

Gold-Antimony occurrences in Victoria

Australian Earth Science Convention 2026

3 February 2026

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We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it.

We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

Resources Victoria is committed to genuinely partnering with Victorian Traditional Owners and Victoria's Aboriginal community to progress their aspirations.

Acknowledgements



Cameron Cairns, Sam Waugh, Steven Boger, Simon Travers, Ross Cayley
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Berni, Jacob Walmsley, Chris Ryan



Robert Creaser

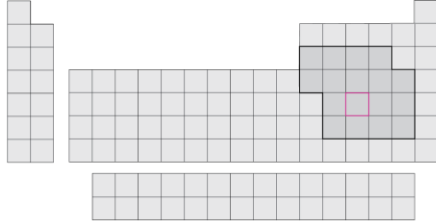


Reference

Cairns C.P., Waugh S.A.F., Pintér Z., Boger S.D., Travers S.J., Cayley R.A., Creaser R.A., Farmer N., 2026, Gold-Antimony occurrences in Victoria, Australian Earth Science Convention, Melbourne.

Why antimony?

- Semiconductors
- Solar panels
- Batteries (liquid metal (Sb-Ca) and Na-ion anode)
- Flame retardants
- Defence



13		14		15		16	
26.982 Al Aluminium	28.085 Si Silicon	30.974 P Phosphorus	32.06 S Sulphur				
69.723 Ga Gallium	72.630 Ge Germanium	74.992 As Arsenic	78.971 Se Selenium	79.904 Br Bromine			
118.71 Sn Tin	121.76 Sb Antimony	127.60 Te Tellurium	126.90 I Iodine				
207.2 Pb Lead	208.98 Bi Bismuth	(210) Po Polonium	(210) At Astatine				

Transition metals

Metalloids

Reactive nonmetals

Atomic weight →

121.76

Chemical symbol →

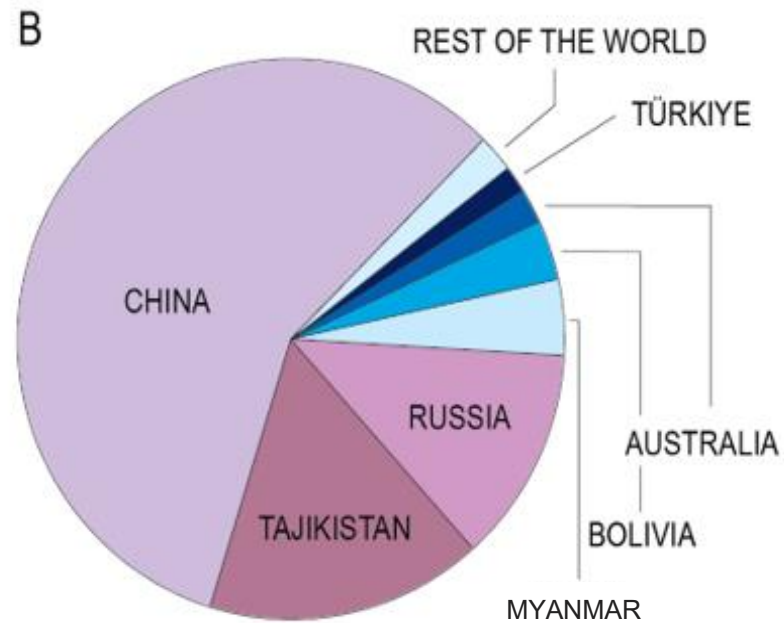
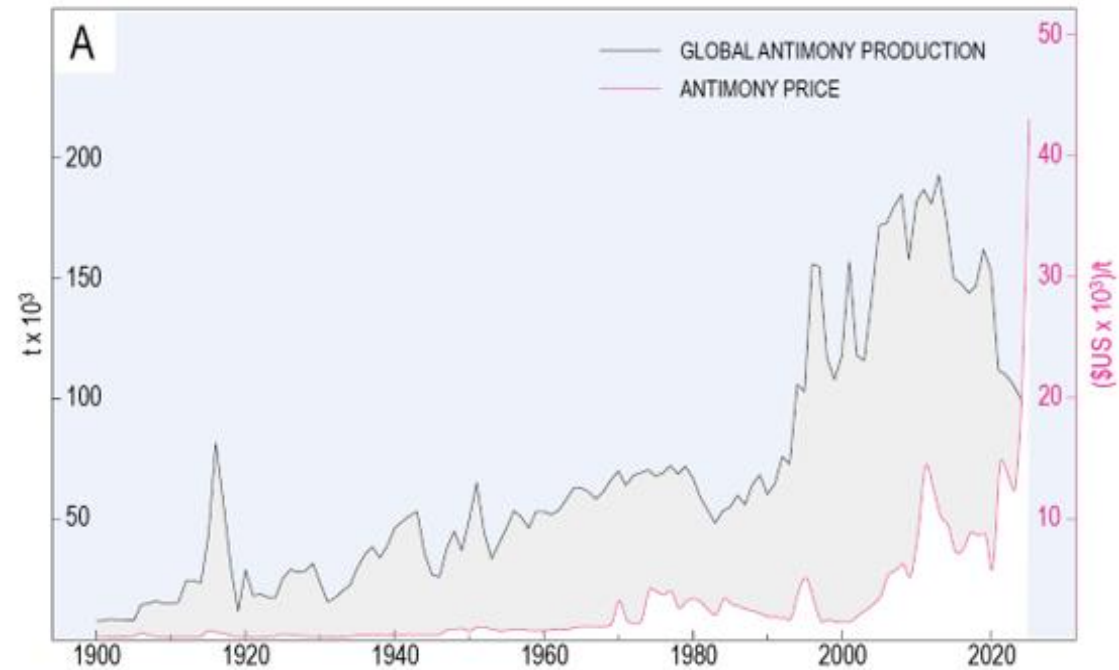
Sb

Name →

Antimony

← Atomic number

51

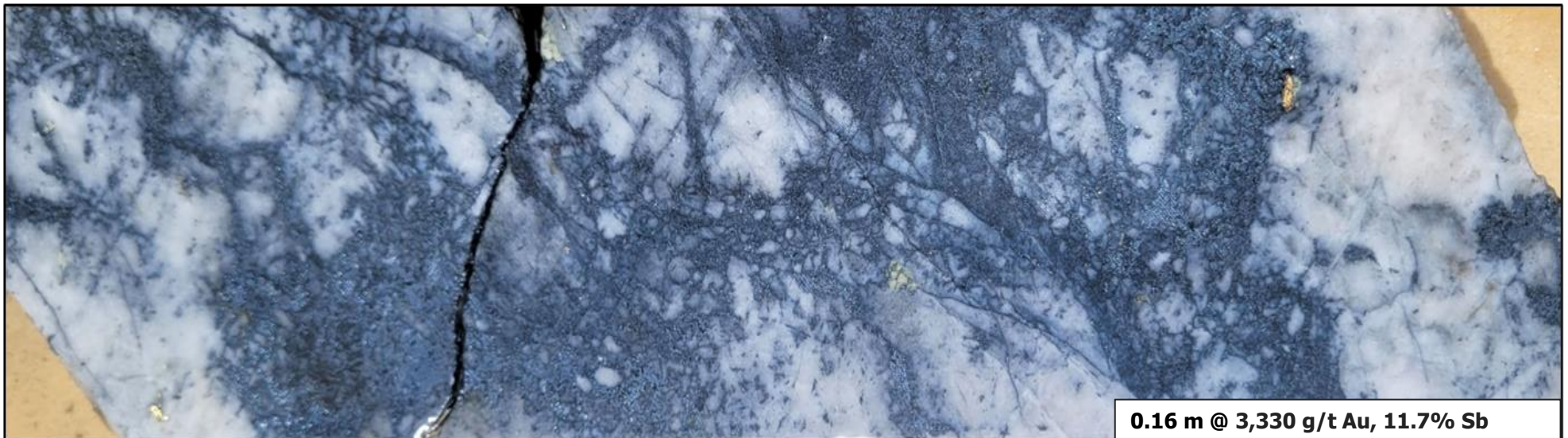


Source: USGS, 2024

Why Victoria?



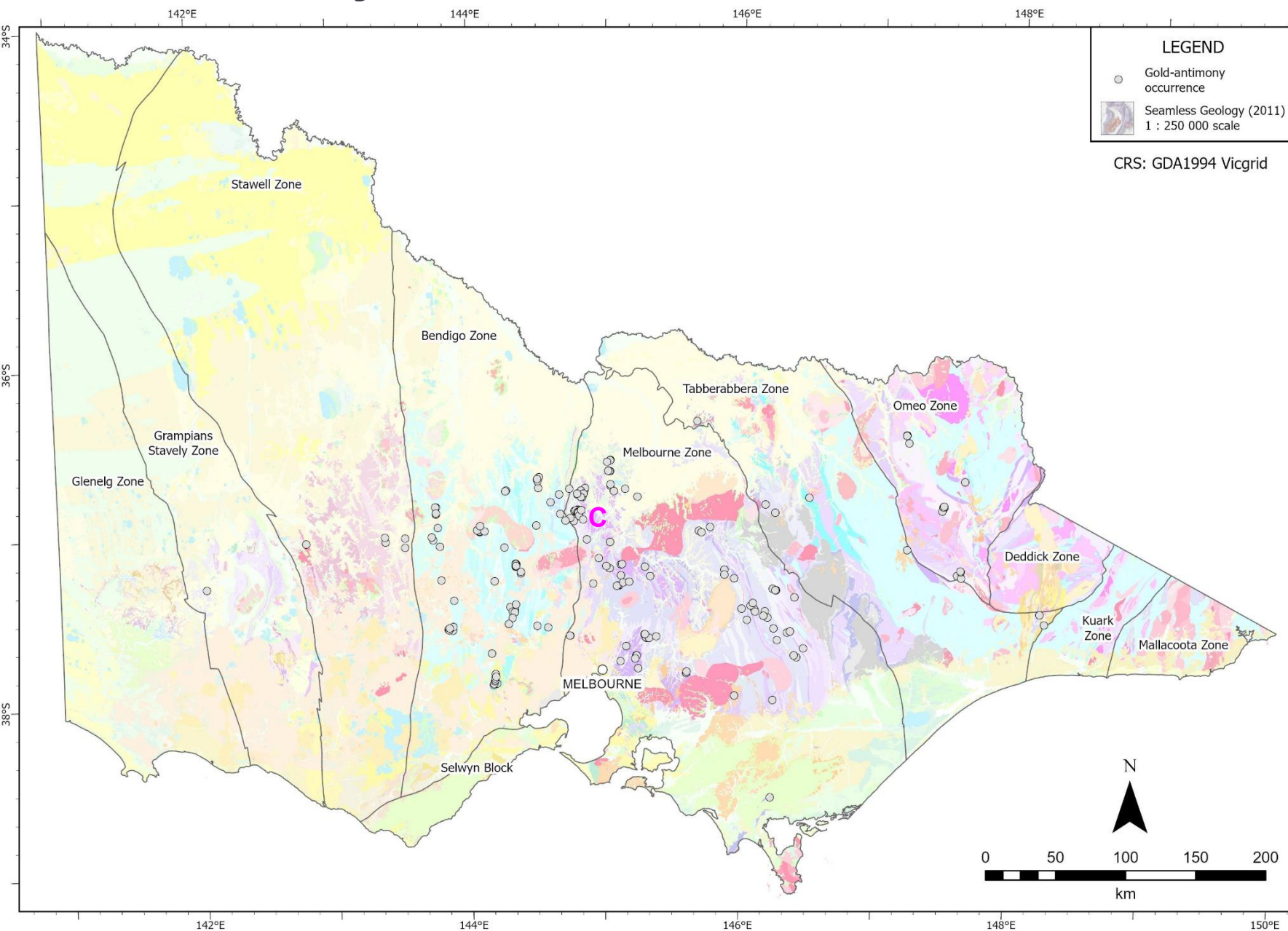
Costerfield, True Blue



Sunday Creek, Rising Sun, SDDSC144, 776.6m

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Gold-Antimony occurrences



Discovery: 1851

Occurrences: 253

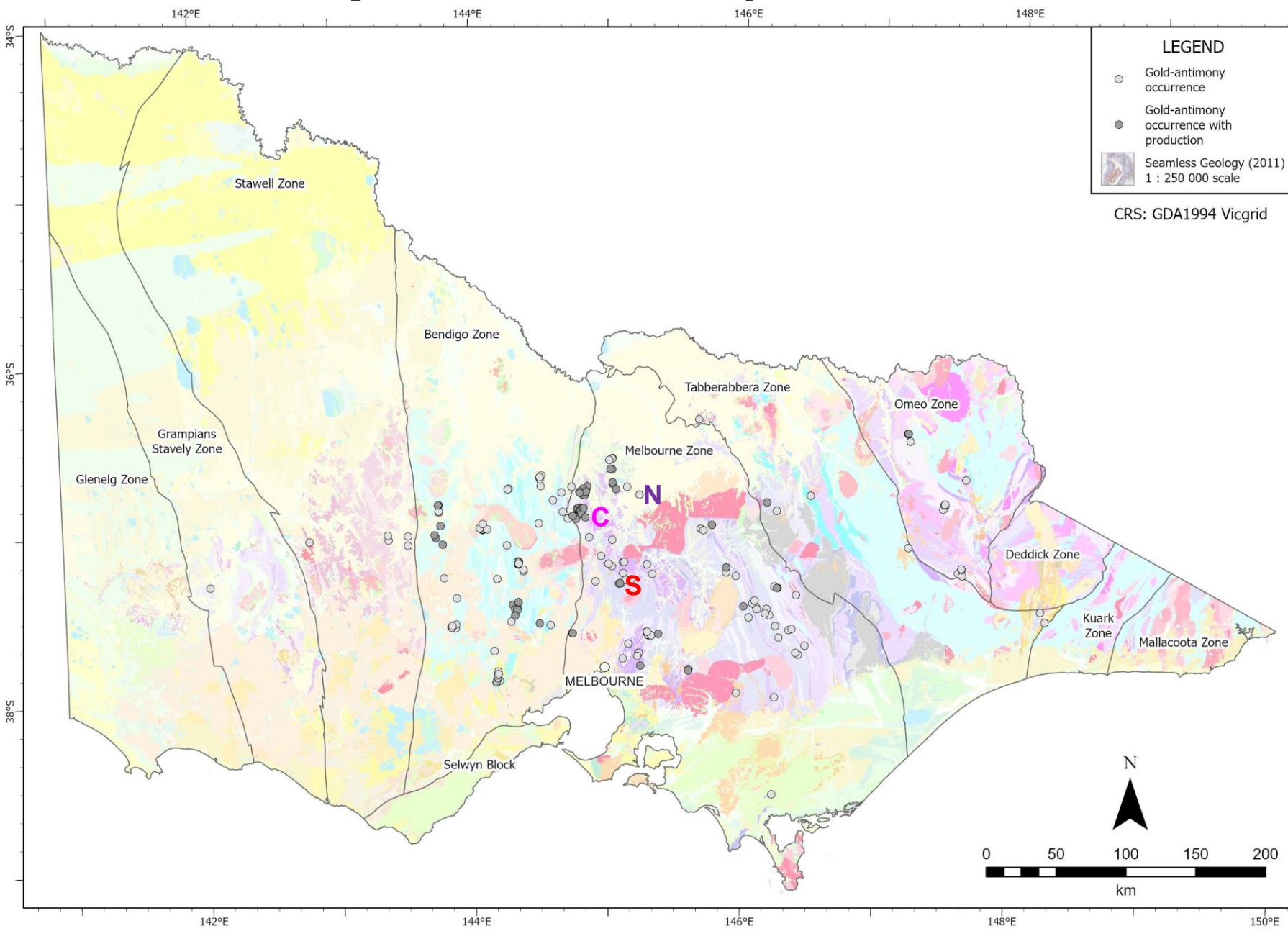
First ore: 1862(?)

Production centres: 98

Total recorded production:
>2.15Mt antimony ore
~107,000t antimony metal/con*

Largest deposit:
C Costerfield (c.2Moz AuEq)
1,093,000Moz Au
111,000t Sb
95% of ore tonnes since 2009

Gold-Antimony occurrences – production



Sunday Creek

41kOz Au

27t ore for 3t Sb metal over 4 discontinuous years (1876-1883)

Mineral exploration target

8.1 – 9.6Mt: 6.4-8.3g/t Au, 0.8-0.9% Sb for 2.6Moz Au and 88.2kt Sb

Nagambie

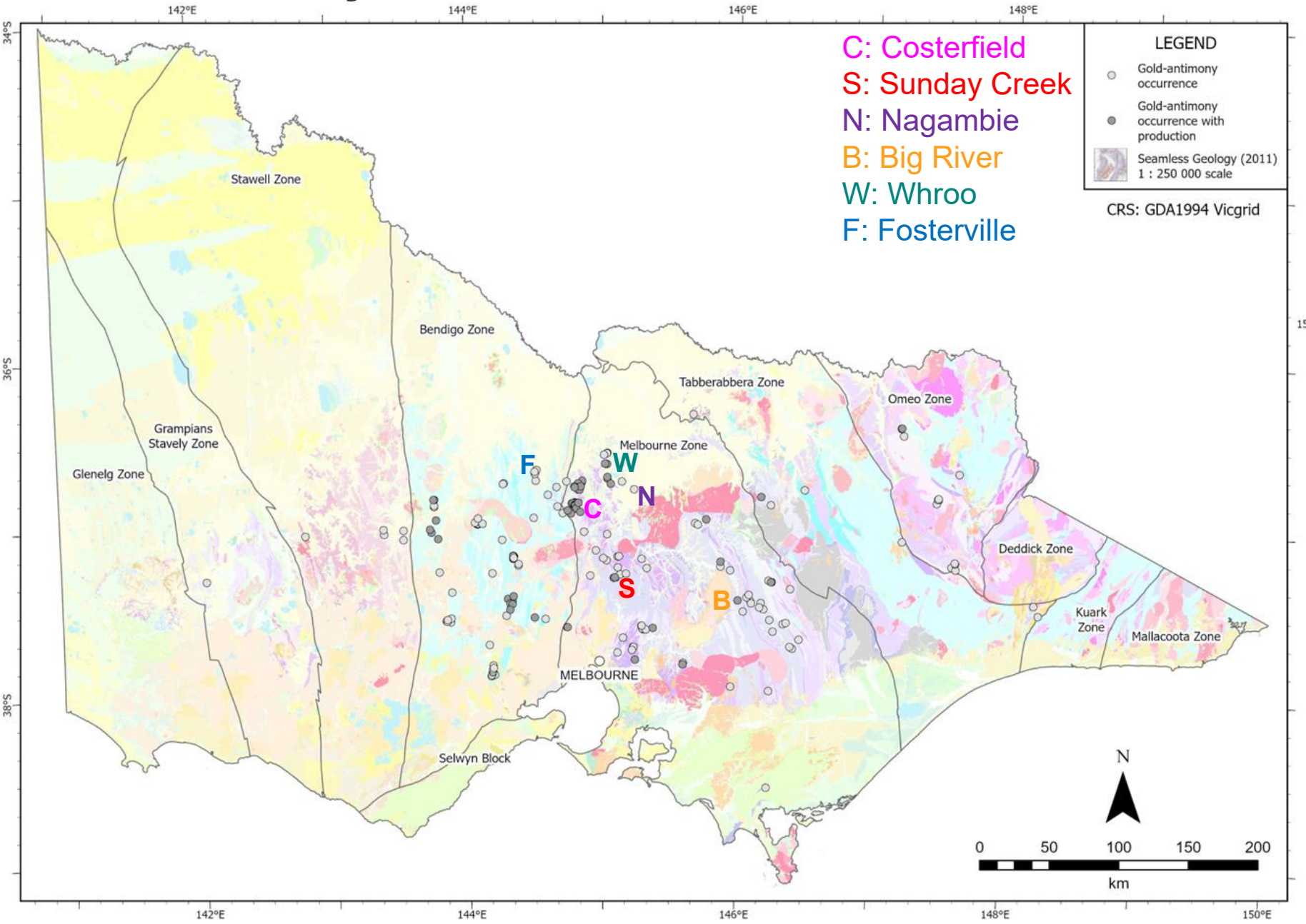
148kOz Au

No antimony production.
2006 drill hole beneath West Pit:
7.2g/t Au and Sb 12.3%

Inferred mineral resource

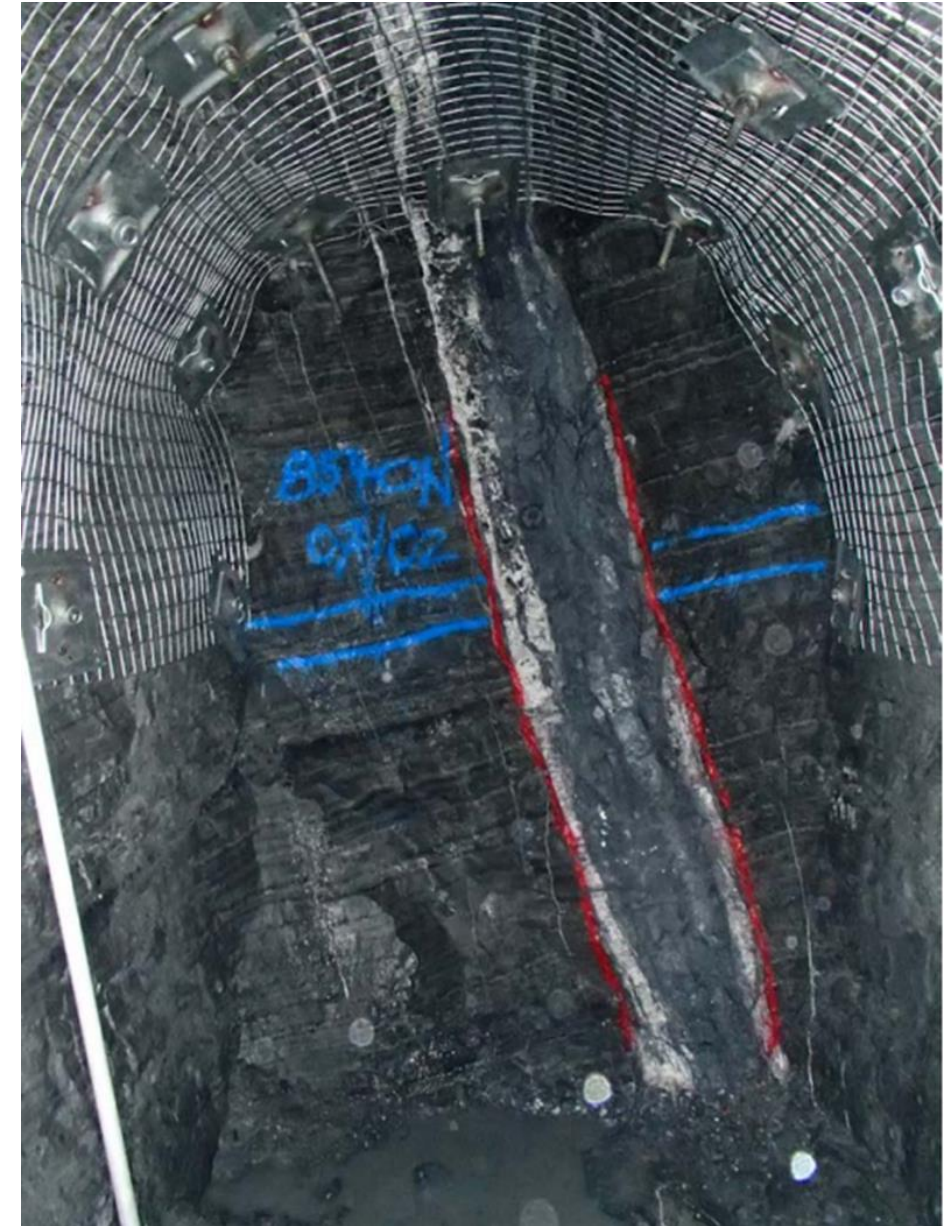
539,000t: 3.3g/t Au, 3.9% Sb for
58koz Au and 20.8kt Sb

Gold-Antimony occurrences



Host geology and mineralisation

- Murrindindi Supergroup (Silurian-early Devonian) – Melb Zone
 - Marine mudstone, shale, sandstone
 - prehnite-pumpellyite facies
- Massive to semi-massive quartz-stibnite-carbonate veins
 - cm's to up to 1m wide
 - 10's m to +100m, strike and down dip
 - Predominantly north-south, steep
 - ~1km vertical extent: zonation
- Primary ore mineral: Stibnite
 - **Sulphosalts**: boulangerite, jamesonite, tetrahedrite, chalcostibite, famatinite, zinkenite
 - Aurostibite (Costerfield, Coimadai, Fosterville)
 - Accessories: **arsenopyrite**, pyrite, lesser chalcopyrite, galena, sphalerite, **gold**
- Cryptic confined(?) hydrothermal alteration
 - sericite, carbonate, chlorite, clay
- High level with preservation



Steep dipping massive stibnite-quartz vein cross cutting bedding, Cuffley lode, Costerfield ([Fenwick, 2019](#)).

Costerfield (Youle)

GSV sample 310405, drill hole BC047W1. The corresponding interval from original drill hole BC047, of which BC047W1 was a twin, returned 0.93m (0.73m ETW), 265.01 ppm Au and 33.12 % Sb, 372.48-373.41m.

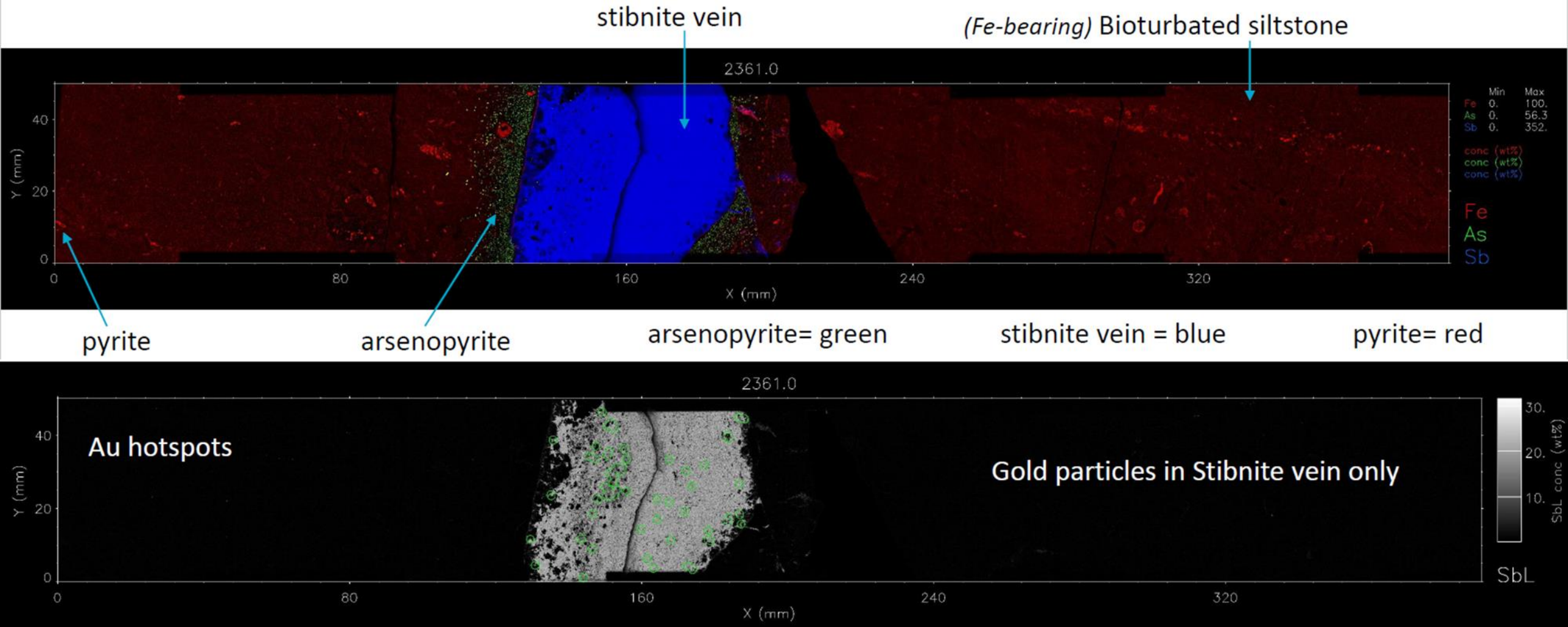


Nearby ore heading, courtesy Mandalay Resources 10

Costerfield (Youle)

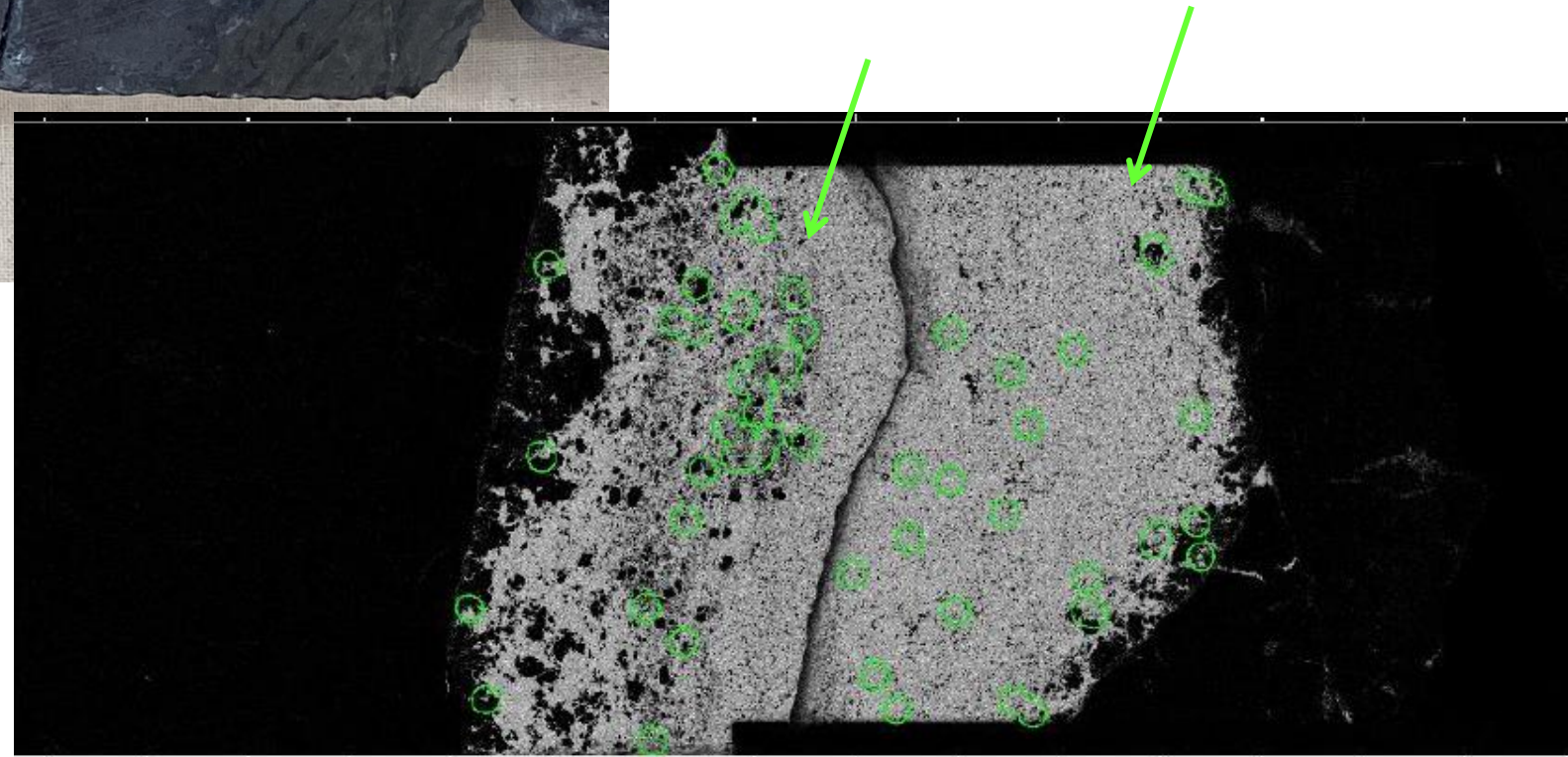
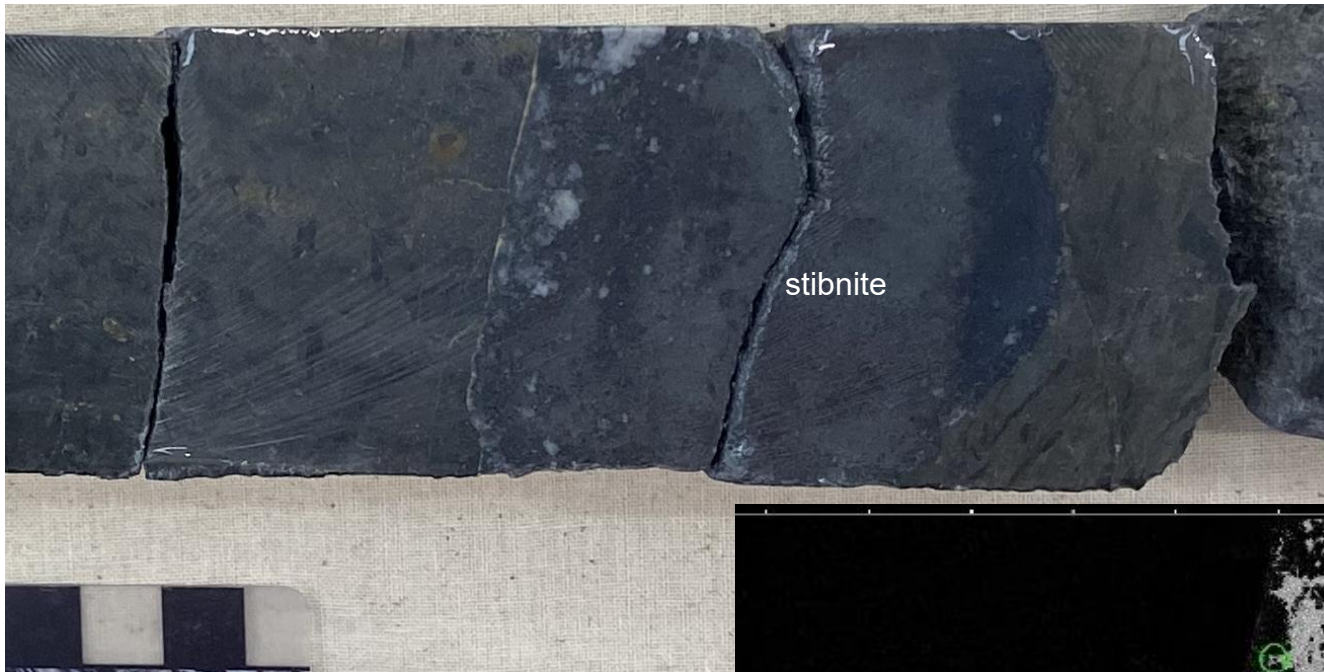


GSV sample 310415, drill hole BC120, 131.50-132.00m. The Maia map is within sample interval 131.76-131.98 43.9g/t Au and 21.0% Sb ([Mandalay Resources, 2020](#)).



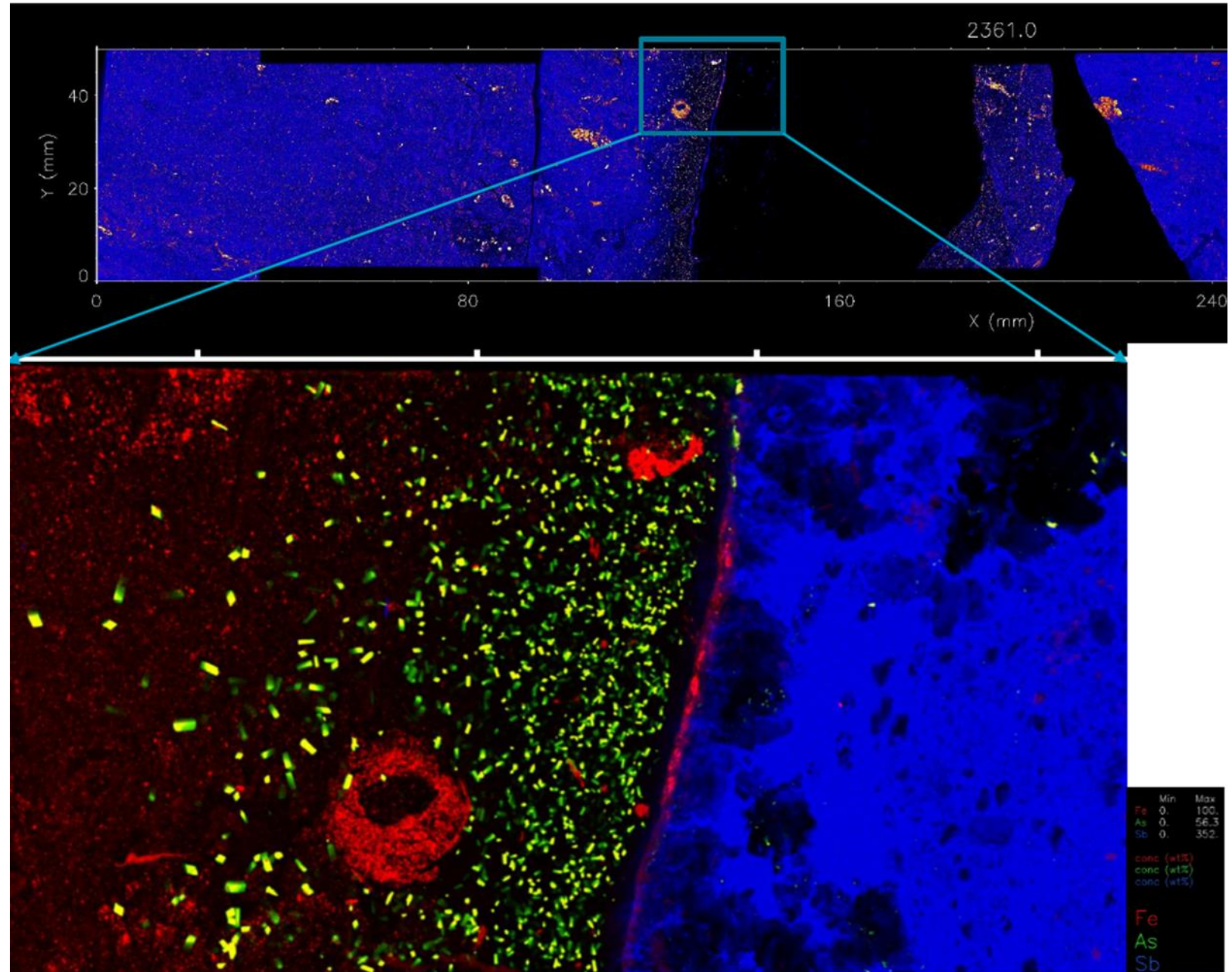
Costerfield (Youle)

GSV sample 310415, drill hole BC120, 131.50-132.00m. The Maia map is within sample interval 131.76-131.98 43.9g/t Au and 21.0% Sb ([Mandalay Resources, 2020](#)).



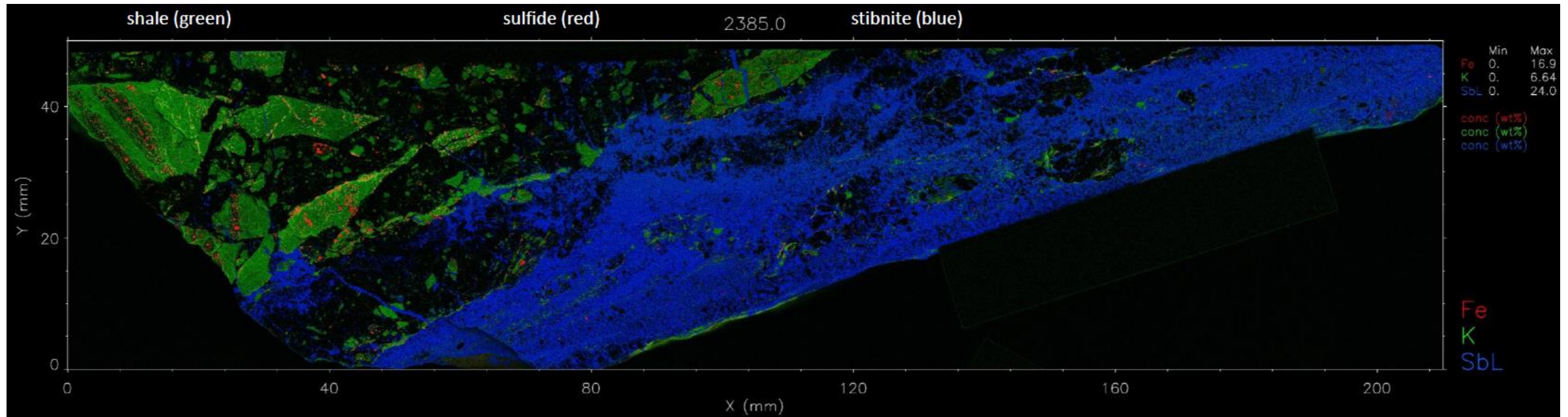
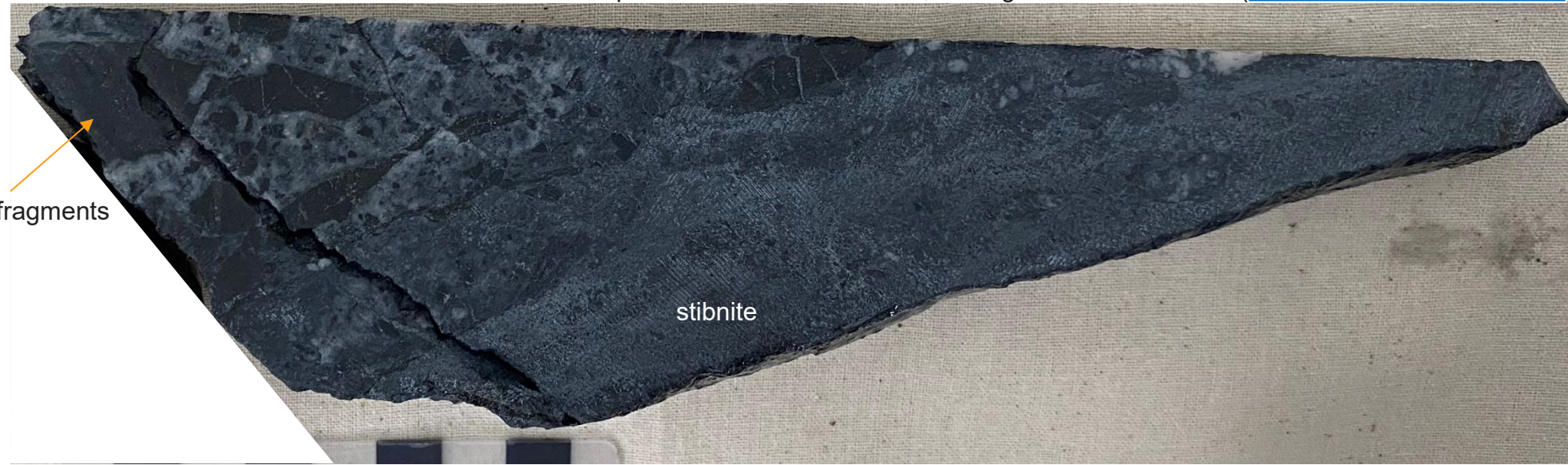
Costerfield (Youle)

GSV sample 310415, drill hole BC120, 131.50-132.00m. The Maia map is within sample interval 131.76-131.98 43.9g/t Au and 21.0% Sb ([Mandalay Resources, 2020](#)).



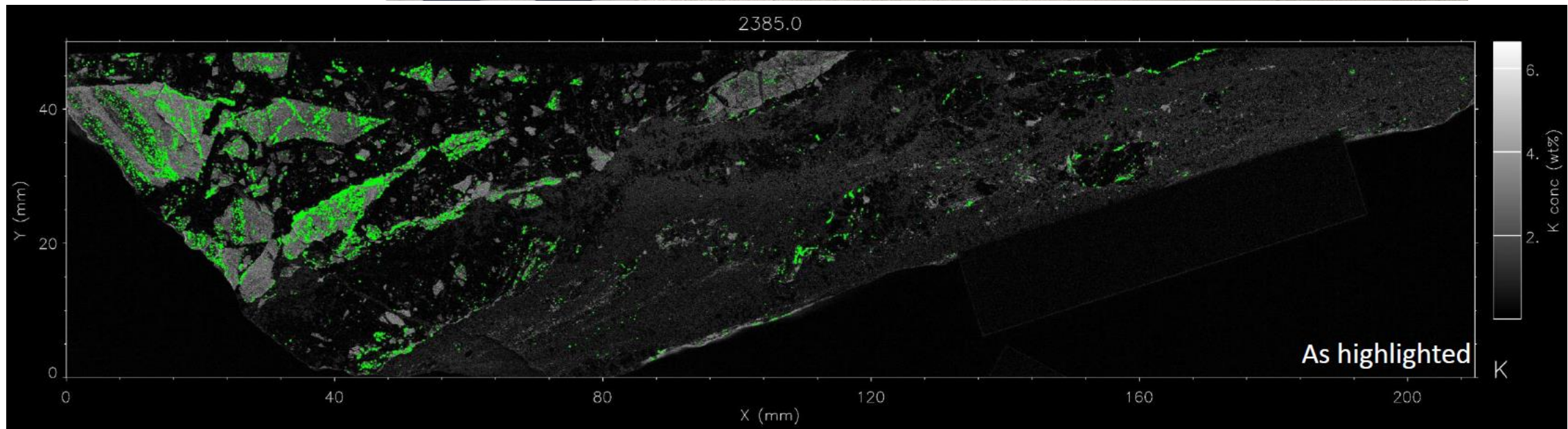
Sunday Creek (Apollo)

GSV sample 322114, drill hole SDDSC033, 194.20-194.45m. The Maia map occurs within sample interval 194.3 – 195.1m, 38.35g/t Au and 7.12% Sb ([Mawson Gold Limited, 2022](#)).



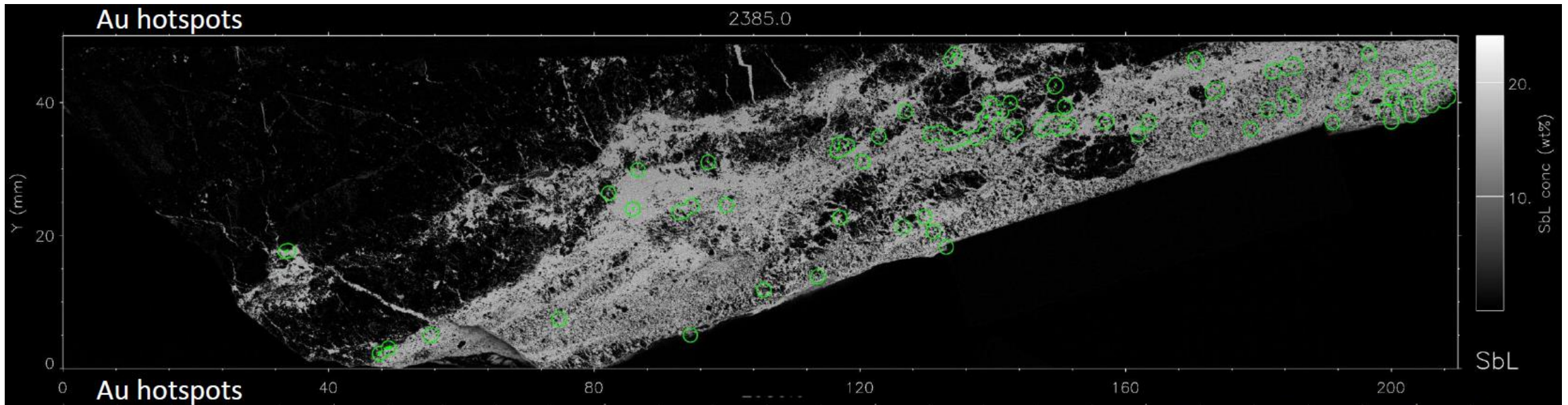
Sunday Creek (Apollo)

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Sunday Creek (Apollo)

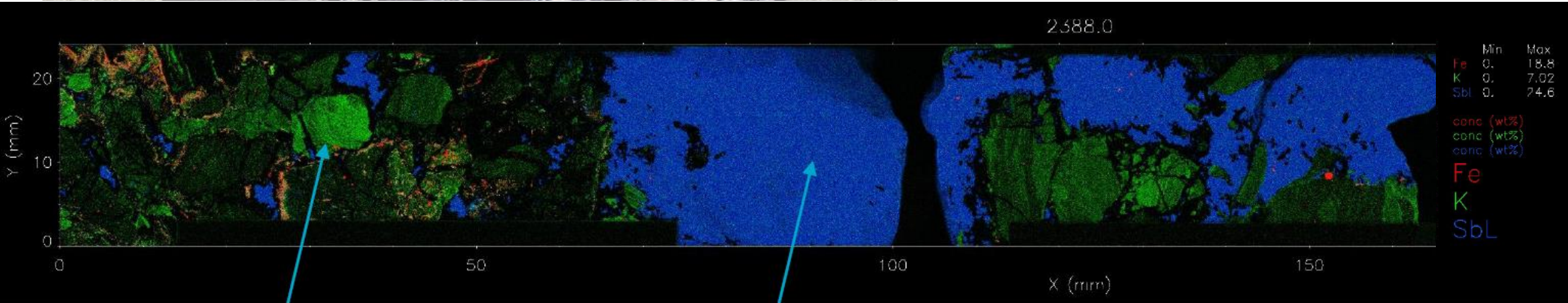
GSV sample 322114, drill hole SDDSC033, 194.20-194.45m. The Maia map occurs within sample interval 194.3 – 195.1m, 38.35g/t Au and 7.12% Sb ([Mawson Gold Limited, 2022](#)).



Nagambi (C1 vein east)



GSV sample 322247, drill hole NAD036, 311.45-311.72m. The Maia map occurs within interval 310.00-314.16m, 3.32g/t Au and 1.24% Sb ([Nagambi Resources, 2024](#)).

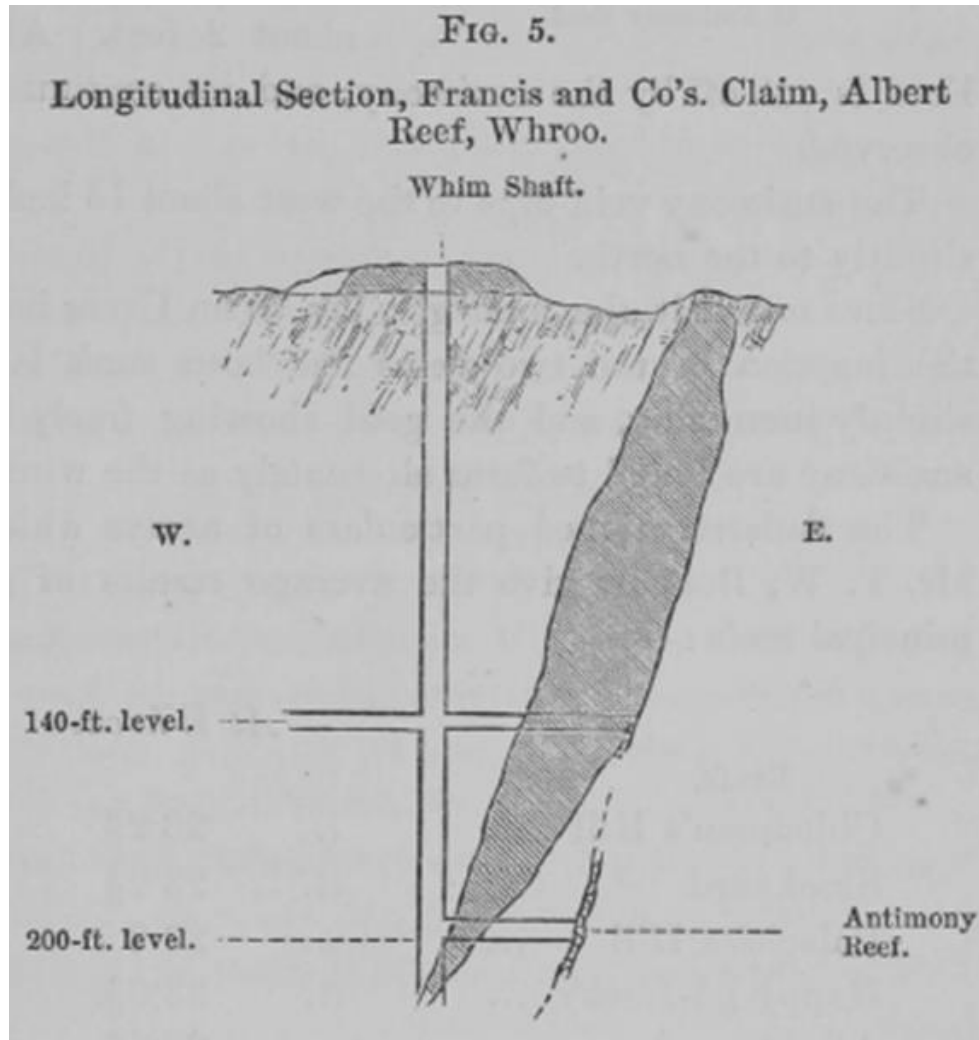


Brecciated sandstone (green)

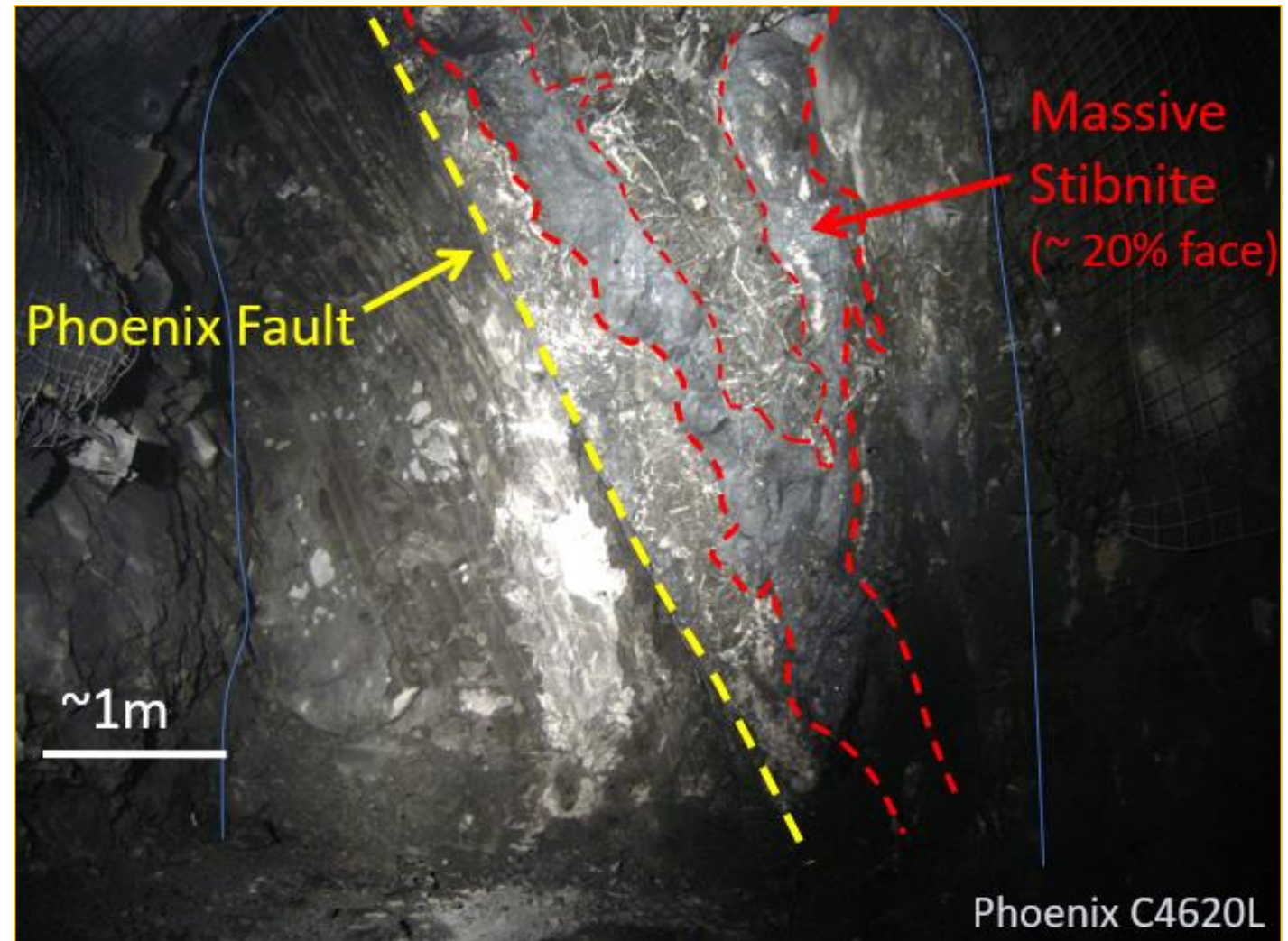
Stibnite vein (blue)

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Timing



[Couchman \(1877\)](#)

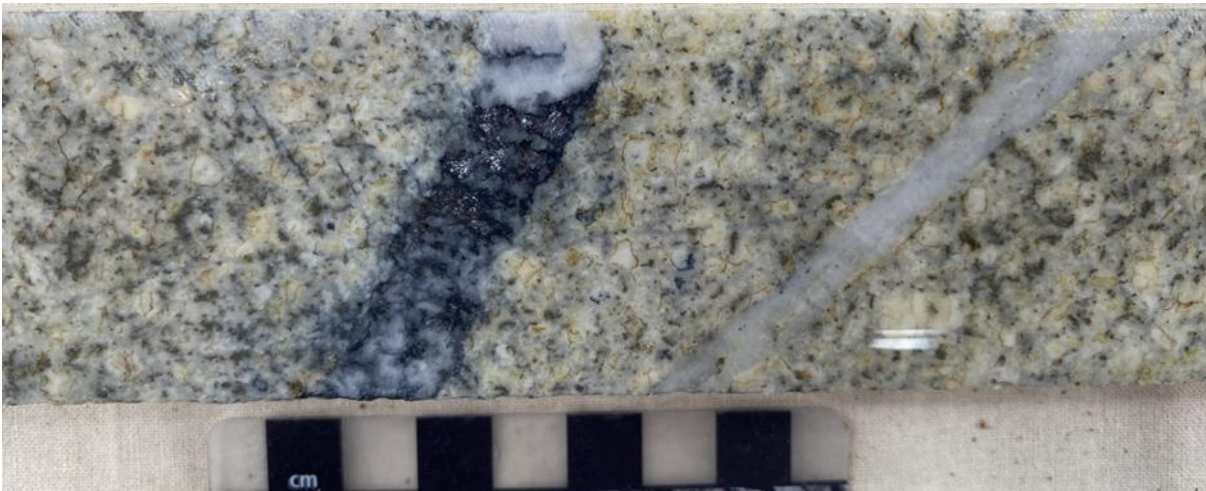
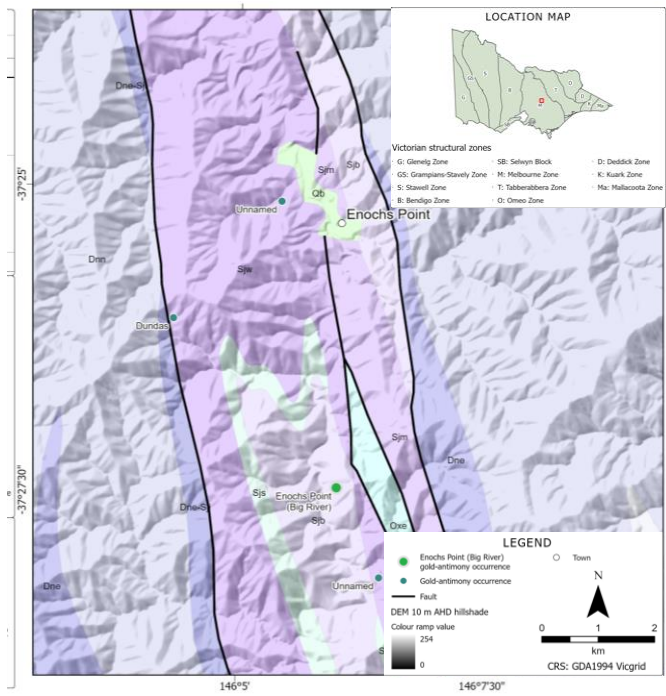


Quartz-filled faults with variable gold associated with the Phoenix Fault overprinted by massive stibnite, Fosterville (Bush et al. 2024).

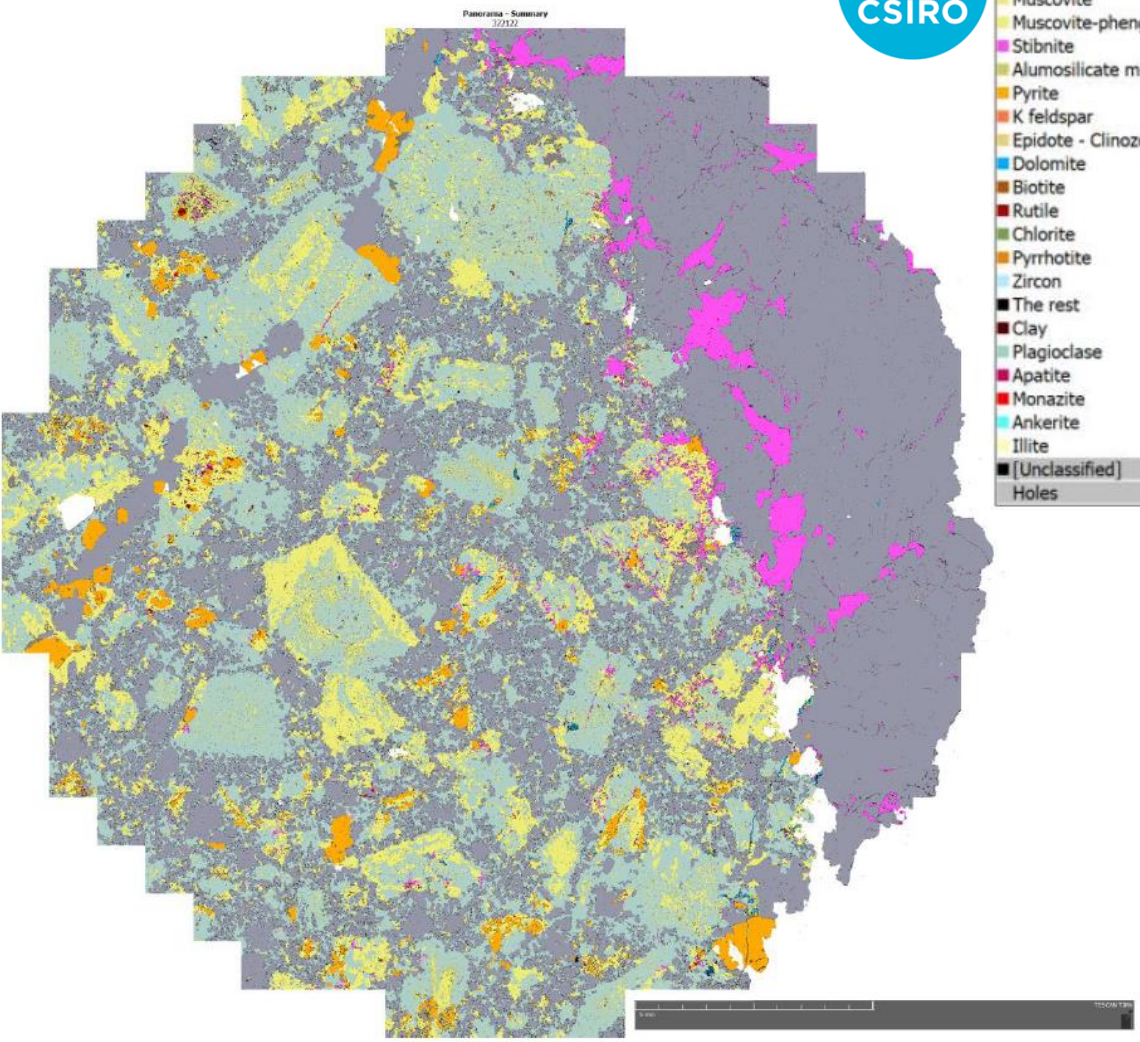


Summary	
Quartz	46.16
Albite	29.61
Muscovite	7.13
Muscovite-phengitic	4.41
Stibnite	3.00
Alumosilicate mixture	2.92
Pyrite	2.13
K feldspar	0.17
Epidote - Clinozoisite	0.05
Dolomite	0.05
Biotite	0.04
Rutile	0.04
Chlorite	0.04
Pyrrhotite	0.03
Zircon	0.03
The rest	0.03
Clay	0.02
Plagioclase	0.02
Apatite	0.02
Monazite	0.01
Ankerite	0.01
Illite	0.01
[Unclassified]	3.70
Holes	0.33

Enochs Point (Big River Antimony Mine)

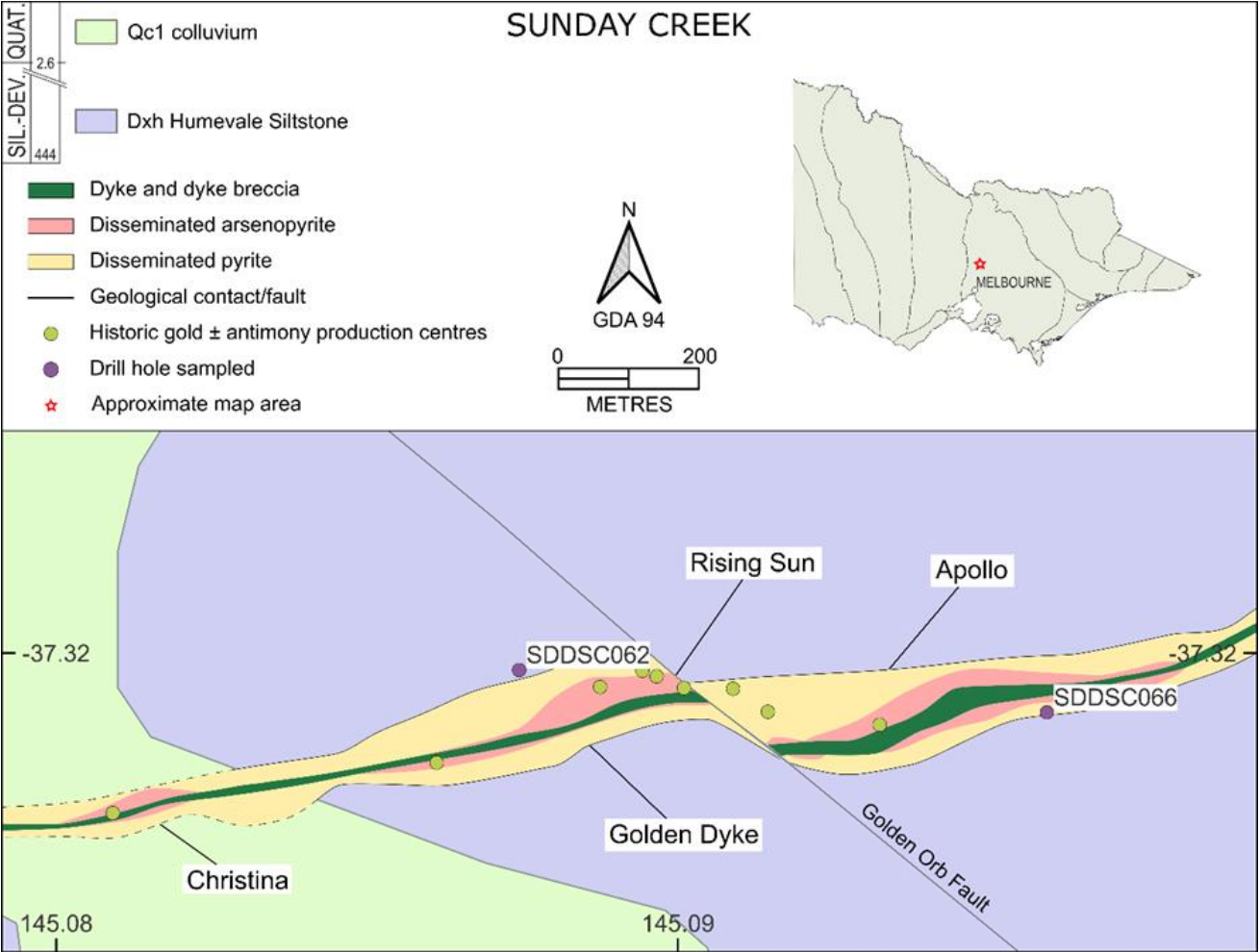


Quartz-stibnite vein cutting hydrothermal altered granite. GSV sample 322122, drill hole BRD02, 386.1-386.5 m.

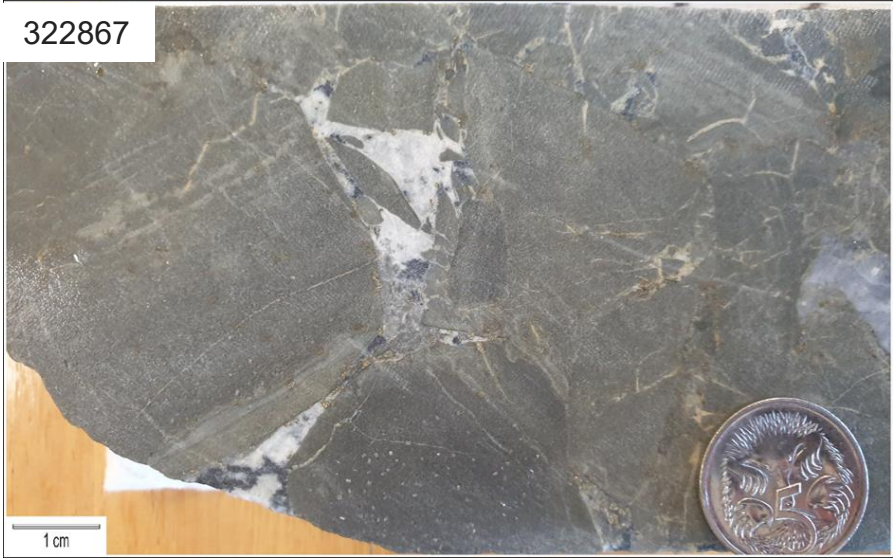


TIMA mineral map of altered granite host with quartz-stibnite vein. Note the presence of stibnite (magenta) in the groundmass with ~2 vol% disseminated pyrite (orange).

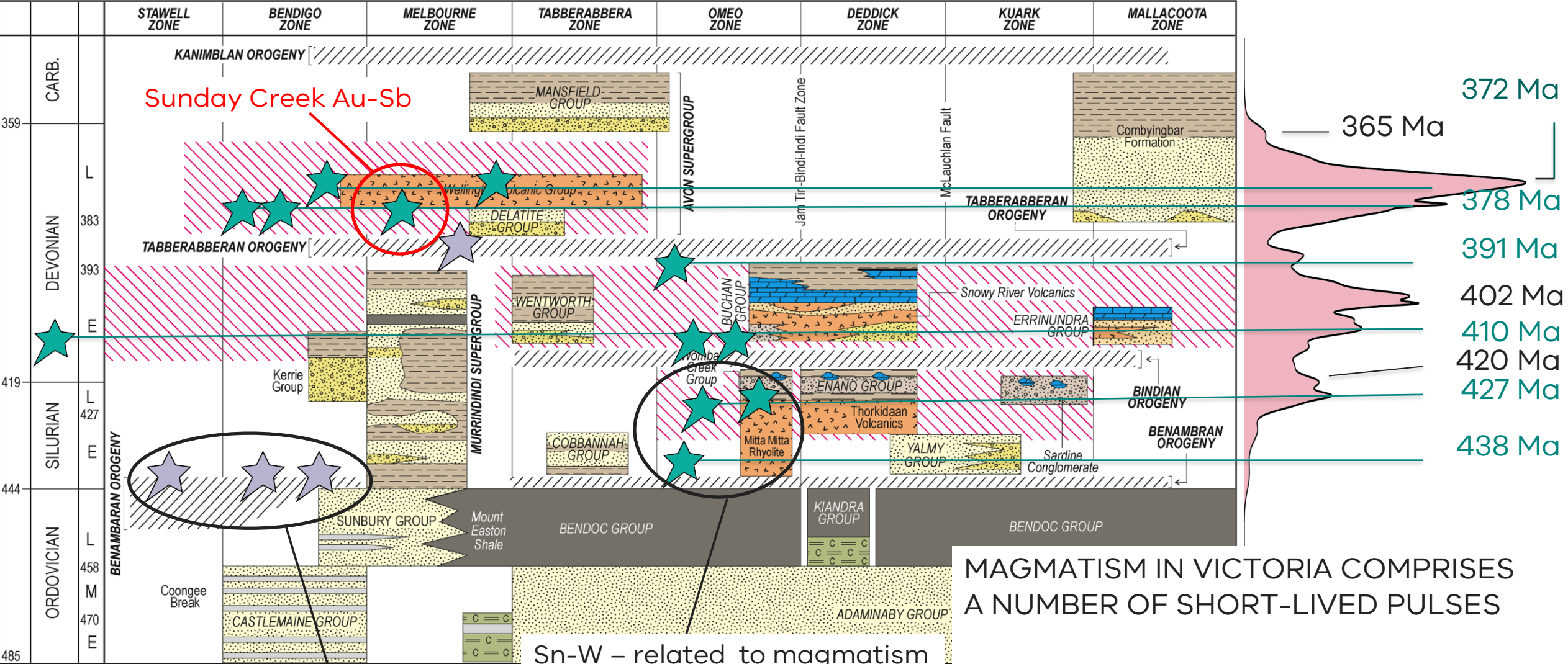
Re-Os geochronology



GSV Sample	Occurrence	Mineral	Model age (Ma)	$\pm 2\sigma$
322119	Golden Dyke	Pyrite	378.8	1.6
322866	Apollo	Arsenopyrite	379.1	1.6
322867	Apollo	Arsenopyrite	380.0	1.6



A causative relationship between magmatism and mineralisation?



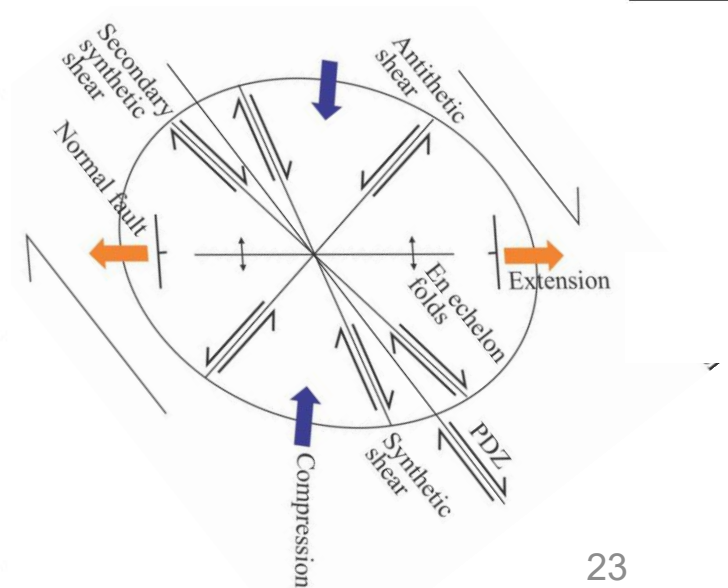
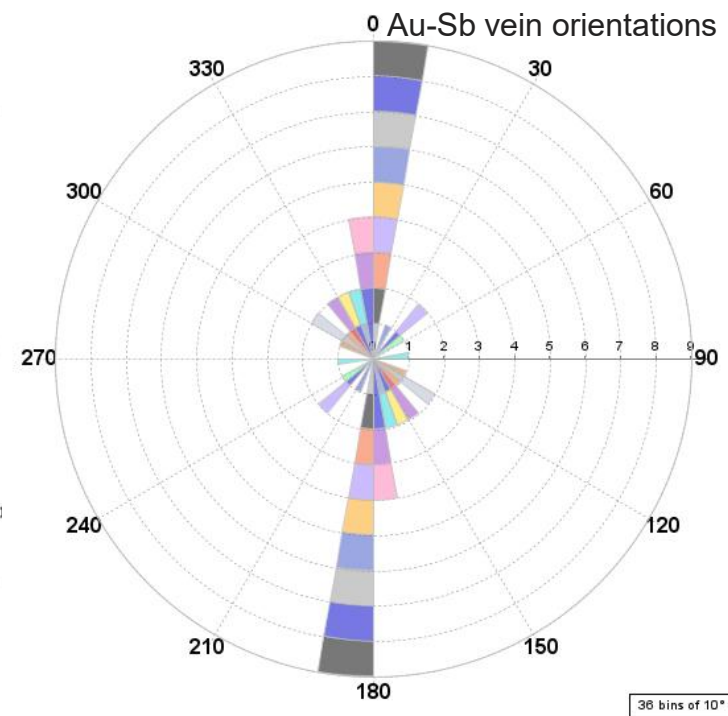
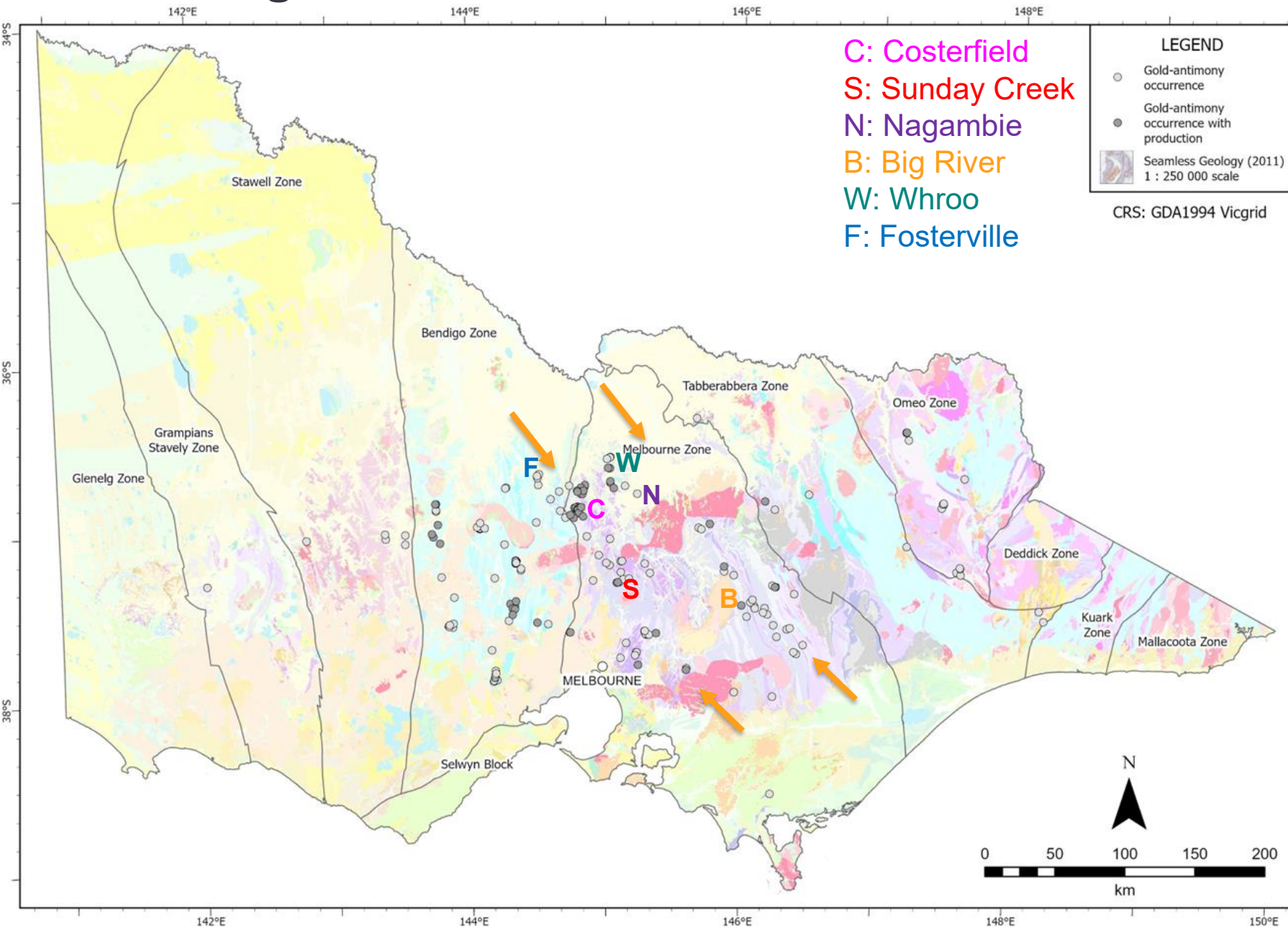
Bendigo style Au – unrelated to magmatism

Sn-W – related to magmatism

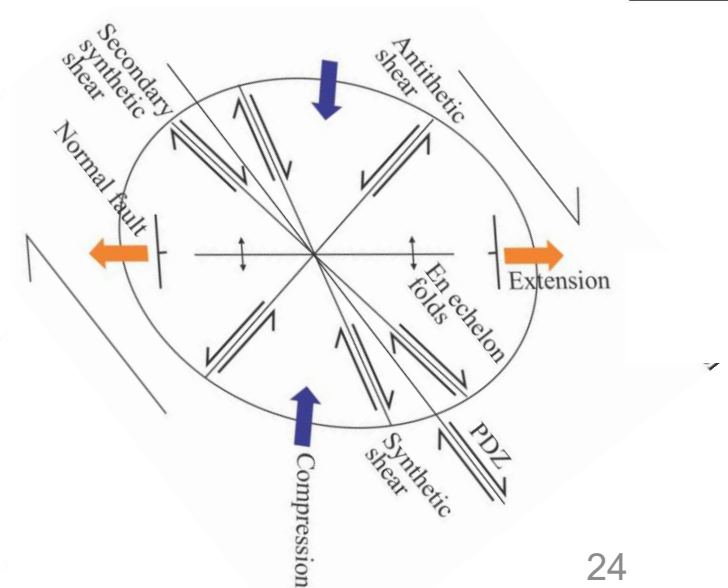
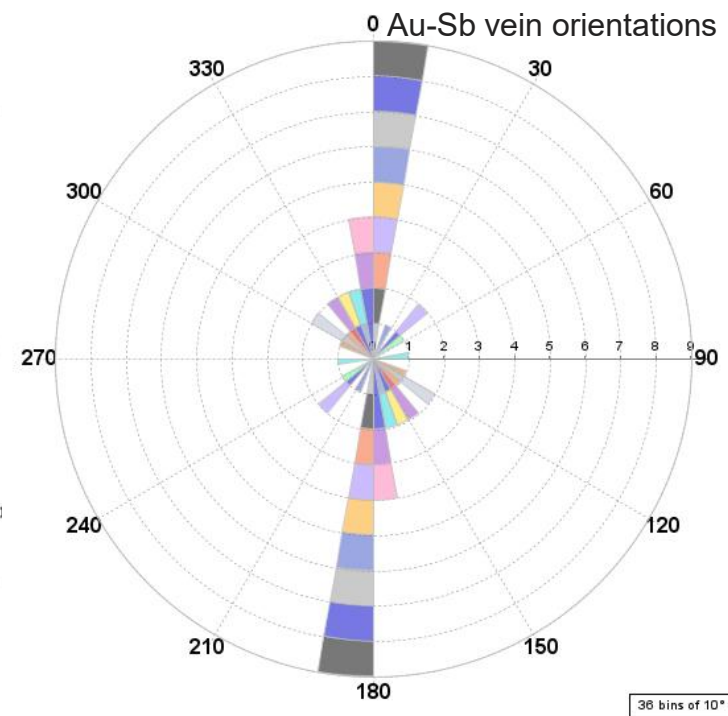
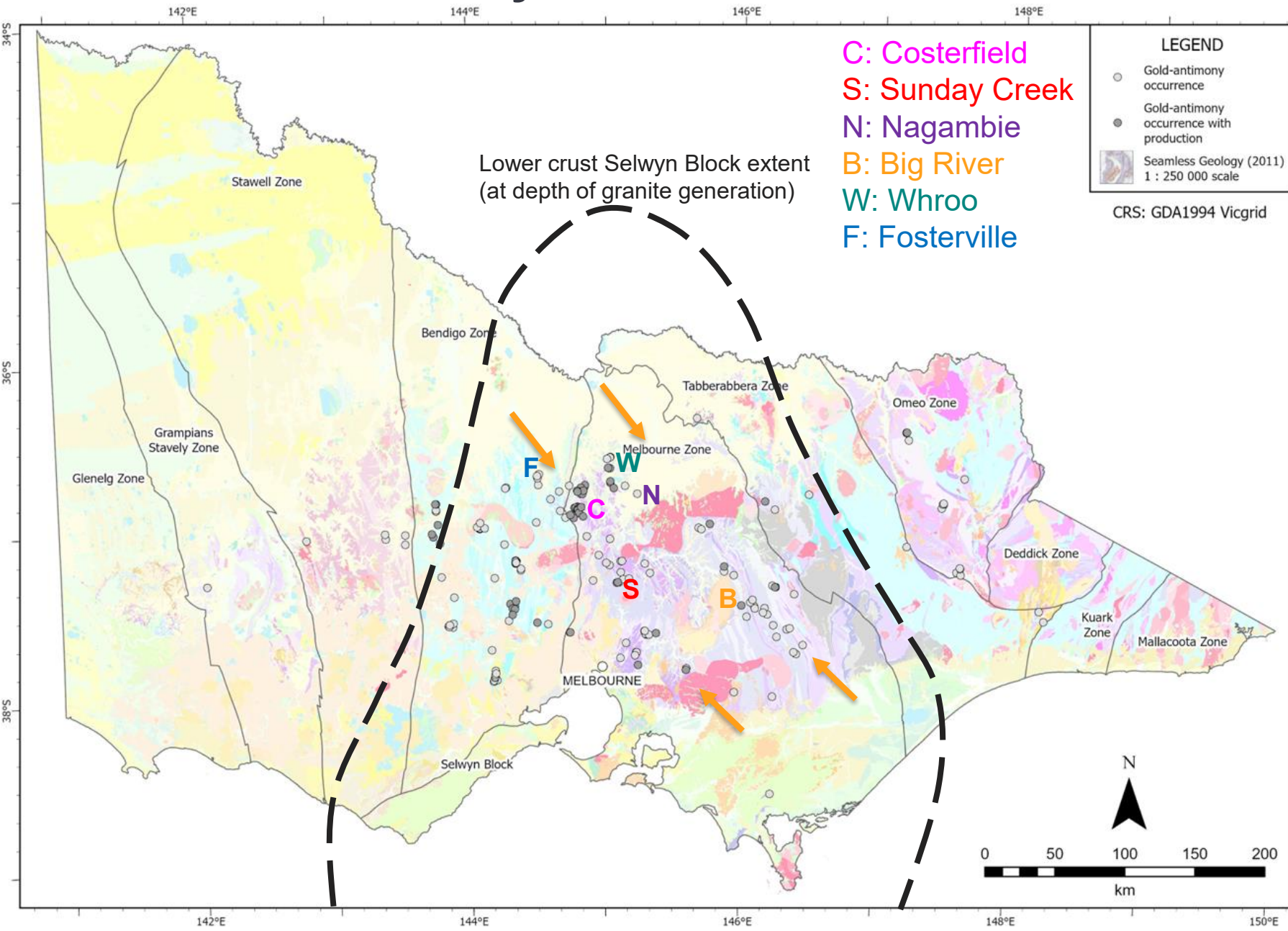
MAGMATISM IN VICTORIA COMPRISES A NUMBER OF SHORT-LIVED PULSES

CLOSE CORRESPONDENCE BETWEEN THE AGE OF MANY OF THESE MAGMATIC PULSES AND MINERALISATION

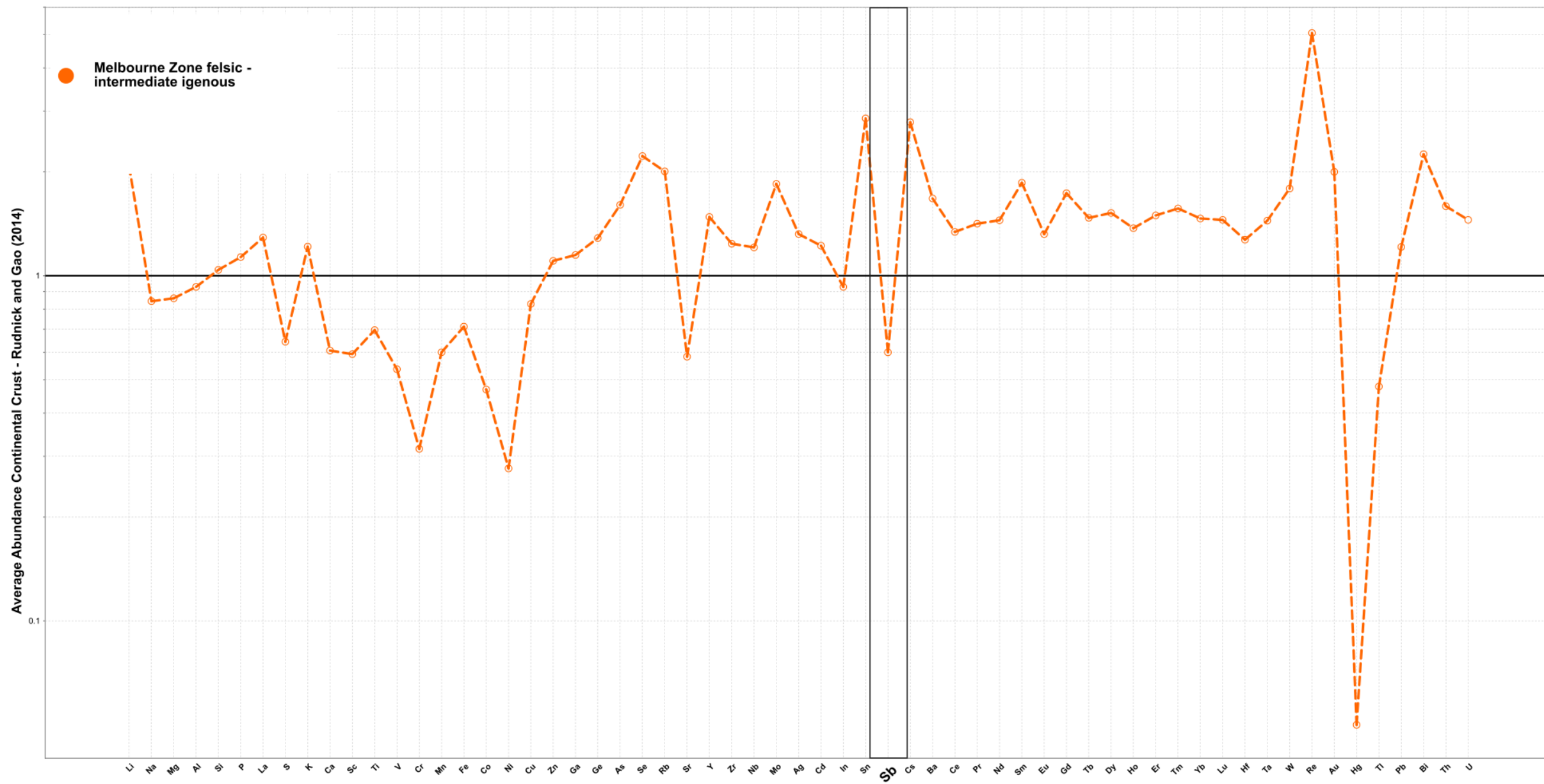
Contrasting orientations



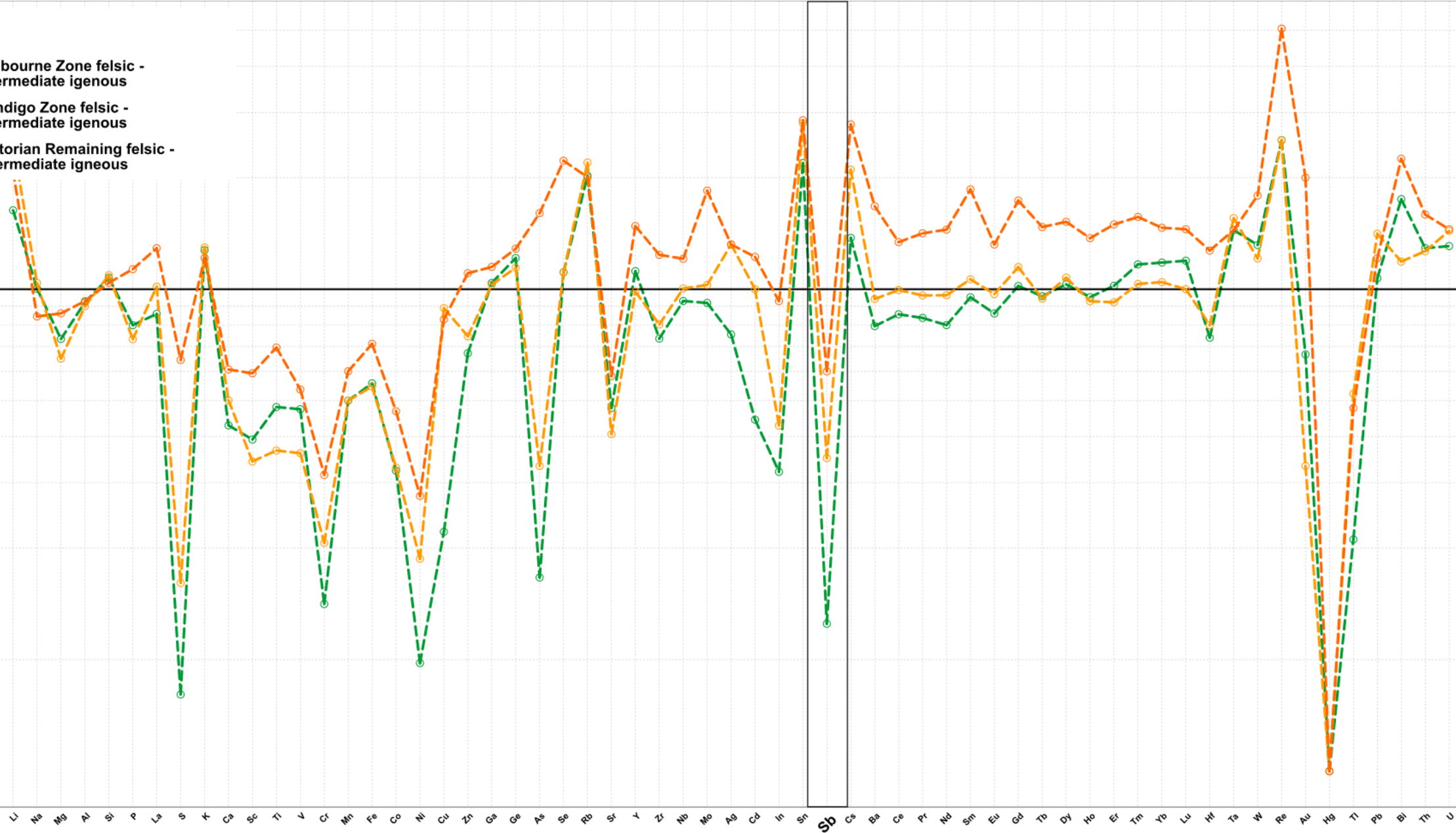
Influence of the Selwyn Block



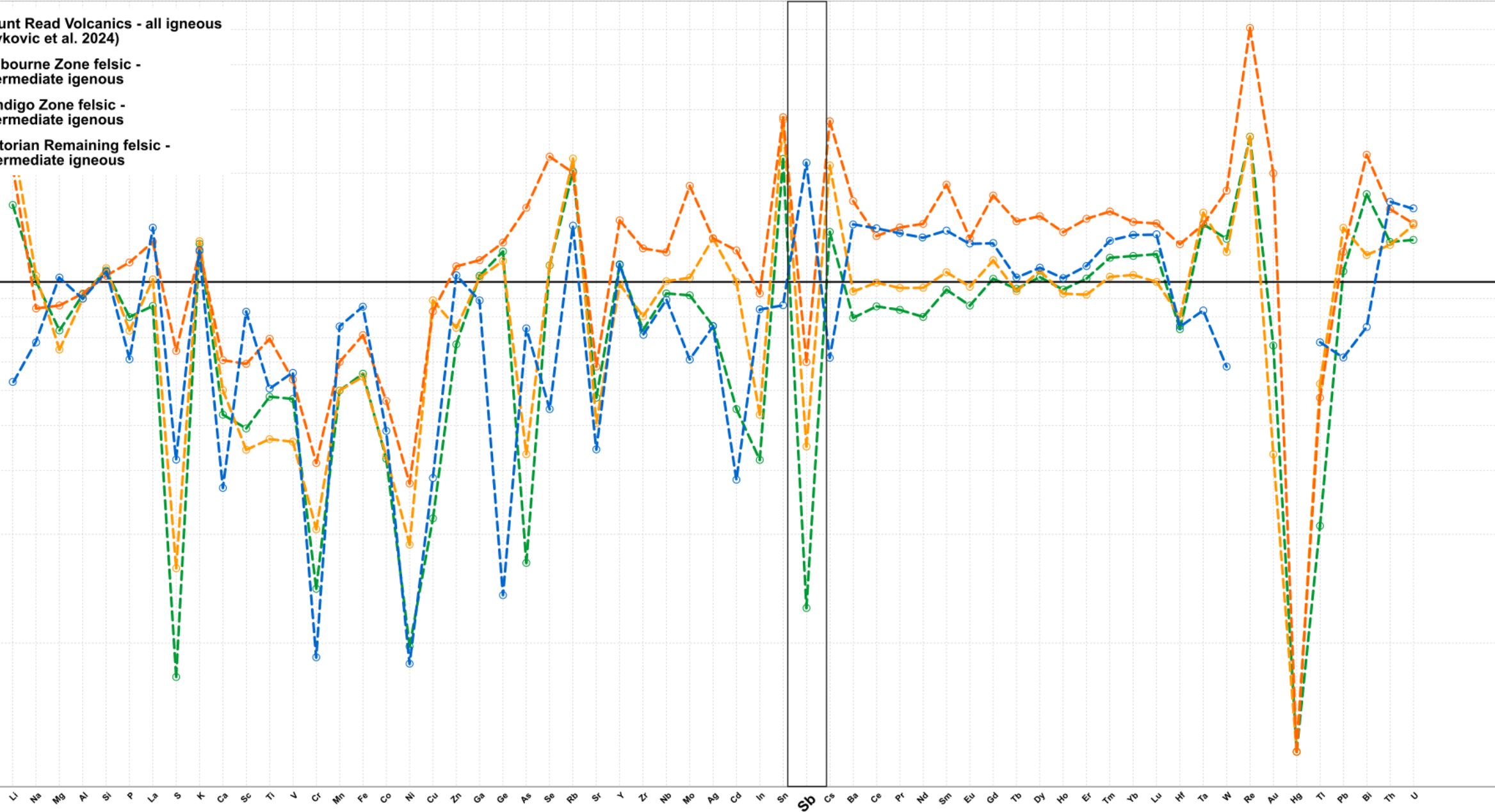
Is there a source for the antimony?



- Melbourne Zone felsic - intermediate igenous
- Bendigo Zone felsic - intermediate igenous
- Victorian Remaining felsic - intermediate igenous

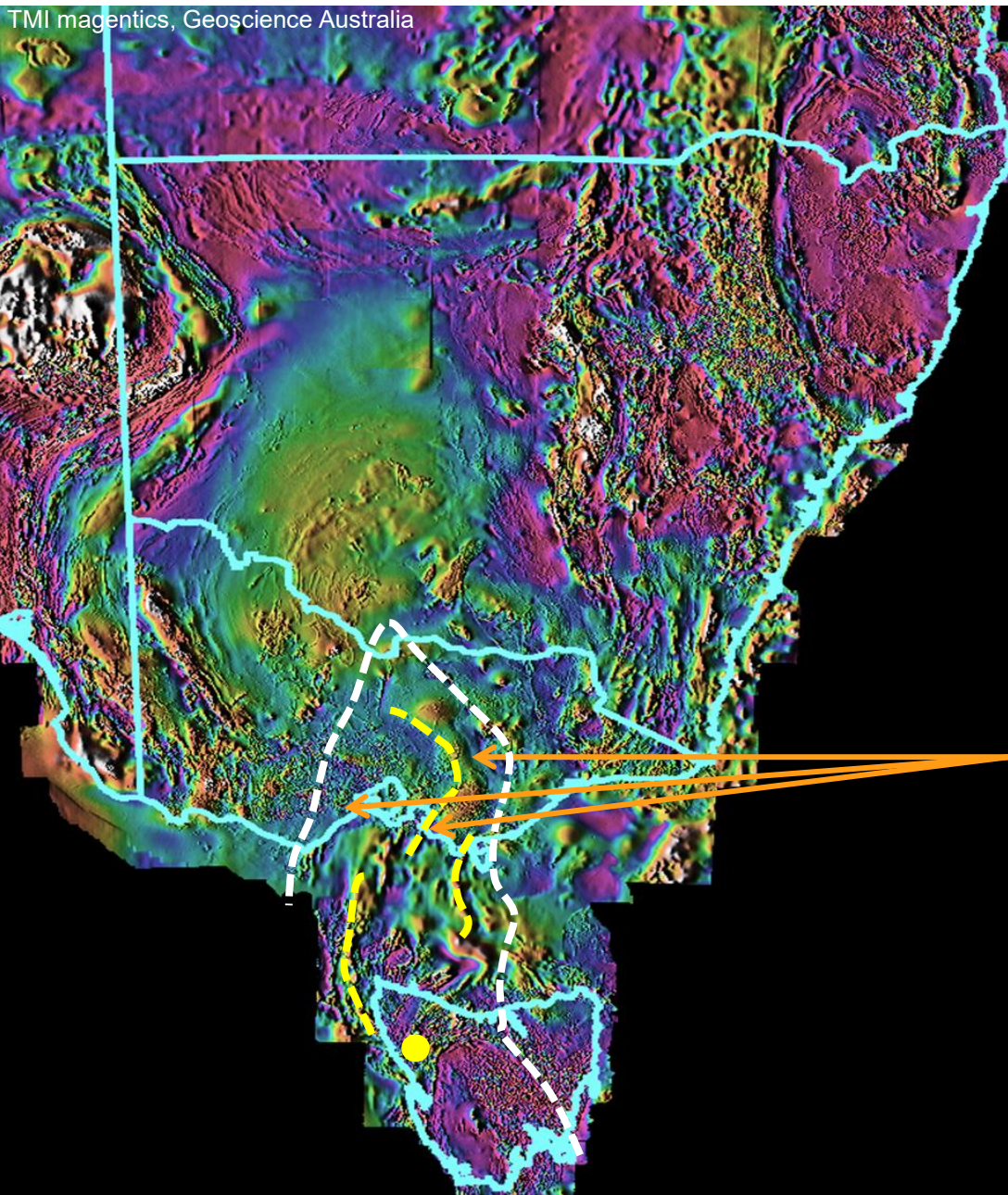


- Mount Read Volcanics - all igneous (Zivkovic et al. 2024)
- Melbourne Zone felsic - intermediate igenous
- Bendigo Zone felsic - intermediate igenous
- Victorian Remaining felsic - intermediate igenous

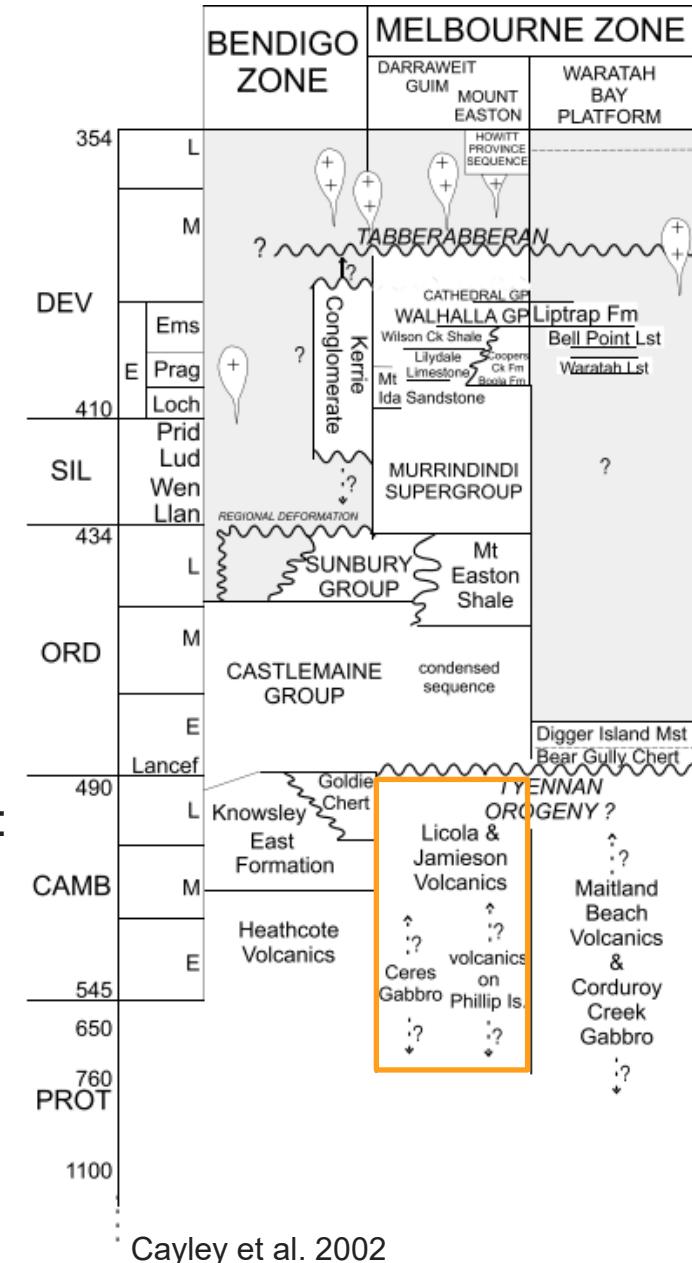


Is there an emerging bigger picture?

TMI magentics, Geoscience Australia

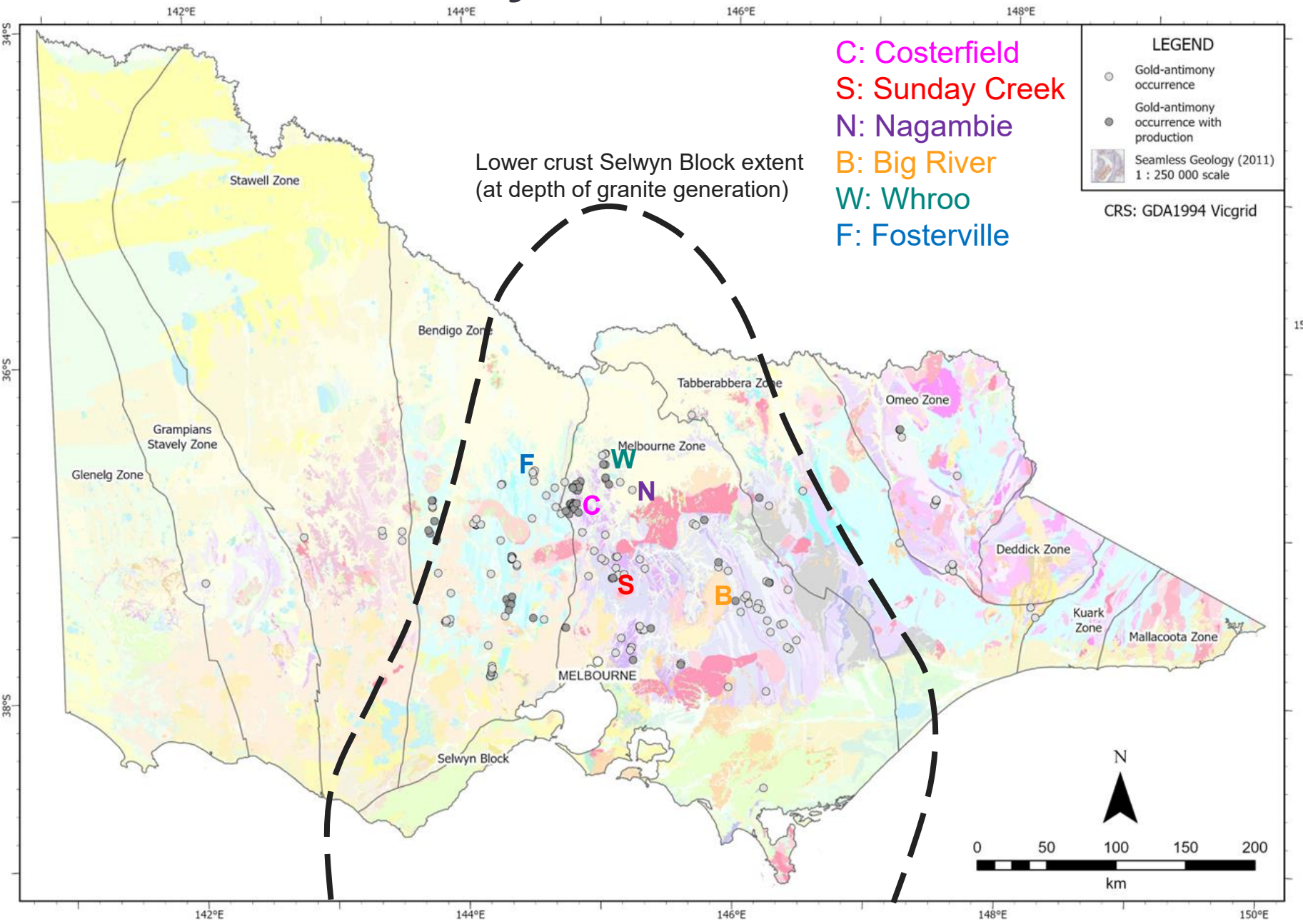


Includes Cambrian volcanic rocks:
Mount Read Volcanics equivalent



Cayley et al. 2002

Influence of the Selwyn Block

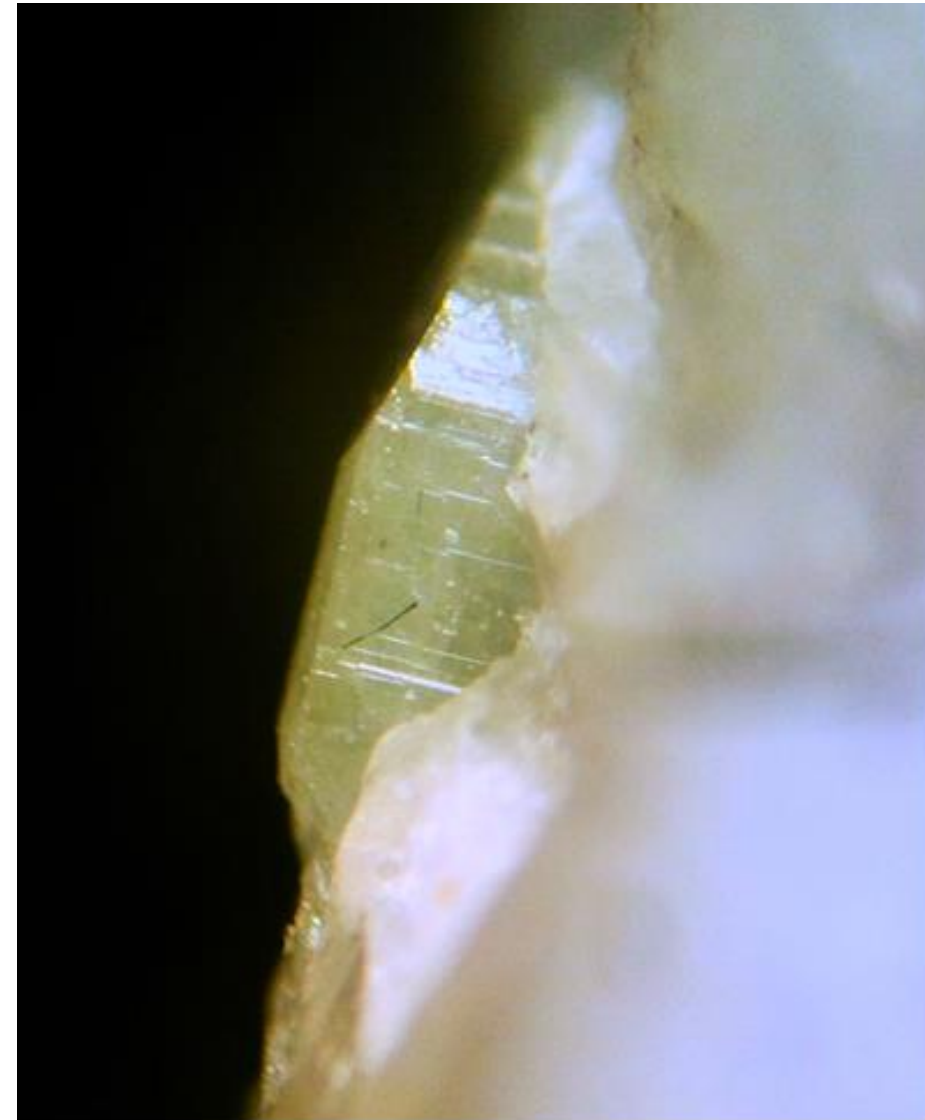


What's next?

- Report in prep
 - **Mineralisation and textures of select gold-antimony occurrences from the Melbourne Zone, central Victoria**
- Geochronology
 - U-Pb Apatite
 - Rb-Sr Mica
 - SHRIMP U-Pb zircon
- Mineral systems analysis
 - Sourcing a source
 - The age-old debate: orogenic vs intrusion related, why not both?



Australian Government
Geoscience Australia



Stibnite(?) needle within apatite, Costerfield. Courtesy R. Eagle

Thank you

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Geological Survey of Victoria

resources.vic.gov.au