RESTRICTED INVESTIGATION REPORT 1659R

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INSTITUTE OF ENERGY AND EARTH RESOURCES

DIVISION OF MINERAL PHYSICS AND MINERALOGY

MAGNETIC PROPERTIES AND MODELS FOR PECULIAR KNOB AND TEATREE GLEN PROSPECTS, S.A.

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SUMMARY

The susceptibility, anisotropy of susceptibility, magnetic remanence and stability of magnetic remanence of fourty samples (85 specimens) from five drill holes have been determined. Four of the drill holes are at the Peculiar Knob Prospect (Enginina E.L. 1145-S.A.) while the remaining drill hole is at the Teatree Glen Prospect (Weetulta E.L. 1128-S.A.). The core from this last hole had been oriented during the drilling operation.

Susceptibility versus temperature determinations on the massive haematite samples from Peculiar Knob Prospect show that their magnetic properties are dominated by a small volume percentage of magnetite and maghaemite, probably occurring as fine intergrowths within the haematite. This has led to some samples displaying remarkable Koenigsberger ratios (Q), greater than 1000. The large magnetic anomalies at the Peculiar Knob Prospect can be accounted for by the large remanent magnetisations of the massive haematite/magnetite (mHt/Mt) bodies. The magnetic anomalies have been successfully modelled using a two-dimensional dipping slab programme (a copy of which has been supplied to CRAE). Gravity modelling has also been carried out and augments the magnetic model.

The magnetic anomalies present at the Teatree Glen Prospect appear to be dominated by the susceptibilities of the bodies. The anisotropy of the susceptibility reflects the bedding and confirms that the beds are dipping to the north west. Moreover, the high anisotropy of susceptibility of many samples indicates that simple induced magnetic models are inappropriate. These

anomalies have been modelled taking into account the anisotropy of susceptibility which has the effect of making the anomalies more symmetric than they would otherwise be. While many of the supplied profiles can be reasonably modelled, there still appears to be a significant discrepancy between the main anomaly at 11000mN and any of the model anomalies. Several reasons for this are suggested.

1 INTRODUCTION

The magnetic properties of drill core samples from two areas in South Australia have been examined in an attempt to explain inconsistencies between measured anomalies over several magnetic bodies, and the calculated anomalies assuming that the bodies are magnetised by induction in the present Earth's field direction. The first of these areas is within the Enginina E.L. 1145-S.A. (known as the Peculiar Knob Prospect), where measured magnetic susceptibilities are not large enough to account for the magnitude of the associated magnetic anomalies. The second area is within the Weetulta E.L. 1128-S.A. (known as the Teatree Glen Prospect), where the measured magnetic anomaly suggests southeasterly dipping strata but drill hole intersections suggest northwesterly dips, which should produce a quite different anomaly.

Four diamond drill holes (DDH) from the Peculiar Knob Prospect (85EN19, 20, 21 and 22) and one DDH from the Teatree Glen Prospect (86WE6) were sampled with the aid of a susceptibility meter and a portable magnetometer (Minispin) to identify the more prominently magnetised sections. In addition DDH 86WE6 had been fully oriented (in sections) enabling the magnetic parameters to be determined with respect to geographic co-ordinates, enhancing the utility of the results considerably. A total of 40 samples were collected, from which 85 individual specimens of nominal size 25mm diameter, and 22mm height (giving the best approximation to a sphere) were prepared. The rock types sampled varied from massive haematite/magnetite to granite-gneiss, amphibolite and a quartz-feldspar-magnetite. The sampling is summarised in Table 1.

2 PECULIAR KNOB PROSPECT

Ground magnetic anomalies at Peculiar Knob Prospect are greater than 30,000 gammas (30,000 nT). The supplied cross-sections and contour maps suggest that the magnetised bodies are striking northeast and are steeply dipping. Measured susceptibilities are typically several orders of magnitude too low to allow induced magnetisation to be the cause of the anomalies, indicating that either the drill hole has not penetrated the causative bodies, or that the units are strongly remanently magnetised. The former of these is unlikely if the inferred geometry of the drill hole and steeply dipping slab-like bodies is correct.

In conjunction with measurements of remanent magnetisation the variation of susceptibility versus temperature of a small sample (DDH 85EN20 242m) was monitored to identify the magnetic species present. Figure 1 shows susceptibility variation from liquid nitrogen temperature (-196°C) to almost 700°C using the transformer bridge of Ridley and Brown, (1980). The small peak observed at about -155°C indicates the presence of multi-domain magnetite. Just below 300°C susceptibility decreases irreversibly, reflecting chemical alteration. The most likely candidate for alteration is maghaemite inverting to the much less magnetic haematite. The steady irreversible increase in susceptibility after 400°C, until about 500°C, indicates further alteration but this time producing a more magnetic phase which compensates for the loss of maghaemite. The more magnetic phase appears to be magnetite. The sharp drop in the susceptibility at about 580°C marks the Curie Temperature of magnetite (578°C), while a similar sharp drop at 680°C is due to the haematite present. Finally on cooling, further alteration is evident by the irreversibility of the curve above 500°C. While the bulk of the sample is haematite, the magnetic properties are dominated by the magnetite/maghaemite present. From typical values of susceptibility of these materials, it is estimated that the magnetite/maghaemite need only be present as 1 percent by volume to account for this result.

Natural remanent magnetisation (NRM) of each specimen was measured on a fluxgate spinner magnetometer after finding that many samples were too strong for the otherwise more convenient cryogenic magnetometer. The massive haematite/magnetite (mHt/Mt) was found to possess extremely strong remanence of up to 0.27 G (270 Am^{-1}) and although the Peculiar Knob Prospect drill cores were not azimuthally oriented, the directions of remanence between contiguous samples were in agreement suggesting that the remanence is stable. Further evidence of the stability of the remanence was sought from alternating field (AF) demagnetisation (see Schmidt and Clark, 1985 for a discussion of palaeomagnetic methods). Figure 2 shows stereographic projections of magnetisation directions with respect to the drill core axis for NRM and after AF cleaning in peak fields of 50oe, 100oe, 200oe, 500oe and 1000oe (i.e. 5mT to 100mT). Most samples of mHt/Mt change direction very little up to 1000oe, demonstrating remarkable stability. This stability is further borne out by the intensity decay curves plotted in Figure 3. The median destructive field (MDF), a measure of magnetic hardness, for many samples of mHt/Mt is around 500oe. Two samples (20/97.0B and 20/97.2A) are contrastingly softer and decay to 10-20 percent of NRM intensity by 100oe. Figure 2b shows that this decay is accompanied by a large change in direction indicating that these samples possess multicomponent magnetisation. The softer remanent component is removed by 500oe isolating a hard remanent component comparable in inclination to magnetic directions of other samples of mHt/Mt. Because these drill hole cores are not azimuthally oriented, the declinations are only relevant between contiguous samples.

Magnetisation directions from granite and quartzite samples (Fig.2c-e) tend to be less systematic and less stable than those of the mHt/Mt samples, although consistent negative inclinations suggests that overall the intersected units are magnetised in a normal sense. Some of these rock types are reasonably magnetic and in the absence of the mHt/Mt would produce substantial magnetic anomalies themselves i.e. the quartzite sample from 118.2-118.6m in DDH 85EN22.

A summary of the magnetic properties of samples from the Peculiar Knob Prospect is presented in Table 2. It is apparent that the remanence of the mHt/Mt dominates the magnetisations present in these samples, with Koenigsberger Ratios (Q) of up to 1200. Fine intergrowths of magnetite/maghaemite are probably the cause of such high values. Although susceptibilities are considerable (over 0.03 G/oe in some cases), the induced magnetisations (0.02 G say) are much smaller than the remanent magnetisations of up to 0.2 G.

Directions of remanent magnetisation of mHt/Mt samples after linearity spectrum analysis (Schmidt and Clark, 1985) are plotted in Figure 4a with respect to the drill core axis. There is a clear disposition for high inclinations. For data such as these with no declination control, the method of McFadden and Reid (1981) may be used to estimate the true mean inclination. This method allows for the bias that would be present in a simple arithmetic mean (the mean of directions D=0°, I=-80° and D=180°, I=-80° is I=-90°, but an arithmetic mean returns I=-80°). Applying the method of McFadden and Reid (1981) to the remanence inclinations determined from the mHt/Mt samples, and correcting for the drill hole plunge of 60° to N145°E, the annulus plotted in Figure 4b is determined. This annulus encloses the most probable direction of remanent magnetisation of the Peculiar Knob bodies.

The practice adopted in the past to estimate the average remanent magnetisation of a body has been to use the vector mean, i.e. weighting directions in favour of their intensities. However, with no knowledge of declination this method is not possible. Because the mHt/Mt units are predominantly of a single magnetic component, the directions and intensities of magnetisations are independently distributed (the NRM intensities of core piece 20/97.0-97.4 have not been used here since these samples possess multiple magnetisations in which case directions and intensities are likely to be correlated). The mean intensity of magnetisation of the remaining mHt/Mt samples is .19 G (190

Am^{-1}), with a standard deviation of .07 G (70 Am^{-1}). It is expected that this value will be biassed on the high side compared with the true average remanent intensity of these bodies since the samples were selected on the basis that they appeared to have either strong remanence and/or high susceptibilities.

Assuming the gross geological structure inferred from the supplied drill hole cross-section (10000 mN) is an appropriate starting point, the magnetic signature for the intersected bodies at Peculiar Knob Prospect has been modelled with a remanent intensity of .2 G, a remanent direction of Dec= 0°, Inc= -90°, and an isotropic susceptibility of 0.02 Goe^{-1} using a two-dimensional programme for thick slab-like bodies (Emerson, Clark and Saul, 1985). This first attempt yielded a magnetic anomaly greater than 50,000 gammas, which is 60 percent greater than the observed anomaly. This confirms the suggestion that that the mean measured remanent intensity of the mHt/Mt bodies is higher than the true value, but more importantly the initial attempt showed quite clearly that the magnetic remanence of these bodies is sufficient to account for the observed anomaly. Since the main body that is intersected by DDH 85EN19 and DDH 85EN20 appears to be responsible for the major anomaly, further modelling was performed with a progressively weaker remanence for this body, until the calculated anomaly agreed better with the observed anomaly. The remanent intensity value thus determined was 0.12 G, which is at the extreme low side of the estimated intensity. A further refinement to the model involved adjusting the dip of the flanking body intersected by DDH 85EN21, while constraining the body to pass through the drill hole intersection point. Assigning dips to the three main bodies, of 60°, 90° and 95° from west to east respectively, was found to optimise the anomaly location (fig. 5). The fit to the observed anomaly (also plotted in Fig. 5a) is reasonable, and although a somewhat better fit could be achieved by arbitrarily adjusting depths or remanent intensities (say), it is preferable to manipulate as few parameters as possible for the model to represent the geology meaningfully. It is noted that if the alternative extreme direction (Dec= 325°, Inc= -30°) of remanent magnetisation is substituted in the model, a very asymmetrical anomaly results supporting the vertical magnetisation direction used above (Fig. 5a).

A further check on the validity of the Peculiar Knob Prospect model was possible by modelling the Bouguer gravity anomaly. Since the massive haematite bodies have strong density contrasts with the host rocks, the measured Bouguer anomaly is substantial. Estimates of densities of representative samples of the mHt/Mt and the host rock led to a density contrast of 2.37 being used in the two-dimensional model, yielding the gravity anomaly shown in Figure 5b. Again there is reasonable comparison between the calculated and the observed anomalies. The consistency of the calculated magnetic and gravity anomalies with their observed counterparts is all the more significant through the Poisson Theorem, which allows parameters such as density and magnetisation to be related if the magnetic and gravity anomalies arise from the same source as they appear to here, even without assuming a source body geometry (Cordell and Taylor, 1971). In the present instance this means that the Poisson

Theorem would require intense vertical-up magnetisations, independently supporting the laboratory measurements.

From the above, the general structure present at 10000mN appears to be a tight anticline with an axial plane dipping steeply to the northwest. The supplied contour map suggests that there is a closure to the northeast.

3 TEATREE GLEN PROSPECT

The regional geological strike at Teatree Glen is northeast-southwest, and from drill core the strata appear to dip to the northwest. A prominent magnetic anomaly of about 5000 gammas (5000 nT) intensity at 11000mN is reasonably symmetric, suggesting that the strata are dipping to the southeast, assuming that the source is isotropic and magnetised by induction in the Earth's magnetic field. To determine whether these assumptions are justfiable or not, seven fully oriented core pieces (Table 1) were collected from DDH 86WE6. From these, 25 individual specimens were prepared and measurements of their NRMs, bulk susceptibility and anisotropy of susceptibility were recorded. The magnetisations of these specimens are dominated by their susceptibilities, which are highly anisotropic (Table 3). Nevertheless, routine AF demagnetisation was carried out to test the stability of the NRMs. Changes in direction during these tests are plotted in Figures 6a and 6b. Scattered NRM directions and erratic changes in directions during AF demagnetisation serves to emphasise the subordinate role of the remanent magnetisation in these specimens. The soft nature of the remanence is reflected by the demagnetisation curves plotted in Figure 7.

The anisotropy of susceptibility is described by the principal axes of the susceptibility ellipsoid. After correction for orientation, the maximum (representing a lineation) and minimum (representing a pole to a planar fabric) axes are plotted in Figure 8. The minimum axes display a strong mode in the southeast quadrant consistent with dipping strata to the northwest, i.e. the minimum axes are perpendicular to bedding. The mean minimum susceptibility axis, derived from the mean susceptibility tensor (Clark and Schmidt, 1986), indicates the strata intersected by DDH 86WE6 are dipping 47° to N316°E (Table 3). The significance of the weaker mode displayed by the maximum axes is not clear, but in many deformed metamorphic rocks the magnetic lineation is parallel to the fold axis plunge. It is noted that this mean maximum axis (northwest-down, Table 3) is in approximate alignment with some of the NRM directions (i.e.Fig. 6b after correcting for drill hole orientation), suggesting a causal relationship.

Using the magnetic properties discussed above and summarised in Table 3, a suite of two-dimensional magnetic profiles were generated to cover a range of possible variations. Several profiles of the observed magnetics (Figure 9a) may be compared with the computed profiles (Figure 9b). The magnitude of the anomaly may be accounted for solely by the induced magnetisation.

The effect of the high anisotropy is to make the calculated anomaly shapes more symmetric than they otherwise would be with isotropically induced magnetisation. While a northwest geological dip is retained, it has been varied from 30° to 60°, and although the anomaly amplitude varies, a strong asymmetry of the anomaly shape is apparent. The effect of substituting a thicker slab is to simply broaden the anomaly, again retaining a characteristic asymmetry. One of the problems in modelling the Teatree Glen Prospect anomaly is with defining the limits of the source. From the supplied summary drill core log it is apparent that the drill hole has not penetrated the far side of the source.

Model 1 is a 200m wide slab dipping 47° degrees to the northwest (as determined from the magnetic fabric, Fig.8), and displays a sharp gradient to the northwest and a shallower gradient to the southeast. This is more characteristic of the observed anomalies immediately to the south of this area (8600mN to 9600mN) although these anomalies do not have the pronounced lows to the southeast as do the calculated anomalies. There is perhaps a regional gradient that has not been adequately removed, or other bodies present to the southeast may counter the low. Model 5 is an attempt to investigate the effect of other bodies to the southeast. This model is essentially a fault-block, again dipping 47 degrees to the northwest, and in general terms displays the overall character of many of the profiles supplied. In fact, arbitrary variations between the two extremes shown in Figure 9b (models 1 and 5) could account for the overall magnetic signature of the Teatree Glen Prospect. Nevertheless, there does not seem to be a plausible model using the measured magnetic parameters (negligible remanence, strong anisotropic susceptibility consistent with northwesterly dips) that produces a symmetric anomaly shape similar to that observed at 11000mN. It should be noted, however, that contours of the anomaly at 11000mN reveal it as having little lateral extent, suggesting that the source is compact and may not have been intersected by the drill hole. This is especially so if the source for the 11000mN anomaly is shallow and superimposed on an anomaly similar to the others, arising from greater depths. In general all of the profiles at the Teatree Glen Prospect appear to be of composite character to some extent, and may be reflecting bands of bedding of varying magnetisations.

In conclusion, while many of the Teatree Glen Prospect profiles are adequately accounted for by northwesterly dipping strata, albeit of ill-defined distribution, having magnetic properties similar to those of samples collected from DDH 86WE6, the 11000mN profile in particular, is not easy to account for. The reasons for this include the possibilities of the anomaly arising from,

i) highly remanent magnetic material at shallow depths (the remanence being in the bedding plane as observed above),

ii) or alternatively of highly anisotropic material, effectively constraining the induced magnetisation to the bedding plane and,

iii) a regional magnetic gradient rising to the southeast that has not been adequately removed, obscuring the true character of all the profiles.

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TABLE 1 INVENTORY OF SAMPLES

DDH	Depth(m)	Rock Type
85EN19	71.3-71.4	Massive haematite/magnetite
85EN20	37.8-37.9	Haematite quartzite
	89.1-89.3	Granite gneiss and haematite
	90.8	Gneiss-amphibolite
	97.0-97.4	Massive haematite/magnetite
	241.6-242.3	Massive haematite/magnetite
	246.6-247.0	Massive haematite/magnetite
85EN21	56.5	Magnetic granite
	71.8-71.9	Granite haematite
	111.7-111.8	Massive haematite/magnetite
85EN22	118.2-118.6	Magnetic quartzite
	137.7	Massive haematite/magnetite
86WE6	51.5	Massive/contorted magnetite gneiss
	53.6-53.7	Massive/contorted magnetite gneiss
	76.6-76.7	Amphibolite magnetite gneiss
	78.0	Amphibolite magnetite gneiss
	84.0	Quartz feldspar
	87.5	Quartz feldspar
	133.4-134.7	Quartz/feldspar/biotite/magnetite

TABLE 2 SUMMARY OF MAGNETIC PROPERTIES FROM PECULIAR KNOB PROSPECT

Core/depth(m)	N	Dec	Inc	J(G)	k(G/oe)	Q	A
DDH 85EN19							
71.3-71.4	4	117	-47	0.204	0.000276	1230	1.44
DDH 85EN20							
37.8-37.9	3	178	-29	0.000256	0.00232	0.18	1.09
89.1-89.3	4	355	6	0.00509	0.0198	0.45	1.10
90.8	2	93	16	0.00871	0.00104	1.4	1.18
97.0-97.4	6	309	-15	0.0569	0.0268	3.71	1.27
241.6-242.3	9	299	-71	0.202	0.0250	14.1	1.12
246.6-247.0	8	96	-69	0.227	0.0321	12.3	1.04
DDH 85EN21							
56.5	3	305	-43	0.00113	0.00830	0.24	1.12
71.8-71.9	3	251	-75	0.0584	0.0559	1.82	1.17
111.7-111.8	4	106	-70	0.114	0.00301	66.1	1.20
DDH 85EN22							
118.2-118.6	11	102	-89	0.0368	0.0192	3.34	1.48
137.7	2	98	-13	0.0360	0.0187	3.40	1.20

[illegible], indu[illegible] [illegible]

TABLE 3 SUMMARY OF MAGNETIC PROPERTIES FROM TEATREE GLEN PROSPECT

Core/depth(m)	N	Dec	Inc	J(G)	k(G/oe)	Q	A
DDH 86WE6							
51.5	2	66	-28	0.00920	0.0470	0.34	1.58
53.6-53.7	4	292	3	0.00172	0.0206	0.15	1.33
76.6-76.7	4	3	-42	0.000573	0.227	0.03	1.29
78.0	2	244	-31	0.000084	0.0080	0.02	1.19
84.0	2	110	-87	0.000052	0.0654	0.001	1.00
87.5	2	183	-71	0.000596	0.0051	0.20	1.19
133.4-134.7	9	277	24	0.00152	0.0131	0.20	1.88

Anisotropy of Susceptibility*

Mean Axes	Dec	Inc	k(G/oe)
Maximum	326	46	0.0297
Intermediate	230	6	0.0276
Minimum	135	43	0.0221

Mean Magnetisation*

	Dec	Inc	J(G)	Q	A
Remanence	46	-37	0.0011		
Induced	21	-64	0.01406		
Resultant	24	-63	0.0150	0.08	1.34

*Note: the above mean directions have been corrected for the drill hole orientation.

FIGURE CAPTIONS

FIGURE 1. Susceptibility versus temperature (k/T) curve for massive haematite/maghaemite/magnetite sample from Peculiar Knob Prospect.

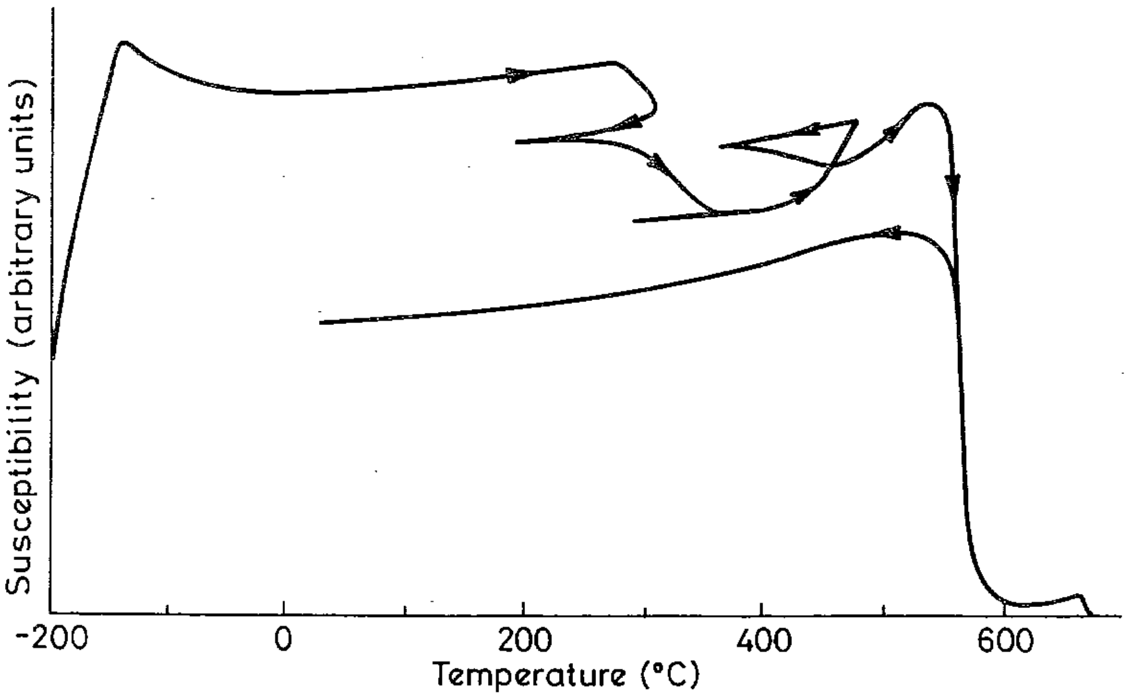
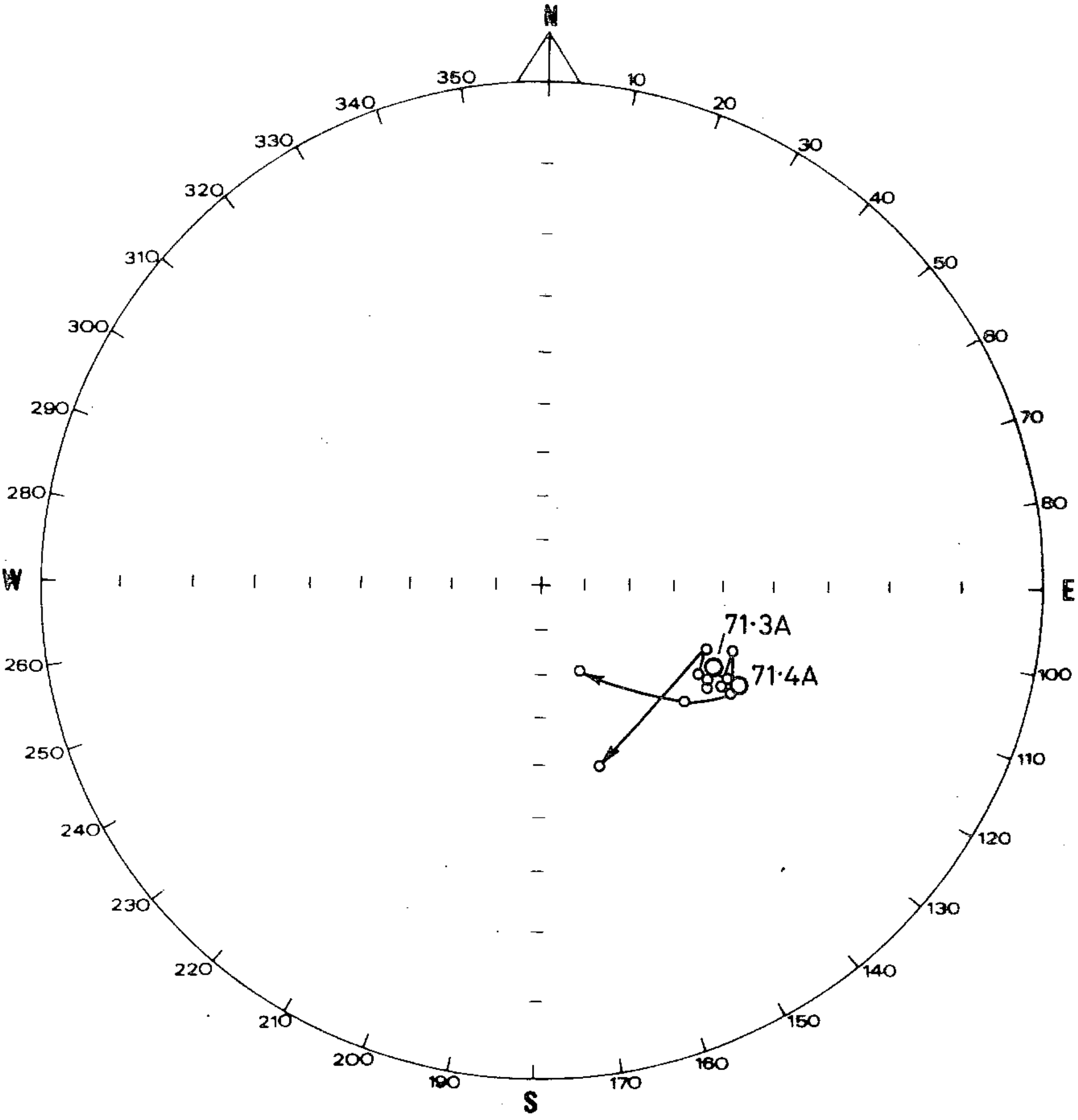


FIG.1 SUSCEPTIBILITY VERSUS TEMPERATURE CURVE FOR PECULIAR KNOB PROSPECT

FIGURE 2. Stereographic projections of magnetisation directions for samples from Peculiar Knob Prospect with respect to the drill core axis for NRM and following AF demagnetisation at peak fields of 20oe,50oe,100oe,200oe,500oe and 1000oe. Open(closed) circles plot on the upper(lower) hemisphere.



85 EN 19 Massive Haematite

FIG. 2a STEREOGRAPHIC PROJECTIONS OF MAGNETIC DIRECTIONS FOR SAMPLES FROM PECULIAR KNOB PROSPECT

85 E 20 Massive Haematite

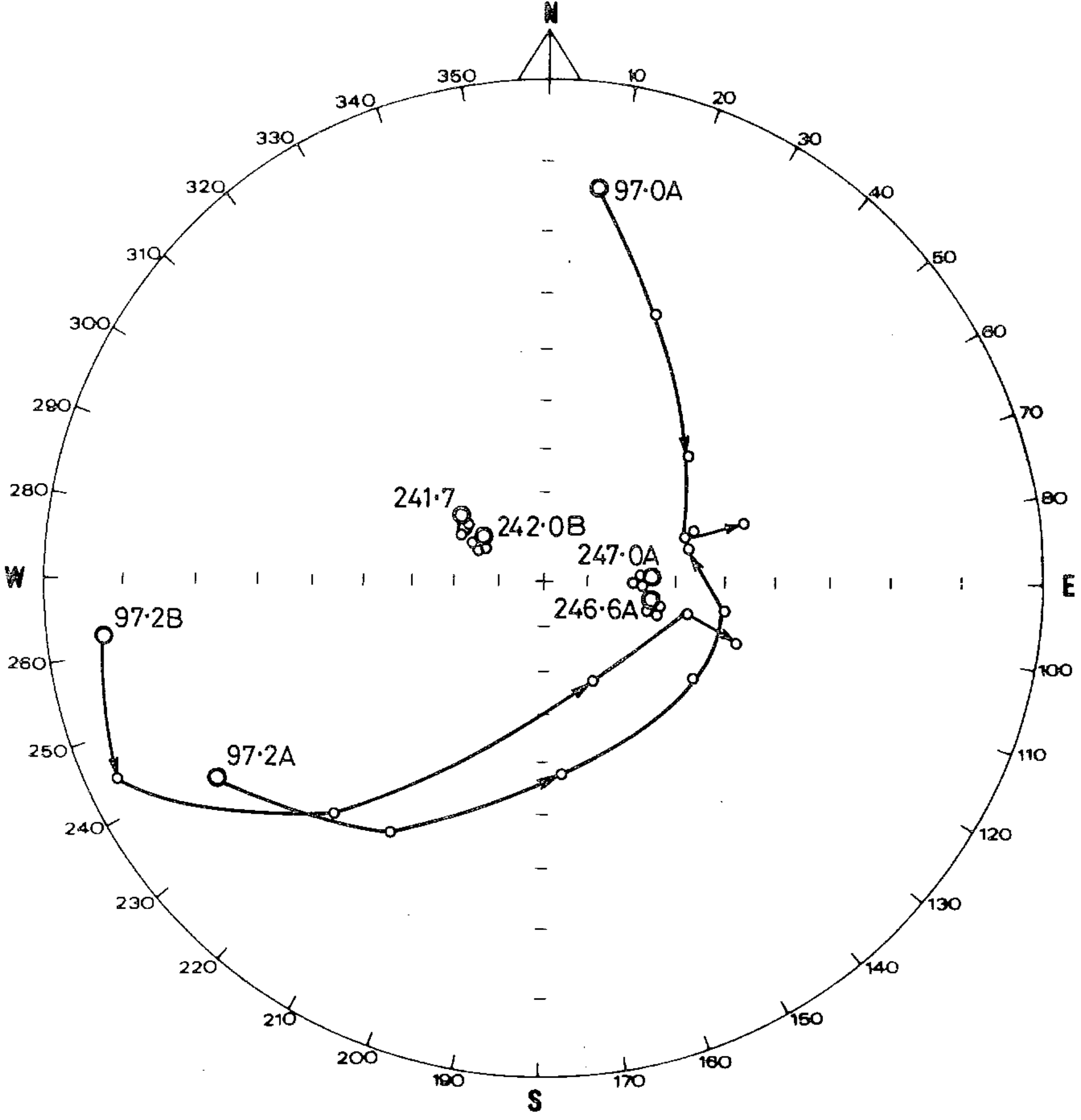


FIG.2b STEREOGRAPHIC PROJECTIONS OF MAGNETIC DIRECTIONS FOR SAMPLES FROM PECULIAR KNOB PROSPECT.

85 E 20 Granite Quartzite

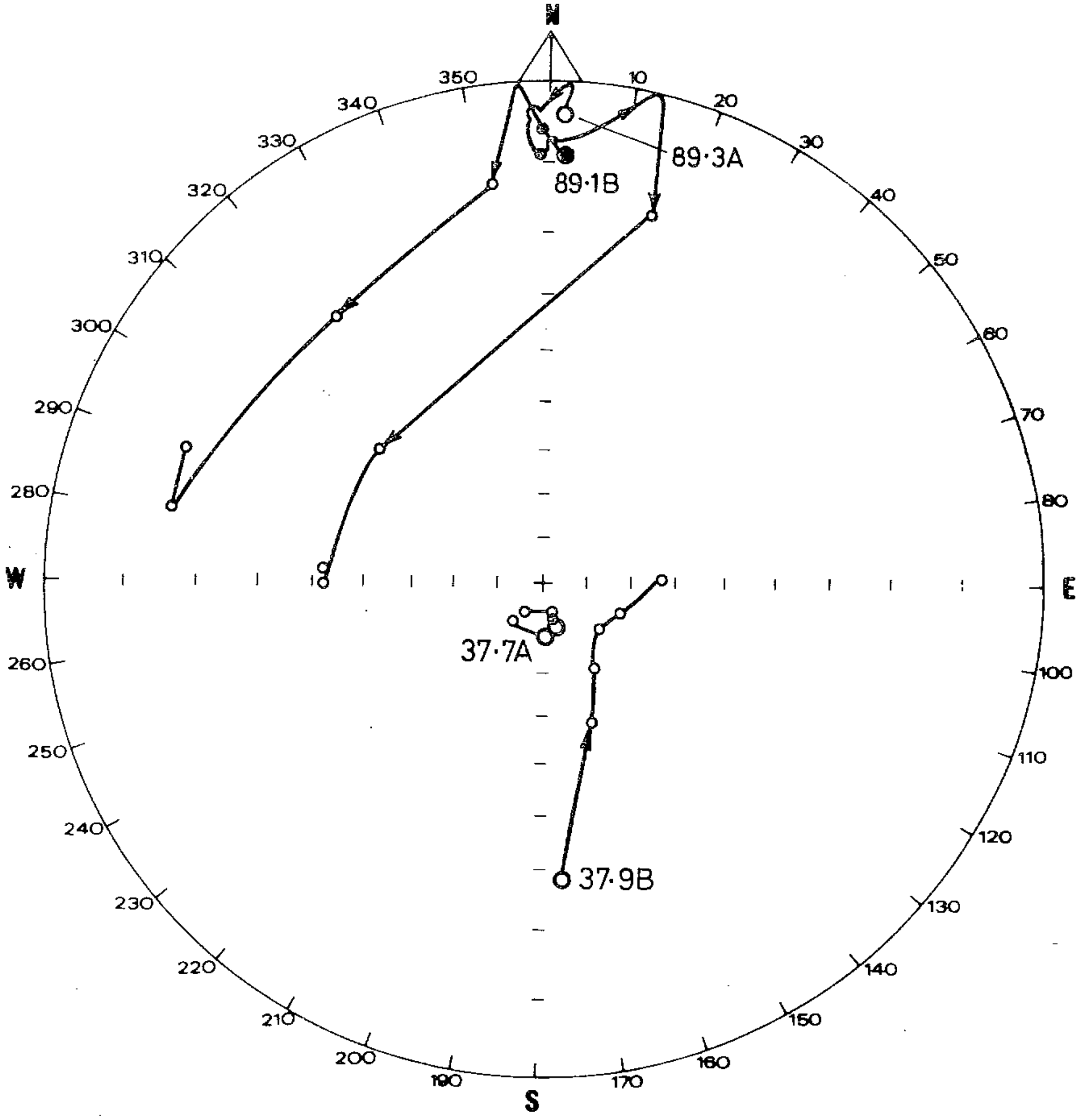


FIG. 2c STEREOGRAPHIC PROJECTIONS OF MAGNETIC DIRECTIONS FOR SAMPLES FROM PECULIAR KNOB PROSPECT

85 EN 21

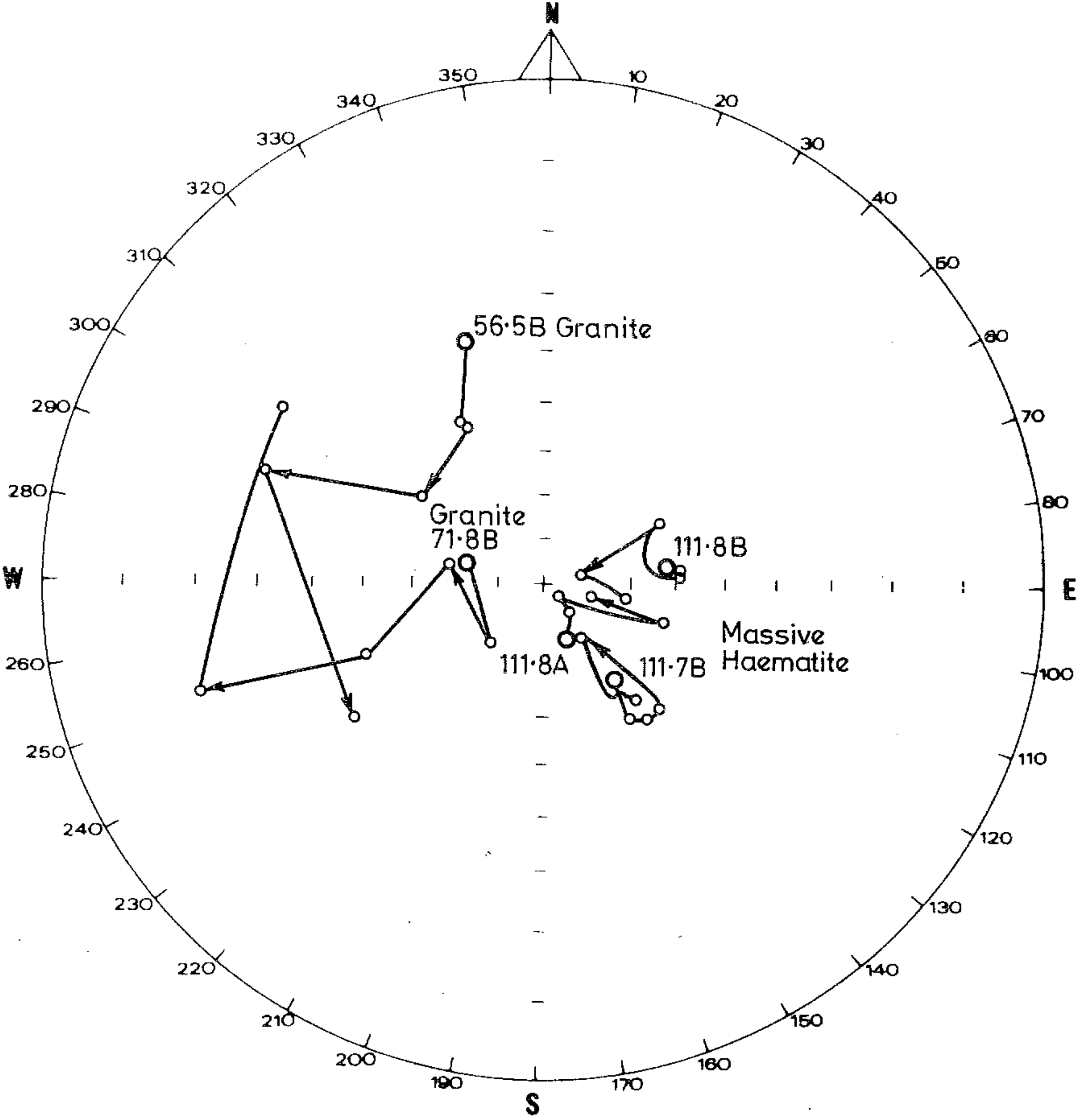


FIG. 2d STEREOGRAPHIC PROJECTIONS OF MAGNETIC DIRECTIONS FOR SAMPLES FROM PECULIAR KNOB PROSPECT

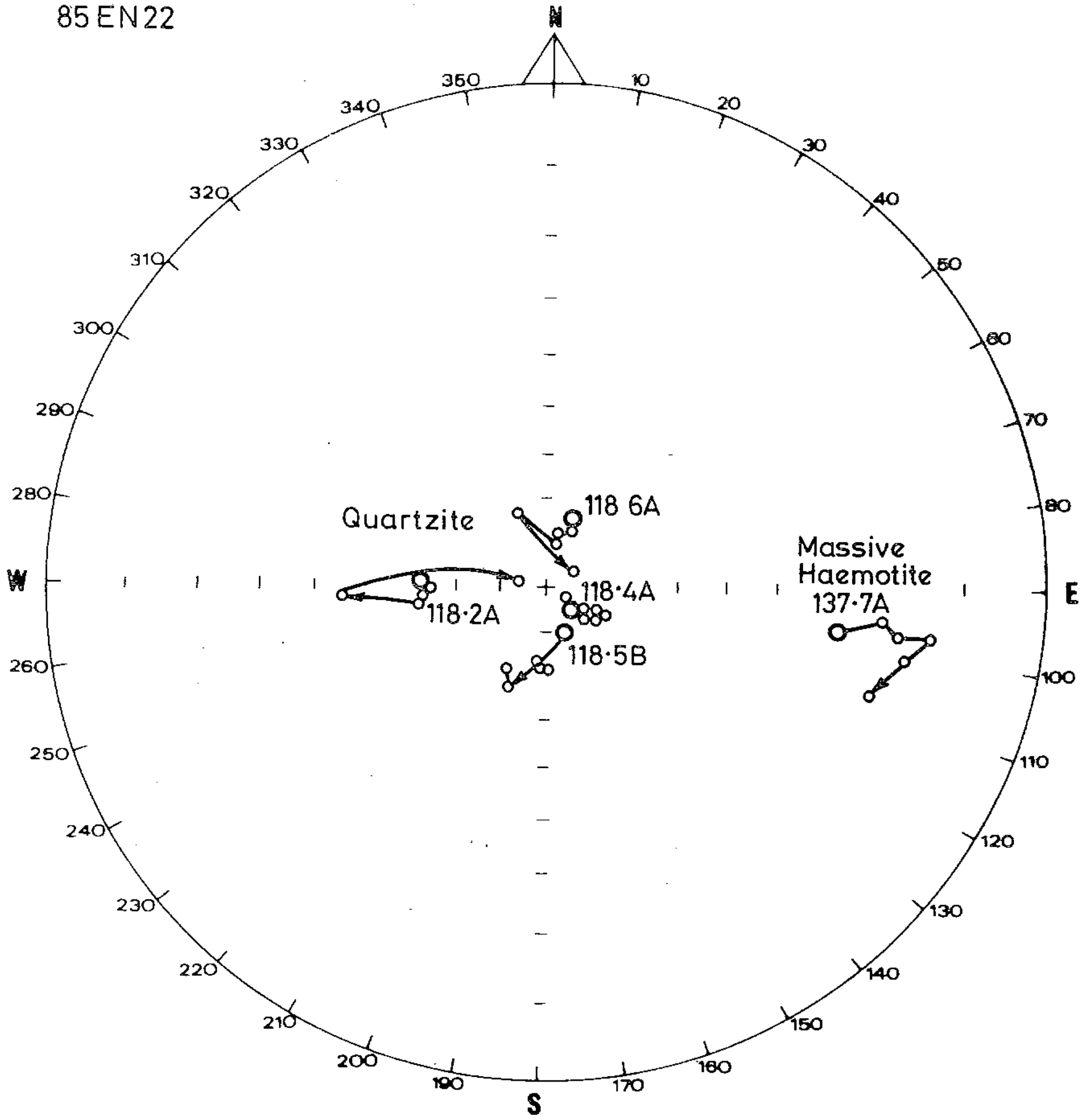


FIG. 2e STEREOGRAPHIC PROJECTIONS OF MAGNETIC DIRECTIONS FOR SAMPLES PECULIAR KNOB PROSPECT

FIGURE 3. AF demagnetisation decay curves for samples of massive haematite/maghaemite/magnetite from Peculiar Knob Prospect.

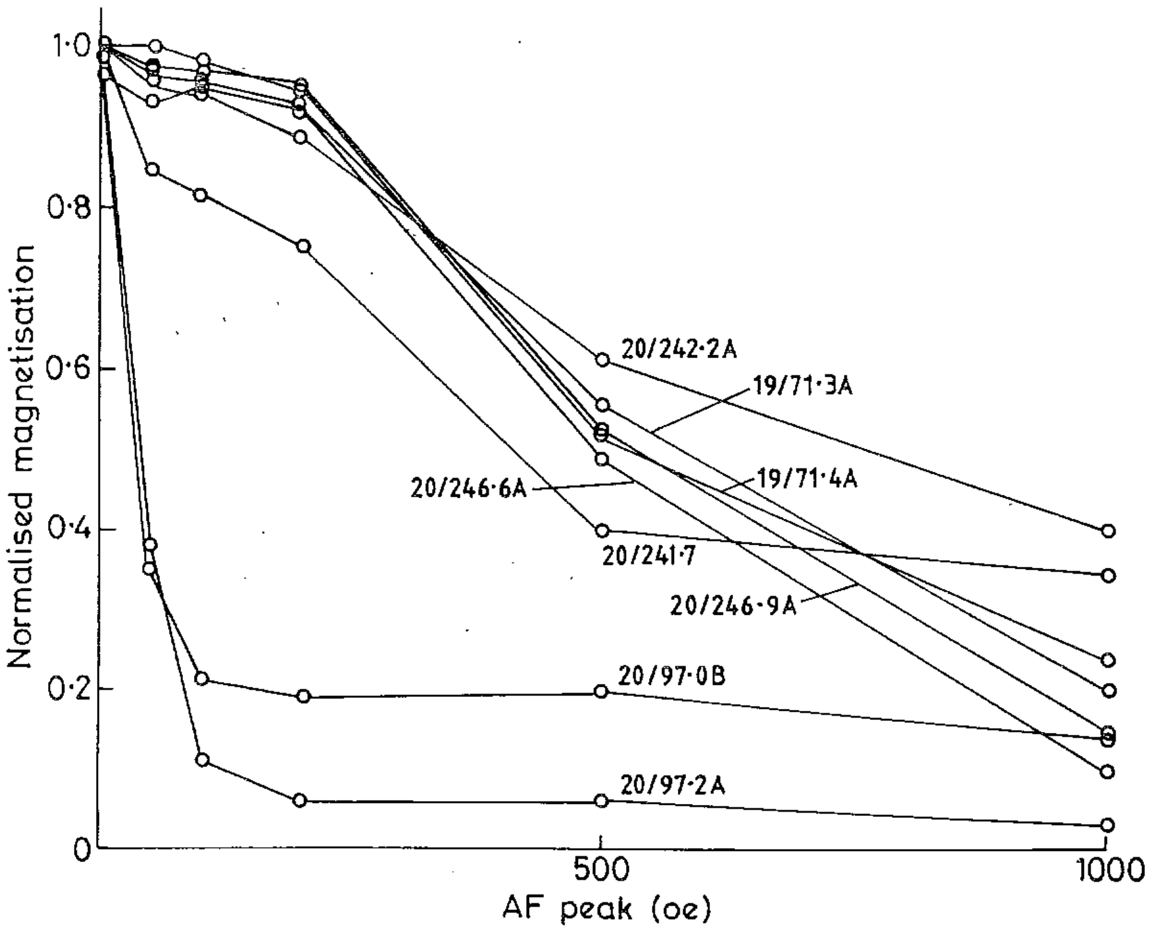


FIG. 3 DEMAGNETISATION CURVES FOR SAMPLES FROM PECULIAR KNOB PROSPECT

FIGURE 4. Stereographic projections of cleaned magnetisation directions (symbols as for Fig.2).
a) Directions are plotted with respect to the drill core axis. Those in groups are from contiguous core pieces for which relative declinations are meaningful.
b) The drill core axis is oriented in its field position (upper hemisphere only shown), and the possible magnetic remanence directions are found by constucting cones with respect to the drill core axis representing the mean inclination and error (McFadden and Reid, 1982).

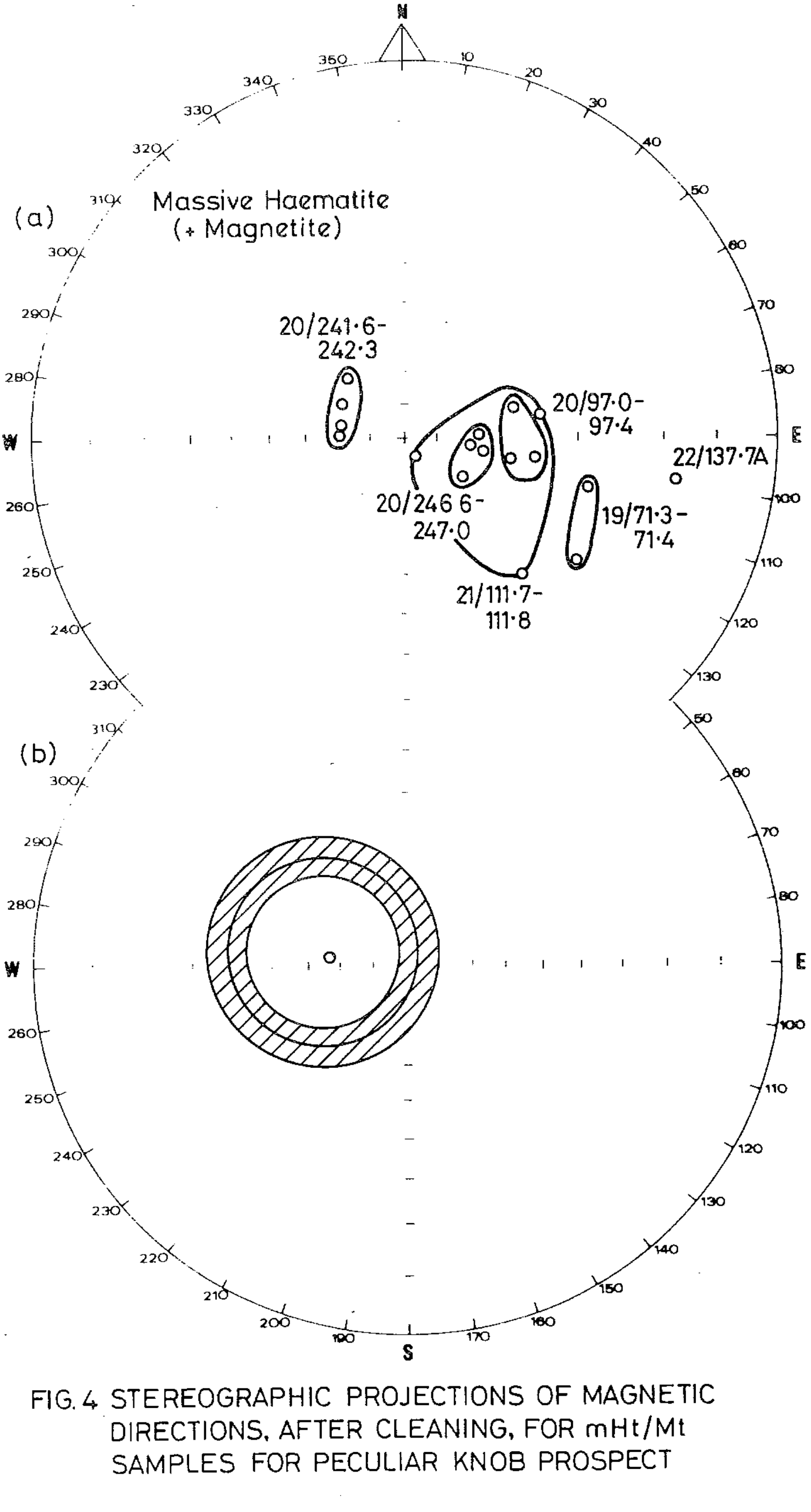


FIG. 4 STEREOGRAPHIC PROJECTIONS OF MAGNETIC DIRECTIONS, AFTER CLEANING, FOR mHt/Mt SAMPLES FOR PECULIAR KNOB PROSPECT

FIGURE 5a. Two-dimensional magnetic model compared to the observed magnetic profile at Peculiar Knob Prospect, 10000mN,
5b. Two-dimensional gravity model compared to the observed Bouguer gravity profile at Peculiar Knob Prospect, 10000mN.

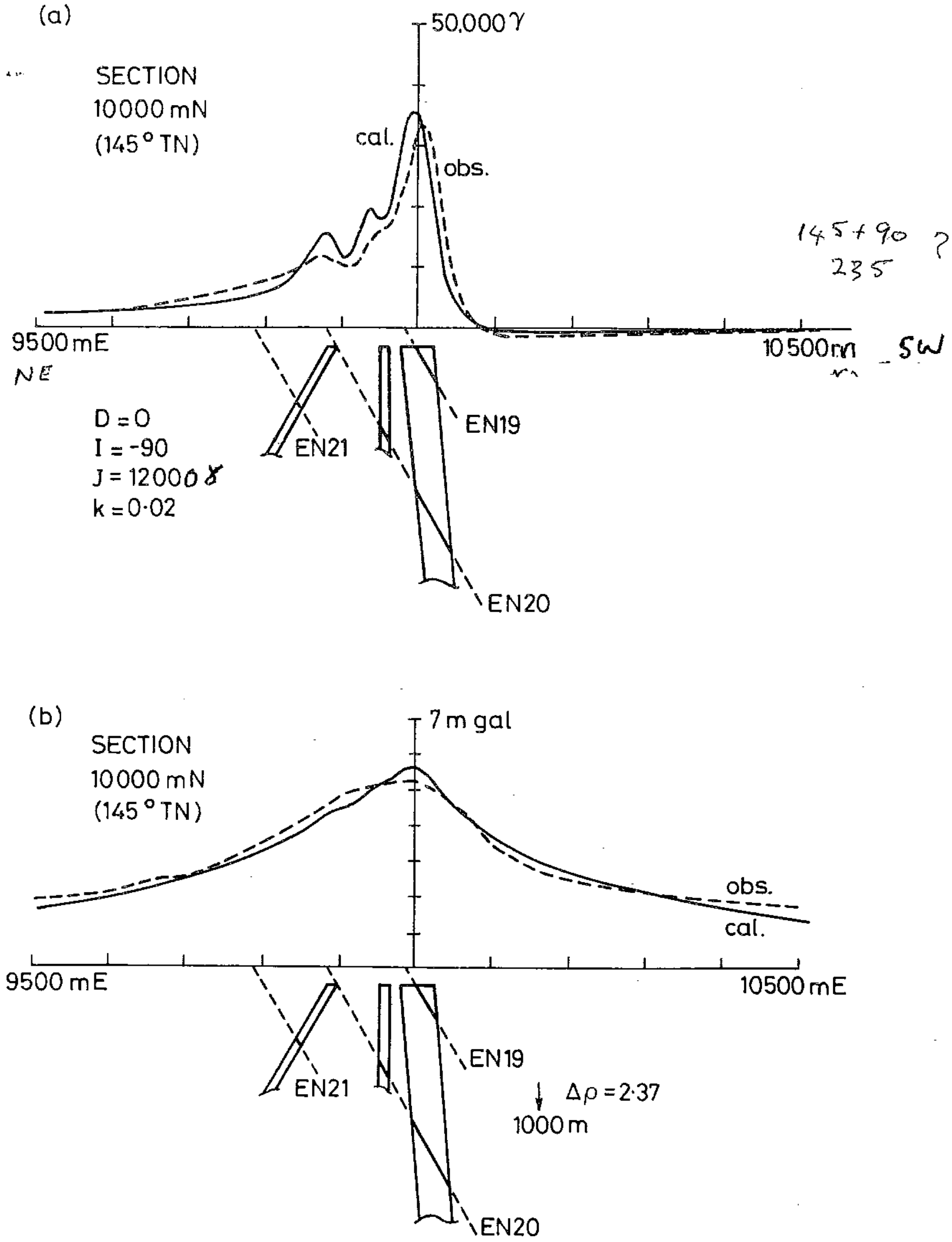


FIG. 5 MODELS FOR PECULIAR KNOB PROSPECT (a) MAGNETIC AND (b) GRAVITY

FIGURE 6. Stereographic projections of magnetisation directions of samples from Teatree Glen Prospect with respect to drill core axis of NRM and following AF cleaning in peak fields of 20oe,50oe,100oe,200oe,500oe and 1000oe. Symbols as for Fig.2.

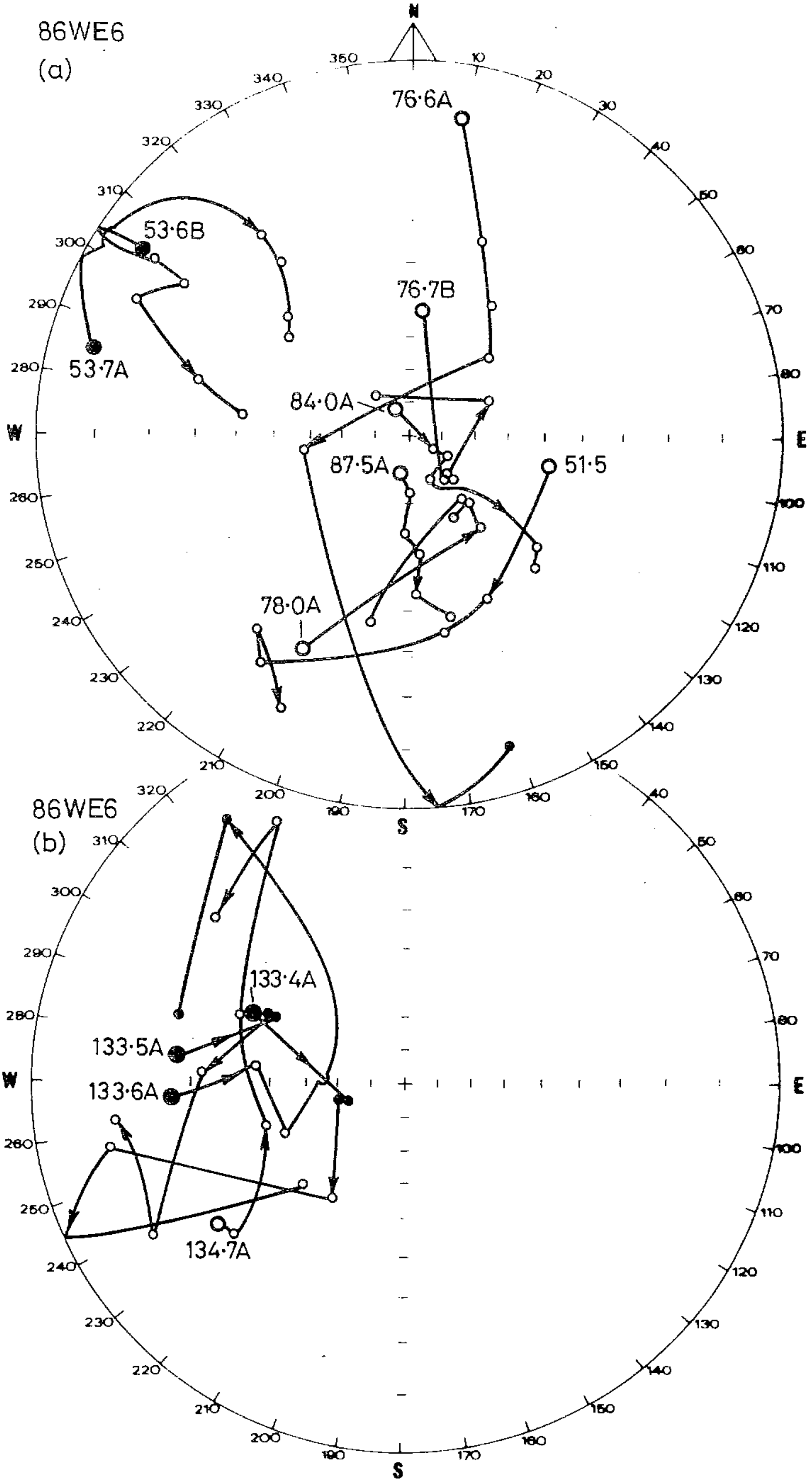


FIG.6 STEREOGRAPHIC PROJECTIONS OF MAGNETIC DIRECTIONS FOR SAMPLES FROM TEA TREE GLEN PROSPECT

FIGURE 7. AF demagnetisation decay curves for samples from Teatree Glen.

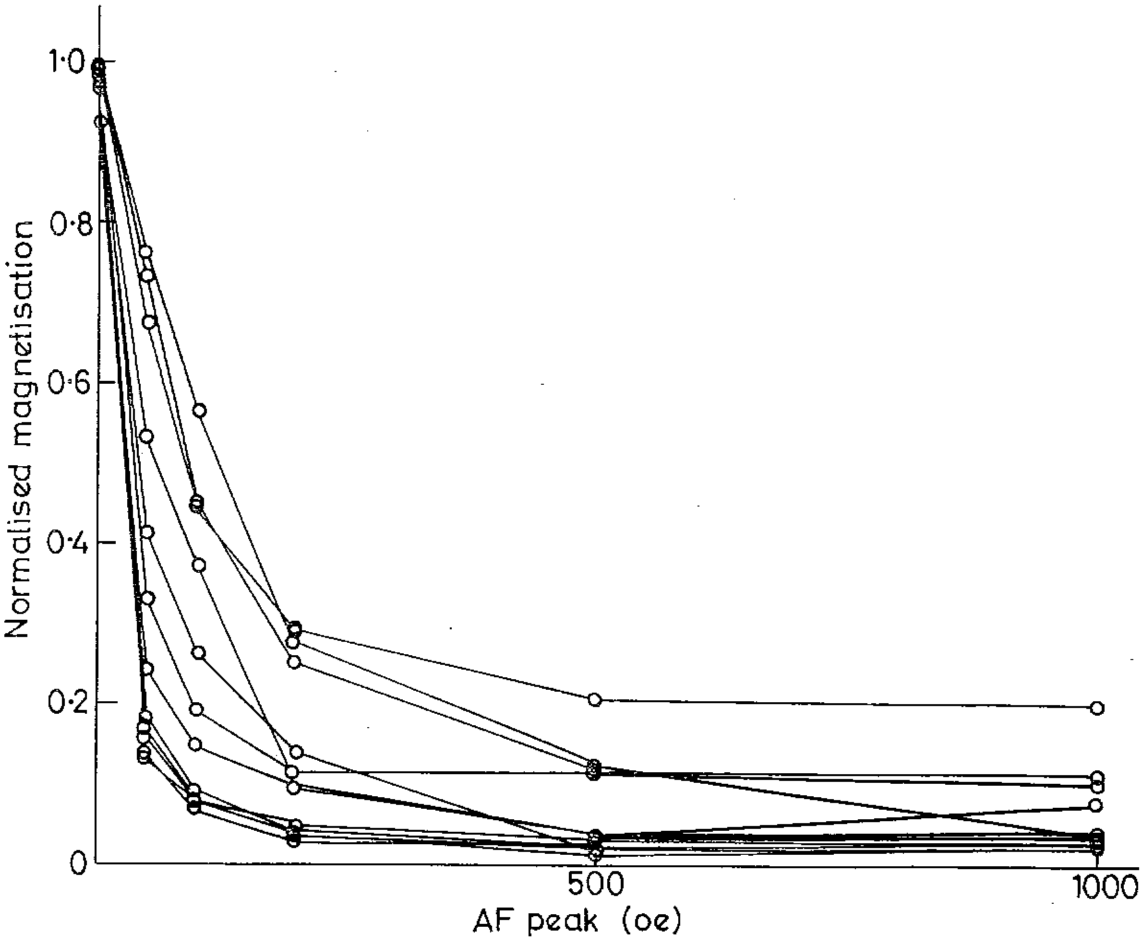


FIG. 7 DEMAGNETISATION CURVES FOR SAMPLES FROM TEATREE GLEN PROSPECT

FIGURE 8. Stereographic projection of axes of maximum and minimum susceptibilities for samples from Teatree Glen Prospect.

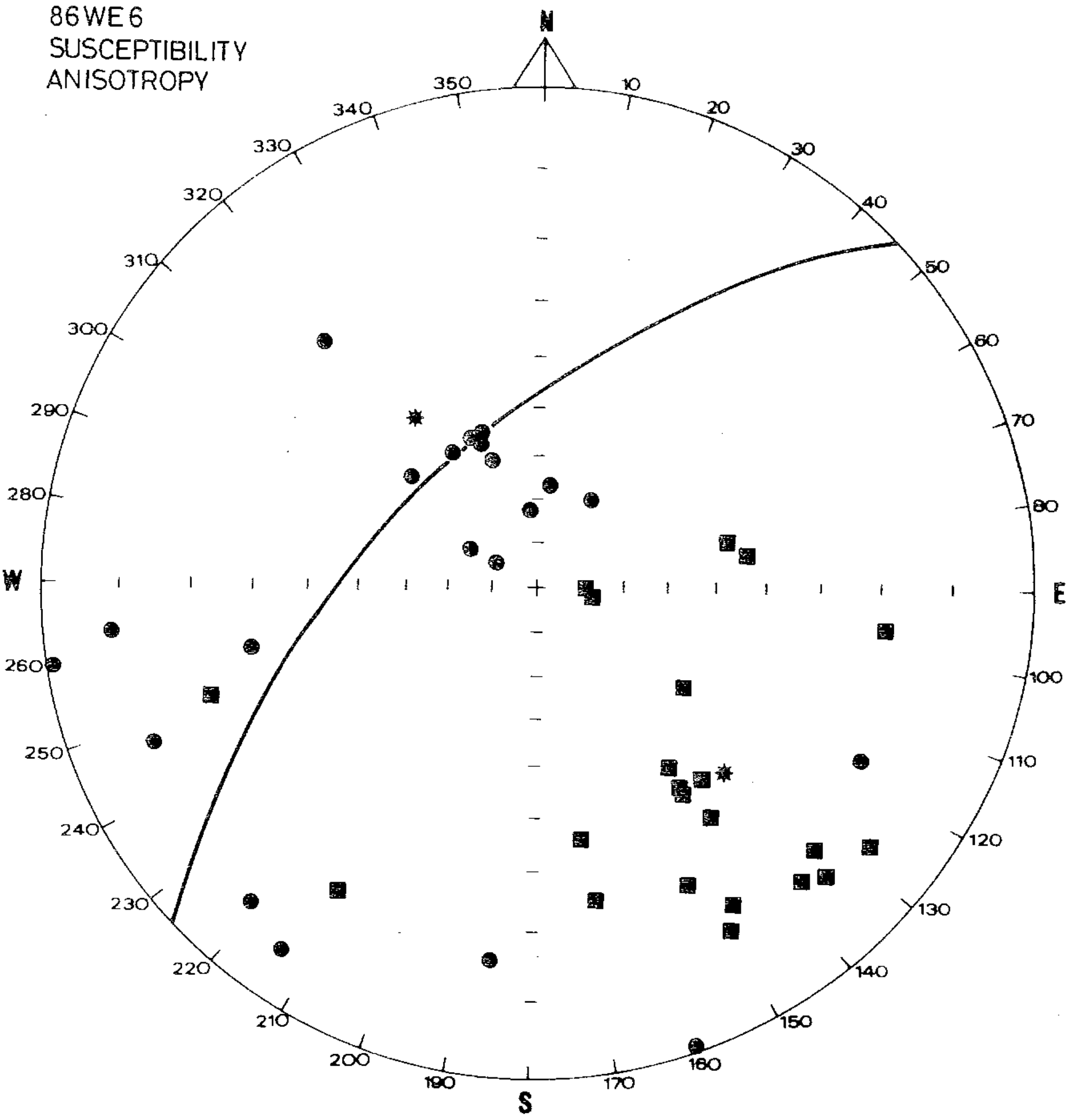


FIG. 8 STEREOGRAPHIC PROJECTIONS OF PRINCIPAL AXES OF ANISTROPY OF SUSCEPTIBILITY FOR SAMPLES FROM TEATREE GLEN PROSPECT

● Maximum ■ Minimum

FIGURE 9. Magnetic profiles for Teatree Glen Prospect, a) calculated from measured properties for the models shown and, b) observed along the sections as marked. Correcting the measured properties for self-demagnetisation, as in Table 3, would increase the anomaly magnitudes about 10 percent but would not alter the anomaly shapes.

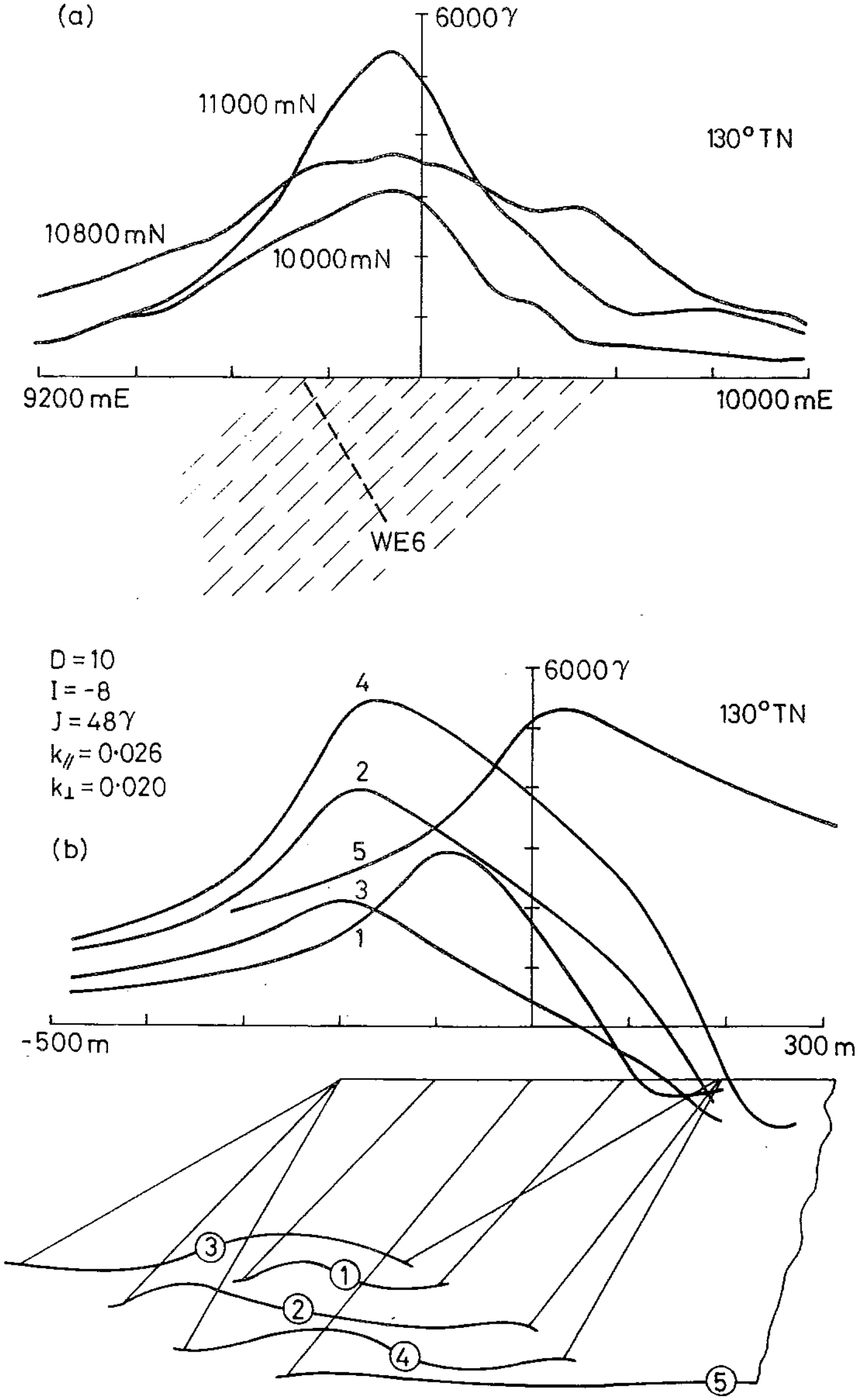


FIG. 9 MAGNETIC PROFILES (a), AND MODELS (b), FOR TEATREE GLEN PROSPECT