SITE 46  WLOTSKA'S BAKEN : KHAN FORMATION

SITE 47  GOANIKONTES : SWAKOP GROUP

SITE 48  VINETA : RED GRANITE

- POSITIVE INCLINATION
- SITE MEANS
- NEGATIVE INCLINATION
- FISHER STATISTICS AS DEFINED IN TEXT
**TABLE A3 : FeO - Fe₂O₃ - TiO₂ CONCENTRATIONS OF THE PALAEO MAGNETIC SAMPLES**

<table>
<thead>
<tr>
<th>SAMPLE NO</th>
<th>FeO (%)</th>
<th>Fe₂O₃ (%)</th>
<th>TiO₂ (%)</th>
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<tbody>
<tr>
<td>SITE 01</td>
<td>0.54</td>
<td>0.057</td>
<td>0.068</td>
</tr>
<tr>
<td>SITE 02</td>
<td>0.45</td>
<td>0.66</td>
<td>0.147</td>
</tr>
<tr>
<td>SITE 03</td>
<td>0.54</td>
<td>1.21</td>
<td>0.371</td>
</tr>
<tr>
<td>SITE 04</td>
<td>0.63</td>
<td>0.68</td>
<td>0.261</td>
</tr>
<tr>
<td>SITE 07</td>
<td>2.23</td>
<td>4.85</td>
<td>0.66</td>
</tr>
<tr>
<td>SITE 10</td>
<td>0.80</td>
<td>0.32</td>
<td>0.088</td>
</tr>
<tr>
<td>SITE 11</td>
<td>1.16</td>
<td>4.36</td>
<td>0.373</td>
</tr>
<tr>
<td>SITE 15a</td>
<td>0.71</td>
<td>2.16</td>
<td>0.522</td>
</tr>
<tr>
<td>SITE 15b</td>
<td>1.27</td>
<td>2.24</td>
<td>0.50</td>
</tr>
<tr>
<td>SITE 16a</td>
<td>1.16</td>
<td>3.29</td>
<td>0.626</td>
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<tr>
<td>SITE 16b</td>
<td>1.57</td>
<td>1.83</td>
<td>0.35</td>
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<tr>
<td>SITE 18a</td>
<td>0.71</td>
<td>1.566</td>
<td>0.295</td>
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<tr>
<td>SITE 18b*</td>
<td>9.74</td>
<td>70.98</td>
<td>11.18</td>
</tr>
<tr>
<td>SITE 18c*</td>
<td>10.06</td>
<td>84.32</td>
<td>1.11</td>
</tr>
<tr>
<td>SITE 19a</td>
<td>0.71</td>
<td>0.16</td>
<td>0.057</td>
</tr>
<tr>
<td>SITE 19b*</td>
<td>6.20</td>
<td>88.61</td>
<td>0.84</td>
</tr>
<tr>
<td>SITE 20</td>
<td>0.54</td>
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<td>0.715</td>
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<td>SITE 21</td>
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<td>3.89</td>
<td>1.063</td>
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<td>SITE 23</td>
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<td>0.04</td>
<td>0.222</td>
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<td>SITE 24</td>
<td>2.05</td>
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<td>SITE 25</td>
<td>0.62</td>
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<td>SITE 26a</td>
<td>1.07</td>
<td>0.79</td>
<td>0.138</td>
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<tr>
<td>SITE 26b</td>
<td>0.99</td>
<td>1.84</td>
<td>1.37</td>
</tr>
<tr>
<td>SITE 27</td>
<td>1.25</td>
<td>1.92</td>
<td>0.385</td>
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<tr>
<td>SITE 28</td>
<td>1.52</td>
<td>1.32</td>
<td>0.398</td>
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<tr>
<td>SITE 29</td>
<td>0.80</td>
<td>0.70</td>
<td>0.138</td>
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<td>SITE 31</td>
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<td>2.60</td>
<td>0.928</td>
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<td>SITE 46</td>
<td>9.66</td>
<td>0.78</td>
<td>0.66</td>
</tr>
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<td>GELUK 1*</td>
<td>16.75</td>
<td>76.89</td>
<td>2.21</td>
</tr>
</tbody>
</table>

TiO₂ analyses were conducted by McLachlan and Lazar Pty Ltd, using the XRF technique. FeO and Fe₂O₃ analyses were conducted by the Chemistry division of the Atomic Energy Board (W.R.O. Jacob). The samples were subjected to cold acid digestion using HF and H₂SO₄, and V⁵⁺ was added as an oxidising agent. The amount of FeO was then determined by back filtration and the use of standard solutions. Total Fe content was determined using the XRF technique and calculation thus yielded the Fe₂O₃ content.

*Magnetite samples*
APPENDIX A4.

DEPENDANCE OF MAGNETIC ANOMALY FORM ON DIRECTION OF MAGNETISATION.

When interpreting magnetic data it is essential to bear in mind that the form of a magnetic anomaly may change drastically over a given structure, depending on the direction of magnetisation within that structure. This may result in completely erroneous conclusions with regard to the exact location of the causative body and its direction of dip. Most rocks acquire a secondary or viscous remanent magnetisation which is induced by the earth’s present-day field and many researchers, in the absence of palaeomagnetic data, perforce assume that magnetisation is induced.

The Damara orogen is an excellent example of where such an assumption cannot be made. The palaeomagnetic results (Chapter 4) clearly indicate a direction of natural remanent magnetisation for the Nosib Group rocks which is very different to the present-day field direction (declination = 334°; inclination = +54°). Utilizing the magnetisation parameters derived in this study, total-field magnetic anomalies have been calculated, assuming both induced and remanent magnetisation, for two simple two-dimensional structures, i.e. an anticline which is uniformly magnetised (Figs. 21a, 21b), and the same anticline with only the limbs being magnetised (Figs. 22a, 22b).

The method of Talwani and Heirtzler (1964) was used in the calculation of the magnetic anomalies. The apparent 'depth of burial' of the structures is 200m and was included to simulate the average aircraft terrain-clearance used for the surveys in the area. The structures were extended only to a depth of 3 depth-units (say kilometres) since most of the Nosib rocks probably do not extend beyond this. Any further depth extensions would in fact not change the basic anomaly forms but only introduce longer wavelength components. The structures were kept simple to illustrate the point. Fig 17 (section 5.2) represents a more realistic model of the complex structures found in the area.

The results in Figs 21 and 22 clearly demonstrate the origin of the negative magnetic anomalies which are discussed in this thesis. Figs 21a and 22a illustrate the anomaly forms for magnetisation induced by the earth’s present-day field, as is mostly the case for the Swakop Group rocks, and Figs 21b and 22b for remanent magnetisation as is found in the Nosib rocks. The aeromagnetic maps of the area (Fig 3) should be viewed in the context of these results.
Fig 21a. Total-field magnetic anomaly over a simulated anticline with uniform induced magnetisation (declination = 340°; inclination = -60°; field intensity = 30000 nT; susceptibility = 0.01 SI). Traverse bearing is 105° which is perpendicular to strike.

Fig 21b. Total-field magnetic anomaly over a simulated anticline with uniform remanent magnetisation (declination = 334°; inclination = +54°; intensity = 0.8 Amp. m⁻¹). Traverse bearing is 105° which is perpendicular to strike.
Fig 22a. Total-field magnetic anomaly over a simulated anticline with induced magnetisation in limbs only (declination = 340°; inclination = -60°; field intensity = 30000 nT; susceptibility = 0.01 SI). Traverse bearing is 105° which is perpendicular to strike.

Fig 22b. Total-field magnetic anomaly over a simulated anticline with remanent magnetisation in limbs only (declination = 334°; inclination = +5°; intensity = 0.8 Amp.m⁻¹). Traverse bearing is 105° which is perpendicular to strike.
REFERENCES


JACOB, R.E. (1974a): Geology and metamorphic petrology of part of the
Damara Orogen along the lower Swakop River, South West Africa.


10. SELECTED BIBLIOGRAPHY


Fig 1. Aeromagnetic colour-composite map of portion of the Damara Orogenic Belt.
Author  Corner B
Name of thesis  An Interpretation of the Aeromagnetic data covering portion of the drama orogenic belt, with special reference to the occurrence of uraniferous granite  1982

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