Arbeitsbericht NAB 22-04

TBO Bachs-1-1: Data Report

Dossier II
Core Photography

August 2023

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[1] Maya & Daniele
[2] Nagra

Keywords:
BAC1-1, Nördlich Lägern, TBO, deep drilling campaign, drill cores, cuttings, photos, composites, CoreScan[3]

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Nagra Arbeitsberichte NAB ("Working Reports") present the results of work in progress that have not necessarily been subject to a comprehensive review. They are intended to provide rapid dissemination of current information.

This NAB aims at reporting drilling results at an early stage. Additional borehole-specific data will be published elsewhere.

In the event of inconsistencies between dossiers of this NAB, the dossier addressing the specific topic takes priority. In the event of discrepancies between Nagra reports, the chronologically later report is generally considered to be correct. Data sets and interpretations laid out in this NAB may be revised in subsequent reports. The reasoning leading to these revisions will be detailed there.

This Dossier was prepared by:
D. Kaehr (photography post-processing and core photograph composite design and compilation)
H.P. Weber (project management, conceptualisation, QC and writing)
M. Stockhecke (QC sanner and pictures)

Editorial work: Geomecon and M. Unger

The Dossier has greatly benefitted from technical discussions with, and reviews by, external and internal experts. Their input and work are very much appreciated!

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Note: The appendix is only included it the digital version of this report and can be found under the paper clip symbol.

1 Introduction

1.1 Context

To provide input for site selection and the safety case for deep geological repositories for radioactive waste, Nagra has drilled a series of deep boreholes ("Tiefbohrungen", TBO) in Northern Switzerland. The aim of the drilling campaign is to characterise the deep underground of the three remaining siting regions located at the edge of the Northern Alpine Molasse Basin (Fig. 1-1).

In this report, we present the results from the Bachs-1-1 borehole.

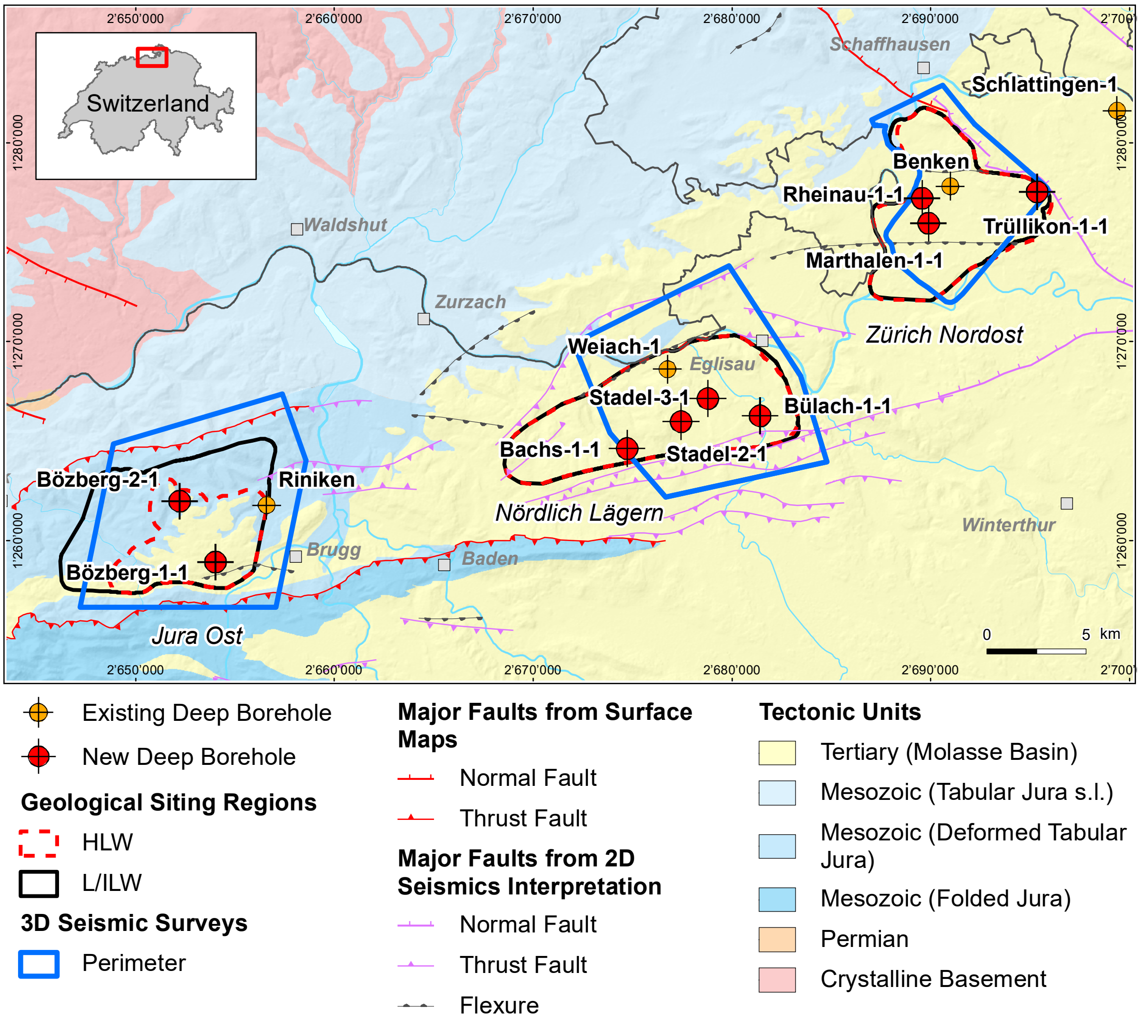


Fig. 1-1: Tectonic overview map with the three siting regions under investigation

1.2 Location and specifications of the borehole

The Bachs-1-1 (BAC1-1) exploratory borehole is the ninth (and last) borehole drilled within the framework of the TBO project. The drill site is located in the western part of the Nördlich Lägern siting region (Fig. 1-2). The vertical borehole reached a final depth of 1'306.26 m (MD)[1]. The borehole specifications are provided in Tab. 1-1.

Due to a loss of a measurement tool (dilatometer), the borehole was cemented up to 500 m MD and a sidetrack was initiated with a kickoff point (KOP) at about 600 m MD . This sidetrack was labelled Bachs-1-1B (BAC1-1B). BAC1-1B reached a final depth of 952 m MD but was abandoned during borehole reaming operations due to entering the original borehole BAC1-1. Therefore, the vertical borehole BAC1-1 was used again for the remaining investigations. For easier communication and labelling, the name BAC1-1 is generally used for this borehole, including the sidetrack, unless stated otherwise. A detailed description of all technical details about the drilling process can be found in Dossier I.

Tab. 1-1: General information about the BAC1-1 borehole

Siting region	Nördlich Lägern
Municipality	Bachs (Canton Zürich / ZH), Switzerland
Drill site	Bachs-1 (BAC1)
Borehole	Bachs-1-1 (BAC1-1)
Coordinates	LV95: 2'674’769.089 / 1'264’600.698
Elevation	Ground level = top of rig cellar: 450.35 m above sea level (asl)
Borehole depth	1'306.26 m measured depth (MD) below ground level (bgl)
Drilling period	10th September 2021 – 23rd April 2022 (spud date to end of rig release)
Drilling company	Daldrup & Söhne AG
Drilling rig	Wirth B 152t
Drilling fluid	Water-based mud with various amounts of different components such as:[2] 0 – 700 m: Bentonite & polymers 700 – 1'057 m: Potassium silicate & polymers[3] 1'057 – 1'129 m: Water & polymers 1'129 – 1'306.26 m: Sodium chloride brine & polymers

The lithostratigraphic profile and the casing scheme are shown in Fig. 1-3. The comparison of the core versus log depth[4] of the main lithostratigraphic boundaries in the BAC1-1 borehole is shown in Tab. 1-2.

[1] Measured depth (MD) refers to the position along the borehole trajectory, starting at ground level, which for this borehole is the top of the rig cellar. For a perfectly vertical borehole, MD below ground level (bgl) and true vertical depth (TVD) are the same. In all Dossiers depth refers to MD unless stated otherwise.

[2] For detailed information see Dossier I.

[3] Including sidetrack.

[4] Core depth refers to the depth marked on the drill cores. Log depth results from the depth observed during geophysical wireline logging. Note that the petrophysical logs have not been shifted to core depth, hence log depth differs from core depth.

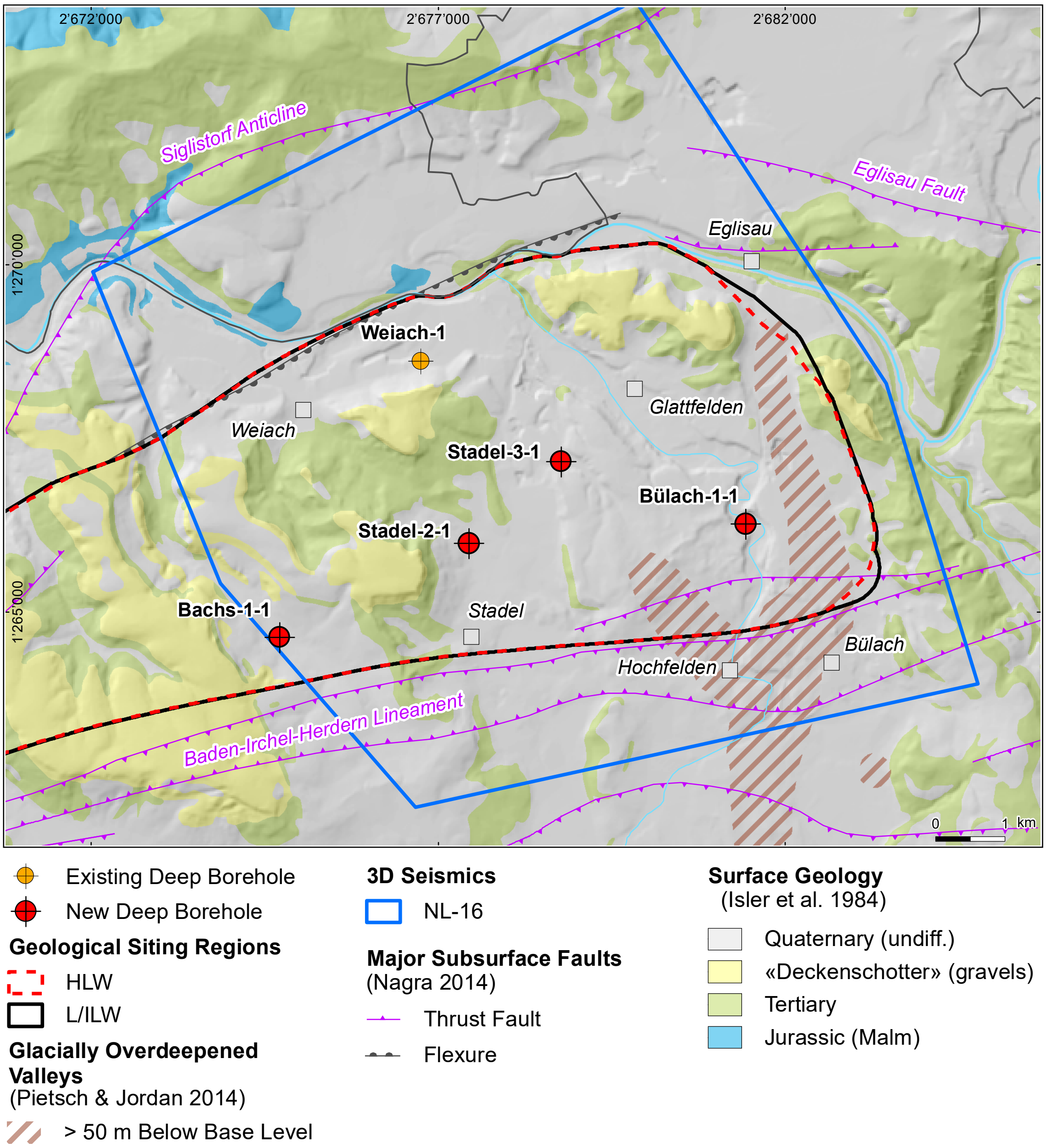


Fig. 1-2: Overview map of the investigation area in the Nördlich Lägern siting region with the location of the BAC1-1 borehole in relation to the boreholes Weiach-1, BUL1-1, STA3-1 and STA2-1

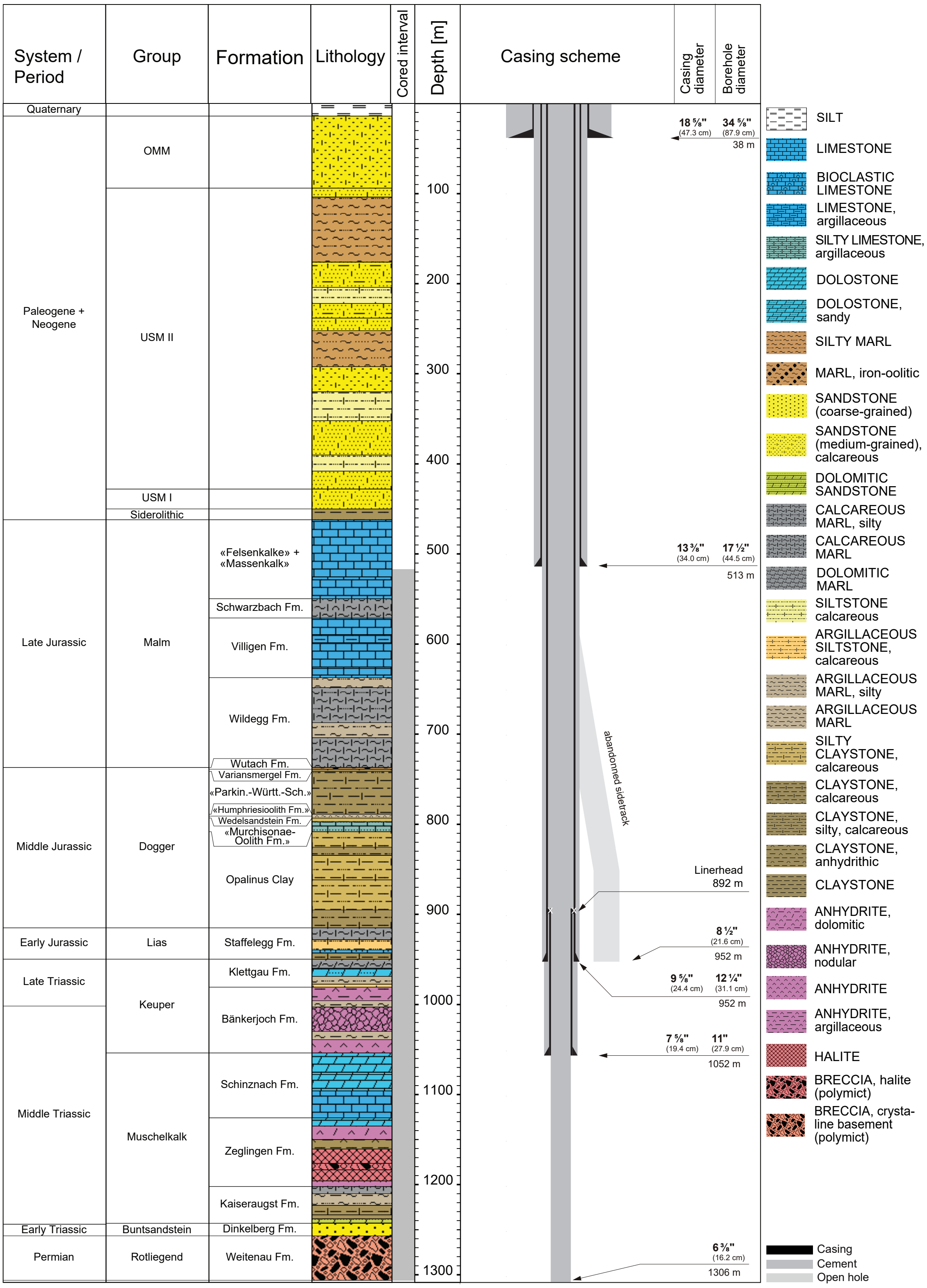


Fig. 1-3: Lithostratigraphic profile and casing scheme for the BAC1-1 borehole[5]

[5] For detailed information see Dossier I and III.

Tab. 1-2: Core and log depth for the main lithostratigraphic boundaries in the BAC1-1 borehole[6]

System / Period	Group	Formation	Core top depth in m (MD)	Log top depth in m (MD)
Quaternary				
Paleogene + Neogene	OMM		**14**	
	USM		94	
	Siderolithic		450	
Jurassic	Malm	«Felsenkalke» + «Massenkalk»	**462**	
		Schwarzbach Formation	549.69	550.03
		Villigen Formation	570.98	571.29
		Wildegg Formation	637.31	637.55
	Dogger	Wutach Formation	737.05	737.32
		Variansmergel Formation	738.81	739.08
		«Parkinsoni-Württembergica-Schichten»	741.22	741.47
		«Humphriesioolith Formation»	788.92	789.12
		Wedelsandstein Formation	791.05	791.25
		«Murchisonae-Oolith Formation»	793.11	793.31
		Opalinus Clay	808.34	808.57
	Lias	Staffelegg Formation	914.91	915.30
Triassic	Keuper	Klettgau Formation	**949.73**	**950.07**
		Bänkerjoch Formation	980.93	981.27
	Muschelkalk	Schinznach Formation	1053.90	1054.30
		Zeglingen Formation	1125.75	1126.20
		Kaiseraugst Formation	1202.03	1202.43
	Buntsandstein	Dinkelberg Formation	1242.82	1243.12
Permian	Rotliegend	Weitenau Formation	**1256.86**	**1257.26**
		final depth	1306.26	1306.77

[6] For details regarding lithostratigraphic boundaries see Dossier III and IV; for details about depth shifts (core goniometry) see Dossier V.

1.3 Documentation structure for the BAC1-1 borehole

NAB 22-04 documents the majority of the investigations carried out in the BAC1-1 borehole, including laboratory investigations on core material. The NAB comprises a series of stand-alone dossiers addressing individual topics and a final dossier with a summary composite plot (Tab. 1-3).

This documentation aims at early publication of the data collected in the BAC1-1 borehole. It includes most of the data available approximately one year after completion of the borehole. Some analyses are still ongoing (e.g. diffusion experiments, analysis of veins, hydrochemical interpretation of water samples) and results will be published in separate reports.

The current borehole report will provide an important basis for the integration of datasets from different boreholes. The integration and interpretation of the results in the wider geological context will be documented later in separate geoscientific reports.

Tab. 1-3: List of dossiers included in NAB 22-04

Black marks the dossier at hand.

Dossier	Title	Authors
I	TBO Bachs-1-1: Drilling	P. Hinterholzer-Reisegger
II	**TBO Bachs-1-1: Core Photography**	**D. Kaehr, M. Stockhecke & H.P. Weber**
III	TBO Bachs-1-1: Lithostratigraphy	P. Jordan, P. Schürch, M. Schwarz, R. Felber, H. Naef, T. Ibele & F. Casanova
IV	TBO Bachs-1-1: Microfacies, Bio- and Chemostratigraphic Analysis	S. Wohlwend, H.R. Bläsi, S. Feist-Burkhardt, B. Hostettler, U. Menkveld-Gfeller, V. Dietze & G. Deplazes
V	TBO Bachs-1-1: Structural Geology	A. Ebert, E. Hägerstedt, S. Cioldi, L. Gregorczyk & F. Casanova
VI	TBO Bachs-1-1: Wireline Logging, Micro-hydraulic Fracturing and Pressure-meter Testing	J. Gonus, E. Bailey, J. Desroches & R. Garrard
VII	TBO Bachs-1-1: Hydraulic Packer Testing	R. Schwarz, R. Beauheim, L. Schlickenrieder, E. Manukyan & A. Pechstein
VIII	TBO Bachs-1-1: Rock Properties, Porewater Characterisation and Natural Tracer Profiles	E. Gaucher, L. Aschwanden, T. Gimmi, A. Jenni, M. Kiczka, M. Mazurek, P. Wersin, C. Zwahlen, U. Mäder & D. Traber
IX	*The geomechanical campaign in BAC-1-1 was limited to two oedometric tests. Hence, no dedicated Dossier IX was produced for NAB 22-04. The hydraulic conductivity values derived from the oedometric tests are documented in the Summary Plot.*	
X	TBO Bachs-1-1: Petrophysical Log Analysis	S. Marnat & J.K. Becker
	TBO Bachs-1-1: Summary Plot	Nagra

1.4 Scope and objectives of this dossier

The dossier at hand (Dossier II) documents core photography. The objectives are the following:

- summary of core handling and core photography of this drilling campaign
- visual documentation of the cuttings samples and cores of BAC1-1 from 0 m to 1'306.26 m MD core depth

2 Executed working procedures

2.1 On-site core handling

The cores were drilled with a 6 m long inner core barrel containing an inner plastic tube. To avoid core jamming and to obtain a better core quality the length of a core run was 3 m, only. After cutting the core, the drilling crew pulled the inner core barrel up with a winch (wireline coring) and placed it on the pipe rack (Fig. 2-1). The core catcher was detached and the inner plastic tube was removed and laid down on trestles. The section containing the core was separated from the empty plastic tube by cutting the tube to a length of approximately 3.5 m. The core was then carried to the core processing area (Fig. 2-2) and pushed out of the tube using an appropriate rod. If the core was jammed inside the tube, the plastic liner was cut laterally using an electric cutting machine.

Fig. 2-1: The inner core barrel is placed on the pipe rack

Showcase picture of rig 16 (Marriott); workflow comparable at the Daldrup rig (picture credits: © Maya & Daniele)

Fig. 2-2: The 3 m core in the plastic liner is carried to the core processing area

Showcase picture of rig 16 (Marriott); workflow comparable at the Daldrup rig (picture credits: © Maya & Daniele)

Once laid out, the core was washed with water to remove the drilling fluid (Figs. 2-3 and 2-4). Afterwards, the top of the newly cut core was aligned with the bottom of the previous core section. If the two core pieces did not fit properly, they were marked with a red cross and a new set of orientation lines was started. If a fit was established, the orientation lines were correctly copied onto the newly cored section. These orientation lines consist of two parallel lines drawn along the core axis with additional arrows indicating the downhole direction. The line on the right-hand side when looking towards the core top is red (Figs. 2-5 and 2-6). The colour of the line on the left-hand side can be white, yellow or black depending on the colour of the cored rock. The core depth was marked on the core with a line perpendicular to the core axis and corresponding depth labels at 0.5 m intervals.

To facilitate proper core handling, transportation and further analyses, the core sections were cut into pieces approximately one metre long using a diamond-impregnated rock saw before being stored in one metre core boxes.

Fig. 2-3: A core covered in drilling fluid on the core processing table

Picture credits: © Maya & Daniele

Fig. 2-4: A core is washed with water on the core processing table to remove the drilling fluid

Picture credits: © Maya & Daniele

Fig. 2-5: A core is marked with orientation lines

Picture credits: © Maya & Daniele

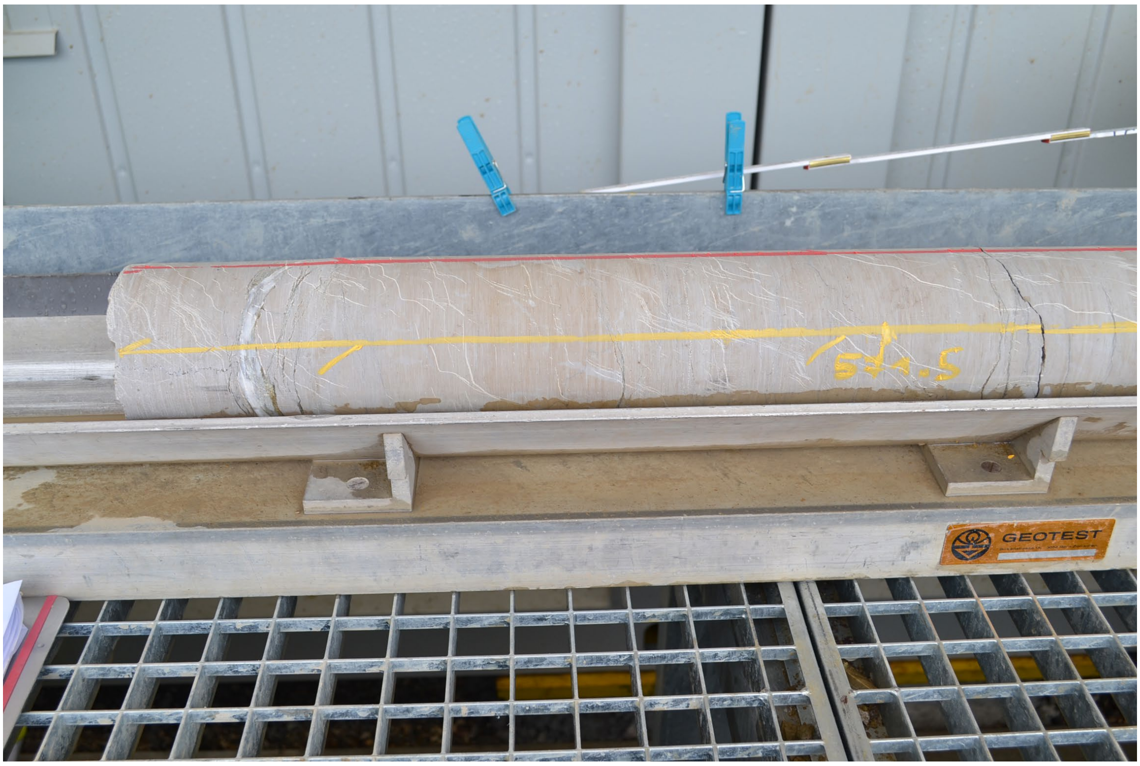


Fig. 2-6: Cleaned, measured and marked core

2.2 Core photography

All core pieces were photographed (planar pictures) using a modified version of the DMT CoreScan^3 system (Fig. 2-7) specifically designed to take high-resolution core photographs (10 px/mm). If the core geometry and condition allowed it, 360° photographs of the core surface were also taken (not documented in this dossier). For both planar and 360° photographs, the core was placed on two rubber rollers and a digital line scan camera recorded the picture via an inclined mirror in the top section of the CoreScan^3 system. During 360° photography, the core was rotated around its longitudinal axis and the picture was taken at the upper section of the core. In addition, all 360° photographs were digitally rotated to set the red orientation line to 0°. Both planar and 360° photographs were saved on the CoreScan^3 computer, which automatically synchronised the data with the Nagra network-attached storage (NAS) located at the core storage facility in Würenlingen.

2.2.1 Specifications

Camera:

- manufacturer: avaluar GmbH
- camera model: CCD-Colour camera CSc3b1.26
- resolution y: 6'400 (10 px/mm)
- resolution x: 10'680 (10 px/mm)
- spectral response: 400 nm to 700 nm
- sharpening: 0
- gamma: 1.4
- lens maker: Schneider Kreuznach
- lens model: APO COMPONON f4.0/60mm
- aperture: f/8
- focal length: 35 mm
- exposure time: program very dark (custom calibrated for Nagra's LED panels)

LED panels:

- 4x Aladdin BI-FLEX 4 (200 W Bi-Colour Panel): two at the back and two at the front of the CoreScan^3 system, protected in aluminium boxes with a diffusor plate as front cover
- 2x Aladdin BI-FLEX 2 (70 W Bi-Colour Panel): one on the left-hand side and one on the right-hand side of the CoreScan^3 system, protected in an aluminium box with a diffusor plate as front cover
- all six panels are calibrated to 5'000 K with a Sekonic C-800 SpectroMaster

Reference cards:

- X-Rite ColorChecker White Balance: used for camera calibration (shading)
- X-Rite ColorChecker Classic Mini colour chart: colour reference on every core photo
- BST14 greyscale chart: greyscale reference on every core photo
- Datacolor SpyderCHECKR 48 colour chart: colour reference chart for reference photographs

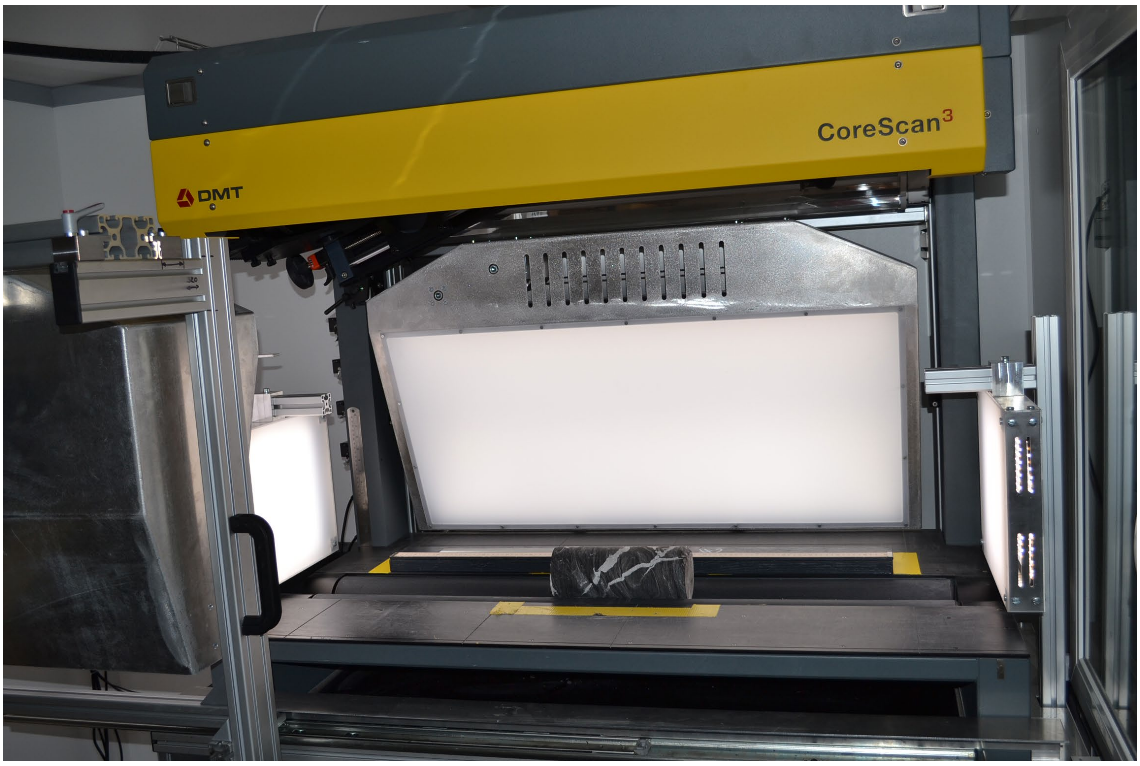


Fig. 2-7: Modified DMT CoreScan^3 system at the drill site

2.2.2 Colour drift monitoring

During coring operations, a reference photograph of the Datacolor SpyderCHECKR 48 colour chart was taken with the CoreScan^3 system at least twice per 24 h (Fig. 2-8). These reference photographs enabled to monitor the proper functioning of the CoreScan^3 system during operations. Issues regarding colour correctness and contrast could be detected early and necessary adjustments to the CoreScan^3 system or environment conditions (especially room temperature) could be made. The reference photographs could further be used to create an ICC profile (International Color Consortium): a data set characterising the colour input / output for the most accurate colour matching.

Each core photograph taken included a metre scale, a BST14 greyscale chart and an X-Rite ColorChecker Classic Mini colour chart (Fig. 2-9). The metre scale is essential to have a depth indicator on the core photograph, whereas the colour and greyscale charts allow manual colour management during post-processing of the core photograph if required.

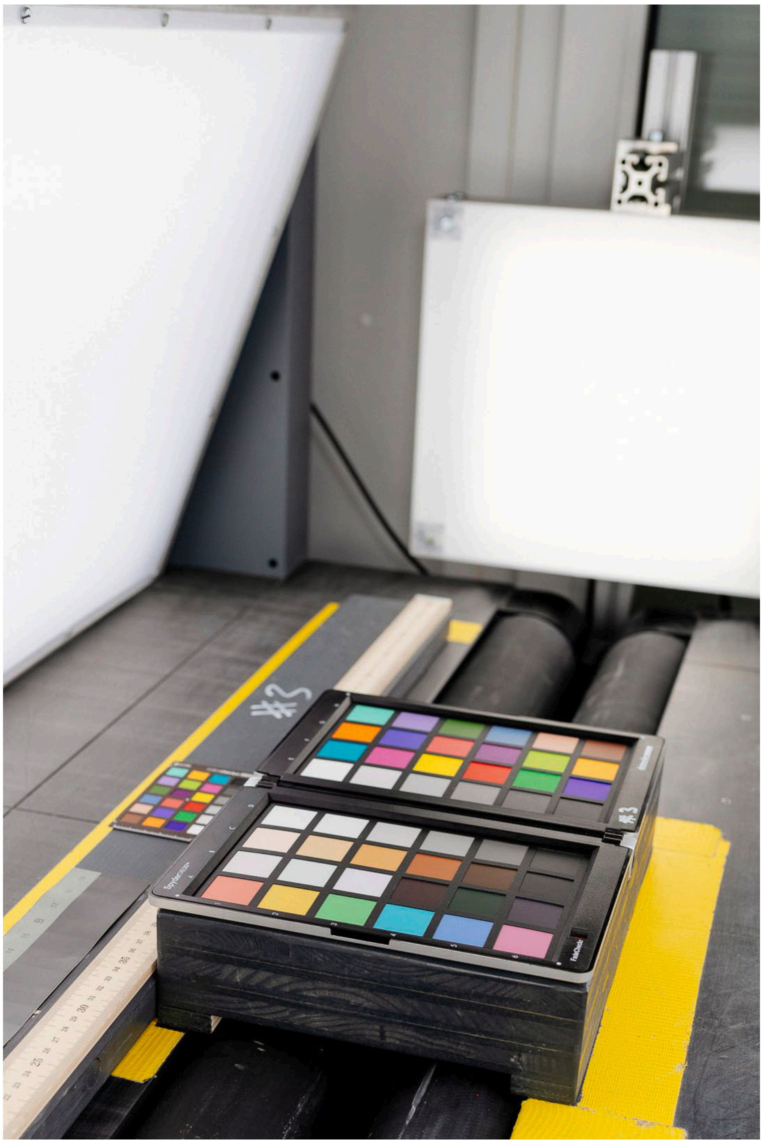


Fig. 2-8: Reference photograph setup of the CoreScan[3] system with a Datacolor SpyderCHECKR 48 colour chart, a metre scale, a BST14 greyscale chart and an X-Rite ColorChecker Classic Mini colour chart

Picture credits: © Maya & Daniele

Fig. 2-9: CoreScan[3] system setup during core photography with a metre scale, a BST14 grey-scale chart and an X-Rite ColorChecker Classic Mini colour chart

Picture credits: © Maya & Daniele

2.3 Post-processing of core photographs

All core photographs taken on the drill site were post-processed by a professional photographer. The colour management of the post-processing workflow provided colour-matched, high-resolution core photograph reproductions with enhanced quality and fidelity. The following post-processing steps were applied to a batch of core photographs with comparable camera settings and environmental conditions:

1. noise reduction of the reference photographs of the Datacolor SpyderCHECKR 48 colour chart, shot with the CoreScan[3] system
2. ICC profiling of the noise-reduced reference photographs, shot with the CoreScan[3] system
3. evaluation of the ICC profiles and selection of the best ICC profile for the post-processing of the core photographs
4. ICC profile application to the core photographs in batch mode
5. correction of contrast and brightness of the core photographs in batch mode
6. conversion of the photographs to eciRGB_v2 standard colour space in batch mode
7. noise reduction and pre-sharpening of every single core photograph
8. correction of colour, exposure and contrast of the core photographs in batch mode

9. comparison between the best ICC profile of the Datacolor SpyderCHECKR 48 colour chart reference photograph, shot with the CoreScan[3] system and the ICC profile of the Datacolor SpyderCHECKR 48 colour chart reference photograph, shot with a Canon 5DmkIV camera
10. visual adjustment of the best ICC profile of the Datacolor SpyderCHECKR 48 colour chart reference photograph, shot with the CoreScan[3] system to the ICC profile of the Datacolor SpyderCHECKR 48 colour reference photograph, shot with a Canon 5DmkIV camera
11. application of the colour adjustement defined in the previous step to the core photographs in batch mode
12. if required, manual colour neutralisation of every single core photograph based on the BST14 greyscale chart and the X-Rite ColorChecker Classic Mini colour chart
13. cropping of the core photographs to the core outlines
14. export of the core photographs as .jpg and .tiff in pre-defined resolutions and corresponding sharpening parameters

2.4 Signatures

The following signature was used in the composite displays of the complete cores:

- white hachures: missing core due to formation integrity test (FIT) pilot hole or drilling-related technical issues (Fig. 2-10)

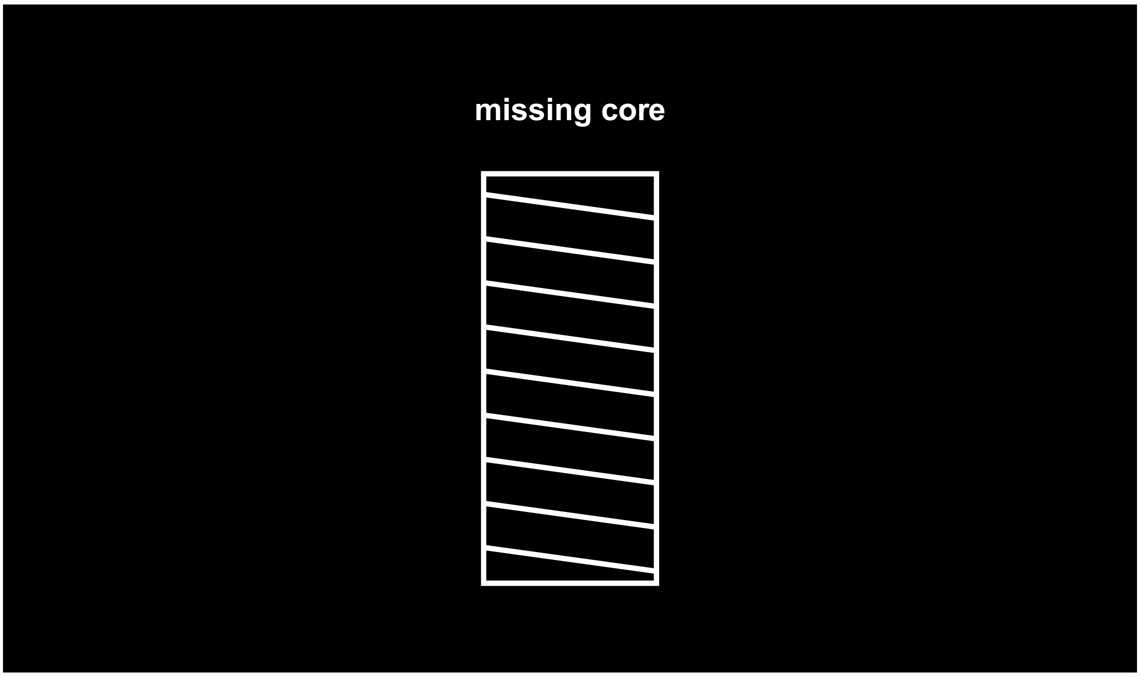


Fig. 2-10: White hachures signature used for missing core due to FIT pilot hole or drilling related technical issues in the composite displays

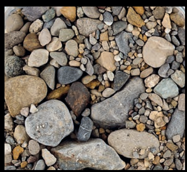
3 Bachs-1-1 core- and cuttings composites

2.00m

2.00m

4.00m

6.00m



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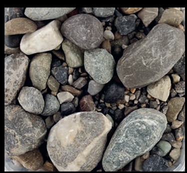
10.00m



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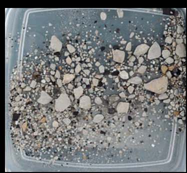

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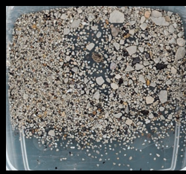

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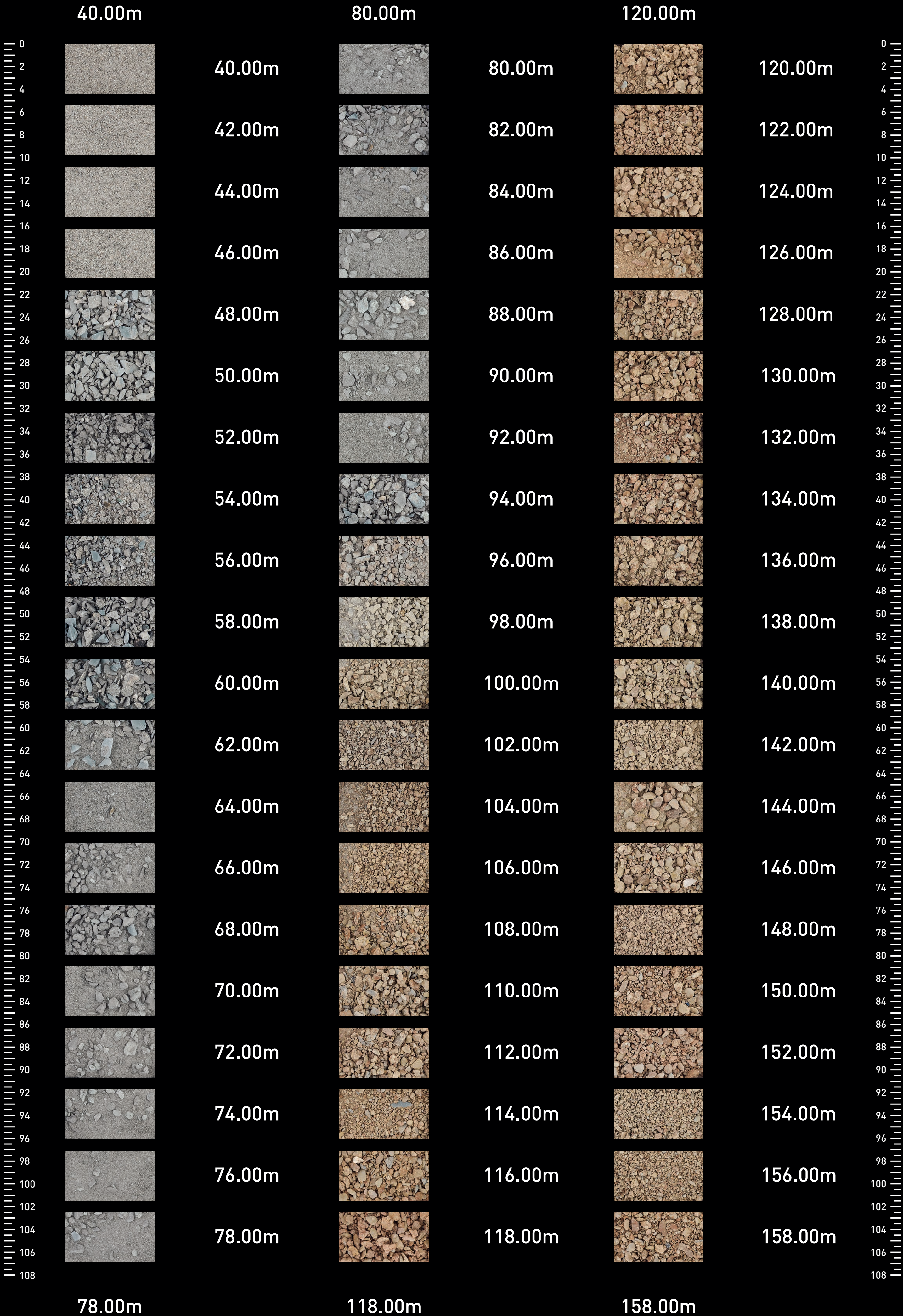
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420.00m
422.00m
424.00m
426.00m
428.00m
430.00m
432.00m
434.00m
436.00m
438.00m
440.00m
442.00m
444.00m
446.00m
448.00m
450.00m
452.00m
454.00m
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458.00m
460.00m
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512.00m
514.00m
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438.00m
478.00m
514.00m

517.16m 518.00m 518.90m 519.73m 520.10m 520.85m

518.00m 518.90m 519.73m 520.10m 520.85m 521.50m

521.50m 522.00m 522.90m 523.85m 524.50m 525.35m

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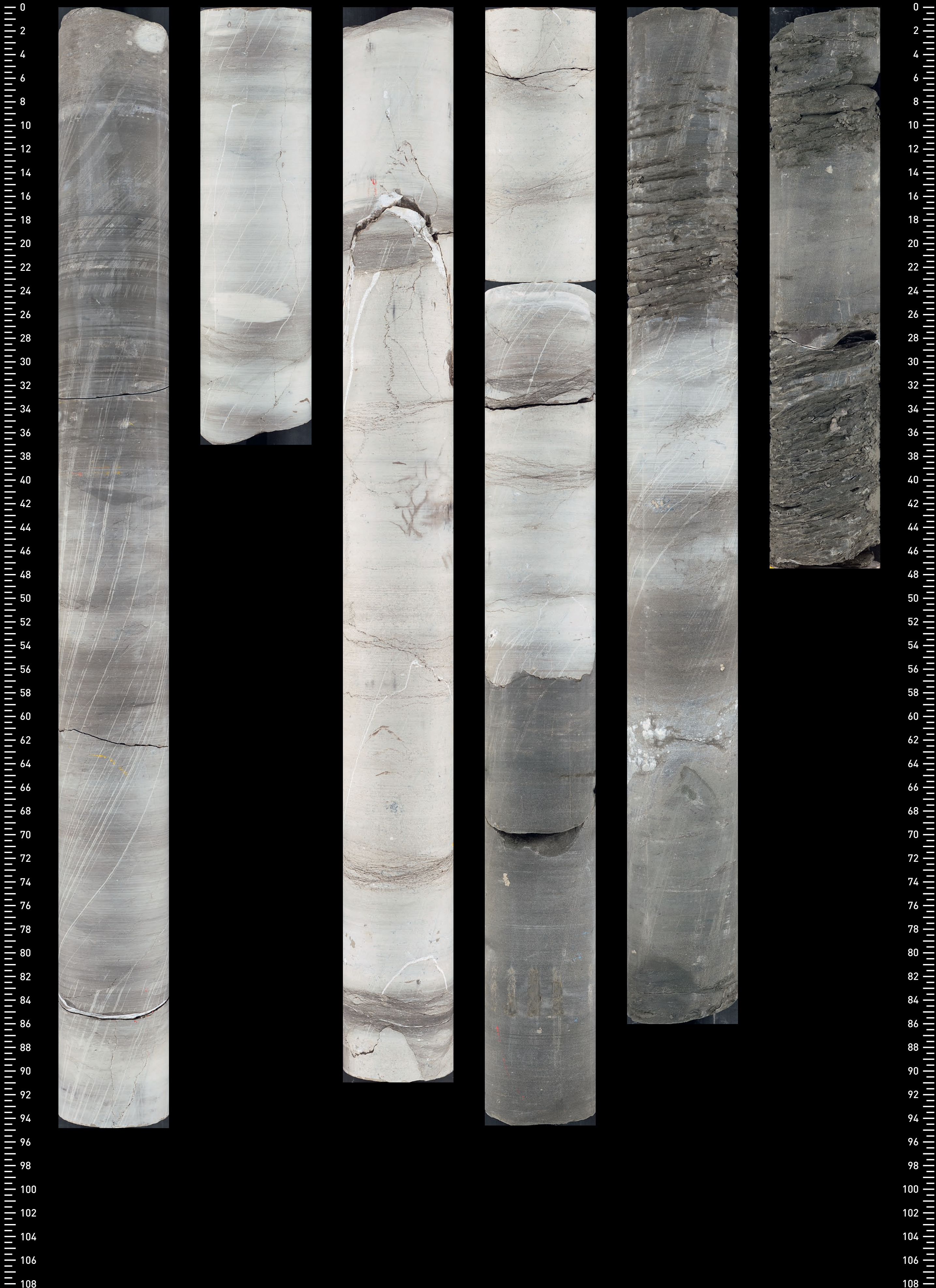

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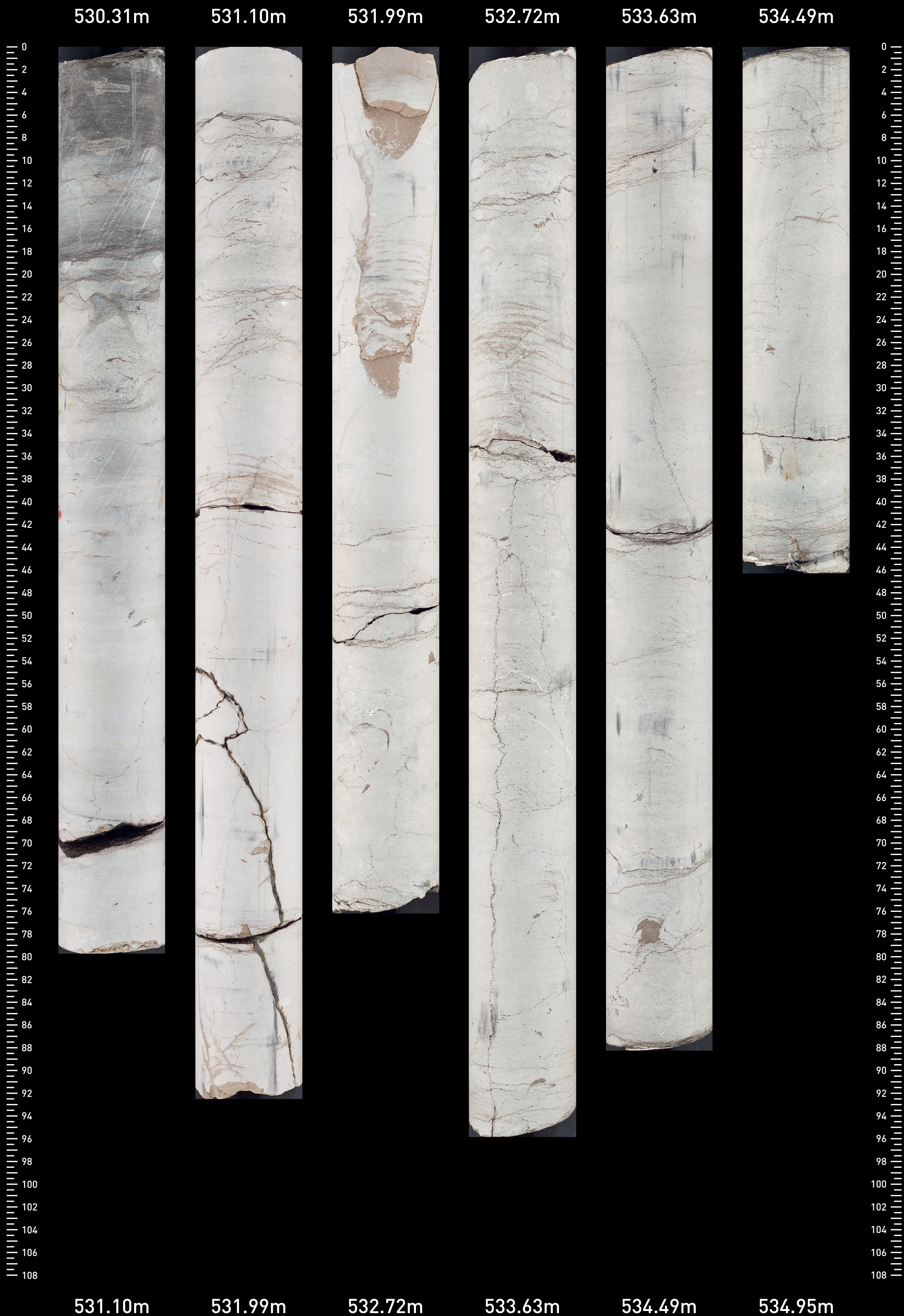
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534.95m


534.95m
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538.85m
535.80m
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539.58m

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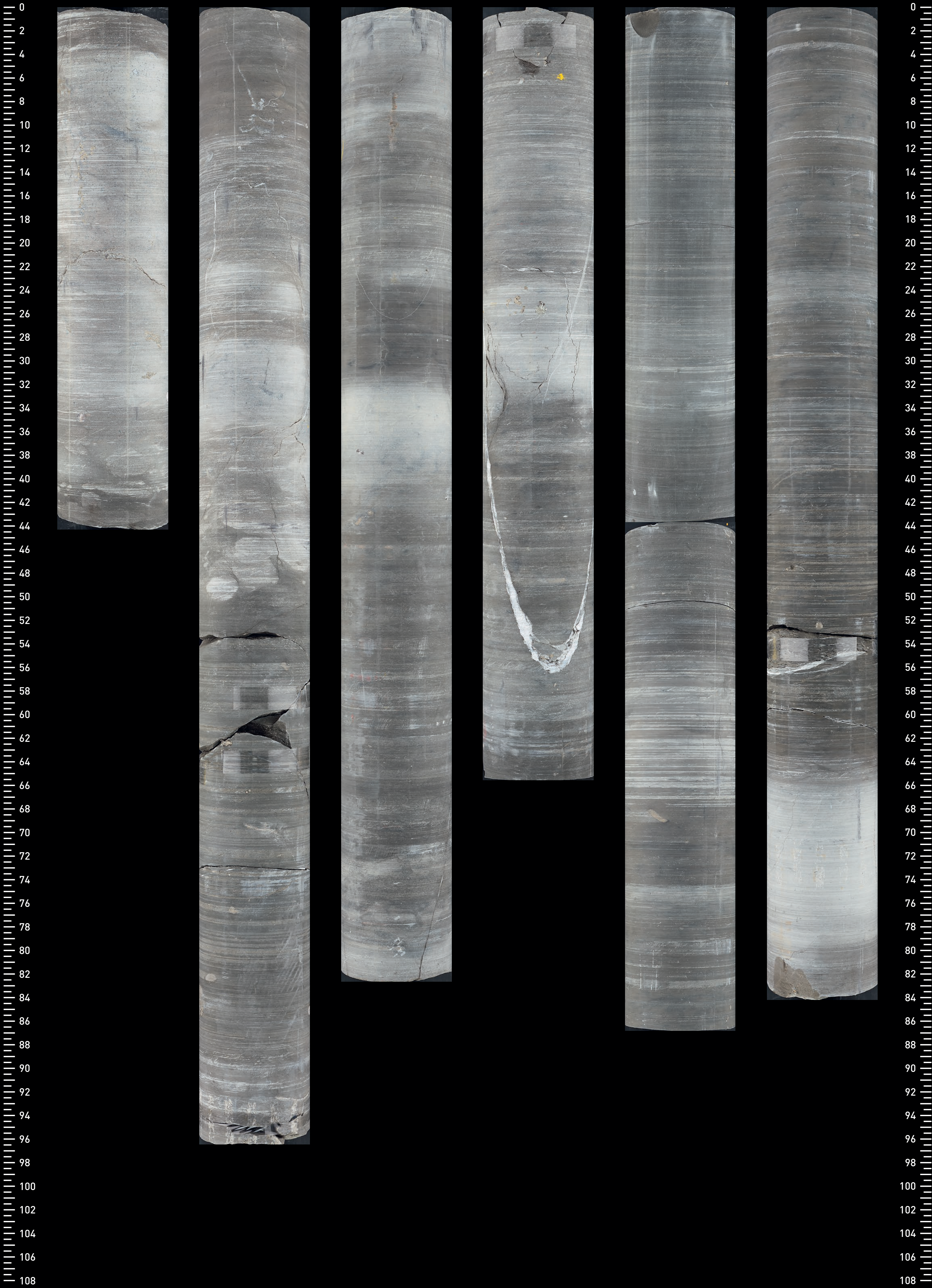

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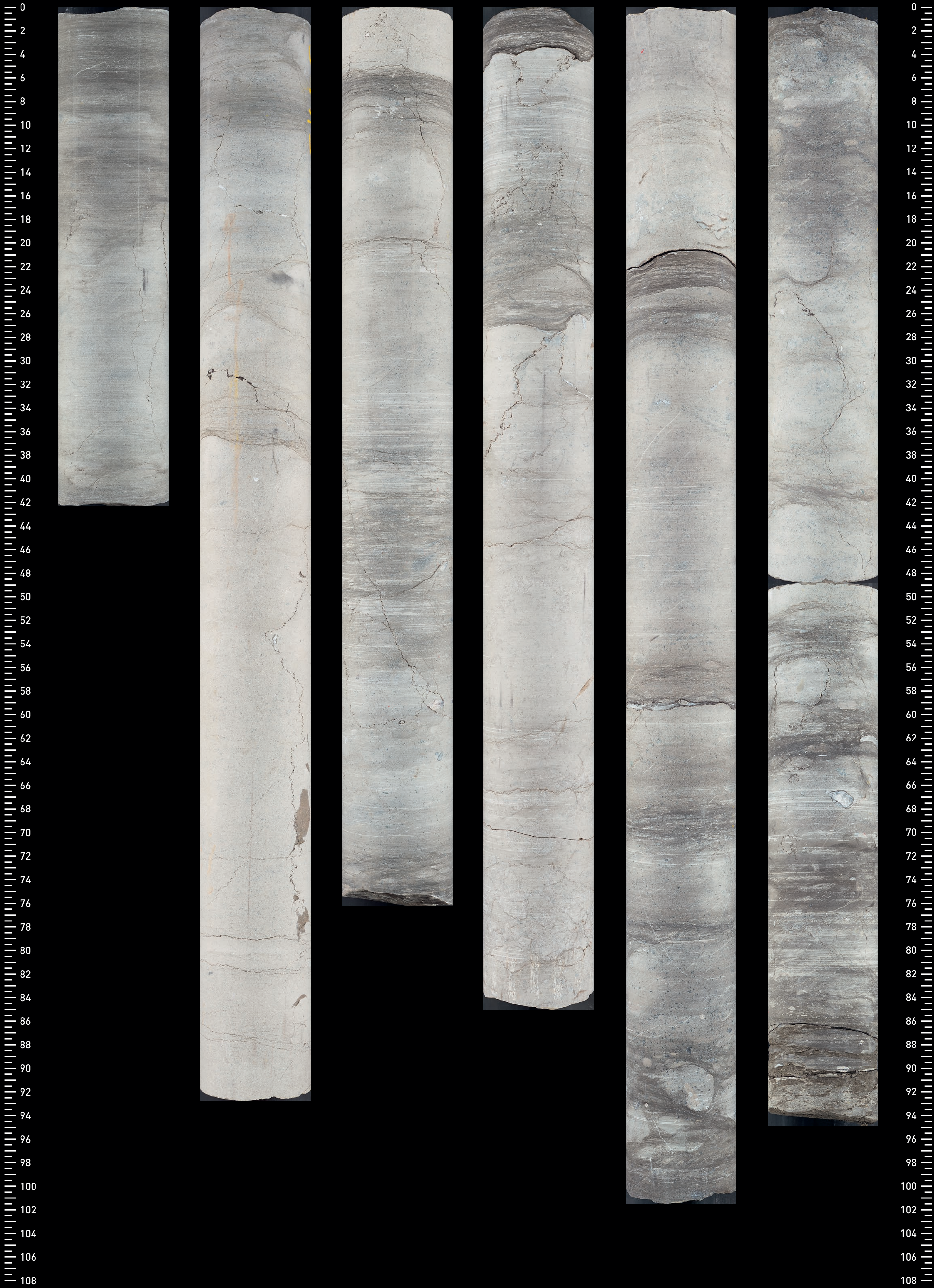

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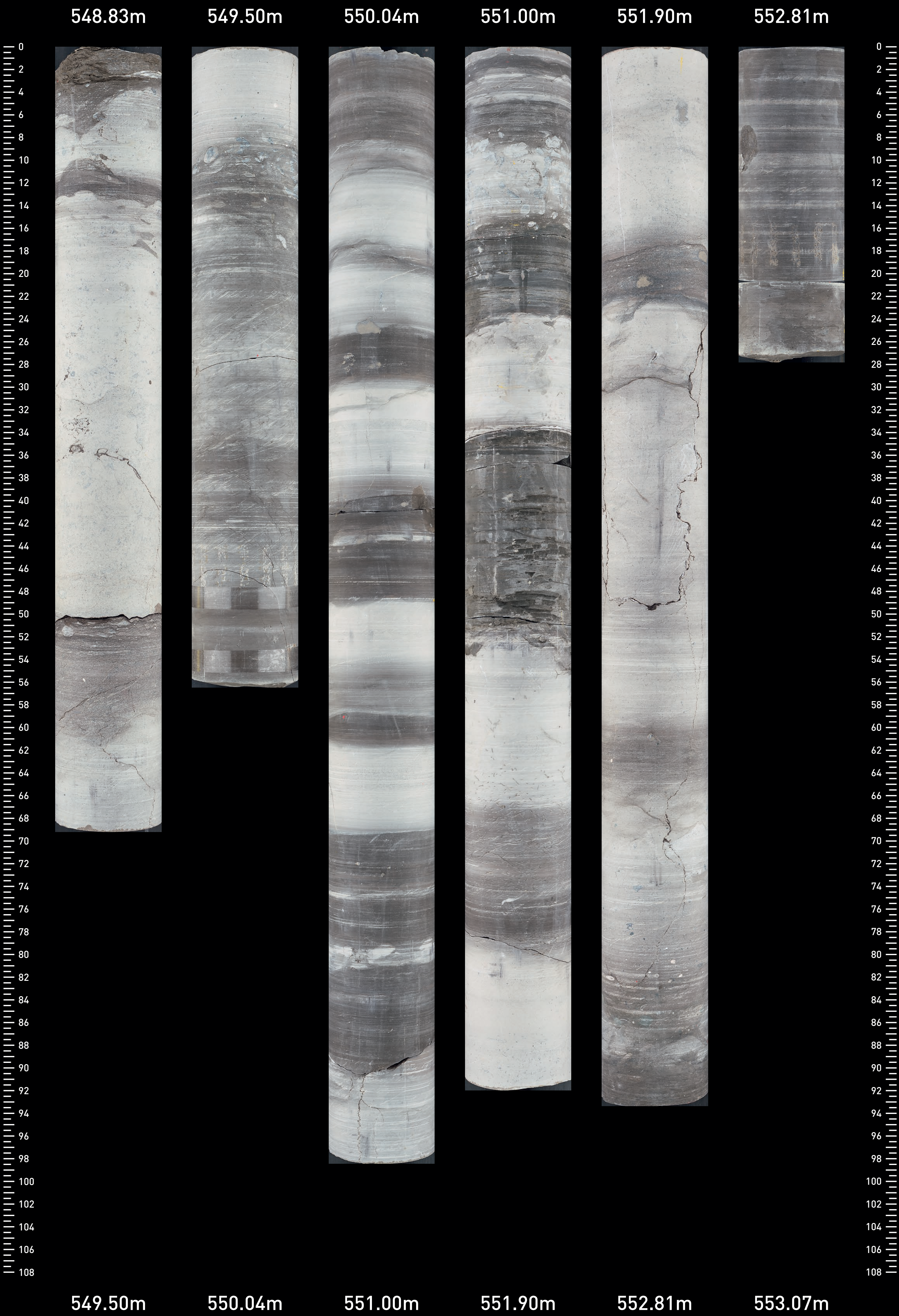
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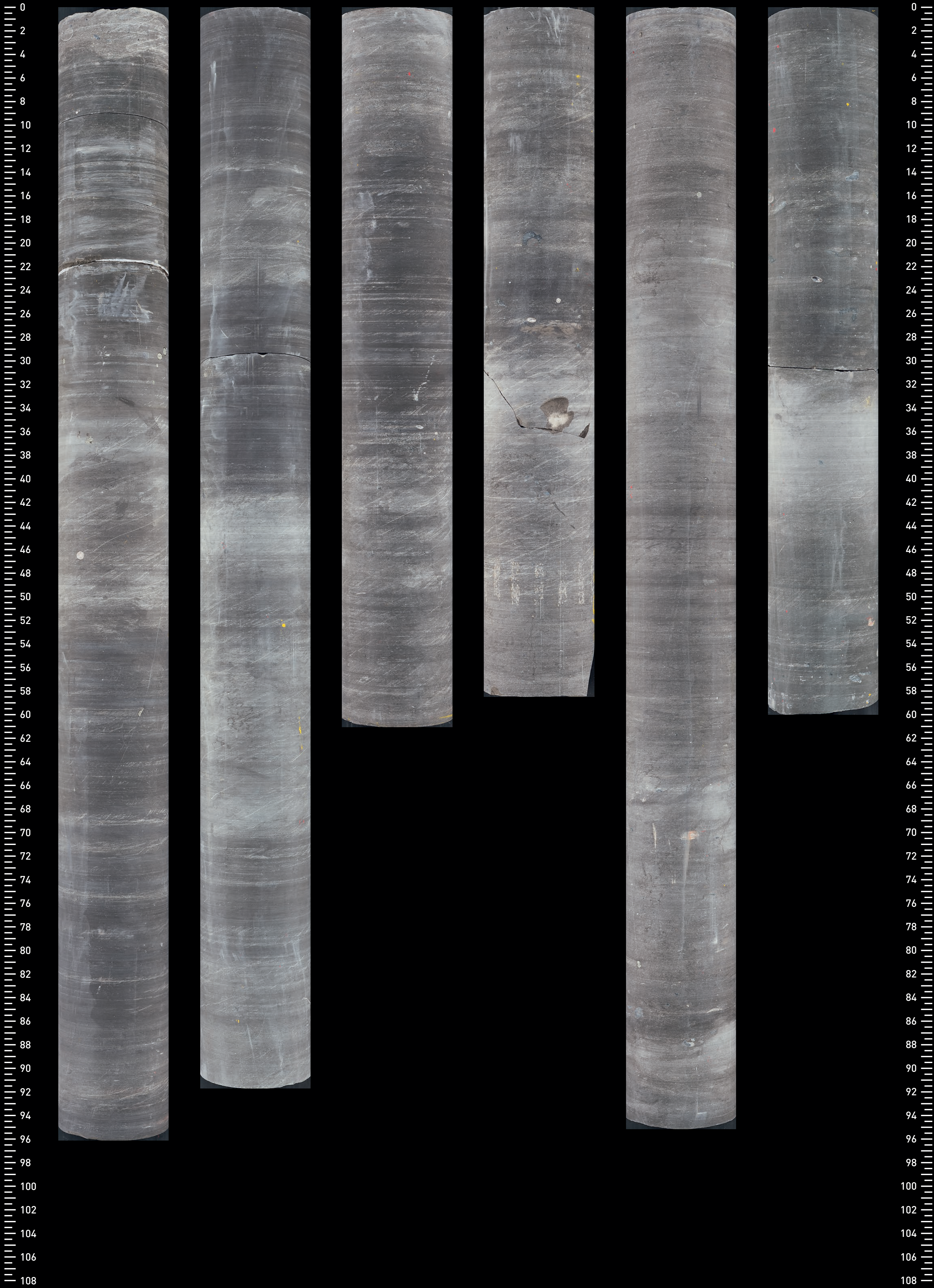

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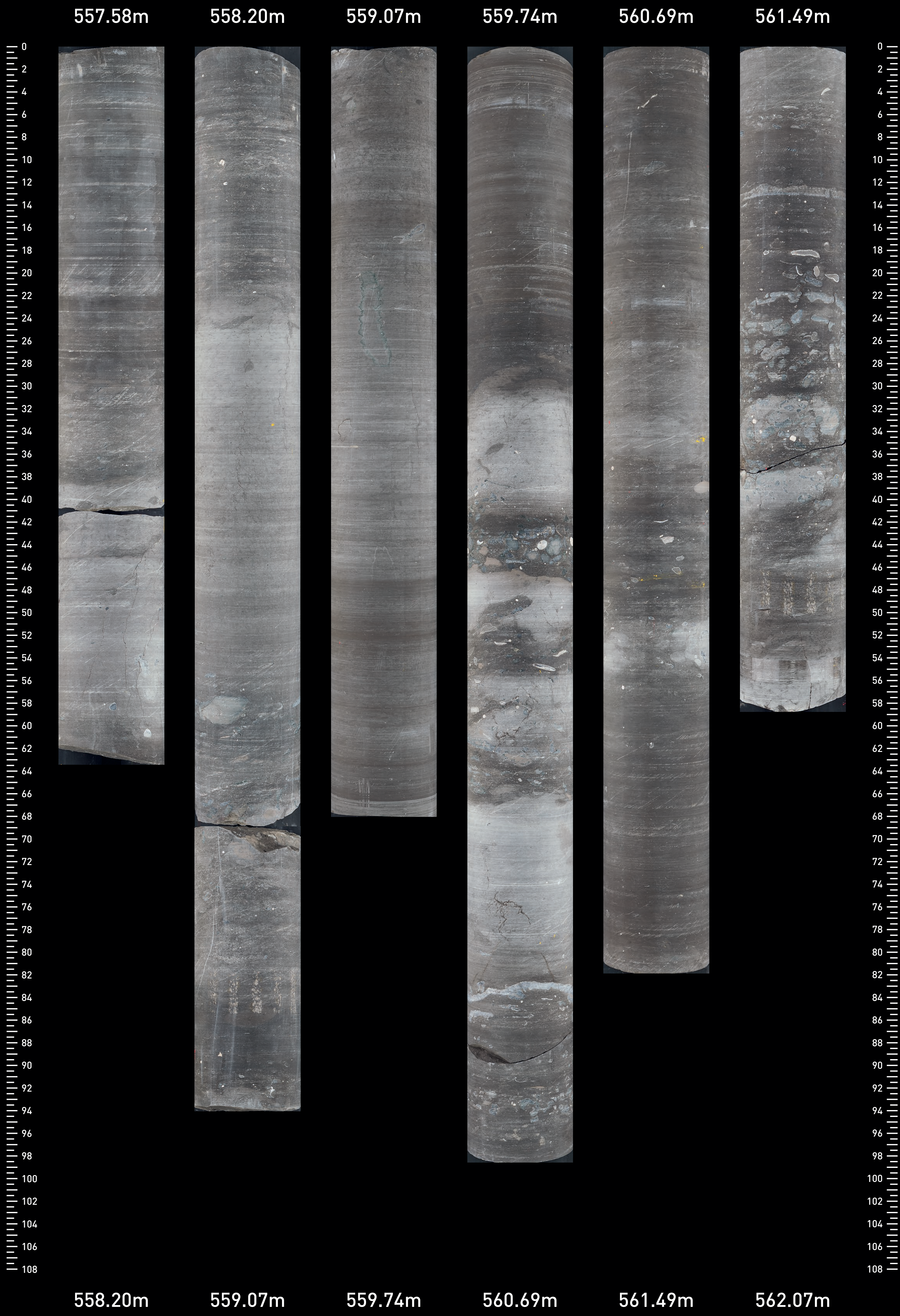
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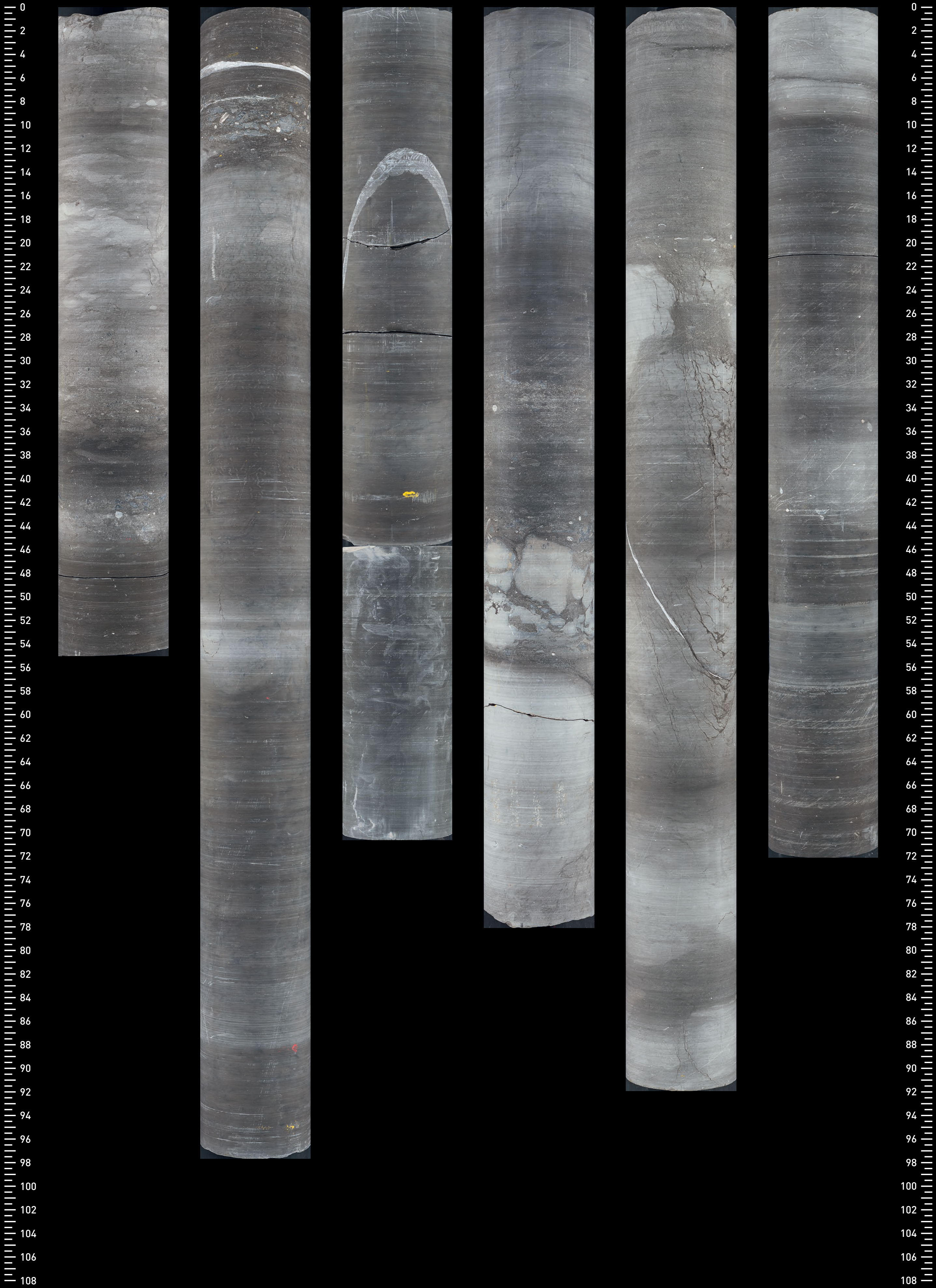
562.07m 562.60m 563.55m 564.25m 565.00m 565.90m



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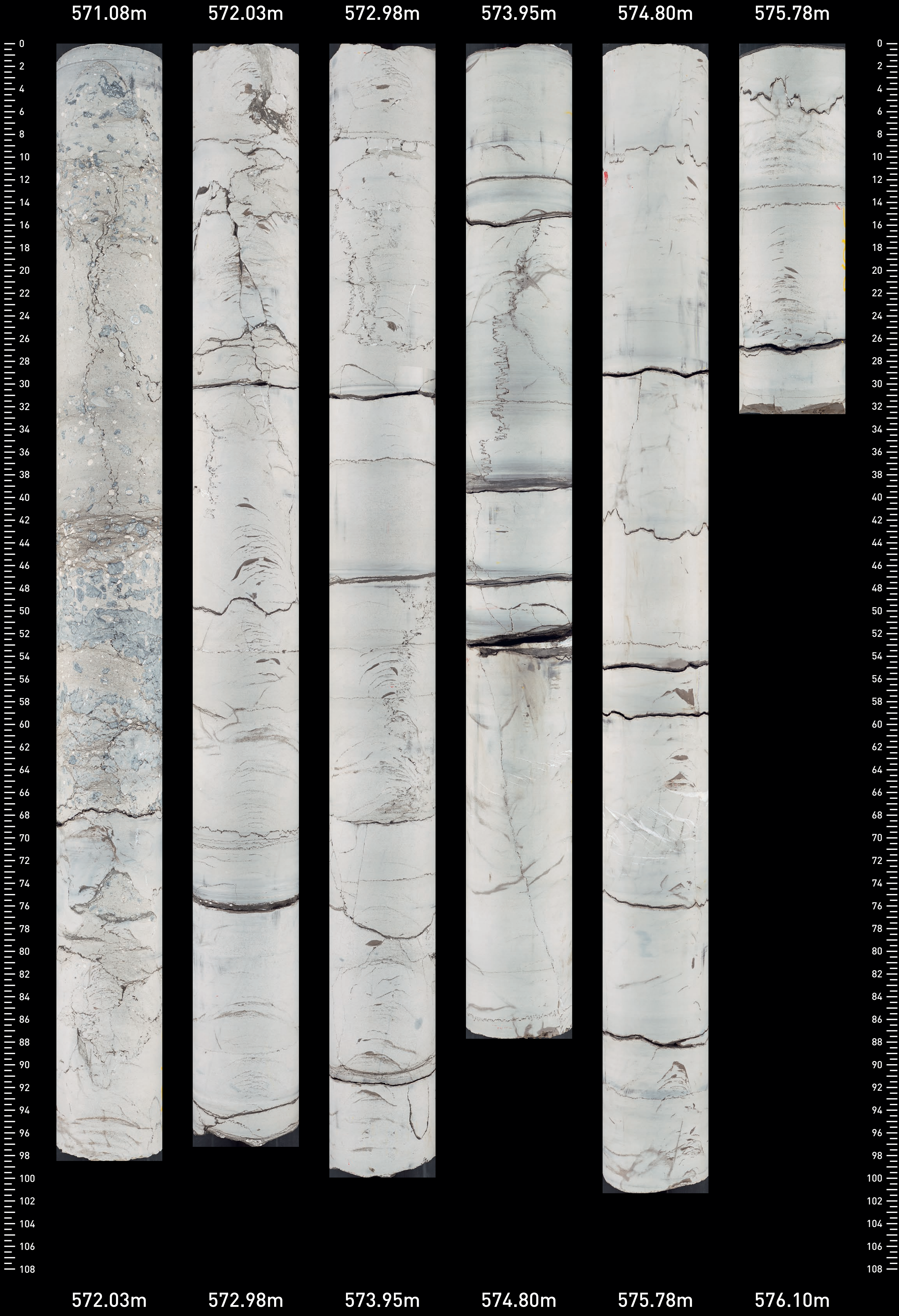
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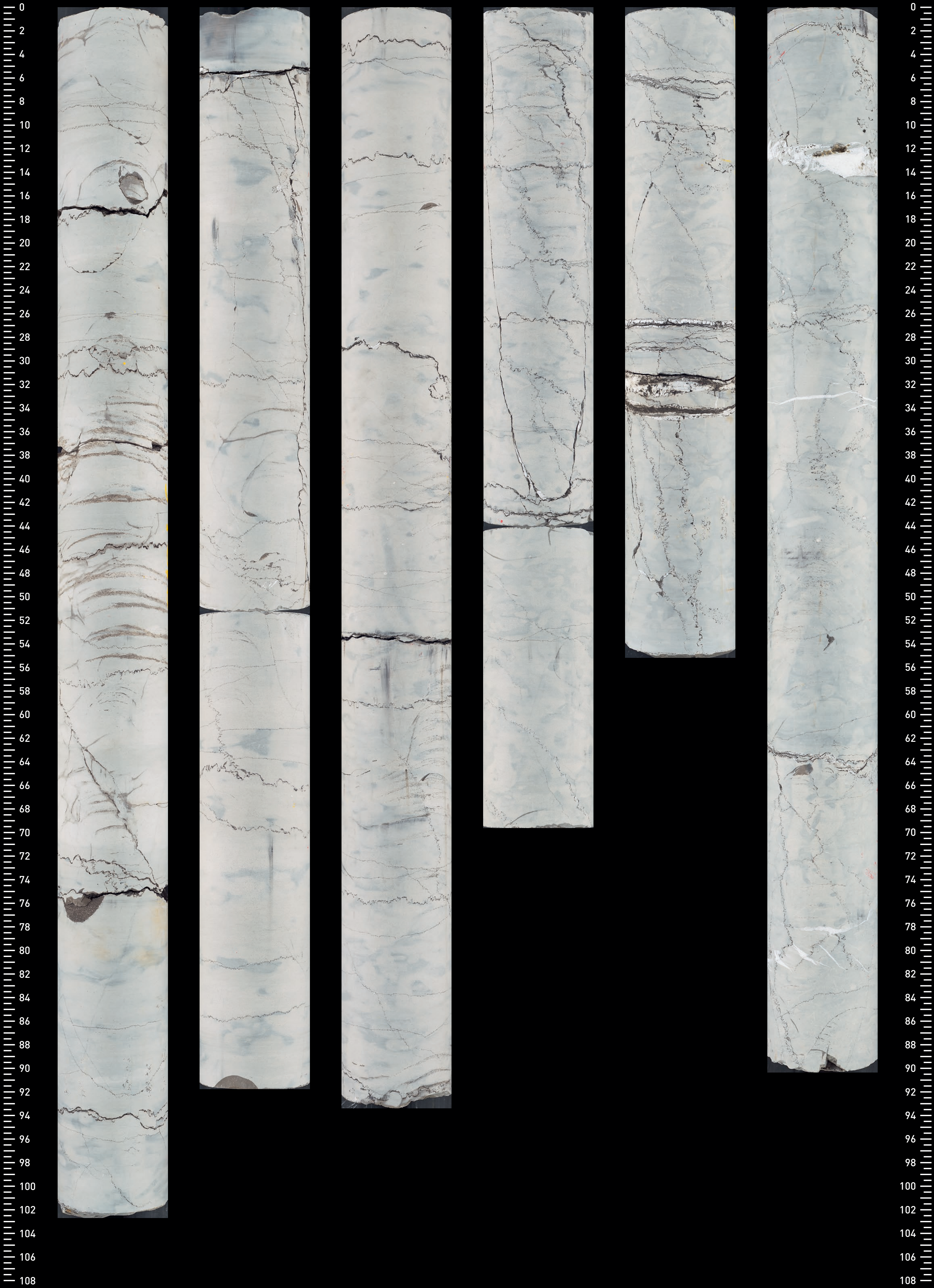

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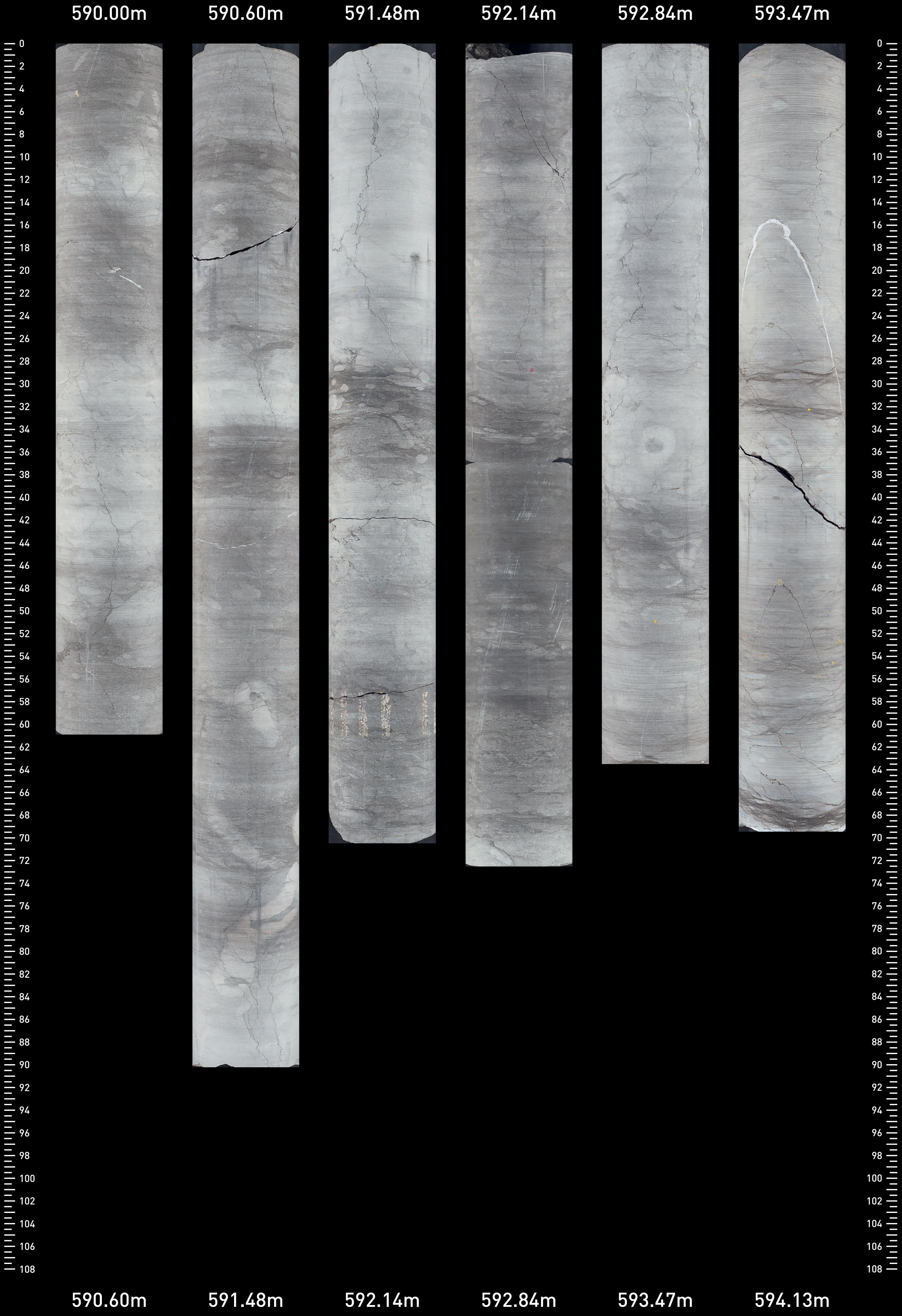
586.08m 586.97m 587.90m 588.50m 589.10m 590.00m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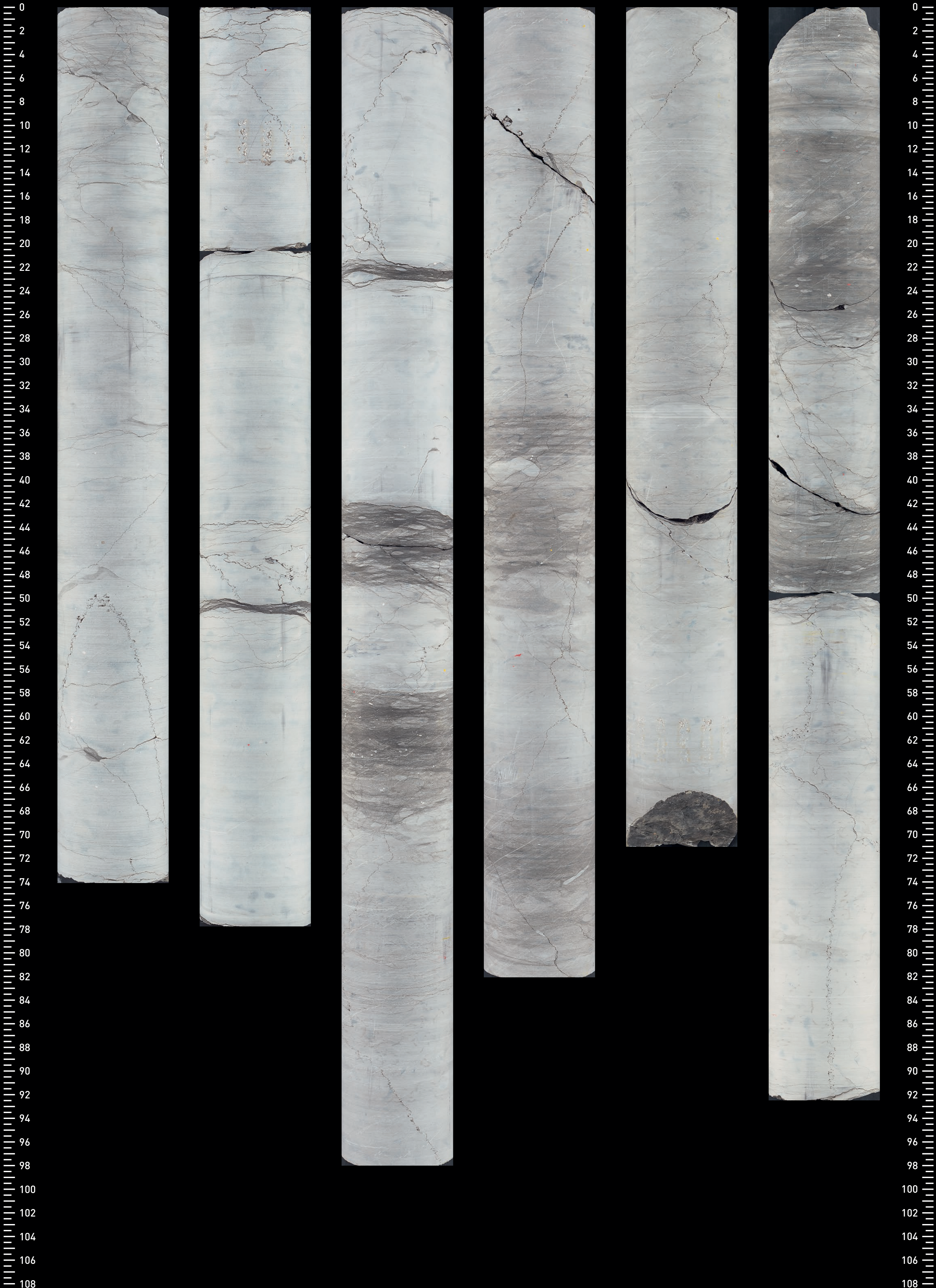
594.13m

594.13m	594.85m	595.60m	596.55m	597.35m	598.04m



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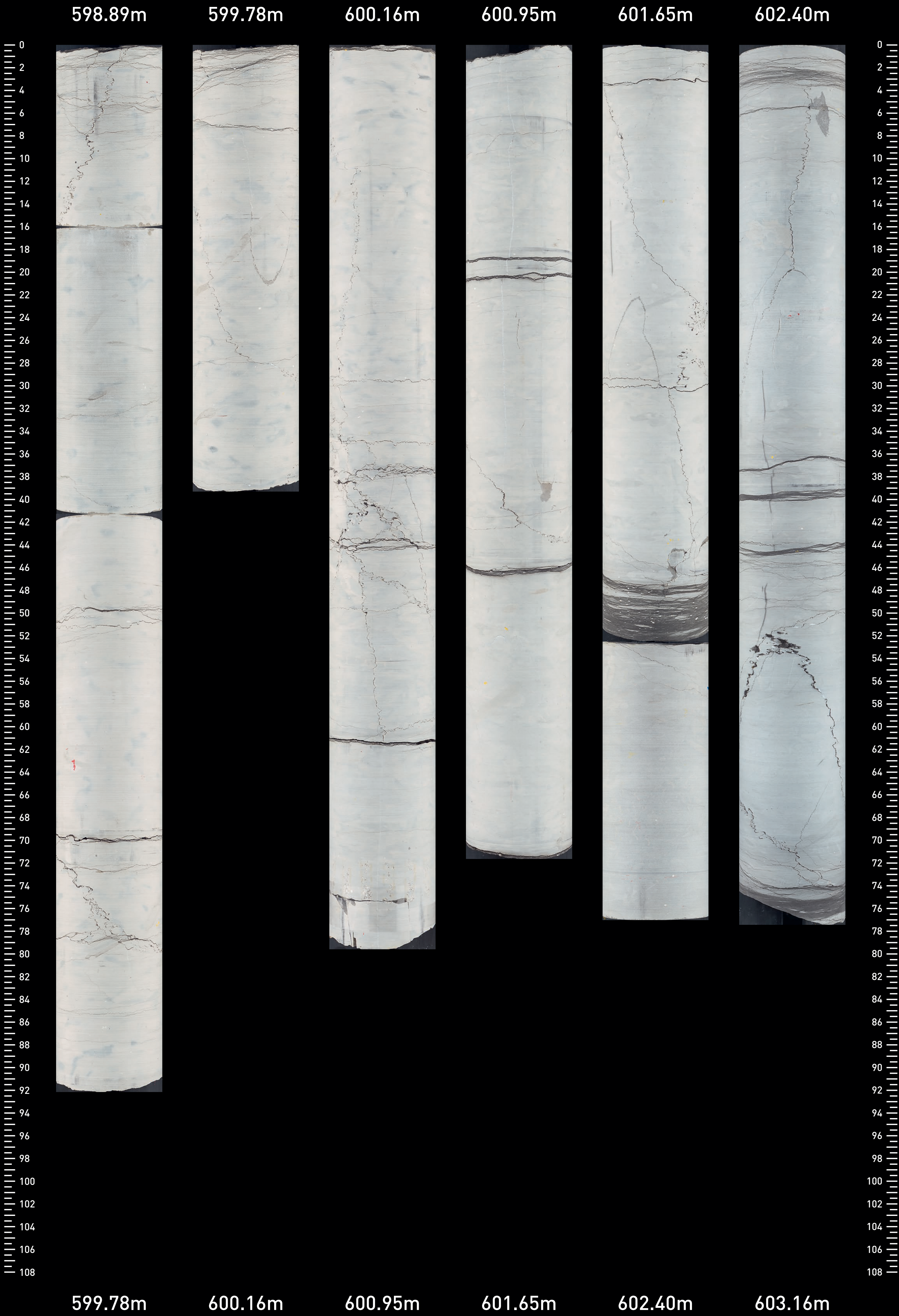
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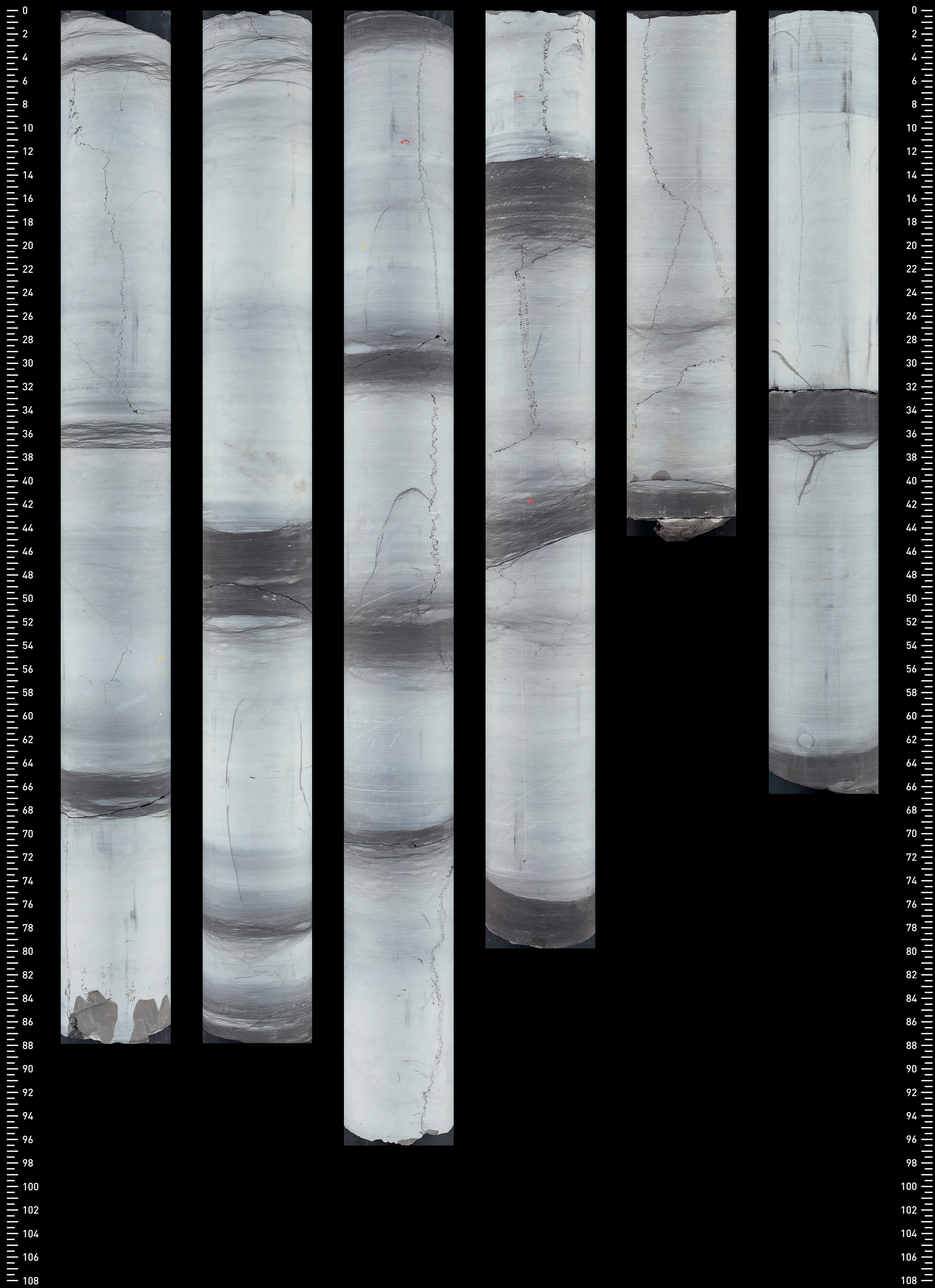
603.16m

603.16m 603.99m 604.86m 605.78m 606.56m 607.00m



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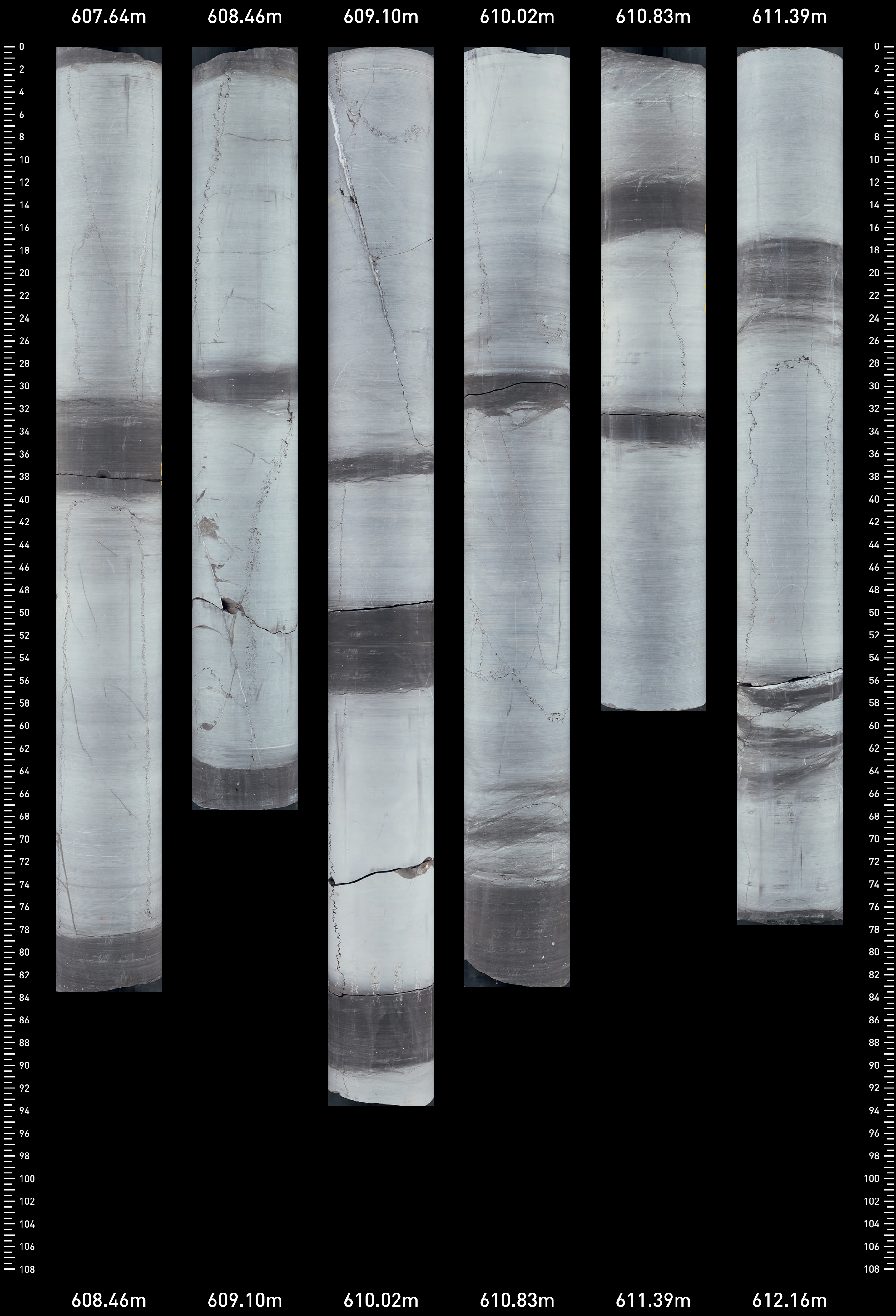
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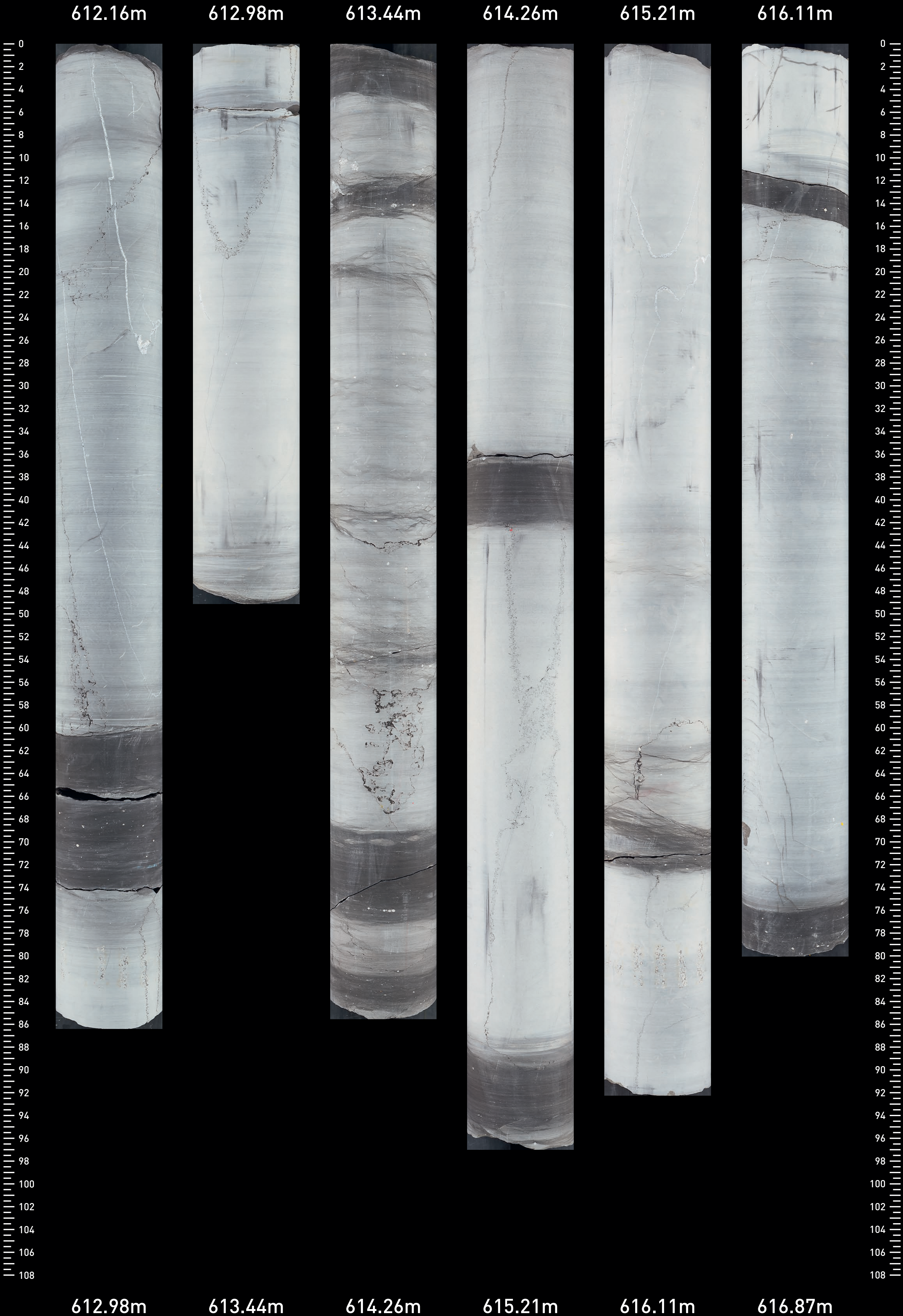
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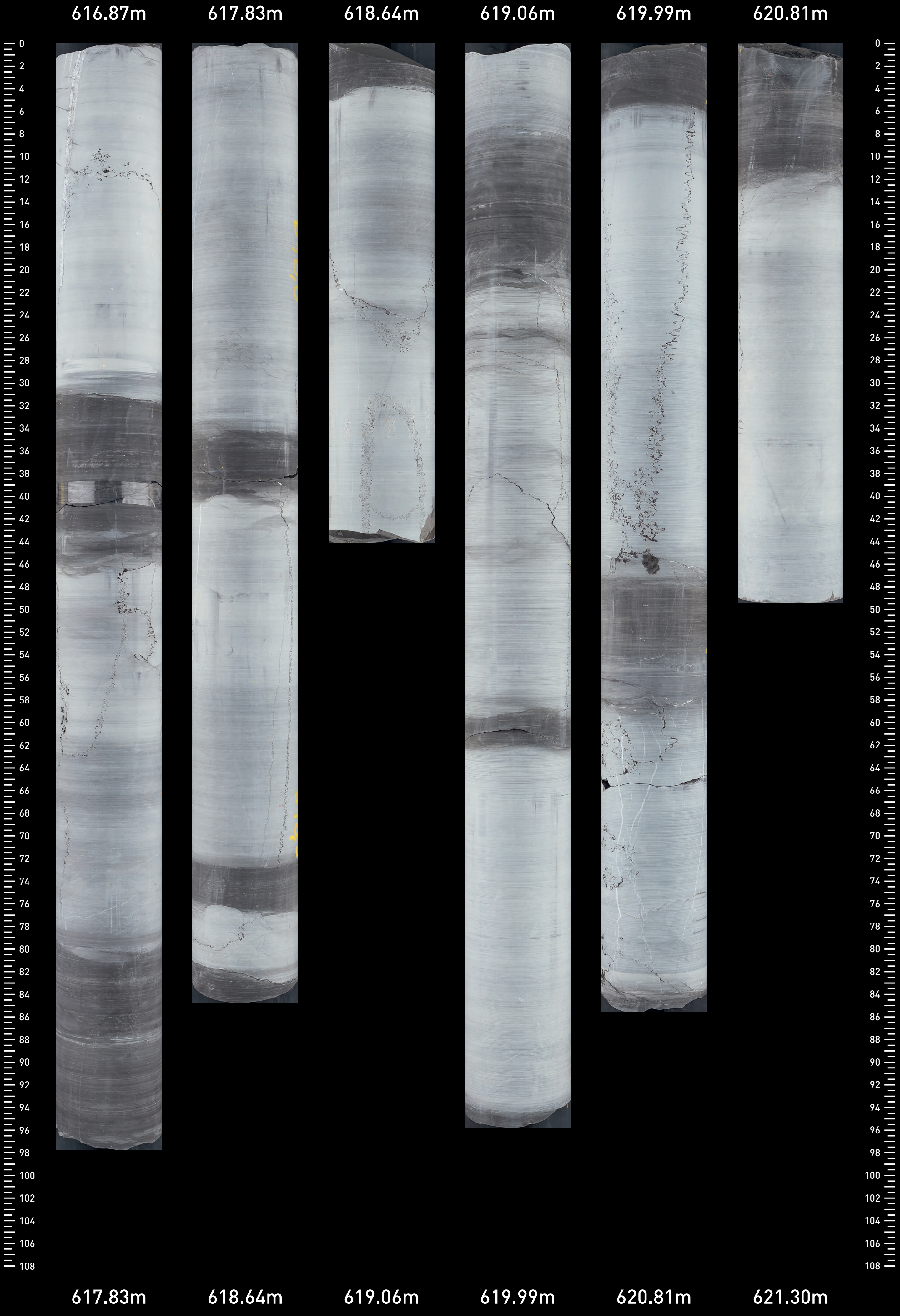
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621.30m
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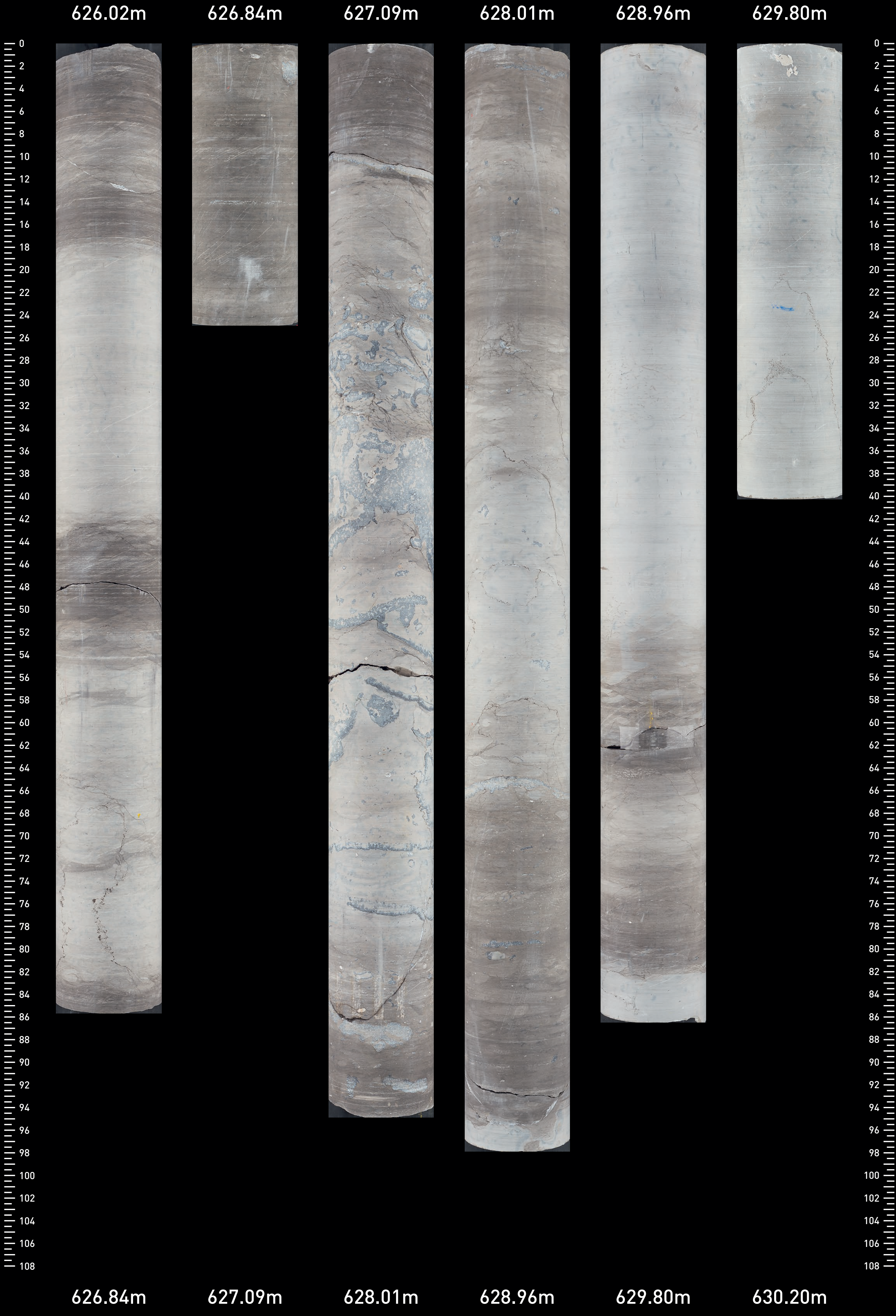
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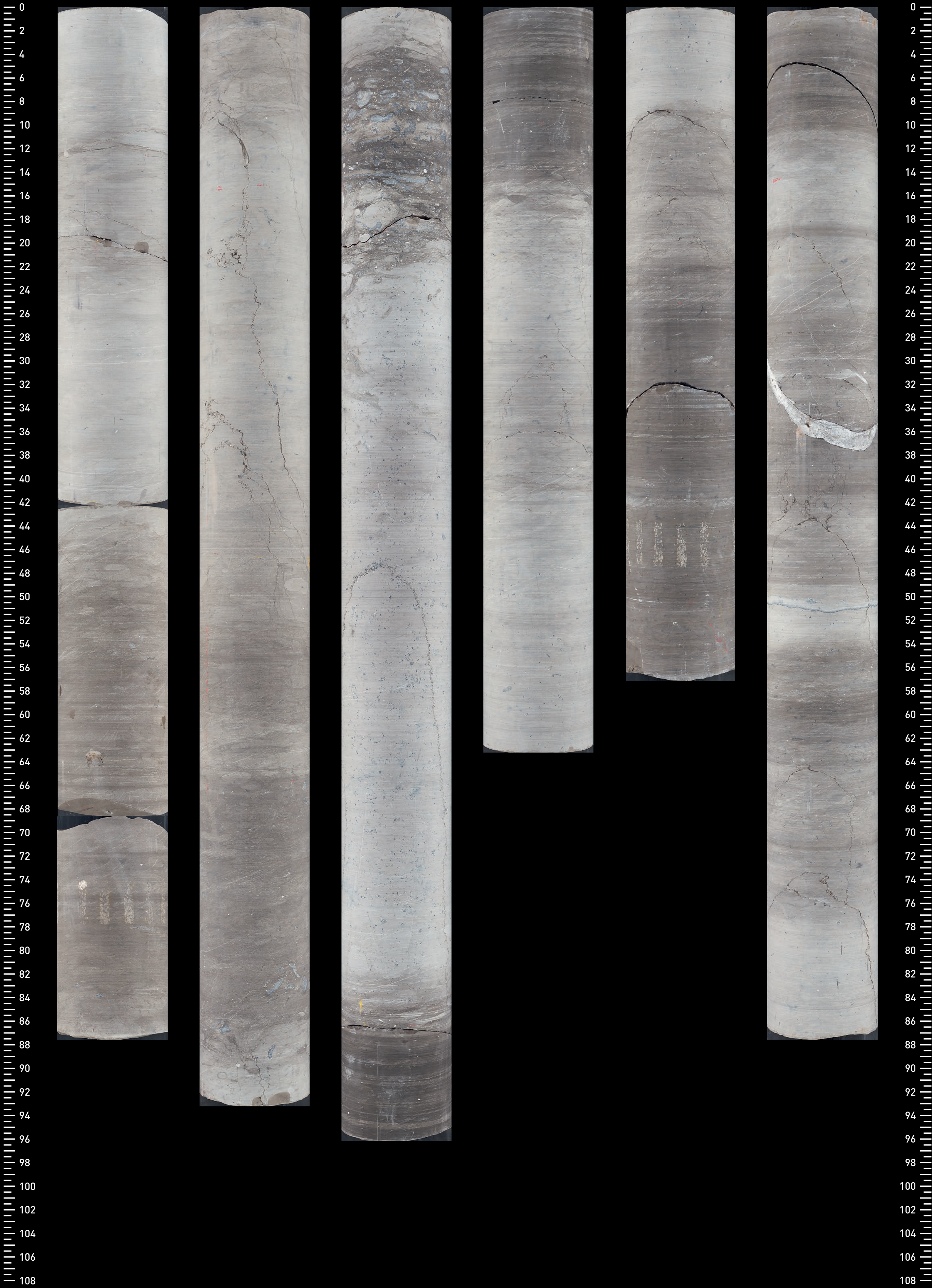
630.20m | 631.04m | 631.95m | 632.89m | 633.51m | 634.06m



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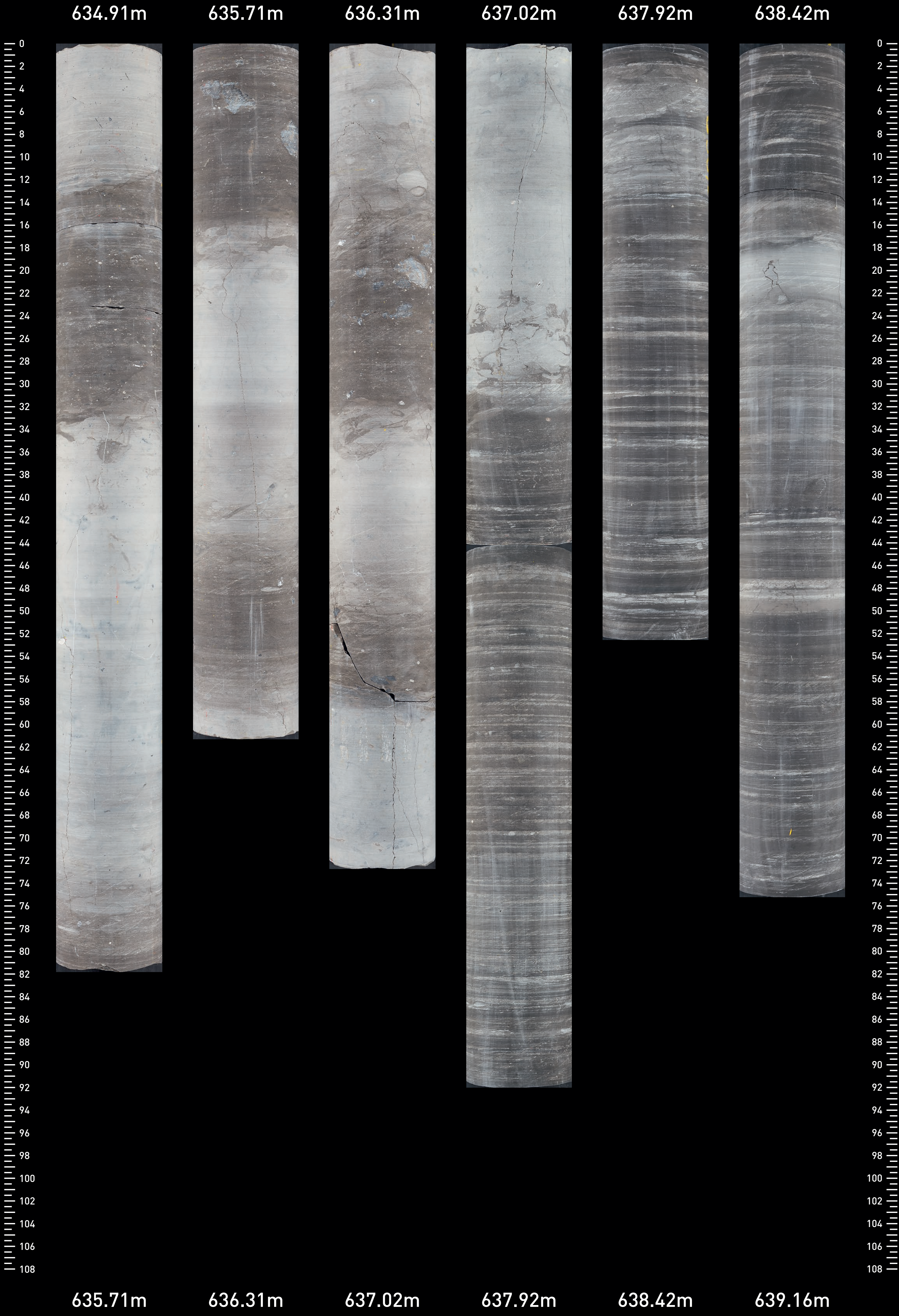
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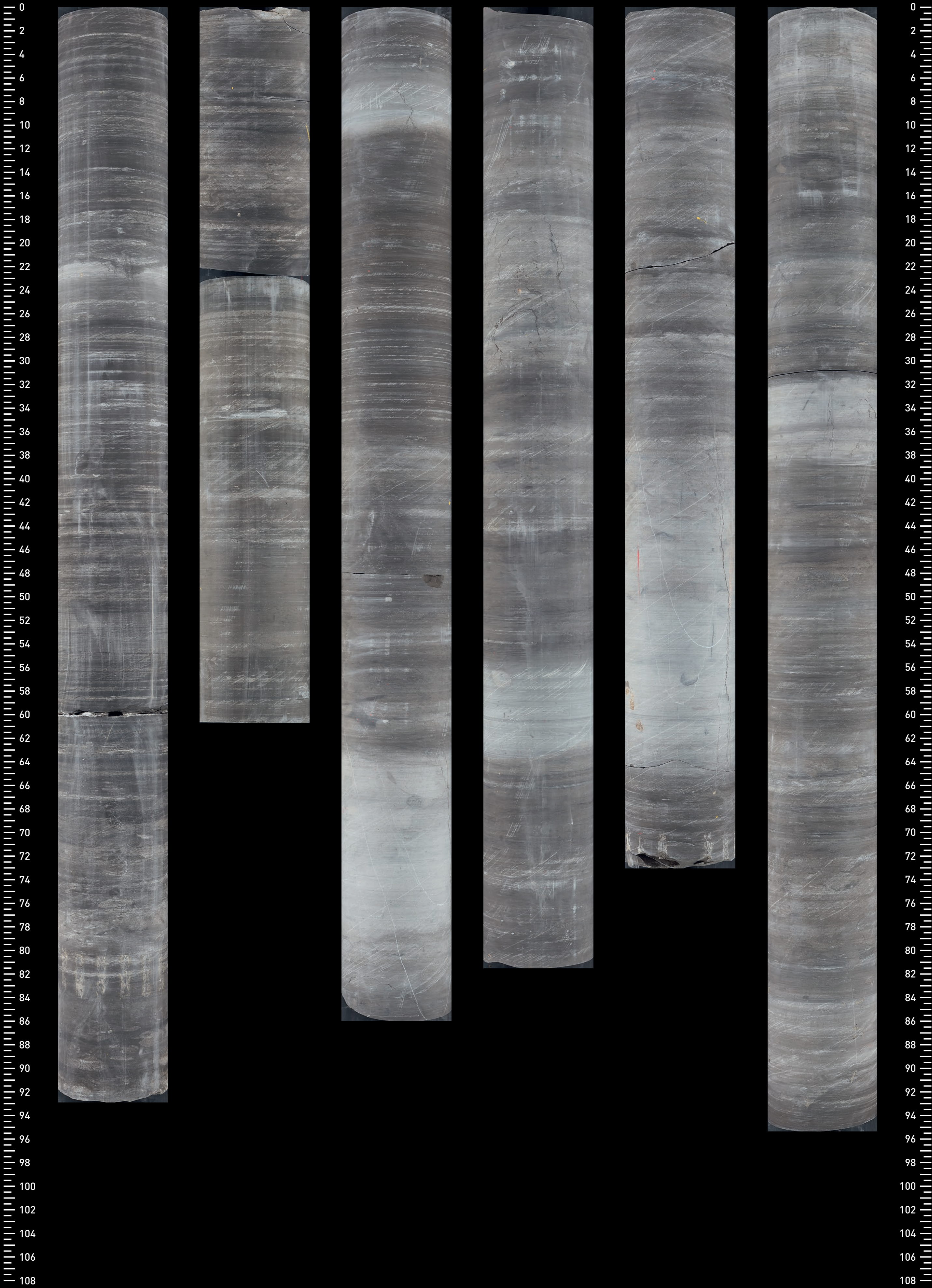
639.16m | 640.06m | 640.65m | 641.48m | 642.27m | 642.98m



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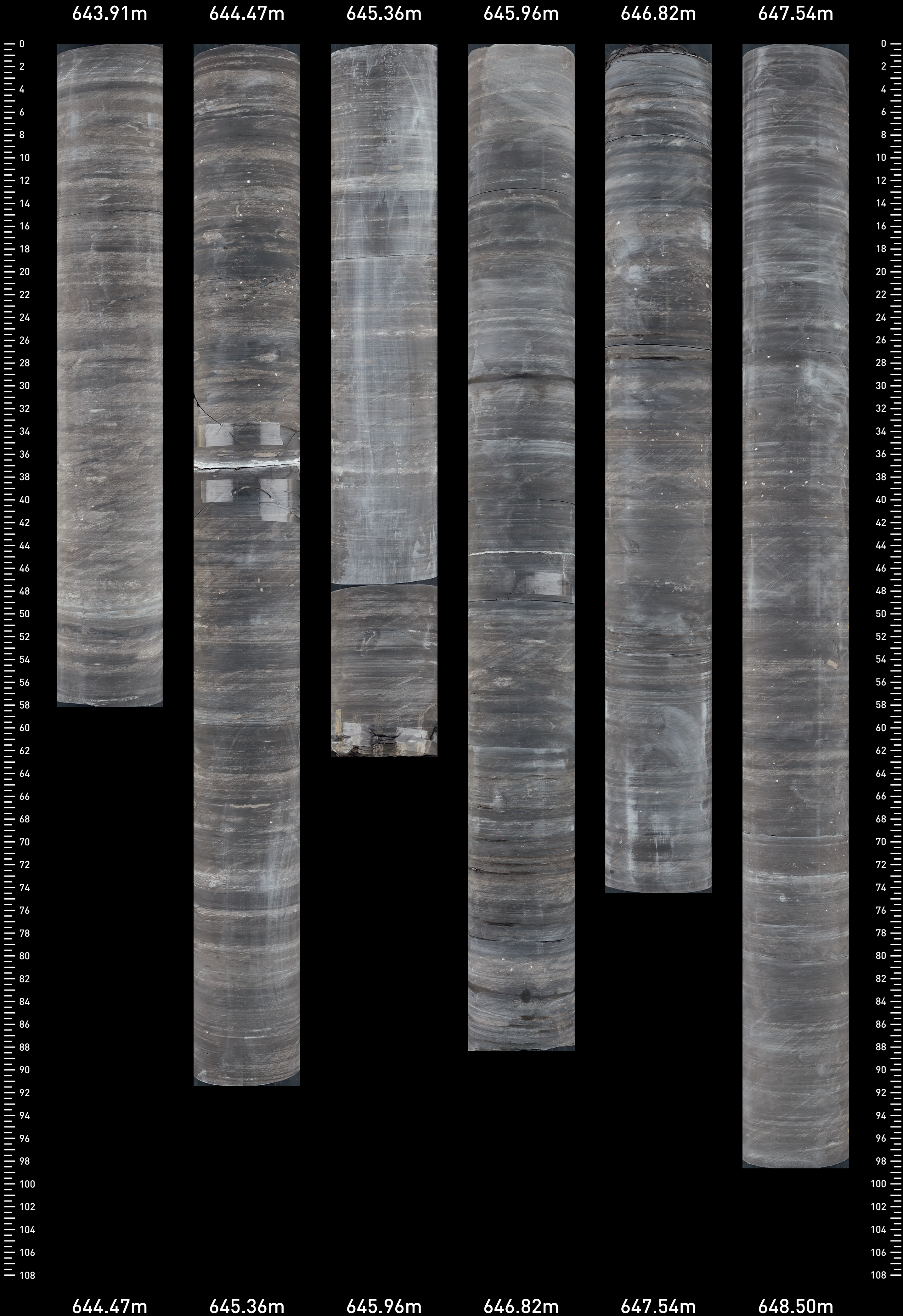
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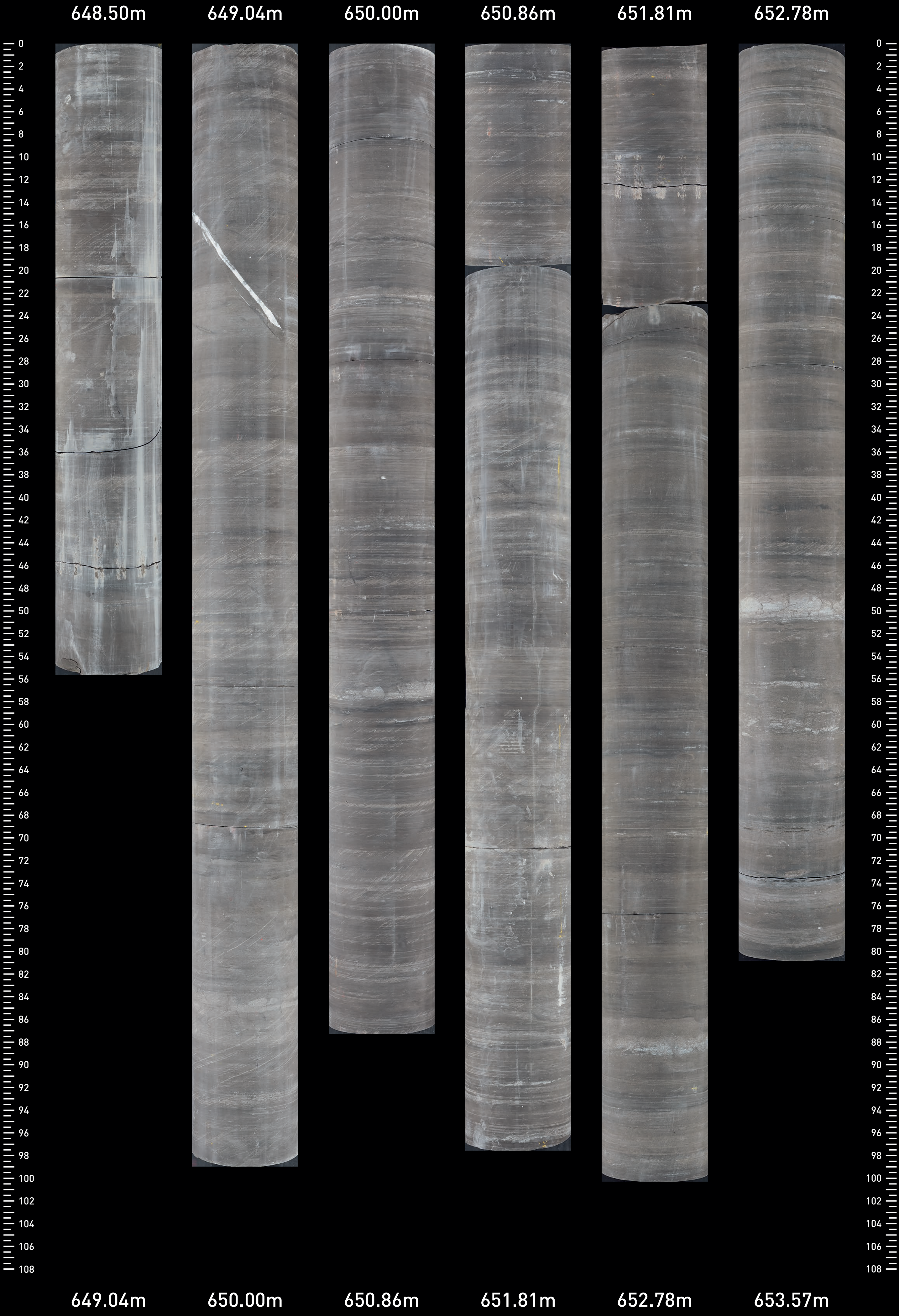
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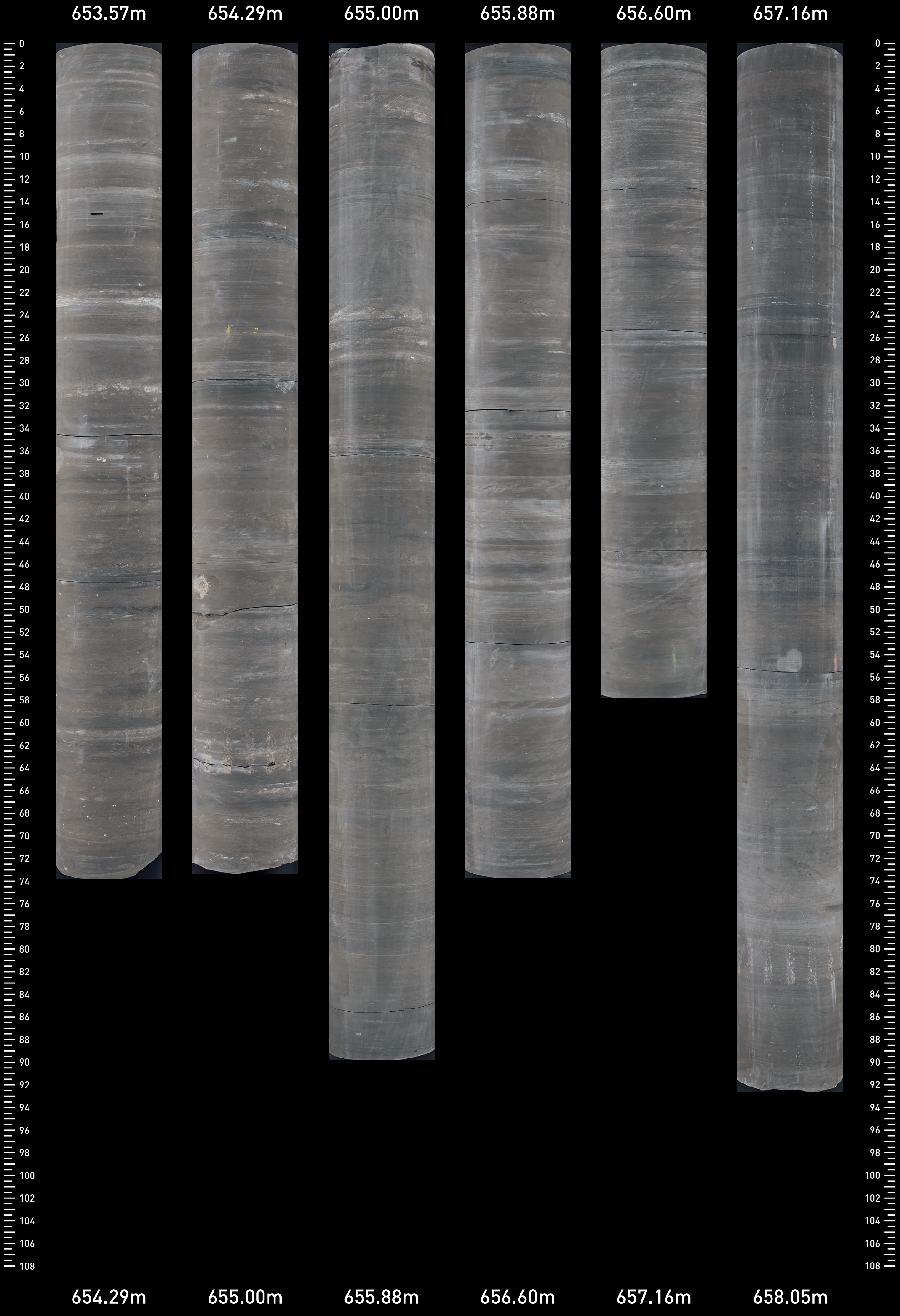
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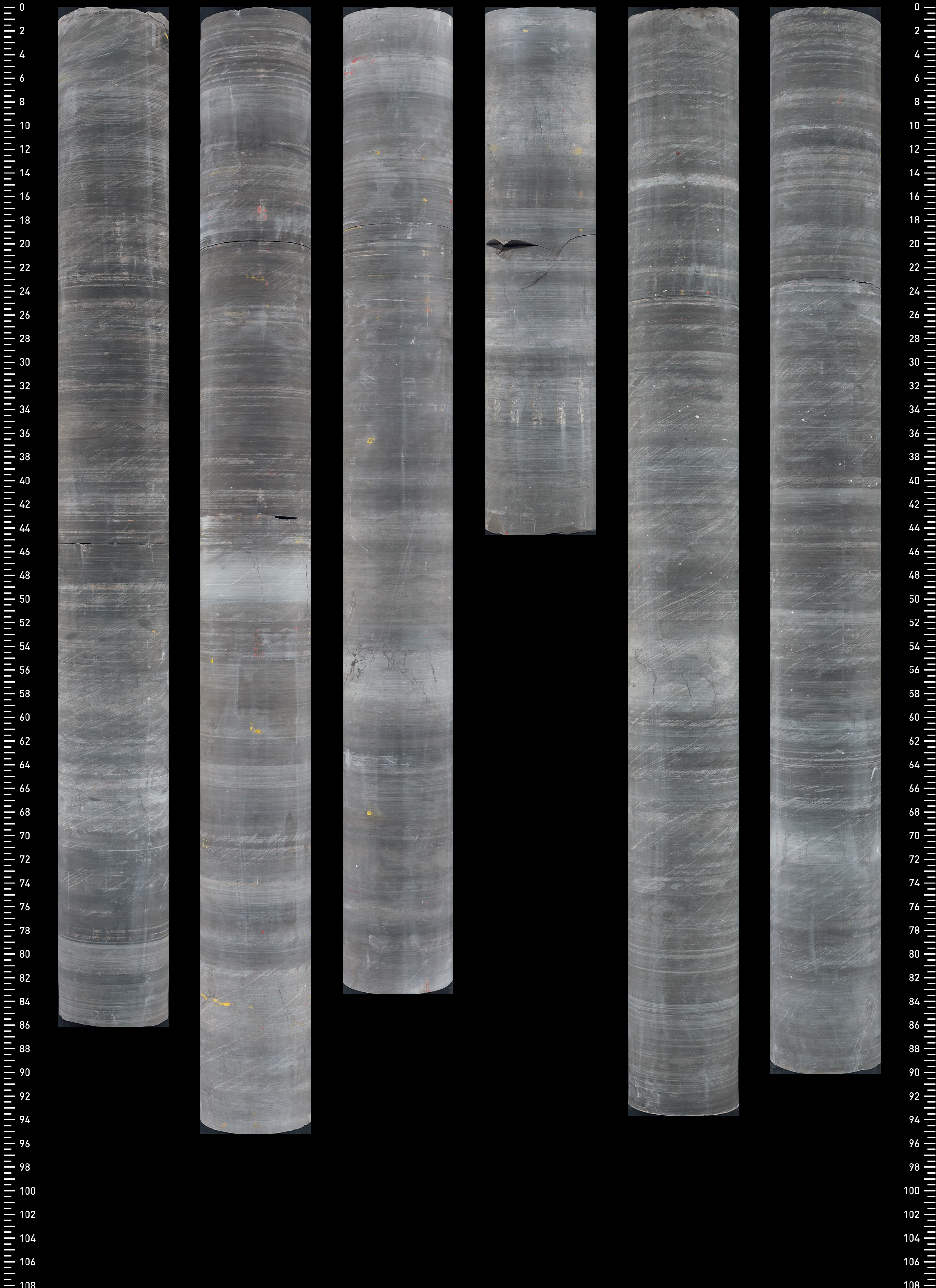
658.05m 658.90m 659.82m 660.63m 661.06m 661.98m



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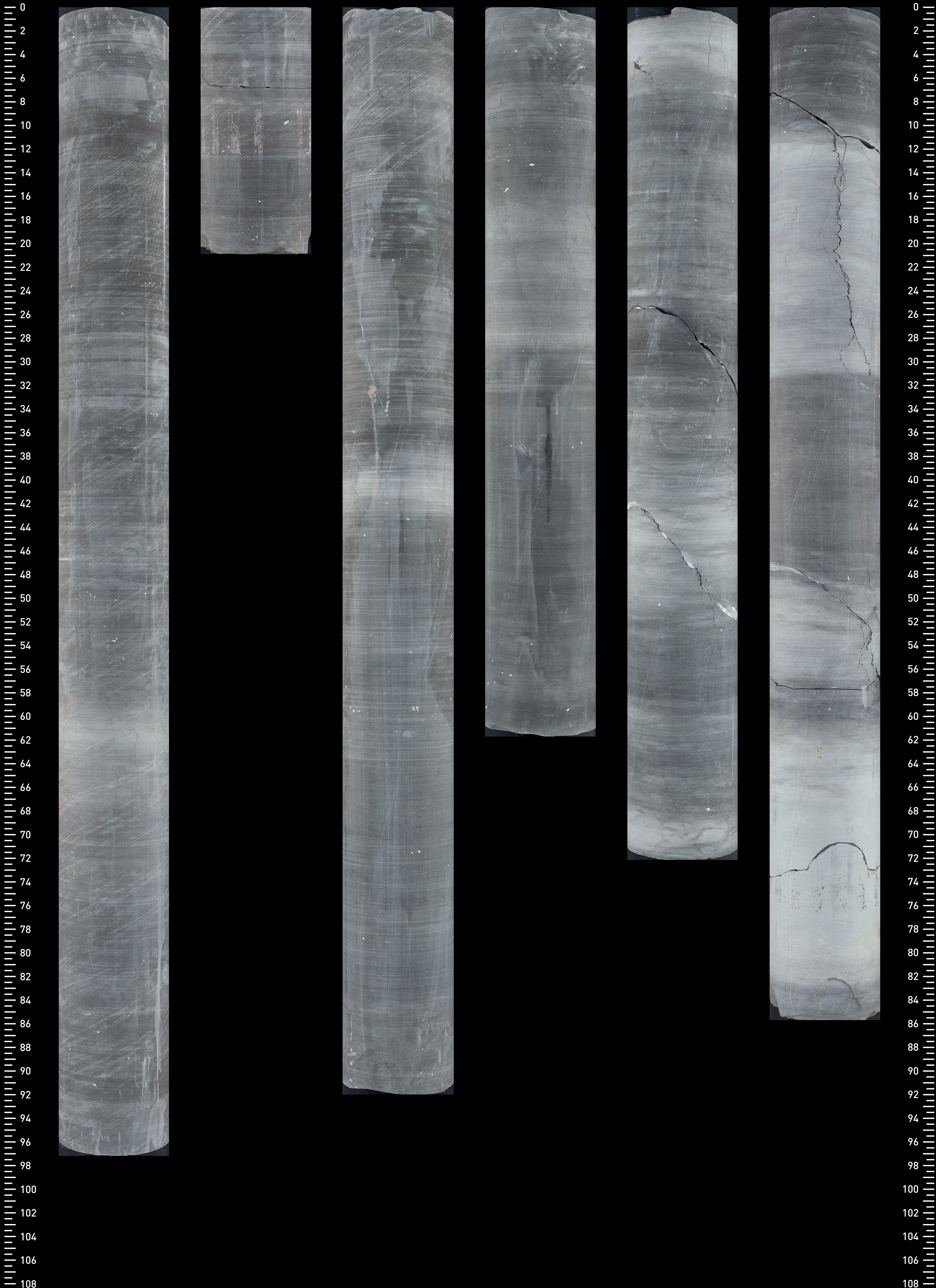

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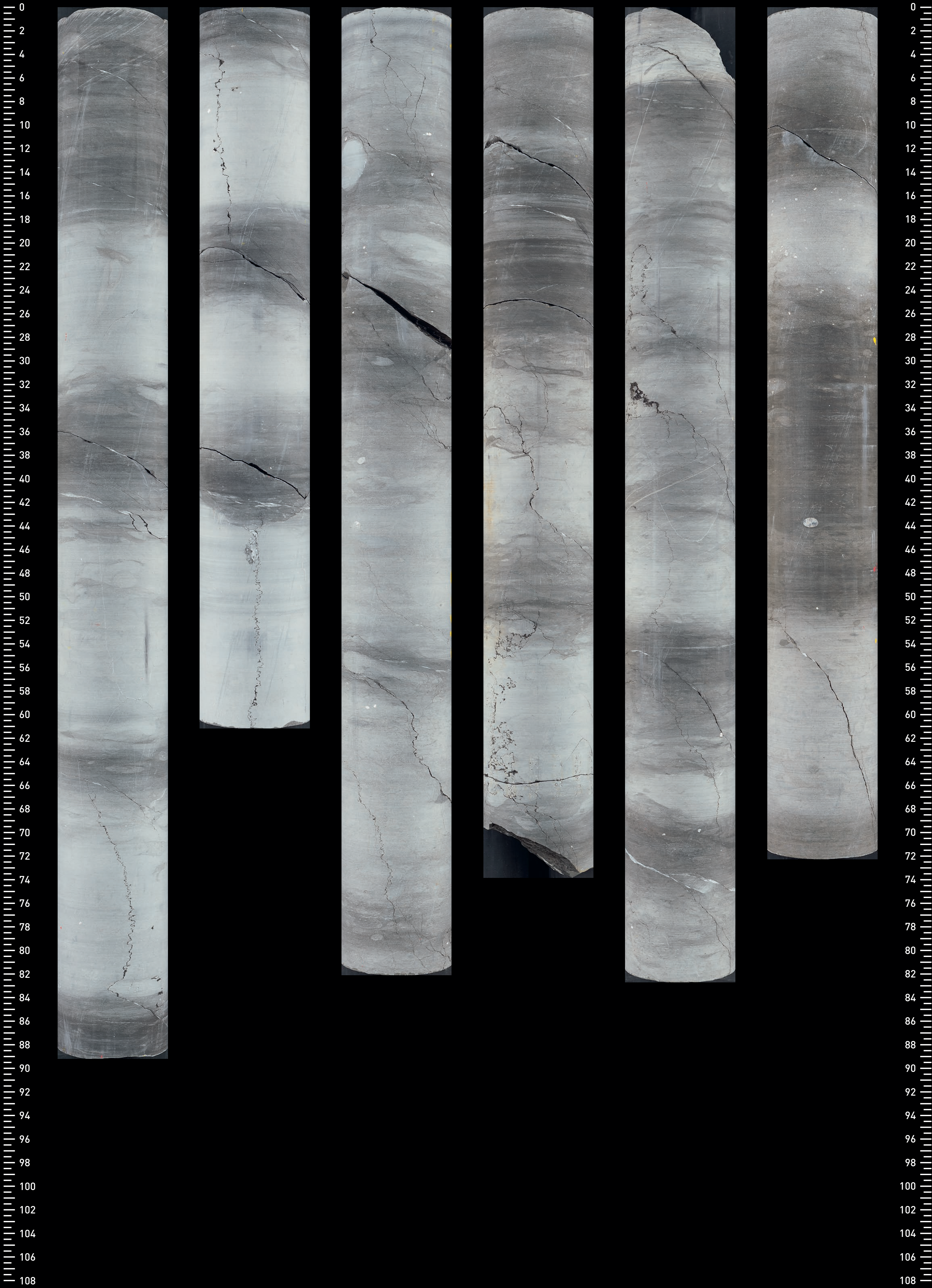
667.03m 667.90m 668.50m 669.30m 670.02m 670.80m



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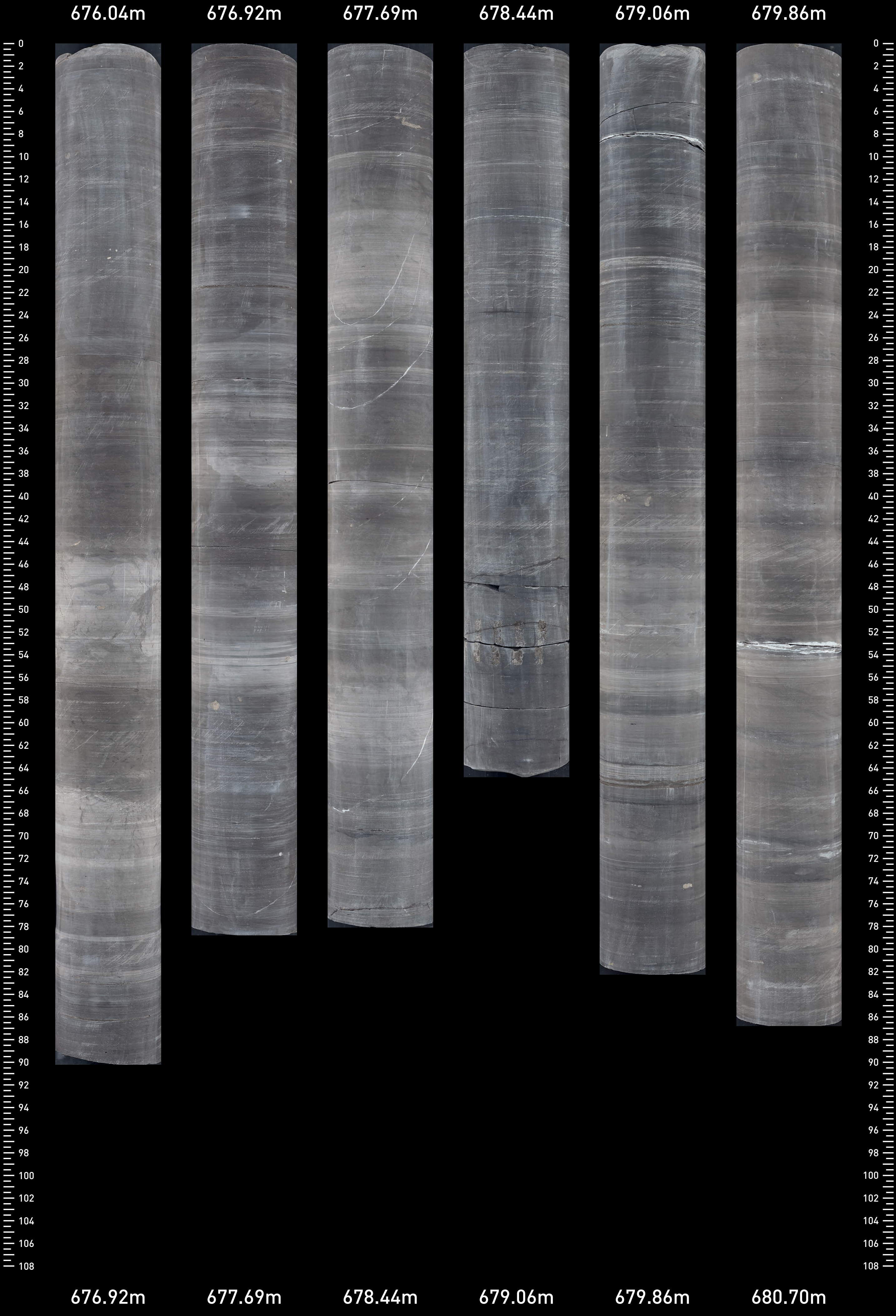
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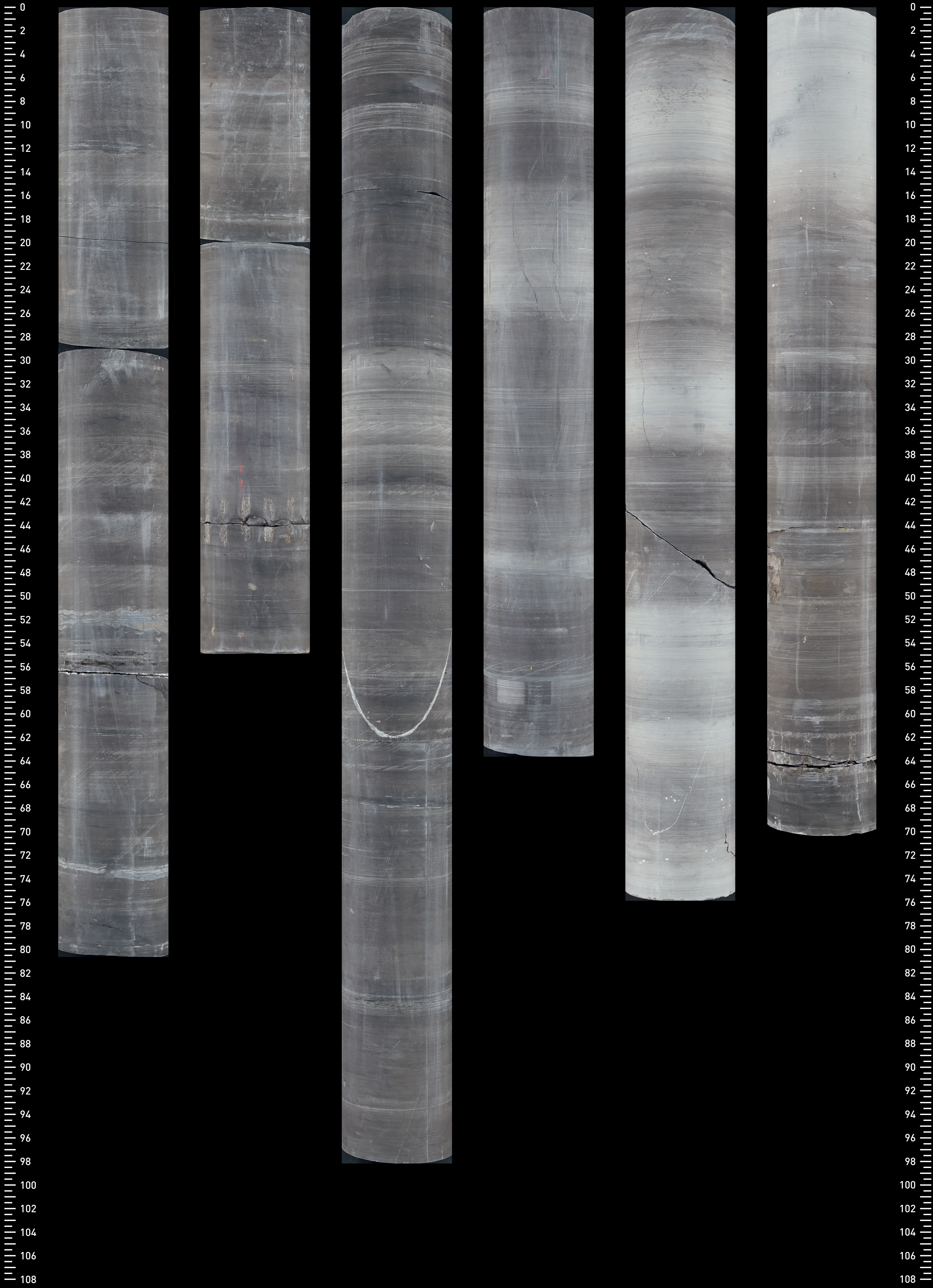

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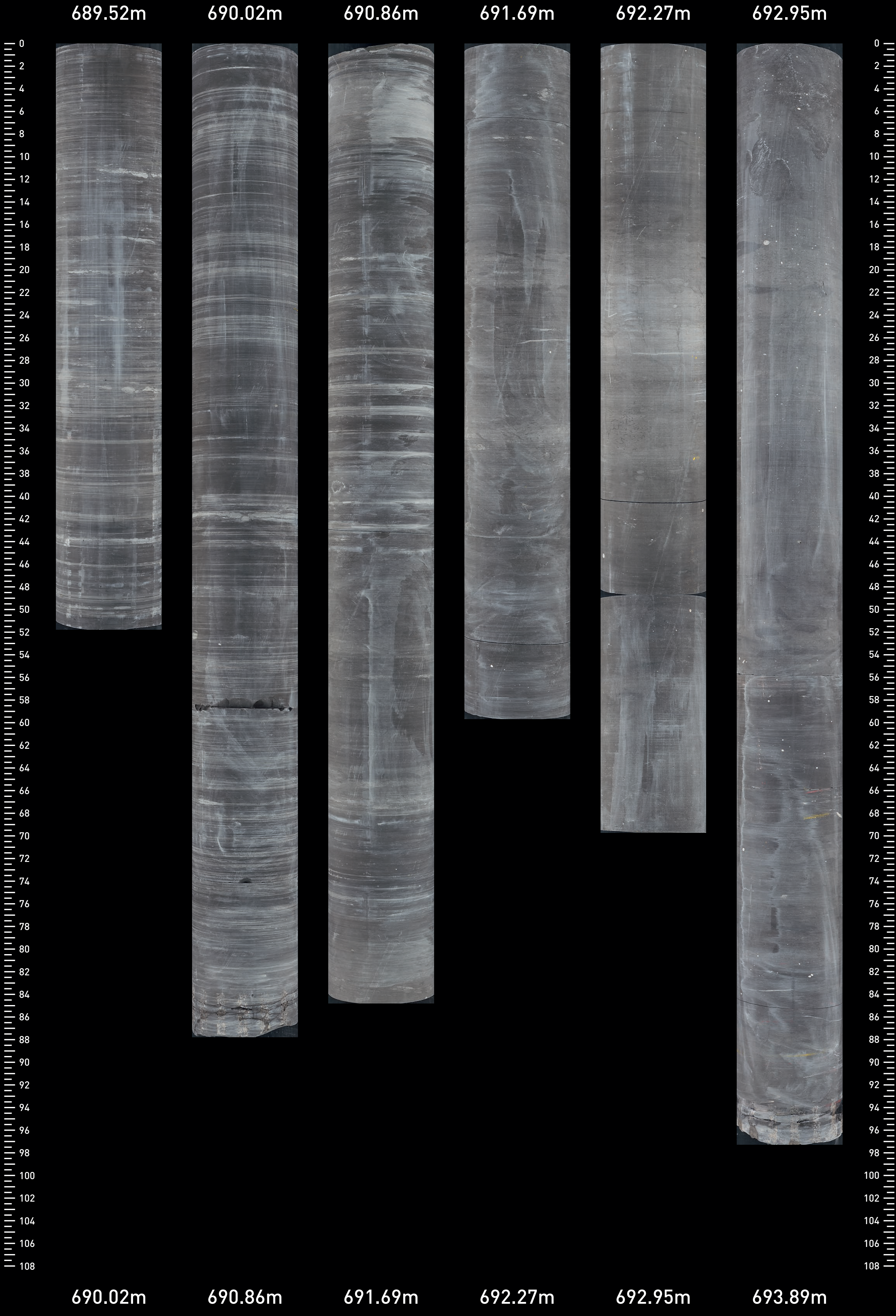
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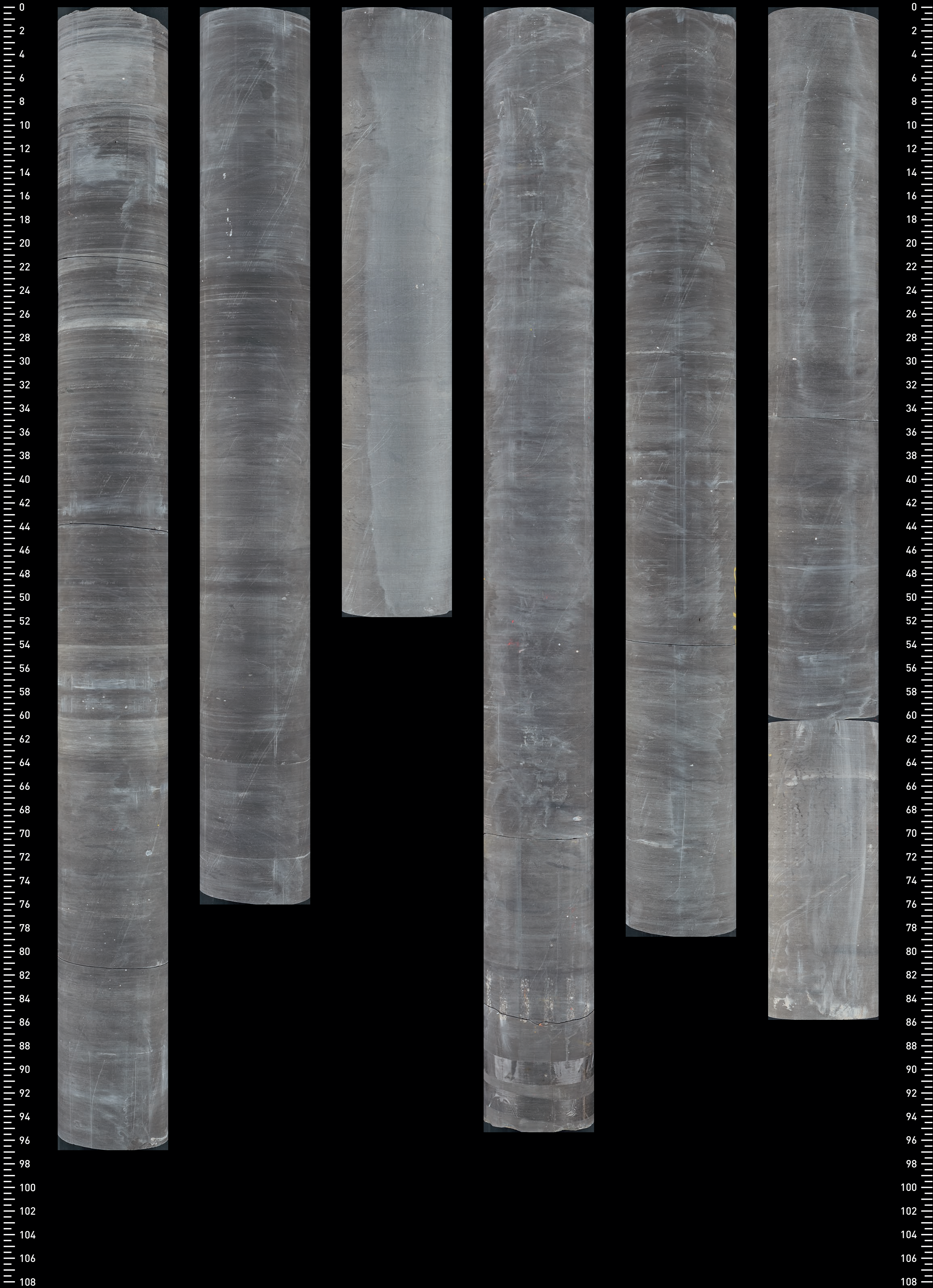

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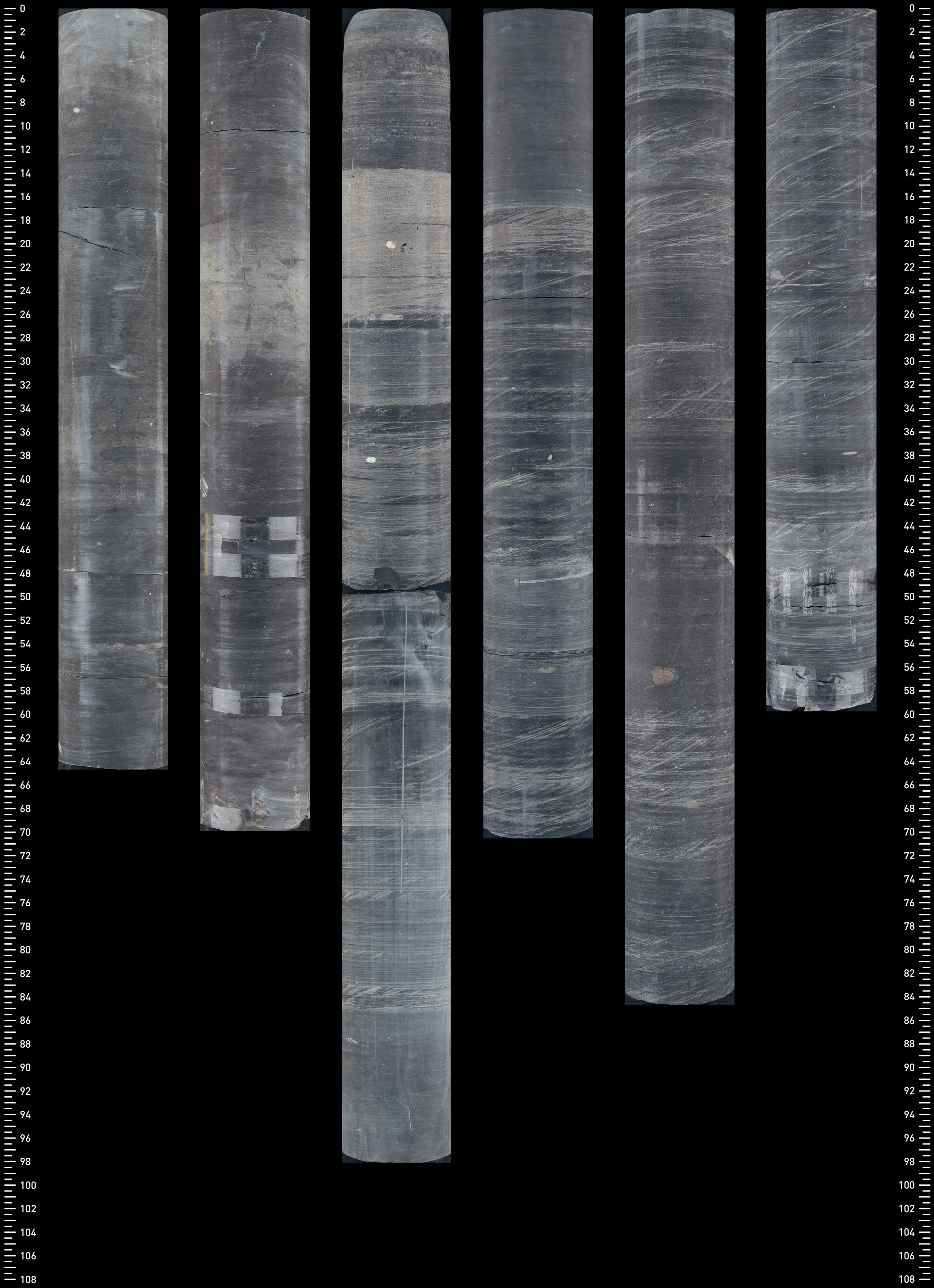

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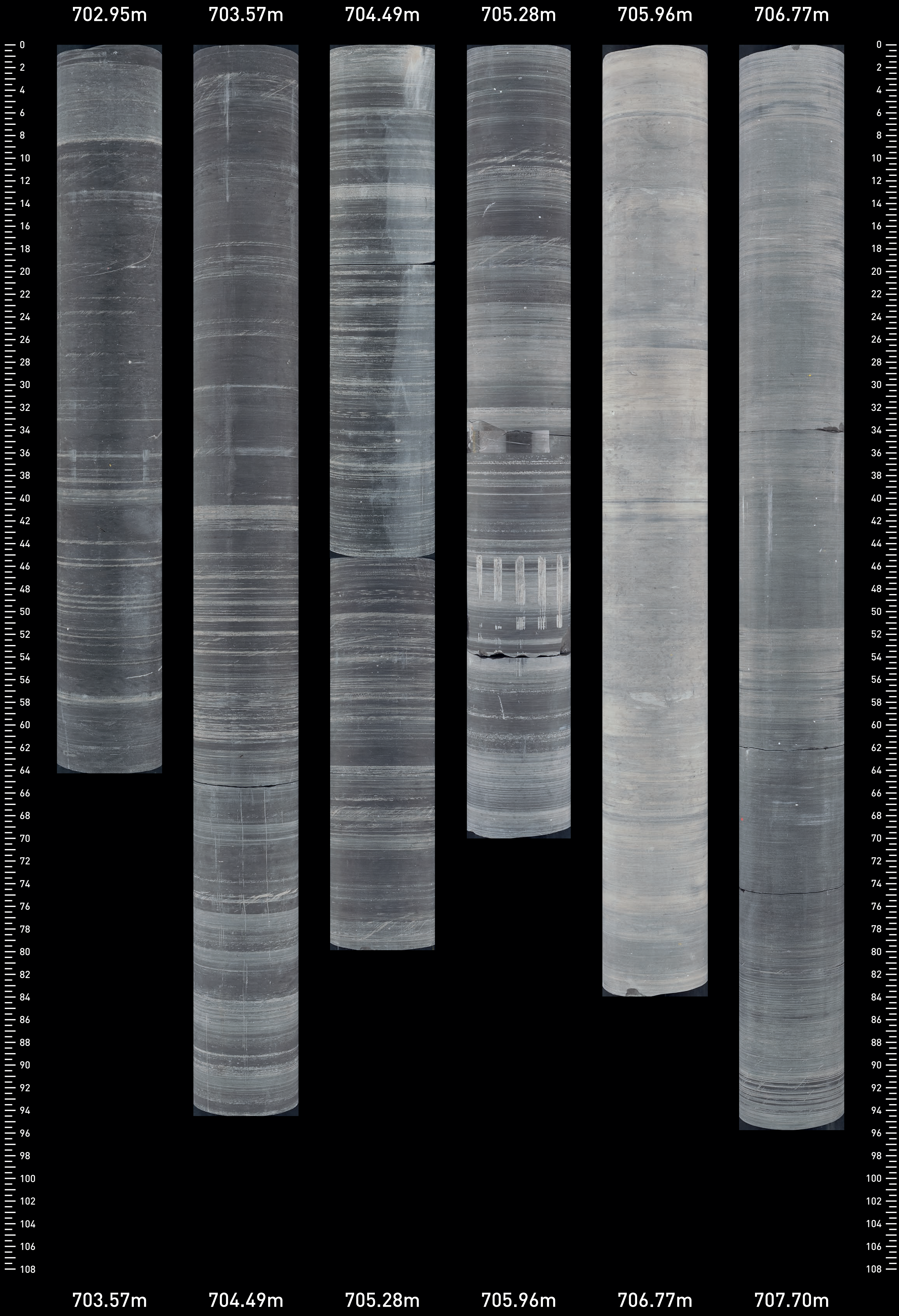
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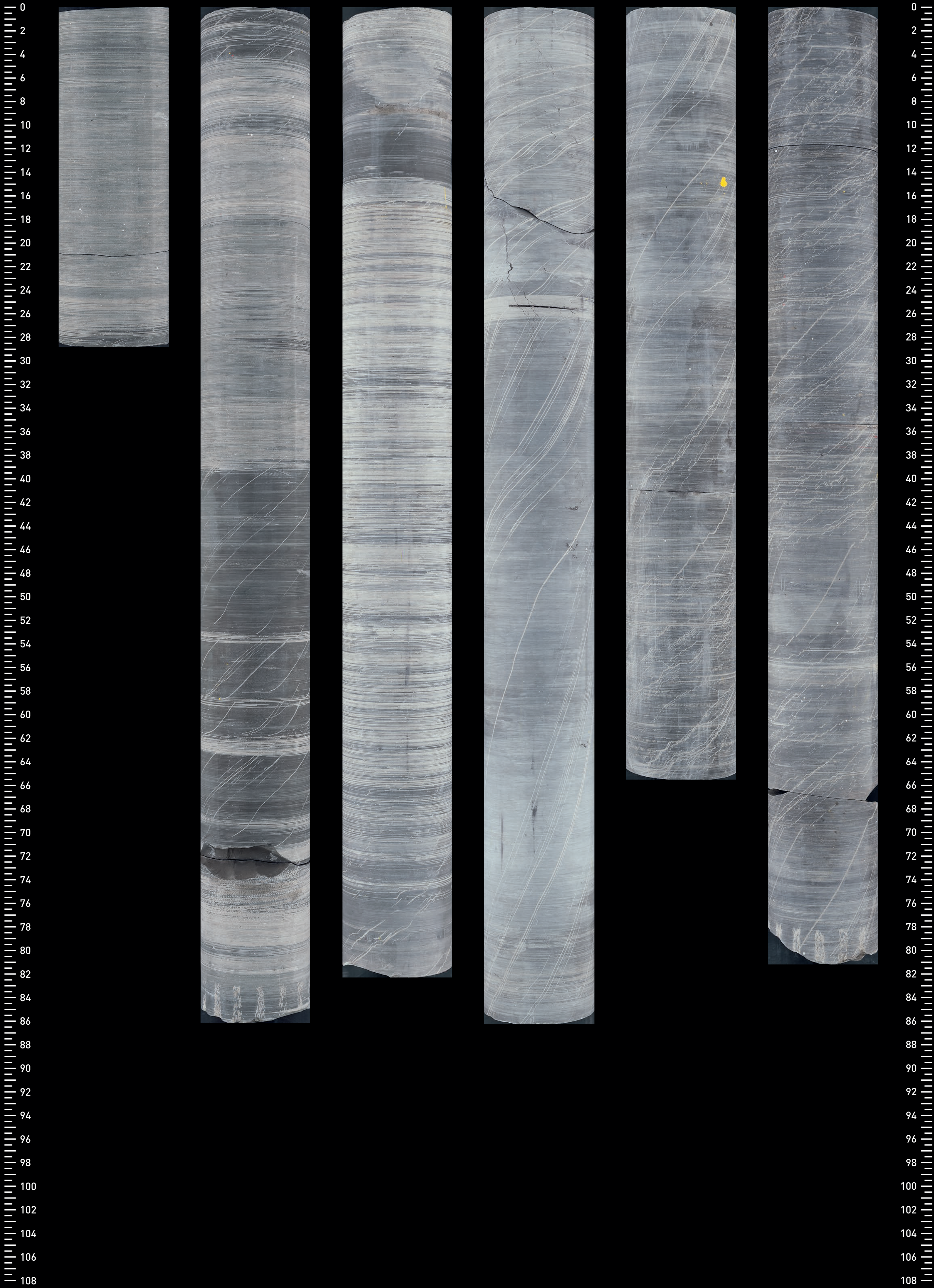

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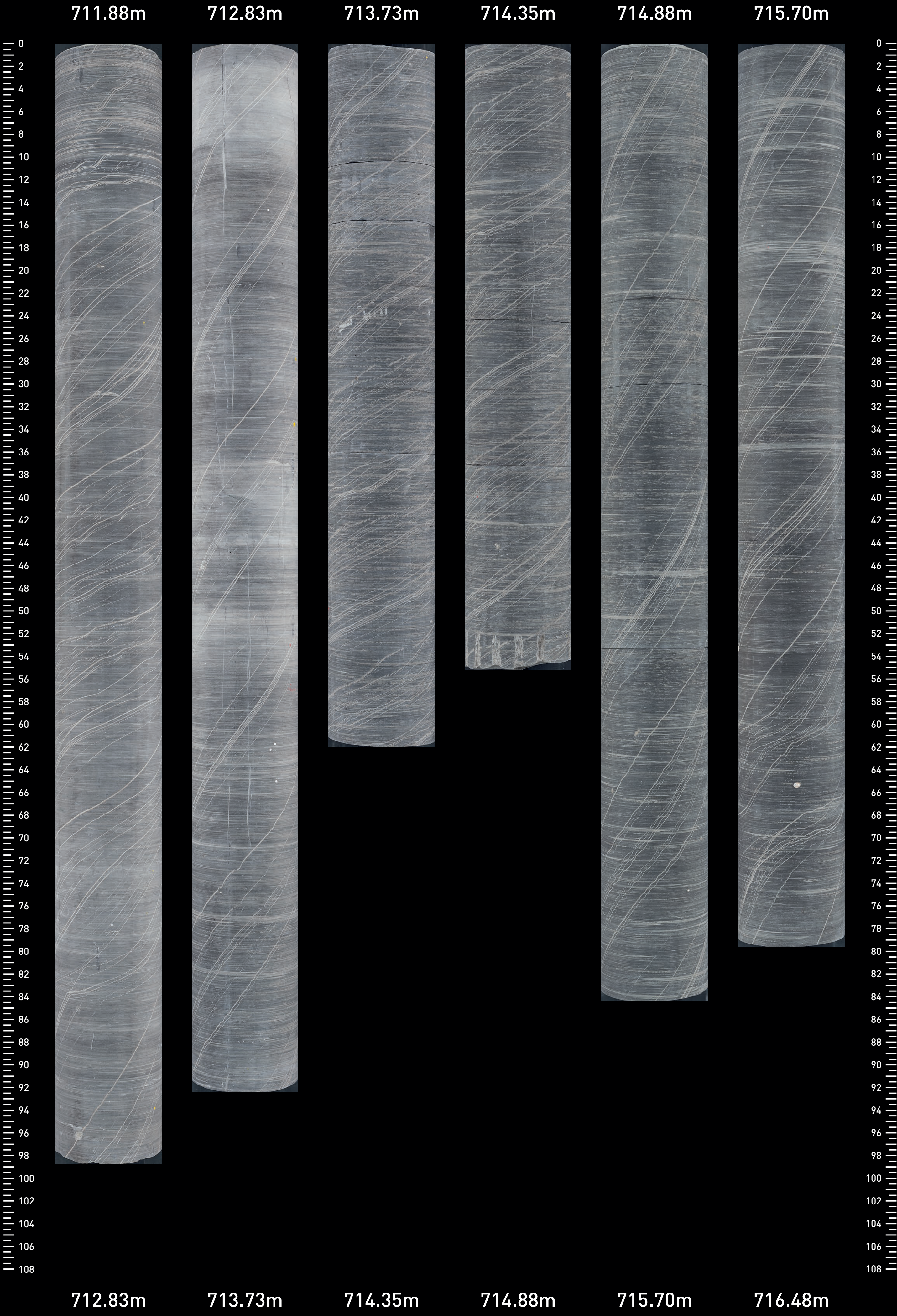
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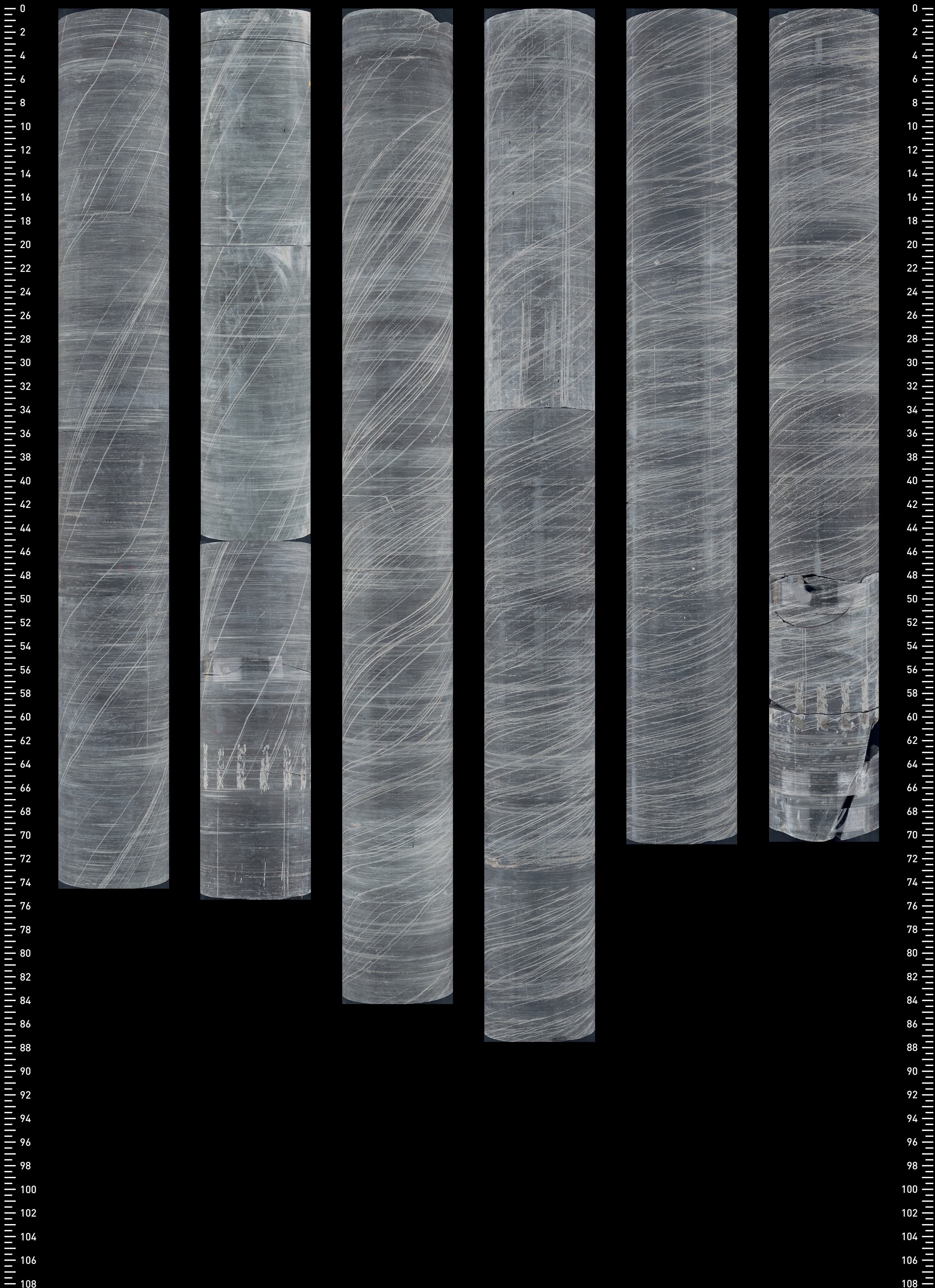

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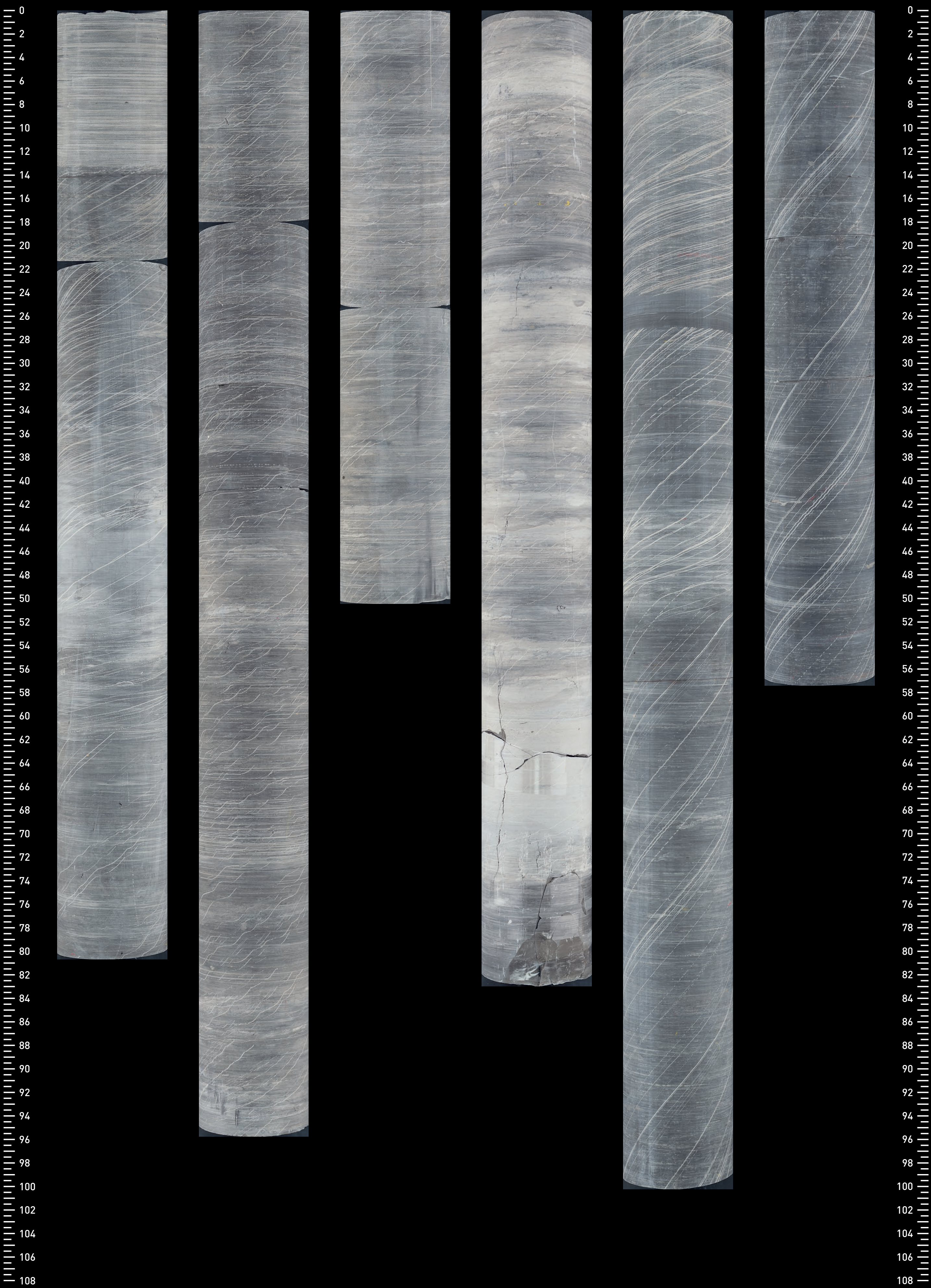

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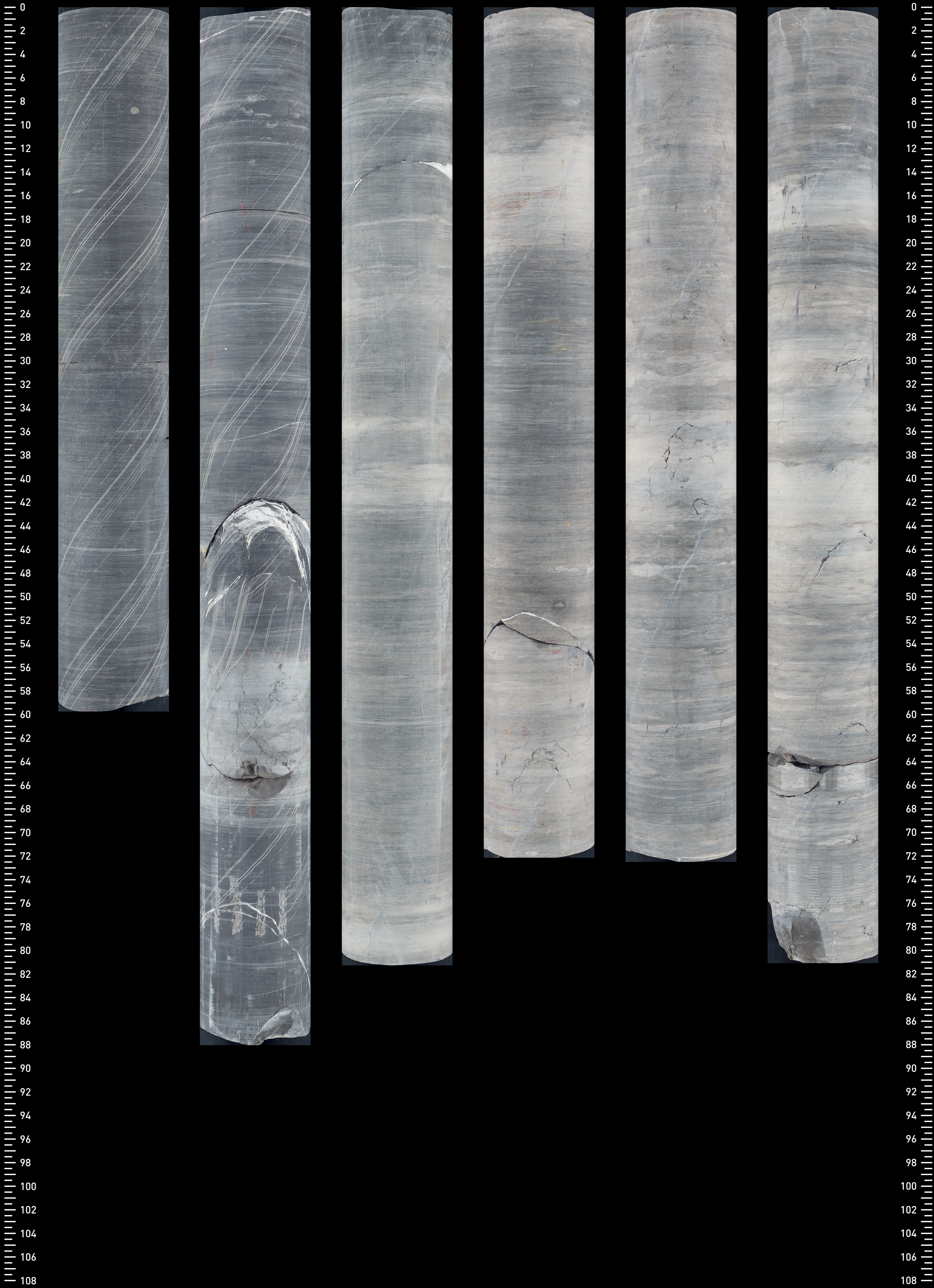
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726.11m
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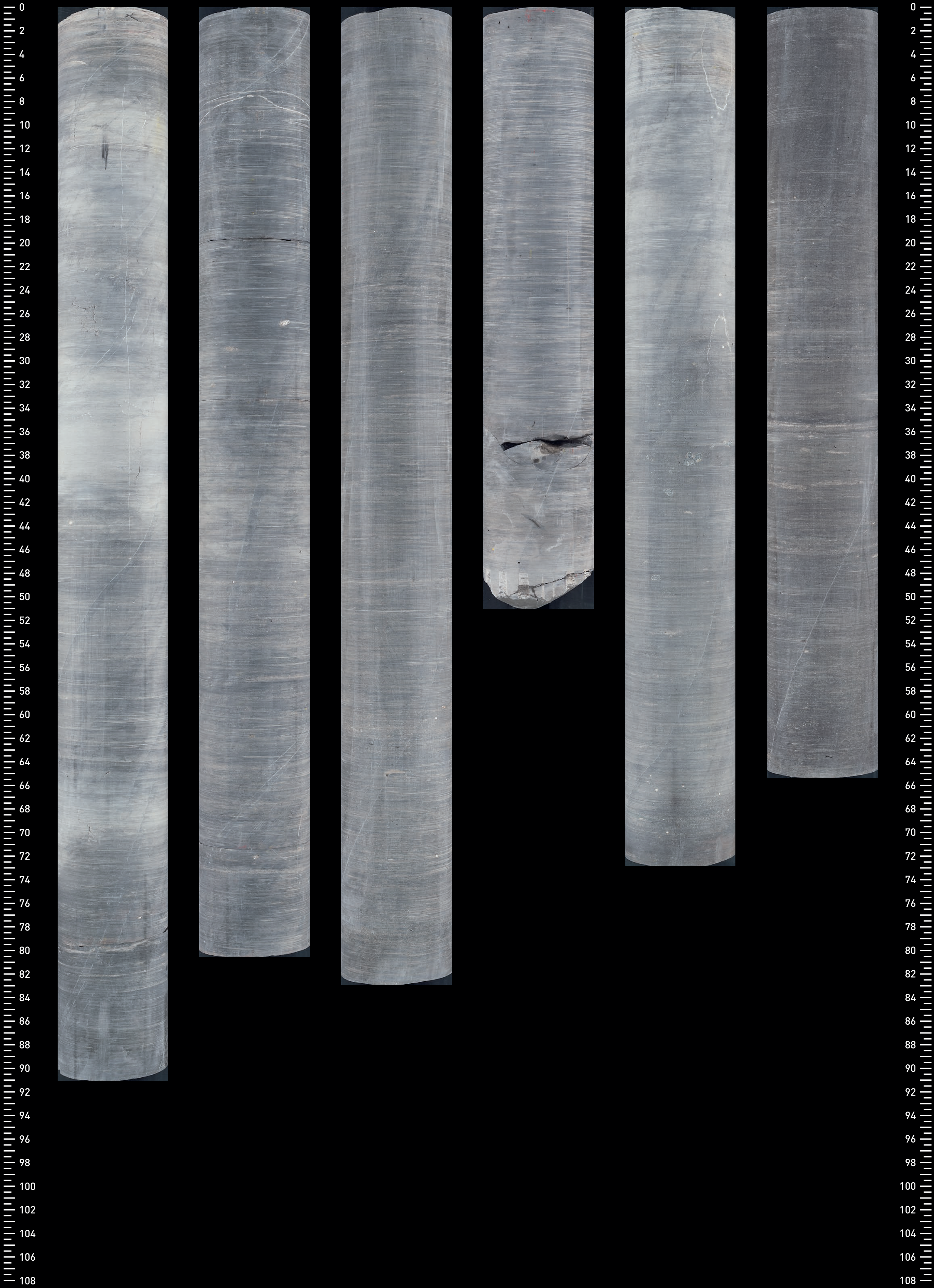
729.96m | 730.84m | 731.63m | 732.43m | 732.92m | 733.62m



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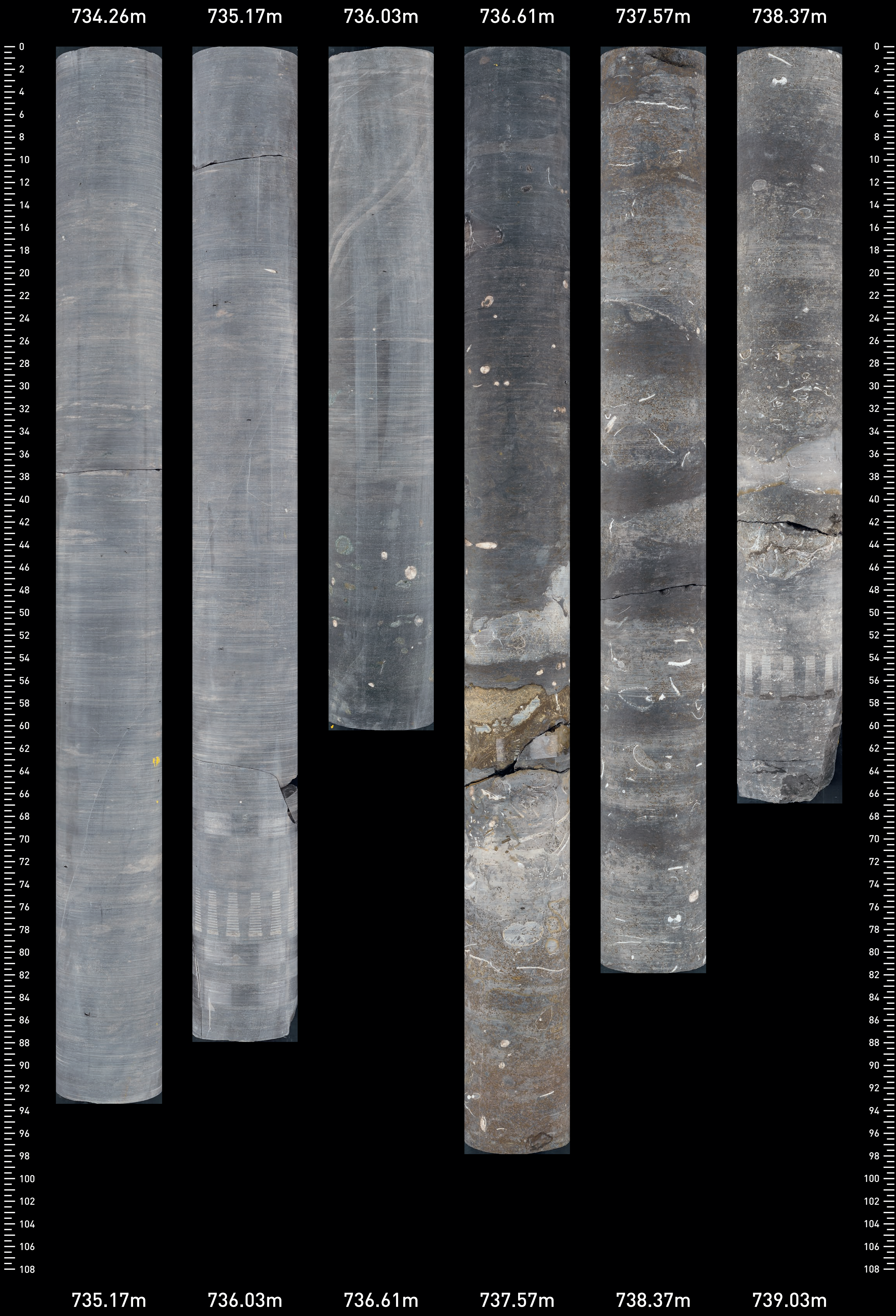
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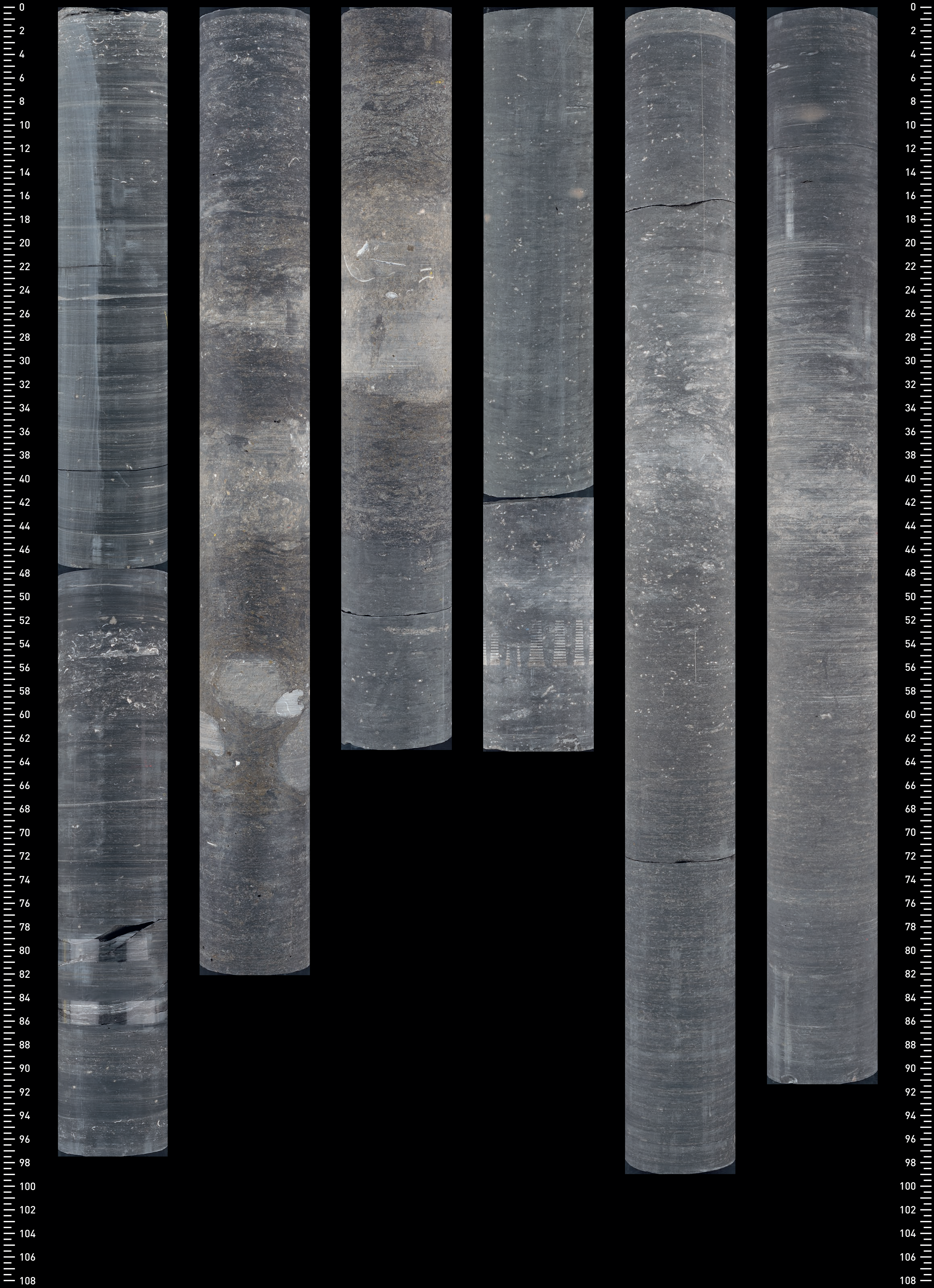

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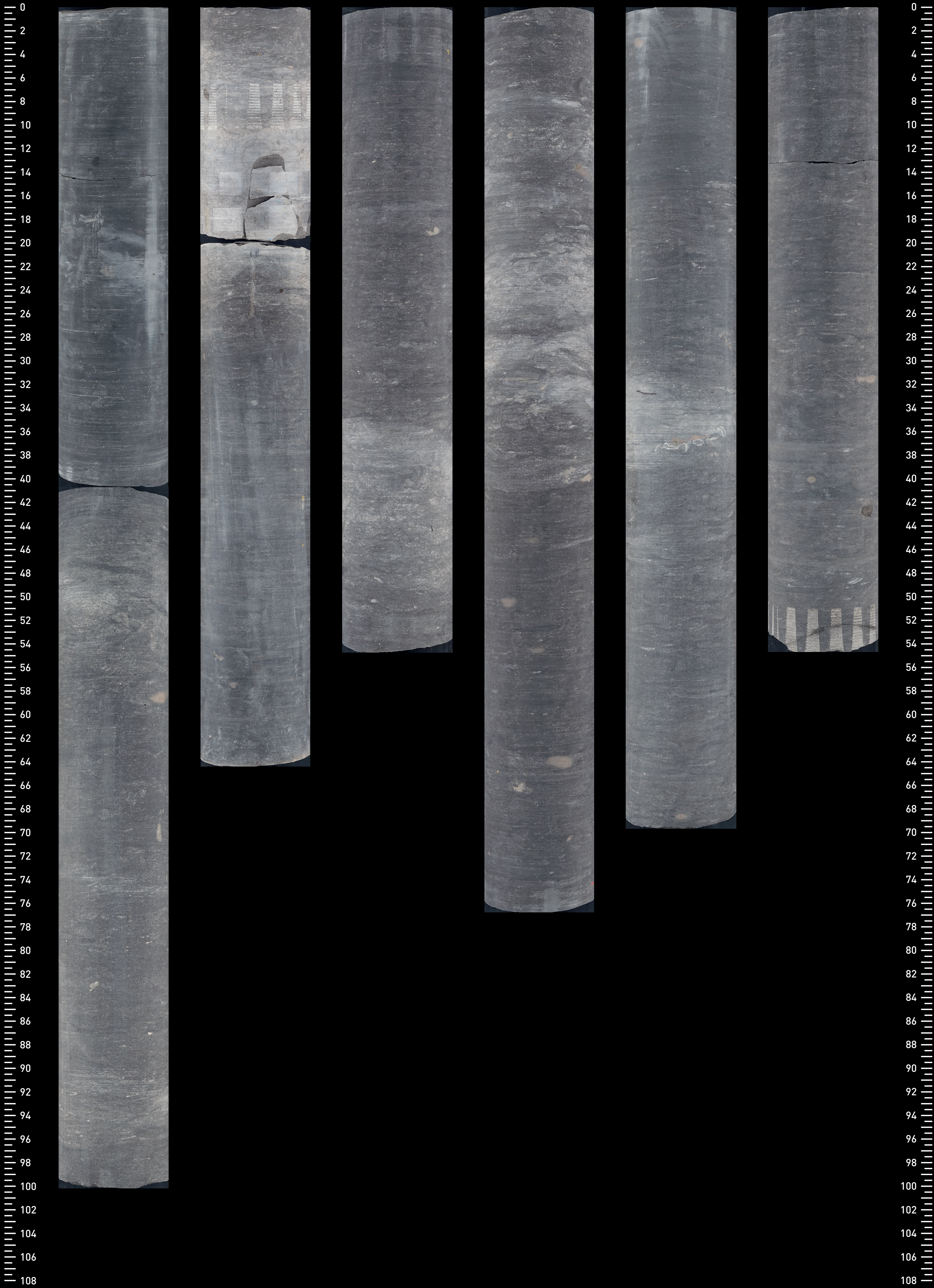

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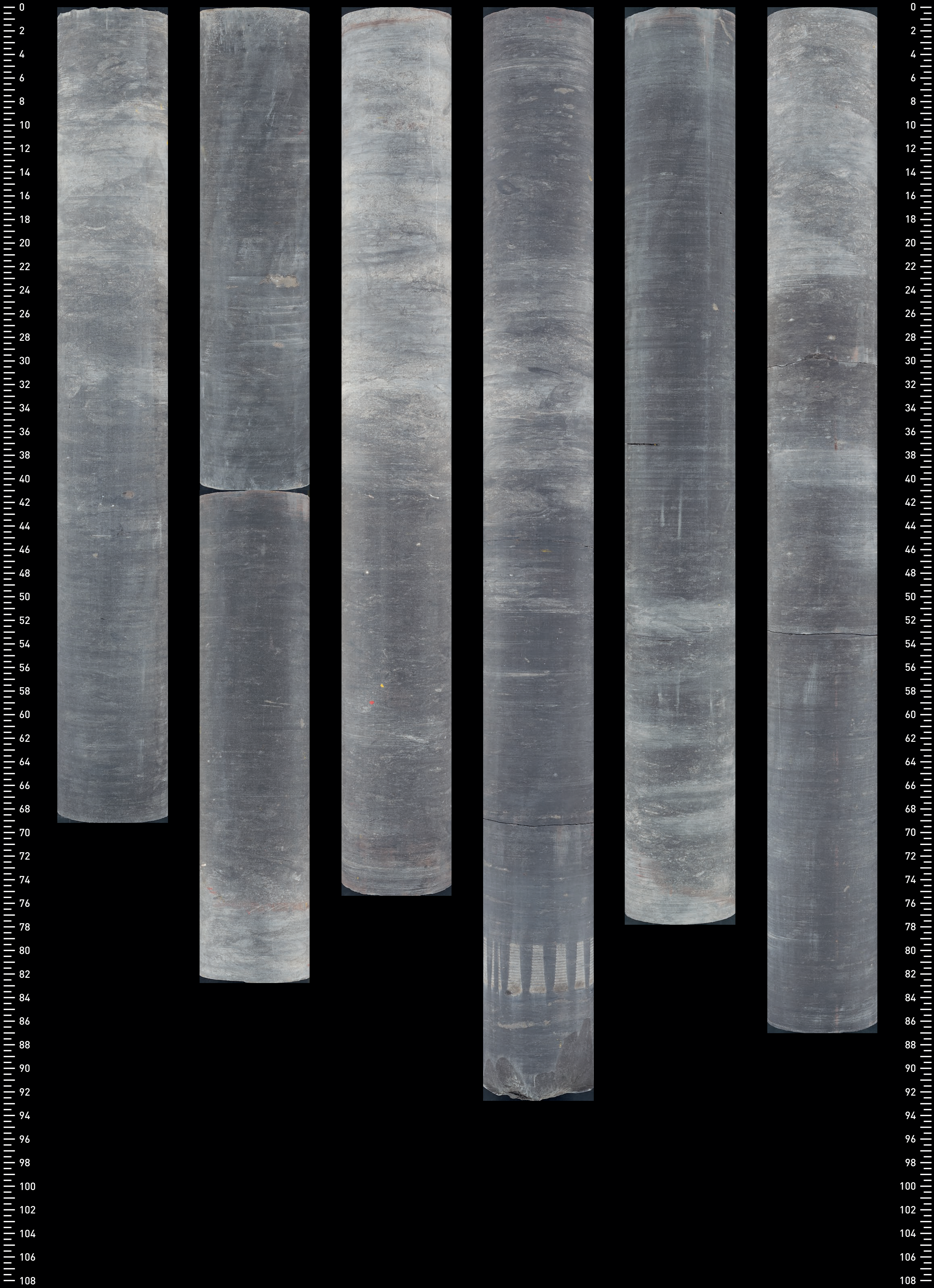
747.93m 748.60m 749.42m 750.15m 751.05m 751.80m



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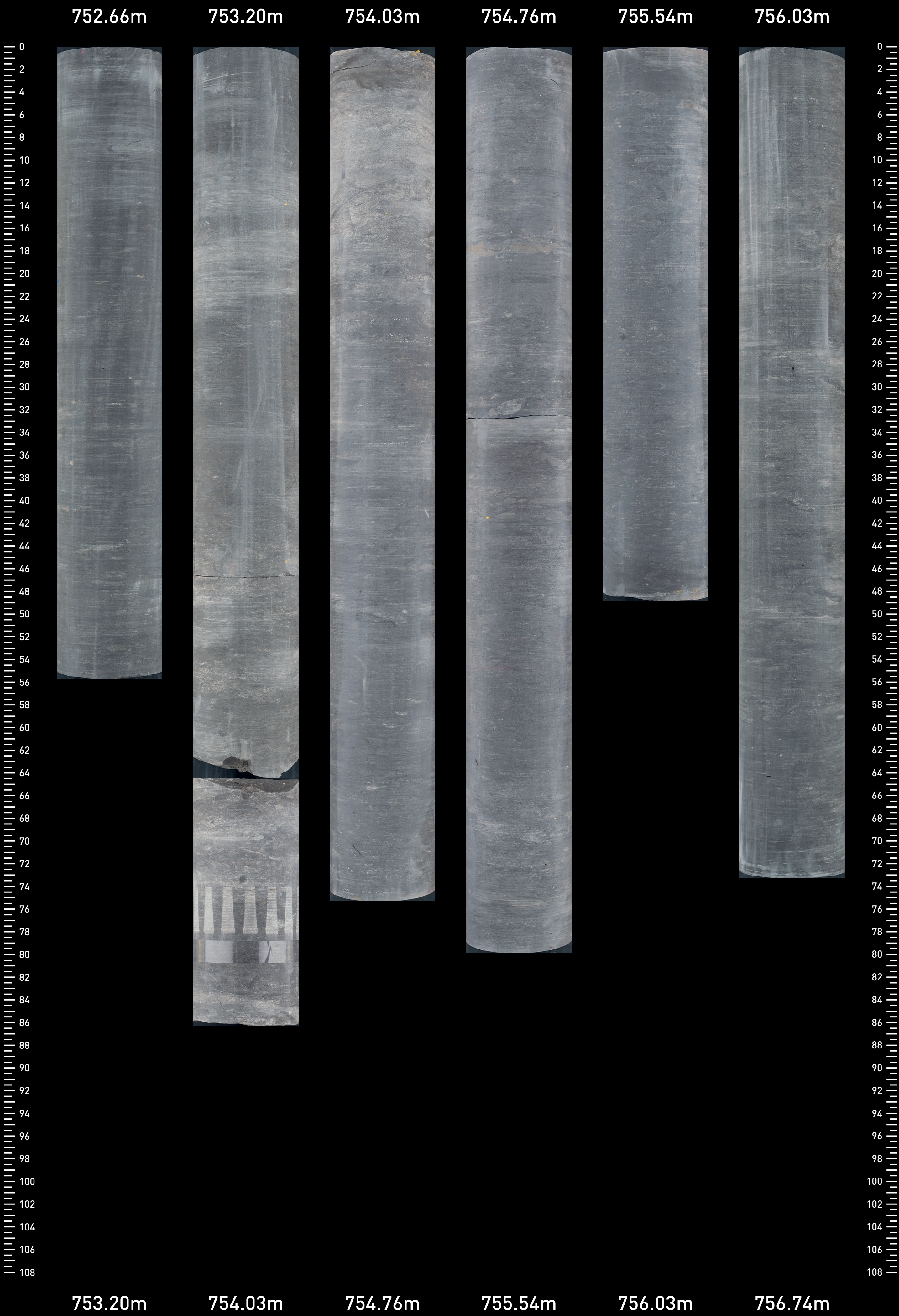
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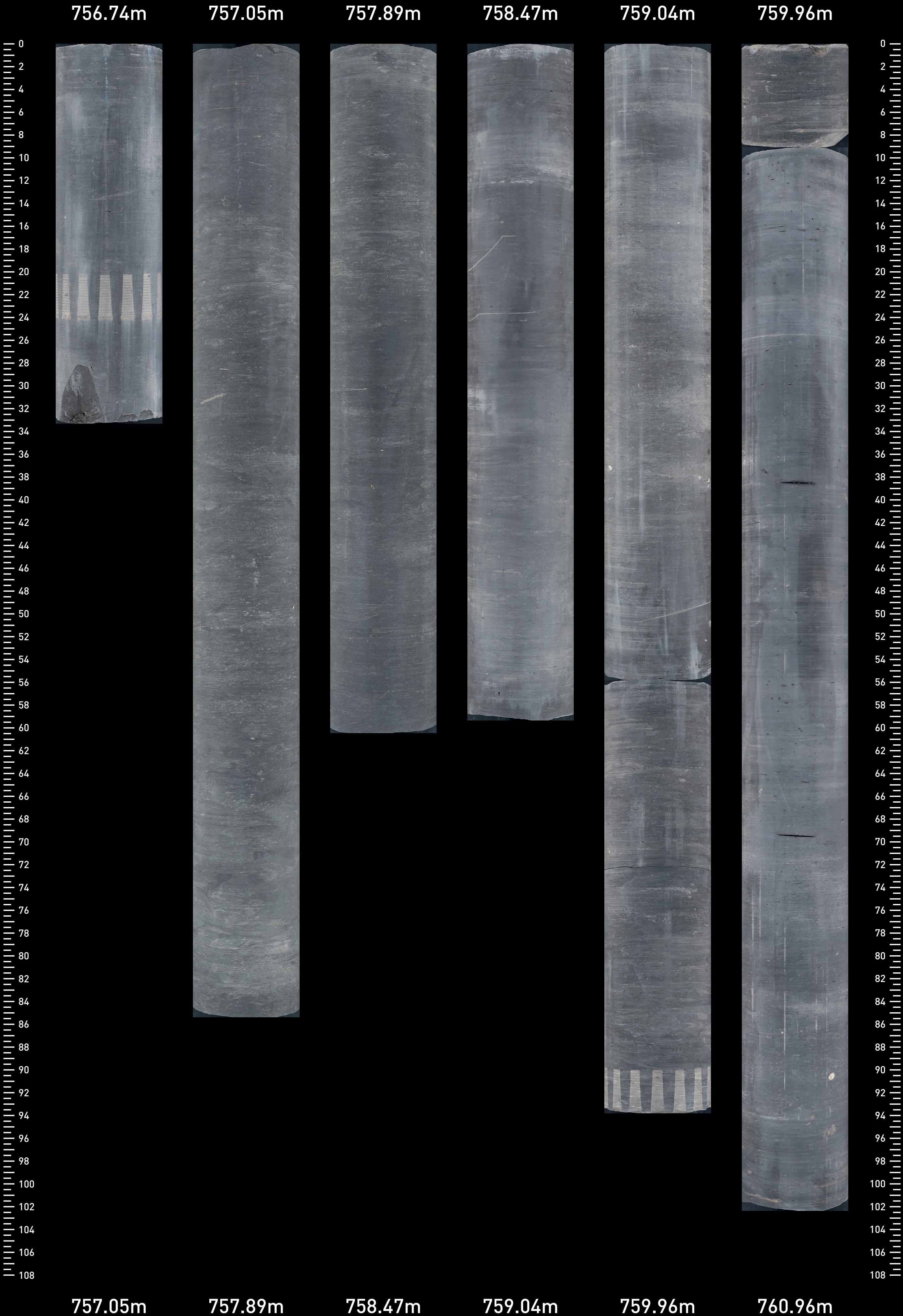
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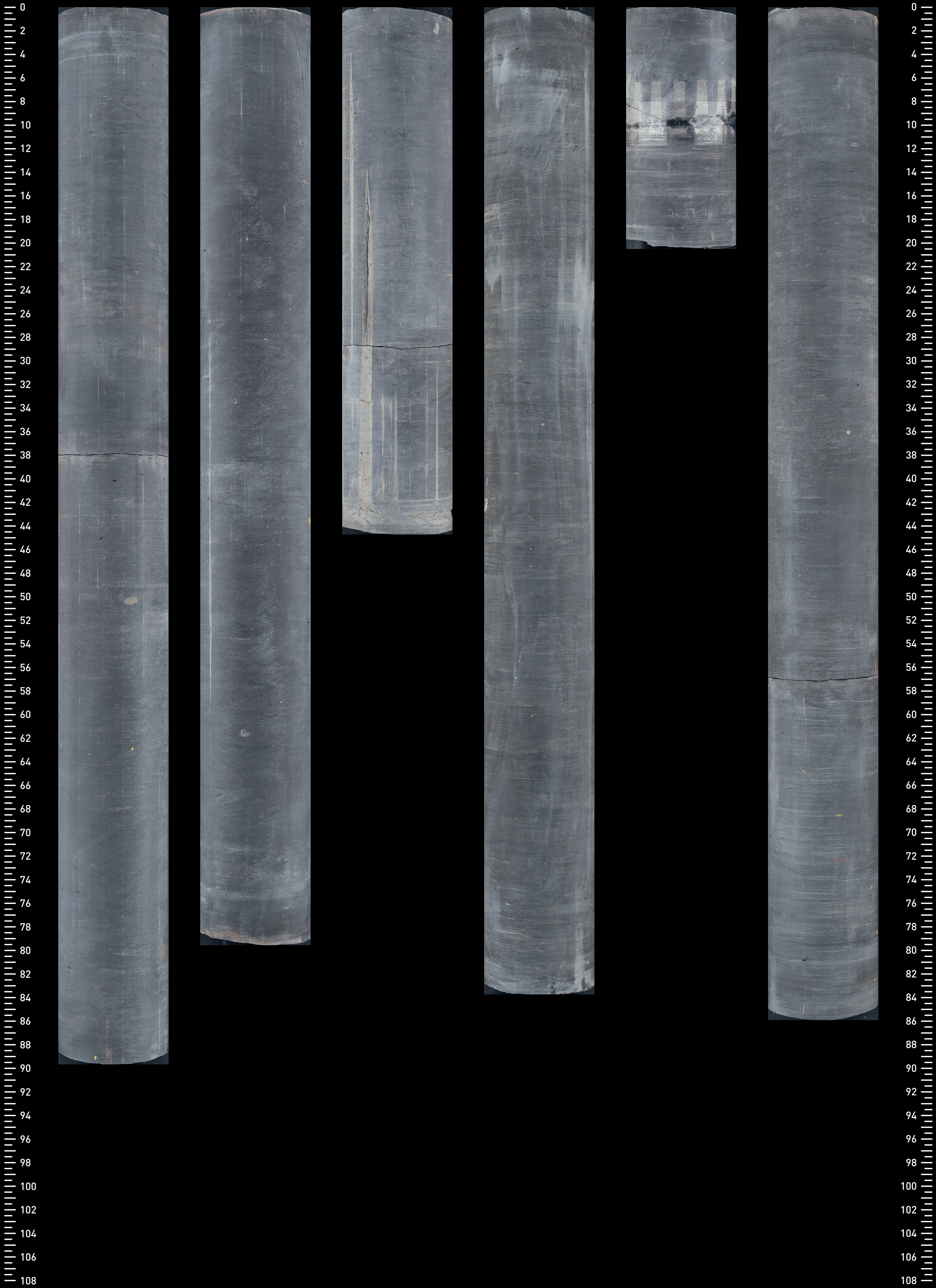
760.96m | 761.83m | 762.61m | 763.04m | 763.86m | 764.05m



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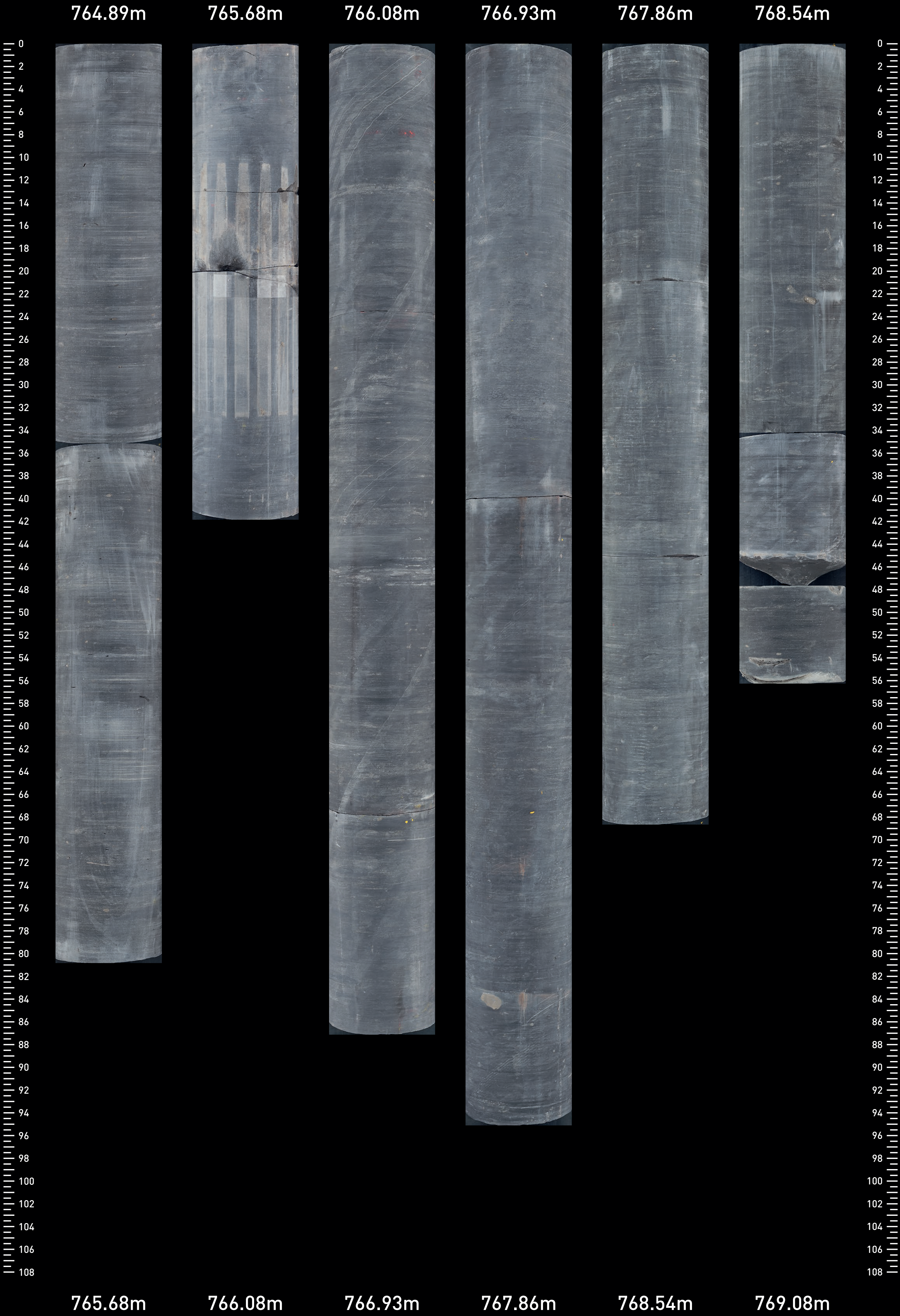
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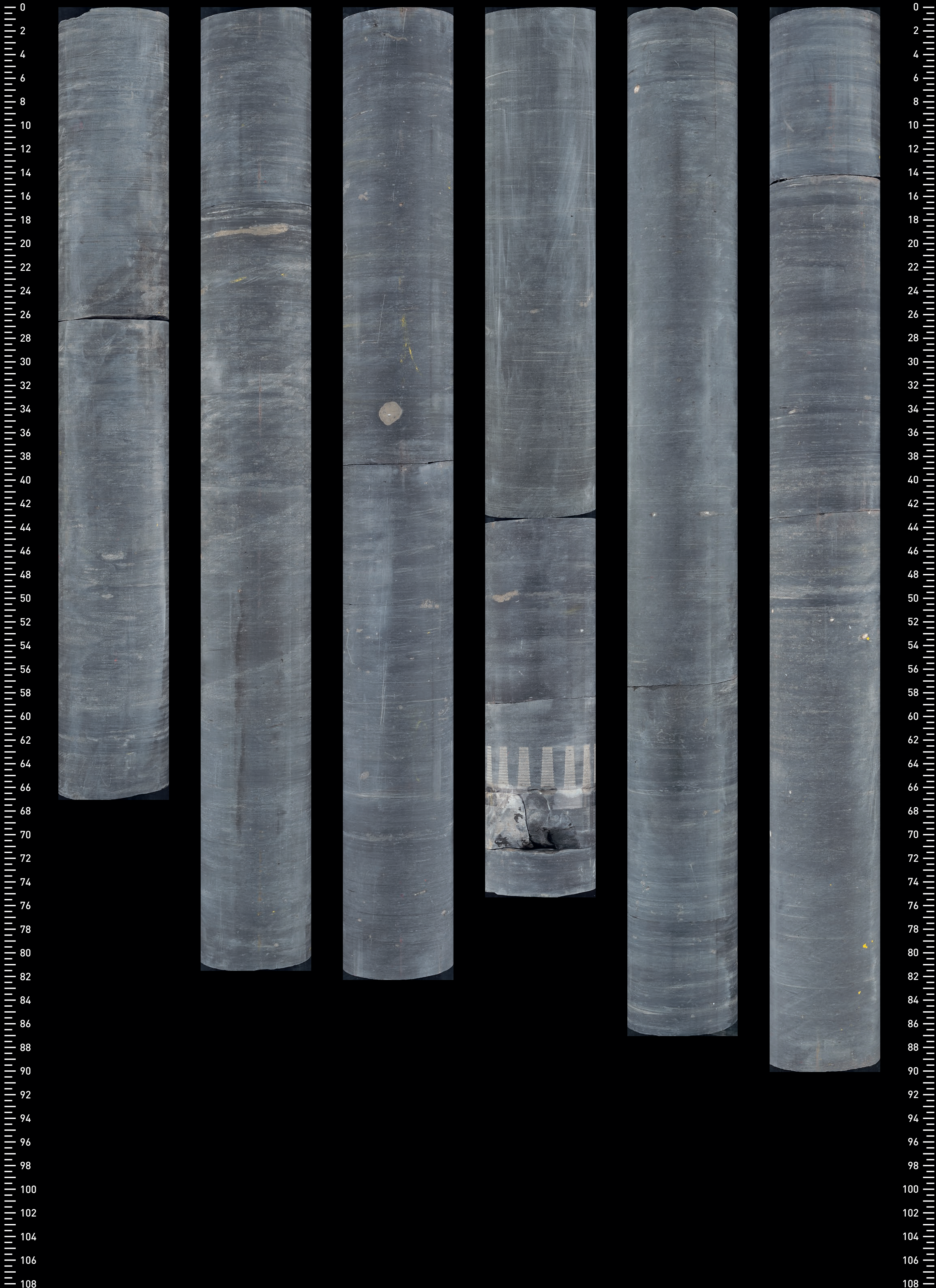

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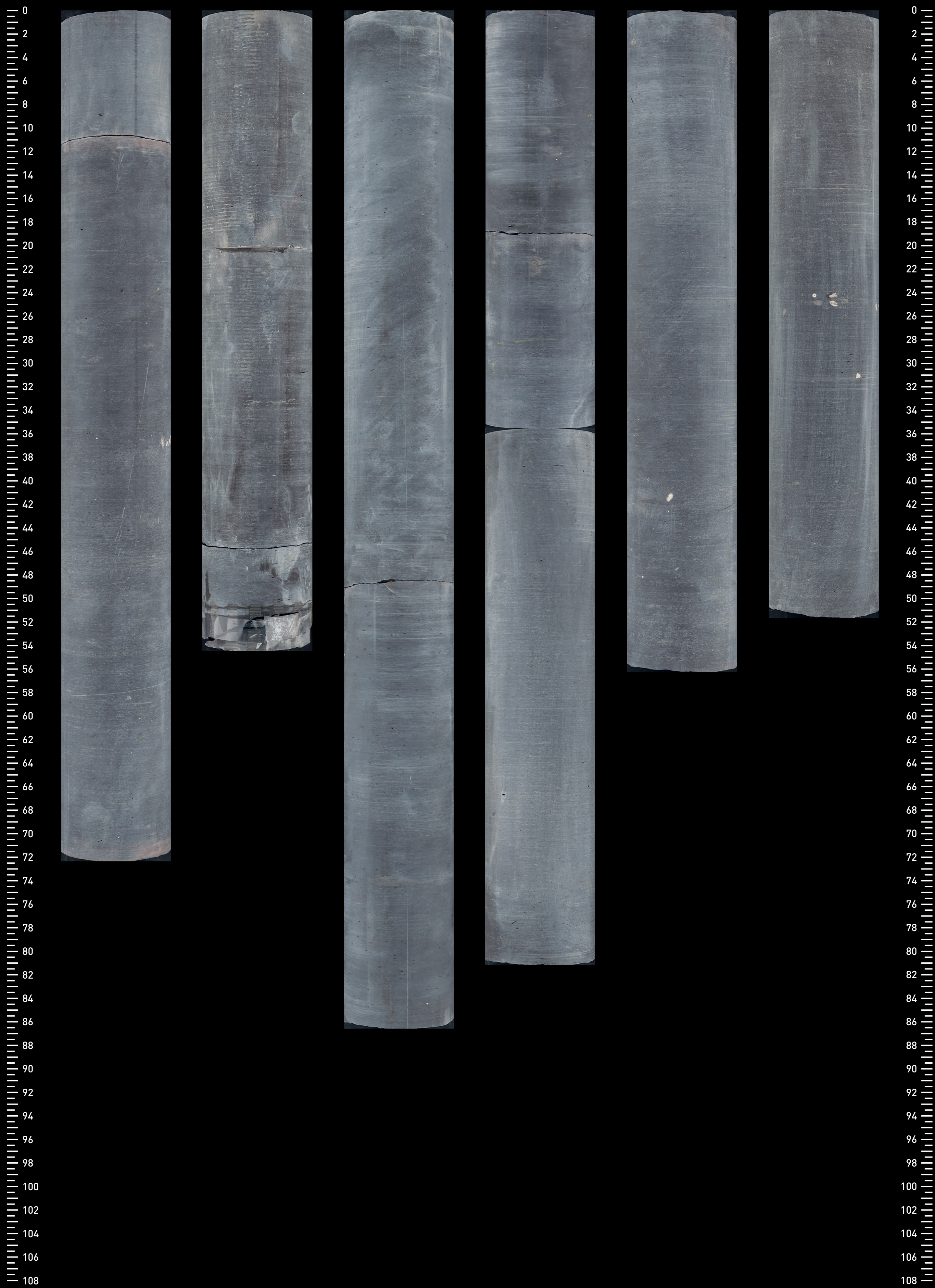

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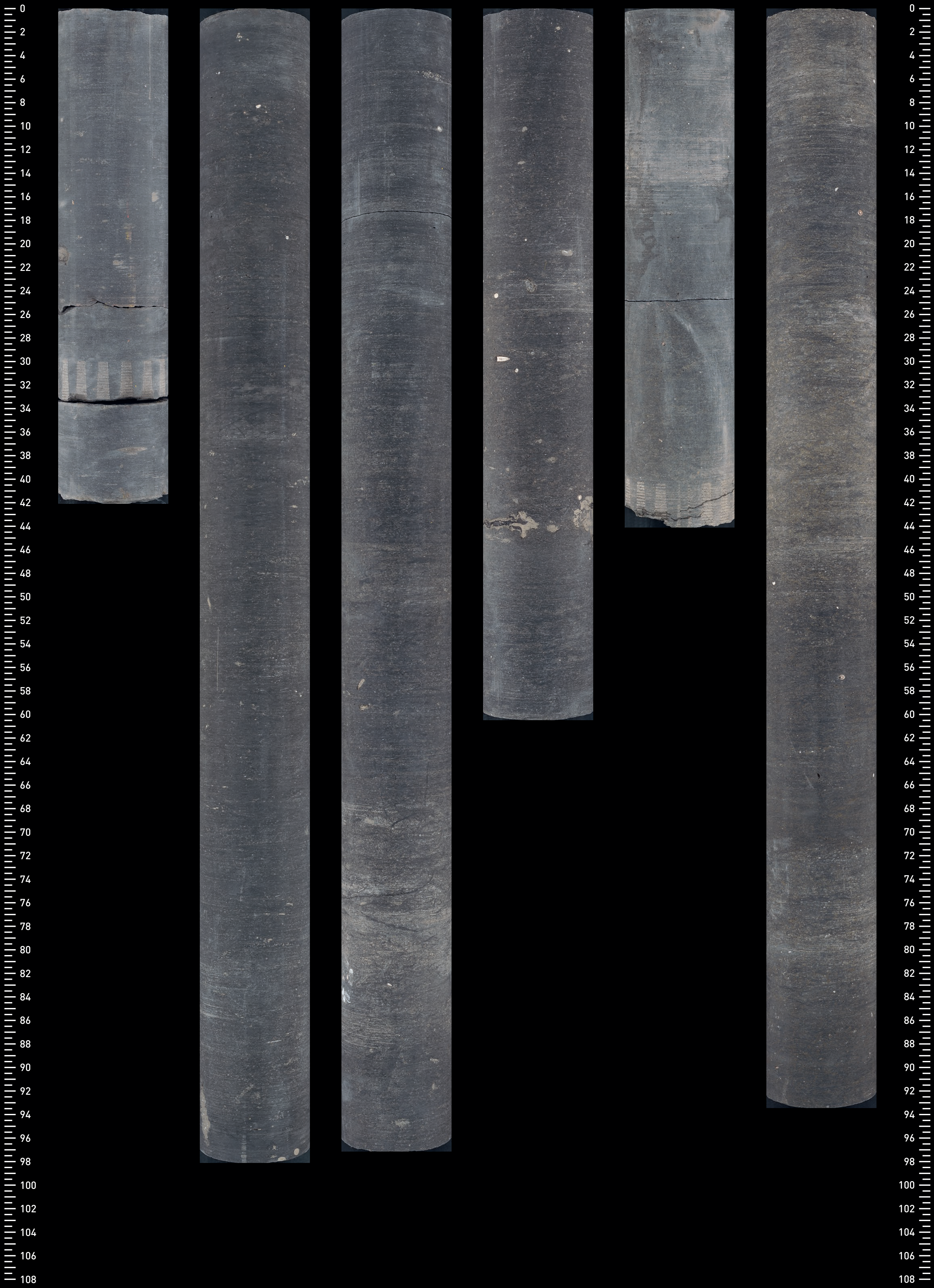

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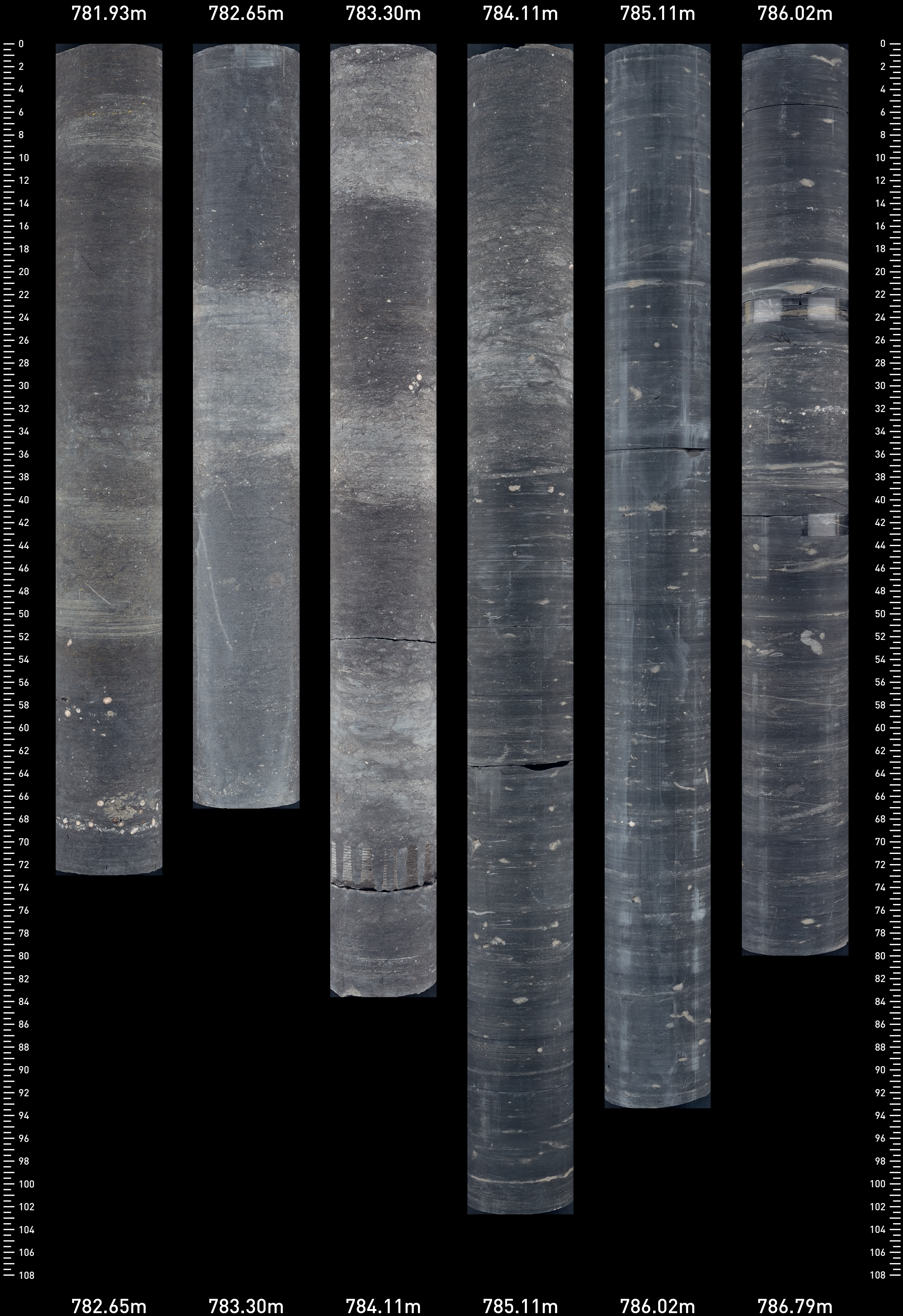
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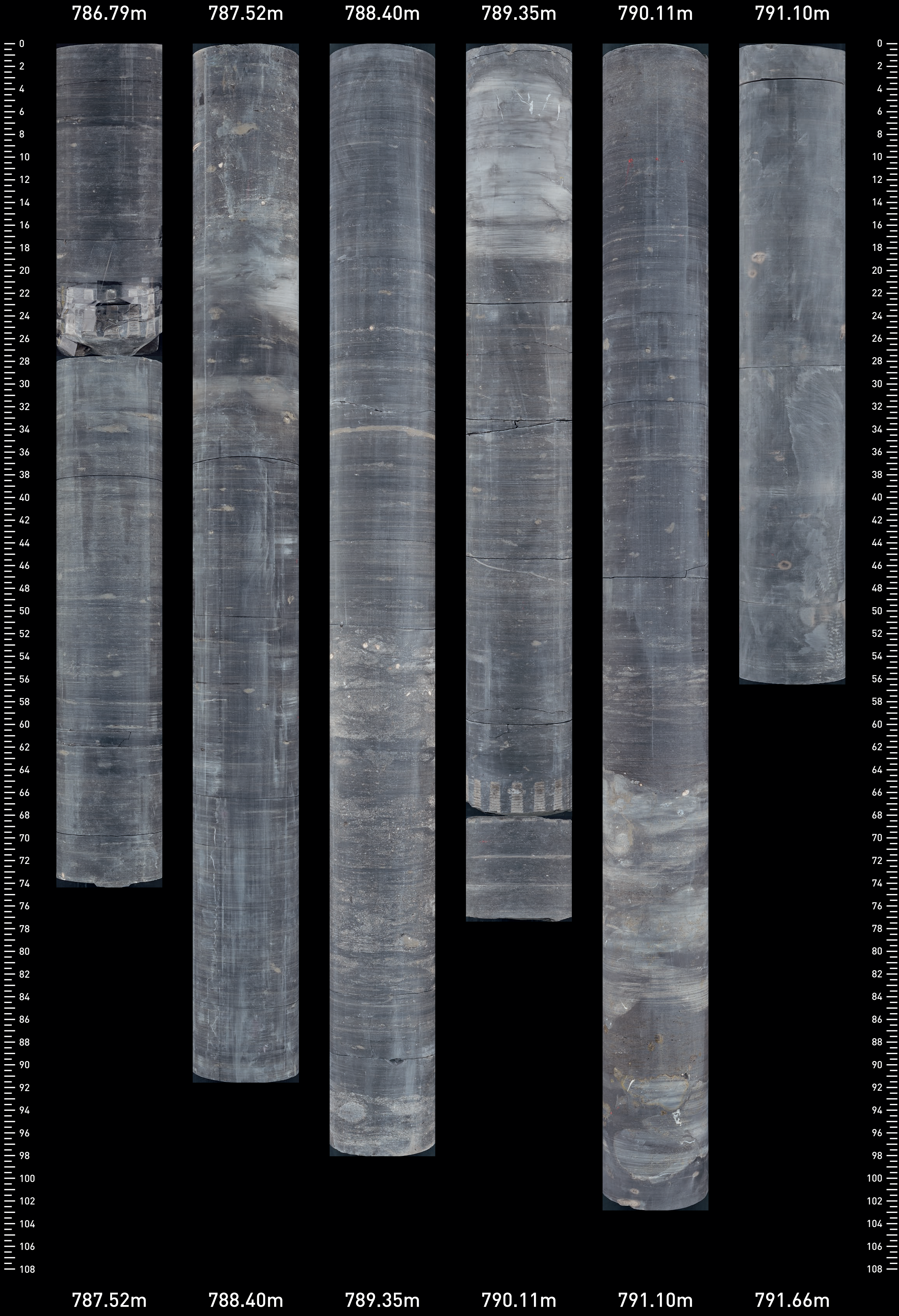
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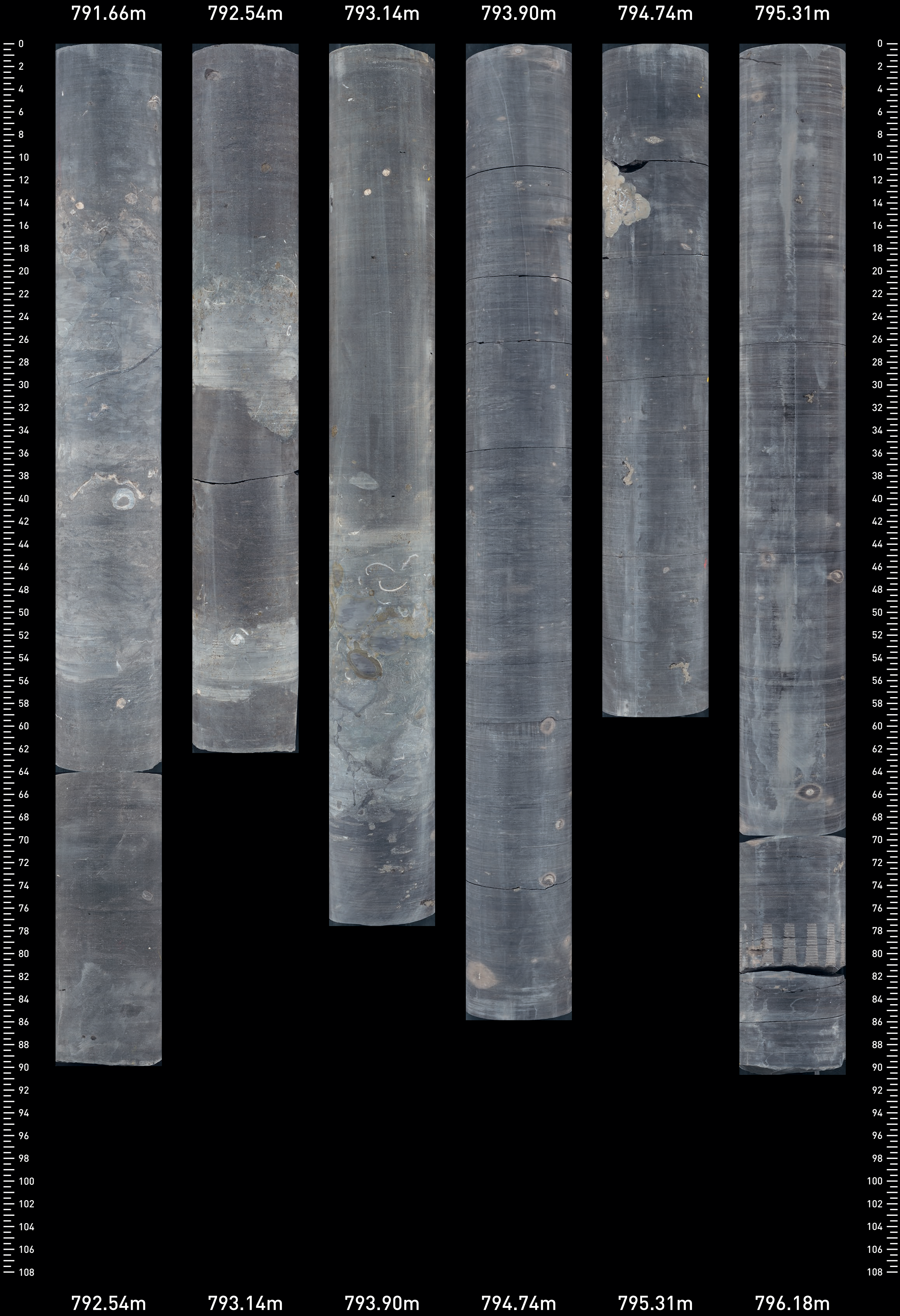
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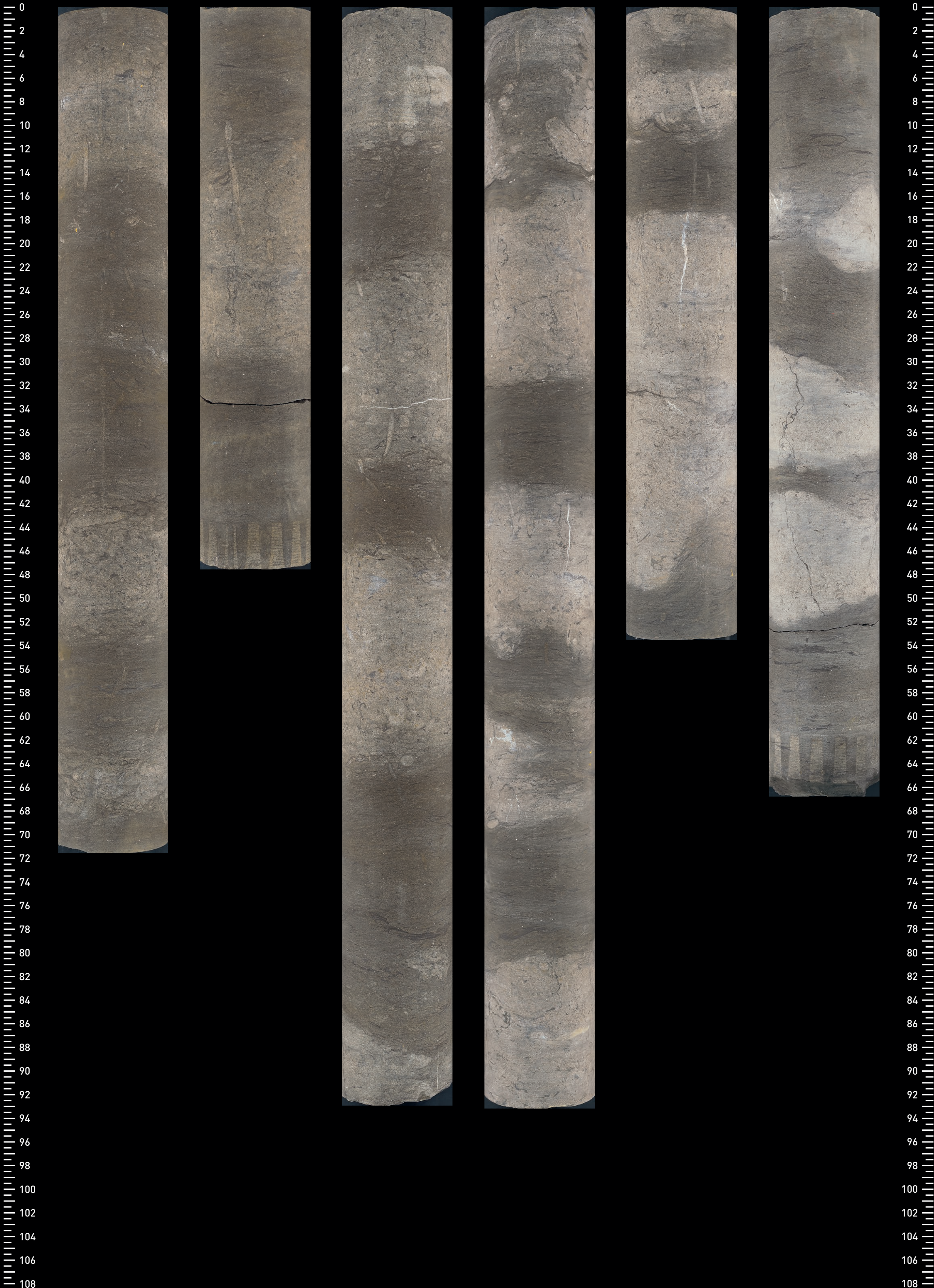

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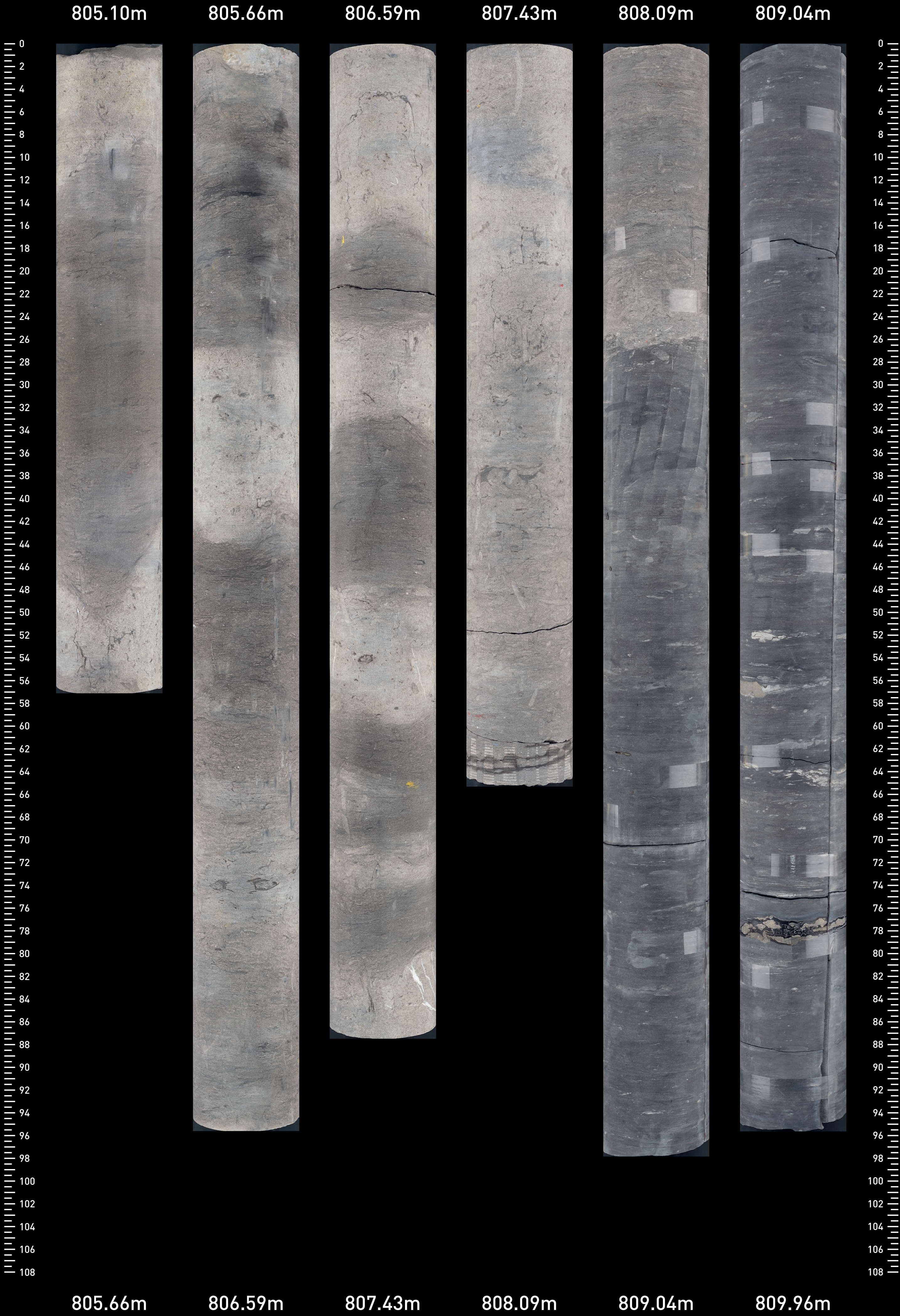
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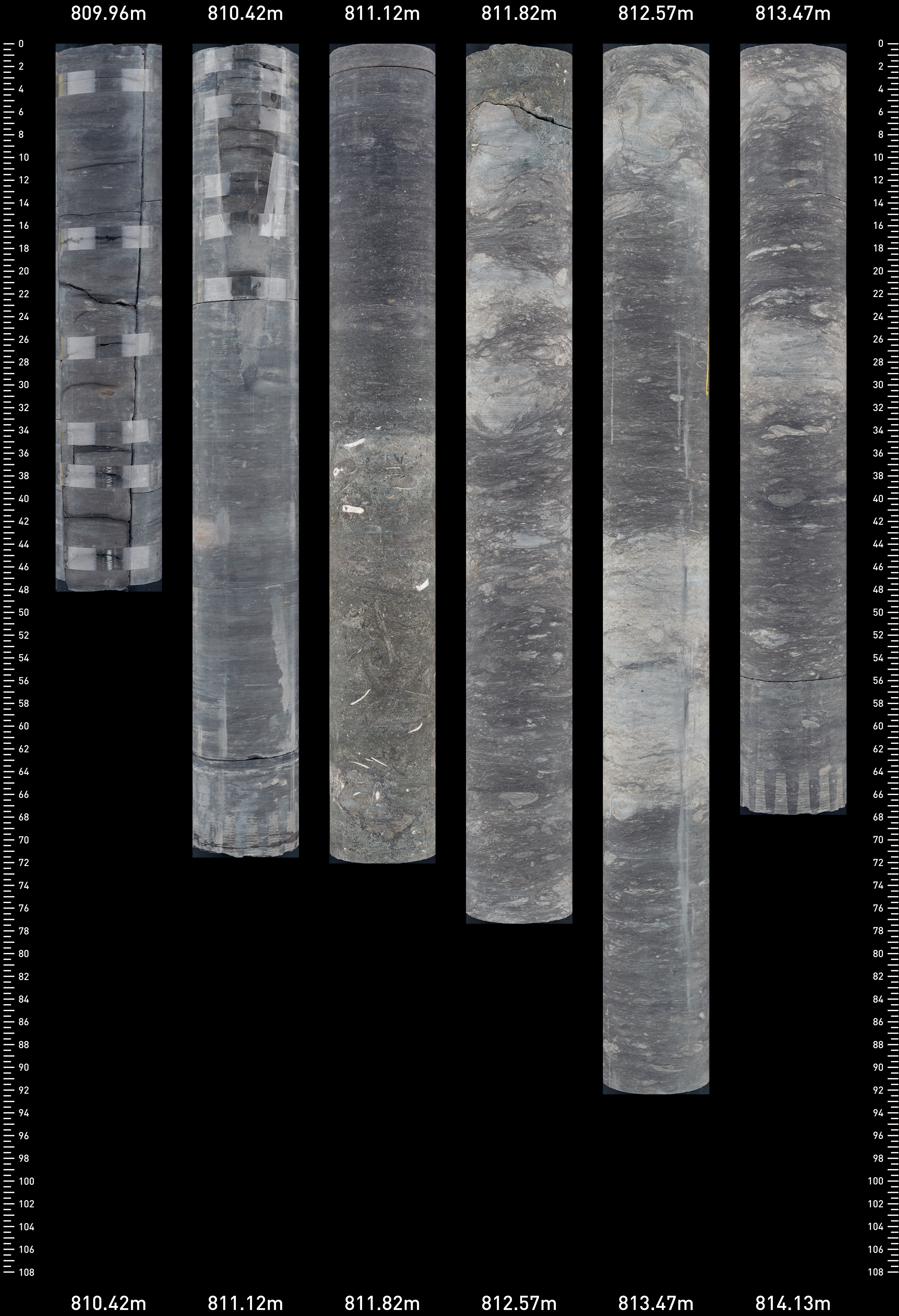
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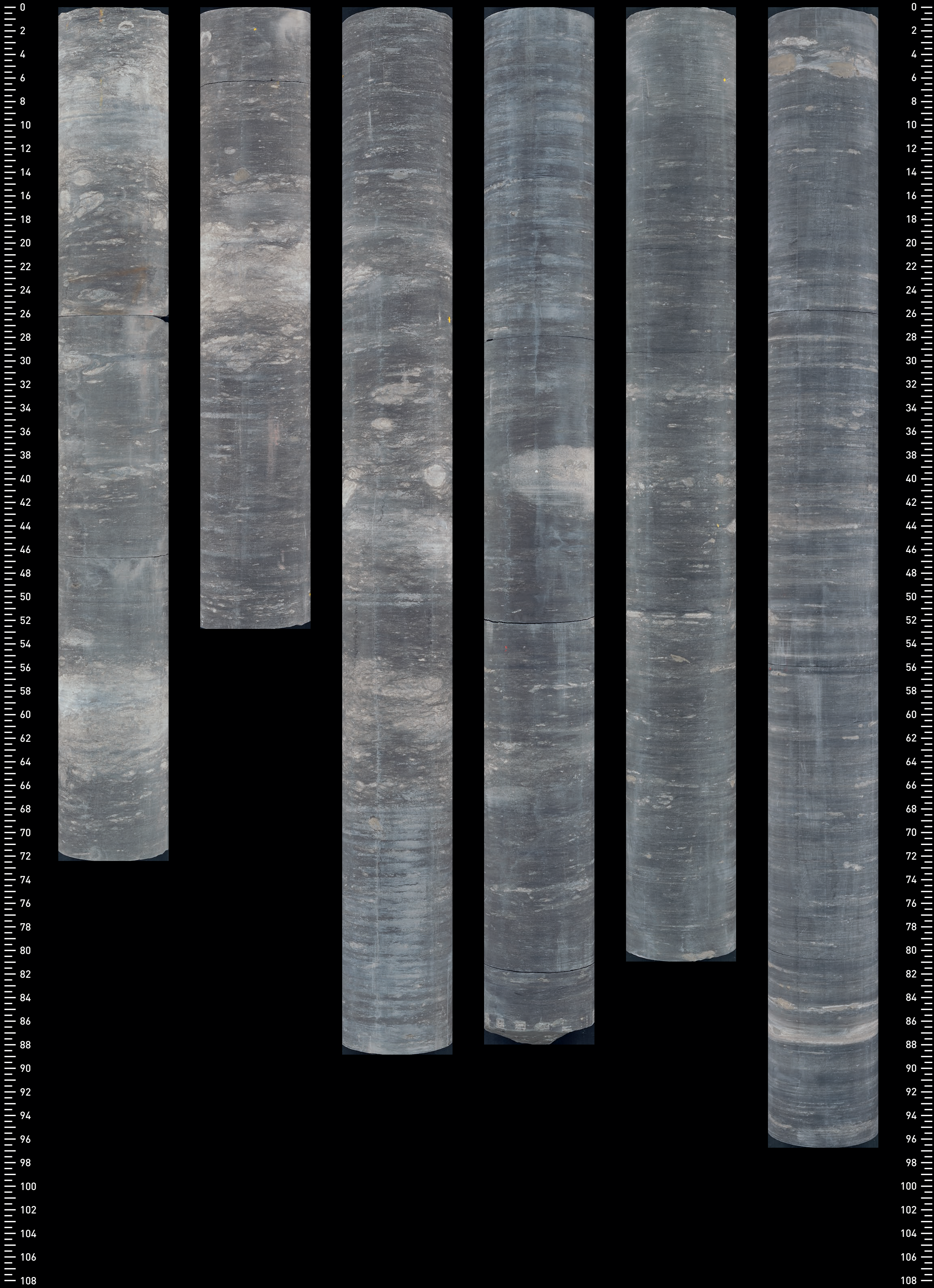

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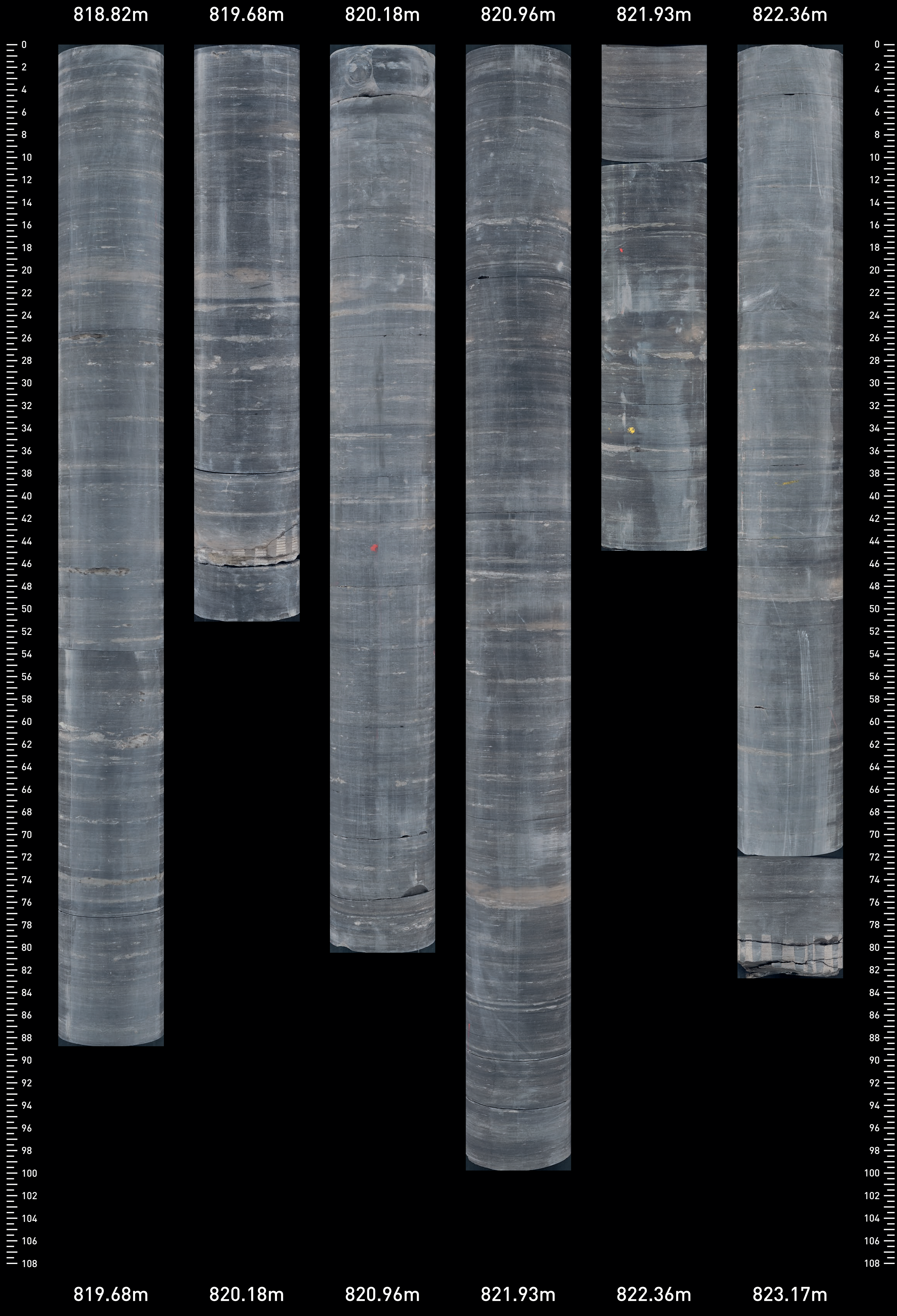
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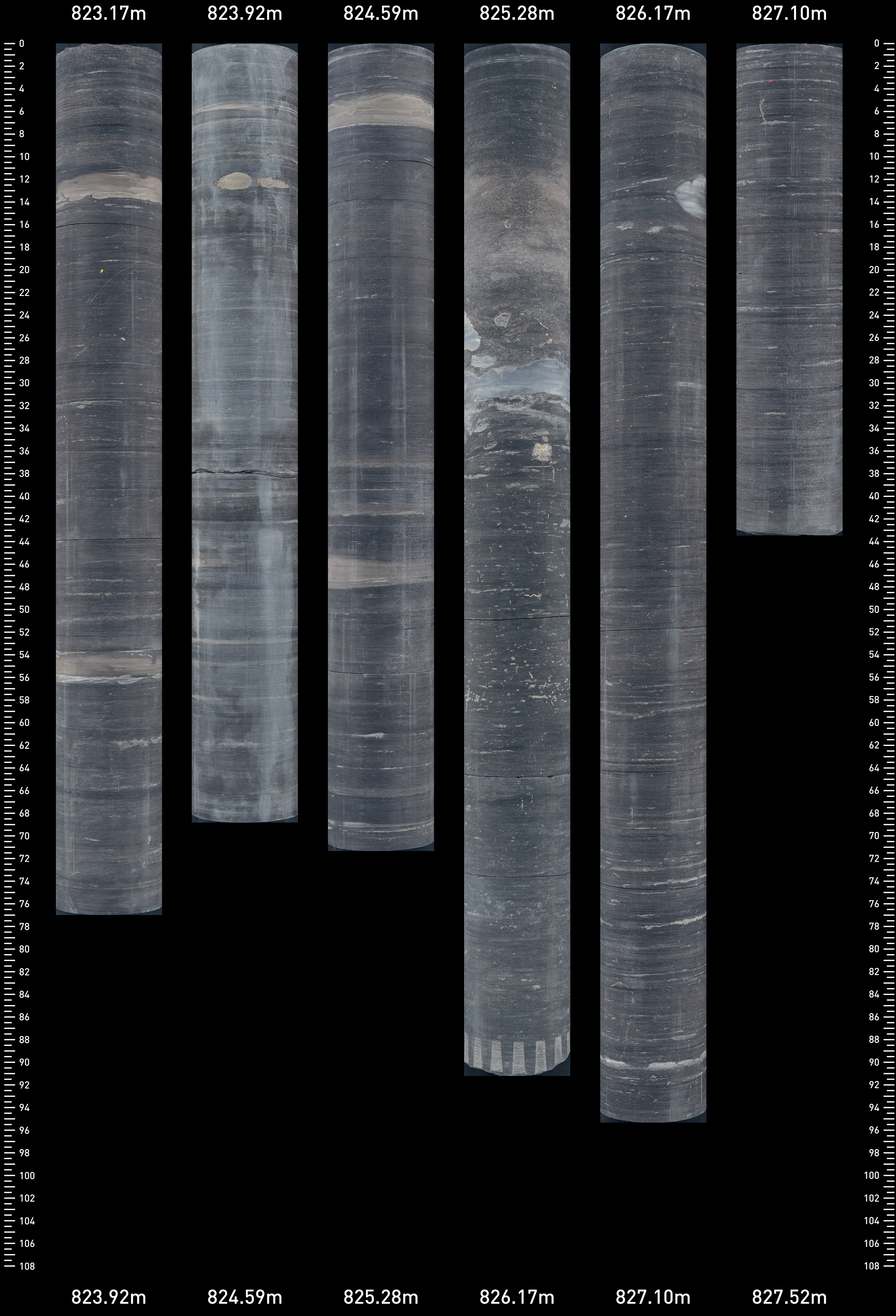
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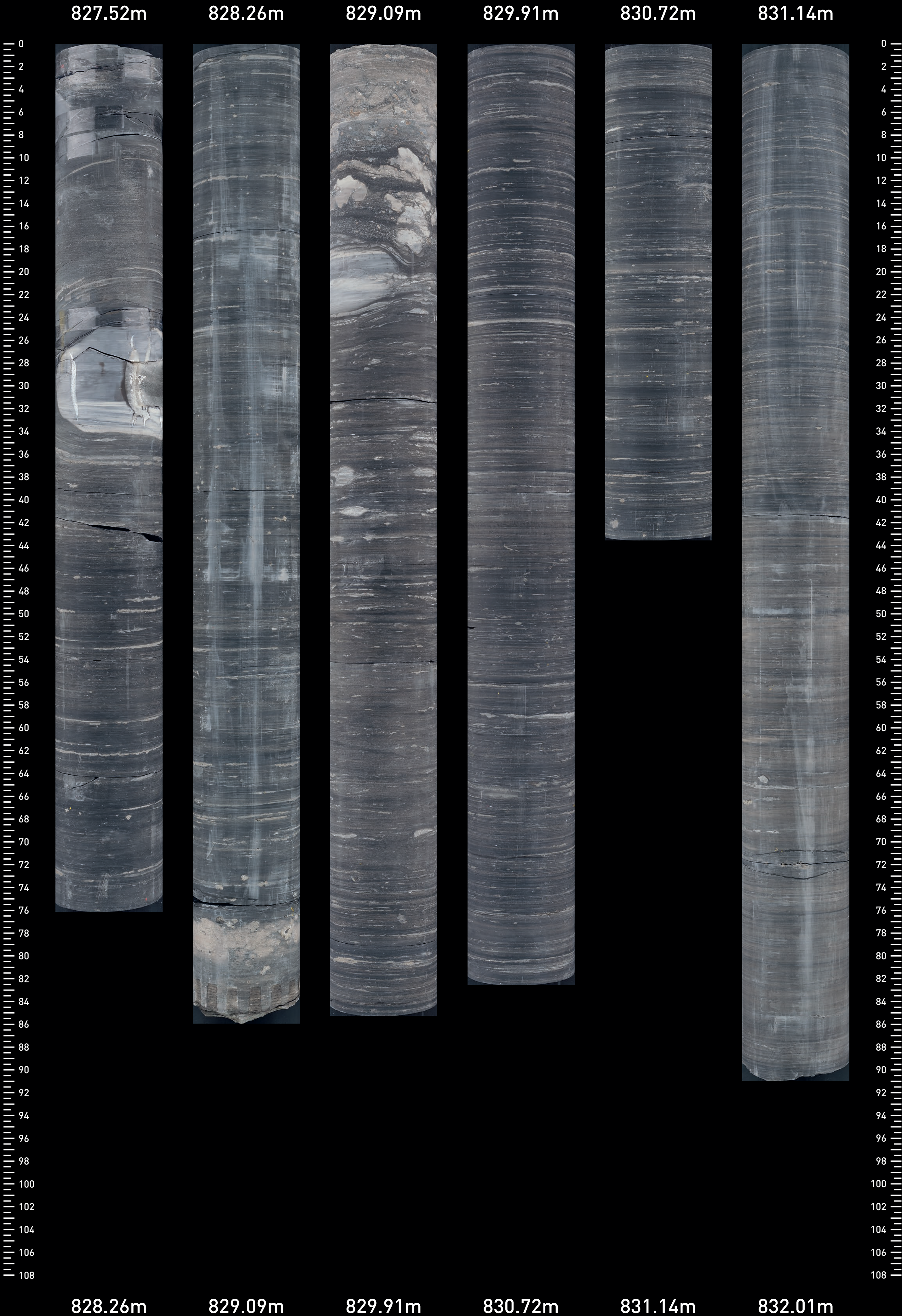
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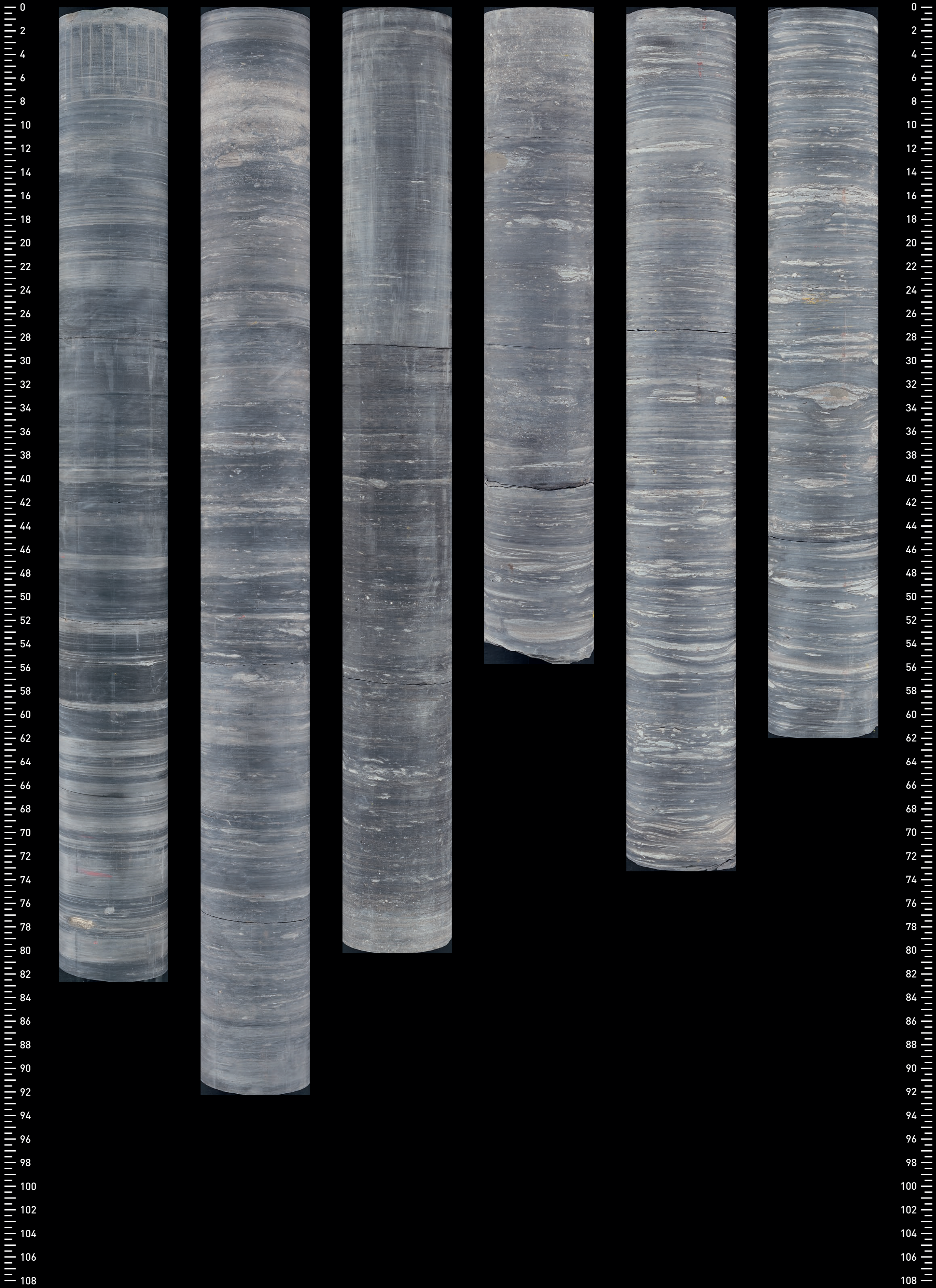

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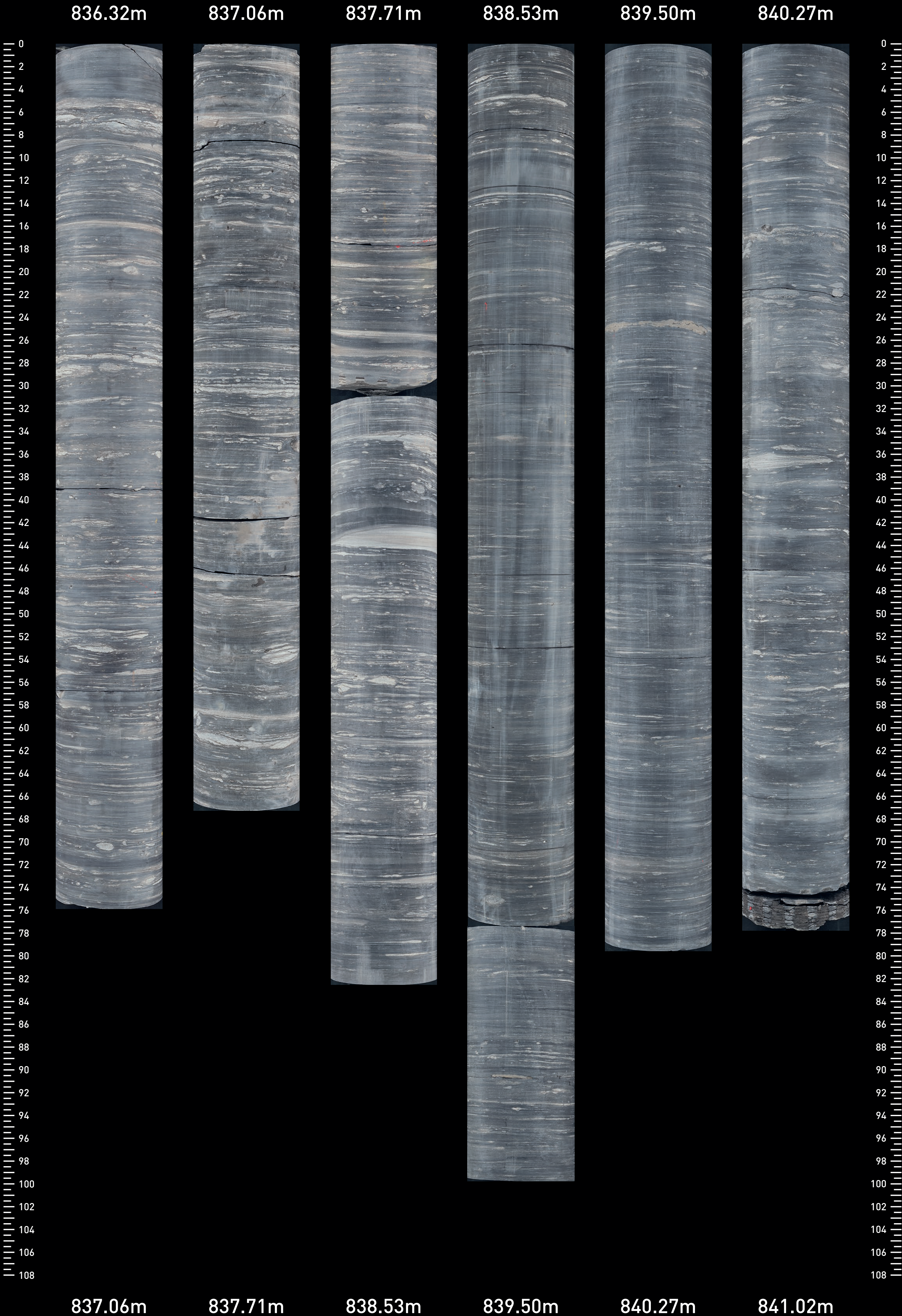
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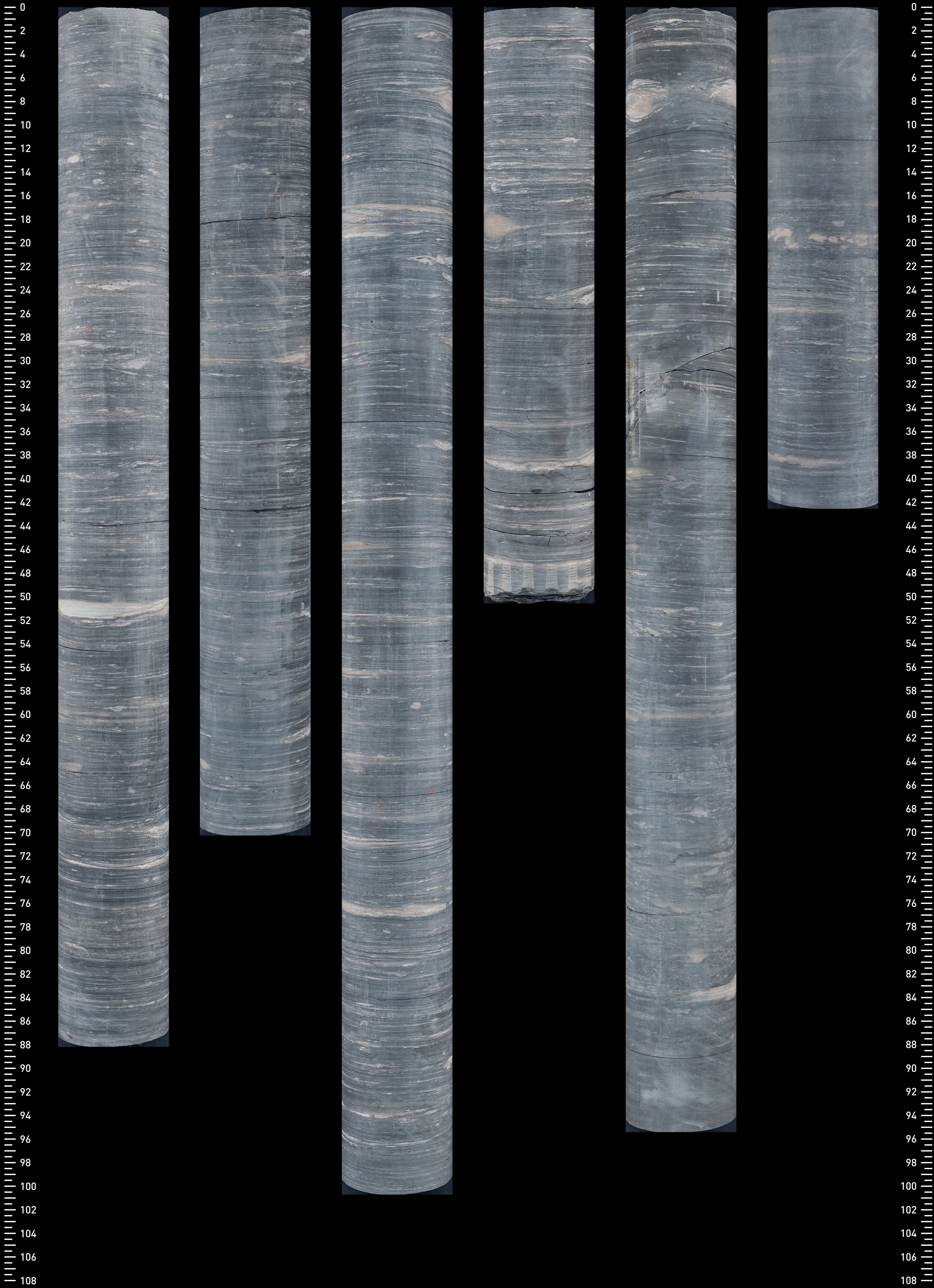

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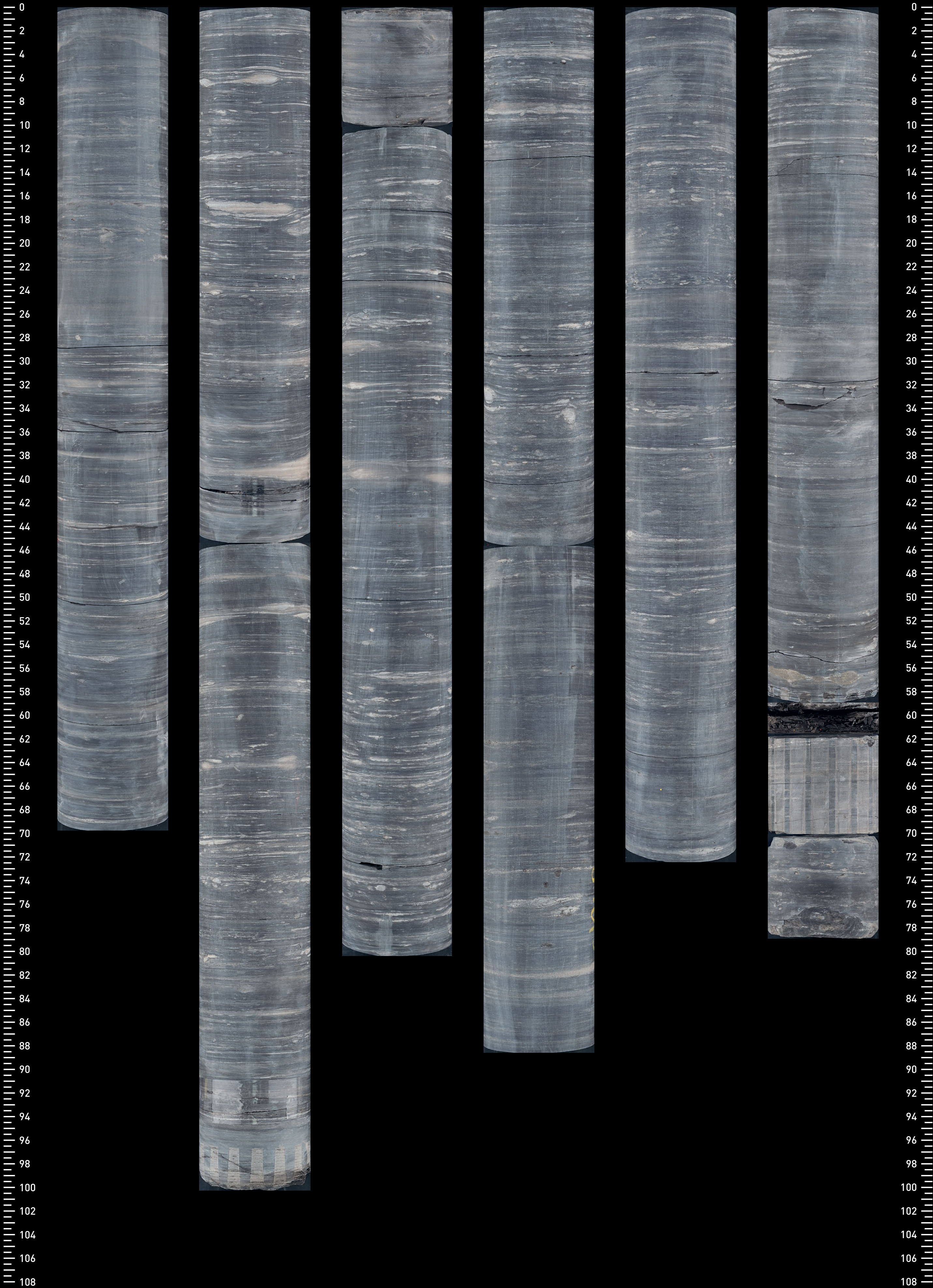

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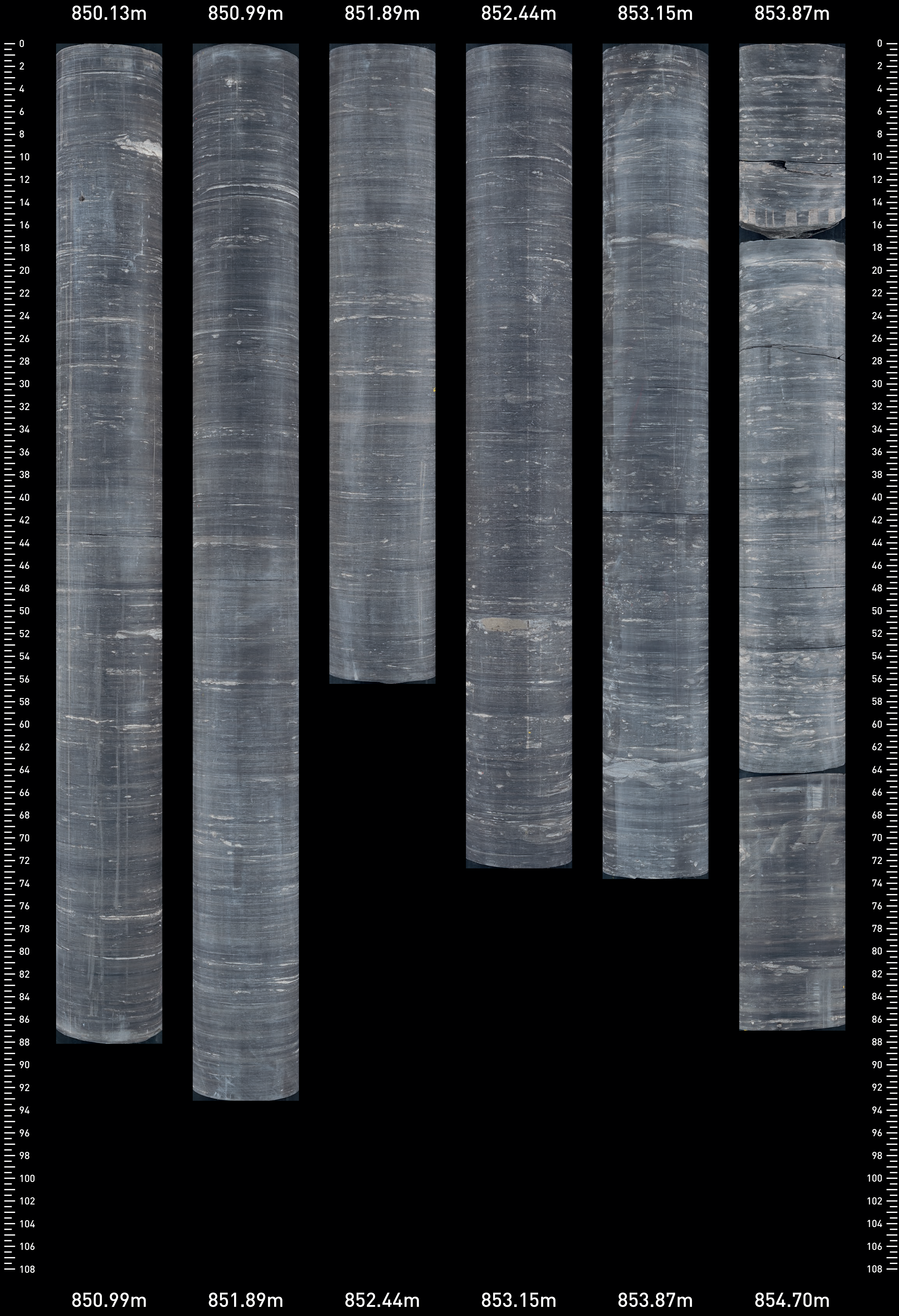
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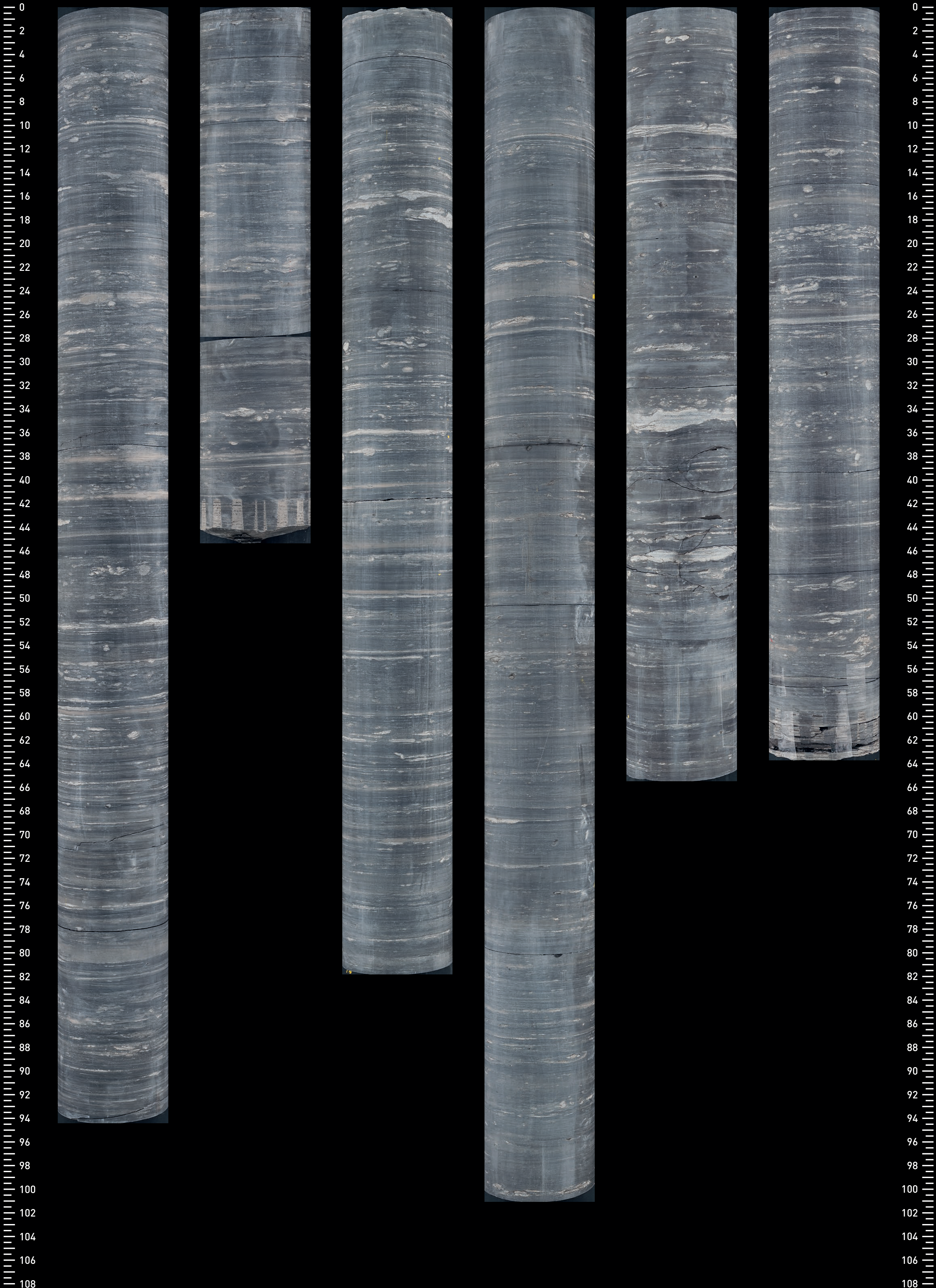

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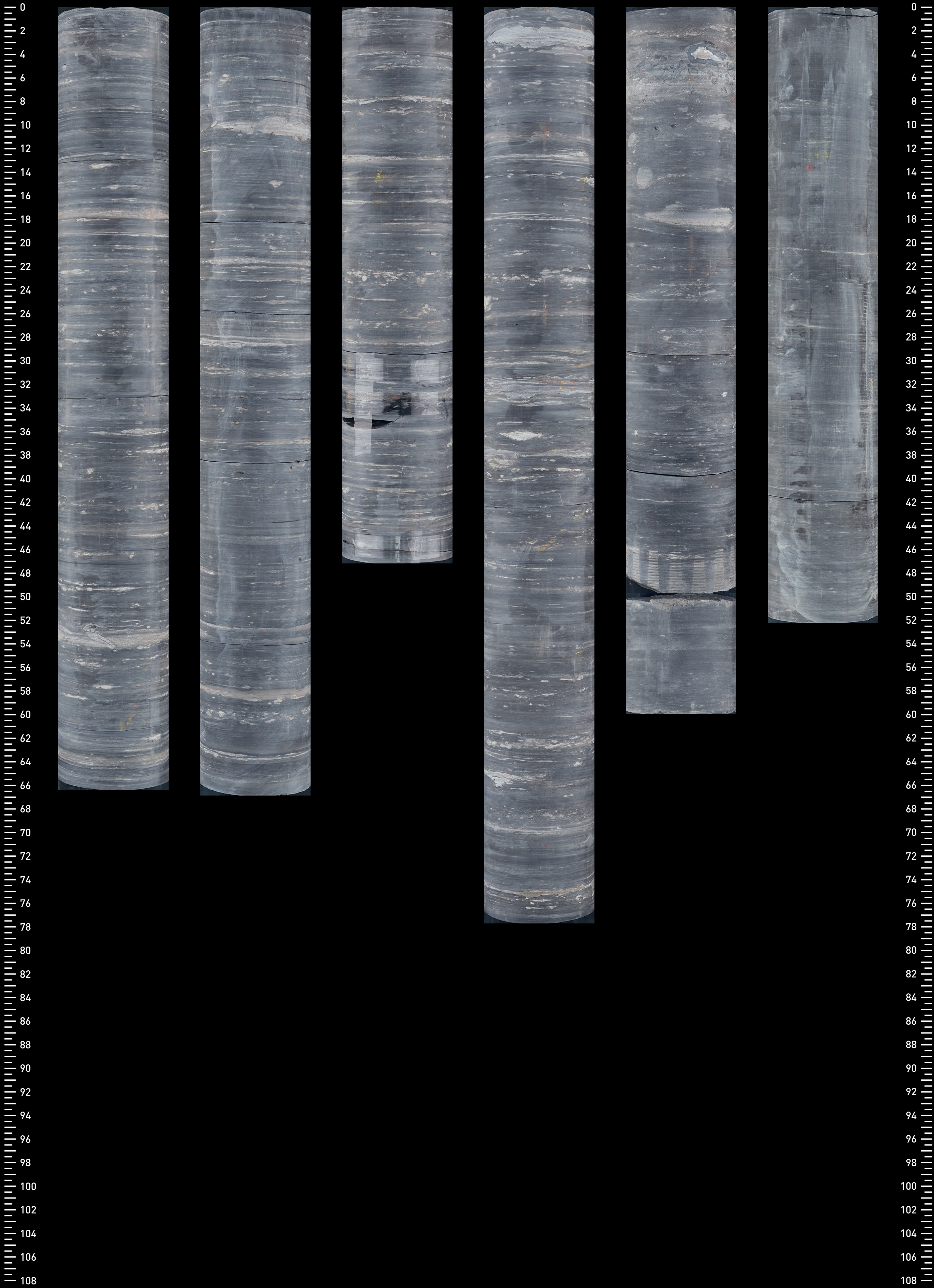

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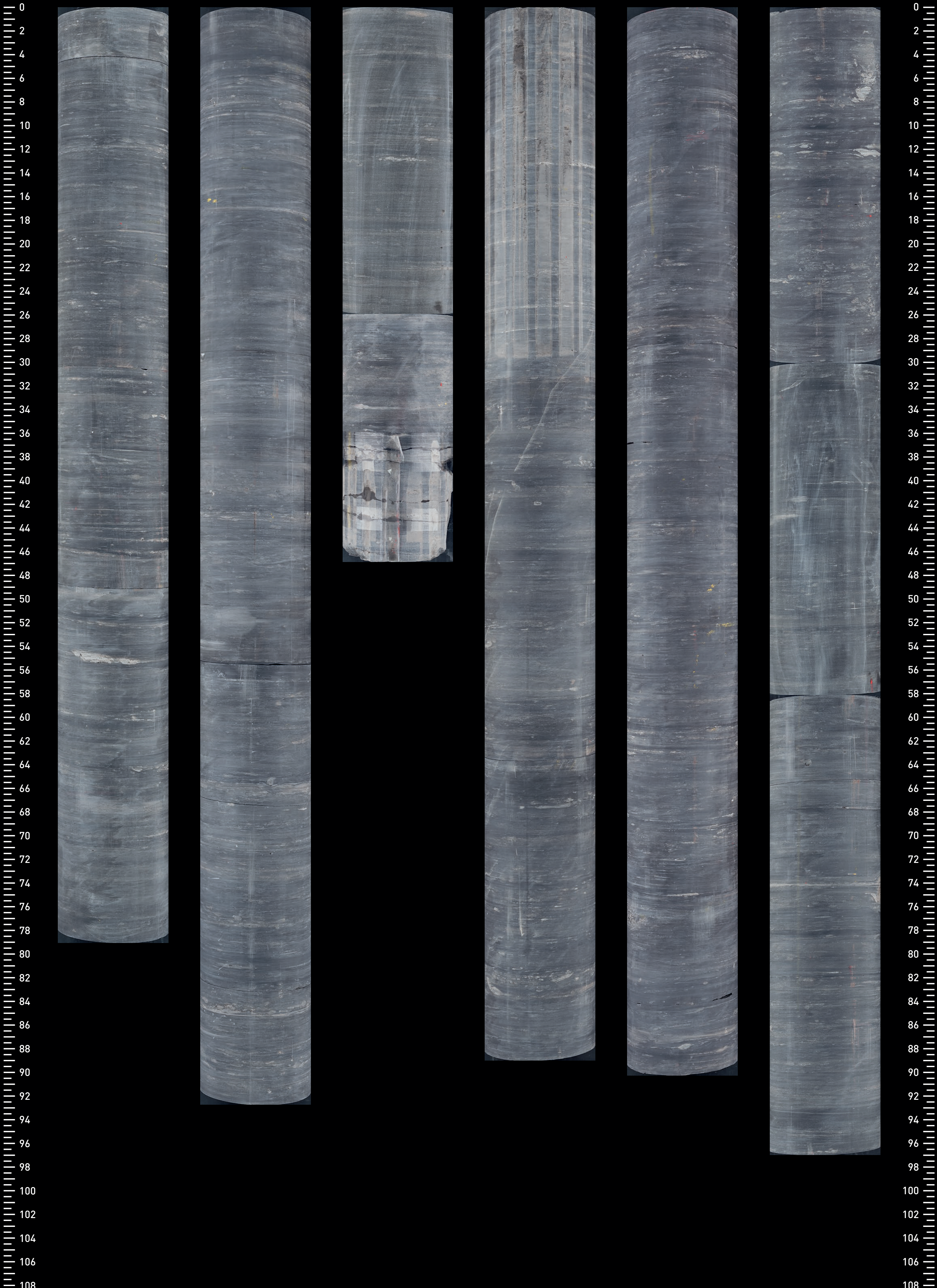

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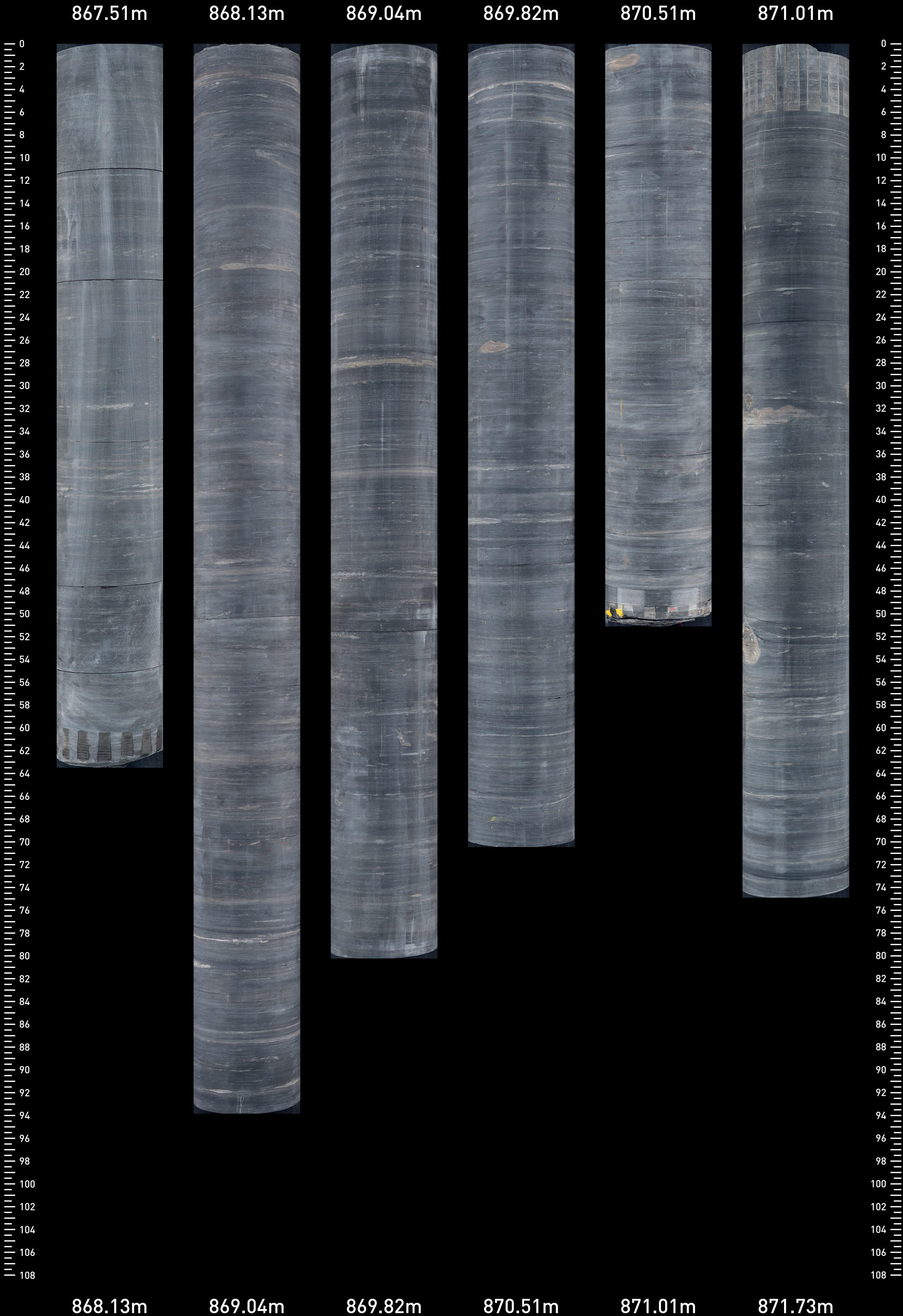
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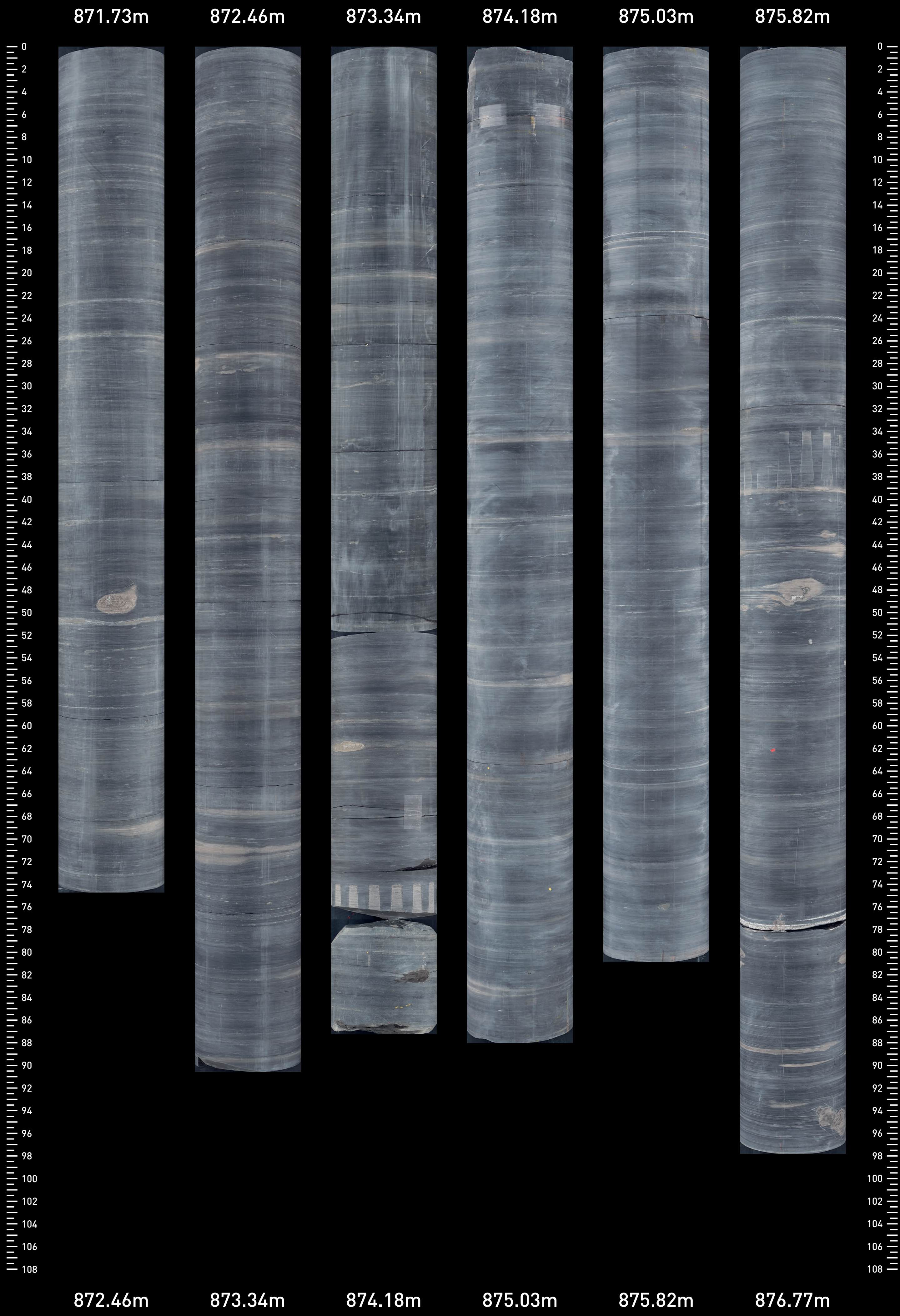
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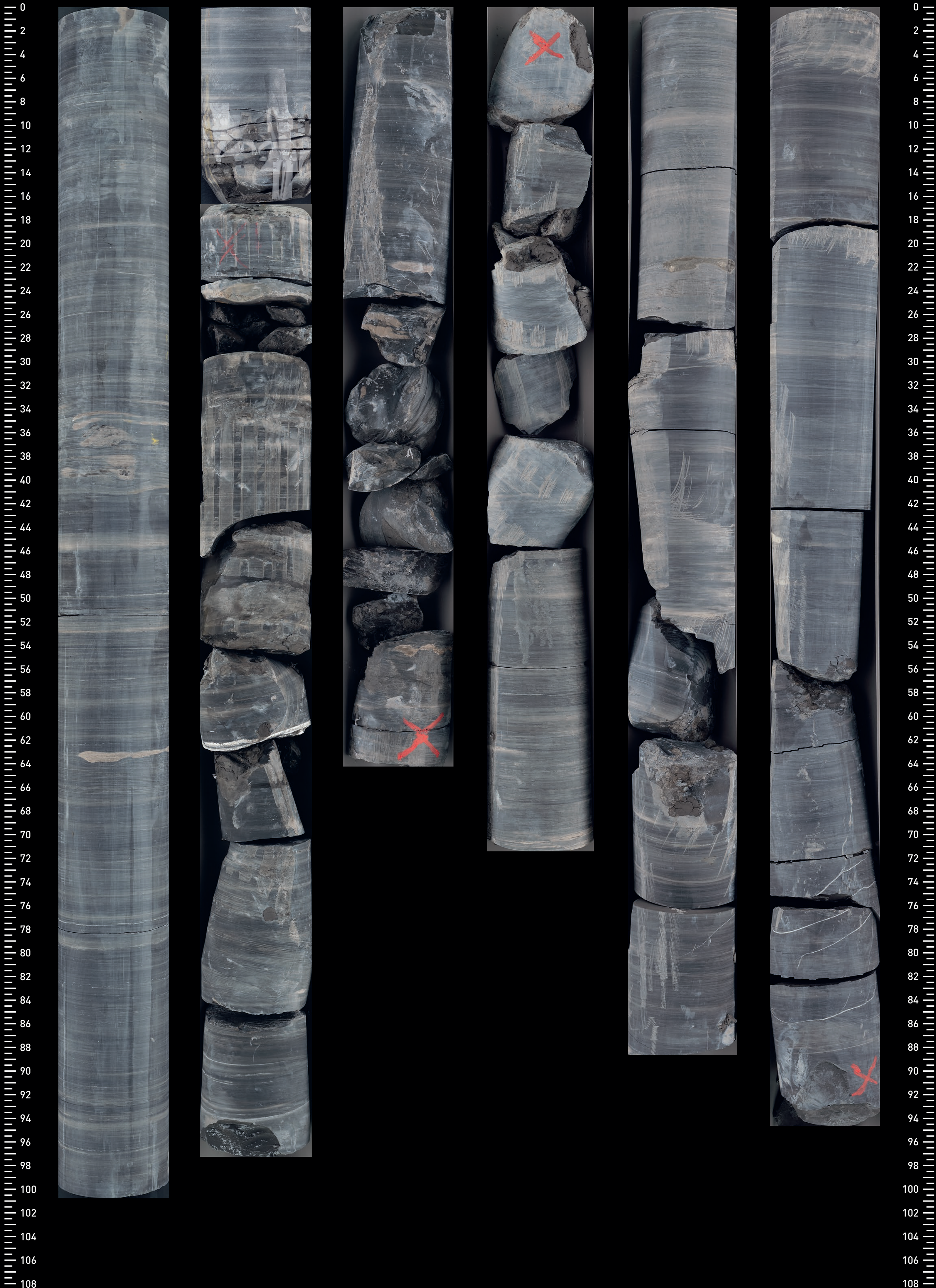

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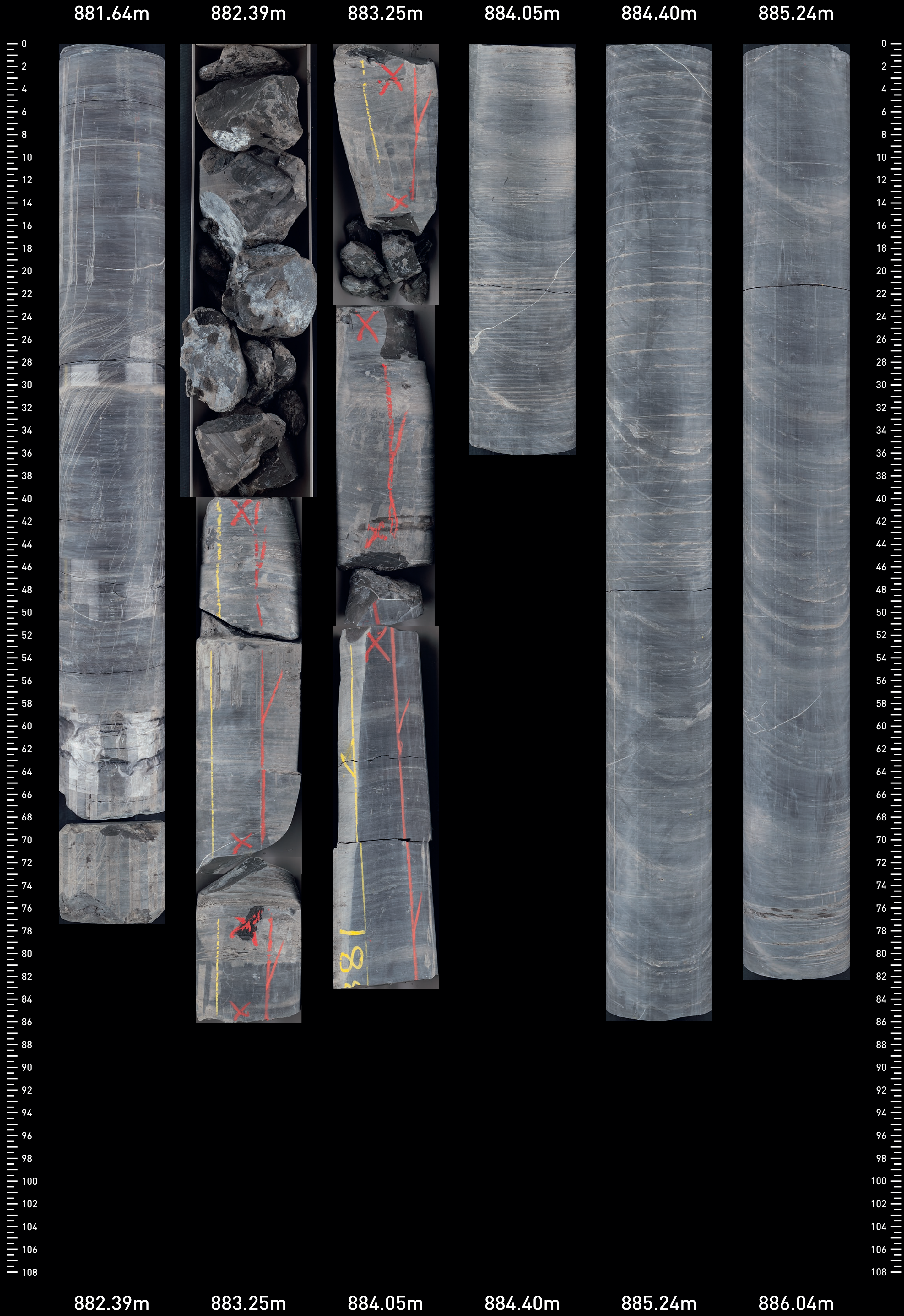
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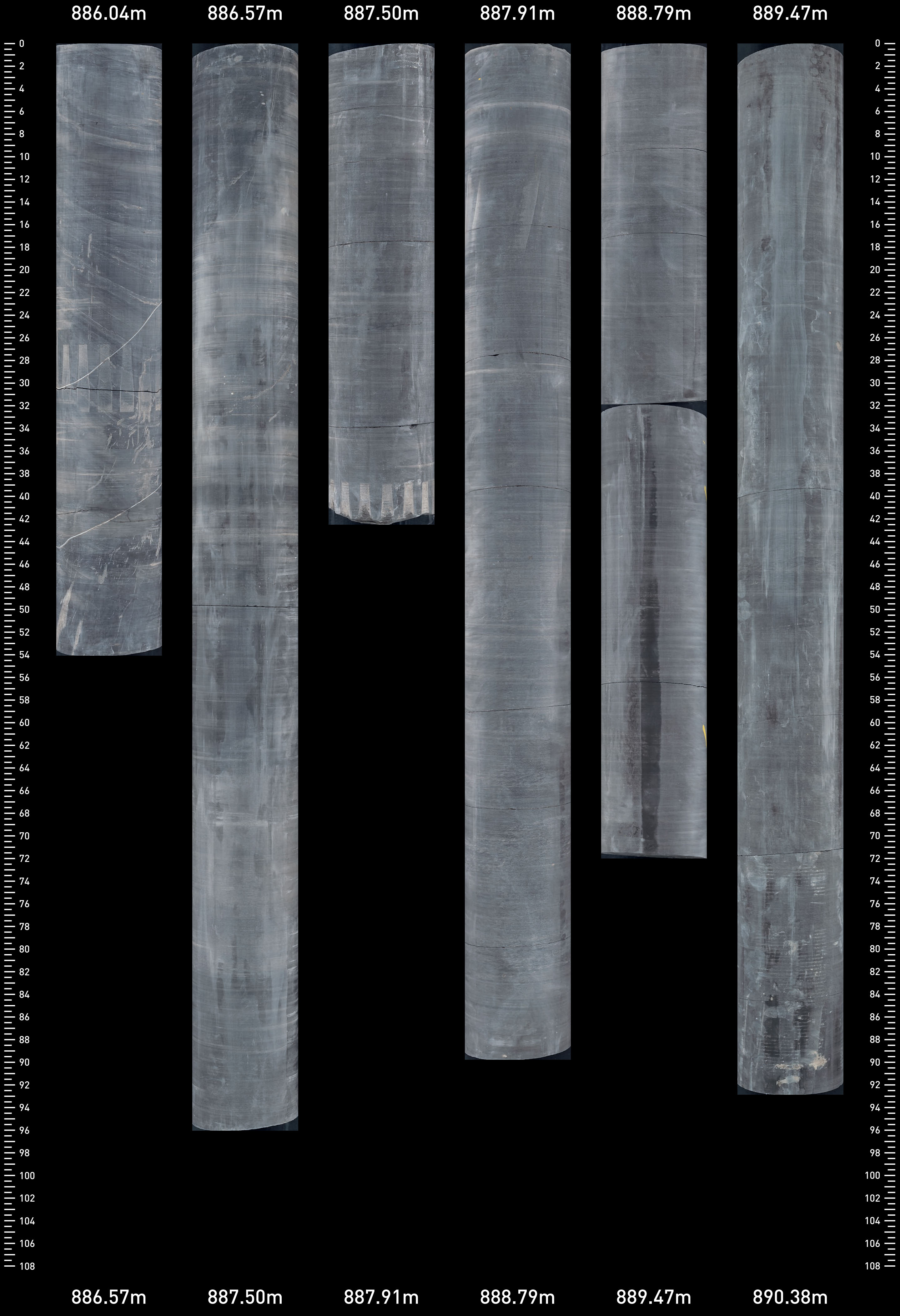
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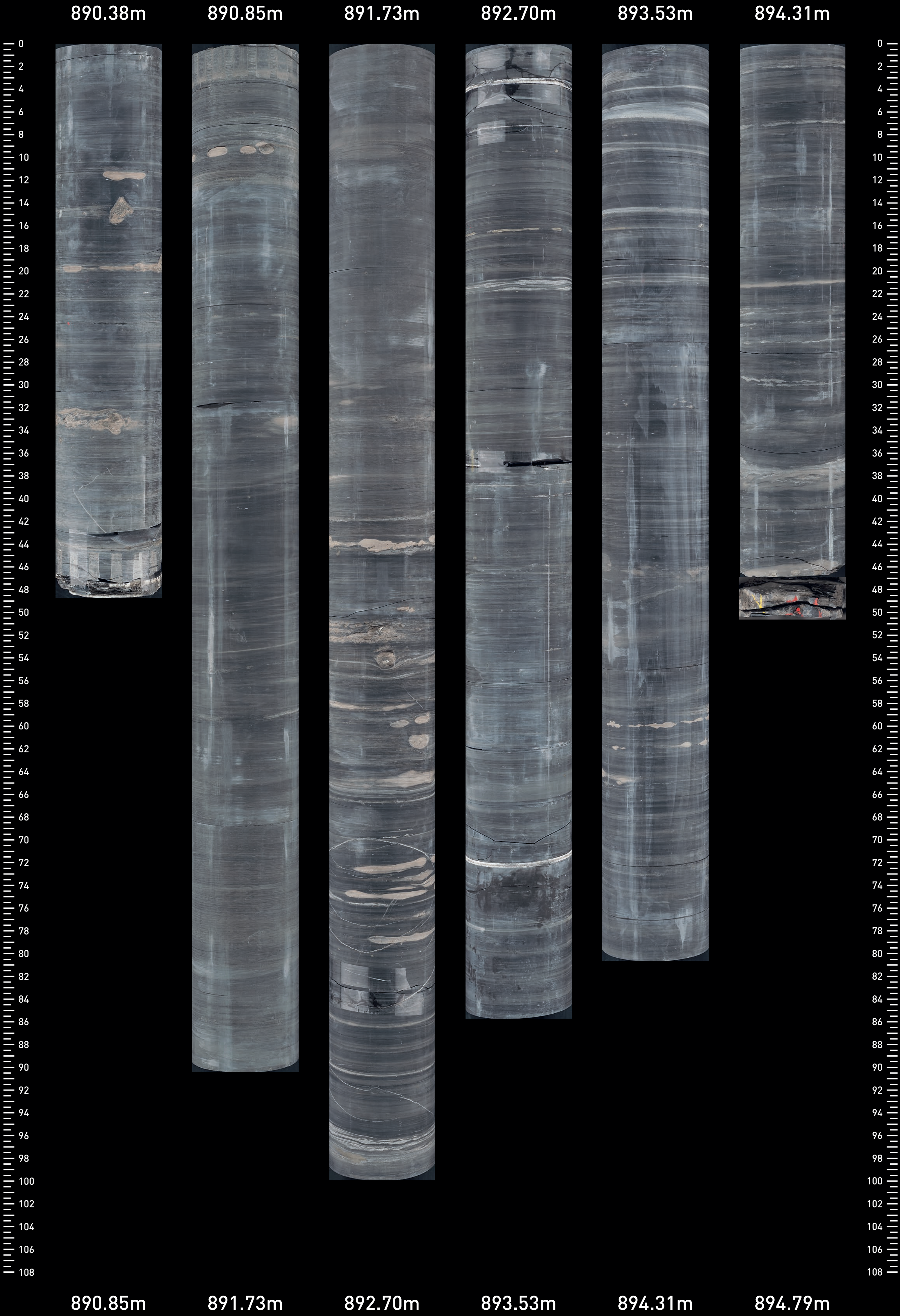
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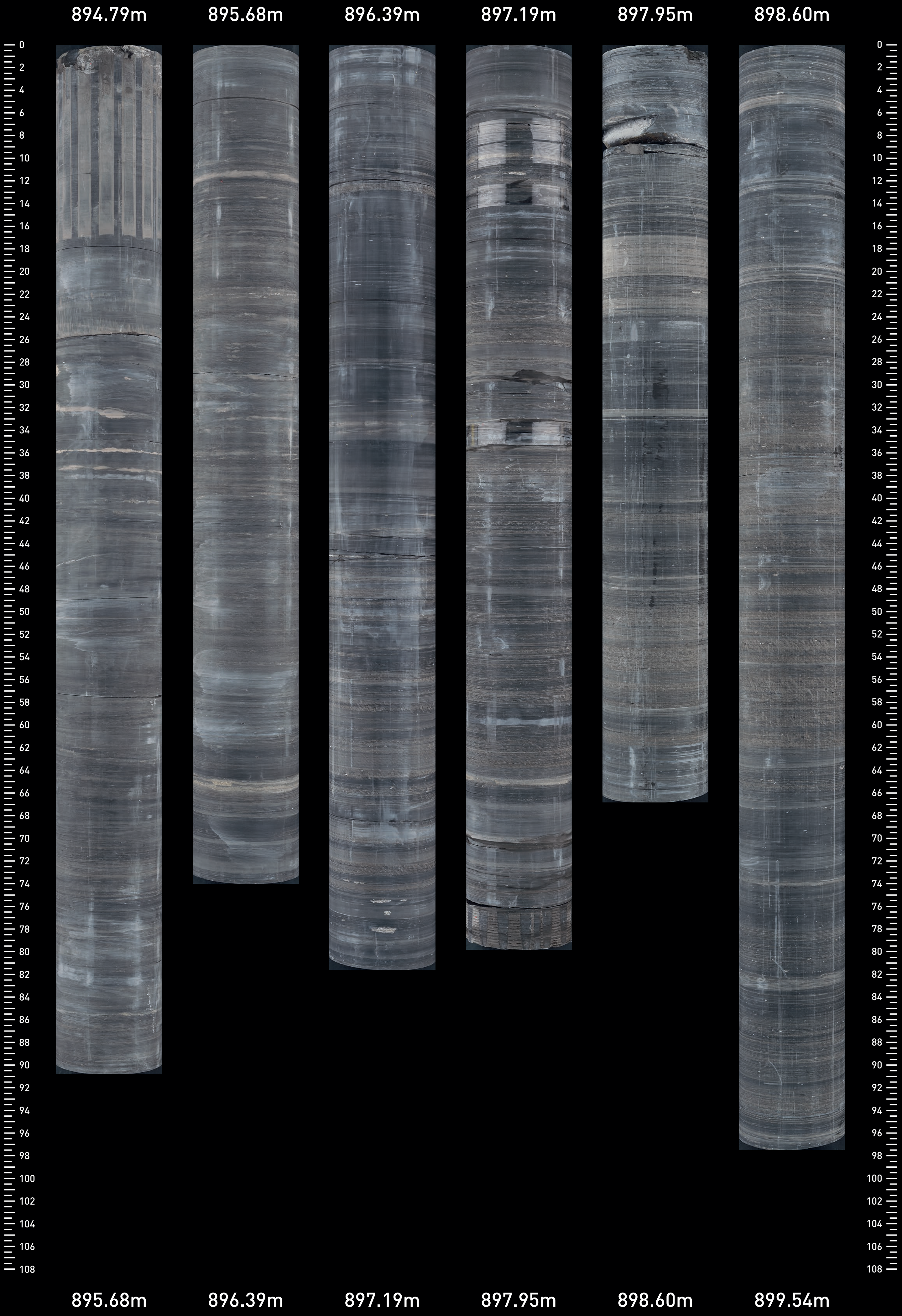
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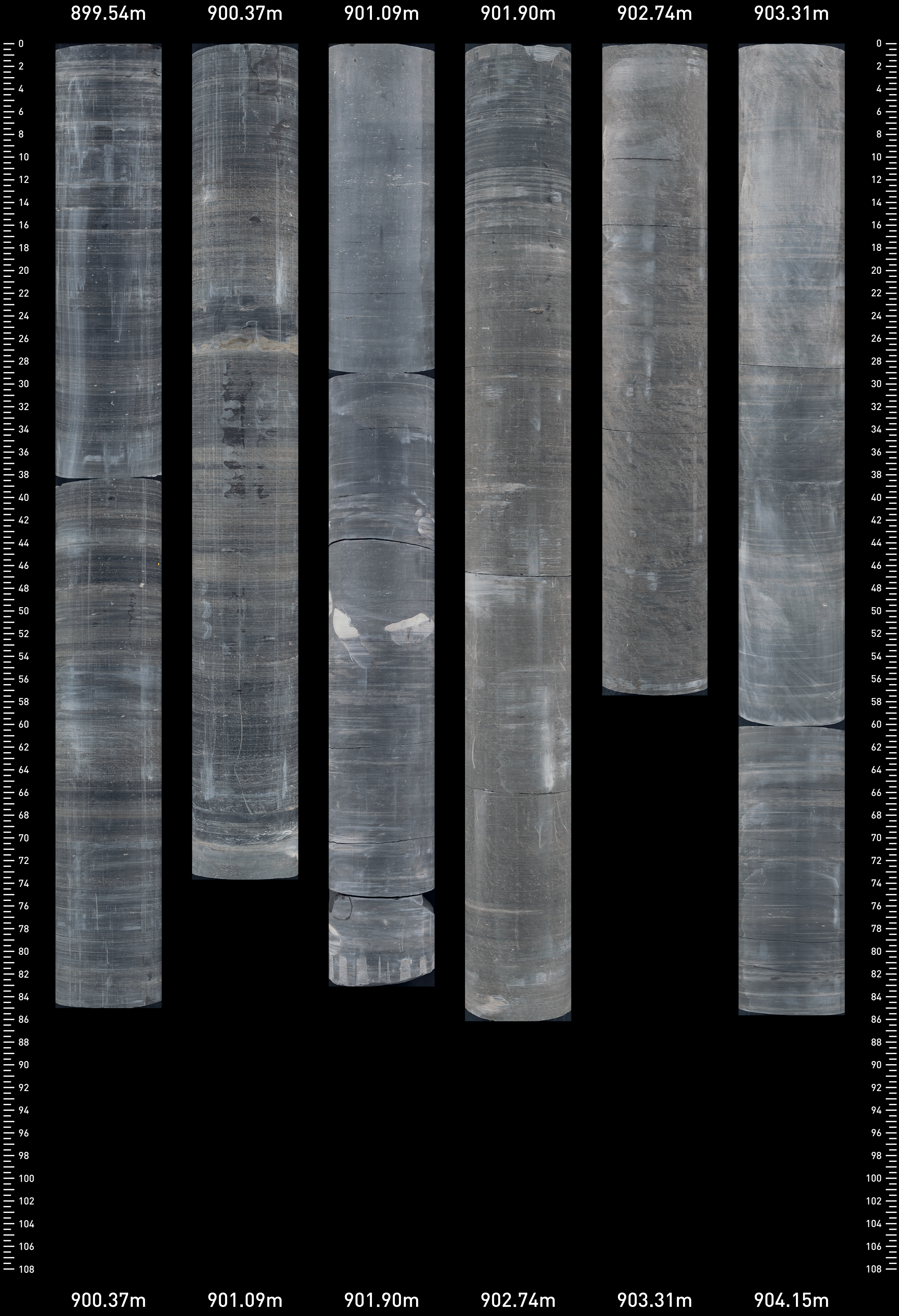
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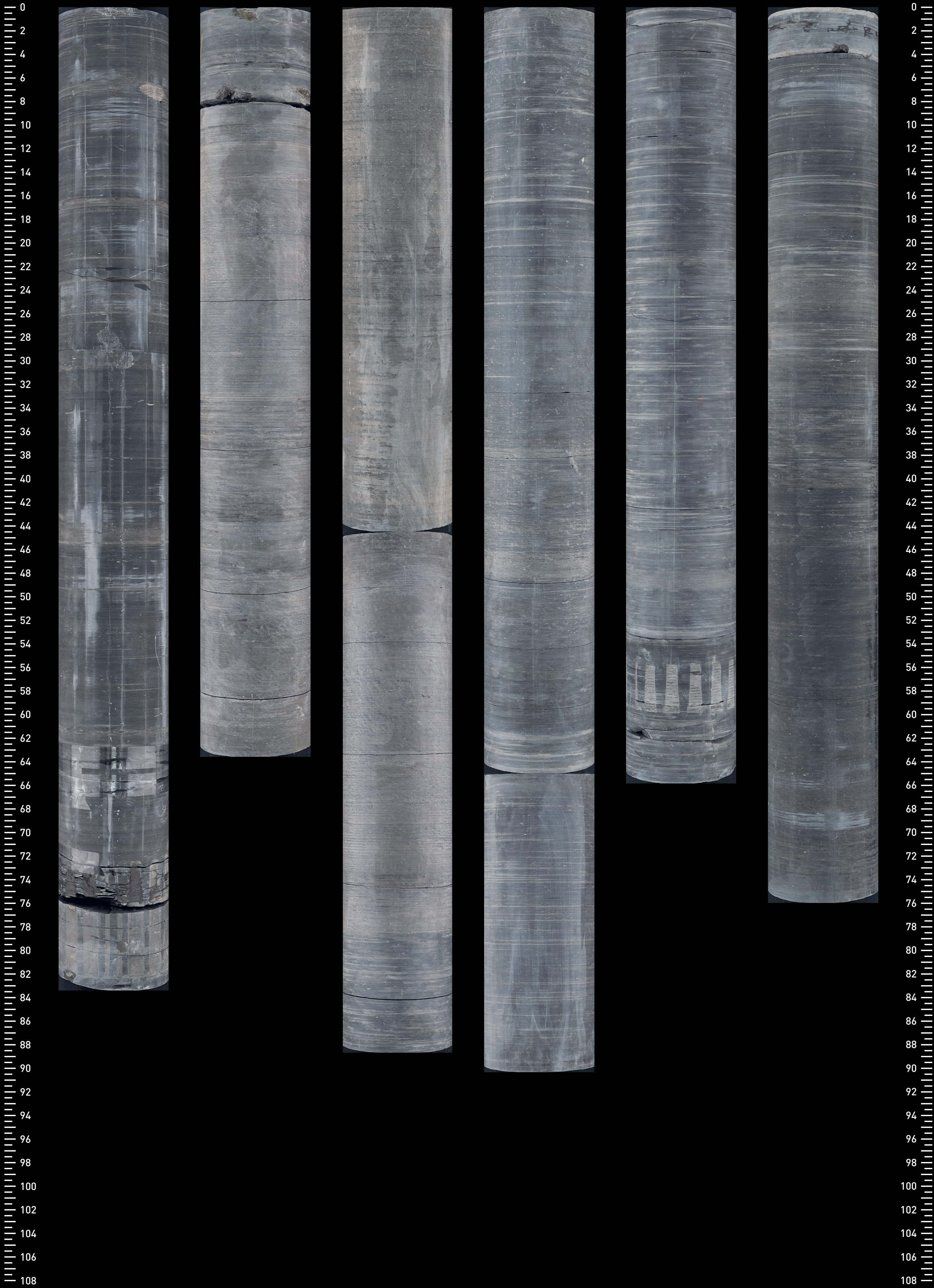

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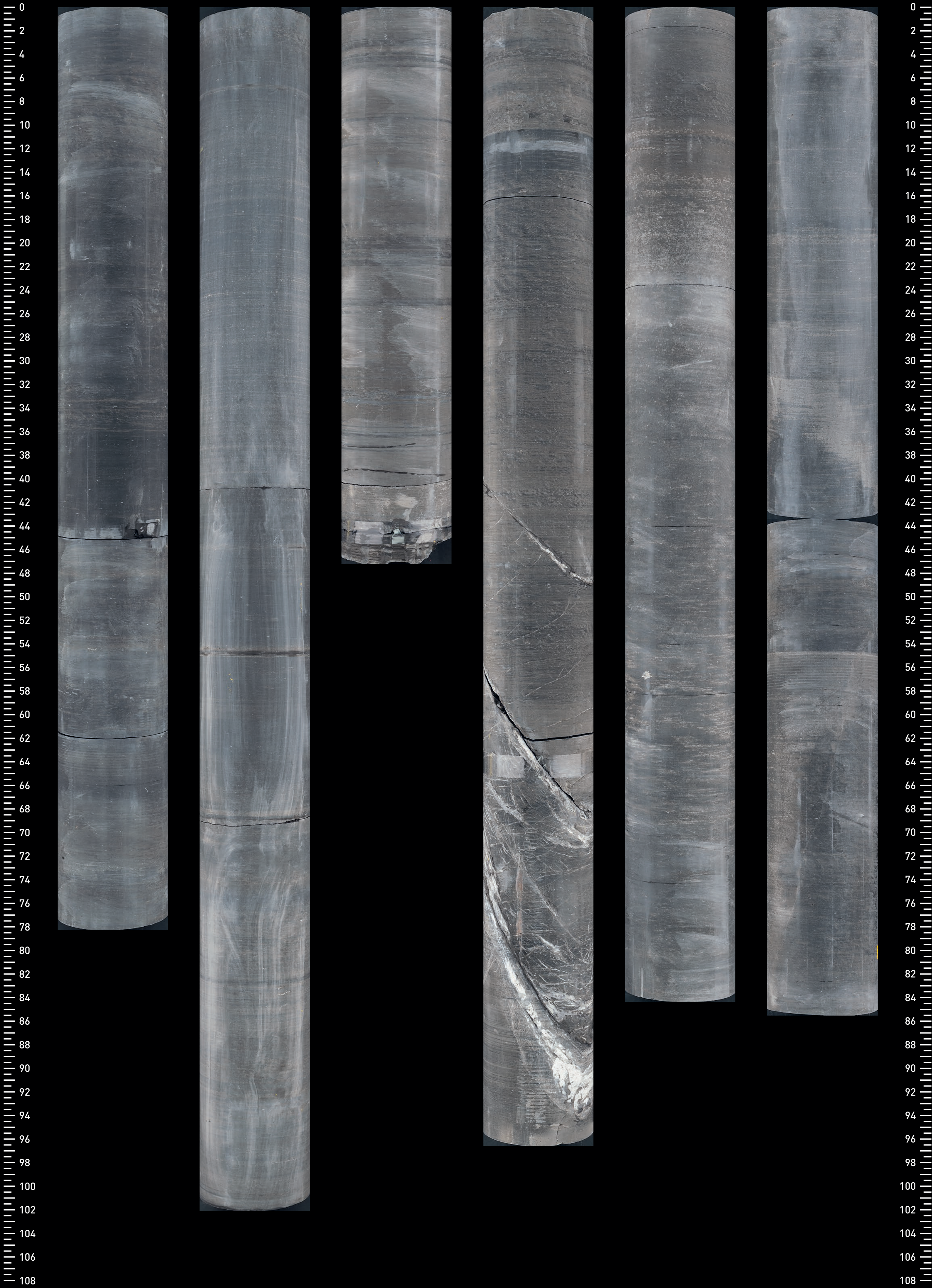

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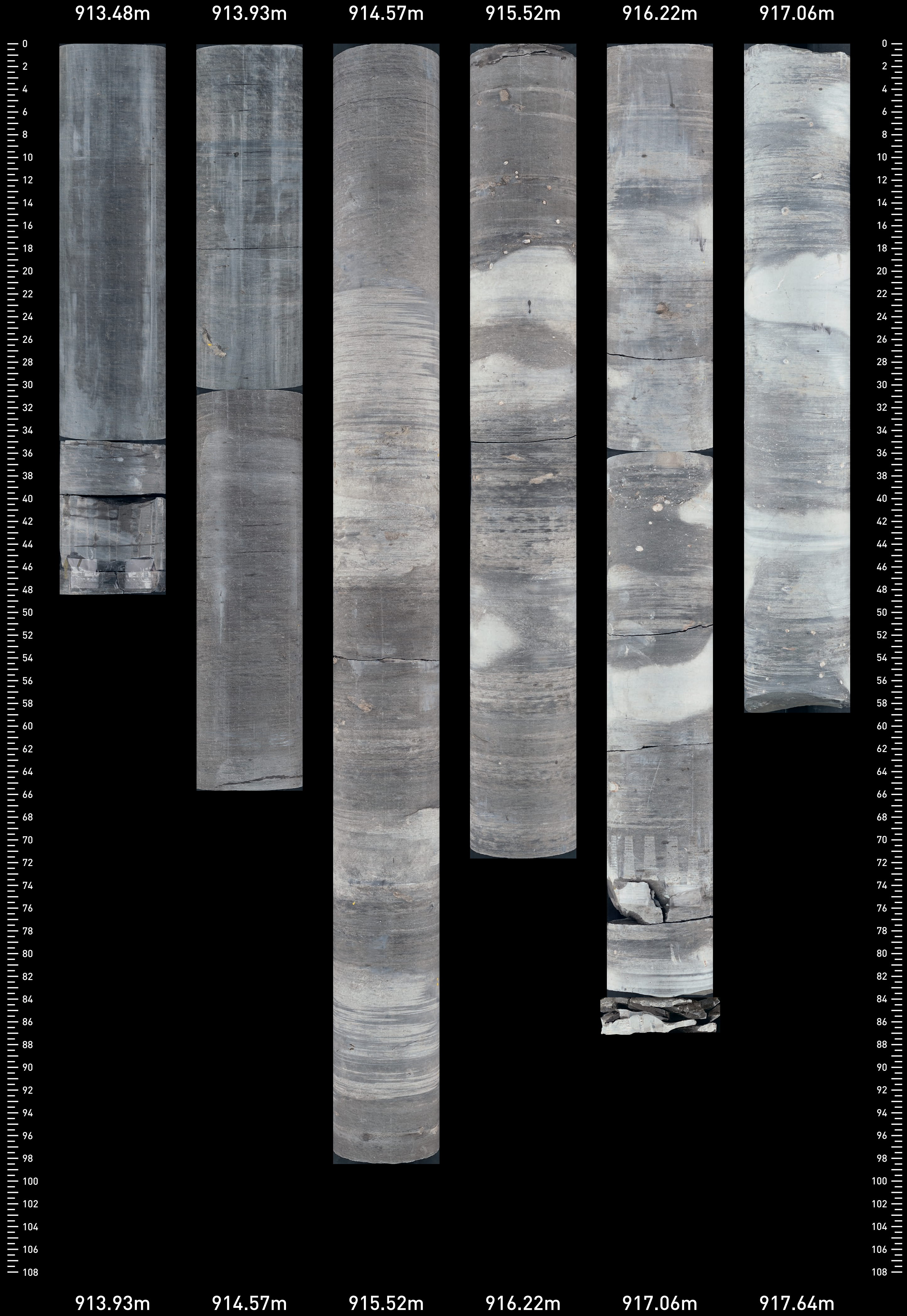
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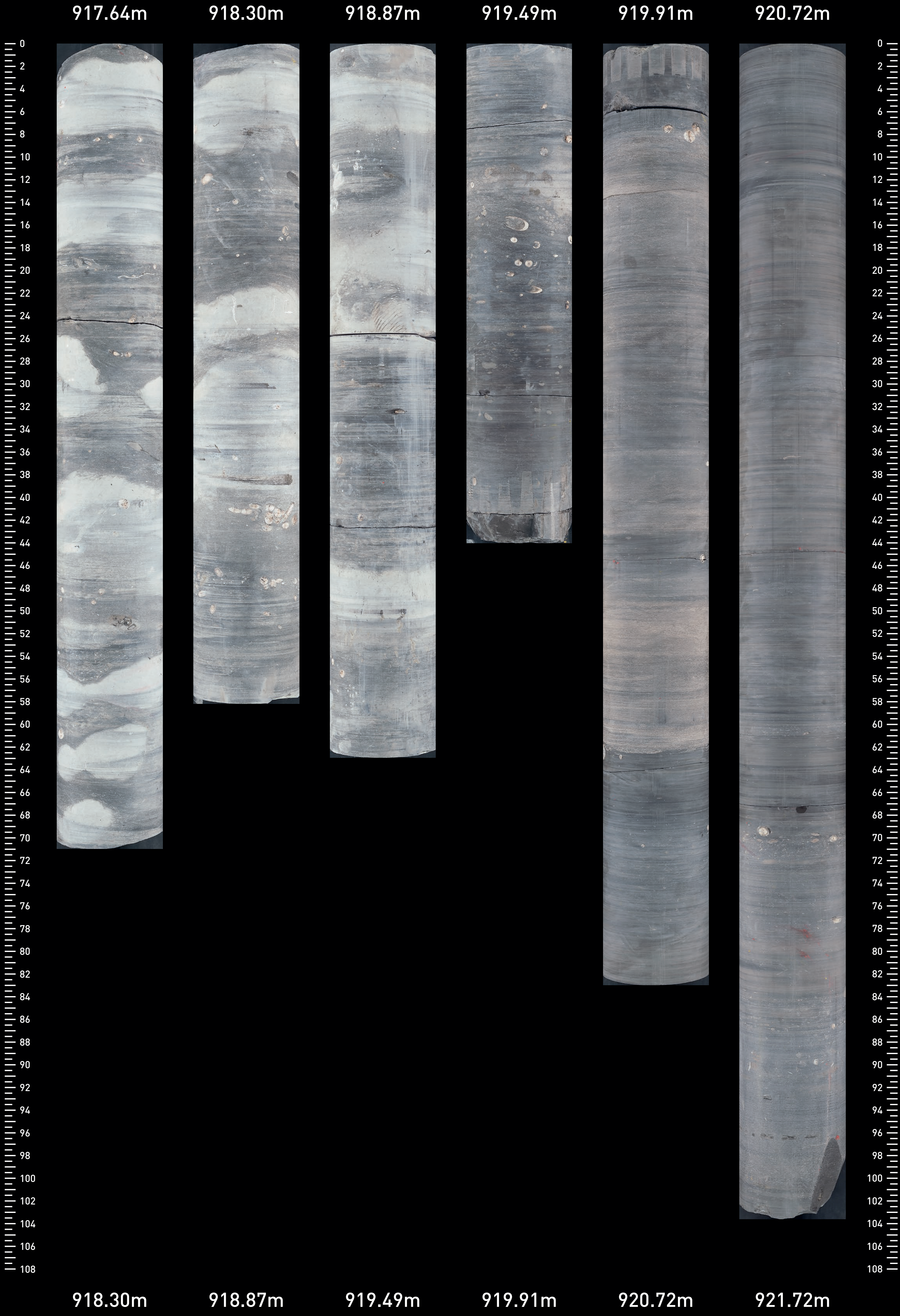
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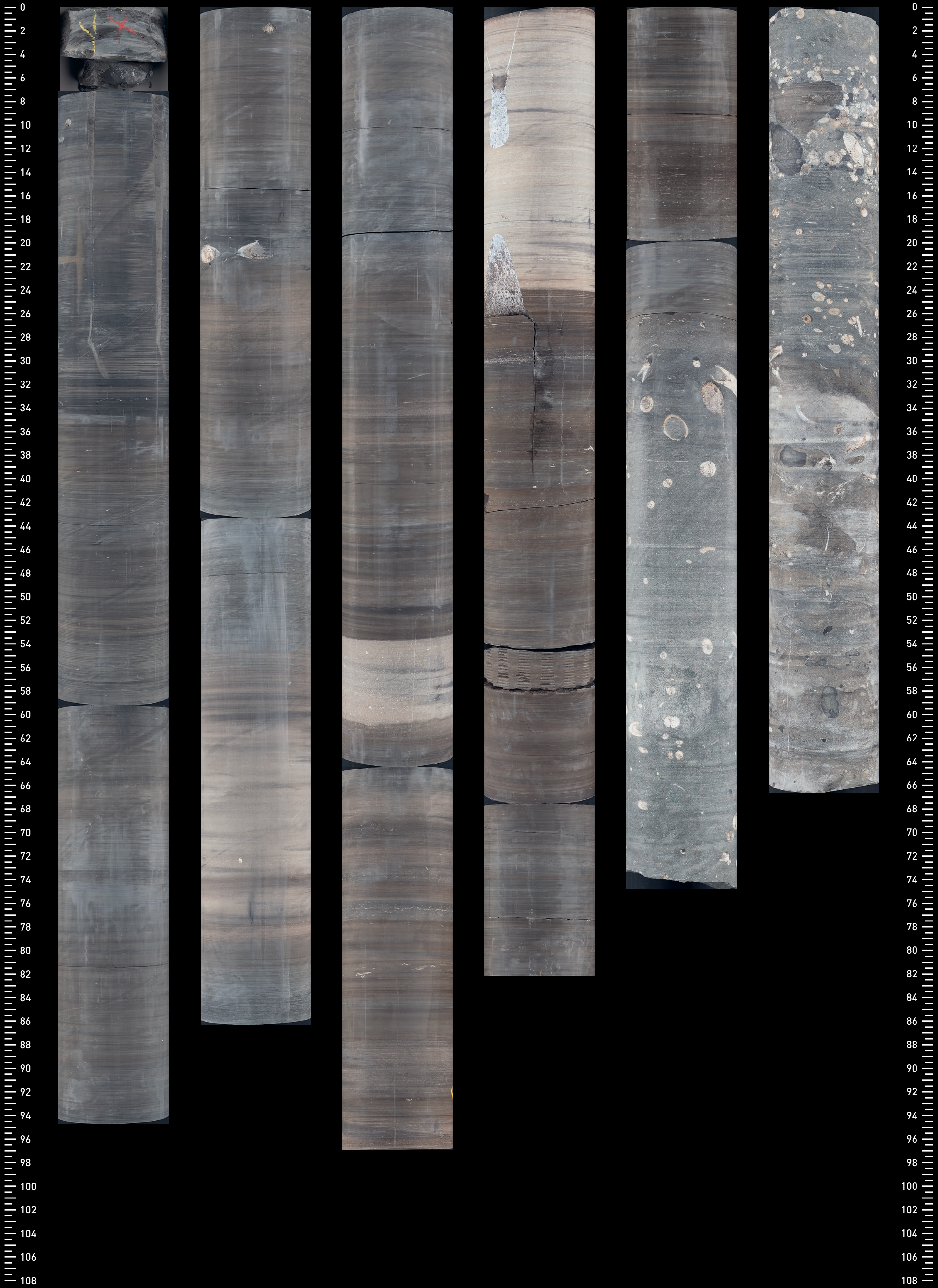

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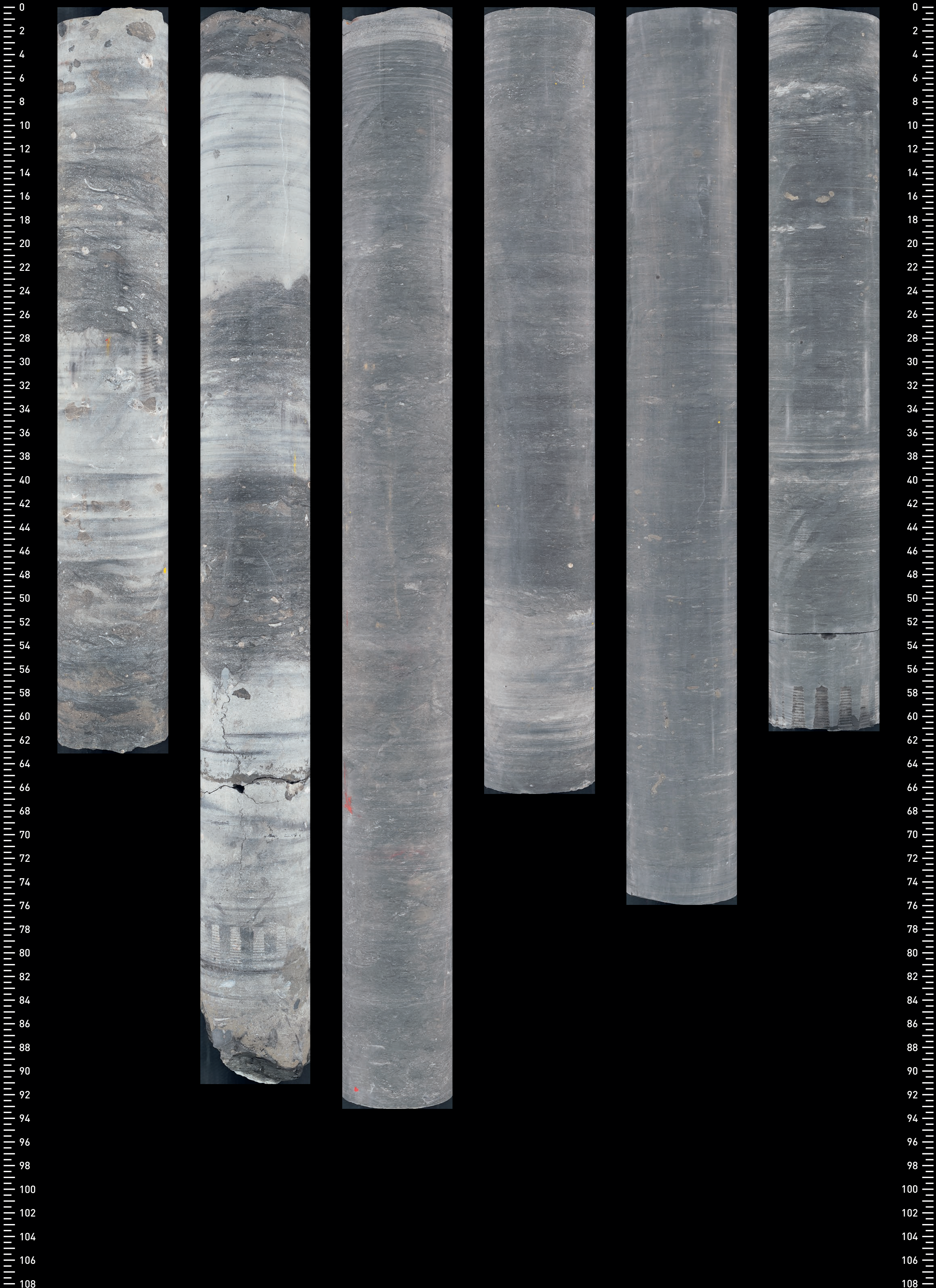

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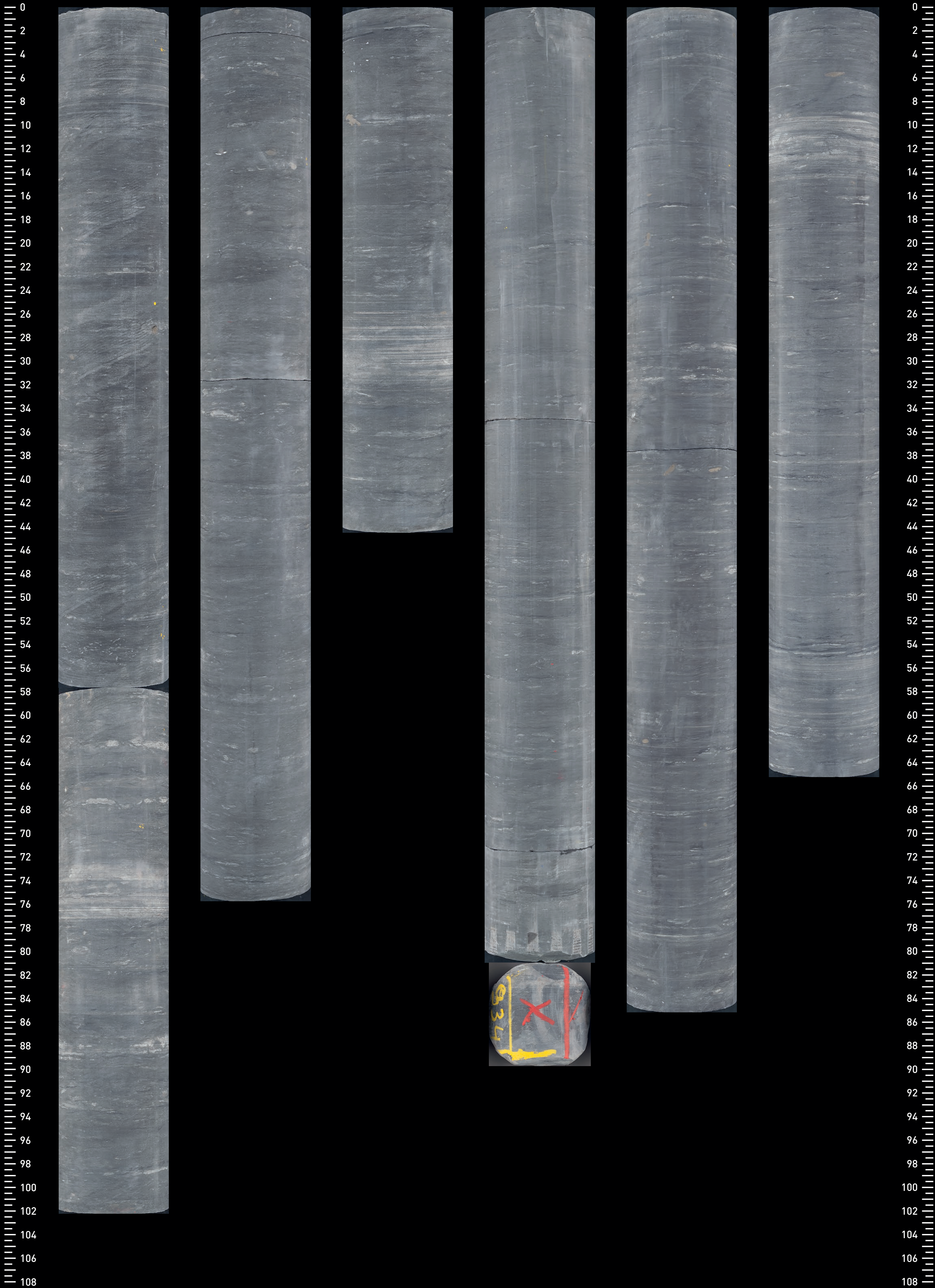

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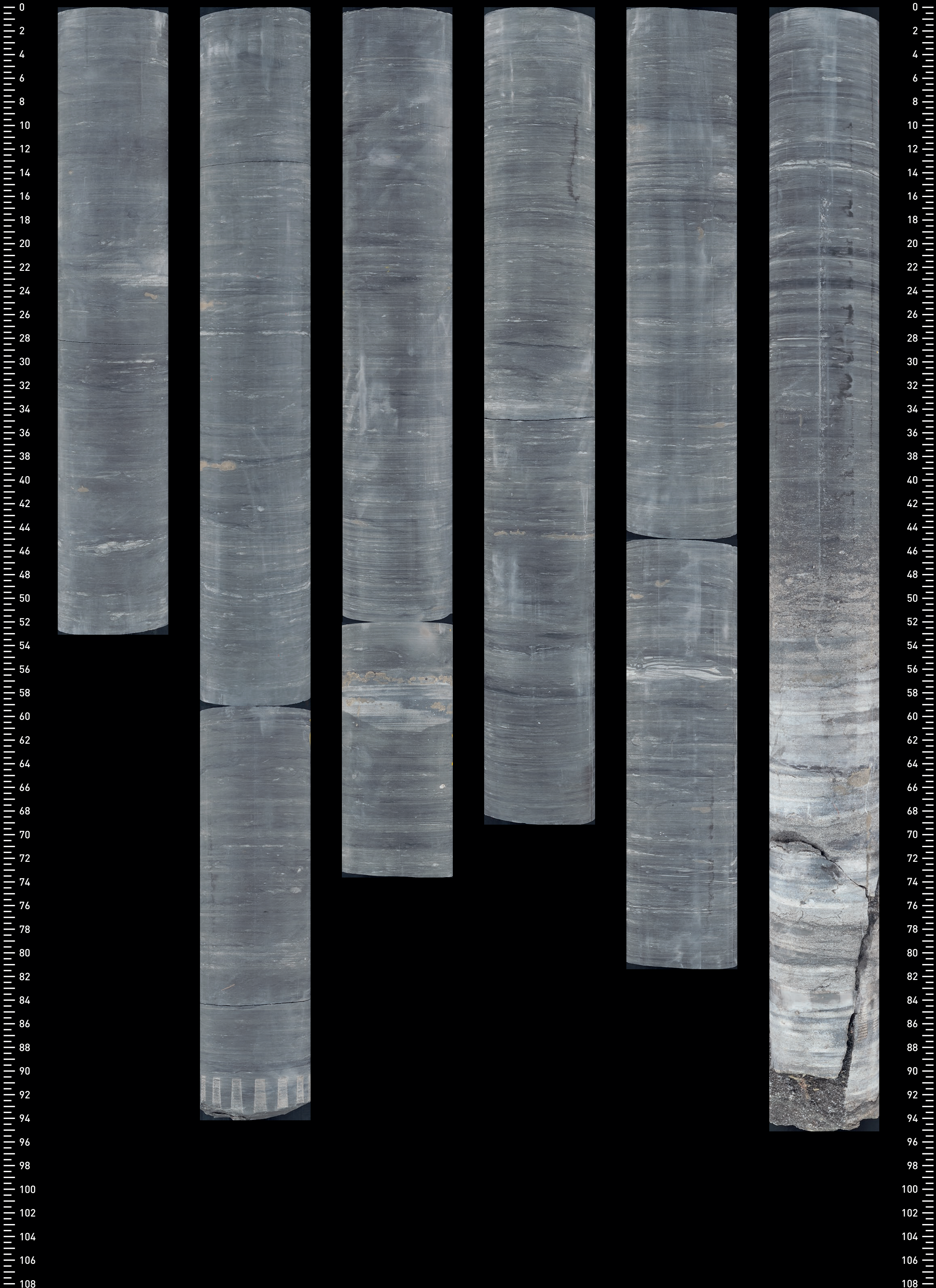

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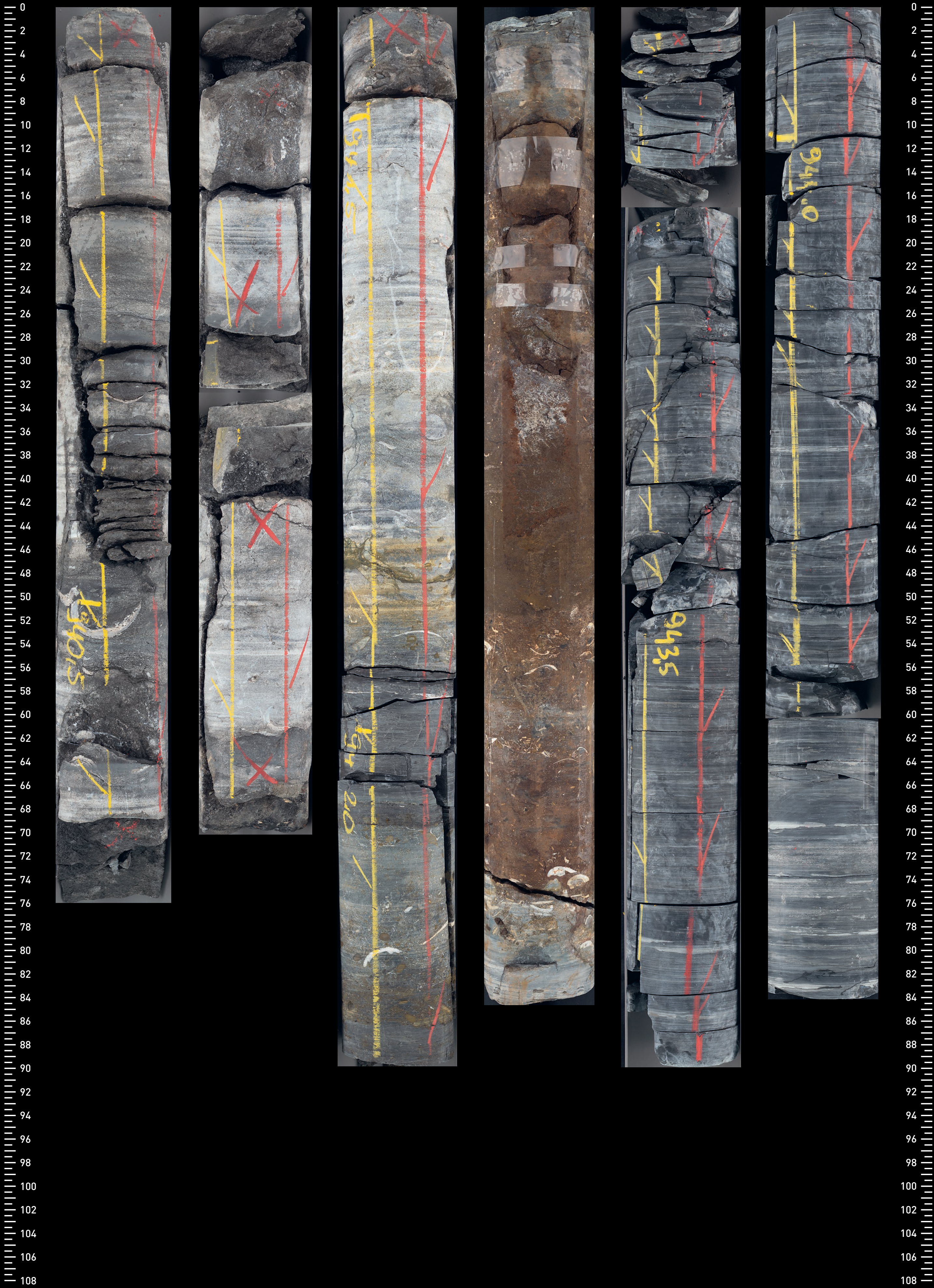

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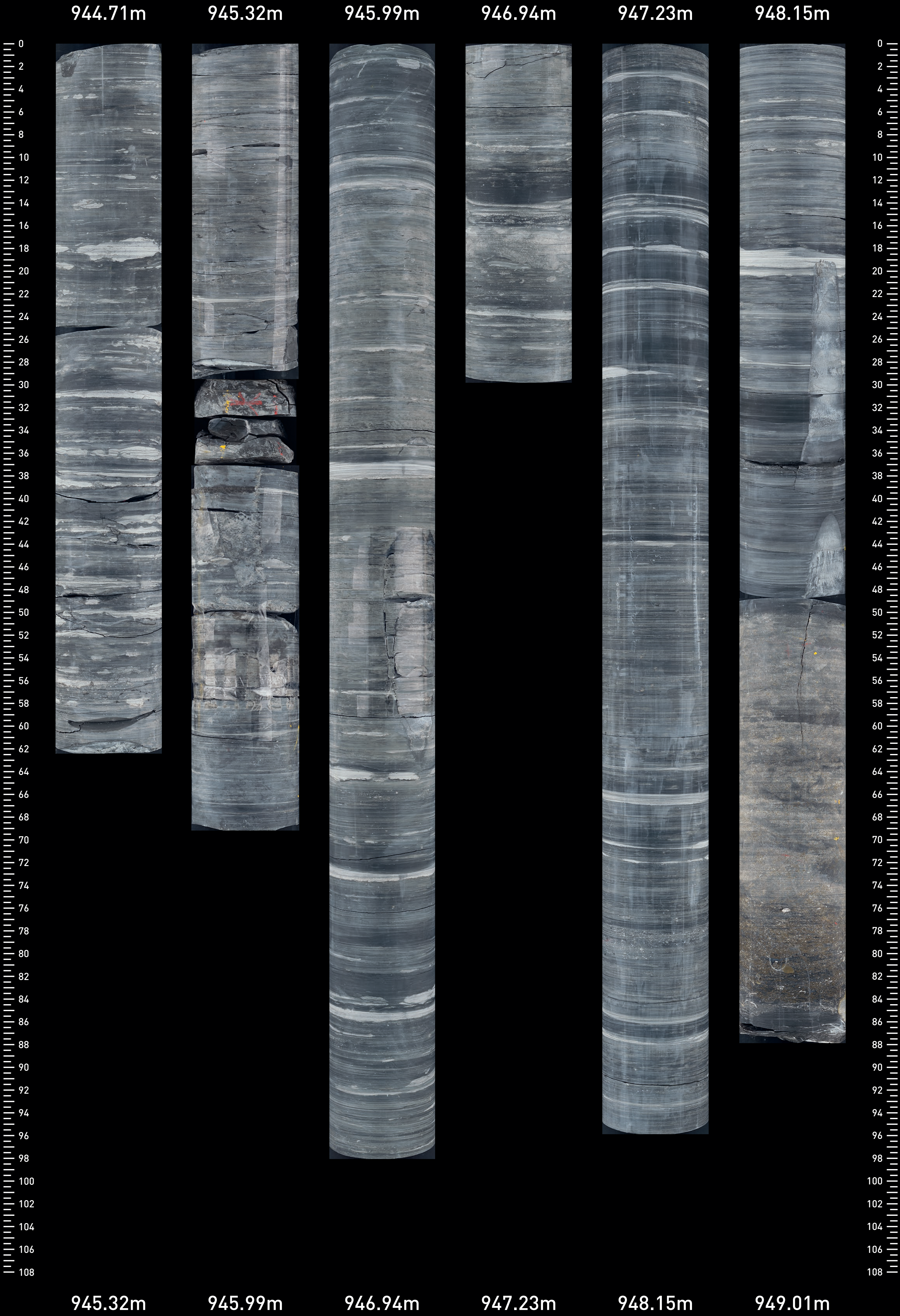
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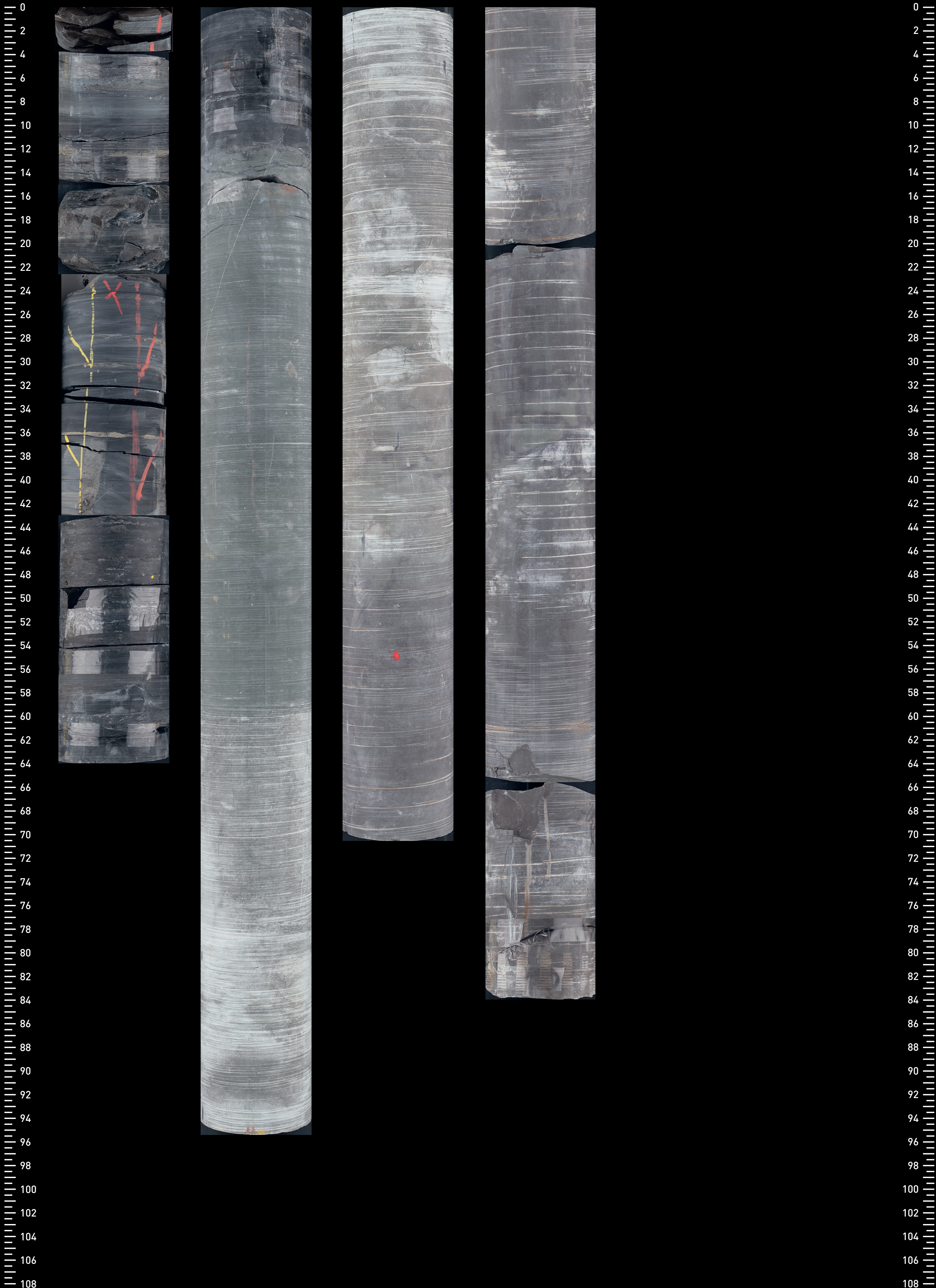

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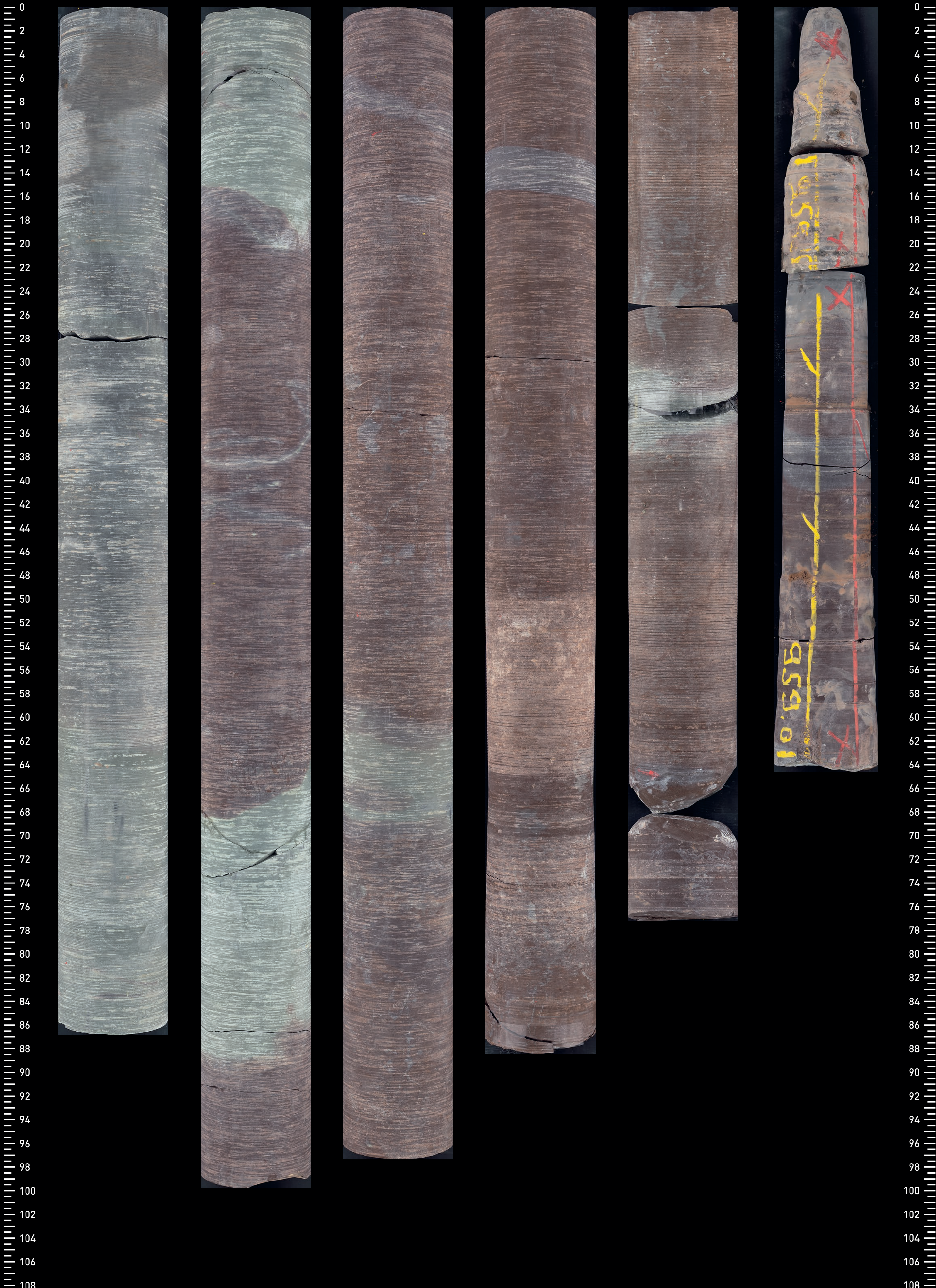

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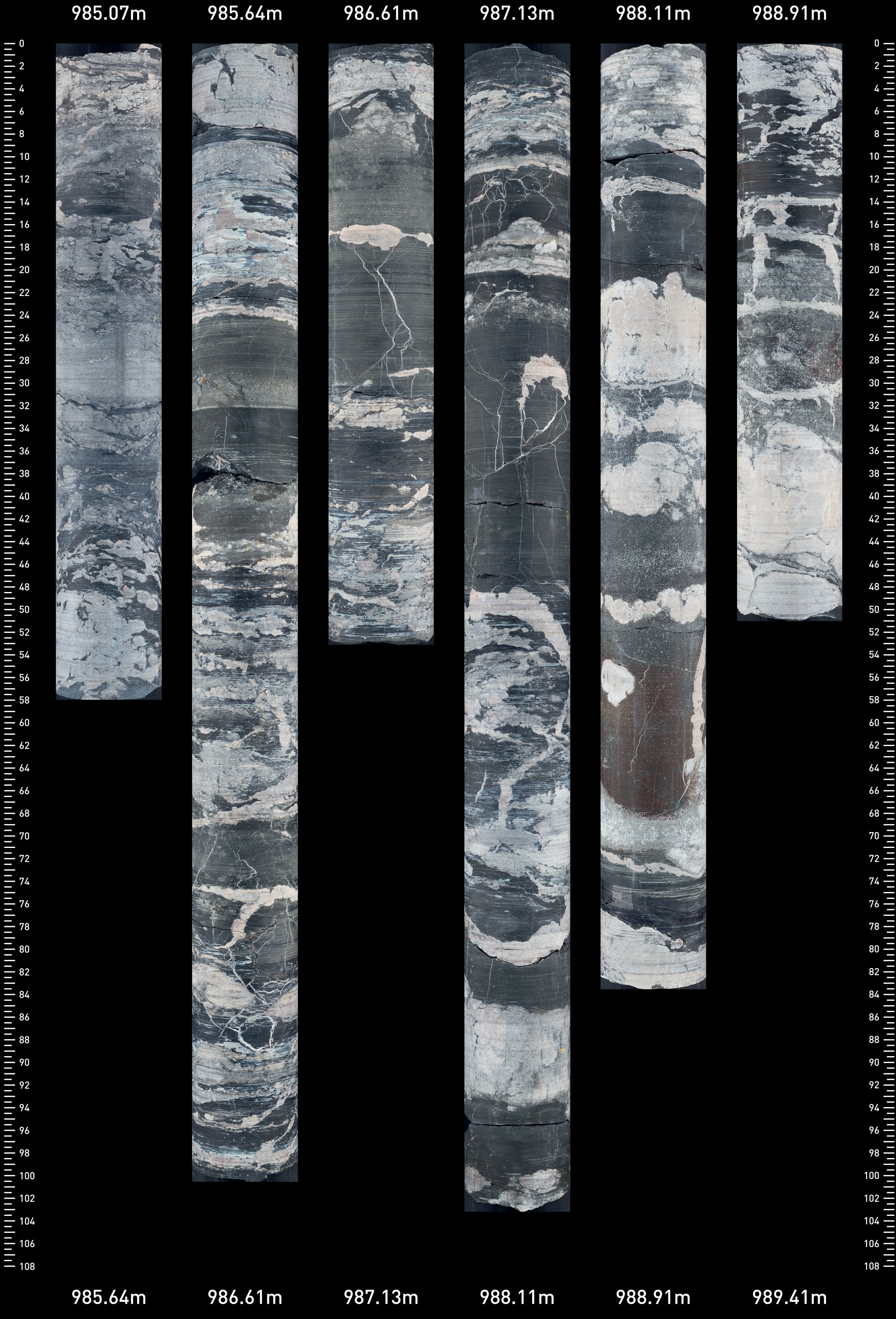
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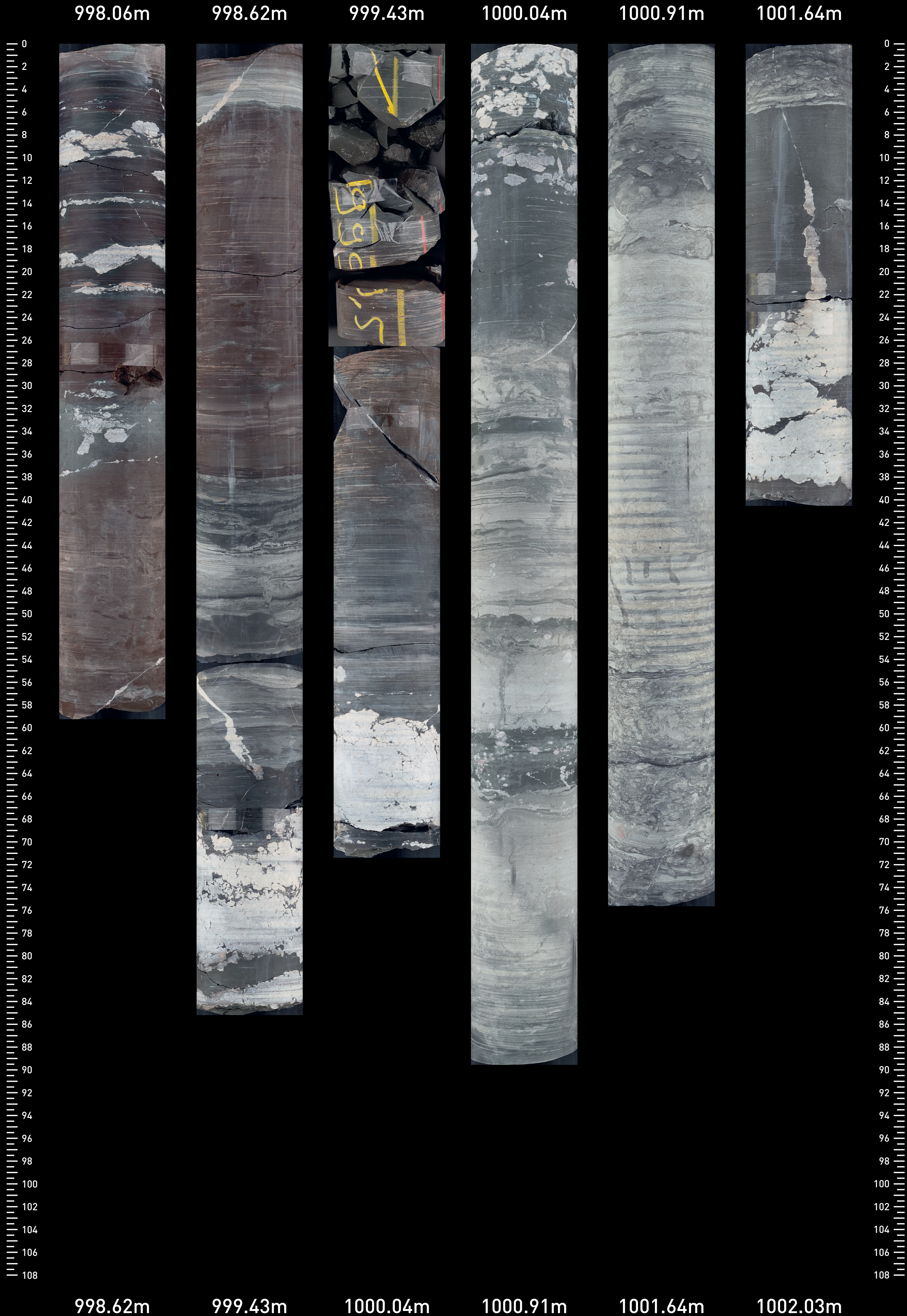
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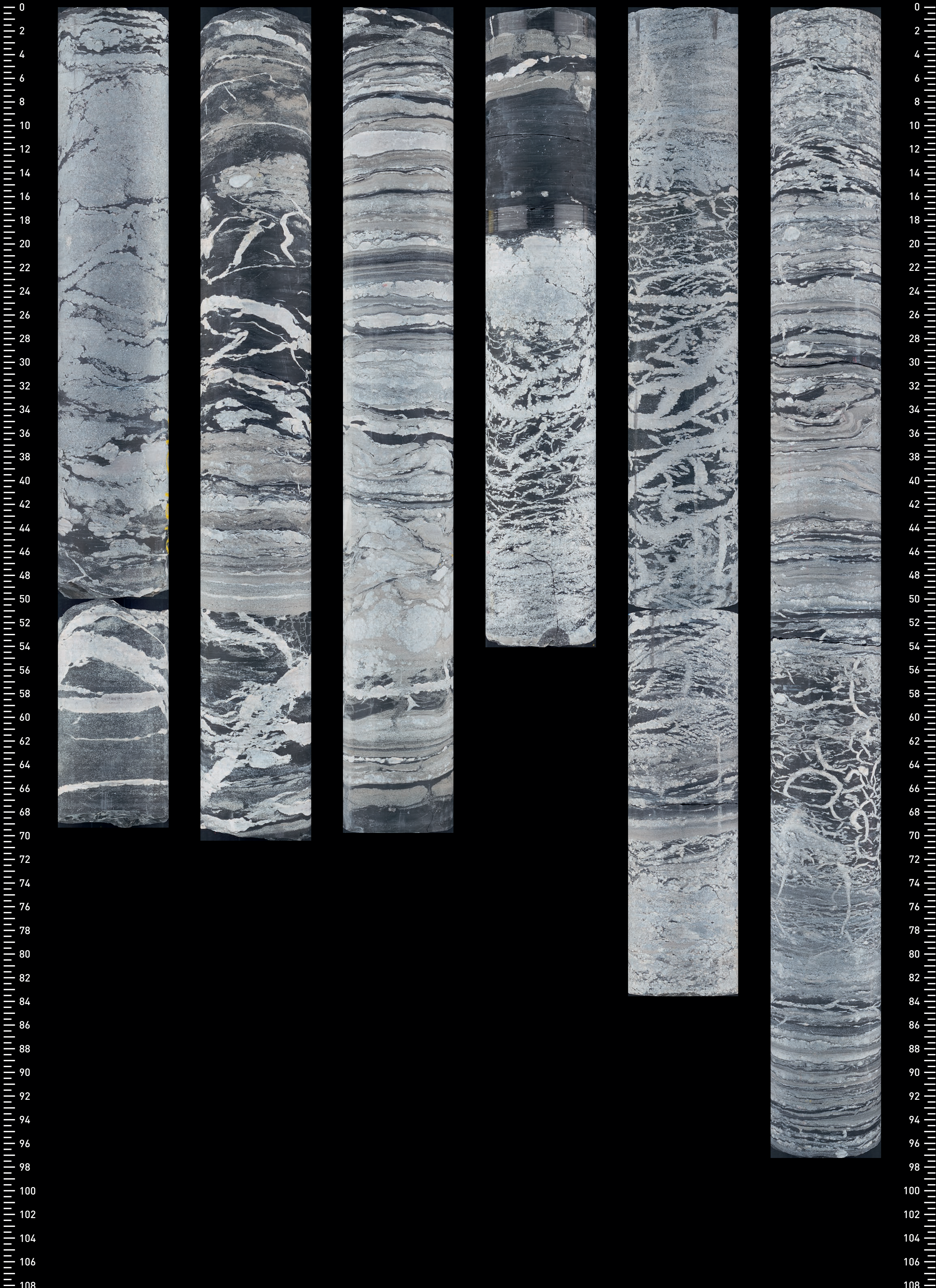

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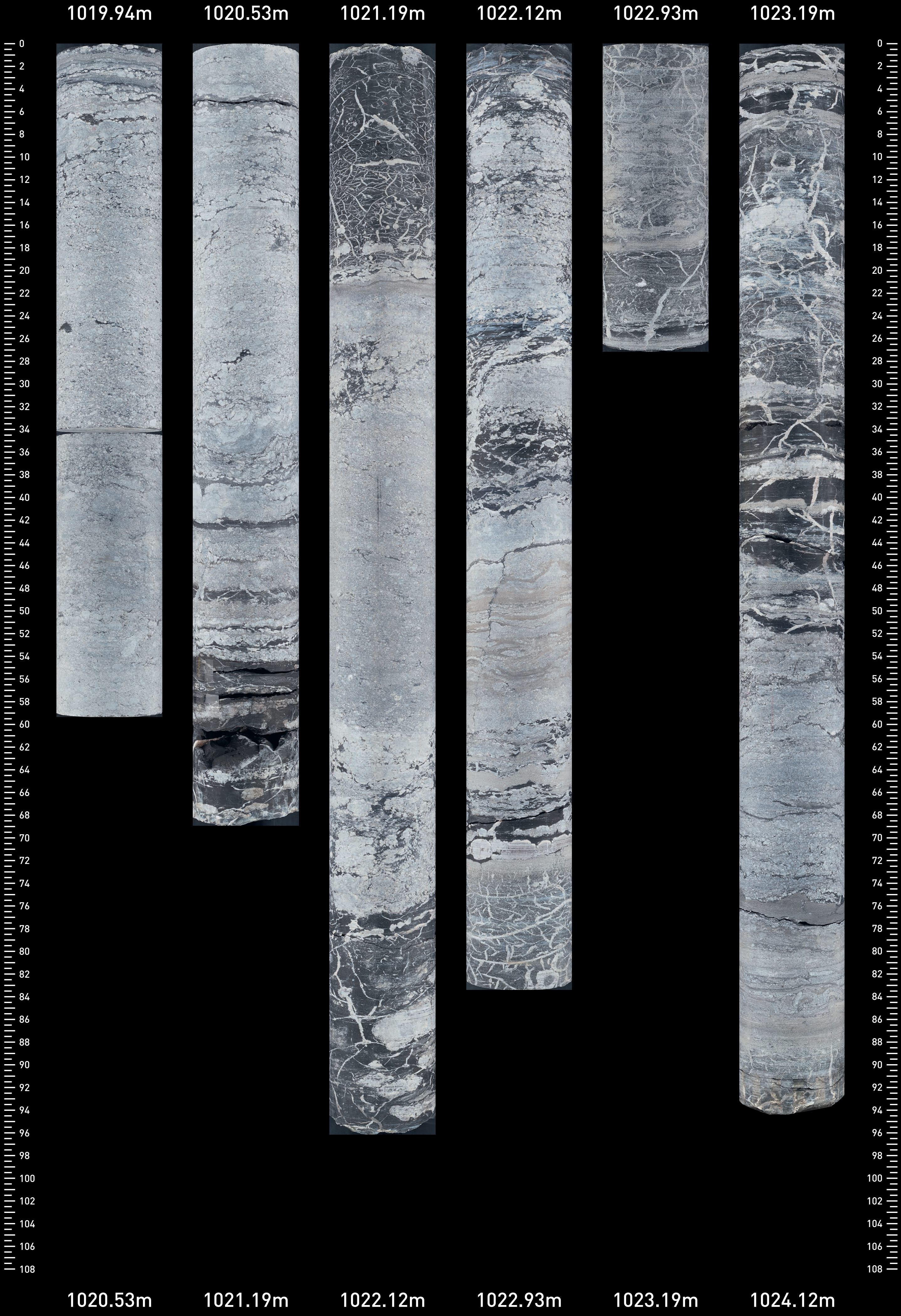
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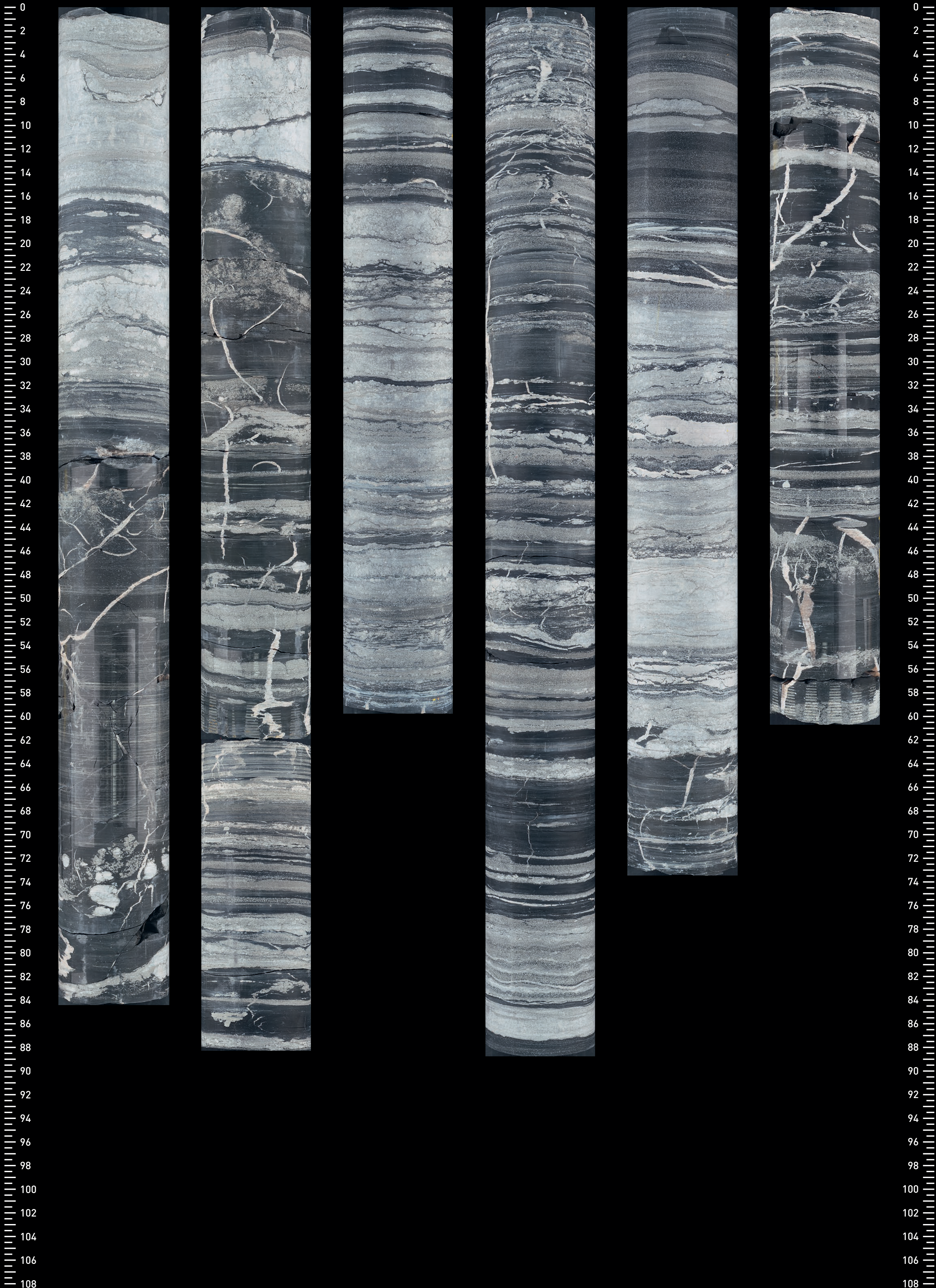

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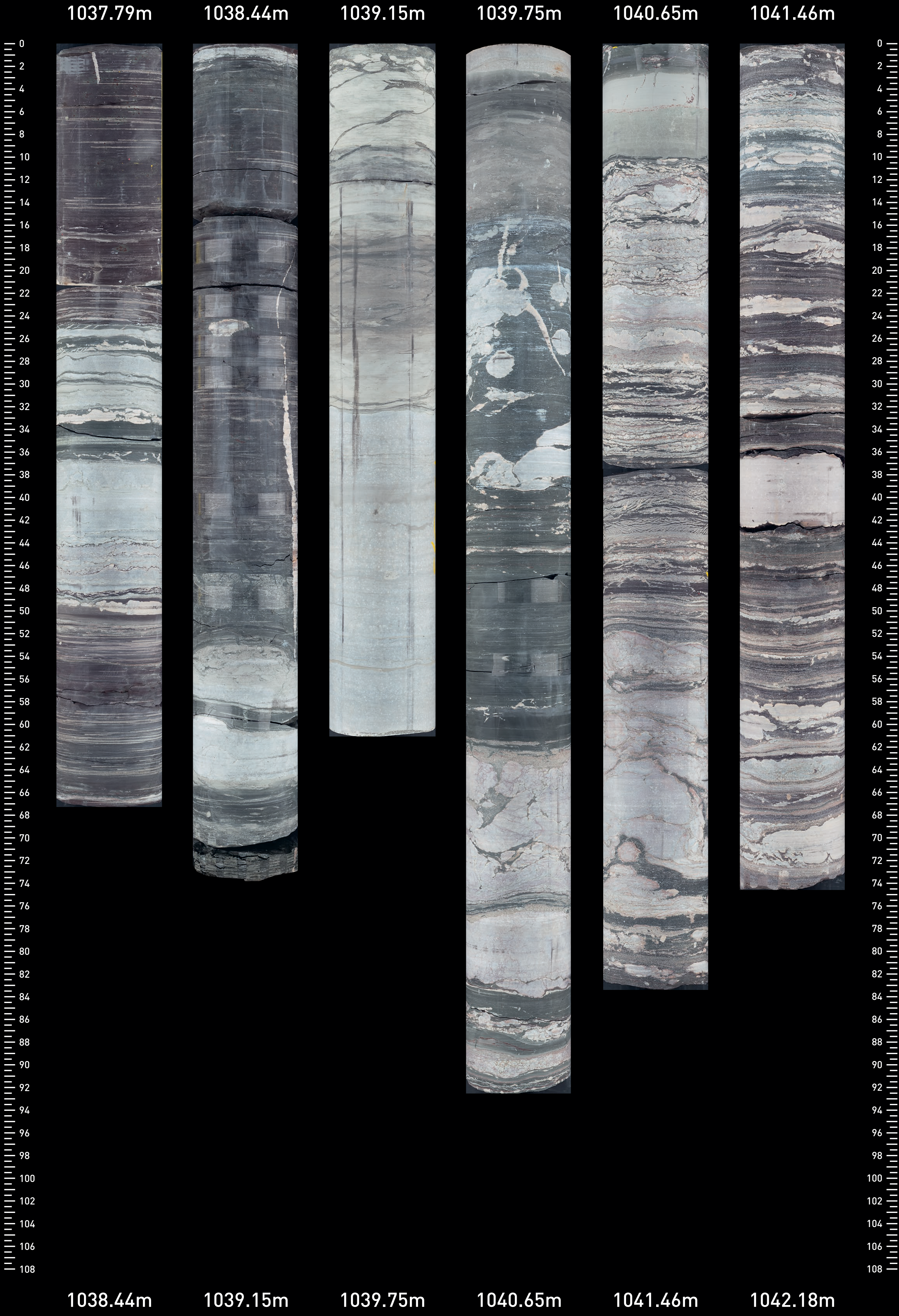
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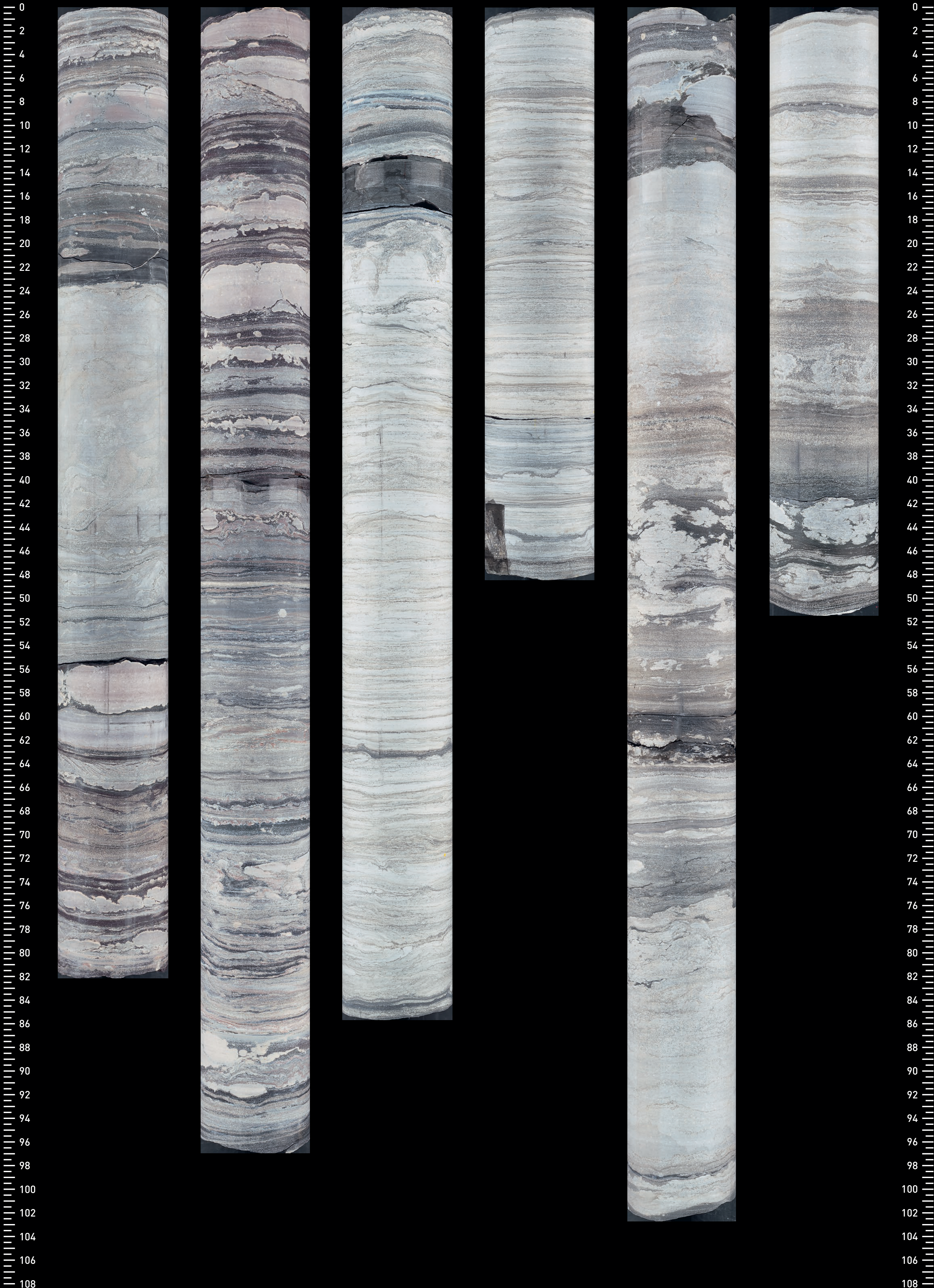

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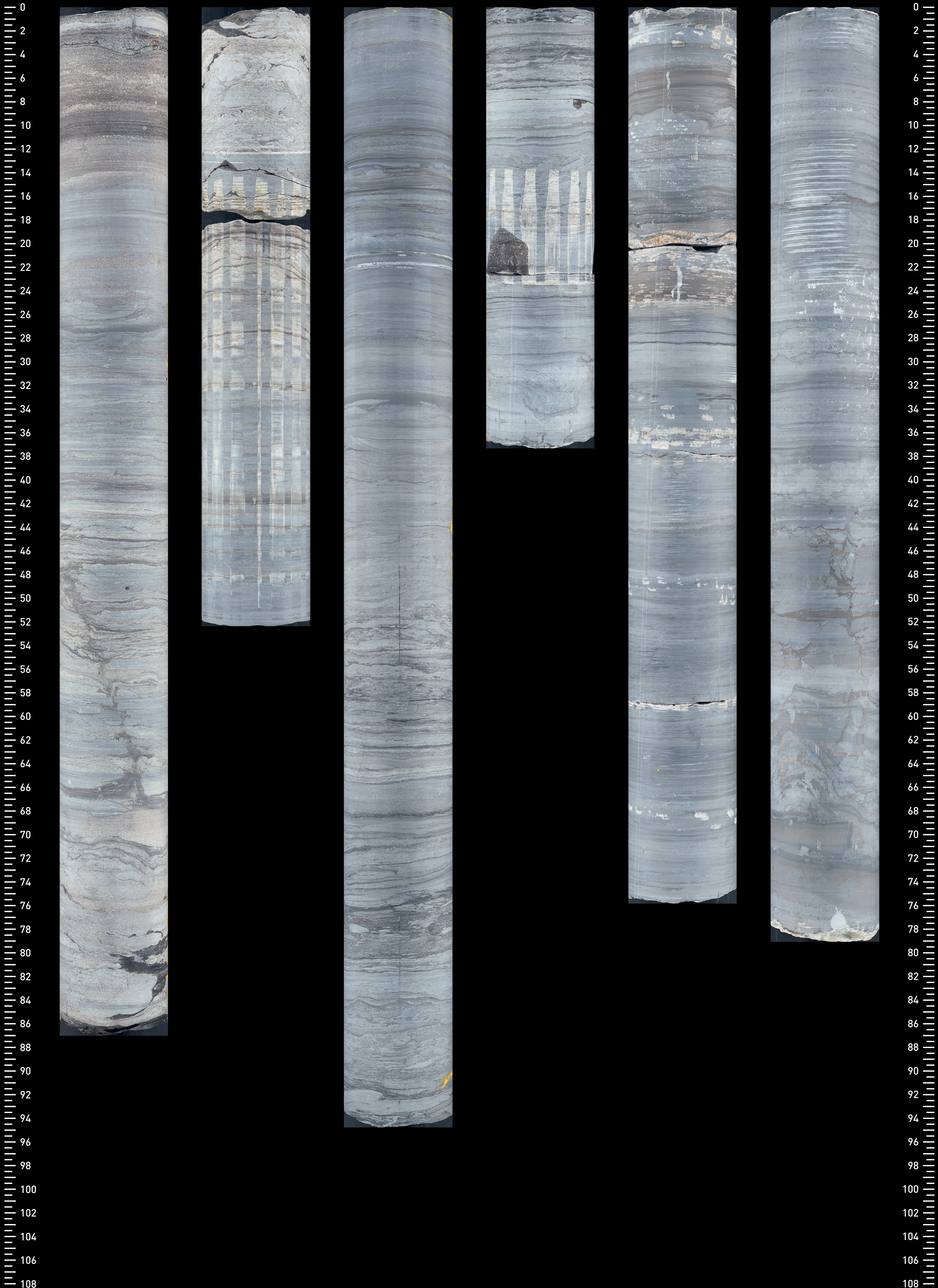

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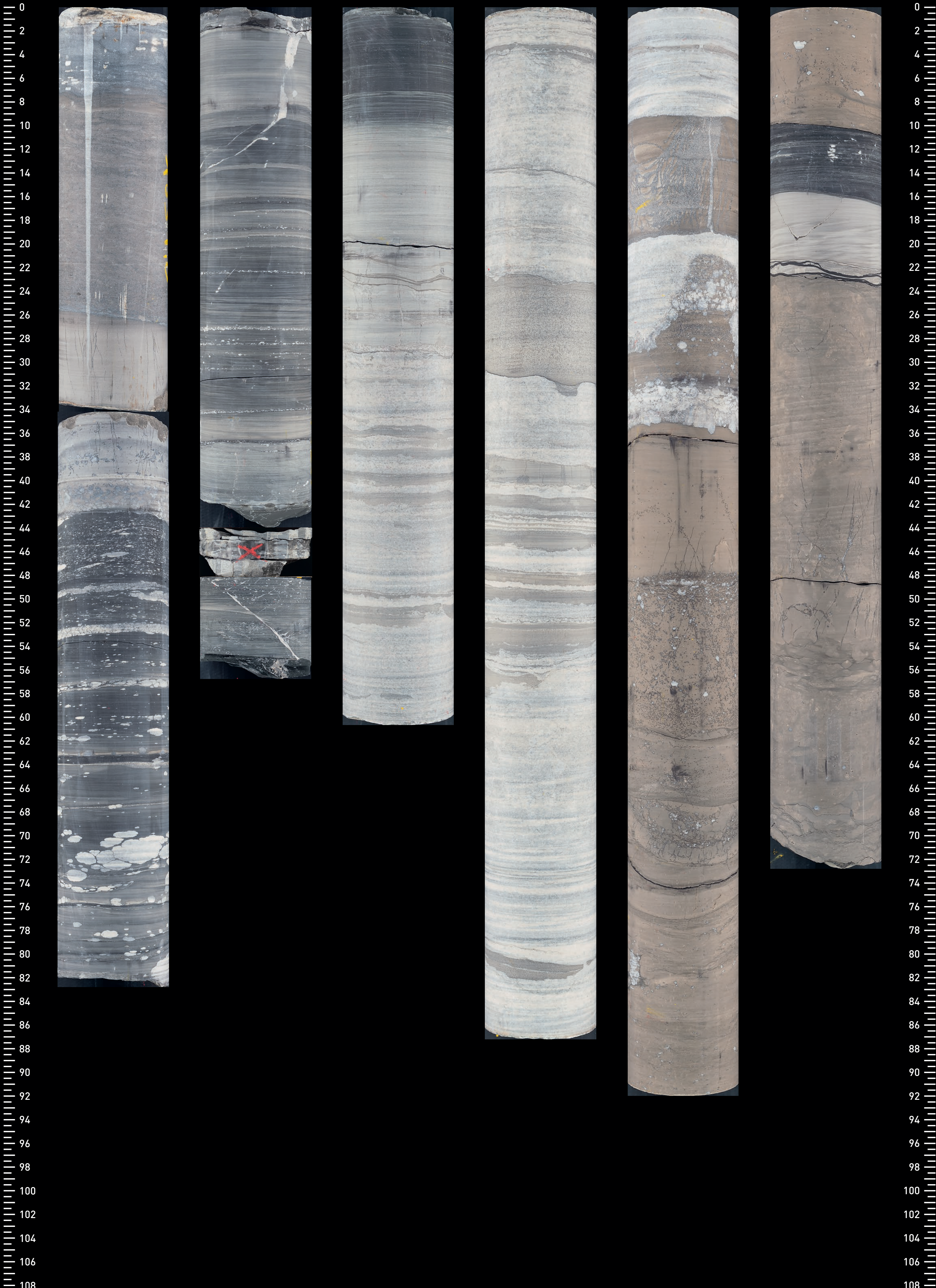

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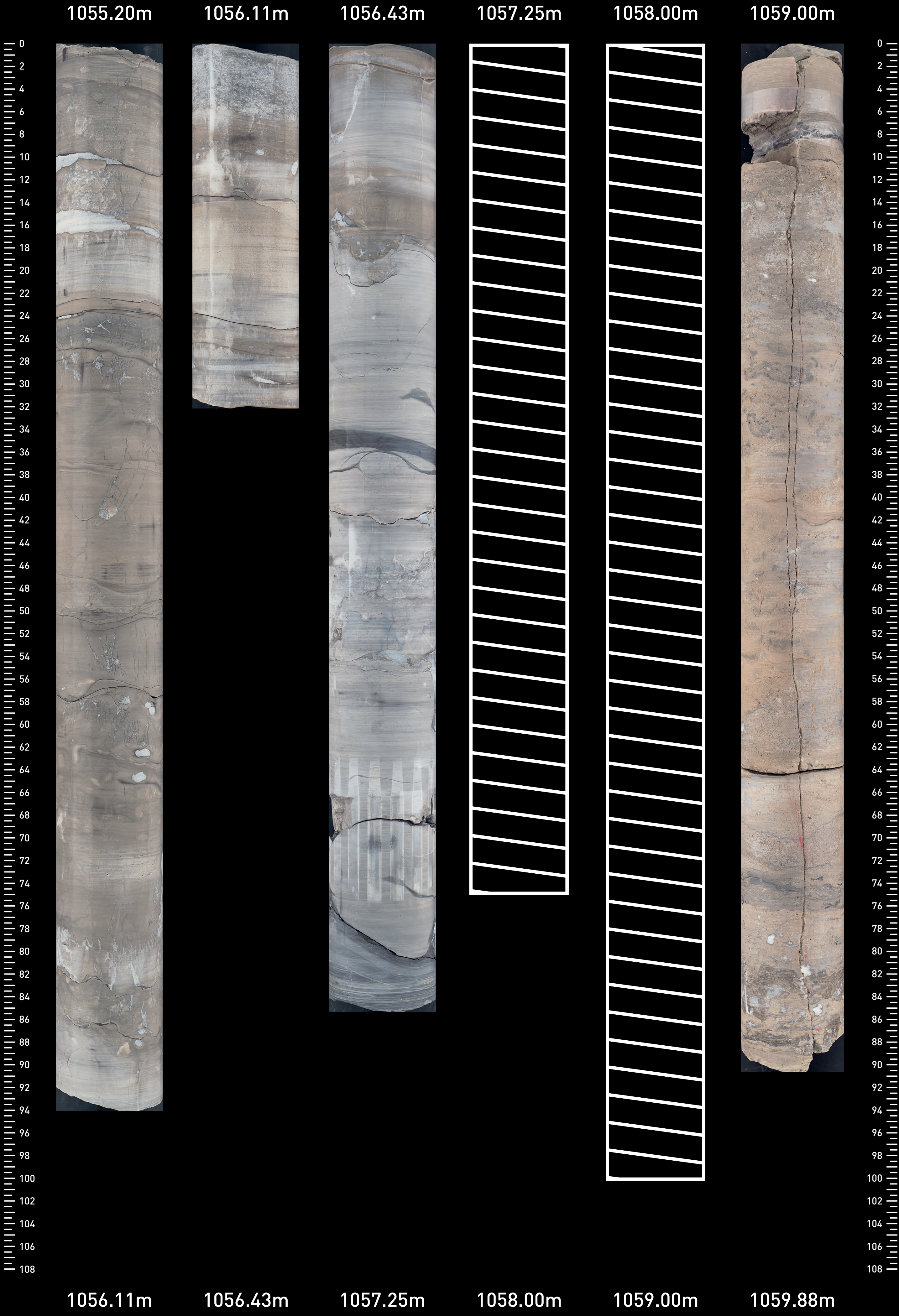
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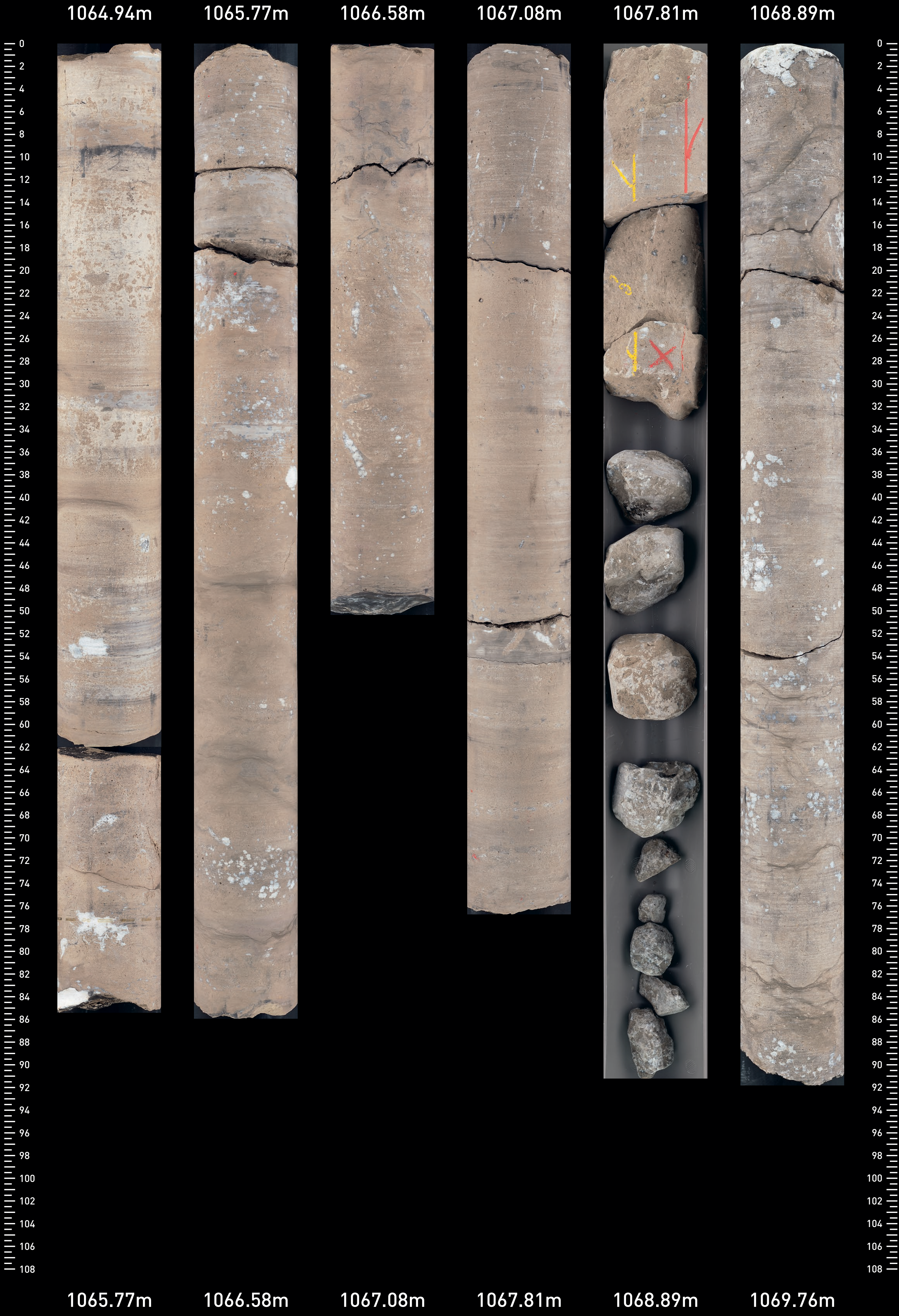
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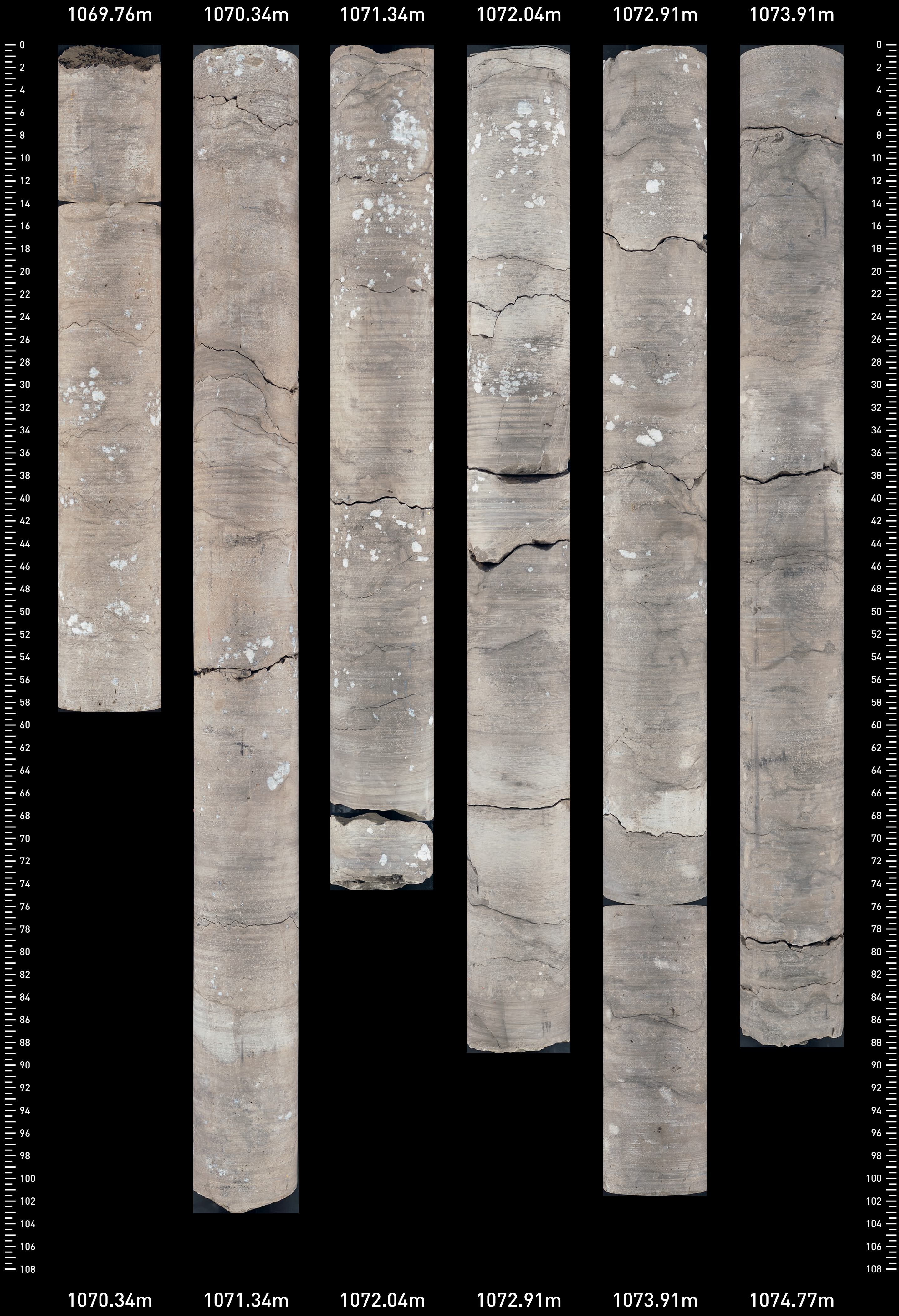
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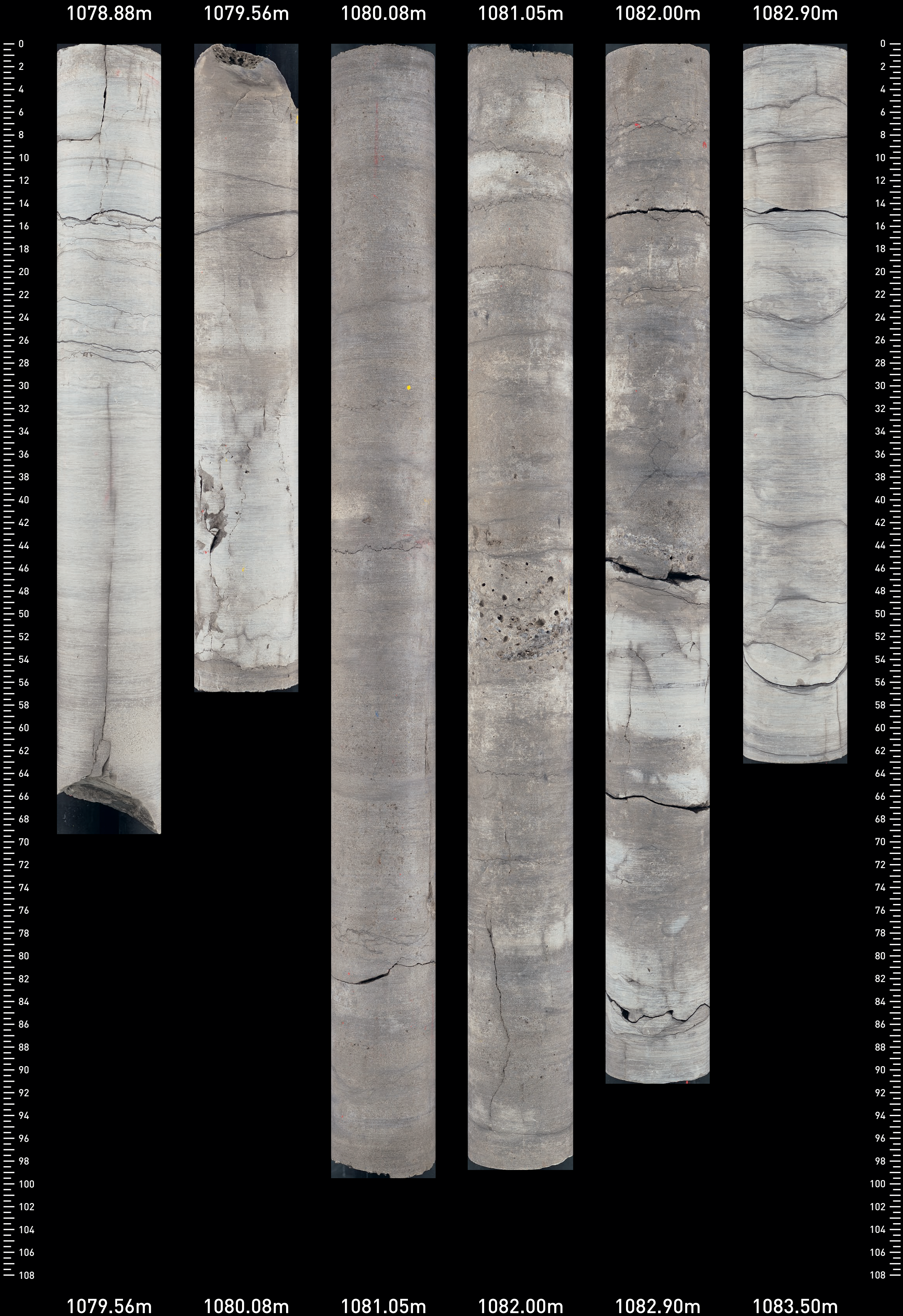
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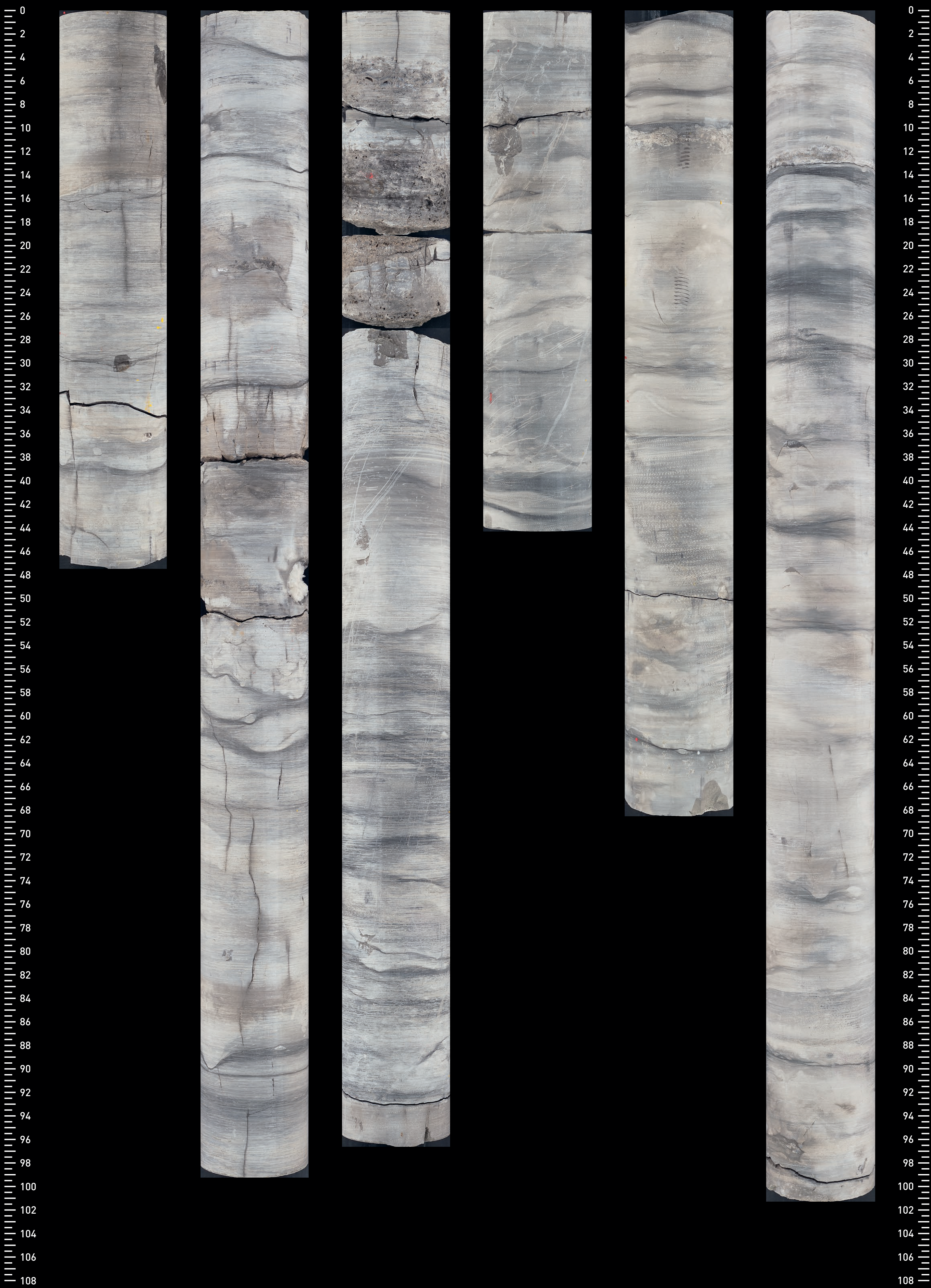

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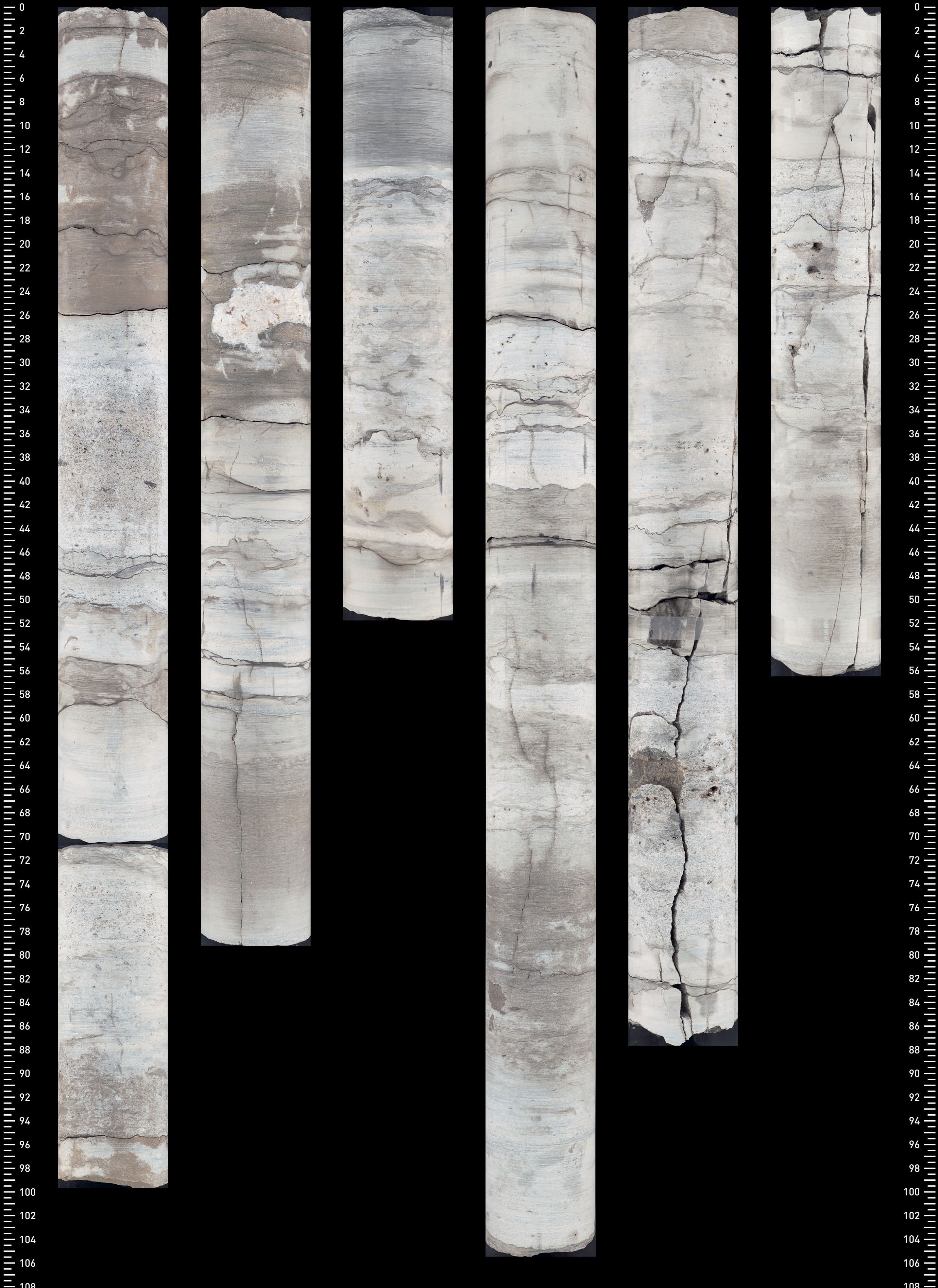

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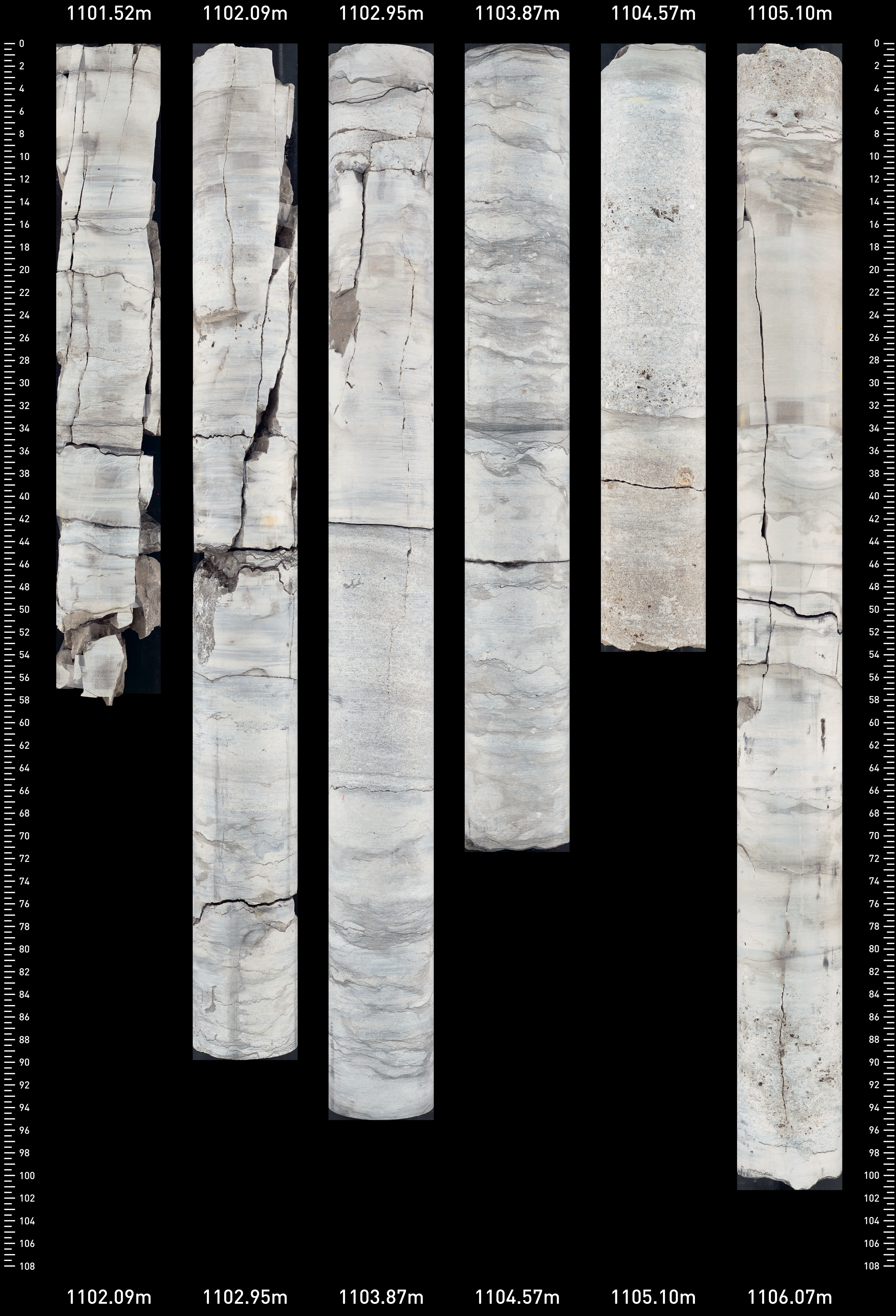
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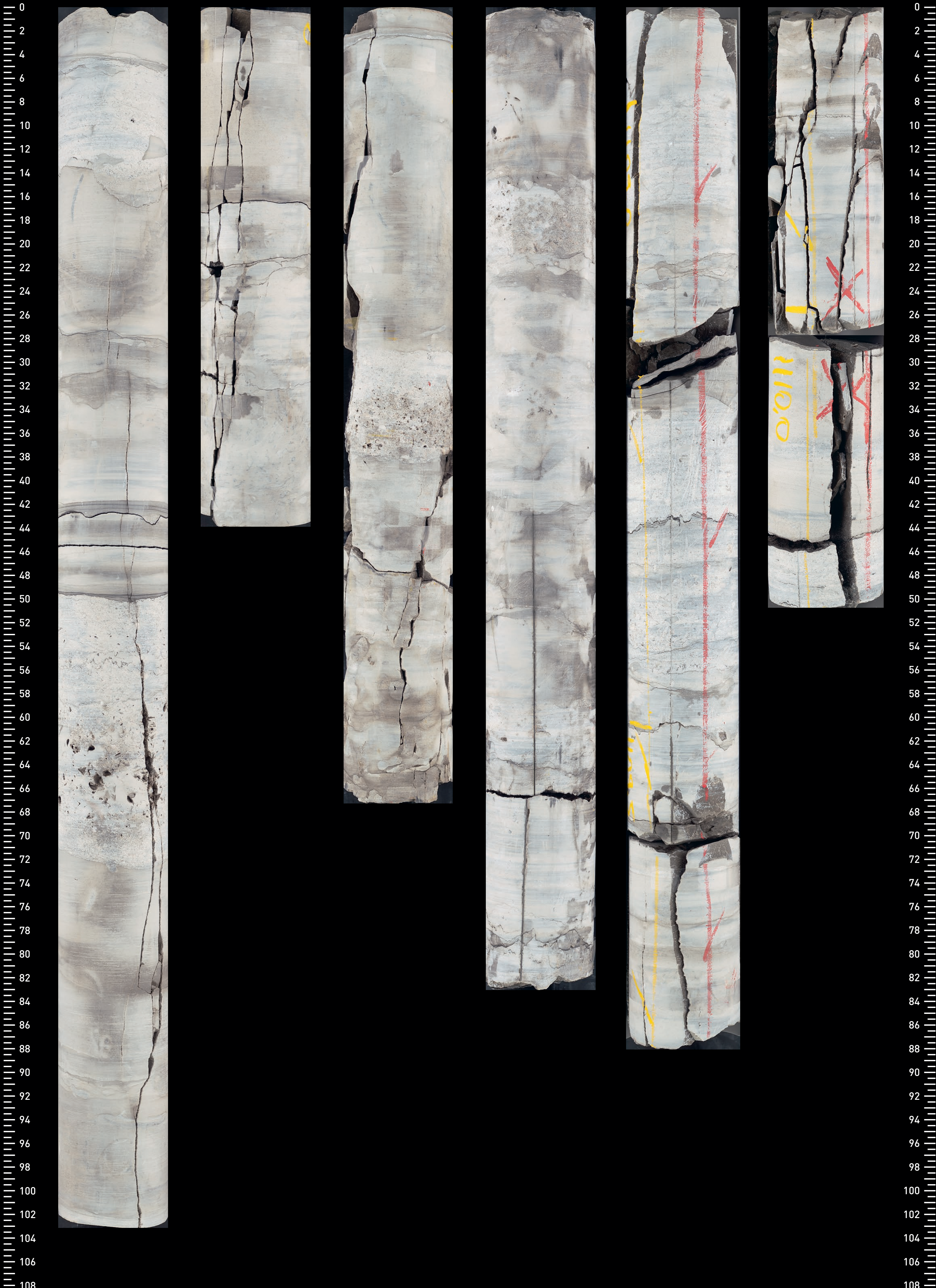

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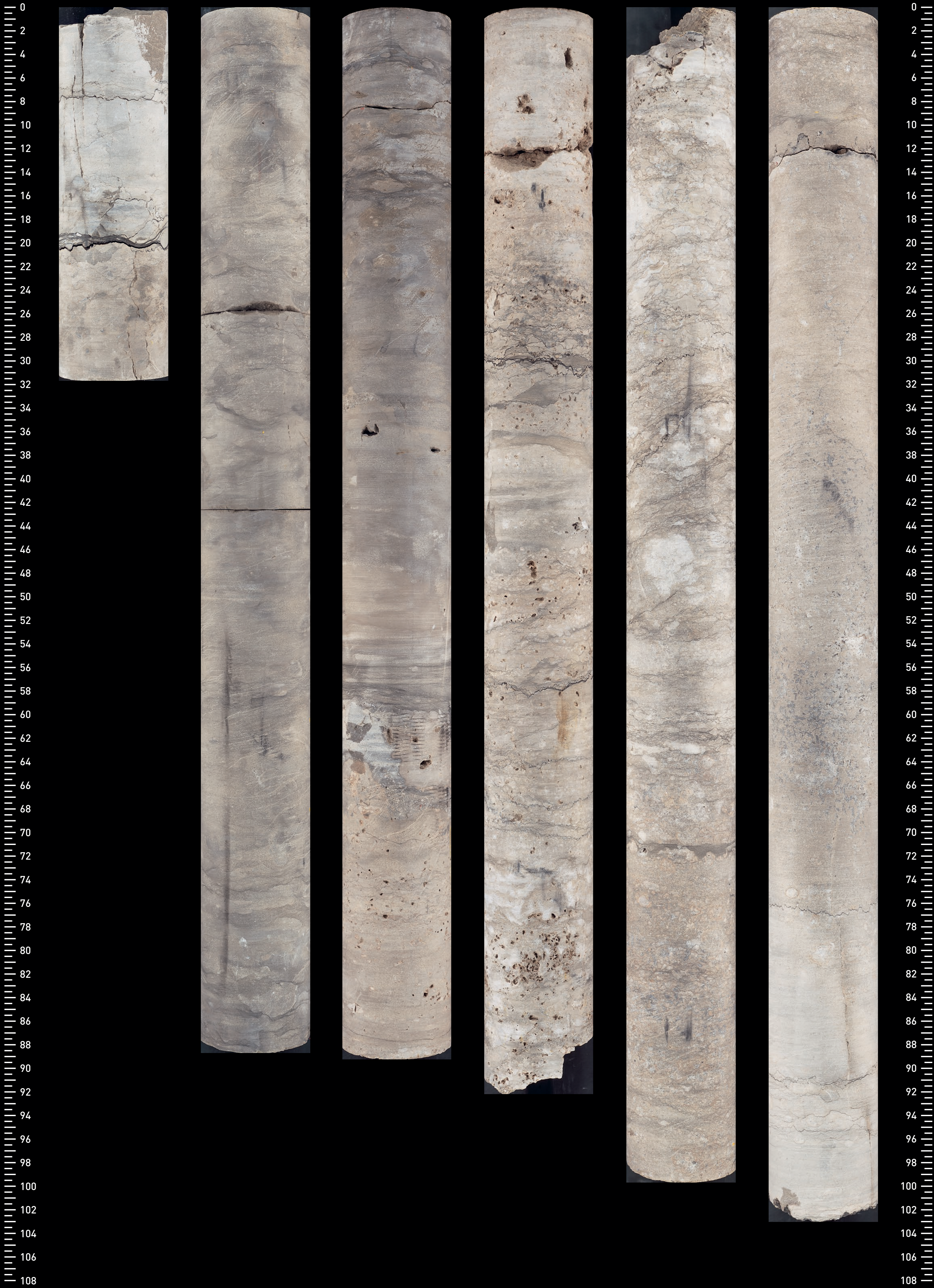

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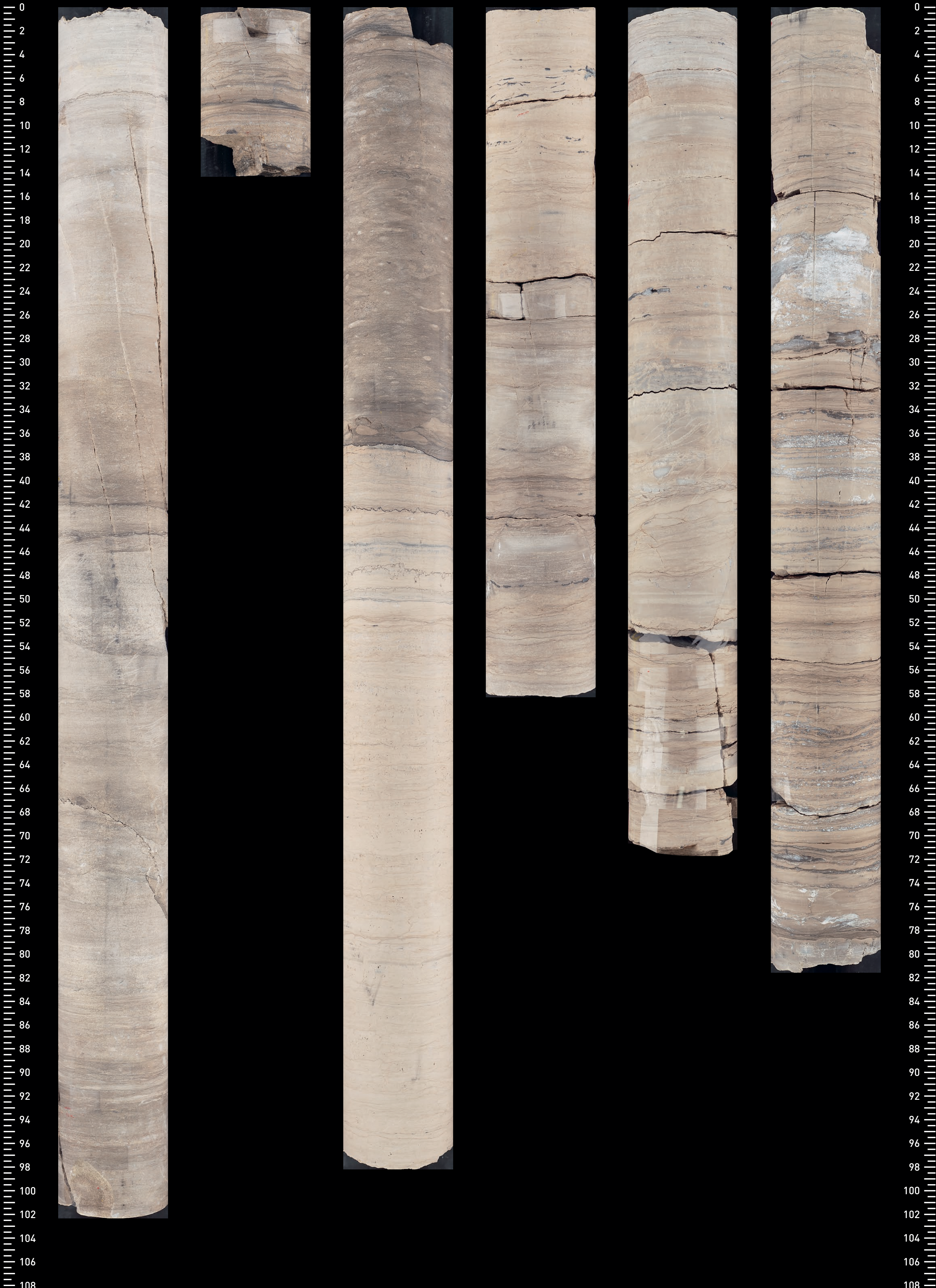

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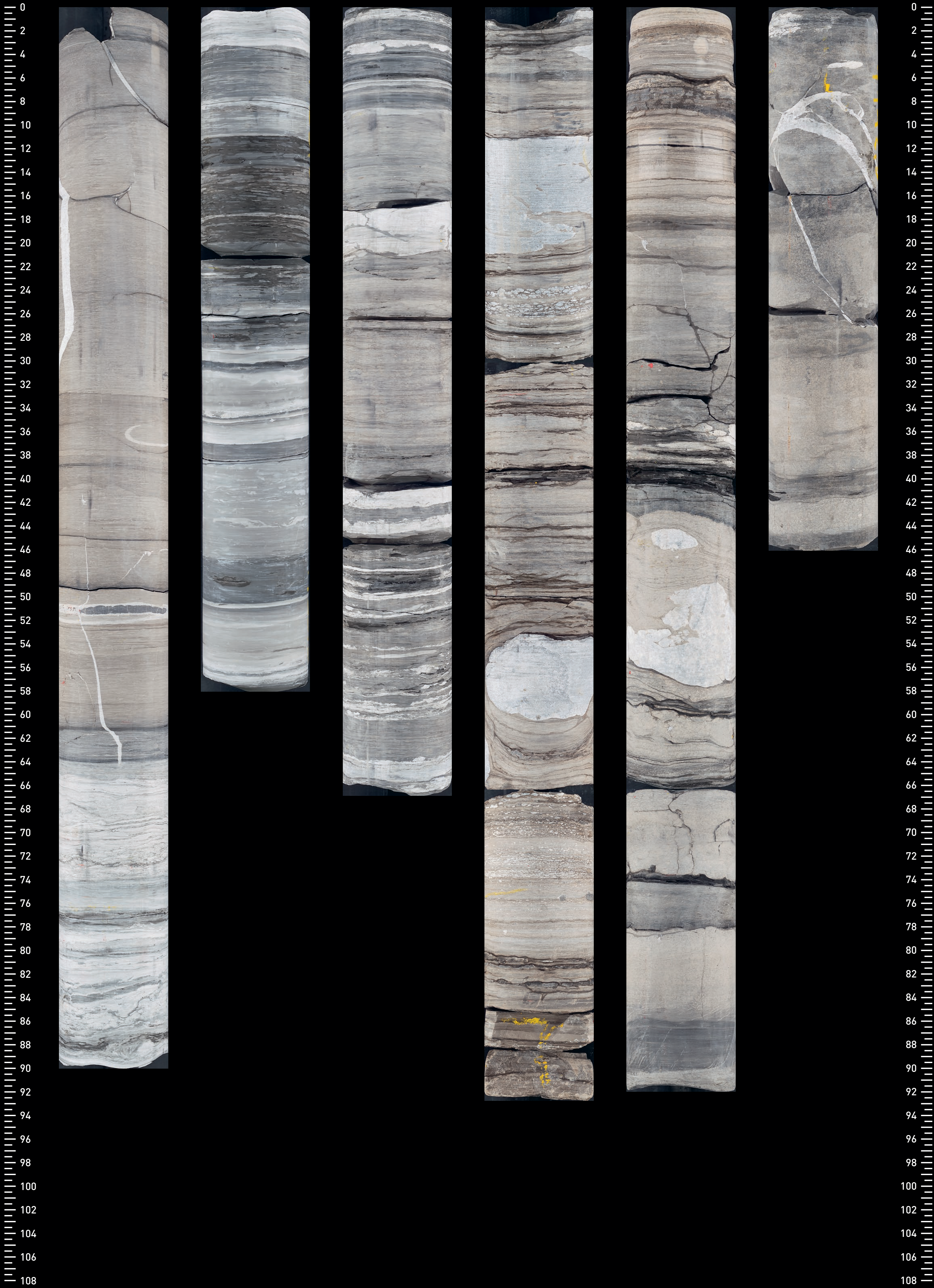

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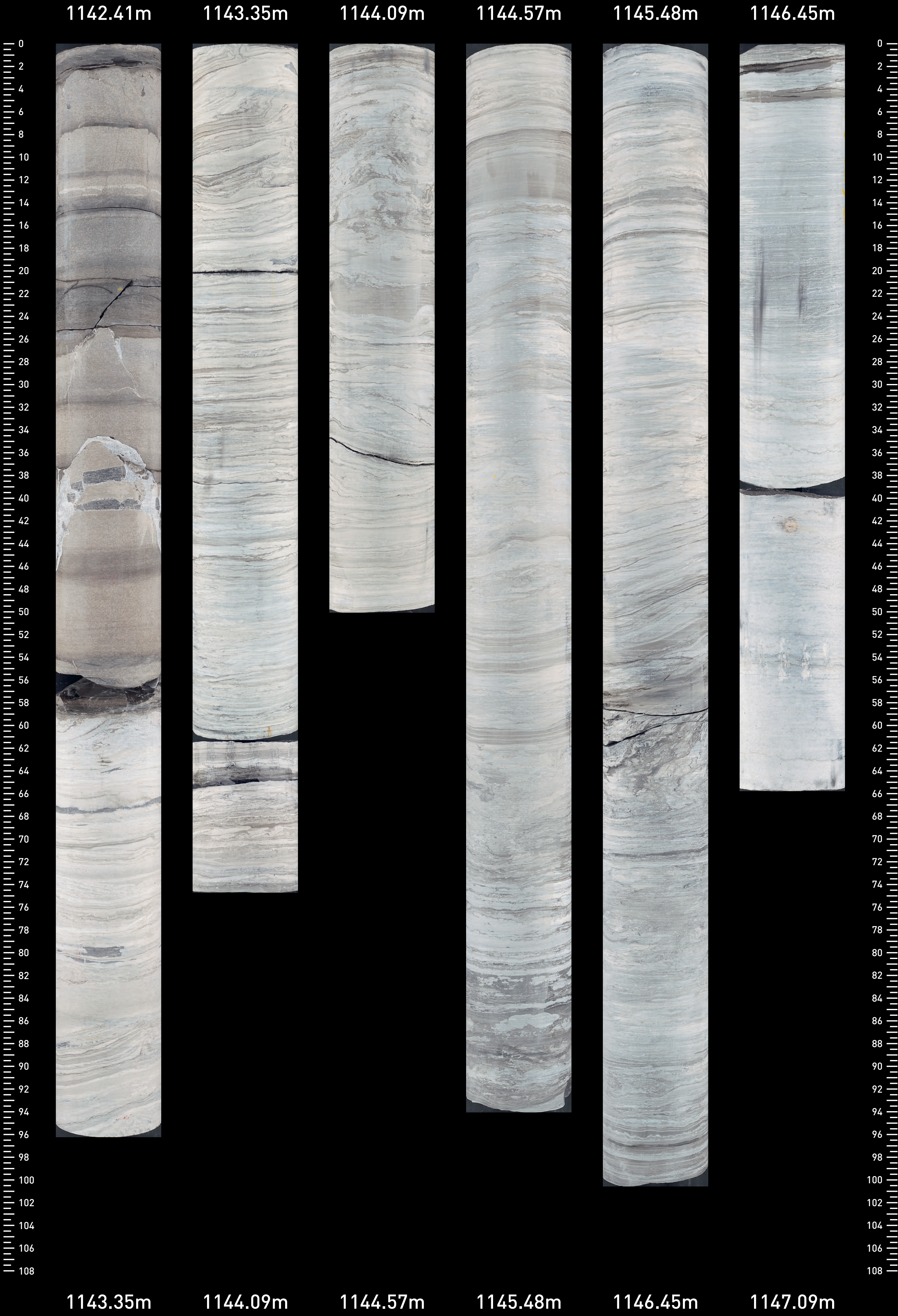
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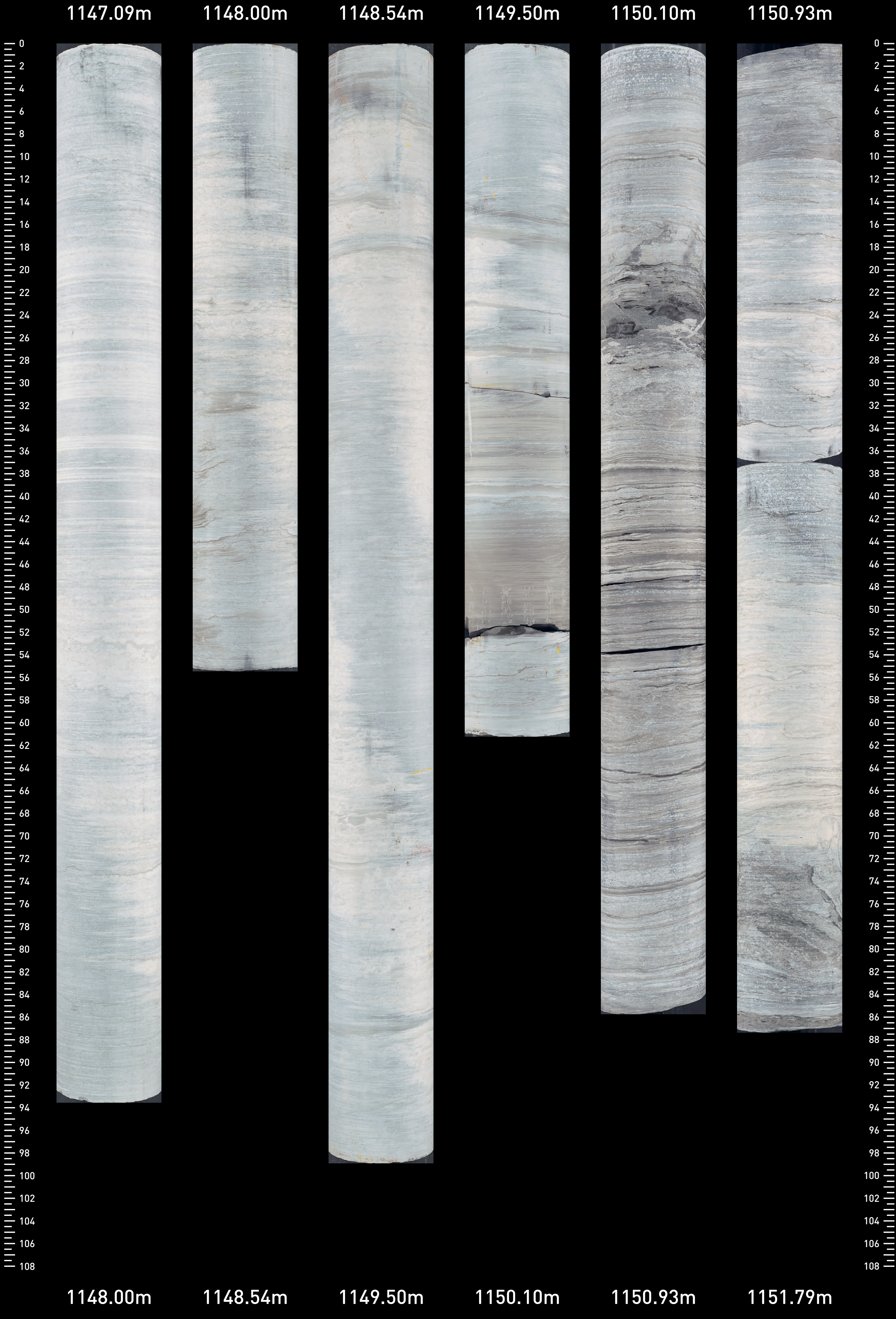
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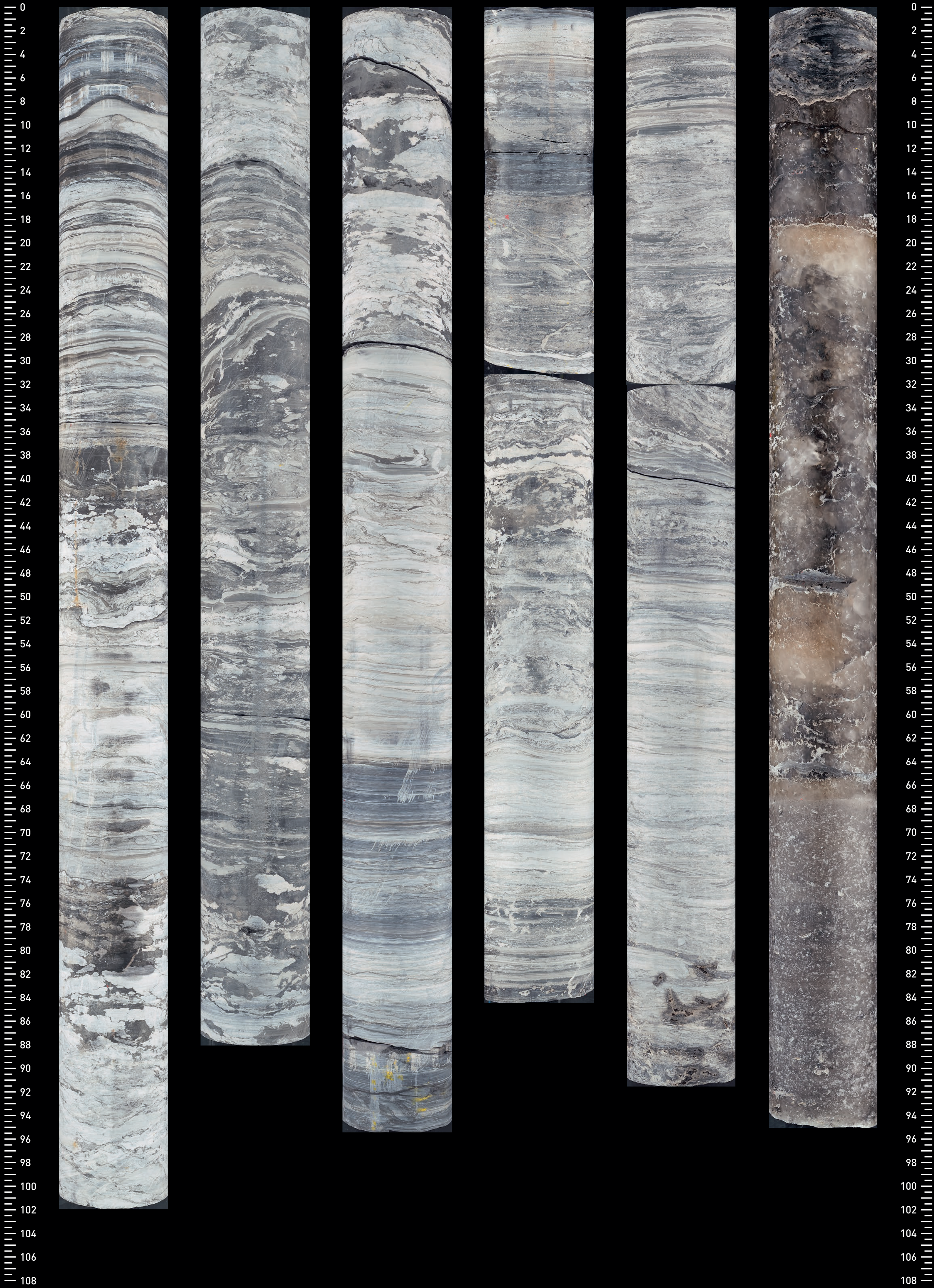

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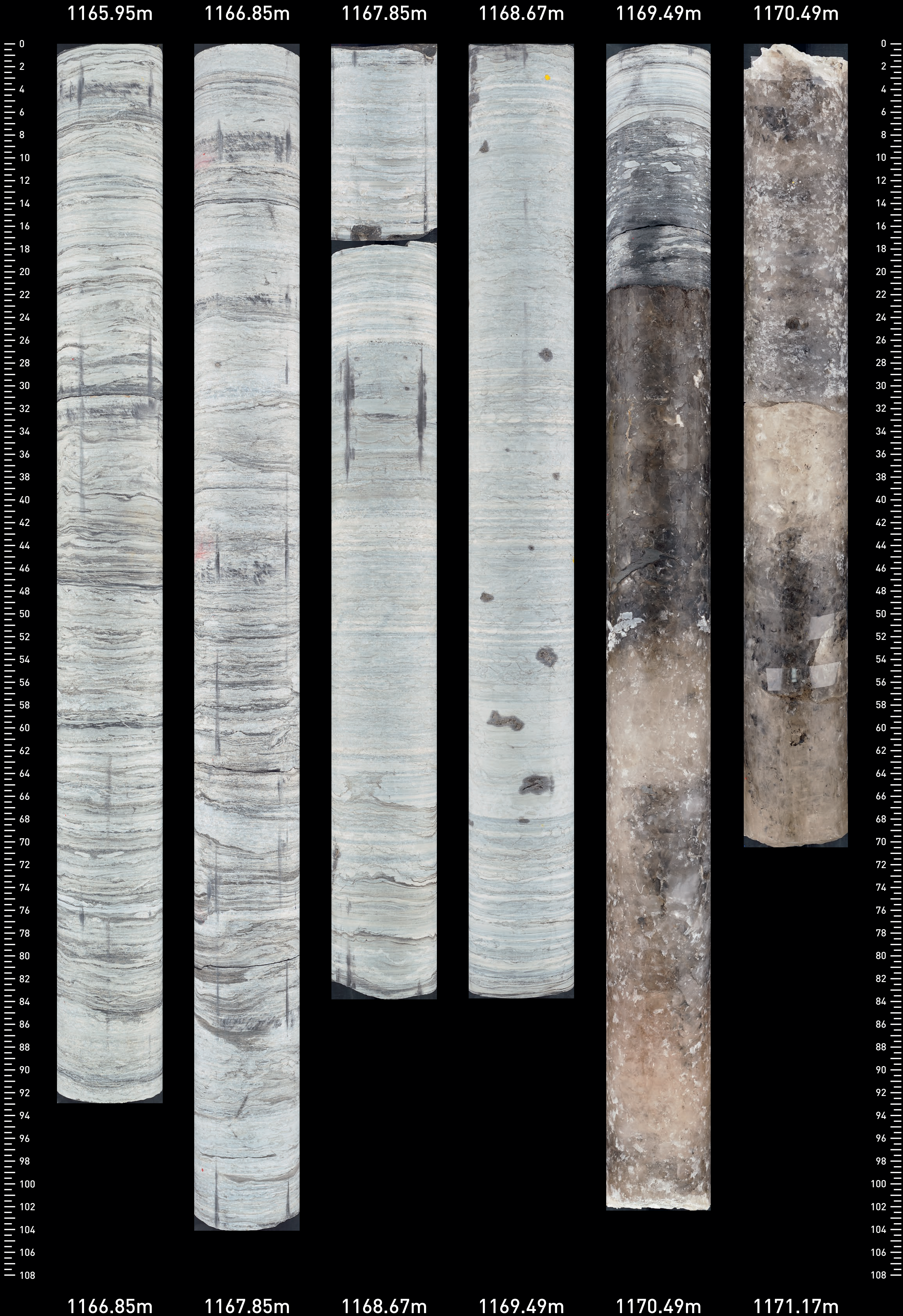
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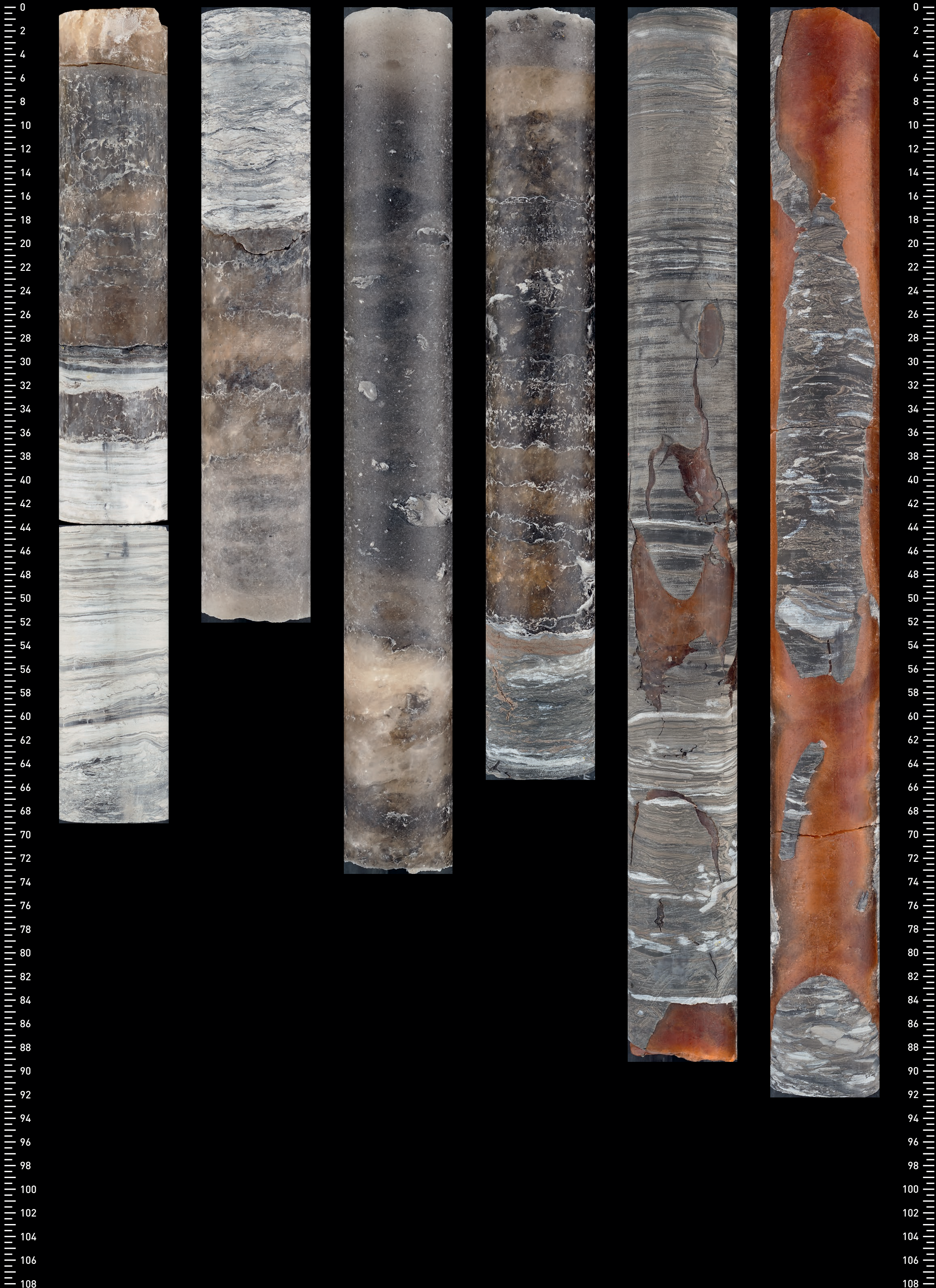

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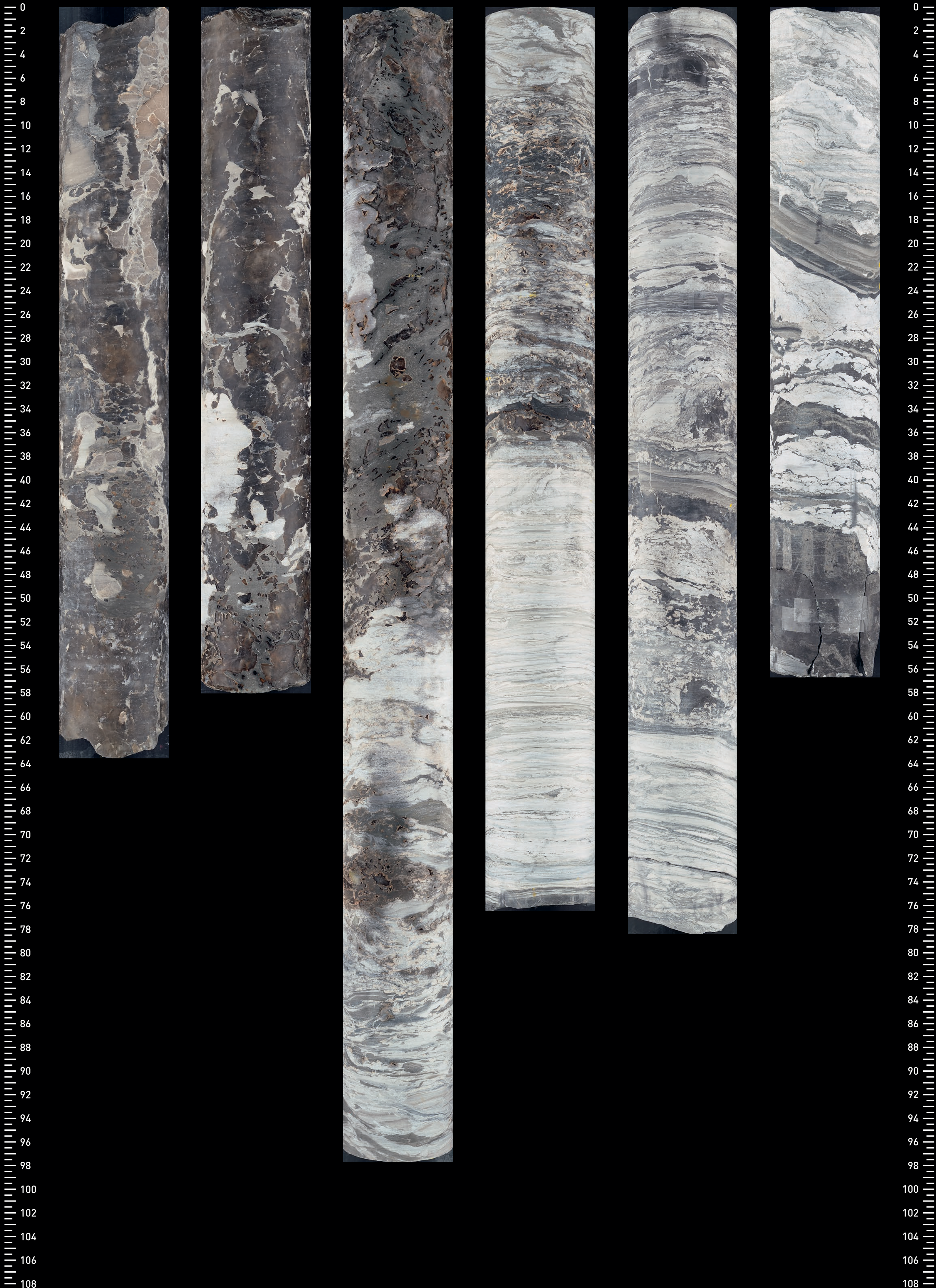

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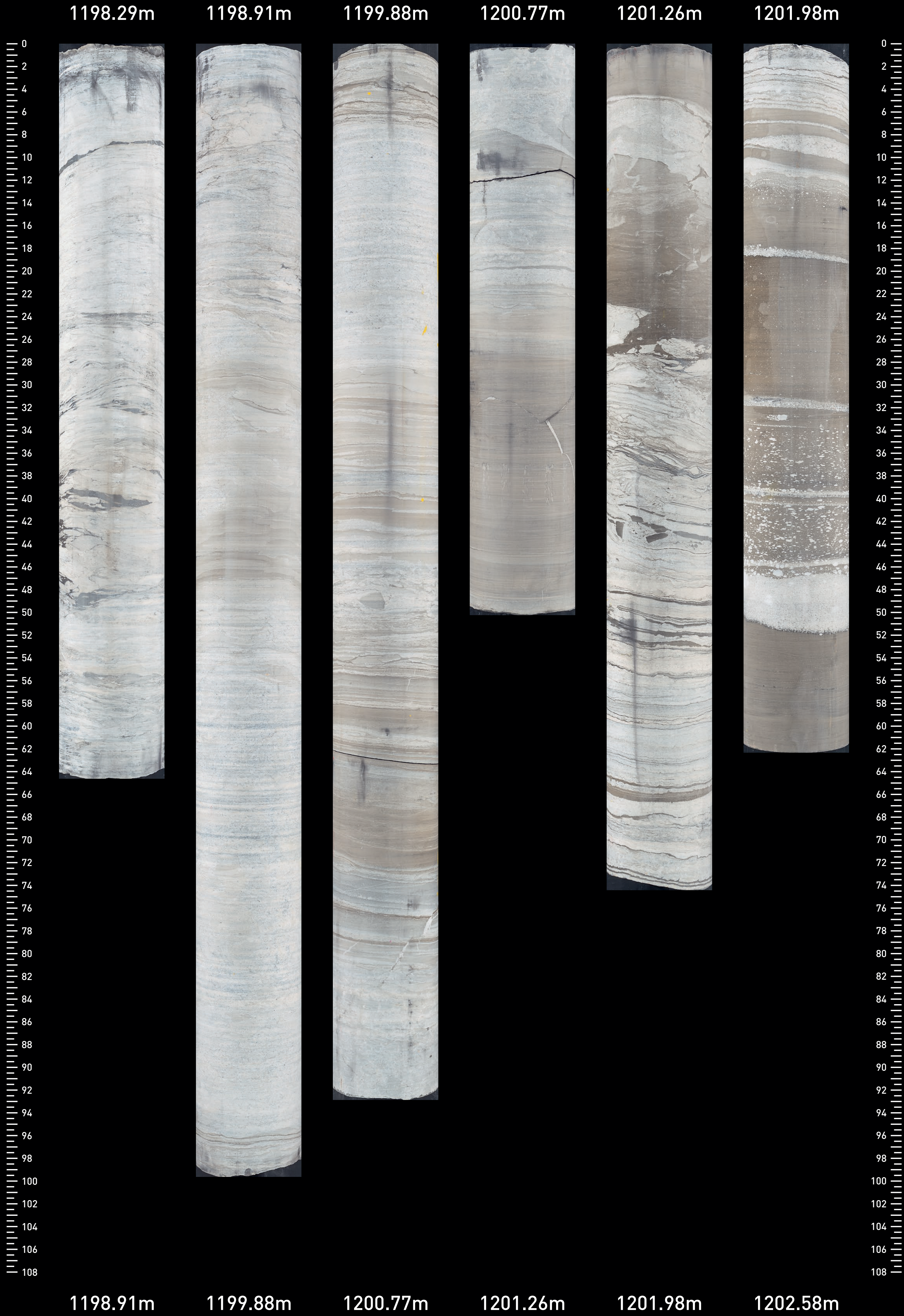
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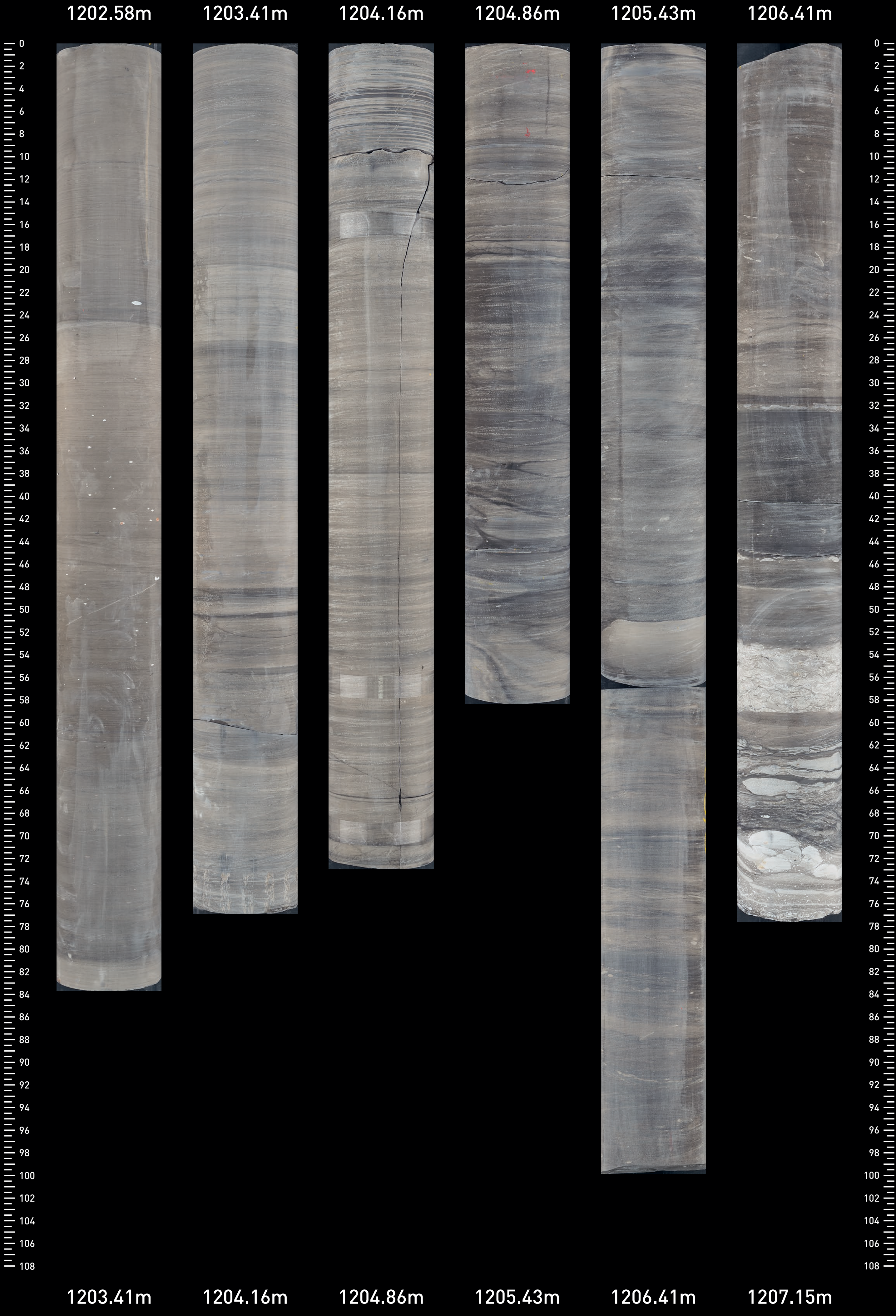
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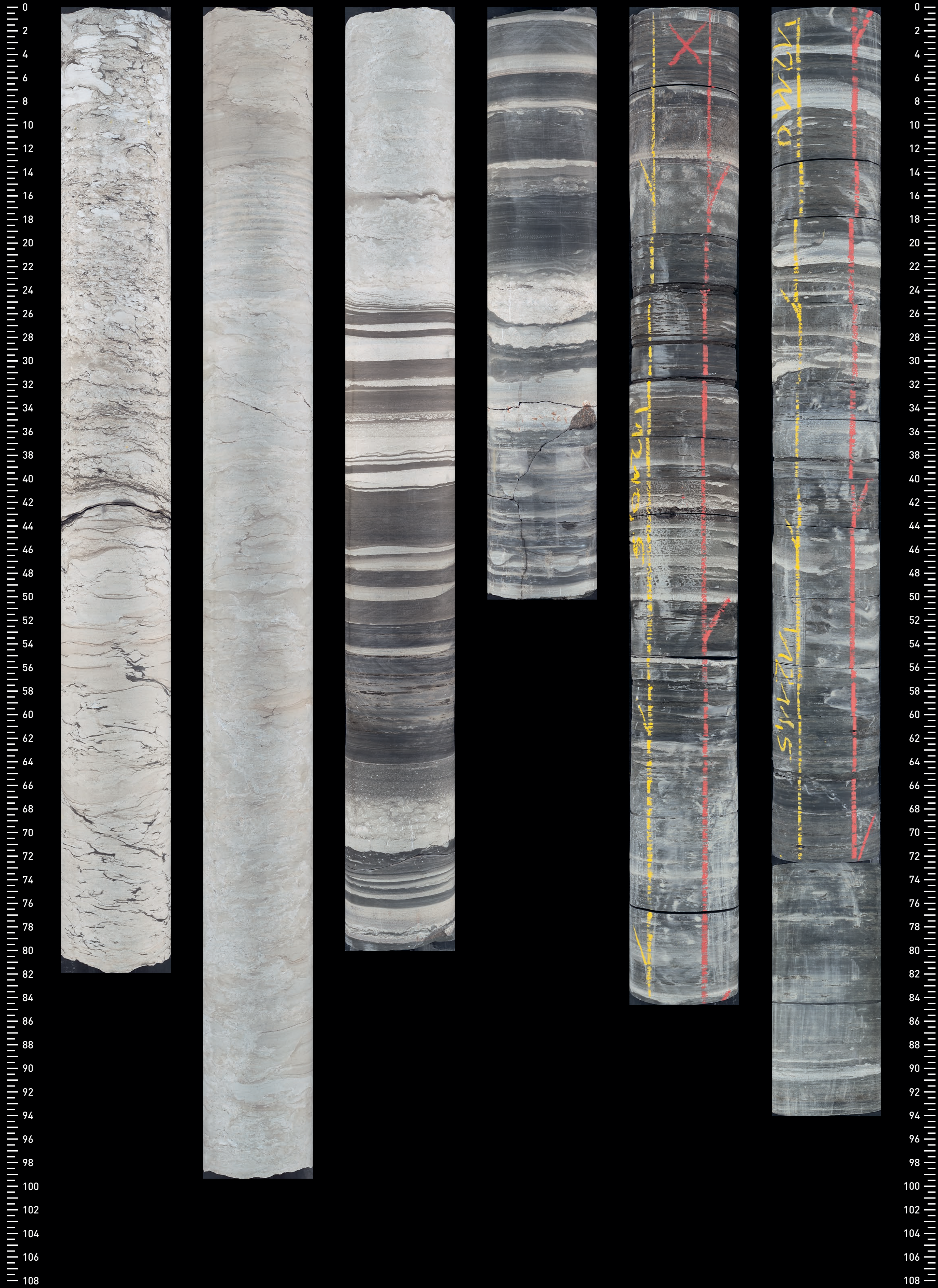

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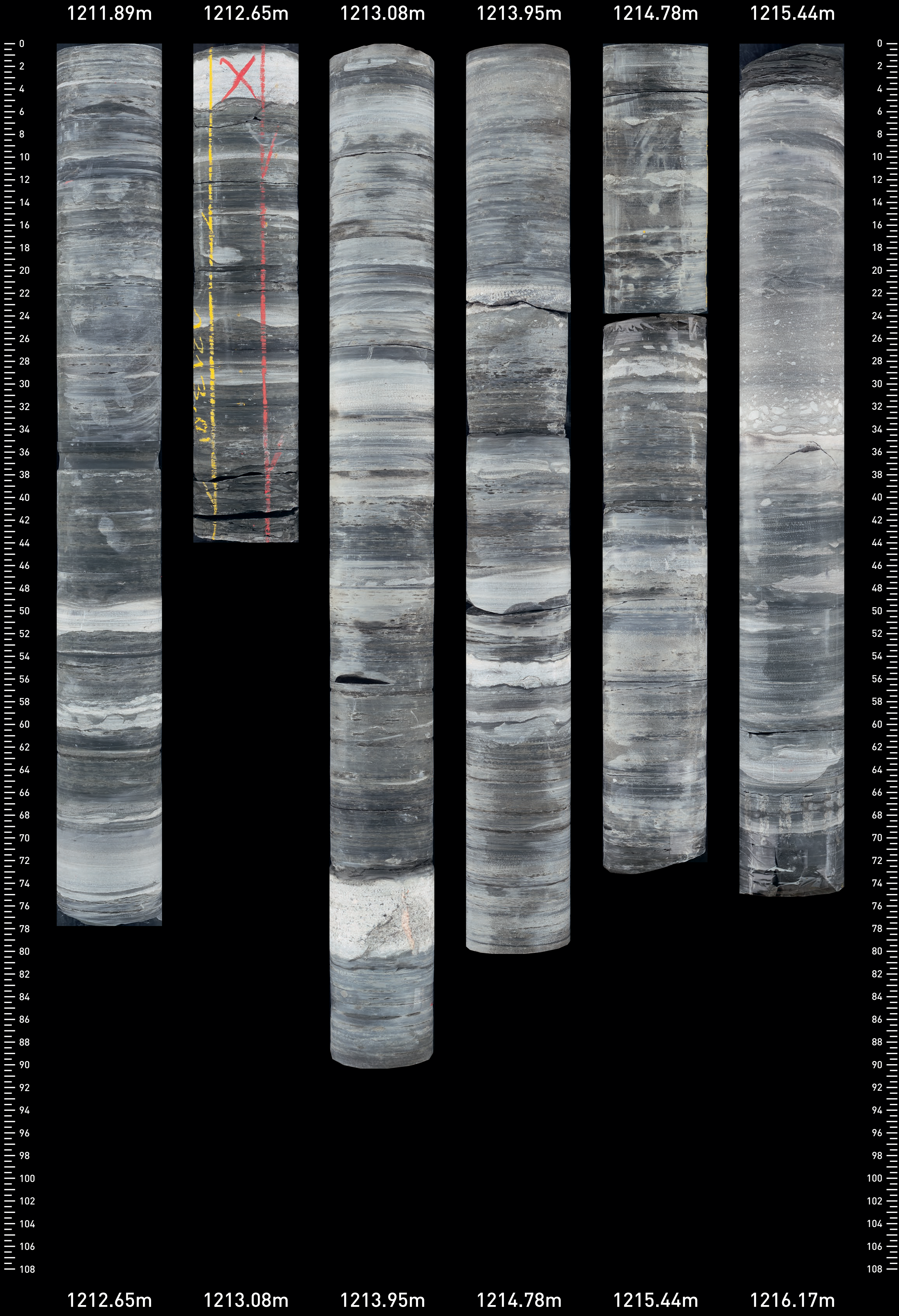
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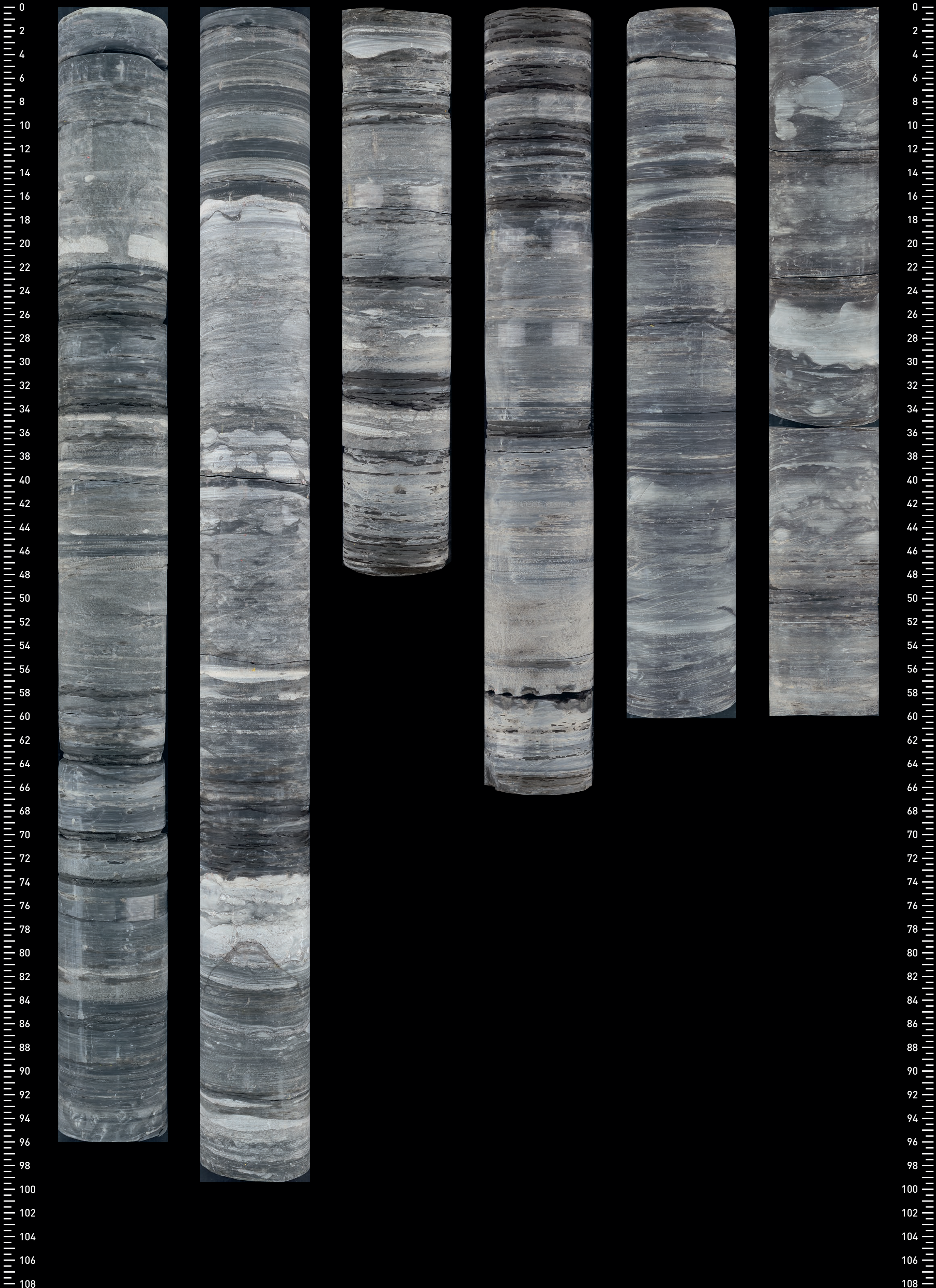
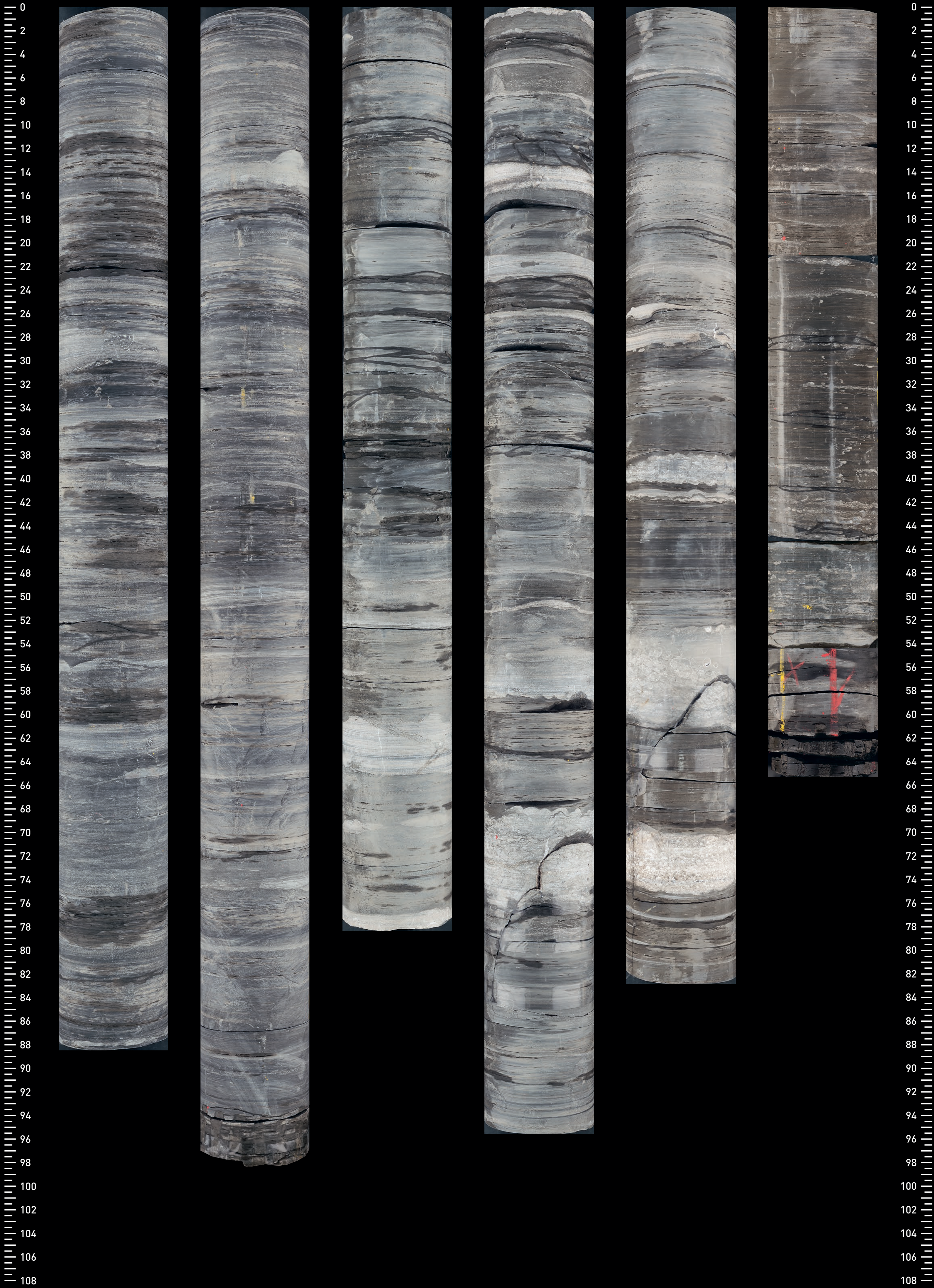


1217.10m | 1218.06m | 1218.53m | 1219.17m | 1219.75m | 1220.34m

1220.34m 1221.20m 1222.14m 1222.90m 1223.83m 1224.63m



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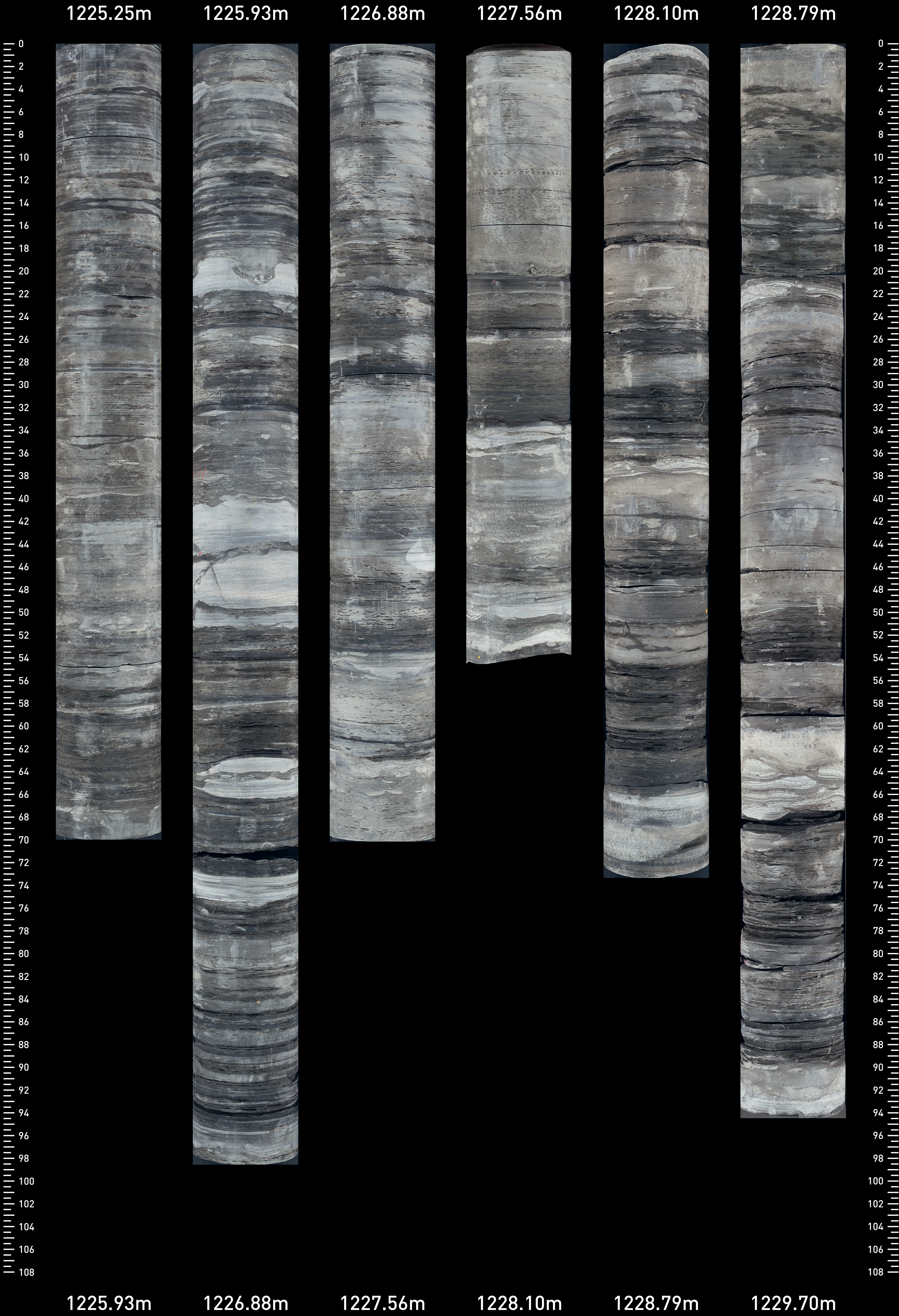
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1228.10m
1228.79m
1229.70m


1229.70m
1230.41m
1231.00m
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1230.41m
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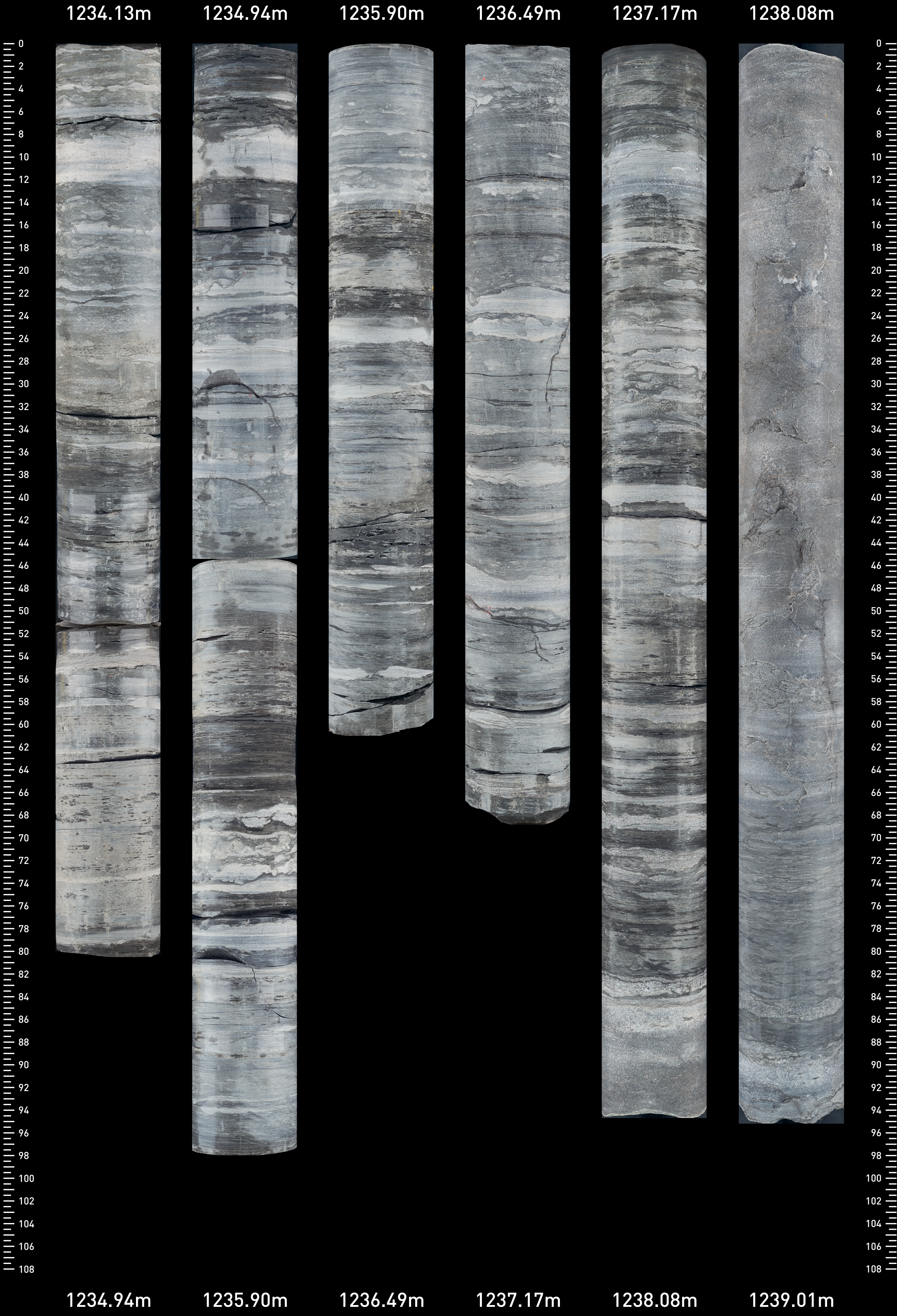
1233.48m
1234.13m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1236.49m
1237.17m
1238.08m
1234.94m
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1236.49m
1237.17m
1238.08m
1239.01m


1239.01m
1239.94m
1240.89m
1241.52m
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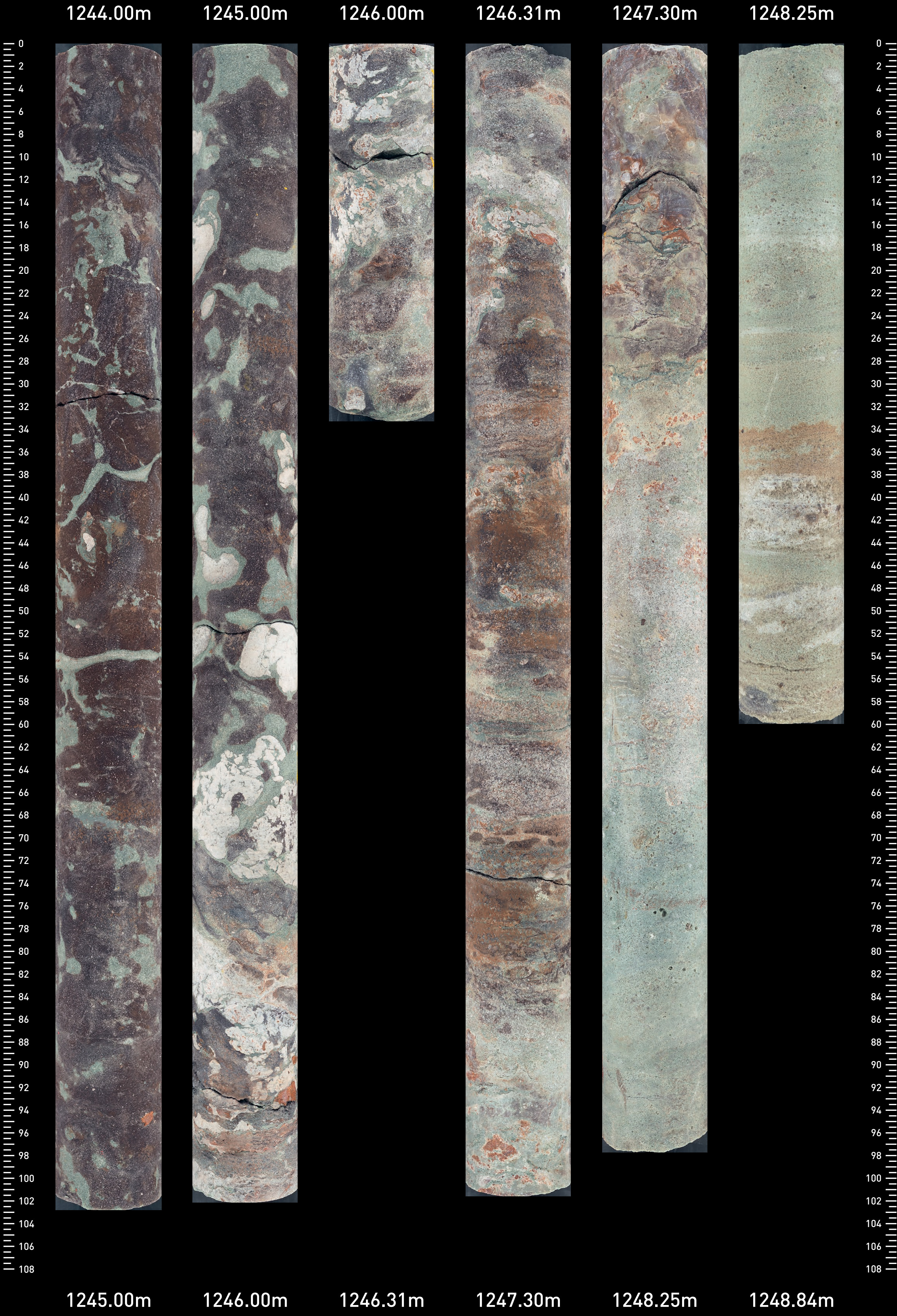
1244.00m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1246.00m
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1247.30m
1248.25m
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1245.00m
1246.00m
1246.31m
1247.30m
1248.25m
1248.84m


1248.84m
1249.26m
1250.06m
1250.76m
1251.57m
1252.20m
1249.26m
1250.06m
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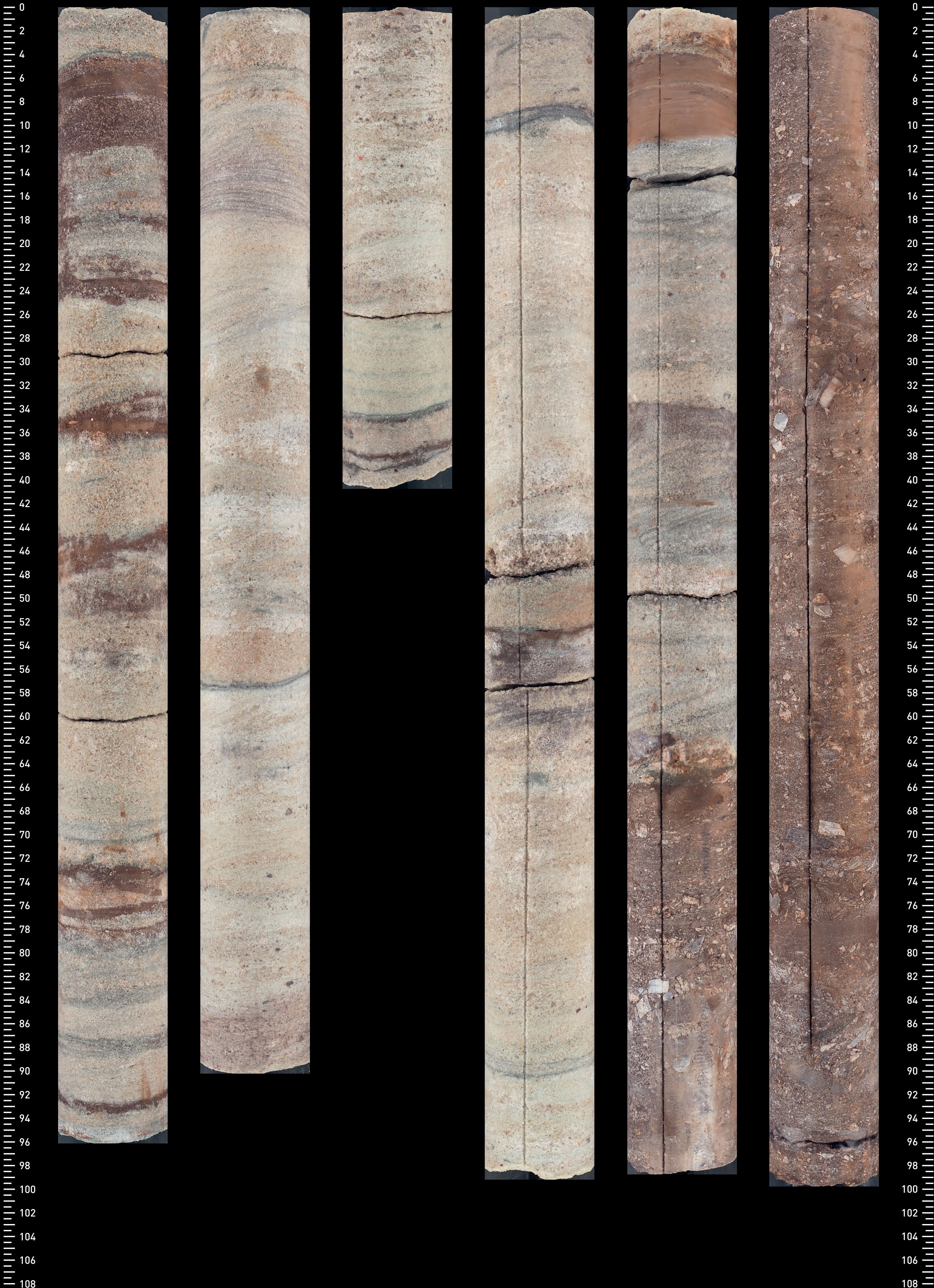
1252.20m
1253.05m

1253.05m 1253.99m 1254.87m 1255.26m 1256.22m 1257.18m



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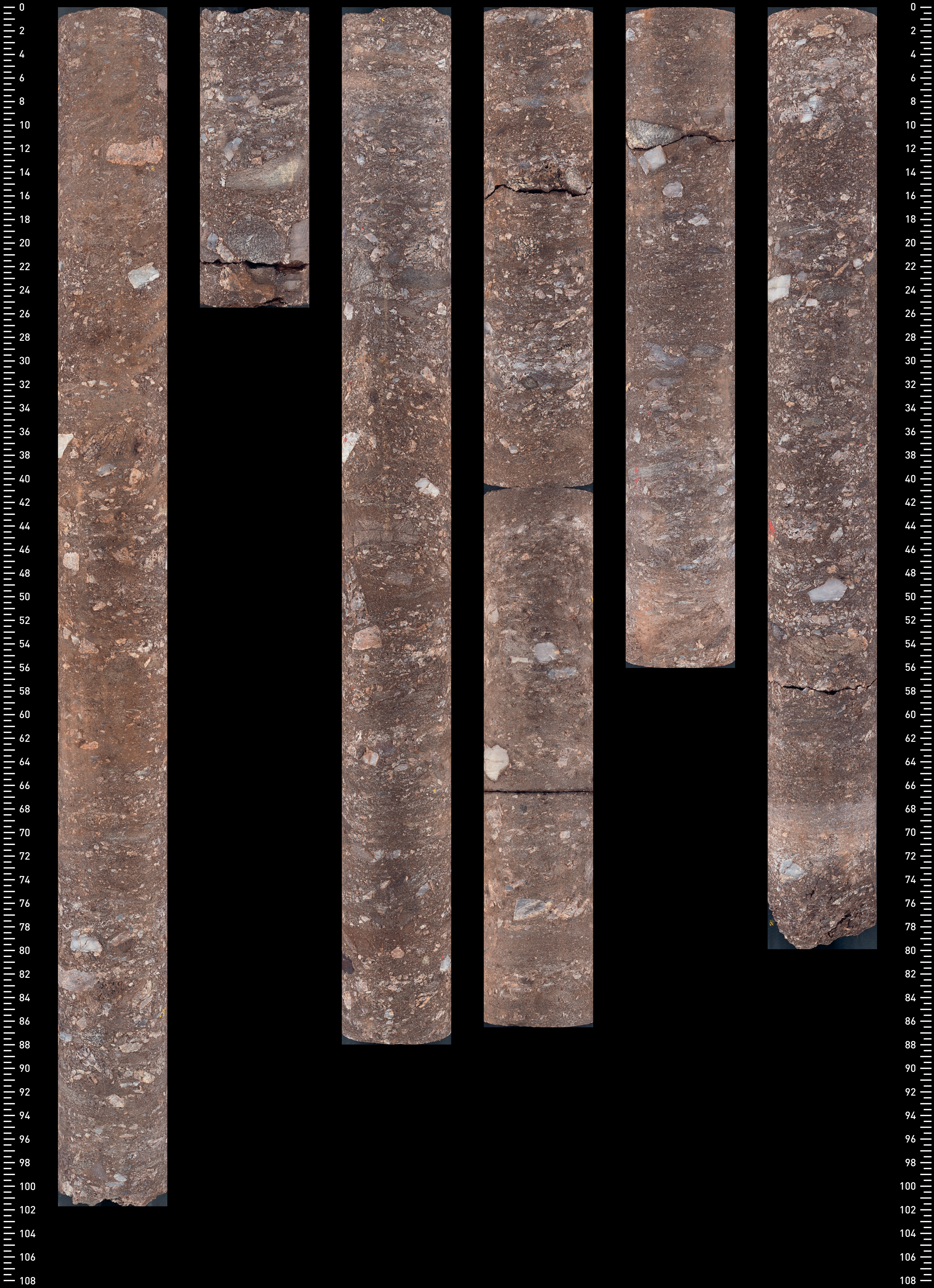
1259.00m 1259.80m 1260.70m 1261.21m 1262.00m 1263.00m

1263.00m 1264.00m 1264.24m 1265.10m 1265.95m 1266.50m



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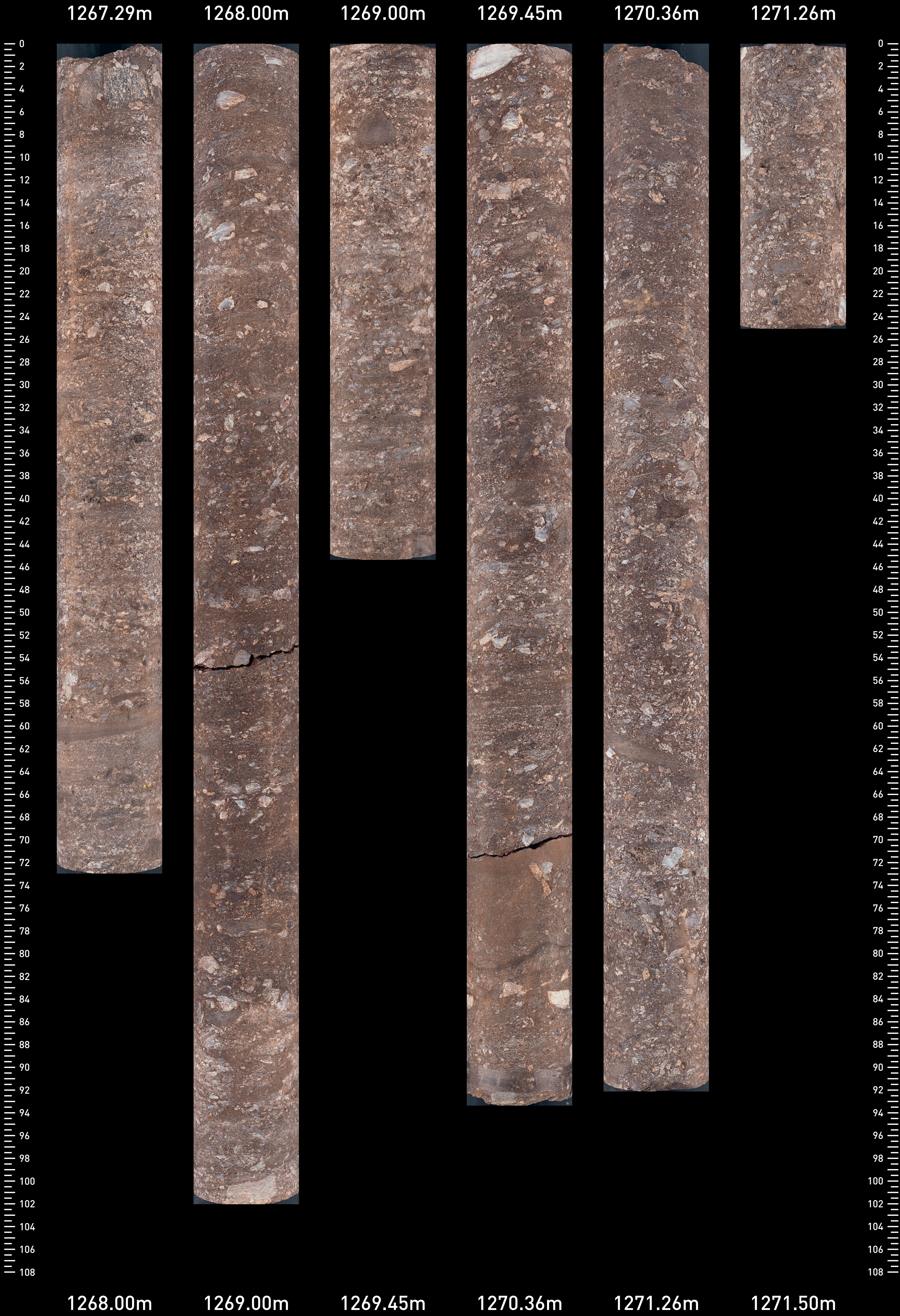
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1268.00m
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1271.50m


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1276.33m


1276.33m
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1277.75m
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1277.20m
1277.75m
1278.50m
1279.25m
1280.00m
1280.90m

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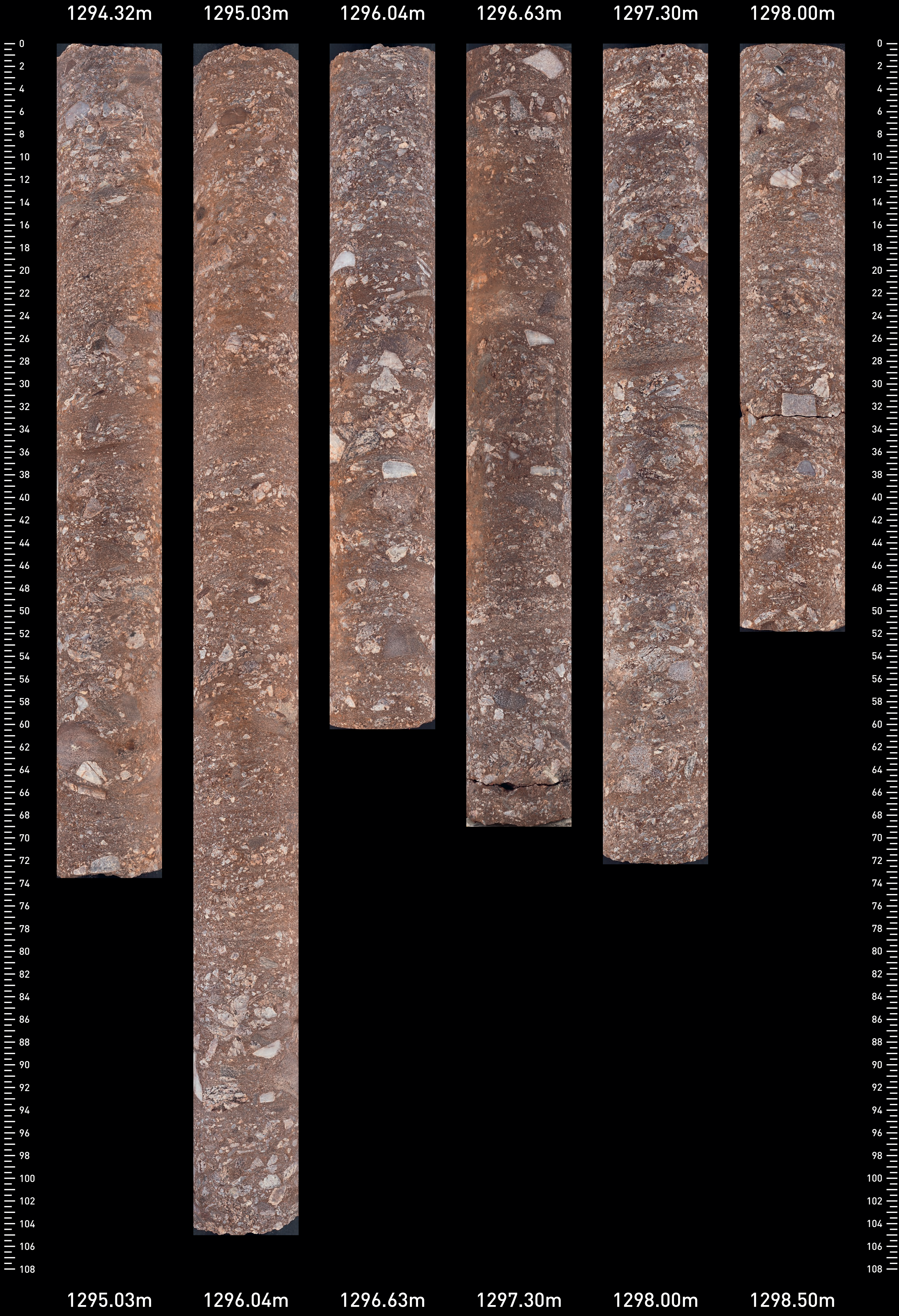
1281.70m	1282.25m	1283.00m	1283.90m	1284.80m	1285.29m


1285.29m
1286.21m
1286.95m
1287.66m
1288.33m
1289.08m
1286.21m
1286.95m
1287.66m
1288.33m
1289.08m
1290.00m

1290.00m 1290.60m 1291.38m 1292.25m 1292.70m 1293.50m

1290.60m 1291.38m 1292.25m 1292.70m 1293.50m 1294.32m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1297.30m
1298.00m
1298.50m

1298.50m 1299.50m 1300.30m 1301.11m 1301.48m 1302.40m

1299.50m 1300.30m 1301.11m 1301.48m 1302.40m 1303.30m

1303.30m 1304.30m 1305.30m

1304.30m 1305.30m 1306.26m

4 Bachs-1-1B core- and cuttings composites

515.00m

515.00m
520.00m
525.00m
530.00m
535.00m
540.00m
545.00m
550.00m
555.00m
560.00m
565.00m
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575.00m
580.00m
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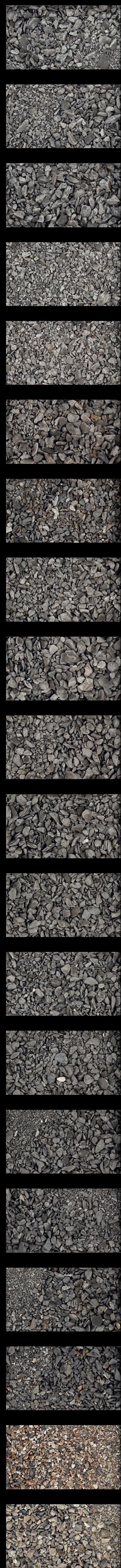
710.00m

715.00m



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745.00m
750.00m
755.00m
760.00m
765.00m
770.00m
775.00m
780.00m
785.00m
790.00m
795.00m
800.00m
805.00m
810.00m

810.00m

815.00m

815.00m

820.00m

825.00m

830.00m

835.00m

840.00m

845.00m

850.00m

855.00m

860.00m

865.00m

870.00m

875.00m

880.00m

885.00m

890.00m

895.00m

900.00m

905.00m

910.00m

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915.00m

915.00m

920.00m

925.00m

930.00m

935.00m

940.00m

945.00m

950.00m

952.00m

952.00m

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