

# Tin and Tungsten in Victoria

Yesterday's contaminants become tomorrow's critical minerals

9 May 2023

**GEOLOGICAL  
SURVEY OF VICTORIA**

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Economic Geologist – Critical Minerals

**DISCOVER  
EARTH'S  
SECRETS**

# Collaboration

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Thank you to our partners



**Australian Government**  

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**Geoscience Australia**





# Talk outline

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- GSV's critical minerals studies
- Why tin and tungsten?
- History of discovery and production
- Victoria's production in context
- The case for unrealised potential – Victoria's northeast
- Our research strategy – targeted studies
- Case study – how fundamental geoscientific data underpins exploration strategies
- Recap project, progress and goals



# GSV's critical mineral studies

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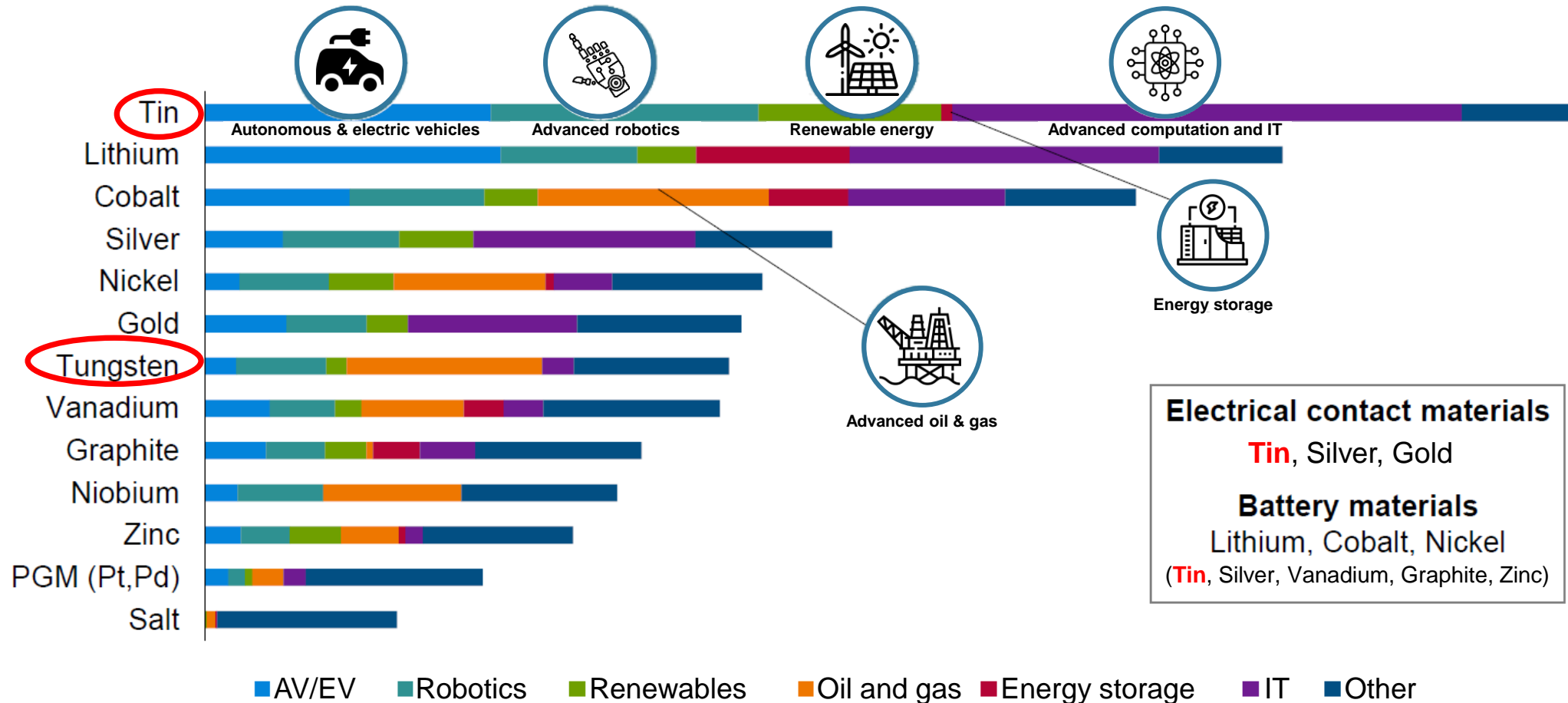
## Targeted 2-year characterisation studies:

- Tin and tungsten
- Lithium (pegmatite/granite)
- Antimony
- Kaolin-hosted HPA and REE
- Alkaline-silicate REE
- Sedimentary phosphorous-hosted REE
- Sediment-hosted copper
- Platinum-group elements



# Why tin and tungsten?

## Metals most impacted by new technology



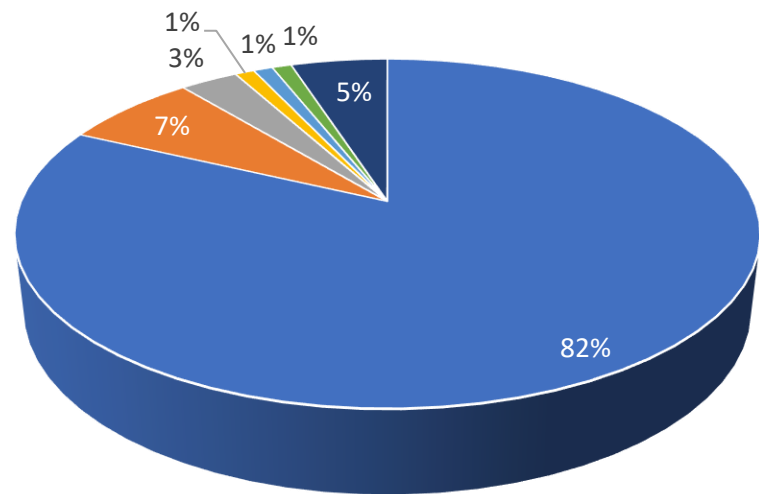
**Electrical contact materials**  
**Tin**, Silver, Gold

**Battery materials**  
 Lithium, Cobalt, Nickel  
 (**Tin**, Silver, Vanadium, Graphite, Zinc)

# Why tin and tungsten?

## Tungsten – world production 2018<sup>1</sup>

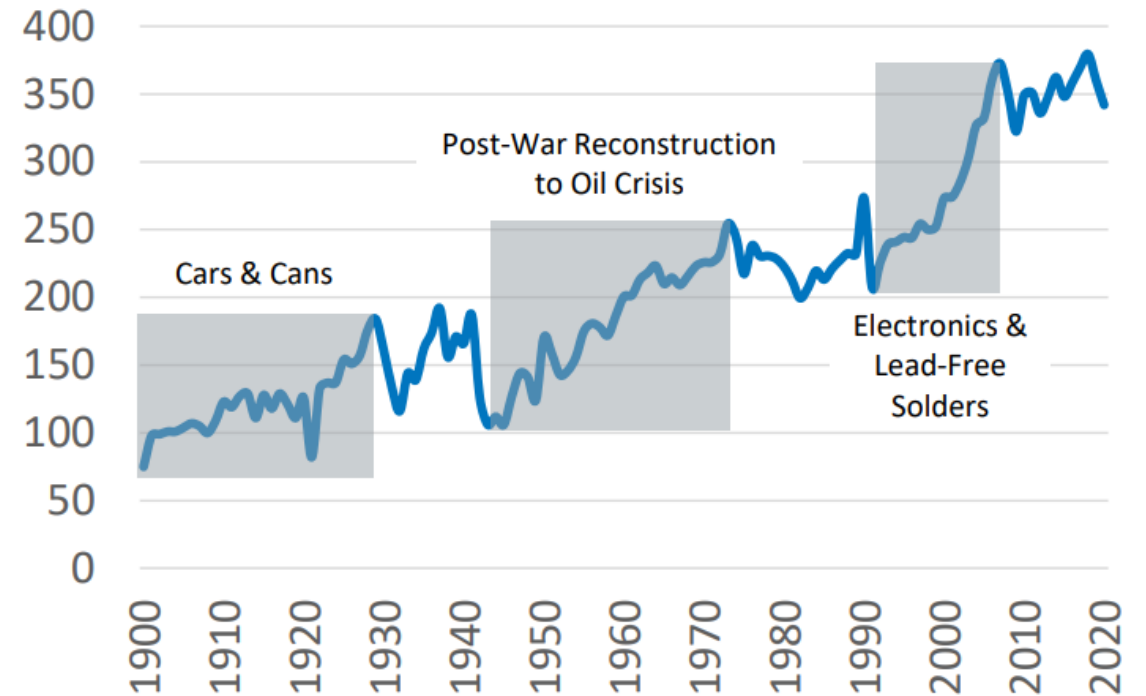
% total world production



■ China    ■ Vietnam    ■ Russia    ■ Bolivia  
■ Austria    ■ UK    ■ Others

## Tin – long-term demand<sup>2</sup>

'000 tonnes refined tin



Tin is on 10 international critical mineral lists, Tungsten is on 14!

Source: 1) Geoscience Australia, 2019; 2) International Tin Association; 3) GSV analysis (unpublished)

# Why tin and tungsten?

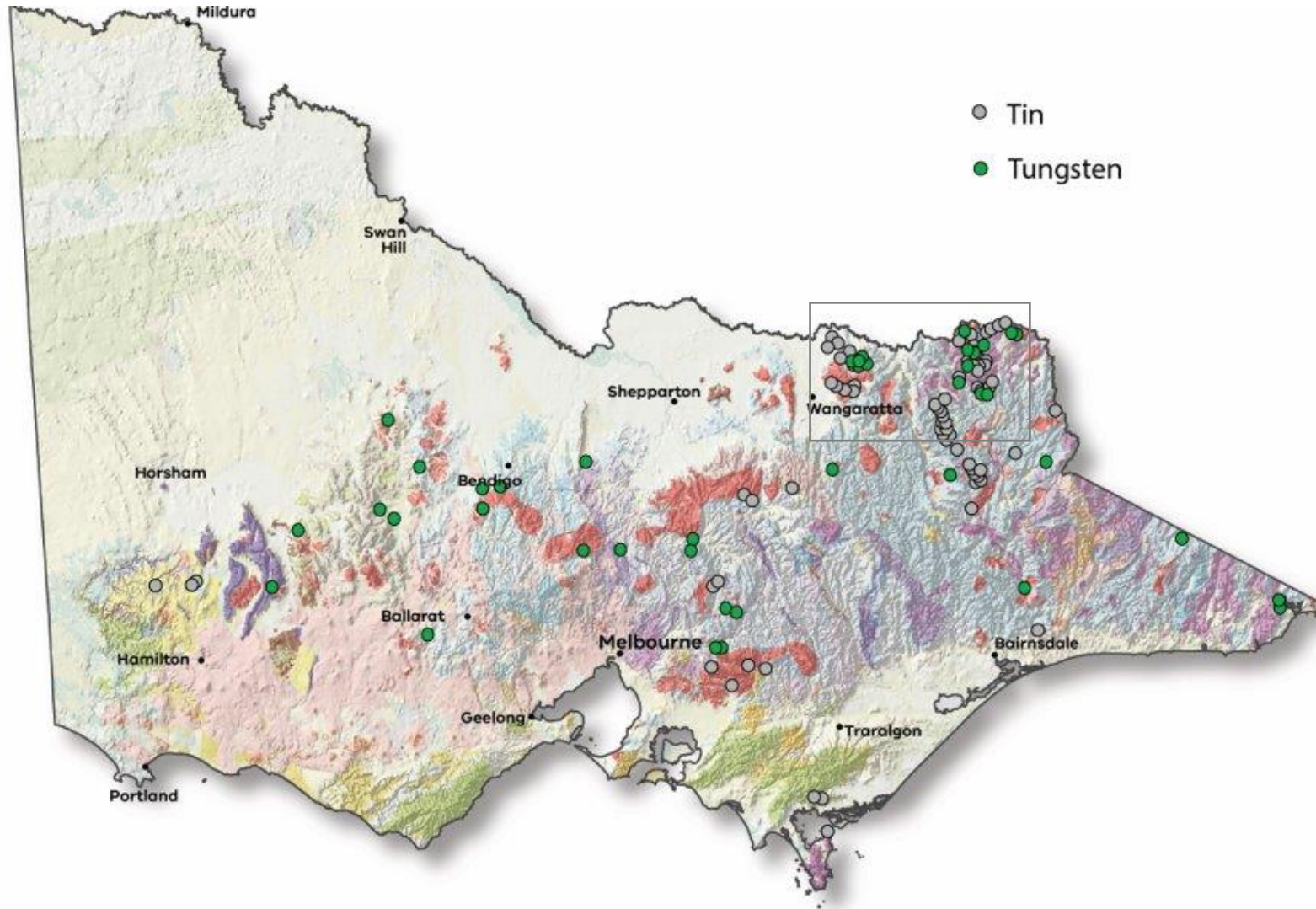
## Tin price

US dollars per tonne





# History of discovery and production



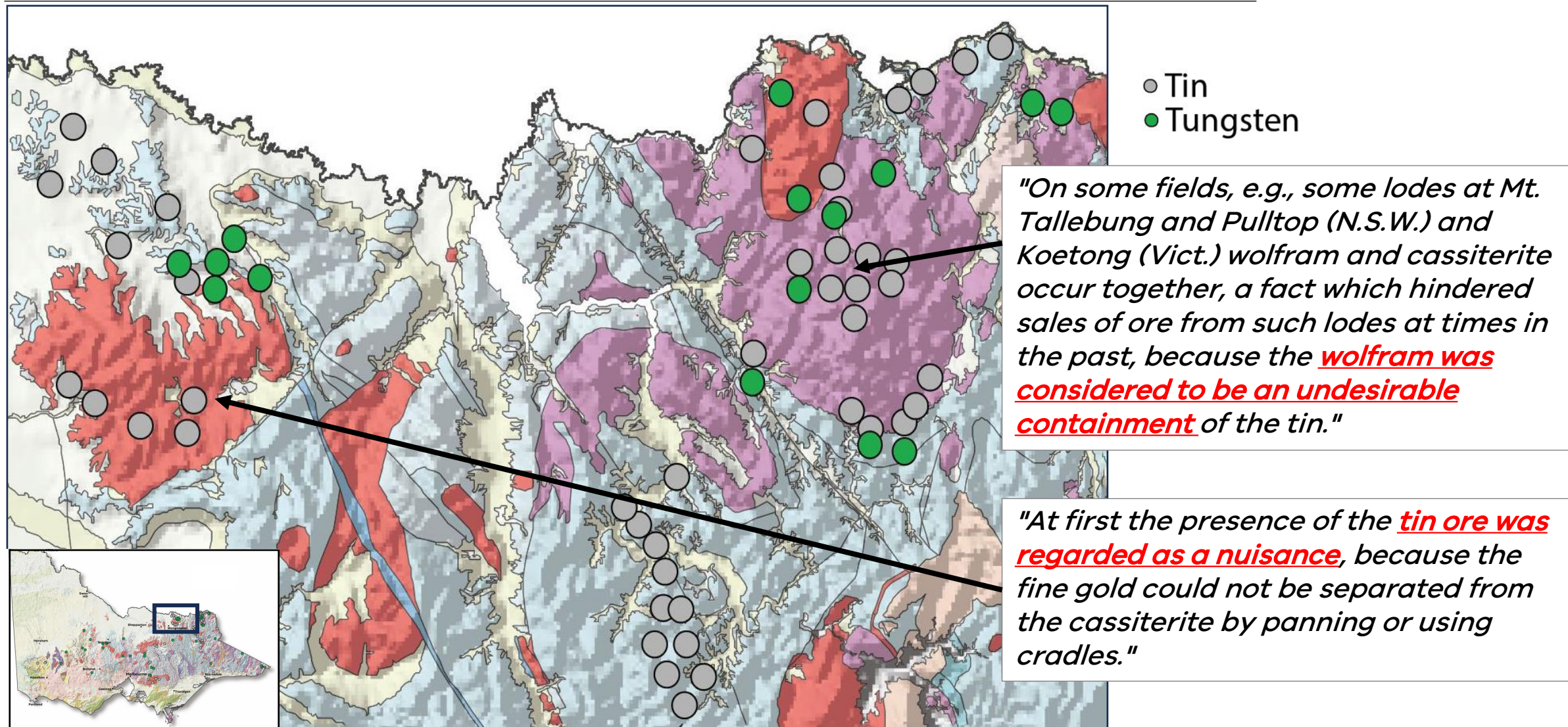
*Eldorado dredge (Beechworth-Eldorado Tin Field)*



*Tungsten Ore (Mount Murphy)*



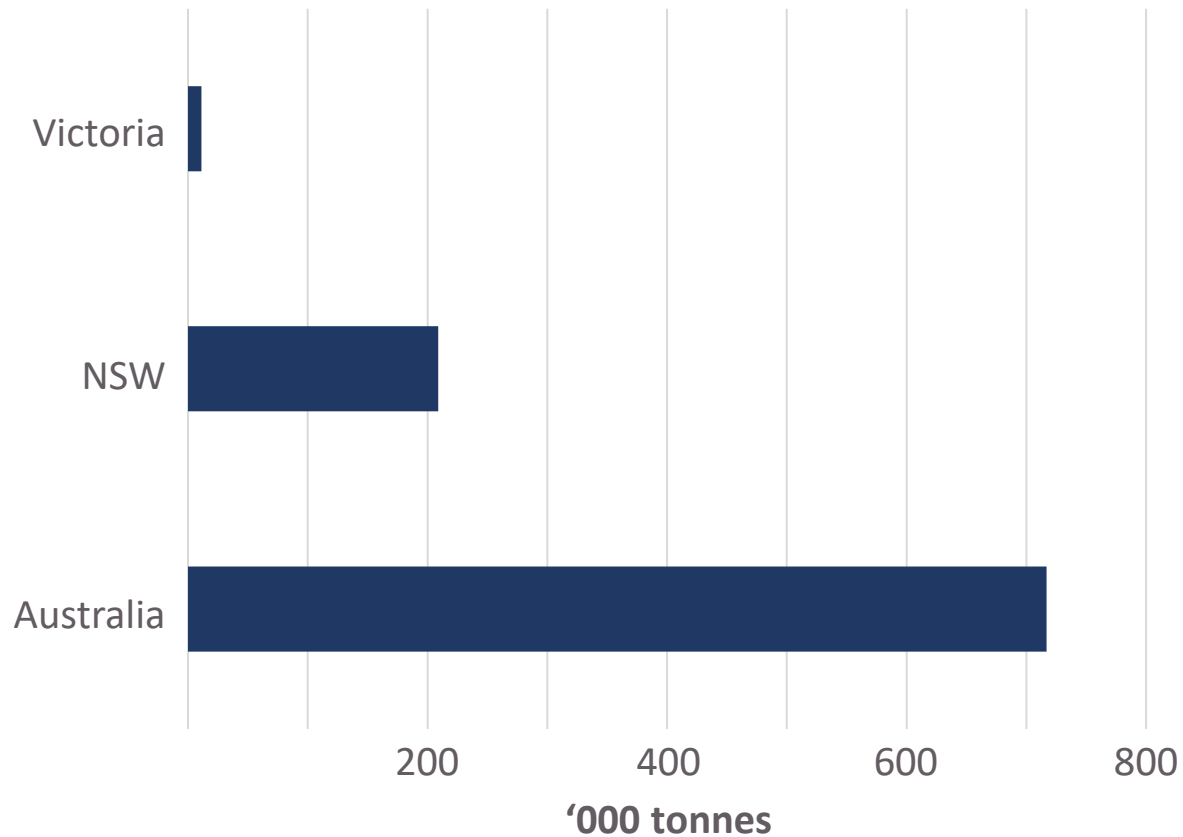
# History of discovery and production



# Victoria's production in context

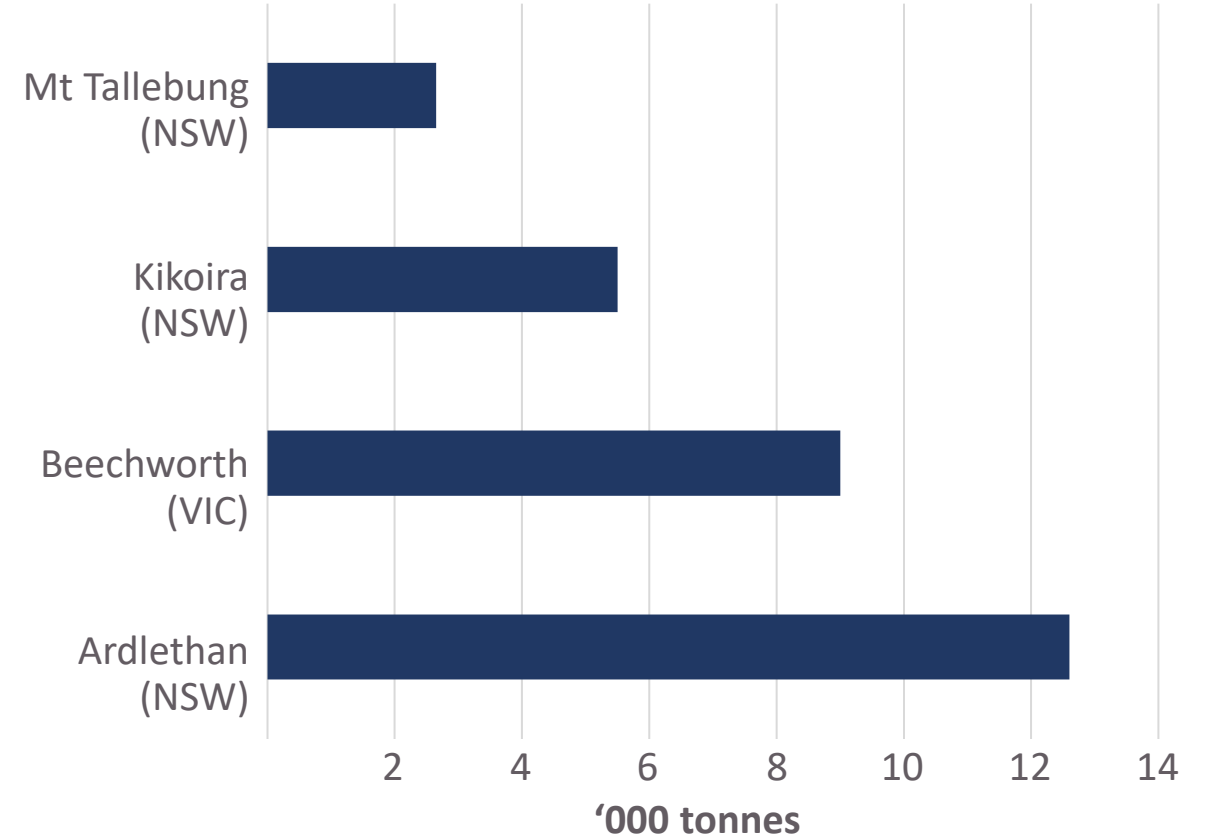
## Tin concentrate produced to 1968

Total production prior to 1968, '000 tonnes



## Tin concentrate produced to 1968 – by deposit

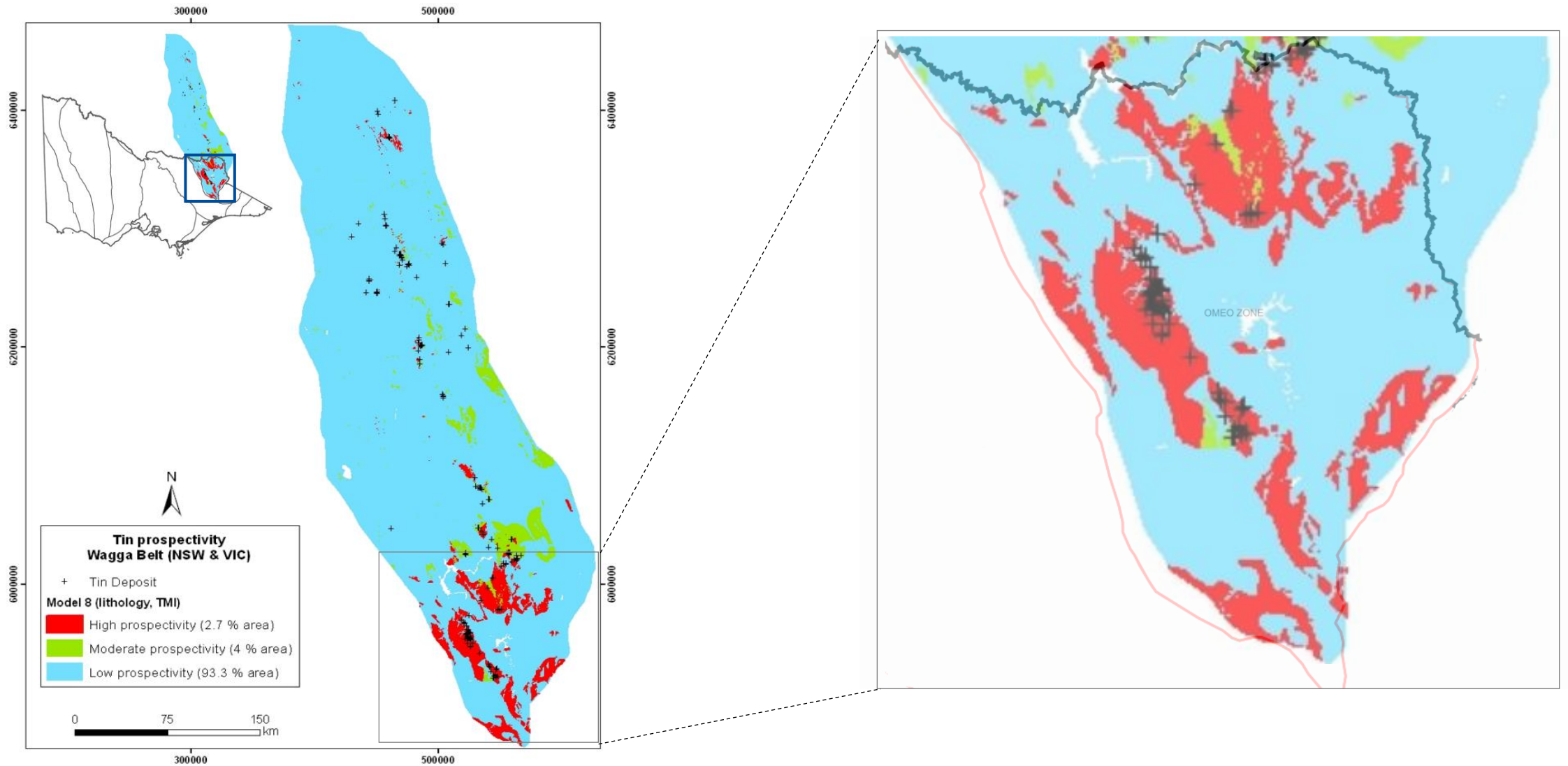
Total production prior to 1968, '000 tonnes





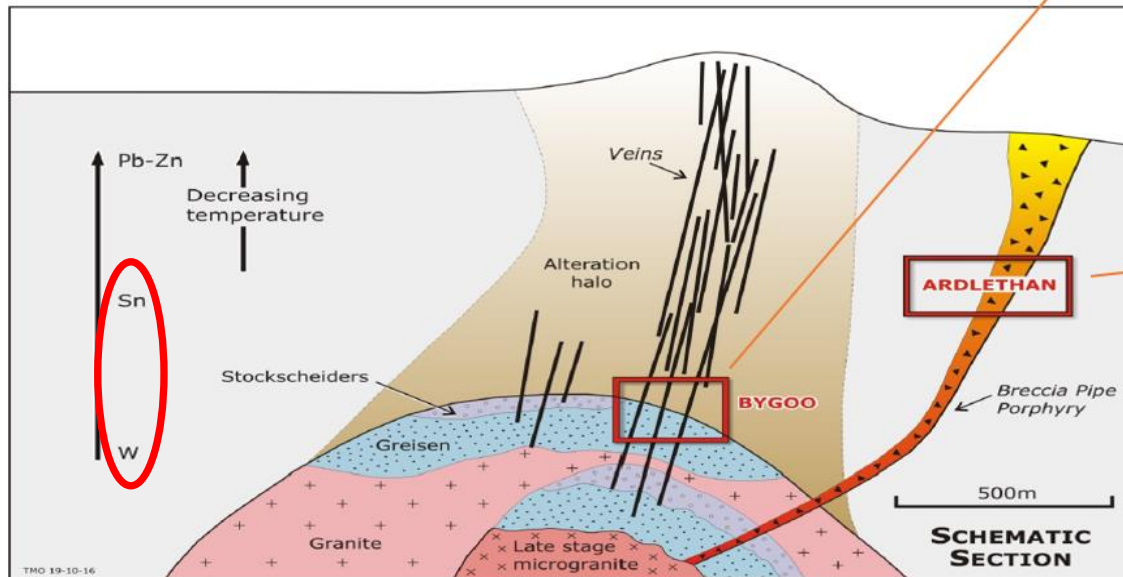


# Unrealised potential



# Unrealised potential

## Ardlethan



Source: Thomson Resources after Blevin (1998)



# Talk outline

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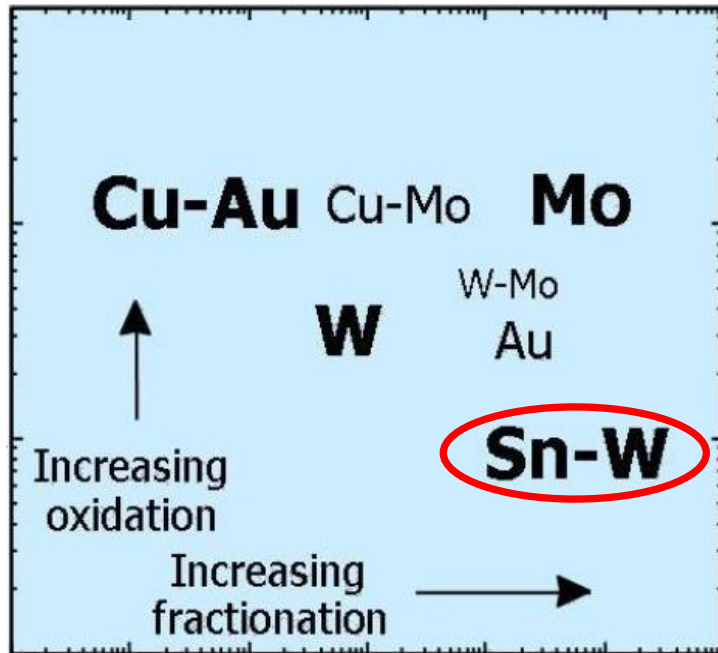
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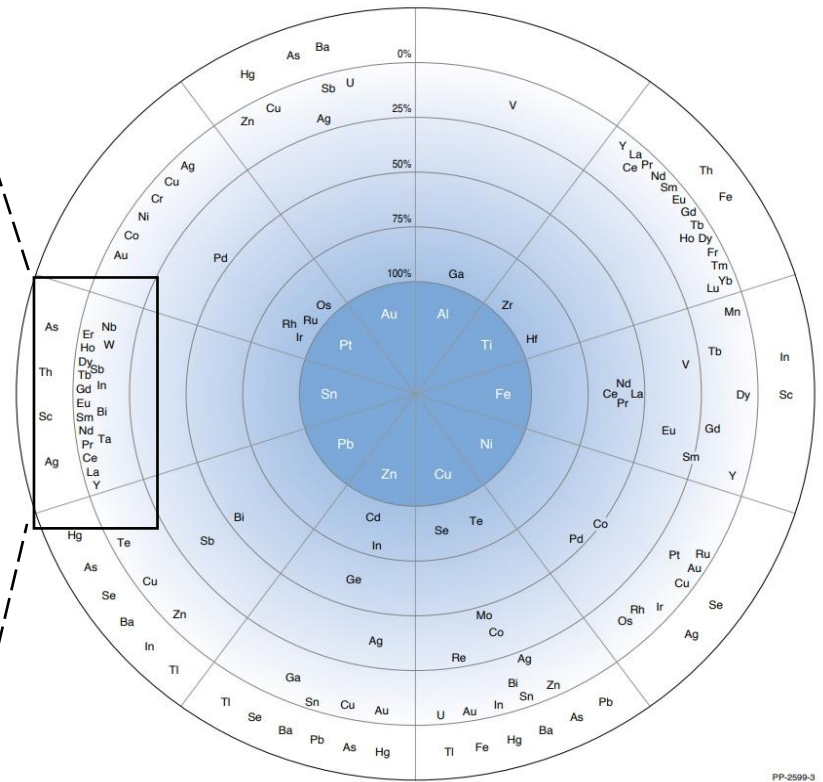
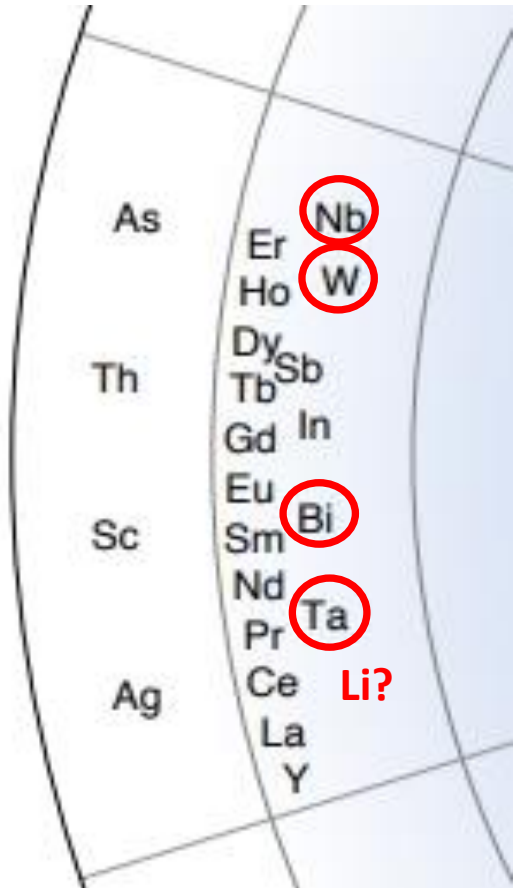


# GSV studies

## Geochemistry



Regional scale



Deposit scale



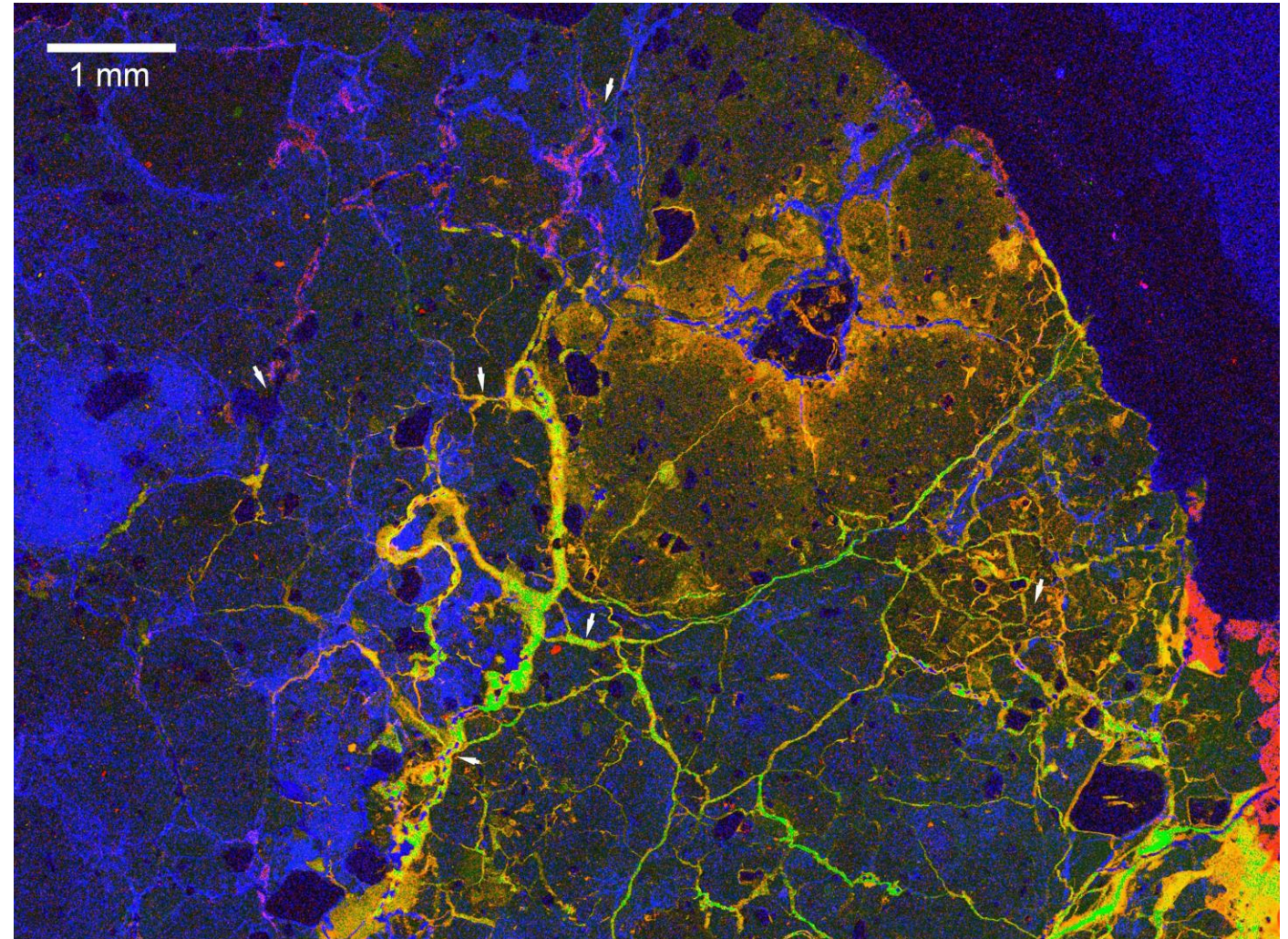
# GSV studies

## Characterisation

- Maia imaging example:
  - Green = iron
  - Blue = bromine
  - Red = arsenic



Bullhead Tin Mine (BHH1) – Mitta Mitta Field

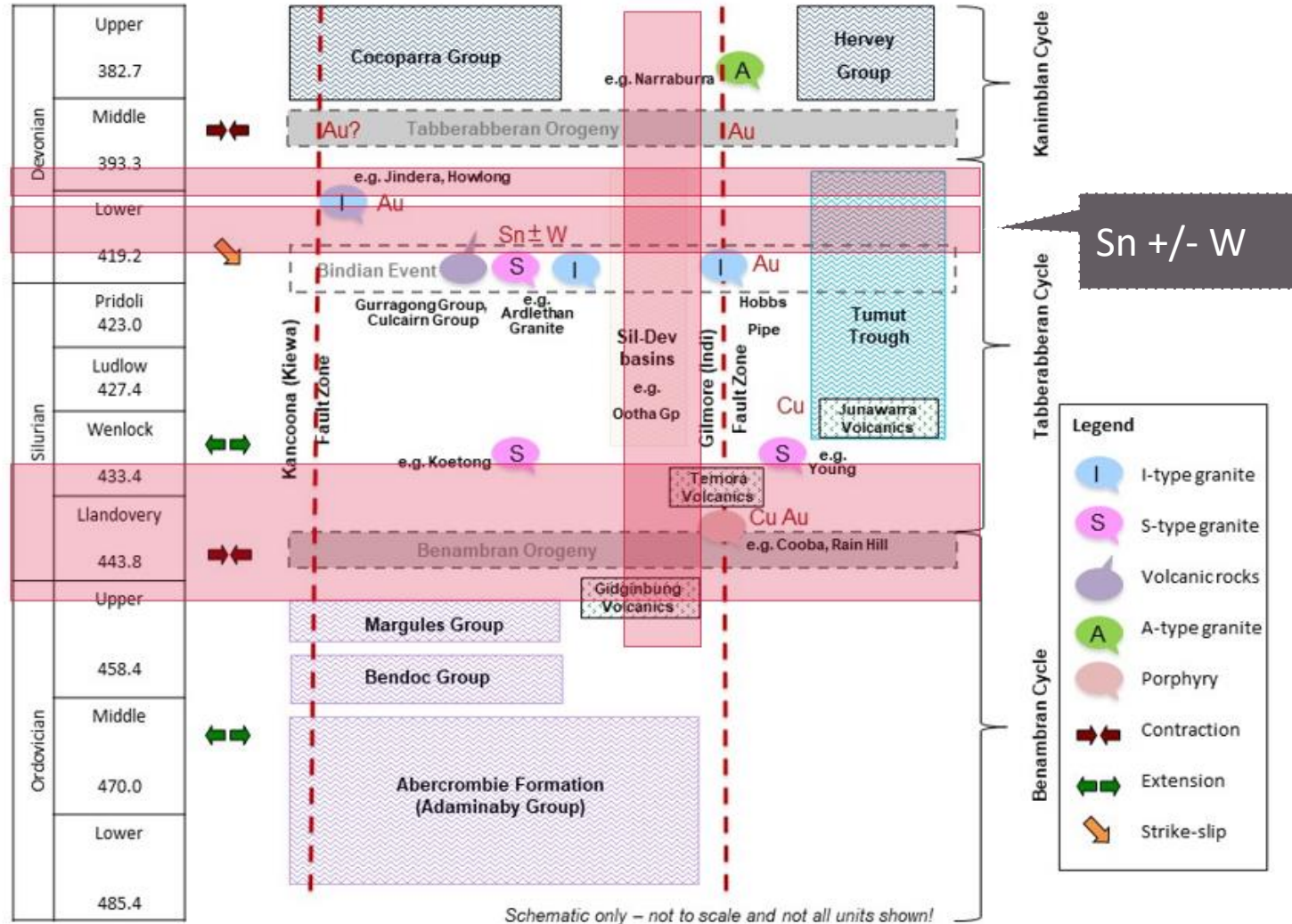


Maia image (example only – not from GSV study)



# GSV studies

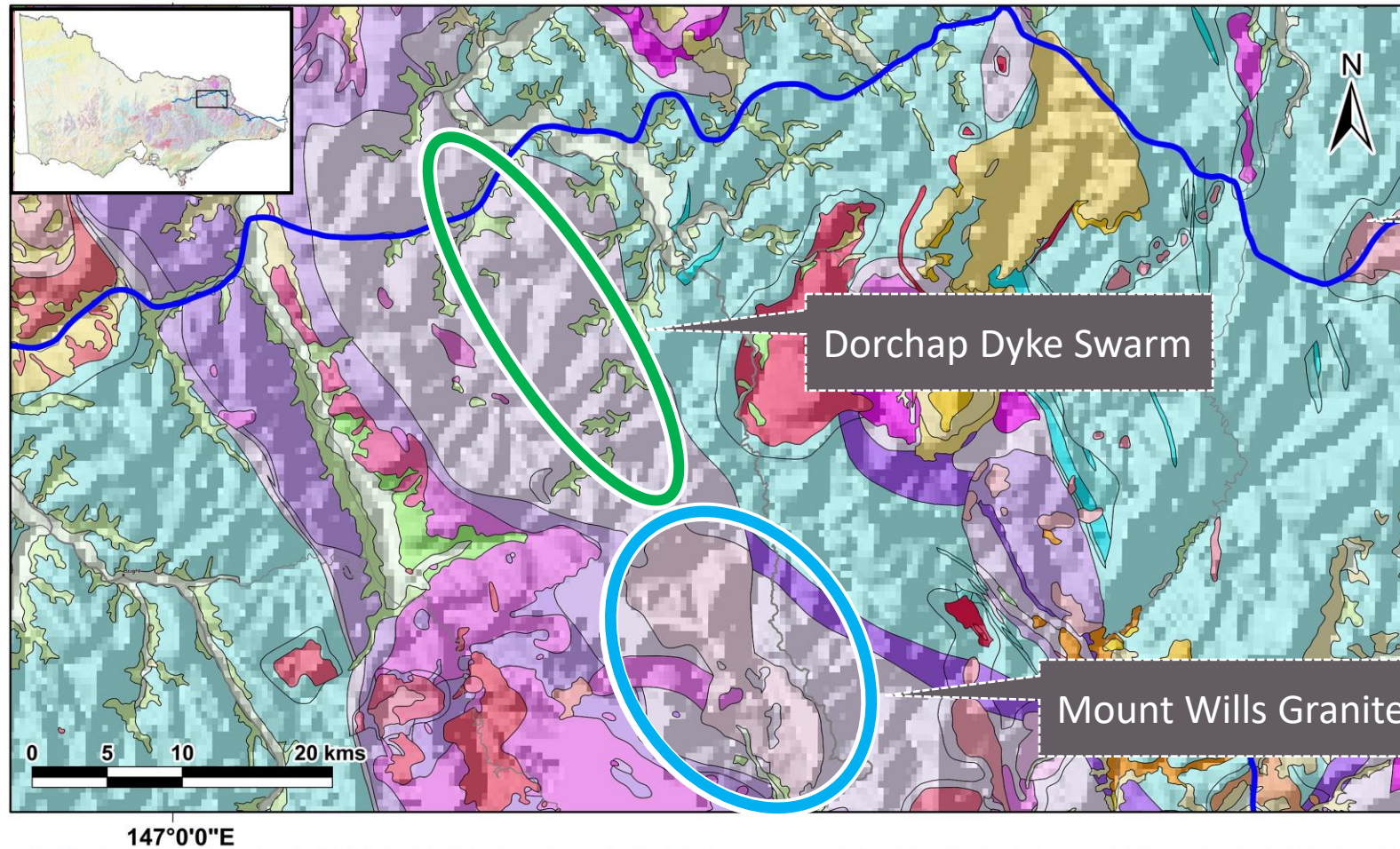
## Geochronology





# Case study

## How fundamental geoscientific data underpins exploration strategies



2018 seismic route

Dorchap Dyke Swarm

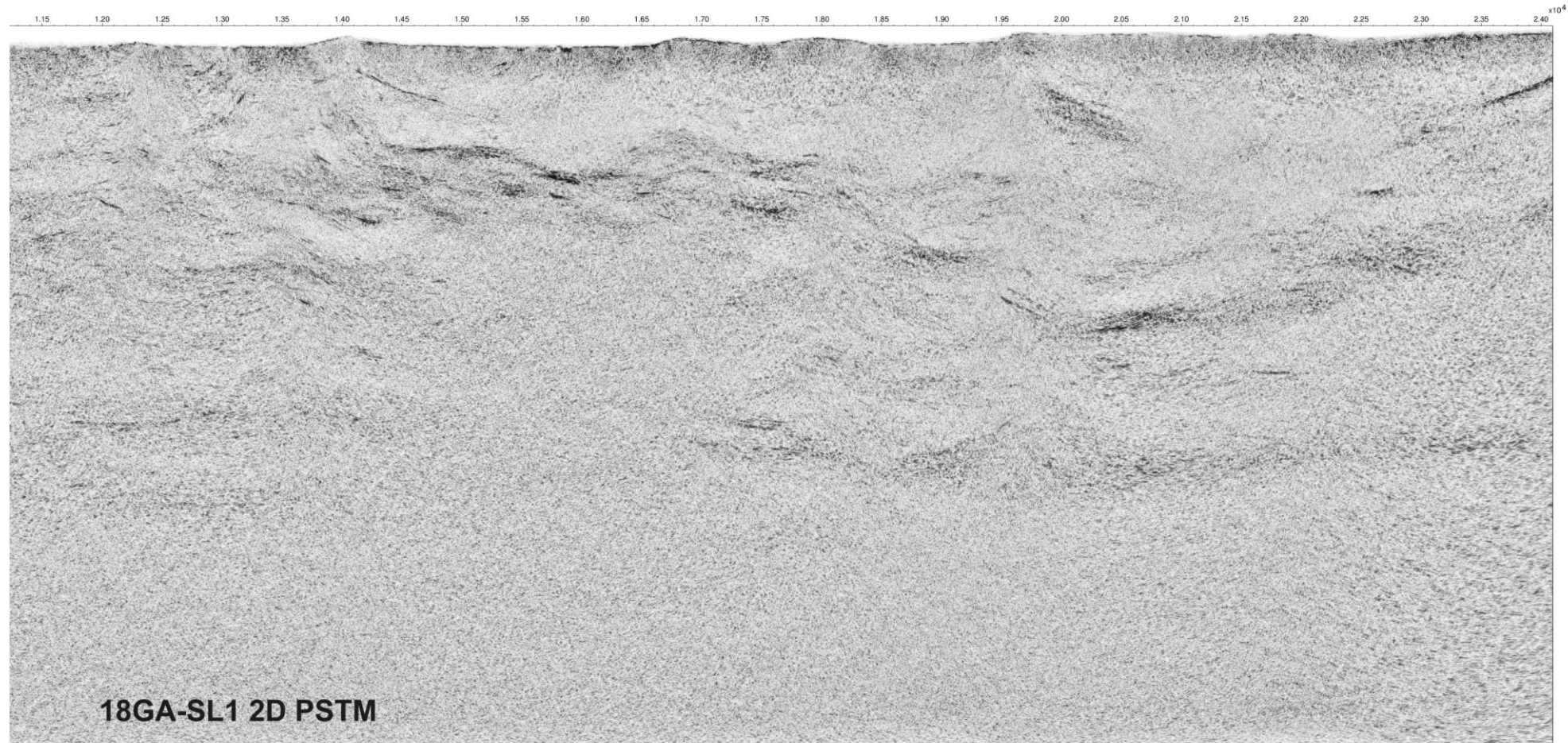
Mount Wills Granite





# Case study

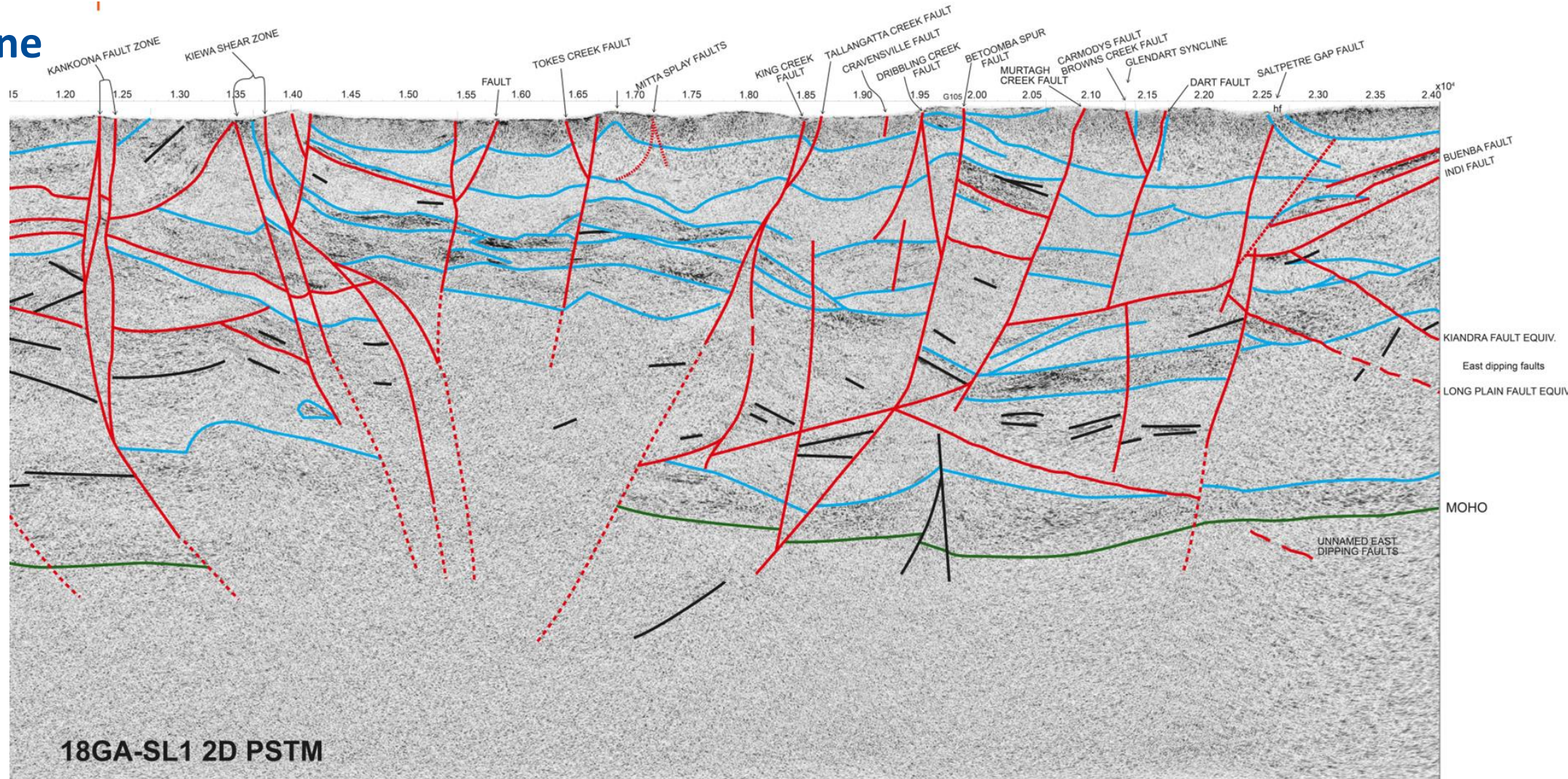
## Omeo Zone





# Case study

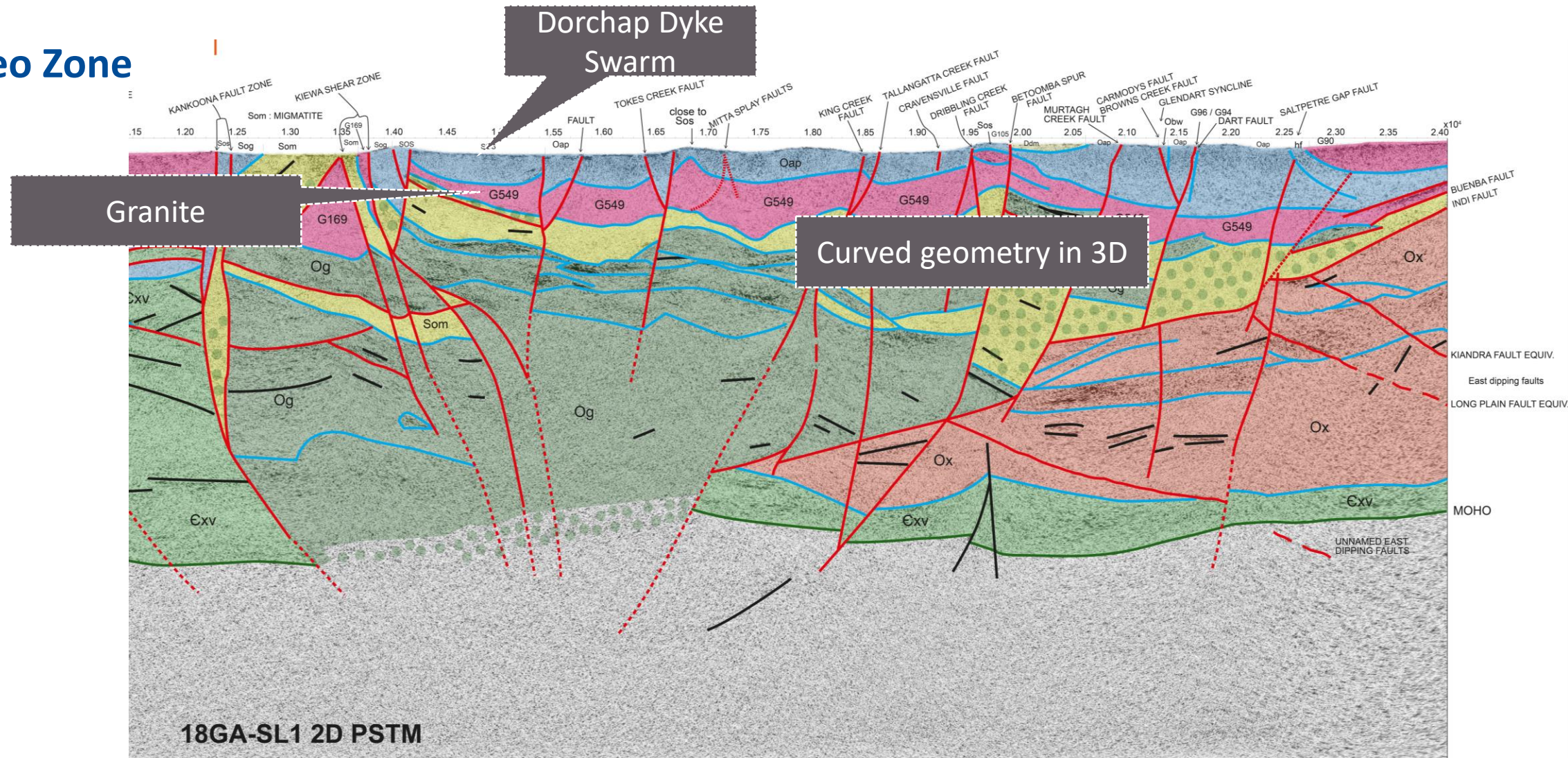
## Omeo Zone





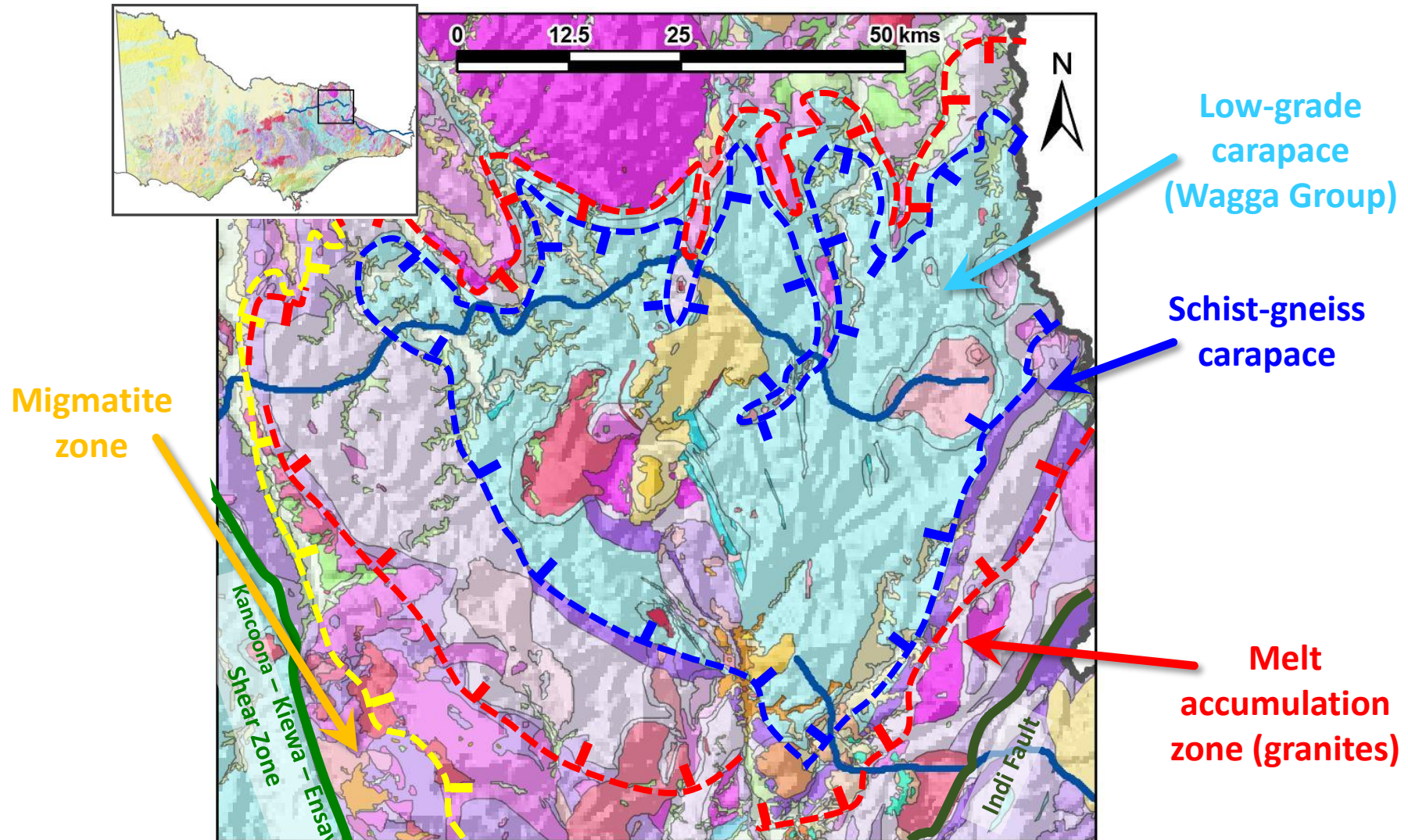
# Case study

## Omeo Zone





# Case study



# Summary

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- 2-year applied geoscience program
- Multiple critical minerals
- Sample collection and analysis phase

## Tin and Tungsten

- Lack of modern analyses
- Geological framework predicts unrealised potential
- New generation geochemistry, geochronology and mineralogy
  - ✓ Improve the understanding of existing deposits
  - ✓ Potential 'value-add' metals
  - ✓ Inform mineral exploration strategy and decision making







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Energy,  
Environment  
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