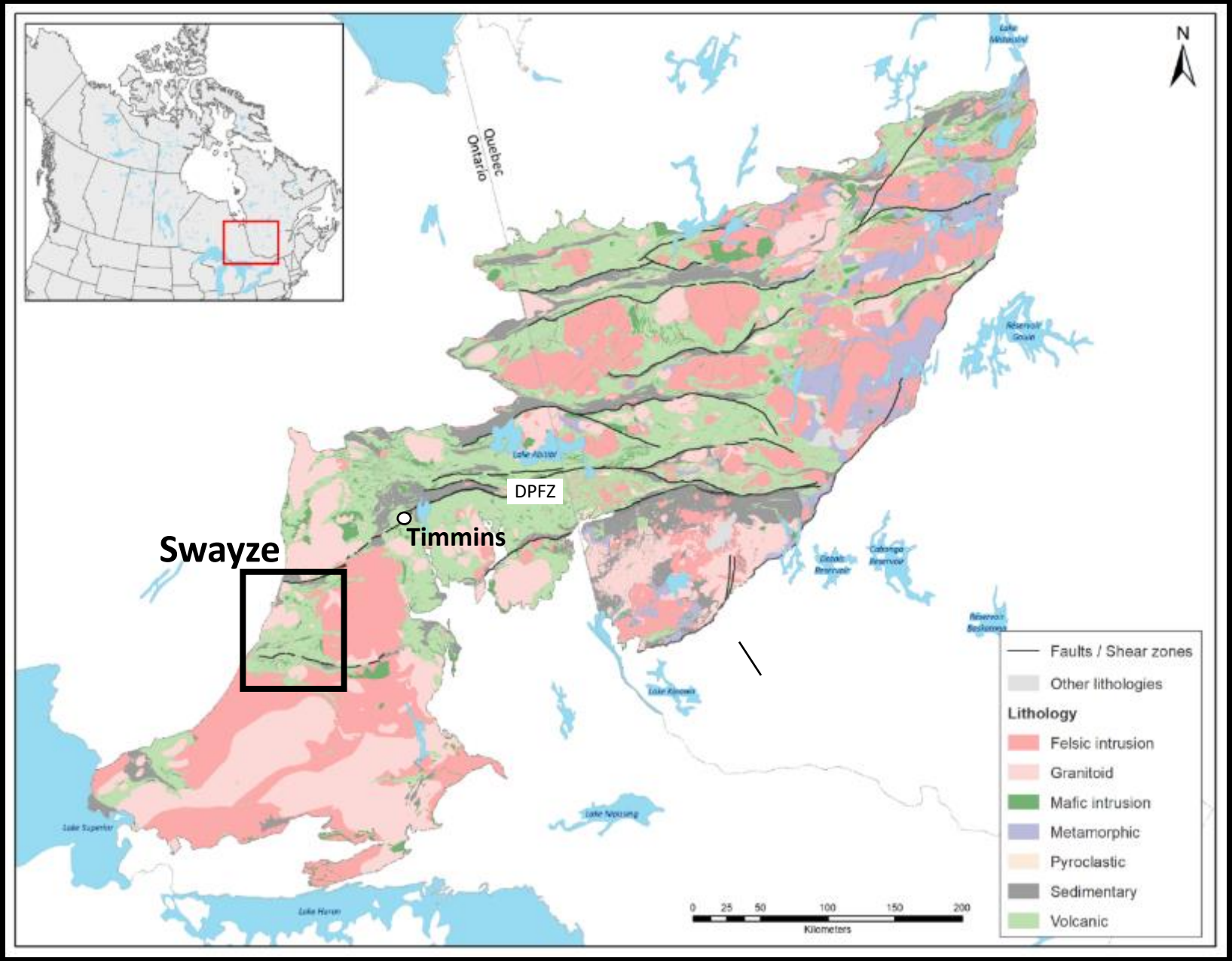
Stratigraphic, volcanologic and sedimentological architecture of the Swayze area, Abitibi greenstone belt

METAL EARTH

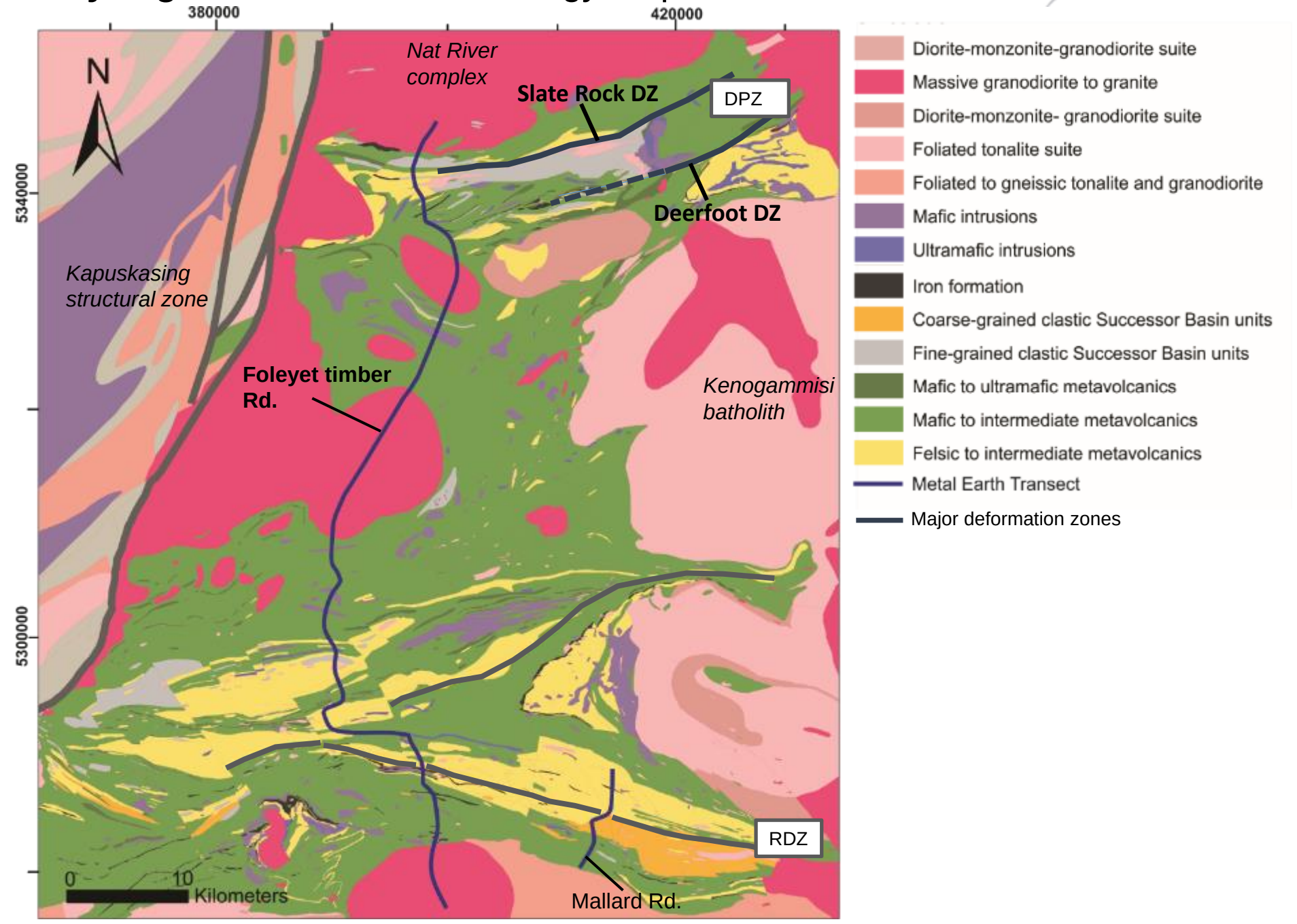
MERC
Mineral Exploration Research Centre

Laurentian University
Université Laurentienne
GOODMAN SCHOOL OF MINES
ÉCOLE DES MINES

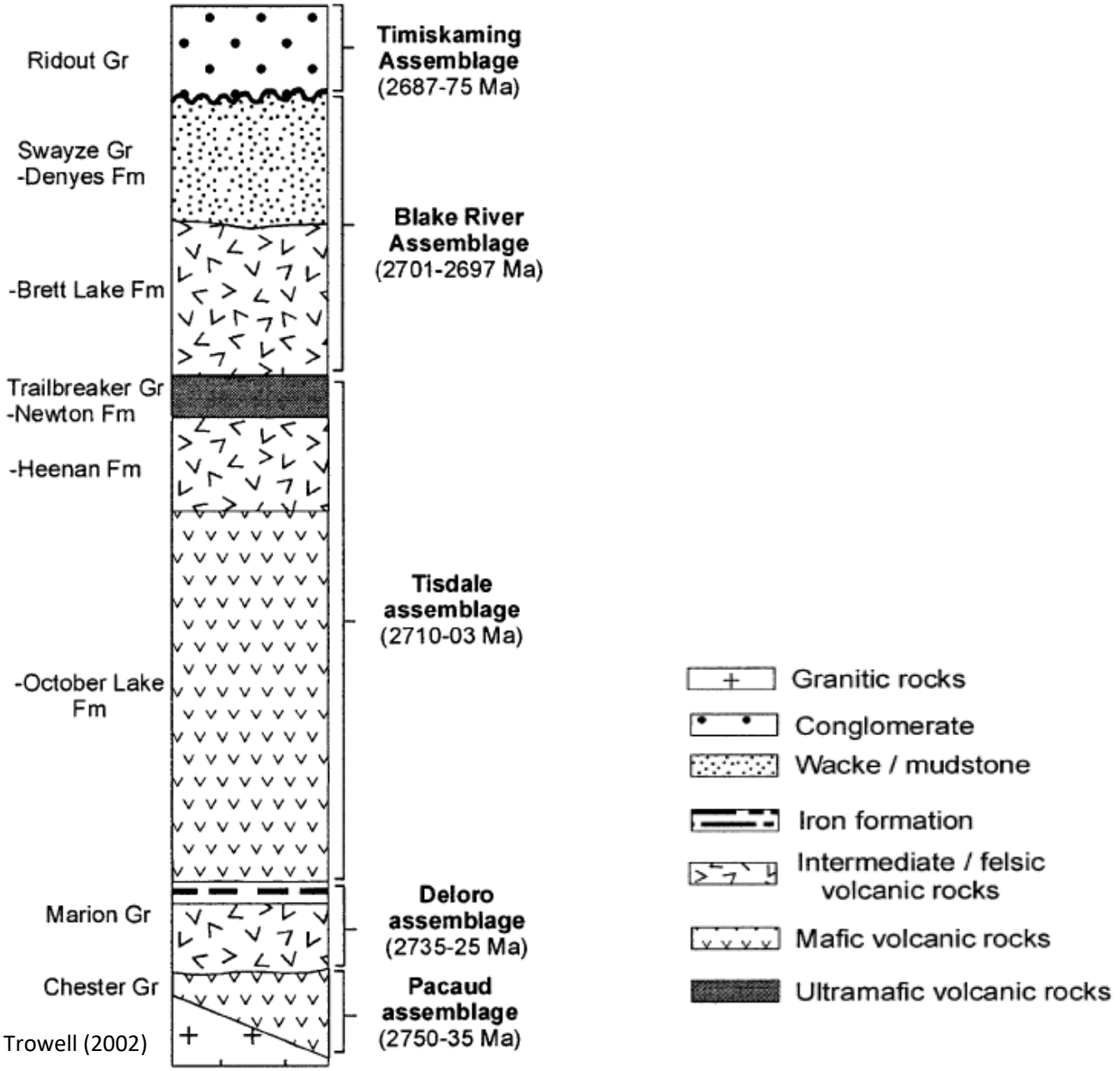
Swayze?


Quebec
Ontario
DPFZ
Timmins
Swayze
N
Faults / Shear zones
Other lithologies
Lithology
Felsic intrusion
Granitoid
Mafic intrusion
Metamorphic
Pyroclastic
Sedimentary
Volcanic
0 25 50 100 150 200
Kilometers

Swayze greenstone belt – Geology map



Swayze greenstone belt – Nomenclature and general Stratigraphy



Ayer and Trowell (2002)

Agenda

1) Overall goals
2) People
3) Historical mining and known deposits
4) The sedimentary basins of Swayze – unconformities, provenance and depositional timing
5) Sedimentary interface zones – the importance of banded iron formation for the Swayze stratigraphy and syngenetic mineralization
6) Geochronology map of Swayze: The emerging of different volcanic terrains
7) Future work
8) Bonus slide – preliminary seismic profile through Swayze

The Swayze transect – Overall Goals

Through transect mapping and transect scale research the goals are to:

- Identify and map critical rock units throughout the belt
- Improve the stratigraphy and architecture of key volcanic and sedimentary successions and their internal relationships (thereby improving further geophysical interpretations - e.g., seismic and MT)
- Solve the question whether the volcanic stratigraphy represents a continuum or its comprised of an amalgamation of unrelated volcanic terrains?

Assess the potential for base and precious metal mineralization

The Swayze transect – People

Rasmus Haugaard (Metal Earth)

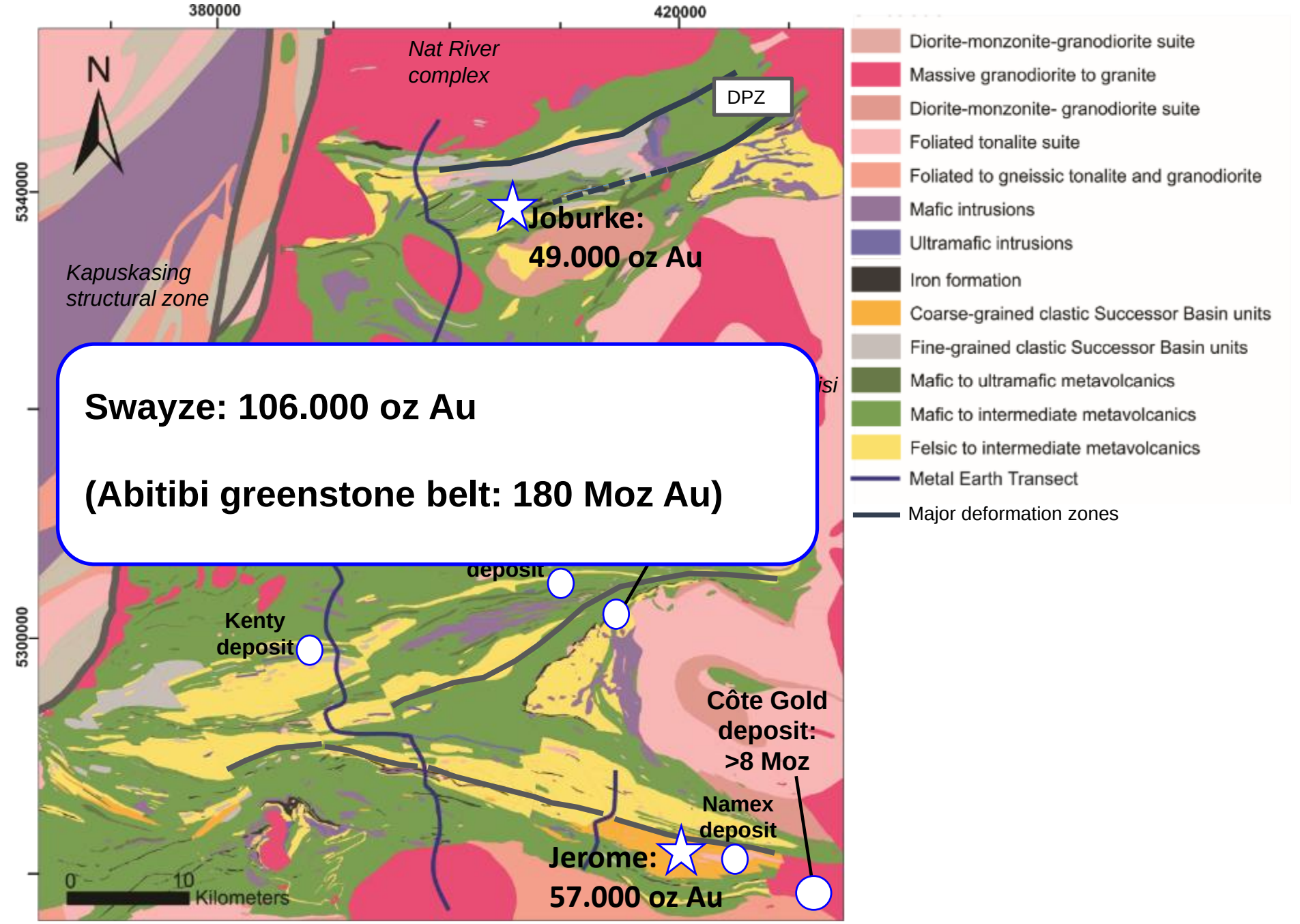
Tom Gemmell (OGS and PhD student w. Metal Earth)

Msc and Bsc students

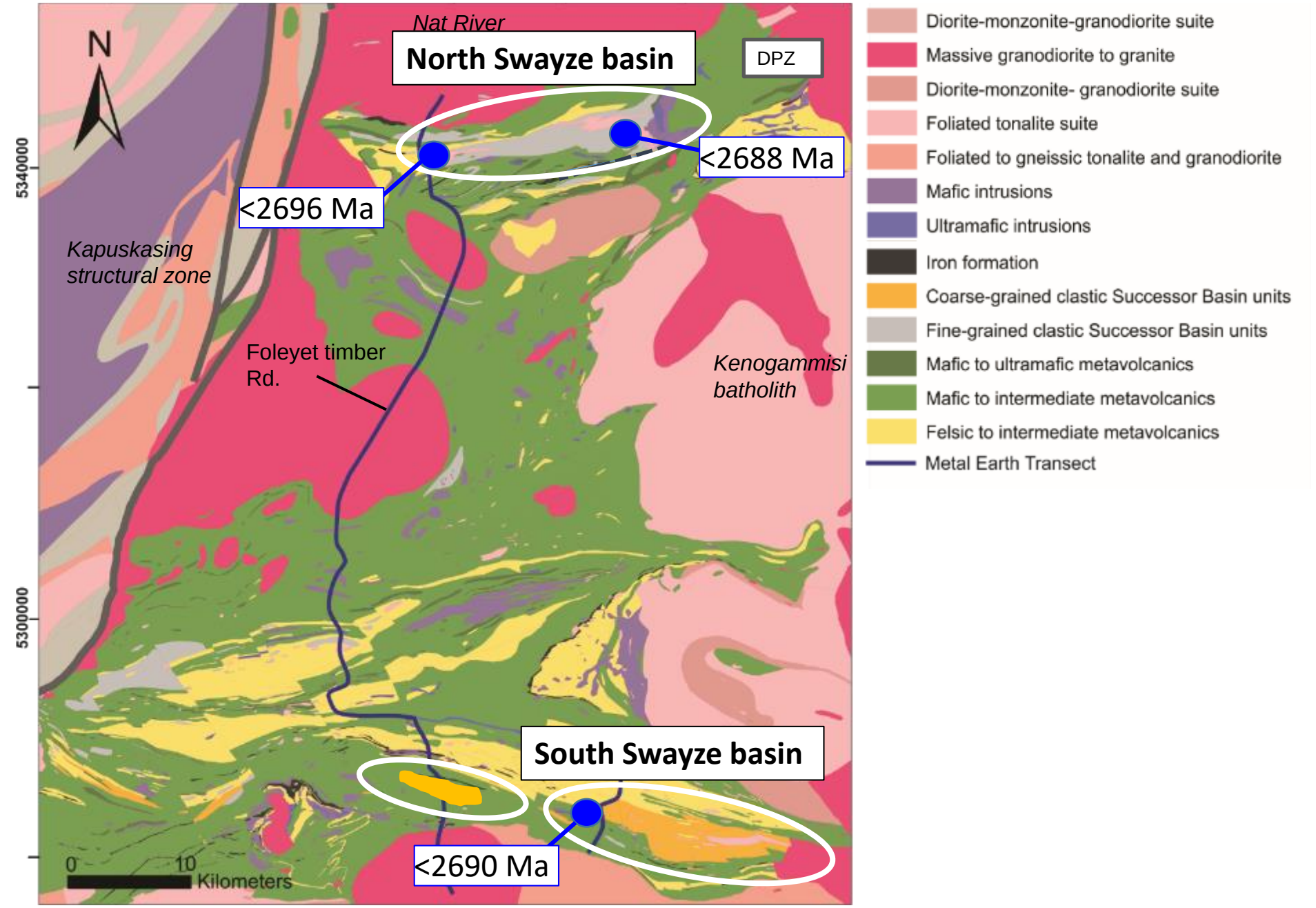
Arthur Blake, Msc (2017-2019) - Jefferson VMS deposit
Sean Hofman, Bsc (2017-2018) - Jefferson VMS deposit
Colt Meyer, Bsc (2017-2018) - Erosional unconformity

Lawraine Mogashoa Msc (2018-2020) - Geological and Geophysical modelling

Swayze - known deposits and mine sites



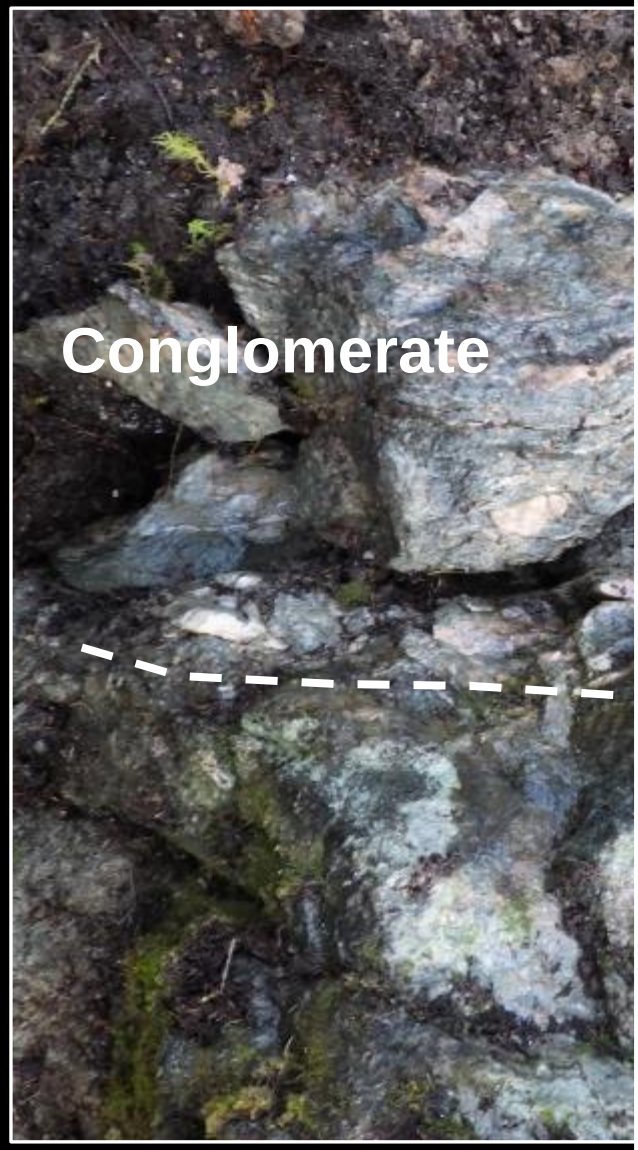
The Swayze transect – The sedimentary basins of Swayze



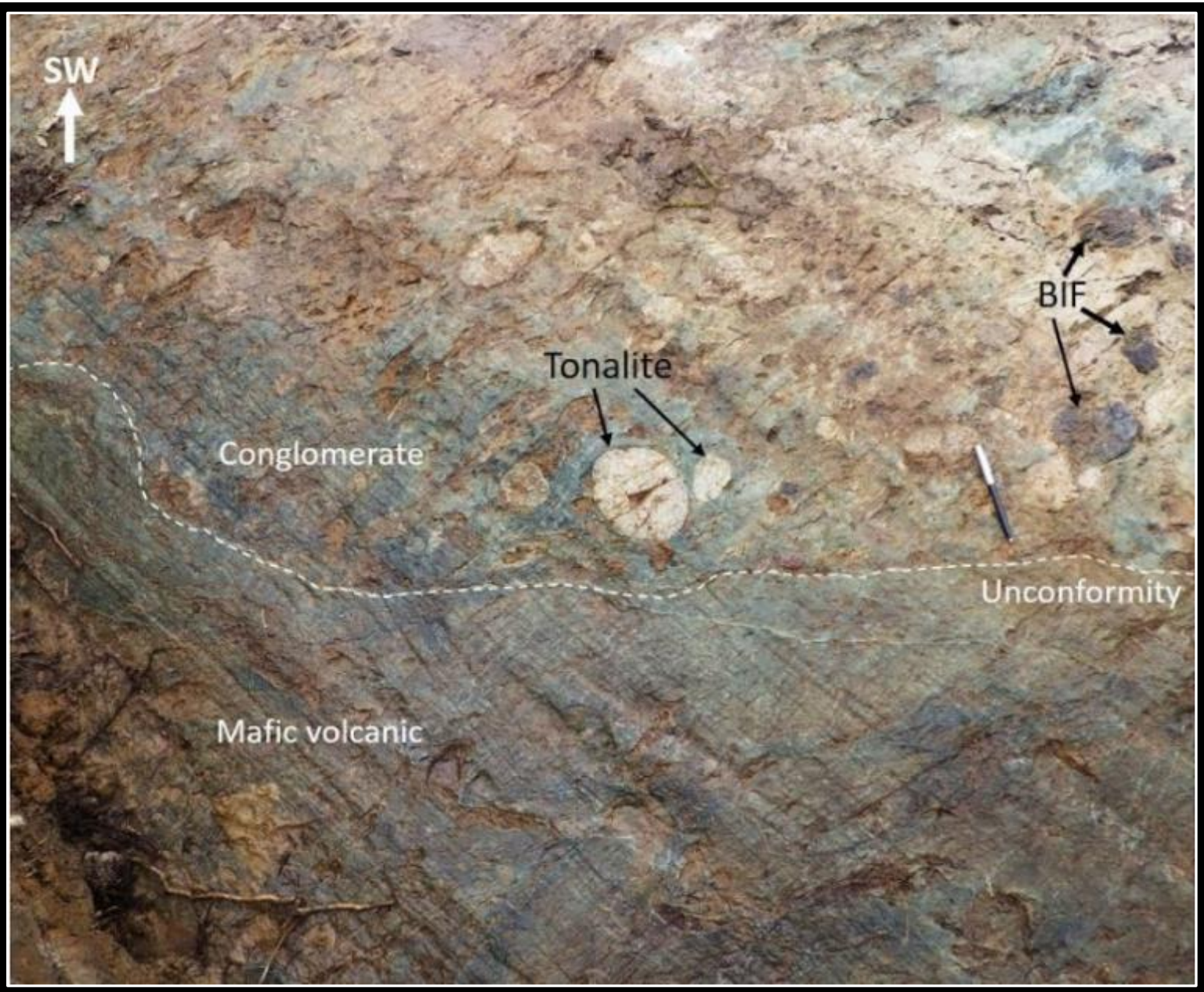
The Swayze transect – South Swayze basin

The Swayze transect – South Swayze basin

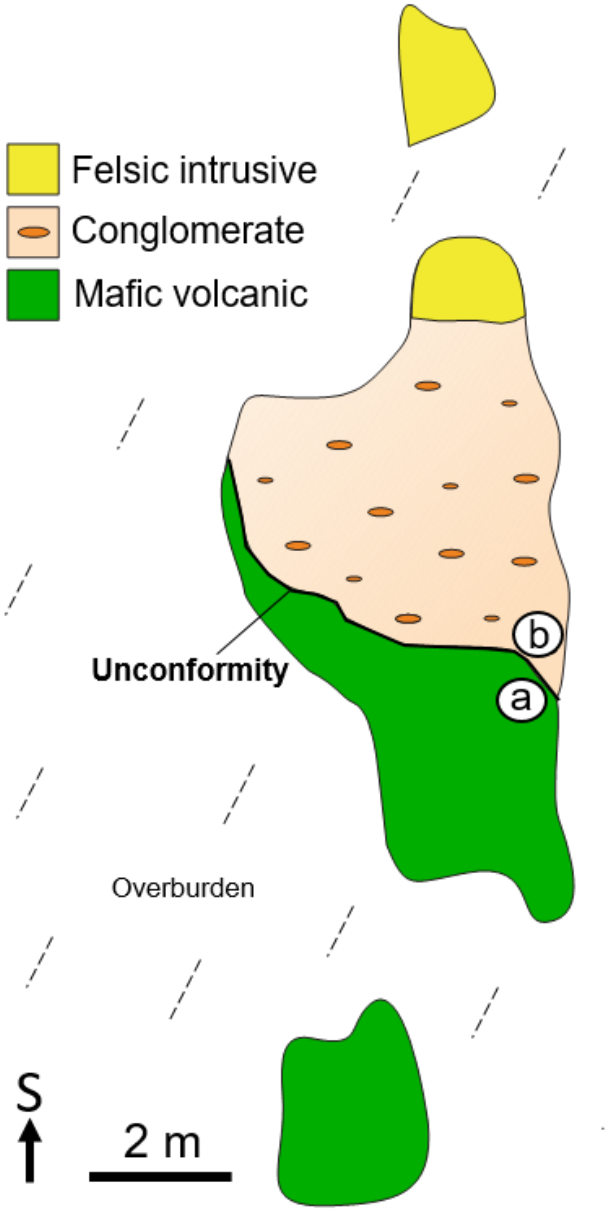
The Swayze transect – South Swayze basin - Unconformities

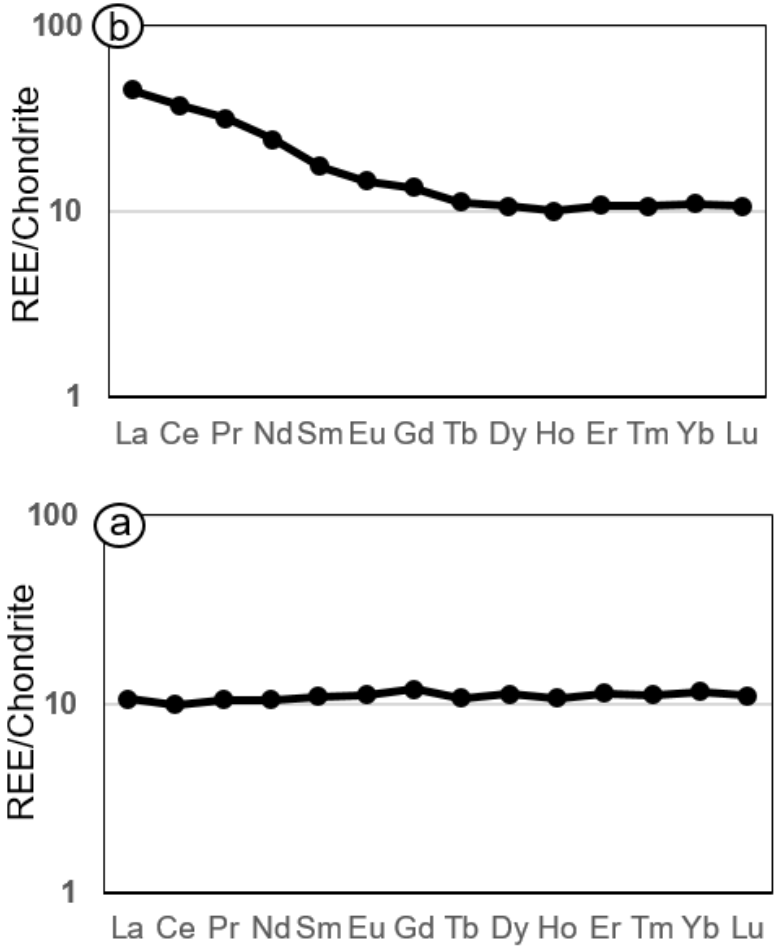


The Swayze transect – South Swayze basin - Unconformities

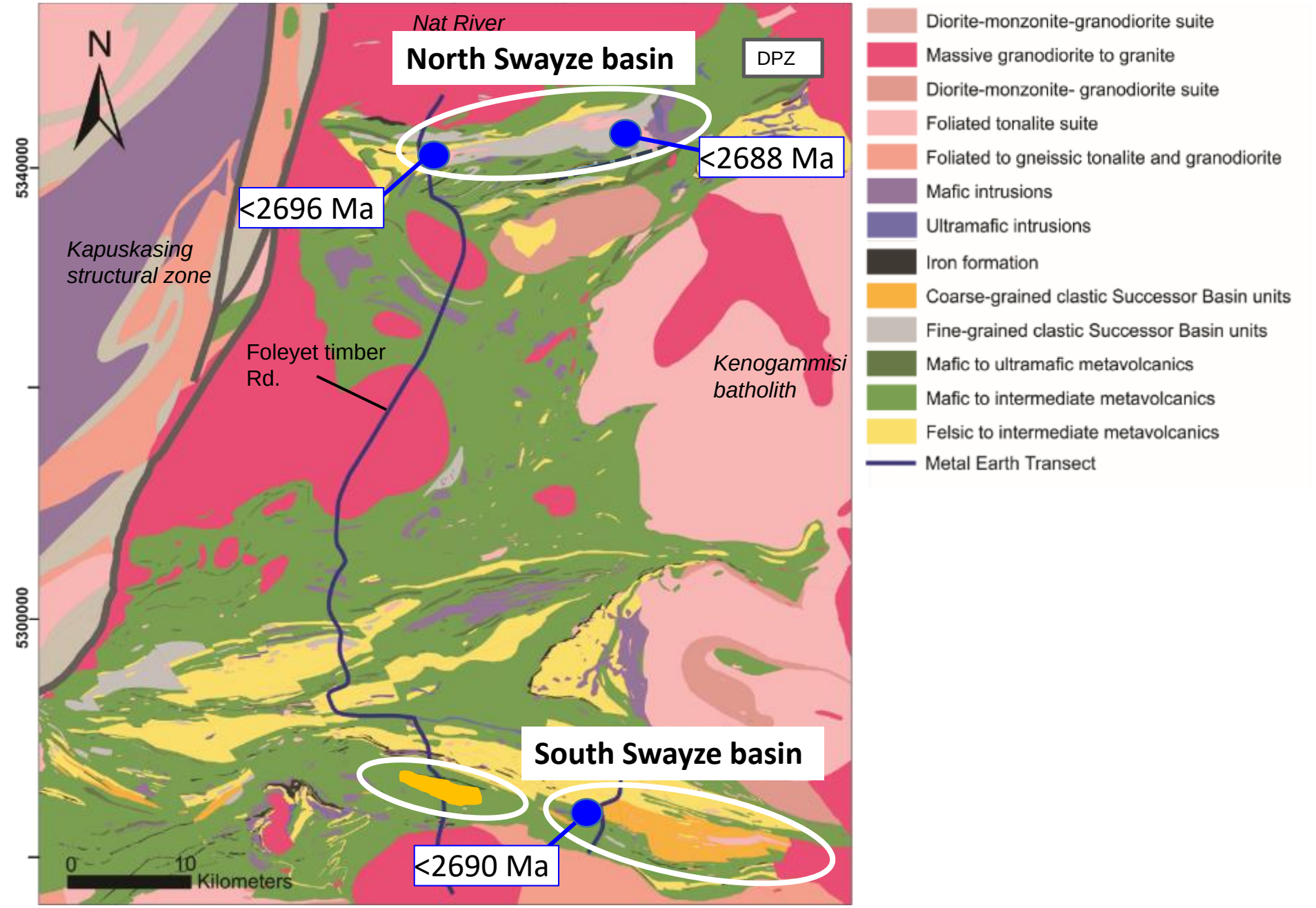


The Swayze transect – South Swayze basin - Unconformities

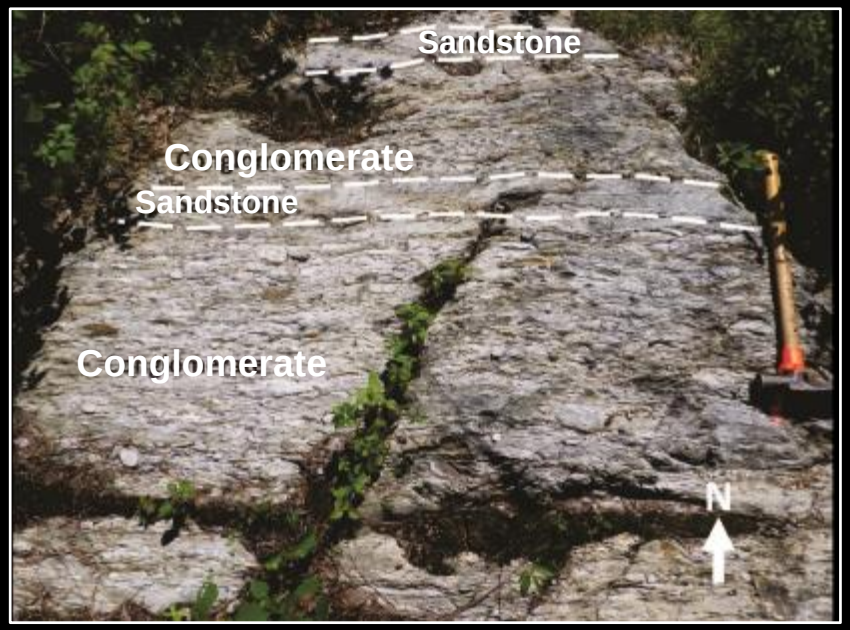


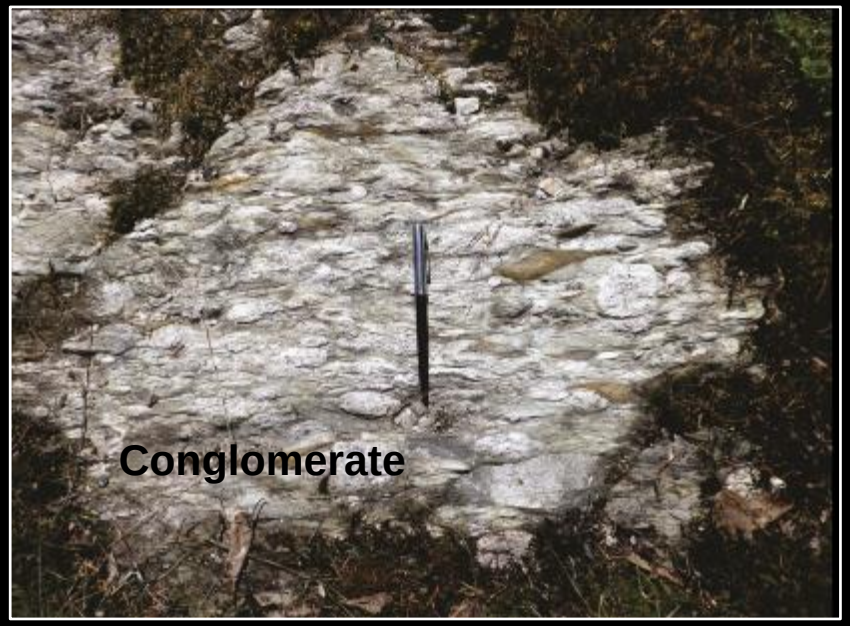


The Swayze transect – The sedimentary basins of Swayze

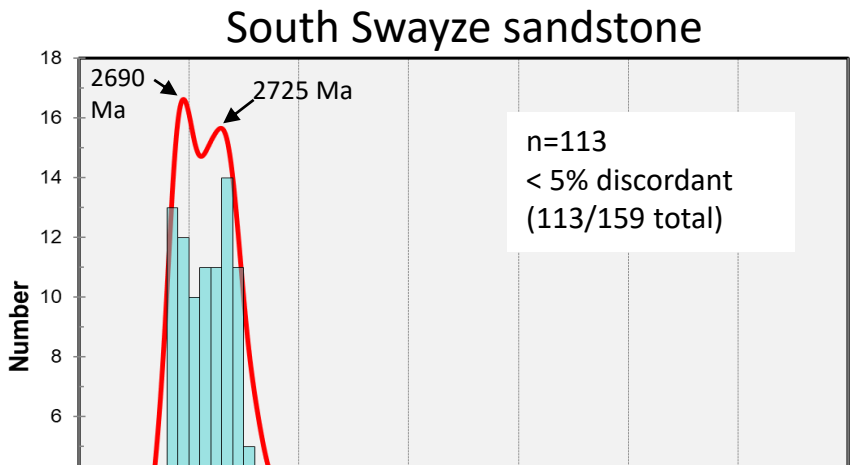


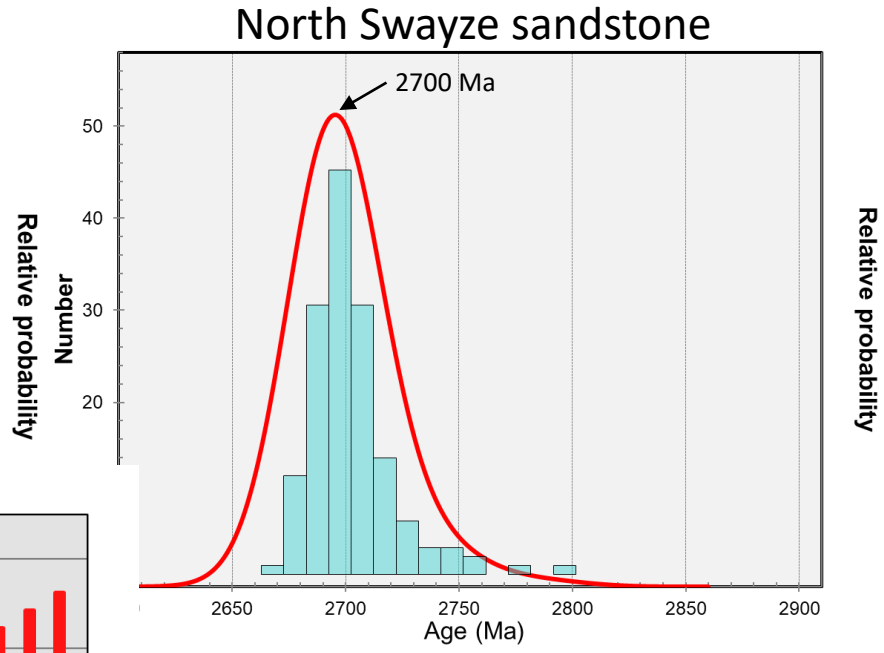
The Swayze transect – North Swayze basin

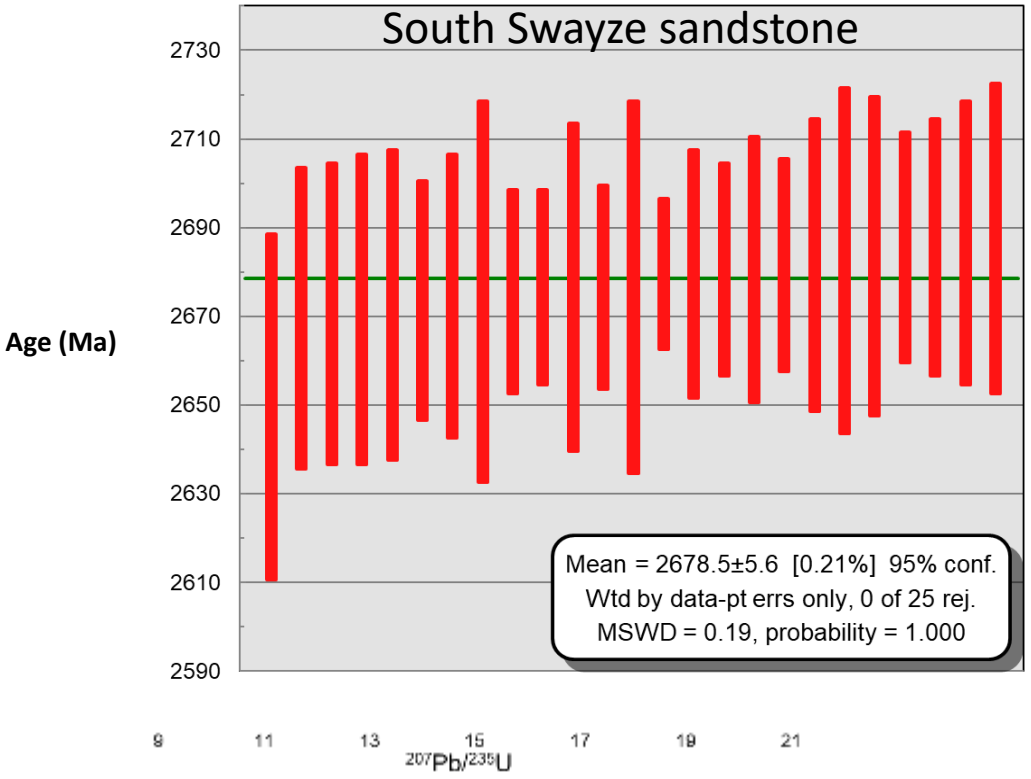


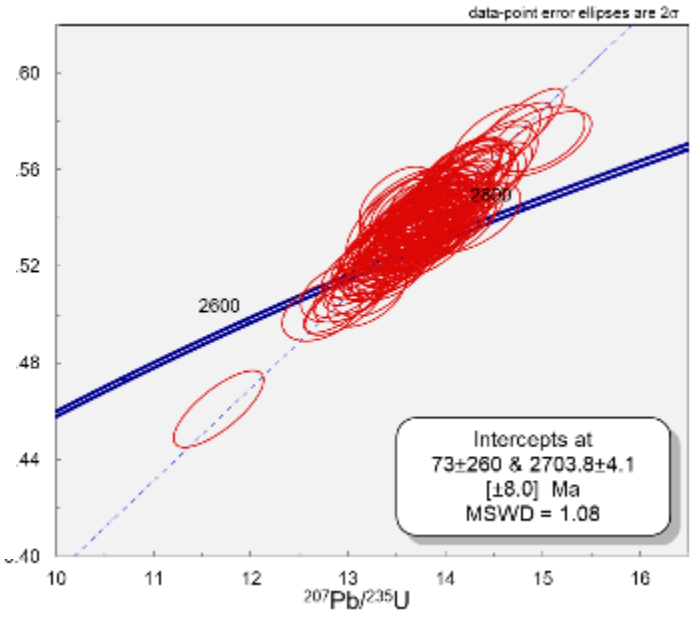


The Swayze transect – The sedimentary basins – Detrital zircons

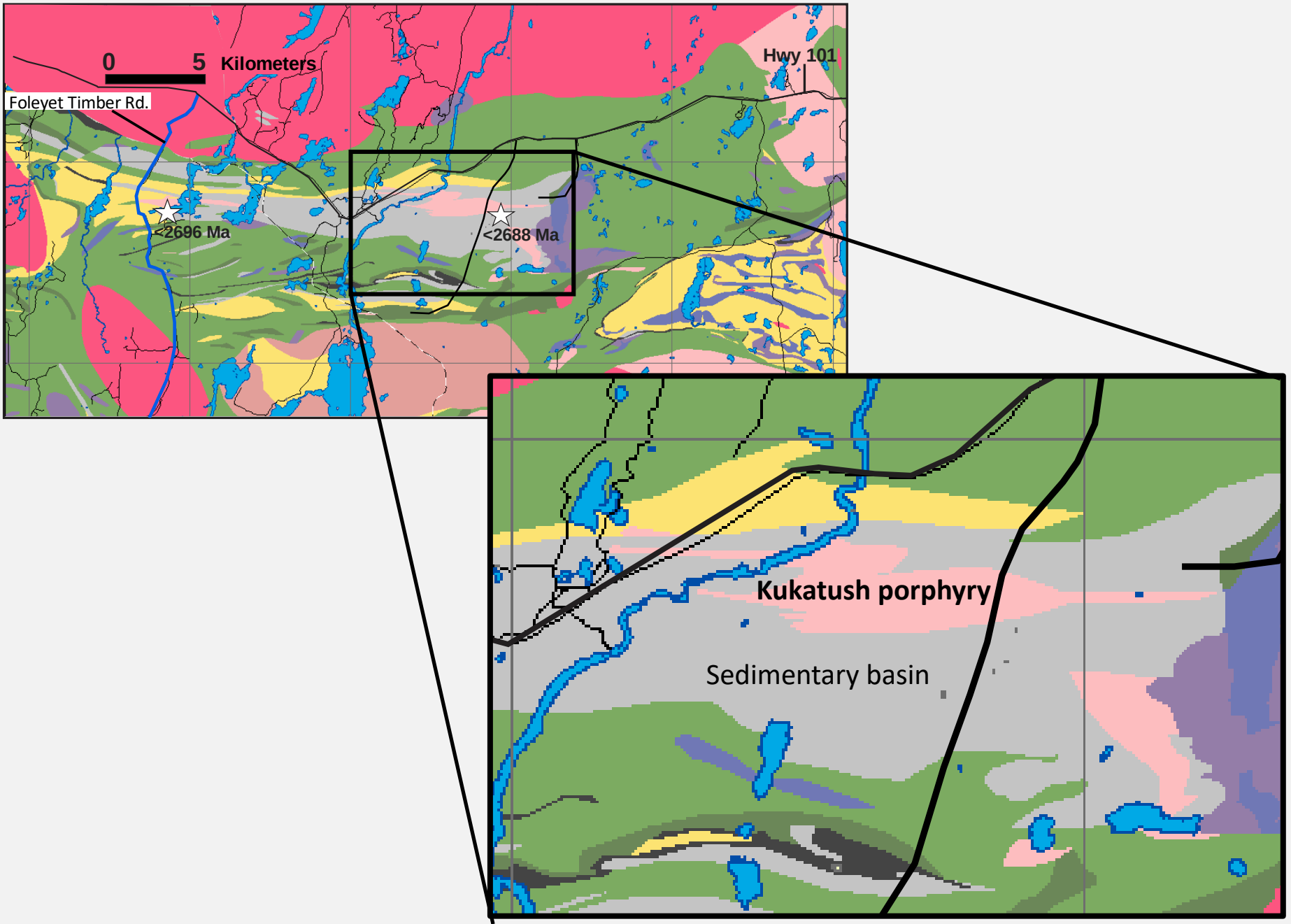




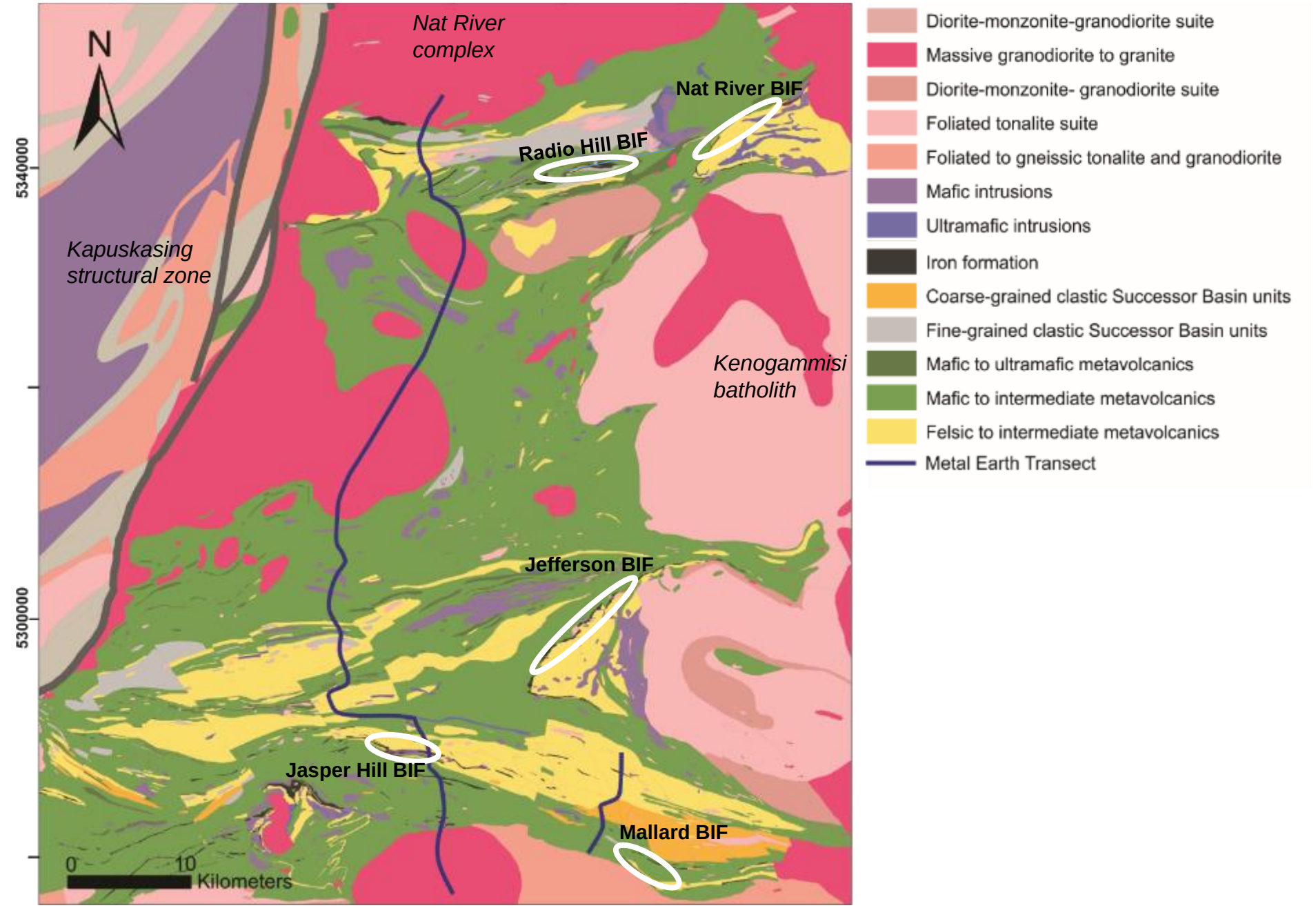




The Swayze transect – Depositional timing of the North Swayze basin?

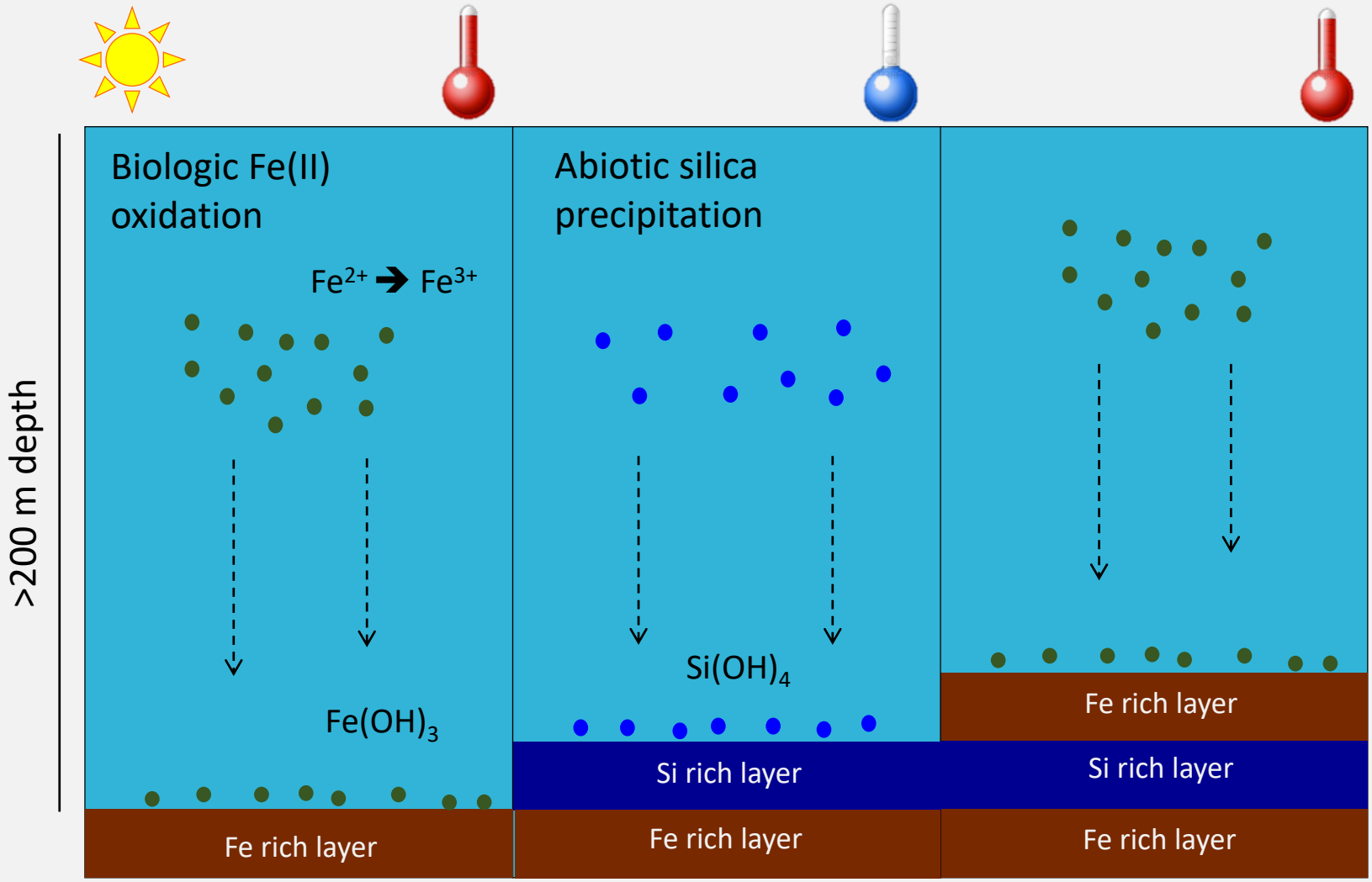


The Swayze transect – The importance of BIF



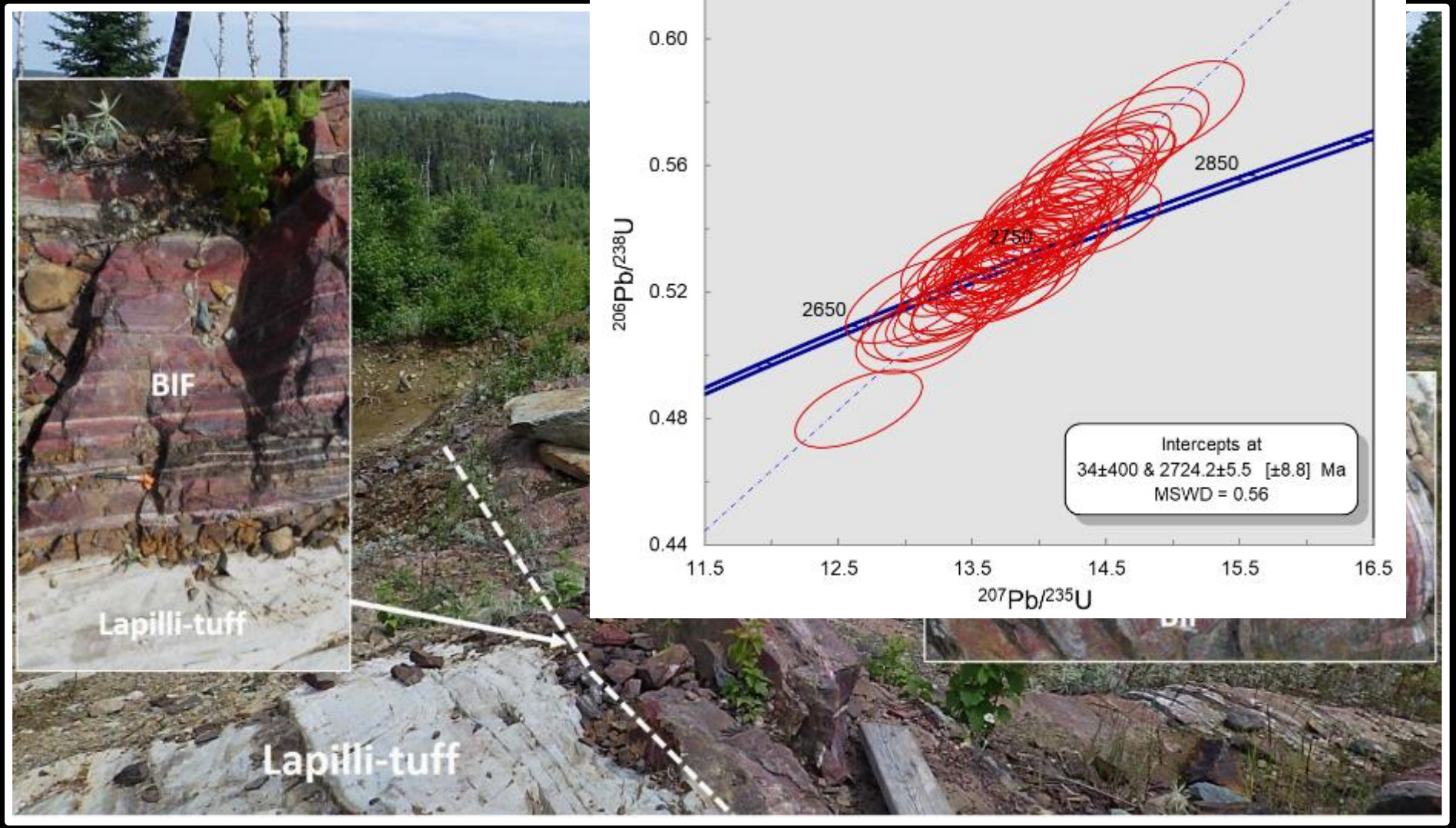
The Swayze transect – The importance of BIF

Depositional rate = 1 cm/400-500 year = 20-25 m/Myr

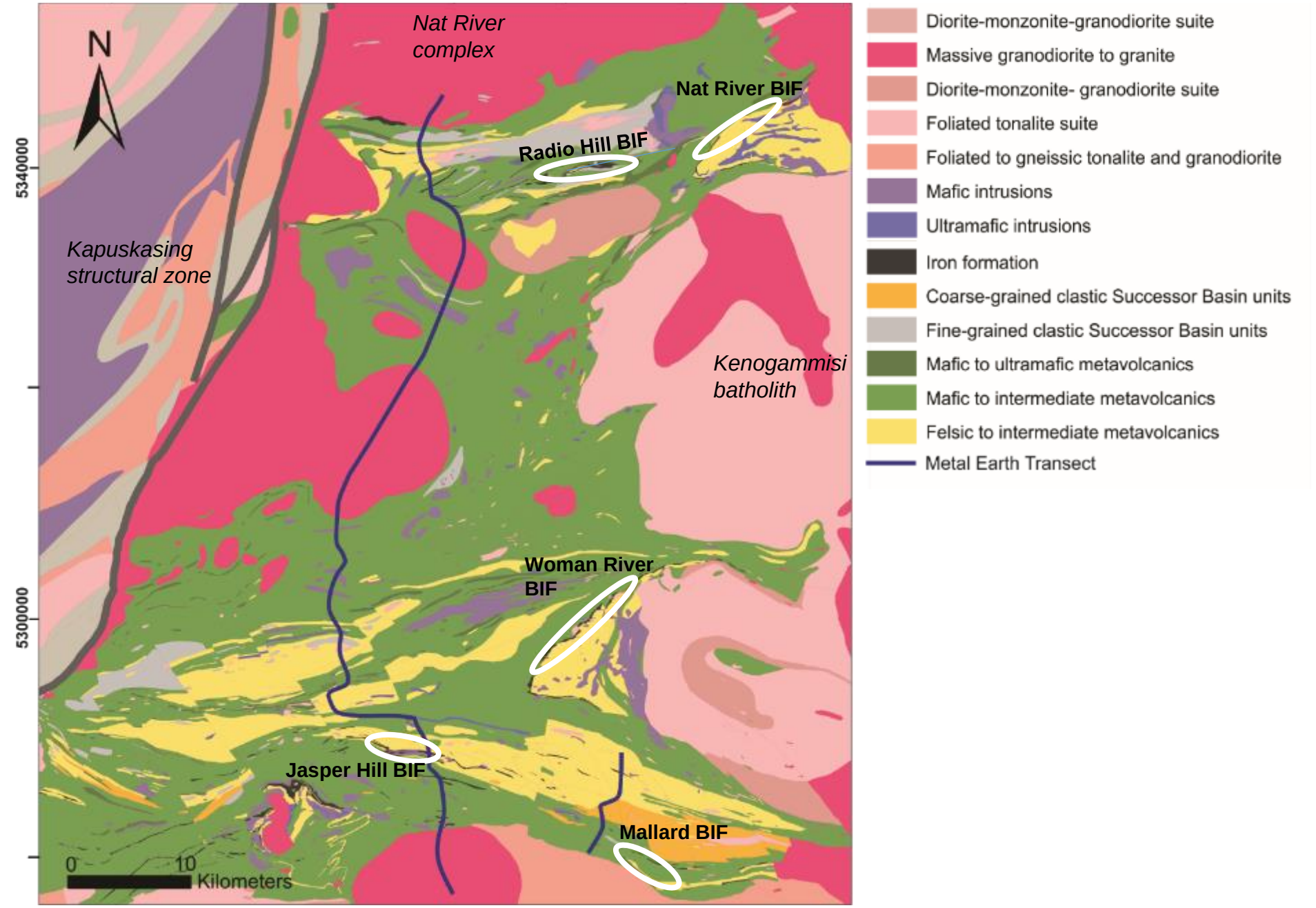


Haugaard et al. 2013

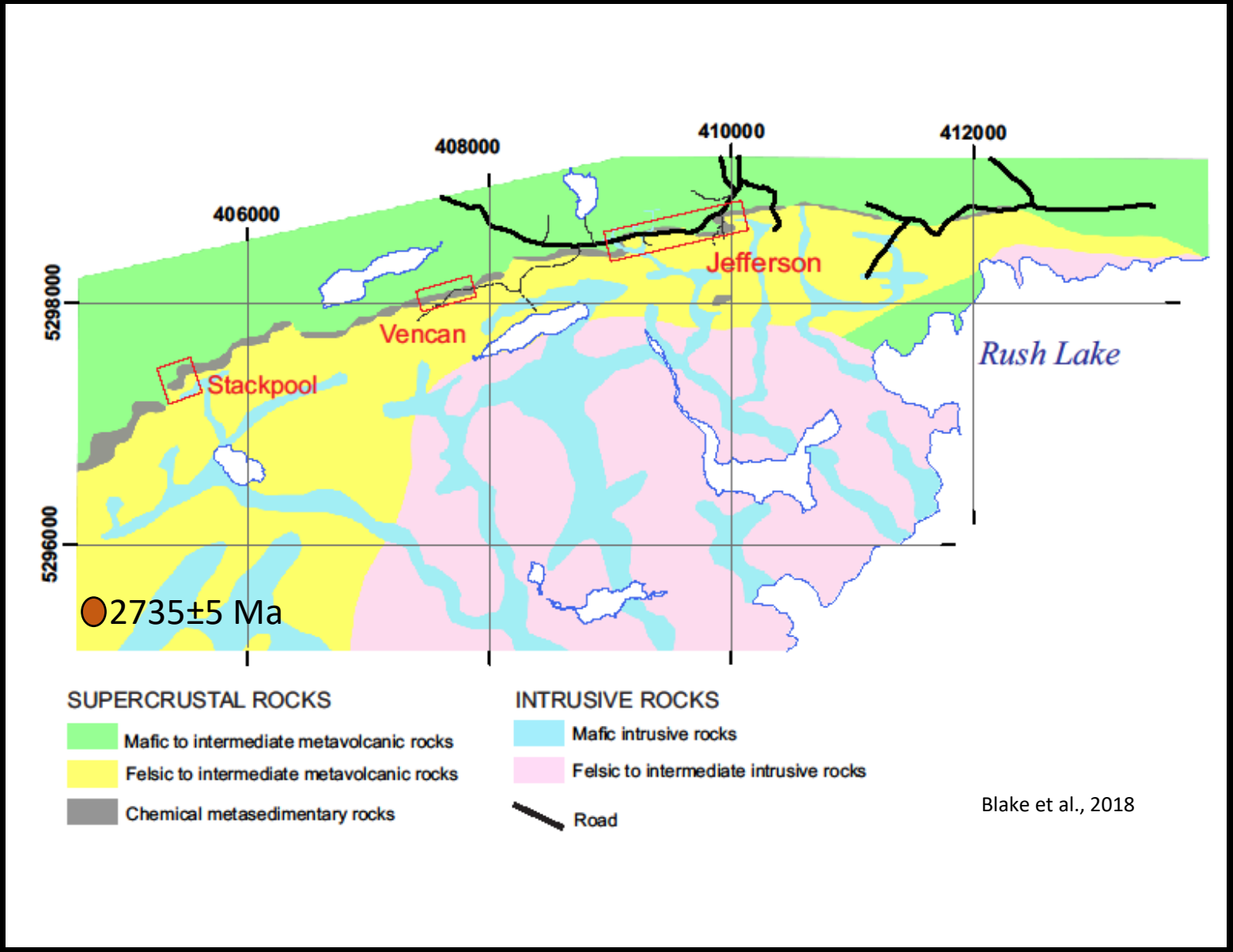
The Swayze transect – The importance of BIF



The Swayze transect – The importance of BIF

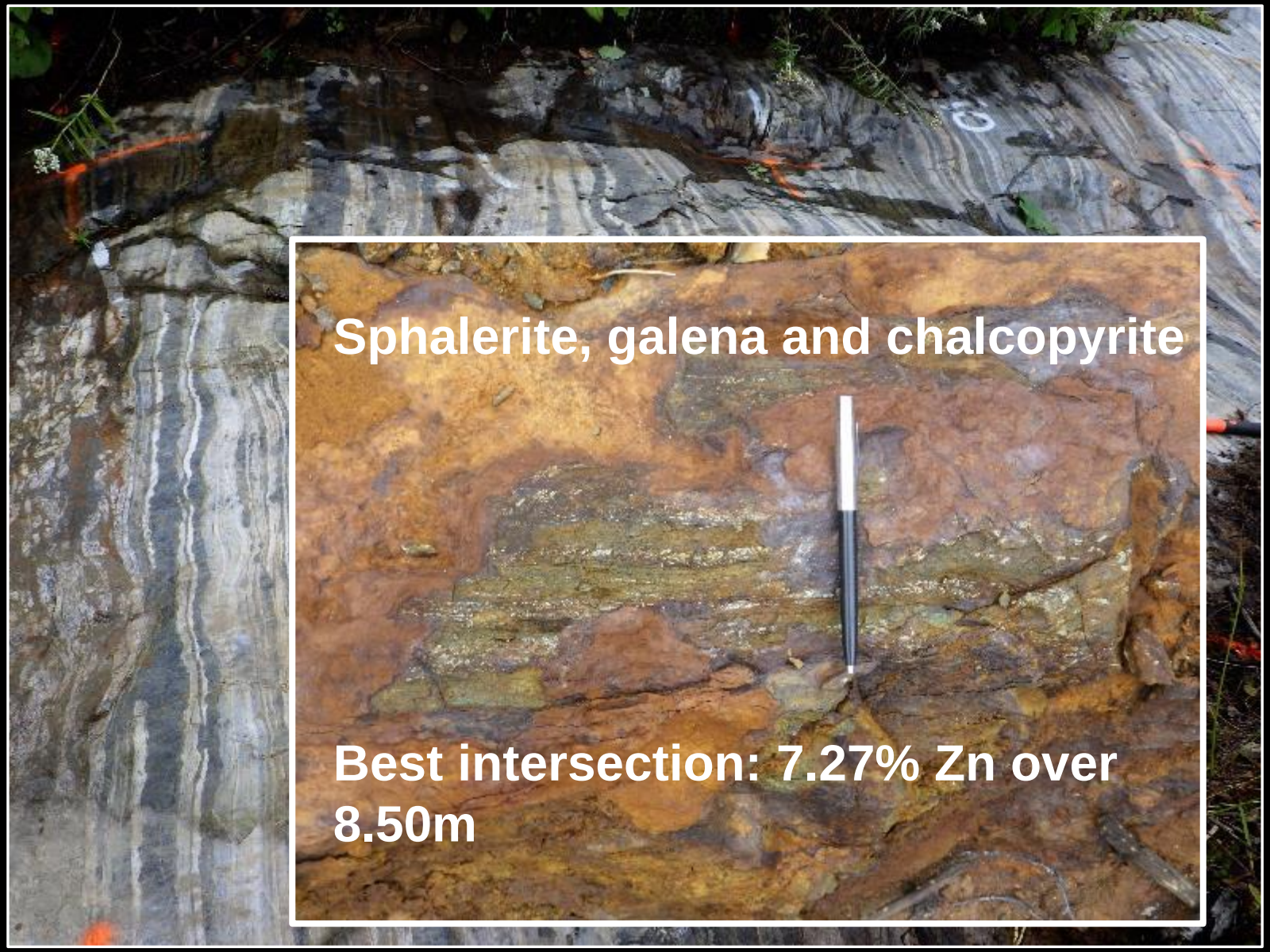


The Swayze transect – Msc project - The Woman River BIF

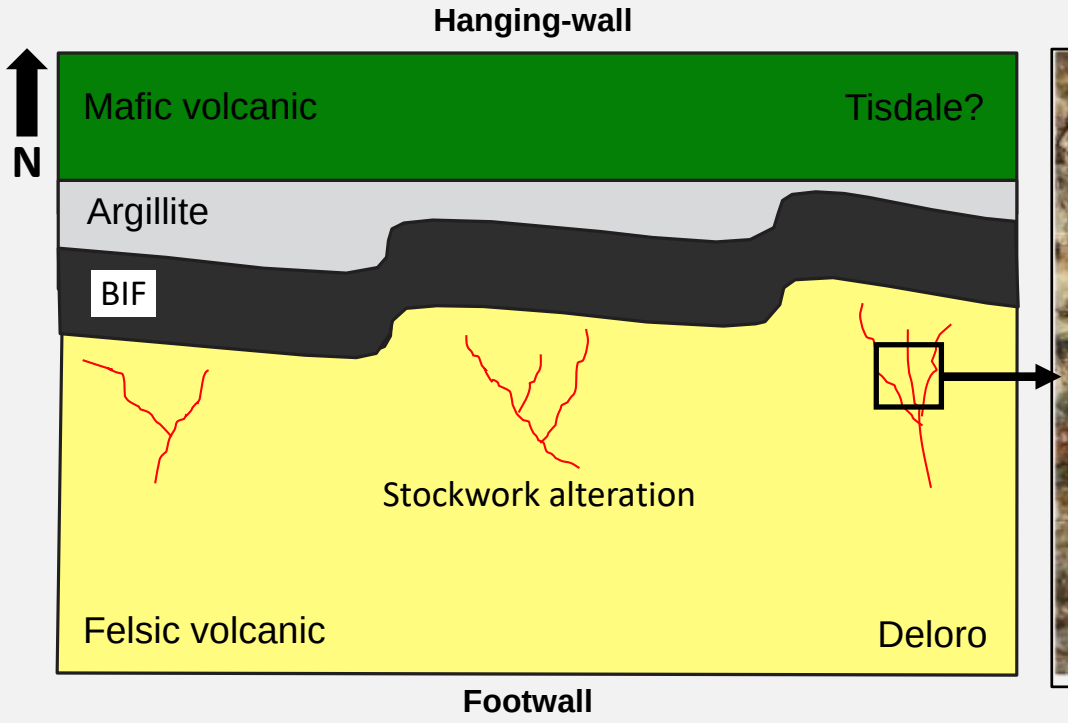


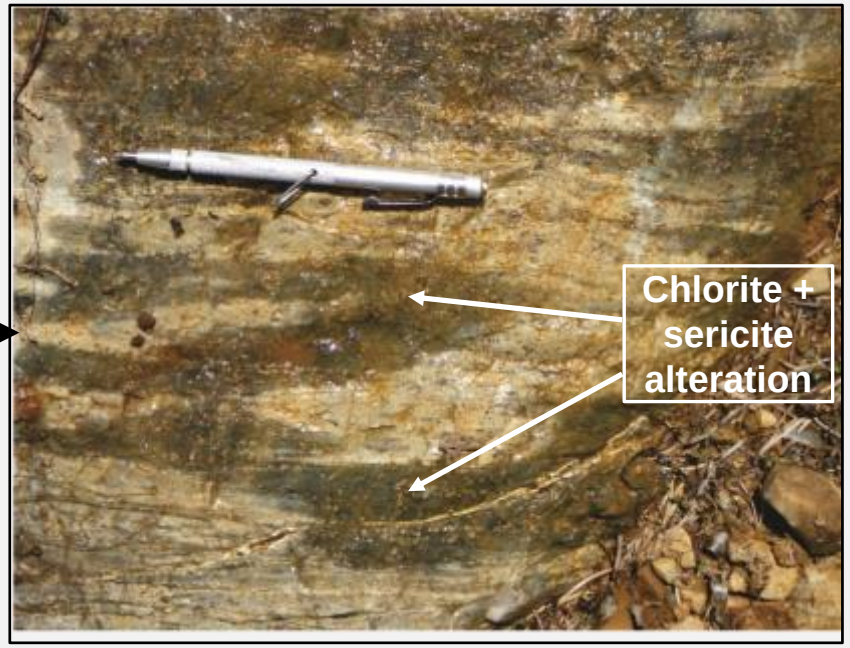
Blake et al., 2018

The Swayze transect – The Woman River BIF



The Swayze transect – The Woman River BIF





Future work

1. Further strengthen the stratigraphy (chronostratigraphy and chemostratigraphy of the volcanic rocks)
2. Improving the geological architecture such as important terrain boundaries can be determined
3. Implement the high-resolution seismic data, especially the R2 (<10 km depth)
4. Constraining the nature, provenance and, if possible, the depositional timing of the North Swayze basin

Acknowledgements: Peter MacDonald (OGS); Charlie Mortimer; Pat Pope and Mary Stalker (GFG Resources); IAMGOLD