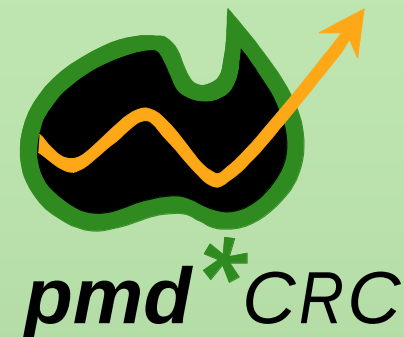
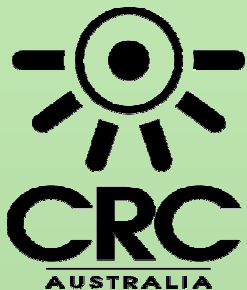
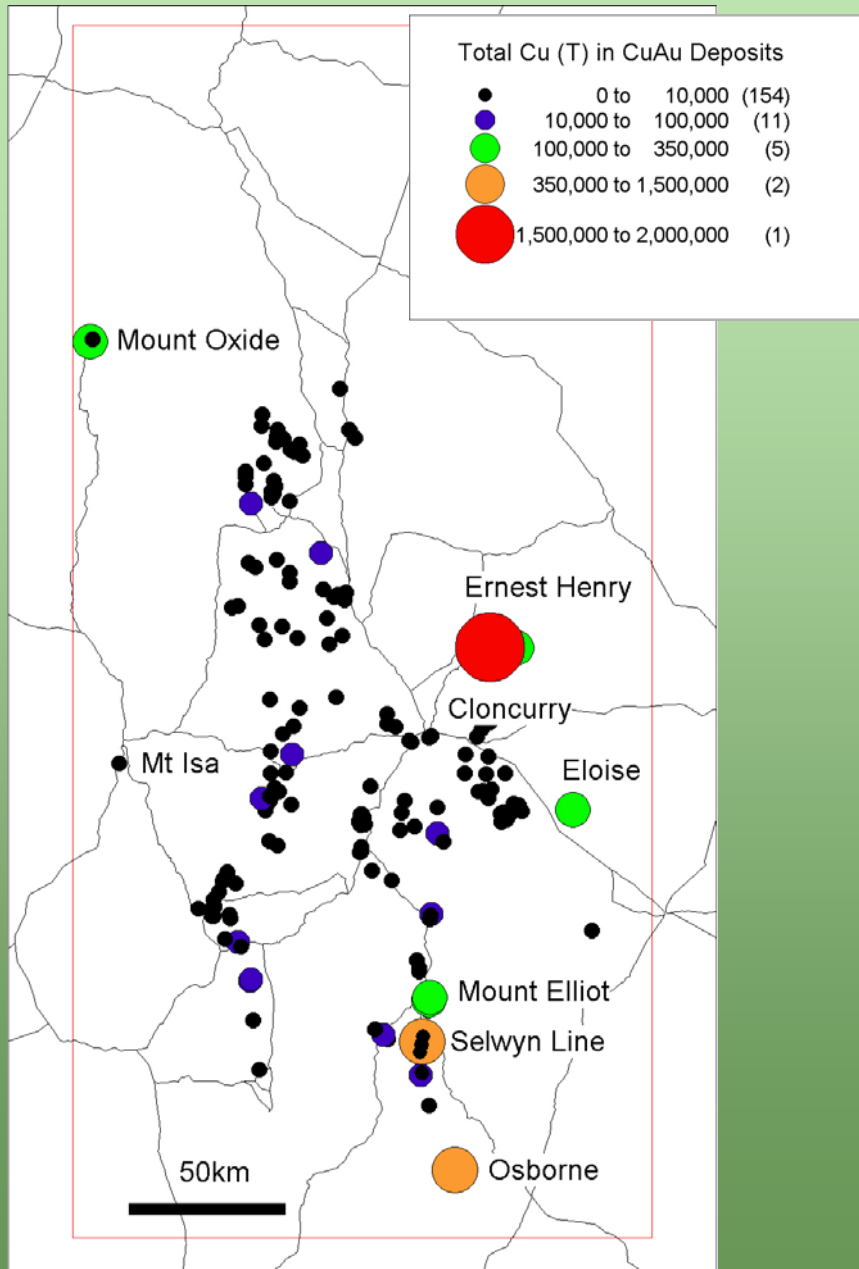




Statistical Evaluation of potential critical ingredients for the IOCG Deposit Model & Melt inclusion Pilot Study

Dr Roger Mustard
James Cook University

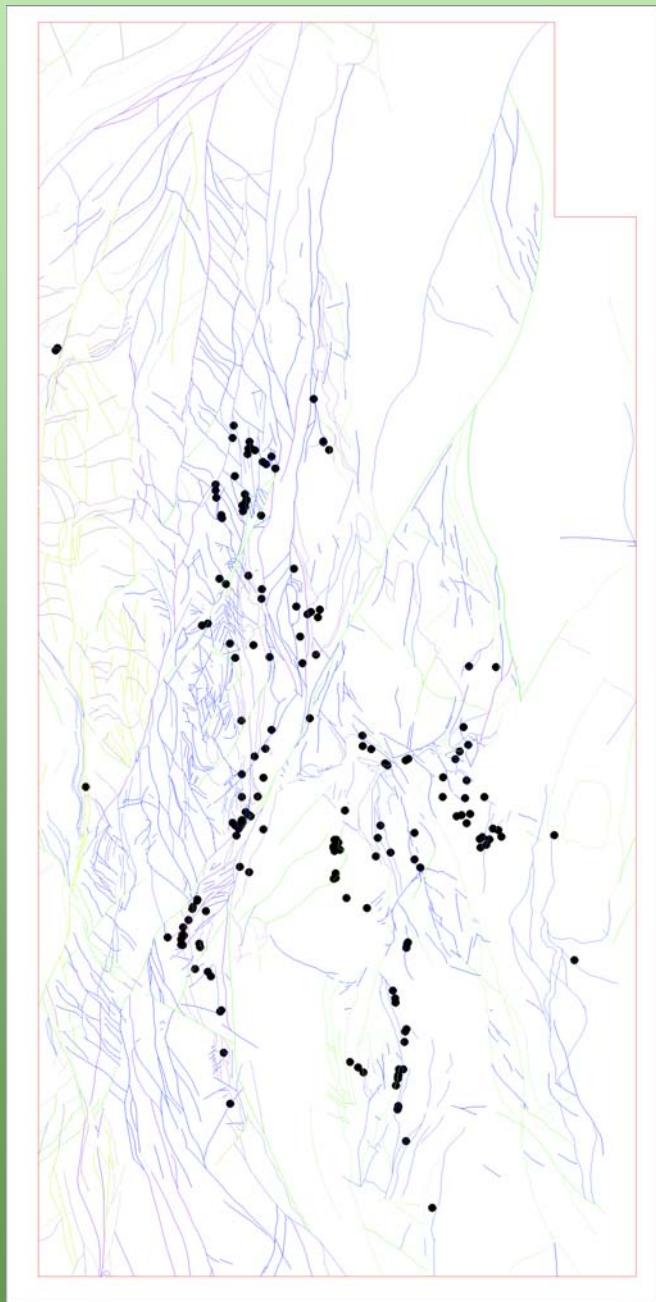




Study Area



- 82,750 km² Area
- Covering most of the future integrated Isa Project area
- Data Set - Northwest Queensland Mineral Deposit Report (2001)
- **Training Data Set** (n=181) including deposits, historical mines and quoted geological resources containing both gold and copper out of 567 known CuAu occurrences. Training data set contains Ernest Henry, Osborne, the Starra line, Mount Elliot and Eloise.

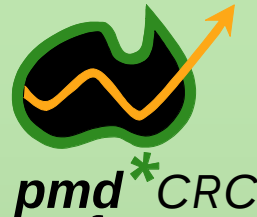


Fault dataset



- Coded for age of movement
- Derived from published 1:250K geological mapping and interpretation from magnetic data
- 3,905 faults initially, when correctly stucked together /joined became 1,854
- Selected all faults for study because of late stage nature of CuAu mineralisation
- Attributed with orientation and length
- Added nodes at 100m intervals to all faults to allow for bend recognition by software

Weights of Evidence



The Contrast C: $\ln\left(\frac{\text{Odds of a deposit given the presence of...}}{\text{Odds of a deposit given the absence of....}}\right)$

$C > 0$ - Greater association than by chance

$C = 0$ - Chance association

$C < 0$ - Less association than by chance

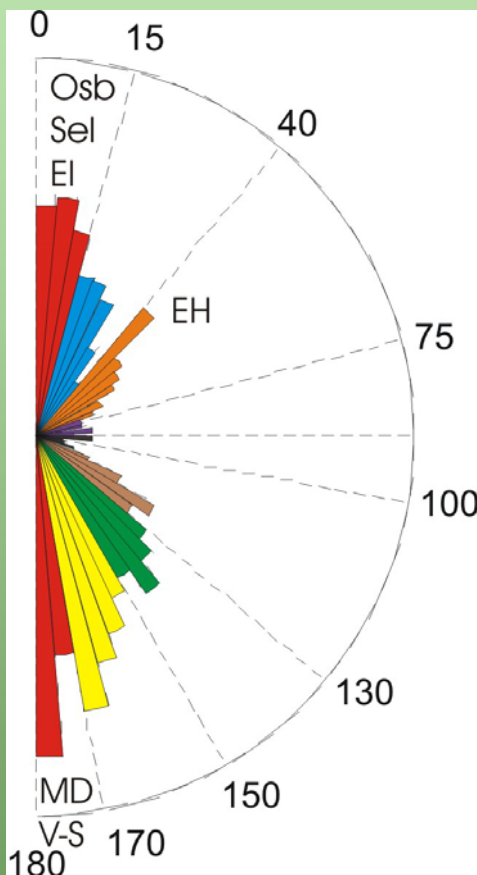
As a rule of thumb, Contrast > 0.5 is considered significant

The Confidence (StudC):

As a rule of thumb, Confidence > 1.5 is considered to have a significant spatial association

Confidence is best used as a relative indicator of spatial correlation

Fault Orientations



Orientation	Area (km ²)	Min Occ	Contrast	Confidence
NS (350-15°)	21,265	108	1.45	9.59
ENE (40-75°)	8,339	58	1.43	9.02
SSE (150-170°)	16,834	102	0.95	6.26
NNE (15-40°)	11,851	53	0.91	5.55
EW (75-100°)	2,389	9	0.56	1.65
ESE (110-130°)	5,935	21	0.53	2.28
SE (130-150°)	9,434	29	0.39	1.94

- Summary statistics for all faults (n=1,854) from the Isa project area.

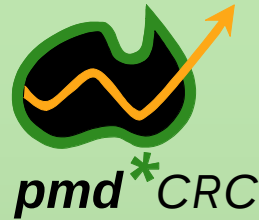
Fault Bends



Orientation	Area (km ²)	Min Occ	Contrast	Confidence	
ENE (All)	2,648	22	1.43	6.29	*Ernest Henry
ENE (Clockwise)	1,691	19	1.73	7.12	
ENE (Anti-clockwise)	1,783	17	1.55	6.08	
SSE (All)	4,836	31	1.31	6.62	
SSE (Clockwise)	2,796	19	1.21	4.99	
SSE (Anti-clockwise)	2,863	21	1.30	5.59	
N-S (All)	5,594	34	1.16	6.10	*Eloise
N-S (Clockwise)	1,857	13	1.21	4.22	
N-S (Anti-clockwise)	3,671	21	1.05	4.44	
NNE (All)	2,857	14	0.85	3.06	
NNE (Clockwise)	1,830	11	1.05	3.38	
NNE (Anti-clockwise)	1,857	13	1.22	4.22	
SE (All)	2,960	13	0.74	2.55	
SE (Clockwise)	1,848	8	0.71	1.95	
SE (Anti-clockwise)	1,883	6	0.39	0.93	
ESE (All)	2,056	7	0.46	1.18	
ESE (Clockwise)	1,429	6	0.67	1.61	
ESE (Anti-clockwise)	1,292	4	0.35	0.70	
E-W (All)	1,209	8	0.36	3.15	
E-W (Clockwise)	799	7	1.42	3.68	
E-W (Anti-clockwise)	842	5	1.02	2.24	

- ENE trending fault bends have highest contrast and are associated with the largest known Cu-Au deposit

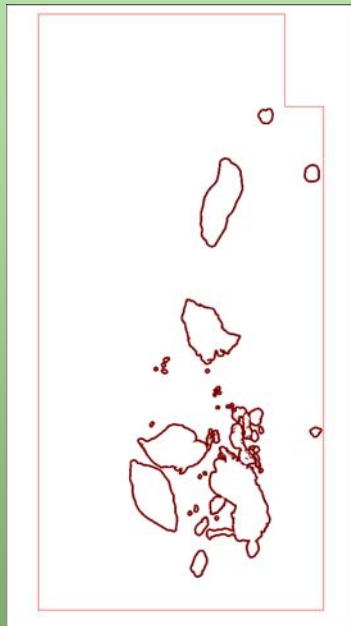
Fault Intersections



Orientation	Area (km ²)	Min Occ	Contrast	Confidence
ENE & All	2,670	25	1.57	7.29
SSE & All	5,125	38	1.39	7.63
NNE & All	4,225	30	1.31	6.54
N-S & All	6,804	41	1.19	6.67
ESE & All	2,341	9	0.59	1.71
E-W & All	1,043	7	1.15	2.98
SE & All	3,656	20	0.99	4.17

Orientation	Area (km ²)	Min Occ	Contrast	Confidence
ENE & SSE	799	13	2.07	7.19
NNE & SSE	1,448	13	1.47	5.1
N-S & ENE	1,094	11	1.58	5.06
ENE & NNE	738	8	1.64	4.52
NNE & NS	1,576	11	1.21	3.87
SSE & SE	880	7	1.32	3.42
ENE & E-W	234	3	1.77	3.04
ENE & SE	305	3	1.52	2.61
NS & ESE	1,112	6	0.92	2.22
NS & EW	402	3	1.24	2.13
NS & SE	1,849	8	0.71	1.95
SSE & E-W	285	2	1.17	1.65
NNE & SE	871	4	0.75	1.49
SSE & ESE	596	2	0.43	0.61
ENE & ESE	259	1	0.57	0.57
NNE & E-W	87	0	0	0
NNE & ESE	532	1	-0.15	-0.15

Key Ingredients of 5 Layer Model

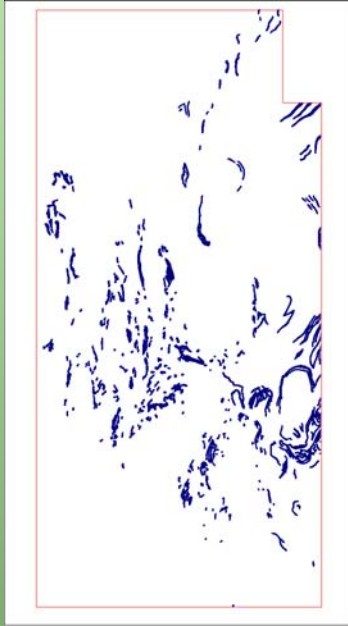


Granite
Intrusives

1500m buffer

Training n=20

Area =754km²

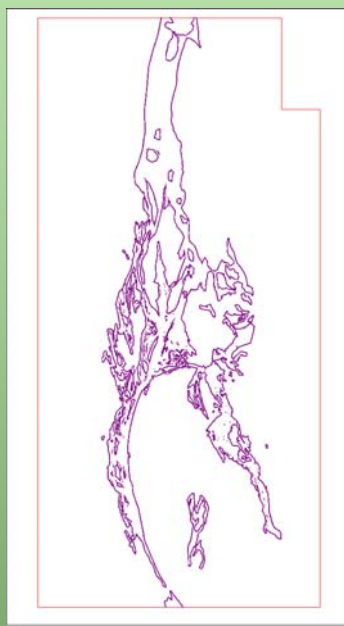


Mafic
Intrusives

750m buffer

Training n=29

Area =4300km²

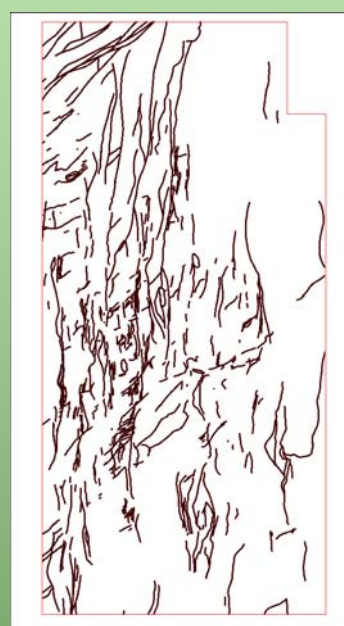


Corella –
Soldiers Contact

750m buffer

Training n=43

Area =3826km²



NS and ENE
trending Faults

600m buffer

Training n=64

Area =9423km²



Magnetic Highs

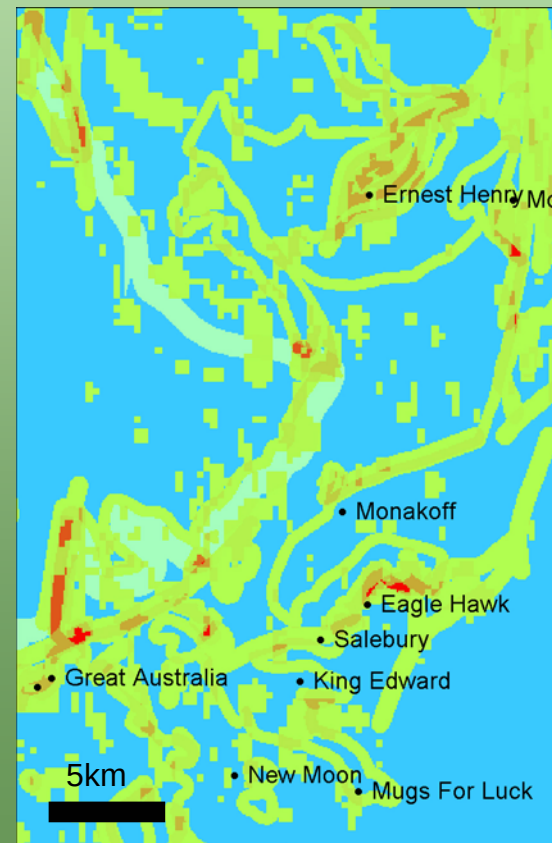
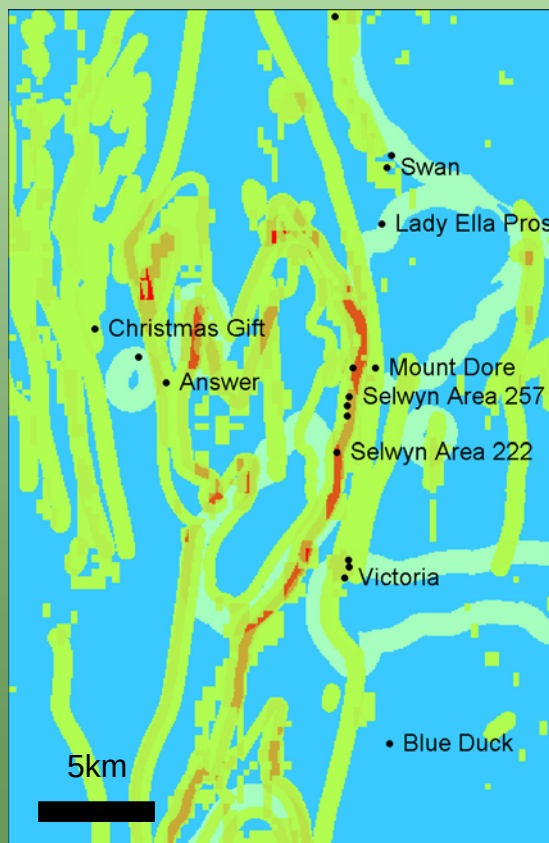
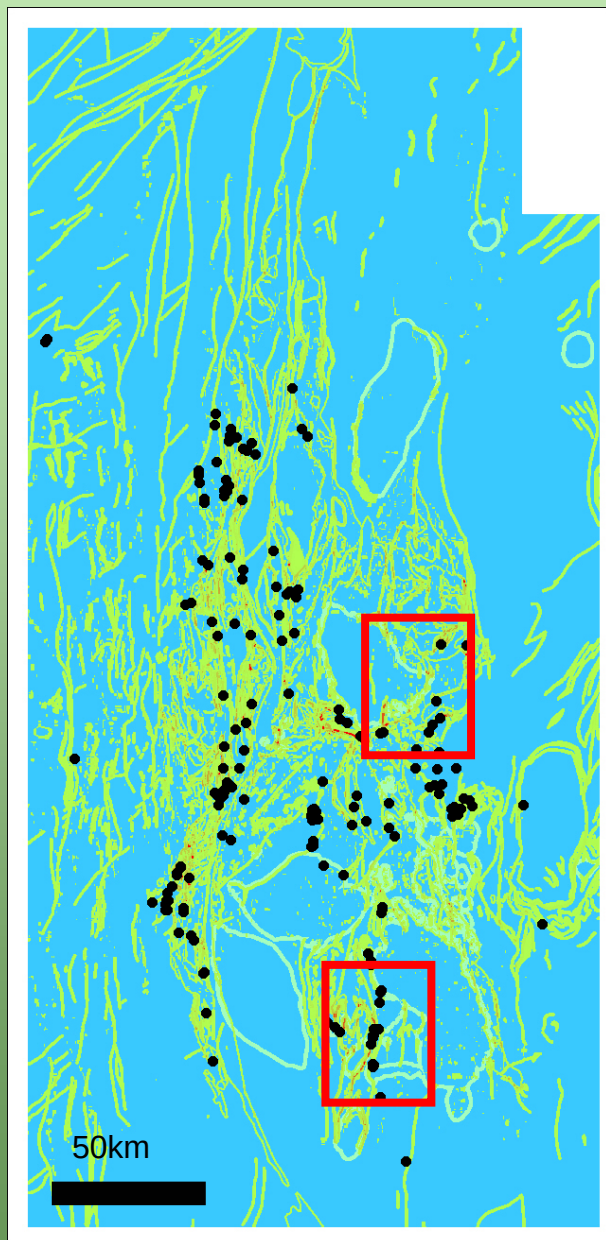
Training n=43

Area =1123km²

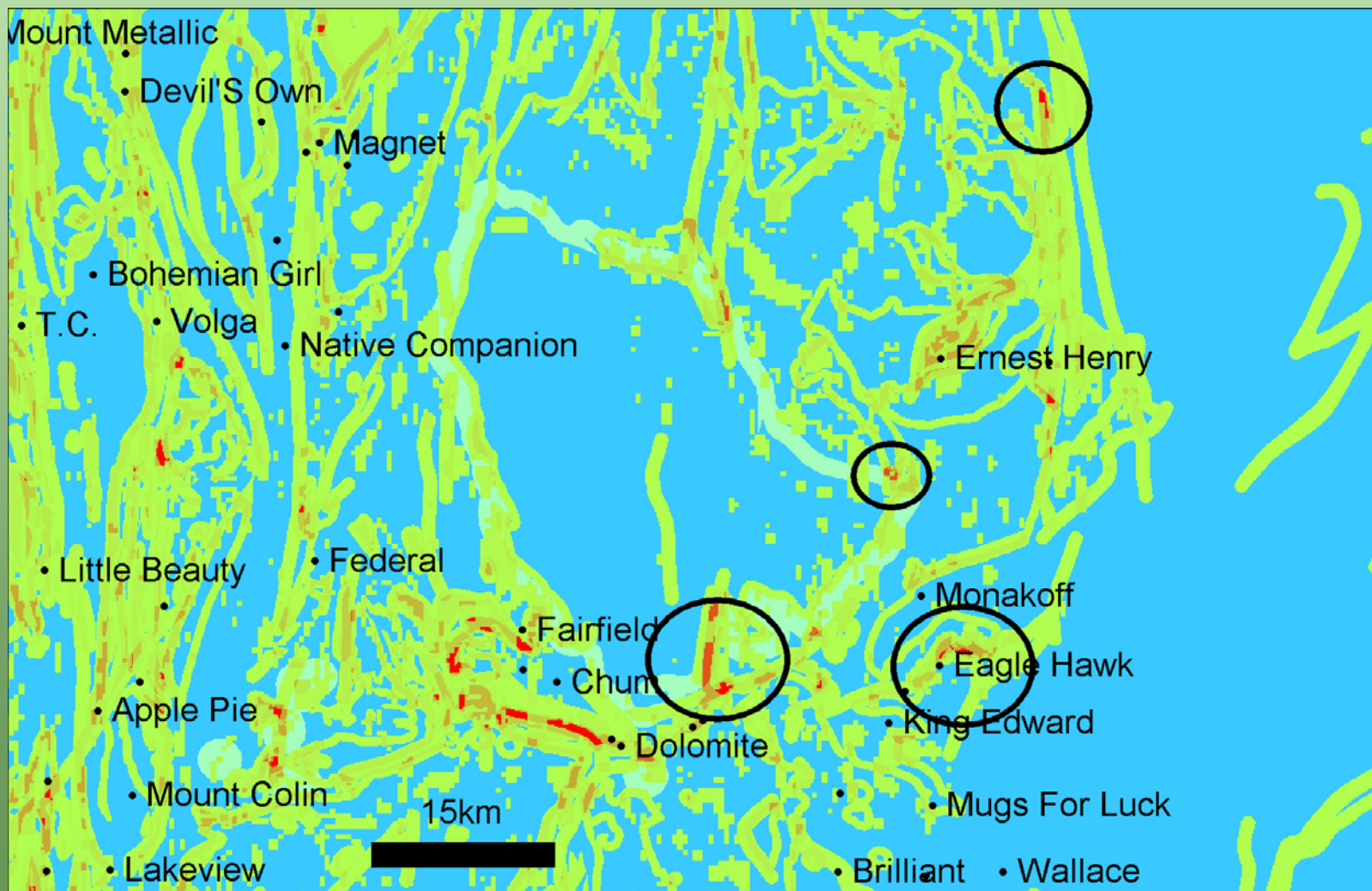
5 Layer Model

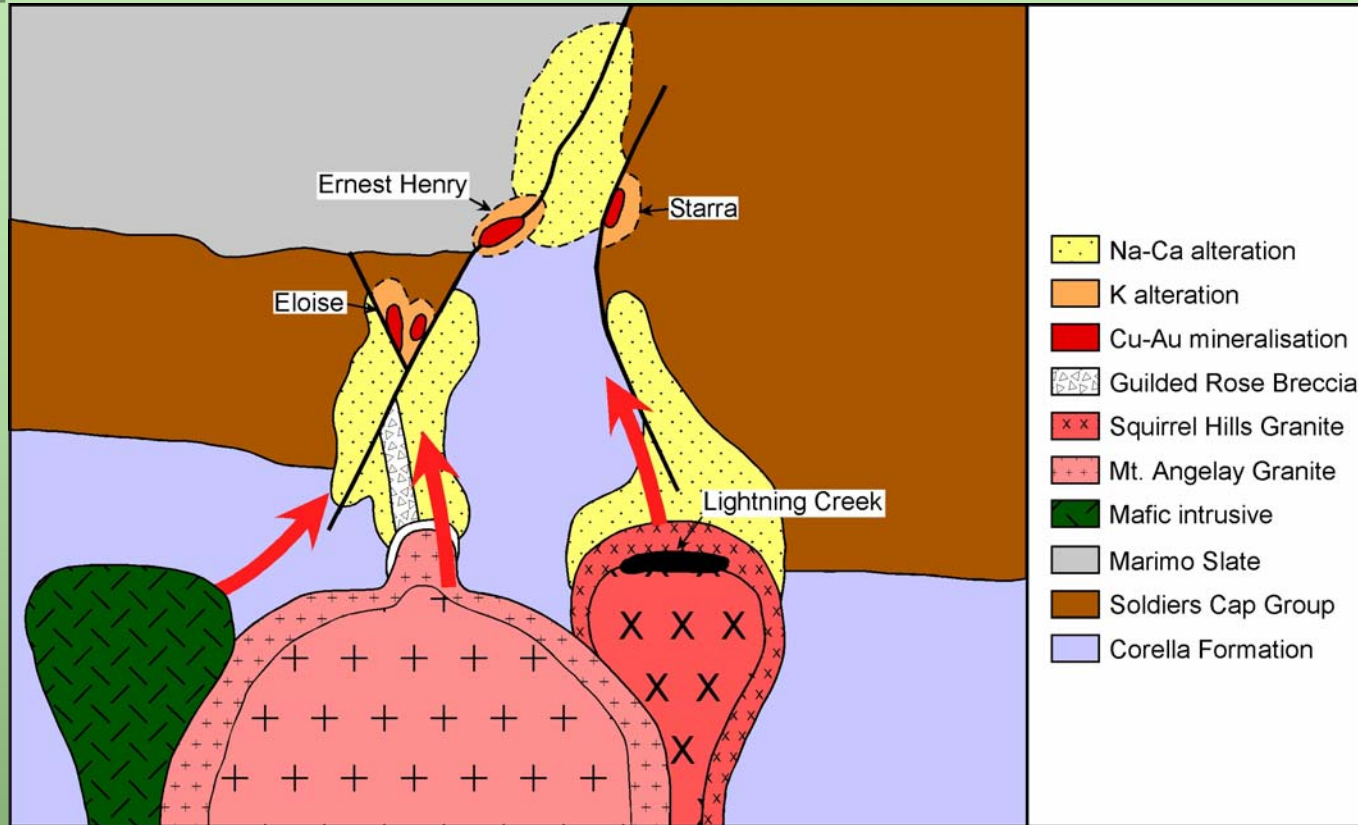


- Highlights Ernest Henry as largest sized ENE trending anomalous body
- Selwyn corridor forms the most prominent continuous linear anomaly extending for 40km (~14km under cover)
- Numerous specific targets highlighted



Areas of Interest

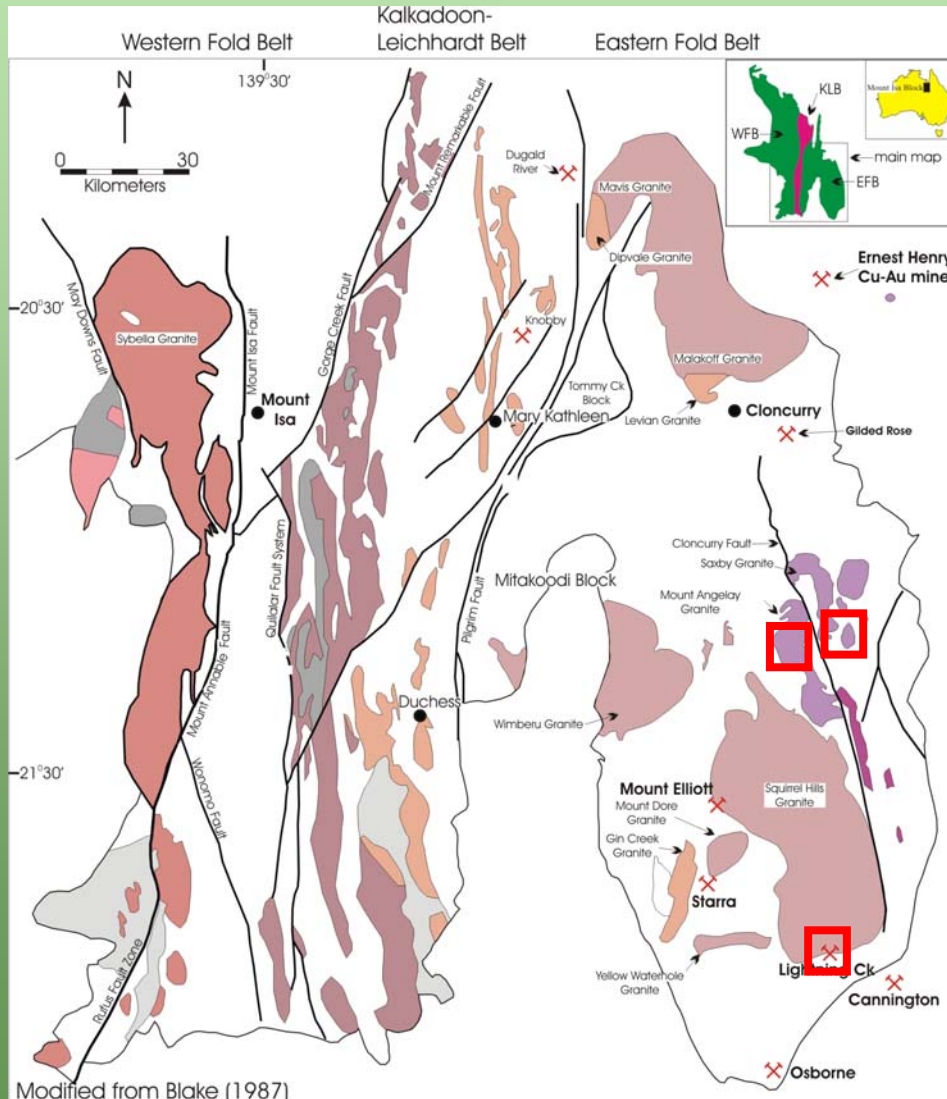




Contrast is best used as a relative indicator of spatial correlation

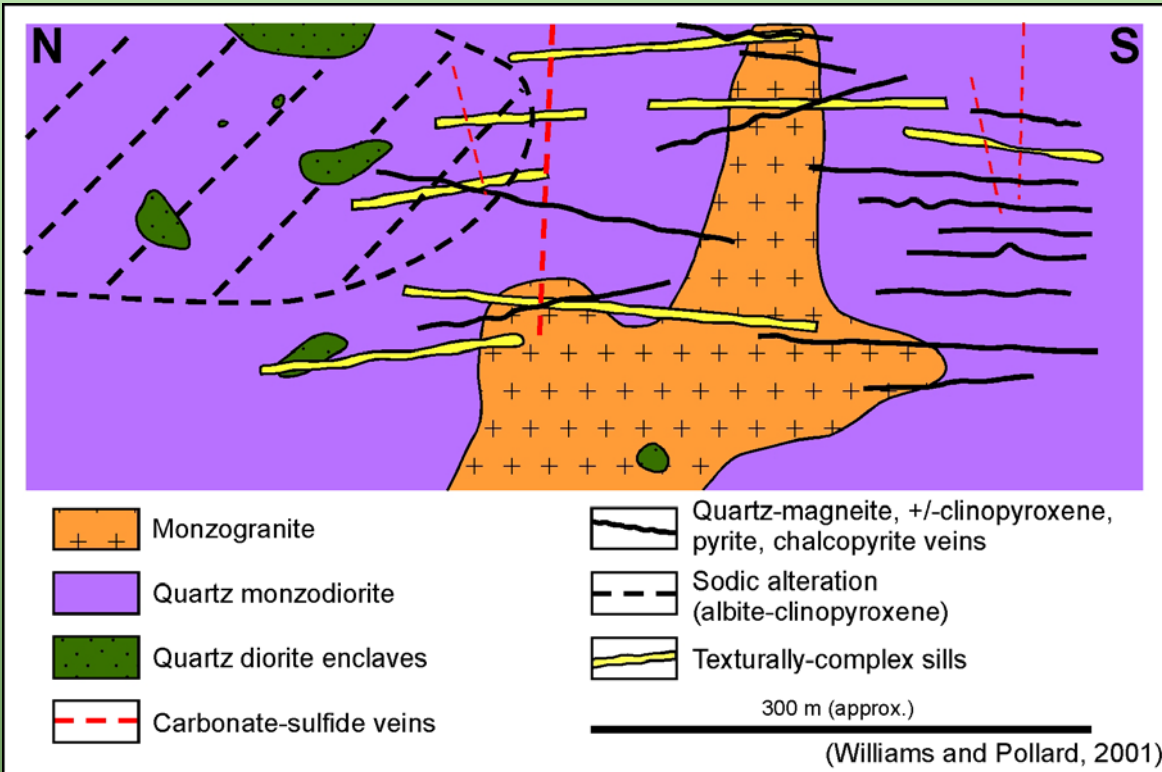
Key Ingredients	Contrast	Confidence
Faults (NS & ENE)	1.45	17.20
Magnetic Highs (Mgt?)	1.82	14.36
Corella /Soldiers Cap	1.87	13.97
Mafic Intrusives	1.24	7.47
Felsic Intrusives	0.73	2.38

Melt Inclusion - Pilot Study



- Thin sections prepared for initial localities:
 - Lightning Creek
 - Whiley Igneous Complex
 - Mt Angelay Igneous Complex
- Are melt Inclusions present?
- Rapidly determine their metal contents using LA ICP-MS
- Is there a stage of granite evolution where the metal content of the melt is high?

Lightning Creek



- Late stage fluid inclusions in sperulitic aplite dykes contains up to 1 wt. % Cu.

