P-07-210

Oskarshamn site investigation

Boremap mapping of telescopic drilled borehole KLX19A

Karl-Johan Mattsson, Peter Dahlin
Geosigma AB

Jan Ehrenborg, Mírab AB

December 2007

Svensk Kärnbränslehantering AB
Swedish Nuclear Fuel
and Waste Management Co
Box 250, SE-101 24 Stockholm
Tel +46 8 459 84 00

ISSN 1651-4416
SKB P-07-210

Oskarshamn site investigation

Boremap mapping of telescopic drilled borehole KLX19A

Karl-Johan Mattsson, Peter Dahlin
Geosigma AB

Jan Ehrenborg, Mírab AB

December 2007

Keywords: KLX19A, Geology, Drill core mapping, Boremap, Fractures, BIPS, Laxemar.

Abstract

This report presents the Boremap mapping of KLX19A, which is a c. 800 m long telescopic drilled borehole. The borehole was drilled with the orientation 197/–58°. The mapping was conducted between 2006-10-16 and 2006-11-01.

The documentation of geological structures and lithologies intersecting borehole KLX19A were studied using the drill core and BIPS-images. Geological structures are correctly oriented in space along the borehole with the Boremap system.

The lithology in KLX19A is dominated by quartz monzodiorite (501036). Subordinate rock types comprise dolerite (501027), fine-grained granite (511058), fine-grained diorite-gabbro (505102) and pegmatite (501061).

Five sections have been highlighted based on increased fracture frequencies, alterations and structural features. These sections cover the following intervals: 92–116 m, 298–304 m, 412–416 m, 439–452 m and 484–554 m. The last section is lithologically related with a dolerite (501027).

Sammanfattning

Denna rapport presenterar boremapkarteringen av KLX19A som är ett cirka 800 meter långt teleskopborrat kärnborrhål. Borrhålet borrades med orienteringen 197/–58º och karterades mellan 2006-10-16 och 2006-11-01.

Dokumentationen av geologiska strukturer och litologi som genomskär borrhål KLX19A har studerats med borrkärna och BIPS-bilder. Geologiska strukturer har orienterats i rummet längs med borrhålet med Boremap systemet.

KLX19A domineras av kvartsmonzodiorit (501036). Underordnade bergarter utgörs av diabas (501027), finkornig granit (511058) och finkornig diorit-gabbro (505102).

Fem sektioner i KLX19A kan urskiljas baserat på förhöjd sprickfrekvens, bergets omvandlingar och geologiska strukturer. Dessa sektioner återfinns i följande intervall: 92–116 m, 298–304 m, 412–416 m, 439–452 m och 484–554 m. Den sista sektionen är litologiskt relaterad till en diabas (501027).

Contents

1 Introduction

This report gives a brief presentation of the data gained from the mapping of KLX19A in the Laxemar area, 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 400-06-126. In Table 1-1 controlling documents for performing this activity are listed. Both Activity Plan and Method Descriptions are SKB's internal controlling documents. Rock type nomenclature that has been used is shown in Table 1-2.

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

Activity Plan	Number	Version
Boremapkartering av KLX19A	AP PS 400-06-126	1.0
Method Descriptions	**Number**	**Version**
Nomenklatur vid Boremapkartering	SKB MD 143.008	1.0
Method Description for Boremap mapping	SKB MD 143.006	2.0
Mätsystembeskrivning för Boremap	SKB MD 146.005	1.0
Instruktion: Regler för bergarters benämningar vid platsundersökning i Oskarshamn	SKB MD 132.004	1.0
Instruktion för längdkalibrering vid undersökningar i kärnborrhål	SKB MD 620.010	2.0

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

SKB investigates two potential sites for a deep repository for nuclear waste in the Swedish Precambrian basement at approximately 500 m depth. These places are Forsmark in northern Uppland and Oskarshamn in eastern Småland. In order to make a preliminary evaluation of the rock mass down to a depth of about 1,000 m at these sites, SKB has initiated a drilling program using core drilled boreholes. Every borehole usually starts with a percussion drilled part the first 100 m, where only drill cuttings are examined together with BIPS, followed by core drilling.

Borehole KLX19A is situated within the Laxemar area (Figure 1-1). KLX19A is a c. 800 m long telescopic borehole with orientation 197/–58°. Mapping of the borehole was performed between 2006-10-16 and 2006-11-01.

Detailed mapping of the drill cores is essential for a three dimensional modelling of the geology at depth. The mapping is based on the use of BIPS-image (Borehole Image Processing System) of the borehole wall and by the study of the drill core itself. The BIPS-image enables the study of orientations, since the Boremap software calculates strike and dip of planar features such as foliations, rock contacts and fractures.

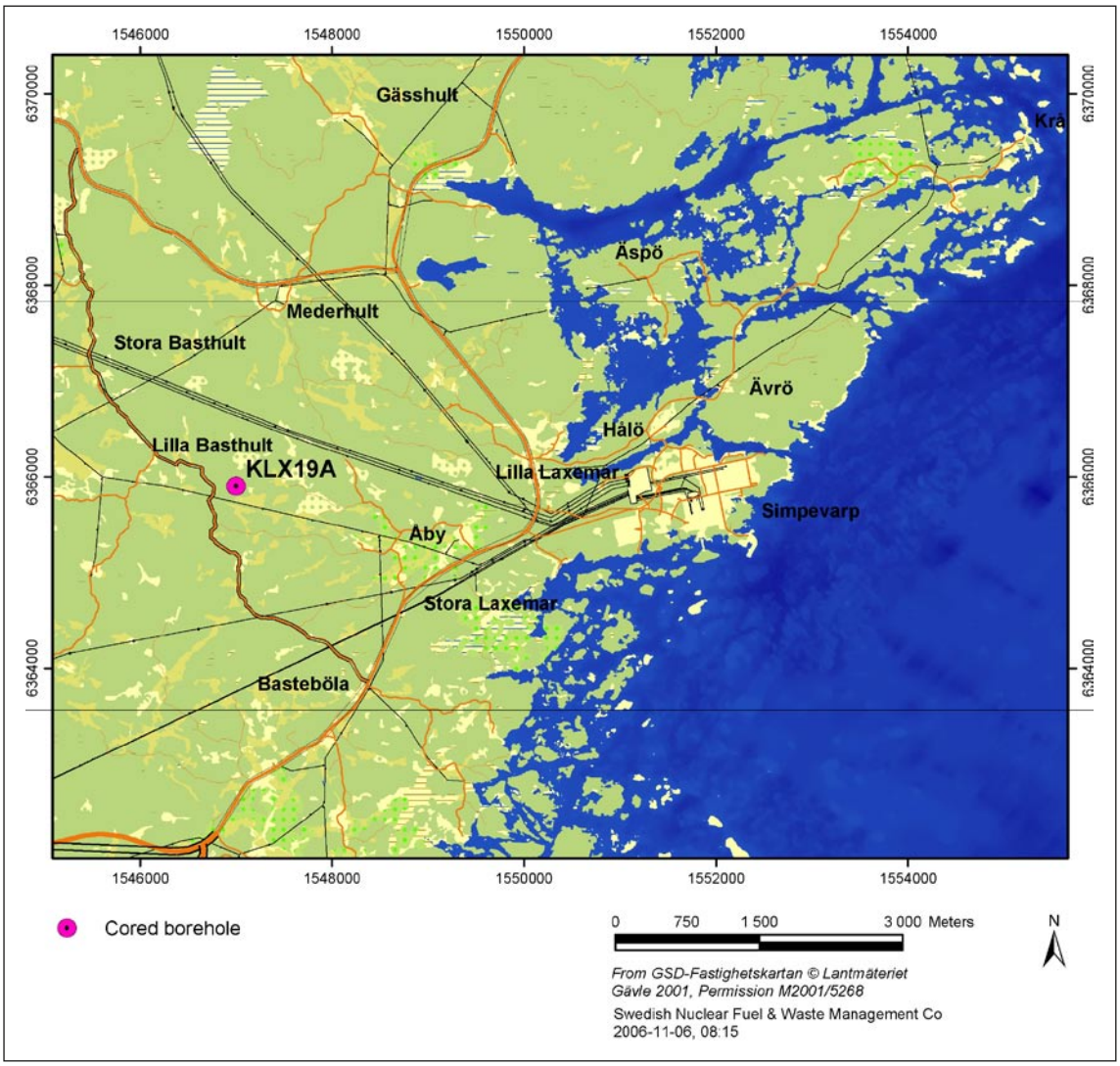


Figure 1-1. *Location of the core drilled borehole KLX19A.*

2 Objective and scope

The principal aim of the mapping activities presented in this report is to obtain a documentation of geological structures and lithologies intersecting borehole KLX19A. Geological structures will be correctly orientated in space along the borehole with the Boremap system. The result will serve as a platform for forthcoming investigations of the drill core, as well as various site descriptive modelling.

3 Equipment

3.1 Description of software

Software used for the mapping of KLX19A was Boremap v. 3.7.5, with bedrock and mineral standards of SKB. The data presentation was made using WellCad v. 4, Microsoft Access and Microsoft Excel. Boremap is the software that unites orthodox core mapping with modern video mapping, where Boremap shows the image from BIPS (Borehole Image Processing System) and extracts the geometrical parameters: length, width, strike and dip from the image.

3.2 Other equipment

The following equipment is used to facilitate the core mapping: folding rule, pen, diluted hydrochloric acid, knife, water-filled atomiser and hand lens.

3.3 BIPS-image video film sequences

The BIPS-image of KLX19A covers the interval 100.00–795.040 m.

3.4 BIPS-image video film quality

The visibility of thin fractures in BIPS depends on image resolution, image contrast and image quality.

3.4.1 BIPS-image resolution

Resolution of the BIPS-image is perhaps the principal reason why very thin fractures as well as very thin apertures are not visible in the BIPS-image and the resolution depends on the BIPS video camera pixel size and illumination angle.

3.4.2 BIPS-image contrast

Thick fractures are always visible in both drill core and the BIPS-image. However, the visibility of thin fractures depends strongly on the contrast between the fracture and the wall rock.
A bright fracture in a dark rock is clearly visible in the BIPS-image. But a bright coloured fracture in a light coloured rock might, however, be clearly visible in the drill core but not visible in the BIPS-image, especially if the fracture and wall rock have the same colour. The opposite is true for dark fractures.

In very rare cases when the BIPS-image contrast between a very thin fracture and the wall rock is very strong the fracture might be visible in the BIPS-image even if it is not visible in the drill core.

3.4.3 BIPS-image quality

BIPS-image quality is sometimes limited due to:

1) blackish coatings probably related to the drilling equipment,
2) vertical bleached bands from the clayey mixture of drill cuttings and water,
3) light and dark bands at high angle to the drill hole related to the automatic aperture of the video camera,
4) vertical enlargements of pixels due to stick-slip movement of the camera probe.

Vertical bleached bands and blackish coatings are usually the main disturbances in the BIPS-image quality.

The image quality is classified into four levels; good, acceptable, bad and very bad. Good quality means a more or less clear image which is easy to interpret. If the quality is acceptable it means that the image is not good, but that the mapping can be performed without any problems. An image of bad quality is somewhat difficult to interpret while an image of very bad quality cannot be interpreted except from very obvious and outstanding features. When the BIPS-image quality is so bad that fractures and structures cannot be identified, they can still be oriented using the *guide-line method* (Section 4.3.3). The BIPS-image quality for KLX19A is presented in Table 3-1.

Table 3-1. BIPS-image quality in KLX19A.

From (m)	To (m)	Quality
100	108	Very bad
108	796	Acceptable

4 Execution

4.1 General

Mapping of the drill core of the telescopic drilled borehole was performed and documented according to Activity Plan AP PS 400-06-126 (SKB, internal document) referring to the *Method Description for Boremap mapping* (SKB MD 143.006, v. 2.0), *Nomenklatur vid Boremapkartering* (SKB MD 143.008, v. 1.0), *Instruktion: Regler för bergarters benämningar vid platsundersökningen i Oskarshamn* (SKB MD 132.004, v. 1.0) and *Instruktion för längdkalibrering vid undersökningar i kärnborrhål* (SKB MD 620.010, v. 2.0), all of them SKB internal documents.

The drill core was displayed on inclined roller tables and mapped in its entire length with the Boremap software. The core mapping was carried out without any detailed geological knowledge of the area but with access to geophysical logs from the borehole and rock samples.

The term *oxidation* has been used as an alteration type until the mapping of KLX05. However, research has shown that the red colour of the bedrock is actually not only a result of oxidation. Since April 2005 the term *red staining* is used instead of the term *oxidation.*

The mapping was performed by Karl-Johan Mattsson and Peter Dahlin (Geosigma AB) and Jan Ehrenborg (Mírab Mineral Resurser AB).

4.2 Preparations

Any depth registered in the BIPS-image deviates from the true depth in the borehole, a deviation which increases with depth, with approximately 0.4 m/100 m. This problem is eliminated by adjusting the depth of the BIPS-image to reference slots cut into the borehole walls every fiftieth meter (Appendix 7). The level for each slot is measured in the BIPS-images and then adjusted to the correct level using the correct depth value from the SICADA database.

Necessary in data for length adjustment and orientation in space are borehole diameter, reference marks, length and deviation; both collected from SICADA database (Appendices 6–8).

4.3 Execution of measurements

Concepts used during the core mapping, are defined in this chapter.

4.3.1 Fracture definitions

Definitions of different fracture types and aperture, crush zones and sealed fracture network are found in *Nomenklatur vid Boremapkartering* (SKB MD 143.008, v. 1.0), SKB internal document.

Two types of fractures are mapped in Boremap; broken and unbroken. Broken are fractures that split the core while unbroken fractures do not split the core. All fractures are described with their fracture minerals and other characteristics, e.g. width, aperture and roughness. Visible apertures are measured down to 1 mm in the BIPS-image. Smaller apertures, which are impossible to detect in the BIPS-image, are denoted a value of 0.5 mm. If the core pieces don't fit well, the aperture is considered "probable". If the core pieces do fit well, but the fracture surfaces are dull or altered, the aperture is considered "possible".

All fractures with apertures > 0 mm are treated as open in the SICADA database. Only few broken fractures are given the aperture = 0 mm. Unbroken fractures usually have apertures = 0 mm. Unbroken fractures that have apertures > 0 mm are interpreted as partly open and are included in the open-category. Open and sealed fractures are finally frequency calculated and shown in Appendix 1.

4.3.2 Fracture alteration and joint alteration number

Joint alteration number is principally related to the thickness of, and the clay content in a fracture. Thick fractures rich in clay minerals are given joint alteration numbers between 2 and 3. The majority of the broken fractures are very thin to extremely thin and seldom contain clay minerals. These fractures receive joint alteration numbers between 1 and 2.

A subdivision of fractures with joint alteration numbers between 1 and 2 was introduced to facilitate both the evaluation process for fracture alterations and the possibility to compare the alterations between different fractures in the boreholes. The subdivision is based on fracture mineralogy as follows:

a) fracture wall alterations,

b) fracture mineral fillings assumed to have been deposited from circulating water-rich solutions,

c) fracture mineral fillings most likely resulting from altered wall rock material.

Joint alteration number equal to 1: Fractures with or without wall rock alteration, e.g. oxidation or epidotization, and without mineral fillings is considered as fresh. The joint alteration number is thus set to 1.

Minerals such as calcite, quartz, fluorite, zeolites, laumontite and sulphides are regarded as deposited by circulating water-rich solutions and not as true fracture alteration minerals. The joint alteration number is thus set to 1.

Joint alteration number equal to 1.5: Epidote, prehnite, hematite, chlorite and/or clay minerals are regarded as fracture minerals most likely resulting from altered wall rock. A weak alteration is thus assumed and the joint alteration number was set to 1.5. Extra considerations have been given to clay minerals since the occurrence of these minerals often resulted in a higher joint alteration number.

Joint alteration numbers higher than 1.5: When the mineral fillings is thick and contain a few mm of clay minerals, often together with epidote and chlorite, the joint alteration number is set to 2. In rare cases, when a fracture contains 5–10 mm thick clay, together with chlorite, the joint alteration number is set to 3 or higher.

When the alteration of a fracture is too thick (and/or intense) to give the fracture the joint alteration number 1.5 and too thin and/or weak to give it a 2, 1.7 and 1.8 is used.

4.3.3 Mapping of fractures not visible in the BIPS-image

Not all fractures are visible in the BIPS-images, and these fractures are orientated by using the *guide-line method*, based on the following data:

- Amplitude (measured along the drill core) which is the interval between fracture extremes along the drill core.
- The relation between the orientations of the fracture trace, measured on the drill core and a well defined structure visible in the BIPS-image.
- Absolute depth.

Orientation of fractures and other structures with the *guide-line method* is done in the following way: The first step is to calculate the amplitude of the fracture trace in the BIPS-image (with 76 mm diameter) from the measured fracture amplitude in the drill core (with 50 mm diameter). The second step is the correction of strike and dip. This is done by rotating the fracture trace in the BIPS-image relative to a feature with known orientation. The fracture trace is then put at the correct depth according to the depth measured on the drill core.

The *guide-line method* can be used to orientate any feature that is not visible in the BIPS-image. It is also a valuable tool to control that the personnel working with the drill core is observing the same feature as the personnel delineating the trace in the BIPS-image, especially in intervals rich in fractures.

The error of orientating fractures using the *guide-line method* is not known but experience and an estimation using stereographic plots indicated that the error is most likely insignificant. Accordingly, the *guide-line method* is so far considered better than mapping lots of non-oriented fractures. The fractures in question are mapped as "non-visible in BIPS" and can therefore be separated from fractures visible in BIPS which probably have a more accurate orientation.

4.3.4 Definition of veins and dikes

Rock occurrence is the way Boremap handles the occurrence of lithology up to 1 meter wide. Chiefly two different rock occurrences are mapped: veins and dikes. These two are separated by their respectively length in the drill core; veins are set to 0–20 cm and dikes are set to 20–100 cm. Rock occurrences that covers more than 100 cm of the drill core are mapped under the feature *rock type.*

4.3.5 Mineral codes

In the case where properties and/or minerals are not represented in the mineral list, following mineral codes have been used:

X3 Talc.

X5 Bleached fracture walls.

X7 Fractures with a fresh and no detectable mineral.

X8 Fractures with epidotized/saussuritized walls.

4.4 Data handling

Mapping of the drill core is performed on-line on the SKB network, in order to obtain the best possible data security. Before every break (> 15 minutes) a back-up is saved on the local disk. Regular quality controls are performed. Every working day a Summary report (from Boremap) and a WellCad plot are printed in order to find possible misprints. The mapping is also quality checked by a routine in Boremap before it is exported to and archived in SICADA database. Personnel from SKB also perform spot test controls and regular quality revisions. All primary data is stored in SKB's database SICADA and only these data are later used for interpretation and modelling.

4.5 Geological summary table, general description

A Geological summary table (Appendix 1) is an overview of the features mapped with the Boremap software. It also facilitates comparisons between Boremap information collected from different boreholes and is more objective than a pure descriptive borehole summary. All information is taken directly from the Boremap database using simple and well defined search paths for each geological parameter (Appendix 2).

The Geological summary table consists of 23 columns, each one representing a specific geological parameter, presented as either intervals or frequencies (see Section 4.5.1 for column description). Intervals are calculated for parameters with a width ≥ 1 m and frequencies for parameters with a width < 1 m. Frequency information is treated as point observations. It should be noted that parameters with a thickness of only 1 mm get the same "value" as a similar parameter with a thickness of 999 mm since both are treated as point observations and used for frequency calculations.

Parameters are sometimes related in such a way that the mapping of one parameter cause a decrease in the frequency of another parameter. This type of intimate relationship between parameters has been noted for the following cases:

- There is a decrease in the frequency of *unbroken fractures* with oxidized walls and without mineral fillings in intervals mapped with *Alteration – red staining.*
- No *unbroken fractures* are mapped in intervals of *sealed fracture network*.
- No *broken fractures* are mapped in intervals with *crush.*
- Hybrid rock and composite dikes generally include a large amount of fine to medium grained granite veins. These veins are not mapped and the frequency presented for veins + dikes in column 6 (Appendix 1) are lower than the true frequency in composite dike intervals.

4.5.1 Columns in the Geological summary table

The Geological summary table includes the following 23 columns:

Column 1: *Rock type/Lithology*, interval column. Only lithologies longer than 1 m are presented here. Shorter lithologies are presented in column 6. This column is identical with the ordinary WellCad presentation.

Column 2: *Rock type/Grain size*, interval column. Interval limits follows column 1. This column is identical with the ordinary WellCad presentation.

Column 3: *Rock type/Texture*, interval column. Interval limits follows column 1. This column is identical with the ordinary WellCad presentation.

Column 4: *Alteration/Type*, interval column. No frequency column is presented for alteration/type. The alteration/type column are identical with the ordinary WellCad presentation.

Column 5: *Alteration/Intensity*, interval column. This column is identical with the ordinary WellCad presentation.

Column 6: *Rock occurrence/Veins + Dikes < 1 m wide*, frequency column. This rock type column can be seen as the frequency complement to the rock type/lithology interval column. Only rock type sections that are thinner than 1 m can be described as rock occurrences in Boremap. Thicker rock type sections are mapped as rock type.

Column 7: *Structure/Shear zone < 1 m wide*, frequency column. This column includes ductile shear structures as well as brittle-ductile shear structures and these are mapped as rock occurrences in Boremap.

Column 8: *Structure/Brecciated < 1 m wide*, frequency column. Breccias < 1 m wide are mapped as rock occurrence in Boremap. Very thin micro breccias along sealed/natural fracture planes are generally not considered.

Column 9: *Structure/Brecciated ≥ 1 m wide*, interval column. Breccias > 1 m wide are mapped as rock type/structure in Boremap.

Column 10: *Structure/Mylonite < 1 m wide*, frequency column. Mylonites < 1 m wide are mapped as rock occurrence/structure in Boremap.

Column 11: *Structure/Mylonite ≥ 1 m wide* is an interval column. Mylonites > 1 m wide are mapped as rock type/structure in Boremap.

Column 12: *Structure/Foliated < 1 m wide* is a frequency column. Sections with foliation < 1 m wide are mapped as rock occurrence/structure in Boremap.

Column 13: *Structure/Foliated ≥ 1 m wide* is an interval column. Sections with foliation ≥ 1 m wide are mapped as rock type/structure in Boremap.

Column 14: *Sealed fractures/All*, frequency column. This column includes all fractures mapped as unbroken in the Boremap system as well as broken fractures interpreted to have broken up artificially during/after drilling.

Column 15: *Sealed fractures/Broken fractures with aperture = 0*, frequency column. This column includes unbroken fractures interpreted to have broken up artificially during/after drilling.

Column 16: *Sealed fractures/Sealed fracture network < 1 m wide*, frequency column. The sealed fracture network parameter is the only parameter that is generally evaluated directly from observations of the drill core. These types of sealed fractures can only in rare cases be observed in the BIPS-image.

Column 17: *Sealed fractures/Sealed fracture network ≥ 1 m wide*, interval column.

Column 18: *Open fractures/All Apertures > 0*, frequency column. This column includes all broken fractures, both fractures that with certainty were open before drilling and fractures that probably or possibly were open before drilling.

Column 19: *Open fractures/Uncertain Aperture = 0.5 probable + 0.5 possible*, frequency column. This column includes fractures that probably or possibly open before drilling.

Column 20: *Open fractures/Certain Aperture = 0.5 and > 0.5*, frequency column. This column includes fractures that certainly were open before drilling.

Column 21: *Open fractures/Joint alteration > 1.5*, frequency column. This column show fractures with stronger joint alteration than normal. This parameter is generally correlated with the location of lithologies with a more weathered appearance.

Column 22: *Open fractures/Crush < 1 m wide*, frequency column. This column includes shorter sections with crush.

Column 23: *Open fractures/Crush ≥ 1 m wide*, interval column. This column includes longer sections with crush.

4.6 Nonconformities

The BIPS-image covering the interval 100.000–107.000 is very bad. No fractures in this interval could be oriented according to the BIPS-image. Fractures in this interval were mapped not orientated.

Core losses occur in the intervals: 102.591–102.799 m, 105.109–105.431 m, 299.616-299.737 m, 301.307–301.528 m, 499.407–499.529 m and 524.189–524.320 m.

The section 520.434–522.403 m borehole length is covered with a steel plate. Due to the steel plate in this section, no mapped features could be orientated.

5 Results

5.1 General

Borehole KLX19A is oriented 197/–58°. The drill core covers the interval 100.00–800.07 m with BIPS-image covering the interval 100.00–795.00 m.

All results from the mapping are principally found in the appendices. Information from the SICADA database is shown in the Geological summary table in Appendix 1 and a search path to Geological summary table is presented in Appendix 2. The BIPS-image is presented in Appendix 3, the WellCad diagram in Appendix 4 and In-data, such as borehole length, reference marks, deviation data and diameter are presented in Appendices 6–8.

Original data from the reported activity are stored in the primary database SICADA. Data are traceable in SICADA by the Activity Plan number (AP PS 400-06-126). Only data in databases are accepted for further interpretation and modelling. The data presented in this report are regarded as copies of the original data. Data in the databases may be revised, if needed. Such revisions will not necessarily result in a revision of the P-report, although the normal procedure is that major revisions entail a revision of the P-report. Minor revisions are normally presented as supplements, available at www.skb.se.

5.2 Lithology and structures

The lithology in KLX19A (Table 5-1) is dominated by quartz monzodiorite (501036). Subordinate rock types comprise dolerite (501027), fine-grained granite (511058), fine-grained diorite-gabbro (505102) and pegmatite (501061).

Quartz monzodiorite (501036) clearly dominates the borehole and is intercalated by fine-grained granite (511058) in the intervals 217.2–227.3 m and 372.6–375.1 m, dolerite (501027) in the intervals 482.6–507.7 m and 520.4–552.2 m, and by fine-grained diorite-gabbro in the intervals 691.5–693.6 m and 705.2–706.5m. Rock occurrences, mostly fine-grained granite (511058), granite (501058) and pegmatite (501061) occur throughout the borehole, except for the dolerite sections.

Table 5-1. Lithology distribution in KLX19A.

Rock types	%
Quartz monzodiorite (501036)	88.9
Dolerite (501027)	8.2
Fine-grained granite (511058)	1.8
Fine-grained diorite-gabbro (505102)	0.5
Pegmatite (501061)	0.5

Five sections in KLX19A are recognized by increased fracture frequencies, alterations and structural features:

Section interval characteristics

1. 92–116 m. Increased frequency of open fractures and open fractures with aperture > 0.5 mm, sealed fracture networks, gauge, core loss, saussuritization and red staining occurs within this section.
2. 298–304 m. Increased frequency of open fractures and open fractures with aperture > 0.5 mm, sealed fracture networks, core loss, saussuritization and red staining occurs within this section.
3. 412–416 m. Increased frequency of open fractures and open fractures with aperture > 0.5 mm, sealed fracture networks, foliation, epidotization and red staining occurs within this section.
4. 439–452 m. Increased frequency of open fractures and open fractures with aperture > 0.5 mm, sealed fracture networks, brittle- ductile and ductile shear zones, crush zones, foliation, gauge, epidotization and red staining occurs within this section.
5. 484–554 m. Increased frequency of open fractures and open fractures with aperture > 0.5 mm, sealed fracture networks, fractures with Ja-number > 1.5, crush zones, brittle-ductile and ductile shear zones, slickenside's, crush zones, core loss foliation and gauge occurs within this section. This section is associated with a dolerite (501027) intrusion.

5.3 Fracture mineralogy

Tables 5-3 and 5-4 show the frequency of minerals and rock wall alteration in sealed fractures and open fractures respectively. Minerals less than 0.1% are not accounted for. For X-mineral classification, see Section 4.3.5.

Chlorite, calcite and clay minerals are the most frequently occurring minerals in open fractures. In the section between 482.603 and 452.213 m there is an increase of minerals mapped as unknown, later recognized as barite.

In sealed fractures the dominating minerals and rock wall alterations are calcite and oxidized walls. Subordinate minerals are chlorite, epidote and quartz.

The section 484–554 m, dominated by dolerite (501027), has characteristic thick mineral fillings > 2 mm, consisting of a mixture of chlorite and clay minerals**.**

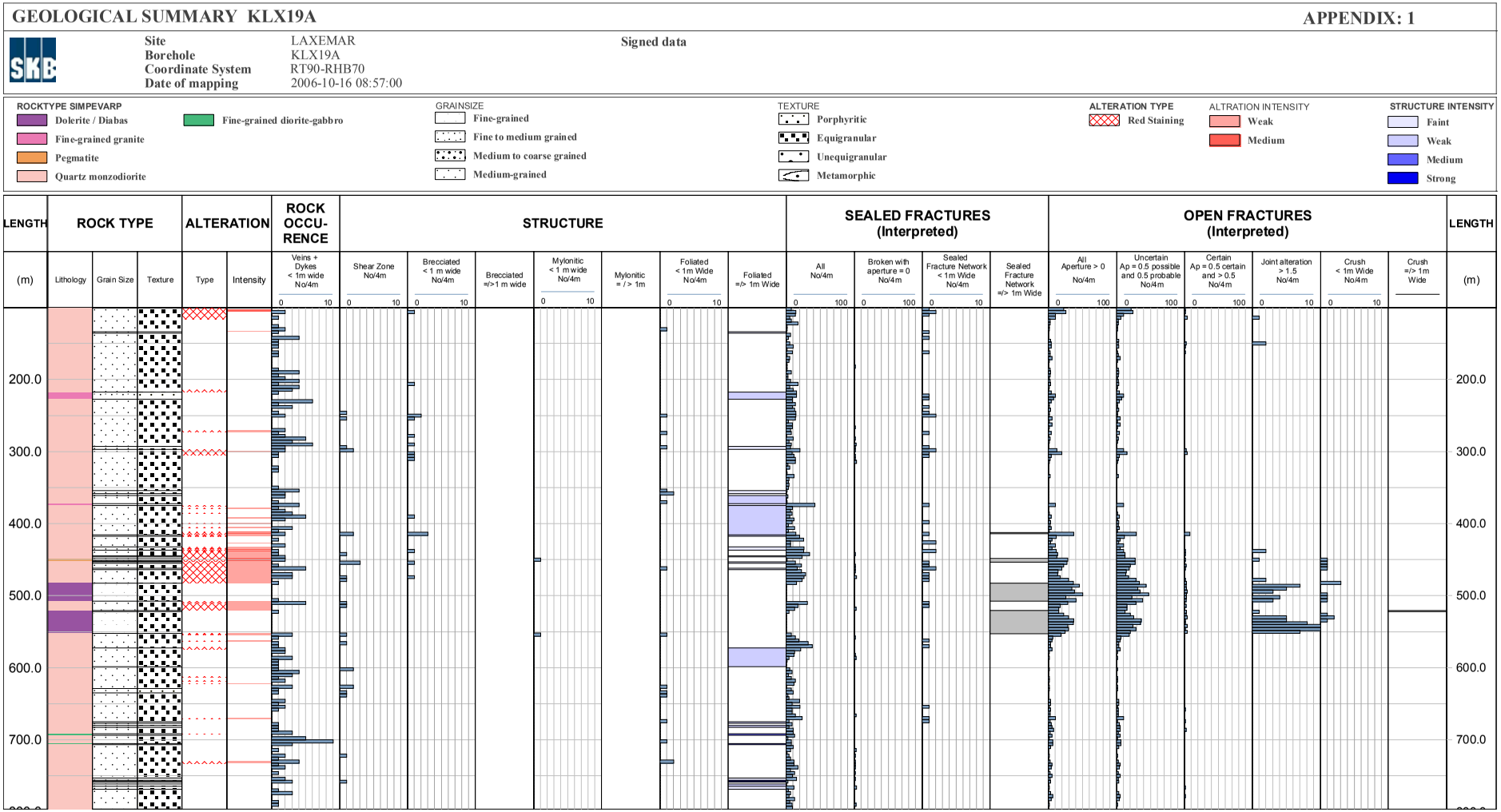
Table 5-3. Frequency of minerals and rock wall alteration in open fractures.

Mineral	%
Adularia	0.8
Calcite	56.7
Chalcopyrite	0.3
Chlorite	76.6
Clay Minerals	51.8
Epidote	6.4
Hematite	0.6
Iron Hydroxide	0.2
Oxidized Walls	3.7
Prehnite	0.4
Pyrite	15.7
Quartz	1.4
Unknown Mineral	2.1
X7	5.3
X8	0.5
Zeolite	0.l

Table 5-4. Frequency of minerals and rock wall alteration in sealed fractures.

Mineral	%
Adularia	3.2
Calcite	55.1
Chalcopyrite	0.7
Chlorite	23.0
Clay minerals	0.3
Epidote	17.6
Fluorite	0.4
Hematite	0.7
Oxidized walls	44.1
Prehnite	8.4
Pyrite	3.6
Quartz	13.2
Red feldspar	0.7
Unknown mineral	0.1
White feldspar	1.4
X5	1.7
X7	1.9
X8	6.8

Geological summary table for KLX19A



Appendix 2

Search paths for the Geological summary table

TABLE HEAD LINES		INFORMATION SOURCE			PRESENTATION
Head lines	**Sub head lines**	**Varcode**	**First suborder**	**Second suborder**	**Interval / frequence**
Rock type	Lithology	5	Sub 1		Interval
	Grain size	5	Sub 5		Interval
	Texture	5	Sub 6		Interval
Alteration	Type	7	Sub 1 = 700		Interval
	Intensity	7	Sub 1 = 700	Sub 2	Interval
Rock occurrence	Vein + dyke	31	Sub 1 = 2 and 18		Frequence
Structure	Shear zone, < 1m wide	31	Sub 4 = 41 and 42		Frequence
	Brecciated, < 1m wide	31	Sub 4 = 7		Frequence
	Brecciated, >/= 1m wide	5	Sub 3 = 7	Sub 4; 101 and 102 = 102	Interval
		5	Sub 3 = 7	Sub 4; 103 and 104 = 104	
	Mylonite, < 1 m wide	31	Sub 4 = 34		Frequence
	Mylonite, >/= 1 m wide	5	Sub 3 = 34	Sub 4; 101 and 102 = 102	Interval
		5	Sub 3 = 34	Sub 4; 103 and 104 = 104	
	Foliated, < 1 m wide	31	Sub 4 = 81		Frequence
	Foliated, >/= 1 m wide	5	Sub 3 = 81	Sub 4; 101 and 102 = 102	Interval
		5	Sub 3 = 81	Sub 4; 103 and 104 = 104	
Sealed fracture	All unbroken fractures	3			Frequence
	and broken fractures	2	SNUM 11= 0		
	Broken fractures, Aperture = 0	2	SNum 11 = 0		Frequence
	Sealed fracture network < 1 m wide	32			Frequence
	Sealed fracture network>/= 1 m wide	32			Interval
Open fractures	All, Aperture > 0	2 and 3	SNum 11>0		Frequence
	Uncertain, Aperture = 0.5 possible	2 and 3	SNum 11>0	Sub 12 = 3	Frequence
	and 0.5 probable	2 and 3	SNum 11>0	Sub 12 = 2	
	Certain, Aperture = 0.5 and >0.5	2 and 3	SNum 11>0	Sub 12 = 1	Frequence
	Joint alteration > 1.5	2	SNum16 > 1.5		Frequence
	Crush < 1 m wide	4			Frequence
	Crush >/= 1 m wide	4			Interval

Appendix 3

BIPS-image for KLX19A

Borehole Image Report

Borehole Name: KLX19A

Mapping Name: KLX19A_Geosigma_1

Mapping Range: 100.000 - 795.040 m

Diameter: 76.0 mm

Printed Range: 100.000 - 795.040

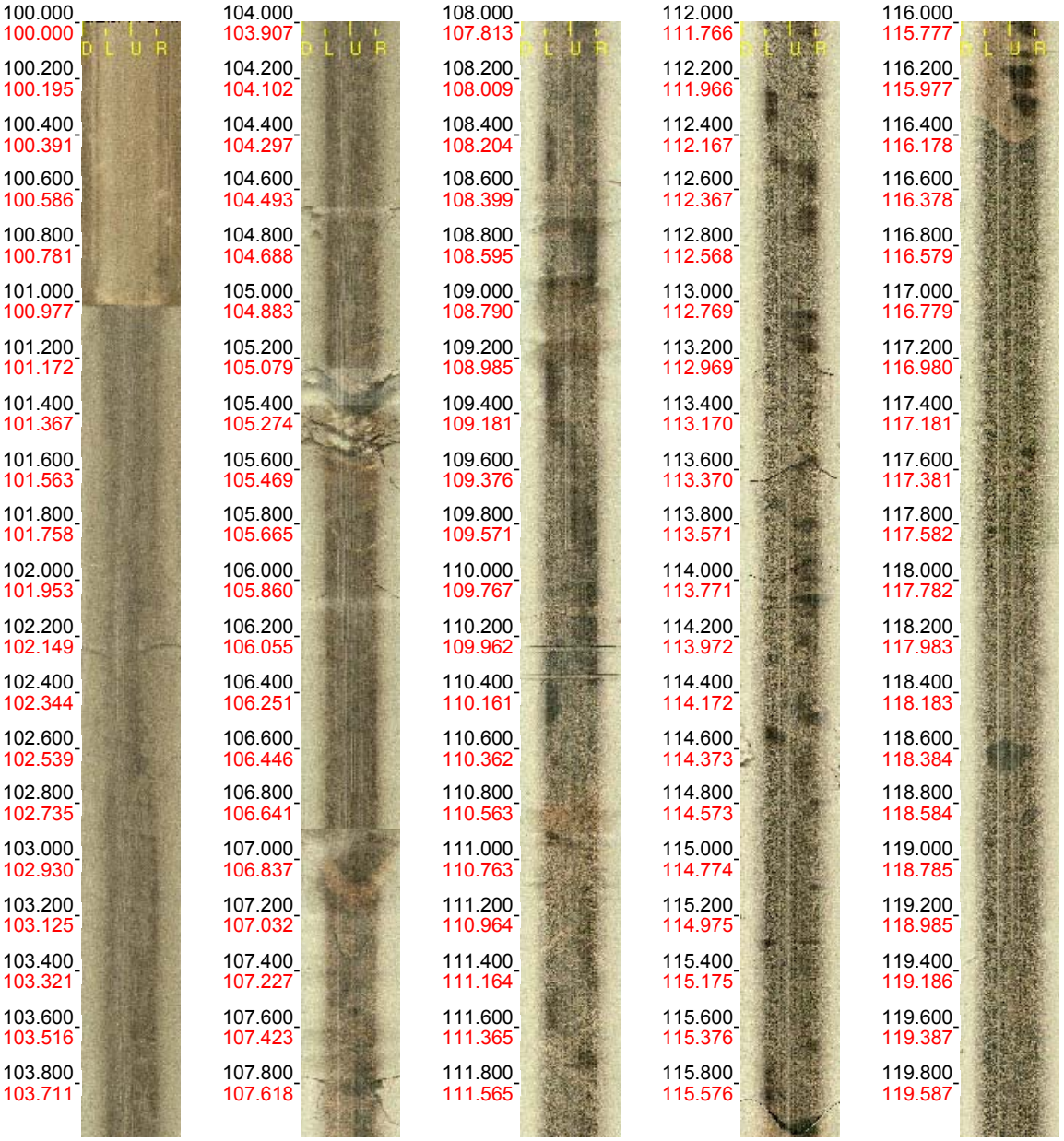
Pages: 36

Image File Information:

File:	G:\skb\bips\oskarshamn\KLX19A\Used\KLX19A_100-795m.BIP
Date/Time:	2006-10-09 16:05:00
Start Depth:	100.000 m
End Depth:	795.040 m
Resolution:	1.00 mm/pixel (depth)
Orientation:	Gravmetric
Image height:	695040 pixels
Image width:	360 pixels
BIP Version:	BIP-III
Locality:	LAXEMAR
Borehole:	KLX19A
Scan Direction:	Down
Color adjust:	0 0 0 (RGB)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

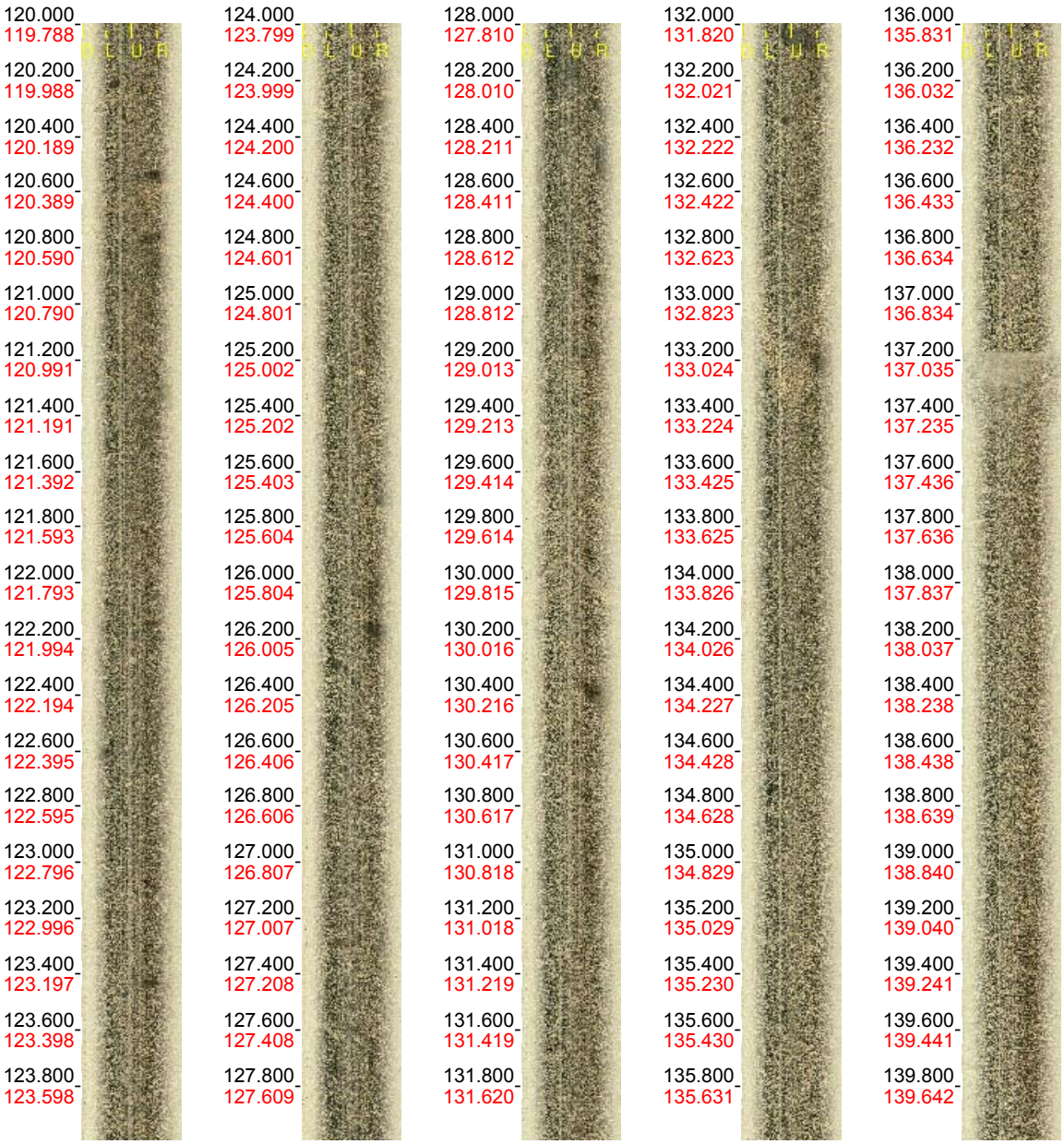
Depth range: 100.000 - 120.000 m
Azimuth: 196.3
Inclination: -57.7



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 2 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

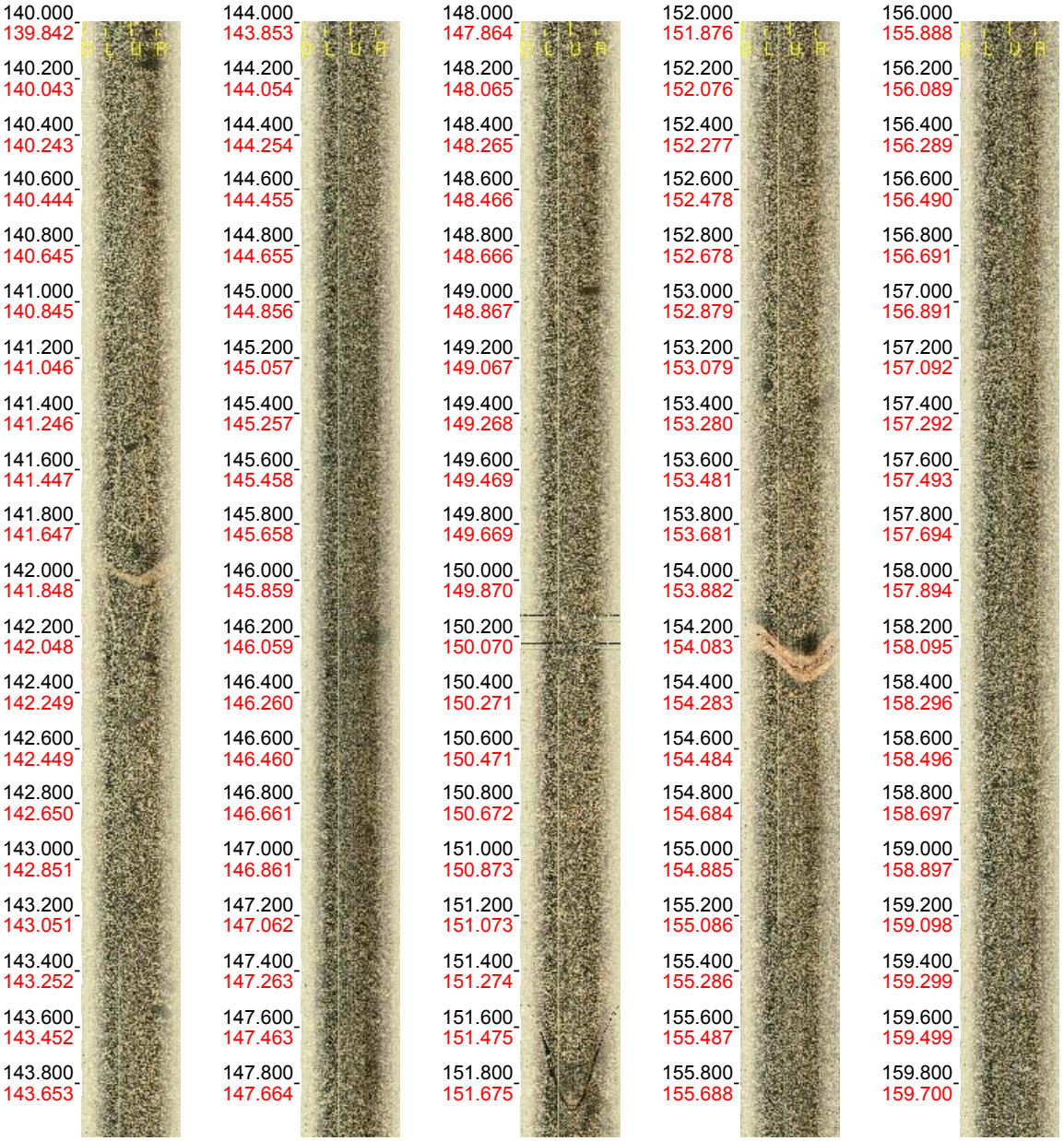
Depth range: 120.000 - 140.000 m
Azimuth: 196.2
Inclination: -57.5



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 3 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

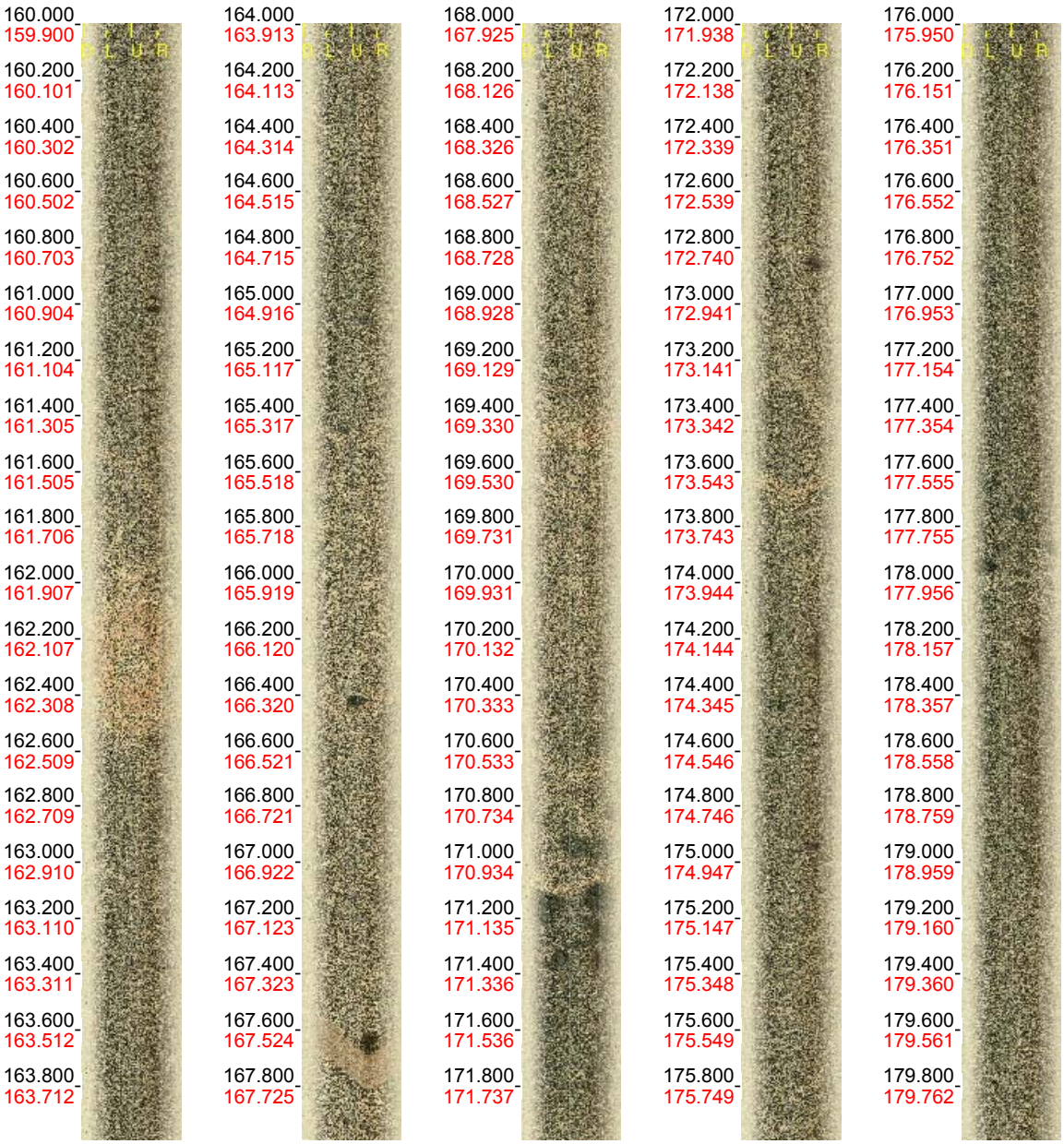
Depth range: 140.000 - 160.000 m
Azimuth: 196.5
Inclination: -57.4



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 4 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

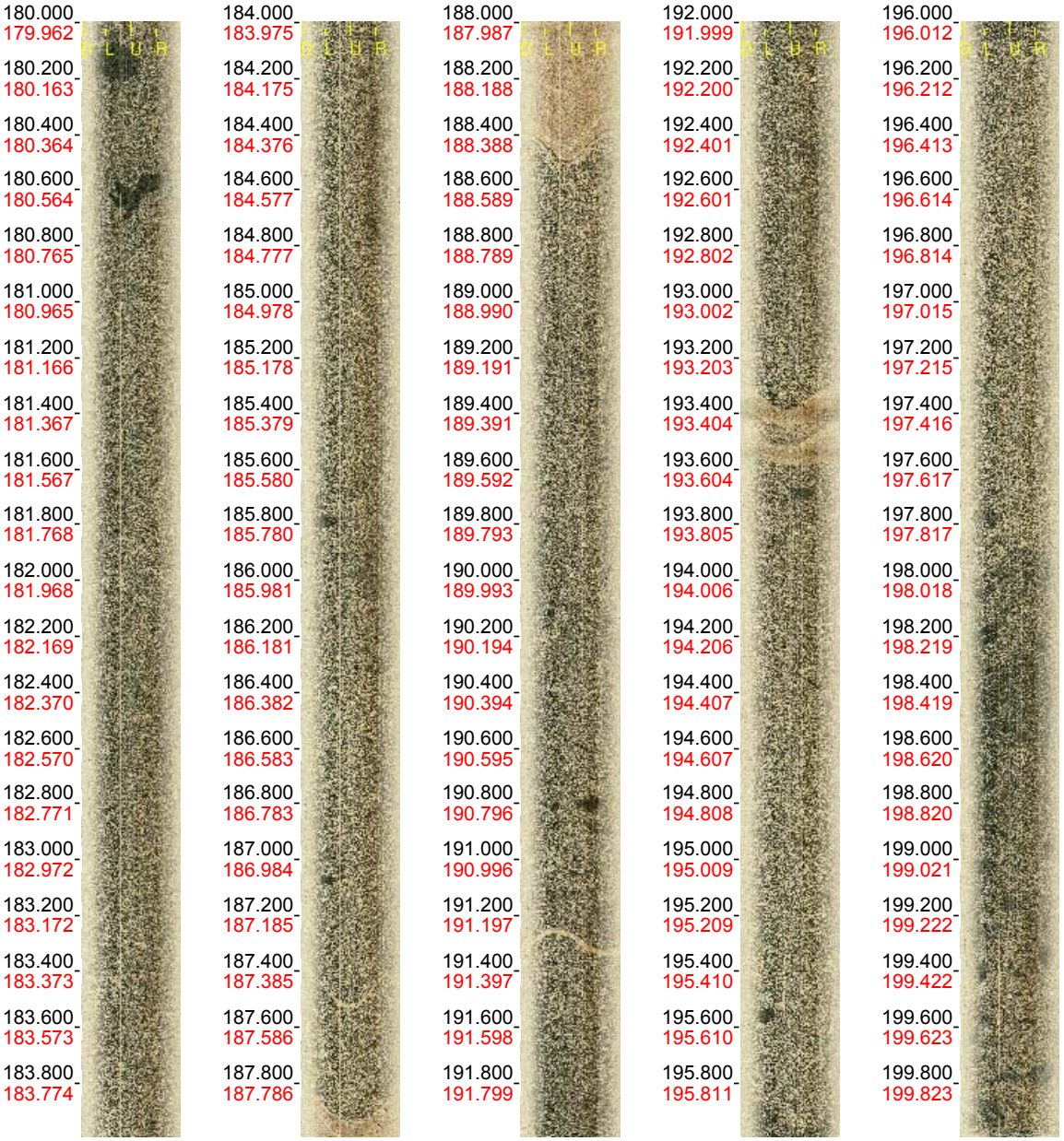
Depth range: 160.000 - 180.000 m
Azimuth: 196.8
Inclination: -57.1



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 5 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

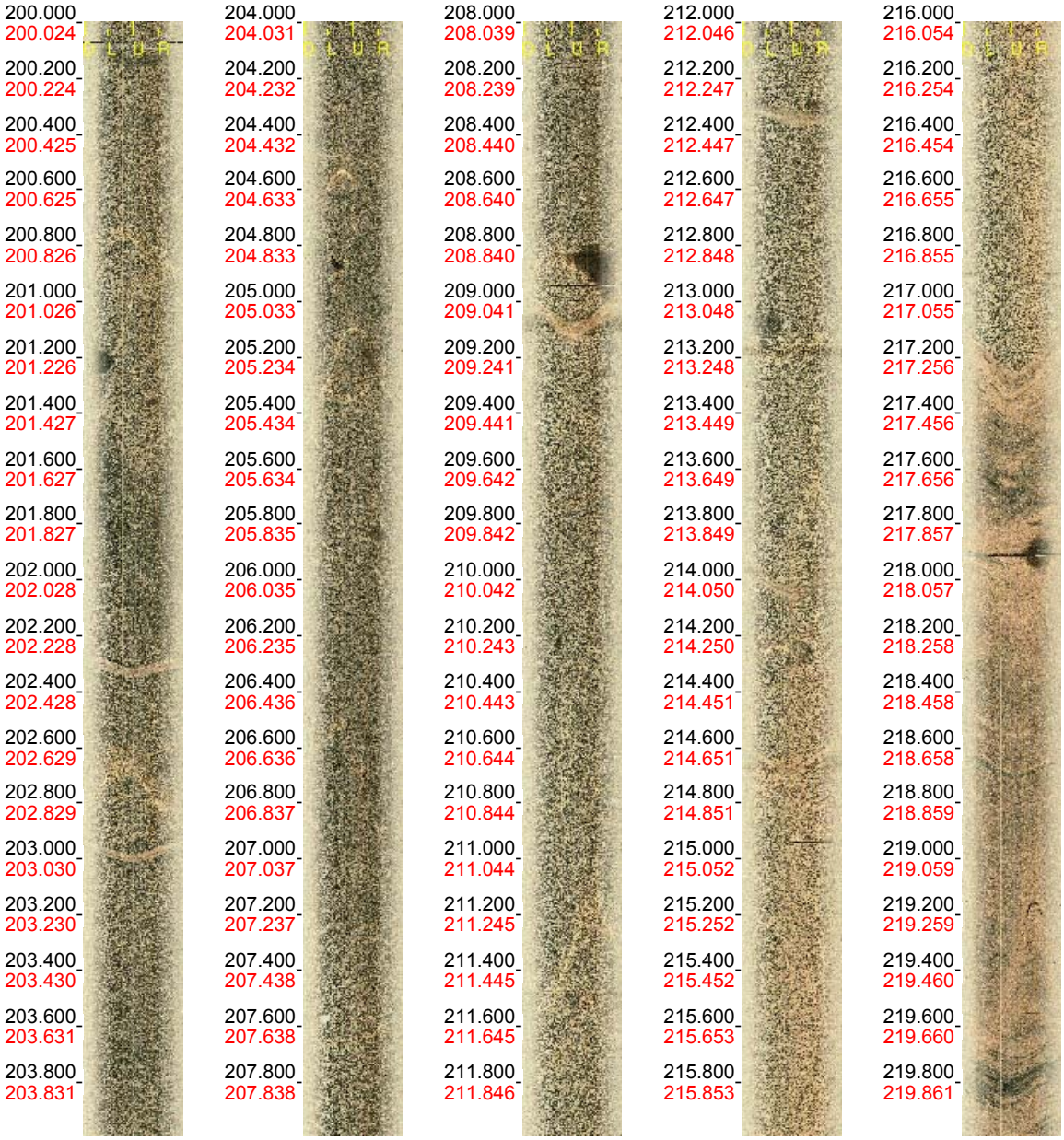
Depth range: 180.000 - 200.000 m
Azimuth: 196.7
Inclination: -57.0



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 6 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 200.000 - 220.000 m
Azimuth: 196.7
Inclination: -56.9



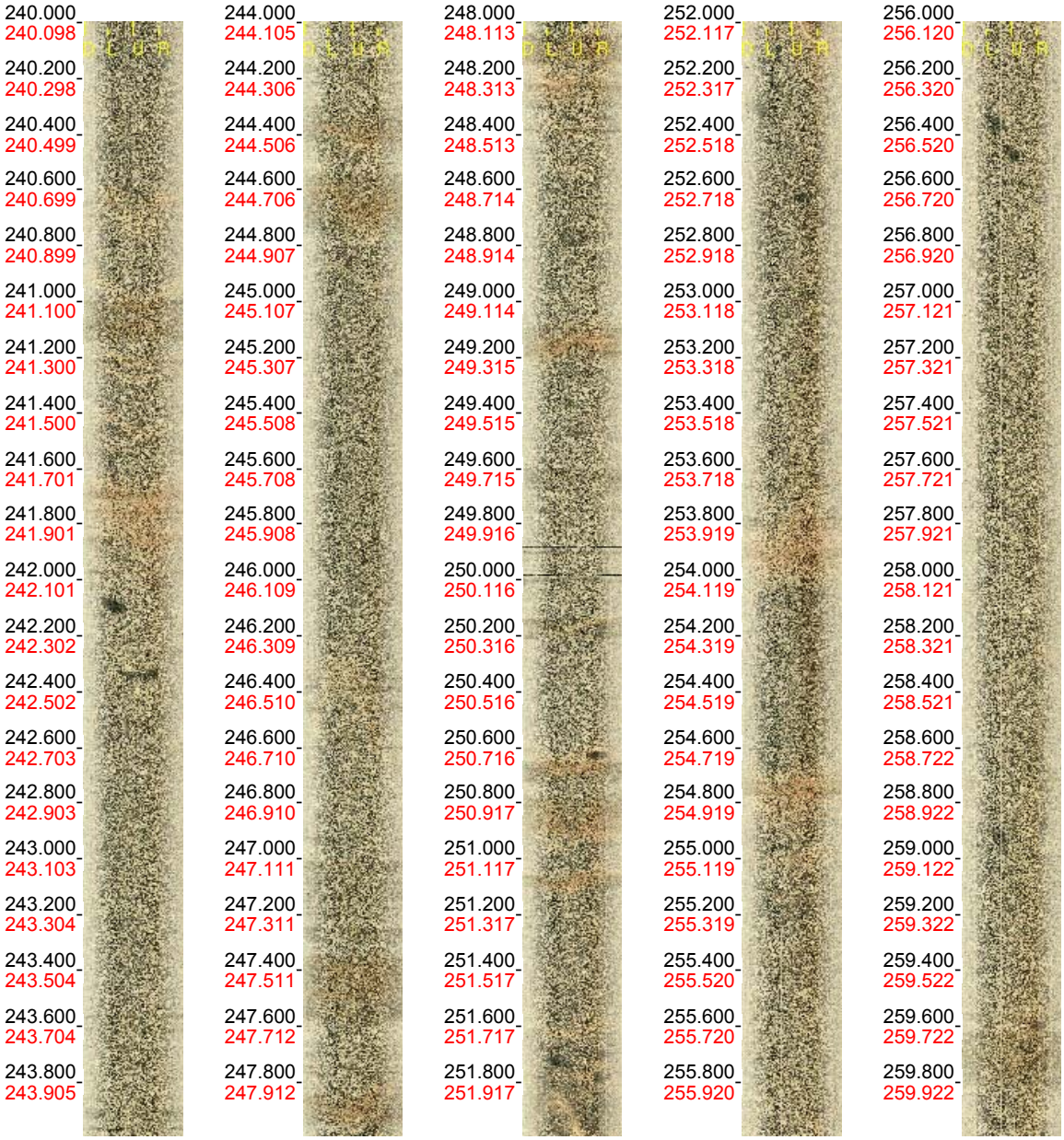
Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 7 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 220.000 - 240.000 m
Azimuth: 196.6
Inclination: -56.7

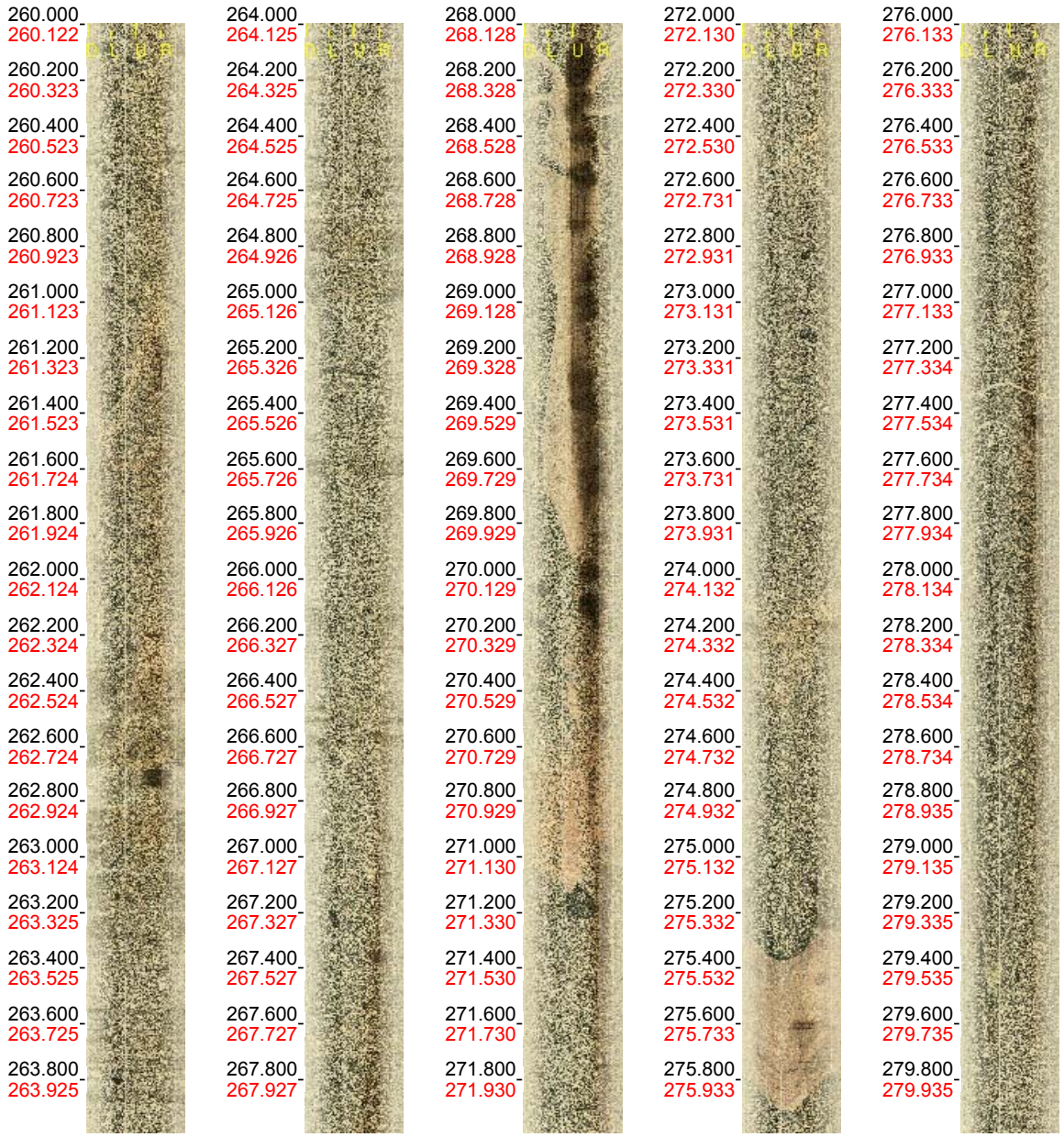
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 240.000 - 260.000 m
Azimuth: 196.6
Inclination: -56.7



Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

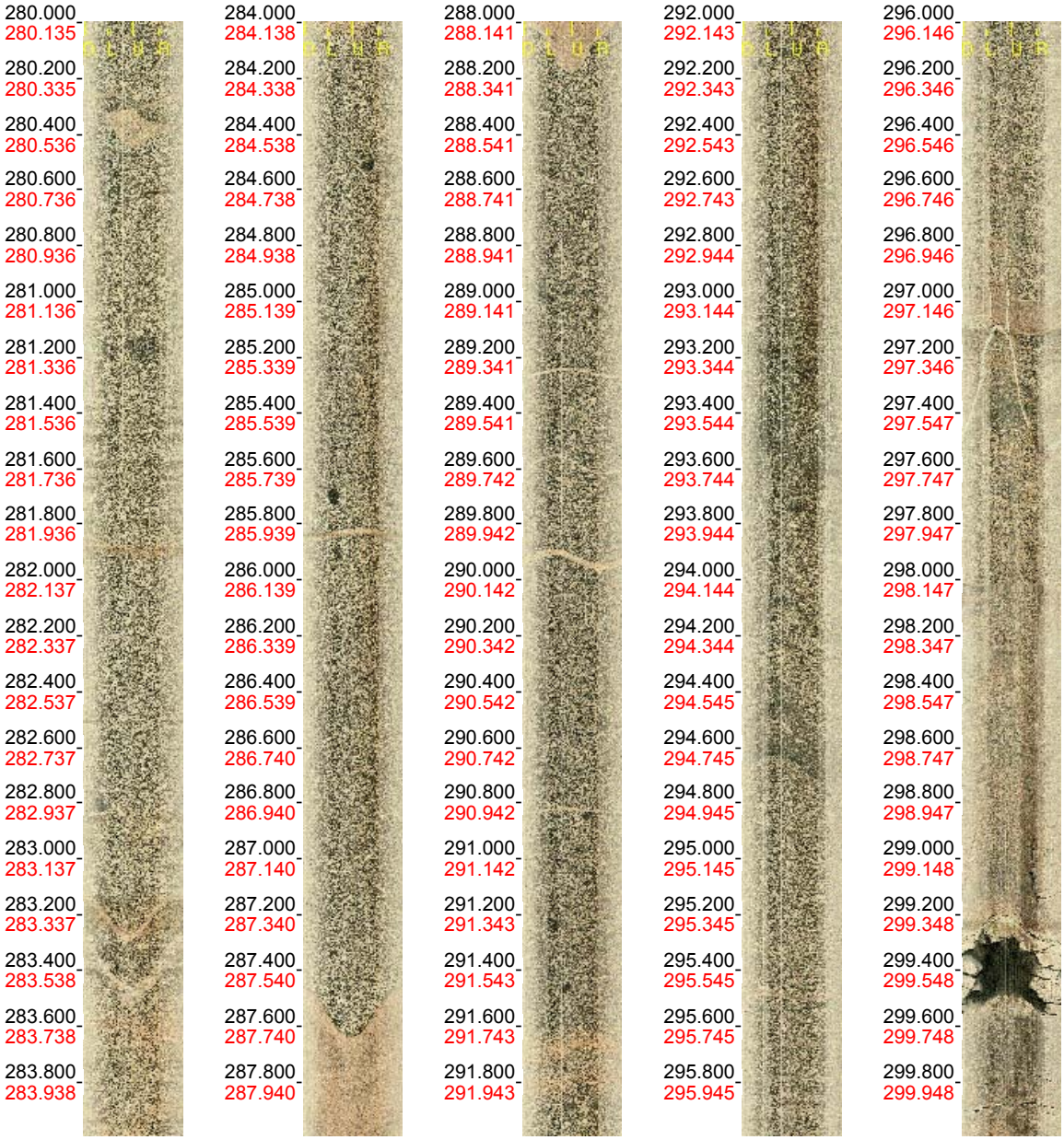
Depth range: 260.000 - 280.000 m
Azimuth: 196.5
Inclination: -56.6



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 10 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

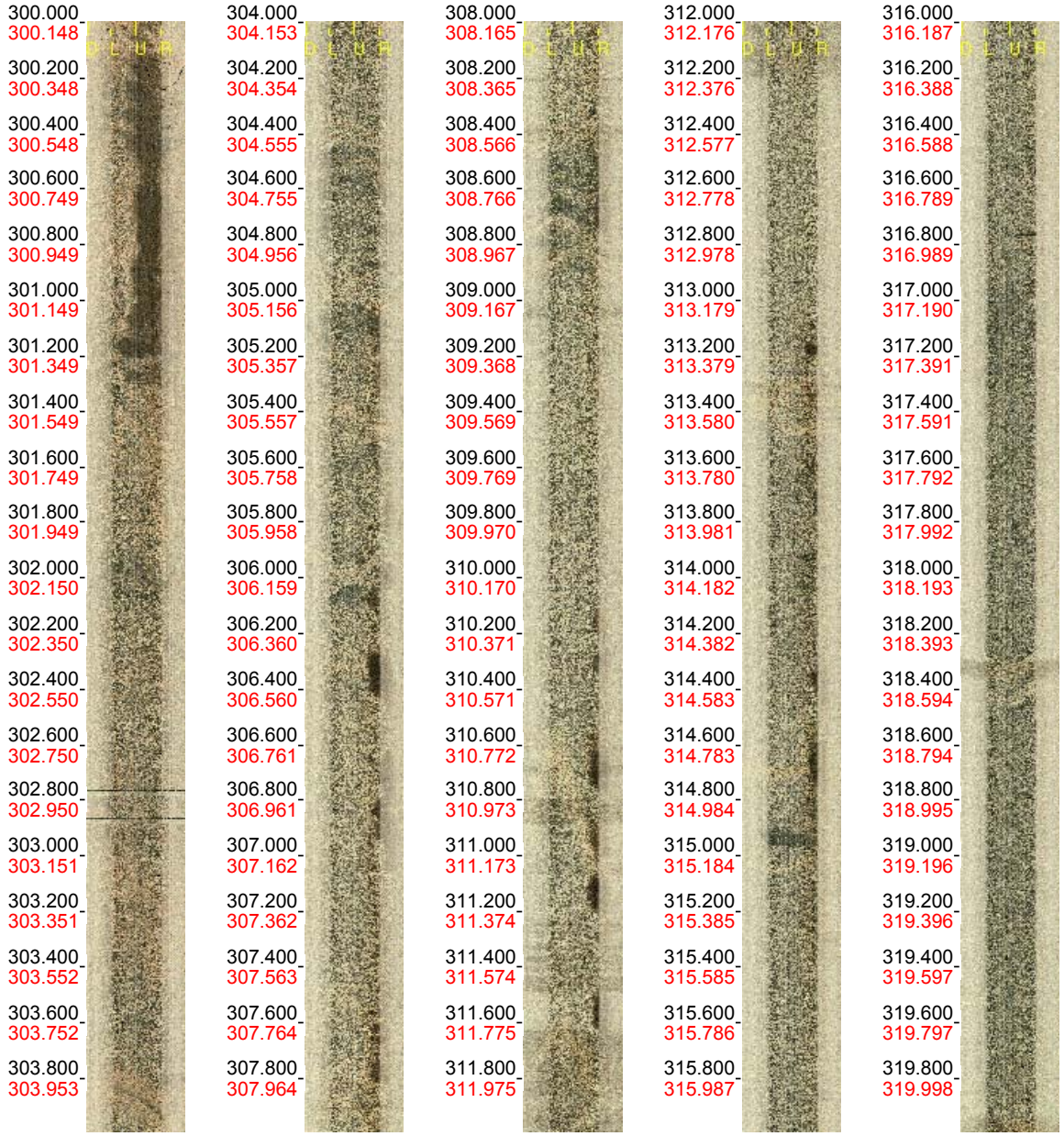
Depth range: 280.000 - 300.000 m
Azimuth: 196.5
Inclination: -56.4



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 11 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

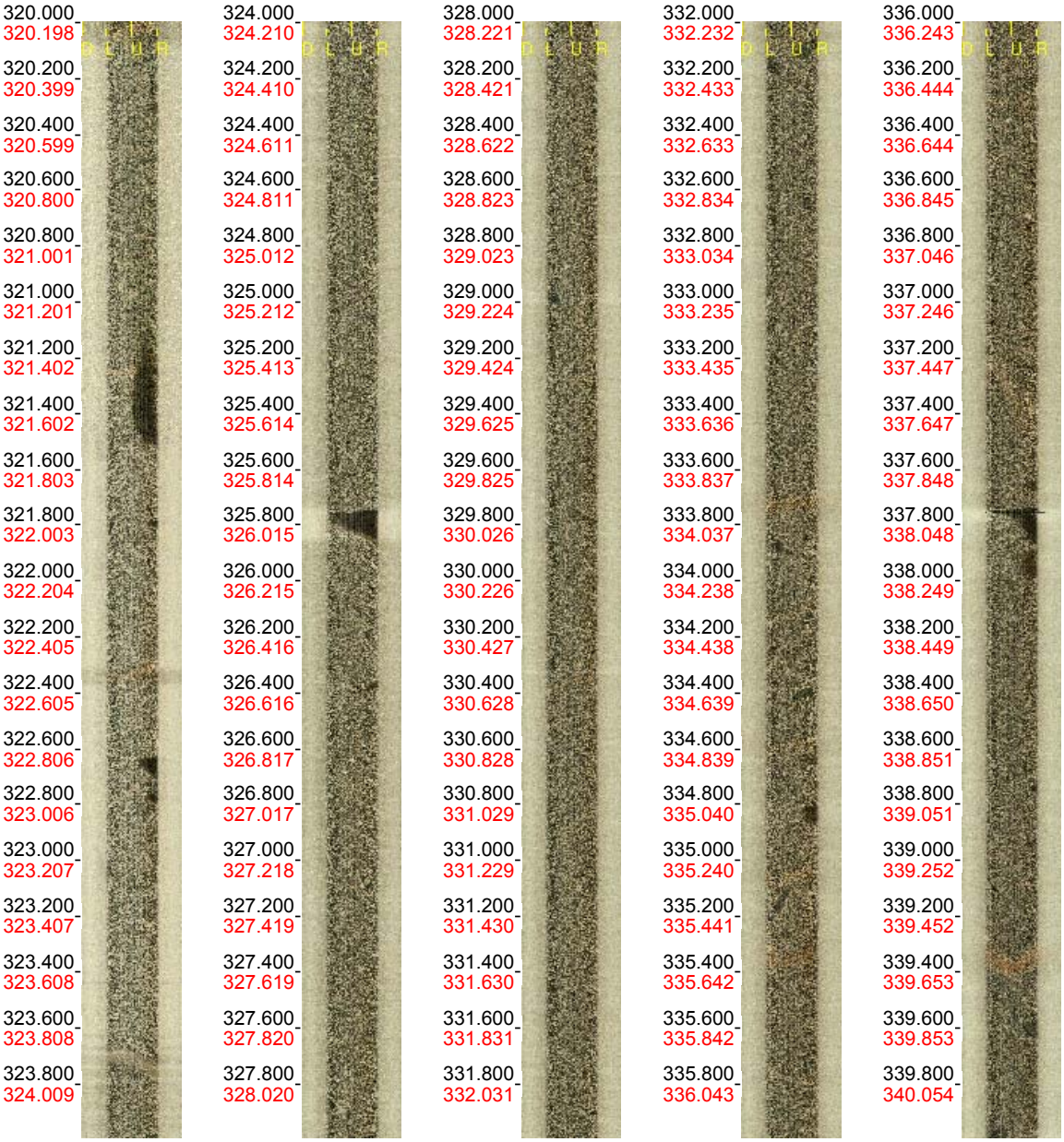
Depth range: 300.000 - 320.000 m
Azimuth: 196.1
Inclination: -56.6



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 12 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

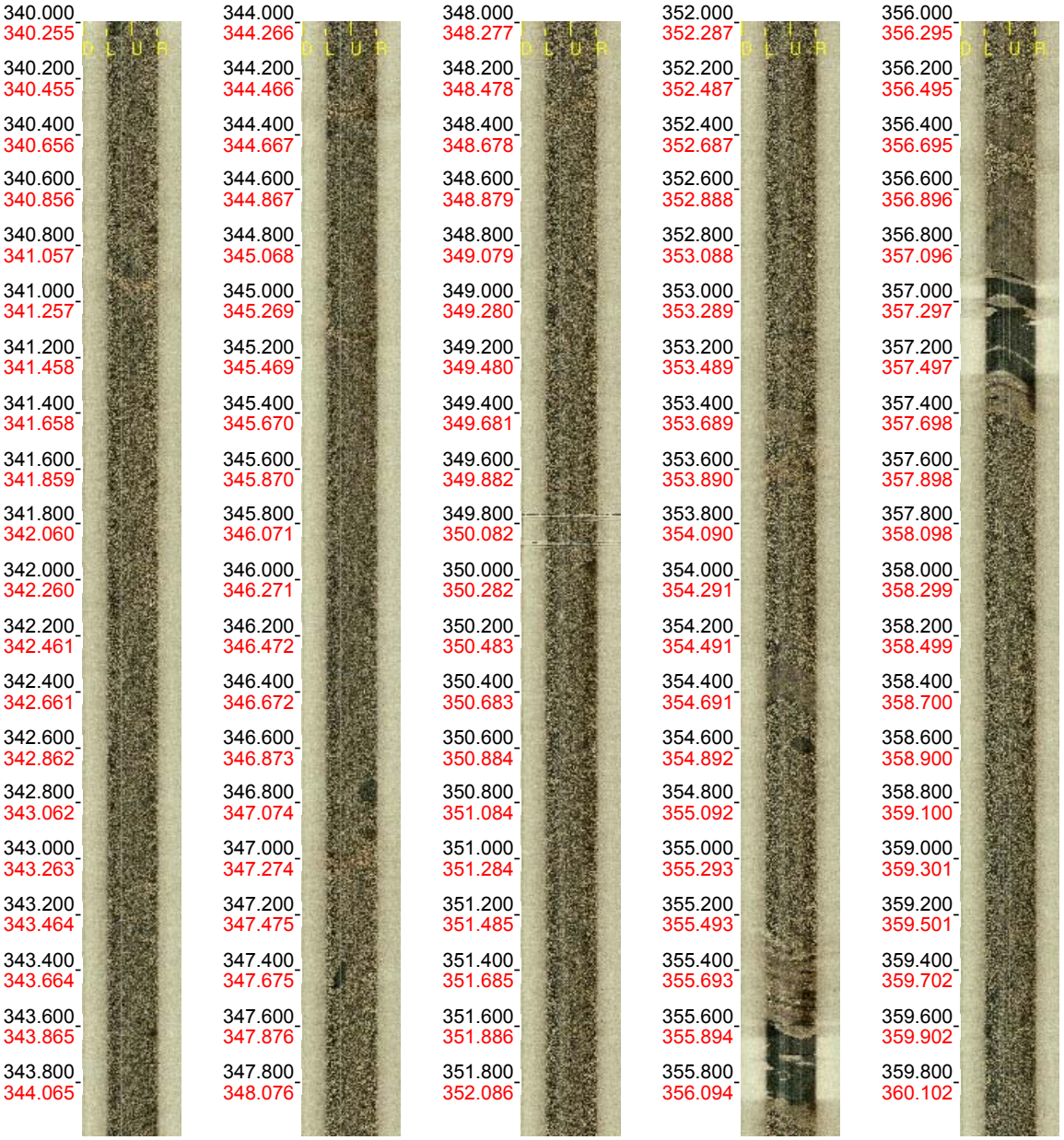
Depth range: 320.000 - 340.000 m
Azimuth: 196.6
Inclination: -56.6



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 13 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

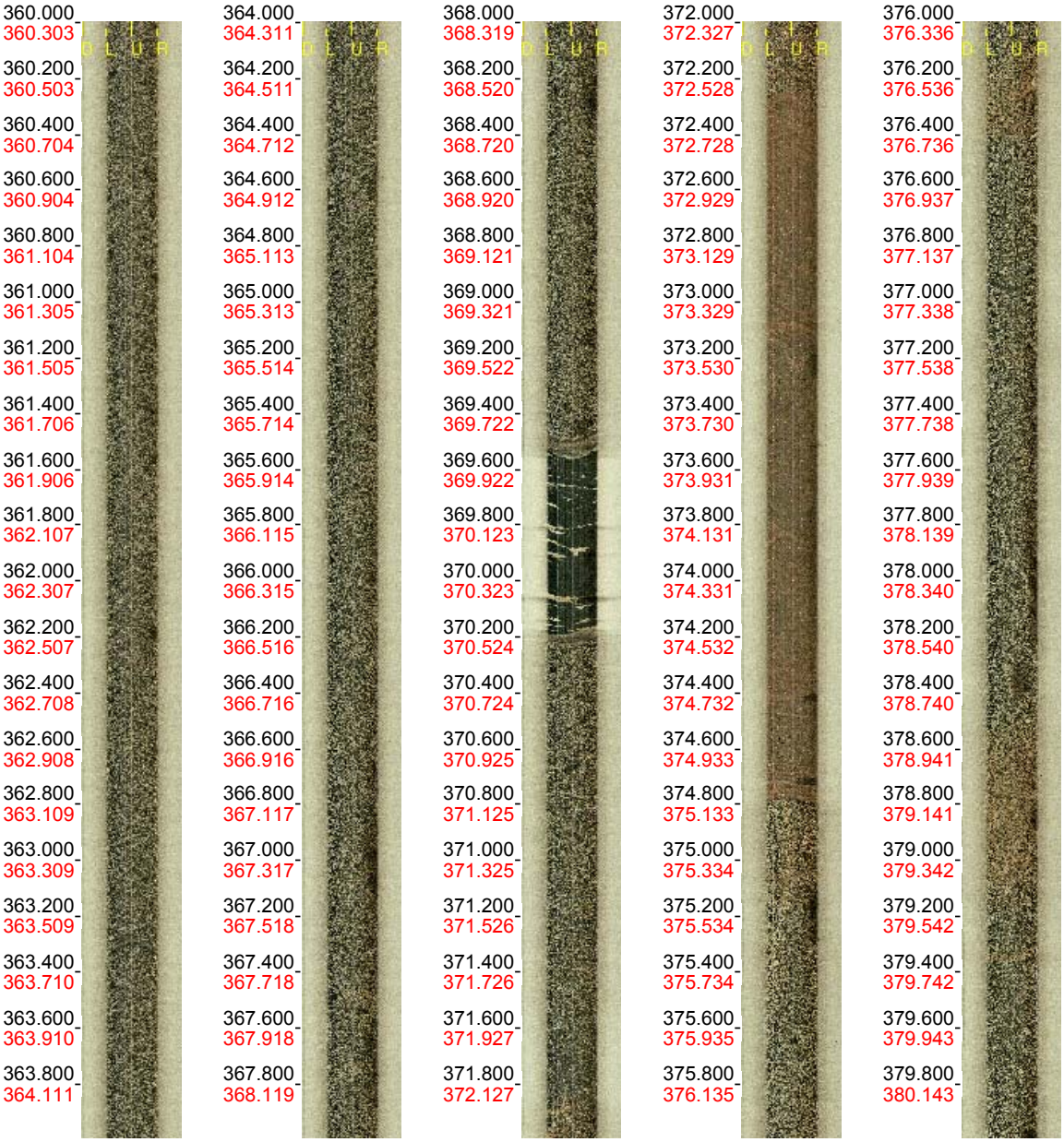
Depth range: 340.000 - 360.000 m
Azimuth: 196.5
Inclination: -56.4



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 14 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 360.000 - 380.000 m
Azimuth: 196.4
Inclination: -56.3



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 15 (36)

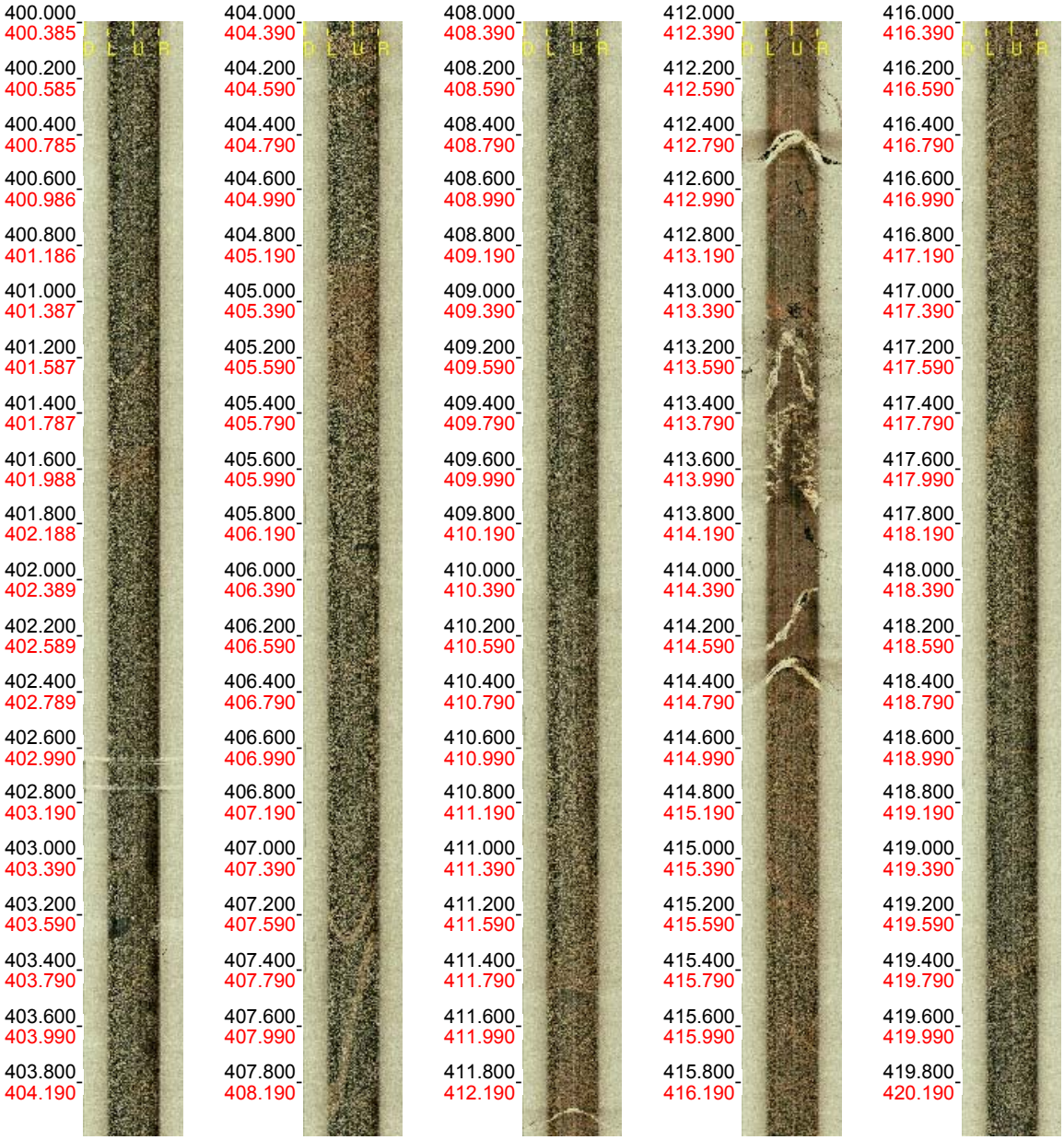
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 380.000 - 400.000 m
Azimuth: 196.4
Inclination: -56.2

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 16 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

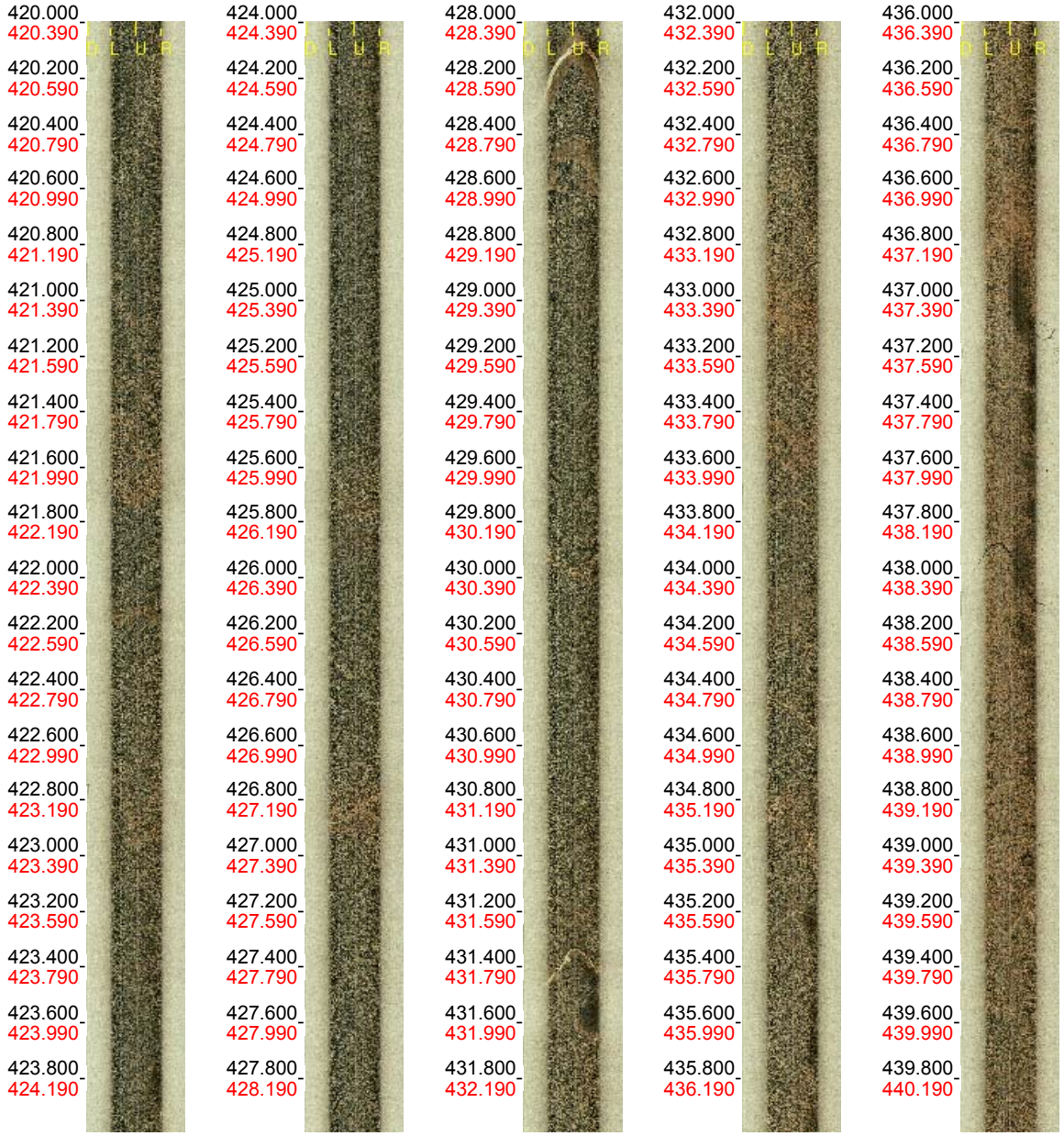
Depth range: 400.000 - 420.000 m
Azimuth: 196.3
Inclination: -56.0



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 17 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

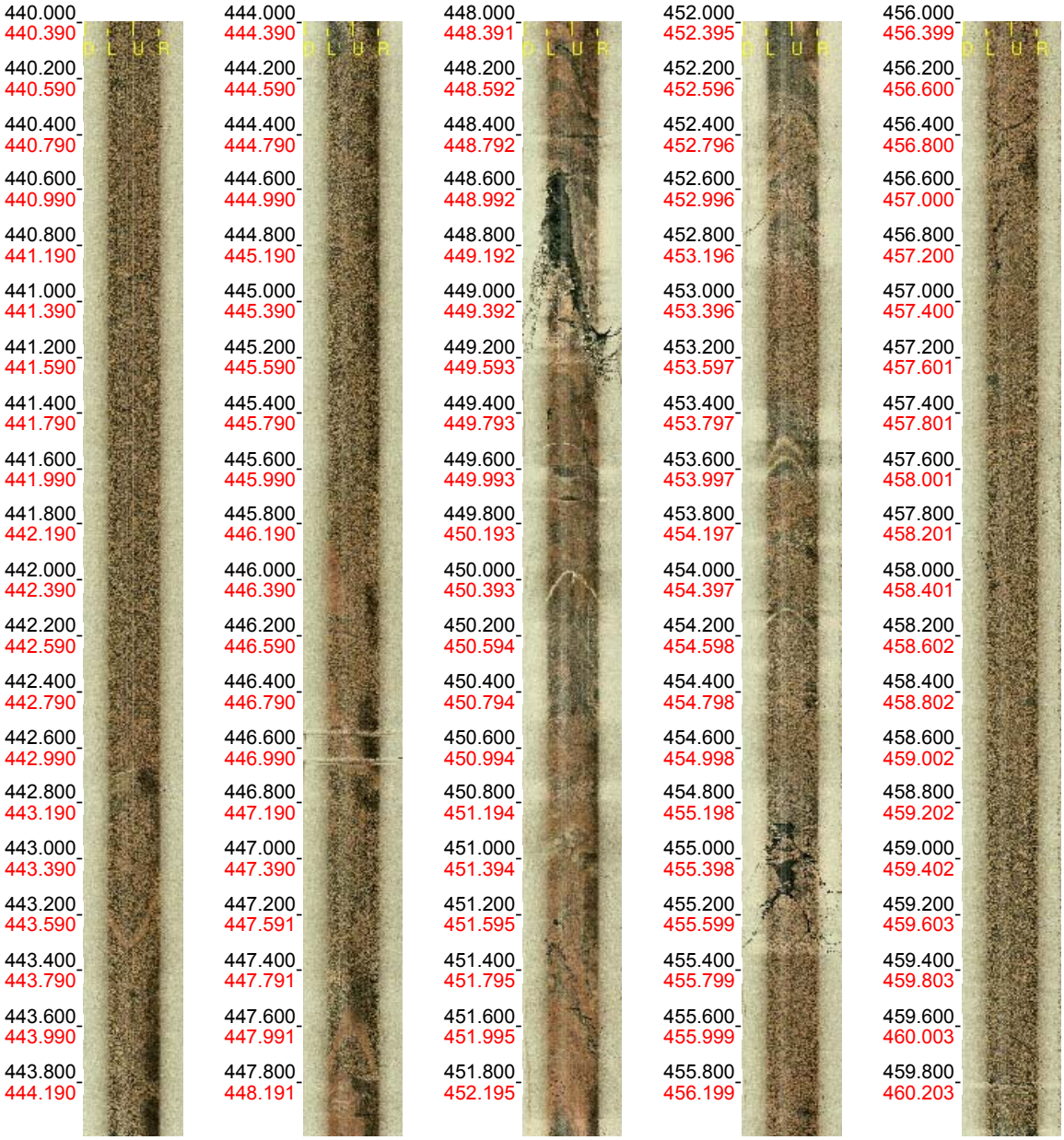
Depth range: 420.000 - 440.000 m
Azimuth: 196.3
Inclination: -55.9



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 18 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 440.000 - 460.000 m
Azimuth: 196.3
Inclination: -55.9



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 19 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 460.000 - 480.000 m
Azimuth: 196.2
Inclination: -55.8

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 20 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 480.000 - 500.000 m
Azimuth: 195.9
Inclination: -55.8

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 21 (36)

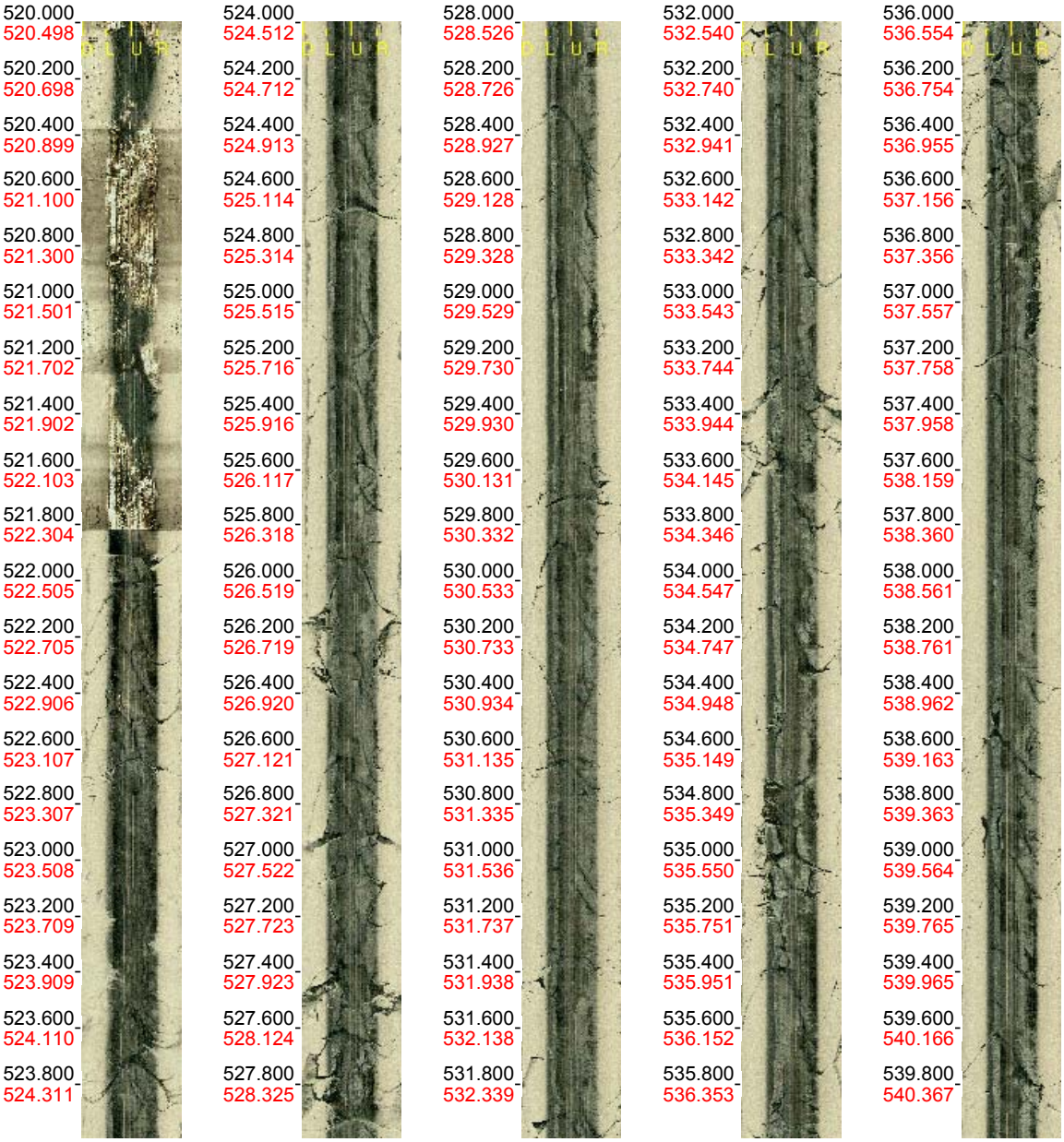
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 500.000 - 520.000 m
Azimuth: 195.8
Inclination: -55.7

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 22 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 520.000 - 540.000 m
Azimuth: 195.8
Inclination: -55.6



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 23 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 540.000 - 560.000 m
Azimuth: 195.8
Inclination: -55.6

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 24 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 560.000 - 580.000 m
Azimuth: 195.7
Inclination: -55.4

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 25 (36)

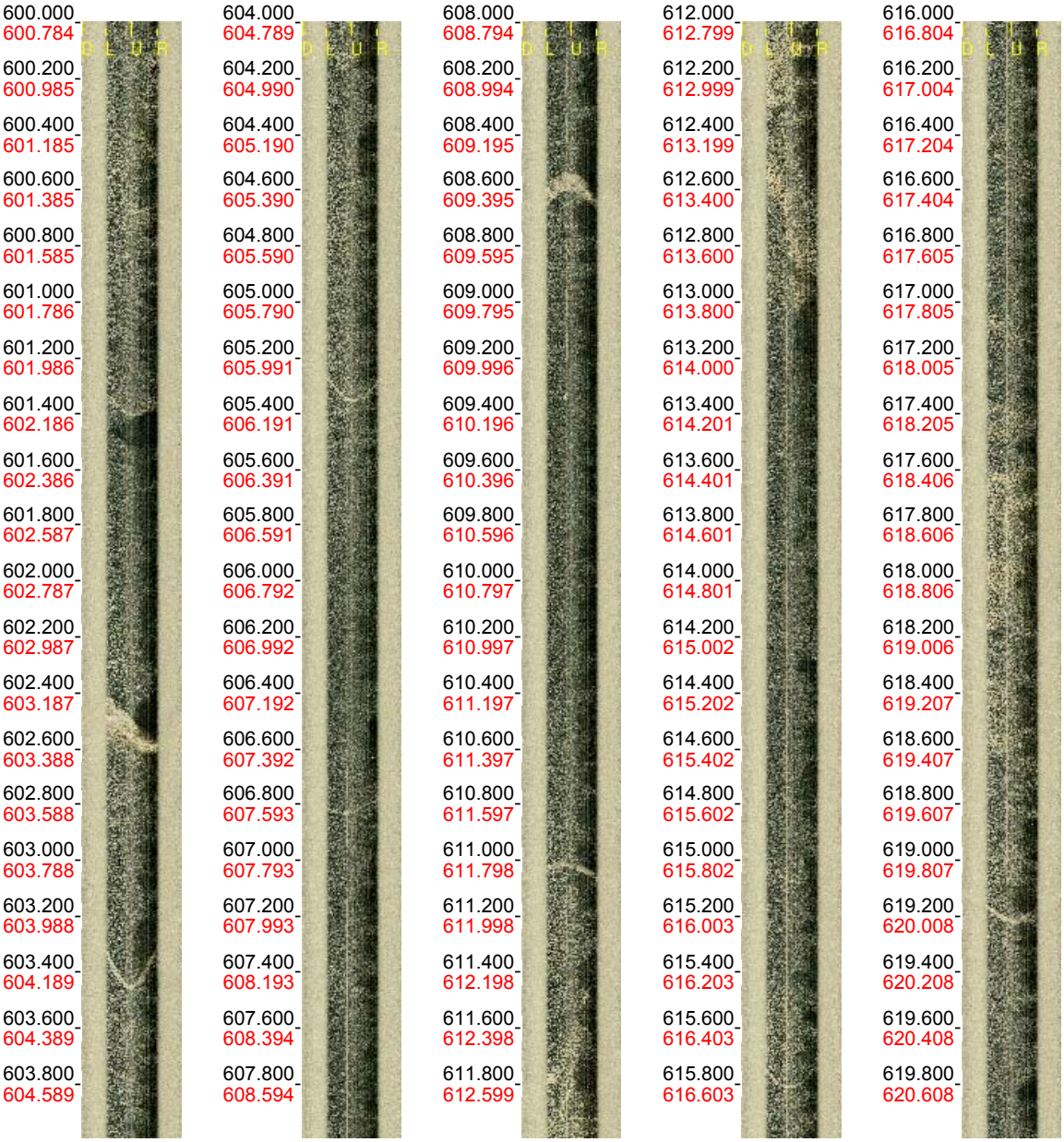
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 580.000 - 600.000 m
Azimuth: 195.3
Inclination: -55.5

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 26 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

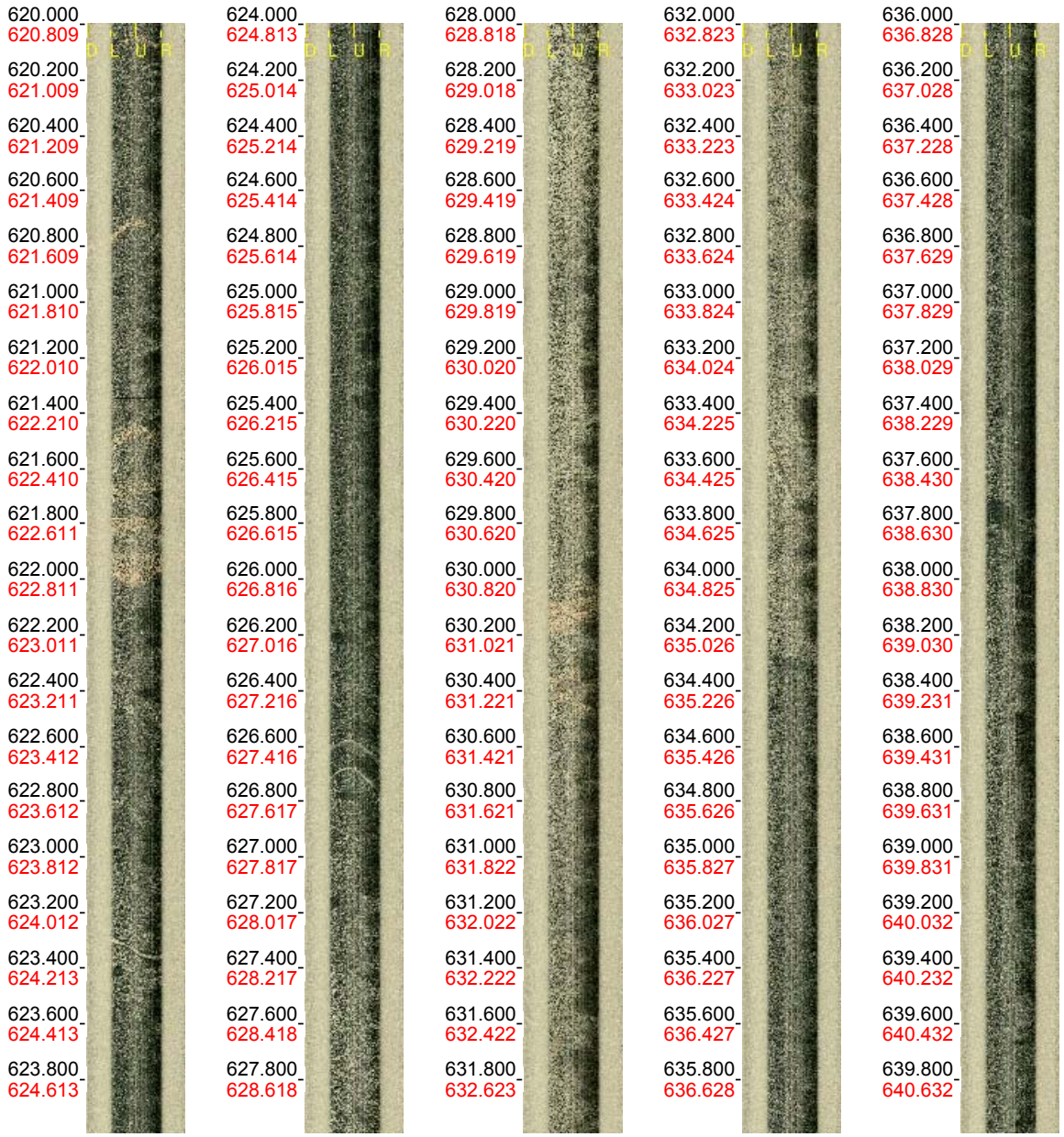
Depth range: 600.000 - 620.000 m
Azimuth: 195.3
Inclination: -55.3



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 27 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

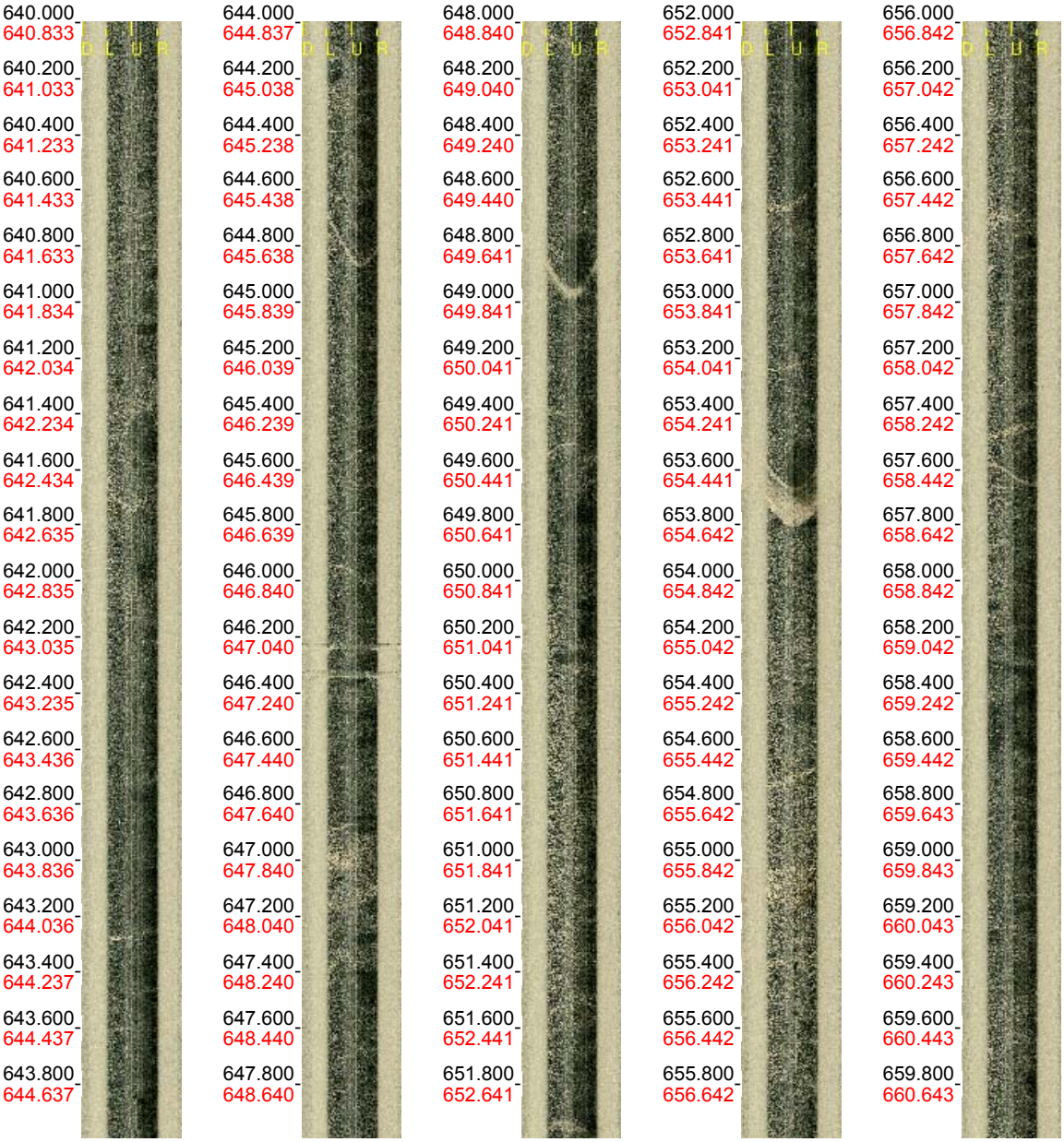
Depth range: 620.000 - 640.000 m
Azimuth: 195.2
Inclination: -55.0



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 28 (36)

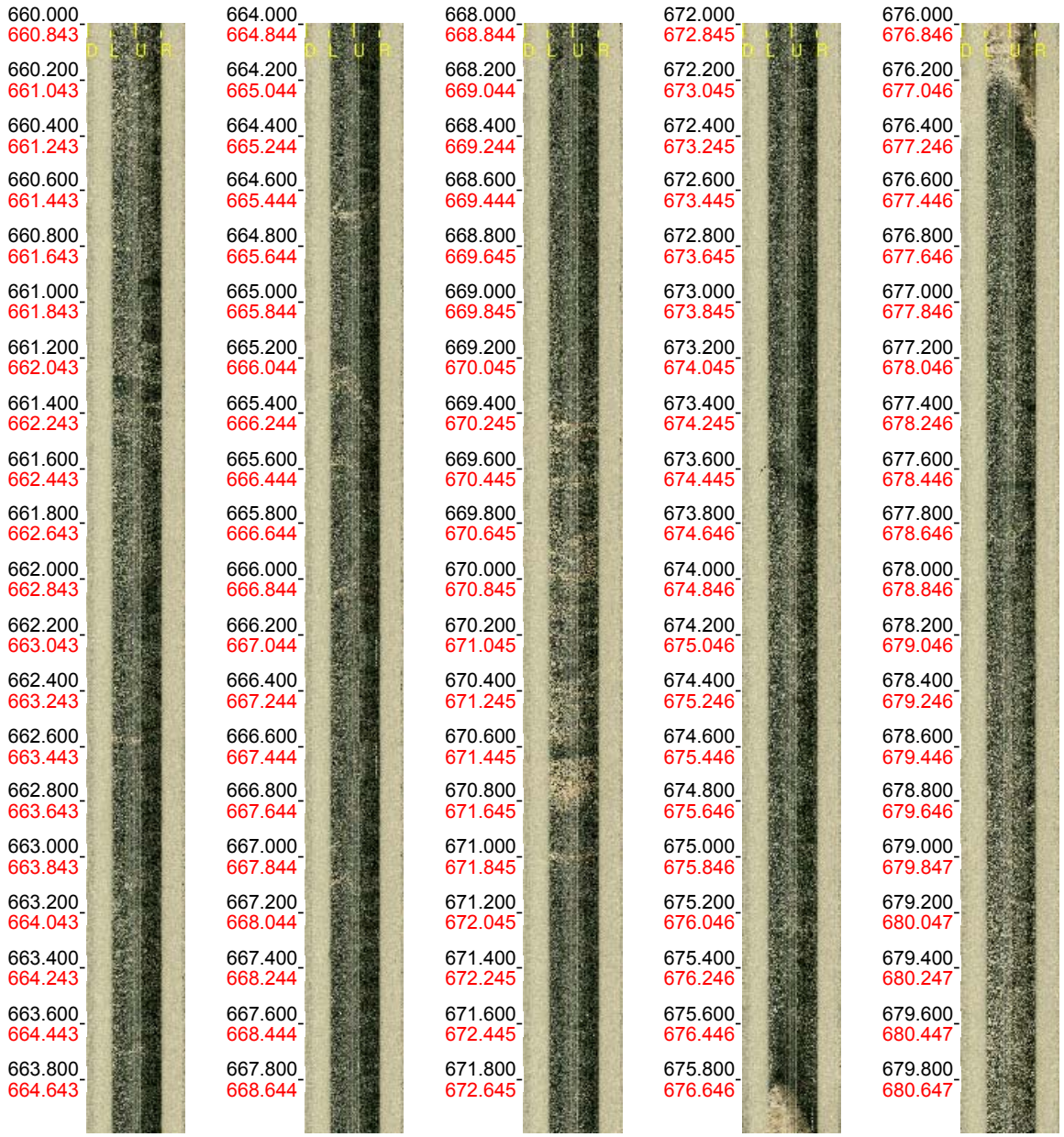
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 640.000 - 660.000 m
Azimuth: 195.2
Inclination: -55.0



Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

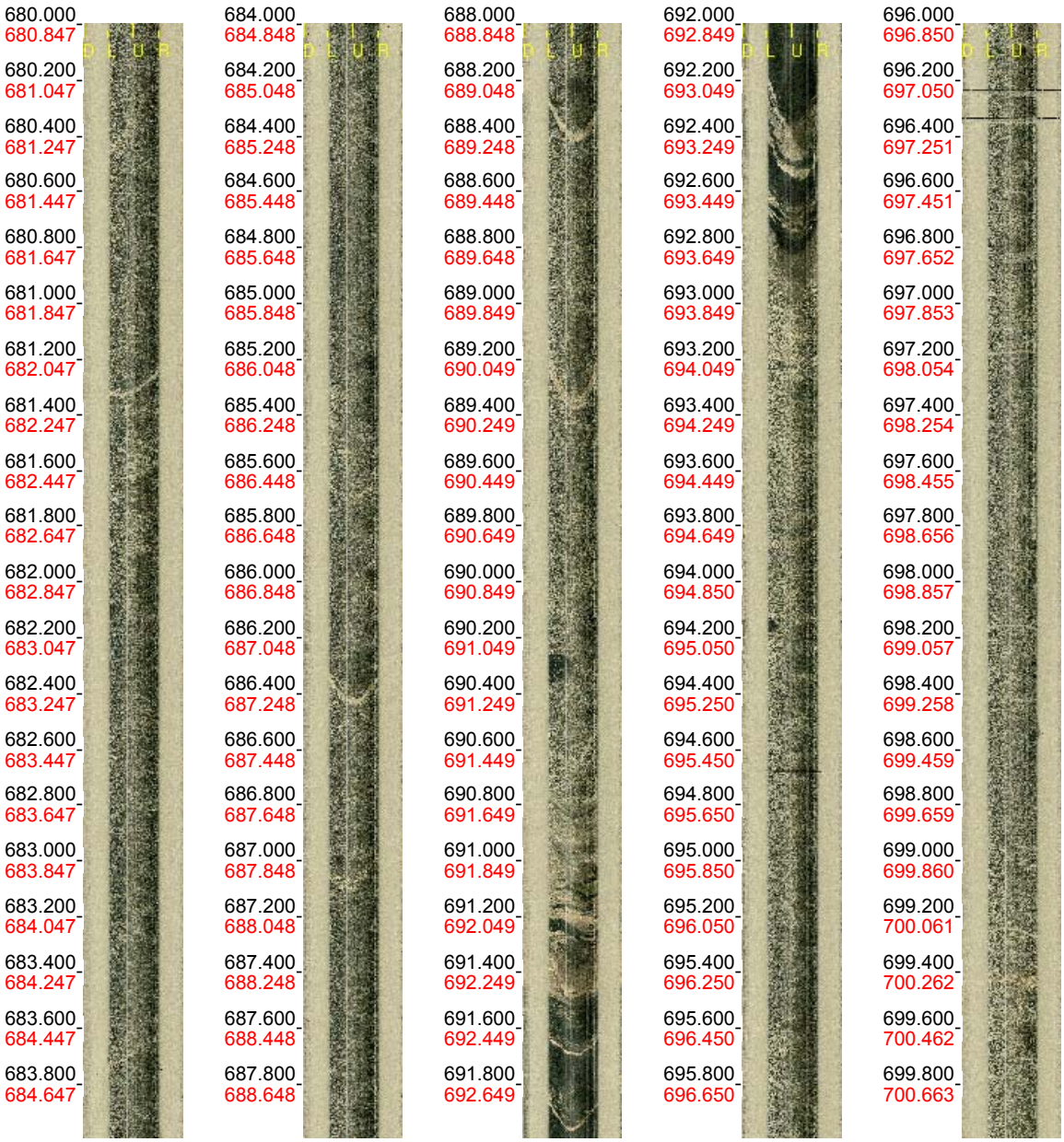
Depth range: 660.000 - 680.000 m
Azimuth: 195.3
Inclination: -55.2



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 30 (36)

Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 680.000 - 700.000 m
Azimuth: 195.3
Inclination: -55.2



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 31 (36)

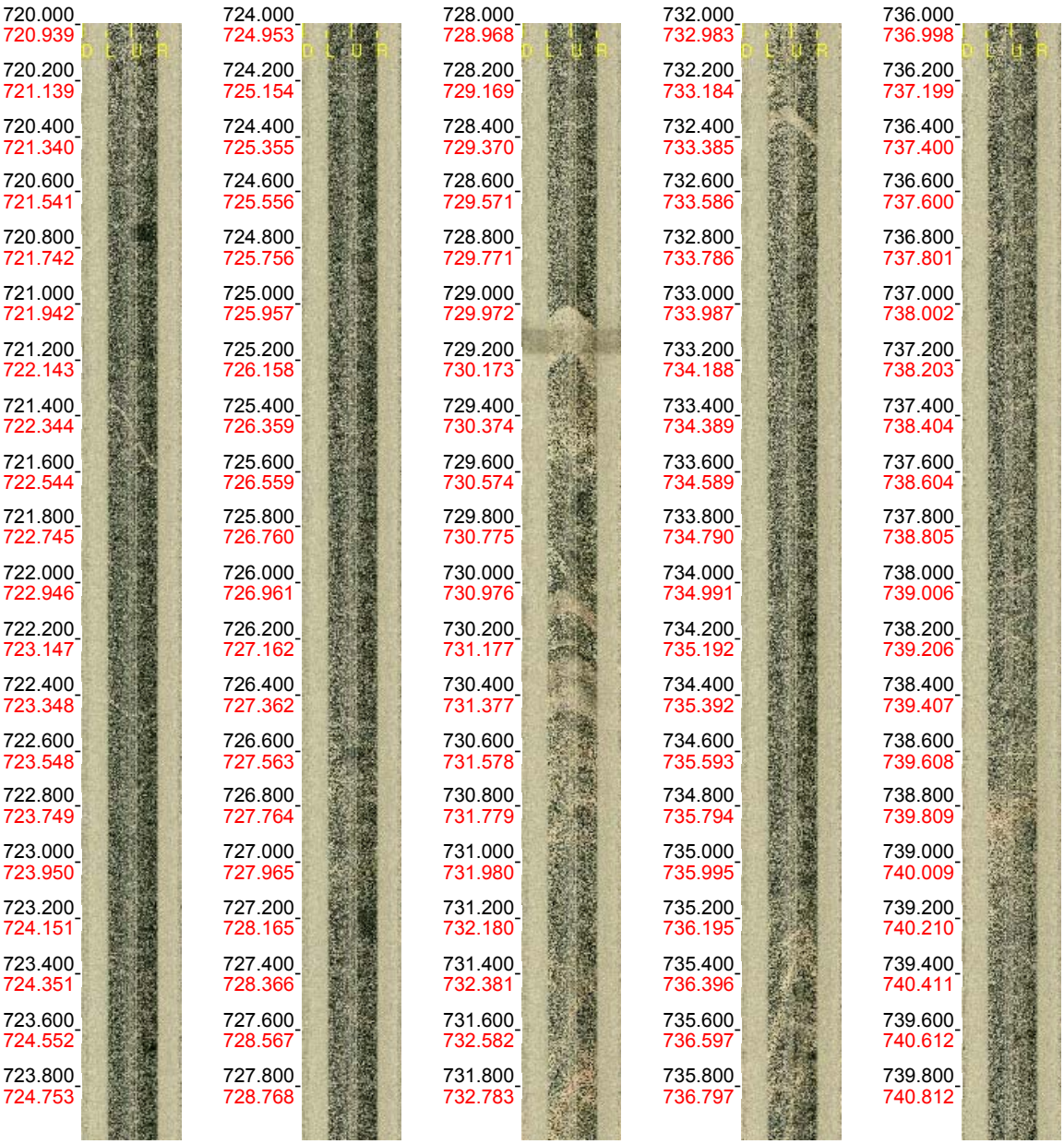
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 700.000 - 720.000 m
Azimuth: 195.3
Inclination: -55.2

Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 32 (36)

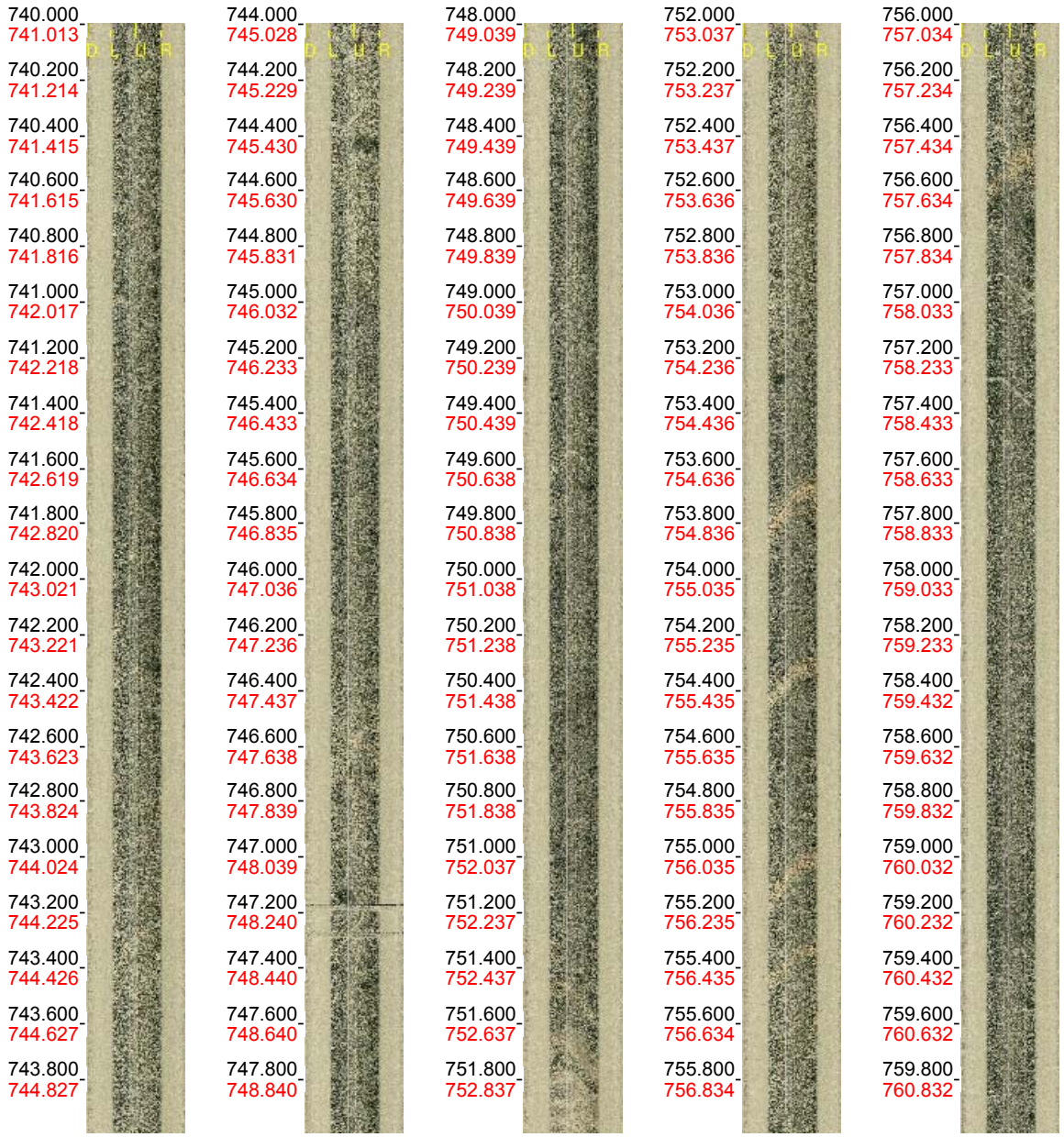
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 720.000 - 740.000 m
Azimuth: 195.3
Inclination: -55.2



Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

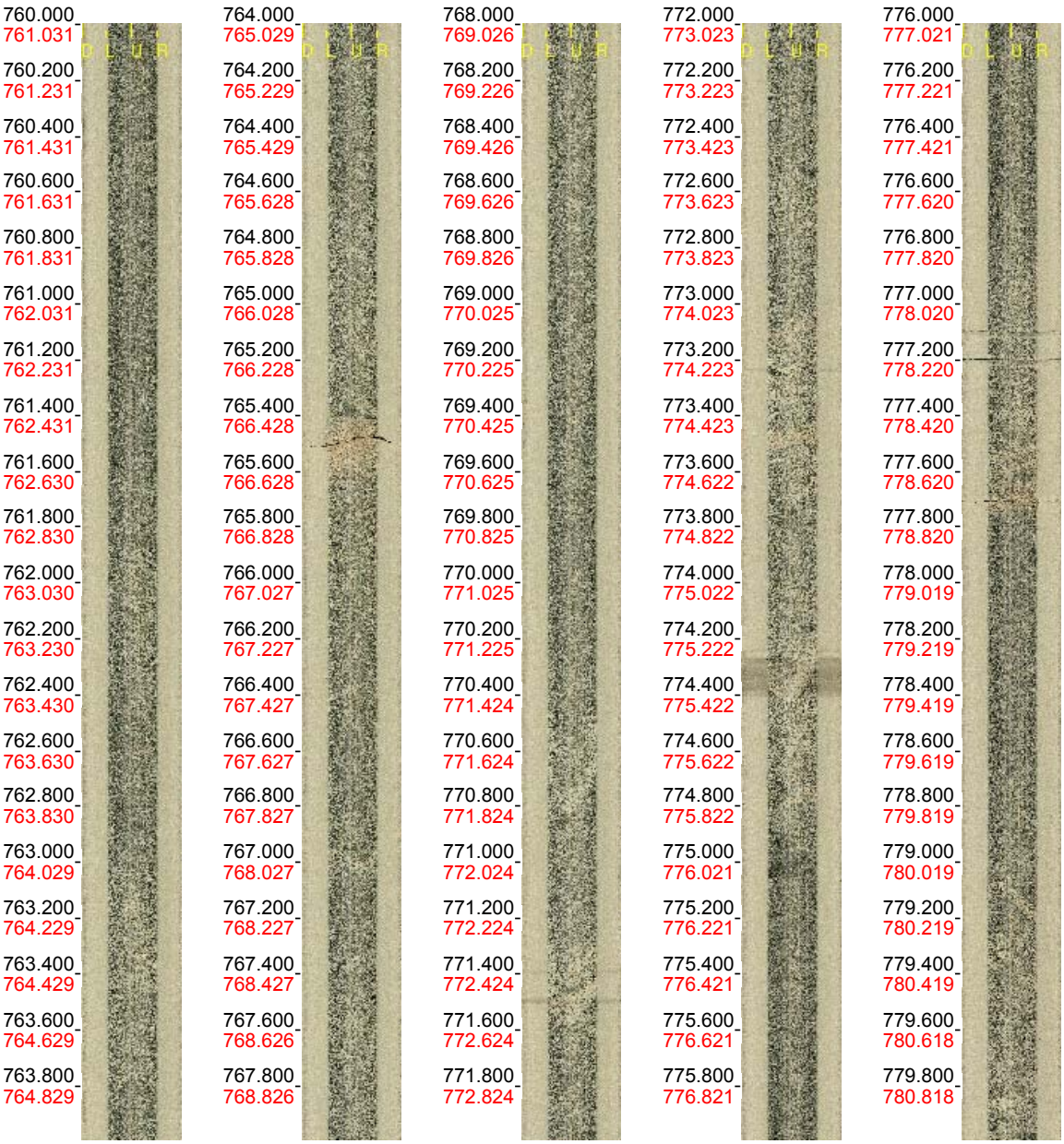
Depth range: 740.000 - 760.000 m
Azimuth: 195.3
Inclination: -55.2



Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 34 (36)

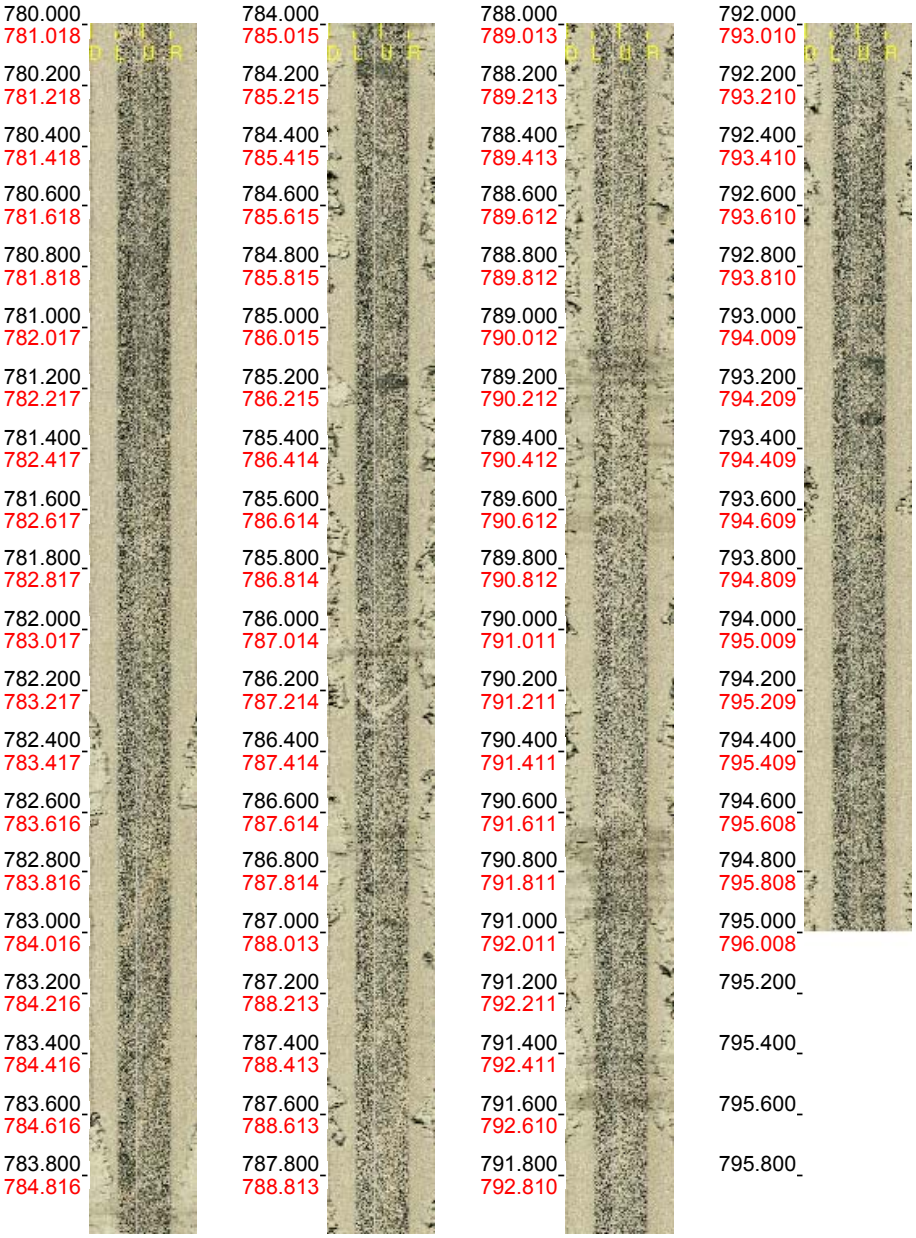
Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 760.000 - 780.000 m
Azimuth: 195.3
Inclination: -55.2



Borehole: KLX19A
Mapping: KLX19A_Geosigma_1

Depth range: 780.000 - 795.040 m
Azimuth: 195.3
Inclination: -55.2

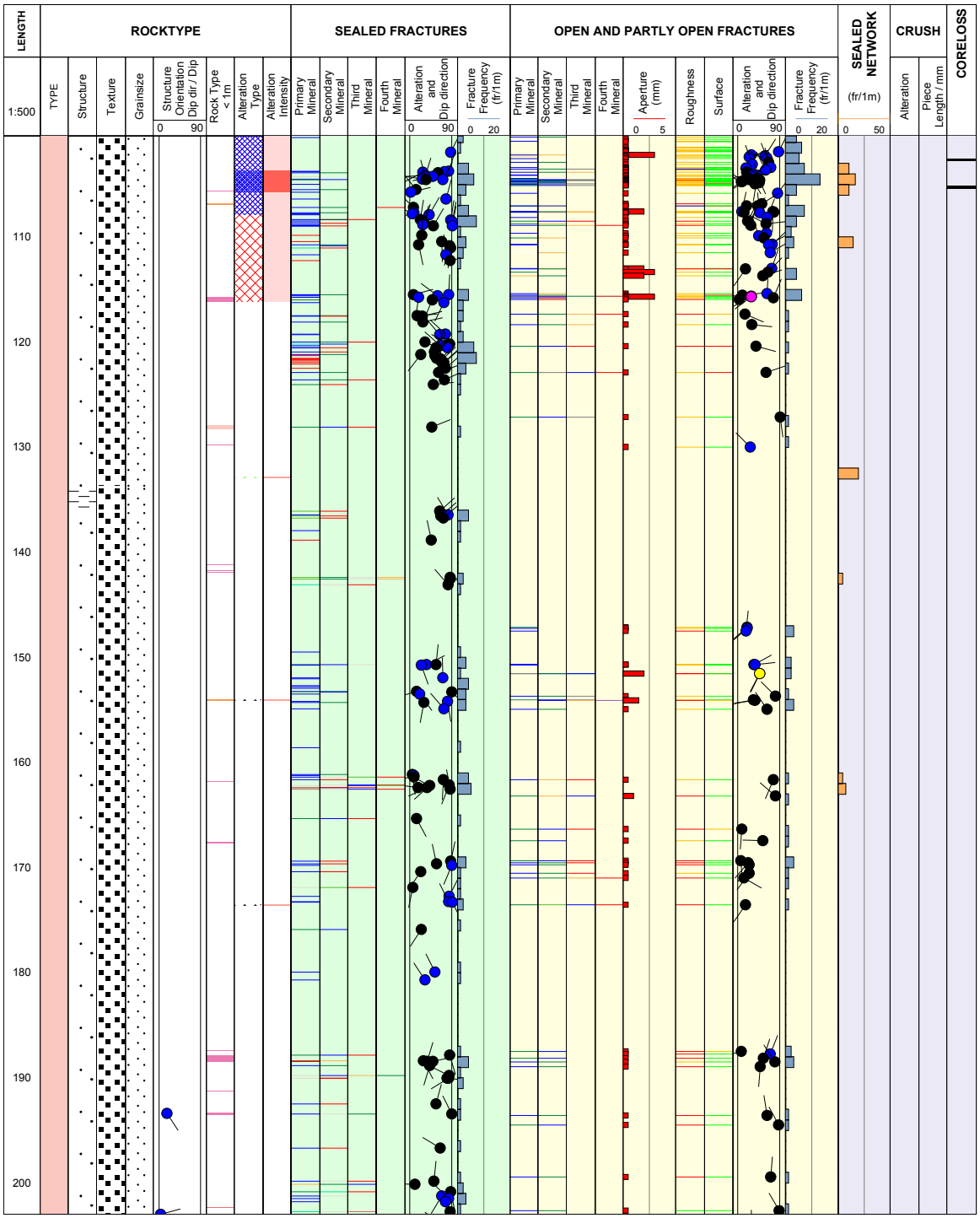


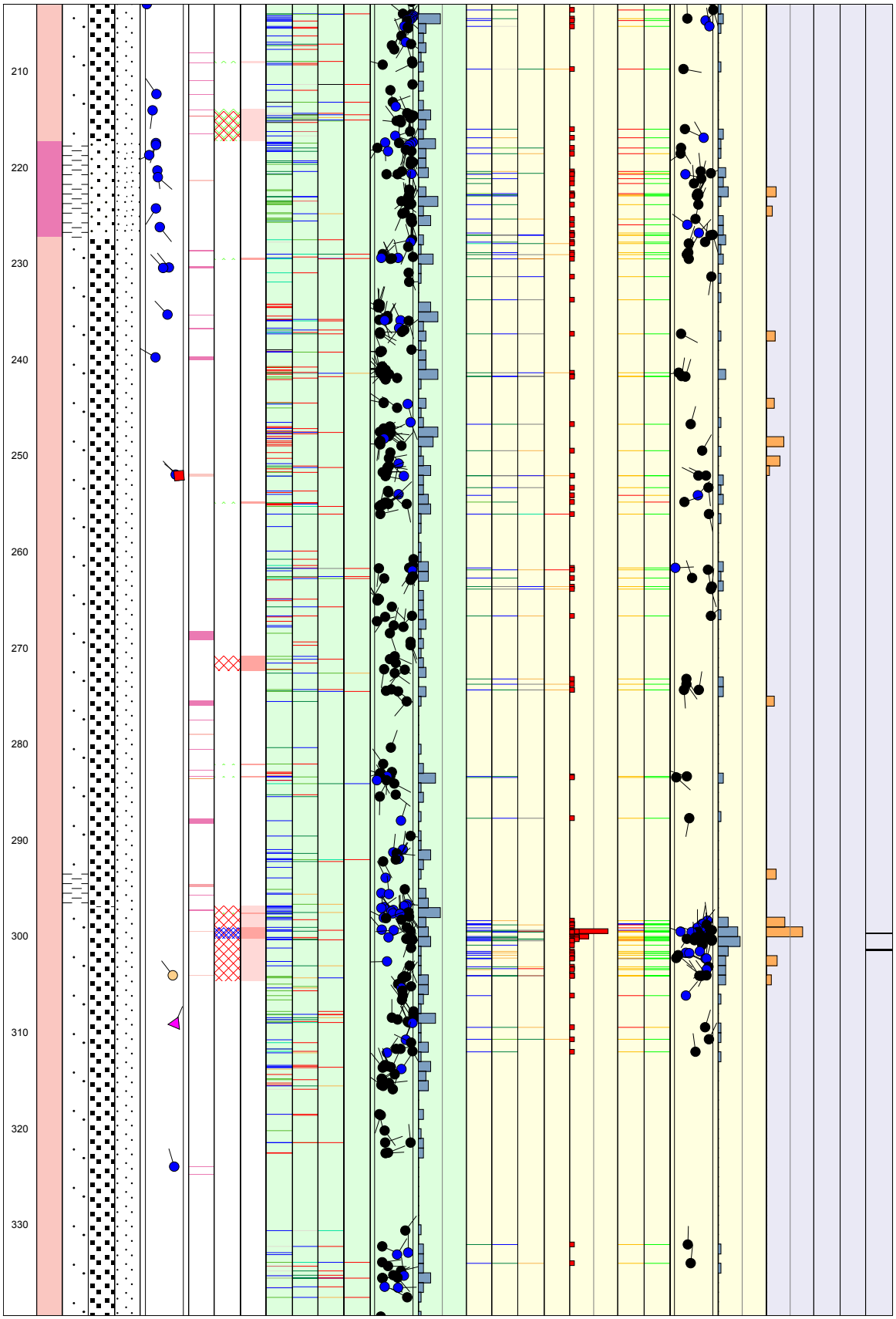
Printed: 2006-11-02 12:38:08 Scale: 1 : 20 Aspect: 150 % 36 (36)

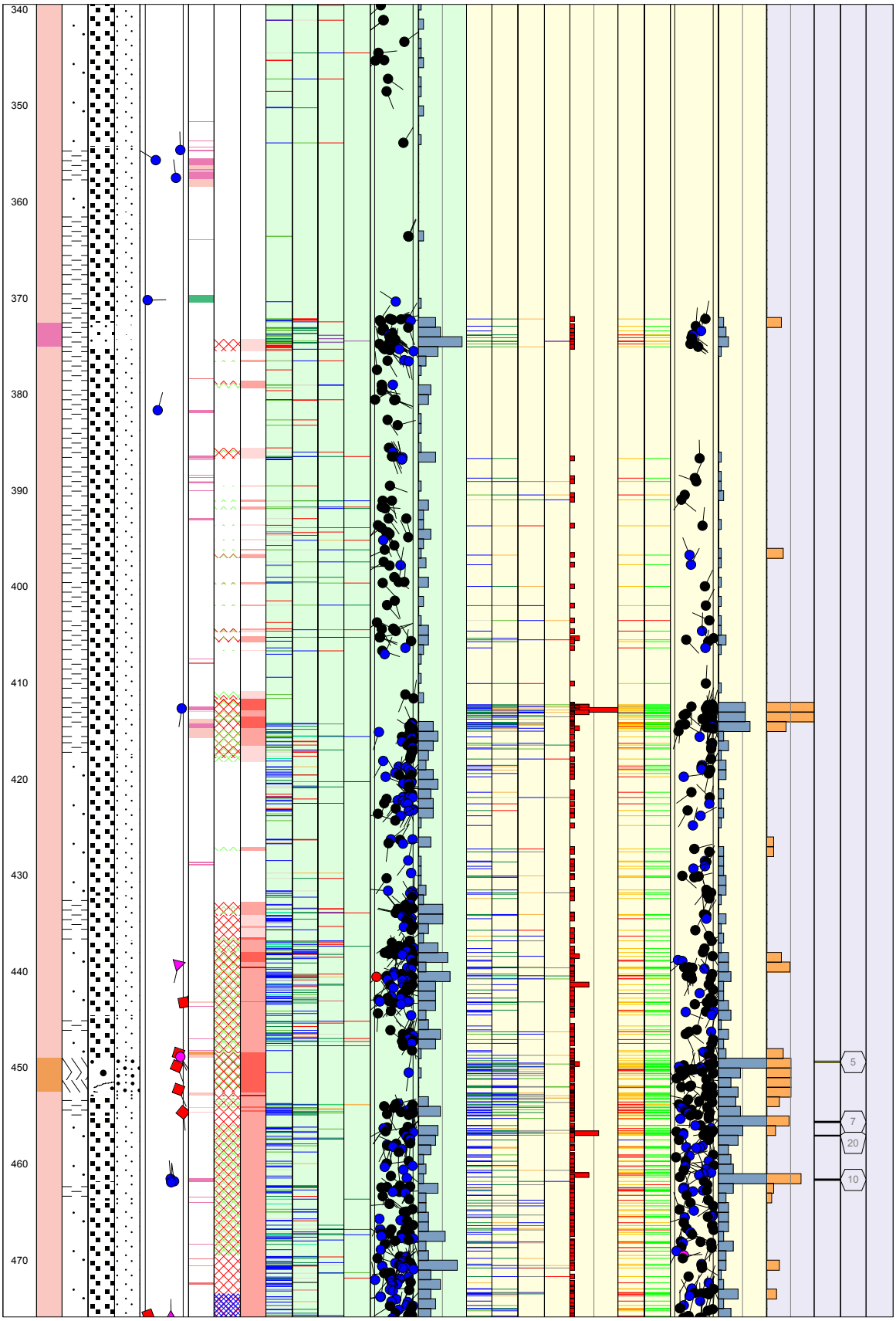
WellCad diagram for KLX19A

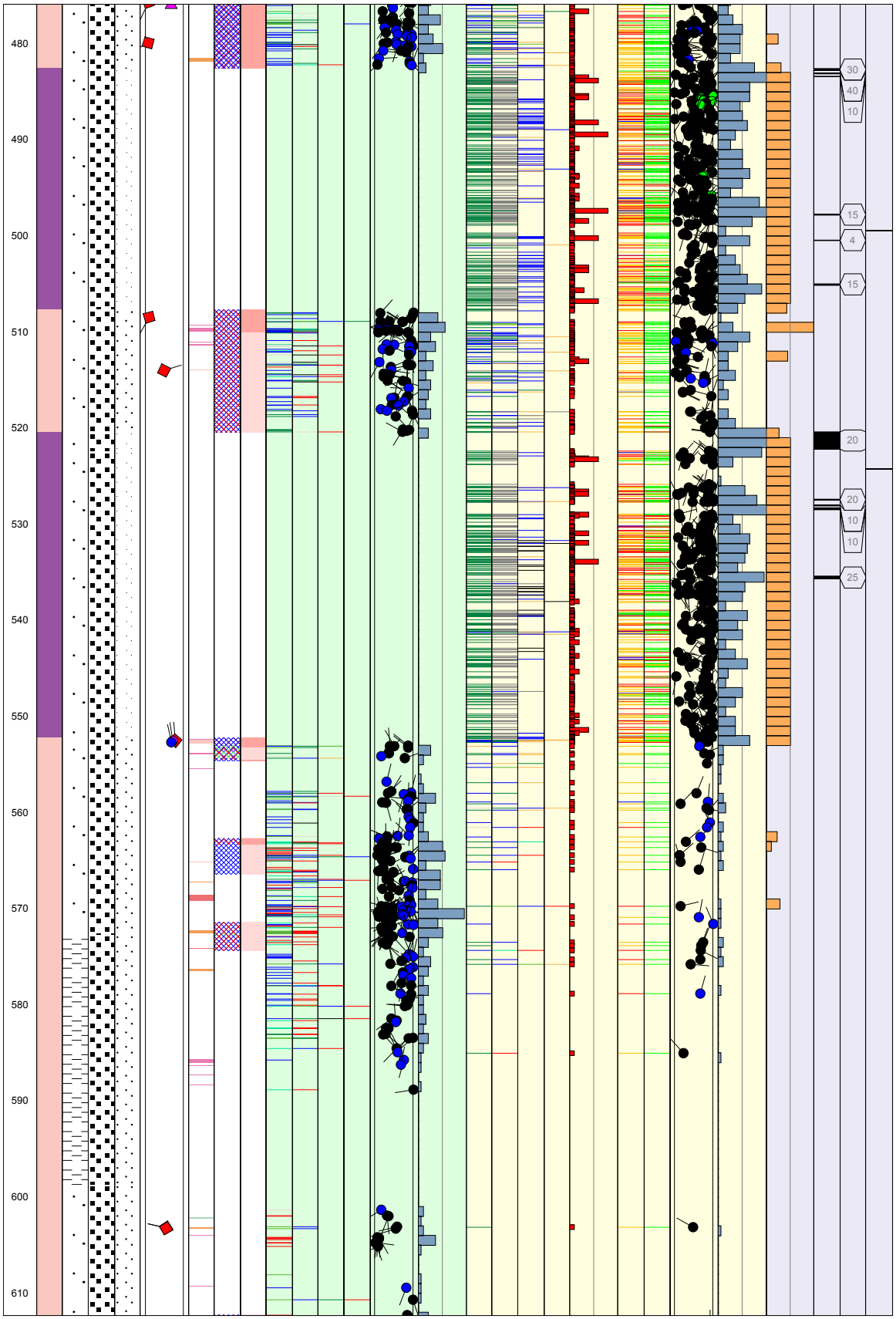
Title GEOLOGY IN KLX19A **Appendix:**

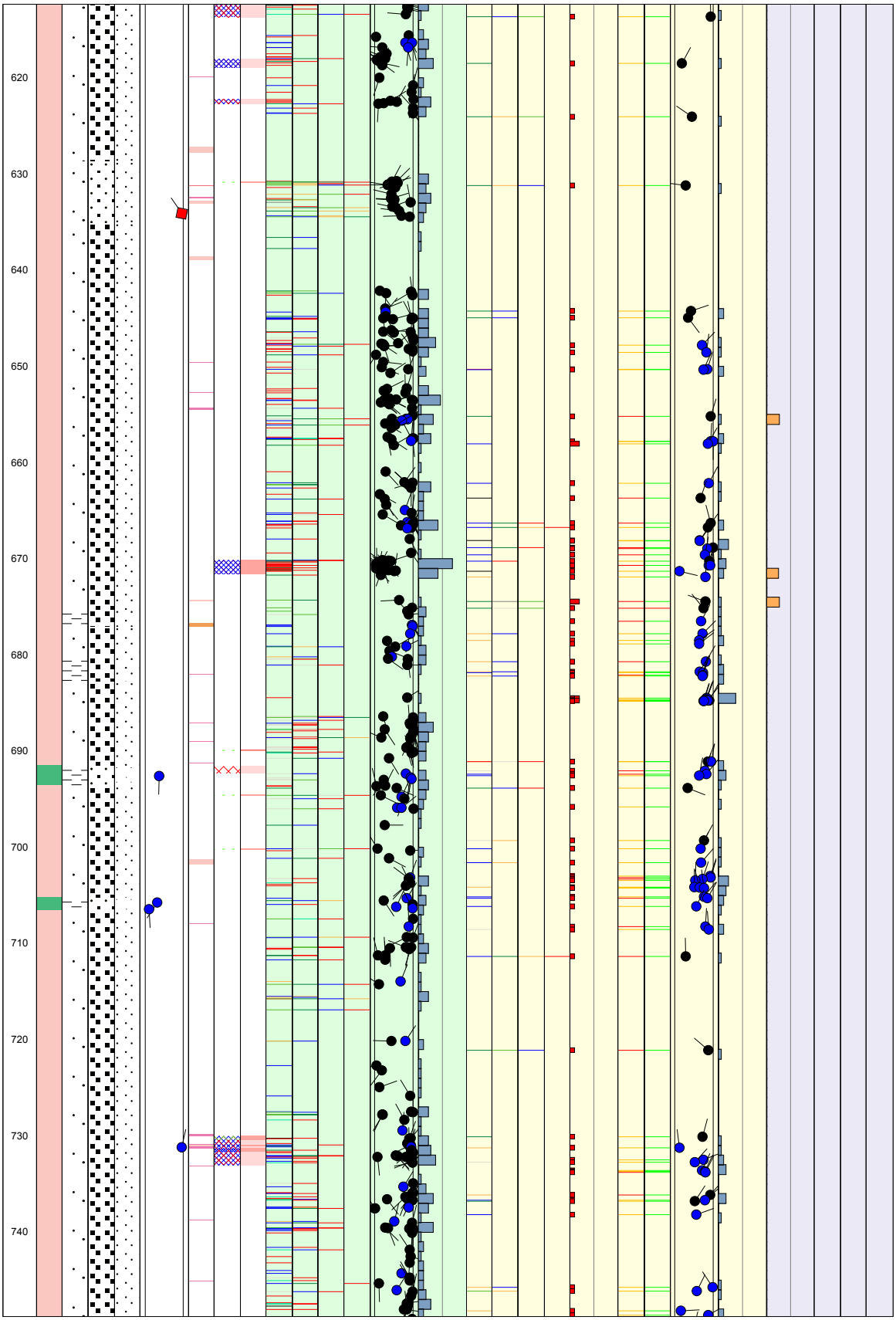
Site	LAXEMAR	**Coordinate System**	RT90-RHB70
Borehole	KLX19A	**Northing [m]**	6365901.42
Diameter [mm]	76	**Easting [m]**	1547004.62
Length [m]	800.070	**Elevation [m.a.s.l.]**	16.87
Bearing [°]	197.13	**Drilling Start Date**	2006-06-03 11:00:00
Inclination [°]	-57.54	**Drilling Stop Date**	2006-09-20 17:27:00
Date of coremapping	2006-10-16 08:57:00	**Plot Date**	2007-10-25 22:03:45
Rocktype data from	p_rock	**Signed data**	

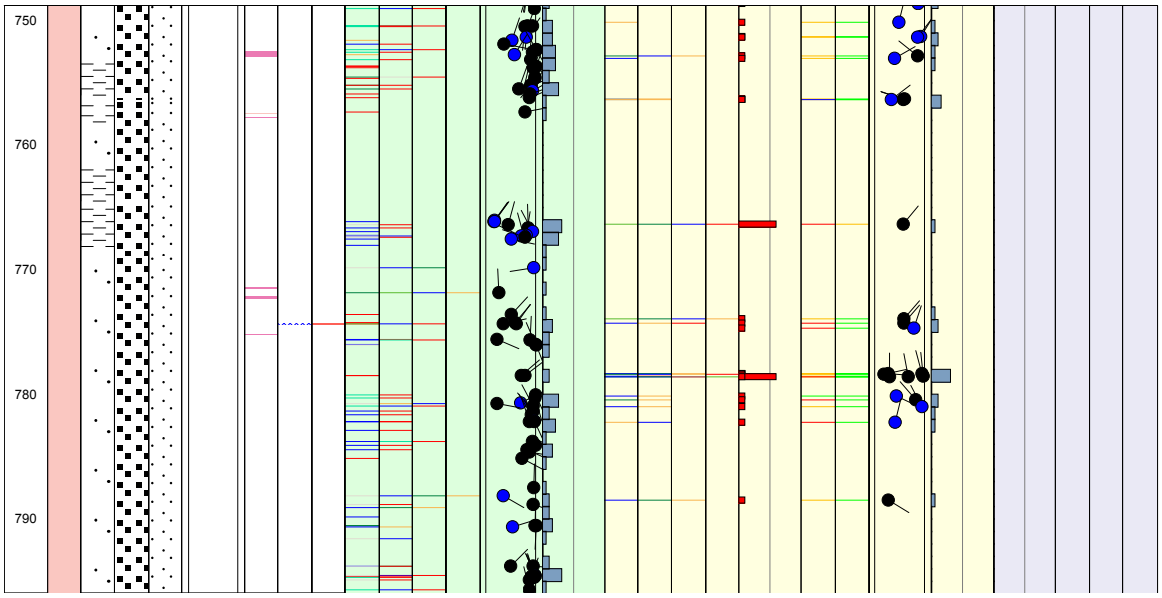



210
220
230
240
250
260
270
280
290
300
310
320
330


340
350
360
370
380
390
400
410
420
430
440
450
460
470
5
7
20
10


480
490
500
510
520
530
540
550
560
570
580
590
600
610
30
40
10
15
4
15
20
20
10
10
25


620
630
640
650
660
670
680
690
700
710
720
730
740


750
760
770
780
790

Legend to WellCad diagram for KLX19A

Title LEGEND FOR LAXEMAR KLX19A

Site LAXEMAR
Borehole KLX19A
Plot Date 2007-10-25 22:03:45
Signed data

ROCKTYPE LAXEMAR
- Äspö Diorite
- Dolerite
- Fine-grained Götemargranite
- Coarse-grained Götemargranite
- Fine-grained granite
- Pegmatite
- Granite
- Ävrö granite
- Quartz monzodiorite
- Diorite / Gabbro
- Fine-grained dioritoid
- Fine-grained diorite-gabbro
- Sulphide mineralization
- Sandstone
- Soil
- Ävrö quartz monzodiorite
- Ävrö granodiorite

STRUCTURE
- Cataclastic
- Schistose
- Gneissic
- Mylonitic
- Ductile Shear Zone
- Brittle-Ductile Zone
- Veined
- Banded
- Massive
- Foliated
- Brecciated
- Lineated

TEXTURE
- Hornfelsed
- Porphyritic
- Ophitic
- Equigranular
- Augen-Bearing
- Unequigranular
- Metamorphic

GRAINSIZE
- Aphanitic
- Fine-grained
- Fine to medium grained
- Medium to coarse grained
- Coarse-grained
- Medium-grained

STRUCTURE ORIENTATION
- Cataclastic
- Bedded
- Gneissic
- Schistose
- Brittle-Ductile Shear Zone
- Ductile Shear Zone
- Lineated
- Banded
- Veined
- Brecciated
- Foliated
- Mylonitic

ROCK ALTERATION TYPE
- Oxidized
- Chloritisized
- Epidotisized
- Weathered
- Tectonized
- Sericitisized
- Quartz dissolution
- Silicification
- Argillization
- Albitization
- Carbonatization
- Saussuritization
- Steatitization
- Uralitization
- Laumontitization
- Fract zone alteration

ROCK ALTERATION INTENSITY
- No intensity
- Faint
- Weak
- Medium
- Strong

ROUGHNESS
- Planar
- Undulating
- Stepped
- Irregular

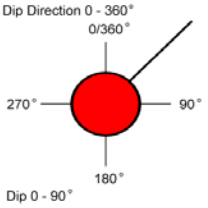
SURFACE
- Rough
- Smooth
- Slickensided

CRUSH ALTERATION
- Slightly Altered
- Moderately Altered
- Highly Altered
- Completley Altered
- Gouge
- Fresh

MINERAL
- Epidote
- Calcite
- Chlorite
- Quartz
- Unknown
- Pyrite
- Clay Minerals
- Zeolite
- Prehnite
- Oxidized Walls

FRACTURE ALTERATION
- Slightly Altered
- Moderately Altered
- Highly Altered
- Completely Altered
- Gouge
- Fresh

FRACTURE DIRECTION
STRUKTURE ORIENTATION



Appendix 6

In-data: Borehole length and diameter for KLX19A
Hole Diam T - Drilling: Borehole diameter

KLX19A, 2006-06-03 11:00:00 - 2006-09-20 17:27:00 (99.330 - 800.070 m)

Sub Secup (m)	Sub Seclow (m)	Hole Diam (m)	Comment
99.330	100.730	0.0862	T-86
100.230	800.070	0.0758	Corac N/3
520.300	522.500	0.0840	

Printout from SICADA 2006-10-23 12:57:37.

In-data: Reference marks for length adjustments for KLX19A

KLX19A, 2006-11-25 15:00:00 - 2006-11-26 17:24:00 (110.000 - 778.000 m)

Bhlen (m)	Rotation Speed (rpm)	Start Flow (l/h)	Stop Flow (l/h)	Stop Pressure (bar)	Cutter Time (s)	Trace Detectable	Cutter Diameter (mm)	Comment
110.00	400.00	200	1000	40.0	19	Yes		
150.00	400.00	200	1000	35.0	36	Yes		
200.00	400.00	200	1000	37.0	33	Yes		
250.00	400.00	200	1000	33.0	34	Yes		
303.00	400.00	200	1000	36.0	32	Yes		Korrigerat djup efter kontroll av referenspår
350.00	400.00	250	1000	36.0	34	Yes		
403.00	400.00	200	1000	39.0	31	Yes		Korrigerat djup efter kontroll av referenspår
447.00	400.00	200	1000	38.0	35	Yes		Korrigerat djup efter kontroll av referenspår
507.00	400.00	250	1000	37.0	32	Yes		Korrigerat djup efter kontroll av referenspår
547.00	400.00	200	1000	38.0	27	Yes		Korrigerat djup efter kontroll av referenspår
597.00	400.00	200	1000	35.0	30	Yes		Korrigerat djup efter kontroll av referenspår
647.00	400.00	250	1000	35.0	28	Yes		Korrigerat djup efter kontroll av referenspår
697.00	400.00	200	1000	39.0	33	Yes		Korrigerat djup efter kontroll av referenspår
748.00	400.00	300	1000	40.0	37	Yes		Korrigerat djup efter kontroll av referenspår
778.00	400.00	300	1000	40.0	35	Yes		Släppte kulan 17:24

Printout from SICADA 2006-11-22 13:19:19.

Appendix 8

In-data: Borehole deviation data for KLX19A

SICADA - object_location

Idcode	Coord System	Northing (m)	Easting (m)	Elevation (m.a.s.l.)	Length (m)	Vertical Depth (m)	Inclination (degrees)	Bearing (degrees)	Inclination Uncert (degrees)	Bearing Uncert (degrees)	Radius Uncert (m)	Origin	Indat
KLX19A	RT90-RHB70	6365901.42	1547004.62	16.87	0.00	0.00	-57.55	197.13	0.995	0.595	0.00	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365899.88	1547004.14	14.34	3.00	2.53	-57.55	197.13	0.995	0.595	0.05	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365898.34	1547003.67	11.81	6.00	5.06	-57.34	197.10	0.995	0.595	0.10	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365896.79	1547003.19	9.28	9.00	7.59	-57.31	197.08	0.995	0.595	0.16	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365895.24	1547002.72	6.76	12.00	10.11	-57.34	197.06	0.995	0.595	0.21	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365893.69	1547002.24	4.23	15.00	12.64	-57.31	197.04	0.995	0.595	0.26	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365892.14	1547001.77	1.71	18.00	15.16	-57.28	197.02	0.995	0.595	0.31	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365890.59	1547001.30	-0.82	21.00	17.69	-57.36	196.99	0.995	0.595	0.36	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365889.05	1547000.82	-3.34	24.00	20.21	-57.47	196.97	0.995	0.595	0.42	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365887.51	1547000.35	-5.87	27.00	22.74	-57.50	196.95	0.995	0.595	0.47	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365885.97	1546999.88	-8.41	30.00	25.27	-57.61	196.93	0.995	0.595	0.52	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365884.43	1546999.42	-10.94	33.00	27.81	-57.72	196.90	0.995	0.595	0.57	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365882.90	1546998.95	-13.48	36.00	30.35	-57.78	196.88	0.995	0.595	0.63	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365881.37	1546998.49	-16.02	39.00	32.88	-57.78	196.86	0.995	0.595	0.68	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365879.84	1546998.02	-18.55	42.00	35.42	-57.81	196.84	0.995	0.595	0.73	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365878.31	1546997.56	-21.09	45.00	37.96	-57.77	196.82	0.995	0.595	0.78	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365876.78	1546997.10	-23.63	48.00	40.50	-57.75	196.79	0.995	0.595	0.83	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365875.24	1546996.64	-26.17	51.00	43.04	-57.78	196.77	0.995	0.595	0.89	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365873.71	1546996.18	-28.71	54.00	45.58	-57.88	196.75	0.995	0.595	0.94	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365872.19	1546995.72	-31.25	57.00	48.12	-57.86	196.73	0.995	0.595	0.99	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365870.66	1546995.26	-33.79	60.00	50.66	-57.83	196.70	0.995	0.595	1.04	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365869.13	1546994.80	-36.33	63.00	53.19	-57.78	196.68	0.995	0.595	1.09	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365867.59	1546994.34	-38.86	66.00	55.73	-57.81	196.66	0.995	0.595	1.15	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365866.06	1546993.88	-41.40	69.00	58.27	-57.78	196.64	0.995	0.595	1.20	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365864.53	1546993.42	-43.94	72.00	60.81	-57.82	196.62	0.995	0.595	1.25	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365863.00	1546992.97	-46.48	75.00	63.35	-57.86	196.59	0.995	0.595	1.30	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365861.47	1546992.51	-49.02	78.00	65.89	-57.89	196.57	0.995	0.595	1.35	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365859.94	1546992.06	-51.56	81.00	68.43	-57.78	196.55	0.995	0.595	1.41	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365858.41	1546991.60	-54.10	84.00	70.97	-57.78	196.53	0.995	0.595	1.46	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365856.87	1546991.15	-56.64	87.00	73.51	-57.78	196.50	0.995	0.595	1.51	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365855.34	1546990.69	-59.18	90.00	76.05	-57.86	196.48	0.995	0.595	1.56	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365853.81	1546990.24	-61.72	93.00	78.59	-57.86	196.46	0.995	0.595	1.61	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365852.28	1546989.79	-64.26	96.00	81.13	-57.84	196.44	0.995	0.595	1.67	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365850.75	1546989.34	-66.80	99.00	83.66	-57.81	196.42	0.995	0.595	1.72	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365849.21	1546988.89	-69.33	102.00	86.20	-57.79	196.39	0.995	0.595	1.77	Measured	2007-01-17 09:56

KLX19A	RT90-RHB70	6365847.68	1546988.43	-71.87	105.00	88.74	-57.77	196.37	0.995	0.595	1.82	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365846.14	1546987.98	-74.41	108.00	91.28	-57.75	196.35	0.995	0.595	1.88	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365844.61	1546987.53	-76.95	111.00	93.82	-57.72	196.33	0.995	0.595	1.93	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365843.07	1546987.08	-79.48	114.00	96.35	-57.69	196.31	0.995	0.595	1.98	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365841.53	1546986.63	-82.02	117.00	98.89	-57.68	196.30	0.995	0.595	2.03	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365839.99	1546986.18	-84.55	120.00	101.42	-57.66	196.30	0.995	0.595	2.08	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365838.45	1546985.73	-87.09	123.00	103.96	-57.64	196.31	0.995	0.595	2.14	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365836.91	1546985.28	-89.62	126.00	106.49	-57.61	196.35	0.995	0.595	2.19	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365835.36	1546984.83	-92.15	129.00	109.02	-57.59	196.37	0.995	0.595	2.24	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365833.82	1546984.37	-94.69	132.00	111.56	-57.58	196.36	0.995	0.595	2.29	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365832.28	1546983.92	-97.22	135.00	114.09	-57.53	196.34	0.995	0.595	2.34	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365830.73	1546983.47	-99.75	138.00	116.62	-57.50	196.37	0.995	0.595	2.40	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365829.18	1546983.01	-102.28	141.00	119.15	-57.47	196.37	0.995	0.595	2.45	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365827.64	1546982.56	-104.81	144.00	121.68	-57.42	196.37	0.995	0.595	2.50	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365826.09	1546982.10	-107.34	147.00	124.20	-57.41	196.38	0.995	0.595	2.55	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365824.54	1546981.65	-109.86	150.00	126.73	-57.40	196.38	0.995	0.595	2.60	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365822.98	1546981.19	-112.39	153.00	129.26	-57.37	196.39	0.995	0.595	2.66	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365821.43	1546980.73	-114.92	156.00	131.79	-57.36	196.41	0.995	0.595	2.71	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365819.88	1546980.28	-117.44	159.00	134.31	-57.34	196.41	0.995	0.595	2.76	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365818.33	1546979.82	-119.97	162.00	136.84	-57.33	196.44	0.995	0.595	2.81	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365816.77	1546979.36	-122.49	165.00	139.36	-57.30	196.46	0.995	0.595	2.87	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365815.22	1546978.90	-125.02	168.00	141.89	-57.28	196.46	0.995	0.595	2.92	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365813.66	1546978.44	-127.54	171.00	144.41	-57.26	196.44	0.995	0.595	2.97	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365812.11	1546977.98	-130.06	174.00	146.93	-57.23	196.44	0.995	0.595	3.02	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365810.55	1546977.52	-132.59	177.00	149.45	-57.20	196.44	0.995	0.595	3.07	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365808.99	1546977.06	-135.11	180.00	151.98	-57.17	196.44	0.995	0.595	3.13	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365807.43	1546976.60	-137.63	183.00	154.50	-57.14	196.46	0.995	0.595	3.18	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365805.87	1546976.14	-140.15	186.00	157.02	-57.13	196.45	0.995	0.595	3.23	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365804.31	1546975.68	-142.67	189.00	159.54	-57.13	196.44	0.995	0.595	3.28	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365802.74	1546975.22	-145.19	192.00	162.06	-57.11	196.43	0.995	0.595	3.33	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365801.18	1546974.76	-147.71	195.00	164.58	-57.11	196.38	0.995	0.595	3.39	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365799.62	1546974.30	-150.23	198.00	167.09	-57.11	196.39	0.995	0.595	3.44	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365798.05	1546973.84	-152.74	201.00	169.61	-57.09	196.42	0.995	0.595	3.49	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365796.49	1546973.38	-155.26	204.00	172.13	-57.09	196.43	0.995	0.595	3.54	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365794.93	1546972.92	-157.78	207.00	174.65	-57.09	196.39	0.995	0.595	3.59	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365793.36	1546972.46	-160.30	210.00	177.17	-57.09	196.39	0.995	0.595	3.65	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365791.80	1546972.00	-162.82	213.00	179.69	-57.07	196.41	0.995	0.595	3.70	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365790.23	1546971.54	-165.34	216.00	182.20	-57.08	196.44	0.995	0.595	3.75	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365788.67	1546971.07	-167.85	219.00	184.72	-57.08	196.43	0.995	0.595	3.80	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365787.11	1546970.61	-170.37	222.00	187.24	-57.09	196.44	0.995	0.595	3.86	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365785.54	1546970.15	-172.89	225.00	189.76	-57.09	196.45	0.995	0.595	3.91	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365783.98	1546969.69	-175.41	228.00	192.28	-57.11	196.44	0.995	0.595	3.96	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365782.42	1546969.23	-177.93	231.00	194.80	-57.08	196.44	0.995	0.595	4.01	Measured	2007-01-17 09:56

KLX19A	RT90-RHB70	6365780.85	1546968.77	-180.45	234.00	197.32	-57.05	196.43	0.995	0.595	4.06	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365779.29	1546968.31	-182.96	237.00	199.83	-57.03	196.39	0.995	0.595	4.12	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365777.72	1546967.85	-185.48	240.00	202.35	-57.03	196.36	0.995	0.595	4.17	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365776.15	1546967.38	-188.00	243.00	204.87	-56.97	196.50	0.995	0.595	4.22	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365774.59	1546966.92	-190.51	246.00	207.38	-56.94	196.50	0.995	0.595	4.27	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365773.02	1546966.45	-193.02	249.00	209.89	-56.93	196.50	0.995	0.595	4.32	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365771.45	1546965.99	-195.54	252.00	212.41	-56.92	196.48	0.995	0.595	4.38	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365769.88	1546965.53	-198.05	255.00	214.92	-56.92	196.45	0.995	0.595	4.43	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365768.31	1546965.06	-200.57	258.00	217.44	-56.92	196.43	0.995	0.595	4.48	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365766.73	1546964.60	-203.08	261.00	219.95	-56.89	196.33	0.995	0.595	4.53	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365765.16	1546964.14	-205.59	264.00	222.46	-56.91	196.26	0.995	0.595	4.58	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365763.59	1546963.68	-208.11	267.00	224.98	-56.94	196.35	0.995	0.595	4.64	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365762.02	1546963.22	-210.62	270.00	227.49	-57.00	196.46	0.995	0.595	4.69	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365760.45	1546962.76	-213.14	273.00	230.01	-57.00	196.46	0.995	0.595	4.74	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365758.89	1546962.29	-215.65	276.00	232.52	-57.00	196.47	0.995	0.595	4.79	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365757.32	1546961.83	-218.17	279.00	235.04	-56.99	196.45	0.995	0.595	4.84	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365755.75	1546961.37	-220.69	282.00	237.55	-56.99	196.42	0.995	0.595	4.90	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365754.18	1546960.91	-223.20	285.00	240.07	-56.99	196.41	0.995	0.595	4.95	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365752.62	1546960.45	-225.72	288.00	242.59	-56.98	196.39	0.995	0.595	5.00	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365751.05	1546959.98	-228.23	291.00	245.10	-56.97	196.37	0.995	0.595	5.05	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365749.48	1546959.52	-230.75	294.00	247.62	-56.97	196.35	0.995	0.595	5.11	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365747.91	1546959.06	-233.26	297.00	250.13	-56.97	196.30	0.995	0.595	5.16	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365746.34	1546958.60	-235.78	300.00	252.65	-56.97	196.31	0.995	0.595	5.21	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365744.77	1546958.15	-238.29	303.00	255.16	-56.94	196.32	0.995	0.595	5.26	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365743.20	1546957.69	-240.81	306.00	257.67	-56.92	196.33	0.995	0.595	5.31	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365741.63	1546957.22	-243.32	309.00	260.19	-56.92	196.35	0.995	0.595	5.37	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365740.06	1546956.76	-245.83	312.00	262.70	-56.91	196.41	0.995	0.595	5.42	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365738.48	1546956.30	-248.35	315.00	265.22	-56.91	196.38	0.995	0.595	5.47	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365736.91	1546955.84	-250.86	318.00	267.73	-56.91	196.38	0.995	0.595	5.52	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365735.34	1546955.38	-253.37	321.00	270.24	-56.94	196.33	0.995	0.595	5.57	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365733.77	1546954.92	-255.89	324.00	272.76	-56.95	196.32	0.995	0.595	5.63	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365732.20	1546954.46	-258.40	327.00	275.27	-56.96	196.32	0.995	0.595	5.68	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365730.63	1546954.00	-260.92	330.00	277.79	-56.95	196.40	0.995	0.595	5.73	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365729.06	1546953.54	-263.43	333.00	280.30	-56.94	196.40	0.995	0.595	5.78	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365727.49	1546953.07	-265.95	336.00	282.82	-56.93	196.41	0.995	0.595	5.83	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365725.92	1546952.61	-268.46	339.00	285.33	-56.93	196.37	0.995	0.595	5.89	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365724.35	1546952.15	-270.97	342.00	287.84	-56.92	196.38	0.995	0.595	5.94	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365722.78	1546951.69	-273.49	345.00	290.36	-56.91	196.36	0.995	0.595	5.99	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365721.21	1546951.23	-276.00	348.00	292.87	-56.91	196.34	0.995	0.595	6.04	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365719.64	1546950.77	-278.52	351.00	295.38	-56.91	196.33	0.995	0.595	6.10	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365718.07	1546950.31	-281.03	354.00	297.90	-56.91	196.33	0.995	0.595	6.15	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365716.49	1546949.85	-283.54	357.00	300.41	-56.91	196.32	0.995	0.595	6.20	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365714.92	1546949.39	-286.06	360.00	302.92	-56.91	196.31	0.995	0.595	6.25	Measured	2007-01-17 09:56

KLX19A	RT90-RHB70	6365713.35	1546948.93	-288.57	363.00	305.44	-56.89	196.31	0.995	0.595	6.30	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365711.78	1546948.46	-291.08	366.00	307.95	-56.87	196.36	0.995	0.595	6.36	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365710.20	1546948.00	-293.59	369.00	310.46	-56.86	196.31	0.995	0.595	6.41	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365708.63	1546947.54	-296.11	372.00	312.97	-56.86	196.28	0.995	0.595	6.46	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365707.05	1546947.08	-298.62	375.00	315.49	-56.84	196.25	0.995	0.595	6.51	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365705.48	1546946.63	-301.13	378.00	318.00	-56.83	196.22	0.995	0.595	6.56	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365703.90	1546946.17	-303.64	381.00	320.51	-56.80	196.18	0.995	0.595	6.62	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365702.32	1546945.71	-306.15	384.00	323.02	-56.77	196.15	0.995	0.595	6.67	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365700.74	1546945.25	-308.66	387.00	325.53	-56.76	195.99	0.995	0.595	6.72	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365699.16	1546944.80	-311.17	390.00	328.04	-56.75	195.98	0.995	0.595	6.77	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365697.58	1546944.35	-313.68	393.00	330.55	-56.75	196.10	0.995	0.595	6.82	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365696.00	1546943.89	-316.19	396.00	333.05	-56.75	196.09	0.995	0.595	6.88	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365694.42	1546943.44	-318.69	399.00	335.56	-56.74	196.09	0.995	0.595	6.93	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365692.84	1546942.98	-321.20	402.00	338.07	-56.72	196.09	0.995	0.595	6.98	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365691.26	1546942.52	-323.71	405.00	340.58	-56.70	196.07	0.995	0.595	7.03	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365689.67	1546942.07	-326.22	408.00	343.09	-56.69	196.06	0.995	0.595	7.08	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365688.09	1546941.62	-328.72	411.00	345.59	-56.66	195.85	0.995	0.595	7.14	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365686.50	1546941.17	-331.23	414.00	348.10	-56.64	195.78	0.995	0.595	7.19	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365684.92	1546940.72	-333.74	417.00	350.61	-56.63	195.88	0.995	0.595	7.24	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365683.33	1546940.26	-336.24	420.00	353.11	-56.62	195.95	0.995	0.595	7.29	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365681.74	1546939.81	-338.75	423.00	355.62	-56.61	196.01	0.995	0.595	7.35	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365680.15	1546939.35	-341.25	426.00	358.12	-56.60	196.07	0.995	0.595	7.40	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365678.57	1546938.89	-343.76	429.00	360.62	-56.59	196.12	0.995	0.595	7.45	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365676.98	1546938.44	-346.26	432.00	363.13	-56.59	196.16	0.995	0.595	7.50	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365675.39	1546937.97	-348.76	435.00	365.63	-56.60	196.21	0.995	0.595	7.55	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365673.81	1546937.51	-351.27	438.00	368.14	-56.61	196.31	0.995	0.595	7.61	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365672.22	1546937.05	-353.77	441.00	370.64	-56.60	196.40	0.995	0.595	7.66	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365670.64	1546936.58	-356.28	444.00	373.15	-56.59	196.38	0.995	0.595	7.71	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365669.06	1546936.12	-358.78	447.00	375.65	-56.59	196.36	0.995	0.595	7.76	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365667.47	1546935.65	-361.29	450.00	378.16	-56.57	196.26	0.995	0.595	7.81	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365665.88	1546935.19	-363.79	453.00	380.66	-56.55	196.16	0.995	0.595	7.87	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365664.29	1546934.73	-366.29	456.00	383.16	-56.53	196.13	0.995	0.595	7.92	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365662.70	1546934.27	-368.79	459.00	385.66	-56.53	196.07	0.995	0.595	7.97	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365661.11	1546933.81	-371.30	462.00	388.17	-56.53	196.04	0.995	0.595	8.02	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365659.52	1546933.36	-373.80	465.00	390.67	-56.53	196.01	0.995	0.595	8.07	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365657.93	1546932.90	-376.30	468.00	393.17	-56.55	195.97	0.995	0.595	8.13	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365656.34	1546932.45	-378.81	471.00	395.67	-56.56	195.94	0.995	0.595	8.18	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365654.75	1546931.99	-381.31	474.00	398.18	-56.56	195.87	0.995	0.595	8.23	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365653.16	1546931.54	-383.81	477.00	400.68	-56.56	195.85	0.995	0.595	8.28	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365651.57	1546931.09	-386.32	480.00	403.18	-56.56	195.82	0.995	0.595	8.34	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365649.98	1546930.64	-388.82	483.00	405.69	-56.55	195.82	0.995	0.595	8.39	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365648.39	1546930.19	-391.32	486.00	408.19	-56.56	195.82	0.995	0.595	8.44	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365646.80	1546929.74	-393.83	489.00	410.70	-56.59	195.81	0.995	0.595	8.49	Measured	2007-01-17 09:56

KLX19A	RT90-RHB70	6365645.21	1546929.29	-396.33	492.00	413.20	-56.61	195.79	0.995	0.595	8.54	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365643.62	1546928.84	-398.84	495.00	415.70	-56.61	195.81	0.995	0.595	8.60	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365642.03	1546928.39	-401.34	498.00	418.21	-56.61	195.82	0.995	0.595	8.65	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365640.45	1546927.94	-403.84	501.00	420.71	-56.58	195.82	0.995	0.595	8.70	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365638.86	1546927.49	-406.35	504.00	423.22	-56.57	195.84	0.995	0.595	8.75	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365637.27	1546927.04	-408.85	507.00	425.72	-56.56	195.87	0.995	0.595	8.80	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365635.68	1546926.59	-411.36	510.00	428.22	-56.55	195.95	0.995	0.595	8.86	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365634.08	1546926.13	-413.86	513.00	430.73	-56.54	195.86	0.995	0.595	8.91	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365632.49	1546925.68	-416.36	516.00	433.23	-56.54	195.79	0.995	0.595	8.96	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365630.90	1546925.23	-418.86	519.00	435.73	-56.53	195.74	0.995	0.595	9.01	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365629.31	1546924.78	-421.37	522.00	438.24	-56.54	195.70	0.995	0.595	9.06	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365627.72	1546924.34	-423.87	525.00	440.74	-56.52	195.69	0.995	0.595	9.12	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365626.12	1546923.89	-426.37	528.00	443.24	-56.50	195.69	0.995	0.595	9.17	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365624.53	1546923.44	-428.87	531.00	445.74	-56.49	195.69	0.995	0.595	9.22	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365622.93	1546922.99	-431.37	534.00	448.24	-56.48	195.58	0.995	0.595	9.27	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365621.34	1546922.55	-433.87	537.00	450.74	-56.45	195.53	0.995	0.595	9.33	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365619.74	1546922.11	-436.37	540.00	453.24	-56.42	195.53	0.995	0.595	9.38	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365618.14	1546921.66	-438.87	543.00	455.74	-56.41	195.59	0.995	0.595	9.43	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365616.54	1546921.21	-441.37	546.00	458.24	-56.41	195.72	0.995	0.595	9.48	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365614.94	1546920.76	-443.87	549.00	460.74	-56.41	195.71	0.995	0.595	9.53	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365613.35	1546920.31	-446.37	552.00	463.24	-56.41	195.74	0.995	0.595	9.59	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365611.75	1546919.86	-448.87	555.00	465.74	-56.39	195.70	0.995	0.595	9.64	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365610.15	1546919.41	-451.37	558.00	468.24	-56.36	195.69	0.995	0.595	9.69	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365608.55	1546918.97	-453.86	561.00	470.73	-56.36	195.67	0.995	0.595	9.74	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365606.95	1546918.52	-456.36	564.00	473.23	-56.38	195.69	0.995	0.595	9.79	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365605.35	1546918.07	-458.86	567.00	475.73	-56.40	195.58	0.995	0.595	9.85	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365603.75	1546917.62	-461.36	570.00	478.23	-56.40	195.51	0.995	0.595	9.90	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365602.15	1546917.18	-463.86	573.00	480.73	-56.38	195.46	0.995	0.595	9.95	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365600.55	1546916.74	-466.36	576.00	483.22	-56.37	195.43	0.995	0.595	10.00	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365598.95	1546916.30	-468.85	579.00	485.72	-56.36	195.32	0.995	0.595	10.05	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365597.34	1546915.86	-471.35	582.00	488.22	-56.36	195.28	0.995	0.595	10.11	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365595.74	1546915.42	-473.85	585.00	490.72	-56.35	195.21	0.995	0.595	10.16	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365594.13	1546914.99	-476.35	588.00	493.21	-56.34	195.21	0.995	0.595	10.21	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365592.53	1546914.55	-478.84	591.00	495.71	-56.32	195.14	0.995	0.595	10.26	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365590.92	1546914.12	-481.34	594.00	498.21	-56.31	195.13	0.995	0.595	10.31	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365589.32	1546913.68	-483.83	597.00	500.70	-56.30	194.94	0.995	0.595	10.37	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365587.71	1546913.25	-486.33	600.00	503.20	-56.28	194.94	0.995	0.595	10.42	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365586.10	1546912.82	-488.83	603.00	505.69	-56.28	194.95	0.995	0.595	10.47	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365584.49	1546912.39	-491.32	606.00	508.19	-56.28	194.94	0.995	0.595	10.52	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365582.88	1546911.97	-493.82	609.00	510.69	-56.28	194.94	0.995	0.595	10.58	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365581.27	1546911.54	-496.31	612.00	513.18	-56.28	194.82	0.995	0.595	10.63	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365579.66	1546911.11	-498.81	615.00	515.68	-56.28	194.79	0.995	0.595	10.68	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365578.05	1546910.69	-501.30	618.00	518.17	-56.28	194.79	0.995	0.595	10.73	Measured	2007-01-17 09:56

KLX19A	RT90-RHB70	6365576.44	1546910.26	-503.80	621.00	520.67	-56.28	194.84	0.995	0.595	10.78	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365574.83	1546909.83	-506.29	624.00	523.16	-56.27	195.22	0.995	0.595	10.84	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365573.22	1546909.39	-508.79	627.00	525.66	-56.27	195.22	0.995	0.595	10.89	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365571.62	1546908.95	-511.28	630.00	528.15	-56.27	195.20	0.995	0.595	10.94	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365570.01	1546908.52	-513.78	633.00	530.65	-56.26	195.16	0.995	0.595	10.99	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365568.40	1546908.08	-516.27	636.00	533.14	-56.25	195.14	0.995	0.595	11.04	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365566.79	1546907.65	-518.77	639.00	535.64	-56.25	195.14	0.995	0.595	11.10	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365565.18	1546907.22	-521.26	642.00	538.13	-56.25	194.79	0.995	0.595	11.15	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365563.57	1546906.79	-523.76	645.00	540.62	-56.25	194.88	0.995	0.595	11.20	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365561.96	1546906.36	-526.25	648.00	543.12	-56.24	194.92	0.995	0.595	11.25	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365560.35	1546905.93	-528.74	651.00	545.61	-56.24	194.91	0.995	0.595	11.30	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365558.74	1546905.50	-531.24	654.00	548.11	-56.23	194.90	0.995	0.595	11.36	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365557.12	1546905.08	-533.73	657.00	550.60	-56.24	194.75	0.995	0.595	11.41	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365555.51	1546904.65	-536.23	660.00	553.09	-56.24	194.74	0.995	0.595	11.46	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365553.90	1546904.23	-538.72	663.00	555.59	-56.26	194.76	0.995	0.595	11.51	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365552.29	1546903.80	-541.21	666.00	558.08	-56.27	194.92	0.995	0.595	11.57	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365550.68	1546903.37	-543.71	669.00	560.58	-56.27	194.92	0.995	0.595	11.62	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365549.07	1546902.94	-546.20	672.00	563.07	-56.28	194.91	0.995	0.595	11.67	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365547.46	1546902.52	-548.70	675.00	565.57	-56.28	194.72	0.995	0.595	11.72	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365545.85	1546902.10	-551.20	678.00	568.06	-56.30	194.65	0.995	0.595	11.77	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365544.24	1546901.68	-553.69	681.00	570.56	-56.31	194.64	0.995	0.595	11.83	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365542.63	1546901.26	-556.19	684.00	573.06	-56.31	194.62	0.995	0.595	11.88	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365541.02	1546900.84	-558.68	687.00	575.55	-56.31	194.49	0.995	0.595	11.93	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365539.41	1546900.42	-561.18	690.00	578.05	-56.31	194.58	0.995	0.595	11.98	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365537.80	1546900.00	-563.68	693.00	580.55	-56.31	194.57	0.995	0.595	12.03	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365536.19	1546899.58	-566.17	696.00	583.04	-56.30	194.63	0.995	0.595	12.09	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365534.58	1546899.16	-568.67	699.00	585.54	-56.31	194.61	0.995	0.595	12.14	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365532.97	1546898.74	-571.16	702.00	588.03	-56.30	194.60	0.995	0.595	12.19	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365531.35	1546898.32	-573.66	705.00	590.53	-56.29	194.41	0.995	0.595	12.24	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365529.74	1546897.91	-576.16	708.00	593.02	-56.28	194.56	0.995	0.595	12.29	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365528.13	1546897.49	-578.65	711.00	595.52	-56.28	194.55	0.995	0.595	12.35	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365526.52	1546897.07	-581.15	714.00	598.02	-56.28	194.54	0.995	0.595	12.40	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365524.91	1546896.66	-583.64	717.00	600.51	-56.30	194.30	0.995	0.595	12.45	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365523.29	1546896.24	-586.14	720.00	603.01	-56.28	194.47	0.995	0.595	12.50	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365521.68	1546895.83	-588.63	723.00	605.50	-56.27	194.47	0.995	0.595	12.56	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365520.07	1546895.41	-591.13	726.00	608.00	-56.26	194.45	0.995	0.595	12.61	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365518.45	1546895.00	-593.62	729.00	610.49	-56.25	194.38	0.995	0.595	12.66	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365516.84	1546894.58	-596.12	732.00	612.98	-56.24	194.38	0.995	0.595	12.71	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365515.22	1546894.17	-598.61	735.00	615.48	-56.23	194.36	0.995	0.595	12.76	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365513.61	1546893.75	-601.10	738.00	617.97	-56.23	194.34	0.995	0.595	12.82	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365511.99	1546893.34	-603.60	741.00	620.47	-56.22	194.22	0.995	0.595	12.87	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365510.37	1546892.93	-606.09	744.00	622.96	-56.20	194.35	0.995	0.595	12.92	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365508.76	1546892.52	-608.58	747.00	625.45	-56.20	194.34	0.995	0.595	12.97	Measured	2007-01-17 09:56

KLX19A	RT90-RHB70	6365507.14	1546892.10	-611.08	750.00	627.95	-56.19	194.32	0.995	0.595	13.02	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365505.52	1546891.69	-613.57	753.00	630.44	-56.17	194.47	0.995	0.595	13.08	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365503.91	1546891.27	-616.06	756.00	632.93	-56.15	194.43	0.995	0.595	13.13	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365502.29	1546890.86	-618.55	759.00	635.42	-56.14	194.38	0.995	0.595	13.18	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365500.67	1546890.45	-621.04	762.00	637.91	-56.11	194.15	0.995	0.595	13.23	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365499.04	1546890.04	-623.53	765.00	640.40	-56.10	194.07	0.995	0.595	13.28	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365497.42	1546889.63	-626.02	768.00	642.89	-56.09	194.05	0.995	0.595	13.34	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365495.80	1546889.22	-628.51	771.00	645.38	-56.09	194.03	0.995	0.595	13.39	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365494.17	1546888.82	-631.00	774.00	647.87	-56.09	193.97	0.995	0.595	13.44	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365492.55	1546888.42	-633.49	777.00	650.36	-56.08	194.00	0.995	0.595	13.49	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365490.92	1546888.01	-635.98	780.00	652.85	-56.06	193.98	0.995	0.595	13.54	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365489.30	1546887.61	-638.47	783.00	655.34	-56.06	193.97	0.995	0.595	13.60	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365487.67	1546887.20	-640.96	786.00	657.83	-56.04	193.96	0.995	0.595	13.65	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365486.05	1546886.80	-643.45	789.00	660.32	-56.03	193.77	0.995	0.595	13.70	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365484.42	1546886.40	-645.93	792.00	662.80	-56.03	193.63	0.995	0.595	13.75	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365482.79	1546886.01	-648.42	795.00	665.29	-56.03	193.63	0.995	0.595	13.81	Measured	2007-01-17 09:56
KLX19A	RT90-RHB70	6365480.03	1546885.34	-652.63	800.07	669.50	-56.03	193.63	0.995	0.595	13.89	Measured	2007-01-17 09:56

Number of rows: 267.
Printout from SICADA 2007-10-26 12:33:55.