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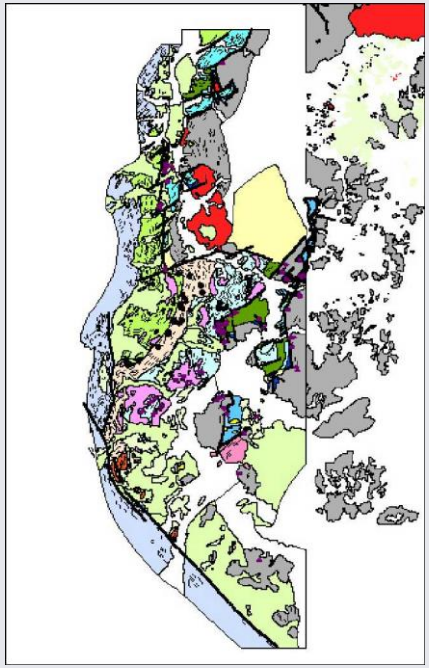
Commercial Application of Spatial Data Modelling with Examples from North Queensland

How to Improve Your Chances of Success?

The Practical Implication Of High Discovery Risk For Strategic Planning & Exploration Budgeting Is A Large Difference Between The Average Cost Of Exploration Success And The Level Of Funding Required To Ensure Success (e.g. - "World Class" Deposits)

Discoveries Are Typically Made By The 5th-7th Person/Company Covering The Ground

Key to Exploration



- Exploration Value Chain.
- Requirement to Get from Regional to Prospect Scale Quickly and Cheaply.
- Scale Dependent.
- Map Key Evidence of Mineral System Processes.
- Identify Highly Prospective Targets for Additional Data Collection.

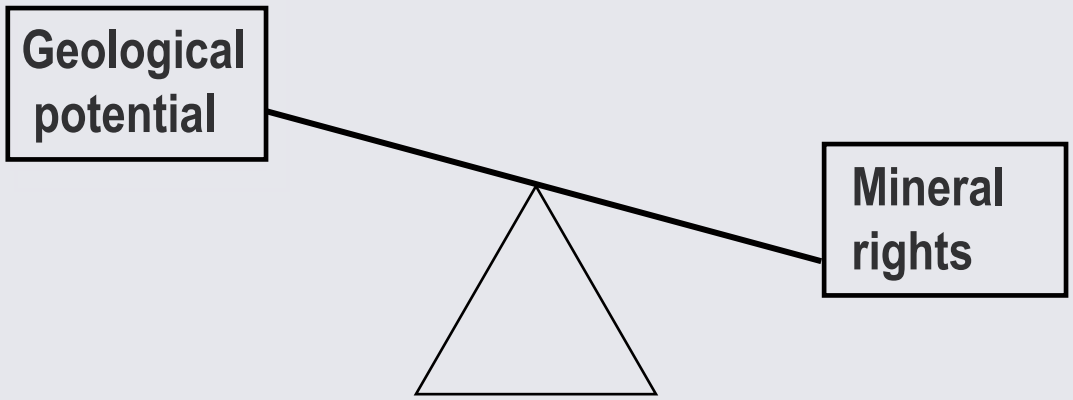
Geological Potential – Main Risk For Exploration

- Investment Criteria No. 1:

  - *geological potential and geological information*

- Investment Criteria No. 2:

  - *land access, sovereign risk – value of mineral rights*



Assessing Prospectivity

- Most Common form of Targeting is Subjective Either for Where and What to Explore or Who to Invest in.
- This Leads to Wide Range of Prospectivity Estimates That Include Personal Bias and Experience.
- No Consensus on New Work and Investment Required for Each Project.
- No Way of Comparing Projects Held by Different Companies with Differing Geology and Economics.
- Assessments Can Not be Repeated or Independently Verified.

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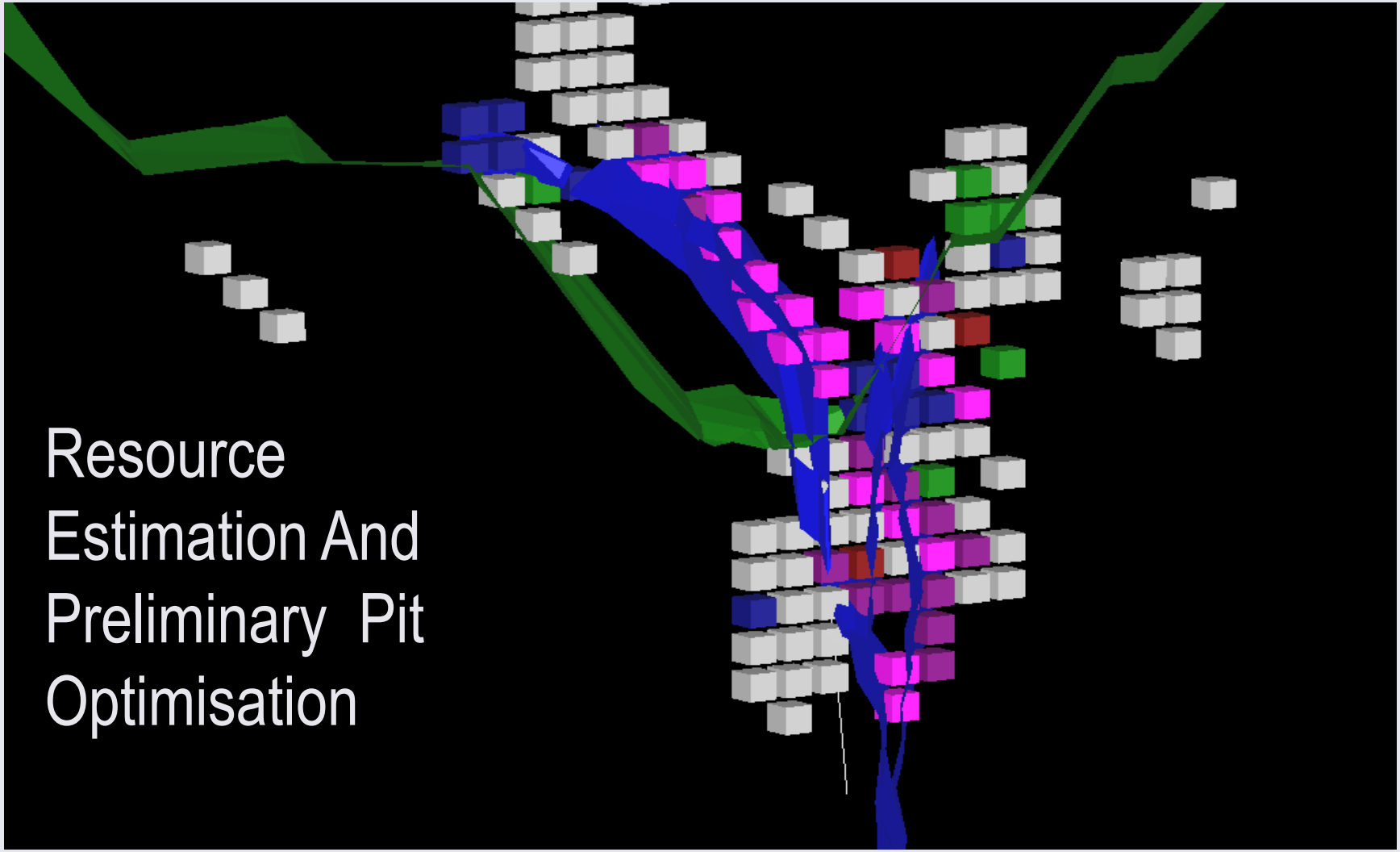
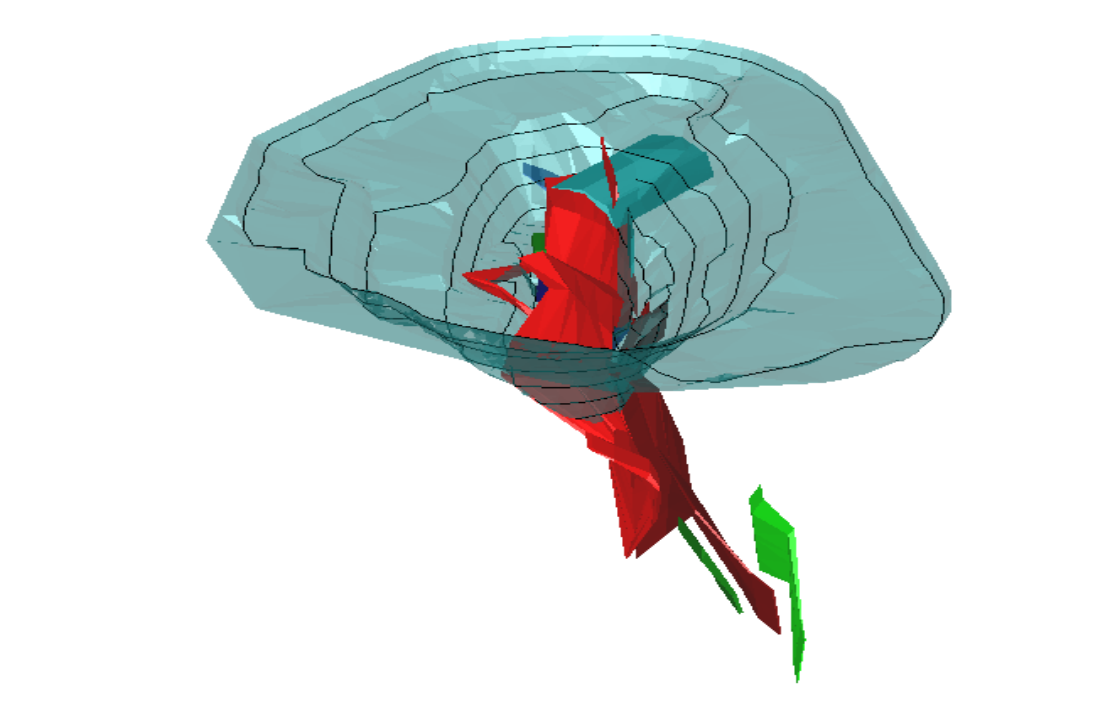
We Measure Metal Content



Reserve Estimation: We Predict Financial Performance

Optimisation, Financial Risk Profile, Reserve Calculations



Geological Potential Has to Be Measured not Guessed!!

- You Would Not Guess What the Grade and Tonnes of a Resource is After Spending Millions of Dollars on Drilling, Assaying and Geological Logging
- Why Would You Guess the Prospectivity and Rank of Exploration Targets after Spending Millions of Dollars on Collecting Geophysical, Geochemical and Geological Data?
- Tools and Techniques are Now Available to Make These Measurements.

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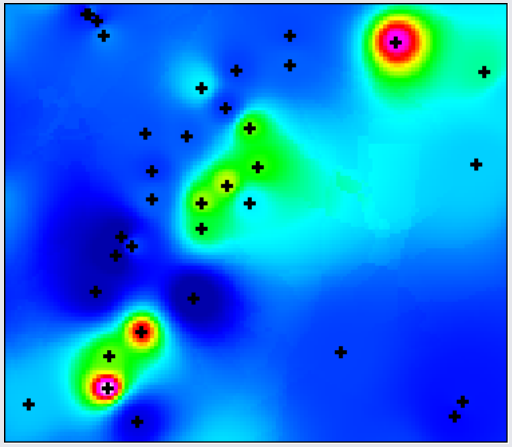
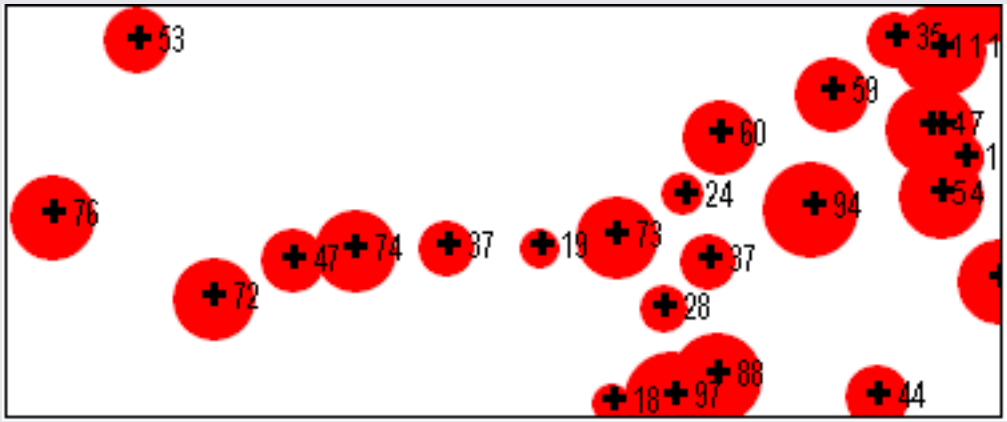
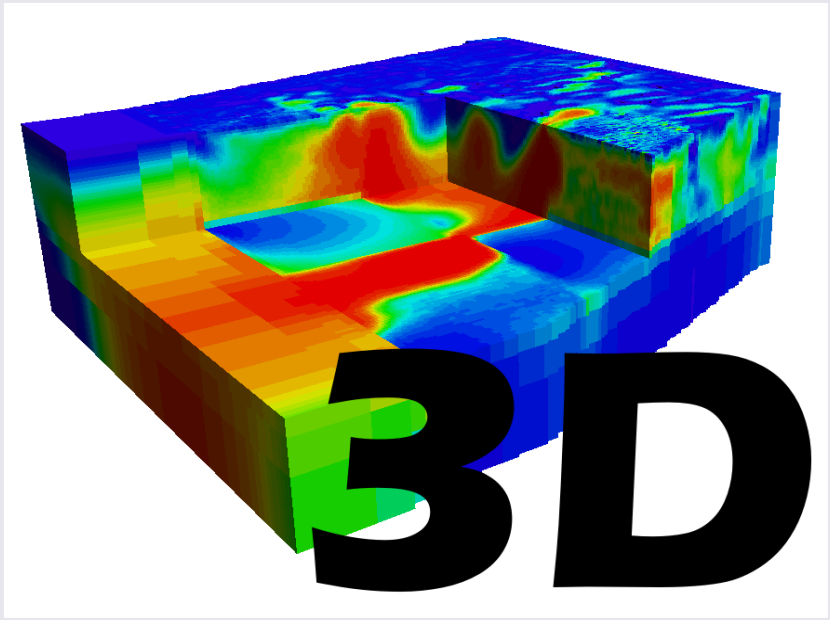
Measuring Prospectivity Using Digital Data in GIS

Mapping Variables, Interpolation, 3D Modelling of Geology or Physical and Chemical Modelling of Fluid Flow and Chemical Reactions







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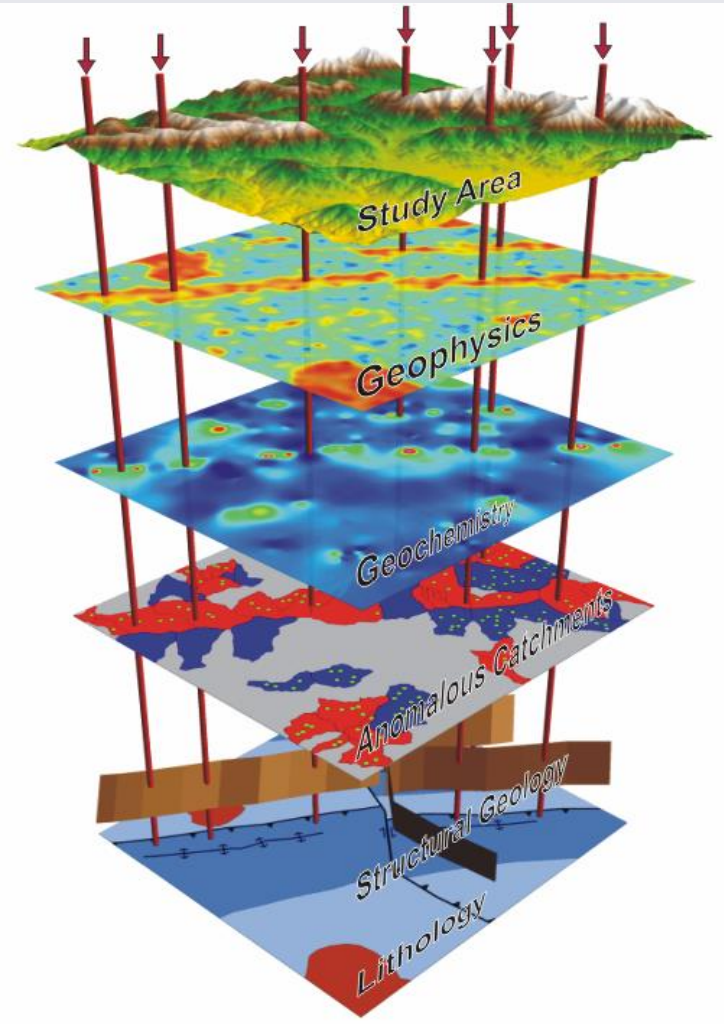
Measuring Geological Potential

Multi-variable Models: Fuzzy Logic, Neural Networks, and Weights of Evidence Predictive Modelling that Replicates Known Systems



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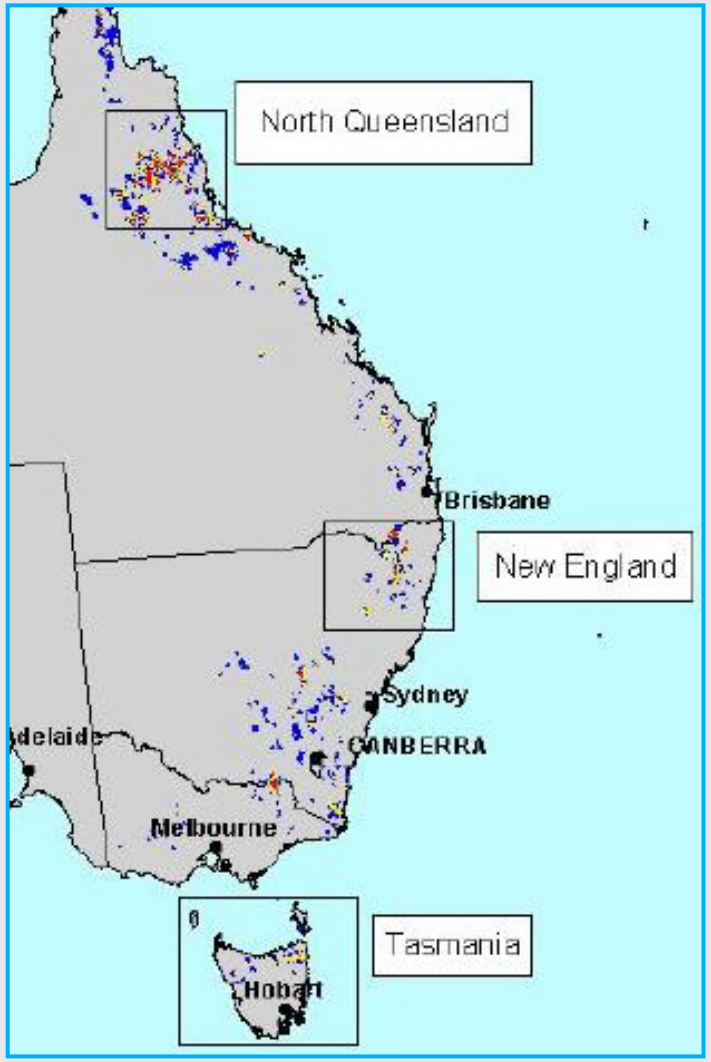
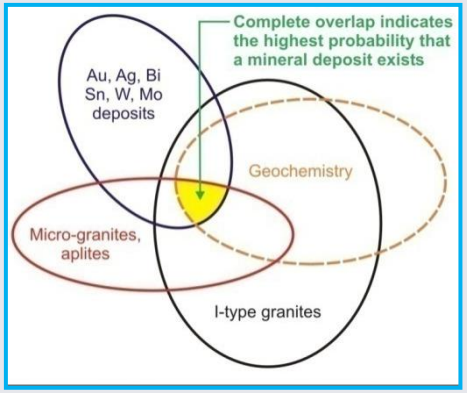
Commercial Application



- Auzex Resources
- Clear Strategy Based on Increasing Probability of Discovery
- Used to List and Target Exploration
- Campaign Exploration up to Pre-Feasibility Stage
- Commercialise Future Mines Early



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Approach to Exploration

Mineral Systems
Critical processes

Measure Prospectivity
Geological risk

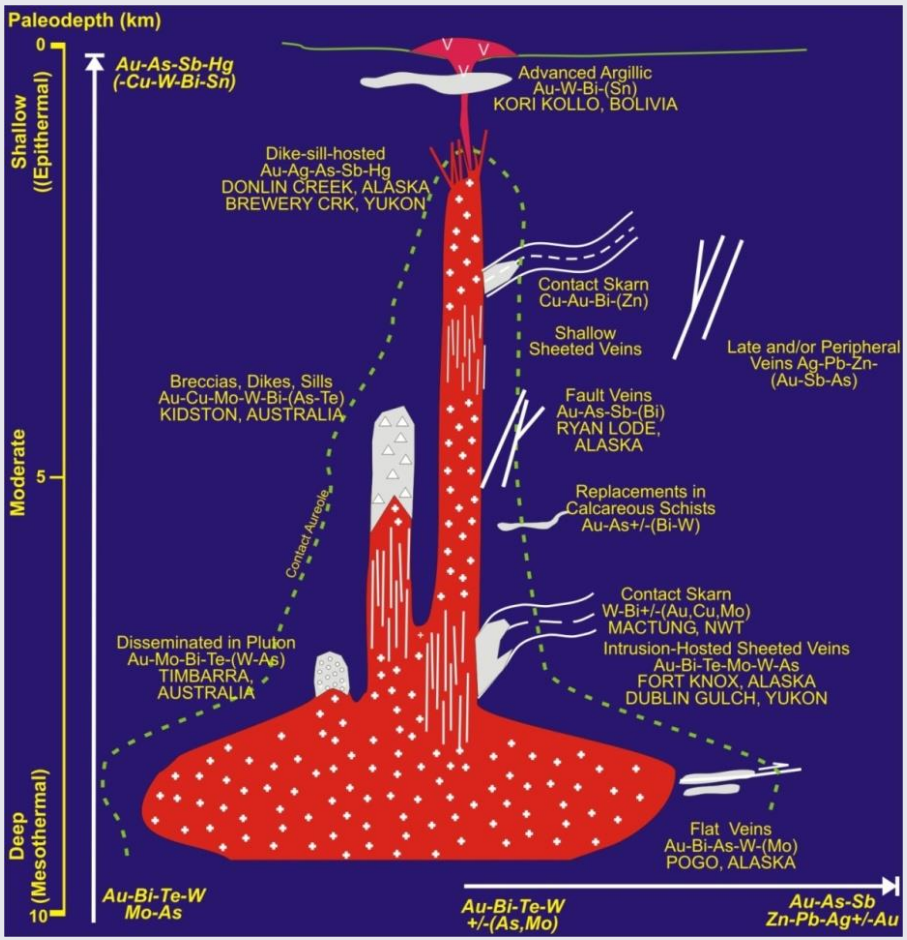
Assess Cultural Issues
Geopolitical risk

Simulate Economic Value
Financial risk

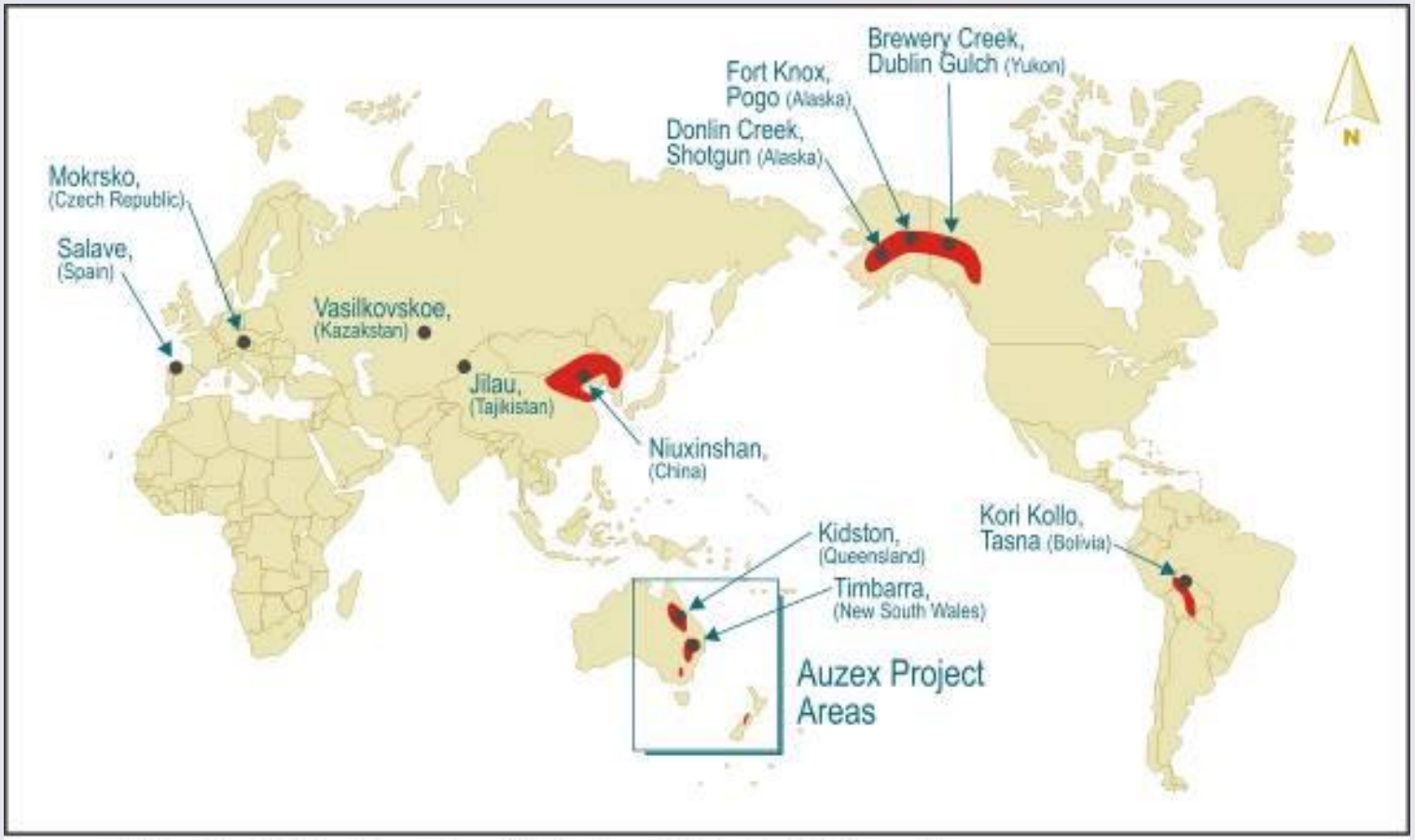
Prospectivity Matrix
Rank targets

Deposit Models Become One Mineral System

- Based on Being Able to Map Critical Parts of the Mineral System.
- Source of Metals.
- Transport of Metals.
- Concentration and Deposition of Metals.
- Efficient Focussing of Metals as Fluids Move Through.
- All Parts Required to Make an Ore body.

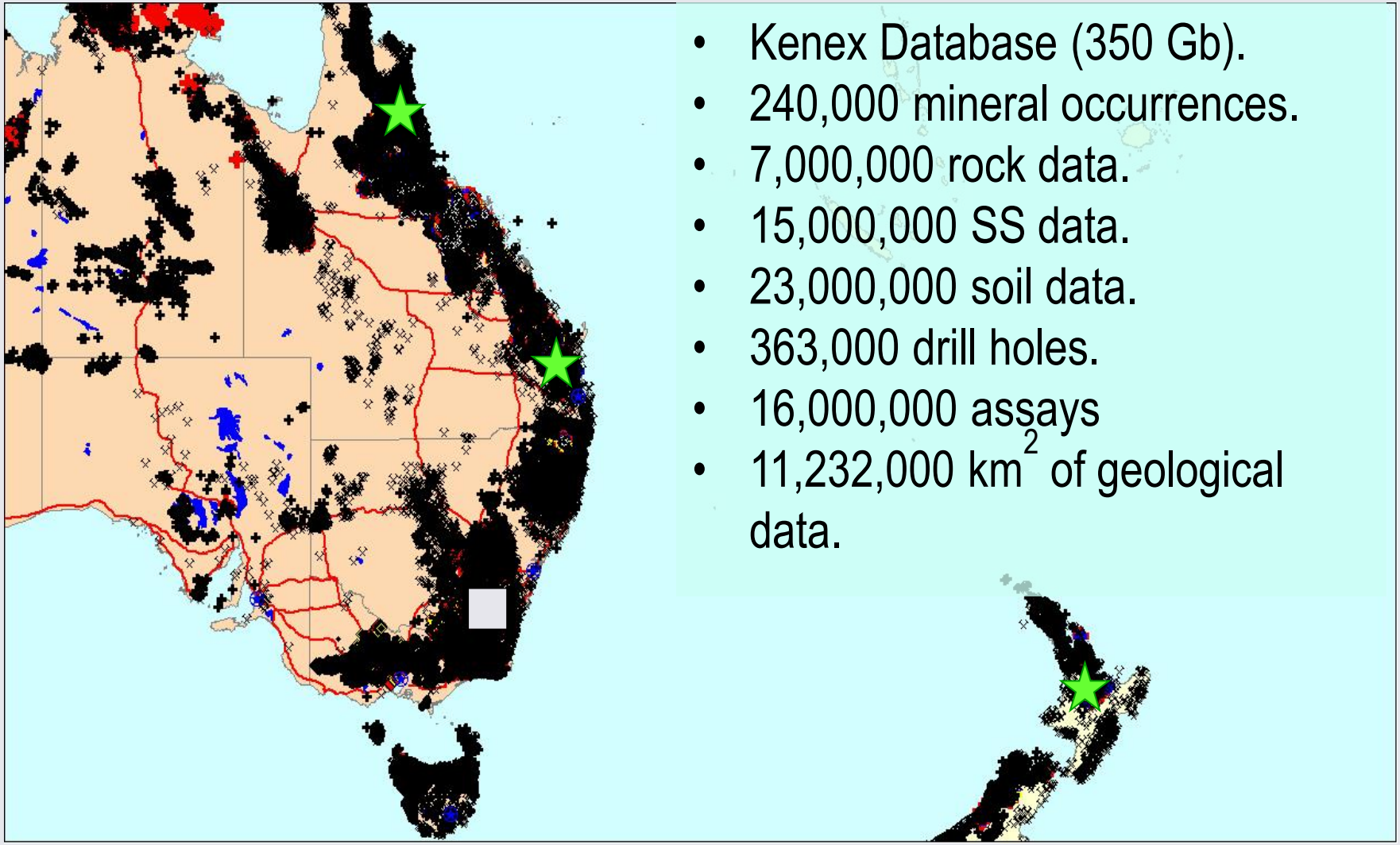


What You Need to Measure Prospectivity



Major Worldwide Examples of Intrusion-Related Gold Deposits (Modified from Lang and Baker 2001)

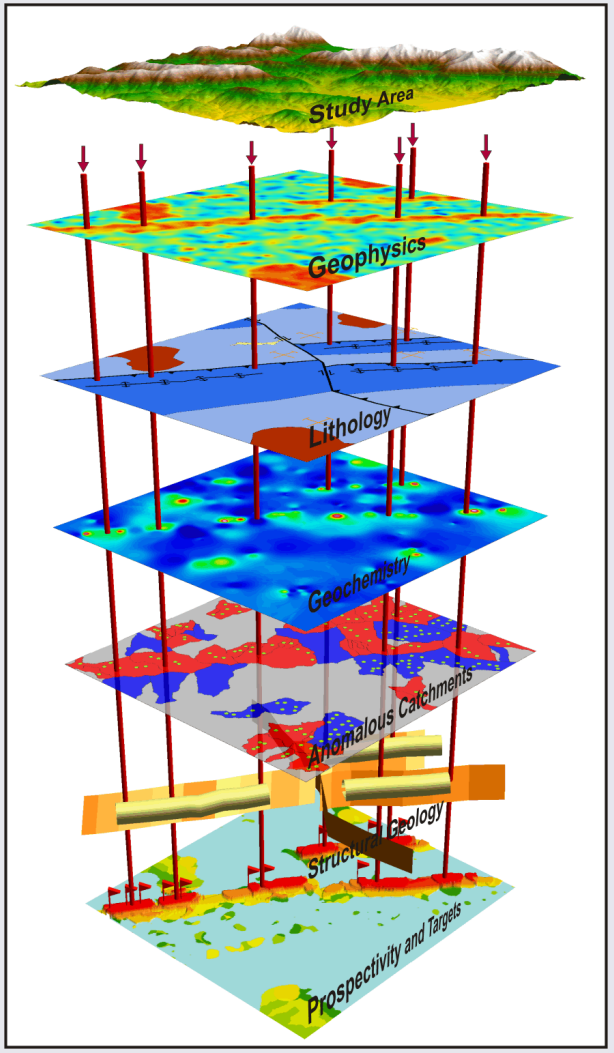
Database That Covers Mineral System Area



- Kenex Database (350 Gb).
- 240,000 mineral occurrences.
- 7,000,000 rock data.
- 15,000,000 SS data.
- 23,000,000 soil data.
- 363,000 drill holes.
- 16,000,000 assays
- 11,232,000 km^2 of geological data.

WoE Modelling

- Wide Range of Digital Data Available
- Create Predictive Maps from Digital Geological, Geochemical and Geophysical Data
- Use Known Deposits to Test Spatial Correlation of Maps
- Combine Maps Using Weights from Spatial Correlation
- Use Computer to Calculate Probability of an Occurrence for Each Grid Cell



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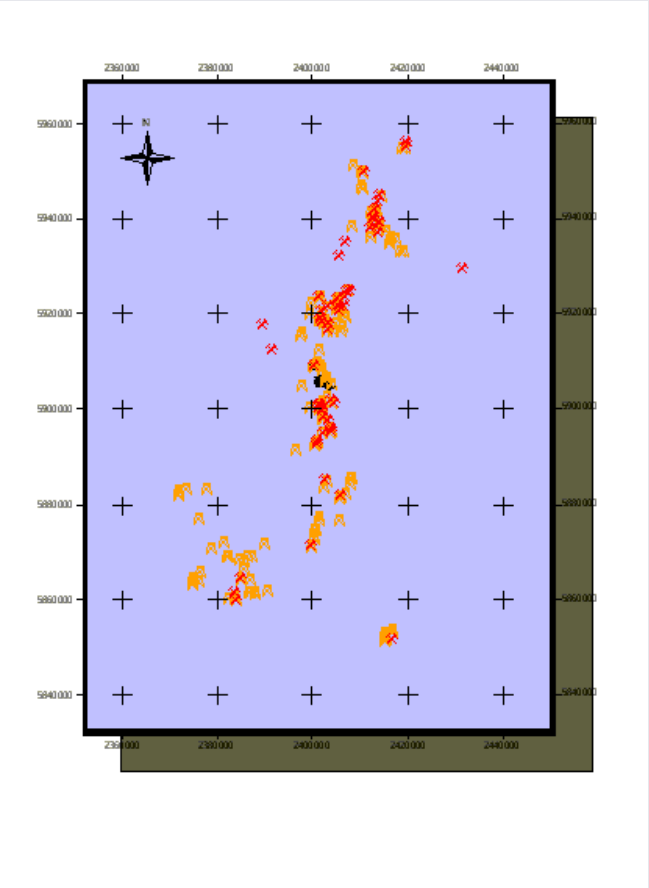
Training Data Sets

- System Model Defines Training Data Types e.g. Kidston and Timbarra
- Use Mineral Occurrence Data
- What is the Target?
- Apples and Oranges
- Size or Production
- Can Use Random Subsets to Statistically Test Predictive Capacity of the Model.



Mapping Source and Transport in GIS

- Source
  - I-type (Crustal Input, Continental), Sub-alkalic, Metaluminous (to Peraluminous) Felsic Rocks Au, Bi, Te, W, Mo, As and Sn Metals Present.
  - Map Rock Types and Mineral Occurrences.
- Migration
  - Hydrothermal Fluid from Fractionation - Pegmatites, Miorilitic Cavities, Pipes, Aplite.
  - Map Rock Types Geochemistry and Alteration.

Mapping Trap and Deposition in GIS

- Fluid Focus
  - Roof, Breccia, Vein Stockwork, Chemical, Mechanical Contrasts, Alteration - Feldspathic (Na>K), Phyllic.
  - Map Alteration, Structure, Rock Type, Scale from Geochemical Anomalism.
- Deposition
  - Au, Bi, Te, W, Mo, As and Sn
  - Reduced (no Mag-Hem), Low Sulphide (Po-Py-Apy)
  - Map Geochemistry, Fluid Type, Alteration, Grade from Drilling.

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Only Use Top Ranked Maps

Spatial Variable	Measure	Variable ID	C	Stud C
Bi, Mo, W	Association with density of Bi occurrences per unit cell.	High Density	4.78	16.41
Rock Au	Au in various lithologies from rock chip samples.	> 0.1 ppm Au	2.61	3.53
Radiometric signature	U intensity in various lithologies.	1,200m	2.61	8.25
Distance from local faults	Local fault control	15,700m	2.57	4.33
Granite Permo-Carboniferous Age	Age range of granite intrusives.	600m	2.52	9.12
Rock Rb/Sr	Rb/Sr ratio of granite from rock chip samples. Measure of fractionation.	400m	2.49	9.43
SS W	Theme contains spatial area relating to anomalous geochemistry and background geochemistry.	> 37 ppm W	2.44	5.01
Rock SiO2	SiO2 content of granite from rock chip samples. Measure of fractionation.	500m	2.39	9.02
Distance from granite contact	Distance internally or externally from granite contact	2,300m	2.36	8.04
Miarolitic Cavities	Magmatic Fractionation and gas or water in the magma	900m	2.32	6.07
Intrusion Depth	Proximity to roof of granite intrusion.	9,700m	2.27	6.77
Distance From Crustal Faults	Crustal scale structural control	13,600m	2.20	4.25
SS Bi	Stream sediment samples analysed for gold and statistically analysed using cumulative probability plots to define anomalous threshold values.	> 22 ppm Bi	2.18	3.60
PermoCarb greisenised granites	Permian fine grained granites	600m	2.09	5.99
Pegmatite and Aplitic granites	Magmatic Fractionation and gas or water in the magma	15,500m	2.01	7.59
Rock U	Calculated radiogenic content of granite from rock chip samples as a measure of fractionation.	400m	1.90	7.02
PermoCarb granite texture	Granite texture as mapped in the field.	Fine grained	1.67	6.14
SS Au	Pan Con, BLEG and ordinary sieved stream sediment samples analysed for gold. All sample methods statistically analysed separately. Then values leveled using the threshold value for each method.	> 92 percentile Au	1.37	3.19

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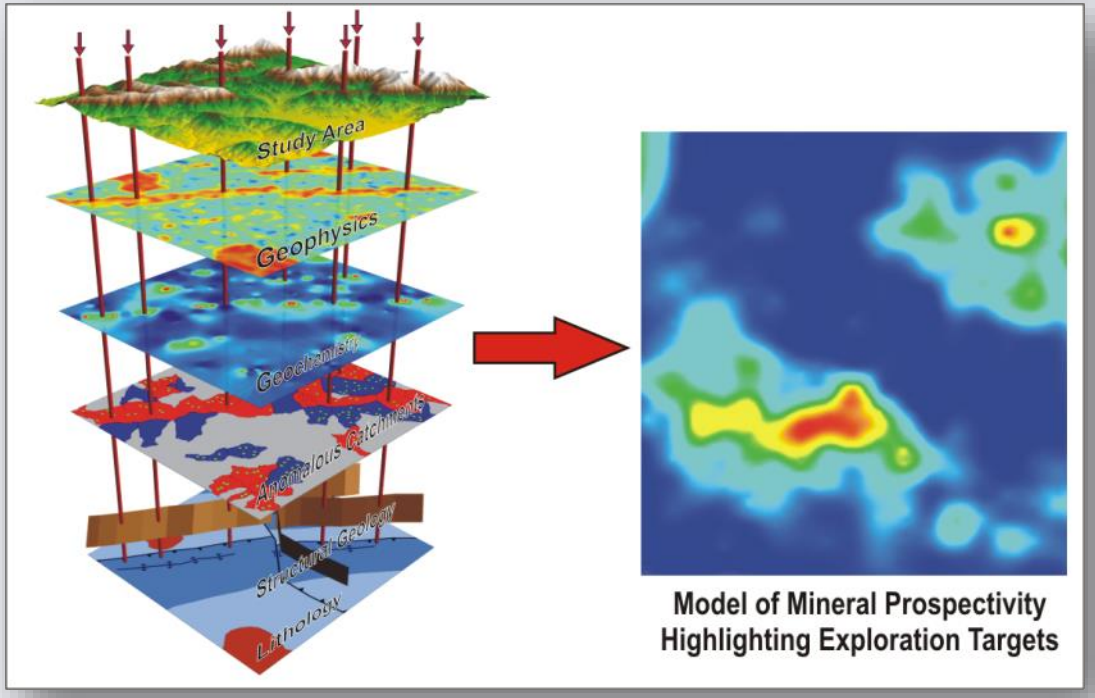
Model = Mineral System

Mineral System	Theme
Deposition	Alteration mapped in granite.
Source	Granite lithology.
Source	Bi mineralisation.
Source	Mo mineralisation.
Transport	National Scale Gravity.
Transport	Relationship to NE trending faults.
Source	Bi Stream Geochemistry.
Source	National Scale Magnetic data.
Deposition	Bi Granite Geochemistry.
Transport	U Stream Geochemistry
Source	Au Stream Geochemistry
Deposition	Mo Granite Geochemistry.



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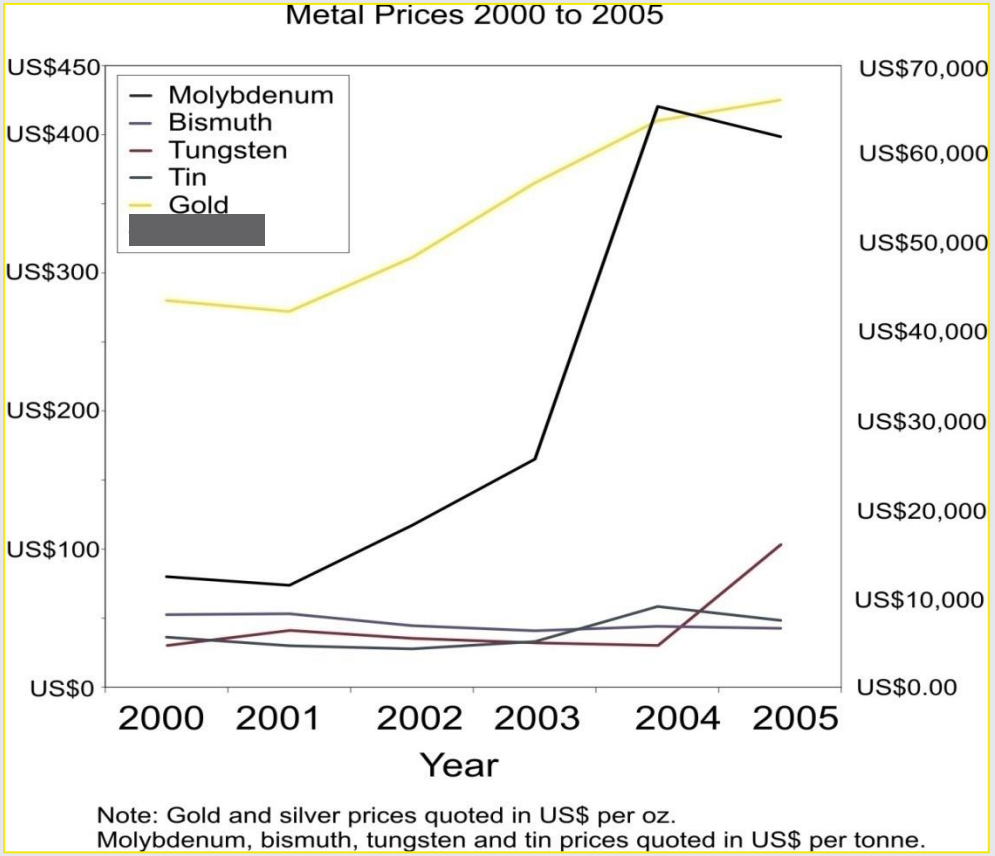
Pathfinder Metals Valuable

The value of metals identified.

	Approx A$ value
Molybdenum:	$86,000 t
Gold:	$846 oz
Silver:	$15 oz
Tin:	$17,600 t
Tungsten:	$23,900 t
Bismuth:	$45,300 t



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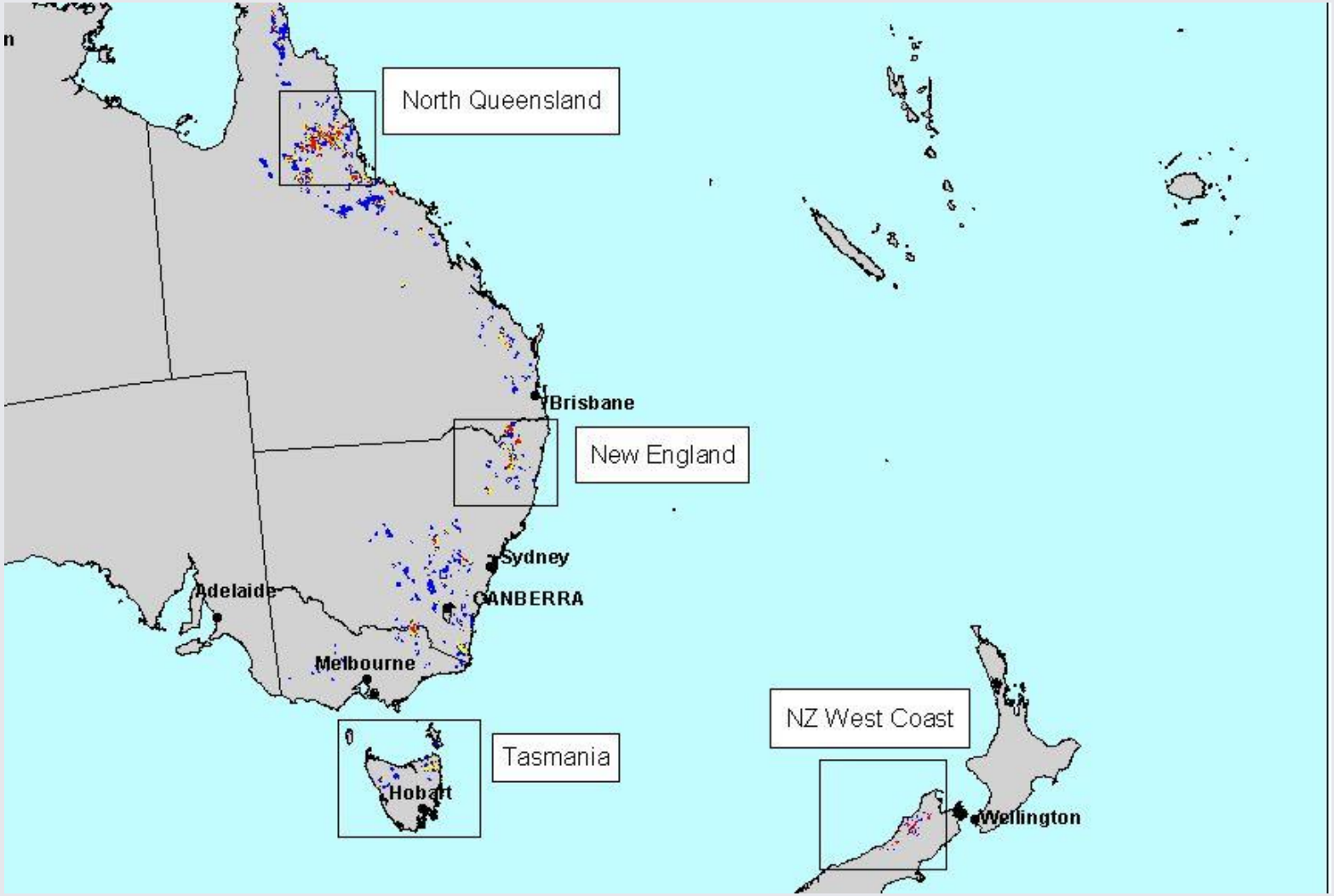
Models Designed to Reduce Search Area



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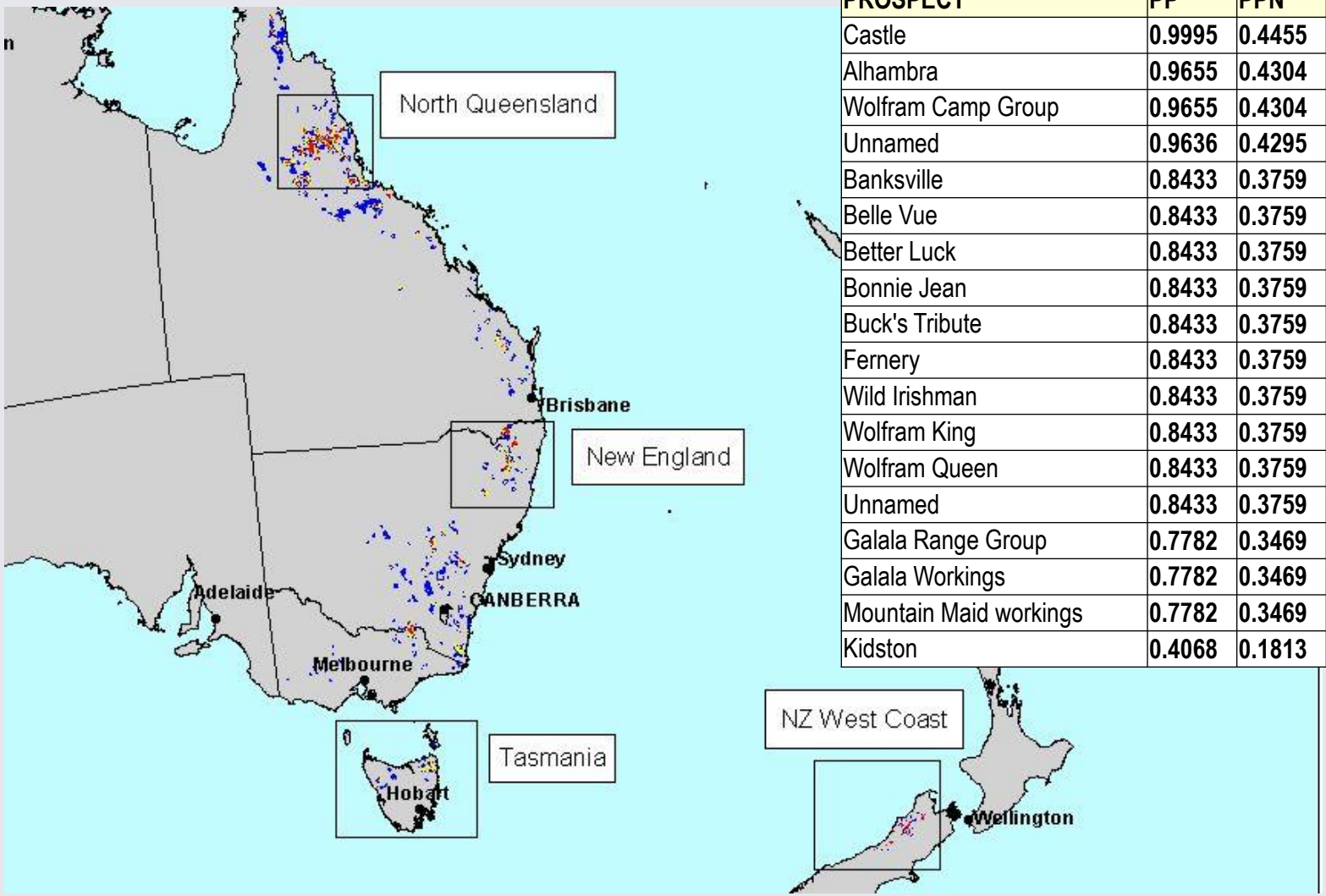
Targets Identified Based on Known Examples



PROSPECT	PP	PPN	TP
Castle	0.9995	0.4455	1
Alhambra	0.9655	0.4304	2
Wolfram Camp Group	0.9655	0.4304	2
Unnamed	0.9636	0.4295	1
Banksville	0.8433	0.3759	10
Belle Vue	0.8433	0.3759	10
Better Luck	0.8433	0.3759	10
Bonnie Jean	0.8433	0.3759	10
Buck's Tribute	0.8433	0.3759	10
Fernery	0.8433	0.3759	10
Wild Irishman	0.8433	0.3759	10
Wolfram King	0.8433	0.3759	10
Wolfram Queen	0.8433	0.3759	10
Unnamed	0.8433	0.3759	10
Galala Range Group	0.7782	0.3469	3
Galala Workings	0.7782	0.3469	3
Mountain Maid workings	0.7782	0.3469	3
Kidston	0.4068	0.1813	1

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Targets Ranked and Geological Potential Defined

Rank	Area	PP	PPN	Uncertainty	Au	Mo	Bi	RockGeochem	SSGeochem	Fractionated Granite	Structure
1	12,720,000	0.9905	0.4415	0.0061	Present	Present	Present	Present	Absent	Present	Present
2	12,540,000	0.9833	0.4383	0.0198	Absent	Present	Present	Present	Missing	Present	Absent
3	10,000	0.9655	0.4304	0.1224	Absent	Present	Present	Missing	Missing	Present	Absent
4	910,000	0.9655	0.4304	0.1224	Absent	Present	Present	Missing	Missing	Present	Absent
5	10,000	0.9655	0.4304	0.1224	Absent	Present	Present	Missing	Missing	Present	Absent
6	50,000	0.9655	0.4304	0.1224	Absent	Present	Present	Missing	Missing	Present	Absent
7	12,550,000	0.9636	0.4295	0.0209	Present	Absent	Present	Present	Present	Present	Absent
8	13,000,000	0.9599	0.4278	0.0260	Absent	Present	Present	Present	Absent	Present	Absent
9	90,000	0.9580	0.4270	0.1427	Present	Present	Present	Missing	Missing	Absent	Present
10	7,170,000	0.9580	0.4270	0.1427	Present	Present	Present	Missing	Missing	Absent	Present
11	170,000	0.9502	0.4235	0.0277	Present	Present	Absent	Present	Present	Present	Absent
12	17,780,000	0.9202	0.4102	0.0832	Present	Present	Absent	Present	Missing	Present	Absent
13	1,060,000	0.9004	0.4014	0.2540	Present	Present	Absent	Missing	Present	Present	Absent
14	13,610,000	0.8990	0.4007	0.2551	Absent	Present	Present	Missing	Present	Present	Present
15	12,520,000	0.8721	0.3887	0.1001	Absent	Present	Present	Absent	Present	Present	Absent
16	4,040,000	0.8721	0.3887	0.1001	Absent	Present	Present	Absent	Present	Present	Absent
17	1,100,000	0.8454	0.3768	0.3109	Present	Present	Absent	Missing	Missing	Present	Absent
18	2,700,000	0.8454	0.3768	0.3109	Present	Present	Absent	Missing	Missing	Present	Absent
19	16,600,000	0.8394	0.3742	0.3157	Absent	Present	Present	Missing	Missing	Absent	Absent
20	11,630,000	0.8394	0.3742	0.3157	Absent	Present	Present	Missing	Missing	Absent	Absent
21	12,490,000	0.8394	0.3742	0.3157	Absent	Present	Present	Missing	Missing	Absent	Absent
22	18,690,000	0.7782	0.3469	0.0938	Absent	Present	Present	Present	Present	Absent	Present
23	11,360,000	0.6793	0.3028	0.3712	Absent	Present	Present	Missing	Absent	Absent	Absent
24	10,000	0.6793	0.3028	0.3712	Absent	Present	Present	Missing	Absent	Absent	Absent
25	12,190,000	0.6793	0.3028	0.3712	Absent	Present	Present	Missing	Absent	Absent	Absent
26	3,880,000	0.6793	0.3028	0.3712	Absent	Present	Present	Missing	Absent	Absent	Absent
27	20,000	0.6793	0.3028	0.3712	Absent	Present	Present	Missing	Absent	Absent	Absent
28	11,210,000	0.6793	0.3028	0.3712	Absent	Present	Present	Missing	Absent	Absent	Absent
29	13,190,000	0.6793	0.3028	0.3712	Absent	Present	Present	Missing	Absent	Absent	Absent
30	11,690,000	0.6489	0.2892	0.2048	Present	Absent	Present	Absent	Present	Present	Absent

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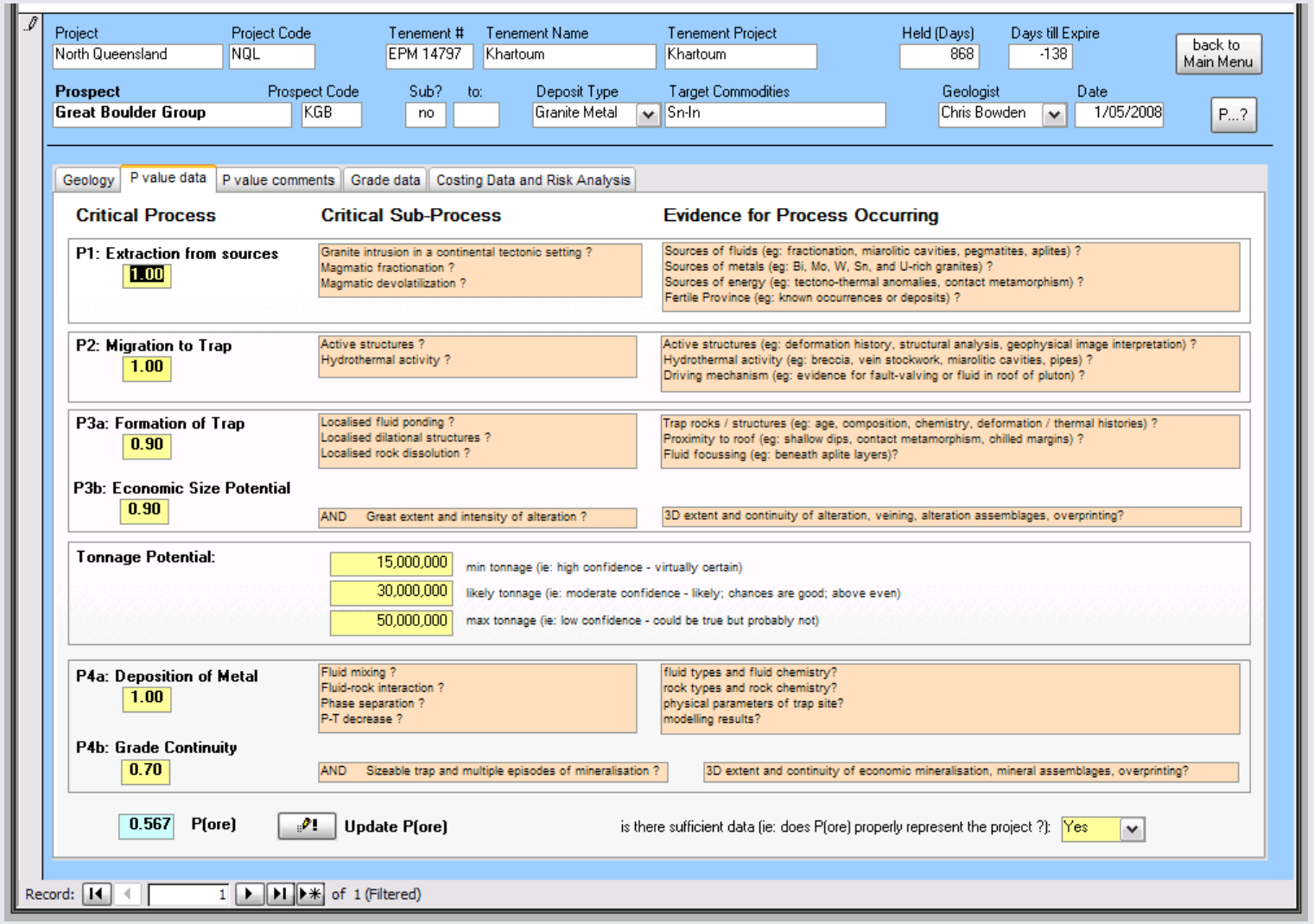
Geological Risk from Model



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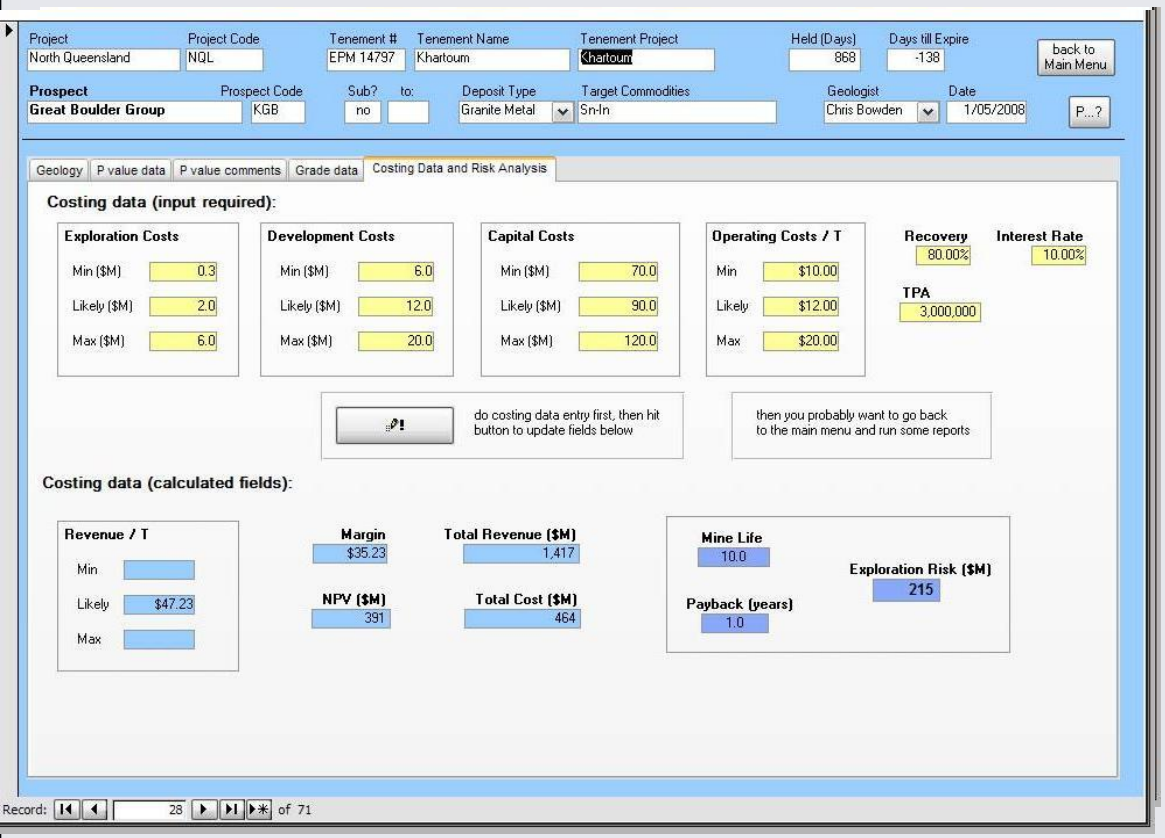
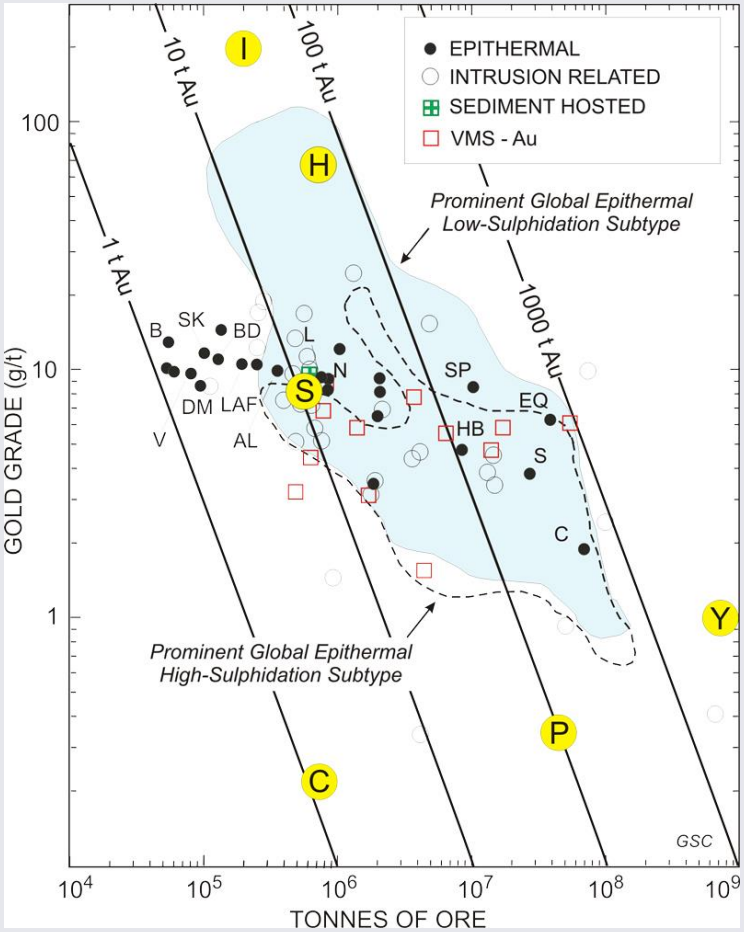
Economic Risk Unknown But Can Be Simulated





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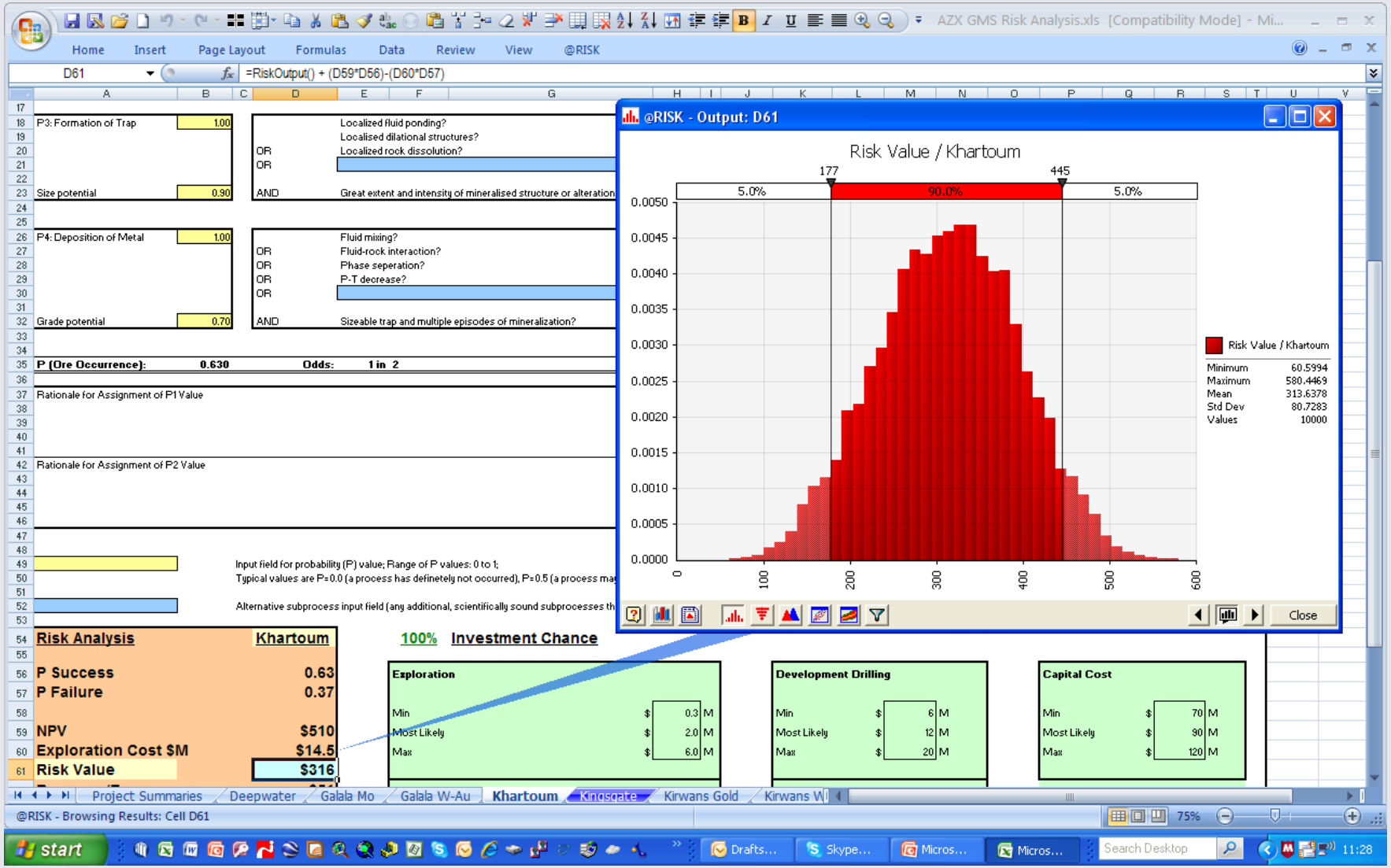
Exploration Risk Simulated



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Economic Analysis

Prospects	Target	P(ore)	Margin	NPV	Exrisk	Chance Ex Risk > 0	Chance NPV > 0	Revenue ($M)	Ex Cost	Total Cost ($M)	Payback Yrs
Lyell GoldFields	Au	0.33	$68	$485	$126	100.00%	100.00%	$980	$31	$315	1
Gows Region Group	Sn, W, Bi	0.58	$62	$151	$81	100.00%	100.00%	$259	$15	$71	1
Excelsior Region Group	Sn, W, Bi	0.31	$32	$215	$58	100.00%	100.00%	$651	$15	$243	1
Right Bower Region Group	Sn	0.50	$21	$27	$7	75.06%	96.28%	$103	$15	$61	1
Great Boulder Group	Sn-In-Zn-Cu	0.73	$7	$53	$3	45.32%	62.37%	$1,092	$15	$905	2
Normanby Group	Sn	0.50	$5	$8	$8	0.00%	0.00%	$1	$8	$9	18
Kirwans-Reward	Au	0.32	$109	$54	$28	8.92%	87.73%	$240	$17	$163	1
Klondyke	Au	0.43	$193	$53	$29	8.57%	82.40%	$294	$12	$193	2
Runningbrook	Au	0.36	$90	$153	$29	21.11%	97.39%	$423	$11	$194	2
Brodies Camp	Sn	0.29	$6	$108	$39	12.11%	75.36%	$1,313	$11	$1,095	1
Zoned Pluton	Au, Bi, Mo	0.07	$85	$541	$46	0.00%	100.00%	$1,421	$12	$296	1
Denford Group	Sn-In	0.58	$3	$73	$48	5.90%	9.21%	$406	$15	$515	1
Kingsgate Group	Mo-Bi-Si	0.28	$178	$68	$55	0.02%	87.26%	$356	$19	$232	2
Seven Hills Group	Au	0.04	$91	$227	$97	0.00%	99.99%	$544	$12	$207	2
Khartoum North Group	Sn-W-Au	0.03	$11	$38	$98	0.00%	9.14%	$270	$11	$273	4
Galala Mo	Mo	0.53	$1	$98	$103	0.00%	0.15%	$290	$10	$383	3
Oban River Group	Au	0.01	$72	$159	$109	0.00%	99.76%	$454	$12	$207	2
West Tinaroo Veins	Au	0.00	$127	$99	$109	0.00%	98.22%	$309	$9	$151	2

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Projects Located and Tenements Acquired

Target Portfolio

- 87 Targets Acquired 100% in NQ, NE and NZ.
- Range of Metals Prioritised by Economic Factors and Geological Potential with 12 with a Positive Exploration Risk at Current Metal Prices.
- 1 Project at Feasibility Stage, 4 at Resource Definition Stage and 14 at Drilling Stage.
- 25 Targets Identified in NQ with Three Considered to Have Resource Potential and Positive Exploration Risks, One Gold, One Molybdenum and One for Tin.

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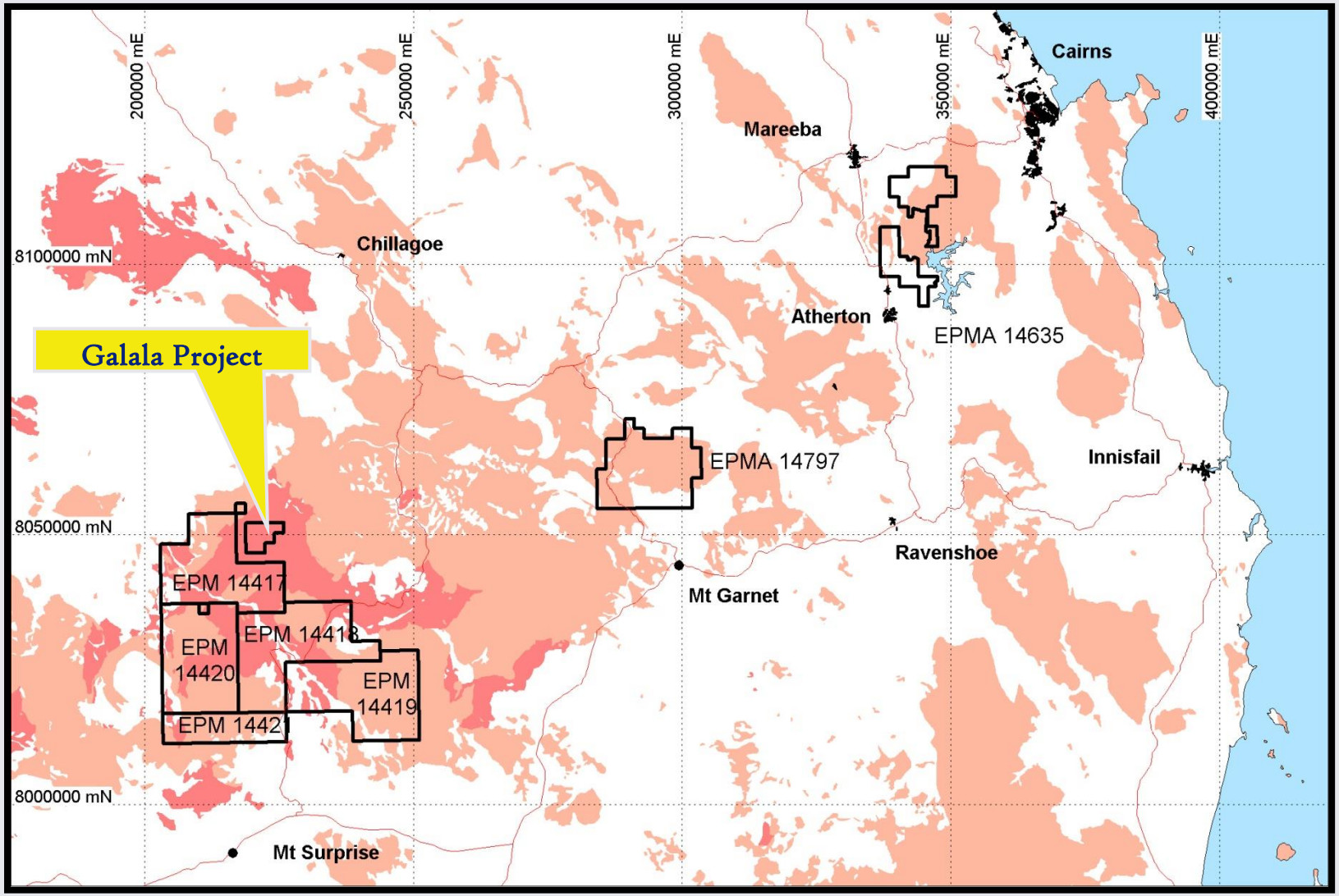
Galala Range Molybdenum-Tungsten-Gold



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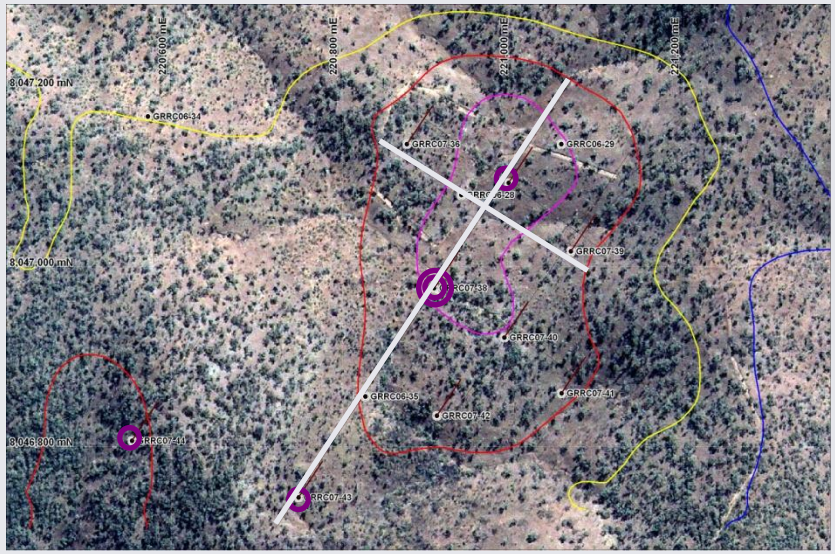
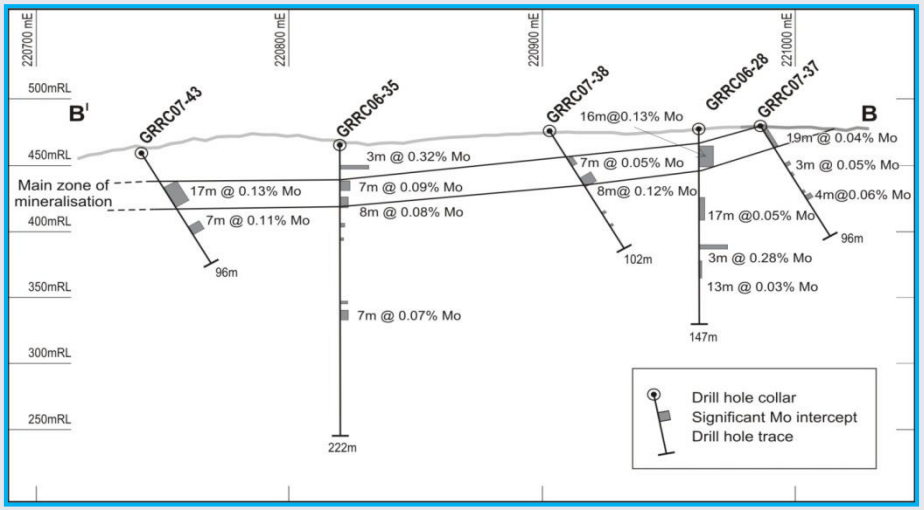
Galala Range

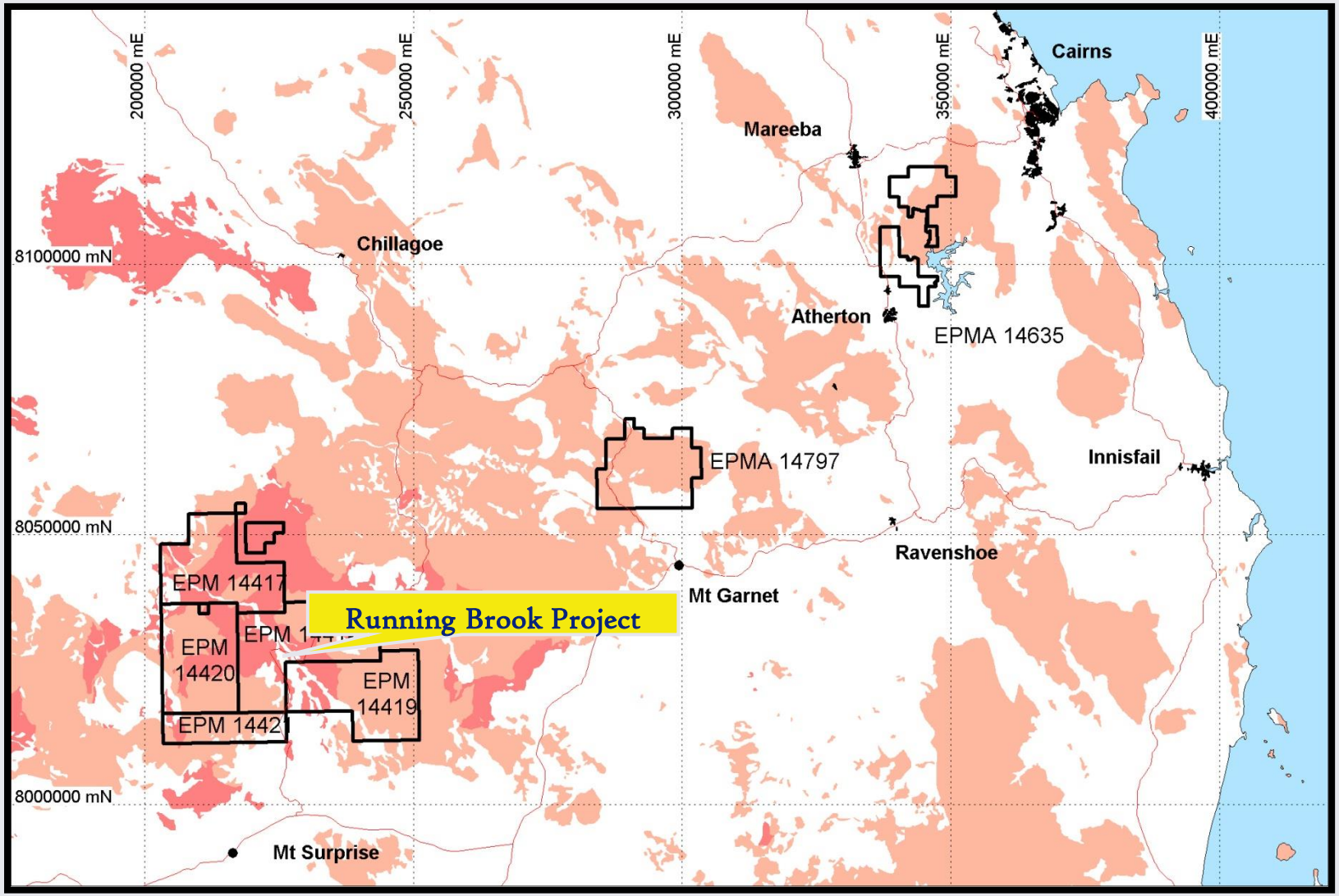
- Galala Contains Central Mo Core (1km^2) Surrounded by W Zone and Outer Au Zone.
- Soils to 6g/t Au, 0.18% Mo and 19% W Define Zonation.
- Mo Mineralisation Drilled Over 600m x 400m Area, Intersecting Horizontal Veins with Potential for +20 M Tonnes at 0.15% Mo.
- Drilling Confirmed Zonation and Although Au and W Only Found in Narrow Sub Horizontal Veins a Large Number of Au-W Soil Anomalies Remain to be tested.





Kenex

Running Brook Gold



Kenex

Running Brook

- No Modern Exploration for Gold.
- Anomalous Soil Au-Bi-Cu Over 1500mx450m with 200ppb Au.
- Drilling Intersected Wide Low Grade Gold 100-200m up to 0.5 g/t Au.
- Geology Similar to Kidston.
- Mineralisation Controls and Continuity Need to be Better Understood.
- Find the Trap and Zone of Deposition.

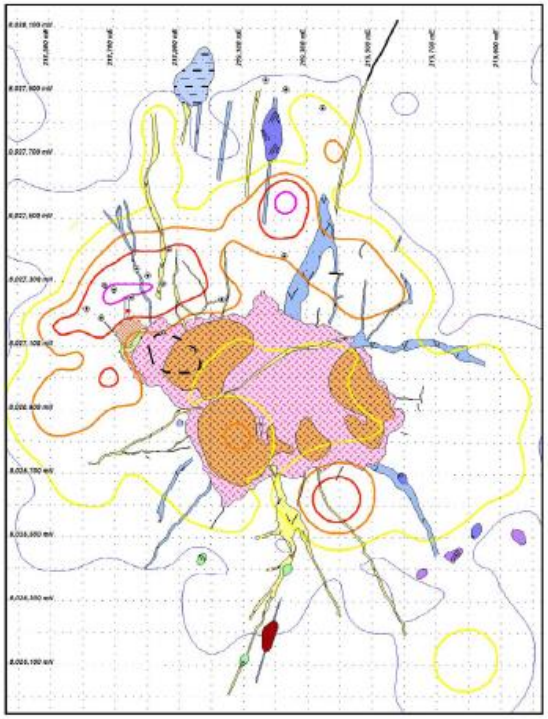
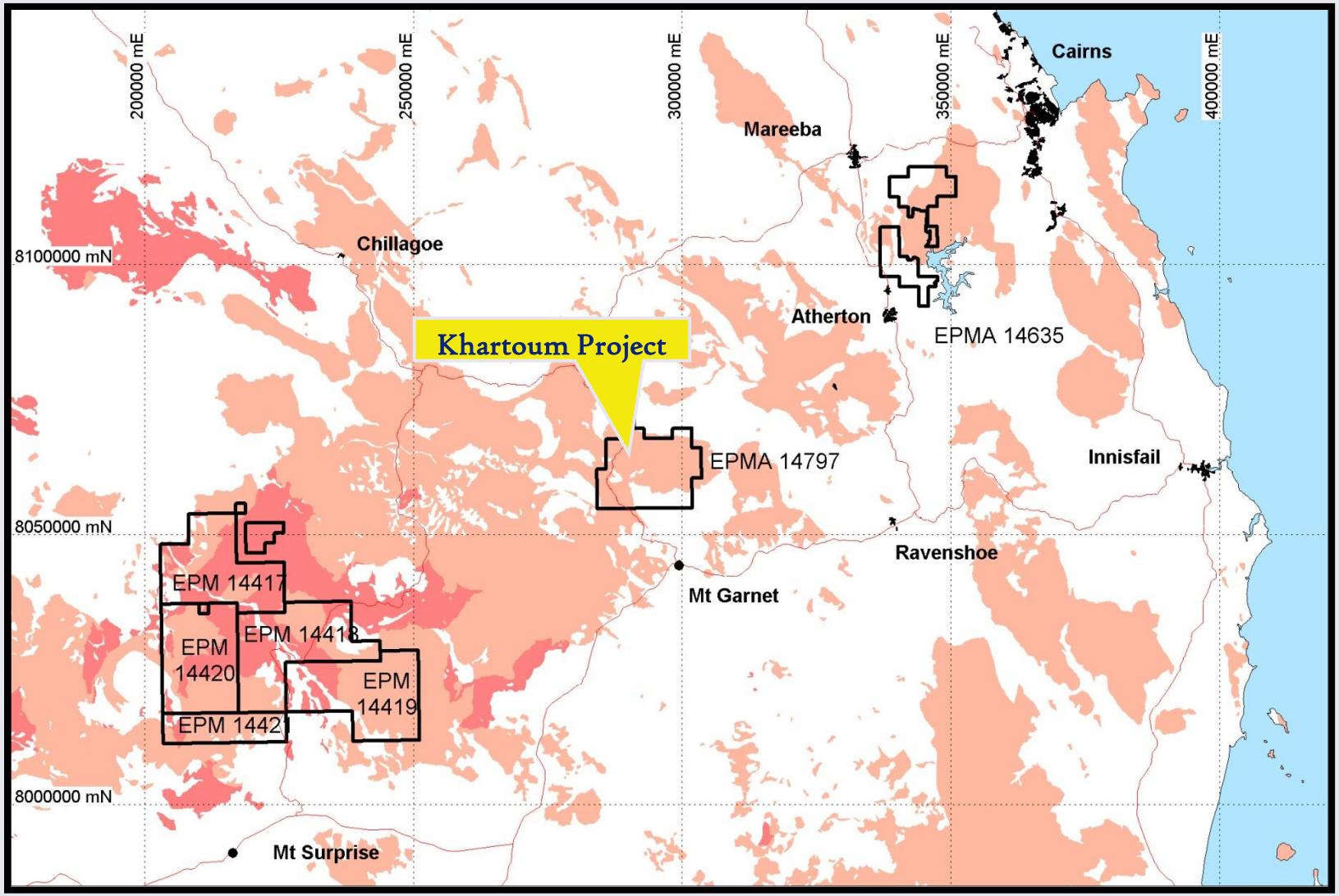


Figure 4. Au soil sample contours.

brain rock insitu at Runningbrook – indicative of a potentially mineralised porphyry-style or intrusive system at depth

Kenex

Khartoum Tin



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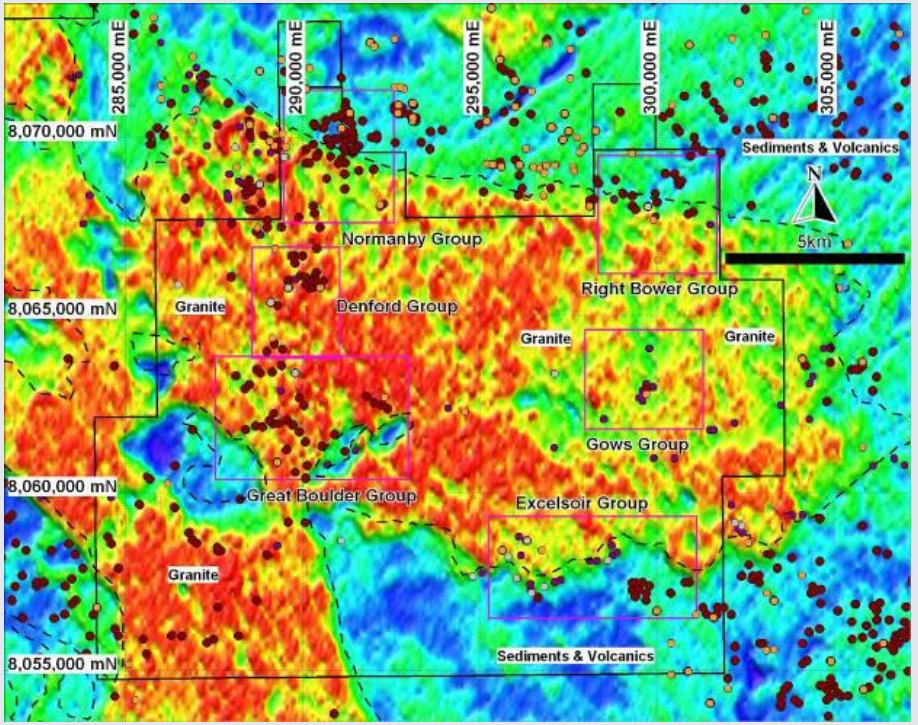
Khartoum Tin

- Major Alluvial Production.
- 9kmx3km Zone of Tin Mineralisation in Greisen.
- Fifteen Anomalous Areas with up to 1.8% Tin in Soils.
- Best Exploration Risk and NPV Potential.



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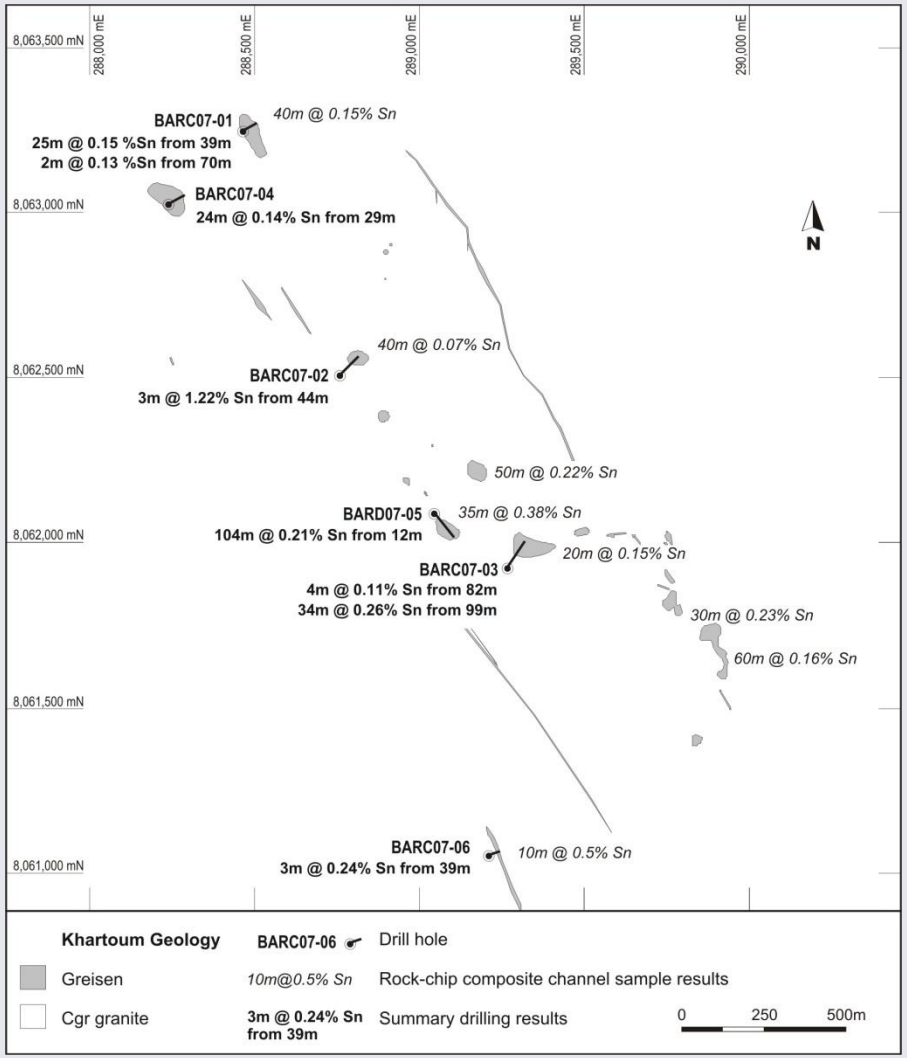
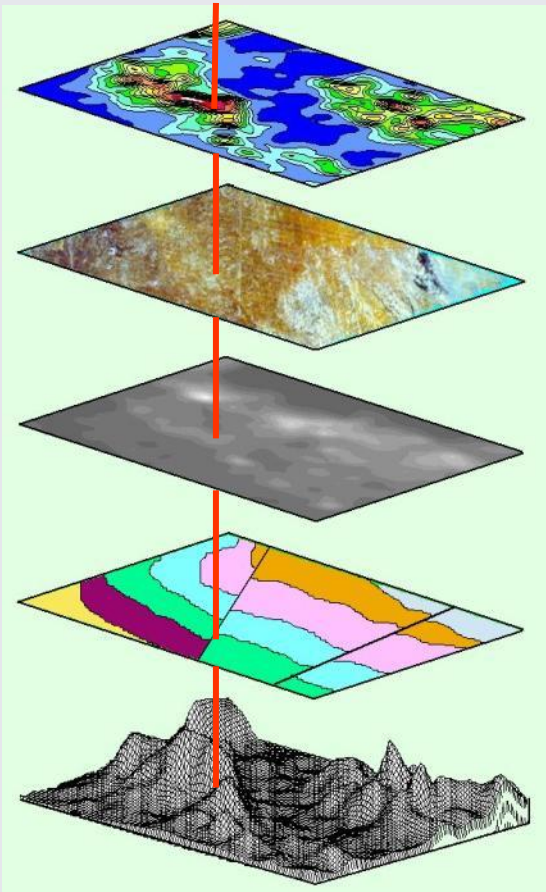
Khartoum Tin

- Costeaning Confirmed Grade and Continuity of Sn.
- Sn Intersected in all Holes Drilled from a 2,500m Strike to 132m Depth.
- Grades Between 0.26% and 1.76% Sn over 3-104m.
- Numerous Similar Greisens Mapped Suggesting 100+ Million Tonne Target.



Increasing Exploration Success

- You Can Measure Your Risks
- Data and Knowledge Can be Integrated
- You Can Make Sure You are Investing in the Opportunity that Gives the Best Chance of Success
- You Can Manage Your Exploration Investment More Effectively
- We Need Better Economic Data



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