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Postboks 3021, 7002 Trondheim

Rapportarkivet

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Tittel

Detailed geological mapping around the Stülberget area

Forfatter	Dato	Bedrift
GALLAY C.	1974	Sulitjelma Gruber A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad

Fagområde	Dokument type	Forekomster
Råstofftype	**Emneord**	

Sammendrag

Detaljert blotningskartlegging M = 1:10000 langs amfibolitthorisonten, Staalberget, med tanke pa sulfidmineraliseringer. Komplett stratigrafi er stilt opp med detaljerte skildringer av de enkelte bergartene. Strukturgeologien i omradet er kort skildra. Ingen okonomiske malmforekomster er observert. Pavist mindre mengder pyritt og andre sulfidmineraler i en breksje-enhet i Sulitjelma-amfibolitten, tilsv. Sulitjelma-amfibolitten ved Langvann.

022.034

A/S SULITJELMA GRUBER
Prospektering 1974
Prosjekt 7.402/C

TSH/GR/KH
10.12.1974

Detailed geological mapping around the Staalberget area (EE-212).

CONTENTS

Enclosures:

1. Geological outcrop map 1 : 5.000
2. Geological structure map 1 : 5.000 and vertical sections

Abstract:

The Sulitjelma amphibolite here is very thin (0-10 m) but repeated by intense folding. No economical concentrations of ore are present in the area mapped.

INTRODUCTION

This report describes the geology of an area of approximately 1 sq.km lying on the south facing slopes of Staalberget (1011 m) (A.M.S. series M711, sheet 2129 111, 50750Y, 017000X), which is 15 km west south-west of Furulund, Sulitjelma. The area lies on the 1:10.000 map No.EE212 between NGO-grid northings 101490X-101650X, and between grid eastings 51200Y-52000Y.

The area is situated on the western limb of the Baldoaivve Syncline, and the units exposed range from the upper part of the Furulund schist to the granite complex which forms the centre of the syncline. These units are included in earlier works by Dybdahl (1953) and by Raith and Thalenhorst (1965), but both these studies included much larger areas and were on a scale of 1:50.000. They give an account of the general succession in the area. Mapping on a scale of 1:5.000 of the Staalberget area was done in 1968 by Wunsch and Lobinger, but this is superseded by the present report.

The present project involved detailed geological outcrop mapping on a scale of 1:10.000 of the amphibolite horizon between the upper Furulund schists and the "acid gneiss", as part of a systematic exploration and prospecting project by A/S Sulitjelma Gruber of the horizon which at Langvann yields economical copper ore. The mapping provides ground control for the interpretation of the geophysical work carried out by N.G.U. (1968), and is also supported by geochemical soil sampling carried out perpendicular to the strike (see report 7.403/C). The mapping was done using sheet EE212 and the air photographs E18.1764 and F20.1818 (Widerøe A/S Series 415). The results are presented on three maps of scale 1:5.000, blown up from the 1:10.000 base map, which is also included.

Map i/. Geology
ii/. Structure
iii/. Geochemical Profiles

The area lies on the north side of the Storforsdal, a valley running approximately east-west. The strike of the rock units is north-south with dips to the east. This results in the outcrops often being continuous along streams, of which there are many. Outcrops tend to be dip slopes on the western sides of the streams and small scarps on the eastern sides. The northern part of the area is plateau-like, with the break in slope. The effects of glaciation were to be seen everywhere e.g. perched boulders, erratics and glacial striae. Despite a favourable southerly aspect, the height above sea level (800 m +) prevents the growth of trees although dwarf birch and occasional rowan appear close to the river. The upper slopes are covered by a mass of alpine and arctic flowers and plants, of which dandelions, buttercups and forget-me-nots were recognised. On the plateau area, snow patches tended to dominate the flora which was restricted to lichen and hardy grass.

Amongst the fauna, reindeer were common and a small herd of elk crossed the area one day. The small mammals included the ubiquitous mice and lemmings and the sporadic stoat. Curlews, ptarmigans and ravens made up the larger bird population, whilst smaller birds were plentiful and included stonechats and snowbuntings. Insect life was dominated by mosquitoes although grounded craneflies and spiders were frequently seen.

STRATIGRAPHY

Although detailed mapping was intended solely for the amphibolite "Breccia" (Greenstone of previous authors), a detailed local stratigraphy was established out of the necessity to elucidate the structure. The stratigraphy is:

f/. "Baldoaivve" Granite
e/. Sulitjelma Schists (SUS)
d/. Furulund "Acid Gneiss" (FAG)
c/. Lapphelleren Schists (LAS)
b/. Sulitjelma Amphibolite (SAM) ii/. Schistose Amphibolite
i/. Breccia
a/. Upper Furulund Schist (with Amphibolite pods)

a/. Upper Furulund Schist

The top half of the Furulund Schist (in the terminology of Raith and Thalenhorst) was the lowest formation recognised in the area, outcropping as a westerly perimeter. It contains two major rock types, which are:

1/. Biotite Schists
2/. Coarse Amphibolites

1/. This is a thick sequence of dark, fine-grained, slightly calcareous biotite schists. The mineralogy is variable over the area, but commonly the rocks contain small amounts of hornblende and chlorite. In some places large garnet porphyroblasts make up a high proportion of the rock. Locally both hornblende or chlorite become important and at one or two localities Kyanite-bearing schists are found. The amount of calcite also varies from place to place. Quartz boudins are very common. These schists represent a metamorphosed pelite sequence.

2/. Massive pods of amphibolite were recognised at several localities (e.g. 6 and 11). They consist of hornblende and white felspar. They are massive, showing little or no schistosity, and have an even, intergrown texture. This results in the coarser grained varieties appearing as spotted green and white rocks. They occur in thick (up to 30 m)

discontinuous lenses within the schist. The lenses sometimes contain small (< 1 m) discontinuous layers of hornblende biotite schist. Thin amphibolite bands up to 5 cm thick can be found in the nearby schists.

It is thought that the amphibolite pods represent small volcanic outbursts on the sea floor, possibly as pillow lavas, with the interbedded schists representing normal fine grained sediments deposited during breaks in the igneous activity.

Neither the schists nor the amphibolites contain significant amounts of sulphides. The notable exception to this is the Staalhaugen ore-horizon (see Gallay, Roberts and Taylor, Project 7.402/B).

b/. Sulitjelma Amphibolite

This formation is represented by two members in the Staalberget area. The lowest, the "Breccia member", is recognisable everywhere northwards from the Storforsdalselv to the termination of the Sulitjelma Amphibolite formation on Staalberget. The uppermost unit, the Schistose amphibolite member, is a variable discontinuous unit, not always present in the field.

i/. The Breccia Member

This unit ranges in thickness from 0-10 m and its average thickness is about 4 m. It is a heterogeneously layered, brecciated rock with a weak overall schistosity, although platy minerals surrounding the clasts may be strongly schistose producing "augen". The rock is compositionally banded and folded on a centimetre scale. This may be primary. Quartz veins are common and are boudinaged. Brecciated clasts are not everywhere to be found. Some rock patches resemble meta-agglomerate with angular fragments of more silicic clasts (Quartz & Felspar) up to 10 cm long, set in a more chloritic matrix. To the north of the area the size of the clasts diminishes. The colour of the rock depends on the percentage of the lighter coloured clasts, but on the whole the rock shows various shades of green.

Mineralogically the matrix comprises small crystals of chlorite and white felspar; biotite and hornblende are less common. The clasts are of white felspar and quartz. Texturally the rock is very variable, but it is always uneven, tending to be porphyritic or porphyroblastic. Porphyroblasts are of pyrite and rare chalcopyrite but nevertheless, the sulphide content of this member is relatively low and is unlikely to contain more than five percent of sulphides. The rock rarely exceeds a medium rusty weathering state.

Concerning the origin of this rock type, importance is placed on whether the brecciation is primary or secondary. As mentioned above, primary brecciation is recognisable; secondary brecciation is recognisable where it also affects quartz veins. Probably the rock unit represents a metamorphosed tuff/agglomerate flow of unusual chemistry.

ii/. The Schistose Amphibolite Member

This unit ranges in thickness from 0-2 m, but in average it is less than 1 m thick. The rock is a hornblende, white felspar rock with a moderate schistosity. It appears to grade upwards into hornblende-bearing biotite schists of the overlying unit. This boundary is poorly delineated, but usually can be recognised by weathering characteristics. Layering occurs within the rock on a scale of several centimetres and, in places, the rock may be coarse grained with crystals up to 2 cm in length. The rock has a grey-green, mottled appearance and contains occasional garnet or pyrite mega crystals.

The origin of this rock is problematical, but it may represent a lava episode after the deposition of the breccia.

c/. Lapphelleren Schists

Between the amphibolite and the "acid gneiss" lies a variable schist horizon. In the south the horizon rarely reaches thicknesses greater than a few metres, but in the north it forms a larger unit, perhaps 30 m thick or more.

Petrographically it is a dark brown biotite schist often with small amounts of hornblende. Occasionally chlorite, muscovite and garnet can be found. To the north the rock is evenly schistose, but in the south it is often heterogeneously layered and contains more hornblende. Like the other schists in the area it contains quartz boudins. The rocks contain little or no oxides or sulphides.

This unit represents a period of sedimentation between the deposition of the amphibolite and the "acid gneiss".

d/. Furulund "Acid Gneiss"

A relatively sharp boundary separates the "acid gneiss" unit from the underlying biotite schists. The "acid gneiss" forms massive, rounded outcrops which are readily seen on the air photographs. Its thickness is variable and difficult to estimate because of the intense folding. Nevertheless, nowhere would it seem to be more than 20m thick and an average thickness would be less than 10 m.

It is a light coloured, coarse grained rock, weakly schistose and usually massive. It contains a large proportion of quartz and felspar. Other major constituants are muscovite and chlorite. Biotite is more common in the lower parts. Porphyroblasts of garnet and muscovite occur sporadically.
Characteristic of this rock type is the presence of large, rounded fragments of quartz and felspar up to 3 cm in size. The fragments, set in a deformed, finer grained matrix, produce an augen-like texture. This has resulted in the unit being named as an augen acid gneiss and, although this is now purely a descriptive term, the name "acid gneiss" has been retained here solely to be consistent with its use by other workers. Often the rock shows a compositional layering on a millimetre scale and includes lense shaped felspars. This rock type closely resembles an acid tuff with relict phenocrysts of felspar and relict eutaxitic layering. In other places fragments of quartz and felspar are clearly clasts which have an earlier origin in that they resemble sedimentary pebbles. This would suggest a conglomeratic or agglomeratic origin for parts of the unit.

It is our opinion that this "acid gneiss" unit is a metamorphosed acid tuff/agglomerate, but the possibility of a sedimentary origin for some parts cannot be ruled out.

e/. Sulitjelma Schists

This unit is the highest stratigraphic horizon present in the area mapped and no estimate of its thickness is attempted. It was not studied in detail and the following description is based on only a few localities. The rocks are hornblende-, muscovite- or chlorite-bearing biotite schists with occasional graphite schist horizons. The rocks are heterogeneously layered with varying degrees of schistosity. They are dark rocks often porphyroblastic with abundant garnet megacrystals: pyrite megacrystals were recognised at one locality (1). The schists frequently weather to a rusty colour and at locality 12 showed a moderate malachite colouration.

The Sulitjelma Schists would appear to be similar to the Furulund Schist except that they contain a larger quantity of sulphide material.

f/. The Baldoaivve Granite

This was not mapped in this work as it lies off the map above the Sulitjelma Schists. It appears to be a genuinely intrusive body.

STRUCTURE

The major structural element of the area is the Baldoaivve syncline to the east, and the dips of the bedding/schistosity are consistantly in this direction. To the west are a number of smaller folds which affect the Furulund schist units there and cause a repetition of the amphibolite horizons.

Between and including the Breccia and "acid gneiss" units are found a series of tight, reclined and sometimes recumbent folds which have wavelengths on the order of 20 m. The folds are "S" type asymmetrical folds with amplitudes around 50 m and are sometimes so acute that horizons are pinched out to nothing. The axial surface of these reclined folds dips to the east with an average value of 30°. Both limbs of any fold dip in this same direction with the result that one of them is overturned. The plunge of the fold axis is small and towards the south. These folds are the dominant features in the competent Breccia and "acid gneiss" horizons, but only the adjacent parts of the surrounding schists seem to have been affected by the folding. The plane of the schistosity of the schists is exactly the same as that of the axial surface of the folds and this suggests that they are of the same origin. It is suggested that a regional deformation with a large shear component produced both the schistosity and the tight folding, the former deforming by simple shear and the latter, because of its greater competency, deforming by folding.

Small scale crenulation folding is occasionally found. This folding and the lineations associated with it, have both the same trend as the reclined folding, although the style is very different. This crenulation folding may represent a later event.

MINERALISATION

No economical concentrations of ore are present in the area mapped.

The most promising unit at Staalberget in which economical ores may have been present, was the breccia, the equivalent horizon to the Sulitjelma amphibolite of Langvann. At Langvann the ore occurs sporadically within brecciated units. However, the breccia unit mapped at Staalberget is much thinner than was anticipated and consists of a single lithological horizon. The breccia contains small amounts of pyrite and other sulphides in places but nowhere are these concentrated into ore bodies.

QUARTZ VEINS

In the more competent Breccia and "acid gneiss" quartz veins are found which are not deformed beyond recognition. This is attributed to the shielding affects of these stronger rocks. These quartz veins are thick, up to 2 or 3 metres in places, but are laterally discontinuous. Characteristically they contain a relatively large quantity of sulphides and they show rusty weathering. Throughout the schist units are found the boudinaged remains of quartz veins.

DISCUSSION AND CONCLUSIONS

With the identification of the small scale reclined folding of the amphibolite and "acid gneiss" units, it is now possible to estimate the thicknesses more realistically than was previously possible. The folding causes the rock units to be repeated on the ground and gives a first impression of considerable thickness (e.g. Wunsch and Lobinger 1968). In fact, the units are surprisingly thin especially when compared to the equivalent formations at Langvann. The breccia unit mapped at Staalberget together with the accompanying schistose amphibolite, is less than 10 m thick compared with a maximum of 750 m at Langvann (Wilson Ph.D.Thesis 1968). Similarly the "acid gneiss" unit, which is the equivalent of the Furulund granite, is also very thin. The equivalent horizon to the Lapphelleren schists is very much reduced (140 to 30 m), but this may be due to a difference in age of either the breccia or the "acid gneiss". Not all of this change in thickness can be attributed to tectonics.

These facts lead us to believe that the Staalberget area lay some distance away from the volcanic source and depositional basin in which the economic copper ores of Sulitjelma accumulated. The Staalberget breccia differs from the breccias at Sulitjelma in that it contains more felspar, less chlorite and very much less amounts of sulphides. The electro-magnetic survey of the region carried out by N.G.U. in 1968 failed to reveal any anomalies associated with this horizon. It may be too early to suggest that the breccia horizon at Staalberget is barren until the results of the soil sampling are available, but our mapping results suggest that this is so.

N

1014.000 1015.000 1016.000 1017.000

53.000

52.000

51.000

11000 N
0 Ø

10600 N
700 Ø

10800 N
700 Ø

11000 N
750 Ø

KEY

0 100 200 300
METER

	SULITJELMA SCHIST	SUS	FURULUND SCHIST	FUS
	"ACID GNEISS"	FAG	COARSE AMPHIBOLITE	
	HORNBLENDE BIOTITE SCHIST	LAR	GEOPHYSICAL MARKER POSTS	
	SCHISTOSE AMPHIBOLITE	SAM	OUTCROPS WITH LOCALITIES	
	BRECCIA		CLIFF	
			STREAM	

STÅLBERGET

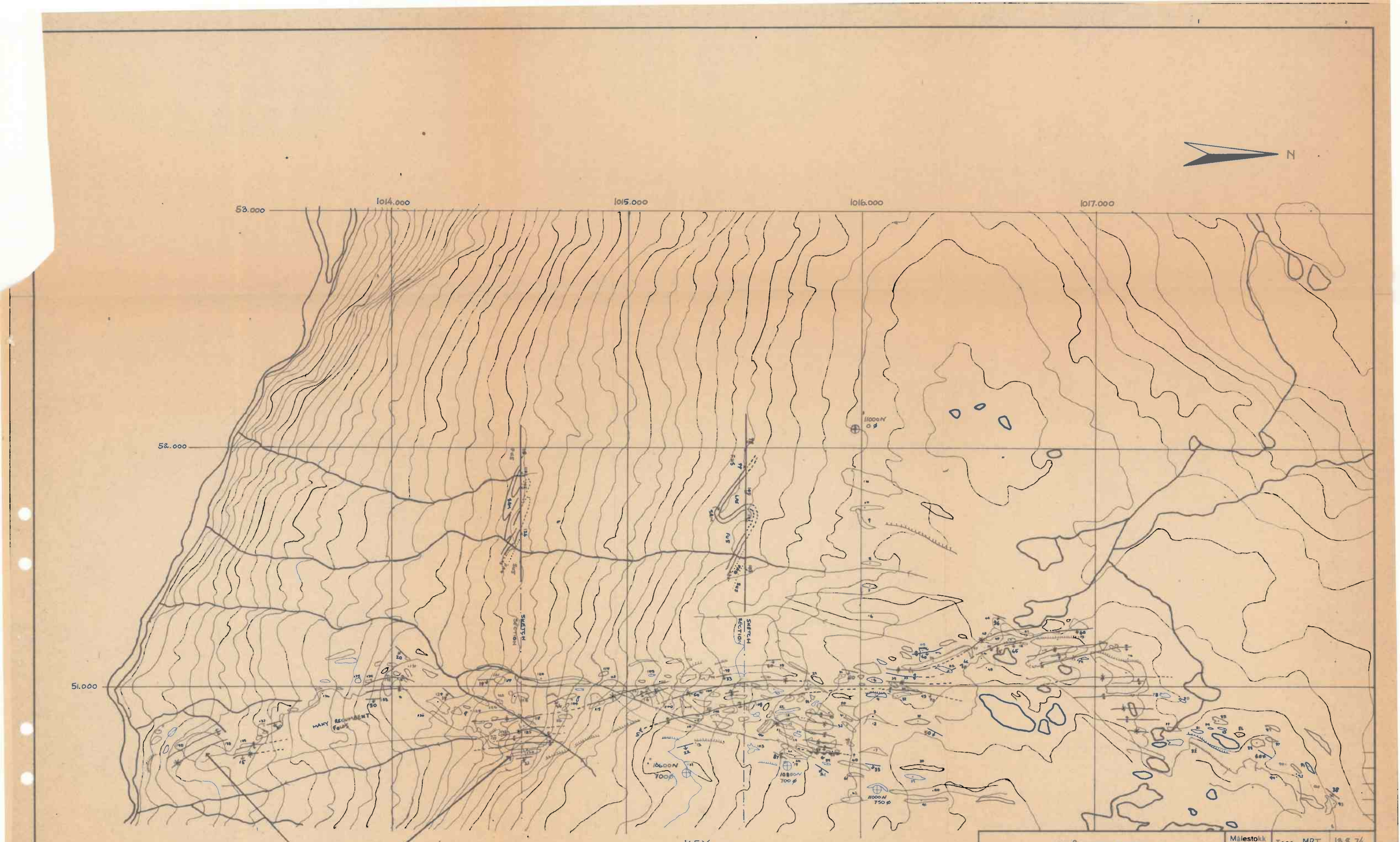
GEOLOGISK BLOTNINGSKART
EDB-LOKALITETSNUMMER

A/S SULITJELMA GRUBER

PROSPEKTERING 1974
PROSJEKT 7.402/C

Målestokk 1:5000	Tegn. MRT	13.8.74	
	Trac. "	"	
	Kfr. TGH	"	
Erstatning for:			
Erstattet av:			

A.S Tanum A2



KEY

59	SULITJELMA SCHIST	SUS	
18	"ACID GNEISS"	FAG	
62	HORNBLENDE BIOTITE SCHIST	LAR	
53	SCHISTOSE AMPHIBOLITE	SAM	
46	BRECCIA		
6	FURULUND SCHIST	FUS	
56	COARSE AMPHIBOLITE	FUS	

- STRIKE AND DIP OF BEDDING/SCHISTOSITY
- OVERTURNED BEDS
- ANTICLINE
- SYNCLINE
- GEOPHYSICAL MARKER POSTS
- CLIFF
- STREAM
- OUTCROP OF BRECCIA
- THRUST WITH TEETH ON OVERRIDING SLAB

STÅLBERGET

– STRUKTURGEOLOGISK TOLKNINGSKART –

VERTIKALPROFILER

A/S SULITJELMA GRUBER

PROSPEKTERING 1974

PROSJEKT 7.402/C

Målestokk 1:5000	Tegn MRT	13.8.74
	Trac "	"
	Klr. TSH	"

Erstatning for:

Erstattet av:

A.S Terrapo A2

A/S SULITJELMA GRUBER
Prospektering 1974
Prosjekt 7.402/C

TSH/GR/KH
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i/. Breccia
a/. Upper Furulund Schist (with Amphibolite pods)

a/. Upper Furulund Schist

The top half of the Furulund Schist (in the terminology of Raith and Thalenhorst) was the lowest formation recognised in the area, outcropping as a westerly perimeter. It contains two major rock types, which are:

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It is thought that the amphibolite pods represent small volcanic outbursts on the sea floor, possibly as pillow lavas, with the interbedded schists representing normal fine grained sediments deposited during breaks in the igneous activity.

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b/. Sulitjelma Amphibolite

This formation is represented by two members in the Staalberget area. The lowest, the "Breccia member", is recognisable everywhere northwards from the Storforsdalselv to the termination of the Sulitjelma Amphibolite formation on Staalberget. The uppermost unit, the Schistose amphibolite member, is a variable discontinuous unit, not always present in the field.

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This unit ranges in thickness from 0-10 m and its average thickness is about 4 m. It is a heterogeneously layered, brecciated rock with a weak overall schistosity, although platy minerals surrounding the clasts may be strongly schistose producing "augen". The rock is compositionally banded and folded on a centimetre scale. This may be primary. Quartz veins are common and are boudinaged. Brecciated clasts are not everywhere to be found. Some rock patches resemble meta-agglomerate with angular fragments of more silicic clasts (Quartz & Felspar) up to 10 cm long, set in a more chloritic matrix. To the north of the area the size of the clasts diminishes. The colour of the rock depends on the percentage of the lighter coloured clasts, but on the whole the rock shows various shades of green.

Mineralogically the matrix comprises small crystals of chlorite and white felspar; biotite and hornblende are less common. The clasts are of white felspar and quartz. Texturally the rock is very variable, but it is always uneven, tending to be porphyritic or porphyroblastic. Porphyroblasts are of pyrite and rare chalcopyrite but nevertheless, the sulphide content of this member is relatively low and is unlikely to contain more than five percent of sulphides. The rock rarely exceeds a medium rusty weathering state.

Concerning the origin of this rock type, importance is placed on whether the brecciation is primary or secondary. As mentioned above, primary brecciation is recognisable: secondary brecciation is recognisable where it also affects quartz veins. Probably the rock unit represents a metamorphosed tuff/agglomerate flow of unusual chemistry.

ii/. The Schistose Amphibolite Member

This unit ranges in thickness from 0-2 m, but in average it is less than 1 m thick. The rock is a hornblende, white felspar rock with a moderate schistosity. It appears to grade upwards into hornblende-bearing biotite schists of the overlying unit. This boundary is poorly delineated, but usually can be recognised by weathering characteristics. Layering occurs within the rock on a scale of several centimetres and, in places, the rock may be coarse grained with crystals up to 2 cm in length. The rock has a grey-green, mottled appearance and contains occasional garnet or pyrite mega crystals.

The origin of this rock is problematical, but it may represent a lava episode after the deposition of the breccia.

c/. Lapphelleren Schists

Between the amphibolite and the "acid gneiss" lies a variable schist horizon. In the south the horizon rarely reaches thicknesses greater than a few metres, but in the north it forms a larger unit, perhaps 30 m thick or more.

Petrographically it is a dark brown biotite schist often with small amounts of hornblende. Occasionally chlorite, muscovite and garnet can be found. To the north the rock is evenly schistose, but in the south it is often heterogeneously layered and contains more hornblende. Like the other schists in the area it contains quartz boudins. The rocks contain little or no oxides or sulphides.

This unit represents a period of sedimentation between the deposition of the amphibolite and the "acid gneiss".

d/. Furulund "Acid Gneiss"

A relatively sharp boundary separates the "acid gneiss" unit from the underlying biotite schists. The "acid gneiss" forms massive, rounded outcrops which are readily seen on the air photographs. Its thickness is variable and difficult to estimate because of the intense folding. Nevertheless, nowhere would it seem to be more than 20m thick and an average thickness would be less than 10 m.

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It is our opinion that this "acid gneiss" unit is a metamorphosed acid tuff/agglomerate, but the possibility of a sedimentary origin for some parts cannot be ruled out.

e/. Sulitjelma Schists

This unit is the highest stratigraphic horizon present in the area mapped and no estimate of its thickness is attempted. It was not studied in detail and the following description is based on only a few localities. The rocks are hornblende-, muscovite- or chlorite-bearing biotite schists with occasional graphite schist horizons. The rocks are heterogeneously layered with varying degrees of schistosity. They are dark rocks often porphyroblastic with abundant garnet megacrystals: pyrite megacrystals were recognised at one locality (1). The schists frequently weather to a rusty colour and at locality 12 showed a moderate malachite colouration.

The Sulitjelma Schists would appear to be similar to the Furulund Schist except that they contain a larger quantity of sulphide material.

f/. The Baldoaivve Granite

This was not mapped in this work as it lies off the map above the Sulitjelma Schists. It appears to be a genuinely intrusive body.

STRUCTURE

The major structural element of the area is the Baldoaivve syncline to the east, and the dips of the bedding/schistosity are consistantly in this direction. To the west are a number of smaller folds which affect the Furulund schist units there and cause a repetition of the amphibolite horizons.

Between and including the Breccia and "acid gneiss" units are found a series of tight, reclined and sometimes recumbent folds which have wavelengths on the order of 20 m. The folds are "S" type asymmetrical folds with amplitudes around 50 m and are sometimes so acute that horizons are pinched out to nothing. The axial surface of these reclined folds dips to the east with an average value of 30°. Both limbs of any fold dip in this same direction with the result that one of them is overturned. The plunge of the fold axis is small and towards the south. These folds are the dominant features in the competent Breccia and "acid gneiss" horizons, but only the adjacent parts of the surrounding schists seem to have been affected by the folding. The plane of the schistosity of the schists is exactly the same as that of the axial surface of the folds and this suggests that they are of the same origin. It is suggested that a regional deformation with a large shear component produced both the schistosity and the tight folding, the former deforming by simple shear and the latter, because of its greater competency, deforming by folding.

Small scale crenulation folding is occasionally found. This folding and the lineations associated with it, have both the same trend as the reclined folding, although the style is very different. This crenulation folding may represent a later event.

MINERALISATION

No economical concentrations of ore are present in the area mapped.

The most promising unit at Staalberget in which economical ores may have been present, was the breccia, the equivalent horizon to the Sulitjelma amphibolite of Langvann. At Langvann the ore occurs sporadically within brecciated units. However, the breccia unit mapped at Staalberget is much thinner than was anticipated and consists of a single lithological horizon. The breccia contains small amounts of pyrite and other sulphides in places but nowhere are these concentrated into ore bodies.

QUARTZ VEINS

In the more competent Breccia and "acid gneiss" quartz veins are found which are not deformed beyond recognition. This is attributed to the shielding affects of these stronger rocks. These quartz veins are thick, up to 2 or 3 metres in places, but are laterally discontinuous. Characteristically they contain a relatively large quantity of sulphides and they show rusty weathering. Throughout the schist units are found the boudinaged remains of quartz veins.

DISCUSSION AND CONCLUSIONS

With the identification of the small scale reclined folding of the amphibolite and "acid gneiss" units, it is now possible to estimate the thicknesses more realistically than was previously possible. The folding causes the rock units to be repeated on the ground and gives a first impression of considerable thickness (e.g. Wunsch and Lobinger 1968). In fact, the units are surprisingly thin especially when compared to the equivalent formations at Langvann. The breccia unit mapped at Staalberget together with the accompanying schistose amphibolite, is less than 10 m thick compared with a maximum of 750 m at Langvann (Wilson Ph.D.Thesis 1968). Similarly the "acid gneiss" unit, which is the equivalent of the Furulund granite, is also very thin. The equivalent horizon to the Lapphelleren schists is very much reduced (140 to 30 m), but this may be due to a difference in age of either the breccia or the "acid gneiss". Not all of this change in thickness can be attributed to tectonics.

These facts lead us to believe that the Staalberget area lay some distance away from the volcanic source and depositional basin in which the economic copper ores of Sulitjelma accumulated. The Staalberget breccia differs from the breccias at Sulitjelma in that it contains more felspar, less chlorite and very much less amounts of sulphides. The electro-magnetic survey of the region carried out by N.G.U. in 1968 failed to reveal any anomalies associated with this horizon. It may be too early to suggest that the breccia horizon at Staalberget is barren until the results of the soil sampling are available, but our mapping results suggest that this is so.

N

1014 000 1015 000 1016 000 1017 000

53 000 52 000 51 000

1000N 0Ø

10600N 700Ø

10800N 700Ø

11000N 750Ø

KEY

57	SULITJELMA SCHIST	SUS	4	FURULUND SCHIST	FUS
15	"ACID GNEISS"	FAG	50	COARSE AMPHIBOLITE	FUS
62	HORNBLENDE BIOTITE SCHIST	LAR	⊕	GEOPHYSICAL MARKER POSTS	
53	SCHISTOSE AMPHIBOLITE	SAM	57	OUTCROPS WITH LOCALITIES	
46	BRECCIA	SAM		CLIFF	
				STREAM	

0 100 200 300 METER

STÅLBERGET

GEOLOGISK BLOTNINGSKART
EDB - LOKALITETSNUMMER

A/S SULITJELMA GRUBER

PROSPEKTERING 1974
PROSJEKT 7.402/C

Målestokk 1:5000

Tegn. MRT 13.8.74
Trac. "
Kfr. TSH "

Erstatning for:

Erstattet av:

A.S Tanum A/2

N

1014.000 1015.000 1016.000 1017.000

53.000

52.000

51.000

MANY RECUMBENT FOLDS

LARGE RECUMBENT FOLDS

11000N 0 Ø

10600N 700Ø

10800N 700Ø

11000N 750Ø

SKETCH SECTION

SKETCH SECTION

KEY

59	SULITJELMA SCHIST	SUS	
19	"ACID GNEISS"	FAG	
62	HORNBLENDE BIOTITE SCHIST	LAR	
53	SCHISTOSE AMPHIBOLITE	SAM	
60	BRECCIA		
6	FURULUND SCHIST	FUS	
56	COARSE AMPHIBOLITE	FUS	

0 100 200 300 METER

STRIKE AND DIP OF BEDDING/SCHISTOSITY

OVERTURNED BEDS

ANTICLINE

SYNCLINE

GEOPHYSICAL MARKER POSTS

CLIFF

STREAM

OUTCROP OF BRECCIA

THRUST WITH TEETH ON OVERRIDING SLAB

GTÅLBERGET

– STRUKTURGEOLOGISK TOLKNINGSKART –

VERTIKALPROFILER

A/S SULITJELMA GRUBER

PROSPEKTERING 1974

PROSJEKT 7.402/C

Målestokk 1:5000	Tegn. MRT	13.8.74
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Erstatning for:

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A3 format