The post-Karoo Mutandahwe Igneous Complex of South-Eastern Zimbabwe - A host to a potential "CLIMAX-Type" Porphyry Molybdenum Deposit with distal Tungsten/Copper?

Tenyears Gumede

ONEIRIC MINERALS KNOWLEDGE FACTORY

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ONEIRIC MINERALS (PVT) LTD

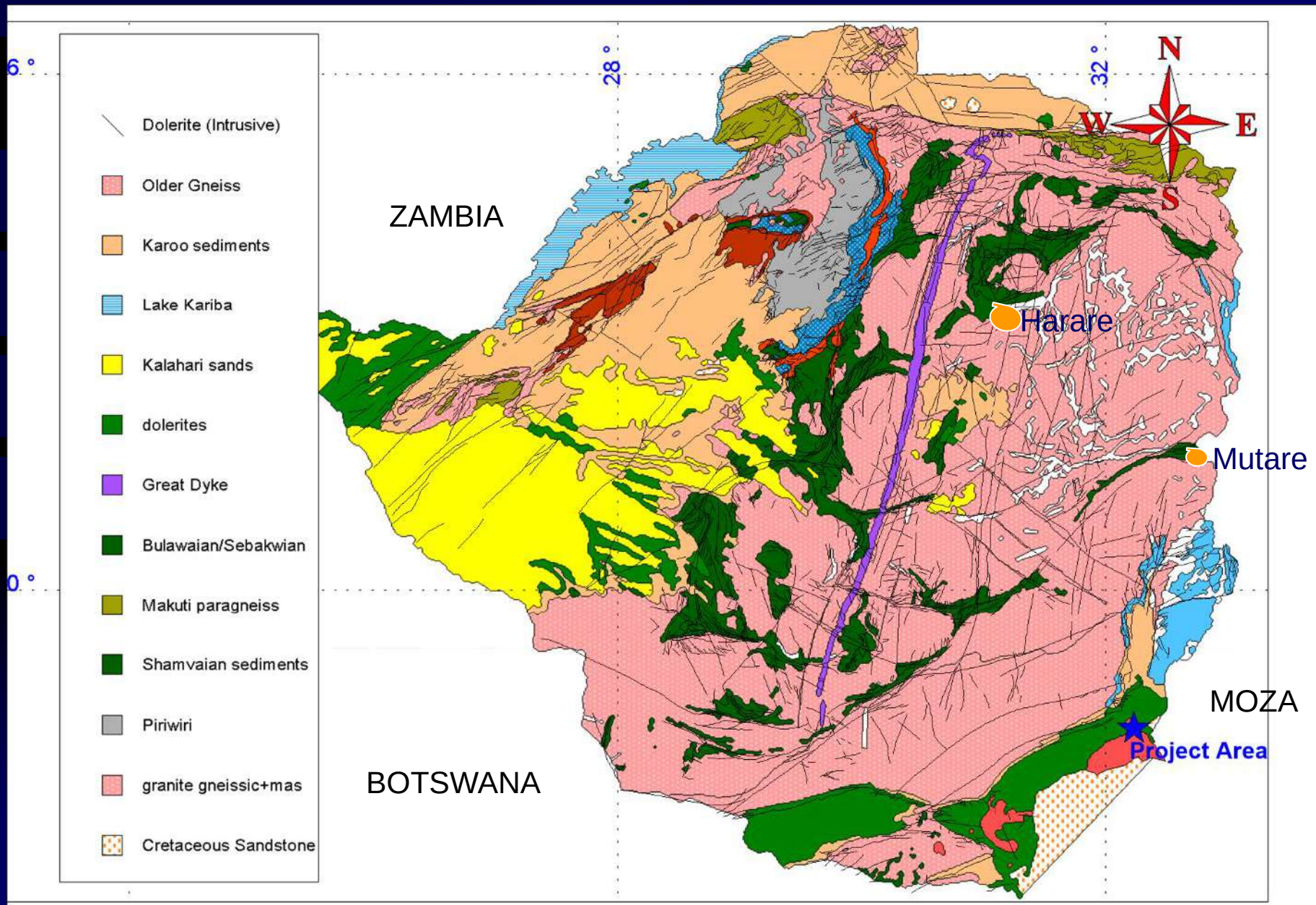
PROFILE

- The company ("OM") is a privately-owned, junior Zimbabwe base metal explorer and developer
- OM has 3 Exploration tenements for molybdenum (Mo) in south-eastern Zimbabwe
- OM is actively engaged in "brownfield" exploration since 2018

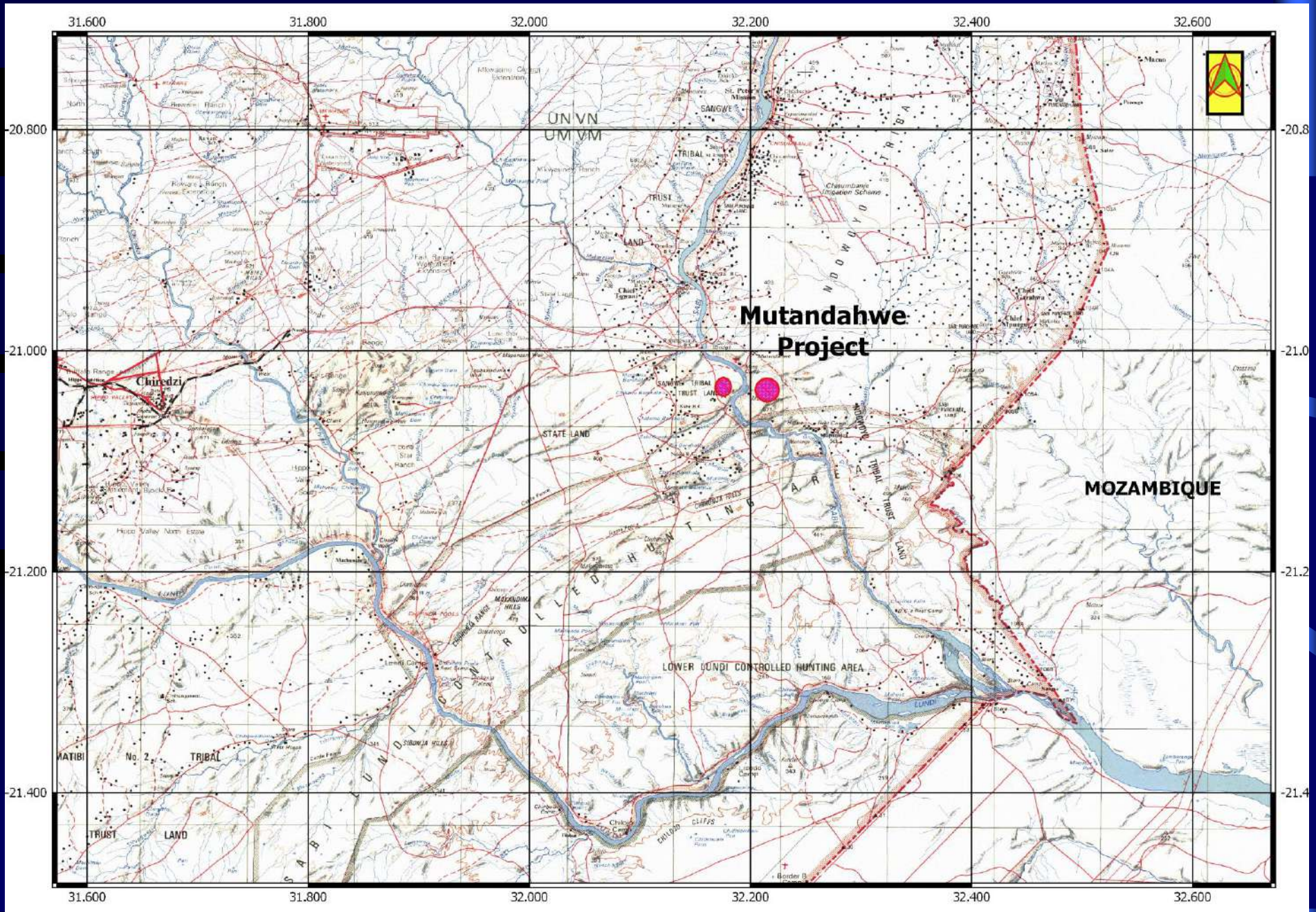
PROLOGUE

I. Introduce the OM Project
II. Summaries Climax-Type Deposits
III. Look at the Market trend as a motivator for search for Moly and Tungsten
IV. Look at the Geology of Mutandahwe Complex
V. Historical Work at Mutandahwe
VI. Present Work at Mutandahwe

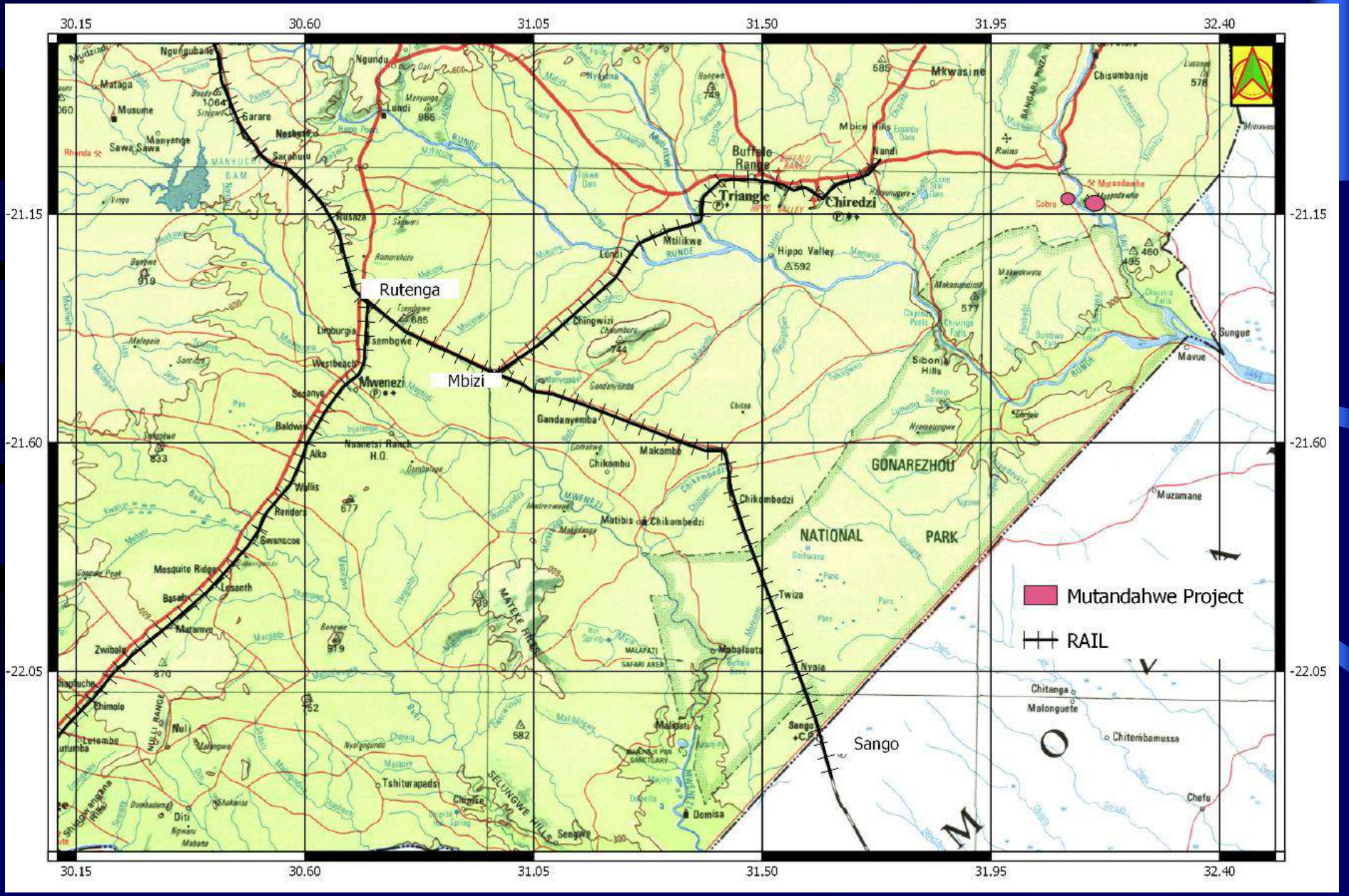
LOCALITY - ZIMBABWE



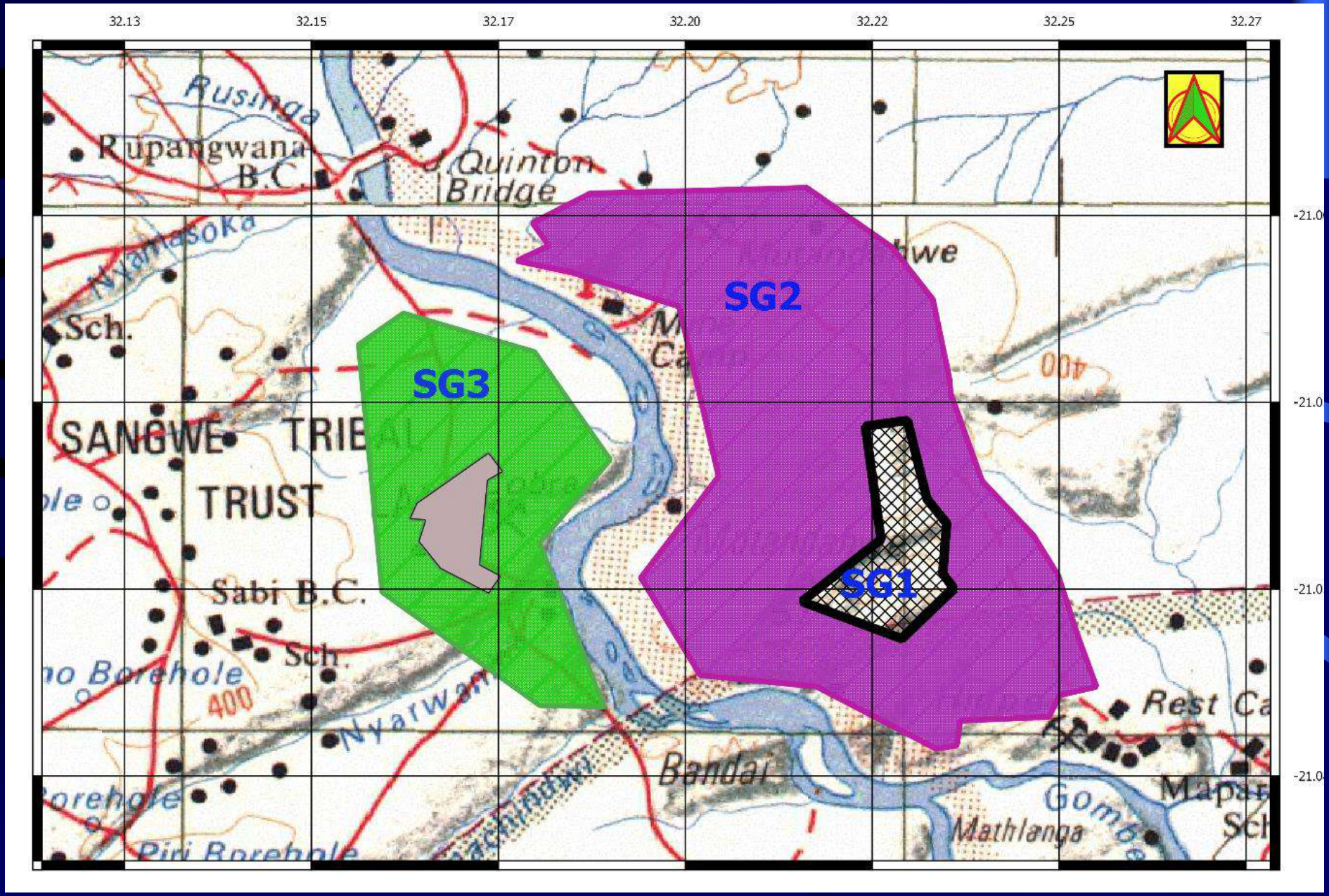
LOCALITY AT PROVINCE LEVEL



INFRASTRUCTURE AT PROVINCE LEVEL



LOCALITY OF SGs



Molybdenite Ore

Climax-Type Mo Deposits

- Deposits are large (100 to 1,000 million metric tons of ore containing 0.06 to about 1 weight percent molybdenum)
- Consist of stockworks of molybdenite-bearing veins and veinlets, within larger masses of hydrothermally-altered rock.

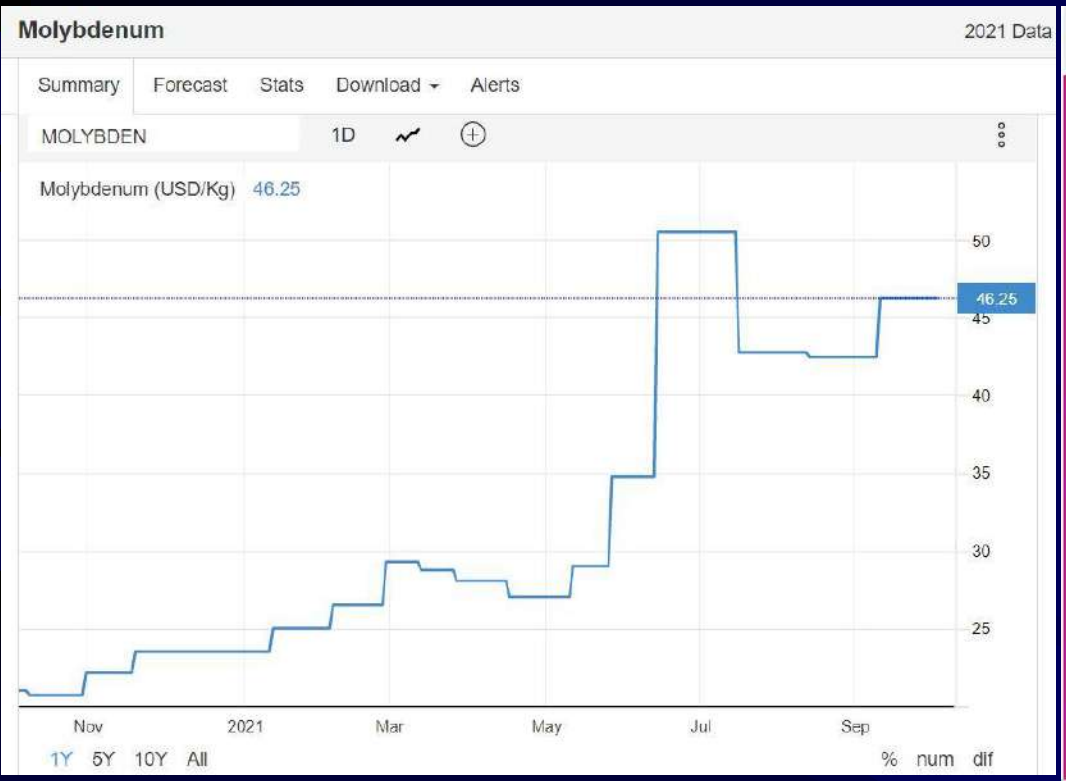
Synonyms

- Granite Molybdenite; Climax Mo; Granite-Related Mo; Porphyry Mo (High F-type).

- ***Examples***
- Climax, Henderson, Mount Emmons, Silver Creek, Pine Grove, Questa (USA), Malmbjerg (Greenland), Nordli (Norway).
- ***Precedents***
- USGS: 16 Climax Mo.
- CGS: 19.5 Porphyry Molybdenum.
- BCGS: L08 Porphyry Mo (Climax-type).
- AAPlc: F04 Porphyry Alkaline Mo (Climax-type).

- Climax Molybdenum Company, a subsidiary of Freeport-McMoRan, is one of the world’s leading molybdenum producers.
- The Henderson mine is North America's largest producer of primary molybdenum. 2007 production was 40 million pounds of molybdenum, with a value of $1.1 billion.

WHY MOLYBDENUM (MOLY)



Tungsten APT fob China (per mtu WO3) prices USD/mtu

Prices for PA0014502 | Add to workspace | Add to notifications | Historical export

Included with the following product:

Argus Metals International

Date	Low	High	Last	Change	% Change
01 Oct 2021	305.0000	310.0000	307.5000	0.0000 =	0.00 %
30 Sep 2021	305.0000	310.0000	307.5000	3.0000 ↑	0.99 %
29 Sep 2021	302.0000	307.0000	304.5000	0.0000 =	0.00 %
28 Sep 2021	302.0000	307.0000	304.5000	2.0000 ↑	0.66 %
27 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
24 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
23 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
22 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
21 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
20 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
17 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
16 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
15 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %
14 Sep 2021	300.0000	305.0000	302.5000	0.0000 =	0.00 %

WHY MOLY cont.

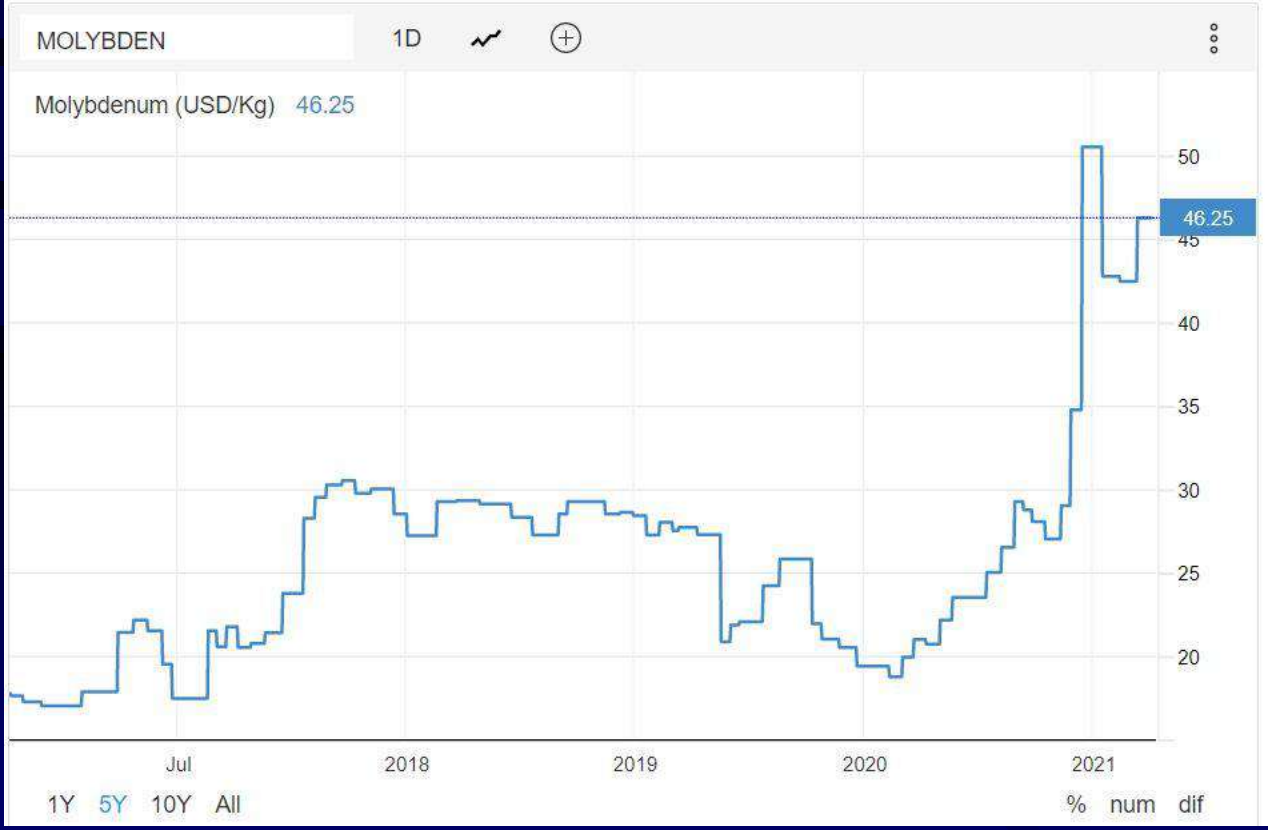
TRADING ECONOMICS

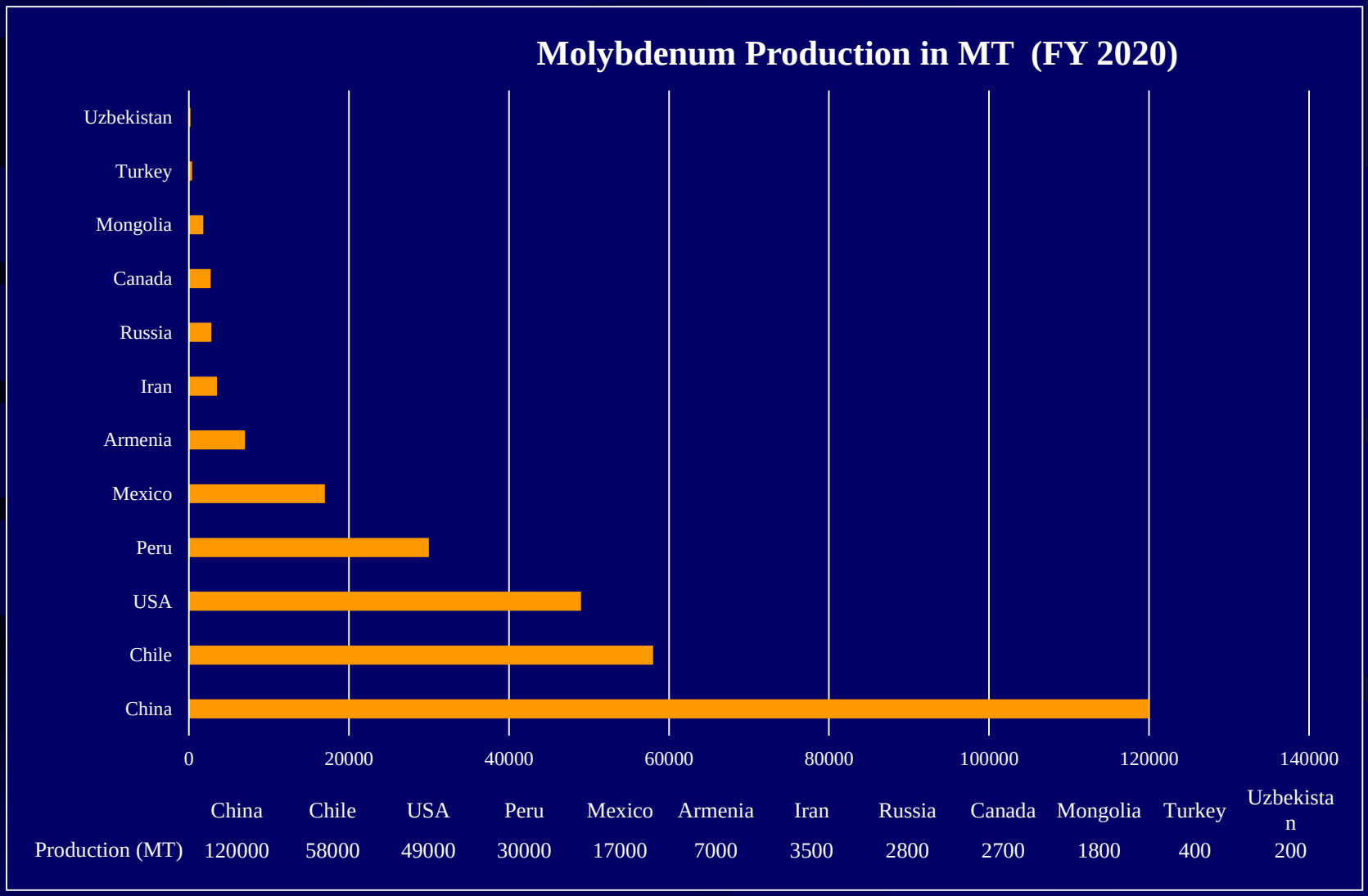
Calendar News Markets Indicator

Molybdenum 2021 Data

Summary Forecast Stats Download Alerts

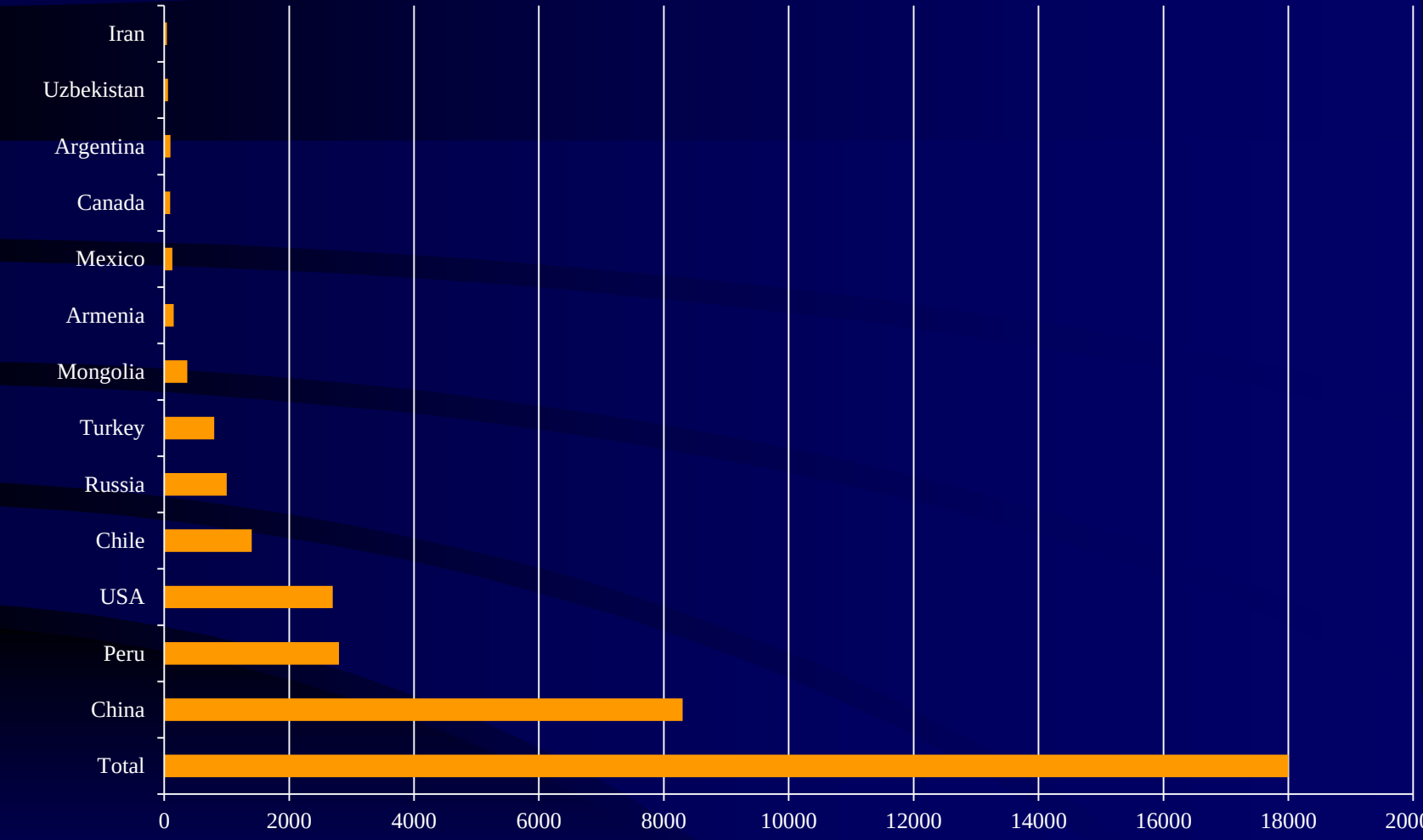
Molybdenum increased 22.75 USD/Kg or 96.81% since the beginning of 2021, according to trading on a contract for difference (CFD) that tracks the benchmark market for this commodity.





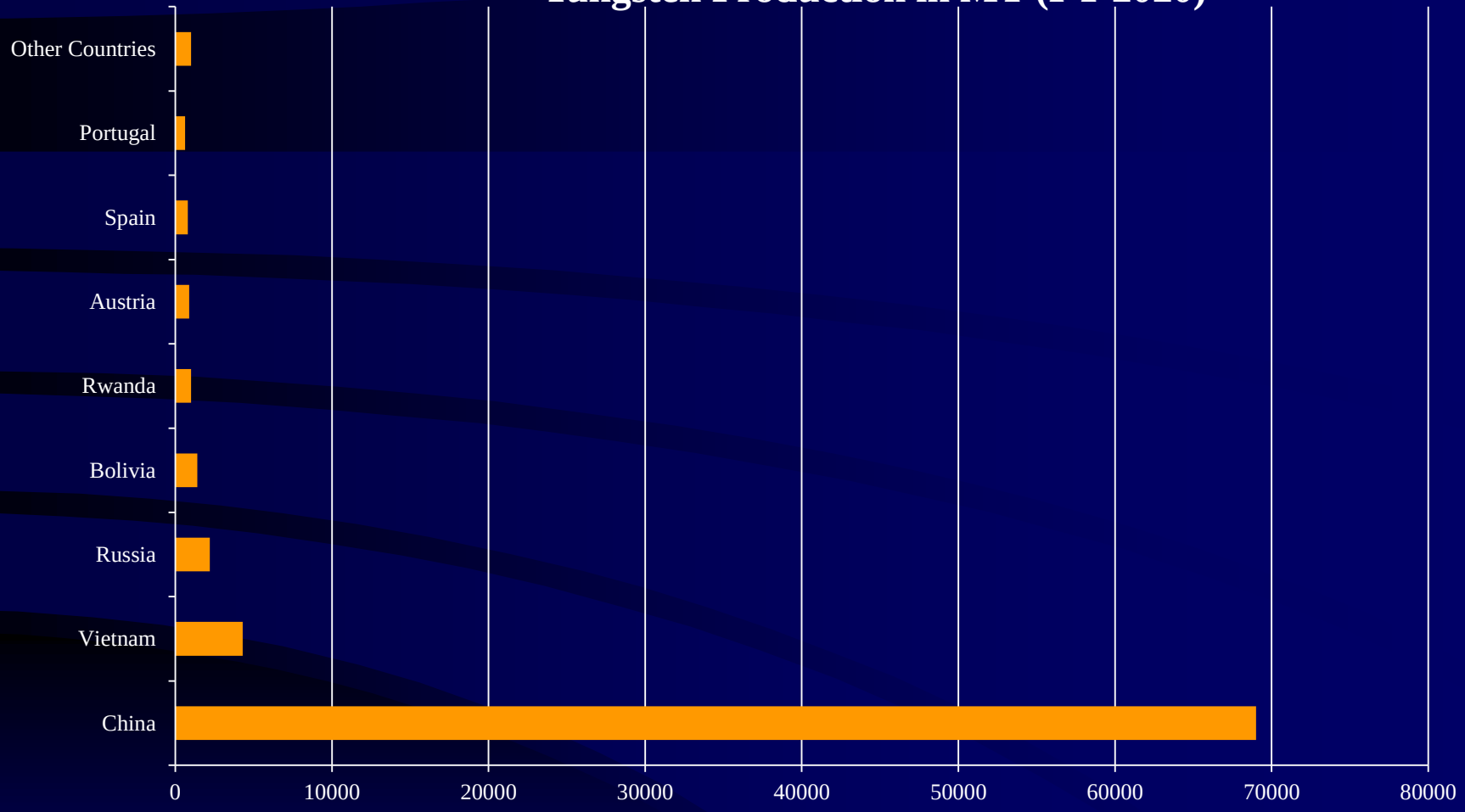
	China	Chile	USA	Peru	Mexico	Armenia	Iran	Russia	Canada	Mongolia	Turkey	Uzbekistan
Production (MT)	120000	58000	49000	30000	17000	7000	3500	2800	2700	1800	400	200

Molybdenum Reserves in 1000 MT (FY 2020)



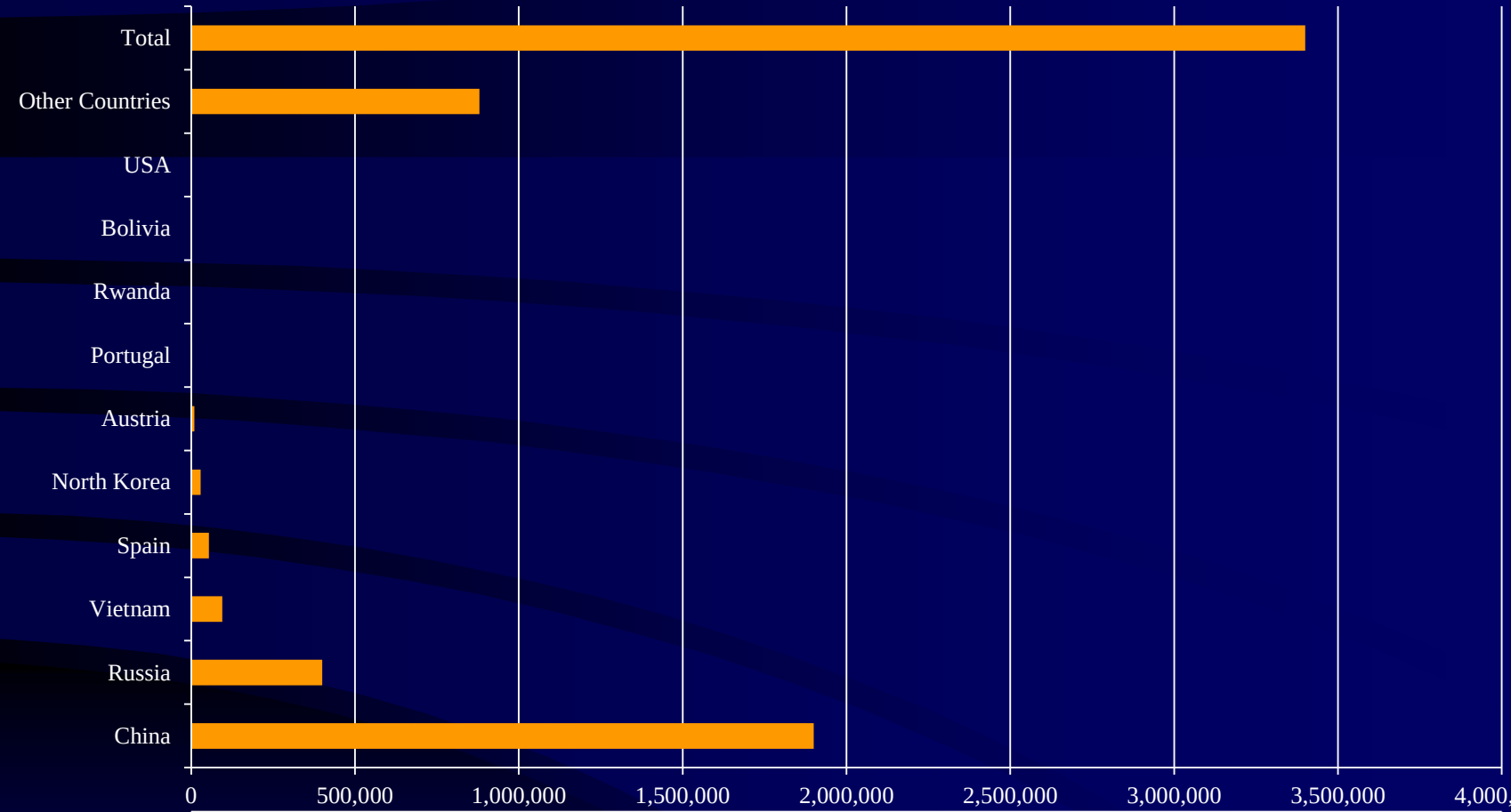
	Total	China	Peru	USA	Chile	Russia	Turkey	Mongolia	Armenia	Mexico	Canada	Argentina	Uzbekistan	Iran
Reserves (in 1000 MT)	18000	8300	2800	2700	1400	1000	800	370	150	130	96	100	60	43

Tungsten Production in MT (FY 2020)



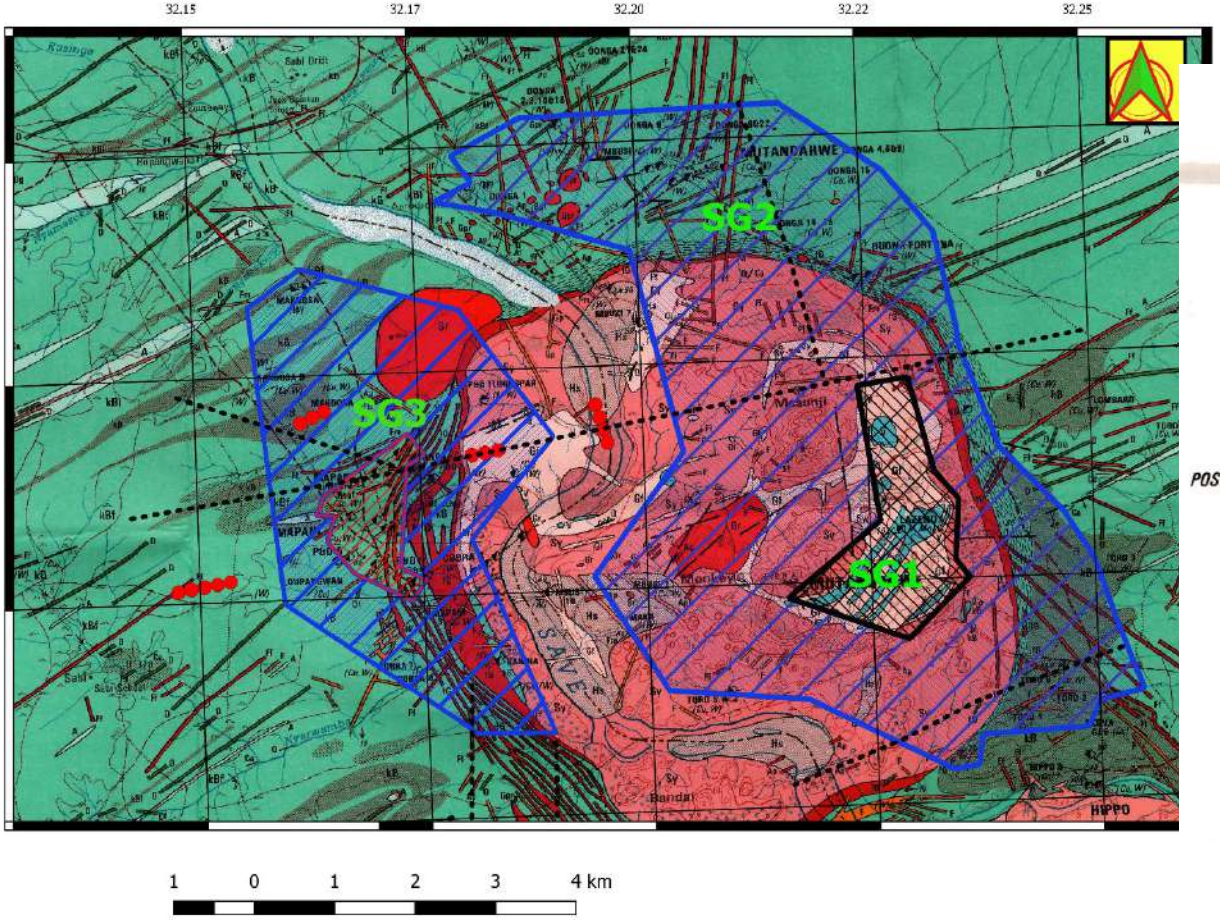
	China	Vietnam	Russia	Bolivia	Rwanda	Austria	Spain	Portugal	Other Countries
Production	69000	4300	2200	1400	1000	890	800	618	1000

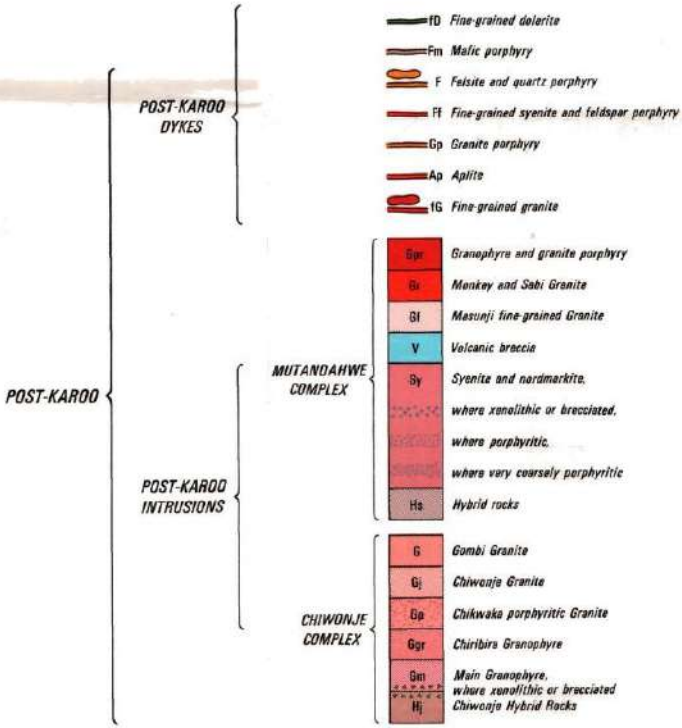
Tungsten Reserves in MT (FY 2020)



	China	Russia	Vietnam	Spain	North Korea	Austria	Portugal	Rwanda	Bolivia	USA	Other Countries	Total
Reserves in MT	1,900,000	400,000	95,000	54,000	29,000	10,000	3,100				880,000	3,400,000

MUTANDAHWE GEOLOGY



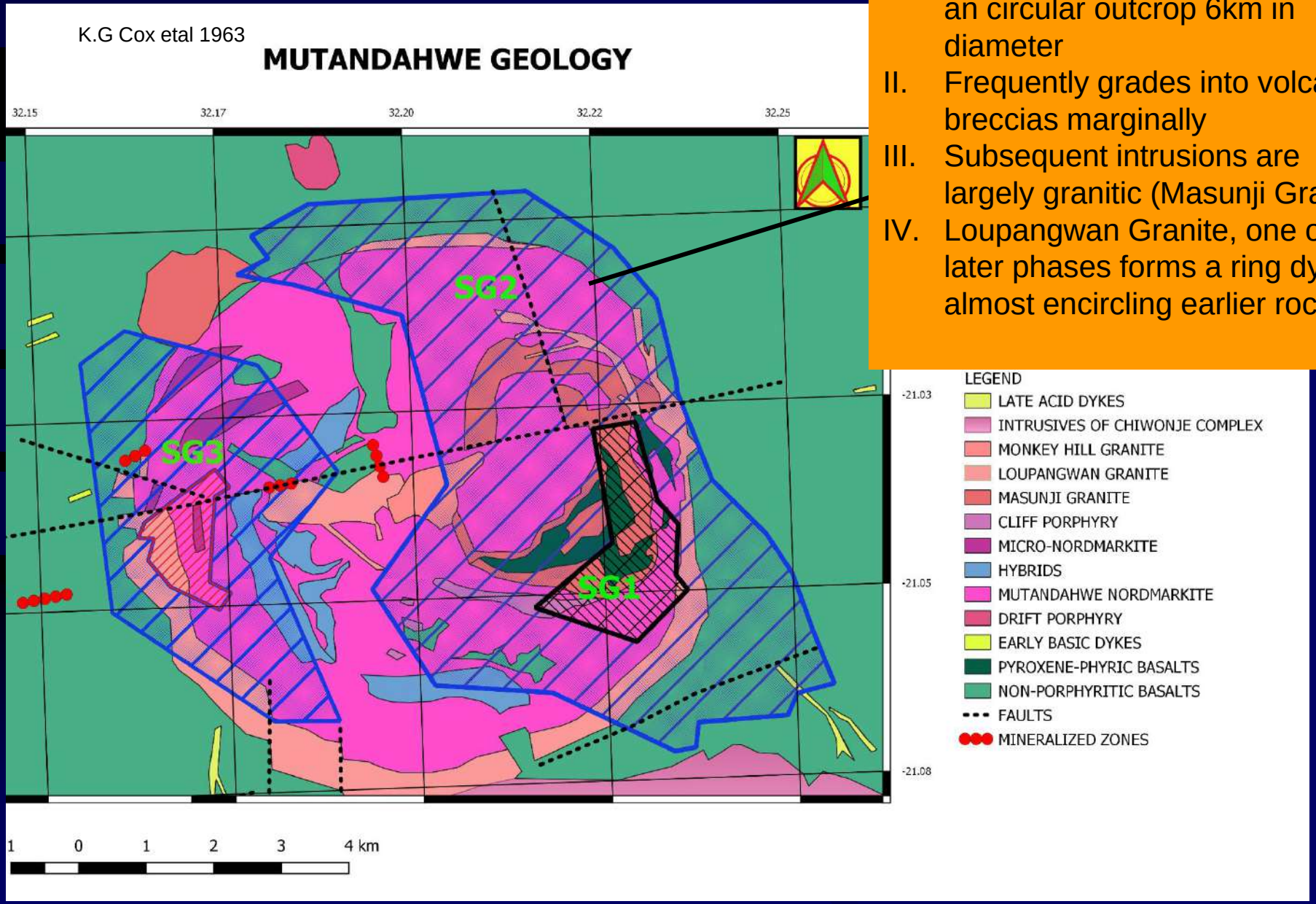


I. Syenitic/granitic ring complex, a granophyre boss, some 7km in diameter
II. Country rocks are Karoo basalts, in which copper/tungsten mineralization is found in veins and shears
III. Similar geological and tectonic setting as the Climax Mine
IV. Molybdenum/Fluorite mineralization is seen in the extrusives of the complex, being volcanic breccia rocks of the complex

Mutandahwe Geology

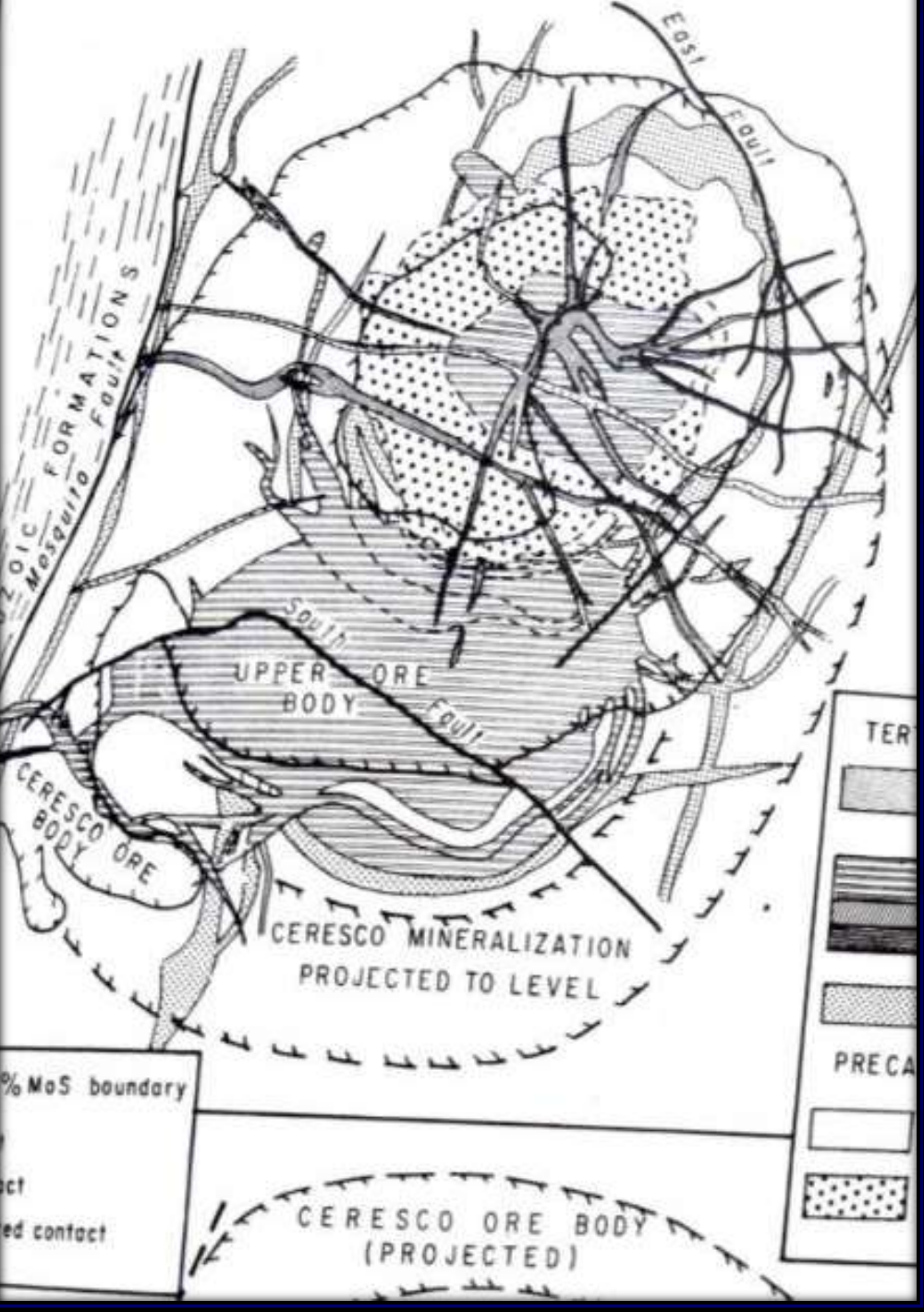
- Copper/tungsten mineralization is best developed within a 2.5km radius of the granophyre perimeter and occurs in a series of E-N-E/W-S-W trending fissures coincident with the regional Limpopo fracture pattern
- Generally sub-vertical save for Hippo Mine with a shallow dip

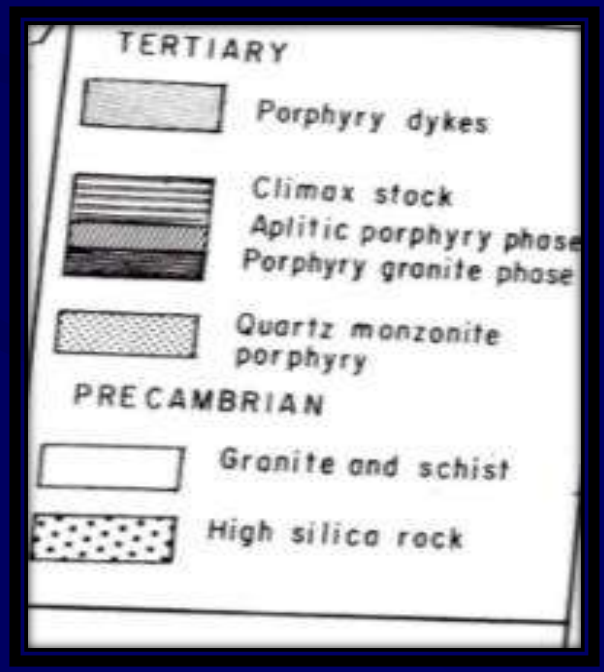
K.G Cox etal 1963



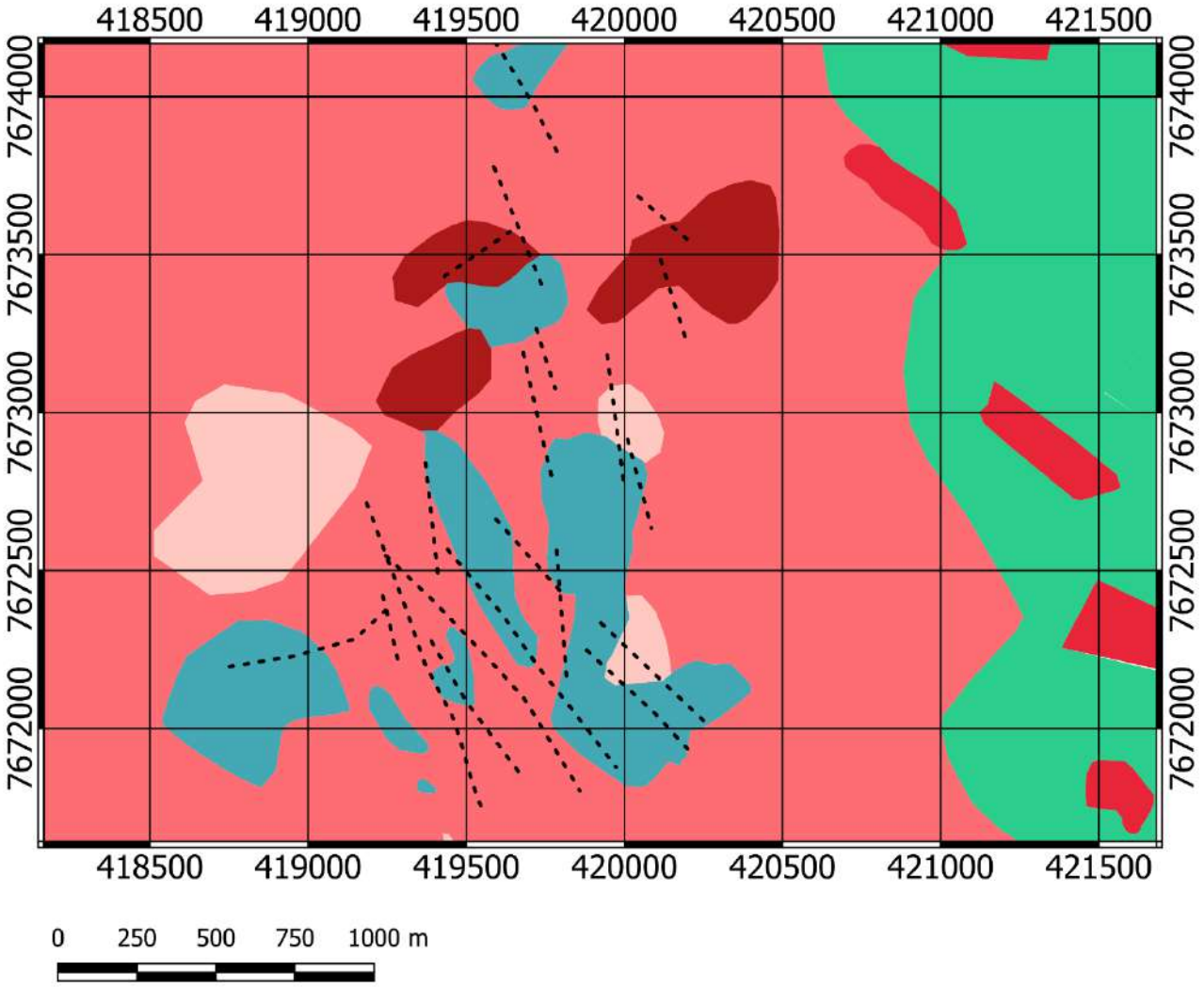
I. Mutandahwe Syenite – Forms an circular outcrop 6km in diameter
II. Frequently grades into volcanic breccias marginally
III. Subsequent intrusions are largely granitic (Masunji Granite)
IV. Loupangwan Granite, one of the later phases forms a ring dyke, almost encircling earlier rocks

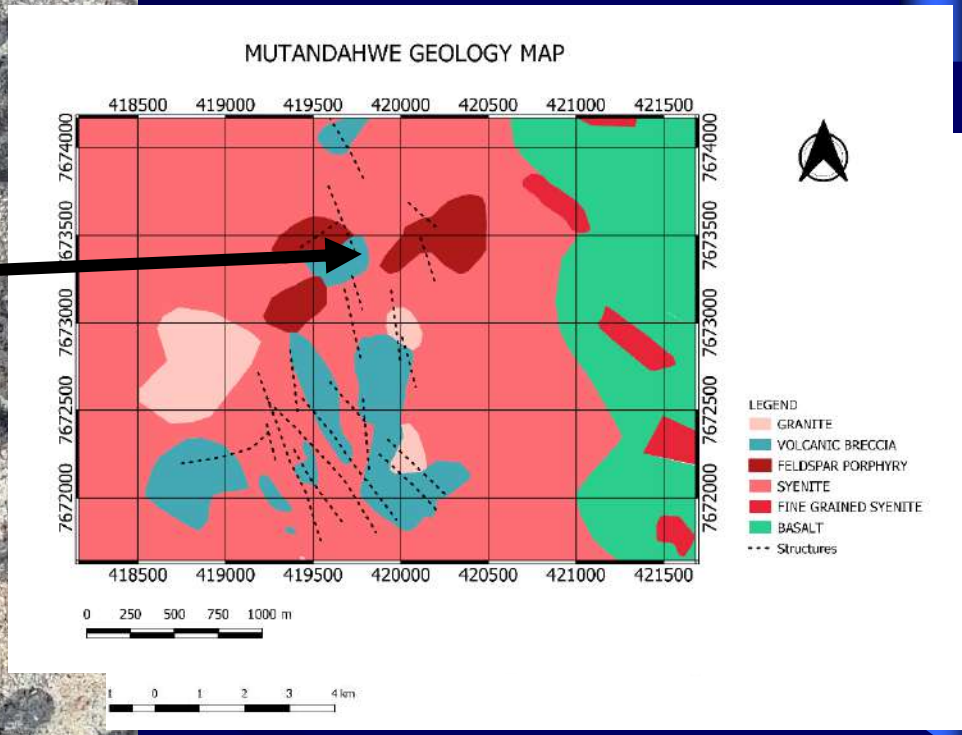
SIMPLIFIED CLIMAX MINE GEOLOGY



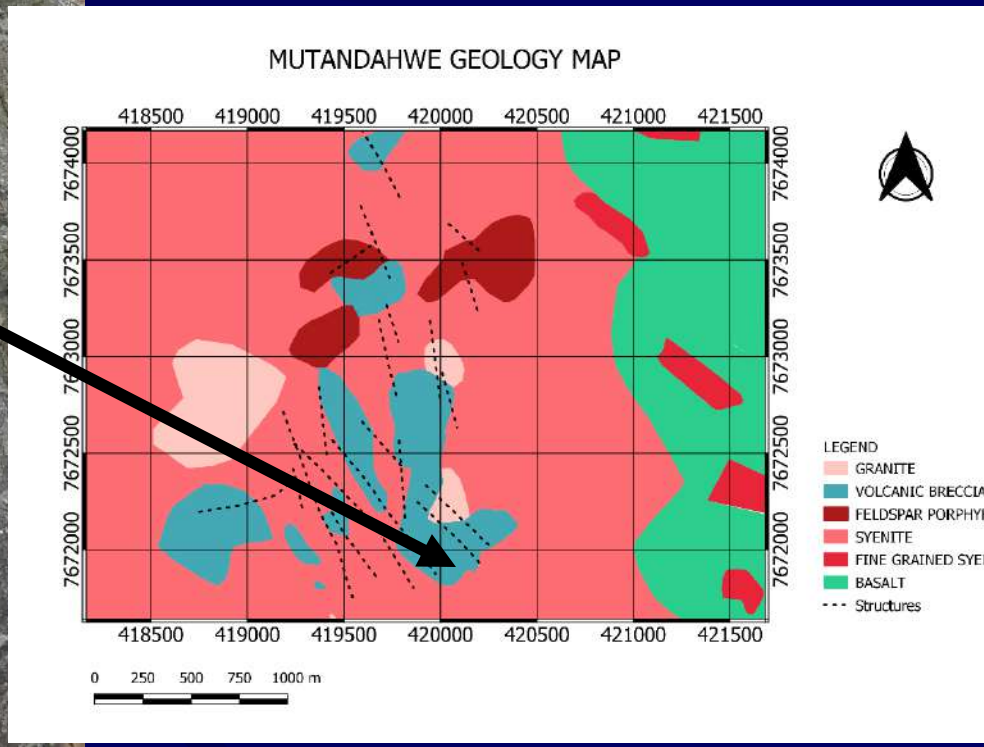


MUTANDAHWE GEOLOGY MAP

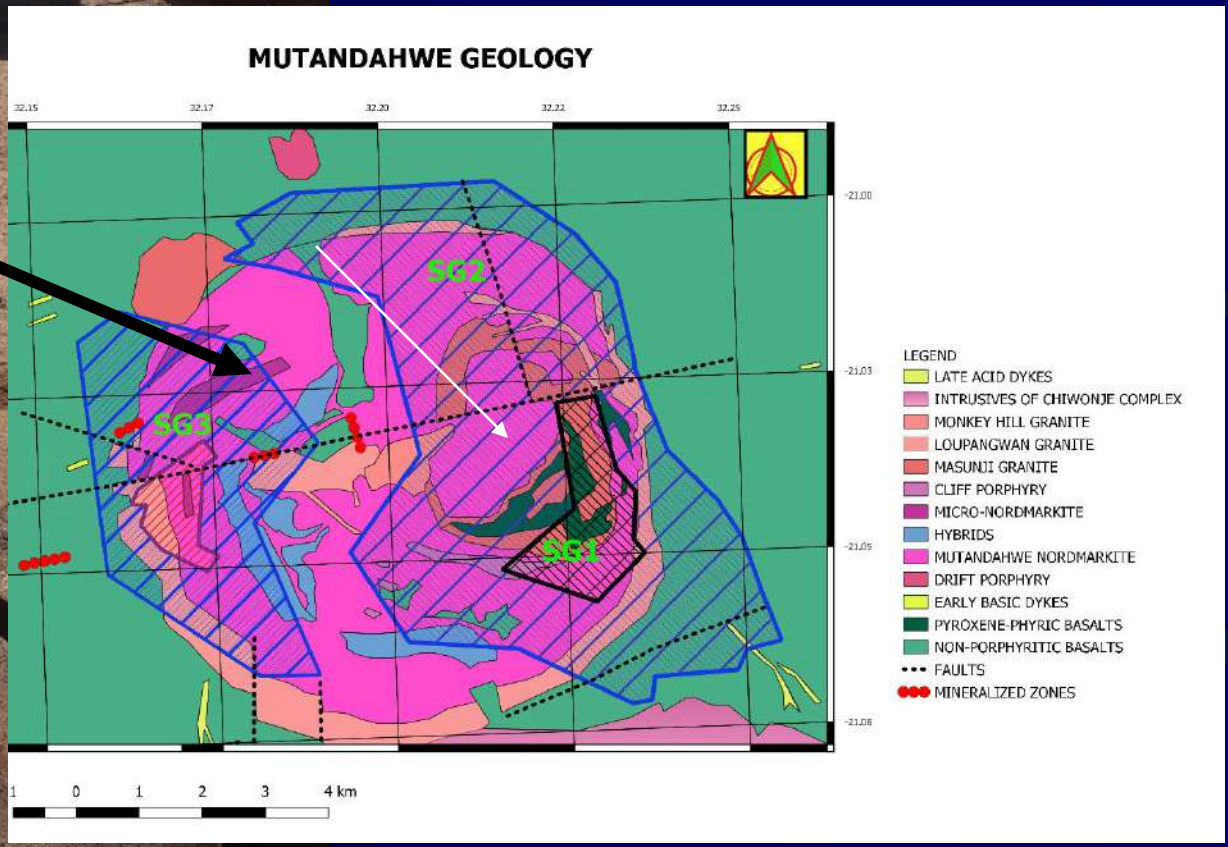



MUTANDAHWE GEOLOGY MAP
418500
419000
419500
420000
420500
421000
421500
7674000
7673500
7673000
7672500
7672000
LEGEND
GRANITE
VOLCANIC BRECCIA
FELDSPAR PORPHYRY
SYENITE
FINE GRAINED SYENITE
BASALT
Structures
0 250 500 750 1000 m
4 km

CLAST SUPPORTED BRECCIA



FINE GRAINED SYENITE/MICRO-NORDMARKITE ON THE WEST BANK OF SAVE RIVER

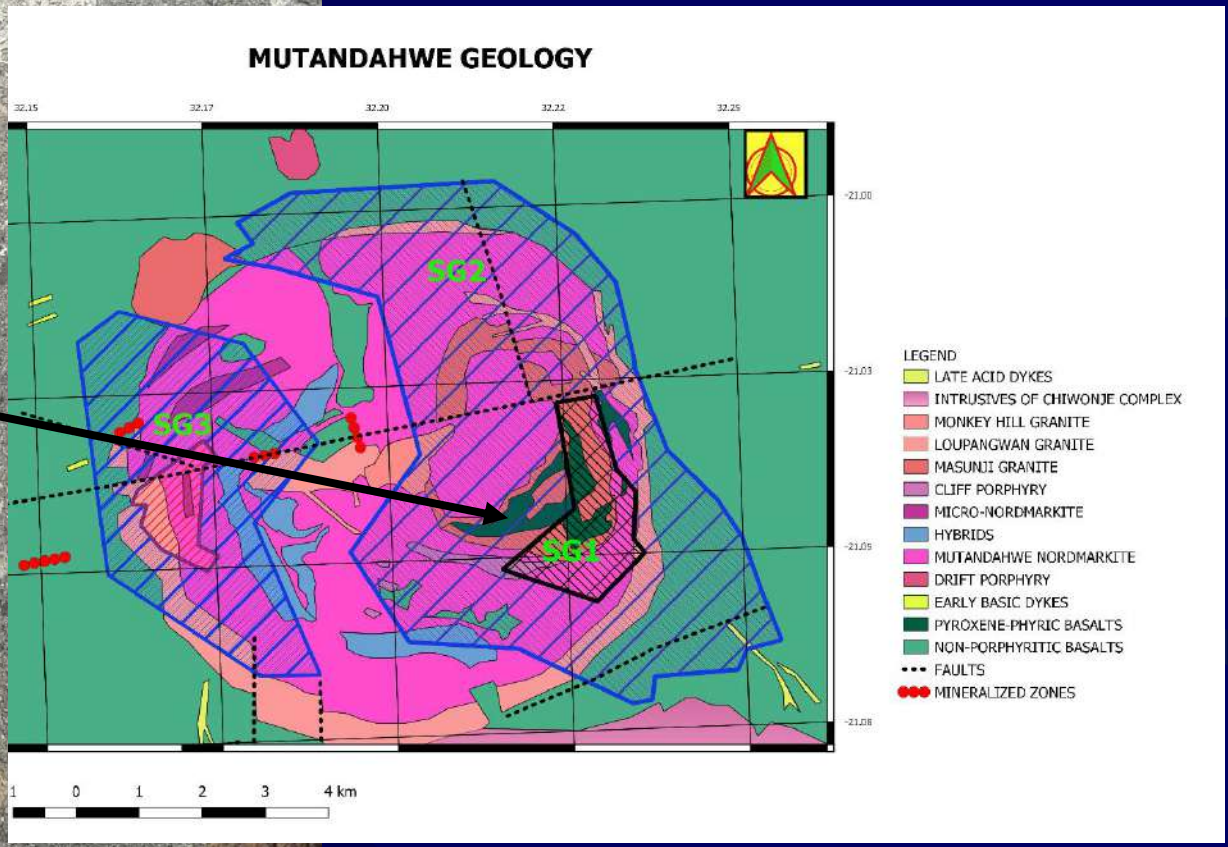


COARSE GRAINED SYENITE

NORDMARKITE	%
SiO2	61.48
TiO2	0.67
Al2O3	17.28
Fe2O3	1.98
FeO	3.7
MnO	0.12
MgO	0.64
CaO	2.33
Na2O	4.46
K2O	6.1
H2O+	0.46
H2O-	0.25
P2O5	0.17
Total	99.64

C.I.P.W	%
Quartz	5.12
orthoclase	36.14
albite	37.2
anorthite	9.5
diopside	1.12
hypersthene	5.54
magnetite	2.32
ilmenite	1.22
apatite	0.34
Total	98.5

Source K. G Cox 1963


MUTANDAHWE GEOLOGY
32.15
32.17
32.20
32.22
32.25
-21.00
-21.03
-21.05
-21.08
SG2
SG3
SG1
LEGEND
LATE ACID DYKES
INTRUSIVES OF CHIWONJE COMPLEX
MONKEY HILL GRANITE
LOUPANGWAN GRANITE
MASUNJI GRANITE
CLIFF PORPHYRY
MICRO-NORDMARKITE
HYBRIDS
MUTANDAHWE NORDMARKITE
DRIFT PORPHYRY
EARLY BASIC DYKES
PYROXENE-PHYRIC BASALTS
NON-PORPHYRITIC BASALTS
FAULTS
MINERALIZED ZONES
1 0 1 2 3 4 km

Sharp Contact – Syenite/Basalt

BASALT	ppm
Ba	400
Li	<10
Sr	350
Co	35
Cr	300
Ga	15
La	<100
Mo	<3
Mn	nd
Nb	<30
Ni	90
Pb	˜10
Ti	>3000
V	200
Y	˜30
Zr	350
Sc	nd
Be	<3
Ge	nd
Ta	<100
Rb	<100
Cu	˜30

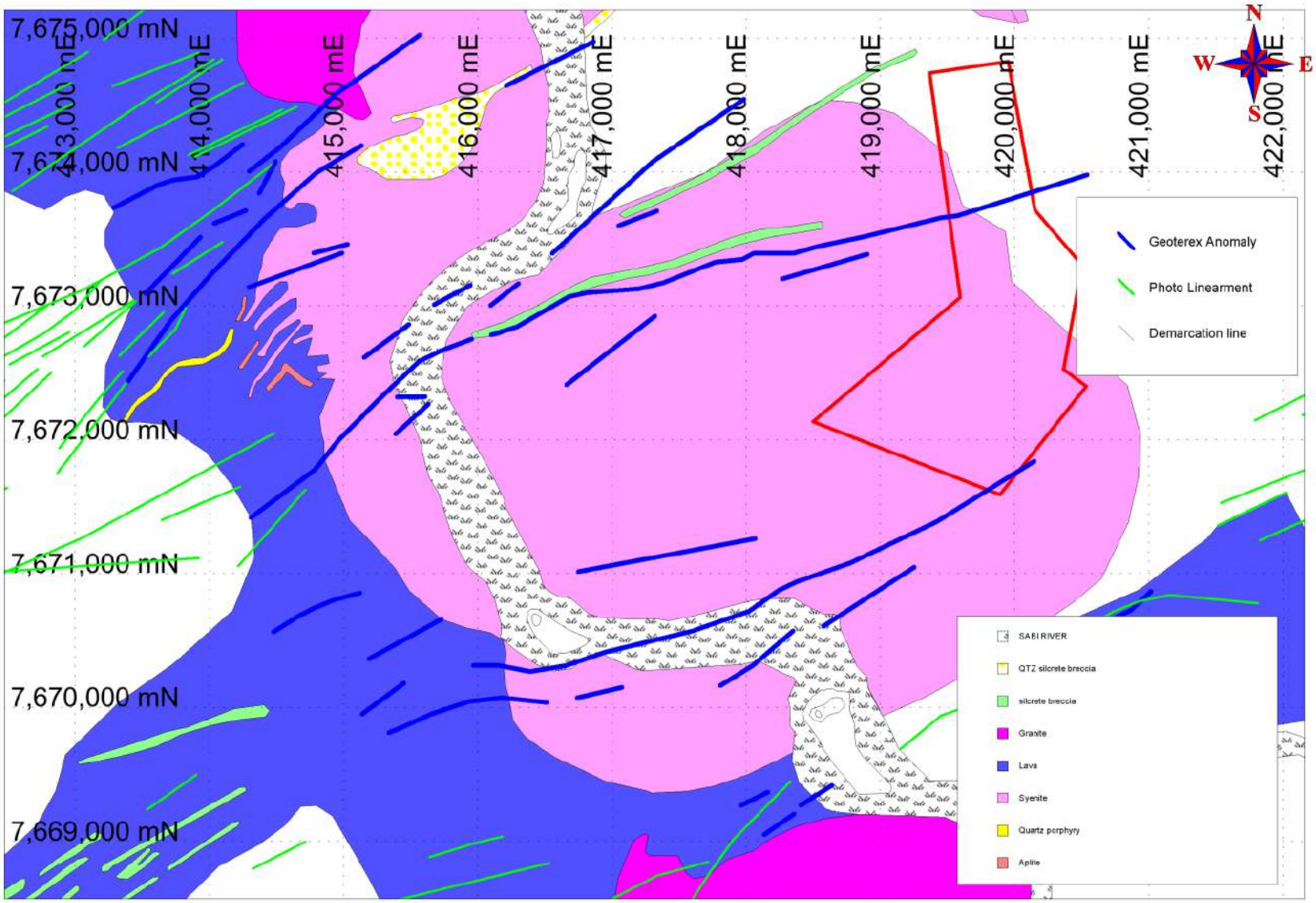
Multiple phases of magmatism (felsic > basaltic>felsic)

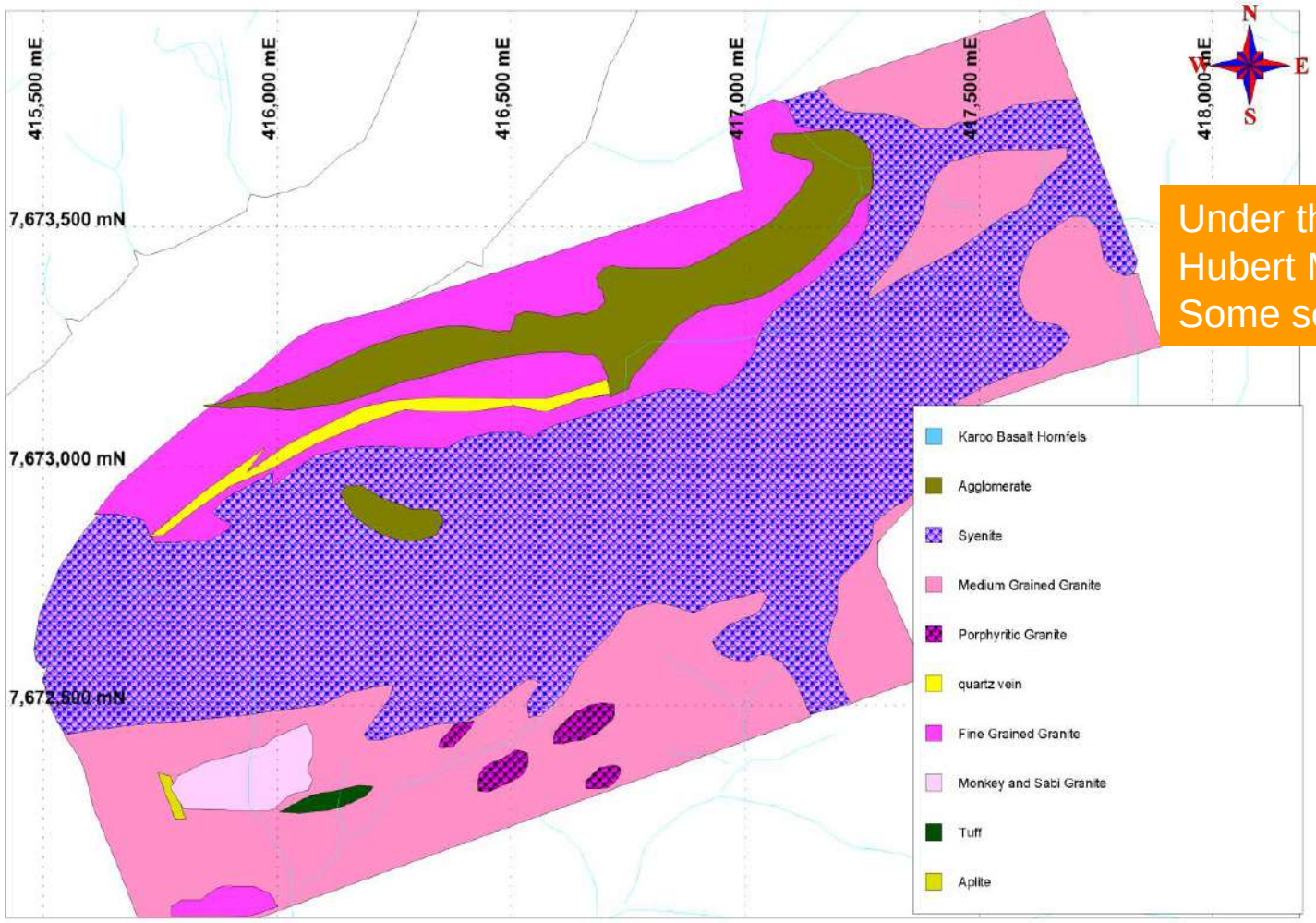
Historical Work

- The area has been held by numerous companies in search for copper, tungsten and molybdenum.
- EPO 234 - for copper, lead, zinc, silver and tungsten for Johannesburg Consolidated Investment Company (1968)
- EPO 267 - for copper, tungsten, fluorite and gold for South African Manganese Ltd
- Claims BM5739, BM5740, BM5741, BM5742, BM5743 and BM5744

Historical Work (cont..)

- Results from EPO 234 produced geological map on a scale of 1:25 000; an airborne combined electromagnetic (INPUT) and magnetic survey interpretation
- ZMDC's Munyanyiwa mapped section of the complex
- ZMDC Drilled and sunk an Adit on one of their geochemistry anomalies and defined 2.3 MT Proven Reserve + 2.7 MT Estimated Reserve to an 89m depth (Mr Sam Siziba) – *Recommendations of a geophysical program were made*


7,675,000 mN
7,674,000 mN
7,673,000 mN
7,672,000 mN
7,671,000 mN
7,670,000 mN
7,669,000 mE
413,000 mE
414,000 mE
415,000 mE
416,000 mE
417,000 mE
418,000 mE
419,000 mE
420,000 mE
421,000 mE
422,000 mE
N
W
E
S
Geoterex Anomaly
Photo Lineament
Demarcation line
SABI RIVER
QTZ silcrete breccia
silcrete breccia
Granite
Lava
Syenite
Quartz porphyry
Aplite



Under the tenure of ZMDC, Hubert Munyanyiwa mapped Some section of the Complex

Proven Moly (molybdenite ore)

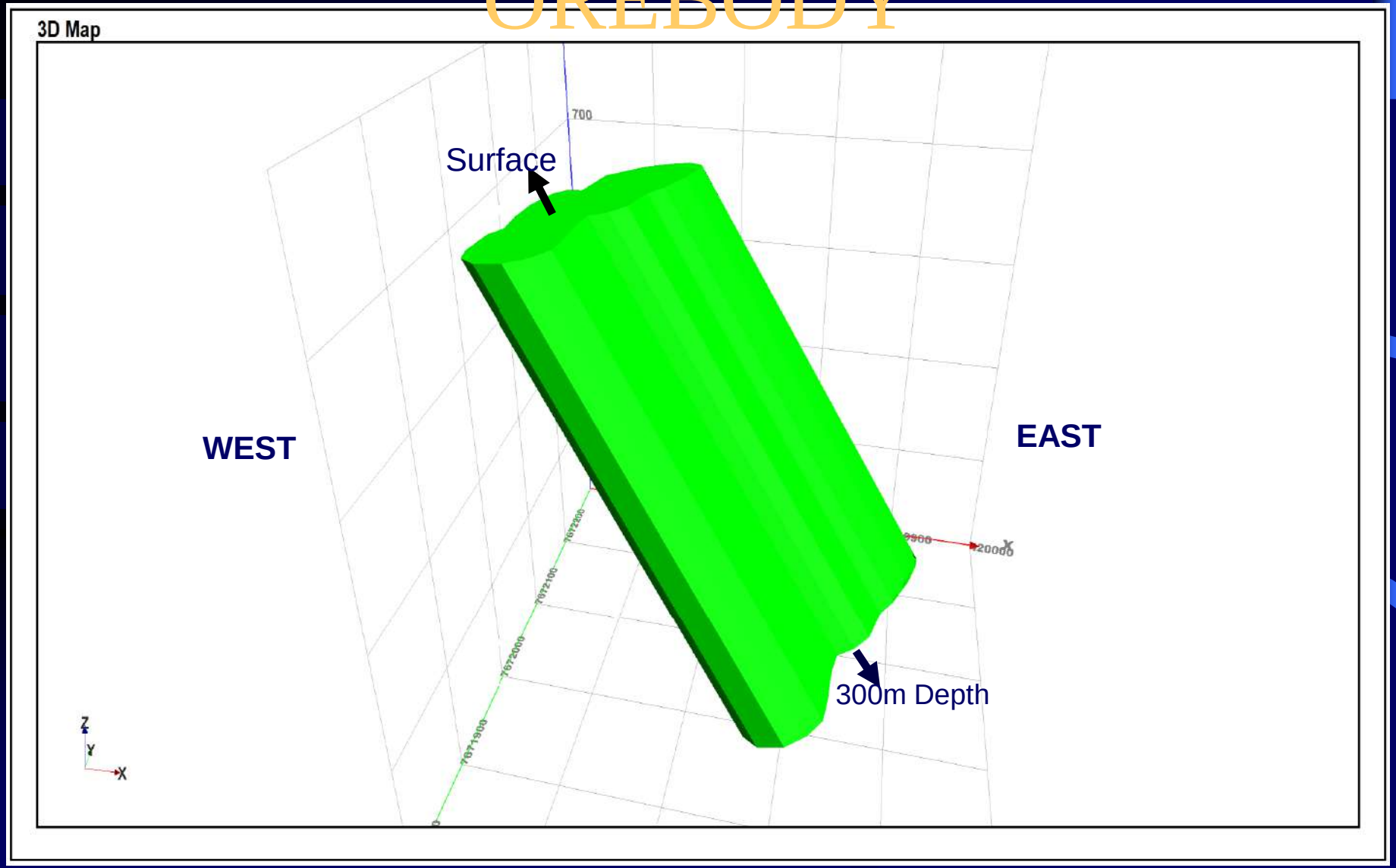
Section	4W	3W	2W	1W	1E	2E
3N		53,808	19,470	8,776	3,717	14,5042
2N	3319	221,545	241,605	19,9125	219,038	14,5042
1N			1,328	18,290	53,543	147,500
						1,336,098
1/2N	30,828	100,300	91,450	66,375		
1/1N	2,434	68,883	167,560	221,250	258,125	
1/1S				319	8,850	
						1,016,374
						2,352,372
ESTIMATED						**2,700,000**
TOTAL in metric tonnes @ 0.2% Mo						**5,052,372**

10,000MT Contained Metal

Metallurgy

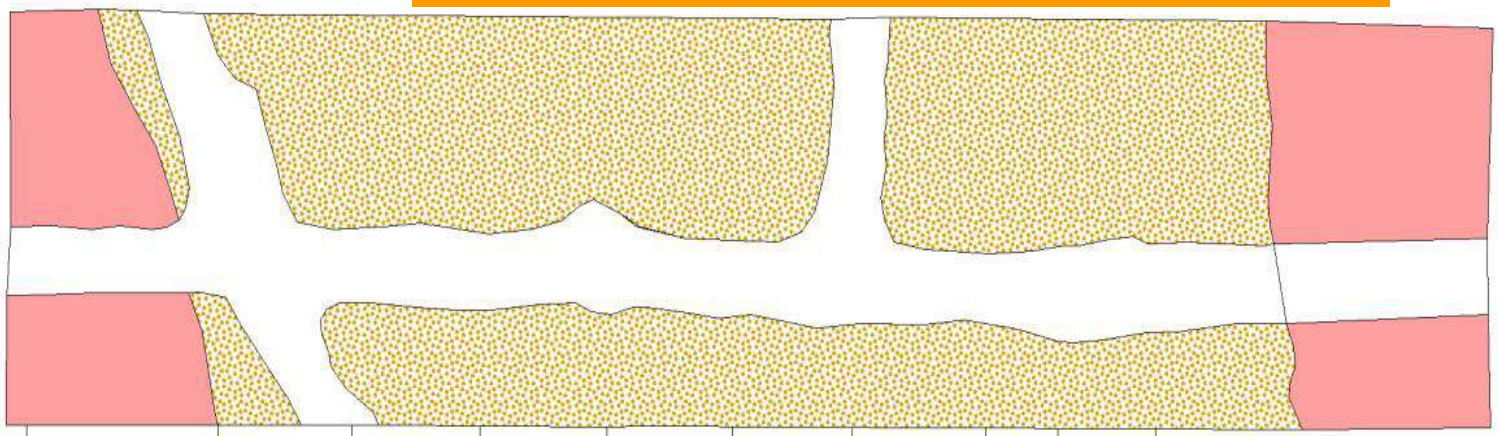
Mineral	% Approx.	SG	Hardness	Main Characteristics
Quartz (SiO_2)	60	2.65	7	
Feldspars $Al_2O_3K_2O_6SiO_2$)	20	2.57	6	
Olivine $2(MgFe)OSiO_2$	9	3.3	6.5	Decomp. by acids (SiO_2)
Pyrrhotite Fe^mS^{m+1}	3	4.6	4	Magnetic
Chalcopyrite	1	4.2	4	
Molybdenum (MoS_2)	1	4.5	1.5	Soft
Fluorite CaF_2	1	3.1	4	
Monazite $REE(PO_4)$	5	5.1	5	Soluble in H_2SO_4

3D IMAGE OF Mutandahwe OREBODY



ADIT AND Mo GRADE

Mineralization appears to increase from east to west, and dips to the east.



- 229m of Adit Development
- 124m on Ore Giving 1200MT Stockpile

3.3	20000	20000	20000	20000	19300	20000	PPM F	Fluorine
4.3	0.14	0.19	0.24	0.48	0.28	0.29	PCT P2O5	Phosphorous
5700	3980	2630	2350	1760	861	1280	PPM Mo	Molybdenum
0.06								
80								

Ore body

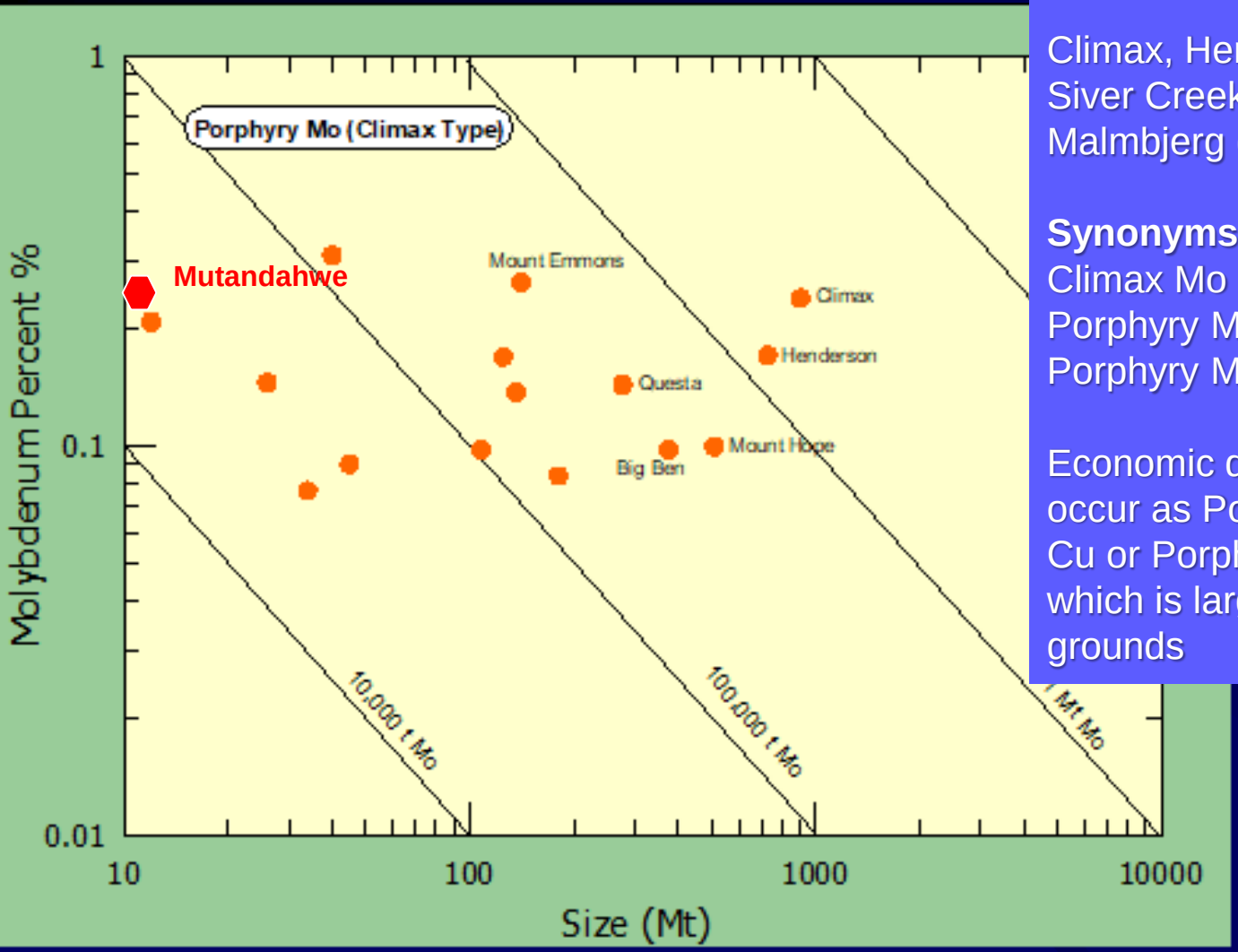
Adit

Syenite

Multi Element Analysis

Element	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5	SAMPLE 6	SAMPLE 7	
Irone Fe	10	3.8	13	11	5.9	5	3.3	0.5 PCT Neutron Activation
Sodium Na	1.9	2.6	2.2	2.3	2.3	1.8	4.3	0.5 PCT Neutron Activation
Flourine F	**>20 000**	**19 300**	**>20 000**	**>20 000**	**>20 000**	**>20 000**	**5 700**	20 ppm Specific Ion
Phosphorous P_2O_5	0.29	0.28	>0.48	0.24	0.19	0.14	0.06	0.01 PCT DC Plasma
Molybdenum Mo	**1280**	**861**	**1760**	**2 350**	**2 630**	**3 980**	**89**	2 ppm Specific Ion
Zirconium Zr	<500	650	570	600	<500	<500	640	500 ppm Specific Ion
Barium Ba	570	<100	830	420	<100	210	270	100 ppm Specific Ion
Rubidium	340	210	240	260	140	190	220	200 ppm Specific Ion
Tantalum Ta	11	19	7	9	21	10	15	1 ppm Specific Ion
Hafnium Hf	12	14	8	7	12	11	20	2 ppm Specific Ion
Cadmium Cd	<10	<10	17	<10	15	<10	<10	10 ppm Specific Ion
Selenium Se	<10	<10	<10	<10	<10	<10	<10	10 ppm Specific Ion
Tungsten W	**18**	**9**	**9**	**9**	**6**	**11**	**<12**	2 ppm Neutron Activation
Bromine Br	<5	<5	<5	<5	<5	<5	<5	1 ppm Neutron Activation
Silver Ag	<5	<5	<5	<5	<5	<5	<5	5 ppm Neutron Activation
Scandium Sc	6.8	1.2	11	6.7	<0.5	3.2	5.1	0.5 ppm Neutron Activation
Arsenic As	4	2	3	2	<1	2	7	1 ppm Neutron Activation
Iridium Ir	<100	<100	<100	<100	<100	<100	<100	100 ppb
Cerium Ce	**800**	**510**	**770**	**650**	**710**	**490**	**480**	10 ppm
Lanthanium La	**722**	**350**	**678**	**539**	**720**	**470**	**340**	5 ppm
Samanium Sm	25	24	29	25	27	21	18	0.1 ppm
Ytterbium Yb	5	9	6	8	10	6	5	5 ppm
Terbium Tb	5	5	5	5	5	5	5	1 ppm
Europium Eu	<2	<2	<2	<2	<2	<2	<2	<2 ppm
Lutetium Lu	1.2	1.3	1.3	1.5	2.1	1.2	1	0.5 ppm
Thorium Th	50.8	87.3	32	54	96.6	53.9	76	0.5 ppm
Uranium U	16	25	9.5	13	31	11	12	0.5 ppm

MOTIVATION FOR CLIMAX-TYPE Mo RECOGNITION



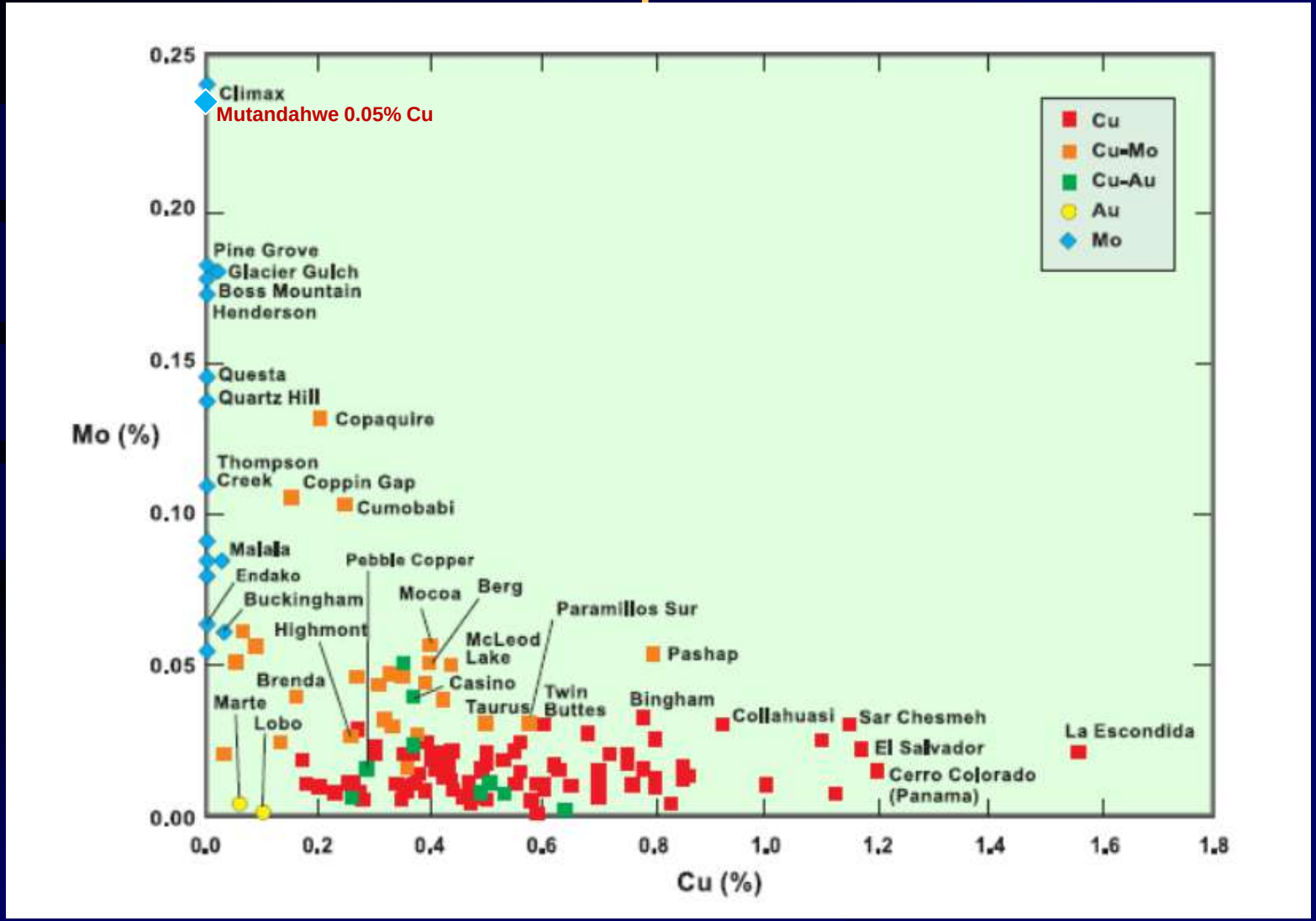
Extremely rare:

Climax, Henderson, Mt Emmons, Siver Creek, Pine Grove, Questa (USA) Malmbjerg (Greenland), Nordli (Norway)

Synonyms:
Climax Mo
Porphyry Molybdenum
Porphyry Mo (Climax-Type)

Economic deposits of molybdenum occur as Porphyry Cu-Mo, Porphyry Mo-Cu or Porphyry Mo, the distinction of which is largely based on economic grounds

Mo versus Cu grades in porphyry deposits



Adapted from W. Sinclair Geological Survey of Canada, 601 Booth St., Ottawa, Ontario, K1A 0E8

MOTIVATION – CLIMAX TYPE Mo cont….

- CLIMAX MINE IS THE LEADING Mo PRODUCER

WHY CLIMAX?

Characteristic	Climax Mine - Colorado	Mutandahwe
Age	Cretaceous to Tertiary	Younger than Jurassic basalts – likely Cretaceous
Tectonic Setting	Post-subduction, extensional	Block fault/ extensional tectonics
Associated granite type	A-type granite	A-type granite
Ore-type	Quartz-molybdenite stock work	Quartz-molybdenite
Chemistry	High fluorine >1%	High fluorine >2%
	Rubidium ±500ppm	Rubidium ±340ppm
	Niobium >50ppm	Niobium?? (not assayed)
	Molybdenum (Mo) 0.1% - 0.3%	Molybdenum 0.1% - 0.4%
	Elevated Caesium (Cs)	Cs ± 2ppm
	Elevated Tin (Sn)	Sn ± 200ppm
	Elevated Tantalum (Ta)	Ta ± 11ppm
	Elevated Rare Earth Elements	Lanthanum (La) ±722ppm Cerium (Ce) ± 800ppm Samarium (Sm) ± 29ppm Ytterbium (Yb) ± 10ppm
Tonnage	>1,000,000 Metric Tonnes (MT) contained Mo	Currently 10,000MT contained Mo proved and inferred

CLIMAX–Type Porphyry Mo Deposit Characteristics

No. of Stock Phases.

- Climax-Type: (1) porphyritic to aplitic Climax Stock (2) Central mass of Climax Stock (3) Quartz monzonite porphyry (4) Minturn Formation
- Mutandahwe - (1) Porphyritic syenite (2) Fine-grained Masunji granite (3) Medium-grained Monkey

Alteration.

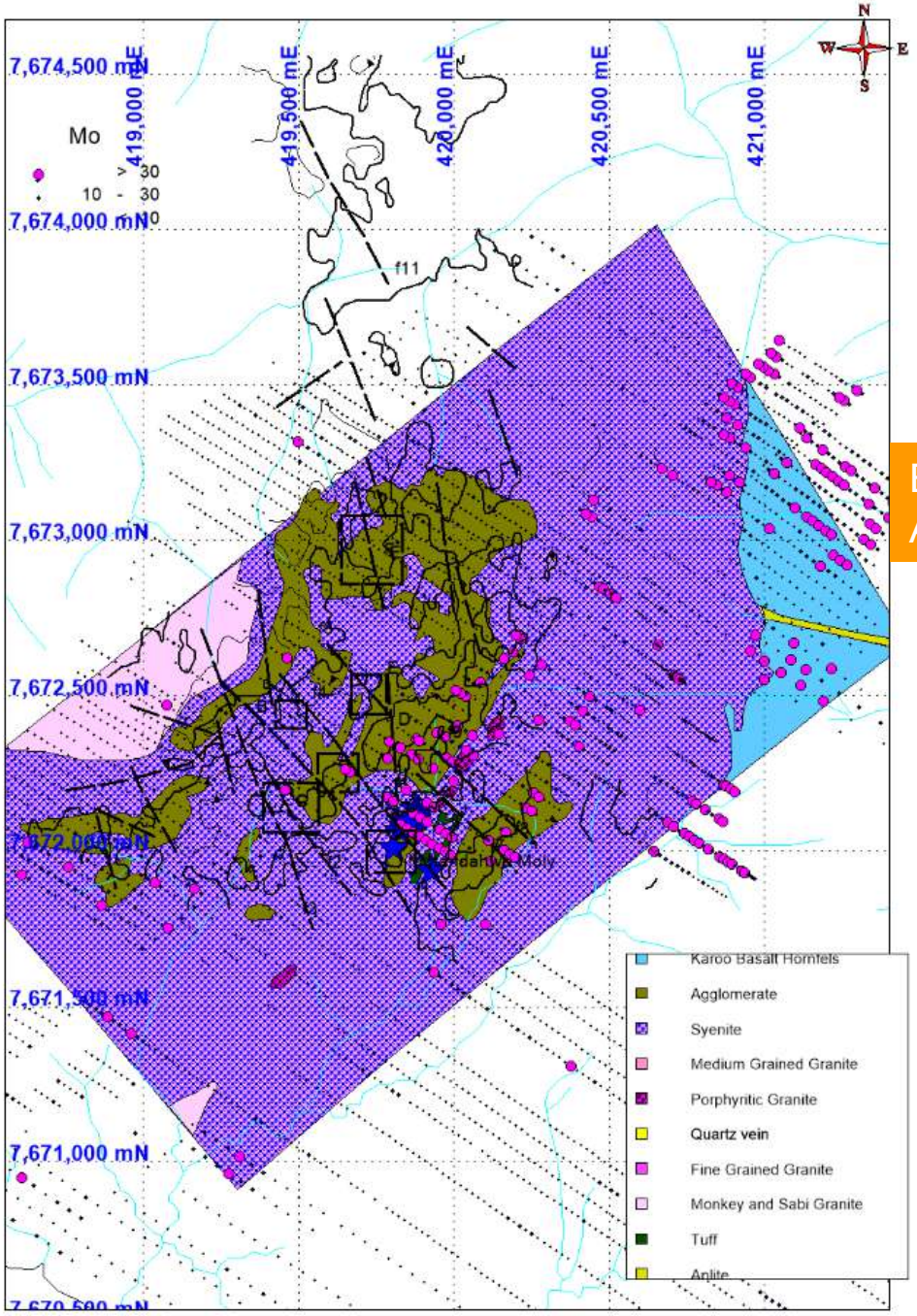
- Climax-Type - Hydrothermal.
- Mutandahwe - Hydrothermal

Orebody shape

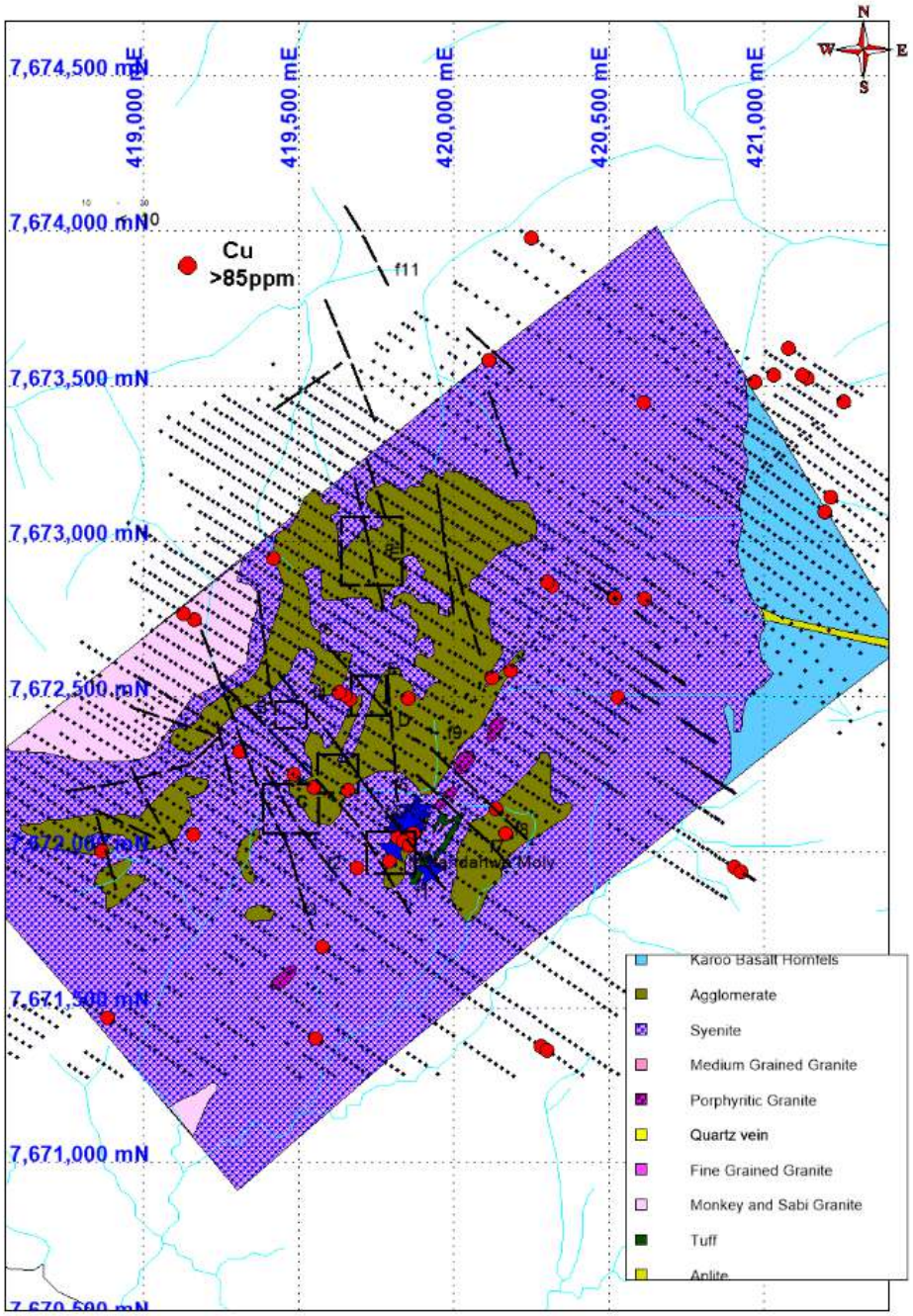
- Climax-Type - Cylindrical
- Mutandahwe - Cylindrical

PHASE ONE EXPLORATION PROGRAMME

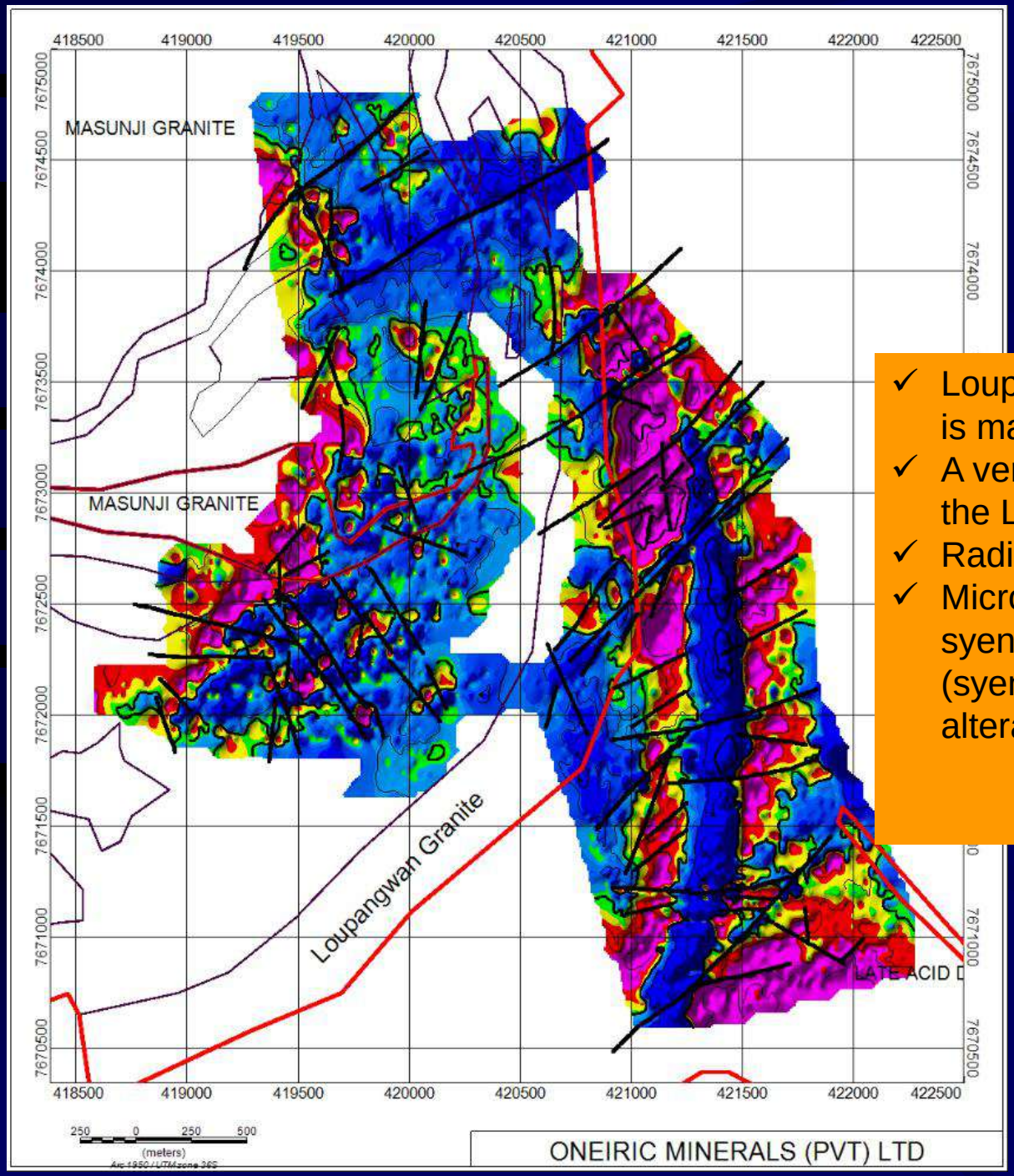
- OBTAINED EMA CERTIFICATION – 3 SGs
- SOIL GEOCHEMISTRY
- CLEANED AND RESAMPLED TRENCHES
- GEOLOGICAL MAPPING (1:10000)
- GEOPHYSICAL SURVEYS
- ADDITIONAL TRENCHING
- VERIFIED HISTORICAL DRILLING RESULTS AND TECHNICAL REPORTS



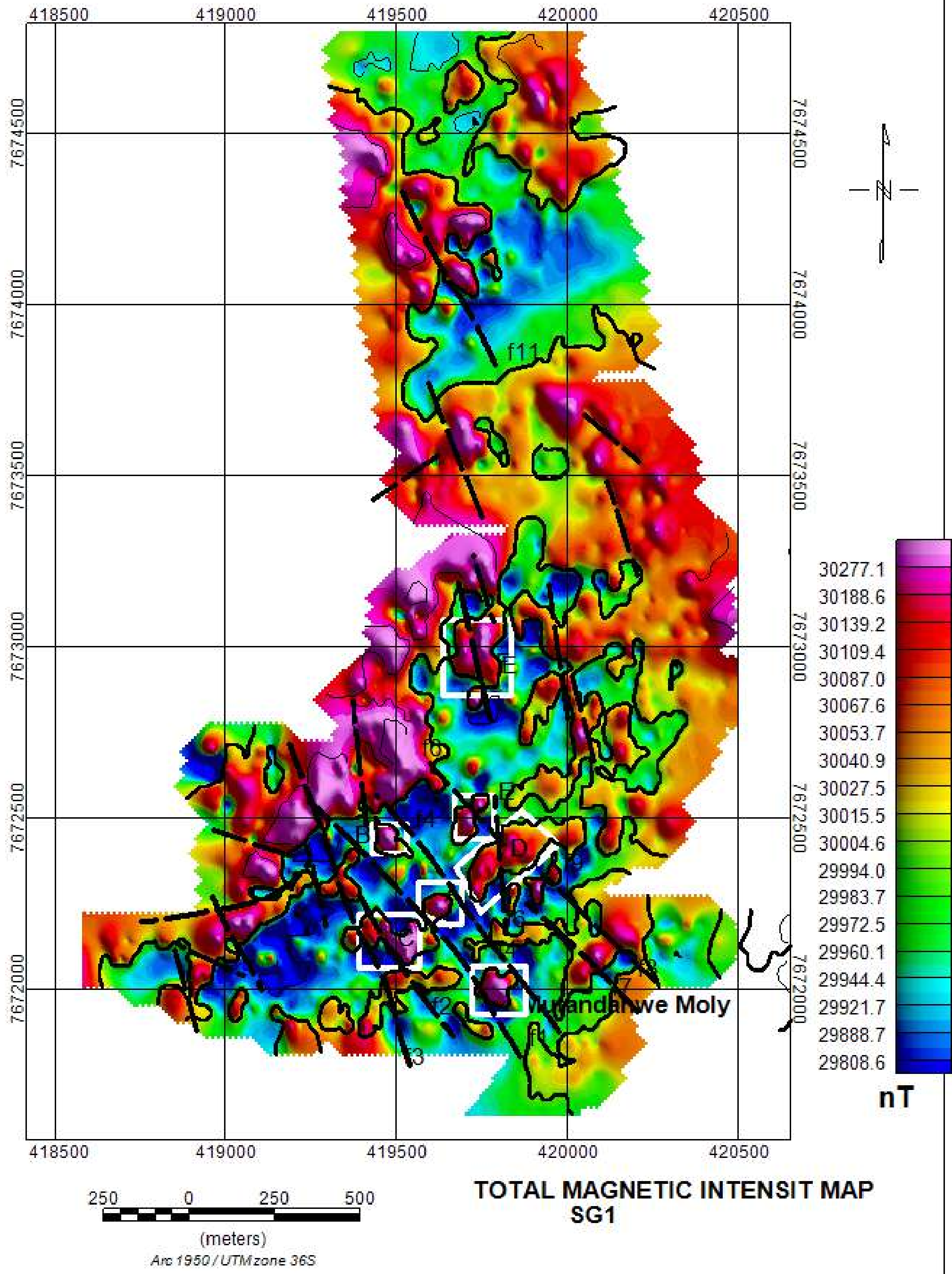
ELEVATED Mo VALUES ON AGGLOMERATES AND SYENITE BASALT CONTACTS



Copper is lower – sporadic highs.
Elevated around the known lense



- ✓ Loupangwan Granite\Basalt Contact is mapped from the ground magnetics
- ✓ A very low magnetic feature encircling the Loupangwan Granite is also mapped
- ✓ Radial Fractures are mapped
- ✓ Micro-magnetic variations within the syenite is due to mineralogical variation (syenite grades to breccia), and alteration


418500
419000
419500
420000
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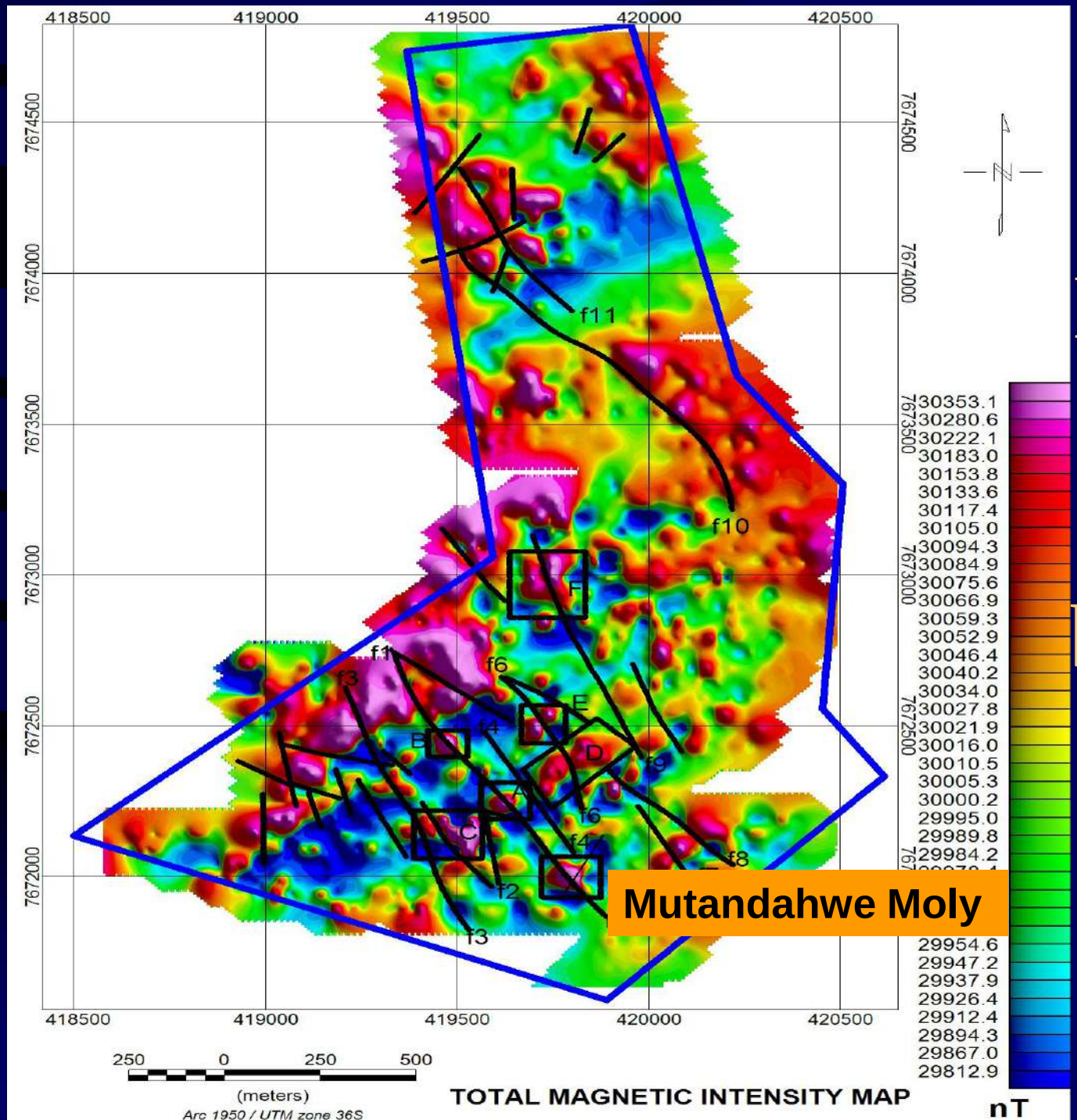
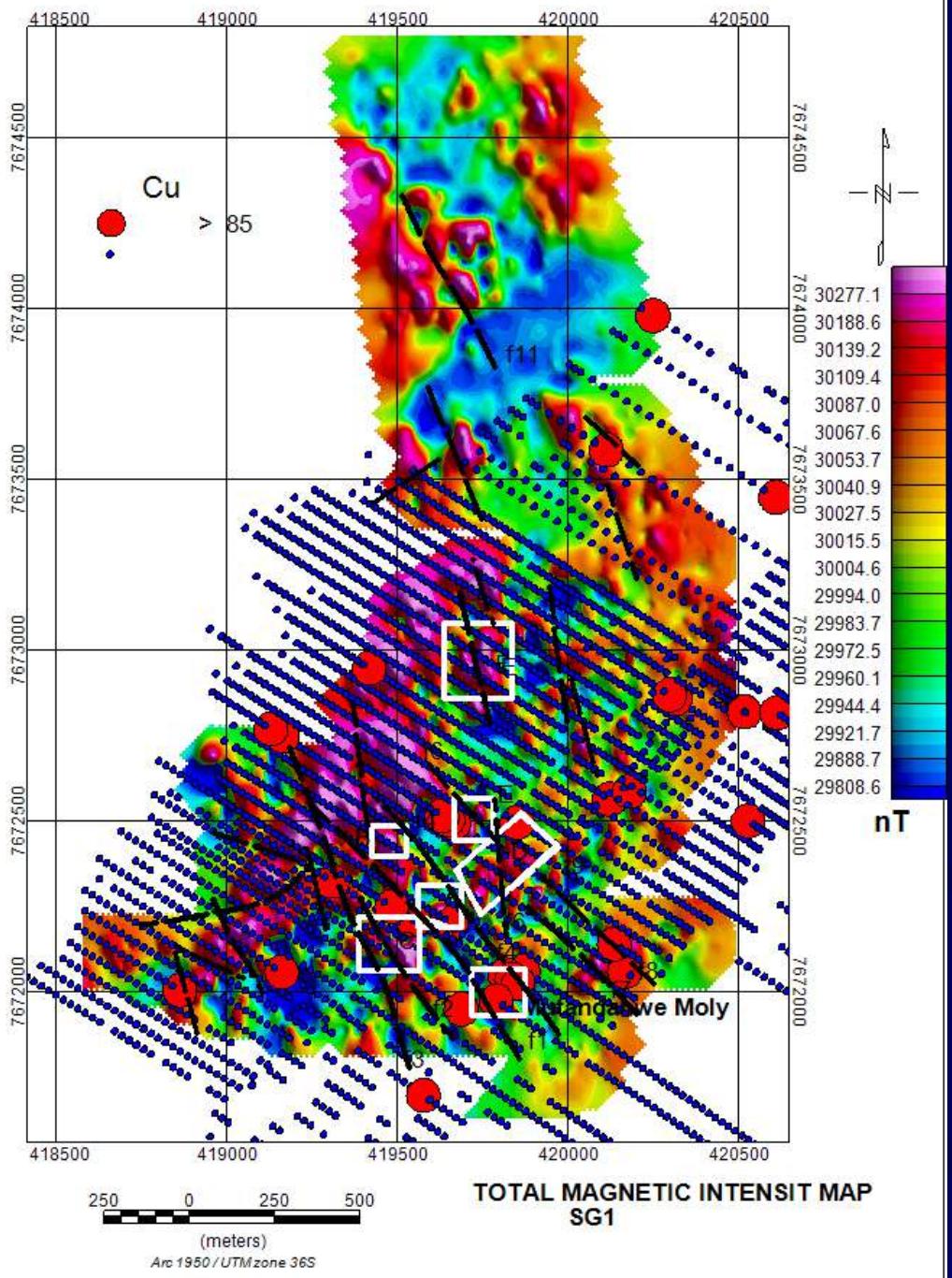
7674500
7674000
7673500
7673000
7672500
7672000
f11
Murandamwe Moly
30277.1
30188.6
30139.2
30109.4
30087.0
30067.6
30053.7
30040.9
30027.5
30015.5
30004.6
29994.0
29983.7
29972.5
29960.1
29944.4
29921.7
29888.7
29808.6
nT
250
0
250
500
(meters)
Arc 1950 / UTM zone 36S
TOTAL MAGNETIC INTENSIT MAP
SG1



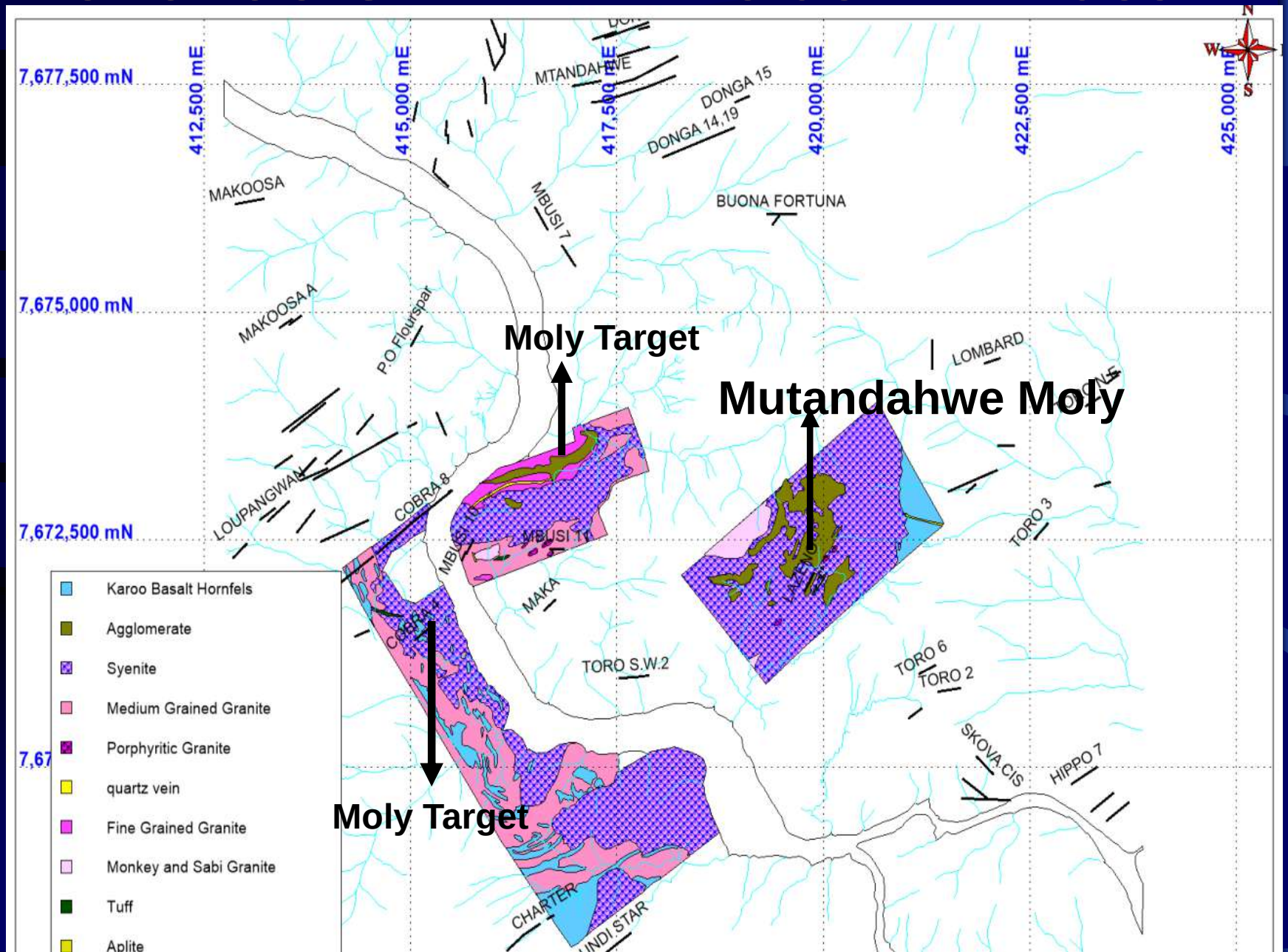
Magnetic Map Overlain by Target



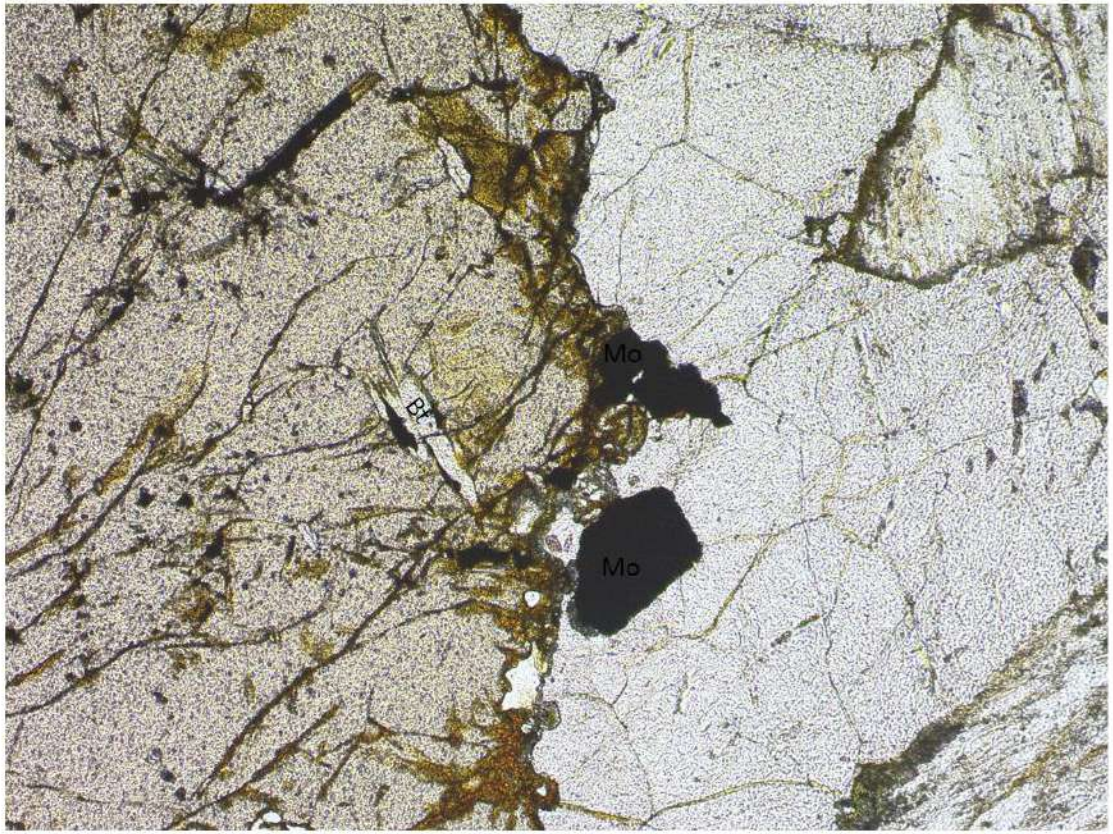
TOTAL MAGNETIC INTENSIT MAP
SG1

Data Integration and re-interpretation

GEOLOGICAL MAPPING SG2 AND SG3



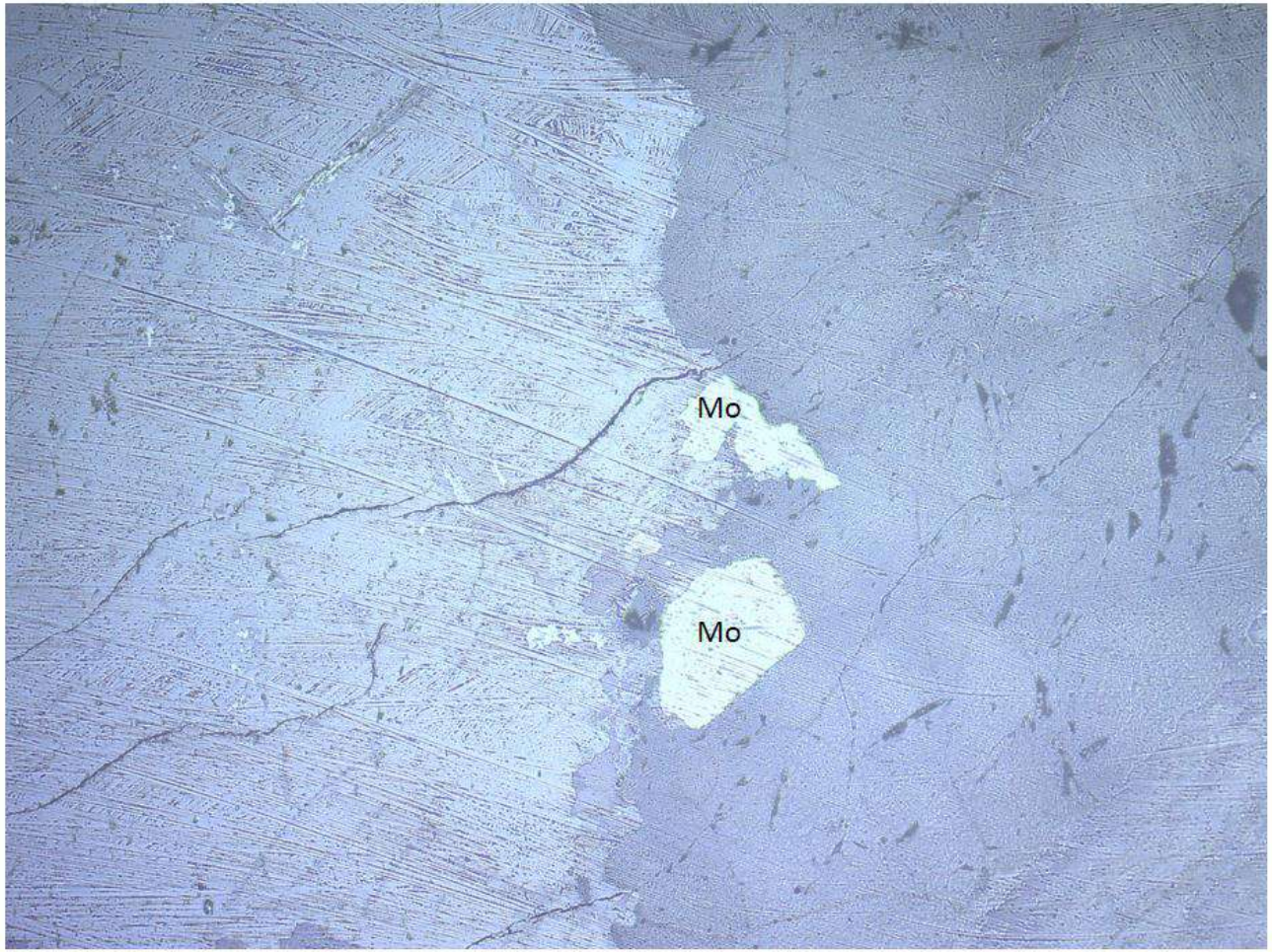
ORE PETROGRAPHY



Mo is greater than 2.5% where the host is fractured in Plane Polarized Light.

High grade Mo on fractured part of syenite

Moly flakes

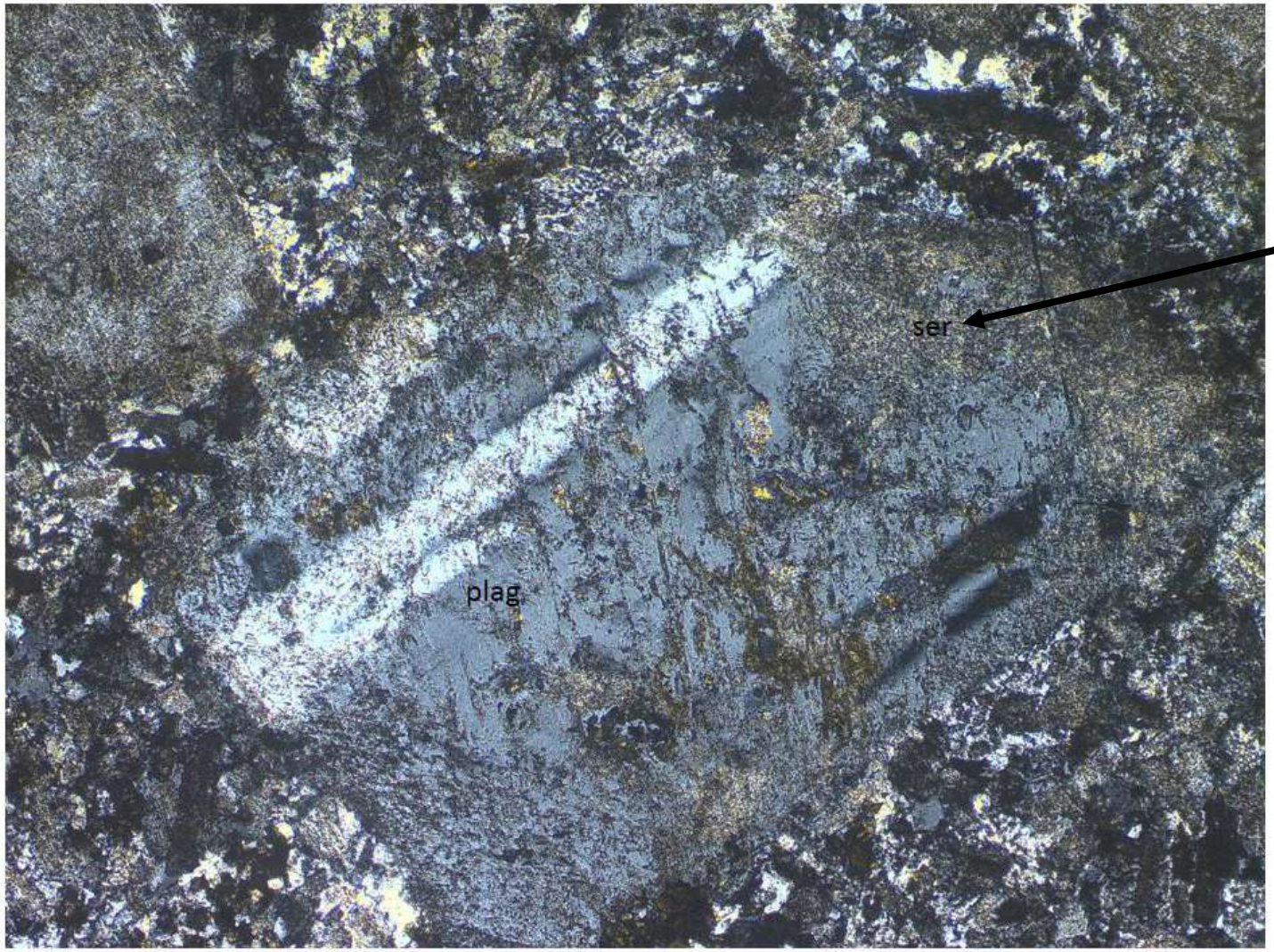


Mo in Reflected Light

Mo (opaque) within the matrix in Plane Polarized Light.

Mo >1%

ALTERATION



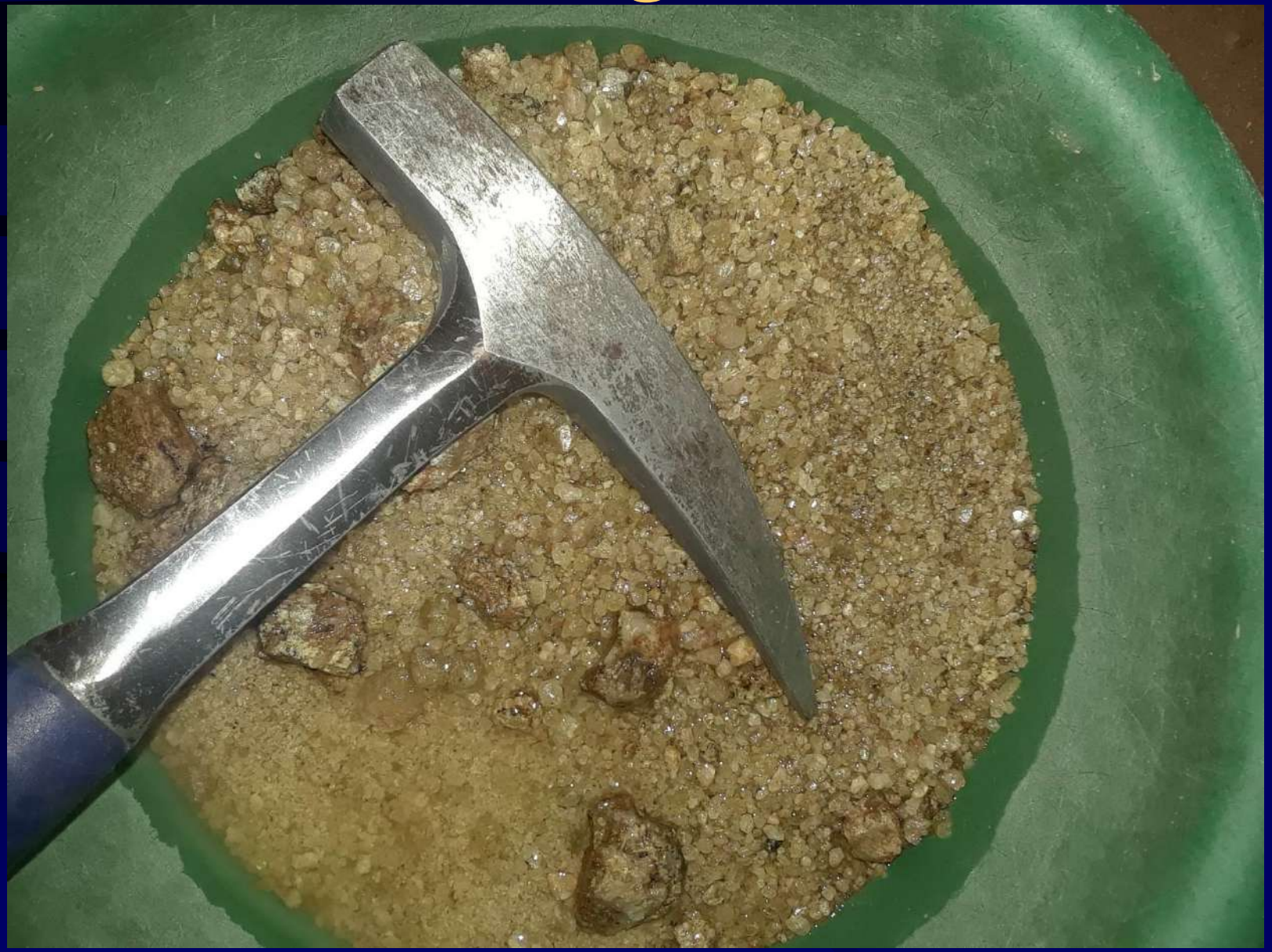
Sericitic alteration

EXPLORATION OBJECTIVES

Establishing/drilling:

- a resource of 60 million MT of molybdenite, the potential being in excess of 100 million MT
- the igneous/basalt wall provinces for tungsten/copper mineralization.
- A total 25,000m of drilling is planned for OM's exploration programme

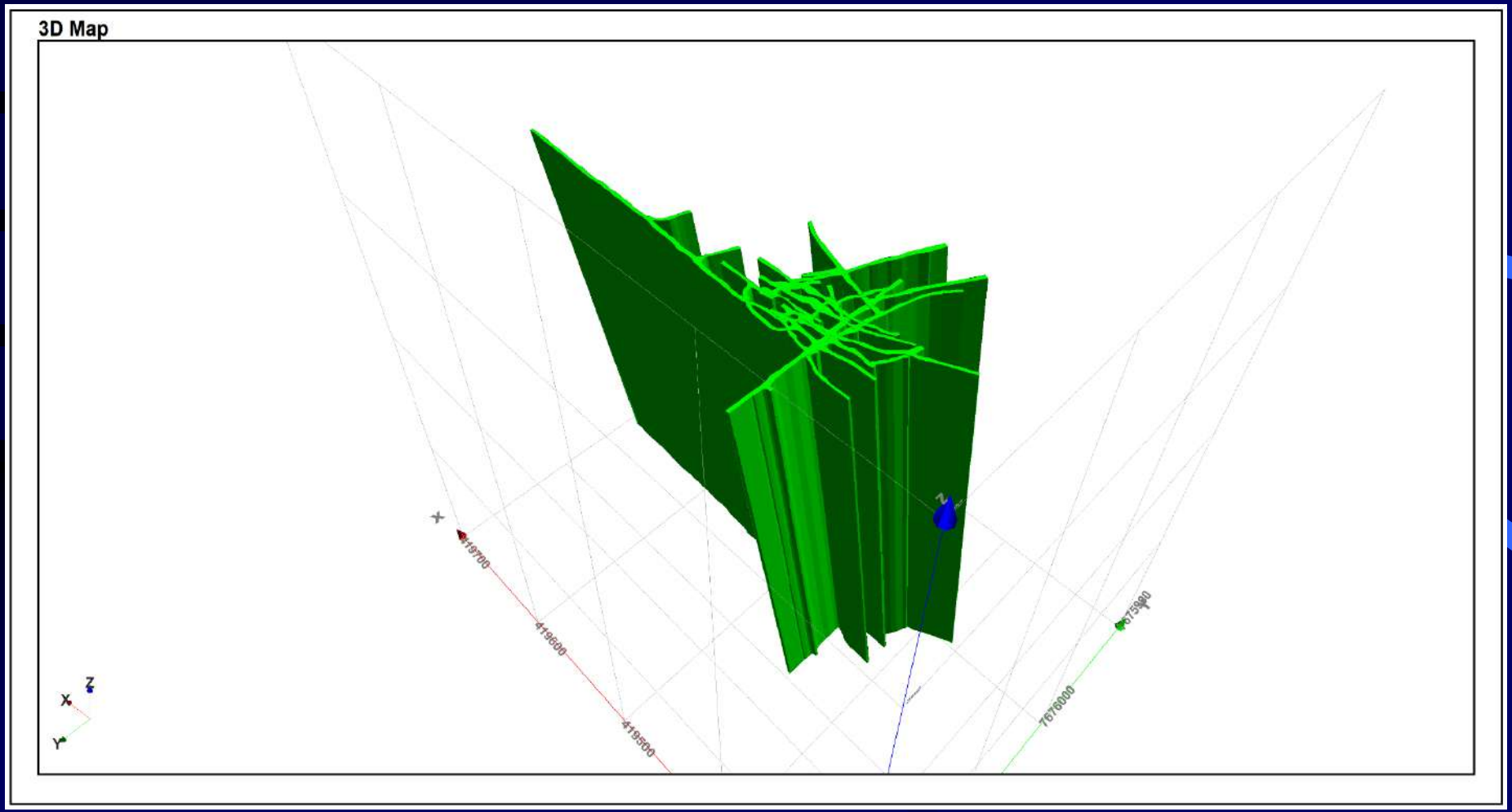
Tungsten



Tungsten deposits

- 113,985 tonnes ore grading 0.45% WO3 has been proven from surface to 10m below 2nd level at Buona Fortuna
- 1,321 underground samples
- Mineralization occurs as both scheelite and wolframite ores.

3D MODEL OF TUNGSTEN RESOURCE AT BUONA FORTUNA



TUNGSTEN - HISTORICAL DATA

Location	Proven Reserves (T)	Grade	Probable	Grade	Comment
Mutandahwe	8600	1.38% Cu 0.47% Wo3			
Donga 4, 5,6	20000	>1.00% Cu <0.5% Wo3			
P & O			14000	>5.00% Cu 1.00% Wo3	Oxidized to 30m
Mbusi 7	360	1.00% Wo3 0.30% Cu	20000	1.00% Wo3 Nil Cu	Cobalt is 0.3%
Donga 3			24000	0.25% Wo3	
Mutandahwe Dump	100000	0.40% Wo3			
Mapani Dump	50000	0.56% Wo3 0.7% Cu			

TRENCHING ACROSS THE TORO 6 AND TORO 2 TUNGSTEN PROSPECTS
~1.2m width at 0.55% WO_3

CONCLUSIONS

- Mutandahwe Ring Complex has some interesting geology
- Ground magnetic surveys are giving additional detail useful to map other molybdenite lenses. IP Survey are recommended on targets identified by magnetics
- It is a potential Porphyry Mo Climax-Type Deposit (High F)


Thank You!