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Oskarshamn site investigation

Geological single-hole interpretation of KLX17A and HLX42

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Keywords: Geophysics, Rock unit, Borehole, Deformation zone, Fractures, Alteration.

Abstract

This report contains geological single-hole interpretation of the cored borehole KLX17A and the percussion borehole HLX42 at Laxemar. The interpretation combines the geological core mapping, interpreted geophysical logs and borehole radar measurements to identify rock units and possible deformation zones in the boreholes.

The geological single-hole interpretation shows that two rock units (RU1–RU2) occur in KLX17A. In general, borehole KLX17A is dominated by Ävrö granite (501044). Subordinate rock types comprise occurrences of diorite/gabbro (501033), fine-grained diorite-gabbro (505102), fine-grained granite (511058), pegmatite (501061) and granite (501058). Ten possible deformation zones are identified in KLX17A (DZ1–DZ10).

One rock unit (RU1) occurs in HLX42. The borehole is dominated by quartz monzodiorite (501036). Subordinate rock types comprise occurrences of fine-grained granite (511058), fine-grained diorite-gabbro (505102) and pegmatite (501061). No possible deformation zone is identified in HLX42.

Sammanfattning

Denna rapport behandlar geologisk enhålstolkning av kärnborrhålet KLX17A och hammarborrhålet HLX42 i Laxemar. Den geologiska enhålstolkningen syftar till att utifrån den geologiska karteringen, tolkade geofysiska loggar och borrhålsradarmätningar identifiera olika litologiska enheters fördelning i borrhålen samt möjliga deformationszoners läge och utbredning.

Den geologiska enhålstolkningen visar att KLX17A kan delas in i två litologiska enheter (RU1–RU2). Generellt sett domineras borrhålet av Ävrögranit (501044). Diorit/gabbro (501033), finkornig diorit-gabbro (505102), finkornig granit (511058), pegmatit (501061) och granit (501058) förekommer som underordnade bergarter. Tio möjliga deformationszoner har identifierats i KLX17A (DZ1–DZ10).

En litologisk enhet (RU1) förekommer i hammarborrhålet HLX42. Borrhålet domineras av kvartsmonzodiorit (501036). Finkornig granit (511058), finkornig diorit-gabbro (505102) och pegmatit (501061) förekommer som underordnade bergarter. Ingen möjlig deformationszon har identifierats i HLX42.

Contents

1 Introduction

Much of the primary geological and geophysical borehole data stored in the SKB database SICADA need to be integrated and synthesized before they can be used for modeling in the 3D-CAD system Rock Visualization System (RVS). The end result of this procedure is a geological single-hole interpretation, which consists of integrated series of different loggings and accompanying descriptive documents (SKB MD 810.003 v. 3.0, SKB internal controlling document).

This document reports the results gained by the geological single-hole interpretation of boreholes KLX17A and HLX42 at Laxemar (Figure 1-1), which is one of the activities performed within the site investigation at Oskarshamn. The work was carried out in accordance with activity plan AP PS 400-07-011. The controlling documents for performing this activity are listed in Table 1-1. Both activity plan and method description are SKB's internal controlling documents. Rock type nomenclature that has been used is shown in Table 1-2.

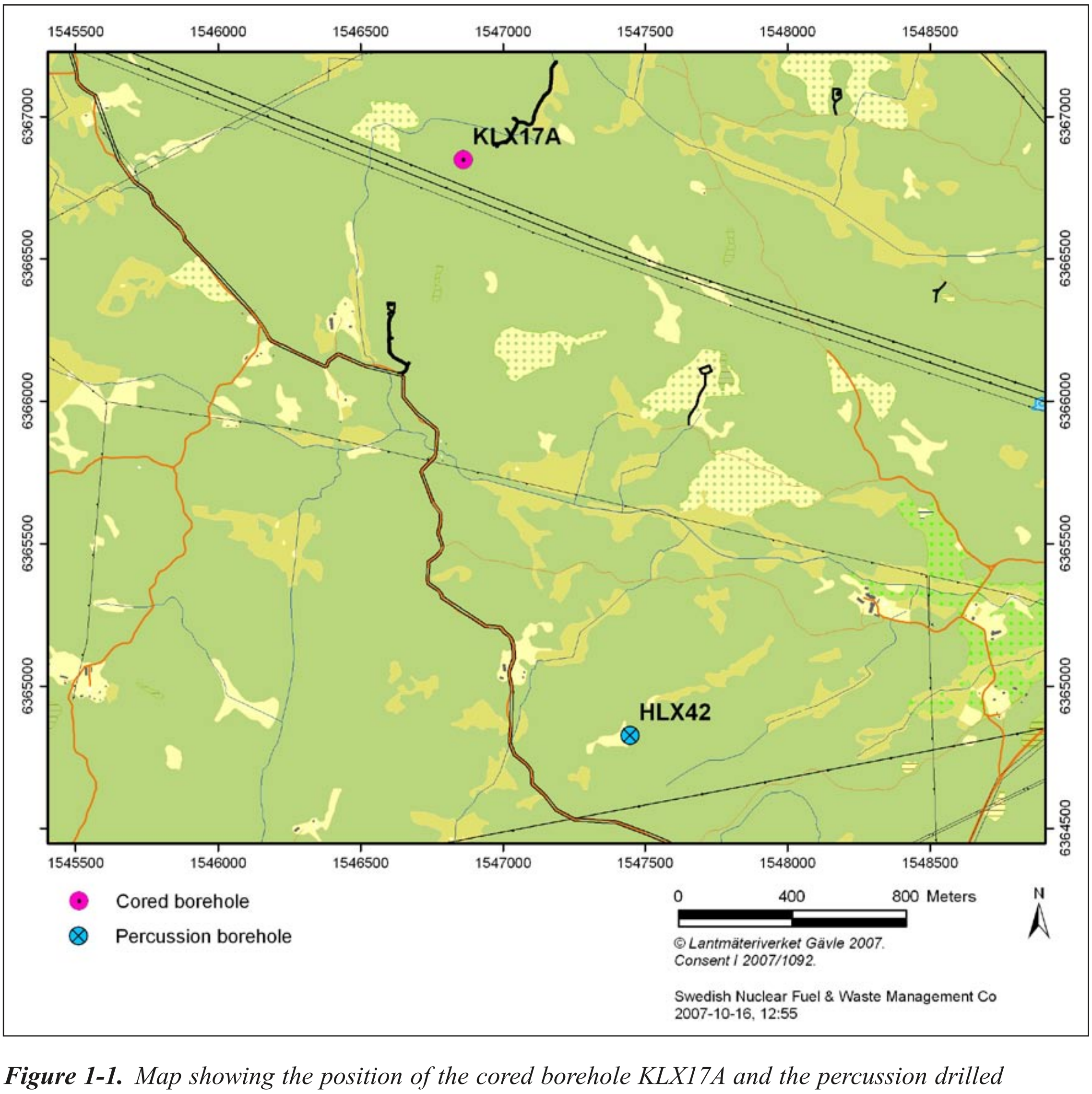


Figure 1-1. Map showing the position of the cored borehole KLX17A and the percussion drilled borehole HLX42.

Table 1-1. Controlling documents for the performance of the activity.

Activity Plan	Number	Version
Geologisk enhålstolkning av KLX17A och HLX42	AP PS 400-07-011	1.0
Method Description	**Number**	**Version**
Metodbeskrivning för geologisk enhålstolkning	SKB MD 810.003	3.0

Table 1-2. Rock type nomenclature for the site investigation at Oskarshamn.

Rock type	Rock code	Rock description
Dolerite	501027	Dolerite
Fine-grained Götemar granite	531058	Granite, fine- to medium-grained, ("Götemar granite")
Coarse-grained Götemar granite	521058	Granite, coarse-grained, ("Götemar granite")
Fine-grained granite	511058	Granite, fine- to medium-grained
Pegmatite	501061	Pegmatite
Granite	501058	Granite, medium- to coarse-grained
Ävrö granite	501044	Granite to quartz monzodiorite, generally porphyritic
Quartz monzodiorite	501036	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic
Diorite/gabbro	501033	Diorite to gabbro
Fine-grained dioritoid	501030	Intermediate magmatic rock
Fine-grained diorite-gabbro	505102	Mafic rock, fine-grained
Sulphide mineralization	509010	Sulphide mineralization
Sandstone	506007	Sandstone

2 Objective and scope

A geological single-hole interpretation is carried out in order to identify and to describe briefly the characteristics of major rock units and possible deformation zones within a borehole. The work involves an integrated interpretation of data from the geological mapping of the borehole (Boremap), different borehole geophysical logs and borehole radar data. The geological mapping of the cored boreholes involves a documentation of the character of the bedrock in the drill core. This work component is carried out in combination with an inspection of the oriented image of the borehole walls that is obtained with the help of the Borehole Image Processing System (BIPS). The geological mapping of the percussion boreholes focuses more attention on an integrated interpretation of the information from the geophysical logs and the BIPS images. For this reason, the results from the percussion borehole mapping are more uncertain. The interpretations of the borehole geophysical and radar logs are available when the single-hole interpretation is performed. The result from the geological single-hole interpretation is presented in a WellCad plot. The work reported here concerns stage 1 in the single-hole interpretation, as defined in the method description.

3 Data used for the geological single-hole interpretation

The following data have been used in the single-hole interpretation of boreholes KLX17A and HLX42:

- Boremap data (including BIPS and geological mapping data) /2, 3/.
- Generalized geophysical logs and their interpretation /4/.
- Radar data and their interpretation /5, 6/.

As a basis for the geological single-hole interpretation a combined WellCad plot consisting of the above mentioned data sets were used. An example of a WellCad plot used during the geological single-hole interpretation is shown in Figure 3-1. The plot consists of ten main columns and several subordinate columns. These include:

1: Length along the borehole

2: Boremap data
    2.1: Rock type
    2.2: Rock type < 1 m
    2.3: Rock type structure
    2.4: Rock structure intensity
    2.5: Rock type texture
    2.6: Rock type grain size
    2.7: Structure orientation
    2.8: Rock alteration
    2.9: Rock alteration intensity
    2.10: Crush

3: Generalized geophysical data
    3.1: Silicate density
    3.2: Magnetic susceptibility
    3.3: Natural gamma radiation
    3.4: Estimated fracture frequency

4: Unbroken fractures
    4.1: Primary mineral
    4.2: Secondary mineral
    4.3: Third mineral
    4.4: Fourth mineral
    4.5: Alteration, dip direction

5: Broken fractures
    5.1: Primary mineral
    5.2: Secondary mineral
    5.3: Third mineral
    5.4: Fourth mineral
    5.5: Aperture (mm)
    5.6: Roughness
    5.7: Surface
    5.8: Slickenside
    5.9: Alteration, dip direction

6: Crush zones
  - 6.1: Piece (mm)
  - 6.2: Sealed network
  - 6.3: Core loss

7: Fracture frequency
  - 7.1: Sealed fractures
  - 7.2: Open fractures

8: BIPS

9: Length along the borehole

The geophysical logs are described below:

Magnetic susceptibility: The rock has been classified into sections of low, medium, high, and very high magnetic susceptibility. The susceptibility is strongly connected to the magnetite content in the different rock types.

Natural gamma radiation: The rock has been classified into sections of low, medium, and high natural gamma radiation. Low radiation may indicate mafic rock types and high radiation may indicate fine-grained granite or pegmatite.

Possible alteration: This parameter has not been used in the geological single-hole interpretation in the area.

Silicate density: This parameter indicates the density of the rock after subtraction of the magnetic component. It provides general information on the mineral composition of the rock types, and serves as a support during classification of rock types.

Estimated fracture frequency: This parameter provides an estimate of the fracture frequency along 5 m sections, calculated from short and long normal resistivity, SPR, P-wave velocity as well as focused resistivity 140 and 300. The estimated fracture frequency is based on a statistical connection after a comparison has been made between the geophysical logs and the mapped fracture frequency. The log provides an indication of sections with low and high fracture frequencies.

Close inspection of the borehole radar data was carried out during the interpretation process, especially during the identification of possible deformation zones. The occurrence and orientation of radar anomalies within the possible deformation zones are commented upon in the text that describes these zones.

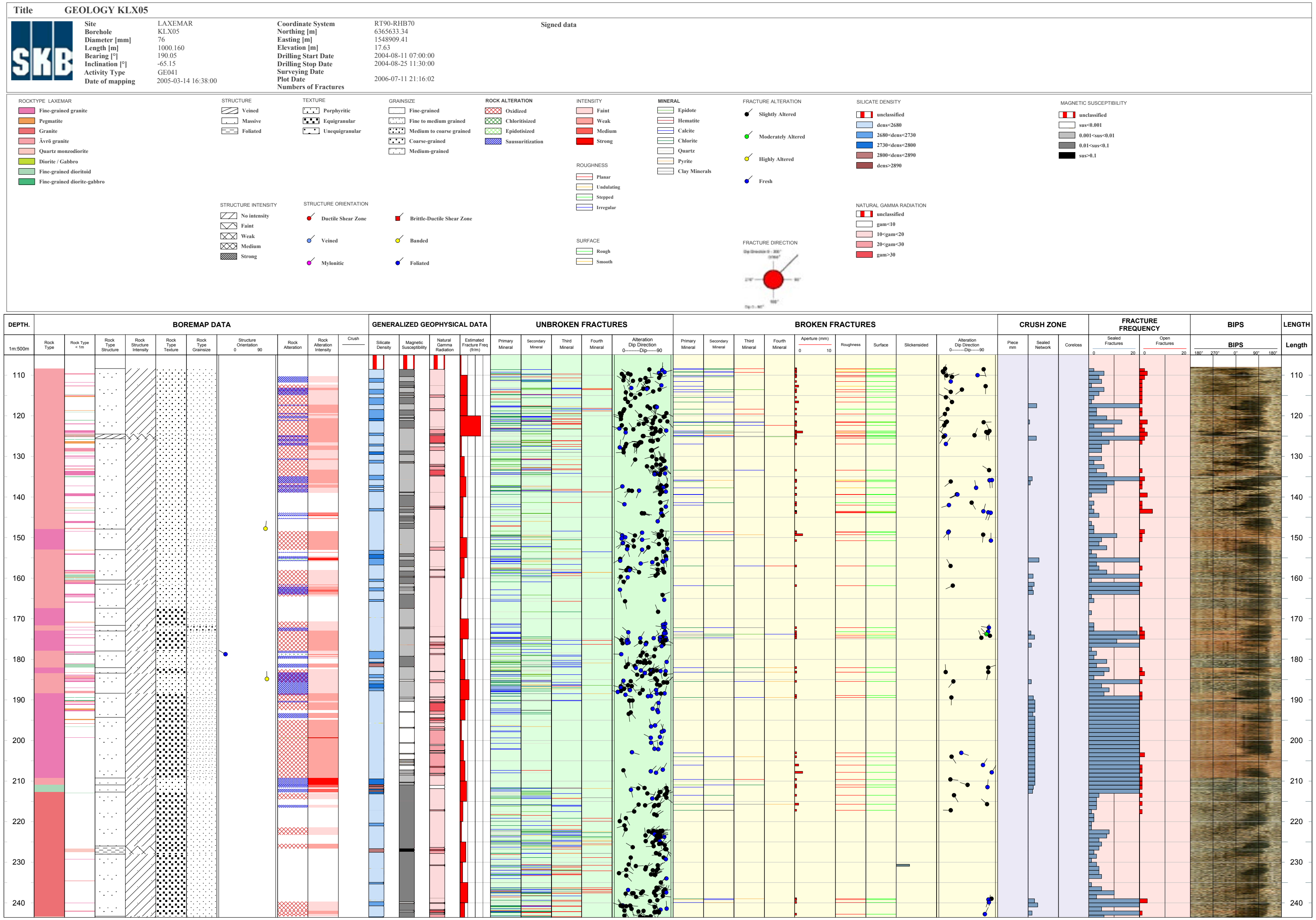


Figure 3-1. *Example of WellCad plot (from borehole KLX05 in Laxemar) used as a basis for the single-hole interpretation.*

4 Execution

4.1 General

The geological single-hole interpretation has been carried out by a group of geoscientists consisting of both geologists and geophysicists. All data to be used (see Chapter 3) are visualized side by side in a borehole document extracted from the software WellCad. The working procedure is summarized in Figure 4-1 and in the text below.

The first step in the working procedure is to study all types of data (rock type, rock alteration, silicate density, natural gamma radiation, etc) related to the character of the rock type and to merge sections of similar rock types, or sections where one rock type is very dominant, into rock units (minimum length of c. 5 m). Each rock unit is defined in terms of the borehole length interval and provided with a brief description for inclusion in the WellCad plot. This includes a brief description of the rock types affected by the possible deformation zone. The confidence in the interpretation of a rock unit is made on the following basis: 3 = high, 2 = medium and 1 = low.

The second step in the working procedure is to identify possible deformation zones by visual inspection of the results of the geological mapping (fracture frequency, fracture mineral, aperture, alteration, etc) in combination with the geophysical logging and radar data. The section of each identified possible deformation zone is defined in terms of the borehole length interval and provided with a brief description for inclusion in the WellCad plot. The confidence in the interpretation of a possible deformation zone is made on the following basis: 3 = high, 2 = medium and 1 = low.

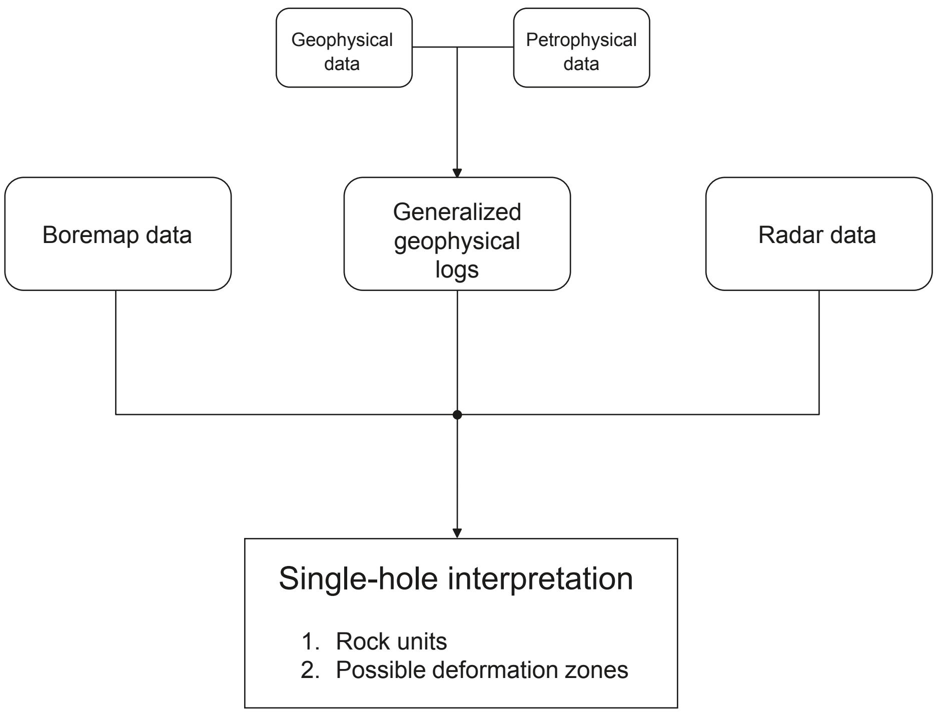
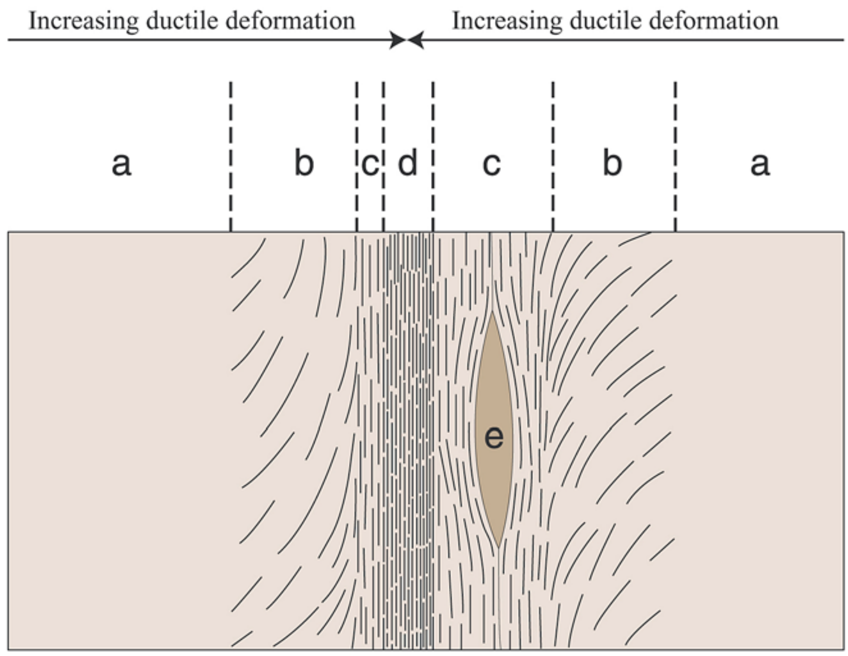


Figure 4-1. *Schematic block-scheme of single-hole interpretation.*

Inspection of BIPS images is carried out whenever it is judged necessary during the working procedure. Furthermore, following definition of rock units and deformation zones, with their respective confidence estimates, the drill cores are inspected in order to check the selection of the boundaries between these geological entities. If judged necessary, the location of these boundaries is adjusted.

Possible deformation zones that are ductile or brittle in character have been identified primarily on the basis of occurrence of protomylonitic to mylonitic foliation and the frequency of fractures, respectively, according to the recommendations in /1/. Both the transitional parts and the core part have been included in each zone (Figures 4-2 to 4-4). The fracture/m values in Figure 4-4 may serve only as examples. The frequencies of open and sealed fractures have been assessed in the identification procedure, and the character of the zone has been described accordingly. Partly open fractures are included together with open fractures in the brief description of each zone. The presence of bedrock alteration, the occurrence and, locally, inferred orientation of radar reflectors, the resistivity, SPR, P-wave velocity, caliper and magnetic susceptibility logs have all assisted in the identification of primarily the brittle structures.

Since the frequency of fractures is of key importance for the definition of the possible deformation zones, a moving average plot for this parameter is shown for the cored borehole KLX17A (Figure 4-5). A 5 m window and 1 m steps have been used in the calculation procedure. The moving averages for open fractures alone, the total number of open fractures (open, partly open and crush), the sealed fractures alone, and the total number of sealed fractures (sealed and sealed fracture network) are shown in a diagram.



a. Wallrock - undeformed to weakly deformed hostrock.
b. Transition zone - protomylonite. Weakly to strongly deformed hostrock.
c. Core - mylonite. Strongly deformed hostrock.
d. Core - ultramylonite. Intensely deformed hostrock.
e. Tectonic lens - rock with minor deformation within the shearzone

Figure 4-2. *Schematic example of a ductile shear zone. Homogeneous rock which is deformed under low- to medium-grade metamorphic conditions (after /1/).*

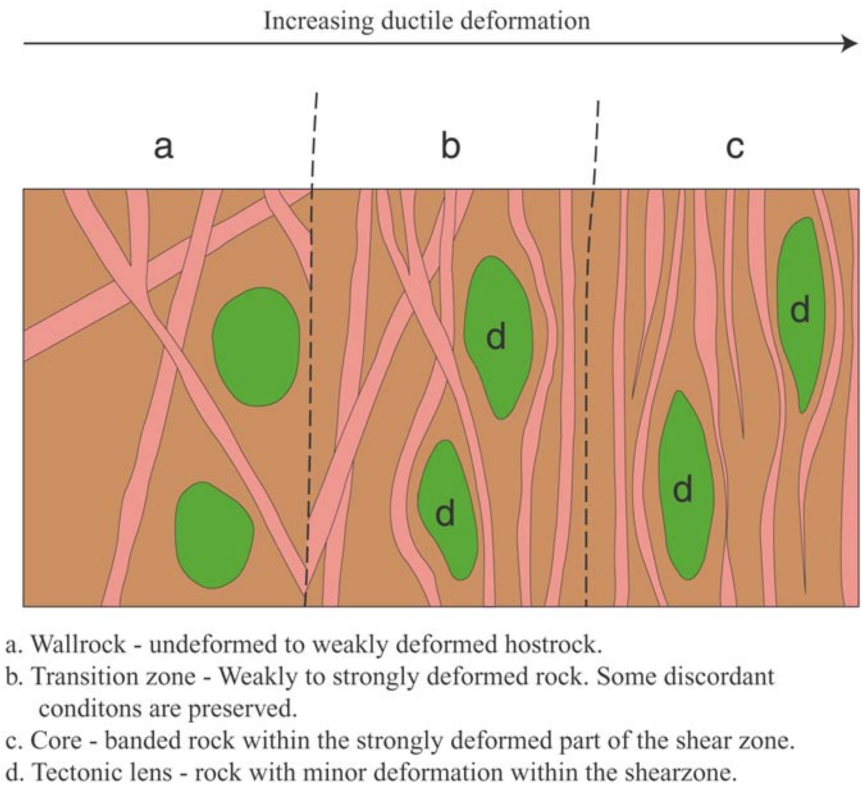


Figure 4-3. *Schematic example of a ductile shear zone. Heterogeneous rock which is deformed under low- to high-grade metamorphic conditions (after /1/).*

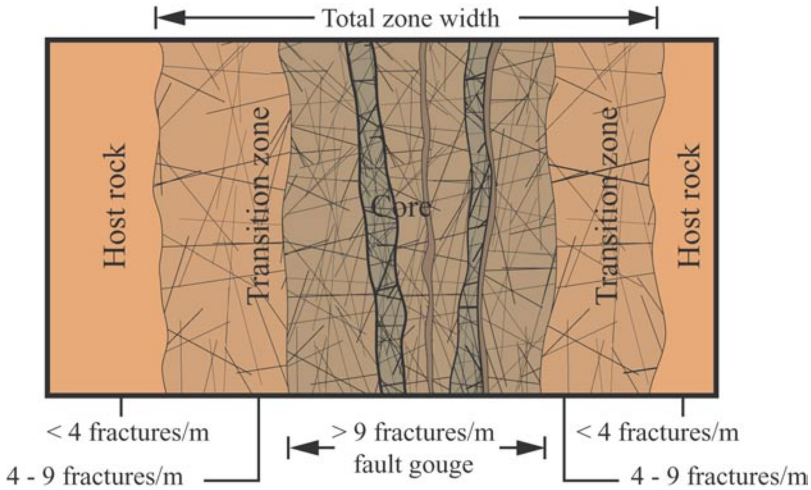


Figure 4-4. *Schematic example of a brittle deformation zone (after /1/).*

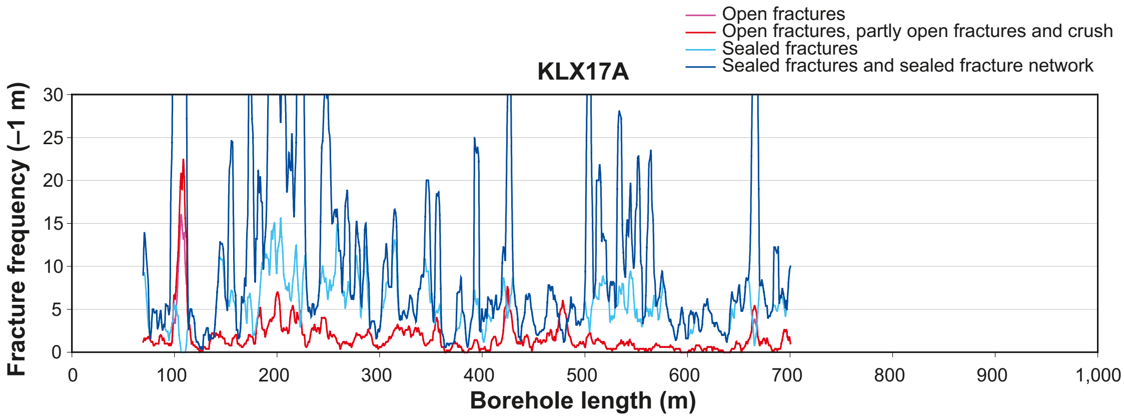


***Figure 4-5.** Fracture frequency plot for KLX17A. Moving average with a 5 m window and 1 m steps.*

The occurrence and orientation of radar anomalies within these possible deformation zones are used during the identification of zones. Overview of the borehole radar measurement in KLX17A is shown in Figure 4-6 and for HLX42 in Figure 4-7. In some cases, alternative orientations for oriented radar reflectors are presented. One of the alternatives is considered to be correct, but due to uncertainty in the interpretation of radar data, a decision concerning which of the alternatives that represent the true orientation cannot be made.

Orientations from directional radar are presented as strike/dip using the right-hand-rule method, e.g. 040/80 corresponds to a strike of N40°E and a dip of 80° to the SE.

4.2 Nonconformities

No geophysical loggings have been carried out in percussion borehole HLX42. Accordingly, no generalized geophysical logs were available during the single-hole interpretation of HLX42.

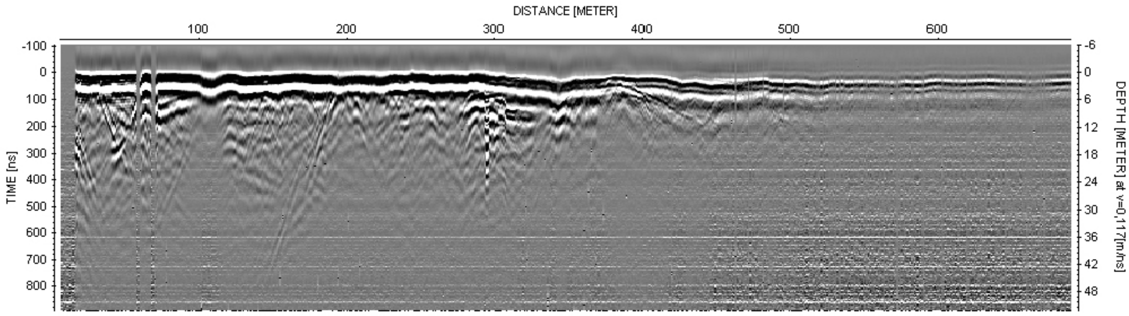


***Figure 4-6.** Overview (20 MHz data) of the borehole radar measurement in KLX17A.*

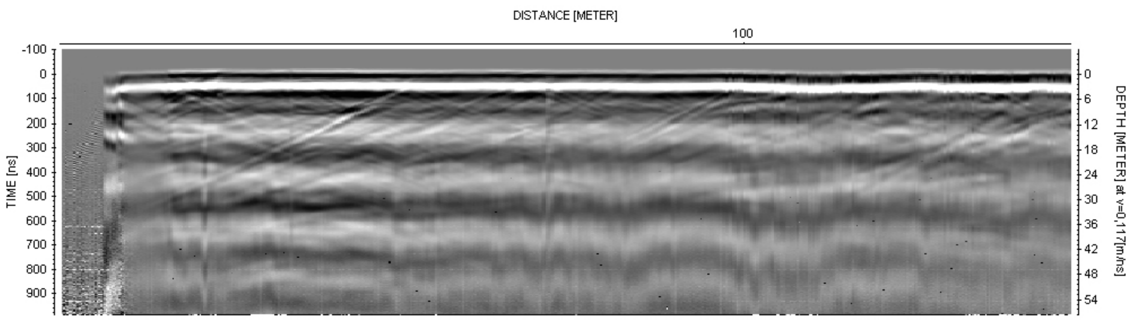


***Figure 4-7.** Overview (20 MHz data) of the borehole radar measurement in HLX42.*

5 Results

The detailed result of the single-hole interpretation is presented as print-out from the software WellCad (Appendix 1 for KLX17A and Appendix 2 for HLX42).

5.1 KLX17A

Rock units

The borehole consists of two rock units (RU1 and RU2).

66.12–587.65 m

RU1: Dominated by Ävrö granite (501044). Diorite/gabbro (501033) and also fine-grained diorite-gabbro (505102) occur in scattered ≤ 10 m long sections. Subordinate rock types comprise fine-grained granite (511058) and sparse occurrences of pegmatite (501061) and granite (501058). Scattered up to 100 m long sections are characterized by faint to weak foliation. The Ävrö granite (501044) has a density in the range 2,730–2,790 kg/m^3 in the section 66–378 m, and 2,680–2,790 kg/m^3 in the section 378–587 m. Note the large variation in density in the latter section. Confidence level = 3.

587.65–696.69 m

RU2: Totally dominated by Ävrö granite (501044). Subordinate rock types comprise sparse occurrences of fine-grained granite (511058) and pegmatite (501061). The Ävrö granite (501044) has a density in the range 2,680–2,710 kg/m^3. Scattered up to 30 m long sections are characterized by faint to weak foliation, particularly between c. 665–696 m. Confidence level = 3.

Possible deformation zones

Ten possible deformation zones have been recognised in KLX17A (DZ1–DZ10).

100.10–114.30 m

DZ1: Brittle deformation zone characterized by increased frequency of open and sealed fractures, sealed network, nine crush zones, high frequency of open fractures with large apertures, medium red staining and one slickenside. The most intensely deformed section is 104.55–114.30 m. The section 104.8–114.3 m is characterized by a major decrease in bulk resistivity and in magnetic susceptibility. There is also partly decreased P-wave velocity, density and some caliper anomalies. Six non-oriented radar reflectors occur within DZ1 with an angle from 32° to 71° to borehole axis. Low radar amplitude occurs in the interval 103–112 m. The host rock is dominated by Ävrö granite (501044). Subordinate rock types comprise fine-grained granite (511058) and very sparse occurrences of granite (501058) and diorite/gabbro (501033). Confidence level = 3.

142.27–142.86

DZ2: Low-grade ductile shear zone in composite intrusion. Moderate increase in sealed fractures and weak epidotization. There are no significant geophysical anomalies in this interval. The host rock is dominated by fine-grained diorite-gabbro (505102). Confidence level = 3.

192.70–227.00 m

DZ3: Inhomogeneous brittle to brittle-ductile deformation zone which is characterized by increased frequency of sealed fractures, sealed network, moderate increase in open fractures, slickensides, weak to medium foliation, faint to strong red staining, weak to strong saussuritization, weak epidotization, breccias, cataclasites, and ductile and brittle ductile shear zones. The most intensely deformed parts are 193.45–193.80 m, 199.85–200.165 m and 221.10–224.75 m. The entire section is characterized by several short intervals of decreased resistivity, magnetic susceptibility and P-wave velocity. The most significant geophysical anomalies occur at 199.5–201.5 m and 220.5–225.5 m. Two oriented and eleven non-oriented radar reflectors occur within DZ3. The oriented reflectors occur at 195.4 m with the orientation 017/06 or 108/57 and at 222.7 m with the orientation 079/39 or 141/27. The reflectors are medium in strength and can be observed to a distance of 9–14 m outside the borehole. The non-oriented reflectors occur with an angle from 46° to 79° to borehole axis. Two of them are strong and prominent in the radar map, one intersects at 197.3 m with the angle 69° and the other is the extension of the first one. Low radar amplitude occurs in the interval 198–201 m. The host rock is dominated by Ävrö granite (501044). Subordinate rock types comprise diorite/gabbro (501033), fine-grained diorite-gabbro (505102), fine-grained granite (511058), pegmatite (501061) and granite (501058). Confidence level = 3.

350.14–357.25 m

DZ4: Low-grade ductile shear zone in composite intrusion. Sealed fractures and slickensides on open fractures. The interval 354–357 m is characterized by a minor decrease in P-wave velocity and resistivity. Four non-oriented radar reflectors occur within DZ4 with an angle from 56° to 86° to borehole axis. The host rock is dominated by fine-grained diorite-gabbro (505102). Subordinate rock types comprise Ävrö granite (501044) and fine-grained granite (51058). Confidence level = 3.

422.75–423.67 m

DZ5: Brittle deformation zone characterized by moderate increase in frequency of both sealed and open fractures, one crush zone, weak foliation and red staining. At c. 423.5 m there is a distinct and sharp decrease in resistivity in combination with a minor caliper anomaly. Two non-oriented radar reflectors occur at 422.7 m and at 423.7 m with the angle 45° and 73° to borehole axis, respectively. Low radar amplitude occurs in the interval 421–431 m, i.e. partly above and below DZ5. The host rock is dominated by Ävrö granite (501044). Subordinate rock type comprises fine-grained diorite-gabbro (505102). Confidence level = 3.

423.67–431.76 m

DZ6: Low-grade ductile shear zone in composite intrusion. Sealed fractures, moderate increase in open fractures and slickensides. The interval is characterized by several minor low resistivity anomalies. One oriented radar reflector occurs at 426.2 m with the orientation 124/45 or 058/23 and one non-oriented radar reflector occurs at 431.6 m with the angle 59° to borehole axis. Low radar amplitude occurs in the interval 421–431 m, i.e. partly above DZ6. The host rock is dominated by fine-grained diorite-gabbro (505102). Subordinate rock type comprises fine-grained granite (511058). Confidence level = 3.

502.75–504.40 m

DZ7: Minor brittle-ductile deformation zone characterized by increased frequency of sealed fractures, sealed network and weak epidotization. At c. 503.9 m there is a minor decrease in resistivity and magnetic susceptibility. Two non-oriented radar reflectors occur at 502.6 m and at 503.4 m with the angle 58° and 30° to borehole axis, respectively. Low radar amplitude occurs in the interval 502–504 m, i.e. partly above DZ7. The host rock is dominated by Ävrö granite (501044). Confidence level = 3.

542.57–543.30 m

DZ8: Minor brittle deformation zone characterized by increased frequency of sealed fractures, sealed network, slickensides on open fractures, faint foliation and faint to weak red staining. There are no significant geophysical anomalies in this interval. One non-oriented radar reflector occurs at 543.4 m with the angle 67° to borehole axis. The host rock is dominated by Ävrö granite (501044). Subordinate rock type comprises diorite/gabbro (501033). Confidence level = 3.

546.05–546.35 m

DZ9: Minor brittle-ductile deformation zone characterized by increased frequency of sealed fractures, sealed network, foliation and weak red staining. There are no significant geophysical anomalies in this interval. The host rock is dominated by Ävrö granite (501044). Confidence level = 3.

662.29–670.00 m

DZ10: Brittle deformation zone characterized by increase in sealed fractures and sealed network, moderate increase in open fractures, one crush zone, scattered thin brittle-ductile shear zones and cataclasites and weak to medium red staining. The interval is characterized by decreased P-wave velocity, bulk resistivity and magnetic susceptibility. Two non-oriented radar reflectors occur at 667.6 m and at 669.3 m with the angle 31° and 46° to borehole axis, respectively. The host rock is dominated by Ävrö granite (501044). Subordinate rock type comprises fine-grained granite (511058). Confidence level = 3.

5.2 HLX42

Rock units

The borehole consists of one rock unit (RU1).

9.09–152.60 m

RU1: Dominated by quartz monzodiorite (501036). Subordinate rock types comprise fine-grained granite (511058), fine-grained diorite-gabbro (505102) and pegmatite (501061). Red staining, mainly of weak but also medium intensity is characteristic in ≤ 10 m long sections. Confidence level = 3.

Possible deformation zones

No possible deformation zone has been recognised in HLX42.

6 Comments

The results from the geological single-hole interpretation of KLX17A and HLX42 are presented in a WellCad plot (Appendices 1–2). The WellCad plot consists of the following columns:

In data Boremap	1: Depth (Length along the borehole)
	2: Rock type
	3: Rock alteration
	4: Frequency of sealed fractures
	5: Frequency of open and partly open fractures
	6: Crush zones
In data Geophysics	7: Silicate density
	8: Magnetic susceptibility
	9: Natural gamma radiation
	10: Estimated fracture frequency
Interpretations	11: Description: Rock unit
	12: Stereogram for sealed fractures in rock unit (blue symbols)
	13: Stereogram for open and partly open fractures in rock unit (red symbols)
	14: Description: Possible deformation zone
	15: Stereogram for sealed fractures in possible deformation zone (blue symbols)
	16: Stereogram for open and partly open fractures in possible deformation zone (red symbols)

7 References

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Geological single-hole interpretation of KLX17A

Title	SINGLE HOLE INTERPRETATION KLX17A							
	Site	LAXEMAR	**Inclination [°]**	-61.33	**Elevation [m.a.s.l.]**	27.56	**Signed data**	
	Borehole	KLX17A	**Date of mapping**	2006-12-06 11:49:00	**Drilling Start Date**	2006-08-07 07:00:00		
	Diameter [mm]	76	**Coordinate System**	RT90-RHB70	**Drilling Stop Date**	2006-08-15 09:30:00		
	Length [m]	701.080	**Northing [m]**	6366847.93	**Surveying Date**			
	Bearing [°]	11.21	**Easting [m]**	1546862.13	**Plot Date**	2007-09-03 22:03:06		

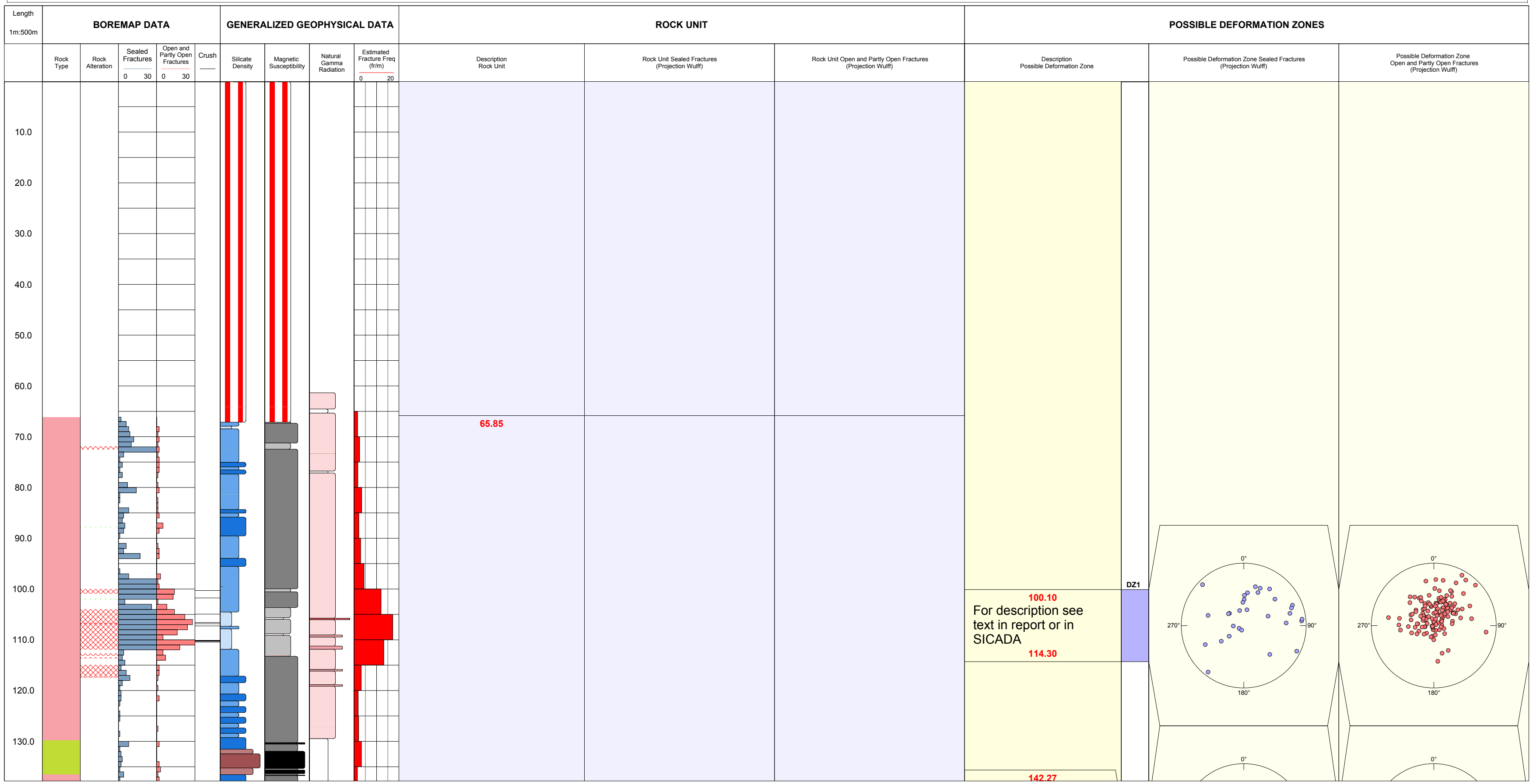
ROCKTYPE LAXEMAR
- Fine-grained granite
- Ävrö granite
- Diorite / Gabbro
- Fine-grained diorite-gabbro

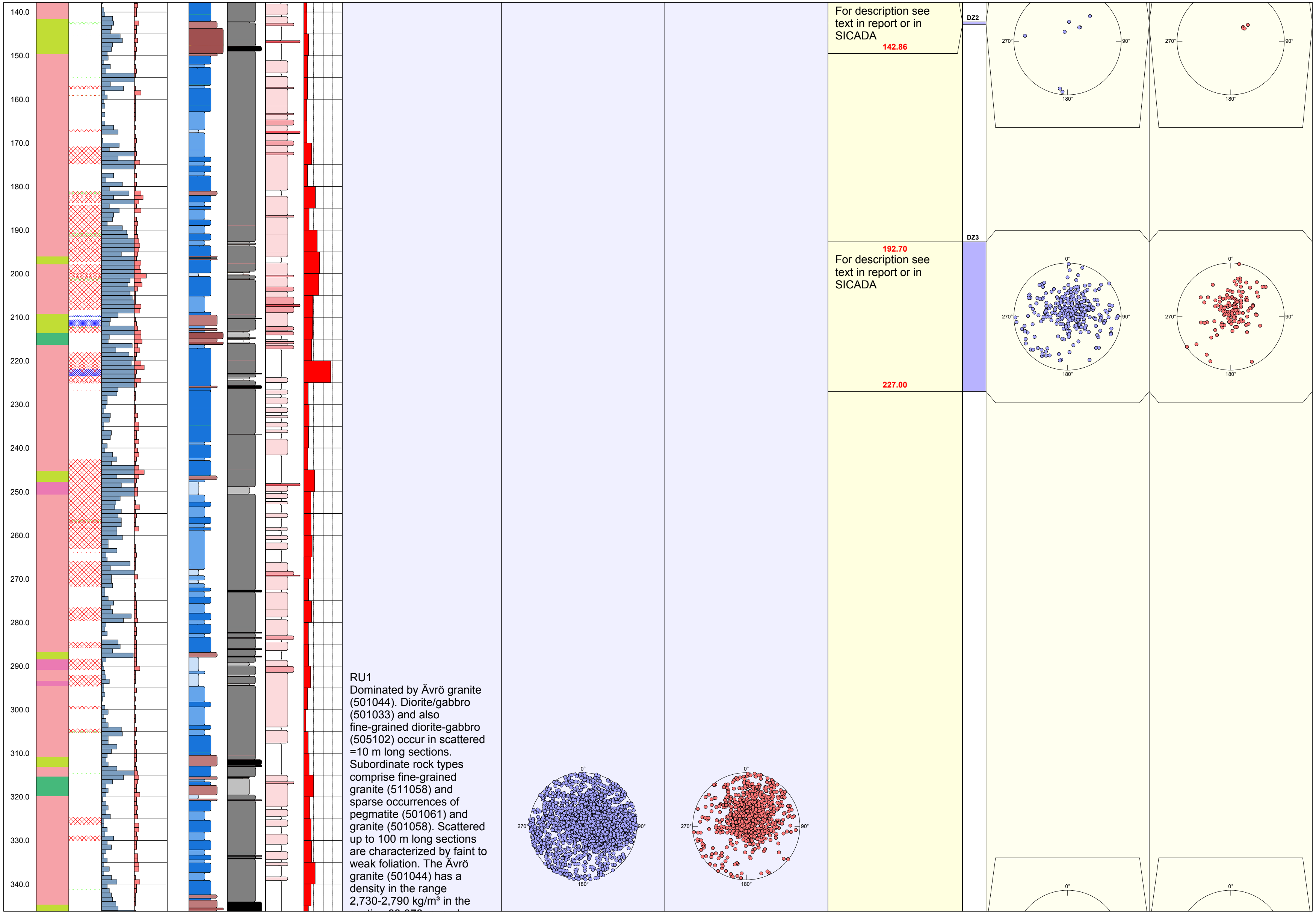
ROCK ALTERATION
- Oxidized
- Chloritisized
- Epidotisized
- Silicification
- Saussuritization

SILICATE DENSITY
- unclassified
- dens<2680
- 2680<dens<2730
- 2730<dens<2800
- 2800<dens<2890
- dens>2890

SUSCEPTIBILITET
- unclassified
- sus<0.001
- 0.001<sus<0.01
- 0.01<sus<0.1
- sus>0.1

NATURAL GAMMA
- unclassified
- gam<10
- 10<gam<20
- 20<gam<30
- gam>30




140.0
150.0
160.0
170.0
180.0
190.0
200.0
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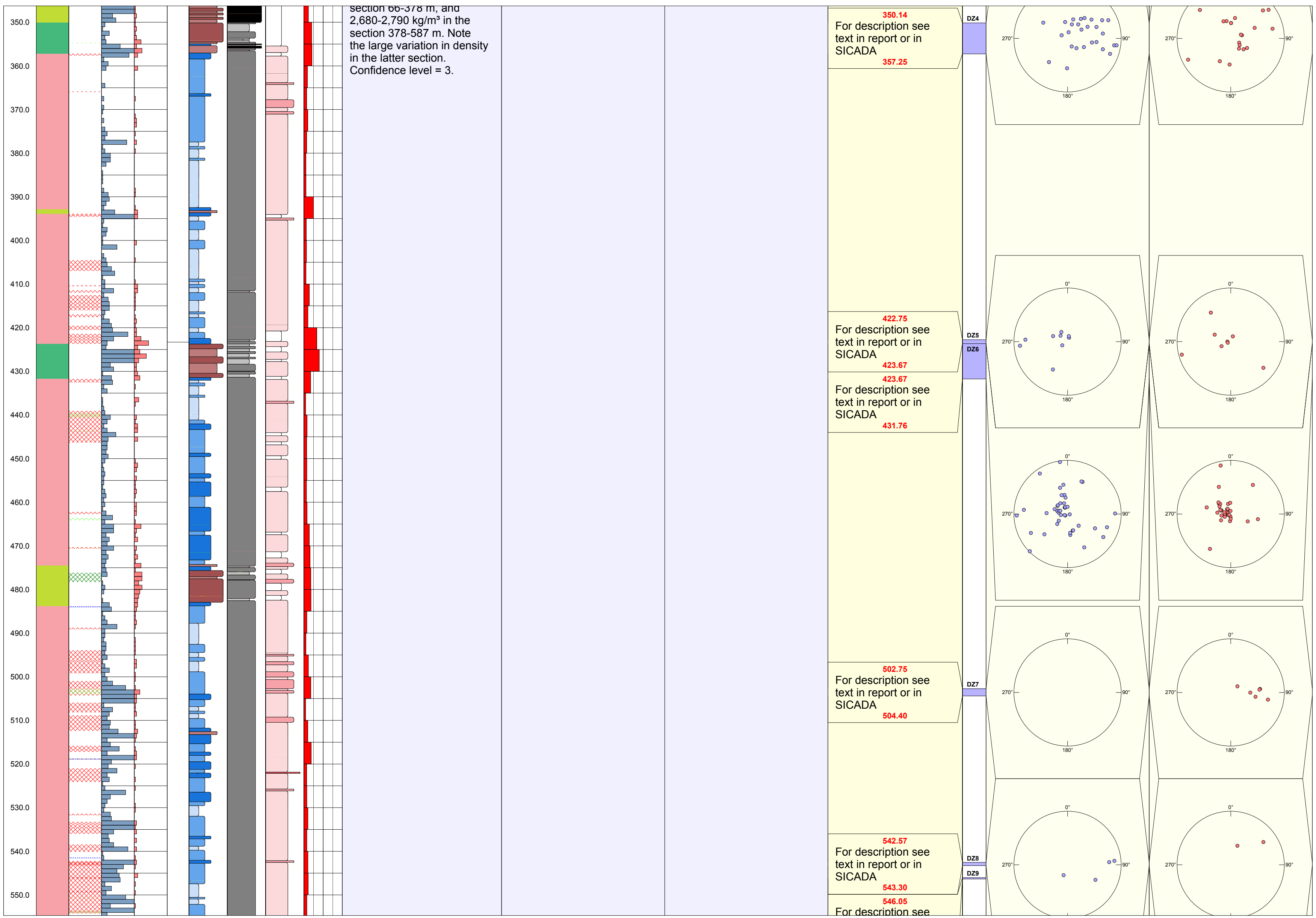
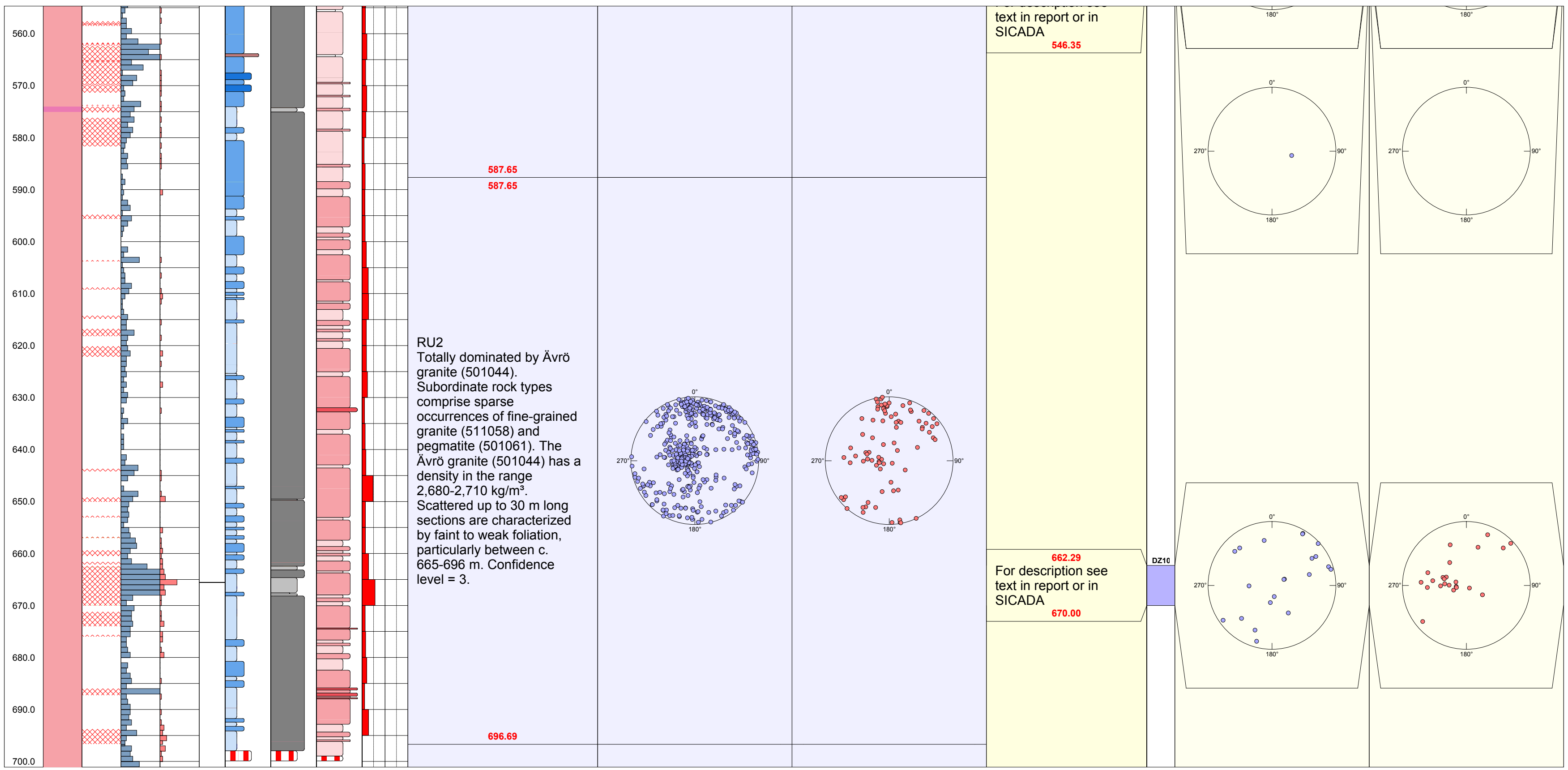
230.0
240.0
250.0
260.0
270.0
280.0
290.0
300.0
310.0
320.0
330.0
340.0
RU1
Dominated by Ävrö granite (501044). Diorite/gabbro (501033) and also fine-grained diorite-gabbro (505102) occur in scattered =10 m long sections. Subordinate rock types comprise fine-grained granite (511058) and sparse occurrences of pegmatite (501061) and granite (501058). Scattered up to 100 m long sections are characterized by faint to weak foliation. The Ävrö granite (501044) has a density in the range 2,730-2,790 kg/m³ in the
For description see text in report or in SICADA
142.86
192.70
For description see text in report or in SICADA
227.00
DZ2
DZ3
0°
90°
180°
270°


350.0
360.0
370.0
380.0
390.0
400.0
410.0
420.0
430.0
440.0
450.0
460.0
470.0
480.0
490.0
500.0
510.0
520.0
530.0
540.0
550.0
section 66-378 m, and 2,680-2,790 kg/m³ in the section 378-587 m. Note the large variation in density in the latter section. Confidence level = 3.
350.14
For description see text in report or in SICADA
357.25
422.75
For description see text in report or in SICADA
423.67
423.67
For description see text in report or in SICADA
431.76
502.75
For description see text in report or in SICADA
504.40
542.57
For description see text in report or in SICADA
543.30
546.05
For description see
DZ4
DZ5
DZ6
DZ7
DZ8
DZ9
0°
90°
180°
270°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570.0
580.0
590.0
600.0
610.0
620.0
630.0
640.0
650.0
660.0
670.0
680.0
690.0
700.0
587.65
587.65
RU2
Totally dominated by Ävrö granite (501044). Subordinate rock types comprise sparse occurrences of fine-grained granite (511058) and pegmatite (501061). The Ävrö granite (501044) has a density in the range 2,680-2,710 kg/m³. Scattered up to 30 m long sections are characterized by faint to weak foliation, particularly between c. 665-696 m. Confidence level = 3.
696.69
text in report or in SICADA
546.35
662.29
For description see text in report or in SICADA
670.00
DZ10
0°
90°
180°
270°

Appendix 2

Geological single-hole interpretation of HLX42

Title	SINGLE HOLE INTERPRETATION HLX42					
Site	LAXEMAR	Inclination [°]	-57.20	Elevation [m.a.s.l.]	12.88	Signed data
Borehole	HLX42	Date of mapping	2007-01-31 14:11:00	Drilling Start Date	2006-11-13 13:30:00	
Diameter [mm]	139	Coordinate System	RT90-RHB70	Drilling Stop Date	2006-11-16 19:00:00	
Length [m]	152.600	Northing [m]	6364827.04	Surveying Date		
Bearing [°]	321.51	Easting [m]	1547446.73	Plot Date	2007-08-28 22:04:28	

ROCKTYPE LAXEMAR
- Fine-grained granite
- Pegmatite
- Quartz monzodiorite
- Fine-grained diorite-gabbro

ROCK ALTERATION
- Oxidized

SILICATE DENSITY **SUSCEPTIBILITET** **NATURAL GAMMA**