P-06-260

# Oskarshamn site investigation

# RAMAC, BIPS and deviation logging in boreholes KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41

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November 2006

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*Keywords:* BIPS, RAMAC, Radar, TV, Deviation logging, Flexit.

# Abstract

This report includes the data gained in geophysical logging operations performed within the site investigation at Oskarshamn. The logging operations presented here includes borehole radar (RAMAC), BIPS and deviation logging in the core drilled boreholes KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A and KLX26B and in the percussion drilled boreholes HLX39 and HLX41. All measurements were conducted by Malå Geoscience AB/RAYCON during July, August, September and November 2006.

The objective of the radar surveys is to achieve information on the rock mass around the borehole. Borehole radar is used to investigate the nature and the structure of the rock mass enclosing the boreholes.

The objective of the BIPS logging is to achieve information of the borehole including occurrence of rock types as well as determination of fracture distribution and orientation.

The objective of the deviation measurement is to achieve information on borehole coordinates as well as dip and azimuth along the borehole length.

This report describes the equipment used as well as the measurement procedures and data gained. For the BIPS survey, the result is presented as images. Radar data is presented in radargrams and the identified reflectors are listed. The deviation measurement is presented as a list of data.

The borehole radar data quality from KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41 was relatively good, but in some parts of lower quality due to more conductive conditions. This conductive environment of course reduces the possibility to distinguish and interpret possible structures in the rock mass which otherwise could give a reflection. However, the borehole radar measurements resulted in 108 identified radar reflectors in KLX13A and of these 14 were orientated (strike/dip). The corresponding figures for KLX14A are 39 and 4, for KLX22A 34 and 8, for KX22B 27 and 6, for KLX23A 33 and 7, for KLX23B 24 and 5, for KLX24A 33 and 4, for KLX25A 23 and 6, for KLX26A 31 and 5, and for KLX26B 16 and 4. In HLX39 23 structures were identified and in HLX41 25 structures.

The BIPS image quality is not optimal in the core drilled boreholes. Mud covering parts of the borehole walls limits the visibility. However in the percussion drilled boreholes there is no remaining mud left from the drilling.

# Sammanfattning

Denna rapport omfattar geofysiska loggningar inom platsundersökningsprogrammet för Oskarshamn. Mätningarna som presenteras här omfattar borrhålsradarmätningar (RAMAC), och BIPS-loggningar i kärnborrhålen KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A and KLX26B och i hammarborrhålen HLX39 och HLX41. I alla borrhål genomfördes även avvikelsemätningar, s k krökningsmätningar. Alla mätningar är utförda av Malå Geoscience AB/RAYCON under juli, augusti, september och november 2006.

Syftet med radarmätningarna är att samla information om bergmassan runt borrhålet. Borrhålsradar används till att karakterisera bergets egenskaper och strukturer i bergmassan närmast borrhålet.

Syftet med BIPS-loggningen är att skaffa information om borrhålet inkluderande förekommande bergarter och bestämning av sprickors fördelning och deras orientering.

Syftet med krökningsmätningarna är att mäta lutning och riktning och därmed få fram koordinater för punkter längs med borrhålet.

Rapporten beskriver utrustningen som använts liksom mätprocedurer och en beskrivning och tolkning av data som erhållits. För BIPS-loggningen presenteras data som plottar längs med borrhålet. Radardata presenteras i radargram och en lista över tolkade radarreflektorer ges. Krökningsmätningen presenteras som en lista med lägesdata.

Borrhålsradardata från KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 och HLX41 var relativt bra, men bitvis med sämre djuppenetration troligen till stor del beroende på en konduktiv miljö. En konduktiv miljö minskar möjligheterna att identifiera strukturer från borrhålsradardata. Dock har 108 radarreflektorer identifierats i KLX13A och av dessa har 14 orienterats (med strykning/stupning). Motsvarande siffror för KLX14A är 39 och 4, för KLX22A 34 och 8, för KLX22B 27 och 6, för KLX23A 33 och 7, för KLX23B 24 och 5, för KLX24A 33 och 4, för KLX25A 23 och 6, för KLX26A 31 och 5 och för KLX26B 16 och 4. I HLX39 identifierades 23 strukturer och i HLX41 25 strukturer.

Kvalitén på BIPS bilderna är inte helt optimala i de kärnborrade borrhålen, framförallt är det suspendat på den nedre delen av borrhålsväggen som orsakar kvalitetsförsämringen. Däremot i hammarborrhålen finns det ingen kvarvarande suspendat från borrningen.

# Contents

# 1 Introduction

This report presents the data gained in geophysical logging operations, which is one of the activities performed within the site investigation at Oskarshamn. The logging operations presented here includes borehole radar (RAMAC) and BIPS in the core drilled boreholes KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A and KLX26B and in the percussion drilled boreholes HLX39 and HLX41. In all boreholes deviation measurements were also carried out.

The work was carried out in accordance with activity plans AP PS 400-06-058 and AP PS 400-06-083. In Table 1-1 the controlling documents for performing this activity are listed. Both activity plans and method descriptions are SKB's internal controlling documents.

This report includes measurements from 0 to 590 m in KLX13, from 0 to 170 in KLX14A, 0 to 96 m in KLX22A, from 0 to 96 m in KLX22B, from 0 to 96 m in KLX23A, from 0 to 46 m in KLX23B, from 0 to 95 in KLX24A, from 0 to 46 in KLX25A, from 0 to 95 in KLX26A and from 0 to 46 in KLX26B. These boreholes were core drilled with a diameter of 76 mm. The measurements in HLX39 was made from 0 to 194 m and in HLX41 from 0 to 195 m. These boreholes were percussion drilled with a diameter of 138 mm.

All measurements were conducted by Malå Geoscience AB/RAYCON during July, August, September and November 2006. The investigation site and location of the boreholes is shown in Figure 1-1.

The used investigation techniques comprised:

- Borehole radar measurements (Malå Geoscience AB's RAMAC system) with dipole and directional radar antennas.
- Borehole TV logging with the so-called BIP-system (Borehole Image Processing System), which is a high resolution, side viewing, colour borehole TV system.
- Borehole deviation equipment (Flexit SmartTool from Flexit AB), measuring azimuth, inclination (dip), tool face (gravity and magnetic) and magnetic dip.

The delivered raw and processed data have been inserted in the database of SKB (SICADA) and data are traceable by the activity plan number.

**Table 1-1. Controlling documents for the performance of the activity (SKB's internal controlling documents).**

| Activity plan | Number | Version |
|---|---|---|
| Borrhålsradar, BIPS och Flexit-mätning i KLX13A, KLX24A, KLX25A, HLX39 and HLX41 | AP PS 400-06-083 | 1.0 |
| Borrhålsradar, BIPS och Flexit-mätning i KLX20A, KLX18A, KLX11B–F, HLX38 och HLX40 | Tillägg till AP PS 400-06-058 | 1.0 |
| Tillägg till AP PS 400-06-083 med BIPS radar och krökningsmätning med FLEXIT i KLX14A | Tillägg till AP PS 400-06-083 | 1.0 |
| Tillägg till AP PS 400-06-083 med BIPS radar och krökningsmätning med FLEXIT i KLX26A och KLX26B | Tillägg till AP PS 400-06-083 | 1.0 |
| **Method descriptions** | **Number** | **Version** |
| Metodbeskrivning för TV-loggning med BIPS | SKB MD 222.006 | 1.0 |
| Metodbeskrivning för borrhålsradar | SKB MD 252.020 | 2.0 |
| Metodbeskrivning för krökningsmätning av hammar- och kärnborrhål | SKB MD 224.001 | 1.0 |

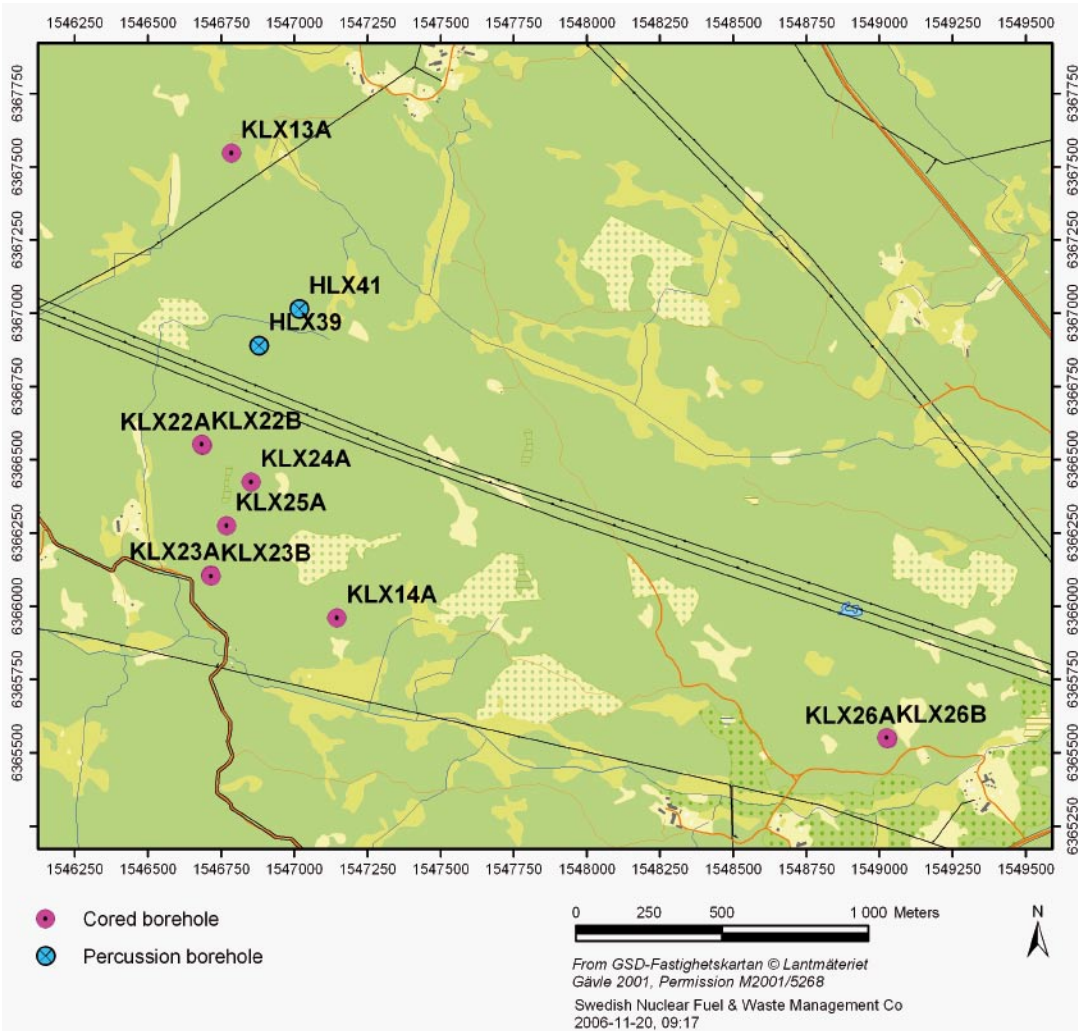



***Figure 1-1.*** *Map of the location of the boreholes KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41 in the Laxemar subarea, Oskarshamn.*

# 2 Objective and scope

The objective of the radar and BIPS surveys is to achieve information on the borehole conditions (borehole wall) as well as on the rock mass around the borehole. Borehole radar is engaged to investigate the nature and the structure of the rock mass enclosing the boreholes, and borehole TV for geological surveying of the borehole including determination of rock types as well as fracture distribution and orientation.

The objective of deviation logging is to achieve information of the borehole coordinates as well as dip and azimuth along the entire borehole length.

This report describes the equipment used for the radar, BIPS and deviation surveys as well as the measurement procedures and data gained. For the BIPS survey, the result is presented as images. Radar data is presented in radargrams and the identified reflectors are listed. The deviation measurements are presented as lists of data (coordinates etc).

# 3 Equipment

## 3.1 Radar measurements RAMAC

The RAMAC GPR system owned by SKB is a fully digital GPR system where emphasis has been laid on fast survey speed and easy field operation. The system operates dipole and directional antennas (see Figure 3-1). A system description is given in the SKB internal controlling document MD 252.021.

The borehole radar system consists of a transmitter and a receiver antenna. During operation an electromagnetic pulse, within the frequency range of 20 MHz up to 250 MHz, is emitted into the bedrock. Once a feature, e.g. a water-filled fracture, with sufficiently different electrical properties is encountered, the pulse is reflected back to the receiver and recorded.

## 3.2 TV-Camera, BIPS

The BIPS 1500 system used is owned by SKB and described in SKB internal controlling document MD 222.005. The BIPS method for borehole logging produces a digital scan of the borehole wall. In principle, a standard CCD video camera is installed in the probe in front of a conical mirror (see Figure 3-2). An acrylic window covers the mirror part and the borehole image is reflected through the window and displayed on the cone, from where it is recorded. During the measuring operation, pixel circles are grabbed with a resolution of 360 pixels/circle.

The system orientates the BIPS images according to two alternative methods, either using a compass (vertical boreholes) or with a gravity sensor (inclined boreholes).

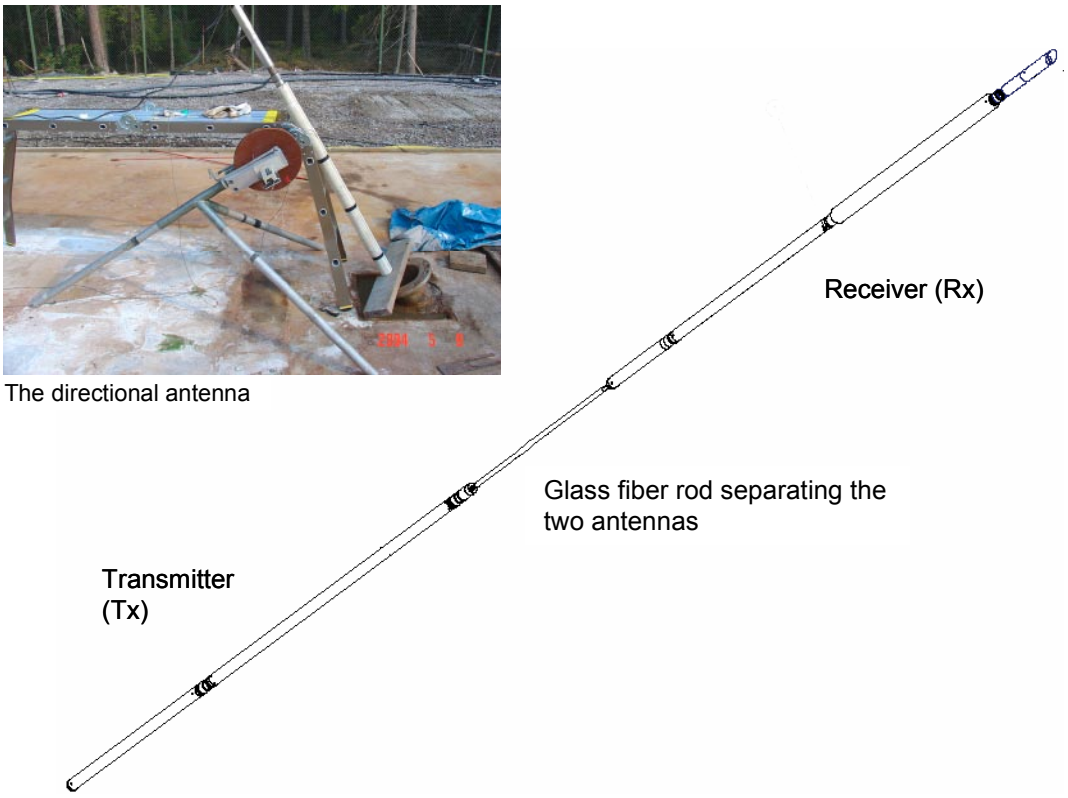



***Figure 3-1.*** *Example of a borehole radar antenna.*

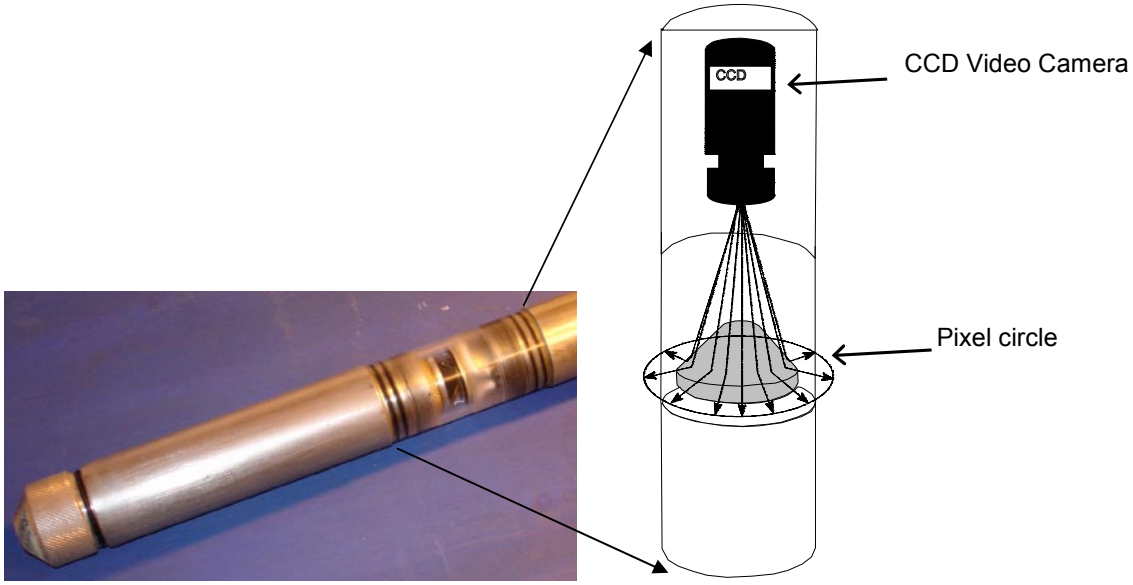



***Figure 3-2.*** *The BIP-system. Illustration of the conical mirror scanning.*

## 3.3 Deviation measurements, Flexit SmartTool

The deviation measurements were carried out with the Flexit SmartTool Deviation equipment, Figure 3-3. The system is based on station readings.

The system consist of a borehole probe (SensIT) including 3-component magnetometers and accelerometers, measuring a number of different parameters. Table 3-1 describe the delivered parameters. Inside the probe the radio link is also built in were all data is downloaded after the end of the survey. The probe are controlled during the measurement either by an external PC and the software package called MeasureIT or a data pad StoreIT. For processing and reporting data the PC software MeasureIT and DisplayIT are used.

In the Flexit SmartTool system there is a magnetic integrity check to detect magnetic disturbance in the survey measurements. Magnetic disturbance results in incorrect/inaccurate azimuth values. The operator can select the average values for this parameters in the MeasureIT software and run a magnetic integrity check and if necessary change or delete azimuth values. If the azimuth value is changed the new added value by the operator is interpolated from the nearby station readings.

For more information and technical specification visit www.flexit.se.


***Figure 3-3.*** *The FlexIT SmartTool-system. Illustration of the set-up in the borehole.*

**Table 3-1. Flexit SmartTool result tables.**

| | |
|---|---|
| Dip: | Inclination of the borehole at the position for reading. |
| Azimuth: | Direction of the borehole at the position for reading. |
| Easting northing and elevation: | Co-ordinate of the borehole at the position for reading. |
| Mag. field: | Strength of earth's magnetic field. |
| Mag. dip: | Inclination of earth's magnetic field. |
| Grav. field: | Indicates if the probe was moved during recording at that station. |
| Status: | Indicates if the azimuth value at the reading station was disturbed or changed by the operator. If the azimuth value has been edited or the magnetic integrity check have indicated a magnetic disturbance at the reading station a symbol with more than two "hands" is visible in the status field.  |
| Updown: | Shows the distance the actual reading station is above or below the planned straight line for the borehole given the starting direction. |
| Left/right: | Shows the distance the actual reading station is left or right the planned straight line for the borehole given the starting direction. |
| Short fall: | Shows the amount the actual point falls short of the planned survey point. |

# 4 Execution

## 4.1 General

### 4.1.1 RAMAC Radar

The measurements in KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41 were carried out with dipole radar antennas, with frequencies of 250, 100 and 20 MHz. In KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, and KLX26B measurements were also carried out with a directional antenna, with a central frequency of 60 MHz.

During logging the dipole antennas (transmitter and receiver) were lowered continuously into the borehole and data were recorded on a field PC along the measured interval. The measurement with the directional antenna was made step wise, with a short pause for each measurement occasion. The antennas (transmitter and receiver, both for dipole and directional) were kept at a fixed separation by glass fiber rods according to Tables 4-1 to 4-12. See also Figures 3-1 and 4-1.

All measurements were performed in accordance with the instructions and guidelines from SKB (internal document MD 252.020). All cleaning of the antennas and cable was performed according to the internal document SKB MD 600.004 before the logging operation.

The functionality of the directional antenna was tested before measurements of the core drilled boreholes. This was performed by measurements in the air, where the receiver antenna and the transmitter antenna are placed apart. While transmitting and measuring the receiver antenna is turned around and by that giving the direction from the receiver antenna to the transmitter antenna. The difference in direction is measured by compass and the result difference achieved from the directional antenna varied from 1 to 10 degrees. This can be considered to be good due to the disturbed environment, with metallic objects etc at the test site.

For more information on system settings used in the investigation of KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41 see Tables 4-1 to 4-12 below.

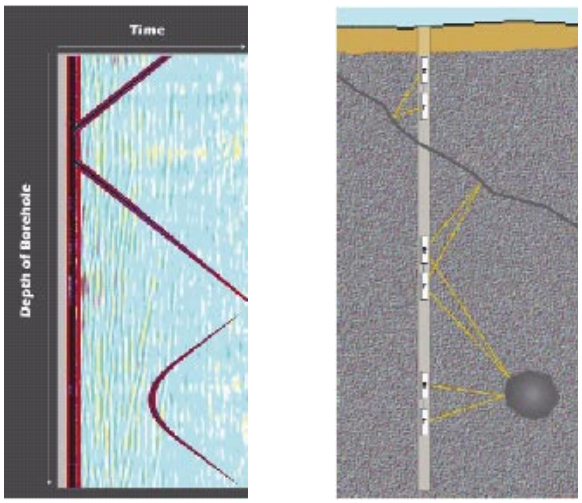



***Figure 4-1.*** *The principle of radar borehole reflection survey and an example of result.*

**Table 4-1. Radar logging information from KLX13A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX13A | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-09-13 | 06-09-12 | 06-09-12 | 06-09-12 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.36 | –0.36 | –1.42 |
| Logging from (m): | | 105.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 583.4 | 591.5 | 590.8 | 586.15 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-2. Radar logging information from KLX14A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX14A | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-09-14 | 06-09-14 | 06-09-14 | 06-09-14 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.36 | –0.36 | –1.42 |
| Logging from (m): | | 9.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 86.9 | 171.5 | 169.8 | 167.65 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-3. Radar logging information from KLX22A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX22A | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-07-05 | 06-07-05 | 06-07-05 | 06-07-05 |
| Reference: | | TOC. | TOC. | TOC. | TOC. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.35 | –0.35 | –1.42 |
| Logging from (m): | | 5.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 91.4 | 97.8 | 97.0 | 93.05 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-4. Radar logging information from KLX22B.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX22B | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-07-05 | 06-07-05 | 06-07-05 | 06-07-05 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.35 | –0.35 | –1.42 |
| Logging from (m): | | 5.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 93.4 | 97.6 | 96.6 | 92.55 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-5. Radar logging information from KLX23A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX23A | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-07-06 | 06-07-06 | 06-07-06 | 06-07-06 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.35 | –0.35 | –1.42 |
| Logging from (m): | | 3.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 93.4 | 97.6 | 96.6 | 92.55 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-6. Radar logging information from KLX23B.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX23B | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-07-06 | 06-07-06 | 06-07-06 | 06-07-06 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.35 | –0.35 | –1.42 |
| Logging from (m): | | 3.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 43.4 | 47.7 | 46.9 | 42.95 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-7. Radar logging information from KLX24A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX24A | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-08-11 | 06-08-11 | 06-08-11 | 06-08-11 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.35 | –0.36 | –1.42 |
| Logging from (m): | | 5.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 93.4 | 97.3 | 97.0 | 92.25 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-8. Radar logging information from KLX25A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX25A | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-08-12 | 06-08-12 | 06-08-12 | 06-08-12 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.36 | –0.35 | –1.42 |
| Logging from (m): | | 5.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 43.4 | 47.7 | 46.7 | 43.15 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-9. Radar logging information from KLX26A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX26A | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-09-12 | 06-09-11 | 06-09-11 | 06-09-11 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.36 | –0.36 | –1.42 |
| Logging from (m): | | 5.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 93.4 | 98.3 | 97.3 | 92.55 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-10. Radar logging information from KLX26B.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | | |
|---|---|---|---|---|---|
| BH: | KLX26B | Equipment: | SKB RAMAC | | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | | |
| Operator: | CG | Antenna | | | |
| | | Directional | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-09-12 | 06-09-11 | 06-09-11 | 06-09-11 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 615 | 2,424 | 891 | 239 |
| Number of samples: | | 512 | 619 | 518 | 518 |
| Number of stacks: | | 32 | Auto | Auto | Auto |
| Signal position: | | 410.5 | –0.36 | –0.36 | –1.42 |
| Logging from (m): | | 5.4 | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 43.4 | 47.9 | 47.1 | 43.15 |
| Trace interval (m): | | 0.5 | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 5.73 | 2.4 | 3.9 | 10.05 |

**Table 4-11. Radar logging information from HLX39.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX39 | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Operator: | CG | Antenna | | |
| | | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-09-14 | 06-09-14 | 06-09-14 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 2,424 | 891 | 239 |
| Number of samples: | | 619 | 518 | 518 |
| Number of stacks: | | Auto | Auto | Auto |
| Signal position: | | –0.36 | –0.36 | –1.42 |
| Logging from (m): | | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 195.5 | 194.8 | 191.25 |
| Trace interval (m): | | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 2.4 | 3.9 | 10.05 |

**Table 4-12. Radar logging information from HLX41.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX41 | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Operator: | CG | Antenna | | |
| | | 250 MHz | 100 MHz | 20 MHz |
| Logging date: | | 06-09-13 | 06-09-13 | 06-09-13 |
| Reference: | | T.O.C. | T.O.C. | T.O.C. |
| Sampling frequency (MHz): | | 2,424 | 891 | 239 |
| Number of samples: | | 619 | 518 | 518 |
| Number of stacks: | | Auto | Auto | Auto |
| Signal position: | | –0.36 | –0.36 | –1.42 |
| Logging from (m): | | 1.5 | 2.6 | 6.25 |
| Logging to (m): | | 196.5 | 195.8 | 190.35 |
| Trace interval (m): | | 0.1 | 0.2 | 0.25 |
| Antenna separation (m): | | 2.4 | 3.9 | 10.05 |

### 4.1.2 BIPS

All measurements were performed in accordance with the instructions and guidelines from SKB (internal document MD 222.006). All cleaning of the probe and cable was performed according to the internal document SKB MD 600.004 before the logging operation.

During the measurement, a pixel circle with a resolution of 360 pixels/circle was used and the digital circles were stored at every 1 mm on a MO- disc in the surface unit. The maximum speed during data collection was 1.5 m/minute.

A gravity sensor based on a air bulb in a alcohol liquid was used to measure the orientation of the images in the boreholes KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41.

In order to control the quality of the system, calibration measurements were performed in a test pipe before logging and after logging. Figures 4-2 to 4-4 show the results of the test logging performed before and after the logging campaign in July, August and September. The results showed no difference regarding the colours and focus of the images. Results of the test loggings were included in the delivery of the raw data.

The BIPS logging information is found in the header for every single borehole presented in Appendices 13 to 24 in this report.

### 4.1.3 Deviation measuremnts

The deviation measurements were carried out according to the instructions and guidelines from SKB (internal document MD 224.001). All cleaning of the probe and cable was performed according to the internal document SKB MD 600.004 before the logging operation.

During the logging a measurement was performed for each 3 m. The logging was carried out in two directions, both from the surface measuring to the bottom of the borehole and a second run measuring from the bottom of the borehole up to the surface. For the operation in the core drilled boreholes the RAMAC/BIPS winch installed in the container was used together with the standard length measuring devices. For an accurate depth control the length recording was adjusted regularly for every 50 metre by the actual marks on the logging cable. In the percussion drilled boreholes the dummy winch was used for the logging. No depth control is possible for the measuring wheel due to lack off reference marks on the logging cable. Maximum depth error for the measuring wheel is 0.5%.

### 4.1.4 Length measurements

During logging the depth recording for the RAMAC systems is taken care of by a measuring wheel mounted on the cable winch. The logging is measured from TOC (Top of Casing). The length is adjusted to the bottom of casing when visible in the BIPS image.

During the BIPS logging in core drilled boreholes, where the reference marks in the borehole wall is visible on the image, the position where the depth mark is visible is marked with scotch tape on the logging cable. During BIPS logging the measured length was adjusted to true length according to depth mark visible in the BIPS image. The adjusted true length is marked with red in the image plot together with the non-adjusted measured length. The non-adjusted length is marked with black as seen in Appendices 13 to 24. The tape marks on the logging cable are then used for controlling the RAMAC measurement.

The experience we have from earlier measurements with dipole antennas in the core drilled boreholes in Forsmark and Oskarshamn for the radar logging is that the depth divergence is less than 100 cm in the deepest parts of a 1,000 metre deep borehole.

The depth divergence is taken into account in the resulting tables in Chapter 5.

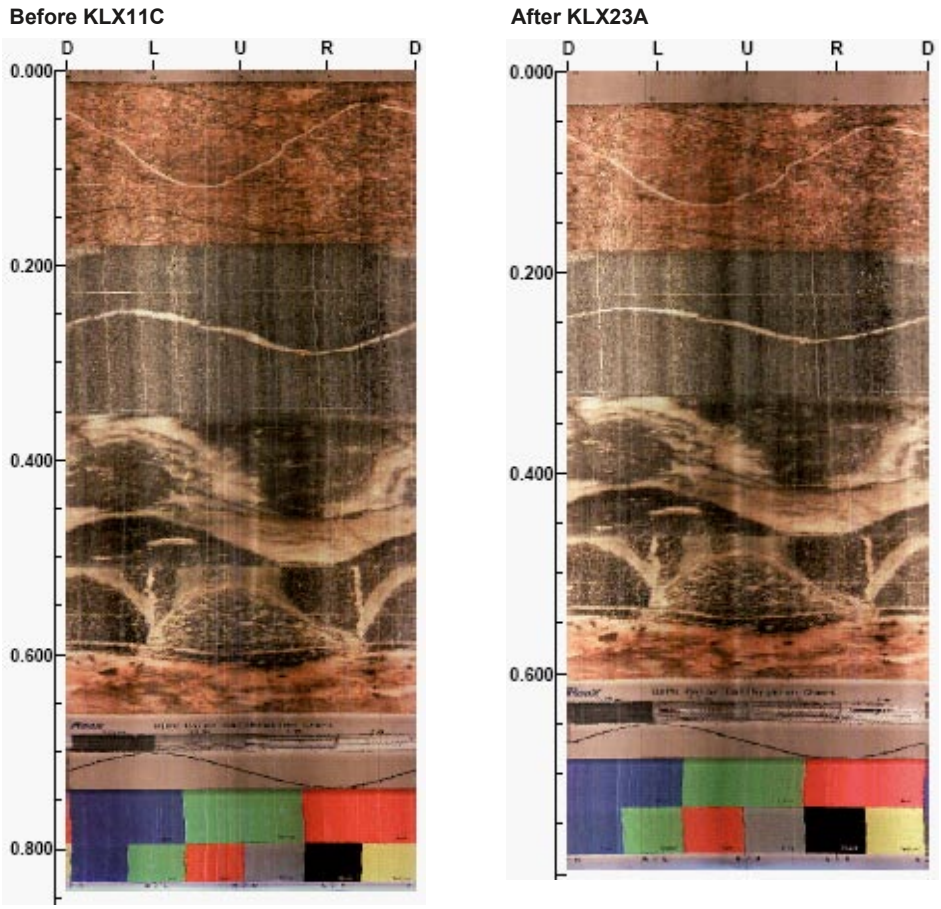



***Figure 4-2.*** *Results from logging in the test pipe before and after the logging campaign in July, 2006.*

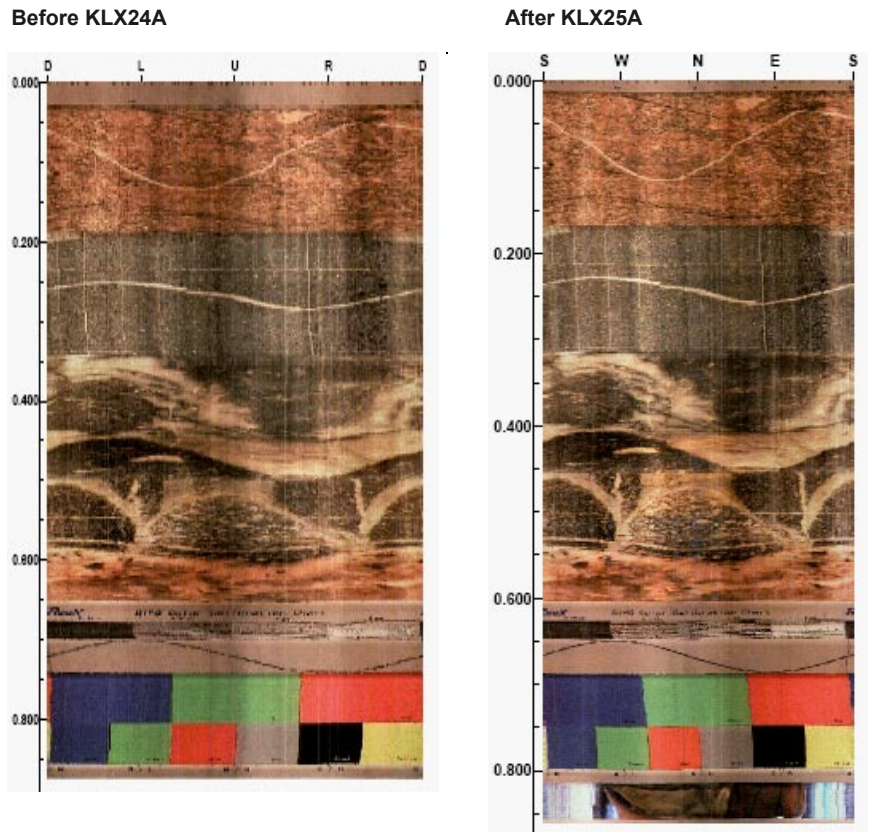



***Figure 4-3.*** *Results from logging in the test pipe before and after the logging campaign in August, 2006.*

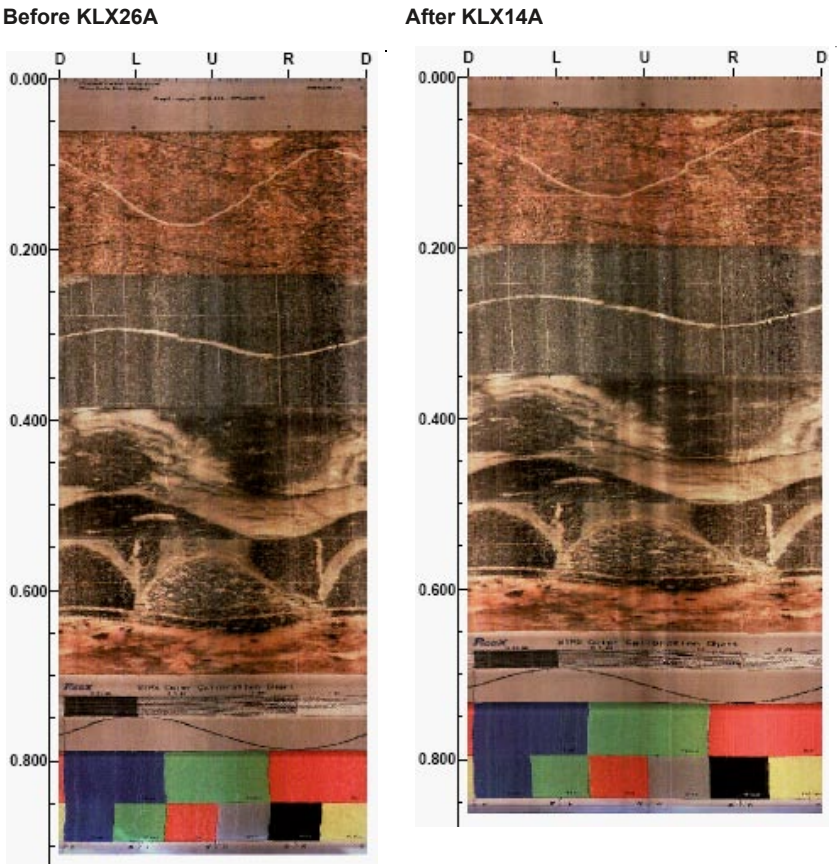



***Figure 4-4.*** *Results from logging in the test pipe before and after the logging campaign in September, 2006.*

## 4.2 Analyses and Interpretation

### 4.2.1 Radar

The result from radar measurements is most often presented in the form of a radargram where the position of the probes is shown along one axis and the radar wave propagation and reflection is shown along the other axis. The amplitude of the received signal is shown in the radargram with a grey scale where black colour corresponds to large positive signals and white colour to large negative signals. Grey colour corresponds to no reflected signals.

The presented data in this report is adjusted for the measurement point of the antennas. The measurement point is defined to be the central point between the transmitter and the receiver antenna.

The two basic patterns to interpret in borehole measurements are point and plane reflectors. In the reflection mode, borehole radar essentially gives a high-resolution image of the rock mass, showing the geometry of plane structures which may or may not, intersect the borehole (contact between layers, thin marker beds, fractures) or showing the presence of local features around the borehole (cavities, lenses etc).

The distance to a reflecting object or plane is determined by measuring the difference in arrival time between the direct and the reflected pulse. The basic assumption is that the speed of propagation is the same everywhere.

There are several ways to determine the radar wave propagation velocity. Each of them has its advantages and its disadvantages. For this logging campaign the velocity determination was performed between KLX07A and KLX07B by keeping the transmitter fixed in one borehole while moving the receiver downwards in a nearby borehole. The velocity measurement was performed with the 20 MHz antennas in boreholes KLX07A and KLX07B /1/.

The result is plotted in Figure 4-5 and the calculation shows a velocity varying between 110 and 117 m/micro seconds. The lower velocities most probably represent a fracture zone in the depth interval 40 to 60 m.

The visualization of data is made with ReflexWin, a Windows based processing software for filtering and analysis of borehole radar data. The processing steps are shown in Tables 4-13 to 4-24. It should be observed that the processing steps in Tables 4-13 to 4-24 below refer to Appendices 1 to 12 in this report. The filters applied affect the whole borehole length and are not always suitable in all parts, depending on the geological conditions and conductivity of the borehole fluid. During interpretation further processing can be done, most often in form of bandpass filtering. This filtering can be applied just in parts of the borehole, where needed.

For the interpretation of the intersection angle between the borehole axis and the planes visible on the radargrams the RadinterSKB software has been used. The interpreted intersection points and intersection angles of the detected structures are presented in the Tables 5-13 to 5-24 and are also visible on the radargrams in Appendices 1 to 12.

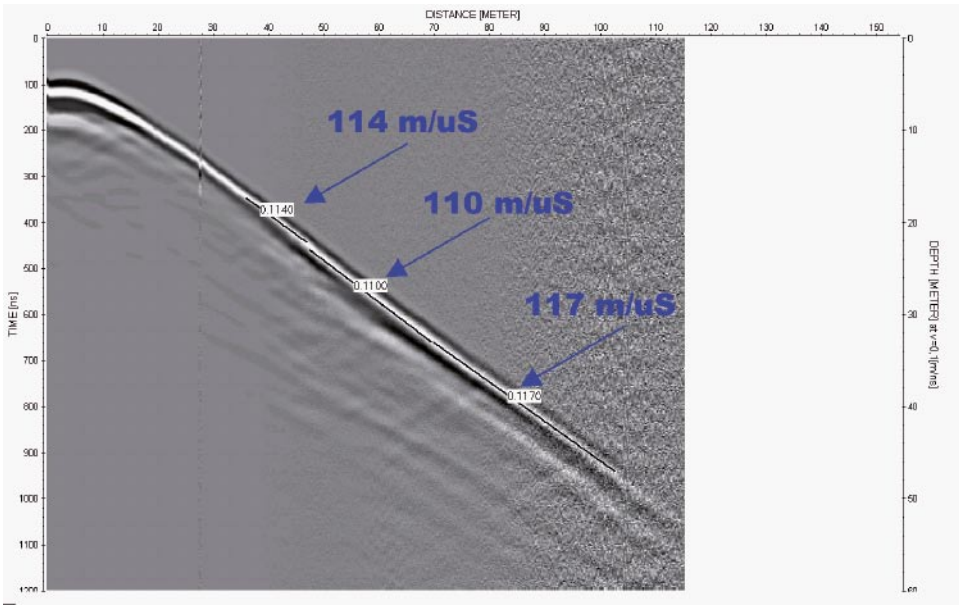



***Figure 4-5.*** *Results from velocity measurements /1/.*

**Table 4-13. Processing steps for borehole radar data from KLX13A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX13A | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–47 samples) | Move start time (–20.7) | Move start time (–35) | Move start time (–92.8) |
| | DC shift (390–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 82 lin 100 exp 5) | Gain (start 11 lin 1.4 exp 1) | Gain (start 35 lin 2.9 exp 0.3) | Gain (start 120 lin 3.6 exp 0.08) |
| | (FIR) | | | |

**Table 4-14. Processing steps for borehole radar data from KLX14A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX14A | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–45 samples) | Move start time (–17.3) | Move start time (–31.3) | Move start time (–93) |
| | DC shift (390–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 82 lin 100 exp 5) | Gain (start 25 lin 1.2 exp 0.5) | Gain (start 39 lin 1 exp 0.6) | Gain (start 120 lin 3.6 exp 0.1) |
| | (FIR) | | | |

**Table 4-15. Processing steps for borehole radar data from KLX22A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX22A | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–50 samples) | Move start time (–14.5) | Move start time (–23) | Move start time (–104.5) |
| | DC shift (409–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 96 lin 100 exp 1) | Gain (start 13 lin 1.7 exp 0.4) | Gain (start 27 lin 1.4 exp 0.5) | Gain (start 83 lin 2.5 exp 0.2) |
| | (FIR) | | | Bandpass 7/120 |

**Table 4-16. Processing steps for borehole radar data from KLX22B.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX22B | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–51 samples) | Move start time (–15) | Move start time (–24.5) | Move start time (–106) |
| | DC shift (414–510) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 91 lin 100 exp 1) | Gain (start 14 lin 1 exp 1) | Gain (start 42 lin 1.2 exp 0.6) | Gain (start 100 lin 4.3 exp 0.1) |
| | (FIR) | | | Bandpass 7/120 |

**Table 4-17. Processing steps for borehole radar data from KLX23A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX23A | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–48 samples) | Move start time (–14.5) | Move start time (–28.7) | Move start time (–109) |
| | DC shift (370–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 76 lin 100 exp 5) | Gain (start 19 lin 1.7 exp 1) | Gain (start 33 lin 1.7 exp 0.6) | Gain (start 87 lin 1.4 exp 0.2) |
| | (FIR) | | | Bandpass 7/120 |

**Table 4-18. Processing steps for borehole radar data from KLX23B.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX23B | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–48 samples) | Move start time (–14.9) | Move start time (–28.4) | Move start time (–106.2) |
| | DC shift (370–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 88 lin 100 exp 5) | Gain (start 23 lin 1 exp 1) | Gain (start 28 lin 1.2 exp 0.6) | Gain (start 94 lin 2 exp 0.2) |
| | (FIR) | | | Bandpass 7/120 |

**Table 4-19. Processing steps for borehole radar data from KLX24A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX24A | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–43 samples) | Move start time (–23.8) | Move start time (–20) | Move start time (–90.7) |
| | DC shift (370–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 80 lin 100 exp 5) | Gain (start 19 lin 1.7 exp 0.4) | Gain (start 30 lin 2 exp 0.5) | Gain (start 78 lin 2 exp 0.05) |
| | (FIR) | | | |

**Table 4-20. Processing steps for borehole radar data from KLX25A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX25A | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–48 samples) | Move start time (–16.7) | Move start time (–23.3) | Move start time (–102.6) |
| | DC shift (390–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 81 lin 100 exp 5) | Gain (start 14 lin 1.1 exp 1.4) | Gain (start 26 lin 1.4 exp 0.6) | Gain (start 72 lin 2.1 exp 0.13) |
| | (FIR) | | | |

**Table 4-21. Processing steps for borehole radar data from KLX26A.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX26A | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–47 samples) | Move start time (–6) | Move start time (–22.2) | Move start time (–86.9) |
| | DC shift (390–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800–2,100) |
| | Time gain (start 76 lin 100 exp 5) | Gain (start 13 lin 1.4 exp 1.2) | Gain (start 37 lin 1.7 exp 0.6) | Gain (start 80 lin 5 exp 0.1) |
| | (FIR) | | | |

**Table 4-22. Processing steps for borehole radar data from KLX26B.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX26B | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | Directional | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | Move start time (–48 samples) | Move start time (–6.7 | Move start time (–20) | Move start time (–83.6) |
| | DC shift (390–511) | DC shift (190–240) | DC shift (460–520) | DC shift (1,800-2,100) |
| | Time gain (start 81 lin 100 exp 5) | Gain (start 14 lin 1.2 exp 1.2) | Gain (start 32 lin 1.2 exp 0.6) | Gain (start 67 lin 5 exp 0.07) |
| | (FIR) | | | |

**Table 4-23. Processing steps for borehole radar data from HLX39.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX39 | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | | Move start time (–23) | Move start time (–36.2) | Move start time (–99.1) |
| | | DC removal (190–240) | DC removal (460–520) | DC removal (1,800–2,100) |
| | | Gain (start 15 lin 0.8 exp 0) | Gain (start 48 lin 1.2 exp 0.9) | Gain (start 88 lin 2.9 exp 0.1) |

**Table 4-24. Processing steps for borehole radar data from HLX41.**

| Site: | Oskarshamn | Logging company: | MALÅ GeoScience/RAYCON | |
|---|---|---|---|---|
| BH: | HLX41 | Equipment: | SKB RAMAC | |
| Type: | Directional/Dipole | Manufacturer: | MALÅ GeoScience | |
| Interpret: | JG | Antenna | | |
| | | 250 MHz | 100 MHz | 20 MHz |
| **Processing:** | | Move start time (–23) | Move start time (–36.2) | Move start time (–99.1) |
| | | DC removal (190–240) | DC removal (460–520) | DC removal (1,800–2,100) |
| | | Gain (start 15 lin 0.8 exp 0) | Gain (start 48 lin 1.2 exp 0.9) | Gain (start 88 lin 2.9 exp 0.1) |

### 4.2.2 BIPS

The visualization of data is made with BDPP, a Windows based processing software for filtering, presentation and analysis of BIPS data. As no fracture mapping of the BIPS image is performed, the raw data was delivered on a CD-ROM together with printable pictures in *.pdf format before the field crew left the investigation site.

The printed results were delivered with measured length, together with adjusted length according to the length marks visible in the BIPS image. For printing of the BIPS images the printing software BIPP from RaaX was used.

### 4.2.3 Deviation measurements

The resulting data from the deviation measurements were corrected relatively to the magnetic North, 2.53 degrees east of RT90 North for the presentation in Appendices 25 to 36. For delivery to SICADA the azimuth was delivered relatively to magnetic North.

## 4.3 Nonconformities

The logging with the directional antenna in KLX14A was stopped at 83 m depth as the antenna got stuck. The BIPS logging in KLX14A was re-made during November due to bad logging conditions during the first run. Otherwise no nonconformities occurred during the logging campaigns in July, August and September, 2006.

# 5 Results

The results from the BIPS measurements for KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41 were delivered as raw data (*.bip-files) on CD-ROM disks and MO-disks to SKB together with printable BIPS pictures in *.pdf format before the field crew left the investigation site. The information of the measurements was registered in SICADA, and the digital data and VHS tapes stored by SKB.

The RAMAC radar data was delivered as raw data (file format *.rd3 (dipole antennas ) or *.rd5 (directional antenna)) for KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41 with corresponding information files (file format *.rad) whereas the data processing steps and results are presented in this report. Relevant information, including the interpretation presented in this report, was inserted into the SKB database SICADA.

The results from the deviation measurement were delivered to SKB in form of raw Flexit files and Excel-files, and also presented in Appendices 25 and 36 in this report. Each reading station depth are referred from T.O.C. in the appendices.

The delivered raw and processed data have been inserted in the database of SKB (SICADA) and data are traceable by the activity plan number.

## 5.1 RAMAC logging

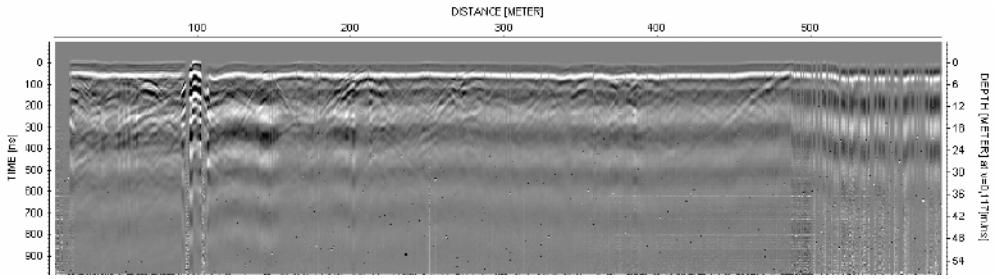
The results of the interpretation of the radar measurements are presented in Tables 5-1 to 5-37. Radar data is also visualized in Appendices 1 to 12. It should be remembered that the images in Appendices 1 to 12 are only a composite picture of all events 360 degrees around the borehole, and do not reflect the orientation of the structures.

Only the larger clearly visible structures are interpreted in RadinterSKB. An overview of the boreholes are given in Figure 5-1 below. A number of minor structures also exist but not interpreted as indicated in Appendix 1. Often a number of structures can be noticed, but most probably lying so close to each other that it is impossible to distinguish one from the other. Larger structures parallel to the borehole, if present, are also indicated in Appendix 1. Very clear parallel structures can bee seen in the data from KLX23A and KLX25A, also shown in Figure 5-2 below. It should also be pointed out that reflections interpreted will always get an intersection point with the borehole, but being located further away. They may in some cases not reach the borehole.

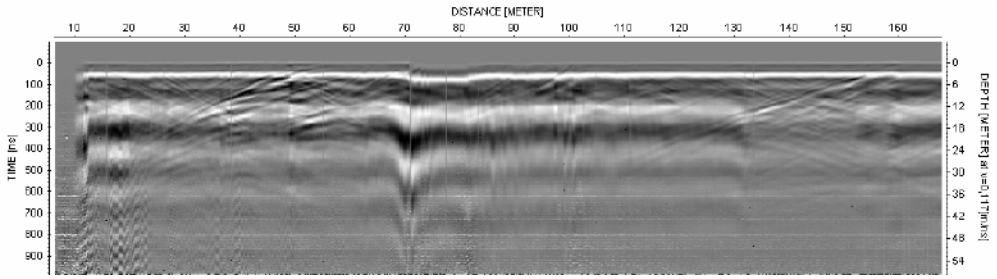
The data quality from KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41, (as seen in Appendices 1 to 12) is relatively god, but in some parts of lower quality due to more conductive conditions. This is especially seen for HLX39 and HLX41. A conductive environment makes the radar wave to attenuate, which decreases the penetration. This conductive environment of course also reduces the possibility to distinguish and interpret possibly structures in the rock which otherwise could give a reflection.

This effect is also seen in the directional antenna for KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A and KLX26B, which makes it more difficult to interpret the direction to the identified structures.

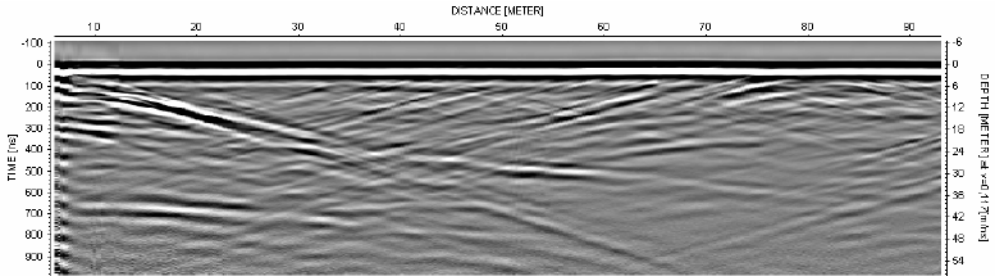
## KLX13A



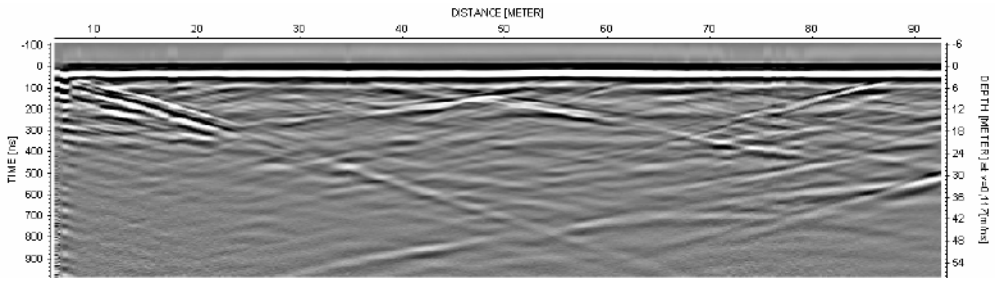

## KLX14A



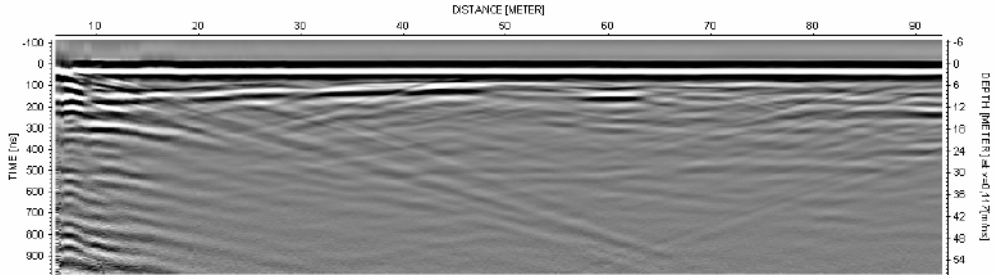

## KLX22A



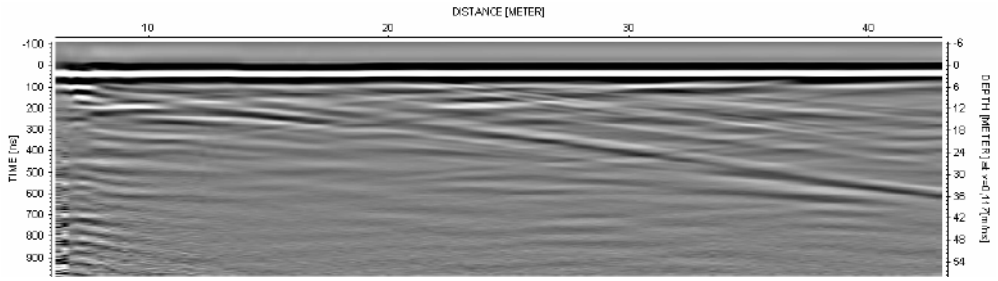

## KLX22B



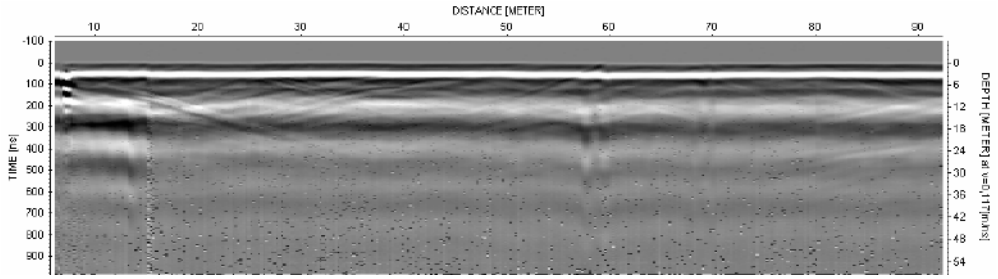
## KLX23A



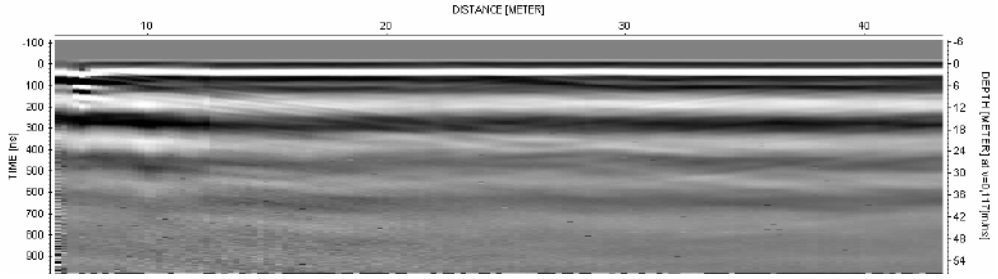

## KLX23B



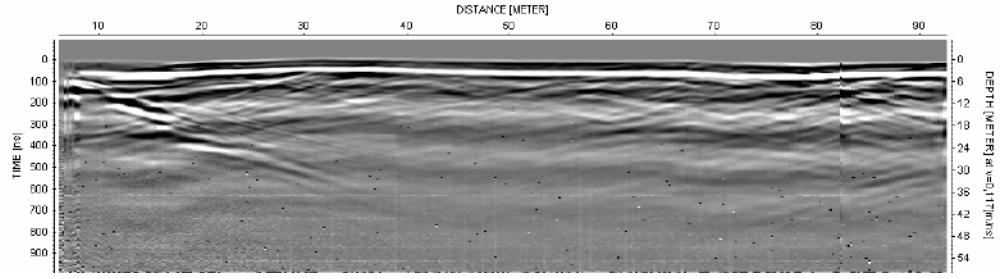

## KLX24A



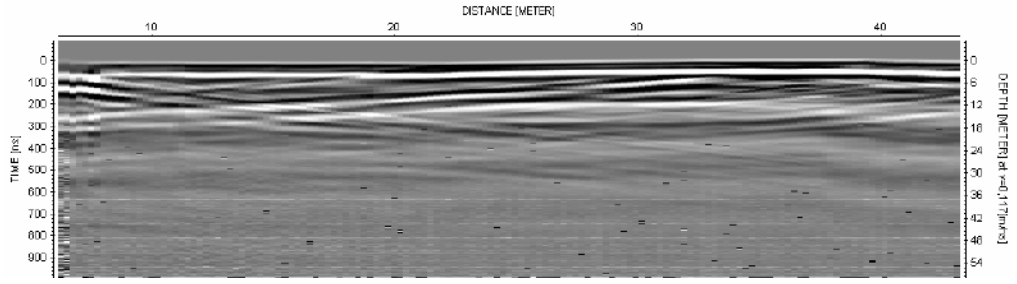

## KLX25A



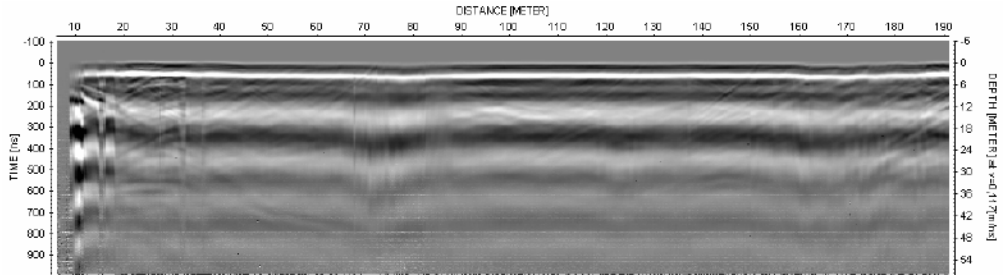
**KLX26A**




**KLX26B**




**HLX39**




**HLX41**

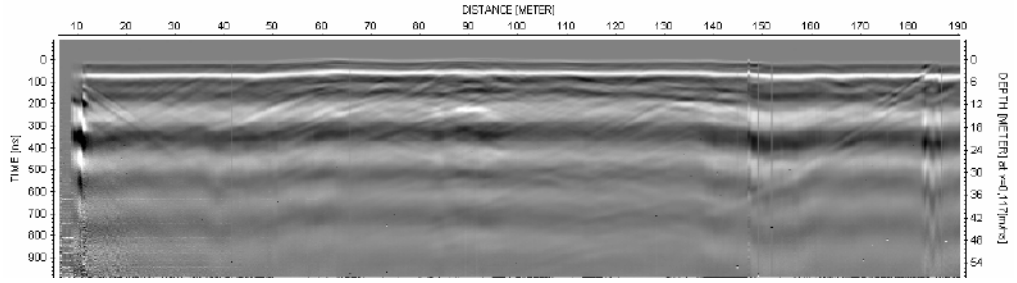
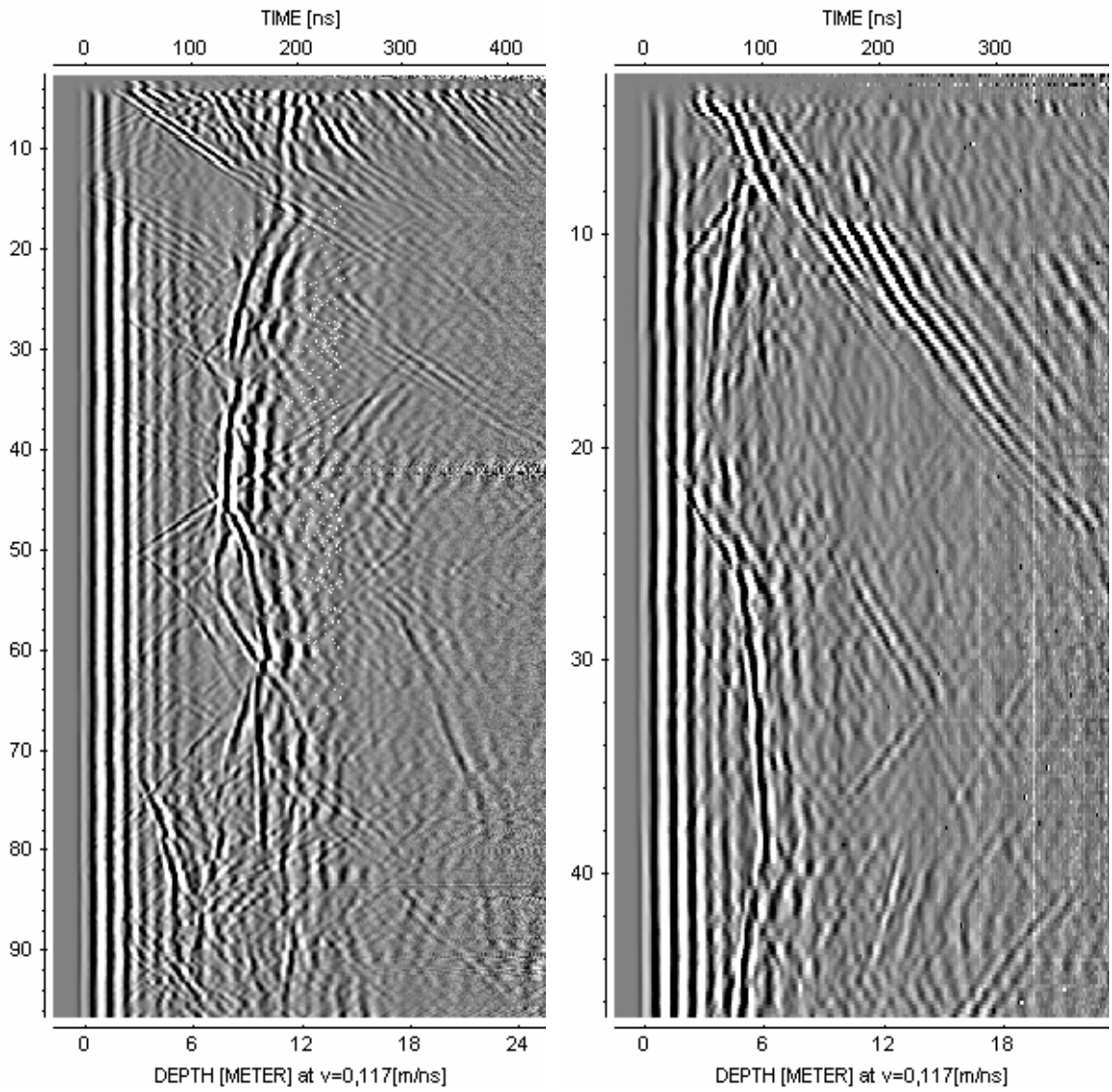



***Figure 5-1.*** *An overview (20 MHz data) of the radar data for the boreholes KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41. Observe that the length (x-scale) differs between the different boreholes.*




**KLX23A** **KLX25A**

***Figure 5-2.*** *100 MHz data from KLX23A and KLX25A, showing clear sub-parallel structures stretching along the whole borehole.*

In parts with an increased conductivity and thereby a decreased depth penetration most often only the edges of structures can be distinguished, giving an intersection angle of 90 degrees. This is seen especially in the 250 MHz data from HLX39 and HLX41.

As also seen in Appendices 1 to 12 the resolution and penetration of radar waves depend on the antenna frequency used. Low antenna frequency gives less resolution but higher penetration depth compared to a higher frequency. If structures can be identified with all three antenna frequencies, it can probably be explained by that the structure is quite significant.

In Tables 5-1 to 5-12 below the distribution of identified structures along the borehole are listed for KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41.

**Table 5-1. Identified structures as a function of depth in KLX13A.**

| Depth (m) | No. of structures |
|---|---|
| –50 | 3 |
| 50–100 | 4 |
| 100–150 | 11 |
| 150–200 | 10 |
| 200–250 | 13 |
| 250–300 | 12 |
| 300–350 | 10 |
| 350–400 | 10 |
| 400–450 | 11 |
| 450–500 | 10 |
| 500–550 | 5 |
| 550– | 3 |

**Table 5-2. Identified structures as a function of depth in KLX14A.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 3 |
| 20–40 | 5 |
| 40–60 | 5 |
| 60–80 | 4 |
| 80–100 | 2 |
| 100–120 | 6 |
| 120–140 | 4 |
| 140–160 | 5 |
| 160– | 5 |

**Table 5-3. Identified structures as a function of depth in KLX22A.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 6 |
| 20–40 | 10 |
| 40–60 | 6 |
| 60–80 | 6 |
| 80–100 | 4 |
| 100– | 2 |

**Table 5-4. Identified structures as a function of depth in KLX22B.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 5 |
| 20–40 | 6 |
| 40–60 | 6 |
| 60–80 | 5 |
| 80–100 | 3 |
| 100– | 2 |

**Table 5-5. Identified structures as a function of depth in KLX23A.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 8 |
| 20–40 | 5 |
| 40–60 | 8 |
| 60–80 | 5 |
| 80–100 | 3 |
| 100–120 | – |
| 120–140 | 1 |
| 140–160 | 2 |
| 160– | 1 |

**Table 5-6. Identified structures as a function of depth in KLX23B.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 11 |
| 20–40 | 3 |
| 40–60 | 8 |
| 60–80 | 1 |
| 80–100 | 1 |

**Table 5-7. Identified structures as a function of depth in KLX24A.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 8 |
| 20–40 | 6 |
| 40–60 | 4 |
| 60–80 | 8 |
| 80–100 | 5 |
| 100–120 | 1 |
| 120– | 1 |

**Table 5-8. Identified structures as a function of depth in KLX25A.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 8 |
| 20–40 | 4 |
| 40–60 | 5 |
| 60–80 | 4 |
| 80–100 | 2 |

**Table 5-9. Identified structures as a function of depth in KLX26A.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 7 |
| 20–40 | 7 |
| 40–60 | 6 |
| 60–80 | 7 |
| 80–100 | 3 |
| 100–120 | 1 |

**Table 5-10. Identified structures as a function of depth in KLX26B.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 6 |
| 20–40 | 6 |
| 40–60 | 4 |

**Table 5-11. Identified structures as a function of depth in HLX39.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 4 |
| 20–40 | 3 |
| 40–60 | 6 |
| 60–80 | 1 |
| 80–100 | 2 |
| 100–120 | 1 |
| 120–140 | 1 |
| 140–160 | 2 |
| 160– | 3 |

**Table 5-12. Identified structures as a function of depth in HLX41.**

| Depth (m) | No. of structures |
|---|---|
| –20 | 5 |
| 20–40 | 2 |
| 40–60 | 2 |
| 60–80 | 3 |
| 80–100 | 5 |
| 100–120 | – |
| 120–140 | 2 |
| 140–160 | 2 |
| 160–180 | 1 |
| 180– | 3 |

Tables 5-13 to 5-24 summarises the interpretation of radar data from KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41. The direction to the reflector (object) is also given for the core drilled boreholes. As seen some radar reflectors in the tables are marked with ±, which indicates an uncertainty in the interpretation of direction. The direction can in these cases be ±180 degrees. The direction to the reflector (object) is defined in Figure 5-3. As the borehole inclination is less than 85° the direction to object is calculated using gravity roll. The direction to object and the intersection angle are recalculated to strike and dip, also given in the Tables 5-13 to 5-22. The plane strike is the angle between line of the plane's cross-section with the surface and the Magnetic North direction. It counts clockwise and can be between 0 and 359 degrees. A strike of 0 degrees implies a dip to the east while a strike of 180 degrees implies a dip to the west. The plane dip is the angle between the plane and the surface. It can vary between 0 and 90 degrees.

Observe that a structure can have several different angles, if the structure is undulating, and thereby also different intersection depths is given. This is seen for instance for structure 9 in Table 5-13 and Appendix 1. To this structure, most likely, also structure 9x belongs.

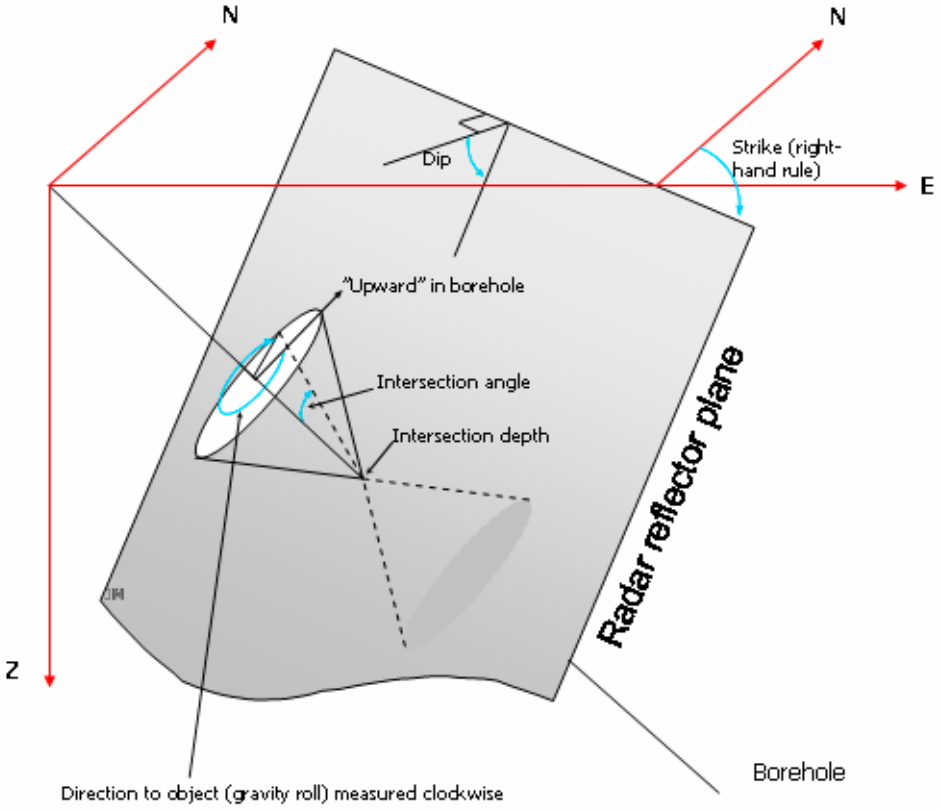



***Figure 5-3.*** *Definition of intersection angle, direction to object using gravity roll, dip and strike using the right hand rule as presented in Tables 5-13 to 5-22.*

**Table 5-13. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX13A.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Site: | | Oskarshamn | | | | | |
| Borehole name: | | KLX13A | | | | | |
| Nominal velocity (m/μs): | | 117.0 | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 2 | 16.4 | 76 | | | | | |
| 1 | 44.0 | 56 | | | | | |
| 103 | 46.1 | 42 | | | | | |
| 3 | 52.0 | 80 | | | | | |
| 4 | 77.7 | 56 | | | | | |
| 6 | 91.1 | 49 | | | | | |
| 9 | 97.4 | 22 | | | | | |
| 7 | 110.4 | 90 | | | | | |
| 9x | 113.2 | 43 | | | | | |
| 10 | 123.3 | 74 | | | | | |
| 8 | 123.7 | 30 | 210 ± | 50 | 173 | 62 | 348 |
| 11 | 131.4 | 67 | | | | | |
| 12 | 134.5 | 69 | | | | | |
| 5x | 136.1 | 14 | | | | | |
| 13 | 138.0 | 67 | | | | | |
| 14 | 142.9 | 69 | 6 ± | 27 | 324 | 13 | 149 |
| 15 | 145.7 | 75 | | | | | |
| 16 | 149.0 | 23 | | | | | |
| 17 | 152.8 | 58 | | | | | |
| 19 | 153.6 | 46 | | | | | |
| 104 | 156.0 | 14 | | | | | |
| 20 | 158.4 | 60 | | | | | |
| 18 | 169.8 | 36 | | | | | |
| 21 | 169.8 | 58 | | | | | |
| 25 | 172.0 | 68 | | | | | |
| 23 | 176.9 | 56 | | | | | |
| 22 | 177.5 | 48 | 192 ± | 37 | 153 | 50 | 330 |
| 5 | 177.6 | 9 | | | | | |
| 24 | 181.7 | 65 | | | | | |
| 26 | 186.9 | 83 | | | | | |
| 27 | 188.8 | 56 | | | | | |
| 28 | 192.5 | 70 | | | | | |
| 29 | 201.3 | 51 | | | | | |
| 34 | 208.0 | 68 | 36 ± | 29 | 348 | 17 | 189 |
| 30 | 208.1 | 18 | | | | | |
| 31 | 208.9 | 83 | | | | | |
| 36 | 216.7 | 25 | | | | | |
| 32 | 217.8 | 19 | | | | | |
| 37 | 218.8 | 46 | | | | | |
| 33 | 220.0 | 24 | | | | | |
| 35 | 221.5 | 50 | | | | | |
| 46 | 222.3 | 10 | | | | | |

**Radinter model information (Directional antenna)**

| | |
|---|---|
| **Site:** | **Oskarshamn** |
| **Borehole name:** | **KLX13A** |
| **Nominal velocity (m/μs):** | **117.0** |

| Name | Intersection depth | Inter-section angle | RadInter direction to object (gravity roll) | Dip 1 | Strike 1 | Dip 2 | Strike 2 |
|---|---|---|---|---|---|---|---|
| 39 | 230.5 | 49 | | | | | |
| 38 | 231.8 | 43 | | | | | |
| 41 | 246.3 | 59 | | | | | |
| 42 | 250.6 | 41 | | | | | |
| 40x | 251.7 | 54 | | | | | |
| 43 | 254.6 | 63 | | | | | |
| 40 | 255.3 | 38 | 207 ± | 45 | 170 | 57 | 345 |
| 44 | 255.5 | 66 | | | | | |
| 105 | 256.5 | 73 | | | | | |
| 45 | 256.6 | 58 | | | | | |
| 47 | 258.7 | 26 | | | | | |
| 49 | 278.1 | 42 | | | | | |
| 102 | 284.6 | 51 | | | | | |
| 106 | 297.9 | 24 | | | | | |
| 48 | 298.4 | 15 | 81 | 77 | 35 | | |
| 51 | 309.2 | 38 | | | | | |
| 52 | 314.8 | 37 | | | | | |
| 59 | 316.3 | 41 | | | | | |
| 53 | 316.4 | 34 | | | | | |
| 50 | 317.9 | 19 | | | | | |
| 54 | 332.0 | 46 | 36 ± | 49 | 348 | 38 | 177 |
| 55 | 345.7 | 35 | | | | | |
| 60 | 346.1 | 57 | | | | | |
| 56 | 348.6 | 39 | | | | | |
| 57 | 349.9 | 62 | | | | | |
| 58 | 357.8 | 47 | | | | | |
| 61 | 363.3 | 58 | | | | | |
| 65 | 370.7 | 65 | | | | | |
| 62 | 374.1 | 66 | | | | | |
| 74 | 381.2 | 19 | 36 | 77 | 352 | | |
| 63 | 385.0 | 44 | | | | | |
| 64 | 385.5 | 65 | 189 | 14 | 150 | | |
| 75 | 391.9 | 17 | | | | | |
| 73 | 394.6 | 56 | | | | | |
| 66 | 398.7 | 62 | | | | | |
| 67 | 401.6 | 66 | 57 ± | 25 | 1 | 18 | 212 |
| 70 | 407.2 | 66 | | | | | |
| 68 | 407.9 | 90 | | | | | |
| 69 | 410.7 | 73 | | | | | |
| 71 | 417.1 | 69 | | | | | |
| 72 | 419.8 | 68 | | | | | |
| 76 | 413.4 | 20 | | | | | |
| 79 | 415.6 | 81 | | | | | |
| 78 | 431.7 | 24 | 24 | 72 | 340 | | |

**Radinter model information (Directional antenna)**

| | |
|---|---|
| **Site:** | **Oskarshamn** |
| **Borehole name:** | **KLX13A** |
| **Nominal velocity (m/μs):** | **117.0** |

| Name | Intersection depth | Inter-section angle | RadInter direction to object (gravity roll) | Dip 1 | Strike 1 | Dip 2 | Strike 2 |
|---|---|---|---|---|---|---|---|
| 81 | 435.1 | 78 | | | | | |
| 80 | 436.9 | 71 | | | | | |
| 84 | 450.0 | 28 | | | | | |
| 82 | 450.3 | 71 | | | | | |
| 83 | 451.5 | 74 | | | | | |
| 100 | 453.9 | 45 | | | | | |
| 85 | 456.0 | 34 | | | | | |
| 87 | 470.6 | 65 | | | | | |
| 88 | 475.5 | 60 | | | | | |
| 92 | 484.0 | 57 | | | | | |
| 90 | 485.9 | 35 | | | | | |
| 91 | 491.0 | 53 | | | | | |
| 86 | 493.2 | 33 | 252 ± | 54 | 214 | 58 | 25 |
| 89 | 494.5 | 21 | 321 | 74 | 280 | | |
| 93 | 504.9 | 39 | | | | | |
| 94 | 519.2 | 77 | | | | | |
| 95 | 521.3 | 53 | 345 ± | 44 | 304 | 31 | 119 |
| 96 | 533.3 | 38 | | | | | |
| 101 | 542.7 | 53 | | | | | |
| 99 | 555.8 | 63 | | | | | |
| 97 | 558.6 | 48 | | | | | |
| 98 | 575.7 | 38 | | | | | |

**Table 5-14. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX14A.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Site: | | Oskarshamn | | | | | |
| Borehole name: | | KLX14A | | | | | |
| Nominal velocity (m/μs): | | 117.0 | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 1 | 4.9 | 39 | 195 ± | 15 | 65 | 89 | 23 |
| 2 | 17.9 | 63 | 183 | 14 | 186 | | |
| 3 | 18.7 | 44 | | | | | |
| 5 | 20.2 | 26 | | | | | |
| 4 | 21.0 | 33 | | | | | |
| 6 | 33.7 | 36 | | | | | |
| 7 | 36.7 | 69 | | | | | |
| 35 | 39.7 | 63 | | | | | |
| 8 | 40.6 | 42 | | | | | |
| 9 | 43.1 | 55 | | | | | |
| 10 | 45.1 | 64 | 138 ± | 27 | 230 | 63 | 172 |
| 11 | 56.4 | 41 | | | | | |
| 12 | 59.7 | 18 | | | | | |
| 13 | 67.8 | 69 | | | | | |
| 14 | 69.8 | 85 | | | | | |
| 15 | 75.8 | 28 | 303 | 87 | 144 | | |
| 16 | 75.9 | 58 | | | | | |
| 18 | 95.4 | 84 | | | | | |
| 17 | 97.6 | 73 | | | | | |
| 19 | 103.2 | 55 | | | | | |
| 20 | 105.6 | 71 | | | | | |
| 36 | 108.3 | 60 | | | | | |
| 21 | 109.2 | 52 | | | | | |
| 22 | 115.9 | 38 | | | | | |
| 22x | 117.8 | 39 | | | | | |
| 26 | 123.5 | 77 | | | | | |
| 23 | 129.9 | 44 | | | | | |
| 24 | 131.5 | 41 | | | | | |
| 25 | 139.5 | 59 | | | | | |
| 30 | 146.2 | 34 | | | | | |
| 27 | 148.2 | 40 | | | | | |
| 28 | 149.6 | 43 | | | | | |
| 29 | 154.2 | 40 | | | | | |
| 34 | 156.9 | 43 | | | | | |
| 31 | 164.6 | 36 | | | | | |
| 33 | 166.9 | 57 | | | | | |
| 31x | 167.5 | 30 | | | | | |
| 31xx | 162.1 | 30 | | | | | |
| 32 | 174.9 | 34 | | | | | |

**Table 5-15. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX22A.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site:** | | **Oskarshamn** | | | | | |
| **Borehole name:** | | **KLX22A** | | | | | |
| **Nominal velocity (m/μs):** | | **117.0** | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 32 | –73.6 | 15 | 297 | 90 | 214 | | |
| 31 | –2.5 | 58 | | | | | |
| 1 | 7.7 | 65 | 171 ± | 5 | 321 | 55 | 269 |
| 27 | 11.5 | 57 | | | | | |
| 2 | 14.6 | 73 | | | | | |
| 5 | 19.0 | 28 | 18 | 90 | 289 | | |
| 28 | 21.6 | 73 | | | | | |
| 3 | 22.1 | 69 | | | | | |
| 4xx | 23.0 | 36 | | | | | |
| 6 | 24.1 | 60 | | | | | |
| 4 | 24.6 | 46 | | | | | |
| 8 | 27.6 | 41 | | | | | |
| 7 | 28.8 | 54 | | | | | |
| 4x | 29.1 | 22 | 234 | 53 | 163 | | |
| 9 | 32.7 | 67 | | | | | |
| 11 | 36.4 | 55 | | | | | |
| 10 | 45.0 | 64 | | | | | |
| 26 | 48.9 | 60 | | | | | |
| 12 | 53.2 | 56 | 213 ± | 18 | 182 | 61 | 294 |
| 29 | 55.4 | 42 | | | | | |
| 13 | 55.6 | 70 | | | | | |
| 14 | 58.9 | 37 | | | | | |
| 15 | 64.0 | 44 | 192 ± | 19 | 121 | 77 | 283 |
| 16 | 70.1 | 61 | | | | | |
| 17 | 71.7 | 54 | | | | | |
| 18 | 73.1 | 54 | | | | | |
| 19 | 76.0 | 54 | | | | | |
| 20 | 77.9 | 51 | | | | | |
| 25 | 80.7 | 50 | | | | | |
| 21 | 81.4 | 47 | 60 ± | 62 | 315 | 36 | 191 |
| 22 | 83.2 | 59 | | | | | |
| 24 | 90.9 | 66 | | | | | |
| 23 | 129.5 | 47 | 330 | 71 | 252 | | |
| 30 | 144.5 | 48 | | | | | |

**Table 5-16. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX22B.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site:** | | **Oskarshamn** | | | | | |
| **Borehole name:** | | **KLX22A** | | | | | |
| **Nominal velocity (m/μs):** | | **117.0** | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 23 | 4.1 | 67 | | | | | |
| 1 | 6.1 | 65 | | | | | |
| 2 | 7.7 | 59 | | | | | |
| 3 | 15.7 | 62 | | | | | |
| 4 | 17.2 | 70 | | | | | |
| 24 | 20.0 | 48 | | | | | |
| 5 | 22.6 | 32 | | | | | |
| 6 | 25.3 | 31 | 174 | 31 | 241 | | |
| 7 | 30.6 | 35 | | | | | |
| 8 | 33.6 | 62 | | | | | |
| 9 | 38.9 | 62 | | | | | |
| 10 | 41.1 | 73 | | | | | |
| 11 | 44.8 | 33 | | | | | |
| 26 | 47.8 | 44 | 6 ± | 76 | 75 | 18 | 265 |
| 12 | 48.6 | 70 | | | | | |
| 13 | 50.3 | 74 | 270 ± | 32 | 43 | 32 | 99 |
| 14 | 57.2 | 64 | | | | | |
| 16 | 62.1 | 83 | | | | | |
| 25 | 64.2 | 50 | | | | | |
| 15 | 70.9 | 76 | 129 ± | 23 | 97 | 38 | 55 |
| 22 | 74.9 | 69 | | | | | |
| 19 | 79.8 | 61 | | | | | |
| 18 | 83.6 | 35 | | | | | |
| 17 | 86.2 | 19 | 198 | 42 | 276 | | |
| 20 | 87.4 | 54 | | | | | |
| 21 | 101.2 | 42 | 117 | 41 | 158 | | |
| 27 | 140.6 | 50 | | | | | |

**Table 5-17. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX23A.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Site: | | Oskarshamn | | | | | |
| Borehole name: | | KLX23A | | | | | |
| Nominal velocity (m/μs): | | 117.0 | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 22 | –416.5 | 1 | 249 ± | 78 | 14 | 81 | 13 |
| 13x | –78.6 | 2 | 273 ± | 89 | 36 | 86 | 213 |
| 7 | –22.7 | 14 | 255 | 70 | 26 | | |
| 1 | 7.5 | 59 | | | | | |
| 24 | 8.2 | 59 | | | | | |
| 2 | 11.4 | 61 | | | | | |
| 29 | 11.7 | 77 | | | | | |
| 3 | 15.0 | 65 | | | | | |
| 4 | 21.6 | 75 | | | | | |
| 23 | 27.5 | 20 | 258 | 66 | 32 | | |
| 5 | 32.7 | 77 | 8 ± | 42 | 124 | 18 | 115 |
| 10x | 33.0 | 20 | | | | | |
| 6 | 35.9 | 83 | | | | | |
| 10 | 41.5 | 34 | | | | | |
| 8 | 41.9 | 54 | | | | | |
| 13 | 53.2 | 15 | | | | | |
| 21 | 54.2 | 40 | | | | | |
| 25 | 54.4 | 51 | | | | | |
| 26 | 55.0 | 26 | | | | | |
| 9 | 56.1 | 52 | 33 ± | 64 | 143 | 19 | 25 |
| 11 | 59.4 | 58 | | | | | |
| 20 | 62.9 | 37 | | | | | |
| 12 | 63.9 | 51 | | | | | |
| 19 | 72.0 | 25 | | | | | |
| 18 | 76.6 | 27 | | | | | |
| 27 | 79.7 | 66 | | | | | |
| 15 | 83.3 | 50 | | | | | |
| 14 | 83.5 | 37 | | | | | |
| 16 | 98.6 | 54 | | | | | |
| 30 | 123.6 | 75 | | | | | |
| 28 | 141.4 | 7 | | | | | |
| 17 | 158.2 | 7 | 68 ± | 86 | 10 | 74 | 17 |
| 31 | 338.4 | 7 | | | | | |

**Table 5-18. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX23B.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site:** | | **Oskarshamn** | | | | | |
| **Borehole name:** | | **KLX23B** | | | | | |
| **Nominal velocity (m/μs):** | | **117.0** | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 20 | –2.9 | 65 | | | | | |
| 5 | 2.7 | 56 | 165 | 9 | 314 | | |
| 16 | 4.6 | 74 | | | | | |
| 3x | 6.0 | 31 | 21 | 88 | 221 | | |
| 1 | 9.0 | 60 | 201 | 12 | 101 | | |
| 2 | 10.7 | 66 | | | | | |
| 17 | 11.7 | 68 | | | | | |
| 6 | 11.9 | 63 | | | | | |
| 3 | 12.4 | 46 | | | | | |
| 4 | 13.8 | 60 | | | | | |
| 15 | 17.1 | 61 | | | | | |
| 8 | 26.3 | 68 | | | | | |
| 7 | 26.6 | 43 | | | | | |
| 9 | 33.6 | 47 | | | | | |
| 10 | 40.6 | 69 | | | | | |
| 13 | 41.1 | 51 | | | | | |
| 11 | 46.3 | 34 | | | | | |
| 18 | 47.6 | 60 | | | | | |
| 12 | 51.8 | 31 | | | | | |
| 19 | 55.6 | 35 | | | | | |
| 12x | 57.7 | 20 | 228 | 52 | 85 | | |
| 14 | 57.8 | 38 | | | | | |
| 12xx | 68.2 | 14 | 228 | 57 | 82 | | |
| 21 | 84.7 | 34 | | | | | |

**Table 5-19. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX24A.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Site: | | Oskarshamn | | | | | |
| Borehole name: | | KLX24A | | | | | |
| Nominal velocity (m/μs): | | 117.0 | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 1 | 0.0 | 32 | | | | | |
| 1x | 2.2 | 47 | | | | | |
| 2 | 7.1 | 52 | | | | | |
| 20x | 8.4 | 5 | | | | | |
| 7 | 9.1 | 58 | | | | | |
| 4 | 13.6 | 41 | | | | | |
| 5 | 17.2 | 53 | 3 ± | 66 | 182 | 4 | 28 |
| 6 | 18.6 | 35 | | | | | |
| 3 | 20.2 | 18 | | | | | |
| 8 | 21.4 | 63 | | | | | |
| 10 | 24.6 | 62 | | | | | |
| 12 | 28.3 | 52 | | | | | |
| 11 | 33.1 | 60 | 231 ± | 26 | 115 | 54 | 208 |
| 13 | 37.8 | 46 | | | | | |
| 14 | 42.9 | 57 | | | | | |
| 15 | 46.7 | 65 | | | | | |
| 29 | 49.6 | 49 | | | | | |
| 16 | 56.7 | 47 | | | | | |
| 30 | 61.9 | 66 | | | | | |
| 17 | 64.1 | 77 | 168 | 17 | 191 | | |
| 31 | 65.6 | 82 | | | | | |
| 25 | 67.4 | 58 | | | | | |
| 20 | 73.4 | 26 | | | | | |
| 18x | 74.4 | 55 | 75 ± | 50 | 224 | 38 | 122 |
| 18 | 75.3 | 45 | | | | | |
| 19 | 79.7 | 52 | | | | | |
| 23 | 81.2 | 25 | | | | | |
| 21 | 81.3 | 48 | | | | | |
| 22 | 86.5 | 25 | | | | | |
| 26 | 90.8 | 46 | | | | | |
| 27 | 95.2 | 39 | | | | | |
| 24 | 114.1 | 38 | | | | | |
| 28 | 142.3 | 30 | | | | | |

**Table 5-20. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX25A.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Site: | | Oskarshamn | | | | | |
| Borehole name: | | KLX25A | | | | | |
| Nominal velocity (m/μs): | | 117.0 | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 10 | –45.5 | 6 | 189 ± | 62 | 9 | 66 | 61 |
| 7 | –12.3 | 21 | | | | | |
| 2 | 5.4 | 74 | | | | | |
| 8 | 6.7 | 40 | 6 | 235 | | | |
| 1 | 7.8 | 34 | | | | | |
| 3 | 13.8 | 39 | | | | | |
| 4 | 15.8 | 40 | 24 ± | 249 | 204 | 24 | 100 |
| 5 | 16.8 | 49 | 219 ± | 138 | 39 | 65 | 257 |
| 6 | 21.7 | 42 | | | | | |
| 12 | 23.9 | 58 | | | | | |
| 11 | 30.6 | 57 | | | | | |
| 19 | 34.3 | 61 | | | | | |
| 9 | 48.9 | 9 | 9 | 60 | | | |
| 20 | 49.1 | 50 | | | | | |
| 14 | 51.5 | 56 | 36 ± | 253 | 216 | 19 | 146 |
| 21 | 56.6 | 33 | | | | | |
| 15 | 58.1 | 46 | | | | | |
| 16 | 62.2 | 36 | | | | | |
| 22 | 66.8 | 46 | | | | | |
| 18 | 69.6 | 52 | | | | | |
| 23 | 76.9 | 55 | | | | | |
| 17 | 93.0 | 16 | | | | | |
| 13 | 95.0 | 8 | | | | | |

**Table 5-21. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX26A.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Site: | | Oskarshamn | | | | | |
| Borehole name: | | KLX26A | | | | | |
| Nominal velocity (m/μs): | | 117.0 | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 2 | –38.1 | 7 | | | | | |
| 2x | –21.4 | 12 | | | | | |
| 28 | –10.3 | 39 | 207 | 27 | 50 | | |
| 14 | –3.4 | 19 | | | | | |
| 1 | 11.2 | 39 | | | | | |
| 3 | 14.7 | 40 | | | | | |
| 4 | 18.6 | 35 | 288 ± | 69 | 121 | 52 | 264 |
| 5 | 26.9 | 77 | | | | | |
| 6 | 27.4 | 38 | | | | | |
| 15 | 32.1 | 46 | | | | | |
| 8 | 36.8 | 57 | | | | | |
| 7 | 38.1 | 35 | | | | | |
| 9 | 39.1 | 42 | | | | | |
| 29 | 39.8 | 55 | | | | | |
| 12 | 42.2 | 66 | 216 ± | 17 | 122 | 52 | 200 |
| 11 | 46.5 | 26 | | | | | |
| 10 | 47.4 | 22 | 273 | 73 | 103 | | |
| 13 | 46.8 | 46 | | | | | |
| 16 | 45.5 | 66 | | | | | |
| 17 | 50.5 | 52 | | | | | |
| 18 | 61.1 | 54 | | | | | |
| 19 | 62.7 | 62 | | | | | |
| 24 | 63.0 | 27 | | | | | |
| 20 | 73.6 | 54 | 240 | 32 | 104 | | |
| 30 | 74.2 | 34 | | | | | |
| 21 | 75.3 | 62 | | | | | |
| 22 | 77.2 | 58 | | | | | |
| 23 | 81.8 | 53 | | | | | |
| 25 | 85.3 | 54 | | | | | |
| 26 | 99.1 | 43 | | | | | |
| 27 | 103.3 | 53 | | | | | |

**Table 5-22. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, and the directional antenna 60 MHz in borehole KLX26B.**

| Radinter model information (Directional antenna) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site:** | | **Oskarshamn** | | | | | |
| **Borehole name:** | | **KLX26B** | | | | | |
| **Nominal velocity (m/μs):** | | **117.0** | | | | | |
| **Name** | **Intersection depth** | **Inter-section angle** | **RadInter direction to object (gravity roll)** | **Dip 1** | **Strike 1** | **Dip 2** | **Strike 2** |
| 2 | –14.5 | 13 | | | | | |
| 14 | –9.6 | 42 | 171 | 77 | 212 | | |
| 2x | –2.1 | 18 | | | | | |
| 1 | 4.9 | 62 | | | | | |
| 3 | 13.2 | 53 | | | | | |
| 4 | 14.7 | 58 | | | | | |
| 5 | 20.4 | 59 | 345 ± | 60 | 210 | 8 | 316 |
| 6 | 26.2 | 49 | | | | | |
| 7 | 28.1 | 50 | 318 | 63 | 191 | | |
| 13 | 29.8 | 43 | | | | | |
| 8 | 31.4 | 43 | | | | | |
| 9 | 35.9 | 41 | | | | | |
| 10 | 43.9 | 60 | | | | | |
| 11 | 47.0 | 30 | 174 | 31 | 29 | | |
| 12 | 50.6 | 51 | | | | | |
| 11x | 53.5 | 23 | | | | | |

**Table 5-23. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, in borehole HLX39.**

| Radinter model information (20, 100 and 250 MHz Dipole Antennas) | | | |
|---|---|---|---|
| **Site:** | | **Oskarshamn** | |
| **Borehole name:** | | **HLX39** | |
| **Nominal velocity (m/μs):** | | **117.0** | |
| **Reflector type** | **Name** | **Intersection depth** | **Intersection angle** |
| PLANE | 23 | –115.9 | 16 |
| PLANE | 6 | 7.3 | 55 |
| PLANE | 1 | 14.5 | 70 |
| PLANE | 20 | 18.4 | 60 |
| PLANE | 2 | 28.6 | 61 |
| PLANE | 3 | 32.5 | 44 |
| PLANE | 5 | 32.8 | 64 |
| PLANE | 22 | 40.6 | 46 |
| PLANE | 8 | 40.9 | 59 |
| PLANE | 10 | 47.0 | 18 |
| PLANE | 21 | 53.6 | 29 |
| PLANE | 4 | 54.1 | 55 |
| PLANE | 7 | 58.1 | 73 |
| PLANE | 9 | 78.5 | 68 |
| PLANE | 11 | 92.1 | 77 |
| PLANE | 12 | 99.0 | 65 |
| PLANE | 13 | 105.3 | 67 |
| PLANE | 14 | 133.9 | 67 |
| PLANE | 16 | 150.8 | 50 |
| PLANE | 15 | 159.0 | 66 |
| PLANE | 19 | 161.2 | 49 |
| PLANE | 18 | 170.0 | 54 |
| PLANE | 17 | 178.0 | 57 |

**Table 5-24. Interpretation of radar reflectors from the dipole antennas 250, 100 and 20 MHz, in borehole HLX41.**

| Radinter model information (20, 100 and 250 MHz Dipole Antennas) | | | |
|---|---|---|---|
| **Site:** | | **Oskarshamn** | |
| **Borehole name:** | | **HLX41** | |
| **Nominal velocity (m/μs):** | | **117.0** | |
| **Reflector type** | **Name** | **Intersection depth** | **Intersection angle** |
| PLANE | 24 | –21.5 | 6 |
| PLANE | 21 | 1.2 | 36 |
| PLANE | 5 | 12.2 | 56 |
| PLANE | 1 | 18.2 | 80 |
| PLANE | 2 | 18.4 | 26 |
| PLANE | 6 | 20.6 | 58 |
| PLANE | 3 | 34.9 | 54 |
| PLANE | 4 | 44.8 | 48 |
| PLANE | 7 | 50.8 | 57 |
| PLANE | 8 | 61.1 | 41 |
| PLANE | 22 | 69.8 | 56 |
| PLANE | 23 | 74.9 | 49 |
| PLANE | 9 | 84.6 | 58 |
| PLANE | 10 | 90.1 | 51 |
| PLANE | 11 | 92.6 | 48 |
| PLANE | 12 | 95.1 | 50 |
| PLANE | 13 | 97.9 | 53 |
| PLANE | 14 | 125.2 | 47 |
| PLANE | 15 | 134.9 | 55 |
| PLANE | 16 | 149.6 | 51 |
| PLANE | 17 | 158.1 | 39 |
| PLANE | 17x | 162.6 | 74 |
| PLANE | 18 | 181.8 | 62 |
| PLANE | 19 | 192.3 | 43 |
| PLANE | 20 | 195.6 | 53 |

In Appendices 1 to 12, the amplitude of the first arrival is plotted against the depth, for the 250 MHz dipole antennas. The amplitude variation along the borehole indicates changes of the electrical conductivity of the volume of rock surrounding the borehole. A decrease in this amplitude may indicate fracture zones, clay or rock volumes with increases in water content, i.e. increases in electric conductivity. The decrease in amplitude is shown in Tables 5-25 to 5-36.

**Table 5-25. Borehole length intervals in KLX13A with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 105–120 | 255 |
| 145 | 345–375 |
| 150–160 | 390–455 |
| 175 | 495–510 |
| 190 | 515–590 |
| 205–210 | |

**Table 5-26. Borehole length intervals in KLX14A with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–15 | 85–95 |
| 55–60 | 105 |
| 70 | 135–140 |
| 75–80 | 165 |

**Table 5-27. Borehole length intervals in KLX22A with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–10 | 75–80 |

**Table 5-28. Borehole length intervals in KLX22B with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–5 | 25 |

**Table 5-29. Borehole length intervals in KLX23A with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–15 | 65 |
| 35 | |

**Table 5-30. Borehole length intervals in KLX23B with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–15 | |

**Table 5-31. Borehole length intervals in KLX24A with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–10 | 65 |
| 20 | 75 |
| 50–60 | |

**Table 5-32. Borehole length intervals in KLX25A with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–10 | 15–20 |

**Table 5-33. Borehole length intervals in KLX26A with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–10 | 45–100 |
| 15–25 | |

**Table 5-34. Borehole length intervals in KLX26B with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–10 | 45–50 |

**Table 5-35. Borehole length intervals in HLX39 with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–15 | 125–130 |
| 30 | 160–180 |
| 70–90 | 190 |

**Table 5-36. Borehole length intervals in HLX41 with decreased amplitude for the 250 MHz antenna.**

| Length (m) | Length (m) |
|---|---|
| 0–60 | 145–150 |
| 70–90 | 155–200 |
| 95 | |

Finally, the structures considered as the most important (clear in the radargram, identified with several antenna frequencies, stretching out far from the borehole wall etc) are listed in Table 5-37 below.

Observe that it can be very difficult to classify different structures in an objective manner, along a borehole. This is due to the fact that the water quality (the conductivity) amongst others varies along the borehole length and by that reason affects the results of the radar logging, by for instance attenuating the radar waves differently. Also the intersection angle of the identified structures affects the amplitude on the resulting radargram. A small intersection angle will most often give an increased amplitude compared to a larger intersection angle, and by that a more clear structure.

**Table 5-37. Some important structures in KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41.**

| Borehole | KLX13A | KLX14A | KLX22A | KLX22B |
|---|---|---|---|---|
| Structures | 5, 9, 9x, 14, 40, 40x, 48, 89 and 106 | 1, 2, 15, 17, 22, 22x, 31, 31x and 31xx | 4, 4x, 4xx, 15, 19, 21, 30, 31 and 32 | 5, 6, 17, 21 and 27 |

| Borehole | KLX23A | KLX23B | KLX24A | KLX25A |
|---|---|---|---|---|
| Structures | 7, 9, 13, 13x, 17, 18, 22, 23, 24, 28 and 29 | 3, 3x, 5, 6, 12, 12x, 12xx, 15, 17 and 20 | 5, 18, 18x, 20, 20x, 24 | 4, 5, 8, 9, 10, 13 and 14 |

| Borehole | KLX26A | KLX26B | HLX39 | HLX41 |
|---|---|---|---|---|
| Structures | 4, 10, 11, 14, 16, 20, 24 and 28 | 2, 2x, 7, 11, 11x and 14 | 9, 10, 17, 18 and 19 | 16, 17, 17x, 20 and 24 |

## 5.2 BIPS logging

The BIPS pictures from KLX13A, KLX14A, KLX22A, KLX22B, KLX23A, KLX23B, KLX24A, KLX25A, KLX26A, KLX26B, HLX39 and HLX41 are presented in Appendix 13 to 24.

In order to control the quality of the system, calibration measurements were performed in a test pipe before and after the logging. The resulting images displayed with no difference regarding the colours and focus of the images. Results of the test loggings were included in the delivery of the raw data.

To get the best possible depth accuracy, the BIPS images are adjusted to the reference mark on the cable for the logging.

The error in the depth recording depends mainly on the tension of the cable and error of the depth readings from the measuring wheel. The adjusted depth is showed in red colour and the recording depth have black colour in the printouts.

Very dark pictures in the 197 mm diameter part of borehole KLX13A. The combination of muddy water, dark rock type and lack of light due to the large borehole diameter is the reason. In the core drilled part the images is of very good quality. The quality problem is more related to probe rotation during the complete logging. Test on the accuracy of the orientation device have showed lower quality if the probe rotates during the logging. The rotation of the probe increases in near vertical boreholes.

Two runs has been performed in KLX14A. The second run was made after that the borehole was cleaned with additional nitrogen blowing and resulted in improved images but still the quality along the borehole is of poor quality.

Borehole KLX22A, KLX22B, KLX23A and KLX23B shows the same quality problem. The increasing value of mud covering the borehole walls limits the visibility and make the core logging difficult.

KLX24A and KLX25A shows very good image quality except for the bottom parts of the boreholes were a increasing amount of mud limits the visibility.

Good image quality in KLX26A from the casing shoe down to 50 metres, in the rest of the borehole mud cowering the parts of the borehole wall limits the visibility and the geological

interpretation. Most of the time the mud have a brighter colour compared to the rock. This result that the automatic iris function in the camera get a wrong expose of the images and make the visible rock much darker.

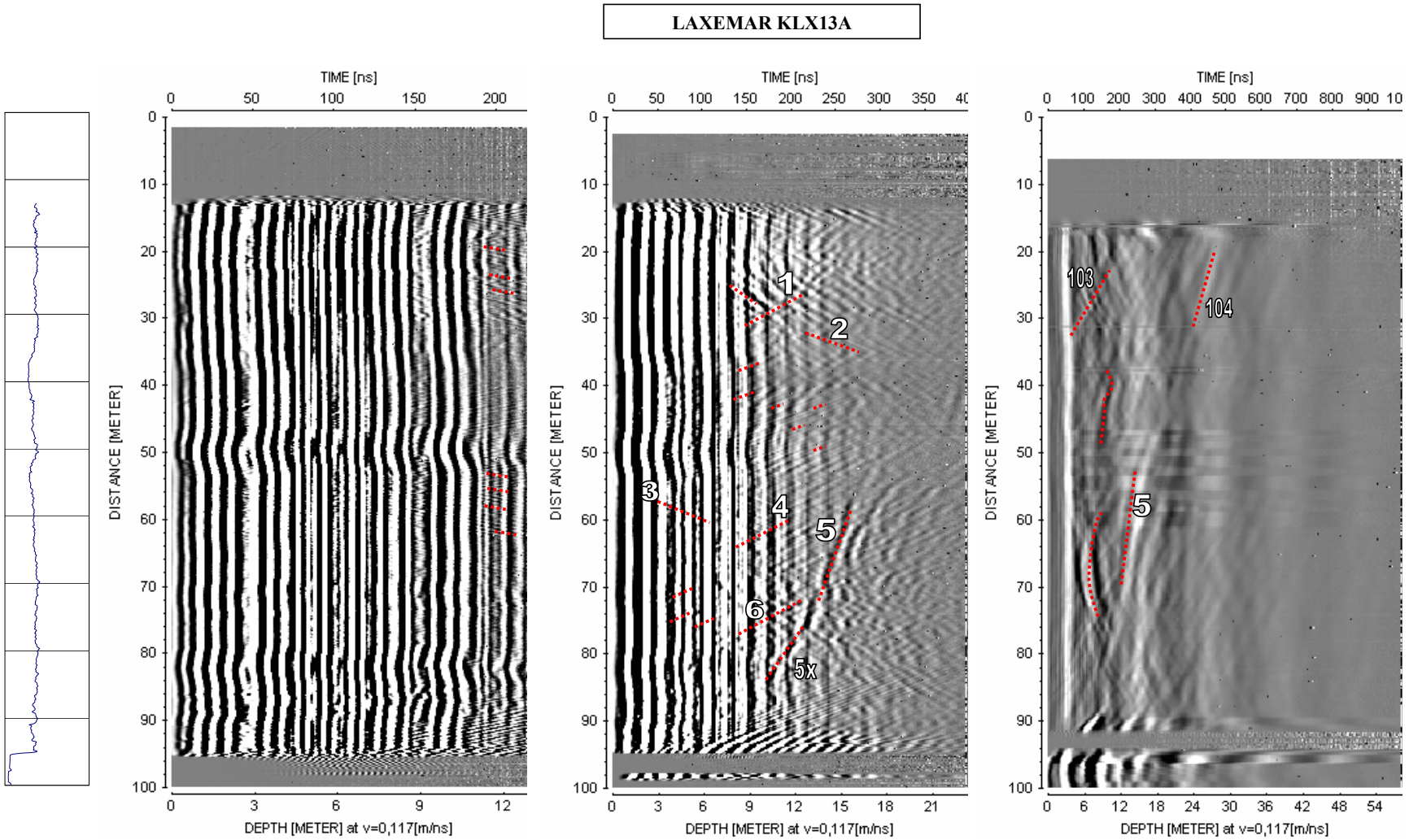
For KLX26B the situation is similar compared with KLX26A with a increasing amount of mud along the borehole.

For the percussion borehole HLX39 the quality along the borehole is very good. In HLX41 the images is very dark from the casing shoe down to 55 metres. Difficult to see if the dark images is related from the borehole water or at the borehole wall. This phenomena's might have something to do with an oxygen reaction in the borehole water.

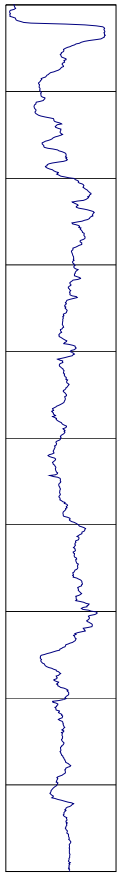
# References

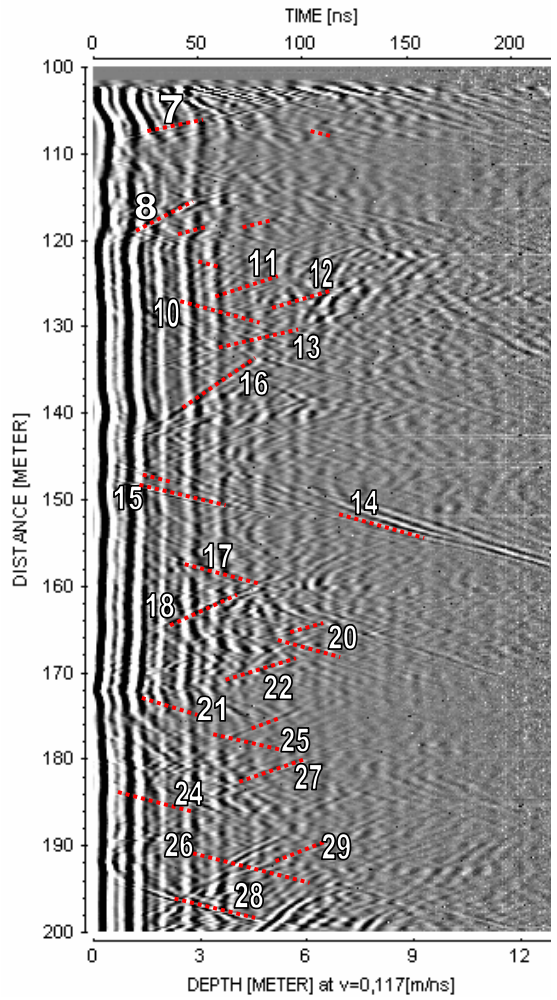
/1/ **Gustafsson J, Gustafsson C, 2005.** Oskarshamn site investigation. RAMAC and BIPS logging in boreholes KLX07A, KLX07B, HLX34 and HLX35 and deviation logging in boreholes KLX07B, HLX34 and HLX35. SKB P-05-231, Svensk Kärnbränslehantering AB.

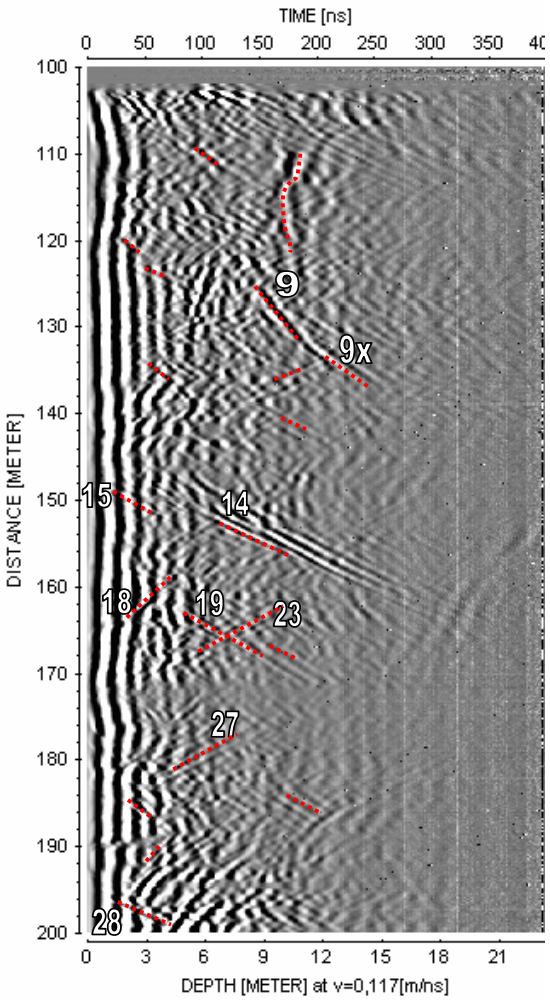
# Radar logging in KLX13A, 0 to 590 m, dipole antennas 250, 100 and 20 MHz

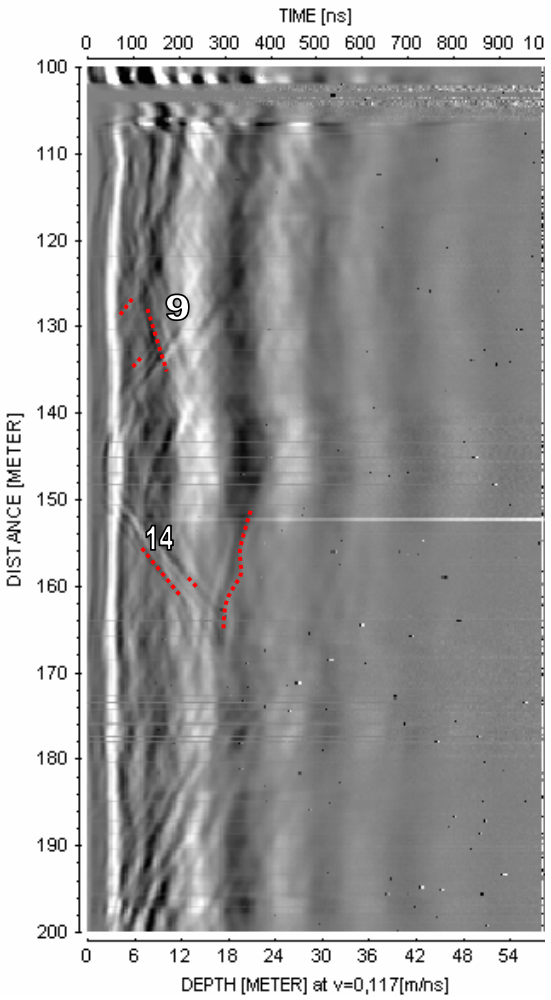


**LAXEMAR KLX13A**





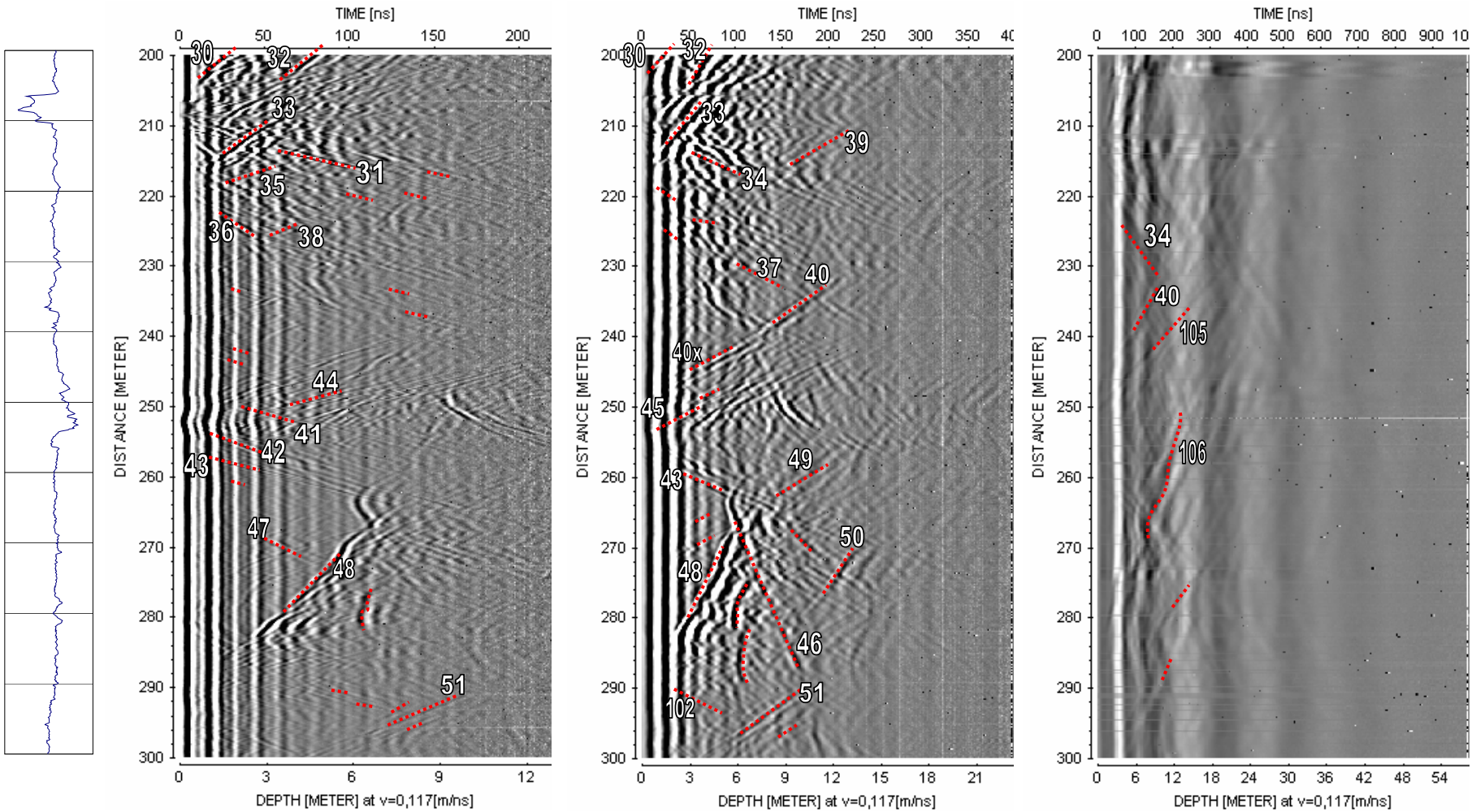




**250 MHz**

**100 MHz**

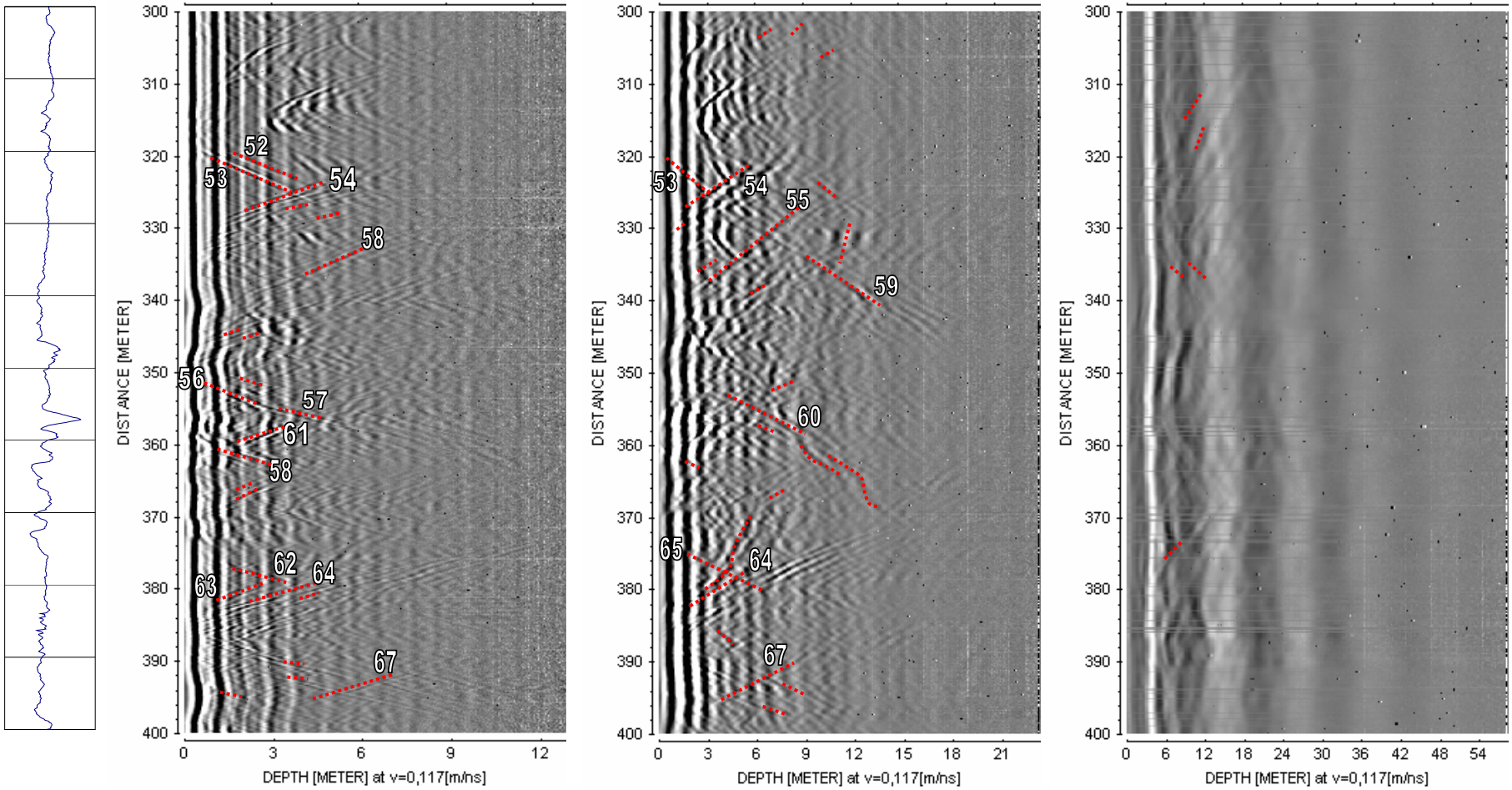
**20 MHz**

**LAXEMAR KLX13A**



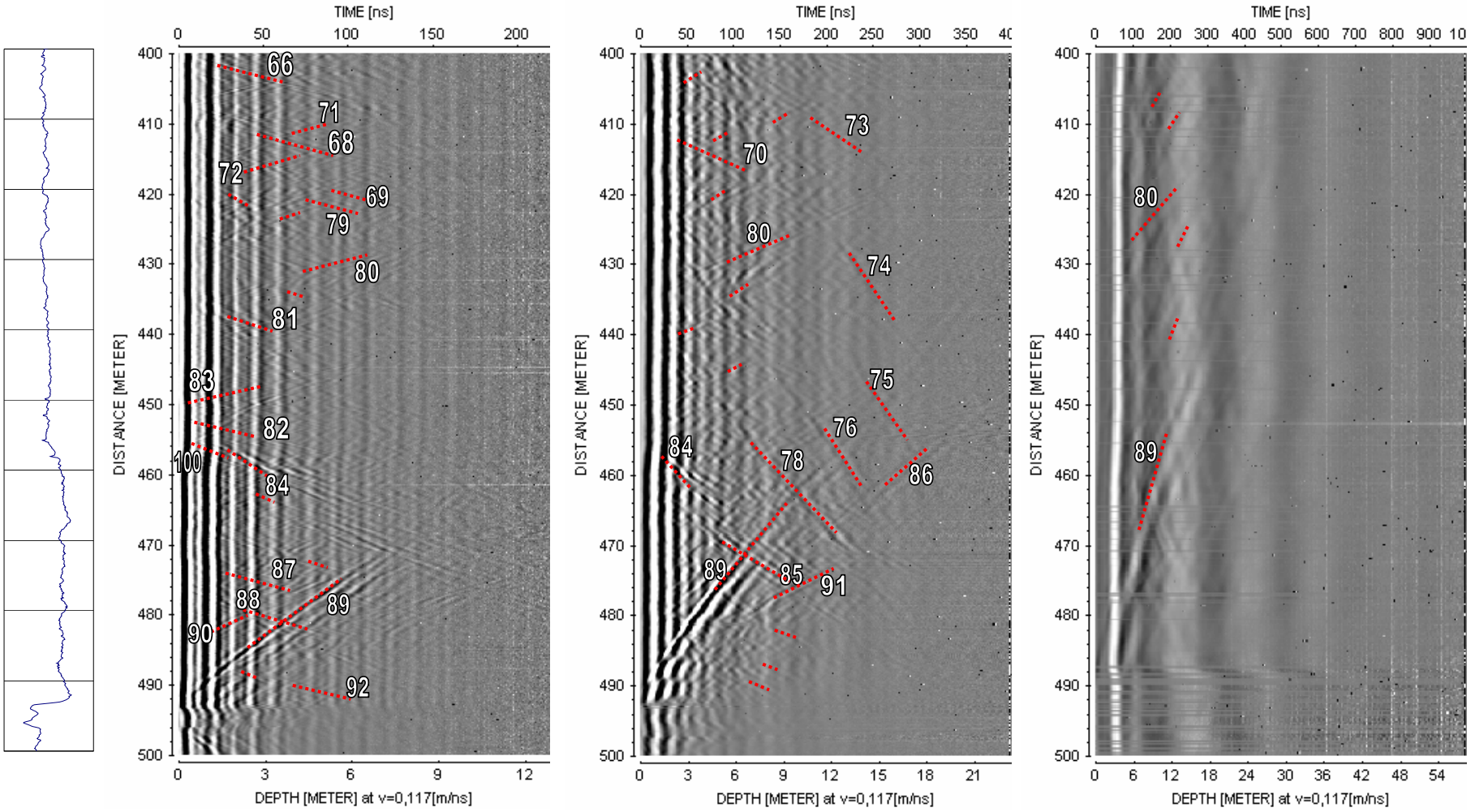

**250 MHz** **100 MHz** **20 MHz**

**LAXEMAR KLX13A**



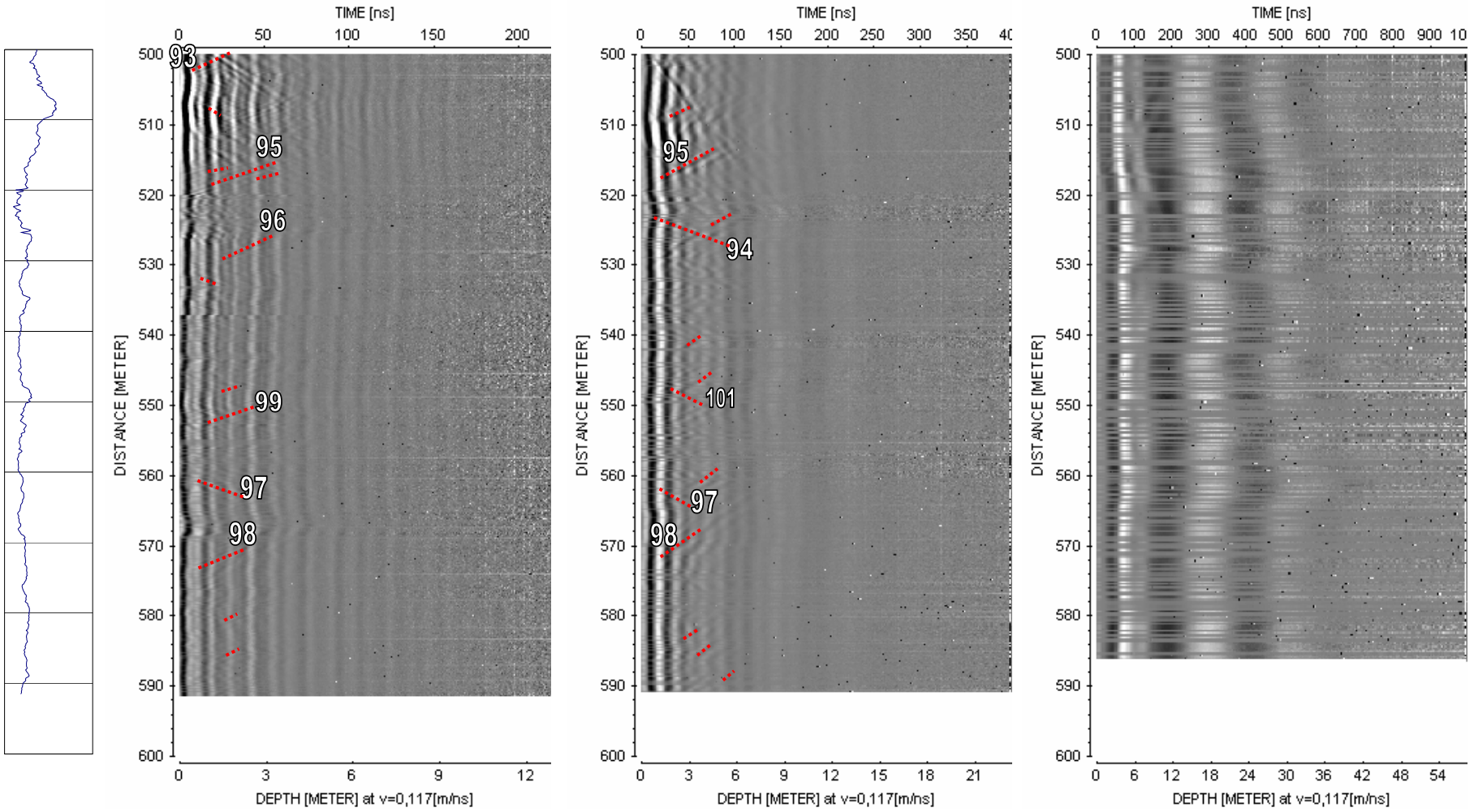

**250 MHz** | **100 MHz** | **20 MHz**

**LAXEMAR KLX13A**



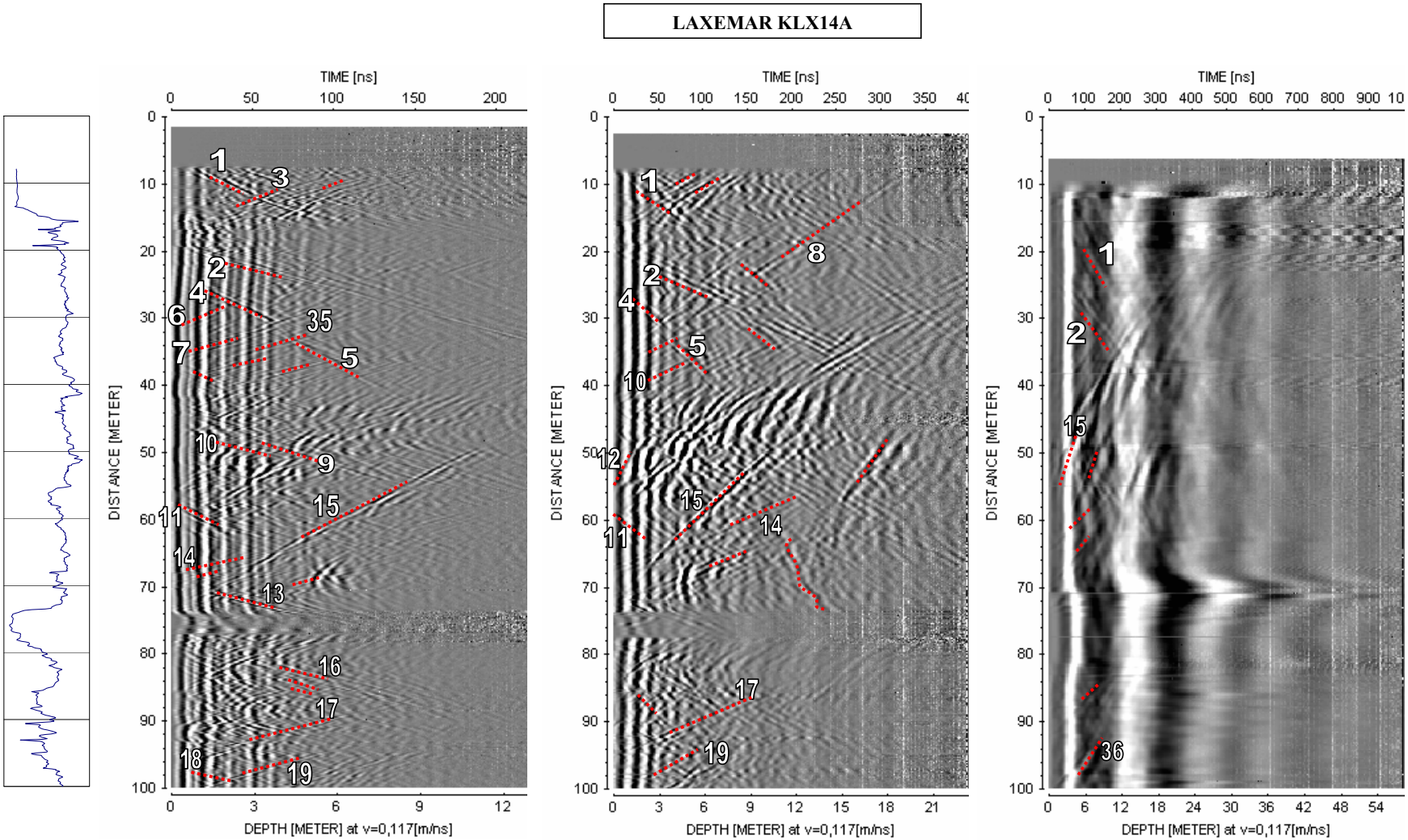

**250 MHz** **100 MHz** **20 MHz**

**LAXEMAR KLX13A**

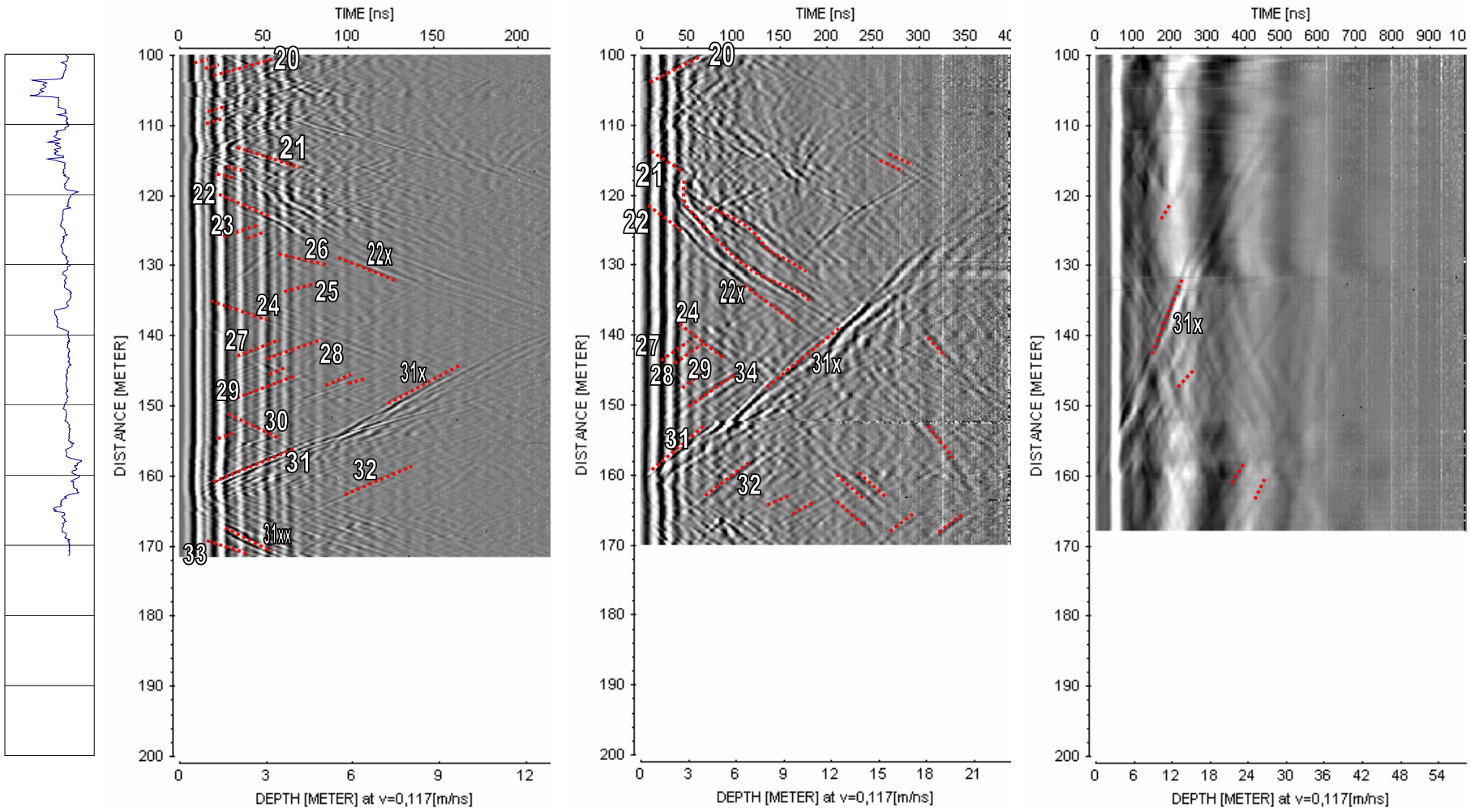



**250 MHz** | **100 MHz** | **20 MHz**

## Radar logging in KLX14A, 0 to 170 m, dipole antennas 250, 100 and 20 MHz

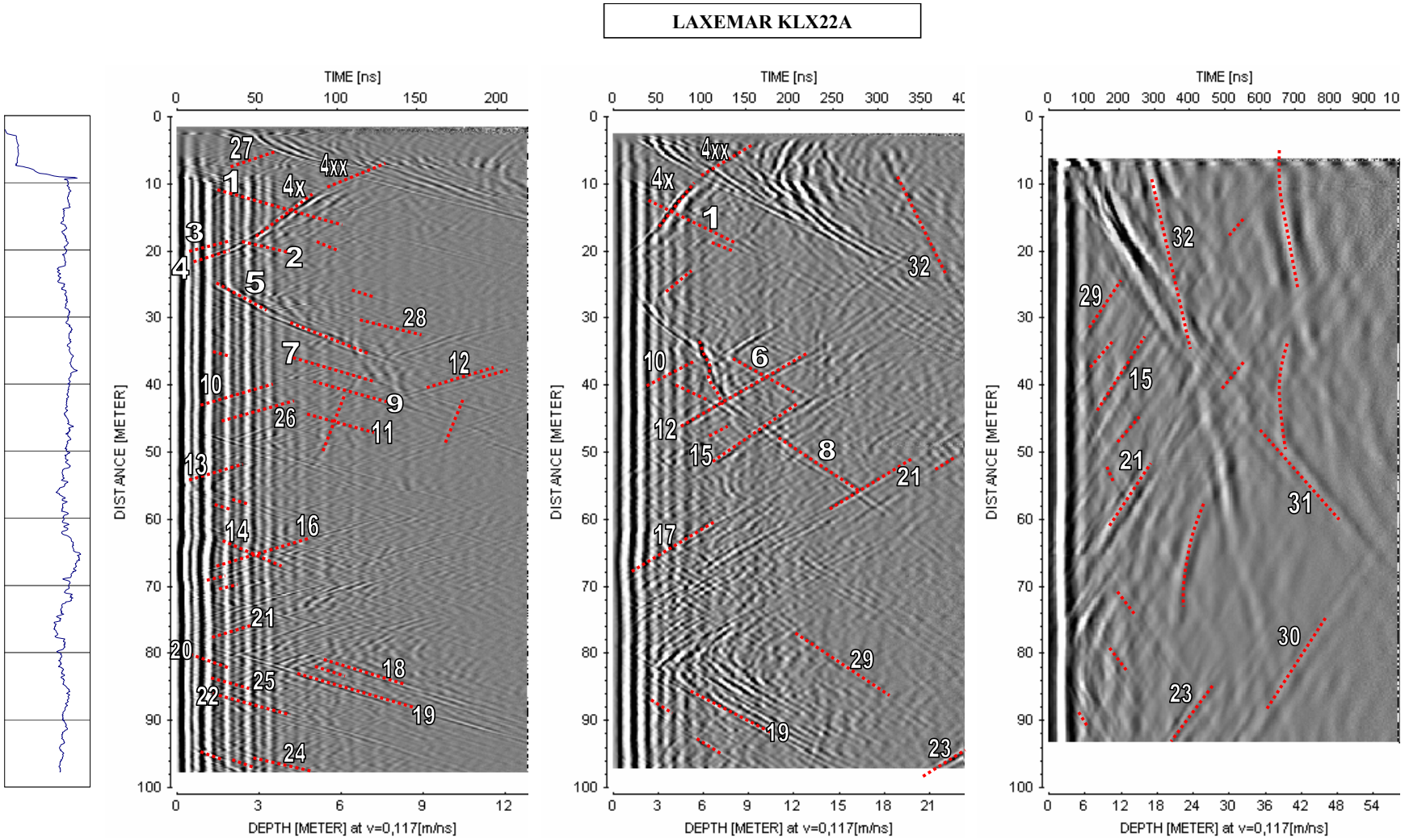


**LAXEMAR KLX14A**

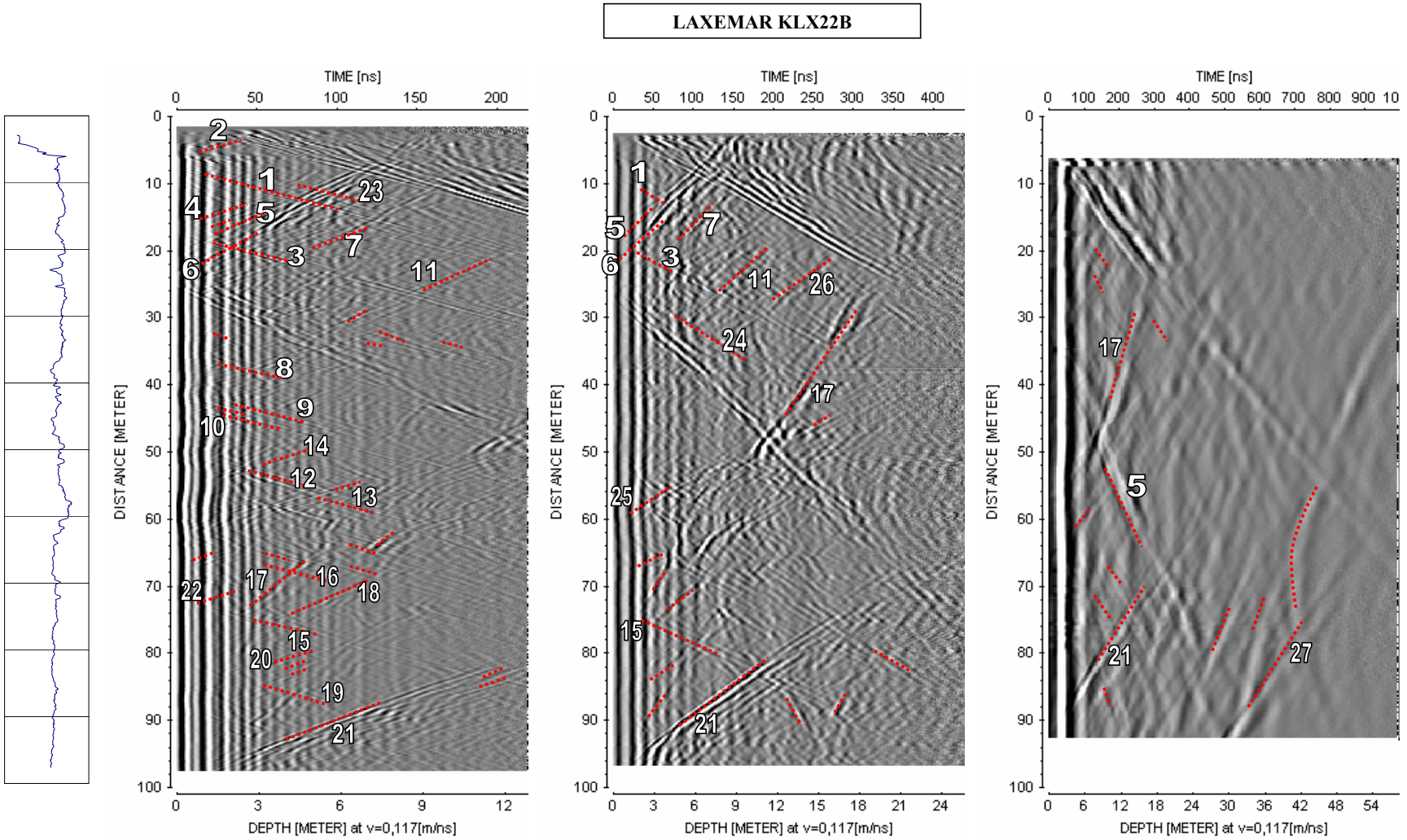



**250 MHz** **100 MHz** **20 MHz**

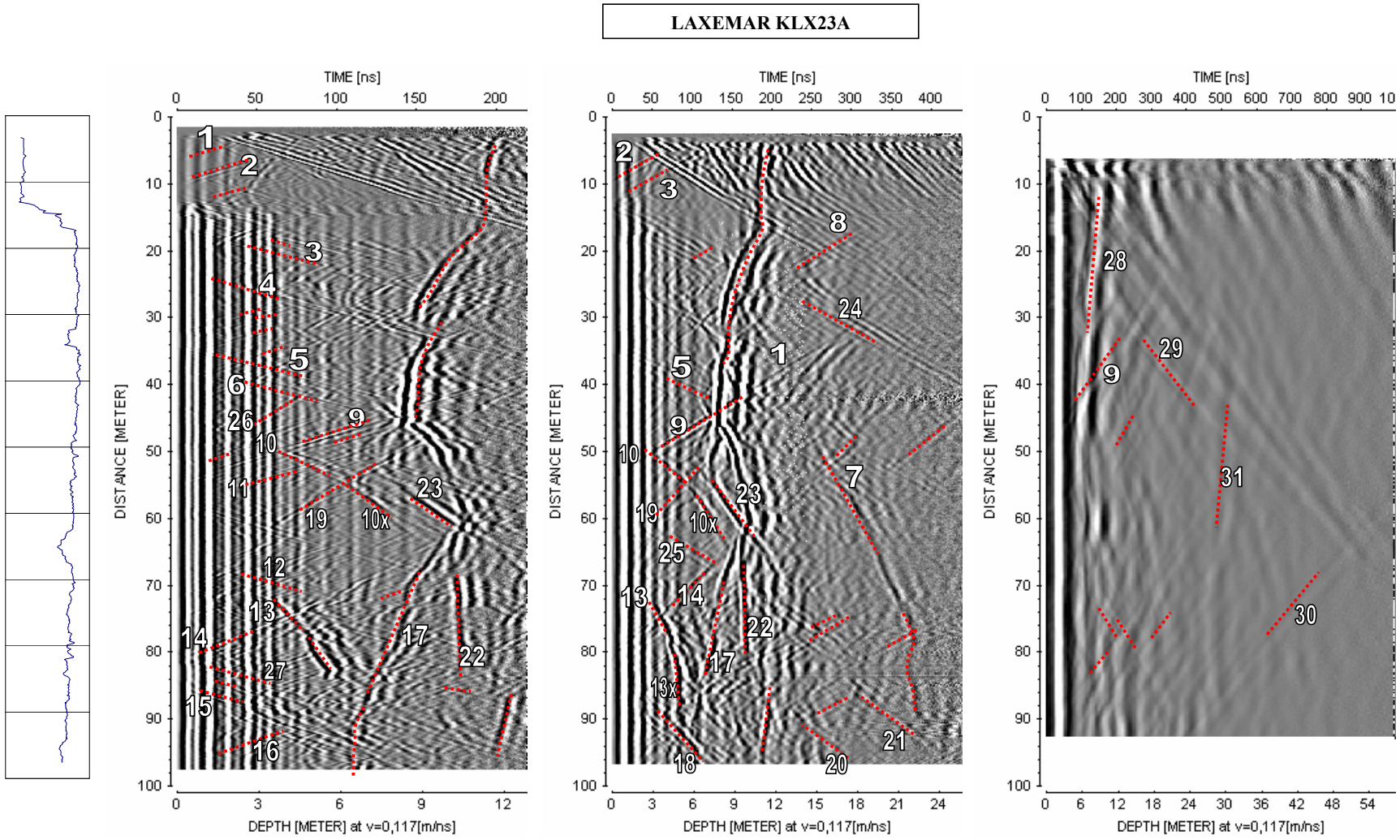
# Radar logging in KLX22A, 0 to 96 m, dipole antennas 250, 100 and 20 MHz



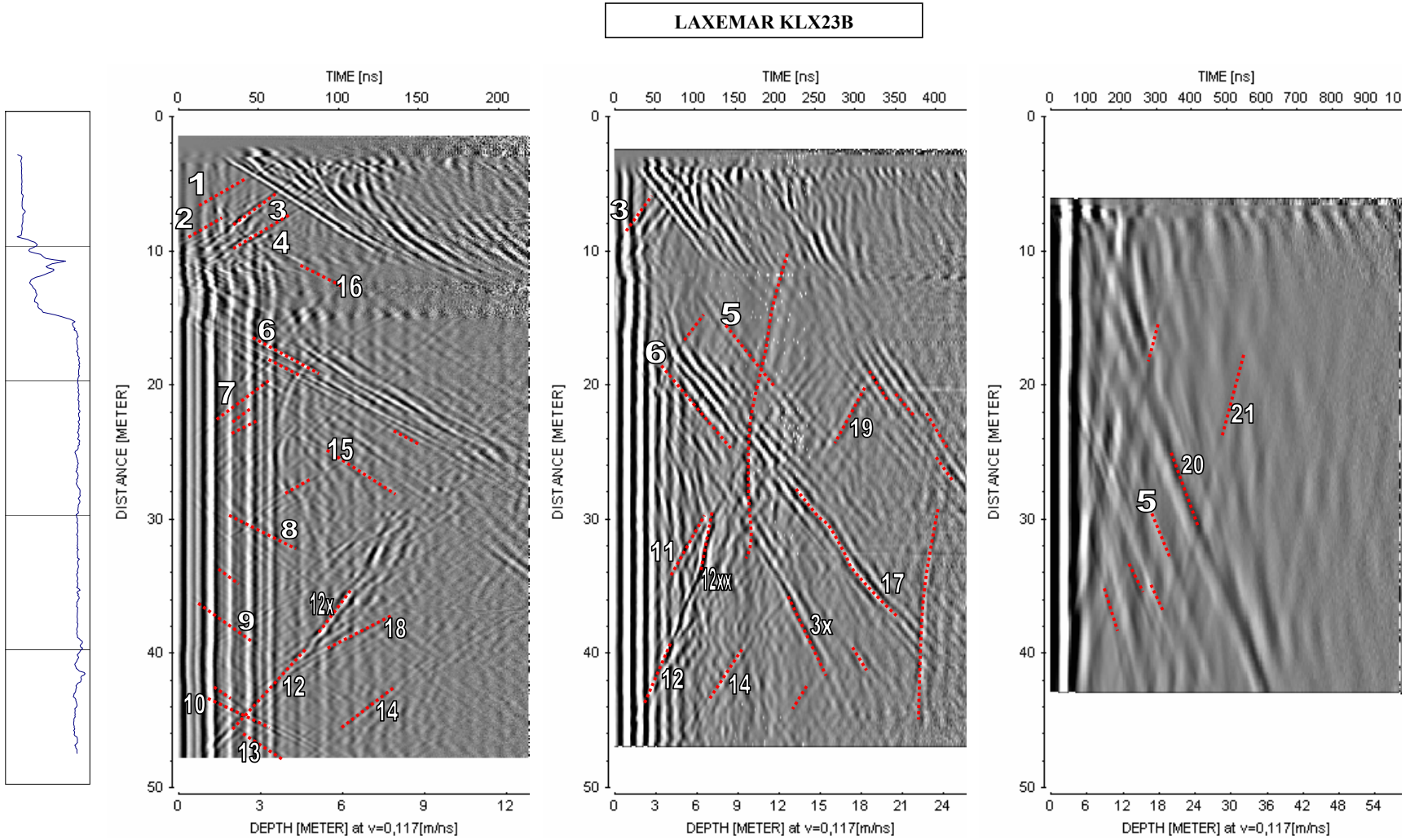
## Radar logging in KLX22B, 0 to 96 m, dipole antennas 250, 100 and 20 MHz



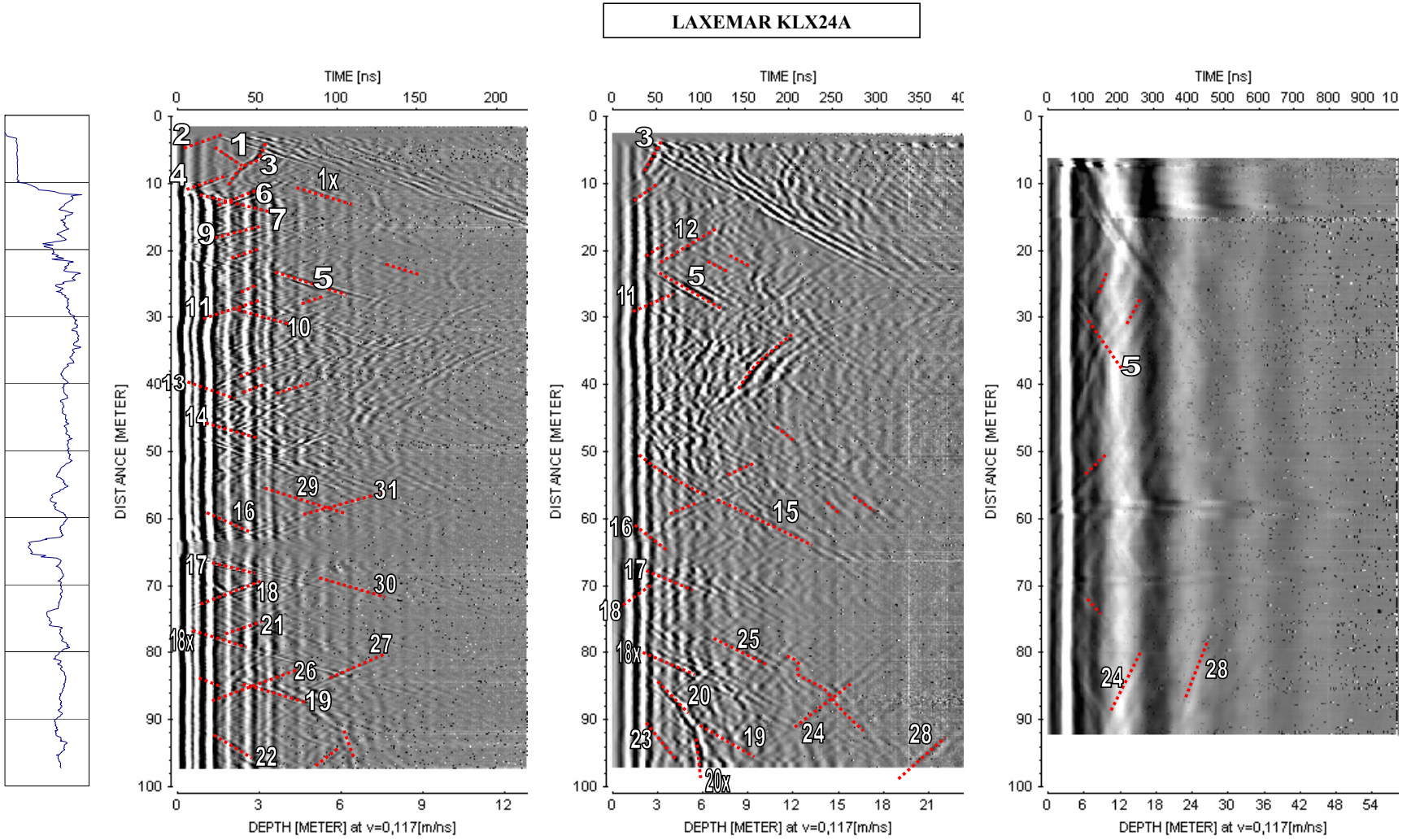
# Radar logging in KLX23A, 0 to 96 m, dipole antennas 250, 100 and 20 MHz



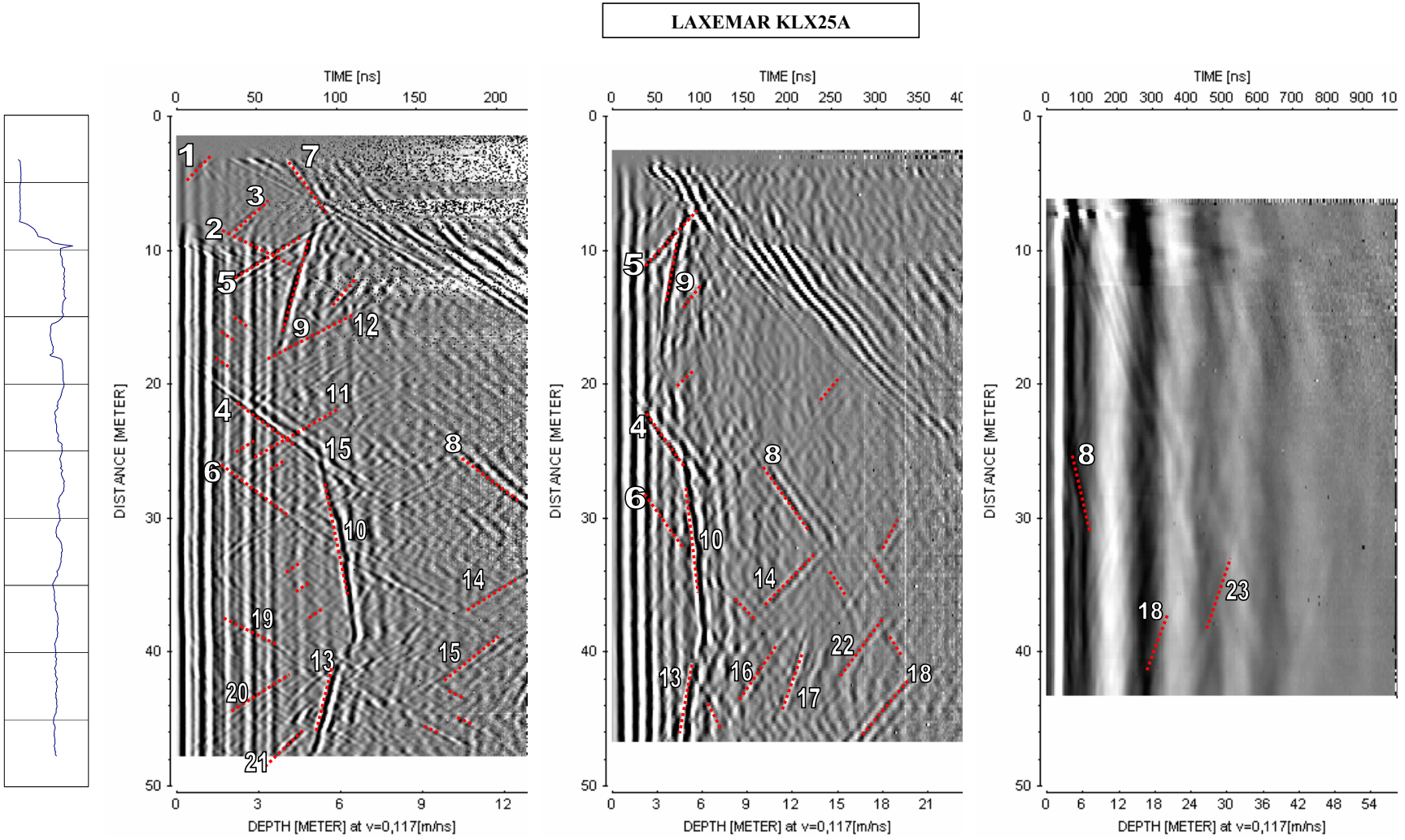
# Radar logging in KLX23B, 0 to 46 m, dipole antennas 250, 100 and 20 MHz



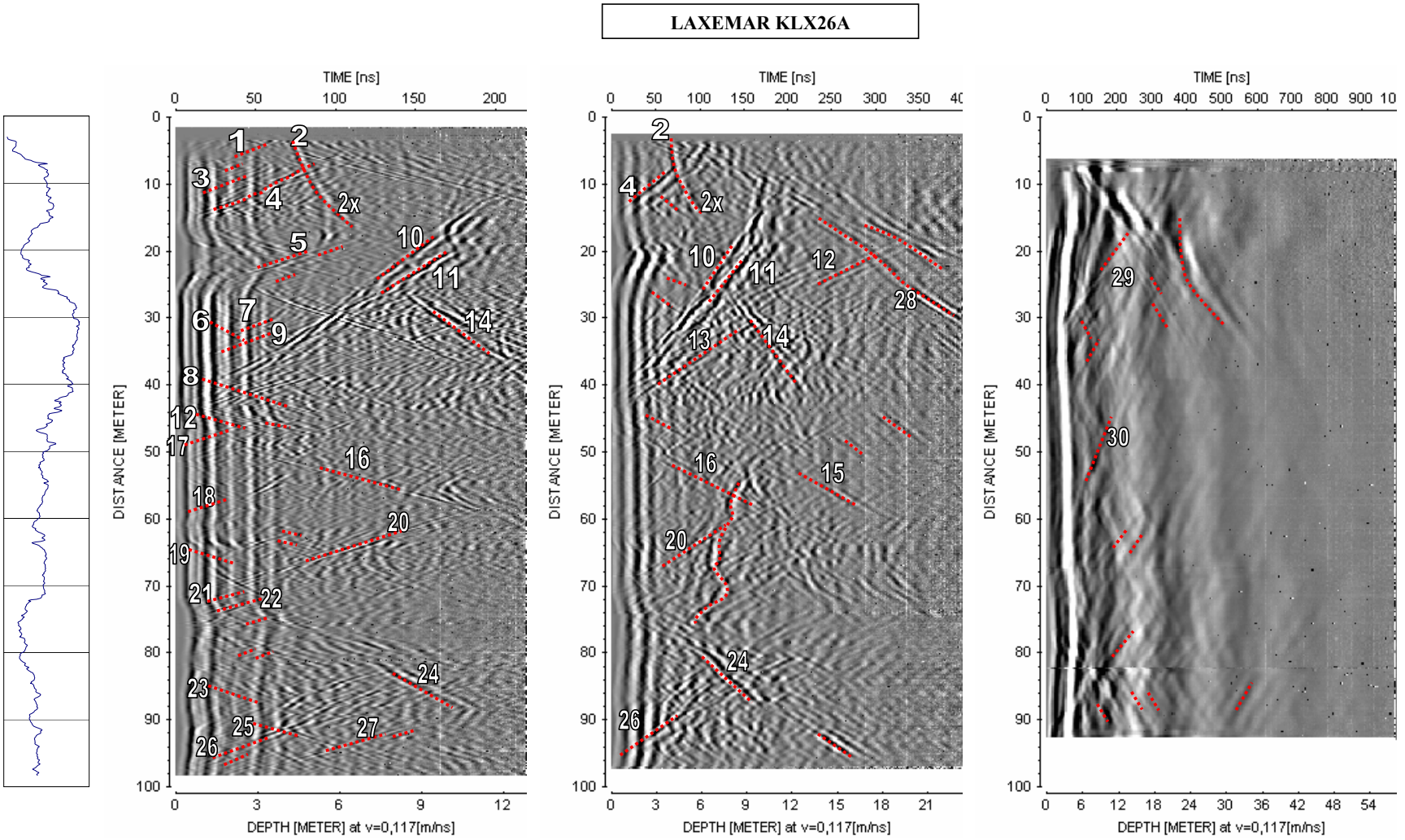
# Radar logging in KLX24A, 0 to 95 m, dipole antennas 250, 100 and 20 MHz



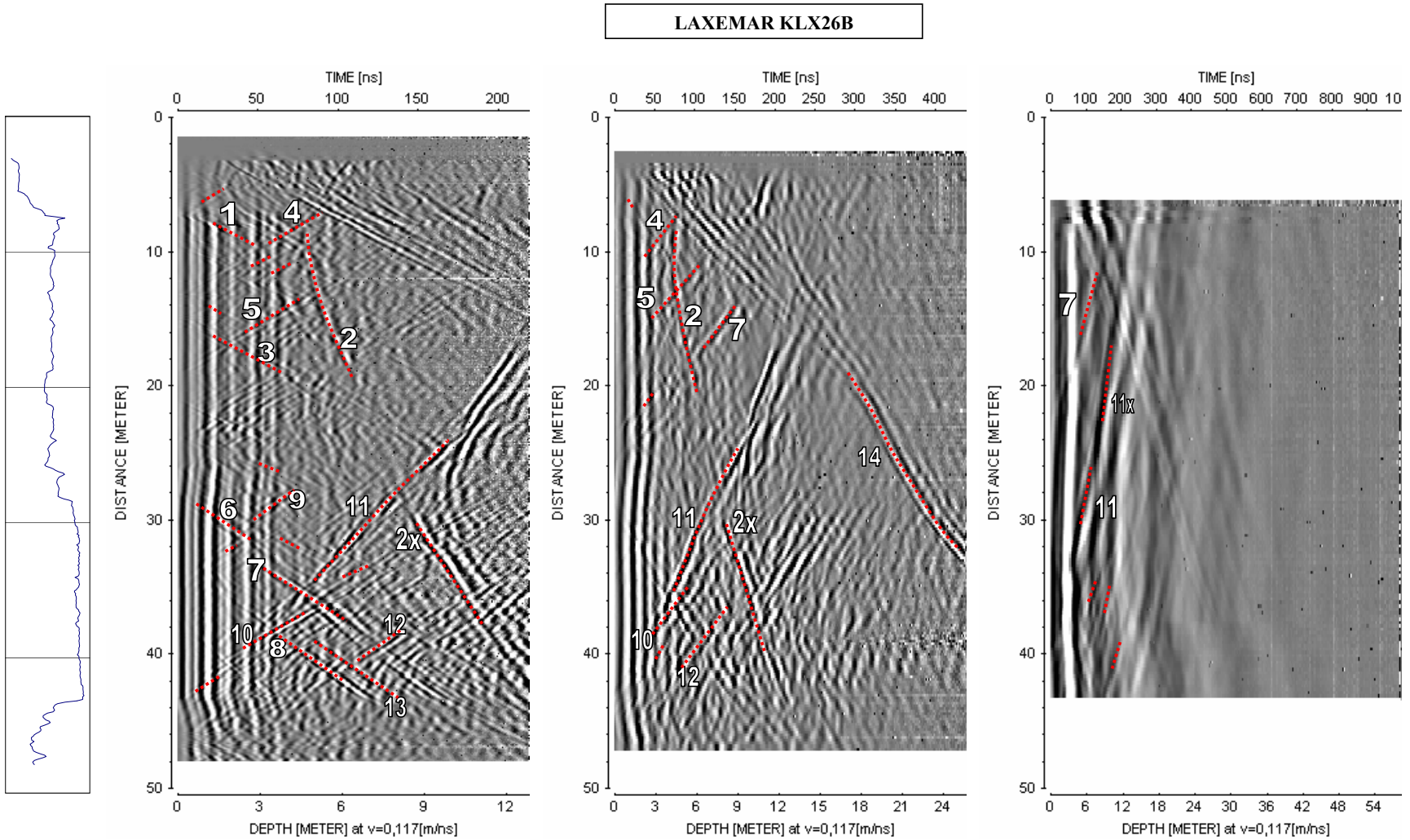
# Radar logging in KLX25A, 0 to 46 m, dipole antennas 250, 100 and 20 MHz



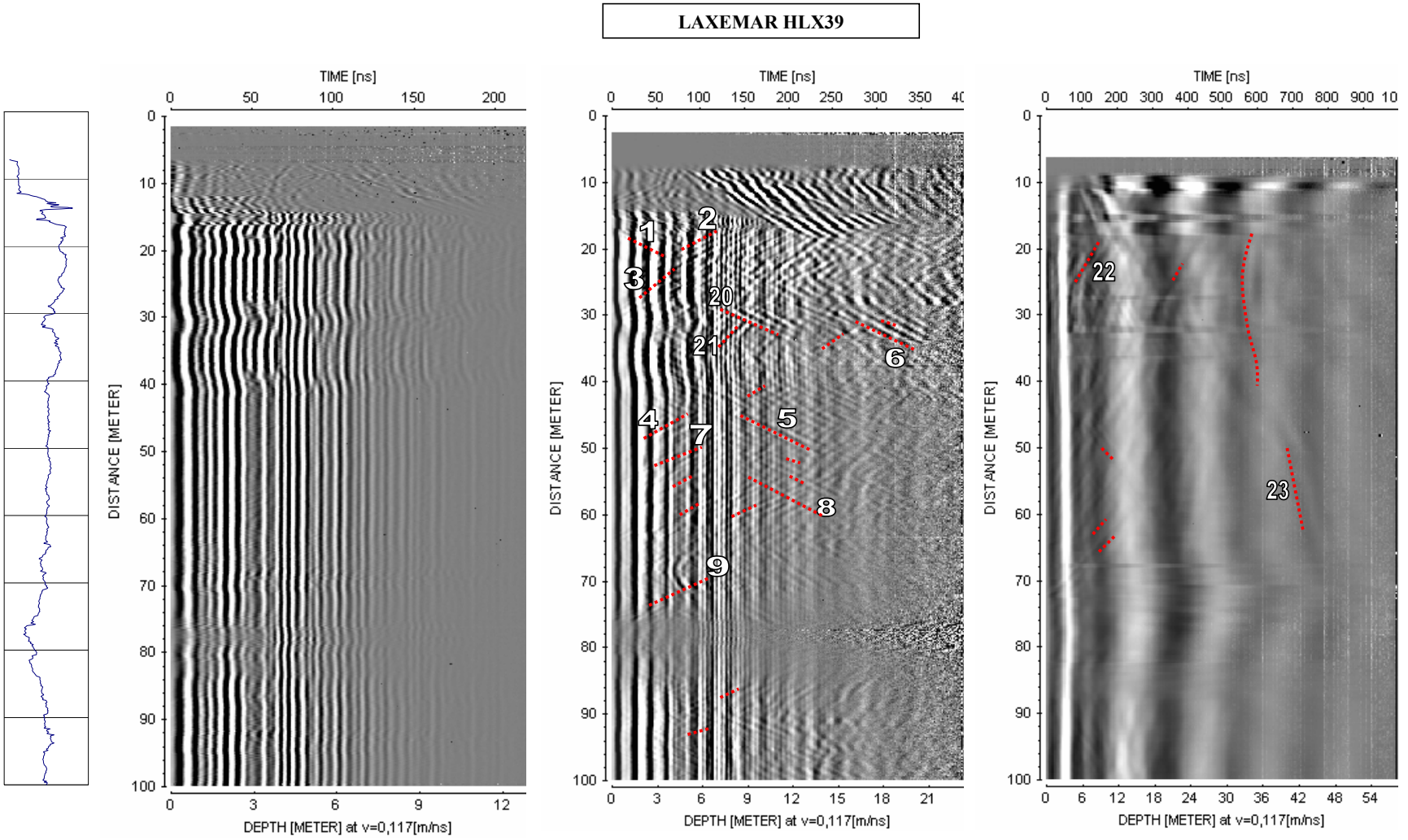
## Radar logging in KLX26A, 0 to 96 m, dipole antennas 250, 100 and 20 MHz



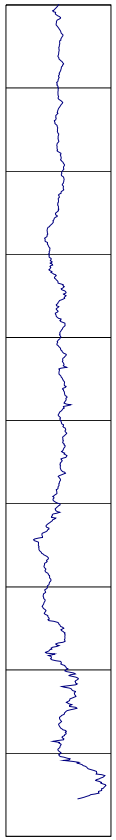
# Radar logging in KLX26B, 0 to 46 m, dipole antennas 250, 100 and 20 MHz

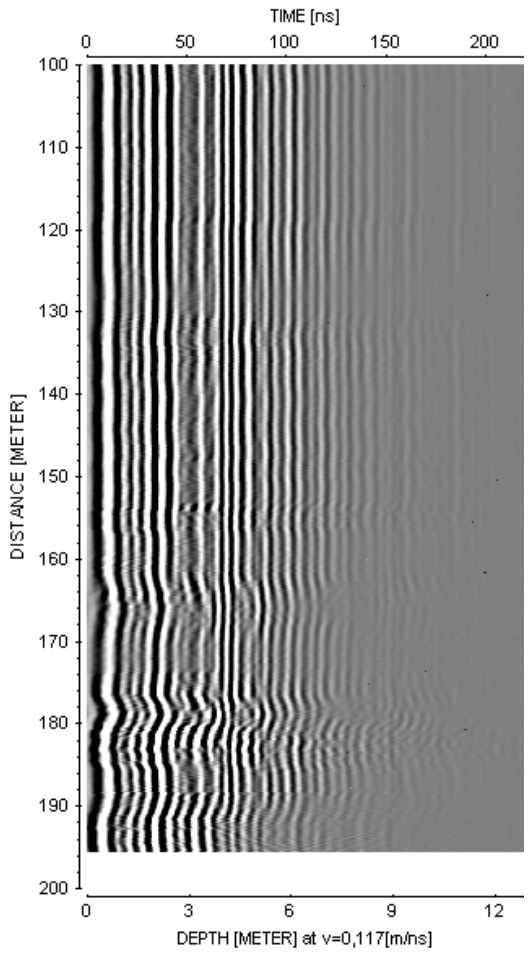


# Radar logging in HLX39, 0 to 194 m, dipole antennas 250, 100 and 20 MHz

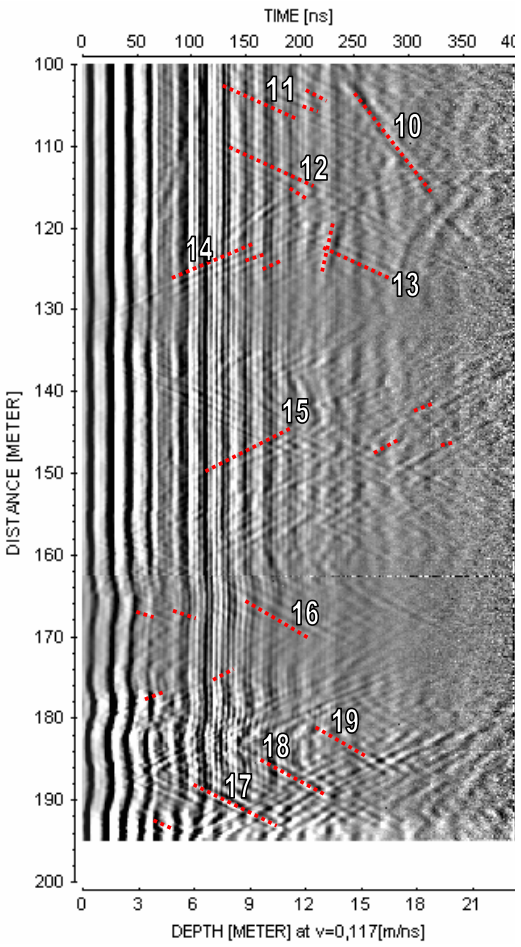


**LAXEMAR HLX39**

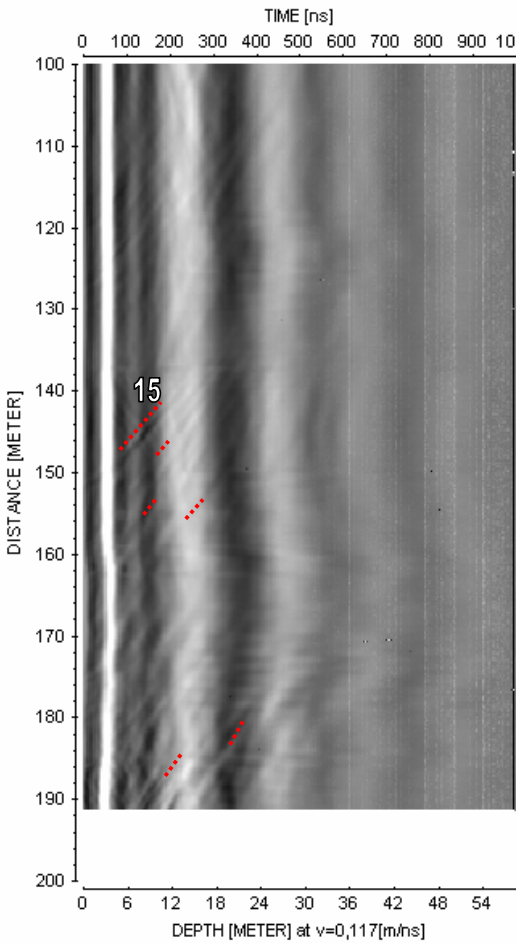





**250 MHz**



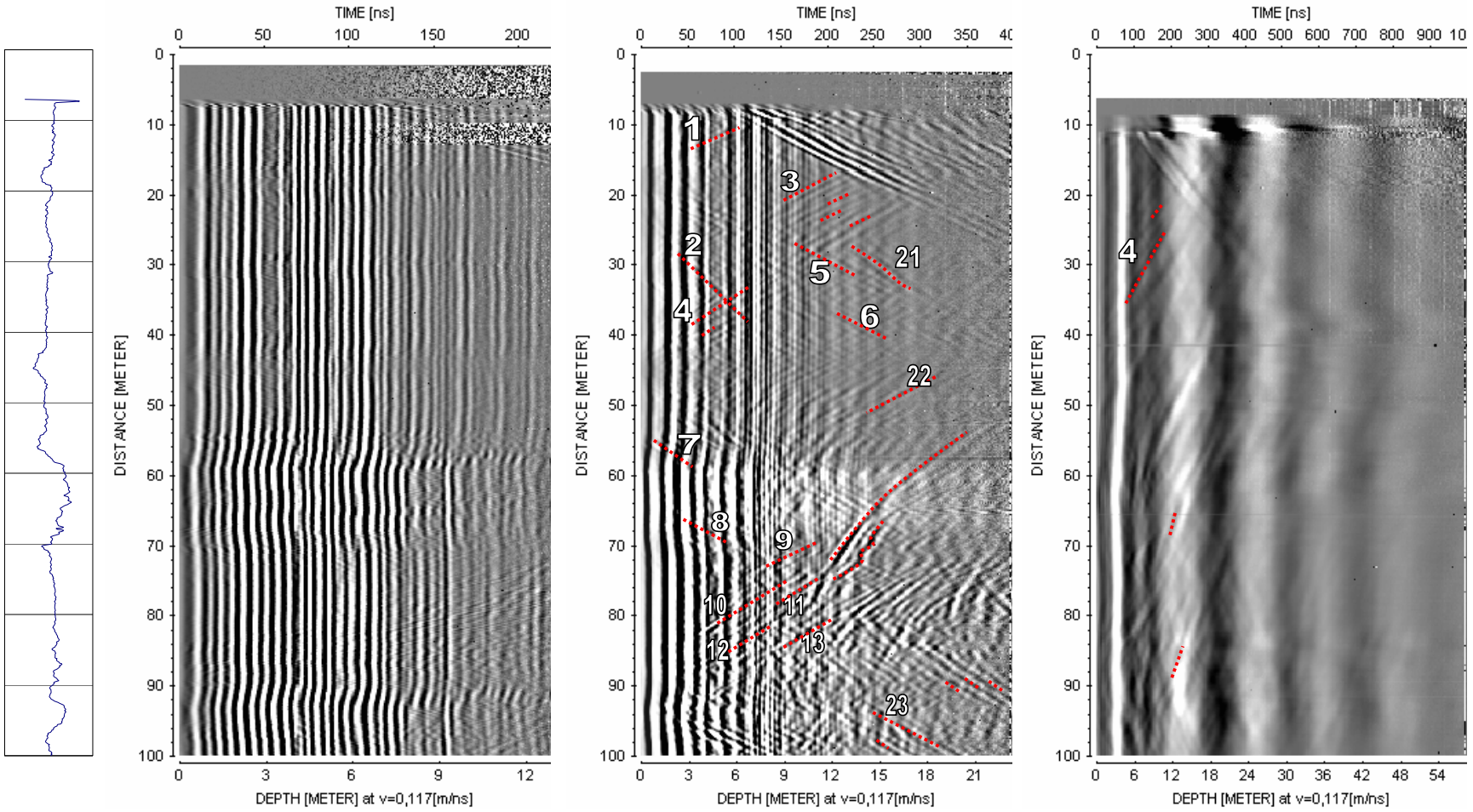

**100 MHz**




**20 MHz**

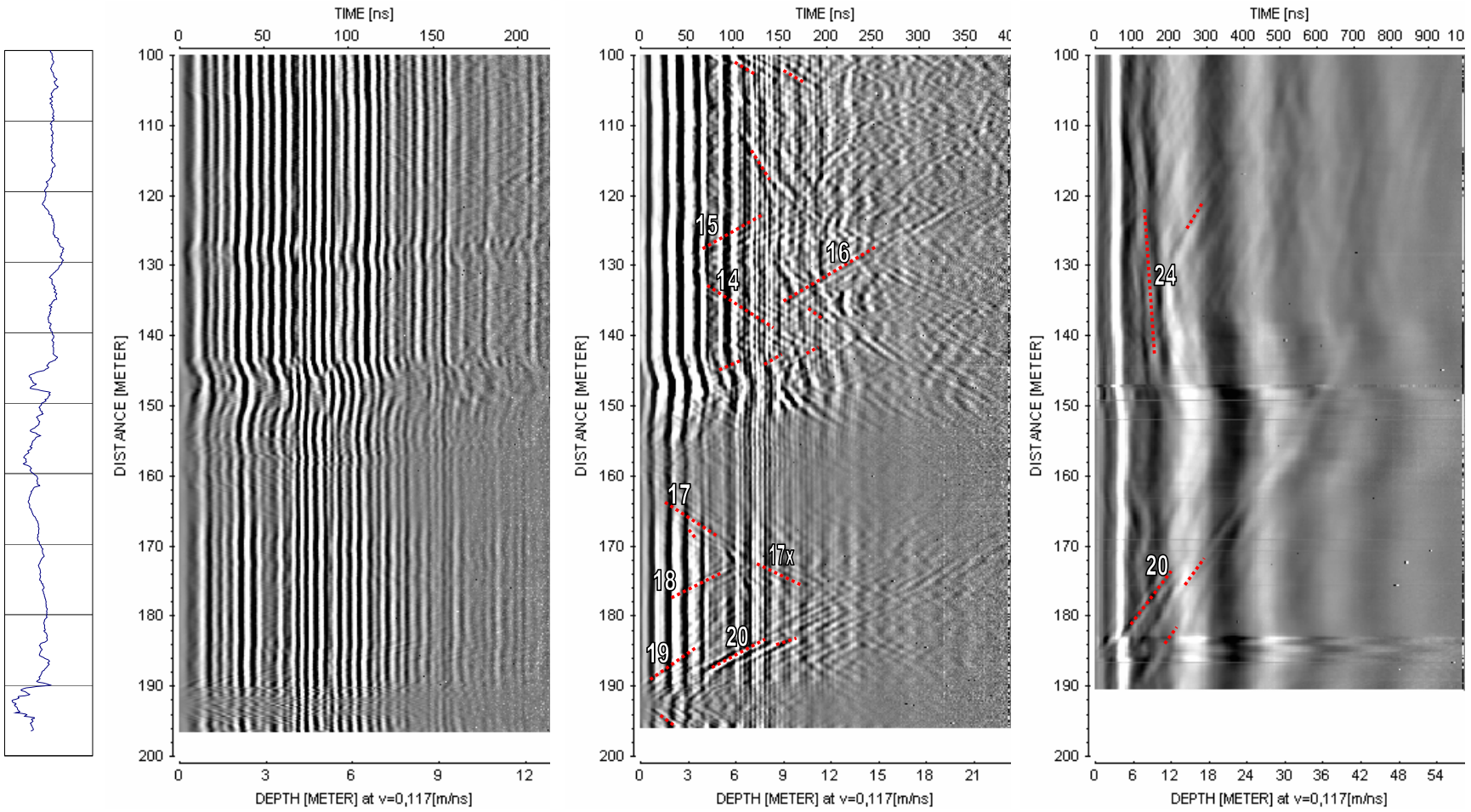
# Radar logging in HLX41, 0 to 195 m, dipole antennas 250, 100 and 20 MHz

**LAXEMAR HLX41**




**250 MHz** **100 MHz** **20 MHz**

**LAXEMAR HLX41**




**250 MHz** **100 MHz** **20 MHz**

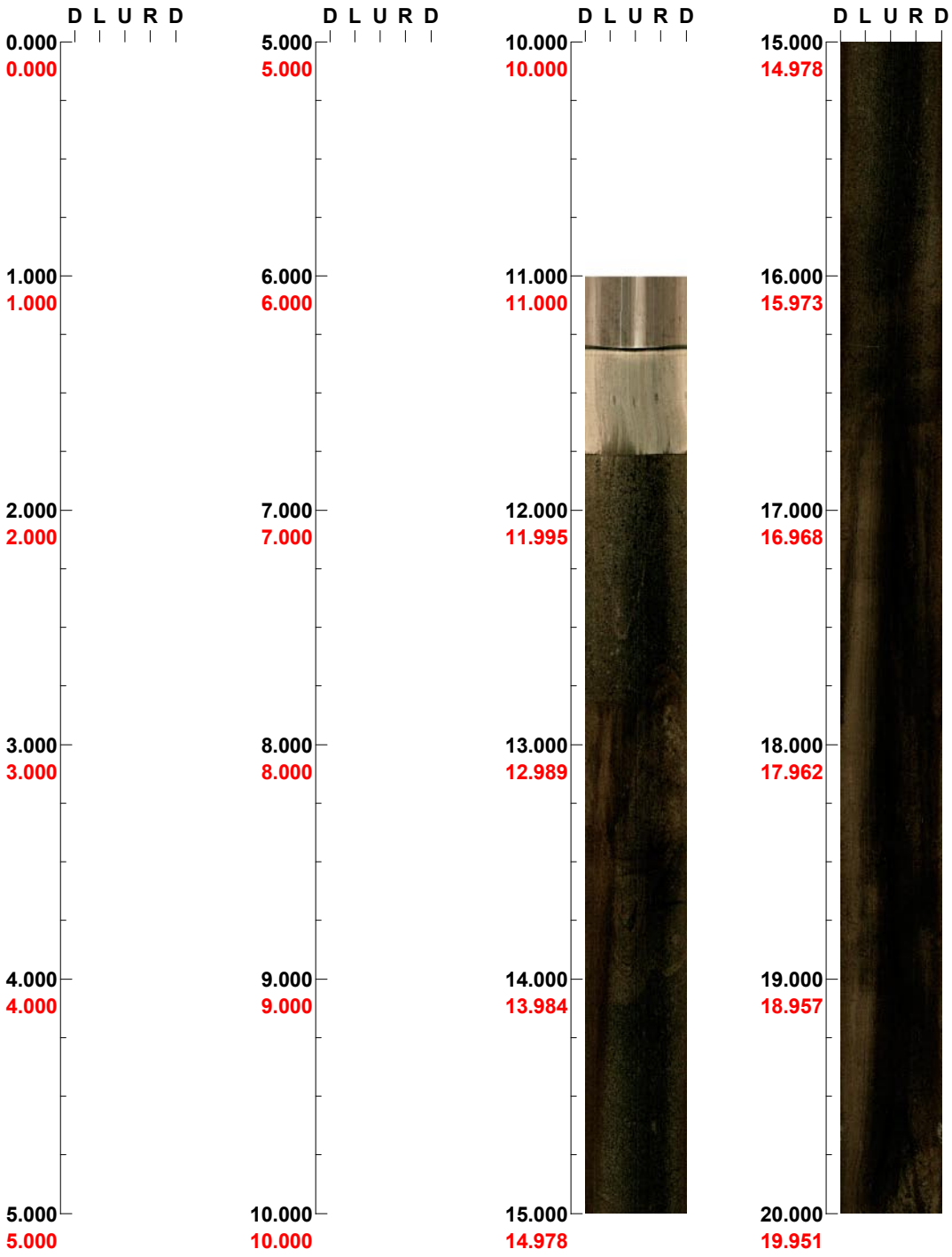
## BIPS logging in KLX13A, 11 to 594 m

**Project name: Laxemar**

| | |
|---|---|
| **Image file** | **: c:\work\r5566k~1\bips\060911~1\klx13a1.bip** |
| **BDT file** | **: c:\work\r5566k~1\bips\060911~1\klx13a1.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX13A** |
| **Date** | **: 06/09/12** |
| **Time** | **: 14:46:00** |
| **Depth range** | **: 11.000 - 96.212 m** |
| **Azimuth** | **: 224** |
| **Inclination** | **: -82** |
| **Diameter** | **: 197.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 70 %** |
| **Pages** | **: 5** |
| **Color** | **:**  **+0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

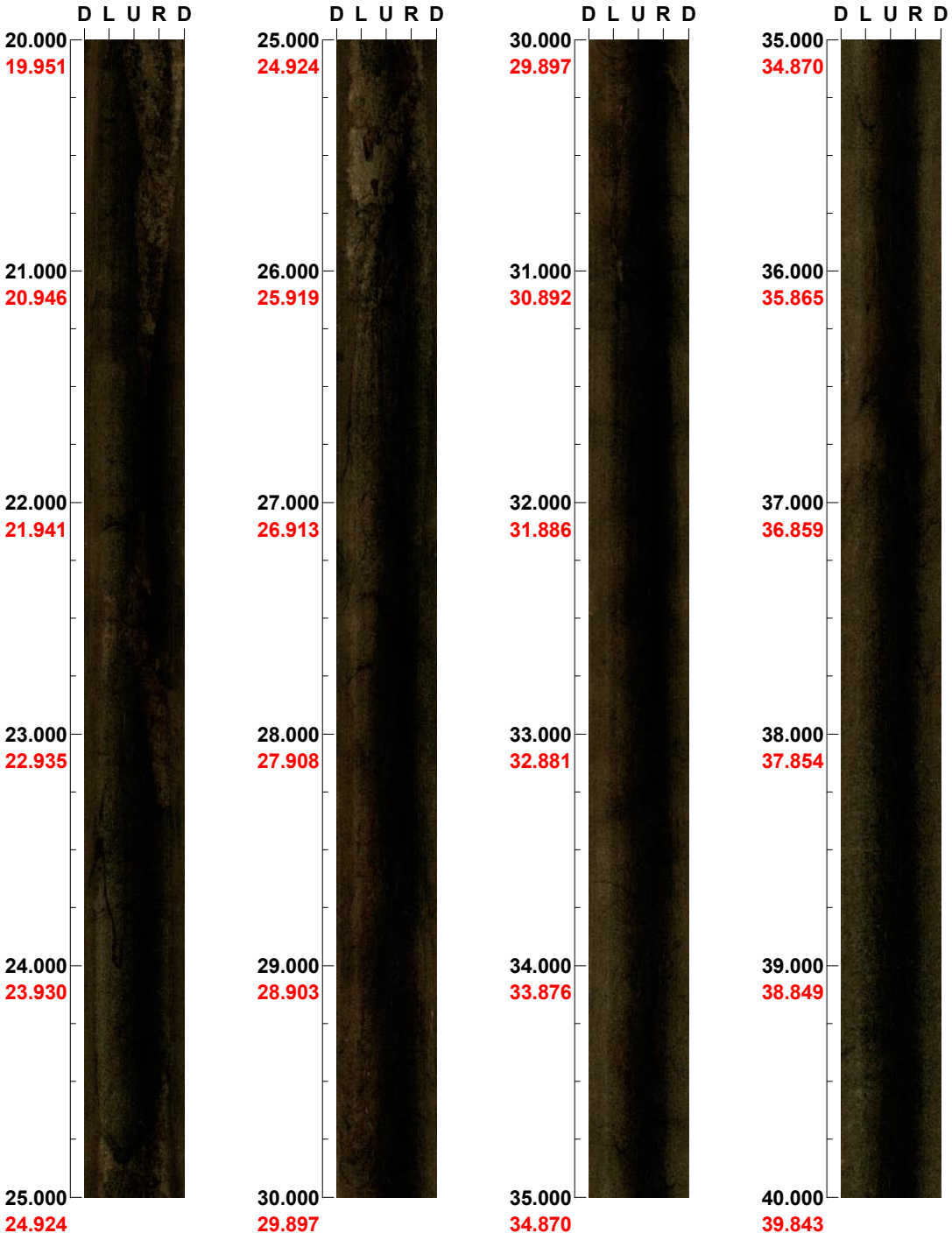
**Depth range: 0.000 - 20.000 m**




**( 1 / 5 )** **Scale: 1/25** **Aspect ratio: 70 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

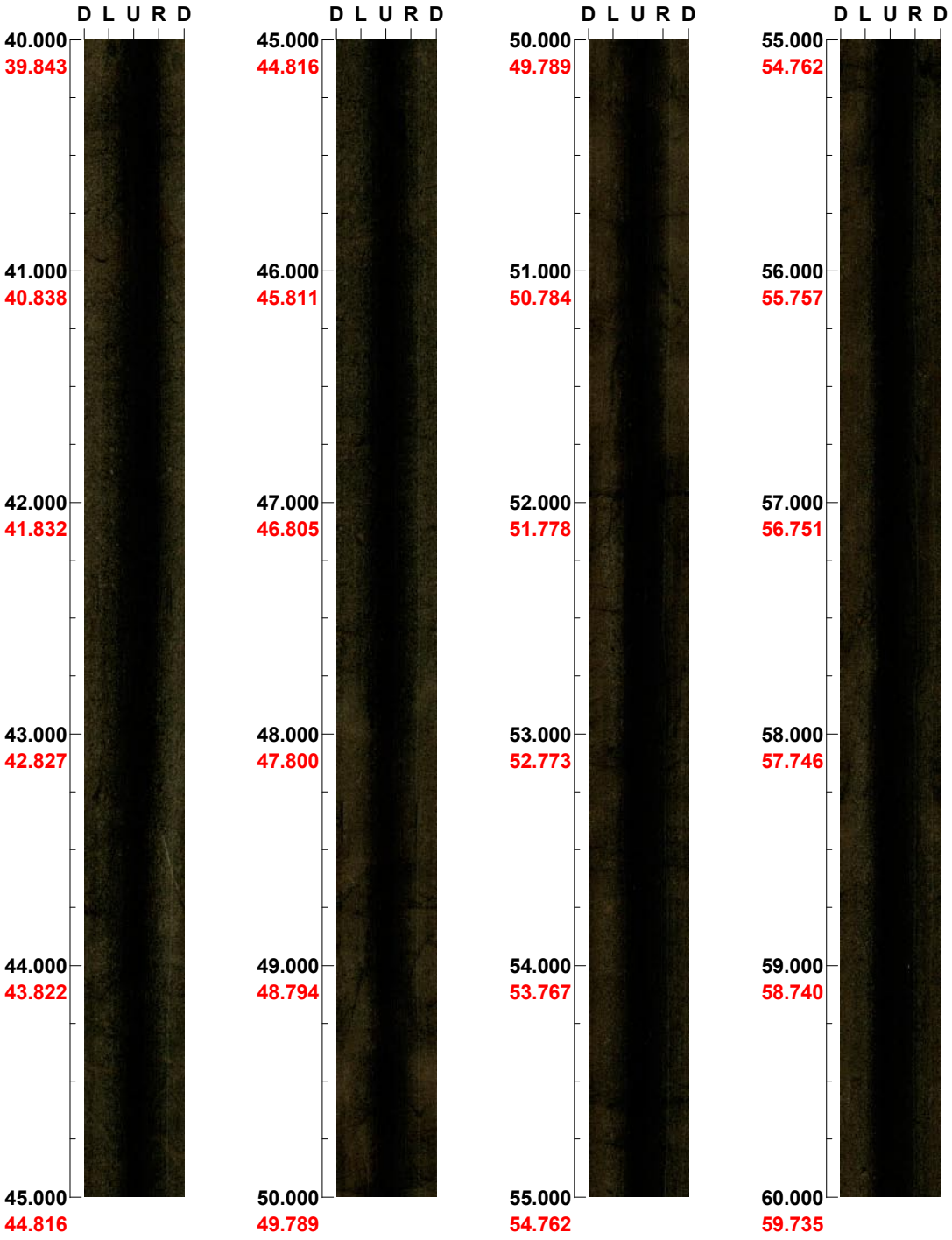
**Depth range: 20.000 - 40.000 m**




**( 2 / 5 )** **Scale: 1/25** **Aspect ratio: 70 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 40.000 - 60.000 m**




**( 3 / 5 )** **Scale: 1/25** **Aspect ratio: 70 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 60.000 - 80.000 m**


**( 4 / 5 )** **Scale: 1/25** **Aspect ratio: 70 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 80.000 - 96.212 m**

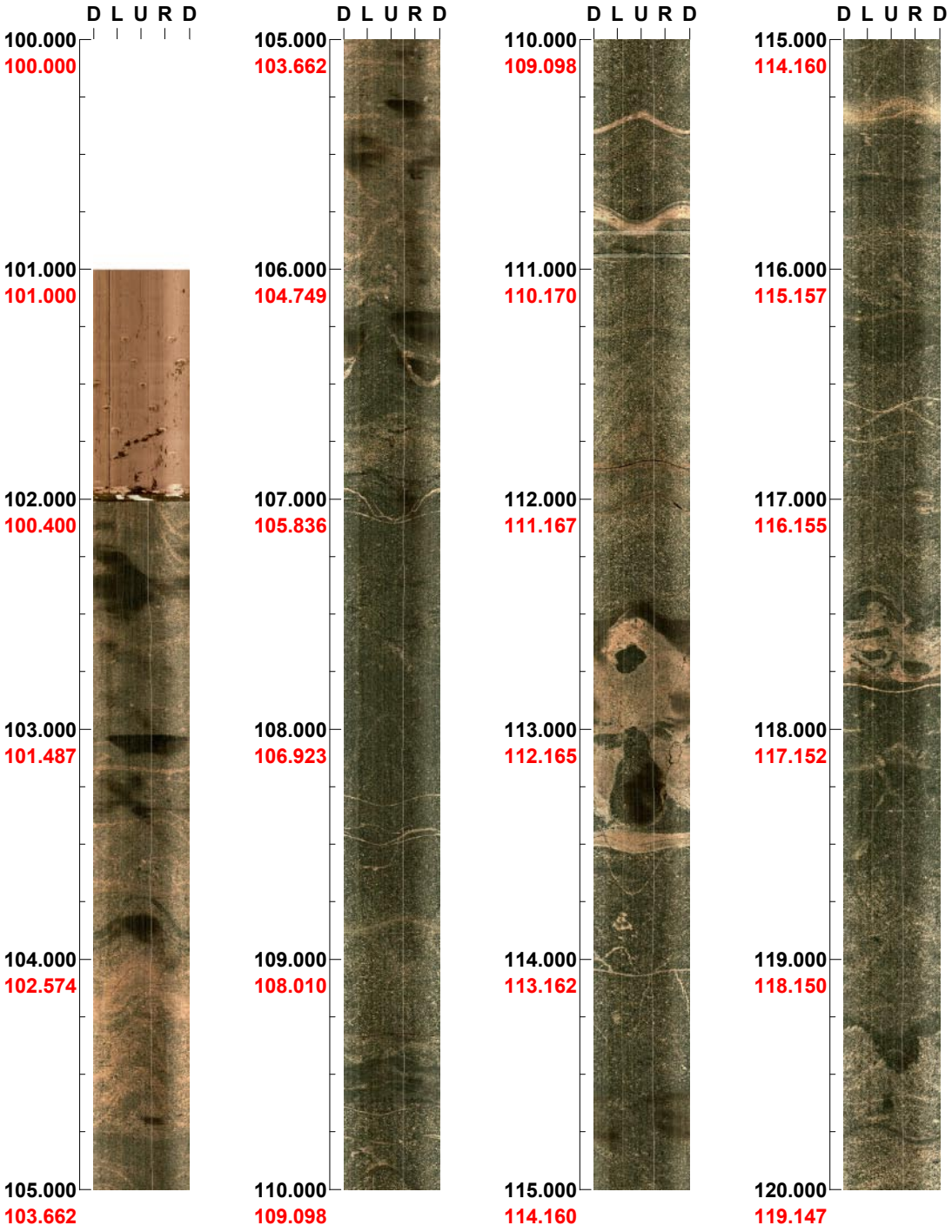

**( 5 / 5 )** **Scale: 1/25** **Aspect ratio: 70 %**

**Project name: Laxemar**

| | |
|---|---|
| **Image file** | **: c:\work\r5566k~1\bips\060911~1\klx13a2.bip** |
| **BDT file** | **: c:\work\r5566k~1\bips\060911~1\klx13a2.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX13A** |
| **Date** | **: 06/09/12** |
| **Time** | **: 08:33:00** |
| **Depth range** | **: 101.000 - 594.004 m** |
| **Azimuth** | **: 224** |
| **Inclination** | **: -82** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 14** |
| **Color** | **: +0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

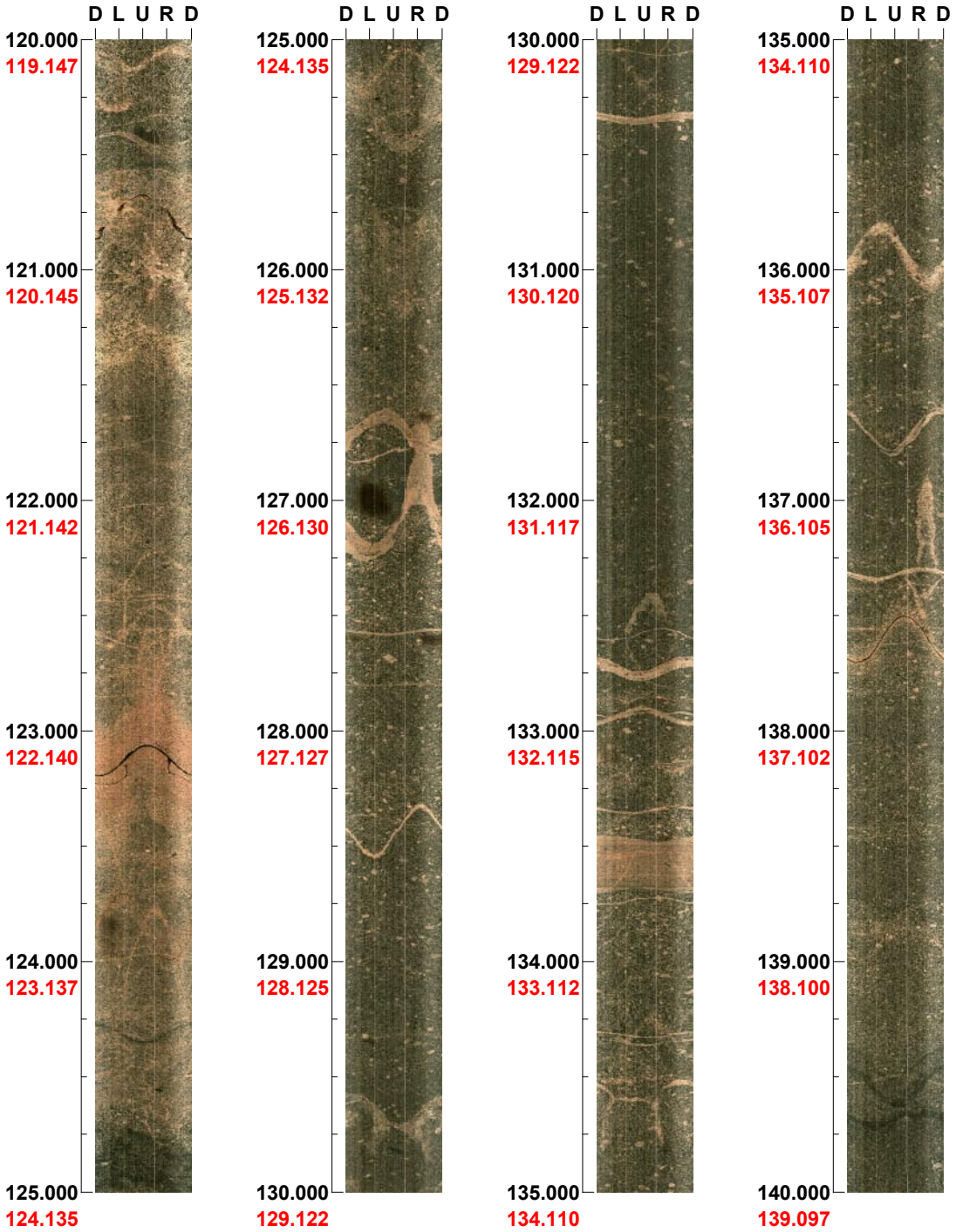
**Depth range: 100.000 - 120.000 m**




**( 1 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

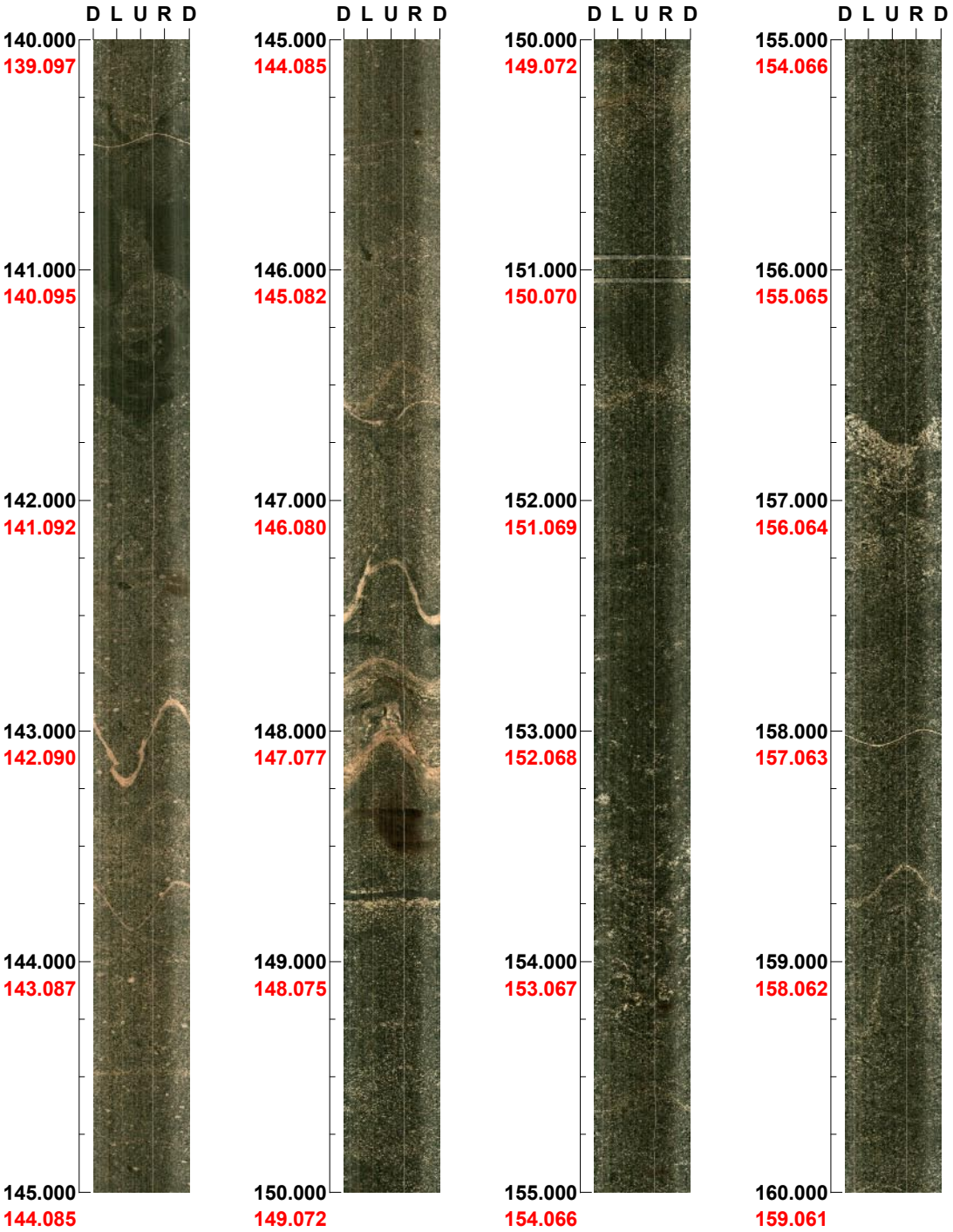
**Depth range: 120.000 - 140.000 m**




**( 2 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

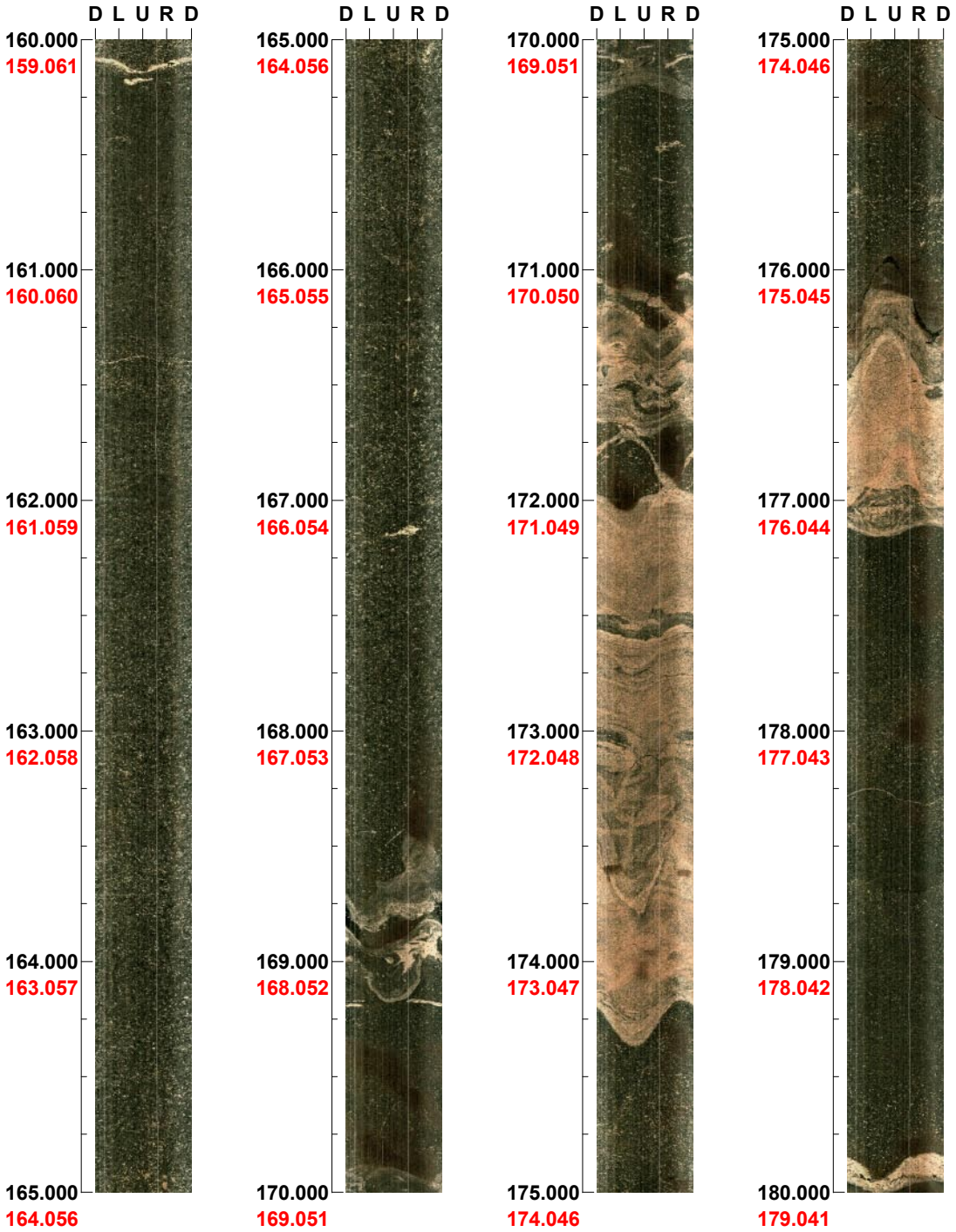
**Depth range: 140.000 - 160.000 m**




**( 3 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

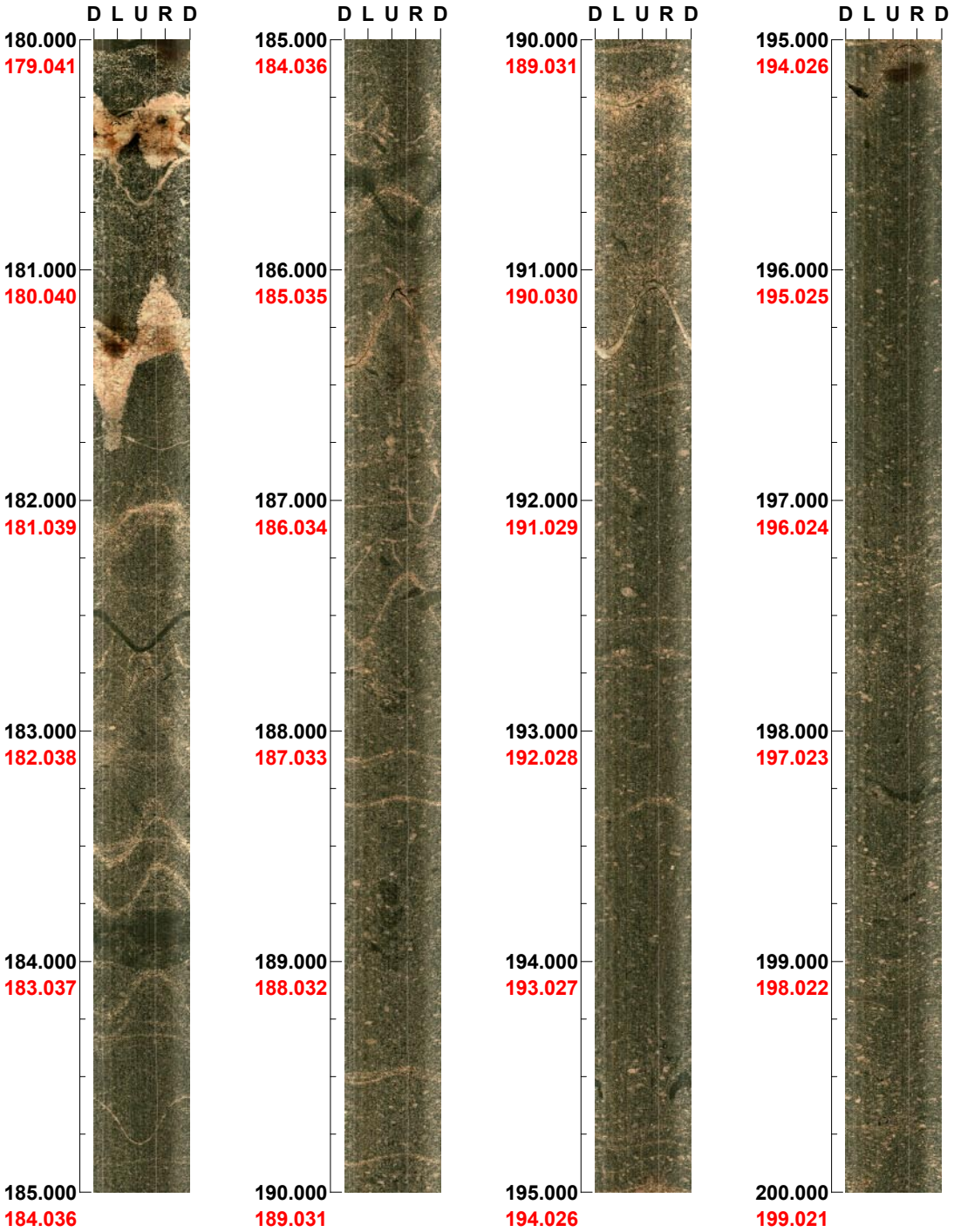
**Depth range: 160.000 - 180.000 m**




**( 4 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 180.000 - 200.000 m**




**( 5 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 200.000 - 220.000 m**


**( 6 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

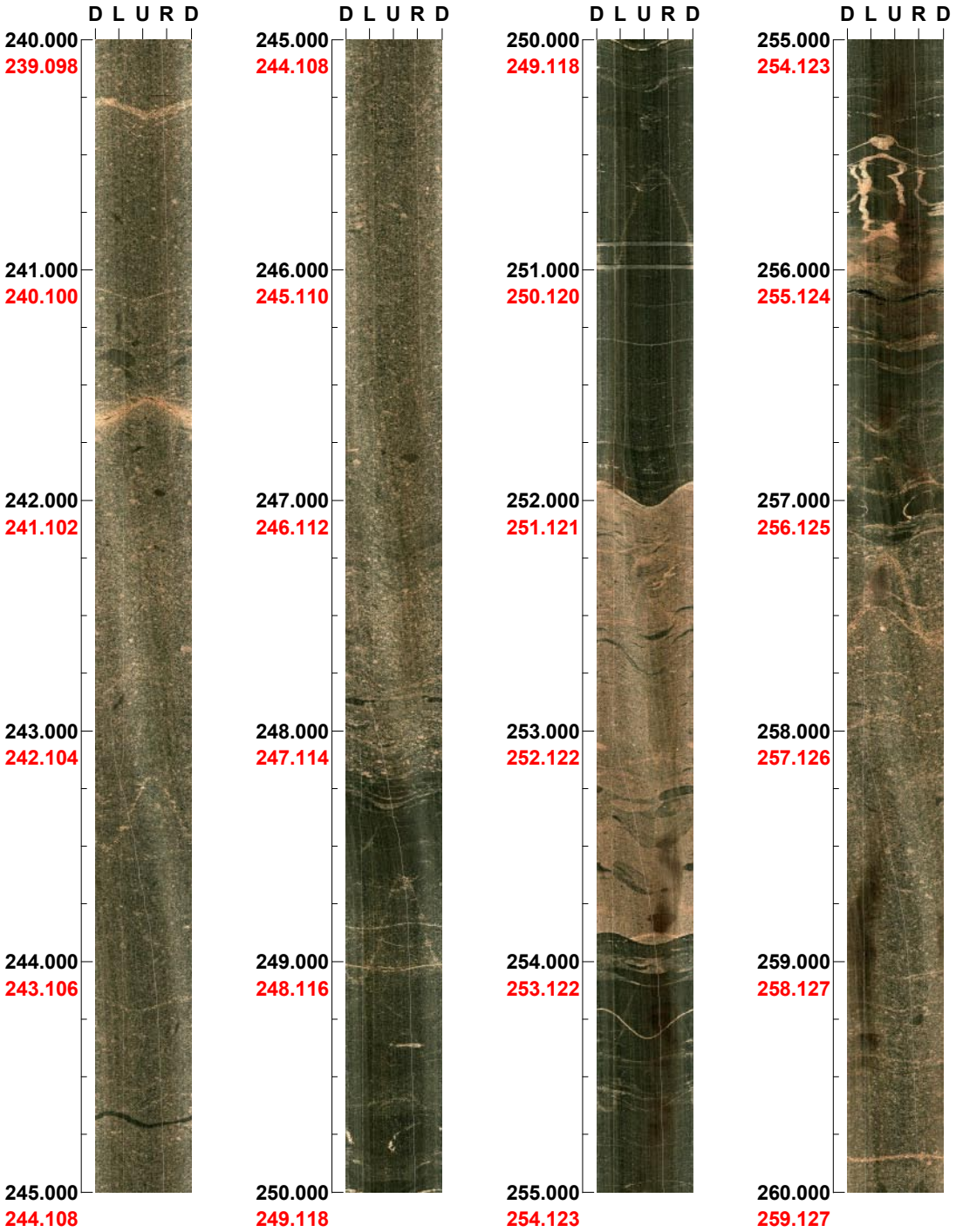
**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 220.000 - 240.000 m**


**( 7 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

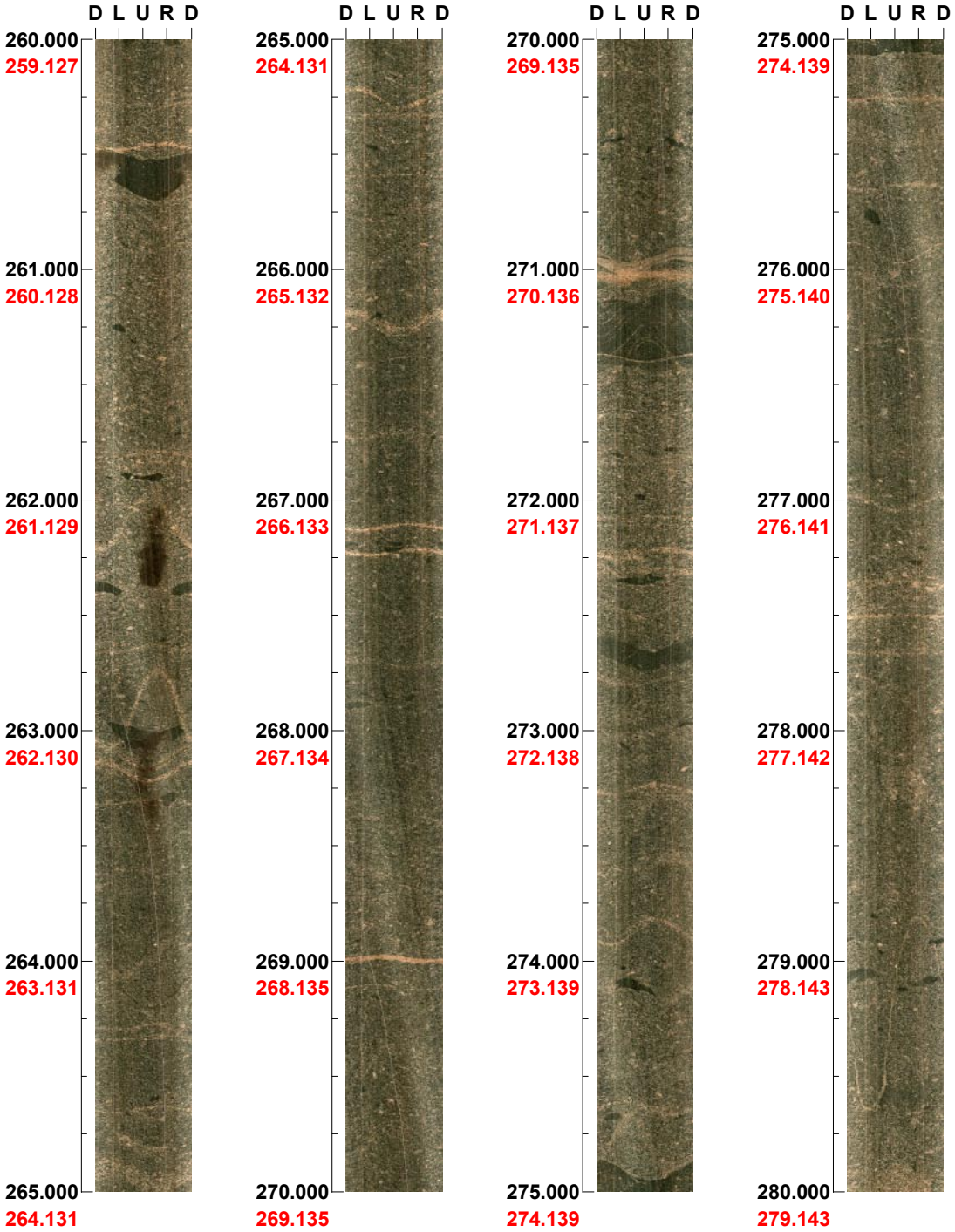
**Depth range: 240.000 - 260.000 m**




**( 8 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 260.000 - 280.000 m**




**( 9 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

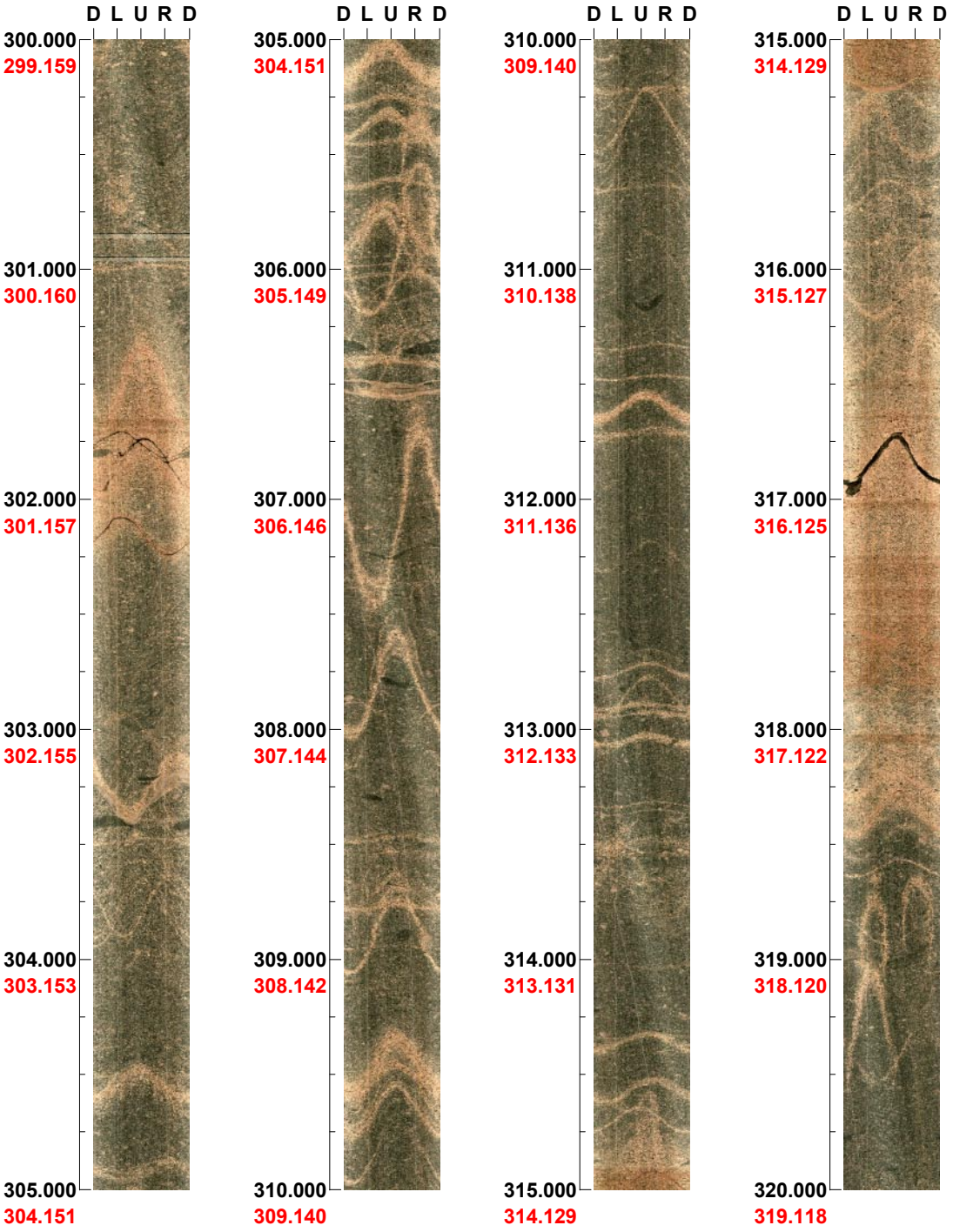
**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 280.000 - 300.000 m**


**( 10 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

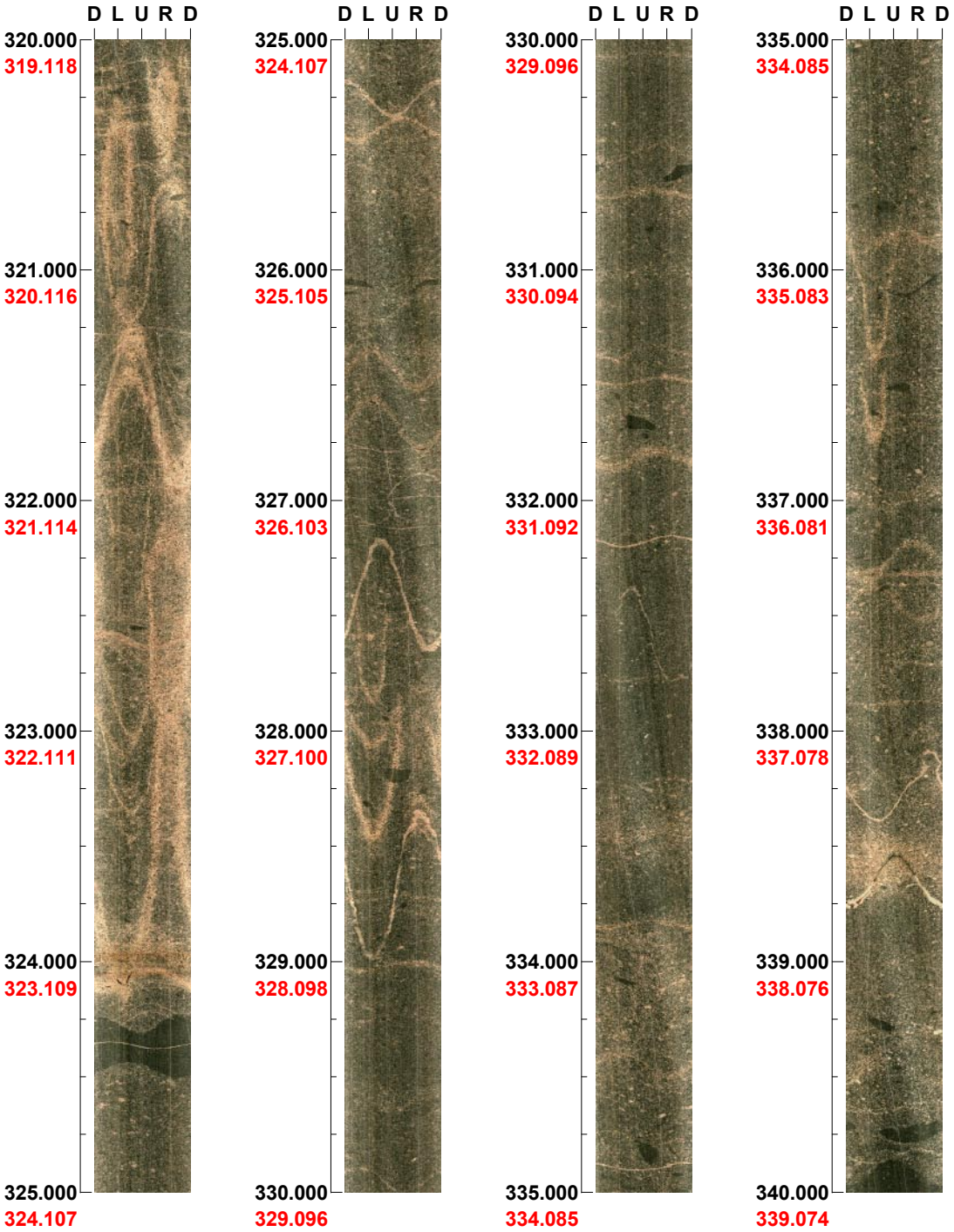
**Depth range: 300.000 - 320.000 m**




**( 11 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

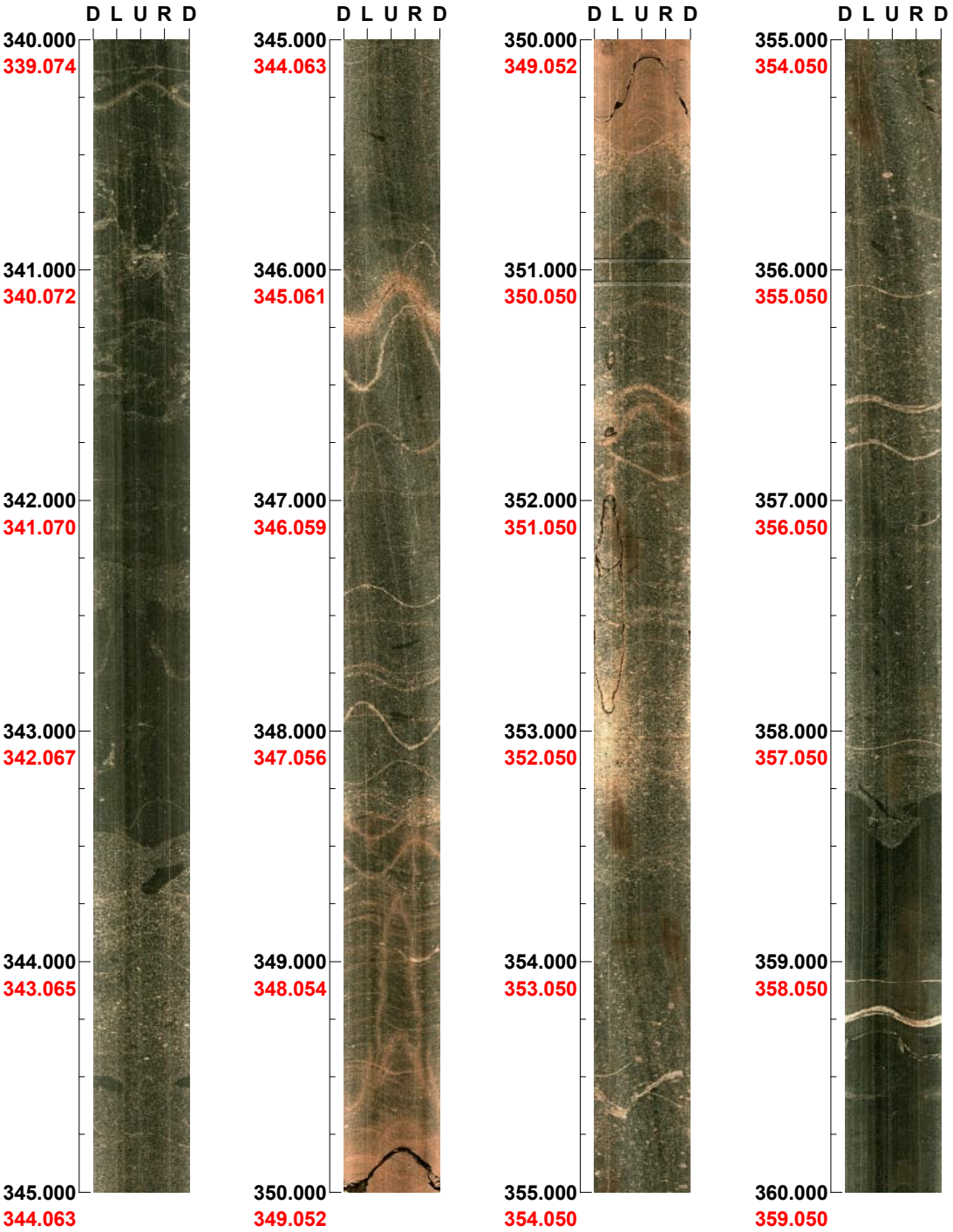
**Depth range: 320.000 - 340.000 m**




**( 12 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

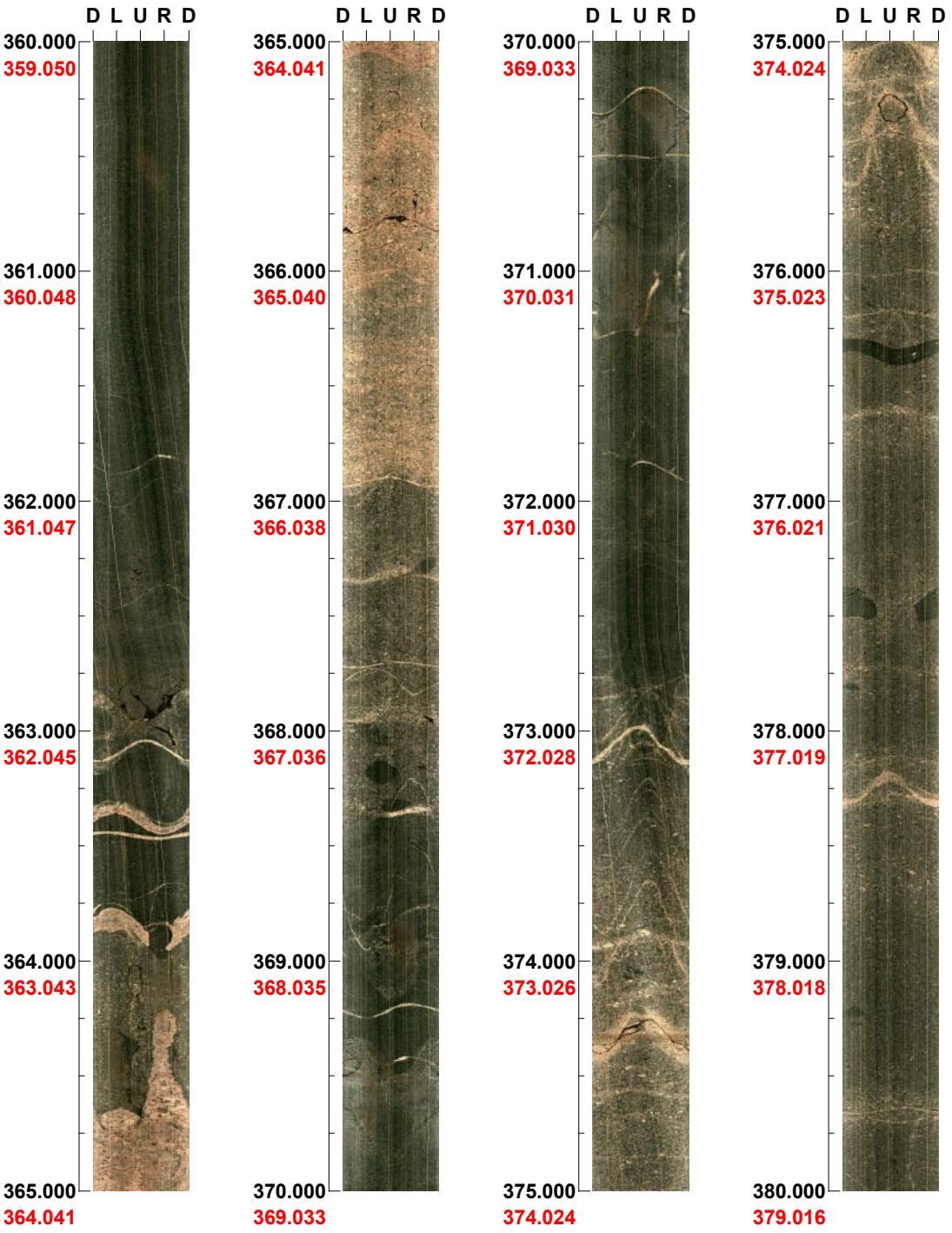
**Depth range: 340.000 - 360.000 m**




**( 13 / 14 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

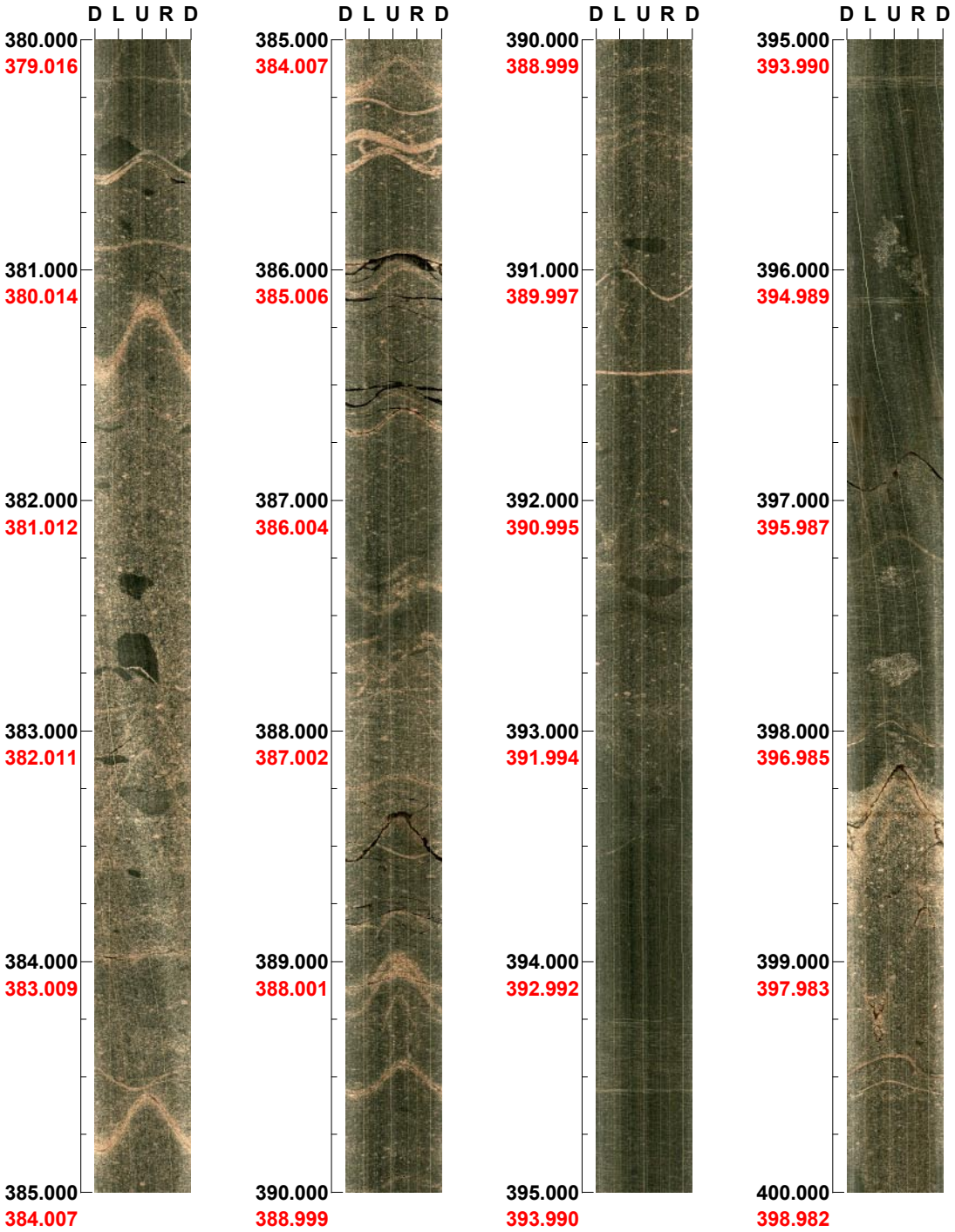
**Depth range: 360.000 - 380.000 m**




**( 1 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

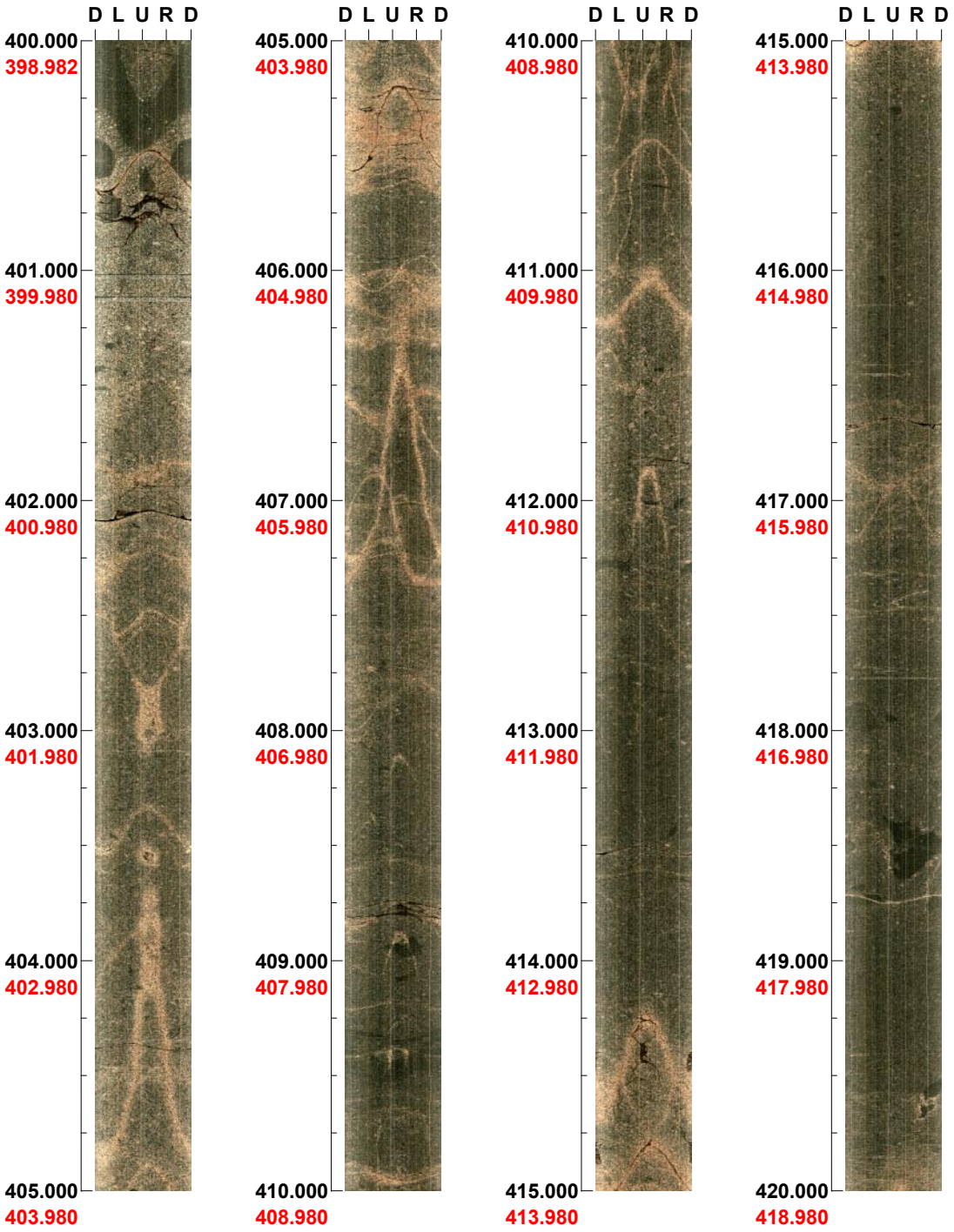
**Depth range: 380.000 - 400.000 m**




**( 2 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

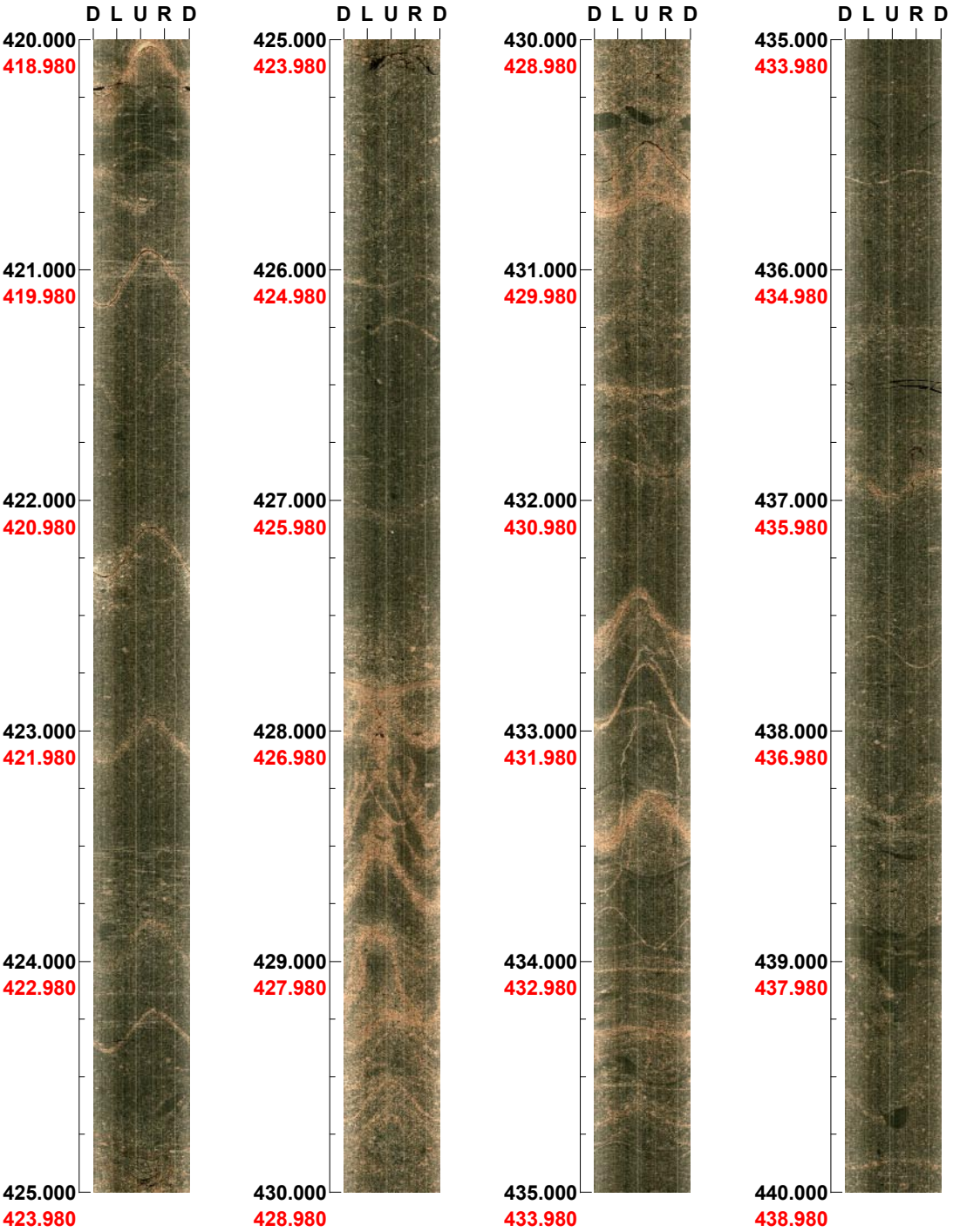
**Depth range: 400.000 - 420.000 m**




**( 3 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

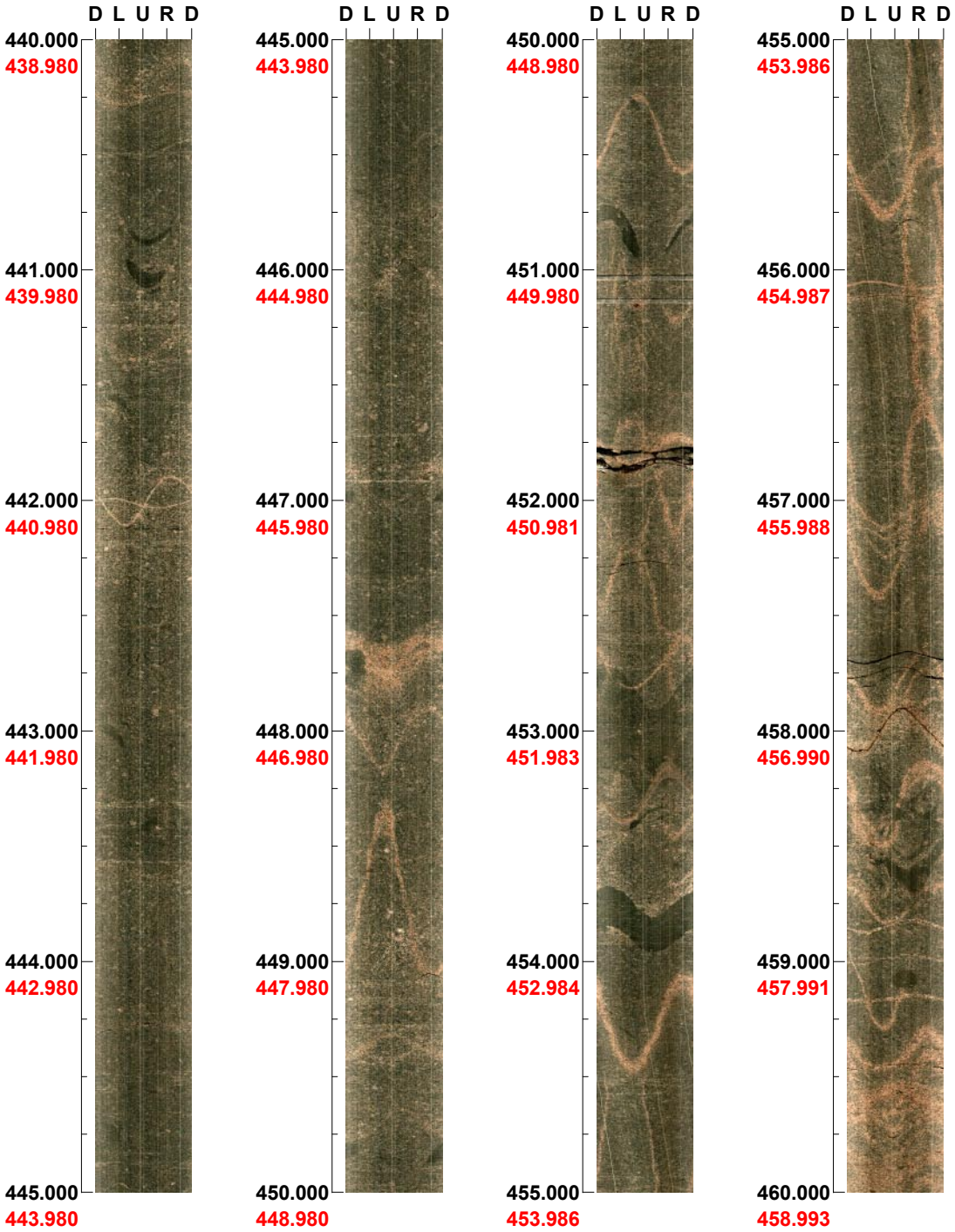
**Depth range: 420.000 - 440.000 m**




**( 4 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

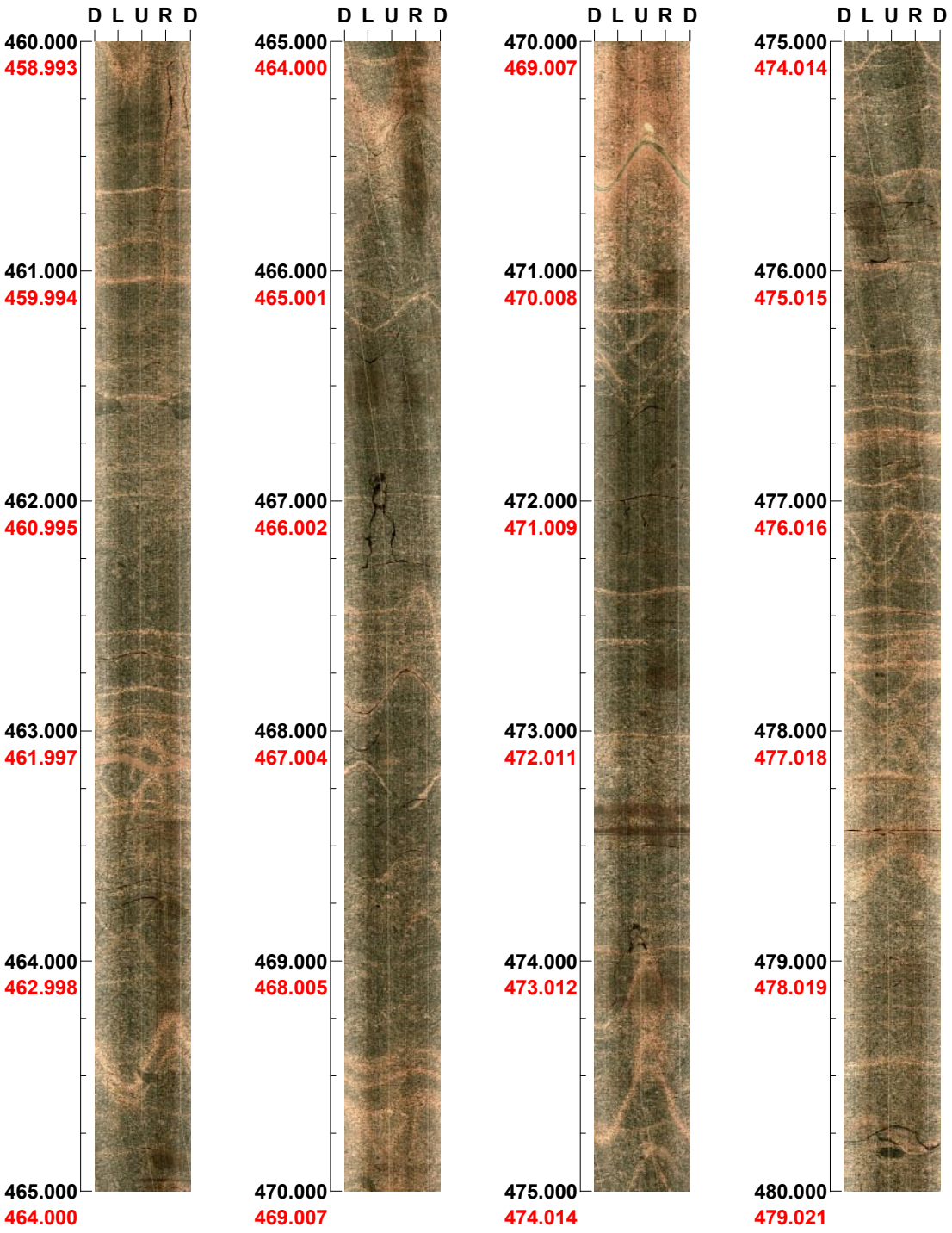
**Depth range: 440.000 - 460.000 m**




**( 5 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

Project name: Laxemar
Bore hole No.: KLX13A Azimuth: 224 Inclination: -82

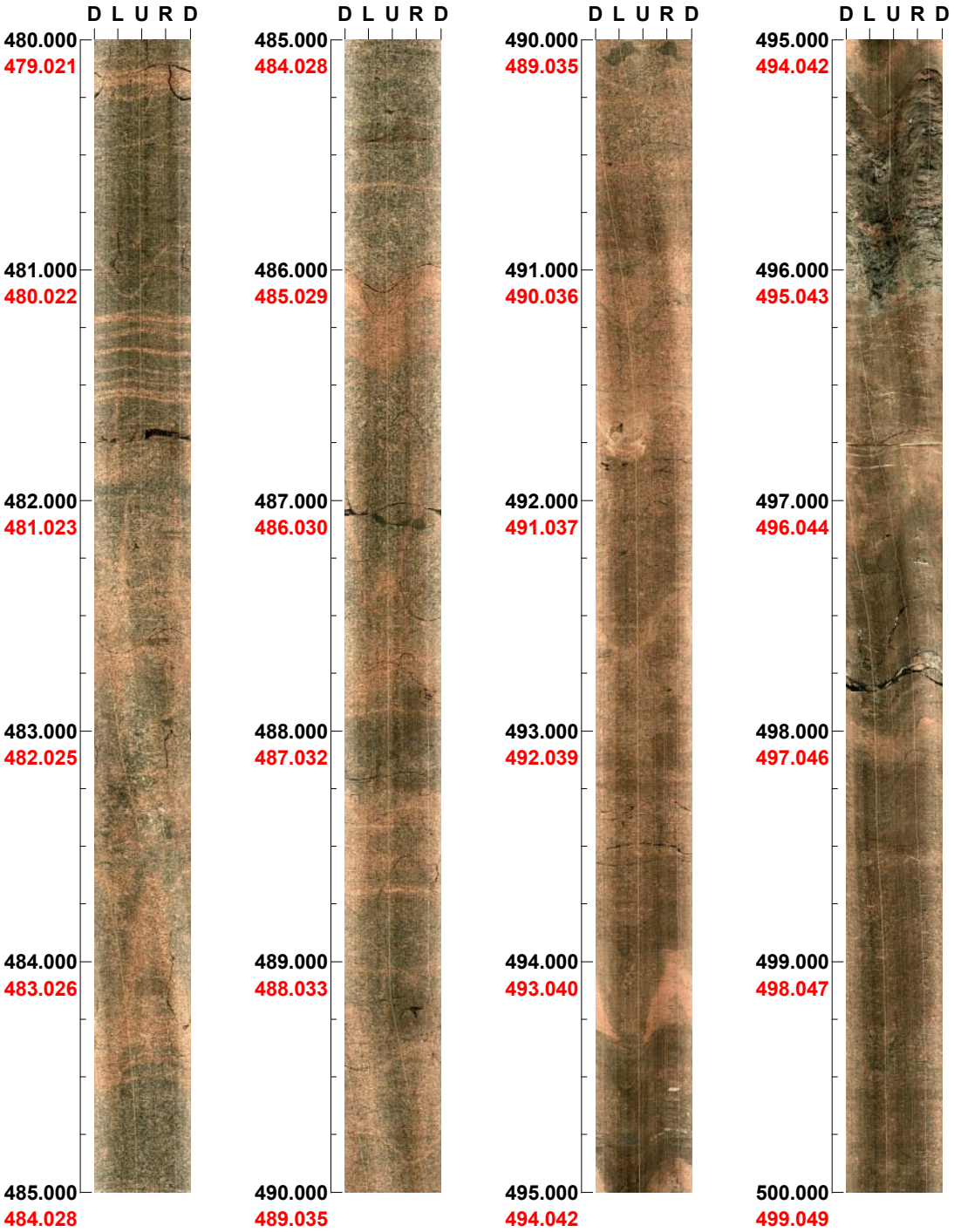
Depth range: 460.000 - 480.000 m




( 6 / 12 ) Scale: 1/25 Aspect ratio: 175 %

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

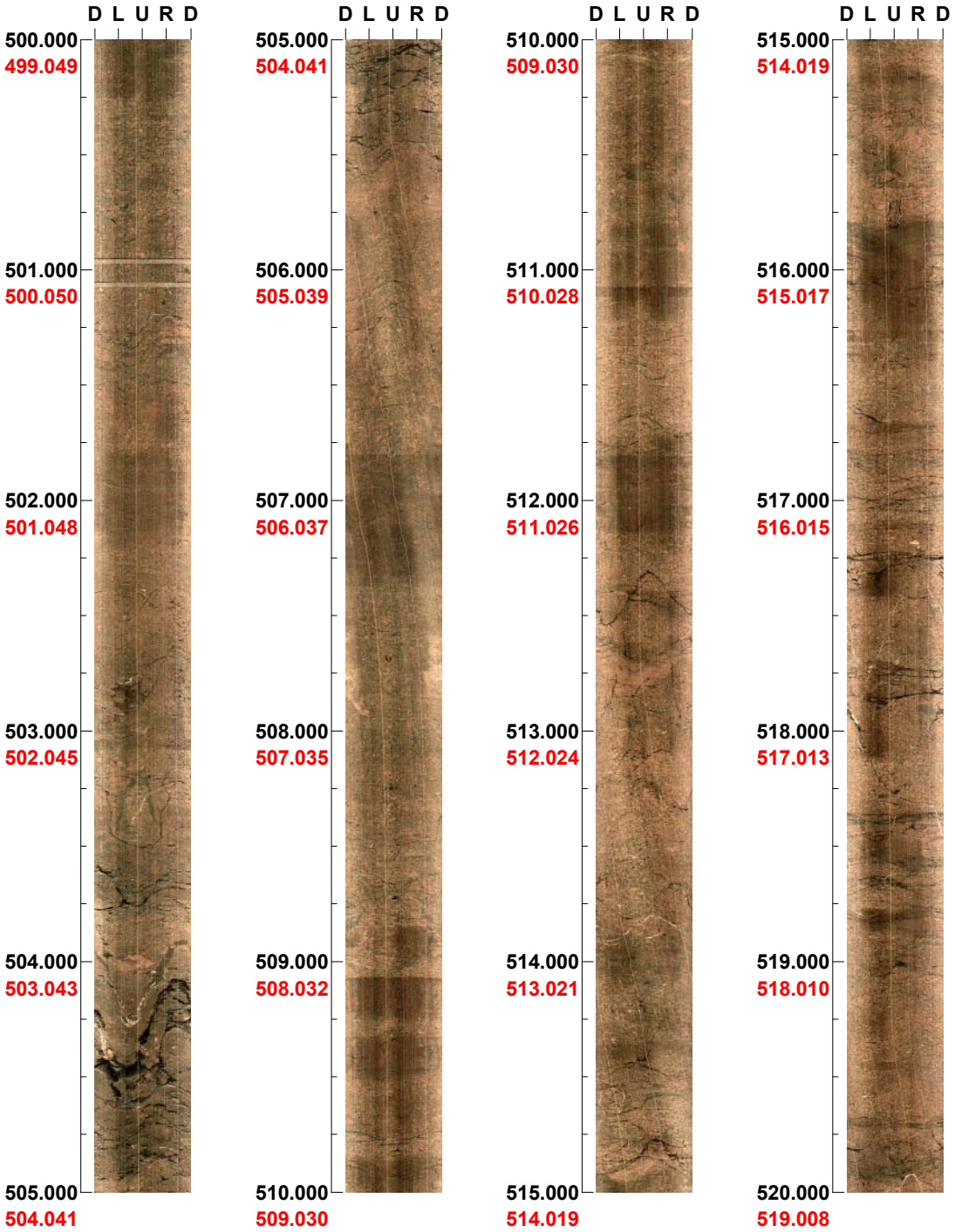
**Depth range: 480.000 - 500.000 m**




**( 7 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

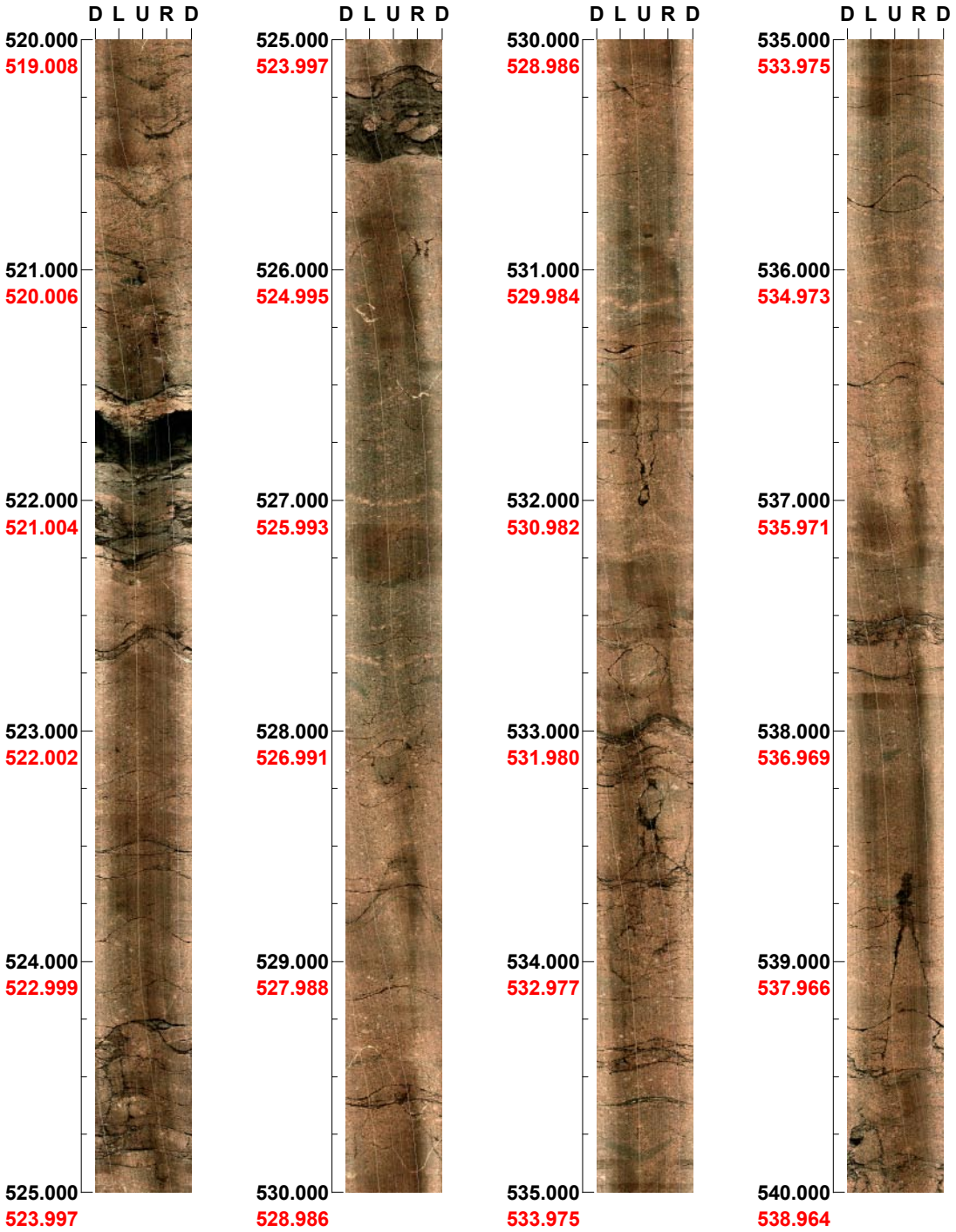
**Depth range: 500.000 - 520.000 m**




**( 8 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

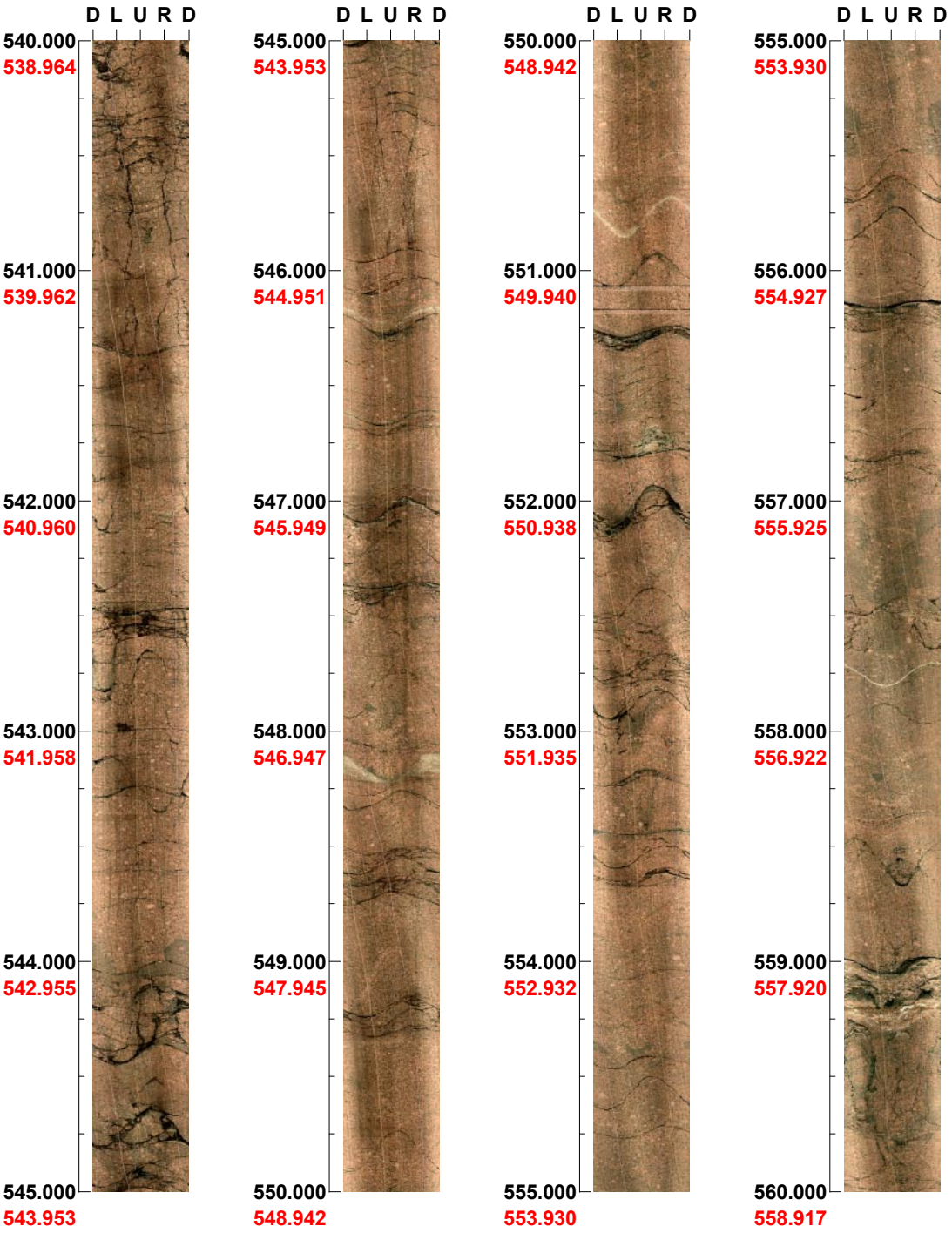
**Depth range: 520.000 - 540.000 m**




**( 9 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

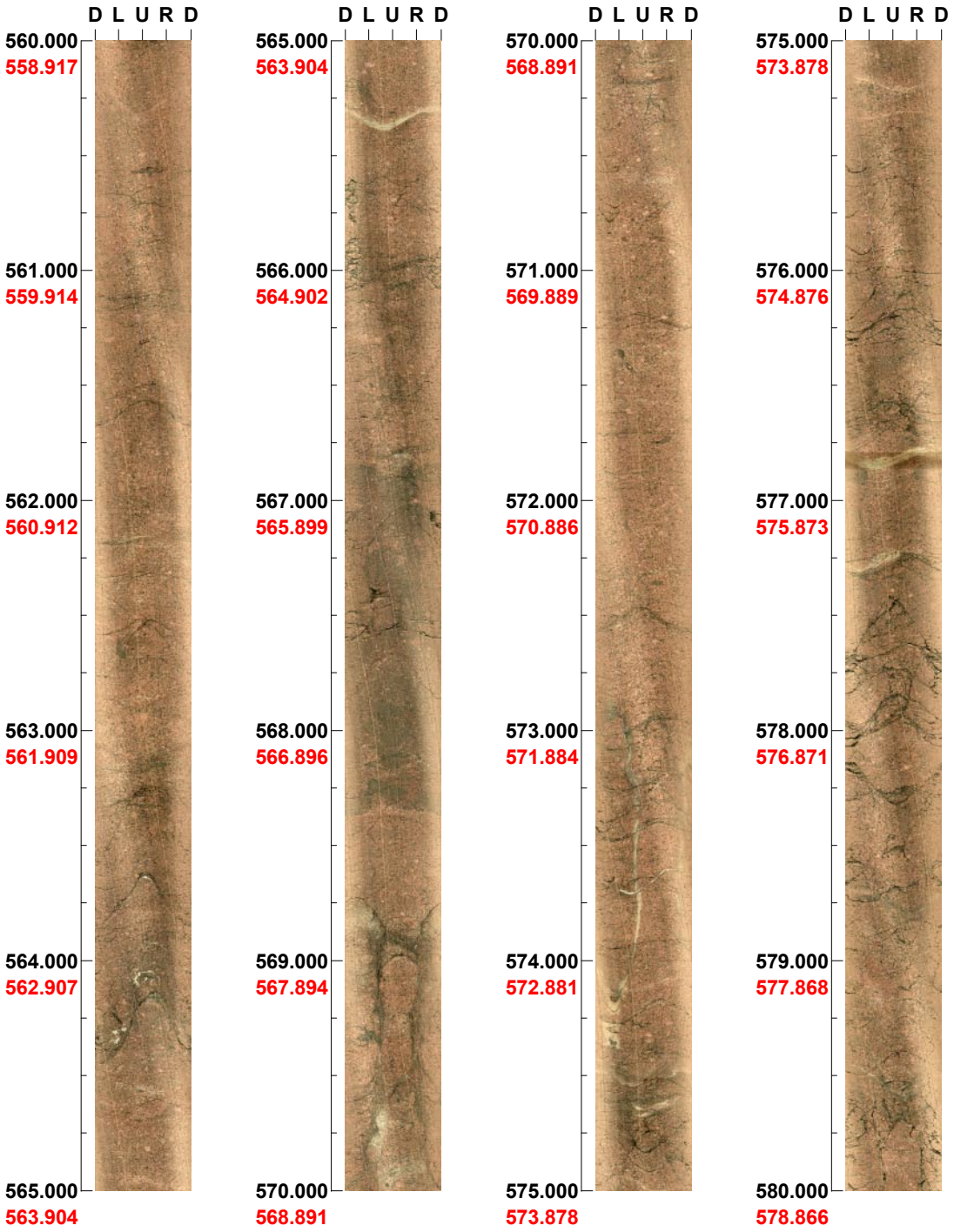
**Depth range: 540.000 - 560.000 m**




**( 10 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

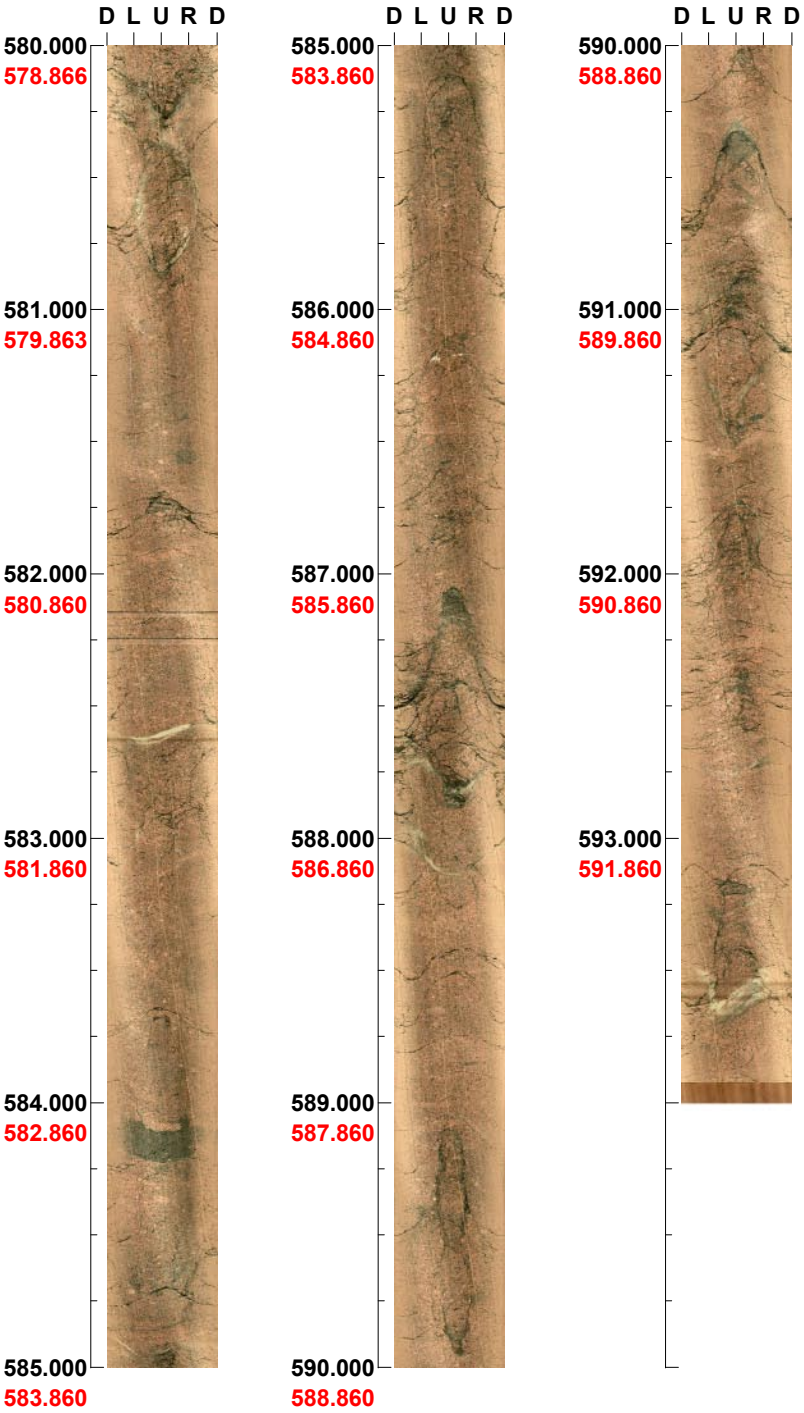
**Depth range: 560.000 - 580.000 m**




**( 11 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX13A** **Azimuth: 224** **Inclination: -82**

**Depth range: 580.000 - 593.999 m**




**( 12 / 12 )** **Scale: 1/25** **Aspect ratio: 175 %**

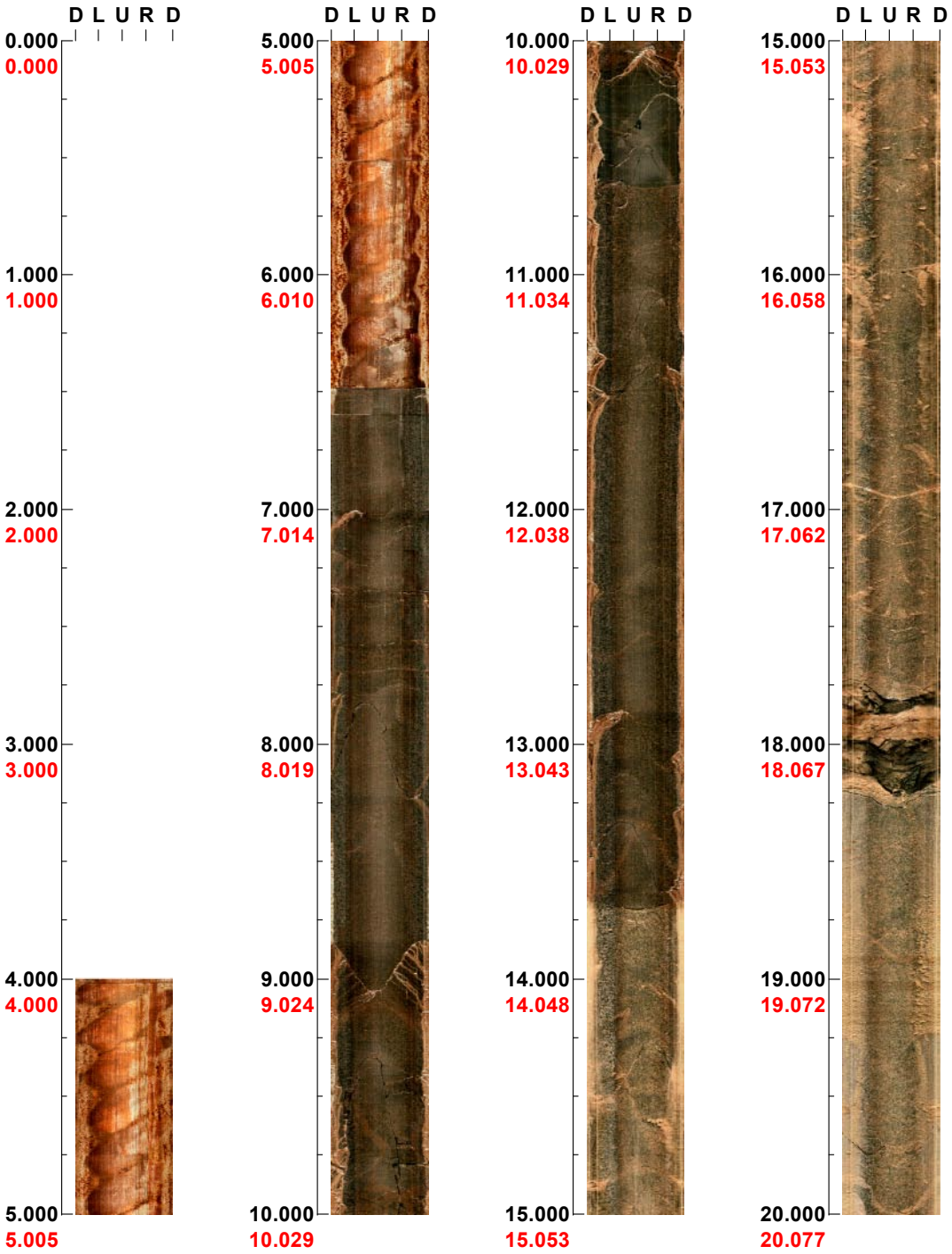
## BIPS logging in KLX14A, 4 to 174 m

**Project name: Laxemar**

| | |
|---|---|
| **Image file** | **: c:\work\r5572k~1\klx14a.bip** |
| **BDT file** | **: c:\work\r5572k~1\klx14a.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX14A** |
| **Date** | **: 06/11/08** |
| **Time** | **: 16:03:00** |
| **Depth range** | **: 4.000 - 174.626 m** |
| **Azimuth** | **: 110** |
| **Inclination** | **: -50** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 9** |
| **Color** | **:**  **+0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

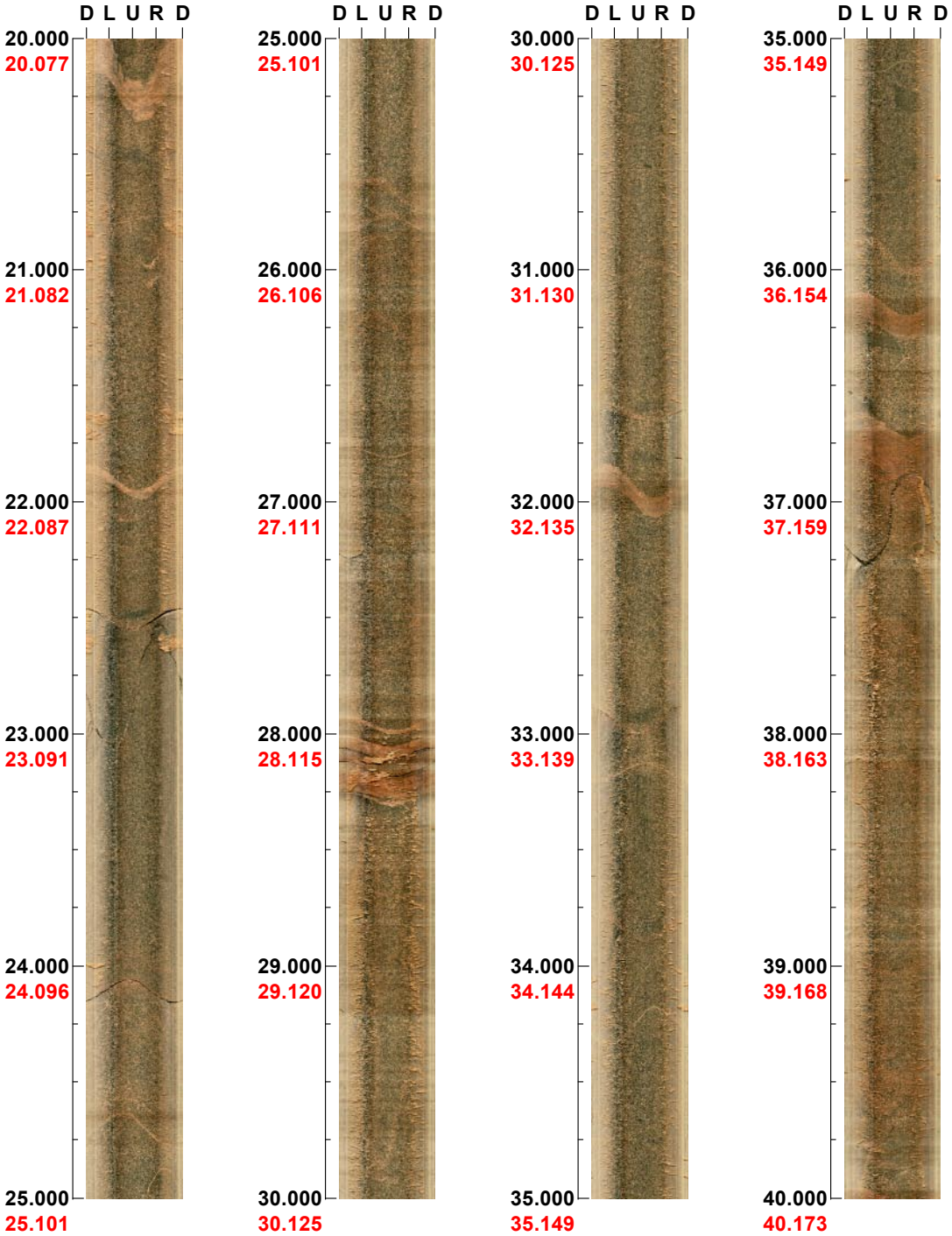
**Depth range: 0.000 - 20.000 m**




**( 1 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 20.000 - 40.000 m**




**( 2 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

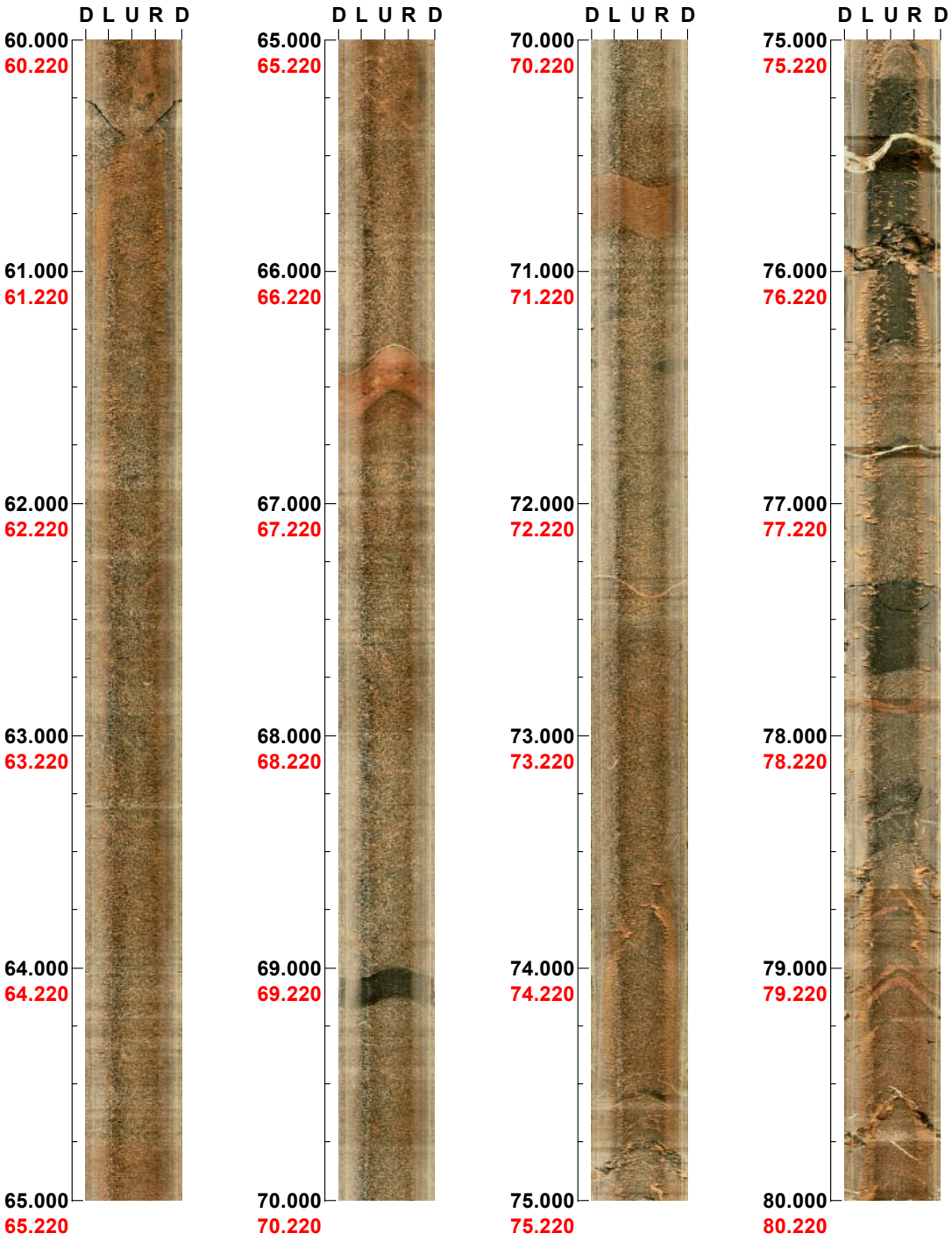
**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 40.000 - 60.000 m**


**( 3 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 60.000 - 80.000 m**




**( 4 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

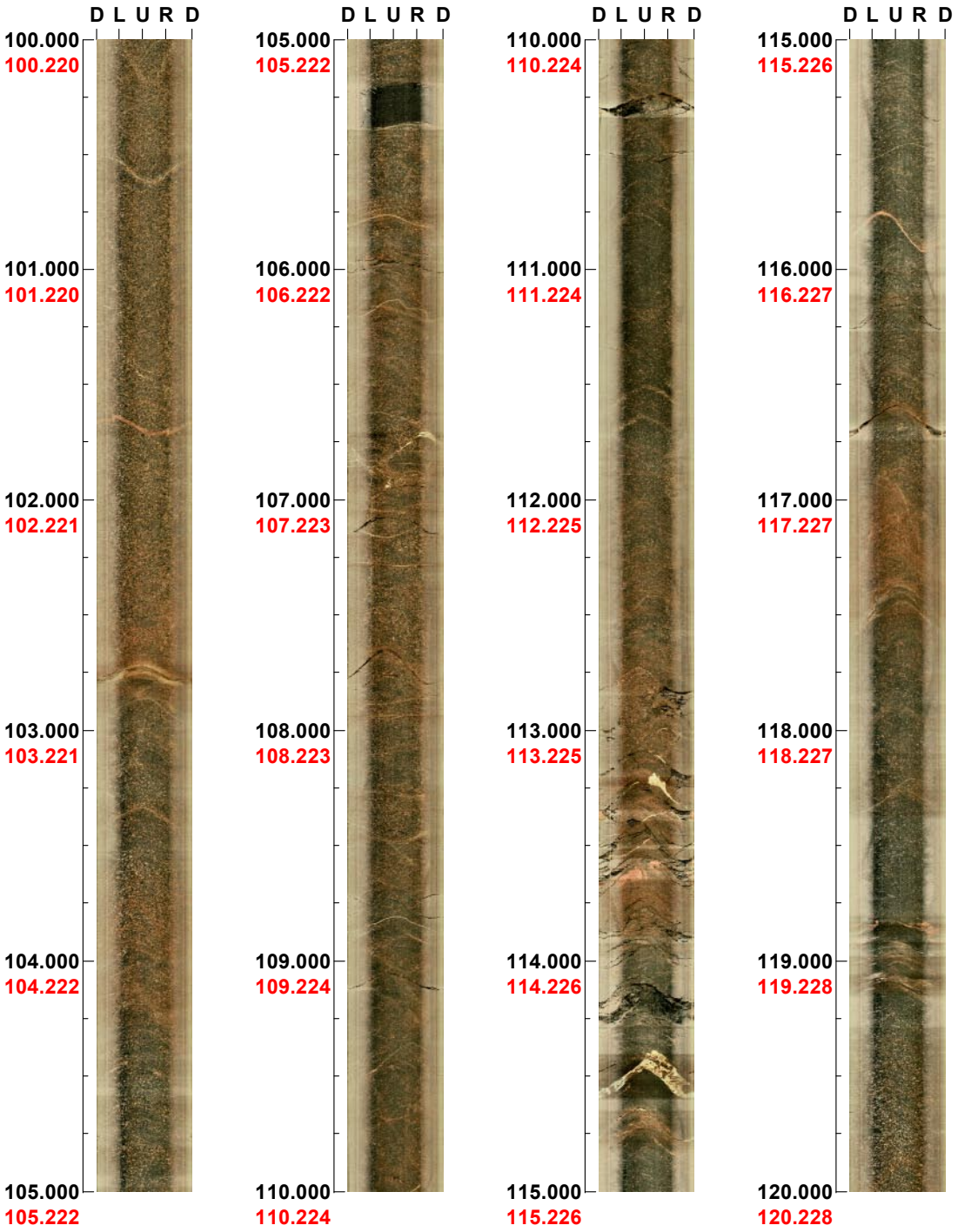
**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 80.000 - 100.000 m**


**( 5 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 100.000 - 120.000 m**




**( 6 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 120.000 - 140.000 m**


**( 7 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

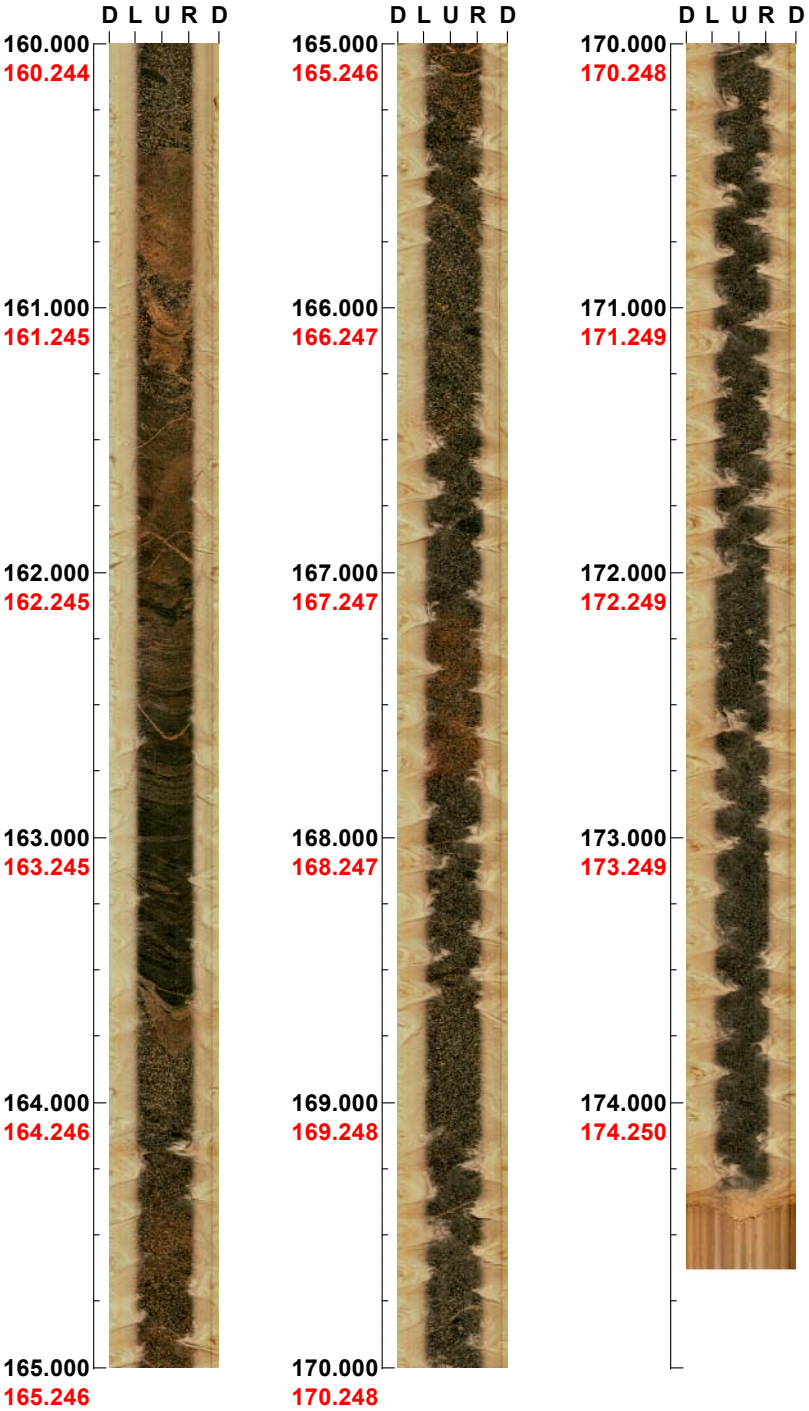
**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 140.000 - 160.000 m**


**( 8 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX14A** **Azimuth: 110** **Inclination: -50**

**Depth range: 160.000 - 174.626 m**




**( 9 / 9 )** **Scale: 1/25** **Aspect ratio: 175 %**

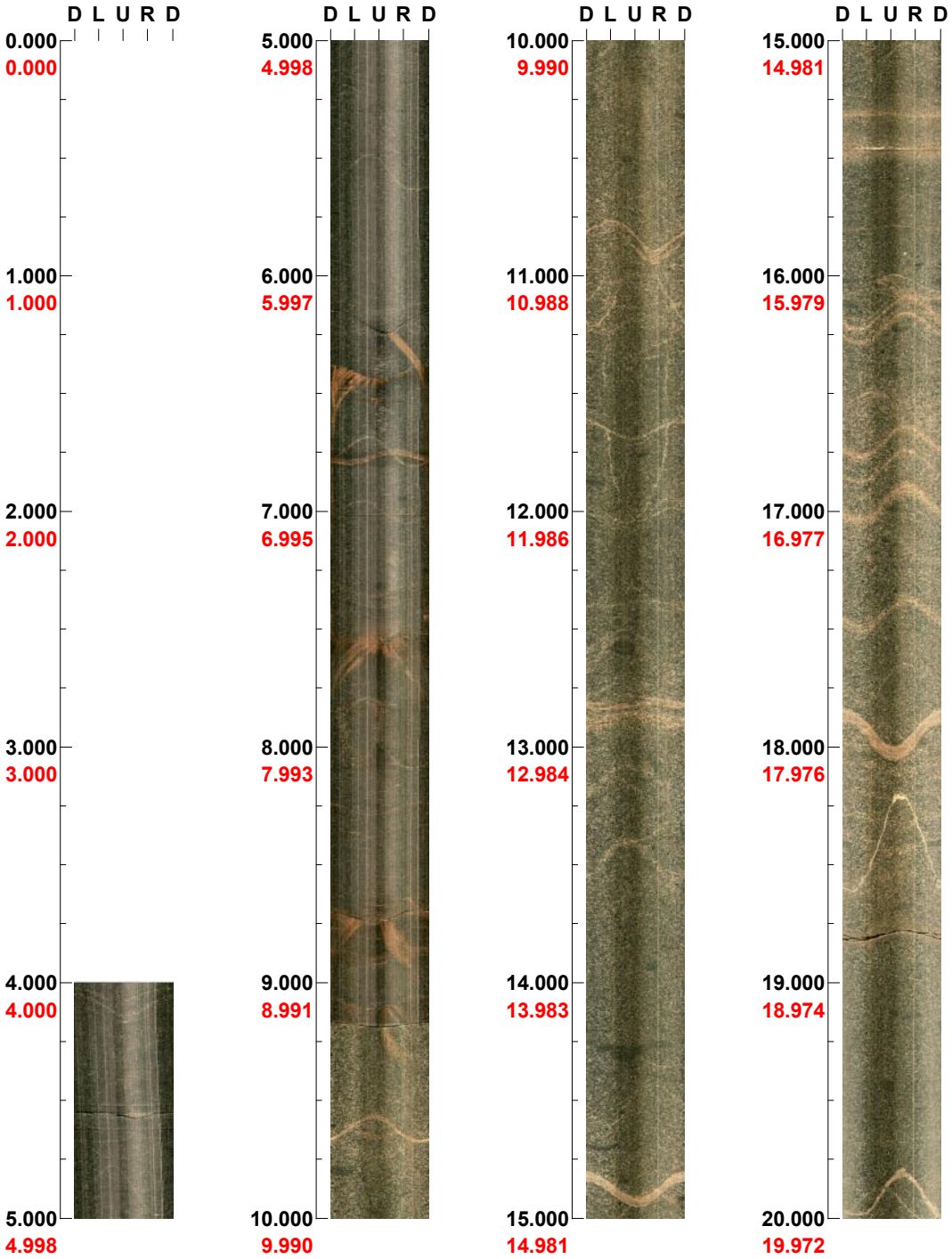
## BIPS logging in KLX22A, 4 to 100 m

**Project name: Laxemar**

| | |
|---|---|
| **Image file** | **: c:\work\r5560k~1\bips\klx22a.bip** |
| **BDT file** | **: c:\work\r5560k~1\bips\klx22a.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX22A** |
| **Date** | **: 06/07/04** |
| **Time** | **: 17:00:00** |
| **Depth range** | **: 4.000 - 100.195 m** |
| **Azimuth** | **: 180** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 6** |
| **Color** | **:**  **+0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX22A** **Azimuth: 180** **Inclination: -60**

**Depth range: 0.000 - 20.000 m**




**( 1 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX22A** **Azimuth: 180** **Inclination: -60**

**Depth range: 20.000 - 40.000 m**


**( 2 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

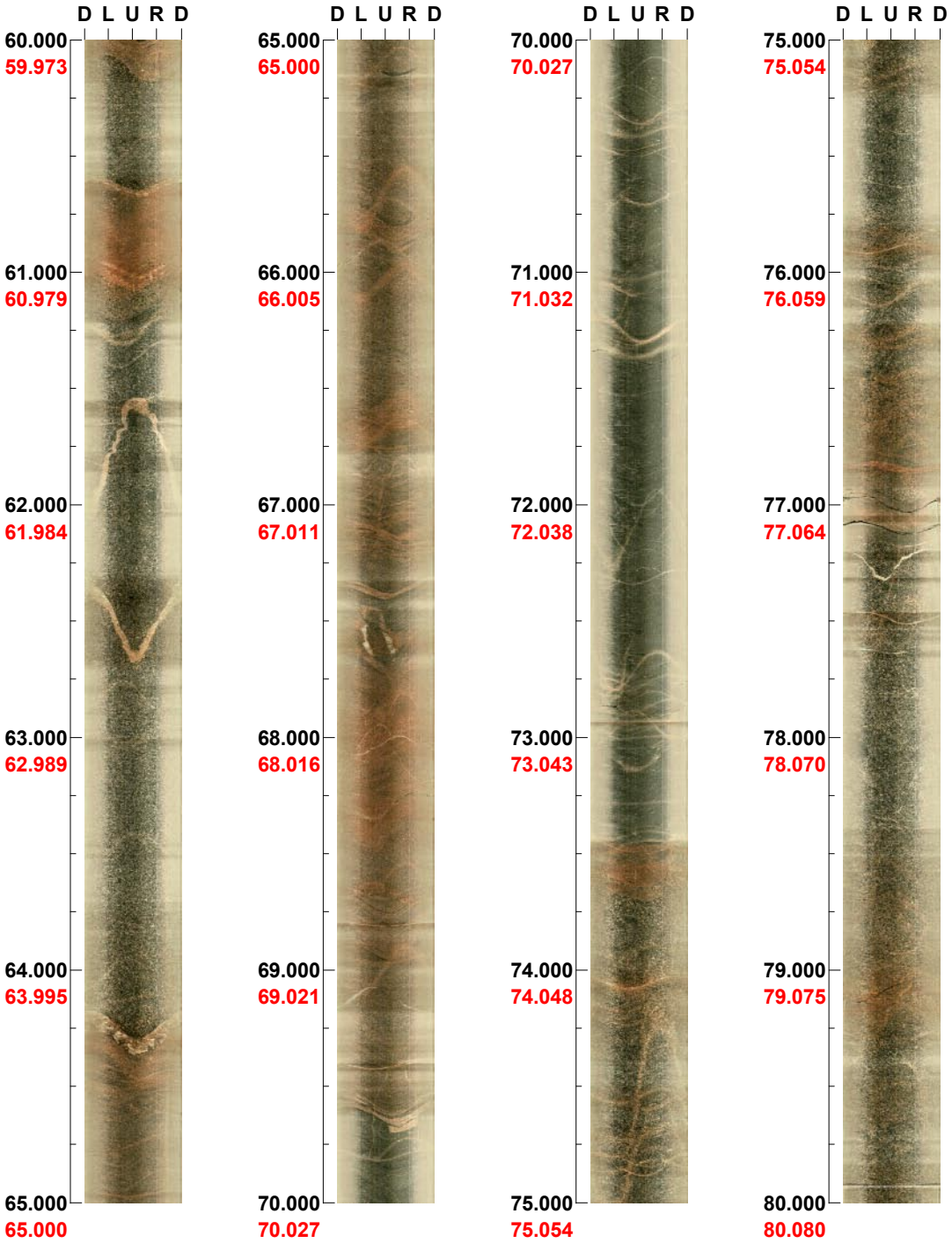
**Project name: Laxemar**
**Bore hole No.: KLX22A** **Azimuth: 180** **Inclination: -60**

**Depth range: 40.000 - 60.000 m**


**( 3 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX22A** **Azimuth: 180** **Inclination: -60**

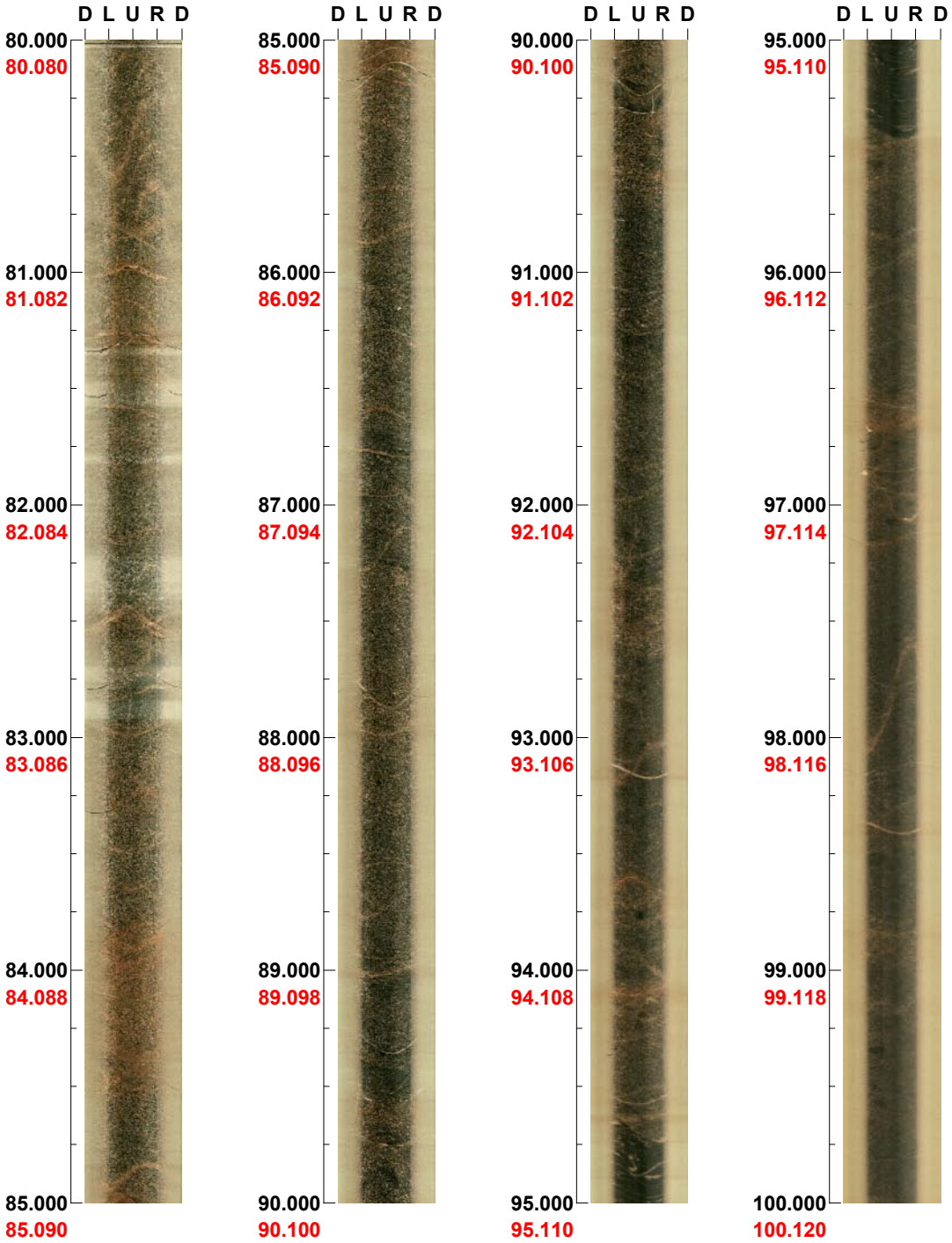
**Depth range: 60.000 - 80.000 m**




**( 4 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX22A** **Azimuth: 180** **Inclination: -60**

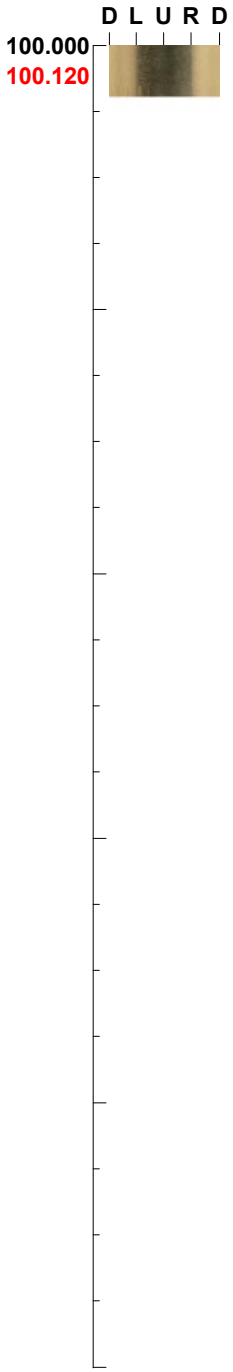
**Depth range: 80.000 - 100.000 m**




**( 5 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX22A** **Azimuth: 180** **Inclination: -60**

**Depth range: 100.000 - 100.195 m**




**( 6 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

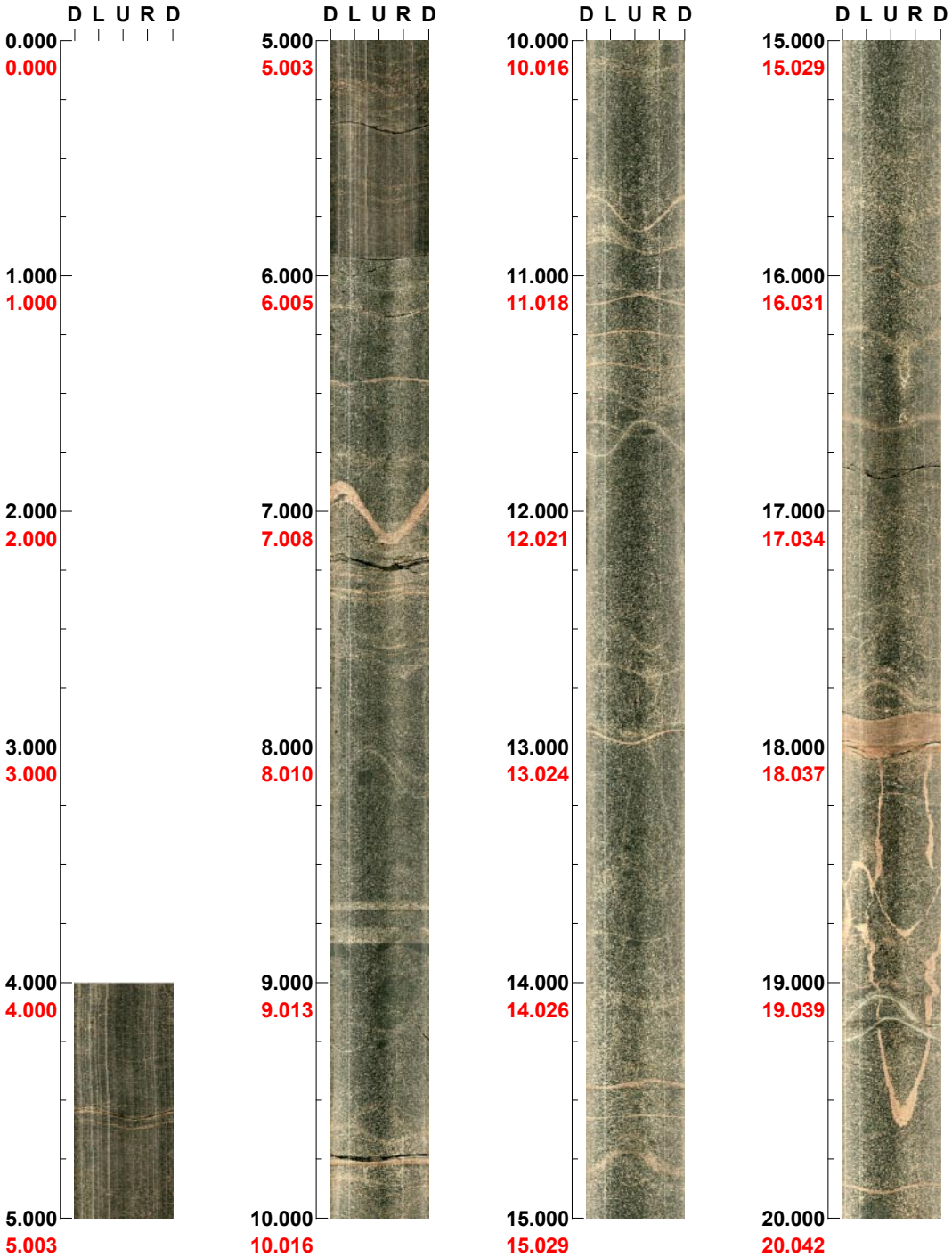
## BIPS logging in KLX22B, 4 to 100 m

## Project name: Laxemar

| | |
|---|---|
| **Image file** | **: c:\work\r5560k~1\bips\klx22b.bip** |
| **BDT file** | **: c:\work\r5560k~1\bips\klx22b.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX22B** |
| **Date** | **: 06/07/04** |
| **Time** | **: 18:15:00** |
| **Depth range** | **: 4.000 - 99.820 m** |
| **Azimuth** | **: 340** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 5** |
| **Color** | **:**  **+0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX22B** **Azimuth: 340** **Inclination: -60**

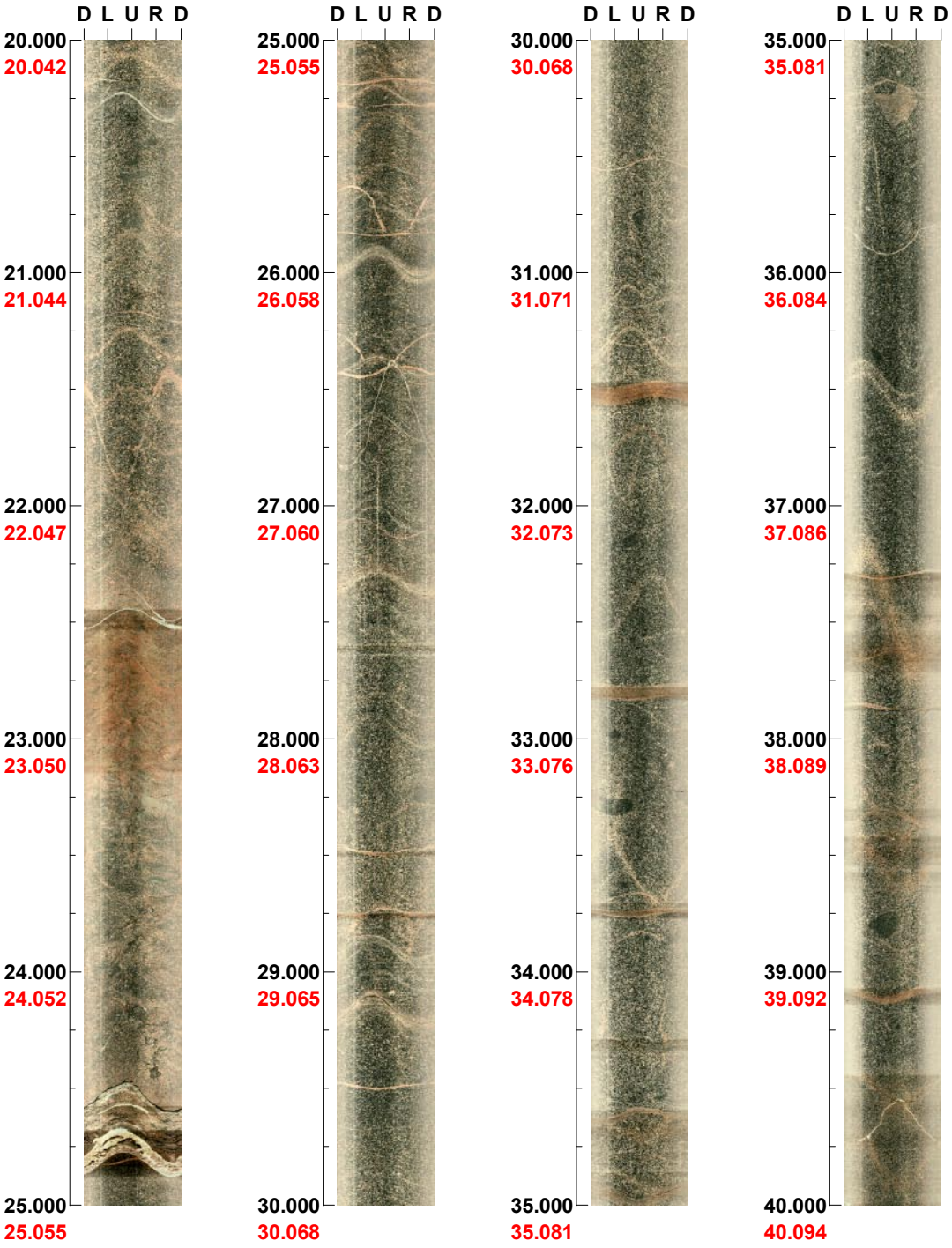
**Depth range: 0.000 - 20.000 m**




**( 1 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX22B** **Azimuth: 340** **Inclination: -60**

**Depth range: 20.000 - 40.000 m**




**( 2 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX22B** **Azimuth: 340** **Inclination: -60**

**Depth range: 40.000 - 60.000 m**


**( 3 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

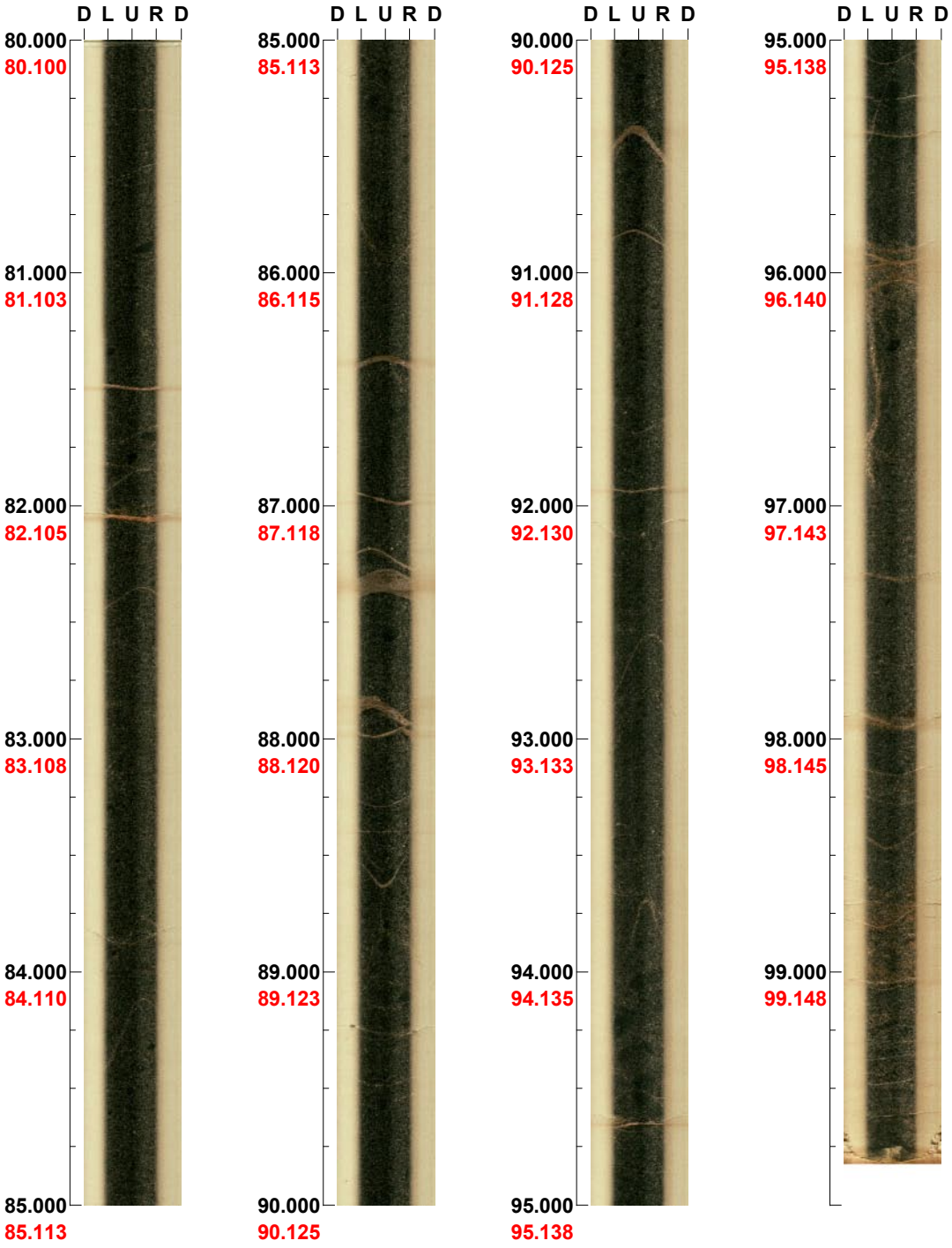
**Project name: Laxemar**
**Bore hole No.: KLX22B** **Azimuth: 340** **Inclination: -60**

**Depth range: 60.000 - 80.000 m**


**( 4 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX22B** **Azimuth: 340** **Inclination: -60**

**Depth range: 80.000 - 99.820 m**




**( 5 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

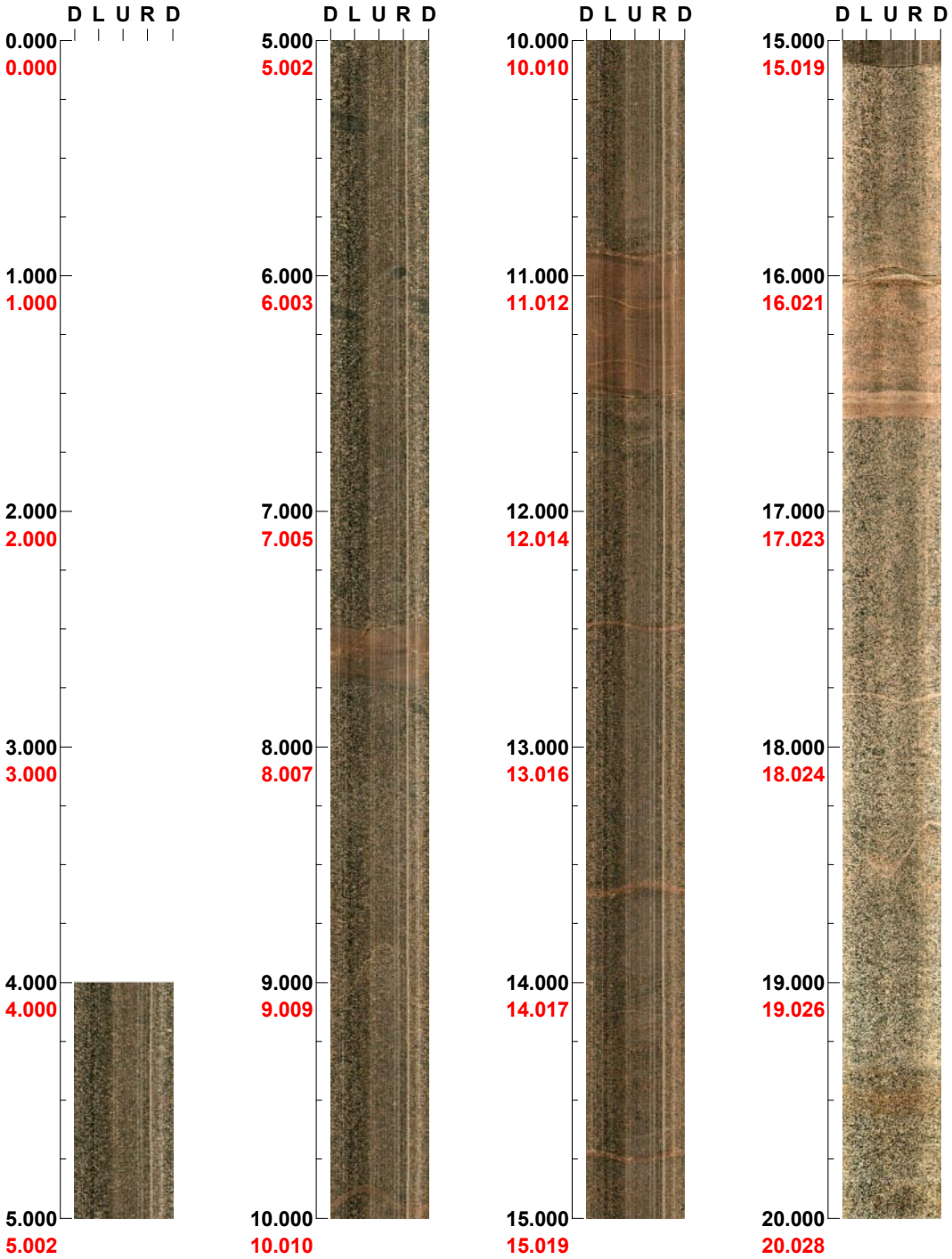
## BIPS logging in KLX23A, 4 to 100 m

**Project name: Laxemar**

| | |
|---|---|
| **Image file** | **: c:\work\r5560k~1\bips\klx23a.bip** |
| **BDT file** | **: c:\work\r5560k~1\bips\klx23a.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX23A** |
| **Date** | **: 06/07/05** |
| **Time** | **: 16:42:00** |
| **Depth range** | **: 4.000 - 99.790 m** |
| **Azimuth** | **: 360** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 5** |
| **Color** | **:**  **+0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX23A** **Azimuth: 360** **Inclination: -60**

**Depth range: 0.000 - 20.000 m**




**( 1 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX23A** **Azimuth: 360** **Inclination: -60**

**Depth range: 20.000 - 40.000 m**


**( 2 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX23A** **Azimuth: 360** **Inclination: -60**

**Depth range: 40.000 - 60.000 m**


**( 3 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX23A** **Azimuth: 360** **Inclination: -60**

**Depth range: 60.000 - 80.000 m**


**( 4 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX23A** **Azimuth: 360** **Inclination: -60**

**Depth range: 80.000 - 99.790 m**


**( 5 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

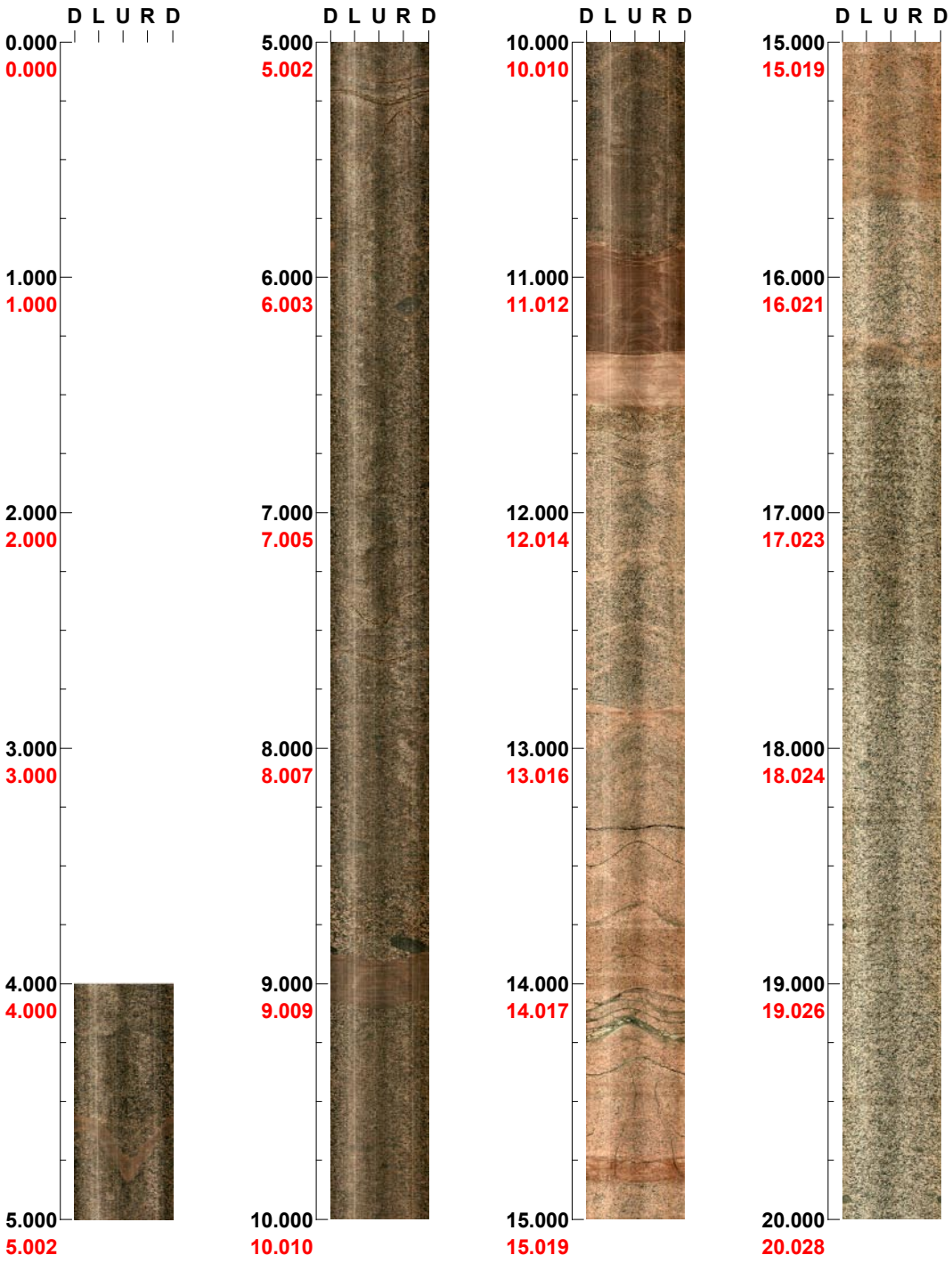
## BIPS logging in KLX23B, 4 to 50 m

**Project name: Laxemar**

| | |
|---|---|
| **Image file** | **: c:\work\r5560k~1\bips\klx23b.bip** |
| **BDT file** | **: c:\work\r5560k~1\bips\klx23b.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX23B** |
| **Date** | **: 06/07/05** |
| **Time** | **: 15:59:00** |
| **Depth range** | **: 4.000 - 50.003 m** |
| **Azimuth** | **: 150** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 3** |
| **Color** | **: +0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX23B** **Azimuth: 150** **Inclination: -60**

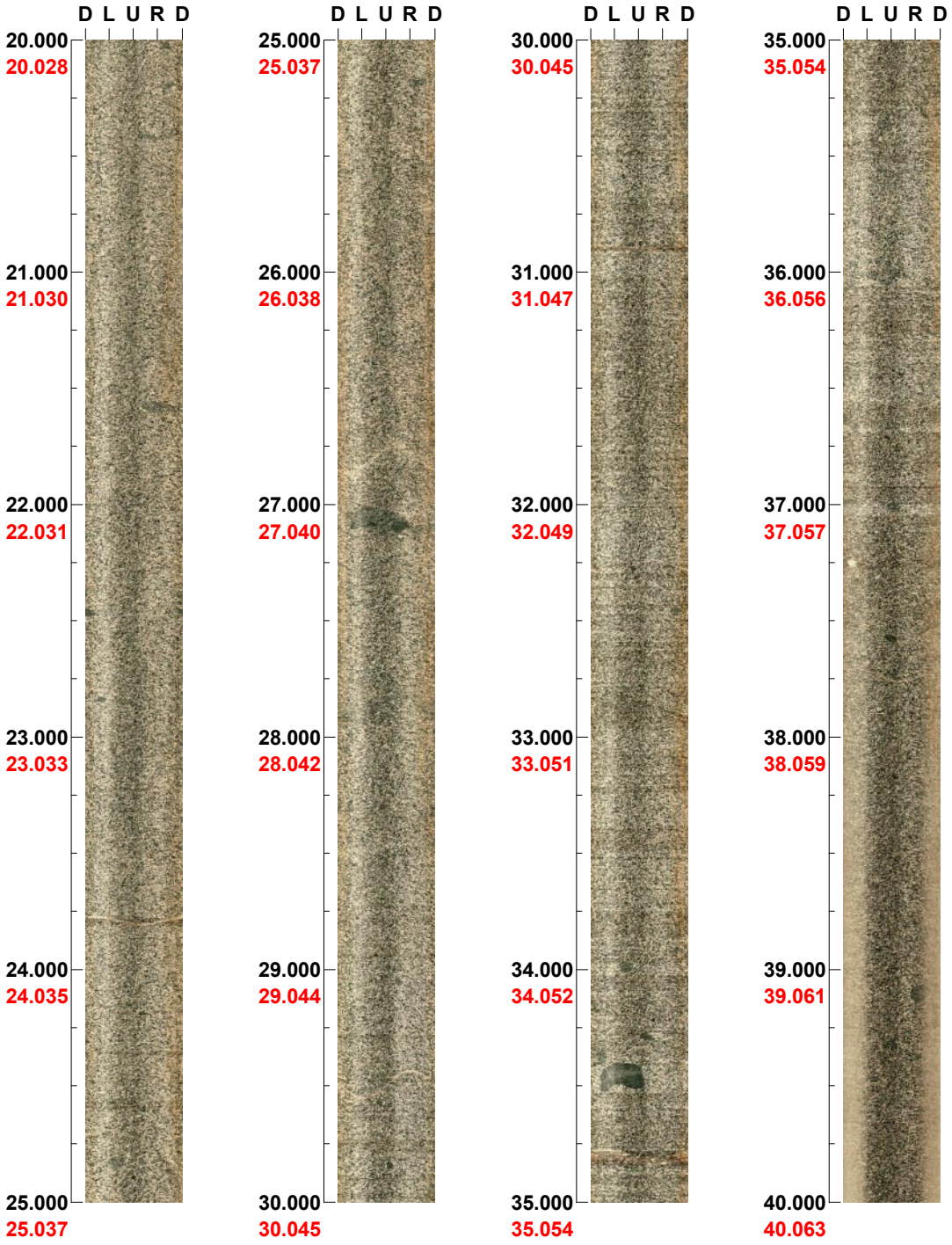
**Depth range: 0.000 - 20.000 m**




**( 1 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX23B** **Azimuth: 150** **Inclination: -60**

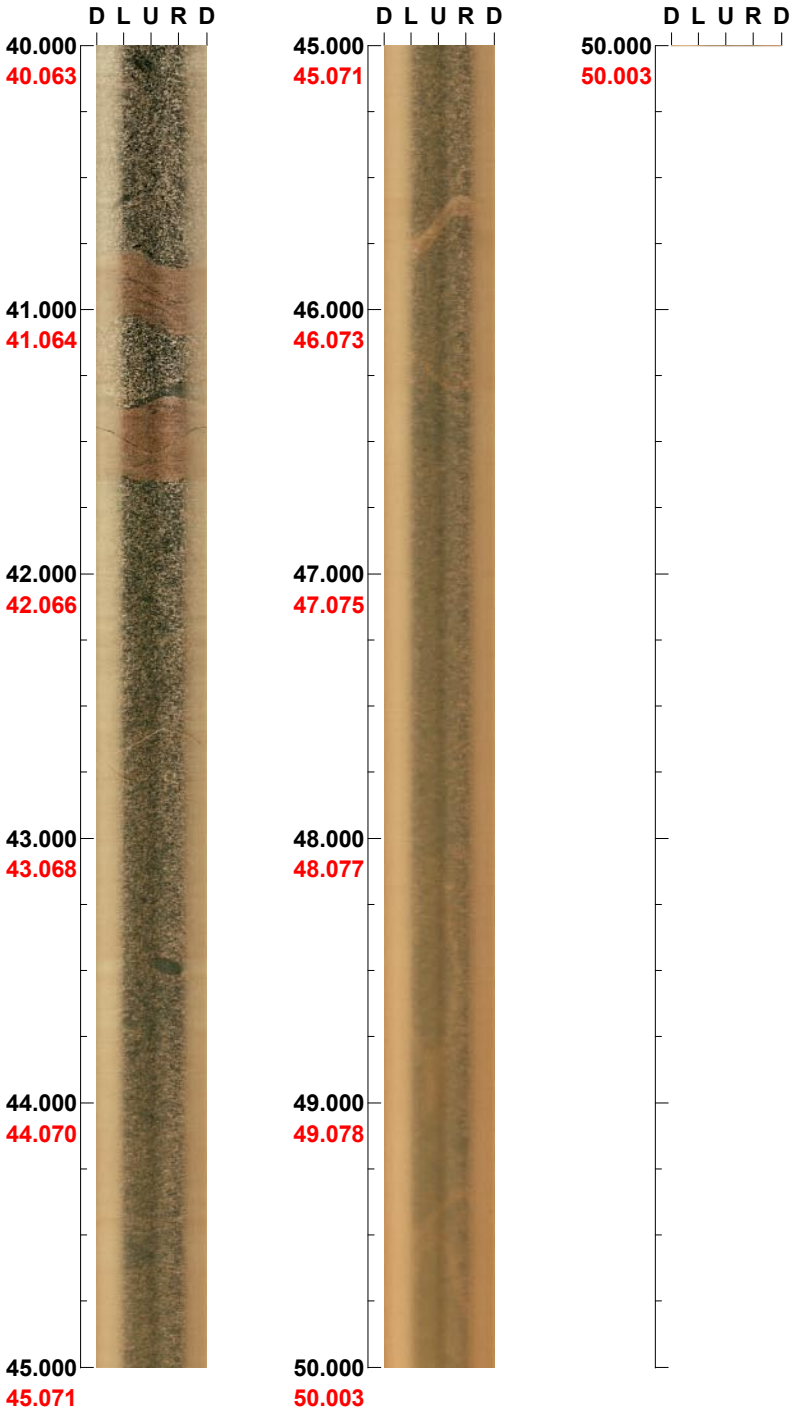
**Depth range: 20.000 - 40.000 m**




**( 2 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX23B** **Azimuth: 150** **Inclination: -60**

**Depth range: 40.000 - 50.003 m**




**( 3 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

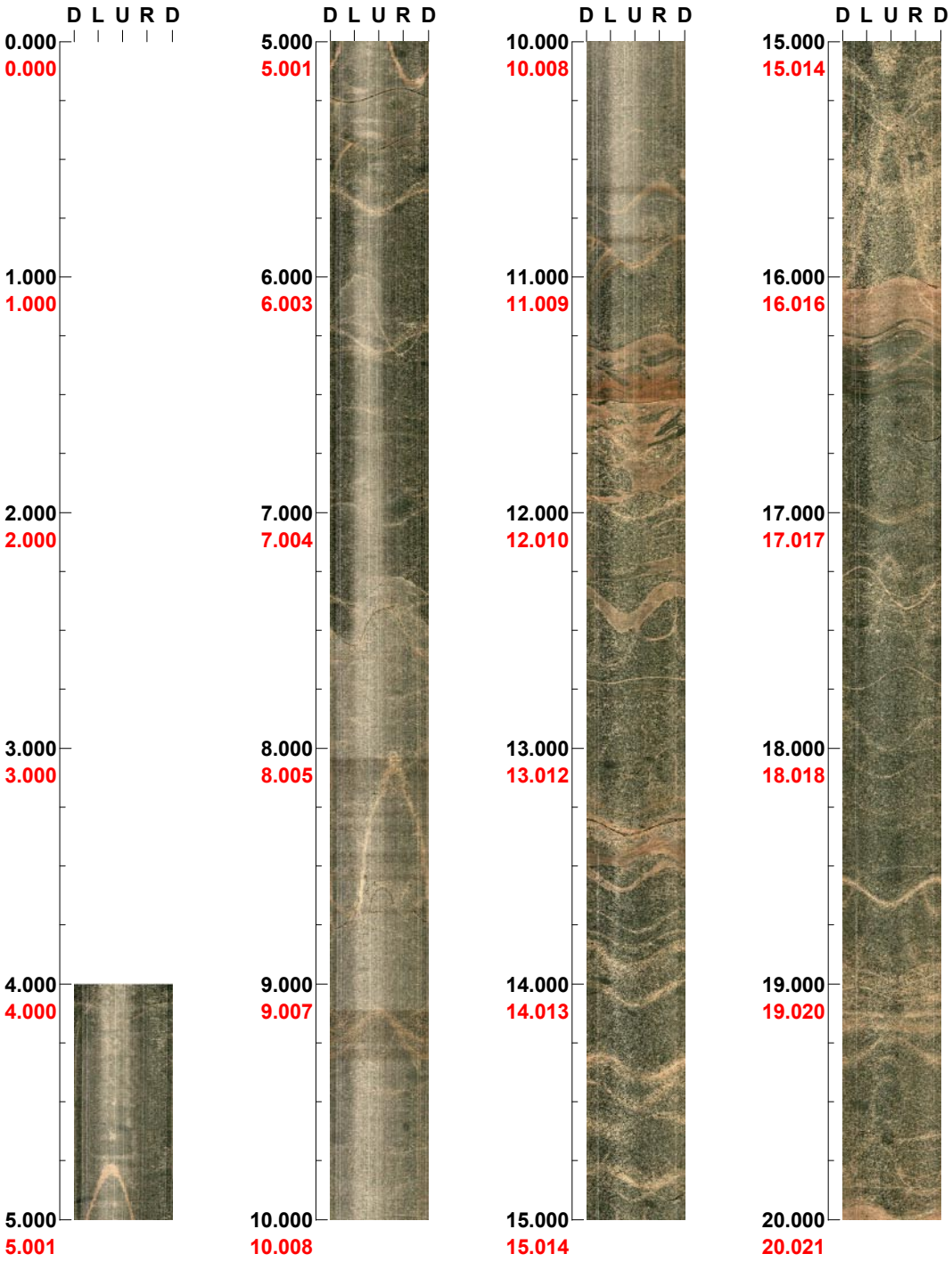
## BIPS logging in KLX24A, 4 to 100 m

## Project name: Laxemar

| | |
|---|---|
| **Image file** | **: c:\work\r55__k~2\bips\klx24a.bip** |
| **BDT file** | **: c:\work\r55__k~2\bips\klx24a.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX24A** |
| **Date** | **: 06/08/11** |
| **Time** | **: 10:38:00** |
| **Depth range** | **: 4.000 - 100.064 m** |
| **Azimuth** | **: 100** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 6** |
| **Color** | **:**  **+0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX24A** **Azimuth: 100** **Inclination: -60**

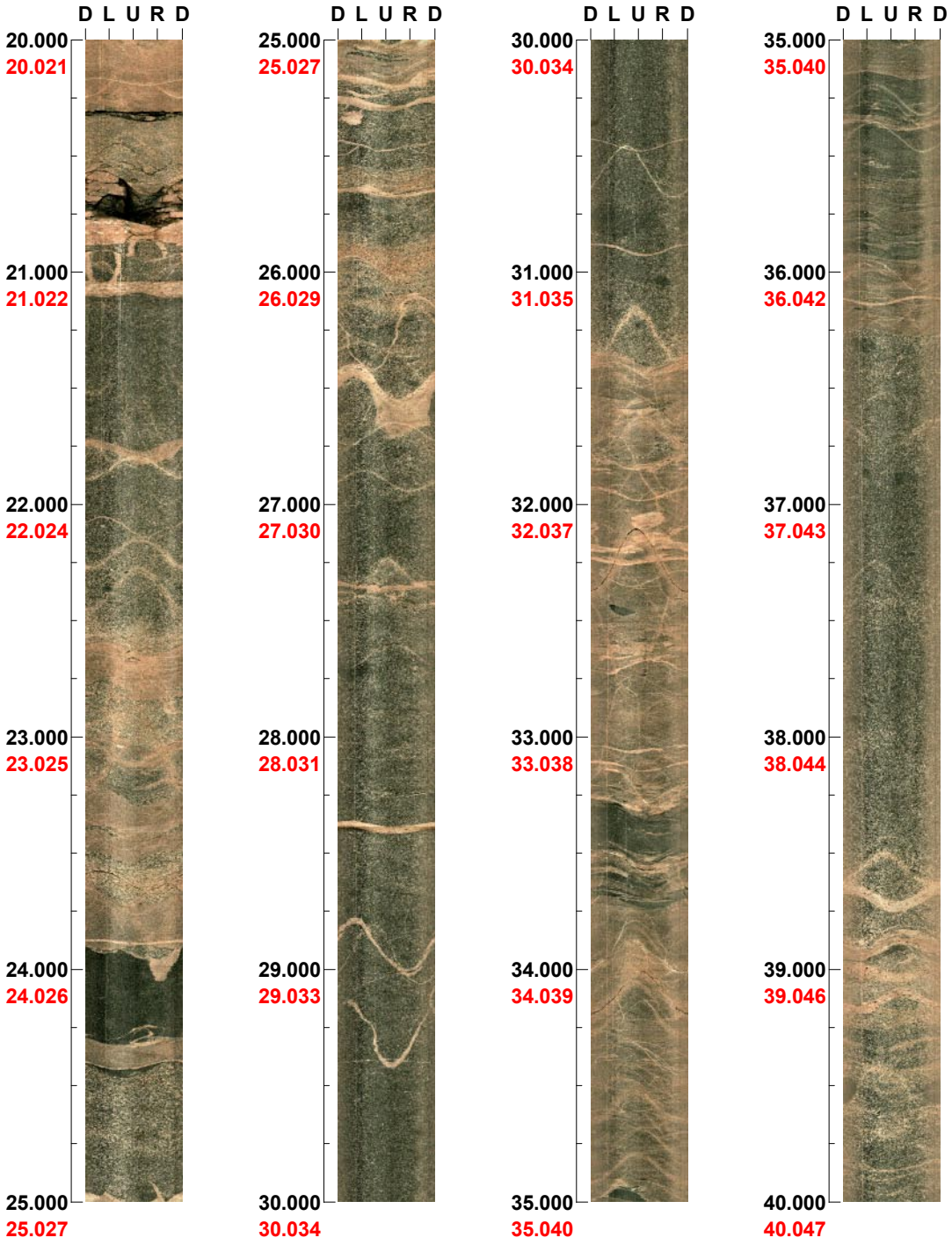
**Depth range: 0.000 - 20.000 m**




**( 1 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX24A** **Azimuth: 100** **Inclination: -60**

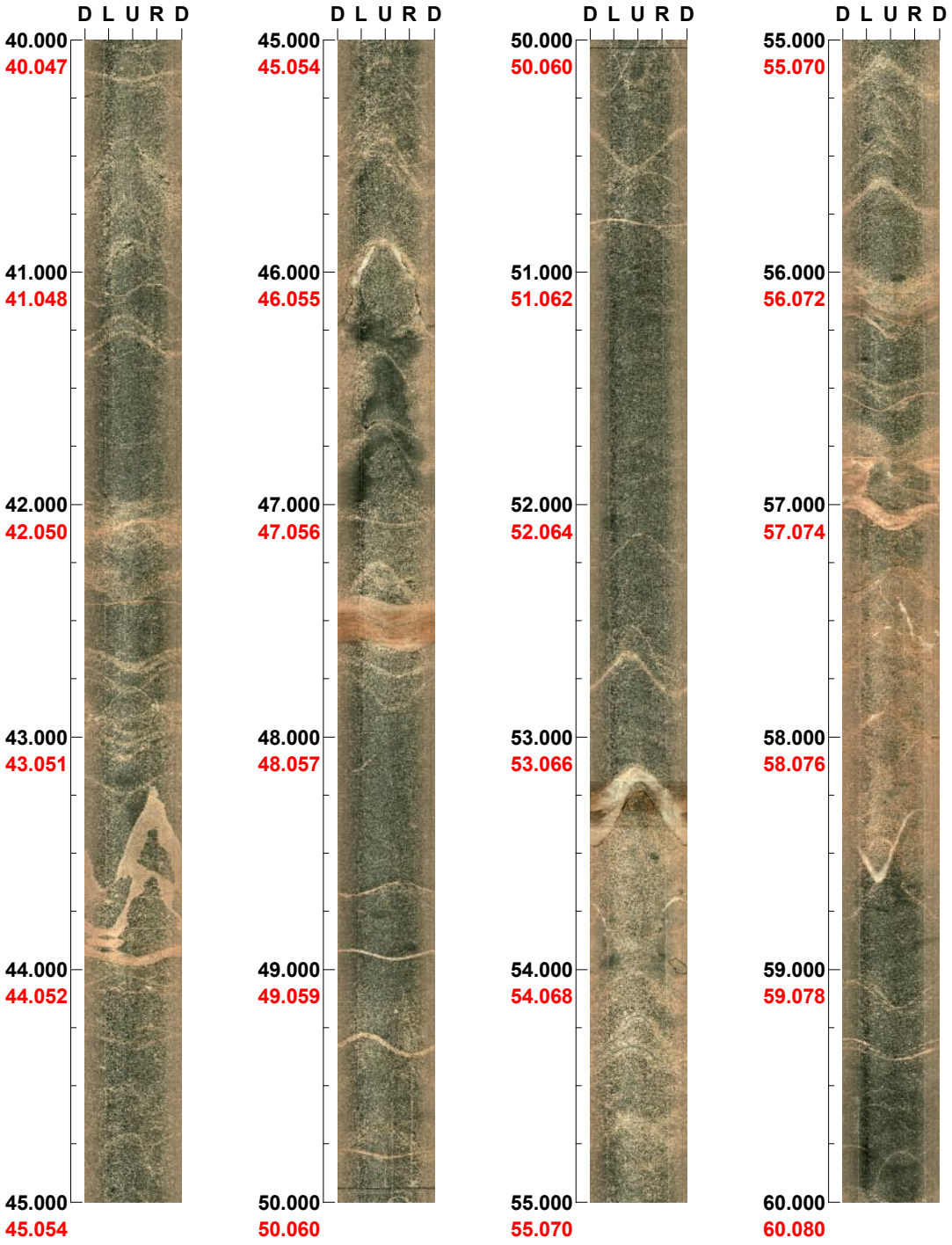
**Depth range: 20.000 - 40.000 m**




**( 2 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX24A** **Azimuth: 100** **Inclination: -60**

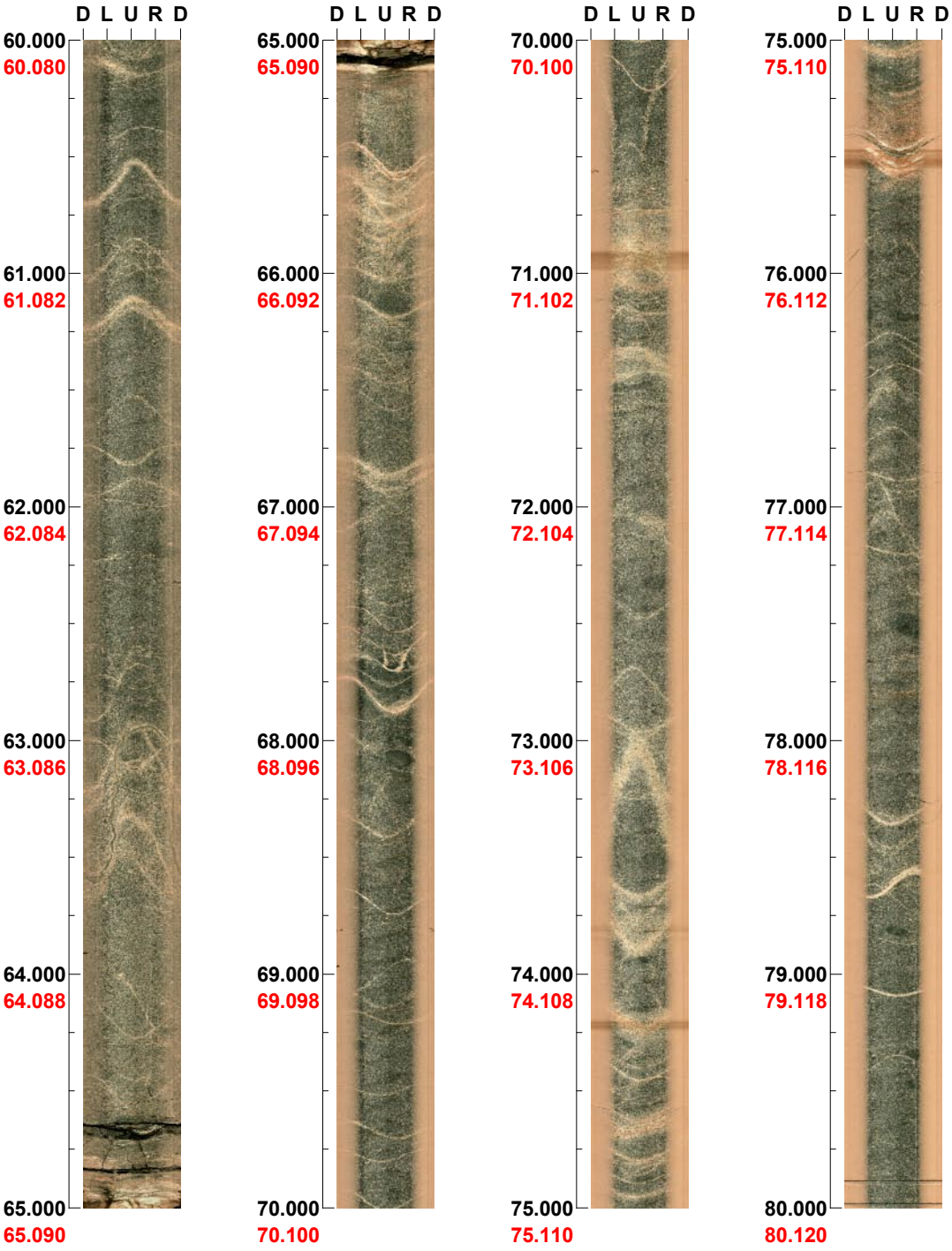
**Depth range: 40.000 - 60.000 m**




**( 3 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX24A** **Azimuth: 100** **Inclination: -60**

**Depth range: 60.000 - 80.000 m**




**( 4 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

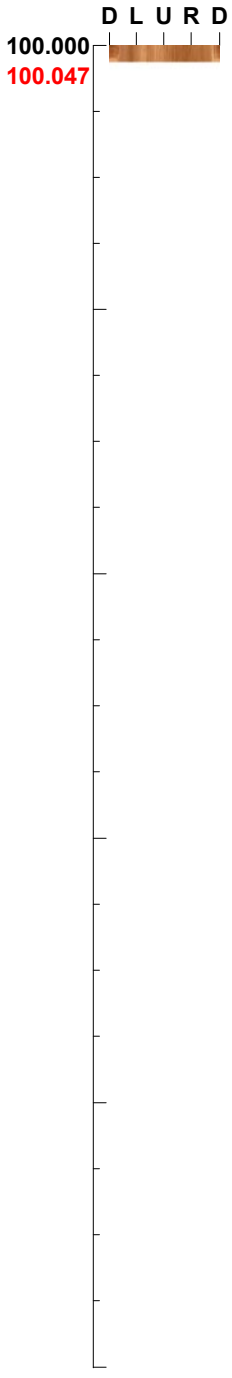
**Project name: Laxemar**
**Bore hole No.: KLX24A** **Azimuth: 100** **Inclination: -60**

**Depth range: 80.000 - 100.000 m**


**( 5 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX24A** **Azimuth: 100** **Inclination: -60**

**Depth range: 100.000 - 100.064 m**




**( 6 / 6 )** **Scale: 1/25** **Aspect ratio: 175 %**

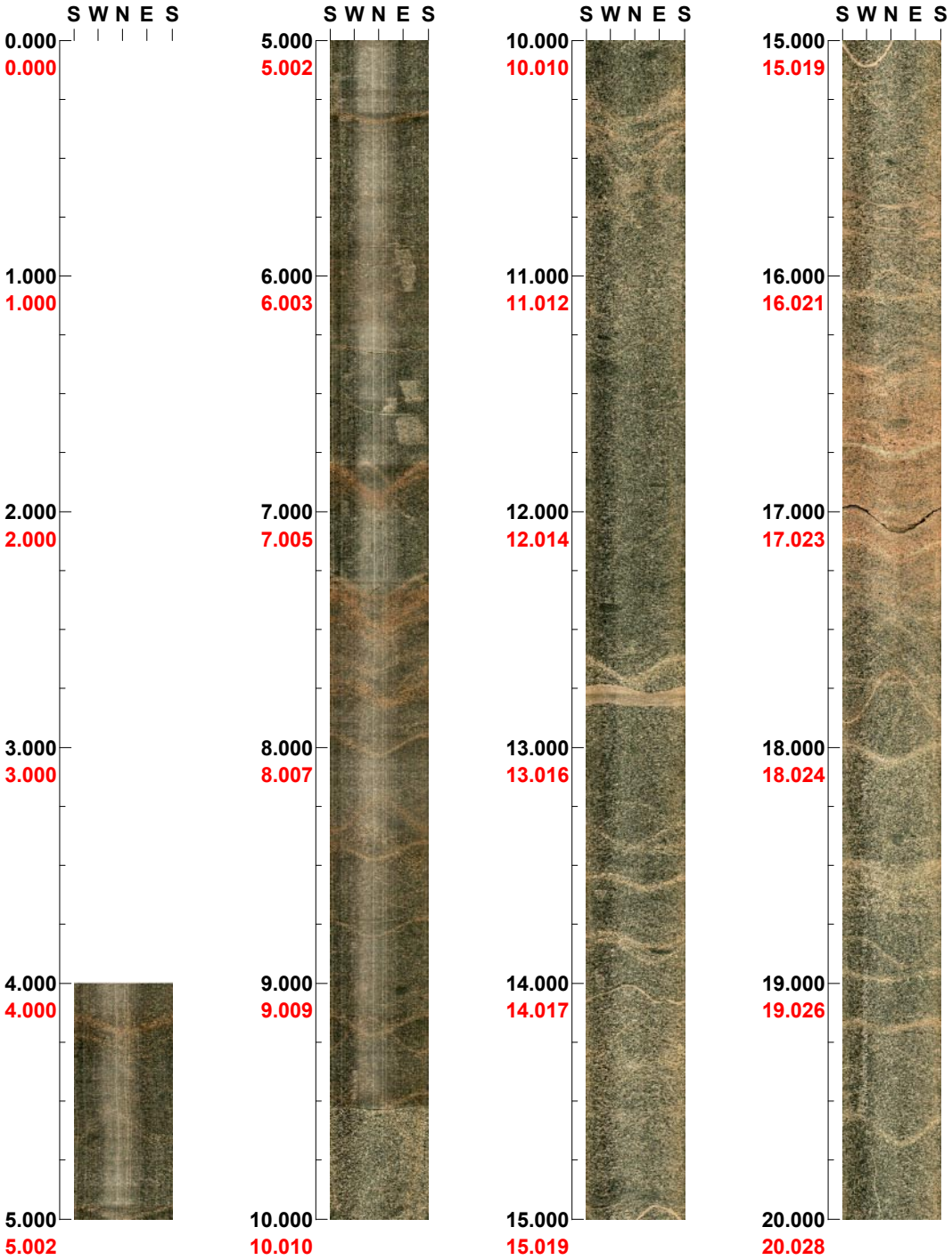
## BIPS logging in KLX25A, 4 to 50 m

## Project name: Laxemar

| | |
|---|---|
| **Image file** | **: c:\work\r55__k~2\bips\klx25a.bip** |
| **BDT file** | **: c:\work\r55__k~2\bips\klx25a.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX25A** |
| **Date** | **: 06/08/12** |
| **Time** | **: 08:48:00** |
| **Depth range** | **: 4.000 - 49.872 m** |
| **Azimuth** | **: 0** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 3** |
| **Color** | **:**  **+0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX25A** **Azimuth: 0** **Inclination: -60**

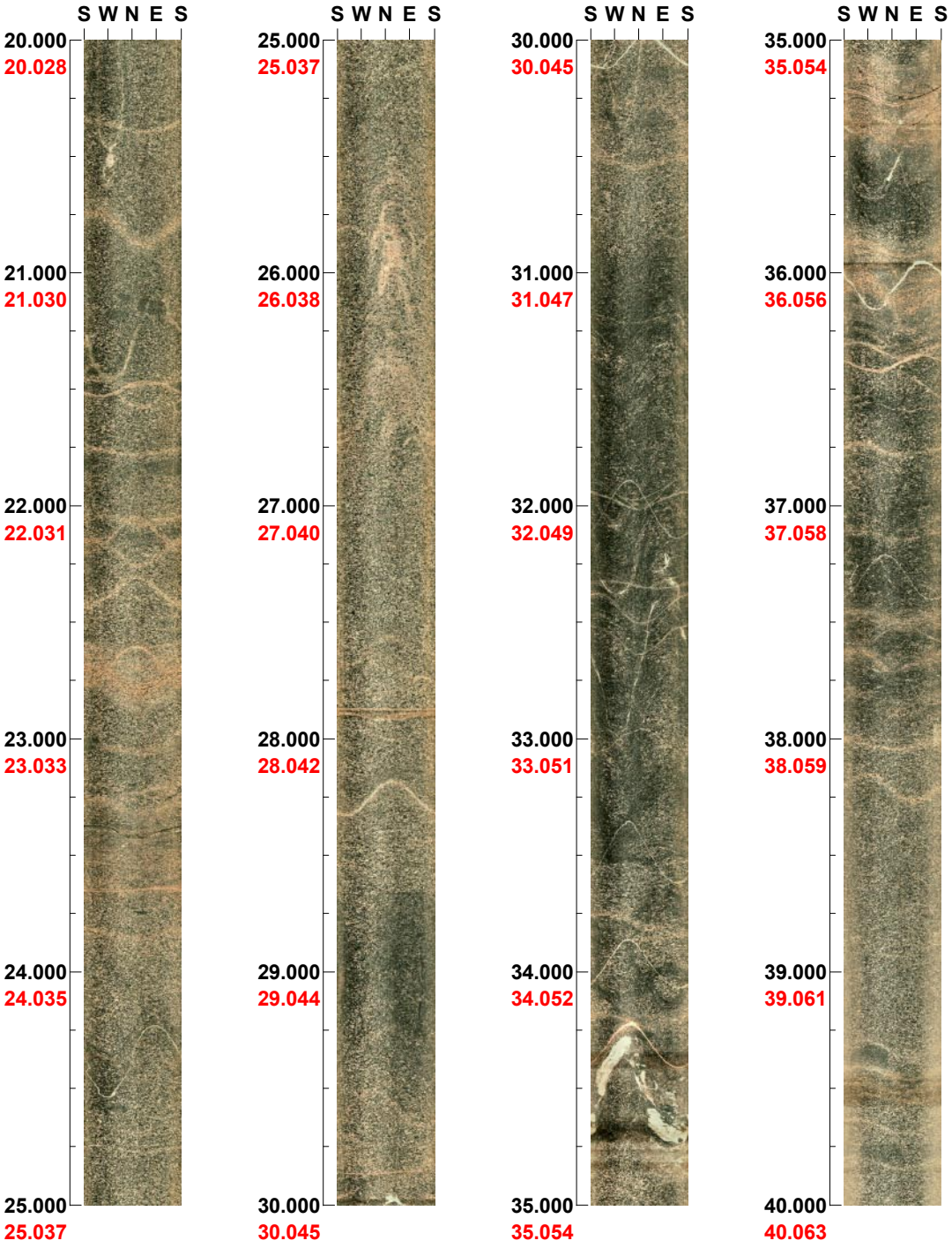
**Depth range: 0.000 - 20.000 m**




**( 1 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX25A** **Azimuth: 0** **Inclination: -60**

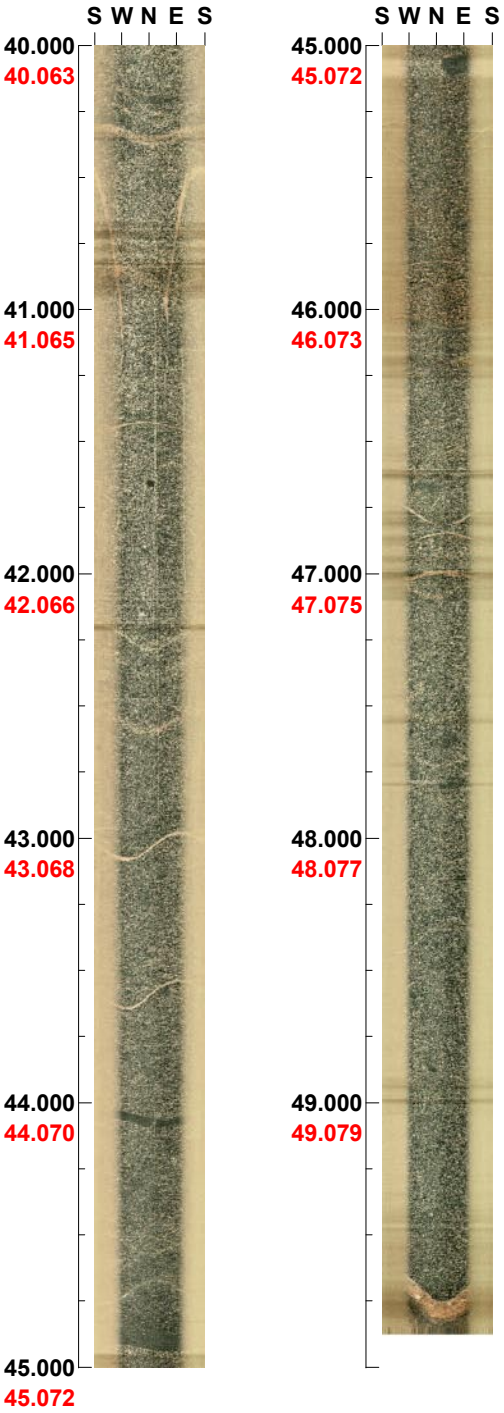
**Depth range: 20.000 - 40.000 m**




**( 2 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX25A** **Azimuth: 0** **Inclination: -60**

**Depth range: 40.000 - 49.872 m**




**( 3 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

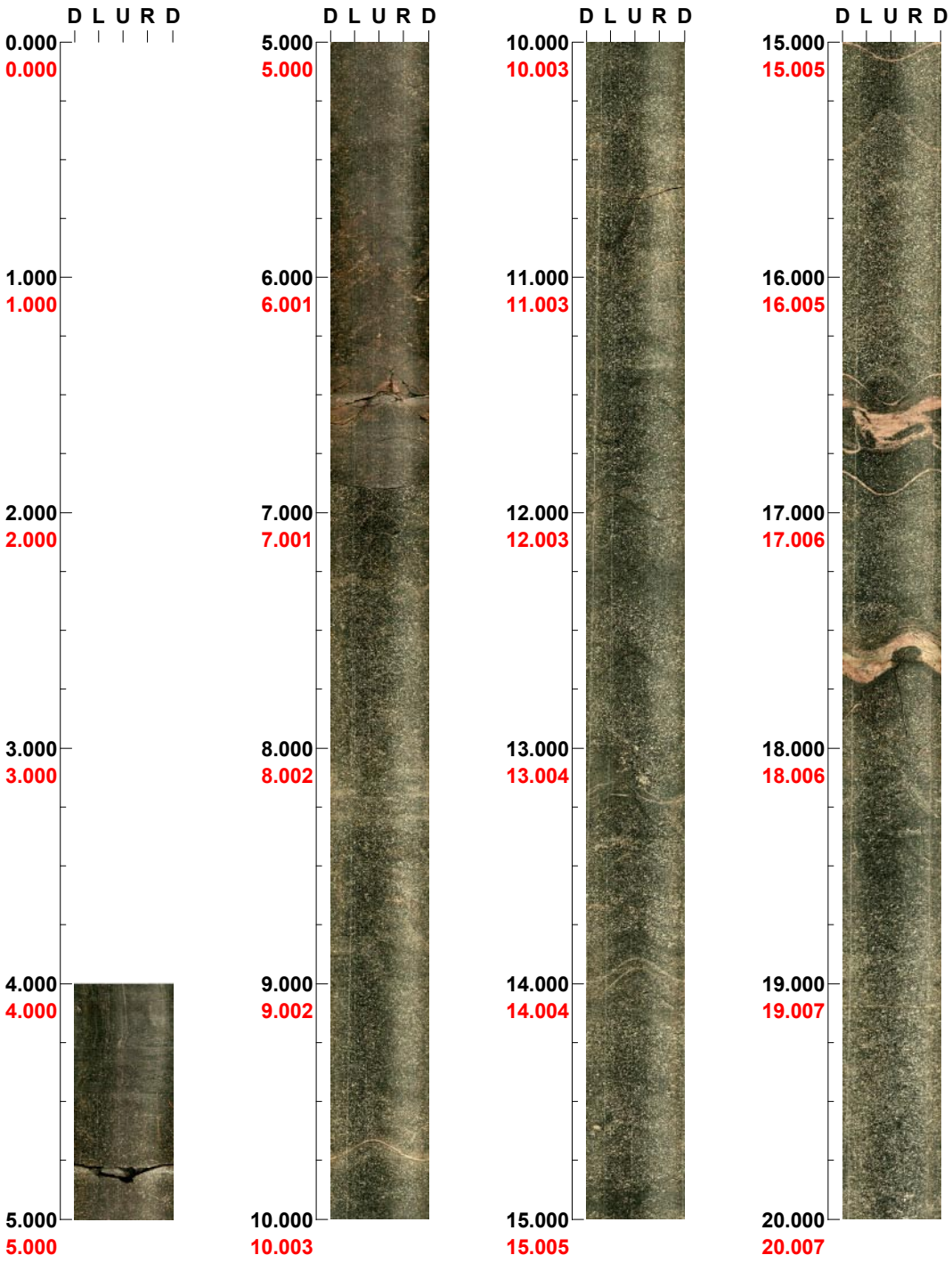
## BIPS logging in KLX26A, 4 to 100 m

## Project name: Laxemar

| | |
|---|---|
| **Image file** | **: c:\work\r5566k~1\bips\060911~1\klx26a.bip** |
| **BDT file** | **: c:\work\r5566k~1\bips\060911~1\klx26a.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX26A** |
| **Date** | **: 06/09/11** |
| **Time** | **: 13:15:00** |
| **Depth range** | **: 4.000 - 99.709 m** |
| **Azimuth** | **: 90** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 5** |
| **Color** | **: +0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX26A** **Azimuth: 90** **Inclination: -60**

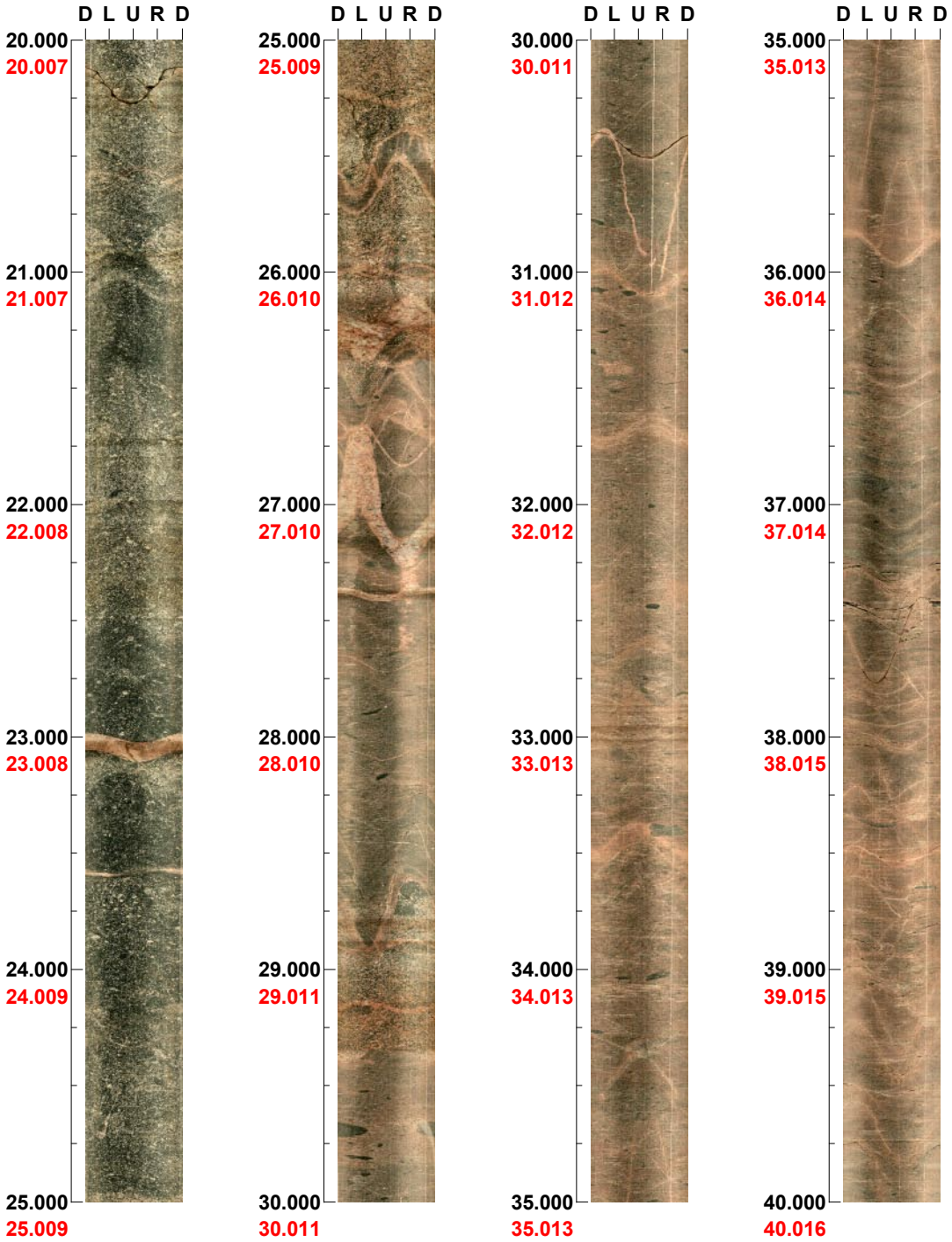
**Depth range: 0.000 - 20.000 m**




**( 1 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX26A** **Azimuth: 90** **Inclination: -60**

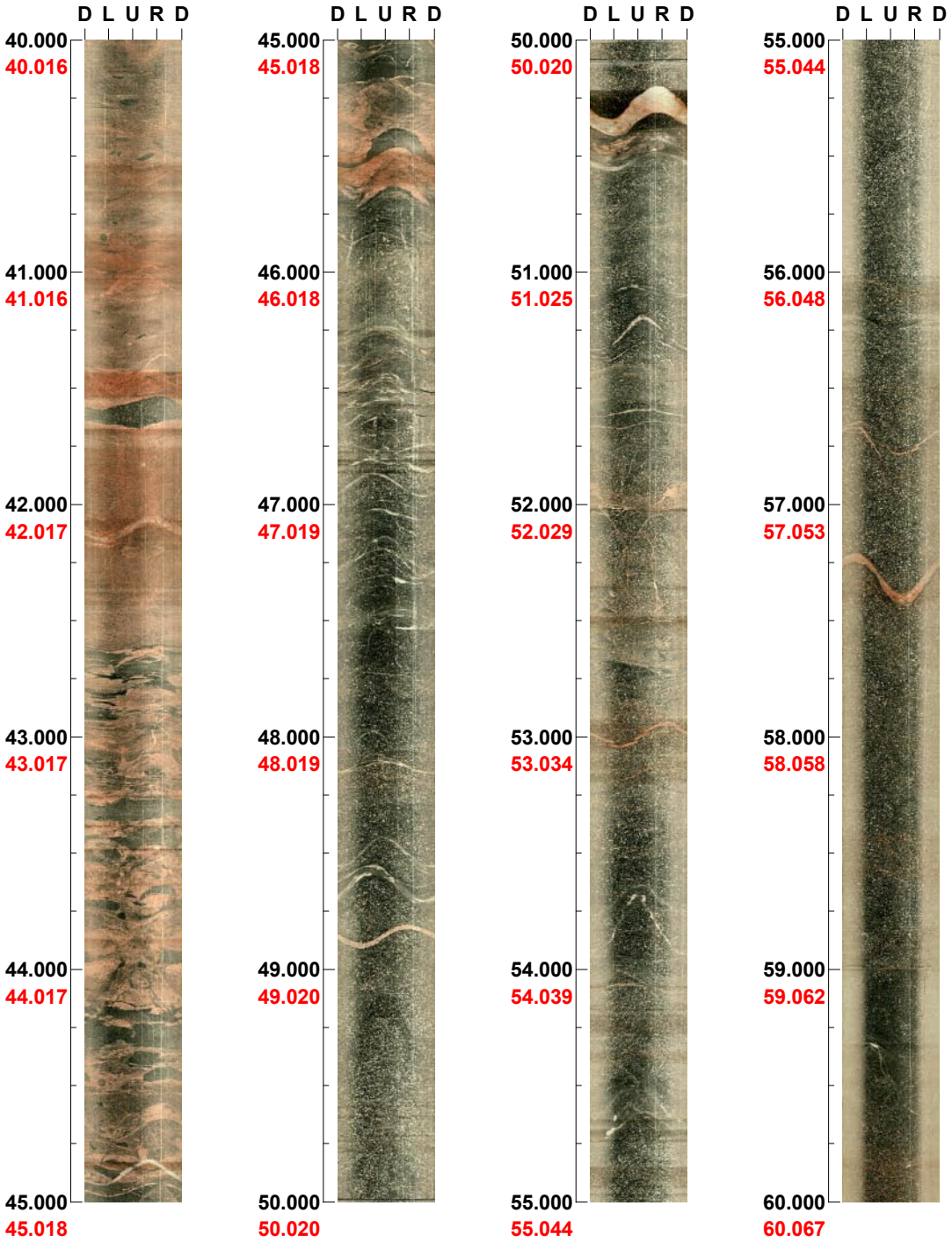
**Depth range: 20.000 - 40.000 m**




**( 2 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX26A** **Azimuth: 90** **Inclination: -60**

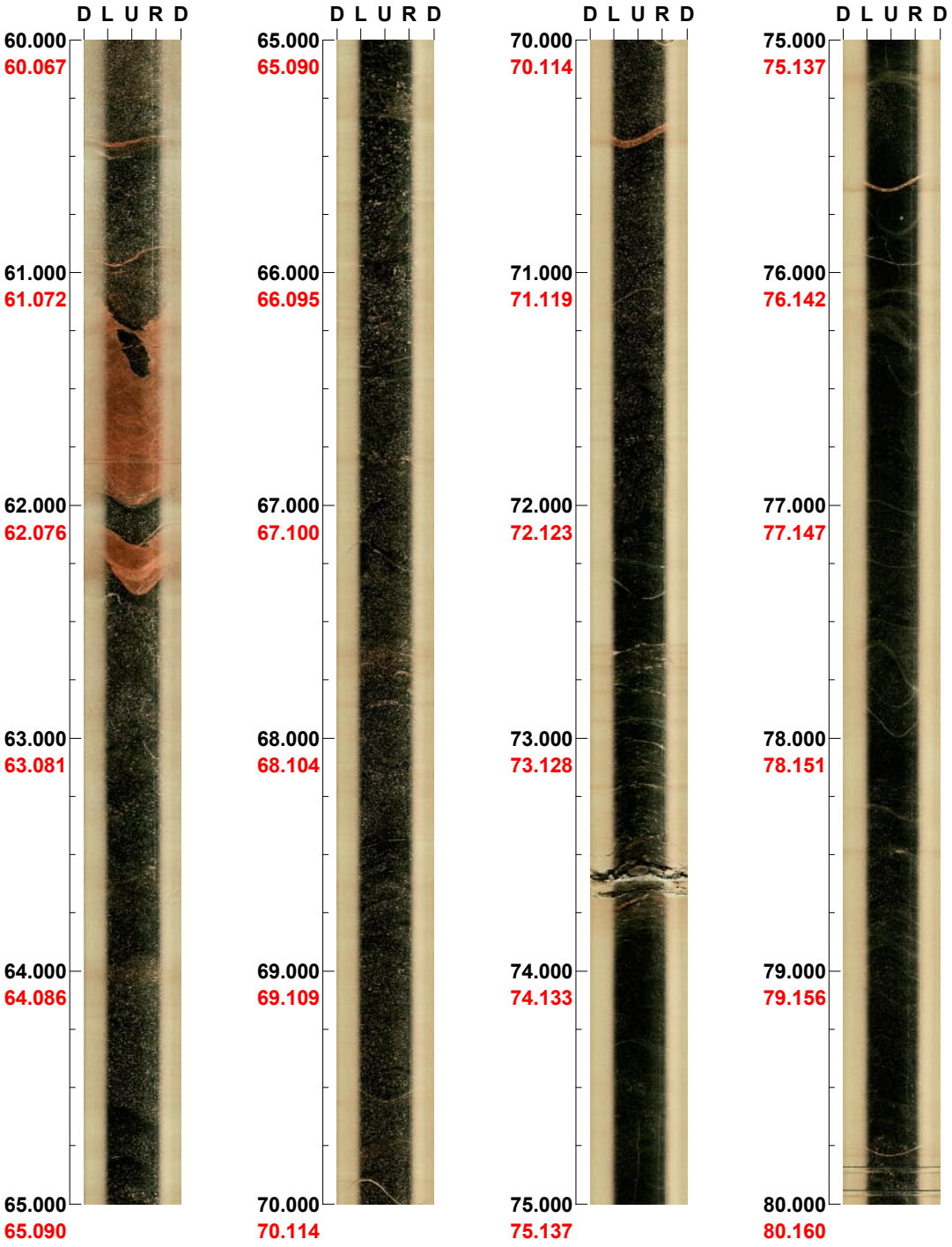
**Depth range: 40.000 - 60.000 m**




**( 3 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX26A** **Azimuth: 90** **Inclination: -60**

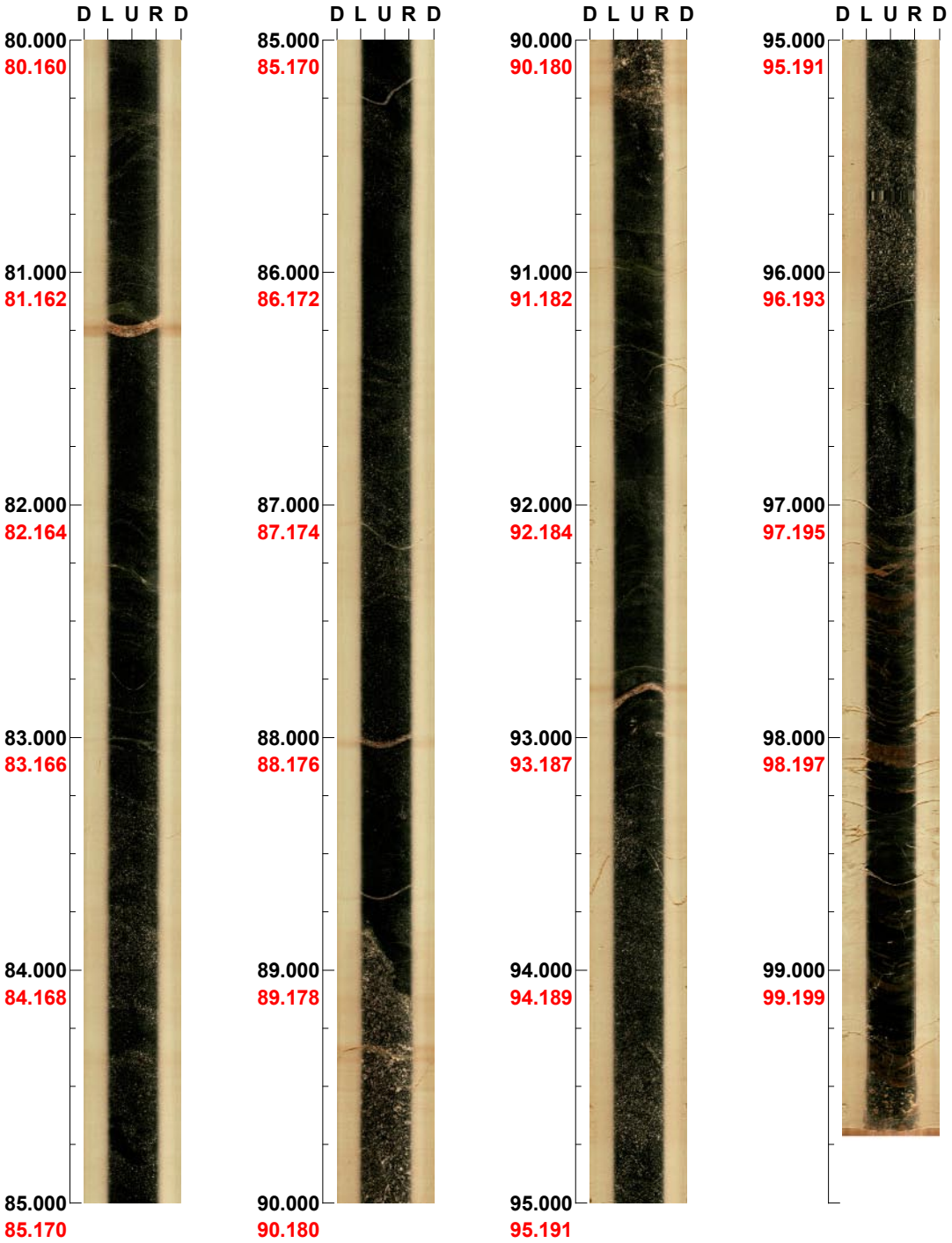
**Depth range: 60.000 - 80.000 m**




**( 4 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX26A** **Azimuth: 90** **Inclination: -60**

**Depth range: 80.000 - 99.709 m**




**( 5 / 5 )** **Scale: 1/25** **Aspect ratio: 175 %**

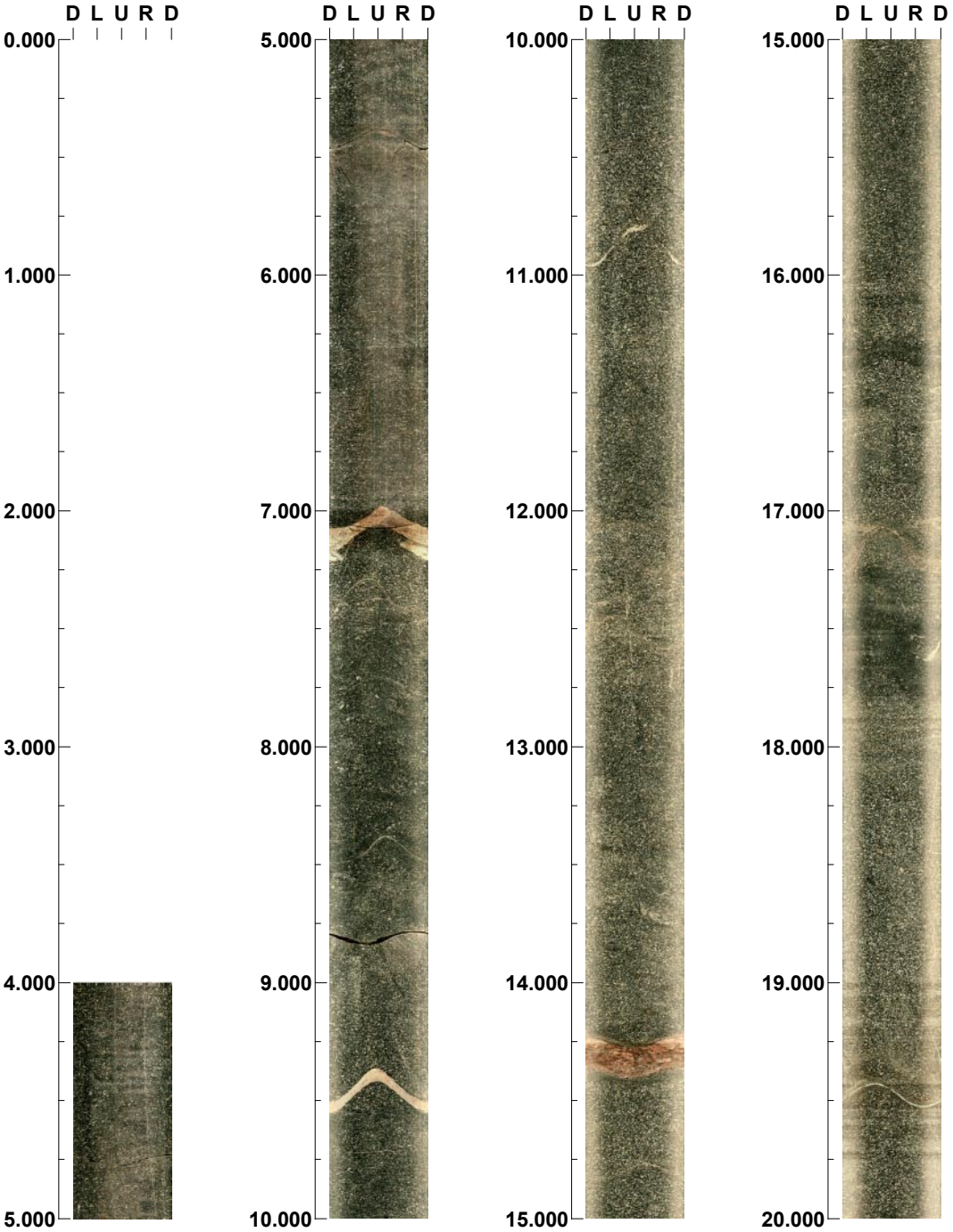
## BIPS logging in KLX26B, 4 to 50 m

## Project name: Laxemar

| | |
|---|---|
| **Image file** | **: c:\work\r5566k~1\bips\060911~1\klx26b.bip** |
| **BDT file** | **: c:\work\r5566k~1\bips\060911~1\klx26b.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: KLX26B** |
| **Date** | **: 06/09/11** |
| **Time** | **: 14:43:00** |
| **Depth range** | **: 4.000 - 50.070 m** |
| **Azimuth** | **: 140** |
| **Inclination** | **: -60** |
| **Diameter** | **: 76.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 175 %** |
| **Pages** | **: 3** |
| **Color** | **: +0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: KLX26B** **Azimuth: 140** **Inclination: -60**

**Depth range: 0.000 - 20.000 m**




**( 1 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX26B** **Azimuth: 140** **Inclination: -60**

**Depth range: 20.000 - 40.000 m**


**( 2 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

**Project name: Laxemar**
**Bore hole No.: KLX26B** **Azimuth: 140** **Inclination: -60**

**Depth range: 40.000 - 50.070 m**


**( 3 / 3 )** **Scale: 1/25** **Aspect ratio: 175 %**

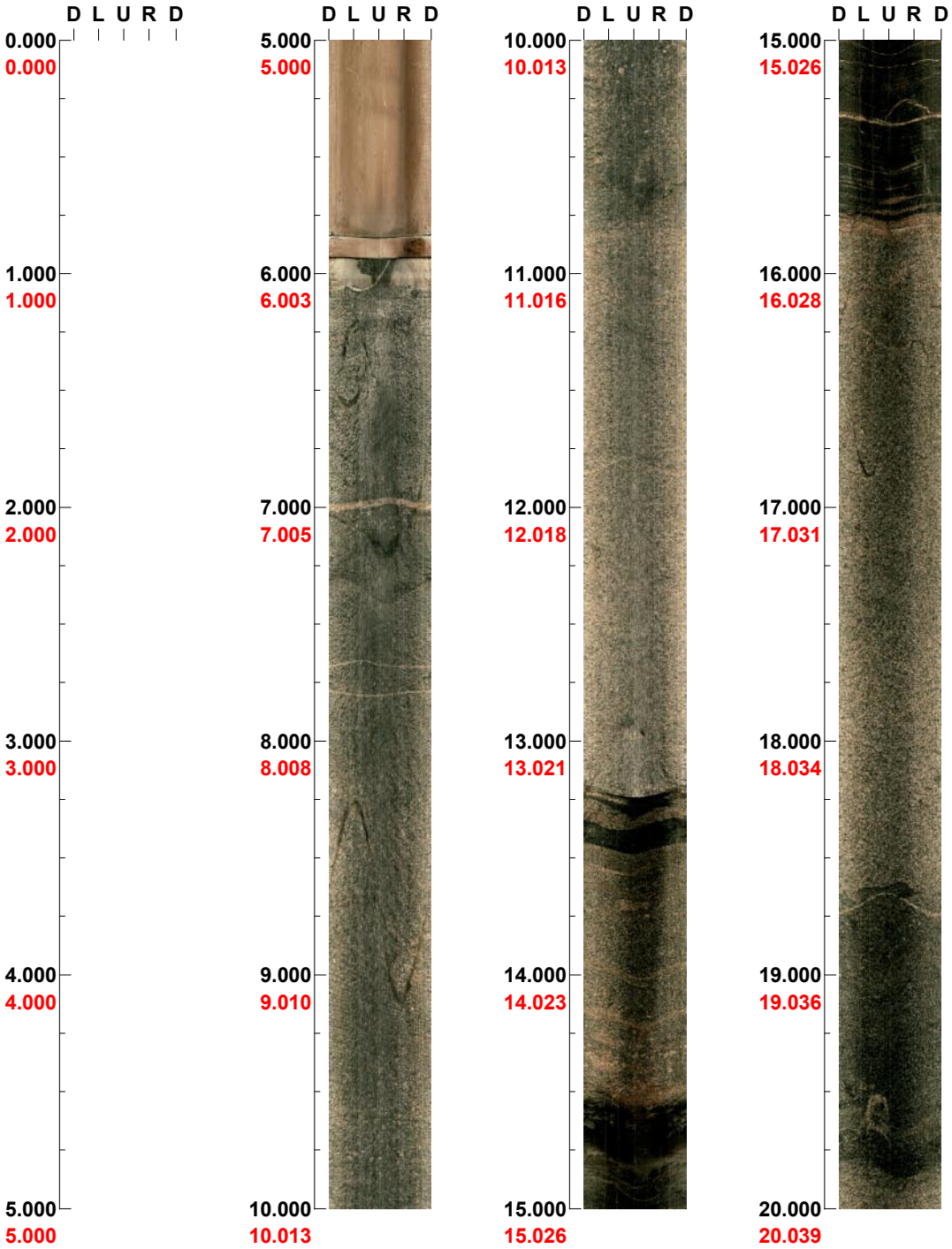
## BIPS logging in HLX39, 5 to 198 m

## Project name: Laxemar

| | |
|---|---|
| **Image file** | **: c:\work\r5566k~1\bips\060911~1\hlx39.bip** |
| **BDT file** | **: c:\work\r5566k~1\bips\060911~1\hlx39.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: HLX39** |
| **Date** | **: 06/09/14** |
| **Time** | **: 08:45:00** |
| **Depth range** | **: 5.000 - 198.202 m** |
| **Azimuth** | **: 14** |
| **Inclination** | **: -59** |
| **Diameter** | **: 140.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 100 %** |
| **Pages** | **: 10** |
| **Color** | **: +0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

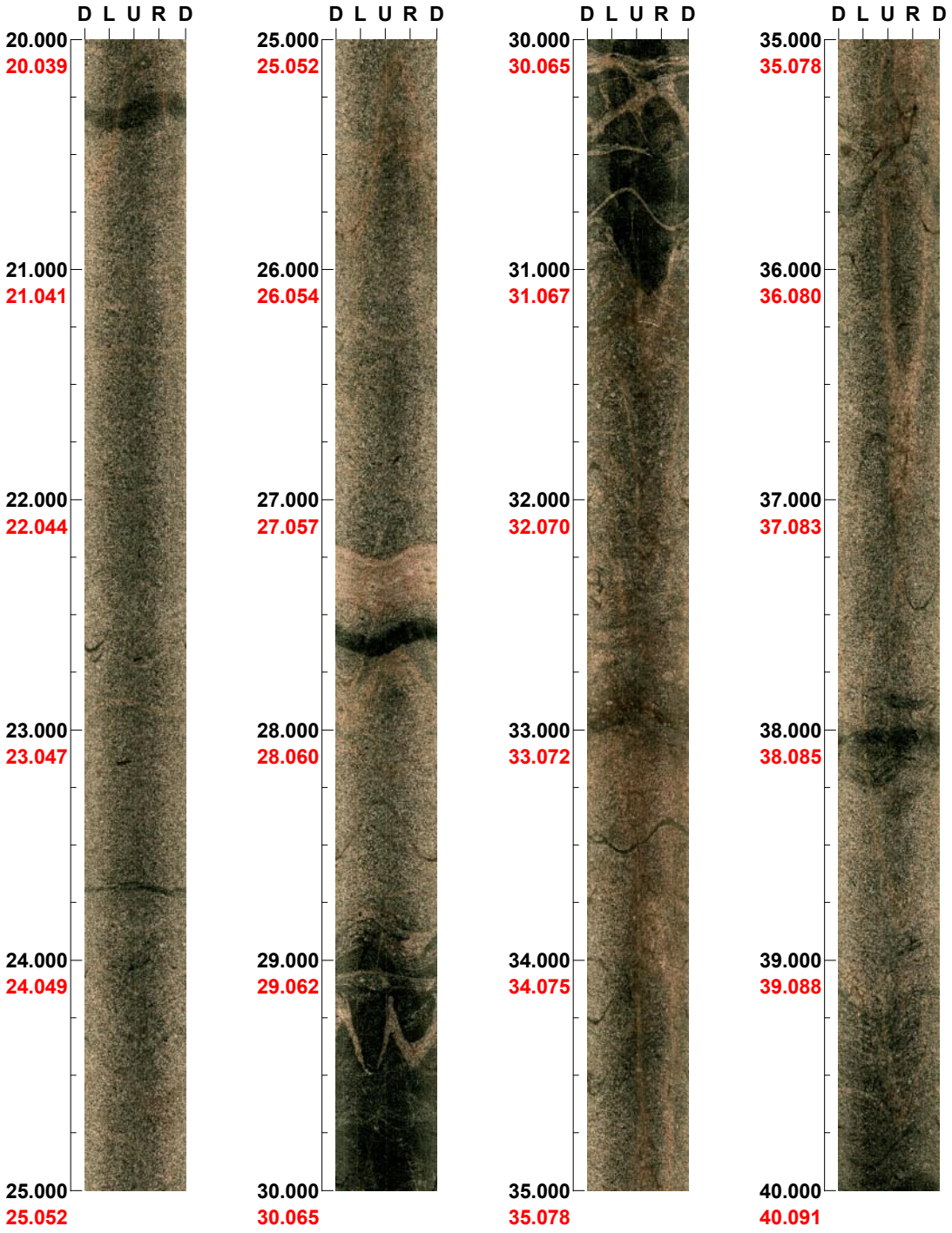
**Depth range: 0.000 - 20.000 m**




**( 1 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

**Depth range: 20.000 - 40.000 m**




**( 2 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

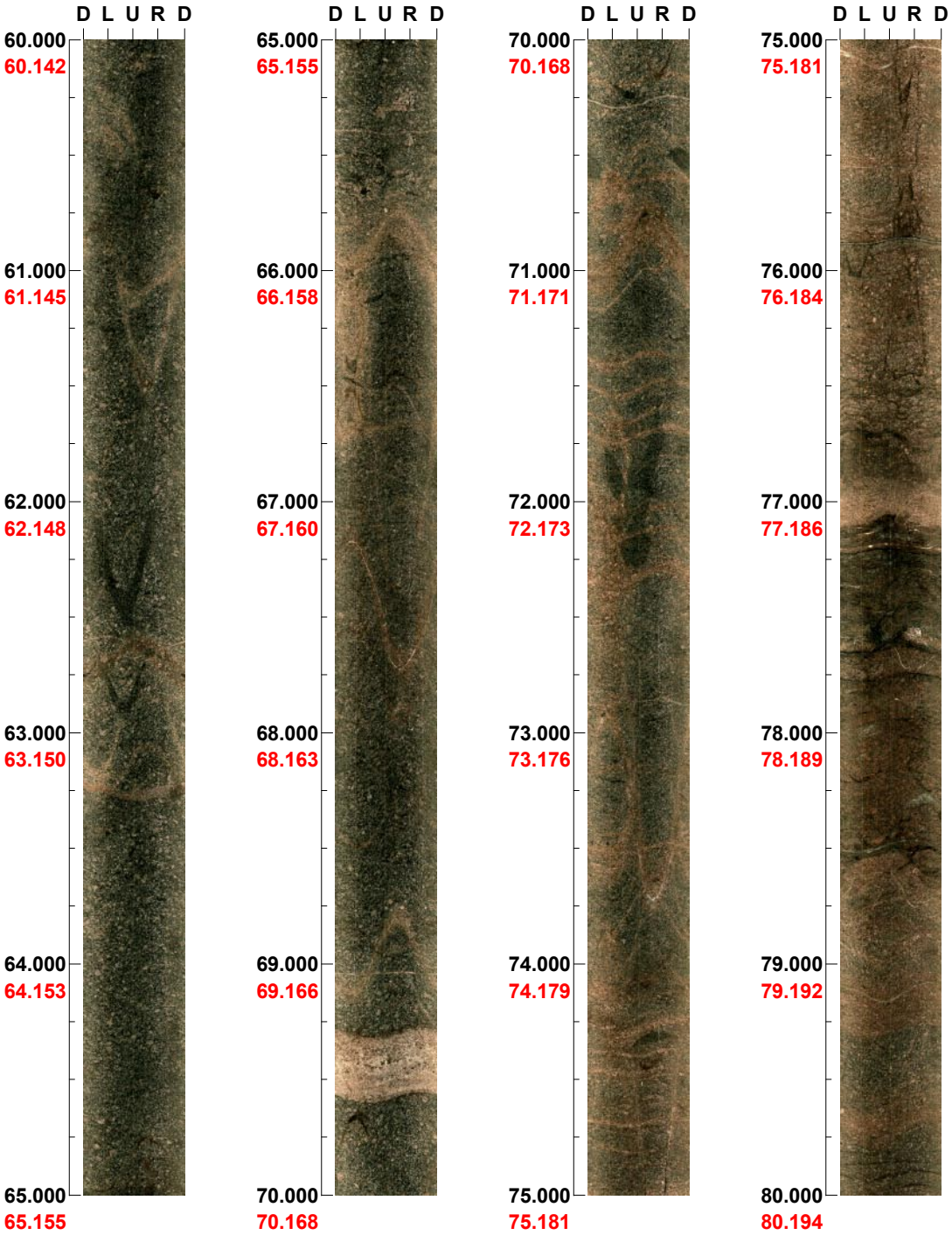
**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

**Depth range: 40.000 - 60.000 m**


**( 3 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

**Depth range: 60.000 - 80.000 m**




**( 4 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

**Depth range: 80.000 - 100.000 m**


**( 5 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

**Depth range: 100.000 - 120.000 m**


**( 6 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

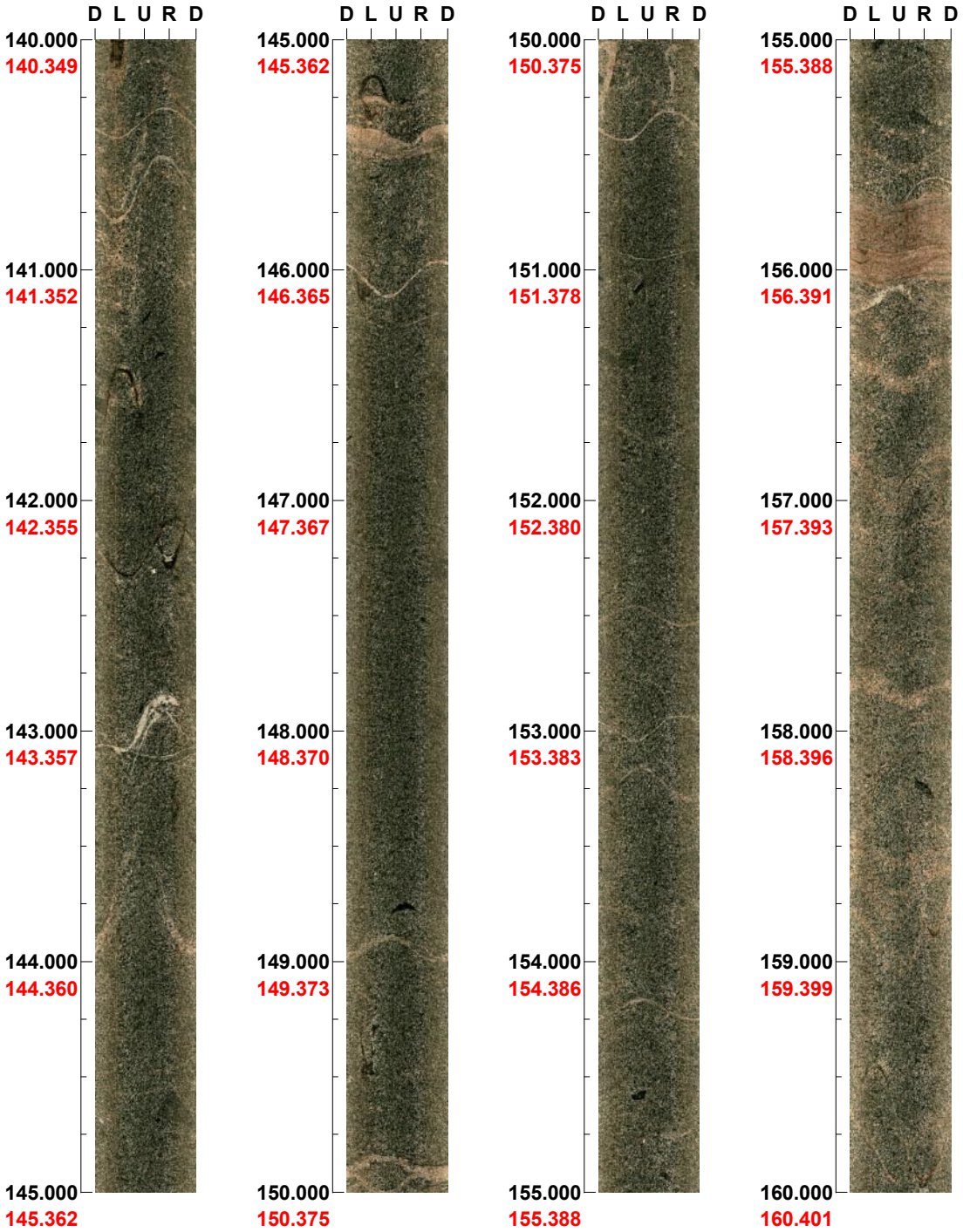
**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

**Depth range: 120.000 - 140.000 m**


**( 7 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

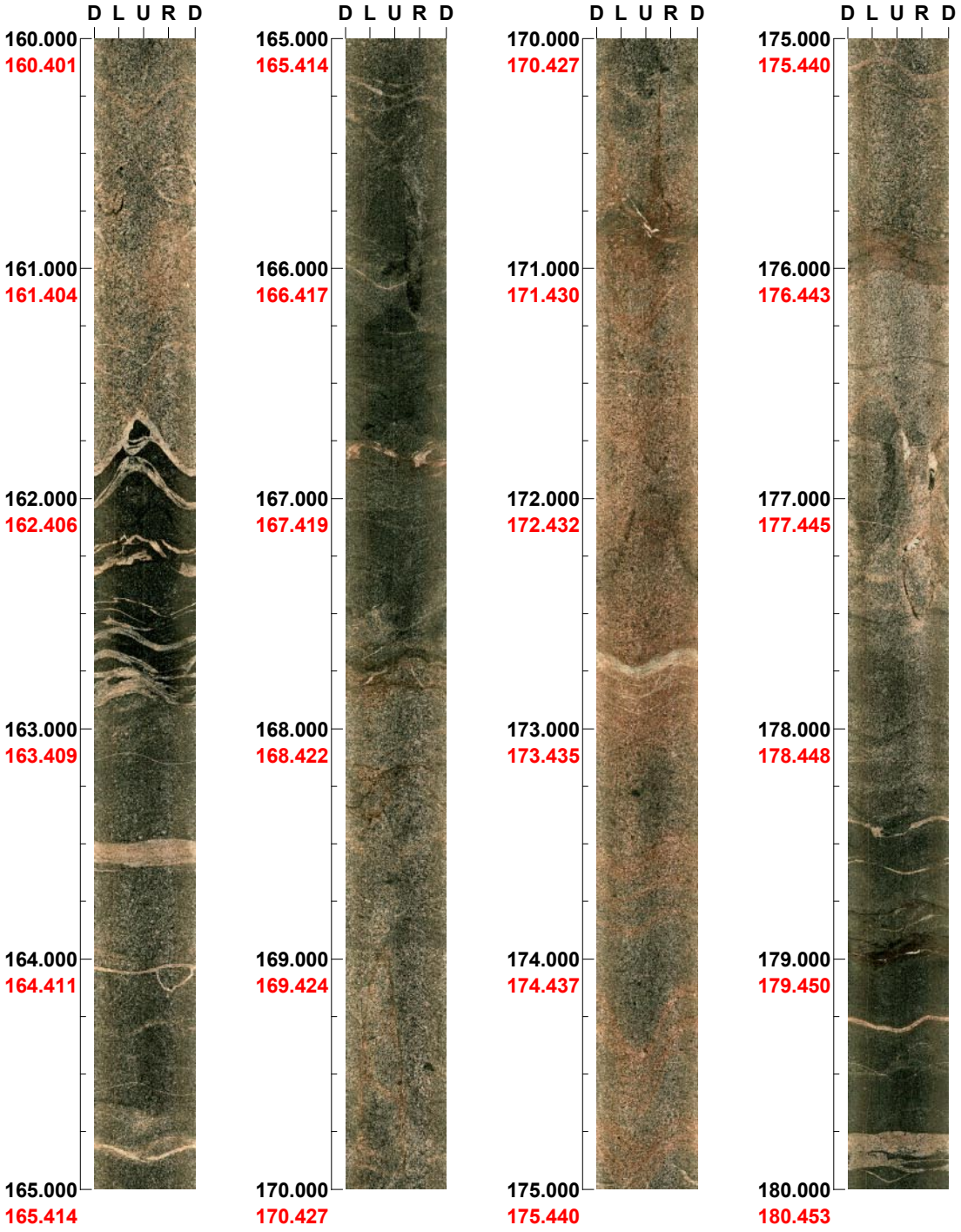
**Depth range: 140.000 - 160.000 m**




**( 8 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

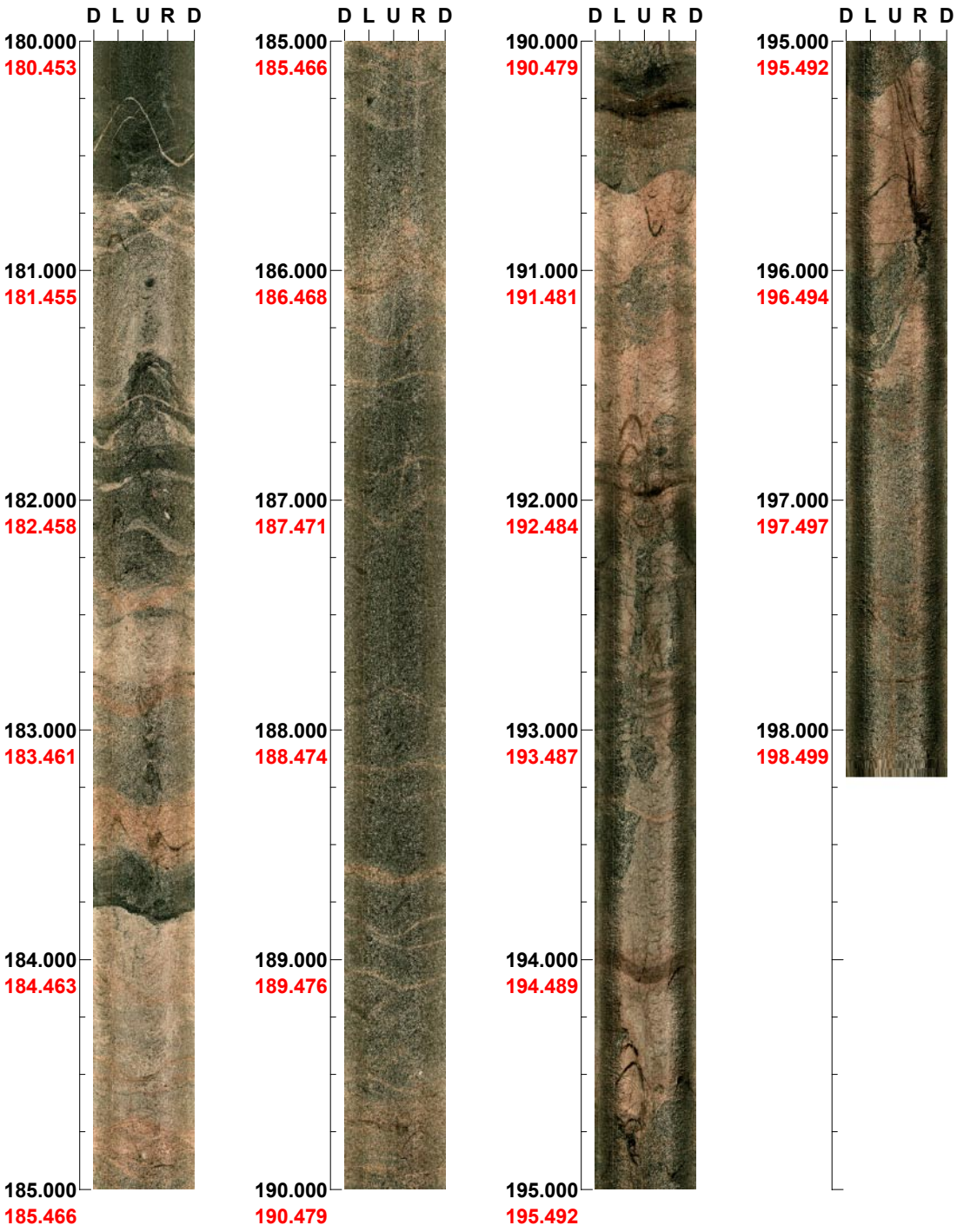
**Depth range: 160.000 - 180.000 m**




**( 9 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX39** **Azimuth: 14** **Inclination: -59**

**Depth range: 180.000 - 198.202 m**




**( 10 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

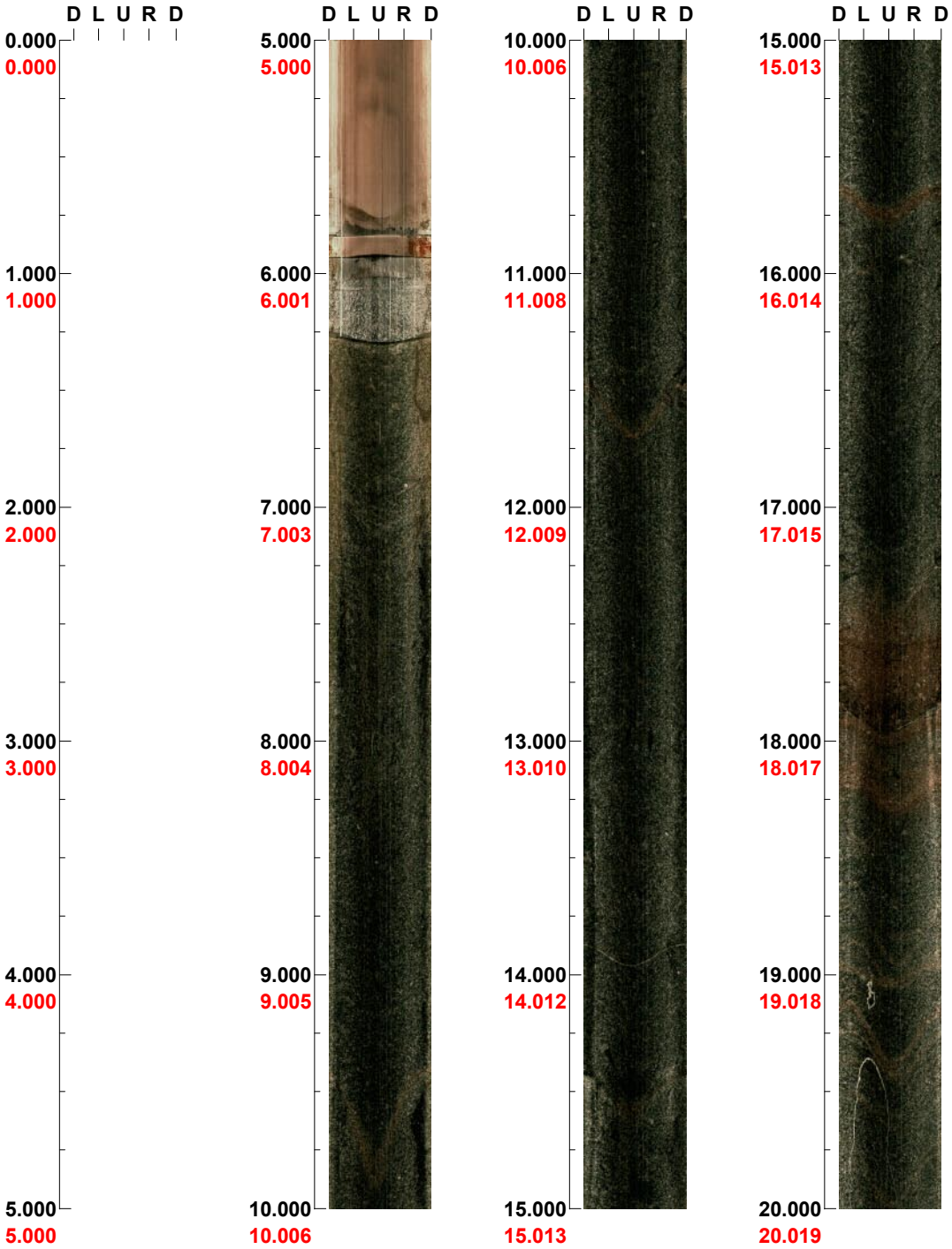
## BIPS logging in HLX41, 5 to 199 m

## Project name: Laxemar

| | |
|---|---|
| **Image file** | **: c:\work\r5566k~1\bips\060911~1\hlx41.bip** |
| **BDT file** | **: c:\work\r5566k~1\bips\060911~1\hlx41.bdt** |
| **Locality** | **: LAXEMAR** |
| **Bore hole number** | **: HLX41** |
| **Date** | **: 06/09/13** |
| **Time** | **: 15:01:00** |
| **Depth range** | **: 5.000 - 198.977 m** |
| **Azimuth** | **: 208** |
| **Inclination** | **: -59** |
| **Diameter** | **: 140.0 mm** |
| **Magnetic declination** | **: 0.0** |
| **Span** | **: 4** |
| **Scan interval** | **: 0.25** |
| **Scan direction** | **: To bottom** |
| **Scale** | **: 1/25** |
| **Aspect ratio** | **: 100 %** |
| **Pages** | **: 10** |
| **Color** | **: +0 +0 +0** |

**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 0.000 - 20.000 m**




**( 1 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 20.000 - 40.000 m**


**( 2 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

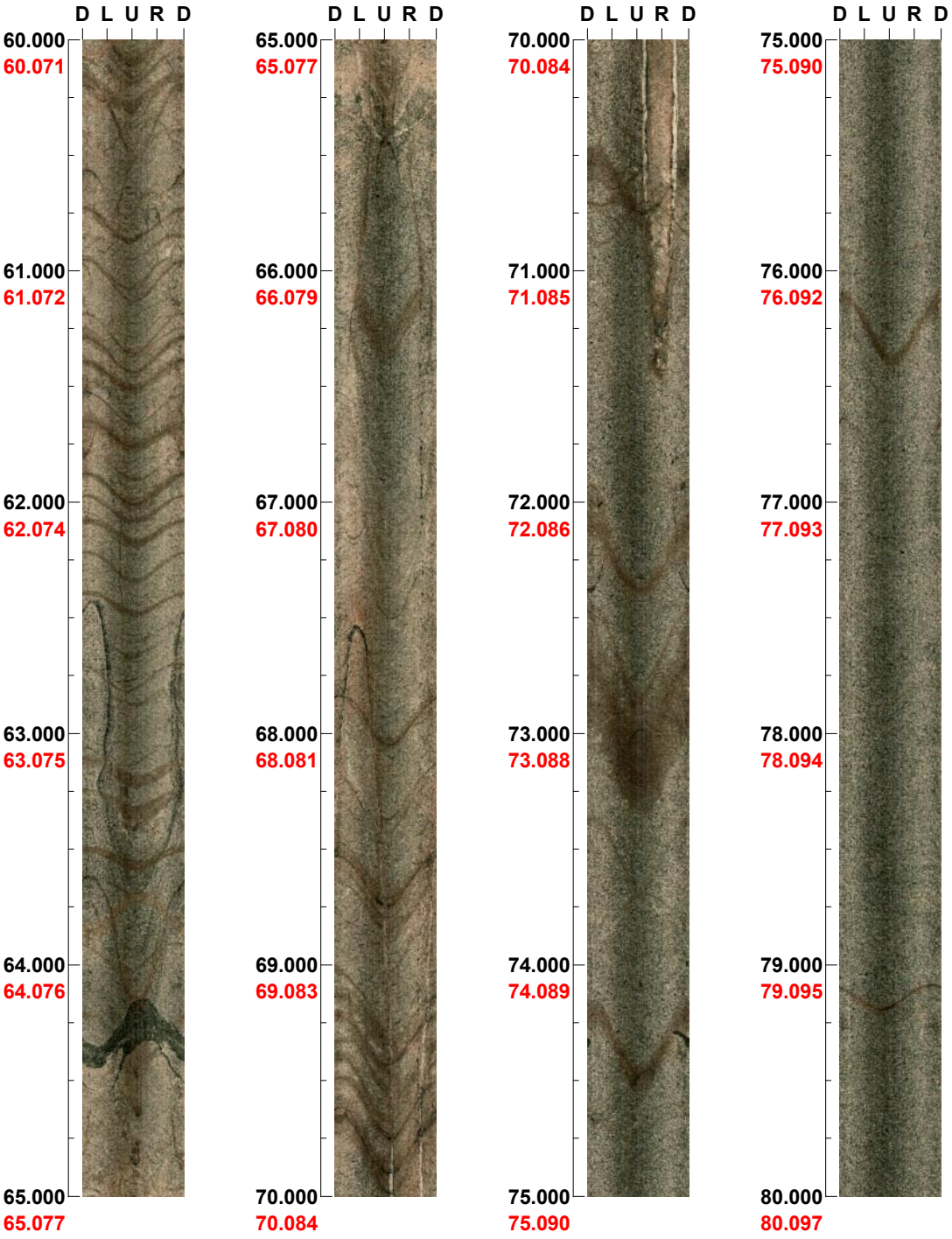
**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 40.000 - 60.000 m**


**( 3 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 60.000 - 80.000 m**




**( 4 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

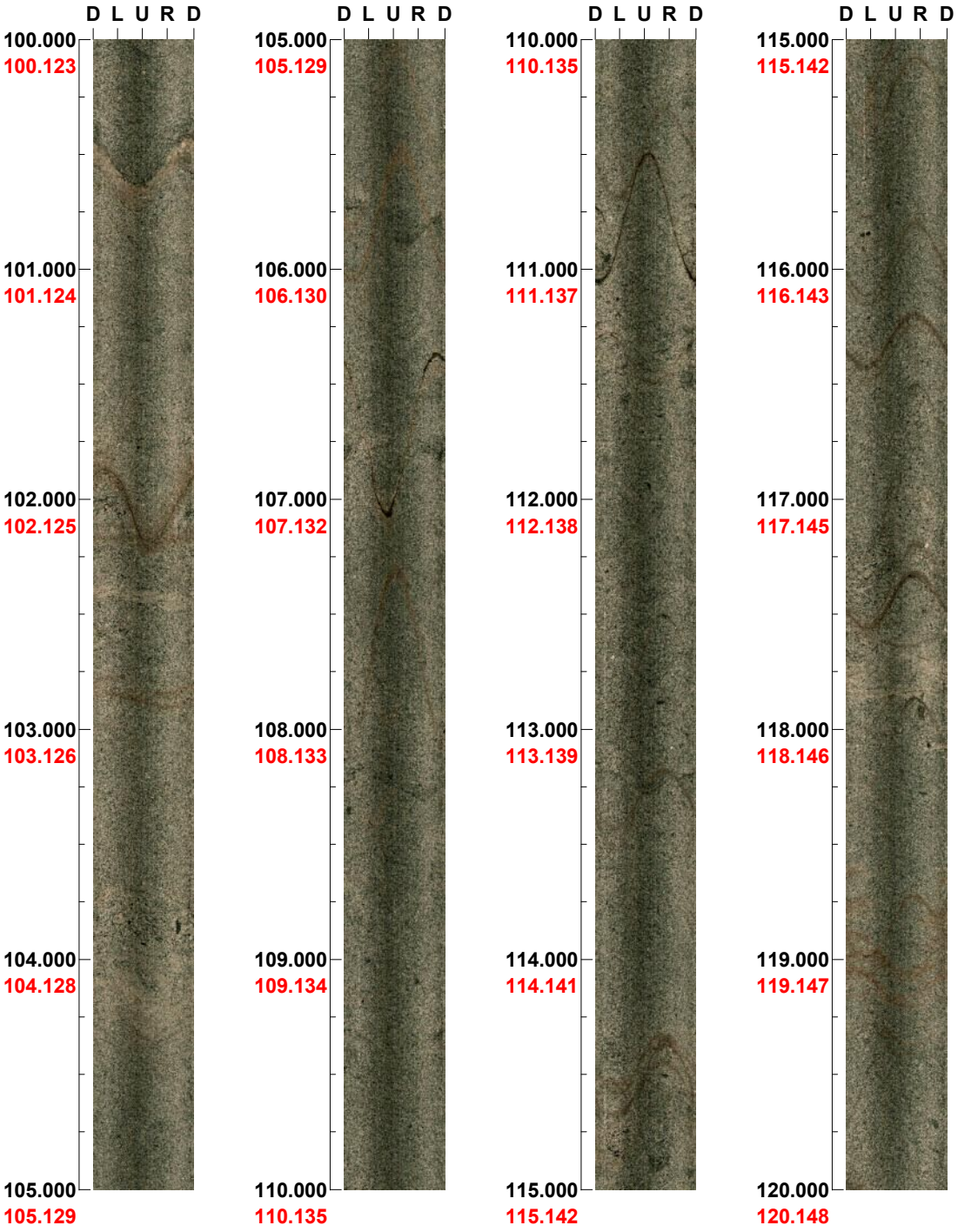
**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 80.000 - 100.000 m**


**( 5 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

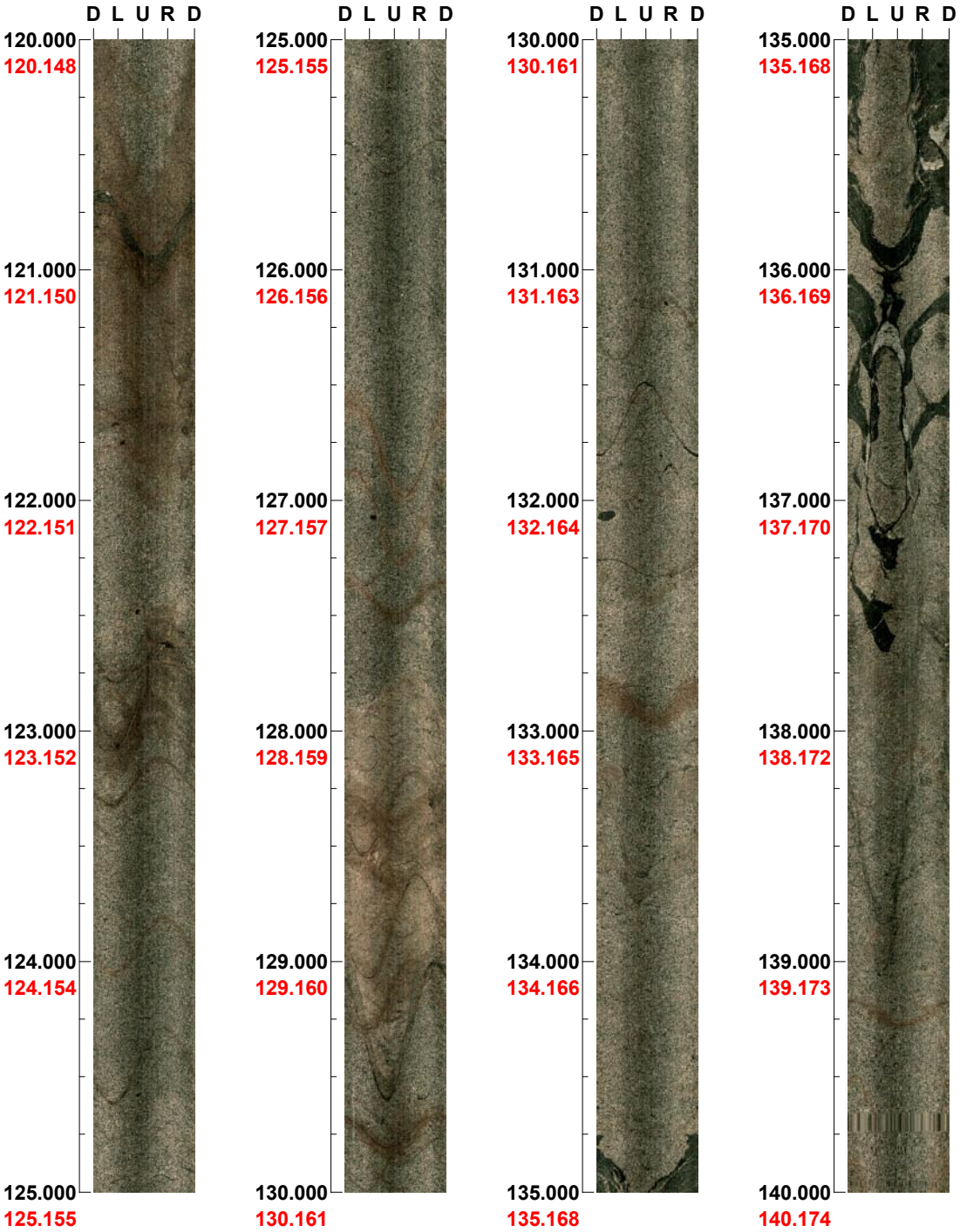
**Depth range: 100.000 - 120.000 m**




**( 6 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

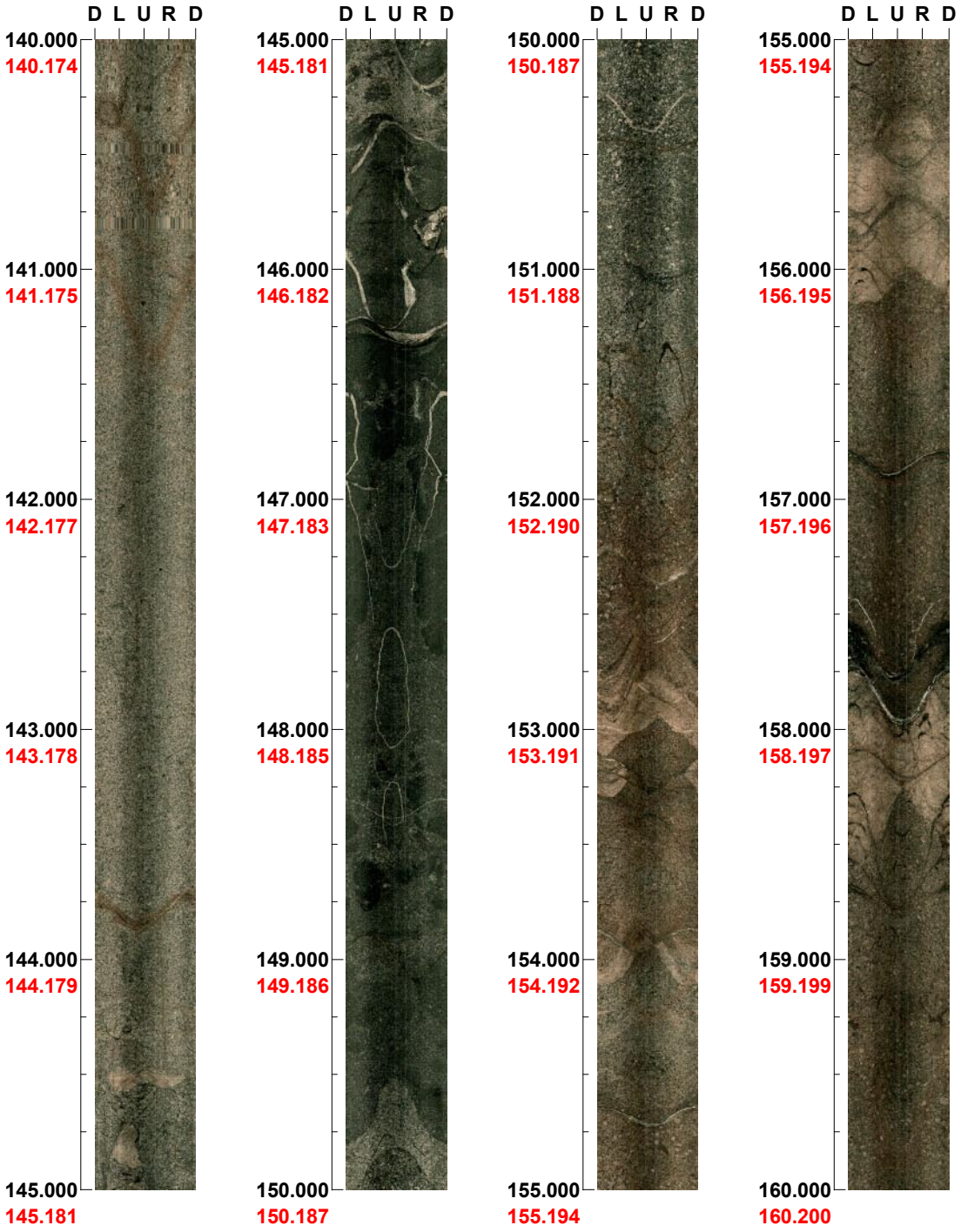
**Depth range: 120.000 - 140.000 m**




**( 7 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 140.000 - 160.000 m**




**( 8 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

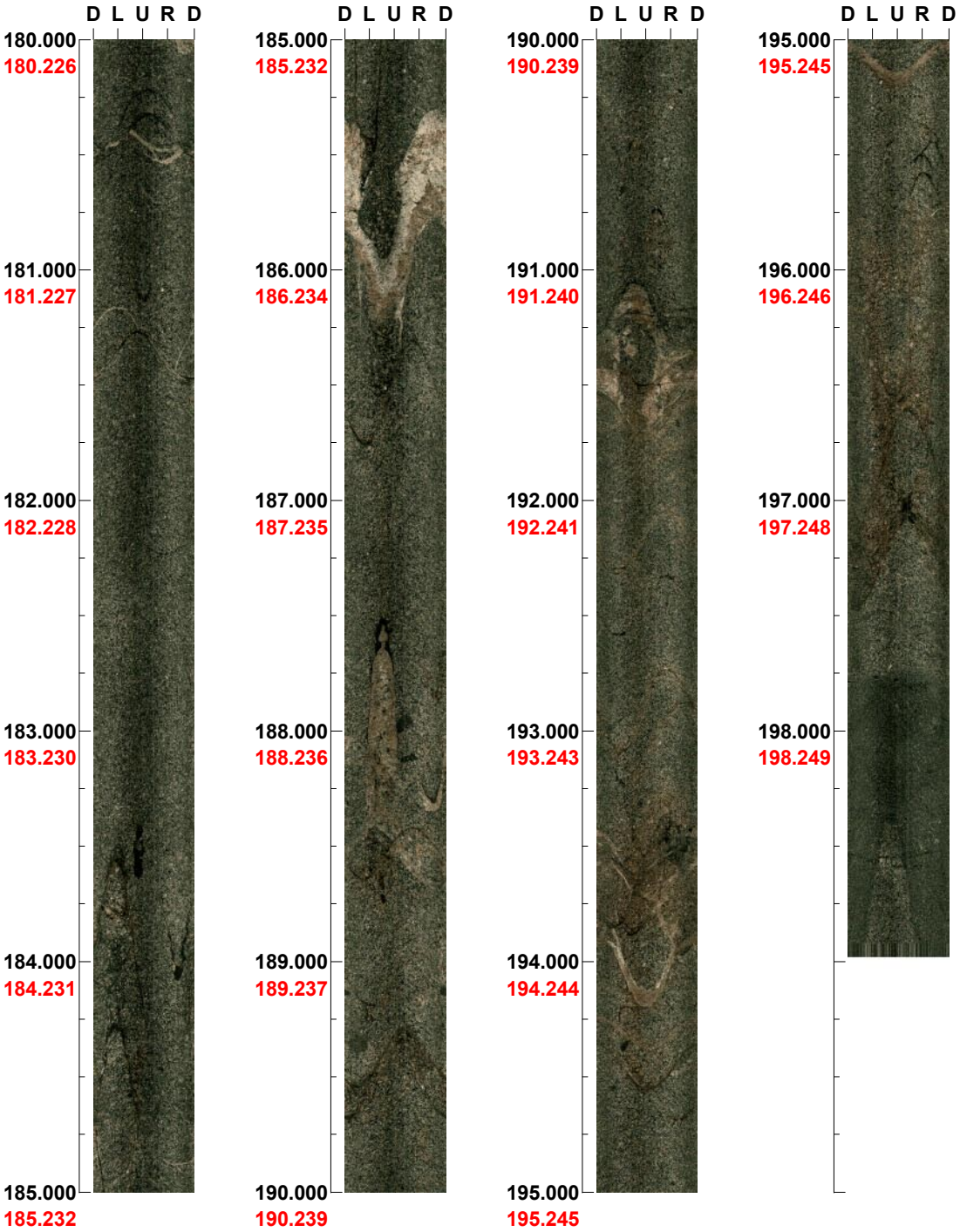
**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 160.000 - 180.000 m**


**( 9 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

**Project name: Laxemar**
**Bore hole No.: HLX41** **Azimuth: 208** **Inclination: -59**

**Depth range: 180.000 - 198.977 m**




**( 10 / 10 )** **Scale: 1/25** **Aspect ratio: 100 %**

# Deviation logging in KLX13A, 0 to 594 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX13A** |
| Survey date: | 20/09/2006 01:27:31 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Leif Stenberg |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 50500 | 1500 | nano Tesla |
| Magnetic dip: | 71 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 594,0 | 594,0 |
| East: | 1546787,36 | 1546728,90 | -58,46 |
| North: | 6367547,14 | 6367502,00 | -45,14 |
| Elevation: | 24,15 | -565,22 | -589,37 |
| Dip: | -82,32 | -83,26 | -0,94 |
| Azimuth: | 224,50 | 229,82 | 5,32 |

OFFSETS at end

Offsets relative to:
ACTUAL START

6,27 metres downwards
10,05 metres right
0,13 metres shortfall

Printed on: 2006-11-14 13:10:32

Survey name : KLX13A
Survey date : 20/09/2006 01:27:31
Printed on 2006-11-14 13:10:57

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,0 | -82,32 | 224,50 | 1546787,36 | 6367547,14 | 24,15 | 29038 | 84,40 | 0,999636 | ✍✍✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -82,24 | 224,00 | 1546787,08 | 6367546,86 | 21,18 | 32806 | 83,67 | 1,000382 | ✍✍✍ | 0,00 | 0,00 | 0,00 |
| 6,0 | -82,21 | 224,00 | 1546786,80 | 6367546,56 | 18,21 | 55640 | 78,86 | 0,999954 | ✍✍✍ | 0,01 | -0,01 | 0,00 |
| 9,0 | -82,15 | 224,00 | 1546786,52 | 6367546,27 | 15,24 | 47901 | 74,39 | 0,999796 | ✍✍✍ | 0,01 | -0,01 | 0,00 |
| 12,0 | -81,93 | 224,00 | 1546786,23 | 6367545,97 | 12,26 | 50031 | 71,37 | 0,999768 | ✍ | 0,03 | -0,01 | 0,00 |
| 15,0 | -82,07 | 224,66 | 1546785,94 | 6367545,67 | 9,29 | 49099 | 71,36 | 0,999847 | ✍ | 0,05 | -0,01 | 0,00 |
| 18,0 | -82,30 | 227,66 | 1546785,64 | 6367545,39 | 6,32 | 49504 | 71,96 | 1,001210 | ✍ | 0,05 | 0,00 | 0,00 |
| 21,0 | -82,51 | 228,62 | 1546785,35 | 6367545,12 | 3,35 | 49065 | 71,57 | 1,000906 | ✍ | 0,05 | 0,02 | 0,00 |
| 24,0 | -82,54 | 227,71 | 1546785,06 | 6367544,86 | 0,37 | 48843 | 71,45 | 0,999730 | ✍ | 0,03 | 0,05 | 0,00 |
| 27,0 | -82,75 | 227,00 | 1546784,77 | 6367544,60 | -2,60 | 49399 | 70,92 | 1,000925 | ✍ | 0,02 | 0,07 | 0,00 |
| 30,0 | -82,60 | 229,30 | 1546784,49 | 6367544,35 | -5,58 | 49389 | 71,30 | 0,999853 | ✍ | 0,00 | 0,09 | 0,00 |
| 33,0 | -82,85 | 230,16 | 1546784,20 | 6367544,10 | -8,55 | 49272 | 71,36 | 1,001011 | ✍ | -0,03 | 0,13 | 0,00 |
| 36,0 | -82,77 | 229,71 | 1546783,91 | 6367543,86 | -11,53 | 49495 | 71,87 | 1,000391 | ✍ | -0,05 | 0,16 | 0,00 |
| 39,0 | -82,88 | 231,92 | 1546783,62 | 6367543,63 | -14,51 | 49199 | 70,84 | 1,000998 | ✍ | -0,08 | 0,20 | 0,00 |
| 42,0 | -82,81 | 232,60 | 1546783,33 | 6367543,40 | -17,48 | 49299 | 71,01 | 1,000970 | ✍ | -0,11 | 0,25 | 0,00 |
| 45,0 | -82,85 | 234,30 | 1546783,02 | 6367543,17 | -20,46 | 49514 | 70,95 | 1,000835 | ✍ | -0,14 | 0,31 | 0,00 |
| 48,0 | -82,74 | 229,24 | 1546782,73 | 6367542,94 | -23,44 | 50292 | 71,05 | 1,000586 | ✍ | -0,17 | 0,36 | 0,00 |
| 51,0 | -82,95 | 231,01 | 1546782,44 | 6367542,70 | -26,41 | 49524 | 70,56 | 1,001046 | ✍ | -0,20 | 0,40 | 0,00 |
| 54,0 | -82,71 | 232,29 | 1546782,15 | 6367542,47 | -29,39 | 49039 | 70,99 | 1,001558 | ✍ | -0,23 | 0,44 | 0,00 |
| 57,0 | -82,86 | 232,47 | 1546781,85 | 6367542,24 | -32,37 | 49312 | 71,07 | 0,989966 | ✍ | -0,26 | 0,49 | -0,01 |
| 60,0 | -82,80 | 233,26 | 1546781,55 | 6367542,01 | -35,34 | 48911 | 71,15 | 0,998660 | ✍ | -0,29 | 0,55 | -0,01 |
| 63,0 | -82,82 | 233,62 | 1546781,25 | 6367541,79 | -38,32 | 49891 | 70,55 | 0,999538 | ✍ | -0,32 | 0,61 | -0,01 |
| 66,0 | -83,08 | 235,38 | 1546780,95 | 6367541,58 | -41,30 | 49701 | 70,61 | 0,998175 | ✍ | -0,36 | 0,67 | -0,01 |
| 69,0 | -82,80 | 232,50 | 1546780,65 | 6367541,36 | -44,27 | 48831 | 71,30 | 0,999881 | ✍ | -0,40 | 0,73 | -0,01 |
| 72,0 | -83,10 | 232,44 | 1546780,36 | 6367541,13 | -47,25 | 48920 | 71,27 | 1,000051 | ✍ | -0,43 | 0,78 | -0,01 |
| 75,0 | -83,12 | 231,83 | 1546780,08 | 6367540,91 | -50,23 | 49046 | 70,87 | 1,000062 | ✍ | -0,48 | 0,83 | -0,01 |
| 78,0 | -83,01 | 233,40 | 1546779,79 | 6367540,69 | -53,21 | 48930 | 71,03 | 0,999810 | ✍ | -0,52 | 0,88 | -0,01 |
| 81,0 | -83,18 | 233,26 | 1546779,50 | 6367540,48 | -56,18 | 48770 | 71,67 | 1,000115 | ✍ | -0,57 | 0,94 | -0,01 |
| 84,0 | -82,95 | 232,00 | 1546779,21 | 6367540,26 | -59,16 | 49443 | 71,37 | 0,999200 | ✍ | -0,61 | 0,99 | -0,01 |
| 87,0 | -83,03 | 234,73 | 1546778,92 | 6367540,04 | -62,14 | 48255 | 70,92 | 0,999577 | ✍ | -0,65 | 1,04 | -0,01 |
| 90,0 | -83,17 | 237,82 | 1546778,62 | 6367539,84 | -65,12 | 47653 | 71,83 | 0,999710 | ✍ | -0,70 | 1,12 | -0,01 |
| 93,0 | -83,02 | 233,86 | 1546778,32 | 6367539,64 | -68,10 | 49466 | 71,64 | 0,999465 | ✍ | -0,74 | 1,19 | -0,02 |
| 96,0 | -82,96 | 232,47 | 1546778,03 | 6367539,42 | -71,07 | 49083 | 71,78 | 0,999730 | ✍ | -0,78 | 1,24 | -0,02 |

Survey name : KLX13A
Survey date : 20/09/2006 01:27:31
Printed on 2006-11-14 13:10:57

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99,0 | -82,96 | 231,59 | 1546777,74 | 6367539,19 | -74,05 | 49356 | 72,61 | 0,999847 | ✍ | -0,82 | 1,29 | -0,02 |
| 102,0 | -82,97 | 235,44 | 1546777,44 | 6367538,97 | -77,03 | 49415 | 72,00 | 0,999700 | ✍ | -0,86 | 1,35 | -0,02 |
| 105,0 | -82,87 | 236,07 | 1546777,14 | 6367538,76 | -80,01 | 48651 | 71,53 | 0,999493 | ✍ | -0,90 | 1,42 | -0,02 |
| 108,0 | -82,87 | 226,62 | 1546776,85 | 6367538,53 | -82,98 | 46300 | 71,20 | 0,999791 | ✍ | -0,93 | 1,47 | -0,02 |
| 111,0 | -82,88 | 229,50 | 1546776,57 | 6367538,28 | -85,96 | 46083 | 70,45 | 0,999463 | ✍ | -0,96 | 1,49 | -0,02 |
| 114,0 | -82,81 | 231,89 | 1546776,28 | 6367538,05 | -88,94 | 45519 | 68,62 | 0,999672 | ✍✍ | -0,99 | 1,53 | -0,02 |
| 117,0 | -82,76 | 229,46 | 1546775,99 | 6367537,81 | -91,91 | 45802 | 72,26 | 0,990195 | ✍ | -1,02 | 1,57 | -0,02 |
| 120,0 | -82,80 | 227,25 | 1546775,71 | 6367537,56 | -94,89 | 47352 | 70,51 | 1,000002 | ✍ | -1,04 | 1,59 | -0,02 |
| 123,0 | -82,79 | 230,70 | 1546775,42 | 6367537,31 | -97,87 | 49052 | 70,67 | 0,999593 | ✍ | -1,07 | 1,62 | -0,02 |
| 126,0 | -82,80 | 229,55 | 1546775,14 | 6367537,07 | -100,84 | 48967 | 71,86 | 1,000075 | ✍ | -1,10 | 1,66 | -0,02 |
| 129,0 | -82,79 | 231,54 | 1546774,84 | 6367536,83 | -103,82 | 49859 | 70,30 | 0,999481 | ✍ | -1,12 | 1,70 | -0,02 |
| 132,0 | -82,80 | 230,50 | 1546774,55 | 6367536,59 | -106,79 | 48967 | 70,63 | 0,999407 | ✍ | -1,15 | 1,74 | -0,02 |
| 135,0 | -82,78 | 231,67 | 1546774,26 | 6367536,36 | -109,77 | 48776 | 71,20 | 0,999861 | ✍ | -1,18 | 1,79 | -0,02 |
| 138,0 | -82,79 | 232,54 | 1546773,96 | 6367536,13 | -112,75 | 48128 | 70,62 | 0,999664 | ✍ | -1,21 | 1,84 | -0,02 |
| 141,0 | -82,79 | 231,62 | 1546773,66 | 6367535,90 | -115,72 | 48135 | 71,12 | 0,999546 | ✍ | -1,23 | 1,89 | -0,02 |
| 144,0 | -82,79 | 229,49 | 1546773,37 | 6367535,66 | -118,70 | 47749 | 70,36 | 0,999547 | ✍ | -1,26 | 1,93 | -0,02 |
| 147,0 | -82,81 | 228,86 | 1546773,09 | 6367535,41 | -121,68 | 48618 | 70,13 | 0,999983 | ✍ | -1,29 | 1,96 | -0,02 |
| 150,0 | -82,78 | 228,51 | 1546772,81 | 6367535,16 | -124,65 | 48159 | 69,33 | 0,999757 | ✍✍ | -1,31 | 1,98 | -0,02 |
| 153,0 | -82,77 | 231,26 | 1546772,52 | 6367534,92 | -127,63 | 48967 | 71,83 | 0,999956 | ✍ | -1,34 | 2,02 | -0,02 |
| 156,0 | -82,76 | 232,46 | 1546772,22 | 6367534,69 | -130,60 | 48858 | 70,90 | 0,999539 | ✍ | -1,37 | 2,07 | -0,03 |
| 159,0 | -82,75 | 233,06 | 1546771,92 | 6367534,46 | -133,58 | 49352 | 70,96 | 0,999514 | ✍ | -1,39 | 2,12 | -0,03 |
| 162,0 | -82,75 | 232,41 | 1546771,62 | 6367534,23 | -136,56 | 48903 | 70,76 | 0,999879 | ✍ | -1,42 | 2,18 | -0,03 |
| 165,0 | -82,72 | 230,58 | 1546771,32 | 6367533,99 | -139,53 | 50002 | 70,06 | 0,999329 | ✍ | -1,44 | 2,22 | -0,03 |
| 168,0 | -82,74 | 232,68 | 1546771,02 | 6367533,76 | -142,51 | 49580 | 71,64 | 0,999786 | ✍ | -1,47 | 2,27 | -0,03 |
| 171,0 | -82,74 | 233,14 | 1546770,72 | 6367533,53 | -145,48 | 49687 | 71,44 | 0,999971 | ✍ | -1,49 | 2,32 | -0,03 |
| 174,0 | -82,68 | 232,70 | 1546770,42 | 6367533,30 | -148,46 | 49815 | 71,30 | 0,999592 | ✍ | -1,52 | 2,38 | -0,03 |
| 177,0 | -82,71 | 233,35 | 1546770,11 | 6367533,07 | -151,44 | 49552 | 71,27 | 0,999723 | ✍ | -1,54 | 2,44 | -0,03 |
| 180,0 | -83,16 | 231,79 | 1546769,82 | 6367532,84 | -154,41 | 48913 | 71,69 | 1,068082 | ✍✍ | -1,58 | 2,49 | -0,03 |
| 183,0 | -82,71 | 234,02 | 1546769,53 | 6367532,62 | -157,39 | 50804 | 71,72 | 0,999526 | ✍ | -1,62 | 2,54 | -0,03 |
| 186,0 | -82,72 | 232,41 | 1546769,22 | 6367532,39 | -160,37 | 48483 | 72,13 | 0,999875 | ✍ | -1,64 | 2,60 | -0,03 |
| 189,0 | -82,74 | 230,91 | 1546768,92 | 6367532,16 | -163,34 | 48641 | 72,18 | 1,000013 | ✍ | -1,67 | 2,65 | -0,03 |
| 192,0 | -82,73 | 236,16 | 1546768,62 | 6367531,93 | -166,32 | 49233 | 71,88 | 0,999618 | ✍ | -1,69 | 2,71 | -0,03 |
| 195,0 | -82,71 | 233,53 | 1546768,31 | 6367531,71 | -169,29 | 48092 | 71,23 | 1,000091 | ✍ | -1,72 | 2,78 | -0,03 |

Survey name : KLX13A

Survey date : 20/09/2006 01:27:31

Printed on 2006-11-14 13:10:58

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 198,0 | -82,70 | 232,46 | 1546768,00 | 6367531,48 | -172,27 | 48248 | 71,42 | 0,999734 | ✍ | -1,74 | 2,83 | -0,03 |
| 201,0 | -82,73 | 232,93 | 1546767,70 | 6367531,25 | -175,24 | 48279 | 70,90 | 0,999731 | ✍ | -1,77 | 2,89 | -0,03 |
| 204,0 | -82,77 | 234,55 | 1546767,40 | 6367531,03 | -178,22 | 48412 | 71,12 | 0,999764 | ✍ | -1,80 | 2,95 | -0,04 |
| 207,0 | -82,77 | 233,28 | 1546767,09 | 6367530,81 | -181,20 | 48476 | 71,45 | 0,998291 | ✍ | -1,83 | 3,01 | -0,04 |
| 210,0 | -82,77 | 234,89 | 1546766,79 | 6367530,59 | -184,17 | 48829 | 70,88 | 0,999946 | ✍ | -1,85 | 3,07 | -0,04 |
| 213,0 | -82,77 | 232,65 | 1546766,48 | 6367530,36 | -187,15 | 49186 | 71,06 | 0,999707 | ✍ | -1,88 | 3,13 | -0,04 |
| 216,0 | -82,81 | 233,09 | 1546766,18 | 6367530,14 | -190,13 | 48760 | 71,22 | 1,000124 | ✍ | -1,91 | 3,19 | -0,04 |
| 219,0 | -82,79 | 234,32 | 1546765,88 | 6367529,91 | -193,10 | 48957 | 71,31 | 0,999904 | ✍ | -1,94 | 3,25 | -0,04 |
| 222,0 | -82,84 | 234,17 | 1546765,57 | 6367529,69 | -196,08 | 48683 | 71,15 | 0,999977 | ✍ | -1,97 | 3,31 | -0,04 |
| 225,0 | -82,83 | 233,76 | 1546765,27 | 6367529,47 | -199,06 | 48692 | 71,10 | 0,999635 | ✍ | -2,01 | 3,37 | -0,04 |
| 228,0 | -82,83 | 233,88 | 1546764,97 | 6367529,25 | -202,03 | 48904 | 71,32 | 1,000258 | ✍ | -2,04 | 3,43 | -0,04 |
| 231,0 | -82,86 | 233,20 | 1546764,67 | 6367529,03 | -205,01 | 48819 | 71,36 | 1,000256 | ✍ | -2,07 | 3,49 | -0,04 |
| 234,0 | -82,89 | 232,56 | 1546764,37 | 6367528,81 | -207,99 | 49532 | 71,35 | 0,999878 | ✍ | -2,10 | 3,55 | -0,04 |
| 237,0 | -82,94 | 233,05 | 1546764,08 | 6367528,58 | -210,96 | 48690 | 71,50 | 0,999820 | ✍ | -2,14 | 3,60 | -0,04 |
| 240,0 | -82,94 | 232,11 | 1546763,78 | 6367528,36 | -213,94 | 48609 | 71,34 | 1,000131 | ✍ | -2,17 | 3,65 | -0,04 |
| 243,0 | -82,93 | 234,56 | 1546763,49 | 6367528,14 | -216,92 | 49013 | 71,44 | 1,000396 | ✍ | -2,21 | 3,71 | -0,04 |
| 246,0 | -82,93 | 232,57 | 1546763,19 | 6367527,92 | -219,89 | 48744 | 71,22 | 0,999659 | ✍ | -2,25 | 3,77 | -0,05 |
| 249,0 | -82,94 | 232,64 | 1546762,90 | 6367527,70 | -222,87 | 48923 | 71,52 | 1,000016 | ✍ | -2,28 | 3,82 | -0,05 |
| 252,0 | -82,95 | 232,87 | 1546762,60 | 6367527,47 | -225,85 | 49549 | 71,64 | 0,999807 | ✍ | -2,32 | 3,87 | -0,05 |
| 255,0 | -82,97 | 232,46 | 1546762,31 | 6367527,25 | -228,83 | 49907 | 71,48 | 0,999955 | ✍ | -2,36 | 3,92 | -0,05 |
| 258,0 | -83,03 | 231,33 | 1546762,02 | 6367527,02 | -231,80 | 50942 | 71,92 | 0,999453 | ✍ | -2,40 | 3,97 | -0,05 |
| 261,0 | -83,05 | 232,43 | 1546761,74 | 6367526,80 | -234,78 | 51388 | 71,50 | 0,999707 | ✍ | -2,44 | 4,02 | -0,05 |
| 264,0 | -82,93 | 235,19 | 1546761,44 | 6367526,58 | -237,76 | 48799 | 71,94 | 1,001027 | ✍ | -2,48 | 4,08 | -0,05 |
| 267,0 | -82,84 | 234,45 | 1546761,14 | 6367526,37 | -240,74 | 48518 | 72,10 | 1,001220 | ✍ | -2,51 | 4,14 | -0,05 |
| 270,0 | -82,86 | 234,96 | 1546760,83 | 6367526,15 | -243,71 | 48617 | 71,72 | 1,000802 | ✍ | -2,55 | 4,21 | -0,05 |
| 273,0 | -82,85 | 233,32 | 1546760,53 | 6367525,94 | -246,69 | 48480 | 71,95 | 1,001136 | ✍ | -2,58 | 4,27 | -0,05 |
| 276,0 | -82,87 | 234,72 | 1546760,23 | 6367525,72 | -249,67 | 48595 | 71,79 | 1,000773 | ✍ | -2,61 | 4,33 | -0,05 |
| 279,0 | -82,87 | 234,31 | 1546759,93 | 6367525,50 | -252,64 | 48811 | 71,97 | 1,000902 | ✍ | -2,65 | 4,40 | -0,05 |
| 282,0 | -82,89 | 233,46 | 1546759,63 | 6367525,28 | -255,62 | 48421 | 71,94 | 1,001225 | ✍ | -2,68 | 4,46 | -0,06 |
| 285,0 | -82,91 | 235,38 | 1546759,33 | 6367525,07 | -258,60 | 48103 | 70,91 | 1,000884 | ✍ | -2,72 | 4,52 | -0,06 |
| 288,0 | -82,87 | 234,60 | 1546759,02 | 6367524,85 | -261,57 | 48835 | 71,84 | 1,000906 | ✍ | -2,76 | 4,59 | -0,06 |
| 291,0 | -82,87 | 233,40 | 1546758,72 | 6367524,63 | -264,55 | 48619 | 71,95 | 1,000909 | ✍ | -2,79 | 4,65 | -0,06 |
| 294,0 | -82,89 | 232,80 | 1546758,42 | 6367524,41 | -267,53 | 48933 | 72,12 | 1,000553 | ✍ | -2,82 | 4,71 | -0,06 |

Survey name : KLX13A
Survey date : 20/09/2006 01:27:31
Printed on 2006-11-14 13:10:58

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 297,0 | -82,85 | 233,73 | 1546758,12 | 6367524,19 | -270,50 | 48997 | 72,65 | 1,001001 | ✍✍ | -2,86 | 4,76 | -0,06 |
| 300,0 | -82,90 | 232,86 | 1546757,83 | 6367523,96 | -273,48 | 48866 | 72,82 | 1,001091 | ✍✍ | -2,89 | 4,82 | -0,06 |
| 303,0 | -82,88 | 233,86 | 1546757,53 | 6367523,74 | -276,46 | 49033 | 72,23 | 1,001136 | ✍ | -2,92 | 4,88 | -0,06 |
| 306,0 | -82,91 | 233,66 | 1546757,23 | 6367523,52 | -279,43 | 48807 | 72,31 | 1,001010 | ✍ | -2,96 | 4,94 | -0,06 |
| 309,0 | -82,91 | 234,33 | 1546756,93 | 6367523,31 | -282,41 | 49264 | 71,56 | 1,000932 | ✍ | -3,00 | 5,00 | -0,06 |
| 312,0 | -82,90 | 234,57 | 1546756,63 | 6367523,09 | -285,39 | 49189 | 72,43 | 1,000829 | ✍ | -3,03 | 5,06 | -0,06 |
| 315,0 | -82,91 | 234,30 | 1546756,33 | 6367522,88 | -288,37 | 48776 | 72,03 | 1,000993 | ✍ | -3,07 | 5,13 | -0,06 |
| 318,0 | -82,88 | 233,66 | 1546756,03 | 6367522,66 | -291,34 | 48848 | 71,89 | 1,001071 | ✍ | -3,10 | 5,19 | -0,06 |
| 321,0 | -82,87 | 236,00 | 1546755,72 | 6367522,44 | -294,32 | 49059 | 71,84 | 1,000968 | ✍ | -3,14 | 5,25 | -0,07 |
| 324,0 | -82,87 | 235,85 | 1546755,41 | 6367522,23 | -297,30 | 49178 | 72,06 | 1,000839 | ✍ | -3,18 | 5,33 | -0,07 |
| 327,0 | -82,87 | 234,34 | 1546755,11 | 6367522,02 | -300,27 | 48633 | 71,72 | 1,001030 | ✍ | -3,21 | 5,40 | -0,07 |
| 330,0 | -82,89 | 235,66 | 1546754,80 | 6367521,81 | -303,25 | 48576 | 71,85 | 1,000932 | ✍ | -3,25 | 5,46 | -0,07 |
| 333,0 | -82,88 | 233,34 | 1546754,50 | 6367521,59 | -306,23 | 48846 | 72,07 | 1,000939 | ✍ | -3,28 | 5,53 | -0,07 |
| 336,0 | -82,90 | 234,98 | 1546754,20 | 6367521,37 | -309,20 | 48529 | 71,80 | 1,001026 | ✍ | -3,32 | 5,59 | -0,07 |
| 339,0 | -82,92 | 234,71 | 1546753,90 | 6367521,16 | -312,18 | 48576 | 72,09 | 1,000975 | ✍ | -3,35 | 5,66 | -0,07 |
| 342,0 | -82,90 | 235,11 | 1546753,59 | 6367520,95 | -315,16 | 48631 | 72,09 | 1,000662 | ✍ | -3,39 | 5,72 | -0,07 |
| 345,0 | -82,89 | 235,87 | 1546753,29 | 6367520,74 | -318,14 | 47729 | 72,40 | 1,001055 | ✍ | -3,43 | 5,80 | -0,07 |
| 348,0 | -82,88 | 233,06 | 1546752,99 | 6367520,52 | -321,11 | 47997 | 70,02 | 1,000951 | ✍ | -3,46 | 5,86 | -0,07 |
| 351,0 | -82,87 | 232,40 | 1546752,69 | 6367520,30 | -324,09 | 47873 | 73,04 | 1,000531 | ✍✍ | -3,50 | 5,91 | -0,08 |
| 354,0 | -82,86 | 233,23 | 1546752,39 | 6367520,07 | -327,07 | 47850 | 73,10 | 1,000929 | ✍✍ | -3,53 | 5,97 | -0,08 |
| 357,0 | -82,88 | 233,50 | 1546752,09 | 6367519,85 | -330,04 | 48986 | 72,64 | 1,000829 | ✍✍ | -3,56 | 6,02 | -0,08 |
| 360,0 | -82,88 | 234,99 | 1546751,79 | 6367519,63 | -333,02 | 47980 | 72,53 | 1,001001 | ✍✍ | -3,60 | 6,09 | -0,08 |
| 363,0 | -82,87 | 234,20 | 1546751,49 | 6367519,42 | -336,00 | 48383 | 72,56 | 1,000833 | ✍✍ | -3,63 | 6,15 | -0,08 |
| 366,0 | -82,86 | 235,00 | 1546751,19 | 6367519,20 | -338,97 | 47017 | 73,98 | 1,000867 | ✍✍✍ | -3,67 | 6,22 | -0,08 |
| 369,0 | -82,86 | 235,00 | 1546750,88 | 6367518,99 | -341,95 | 48585 | 73,23 | 1,000799 | ✍✍✍ | -3,70 | 6,29 | -0,08 |
| 372,0 | -82,86 | 234,96 | 1546750,57 | 6367518,77 | -344,93 | 48211 | 72,42 | 1,000749 | ✍ | -3,73 | 6,35 | -0,08 |
| 375,0 | -82,84 | 238,50 | 1546750,26 | 6367518,57 | -347,90 | 48566 | 72,07 | 1,001038 | ✍ | -3,77 | 6,43 | -0,08 |
| 378,0 | -82,88 | 235,00 | 1546749,95 | 6367518,36 | -350,88 | 49174 | 72,57 | 1,000937 | ✍✍ | -3,81 | 6,51 | -0,08 |
| 381,0 | -82,80 | 235,00 | 1546749,64 | 6367518,15 | -353,86 | 46555 | 71,89 | 1,000996 | ✍✍ | -3,84 | 6,58 | -0,08 |
| 384,0 | -82,79 | 235,62 | 1546749,33 | 6367517,93 | -356,83 | 48023 | 72,17 | 1,000894 | ✍ | -3,87 | 6,65 | -0,09 |
| 387,0 | -82,79 | 234,15 | 1546749,03 | 6367517,72 | -359,81 | 48009 | 73,04 | 1,001194 | ✍✍ | -3,90 | 6,72 | -0,09 |
| 390,0 | -82,81 | 234,91 | 1546748,72 | 6367517,50 | -362,79 | 47899 | 72,96 | 1,001043 | ✍✍ | -3,94 | 6,78 | -0,09 |
| 393,0 | -82,75 | 234,88 | 1546748,41 | 6367517,28 | -365,76 | 48306 | 72,74 | 1,000864 | ✍✍ | -3,97 | 6,85 | -0,09 |

Survey name : KLX13A

Survey date : 20/09/2006 01:27:31

Printed on 2006-11-14 13:10:58

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 396,0 | -82,76 | 233,62 | 1546748,11 | 6367517,06 | -368,74 | 47997 | 73,94 | 1,000836 | ✍✍ | -3,99 | 6,92 | -0,09 |
| 399,0 | -82,77 | 234,86 | 1546747,80 | 6367516,84 | -371,71 | 47588 | 74,03 | 1,000998 | ✍✍ | -4,02 | 6,98 | -0,09 |
| 402,0 | -82,75 | 233,20 | 1546747,49 | 6367516,62 | -374,69 | 48177 | 73,79 | 1,000503 | ✍✍ | -4,05 | 7,04 | -0,09 |
| 405,0 | -82,75 | 236,82 | 1546747,18 | 6367516,40 | -377,67 | 47618 | 72,76 | 1,001036 | ✍✍ | -4,08 | 7,11 | -0,09 |
| 408,0 | -82,75 | 238,20 | 1546746,86 | 6367516,20 | -380,64 | 47540 | 72,42 | 1,000866 | ✍ | -4,11 | 7,20 | -0,09 |
| 411,0 | -82,78 | 237,73 | 1546746,54 | 6367516,00 | -383,62 | 48913 | 71,38 | 1,000981 | ✍ | -4,15 | 7,28 | -0,09 |
| 414,0 | -82,78 | 235,62 | 1546746,23 | 6367515,79 | -386,59 | 48070 | 71,99 | 1,000804 | ✍ | -4,18 | 7,36 | -0,10 |
| 417,0 | -82,77 | 235,84 | 1546745,92 | 6367515,58 | -389,57 | 48592 | 71,87 | 1,000941 | ✍ | -4,21 | 7,44 | -0,10 |
| 420,0 | -82,78 | 236,89 | 1546745,60 | 6367515,37 | -392,55 | 48147 | 72,89 | 1,000976 | ✍✍ | -4,24 | 7,52 | -0,10 |
| 423,0 | -82,78 | 236,12 | 1546745,29 | 6367515,16 | -395,52 | 47543 | 74,11 | 1,000974 | ✍✍ | -4,27 | 7,59 | -0,10 |
| 426,0 | -82,78 | 234,60 | 1546744,98 | 6367514,95 | -398,50 | 48263 | 72,12 | 1,001101 | ✍ | -4,31 | 7,66 | -0,10 |
| 429,0 | -82,78 | 235,27 | 1546744,67 | 6367514,73 | -401,48 | 47816 | 72,72 | 1,001093 | ✍✍ | -4,34 | 7,73 | -0,10 |
| 432,0 | -82,78 | 234,99 | 1546744,36 | 6367514,52 | -404,45 | 48105 | 72,97 | 1,001222 | ✍✍ | -4,37 | 7,80 | -0,10 |
| 435,0 | -82,80 | 233,53 | 1546744,05 | 6367514,30 | -407,43 | 49569 | 72,19 | 1,000926 | ✍ | -4,40 | 7,87 | -0,10 |
| 438,0 | -82,80 | 234,22 | 1546743,75 | 6367514,07 | -410,40 | 48689 | 72,54 | 1,001121 | ✍✍ | -4,43 | 7,93 | -0,10 |
| 441,0 | -82,83 | 235,33 | 1546743,44 | 6367513,86 | -413,38 | 48703 | 72,44 | 1,000746 | ✍ | -4,46 | 7,99 | -0,10 |
| 444,0 | -82,80 | 234,62 | 1546743,14 | 6367513,64 | -416,36 | 48535 | 73,30 | 1,001243 | ✍✍ | -4,49 | 8,06 | -0,11 |
| 447,0 | -82,80 | 235,10 | 1546742,83 | 6367513,43 | -419,33 | 48248 | 73,78 | 1,001056 | ✍✍ | -4,52 | 8,13 | -0,11 |
| 450,0 | -82,81 | 233,79 | 1546742,52 | 6367513,21 | -422,31 | 48276 | 72,90 | 1,001044 | ✍✍ | -4,55 | 8,20 | -0,11 |
| 453,0 | -82,79 | 234,31 | 1546742,22 | 6367512,99 | -425,29 | 48598 | 72,93 | 1,001150 | ✍✍ | -4,58 | 8,26 | -0,11 |
| 456,0 | -82,79 | 234,24 | 1546741,91 | 6367512,77 | -428,26 | 48279 | 72,74 | 1,001138 | ✍✍ | -4,61 | 8,32 | -0,11 |
| 459,0 | -82,79 | 234,04 | 1546741,61 | 6367512,55 | -431,24 | 48908 | 72,67 | 1,001131 | ✍✍ | -4,64 | 8,38 | -0,11 |
| 462,0 | -82,81 | 233,74 | 1546741,30 | 6367512,32 | -434,21 | 48367 | 72,91 | 1,001160 | ✍✍ | -4,68 | 8,45 | -0,11 |
| 465,0 | -82,85 | 234,32 | 1546741,00 | 6367512,10 | -437,19 | 48345 | 73,26 | 1,001312 | ✍✍ | -4,71 | 8,51 | -0,11 |
| 468,0 | -82,86 | 234,14 | 1546740,70 | 6367511,89 | -440,17 | 48618 | 72,84 | 1,001170 | ✍✍ | -4,74 | 8,57 | -0,11 |
| 471,0 | -82,87 | 232,49 | 1546740,40 | 6367511,66 | -443,14 | 49113 | 72,05 | 1,000788 | ✍ | -4,77 | 8,63 | -0,11 |
| 474,0 | -82,88 | 232,07 | 1546740,11 | 6367511,44 | -446,12 | 49189 | 72,27 | 1,001260 | ✍ | -4,81 | 8,68 | -0,11 |
| 477,0 | -82,88 | 231,10 | 1546739,81 | 6367511,21 | -449,10 | 49302 | 71,69 | 1,001062 | ✍ | -4,84 | 8,72 | -0,11 |
| 480,0 | -82,91 | 231,69 | 1546739,52 | 6367510,97 | -452,08 | 49157 | 72,30 | 1,001121 | ✍ | -4,87 | 8,77 | -0,11 |
| 483,0 | -82,88 | 232,41 | 1546739,23 | 6367510,75 | -455,05 | 49552 | 71,85 | 1,001064 | ✍ | -4,91 | 8,82 | -0,12 |
| 486,0 | -82,90 | 231,05 | 1546738,94 | 6367510,52 | -458,03 | 49125 | 72,04 | 1,001214 | ✍ | -4,94 | 8,86 | -0,12 |
| 489,0 | -82,90 | 231,61 | 1546738,65 | 6367510,28 | -461,01 | 49204 | 72,05 | 1,001142 | ✍ | -4,97 | 8,91 | -0,12 |
| 492,0 | -82,89 | 230,80 | 1546738,36 | 6367510,05 | -463,98 | 49456 | 71,88 | 1,000974 | ✍ | -5,00 | 8,95 | -0,12 |

Survey name : KLX13A
Survey date : 20/09/2006 01:27:31
Printed on 2006-11-14 13:10:58

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 495,0 | -82,93 | 231,22 | 1546738,07 | 6367509,82 | -466,96 | 49522 | 71,88 | 1,001202 | ✍ | -5,04 | 8,99 | -0,12 |
| 498,0 | -82,97 | 231,31 | 1546737,79 | 6367509,59 | -469,94 | 49750 | 71,56 | 1,001243 | ✍ | -5,07 | 9,04 | -0,12 |
| 501,0 | -82,95 | 231,04 | 1546737,50 | 6367509,36 | -472,92 | 49618 | 71,67 | 1,001171 | ✍ | -5,11 | 9,08 | -0,12 |
| 504,0 | -82,97 | 230,52 | 1546737,22 | 6367509,13 | -475,89 | 50319 | 70,43 | 1,000927 | ✍ | -5,14 | 9,12 | -0,12 |
| 507,0 | -82,96 | 231,01 | 1546736,93 | 6367508,89 | -478,87 | 50588 | 70,17 | 1,000958 | ✍ | -5,18 | 9,16 | -0,12 |
| 510,0 | -82,95 | 230,67 | 1546736,65 | 6367508,66 | -481,85 | 50525 | 70,24 | 1,001092 | ✍ | -5,22 | 9,20 | -0,12 |
| 513,0 | -82,99 | 229,14 | 1546736,36 | 6367508,42 | -484,82 | 50451 | 70,31 | 0,999975 | ✍ | -5,25 | 9,24 | -0,12 |
| 516,0 | -83,00 | 229,13 | 1546736,09 | 6367508,18 | -487,80 | 50438 | 70,30 | 1,000439 | ✍ | -5,29 | 9,27 | -0,12 |
| 519,0 | -83,04 | 229,13 | 1546735,81 | 6367507,95 | -490,78 | 50437 | 70,16 | 1,000168 | ✍ | -5,33 | 9,29 | -0,12 |
| 522,0 | -83,03 | 229,33 | 1546735,54 | 6367507,71 | -493,76 | 50367 | 70,31 | 1,000128 | ✍ | -5,37 | 9,32 | -0,12 |
| 525,0 | -83,02 | 228,70 | 1546735,26 | 6367507,47 | -496,74 | 50257 | 70,36 | 1,000330 | ✍ | -5,40 | 9,35 | -0,12 |
| 528,0 | -83,02 | 228,83 | 1546734,99 | 6367507,23 | -499,71 | 50475 | 70,34 | 1,000086 | ✍ | -5,44 | 9,38 | -0,12 |
| 531,0 | -83,13 | 228,40 | 1546734,72 | 6367506,99 | -502,69 | 50469 | 70,24 | 1,000163 | ✍ | -5,48 | 9,41 | -0,12 |
| 534,0 | -83,08 | 228,95 | 1546734,45 | 6367506,75 | -505,67 | 50511 | 70,31 | 1,007411 | ✍ | -5,52 | 9,43 | -0,12 |
| 537,0 | -83,00 | 228,78 | 1546734,17 | 6367506,51 | -508,65 | 50574 | 70,31 | 1,000428 | ✍ | -5,56 | 9,46 | -0,12 |
| 540,0 | -82,92 | 228,75 | 1546733,90 | 6367506,27 | -511,63 | 49920 | 70,53 | 1,000245 | ✍ | -5,60 | 9,49 | -0,12 |
| 543,0 | -82,93 | 229,92 | 1546733,61 | 6367506,03 | -514,60 | 50019 | 70,43 | 1,000401 | ✍ | -5,63 | 9,52 | -0,12 |
| 546,0 | -82,93 | 229,03 | 1546733,33 | 6367505,79 | -517,58 | 49913 | 71,06 | 1,000462 | ✍ | -5,67 | 9,55 | -0,12 |
| 549,0 | -82,94 | 228,67 | 1546733,06 | 6367505,55 | -520,56 | 49840 | 70,70 | 1,000506 | ✍ | -5,70 | 9,58 | -0,12 |
| 552,0 | -82,94 | 229,22 | 1546732,78 | 6367505,30 | -523,53 | 50359 | 70,76 | 1,000264 | ✍ | -5,73 | 9,61 | -0,13 |
| 555,0 | -82,95 | 229,36 | 1546732,50 | 6367505,06 | -526,51 | 50447 | 70,70 | 1,000616 | ✍ | -5,77 | 9,64 | -0,13 |
| 558,0 | -82,98 | 229,48 | 1546732,22 | 6367504,83 | -529,49 | 50254 | 70,82 | 1,000849 | ✍ | -5,80 | 9,67 | -0,13 |
| 561,0 | -82,98 | 229,35 | 1546731,94 | 6367504,59 | -532,47 | 50288 | 70,74 | 1,000123 | ✍ | -5,84 | 9,70 | -0,13 |
| 564,0 | -82,97 | 229,12 | 1546731,66 | 6367504,35 | -535,44 | 50172 | 70,79 | 1,000445 | ✍ | -5,87 | 9,73 | -0,13 |
| 567,0 | -82,99 | 229,74 | 1546731,38 | 6367504,11 | -538,42 | 50077 | 70,88 | 1,000205 | ✍ | -5,91 | 9,76 | -0,13 |
| 570,0 | -83,02 | 229,59 | 1546731,11 | 6367503,87 | -541,40 | 50103 | 70,56 | 1,000457 | ✍ | -5,95 | 9,80 | -0,13 |
| 573,0 | -83,02 | 228,91 | 1546730,83 | 6367503,63 | -544,38 | 50246 | 70,69 | 1,000578 | ✍ | -5,98 | 9,83 | -0,13 |
| 576,0 | -82,97 | 229,47 | 1546730,55 | 6367503,40 | -547,35 | 50378 | 70,72 | 1,000564 | ✍ | -6,02 | 9,86 | -0,13 |
| 579,0 | -82,98 | 229,50 | 1546730,27 | 6367503,16 | -550,33 | 50075 | 70,77 | 1,000415 | ✍ | -6,06 | 9,89 | -0,13 |
| 582,0 | -83,02 | 230,05 | 1546730,00 | 6367502,92 | -553,31 | 50326 | 70,69 | 1,000087 | ✍ | -6,09 | 9,92 | -0,13 |
| 585,0 | -83,08 | 230,07 | 1546729,72 | 6367502,69 | -556,29 | 50161 | 70,81 | 1,000516 | ✍ | -6,13 | 9,96 | -0,13 |
| 588,0 | -83,16 | 229,14 | 1546729,44 | 6367502,45 | -559,27 | 50240 | 70,69 | 1,000705 | ✍ | -6,18 | 9,99 | -0,13 |
| 591,0 | -83,21 | 230,19 | 1546729,17 | 6367502,22 | -562,24 | 50095 | 70,82 | 1,000185 | ✍ | -6,22 | 10,02 | -0,13 |

Survey name : KLX13A
Survey date : 20/09/2006 01:27:31
Printed on 2006-11-14 13:10:58

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 594,0 | -83,26 | 229,82 | 1546728,90 | 6367502,00 | -565,22 | 50045 | 71,02 | 1,000637 | ✍ | -6,27 | 10,05 | -0,13 |

# Deviation logging in KLX14A, 0 to 177 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX14A** |
| Survey date: | 20/09/2006 03:52:15 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Nisse Håkansson |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 49900 | 1000 | nano Tesla |
| Magnetic dip: | 69.8 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 177,0 | 177,0 |
| East: | 1547146,87 | 1547257,01 | 110,14 |
| North: | 6365959,69 | 6365912,73 | -46,96 |
| Elevation: | 16,35 | -113,88 | -130,23 |
| Dip: | -50,18 | -44,37 | 5,81 |
| Azimuth: | 109,93 | 114,40 | 4,47 |

| OFFSETS at end |
|---|
| Offsets relative to: ACTUAL START |
| 8,44 metres upwards |
| 6,60 metres right |
| 0,42 metres shortfall |

Printed on: 2006-11-14 13:11:44

Survey name : KLX14A

Survey date : 20/09/2006 03:52:15

Printed on 2006-11-14 13:11:56

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,0 | -50,18 | 109,93 | 1547146,87 | 6365959,69 | 16,35 | 49302 | 70,88 | 0,999384 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -50,02 | 109,00 | 1547148,68 | 6365959,05 | 14,05 | 49938 | 70,94 | 0,999763 | ✍ | 0,00 | -0,02 | 0,00 |
| 6,0 | -49,97 | 109,61 | 1547150,50 | 6365958,41 | 11,75 | 49750 | 70,18 | 0,999911 | ✍ | 0,01 | -0,04 | 0,00 |
| 9,0 | -49,82 | 111,01 | 1547152,32 | 6365957,74 | 9,46 | 50034 | 70,47 | 0,999288 | ✍ | 0,03 | -0,02 | 0,00 |
| 12,0 | -49,75 | 110,50 | 1547154,13 | 6365957,05 | 7,17 | 49520 | 70,20 | 0,999858 | ✍ | 0,05 | 0,00 | 0,00 |
| 15,0 | -49,64 | 110,84 | 1547155,94 | 6365956,37 | 4,88 | 50392 | 71,36 | 0,999744 | ✍ | 0,08 | 0,03 | 0,00 |
| 18,0 | -49,62 | 110,26 | 1547157,76 | 6365955,69 | 2,59 | 49669 | 70,31 | 0,999398 | ✍ | 0,10 | 0,05 | 0,00 |
| 21,0 | -49,59 | 111,40 | 1547159,58 | 6365955,00 | 0,31 | 49842 | 70,45 | 0,999808 | ✍ | 0,13 | 0,08 | 0,00 |
| 24,0 | -49,53 | 111,26 | 1547161,39 | 6365954,29 | -1,98 | 49725 | 70,42 | 0,999440 | ✍ | 0,17 | 0,13 | 0,00 |
| 27,0 | -49,46 | 111,83 | 1547163,21 | 6365953,57 | -4,26 | 50460 | 71,10 | 0,999744 | ✍ | 0,20 | 0,18 | 0,00 |
| 30,0 | -49,37 | 111,41 | 1547165,02 | 6365952,85 | -6,54 | 49787 | 70,40 | 0,999903 | ✍ | 0,24 | 0,24 | 0,00 |
| 33,0 | -49,27 | 111,80 | 1547166,84 | 6365952,13 | -8,81 | 49709 | 70,34 | 0,999241 | ✍ | 0,29 | 0,30 | 0,00 |
| 36,0 | -49,15 | 111,98 | 1547168,66 | 6365951,40 | -11,08 | 50424 | 70,73 | 0,999561 | ✍ | 0,34 | 0,36 | -0,01 |
| 39,0 | -49,04 | 112,31 | 1547170,48 | 6365950,66 | -13,35 | 49936 | 71,23 | 0,999478 | ✍ | 0,39 | 0,44 | -0,01 |
| 42,0 | -48,90 | 111,73 | 1547172,30 | 6365949,92 | -15,61 | 50292 | 71,45 | 0,999733 | ✍ | 0,45 | 0,51 | -0,01 |
| 45,0 | -48,79 | 111,67 | 1547174,14 | 6365949,19 | -17,87 | 49840 | 70,78 | 0,999549 | ✍ | 0,52 | 0,57 | -0,01 |
| 48,0 | -48,73 | 112,18 | 1547175,97 | 6365948,46 | -20,13 | 49821 | 70,75 | 0,999560 | ✍ | 0,60 | 0,64 | -0,01 |
| 51,0 | -48,61 | 112,83 | 1547177,80 | 6365947,70 | -22,38 | 50434 | 71,28 | 0,999324 | ✍ | 0,67 | 0,73 | -0,01 |
| 54,0 | -48,54 | 112,59 | 1547179,63 | 6365946,93 | -24,63 | 49921 | 70,99 | 0,999576 | ✍ | 0,76 | 0,83 | -0,02 |
| 57,0 | -48,41 | 112,33 | 1547181,47 | 6365946,17 | -26,88 | 49907 | 70,79 | 0,999822 | ✍ | 0,84 | 0,92 | -0,02 |
| 60,0 | -48,33 | 112,84 | 1547183,31 | 6365945,41 | -29,12 | 49800 | 71,11 | 0,999822 | ✍ | 0,94 | 1,01 | -0,02 |
| 63,0 | -48,19 | 112,34 | 1547185,15 | 6365944,64 | -31,36 | 49819 | 70,60 | 0,999651 | ✍ | 1,04 | 1,10 | -0,02 |
| 66,0 | -48,09 | 112,73 | 1547187,00 | 6365943,87 | -33,59 | 49758 | 70,64 | 0,999579 | ✍ | 1,14 | 1,19 | -0,03 |
| 69,0 | -48,02 | 113,31 | 1547188,85 | 6365943,09 | -35,82 | 49994 | 71,03 | 0,999436 | ✍ | 1,25 | 1,30 | -0,03 |
| 72,0 | -47,88 | 112,37 | 1547190,70 | 6365942,31 | -38,05 | 50042 | 70,92 | 0,999525 | ✍ | 1,37 | 1,40 | -0,04 |
| 75,0 | -47,81 | 113,24 | 1547192,56 | 6365941,53 | -40,27 | 49901 | 70,99 | 0,999860 | ✍ | 1,49 | 1,50 | -0,04 |
| 78,0 | -47,70 | 113,67 | 1547194,41 | 6365940,72 | -42,50 | 49994 | 71,07 | 0,999829 | ✍ | 1,61 | 1,63 | -0,05 |
| 81,0 | -47,65 | 113,93 | 1547196,25 | 6365939,91 | -44,71 | 49858 | 70,95 | 0,999712 | ✍ | 1,74 | 1,76 | -0,05 |
| 84,0 | -47,55 | 113,68 | 1547198,11 | 6365939,09 | -46,93 | 49890 | 71,00 | 0,999592 | ✍ | 1,87 | 1,90 | -0,06 |
| 87,0 | -47,45 | 113,52 | 1547199,96 | 6365938,28 | -49,14 | 49816 | 71,06 | 0,999573 | ✍ | 2,01 | 2,03 | -0,06 |
| 90,0 | -47,37 | 113,66 | 1547201,82 | 6365937,47 | -51,35 | 49864 | 71,04 | 0,999457 | ✍ | 2,15 | 2,16 | -0,07 |
| 93,0 | -47,27 | 113,52 | 1547203,69 | 6365936,65 | -53,55 | 49950 | 71,01 | 0,999645 | ✍ | 2,30 | 2,29 | -0,08 |
| 96,0 | -47,12 | 113,71 | 1547205,55 | 6365935,84 | -55,76 | 49745 | 70,84 | 0,999191 | ✍ | 2,45 | 2,42 | -0,08 |

Survey name : KLX14A
Survey date : 20/09/2006 03:52:15

Printed on 2006-11-14 13:11:56

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99,0 | -46,99 | 113,85 | 1547207,42 | 6365935,01 | -57,95 | 49830 | 71,10 | 0,999883 | ✍ | 2,61 | 2,56 | -0,09 |
| 102,0 | -46,89 | 113,96 | 1547209,30 | 6365934,18 | -60,14 | 49761 | 71,14 | 0,999652 | ✍ | 2,77 | 2,70 | -0,10 |
| 105,0 | -46,87 | 114,15 | 1547211,17 | 6365933,35 | -62,33 | 49699 | 71,13 | 0,999261 | ✍ | 2,94 | 2,85 | -0,11 |
| 108,0 | -46,73 | 114,18 | 1547213,04 | 6365932,51 | -64,52 | 49678 | 71,13 | 0,999818 | ✍ | 3,12 | 3,00 | -0,12 |
| 111,0 | -46,63 | 114,14 | 1547214,92 | 6365931,66 | -66,70 | 49677 | 71,14 | 0,999370 | ✍ | 3,30 | 3,15 | -0,12 |
| 114,0 | -46,48 | 114,10 | 1547216,80 | 6365930,82 | -68,88 | 49677 | 71,17 | 0,999924 | ✍ | 3,48 | 3,30 | -0,13 |
| 117,0 | -46,40 | 114,13 | 1547218,69 | 6365929,98 | -71,05 | 49658 | 71,16 | 0,999846 | ✍ | 3,67 | 3,45 | -0,14 |
| 120,0 | -46,39 | 114,04 | 1547220,58 | 6365929,13 | -73,23 | 49632 | 71,17 | 0,999486 | ✍ | 3,87 | 3,60 | -0,15 |
| 123,0 | -46,36 | 114,20 | 1547222,47 | 6365928,29 | -75,40 | 49608 | 71,19 | 0,999940 | ✍ | 4,06 | 3,75 | -0,16 |
| 126,0 | -46,32 | 114,21 | 1547224,36 | 6365927,44 | -77,57 | 49574 | 71,20 | 0,999754 | ✍ | 4,26 | 3,91 | -0,17 |
| 129,0 | -46,23 | 114,02 | 1547226,25 | 6365926,59 | -79,74 | 49552 | 71,12 | 0,999678 | ✍ | 4,46 | 4,06 | -0,18 |
| 132,0 | -46,13 | 113,93 | 1547228,15 | 6365925,75 | -81,90 | 49468 | 70,69 | 0,999459 | ✍ | 4,66 | 4,21 | -0,20 |
| 135,0 | -46,07 | 114,55 | 1547230,05 | 6365924,89 | -84,06 | 49591 | 71,07 | 0,999640 | ✍ | 4,87 | 4,36 | -0,21 |
| 138,0 | -45,97 | 113,15 | 1547231,95 | 6365924,05 | -86,22 | 49296 | 70,37 | 0,999619 | ✍ | 5,09 | 4,50 | -0,22 |
| 141,0 | -45,83 | 114,16 | 1547233,86 | 6365923,21 | -88,38 | 49509 | 70,75 | 0,999902 | ✍ | 5,31 | 4,64 | -0,23 |
| 144,0 | -45,70 | 114,01 | 1547235,77 | 6365922,36 | -90,53 | 49535 | 70,71 | 0,999628 | ✍ | 5,53 | 4,79 | -0,24 |
| 147,0 | -45,57 | 114,21 | 1547237,69 | 6365921,50 | -92,67 | 49640 | 70,76 | 0,999521 | ✍ | 5,77 | 4,94 | -0,25 |
| 150,0 | -45,45 | 114,24 | 1547239,61 | 6365920,64 | -94,81 | 49648 | 70,71 | 0,999551 | ✍ | 6,01 | 5,10 | -0,27 |
| 153,0 | -45,34 | 114,11 | 1547241,53 | 6365919,78 | -96,95 | 49615 | 70,61 | 0,999948 | ✍ | 6,25 | 5,26 | -0,28 |
| 156,0 | -45,24 | 114,13 | 1547243,45 | 6365918,91 | -99,08 | 49870 | 70,75 | 0,999850 | ✍ | 6,51 | 5,41 | -0,30 |
| 159,0 | -45,12 | 114,34 | 1547245,38 | 6365918,05 | -101,21 | 49627 | 70,72 | 0,999842 | ✍ | 6,76 | 5,57 | -0,31 |
| 162,0 | -44,96 | 114,43 | 1547247,31 | 6365917,17 | -103,33 | 50472 | 70,94 | 0,999771 | ✍ | 7,03 | 5,73 | -0,33 |
| 165,0 | -44,87 | 114,85 | 1547249,24 | 6365916,28 | -105,45 | 49860 | 71,13 | 0,999949 | ✍ | 7,30 | 5,91 | -0,35 |
| 168,0 | -44,76 | 114,48 | 1547251,18 | 6365915,40 | -107,56 | 49964 | 70,91 | 1,000165 | ✍ | 7,57 | 6,09 | -0,36 |
| 171,0 | -44,63 | 114,82 | 1547253,12 | 6365914,51 | -109,67 | 49499 | 70,83 | 1,000230 | ✍ | 7,85 | 6,26 | -0,38 |
| 174,0 | -44,48 | 114,42 | 1547255,06 | 6365913,62 | -111,78 | 49439 | 70,99 | 1,000181 | ✍ | 8,14 | 6,44 | -0,40 |
| 177,0 | -44,37 | 114,40 | 1547257,01 | 6365912,73 | -113,88 | 49733 | 71,27 | 1,000141 | ✍ | 8,44 | 6,60 | -0,42 |

# Deviation logging in KLX22A, 0 to 99 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX22B** |
| Survey date: | 05/07/2006 15:39:15 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-058 |
| Client reference: | Peter Hultgren |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 49900 | 1000 | nano Tesla |
| Magnetic dip: | 70.5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 99,0 | 99,0 |
| East: | 1546685,41 | 1546673,98 | -11,43 |
| North: | 6366553,13 | 6366600,98 | 47,85 |
| Elevation: | 21,58 | -64,29 | -85,87 |
| Dip: | -61,61 | -58,61 | 3,00 |
| Azimuth: | 344,00 | 351,36 | 7,36 |

| OFFSETS at end |
|---|
| Offsets relative to: ACTUAL START |
| 2,41 metres upwards |
| 2,21 metres right |
| 0,09 metres shortfall |

Printed on: 2006-11-14 13:13:14

Survey name : KLX22B
Survey date : 05/07/2006 15:39:15

Printed on 2006-11-14 13:14:49

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 0,0 | -61,61 | 344,00 | 1546685,41 | 6366553,13 | 21,58 | 49766 | 70,66 | 0,999389 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -61,37 | 343,00 | 1546685,00 | 6366554,50 | 18,94 | 49795 | 70,88 | 0,999603 | ✍ | 0,01 | -0,01 | 0,00 |
| 6,0 | -61,30 | 342,32 | 1546684,57 | 6366555,87 | 16,31 | 49700 | 70,88 | 1,001687 | ✍ | 0,02 | -0,05 | 0,00 |
| 9,0 | -61,24 | 342,75 | 1546684,14 | 6366557,25 | 13,68 | 50117 | 71,38 | 1,001729 | ✍ | 0,04 | -0,08 | 0,00 |
| 12,0 | -61,22 | 342,17 | 1546683,70 | 6366558,63 | 11,05 | 49900 | 71,16 | 1,001743 | ✍ | 0,06 | -0,12 | 0,00 |
| 15,0 | -61,21 | 343,33 | 1546683,27 | 6366560,01 | 8,42 | 50069 | 70,79 | 1,001556 | ✍ | 0,08 | -0,15 | 0,00 |
| 18,0 | -61,15 | 344,07 | 1546682,87 | 6366561,39 | 5,79 | 50150 | 70,69 | 1,002023 | ✍ | 0,10 | -0,16 | 0,00 |
| 21,0 | -61,07 | 344,31 | 1546682,47 | 6366562,79 | 3,16 | 50041 | 70,69 | 1,001675 | ✍ | 0,13 | -0,16 | 0,00 |
| 24,0 | -61,01 | 344,73 | 1546682,08 | 6366564,19 | 0,54 | 50009 | 70,66 | 1,001349 | ✍ | 0,16 | -0,14 | 0,00 |
| 27,0 | -60,87 | 345,09 | 1546681,71 | 6366565,60 | -2,09 | 50046 | 70,56 | 1,001579 | ✍ | 0,19 | -0,12 | 0,00 |
| 30,0 | -60,81 | 344,82 | 1546681,33 | 6366567,01 | -4,71 | 50018 | 70,79 | 1,001463 | ✍ | 0,23 | -0,10 | 0,00 |
| 33,0 | -60,75 | 344,94 | 1546680,94 | 6366568,42 | -7,32 | 50213 | 71,17 | 1,001258 | ✍ | 0,28 | -0,07 | 0,00 |
| 36,0 | -60,67 | 345,01 | 1546680,56 | 6366569,84 | -9,94 | 49521 | 71,06 | 1,001370 | ✍ | 0,32 | -0,05 | 0,00 |
| 39,0 | -60,58 | 345,49 | 1546680,19 | 6366571,26 | -12,55 | 49525 | 70,90 | 1,001224 | ✍ | 0,37 | -0,02 | 0,00 |
| 42,0 | -60,42 | 345,15 | 1546679,81 | 6366572,69 | -15,16 | 49589 | 70,97 | 1,001084 | ✍ | 0,43 | 0,02 | 0,00 |
| 45,0 | -60,29 | 345,16 | 1546679,43 | 6366574,13 | -17,77 | 49202 | 70,88 | 1,001128 | ✍ | 0,50 | 0,05 | -0,01 |
| 48,0 | -60,25 | 345,68 | 1546679,06 | 6366575,56 | -20,38 | 49020 | 70,75 | 1,001134 | ✍ | 0,57 | 0,08 | -0,01 |
| 51,0 | -60,14 | 346,30 | 1546678,70 | 6366577,01 | -22,98 | 49435 | 70,94 | 1,001115 | ✍ | 0,64 | 0,14 | -0,01 |
| 54,0 | -60,08 | 345,68 | 1546678,34 | 6366578,46 | -25,58 | 48967 | 71,21 | 1,000878 | ✍ | 0,72 | 0,19 | -0,01 |
| 57,0 | -59,97 | 347,24 | 1546677,99 | 6366579,92 | -28,18 | 49592 | 70,95 | 1,001241 | ✍ | 0,80 | 0,25 | -0,01 |
| 60,0 | -59,94 | 347,30 | 1546677,65 | 6366581,38 | -30,78 | 49926 | 70,95 | 1,001153 | ✍ | 0,88 | 0,34 | -0,01 |
| 63,0 | -59,84 | 348,01 | 1546677,33 | 6366582,85 | -33,37 | 50237 | 70,83 | 1,001477 | ✍ | 0,97 | 0,43 | -0,02 |
| 66,0 | -59,75 | 348,29 | 1546677,02 | 6366584,33 | -35,97 | 49393 | 70,83 | 1,001070 | ✍ | 1,06 | 0,54 | -0,02 |
| 69,0 | -59,64 | 348,09 | 1546676,71 | 6366585,81 | -38,56 | 48941 | 71,09 | 1,001058 | ✍ | 1,16 | 0,65 | -0,02 |
| 72,0 | -59,50 | 348,54 | 1546676,41 | 6366587,30 | -41,14 | 48889 | 70,95 | 1,001375 | ✍ | 1,26 | 0,77 | -0,03 |
| 75,0 | -59,39 | 349,05 | 1546676,11 | 6366588,80 | -43,73 | 49146 | 70,96 | 1,000647 | ✍ | 1,37 | 0,90 | -0,03 |
| 78,0 | -59,27 | 349,14 | 1546675,82 | 6366590,30 | -46,31 | 49256 | 70,91 | 1,001370 | ✍ | 1,49 | 1,03 | -0,04 |
| 81,0 | -59,18 | 349,40 | 1546675,53 | 6366591,81 | -48,88 | 49183 | 70,88 | 1,001047 | ✍ | 1,60 | 1,17 | -0,04 |
| 84,0 | -59,04 | 349,43 | 1546675,25 | 6366593,32 | -51,46 | 49143 | 70,89 | 1,001415 | ✍ | 1,73 | 1,32 | -0,05 |
| 87,0 | -58,97 | 349,98 | 1546674,97 | 6366594,84 | -54,03 | 49355 | 71,07 | 1,001382 | ✍ | 1,86 | 1,47 | -0,06 |
| 90,0 | -58,86 | 351,84 | 1546674,73 | 6366596,37 | -56,60 | 49802 | 70,31 | 1,001360 | ✍ | 1,99 | 1,66 | -0,06 |
| 93,0 | -58,78 | 350,02 | 1546674,49 | 6366597,91 | -59,17 | 49251 | 70,95 | 1,001036 | ✍ | 2,13 | 1,85 | -0,07 |
| 96,0 | -58,66 | 350,79 | 1546674,23 | 6366599,44 | -61,73 | 49273 | 71,05 | 1,000918 | ✍ | 2,27 | 2,02 | -0,08 |

Survey name : KLX22B
Survey date : 05/07/2006 15:39:15
Printed on 2006-11-14 13:14:50

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 99,0 | -58,61 | 351,36 | 1546673,98 | 6366600,98 | -64,29 | 49678 | 70,93 | 1,001115 | ✍ | 2,41 | 2,21 | -0,09 |

# Deviation logging in KLX22B, 0 to 99 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX22B** |
| Survey date: | 05/07/2006 15:39:15 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-058 |
| Client reference: | Peter Hultgren |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 49900 | 1000 | nano Tesla |
| Magnetic dip: | 70.5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 99,0 | 99,0 |
| East: | 1546685,41 | 1546673,98 | -11,43 |
| North: | 6366553,13 | 6366600,98 | 47,85 |
| Elevation: | 21,58 | -64,29 | -85,87 |
| Dip: | -61,61 | -58,61 | 3,00 |
| Azimuth: | 344,00 | 351,36 | 7,36 |

OFFSETS at end

Offsets relative to:
ACTUAL START

2,41 metres upwards
2,21 metres right
0,09 metres shortfall

Printed on: 2006-11-14 13:13:14

Survey name : KLX22B
Survey date : 05/07/2006 15:39:15

Printed on 2006-11-14 13:14:49

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 0,0 | -61,61 | 344,00 | 1546685,41 | 6366553,13 | 21,58 | 49766 | 70,66 | 0,999389 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -61,37 | 343,00 | 1546685,00 | 6366554,50 | 18,94 | 49795 | 70,88 | 0,999603 | ✍ | 0,01 | -0,01 | 0,00 |
| 6,0 | -61,30 | 342,32 | 1546684,57 | 6366555,87 | 16,31 | 49700 | 70,88 | 1,001687 | ✍ | 0,02 | -0,05 | 0,00 |
| 9,0 | -61,24 | 342,75 | 1546684,14 | 6366557,25 | 13,68 | 50117 | 71,38 | 1,001729 | ✍ | 0,04 | -0,08 | 0,00 |
| 12,0 | -61,22 | 342,17 | 1546683,70 | 6366558,63 | 11,05 | 49900 | 71,16 | 1,001743 | ✍ | 0,06 | -0,12 | 0,00 |
| 15,0 | -61,21 | 343,33 | 1546683,27 | 6366560,01 | 8,42 | 50069 | 70,79 | 1,001556 | ✍ | 0,08 | -0,15 | 0,00 |
| 18,0 | -61,15 | 344,07 | 1546682,87 | 6366561,39 | 5,79 | 50150 | 70,69 | 1,002023 | ✍ | 0,10 | -0,16 | 0,00 |
| 21,0 | -61,07 | 344,31 | 1546682,47 | 6366562,79 | 3,16 | 50041 | 70,69 | 1,001675 | ✍ | 0,13 | -0,16 | 0,00 |
| 24,0 | -61,01 | 344,73 | 1546682,08 | 6366564,19 | 0,54 | 50009 | 70,66 | 1,001349 | ✍ | 0,16 | -0,14 | 0,00 |
| 27,0 | -60,87 | 345,09 | 1546681,71 | 6366565,60 | -2,09 | 50046 | 70,56 | 1,001579 | ✍ | 0,19 | -0,12 | 0,00 |
| 30,0 | -60,81 | 344,82 | 1546681,33 | 6366567,01 | -4,71 | 50018 | 70,79 | 1,001463 | ✍ | 0,23 | -0,10 | 0,00 |
| 33,0 | -60,75 | 344,94 | 1546680,94 | 6366568,42 | -7,32 | 50213 | 71,17 | 1,001258 | ✍ | 0,28 | -0,07 | 0,00 |
| 36,0 | -60,67 | 345,01 | 1546680,56 | 6366569,84 | -9,94 | 49521 | 71,06 | 1,001370 | ✍ | 0,32 | -0,05 | 0,00 |
| 39,0 | -60,58 | 345,49 | 1546680,19 | 6366571,26 | -12,55 | 49525 | 70,90 | 1,001224 | ✍ | 0,37 | -0,02 | 0,00 |
| 42,0 | -60,42 | 345,15 | 1546679,81 | 6366572,69 | -15,16 | 49589 | 70,97 | 1,001084 | ✍ | 0,43 | 0,02 | 0,00 |
| 45,0 | -60,29 | 345,16 | 1546679,43 | 6366574,13 | -17,77 | 49202 | 70,88 | 1,001128 | ✍ | 0,50 | 0,05 | -0,01 |
| 48,0 | -60,25 | 345,68 | 1546679,06 | 6366575,56 | -20,38 | 49020 | 70,75 | 1,001134 | ✍ | 0,57 | 0,08 | -0,01 |
| 51,0 | -60,14 | 346,30 | 1546678,70 | 6366577,01 | -22,98 | 49435 | 70,94 | 1,001115 | ✍ | 0,64 | 0,14 | -0,01 |
| 54,0 | -60,08 | 345,68 | 1546678,34 | 6366578,46 | -25,58 | 48967 | 71,21 | 1,000878 | ✍ | 0,72 | 0,19 | -0,01 |
| 57,0 | -59,97 | 347,24 | 1546677,99 | 6366579,92 | -28,18 | 49592 | 70,95 | 1,001241 | ✍ | 0,80 | 0,25 | -0,01 |
| 60,0 | -59,94 | 347,30 | 1546677,65 | 6366581,38 | -30,78 | 49926 | 70,95 | 1,001153 | ✍ | 0,88 | 0,34 | -0,01 |
| 63,0 | -59,84 | 348,01 | 1546677,33 | 6366582,85 | -33,37 | 50237 | 70,83 | 1,001477 | ✍ | 0,97 | 0,43 | -0,02 |
| 66,0 | -59,75 | 348,29 | 1546677,02 | 6366584,33 | -35,97 | 49393 | 70,83 | 1,001070 | ✍ | 1,06 | 0,54 | -0,02 |
| 69,0 | -59,64 | 348,09 | 1546676,71 | 6366585,81 | -38,56 | 48941 | 71,09 | 1,001058 | ✍ | 1,16 | 0,65 | -0,02 |
| 72,0 | -59,50 | 348,54 | 1546676,41 | 6366587,30 | -41,14 | 48889 | 70,95 | 1,001375 | ✍ | 1,26 | 0,77 | -0,03 |
| 75,0 | -59,39 | 349,05 | 1546676,11 | 6366588,80 | -43,73 | 49146 | 70,96 | 1,000647 | ✍ | 1,37 | 0,90 | -0,03 |
| 78,0 | -59,27 | 349,14 | 1546675,82 | 6366590,30 | -46,31 | 49256 | 70,91 | 1,001370 | ✍ | 1,49 | 1,03 | -0,04 |
| 81,0 | -59,18 | 349,40 | 1546675,53 | 6366591,81 | -48,88 | 49183 | 70,88 | 1,001047 | ✍ | 1,60 | 1,17 | -0,04 |
| 84,0 | -59,04 | 349,43 | 1546675,25 | 6366593,32 | -51,46 | 49143 | 70,89 | 1,001415 | ✍ | 1,73 | 1,32 | -0,05 |
| 87,0 | -58,97 | 349,98 | 1546674,97 | 6366594,84 | -54,03 | 49355 | 71,07 | 1,001382 | ✍ | 1,86 | 1,47 | -0,06 |
| 90,0 | -58,86 | 351,84 | 1546674,73 | 6366596,37 | -56,60 | 49802 | 70,31 | 1,001360 | ✍ | 1,99 | 1,66 | -0,06 |
| 93,0 | -58,78 | 350,02 | 1546674,49 | 6366597,91 | -59,17 | 49251 | 70,95 | 1,001036 | ✍ | 2,13 | 1,85 | -0,07 |
| 96,0 | -58,66 | 350,79 | 1546674,23 | 6366599,44 | -61,73 | 49273 | 71,05 | 1,000918 | ✍ | 2,27 | 2,02 | -0,08 |

Survey name : KLX22B
Survey date : 05/07/2006 15:39:15
Printed on 2006-11-14 13:14:50

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 99,0 | -58,61 | 351,36 | 1546673,98 | 6366600,98 | -64,29 | 49678 | 70,93 | 1,001115 | ✍ | 2,41 | 2,21 | -0,09 |

# Deviation logging in KLX23A, 0 to 99 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX23A** |
| Survey date: | 05/07/2006 18:58:58 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-058 |
| Client reference: | Peter Hultgren |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 50500 | 1000 | nano Tesla |
| Magnetic dip: | 70.5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 99,0 | 99,0 |
| East: | 1546715,74 | 1546741,53 | 25,79 |
| North: | 6366106,89 | 6366149,05 | 42,16 |
| Elevation: | 22,26 | -63,50 | -85,76 |
| Dip: | -61,46 | -58,44 | 3,02 |
| Azimuth: | 28,70 | 33,68 | 4,98 |

| OFFSETS at end |
|---|
| Offsets relative to: ACTUAL START |
| 2,39 metres upwards |
| 2,37 metres right |
| 0,08 metres shortfall |

Printed on: 2006-11-14 13:14:58

Survey name : KLX23A
Survey date : 05/07/2006 18:58:58

Printed on 2006-11-14 13:15:20

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 0,0 | -61,46 | 28,70 | 1546715,74 | 6366106,89 | 22,26 | 50057 | 70,59 | 1,000415 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -61,36 | 28,76 | 1546716,43 | 6366108,15 | 19,63 | 49991 | 70,99 | 1,000157 | ✍ | 0,00 | 0,00 | 0,00 |
| 6,0 | -61,24 | 29,10 | 1546717,13 | 6366109,41 | 17,00 | 49903 | 71,18 | 0,999819 | ✍ | 0,01 | 0,01 | 0,00 |
| 9,0 | -61,17 | 29,50 | 1546717,84 | 6366110,67 | 14,37 | 50066 | 70,81 | 0,999795 | ✍ | 0,02 | 0,02 | 0,00 |
| 12,0 | -61,12 | 29,19 | 1546718,55 | 6366111,93 | 11,74 | 49976 | 71,11 | 1,000270 | ✍ | 0,04 | 0,04 | 0,00 |
| 15,0 | -61,02 | 29,24 | 1546719,26 | 6366113,20 | 9,12 | 49957 | 70,83 | 1,000024 | ✍ | 0,06 | 0,05 | 0,00 |
| 18,0 | -60,88 | 28,86 | 1546719,96 | 6366114,47 | 6,49 | 50316 | 70,59 | 0,996318 | ✍ | 0,09 | 0,06 | 0,00 |
| 21,0 | -60,90 | 29,92 | 1546720,68 | 6366115,75 | 3,87 | 49927 | 71,03 | 0,999733 | ✍ | 0,12 | 0,08 | 0,00 |
| 24,0 | -60,84 | 29,99 | 1546721,41 | 6366117,01 | 1,25 | 49958 | 71,00 | 0,999908 | ✍ | 0,15 | 0,11 | 0,00 |
| 27,0 | -60,74 | 30,05 | 1546722,14 | 6366118,28 | -1,37 | 49864 | 71,03 | 0,999990 | ✍ | 0,18 | 0,14 | 0,00 |
| 30,0 | -60,67 | 30,44 | 1546722,88 | 6366119,55 | -3,98 | 49936 | 71,15 | 1,000029 | ✍ | 0,22 | 0,18 | 0,00 |
| 33,0 | -61,12 | 31,16 | 1546723,63 | 6366120,80 | -6,61 | 49990 | 71,40 | 1,017023 | ✍ | 0,25 | 0,24 | 0,00 |
| 36,0 | -60,46 | 30,49 | 1546724,38 | 6366122,06 | -9,22 | 49859 | 70,86 | 0,999500 | ✍ | 0,28 | 0,29 | 0,00 |
| 39,0 | -60,42 | 30,64 | 1546725,13 | 6366123,33 | -11,83 | 49947 | 70,87 | 0,999145 | ✍ | 0,34 | 0,34 | 0,00 |
| 42,0 | -60,37 | 30,93 | 1546725,89 | 6366124,60 | -14,44 | 49856 | 71,04 | 0,999212 | ✍ | 0,39 | 0,39 | -0,01 |
| 45,0 | -60,25 | 30,95 | 1546726,65 | 6366125,88 | -17,05 | 49923 | 70,96 | 0,999025 | ✍ | 0,45 | 0,45 | -0,01 |
| 48,0 | -60,17 | 31,51 | 1546727,42 | 6366127,15 | -19,65 | 49740 | 71,09 | 0,998637 | ✍ | 0,51 | 0,52 | -0,01 |
| 51,0 | -60,07 | 32,08 | 1546728,21 | 6366128,42 | -22,25 | 49607 | 71,10 | 0,998733 | ✍ | 0,58 | 0,60 | -0,01 |
| 54,0 | -59,94 | 32,10 | 1546729,01 | 6366129,69 | -24,85 | 49706 | 71,01 | 0,998610 | ✍ | 0,66 | 0,69 | -0,01 |
| 57,0 | -60,23 | 32,33 | 1546729,81 | 6366130,96 | -27,45 | 49739 | 71,28 | 1,012375 | ✍ | 0,73 | 0,78 | -0,01 |
| 60,0 | -59,71 | 32,60 | 1546730,61 | 6366132,23 | -30,05 | 50054 | 70,92 | 0,998581 | ✍ | 0,80 | 0,88 | -0,02 |
| 63,0 | -59,61 | 32,47 | 1546731,43 | 6366133,50 | -32,64 | 49794 | 70,89 | 0,998749 | ✍ | 0,89 | 0,98 | -0,02 |
| 66,0 | -59,49 | 31,67 | 1546732,23 | 6366134,79 | -35,22 | 49903 | 71,07 | 0,998867 | ✍ | 0,99 | 1,07 | -0,02 |
| 69,0 | -59,36 | 32,40 | 1546733,04 | 6366136,09 | -37,81 | 49603 | 71,03 | 0,998635 | ✍ | 1,09 | 1,16 | -0,03 |
| 72,0 | -59,30 | 32,52 | 1546733,87 | 6366137,38 | -40,39 | 49608 | 71,03 | 0,998576 | ✍ | 1,20 | 1,26 | -0,03 |
| 75,0 | -59,19 | 33,43 | 1546734,70 | 6366138,66 | -42,97 | 49622 | 70,96 | 0,998627 | ✍ | 1,31 | 1,37 | -0,03 |
| 78,0 | -59,07 | 32,70 | 1546735,54 | 6366139,95 | -45,54 | 49578 | 70,94 | 0,998564 | ✍ | 1,43 | 1,49 | -0,04 |
| 81,0 | -58,99 | 32,96 | 1546736,38 | 6366141,25 | -48,11 | 49637 | 70,81 | 0,998360 | ✍ | 1,56 | 1,60 | -0,04 |
| 84,0 | -58,92 | 32,92 | 1546737,22 | 6366142,55 | -50,68 | 49763 | 71,15 | 0,998431 | ✍ | 1,68 | 1,71 | -0,05 |
| 87,0 | -58,83 | 33,47 | 1546738,07 | 6366143,85 | -53,25 | 49621 | 70,93 | 0,998051 | ✍ | 1,81 | 1,83 | -0,05 |
| 90,0 | -58,72 | 33,52 | 1546738,93 | 6366145,14 | -55,82 | 49581 | 70,95 | 0,998448 | ✍ | 1,95 | 1,96 | -0,06 |
| 93,0 | -58,66 | 33,53 | 1546739,79 | 6366146,44 | -58,38 | 49429 | 70,89 | 0,998639 | ✍ | 2,09 | 2,10 | -0,06 |
| 96,0 | -58,51 | 33,89 | 1546740,65 | 6366147,75 | -60,94 | 49527 | 70,83 | 0,998385 | ✍ | 2,24 | 2,23 | -0,07 |

Survey name : KLX23A
Survey date : 05/07/2006 18:58:58
Printed on 2006-11-14 13:15:20

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 99,0 | -58,44 | 33,68 | 1546741,53 | 6366149,05 | -63,50 | 49821 | 70,87 | 0,998230 | ✍ | 2,39 | 2,37 | -0,08 |

# Deviation logging in KLX23B, 0 to 48 m

## New MeasureIT files


| | |
|---|---|
| **Survey name:** | **KLX23B** |
| Survey date: | 05/07/2006 18:58:58 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-058 |
| Client reference: | Peter Hultgren |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 50500 | 1000 | nano Tesla |
| Magnetic dip: | 70,5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 48,0 | 48,0 |
| East: | 1546717,33 | 1546737,62 | 20,29 |
| North: | 6366101,90 | 6366089,33 | -12,57 |
| Elevation: | 22,32 | -19,33 | -41,65 |
| Dip: | -60,90 | -59,46 | 1,44 |
| Azimuth: | 121,40 | 122,02 | 0,62 |

| OFFSETS at end |
|---|
| Offsets relative to: ACTUAL START |
| 0,60 metres upwards |
| 0,16 metres right |
| 0,01 metres shortfall |

Printed on: 2006-11-14 13:15:45

Survey name : KLX23B

Survey date : 05/07/2006 18:58:58

Printed on 2006-11-14 13:15:54

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,0 | -60,90 | 121,40 | 1546717,33 | 6366101,90 | 22,32 | 50208 | 71,08 | 0,998070 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -60,85 | 121,60 | 1546718,58 | 6366101,14 | 19,70 | 50002 | 71,01 | 1,000860 | ✍ | 0,00 | 0,00 | 0,00 |
| 6,0 | -60,72 | 121,79 | 1546719,82 | 6366100,37 | 17,08 | 49943 | 71,09 | 1,000550 | ✍ | 0,01 | 0,01 | 0,00 |
| 9,0 | -60,62 | 121,60 | 1546721,07 | 6366099,60 | 14,46 | 49984 | 70,95 | 1,000954 | ✍ | 0,02 | 0,02 | 0,00 |
| 12,0 | -60,55 | 121,69 | 1546722,33 | 6366098,82 | 11,85 | 50171 | 71,34 | 1,000418 | ✍ | 0,04 | 0,02 | 0,00 |
| 15,0 | -60,51 | 122,09 | 1546723,58 | 6366098,04 | 9,24 | 49938 | 71,01 | 1,000847 | ✍ | 0,06 | 0,04 | 0,00 |
| 18,0 | -60,40 | 121,91 | 1546724,84 | 6366097,26 | 6,63 | 49884 | 70,94 | 1,001090 | ✍ | 0,08 | 0,05 | 0,00 |
| 21,0 | -60,33 | 121,96 | 1546726,09 | 6366096,47 | 4,02 | 49816 | 71,03 | 1,000667 | ✍ | 0,11 | 0,07 | 0,00 |
| 24,0 | -60,20 | 122,05 | 1546727,36 | 6366095,69 | 1,41 | 49882 | 70,95 | 1,000482 | ✍ | 0,14 | 0,08 | 0,00 |
| 27,0 | -60,09 | 121,72 | 1546728,62 | 6366094,90 | -1,19 | 49805 | 70,90 | 1,000526 | ✍ | 0,18 | 0,09 | 0,00 |
| 30,0 | -59,99 | 122,24 | 1546729,89 | 6366094,10 | -3,79 | 49830 | 70,91 | 1,000637 | ✍ | 0,23 | 0,11 | 0,00 |
| 33,0 | -59,94 | 121,85 | 1546731,17 | 6366093,31 | -6,38 | 49761 | 70,96 | 1,000487 | ✍ | 0,28 | 0,13 | 0,00 |
| 36,0 | -59,82 | 122,17 | 1546732,44 | 6366092,51 | -8,98 | 49873 | 70,86 | 1,000383 | ✍ | 0,33 | 0,14 | 0,00 |
| 39,0 | -59,77 | 122,38 | 1546733,72 | 6366091,70 | -11,57 | 49893 | 70,94 | 1,000100 | ✍ | 0,39 | 0,17 | 0,00 |
| 42,0 | -59,66 | 120,79 | 1546735,01 | 6366090,91 | -14,16 | 50572 | 71,43 | 1,000168 | ✍ | 0,45 | 0,17 | 0,00 |
| 45,0 | -59,29 | 120,89 | 1546736,32 | 6366090,13 | -16,75 | 49828 | 71,07 | 0,993771 | ✍ | 0,52 | 0,16 | 0,00 |
| 48,0 | -59,46 | 122,02 | 1546737,62 | 6366089,33 | -19,33 | 49926 | 70,80 | 1,000332 | ✍ | 0,60 | 0,16 | -0,01 |

# Deviation logging in KLX24A, 0 to 99 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX24A** |
| Survey date: | 11/08/2006 18:26:28 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Nisse Håkansson |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | | | |
|---|---|---|---|
| | Mid value | ± limit | |
| Field strength: | 50500 | 1000 | nano Tesla |
| Magnetic dip: | 70,5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 99,0 | 99,0 |
| East: | 1546853,80 | 1546905,51 | 51,71 |
| North: | 6366423,35 | 6366415,43 | -7,92 |
| Elevation: | 21,29 | -62,74 | -84,03 |
| Dip: | -59,43 | -56,53 | 2,90 |
| Azimuth: | 98,40 | 99,68 | 1,28 |

| OFFSETS at end |
|---|
| Offsets relative to: ACTUAL START |
| 2,30 metres upwards |
| 0,28 metres right |
| 0,04 metres shortfall |

Printed on: 2006-11-14 13:16:04

Survey name : KLX24A
Survey date : 11/08/2006 18:26:28

Printed on 2006-11-14 13:16:13

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 0,0 | -59,43 | 98,40 | 1546853,80 | 6366423,35 | 21,29 | 49962 | 70,78 | 1,001220 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -59,34 | 97,51 | 1546855,31 | 6366423,14 | 18,71 | 50010 | 70,70 | 0,999706 | ✍ | 0,00 | -0,01 | 0,00 |
| 6,0 | -59,24 | 97,56 | 1546856,83 | 6366422,94 | 16,13 | 50125 | 70,66 | 0,999736 | ✍ | 0,01 | -0,04 | 0,00 |
| 9,0 | -59,17 | 97,48 | 1546858,36 | 6366422,74 | 13,55 | 50186 | 70,85 | 0,999791 | ✍ | 0,02 | -0,06 | 0,00 |
| 12,0 | -59,17 | 98,19 | 1546859,88 | 6366422,53 | 10,98 | 50066 | 70,80 | 0,999511 | ✍ | 0,03 | -0,07 | 0,00 |
| 15,0 | -59,03 | 97,79 | 1546861,40 | 6366422,31 | 8,40 | 49800 | 70,69 | 0,999652 | ✍ | 0,05 | -0,08 | 0,00 |
| 18,0 | -59,03 | 99,05 | 1546862,93 | 6366422,09 | 5,83 | 49644 | 70,50 | 0,999731 | ✍ | 0,07 | -0,08 | 0,00 |
| 21,0 | -58,87 | 99,06 | 1546864,46 | 6366421,84 | 3,26 | 49925 | 70,74 | 0,999542 | ✍ | 0,10 | -0,07 | 0,00 |
| 24,0 | -58,90 | 99,00 | 1546865,99 | 6366421,60 | 0,69 | 48889 | 70,73 | 0,999642 | ✍✍ | 0,13 | -0,05 | 0,00 |
| 27,0 | -58,78 | 98,75 | 1546867,52 | 6366421,36 | -1,88 | 49826 | 70,78 | 0,999419 | ✍ | 0,16 | -0,04 | 0,00 |
| 30,0 | -58,66 | 98,78 | 1546869,06 | 6366421,12 | -4,44 | 49504 | 70,74 | 0,998941 | ✍ | 0,19 | -0,03 | 0,00 |
| 33,0 | -58,60 | 97,45 | 1546870,61 | 6366420,90 | -7,00 | 50658 | 70,89 | 0,998972 | ✍ | 0,23 | -0,03 | 0,00 |
| 36,0 | -58,49 | 97,67 | 1546872,16 | 6366420,70 | -9,56 | 50446 | 70,92 | 0,999367 | ✍ | 0,28 | -0,06 | 0,00 |
| 39,0 | -58,43 | 98,64 | 1546873,71 | 6366420,47 | -12,12 | 50057 | 70,69 | 0,998858 | ✍ | 0,33 | -0,06 | 0,00 |
| 42,0 | -58,32 | 98,56 | 1546875,27 | 6366420,24 | -14,67 | 49896 | 70,78 | 0,999066 | ✍ | 0,39 | -0,06 | 0,00 |
| 45,0 | -58,27 | 97,18 | 1546876,83 | 6366420,02 | -17,22 | 50168 | 71,08 | 0,998836 | ✍ | 0,45 | -0,07 | 0,00 |
| 48,0 | -58,16 | 97,21 | 1546878,40 | 6366419,82 | -19,77 | 50200 | 70,99 | 0,998753 | ✍ | 0,51 | -0,11 | 0,00 |
| 51,0 | -58,19 | 98,47 | 1546879,97 | 6366419,61 | -22,32 | 49700 | 70,84 | 0,998874 | ✍ | 0,58 | -0,12 | -0,01 |
| 54,0 | -57,98 | 98,38 | 1546881,54 | 6366419,38 | -24,87 | 49554 | 70,65 | 0,998565 | ✍ | 0,65 | -0,12 | -0,01 |
| 57,0 | -57,98 | 99,04 | 1546883,11 | 6366419,14 | -27,41 | 50103 | 70,56 | 0,998278 | ✍ | 0,72 | -0,11 | -0,01 |
| 60,0 | -57,81 | 99,91 | 1546884,68 | 6366418,87 | -29,95 | 50233 | 70,67 | 0,998490 | ✍ | 0,80 | -0,08 | -0,01 |
| 63,0 | -57,70 | 99,20 | 1546886,26 | 6366418,61 | -32,49 | 49581 | 70,71 | 0,998385 | ✍ | 0,89 | -0,05 | -0,01 |
| 66,0 | -57,61 | 99,82 | 1546887,84 | 6366418,34 | -35,03 | 49534 | 70,80 | 0,998500 | ✍ | 0,98 | -0,02 | -0,01 |
| 69,0 | -57,54 | 99,50 | 1546889,43 | 6366418,07 | -37,56 | 49759 | 70,48 | 0,998696 | ✍ | 1,08 | 0,02 | -0,01 |
| 72,0 | -57,46 | 99,68 | 1546891,02 | 6366417,80 | -40,09 | 49786 | 70,57 | 0,998294 | ✍ | 1,18 | 0,05 | -0,01 |
| 75,0 | -57,42 | 99,58 | 1546892,61 | 6366417,53 | -42,62 | 49516 | 70,45 | 0,998367 | ✍ | 1,28 | 0,08 | -0,02 |
| 78,0 | -57,30 | 99,28 | 1546894,21 | 6366417,27 | -45,14 | 50217 | 70,78 | 0,998876 | ✍ | 1,39 | 0,11 | -0,02 |
| 81,0 | -57,18 | 98,90 | 1546895,81 | 6366417,01 | -47,67 | 49704 | 70,75 | 0,998457 | ✍ | 1,51 | 0,13 | -0,02 |
| 84,0 | -57,10 | 99,46 | 1546897,42 | 6366416,75 | -50,19 | 49901 | 70,86 | 0,998543 | ✍ | 1,63 | 0,15 | -0,02 |
| 87,0 | -56,95 | 99,21 | 1546899,03 | 6366416,49 | -52,70 | 49679 | 70,82 | 0,998432 | ✍ | 1,75 | 0,18 | -0,03 |
| 90,0 | -56,93 | 99,49 | 1546900,64 | 6366416,22 | -55,22 | 49658 | 70,71 | 0,997820 | ✍ | 1,88 | 0,21 | -0,03 |
| 93,0 | -56,79 | 98,34 | 1546902,26 | 6366415,97 | -57,73 | 50032 | 70,62 | 0,998266 | ✍ | 2,02 | 0,22 | -0,03 |
| 96,0 | -56,72 | 99,89 | 1546903,89 | 6366415,71 | -60,24 | 49906 | 70,69 | 0,998194 | ✍ | 2,16 | 0,24 | -0,04 |

Survey name : KLX24A
Survey date : 11/08/2006 18:26:28
Printed on 2006-11-14 13:16:13

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 99,0 | -56,53 | 99,68 | 1546905,51 | 6366415,43 | -62,74 | 49668 | 70,77 | 0,998058 | ✍ | 2,30 | 0,28 | -0,04 |

# Deviation logging in KLX25A, 0 to 48 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX25A** |
| Survey date: | 12/08/2006 13:19:29 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Nisse Håkansson |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | | | |
|---|---|---|---|
| | Mid value | ± limit | |
| Field strength: | 50500 | 1000 | nano Tesla |
| Magnetic dip: | 70,5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 48,0 | 48,0 |
| East: | 1546769,66 | 1546783,28 | 13,62 |
| North: | 6366274,74 | 6366254,11 | -20,63 |
| Elevation: | 22,84 | -18,31 | -41,15 |
| Dip: | -59,75 | -58,19 | 1,56 |
| Azimuth: | 145,70 | 146,07 | 0,37 |

| OFFSETS at end |
|---|
| Offsets relative to: ACTUAL START |
| 0,62 metres upwards |
| 0,38 metres right |
| 0,01 metres shortfall |

Printed on: 2006-11-14 13:16:23

Survey name : KLX25A
Survey date : 12/08/2006 13:19:29
Printed on 2006-11-14 13:16:33

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,0 | -59,75 | 145,70 | 1546769,66 | 6366274,74 | 22,84 | 50308 | 70,86 | 1,002064 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -59,76 | 146,12 | 1546770,51 | 6366273,49 | 20,25 | 50077 | 70,85 | 1,001981 | ✍ | 0,00 | 0,01 | 0,00 |
| 6,0 | -59,62 | 145,90 | 1546771,35 | 6366272,23 | 17,66 | 50272 | 70,71 | 1,001925 | ✍ | 0,00 | 0,01 | 0,00 |
| 9,0 | -59,59 | 146,70 | 1546772,20 | 6366270,97 | 15,07 | 50431 | 71,01 | 1,001533 | ✍ | 0,01 | 0,03 | 0,00 |
| 12,0 | -59,46 | 146,50 | 1546773,03 | 6366269,70 | 12,48 | 50246 | 70,88 | 1,001932 | ✍ | 0,02 | 0,05 | 0,00 |
| 15,0 | -59,39 | 146,14 | 1546773,88 | 6366268,43 | 9,90 | 50717 | 71,22 | 1,002014 | ✍ | 0,04 | 0,07 | 0,00 |
| 18,0 | -59,26 | 146,61 | 1546774,73 | 6366267,16 | 7,32 | 49943 | 71,10 | 1,001828 | ✍ | 0,06 | 0,09 | 0,00 |
| 21,0 | -59,14 | 146,53 | 1546775,57 | 6366265,87 | 4,74 | 50261 | 71,15 | 1,001813 | ✍ | 0,09 | 0,11 | 0,00 |
| 24,0 | -58,99 | 146,49 | 1546776,42 | 6366264,59 | 2,17 | 50053 | 70,94 | 1,002060 | ✍ | 0,13 | 0,13 | 0,00 |
| 27,0 | -58,90 | 146,68 | 1546777,28 | 6366263,30 | -0,40 | 49880 | 71,11 | 1,001880 | ✍ | 0,17 | 0,16 | 0,00 |
| 30,0 | -58,78 | 146,56 | 1546778,13 | 6366262,00 | -2,97 | 49813 | 71,32 | 1,001622 | ✍ | 0,22 | 0,18 | 0,00 |
| 33,0 | -58,65 | 146,80 | 1546778,99 | 6366260,70 | -5,53 | 49815 | 71,29 | 1,001605 | ✍ | 0,27 | 0,21 | 0,00 |
| 36,0 | -58,54 | 146,73 | 1546779,84 | 6366259,39 | -8,09 | 49918 | 71,35 | 1,001406 | ✍ | 0,33 | 0,24 | 0,00 |
| 39,0 | -58,44 | 147,31 | 1546780,70 | 6366258,08 | -10,65 | 49746 | 70,92 | 1,001536 | ✍ | 0,40 | 0,27 | 0,00 |
| 42,0 | -58,37 | 147,15 | 1546781,55 | 6366256,75 | -13,20 | 49864 | 71,11 | 1,001065 | ✍ | 0,47 | 0,32 | -0,01 |
| 45,0 | -58,26 | 146,99 | 1546782,40 | 6366255,43 | -15,76 | 49965 | 70,90 | 1,001532 | ✍ | 0,54 | 0,35 | -0,01 |
| 48,0 | -58,19 | 146,07 | 1546783,28 | 6366254,11 | -18,31 | 49860 | 71,08 | 1,001335 | ✍ | 0,62 | 0,38 | -0,01 |

# Deviation logging in KLX26A, 0 to 102 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX26A** |
| Survey date: | 20/09/2006 03:52:15 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Leif Stenberg |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 50500 | 1000 | nano Tesla |
| Magnetic dip: | 70,5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 102,0 | 102,0 |
| East: | 1549029,90 | 1549080,88 | 50,98 |
| North: | 6365546,49 | 6365542,04 | -4,45 |
| Elevation: | 15,63 | -72,57 | -88,20 |
| Dip: | -60,73 | -59,16 | 1,57 |
| Azimuth: | 93,40 | 99,04 | 5,64 |

| OFFSETS at end |
|---|
| Offsets relative to: |
| ACTUAL START |
| 1,50 metres upwards |
| 1,42 metres right |
| 0,05 metres shortfall |

Printed on: 2006-11-14 13:16:43

Survey name : KLX26A
Survey date : 20/09/2006 03:52:15

Printed on 2006-11-14 13:16:50

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 0,0 | -60,73 | 93,40 | 1549029,90 | 6365546,49 | 15,63 | 50219 | 69,99 | 1,001213 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -60,78 | 93,40 | 1549031,36 | 6365546,41 | 13,01 | 50261 | 70,30 | 1,002537 | ✍ | 0,00 | 0,00 | 0,00 |
| 6,0 | -60,64 | 93,40 | 1549032,83 | 6365546,32 | 10,39 | 50148 | 70,64 | 1,001884 | ✍ | 0,00 | 0,00 | 0,00 |
| 9,0 | -60,59 | 93,40 | 1549034,29 | 6365546,23 | 7,78 | 50051 | 70,53 | 1,002088 | ✍ | 0,00 | 0,00 | 0,00 |
| 12,0 | -60,57 | 95,27 | 1549035,76 | 6365546,12 | 5,17 | 50287 | 70,46 | 1,002292 | ✍ | 0,01 | 0,02 | 0,00 |
| 15,0 | -60,48 | 92,40 | 1549037,24 | 6365546,02 | 2,56 | 50315 | 70,68 | 1,002309 | ✍ | 0,02 | 0,04 | 0,00 |
| 18,0 | -60,42 | 93,00 | 1549038,71 | 6365545,95 | -0,05 | 49093 | 67,61 | 1,002294 | ✍✍✍ | 0,04 | 0,02 | 0,00 |
| 21,0 | -60,35 | 93,01 | 1549040,19 | 6365545,87 | -2,66 | 49662 | 69,24 | 1,002019 | ✍ | 0,05 | 0,01 | 0,00 |
| 24,0 | -60,30 | 94,00 | 1549041,68 | 6365545,78 | -5,27 | 47052 | 69,73 | 1,002079 | ✍✍ | 0,07 | 0,01 | 0,00 |
| 27,0 | -60,27 | 94,32 | 1549043,16 | 6365545,67 | -7,87 | 49313 | 71,69 | 1,002314 | ✍ | 0,10 | 0,03 | 0,00 |
| 30,0 | -60,22 | 94,05 | 1549044,64 | 6365545,57 | -10,48 | 49346 | 71,51 | 1,002105 | ✍ | 0,12 | 0,05 | 0,00 |
| 33,0 | -60,20 | 93,39 | 1549046,13 | 6365545,47 | -13,08 | 49541 | 71,16 | 1,001903 | ✍ | 0,15 | 0,06 | 0,00 |
| 36,0 | -60,19 | 93,47 | 1549047,62 | 6365545,38 | -15,69 | 49699 | 71,08 | 1,002336 | ✍ | 0,18 | 0,06 | 0,00 |
| 39,0 | -60,18 | 93,36 | 1549049,11 | 6365545,29 | -18,29 | 49793 | 71,01 | 1,001816 | ✍ | 0,21 | 0,06 | 0,00 |
| 42,0 | -59,95 | 94,67 | 1549050,60 | 6365545,19 | -20,89 | 49872 | 70,60 | 1,001235 | ✍ | 0,24 | 0,08 | 0,00 |
| 45,0 | -59,90 | 94,75 | 1549052,10 | 6365545,06 | -23,48 | 50106 | 70,66 | 1,001451 | ✍ | 0,28 | 0,11 | 0,00 |
| 48,0 | -59,88 | 96,11 | 1549053,60 | 6365544,92 | -26,08 | 50207 | 70,76 | 0,997991 | ✍ | 0,32 | 0,16 | 0,00 |
| 51,0 | -59,77 | 95,96 | 1549055,10 | 6365544,76 | -28,67 | 50100 | 70,71 | 0,997276 | ✍ | 0,37 | 0,23 | 0,00 |
| 54,0 | -59,75 | 96,01 | 1549056,60 | 6365544,60 | -31,26 | 49893 | 70,73 | 0,997126 | ✍ | 0,42 | 0,30 | -0,01 |
| 57,0 | -59,68 | 95,82 | 1549058,11 | 6365544,45 | -33,86 | 49777 | 70,68 | 0,997222 | ✍ | 0,47 | 0,37 | -0,01 |
| 60,0 | -59,60 | 96,34 | 1549059,61 | 6365544,29 | -36,44 | 49855 | 70,63 | 0,997594 | ✍ | 0,53 | 0,44 | -0,01 |
| 63,0 | -59,57 | 96,29 | 1549061,12 | 6365544,12 | -39,03 | 50599 | 70,50 | 0,996714 | ✍ | 0,58 | 0,52 | -0,01 |
| 66,0 | -59,55 | 97,12 | 1549062,63 | 6365543,94 | -41,62 | 48992 | 70,75 | 0,997458 | ✍ | 0,64 | 0,60 | -0,01 |
| 69,0 | -59,52 | 98,77 | 1549064,14 | 6365543,73 | -44,20 | 49829 | 70,30 | 0,997517 | ✍ | 0,70 | 0,72 | -0,01 |
| 72,0 | -59,45 | 100,99 | 1549065,64 | 6365543,47 | -46,79 | 48847 | 70,03 | 0,997017 | ✍ | 0,76 | 0,90 | -0,02 |
| 75,0 | -59,38 | 99,69 | 1549067,14 | 6365543,20 | -49,37 | 47134 | 71,93 | 0,997008 | ✍ | 0,82 | 1,08 | -0,03 |
| 78,0 | -59,34 | 99,03 | 1549068,65 | 6365542,95 | -51,95 | 46242 | 70,36 | 0,997004 | ✍ | 0,88 | 1,24 | -0,03 |
| 81,0 | -59,29 | 94,62 | 1549070,17 | 6365542,77 | -54,53 | 45577 | 70,32 | 0,996955 | ✍ | 0,95 | 1,33 | -0,03 |
| 84,0 | -59,28 | 94,62 | 1549071,70 | 6365542,64 | -57,11 | 46639 | 71,10 | 0,996993 | ✍ | 1,03 | 1,36 | -0,03 |
| 87,0 | -59,21 | 96,04 | 1549073,22 | 6365542,50 | -59,69 | 49166 | 70,70 | 0,996907 | ✍ | 1,10 | 1,41 | -0,04 |
| 90,0 | -59,22 | 91,48 | 1549074,75 | 6365542,40 | -62,27 | 48250 | 69,79 | 0,996886 | ✍ | 1,18 | 1,42 | -0,04 |
| 93,0 | -59,15 | 93,55 | 1549076,29 | 6365542,33 | -64,84 | 50668 | 69,96 | 0,997112 | ✍ | 1,26 | 1,40 | -0,04 |
| 96,0 | -59,15 | 87,73 | 1549077,83 | 6365542,32 | -67,42 | 48413 | 68,36 | 0,997263 | ✍✍ | 1,34 | 1,33 | -0,04 |

Survey name : KLX26A
Survey date : 20/09/2006 03:52:15
Printed on 2006-11-14 13:16:51

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 99,0 | -59,13 | 97,08 | 1549079,36 | 6365542,25 | -70,00 | 51549 | 69,02 | 0,996962 | ✍ | 1,42 | 1,30 | -0,04 |
| 102,0 | -59,16 | 99,04 | 1549080,88 | 6365542,04 | -72,57 | 51693 | 69,78 | 0,997134 | ✍ | 1,50 | 1,42 | -0,05 |

# Deviation logging in KLX26B, 0 to 48 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **KLX26B** |
| Survey date: | 20/09/2006 03:52:15 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Nisse Håkansson |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 76 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 50500 | 1000 | nano Tesla |
| Magnetic dip: | 70,5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 48,0 | 48,0 |
| East: | 1549025,61 | 1549041,73 | 16,12 |
| North: | 6365550,66 | 6365532,81 | -17,85 |
| Elevation: | 15,82 | -25,72 | -41,54 |
| Dip: | -60,21 | -59,56 | 0,65 |
| Azimuth: | 136,00 | 136,44 | 0,44 |

OFFSETS at end

Offsets relative to:
ACTUAL START

0,22 metres upwards
0,81 metres right
0,01 metres shortfall

Printed on: 2006-11-14 13:17:02

Survey name : KLX26B
Survey date : 20/09/2006 03:52:15
Printed on 2006-11-14 13:17:21

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0,0 | -60,21 | 136,00 | 1549025,61 | 6365550,66 | 15,82 | 51802 | 70,98 | 0,998107 | ✍✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -60,08 | 135,92 | 1549026,65 | 6365549,59 | 13,22 | 50425 | 70,43 | 1,001731 | ✍ | 0,00 | 0,00 | 0,00 |
| 6,0 | -60,00 | 136,20 | 1549027,69 | 6365548,51 | 10,62 | 50362 | 70,33 | 0,999210 | ✍ | 0,01 | 0,00 | 0,00 |
| 9,0 | -59,98 | 136,30 | 1549028,73 | 6365547,42 | 8,02 | 50227 | 70,38 | 0,999286 | ✍ | 0,02 | 0,01 | 0,00 |
| 12,0 | -59,97 | 136,25 | 1549029,77 | 6365546,34 | 5,43 | 50086 | 70,36 | 0,999118 | ✍ | 0,04 | 0,01 | 0,00 |
| 15,0 | -59,97 | 136,93 | 1549030,80 | 6365545,25 | 2,83 | 50057 | 70,49 | 0,999206 | ✍ | 0,05 | 0,03 | 0,00 |
| 18,0 | -59,96 | 137,74 | 1549031,82 | 6365544,14 | 0,23 | 50120 | 70,30 | 0,999214 | ✍ | 0,06 | 0,06 | 0,00 |
| 21,0 | -60,01 | 138,63 | 1549032,82 | 6365543,02 | -2,37 | 50269 | 70,42 | 0,998913 | ✍ | 0,07 | 0,12 | 0,00 |
| 24,0 | -60,00 | 139,58 | 1549033,80 | 6365541,89 | -4,96 | 50026 | 70,08 | 0,998964 | ✍ | 0,08 | 0,20 | 0,00 |
| 27,0 | -60,01 | 139,26 | 1549034,77 | 6365540,75 | -7,56 | 49867 | 70,20 | 0,998918 | ✍ | 0,09 | 0,29 | 0,00 |
| 30,0 | -60,00 | 138,99 | 1549035,76 | 6365539,62 | -10,16 | 49601 | 70,41 | 0,998979 | ✍ | 0,10 | 0,37 | 0,00 |
| 33,0 | -59,97 | 139,04 | 1549036,74 | 6365538,48 | -12,76 | 49550 | 70,66 | 0,999413 | ✍ | 0,11 | 0,45 | -0,01 |
| 36,0 | -59,88 | 139,32 | 1549037,72 | 6365537,35 | -15,35 | 49554 | 70,68 | 0,999046 | ✍ | 0,12 | 0,54 | -0,01 |
| 39,0 | -59,80 | 139,56 | 1549038,70 | 6365536,20 | -17,95 | 49663 | 70,75 | 0,999111 | ✍ | 0,14 | 0,63 | -0,01 |
| 42,0 | -59,69 | 140,37 | 1549039,68 | 6365535,04 | -20,54 | 49641 | 70,66 | 0,998997 | ✍ | 0,16 | 0,73 | -0,01 |
| 45,0 | -59,62 | 136,40 | 1549040,68 | 6365533,91 | -23,13 | 50737 | 71,54 | 0,999024 | ✍ | 0,19 | 0,79 | -0,01 |
| 48,0 | -59,56 | 136,44 | 1549041,73 | 6365532,81 | -25,72 | 47623 | 70,76 | 0,998698 | ✍ | 0,22 | 0,81 | -0,01 |

# Deviation logging in HLX39, 0 to 198 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **HLX39** |
| Survey date: | 19/09/2006 22:47:15 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Leif Stenberg |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 140 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 49000 | 1000 | nano Tesla |
| Magnetic dip: | 69 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 198,0 | 198,0 |
| East: | 1546880,48 | 1546906,98 | 26,50 |
| North: | 6366887,87 | 6366985,18 | 97,31 |
| Elevation: | 27,04 | -143,30 | -170,34 |
| Dip: | -59,44 | -61,12 | -1,68 |
| Azimuth: | 14,30 | 14,00 | -0,30 |

| OFFSETS at end |
|---|
| Offsets relative to: ACTUAL START |
| 0,23 metres upwards |
| 1,64 metres right |
| 0,05 metres shortfall |

Printed on: 2006-11-14 12:54:37

Survey name : HLX39
Survey date : 19/09/2006 22:47:15

Printed on 2006-11-14 12:54:54

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 0,0 | -59,44 | 14,30 | 1546880,48 | 6366887,87 | 27,04 | 44149 | 75,48 | 1,002741 | ✍✍✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -59,31 | 14,10 | 1546880,85 | 6366889,35 | 24,46 | 45653 | 67,53 | 0,997524 | ✍✍ | 0,00 | 0,00 | 0,00 |
| 6,0 | -59,23 | 14,00 | 1546881,23 | 6366890,84 | 21,88 | 47061 | 70,36 | 0,999114 | ✍✍ | 0,01 | -0,01 | 0,00 |
| 9,0 | -59,04 | 13,90 | 1546881,60 | 6366892,33 | 19,31 | 49425 | 69,10 | 0,997843 | ✍ | 0,03 | -0,02 | 0,00 |
| 12,0 | -58,96 | 13,85 | 1546881,97 | 6366893,83 | 16,74 | 50228 | 70,20 | 0,997873 | ✍ | 0,05 | -0,03 | 0,00 |
| 15,0 | -58,85 | 14,41 | 1546882,35 | 6366895,33 | 14,17 | 50919 | 70,65 | 0,998270 | ✍✍ | 0,08 | -0,03 | 0,00 |
| 18,0 | -58,76 | 14,42 | 1546882,73 | 6366896,84 | 11,60 | 49783 | 70,20 | 0,998861 | ✍ | 0,11 | -0,03 | 0,00 |
| 21,0 | -58,65 | 14,96 | 1546883,13 | 6366898,35 | 9,04 | 49795 | 69,93 | 0,998870 | ✍ | 0,15 | -0,02 | 0,00 |
| 24,0 | -58,55 | 14,32 | 1546883,52 | 6366899,86 | 6,48 | 50079 | 70,54 | 0,998880 | ✍✍ | 0,20 | -0,01 | 0,00 |
| 27,0 | -58,38 | 13,40 | 1546883,90 | 6366901,38 | 3,92 | 50337 | 70,12 | 0,999037 | ✍ | 0,25 | -0,02 | 0,00 |
| 30,0 | -58,30 | 13,50 | 1546884,27 | 6366902,91 | 1,37 | 49261 | 69,35 | 0,998980 | ✍ | 0,30 | -0,05 | 0,00 |
| 33,0 | -58,16 | 13,55 | 1546884,63 | 6366904,45 | -1,18 | 50568 | 69,92 | 0,998915 | ✍ | 0,37 | -0,07 | 0,00 |
| 36,0 | -58,23 | 13,19 | 1546885,00 | 6366905,99 | -3,73 | 50431 | 70,06 | 0,999047 | ✍ | 0,43 | -0,09 | 0,00 |
| 39,0 | -58,28 | 14,04 | 1546885,37 | 6366907,52 | -6,28 | 50244 | 70,43 | 0,999124 | ✍ | 0,49 | -0,11 | 0,00 |
| 42,0 | -58,17 | 15,67 | 1546885,78 | 6366909,05 | -8,83 | 49882 | 70,46 | 0,999250 | ✍ | 0,56 | -0,10 | -0,01 |
| 45,0 | -58,20 | 14,72 | 1546886,19 | 6366910,58 | -11,38 | 50177 | 70,22 | 0,998818 | ✍ | 0,62 | -0,07 | -0,01 |
| 48,0 | -58,30 | 16,32 | 1546886,61 | 6366912,10 | -13,93 | 49607 | 70,15 | 0,998835 | ✍ | 0,69 | -0,04 | -0,01 |
| 51,0 | -58,37 | 16,19 | 1546887,05 | 6366913,61 | -16,49 | 50031 | 70,36 | 0,999169 | ✍ | 0,74 | 0,01 | -0,01 |
| 54,0 | -58,49 | 17,15 | 1546887,51 | 6366915,11 | -19,04 | 49694 | 70,32 | 0,998454 | ✍ | 0,79 | 0,08 | -0,01 |
| 57,0 | -58,52 | 18,18 | 1546887,98 | 6366916,61 | -21,60 | 49891 | 69,11 | 0,998768 | ✍ | 0,84 | 0,17 | -0,01 |
| 60,0 | -58,56 | 17,00 | 1546888,45 | 6366918,10 | -24,16 | 49556 | 69,58 | 0,998421 | ✍ | 0,89 | 0,26 | -0,01 |
| 63,0 | -58,56 | 19,56 | 1546888,94 | 6366919,58 | -26,72 | 49450 | 70,01 | 0,998626 | ✍ | 0,93 | 0,37 | -0,01 |
| 66,0 | -58,58 | 15,41 | 1546889,41 | 6366921,08 | -29,28 | 49673 | 71,06 | 0,999197 | ✍ | 0,97 | 0,46 | -0,02 |
| 69,0 | -58,48 | 16,30 | 1546889,84 | 6366922,58 | -31,84 | 49841 | 71,19 | 0,998632 | ✍ | 1,02 | 0,50 | -0,02 |
| 72,0 | -58,42 | 15,00 | 1546890,27 | 6366924,09 | -34,40 | 49610 | 70,24 | 0,998607 | ✍ | 1,07 | 0,54 | -0,02 |
| 75,0 | -58,48 | 16,21 | 1546890,69 | 6366925,61 | -36,95 | 49621 | 69,98 | 0,998603 | ✍ | 1,12 | 0,57 | -0,02 |
| 78,0 | -58,43 | 14,00 | 1546891,10 | 6366927,12 | -39,51 | 51163 | 70,13 | 0,998313 | ✍✍ | 1,17 | 0,59 | -0,02 |
| 81,0 | -58,39 | 14,00 | 1546891,48 | 6366928,65 | -42,06 | 51367 | 70,27 | 0,998696 | ✍✍ | 1,23 | 0,59 | -0,02 |
| 84,0 | -58,36 | 13,51 | 1546891,85 | 6366930,17 | -44,62 | 50889 | 69,97 | 0,998600 | ✍ | 1,28 | 0,57 | -0,02 |
| 87,0 | -58,55 | 13,94 | 1546892,22 | 6366931,70 | -47,18 | 49722 | 69,70 | 0,998619 | ✍ | 1,33 | 0,55 | -0,02 |
| 90,0 | -58,59 | 18,15 | 1546892,66 | 6366933,20 | -49,74 | 48790 | 70,72 | 0,998577 | ✍ | 1,38 | 0,60 | -0,02 |
| 93,0 | -58,69 | 13,81 | 1546893,09 | 6366934,70 | -52,30 | 50334 | 70,25 | 0,998230 | ✍ | 1,42 | 0,65 | -0,02 |
| 96,0 | -58,75 | 15,53 | 1546893,48 | 6366936,21 | -54,86 | 49610 | 69,38 | 0,998675 | ✍ | 1,46 | 0,66 | -0,02 |

Survey name : HLX39
Survey date : 19/09/2006 22:47:15
Printed on 2006-11-14 12:54:54

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99,0 | -58,81 | 13,73 | 1546893,87 | 6366937,71 | -57,43 | 49019 | 68,28 | 0,998494 | ✍ | 1,49 | 0,67 | -0,02 |
| 102,0 | -58,90 | 13,83 | 1546894,24 | 6366939,22 | -59,99 | 48812 | 69,64 | 0,998720 | ✍ | 1,52 | 0,65 | -0,02 |
| 105,0 | -59,00 | 17,48 | 1546894,66 | 6366940,71 | -62,57 | 49003 | 68,49 | 0,998972 | ✍ | 1,55 | 0,69 | -0,02 |
| 108,0 | -59,05 | 15,77 | 1546895,10 | 6366942,19 | -65,14 | 48785 | 68,96 | 0,998680 | ✍ | 1,57 | 0,75 | -0,02 |
| 111,0 | -59,13 | 18,22 | 1546895,55 | 6366943,66 | -67,71 | 48523 | 68,87 | 0,998271 | ✍ | 1,58 | 0,82 | -0,03 |
| 114,0 | -59,27 | 15,56 | 1546896,00 | 6366945,13 | -70,29 | 48938 | 68,79 | 0,998478 | ✍ | 1,59 | 0,89 | -0,03 |
| 117,0 | -59,39 | 16,12 | 1546896,42 | 6366946,60 | -72,87 | 49097 | 68,93 | 0,998688 | ✍ | 1,60 | 0,94 | -0,03 |
| 120,0 | -59,52 | 17,52 | 1546896,86 | 6366948,06 | -75,45 | 48570 | 68,26 | 0,999047 | ✍ | 1,60 | 1,00 | -0,03 |
| 123,0 | -59,60 | 16,06 | 1546897,30 | 6366949,52 | -78,04 | 49123 | 69,05 | 0,998854 | ✍ | 1,59 | 1,07 | -0,03 |
| 126,0 | -59,64 | 16,00 | 1546897,71 | 6366950,98 | -80,63 | 48939 | 69,20 | 0,998597 | ✍ | 1,58 | 1,11 | -0,03 |
| 129,0 | -59,77 | 17,00 | 1546898,14 | 6366952,43 | -83,22 | 48777 | 69,29 | 0,998547 | ✍ | 1,56 | 1,17 | -0,03 |
| 132,0 | -59,85 | 15,00 | 1546898,56 | 6366953,88 | -85,81 | 49371 | 69,49 | 0,998799 | ✍ | 1,54 | 1,22 | -0,03 |
| 135,0 | -59,94 | 14,90 | 1546898,95 | 6366955,33 | -88,41 | 49521 | 69,14 | 0,998548 | ✍ | 1,52 | 1,23 | -0,03 |
| 138,0 | -60,01 | 14,13 | 1546899,32 | 6366956,78 | -91,00 | 49869 | 70,15 | 0,998593 | ✍ | 1,49 | 1,24 | -0,03 |
| 141,0 | -60,11 | 14,84 | 1546899,70 | 6366958,23 | -93,60 | 48914 | 69,16 | 0,998293 | ✍ | 1,46 | 1,24 | -0,03 |
| 144,0 | -60,28 | 16,00 | 1546900,10 | 6366959,67 | -96,21 | 48898 | 68,71 | 0,998532 | ✍ | 1,42 | 1,27 | -0,03 |
| 147,0 | -60,35 | 15,57 | 1546900,50 | 6366961,10 | -98,81 | 48960 | 69,85 | 0,998674 | ✍ | 1,37 | 1,31 | -0,03 |
| 150,0 | -60,14 | 15,85 | 1546900,90 | 6366962,53 | -101,42 | 48419 | 69,95 | 0,998196 | ✍ | 1,33 | 1,35 | -0,03 |
| 153,0 | -60,45 | 16,94 | 1546901,32 | 6366963,96 | -104,02 | 48513 | 69,29 | 0,998773 | ✍ | 1,29 | 1,40 | -0,03 |
| 156,0 | -60,37 | 15,74 | 1546901,74 | 6366965,38 | -106,63 | 48594 | 69,49 | 0,998237 | ✍ | 1,23 | 1,46 | -0,03 |
| 159,0 | -60,53 | 14,04 | 1546902,12 | 6366966,81 | -109,24 | 49303 | 68,66 | 0,998518 | ✍ | 1,18 | 1,47 | -0,03 |
| 162,0 | -60,53 | 13,92 | 1546902,48 | 6366968,24 | -111,85 | 48695 | 69,26 | 0,999038 | ✍ | 1,12 | 1,46 | -0,03 |
| 165,0 | -60,46 | 15,57 | 1546902,85 | 6366969,67 | -114,46 | 47997 | 69,64 | 0,997686 | ✍ | 1,07 | 1,47 | -0,04 |
| 168,0 | -60,61 | 16,00 | 1546903,25 | 6366971,09 | -117,08 | 47309 | 68,95 | 0,998687 | ✍✍ | 1,01 | 1,51 | -0,04 |
| 171,0 | -60,70 | 15,00 | 1546903,65 | 6366972,51 | -119,69 | 45952 | 67,41 | 0,999092 | ✍✍✍ | 0,95 | 1,54 | -0,04 |
| 174,0 | -60,92 | 16,50 | 1546904,04 | 6366973,92 | -122,31 | 48317 | 68,96 | 1,001452 | ✍ | 0,87 | 1,58 | -0,04 |
| 177,0 | -61,03 | 14,00 | 1546904,43 | 6366975,32 | -124,93 | 48762 | 70,56 | 1,001488 | ✍✍ | 0,79 | 1,60 | -0,04 |
| 180,0 | -60,83 | 13,97 | 1546904,78 | 6366976,74 | -127,56 | 49589 | 69,87 | 0,998689 | ✍ | 0,72 | 1,60 | -0,04 |
| 183,0 | -60,89 | 14,00 | 1546905,13 | 6366978,15 | -130,18 | 49011 | 71,63 | 0,998940 | ✍✍ | 0,64 | 1,59 | -0,04 |
| 186,0 | -60,95 | 14,49 | 1546905,49 | 6366979,57 | -132,80 | 48180 | 70,07 | 0,999251 | ✍ | 0,56 | 1,59 | -0,04 |
| 189,0 | -60,83 | 14,00 | 1546905,85 | 6366980,98 | -135,42 | 48083 | 69,71 | 0,998741 | ✍ | 0,49 | 1,59 | -0,04 |
| 192,0 | -61,07 | 15,01 | 1546906,21 | 6366982,39 | -138,04 | 47712 | 69,28 | 0,999521 | ✍ | 0,41 | 1,59 | -0,04 |
| 195,0 | -61,21 | 16,00 | 1546906,60 | 6366983,79 | -140,67 | 46985 | 68,65 | 0,999339 | ✍✍ | 0,32 | 1,62 | -0,05 |

Survey name : HLX39
Survey date : 19/09/2006 22:47:15
Printed on 2006-11-14 12:54:55

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 198,0 | -61,12 | 14,00 | 1546906,98 | 6366985,18 | -143,30 | 49515 | 70,83 | 0,998911 | ✍✍ | 0,23 | 1,64 | -0,05 |

# Deviation logging in HLX41, 0 to 198 m

## New MeasureIT files

| | |
|---|---|
| **Survey name:** | **HLX41** |
| Survey date: | 19/09/2006 21:35:16 |
| Project: | PLU |
| Location: | Laxemar |

| | |
|---|---|
| Country: | Sweden |
| Survey company: | Mala GeoScience AB / RAYCON |
| Surveyed by: | Christer Gustafsson |
| Survey type: | STANDARD |
| Operating conditions: | |
| General comments: | |
| Client name: | SKB |
| Client ID number: | AP PS400-06-083 |
| Client reference: | Leif Stenberg |
| Drill company: | |
| Drill rig: | |
| Drill diameter: | 140 |
| Survey direction: | INTO hole |
| Survey run on: | Wireline |
| Magnetic Var.: | 2,53 degrees East of North |

| **Conventions** | |
|---|---|
| Linear units: | Metres |
| Angular units: | Degrees |
| Temperature units: | Centigrade |
| Co-ordinate system: | 0 North |
| Elevation positive | Up |
| Dip origin: | 0 Horizontal |
| Dip positive: | Up |

| **Magnetic Integrity Check (MagIC)** | Mid value | ± limit | |
|---|---|---|---|
| Field strength: | 50500 | 1000 | nano Tesla |
| Magnetic dip: | 70,5 | 1.5 | Degrees |

| **SURVEY** | Actual start | End of survey | Difference |
|---|---|---|---|
| Station: | 0,0 | 198,0 | 198,0 |
| East: | 1547017,61 | 1546957,39 | -60,22 |
| North: | 6367013,20 | 6366912,14 | -101,06 |
| Elevation: | 21,80 | -137,01 | -158,81 |
| Dip: | -59,36 | -48,17 | 11,19 |
| Azimuth: | 208,30 | 212,51 | 4,21 |

OFFSETS at end

Offsets relative to:
ACTUAL START

20,21 metres upwards
5,11 metres right
1,47 metres shortfall

Printed on: 2006-11-14 14:26:49

Survey name : HLX41
Survey date : 19/09/2006 21:35:16

Printed on 2006-11-14 14:27:01

| Station | Dip | Azimuth | Easting | Northing | Elevation | Mag.Field | Mag.Dip | Grav.Field | Status | UpDown | LeftRight | Shortfall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metres | Degrees | Degrees | Metres | Metres | Metres | nT | Degrees | G | * | Metres | Metres | Metres |
| 0,0 | -59,36 | 208,30 | 1547017,61 | 6367013,20 | 21,80 | 49964 | 70,82 | 0,998063 | ✍ | 0,00 | 0,00 | 0,00 |
| 3,0 | -59,32 | 208,00 | 1547016,89 | 6367011,85 | 19,22 | 49544 | 71,10 | 0,998550 | ✍ | 0,00 | 0,00 | 0,00 |
| 6,0 | -59,32 | 208,00 | 1547016,17 | 6367010,50 | 16,64 | 50021 | 71,53 | 0,998540 | ✍ | 0,00 | -0,01 | 0,00 |
| 9,0 | -59,14 | 207,84 | 1547015,45 | 6367009,14 | 14,06 | 49203 | 72,83 | 1,000008 | ✍✍ | 0,01 | -0,02 | 0,00 |
| 12,0 | -58,82 | 209,02 | 1547014,71 | 6367007,78 | 11,49 | 49444 | 72,70 | 1,000077 | ✍✍ | 0,03 | -0,02 | 0,00 |
| 15,0 | -58,58 | 208,97 | 1547013,96 | 6367006,42 | 8,92 | 48028 | 72,53 | 1,000328 | ✍✍ | 0,07 | 0,00 | 0,00 |
| 18,0 | -58,14 | 207,76 | 1547013,21 | 6367005,04 | 6,37 | 48825 | 72,67 | 0,998348 | ✍✍ | 0,12 | 0,00 | 0,00 |
| 21,0 | -58,06 | 209,93 | 1547012,45 | 6367003,65 | 3,82 | 50160 | 71,15 | 0,998629 | ✍ | 0,18 | 0,02 | 0,00 |
| 24,0 | -57,96 | 211,38 | 1547011,64 | 6367002,28 | 1,28 | 48621 | 72,04 | 0,998406 | ✍✍ | 0,25 | 0,08 | 0,00 |
| 27,0 | -58,12 | 212,07 | 1547010,80 | 6367000,93 | -1,27 | 48761 | 71,48 | 1,004464 | ✍ | 0,32 | 0,18 | -0,01 |
| 30,0 | -57,57 | 212,18 | 1547009,95 | 6366999,58 | -3,81 | 48958 | 71,35 | 0,998335 | ✍ | 0,40 | 0,28 | -0,01 |
| 33,0 | -57,44 | 213,05 | 1547009,08 | 6366998,22 | -6,34 | 48619 | 72,28 | 0,997727 | ✍✍ | 0,49 | 0,41 | -0,01 |
| 36,0 | -57,20 | 209,61 | 1547008,24 | 6366996,84 | -8,86 | 48631 | 72,11 | 0,997690 | ✍✍ | 0,59 | 0,49 | -0,02 |
| 39,0 | -57,01 | 209,71 | 1547007,44 | 6366995,42 | -11,38 | 48522 | 73,20 | 0,997858 | ✍✍ | 0,71 | 0,53 | -0,02 |
| 42,0 | -56,80 | 211,18 | 1547006,60 | 6366994,01 | -13,89 | 48861 | 72,26 | 0,998027 | ✍✍ | 0,84 | 0,59 | -0,02 |
| 45,0 | -56,59 | 211,90 | 1547005,74 | 6366992,61 | -16,40 | 50962 | 71,99 | 0,997801 | ✍ | 0,98 | 0,68 | -0,03 |
| 48,0 | -56,36 | 209,95 | 1547004,89 | 6366991,18 | -18,90 | 48974 | 71,68 | 0,997930 | ✍ | 1,13 | 0,76 | -0,03 |
| 51,0 | -56,15 | 211,59 | 1547004,04 | 6366989,75 | -21,40 | 48488 | 72,03 | 0,997675 | ✍✍ | 1,29 | 0,83 | -0,04 |
| 54,0 | -55,90 | 212,34 | 1547003,15 | 6366988,33 | -23,89 | 48780 | 71,27 | 0,998137 | ✍ | 1,46 | 0,94 | -0,04 |
| 57,0 | -55,64 | 211,29 | 1547002,26 | 6366986,90 | -26,37 | 48883 | 71,57 | 0,998004 | ✍ | 1,64 | 1,04 | -0,05 |
| 60,0 | -55,44 | 210,39 | 1547001,39 | 6366985,44 | -28,84 | 50140 | 71,44 | 0,997953 | ✍ | 1,84 | 1,12 | -0,06 |
| 63,0 | -55,26 | 209,86 | 1547000,54 | 6366983,96 | -31,31 | 50118 | 71,60 | 0,997762 | ✍ | 2,05 | 1,17 | -0,07 |
| 66,0 | -55,15 | 209,81 | 1546999,68 | 6366982,48 | -33,77 | 50173 | 71,52 | 0,997754 | ✍ | 2,27 | 1,22 | -0,07 |
| 69,0 | -55,06 | 210,22 | 1546998,83 | 6366980,99 | -36,23 | 50133 | 71,64 | 0,997811 | ✍ | 2,49 | 1,27 | -0,08 |
| 72,0 | -54,93 | 209,48 | 1546997,97 | 6366979,50 | -38,69 | 50056 | 71,57 | 0,997702 | ✍ | 2,72 | 1,32 | -0,09 |
| 75,0 | -54,81 | 211,07 | 1546997,10 | 6366978,01 | -41,14 | 49775 | 71,20 | 0,997716 | ✍ | 2,95 | 1,37 | -0,10 |
| 78,0 | -54,67 | 210,13 | 1546996,22 | 6366976,52 | -43,59 | 49534 | 71,50 | 0,998044 | ✍ | 3,19 | 1,44 | -0,11 |
| 81,0 | -54,54 | 211,25 | 1546995,33 | 6366975,03 | -46,04 | 49345 | 71,52 | 0,997751 | ✍ | 3,44 | 1,52 | -0,12 |
| 84,0 | -54,34 | 211,78 | 1546994,42 | 6366973,54 | -48,48 | 49506 | 71,30 | 0,997960 | ✍ | 3,70 | 1,61 | -0,14 |
| 87,0 | -54,12 | 213,64 | 1546993,47 | 6366972,06 | -50,91 | 49314 | 71,50 | 0,997757 | ✍ | 3,96 | 1,75 | -0,15 |
| 90,0 | -54,06 | 211,53 | 1546992,52 | 6366970,58 | -53,34 | 49622 | 71,12 | 0,996875 | ✍ | 4,23 | 1,88 | -0,17 |
| 93,0 | -53,76 | 210,59 | 1546991,61 | 6366969,07 | -55,77 | 50120 | 70,71 | 0,996599 | ✍ | 4,52 | 1,97 | -0,18 |
| 96,0 | -53,53 | 210,89 | 1546990,70 | 6366967,54 | -58,18 | 50020 | 71,22 | 0,997708 | ✍ | 4,81 | 2,04 | -0,20 |

Survey name : HLX41
Survey date : 19/09/2006 21:35:16
Printed on 2006-11-14 14:27:01

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99,0 | -53,40 | 210,52 | 1546989,79 | 6366966,00 | -60,59 | 49924 | 71,45 | 0,997792 | ✍ | 5,12 | 2,12 | -0,21 |
| 102,0 | -53,20 | 210,51 | 1546988,88 | 6366964,46 | -63,00 | 49970 | 71,61 | 0,996816 | ✍ | 5,44 | 2,19 | -0,23 |
| 105,0 | -53,01 | 209,79 | 1546987,98 | 6366962,90 | -65,40 | 49841 | 71,59 | 0,997534 | ✍ | 5,76 | 2,24 | -0,25 |
| 108,0 | -52,80 | 212,12 | 1546987,05 | 6366961,35 | -67,79 | 49551 | 71,57 | 0,997005 | ✍ | 6,10 | 2,33 | -0,27 |
| 111,0 | -52,66 | 212,19 | 1546986,08 | 6366959,81 | -70,18 | 49381 | 71,41 | 0,997015 | ✍ | 6,44 | 2,45 | -0,29 |
| 114,0 | -52,41 | 211,08 | 1546985,12 | 6366958,26 | -72,56 | 49494 | 71,72 | 0,997632 | ✍ | 6,79 | 2,56 | -0,31 |
| 117,0 | -52,17 | 212,66 | 1546984,15 | 6366956,70 | -74,93 | 49474 | 71,51 | 0,998003 | ✍ | 7,16 | 2,67 | -0,34 |
| 120,0 | -52,10 | 210,42 | 1546983,19 | 6366955,13 | -77,30 | 49331 | 71,28 | 0,998128 | ✍ | 7,53 | 2,77 | -0,36 |
| 123,0 | -51,94 | 211,77 | 1546982,24 | 6366953,55 | -79,67 | 50054 | 71,10 | 0,997653 | ✍ | 7,92 | 2,86 | -0,39 |
| 126,0 | -51,83 | 211,11 | 1546981,27 | 6366951,97 | -82,03 | 49543 | 71,66 | 0,997800 | ✍ | 8,30 | 2,97 | -0,42 |
| 129,0 | -51,60 | 213,31 | 1546980,28 | 6366950,40 | -84,38 | 49390 | 71,46 | 0,997835 | ✍ | 8,70 | 3,09 | -0,45 |
| 132,0 | -51,42 | 213,69 | 1546979,25 | 6366948,84 | -86,73 | 49595 | 71,38 | 0,997423 | ✍ | 9,10 | 3,26 | -0,48 |
| 135,0 | -51,26 | 212,84 | 1546978,22 | 6366947,27 | -89,07 | 49497 | 71,00 | 0,997105 | ✍ | 9,52 | 3,42 | -0,51 |
| 138,0 | -50,84 | 213,32 | 1546977,19 | 6366945,69 | -91,40 | 50776 | 70,41 | 0,996749 | ✍ | 9,94 | 3,58 | -0,55 |
| 141,0 | -50,75 | 212,58 | 1546976,16 | 6366944,10 | -93,73 | 49844 | 71,77 | 0,997897 | ✍ | 10,39 | 3,74 | -0,58 |
| 144,0 | -50,57 | 212,48 | 1546975,14 | 6366942,50 | -96,05 | 50105 | 71,80 | 0,997845 | ✍ | 10,84 | 3,88 | -0,62 |
| 147,0 | -50,38 | 213,72 | 1546974,10 | 6366940,90 | -98,36 | 50414 | 72,02 | 0,998139 | ✍ | 11,29 | 4,04 | -0,66 |
| 150,0 | -50,07 | 202,06 | 1546973,20 | 6366939,21 | -100,67 | 46200 | 72,20 | 0,997581 | ✍✍ | 11,76 | 4,02 | -0,70 |
| 153,0 | -49,96 | 210,69 | 1546972,35 | 6366937,48 | -102,97 | 50252 | 71,31 | 0,997982 | ✍ | 12,24 | 3,96 | -0,74 |
| 156,0 | -49,95 | 210,61 | 1546971,36 | 6366935,82 | -105,27 | 50448 | 71,32 | 0,997496 | ✍ | 12,73 | 4,04 | -0,78 |
| 159,0 | -49,90 | 209,11 | 1546970,40 | 6366934,15 | -107,57 | 50613 | 70,92 | 0,998216 | ✍ | 13,22 | 4,09 | -0,82 |
| 162,0 | -49,70 | 210,13 | 1546969,44 | 6366932,47 | -109,86 | 50215 | 70,80 | 0,997458 | ✍ | 13,72 | 4,13 | -0,86 |
| 165,0 | -49,56 | 213,47 | 1546968,42 | 6366930,82 | -112,14 | 49674 | 71,18 | 0,998373 | ✍ | 14,23 | 4,25 | -0,91 |
| 168,0 | -49,49 | 212,21 | 1546967,36 | 6366929,18 | -114,43 | 49982 | 71,50 | 0,997952 | ✍ | 14,73 | 4,41 | -0,95 |
| 171,0 | -49,37 | 211,11 | 1546966,34 | 6366927,52 | -116,70 | 48621 | 71,23 | 0,997836 | ✍ | 15,25 | 4,52 | -1,00 |
| 174,0 | -49,27 | 211,31 | 1546965,33 | 6366925,85 | -118,98 | 48821 | 70,98 | 0,997591 | ✍ | 15,77 | 4,62 | -1,05 |
| 177,0 | -49,09 | 207,98 | 1546964,36 | 6366924,14 | -121,25 | 48708 | 70,88 | 0,997779 | ✍ | 16,30 | 4,67 | -1,10 |
| 180,0 | -48,93 | 209,67 | 1546963,41 | 6366922,42 | -123,51 | 49003 | 71,23 | 0,998006 | ✍ | 16,84 | 4,68 | -1,15 |
| 183,0 | -48,84 | 209,93 | 1546962,43 | 6366920,71 | -125,77 | 48733 | 71,20 | 0,997657 | ✍ | 17,38 | 4,73 | -1,20 |
| 186,0 | -48,64 | 210,25 | 1546961,44 | 6366918,99 | -128,03 | 48652 | 71,71 | 0,998010 | ✍ | 17,93 | 4,80 | -1,25 |
| 189,0 | -48,46 | 209,97 | 1546960,44 | 6366917,28 | -130,28 | 48532 | 71,65 | 0,998368 | ✍ | 18,50 | 4,86 | -1,30 |
| 192,0 | -48,51 | 212,30 | 1546959,41 | 6366915,58 | -132,52 | 48806 | 71,43 | 0,996699 | ✍ | 19,06 | 4,96 | -1,36 |
| 195,0 | -48,26 | 208,63 | 1546958,40 | 6366913,86 | -134,77 | 48284 | 72,38 | 0,996603 | ✍✍ | 19,63 | 5,03 | -1,41 |

Survey name : HLX41
Survey date : 19/09/2006 21:35:16
Printed on 2006-11-14 14:27:01

| Station Metres | Dip Degrees | Azimuth Degrees | Easting Metres | Northing Metres | Elevation Metres | Mag.Field nT | Mag.Dip Degrees | Grav.Field G | Status * | UpDown Metres | LeftRight Metres | Shortfall Metres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 198,0 | -48,17 | 212,51 | 1546957,39 | 6366912,14 | -137,01 | 50127 | 71,45 | 0,998064 | ✍ | 20,21 | 5,11 | -1,47 |