

Forsmark site investigation

Boremap mapping of telescopic drilled borehole KFM01A

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April 2003

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This report concerns a study which was conducted for SKB. The conclusions and viewpoints presented in the report are those of the authors and do not necessarily coincide with those of the client.

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1 Introduction

Since 2002, SKB investigates two potential sites for a deep repository in the Swedish Precambrian basement. In order to characterise the rock mass down to a depth of about 1 km at one of these sites, the Forsmark test site area, SKB has initiated a drilling program with three deep telescopic boreholes (Figure 2-1). Each borehole starts with 100 m of percussion drilling, and is followed by core drilling down to about 1000 m depth.

A detailed mapping of the material obtained through the drilling program is essential for a more specific sampling and for three-dimensional modelling of the site geology. For the purpose, the so-called Boremap system has been developed. The system integrates information from drill core mapping, alternatively, drill cuttings when a core is not available, with results from BIPS-logging (Borehole Image Processing System) and calculates the absolute position and orientation of fractures and lithological markers.

This report presents the results from the Boremap-mapping of telescopic borehole KFM01A, the first deep borehole drilled in the Forsmark candidate area (for location see Figure 2-1). In addition, it draws the attention to some of the limitations of the Boremap system.

2 Objective and scope

The aim of this activity is to obtain a detailed documentation of *all* structures and lithologies intersected by telescopic borehole KFM01A. This in turn will serve as a platform for forthcoming investigations (i.e. laboratory tests) of the drill core, as well as site descriptive modellings.



Figure 2-1. Location of telescopic drilled borehole KFM01A in the Forsmark test site area.

3 Equipment

3.1 Description of equipment

All BIPS-based mapping was performed in Boremap v. 3.0 and revised in v. 3.2. This software was loaded with the bedrock and mineral standard used by the Geological Survey of Sweden for surface mapping at the Forsmark investigation site to enable correlation with the surface geology. Additional software used during the course of the mapping was BIPS Viewer v. 1.10 and Microsoft Access. The final data presentation was made using Stereonet and WellCad v. 3.2.

The following equipment was used to facilitate the core mapping: folding rule, hydrochloric acid, knife, water-filled atomizer, hand lens and sandpaper.

4 Execution

Telescopic borehole KFM01A starts with 100 m of percussion drilling, followed by core drilling down to about 1001.5 m depth. The soil cover is about 12 m. The bedrock data available from the upper, percussion drilled part of KFM01A are limited to about 20 m of BIPS-imaging (29.45–51.15 m) and drill cuttings collected at 3 m intervals between 12 and 100 m depth. These samples were mapped by Johan Kjellman (Department of Earth Sciences, Uppsala University) prior to the start of Boremap-mapping, and the data are stored in SKB's database SICADA (field note Forsmark 26; Appendix 6). Some of the drill cutting samples were, however, re-examined during the Boremap-mapping to back up the BIPS-mapping.

During the mapping, the 900 m drill core obtained from the interval 100.0–1001.5 m was available in its entirety on roller tables in the core-mapping accommodation at Forsmark (the Lentab hall, near the SKB/SFR-office at Forsmark). The BIPS-based mapping was preceded by an initial separation of induced and natural fractures made by Allan Stråhle (Geosigma). In addition, Eva-Lena Tullborg (TerraLogica) provided XRD analysis of the core fracture filling mineralogy, whereas SGU provided modal analyses of the principal core lithologies as well as reference samples from the surface mapping.

The mapping of KFM01A was done in Boremap v. 3.0 according to the SKB method description for Boremap-mapping, SKB MD 143.006 (v. 1.0; SKB internal controlling document), with the exception that no geophysical logs were available.

4.1 Preparations

The borehole length registered in the BIPS-image deviates from the true borehole length with increasing depth, and the difference at the bottom of the borehole is about 5 m. It was, therefore, necessary to adjust the length with reference to groove millings cut into the borehole wall every 50th meter. The exact level of each reference mark can be found in SKB's database SICADA (Appendix 5). Unfortunately, reference marks are not visible in the BIPS-image at 450, 850 and 950 m depth, and the correction had to rely on values obtained through linear extrapolation. This may contribute to the fact that the adjusted length still is not completely identical with the one given at the drill core. In some intervals the difference may amount to some decimetres. After adjustment, the BIPS-image from the cored interval covers the depth between 102.03 and 1001.16 m.

The BIPS-image from the upper, percussion drilled 100 m, covers only about 20 m, from 29.45 to 51.15 m depth, due to an obstacle at 51.15 m which prevented further BIPS-logging. No length adjustment was done for this image, as the deviation from the true length is considered to be negligible at such shallow depths.

Data necessary for the calculations of absolute orientation for structures in the borehole includes borehole diameter, azimuth and inclination, and this data was collected from SKB's database SICADA (Appendices 3 and 4). Corrections for the deviation were done every twelfth meter.

4.2 Data handling

To obtain the best possible data security, the mapping was performed on the SKB intranet, with regular back ups on the local drive.

The mapping was quality checked by a routine in the Boremap software before it was archived. The data was subsequently exported to the SKB database SICADA and stored under field note Forsmark 104 (Boremap-mapping) and field note Forsmark 26 (mapping of drill cuttings).

4.3 Analysis and interpretation

The Boremap system has obviously some limitations, since all geological features must be represented by intersecting planes. Non-planar structures, such as small scale folding, linear objects (mineral lineations) and curved fractures can, therefore, not be correctly documented. The major problem is curved structures (e.g. fractures) which run almost parallel with the borehole axis. During the mapping of KFM01A, such features were approximated by fitting the plane after one of their ends, usually the upper, in the borehole. The fact that the structure did not actually intersect the borehole is only noted in the attached comment.

Another problem is geological features (mainly fractures) observed only in the drill core. This problem usually arises from a poor resolution in the BIPS-image, which in the present case was caused by the presence of brownish black coatings on the borehole walls. Moreover, the BIPS-camera seems to have closed down in the interval 670.78–674.65 m. However, even in the most perfect BIPS-image, it is sometimes difficult to distinguish a thin fracture sealed by a low contrast mineral. All fractures and lithological contacts observed in the drill core, but not in the BIPS-image, have been registered as perpendicular to the borehole axis regardless of their actual orientation. The consequence is an overrepresentation of the subhorizontal fracture set.

A large amount of the steeply dipping fractures intersected by KFM01A are sealed by laumontite (a calcium zeolite). This sealing tends to expand, and eventually crackle in the drill core. As a consequence, some fractures mapped as natural (i.e. a fracture which is unsealed in the drill core) may in fact represent originally sealed fractures. All laumontite filled fractures suspected to have been sealed prior to drilling are mapped as sealed.

Even if reliable measurements of fracture widths/apertures less than 1 mm would be possible in the drill core, it is well beyond the BIPS-image resolution. For that reason, the minimum width/aperture given is 1 mm.

Joint alteration (J_a) values used for natural fractures in KFM01A range between 1 and 4. However, later experience has shown that values for individual fractures generally are somewhat low: fractures with very thin chlorite or clay mineral coatings were given J_a values of 1, when values of 2 or 3 probably would have been more suitable.

In some intervals, the mapping was somewhat hampered by the occurrence of brownish black coatings on the borehole walls (mentioned above). The coating occurs sporadically throughout the core drilled part of the borehole, and typically forms a spiral pattern along the borehole axis with a pitch ratio of about 12–13 cm (Appendix 2). This

phenomenon is obviously drill induced, although the mechanism behind it is not fully understood. One plausible explanation is that the coatings originate from metal fragments abraded from the drill pipes, and that the spiral pattern is a consequence of wobbling of the pipe string in the borehole.

5 Results

5.1 Core lithology

The far most abundant rock in borehole KFM01A is a medium-grained, reddish-grey to grey metagranodiorite-granite (rock code 101057). Other rock units, including finer grained metagranitoids, pegmatitic granites, amphibolites and minor bands, dykes or veins of leucogranitic material, are ubiquitous though volumetrically subordinate. With a few exceptions, all these rocks exhibit a moderate to steep ductile foliation, striking roughly between NW and NNE (Figure 5-1). However, a more random orientation due to small scale folding may occur adjacent to lithological discontinuities such as veins or minor dykes (Figure 5-2a).

The medium-grained metagranodiorite-granite is equigranular, foliated and locally shows a distinct, gently dipping mineral lineation. Typically it is light grey in colour, although more reddish varieties do occur, especially in the upper few hundred metres of the borehole. Minor sections speckled by fine grains of whitish plagioclase occur sporadically.

Fine-grained, equigranular metagranitoids (rock code 101051) occupy less than 4 % of the cored interval. They are grey, or more rarely light greyish-red, in colour and occur in intervals with a typical length of a few metres, surrounded by the coarser metagranodiorite-granite. Most of them show a weaker mineral foliation than the surrounding metagranodiorite-granite. Their external contacts are largely parallel with the tectonic foliation, except at two locations, at 898.51 and 937.34 m, suggesting that at least some of the finer grained metagranitoids are younger than the main phase of the ductile deformation (Figure 5-2b).

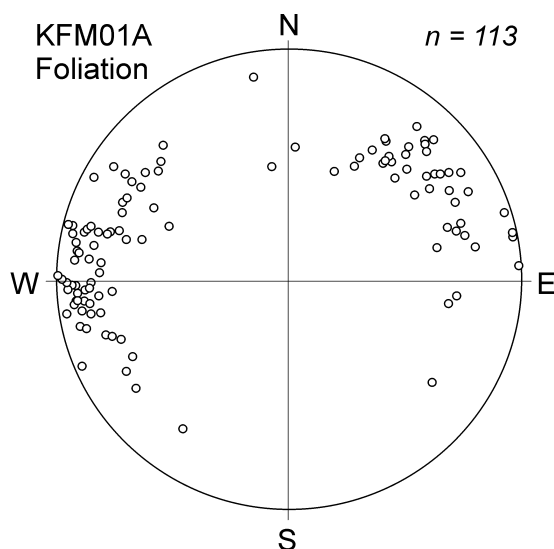


Figure 5-1. Lower hemisphere equal-area stereographic projections showing poles to ductile foliation planes intersected by borehole KFM01A.

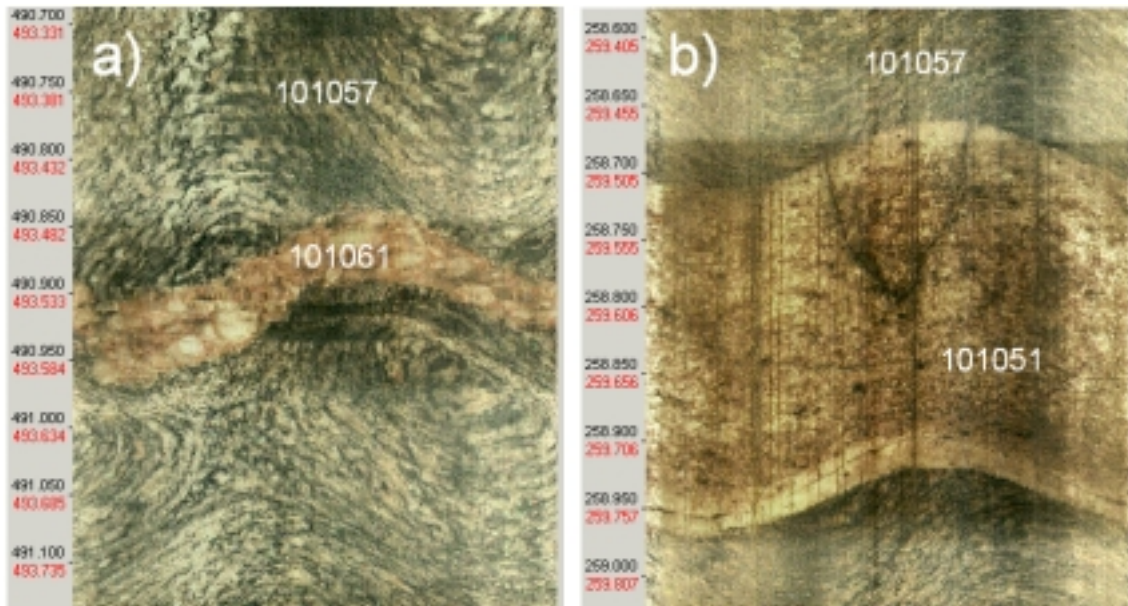


Figure 5-2. BIPS-images from borehole KFM01A. a) Small scale, non-cylindrical folding of the metagranodiorite-granite, adjacent to a vein or thin dyke of pegmatitic granite (493.32–493.76 m depth). b) Dyke of equigranular, fine-grained granitoid cross-cutting the foliation of the surrounding metagranodiorite-granite (259.38–259.83 m depth).

Minor dykes, veins and patches of pegmatite, pegmatitic granite and leucogranitic material are frequent throughout the borehole, especially in lithological contacts. Except for one major occurrence at 525.2–534.5 m depth with pegmatitic granite, they are all less than 1 m in width, and most of them are thinner than about 1 dm. Typically they are texturally heterogeneous, with highly variable grain size, and some have quartz dominated cores. Their orientation varies widely, although a slight majority strike parallel or sub-parallel to the tectonic foliation. Also the intensity of the foliation varies, but it is generally weaker than in the wall rock, and in a few minor pegmatites not even distinguishable. Despite the obvious temporal span within this group, including at least three different pegmatite/aplite generations, these rocks were grouped as “pegmatite, pegmatitic granite” (101061) or “fine- to medium-grained granite” (111058).

Amphibolites (rock code 102017) are estimated to occupy about 3 % of the cored interval. Their extension and contacts are more or less always parallel with the tectonic foliation. The majority is fine-grained, equigranular, and with a large proportion of biotite. Two anomalous, around 5 cm wide, ultramafic and more medium grained occurrences (coded 101004) were found in the depth interval 536.45–536.75 m.

Calc-silicate or skarn-like material (rock code 108019), often intimately associated with minor amounts of leucogranitic material, occurs at four intervals in the cored section: 611.6–613.1 m, 707.9–709.4 m, 863.2–863.9 m and 987.6–989.6 m.

5.2 Fractures

With the exception for a highly fractured zone in the depth interval 656–674 m, there is a conspicuous concentration of fractures in the upper 300 m of KFM01A. The orientation of these shallow fractures varies considerably, though the majority belong to a horizontal to sub-horizontal set, as can be seen in Figure 5-3a and b. Some fractures in this sub-horizontal set appear to be hydraulically open in the BIPS-image, though the aperture is normally less than a few millimetres. The infilling minerals are typically calcite and/or chlorite which form thin coatings on the fracture walls.

It should be noted that fractures mapped in the core that could not be found in the BIPS-image are all classified to fall into this sub-horizontal group of fractures. Due to the slight curvature of the borehole axis, the poles to these fracture planes form a short, but distinct array in the NW quadrant of the stereographic projections (Figure 5-3).

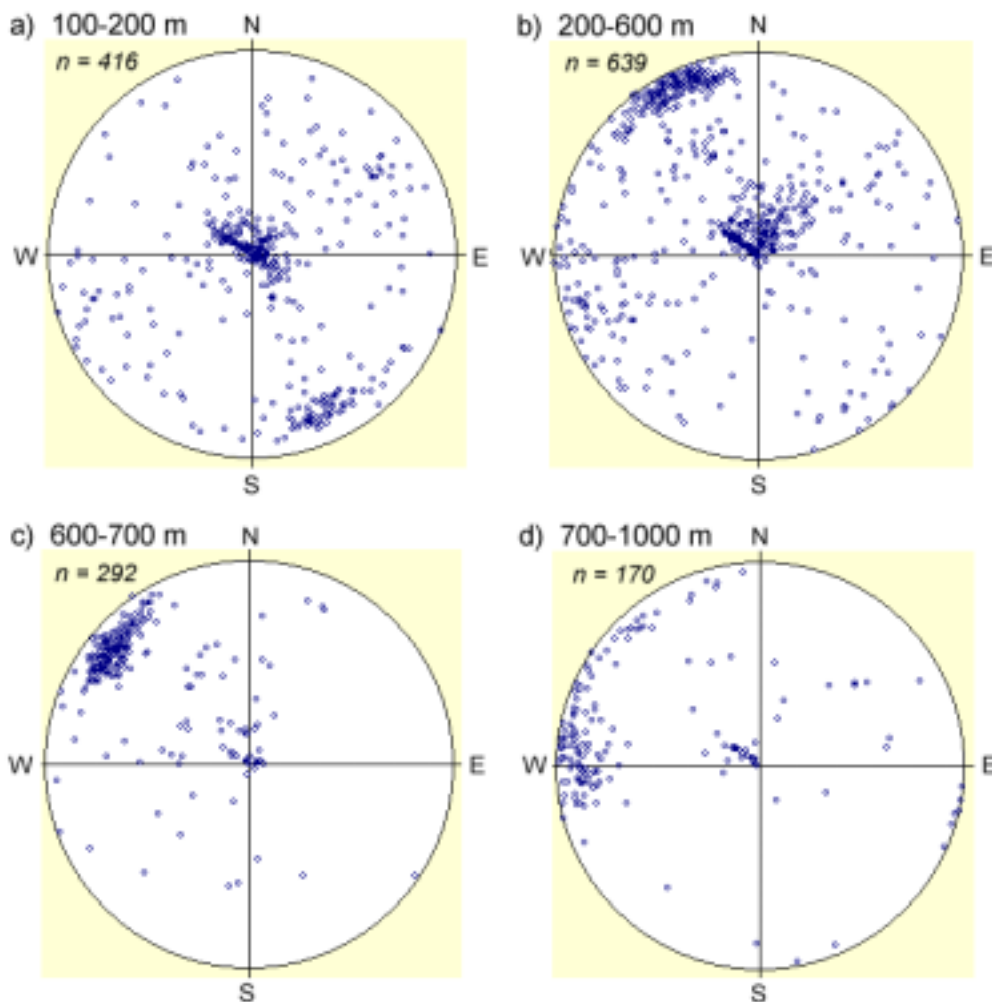


Figure 5-3. Lower hemisphere equal-area stereographic projections showing the poles to sealed and natural fracture planes within borehole KFM01A: a) 100–200 m depth, b) 200–600 m depth, c) 600–700 m depth, and d) 700–1000 m depth.

A second, well defined fracture set is recognized as generally sub-vertical fractures sealed by laumontite and chlorite. The average width of these fractures is 1–2 mm, with individual fractures ranging up to 5 mm. The occurrence of oxidized walls is more or less limited to this set. Down to about 200 m depth this set strikes ENE and dips steeply towards the north (Figure 5-3a). Below 200 m depth, the dip overturns towards south (Figure 5-3b) and with increasing depth the strike gradually becomes more northerly (Figure 5-3c and d). This set of fractures predominates below 600 m depth. The highly fractured zone intersected at 656–674 m depth, with fracture orientations around N30–65°W/70–85°SE, belongs to this set.

In addition to the well-defined sub-vertical and near horizontal sets of fractures described above, there is a third group of NW striking fractures with variable, but mostly moderate dips (40–70°). These NW striking fractures are mainly confined to the upper 600 m of the borehole.

It is, moreover, noteworthy that very few fractures in KFM01A have a measurable displacement that could indicate that they have been active as shear planes.

The only two, hydraulically open crush zones found during the mapping occur in the percussion drilled part of KFM01A.

Lithological contacts provide mechanical discontinuities in the drill core. It is hence reasonable to expect that high contrast in competence, such as between granitic material and amphibolite, may focus fracture formation. However, only about 10 % of the contacts between the amphibolites and the surrounding metagranodiorite-granite are fractured. Almost all of these fractures are natural and there is nothing to suggest that their occurrence is depth dependent.

5.3 Discussion

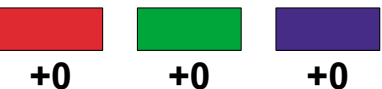
Direct correlation between the top surface geology and the lithology in KFM01A is somewhat hampered by the poor bedrock exposure in the area immediately surrounding the drill site. A thick Quaternary cover and irregular bedrock topography did not allow stripping. However, the general picture is that the core lithology corresponds well with what is to be expected from the regional surface mapping made by the SGU during 2002, though the rock proportions differ slightly /1/. Also the ductile features, including the near-horizontal lineation and steep, NW–NNE striking foliation, are in close agreement with the structural pattern which emerged from SGU's surface mapping in the area /1/. The core fracture pattern, on the other hand, gives a somewhat more ambiguous picture, as some of the more distinct, steep fracture sets (e.g. the NW-set) known in the region /2/ are highly underrepresented in the borehole. The most plausible explanation to this is the orientation of the borehole, plunging steeply towards NW. Another noteworthy feature, considering that epidote and quartz dominate the fracture filling assemblage at surface /1/, is the deficiency of epidote sealing in the borehole. This might probably be due to that epidote, and to some extent quartz, only occurs in steep fractures, which not have been intersected by the borehole.

6 References

- /1/ **Stevens M B, Bergman T, Andersson J, Hermansson T, Wahlgren C-H, Albrecht L, Mikko H, 2003.** Bedrock mapping – Forsmark: Stage 1 (2002) – Outcrop data including fracture data. SKB P-03-09, Svensk Kärnbränslehantering AB.
- /2/ **Carlsson A, Christiansson R, 1987.** Geology and tectonics at Forsmark. SKB Progress Report SFR 87-04, Svensk Kärnbränslehantering AB.

BIPS-image: 29.45–51.15 m

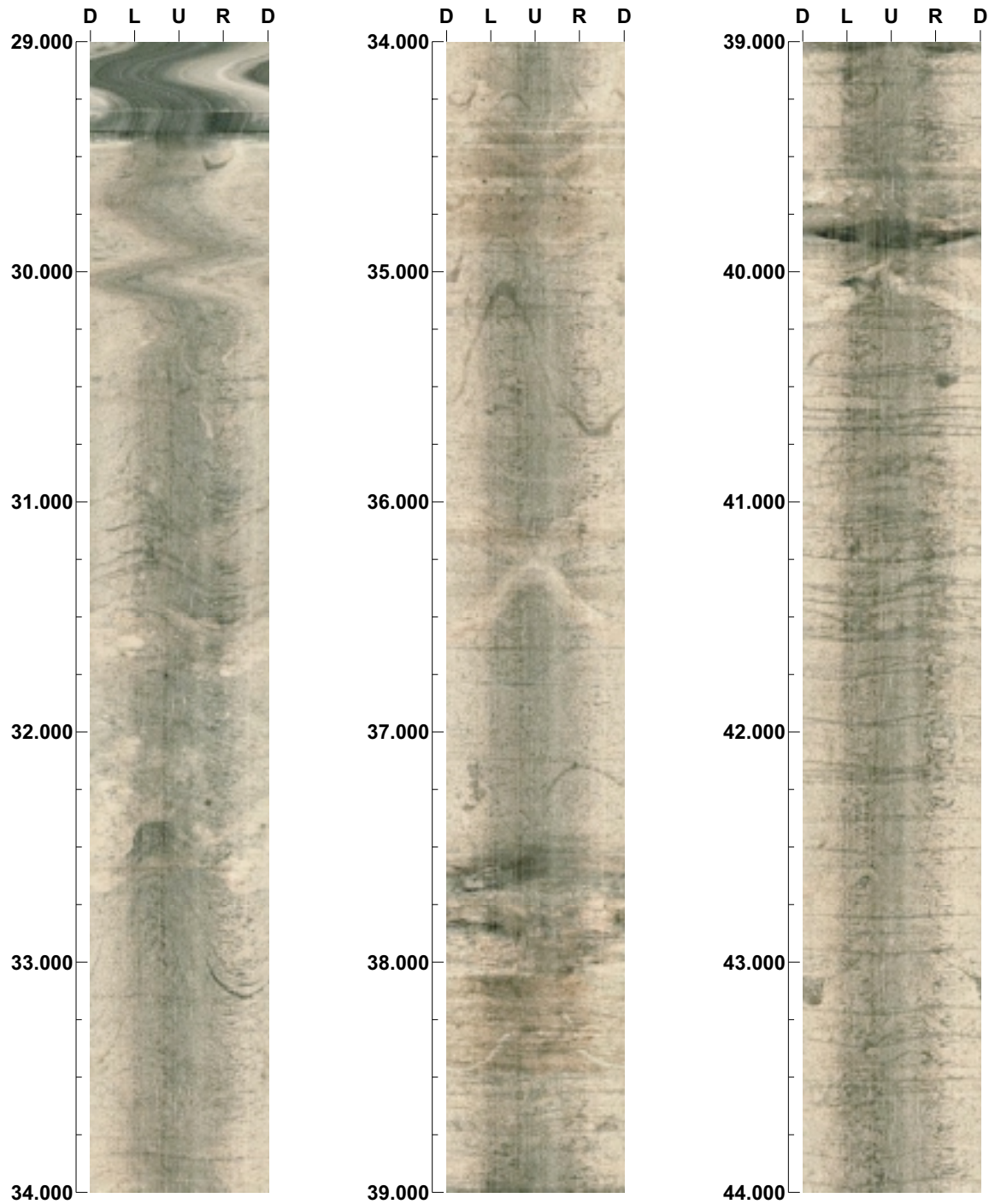
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BDT file : c:\borema~1\kfm01a_0.bdt
Locality : FORSMARK
Bore hole number : KF01A
Date : 02/05/28
Time : 15:20:00
Depth range : 29.000 - 51.152 m
Azimuth : 318
Inclination : -85
Diameter : 165.0 mm
Magnetic declination : 0.0
Span : 4
Scan interval : 0.25
Scan direction : To bottom
Scale : 1/25
Aspect ratio : 149 %
Pages : 2
Color : 

Project name: Forsmark
Bore hole No.: KF01A

Azimuth: 318 Inclination: -85

Depth range: 29.000 - 44.000 m



(1 / 2)

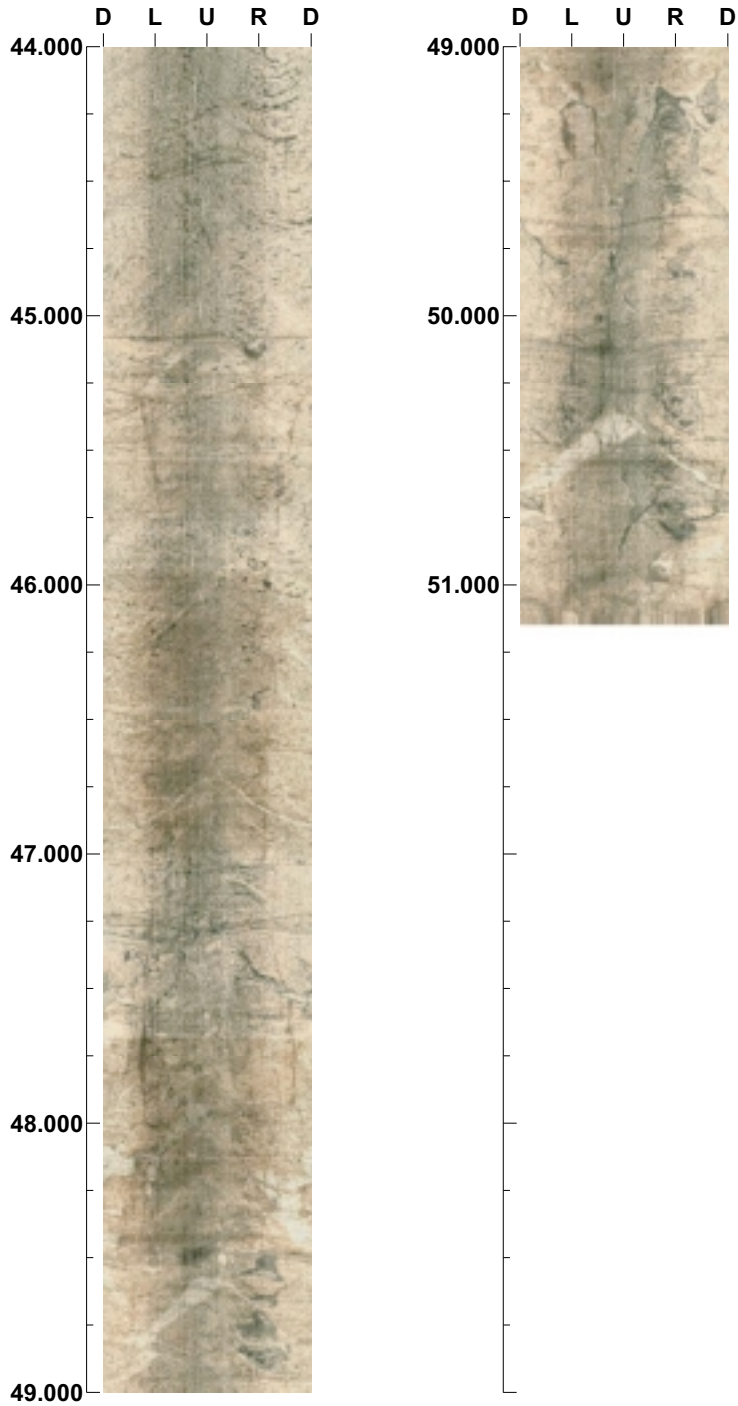
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Aspect ratio: 149 %

Project name: Forsmark
Bore hole No.: KF01A

Azimuth: 318 Inclinaton: -85

Depth range: 44.000 - 51.152 m



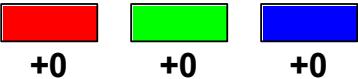
(2 / 2)

Scale: 1/25

Aspect ratio: 149 %

BIPS-image: 102.03–1001.16 m

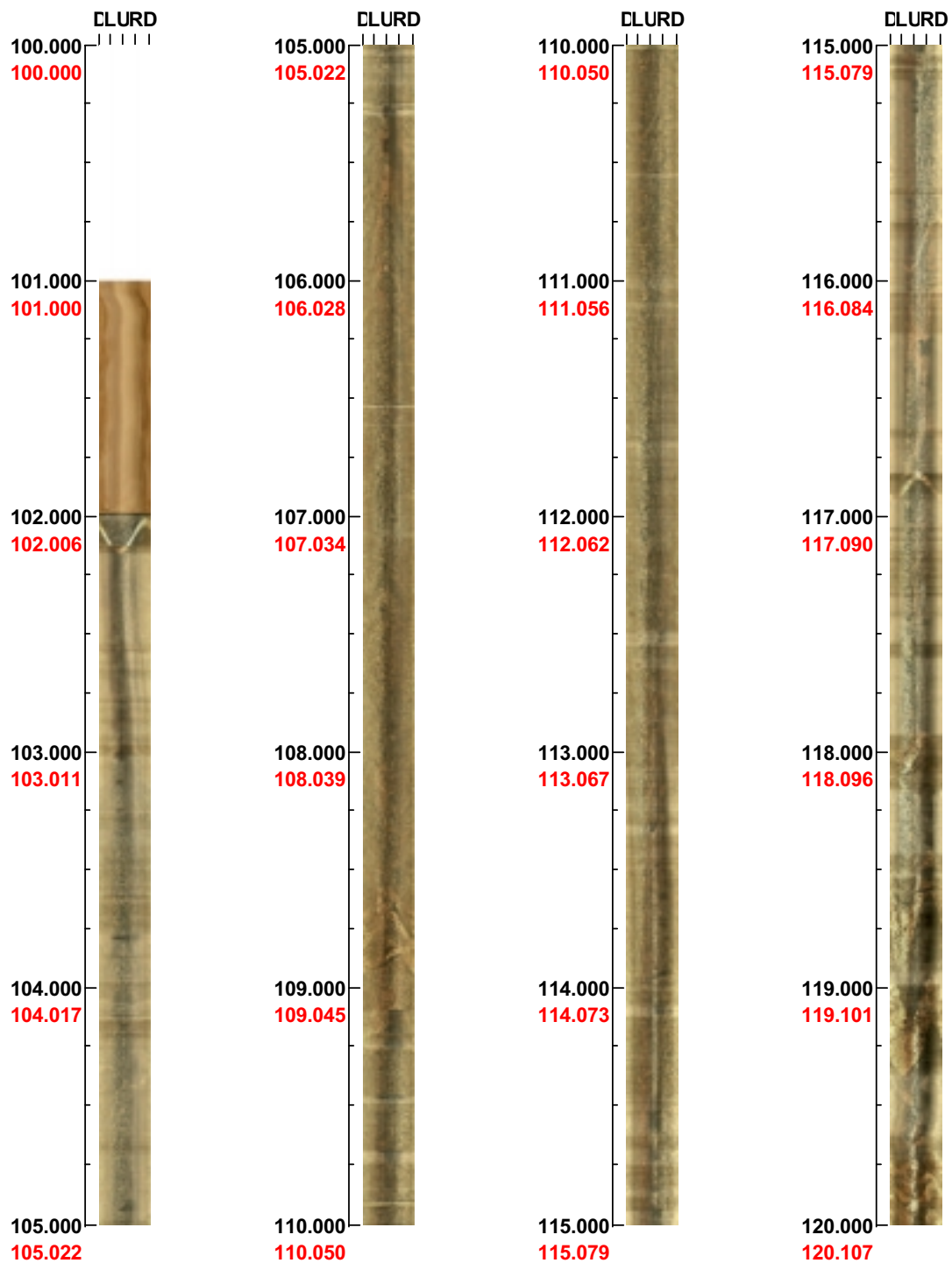
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BDT file : c:\borema~1\kfm01a_1.bdt
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Bore hole number : KFM01A
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Time : 08:43:00
Depth range : 101.000 - 649.999 m
Azimuth : 303
Inclination : -84
Diameter : 76.0 mm
Magnetic declination : 0.0
Span : 4
Scan interval : 0.25
Scan direction : To bottom
Scale : 1/25
Aspect ratio : 90 %
Pages : 28
Color : 

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -84

Depth range: 100.000 - 120.000 m

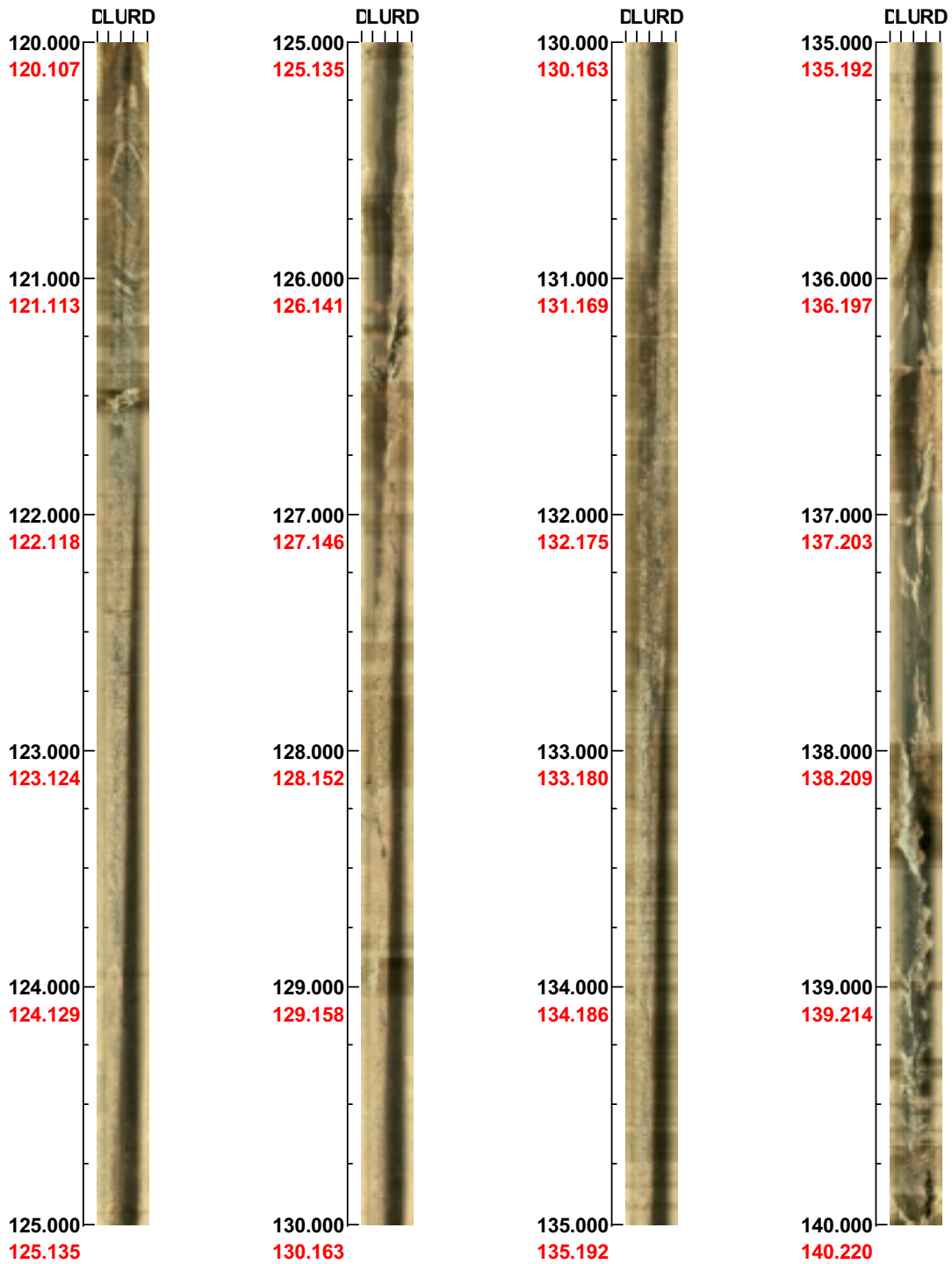


(1 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -84

Depth range: 120.000 - 140.000 m

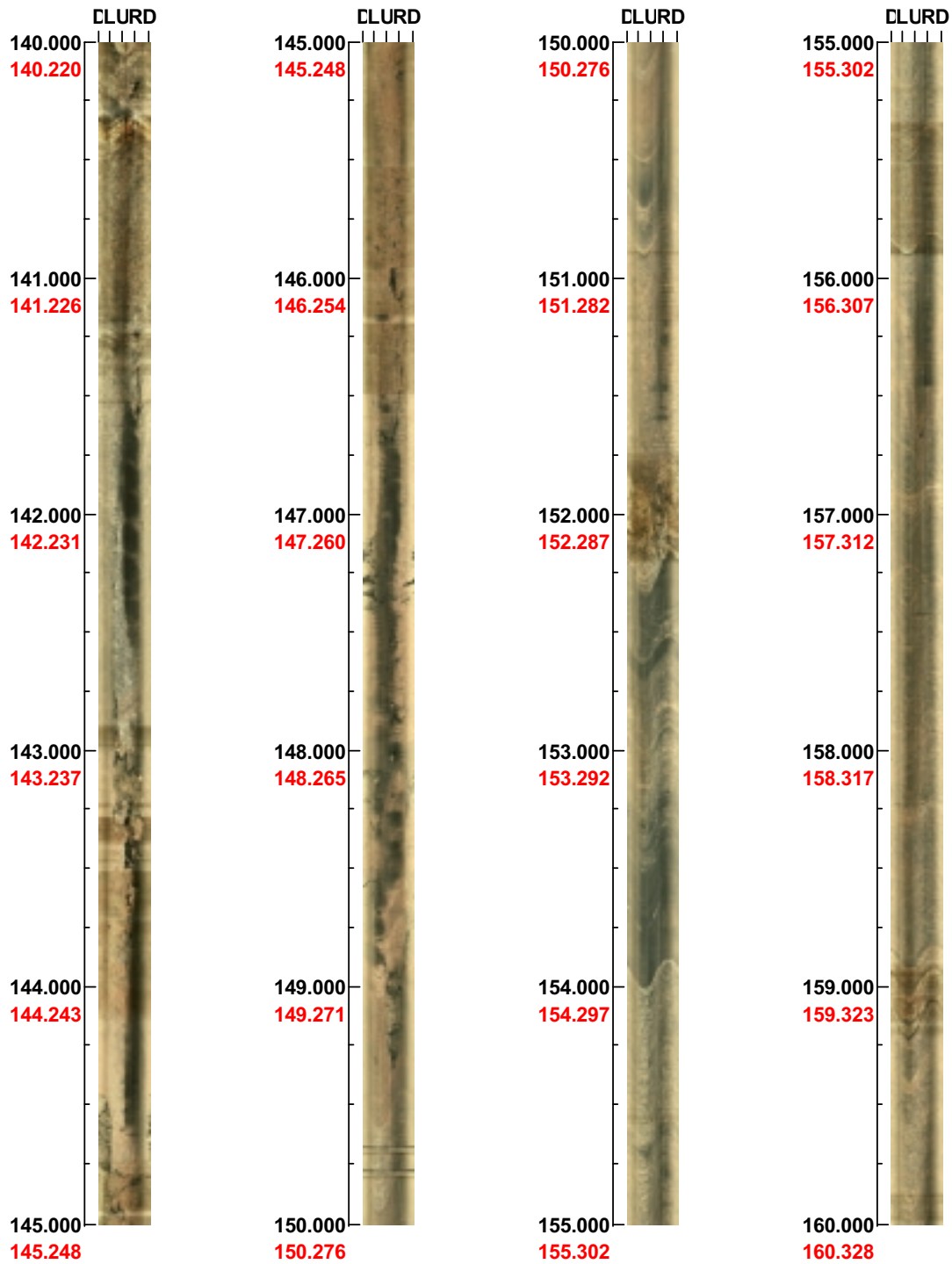


(2 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 302 Inclination: -83

Depth range: 140.000 - 160.000 m

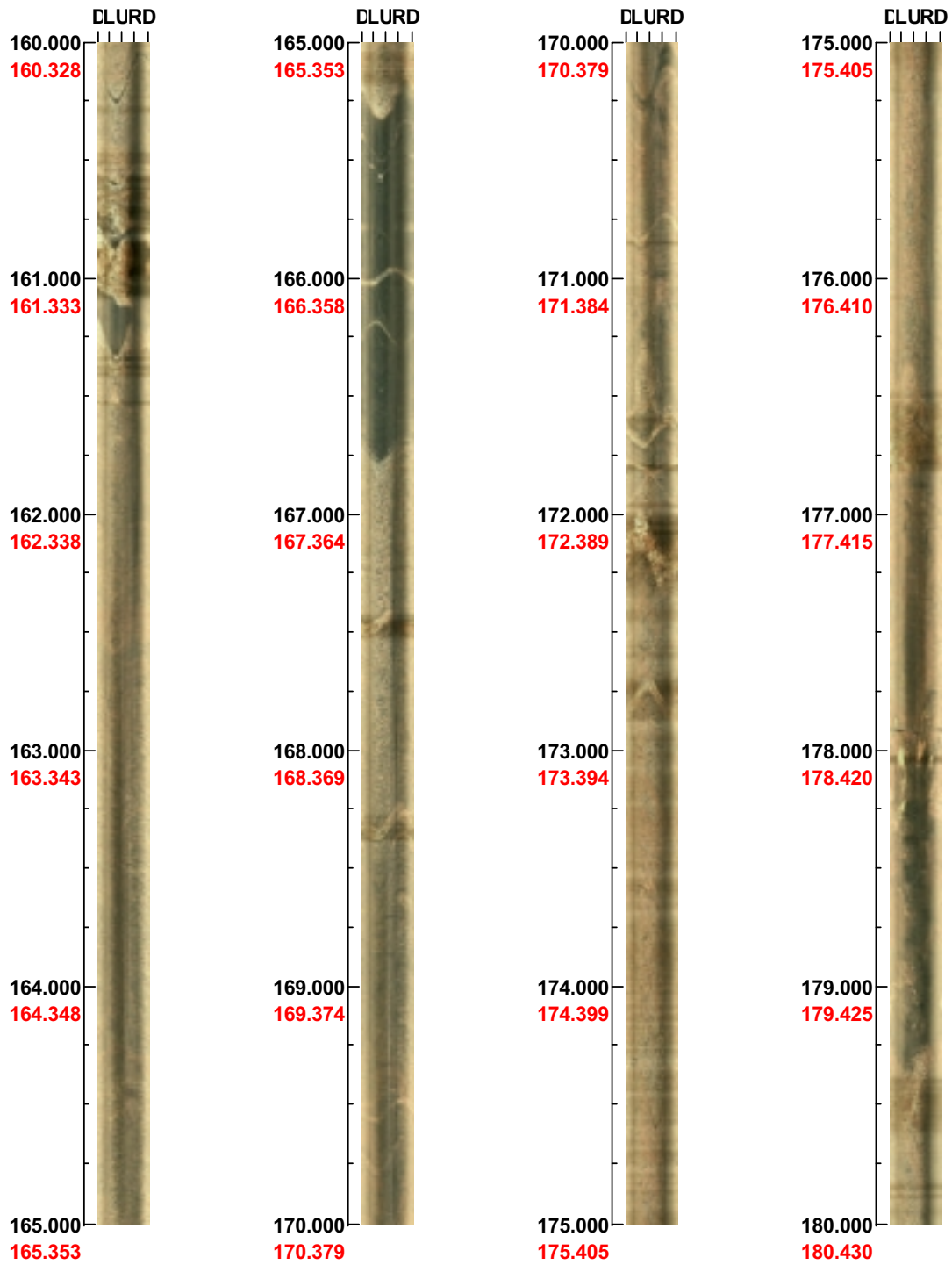


(3 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 300 Inclination: -83

Depth range: 160.000 - 180.000 m

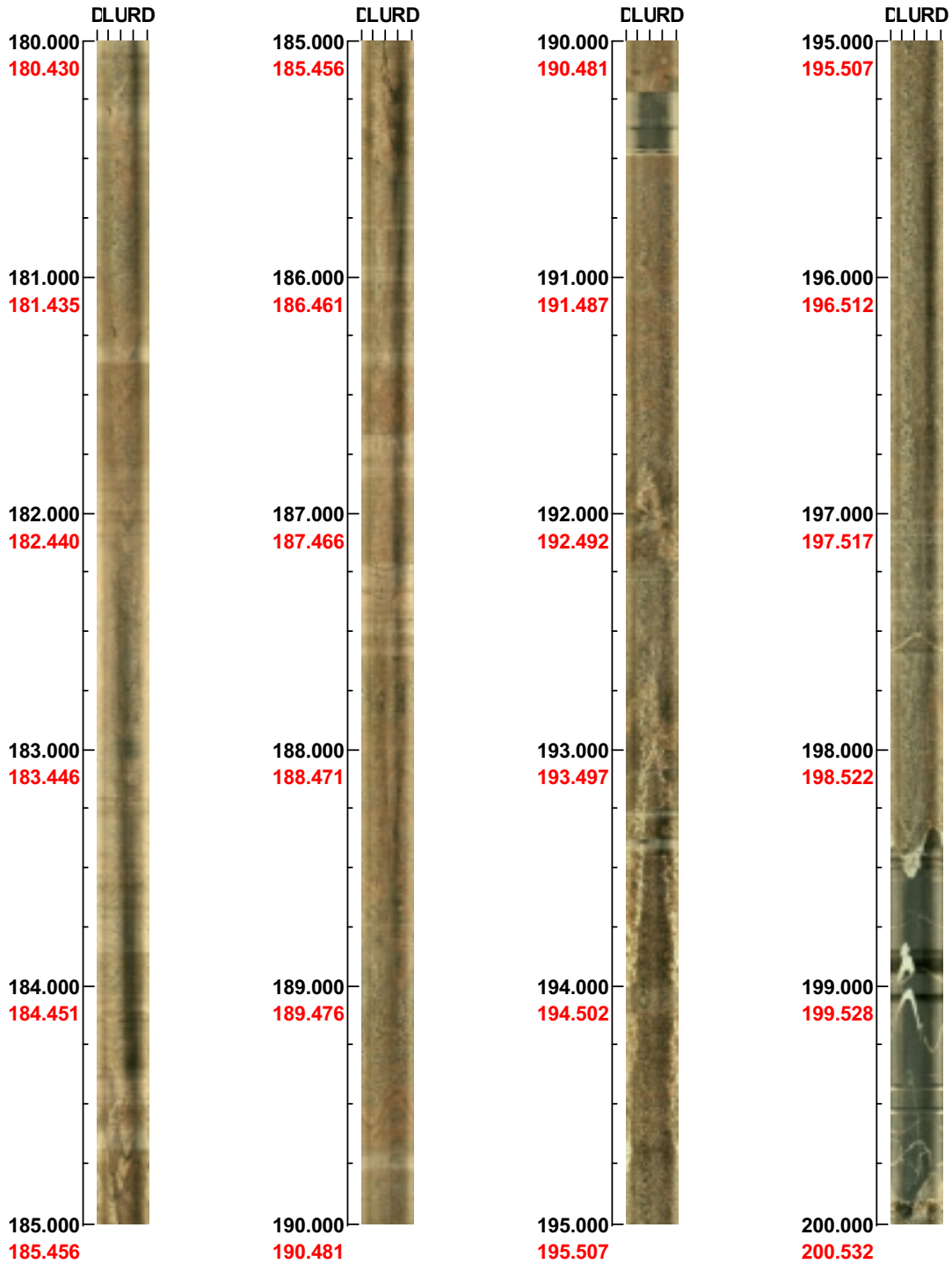


(4 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 301 Inclination: -83

Depth range: 180.000 - 200.000 m

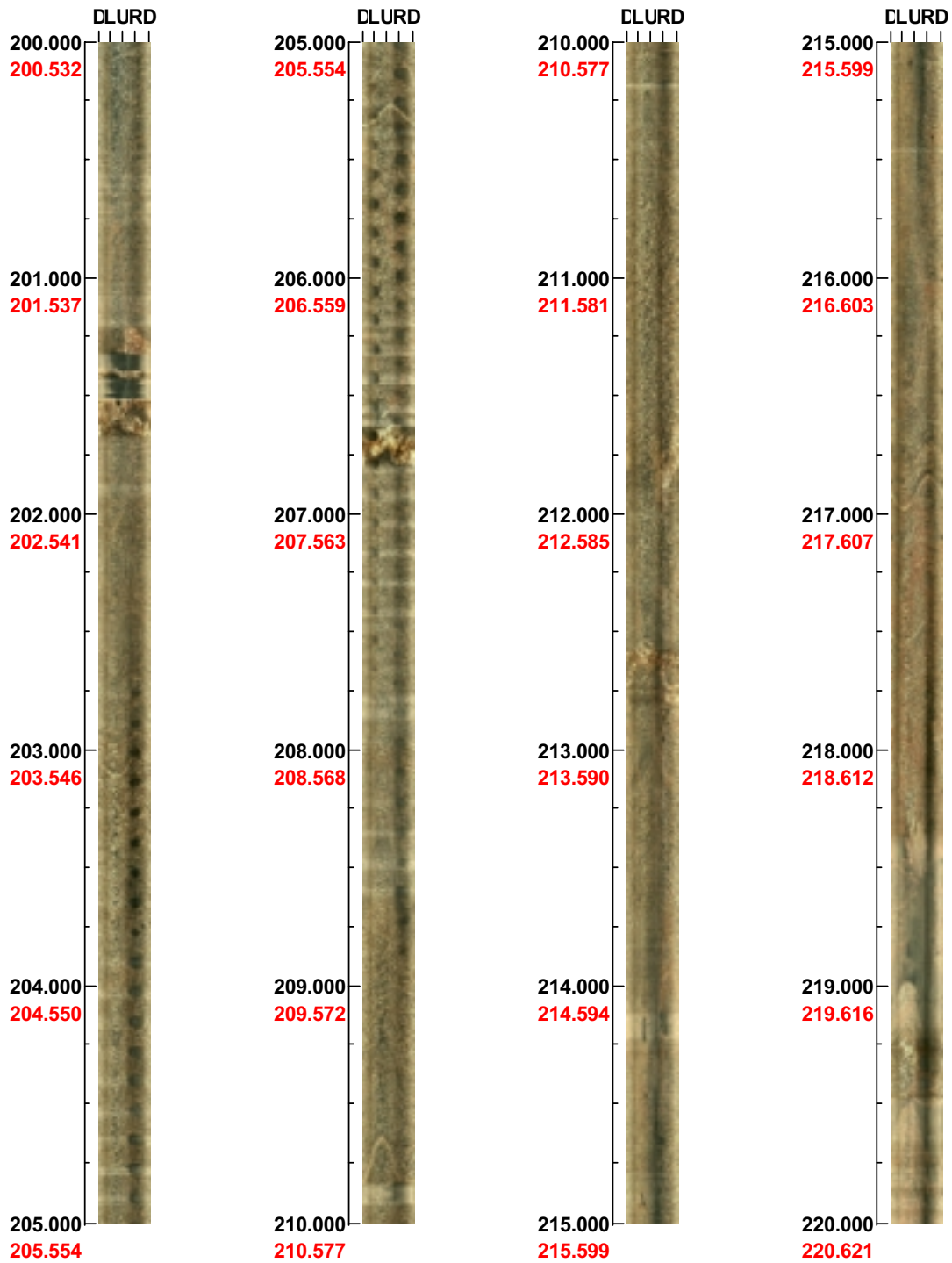


(5 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 302 Inclination: -83

Depth range: 200.000 - 220.000 m

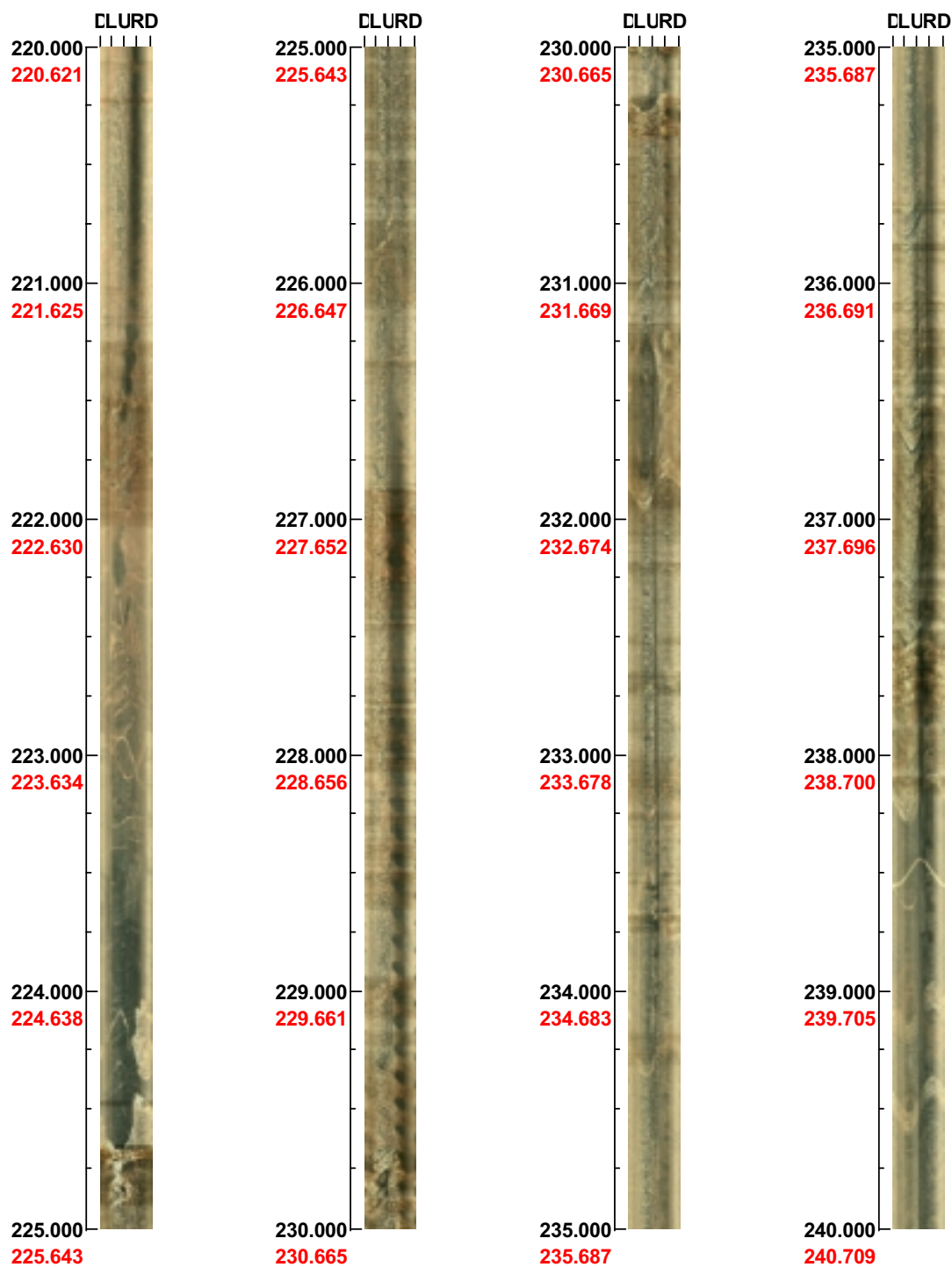


(6 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 304 Inclination: -83

Depth range: 220.000 - 240.000 m

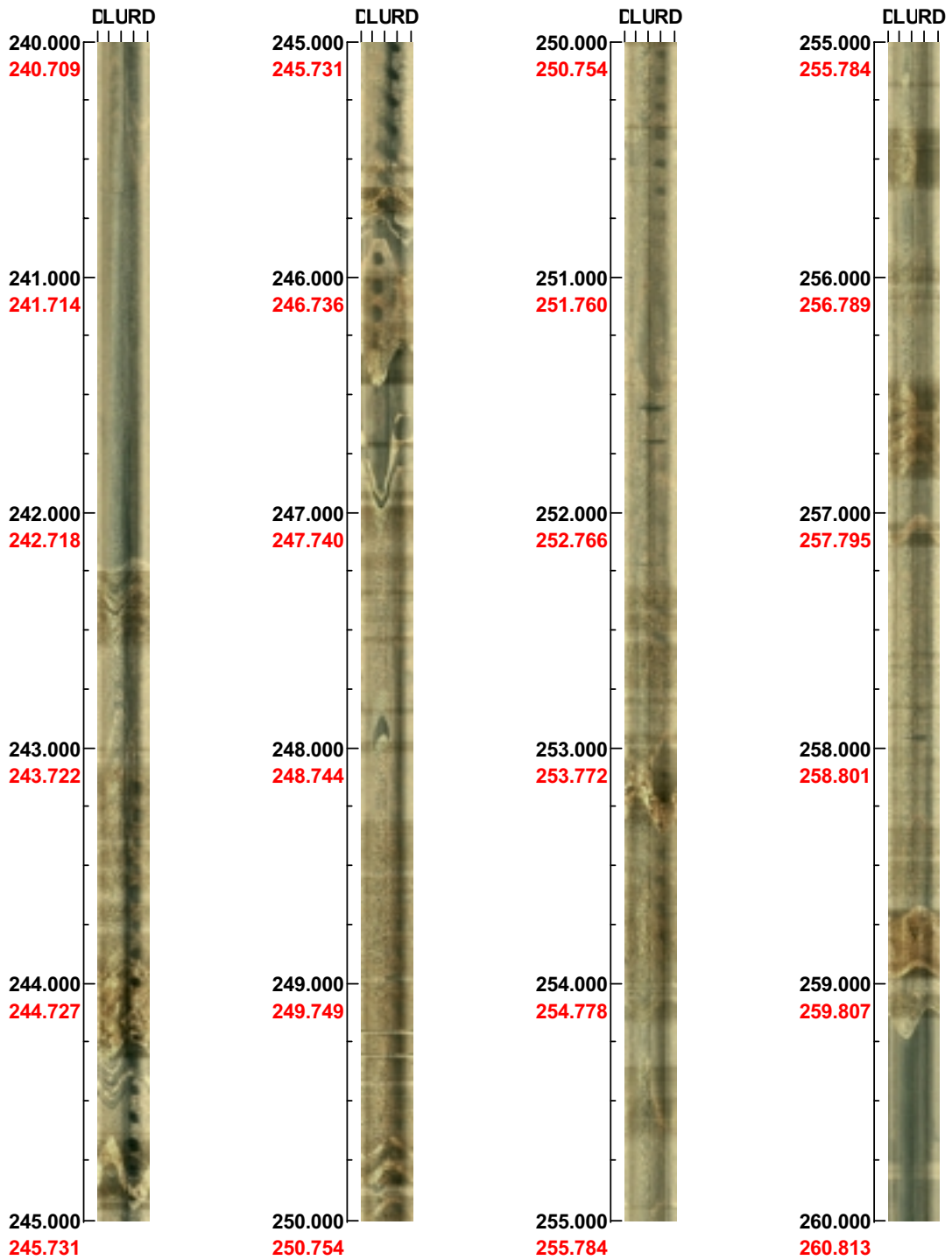


(7 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -83

Depth range: 240.000 - 260.000 m

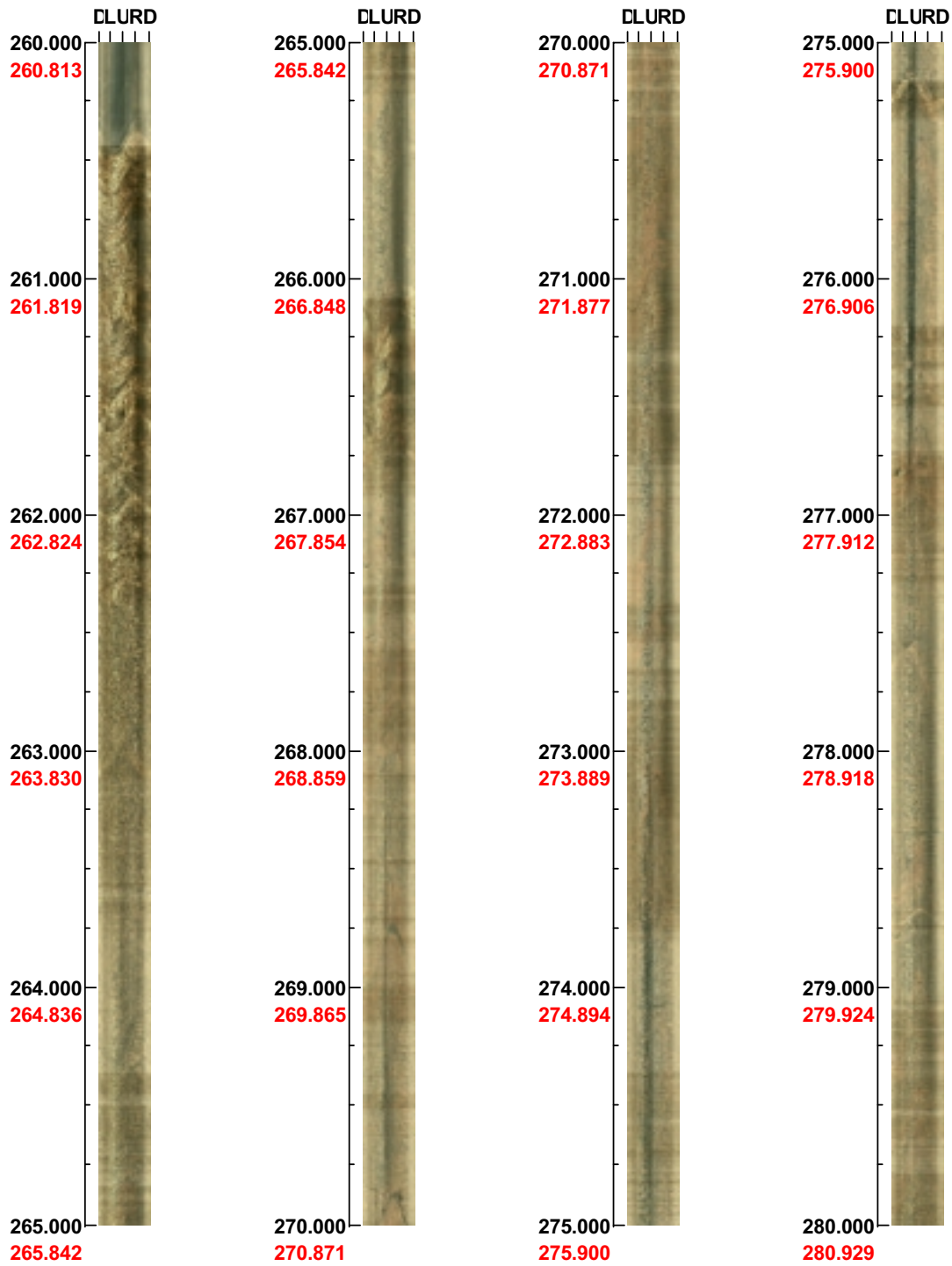


(8 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -82

Depth range: 260.000 - 280.000 m

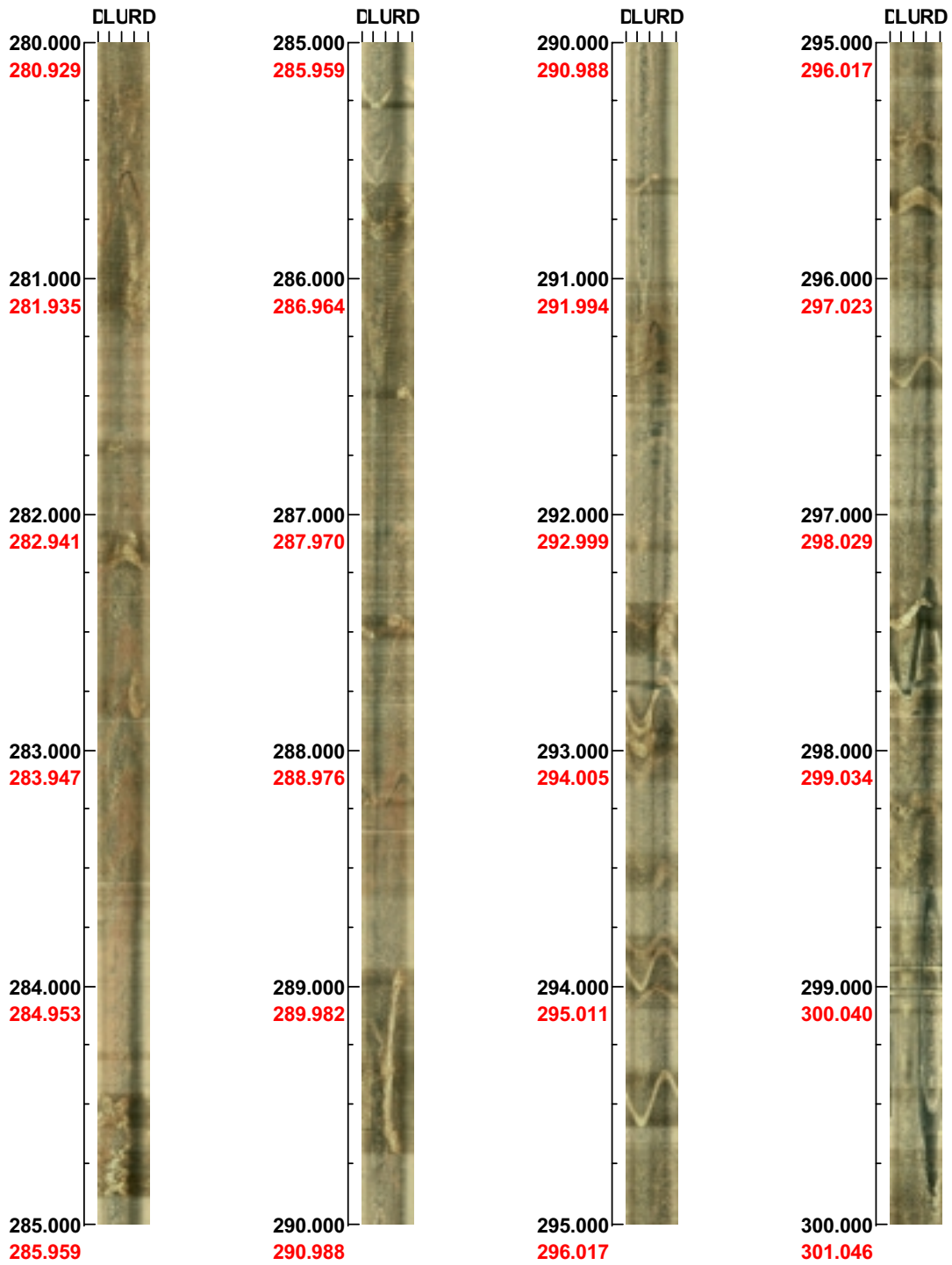


(9 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -82

Depth range: 280.000 - 300.000 m

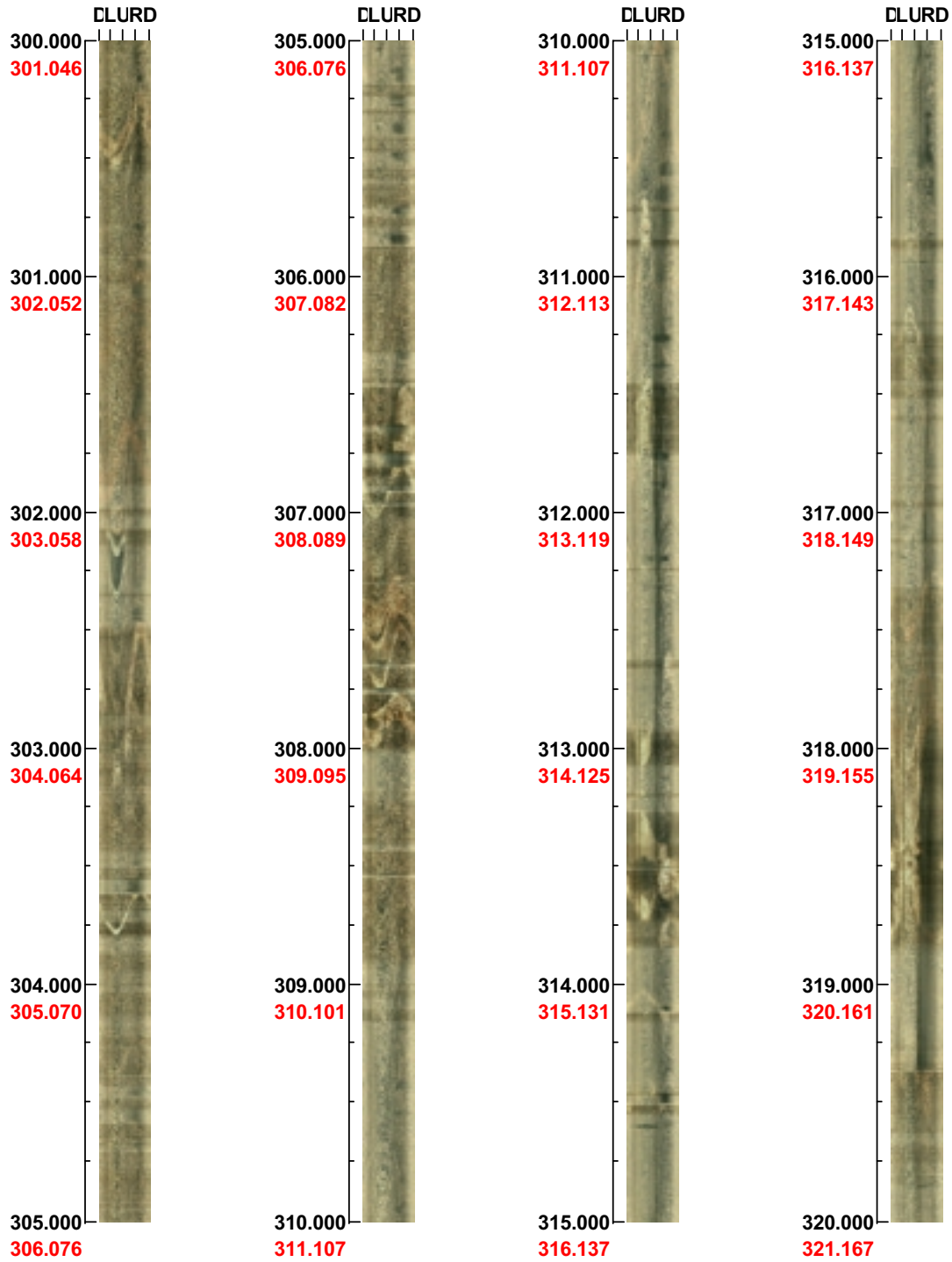


(10 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -82

Depth range: 300.000 - 320.000 m

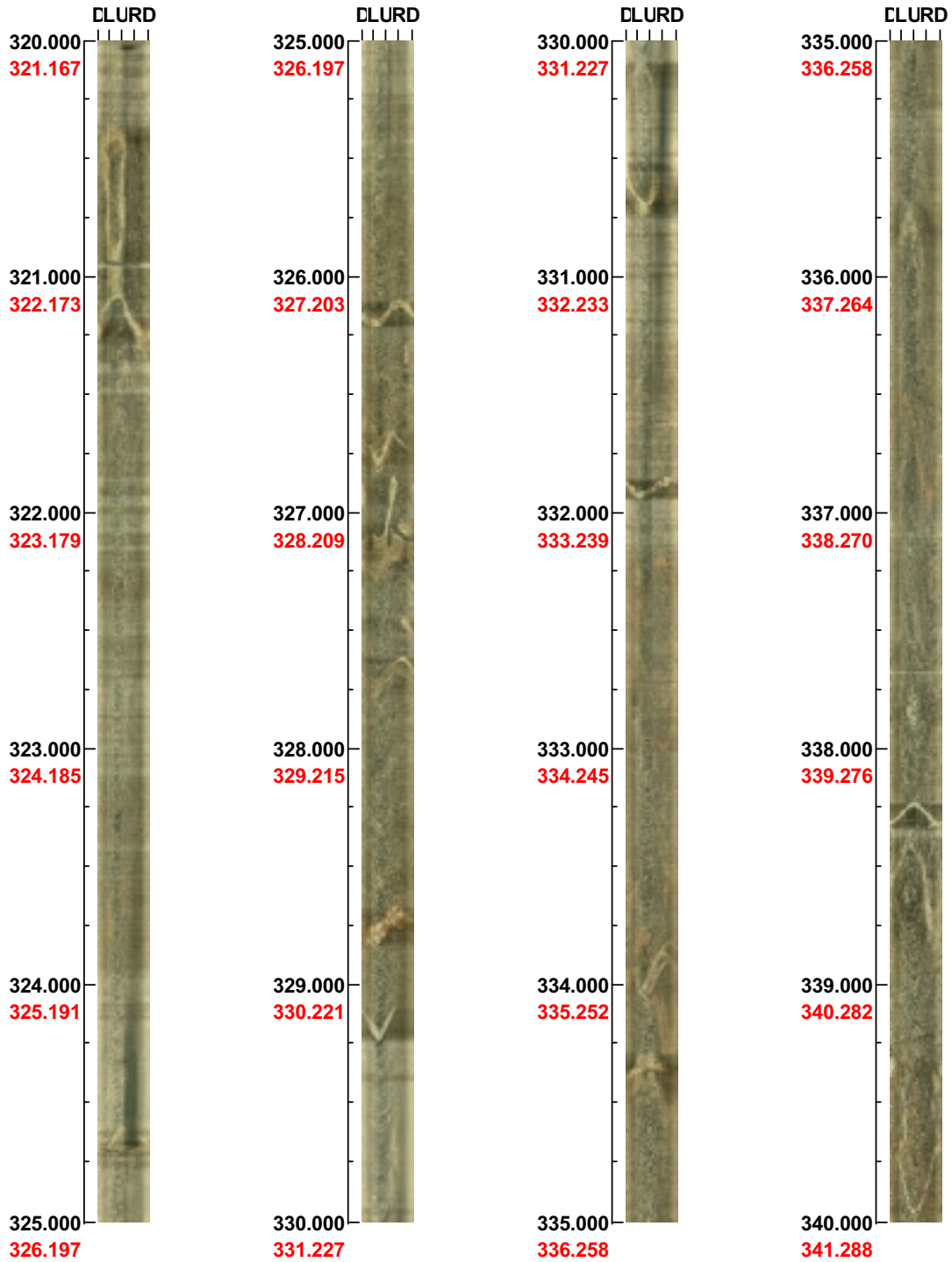


(11 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -82

Depth range: 320.000 - 340.000 m

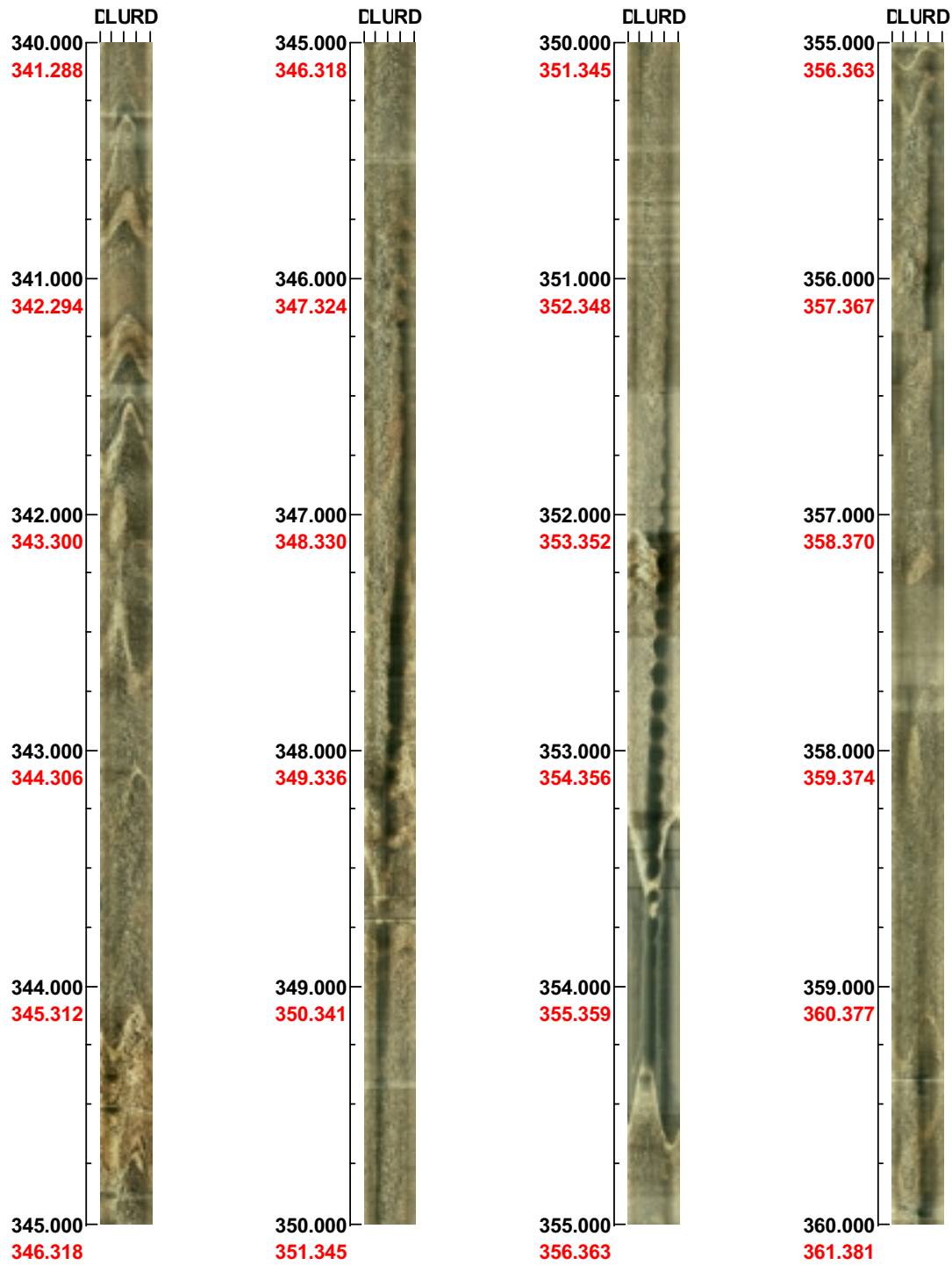


(12 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -82

Depth range: 340.000 - 360.000 m

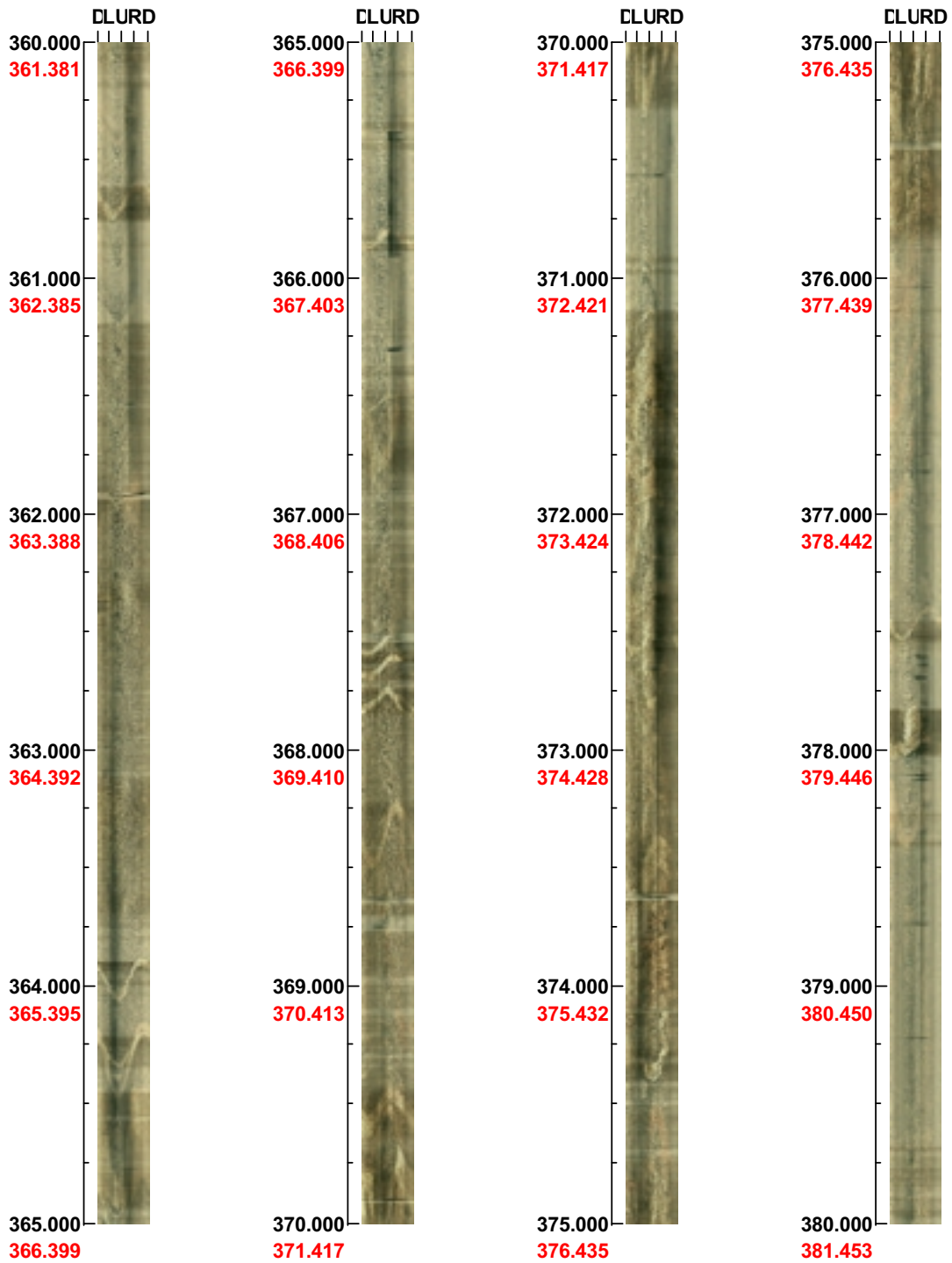


(13 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -82

Depth range: 360.000 - 380.000 m

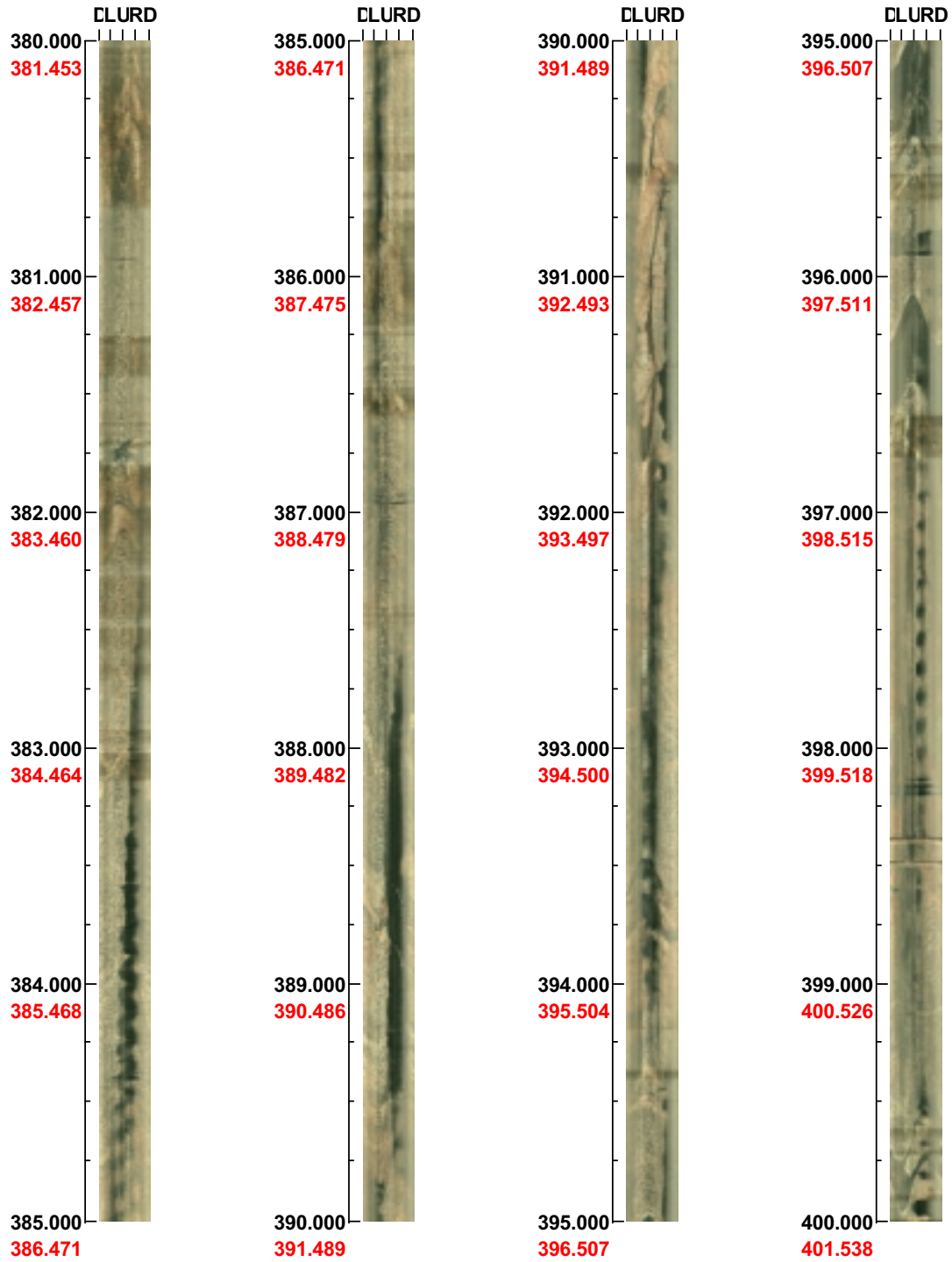


(14 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -82

Depth range: 380.000 - 400.000 m

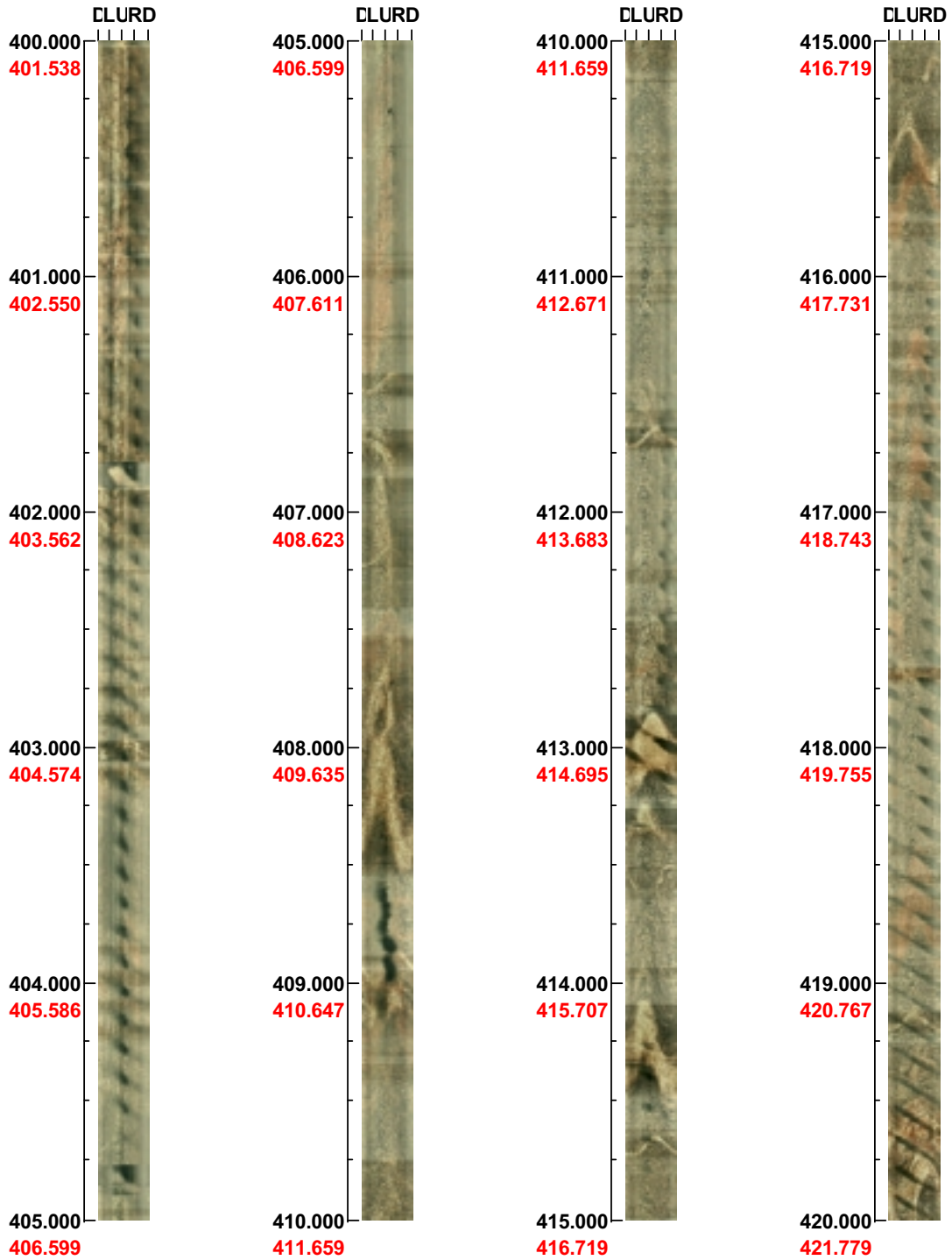


(15 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -81

Depth range: 400.000 - 420.000 m



(16 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -81

Depth range: 420.000 - 440.000 m



(17 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -81

Depth range: 440.000 - 460.000 m



(18 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -81

Depth range: 460.000 - 480.000 m



(19 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -81

Depth range: 480.000 - 500.000 m



(20 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -80

Depth range: 500.000 - 520.000 m

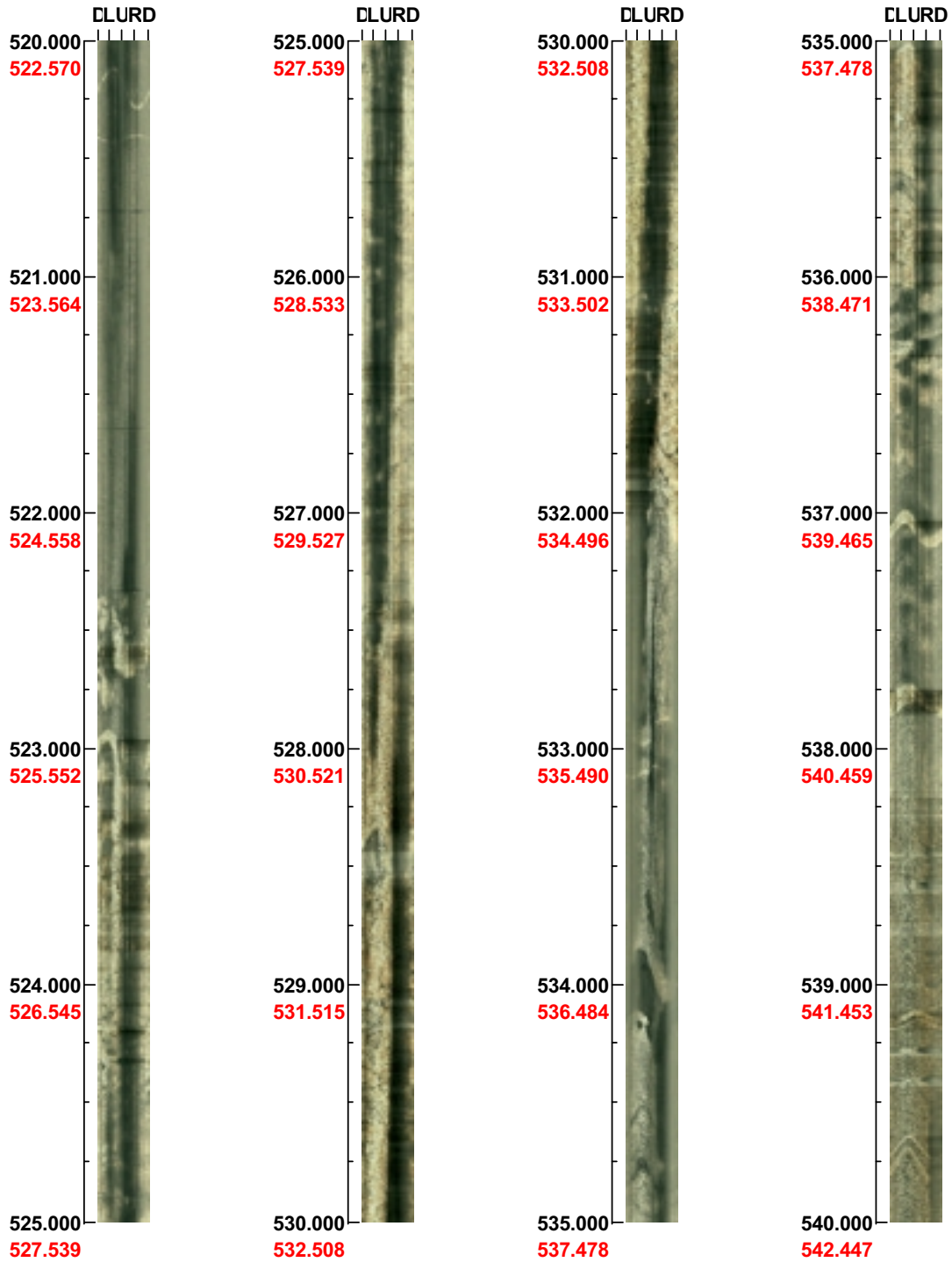


(21 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -80

Depth range: 520.000 - 540.000 m



(22 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 304 Inclination: -80

Depth range: 540.000 - 560.000 m

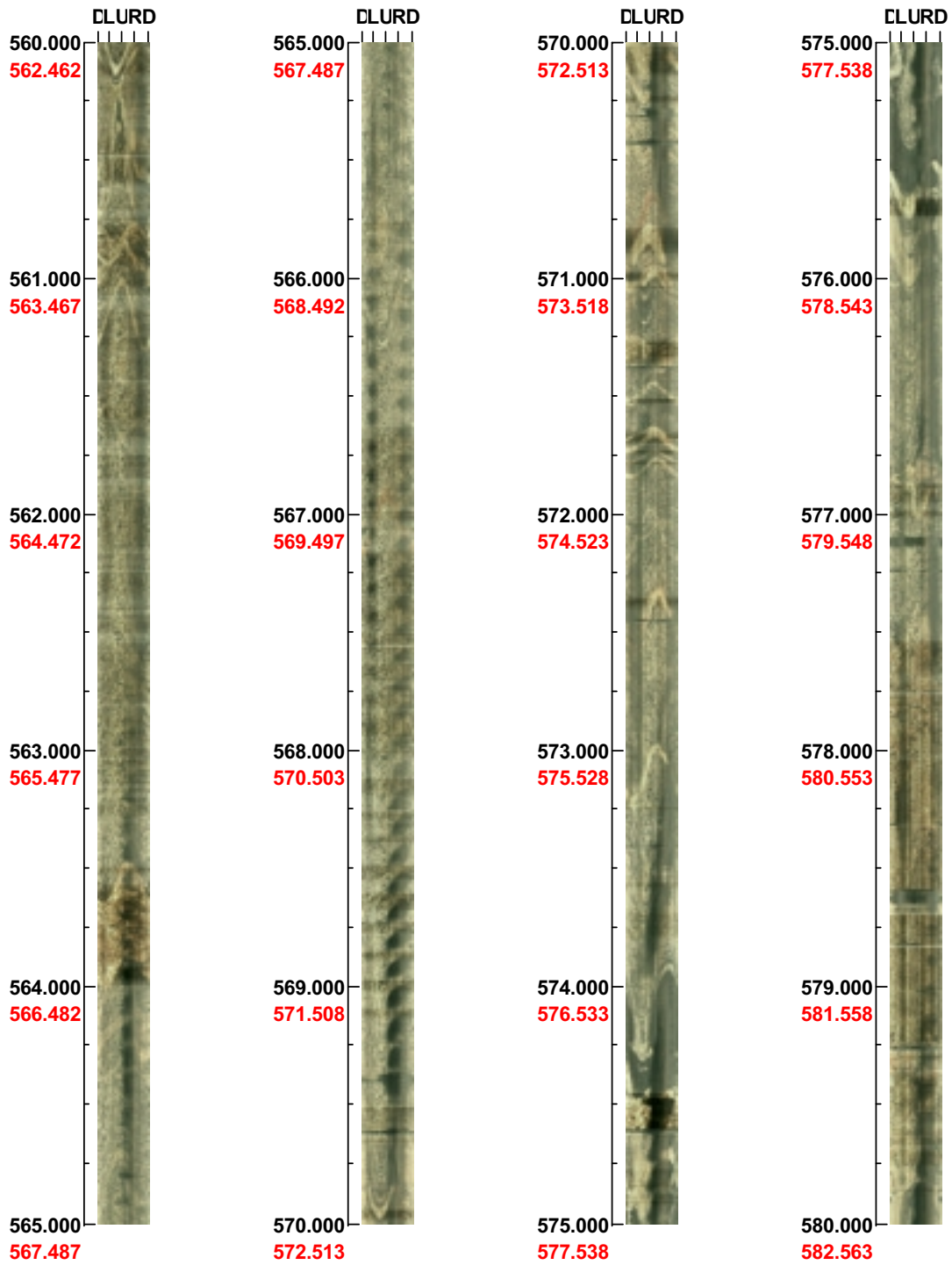


(23 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -79

Depth range: 560.000 - 580.000 m

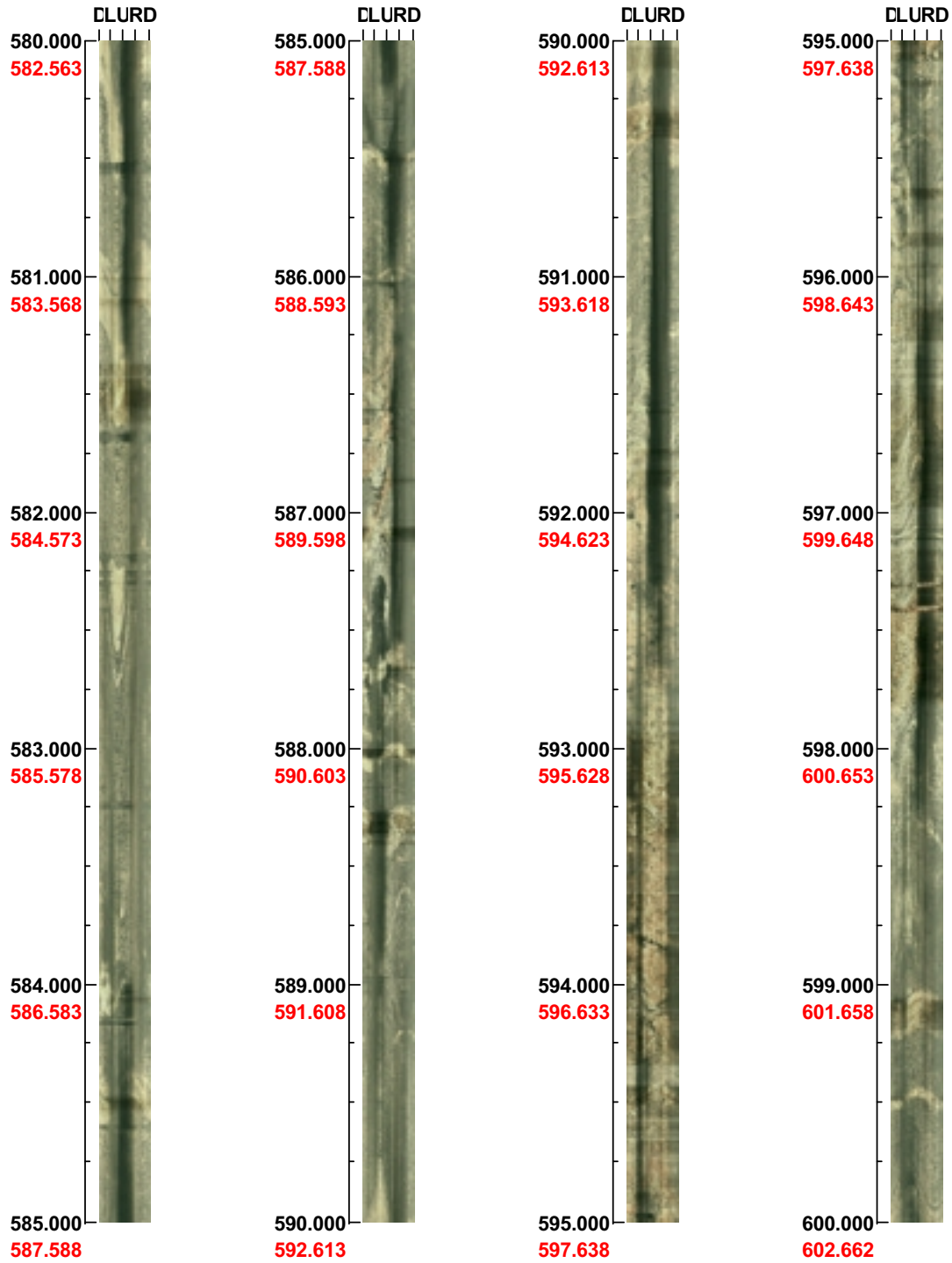


(24 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -79

Depth range: 580.000 - 600.000 m

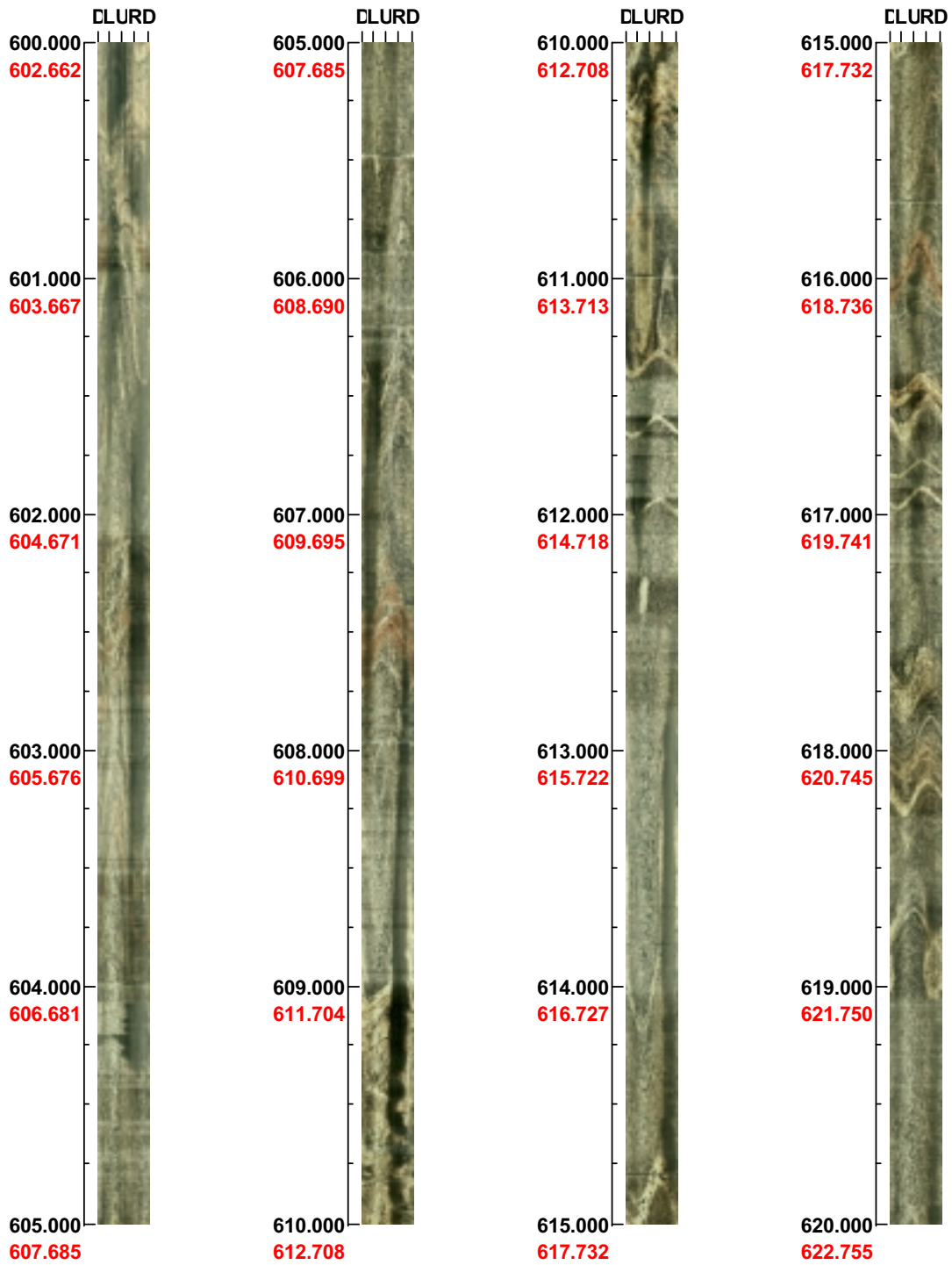


(25 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 304 Inclination: -79

Depth range: 600.000 - 620.000 m



(26 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 304 Inclination: -78

Depth range: 620.000 - 640.000 m

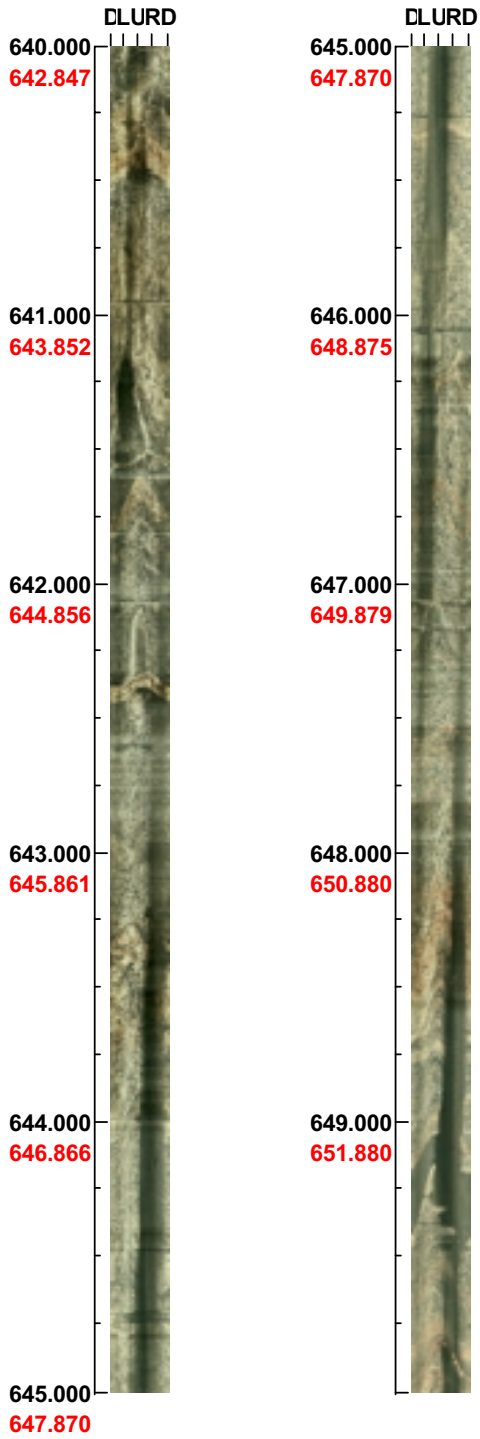


(27 / 28) Scale: 1/25 Aspect ratio: 90 %

Project name: Forsmark
Bore hole No.: KFM01A


Azimuth: 303 Inclination: -78

Depth range: 640.000 - 649.999 m



(28 / 28) Scale: 1/25 Aspect ratio: 90 %

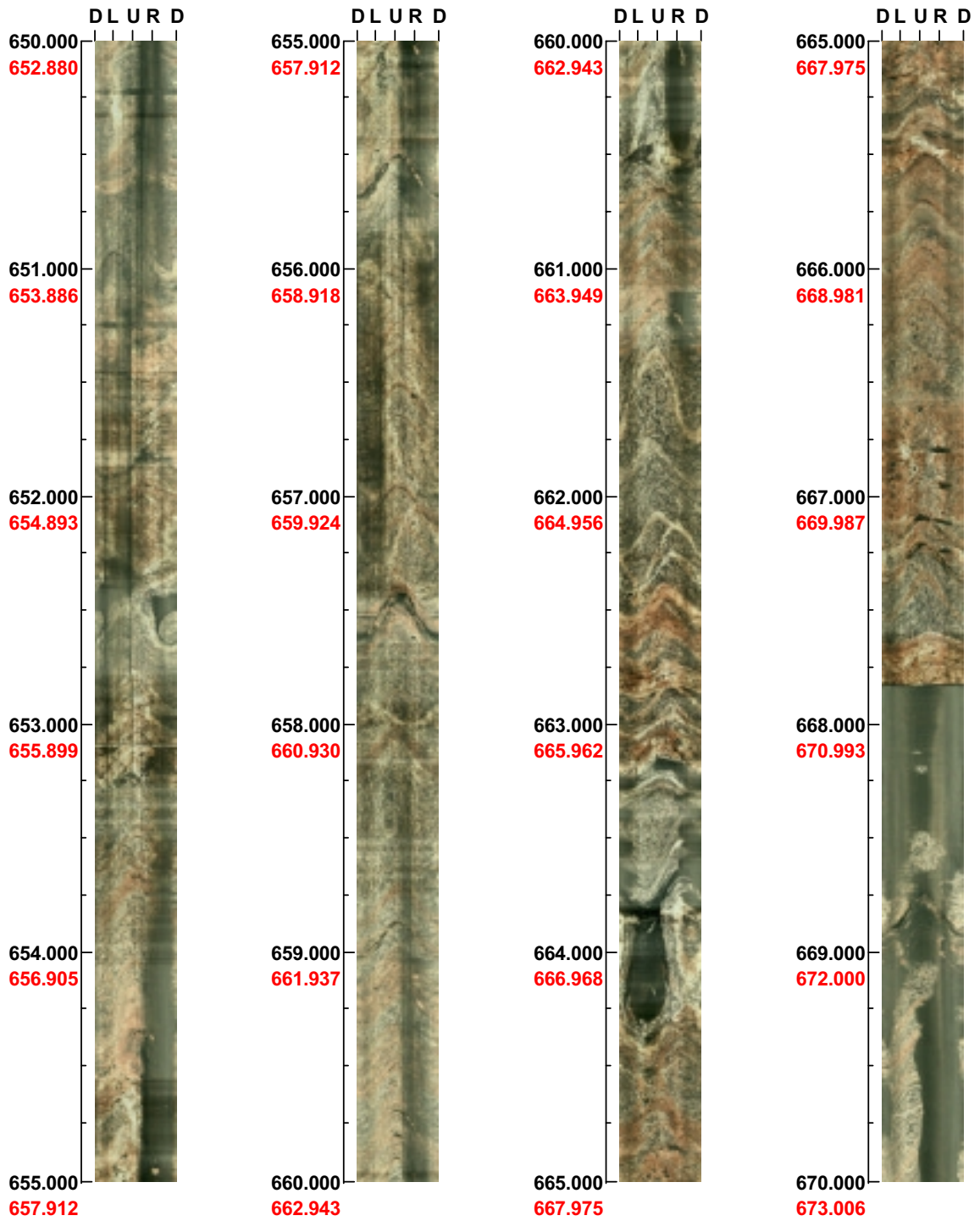
Project name: Forsmark

Image file : c:\borema~1\kfm01a_2.bip
BDT file : c:\borema~1\kfm01a_2.bdt
Locality : FORSMARK
Bore hole number : KFM01A
Date : 02/12/11
Time : 15:11:00
Depth range : 650.000 - 697.013 m
Azimuth : 303
Inclination : -78
Diameter : 76.0 mm
Magnetic declination : 0.0
Span : 4
Scan interval : 0.25
Scan direction : To bottom
Scale : 1/25
Aspect ratio : 150 %
Pages : 3
Color : 

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -78

Depth range: 650.000 - 670.000 m



(1 / 3) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -78

Depth range: 670.000 - 690.000 m

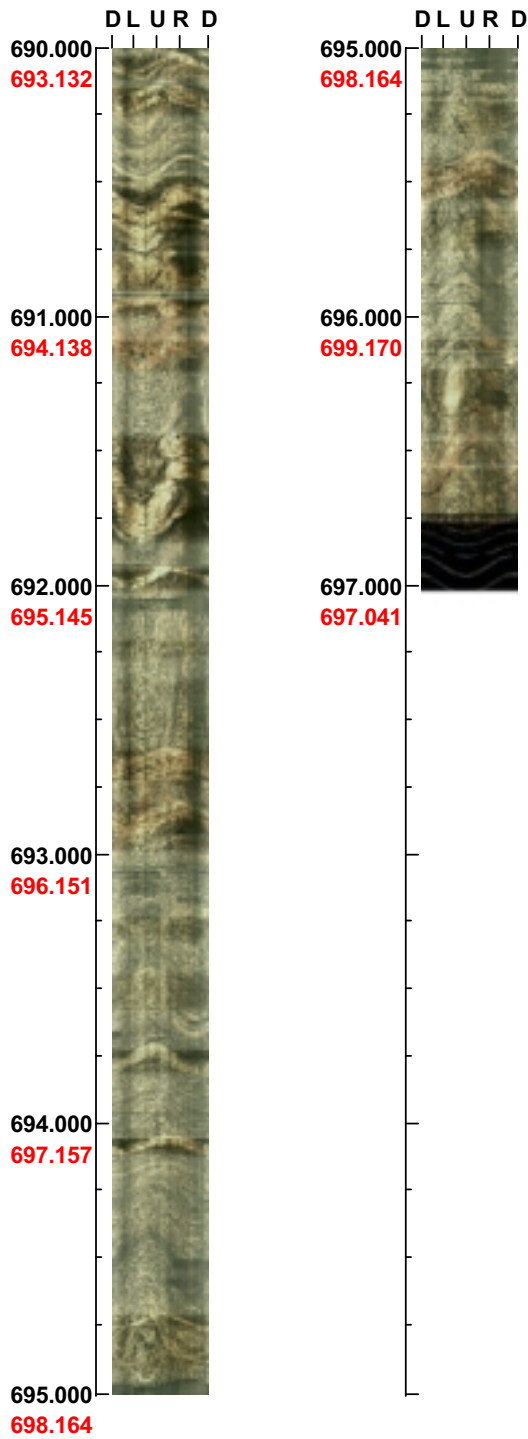


(2 / 3) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A


Azimuth: 302 Inclination: -78

Depth range: 690.000 - 697.013 m



(3 / 3) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark

Image file : c:\borema~1\kfm01a_3.bip
BDT file : c:\borema~1\kfm01a_3.bdt
Locality : FORSMARK
Bore hole number : KFM01A
Date : 02/12/11
Time : 17:18:00
Depth range : 696.000 - 996.137 m
Azimuth : 303
Inclination : -78
Diameter : 76.0 mm
Magnetic declination : 0.0
Span : 4
Scan interval : 0.25
Scan direction : To bottom
Scale : 1/25
Aspect ratio : 150 %
Pages : 16
Color : 
 +0 +0 +0

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -78

Depth range: 696.000 - 716.000 m



(1 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -77

Depth range: 716.000 - 736.000 m

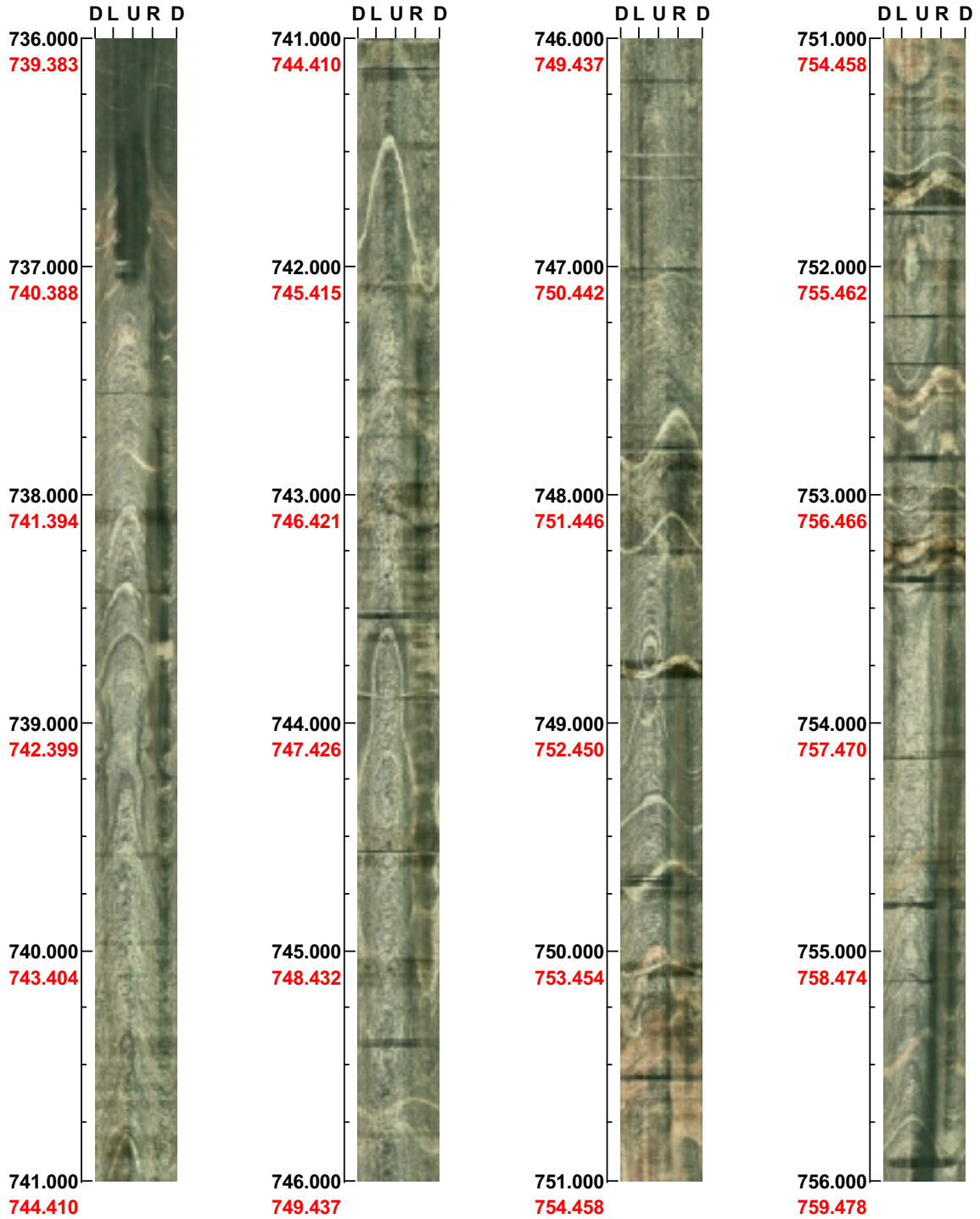


(2 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 303 Inclination: -77

Depth range: 736.000 - 756.000 m

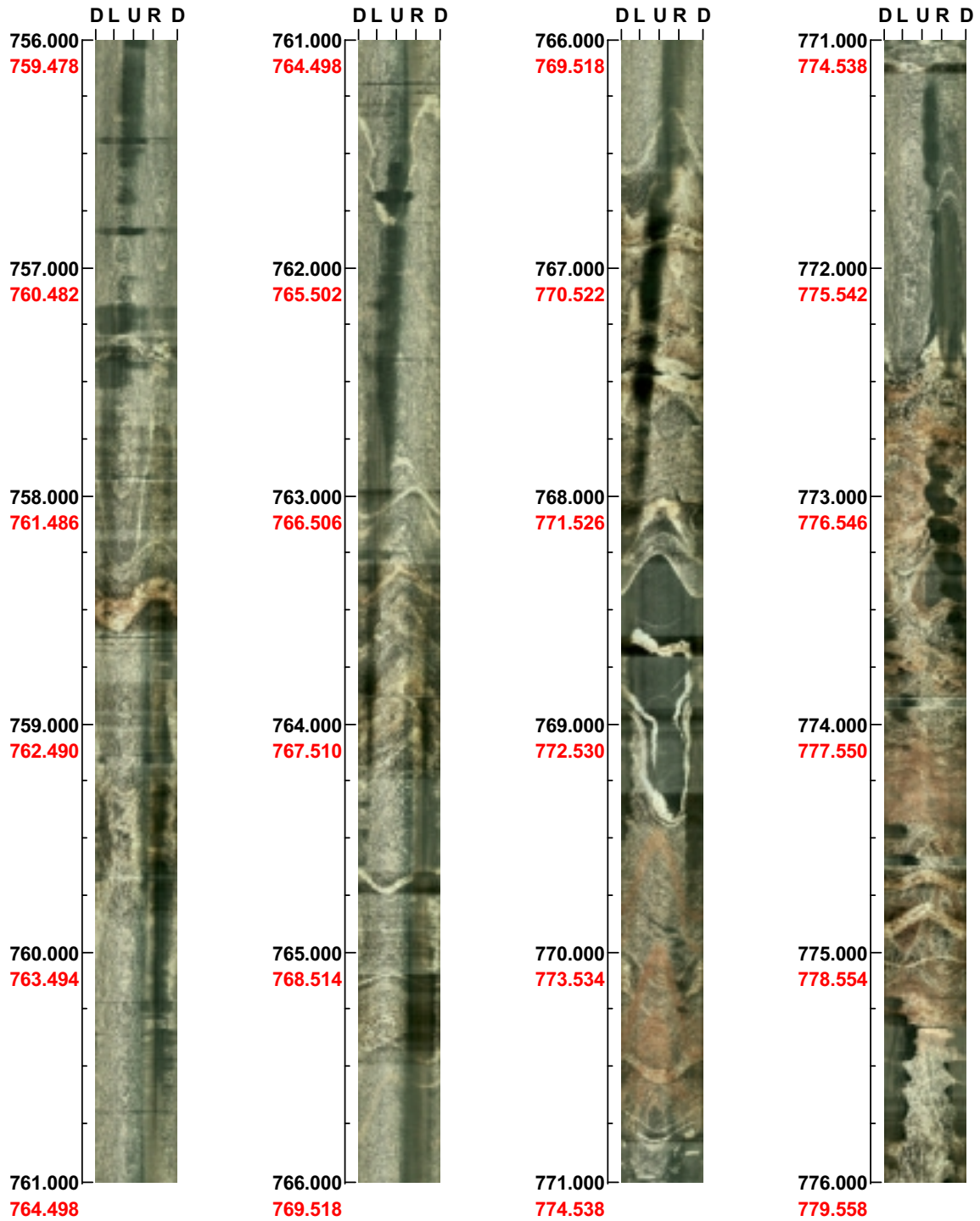


(3 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 304 Inclination: -77

Depth range: 756.000 - 776.000 m

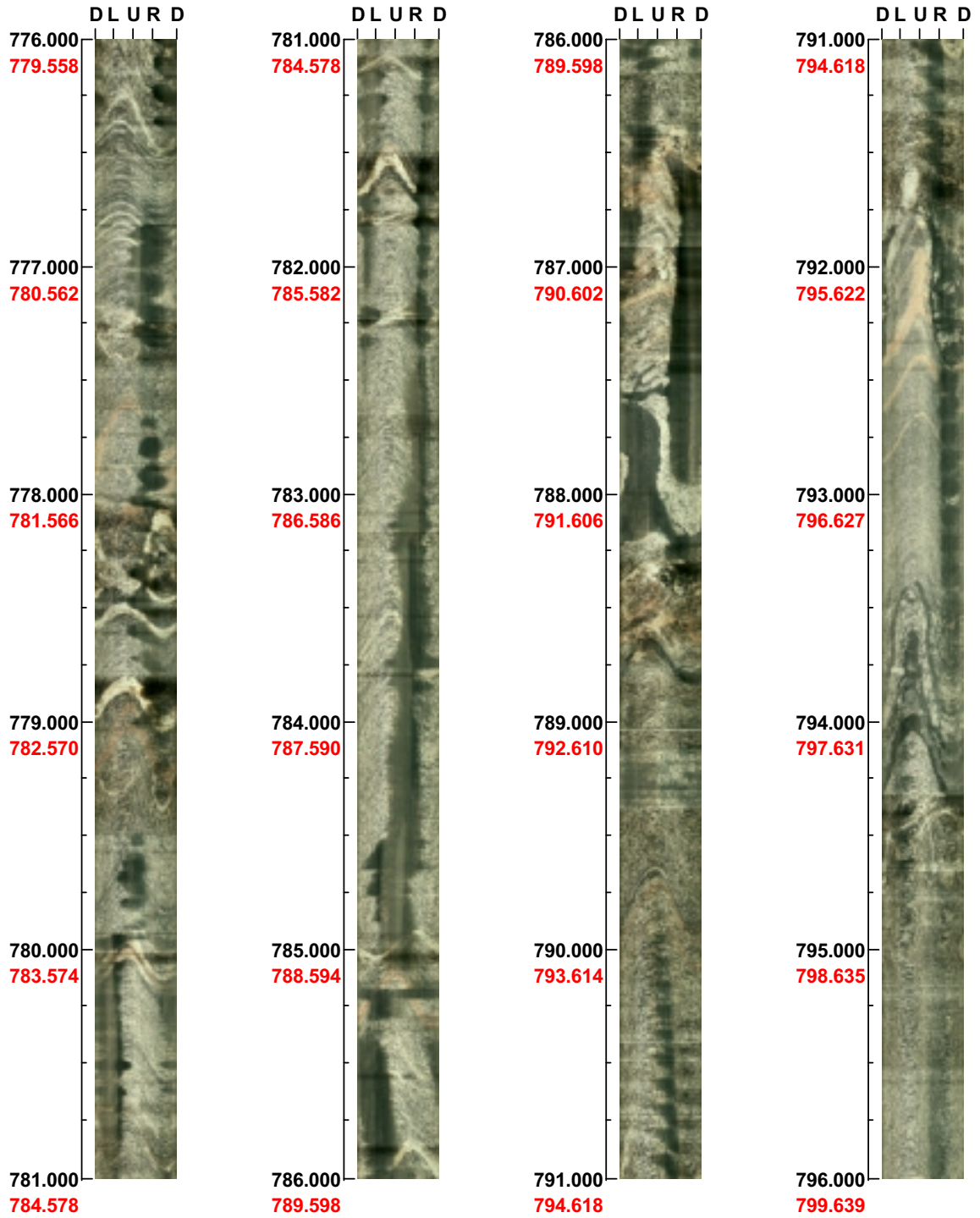


(4 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 304 Inclination: -77

Depth range: 776.000 - 796.000 m

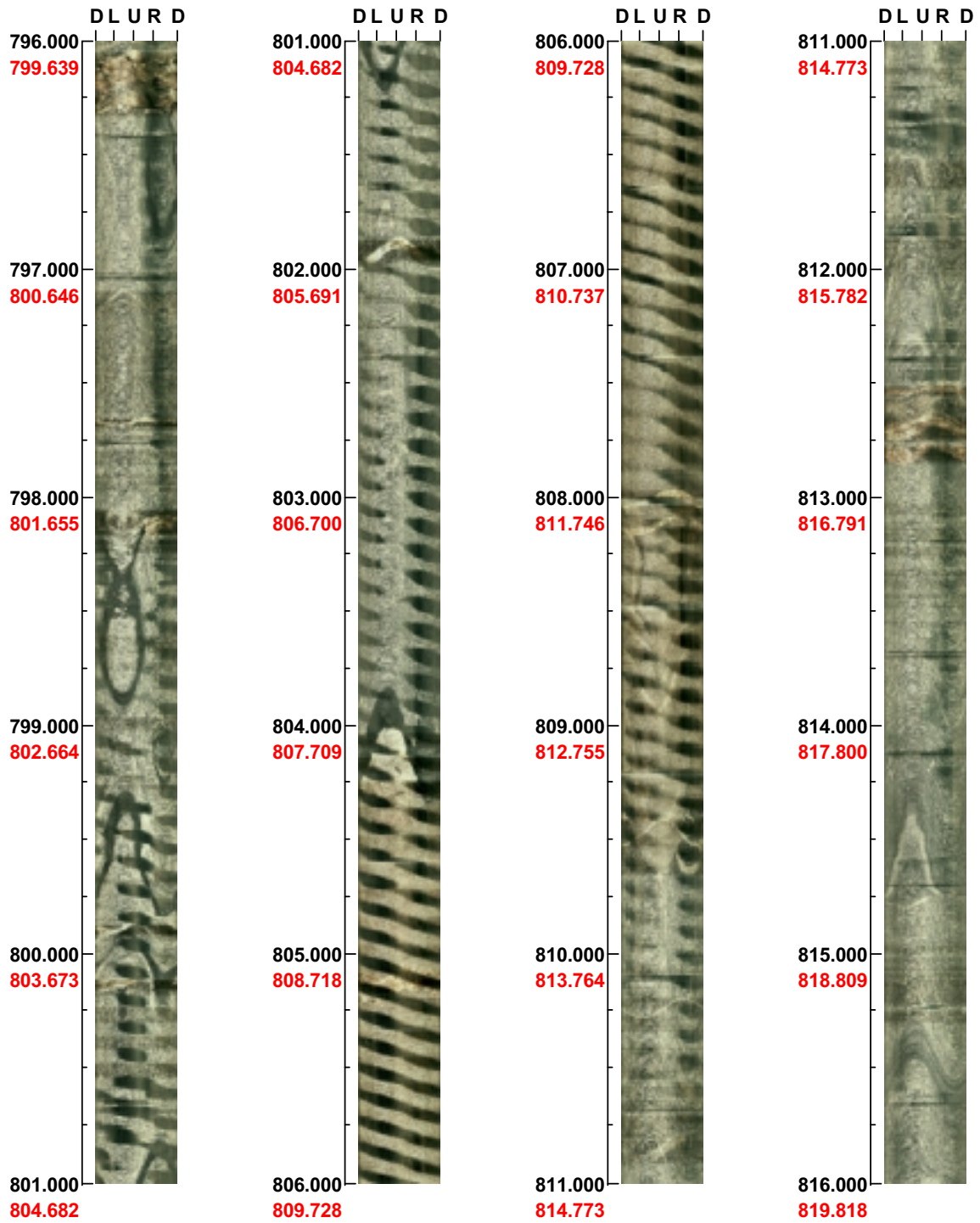


(5 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -76

Depth range: 796.000 - 816.000 m

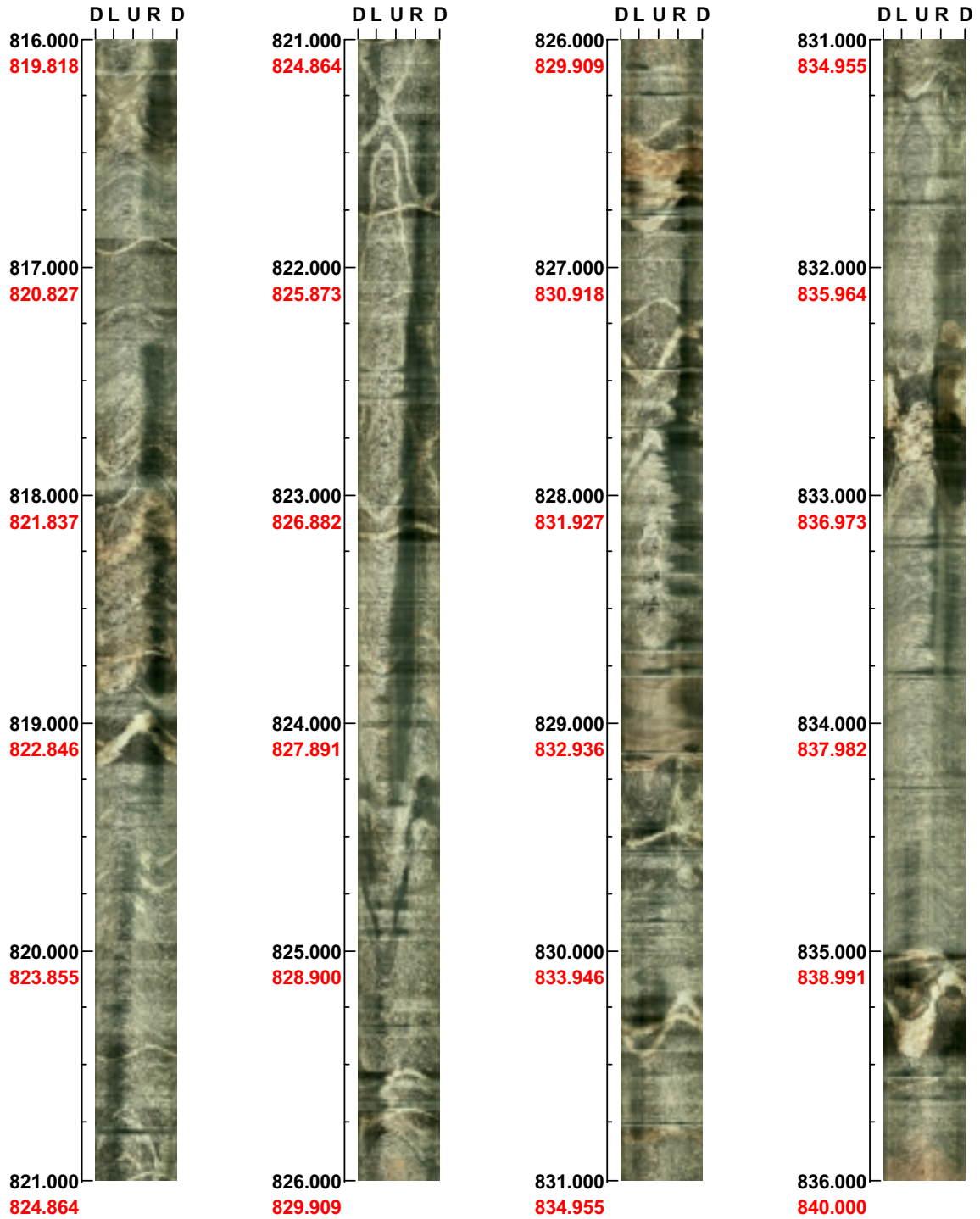


(6 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -76

Depth range: 816.000 - 836.000 m

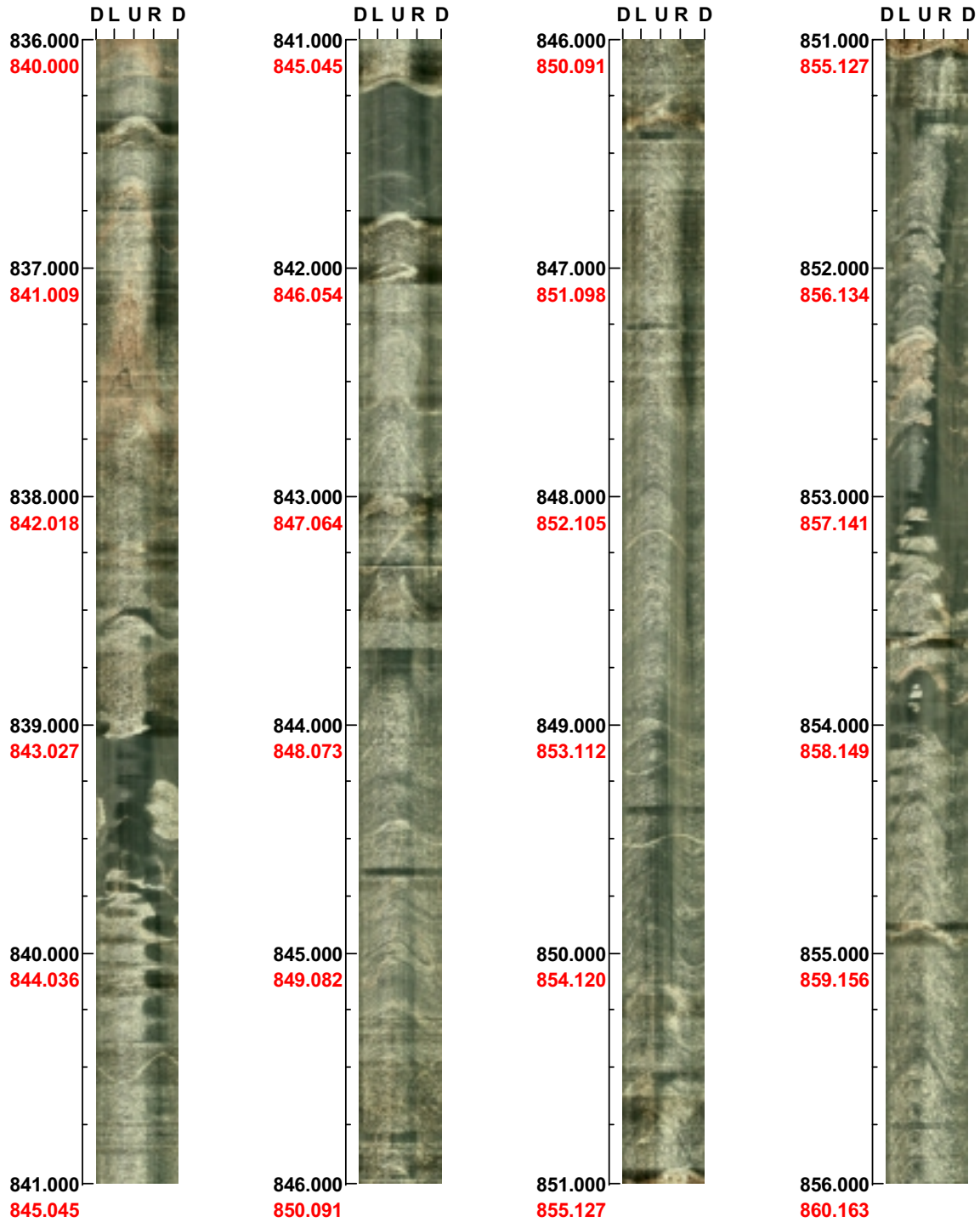


(7 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -76

Depth range: 836.000 - 856.000 m



(8 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -76

Depth range: 856.000 - 876.000 m

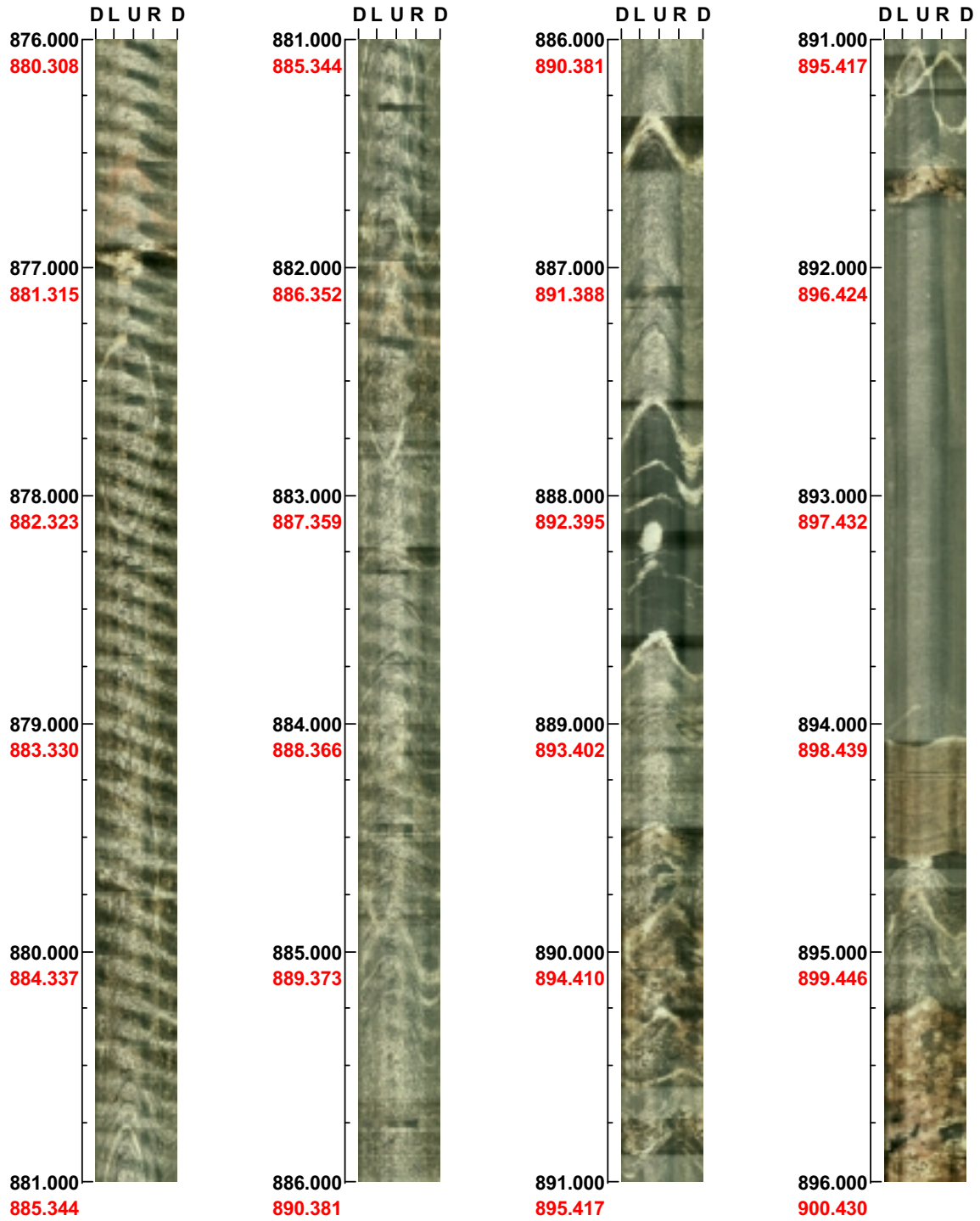


(9 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 305 Inclination: -76

Depth range: 876.000 - 896.000 m



(10 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -76

Depth range: 896.000 - 916.000 m



(11 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -75

Depth range: 916.000 - 936.000 m



(12 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -75

Depth range: 936.000 - 956.000 m



(13 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -75

Depth range: 956.000 - 976.000 m



(14 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 306 Inclination: -75

Depth range: 976.000 - 996.000 m

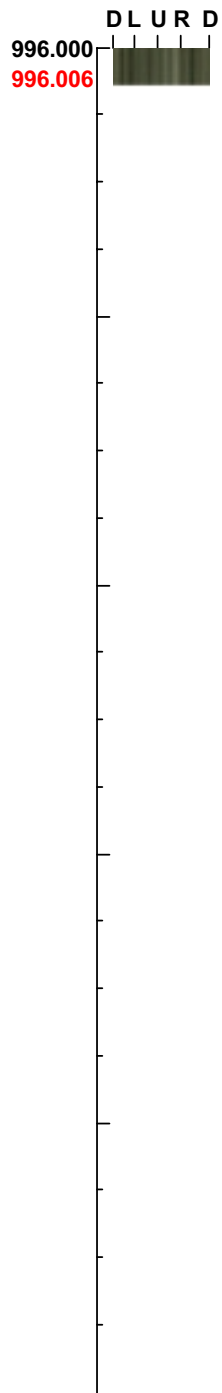


(15 / 16) Scale: 1/25 Aspect ratio: 150 %

Project name: Forsmark
Bore hole No.: KFM01A

Azimuth: 307 Inclination: -75

Depth range: 996.000 - 996.137 m



WellCad diagram: 29.45–51.15 m



Title GEOLOGY IN KFM01A [Draft plot boremap]

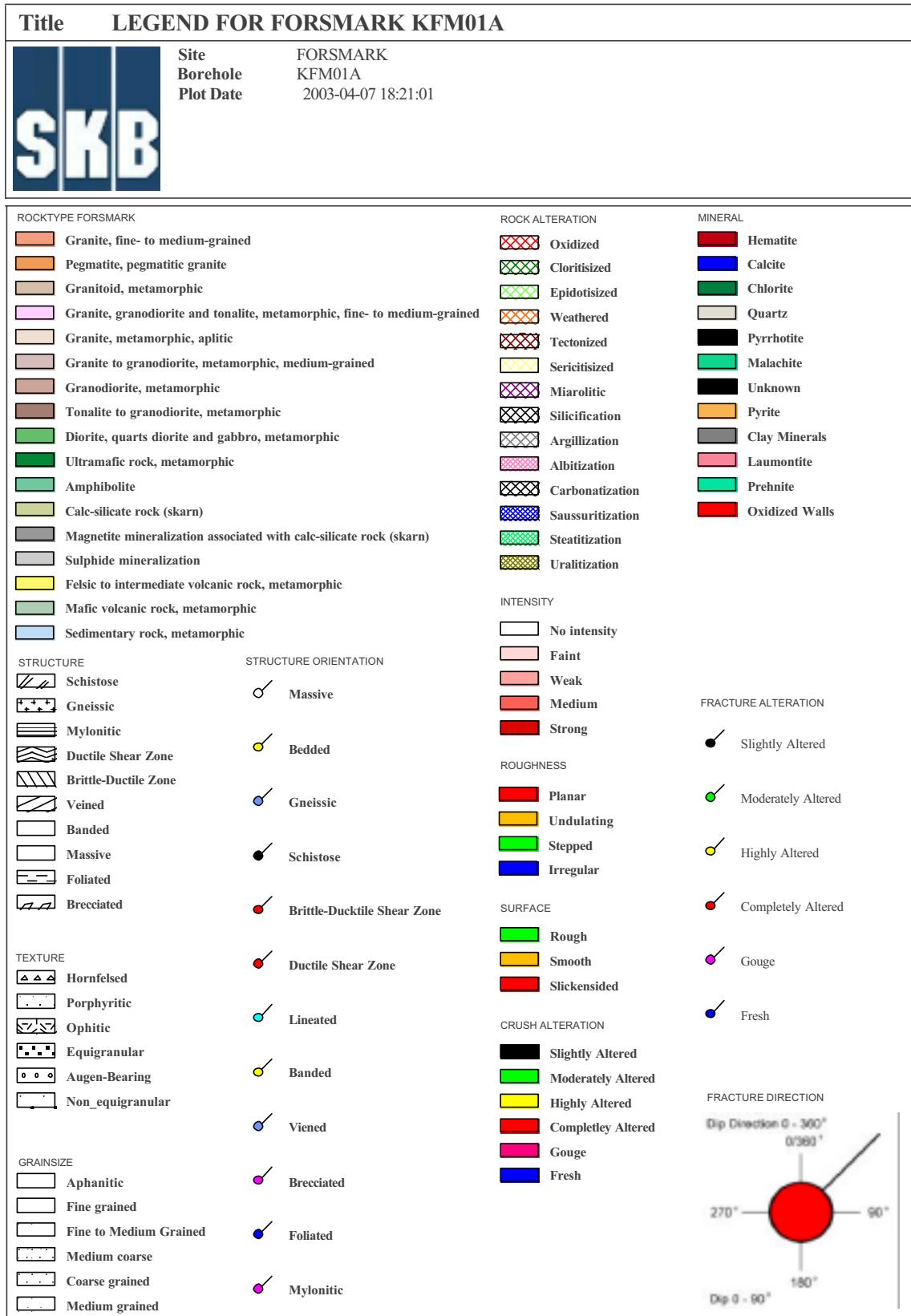


Site Forsmark
Borehole KFM01A
Diameter [m]
Length [m]
Bearing [°]
Inclination [°] -85.0
Remark

Coordinate System Local
Northing [m]
Easting [m]
Elevation [m.a.s.l.]
Drilling Start Date
Drilling Stop Date
Plot Date

DEPTH	ROCKTYPE							SEALED FRACTURES					NATURAL FRACTURES						CRUSH ZONE			FRACTURE				
	TYPE	Structure	Texture	Grainsize	Structure Orientation	Rock Type < 1m	Alteration	Intensity	Primary Mineral	Secondary Mineral	Third Mineral	Fourth Mineral	Alteration Orientation	Primary Mineral	Secondary Mineral	Third Mineral	Fourth Mineral	Aperture (mm)	Roughness	Surface	Alteration Orientation	Alteration	Piece	Concises	Frequency (fr/m)	
1:500																									0	20
10																										
20																										
30																										
40																										
50																										
60																										
70																										
80																										
90																										
100																										

WellCad diagram: 102.03–1001.16 m

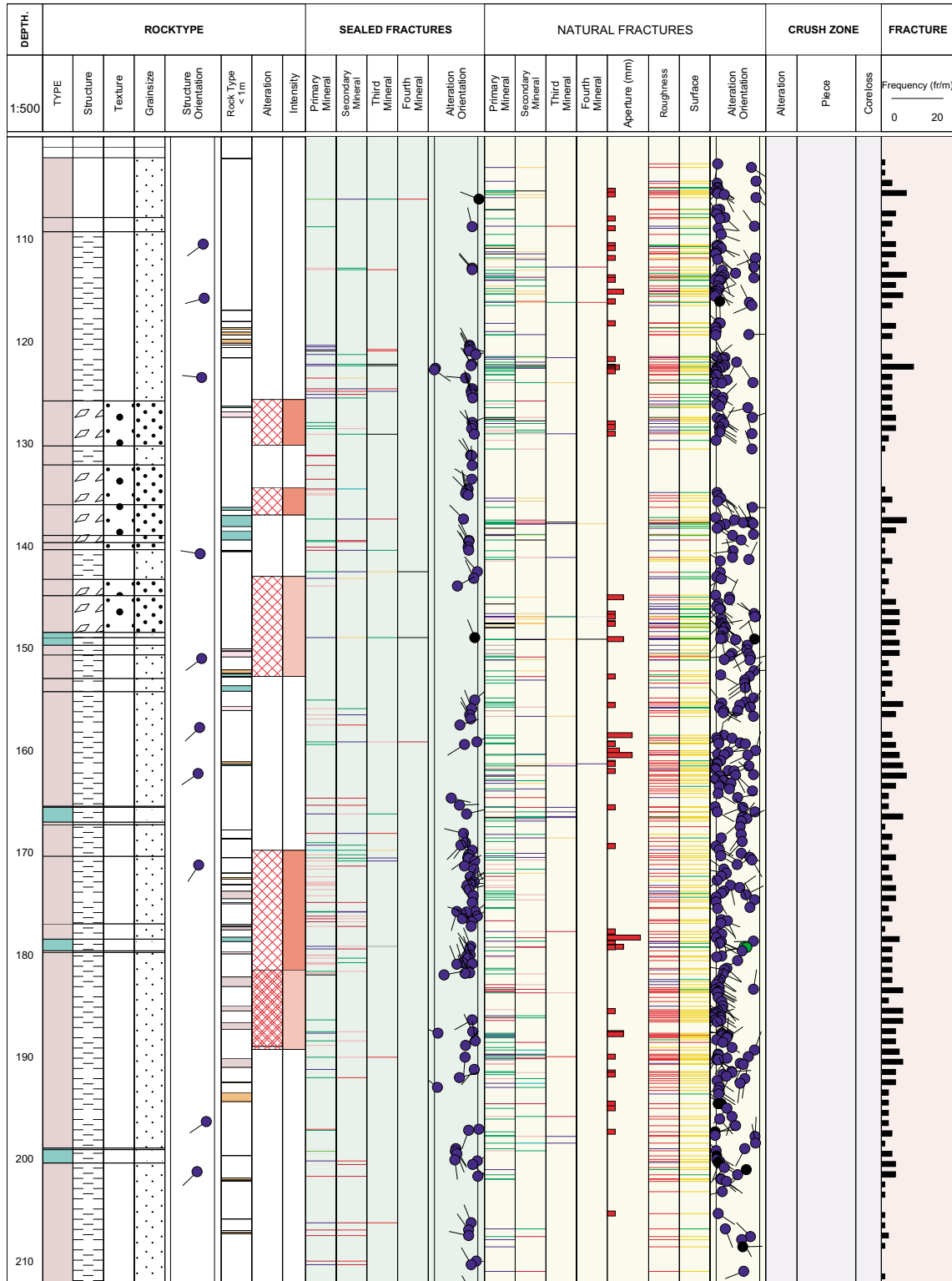


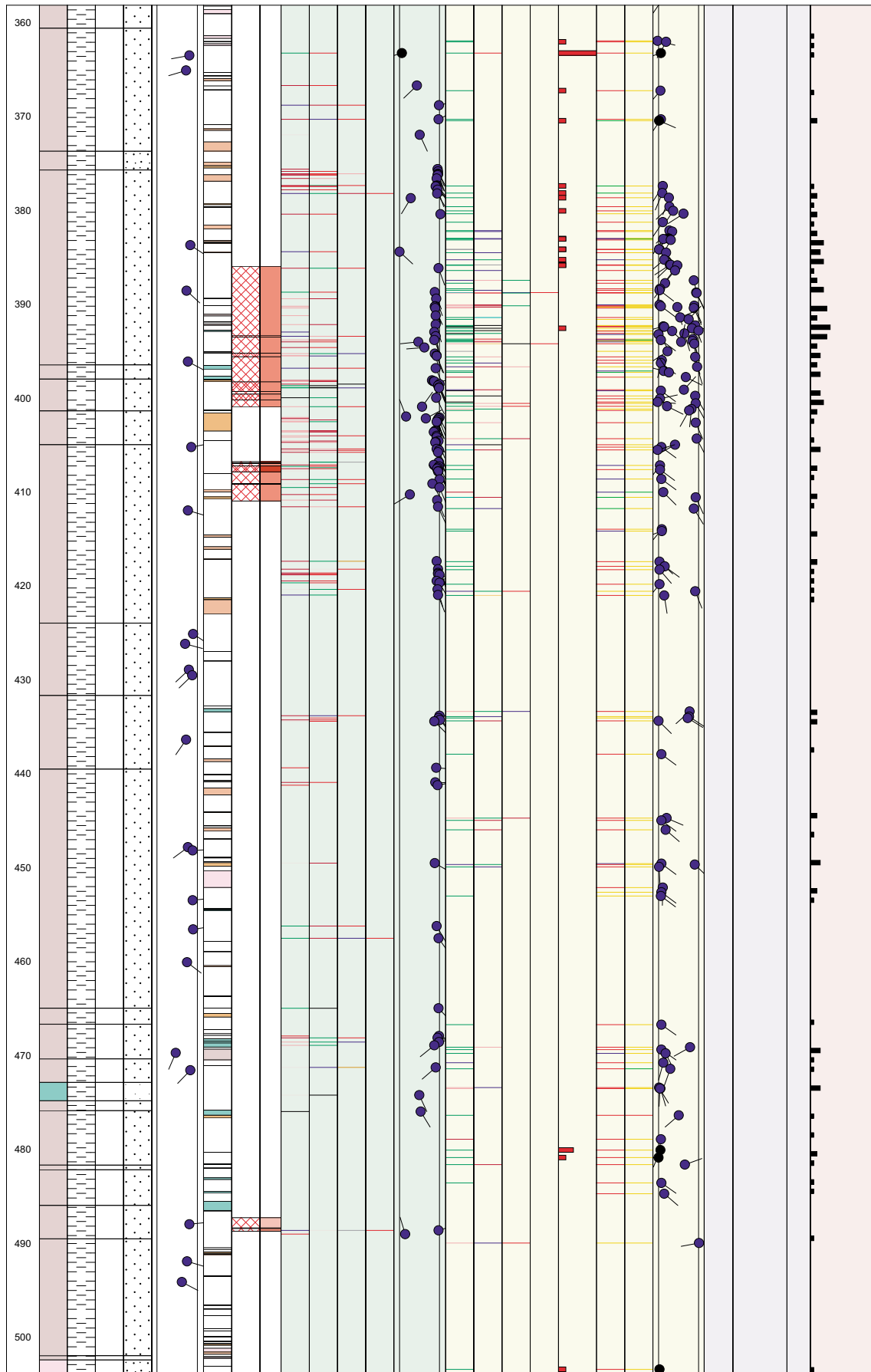
Title **GEOLOGY KFM01A**

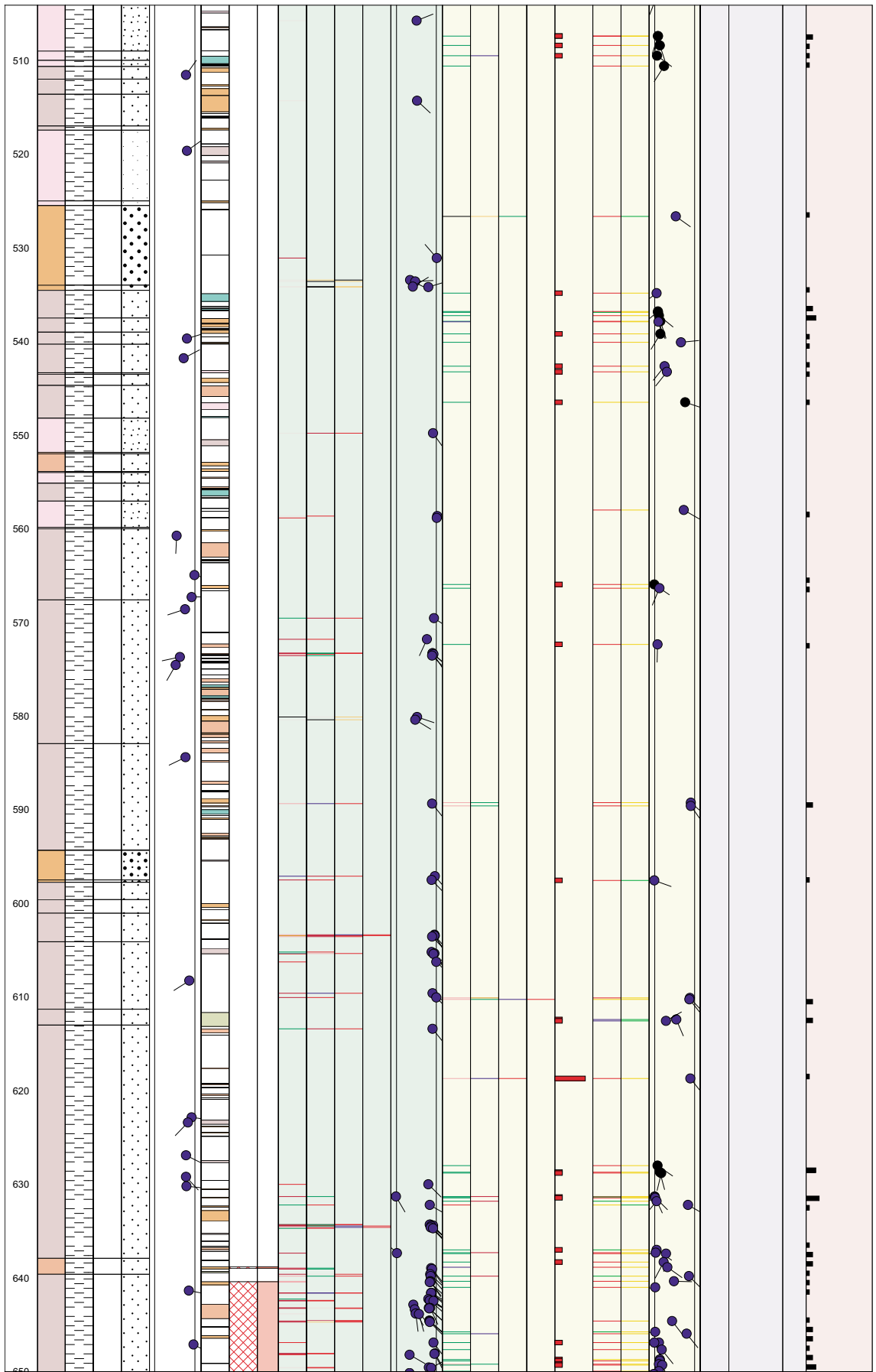


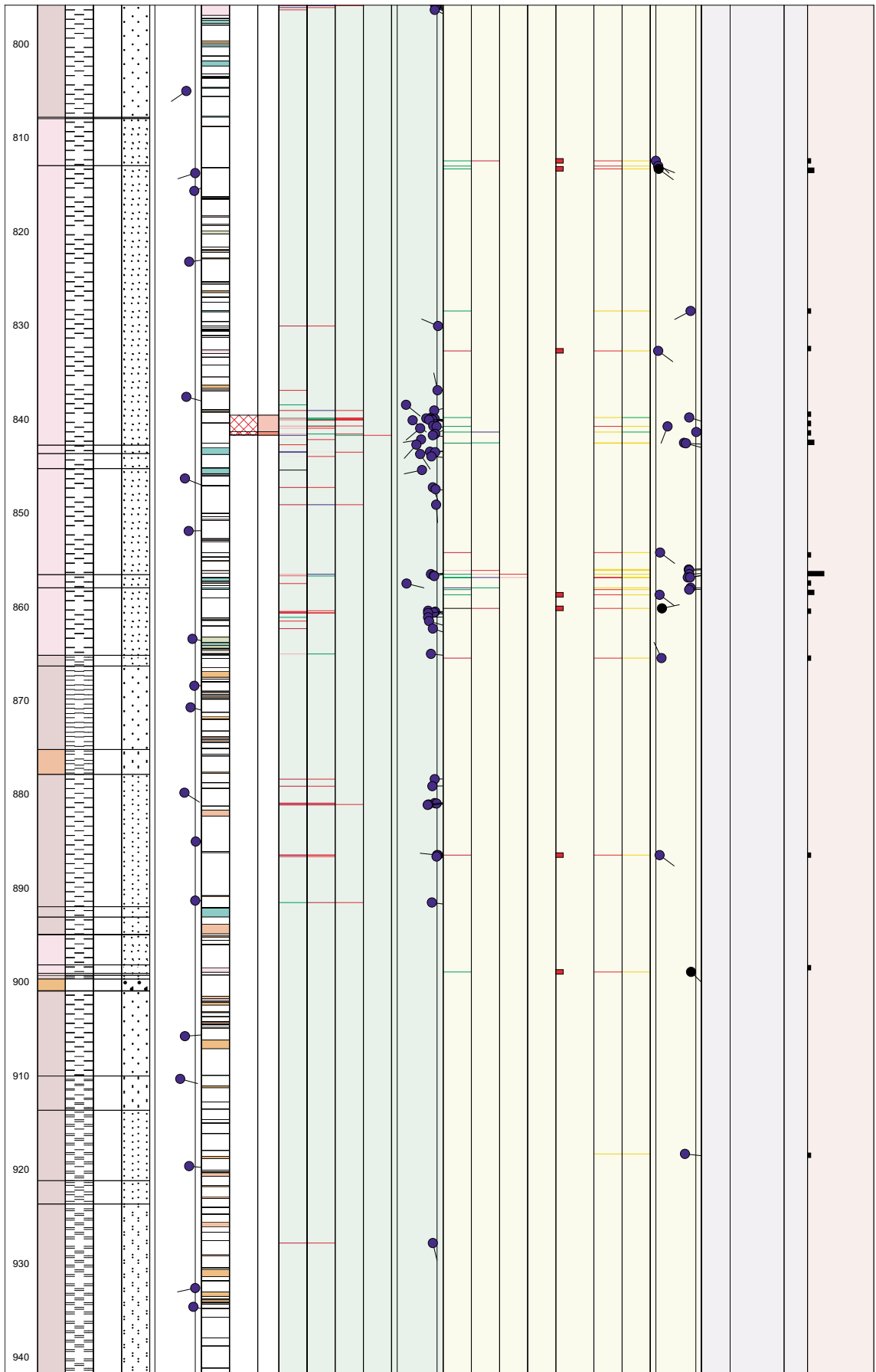
Site **FORSMARK**
 Borehole **KFM01A**
 Diameter [m] **0.0763**
 Length [m] **1001.45**
 Bearing [°] **318.3522**
 Inclination [°] **-84.7342**
 Remark

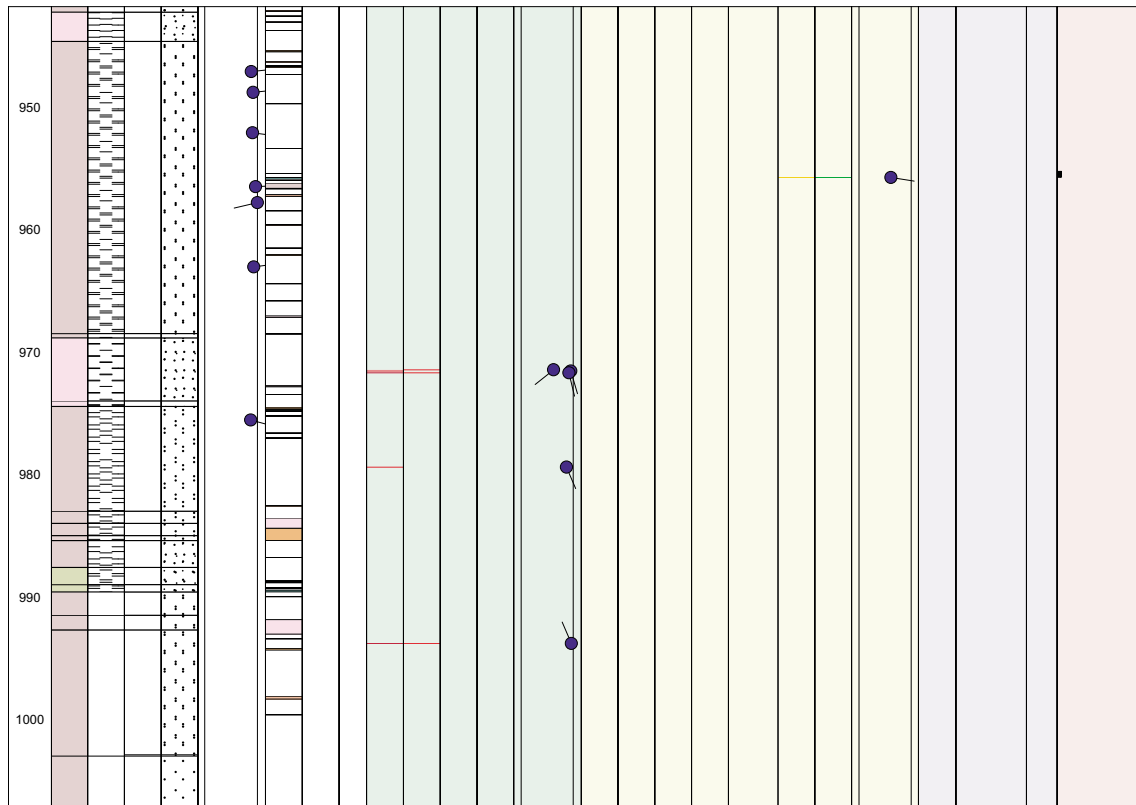
Coordinate System **RT90-RHB70**
 Northing [m] **6699529.813**
 Easting [m] **1631397.16**
 Elevation [m.a.s.l.] **3.125**
 Drilling Start Date **2002-05-07 09:30:00**
 Drilling Stop Date **2002-10-28 14:39:00**
 Plot Date **2003-04-10 13:13:04**











In data: Borehole length and diameter

Hole Diam T - Drilling: Borehole diameter

KFM01A, 2002-06-25 13:55:00 - 2002-10-28 14:39:00 (100.570 - 1001.490 m)

Sub Secup (m)	Sub Seclow (m)	Hole Diam (m)	Comment
0.000	12.000	0.440	
12.000	29.400	0.358	
29.400	100.400	0.251	
100.400	100.520	0.164	
100.520	102.130	0.086	Core drilling
102.130	1001.450	0.076	Core drilling

Printout from SICADA 2003-04-14 14:15:27.

Maxibor T - Borehole deviation: Maxibor

KFM01A, 2002-10-31 11:00:00 - 2002-10-31 17:00:00 (0.000 - 993.000 m)

Length (m)	Northing (m)	Easting (m)	Elevation (m)	Coord System	Inclination (degrees)	Bearing (degrees)	Local A (m)	Local B (m)	Local C (m)	Extrapol Flag
0.00	6699529.813	1631397.160	-3.125	RT90-RHB70	-84.7300	318.3500	0.0000	0.0000	0.0000	
3.00	6699530.019	1631396.977	-0.138	RT90-RHB70	-84.7500	318.2300	0.2750	0.0000	0.0000	
6.00	6699530.224	1631396.794	2.850	RT90-RHB70	-84.7300	318.3100	0.5500	-0.0010	-0.0010	
9.00	6699530.429	1631396.611	5.837	RT90-RHB70	-84.7000	318.4300	0.8250	-0.0010	-0.0010	
12.00	6699530.637	1631396.427	8.824	RT90-RHB70	-84.6700	318.3600	1.1030	0.0000	0.0010	
15.00	6699530.845	1631396.242	11.811	RT90-RHB70	-84.6500	318.4100	1.3810	0.0000	0.0050	
18.00	6699531.054	1631396.056	14.798	RT90-RHB70	-84.6200	318.5100	1.6610	0.0000	0.0090	
21.00	6699531.265	1631395.870	17.785	RT90-RHB70	-84.5700	318.4600	1.9420	0.0010	0.0150	
24.00	6699531.477	1631395.682	20.772	RT90-RHB70	-84.5000	318.4500	2.2260	0.0010	0.0240	
27.00	6699531.693	1631395.491	23.758	RT90-RHB70	-84.4500	318.3200	2.5140	0.0020	0.0360	
30.00	6699531.909	1631395.298	26.744	RT90-RHB70	-84.4000	318.0500	2.8040	0.0020	0.0510	
33.00	6699532.127	1631395.102	29.729	RT90-RHB70	-84.3800	317.3200	3.0970	0.0000	0.0680	
36.00	6699532.343	1631394.903	32.715	RT90-RHB70	-84.3900	316.9500	3.3910	-0.0050	0.0870	
39.00	6699532.557	1631394.703	35.701	RT90-RHB70	-84.3300	316.8300	3.6840	-0.0120	0.1050	
42.00	6699532.774	1631394.500	38.686	RT90-RHB70	-84.2900	316.4600	3.9800	-0.0200	0.1260	
45.00	6699532.990	1631394.294	41.671	RT90-RHB70	-84.2300	316.0500	4.2790	-0.0300	0.1490	
48.00	6699533.207	1631394.085	44.656	RT90-RHB70	-84.2100	315.6400	4.5800	-0.0420	0.1750	
51.00	6699533.423	1631393.873	47.640	RT90-RHB70	-84.2400	314.8700	4.8820	-0.0570	0.2020	
54.00	6699533.636	1631393.660	50.625	RT90-RHB70	-84.2800	313.9500	5.1820	-0.0750	0.2270	
57.00	6699533.843	1631393.445	53.610	RT90-RHB70	-84.2900	313.3200	5.4800	-0.0980	0.2500	
60.00	6699534.048	1631393.228	56.596	RT90-RHB70	-84.3600	312.5400	5.7780	-0.1240	0.2720	
63.00	6699534.247	1631393.011	59.581	RT90-RHB70	-84.4300	311.5500	6.0710	-0.1540	0.2900	
66.00	6699534.440	1631392.793	62.567	RT90-RHB70	-84.4200	311.0800	6.3600	-0.1880	0.3040	
69.00	6699534.632	1631392.573	65.553	RT90-RHB70	-84.3400	310.7700	6.6490	-0.2250	0.3180	
72.00	6699534.825	1631392.349	68.538	RT90-RHB70	-84.2600	310.4700	6.9420	-0.2640	0.3360	
75.00	6699535.020	1631392.121	71.523	RT90-RHB70	-84.2200	309.9600	7.2390	-0.3050	0.3580	
78.00	6699535.214	1631391.889	74.508	RT90-RHB70	-84.2100	308.9300	7.5380	-0.3490	0.3820	
81.00	6699535.404	1631391.654	77.492	RT90-RHB70	-84.2600	307.2700	7.8370	-0.3990	0.4050	
84.00	6699535.586	1631391.415	80.477	RT90-RHB70	-84.2900	306.2800	8.1310	-0.4570	0.4240	
87.00	6699535.762	1631391.175	83.463	RT90-RHB70	-84.2700	306.0200	8.4230	-0.5190	0.4410	
90.00	6699535.938	1631390.932	86.448	RT90-RHB70	-84.2100	305.7600	8.7160	-0.5830	0.4580	
93.00	6699536.115	1631390.686	89.432	RT90-RHB70	-84.2000	305.5000	9.0110	-0.6490	0.4780	
96.00	6699536.291	1631390.440	92.417	RT90-RHB70	-84.1800	304.6900	9.3070	-0.7160	0.4990	
99.00	6699536.465	1631390.190	95.401	RT90-RHB70	-84.1500	303.4700	9.6020	-0.7880	0.5190	
102.00	6699536.633	1631389.935	98.386	RT90-RHB70	-84.1300	303.0900	9.8980	-0.8670	0.5390	
105.00	6699536.801	1631389.678	101.370	RT90-RHB70	-84.1400	303.2700	10.1940	-0.9480	0.5600	

108.00	6699536.968	1631389.422	104.354	RT90-RHB70	-84.1800	303.1300	10.4890	-1.0270	0.5810
111.00	6699537.135	1631389.167	107.339	RT90-RHB70	-84.1400	303.2500	10.7830	-1.1070	0.5990
114.00	6699537.303	1631388.911	110.323	RT90-RHB70	-84.1300	303.4500	11.0790	-1.1870	0.6200
117.00	6699537.472	1631388.655	113.308	RT90-RHB70	-84.1000	303.6000	11.3750	-1.2660	0.6410
120.00	6699537.642	1631388.398	116.292	RT90-RHB70	-84.0700	303.7000	11.6730	-1.3440	0.6640
123.00	6699537.814	1631388.140	119.276	RT90-RHB70	-83.9900	303.5500	11.9730	-1.4230	0.6890
126.00	6699537.988	1631387.879	122.259	RT90-RHB70	-83.9100	303.5500	12.2770	-1.5030	0.7170
129.00	6699538.164	1631387.613	125.242	RT90-RHB70	-83.8400	303.3600	12.5840	-1.5840	0.7500
132.00	6699538.341	1631387.344	128.225	RT90-RHB70	-83.7700	303.0700	12.8950	-1.6670	0.7860
135.00	6699538.519	1631387.071	131.207	RT90-RHB70	-83.7300	302.6500	13.2090	-1.7530	0.8250
138.00	6699538.695	1631386.796	134.189	RT90-RHB70	-83.6800	302.5000	13.5250	-1.8420	0.8650
141.00	6699538.873	1631386.517	137.171	RT90-RHB70	-83.6300	302.1300	13.8430	-1.9320	0.9080
144.00	6699539.050	1631386.235	140.152	RT90-RHB70	-83.6000	301.6300	14.1620	-2.0250	0.9530
147.00	6699539.225	1631385.950	143.134	RT90-RHB70	-83.5600	301.3300	14.4830	-2.1210	0.9980
150.00	6699539.400	1631385.663	146.115	RT90-RHB70	-83.5300	300.9400	14.8040	-2.2200	1.0450
153.00	6699539.574	1631385.373	149.096	RT90-RHB70	-83.5000	300.8100	15.1270	-2.3210	1.0920
156.00	6699539.748	1631385.082	152.076	RT90-RHB70	-83.4900	300.9500	15.4500	-2.4230	1.1410
159.00	6699539.923	1631384.790	155.057	RT90-RHB70	-83.4700	301.0700	15.7750	-2.5250	1.1900
162.00	6699540.099	1631384.498	158.038	RT90-RHB70	-83.4500	301.1000	16.1000	-2.6260	1.2410
165.00	6699540.275	1631384.205	161.018	RT90-RHB70	-83.4400	301.2300	16.4270	-2.7280	1.2930
168.00	6699540.453	1631383.912	163.998	RT90-RHB70	-83.4200	301.1400	16.7550	-2.8290	1.3450
171.00	6699540.631	1631383.618	166.979	RT90-RHB70	-83.3800	301.0900	17.0830	-2.9300	1.3990
174.00	6699540.809	1631383.321	169.959	RT90-RHB70	-83.3200	301.2300	17.4130	-3.0330	1.4540
177.00	6699540.990	1631383.023	172.938	RT90-RHB70	-83.3000	301.5800	17.7470	-3.1360	1.5130
180.00	6699541.174	1631382.725	175.918	RT90-RHB70	-83.2800	301.7000	18.0820	-3.2370	1.5730
183.00	6699541.358	1631382.426	178.897	RT90-RHB70	-83.2700	301.8600	18.4180	-3.3370	1.6350
186.00	6699541.544	1631382.127	181.877	RT90-RHB70	-83.2700	301.9600	18.7560	-3.4370	1.6970
189.00	6699541.730	1631381.829	184.856	RT90-RHB70	-83.2700	302.0100	19.0930	-3.5370	1.7600
192.00	6699541.916	1631381.531	187.835	RT90-RHB70	-83.2700	302.2100	19.4300	-3.6350	1.8220
195.00	6699542.104	1631381.234	190.815	RT90-RHB70	-83.2700	302.5100	19.7680	-3.7330	1.8850
198.00	6699542.293	1631380.937	193.794	RT90-RHB70	-83.2700	302.8500	20.1060	-3.8290	1.9480
201.00	6699542.483	1631380.641	196.773	RT90-RHB70	-83.2600	303.2400	20.4450	-3.9230	2.0120
204.00	6699542.677	1631380.347	199.752	RT90-RHB70	-83.2500	303.5200	20.7850	-4.0150	2.0780
207.00	6699542.871	1631380.053	202.732	RT90-RHB70	-83.2600	303.6000	21.1260	-4.1050	2.1430
210.00	6699543.066	1631379.760	205.711	RT90-RHB70	-83.2700	304.0400	21.4670	-4.1950	2.2090
213.00	6699543.263	1631379.469	208.690	RT90-RHB70	-83.2600	304.3300	21.8070	-4.2820	2.2750
216.00	6699543.461	1631379.178	211.669	RT90-RHB70	-83.2300	304.4300	22.1490	-4.3670	2.3420
219.00	6699543.661	1631378.886	214.649	RT90-RHB70	-83.2200	304.6500	22.4920	-4.4520	2.4100
222.00	6699543.863	1631378.594	217.628	RT90-RHB70	-83.2000	304.9300	22.8360	-4.5360	2.4790
225.00	6699544.066	1631378.303	220.606	RT90-RHB70	-83.2100	305.1700	23.1820	-4.6190	2.5500
228.00	6699544.270	1631378.014	223.585	RT90-RHB70	-83.2000	305.4200	23.5270	-4.6990	2.6200
231.00	6699544.476	1631377.724	226.564	RT90-RHB70	-83.1700	305.4300	23.8730	-4.7790	2.6920
234.00	6699544.683	1631377.433	229.543	RT90-RHB70	-83.1300	305.2600	24.2210	-4.8590	2.7650

237.00	6699544.890	1631377.140	232.521	RT90-RHB70	-83.0700	305.0100	24.5710	-4.9400	2.8390
240.00	6699545.098	1631376.844	235.500	RT90-RHB70	-83.0100	304.9900	24.9230	-5.0240	2.9170
243.00	6699545.307	1631376.545	238.477	RT90-RHB70	-82.9500	305.1200	25.2780	-5.1080	2.9970
246.00	6699545.519	1631376.244	241.455	RT90-RHB70	-82.9200	305.3000	25.6360	-5.1920	3.0800
249.00	6699545.732	1631375.942	244.432	RT90-RHB70	-82.8900	305.4400	25.9960	-5.2760	3.1660
252.00	6699545.948	1631375.639	247.409	RT90-RHB70	-82.8600	305.5900	26.3580	-5.3590	3.2530
255.00	6699546.165	1631375.336	250.385	RT90-RHB70	-82.8500	305.6600	26.7220	-5.4410	3.3420
258.00	6699546.383	1631375.033	253.362	RT90-RHB70	-82.8100	305.8600	27.0860	-5.5230	3.4310
261.00	6699546.602	1631374.729	256.339	RT90-RHB70	-82.7900	305.9700	27.4530	-5.6040	3.5230
264.00	6699546.824	1631374.424	259.315	RT90-RHB70	-82.7600	306.1100	27.8210	-5.6850	3.6170
267.00	6699547.047	1631374.118	262.291	RT90-RHB70	-82.7400	306.2000	28.1900	-5.7650	3.7110
270.00	6699547.271	1631373.812	265.267	RT90-RHB70	-82.7300	306.3000	28.5610	-5.8450	3.8070
273.00	6699547.495	1631373.506	268.243	RT90-RHB70	-82.7300	306.3900	28.9320	-5.9240	3.9040
276.00	6699547.721	1631373.201	271.219	RT90-RHB70	-82.7200	306.2600	29.3040	-6.0030	4.0010
279.00	6699547.945	1631372.894	274.194	RT90-RHB70	-82.7100	306.0600	29.6750	-6.0830	4.0980
282.00	6699548.169	1631372.587	277.170	RT90-RHB70	-82.7200	305.9000	30.0470	-6.1640	4.1950
285.00	6699548.392	1631372.279	280.146	RT90-RHB70	-82.7300	305.7300	30.4180	-6.2450	4.2910
288.00	6699548.614	1631371.971	283.122	RT90-RHB70	-82.7100	305.6400	30.7880	-6.3280	4.3870
291.00	6699548.836	1631371.661	286.098	RT90-RHB70	-82.7000	305.5500	31.1600	-6.4120	4.4830
294.00	6699549.057	1631371.351	289.073	RT90-RHB70	-82.6900	305.4400	31.5310	-6.4970	4.5800
297.00	6699549.279	1631371.040	292.049	RT90-RHB70	-82.6800	305.4300	31.9040	-6.5820	4.6780
300.00	6699549.500	1631370.729	295.024	RT90-RHB70	-82.6600	305.5700	32.2760	-6.6670	4.7760
303.00	6699549.723	1631370.417	298.000	RT90-RHB70	-82.6400	305.7700	32.6500	-6.7520	4.8750
306.00	6699549.948	1631370.105	300.975	RT90-RHB70	-82.6300	305.9300	33.0250	-6.8360	4.9750
309.00	6699550.174	1631369.793	303.950	RT90-RHB70	-82.6300	305.8900	33.4010	-6.9190	5.0770
312.00	6699550.399	1631369.482	306.926	RT90-RHB70	-82.6100	306.0300	33.7760	-7.0020	5.1780
315.00	6699550.626	1631369.170	309.901	RT90-RHB70	-82.6000	306.1000	34.1530	-7.0840	5.2800
318.00	6699550.854	1631368.858	312.876	RT90-RHB70	-82.5700	306.3400	34.5310	-7.1660	5.3830
321.00	6699551.084	1631368.545	315.850	RT90-RHB70	-82.5500	306.6100	34.9100	-7.2470	5.4880
324.00	6699551.316	1631368.233	318.825	RT90-RHB70	-82.5200	306.7200	35.2910	-7.3260	5.5940
327.00	6699551.549	1631367.920	321.800	RT90-RHB70	-82.5100	306.9200	35.6740	-7.4050	5.7020
330.00	6699551.784	1631367.607	324.774	RT90-RHB70	-82.5000	306.9400	36.0570	-7.4820	5.8110
333.00	6699552.019	1631367.294	327.748	RT90-RHB70	-82.4800	306.9300	36.4410	-7.5600	5.9200
336.00	6699552.255	1631366.980	330.723	RT90-RHB70	-82.4300	306.6200	36.8260	-7.6380	6.0300
339.00	6699552.491	1631366.663	333.696	RT90-RHB70	-82.3900	306.5000	37.2130	-7.7180	6.1430
342.00	6699552.728	1631366.343	336.670	RT90-RHB70	-82.3500	306.3100	37.6020	-7.7990	6.2570
345.00	6699552.964	1631366.022	339.643	RT90-RHB70	-82.3000	306.2100	37.9920	-7.8830	6.3730
348.00	6699553.201	1631365.698	342.616	RT90-RHB70	-82.2700	306.0800	38.3850	-7.9670	6.4910
351.00	6699553.439	1631365.371	345.589	RT90-RHB70	-82.2300	305.9800	38.7800	-8.0530	6.6110
354.00	6699553.677	1631365.043	348.561	RT90-RHB70	-82.2000	305.9900	39.1760	-8.1400	6.7330
357.00	6699553.917	1631364.714	351.534	RT90-RHB70	-82.1700	306.0400	39.5740	-8.2270	6.8560
360.00	6699554.157	1631364.383	354.506	RT90-RHB70	-82.1500	306.1400	39.9730	-8.3140	6.9810
363.00	6699554.399	1631364.053	357.478	RT90-RHB70	-82.1300	306.3500	40.3730	-8.4010	7.1070

366.00	6699554.642	1631363.722	360.449	RT90-RHB70	-82.0900	306.2600	40.7750	-8.4860	7.2340
369.00	6699554.886	1631363.389	363.421	RT90-RHB70	-82.0700	306.3000	41.1780	-8.5730	7.3630
372.00	6699555.131	1631363.055	366.392	RT90-RHB70	-82.0300	306.3100	41.5830	-8.6590	7.4940
375.00	6699555.378	1631362.720	369.363	RT90-RHB70	-82.0000	306.5100	41.9900	-8.7460	7.6260
378.00	6699555.626	1631362.385	372.334	RT90-RHB70	-81.9800	306.4400	42.3990	-8.8320	7.7600
381.00	6699555.874	1631362.048	375.305	RT90-RHB70	-81.9400	306.2300	42.8080	-8.9180	7.8950
384.00	6699556.123	1631361.709	378.275	RT90-RHB70	-81.9100	306.4000	43.2190	-9.0060	8.0320
387.00	6699556.374	1631361.369	381.245	RT90-RHB70	-81.9200	306.3100	43.6320	-9.0940	8.1710
390.00	6699556.623	1631361.029	384.215	RT90-RHB70	-81.8900	306.2500	44.0450	-9.1820	8.3090
393.00	6699556.873	1631360.688	387.185	RT90-RHB70	-81.8400	306.2300	44.4580	-9.2700	8.4480
396.00	6699557.125	1631360.345	390.155	RT90-RHB70	-81.7900	306.2500	44.8740	-9.3600	8.5900
399.00	6699557.378	1631359.999	393.124	RT90-RHB70	-81.7300	306.0800	45.2930	-9.4490	8.7340
402.00	6699557.632	1631359.650	396.093	RT90-RHB70	-81.6600	305.7700	45.7150	-9.5410	8.8820
405.00	6699557.887	1631359.297	399.061	RT90-RHB70	-81.6100	305.7100	46.1400	-9.6360	9.0320
408.00	6699558.142	1631358.942	402.029	RT90-RHB70	-81.5700	305.7200	46.5670	-9.7320	9.1850
411.00	6699558.399	1631358.585	404.997	RT90-RHB70	-81.5300	305.8700	46.9960	-9.8280	9.3410
414.00	6699558.658	1631358.226	407.964	RT90-RHB70	-81.4900	305.9400	47.4280	-9.9240	9.4980
417.00	6699558.919	1631357.867	410.931	RT90-RHB70	-81.4600	305.9600	47.8620	-10.0190	9.6580
420.00	6699559.181	1631357.506	413.898	RT90-RHB70	-81.4400	306.0800	48.2970	-10.1150	9.8190
423.00	6699559.444	1631357.145	416.864	RT90-RHB70	-81.4200	305.9900	48.7330	-10.2100	9.9810
426.00	6699559.706	1631356.783	419.831	RT90-RHB70	-81.4000	305.9300	49.1700	-10.3050	10.1440
429.00	6699559.970	1631356.420	422.797	RT90-RHB70	-81.3900	306.0400	49.6080	-10.4020	10.3070
432.00	6699560.234	1631356.057	425.763	RT90-RHB70	-81.3600	306.0300	50.0470	-10.4970	10.4720
435.00	6699560.499	1631355.693	428.729	RT90-RHB70	-81.3400	305.9200	50.4870	-10.5940	10.6380
438.00	6699560.764	1631355.327	431.695	RT90-RHB70	-81.3000	305.7600	50.9280	-10.6910	10.8050
441.00	6699561.029	1631354.959	434.661	RT90-RHB70	-81.2500	305.6300	51.3710	-10.7900	10.9740
444.00	6699561.295	1631354.587	437.626	RT90-RHB70	-81.2200	305.5300	51.8160	-10.8900	11.1460
447.00	6699561.561	1631354.215	440.590	RT90-RHB70	-81.2000	305.4300	52.2630	-10.9920	11.3180
450.00	6699561.827	1631353.841	443.555	RT90-RHB70	-81.1700	305.4200	52.7100	-11.0950	11.4920
453.00	6699562.094	1631353.466	446.520	RT90-RHB70	-81.1600	305.3400	53.1590	-11.1980	11.6660
456.00	6699562.361	1631353.089	449.484	RT90-RHB70	-81.1400	305.3500	53.6080	-11.3020	11.8420
459.00	6699562.628	1631352.712	452.448	RT90-RHB70	-81.1300	305.3200	54.0590	-11.4060	12.0180
462.00	6699562.896	1631352.335	455.412	RT90-RHB70	-81.1000	305.3000	54.5100	-11.5100	12.1950
465.00	6699563.164	1631351.956	458.376	RT90-RHB70	-81.0700	305.1600	54.9620	-11.6150	12.3730
468.00	6699563.432	1631351.575	461.340	RT90-RHB70	-81.0200	305.1000	55.4150	-11.7210	12.5530
471.00	6699563.702	1631351.192	464.303	RT90-RHB70	-80.9900	305.1600	55.8710	-11.8280	12.7350
474.00	6699563.972	1631350.808	467.266	RT90-RHB70	-80.9600	305.2200	56.3290	-11.9360	12.9190
477.00	6699564.244	1631350.423	470.229	RT90-RHB70	-80.9400	305.2700	56.7870	-12.0430	13.1040
480.00	6699564.517	1631350.037	473.191	RT90-RHB70	-80.9300	305.3300	57.2480	-12.1500	13.2900
483.00	6699564.790	1631349.651	476.154	RT90-RHB70	-80.9000	305.4500	57.7090	-12.2560	13.4770
486.00	6699565.066	1631349.265	479.116	RT90-RHB70	-80.8200	305.6800	58.1710	-12.3620	13.6660
489.00	6699565.345	1631348.876	482.077	RT90-RHB70	-80.7600	305.9300	58.6380	-12.4670	13.8590
492.00	6699565.628	1631348.486	485.039	RT90-RHB70	-80.6600	305.9500	59.1090	-12.5710	14.0560

495.00	6699565.913	1631348.091	487.999	RT90-RHB70	-80.5400	305.8300	59.5840	-12.6750	14.2580
498.00	6699566.202	1631347.692	490.958	RT90-RHB70	-80.4400	305.6100	60.0660	-12.7820	14.4650
501.00	6699566.492	1631347.287	493.916	RT90-RHB70	-80.3800	305.5900	60.5510	-12.8920	14.6780
504.00	6699566.784	1631346.879	496.874	RT90-RHB70	-80.3600	305.6600	61.0400	-13.0030	14.8930
507.00	6699567.077	1631346.471	499.832	RT90-RHB70	-80.3200	305.7500	61.5310	-13.1130	15.1100
510.00	6699567.371	1631346.062	502.789	RT90-RHB70	-80.2900	305.7300	62.0230	-13.2230	15.3280
513.00	6699567.667	1631345.651	505.746	RT90-RHB70	-80.2500	305.4700	62.5170	-13.3340	15.5490
516.00	6699567.962	1631345.237	508.703	RT90-RHB70	-80.2200	305.3500	63.0120	-13.4470	15.7710
519.00	6699568.257	1631344.821	511.659	RT90-RHB70	-80.2000	305.2100	63.5090	-13.5620	15.9940
522.00	6699568.551	1631344.404	514.615	RT90-RHB70	-80.1400	305.0800	64.0060	-13.6780	16.2180
525.00	6699568.846	1631343.983	517.571	RT90-RHB70	-80.0900	304.9900	64.5060	-13.7960	16.4440
528.00	6699569.142	1631343.561	520.526	RT90-RHB70	-80.0600	304.8700	65.0080	-13.9150	16.6730
531.00	6699569.438	1631343.136	523.481	RT90-RHB70	-80.0500	304.6400	65.5120	-14.0360	16.9030
534.00	6699569.733	1631342.709	526.436	RT90-RHB70	-79.9800	304.6400	66.0150	-14.1590	17.1340
537.00	6699570.030	1631342.280	529.390	RT90-RHB70	-79.9100	304.5000	66.5220	-14.2830	17.3670
540.00	6699570.327	1631341.847	532.344	RT90-RHB70	-79.7700	304.2000	67.0330	-14.4080	17.6050
543.00	6699570.627	1631341.406	535.296	RT90-RHB70	-79.6700	303.8400	67.5490	-14.5390	17.8480
546.00	6699570.926	1631340.959	538.248	RT90-RHB70	-79.5900	303.5500	68.0700	-14.6730	18.0960
549.00	6699571.226	1631340.507	541.198	RT90-RHB70	-79.5600	303.4100	68.5940	-14.8120	18.3470
552.00	6699571.525	1631340.054	544.149	RT90-RHB70	-79.5400	303.4800	69.1190	-14.9520	18.5990
555.00	6699571.826	1631339.599	547.099	RT90-RHB70	-79.5100	303.4900	69.6460	-15.0920	18.8530
558.00	6699572.127	1631339.144	550.049	RT90-RHB70	-79.4900	303.5900	70.1740	-15.2320	19.1070
561.00	6699572.430	1631338.688	552.998	RT90-RHB70	-79.4800	303.6500	70.7030	-15.3710	19.3630
564.00	6699572.733	1631338.232	555.948	RT90-RHB70	-79.4700	303.7800	71.2330	-15.5110	19.6200
567.00	6699573.038	1631337.776	558.897	RT90-RHB70	-79.4200	303.8600	71.7630	-15.6480	19.8780
570.00	6699573.345	1631337.319	561.846	RT90-RHB70	-79.3800	303.8400	72.2970	-15.7860	20.1390
573.00	6699573.653	1631336.859	564.795	RT90-RHB70	-79.3300	303.8200	72.8320	-15.9250	20.4010
576.00	6699573.962	1631336.398	567.743	RT90-RHB70	-79.2800	303.9300	73.3700	-16.0640	20.6660
579.00	6699574.274	1631335.935	570.691	RT90-RHB70	-79.2600	304.0700	73.9100	-16.2030	20.9340
582.00	6699574.587	1631335.472	573.638	RT90-RHB70	-79.2100	303.9800	74.4520	-16.3410	21.2020
585.00	6699574.901	1631335.006	576.585	RT90-RHB70	-79.1600	303.9700	74.9960	-16.4810	21.4740
588.00	6699575.216	1631334.538	579.531	RT90-RHB70	-79.1200	303.9400	75.5430	-16.6210	21.7480
591.00	6699575.532	1631334.068	582.478	RT90-RHB70	-79.0600	304.0900	76.0910	-16.7620	22.0240
594.00	6699575.852	1631333.597	585.423	RT90-RHB70	-79.0100	304.1600	76.6430	-16.9020	22.3030
597.00	6699576.173	1631333.124	588.368	RT90-RHB70	-78.9600	304.1100	77.1980	-17.0420	22.5850
600.00	6699576.495	1631332.648	591.312	RT90-RHB70	-78.9200	304.0100	77.7550	-17.1840	22.8690
603.00	6699576.818	1631332.170	594.256	RT90-RHB70	-78.8600	303.9500	78.3130	-17.3260	23.1550
606.00	6699577.141	1631331.689	597.200	RT90-RHB70	-78.8400	303.9100	78.8740	-17.4710	23.4440
609.00	6699577.465	1631331.207	600.143	RT90-RHB70	-78.8100	303.9400	79.4370	-17.6150	23.7340
612.00	6699577.790	1631330.724	603.086	RT90-RHB70	-78.7800	303.9200	80.0010	-17.7600	24.0250
615.00	6699578.116	1631330.240	606.029	RT90-RHB70	-78.7500	304.0300	80.5660	-17.9060	24.3180
618.00	6699578.443	1631329.755	608.971	RT90-RHB70	-78.7400	304.1400	81.1330	-18.0500	24.6120
621.00	6699578.772	1631329.270	611.914	RT90-RHB70	-78.7100	304.0900	81.7010	-18.1940	24.9080

624.00	6699579.101	1631328.784	614.856	RT90-RHB70	-78.6500	304.0300	82.2700	-18.3390	25.2040
627.00	6699579.432	1631328.295	617.797	RT90-RHB70	-78.6000	303.9400	82.8420	-18.4850	25.5040
630.00	6699579.763	1631327.803	620.738	RT90-RHB70	-78.5800	303.9000	83.4160	-18.6330	25.8060
633.00	6699580.094	1631327.310	623.678	RT90-RHB70	-78.5200	303.8700	83.9910	-18.7810	26.1090
636.00	6699580.426	1631326.814	626.618	RT90-RHB70	-78.4600	303.7500	84.5690	-18.9300	26.4140
639.00	6699580.760	1631326.315	629.558	RT90-RHB70	-78.4000	303.7000	85.1500	-19.0810	26.7230
642.00	6699581.095	1631325.813	632.496	RT90-RHB70	-78.3700	303.8500	85.7330	-19.2340	27.0340
645.00	6699581.432	1631325.311	635.435	RT90-RHB70	-78.3600	303.7800	86.3190	-19.3850	27.3480
648.00	6699581.768	1631324.808	638.373	RT90-RHB70	-78.3400	303.6400	86.9050	-19.5380	27.6620
651.00	6699582.104	1631324.303	641.311	RT90-RHB70	-78.3000	303.5400	87.4920	-19.6920	27.9760
654.00	6699582.440	1631323.796	644.249	RT90-RHB70	-78.2900	303.4400	88.0790	-19.8470	28.2920
657.00	6699582.776	1631323.288	647.186	RT90-RHB70	-78.3100	303.2600	88.6680	-20.0040	28.6080
660.00	6699583.109	1631322.780	650.124	RT90-RHB70	-78.2800	303.2300	89.2550	-20.1620	28.9230
663.00	6699583.443	1631322.270	653.062	RT90-RHB70	-78.2300	303.0700	89.8430	-20.3210	29.2390
666.00	6699583.777	1631321.757	655.999	RT90-RHB70	-78.1700	302.9000	90.4330	-20.4820	29.5570
669.00	6699584.111	1631321.241	658.935	RT90-RHB70	-78.1400	302.7200	91.0260	-20.6460	29.8780
672.00	6699584.444	1631320.722	661.871	RT90-RHB70	-78.1500	302.7700	91.6190	-20.8120	30.2000
675.00	6699584.777	1631320.204	664.807	RT90-RHB70	-78.2000	302.7700	92.2130	-20.9780	30.5210
678.00	6699585.109	1631319.689	667.744	RT90-RHB70	-78.2200	302.8300	92.8040	-21.1430	30.8400
681.00	6699585.441	1631319.174	670.680	RT90-RHB70	-78.2100	302.8700	93.3940	-21.3060	31.1580
684.00	6699585.774	1631318.659	673.617	RT90-RHB70	-78.1900	302.9200	93.9840	-21.4700	31.4770
687.00	6699586.108	1631318.144	676.554	RT90-RHB70	-78.1600	302.9400	94.5760	-21.6340	31.7960
690.00	6699586.442	1631317.627	679.490	RT90-RHB70	-78.1400	303.0900	95.1700	-21.7970	32.1180
693.00	6699586.779	1631317.110	682.426	RT90-RHB70	-78.1200	303.1400	95.7650	-21.9590	32.4410
696.00	6699587.117	1631316.593	685.362	RT90-RHB70	-78.1000	303.2100	96.3600	-22.1210	32.7640
699.00	6699587.455	1631316.076	688.297	RT90-RHB70	-78.0700	303.2300	96.9570	-22.2830	33.0900
702.00	6699587.795	1631315.557	691.232	RT90-RHB70	-78.0100	303.3200	97.5560	-22.4450	33.4160
705.00	6699588.137	1631315.036	694.167	RT90-RHB70	-78.0100	303.5100	98.1580	-22.6070	33.7460
708.00	6699588.482	1631314.516	697.101	RT90-RHB70	-77.9600	303.5100	98.7610	-22.7660	34.0770
711.00	6699588.827	1631313.995	700.035	RT90-RHB70	-77.9400	303.3300	99.3660	-22.9270	34.4100
714.00	6699589.171	1631313.471	702.969	RT90-RHB70	-77.9000	303.4200	99.9710	-23.0890	34.7440
717.00	6699589.518	1631312.946	705.902	RT90-RHB70	-77.8500	303.5100	100.5790	-23.2510	35.0800
720.00	6699589.866	1631312.420	708.835	RT90-RHB70	-77.8200	303.5600	101.1890	-23.4130	35.4180
723.00	6699590.216	1631311.892	711.768	RT90-RHB70	-77.7900	303.8300	101.8010	-23.5740	35.7580
726.00	6699590.570	1631311.365	714.700	RT90-RHB70	-77.7300	303.9000	102.4150	-23.7340	36.1010
729.00	6699590.925	1631310.836	717.631	RT90-RHB70	-77.6800	304.0700	103.0320	-23.8930	36.4470
732.00	6699591.284	1631310.306	720.562	RT90-RHB70	-77.6000	304.1300	103.6530	-24.0510	36.7960
735.00	6699591.645	1631309.773	723.492	RT90-RHB70	-77.5400	304.0900	104.2770	-24.2090	37.1480
738.00	6699592.008	1631309.237	726.422	RT90-RHB70	-77.4800	304.1600	104.9040	-24.3680	37.5040
741.00	6699592.373	1631308.698	729.350	RT90-RHB70	-77.4500	304.3100	105.5350	-24.5280	37.8630
744.00	6699592.740	1631308.160	732.279	RT90-RHB70	-77.4200	304.3900	106.1670	-24.6860	38.2240
747.00	6699593.109	1631307.621	735.207	RT90-RHB70	-77.4000	304.4300	106.8010	-24.8430	38.5860
750.00	6699593.479	1631307.081	738.134	RT90-RHB70	-77.3600	304.5200	107.4360	-25.0010	38.9500

753.00	6699593.851	1631306.541	741.062	RT90-RHB70	-77.3300	304.5700	108.0730	-25.1580	39.3160
756.00	6699594.225	1631305.999	743.989	RT90-RHB70	-77.3000	304.6400	108.7120	-25.3150	39.6840
759.00	6699594.599	1631305.456	746.915	RT90-RHB70	-77.2600	304.6700	109.3530	-25.4710	40.0530
762.00	6699594.976	1631304.912	749.842	RT90-RHB70	-77.2100	304.6800	109.9960	-25.6270	40.4250
765.00	6699595.354	1631304.366	752.767	RT90-RHB70	-77.1700	304.7100	110.6410	-25.7840	40.7990
768.00	6699595.733	1631303.818	755.692	RT90-RHB70	-77.1100	304.7200	111.2890	-25.9410	41.1750
771.00	6699596.114	1631303.268	758.617	RT90-RHB70	-77.0500	304.7100	111.9390	-26.0990	41.5540
774.00	6699596.497	1631302.715	761.540	RT90-RHB70	-77.0100	304.7600	112.5920	-26.2580	41.9360
777.00	6699596.882	1631302.161	764.463	RT90-RHB70	-76.9900	304.9000	113.2480	-26.4160	42.3210
780.00	6699597.268	1631301.608	767.387	RT90-RHB70	-76.9800	304.9700	113.9050	-26.5730	42.7070
783.00	6699597.655	1631301.054	770.309	RT90-RHB70	-76.9200	305.1300	114.5620	-26.7300	43.0930
786.00	6699598.046	1631300.499	773.232	RT90-RHB70	-76.9000	305.3500	115.2230	-26.8850	43.4830
789.00	6699598.439	1631299.944	776.153	RT90-RHB70	-76.8600	305.3800	115.8860	-27.0380	43.8750
792.00	6699598.834	1631299.388	779.075	RT90-RHB70	-76.8400	305.3000	116.5500	-27.1910	44.2680
795.00	6699599.229	1631298.831	781.996	RT90-RHB70	-76.8200	305.2000	117.2150	-27.3450	44.6630
798.00	6699599.623	1631298.272	784.917	RT90-RHB70	-76.8100	305.2400	117.8820	-27.5010	45.0580
801.00	6699600.018	1631297.712	787.838	RT90-RHB70	-76.7700	305.2300	118.5490	-27.6560	45.4540
804.00	6699600.414	1631297.151	790.758	RT90-RHB70	-76.7300	305.3000	119.2170	-27.8120	45.8520
807.00	6699600.812	1631296.589	793.678	RT90-RHB70	-76.7100	305.3200	119.8880	-27.9680	46.2520
810.00	6699601.211	1631296.027	796.598	RT90-RHB70	-76.6700	305.3400	120.5600	-28.1230	46.6530
813.00	6699601.611	1631295.462	799.517	RT90-RHB70	-76.6700	305.3500	121.2340	-28.2790	47.0560
816.00	6699602.011	1631294.898	802.436	RT90-RHB70	-76.6300	305.3700	121.9080	-28.4350	47.4590
819.00	6699602.413	1631294.332	805.355	RT90-RHB70	-76.6200	305.4000	122.5840	-28.5900	47.8650
822.00	6699602.815	1631293.766	808.273	RT90-RHB70	-76.6000	305.4400	123.2610	-28.7460	48.2710
825.00	6699603.218	1631293.200	811.192	RT90-RHB70	-76.5700	305.3600	123.9380	-28.9010	48.6770
828.00	6699603.622	1631292.632	814.110	RT90-RHB70	-76.5600	305.4200	124.6170	-29.0580	49.0860
831.00	6699604.026	1631292.064	817.028	RT90-RHB70	-76.5800	305.4400	125.2970	-29.2140	49.4950
834.00	6699604.429	1631291.496	819.946	RT90-RHB70	-76.5600	305.3900	125.9750	-29.3700	49.9030
837.00	6699604.833	1631290.928	822.864	RT90-RHB70	-76.5500	305.4800	126.6550	-29.5260	50.3110
840.00	6699605.238	1631290.360	825.781	RT90-RHB70	-76.5000	305.4600	127.3350	-29.6820	50.7210
843.00	6699605.644	1631289.789	828.698	RT90-RHB70	-76.4800	305.4700	128.0180	-29.8380	51.1330
846.00	6699606.052	1631289.218	831.615	RT90-RHB70	-76.4600	305.6000	128.7020	-29.9940	51.5460
849.00	6699606.460	1631288.647	834.532	RT90-RHB70	-76.4500	305.5300	129.3870	-30.1490	51.9610
852.00	6699606.869	1631288.075	837.448	RT90-RHB70	-76.4000	305.5500	130.0720	-30.3050	52.3760
855.00	6699607.279	1631287.501	840.364	RT90-RHB70	-76.3900	305.6100	130.7600	-30.4610	52.7930
858.00	6699607.690	1631286.927	843.280	RT90-RHB70	-76.3900	305.6600	131.4480	-30.6170	53.2110
861.00	6699608.102	1631286.354	846.196	RT90-RHB70	-76.3800	305.6400	132.1370	-30.7720	53.6290
864.00	6699608.513	1631285.779	849.111	RT90-RHB70	-76.3800	305.7400	132.8270	-30.9280	54.0480
867.00	6699608.926	1631285.206	852.027	RT90-RHB70	-76.3600	305.7900	133.5160	-31.0820	54.4670
870.00	6699609.340	1631284.632	854.942	RT90-RHB70	-76.3300	305.8400	134.2070	-31.2360	54.8870
873.00	6699609.755	1631284.057	857.857	RT90-RHB70	-76.3000	305.9200	134.8990	-31.3900	55.3090
876.00	6699610.172	1631283.482	860.772	RT90-RHB70	-76.2600	305.9900	135.5930	-31.5420	55.7320
879.00	6699610.591	1631282.905	863.686	RT90-RHB70	-76.2400	305.9200	136.2890	-31.6950	56.1580

882.00	6699611.009	1631282.327	866.600	RT90-RHB70	-76.2400	306.0800	136.9860	-31.8490	56.5840
885.00	6699611.430	1631281.750	869.514	RT90-RHB70	-76.2000	306.1900	137.6830	-32.0000	57.0110
888.00	6699611.852	1631281.173	872.427	RT90-RHB70	-76.1700	306.1900	138.3830	-32.1510	57.4410
891.00	6699612.276	1631280.594	875.340	RT90-RHB70	-76.1200	306.2400	139.0840	-32.3020	57.8710
894.00	6699612.701	1631280.014	878.253	RT90-RHB70	-76.0600	306.4700	139.7870	-32.4530	58.3050
897.00	6699613.131	1631279.433	881.164	RT90-RHB70	-76.0000	306.6300	140.4950	-32.6020	58.7420
900.00	6699613.564	1631278.850	884.075	RT90-RHB70	-75.9600	306.7100	141.2050	-32.7490	59.1820
903.00	6699613.999	1631278.266	886.985	RT90-RHB70	-75.9100	306.7400	141.9180	-32.8960	59.6250
906.00	6699614.436	1631277.681	889.895	RT90-RHB70	-75.8900	306.7300	142.6340	-33.0430	60.0710
909.00	6699614.873	1631277.095	892.805	RT90-RHB70	-75.8800	306.6700	143.3500	-33.1910	60.5170
912.00	6699615.310	1631276.508	895.714	RT90-RHB70	-75.8600	306.6300	144.0670	-33.3390	60.9630
915.00	6699615.748	1631275.920	898.623	RT90-RHB70	-75.8600	306.6200	144.7840	-33.4880	61.4110
918.00	6699616.185	1631275.332	901.532	RT90-RHB70	-75.8000	306.6500	145.5020	-33.6370	61.8590
921.00	6699616.624	1631274.741	904.441	RT90-RHB70	-75.7700	306.6600	146.2220	-33.7860	62.3090
924.00	6699617.064	1631274.150	907.349	RT90-RHB70	-75.7300	306.6000	146.9450	-33.9350	62.7610
927.00	6699617.505	1631273.556	910.256	RT90-RHB70	-75.7000	306.5100	147.6690	-34.0860	63.2150
930.00	6699617.946	1631272.961	913.163	RT90-RHB70	-75.6600	306.4200	148.3940	-34.2380	63.6710
933.00	6699618.387	1631272.363	916.070	RT90-RHB70	-75.6100	306.2900	149.1210	-34.3920	64.1280
936.00	6699618.829	1631271.762	918.975	RT90-RHB70	-75.5500	306.3000	149.8500	-34.5470	64.5870
939.00	6699619.272	1631271.158	921.881	RT90-RHB70	-75.4800	306.2800	150.5820	-34.7040	65.0500
942.00	6699619.717	1631270.552	924.785	RT90-RHB70	-75.4200	306.3200	151.3180	-34.8610	65.5160
945.00	6699620.164	1631269.944	927.688	RT90-RHB70	-75.3900	306.3300	152.0560	-35.0180	65.9840
948.00	6699620.612	1631269.334	930.591	RT90-RHB70	-75.3700	306.2500	152.7960	-35.1760	66.4550
951.00	6699621.060	1631268.723	933.494	RT90-RHB70	-75.3500	306.3000	153.5370	-35.3350	66.9260
954.00	6699621.509	1631268.112	936.396	RT90-RHB70	-75.3900	306.3900	154.2790	-35.4930	67.3990
957.00	6699621.958	1631267.502	939.299	RT90-RHB70	-75.3500	306.4600	155.0190	-35.6500	67.8690
960.00	6699622.409	1631266.892	942.202	RT90-RHB70	-75.3400	306.5300	155.7620	-35.8060	68.3420
963.00	6699622.861	1631266.282	945.104	RT90-RHB70	-75.3200	306.6300	156.5050	-35.9620	68.8160
966.00	6699623.315	1631265.672	948.006	RT90-RHB70	-75.3300	306.6500	157.2490	-36.1160	69.2910
969.00	6699623.768	1631265.063	950.909	RT90-RHB70	-75.2800	306.7000	157.9930	-36.2700	69.7650
972.00	6699624.224	1631264.452	953.810	RT90-RHB70	-75.2300	306.8500	158.7390	-36.4240	70.2420
975.00	6699624.682	1631263.840	956.711	RT90-RHB70	-75.2000	306.9700	159.4890	-36.5770	70.7220
978.00	6699625.143	1631263.227	959.611	RT90-RHB70	-75.1600	306.9700	160.2400	-36.7280	71.2040
981.00	6699625.605	1631262.614	962.511	RT90-RHB70	-75.1300	307.0500	160.9930	-36.8800	71.6880
984.00	6699626.069	1631261.999	965.411	RT90-RHB70	-75.1100	307.1100	161.7480	-37.0310	72.1730
987.00	6699626.534	1631261.385	968.310	RT90-RHB70	-75.0700	307.0000	162.5040	-37.1810	72.6600
993.00	6699627.469	1631260.148	974.107	RT90-RHB70	-75.0100	307.1300	164.0240	-37.4840	73.6420

Reference Mark T - Reference mark in drillhole

KFM01A, 2002-10-22 22:20:00 - 2002-10-30 17:00:00 (110.000 - 950.000 m)

Bhlen (m)	Rotation Speed (rpm)	Start Flow (l/min)	Stop Flow (l/min)	Stop Pressure (bar)	Cutter Time (s)	Trace Detectable	Cutter Diameter (mm)	Comment
110.00	400.00	330	1000	48.0	1			2002-10-22 22:20/GN/RI
150.00	400.00	300	1100	46.0	1			2002-10-22 22:49/GN/NK/RI
200.00	400.00	300	1000	47.0	1			2002-10-22 23:08/RI
250.00	400.00	280	1100	51.0	1			2002-10-22 23:34/NK/GNRI
300.00	400.00	330	1100	52.0	1			2002-10-22 23:58/RI/NK
350.00	400.00	300	1100	55.0	1			2002-10-23 00:25/RI/NK
400.00	400.00	300	1100	54.0	1			2002-10-23 00:46/RI/NK
450.00	400.00	900	1100	35.0	6			2002-10-23 01:10/RI/NK/JM
500.00	400.00	440	1100	62.0	2			2002-10-29 12:14/RI/NK/KÁ/GN
550.00	400.00	460	1100	63.0	3			2002-10-29 12:40/RI/NK/KÁ
600.00	400.00	480	900	63.0	4			2002-10-29 13:07/RI/NK/KÁ/GN
650.00	400.00	550	1100	55.0	6			2002-10-30 10:51/GN/NK/KÁ/CŞ
700.00	400.00	600	1100	55.0	5			2002-10-30 11:19/GN/NK/KÁ/CŞ
750.00	400.00	620	1100	55.0	5			2002-10-30 12:17/GN/NK/KÁ/CŞ
800.00	400.00	600	1100	55.0	6			2002-10-30 12:12/GN/NK/KÁ/CŞ
850.00	400.00	650	1100	55.0	7			2002-10-30 12:38/GN/NK/KÁ/CŞ
900.00	400.00	660	1100	56.0	5			2002-10-30 13:07/GN/NK/KÁ/CŞ
950.00	400.00	700	1100	48.0	4			2002-10-30 13:33/GN/NK/KÁ/CŞ

Printout from SICADA 2003-04-14 14:19:38.

Drill Cuttings Samp T - Drill cuttings sampling an analysis

KFM01A, 2002-07-01 13:00:00 - 2002-07-31 13:00:00 (12.100 - 100.400 m)

From Length	To Length	Colour Code Unwashed	Grainsize Code Unwashed	Colour Code Washed	Grainsize Code Washed	Rocktype A	Rocktype B	Mineral 1	Mineral 2	Mineral 3	Mineral 4	Mineral 5	Rock-type Distr.	Comment
(m)	(m)	(code)	(code)	(code)	(code)	(code)	(code)	(code)	(code)	(code)	(code)	(code)	(%)	
12.10	14.40	24		6	2	6	101057		36	42	49	10	33	100 rött järnoxidslam i kaxet, sprickor
14.40	17.40	228		9	82	6	101057		36	42	49	10		Kvartsgångar chlorite, epidote
17.40	20.40	82		9	28	9	101057		36	42	49	10		60 green streak chlorite ?
20.40	23.40	82		9	102	9	101057		36	42	49	10		green streak chlorite ?
23.40	26.40	102		9	125	6	101057		36	42	49	10		green streak chlorite ?
26.40	29.40	82		9	52	6	101057		36	42	49	10		fractures with clay and asphalt
29.40	32.20	82		9	82	8	101057	101061	36	42	49	10	33	29.4 clay fracture, altered?
32.20	35.20	82		9	82	6	101057		36	42	49	10	33	
35.20	38.20	82		9	82	6	101057	101061	36	42	49	10	33	fractures with clay and asphalt
38.20	41.20	228		9	202	6	101057	101061	36	42	49	10	33	
41.20	44.20	228		9	202	9	101057		36	42	49	10	33	few fractures with chlorite
44.20	47.20	2		9	2	9	101057		36	42	49	10	33	few fractures with chlorite
47.20	50.20	2		9	2	9	101057	101061	36	42	49	10	33	60 asphalt in fractures
50.20	53.20	28		9	54	6	101057		36	42	49	10		60 larger brecciated fragments in cutings.min 5 =talc(9052)
53.20	56.20	182		9	182	6	101057		36	42	49	10		50 larger becciated fragments in cuttings
56.20	59.20	87		9	17	6	101057	102017	36	42	49	10	28	50
59.20	62.20	87		9	17	6	101057	102017	36	42	49	10	28	70 contact
62.20	65.20	9		6	9	2	102017		28	49	36	25	10	
65.20	68.20	9		6	9	2	102017		28	49	36	25	10	
68.20	71.20	287		9	87	6	101051		36	49	10	50		some amphibolite cuttings
71.20	74.20	87		9	87	6	101051		36	49	10	50		
74.20	77.20	87		9	87	6	101051		36	49	10	50		
77.20	80.20	87		9	87	6	101051		36	49	10	50		
80.20	83.20	287		9	87	6	101051		36	49	10	50		
83.20	86.20	287		9	87	6	101051		36	49	10	50		
86.20	89.20	287		9	287	6	101051	101057	36	49	42	10	50	black REE? Lager grains, pegmatite veins
89.20	92.20	87		9	128	6	101057		36	49	42	10	90	
92.20	95.20	87		9	128	6	101057		36	49	42	10		reddish tone
95.20	98.20	87		9	128	6	101057		36	49	10	42	50	bright pinkish tone, REE-silicate?
98.20	100.50	87		9	128	6	101057		36	49	10	42	50	bright pinkish tone, REE-silicate?

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