

WIRELINE WORKSHOP

ATV STRUCTURE LOG

WELL ID: **ZND05**

WRT TRUE NORTH

COMPANY: NORTHAM PLATINUM LIMITED

COUNTRY: SOUTH AFRICA

PROVINCE: LIMPOPO

RUN ID: ONE

FIELD: NORTHAM PLATINUM MINE

CONTRACTOR: WIRELINE WORKSHOP CC

LOG DATE: MAY 2019

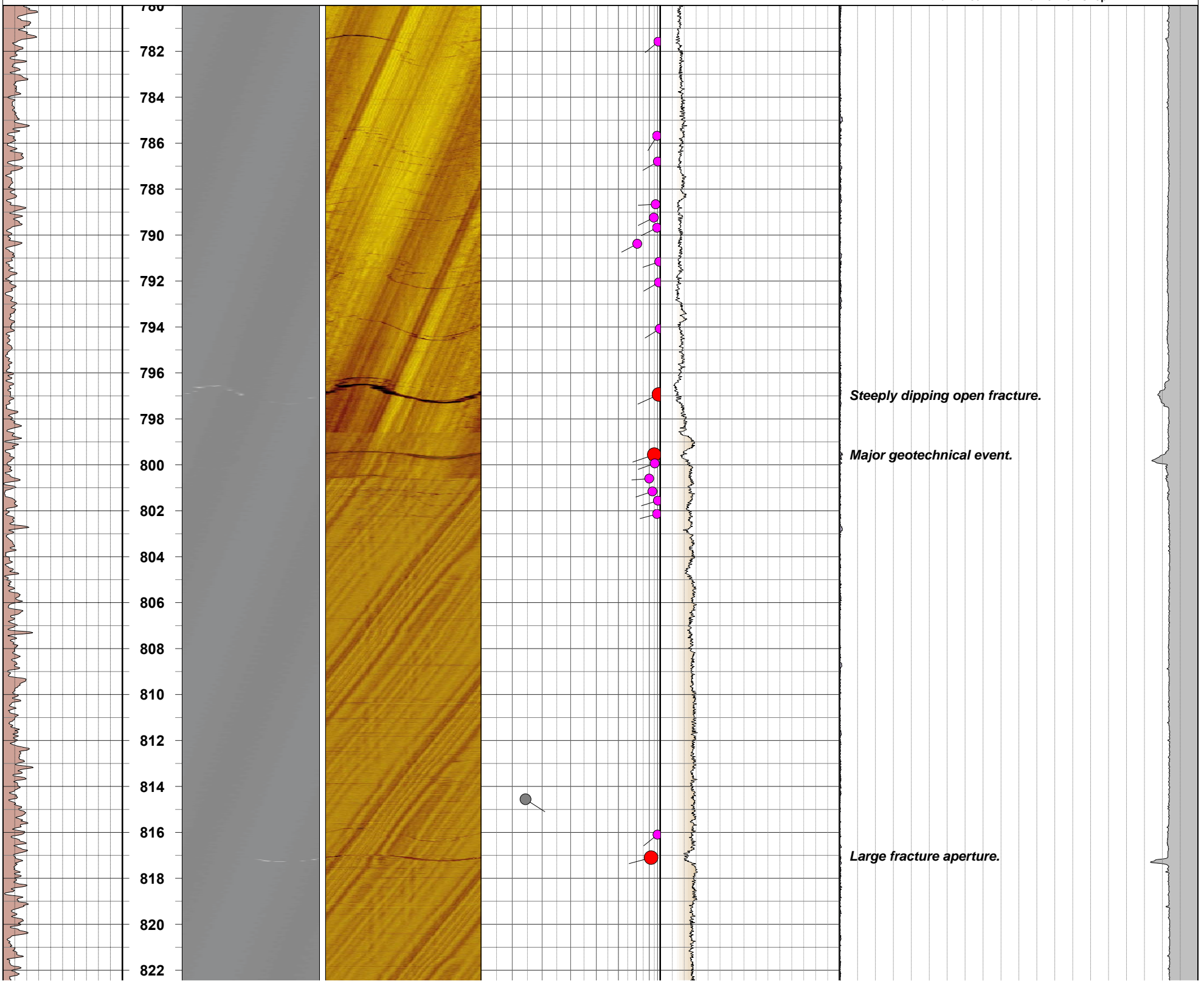
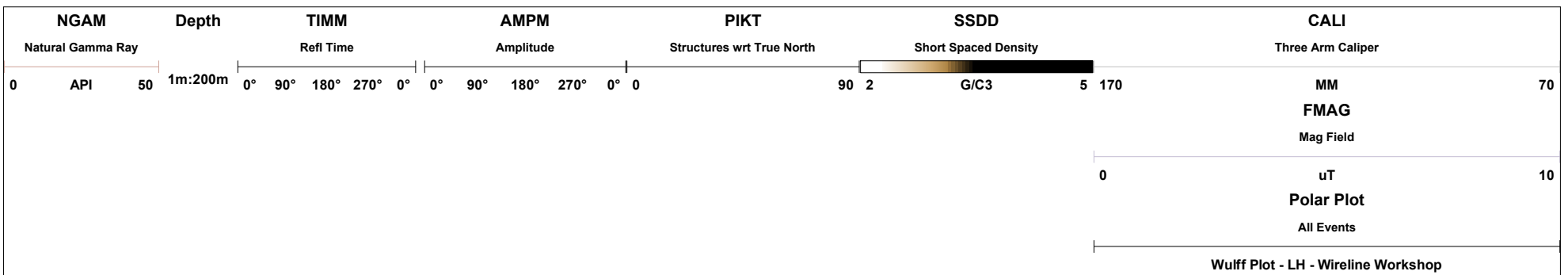
WWS JOB REF: 729



Drill depth 1:	6.00 m.	Logger depth 1:	1585.00 m.	OH bit size 1:	4 inch	Fluid level:	538 metres
Drill depth 2:	1586.00 m.	Logger depth 2:		OH bit size 2:	NQ 76.4mm.	Fluid type:	Water and black oil
Drill depth 3:		Logger depth 3:		OH bit size 3:		Fluid weight:	1.00
Casing size 1:	NXC	Casing depth 1:	6.00 m.	Ops duration:	4 days	Surface datum:	Ground level
Casing size 2:		Casing depth 2:		Logger:	AM / WG	First run:	Full geotech suite
Casing size 3:		Max rec temp:	52 deg C.	Witness:	C v Jaarsveld	Other logs:	Caliper

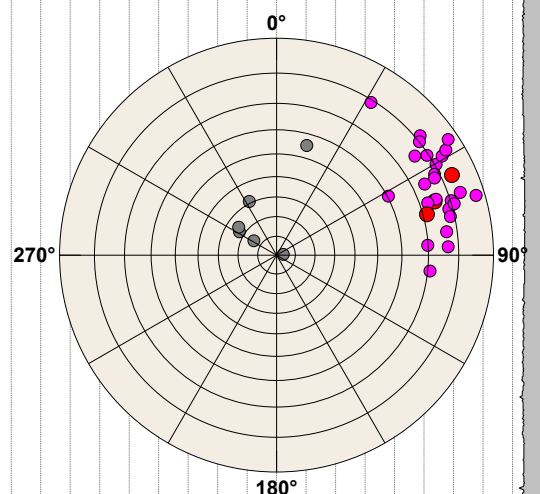
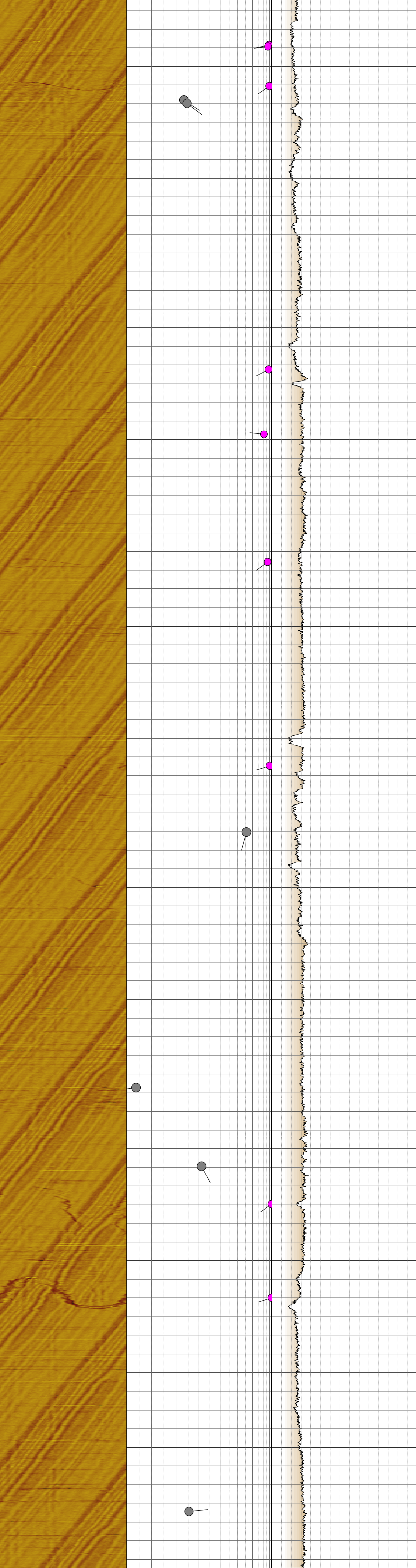
- Comment 1: *Image quality affected by oily sludge. Logged to 1,580 metres to avoid sludge at TD.*
- Comment 2: *Log characterised by mostly competent rocks with a few large open fractures,*
- Comment 3: *Some layering visible on the optical image.*
- Comment 4: *The structure log is correctly to be with respect to True North. Mag declination of -16.58 applied.*

- Sedimentary bed
- Minor or non-continuous fracture
- Significant fracture
- Significant open fracture
- Intermediate fracture
- Layer or boundary
- Cemented fracture, vein
- Drilling-induced tensile fracture



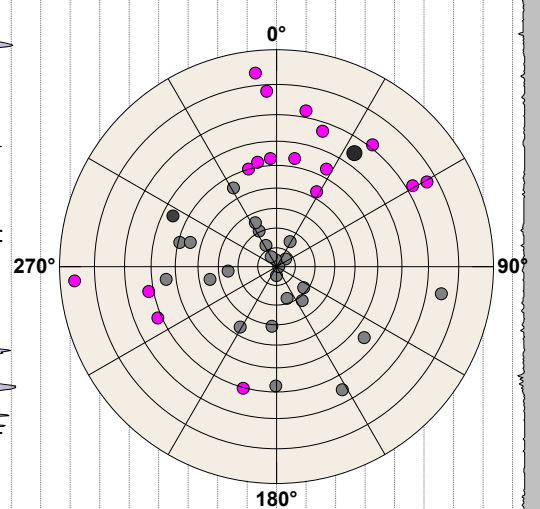
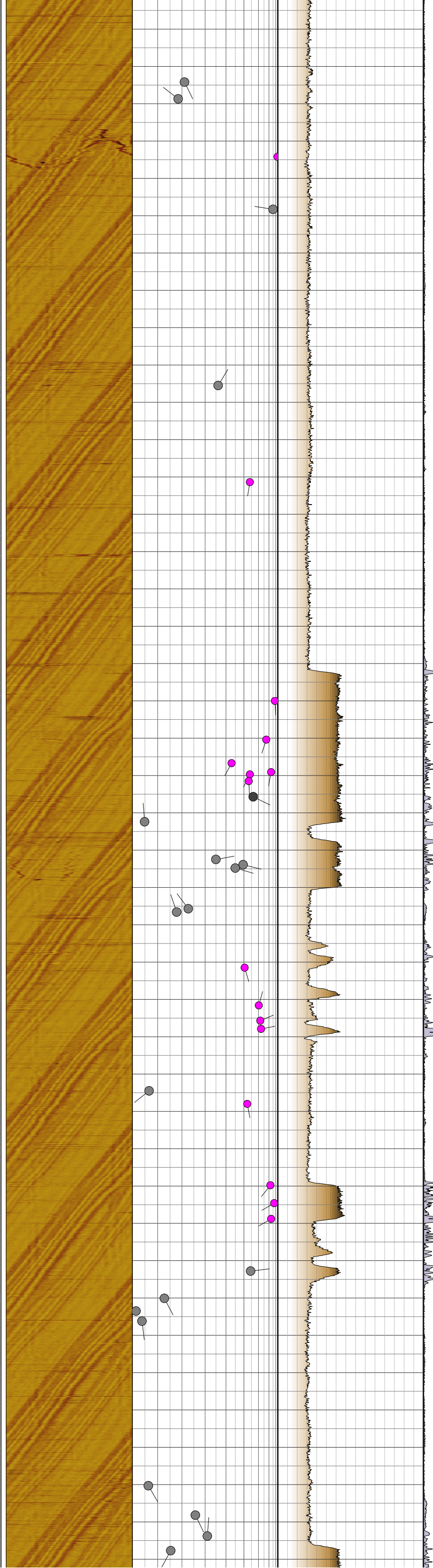
Wulff Plot - LH - Wireline Workshop

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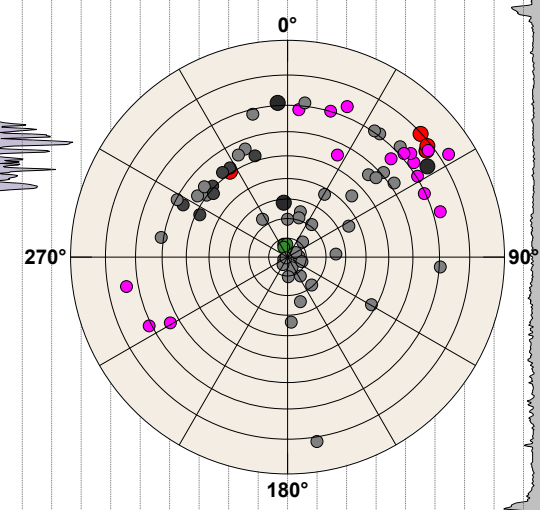
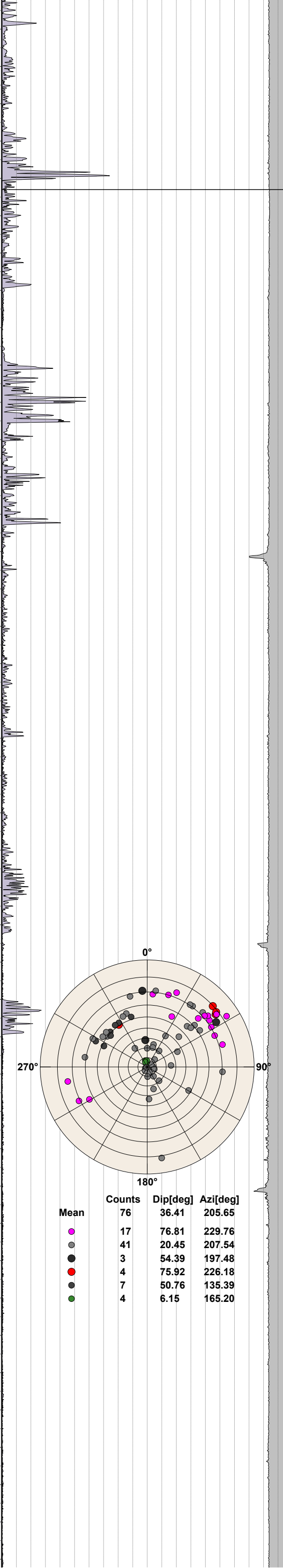
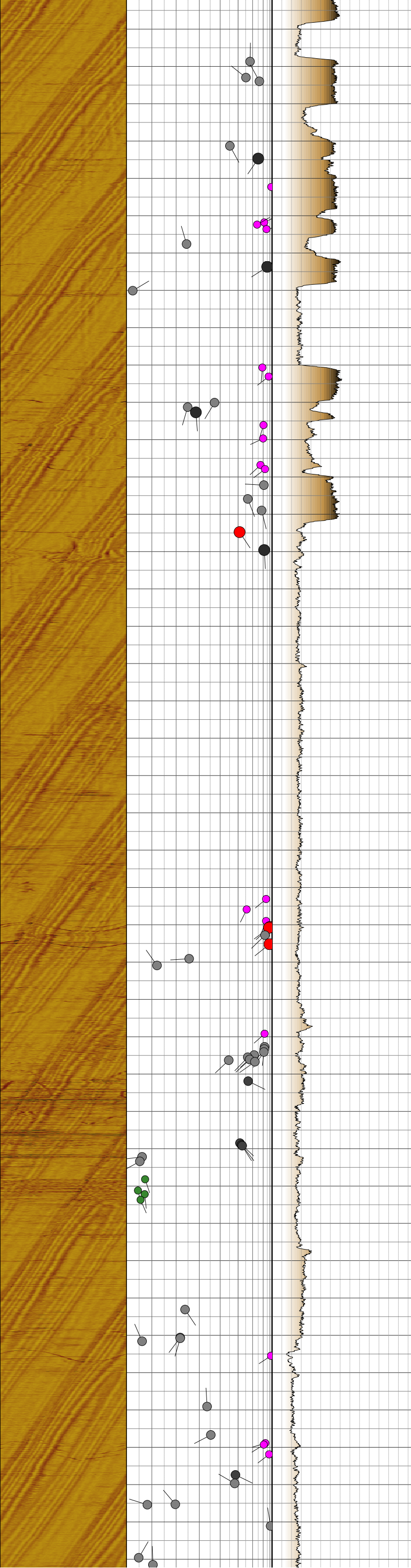
Mean	Counts	Dip[deg]	Azi[deg]
● (pink)	25	78.21	246.67
● (red)	3	76.74	250.41
● (grey)	6	20.63	152.16

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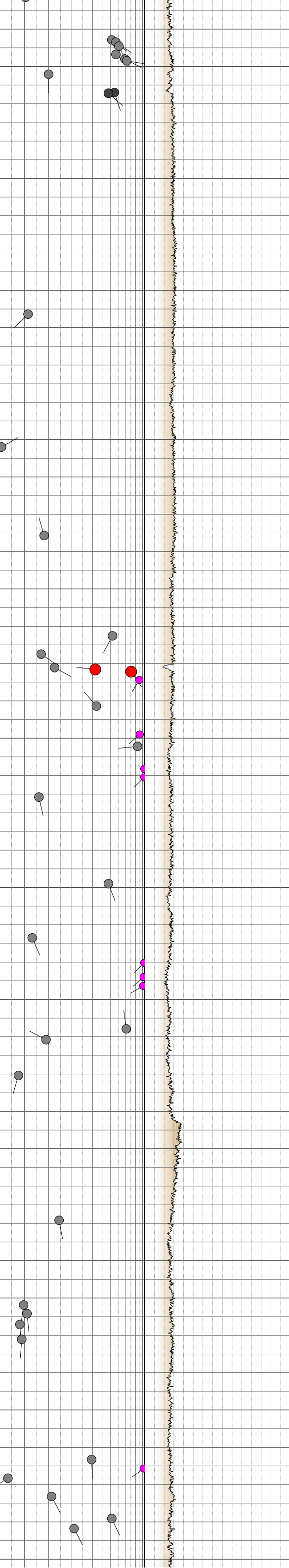
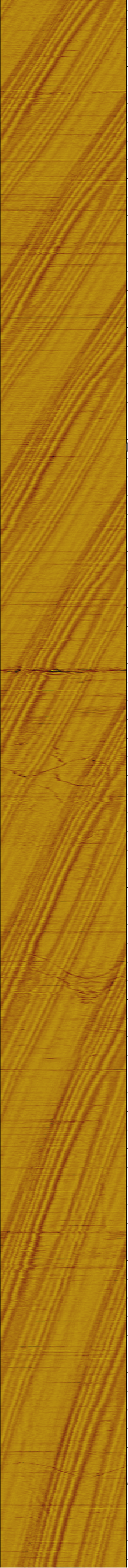
Mean	Counts	Dip[deg]	Azi[deg]
●	43	18.47	160.14
●	24	8.05	64.77
●	17	66.64	200.70
●	1	56.16	116.17
●	1	64.92	214.67

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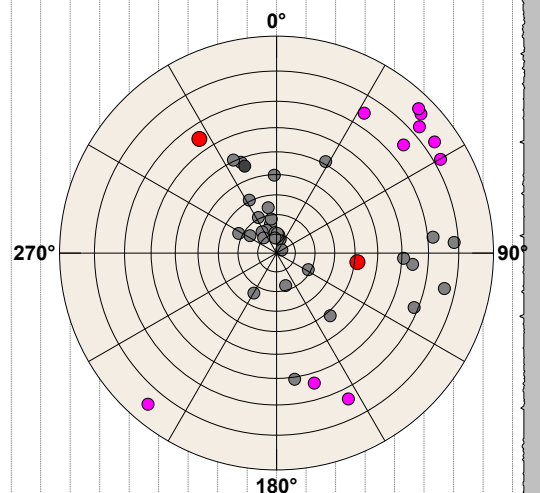


Mean	Counts	Dip[deg]	Azi[deg]
●	76	36.41	205.65
●	17	76.81	229.76
●	41	20.45	207.54
●	3	54.39	197.48
●	4	75.92	226.18
●	7	50.76	135.39
●	4	6.15	165.20

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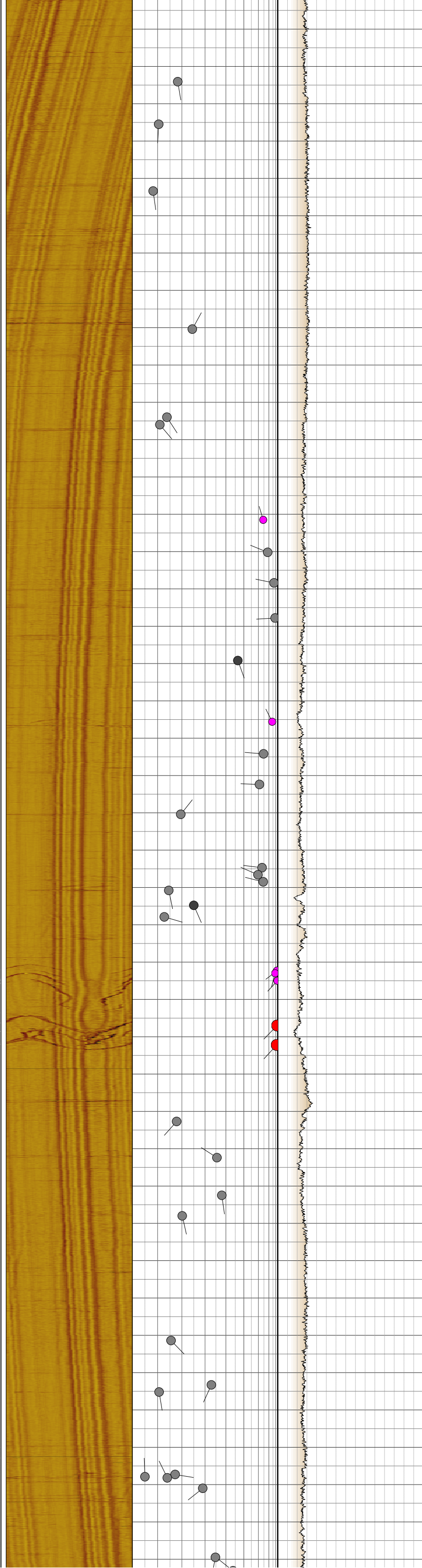


Major geotechnical event.



Mean	Counts	Dip[deg]	Azi[deg]
●	46	18.45	207.26
●	33	10.96	190.86
●	2	77.11	305.46

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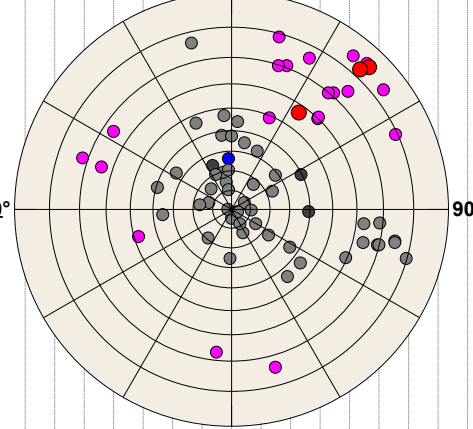
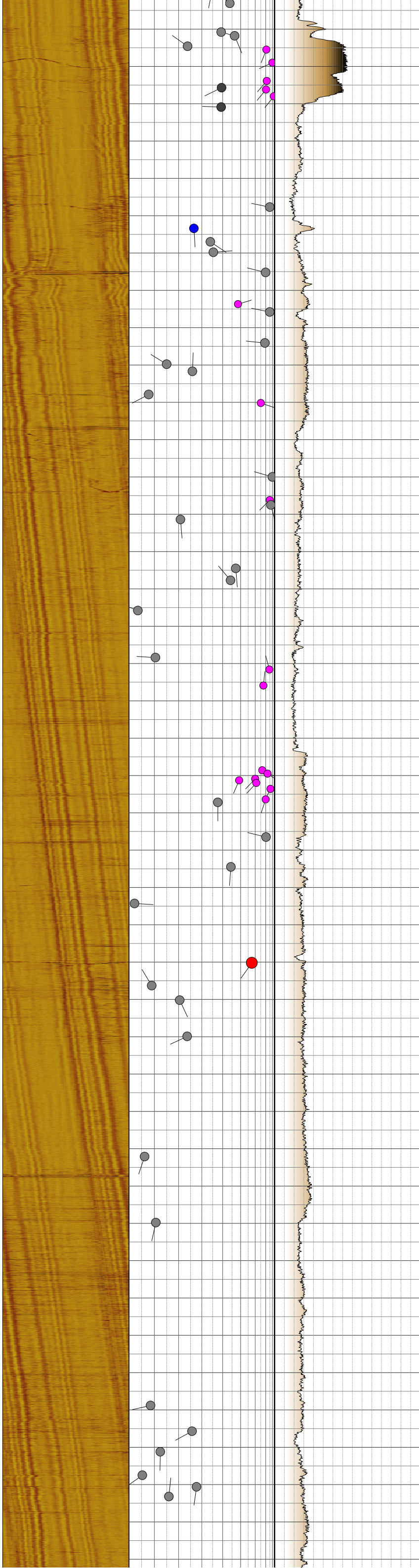


Large open fractures orientated with DIFs.
Difficult to classify.

10 85.36 222.38
1 46.45 159.64

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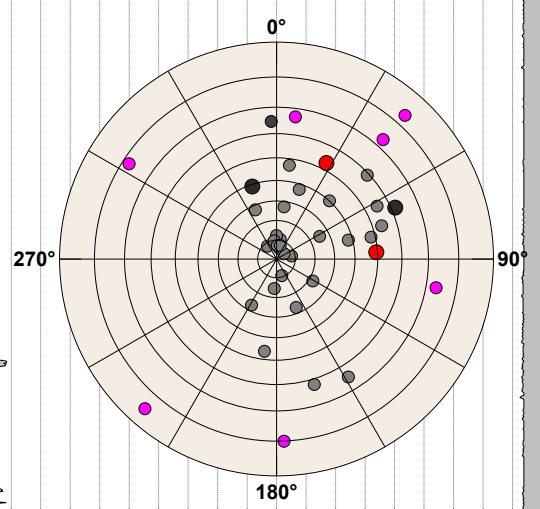
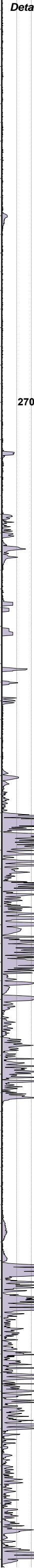
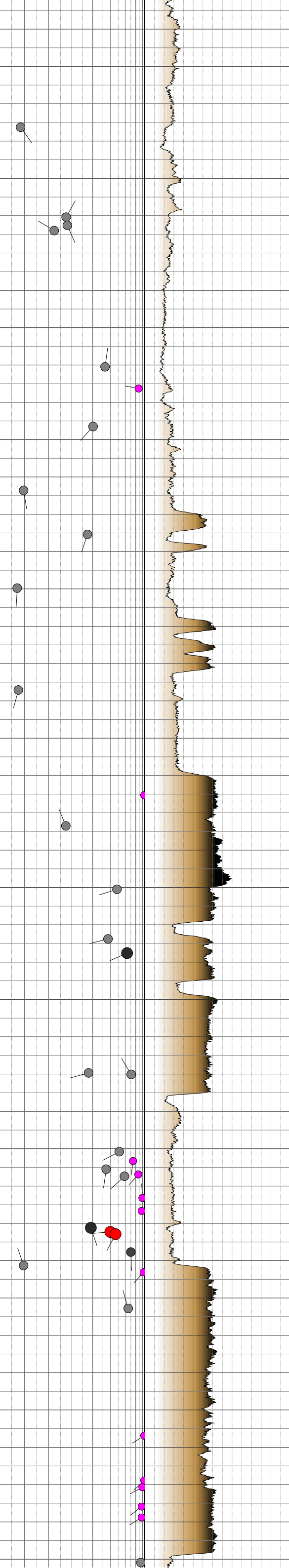
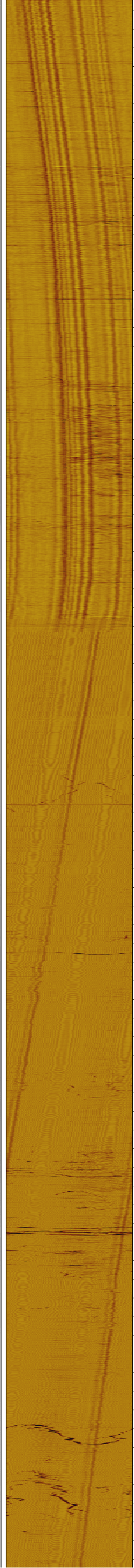


Mean	Counts	Dip[deg]	Azi[deg]
●	72	26.29	219.35
●	45	10.52	231.75
●	3	27.68	240.19
●	20	77.05	215.95
●	3	75.22	220.90
●	1	26.44	176.57

Significant open fracture.

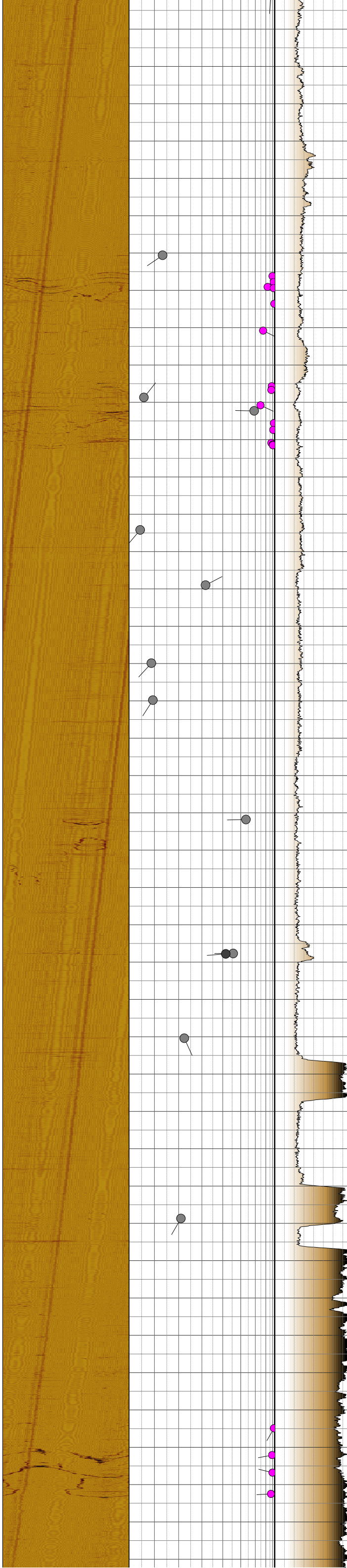
Black grease in borehole affecting image.

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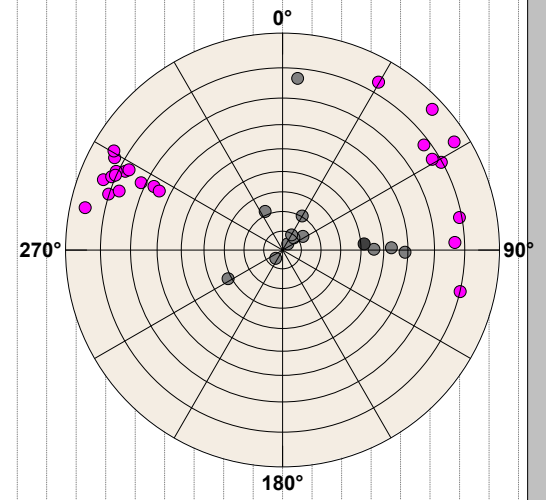


Mean	Counts	Dip[deg]	Azi[deg]
●	40	23.98	227.36
●	28	13.82	241.12
●	7	81.42	212.42
●	2	41.94	212.63
●	2	47.71	236.00
●	1	64.86	177.73

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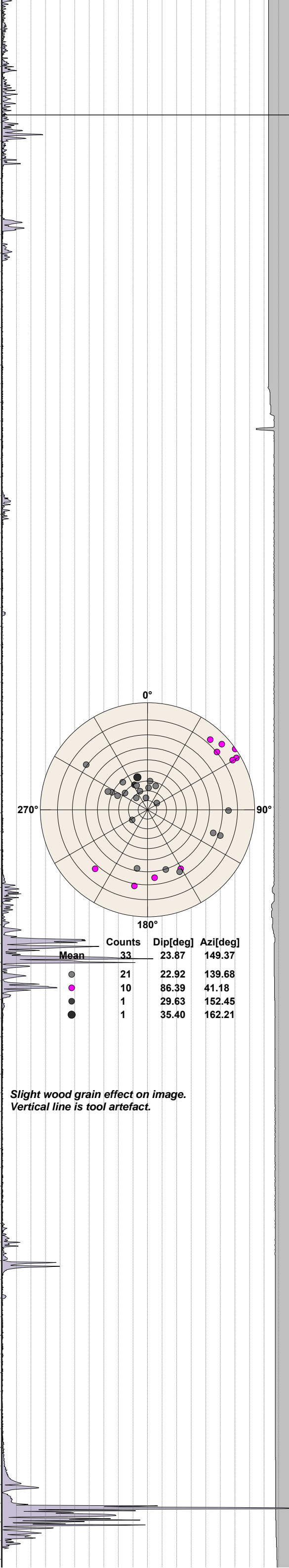
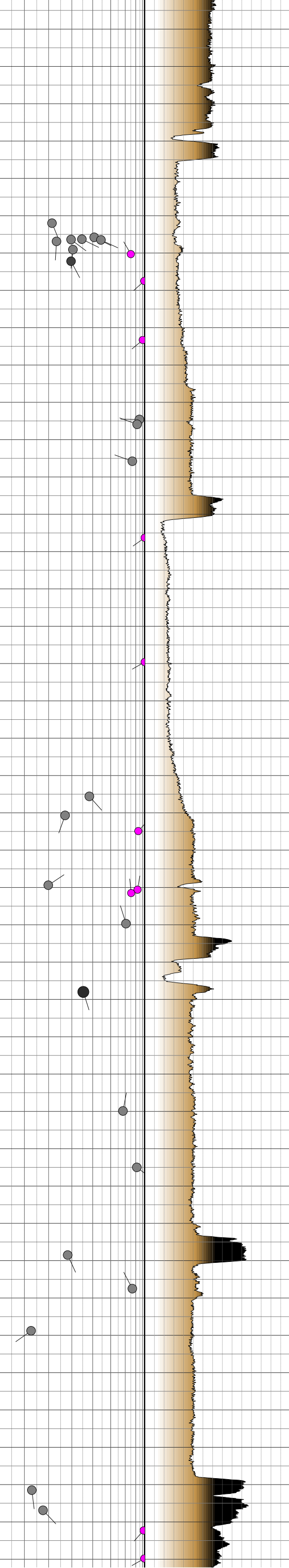
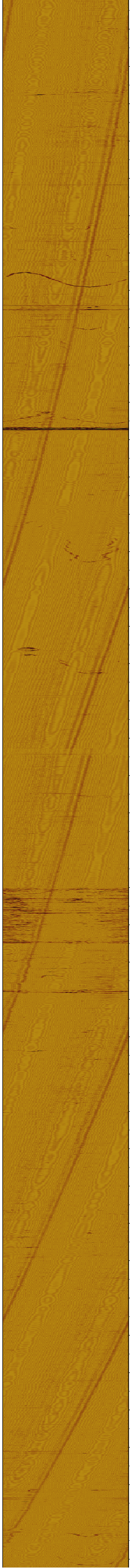
Drill core broken but fractures appear to be drilling-induced.



Mean	Counts	Dip[deg]	Azi[deg]
● (pink)	36	88.24	277.18
● (grey)	23	84.82	100.01
● (dark grey)	12	14.40	238.24
● (black)	1	41.59	265.62

Lithological boundaries not visible on amplitude image.

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	Counts	Dip[deg]	Azi[deg]
Mean	33	23.87	149.37
●	21	22.92	139.68
●	10	86.39	41.18
●	1	29.63	152.45
●	1	35.40	162.21

*Slight wood grain effect on image.
Vertical line is tool artefact.*

