The Genesis and Exploration Potential of IOCG and Base Metal deposits, Eastern Succession, Mount Isa Inlier

The Role of Mafics

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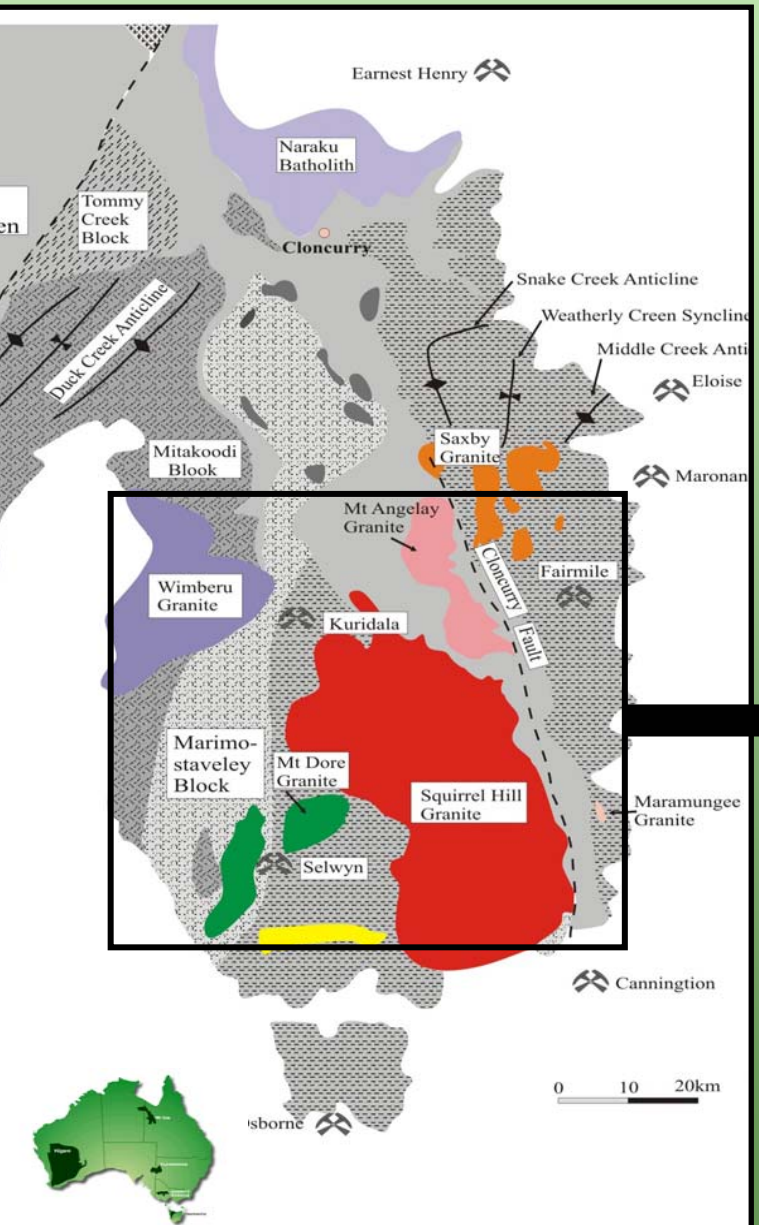
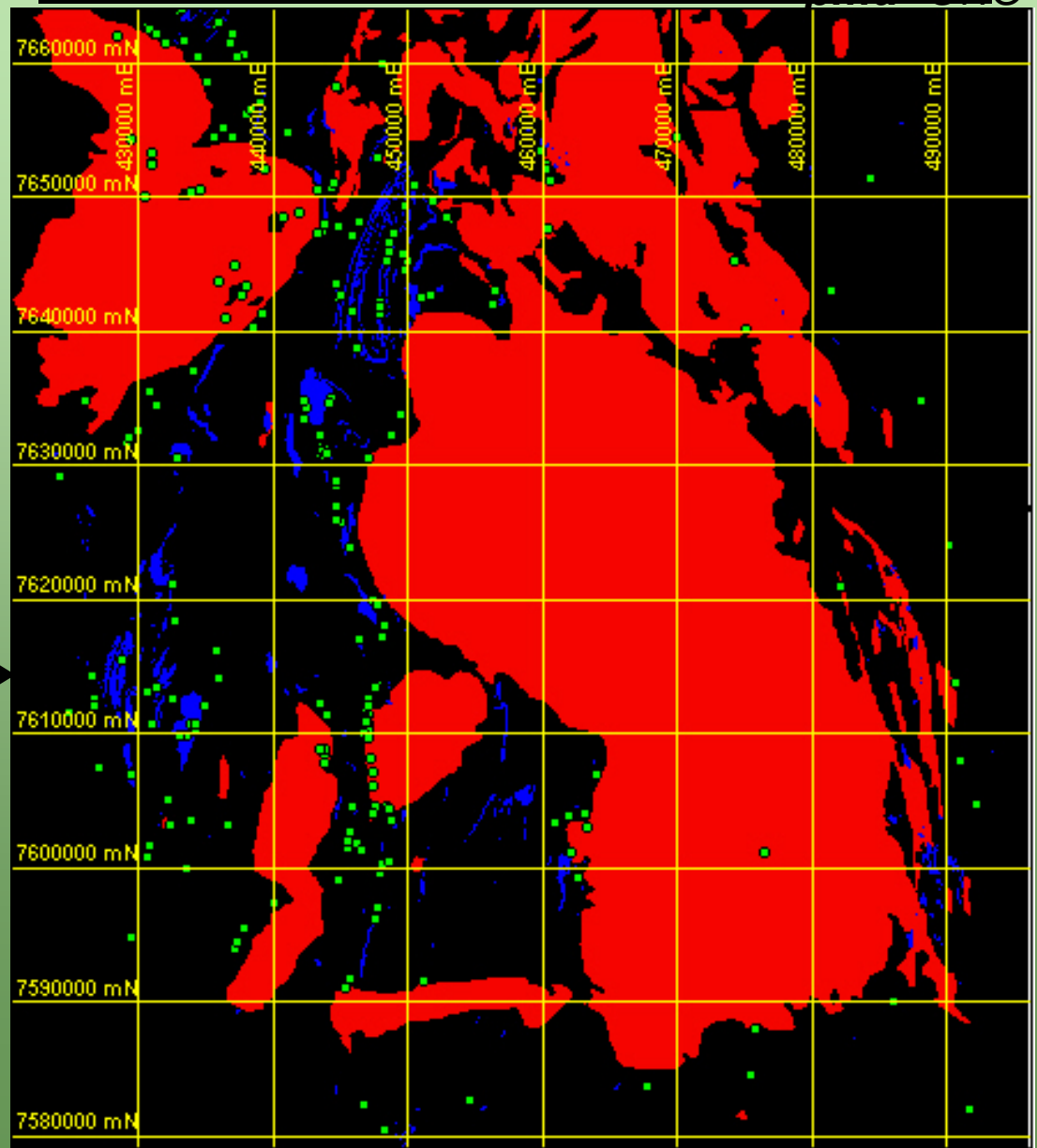
The Genesis and Exploration Potential of IOCG and Base Metal deposits, Eastern Succession, Mount Isa Inlier

- Study Area
- Mafic Rocks
- Spatial and Process Relationships of Mafics and Mineralisation
- IOCG Deposit Models
- Exploration Potential

Study Area

Blue – Mafics Green – Mineral Dep Red - Granites





Mafic Rocks - Geochemistry

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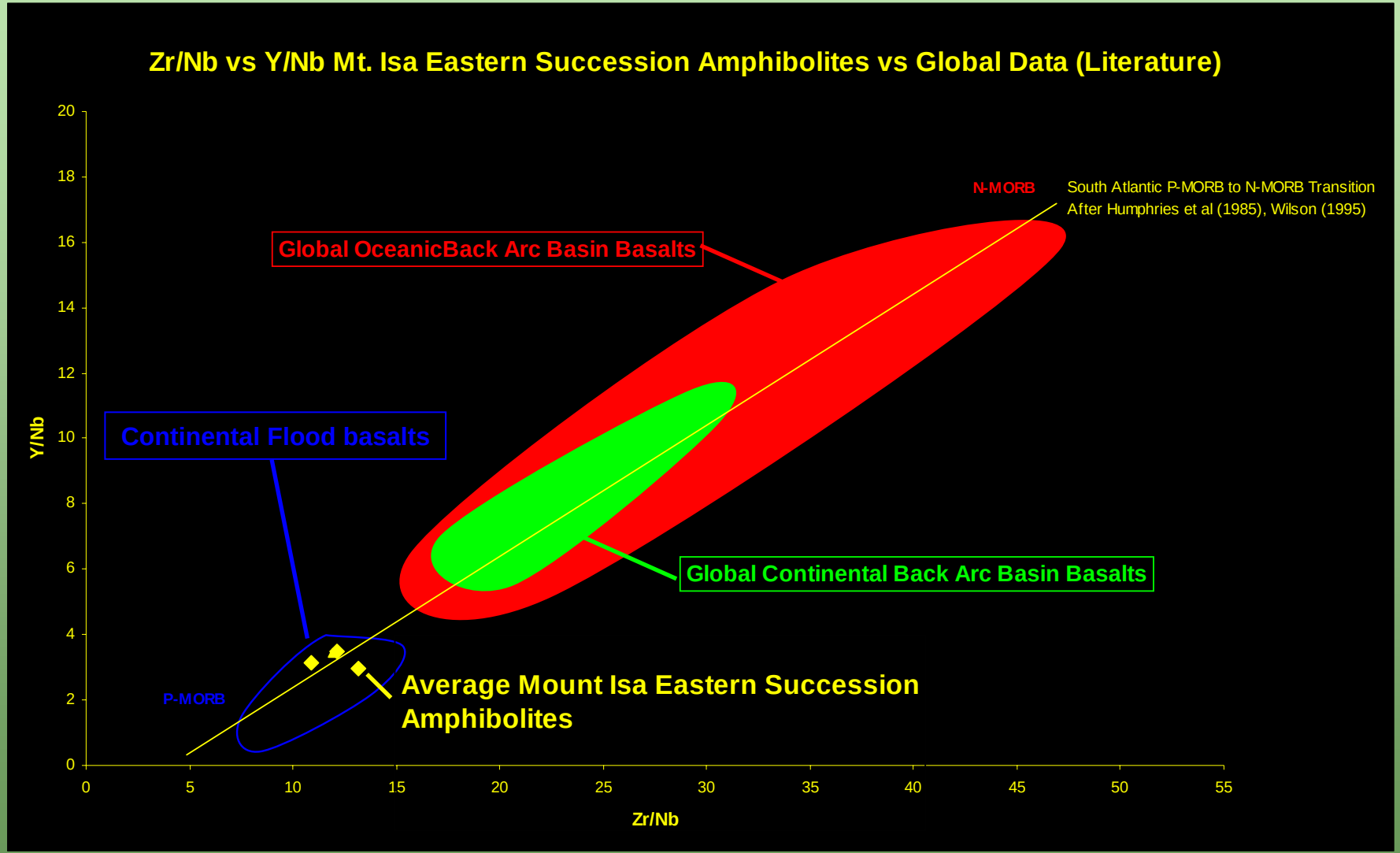

Fractal Analysis

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Fractal Analysis of the spatial distribution of Mafic Rocks and all Mineral Deposits was performed over the study area

- The fractal dimensions of mineral deposits and mafics over the study area are the same within error.

- This is strongly permissive of a genetic relationship between mafics and mineralisation

	Regression Limits (km)		Number (Deposits)	Fractal Dimension	Standard Error	Correlation Coefficient
	Min	Max	N	D	E	R
Mafics	8.53	34.2	-	1.43	0.0357	0.997221
Deposits	8.53	34.2	240	1.43	0.0468	0.99523

Weights of Evidence

Weights of Evidence Results

INSIGNIFICANT
SIGNIFICANT
HIGH
VERY HIGH

All Granites	All Deposits	Larger Deposits	Ironoxide Cu Au	Cu Deposits	Au Deposits
Distance	3.25-3.5km	INSIGNIFICANT	INSIGNIFICANT	1.25-1.5km	1.25-1.5
Contrast	1.41	INSIGNIFICANT	INSIGNIFICANT	1.19	2.29
Confidence	5.28	INSIGNIFICANT	INSIGNIFICANT	3.45	5.07
NumPoints	15	INSIGNIFICANT	INSIGNIFICANT	9	6

Mafic Dykes	All Deposits	Larger Deposits	Ironoxide Cu Au	Cu Deposits	Au Deposits
Distance	0-250m	0-250m	250-500m	0-250m	0-250m
Contrast	1.99	1.77	1.71	1.7	1.2
Confidence	14.2	4.09	3.48	8.2	2.5
NumPoints	71	7	5	30	5

Major Faults	All Deposits	Larger Deposits	Ironoxide Cu Au	Cu Deposits	Au Deposits
Distance	0-100m	0-100m	0-100m	0-100m	0-100m
Contrast	1.23	3.03	2.18	1.23	2.21
Confidence	5.62	7.92	4.76	4.06	5.2
NumPoints	23	11	6	12	7

The IOCG Family - Mafics and Faults

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Faults that intersect 1km buffers of mafic dykes:

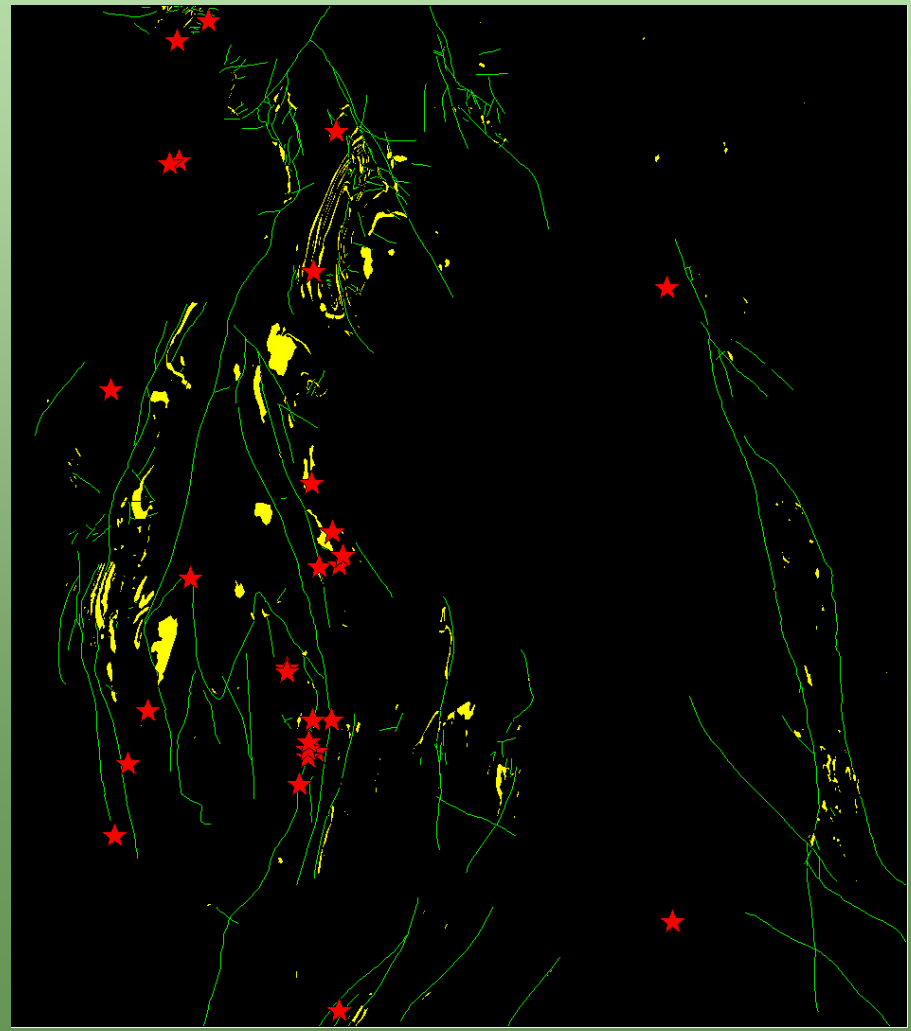
(29 Ironoxide Cu Au Deposits)

0-250m

Contrast = **7.78**

Confidence = **18.73**

n = 8



Yellow = mafics,
Red Stars = IOCG Deposits
Green Lines = Faults

Spatial Distributions & The Process Link

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Fractal Analysis and Weights of Evidence of the spatial distribution of a number of rock, deposit and fault types is strongly permissive of a genetic relationship between IOCG and Base Metal mineralisation and mafic rocks.

- **Mafic rocks and mineral deposits share the same degree of clustering – their fractal dimensions are the same within error**
- **Mafic rocks show the strongest spatial relationship of all rock types studied with All Deposits and Base Metal Deposits**
- **Mafic rocks also show a high correlation with IOCG and Larger Deposits**
- **Faults that intersect areas of mafic rocks are excellent predictors of IOCGs**

- **Preliminary Petrographic and Geochemical studies indicate that sulphur (in the form of primary magmatic sulphides) is removed from the mafics in areas of alteration (& amphibolitisation). These observations, in addition to the Spatial Analysis, add creditability to the process model of**

Mafics as the source of Sulphur for ore deposits.

Sulphur Availability

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Mass fraction calculations for sulphur in all known deposits within the study area were compared to a number of calculations of sulphur sequestering from of the mafics. This was used to test the notion that mafics were the source of sulphur for mineralisation

Total Mineralisation = 3.34Mt Cu (334Mt Ore @1%ave grade), Requires ~ 6.5Mt Sulphur

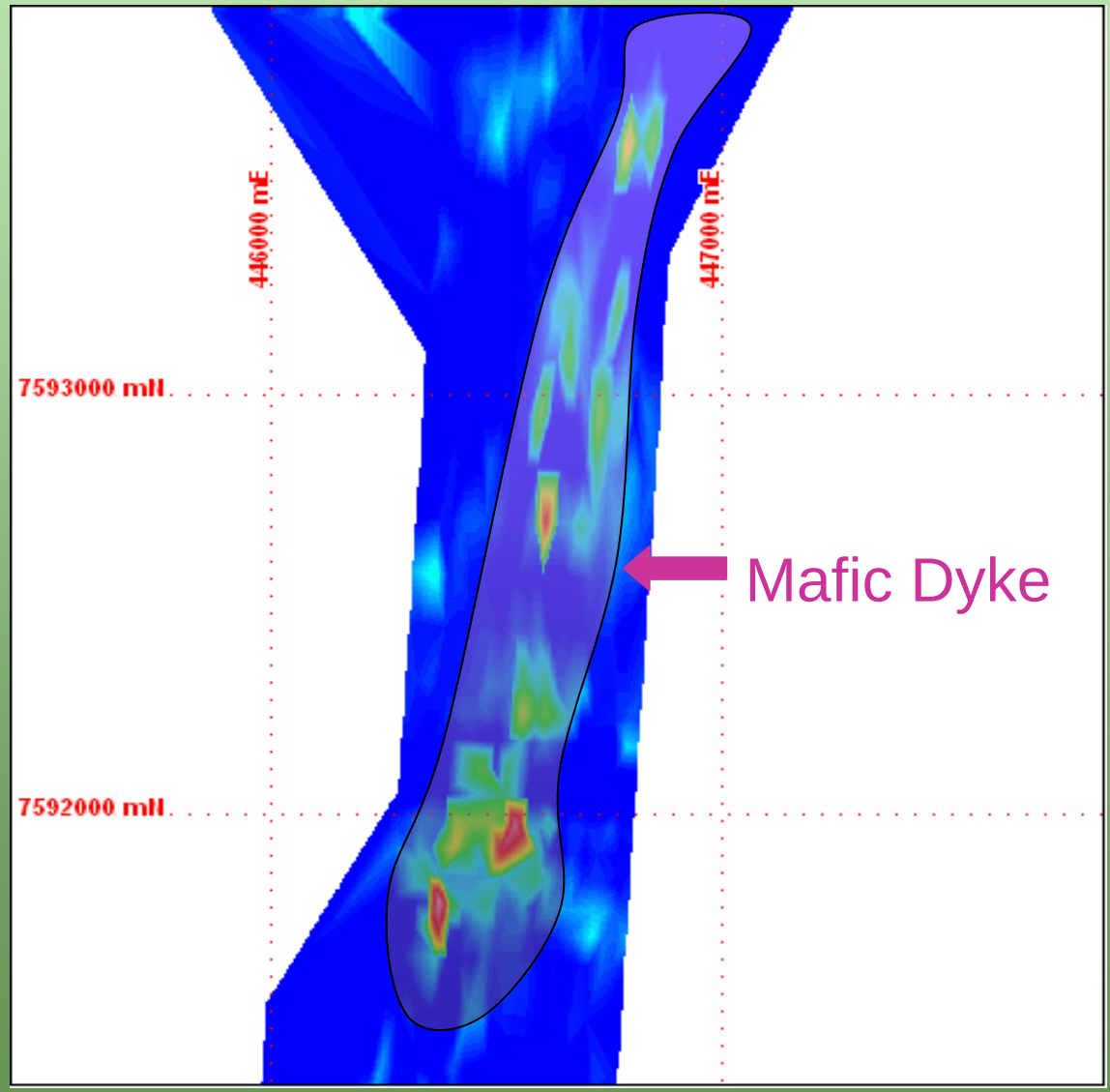
Total Surface Area of Mafics = 98sq km (average density ~2.8t/m^3)

Sulphur Availability @ initial S concentration at 100ppm, thickness (depth) of mafic unit from which S extracted of 1000m, with a 30% extraction efficiency would yield ~ 8Mt Sulphur (enough for mineralisation)

A more realistic calculation of 150ppm initial S, 7500m depth (Soldiers Cap group), 70% extraction efficiency = 216Mt Sulphur

***enough S to supply ~120Mt Cu or 12000Mt Ore @ 1%Average Cu (6kt Au @ 0.5g/t)**

Soil Geochemistry Observations



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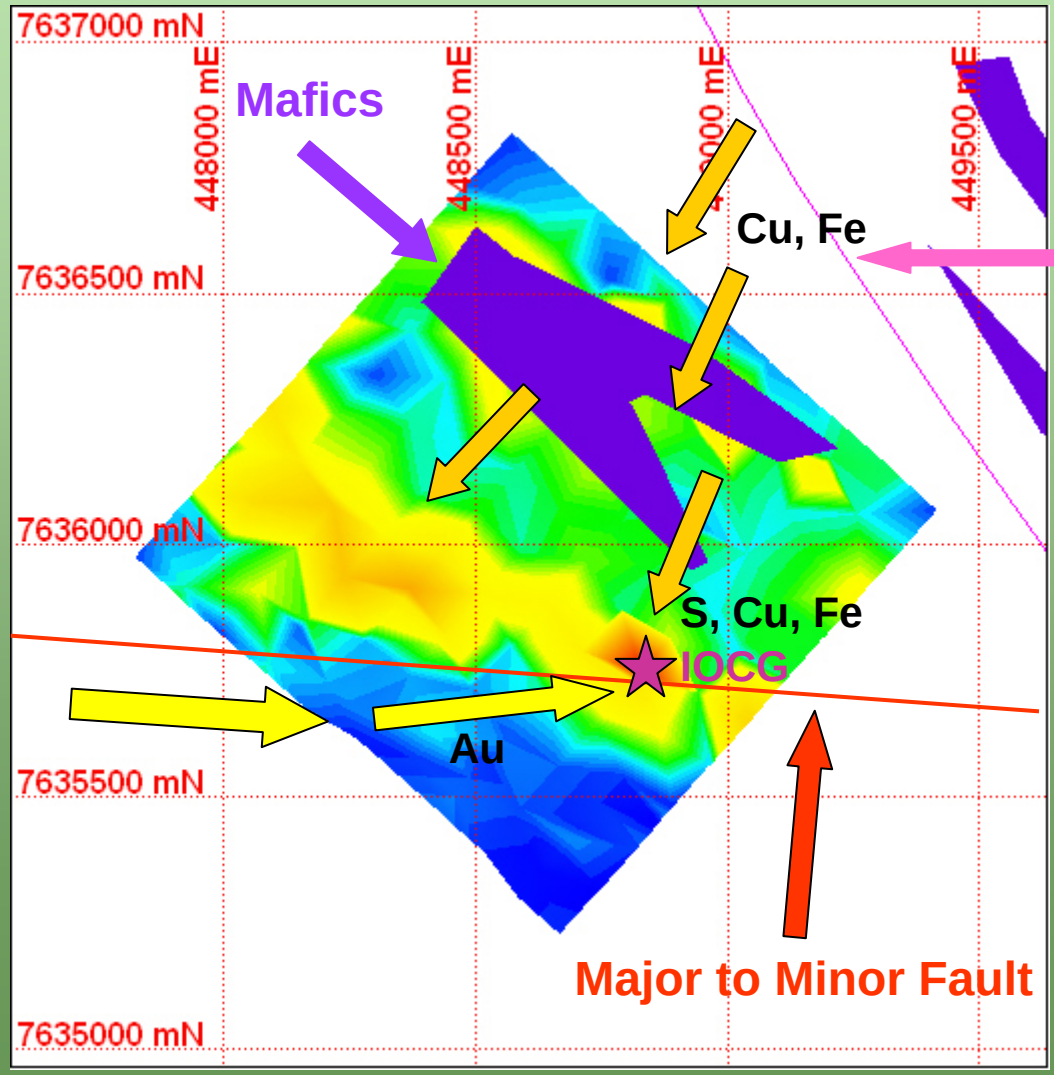
Preliminary IOCG Genesis Model



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Predictive Mineral Discovery:
Exploration Philosophy

Mineralisation Potential

α

Volume of Mafics + Plumbing System

OVER ANY GIVEN AREA

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Predictive Mineral Discovery: Exploration Potential

- Calculations indicate that there is enough sulphur available to supply ~12 Billion Tonnes of Ore
- Areas proximal to Mafics remain underexplored
- Exploration Potential = Very High

Predictive Mineral Discovery: Exploration Potential

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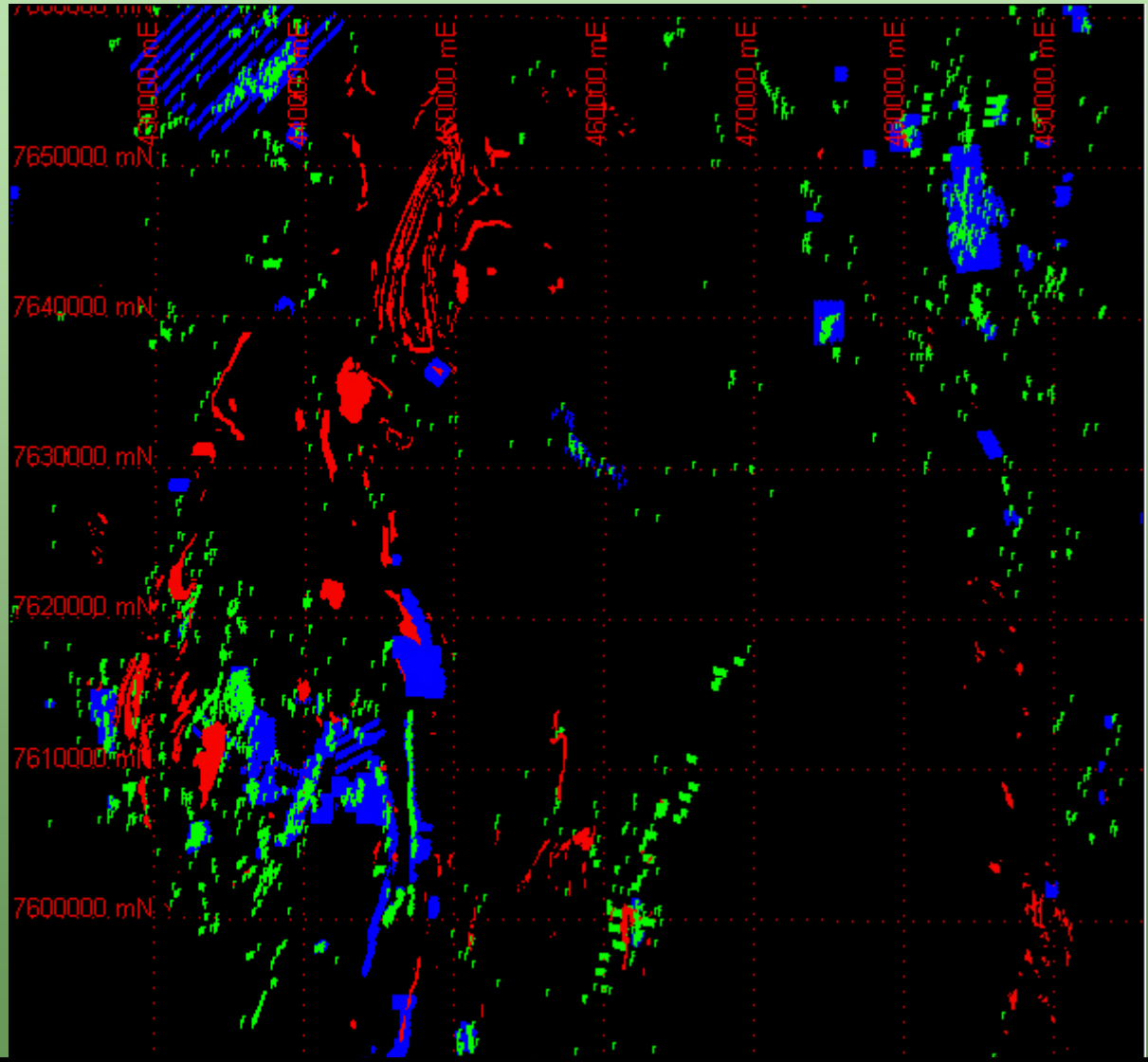

Blue = Soil Geochem, Green = Rock Chip Geochem, Red = Mafics