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		Mindex ASA	Muting	

Tittel

Geophysical Groundsurvey in the Telemark district
Kleivåsen ,Nissedal

Forfatter	Dato	År	Bedrift (Oppdragsgiver og/eller oppdragstaker)
Jensen, Kristian S.	7 nov	1997	Mindex ASA

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Nissedal	Telemark		16133	Skien

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geofysikk		Kleivåsen

Råstoffgruppe	Rastofftype
Malm/metall	Fe Au Ce

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

Eksemplar 1

MINDEX ASA

Geophysical Groundsurvey in the Telemark district.

Kleivásen, Nissedal

by

Stud.scient Kristian S. Jensen

November 7th 1997

4.Nissedal.

Kleivaasen, 59°09'08''N - 59°11'03''N and 8°32'05''W - 8°34'05''W, is situated in Nissedal, Telemark, in the southern part of Norway, cf. fig.1. It has been the subject of a thorough geological investigation by four students from the Aarhus University, Denmark. The area in which this geophysical survey took place has been mapped by Mr.Tonny Thomsen, who will present his results in a Masters Thesis early next year, 1998. The geological interpretations seen on fig. 47 is therefore just a rough sketch but still provides a sound basis for a joint interpretation with the geophysical results.

The groundsurvey in Nissedal took place from August 30th to September 12th 1997. Measurements were taken every 10 metres along eight profiles with an individual interval of 400 metres, cf. fig.37, p.31.

4.1.Results and Interpretation.

The magnetic intensity measured in the basecamp near Nissevatten is around 49700nT but following an aeromagnetic map from 1962 by NGU (Norges Geologiske Undersøkelser) it reaches ca.51500 nT in the central part of the surveyarea. So far the geological investigations in the area has not been able to identify a suitable sourcerock for this anomaly. In fact, the response in magnetic intensity of the surface rocks seem to be lower than average, cf. fig. 36.

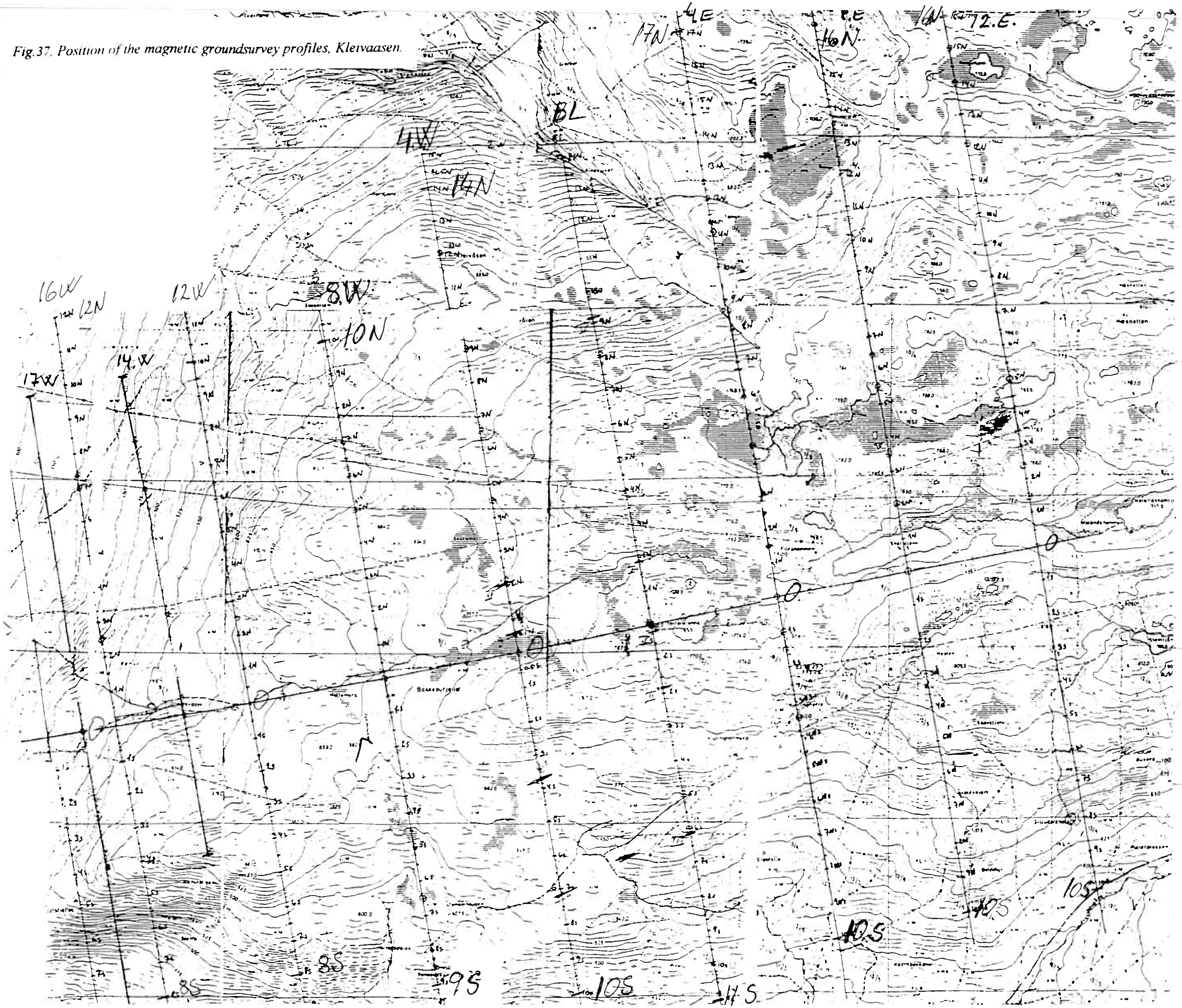
Although the surveyarea is composed of four major rocktypes: Gabbro, Basalt, fine-grained felsic volcanic rocks and pegmatite veins, the geological structures and history is far from simple. Because the magnetometer reacts on the content of magnetising minerals, especially magnetite, a correlation of geological lithologies using magnetic data only should be done with great care. The magnetic response is by no means unequivocal. The joint interpretation seen on fig. 47 is only meant as an example of how the geophysical data can be used as a guess or even confirmation of geological structures. There will therefore be sections on the profiles were the geology is too complex and the time too limited to a thorough analysis and these areas will be left as 'blank'.

The profiles are in general characterised by 100-200 metres wide anomalies comprising a number of smaller bands with a higher magnetic intensity, c.f. profile 4.W, fig. 41. The gabbroic rocks, dark blue, show the lowest magnetic intensity, approximately 51.000 nT. Assuming a regional background intensity of 49000nT, this gives them a susceptibility of ca.$40*10^{-3}$ which is almost half the normal, average value. The basalts measured, light blue, show intensities around 52000nT, resulting in susceptibilities around $61*10^{-3}$. The fine-grained volcanic rocks, orange, show a more inconsistent magnetic signature, with susceptibilities varying

Type	Susceptibility*10^{3} (SI) Range	Average
Amphibolite		0.7
Rhyolite	0.2-35	2.5
Gabbro	1-90	70
Basalts	0.2-175	70
Pyrrhotite	1-6000	1500
Ilmenite	300-3500	1800
Magnetite	1200-19200	6000

fig.36 [ref.1.]

Fig.37. Position of the magnetic groundsurvey profiles, Kleivaasen.



from $60*10^{-3}$ to more than $250*10^{-3}$. The last can be seen on profiles 4E, ~1300m. and 12E, ~300m. The lack of an artificial source, i.e. powerlines, metalroofs etc., implies that the magnetite content of these specific rocks must be high. These highly magnetised zones seems to be relatively narrow, 25-50 metres wide. An exception is the anomaly on profile 4E, ~1100m which could originate from an almost 100 metres wide formation.

Another source of high magnetic anomalies are the pegmatite's, coloured red. The magnetic signature is very distinct cf. profile 'Baseline' fig. 42, p.34 at 500-700 metres and probably also on profile 4W between 500-700 metres and 8W between 650-750 metres.

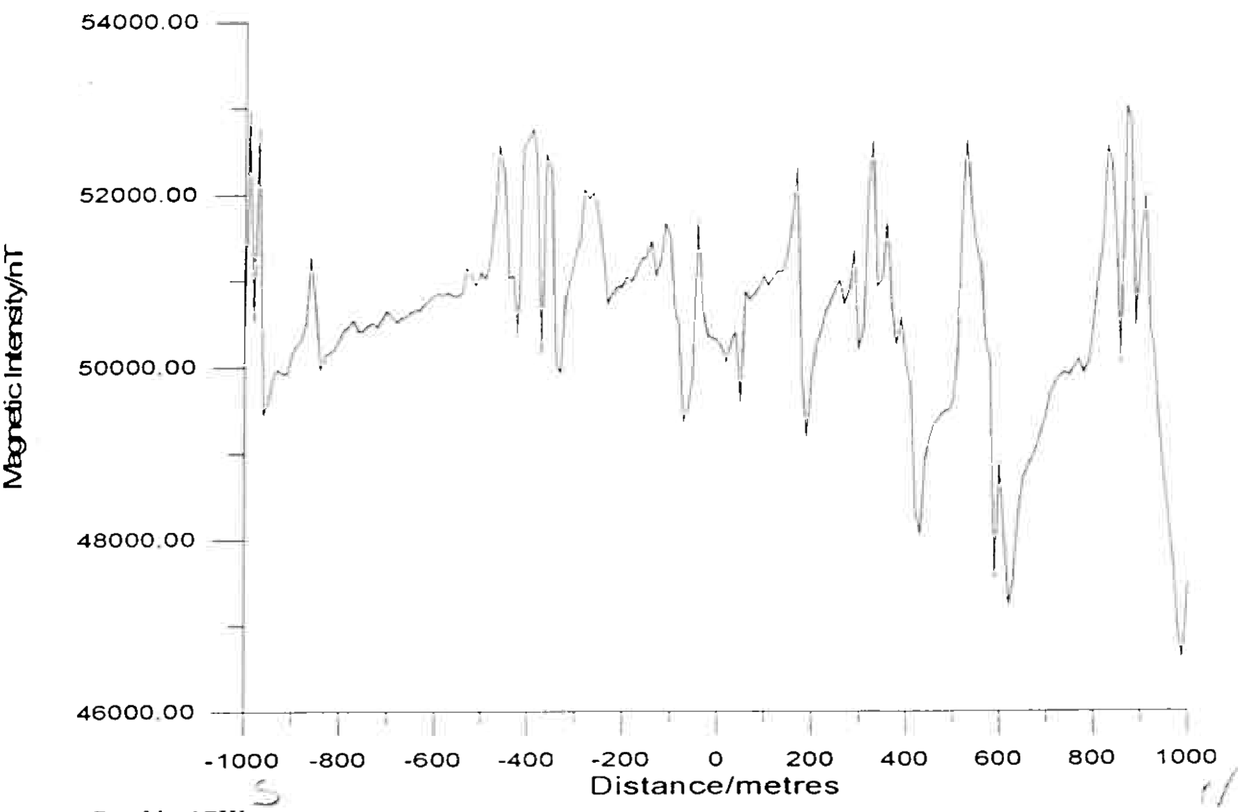


fig.38. Profile 17W.

The separation of the anomalies into approximately 100 metres sections can be clearly seen on profile 17W. Because of great uncertainties in the position of the profile, especially between 1000 and 0 metres I have omitted to include it in the joint interpretation with the geological strata.

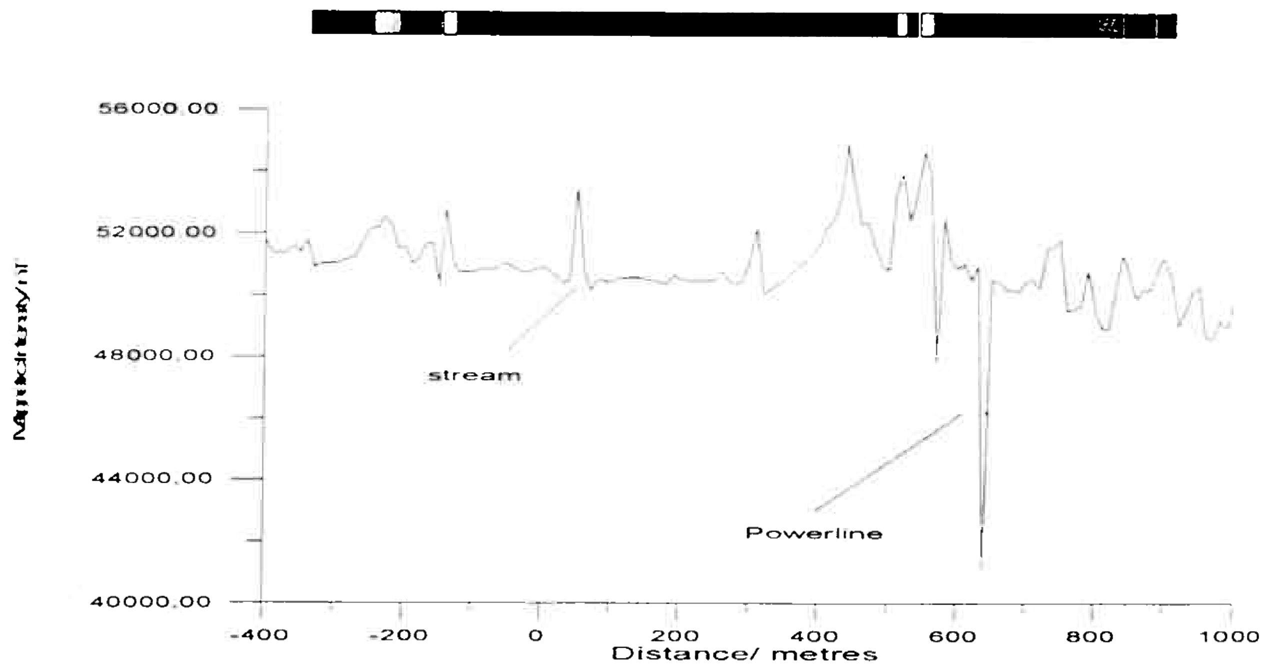


fig. 39. Profile 14W.

Apart from the previous mentioned rocktypes, the green represent a gneiss and the brown is an intermediate andesit. As they don't seem to have any relevance to the observed aeromagnetic anomaly further description shall be omitted here. The small peak at ~300 metres is probably a small stream similar to the one identified at ~50 metres. The area around profile 14W and especially from -100 to 400 was a minor 'delta' of small streams. Deposition of heavy minerals as magnetite in this environment would explain the anomaly. The effect of the powerline,~600 metres, going through the area is a very distinctive feature and can be seen on all the profiles.

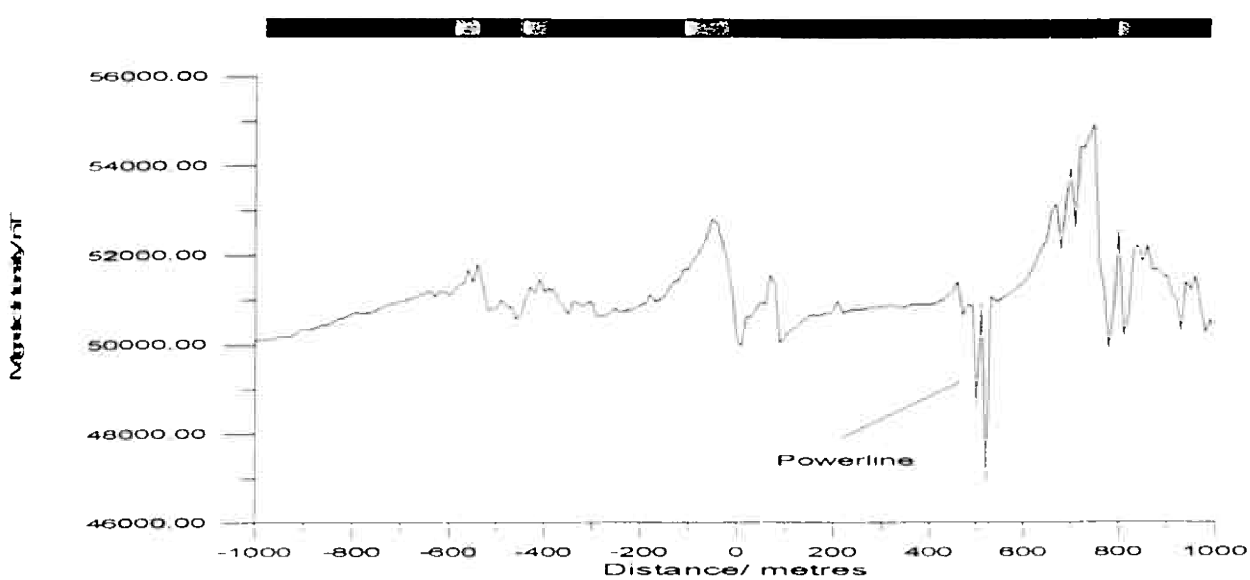


Fig.40. Profile 8W.

An anomaly that could create or contribute to the elongated East/West form of the aeromagnetic anomaly is the high-intensity anomalies that appear between 650 and 750 metres. A clue to the nature of these anomalies can be found on the Baseline profile, where a similar high-intensity anomaly has been mapped in the field as pegmatite.

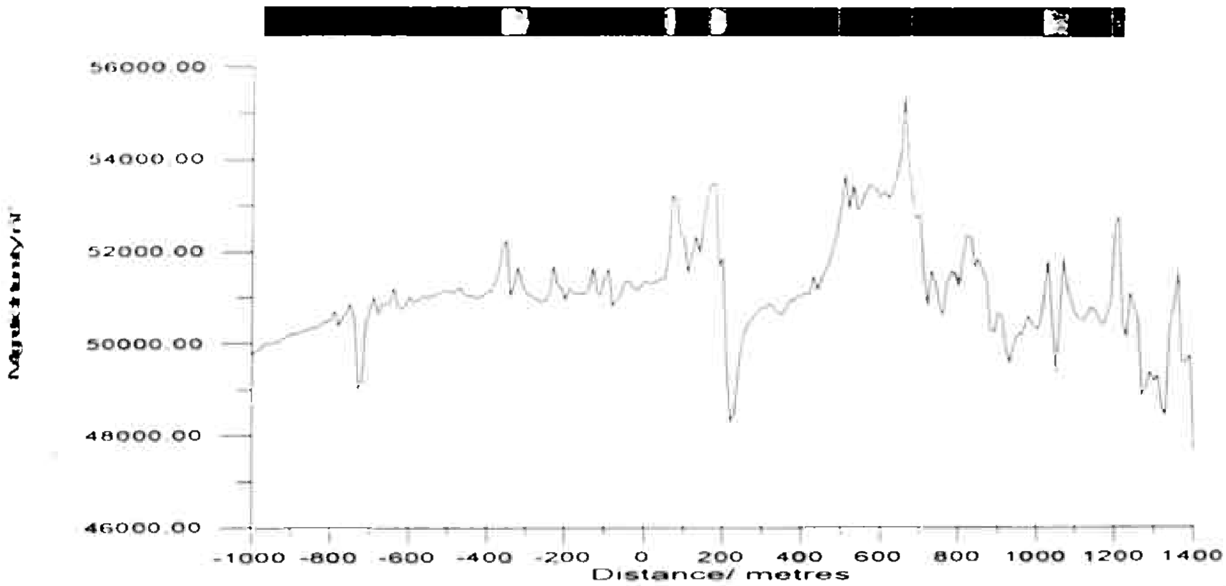


fig. 41. Profile 4W.

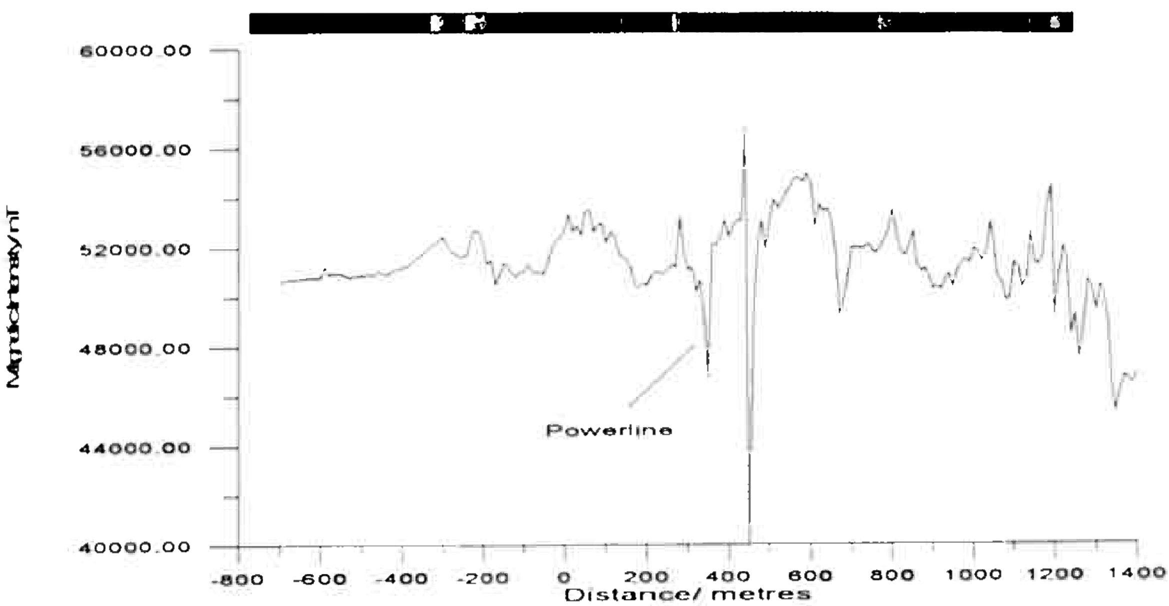


fig. 42. Baseline.

The dramatic shift in magnetic intensity from 57000nT to only 12000nT, not shown here but can be verified on the data file at 450 metres, between 400 and 500 metres mark the change in lithology from basalts to pegmatite.

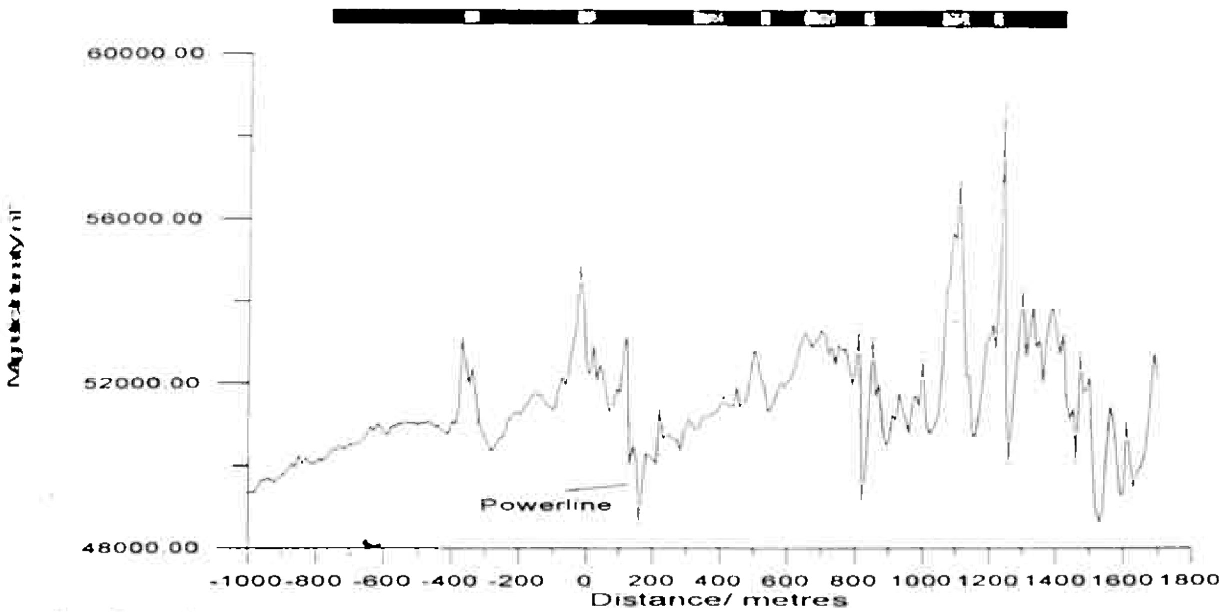


fig. 43. Profile 4E.

Comparing the magnetic intensity of the fine-grained volcanic rock on profile 4E with previous profile-measurements of the same rocktype, strongly suggests a significant increase in the content of magnetite.

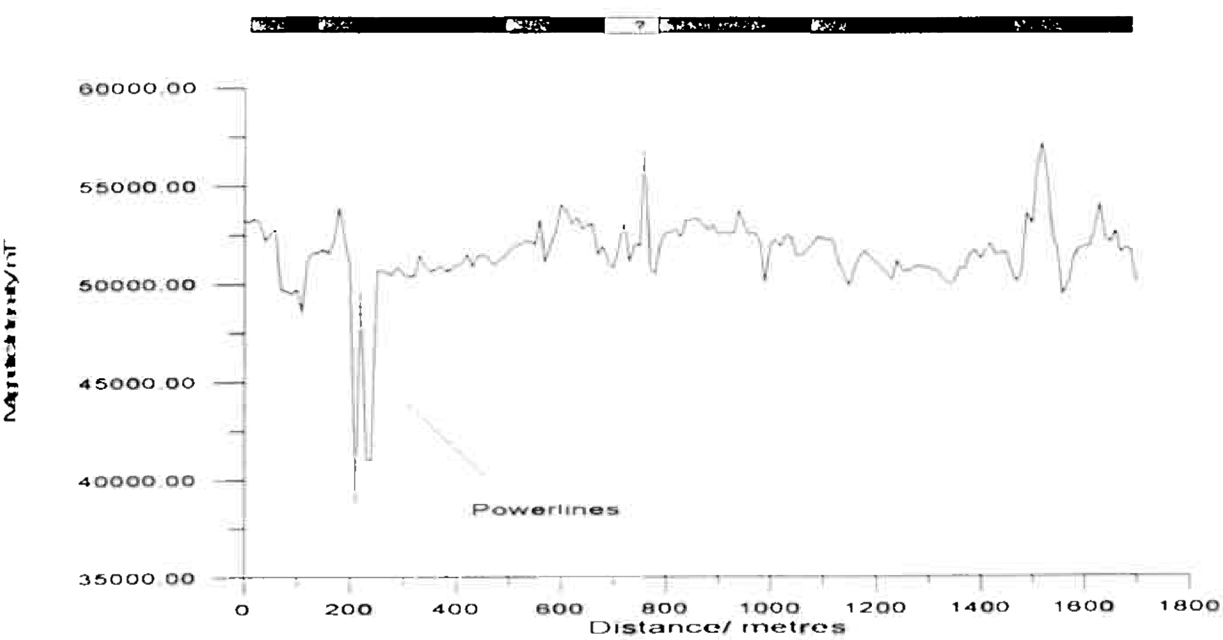


fig.44. Profile 8E.

Profile 8E is a good example of the ambiguity of magnetic data. The magnetite content of the fine-grained volcanic rocks is everywhere, apart from the anomaly at 1500 metres, very low, and makes a positive identification of Basalts and volcanic rock impossible or at least very uncertain.

A useful correlation of the anomalies would require a much tighter grid.

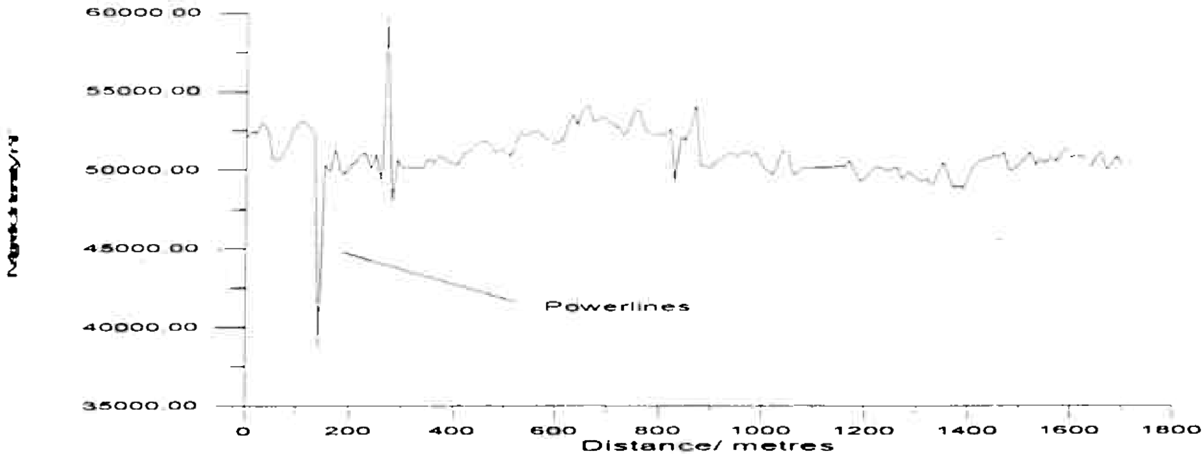


fig.45. Profile 12E.

Profile 12E is located on the edge of the concession area, but still shows a cluster of moderate intensity anomalies. These anomalies are most likely derived from the fine-grained volcanic rock between 600 and 900 metres.

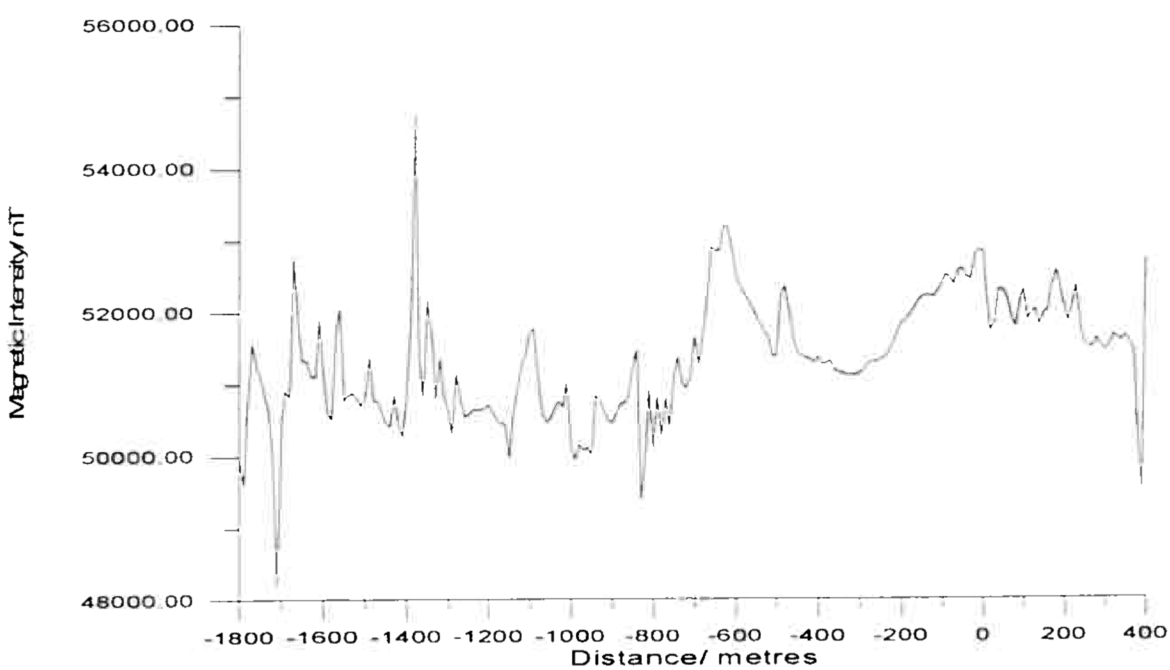


Fig. 46. Reference line (measured from 400 East to 1800 West).

In an attempt to clarify the nature of the large aeromagnetic anomaly, measurements were also taken along the referenceline, which runs perpendicular to the profiles and through 0.0, fig.37 p.31. The profile shows two distinctive anomalies. A large one with a diameter of almost 400 metres and centred on 0.0 (Baseline) and a smaller one at 700 metres (between profiles 4W and 8W).
The anomaly at 700 metres is probably caused by the fine-grained volcanic rock, whereas the origin of the larger one is uncertain.

Fig. 47. The joint interpretation of the geological and magnetic data. Kleivaasen, Nissedal