



# Investor update

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## Exploration by Other Explorers

- This presentation contains information sourced from the reports of Other Explorers. References to the original reports are provided as footnotes where the information is cited in this presentation. The Other Explorers reports cited include: the Geological Survey of Papua New Guinea. and The Federal Institute for Geosciences, Federal Republic of Germany. Kalia does not vouch for the accuracy of these reports. Kalia has taken the decision to include this information as we assess it to be of relevance to shareholders and investors.

## Competent Person Statement

- The information in this presentation that relates to Exploration Results is based on information reviewed by Mr Peter Batten who is a member of the Australasian Institute of Mining and Metallurgy (AusIMM) and is a full time employee and shareholder of Kalia. Mr Batten has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Batten consents to the inclusion of the information in the form and context in which it appears.

# Kalia's proposition

- Panguna is an indicator of the potential of our Bougainville exploration licences
- Already identified targets on Bougainville Exploration Licences
- Large upside to identify more targets following aerial geophysical survey, <20% surveyed
- Performance of Kalia in Bougainville provides a gateway for other opportunities
- Australian projects with high prospectivity

# Corporate

# Corporate Snapshot

## CAPITAL STRUCTURE

Shares on issue	1,940,847,391 shares
Options on issue	308,000,000
Market capitalisation (@ A\$0.016 per share)	A\$31.054m
Cash on hand (28 November 2017)	A\$0.45m
Due by GRIT	A\$0.58m



## KEY PERSONNEL

Chairman	The Hon. David Johnston B.Juris LLB.
Managing Director	Terry Larkan MBA FCIS FCPA (Aust)
Executive Director	Nick Burn BSc (Hons) MBA MAIG
Exploration Manager	Peter Batten BSc (Geology) MAIMM
Comp. Secretary / CFO	Anna MacKintosh BCom CPA

## TOP 20 SHAREHOLDERS (28 November 2017)

ORDINARY SHAREHOLDERS	ORDINARY SHARES	PERCENTAGE
NIKOLAJS ZUKS	281,473,503	14.50
GRAEME KIRK AND ASSOCIATES	172,000,000	8.86
GLENEAGLE SECURITIES NOMINEES PTY LIMITED	122,905,985	6.33
J P MORGAN NOMINEES AUSTRALIA LIMITED	104,745,066	5.40
ENZED NOMINEES PTY LTD <THE NIKOLAIS ZUKS FAMILY AC>	75,301,205	3.88
ENZED NOMINEES PTY LTD <ADAM NIKOLAIS ZUKS A/C>	67,934,157	3.50
GREYWOOD HOLDINGS PTY LTD	62,000,000	3.19
CARLA MICHELLE PTY LTD <CARLA MICHELLE A/C>	61,746,988	3.18
MRS MELANIE THERESE VERHEGGEN	60,000,000	3.09
MAYSTAR PTY LTD	54,216,867	2.79
SUZAN BAKER	40,662,651	2.10
JESSIKA ERIN PTY LTD <JESSIKA ERIN FAMILY A/C>	40,662,651	2.10
PETER BATTEN	36,144,578	1.86
FINROW LIMITED	25,000,000	1.29
LSAF HOLDINGS PTY LTD <OWEN FAMILY A/C>	25,000,000	1.29
AMRIC PTY LTD <AMRIC SUPERFUND A/C>	24,550,000	1.26
IAN SANDOVER & ASSOCIATES PTY LTD <SANDOVER SUPER A/C>	24,400,000	1.26
OAKHURST ENTERPRISES PTY LTD	20,000,000	1.03
FRESHWATER RESOURCES PTY LTD <THE ASHTON SUPERFUND A/C>	19,312,500	1.00
DAVID ALBERT JOHNSTON	18,072,289	0.93

# Board

## **Non-Executive Chairman**

### **Mr David Johnston, B.Juris LLB**

The Honourable David Johnston, former Senator, practiced law in Kalgoorlie, Western Australia specializing in mining conveyancing and tenement disputation. He practiced in Western Australia for 20 years before being elected to the Australian Parliament as a Senator or Western Australia. Mr Johnston was in Parliament for 14 years, and during that time was the Minister for Justice and Customs, the Shadow Minister for Minerals Energy and Tourism, The Shadow Minister for Defence and then the Minister for Defence.

## **Managing Director**

### **Mr Terry Larkan, BCompt. MBA FGIA FCIS FCPA (Aust.)**

Mr Terry Larkan has over 30 years mining finance and general management experience in Australasia, Africa and the Americas. Mr Larkan's previous roles include a director of Bellzone Mining, partner with Ernst & Young (Australia) and vice-president with Barrick Gold.

## **Executive Director**

### **Mr Nick Burn, BSc (Hons) MBA MAIG**

Mr Nick Burn is GB Energy's Exploration Manager. Mr Burn has over 25 years' experience in the minerals exploration industry including extensive operational experience throughout Australia. Mr Burn was previously CEO of ASX-listed uranium explorer Regalpoint Resources Ltd and Exploration Manager for Energy Metals Ltd.

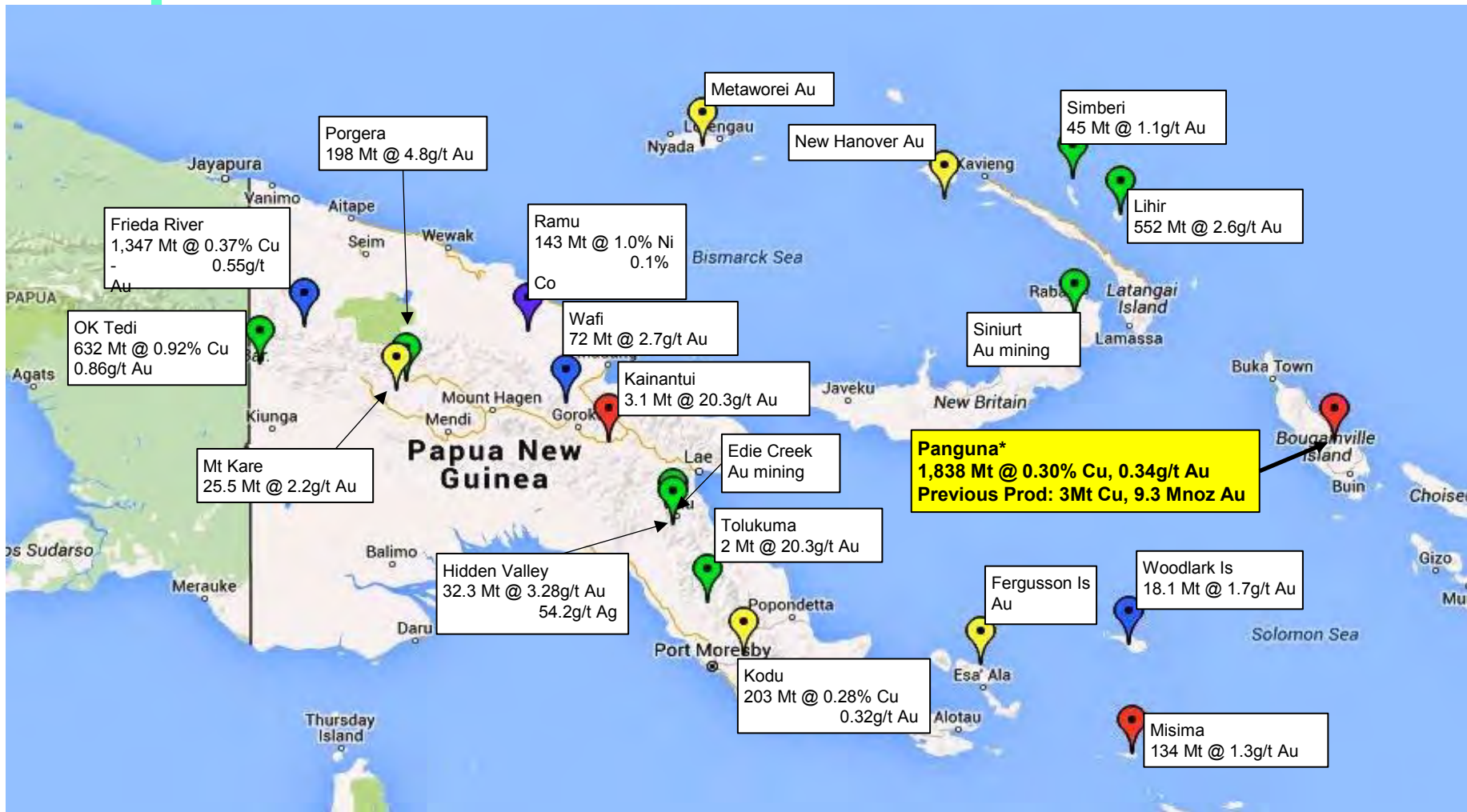
# Bougainville

# The Bougainville opportunity

- Kalia Investment Limited 75% with Toremama Resources Limited 25% free carry to production
- Exploration licences in north of Bougainville Island
  - EL03 covers an area of 865.3 km<sup>2</sup> on the east side
  - EL04 covers an area of 838.7 km<sup>2</sup> on the west side.
- Bougainville is highly supportive of mining development.
- Kalia has established and continues to build deep relationships with landowner and government bodies.
- Initial areas of interest have been developed from desktop studies of existing data.
- Indications (geological, geochemical, geophysical and structural) are that there will be major additional discoveries made once systematic, modern exploration is undertaken.
- Significant potential to identify additional targets on the West where no geophysical data exists but historic rock chip, soil and river sample indicators have been found.



# Bougainville – in the “Ring of Fire” deposit chain



\*The resource estimate for Panguna is taken from the Bougainville Copper Limited website and is reported by BCL as compliant with the JORC 2012 guidelines. All other figures in this diagram are from public sources.

# Regional Geological Setting

- Bougainville and the Solomon chain rise from a submarine ridge bounded on both sides by deep sea trenches.
- Three successive cycles of volcanic activity created the Solomon Island Ridge resulting in repeated accumulations of volcanic rocks from 45 million years ago and until the present day
- The rocks are a mixture of lavas, volcanic breccias and volcanic sediments
- Coarser grained intrusive granodiorites and diorites within the volcanic sequences represent the magma cores. These host the copper and gold mineralization on Bougainville. (Davies, 1992)
- Copper mineralization at Panguna was identified in 1961 by Clark as porphyry in style. Additional porphyry copper and epithermal mineralization were identified by Dr Rogerson (1989) throughout the island of Bougainville.
- Whilst in operation, Panguna was the largest porphyry copper mine in the world. The remaining resources are still amongst the world's largest.
- Copper and gold mineralisation at Ok Tedi, Frieda River and Wafi are of similar style.

# Panguna – An indicator of potential?

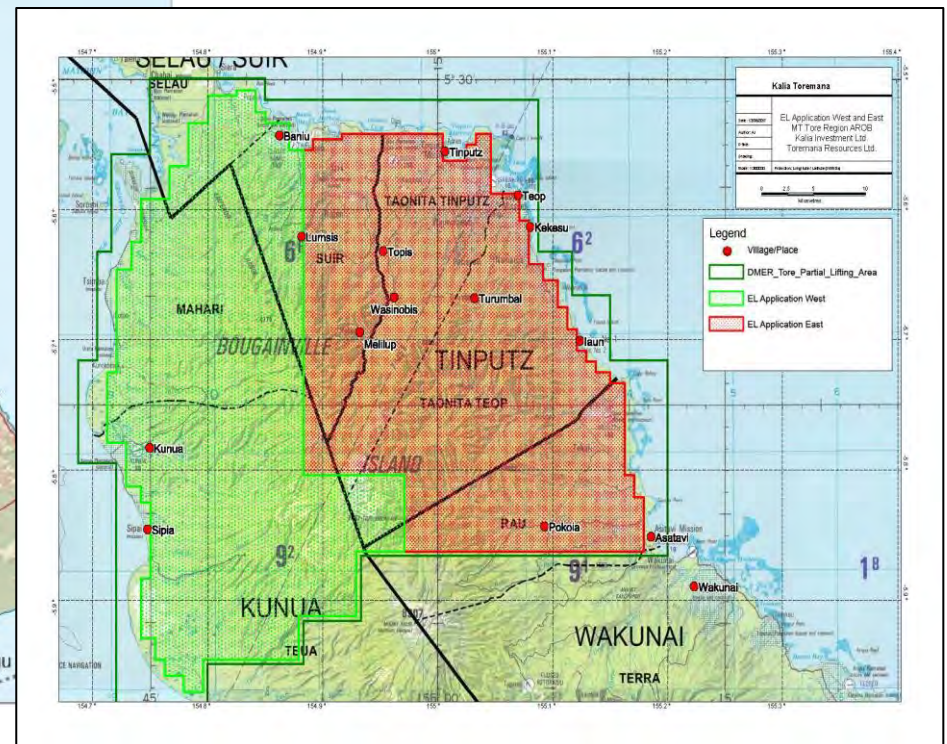
- Panguna operated for 17 years from 1972 to 1989.
- Production ceased due to civil unrest (addressed next slide).
- At closure the pit was 400m deep with ~90 Mtpa of ore and waste being mined.
- Mill throughput was ~48 Mtpa with a grade 0.41 % copper ("Cu") and 0.41 grams per tonne gold ("g/t Au"), producing around 550,000 tonnes per annum ("tpa") of concentrate grading 30% Cu and 25g/t Au containing around 170,000 tonnes ("t") of copper and 450,000 ounces ("ozs") of gold.
- Annual production value in 11 October 2017 terms:
  - Copper LME Dec 3 US\$6,639/t = 1,128,630,000
  - Gold US\$1,286/ozs = 578,700,000
  - **Total notional final year Revenue US\$ = 1,707,330,000**
- Very little exploration across Bougainville after discovery and development of Panguna, in its time the biggest and richest mine in the world - orebody remains with a JORC 2012 resource of 1.83 billion tonnes at 0.30% Copper and 0.34g/t gold

(as published by Bougainville Copper Limited – ASX: BOC in the 2016 Annual Report published 31 March 2017).

# Bougainville Exploration Licences



- Exploration Licence Application 007 covers an area of 865.3 km<sup>2</sup> on the east side of the Tore region
- Exploration Licence Application 008 covers an area of 838.7 km<sup>2</sup> on the west side of the Tore region





# Advance Geological Work

- Kalia invested significant resources researching previous geological work.
- Obtained a copy of the original sample files from the field survey conducted by the Geological Survey of Papua New Guinea (GSPNG) led by Dr Rick Rogerson that was included in the Memoir 16 publication of 1989 giving the last and most complete study of geology undertaken for the whole of Bougainville and Buka Islands.
- Rogerson study incorporated findings from airborne geophysical survey conducted on behalf of the GSPNG by The Federal Institute for Geosciences and Natural Resources, Federal Republic of Germany (FIGNR). The survey recorded Magnetics, Electromagnetics and Radiometrics (K, TH, U).
- Fathom Geophysics Australia Pty Ltd (Fathom) undertook the reprocessing of the raw airborne geophysical data collected by the FIGNR and subjected the data to modern processing techniques to produce clearer and better defined images.
- Fathom is experienced in exploration in epithermal terranes. Fathom has undertaken processed and filtered the data to create datasets specifically engineered to highlight anomalism within the surveyed data that is consistent and comparable to models of known mineralisation from existing sites (Batu Hijau, Grasberg, Alumbreira). The results (slides 17 & 18):
  - The geology of the Tore region is dominated by andesites, diorites and granodiorites similar to the geology of the Crown Prince Ranges to the south, home to the famous Panguna Mine.
  - Identified four intrusive granodiorites in the Tore region of the Emperor Ranges in the EL area.
  - These are priority targets for geological exploration ahead of other identified areas of interest.

# Advance Geological Work

Toremana Resources Ltd sourced a copy of a field report conducted in the Rarie' Puspa district of the Tore region (Tsiperau, C.U., 2012) as part of a Master's of Geology course from the University of Papua New Guinea and supervised by staff of The Geology Department University of Leicester, U.K. This work included rock chip sampling of a number of traverse lines for whole rock, petrographic and chemical analysis. Although the report does not specify the grade analysis for individual samples several occurrences of chalcopyrite ( $\text{CuS}_2$ ) were mentioned with GPS coordinates and other sites of interest (brecciation, epithermal veining) are within the body of work with coordinates.



Figure 5. A mafic diorite dyke intruding monzodiorite. Tributary to Pipiu River, site CUT000093 (0725149E, 9366179N).



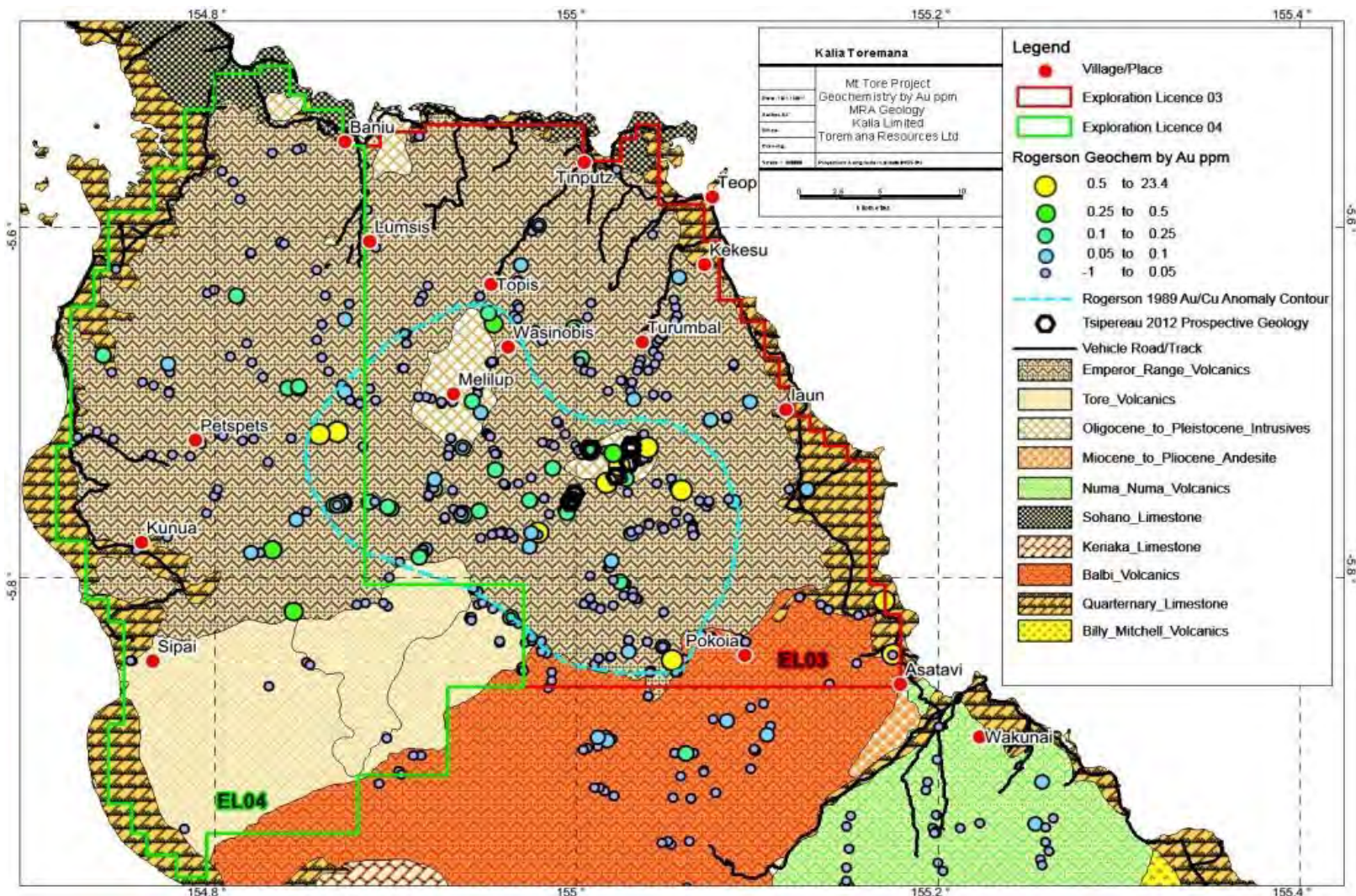
Figure 6. Microdiorite or felsic dyke intruding monzodiorite. The contact appears like a 'tongue' into the monzodiorite. Pipiu River, site CUT000076 (0724028E, 9365707N).

# Mapping historical data

- Rogerson (1989) identified a +20km<sup>2</sup> zone of anomalous Au, Cu, As and Hg that was named the "Upper Ramazon Anomalous Zone".
- Within this zone sampling has identified areas of interest for initial programmes at Melilup – Wasinobis, Melilup – Petspets and Rarie'/Puspa for gold. (slide 15):
- Rogerson noted in the report that potential exists for multiple deposits in the north and up to seven different styles of mineralisation were identified, although these seven styles can be broadly grouped into three:
  - Porphyry Cu, Au;
  - Epithermal veining (including polymetallic veins and Au); and
  - Volcanogenic Massive Sulphides (VMS),
- Sampling has identified areas of interest for the initial exploration programmes at Melilup – Topis and Tore – Kunua for copper in the Upper Ramazon Anomalous Zone. (slide 17):
- Tsiperau's work concentrated on sampling the Diorite, Granodiorite, Monzonite Intrusives at Rarie' Puspa (similar geology to the intrusives at Panguna) and the results of her work has further enhanced this location.

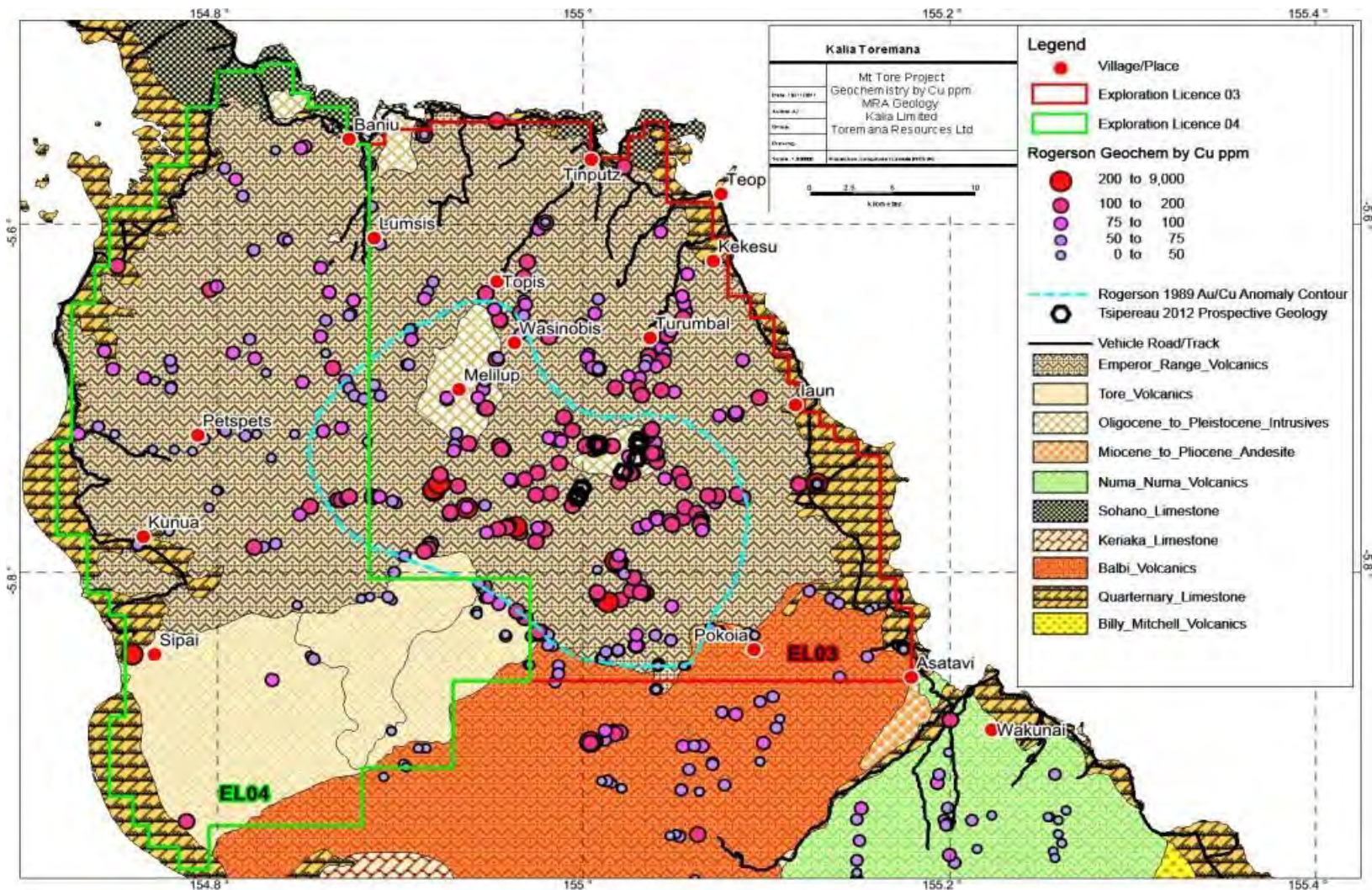


# Gold Results, after Rogerson (1989)



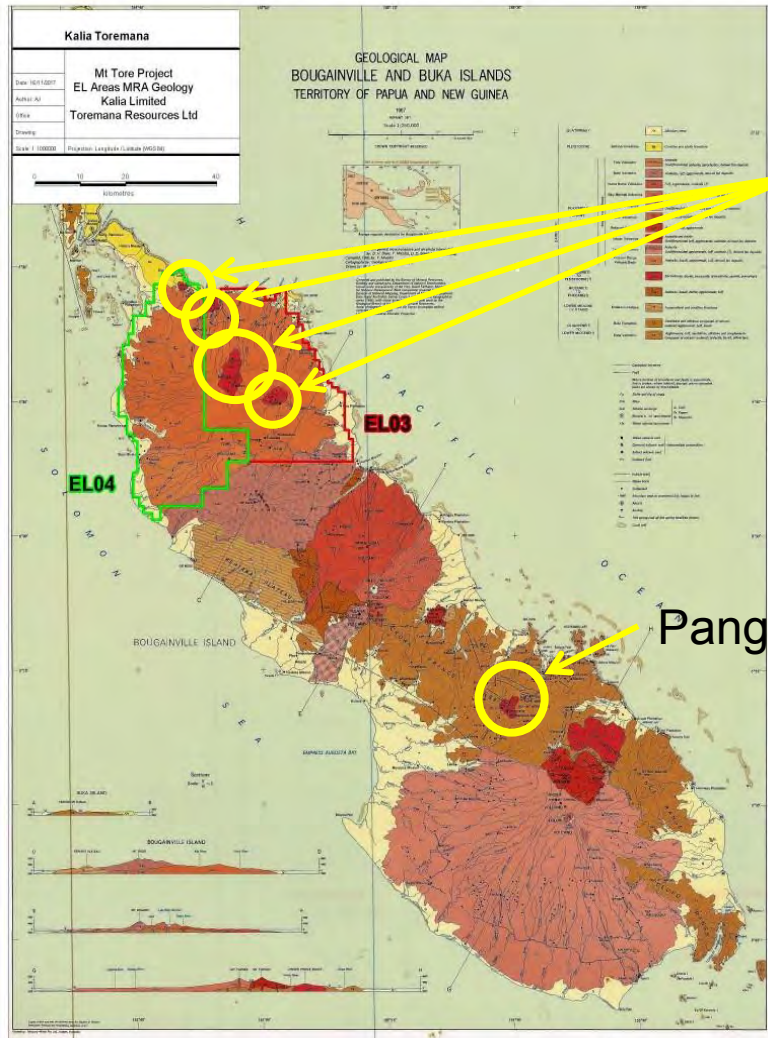


# Copper Results, after Rogerson (1989)

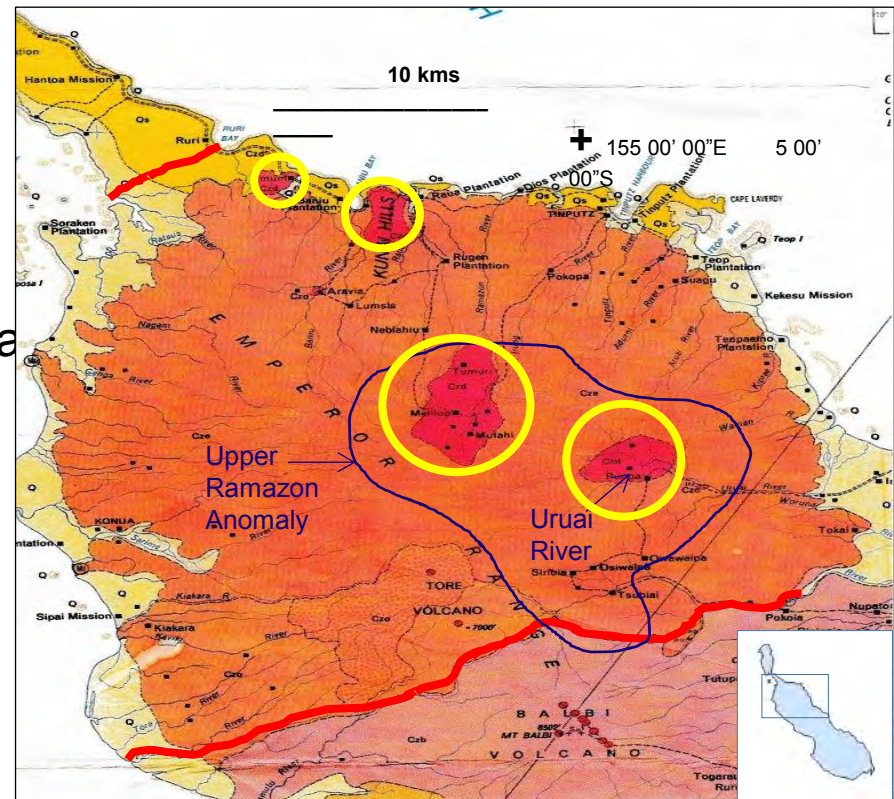




# 4 MRA 1:250,000 Geology within EL areas

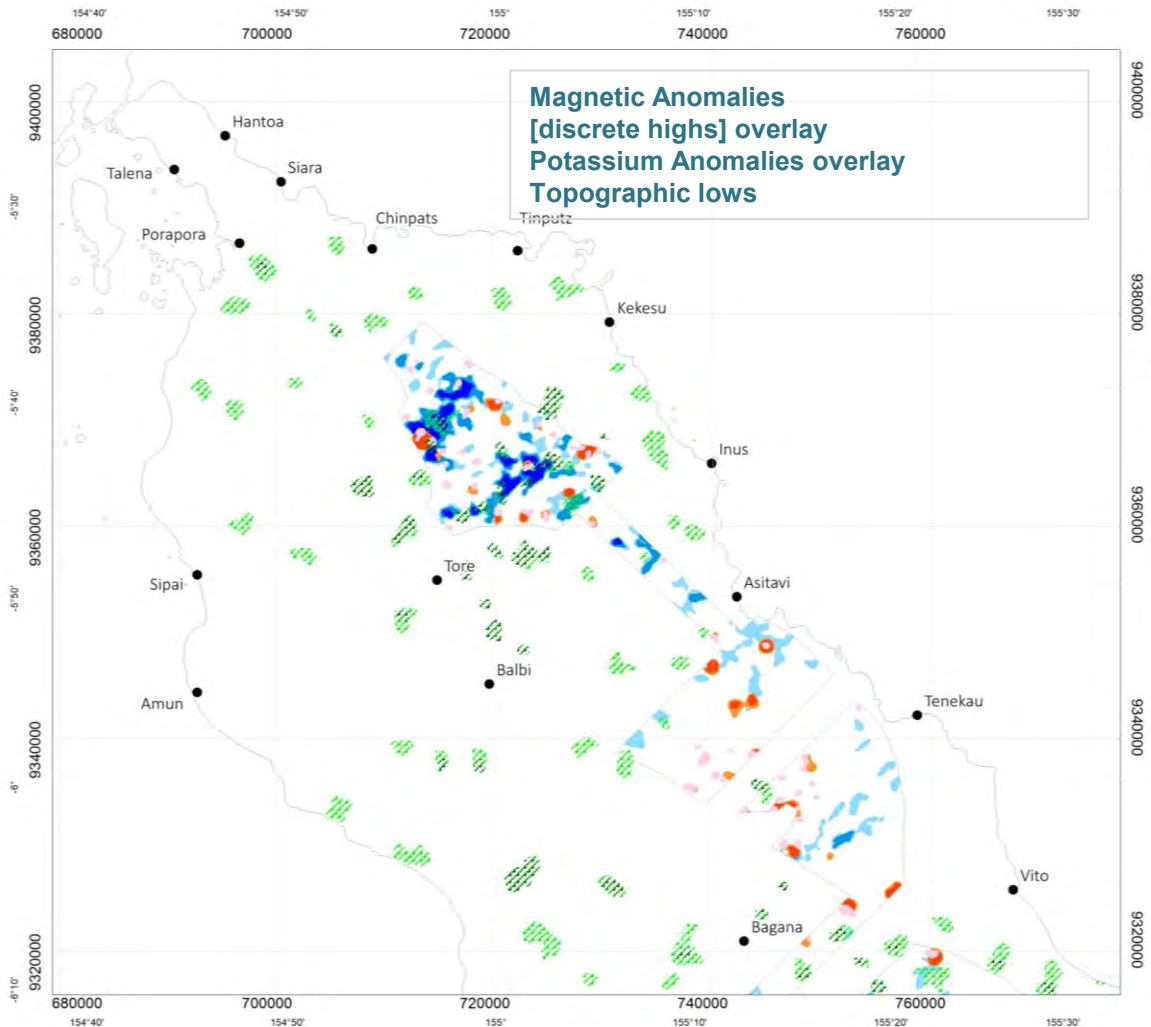


- Panguna styles anomalies identified on EL03
- No geophysics on EL04
- Only 20% of total EL area covered by geophysics



# Targeting Ideas

NORTH



## MAGNETIC HIGHS

- MD 400m HI
- MD 800m HI > 2k
- MD 800m HI > 3k

## POTASSIUM HIGHS

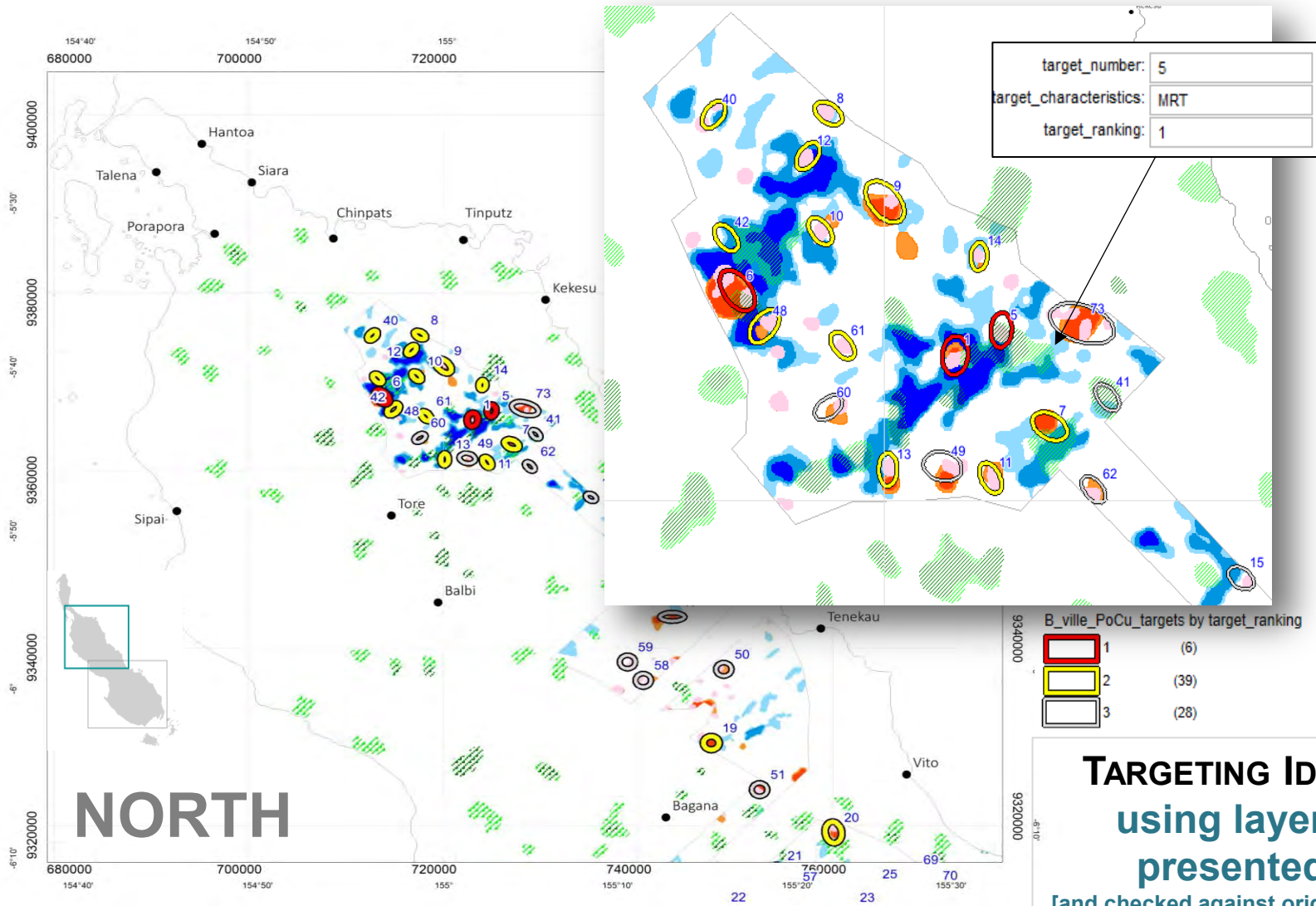
- K Hysteresis thresholding [3 2]
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## TOPOGRAPHIC LOWS

- MI 800 LO
- MD 800 LO

- Using algorithms the geophysical data is assessed to identify discrete anomalies for Magnetic highs (sulphide or metal), Potassium highs (alteration from mineralisation) and Topographic lows (sunken rims of volcanic vents).
- The coincident areas of anomalism are then rated for known geology to generate areas of high interest (next slide).

# Target zone defined





# Work schedule

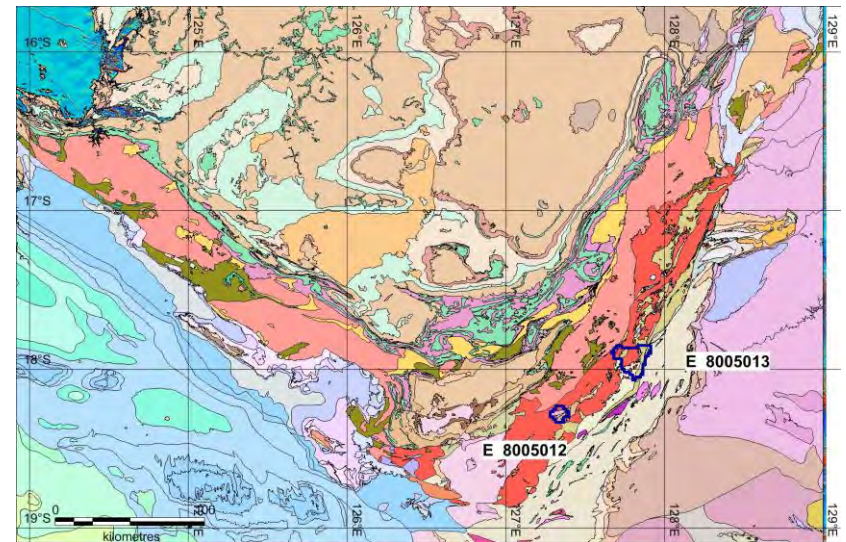
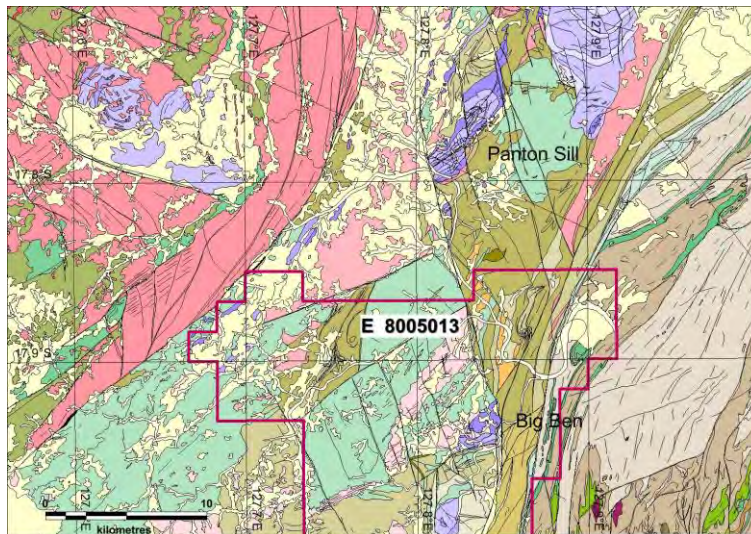
Objective: 1<sup>st</sup> Target definition drilling on receiving positive results from samples (Q2 2018).

Activity	Target
Fieldwork commence Puspa / Rarei - Target sampling, infill stream sediment sampling, soil mapping, wide spaced soil sampling, rock chip sampling	December 2017
2 <sup>nd</sup> Phase social awareness EL04 (West)	December 2017
Complete digitisation of existing data and update Geophysics	December 2017
Assay work with first samples returned to Australia.	December 2017
Commence fieldwork EL04 (West)	February 2018
Environmental studies commence, including establishing weather stations	February 2018
Anthropological studies commences	February 2018
Complete operational base Tinputz	April 2018
Extend airborne Geophysics – 80% not yet covered	Q3 2018

# Other Projects

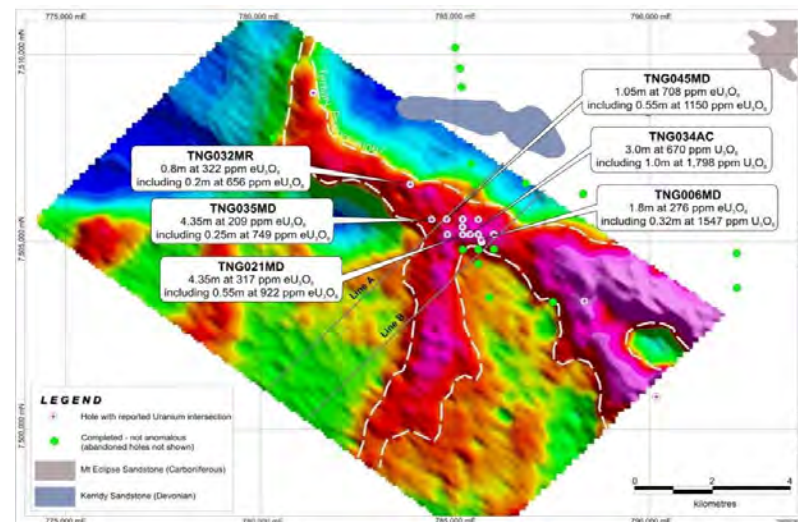
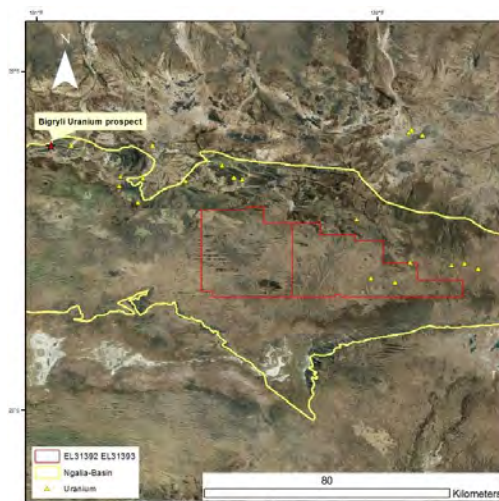
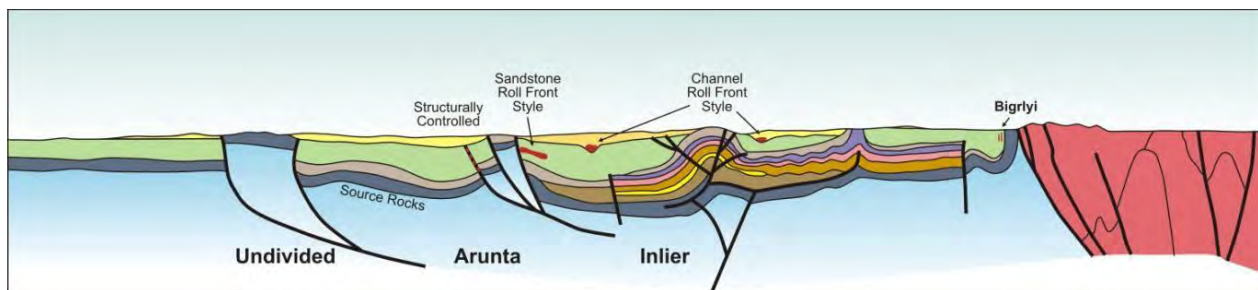
# Kimberley WA

- Targeting copper, chromium and platinum group elements
- Two titles E80\_5012 Mt Angelo and E80\_5013 Armanda River
- Covers Big Ben intrusion, the faulted western extension of the Panton Sill, Tickalara Metamorphics and Koongie Park Formation
  - Historic soil sampling over Big Ben identified anomalous Cr, Pt and Pd values (as per Thundelarra Annual Report 2001)
- Potential of the fertile Tickalara Metamorphics for base-metal, graphite and gold mineralisation
- Native Title agreement signed



# Ngalia NT

- Long term project
- Applications ELA31392 and ELA31393, currently undergoing Native title negotiation
- Targeting ISR uranium mineralisation





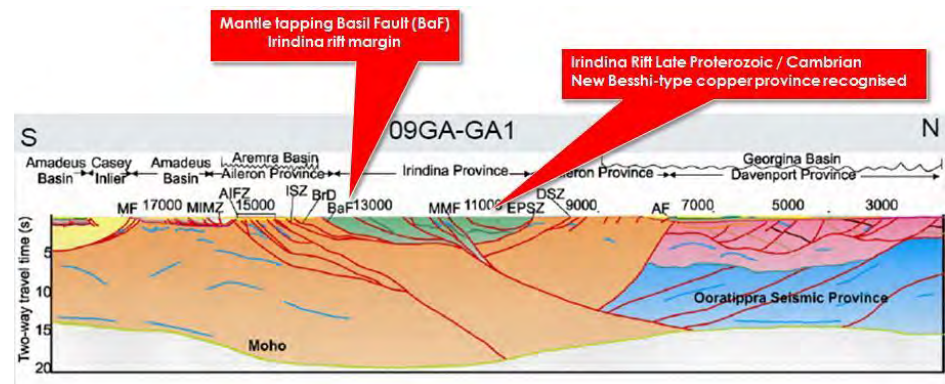
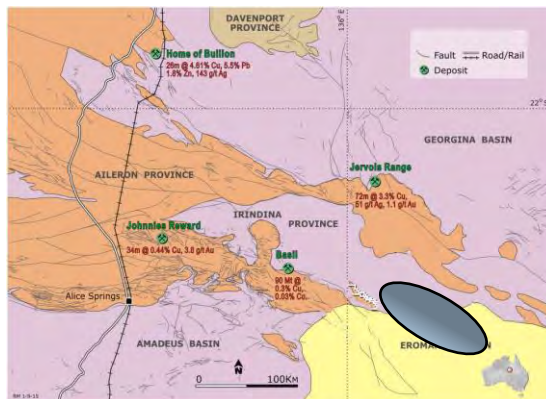
# Indiana NT

- Targeting sulphide mineralisation within the Riddock Amphibolite and later intrusives within the Irindina Province and extensions under thin cover
- Four titles, EL31275, EL31393 and applications ELA31537 and 31542
- Existing Blackadder and Baldrick Cu-Ni-PGE prospects over outcropping copper-bearing gabbro intrusions
  - Blackadder: rock chip assays up to 3.8% Ni and 9.6%Cu
  - Baldrick: rock chip assays 2.3% Ni and 2.4% Cu
- Approximately 15km NE of the Basil Copper-Cobalt sulphide prospect
  - <sup>1</sup>Initial inferred mineral resource estimate
    - 90Mt@0.28%Cu, 0.03%Co at a 0.1%Cu Cut off; or 26.5Mt@0.57%Cu, 0.05%Co at a 0.3%Cu Cut off

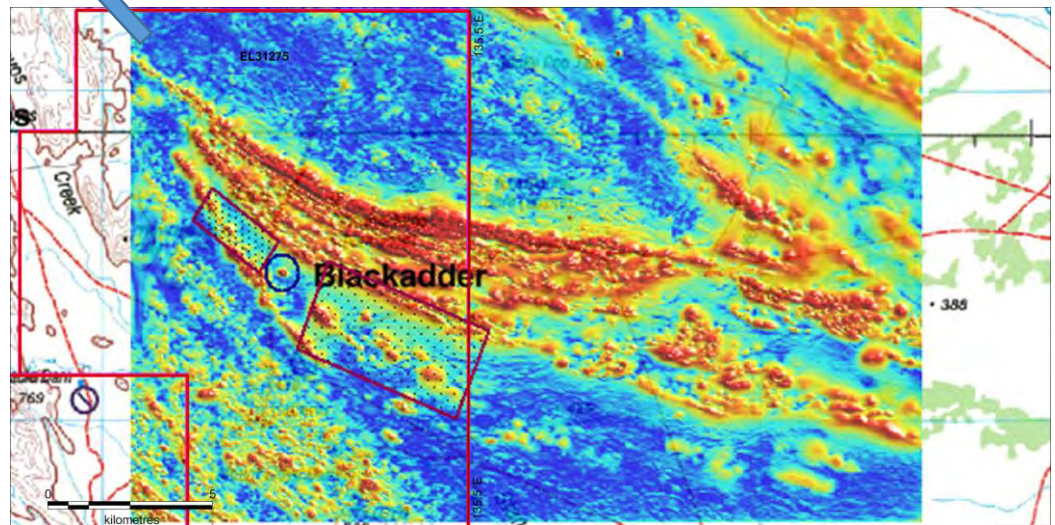
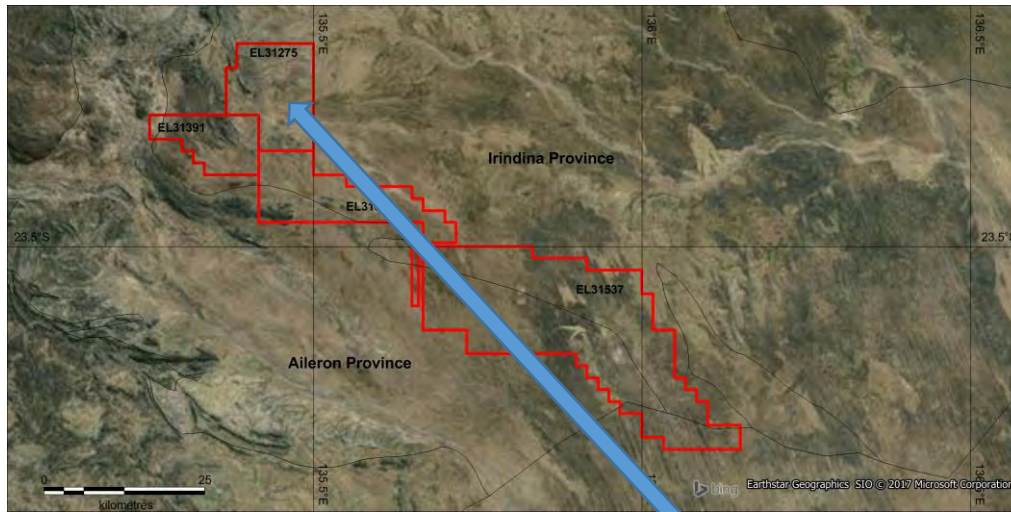
[www.mithrilresources.com.au/pdfs/2012-03-20-22144220120321\\_JORC\\_Basil\\_Cu-Co\\_Resource.pdf](http://www.mithrilresources.com.au/pdfs/2012-03-20-22144220120321_JORC_Basil_Cu-Co_Resource.pdf)

- Noted Lithium-Caesium-Tantalum (LCT) type pegmatites in the province<sup>2</sup>.

<sup>2</sup>Frater KM, 2005. Tin-tantalum pegmatite mineralisation of the Northern Territory. Northern Territory Geological Survey, Report 16



# Indiana NT



# References

- **Geology of Bougainville and Buka Islands, New Guinea**, Blake, D.H. and Miezeitis, Y., 1967.
- **Panguna copper gold deposit**, in Geology of the Mineral Deposits of Australia and Papua New Guinea (Ed- F.E. Hughes) pp1807-1816 (The Australasian Institute of Mining and Metallurgy: Melbourne). Clark, G.H., 1990.
- **Report No. 3, Interpretation of Aerogeophysical data and followup Aerogeophysical anomalies on the island of Bougainville, Papua New Guinea, text volume and Appendix I.** Dr. D. Bering, Prof. Dr. W. Bosum, Dr. K. Busch, F. Plattetschlager, Dr. D. Rammlmair, Dr. R. Robling, B. Stroheker, R. Sumaiang, 1990. (Federal Institute for Geosciences and Natural Resources, Federal Republic of Germany.)
- **Memoir 16: The Geology and Mineral Resources of Bougainville and Buka Islands, Papua New Guinea**, Rogerson, R.J., Hilyard, D.B., Finlayson, E.J., Johnson, R.W. and McKee, C.O., 1989 (Geological Survey of PNG.)
- **Report for the Fourth Field Trip for the North Bougainville Collaborative Research Project, 13<sup>th</sup> February to 07<sup>th</sup> March 2012, Version 2.** Tsiperau, C.U., 2012 (Unpublished).