LWD MEMORY LOG

BAKER HUGHES a GE company

Gamma Ray

Scale: **1:1200 Measured Depth**

Depth Reference: **Driller's Depth**

Company: ConocoPhillips
Well: Schuh_3-65_21-20_3AH
Field: Adams County
County: Adams **Country:** United States
State: Colorado

Status: **Final Print**

API No: 05001102010000
Job ID: 109541489

Surface Location:
Latitude: 039° 46' 21.540" N
Longtitude: 104° 39' 40.090" W
SEC: 21 TWN: 3S RGE: 65W

Other Services:
Directional

Permanent Datum (P.D.): Ground Level
Log Measured From: Rig Floor
Elevation: 5595.00 ft
Above P.D. 25.00 ft

Elev. KB: N/A
Elev. DF: 5620.00 ft
Elev. GL: 5595.00 ft

Dates

Date From: 2018-12-14
Date To: 2018-12-19
Spud Date: 2018-12-12

Interval Drilled

Top: (ft) 2258.00
Bottom: (ft) 18028.00

Magnetic Field Reference

Azi Reference North: True
Dip Angle: (deg) 66.35
Total Magnetic Field Strength: (nT) 51785
Mag to Reference North Correction: (deg) 8.29

Borehole Record

Hole Size (in)	From (ft)	To (ft)
13.500	25.00	2258.00
8.500	2258.00	18028.00

Casing Record

Size (in)	Weight (lb/ft)	From (ft)	To (ft)
9.625	36.00	25.00	2247.00

Mud Record

Type	From (ft)	To (ft)
Oil Based Mud	2258.00	18028.00

Deviation Record

Hole Size (in)	Interval (ft)	Inc | Az (Start)	Inc | Az (End)
8.500	15770.00	0.22 | 232.82	89.82 | 274.09

Acquisition System / Software Version

Baker Hughes Cadence RT 5.0
Plot Studio 5.0.8260.3

Other

Rig: Nabors B16
Contractor: Nabors Drilling
District: RMA
Unit: D&E

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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	8.500	PDC	4.00	AutoTrak Curve	2245.00	18015.00	2258.50	18028.00	2018-12-14 18:05	2018-12-18 09:11	82.27

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adewale Adedeji	2018-12-11	2018-12-19						

Mud Properties Record

Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2018-12-14 14:42	1	2258.00	Oil Based Mud	10.0	16	N/A	N/A	66/34	Active Pit	38000	0.00
2018-12-15 00:00	1	3466.00	Oil Based Mud	9.8	16	N/A	N/A	64.5/35.5	Active Pit	50000	0.00
2018-12-15 12:00	1	6190.00	Oil Based Mud	9.8	16	N/A	N/A	66/34	Active Pit	52000	0.00
2018-12-16 00:00	1	7838.00	Oil Based Mud	9.7	13	N/A	N/A	69/31	Active Pit	48000	0.00
2018-12-16 12:00	1	9650.00	Oil Based Mud	9.7	13	N/A	N/A	68.5/31.5	Active Pit	45000	0.00
2018-12-17 00:00	1	11854.00	Oil Based Mud	9.8	15	N/A	N/A	68.5/31.5	Active Pit	42000	0.00
2018-12-17 12:00	1	14214.00	Oil Based Mud	10.0	16	N/A	N/A	67/33	Active Pit	44000	0.00
2018-12-18 00:00	1	16582.00	Oil Based Mud	10.0	17	N/A	N/A	66.5/33.5	Active Pit	43000	0.00

Mud Resistivity Record

Date / Time	Run No.	Measured Depth (ft)	Surface Temp (degF)	Surface Rm (ohm.m)	Surface Rmf (ohm.m)	Surface Rmc (ohm.m)	BHCT (degF)	Downhole Rm @ BHCT (ohm.m)	Downhole Rmf @ BHCT (ohm.m)	Downhole Rmc @ BHCT (ohm.m)
2018-12-16 17:46	1	10773.00	144.0	100.000	N/A	N/A	220.0	100.000	N/A	N/A
2018-12-17 00:00	1	11669.00	152.0	100.000	N/A	N/A	230.0	100.000	N/A	N/A
2018-12-17 12:00	1	14114.00	158.0	100.000	N/A	N/A	240.0	100.000	N/A	N/A
2018-12-18 00:00	1	16495.00	162.0	100.000	N/A	N/A	255.0	100.000	N/A	N/A

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	AutoTrak Curve Steering Unit	11813727	Near Bit VSS	5.93	6.93	7.000	4.330
1	AutoTrak Curve Steering Unit	11813727	Near Bit Inclination	5.93	6.93	7.000	4.330
1	AutoTrak Curve MWD	14256850	Gamma (single)	2.76	13.10	7.000	3.250
1	AutoTrak Curve MWD	14256850	Directional (mag)	12.28	22.62	7.000	3.250
1	OnTrak	14609701	Pressure	1.17	10687.45	6.750	0.000
1	OnTrak	14609701	Gamma (double)	2.06	10688.34	6.750	0.000
1	OnTrak	14609701	Resistivity (4tx)	6.10	10692.38	6.750	0.000
1	OnTrak	14609701	Directional (mag)	11.89	10698.17	6.750	0.000

Service and Tool Mnemonics

Mnemonic	Name	Description
ATC SU	AutoTrak Curve SU	Auto Trak Curve Steering Unit
ATC MWD	AutoTrak Curve MWD	Auto Trak Curve MWD
ATC LCPM	AutoTrak Curve LCPM	Auto Trak Curve LCPM
OTK	OnTrak	Sensor Sub (Inc, Azi, Temp, Azimuthal GR, Res, AP, VSS), OnTrak Platform
BCPM	BCPM	Bi-Directional Communication and Power Module, OnTrak Platform

Comments

1. Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes, a GE Company (BHGE). Due to the lack of control by BHGE logging engineers, depth calibrations and measurements could not be independently verified.
2. BHGE LWD run 1 utilized 6.75 inch NaviGamma Services (Gamma Ray and Directional) and Ontrak Services (Multiple Propagation Resistivity) behind a 8.5 inch bit and Rotary steerable assembly from 2258 to 18028 feet MD (2258 to 7928 feet TVD).

Remarks

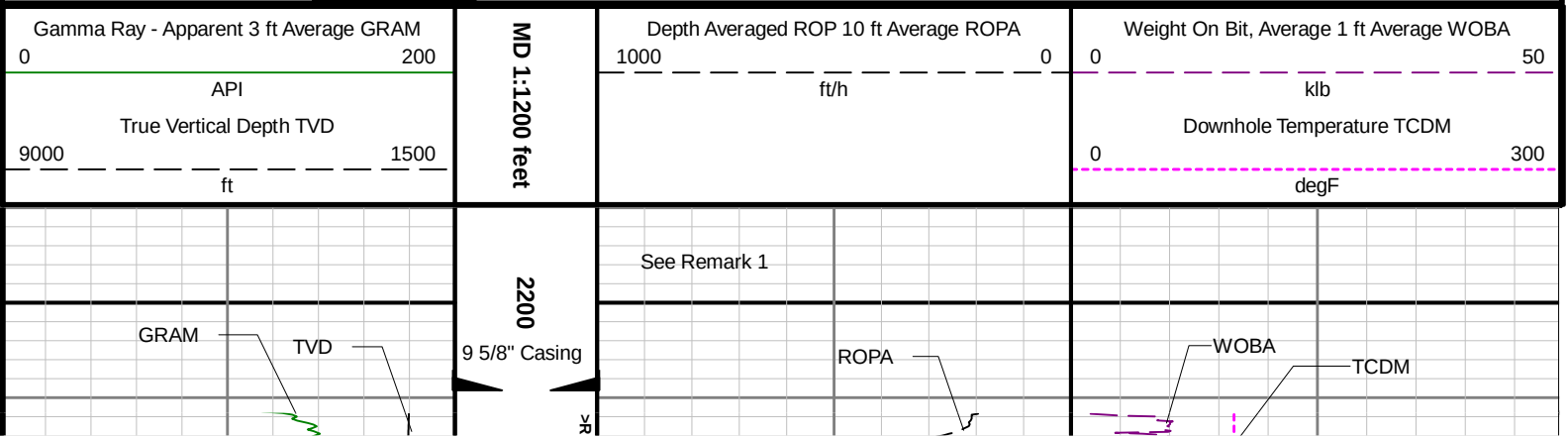
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	2258.00	8.500	1	BHGE logging services began at 2258 feet MD (2258 feet TVD) per customer request.
2	18028.00	8.500	1	The interval from 18015 to 18028 feet MD (7928 feet TVD) was not logged due to sensor to bit offset at TD.

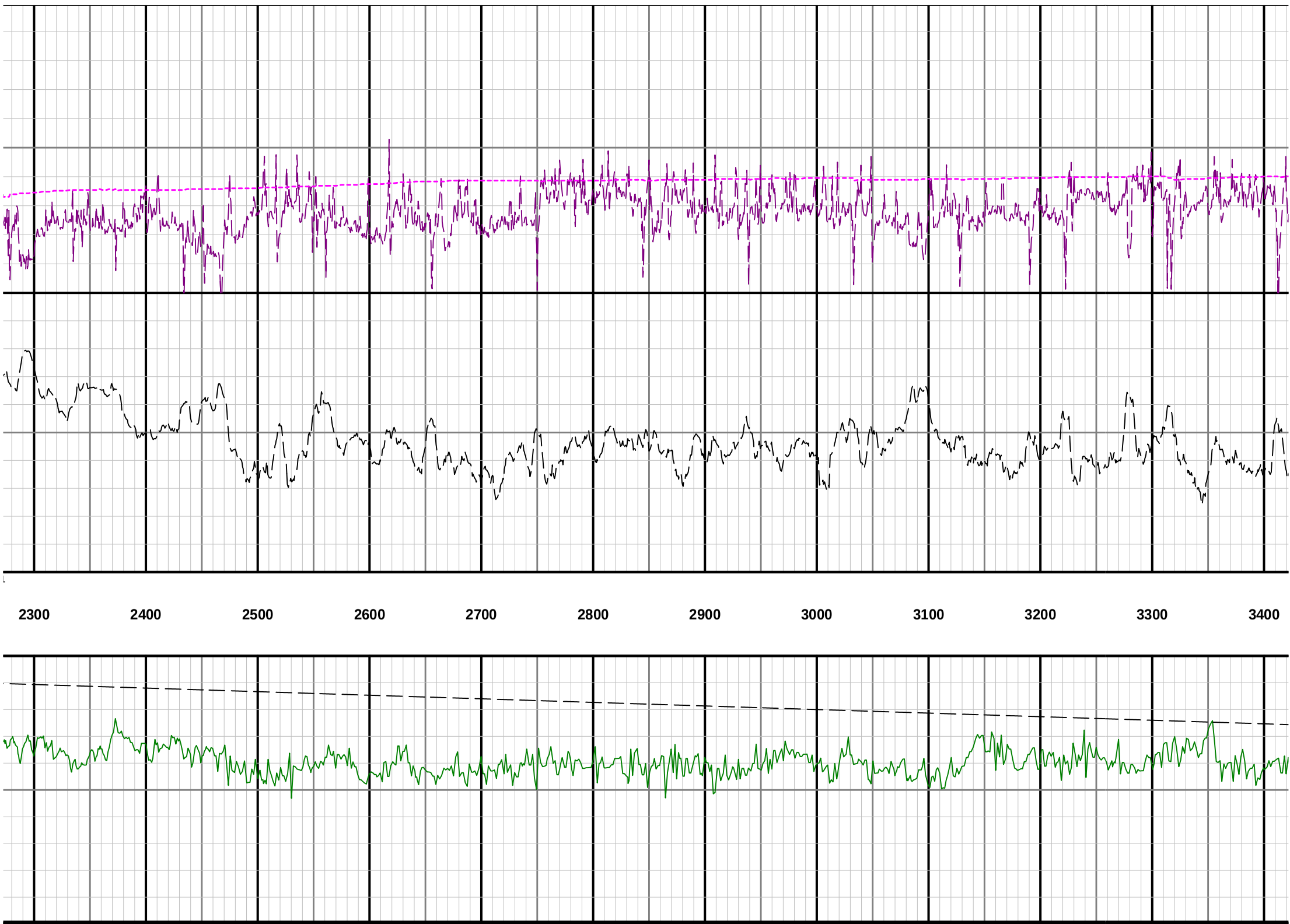
Curve Mnemonics

Presented Curves	Description	Units
ROPA	Depth Averaged ROP 10 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 3 ft Average	API
TCDM	Downhole Temperature	degF

BAKER HUGHES a GE company

Company	ConocoPhillips			
Well	Schuh_3-65_21-20_3AH			
Interval	**Date From:**	2018-12-14 14:44	**Top:**	2258.00 ft
	Date To:	2018-12-19 08:56	**Bottom:**	18028.00 ft
Created	2018-12-19 10:03:12			

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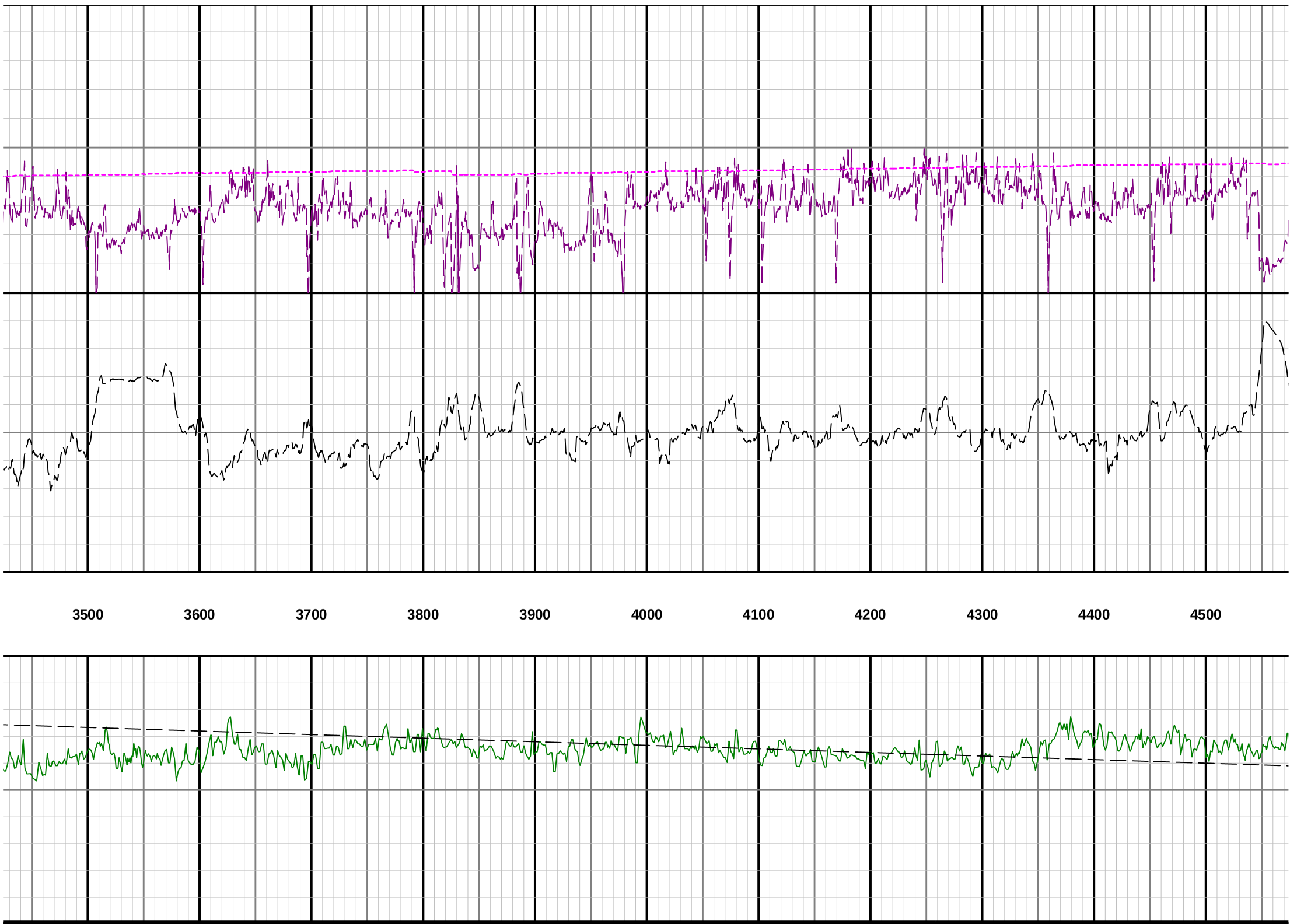
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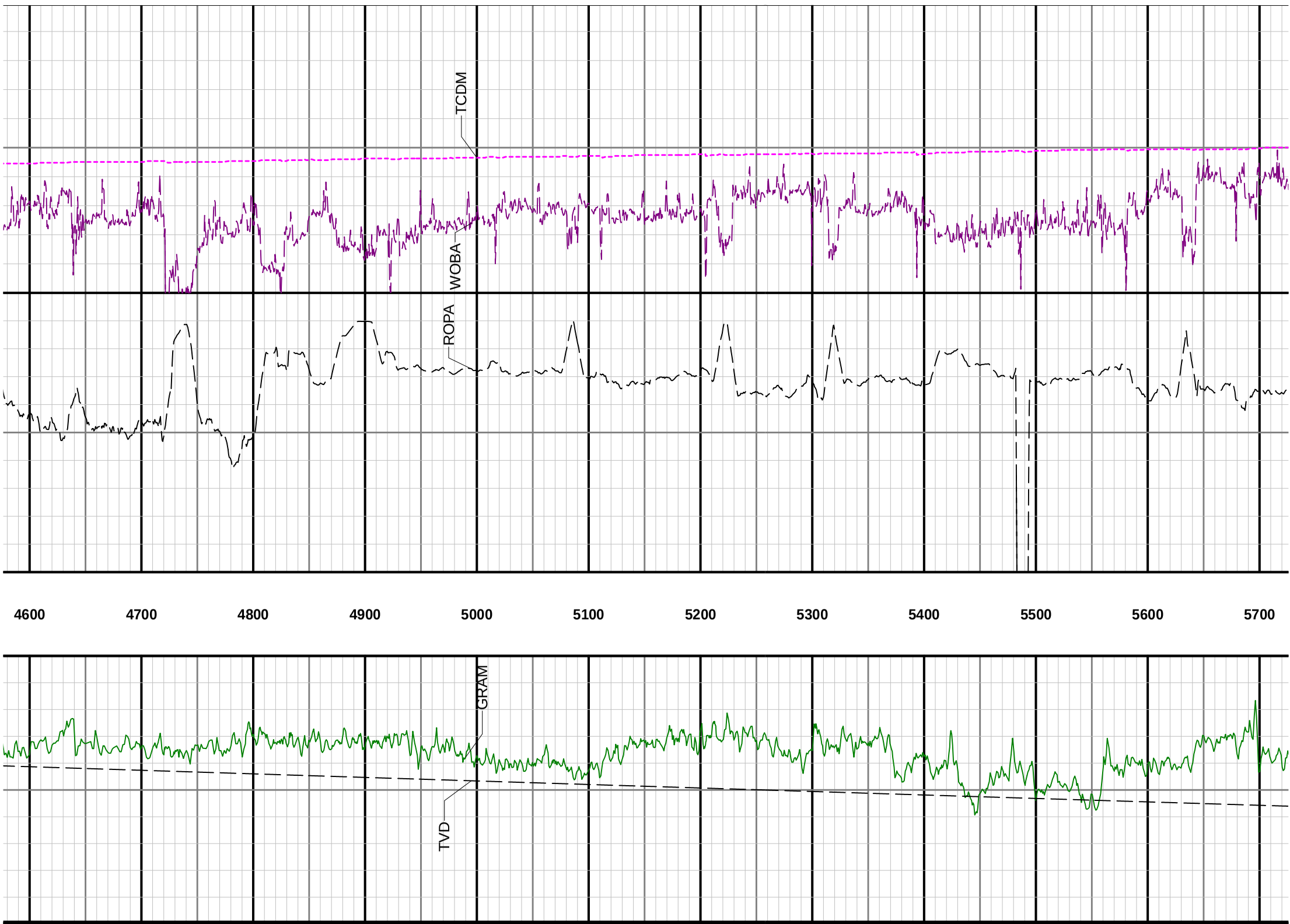
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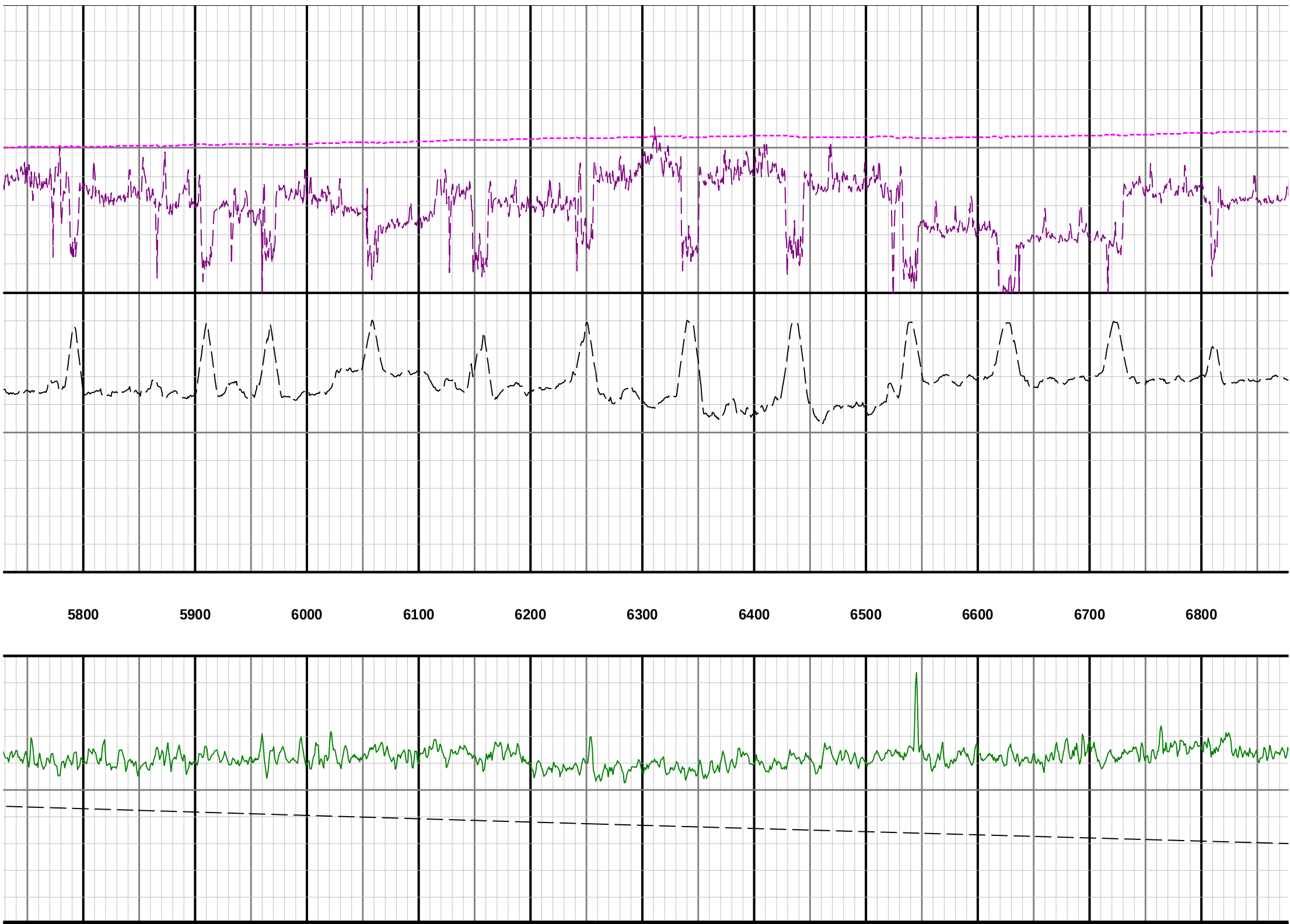
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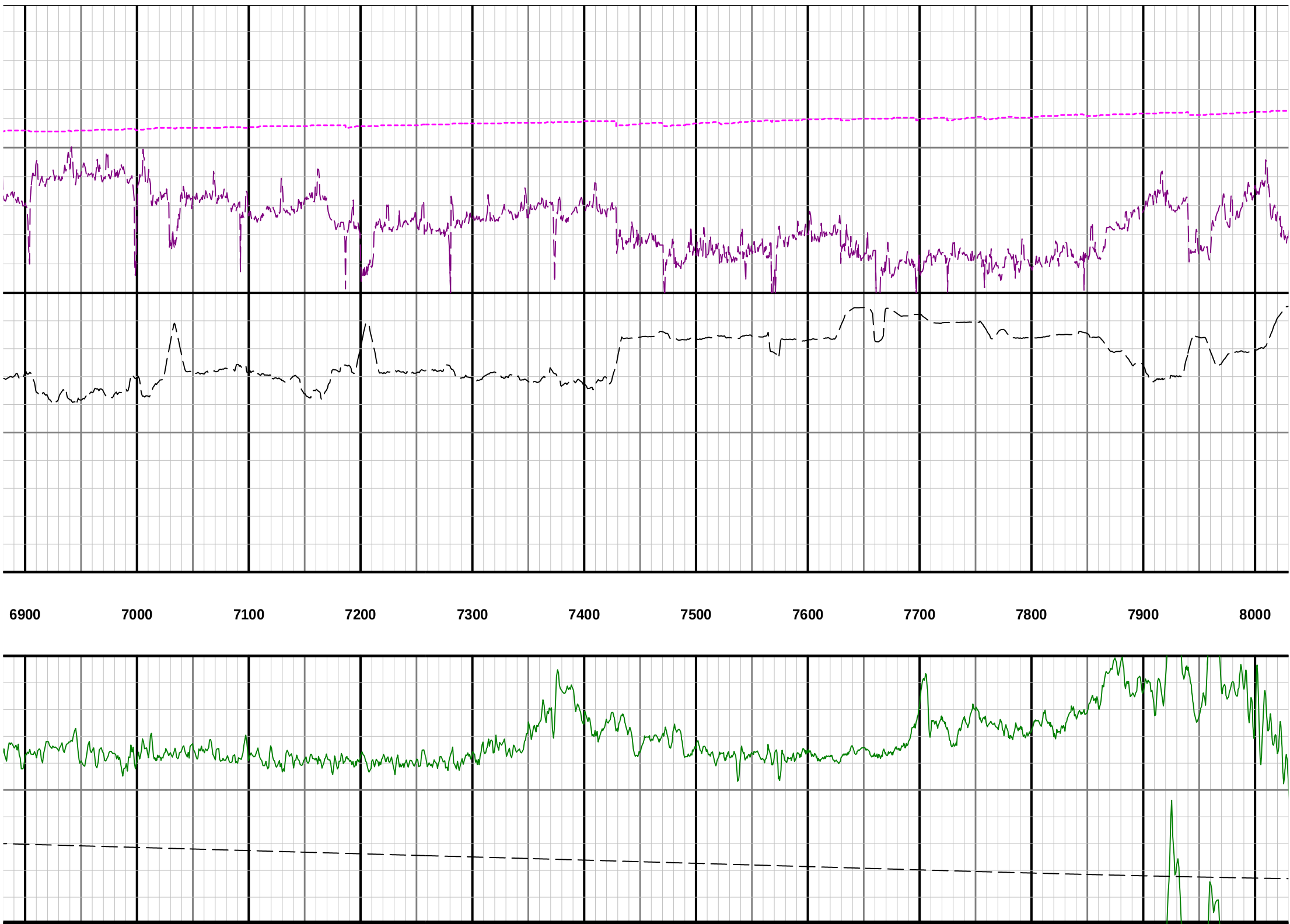
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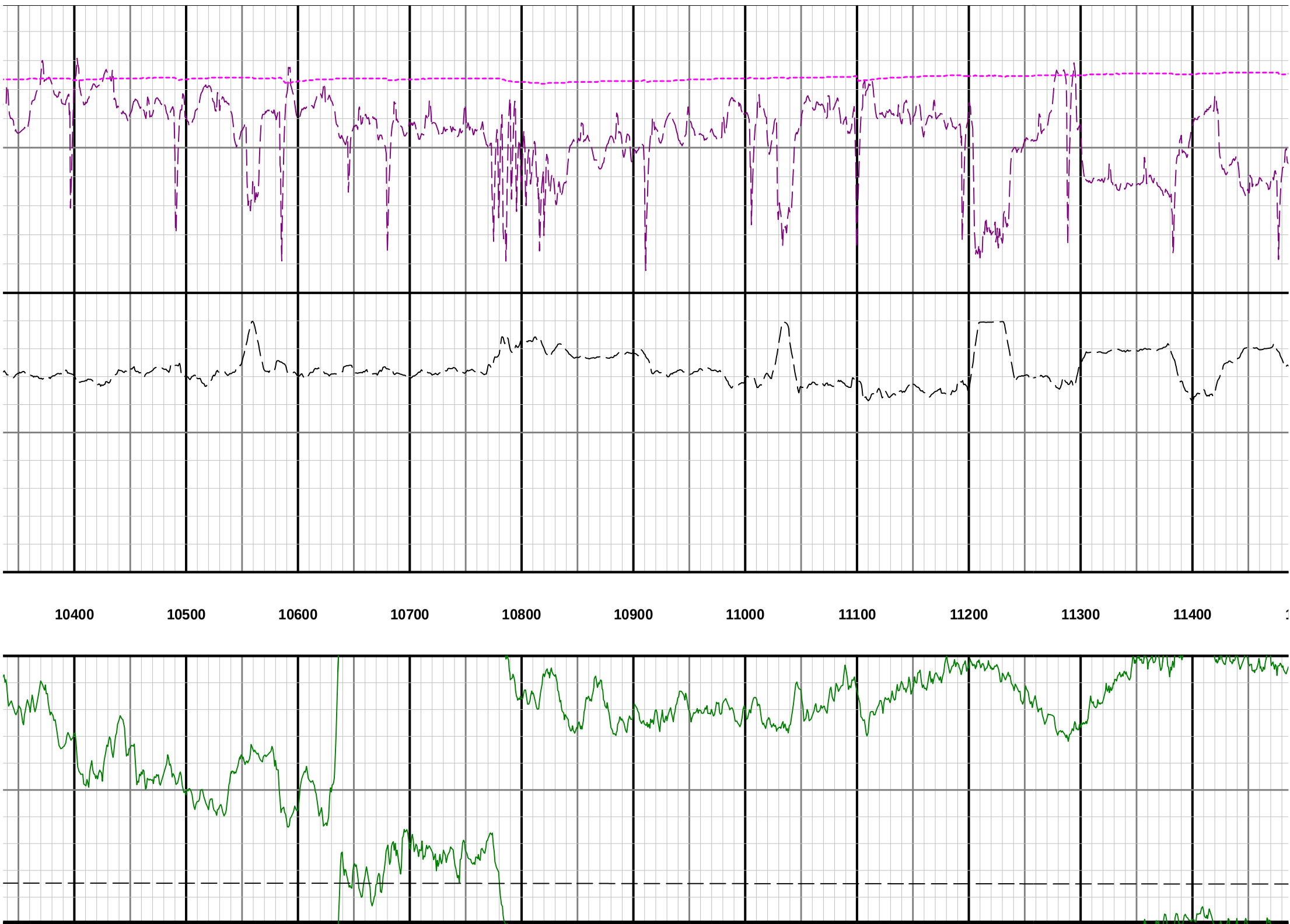
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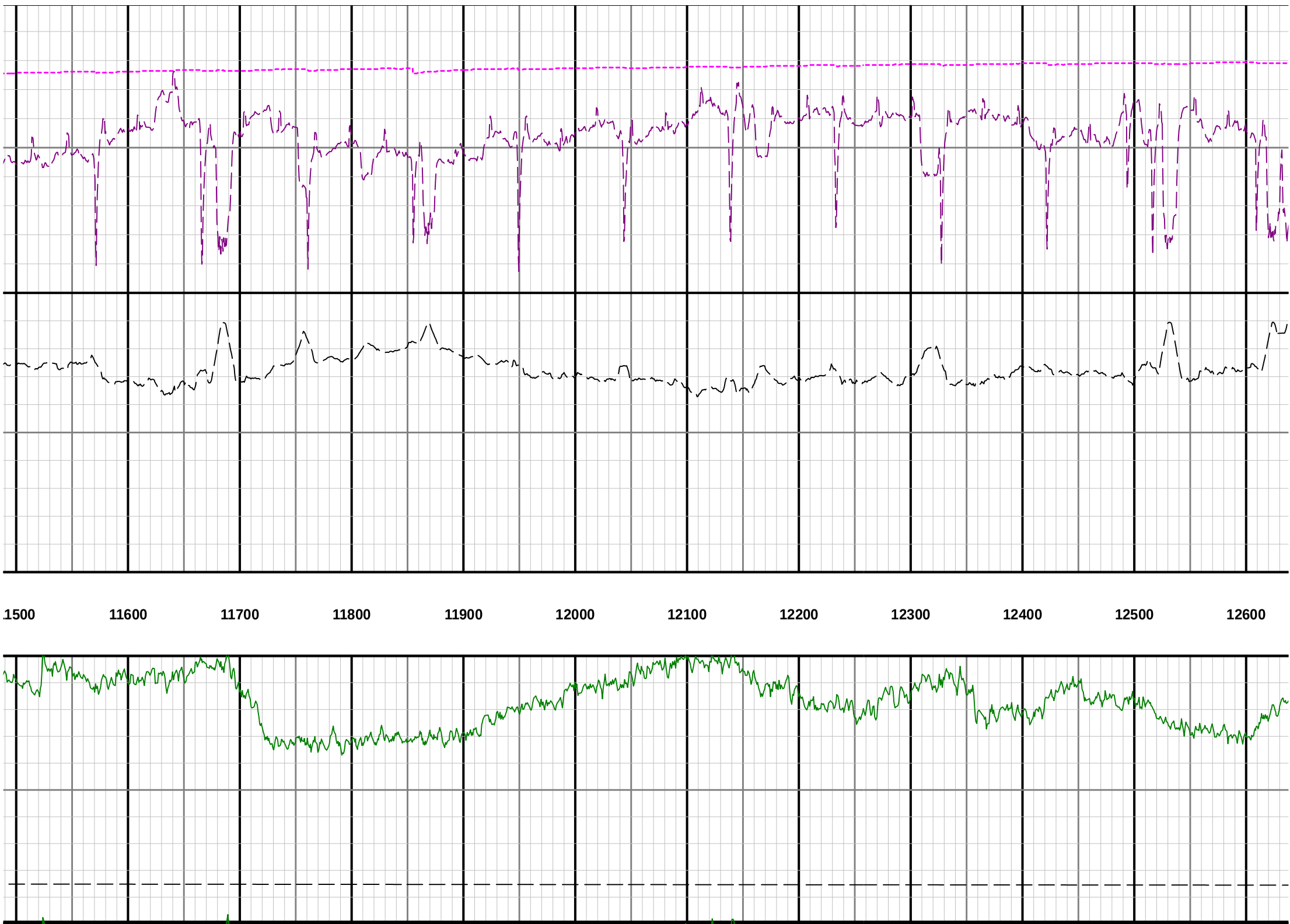
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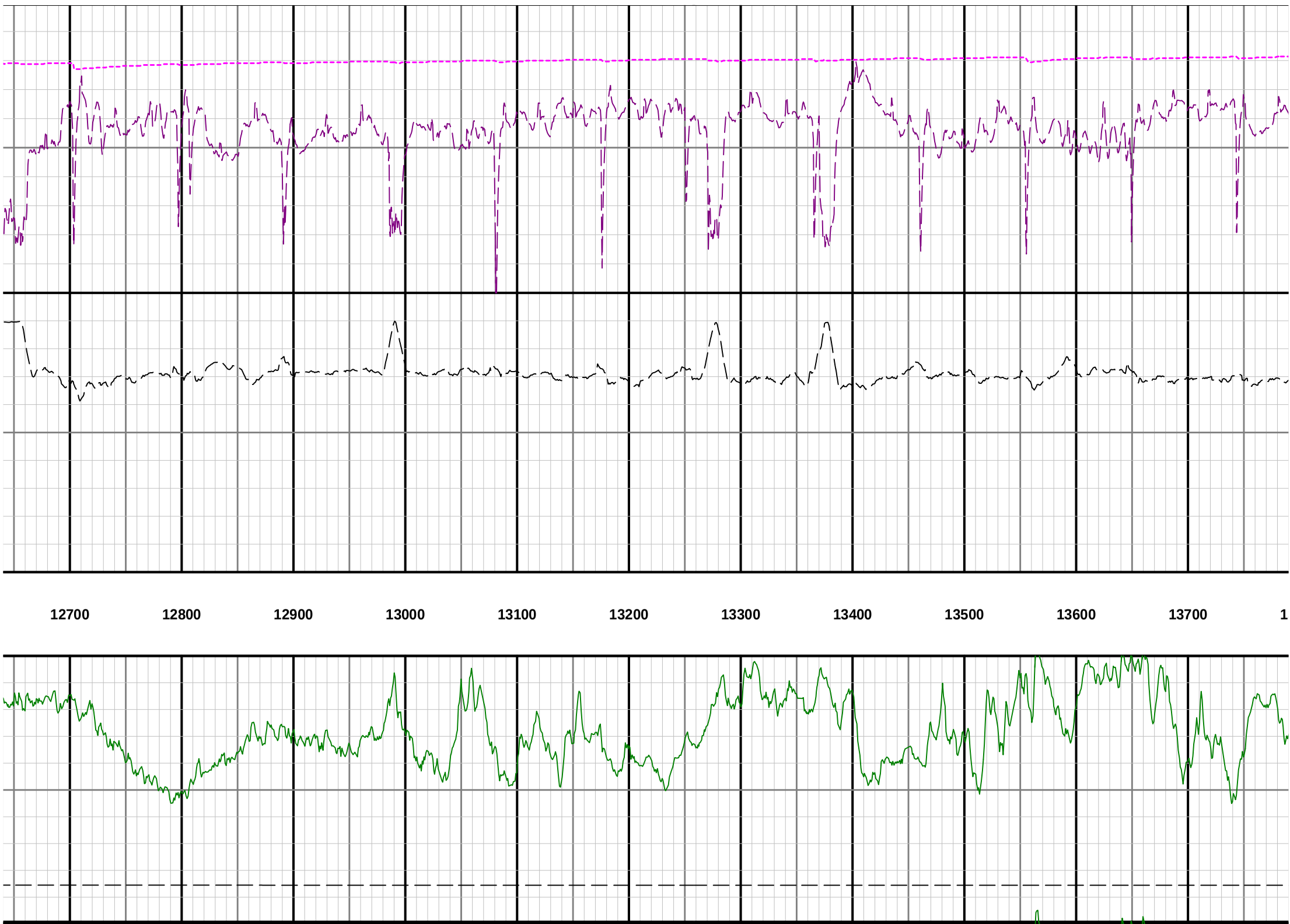
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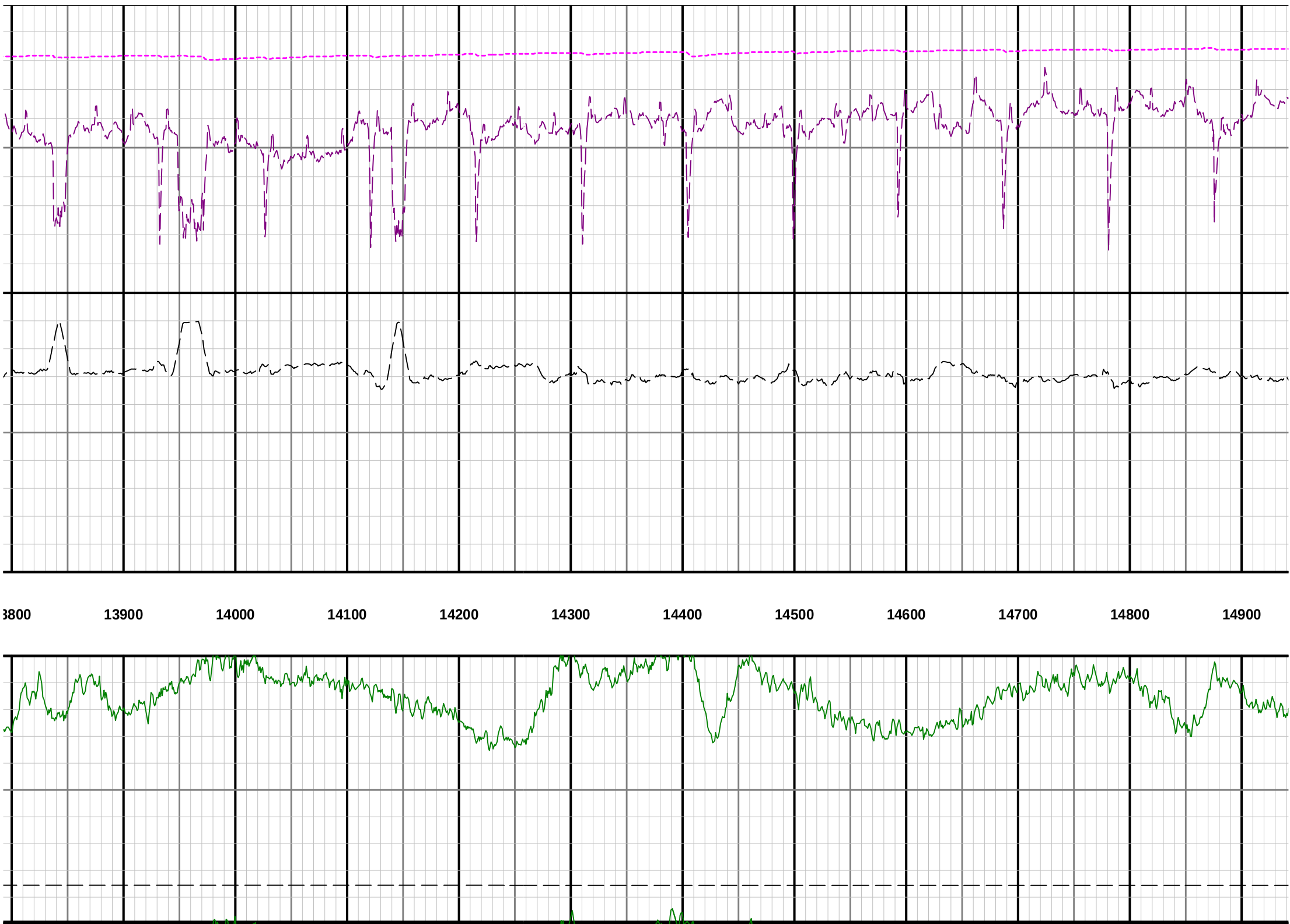
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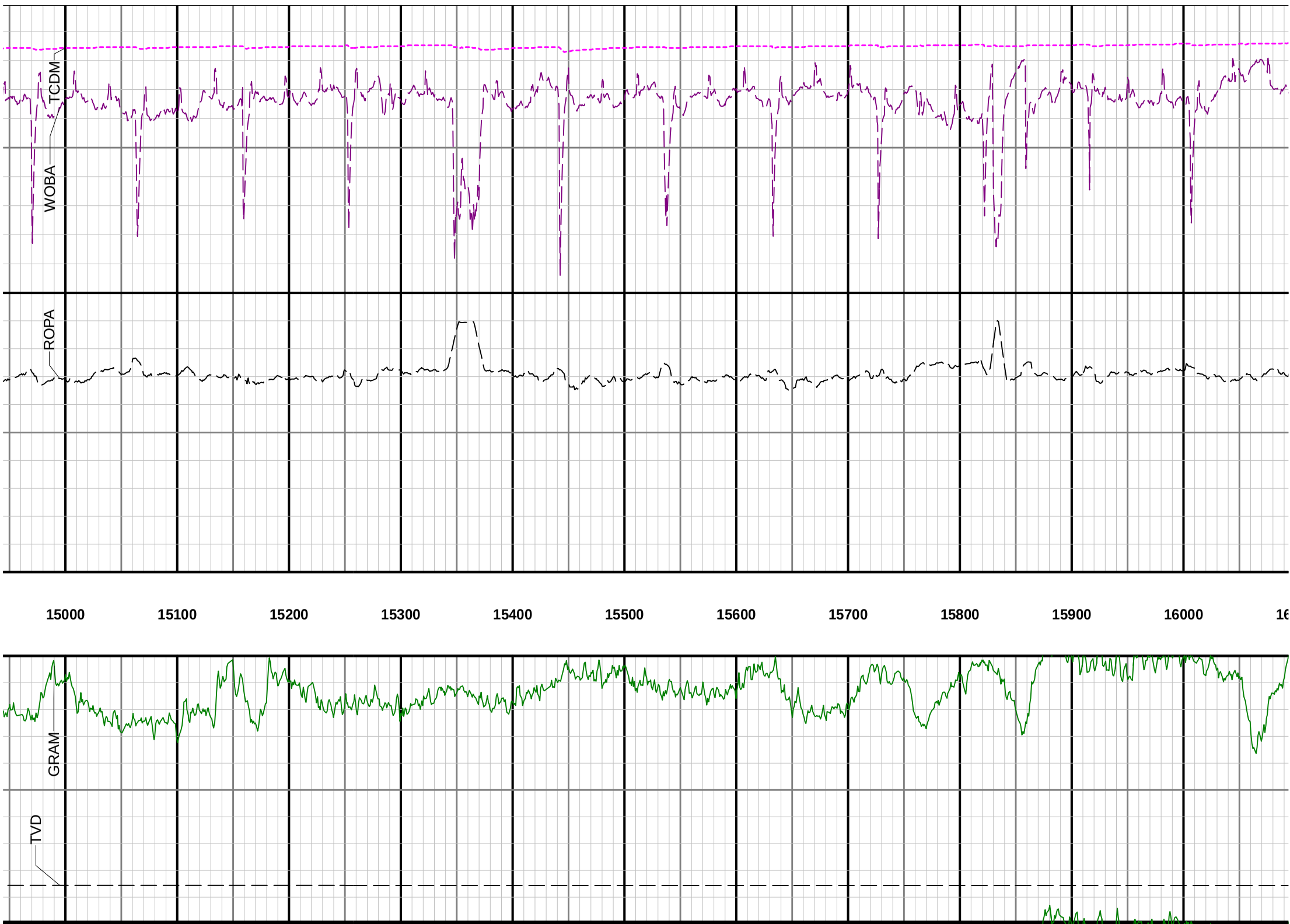
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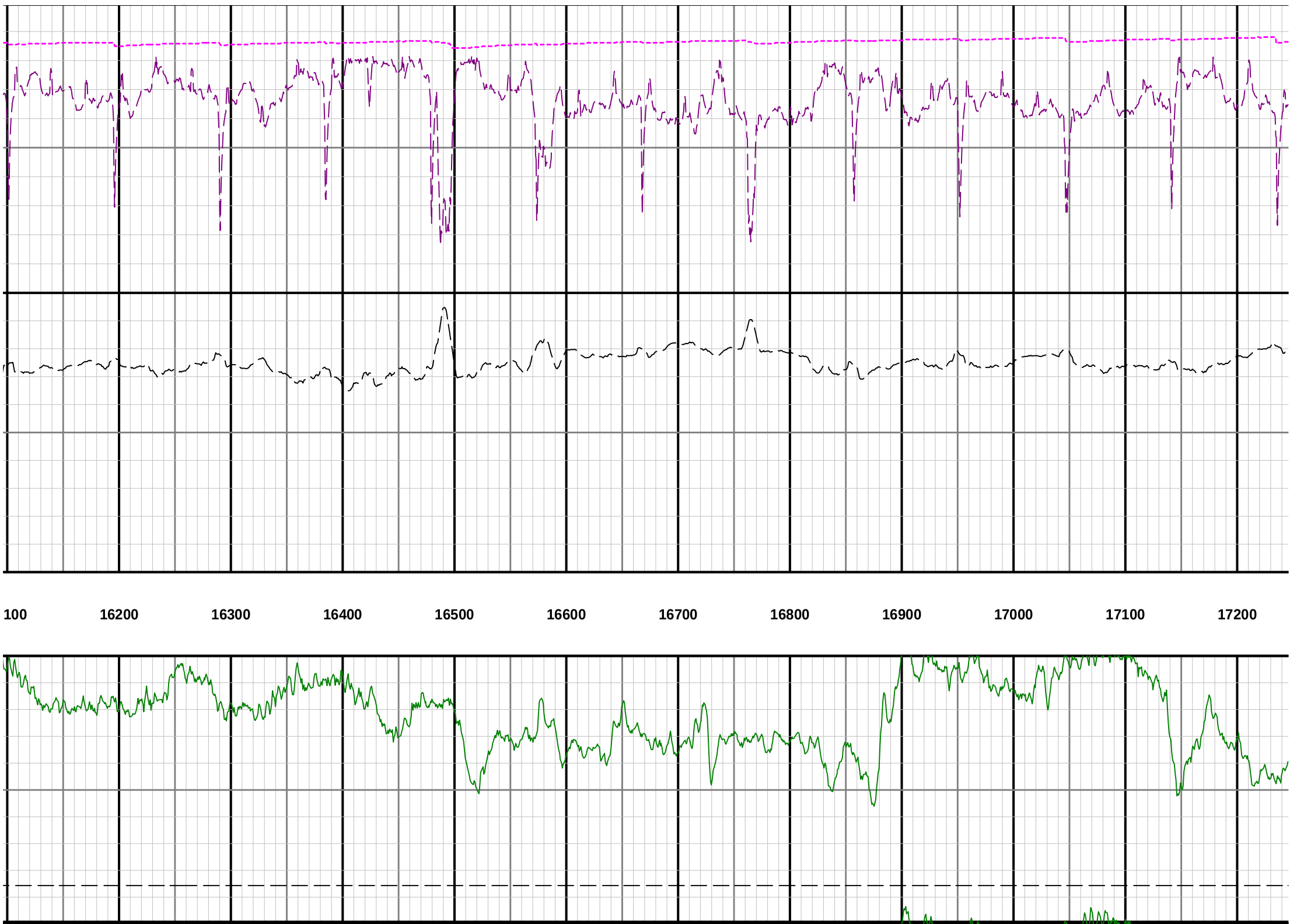
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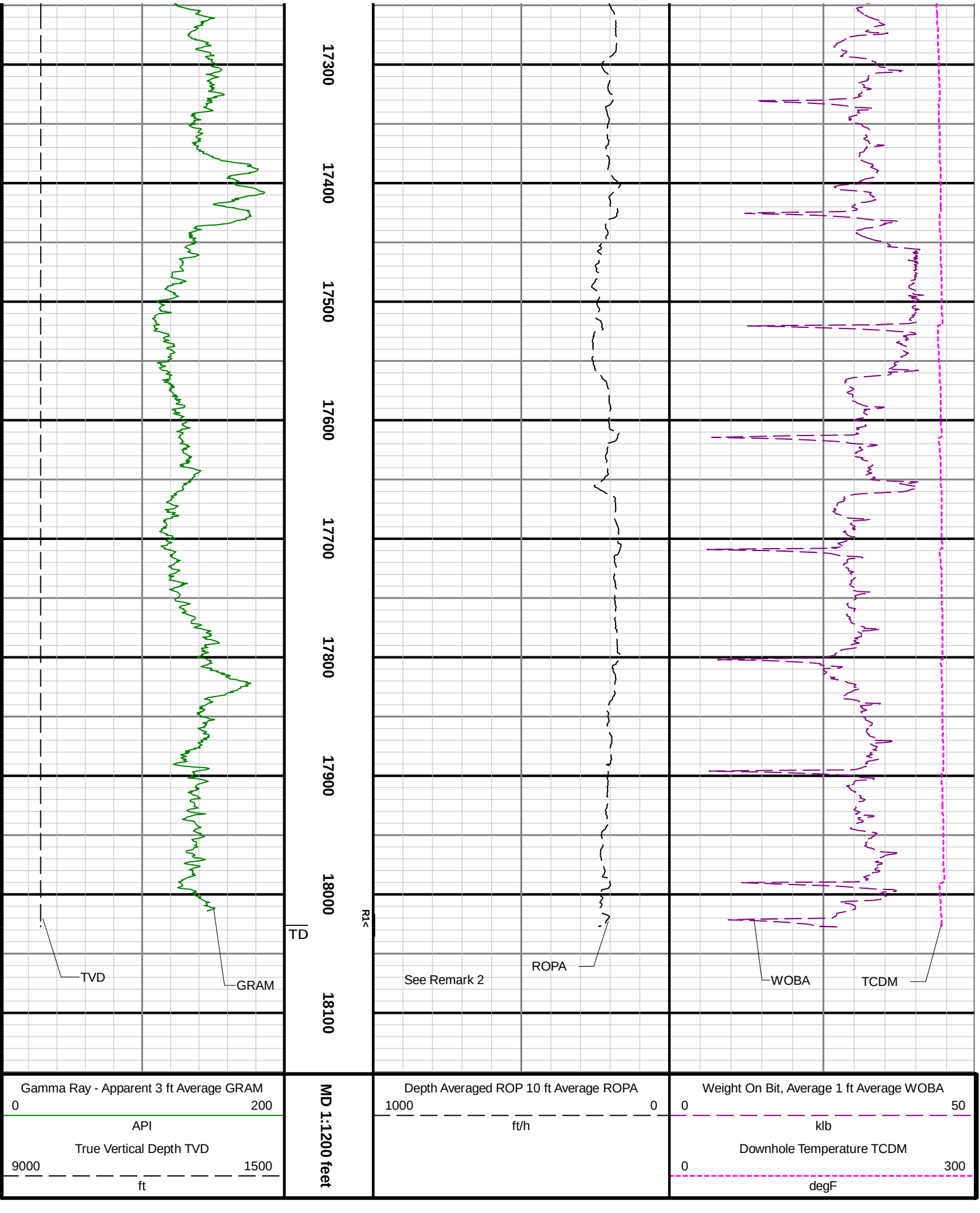
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Gamma Ray - Apparent 3 ft Average GRAM
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klb
Downhole Temperature TCDM
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degF