BAKER HUGHES a GE company

LWD REALTIME LOG

Gamma Ray

Scale:	1:240 Measured Depth	Company:	Crestone Peak Resources Operating LLC
		Well:	Echeverria 2H-2H-D267
		Field:	Weld County
Depth Reference:	Driller's Depth	County:	Weld County Country: United States
		State:	Colorado
Status:	Final Print	Surface Location:	
		Latitude:	040° 10' 19.311" N
API No:	05-123-48749-0000	Longitude:	104° 51' 52.992" W
Job ID:	109763878	SEC: 2 TWN: 2N RGE: 67W	
Permanent Datum (P.D.):	Mean Sea Level	Elevation:	0.00 ft
Log Measured From:	Rig Floor	Above P.D.:	4910.00 ft

Other Services: Directional

Elev. KB:	N/A
Elev. DF:	4910.00 ft
Elev. GL:	4882.00 ft

Dates		Interval		Magnetic Field Reference	
From:	2019-04-09	Drilled (ft)	Logged (ft)	Azi Reference North: True	Dip Angle: (deg) 66.58
To:	2019-04-14	Top: 2361.00	Top: 2321.00	Total Magnetic Field Strength: (nT)	52078
Spud:	2019-01-22	Bottom: 12102.00	Bottom: 12063.00	Mag to Reference North Correction: (deg)	8.35

Borehole Record

Hole Size (in)	From (ft)	To (ft)
13.500	0.00	2361.00
8.500	2361.00	12102.00

Casing Record

Size (in)	Weight (lb/ft)	From (ft)	To (ft)
9.625	3.00	0.00	2351.00

Mud Record

Type	From (ft)	To (ft)
Synthetic Based Mud	2361.00	12104.55

Deviation Record

Hole Size (in)	Interval (ft)	Inc | Az (Start)	Inc | Az (End)
8.500	9785.95	12.20 | 33.11	92.40 | 180.64

Acquisition System		Software Version		Other			
Baker Hughes Cadence	RT 5.1	Rig:	Ensign 142				
Plot Studio	5.1.8355.1	Contractor:	Ensign Drilling				
		District:	RMD			Unit:	D&E

Log Run Summary

Run No	Bit Run No.	Bit Size (in)	Bit Type	Bit Gauge Length (in)	Assembly Type	Logged Interval Top (ft)	Logged Interval Bottom (ft)	Bit Depth Interval From (ft)	Bit Depth Interval To (ft)	Date / Time Start Logging	Date / Time End Logging	Circ. Hours (h)
1	1	2.000	PDC	3.00	Steerable	2321.00	2689.00	2361.00	2733.00	2019-04-09 15:47	2019-04-09 21:43	5.23
2	2	2.000	PDC	3.00	Steerable	2690.00	6155.00	2733.00	6195.00	2019-04-10 04:11	2019-04-11 07:38	22.90
3	3	2.000	PDC	3.00	Steerable	6158.00	12063.00	6195.00	12102.00	2019-04-12 04:28	2019-04-14 10:40	52.30

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
B. Severson	2019-04-08	2019-04-11	A. Spring	2019-04-09	2019-04-14			

Mud Properties Record

Date / Time	Run No.	Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2019-04-09 06:15	1	2361.00	Synthetic Based Mud	10.5	17	0	0.0	67/15.8	Active Pit	27992	0.00
2019-04-10 04:00	2	2731.00	Synthetic Based Mud	10.1	14	0	0.0	69.5/15	Active Pit	27211	0.00
2019-04-10 16:00	2	4574.00	Synthetic Based Mud	9.5	11	0	0.0	69/19	Flow Line	34516	0.00
2019-04-11 14:46	3	6195.00	Synthetic Based Mud	9.5	13	0	0.0	66.5/19	Flow Line	32819	0.00
2019-04-12 17:00	3	7191.00	Synthetic Based Mud	10.1	14	0	0.0	66/19	Flow Line	28958	0.00
2019-04-13 17:00	3	9763.00	Synthetic Based Mud	10.1	15	0	0.0	66.5/18	Flow Line	30888	0.00

Equipment and Service Data

Run No.	Tool	Serial Number	Measurement	Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)	Min I.D. (in)
1	NaviGamma	10350731	Gamma (single)	10.75	41.44	6.750	3.250
1	NaviGamma	10350731	Directional (mag)	14.17	44.86	6.750	3.250
1	NaviGamma	10350731	VSS	14.17	44.86	6.750	3.250
2	NaviGamma	10350730	Gamma (single)	10.65	41.34	6.500	3.250
2	NaviGamma	10350730	Directional (mag)	14.07	44.76	6.500	3.250
2	NaviGamma	10350730	VSS	14.07	44.76	6.500	3.250
3	NaviGamma	10350730	Gamma (single)	10.65	41.40	6.500	3.250
3	NaviGamma	10350730	Directional (mag)	14.07	44.82	6.500	3.250
3	NaviGamma	10350730	VSS	14.07	44.82	6.500	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
GAM	NaviGamma	Probe Based Gamma Module, NaviTrak Platform

Comments

1 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.

2 Baker Hughes run 1-3 utilized 6 1/2 inch NaviGamma services (Gamma Ray and Directional) behind a 8 1/2 inch bit and steerable assembly from 2361 to 12102 feet MD (2314 to 7192 feet TVD).

3 There are numerous gaps throughout the top half of the log due to bad decoding on bottom while drilling ahead.

4 A sliding indicator is shown to the left edge of track 1 as a heavy line. The indicator has been depth-shifted to the Gamma Ray sensor offset to correspond with Gamma Ray data acquired while sliding.

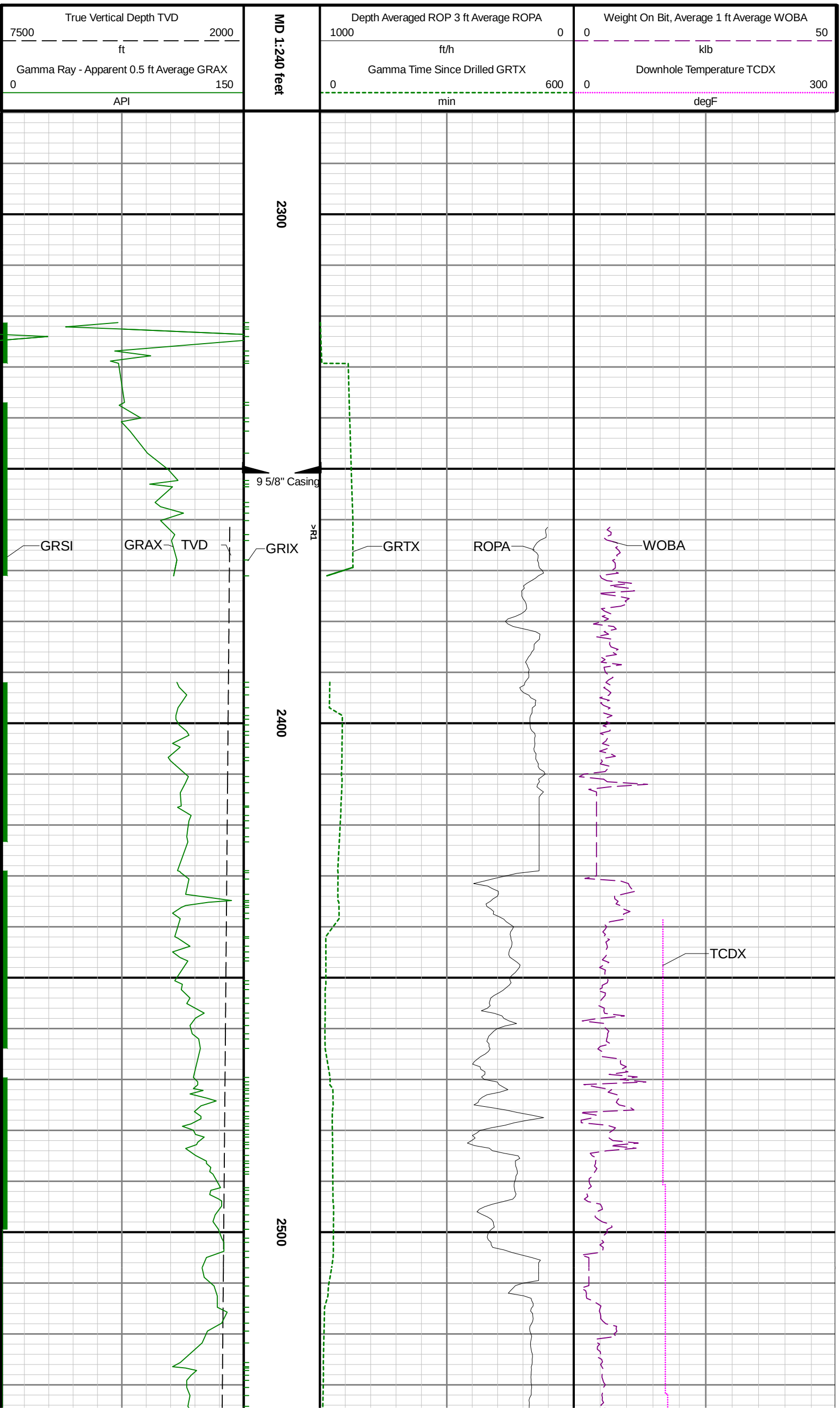
Remarks

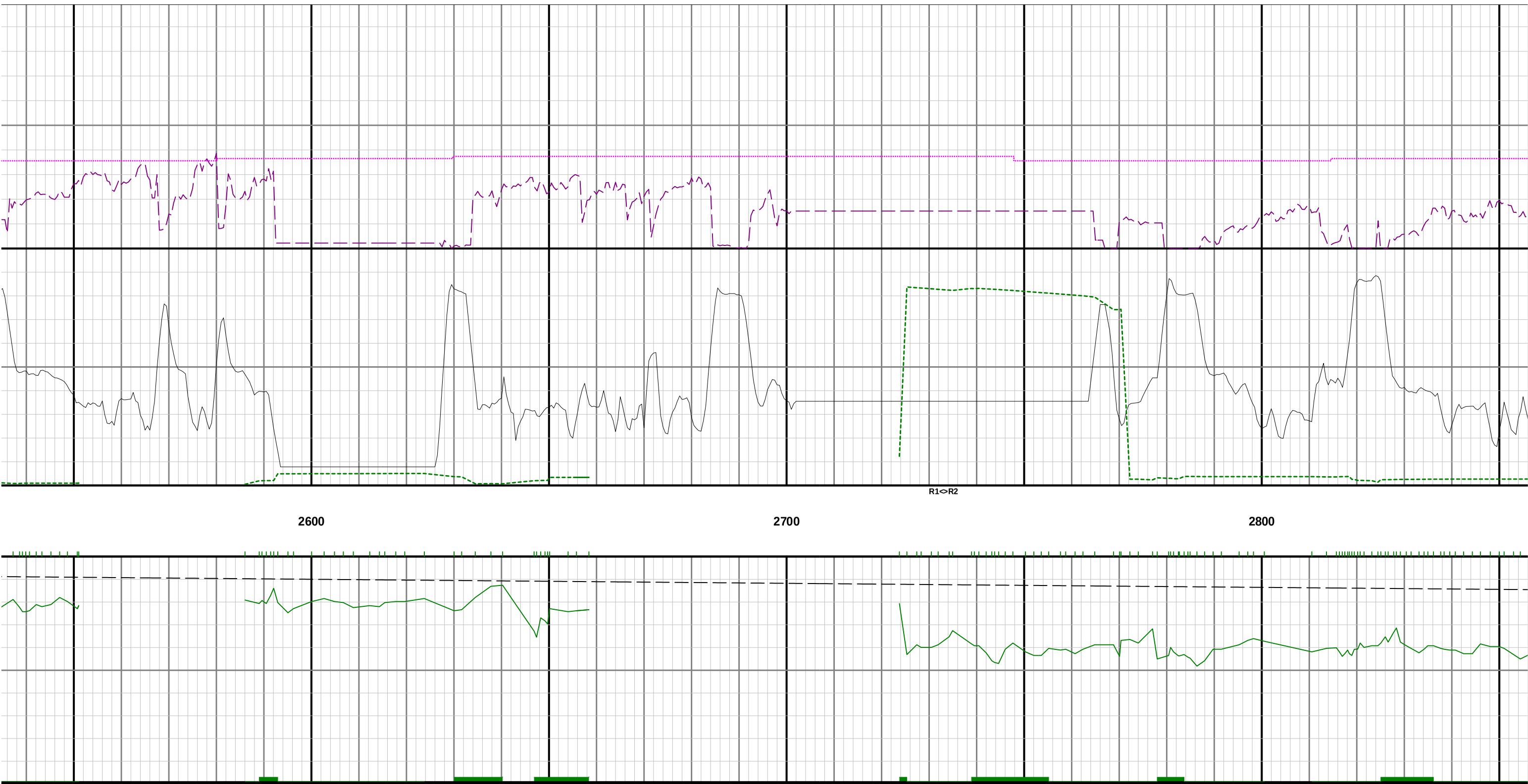
Number	Depth	Hole	Run	Remark

	(ft)	Section (in)	No.	
1	12063.00	8.500	3	The interval from 12063 to 12102 feet MD (7194 to 7192 feet TVD) was not logged due to sensor to bit offset at TD.

Curve Mnemonics

Presented Curves	Description	Units
TCDX	Downhole Temperature	degF
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAX	Gamma Ray - Apparent - Real-Time 0.5 ft Average	API
GRIX	Gamma Ray - Data Point Indicator - Real-Time	unitless
GRTX	Gamma Ray - Time Since Drilled - Real-Time	min
GRSI	Sliding Indicator Flag	unitless

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2700
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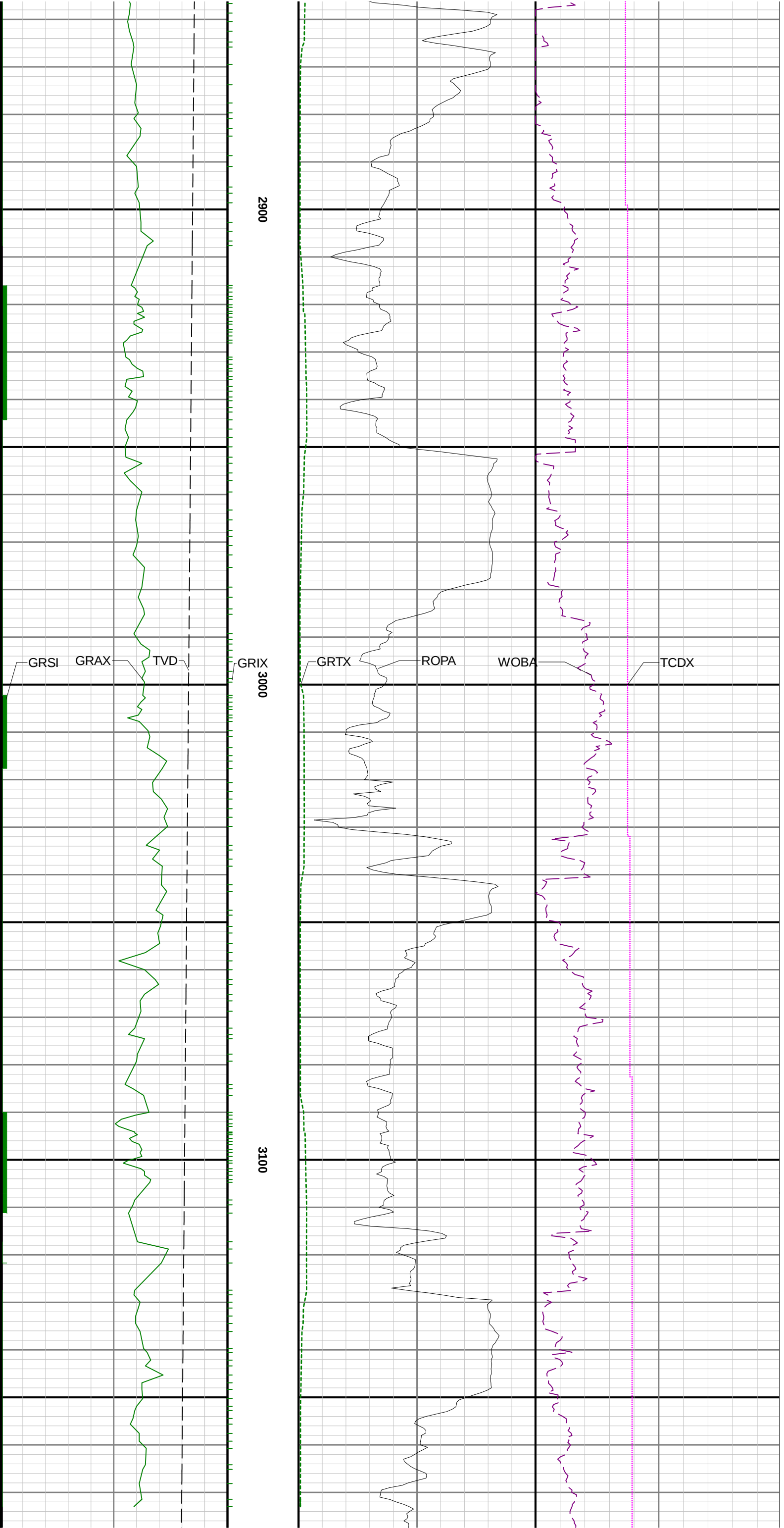
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GRSI
GRAX
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GRTX
ROPA
WOBA
TCDX

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3300

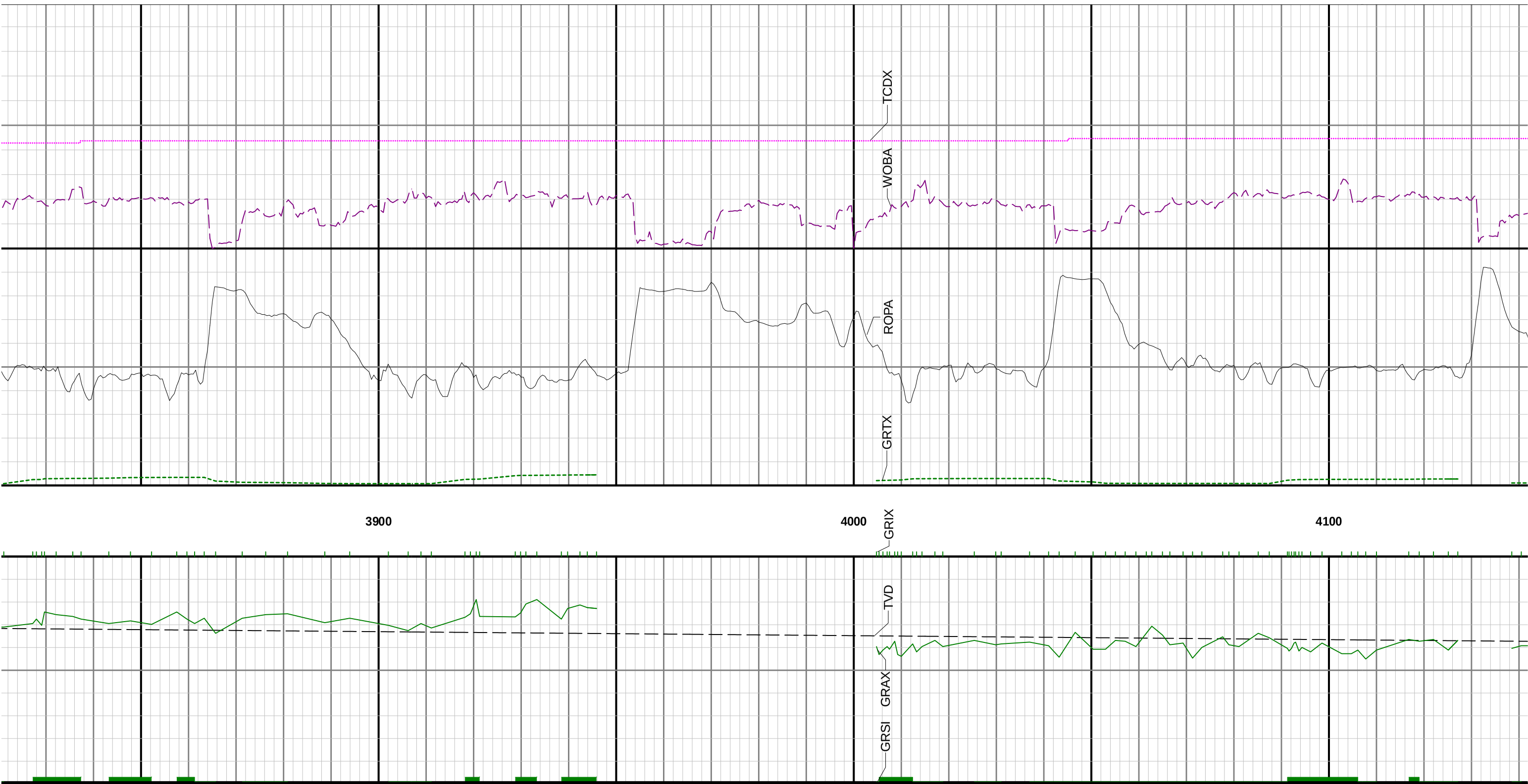
3400

3500

3600

3700

3800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GRIX
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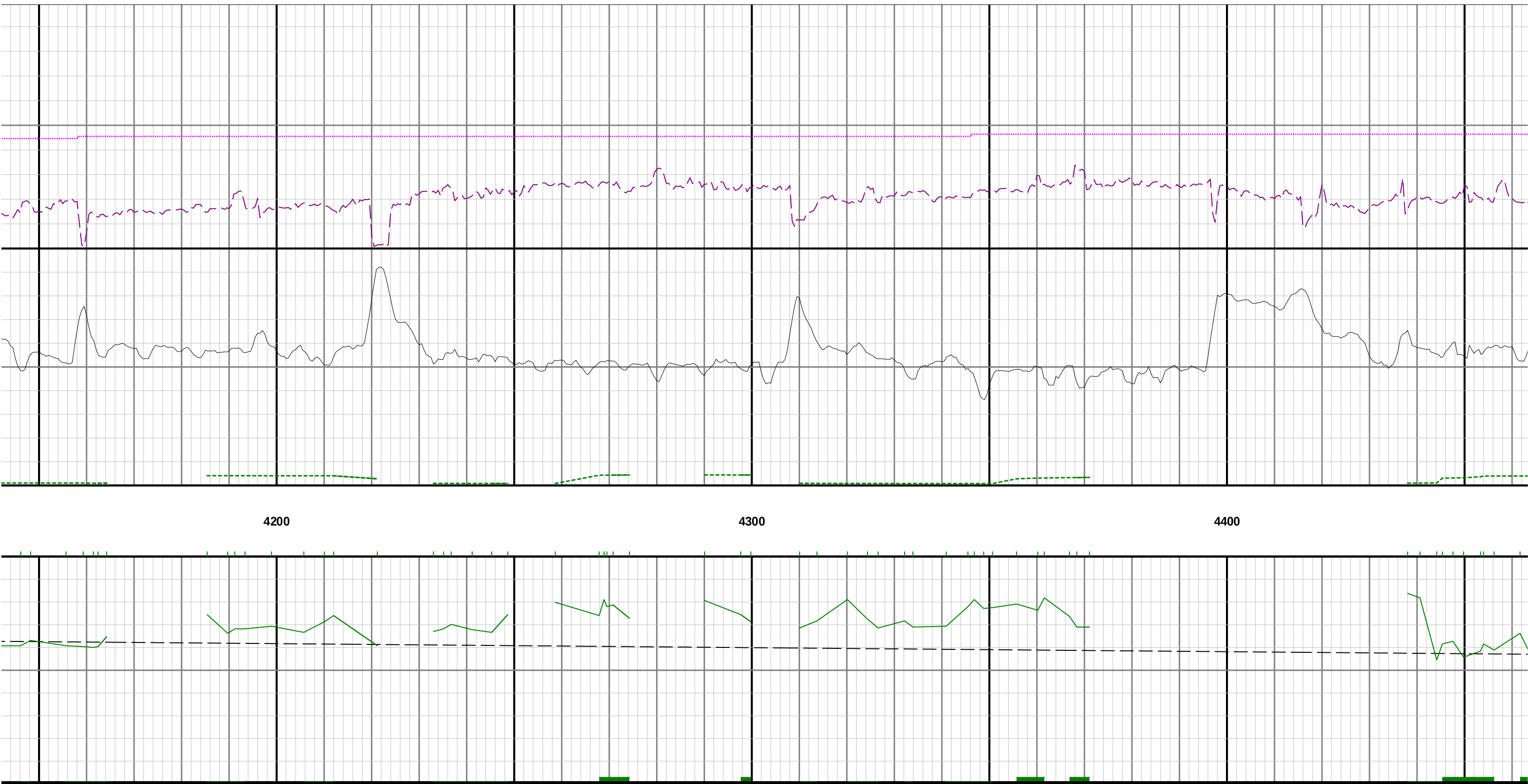
GRAX
GRSI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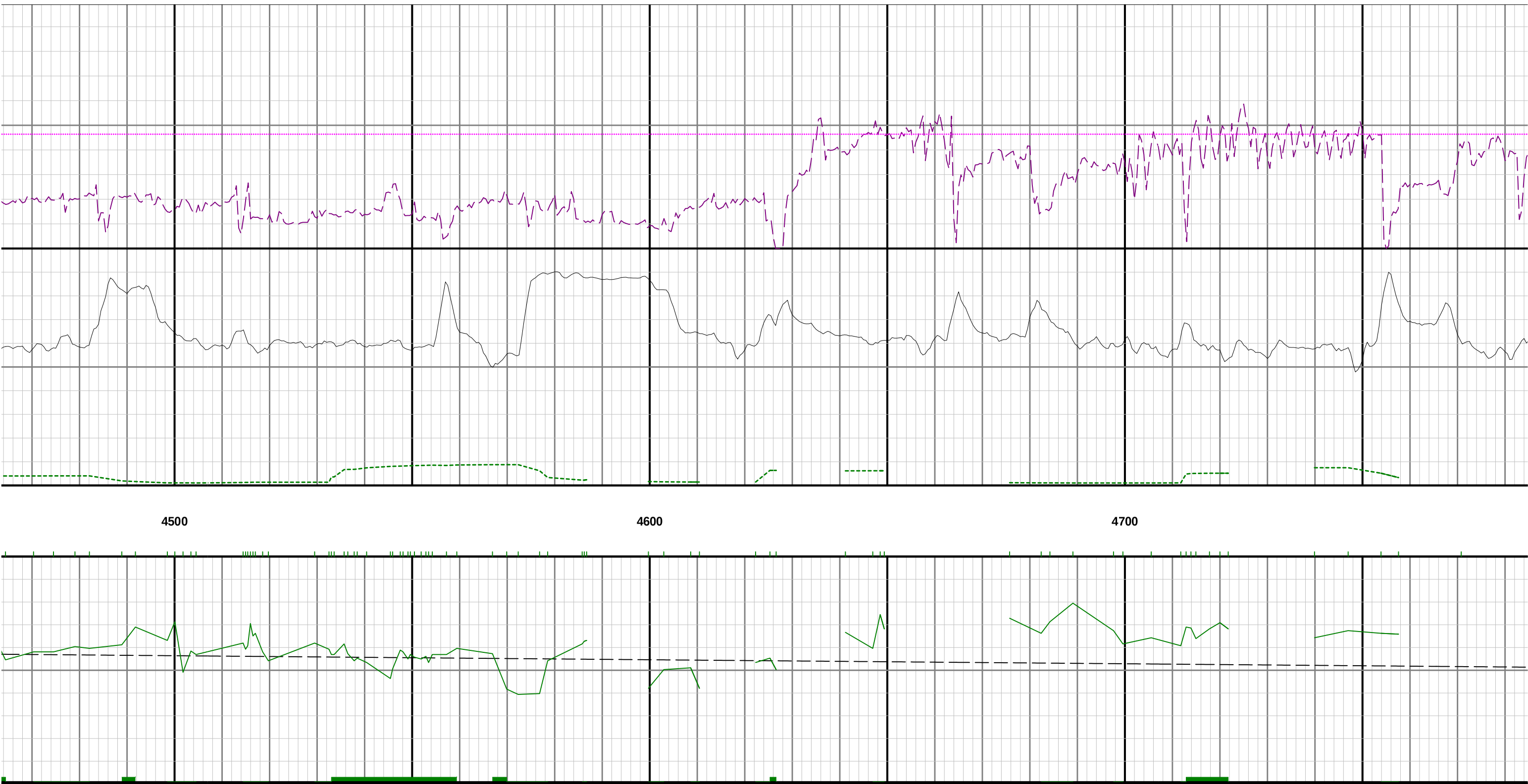
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4800

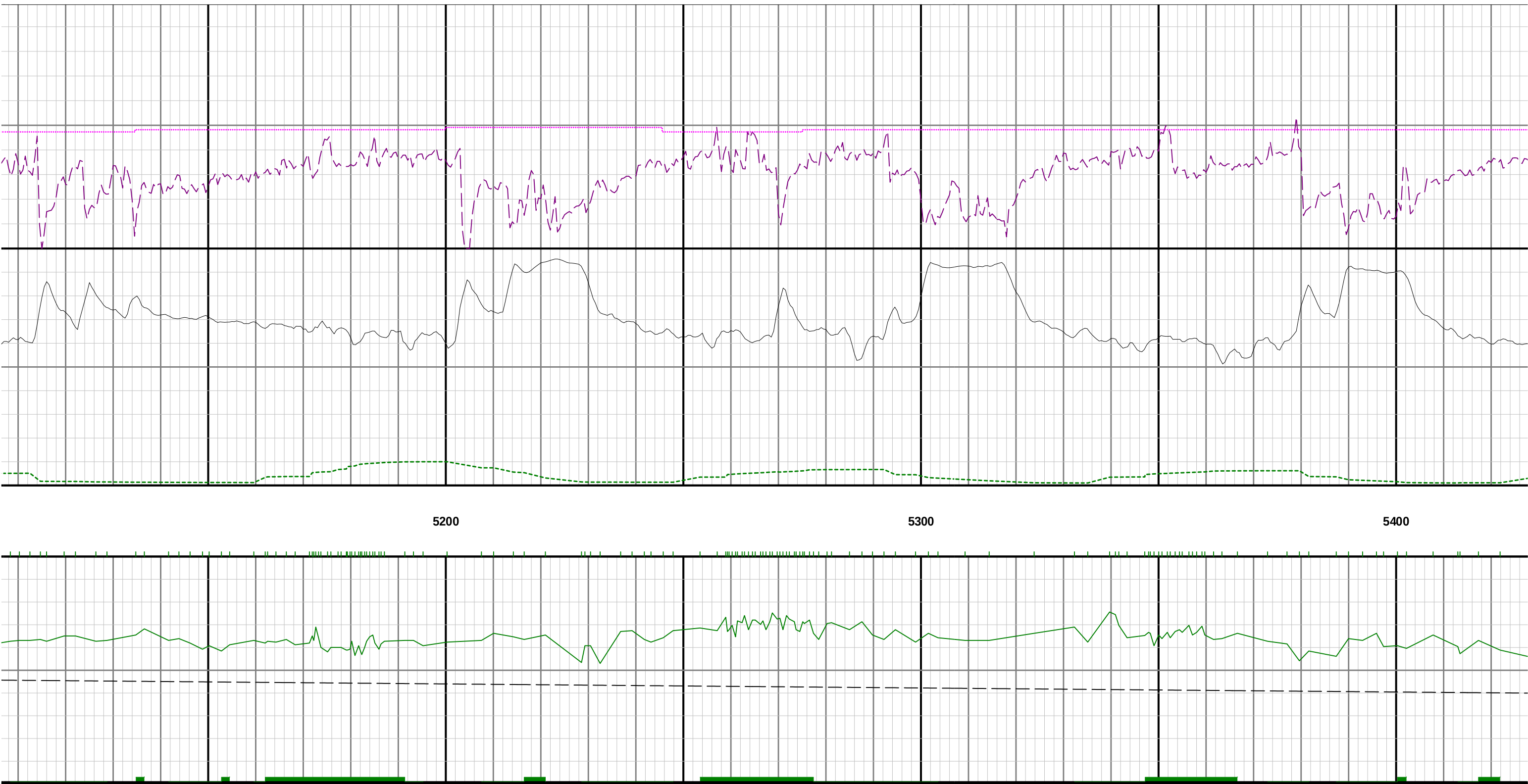
4900

GRSI GRAX TVD GRIX

5000

GRTX ROPA WOBA TCDX

5100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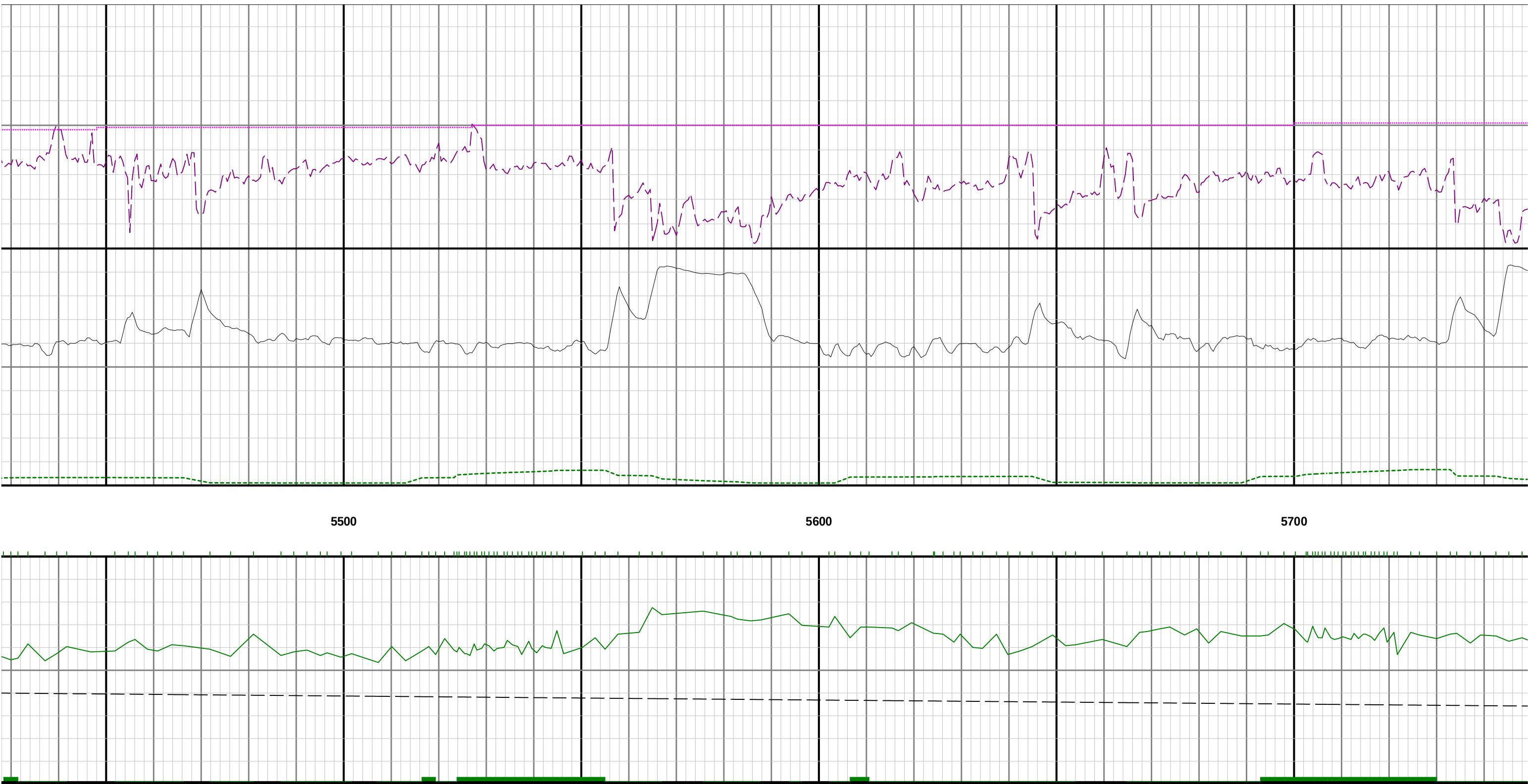
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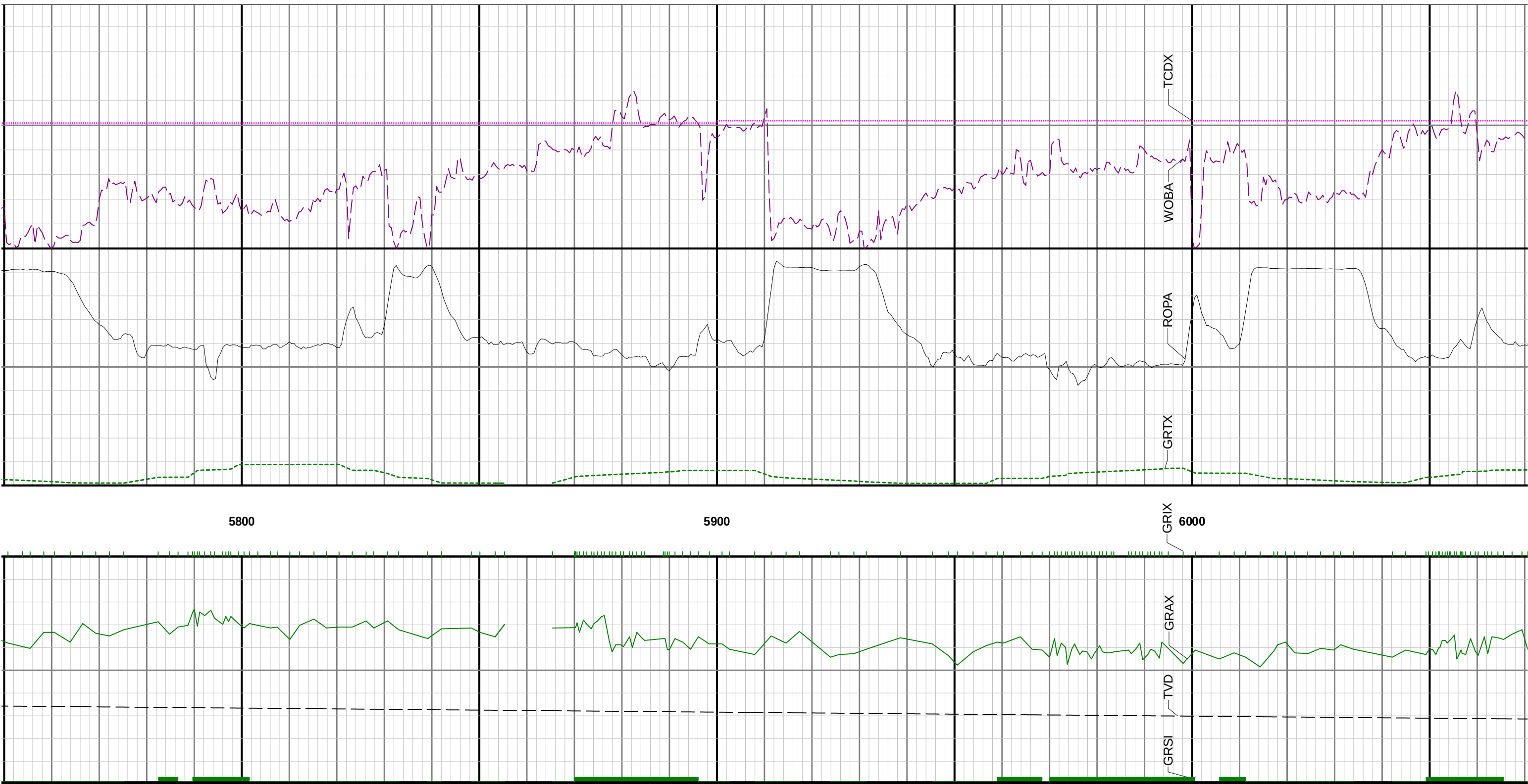
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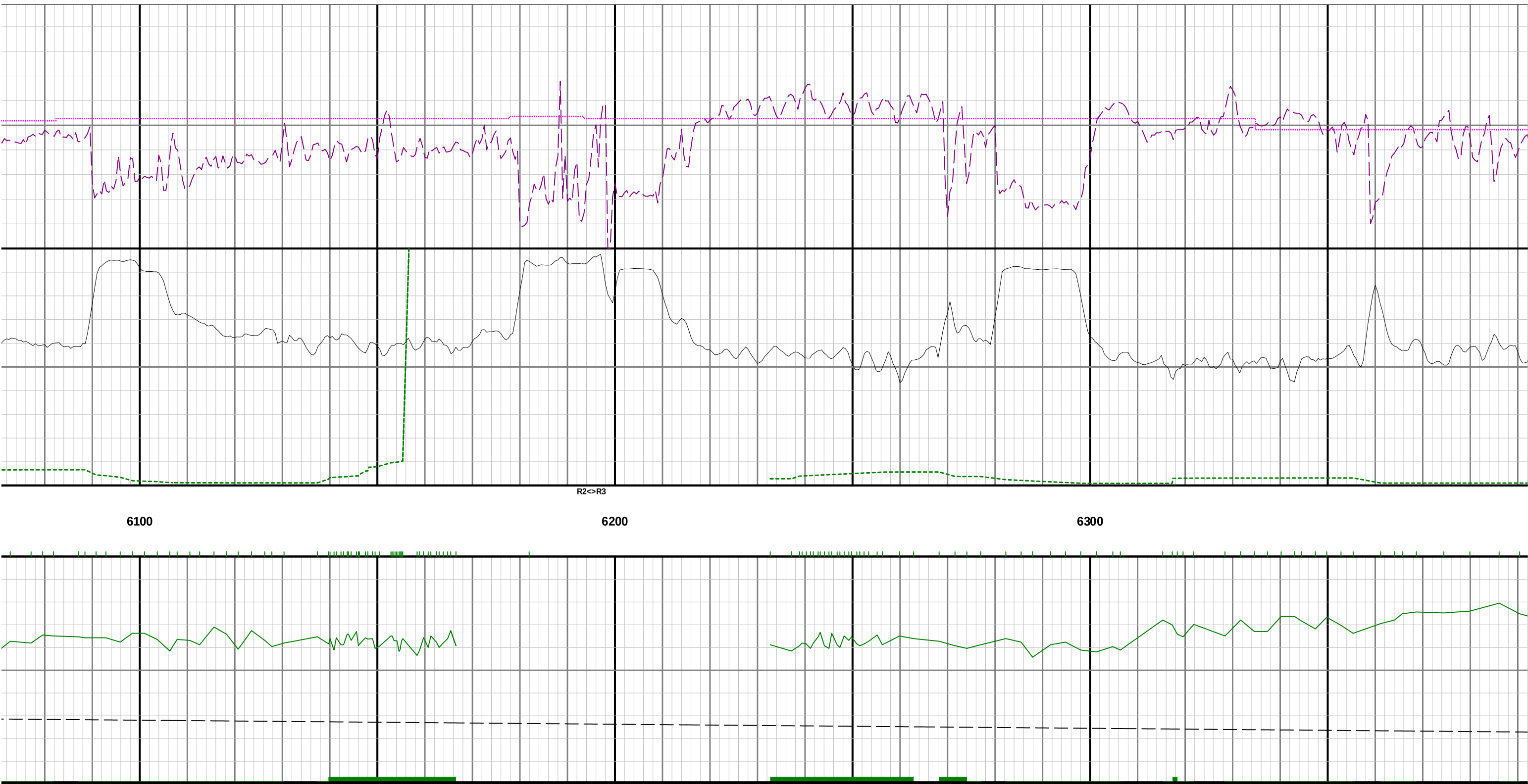
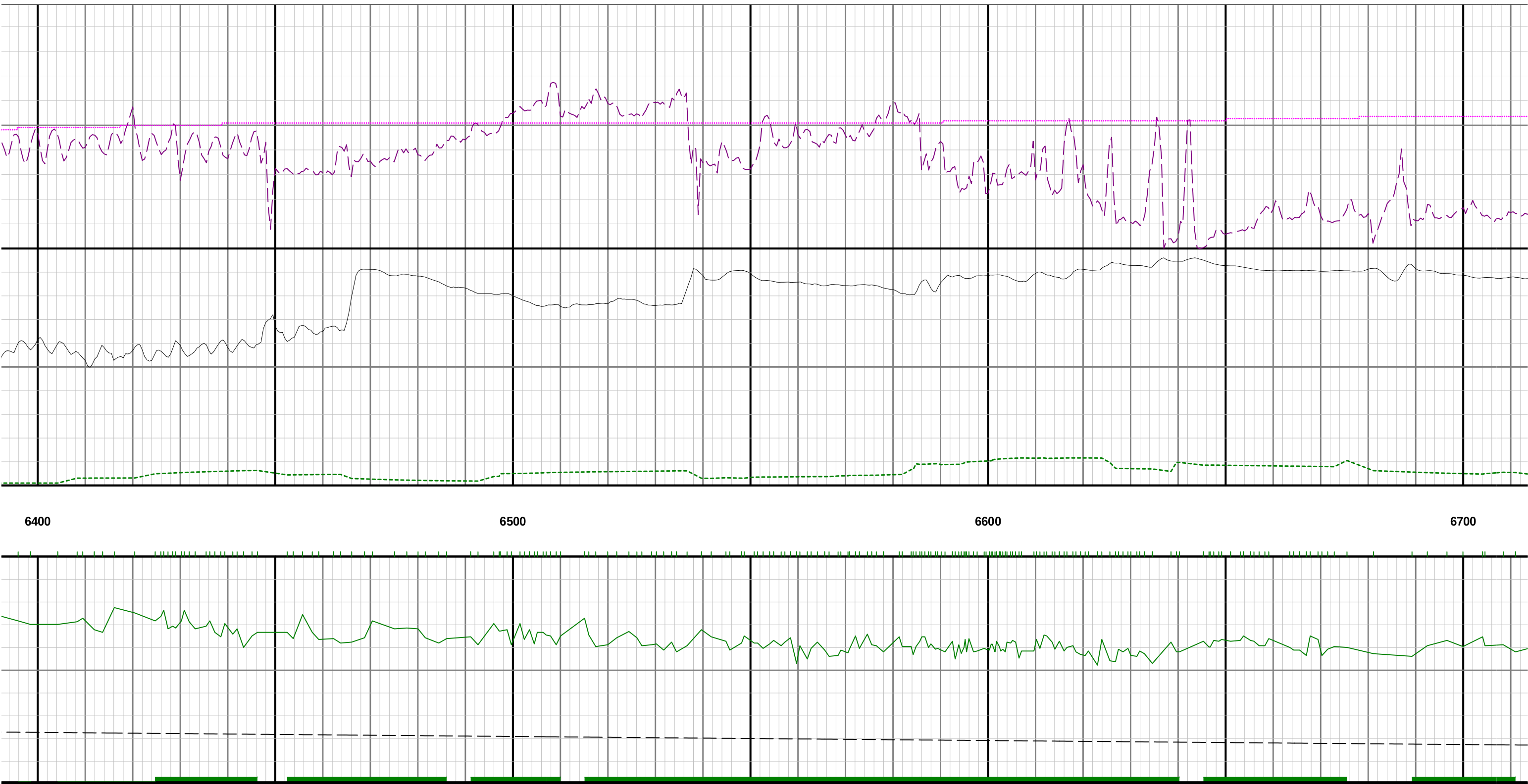
5800
5900
GRIX
6000
GRAX
TVD
GRSI


R2<>R3
6100
6200
6300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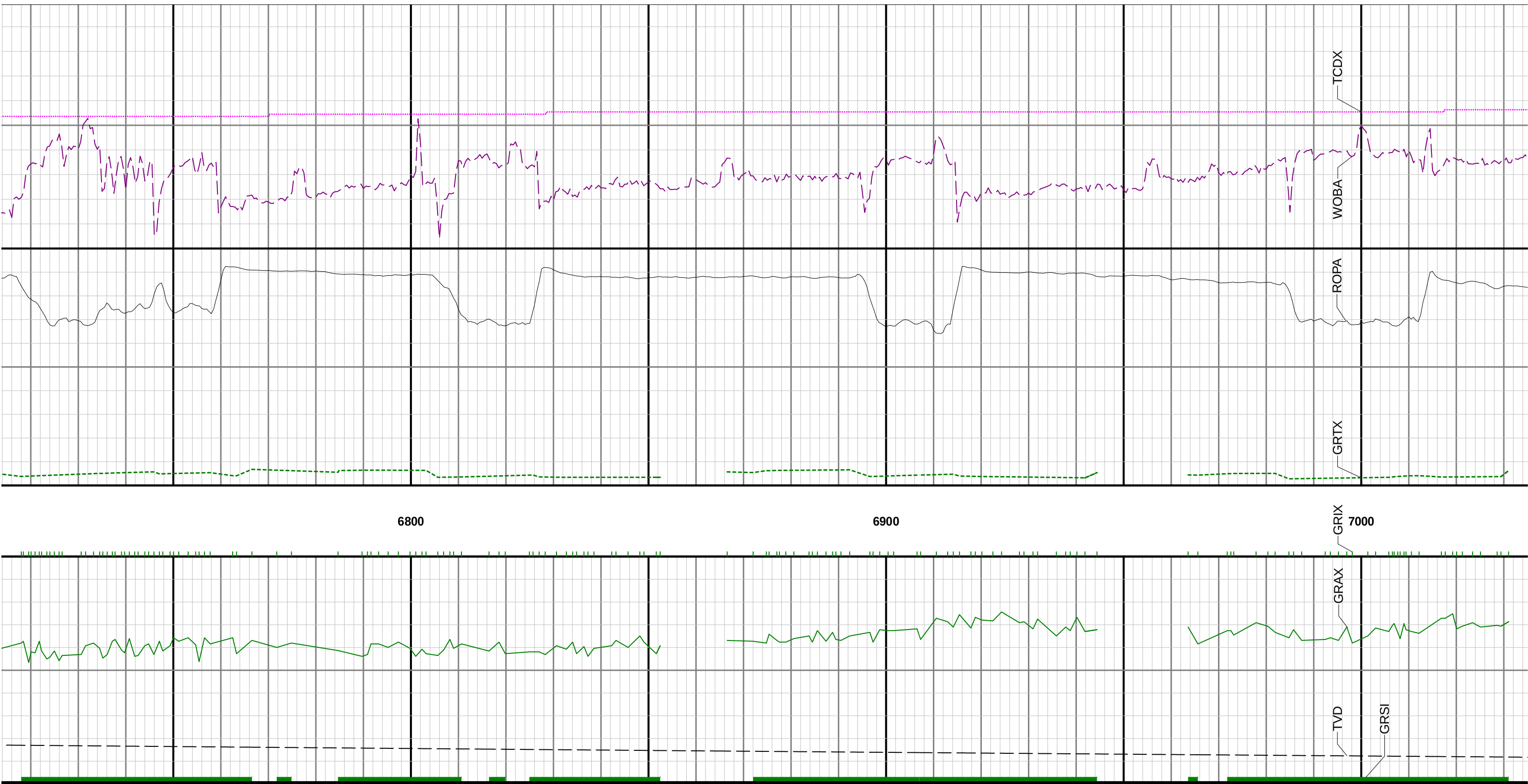
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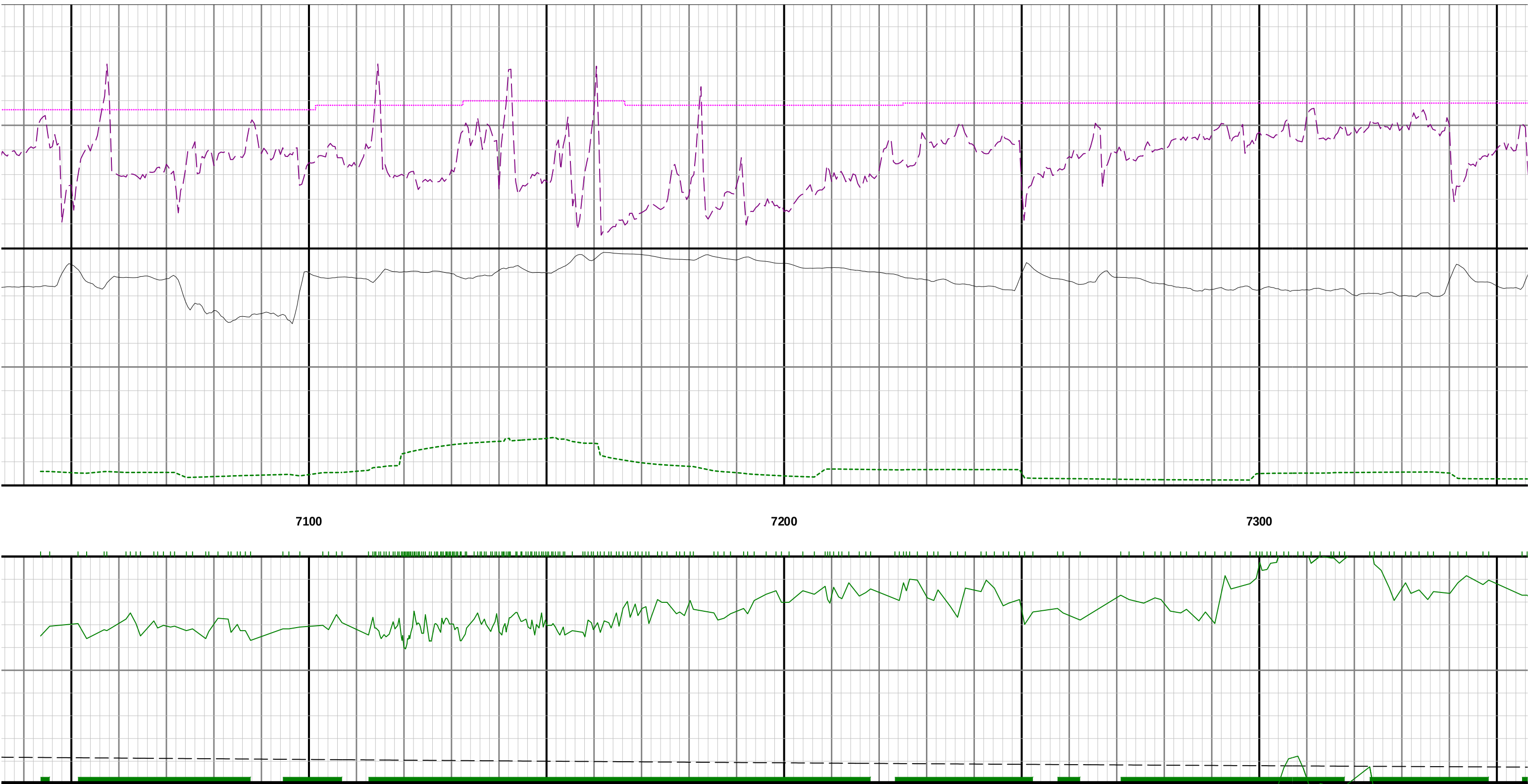
GRIX
7000
GRAX
TVD
GRSI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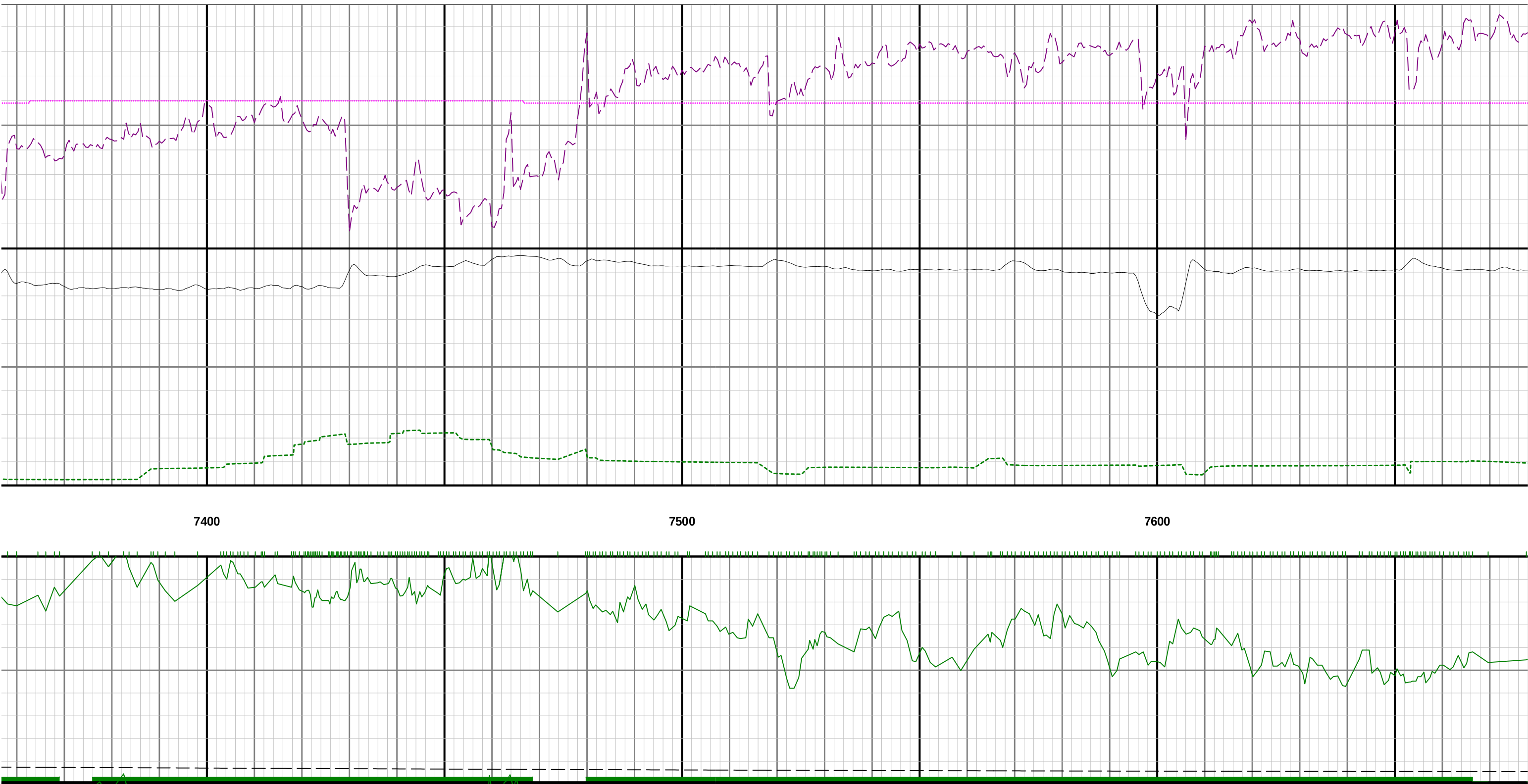
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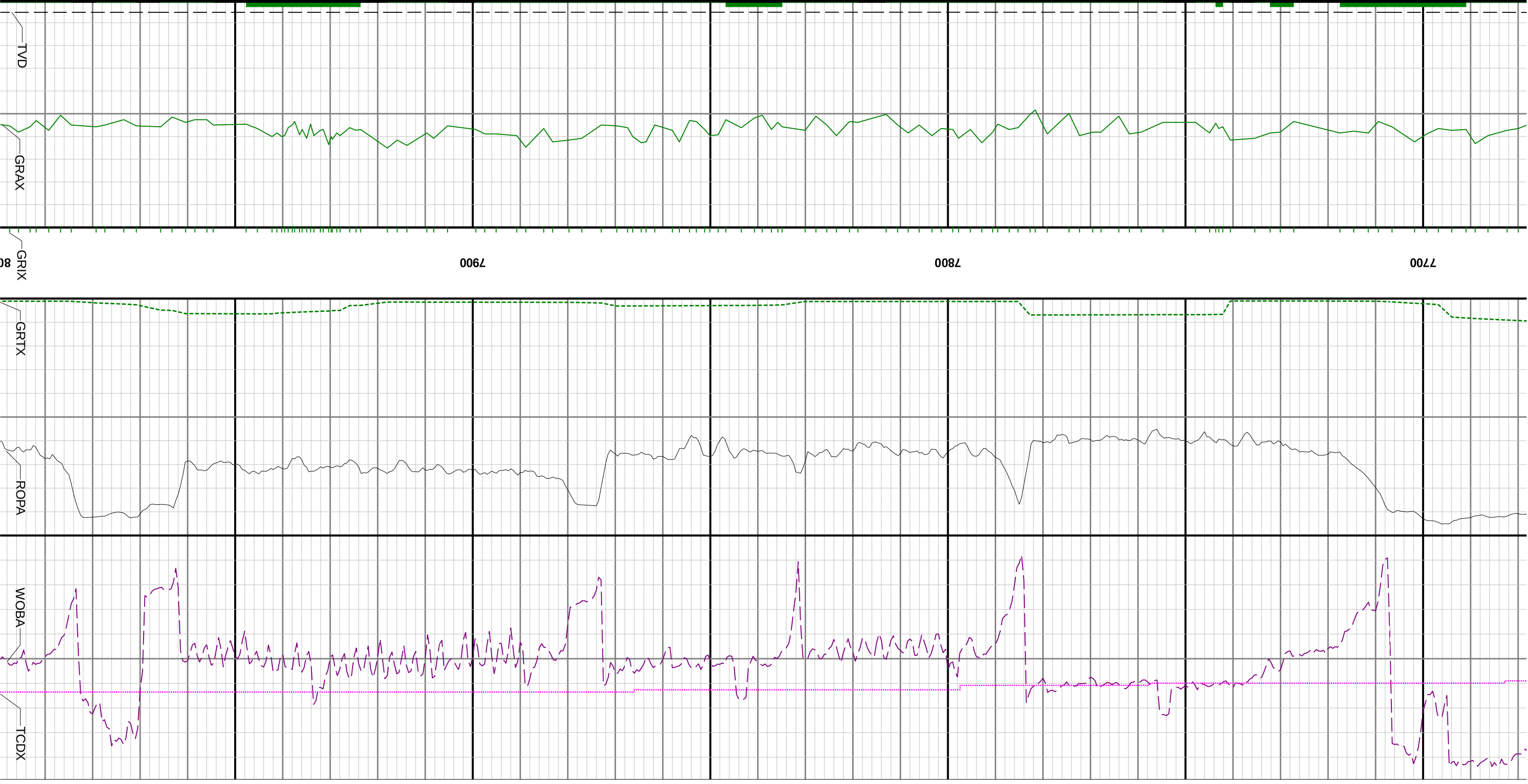
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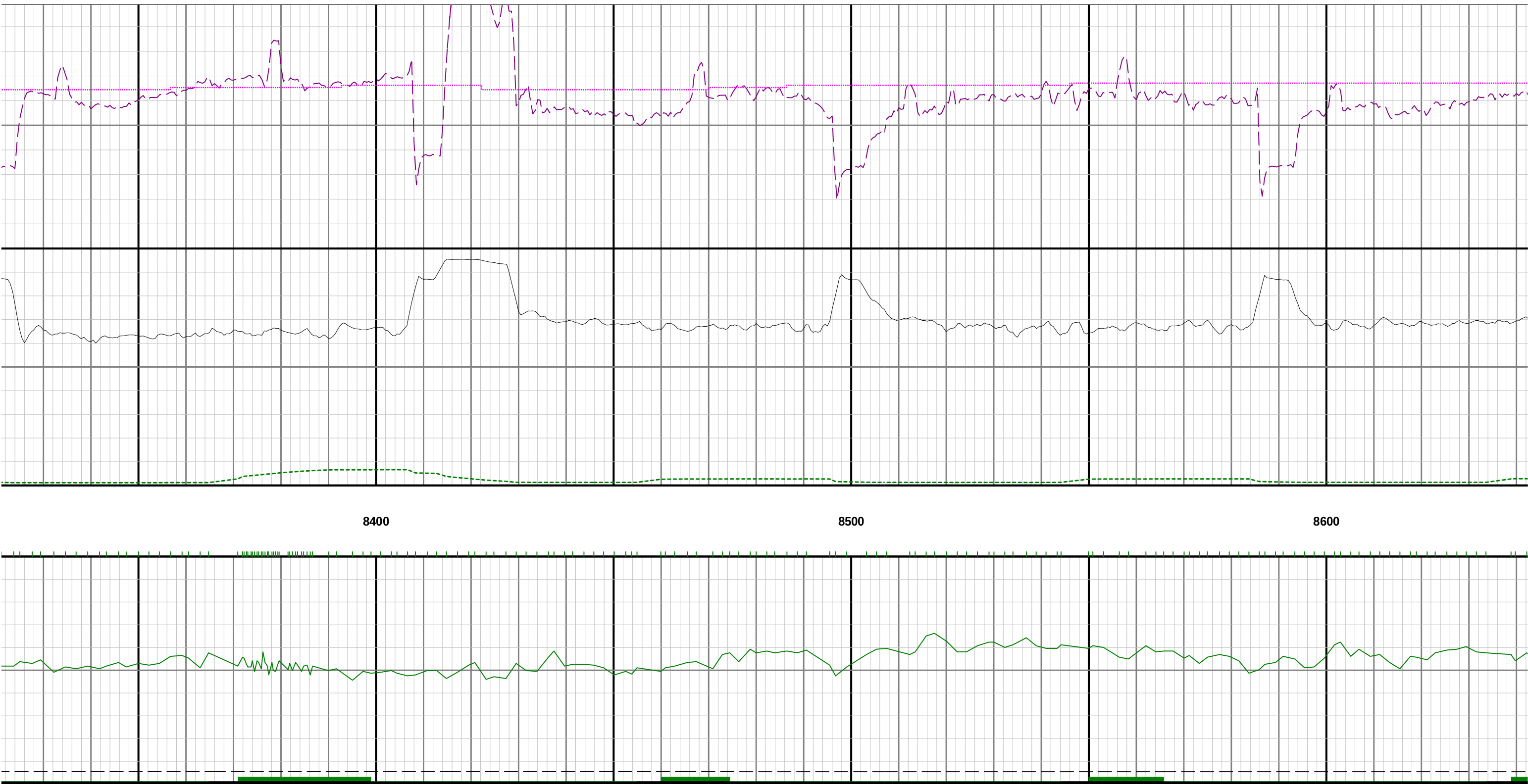
TCDX

GRSI

8100

8200

8300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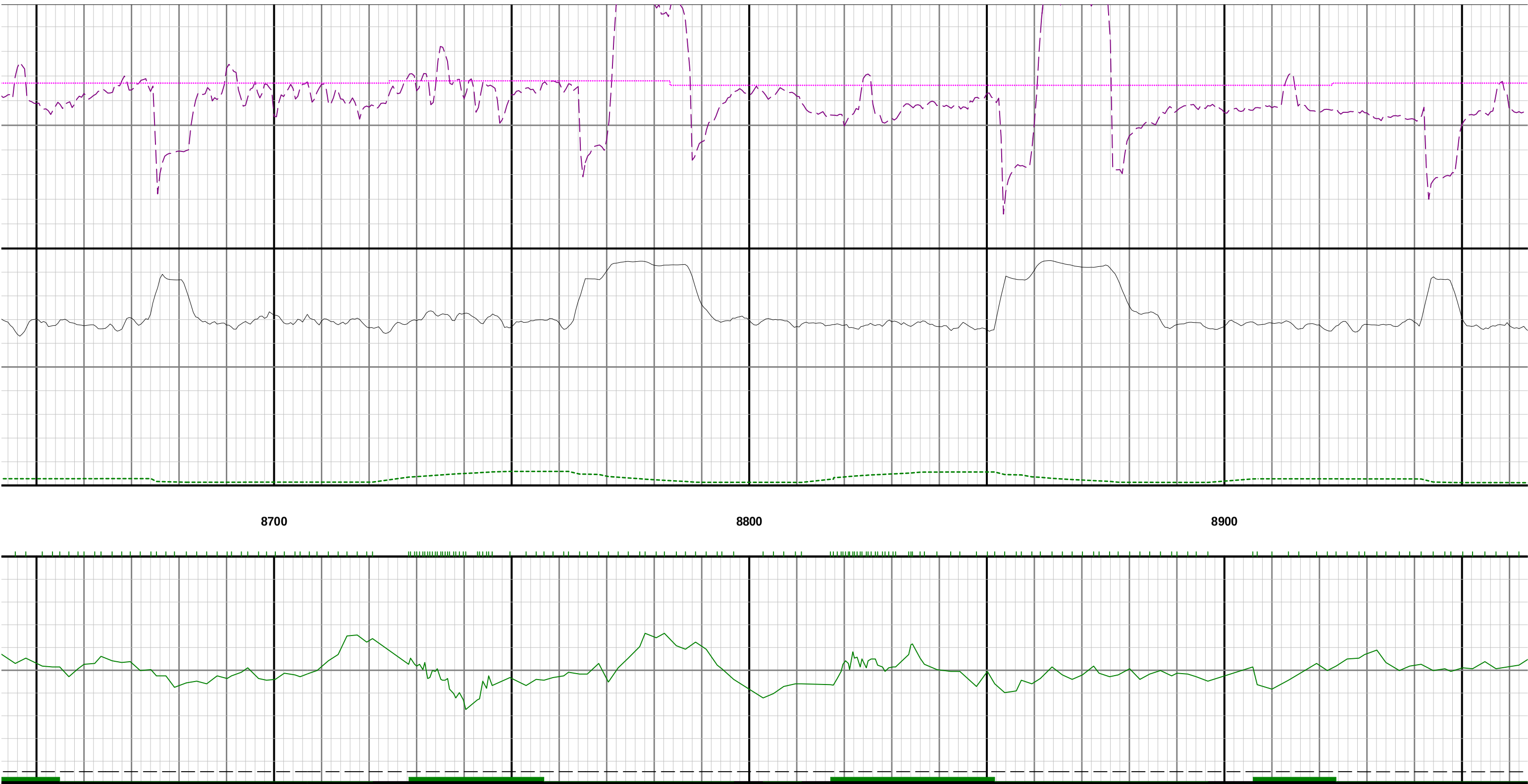
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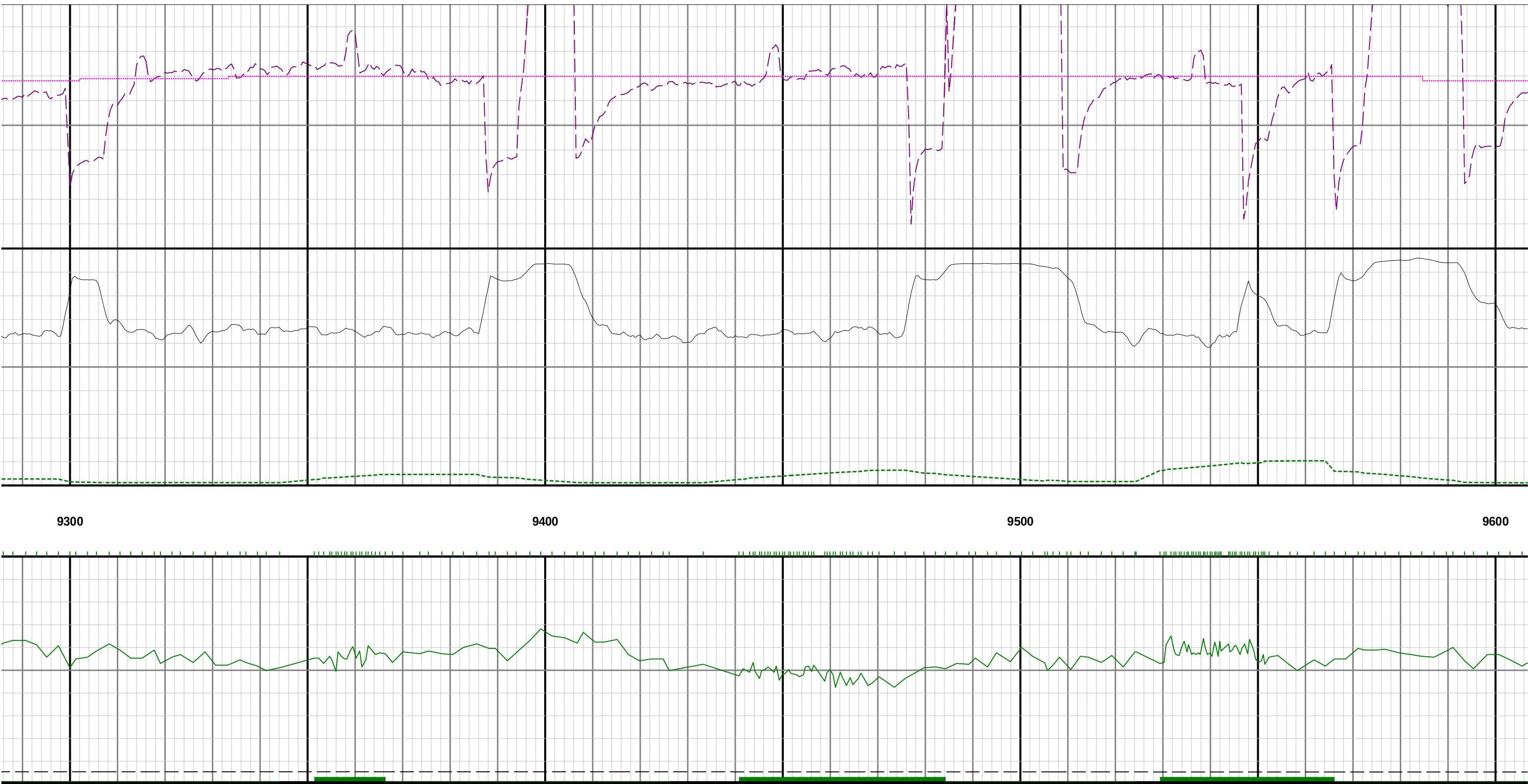
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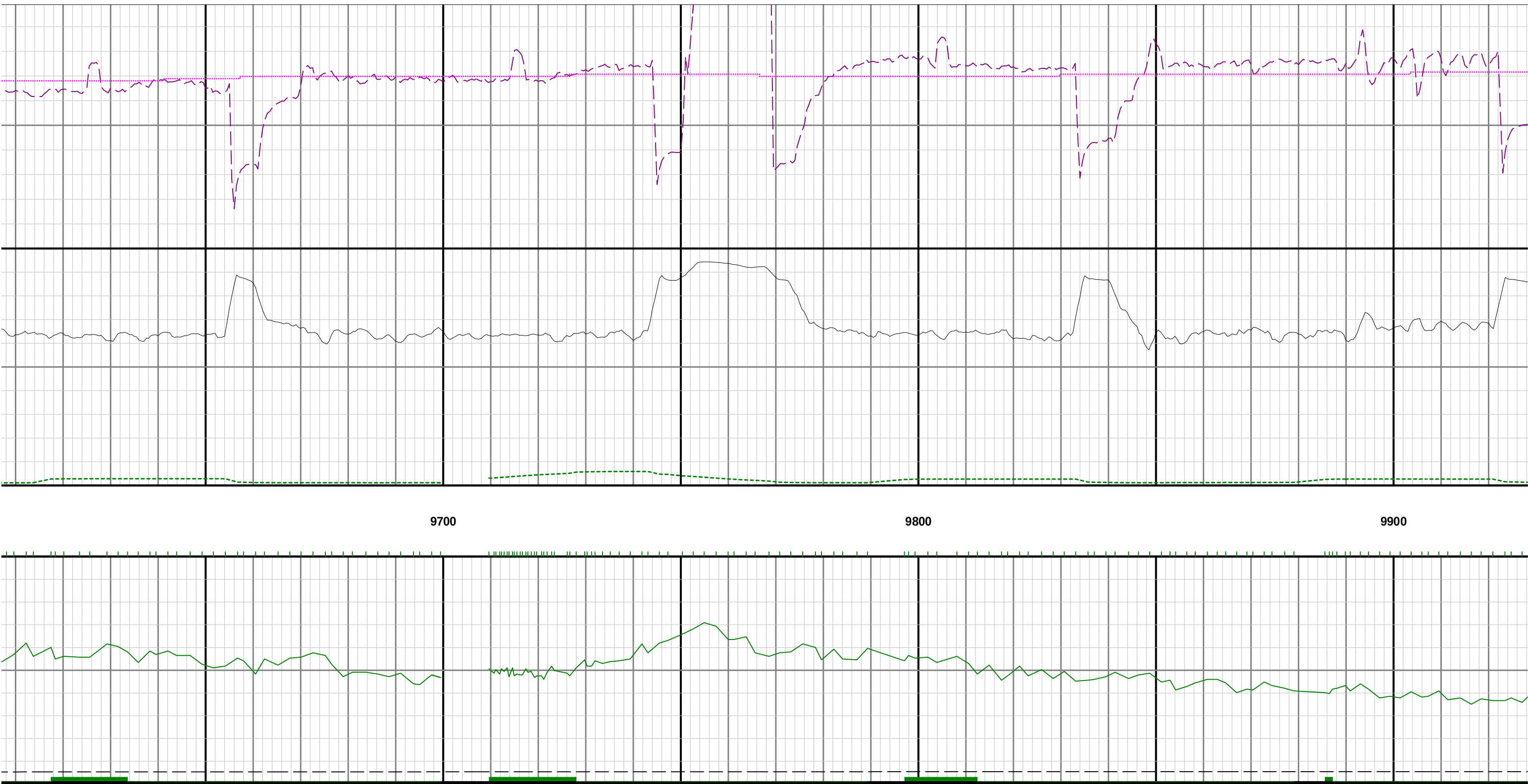
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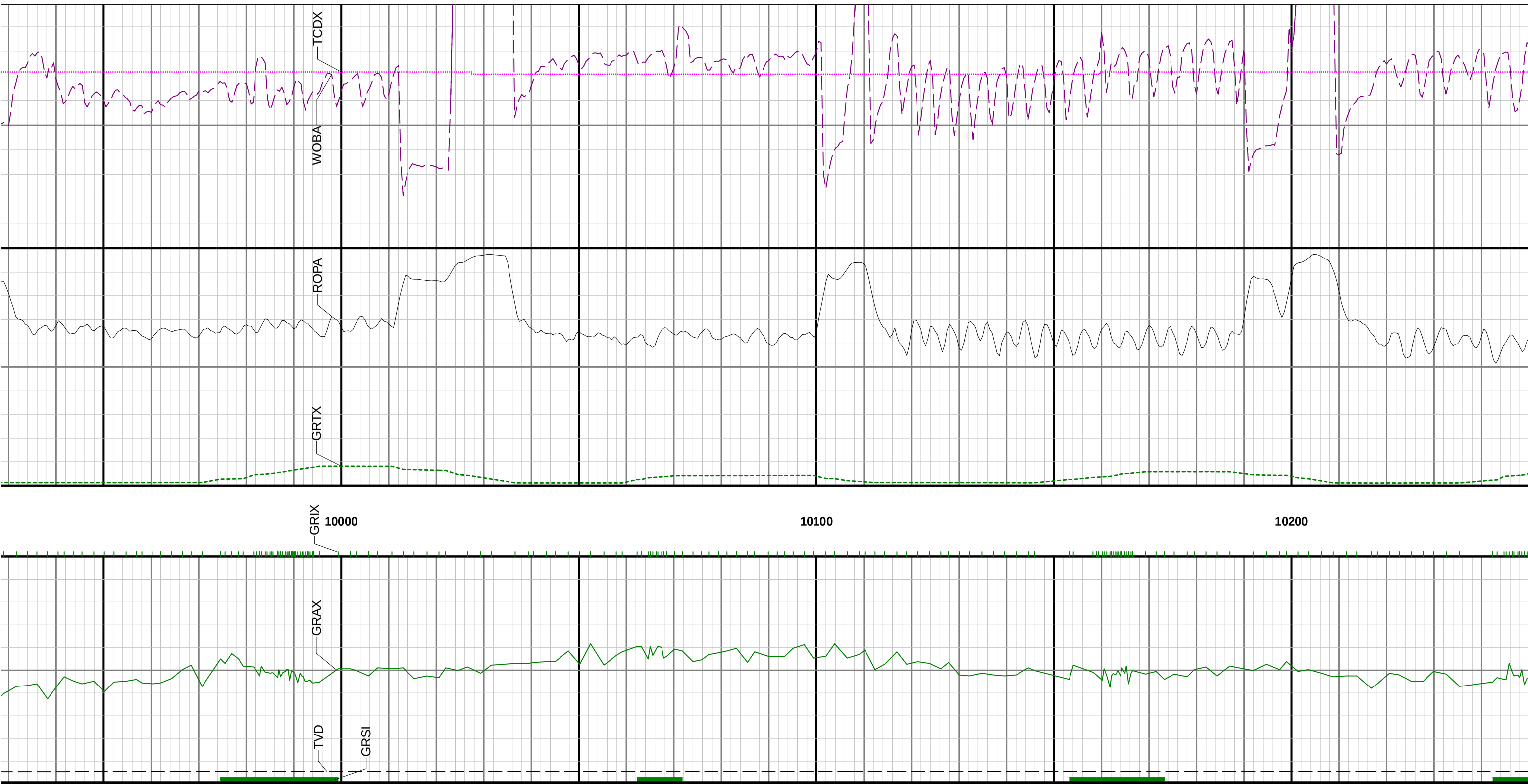
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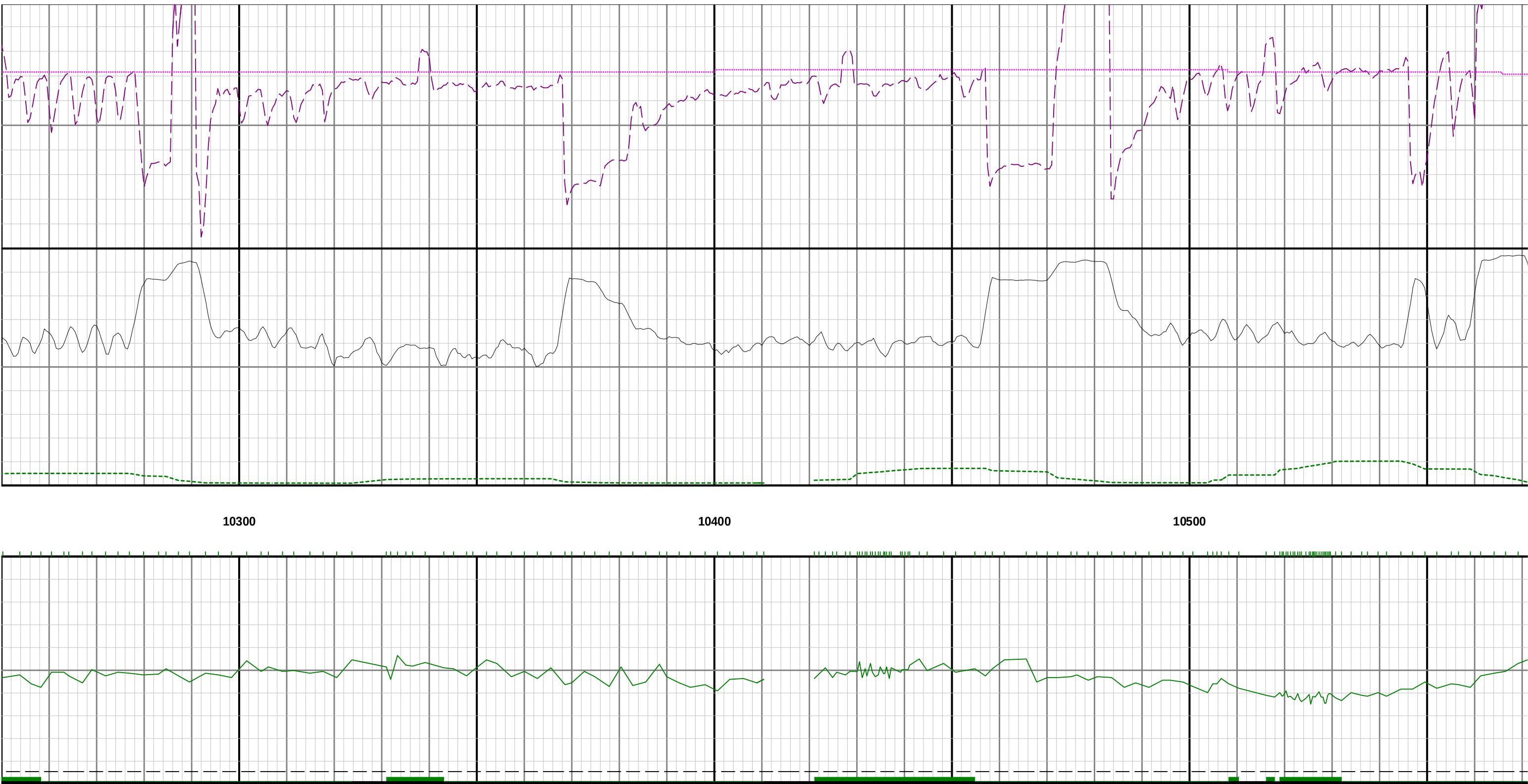
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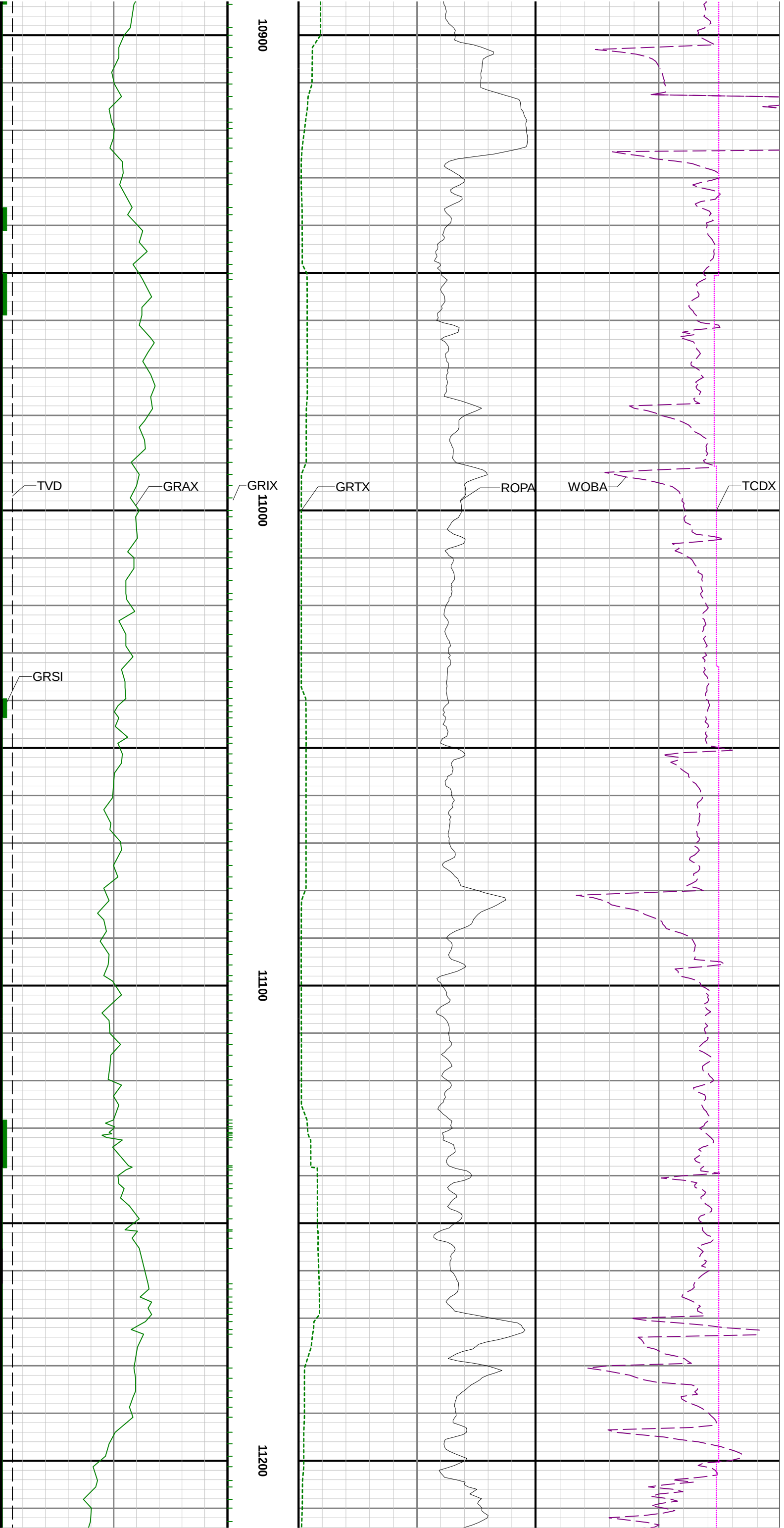
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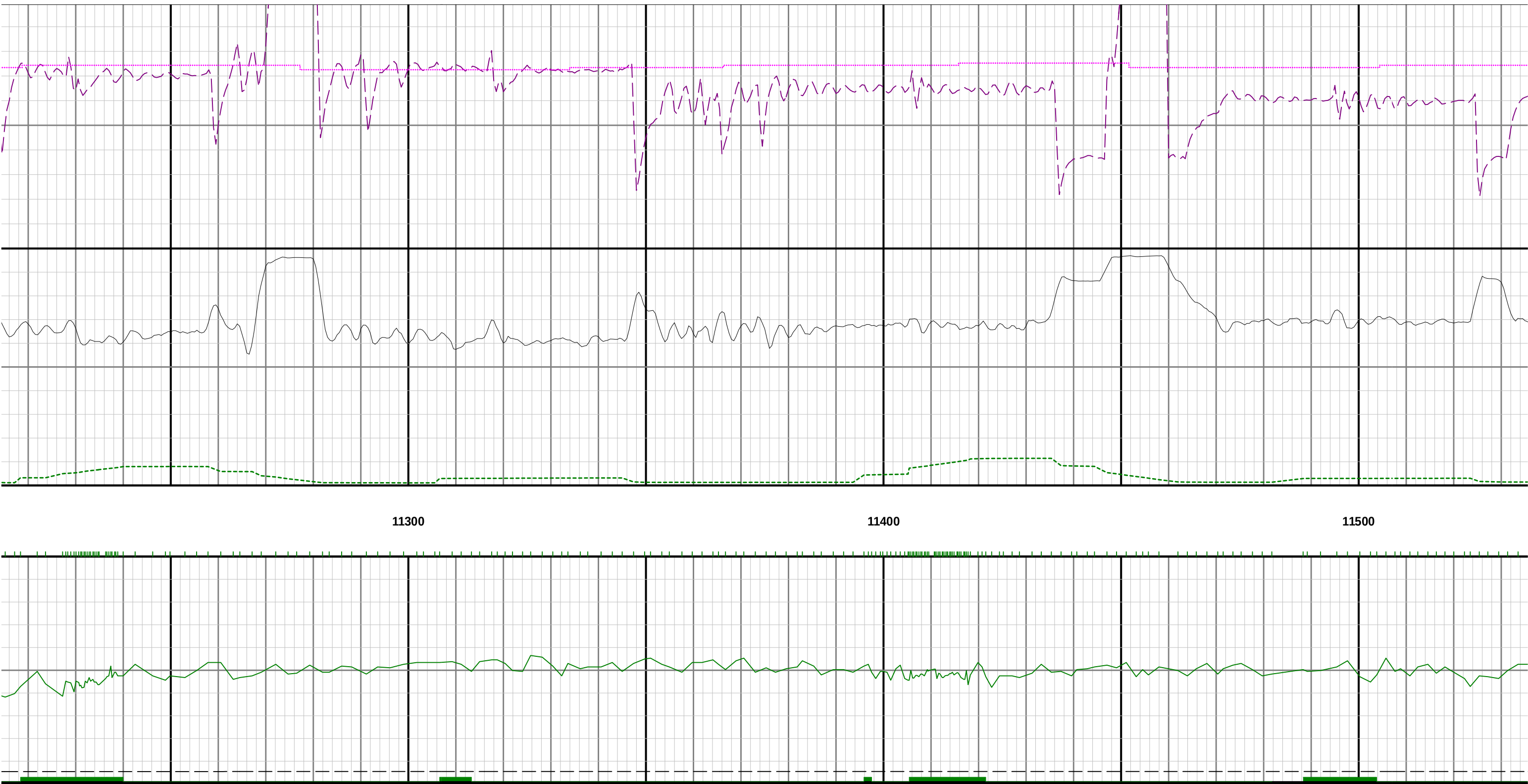
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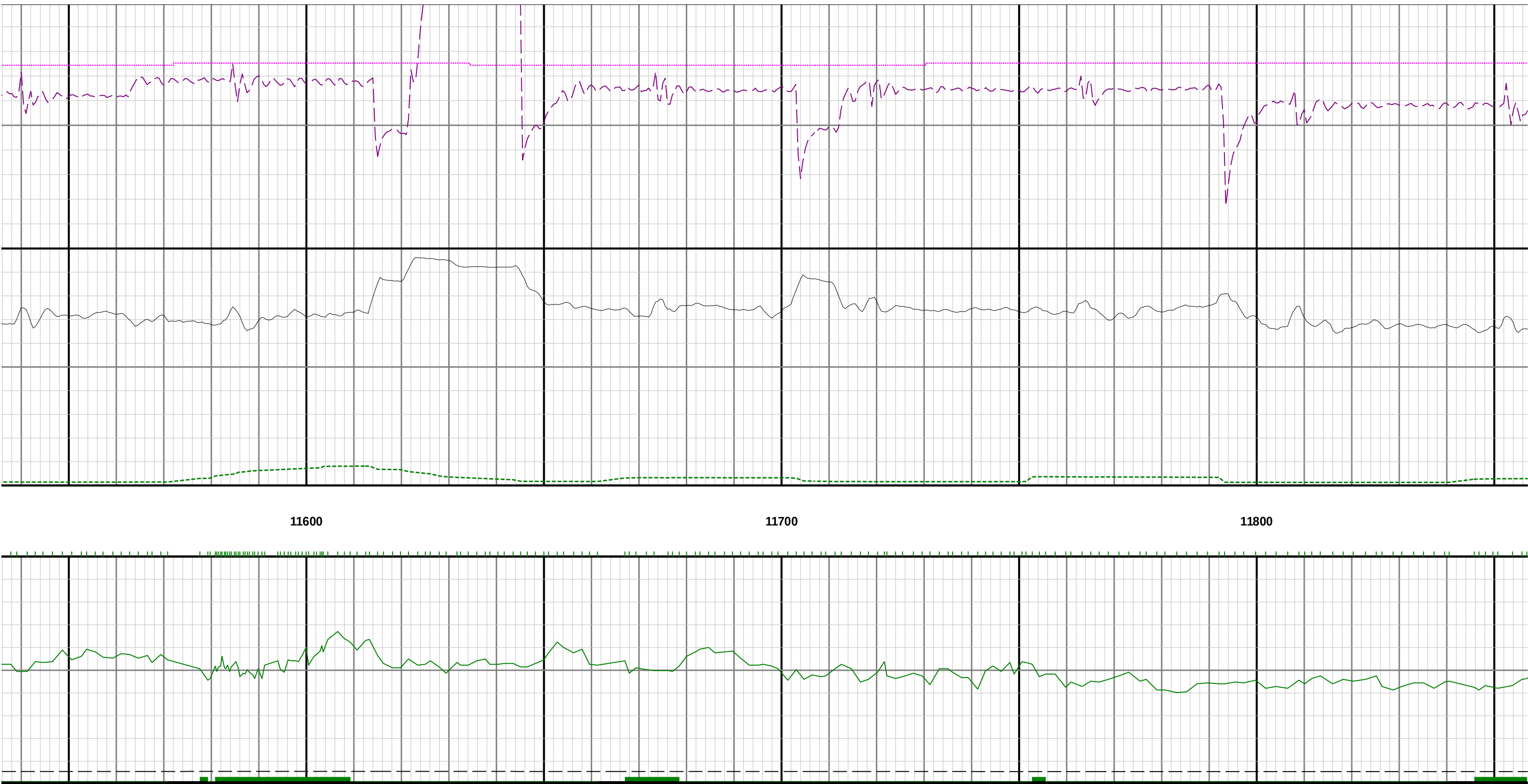
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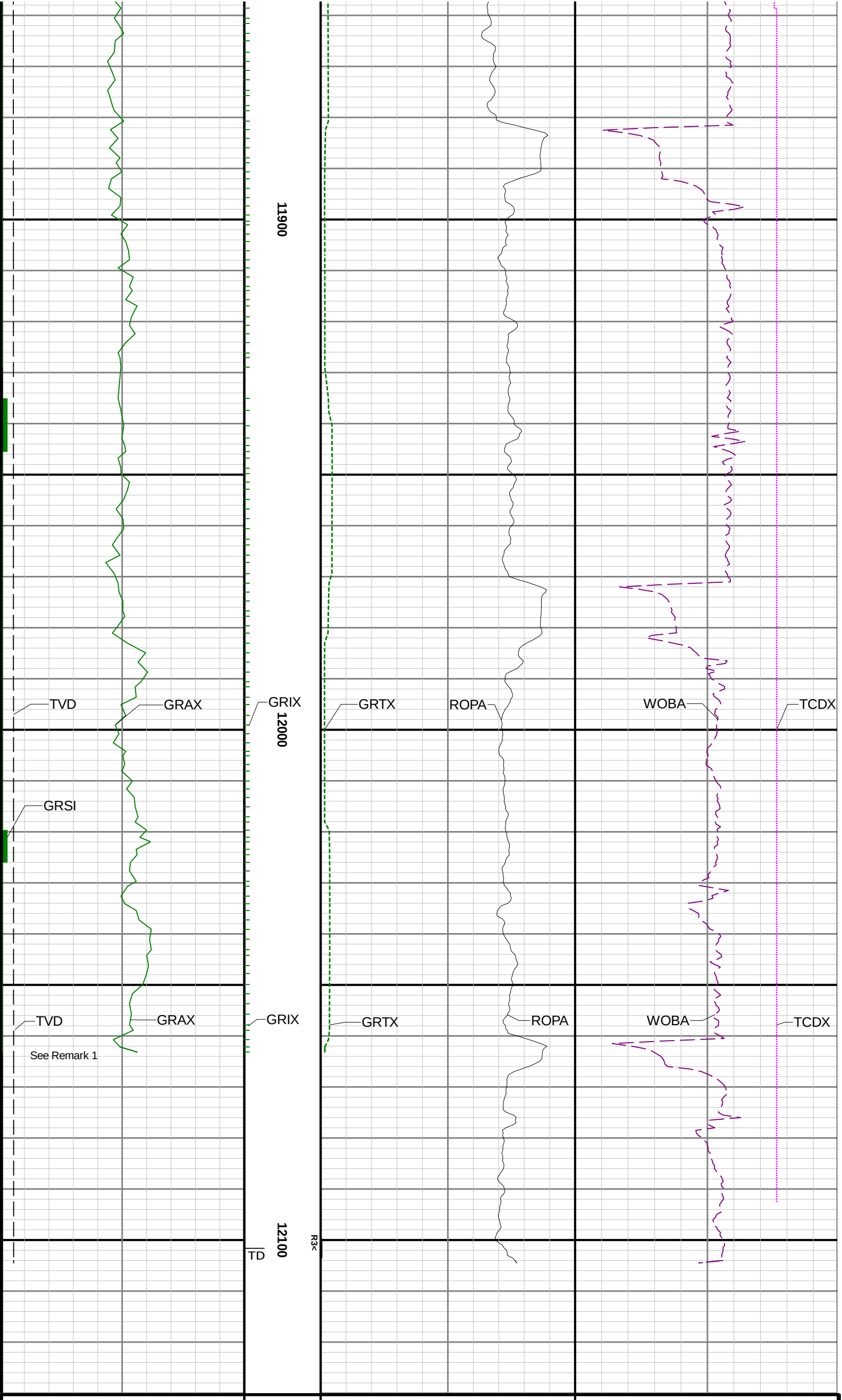

True Vertical Depth TVD	MD 1:240 feet	Depth Averaged ROP 3 ft Average ROPA	Weight On Bit, Average 1 ft Average WOBA
7500 — 2000		1000 — 0	0 — 50
ft		ft/h	klb
Gamma Ray - Apparent 0.5 ft Average GRAX		Gamma Time Since Drilled GRTX	Downhole Temperature TCDX
0 — 150		0 — 600	0 — 300
API		min	degF