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RAPPORT NR: 1507

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SAKSBEARBEIDER Kari Berge

RAPPORT VEDRØRENDE:

Detailed geological survey on electromagnetic anomalies Kautokeino, West-Finmark.

FORDELING
OSLO:

RESYMÉ:

The survey was made to examine electromagnetic anomalies from Dighem's airborne survey of 1982, inside the Bidjovagge Concession/Gulf Joint Venture Area. In this report 8 areas are described. The location of the areas are shown on figs. 1 and 2.

Detailed mapping has been done within grids put up for the ground geophysics.

The areas are for the major part covered by moraine. In addition to bedrock mapping, boulders were also mapped. Possible causes for the electromagnetic anomalies were especially looked for, such as zones of iron sulfides, iron oxides and graphite.

The results are presented on topographical maps in scale 1:5000 figs. no. 3 to 10. The areas numbers correspond to the numbers which the areas are given in the ground geophysics survey.

Together with the geology, the maps also show electromagnetic profiles from the ground geophysics survey. To each map there is a discription of geology, boulders and mineralizations.

Each area is given a recommendation for further follow-up work. This follow-up work was done partly in 1983 and will be continued in 1984.

KIRKENES:

ANDRE:

KOMMENTAR:

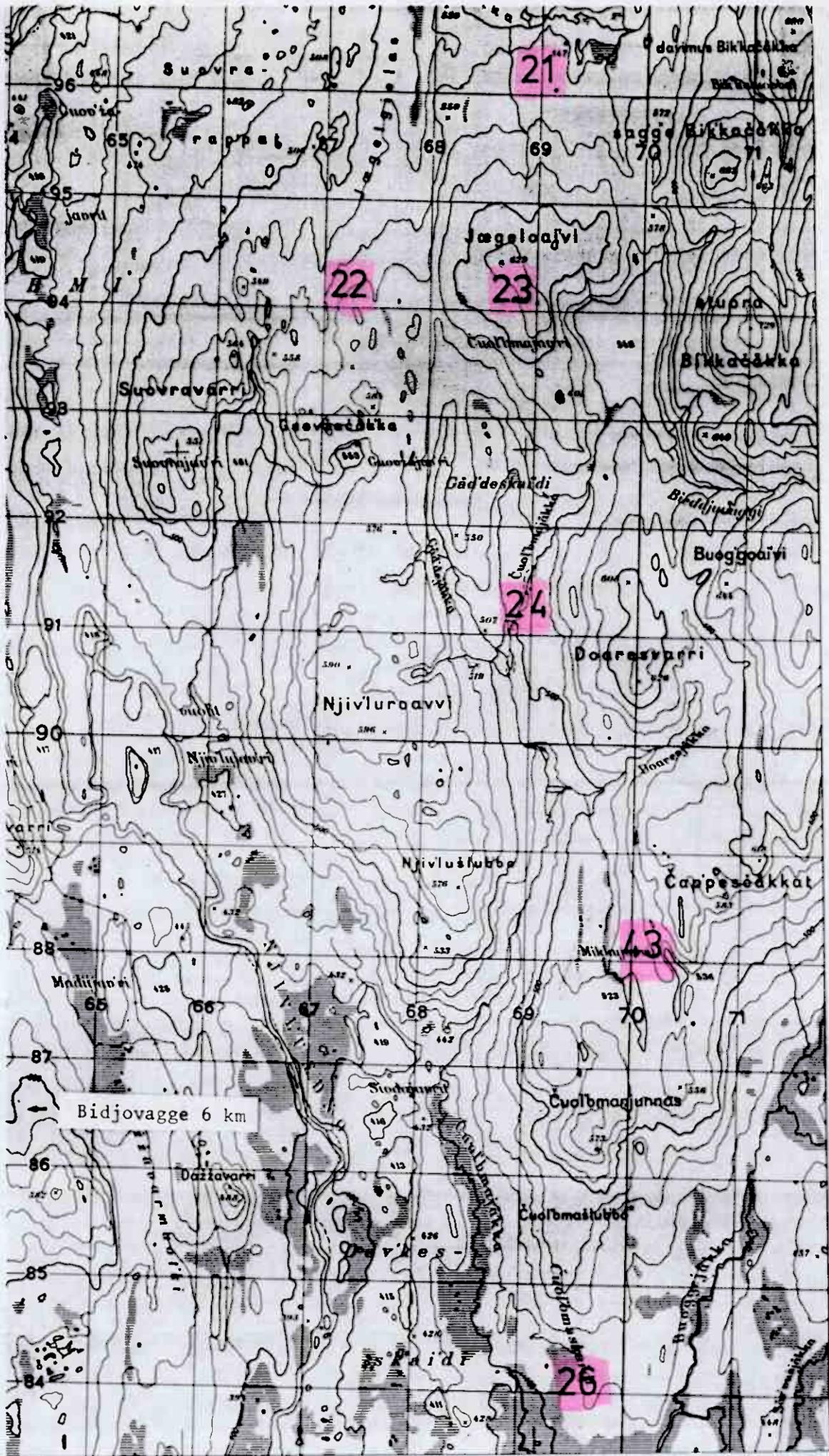


Fig. 2: Location map

AREA 13 Fig. 3

The greater part of this area is covered by moraine or, mostly by swamp. Outcrops occur in the northeasterly corner of the area. The rocks are coarse grained diabases with tuffs and tuffites to the west and east. Medium grained amphibolite is found near the western outcrops of tuff/tuffite.

Coarse grained diabase, is dark green, medium to coarse grained (grain size 2-4 mm), foliated and has a diabase texture. Amphibole is the major mineral. The rock contains a considerable amount of garnet, which occurs in crystals measuring up to 1 cm across. Calcite occurs in veins and fissures.

Medium grained amphibolite is green, medium grained and foliated.

Tuff/tuffite is grey to green, laminated and fine grained, with grain size less than 1 mm. The rock consists of feldspar, amphibole and quartz, with small amounts of biotite. Carbonate and epidote occur in veins.

The strike of the rocks is to the north-northwest, with dip to the south-southwest.

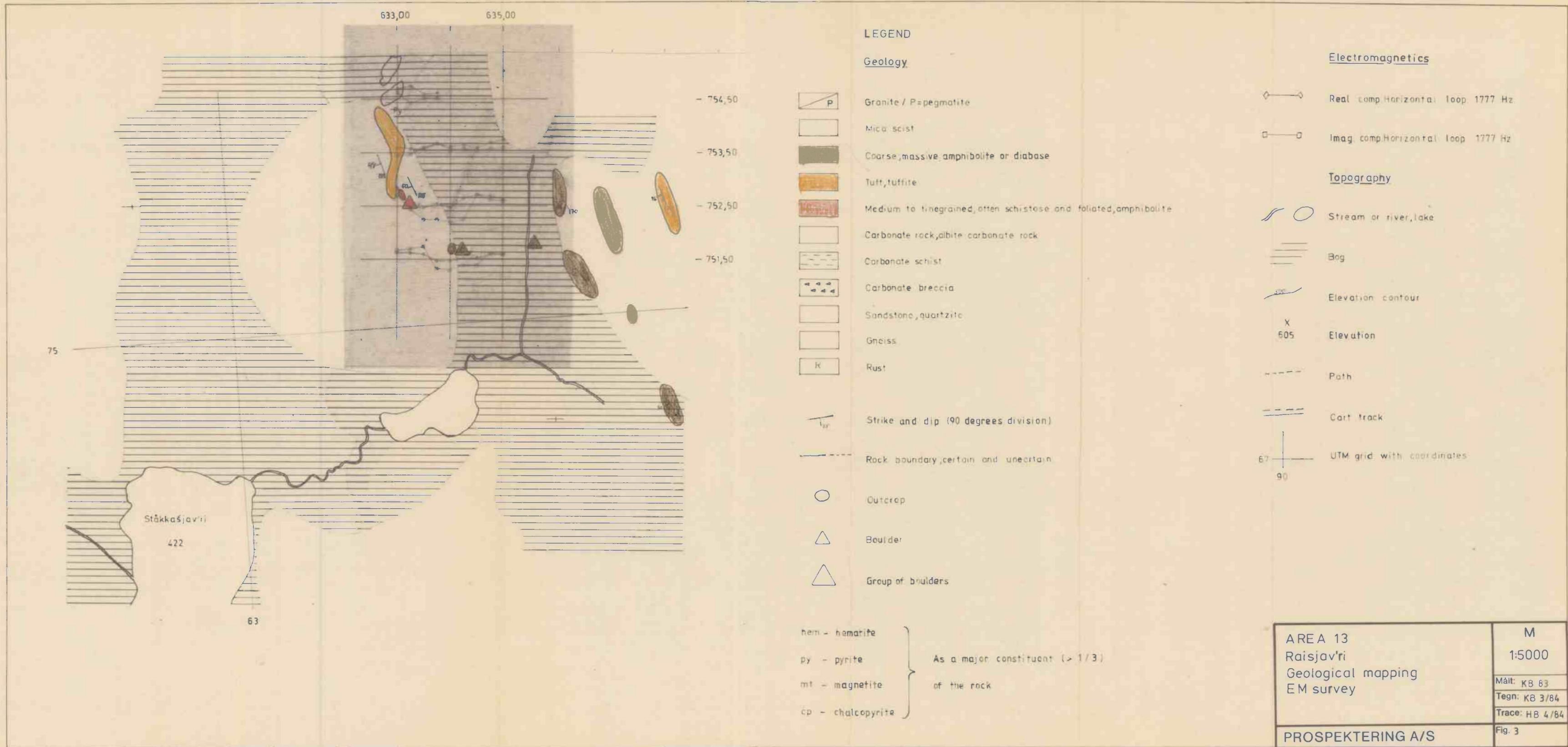
Boulders

Boulders of coarse grained diabase occur in the vicinity of the outcrops of the same rock. They seem to contain more carbonate than the outcrops. One boulder has layers of pyrrhotite and pyrite.

Near the outcrops of medium grained amphibolite, several boulders of the same rock contains chalcopyrite and pyrite in quartz veins.

Recommendations

Deep till sampling is recommended as further follow-up work.



AREA 14

AREA 14 Fig. 4

The measured area has no outcrops. The rocks in the neighbouring areas to the west and northwest, are exposed in several outcrops.

Outcrops

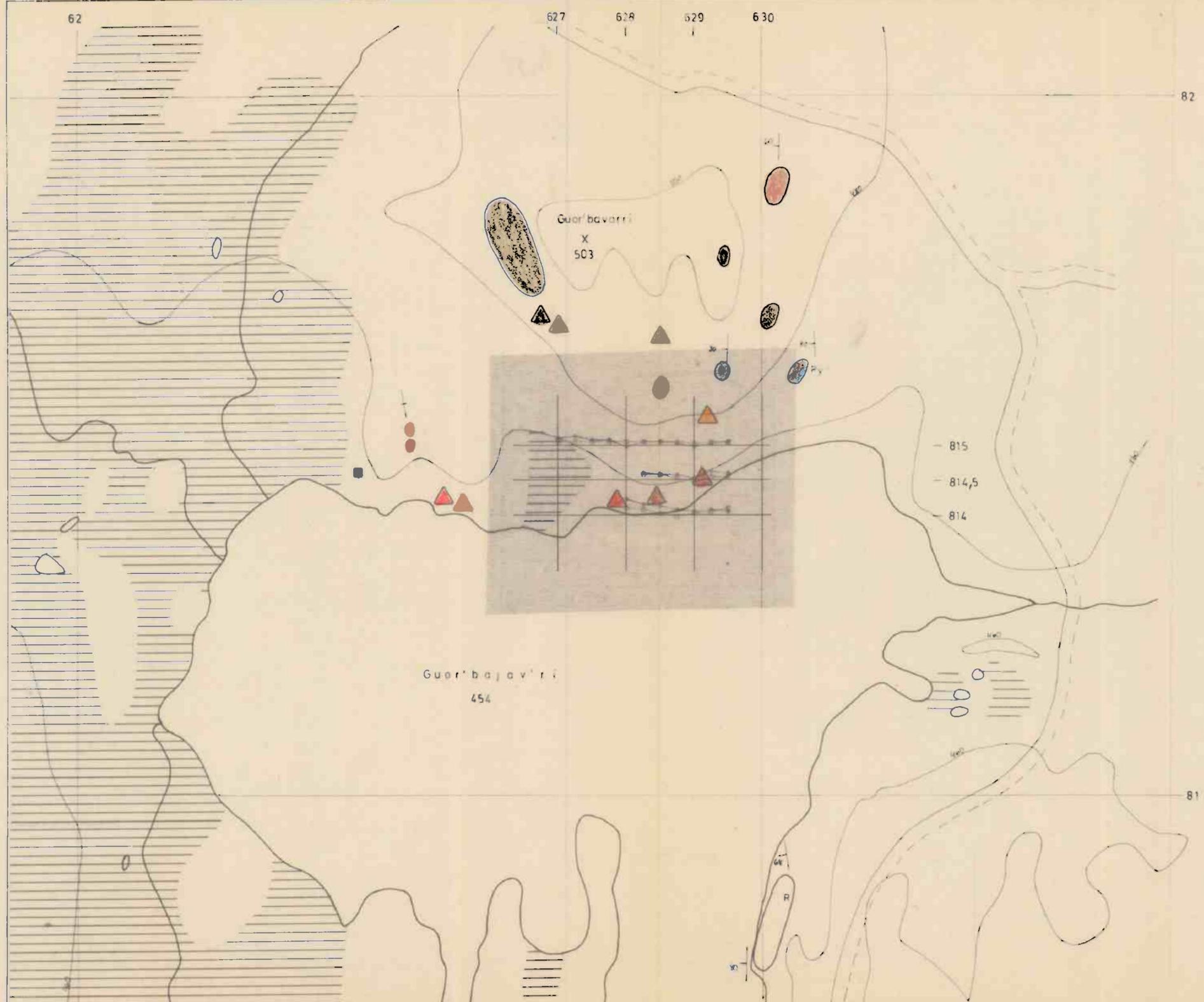
The rock type on the hilltop Guor'bavarri is a dark green, coarse grained amphibolite with no orientation. This may be an intrusive rock. Outside the area of this rock type, there are outcrops of a fine to coarse grained amphibole schist. One outcrop of this rock type is also found on the southeasterly bank of Guor'bajav'ri. It strikes to the north and has a medium to steep western dip. In two outcrops close to the northwestern corner of the surveyed area, there are layers of lenses of a rock type that resembles albite felsite, and which contains pyrite. disseminated and in fissures. The rock is light coloured, foliated, and very fine grained, with hardly visible grains.

Boulders

South of the hilltop Guor'bavarri, there are several boulders of the same coarse amphibolite as in the outcrops on the hill. Towards the lake, there are boulders of amphibole schist that may be of local origin, and also boulders of gneiss and granite.

Recommendations

Ground geophysics should be extended towards the south.
Further follow-up work recommended is deep till sampling and diamond drilling.



LEGEND

Geology

- Granite / P-pegmatite
- Mica schist
- Coarse, massive amphibolite or diabase
- Tuff, tuffite
- Medium to finegrained, often schistose and foliated, amphibolite
- Carbonate rock, albite carbonate rock
- Carbonate schist
- Carbonate breccia
- Sandstone, quartzite
- Gneiss
- Rust
- Strike and dip (90 degrees division)
- Rock boundary, certain and uncertain
- Outcrop
- Boulder
- Group of boulders

hem - hematite
 py - pyrite
 mt - magnetite
 cp - chalcopyrite

} As a major constituent (> 1/3) of the rock

Electromagnetics

- Real comp. Horizontal loop 1777 Hz
- Imag. comp. Horizontal loop 1777 Hz

Topography

- Stream or river, lake
- Bog
- Elevation contour
- Elevation 505
- Path
- Cart track
- UTM grid with coordinates

AREA 14 Raisjavri Geological mapping EM survey	M
	1:5000
	Målt: KB 63 Tegn: KB 3/64 Trace: HB 4/84
PROSPEKTERING A/S	Fig. 4

AREA 29

AREA 21 Fig. 5

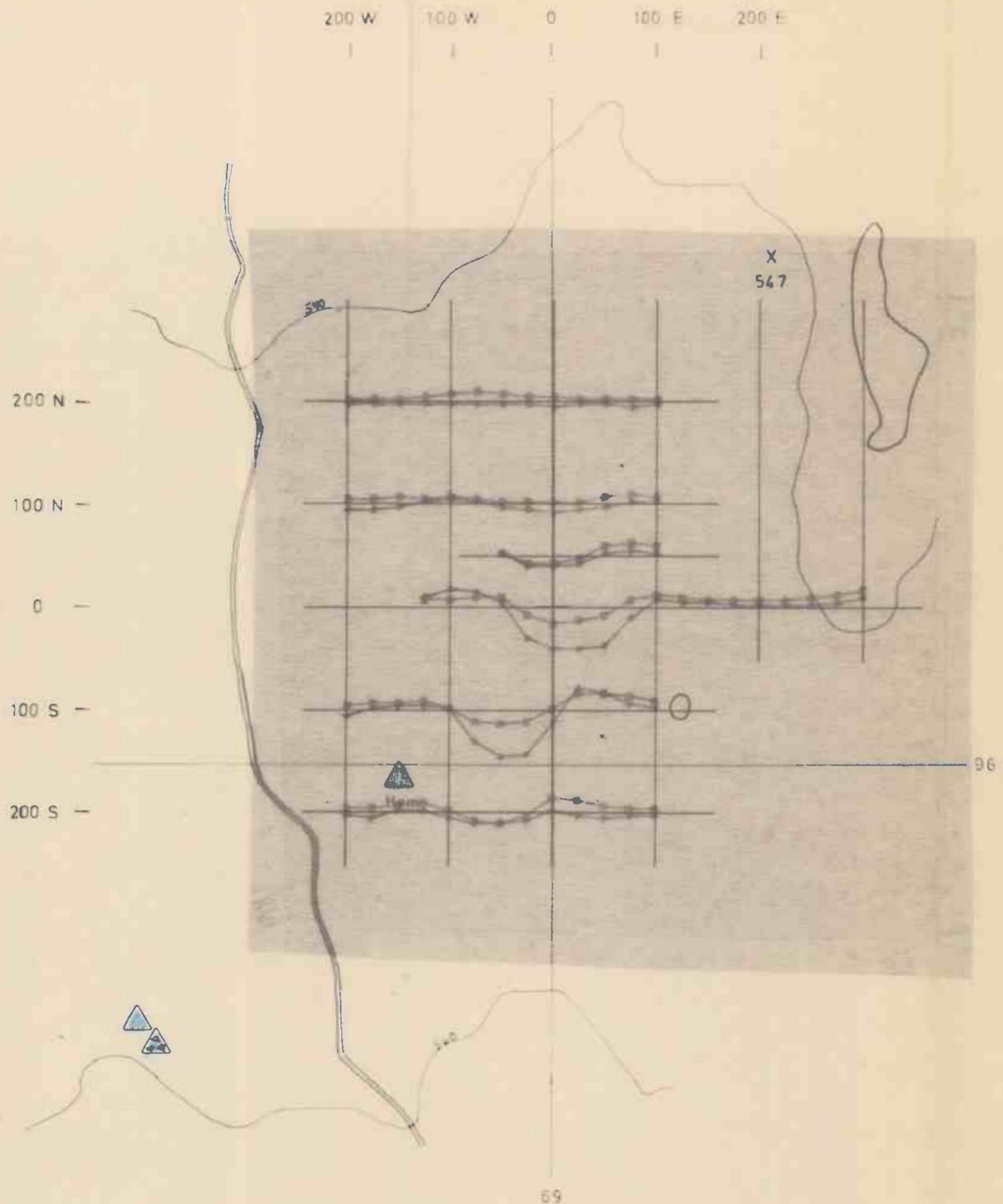
The grid area is covered by boulders, and these again are for the most part covered by vegetation. Boulders that are shown, are mostly gneisses and amphibolites.

In the southwestern corner of the grid area, there is a large boulder or possible outcrop of albite carbonate rock. It has a thick covering of rust, and contains hematite and pyrite. The amounts of these minerals are difficult to decide because of the rust.

Southwards from the grid area there are a large quantity of boulders of albite-carbonate rock or carbonate breccia. The rock is usually reddish because of the hematite content. Small amounts of pyrite occur.

Recommendations

Deep till sampling is recommended as further follow-up work.

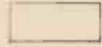
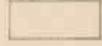
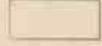
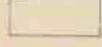
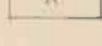
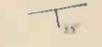


200 N —
100 N —
0 —
100 S —
200 S —

200 W | 100 W | 0 | 100 E | 200 E

LEGEND

Geology

-  Granite / P=pegmatite
-  Mica schist
-  Coarse, massive amphibolite or diabase
-  Tuff, tuffite
-  Medium to fine grained, often schistose and foliated, amphibolite
-  Carbonate rock, albite carbonate rock
-  Carbonate schist
-  Carbonate breccia
-  Sandstone, quartzite
-  Gneiss
-  Rust
-  Strike and dip (90 degrees division)
-  Rock boundary, certain and uncertain
-  Outcrop
-  Boulder
-  Group of boulders

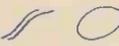
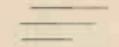
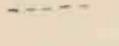
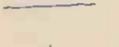
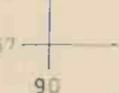
hem - hematite
py - pyrite
mt - magnetite
cp - chalcopyrite

} As a major constituent (> 1/3)
of the rock

Electromagnetics

-  Real comp Horizontal loop 1777 Hz
-  Imag comp Horizontal loop 1777 Hz

Topography

-  Stream or river, lake
-  Bog
-  Elevation contour
-  Elevation
-  Path
-  Cart track
-  UTM grid with coordinates

AREA 21 Mollejus Geological mapping EM survey	M
	1:5000
	Målt: KB 83
	Tegn: KB 3/84
	Trace: HB 4/84
PROSPEKTERING A/S	Fig. 5

AREA 22

AREA 22 Fig. 6

The location of the grid was not possible to ascertain, as there were only two unmarked poles in the area.

The bedrock in the grid area itself has almost no exposures. To the south and southwest of the grid there are several outcrops.

The dominant rock type is carbonate breccia. It is found as boulders that are clearly local. The breccia varies with respect to colour and composition of the matrix and fragments, and the size of the fragments. The fragments are usually very fine grained, but hematite grains are visible. The colour is grey to grey-green. The overall colour of the breccia is reddish. Close to the small lake in the south there are layers of tuff or tuffite.

To the west there are grey and green schists. Some of them have dolomite crystals in sizes a few mm across.

In the far southwest there is a layer of a possibly altered, albite felsite resembling rock: Light coloured, almost pink, and very fine grained.

The strike of the bedrock is mainly to the north, the dip is both to the west and to the east and is medium to steep.

Recommendations

The area has an interesting geology and the anomaly should be examined by diamond drilling.

LEGEND

Geology

- Granite / P=pegmatite
- Mica schist
- Coarse, massive, amphibolite or diabase
- Tuff, tuffite
- Medium to finegrained, often schistose and foliated, amphibolite
- Carbonate rock, albite carbonate rock
- Carbonate schist
- Carbonate breccia
- Sandstone, quartzite
- Gneiss
- Rust
- Strike and dip (90 degrees division)
- Rock boundary, certain and uncertain
- Outcrop
- Boulder
- Group of boulders

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 cp - chalcopryite

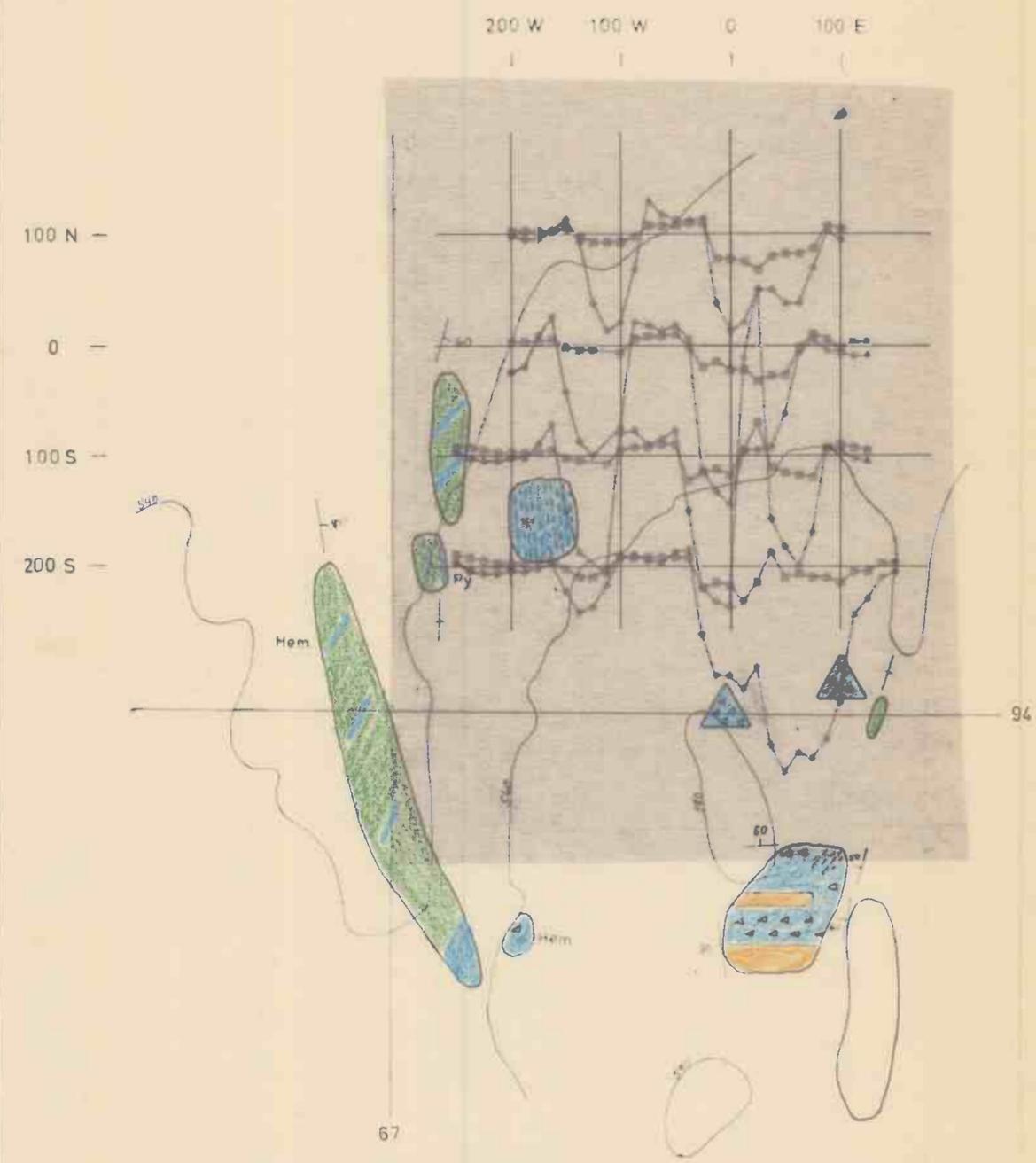
} As a major constituent (> 1/3) of the rock

Electromagnetics

- Real comp Horizontal loop 1777 Hz
- Imag. comp Horizontal loop 1777 Hz

Topography

- Stream or river, lake
- Bog
- Elevation contour
- Elevation
- Path
- Cart track
- UTM grid with coordinates



AREA 22 Mollejus Geological mapping EM survey	M
	1:5000
	Målt: KB 83
	Tegn: KB 84
	Trace: HB 4/64
PROSPEKTERING A/S	Fig. 6

AREA 23

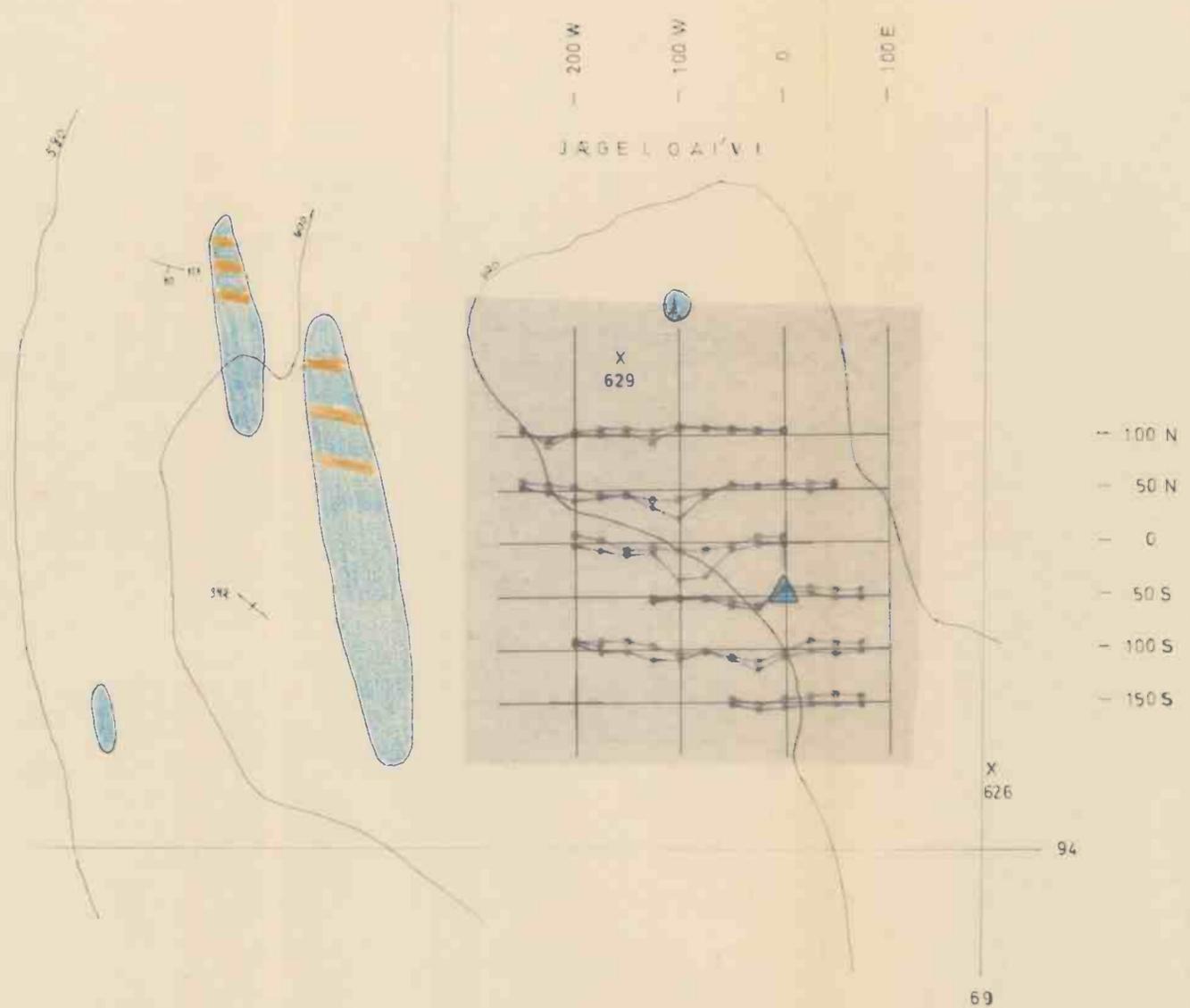
AREA 23 Fig. 7

Exposures of bedrock are found to the north and west of the grid area. The rocks are laminated and massive quartz feldspar rocks. They are very fine grained and are green to pink coloured. Some of the layers seem to consist of tuffs or tuffites, while others resemble albite felsite. These layers may be altered. The rock invariably contains some pyrite. Some of the light coloured layers contain considerable amounts of disseminated magnetite.

The boulders of the area resembles the rock type in the outcrops, but have more veins filled with quartz and carbonate. They contain small amounts of pyrite and hematite.

Recommendations

The geological observations does not suggest that this weak anomaly should be investigated any further. Noe more work is recommended in the area.



LEGEND

Geology

- Granite / P=pegmatite
- Mica schist
- Coarse, massive amphibolite or diabase
- Tuff, tuffite
- Medium to fine grained, often schistose and foliated, amphibolite
- Carbonate rock, albite carbonate rock
- Carbonate schist
- Carbonate breccia
- Sandstone, quartzite
- Gneiss
- Rust
- Strike and dip (90 degrees division)
- Rock boundary, certain and uncertain.
- Outcrop
- Boulder
- Group of boulders

hem - hematite
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 cp - chalcopyrite

} As a major constituent (> 1/3) of the rock

Electromagnetics

- Real comp. Horizontal loop 1777 Hz
- Imag. comp. Horizontal loop 1777 Hz

Topography

- Stream or river, lake
- Bog
- Elevation contour
- Elevation 605
- Path
- Cart track
- UTM grid with coordinates

AREA 23 Mollejus Geological mapping EM survey	M
	1:5000
	Målt: KB 83
	Tegn: KB 3/84
Trace: HB 4/84	
PROSPEKTERING A/S	Fig.7

AREA 24

AREA 24 Fig. 8

This area is mapped on the topographical map alone, as there were no signs of the grid left.

The area is covered, except where the stream divides, and one outcrop further north on the bank of the stream.

The rocks in the two outcrop areas are similar.

The rocks are pink to red, green or gray, bedded slates. The pink variety tend to be softer and is rich in carbonate, while the green and grey varieties are harder and probably contain quartz. They are very fine grained with hardly visible grains, except for minute magnetite grains or crystals that are disseminated. Small amounts of chalcopyrite are seen as well. Magnetite is also found in veins, and veins with thicknesses about 1 cm, are filled with quartz and carbonate.

The pink variety bears a great resemblance to the rock type albitefelsite. It may be a product of alteration.

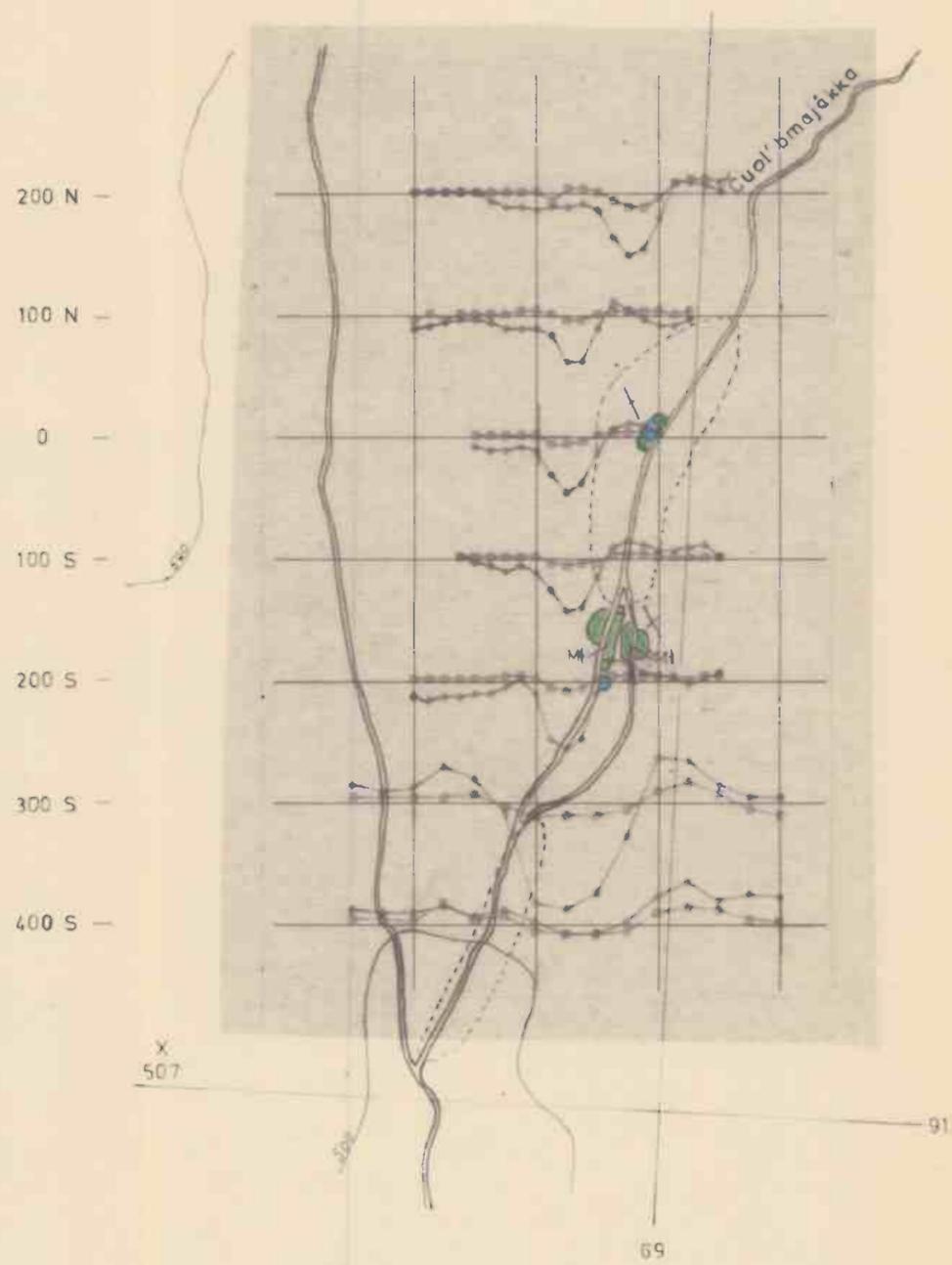
Some of the green layers are rich in carbonate, which can form lumps or crystals with sizes up to 1 cm. These layers show no magnetite or chalcopyrite.

They have a strike towards the north-northwest and vertical or faintly easterly dip.

Recommendations

The geological observations combined with an interesting anomaly suggest further work in this area. Diamond drilling is recommended.

100 W 0 100 E 200 E



LEGEND

Geology

- Granite / P=pegmatite
- Mica schist
- Coarse, massive amphibolite or diabase
- Tuff, tuffite
- Medium to finegrained, often schistose and foliated, amphibolite
- Carbonate rock, albite carbonate rock
- Carbonate schist
- Carbonate breccia
- Sandstone, quartzite
- Gneiss
- Rust
- Strike and dip (90 degrees division)
- Rock boundary, certain and uncertain
- Outcrop
- Boulder
- Group of boulders

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Electromagnetics

- Real comp. Horizontal loop 1777 Hz
- Imag. comp. Horizontal loop 1777 Hz

Topography

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- Bog
- Elevation contour
- Elevation
- Path
- Cart track
- UTM grid with coordinates

AREA 24 Mållejus Geological mapping EM survey	M 1:5000
	Målt: KB 83
	Tegn: KB 3/84
	Trace: HB 4/84
PROSPEKTERING A/S	
Fig. 8	

AREA 26

AREA 26 Fig. 9

The northwestern part of the grid area is covered by bog. To the southeast there is thick moraine, and another swampy area lies farthest to the southeast.

Outcrops

There are no outcrops inside the grid area. To the north of the area there is an outcrop of amphibolite and about 350 m further north there are outcrops of tuff that strike towards the north-northwest and dip steeply to the northeast.

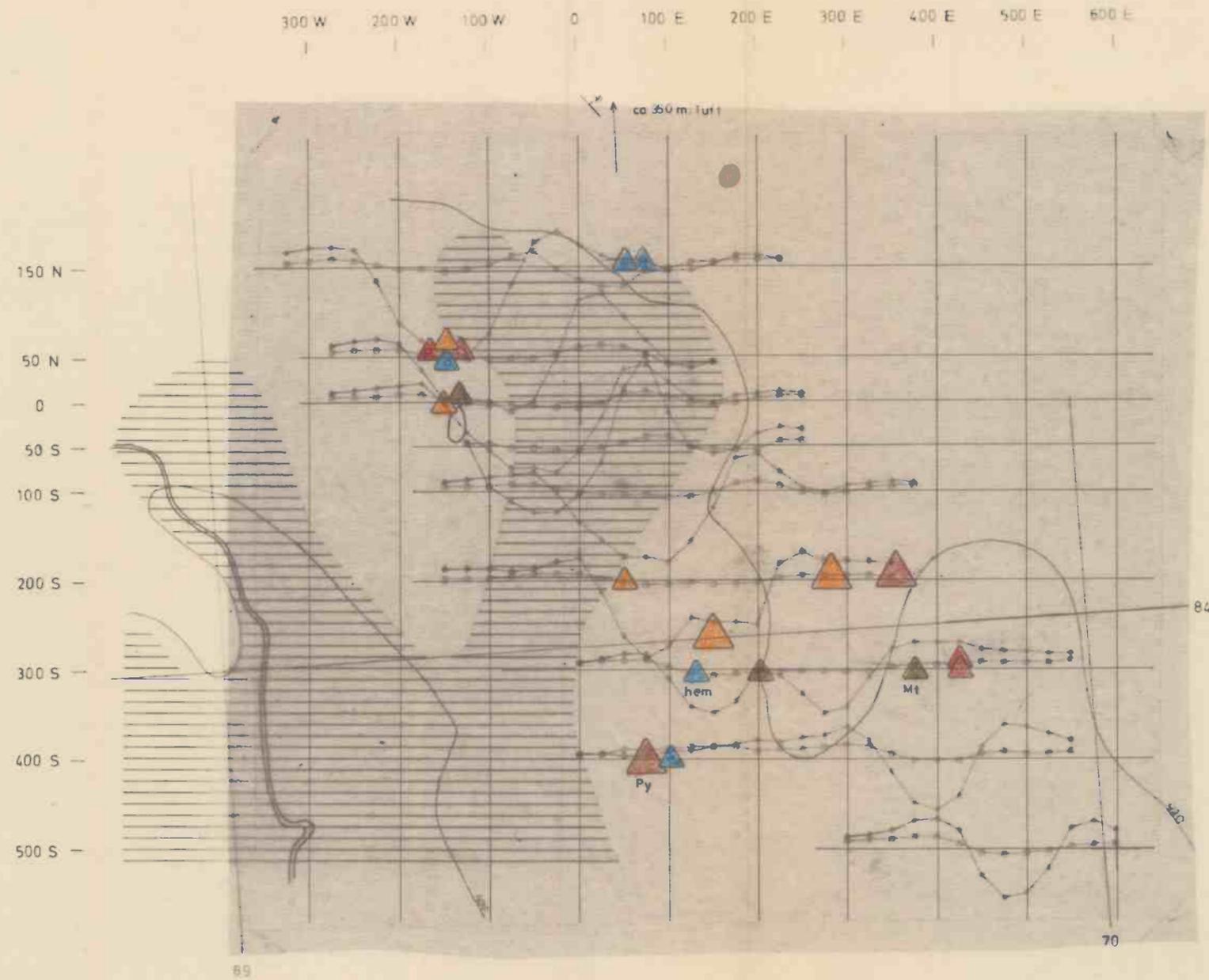
Boulders

The area covered by moraine is dominated by boulders of gneiss, with some boulders of amphibolite and carbonate rocks.

On the outskirts of the swampy areas, there are boulders of both coarse and medium grained amphibolite. Some of them contain considerable amounts of magnetite. There are also boulders of carbonate rocks, especially carbonate breccia. In several of these, hematite, magnetite and pyrite can be found in noticeable amounts. Occasionally there are boulders of granite, pegmatite granite and gneiss.

Recommendations

Although geological observations give little information, the interesting character of the anomaly give reason to examine the area further. Diamond drilling is recommended.



LEGEND

Geology

- Granite / P=pegmatite
- Mica schist
- Coarse, massive amphibolite or diabase
- Tuff, tuffite
- Medium to finegrained, often schistose and foliated, amphibolite
- Carbonate rock, albite carbonate rock
- Carbonate schist
- Carbonate breccia
- Sandstone, quartzite
- Gneiss
- Rust
- Strike and dip (90 degrees division)
- Rock boundary, certain and uncertain
- Outcrop
- Boulder
- Group of boulders

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 mt - magnetite
 cp - chalcopyrite

} As a major constituent (> 1/3)
 of the rock

Electromagnetics

- Real comp. Horizontal loop 1777 Hz
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Topography

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- Elevation 605
- Path
- Cart track
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AREA 26 Mållejus Geological mapping EM survey	M
	1:5000
	Mått: KB 83
	Tegn: KB 3/84
	Trace: HB 4/84
PROSPEKTERING A/S	Fig. 9

AREA 49

AREA 43 Fig. 10

The grid area is totally covered. In the easterly part there is a ridge of moraine with direction northwest to southeast. The moraine cover is thinning out towards the west and outside the grid there is bog.

East of the line 100E there are a few outcrops. Closest to the grid there is fine grained, laminated greenstone, with grain size smaller than 0.5 mm. This is probably a tuff or tuffite. It contains some magnetite. The strike is towards north-northwest with vertical to faintly easterly dip.

About a hundred meters further east there is foliated amphibolite with grain size 1-2 mm. Magnetite is found in veins, fissures and lying parallel to the foliation. Strike and dip is the same as for the former rock type.

Boulders

Coarse grained granite and gneiss. The granite is sometimes pegmatitic. Fine to medium grained, foliated and sometimes banded amphibolite, which may contain magnetite, some hematite and traces of pyrite. Albite-carbonate rocks varying from fine grained rock resembling albite felsite, to carbonate breccia.

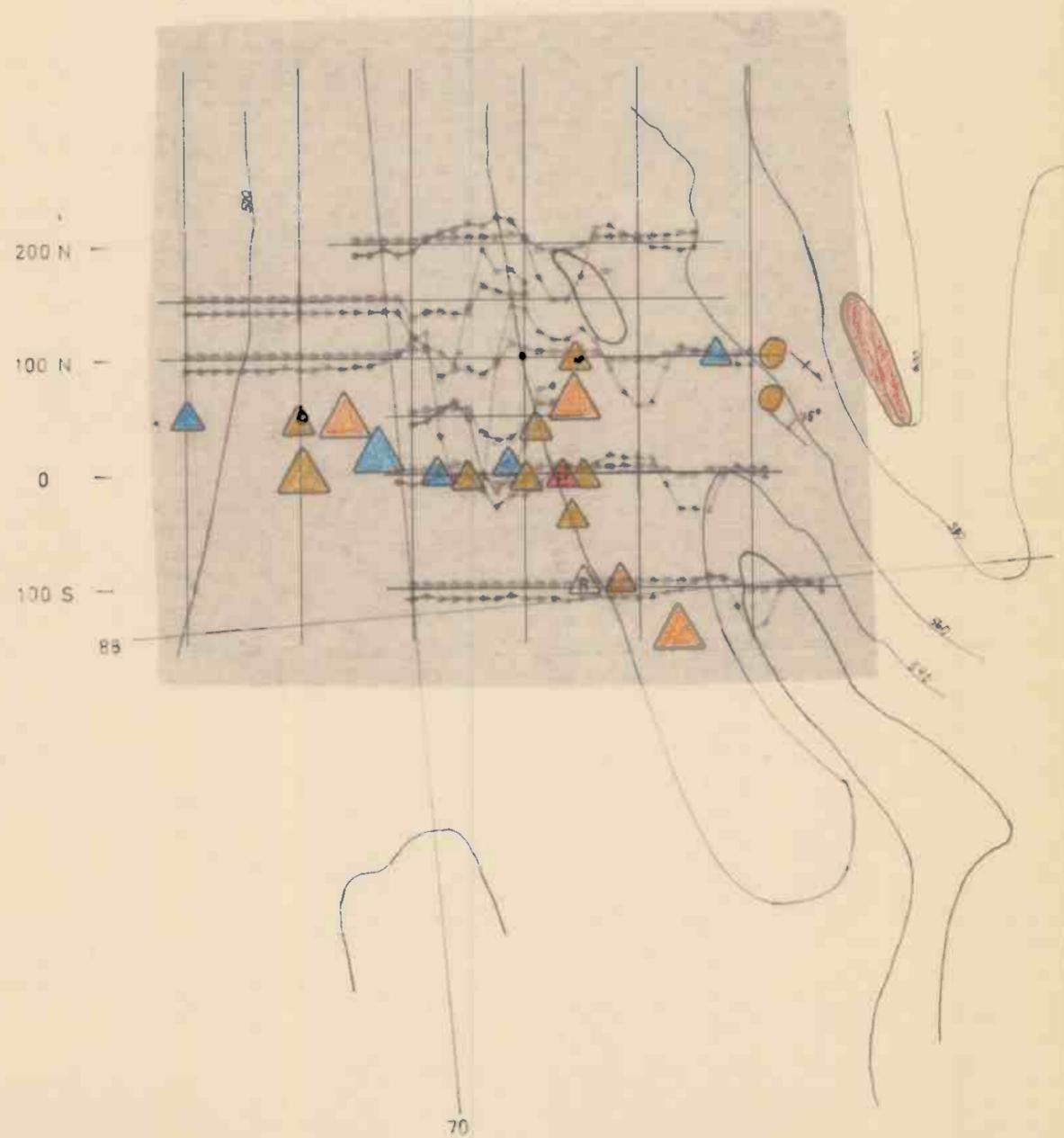
The ridge of moraine has more boulders of gneiss and granite, while amphibolite boulders are dominating in the area west of the ridge.

Together with the outcrops east of the grid area, this leads to the conclusion that the bed rock in the area consists of amphibolite and tuff or tuffite.

Recommendations

The anomaly should be investigated by diamond drilling although the geological observations give little information on the area.

400 W 300 W 200 W 100 W 0 100 E



LEGEND

Geology

- Granite / P=pegmatite
- Mica schist
- Coarse, massive amphibolite or diabase
- Tuff, tuffite
- Medium to fine grained, often schistose and foliated, amphibolite
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AREA 43 Mollejus Geological mapping EM survey	M 1:5000
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	Tegn: KB 3/84
	Trace: HB 4/84
PROSPEKTERING A/S	Fig. 10