

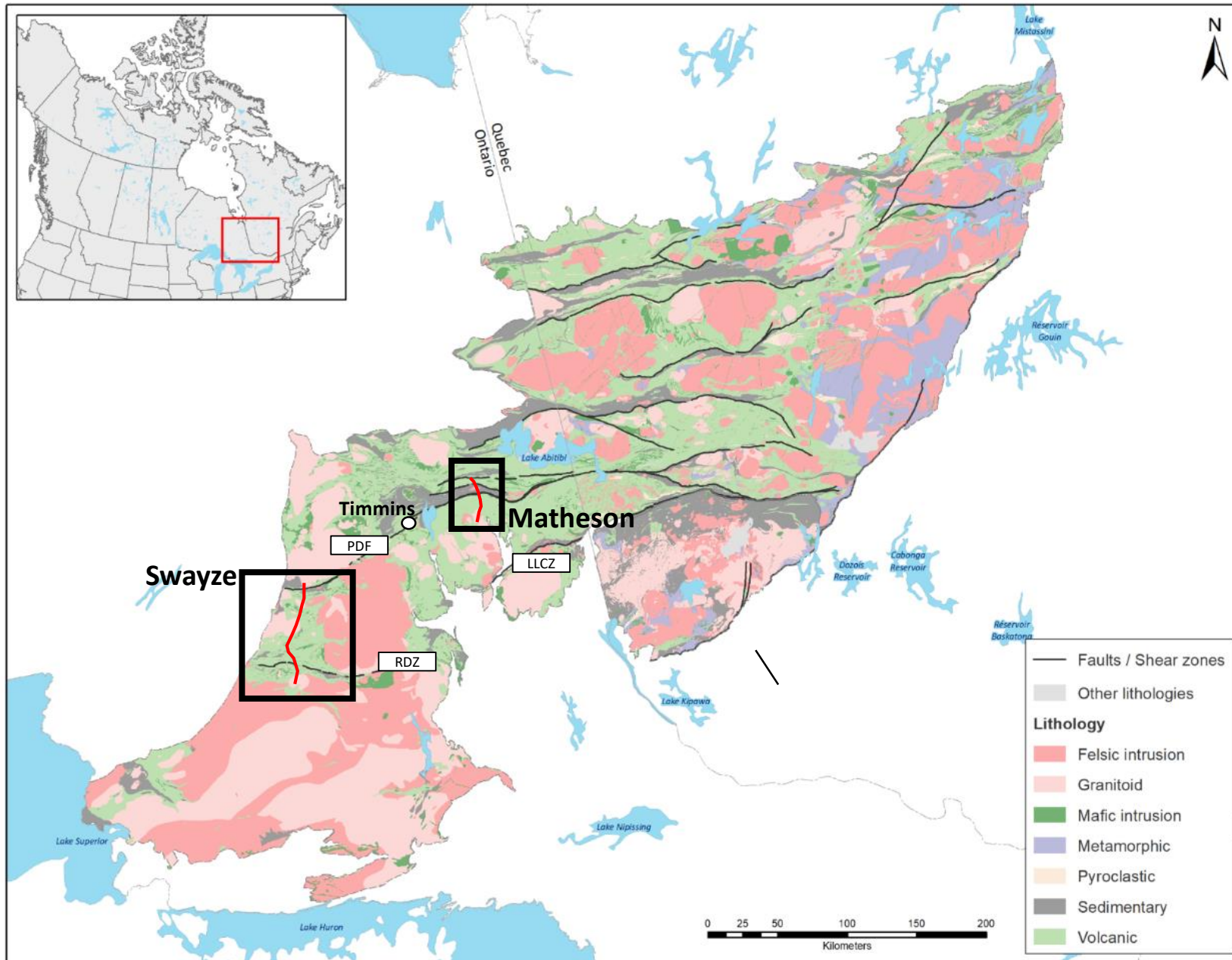
New Geological and Geophysical implications on the Architecture of the Swayze and Matheson Greenstone Belts



A new Canadian research initiative funded by Canada First Research Excellence Fund



The Swayze and Matheson areas



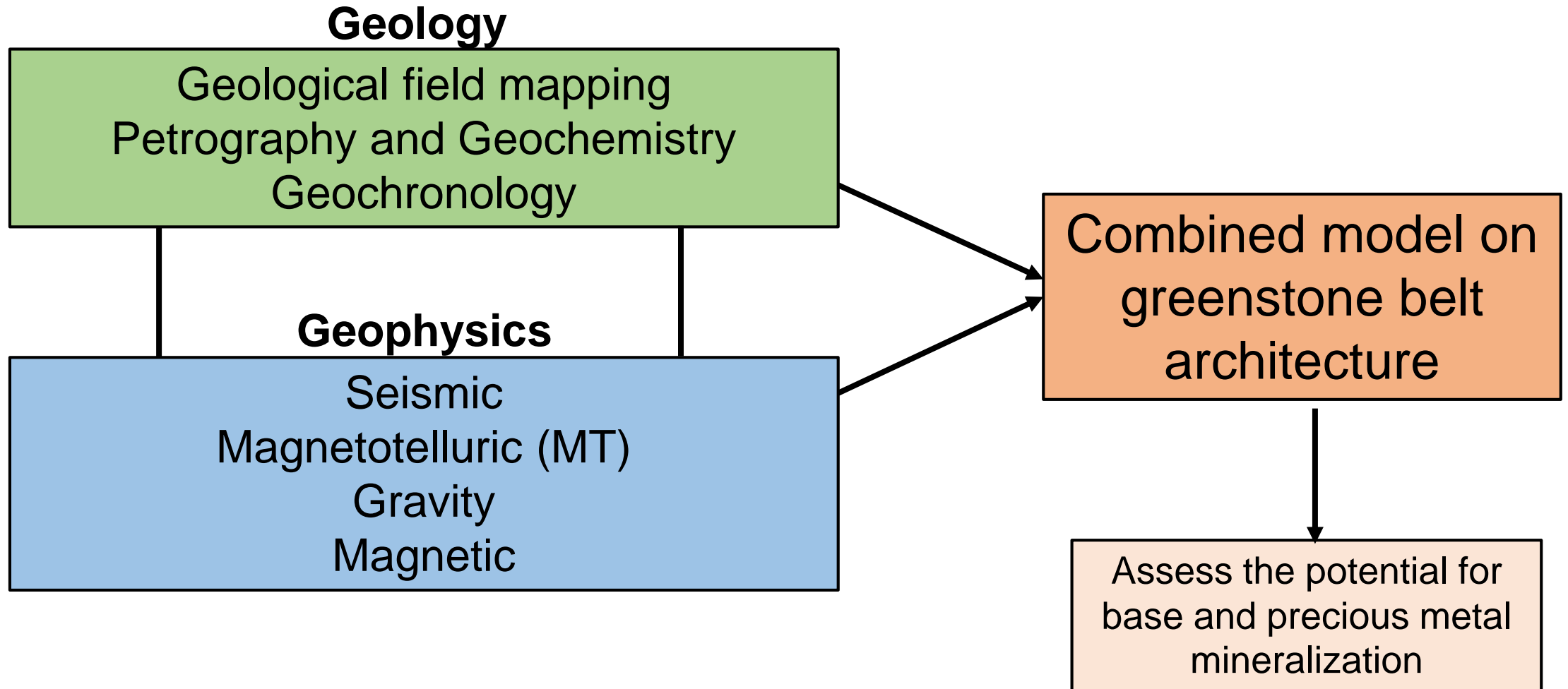
SWAYZE TRANSECT

- Sedimentary assemblages
- The nature and facies association of the sediment
- Volcanic stratigraphy and volcanic assemblages
- Integrating geological and geophysical data - a combined model of the greenstone architecture and key fault locations

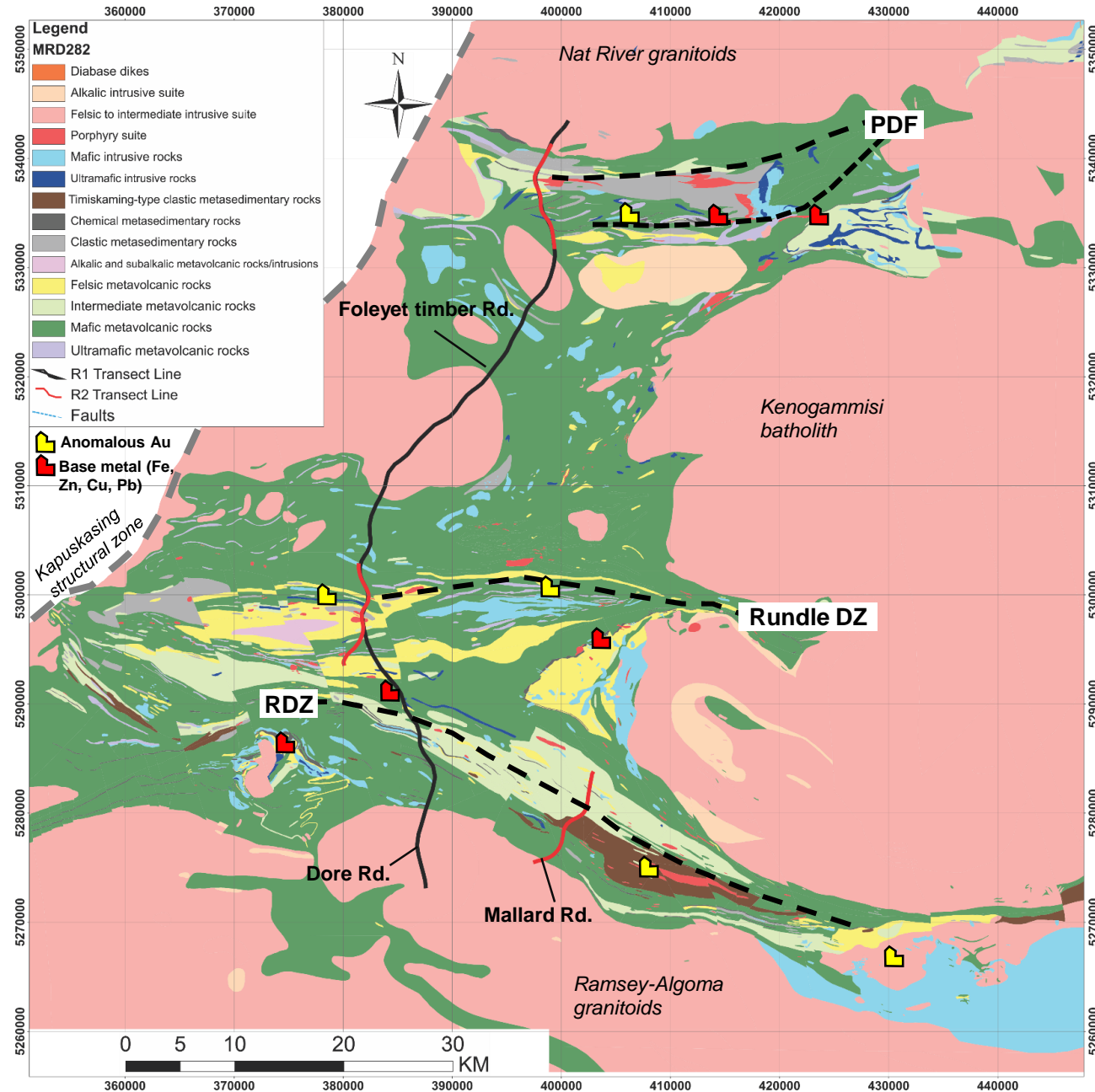
MATHESON TRANSECT

- Minimum age of the Porcupine basin
- A new gravity model – greenstone architecture and fault geometry
- High resolution seismic (R2) interpretations

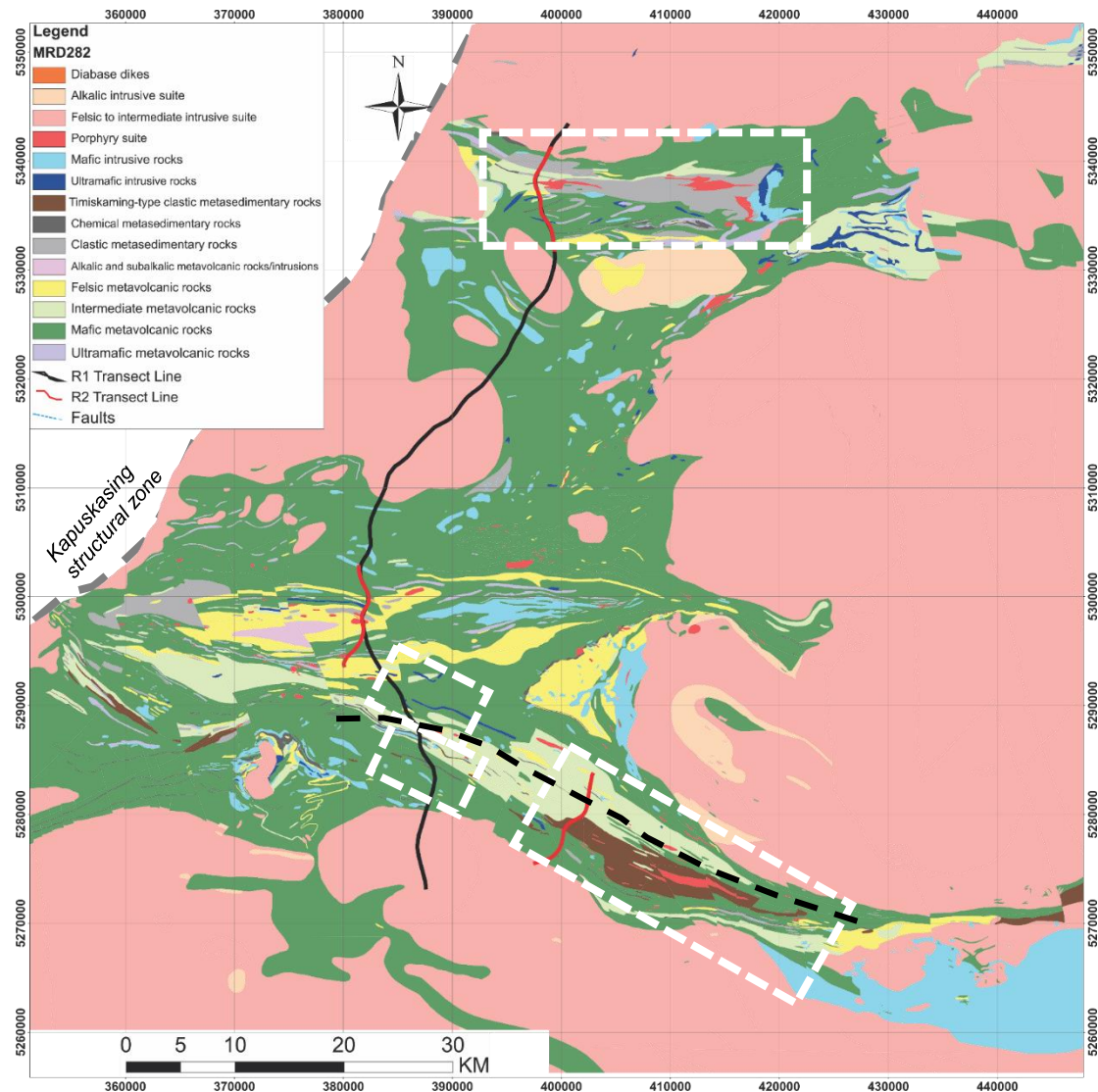
Transect mapping and research – a multidisciplinary approach



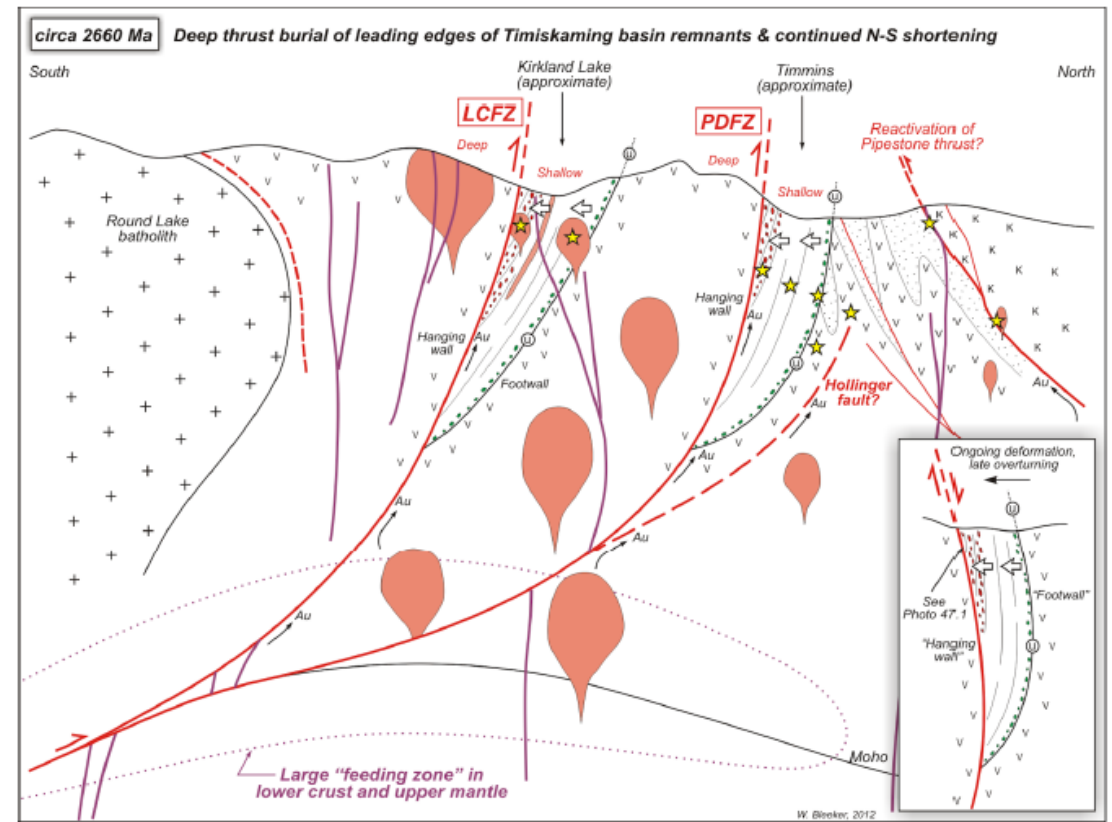
The Swayze greenstone belt

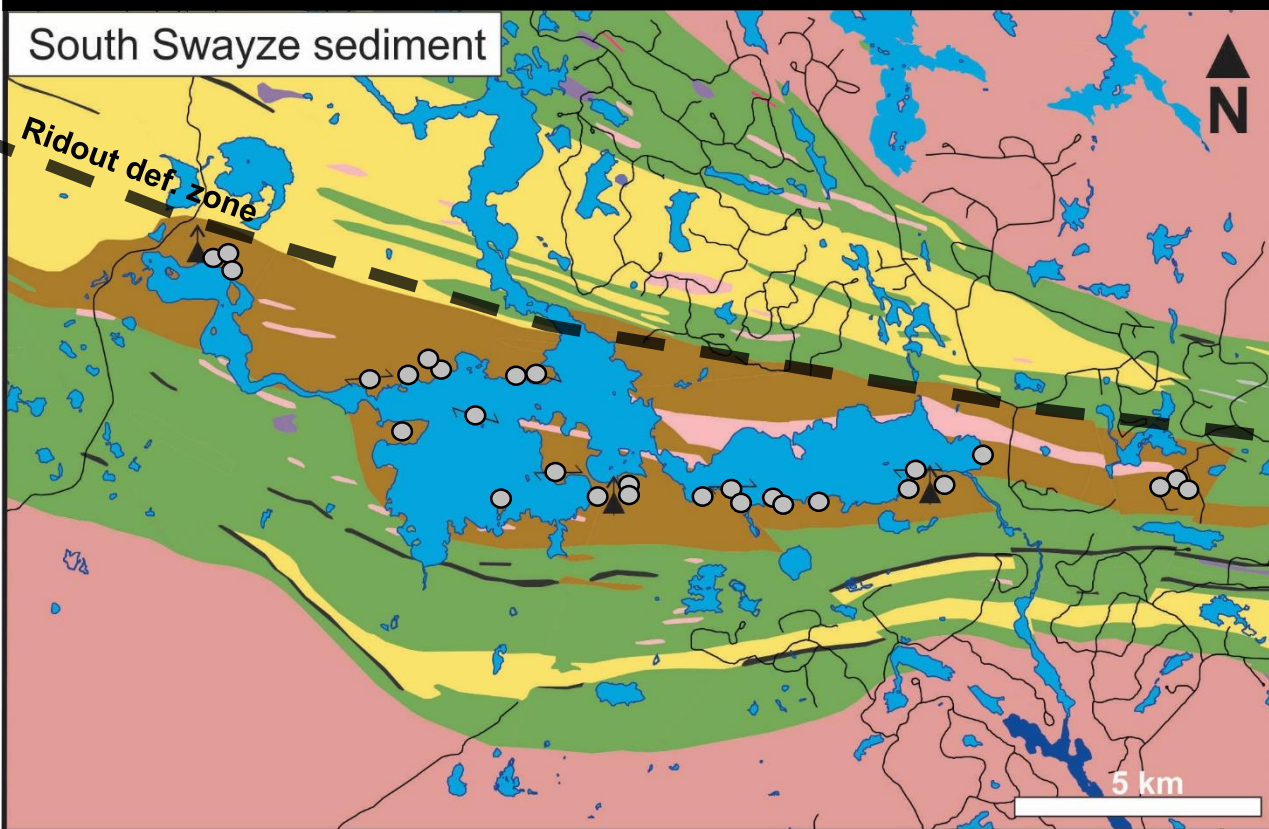
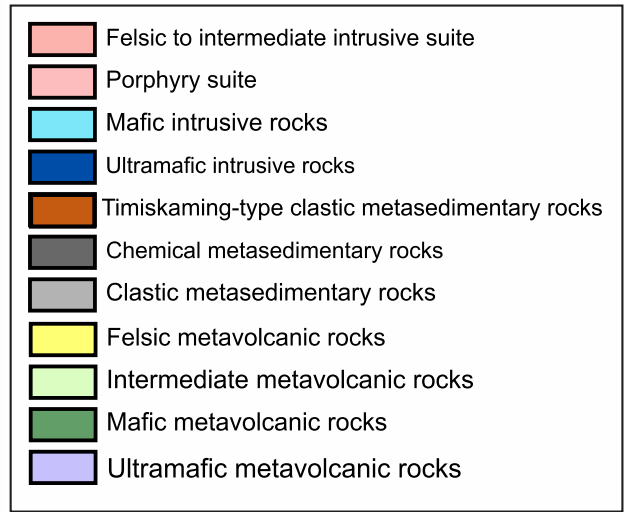
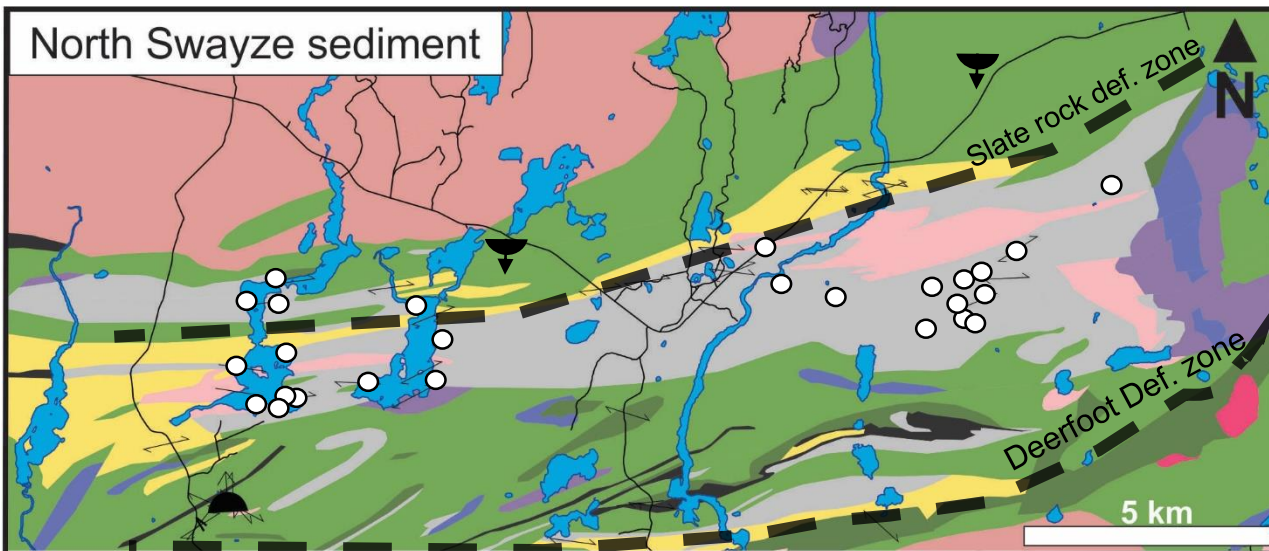


Sedimentary assemblages

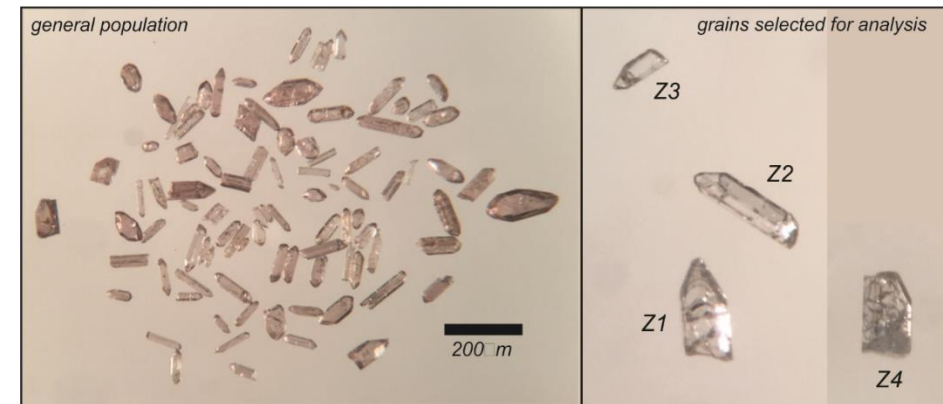
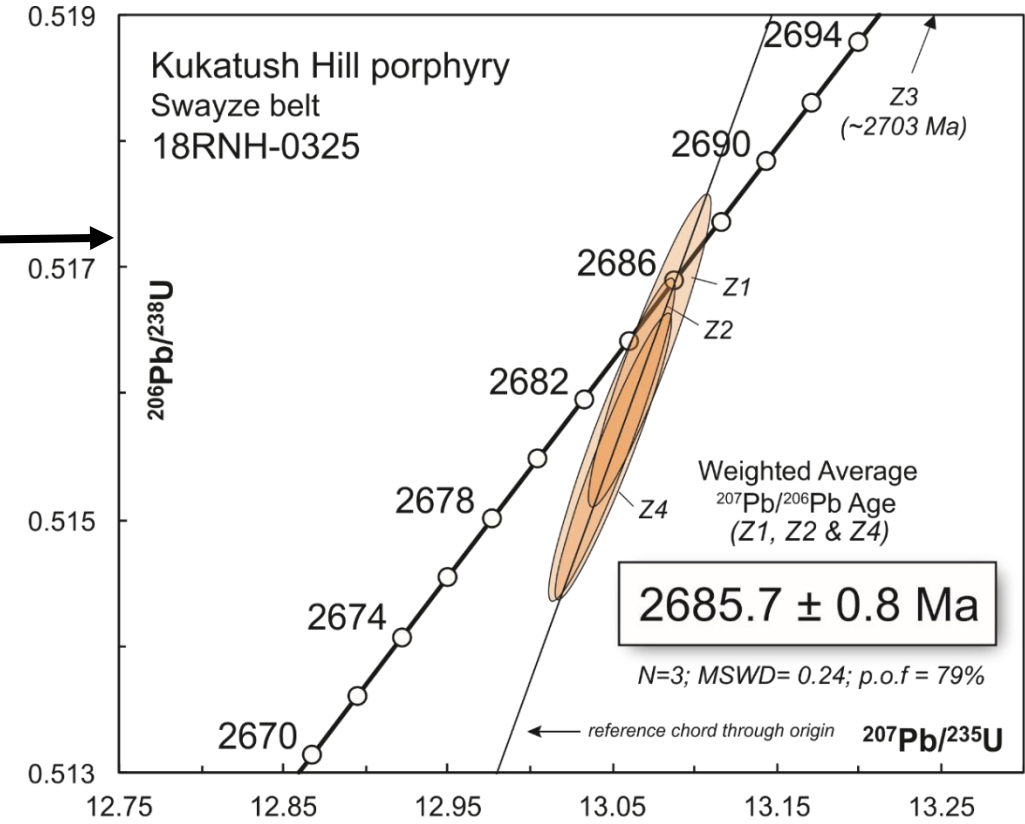
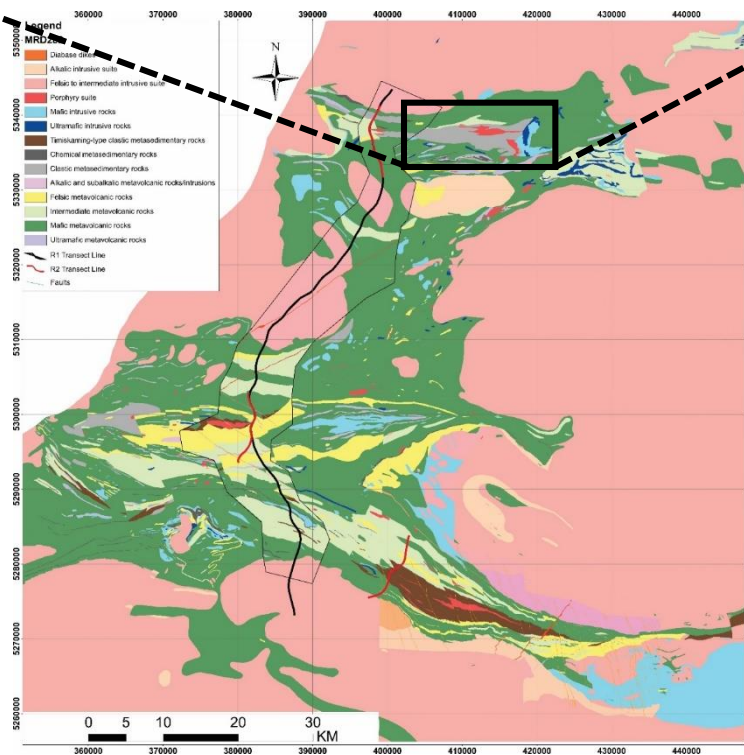
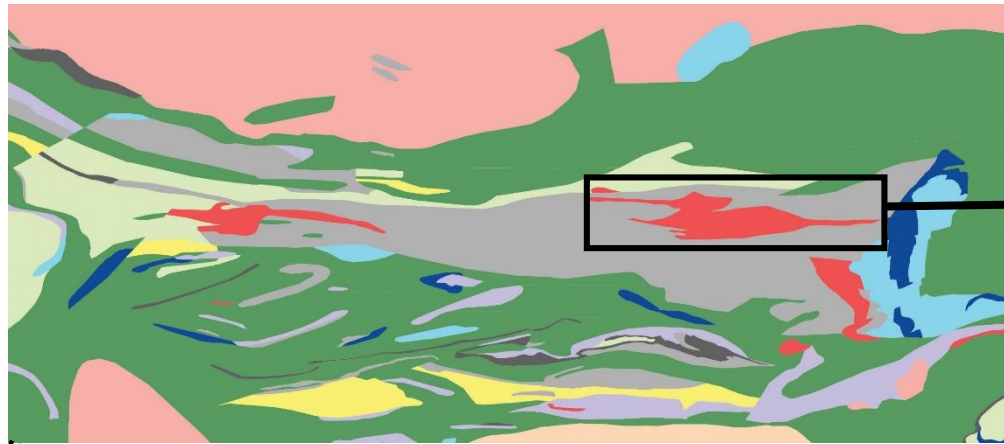


Syn-orogenic sediment

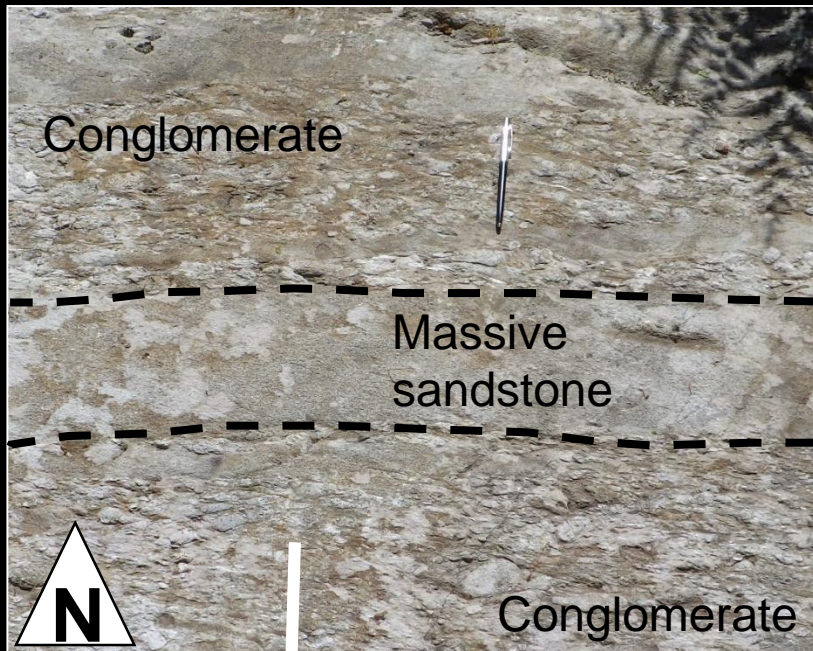




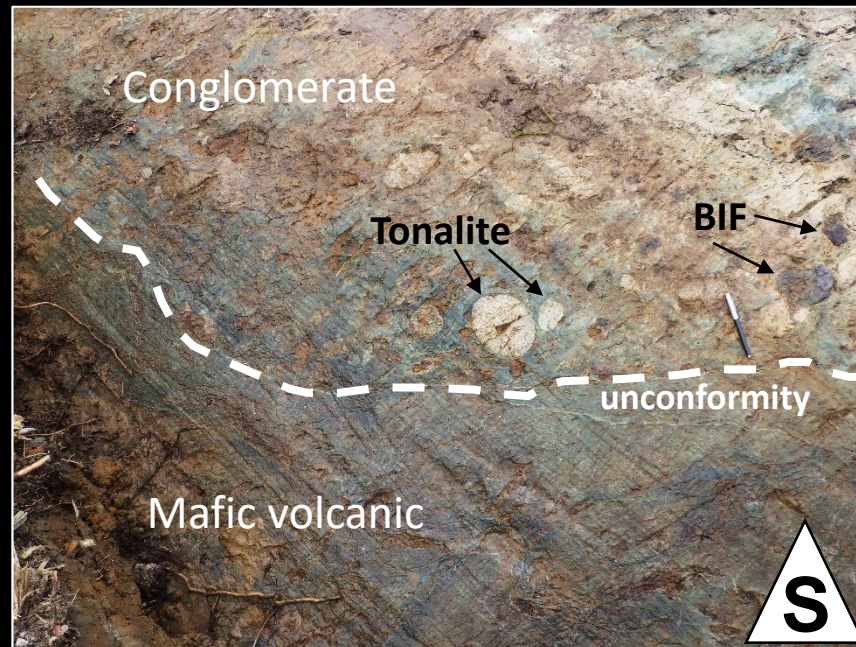
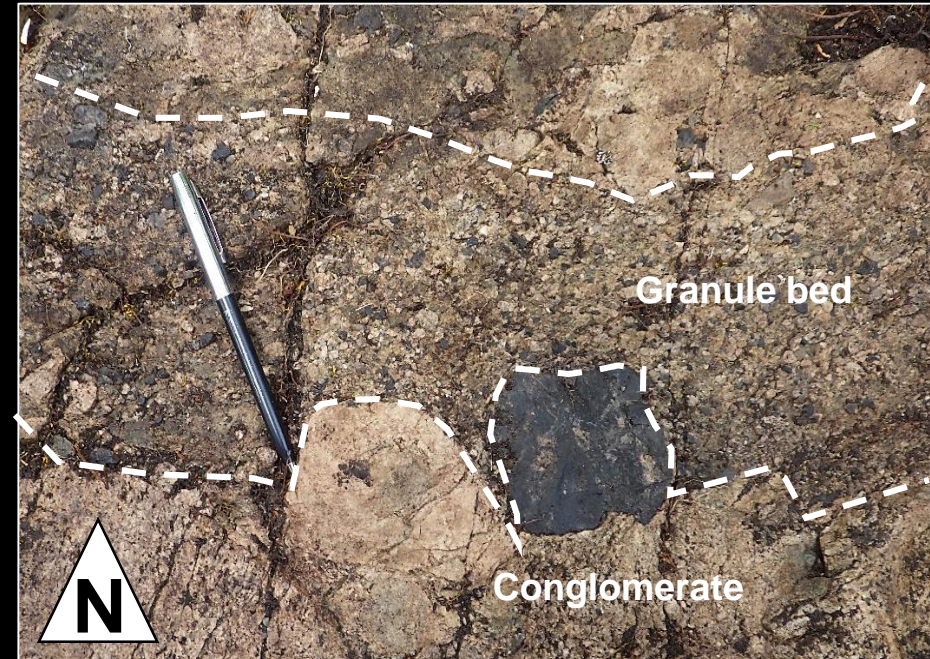
Sedimentary assemblages – Timing of the north basin



North Swayze sediment



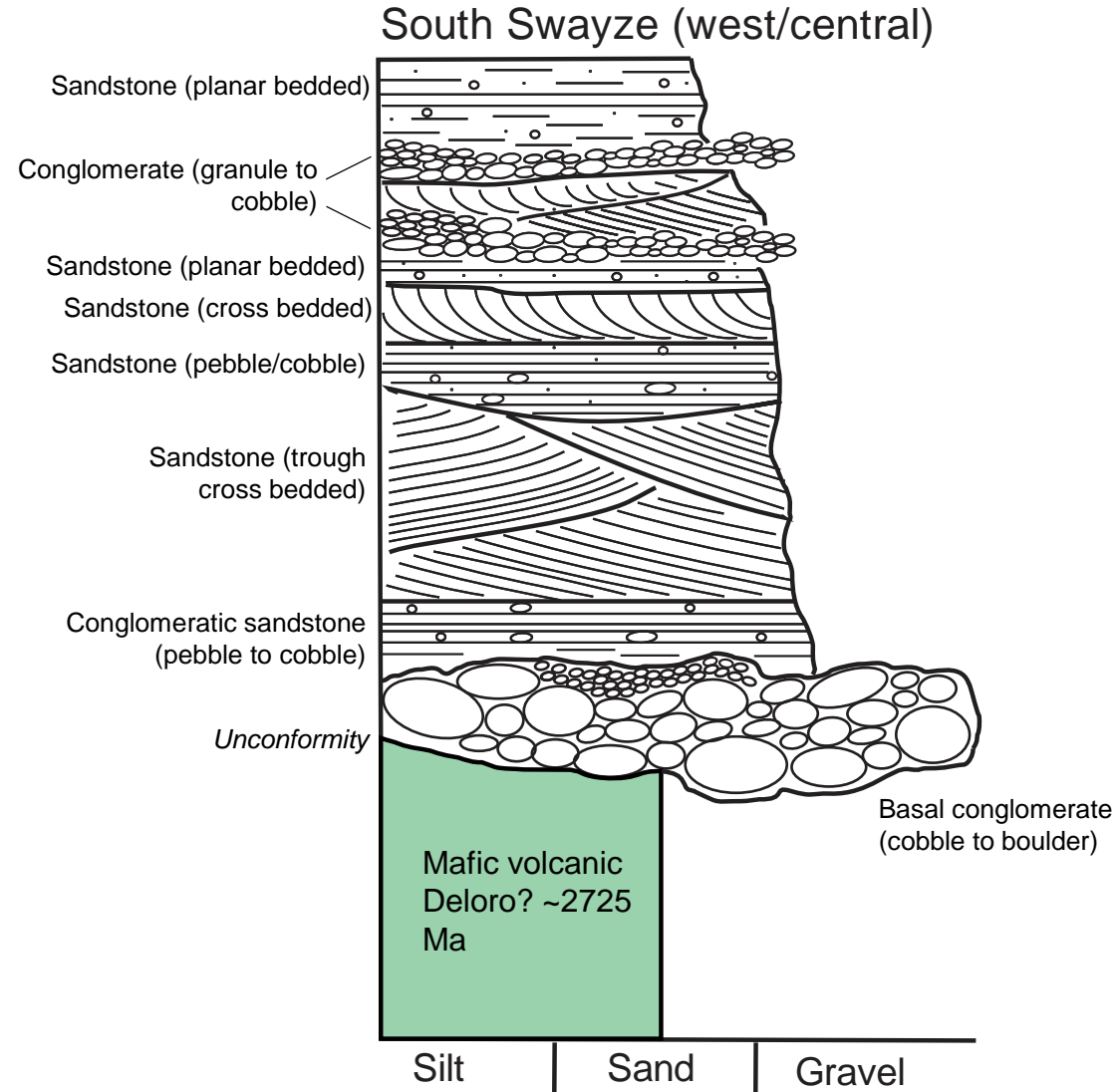
South Swayze sediment



South Swayze sediment

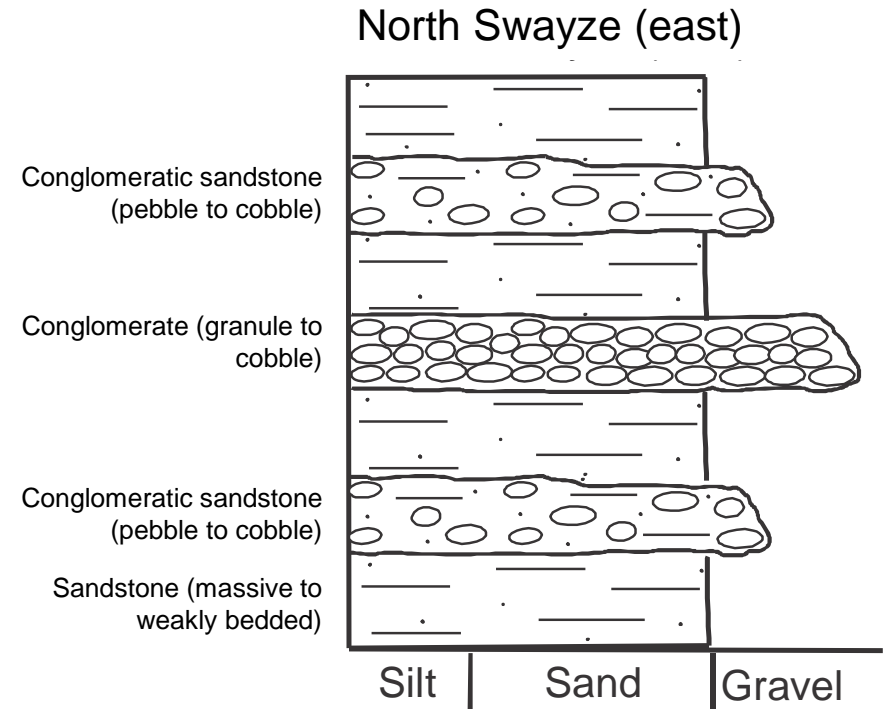
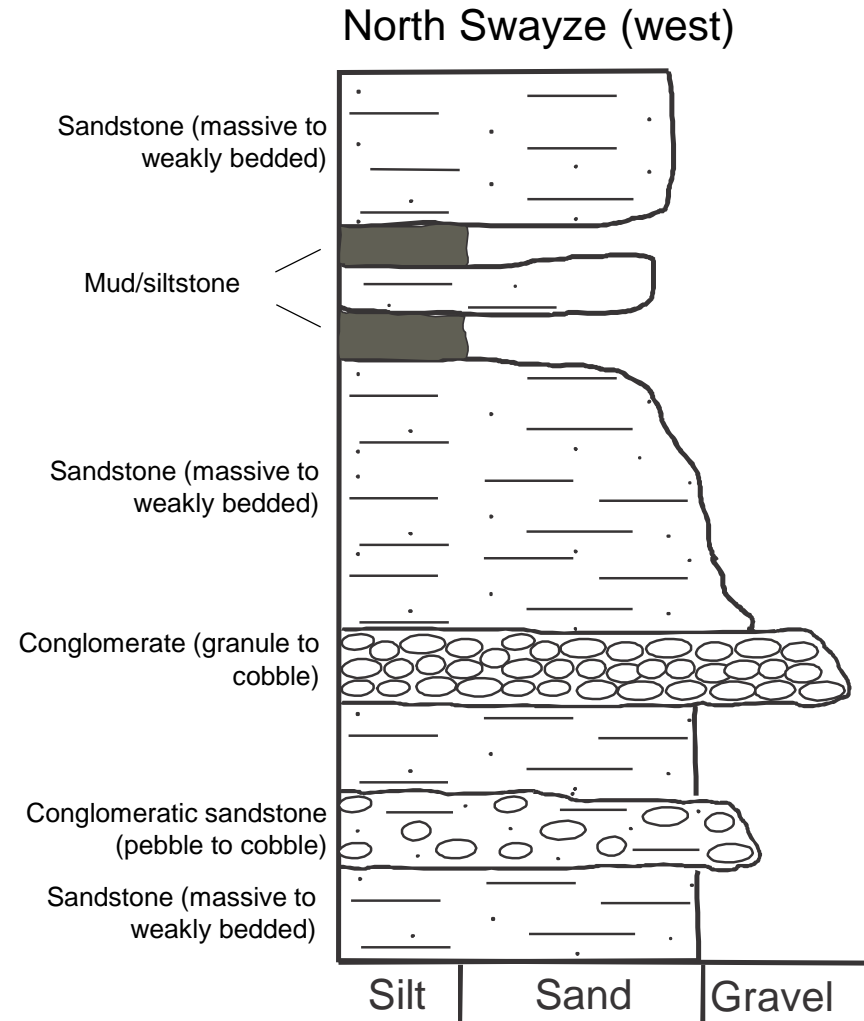


Generalized stratigraphy – South Swayze sediment



Not to scale

Generalized stratigraphy – North Swayze sediment



Not to scale

Depositional environment of the Swayze sediment

1. South Swayze sediment:

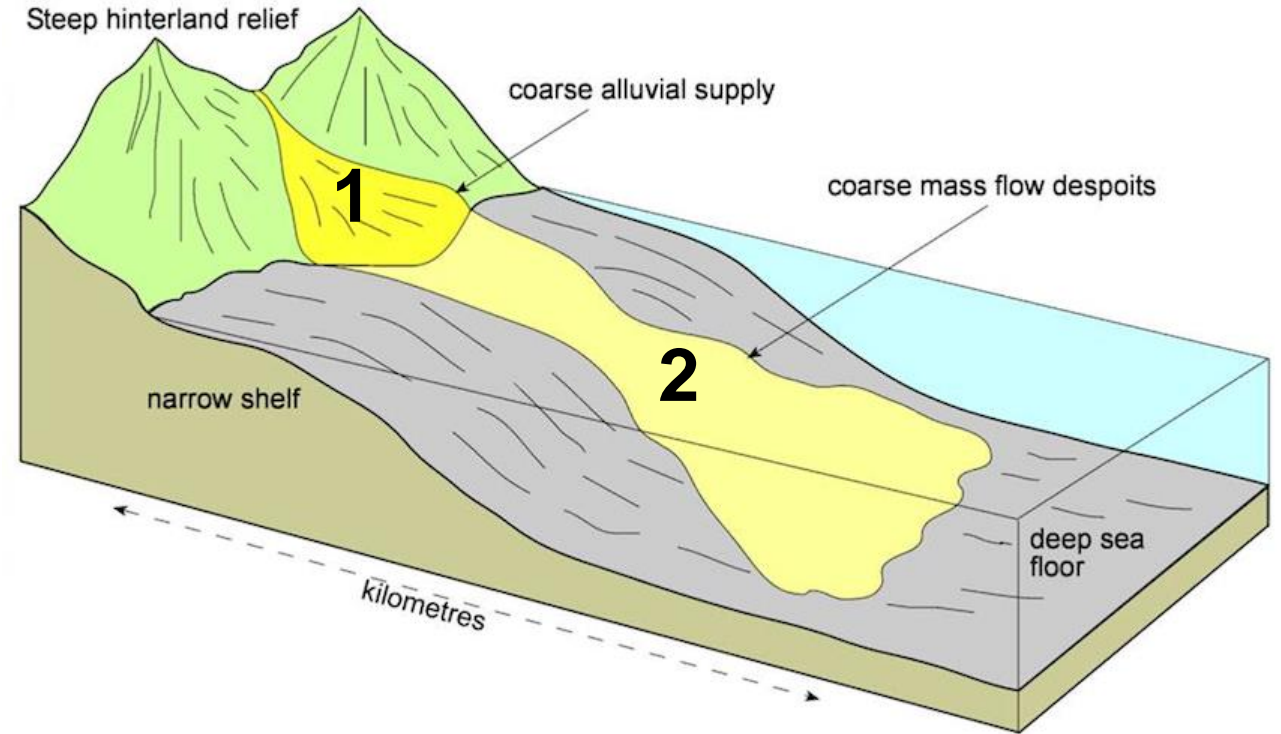
Unconformities - Basal conglomerate – conglomerate - conglomeratic sandstone association

Fluvial fan/deltas (non marine association) with braided river channel deposits

2. North Swayze sediment:

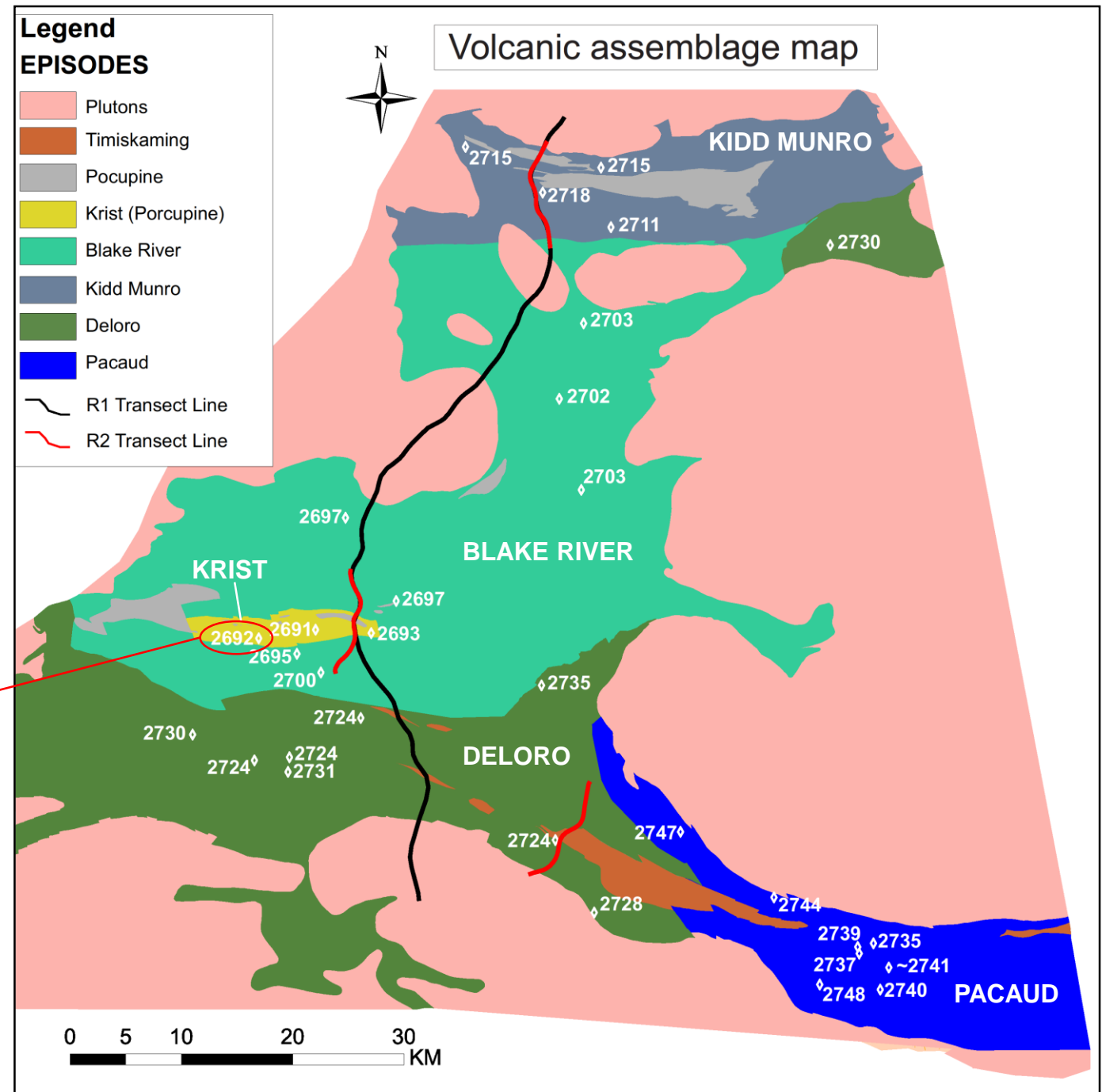
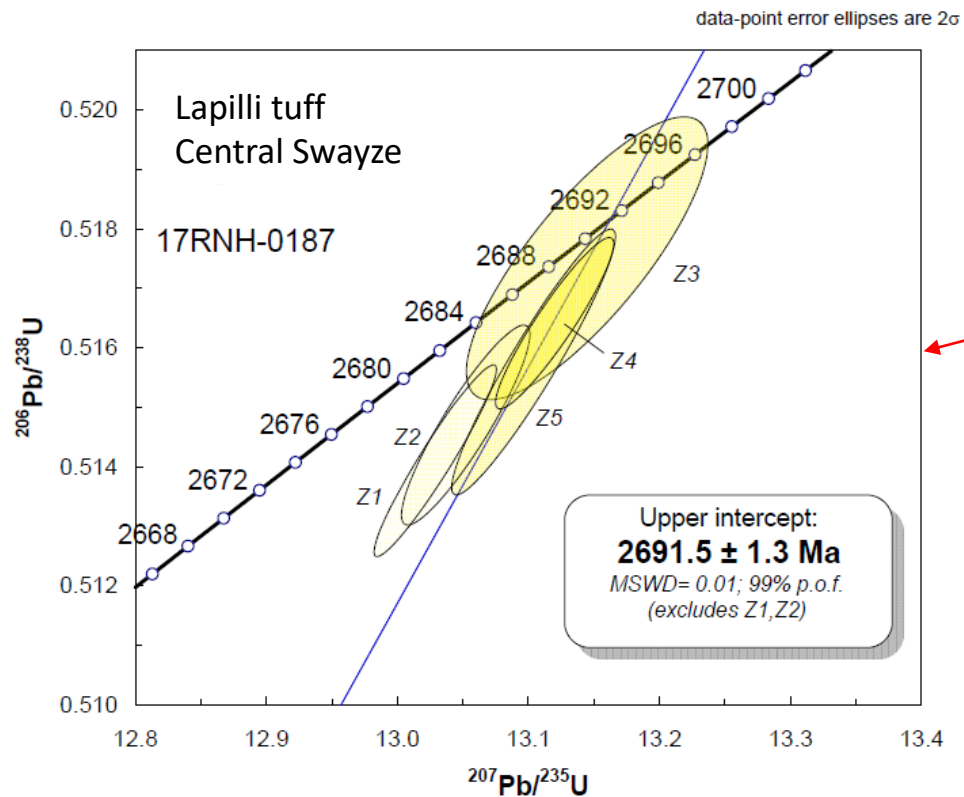
Conglomerate – sandstone – silt/mudstone association

Distal parts of a river delta prograding into a marine environment – submarine fan deposits



Volcanic assemblages

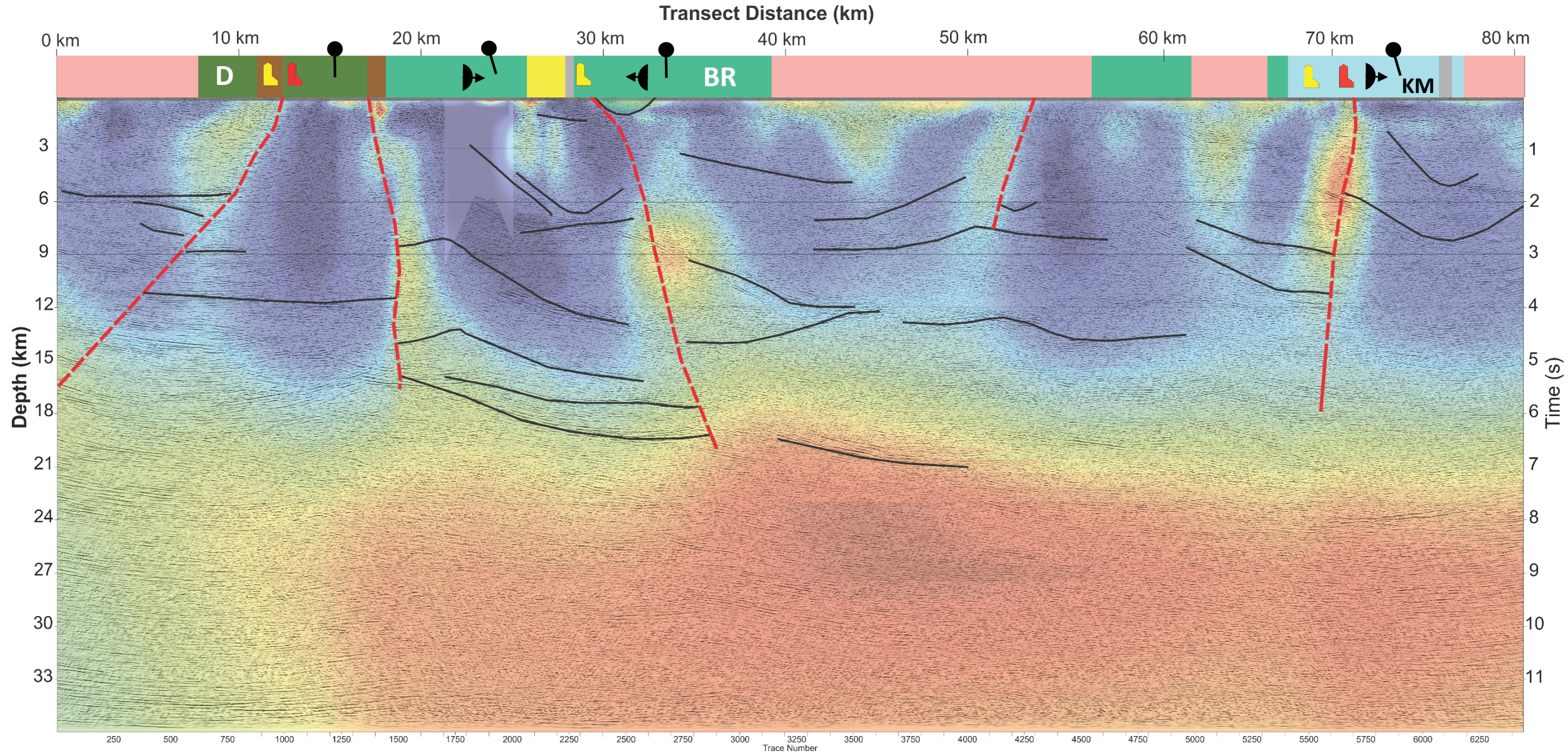
Pancake stratigraphy or a collage of unrelated volcanic terrains?



Integrating Geophysical data with Geology



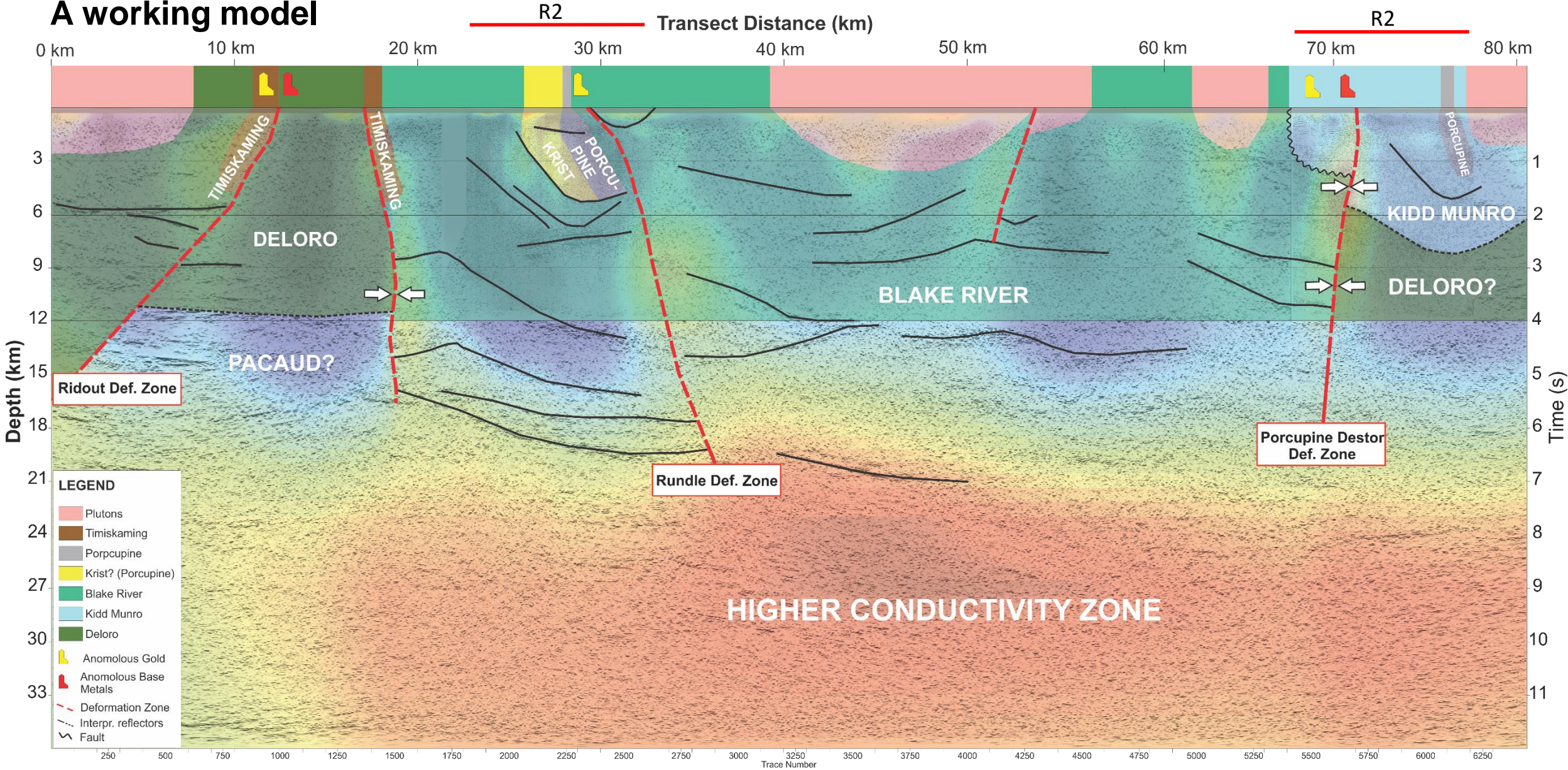
A working model



Integrating Geophysical data with Geology

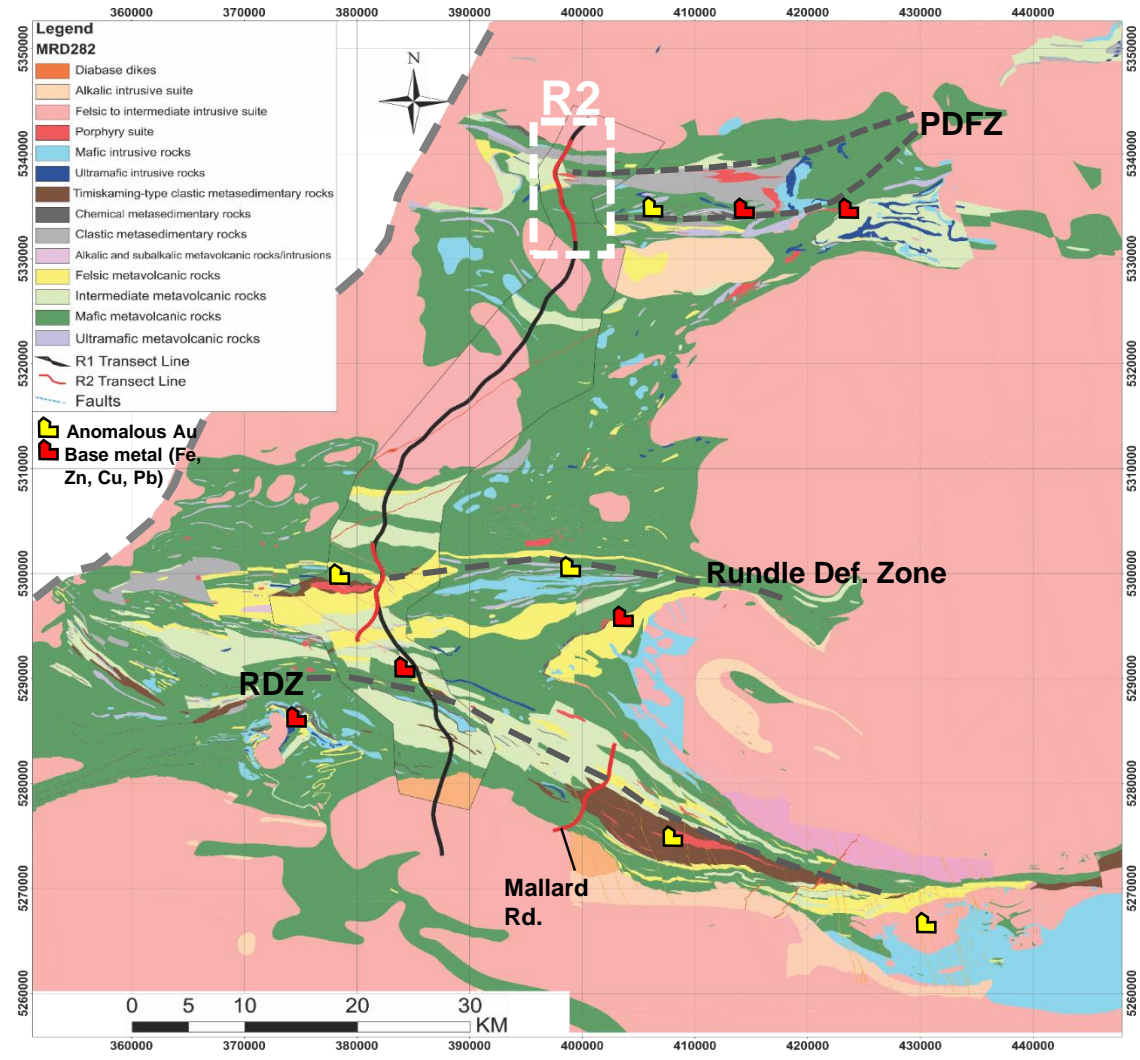


A working model

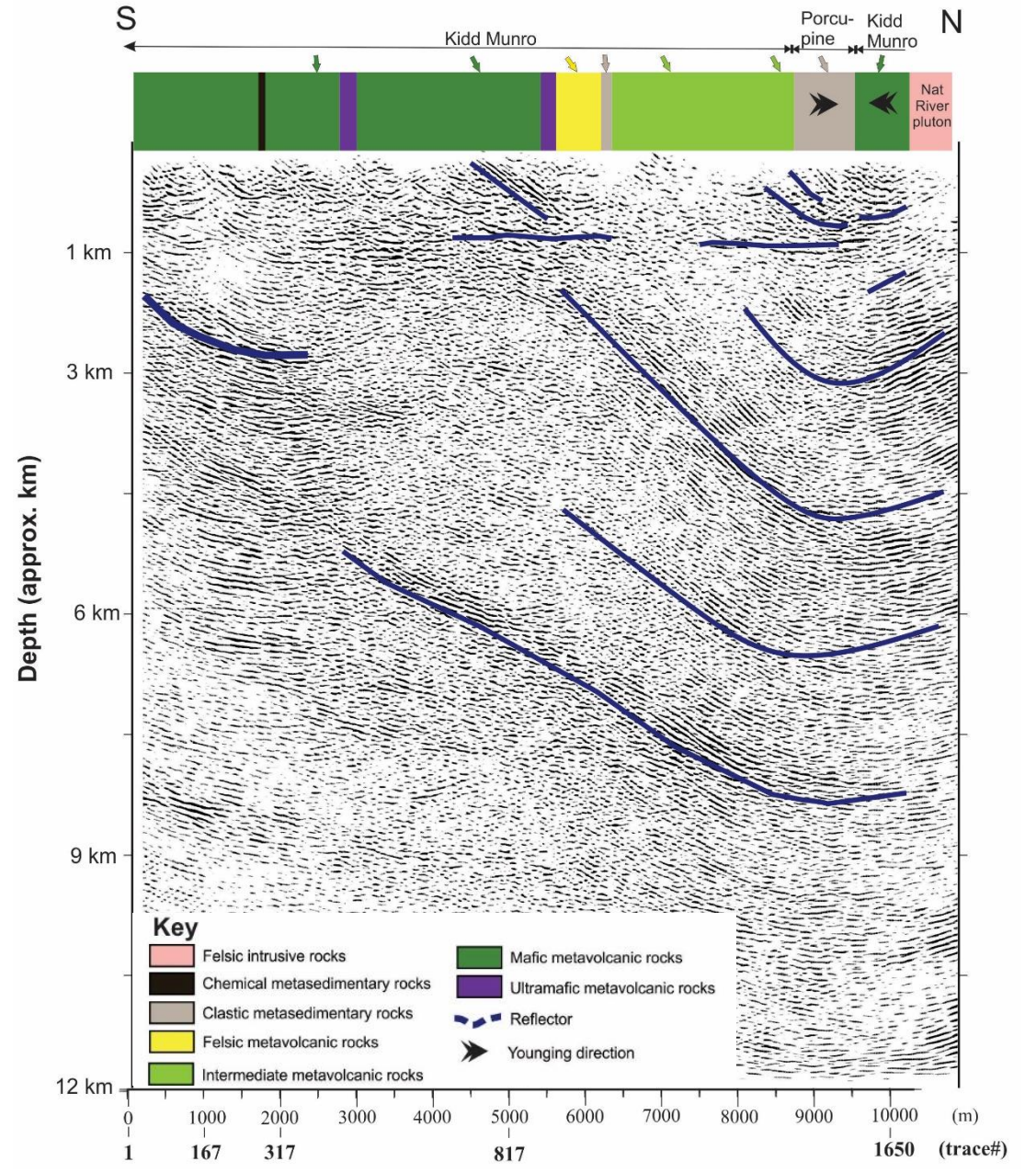


Integrating Geophysical data with Geology

R2 migrated seismic



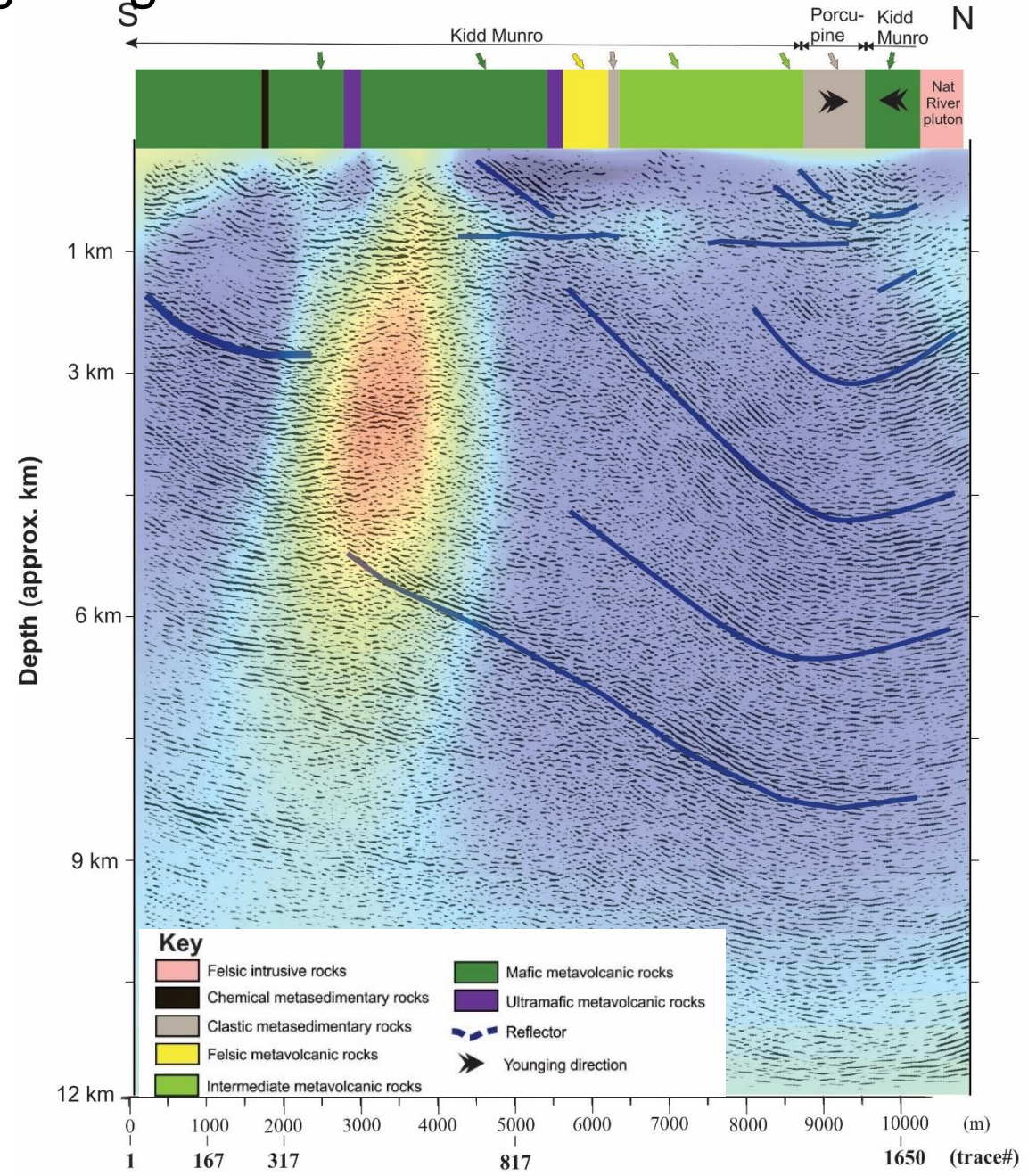
R2 - NORTH SWAYZE



Swayze transect – Integrating the data R2 - NORTH SWAYZE



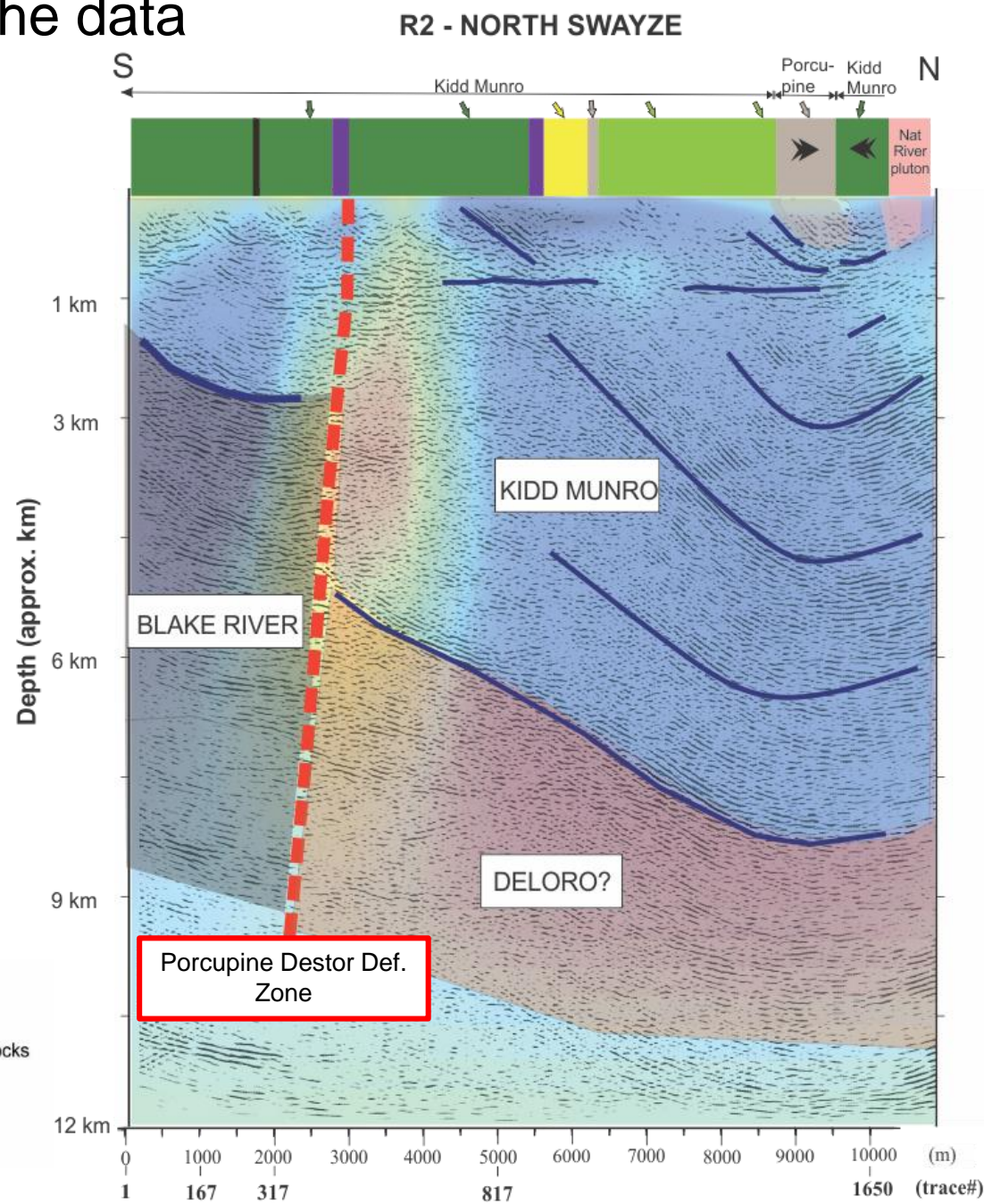
R2 migrated seismic and MT



Swayze transect – Integrating the data

R2 migrated seismic and MT

Porcupine Destor Zone in the north is picked up by the seismic and MT and seems to be spatially unrelated with the sedimentary basin



Key

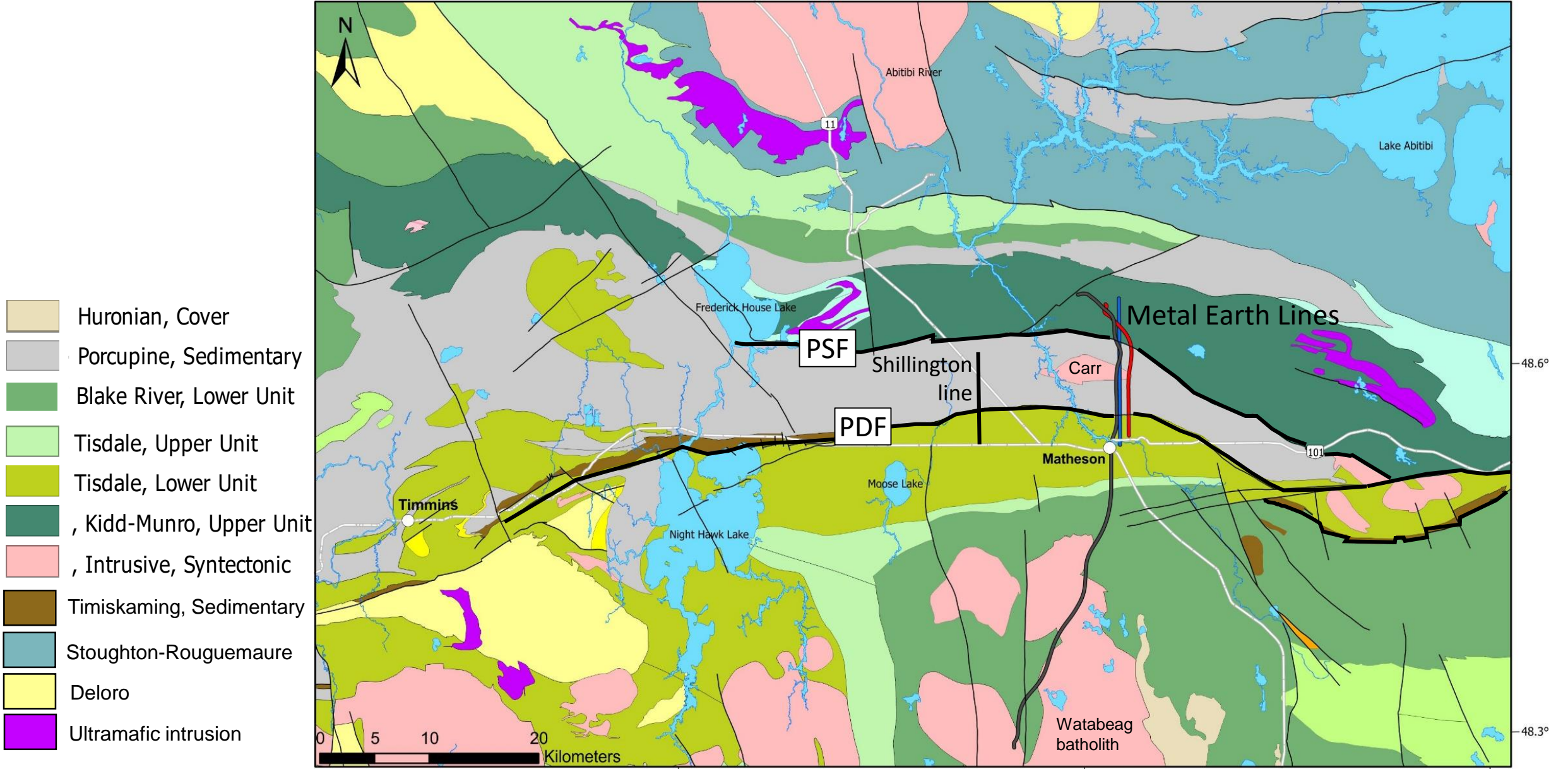
- Felsic intrusive rocks
- Chemical metasedimentary rocks
- Clastic metasedimentary rocks
- Felsic metavolcanic rocks
- Intermediate metavolcanic rocks
- Mafic metavolcanic rocks
- Ultramafic metavolcanic rocks
- Reflector
- Younging direction

Swayze - Main summary

- South Swayze sediment: Inner part of a fluvial fan system; North Swayze sediment: Distal parts of a fluvial fan system prograding into submarine environment
- Porphyry age of 2685.7 ± 0.8 Ma represents the minimum deposition age of the northern sedimentary basin
- New interpretations suggest a regional large block of Blake River in contact with Deloro in south and Kidd Munro in north. No Tisdale has been recovered in Swayze.
- Two Timiskaming style conglomerates mark the location of two deformation zones (incl. the Ridout) in the south Swayze as seen on the seismic and MT.
- Krist age felsic volcanics have been discovered in the central Swayze
- Porcupine Destor Deformation Zone in the north seems to be picked up by the seismic and MT and be spatial unrelated with the sedimentary basin

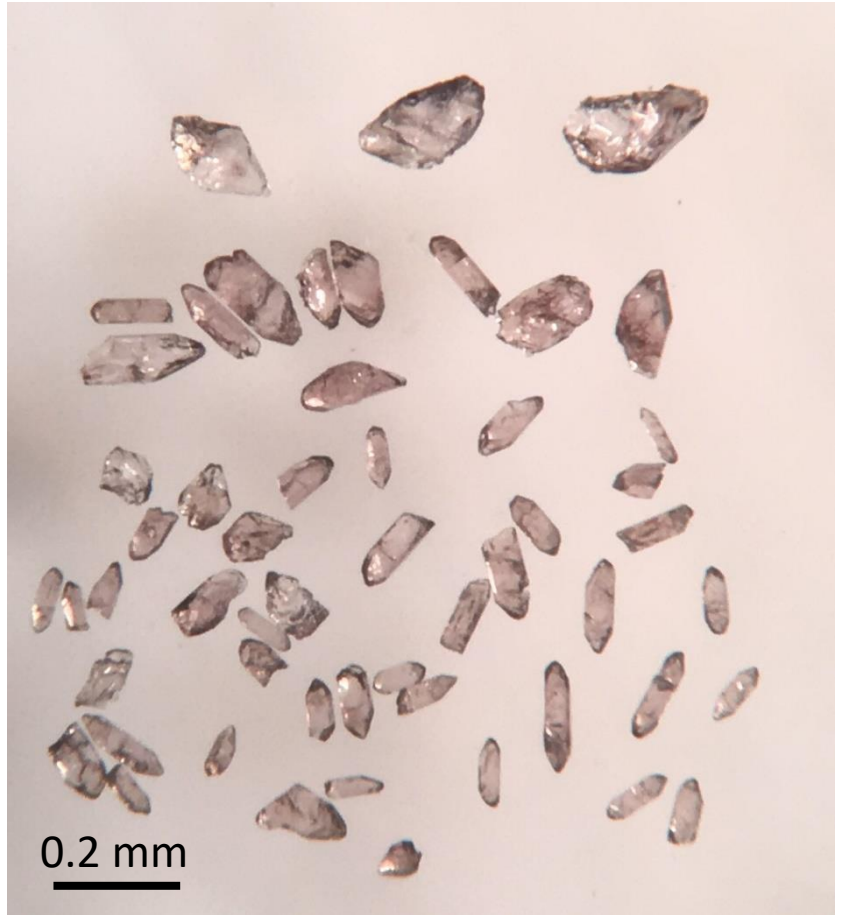
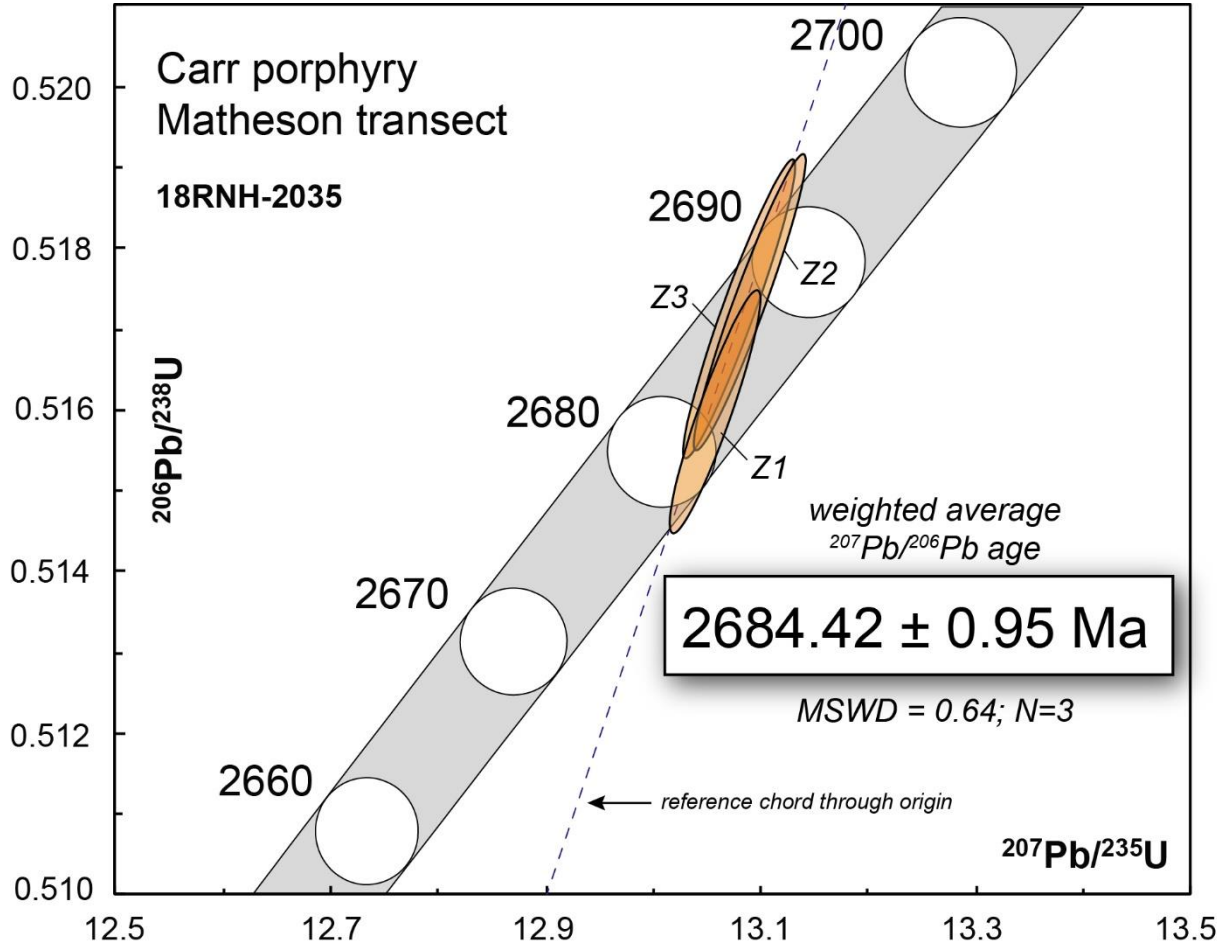
Important collaborators: Peter MacDonald and Evan Hastie (OGS); Tod Keast, Ben Berger, Charlie Mortimer; GFG Resources (Pat, Mary and Rob); IAMGOLD

Matheson – Greenstone architecture and Fault geometry



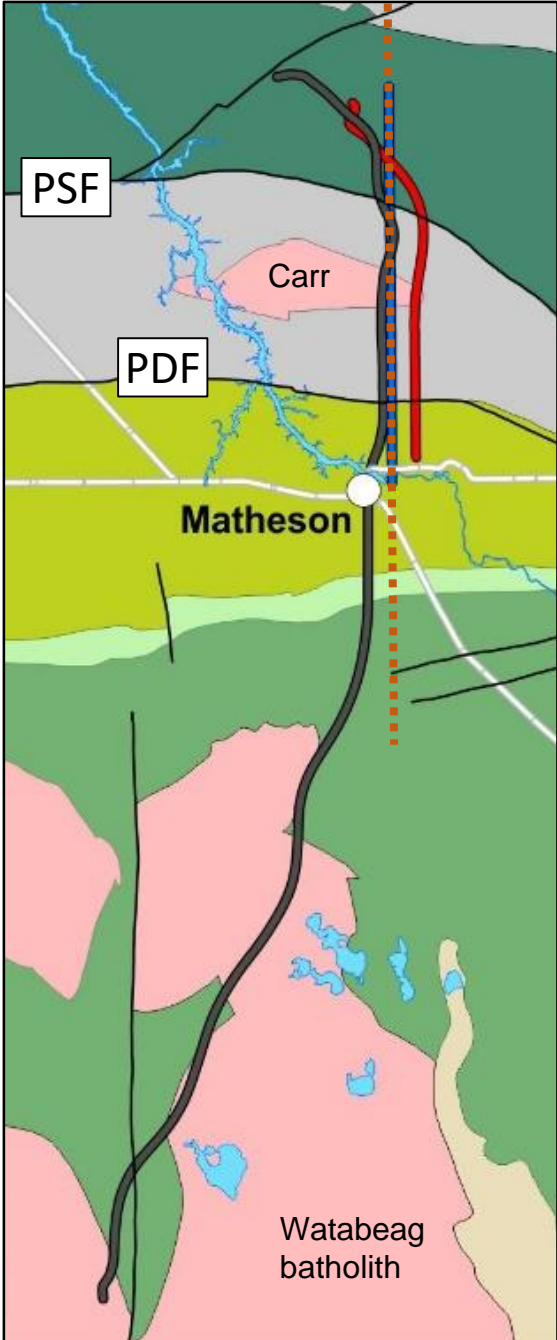
(Geology map modified from Ayer et al., 2005)

Minimum age of the Porcupine basin



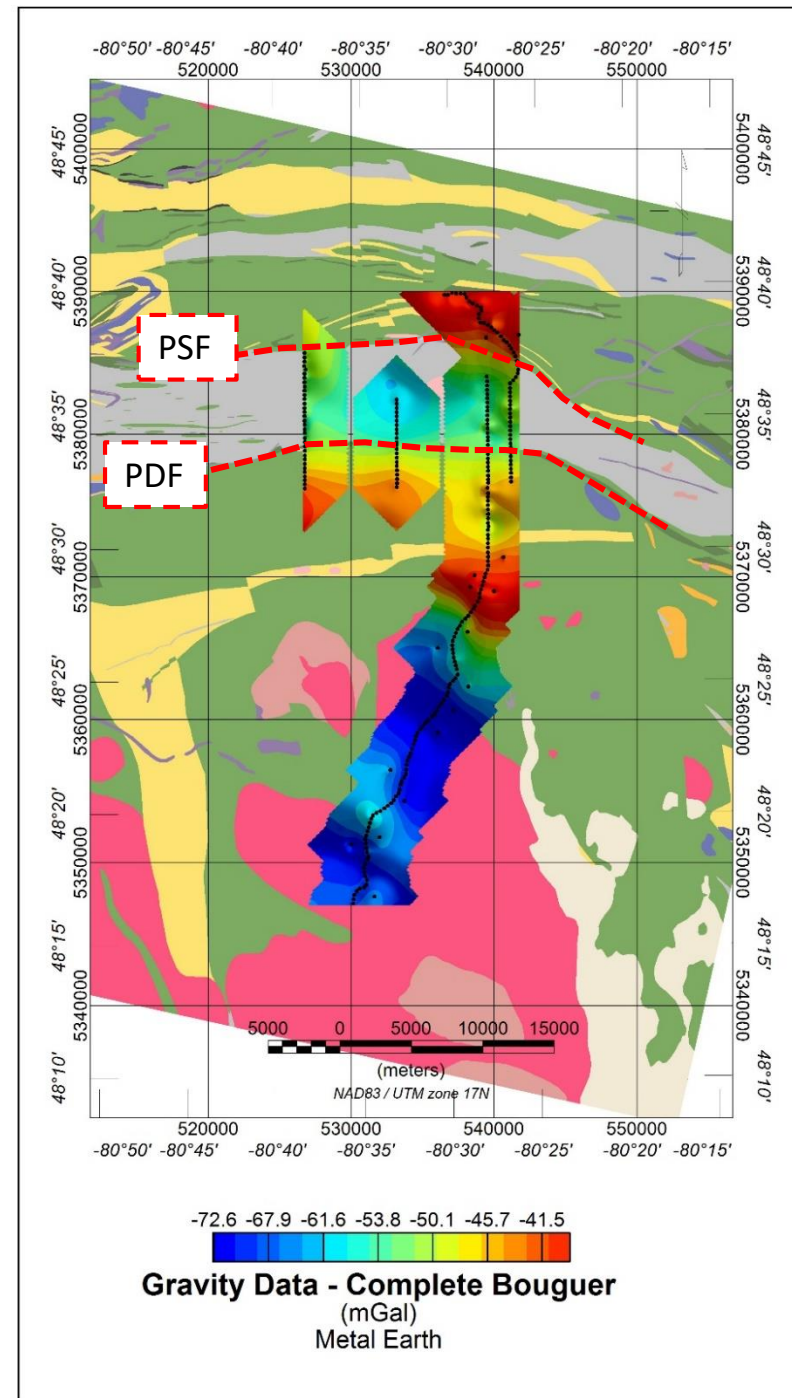
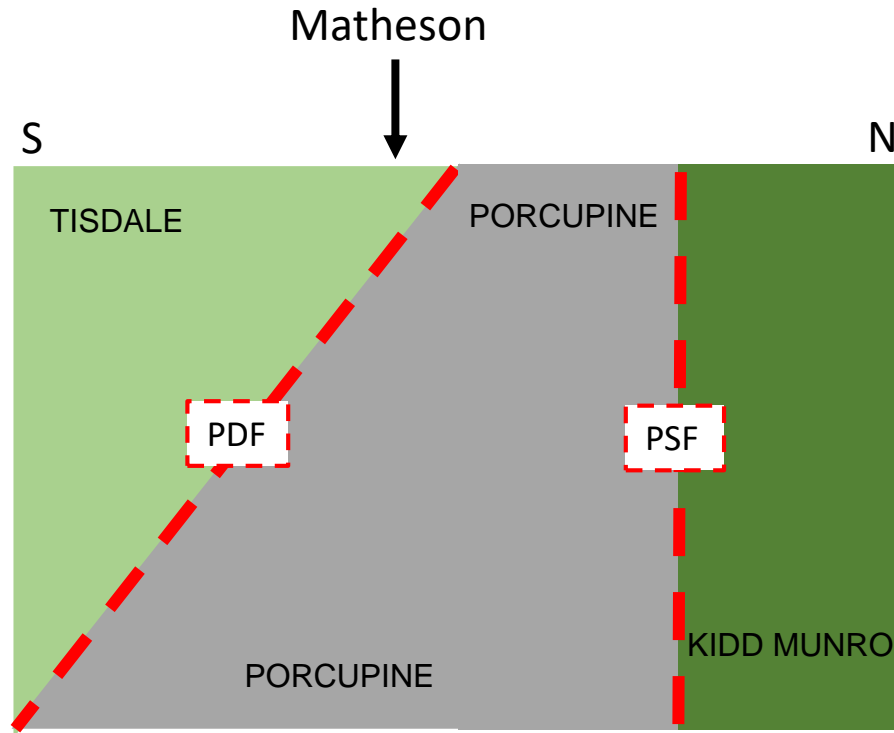
The Metal Earth transects

- Huronian, Cover
- Porcupine, Sedimentary
- Blake River, Lower Unit
- Tisdale, Upper Unit
- Tisdale, Lower Unit
- , Kidd-Munro, Upper Unit
- , Intrusive, Syntectonic

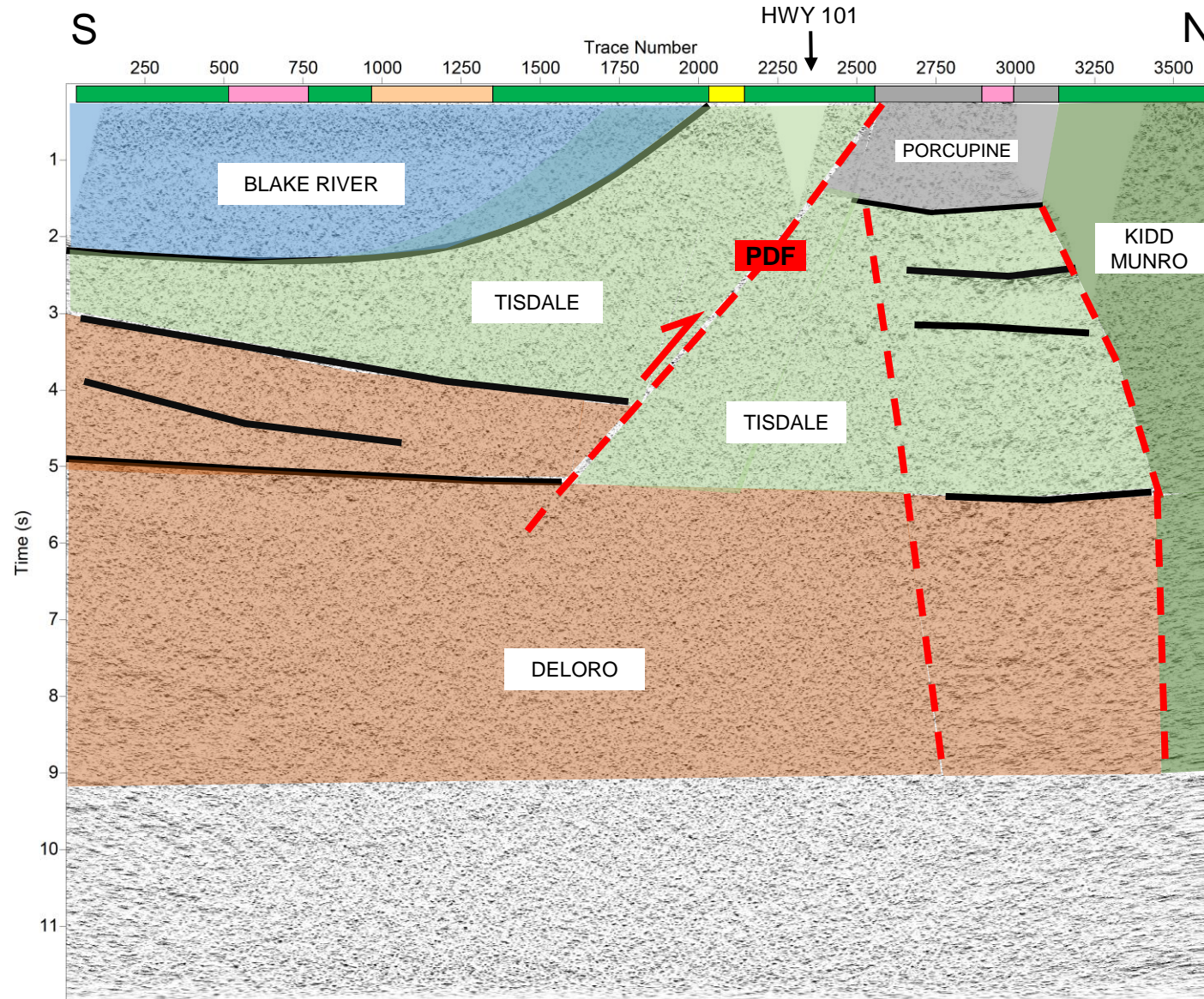


- R1 seismic line
- R2 seismic line
- R2 seismic acquisition line
- Gravity line

Matheson Transect - Gravity

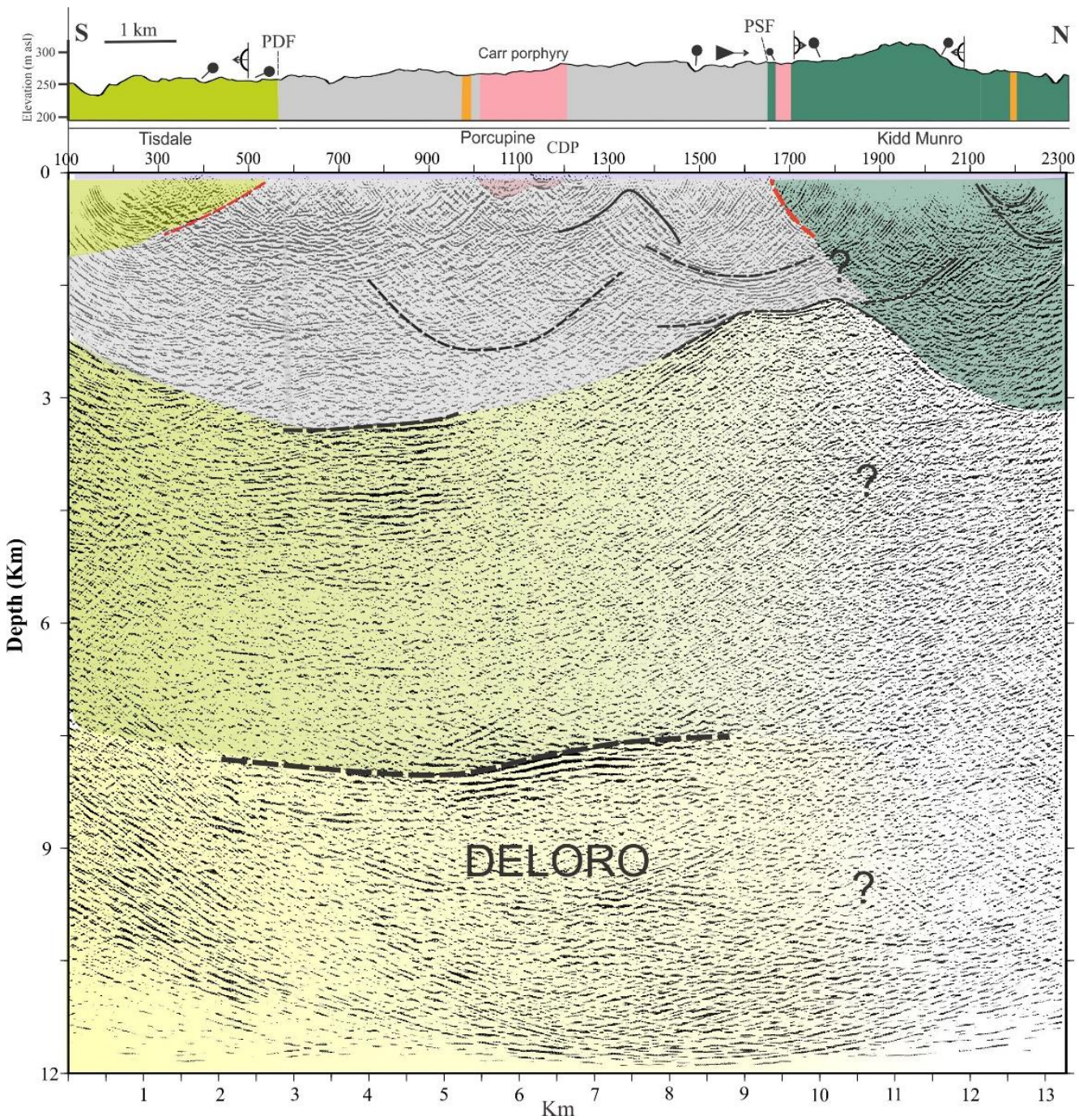


Matheson Transect – R1 Seismic



Metal Earth MATHESON_LN261_R1 Seismic Transect Hilbert Envelope

Seismic R2 interpretation



Matheson - Main summary

- Carr porphyry constrain the minimum age of the sedimentary basin to 2684.5 ± 1 Ma

Gravity and seismic reflection profiles suggest:

- A ca. 30-35° southern dip of the Porcupine Destor Fault
- A steep northern dip of the Pipestone Fault
- A depth of the Porcupine basin of up to 2.5-3 km

**Thanks to Metal Earth
collaborators in Matheson**

McEwen Mining

Moneta Porcupine Mines

Kirkland Lake Gold

**Prospector Lionel
Bonhomme**

Thank you.



A new Canadian research initiative funded
by Canada First Research Excellence Fund



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