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Results from the MinEx CRC National Drilling Initiative campaign in East Tennant: What's there and why you should care

Andy Clark

On behalf of Anthony Schofield, Michael Doublier, Roger Skirrow, Wenping Jiang, Ian Roach, Angela O'Rourke, Anthony Budd, James Murr, Simon van der Wielen, Mark Sutti, Matilda Thomas, James Goodwin, Jingming Duan, Andrew Cross, Karol Czarnota, Dot Close, and many others…

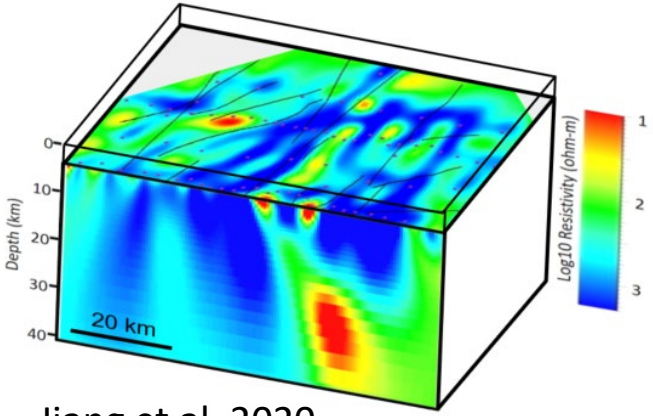
OMNI GeoX and DDH1 drilling

MinEx CRC

NORTHERN TERRITORY GOVERNMENT

East Tennant: What's there and why should you care?

Why here? | Main rock units | Tectonic history | Alteration/mineralisation | Exploration considerations



Jiang et al. 2020

Aim: Stimulate mineral exploration and investment, especially undercover

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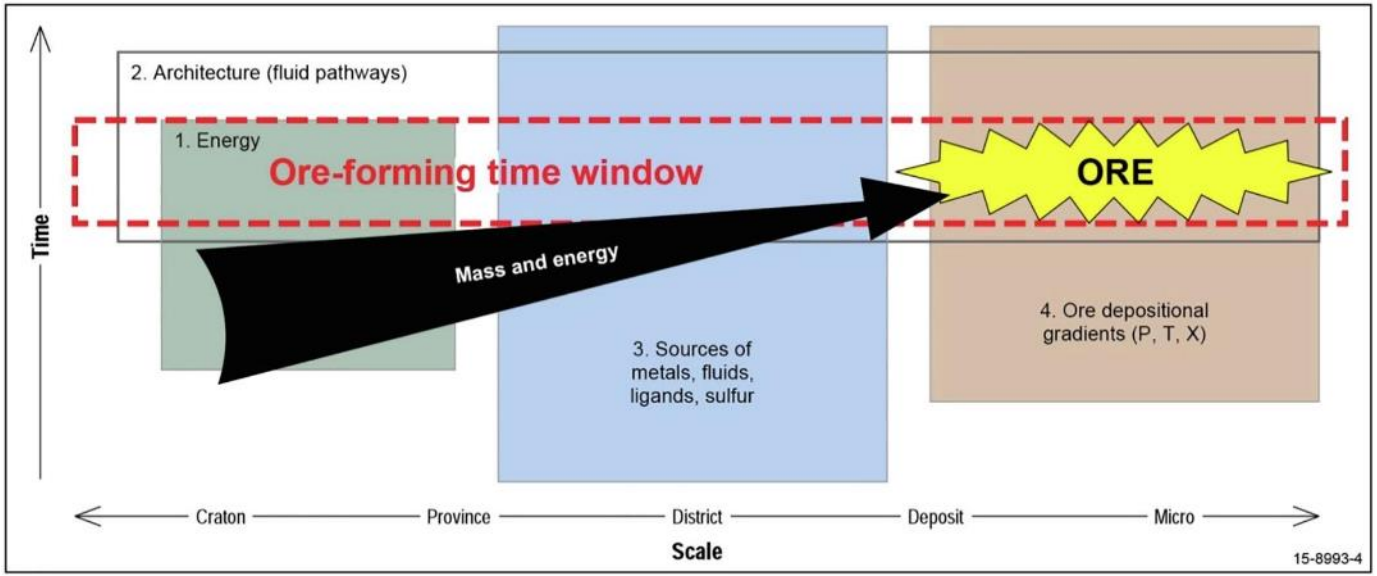
Using new data to identify potential new mineral province(s)

MinEx CRC

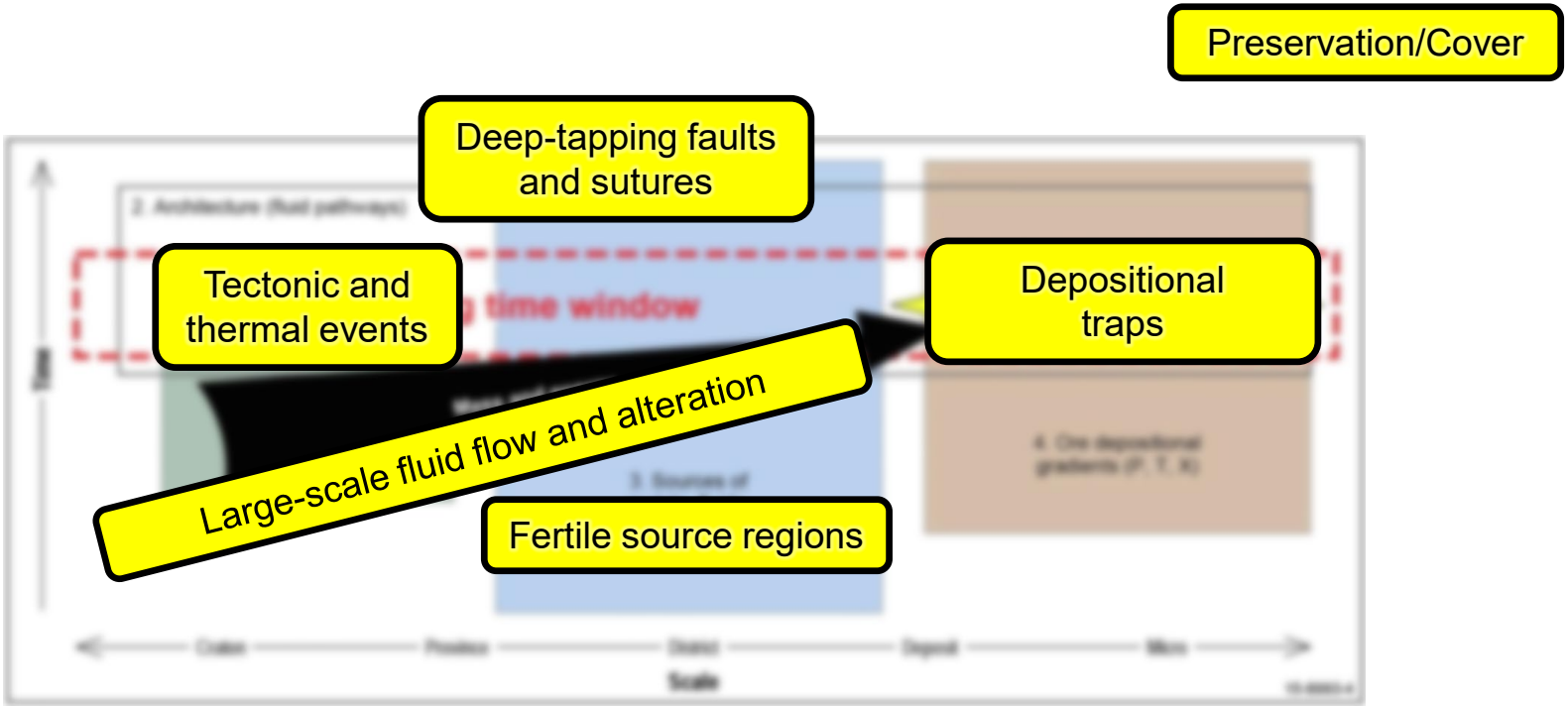
Testing ideas with drilling, etc

East Tennant: What's there and why should you care?



Skirrow (2009), Dulfer et al. (2016), Murr et al. (2020)

East Tennant: What's there and why should you care?

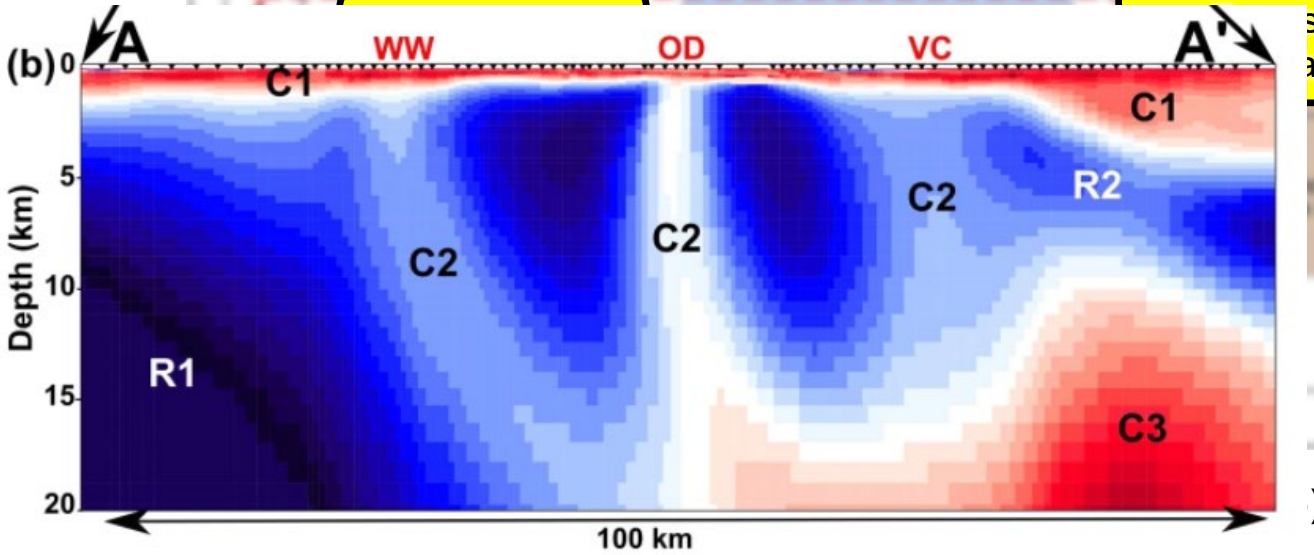


Skirrow (2009), Dulfer et al. (2016), Murr et al. (EFTF Abs.)

East Tennant: What's there and why should you care?

Preservation/Cover

Deep-tapping faults and sutures



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Heinson et al. (2018)

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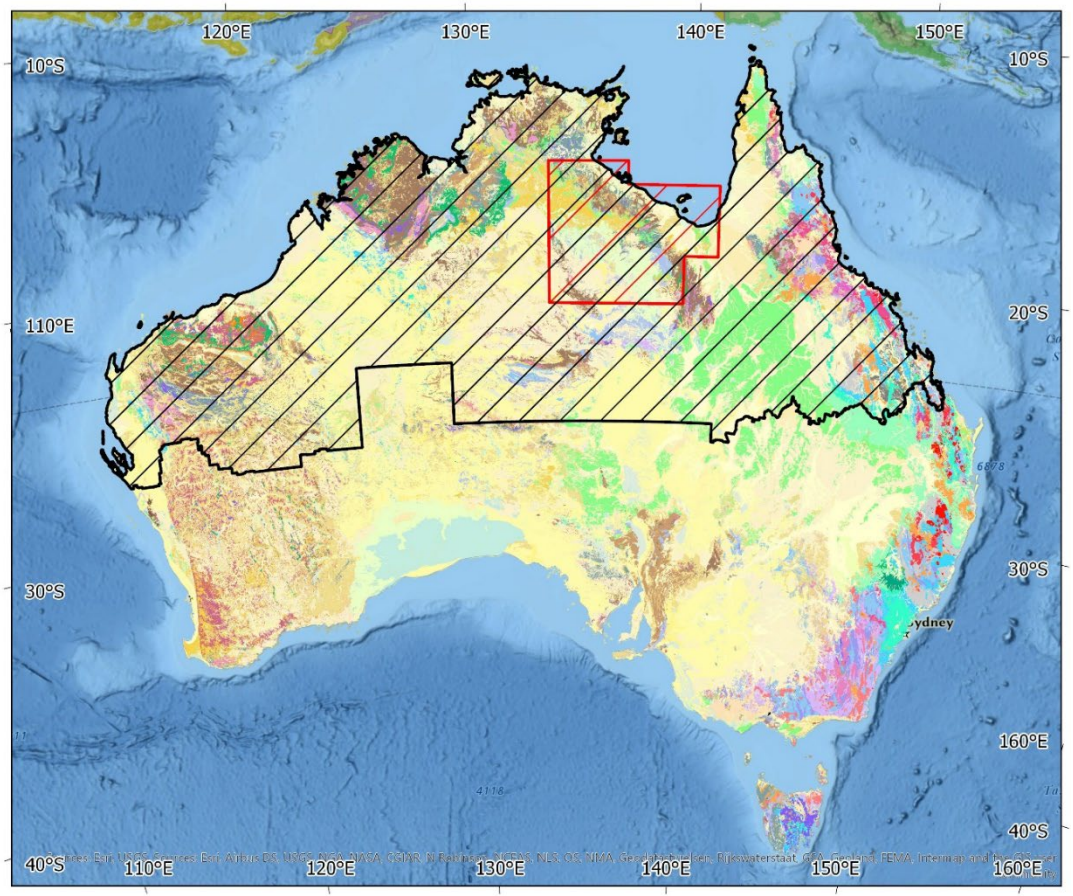

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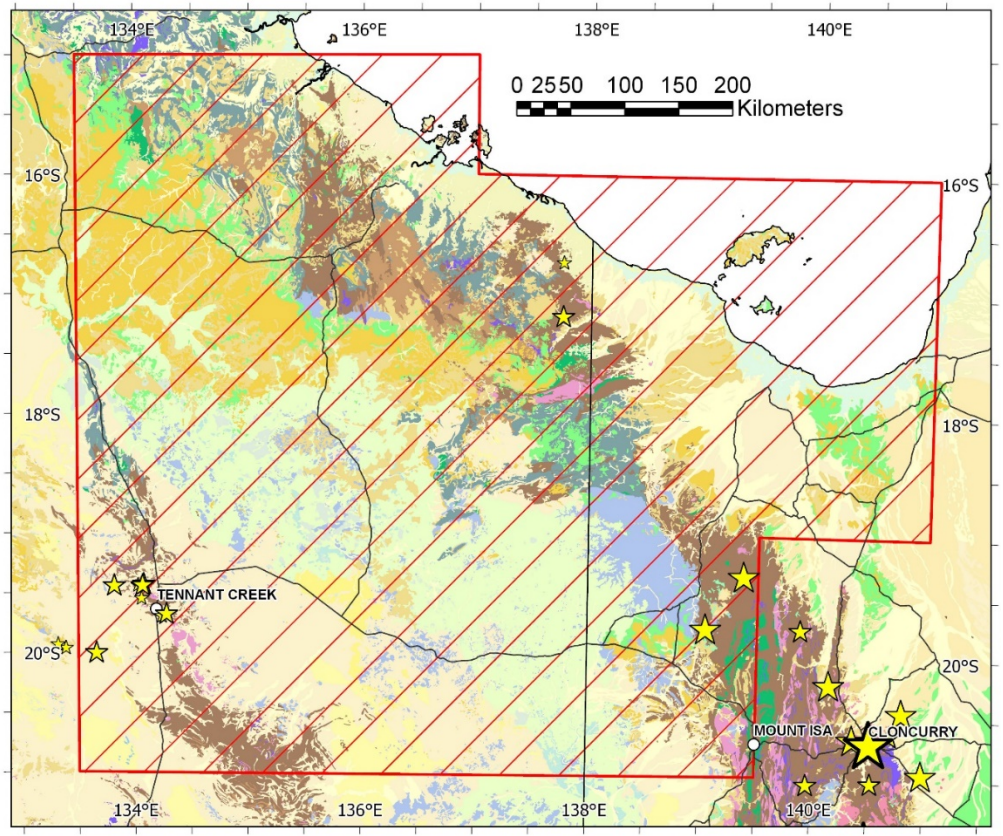
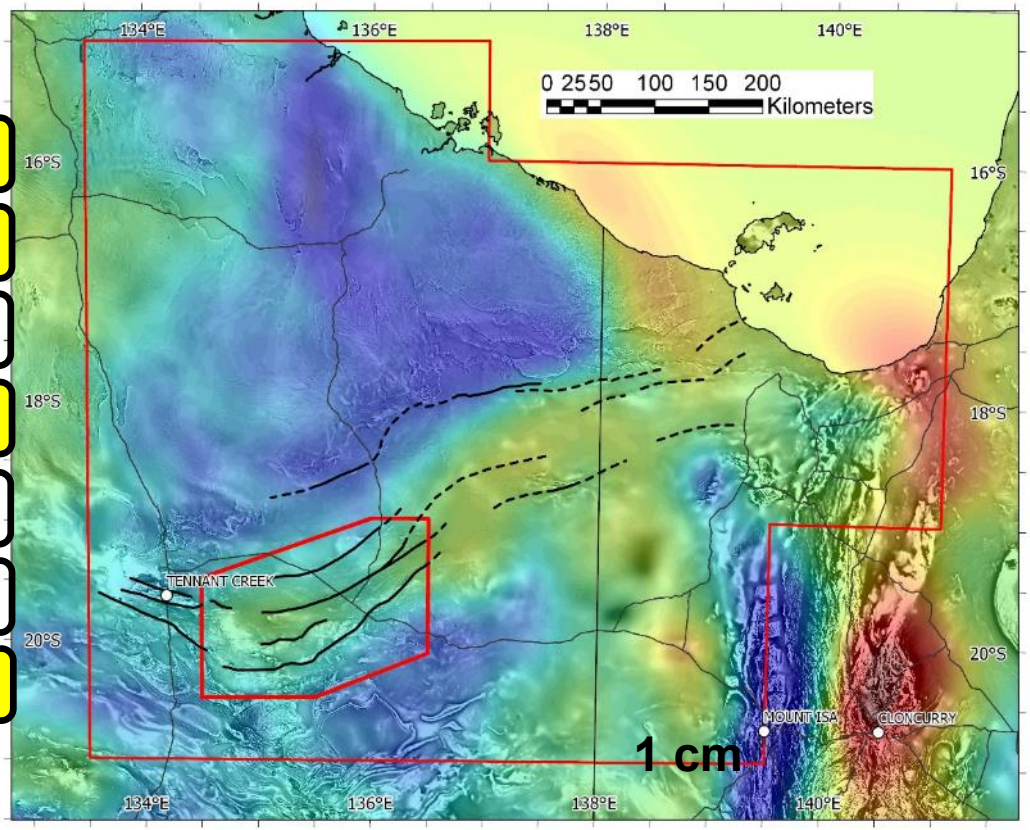


Cu and/or Au deposit

East Tennant: What's there and why should you care?

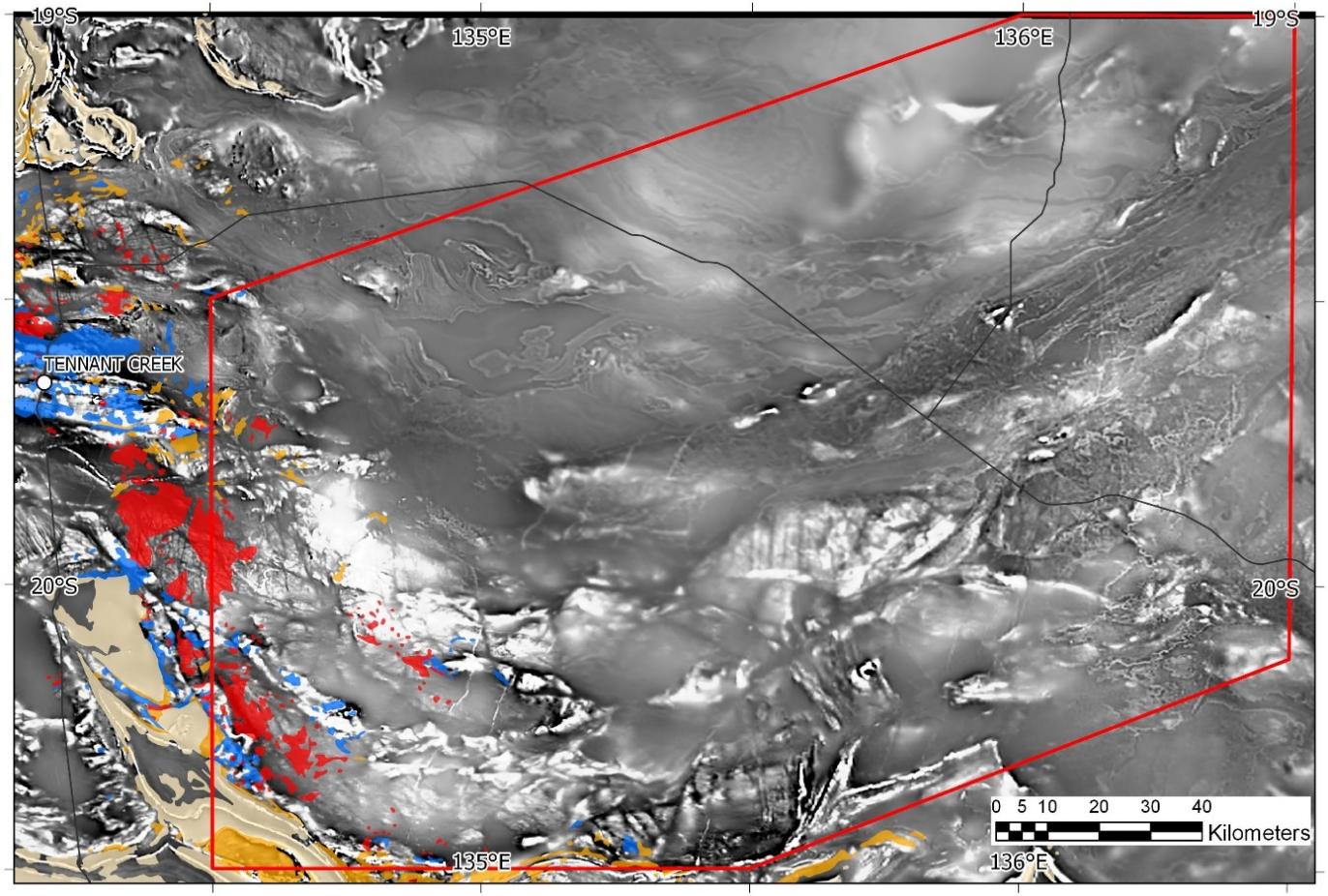
- Fertile source regions
- Deep-tapping structures
- Tectono-magmatic drivers
- Fluid flow/alteration
- Depositional traps
- Preservation
- Cover depth



AusLAMP conductivity at 35 km depth (Duan et al. 2020)

+ 1VD Aeromagnetics

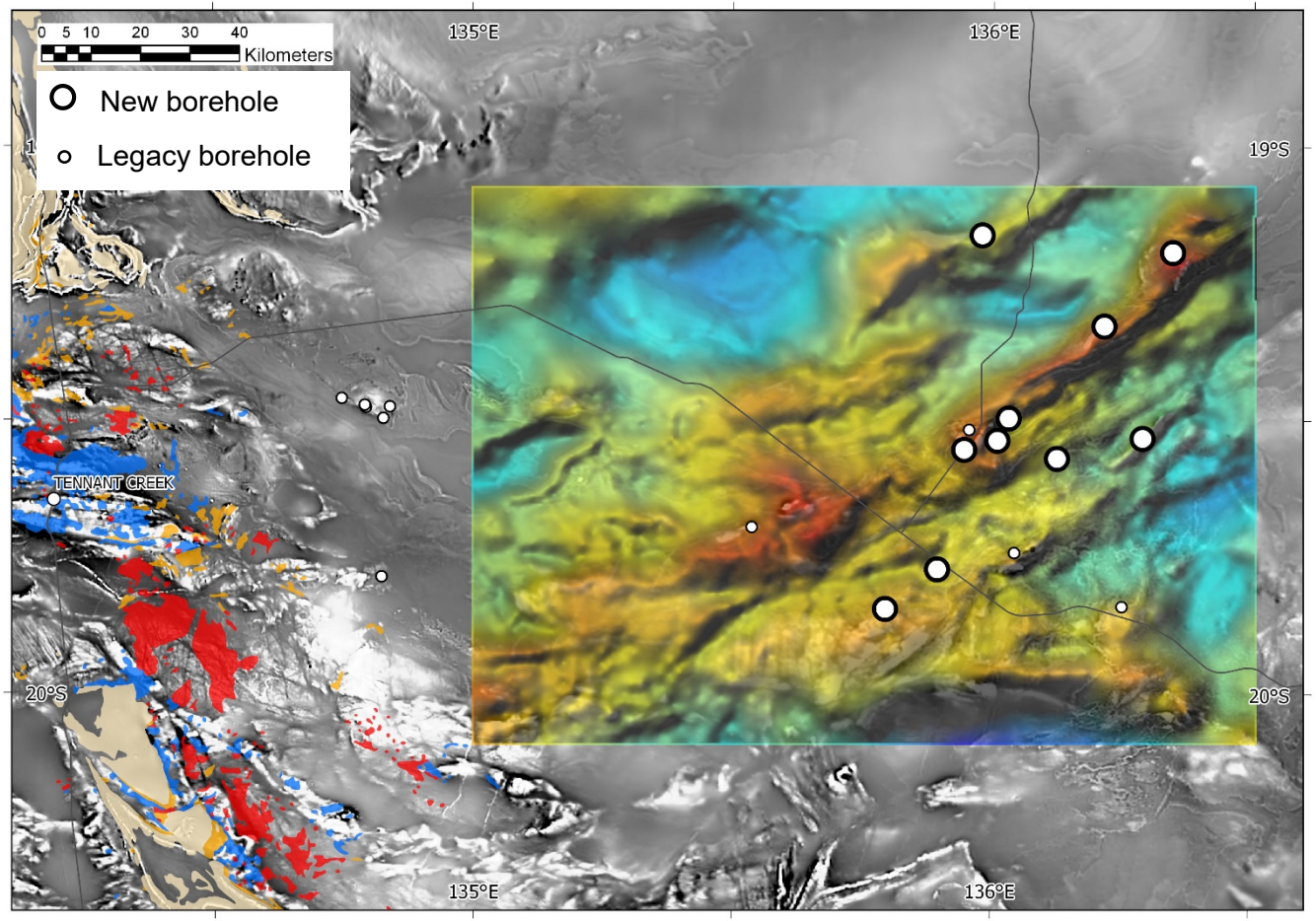
East Tennant: What's there and why should you care?



East Tennant

- Little basement outcrop
- Underexplored
- Very little was known about the geology (ages, stratigraphy, intrusives, deformation, etc)
- Cover depths?
- **Are there the right mineral systems 'ingredients'?**

East Tennant: What's there and why should you care?



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- Drilling
- 2km spaced gravity data
- Conductivity from magnetotellurics
- Geochron, etc …

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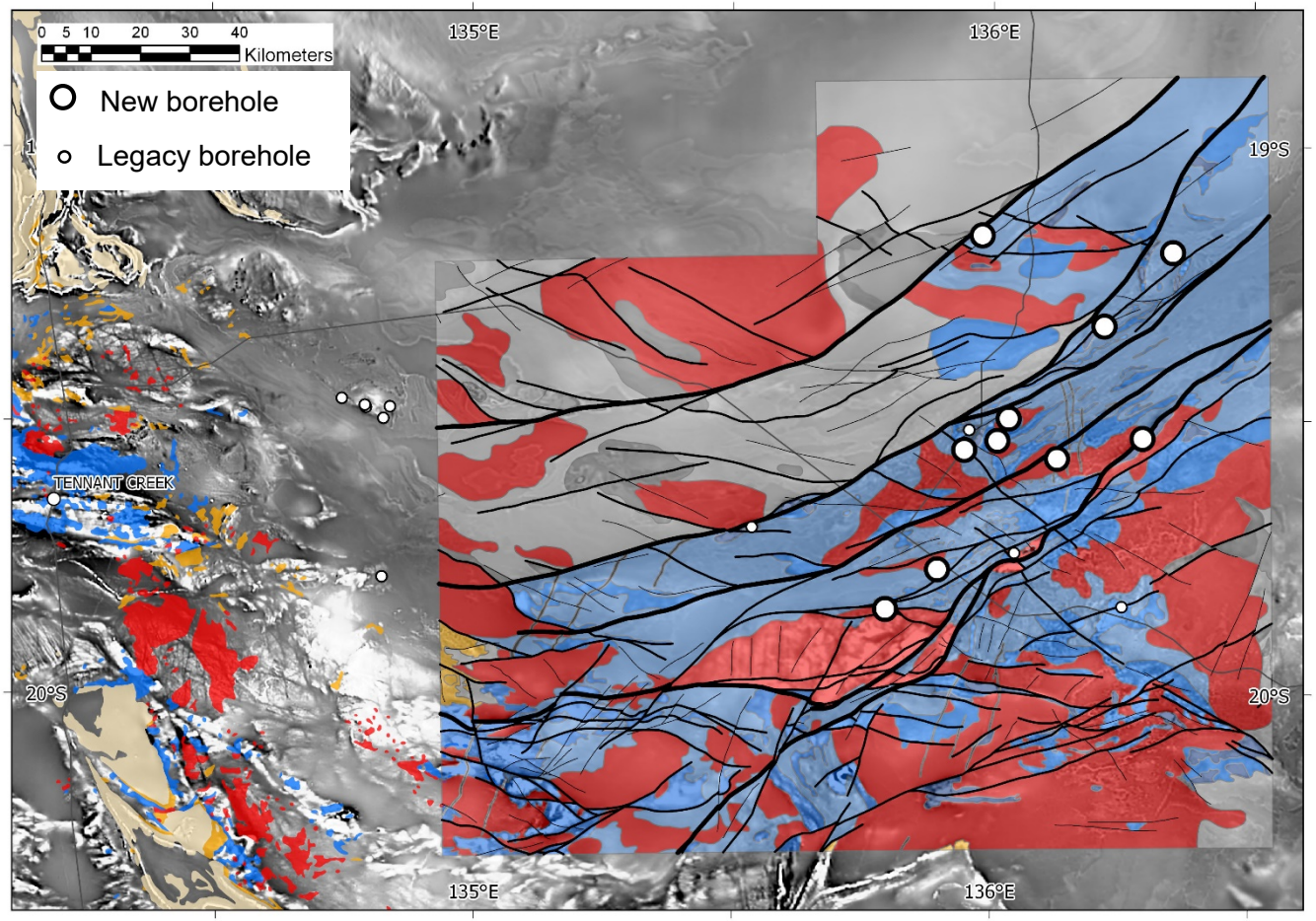
East Tennant: What's there and why should you care?



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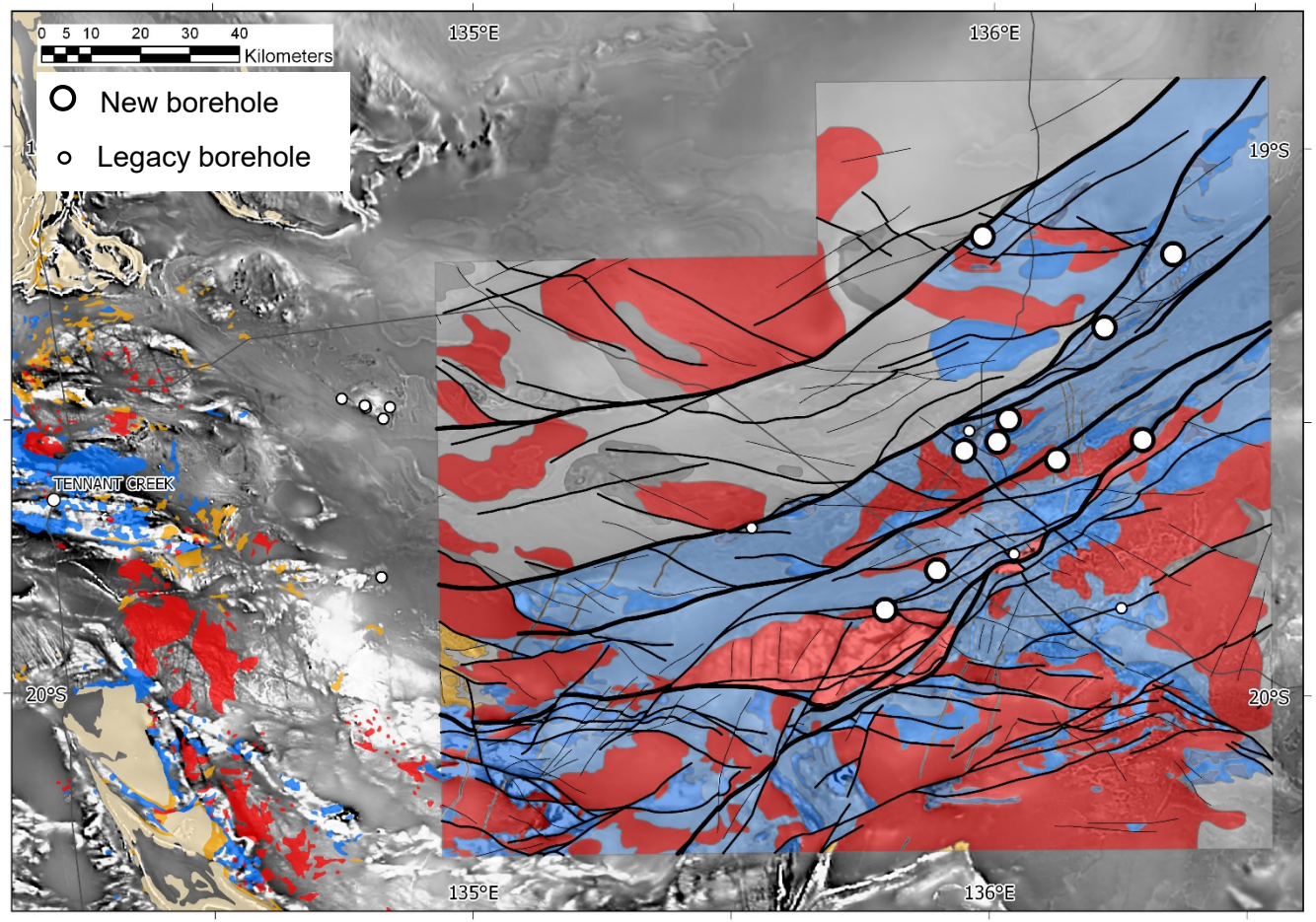
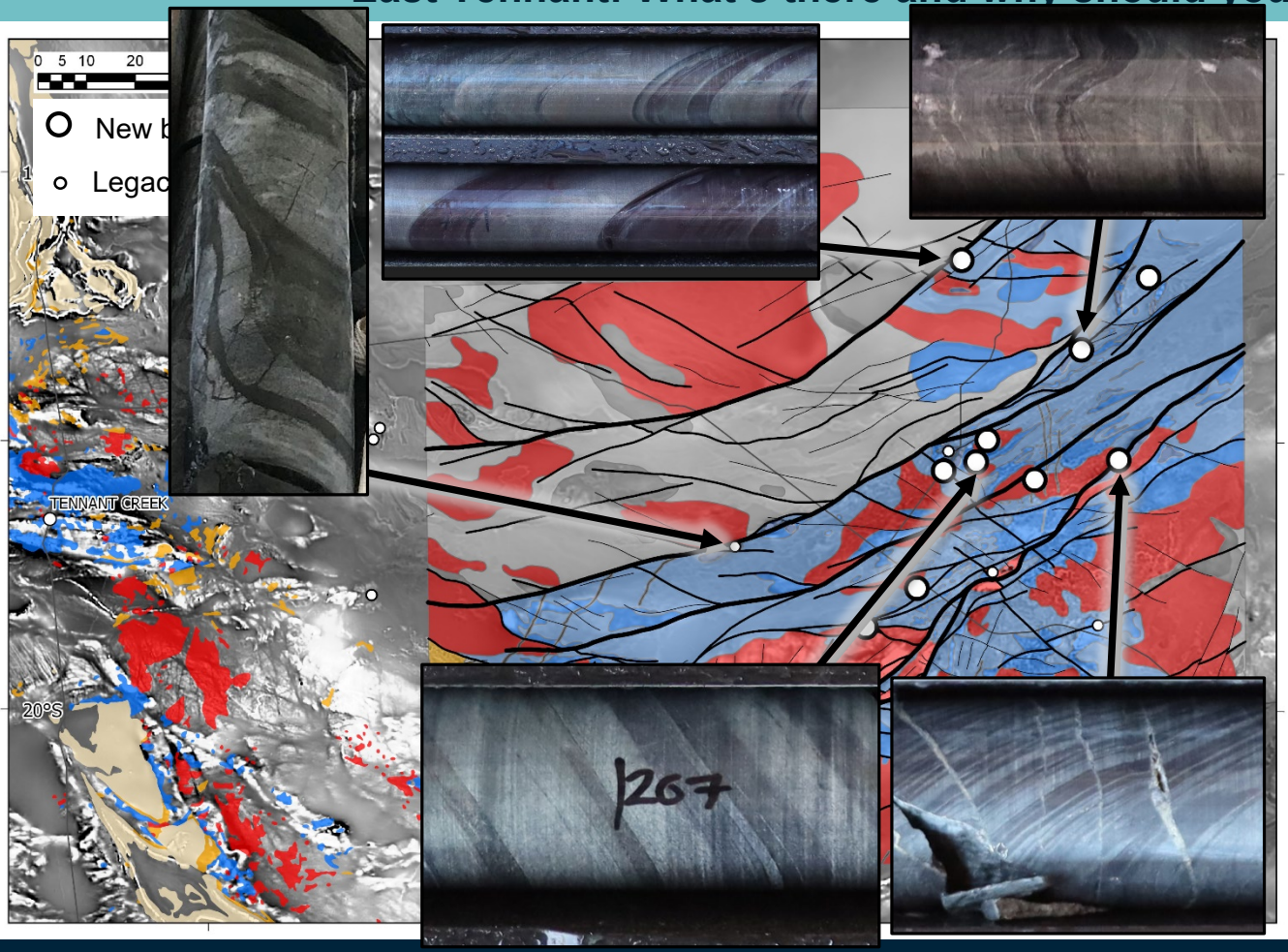


Main rock units

East Tennant: What's there and why should you care?



Main rock units

Alroy Formation

Widespread banded slate, siltstone, phyllite, minor carbonate, BIF

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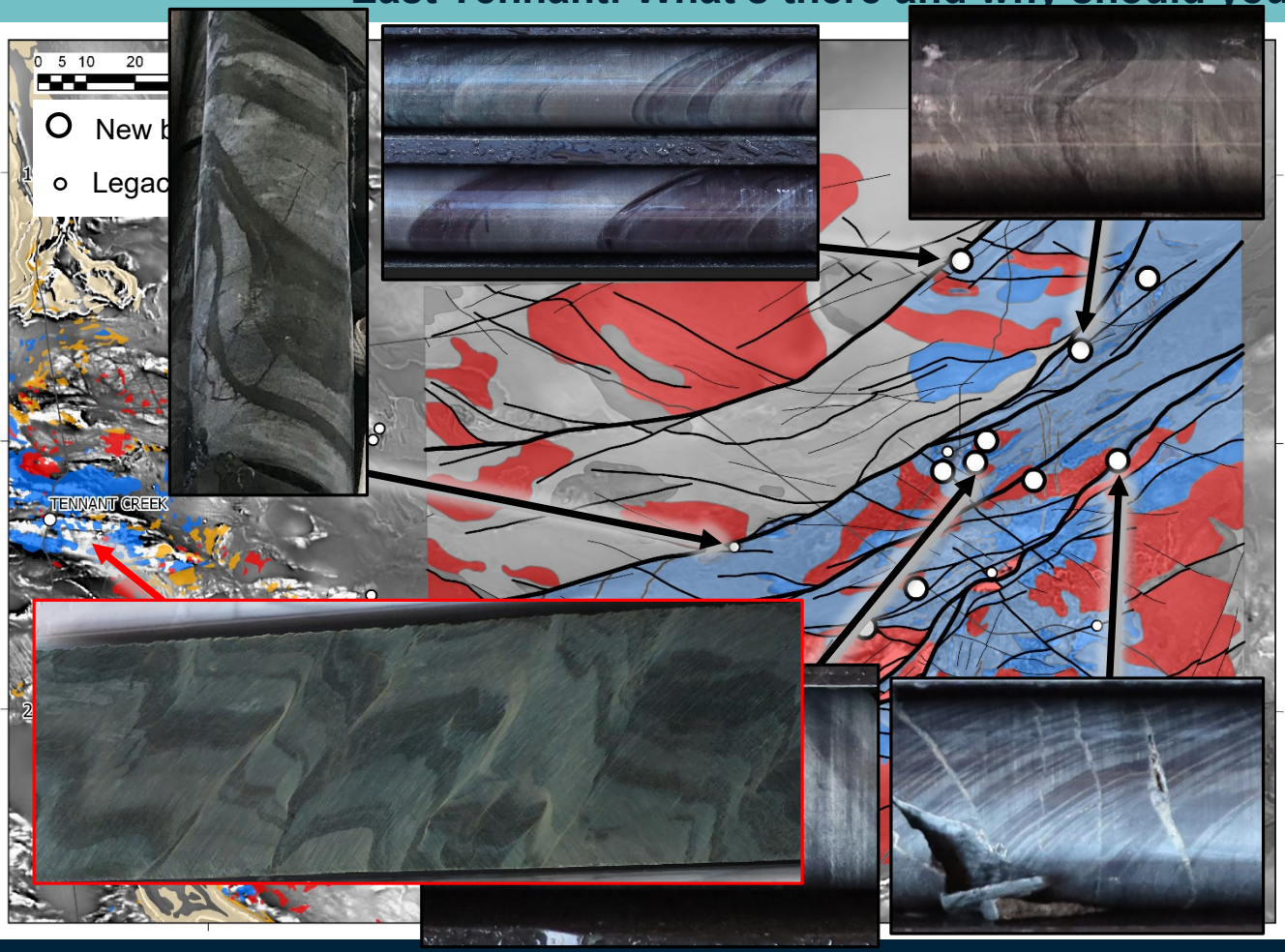

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Lithology and max dep ages similar to ~1860 Ma Warramunga Formation

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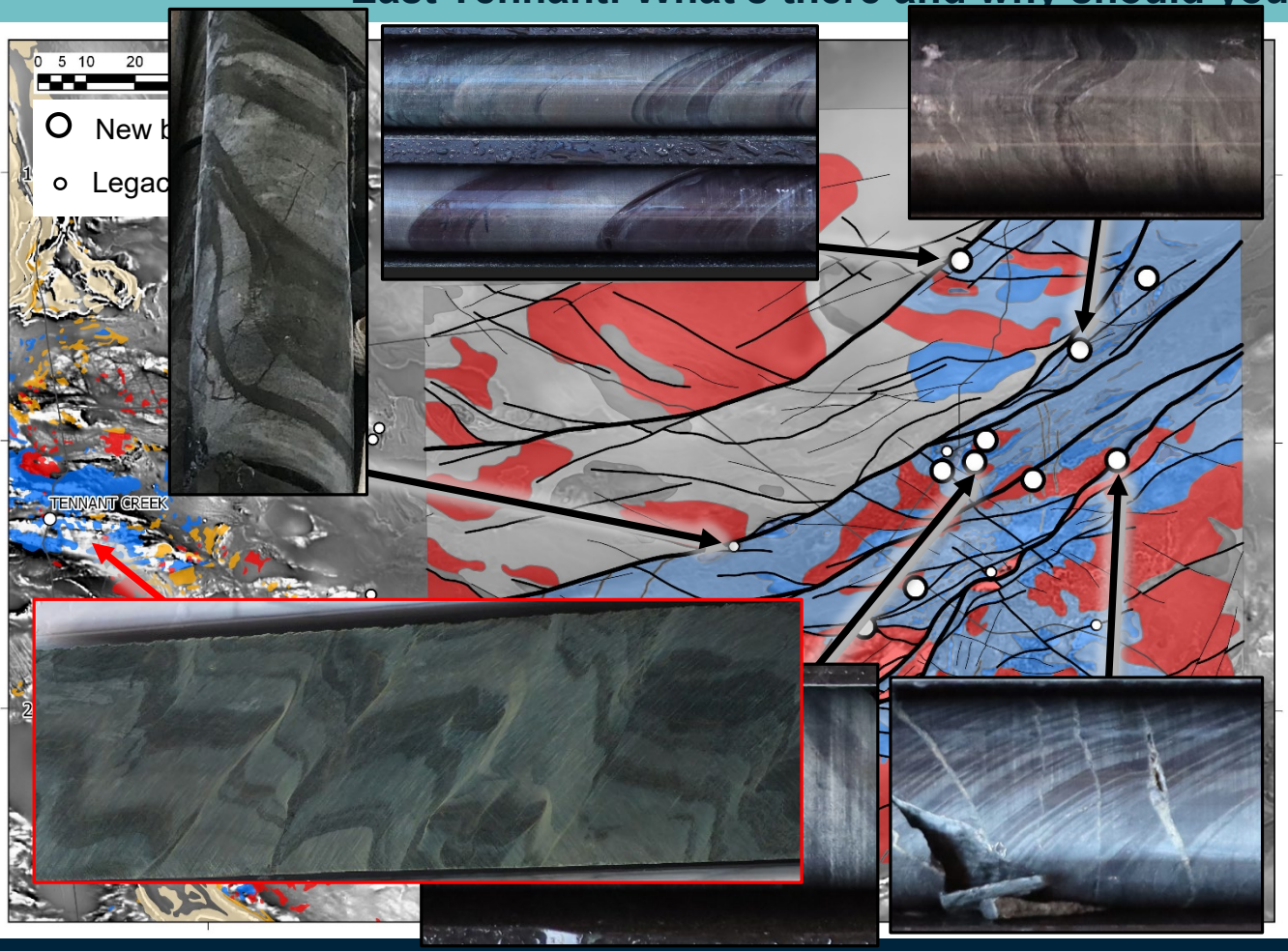

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More geochron required!

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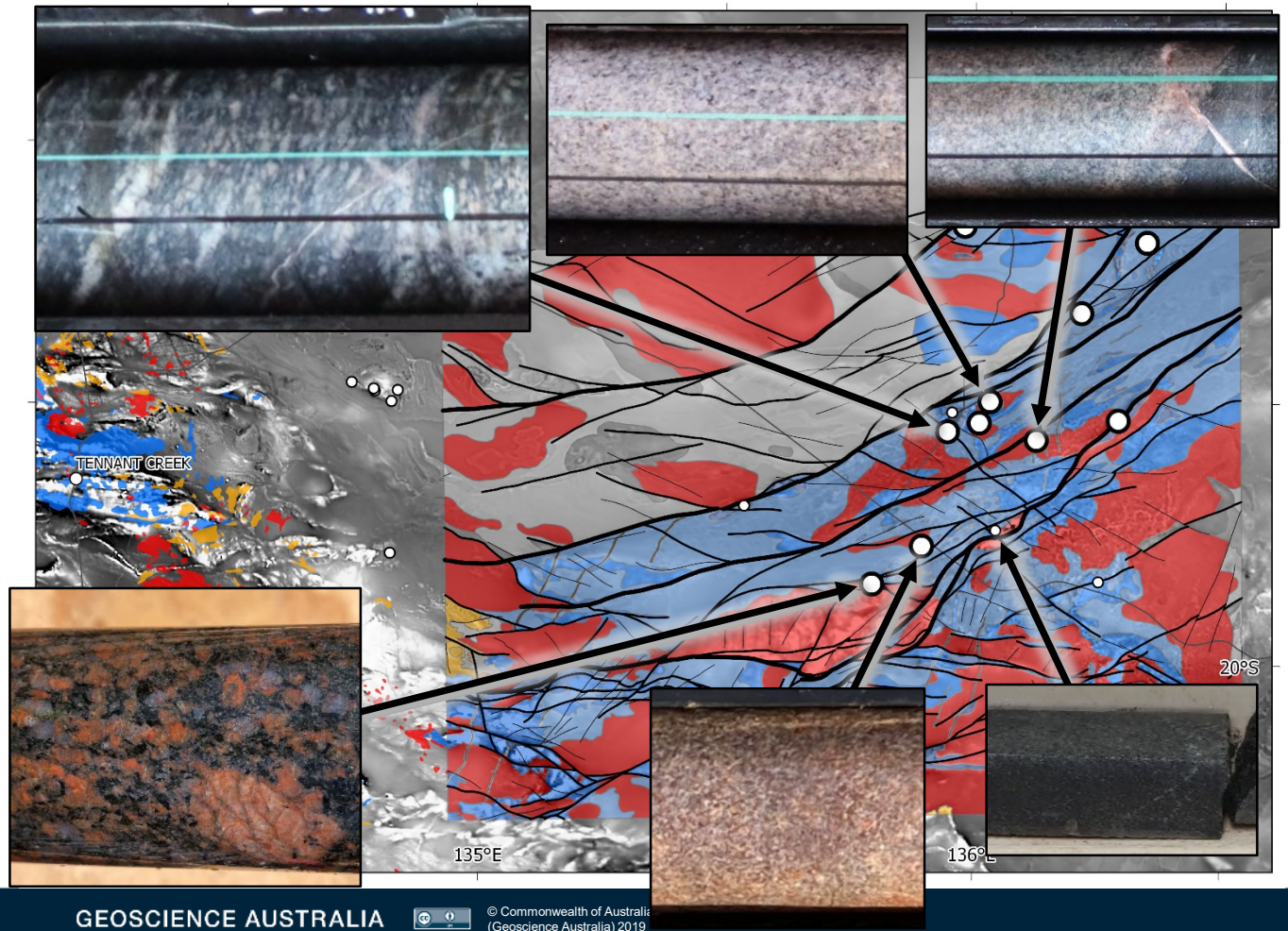

Main rock units

Intrusive rocks

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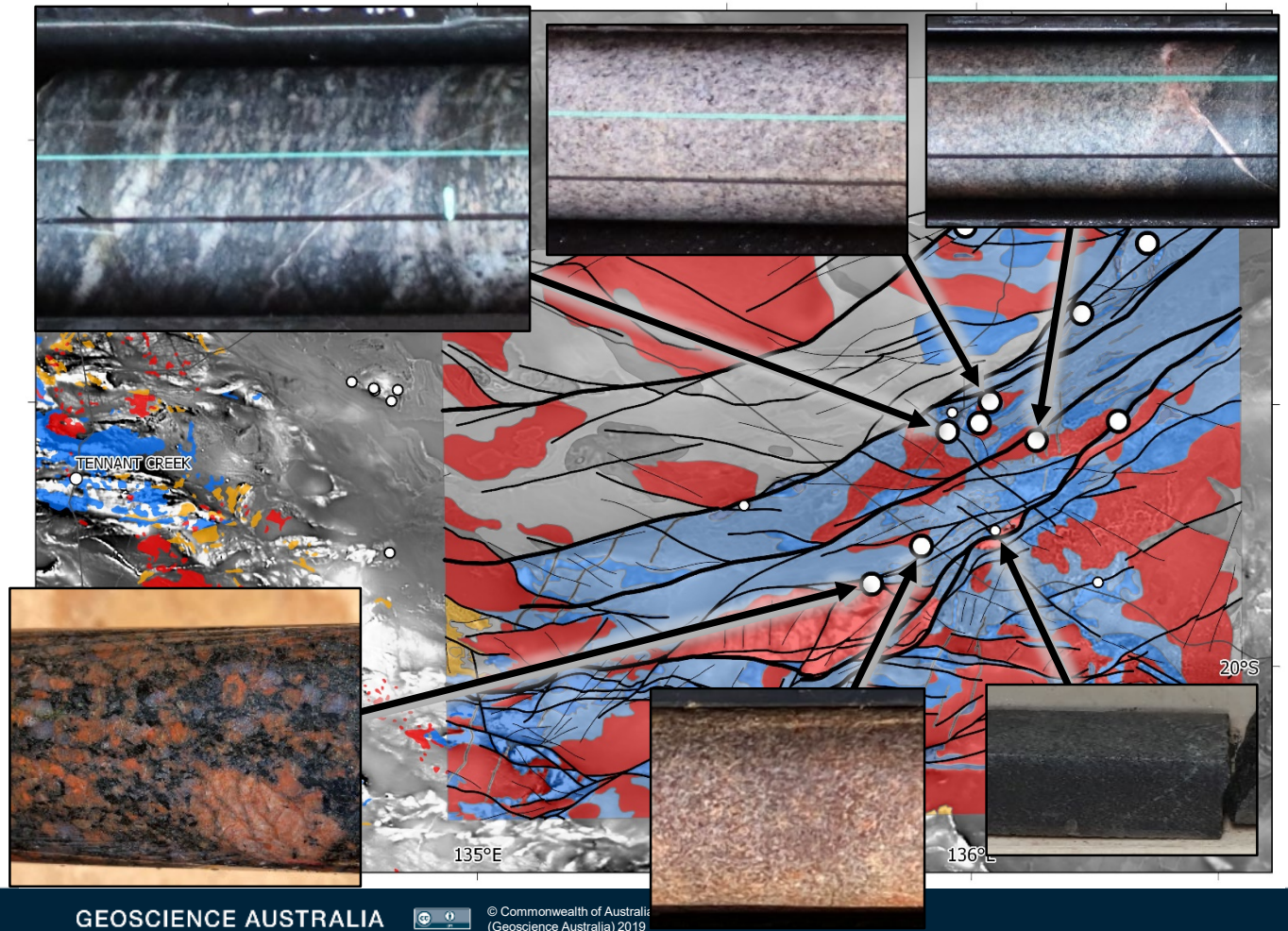

Main rock units

Intrusive rocks

Predominantly felsic composition, with minor mafics

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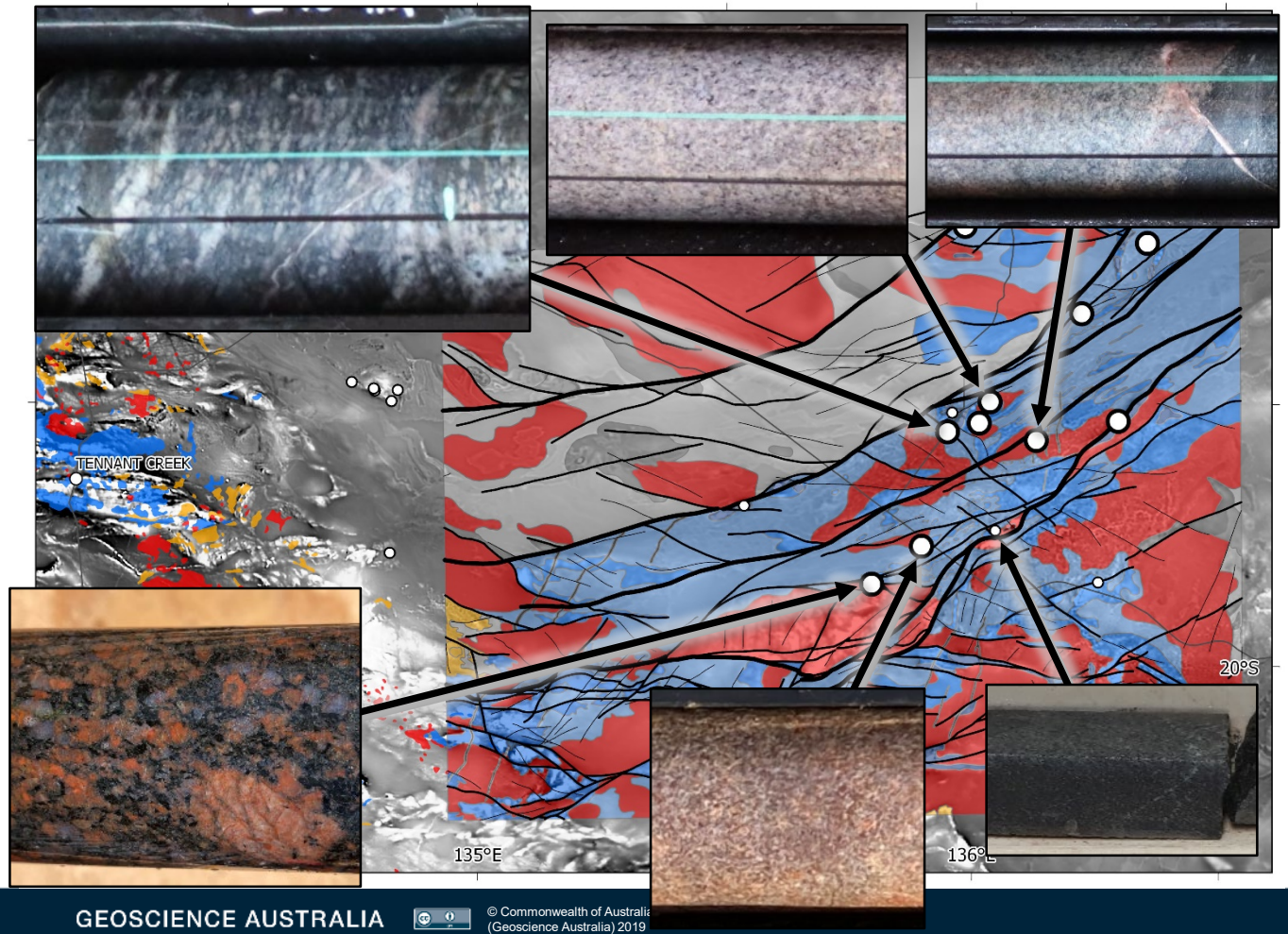

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Geophysics supports more widespread intrusive rocks than previously thought

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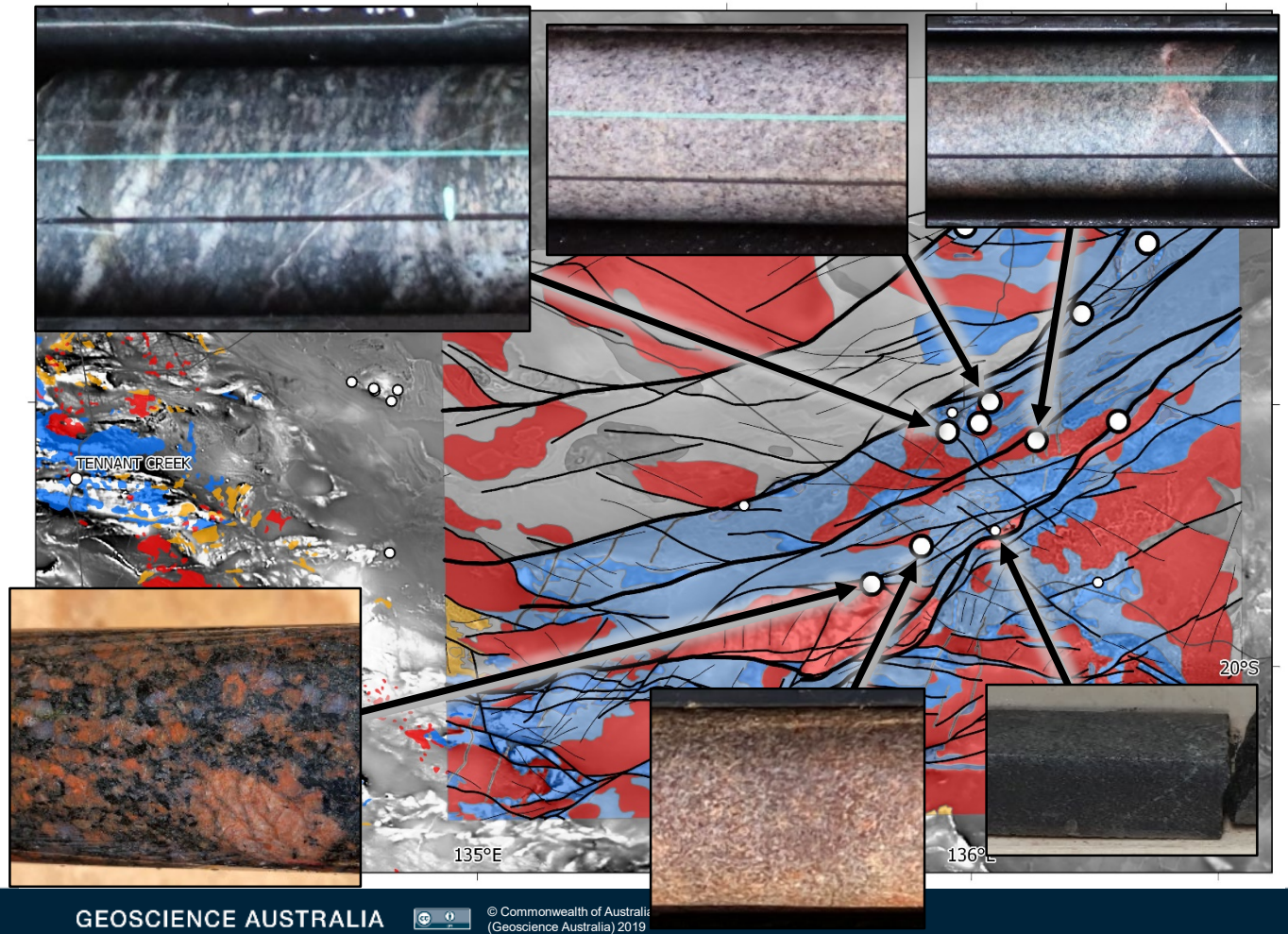

Main rock units

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Tennant Supersuite (1855-1845 Ma) probably extends into East Tennant region

More geochron data required

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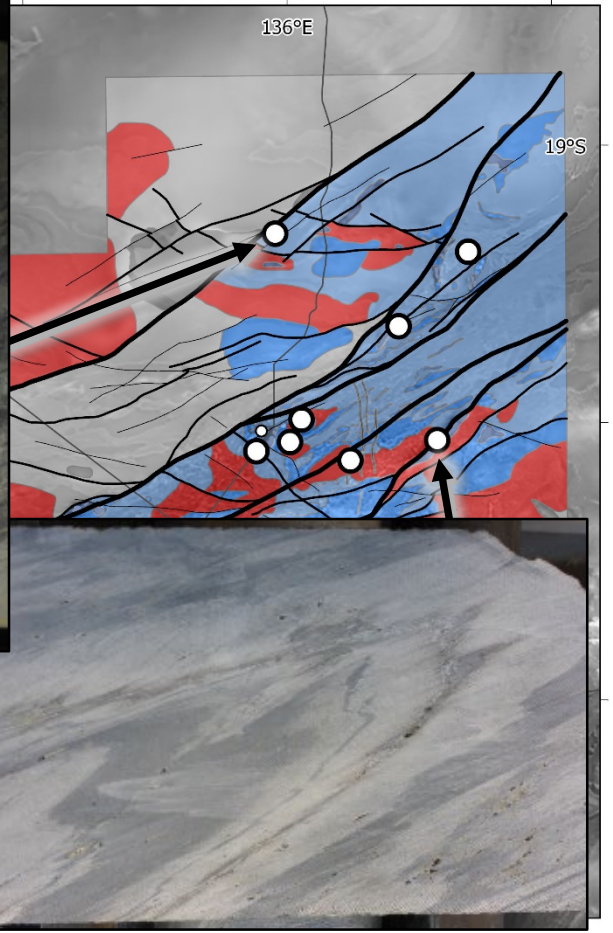
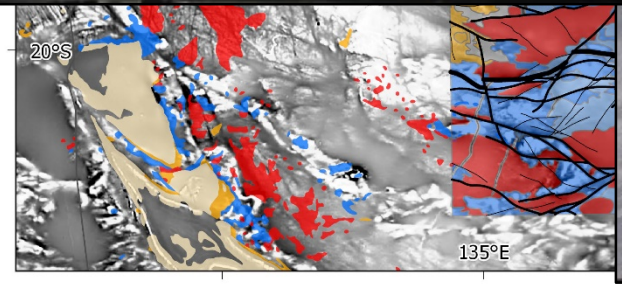
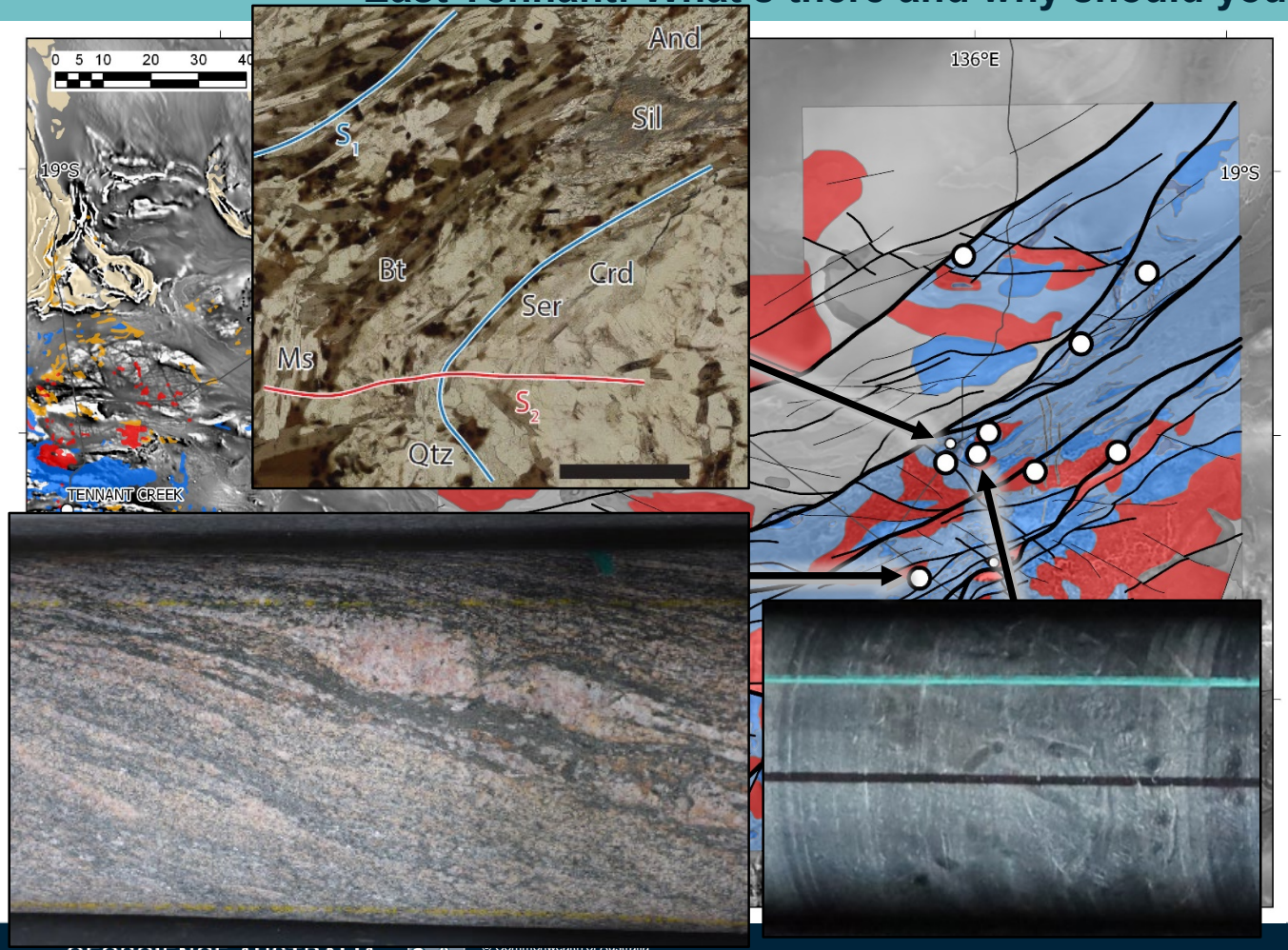




Tectonic History

Regional crustal thickening, folding, incipient cleavage development

East Tennant: What's there and why should you care?



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Regional crustal thickening, folding, incipient cleavage development

Transitions into locally high metamorphic grade (600-700° C) schist and gneiss

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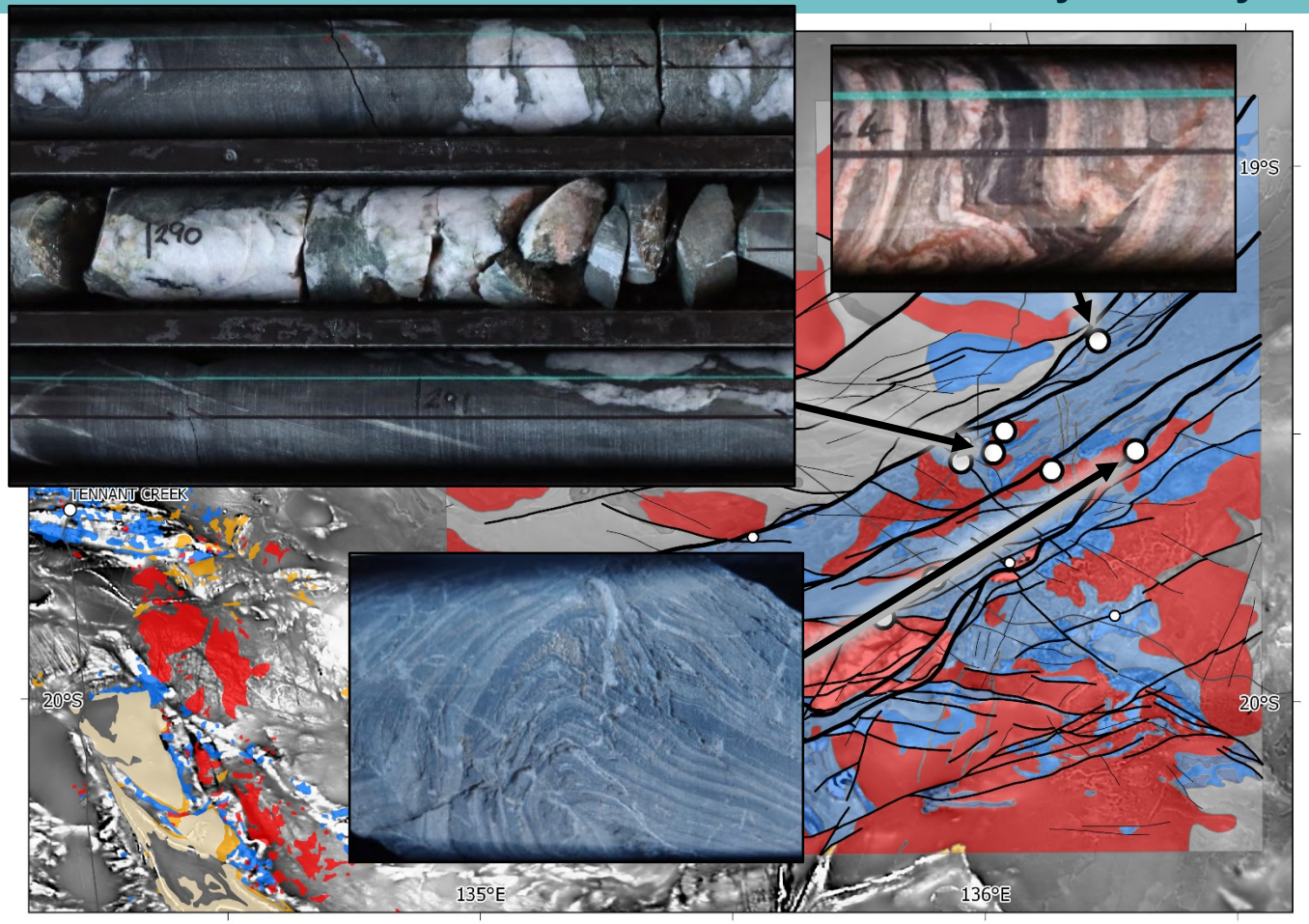

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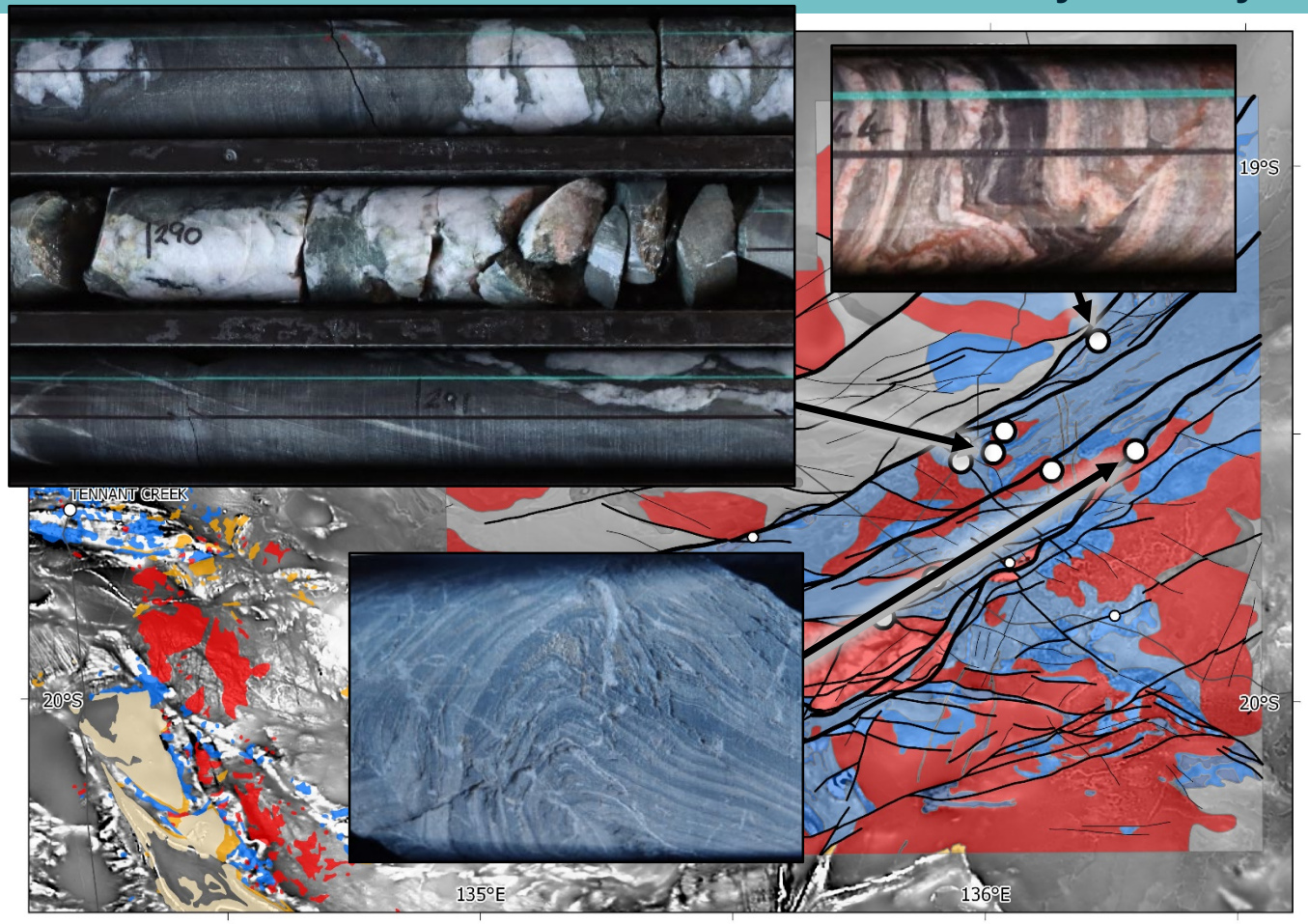

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Open folding, incipient crenulation cleavage and brittle faulting/veining

More geochron required, but likely comparable to ~1850 Ma deformation in Tennant Creek

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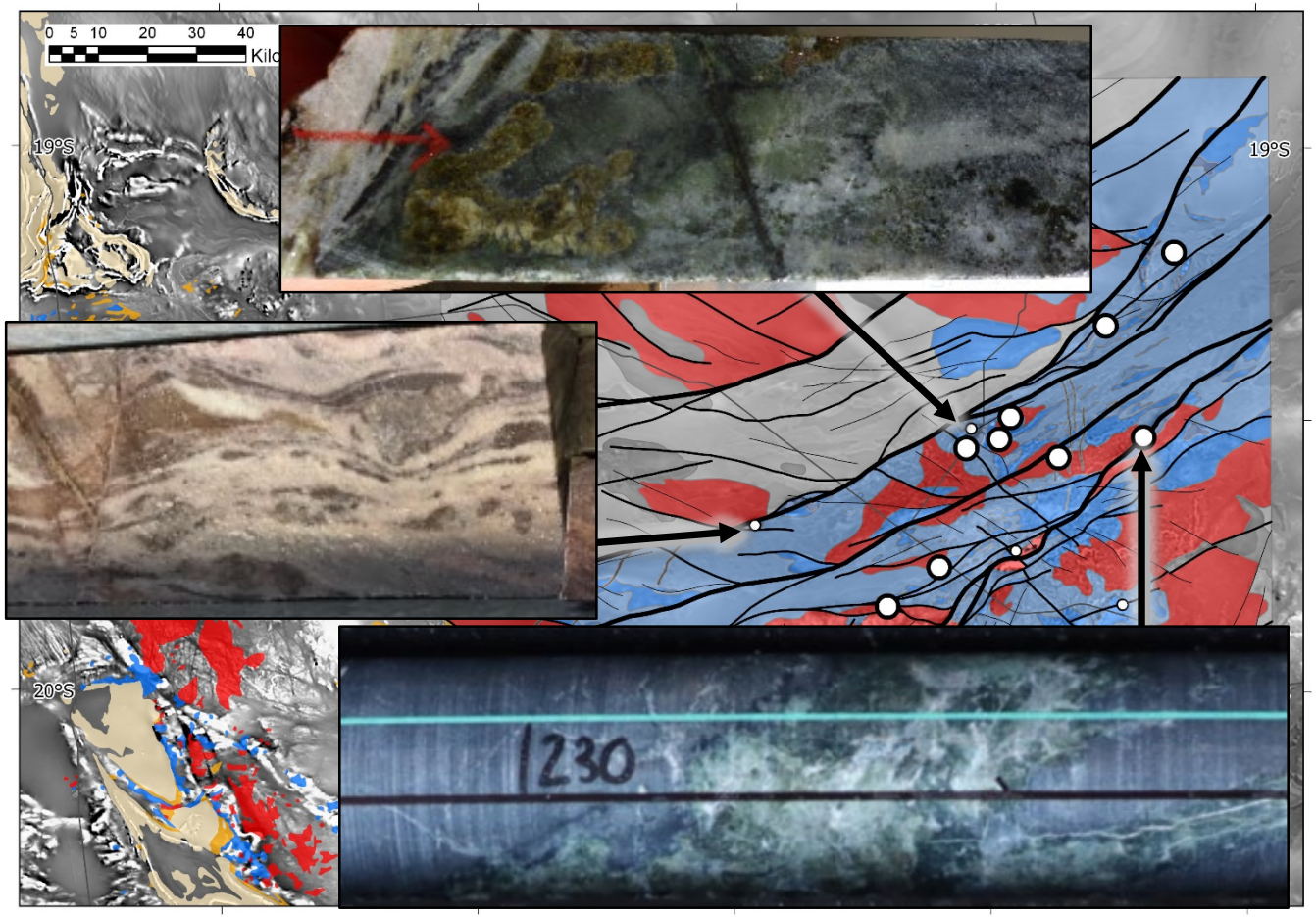
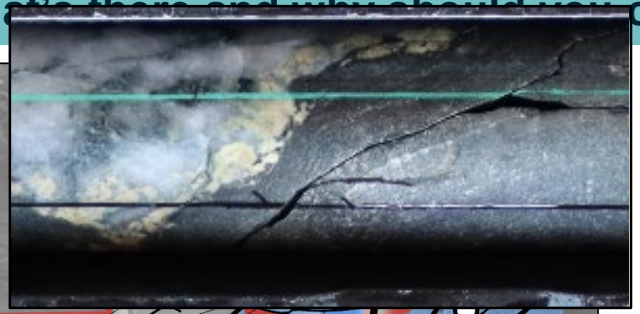
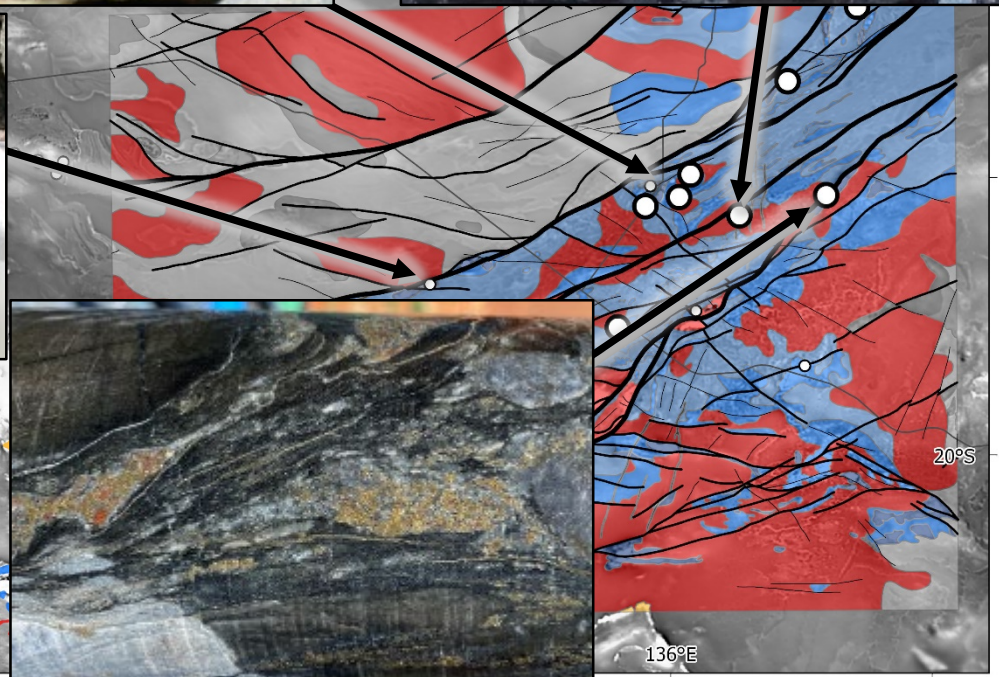


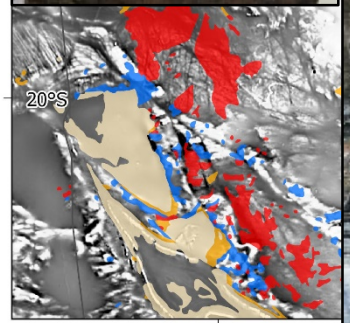
Alteration/
Mineralisation

Early

- Skarn alteration in carbonates







Alteration/
Mineralisation

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- Skarn alteration in carbonates
- Quartz-pyrite/pyrrhotite veins

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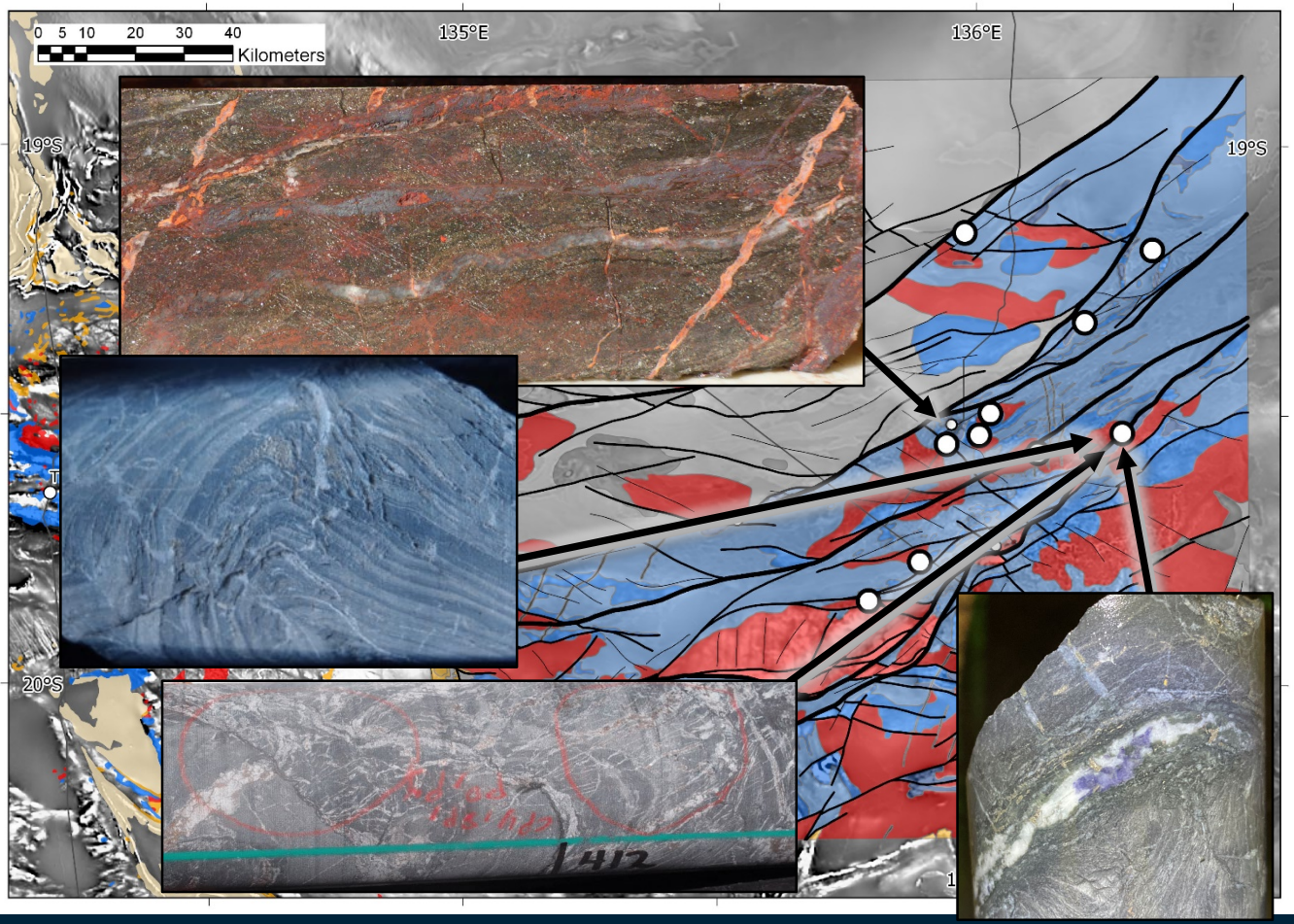

Alteration/
Mineralisation

Early

- Skarn alteration in carbonates
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Late

- Brittle-style carbonate veins (py, hem, mag, cpy, sph, fluorite Arsenic?)

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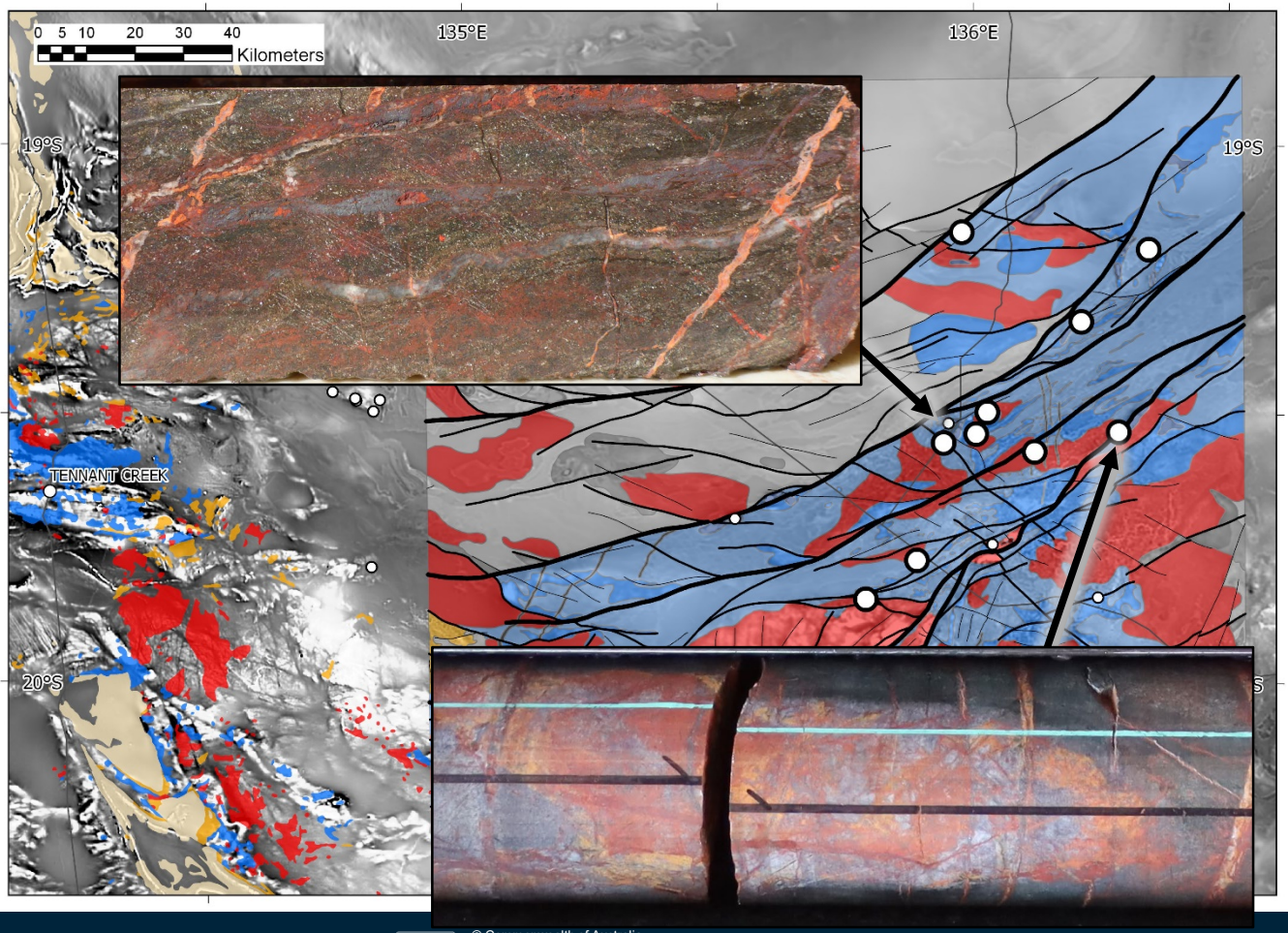

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Iron-oxide alteration

- Introduced during deformation vs remobilised primary Fe?

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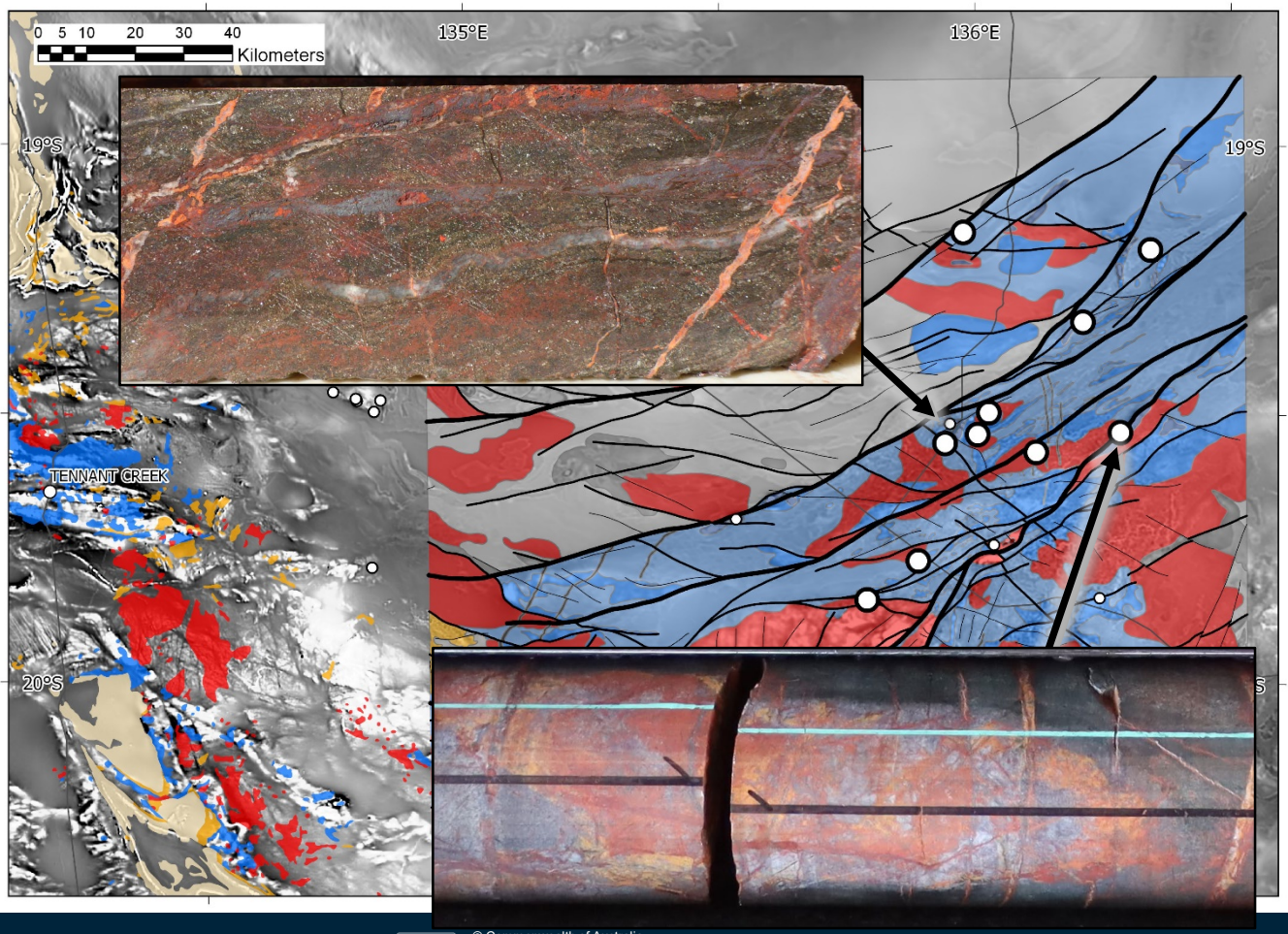

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Iron-oxide alteration

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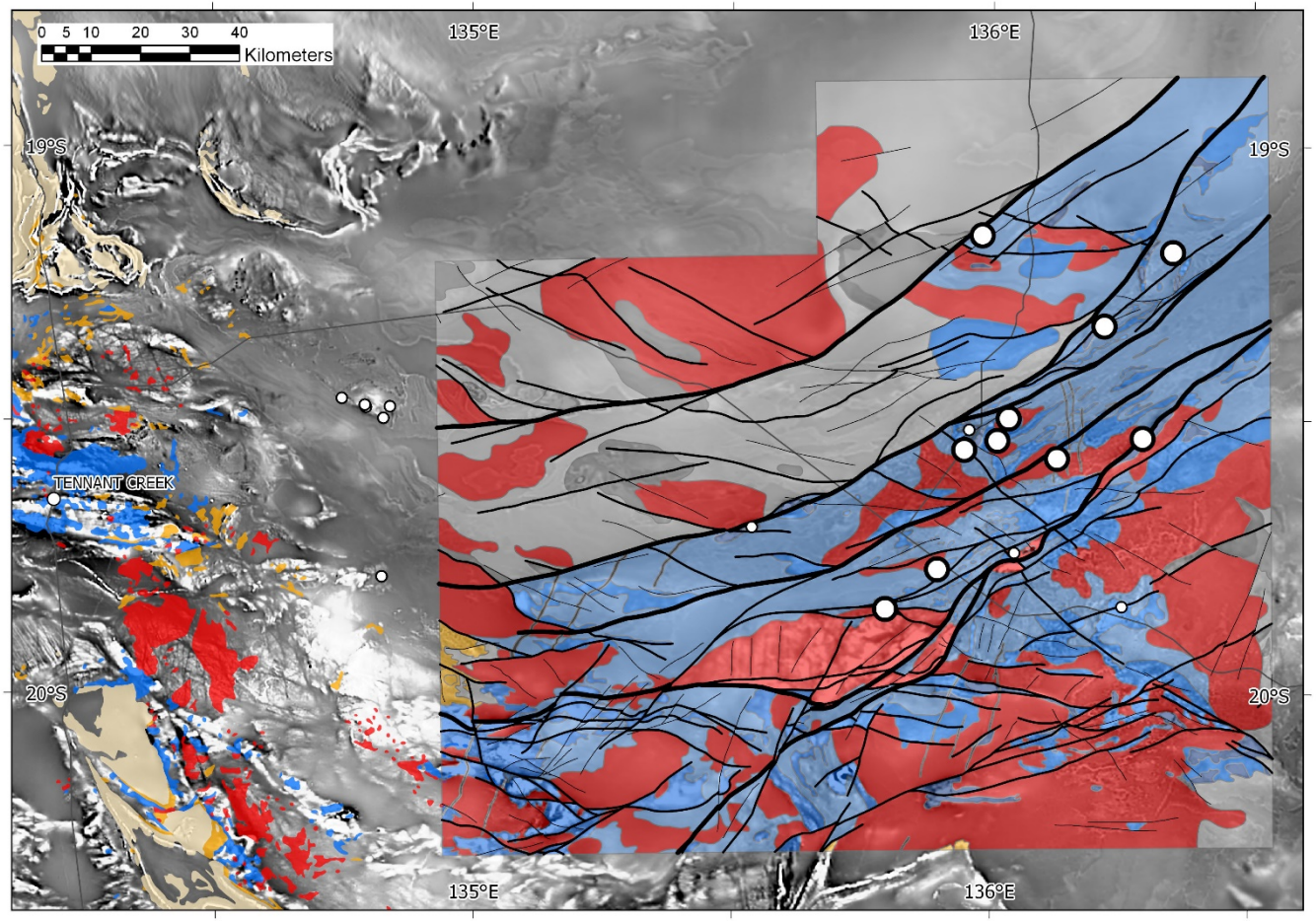
Many outstanding questions, but widespread system present

East Tennant: What's there and why should you care?



Exploration Considerations

All the right ingredients for polymetallic mineral system, including Zn-Cu mineralisation

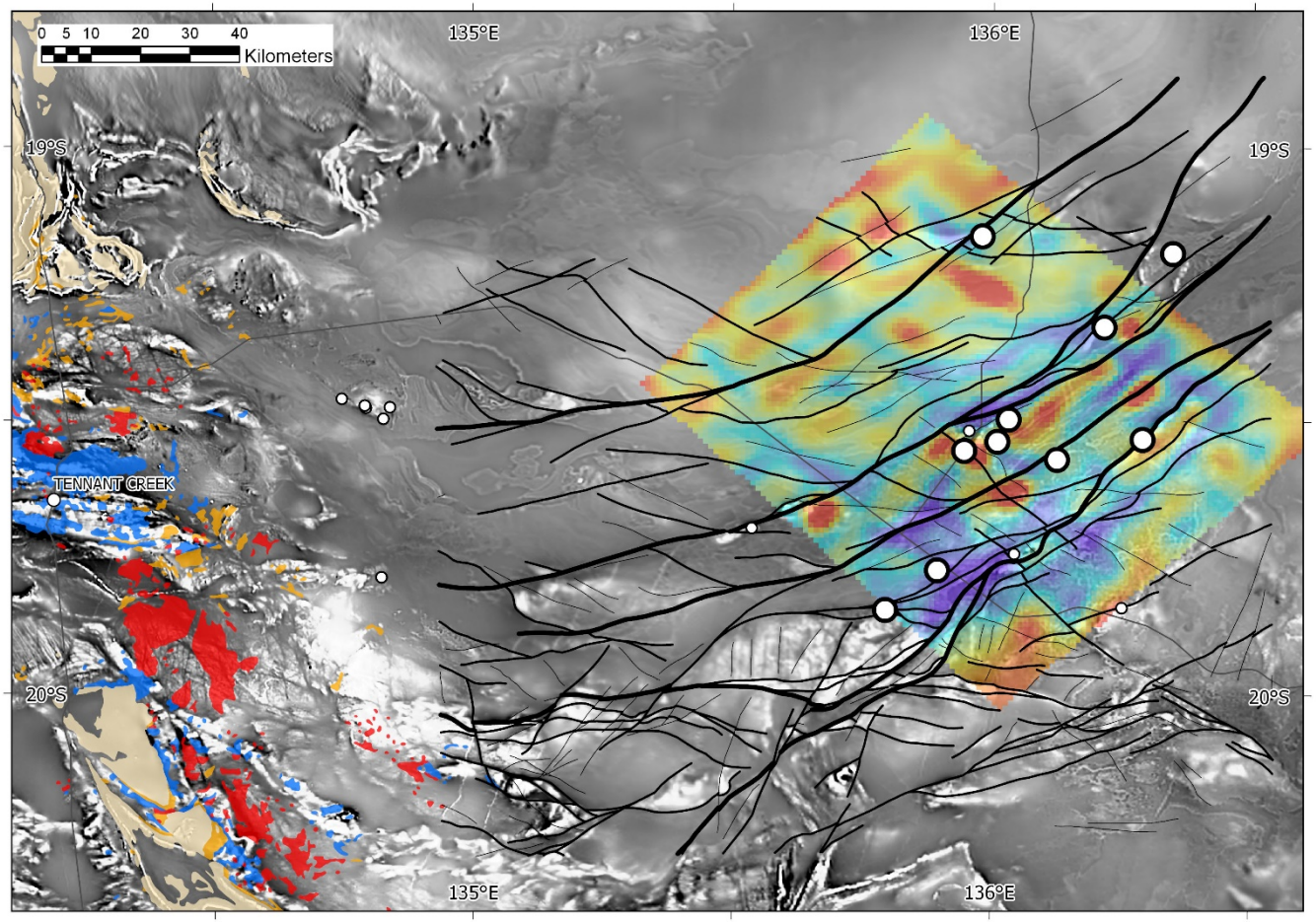
Not necessarily the same style as Tennant Creek

100-200 m of transported cover – how to interpret surface geochem?

Alteration can be magnetic, but caution is required

Conductivity…

East Tennant: What's there and why should you care?



Exploration Considerations

5 km depth slice of conductivity from Broadband MT data

Jiang et al. 2020

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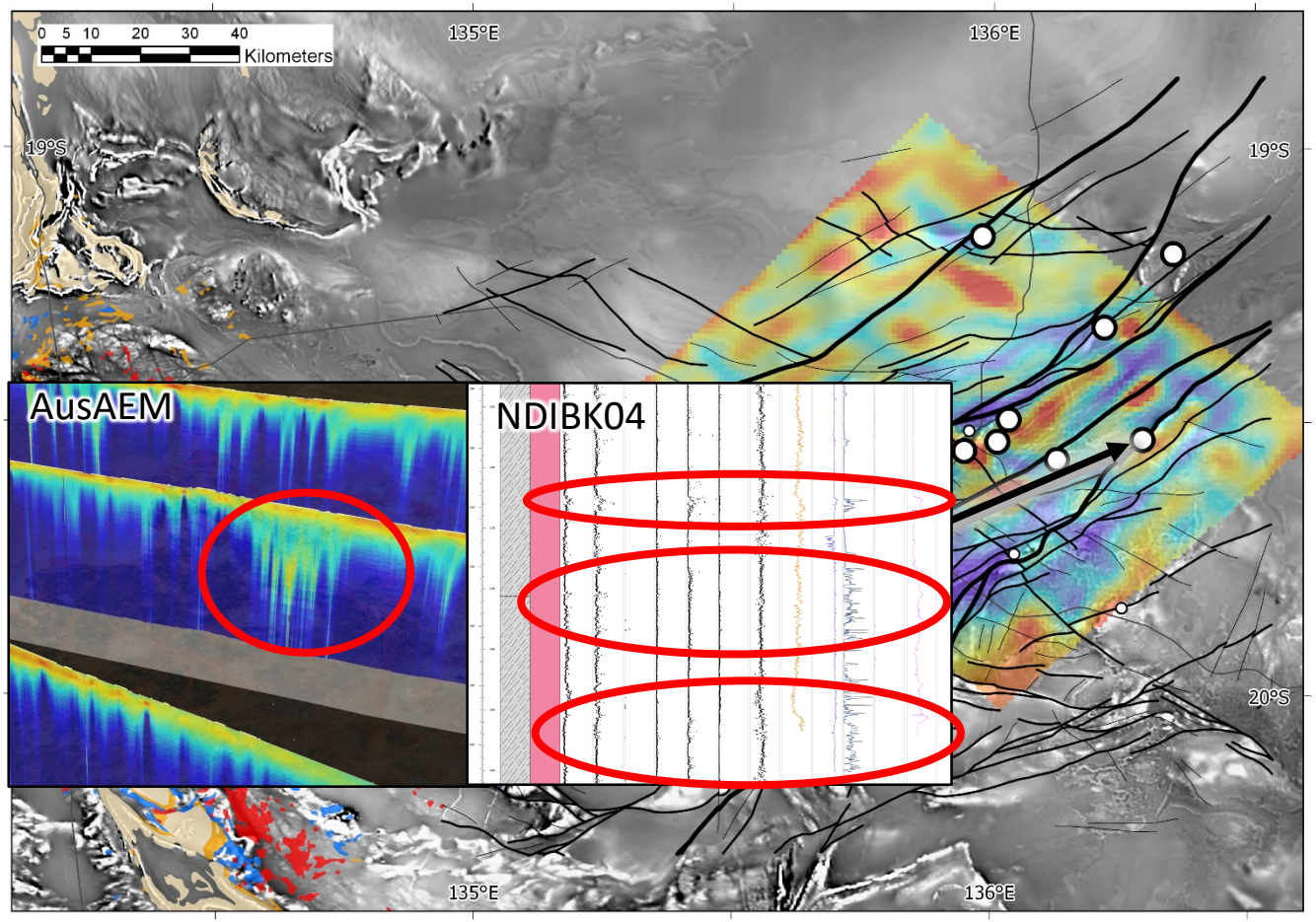


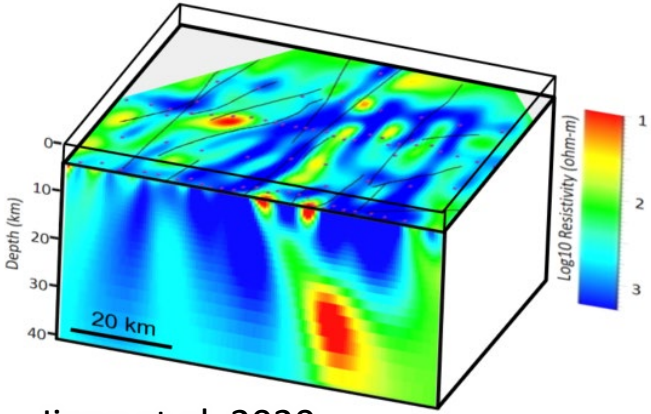
Exploration Considerations

5 km depth slice of conductivity from Broadband MT data

Jiang et al. 2020

East Tennant: What's there and why should you care?

- Underexplored basement province with all the right ingredients for polymetallic/magmatic-hydrothermal mineral system
- Presence of Zn-Cu mineralisation (assay incoming) with elevated As
- Alteration/mineralisation detectable with geophysics



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Thank you

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See you at the East Tennant drill core workshop

Web: https://www.ga.gov.au/eftf/minerals/fis/east-tennant

Email: andrew.clark@ga.gov.au