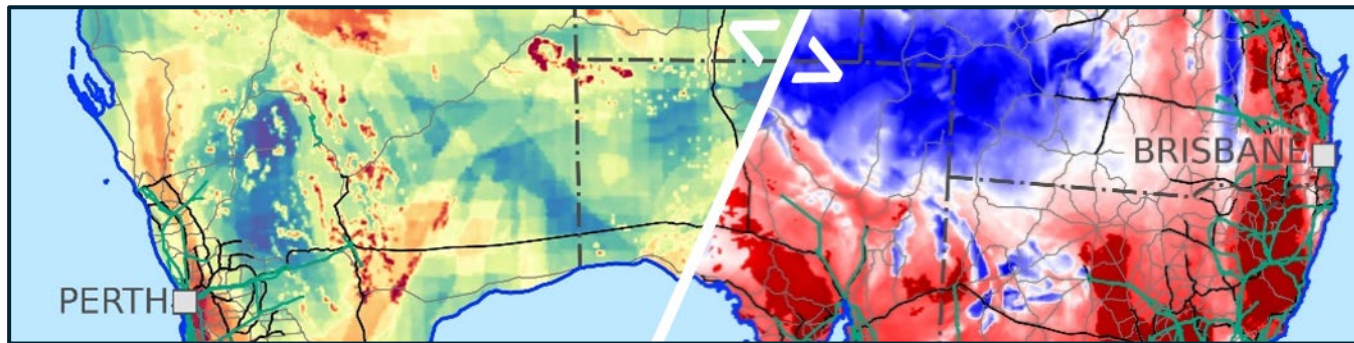




An Integrated Toolkit to Support Decision-making for Exploration:

Bluecap models of Ni-Co-laterite potential in the Tasmanides



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¹ Geoscience Australia

² Monash University

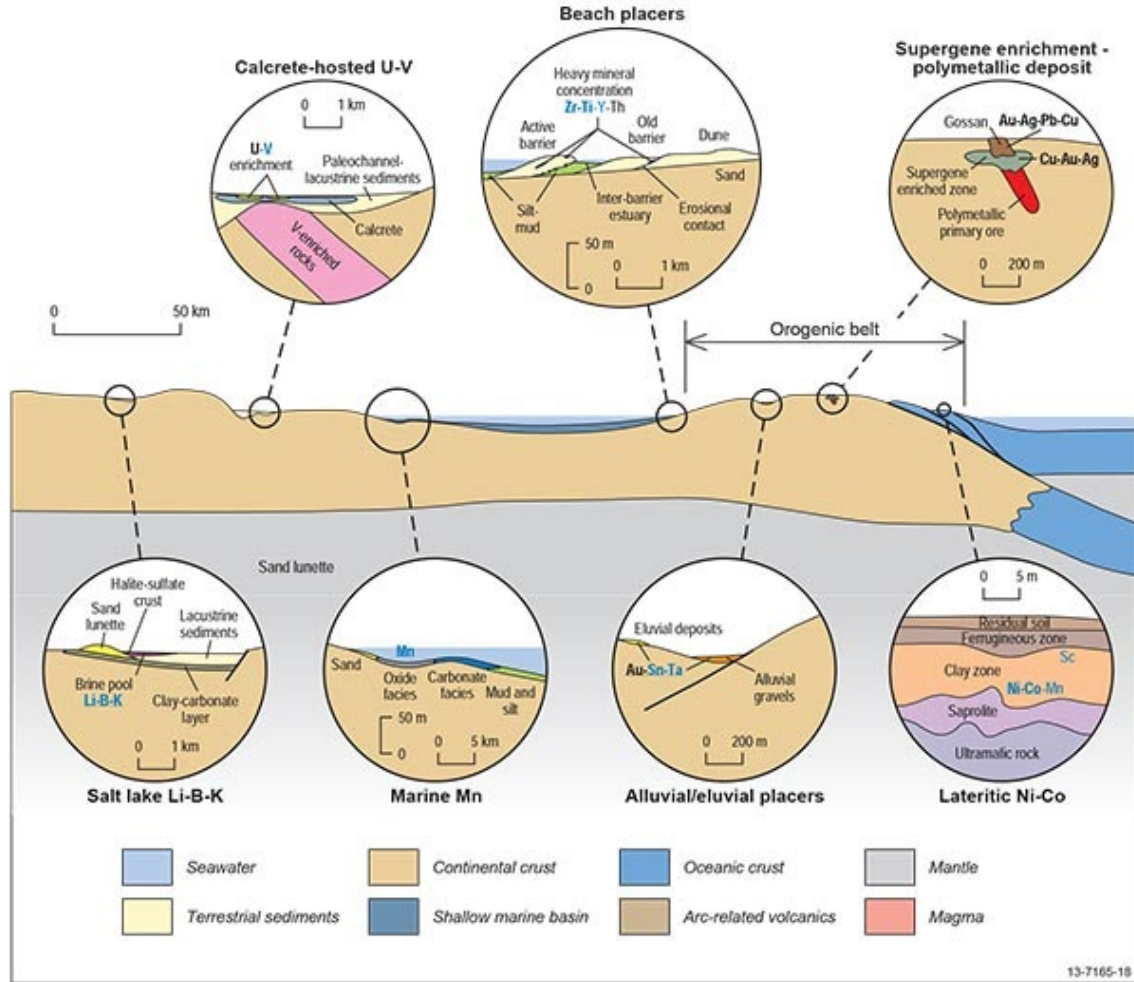
Caretaker



Old Parliament House
Enlighten, 2015

Nickel-laterites

Surficial mineral system



From Skirrow et al. (2013)

Nickel-laterites

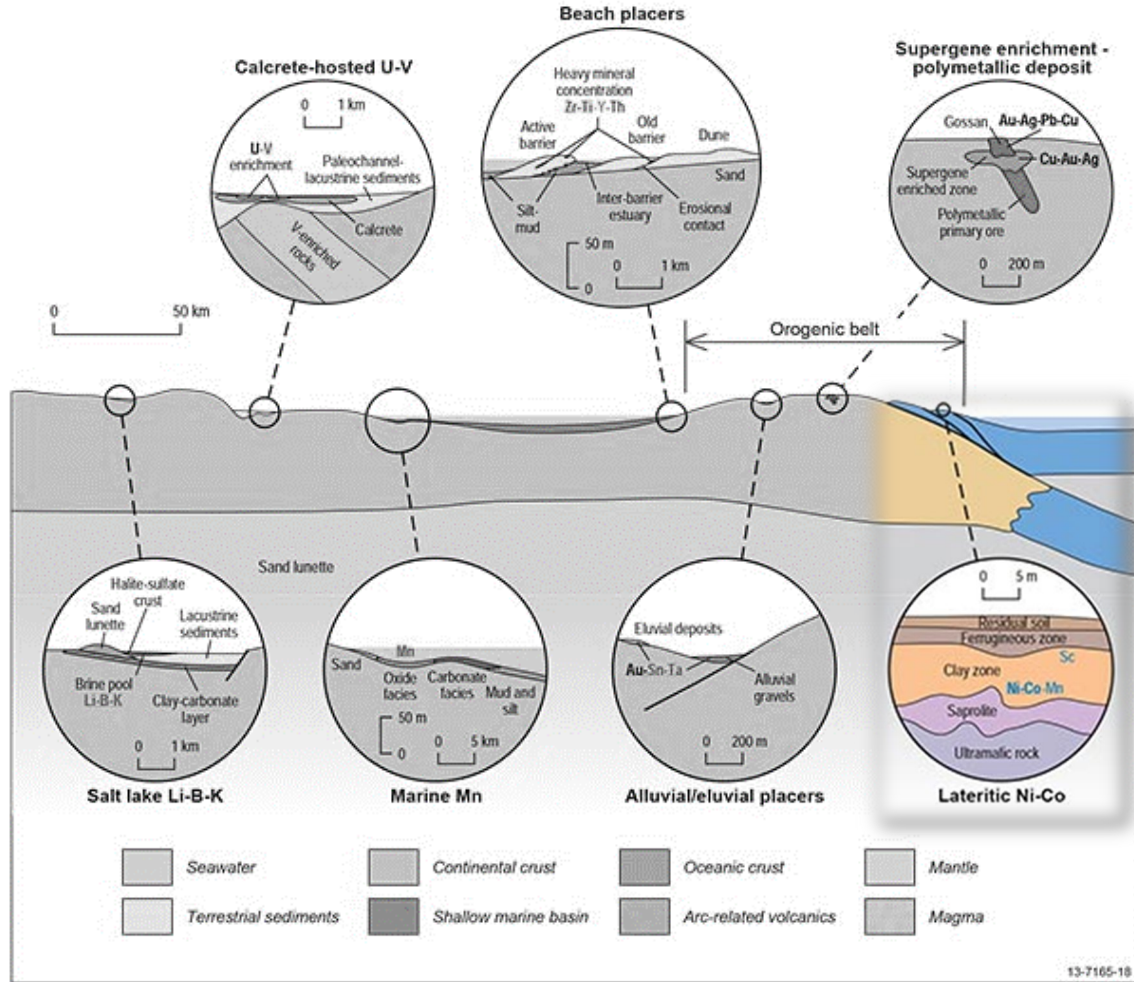
Surficial mineral system

- Related to the mafic-ultramafic orthomagmatic system

Supergene enrichment

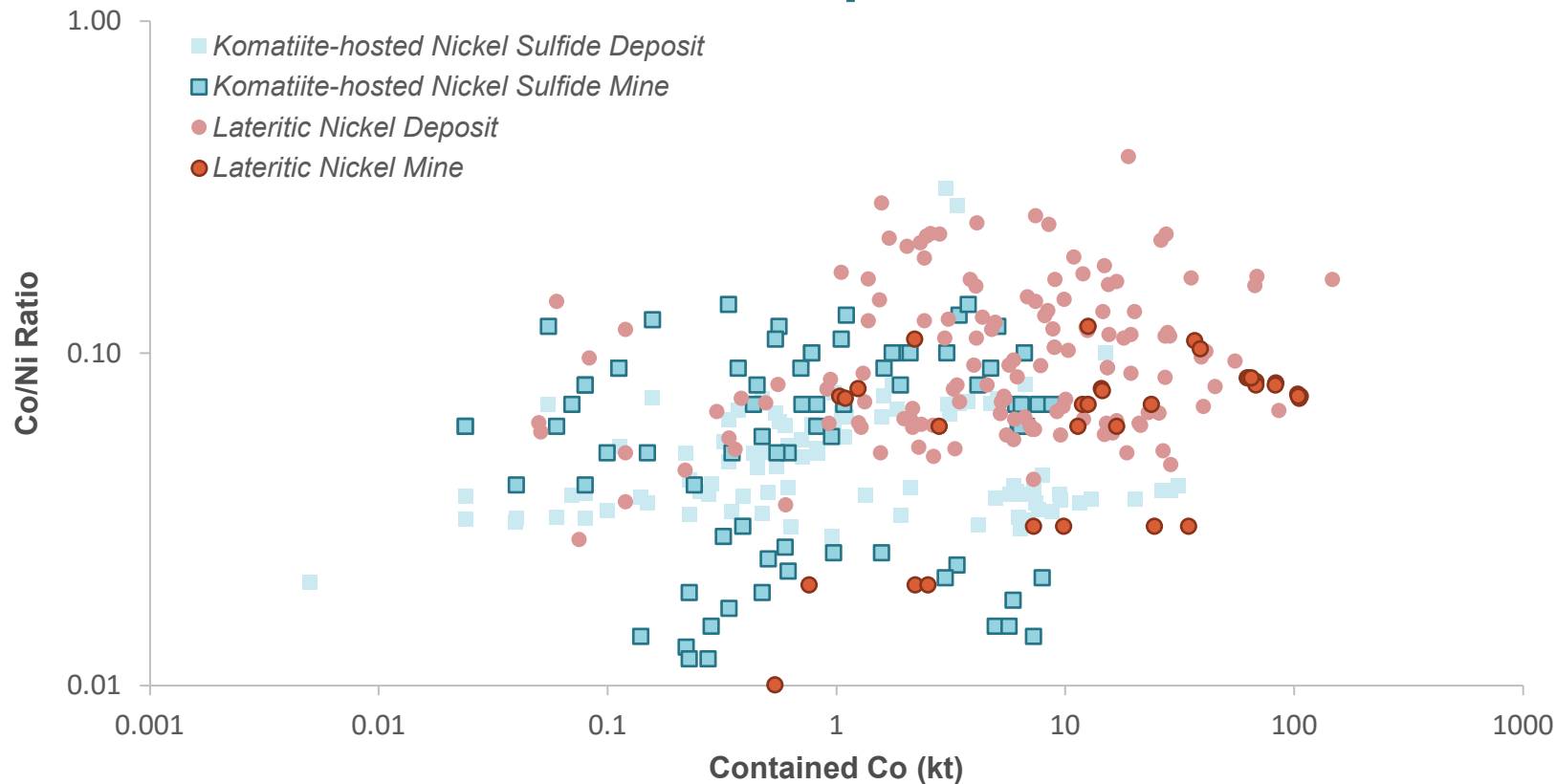
Metal content higher than protolith

From Skirrow et al. (2013)



13-7165-18

Cobalt enrichment in nickel deposits



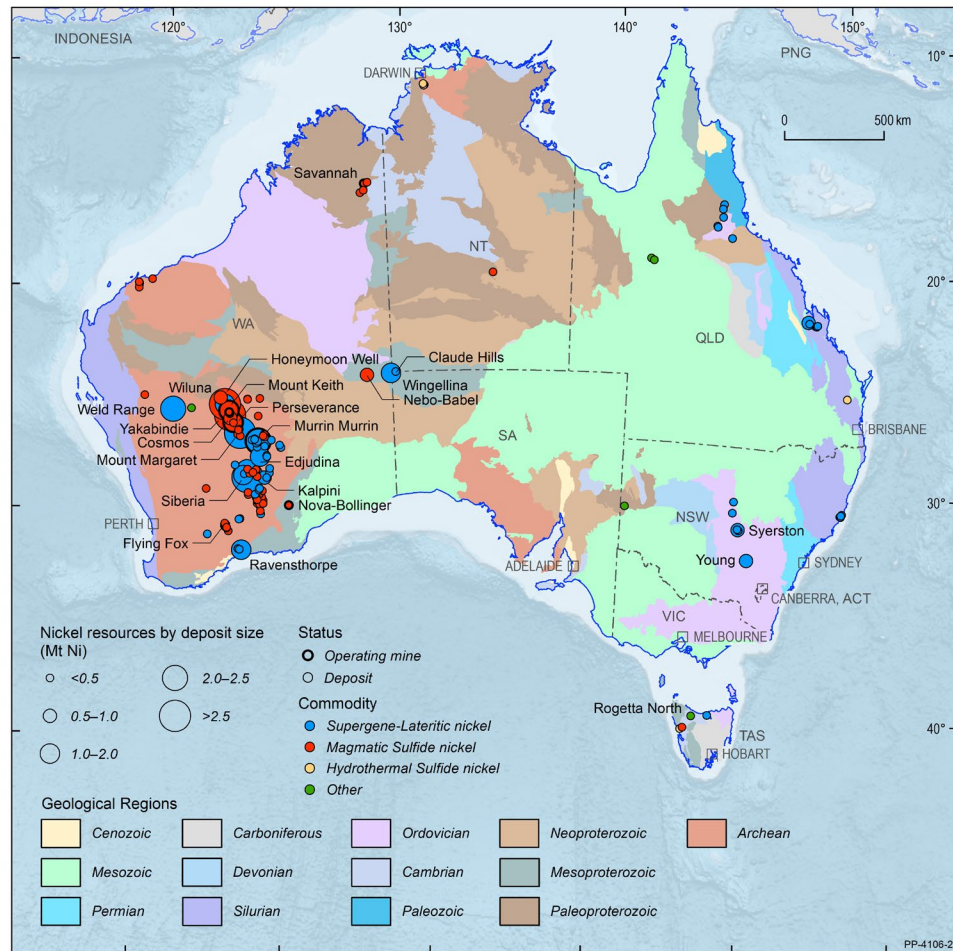
Australian Nickel

Significant endowment:

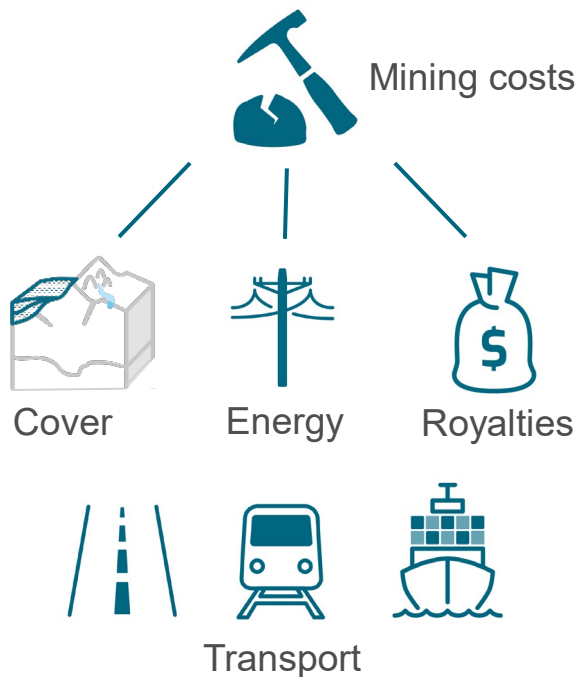
- Ranked 1st for resources
- Ranked 5th for production

Mainly hosted in Western Australia

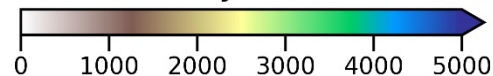
Tasmanides characterised by small Ni-laterite deposits



Economic Fairways

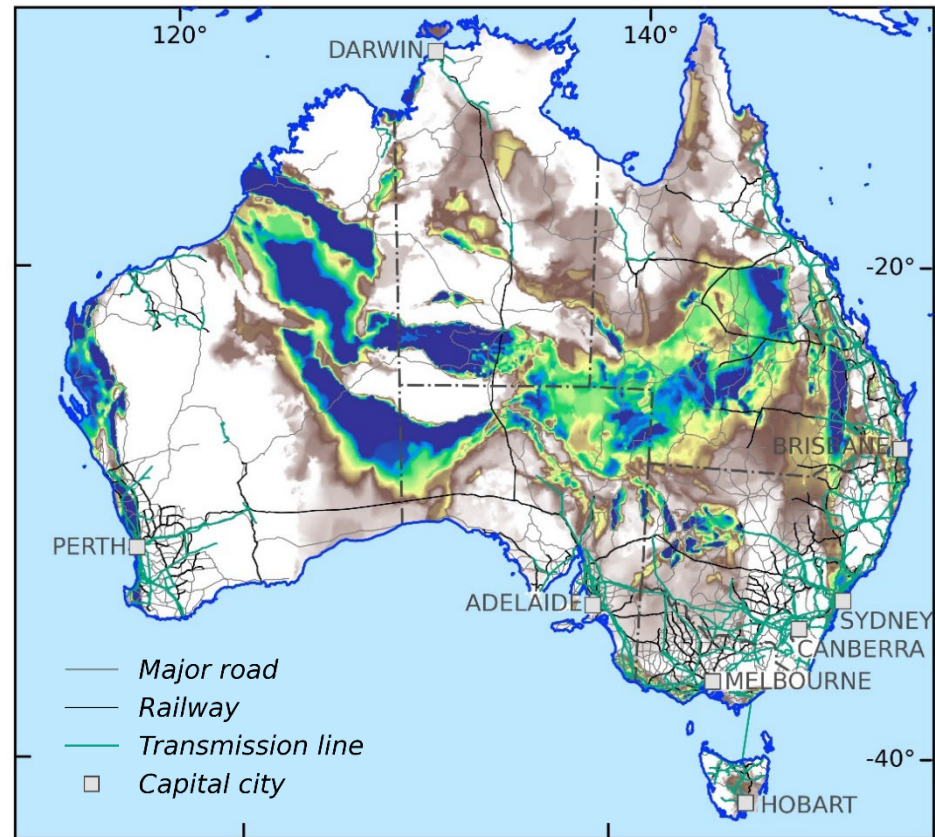


Sedimentary thickness (m)



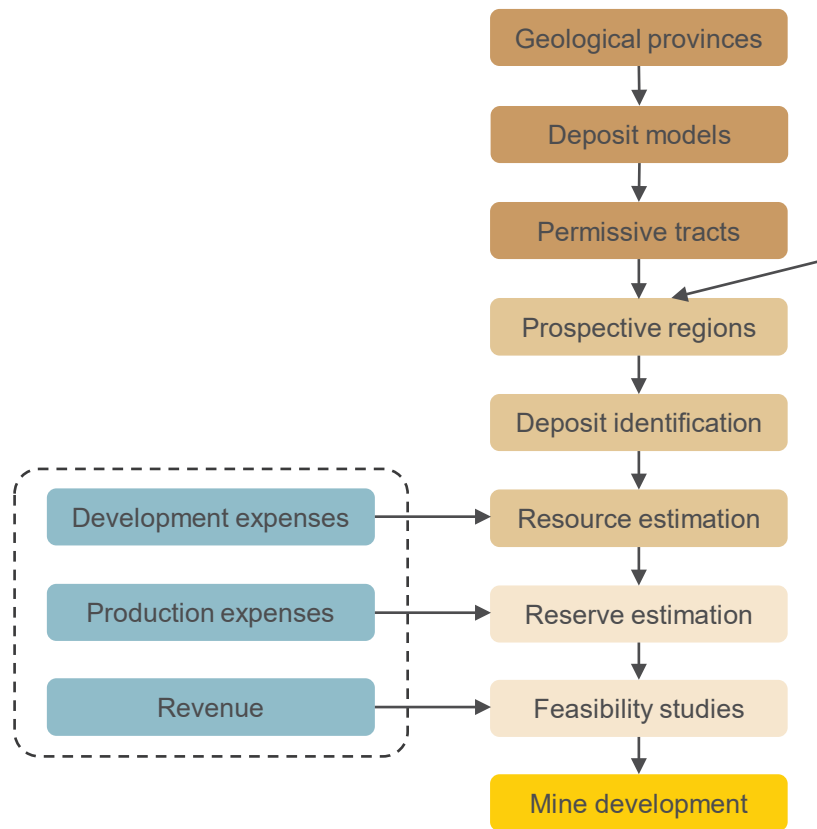
Based on:

Frogtech, 2005. OZ SEEBASE
Phanerozoic Basins Study



Economic Fairways

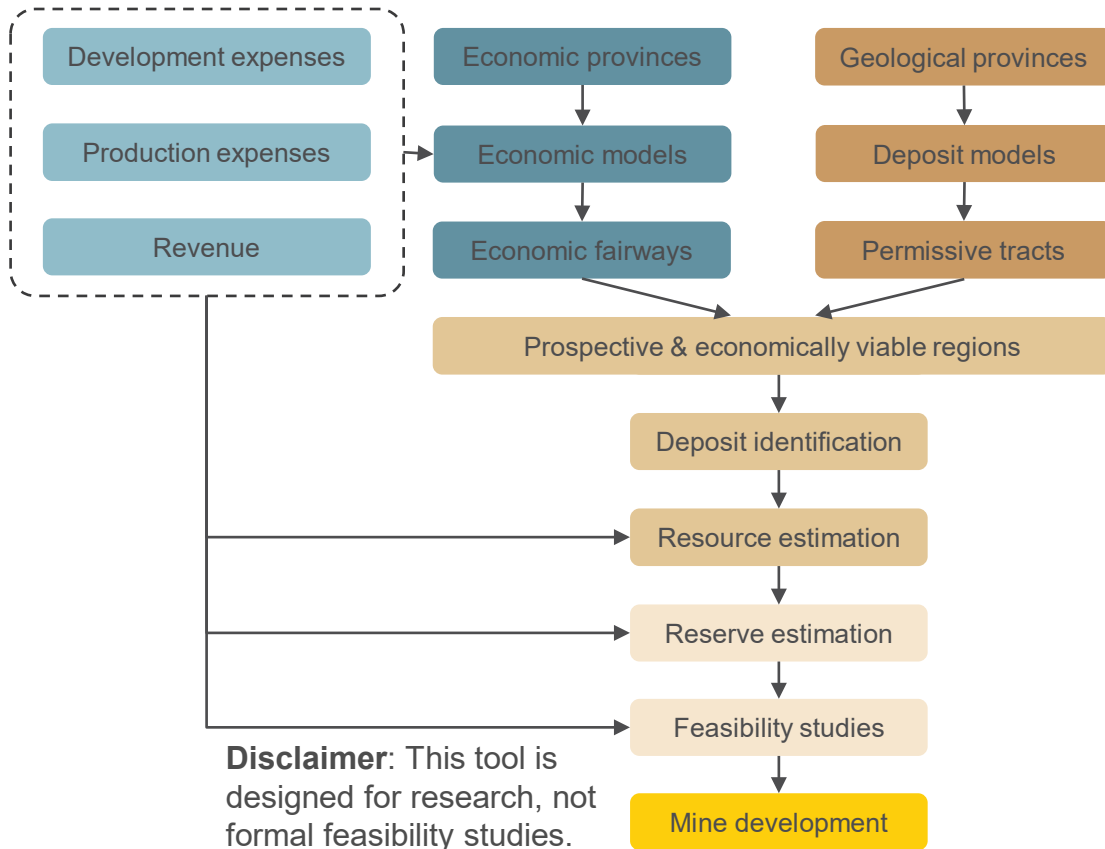
- Stepped framework
- Brings financial considerations forward



After Walsh et al. (2020)

Economic Fairways

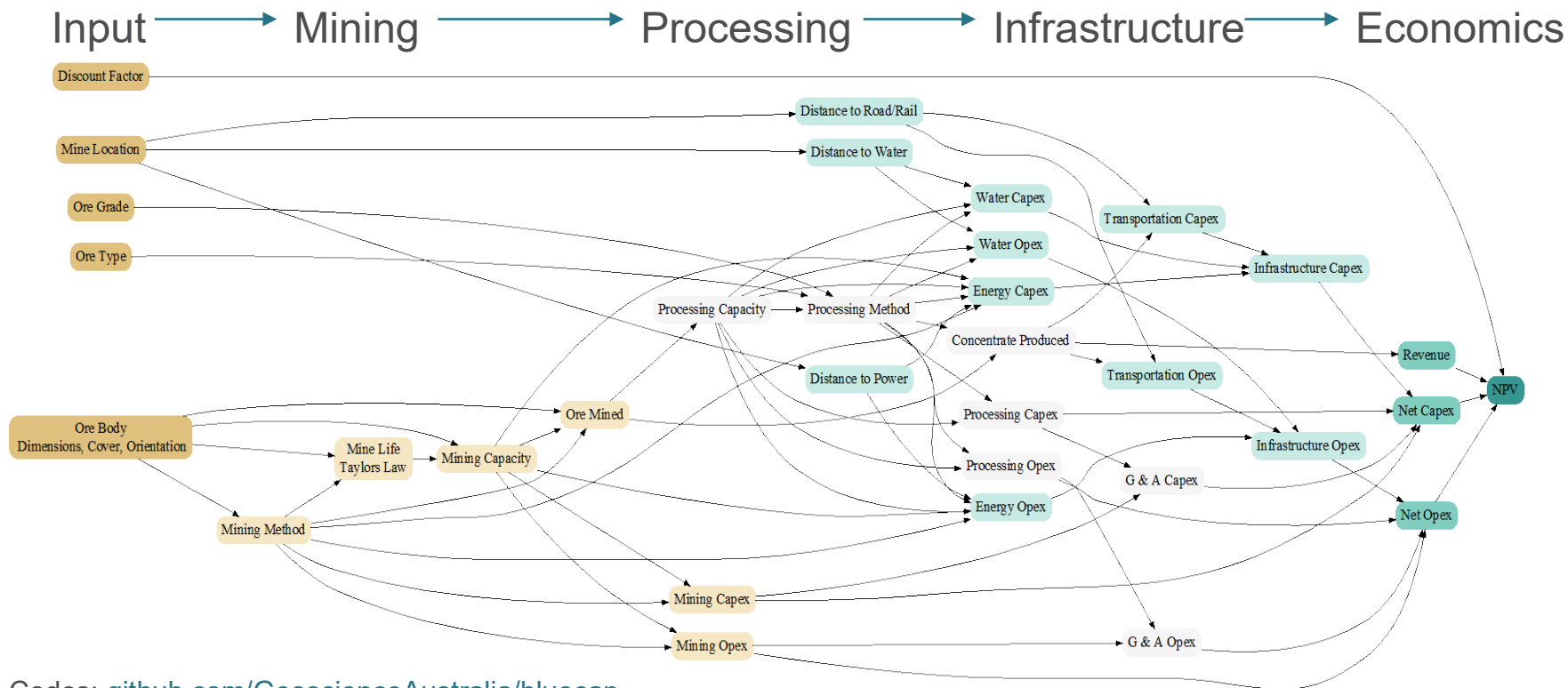
- Stepped framework
- Brings financial considerations forward
- Support for investment and discovery



Disclaimer: This tool is designed for research, not formal feasibility studies.

After Walsh et al. (2020)

Cost model components



Codes: github.com/GeoscienceAustralia/bluecap



www.portal.ga.gov.au

Economic Fairways Mapper

Copper-Gold

☒ Draw Extent ☐ Manual

Select 'Draw Extent' to draw a bounding box, click 'Clear Extent' to cancel drawing.

Draw Extent

Analysis

Basic

Depth to the Top of the Ore Body

☒ Use Cover Model

Regional cover models have limited spatial extents. Please click the globe icon above to check.

Geonostics OZ SEEBASE 2021

Depth Below Cover Model (metres)

Ore Body

Tonnage

☒ Tonnage (megatonnes) (Use keyboard arrow keys to slide to a precise range)

Tonnage 4.0 Mt

Dip of the Ore Body

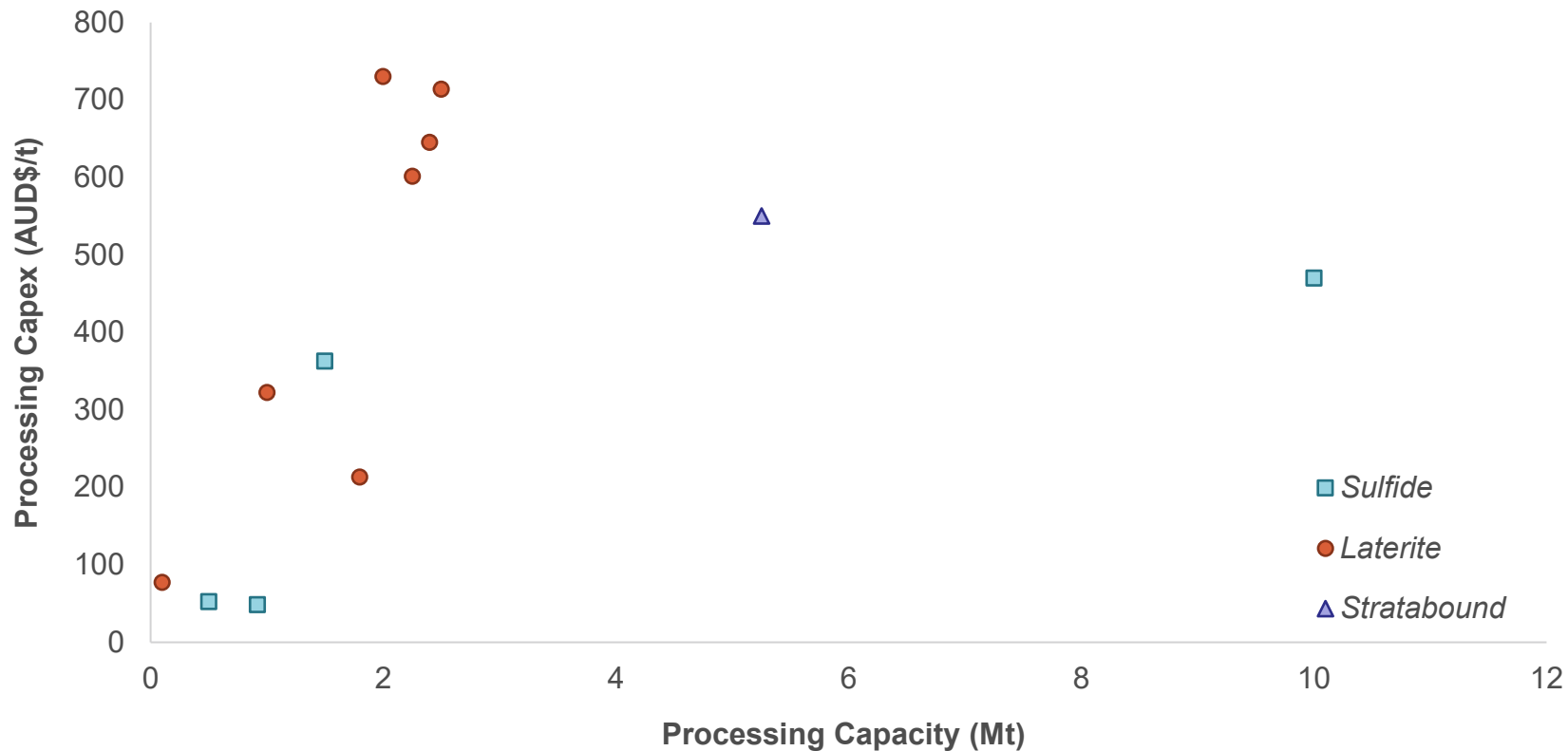
Metal Grade

Copper Grade (Cu equivalent in %)

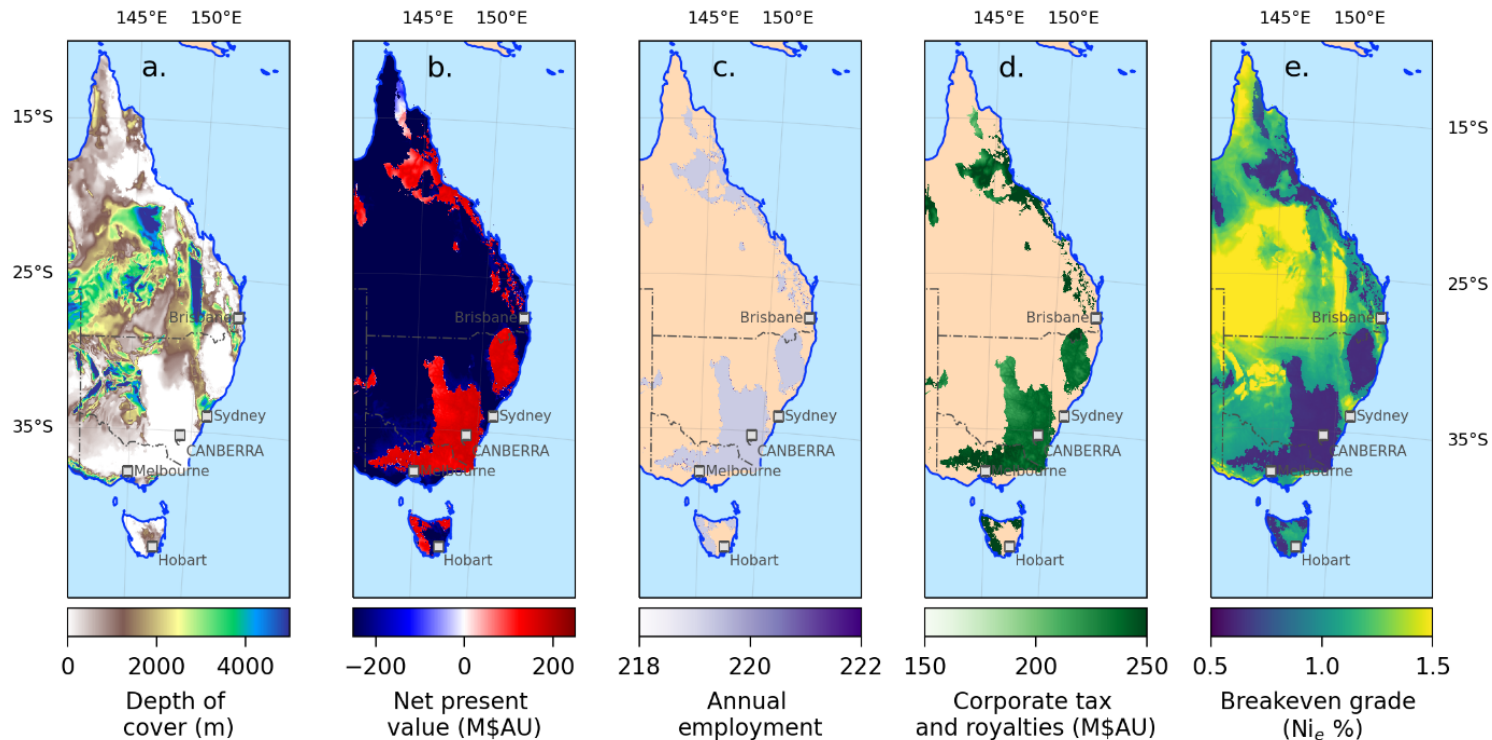
Modelling inputs & assumptions

	VALUE	UNITS	REFERENCE
NICKEL PRICE	20,000	US\$/tonne	
COBALT PRICE	70,000	US\$/tonne	
NICKEL GRADE	0.650	%	Champion et al. (2021)
COBALT GRADE	0.065	%	Champion et al. (2021)
OREBODY LENGTH	700	Meters	
OREBODY WIDTH	350	Meters	
OREBODY HEIGHT	20	Meters	Berger et al. (2011)
OREBODY DIP	0	Degrees	
DISCOUNT RATE	10	%	
CURRENCY CONVERSION	0.70	A\$/US\$	
DEPTH OF COVER	Spatial cover model +10 m	Metres	OZ SEEBASE 2021 Geognostics (2021)

Modelling cost functions

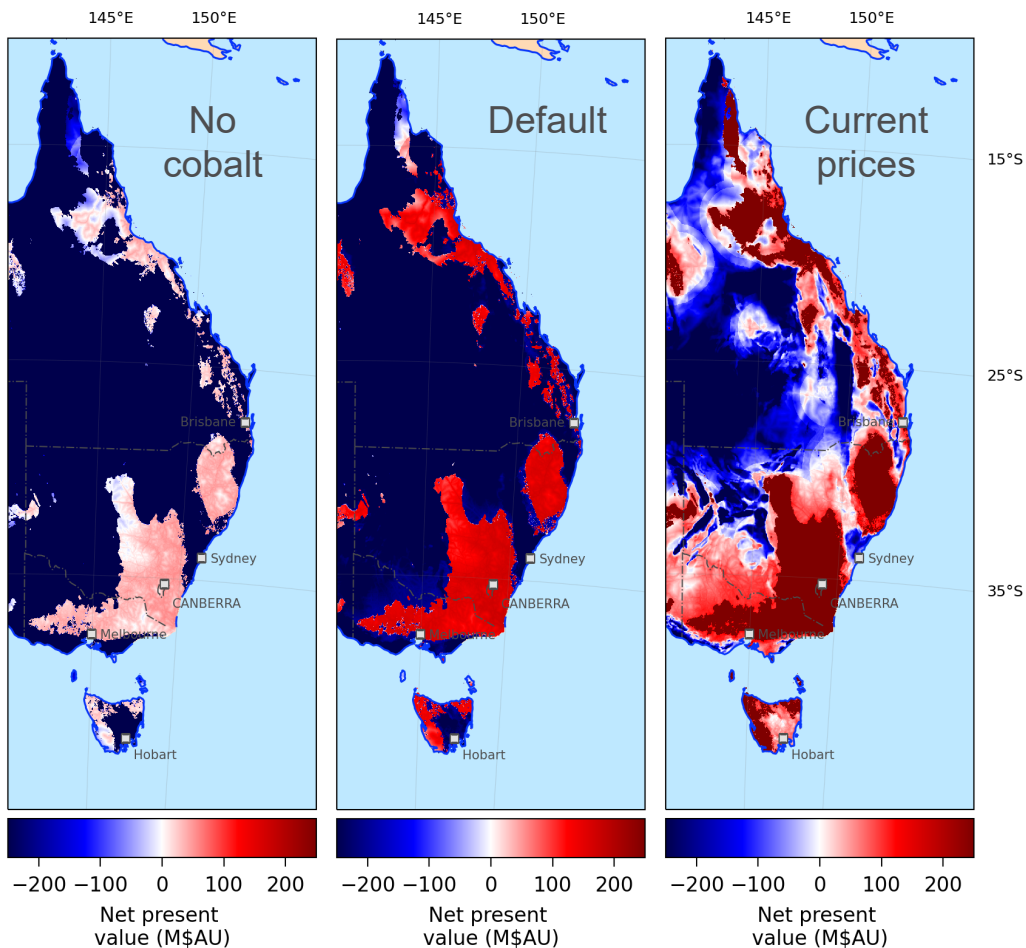


Modelling results



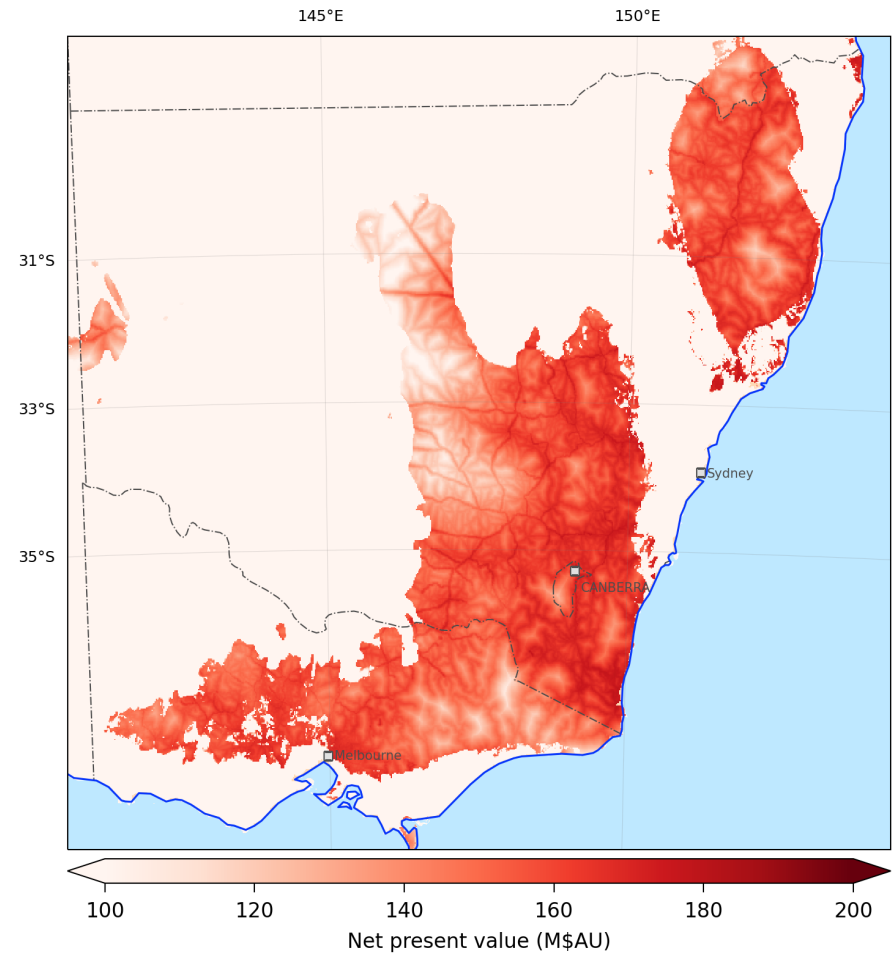
Net present value

- Sum of future cash flows
- Controls:
 - Cover
 - Infrastructure
- New opportunities?



Net present value

- Quantified relationships:
 - Transportation
 - Transmission
 - Taxation



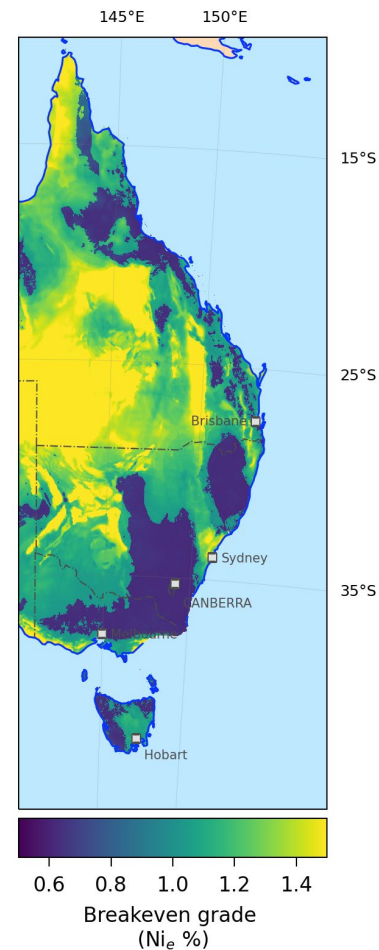
Breakeven grade

- Equivalent nickel grade:

$$Ni_e = Ni + 0.5 \times \frac{P_{Co}}{P_{Ni}} \times Co$$

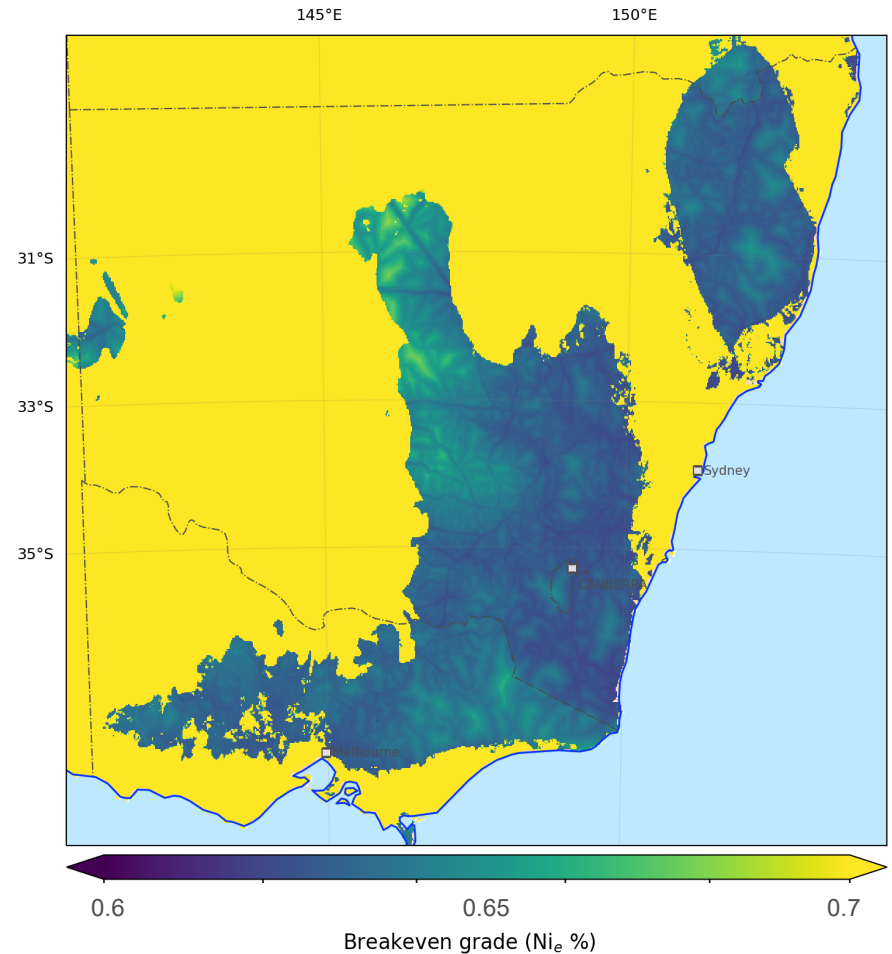
└─ Relative value

└─ Net-smelter discount



Breakeven grade

- Equivalent nickel grade:
$$Ni_e = Ni + 1.75 \times Co$$
- Targets $>0.64 \text{ Ni}_e \%$

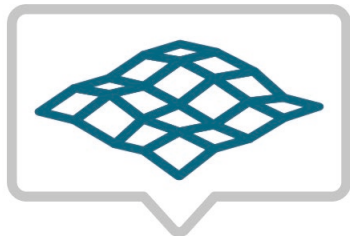


Conclusions - Tasmanides

- Uncertainties are large
- Cobalt supports project realisation
- Transportation is key
- Elevated commodity prices may extend opportunities under cover



Conclusions - Toolkit

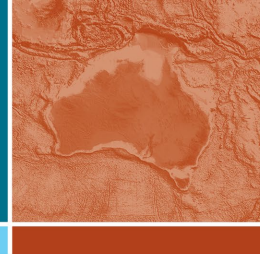


- Rapid scenario testing
- Includes some critical commodities
- Calibrated to Australian conditions
- Integrated toolkit to inform exploration decisions



Australian Government

Geoscience Australia



Economic Fairways

Portal tool: www.portal.ga.gov.au > Tools > Economic Fairways Mapper

Software: <https://github.com/GeoscienceAustralia/bluecap>

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