

# Victoria's pre-competitive geoscience: who, what, why

AIG Victoria Minerals Roundup

22 June 2023

**GEOLOGICAL  
SURVEY OF VICTORIA**

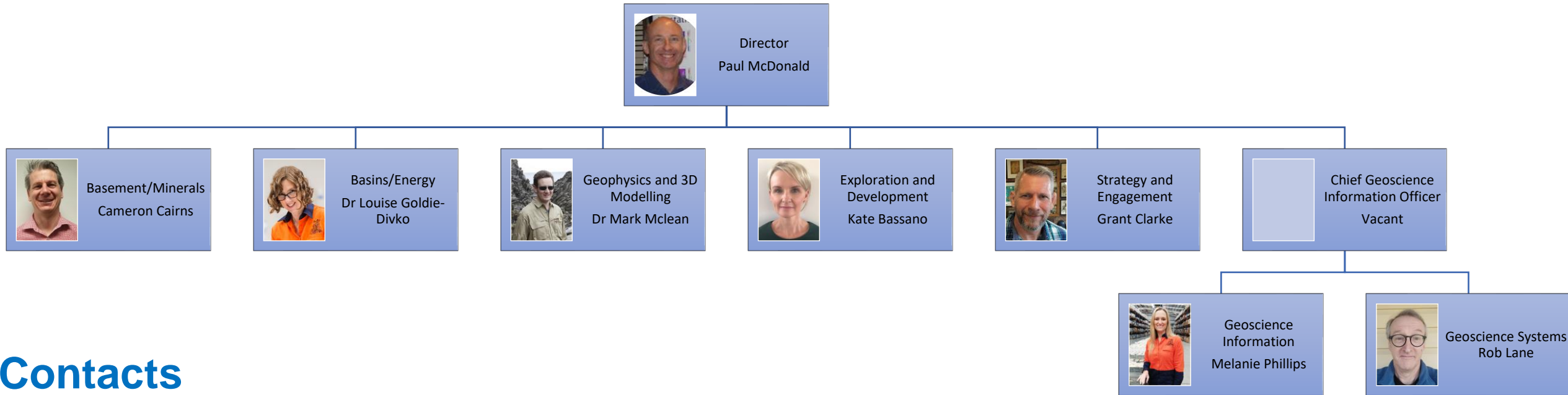
[Cameron.Cairns@ecodev.vic.gov.au](mailto:Cameron.Cairns@ecodev.vic.gov.au)

Manager Basement Geoscience

**DISCOVER  
EARTH'S  
SECRETS**



# Current structure



## Contacts

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Geoscience Information\Mineral Tenements: [gsv.mineraltenements@ecodev.vic.gov.au](mailto:gsv.mineraltenements@ecodev.vic.gov.au)

Drill Core Library: [gsv.drillcorelibrary@ecodev.vic.gov.au](mailto:gsv.drillcorelibrary@ecodev.vic.gov.au)

Exploration and Development: [gsv\\_resources@ecodev.vic.gov.au](mailto:gsv_resources@ecodev.vic.gov.au)

Engagement/Community: [gsv\\_engagement@ecodev.vic.gov.au](mailto:gsv_engagement@ecodev.vic.gov.au)

# Geoscience Information

- **Function:** Tenement reporting compliance
- **Aim:** Quality geoscience data/information submission
- Open file release: **>21,000 tenement reports downloaded last year**

## Record spend year-on-year: 5 years

- **FY22: \$222.3M**
- Drilling – indicates that the increase is going into geoscience data acquisition

## Volume and complexity of technical reports significantly increased

- Resulted in report backlog for auditing

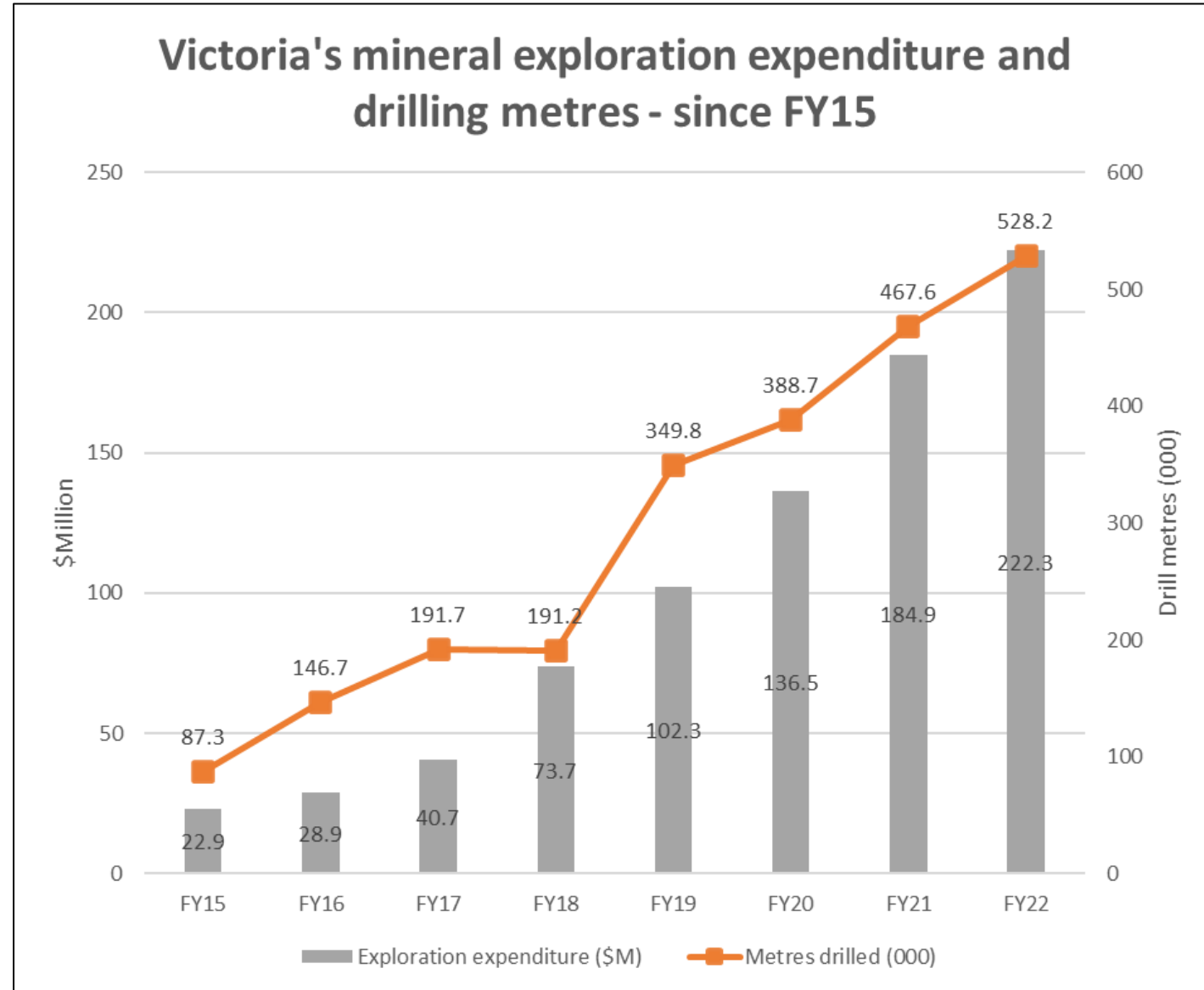
## Improved procedures on the way

- MRT Data validation (via Geobank)
- Information deficiency resolution
- Streamline release of information

Updated reporting guidelines planned for release in first half of 2024

**Meet Mel, Claire and Lara at the booth**

[gsv.mineraltenements@ecodev.vic.gov.au](mailto:gsv.mineraltenements@ecodev.vic.gov.au)



# Drill Core Library

- > 14,000 drill holes
  - Minerals, energy, groundwater, extractives, geotechnical
- ~1.5 million metres of drill core and cuttings
- ~\$2.3B of drilling
- 40 minutes from Melbourne
- Open 5 days a week (by appointment)
- Drill core cutting and potential sampling
- Core photography
- New lab space: petrology, XRD, petrophysics



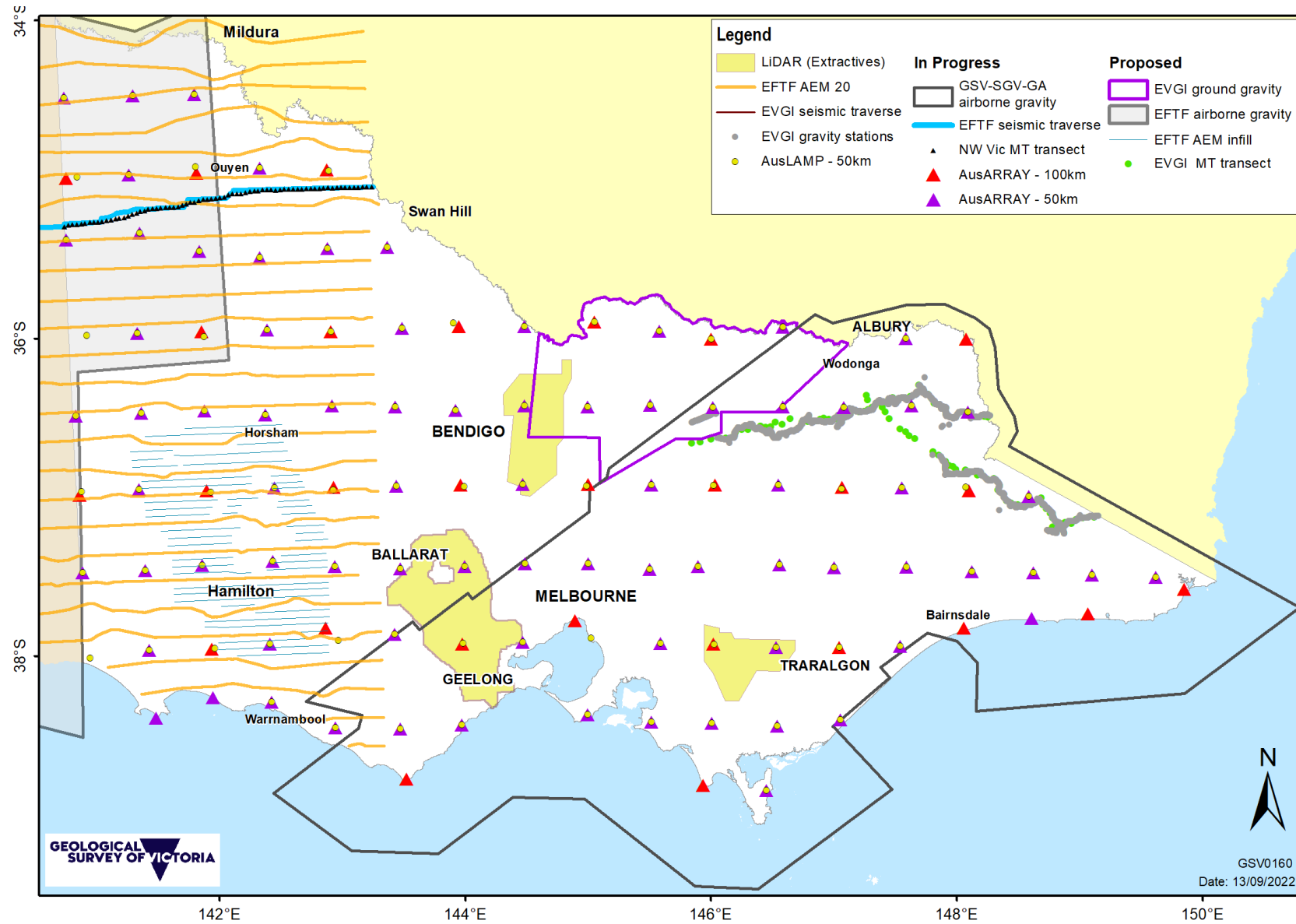
**Please consider offering representative drill core (and data) to help build this important State asset – it's all upside!**

- ~6,000 m of drill core donated per year
- ~300 pallets of representative drill core from Bendigo
- **90% capacity**
  - Temporary storage nearby being arranged



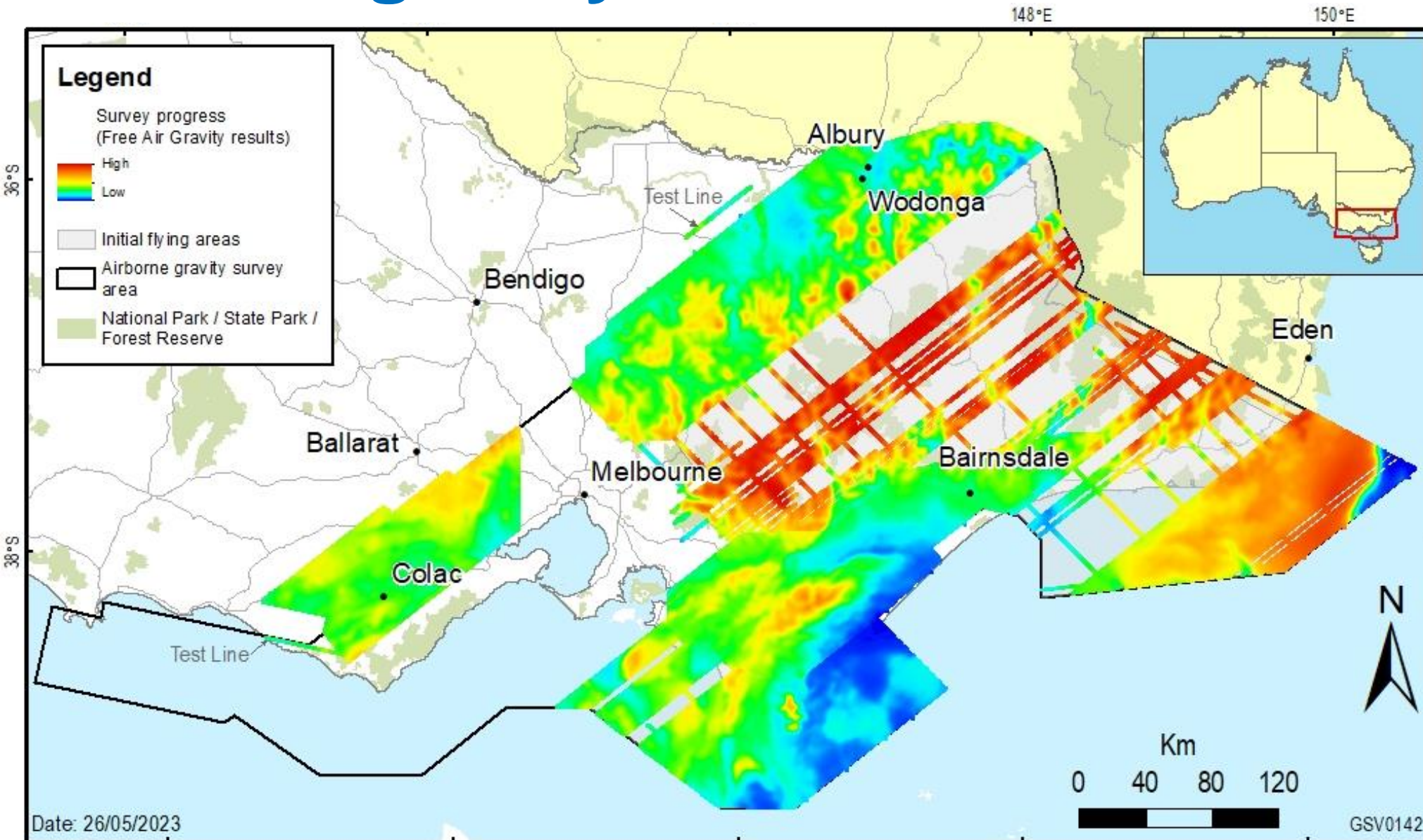
**Meet Shannon (Geoscientist – Drilling Information) at the booth**  
[gsv.drillcorelibrary@ecodev.vic.gov.au](mailto:gsv.drillcorelibrary@ecodev.vic.gov.au)

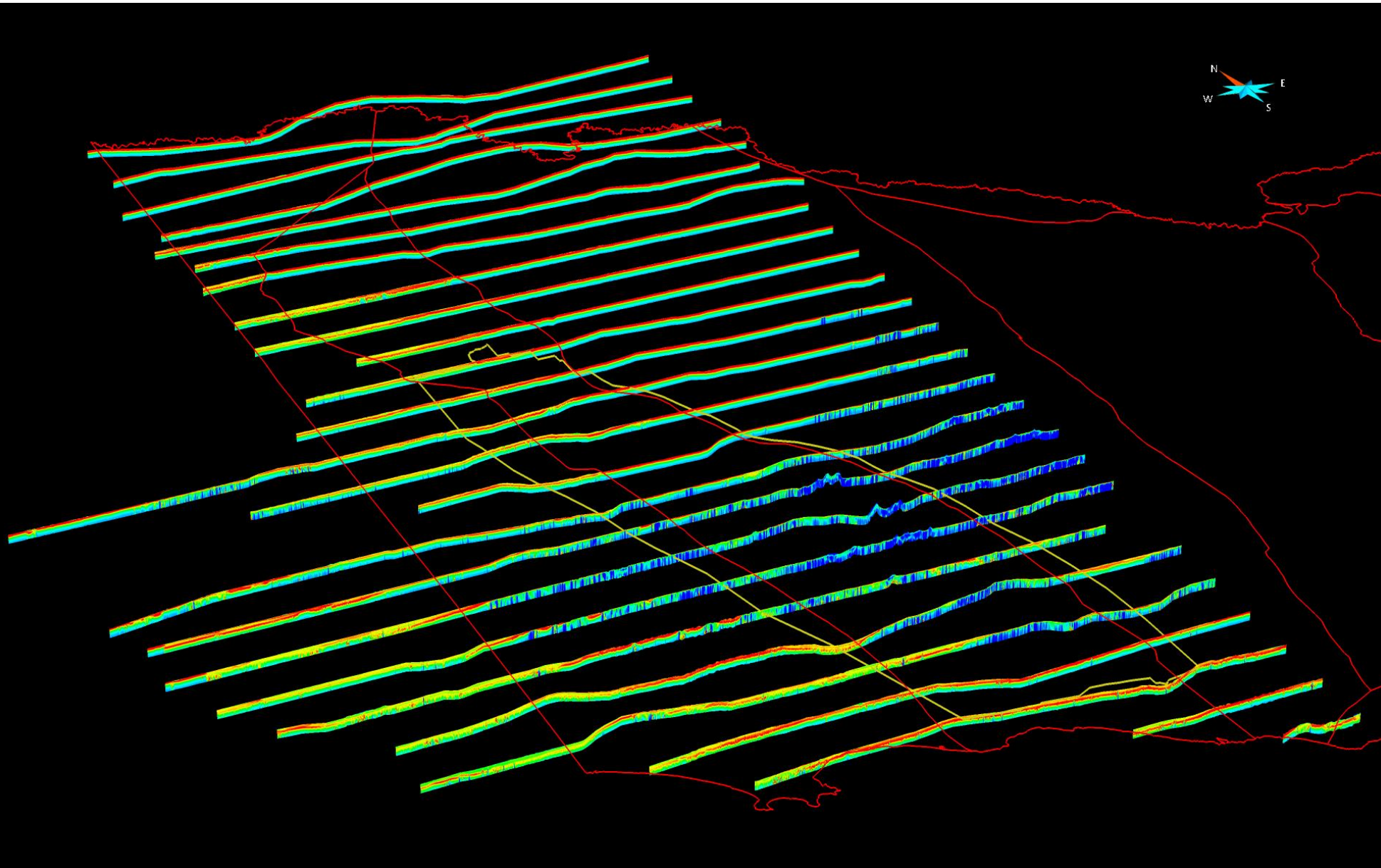
# Geophysical acquisition





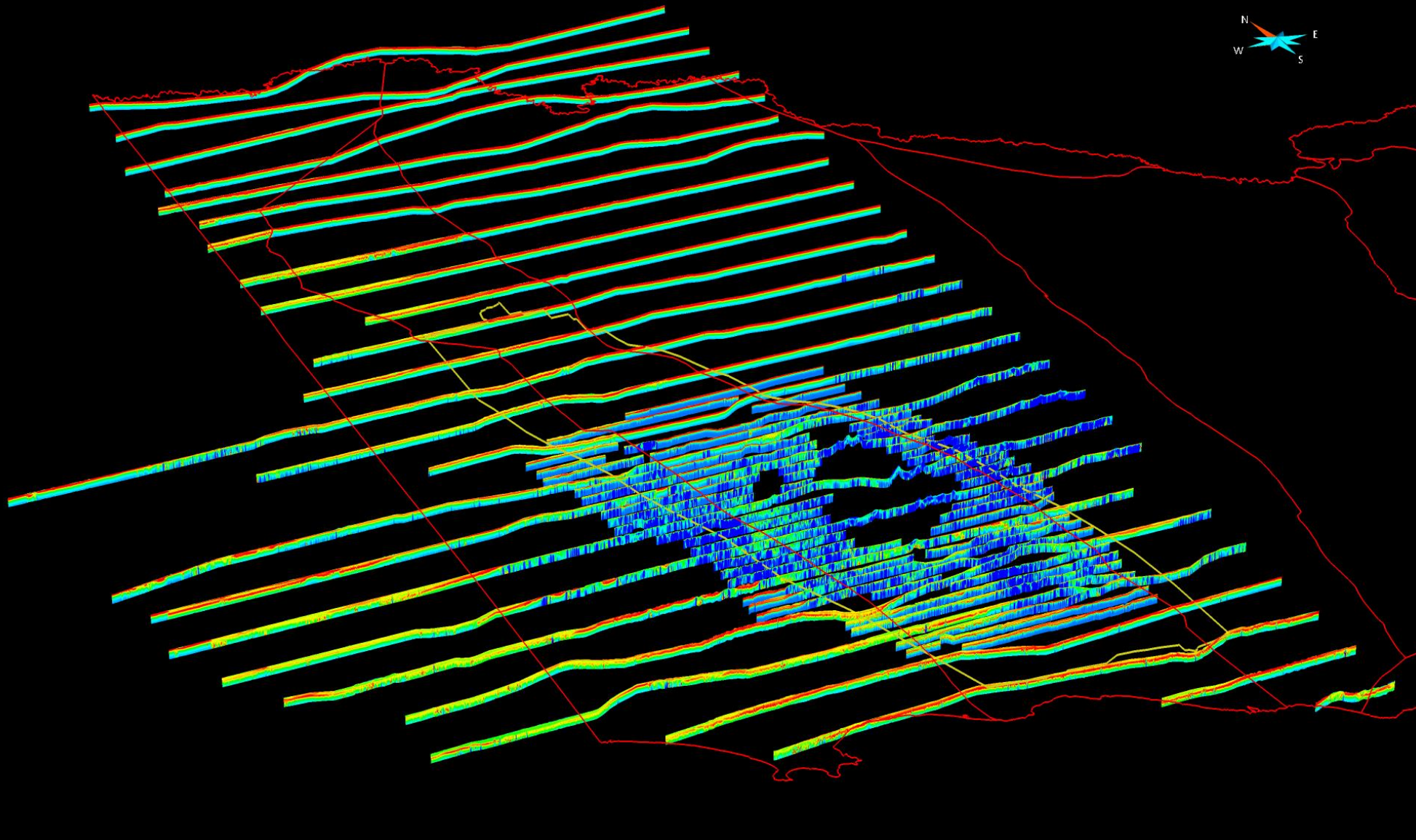
# Airborne gravity







# AEM infill





# Exploring for the Future



Australian Government  
Geoscience Australia



## National (continental) geophysics

- [AusAEM](#)
- [AusARRAY](#)

## [Delamerian Project](#)

- Deep 2D crustal seismic – (NW Victoria) – 2023/24
- Geochronology, geochemistry – now-June 2024
  - ~100 samples (multi-analysis) already collected

## [National Mine Waste Atlas](#) – now-June 2024

- 4 x sites (RMIT)

## [National Pb isotope map](#) – now-June 2024

- Regional granite transect: 25 x geochron samples

## [2023 showcase](#) – 15-17 August



# Geochronology



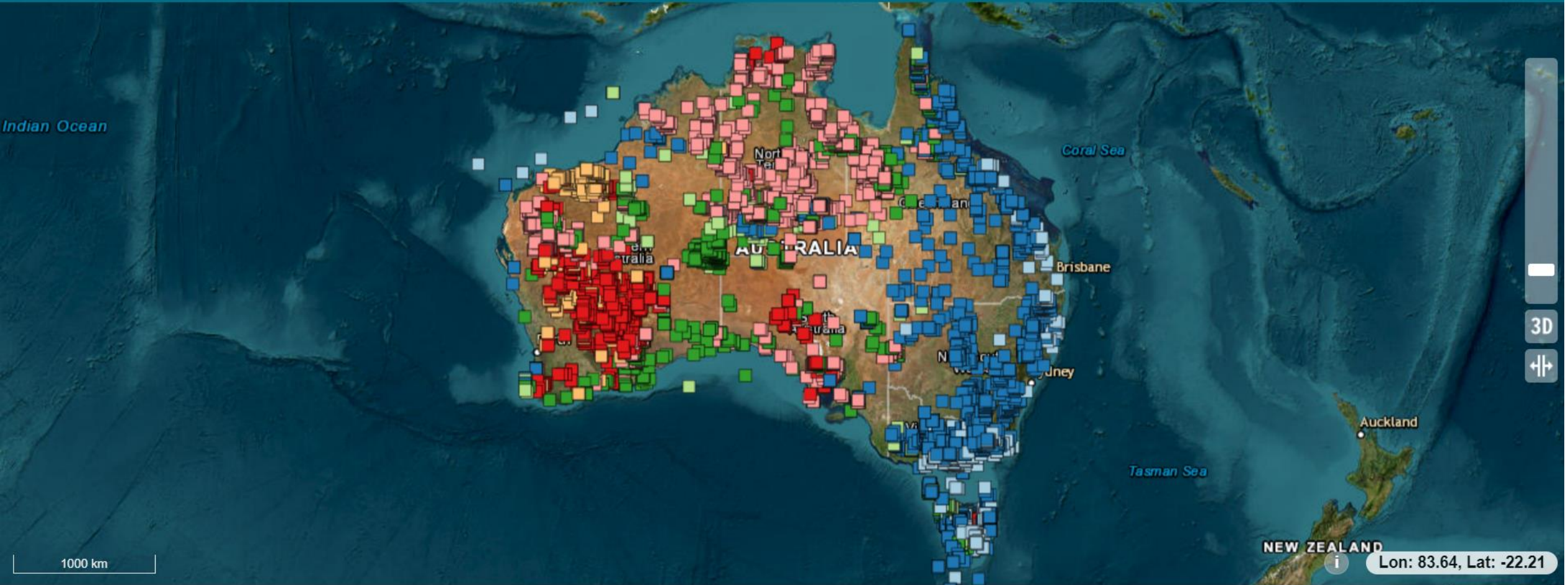
Australian Government  
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## Geochronology and Isotopes Data Portal



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# Geochronology



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## Geochronology and Isotopes Data Portal



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Age and Isotopic Grids (February 2021) >

Age and Isotopic Grids (June 2023) >

Geochronology >

Geochronology - All ☆

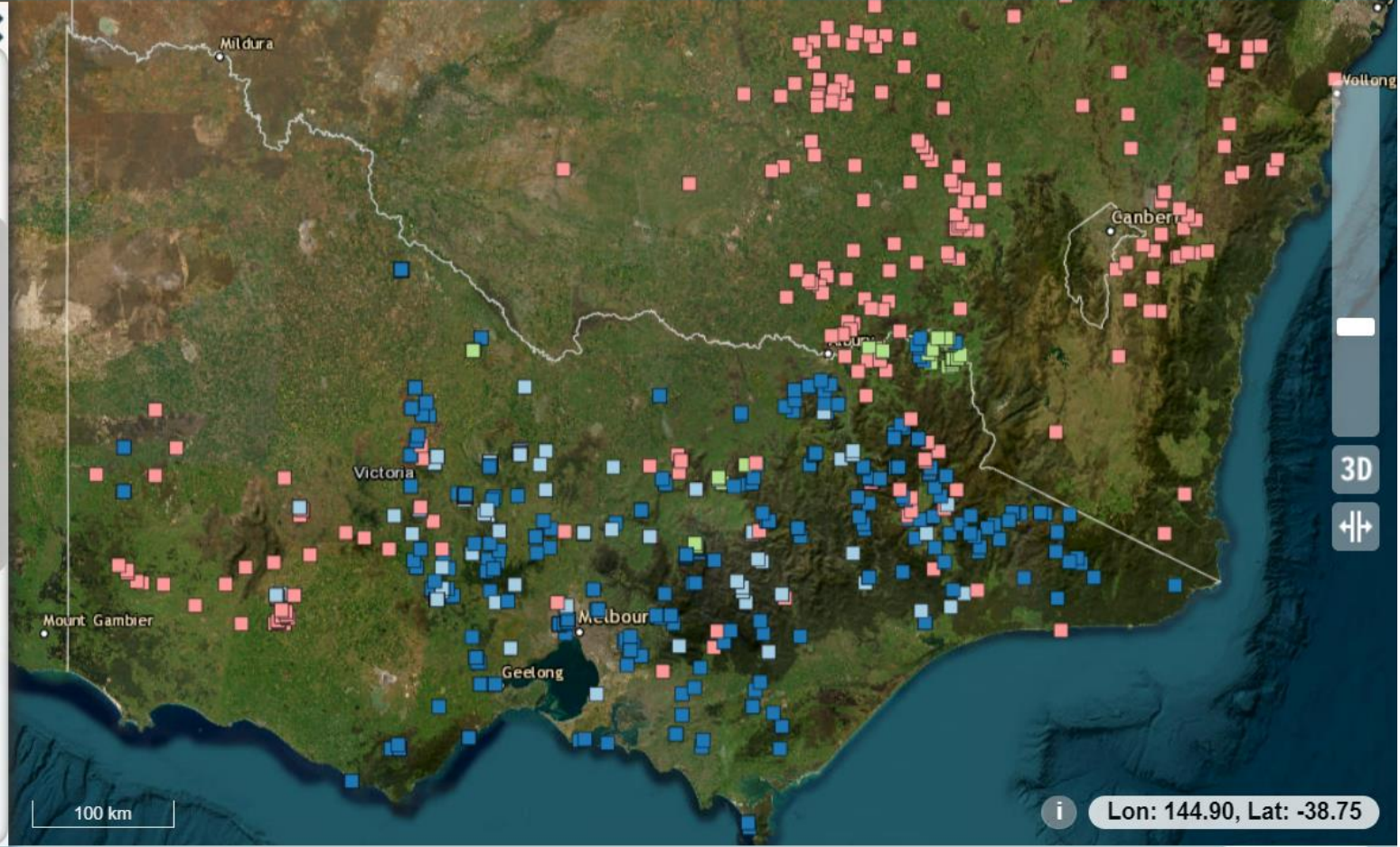
| | (off) | |

Opacity 100%

Style All Geochronology : Isotopic Syste ▾

- U/Pb
- Ar/Ar
- K/Ar
- Rb/Sr
- Sm/Nd

Sensitive High Resolution Ion Microprobe (SHRIMP) - Analyses ☆ +





# Geochronology



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Age and Isotopic Grids (June 2023) >

Geochronology v

Geochronology - All ☆ (-)

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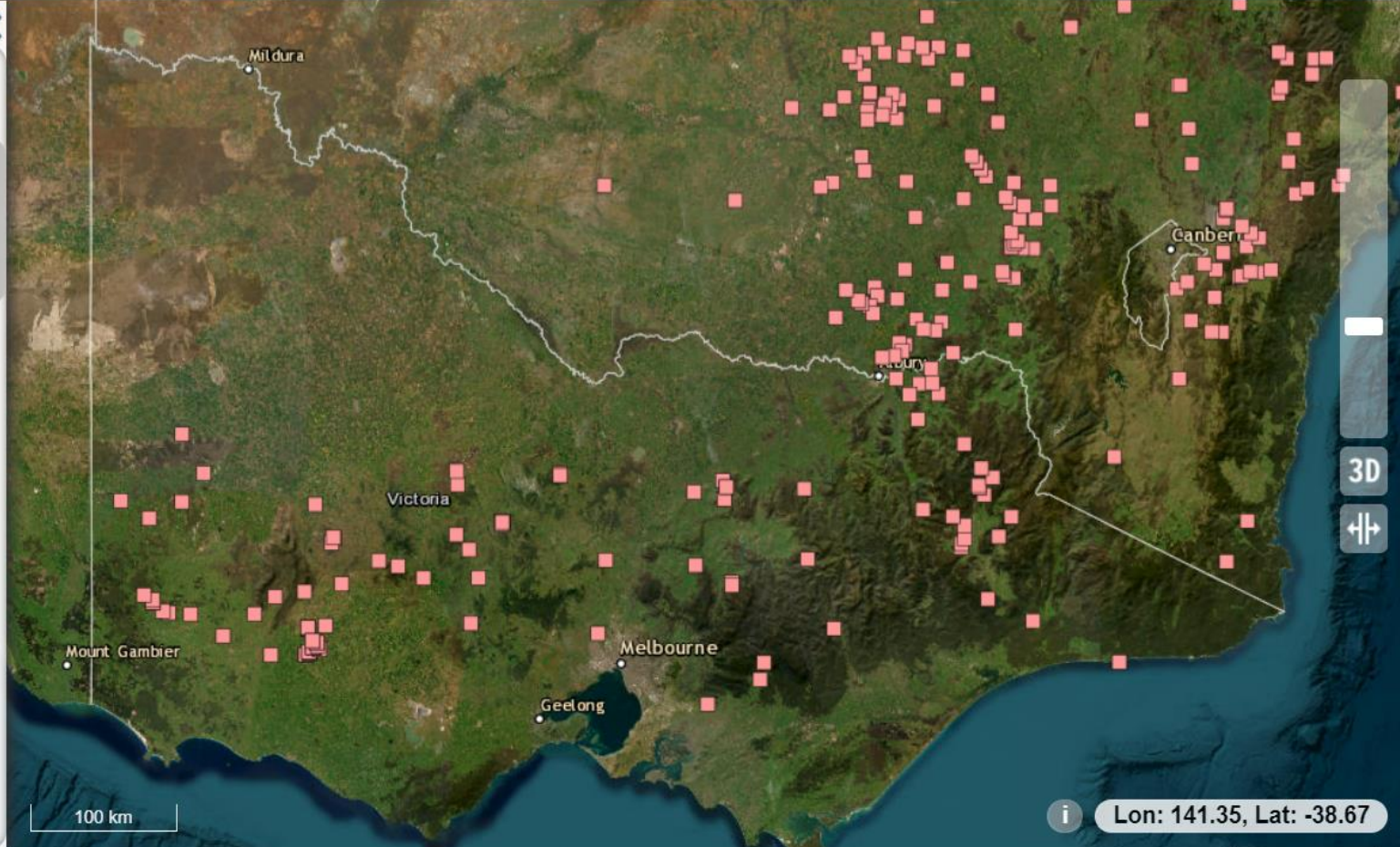
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Remove Filter | Include Null Values | Apply Filter

IGSN

Sample No

Sample ID



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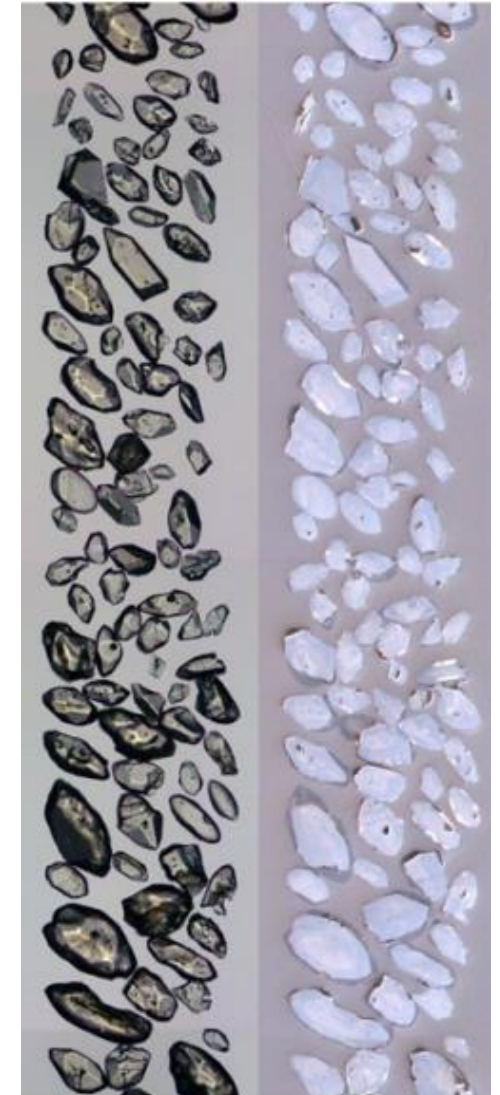
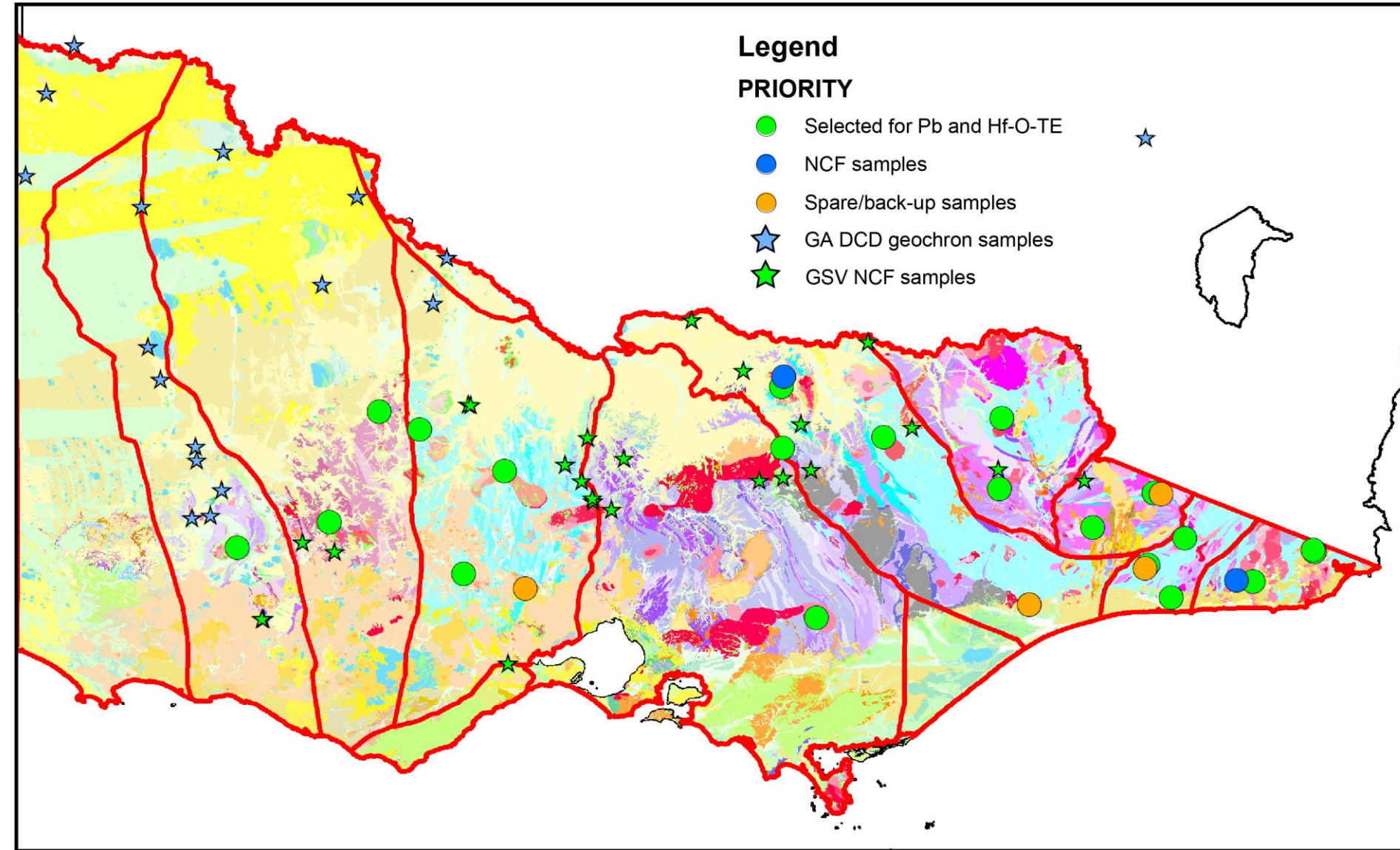


# Geochronology

## Legend

### PRIORITY

- Selected for Pb and Hf-O-TE
- NCF samples
- Spare/back-up samples
- ★ GA DCD geochron samples
- ★ GSV NCF samples



Zircon grain mount for analysis

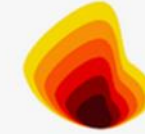




Australian Government  
Geoscience Australia



Department of Transport and Planning



MinEx CRC



UNIVERSITY OF ALBERTA



catalyst METALS LTD



DART MINING



AGNICO EAGLE



FOSTERVILLE SOUTH EXPLORATION





# Critical Mineral studies

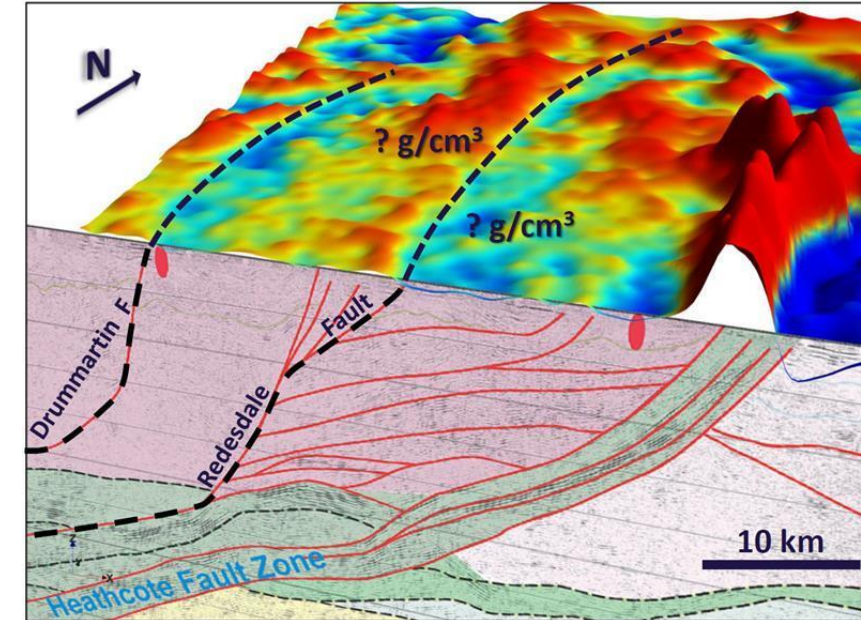
## Targeted 2-year applied characterisation projects:

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



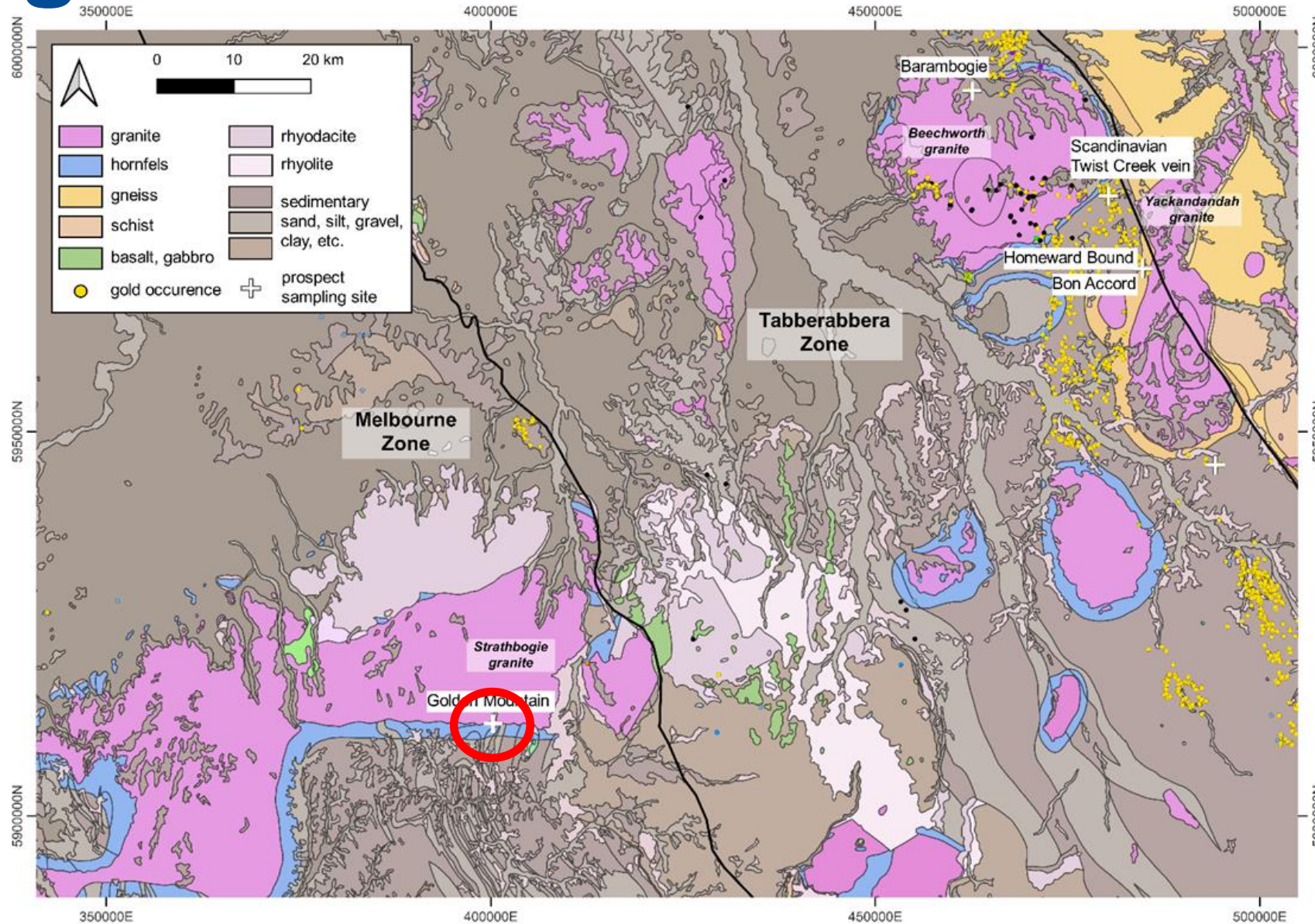
# MinEx CRC

- The world's largest mineral exploration collaboration (2019-2029)
  - [Project 7: Finding Mineral Systems under cover](#)
- 2 x PhD
  - Resistate mineralogy associated with orogenic gold under cover (UniSA)
    - Lockington case study
  - Explaining and delineating faults in regional gravity in north central Victoria (Monash)
    - Gravity responses of Bendigo Zone faults
  - *Characterising intrusion-hosted gold mineralisation in Victoria (UWA-CET) – TBC*
    - A transect of Victoria's geological zones
- **Intrusion-hosted vs orogenic gold** (CSIRO, industry)
  - Dec 2022-Dec 2024
  - Mineralogy, geochemistry, geochronology
- **National Ar-Ar map**
  - ANU, Geoscience Australia





# Orogenic vs Intrusion

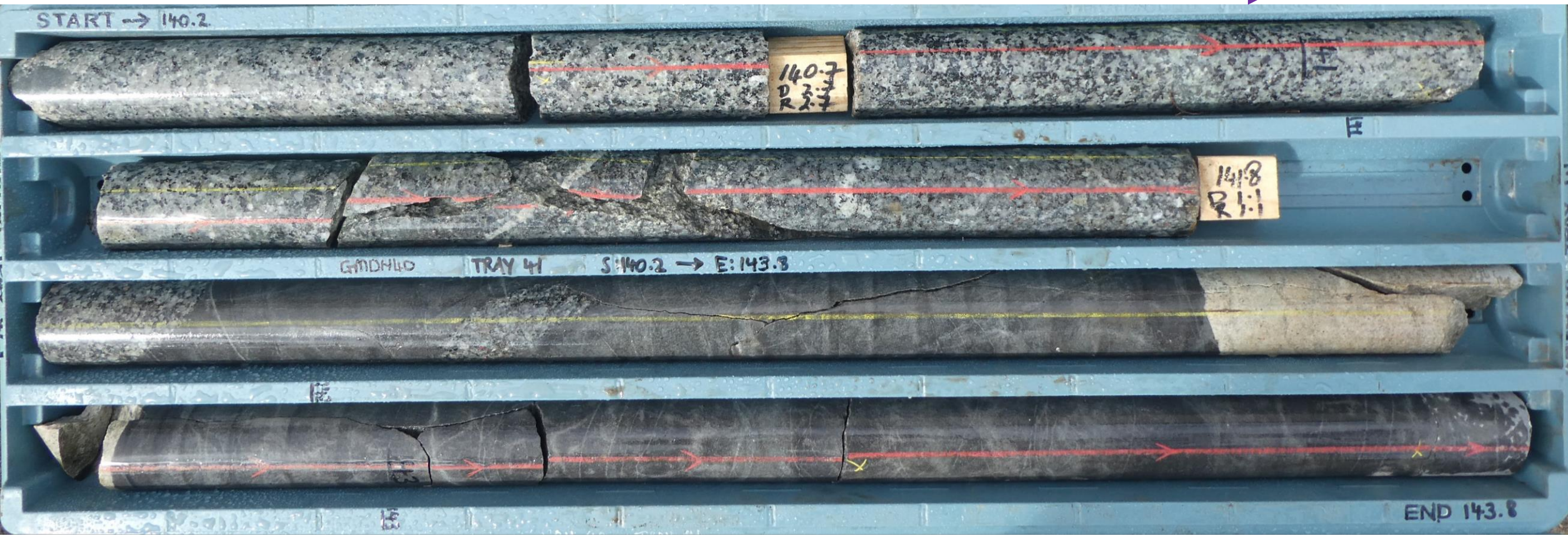




# Golden Mountain

GMDH040: 140-141m 1.18ppm Au

START → 140.2

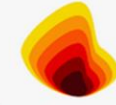




# Golden Mountain

GEOLOGICAL SURVEY OF VICTORIA

GMDH040: 140-141m 1.18ppm Au



MinEx CRC

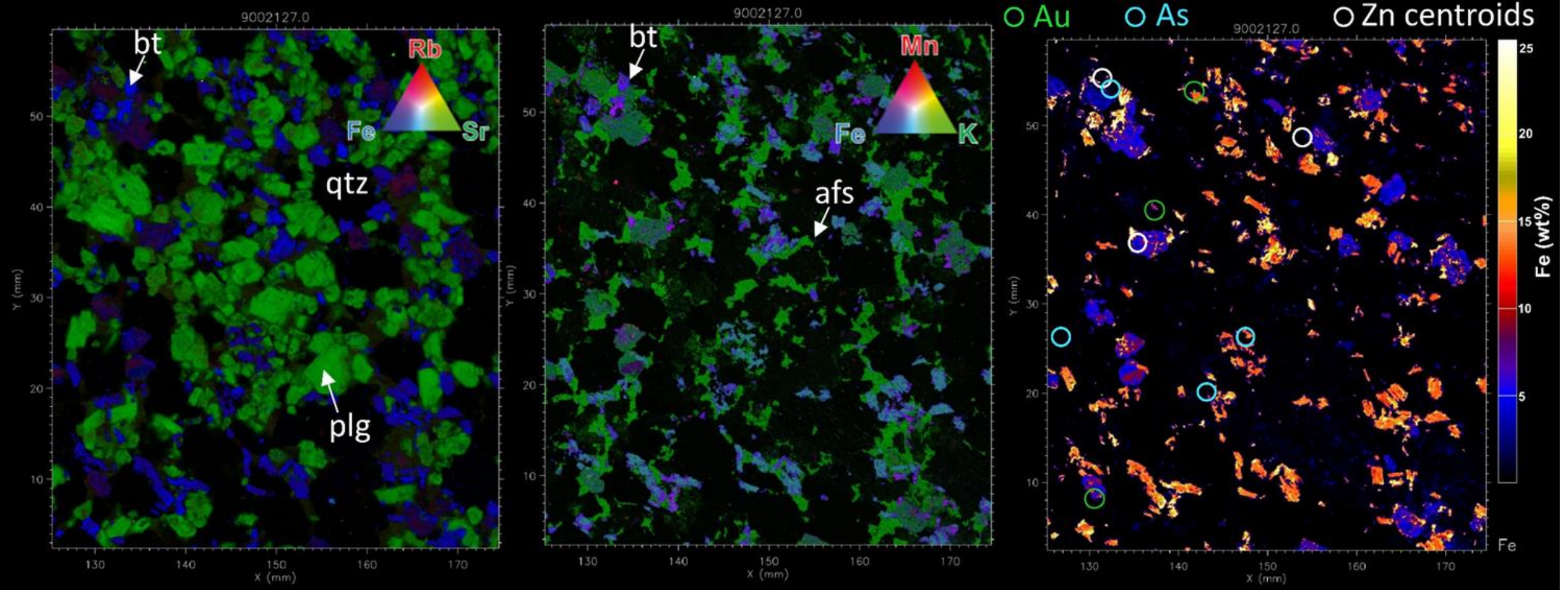




# Maia map - Golden Mountain



GMDH040: 140-141m 1.18ppm Au



Disseminated gold, sphalerite(?), Ni-Co arsenides in Devonian(?) granite dyke intruding Siluro-Devonian Murrindindi Supergroup



# Golden Mountain

GMDH051: 232-232.38m ~1ppm Au



Mineralised (hornfels) deformed Siluro-Devonian Murrindindi Supergroup.

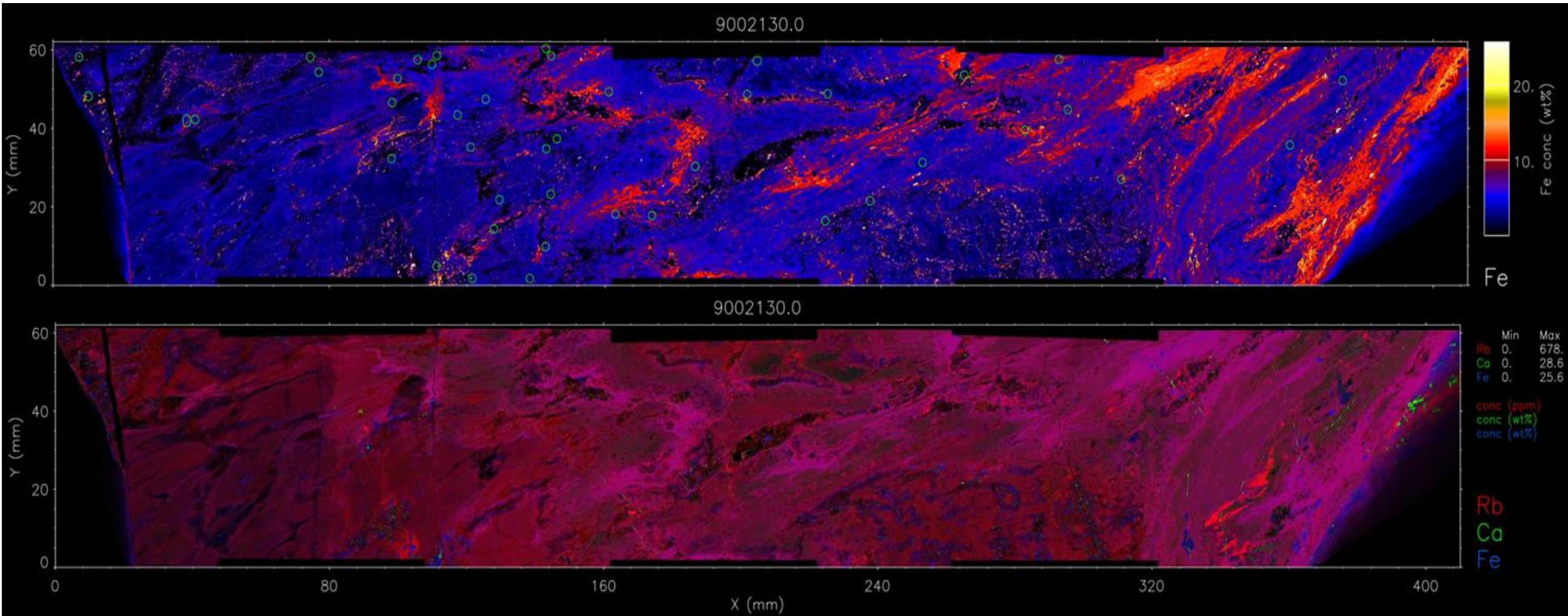


# Maia map - Golden Mountain



GMDH051: 232-232.38m ~1ppm Au

○ Au centroids

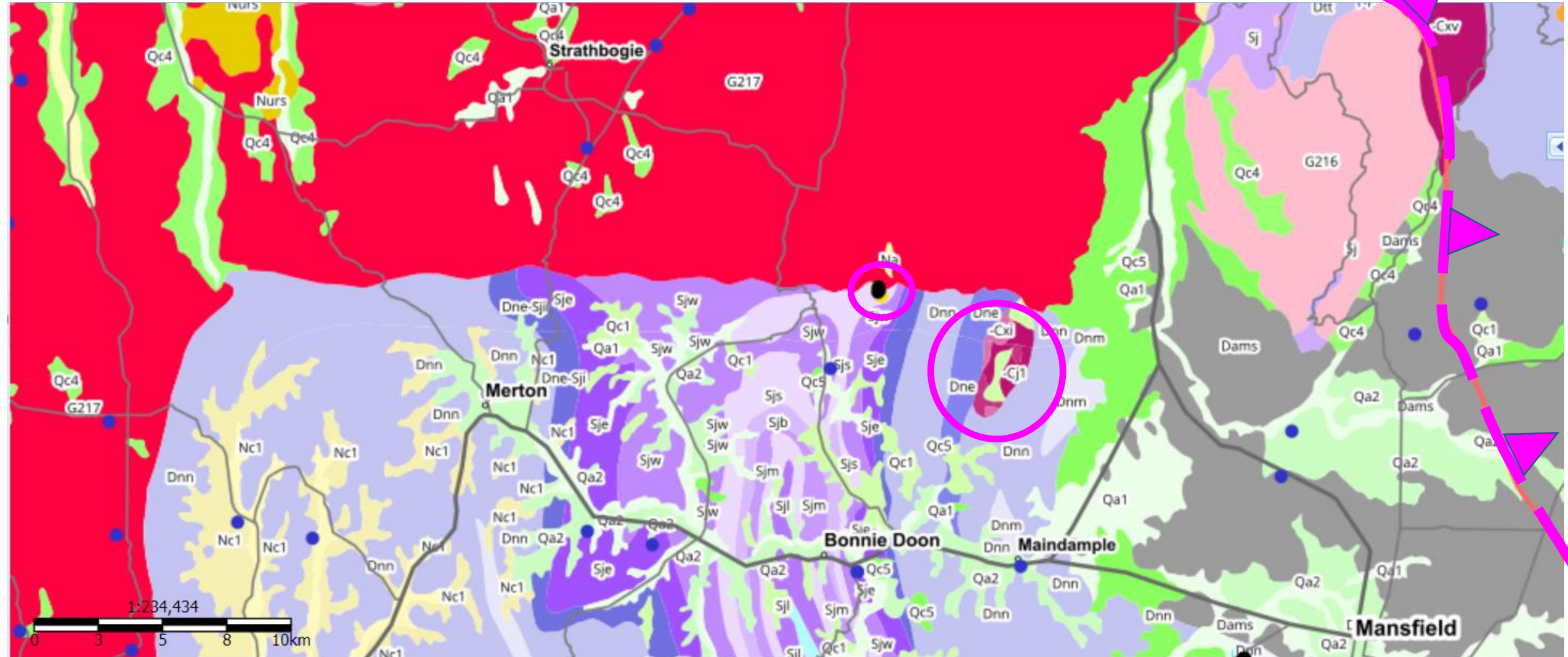


Mineralised (hornfels) Siluro-Devonian Murrindindi Supergroup. Gold spots associated with microstructures, aligned with foliation

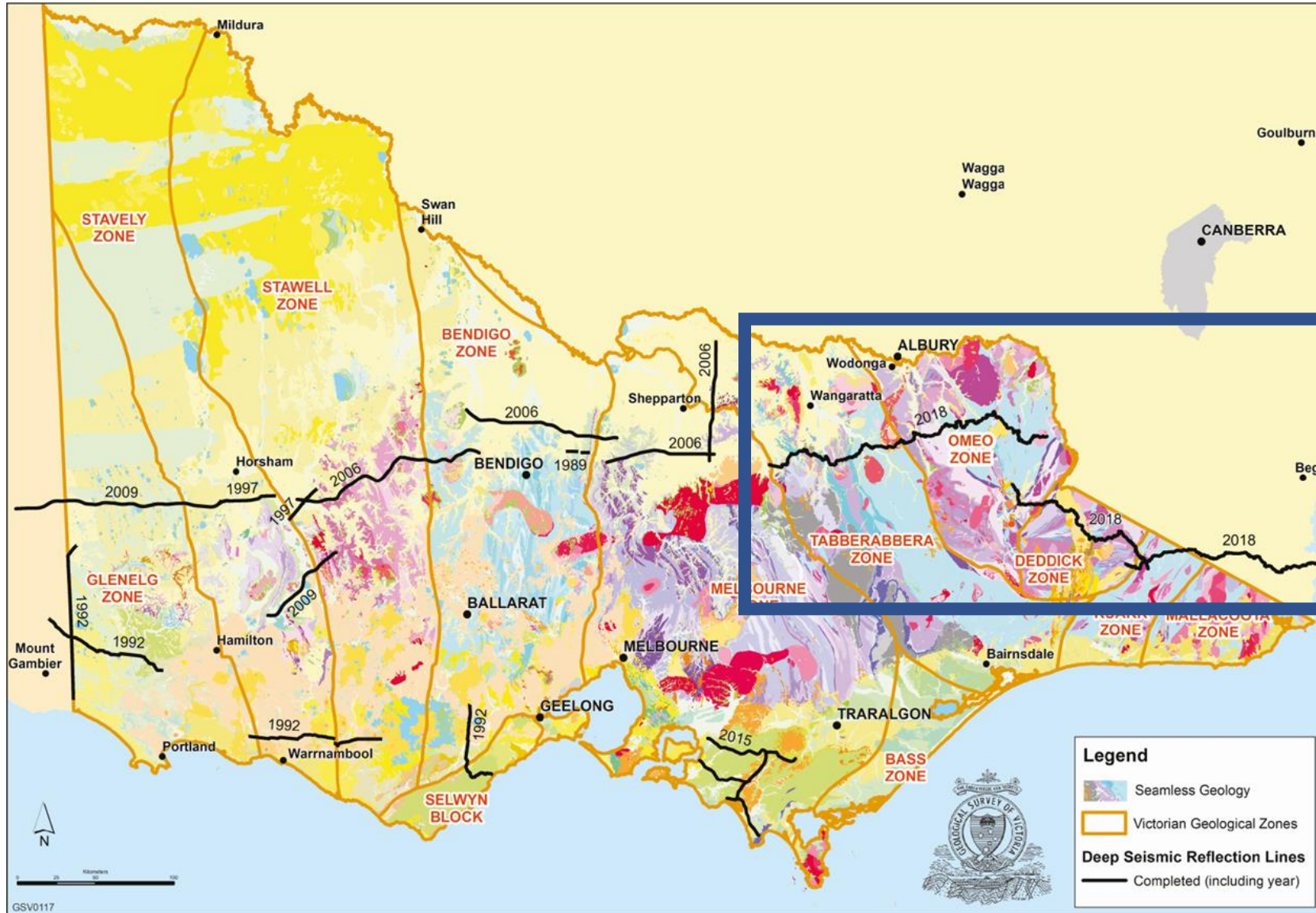


# Golden Mountain

Governor Fault

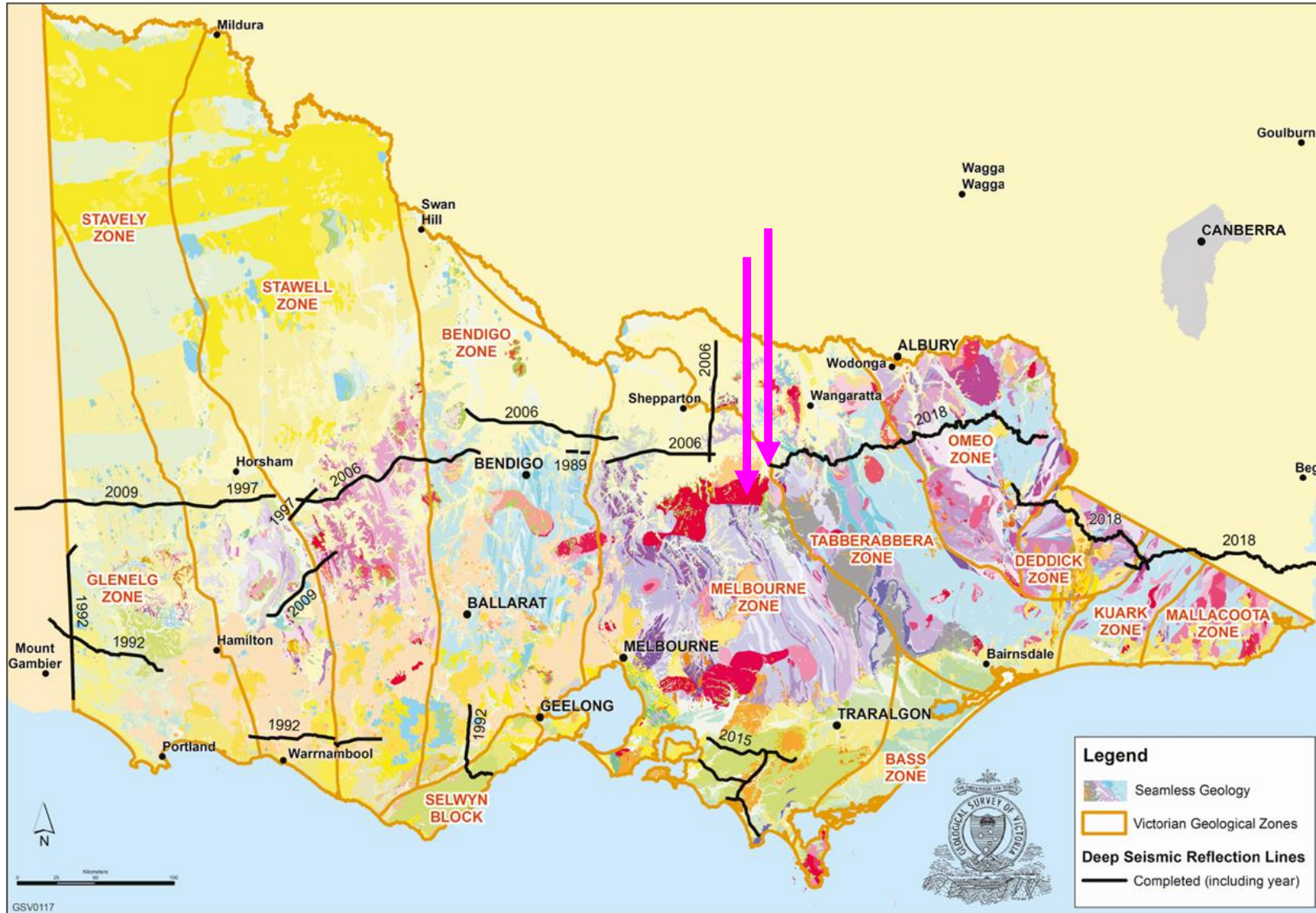


# Regional considerations





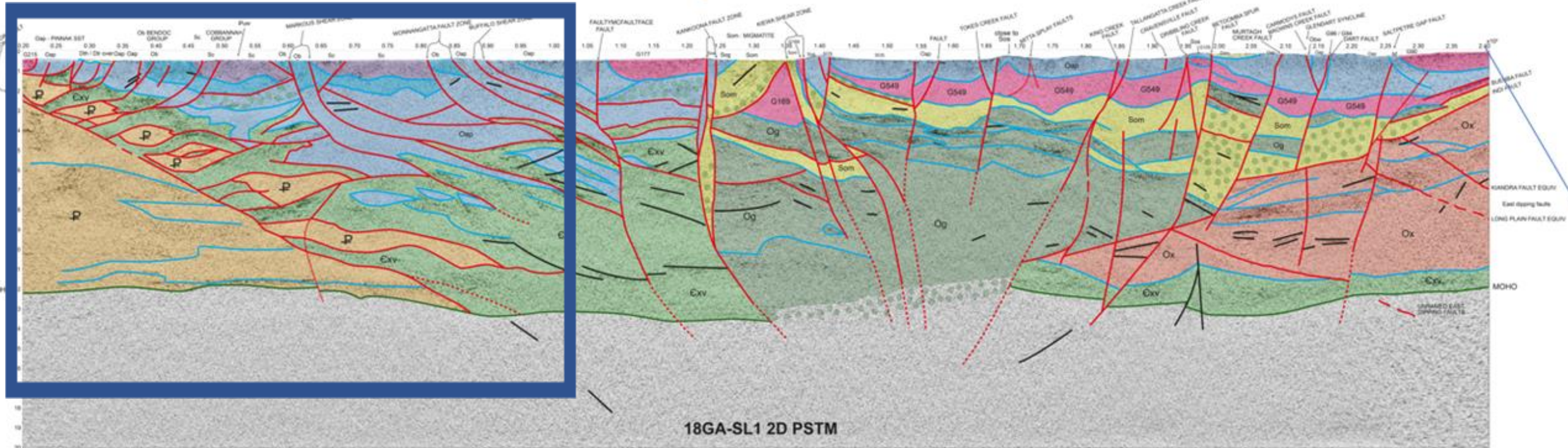
# Regional considerations



# Crustal-scale

Tabberabbera Zone

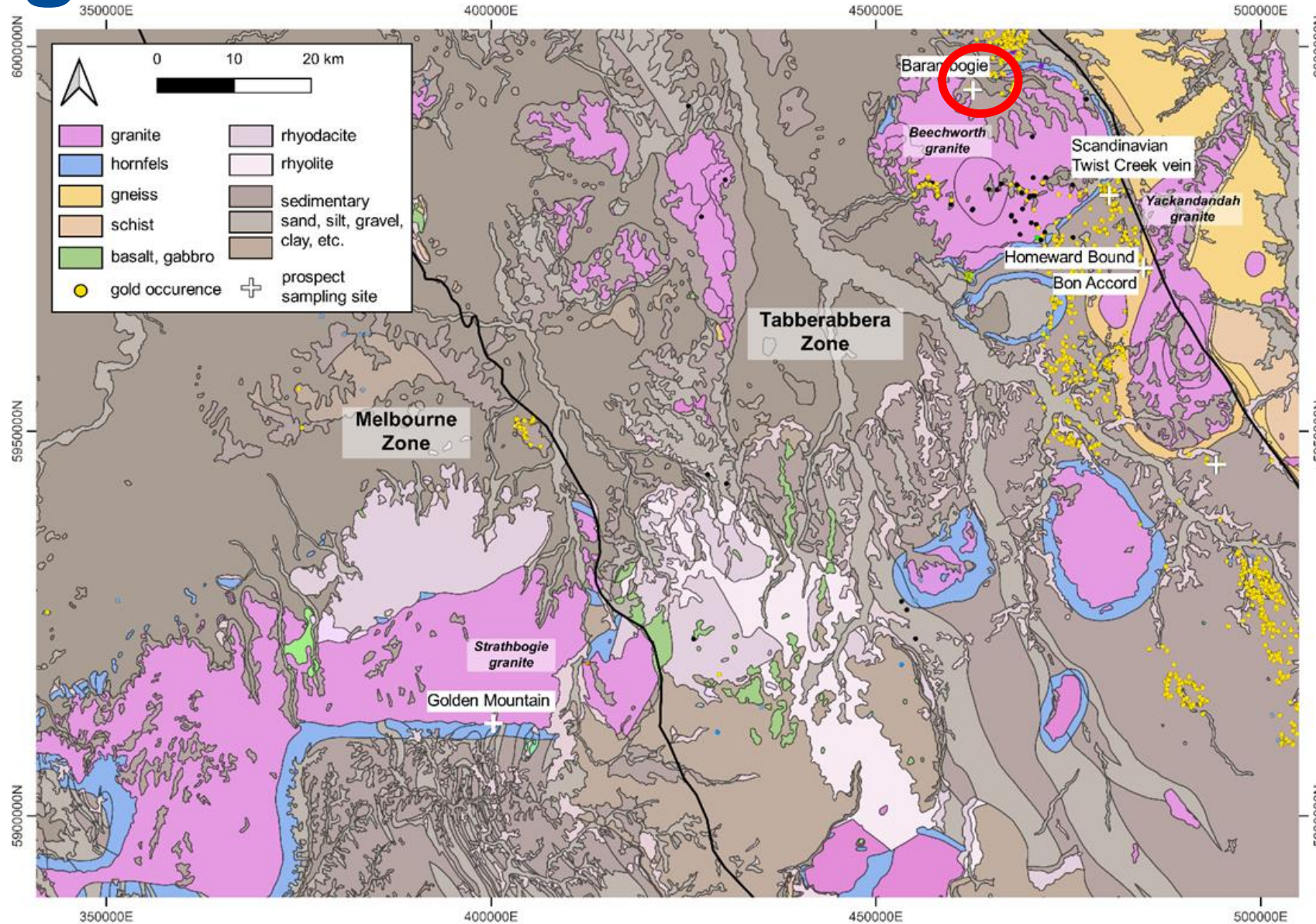
Omeo Zone



SLaCT 2018 transect - Line 1 – migrated and stacked 20s TWT profiles



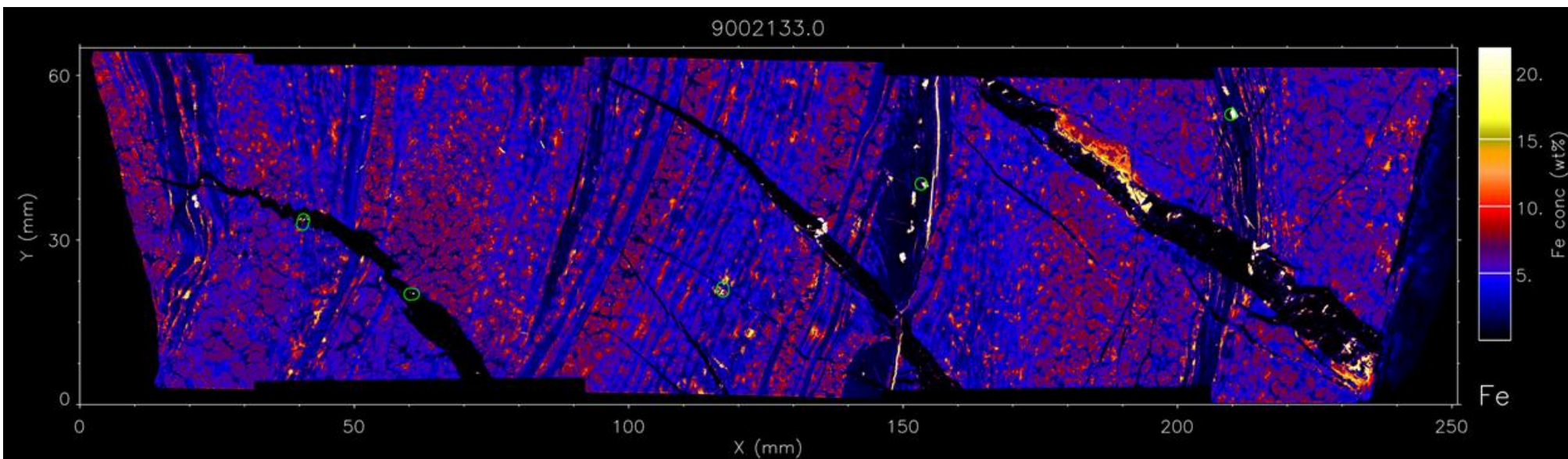
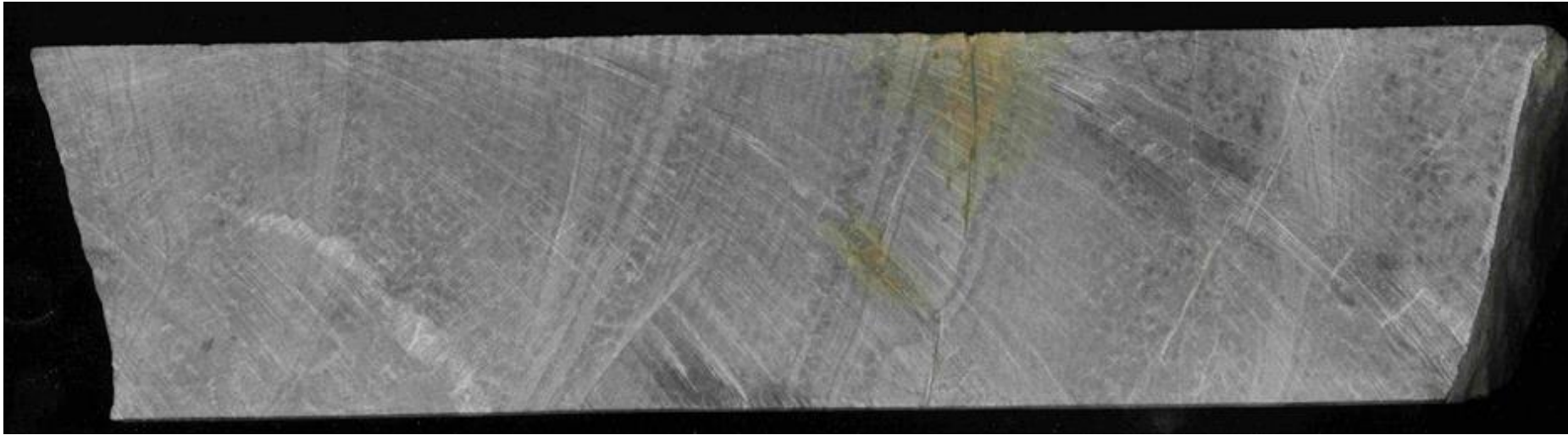
# Orogenic vs Intrusion





# Maia mapping - Barambogie

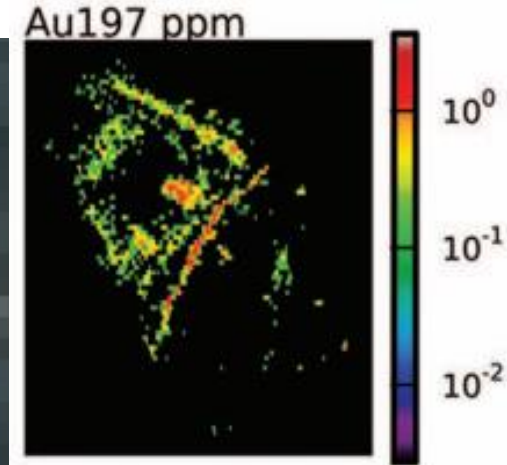
DD93 AL1: 106.92-107.16 m (106.05-107.5m 1.17ppm Au)



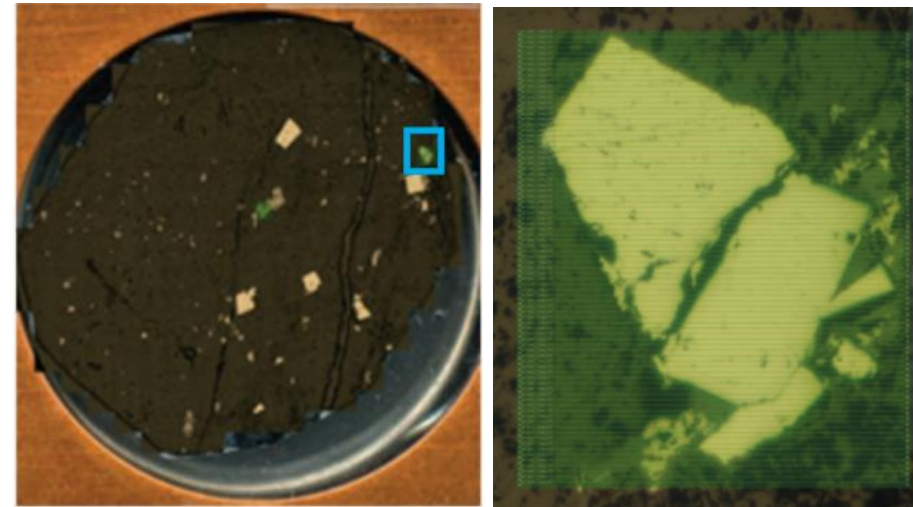
○ Au centroids



# Gold



## Pyrite trace element mapping



Pyrite trace element map, gold map only, Wildwood (GSV, in prep)

## Geochronology

- Re-Os arsenopyrite, stibnite
- Ar-Ar
- Watch this space....

Zone	Prospect	Mineral	Age
Stawell	Resolution	Arsenopyrite	441 ± 12 Ma
Bendigo	Four Eagles	Arsenopyrite	443.4 ± 3.8 Ma
Zone	Prospect	Mineral	Age
Tabberabbera	Granite Flat	Molybdenite	413.5 ± 2.2 Ma

Select Re-Os geochronology for Victorian mineral prospects, not including additional supporting data and analysis (GSV, in prep).



# Recent and upcoming events

Keep in touch

[Minerals update newsletter](#)

[Presentations and papers](#)

- [Australasian Exploration Geoscience Conference](#) – March 13-18
- [Melbourne Mining Club/Cutting Edge](#) – May 9
- [AIG Victoria Minerals Round Up](#) - June 23-24
- [World Mining Congress](#) – June 26-29
- [Diggers and Dealers](#) – August 7-9
- [International Mining and Resources Conference](#) – 31 Oct – 2 Nov
- [Prospectors and Developers Association of Canada](#) – 3-6 March, 2024



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Energy,  
Environment  
and Climate Action