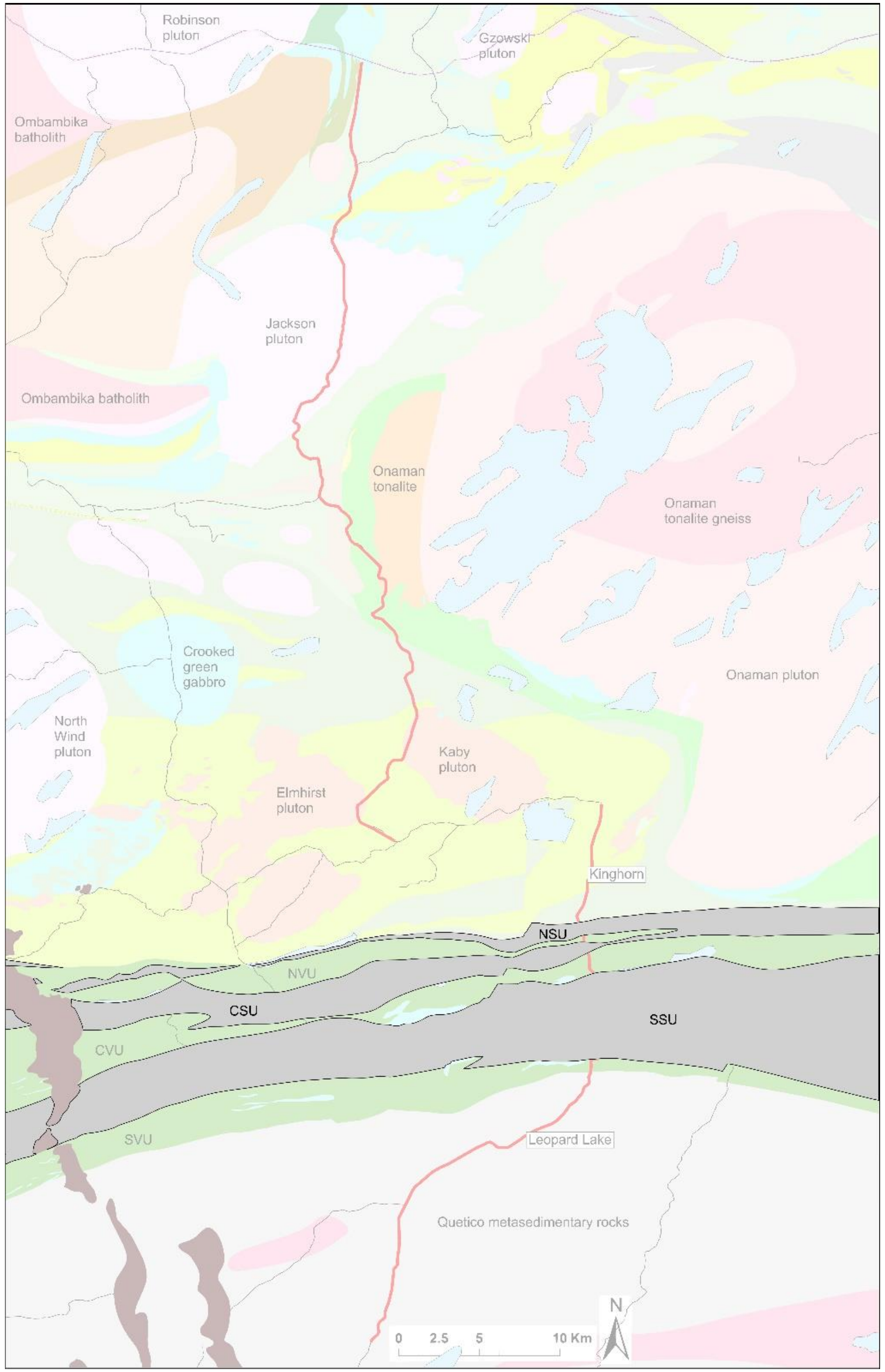
BGB metasedimentary rocks

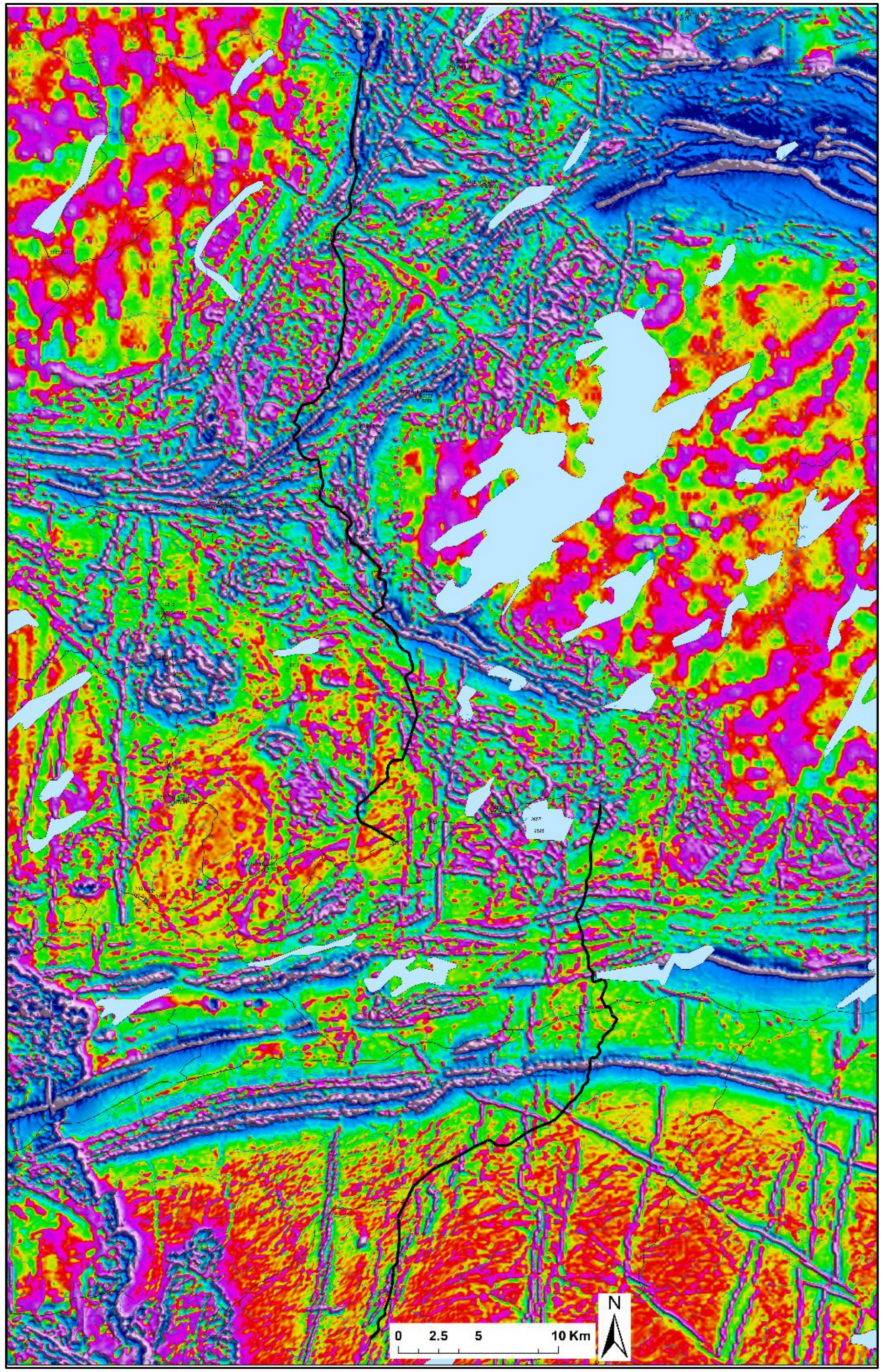
- ~2700-2694 Ma
- Southward prograding clastic wedge
- **NSU:** polymictic conglomerate - alluvial fan or braid-plain environment;
- **CSU:** polymictic conglomerate, feldspathic and quartz-rich sandstone, mudstone and shallow water iron formation - subaqueous fan and/or prodelta setting
- **SSU:** turbiditic sandstone and mudstone with minor iron formation and conglomerate - submarine fan and/or basin-plain environment

Beardmore-Geraldton belt

Fine to coarse clastic sedimentary rocks

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005; Tóth, 2018; Devaney and Williams, 1989





Geological architecture

Neoarchean

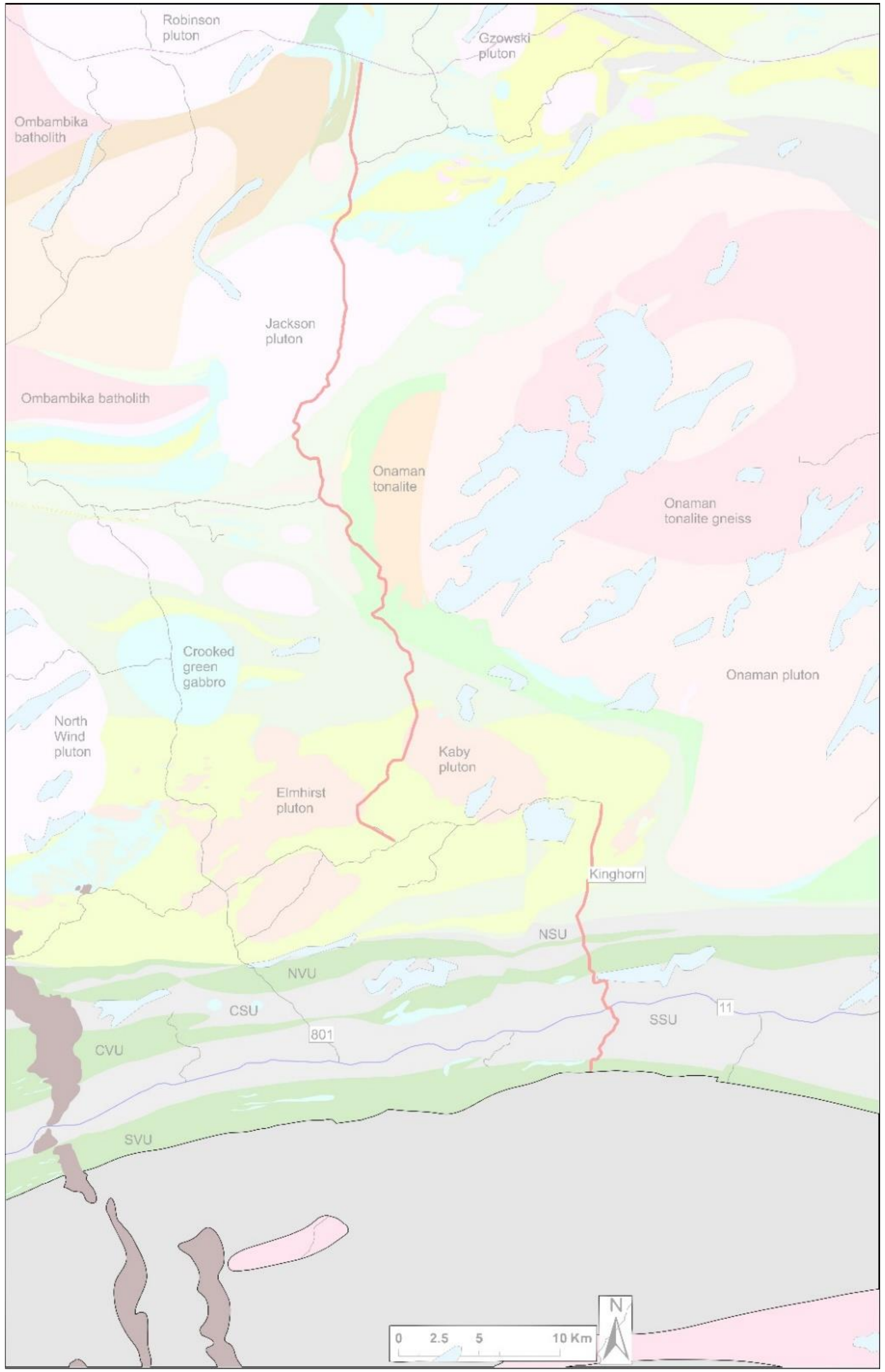
Quetico metasedimentary rocks

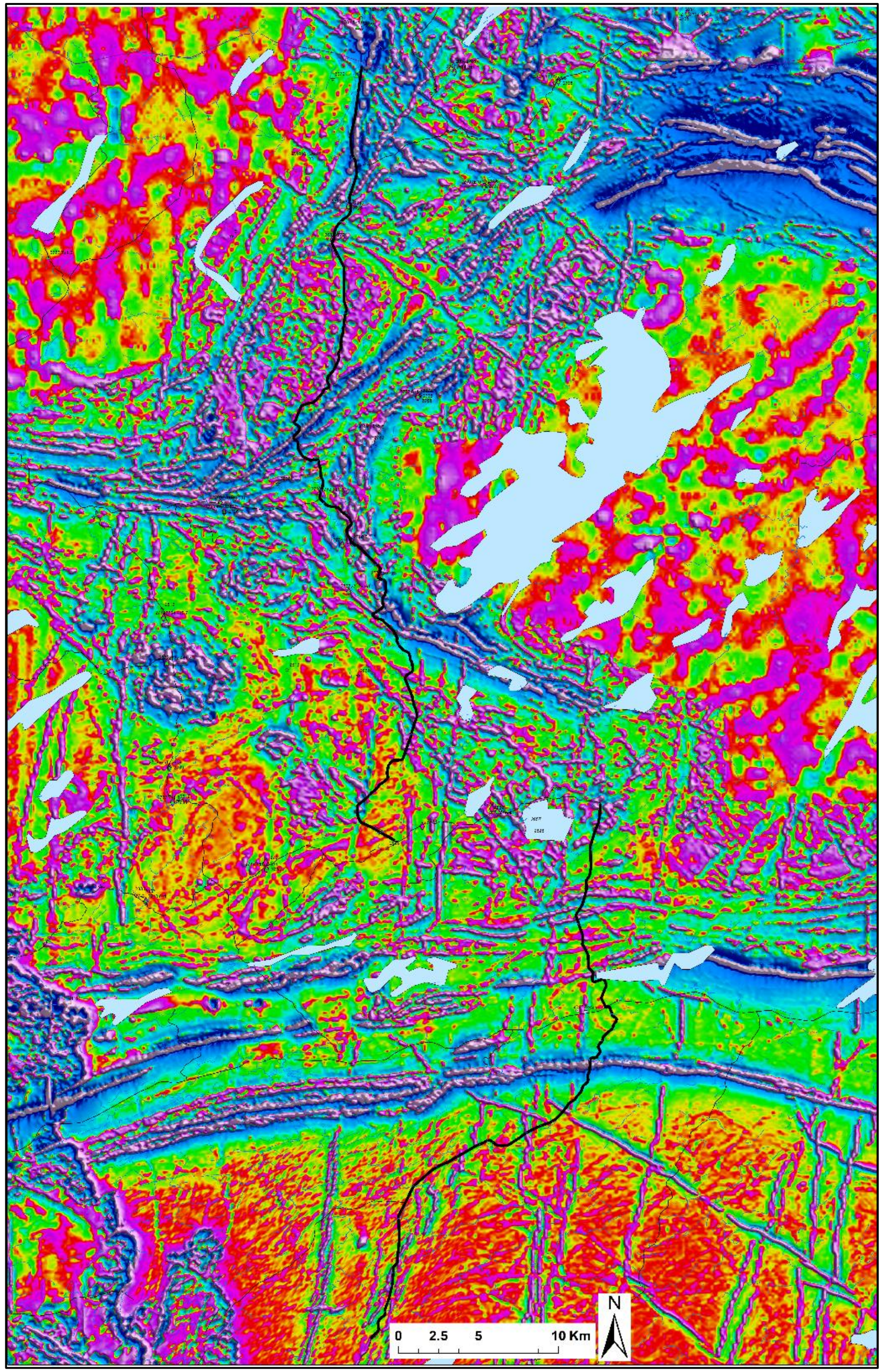
- ~2700-2694 Ma
- turbiditic sandstone and mudstone
- Very rare and thin iron formation and conglomerate
- More distal basin plain environment

Quetico subprovince

Fine clastic sedimentary rocks

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005; Tóth, 2018; Devaney and Williams, 1989



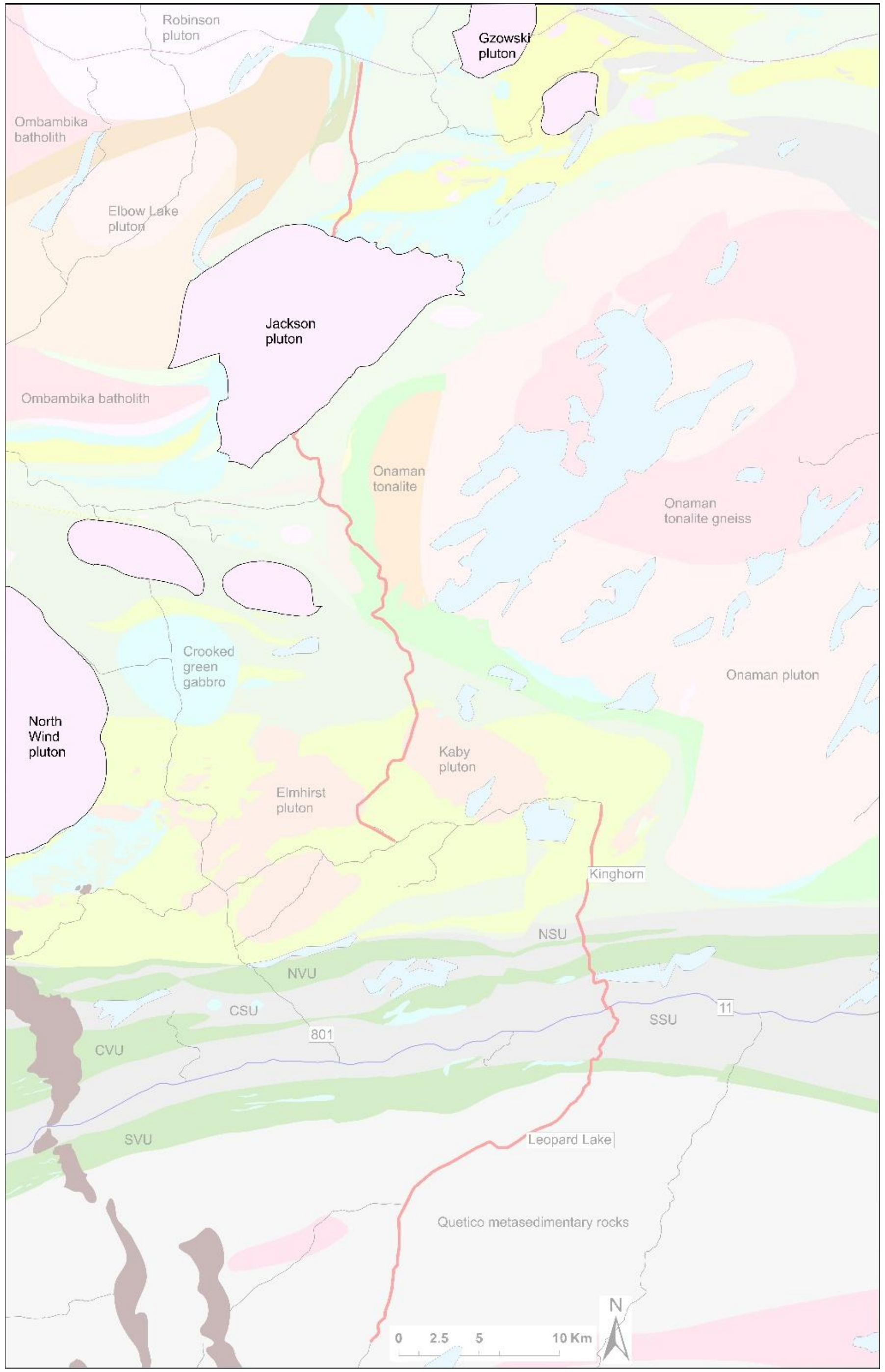


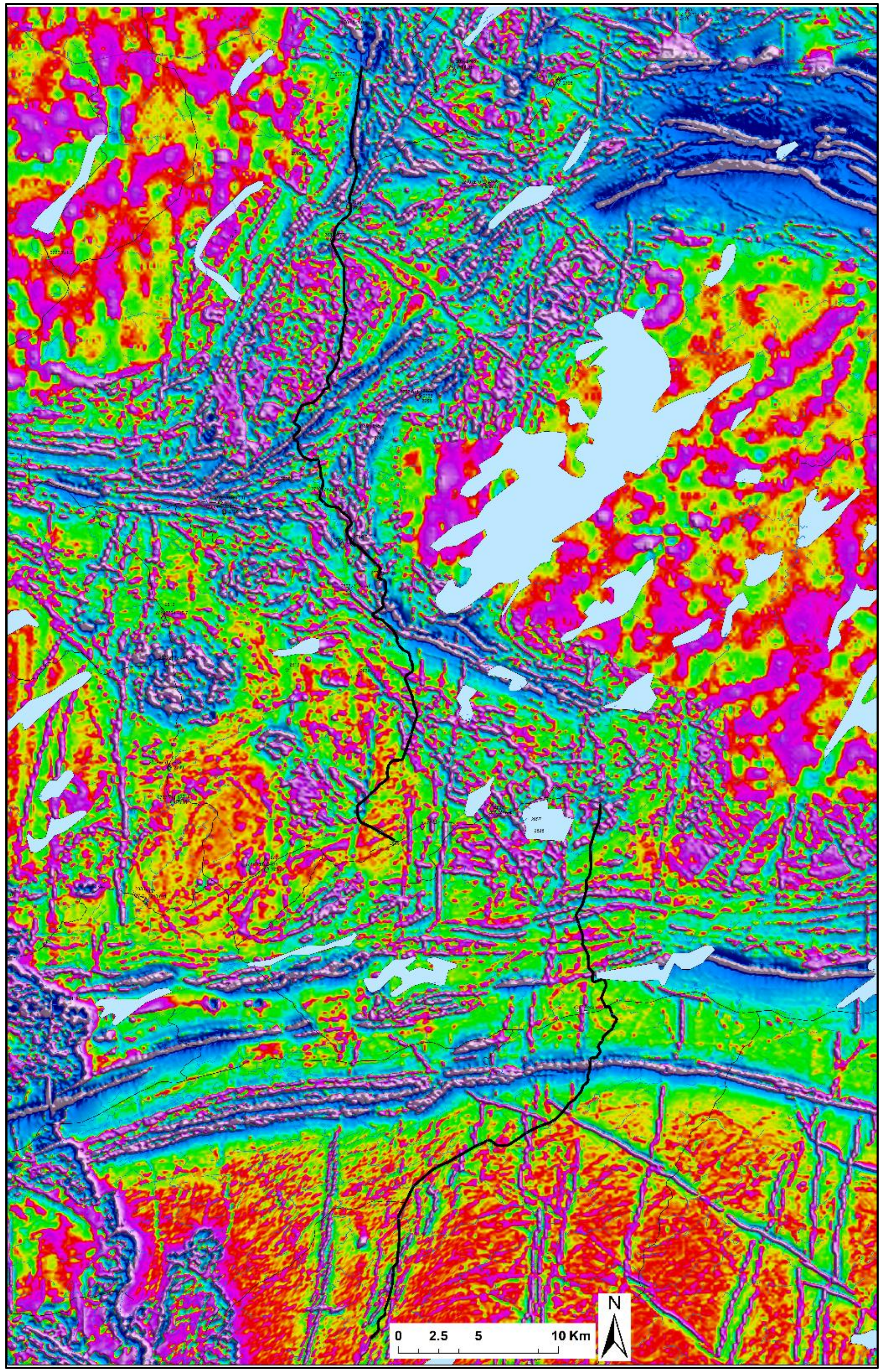
Geological architecture

Neoarchean

Sanukitoid plutons

- 2700-2690 Ma
- Late-tectonic emplacement
- Granodiorite-monzogranite – monzonite-syenite
- Marginal gabbro phase common
- Crosscut terrane boundaries with English River and Quetico metasedimentary subprovinces





Granodiorite, monzogranite, monzonite

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005

Geological architecture

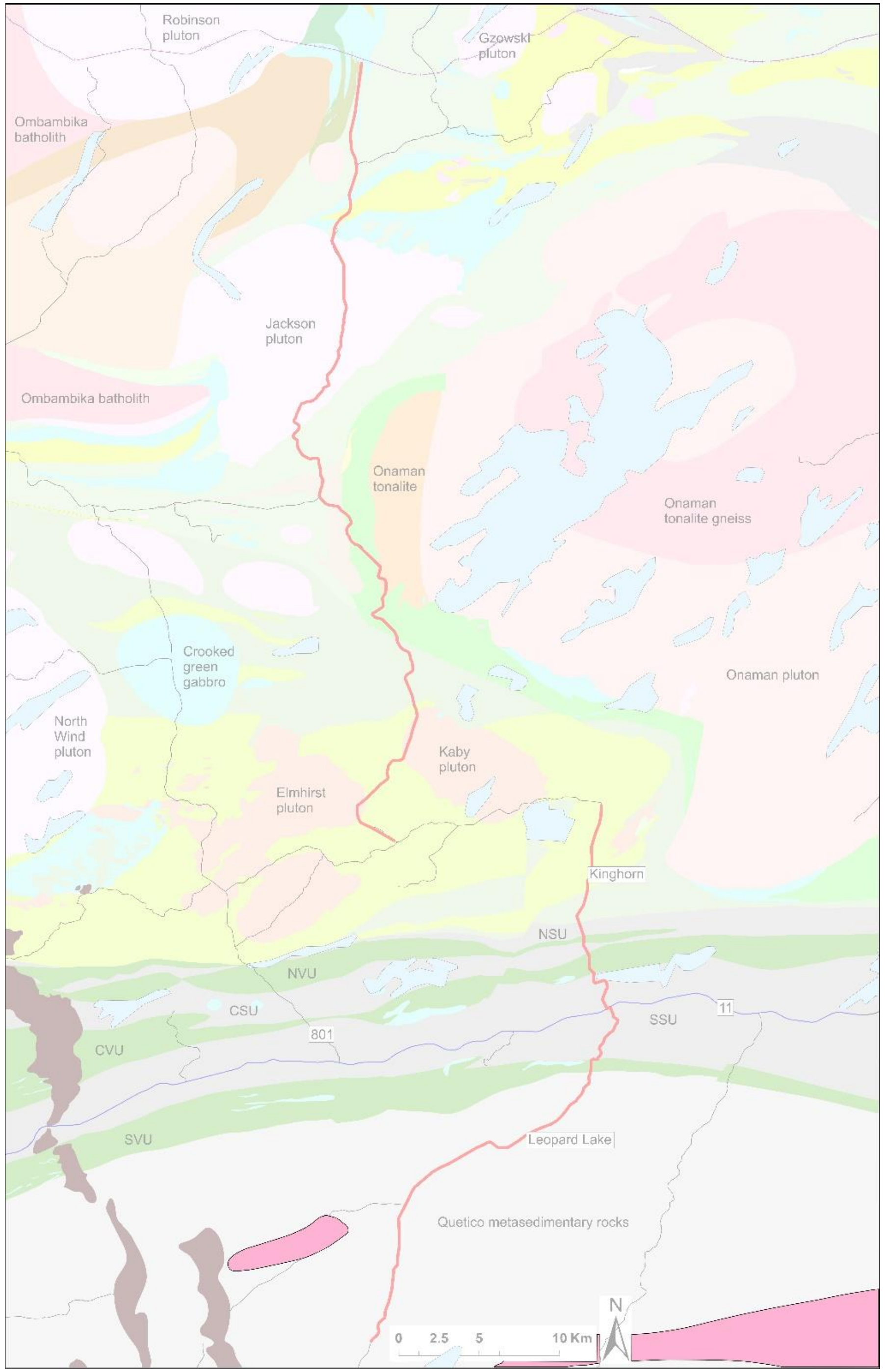
Neoarchean

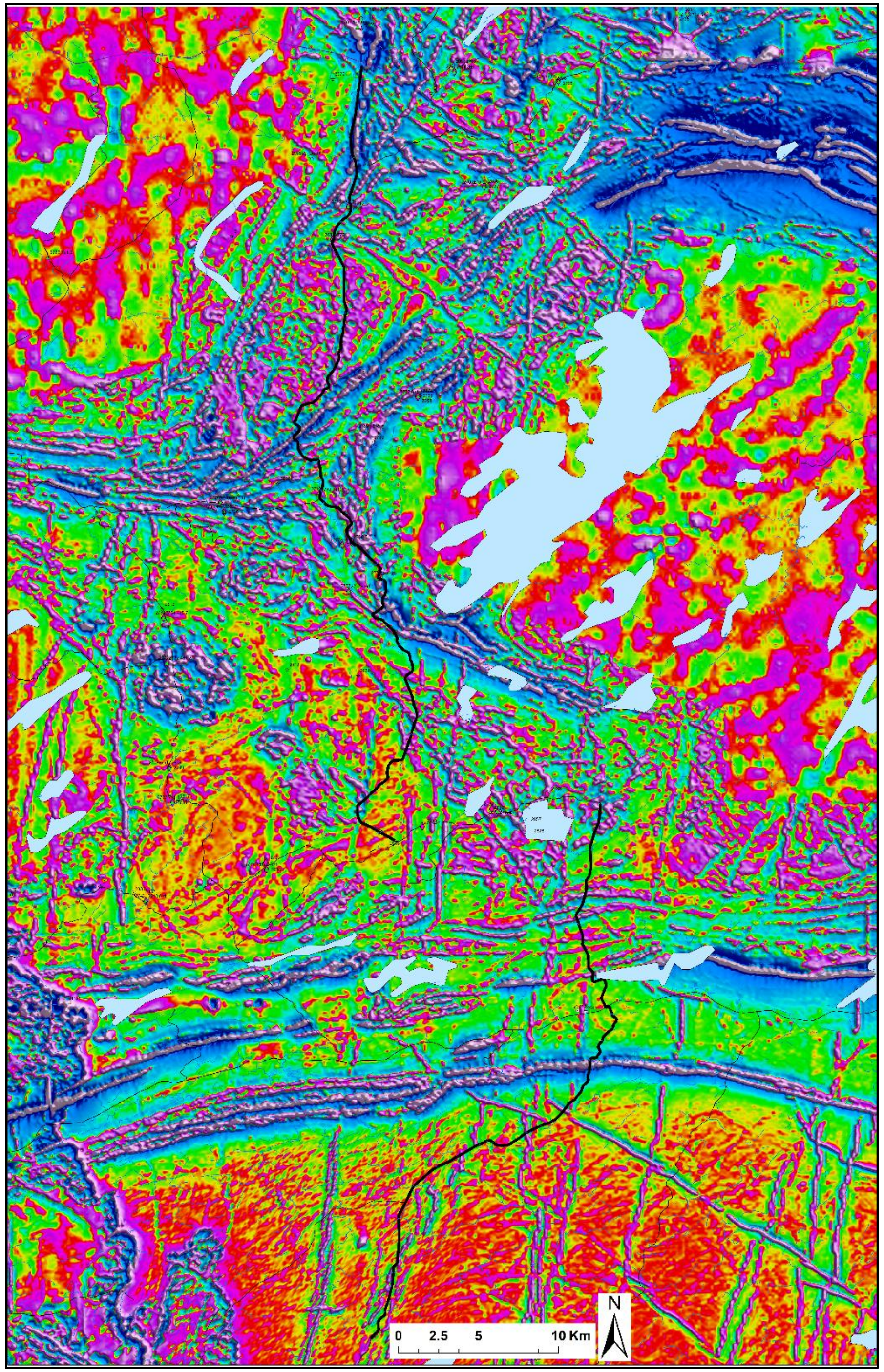
Quetico plutons

- ~2670-2650 Ma
- Major plutonism and metamorphism in Quetico
- Leucogranites –
    - S-type, peraluminous
    - I-type – indicates tonalitic basement underlying Quetico metasedimentary succession

Granit to granodiorite

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005; Percival, 1989





Geological architecture

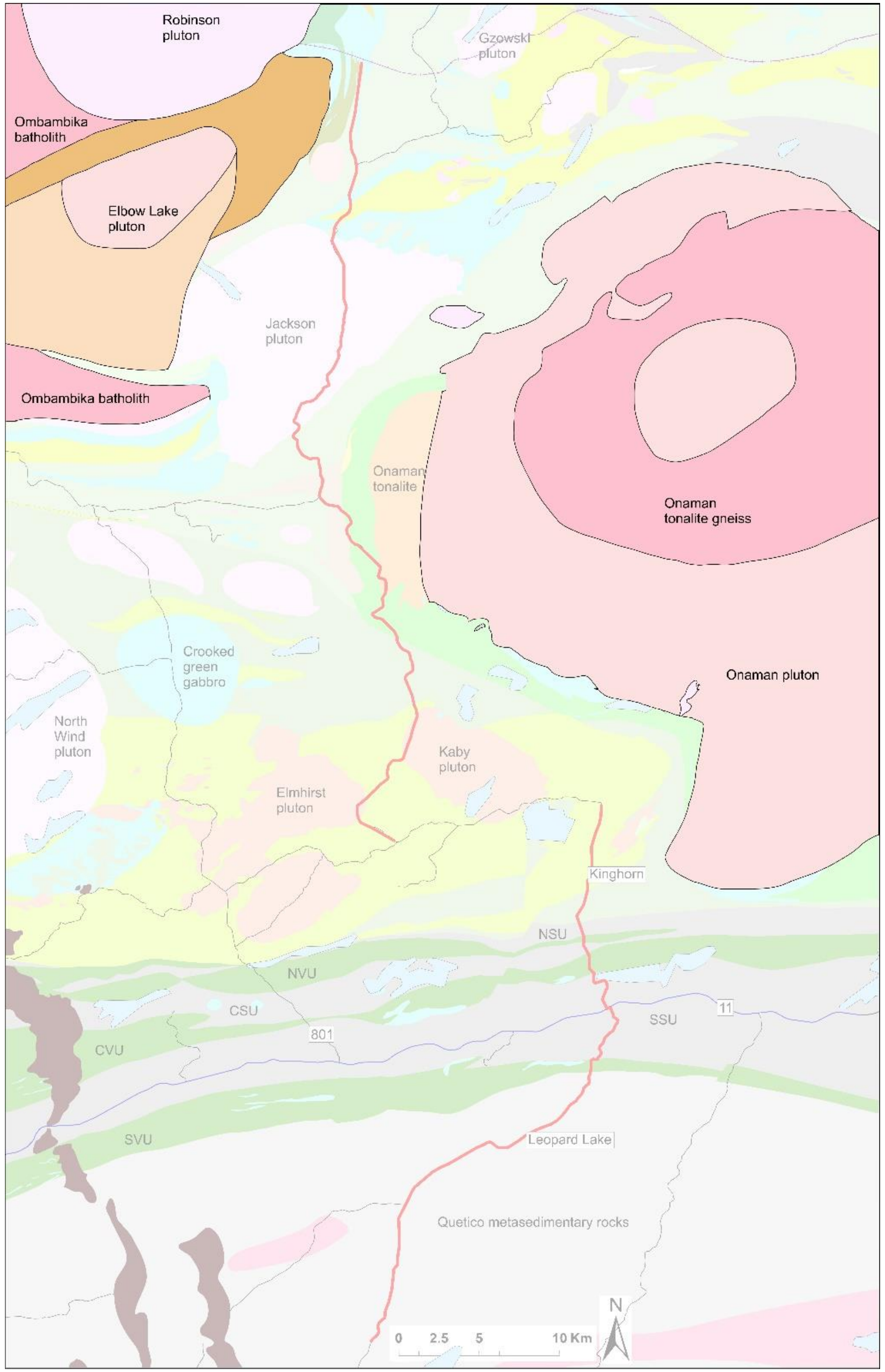
Neoarchean

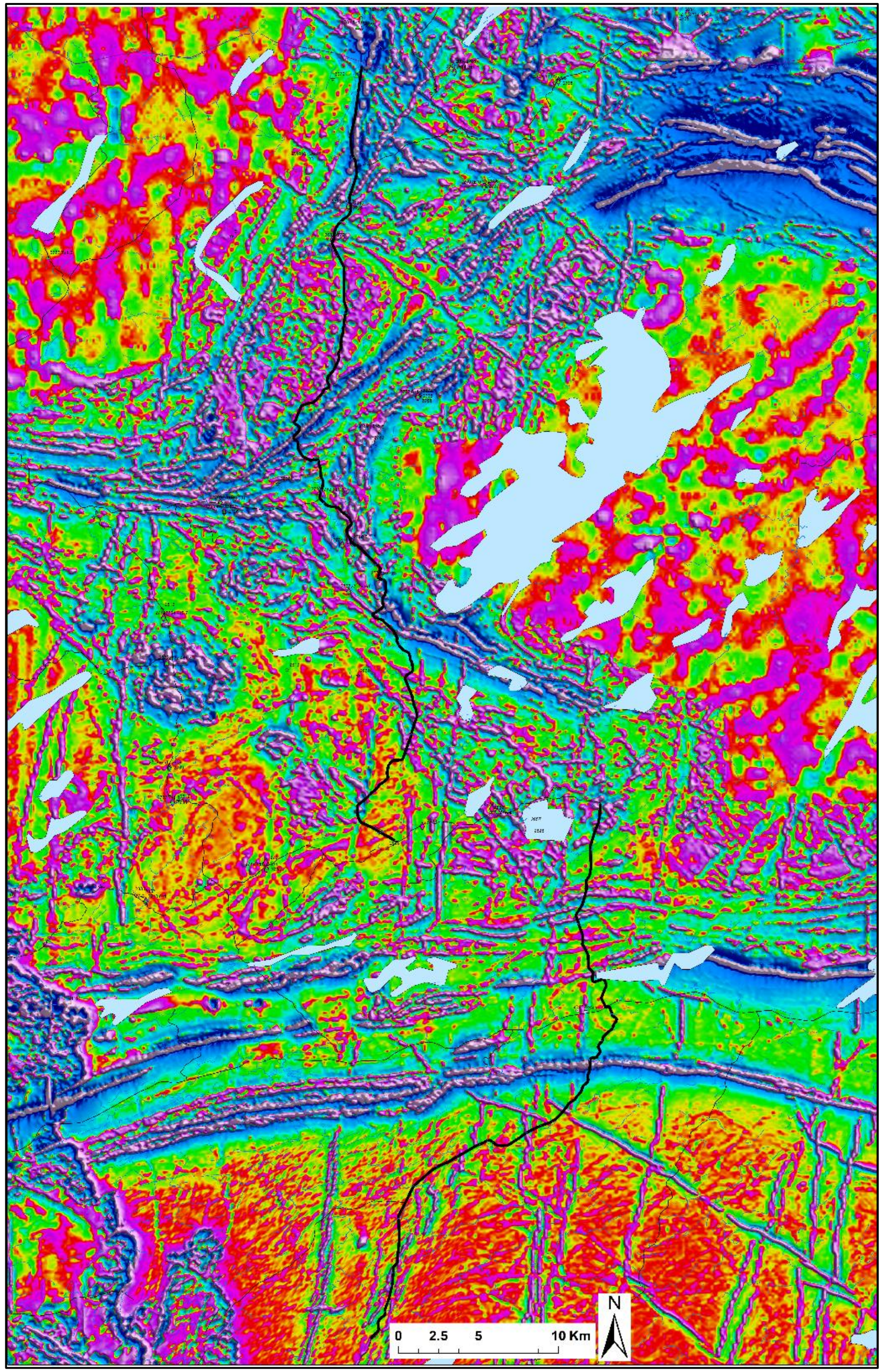
Poorly-defined plutons

- Elbow Lake pluton - gneissic phase @ 2722 Ma
- Onaman pluton and tonalite gneiss – composite pluton with ages 2925 to 2680 Ma

ARCHEAN

- Diorite to quartz diorite
- Tonalite to granodiorite
- Granodiorite to tonalite
- Tonalite to granodiorite





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Structural evolution

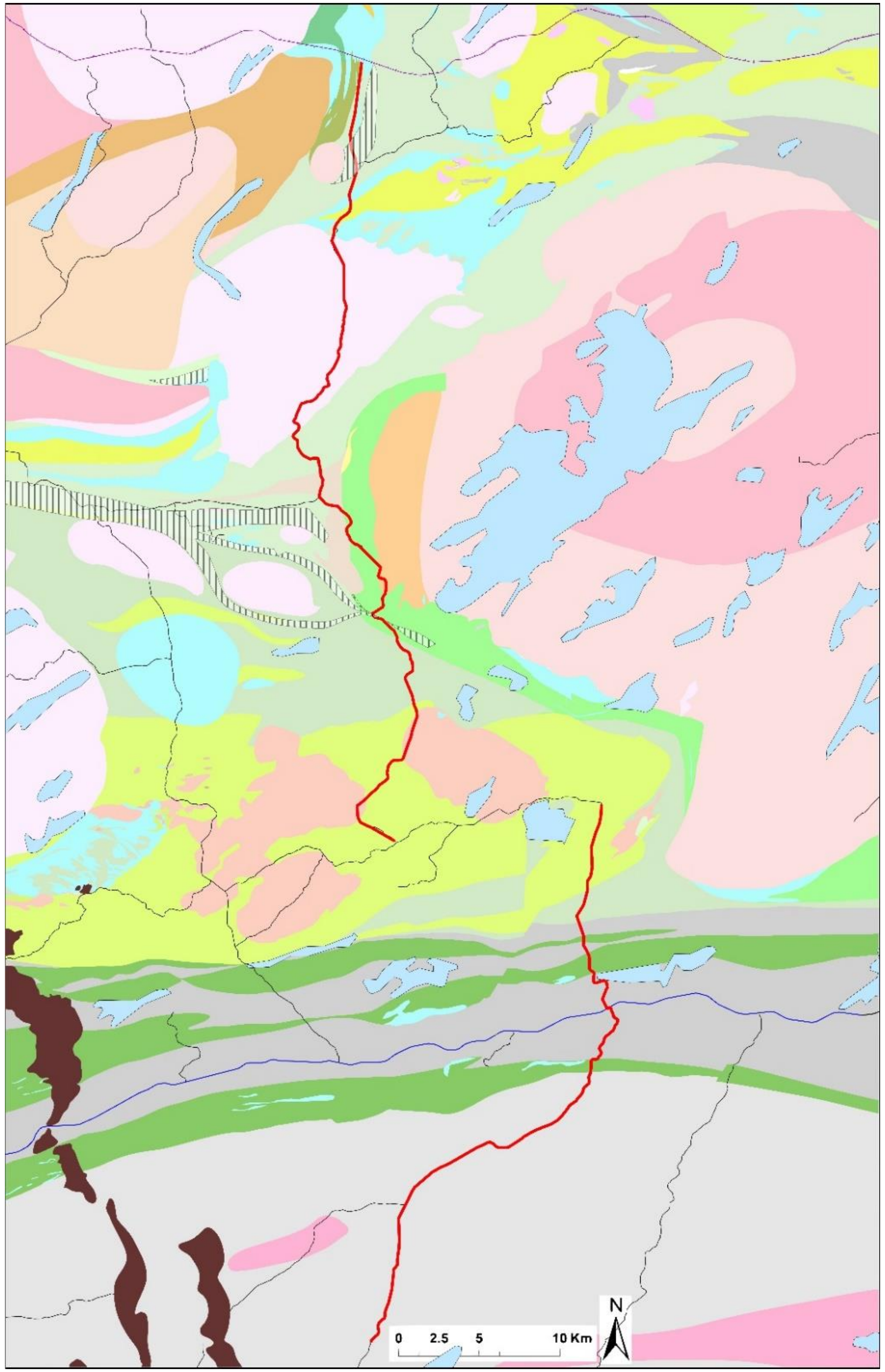
Eastern Wabigoon (Stott et al., 2002)

- D_1 regional shortening
- D_2 regional transpression
- D_3 contact strain aureoles
- D_4 dextral faults

Humboldt Bay deformation zone (Culshaw et al., 2006)

- D_1 regional shortening – assembly of Onaman-Tashota greenstone belt
- D_2 monoclinic transpression with strong pure shear component
- D_3 sinistral shear
- D_4 dextral shear

Reconnaissance mapping indicates the need for re-assessment



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- Transect
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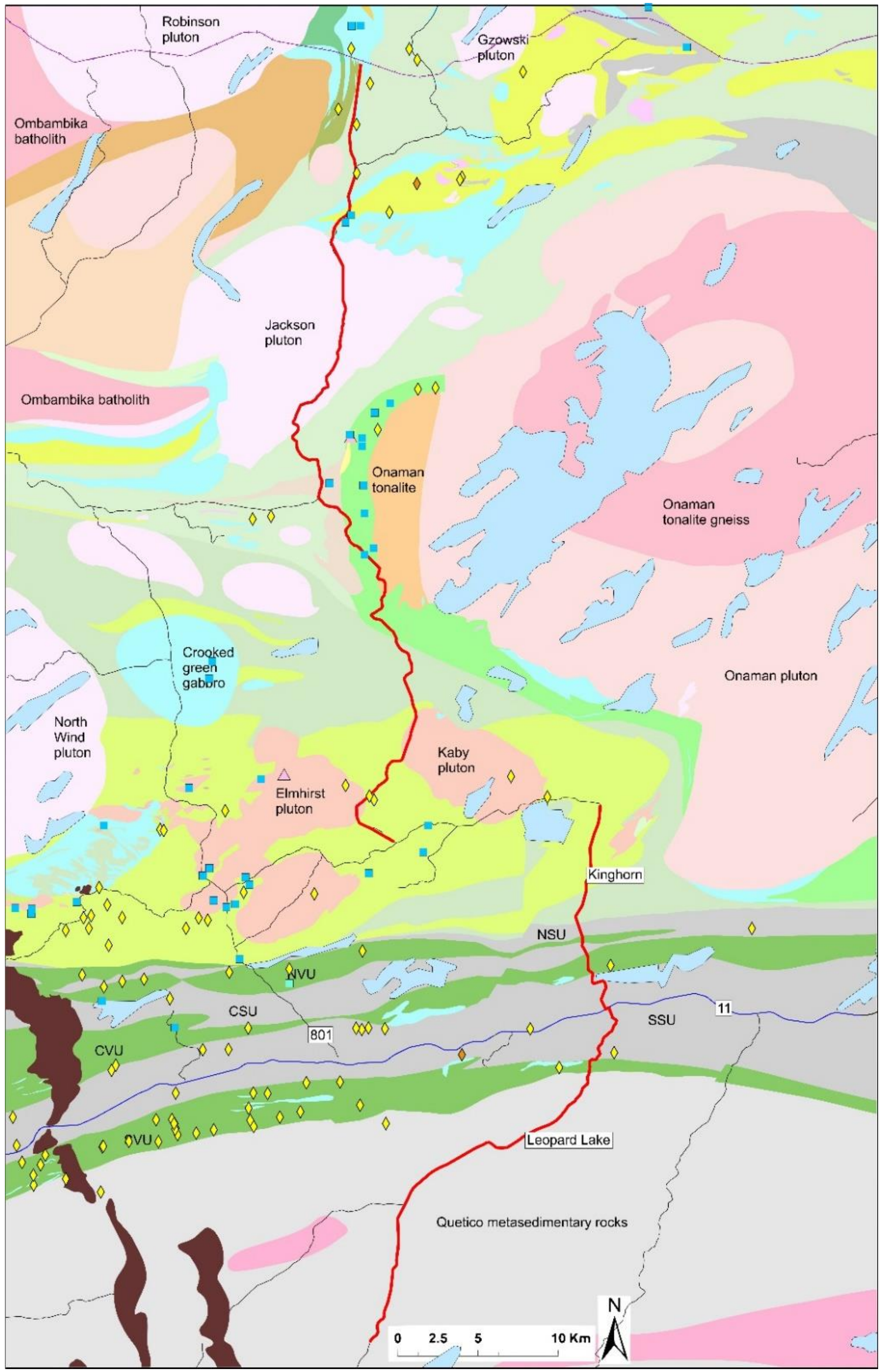
METAL EARTH

Geraldton-Onaman transect

- It has a multitude of mineral showings:
  - ◆ Au; Au-Zn; Au-Cu; Au-Sb
  - ◆ Ag
  - ■ Base metals: Cu; Zn; Zn-Pb; Cu-Zn-Ni; Cu-Zn; Cu-Zn-Pb; Cu-Ni; Cu-Au-Ag; Cu-Au;
  - △ Mo
  - □ Ni
- It lacks significant mineral deposits aside from Hardrock 6.4Moz Au
- Poorly metal-endowed transect
- Its geological history to be compared with that of well endowed transects



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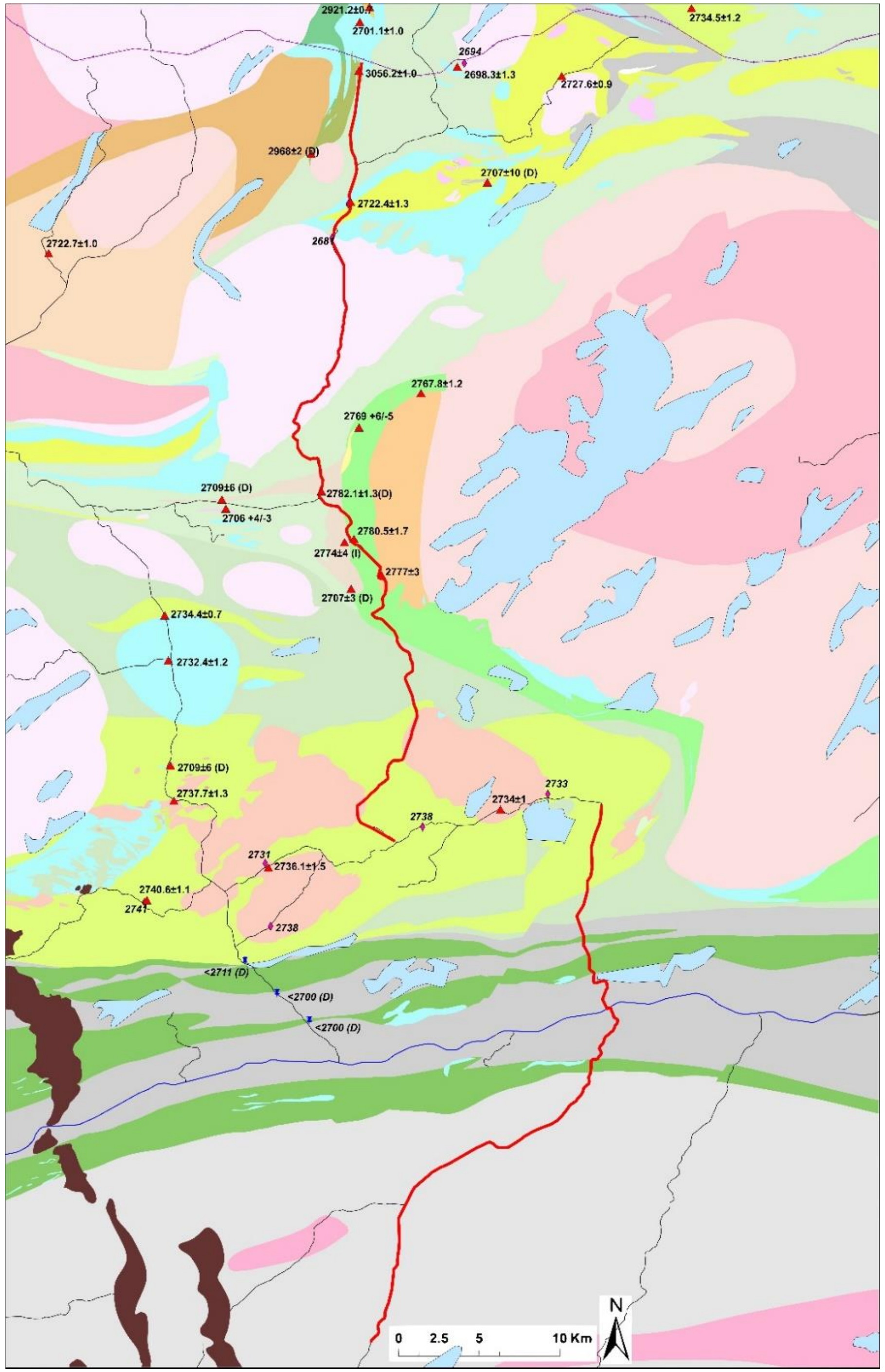
METAL EARTH

Geraldton-Onaman transect

- Largely understudied area due to the lack of mineral deposits



U-Pb ages

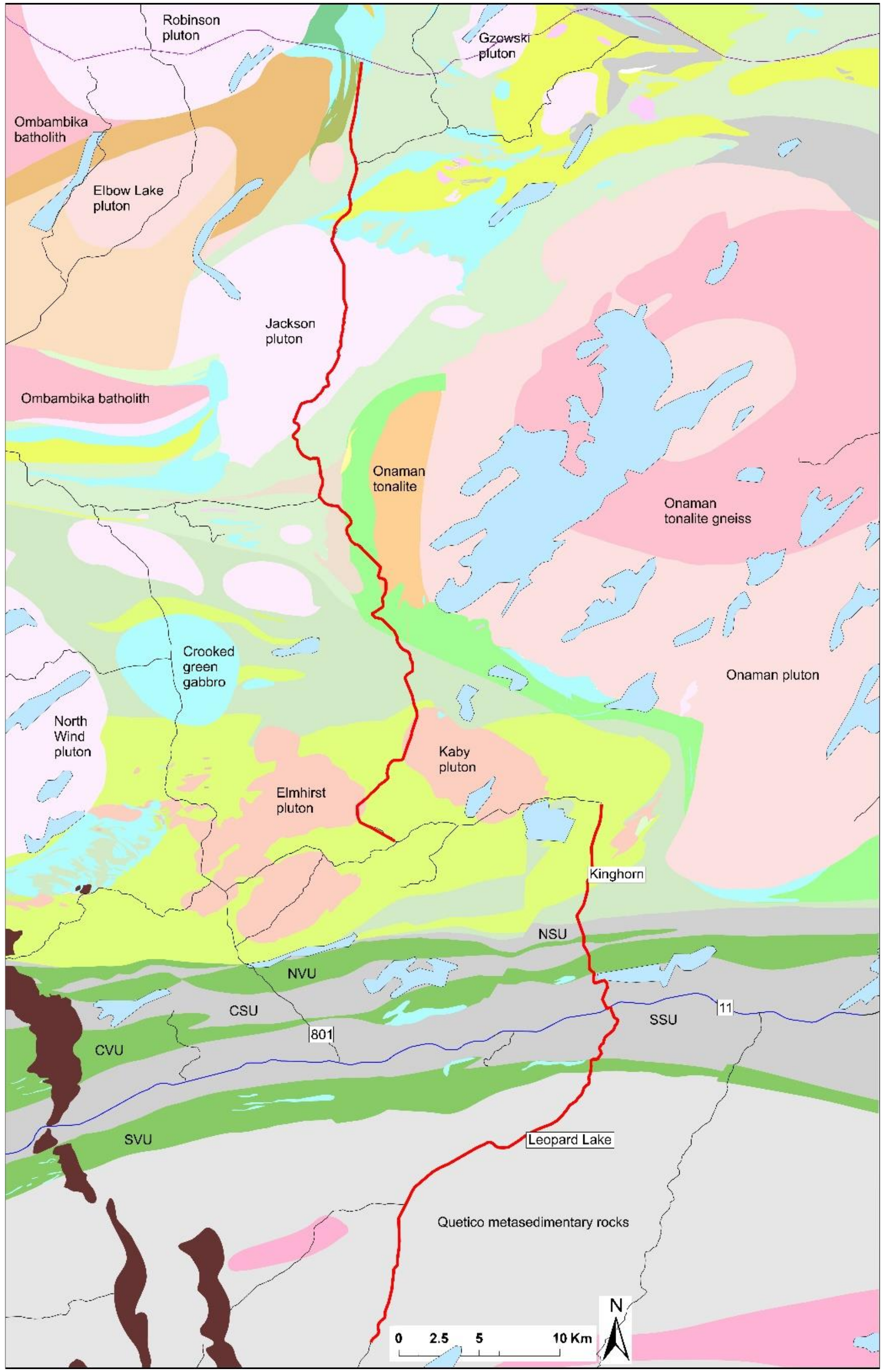
- ▲ Bjorkman & Lu in Bjorkman (2017)
- ◆ Lemkow et al., 2005 – MRD187 and references therein
- Tóth (2018)

Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005;

METAL EARTH

Research problems

- What is the origin of the different lithological assemblages in the eastern Wabigoon?
- What geodynamic processes are responsible for the development of the area?
- How did these processes change in time that would explain the different character of the volcanic assemblages?
  - Onaman vs Willett vs Elmhirst-Rickaby
- What tectonic processes did the area undergo?
- How does the structural evolution of the Onaman-Tashota greenstone belt relate to that of the BGB?
- What type of metamorphic events took place?
- What are the P-T-t conditions of these metamorphic events?
- What mineralization styles are present?
- How do the different mineralization styles relate to the volcanic and structural evolution?
- What are the contact relationship between the Mesoarchean and Neoarchean assemblages?



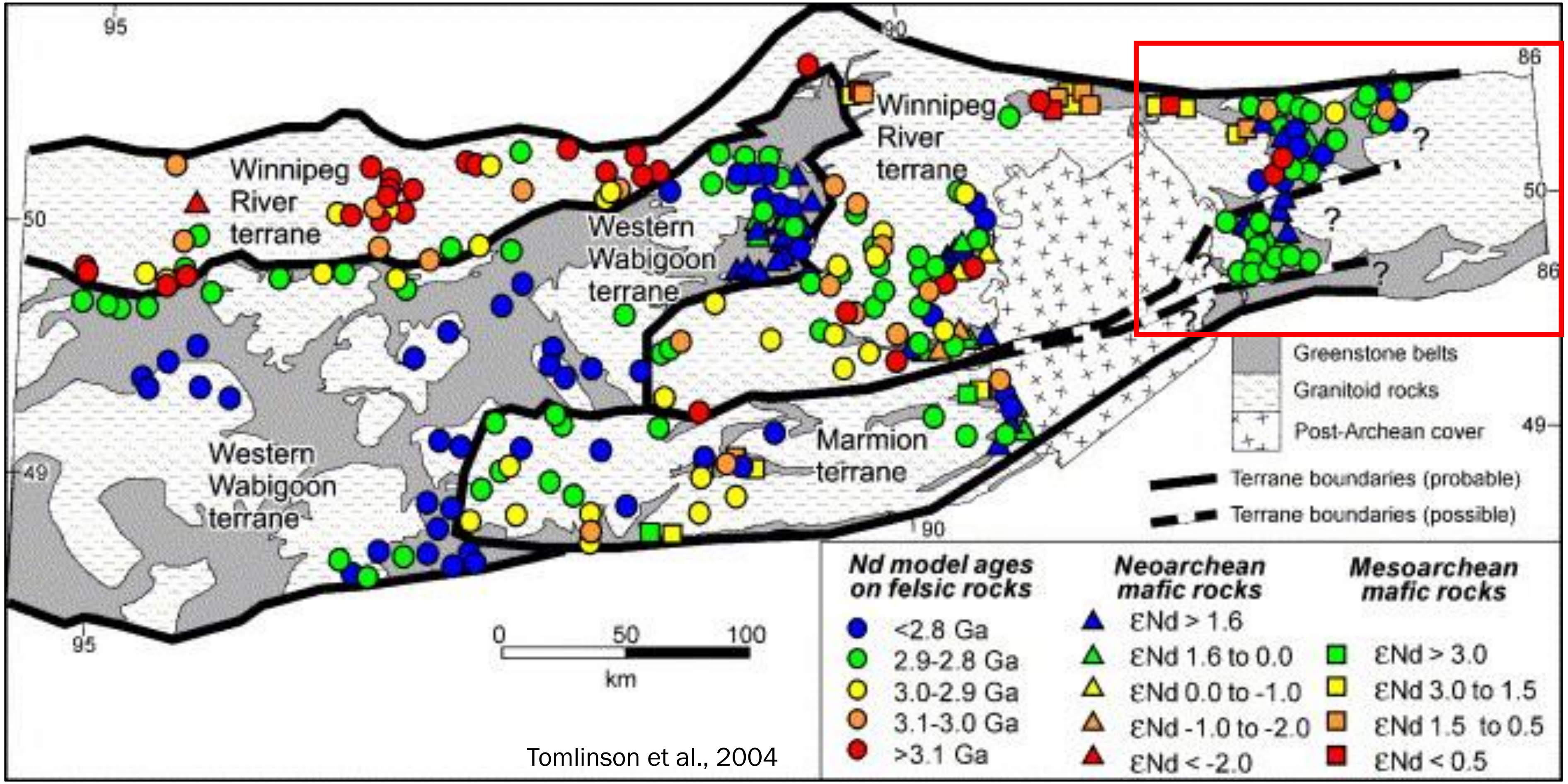
Terranes in the Wabigoon subprovince

Winnipeg River terrane

- Dominated by Neoarchean and minor Mesoarchean granitoids (<3.17 Ga)
- Nd model ages => crust existed at 3.5-3.4 Ga
- Continuation in the eastern Wabigoon is uncertain

Marmion terrane

- 3.0 Ga juvenile Marmion batholith
- younger Meso- and Neoarchean crust reworking Marmion-aged crust
- Continuation in the eastern Wabigoon is uncertain
  - Neoarchean rocks exposed with 2.9-2.8 Ga Nd model ages – recycled 3.0 Ga Marmion crust?



Tomlinson et al., 2004

Remaining question: How do these terranes extend into the study area?

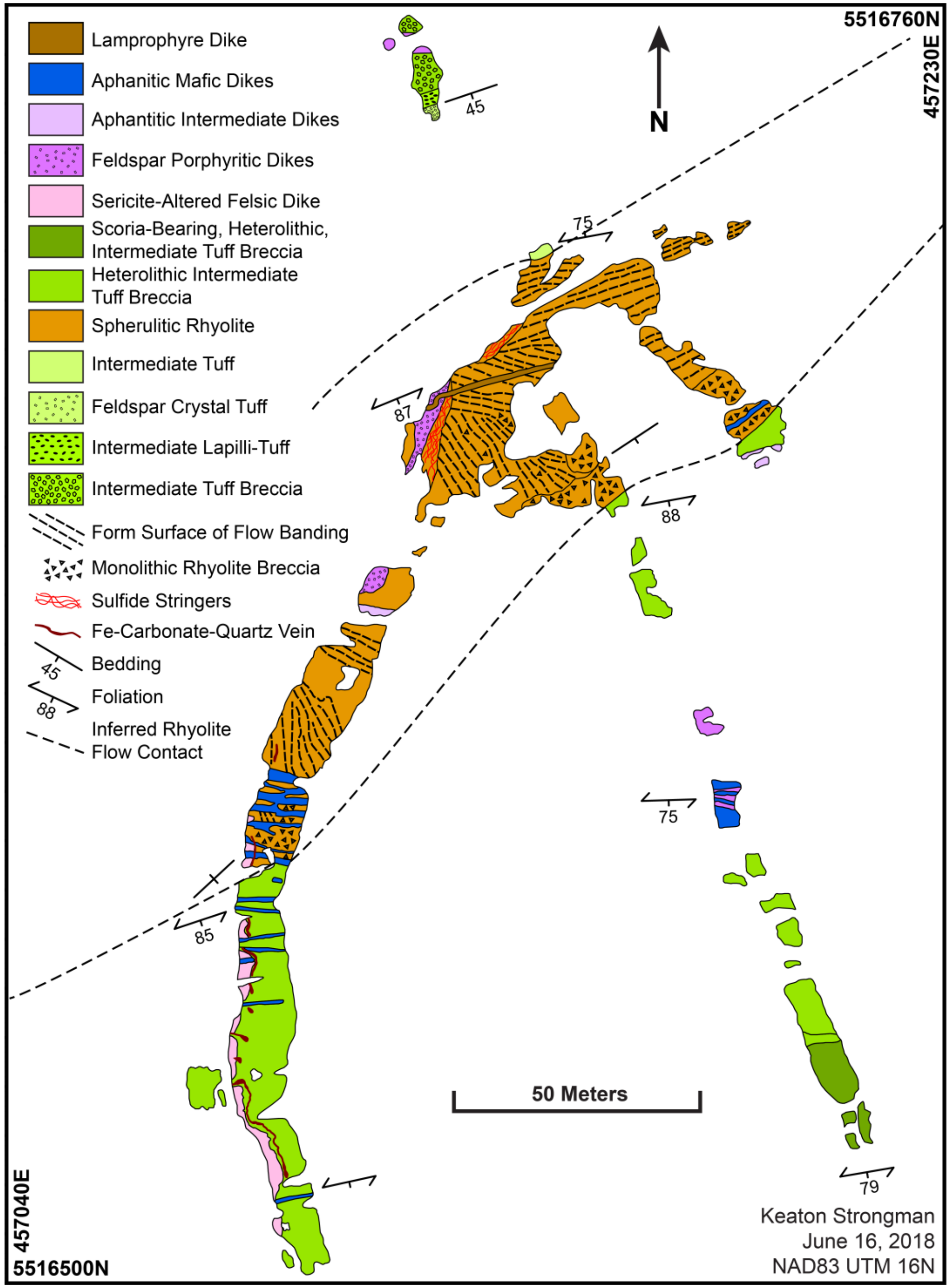
Preliminary results

PhD student – Keaton Strongman

- Metallogeny, volcanic stratigraphy, and geodynamic evolution of Onaman-Tashota greenstone belt with focus on magmatic-hydrothermal mineralization styles

Progress to date

- 1 full field season mapping



Preliminary results

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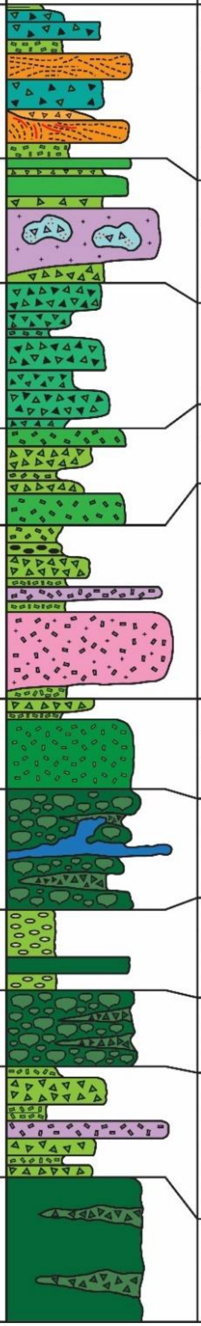
- Selected samples – geochemistry, thin sections complete
- Petrography and geochronology in progress
- Preliminary interpretation of the Elmhirst-Rickaby assemblage



Stratigraphic Unit		Lithostratigraphy	Physical Volcanic Features	Fragmentation Processes	Emplacement Processes
Rickaby formation	Kenty member		Spherulitic, flow-banded rhyolite w/ blocky flow top breccias. Feldspar-crystal lapilli tuffs with wispy chloritized lapilli. Heterolithic intermediate tuff breccia with sub-rounded fragments.	Autoclastic flow-related fragmentation. Weathering and erosion coupled with pyroclastic liberation of crystals.	Possibly sub-aerial rhyolite flows. Pyroclastic flow emplacement of crystal stuffs. Subaerial edifice collapse-related mass flows for the breccia.
	Miner Lake member		Massive intermediate flows and monolithic block-rich intermediate tuff breccia. Intruded by diorite with in-situ hydrothermal breccia.	Flow-front collapse and autoclastic fragmentation. In-situ hydrothermal brecciation.	Flow-front collapse-related block and ash flows with possible phreato-magmatic-related pyroclastic flows.
	Pifher Lake member		Heterolithic massive bedded intermediate tuff breccia, lapilli-tuff, and feldspar crystal tuff with scoured contacts.	Pyroclastic (possibly phreatomagmatic) fragmentarion. Minimal reworking.	Eruption fed mass flow deposits with abundant accessory fragments.
	McConnel member		Feldspar-phyric intermediate flows with monolithic tuff breccia and lapilli tuff.	Flow-front collapse and autoclastic fragmentation.	Intermediate flows with flow-collapse-related block and ash flows.
	Alma Lake member		Feldspar-pyroxene (now chlorite) crystal tuffs. Wispy, chloritised lapilli-bearing lapilli tuff. Monolithic intermediate tuff breccia with minor mafic fragments. Plagioclase-porphyritic diorite and granodiorite intrusions.	Pyroclastic fragmentation (possibly phreatomagmatic). Gravity-oversteepening. Possibly the two are related.	Eruption-fed and syn-eruptive resedimented mass flow units with abudant syn-volcanic intrusions mostly as sills.
Castlewood formation	Calvin Lake member		Feldspar-phyric mafic flows with monolithic intermediate tuff breccia and feldspar-crystal tuffs.	Gravity-collapse and possibly related phreatomagmatic fragmentation.	Gravity-collapse-related mass flows with possibly primary input. Massive lava flows.
	Fairwell member		Pillowed mafic flows with hyaloclastite-rich flow top breccia and peperitic mafic sills.	Quench and autoclastic fragmentation. Peperitic fragmentation.	Subaqueous lava flows and syn-volcanic mafic sills.
	Eureka member		Monolithic intermediate silicifed pumice-bearing lapilli tuff interlayered with massive mafic flows.	Magmatic pyroclastic fragmentation.	Eruption-fed pyroclastic flow deposits and mafic lava flows.
	Caslte-wood member		Pillowed mafic flows with hyaloclastite-rich flow top breccias.	Quench and autoclastic fragmentation.	Subaqueous lava flows.
	Crooked Creek member		Feldspar crystal tuff and compositionally monolithic intermediate vitric lapilli-bearing lapilli tuff to tuff breccia. Feldspar phyric dioritic intrusions.	Pyroclastic fragmentation (either magmatic or phreatomagmatic).	Eruption-fed subaqeuous mass flow deposits with possible syn-eruptive reworking.
	Martin Creek member		Massive mafic flows with hyaloclastite-rich flow top breccias.	Quench and autoclastic fragmentation.	Subaqueous, high effusivity mafic lava flows

Preliminary results

PhD student – Keaton Strongman

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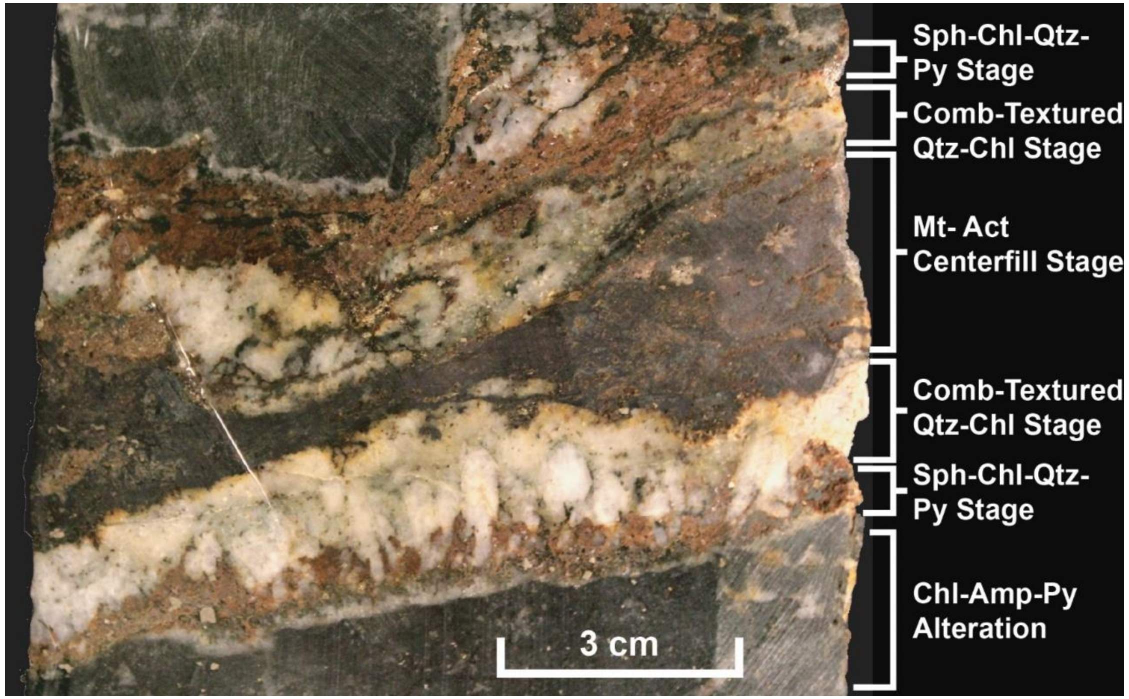
Progress to date

- 1 full field season mapping
- Selected samples – geochemistry, thin sections complete
- Petrography and geochronology in progress
- Preliminary interpretation of the Elmhirst-Rickaby assemblage
- Preliminary assessment of mineralization styles in the Elmhirst-Rickaby assemblage

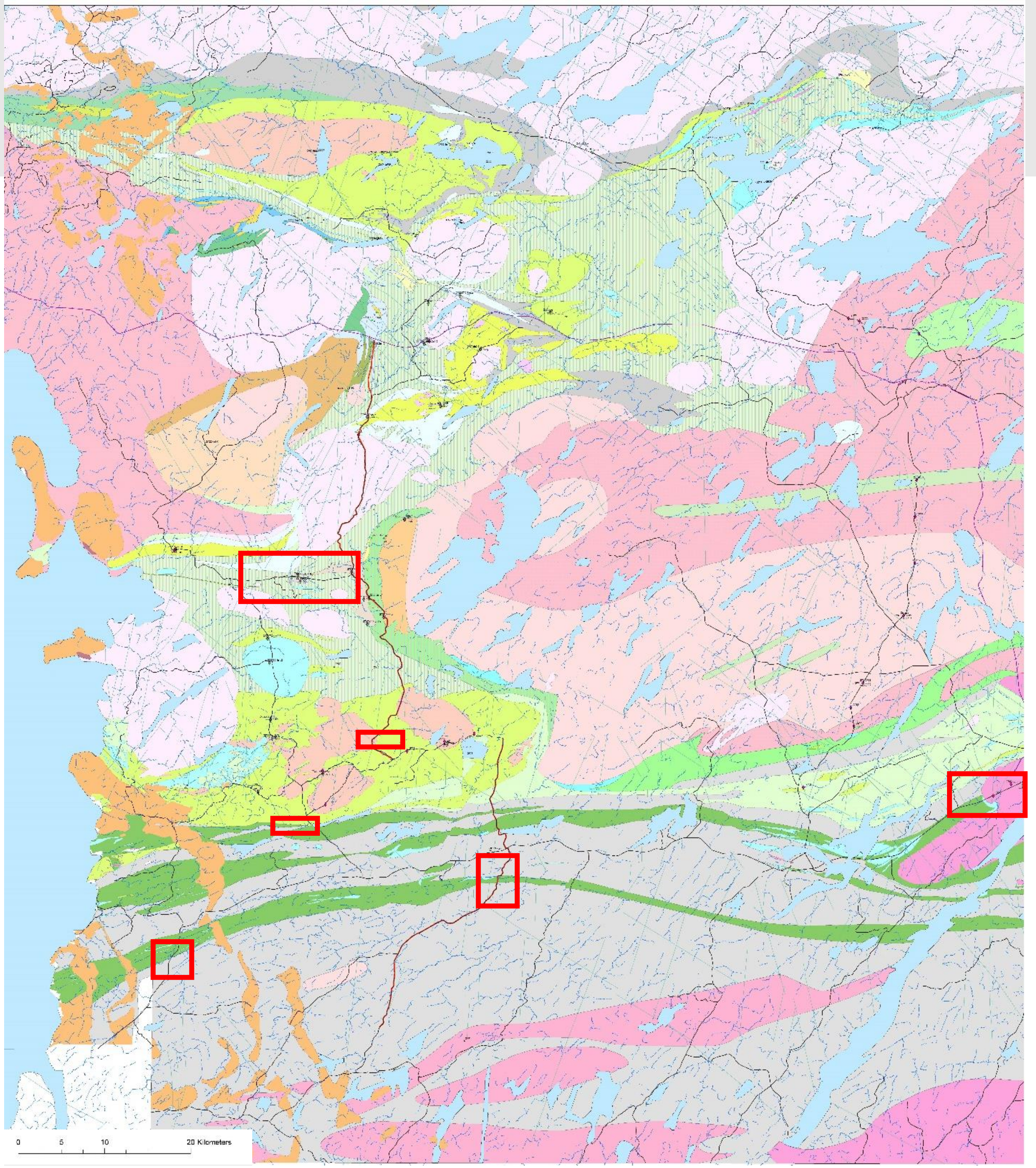


Property Name	Mineralisation Style	Alteration Association	Metal Association	Interpreted Age	Interpreted Model
Ishkoday	Qtz-Mt-Sp-Act-Chl-Py veins	Vein-related Amp-Chl-Ser	Zn-Pb-Cu-Ag-Au-Te-Cs-Cd-W-Sn-Hg-Se	Pre-D1 (Older than ~2700 Ma)	Epithermal to sub-epithermal base-metal veins
Kenty	Py-Sp-Ccp-Gn stringers	Pervasive Ser	Zn-Pb-Cu-Ag-W	Syn-volcanic (~2740 Ma)	VMS or epithermal
Miner Lake	Py-Ccp-Au in hydrothermal breccia	Pervasive Ser-He-Chl-Kfsp	Au-Ag-Cu	Unknown	Intrusion related (Porphyry?)
Sturgeon River Mine	Qtz-Ank-Au veins	Vein-related Fe-Carb	Au-Ag	Post-D1	Orogenic gold
Golden Mile	Qtz-Ank-Au veins	Vein-related Fe-Carb	Au-Ag-Cu	Post-D1	Orogenic gold

Preliminary results

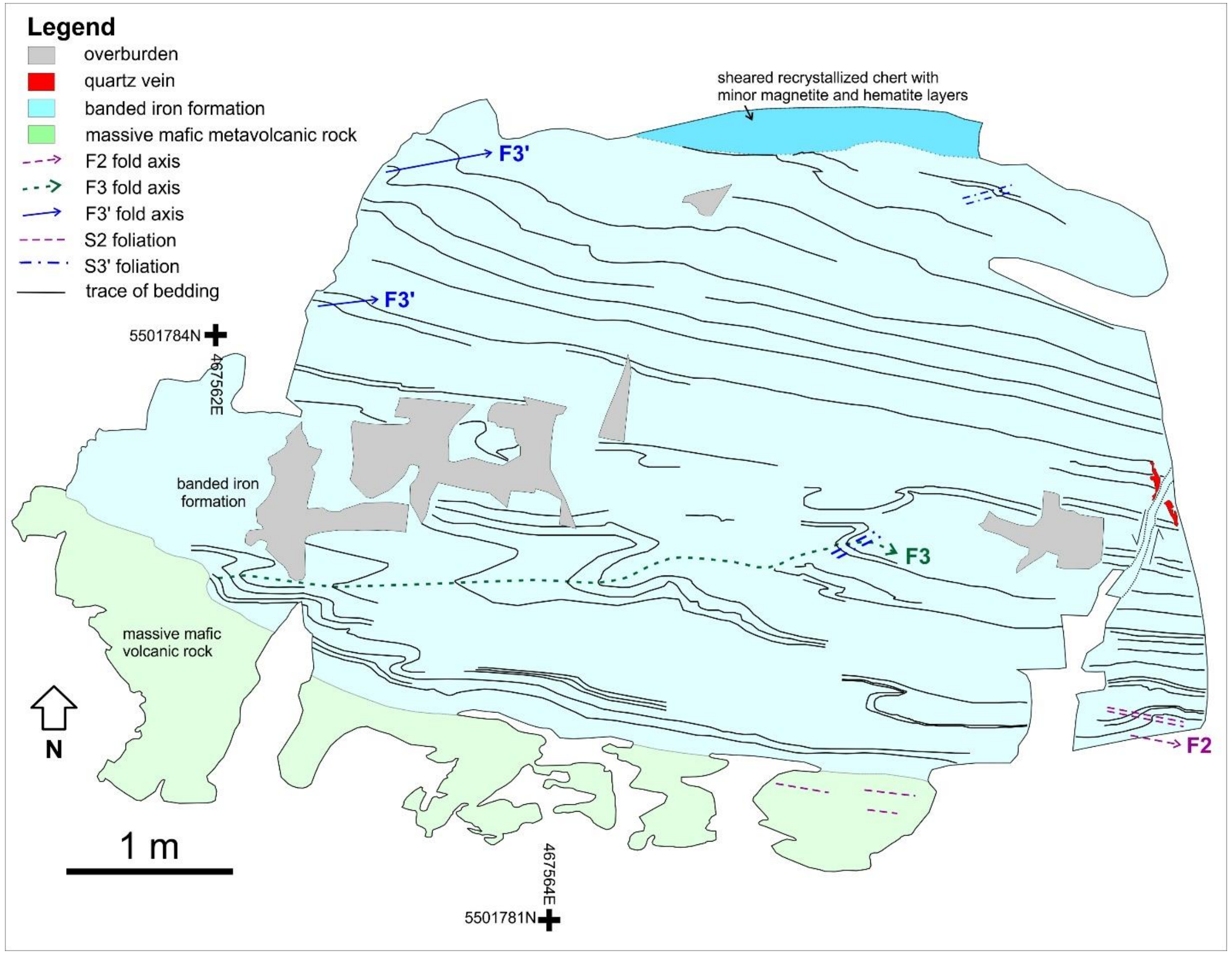
Completed tasks:

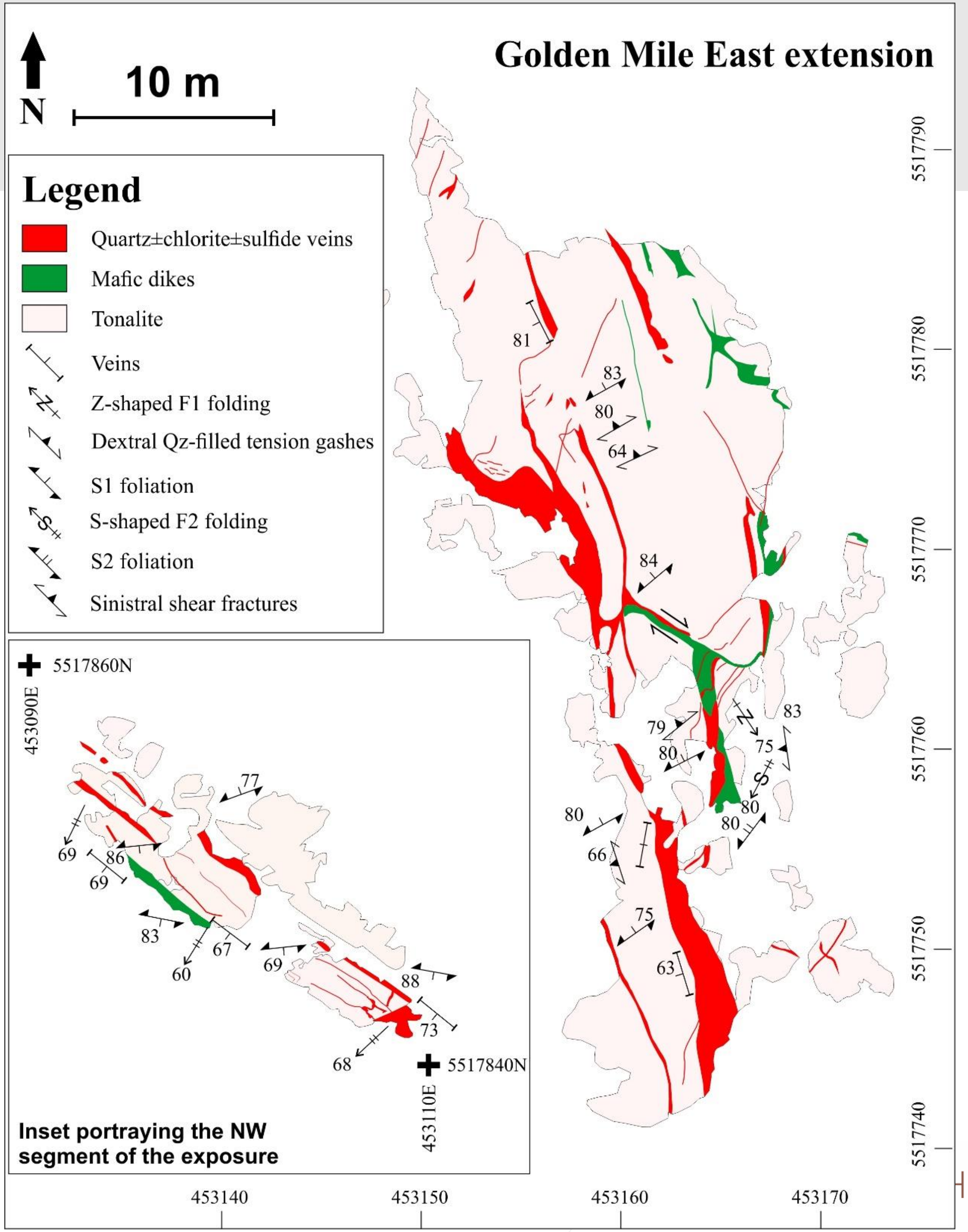
- First field season – Summary of Field Work
  - Local FN youth engagement – 1 day
- Transect mapping with focus on specific questions: Characterization of the structural evolution of the
  - boundary between the BGB and Quetico,
  - Brookbank Au property,
  - Croll Lake stock
  - Golden Mile East extension
  - Humboldt Bay deformation zone
- Compilation of a regional scale map to include the entire eastern Wabigoon subprovince
- Geochemical, geochronology samples submitted
- Geochemical data received
- Thin sections for selected samples completed
- Detrital zircon separates received
- TIMS ages started coming in
- Preliminary interpretation of R1 seismic section



Preliminary results

Detailed mapping of the Golden Mile East extension and "Unconformity" outcrop



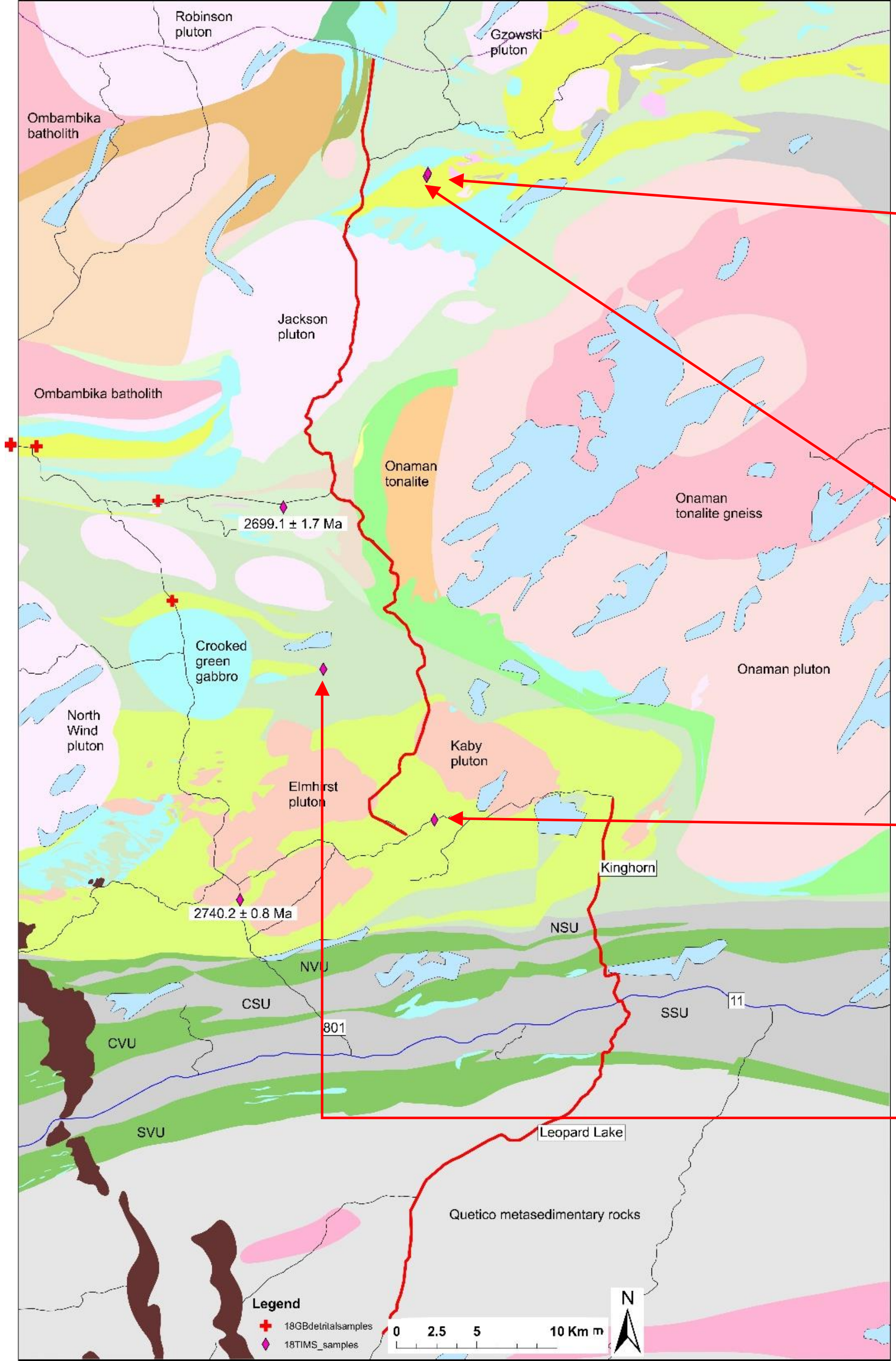


New geochronology

- ♦ 6 samples submitted for TIMS
  - feldspar-quartz porphyry folded in the Humboldt Bay deformation zone – 2699.1±1.7 Ma
  - massive fine grained intermediate (dioritic) intrusion hosting Au-Ag-Cu-Zn-bearing veins – 2740.2±0.8 Ma

- ✚ 5 samples prepared for detrital zircon geochronology
  - mineral separates prepared

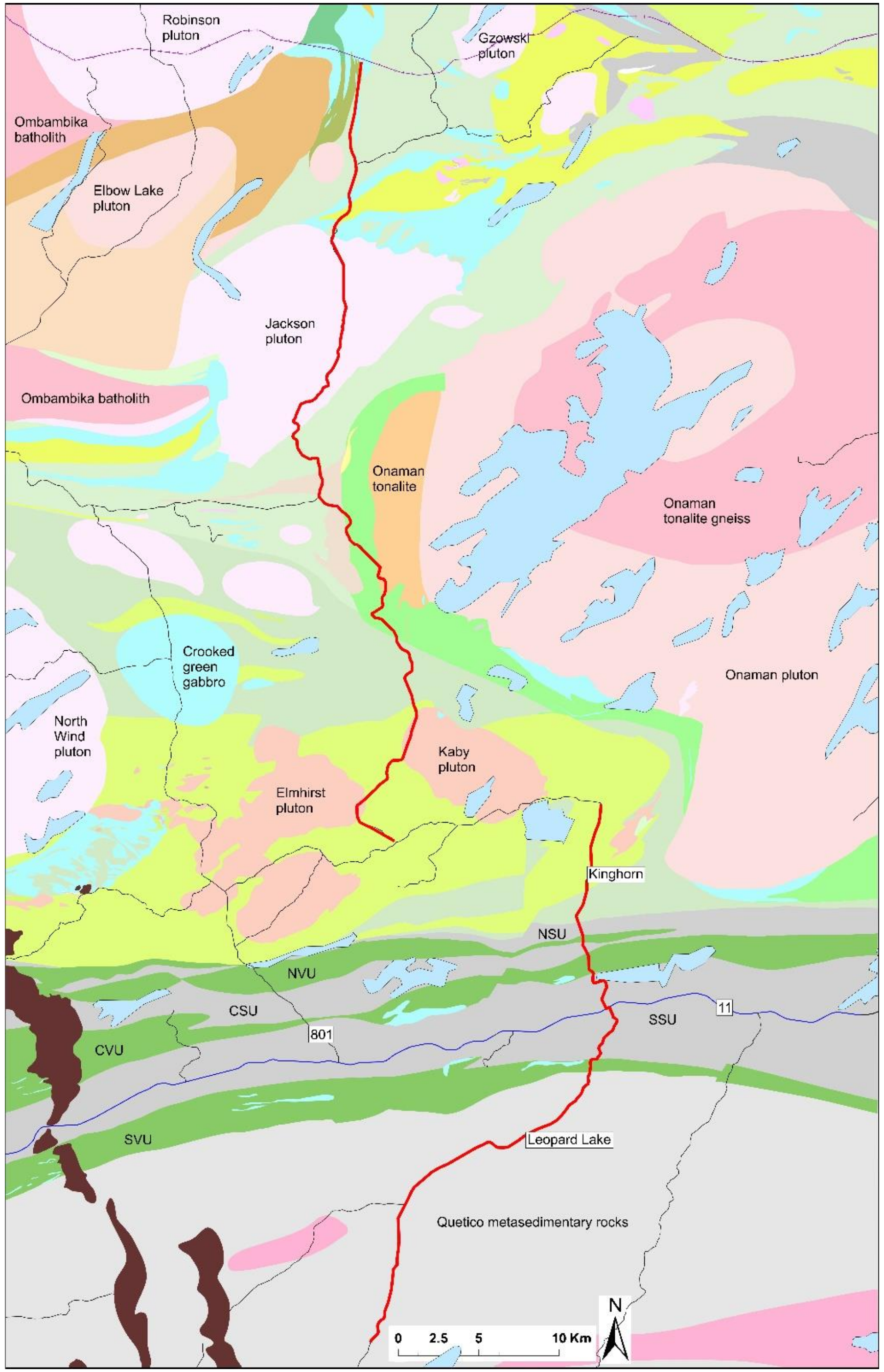
Compiled from Stott et al., 2002; Hart et al., 2002a,b,c; Lemkow et al., 2005

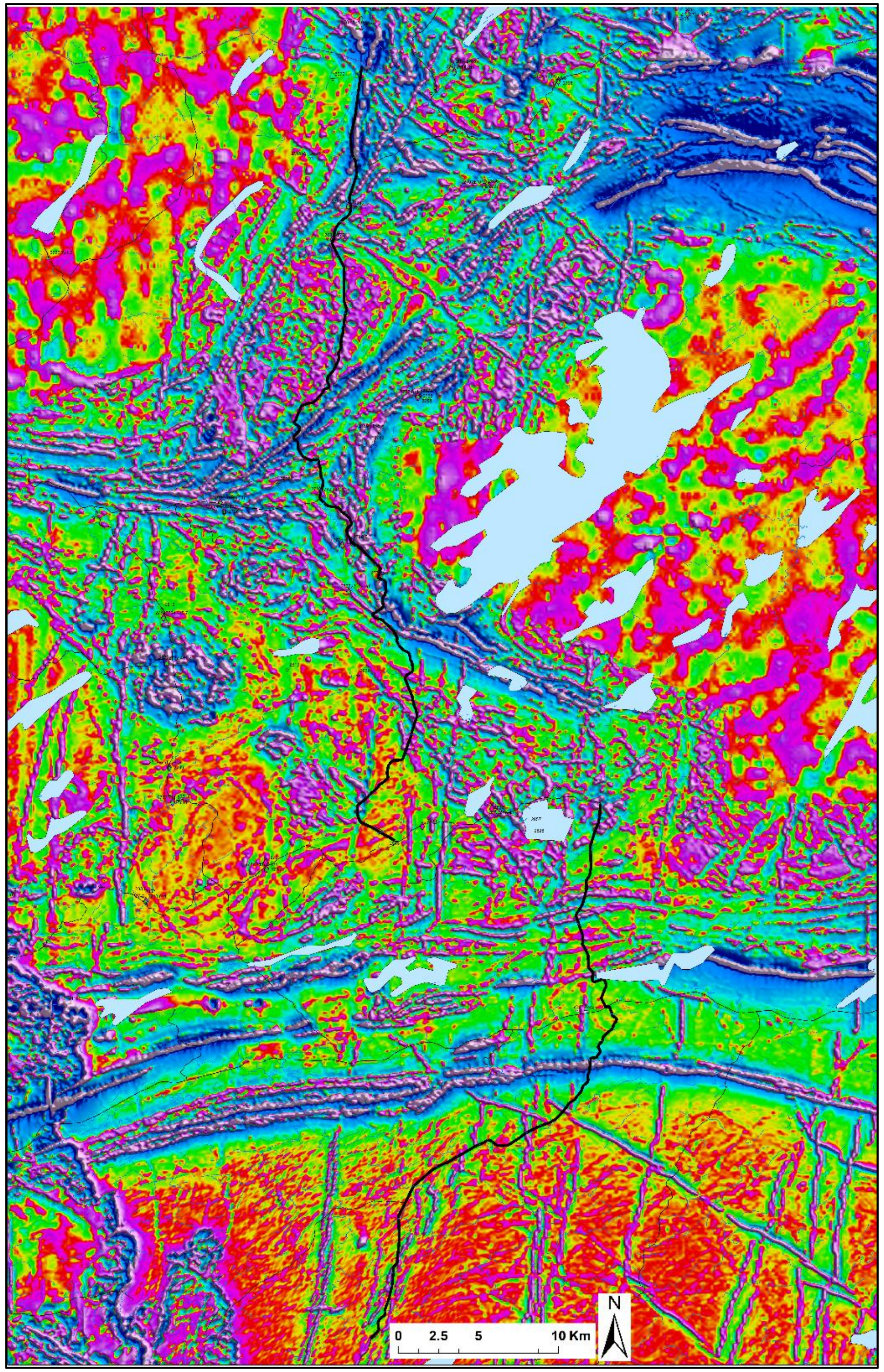


Quartz-phyric rhyolite	**Metcalfe-Venus assemblage** → Maximum age of the mineralization at the Vent, that is a sulfide mineralization with advanced argillic alteration – interpreted to be synvolcanic → approximate age of the mineralization
Fine grained mafic dike	**Metcalfe-Venus assemblage** Contains local S_1 and is folded by F_2 fold → Minimum age of D_1 → Maximum age of D_2 Dike cuts sulfide mineralization Is cut by quartz veins (mineralized?) → Minimum age for sulfide mineralization → Maximum age for subsequent quartz veining
Flow-banded, spherulitic rhyolite	**Elmhirst-Rickaby assemblage** → Maximum age of Zn-Cu-Pb-W sulfide stringer style mineralization at the the Kenty showing, a zone. → Minimum age of the Elmhirst-Rickaby assemblage (a calc-alkaline intermediate complex)
Fine grained mafic flow	**Elmhirst-Rickaby assemblage** • base of the Elmhirst-Rickaby assemblage • overlain by an Archean unusual calc-alkaline intermediate complex → provides maximum age for the Elmhirst-Rickaby assemblage

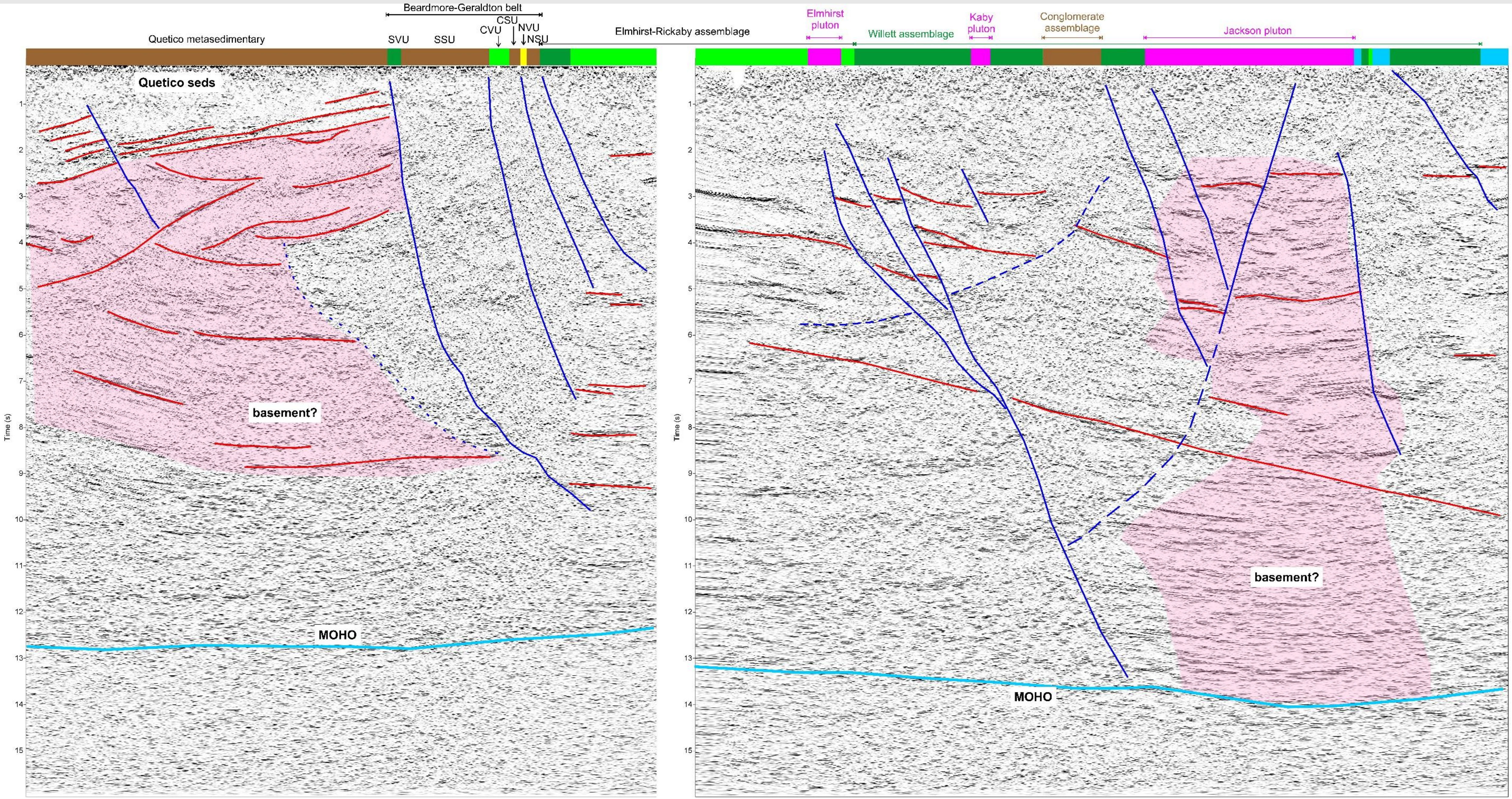
Aeromagnetic image

- Beardmore-Geraldton belt and Onaman-Tashota greenstone belt have higher resolution data than the Quetico metasedimentary subprovince and the large plutons
- Magnetic anomalies well highlight lithologies i.e. banded iron formation, mafic volcanic assemblages and Proterozoic diabase dikes





Preliminary results – R1 seismic section interpretation



Future research plan

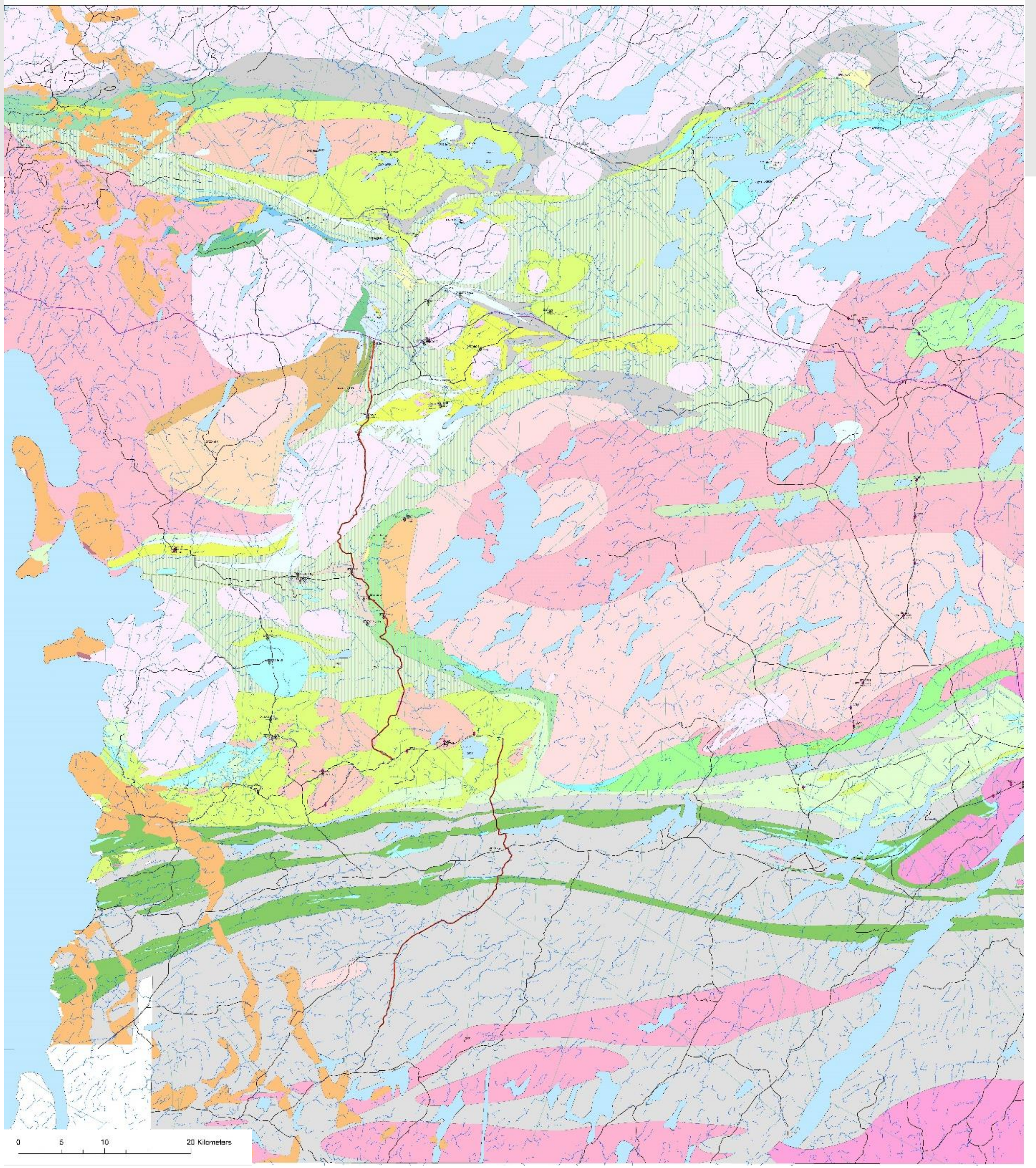
MSc 1 – Anna Haataja (U of Alberta)

Characterization of the metamorphic history of the eastern Wabigoon subprovince

- P-T-t history
- Metamorphic geochronology
- How do the metamorphic events relate to the deformation history?

Potentially: assessment of metamorphic grade change across the subprovince-bounding major faults

- eastern Wabigoon – Quetico subprovince
- eastern Wabigoon – English River subprovince



Future research plan

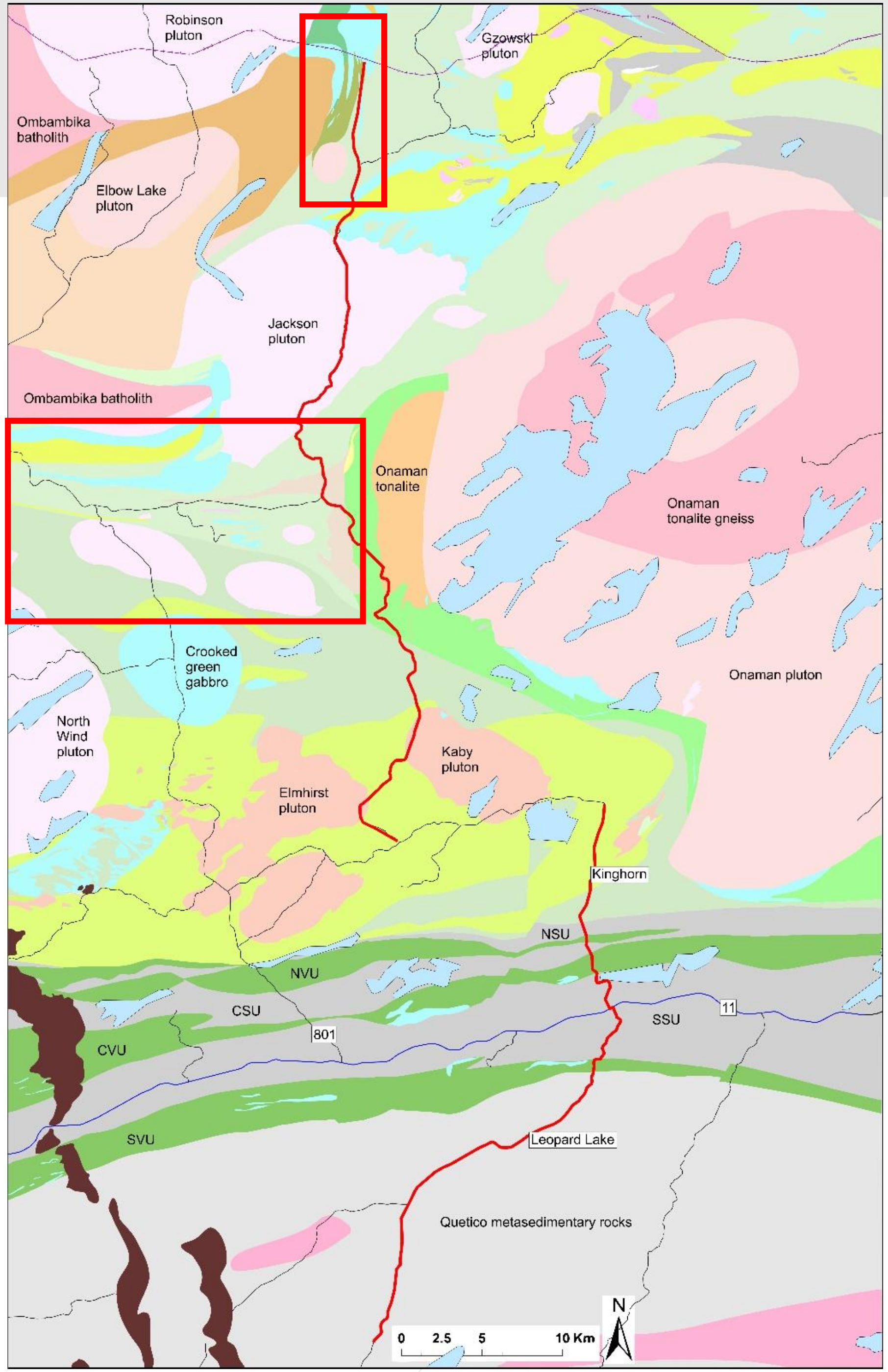
MSc 2 – to be filled

Characterizing the boundary conditions between the Mesoarchean and Neoarchean volcanic assemblages

- Structural evolution of the Tashota shear zone
- Structural control of auriferous veins in the Tashota shear zone – pending upon completion of reconnaissance mapping

Alternatively: structural evolution of the Humboldt Bay deformation zone

  - Proven excellent and accessible exposures



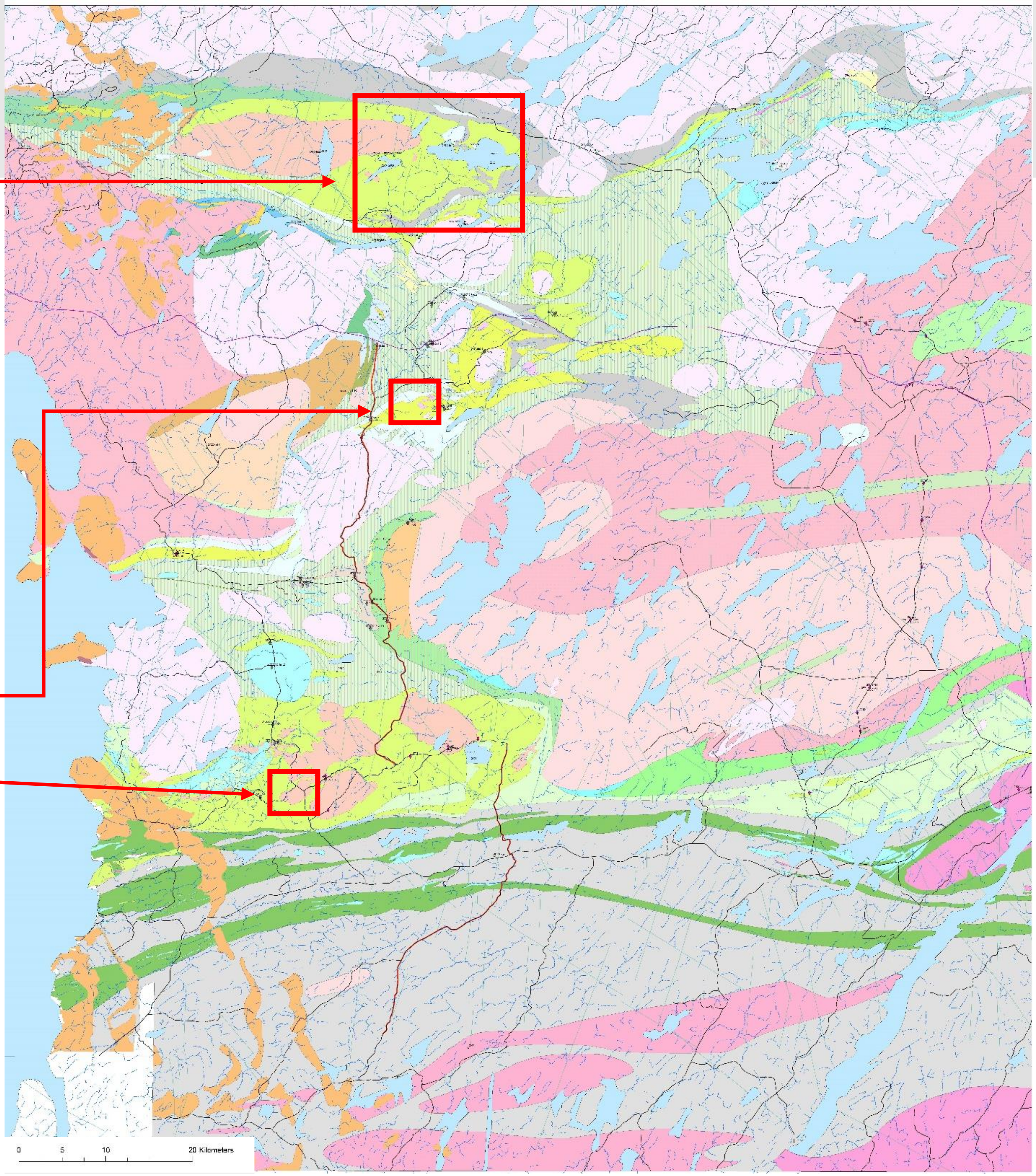
Future research plan

PhD student – Keaton Strongman

Continue working on the stratigraphic reconstruction and metallogeny of the Onaman-Tashota greenstone belt –

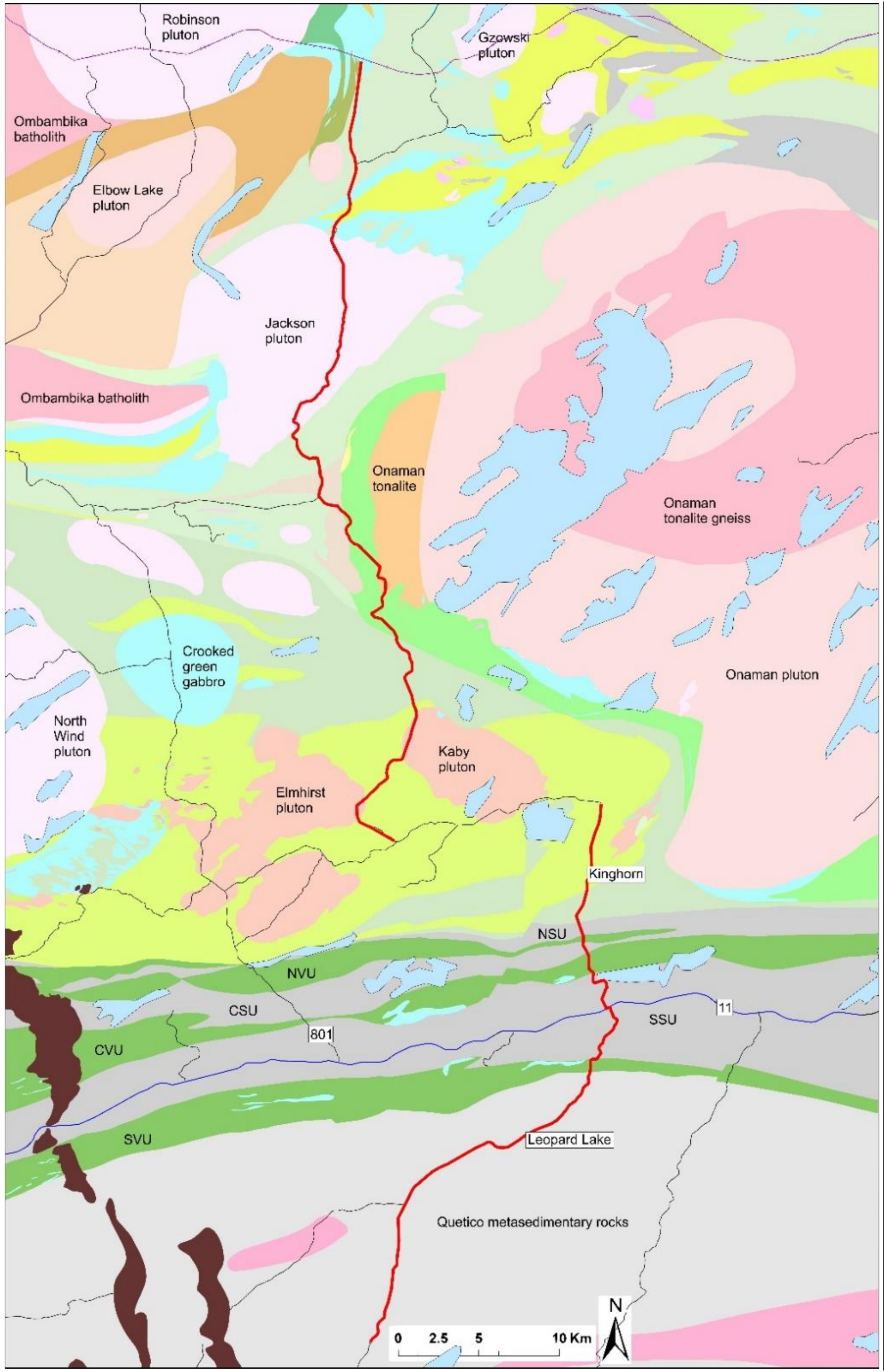
- Marshall Lake,
- Metcalfe-Venus assemblage,
- Ishkoday property (Elmhirst-Rickaby)

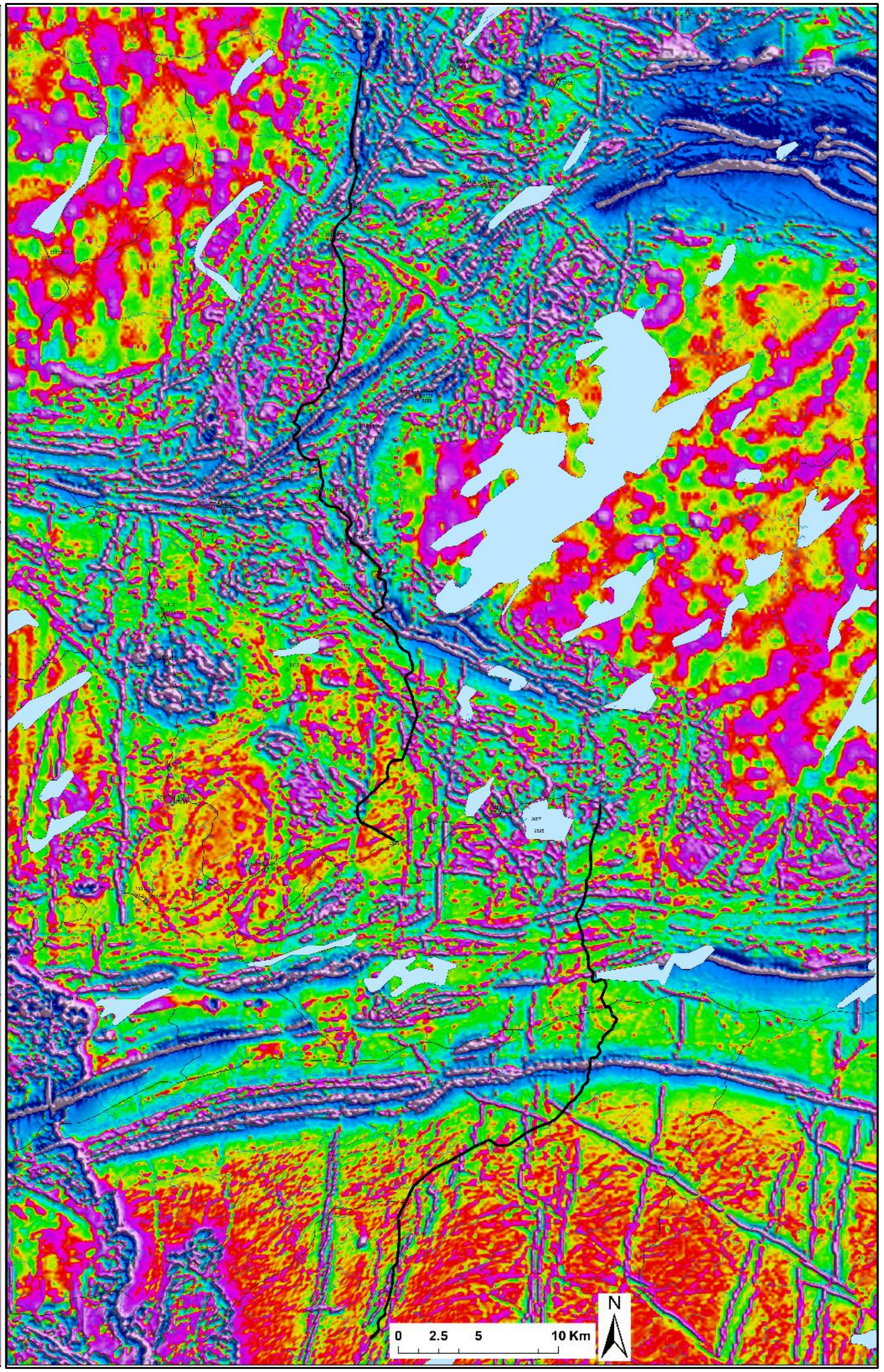
- Transect mapping



Transect data compilation

- Main deliverable for Metal Earth
- Compilation of geology, geochemistry, geochronology, magnetic, seismic, gravity and magnetotelluric data





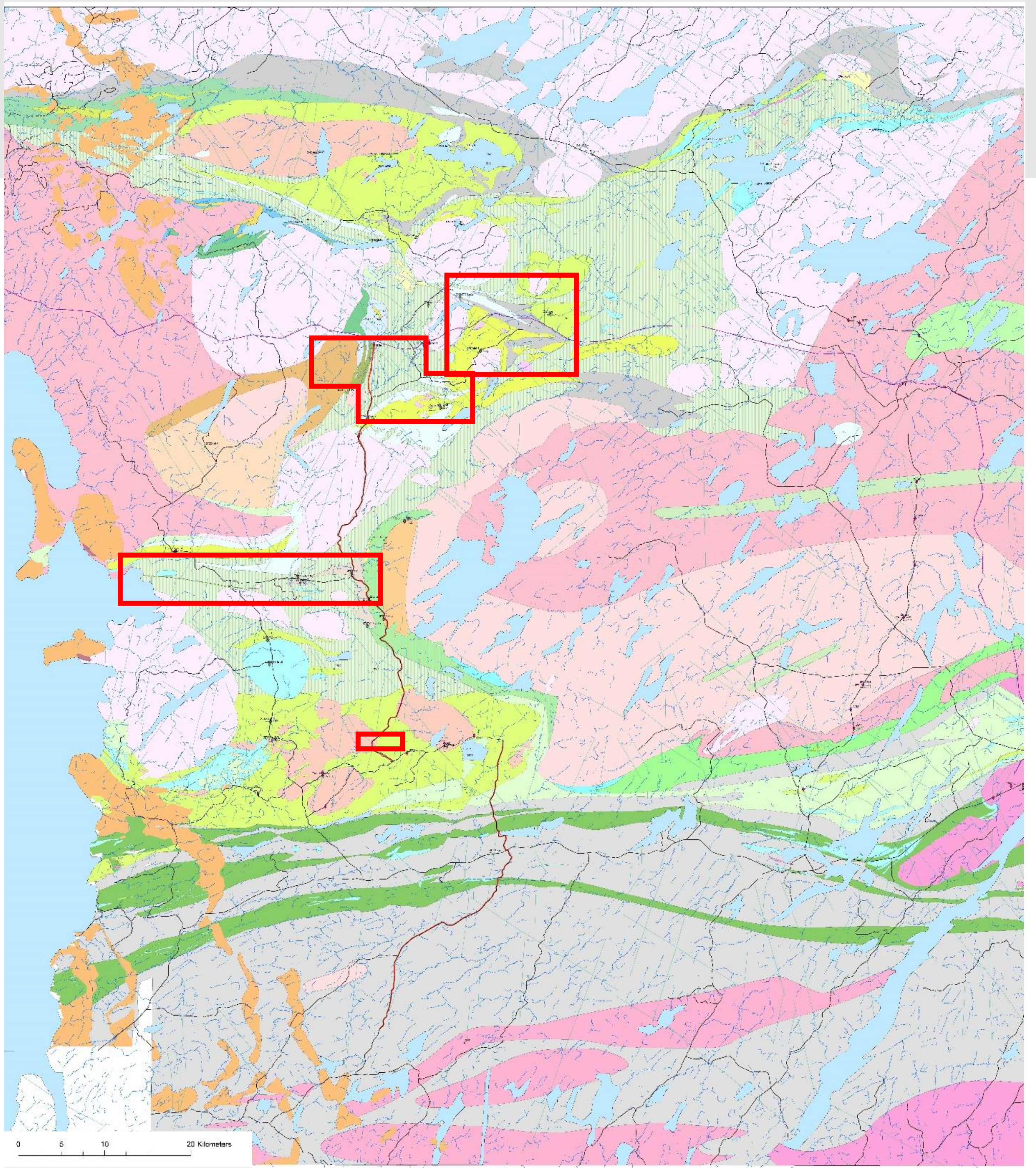
Future research plan

Develop the structural framework for the Onaman-Tashota greenstone belt based on key outcrops

- Humboldt Bay deformation zone
- Tashota shear zone
- Metasedimentary assemblages e.g. Albert-Gledhill are generally good markers

Why do we care?

- Understanding the structural evolution and its complexity is crucial and necessary when attempting a comparison with the Abitibi greenstone belt
- Major structures serve are important conduits for precious and base metal-mineralized hydrothermal fluids
- The longevity of these structures may be responsible for their level of endowment?



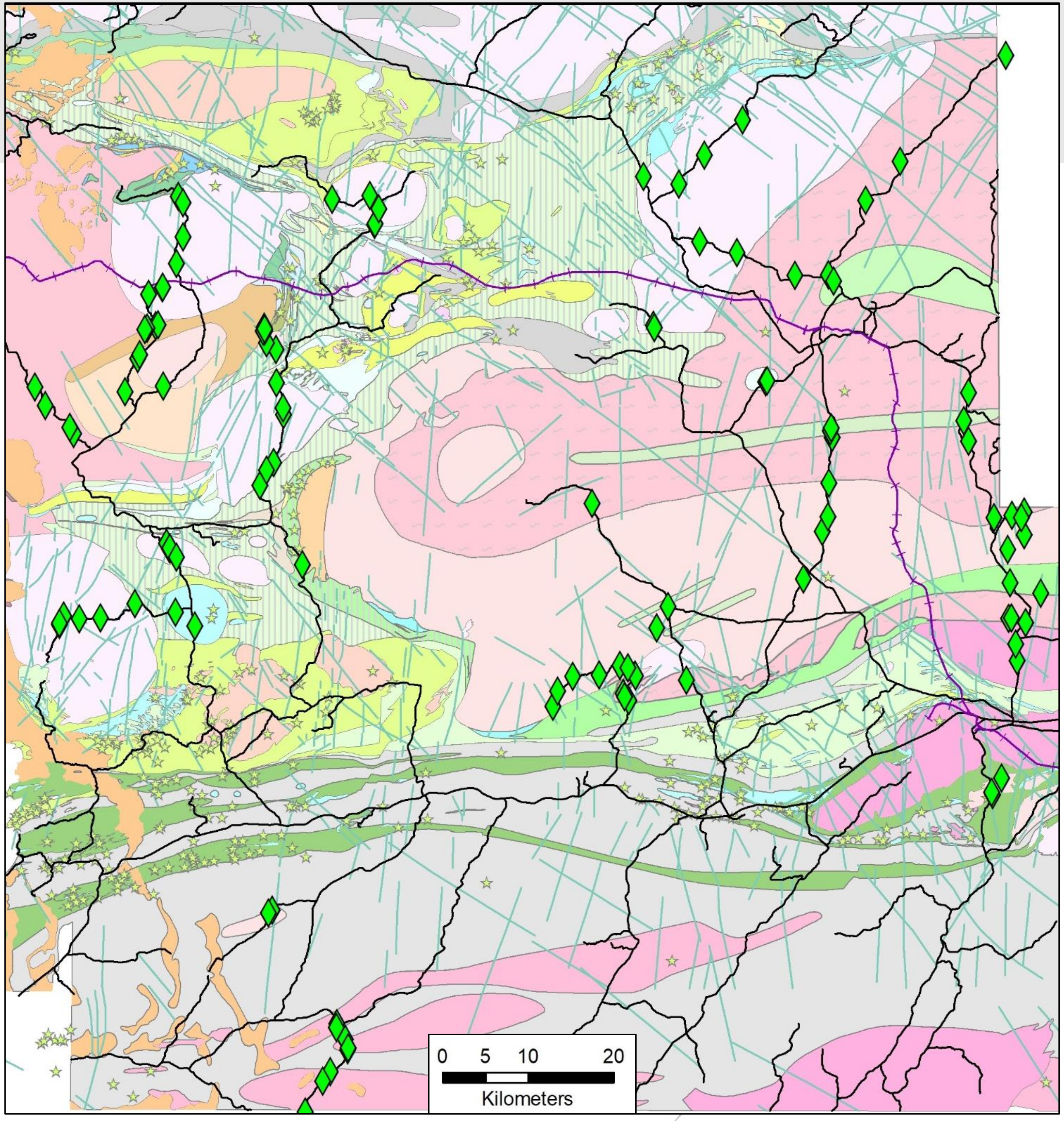
Future research plan

Regional scale sampling program to characterize the plutonic rocks of the eastern Wabigoon

- Petrography
- Structure
- Basic geochemistry
- U-Pb geochemistry on selected samples

Why do we care?

- About 70% of the eastern Wabigoon is underlain by plutons → they must be taken into account when we are building a geodynamic model
- May significantly affect the metamorphic history

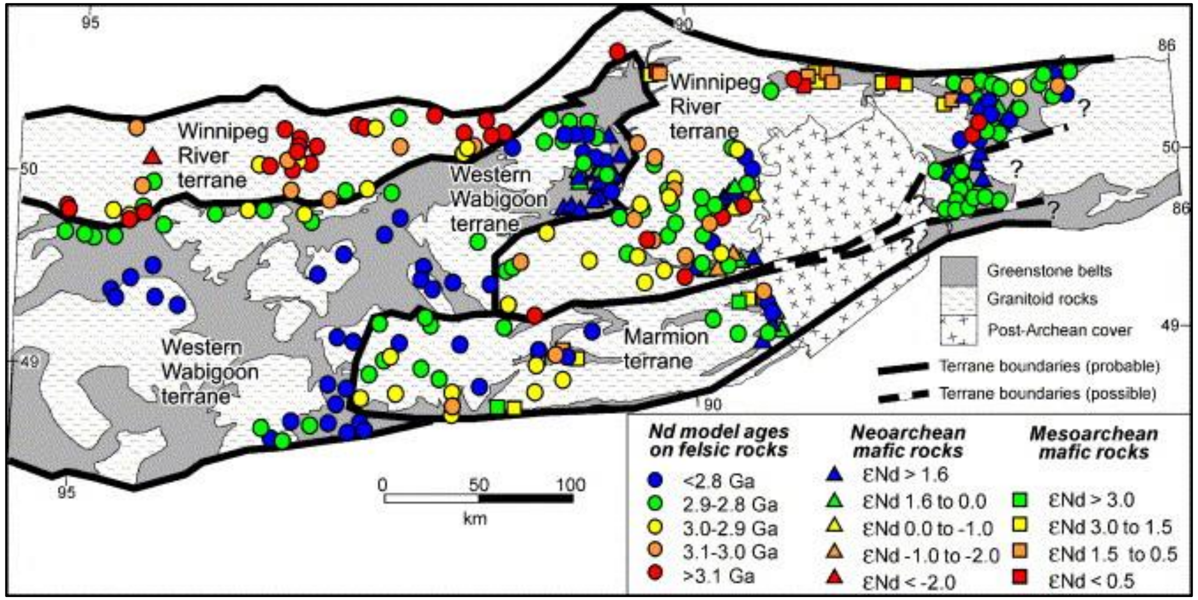


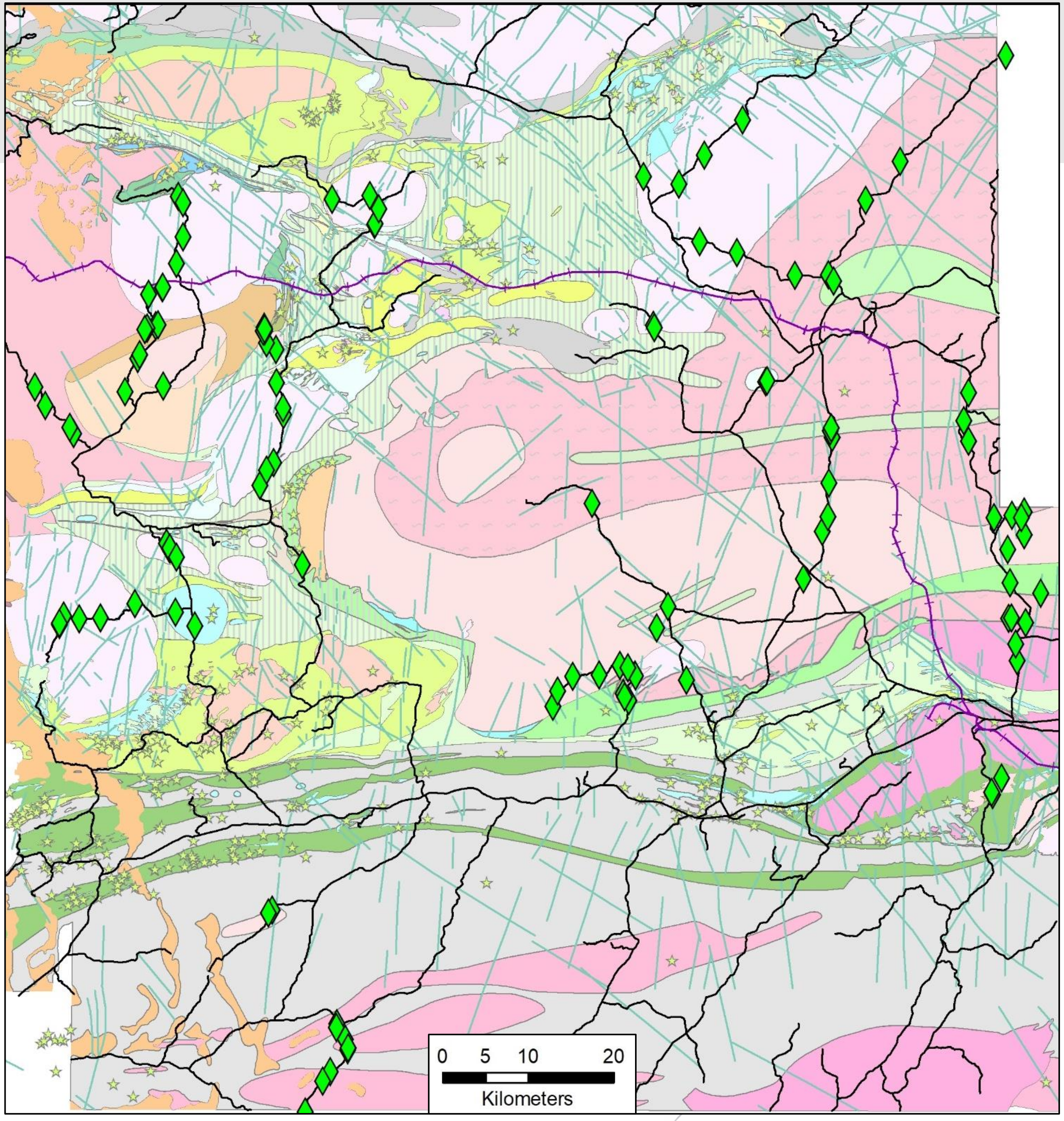
Future research plan

Regional scale sampling program to characterize the plutonic rocks of the eastern Wabigoon

Why do we care?

- They carry information about the evolution of the crust therefore help defining terrane boundaries in the eastern Wabigoon





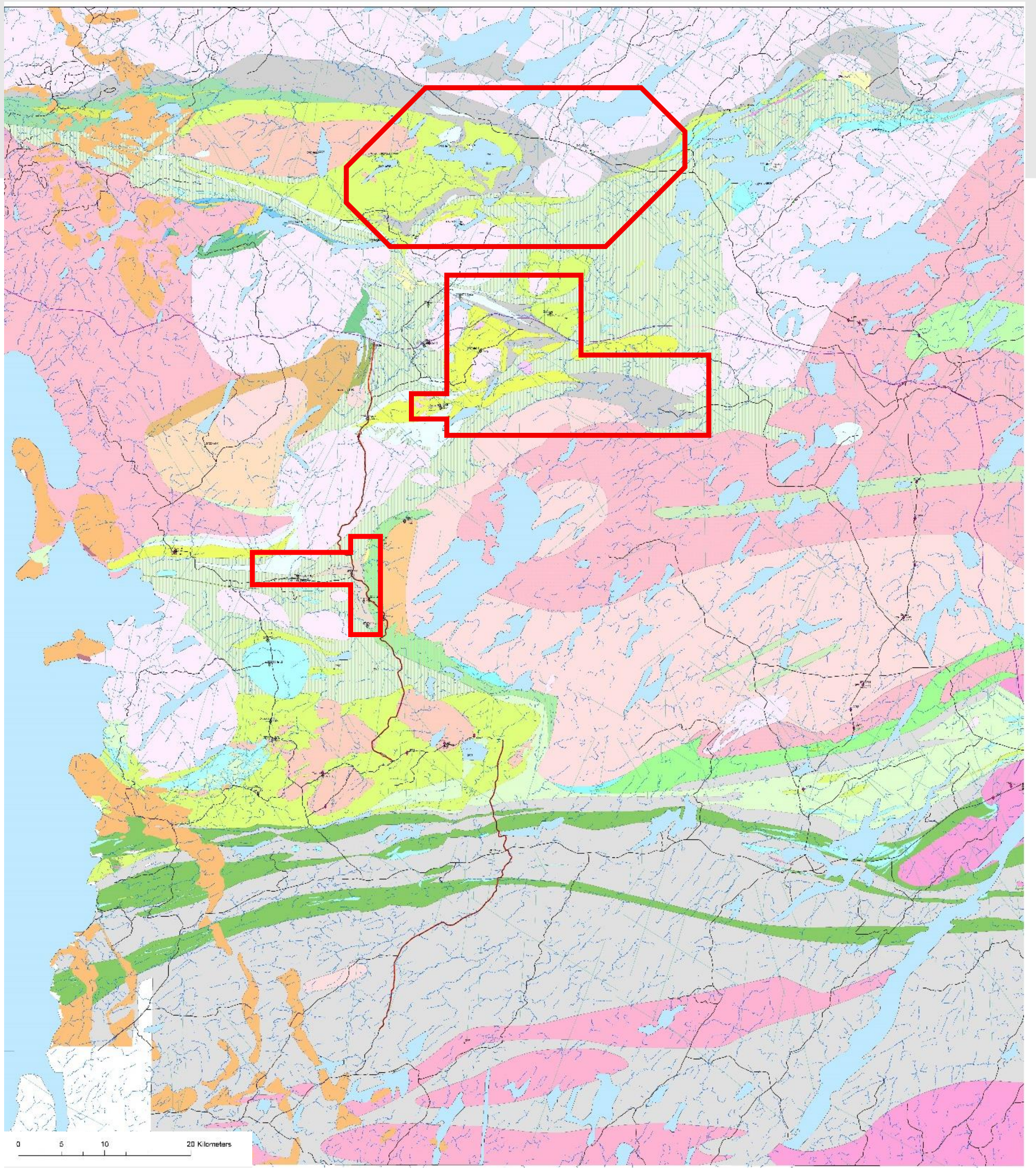
Future research plan

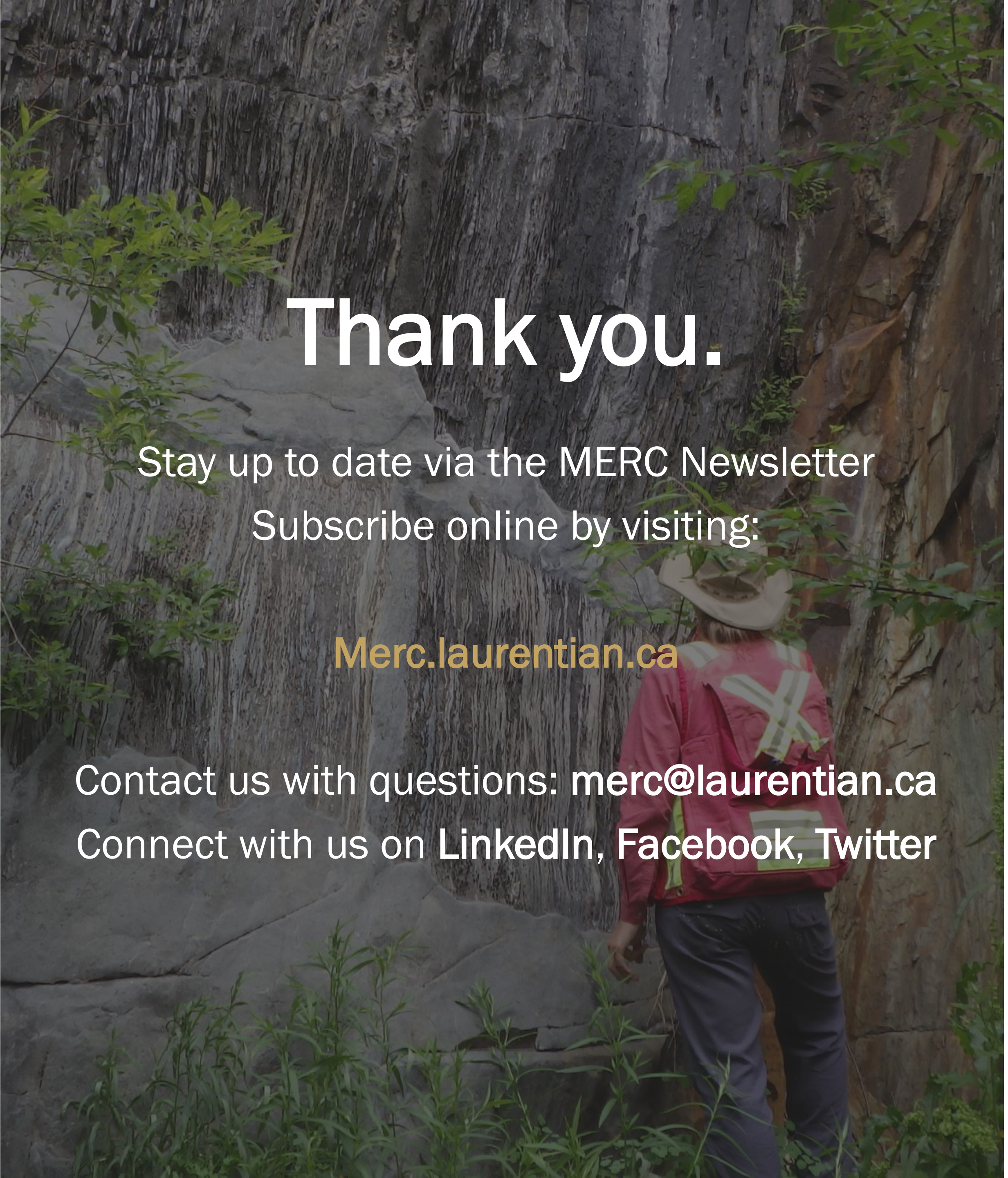
Detrital zircon geochronology of the metasedimentary assemblages

- Systematic sampling from each assemblage (Albert-Gledhill, Conglomerate, English River, other smaller sedimentary units)
- Will determine the maximum age of the sedimentation
- (if lucky we may find crosscutting dikes that define the minimum age of the sedimentation)
- Compare to BGB and Quetico detrital zircon work

Why do we care?

- Are these assemblages part of the same ancient sedimentary succession?
- Can we identify 2 sedimentary pulses similar to the Porcupine and Timiskaming successions?
- The longevity and possible repetition of sedimentary processes carry important implications for the geodynamic evolution





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