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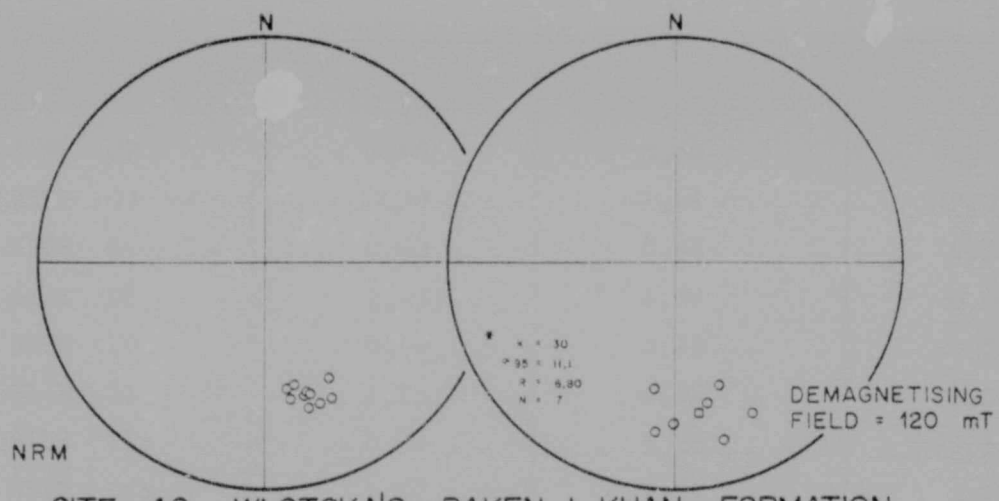
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An interpretation of the aeromagnetic data covering portion of the damara orogenic belt, with special reference to the occurrence of uraniferous granite

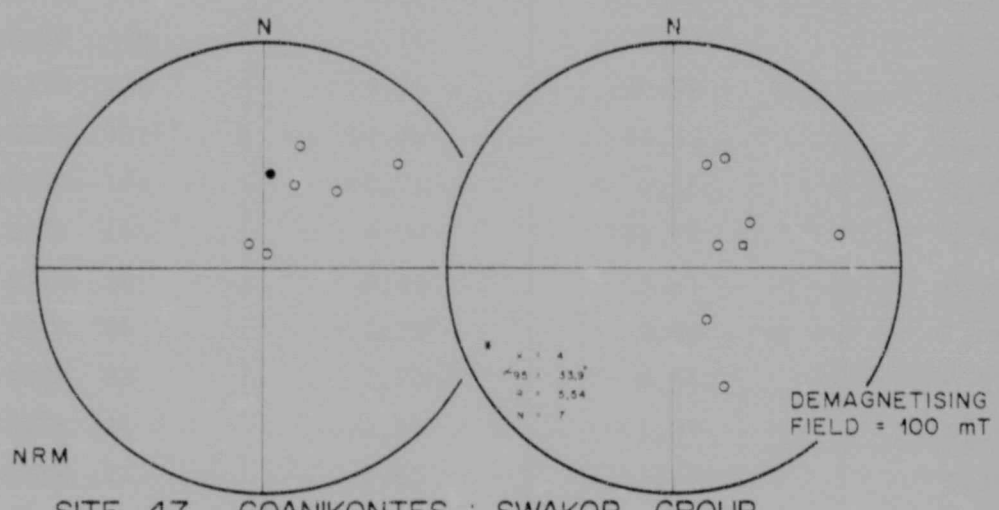
Corner, Branko

2015-02-13
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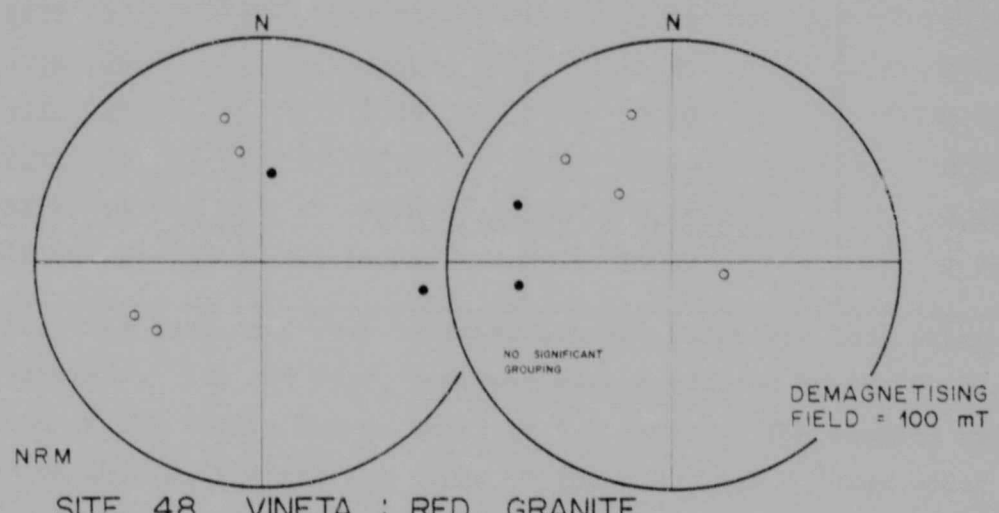
Downloaded from a DSpace repository. https://dspace.org/



SITE 46 WLOTSKA'S BAKEN : KHAN FORMATION



SITE 47 GOANIKONTES : SWAKOP GROUP



SITE 48 VINETA : RED GRANITE

● POSITIVE INCLINATION
○ NEGATIVE INCLINATION
■ □ SITE MEANS
• FISHER STATISTICS AS DEFINED IN TEXT

TABLE A3 : $FeO - Fe_2O_3 - TiO_2$ CONCENTRATIONS OF THE PALAEOMAGNETIC SAMPLES

SAMPLE NO	FeO %	Fe_2O_3 %	TiO_2 %
SITE 01	0,54	0,057	0,068
SITE 02	0,45	0,66	0,147
SITE 03	0,54	1,21	0,371
SITE 04	0,63	0,68	0,261
SITE 07	2,23	4,85	0,66
SITE 10	0,80	0,32	0,088
SITE 11	1,16	4,36	0,573
SITE 15a	0,71	2,16	0,522
SITE 15b	1,27	2,24	0,40
SITE 16a	1,16	3,29	0,626
SITE 16b	1,57	1,83	0,39
SITE 18a	0,71	1,566	0,295
SITE 18b *	9,74	70,98	11,18
SITE 18c *	10,06	84,32	1,11
SITE 19a	0,71	0,16	0,057
SITE 19b *	6,20	88,61	0,84
SITE 20	0,54	3,61	0,715
SITE 21	1,25	3,89	1,063
SITE 23	1,70	0,04	0,222
SITE 24	2,05	1,87	0,582
SITE 25	0,62	4,17	0,35
SITE 26a	1,07	0,79	0,138
SITE 26b	0,99	,84	1,37
SITE 27	1,25	1,92	0,385
SITE 28	1,52	1,32	0,398
SITE 29	0,80	0,70	0,138
SITE 31	3,13	2,60	0,928
SITE 46	9,66	0,78	0,66
GELUK 1 *	16,75	76,89	2,21

TiO_2 analyses were conducted by McLachlan and Lazar Pty Ltd, using the XRF technique. FeO and Fe_2O_3 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 H_2SO_4, and V^{5+} 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 Fe_2O_3 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 whithin 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.

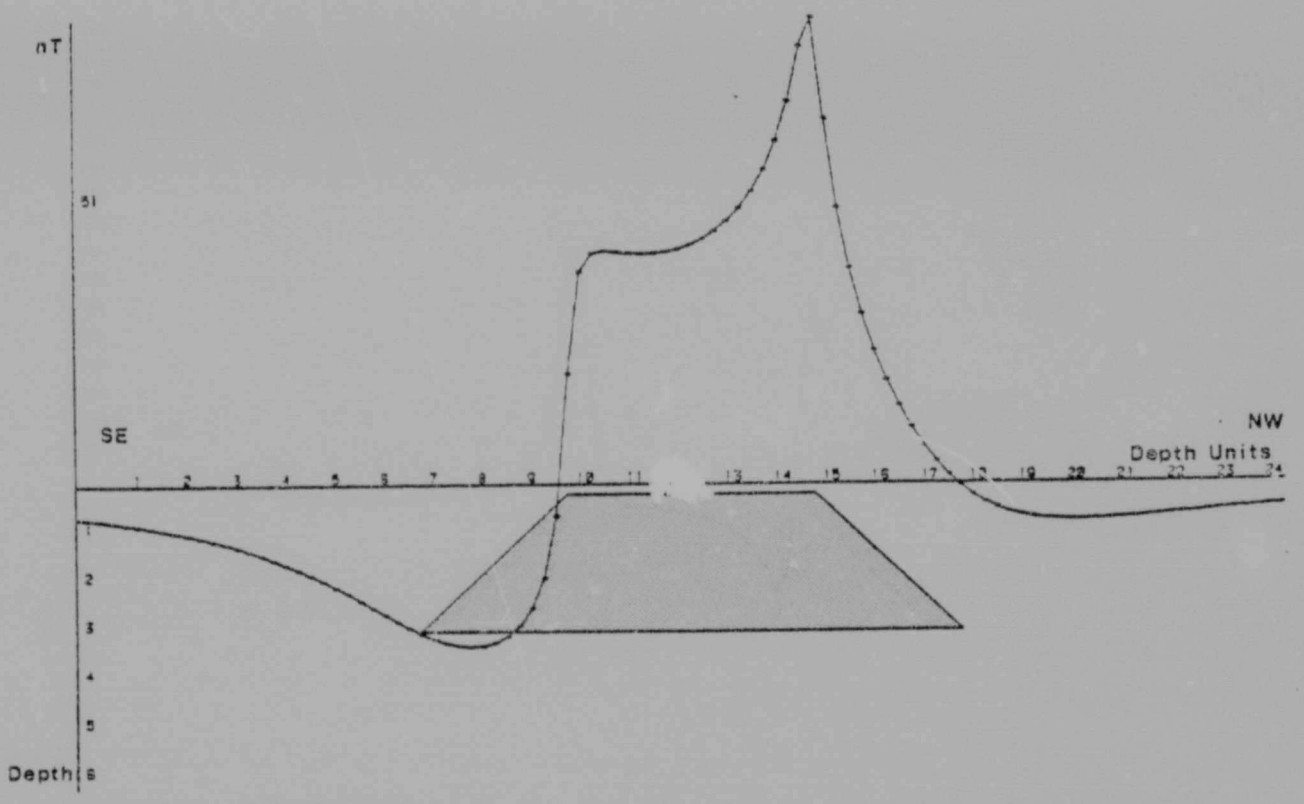


Fig 21a. Total-field magnetic anomaly over a simulated anticline with uniform induced magnetisation (declination = 340; inclination = -60°; field intensity = 30000 n T ; susceptibility = 0,01 SI) Traverse bearing is 105° which is perpendicular to strike.

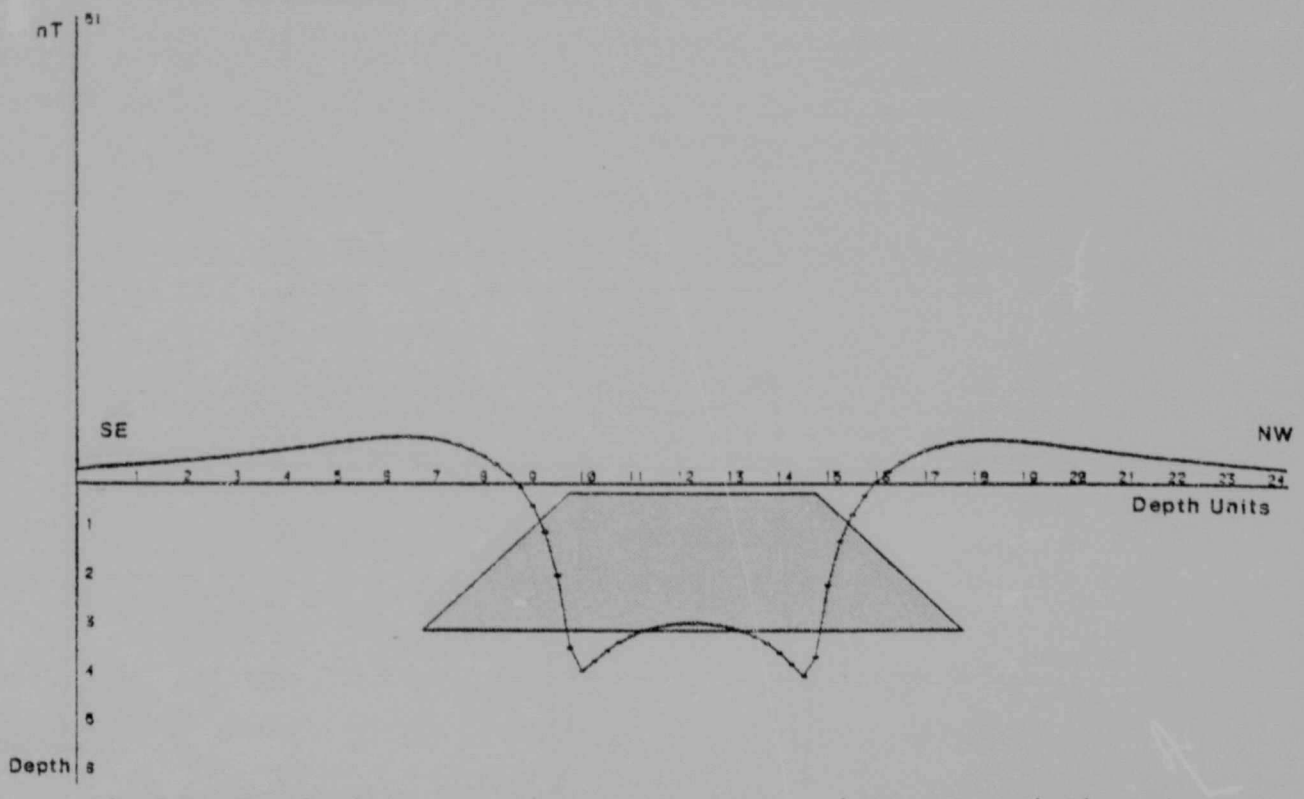


Fig 21b. Total-field magnetic anomaly over a simulated anticline with uniform remanent magnetisation (declination = 334°; inclination = +54°; intensity = 0,8 Amp. m^{-1}).Traverse bearing is 105° which is perpendicular to strike.

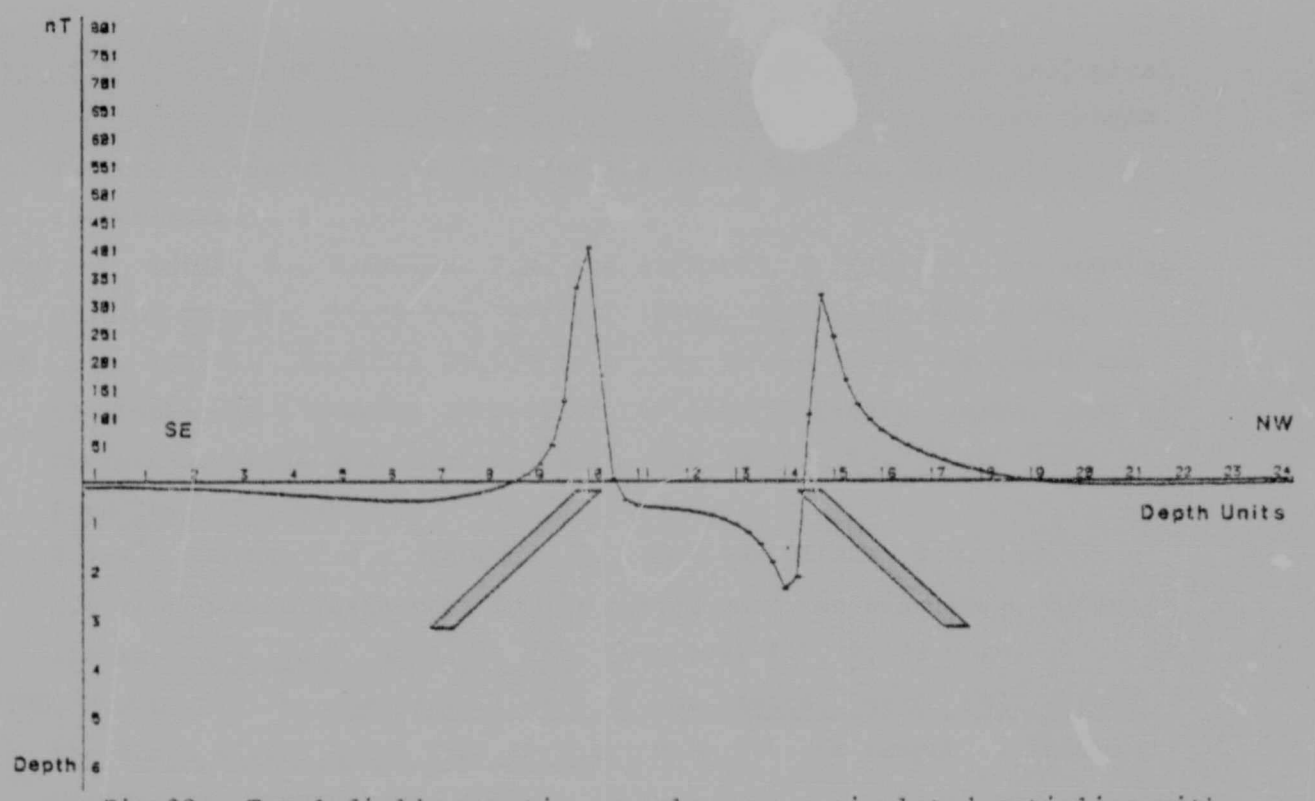


Fig 22a. Total-field magnetic anomaly over a simulated anticline with induced magnetisation in limbs only (declination = 340°; inclination = -60°; field intensity = 30000 n T; susceptibility = 0,01 SI). Traverse bearing is 105° which is perpendicular to strike.

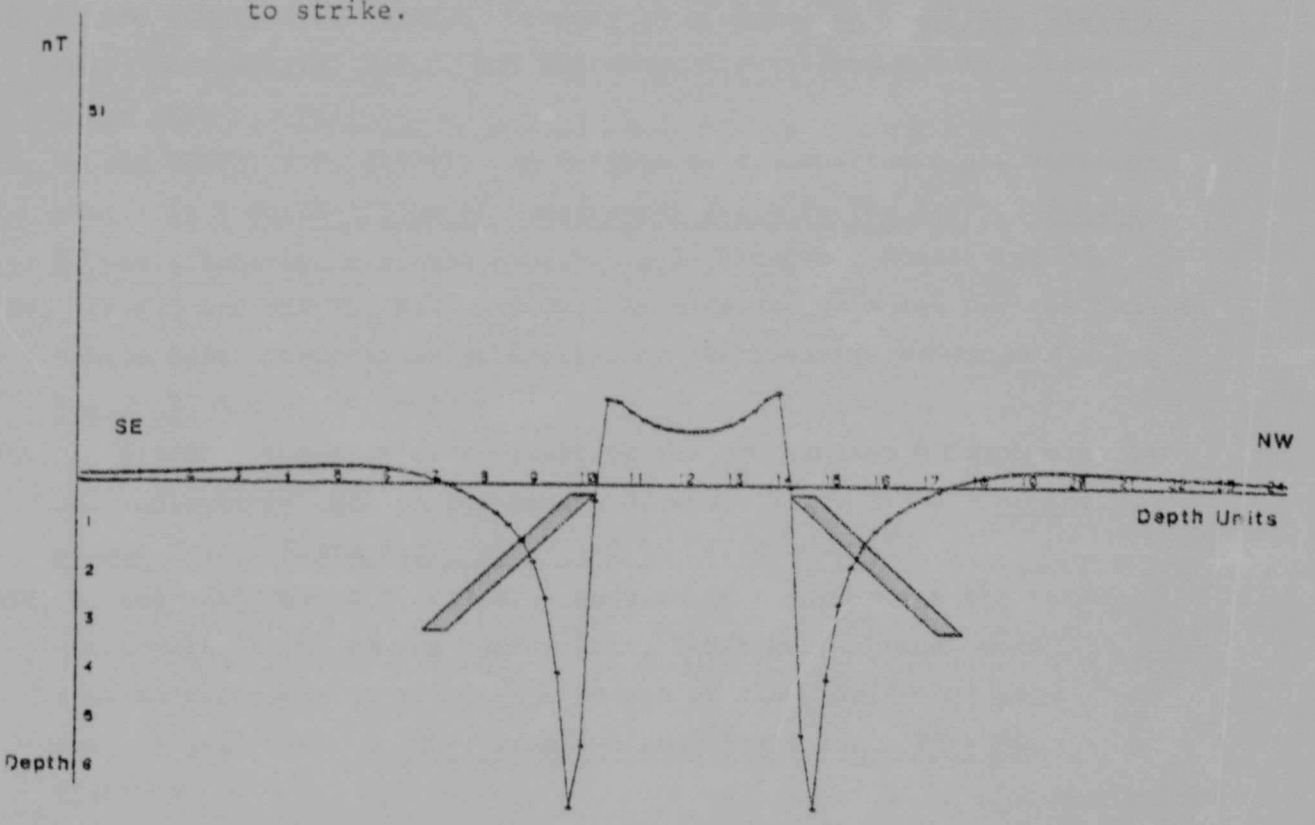


Fig 22b. Total-field magnetic anomaly over a simulated anticline with remanent magnetisation in limbs only (declination = 334°; inclination = +5[illegible]°; intensity = 0,8 Amp.m^{-1}). Traverse bearing is 105° which is perpendicular to strike.

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Fig 3 Aeromagnetic colour-composite map of portion of the Damara Orogenic Belt



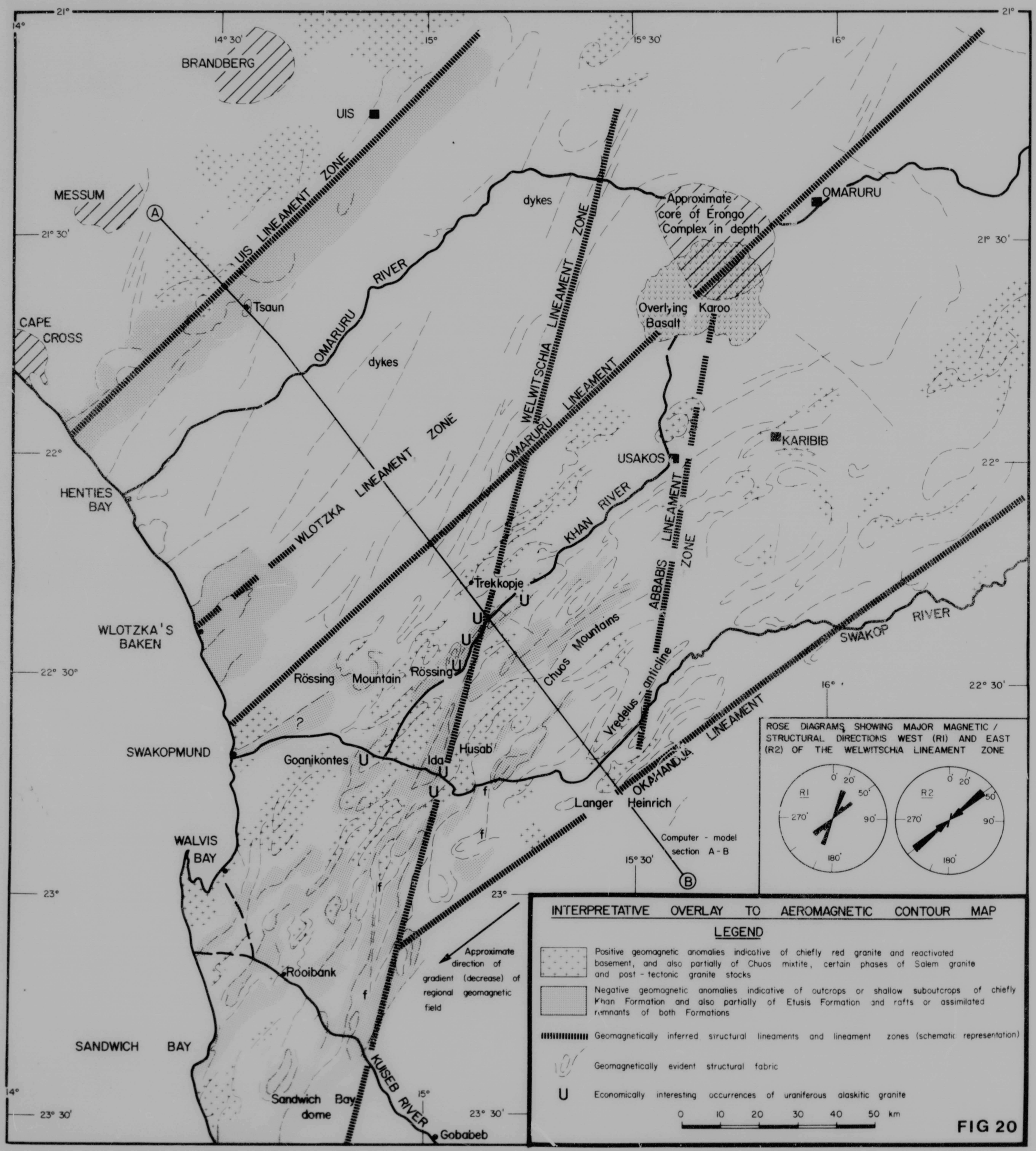

21°
14°
14° 30'
15°
15° 30'
16°
BRANDBERG
UIS
UIS LINEAMENT ZONE
MESSUM
21° 30'
A
Tsaun
CAPE CROSS
OMARURU RIVER
dykes
Approximate core of Erongo Complex in depth
OMARURU
Overlying Karoo Basalt
WELWITSCHIA LINEAMENT ZONE
OMARURU LINEAMENT
22°
HENTIES BAY
WLOTZKA LINEAMENT ZONE
USAKOS
KARIBIB
KHAN RIVER
ABBABIS LINEAMENT ZONE
Trekkopje
WLOTZKA'S BAKEN
22° 30'
Rössing Mountain
Rössing
Chuos Mountains
Vredelus - anticline
SWAKOP RIVER
SWAKOPMUND
Goanikontes
Ida
Husab
OKAHANDJA LINEAMENT
Langer Heinrich
Computer - model section A - B
B
WALVIS BAY
23°
15° 30'
Rooibank
SANDWICH BAY
KUISEB RIVER
Sandwich Bay dome
Gobabeb
23° 30'
ROSE DIAGRAMS SHOWING MAJOR MAGNETIC / STRUCTURAL DIRECTIONS WEST (R1) AND EAST (R2) OF THE WELWITSCHIA LINEAMENT ZONE
R1
R2
0° 20° 50° 90° 180° 270°
INTERPRETATIVE OVERLAY TO AEROMAGNETIC CONTOUR MAP
LEGEND
Positive geomagnetic anomalies indicative of chiefly red granite and reactivated basement, and also partially of Chuos mixtite, certain phases of Salem granite and post - tectonic granite stocks
Negative geomagnetic anomalies indicative of outcrops or shallow suboutcrops of chiefly Khan Formation and also partially of Etusis Formation and rafts or assimilated remnants of both Formations
Geomagnetically inferred structural lineaments and lineament zones (schematic representation)
Geomagnetically evident structural fabric
U Economically interesting occurrences of uraniferous alaskitic granite
0 10 20 30 40 50 km

FIG 20

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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