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

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17/11/07
Orapa 2125B/K5 Indicator Distribution

Total Ilmenite + Garnet Count
Total Indicators: 32,464
Diamonds: 2

Total Ilmenite Count
Ilmenite/Garnet: 5.22

Total Garnet Count
Scale
0 500 1000 1500 2000 2500 Metres
Jwaneng Indicator Distribution

Photo Credit: Manfred Marx

Lock, 1985
De Beers Leralala Kimberlites Soil Results

- 200m x 200m Grid
- 676 Samples
- 61 Samples Positive
- 154 Indicators
- 2 Diamonds
- Three kimberlites
De Beers Thankane – 01 Kimberlite

Preliminary Pipe Perimeters

Thankane - 01 Kimberlite
Gravity Modeled Surface Area 8.07 Ha
Petra KX36 Group II Kimberlite

Garnets

Spinels

Rogers et al. 2013
The Malatswae Garnet Anomaly
The Malatswae Garnet Chemistry
Indicator Shape Classification Scheme

Indicator Shape Category

1  2  3  4  5  6

Powers, MC (1953)
Typical Malatswae Garnet Shape

Indicator Shape Category

1 2 3 4 5 6

Powers, MC (1953)
Orange Peel Surface Texture

[Images of orange peel-like textures]
Termite Surface Expressions

Photo Credit
Gavin Lamont
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

**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
Hodoterme mossambicus

After Hartwig 1965
The Malatswae Garnet Anomaly
Malatswae Garnet Anomaly Study

THE NATURE OF THE DESERT
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                      Thankane - 01

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

<table>
<thead>
<tr>
<th><strong>Macrotermes michaelseni</strong></th>
<th><strong>Hodoterms mossambicus</strong></th>
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<tr>
<td>Large Nests Above Surface</td>
<td>Nests are Underground</td>
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<tr>
<td>Single Focal Point of Concentration</td>
<td>Dispersed Area of Disposal</td>
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<td>Move Large Mass (Tonnes)</td>
<td>Move Small Mass (Grammes)</td>
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<tr>
<td>Limited Area of Activity</td>
<td>Widespread Vent Holes</td>
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<td>High Indicator Concentrations</td>
<td>Background Indicator Counts</td>
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The generation of a Kimberlite Indicator Anomaly in Hodoterms Territory requires repetitive sampling and result accumulation over an extended period of time: > 12 MONTHS.
Thank You