The Role of Hodotermes mossambicus Termites and Background Kimberlite Indicators in the Kgalagadi

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Pangolin Diamonds Corp. – Exploration Data

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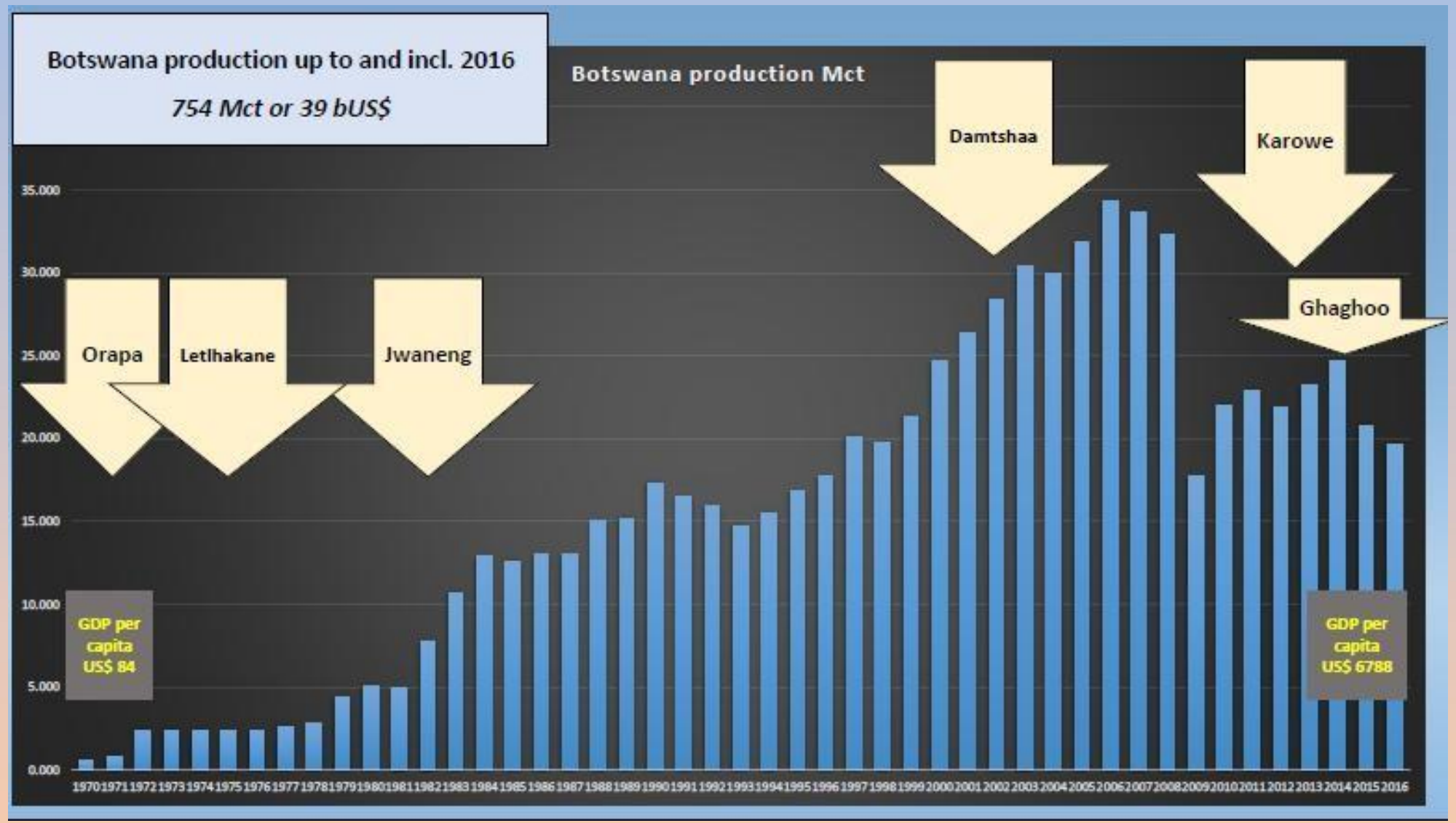
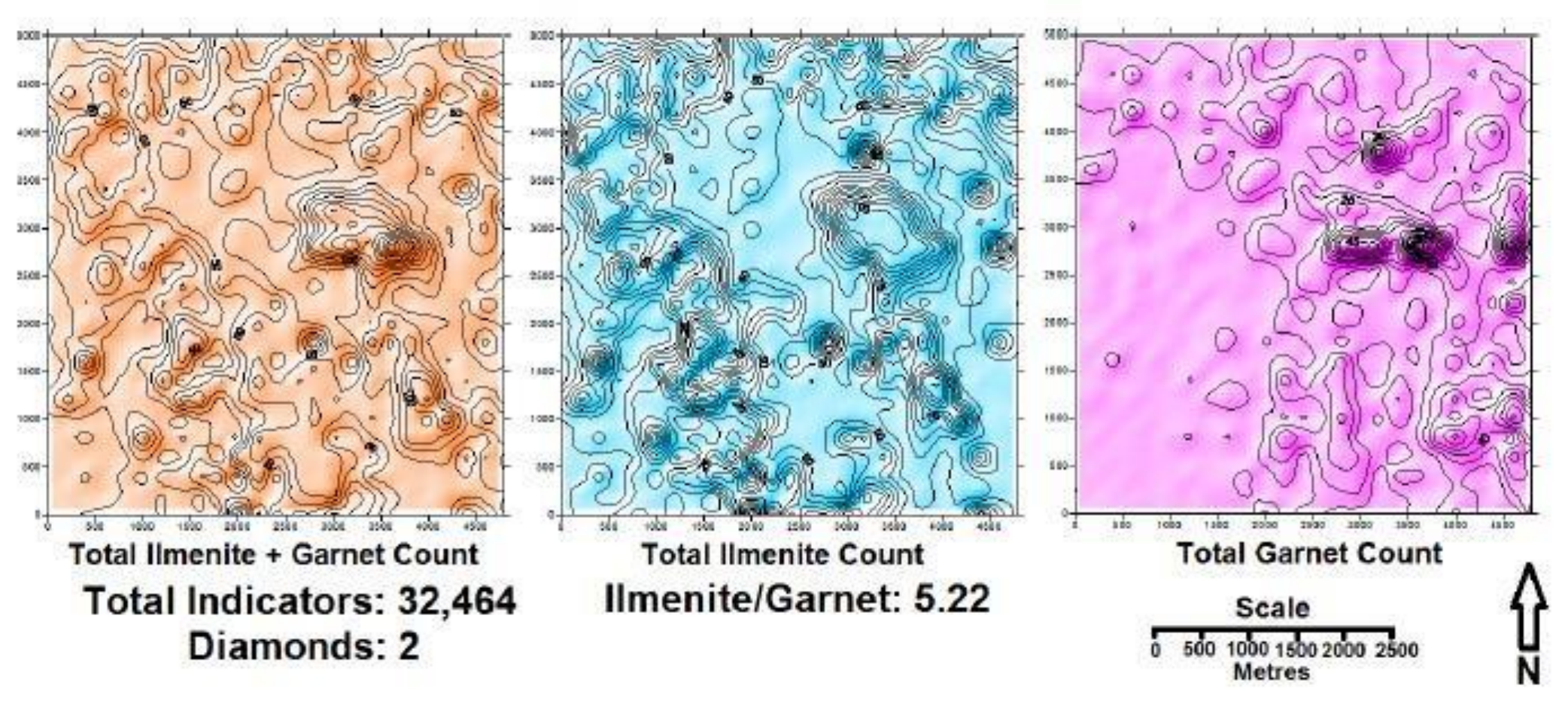
Botswana Diamond Production



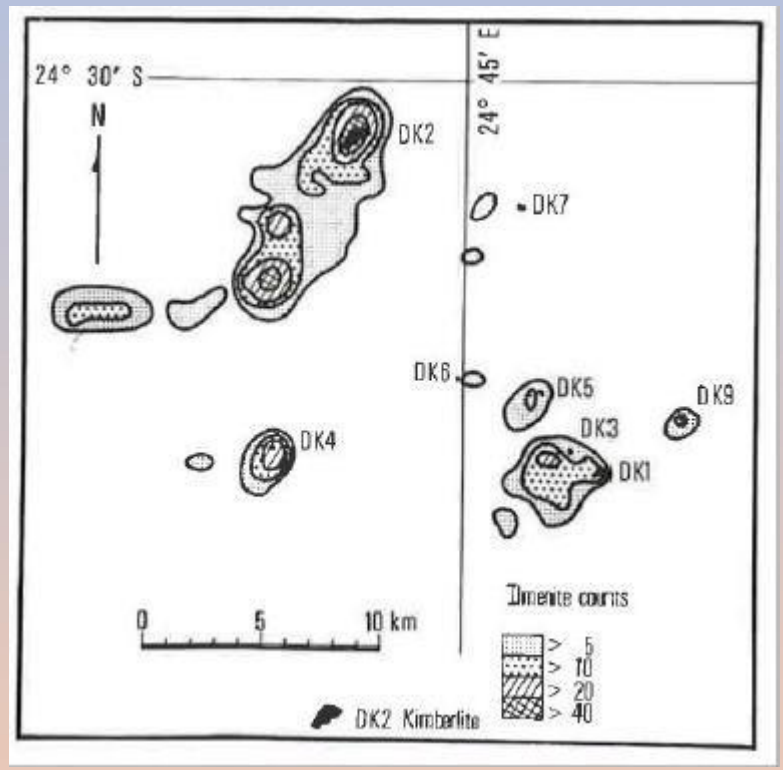
Source: M de Wit, 2017

Orapa 2125B/K5 Indicator Distribution



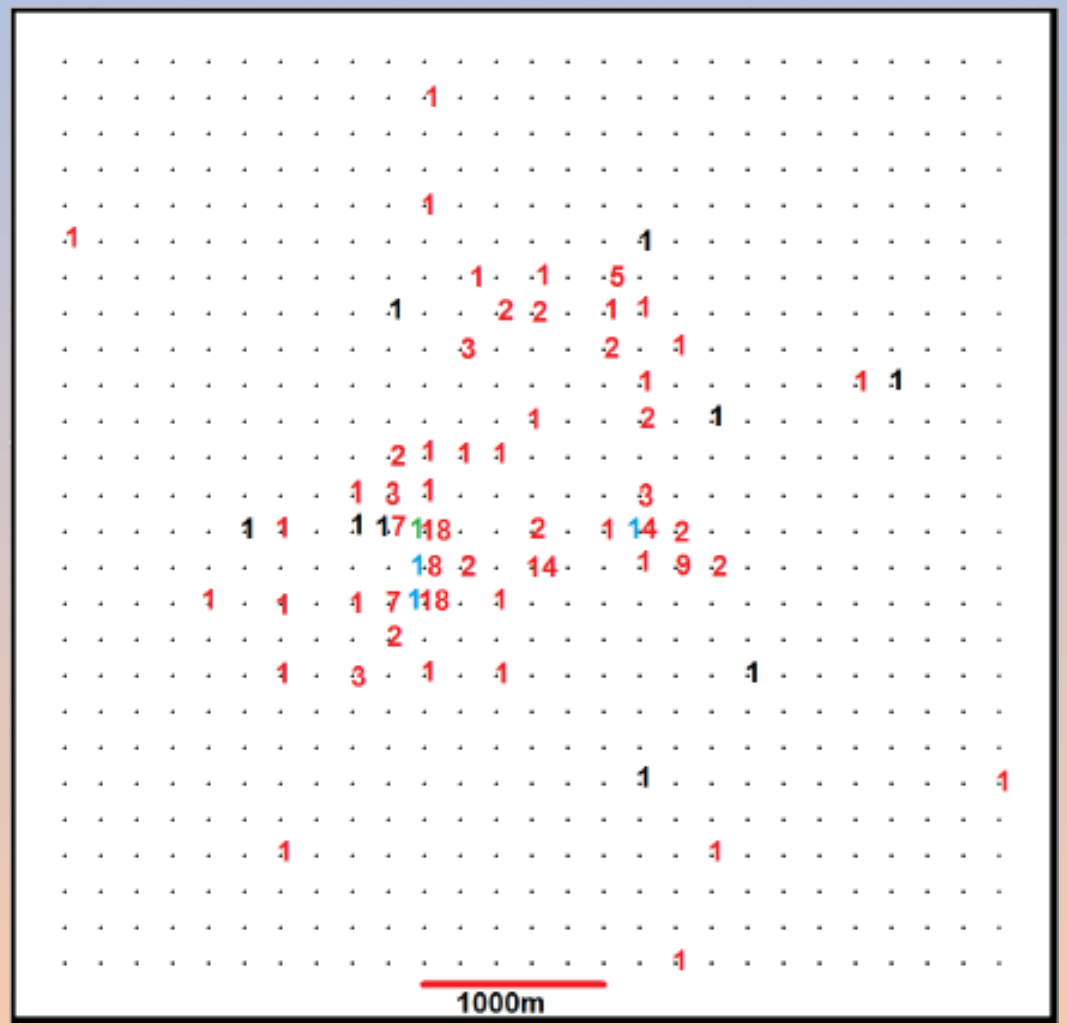
Jwaneng Indicator Distribution

Photo Credit: Manfred Marx



Lock, 1985

De Beers Lerala Kimberlites Soil Results



200m x 200m Grid

676 Samples

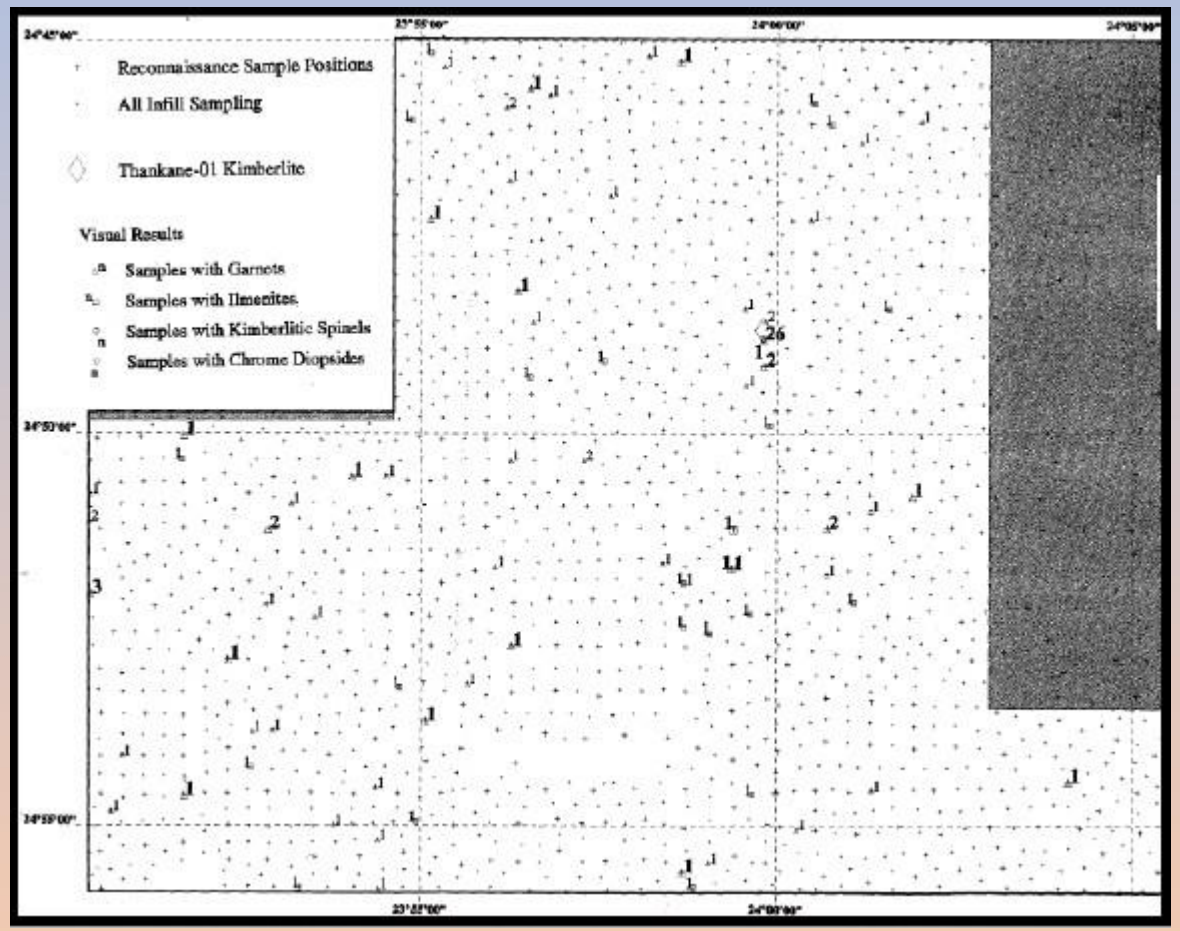
61 Samples Positive

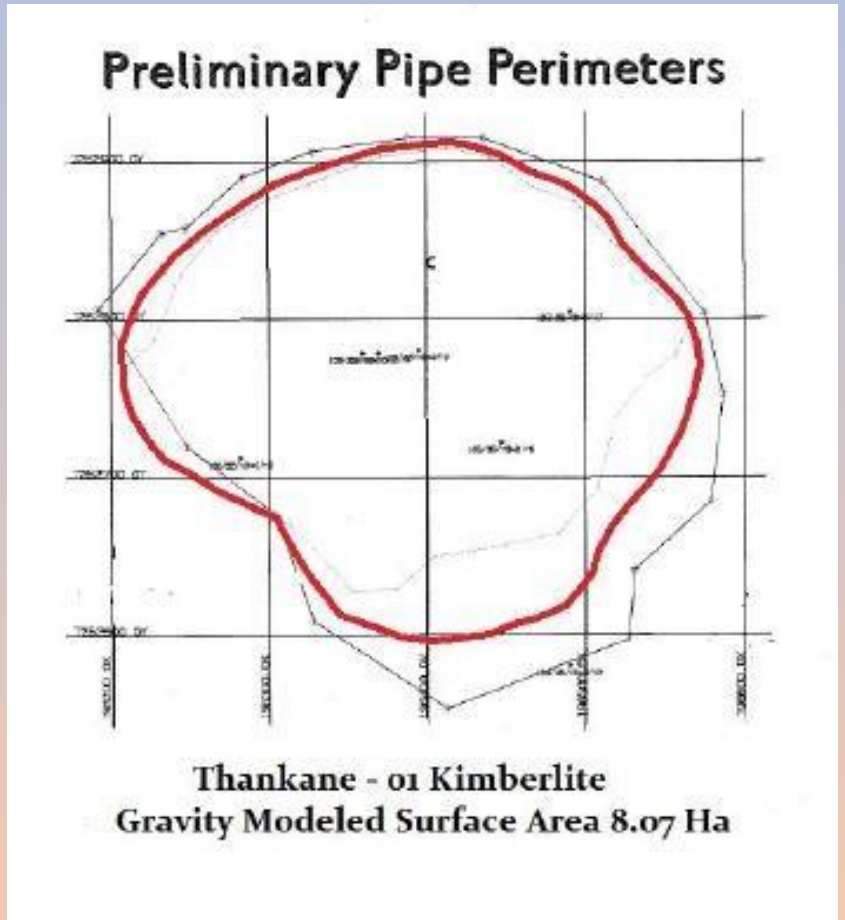
154 Indicators

2 Diamonds

Three kimberlites

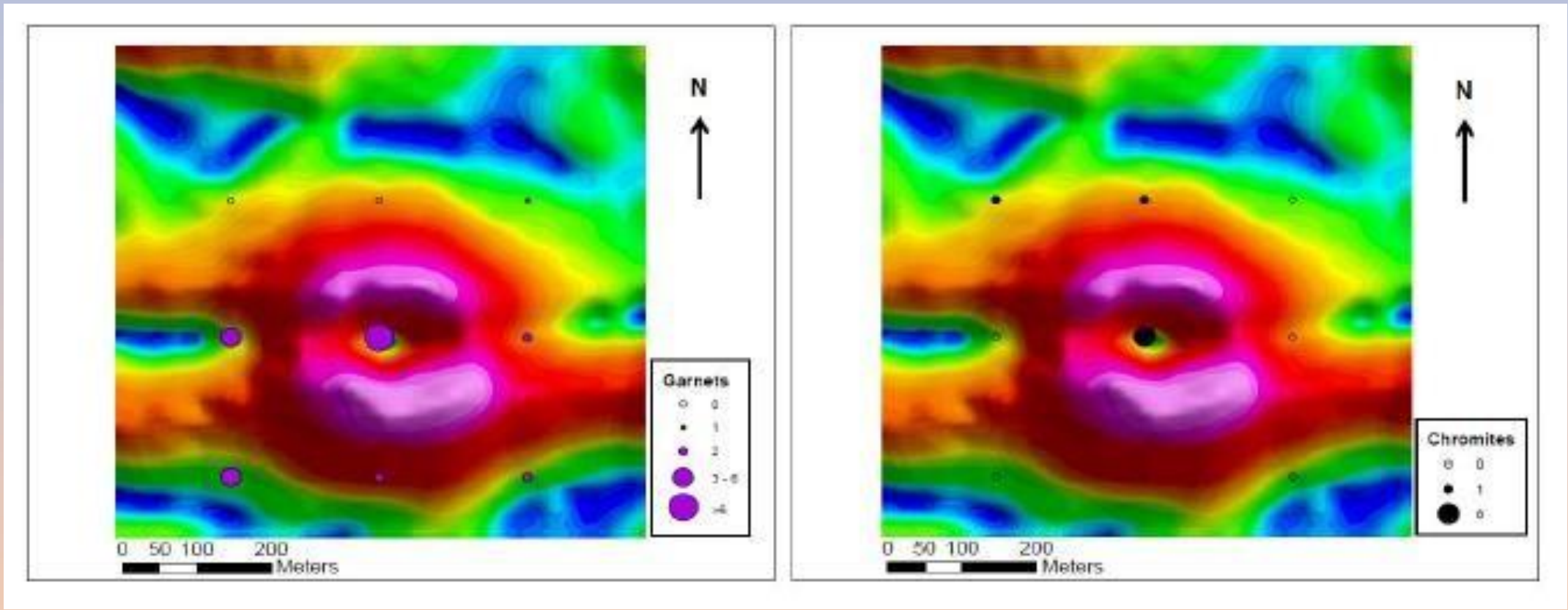
De Beers Thankane – 01 Kimberlite





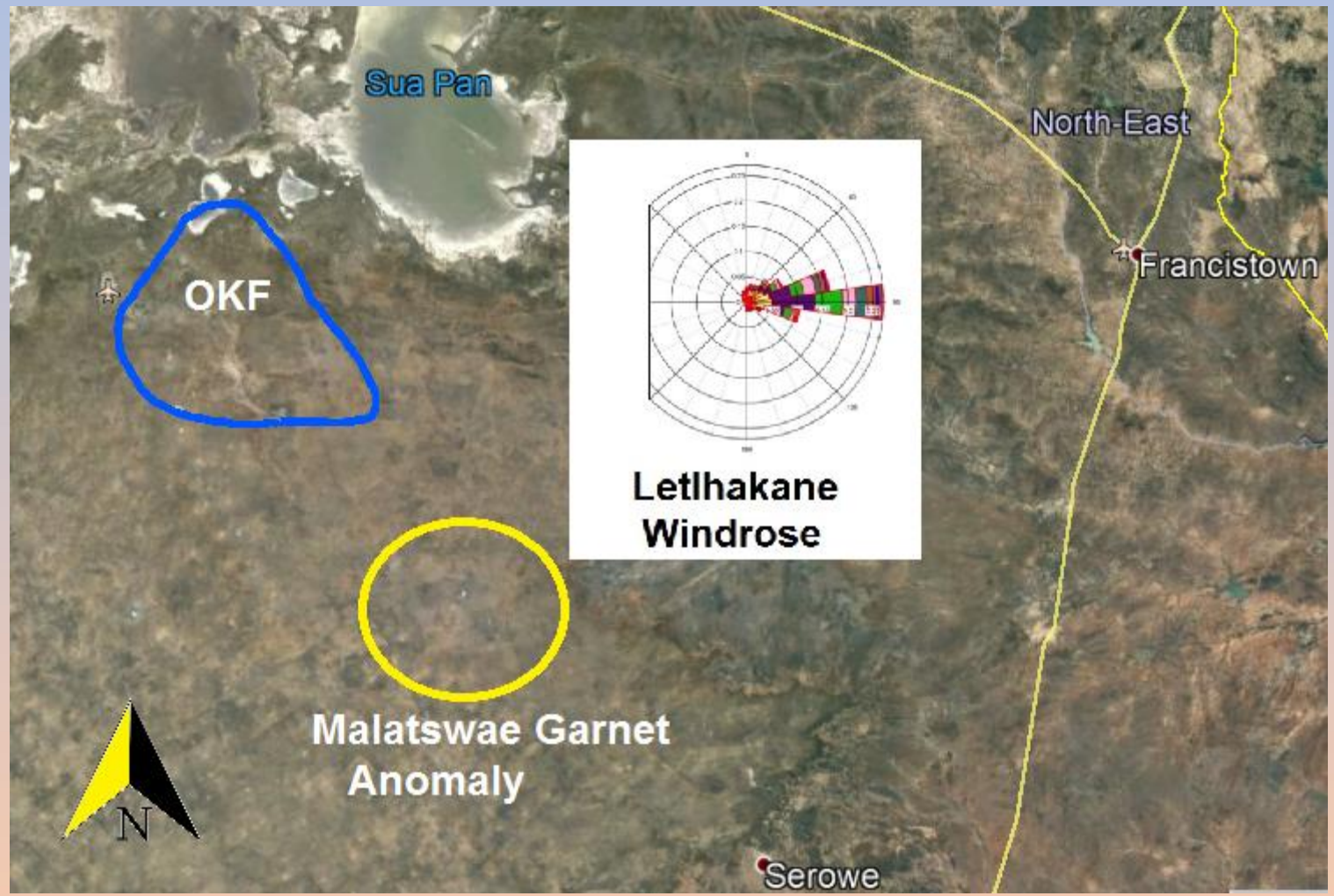
Petra KX36 Group II Kimberlite

Garnets **Spinels**

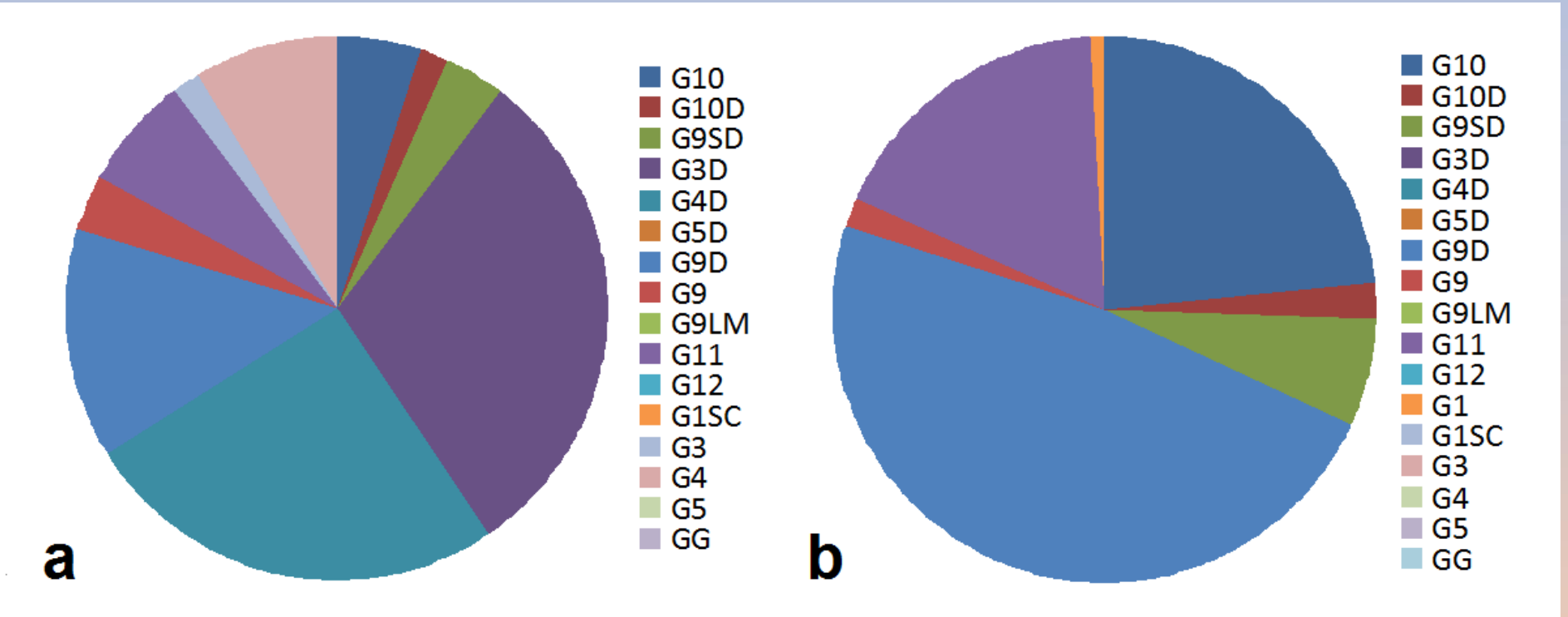


Rogers et al. 2013

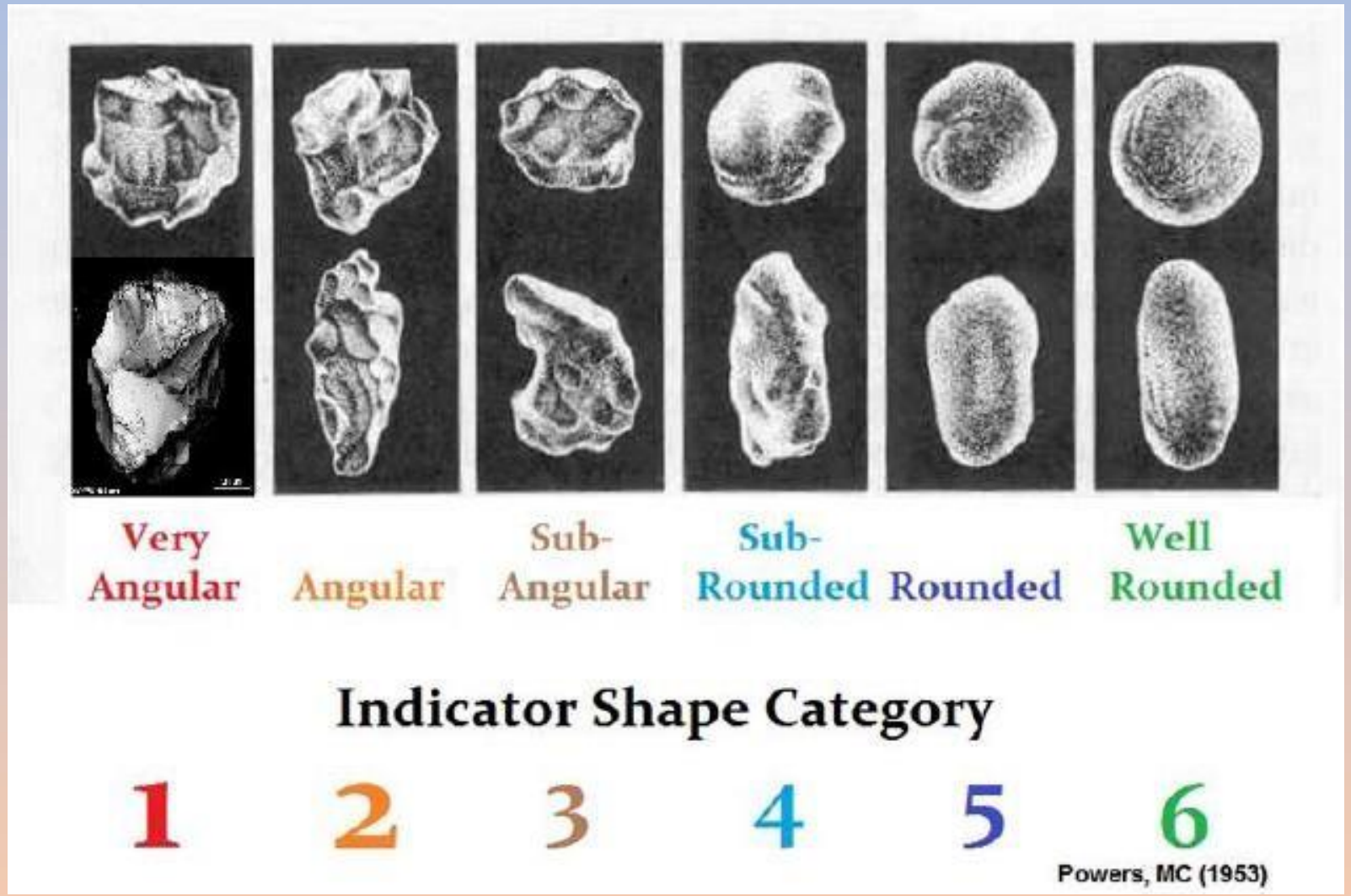
The Malatswae Garnet Anomaly



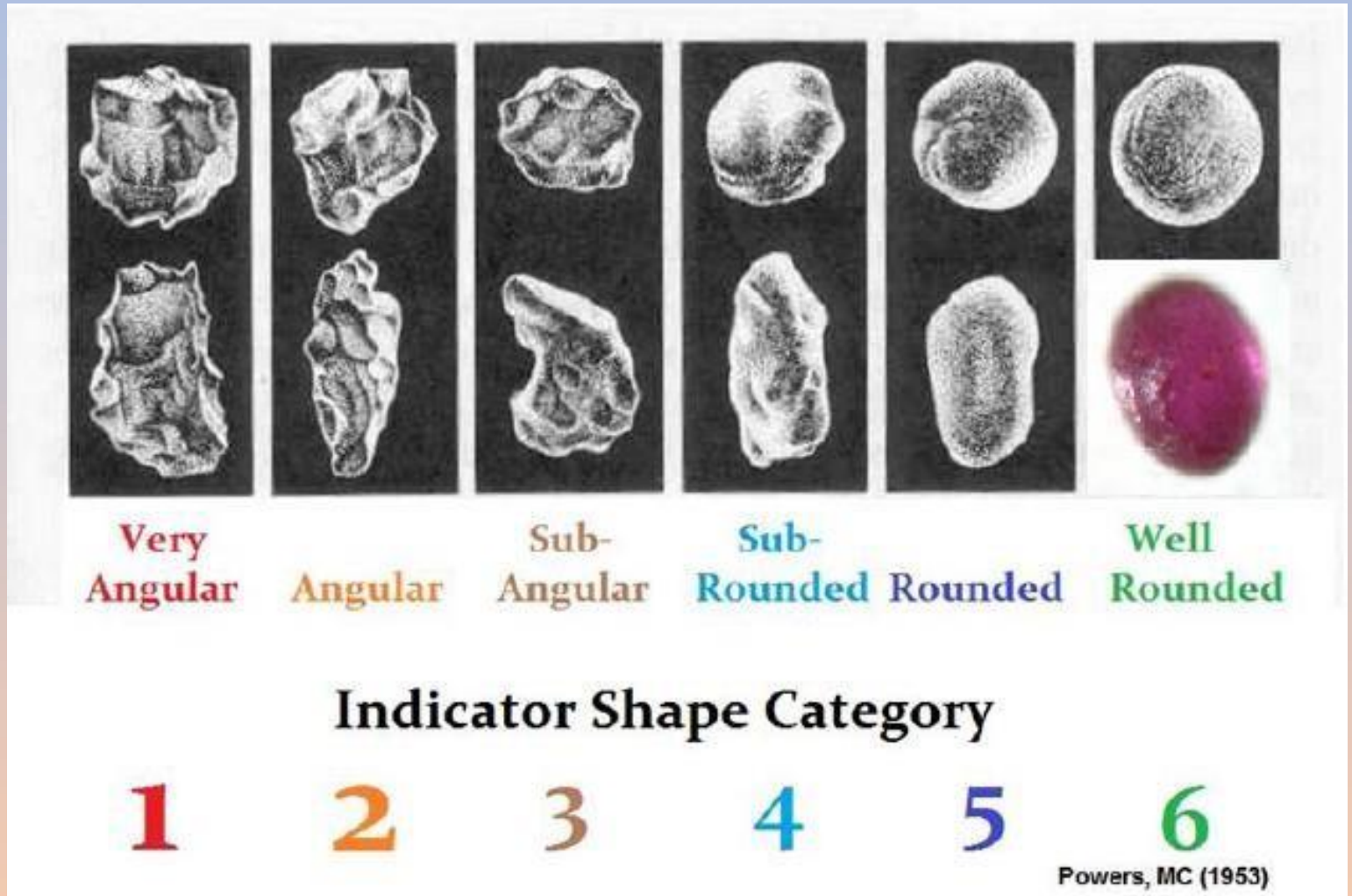
The Malatswae Garnet Chemistry



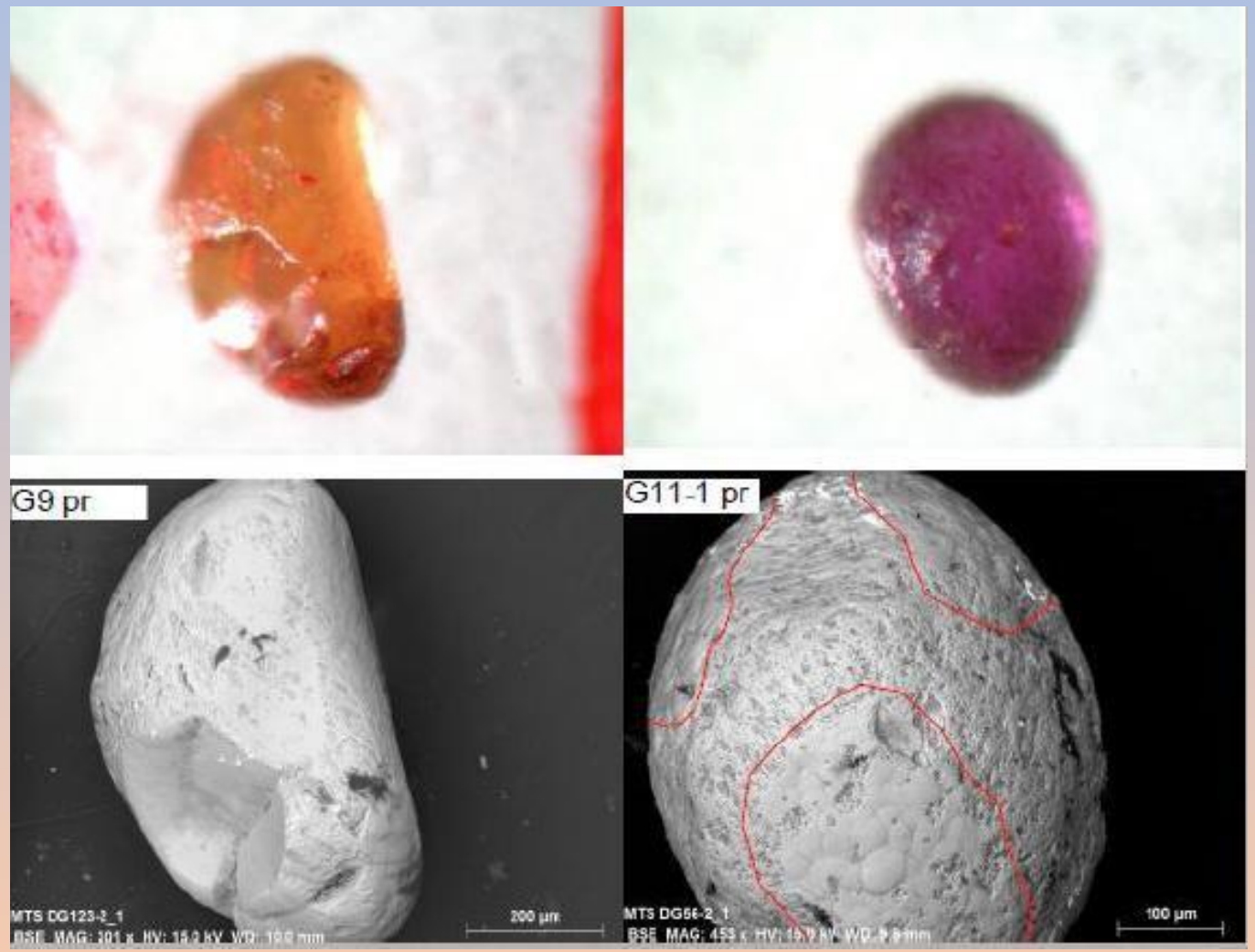
Indicator Shape Classification Scheme



Typical Malatswae Garnet Shape

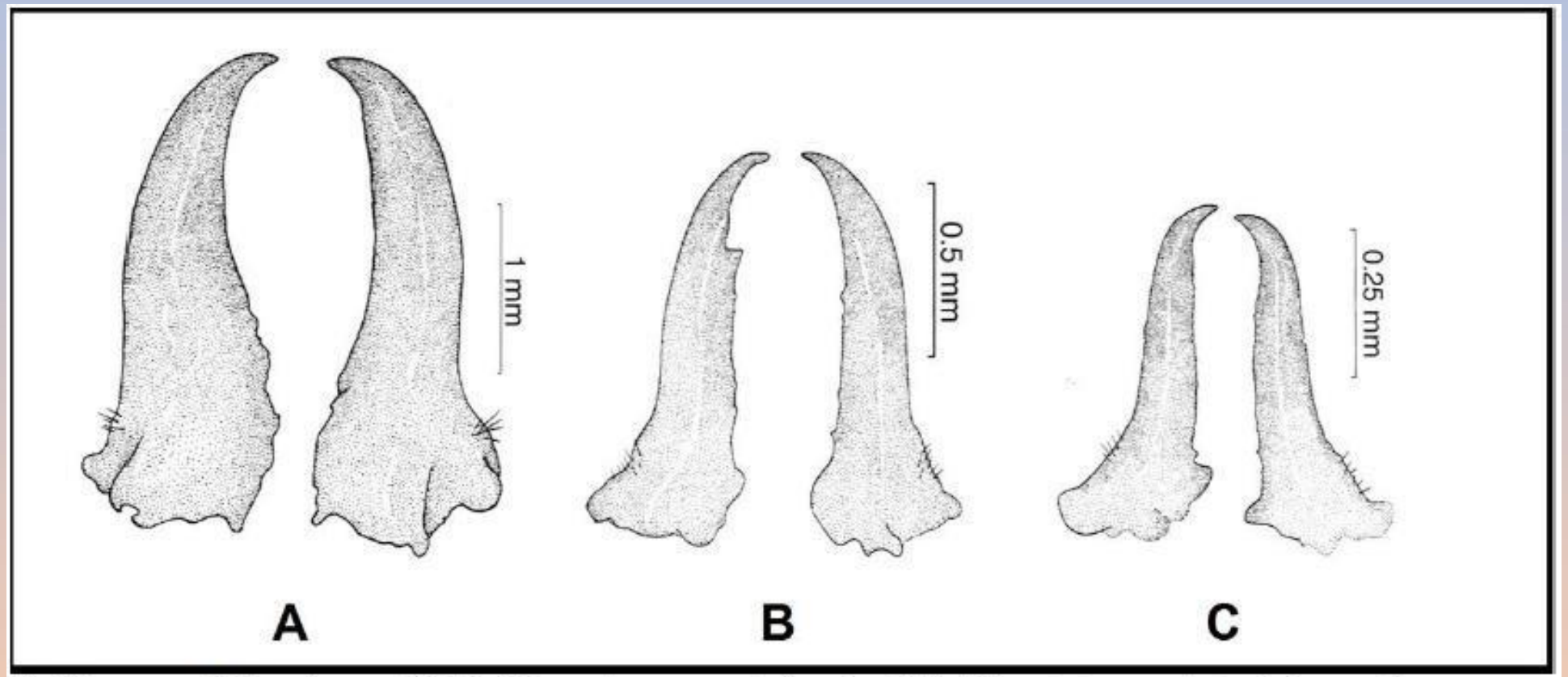


Orange Peel Surface Texture



Termite Surface Expressions

Termite Mandible Sizes



Soldier mandible sizes of (A) *Macrotermes natalensis*, (B) *Odontotermes latericius* and *Microtermes havilandi* (After Uys, 2002).

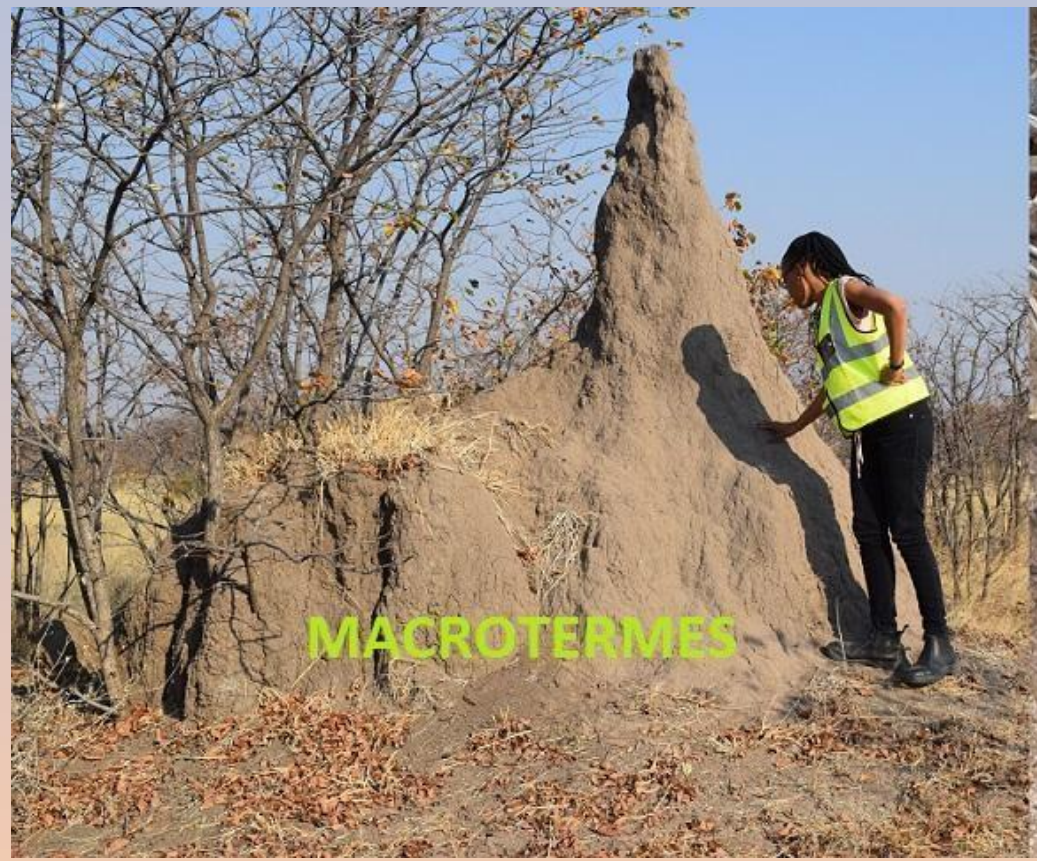
Trinervitermes trinervoides

Termite Collecting

Orapa BK11 Field Study

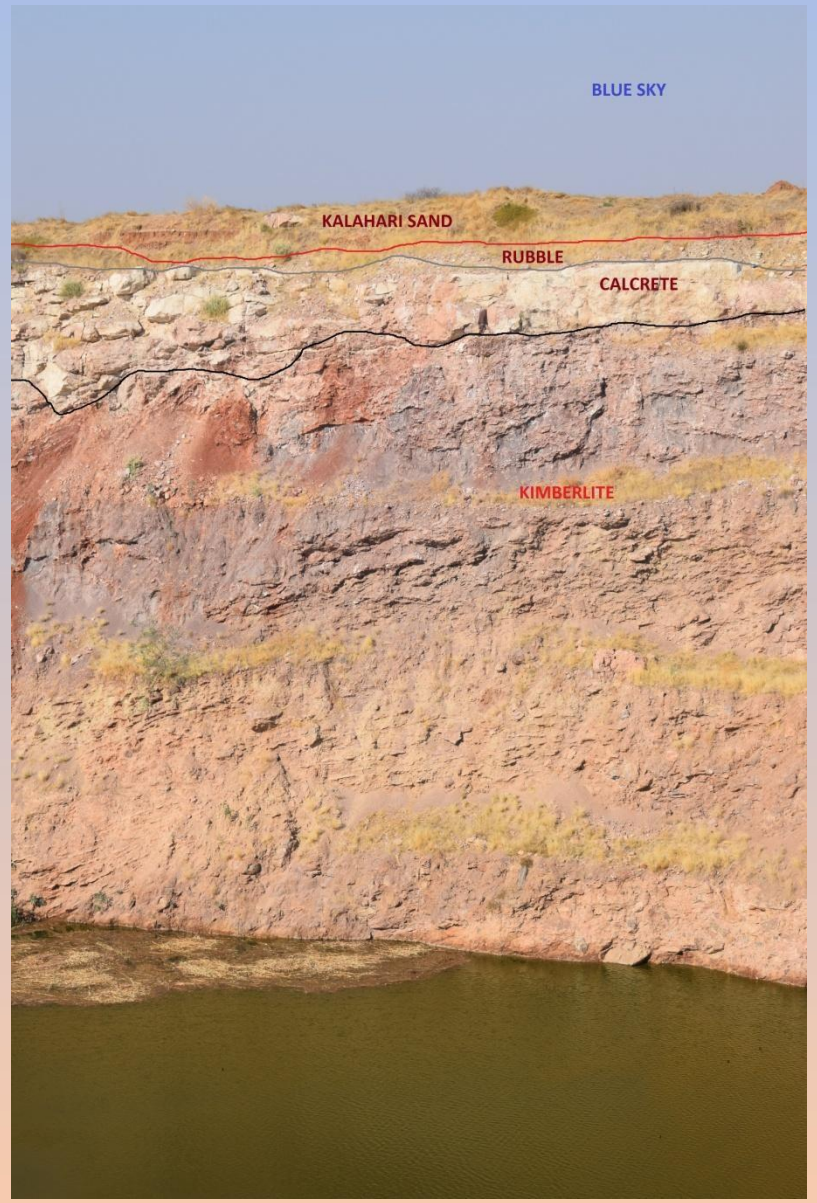
Skyscraper and Ground Level

Orapa



Malatswae

Orapa BK11 Field Study

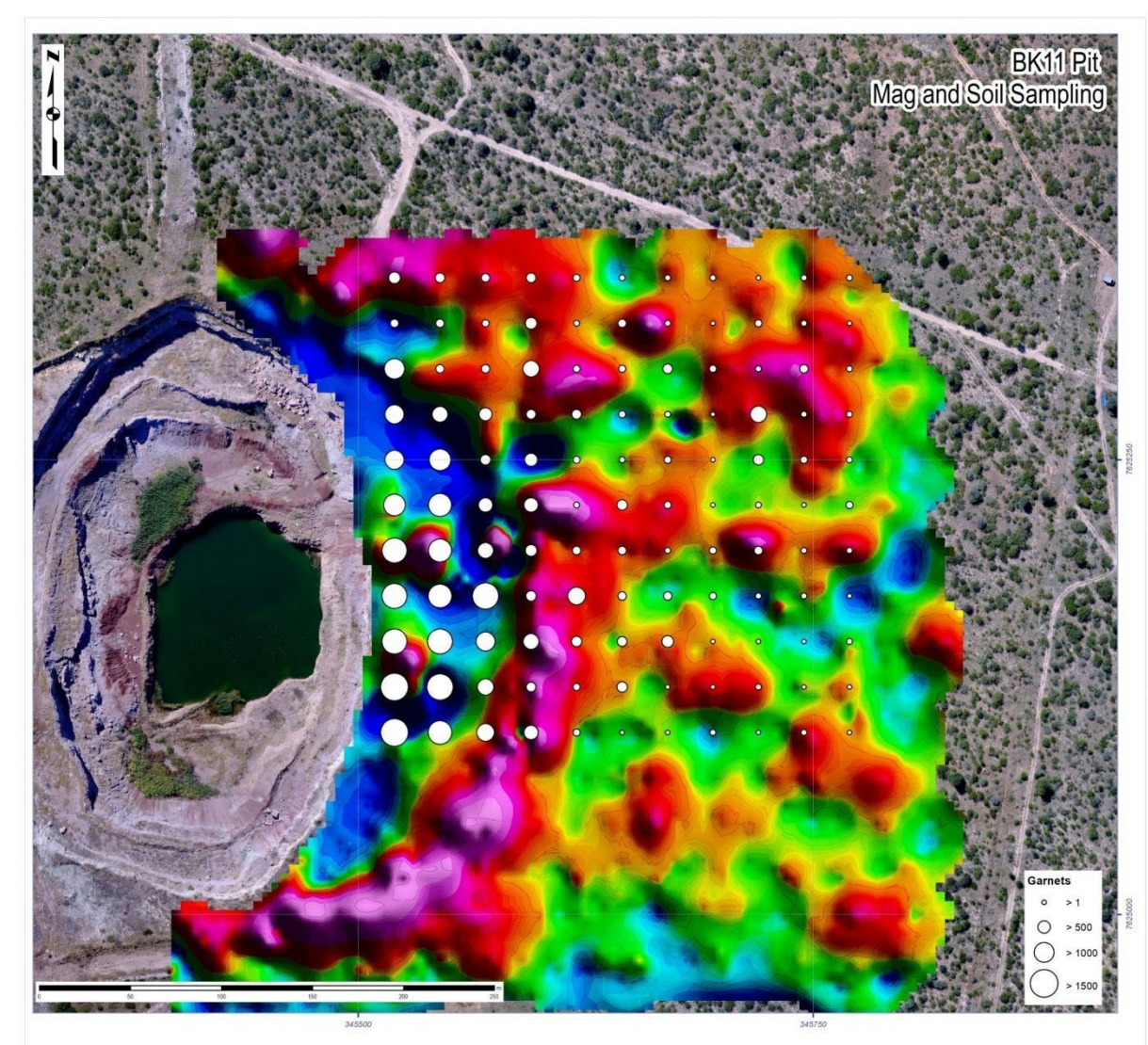


TERMITE GEOLOGICAL CROSS-SECTION

Depth	
Kalahari Sand	1 – 2 metres
Rubble	2 – 2.5 metres
Kalahari Calcrete	2.5 – 8 metres
Kimberlite	8 – 36 metres
Water Table	36 metres

BK11 KIMBERLITE DISCOVERED IN 1972

Orapa BK11 Field Study



Soil Sampling Grid

250 m x 250m: 25m apart

121 x 60 litre Soil Samples

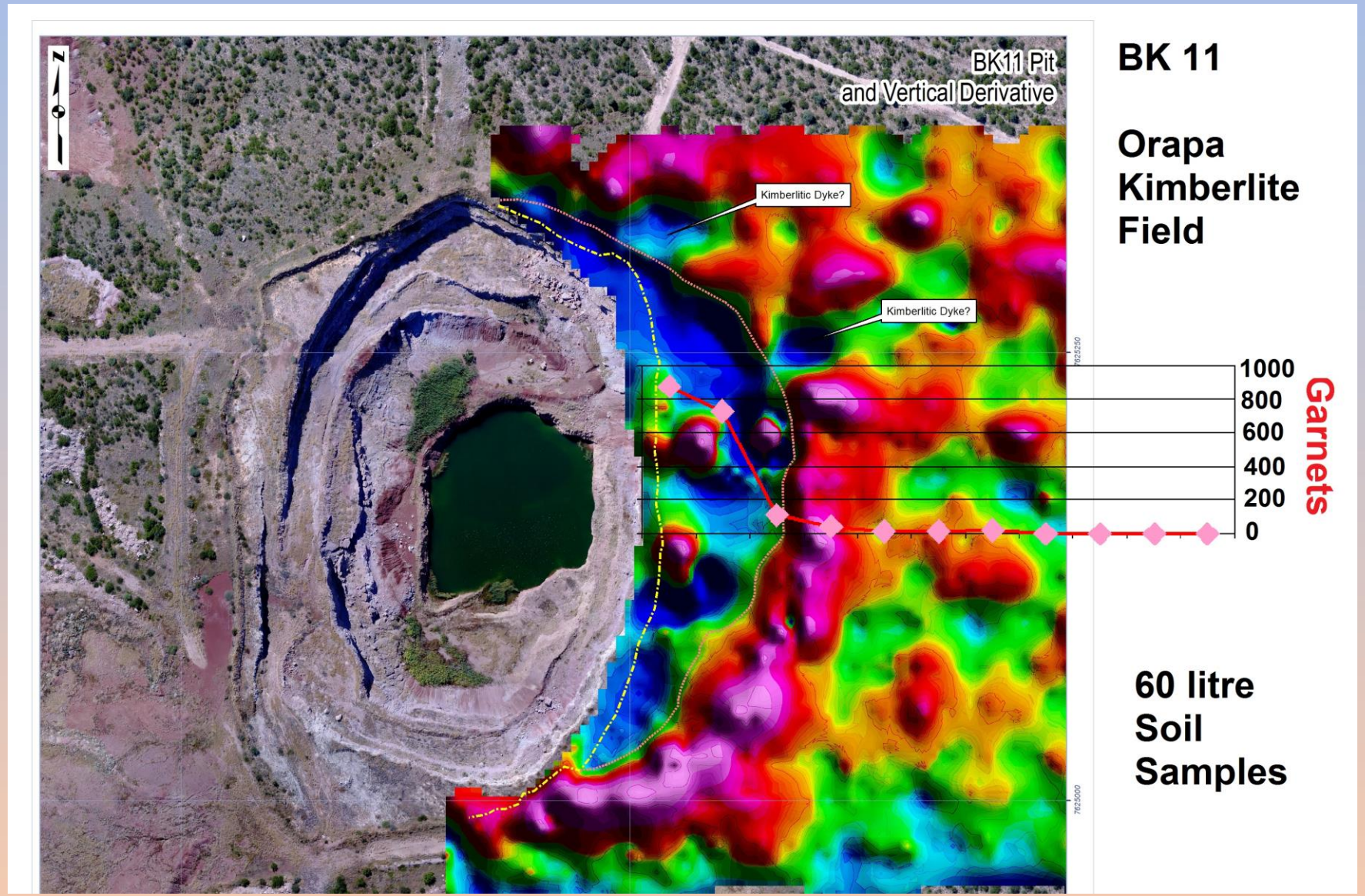
Processed through 1 tph mini-DMS

ONLY Garnets counted

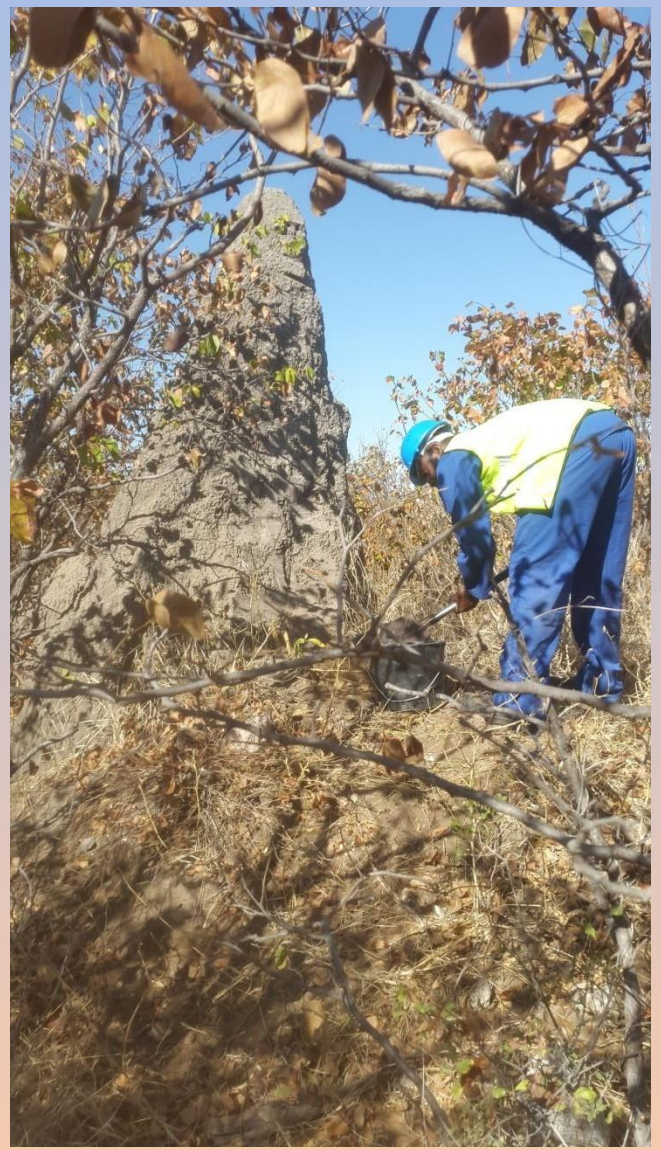
Ilmenite : Garnet~ 8:1

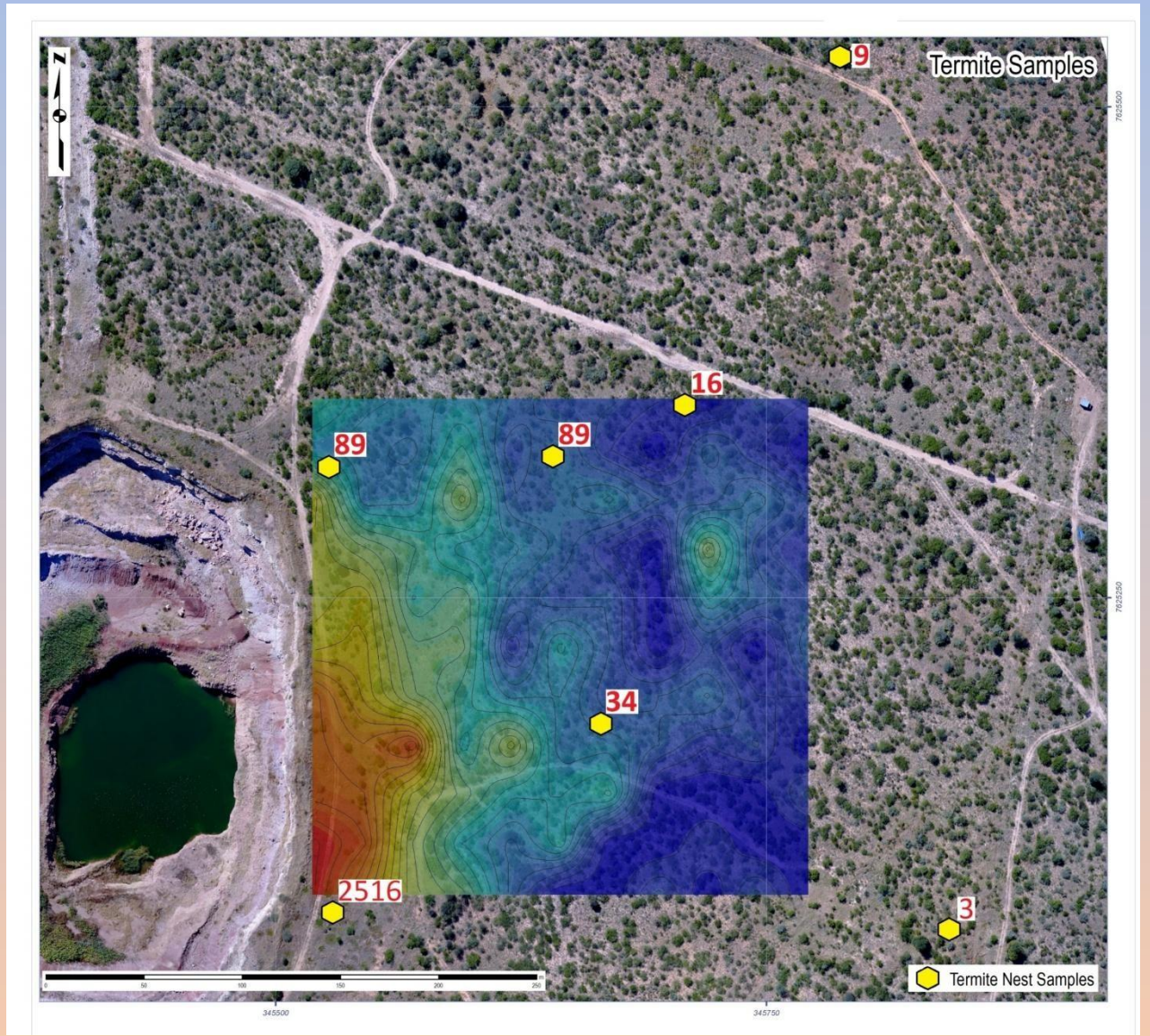
7 Termite Hills Sampled

Orapa BK11 Field Study

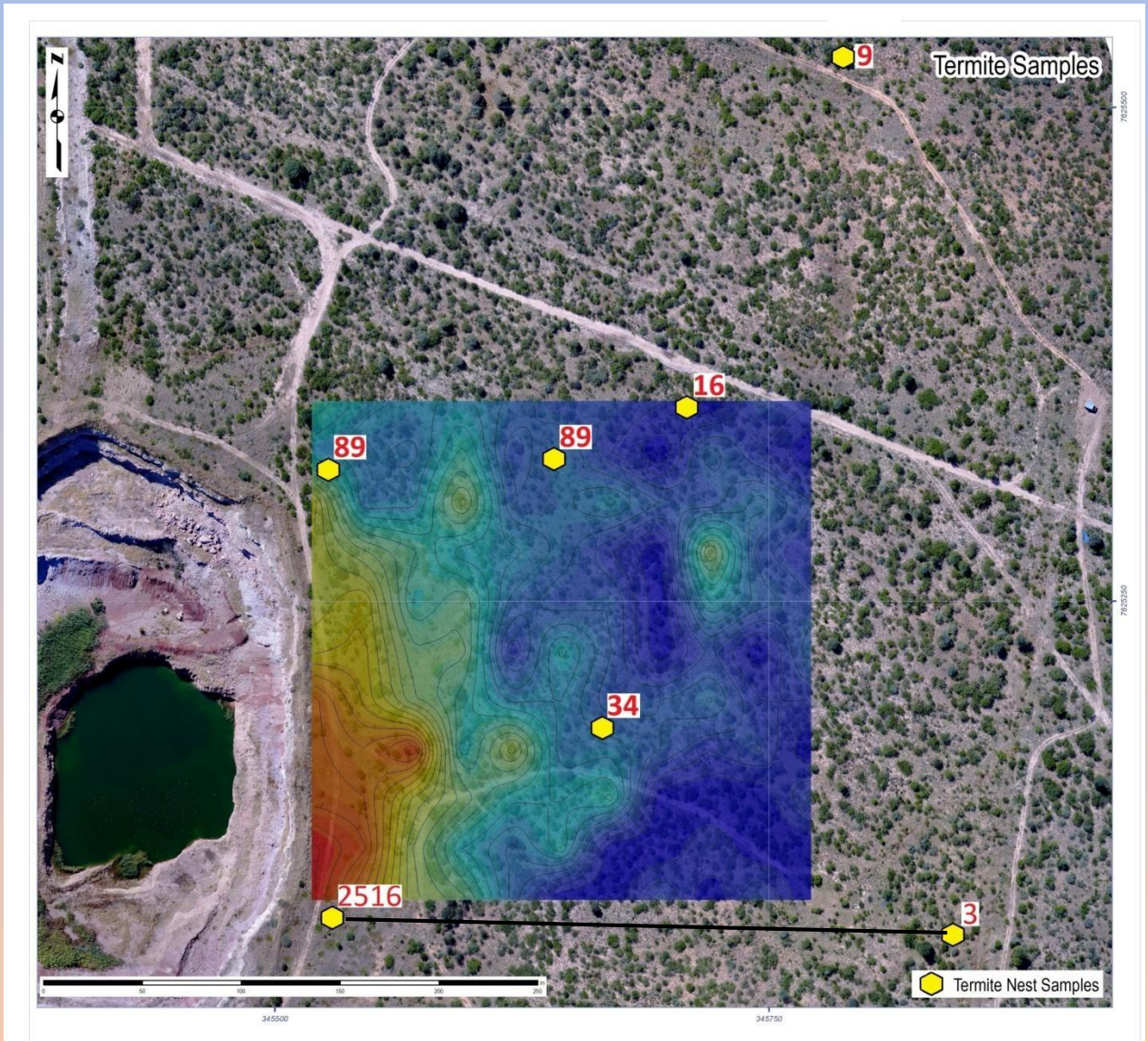


Orapa BK11 Field Study





Orapa BK11 Field Study



TERMITE HILL SAMPLES

60 litre Soil Samples

ONLY Garnets counted

7 Termite Hills Sampled

Directly on kimberlite: 2516 Garnets

270m Off Kimberlite: 3 Garnets

Termite: *Macrotermes michaelseni*

Macrotermes michaelseni

Large Superstructures at Surface

Tonnes of Earth Moved

Single Focal Point Distribution

Small Area of Influence

IF Nest Directly Above Kimberlite:

Very High Concentrations of Indicators

Hodotermes mossambicus

No Structures at Surface

Nests are Built Underground

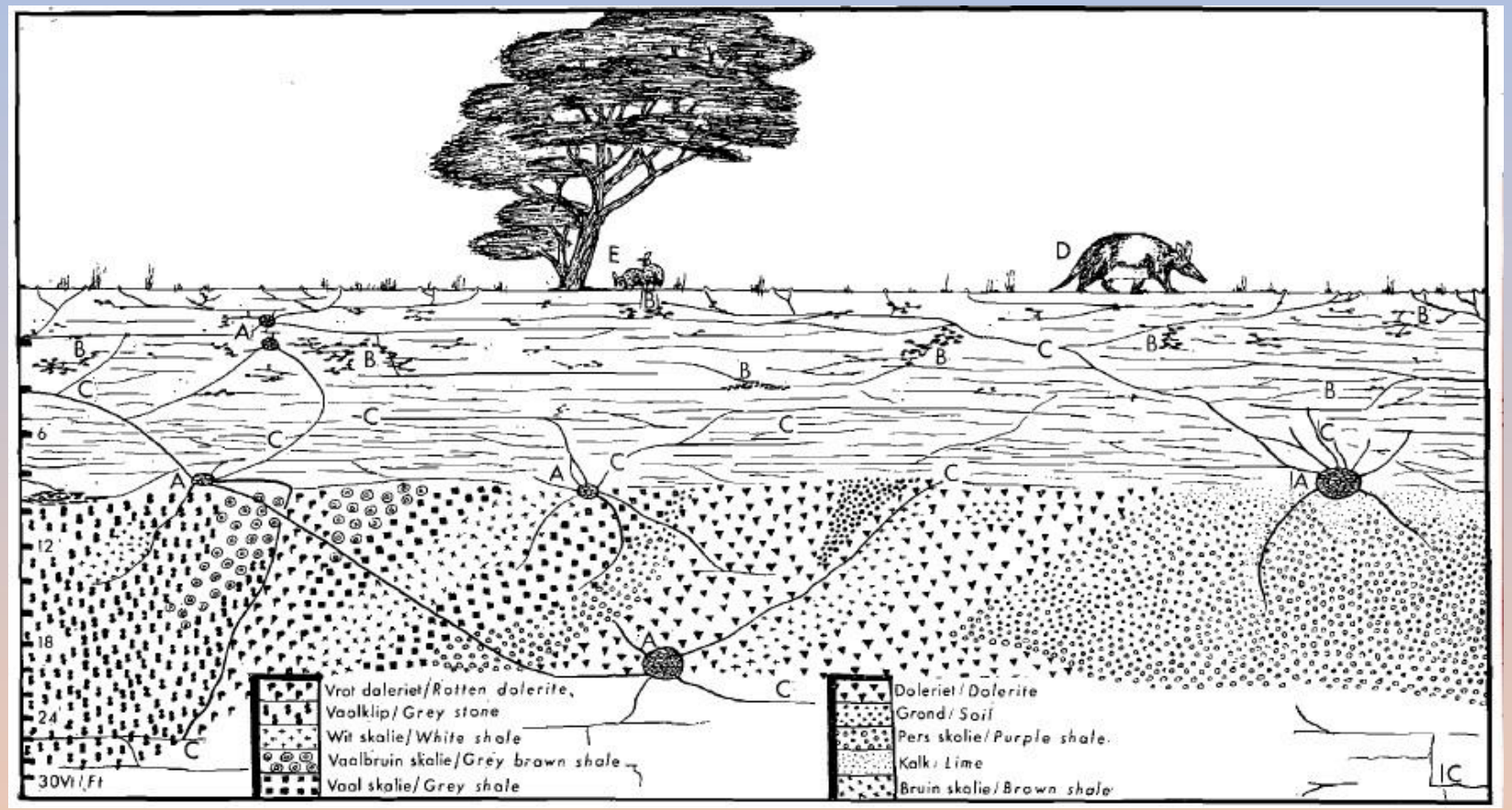
Discharge at Vent Holes

Vent Holes Dispersed

No Focal Point

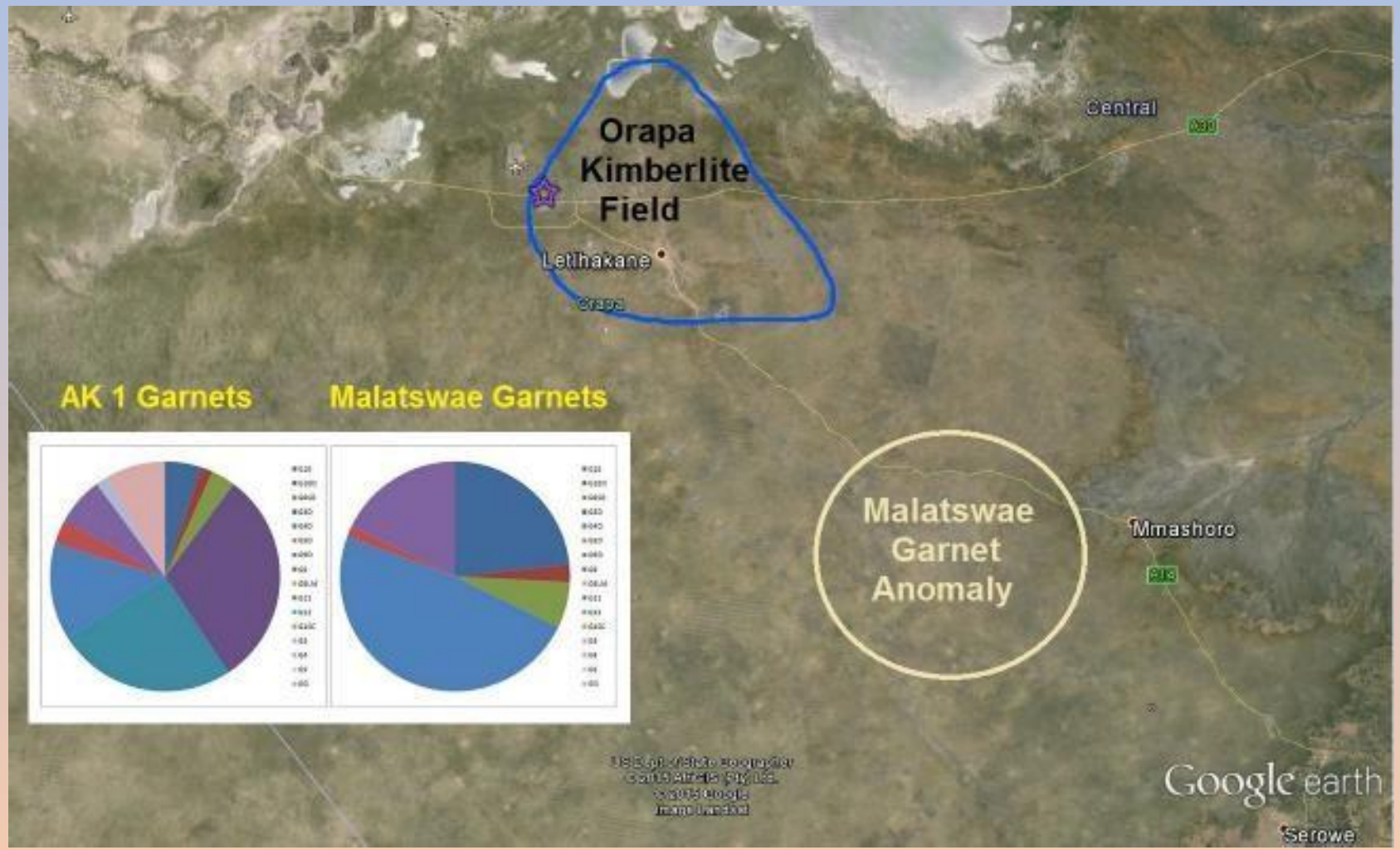
Small Volumes Waste

Hodotermes mossambicus



After Hartwig 1965

The Malatswae Garnet Anomaly



Malatswae Garnet Anomaly Study

Malatswae Garnet Anomaly Study

Soil Sampling

Malatswae Garnet Anomaly Study

Field Screening

Malatswae Garnet Anomaly Study

STUDY CONSISTS OF THREE AREAS:

EACH GRID SAMPLED ONCE A MONTH – MINIMUM 24 MONTH PERIOD

EACH AREA COVERED BY A GRID 200m x 200m

SAMPLES SPACED 50M X 50M: 25 SAMPLES PER GRID

EACH SAMPLE 100 LITRE VOLUME

EACH SAMPLE SCREENED – 4MM + 425 MICRON

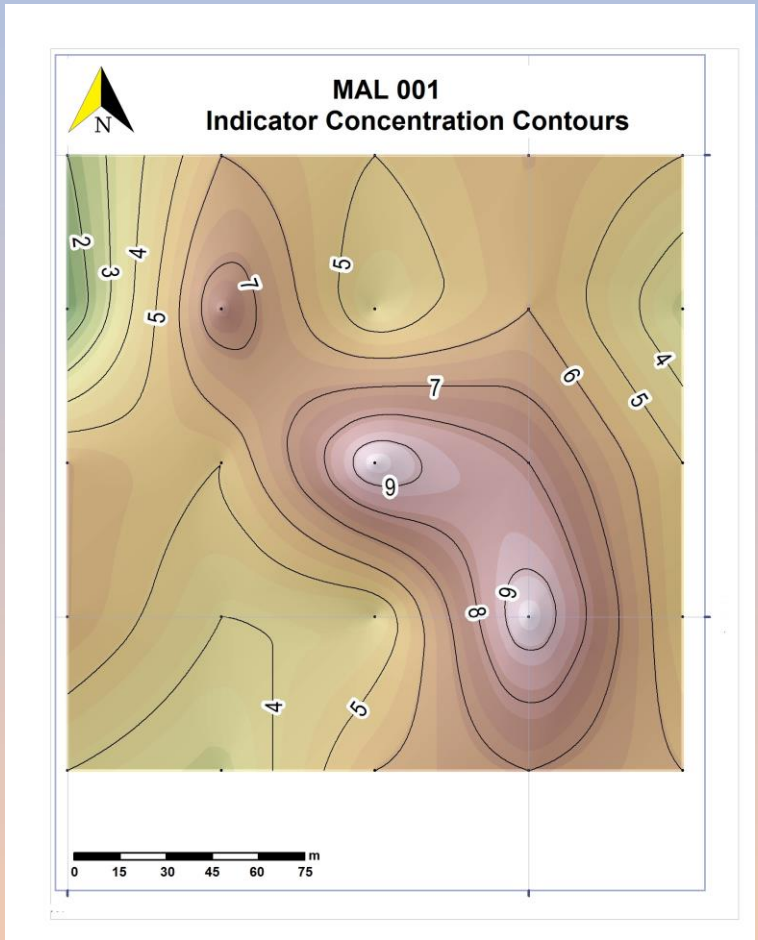
TO INVESTIGATE:

DEVELOPMENT OF LOW INDICATOR COUNT ANOMALY

SEASONAL VARIATION IN TERMITE ACTIVITY

Malatswae Garnet Anomaly Study

MAL 001 Cumulative Results



35,000 litres SOIL

115 Indicators

MAINLY GARNET – NONE ECLOGITIC

2 DIAMONDS

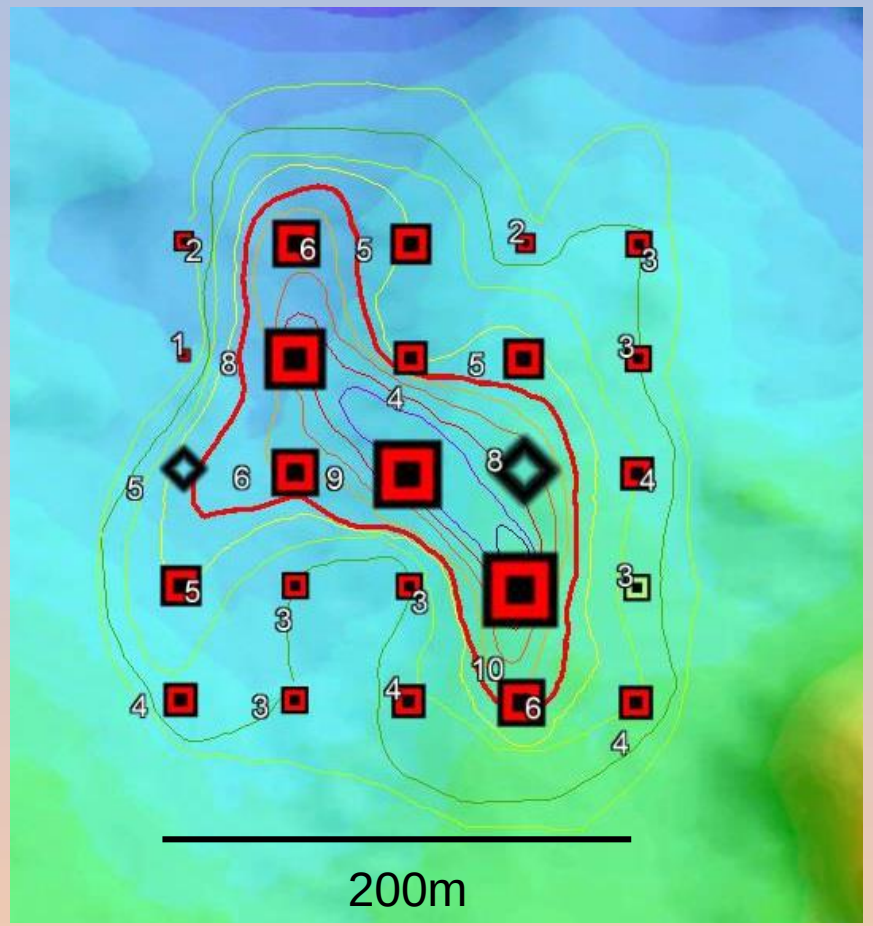
1 OLIVINE (NiO 0.51 wt%)

SAMPLE 100 LITRE VOLUME

EACH SAMPLE SCREENED
– 4MM + 425 MICRON

Malatswae Garnet Anomaly Study

MAL 001



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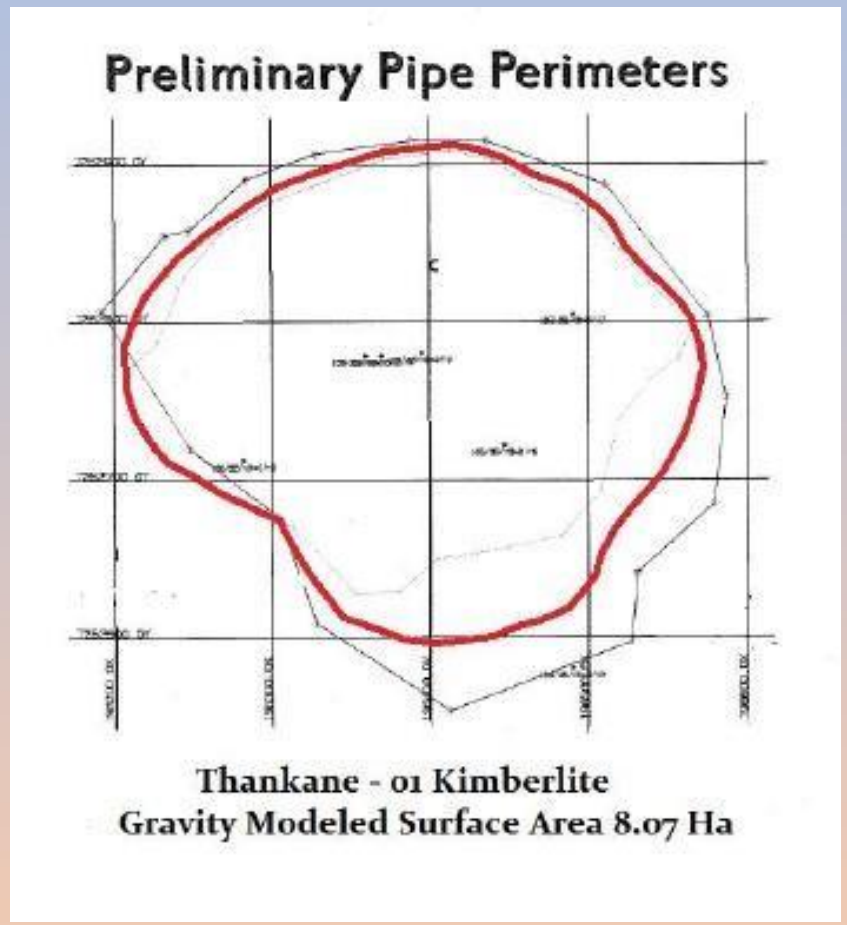
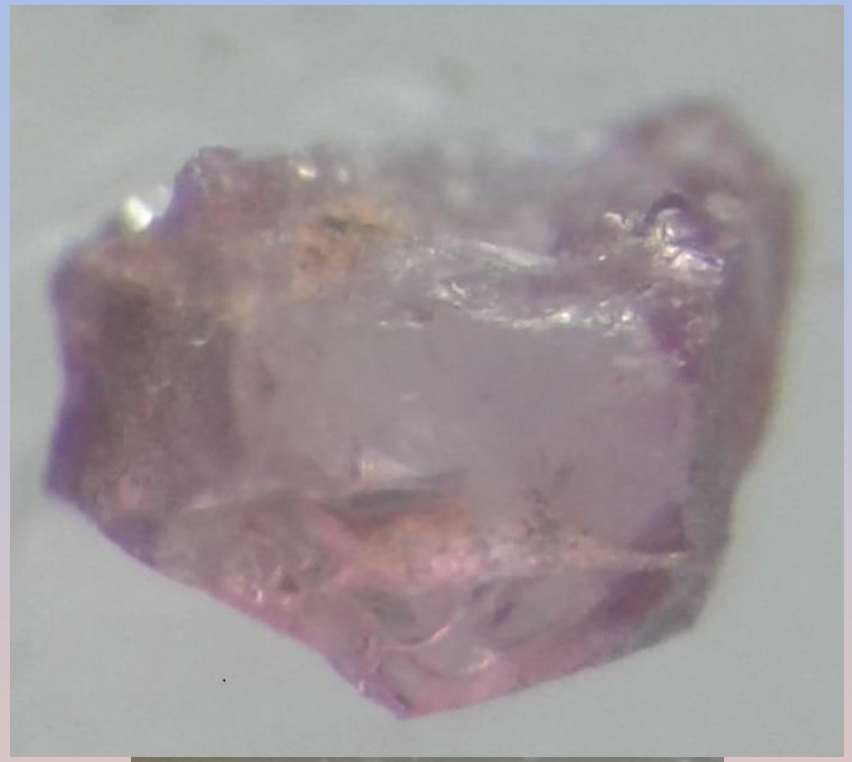
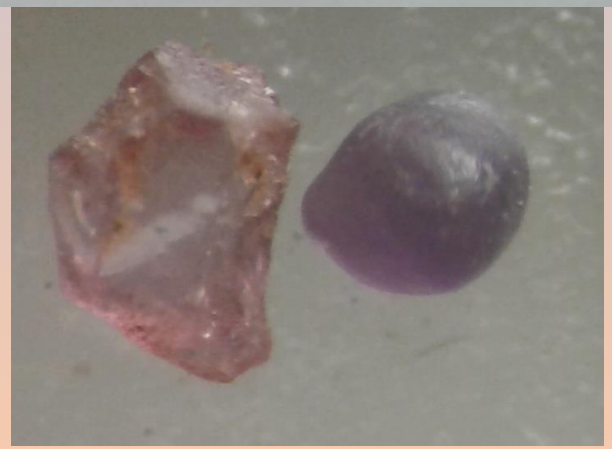


No Aeromagnetic or Groundmagnetic Anomalies

Malatswae Garnet Anomaly Study





EXPLORATION EXAMPLE

REGIONAL SOIL SAMPLE #054

Single Garnet

Sample: 40 Litres Volume

Sample Screened: – 4mm + 0.425 mm

Termite Species: Hodotermes mossambicus

Historical Interpretation: Background

CONCLUSIONS

Macrotermes michaelseni	*Hodotermes mossambicus*
Large Nests Above Surface	Nests are Underground
Single Focal Point of Concentration	Dispersed Area of Disposal
Move Large Mass (Tonnes)	Move Small Mass (Grammes)
Limited Area of Activity	Widespread Vent Holes
High Indicator Concentrations	Background Indicator Counts

The Generation of a Kimberlite Indicator Anomaly in Hodotermes Territory Requires REPETITIVE Sampling and Result ACCUMMULATION over an Extended Period of Time: > 12 MONTHS

Thank You