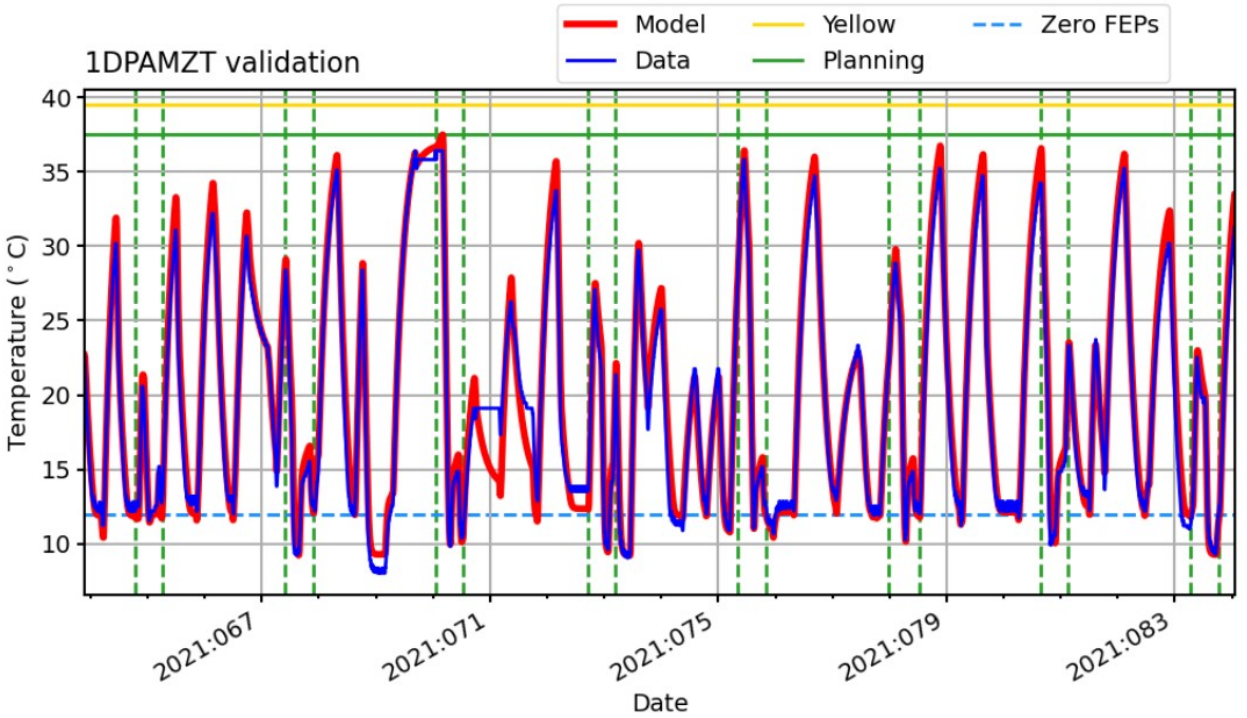
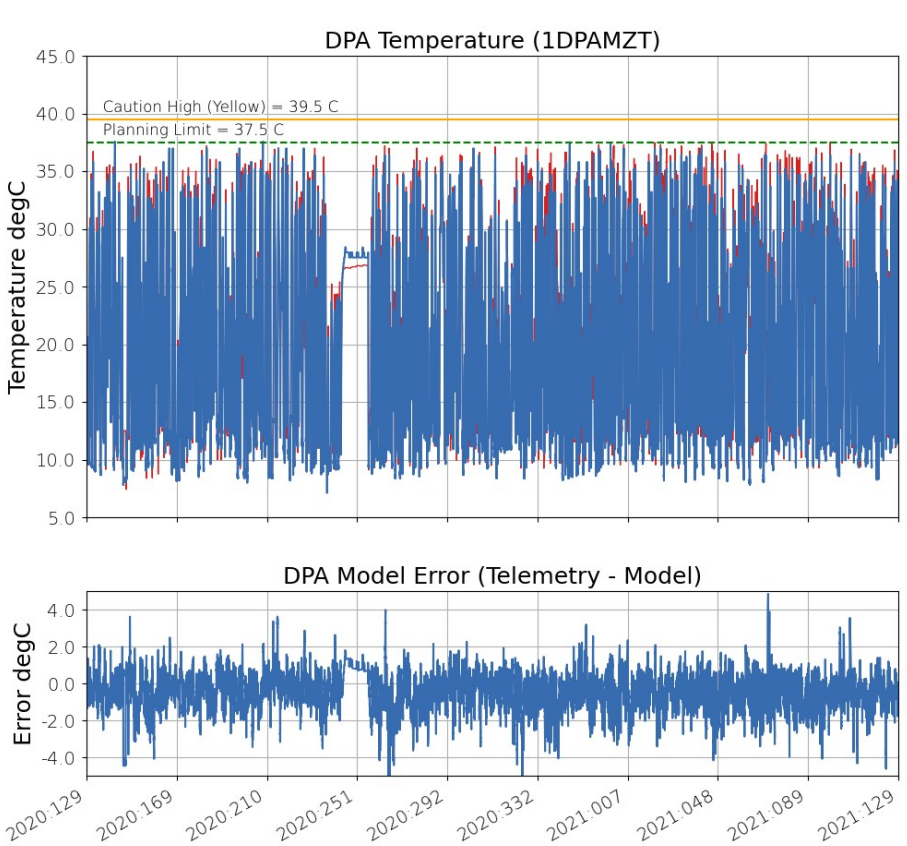
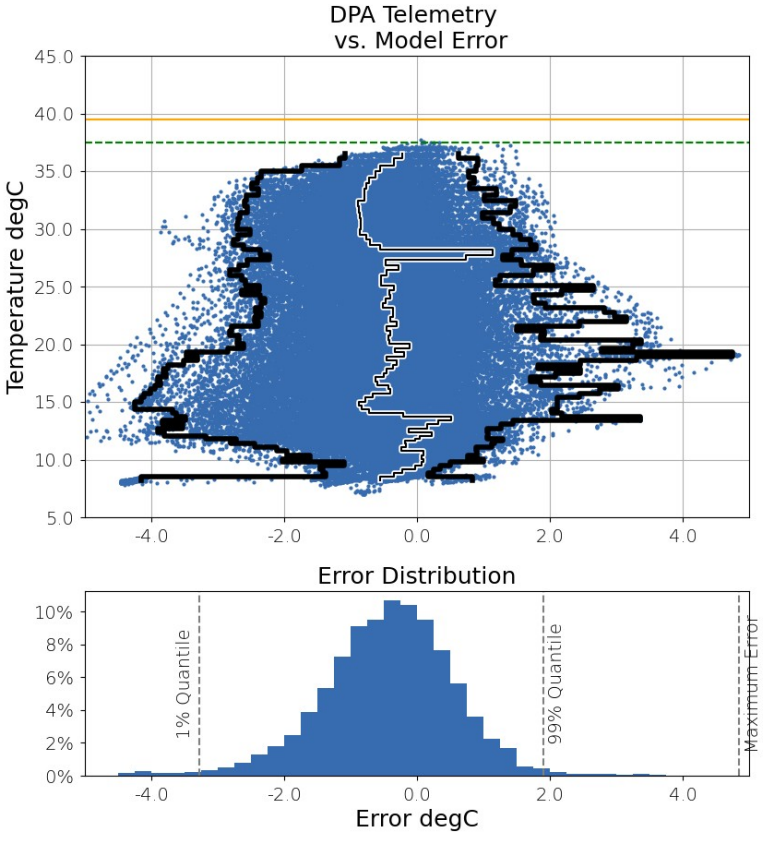
Goals of the 2021 1DPAMZT Re-calibration

1. Primary Goal: eliminate model over-predictions at the hot end.
2. Analyze the Power coefficient for 2xx0

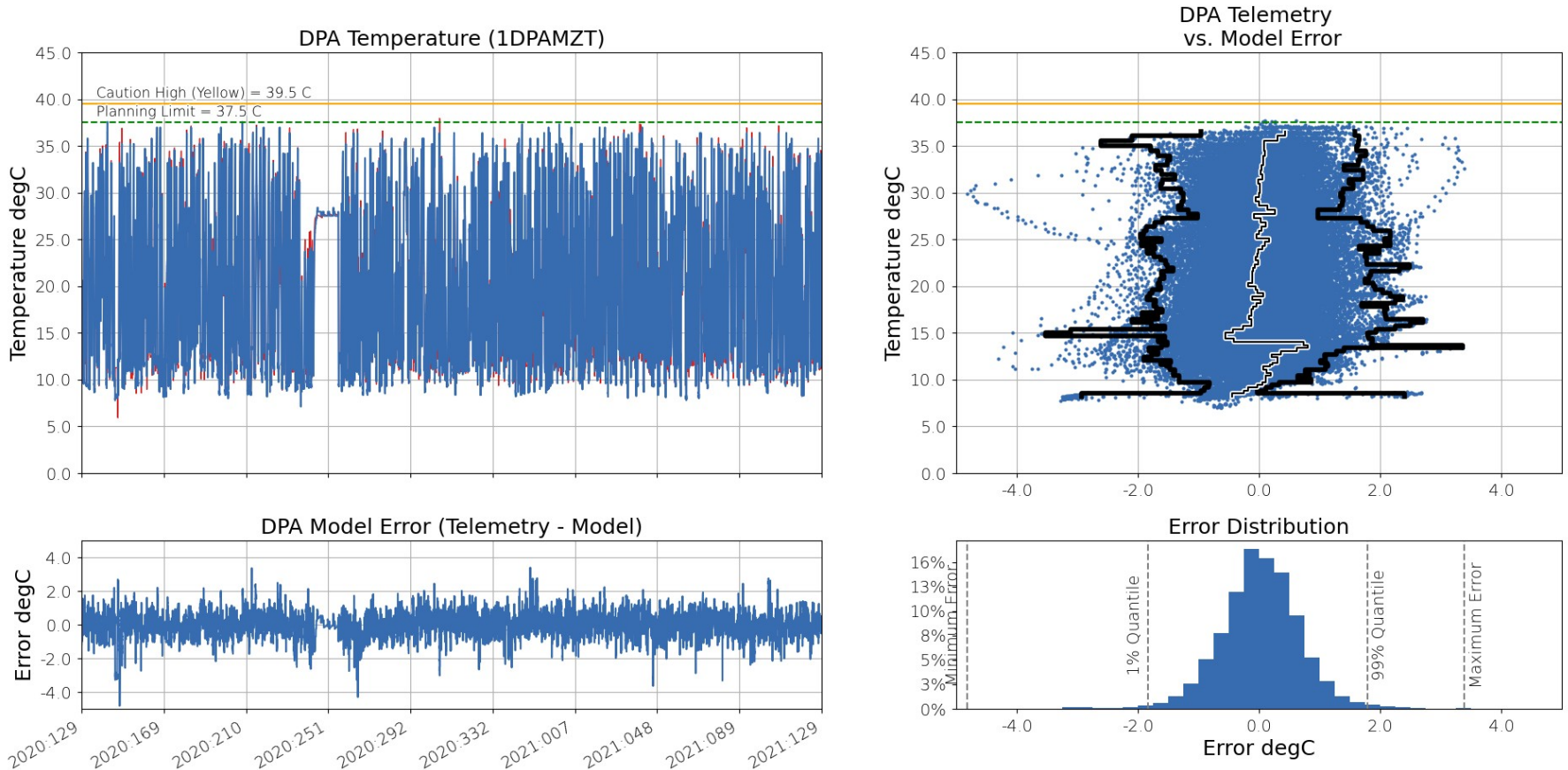


Present Calibration



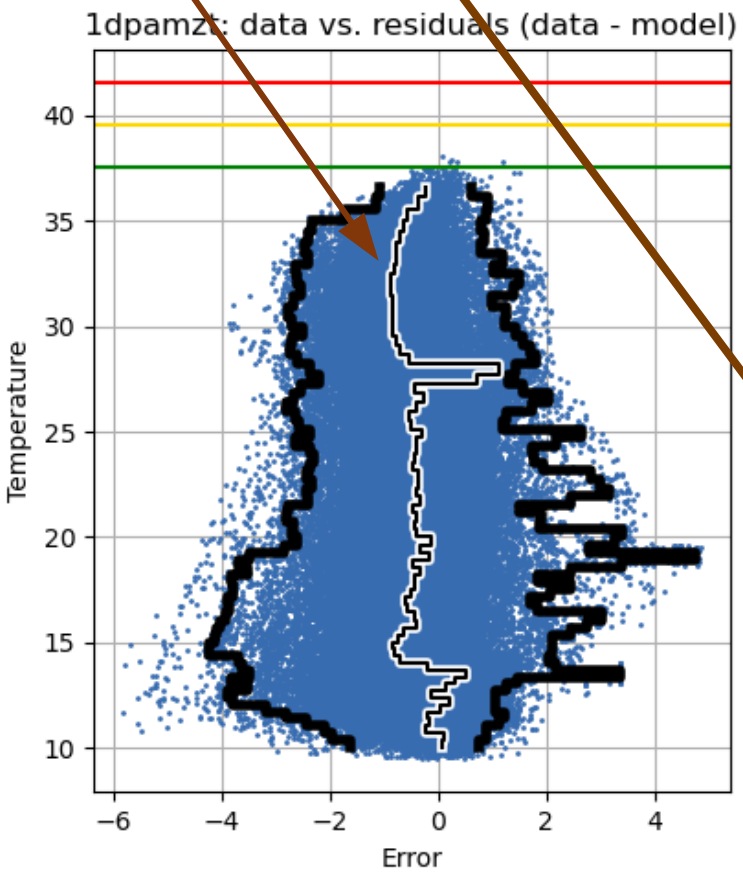


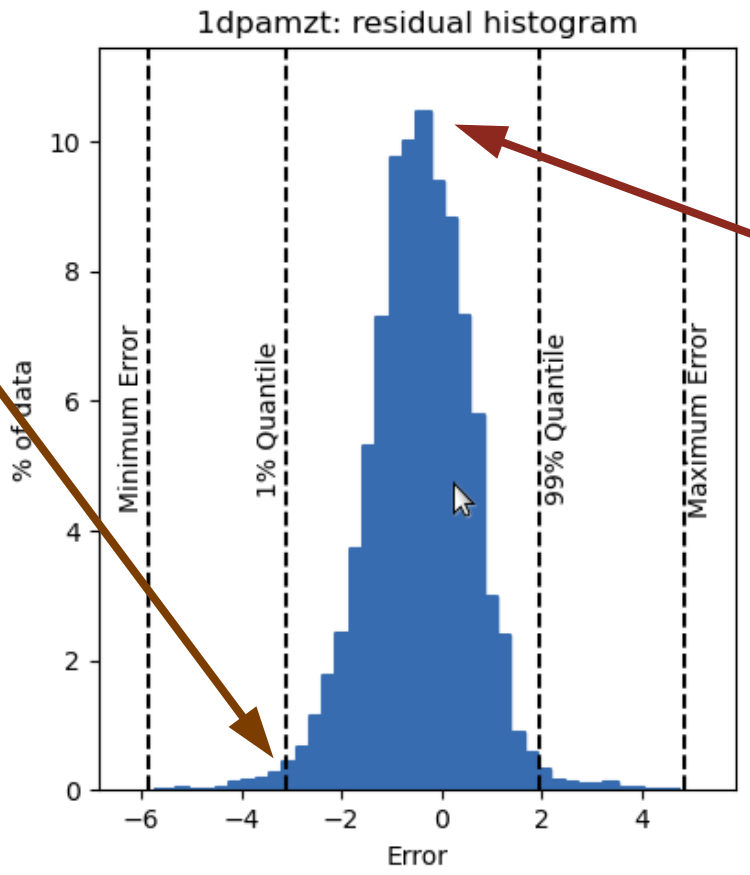
Re-Calibration Dashboard plot



Production v Fit

Overprediction:

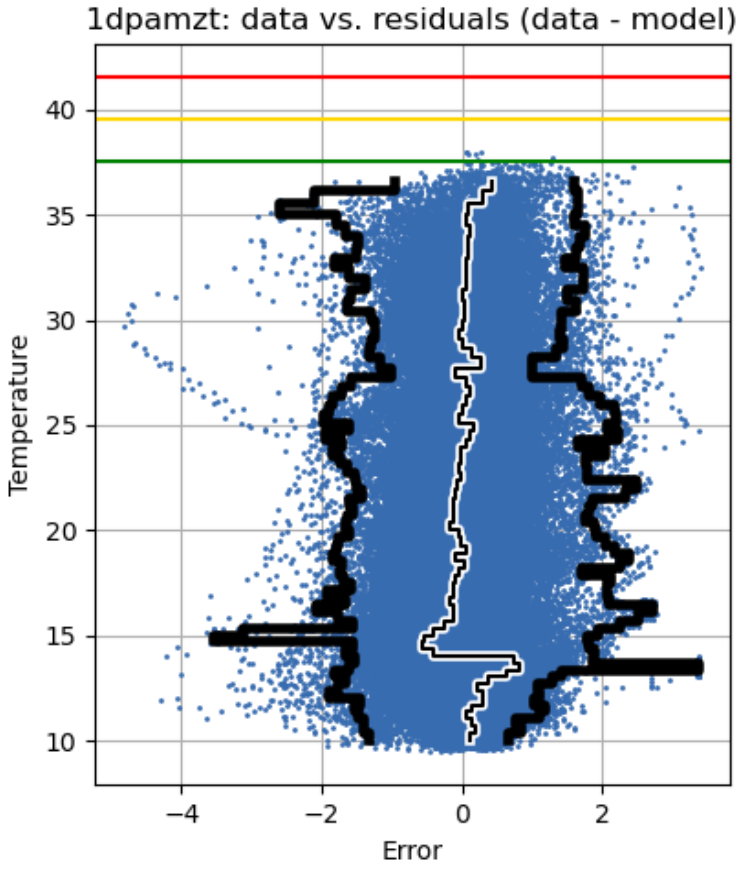


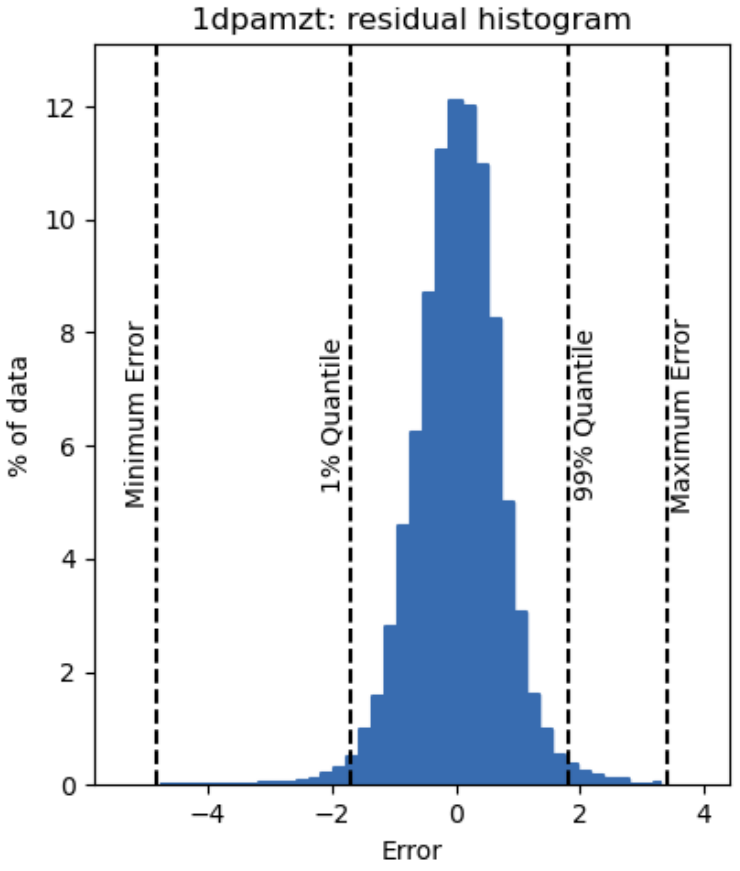


Hot Section Good

1 and 50% Quantiles too far to the left

Latest Fit



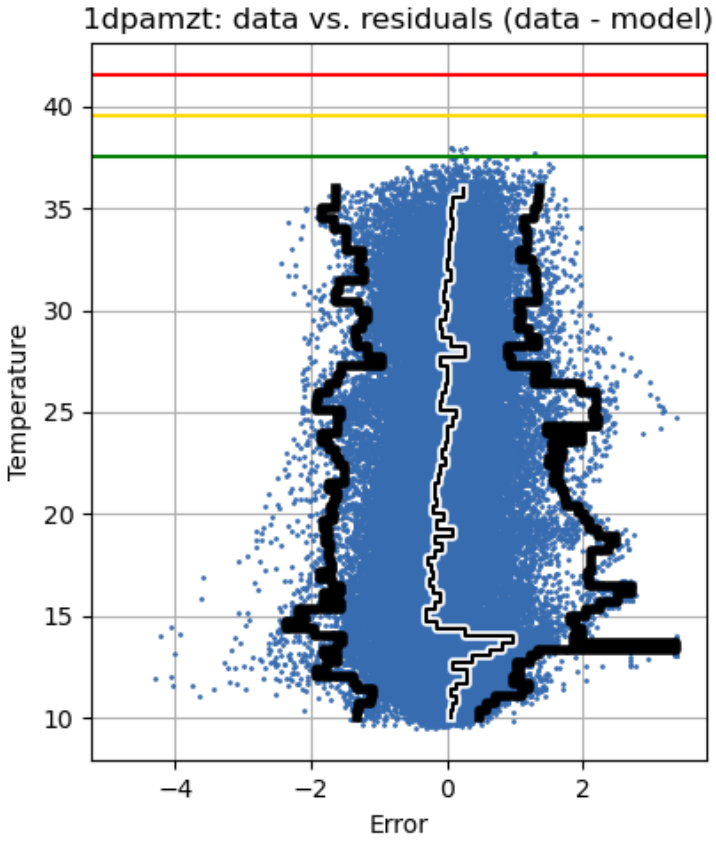


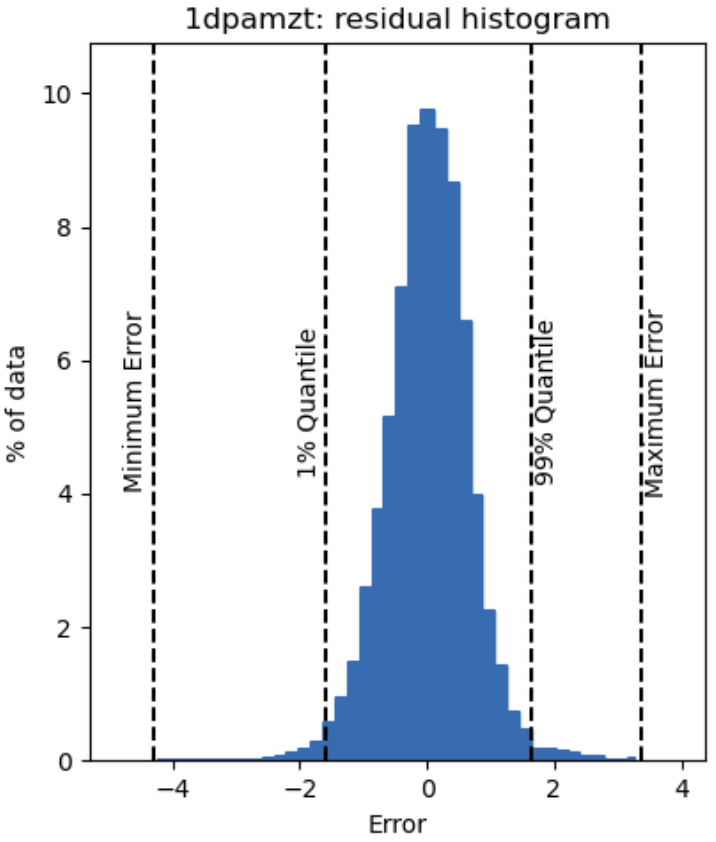
Hot Section Good

1 and 99% Quantiles within -2 and 2 deg.

Peak at +12 with Slight overprediction (good)

-4 and 3 deg Errors Are ECS obs

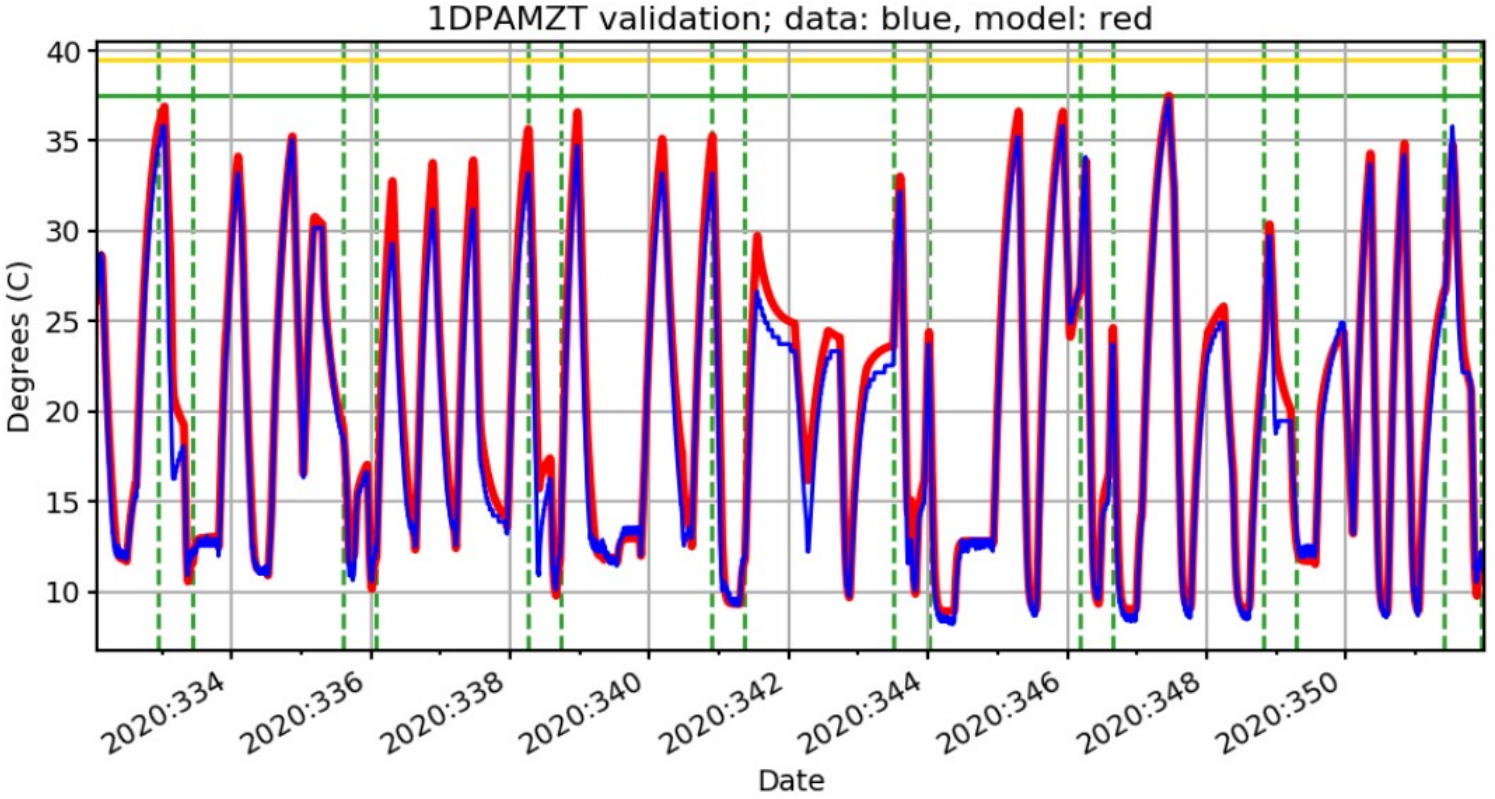




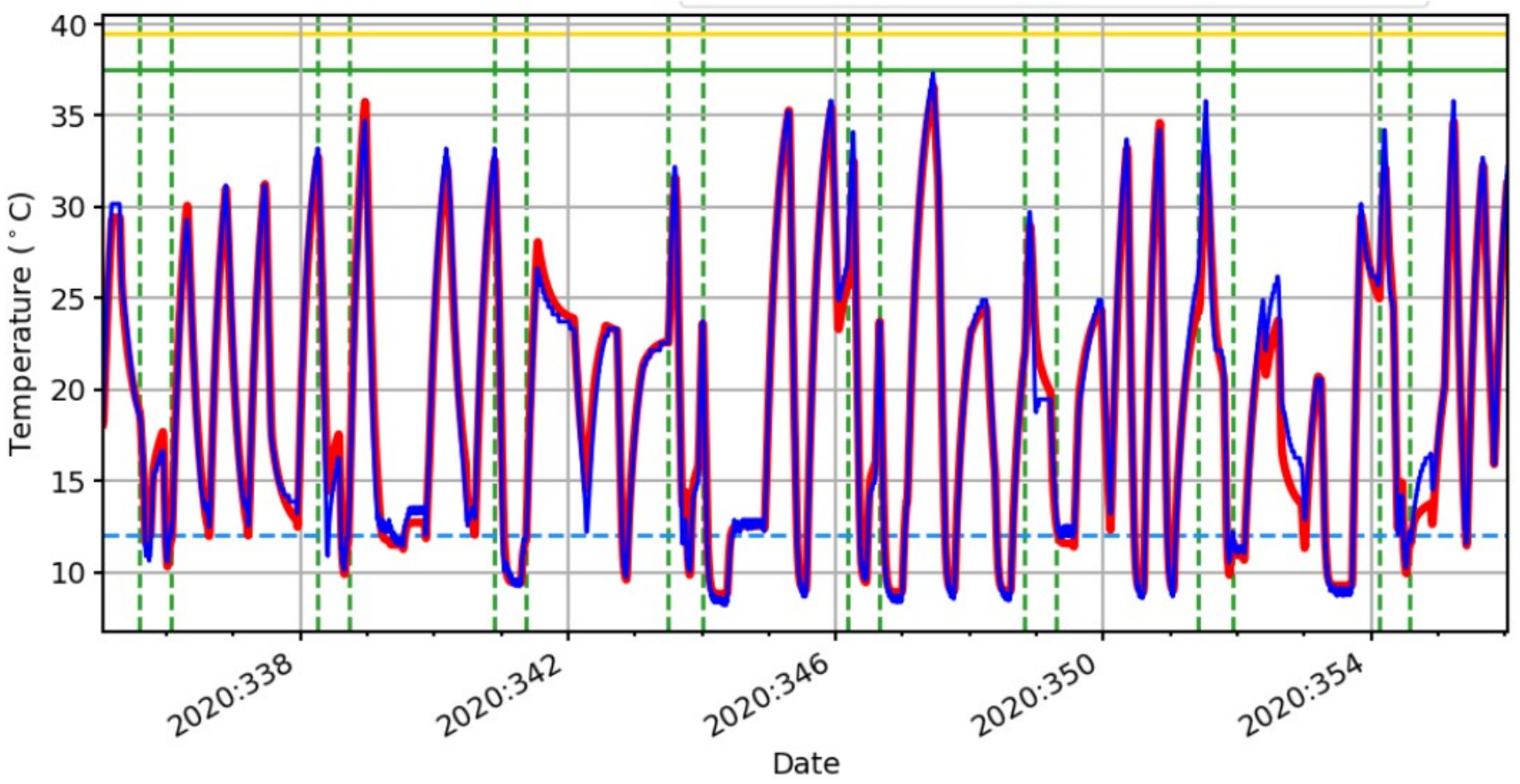
Latest Fit with ECS Obs masked

1DPAMZT Model Comparison Runs

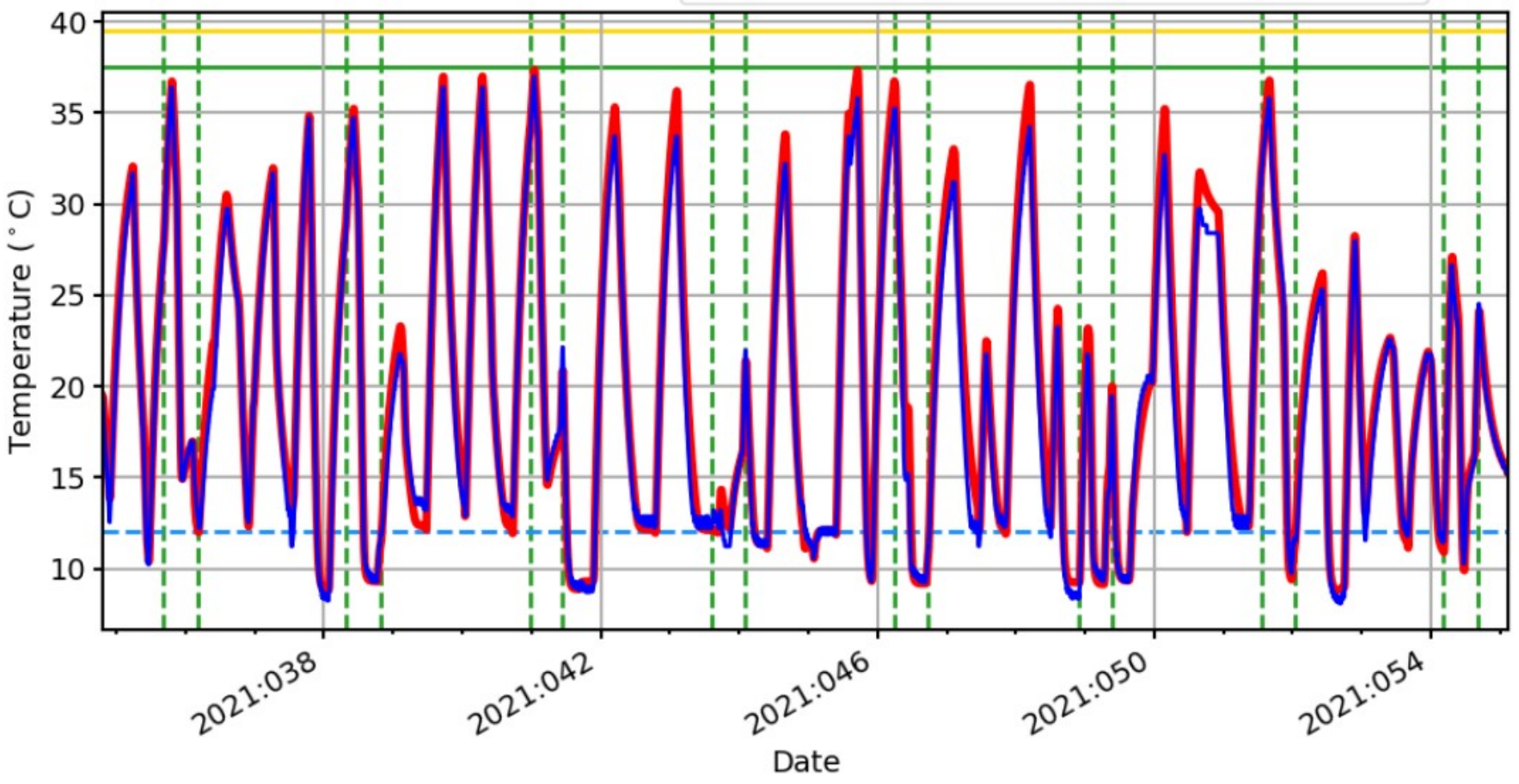
Production: DEC2120



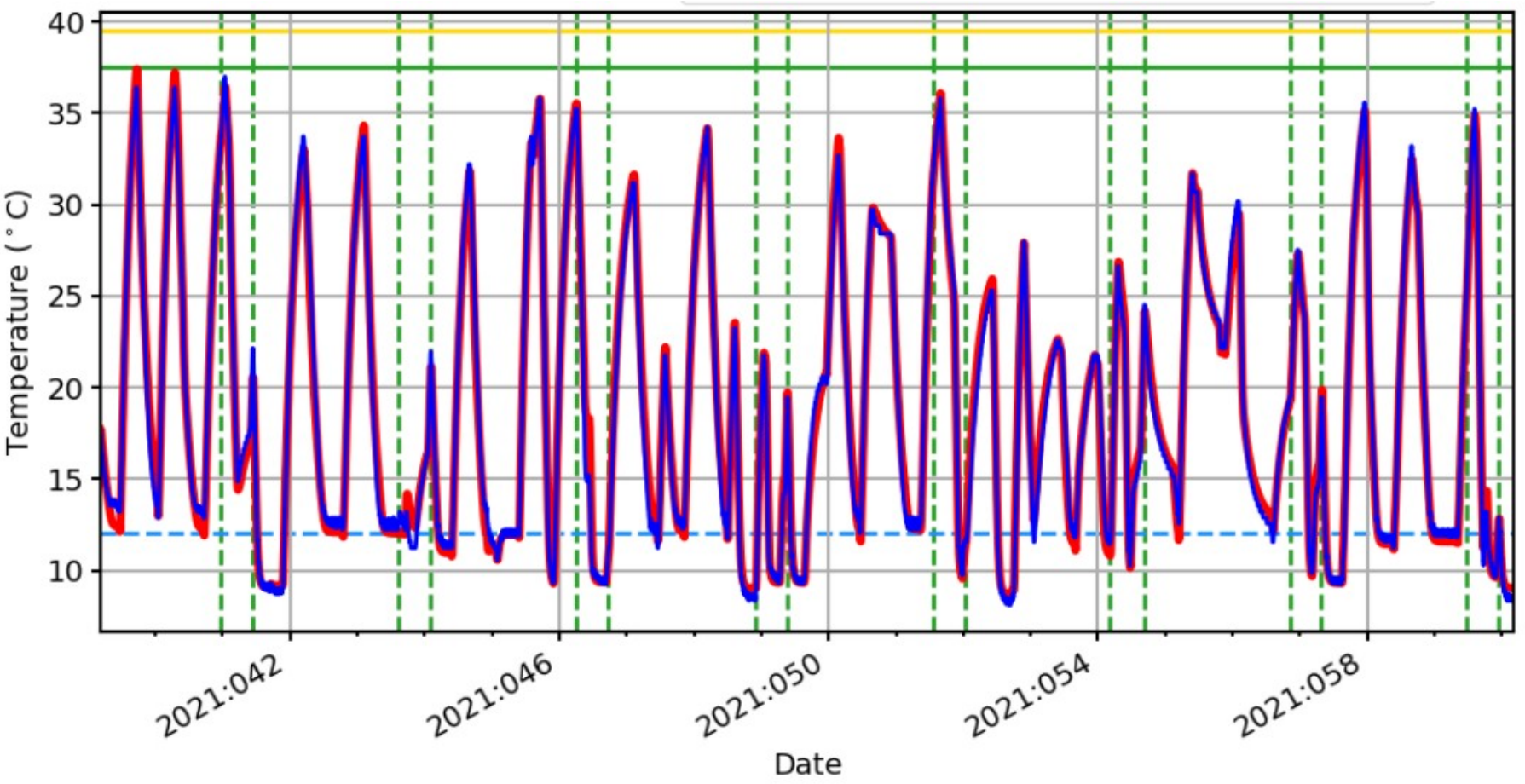
RE-FIT: DEC2120



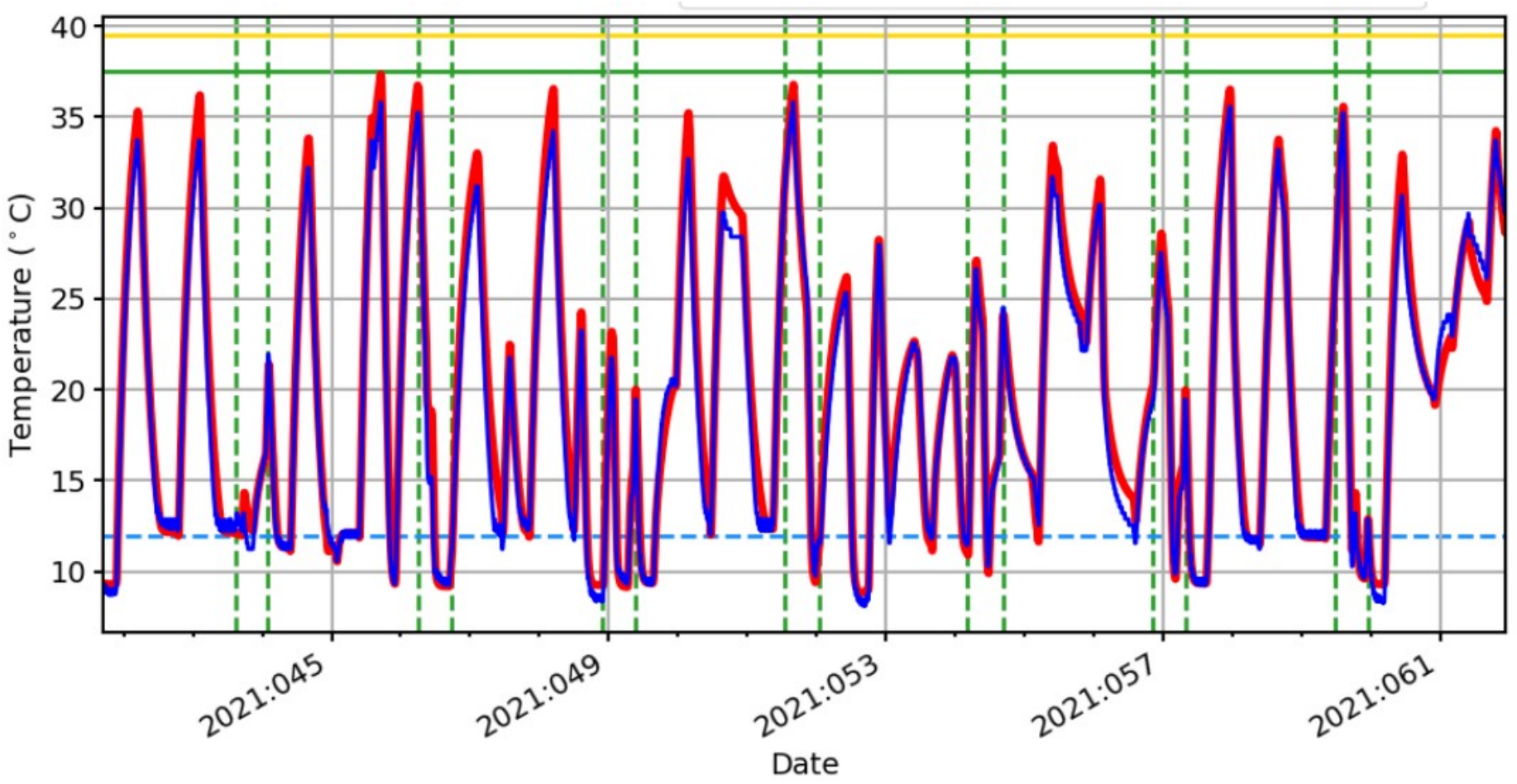
Production: MAR0121



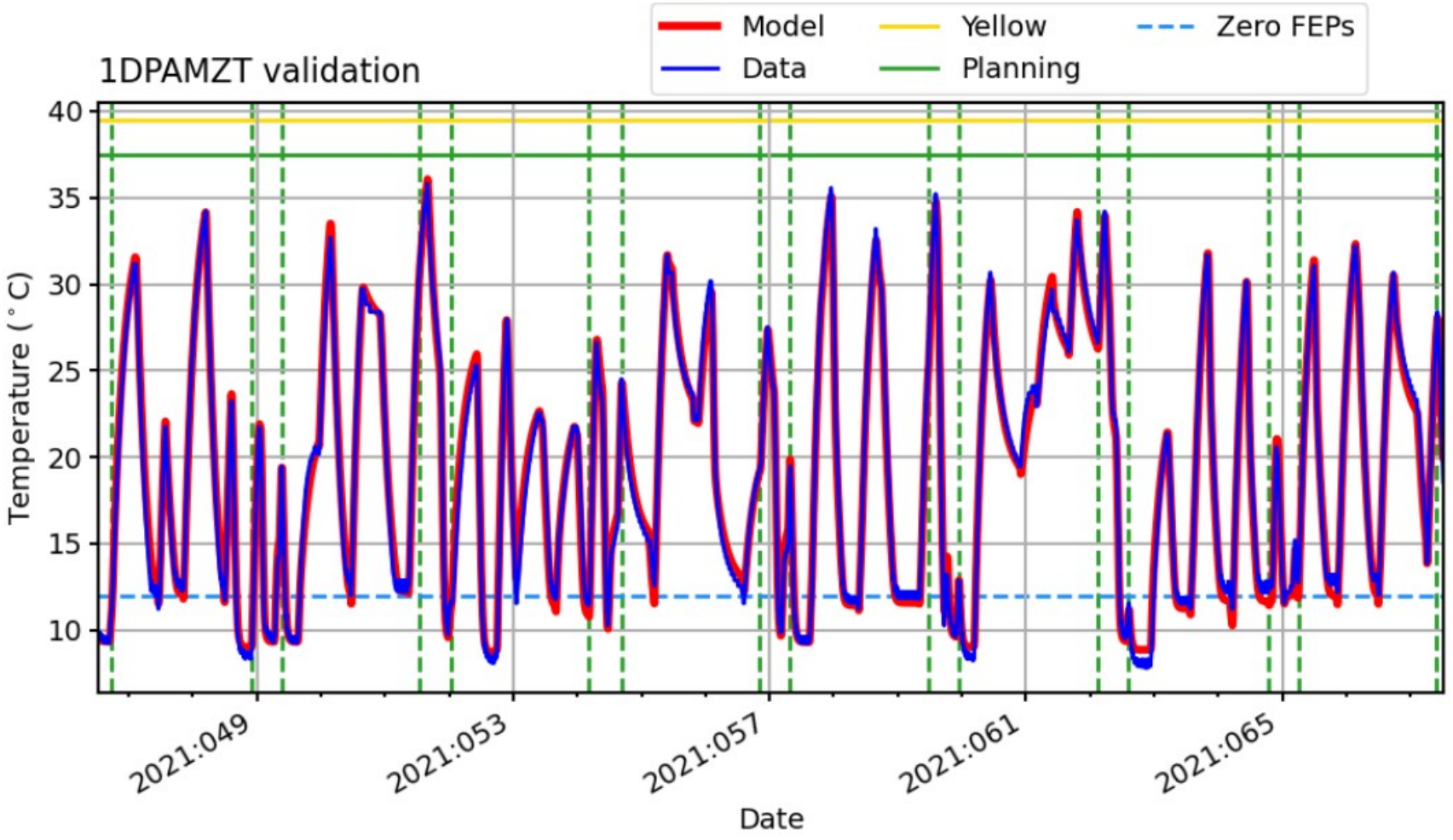
RE-FIT: MAR0121



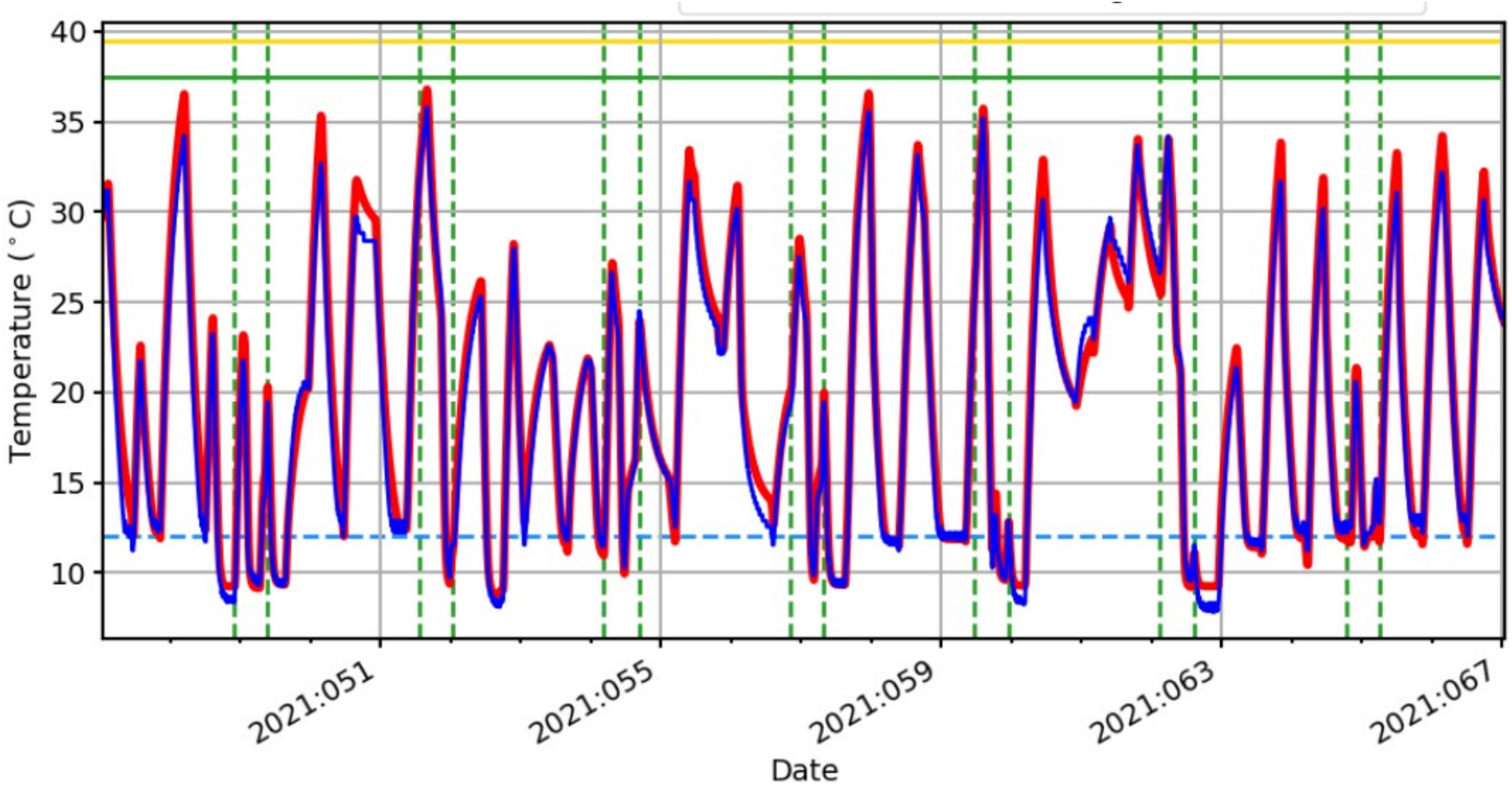
Production: MAR0821



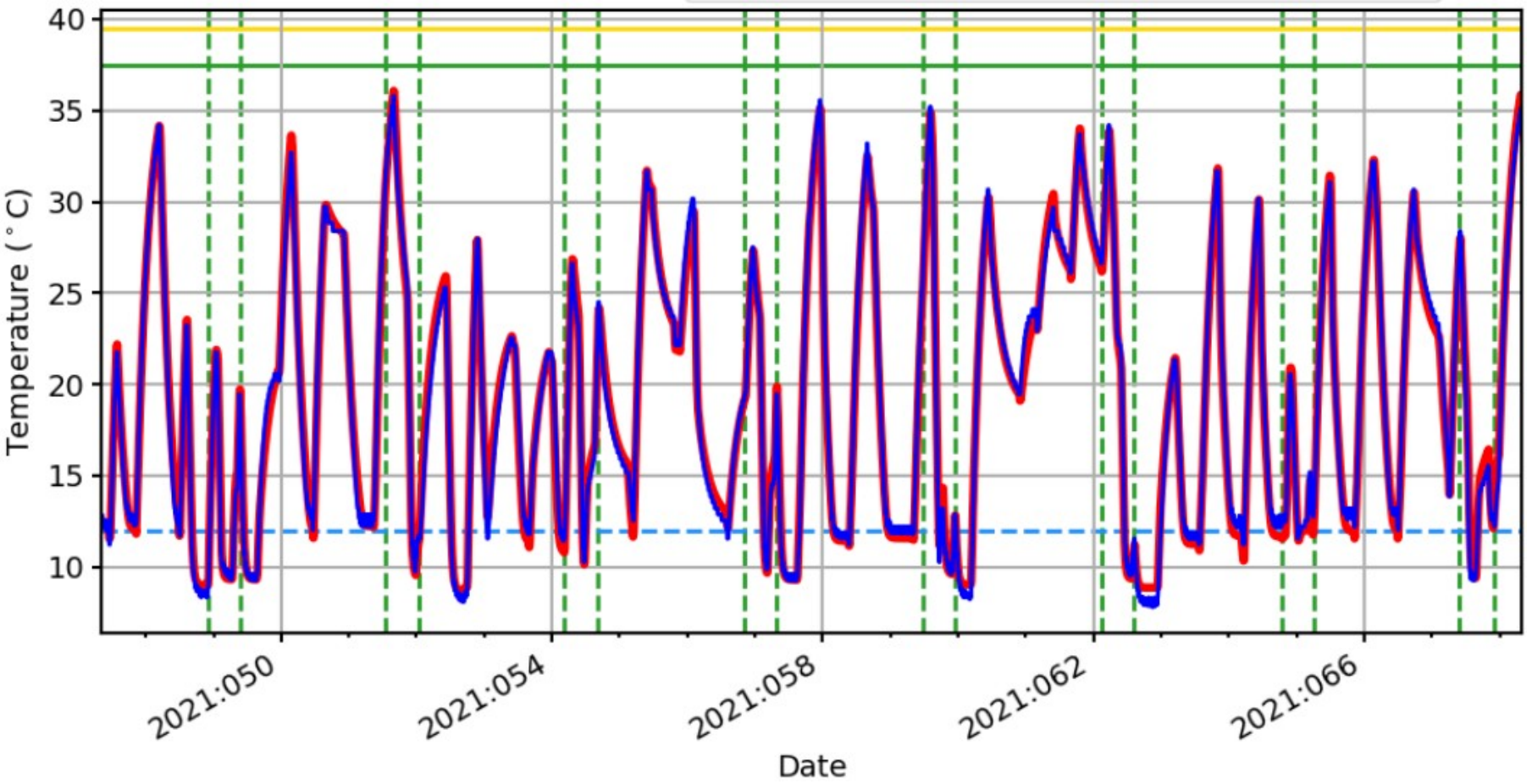
RE-FIT: MAR0821



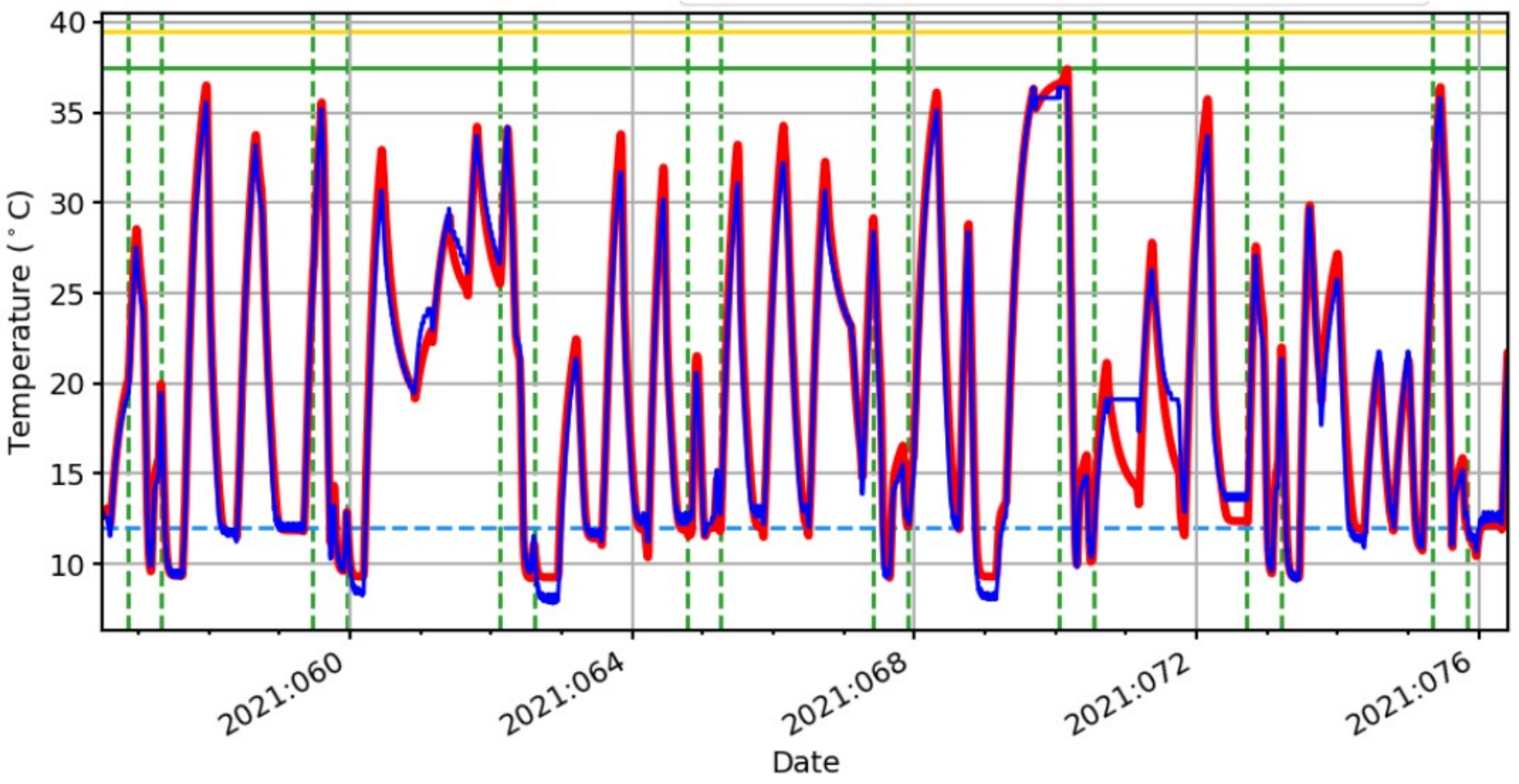
Production: MAR0921



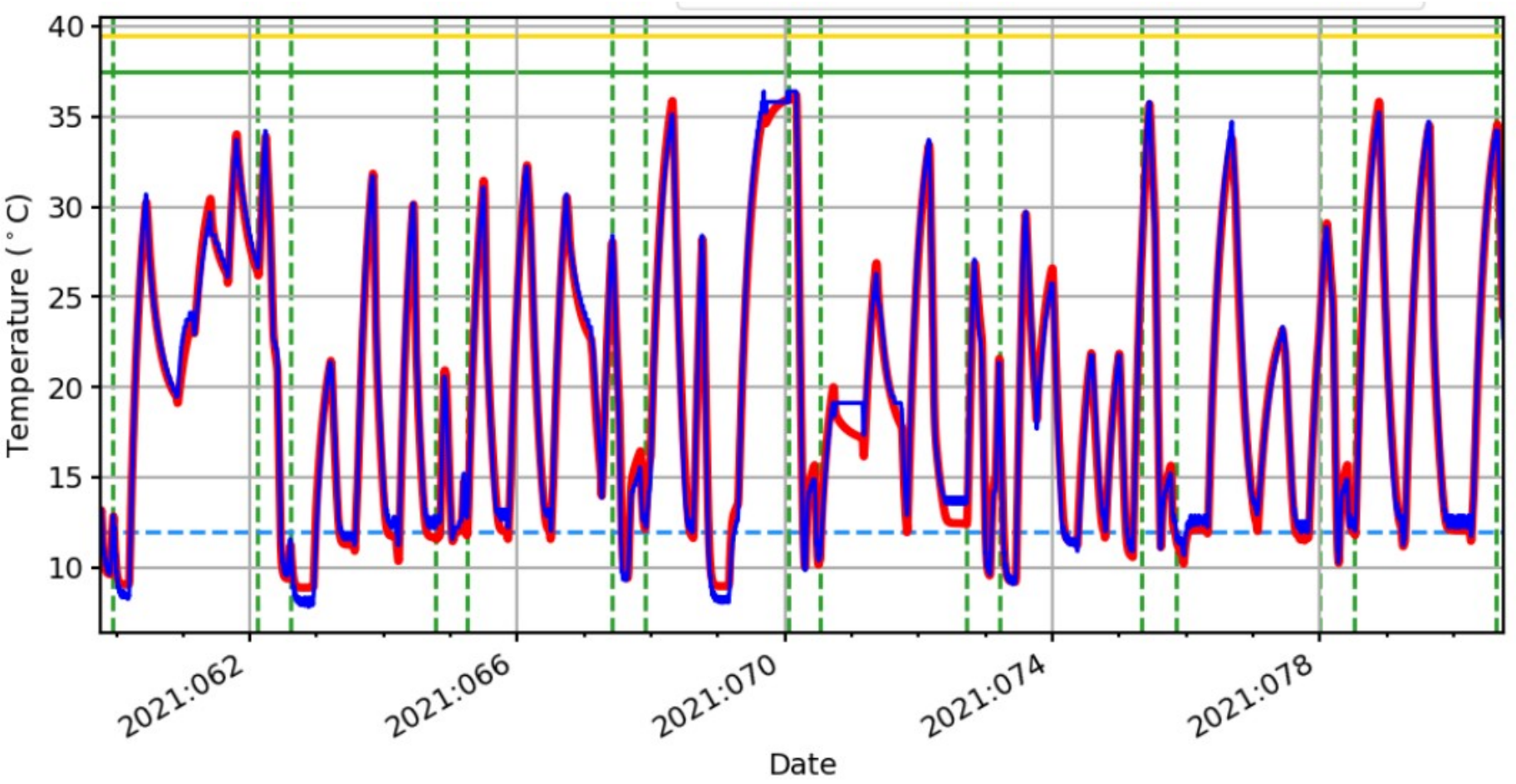
Re-FIT: MAR0921



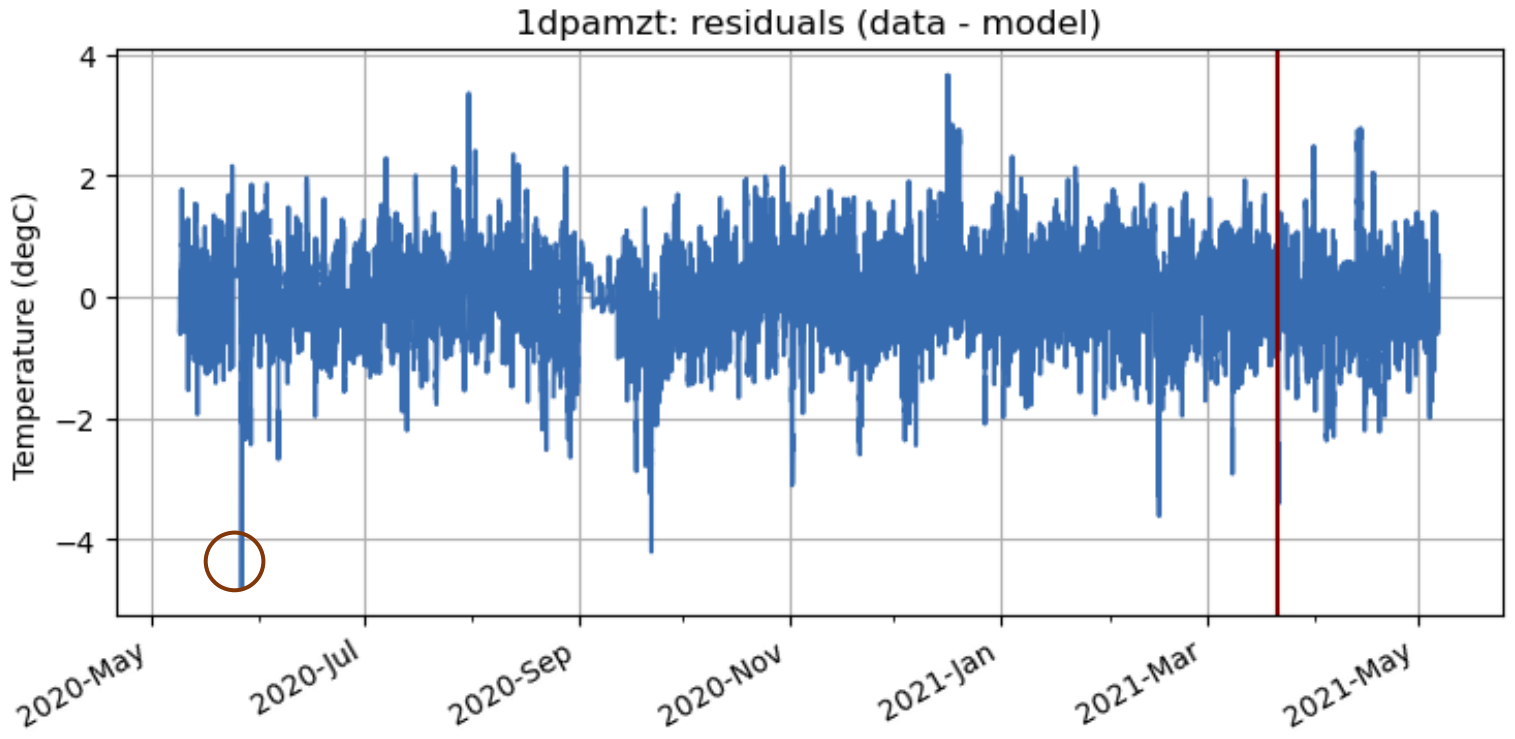
Production: MAR2221



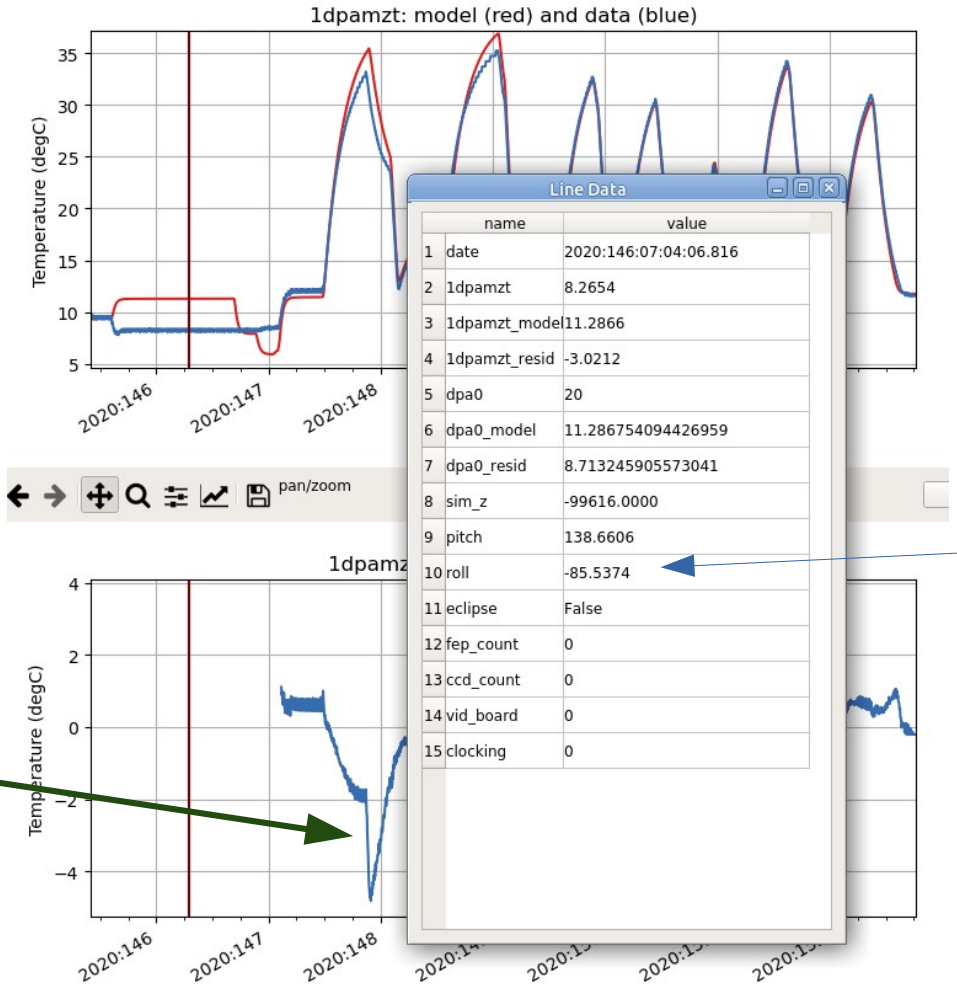
Re-FIT: MAR2221



Residuals

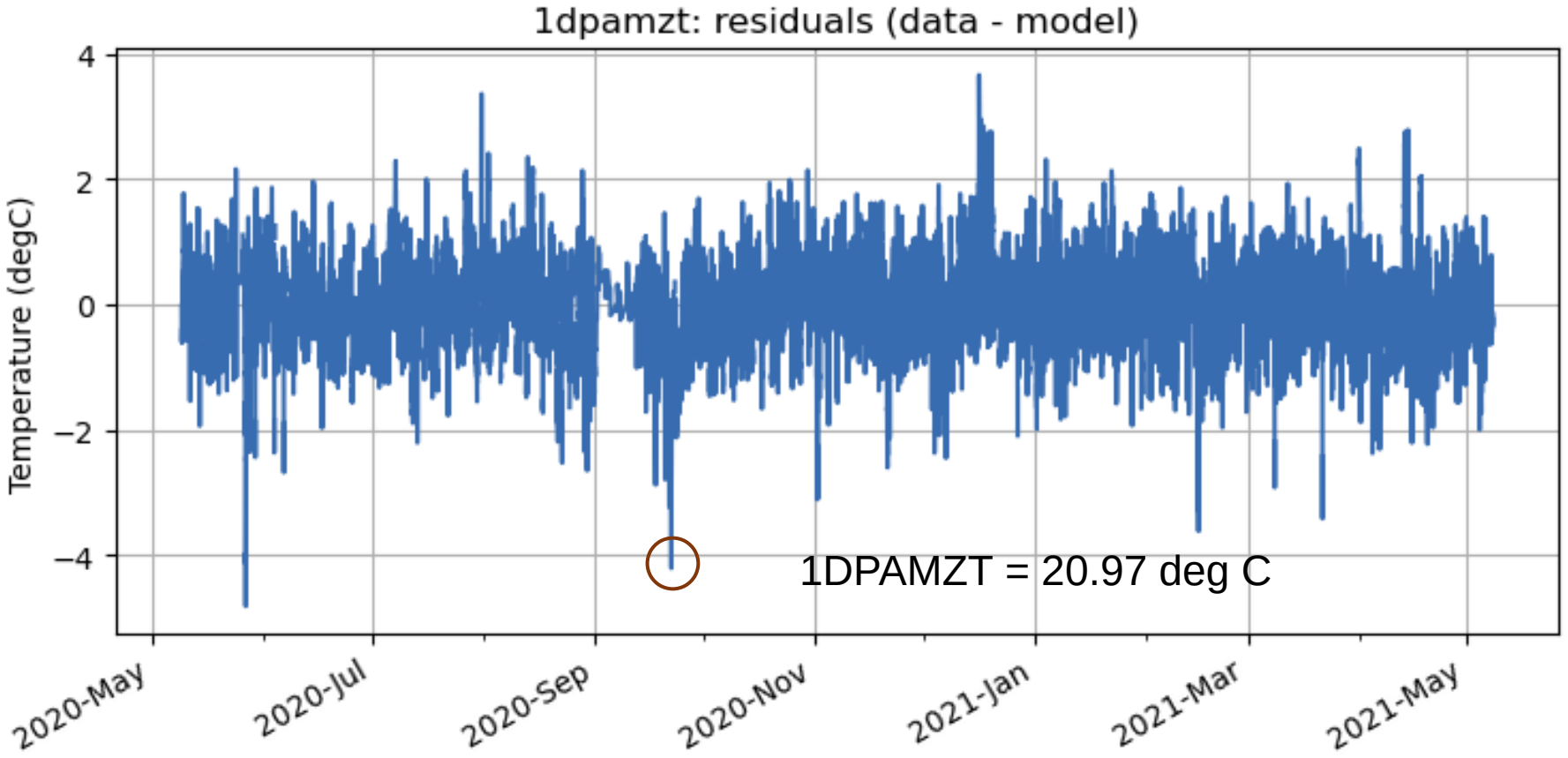

1dpamzt: residuals (data - model)
Temperature (degC)
4
2
0
−2
−4
2020-May
2020-Jul
2020-Sep
2020-Nov
2021-Jan
2021-Mar
2021-May

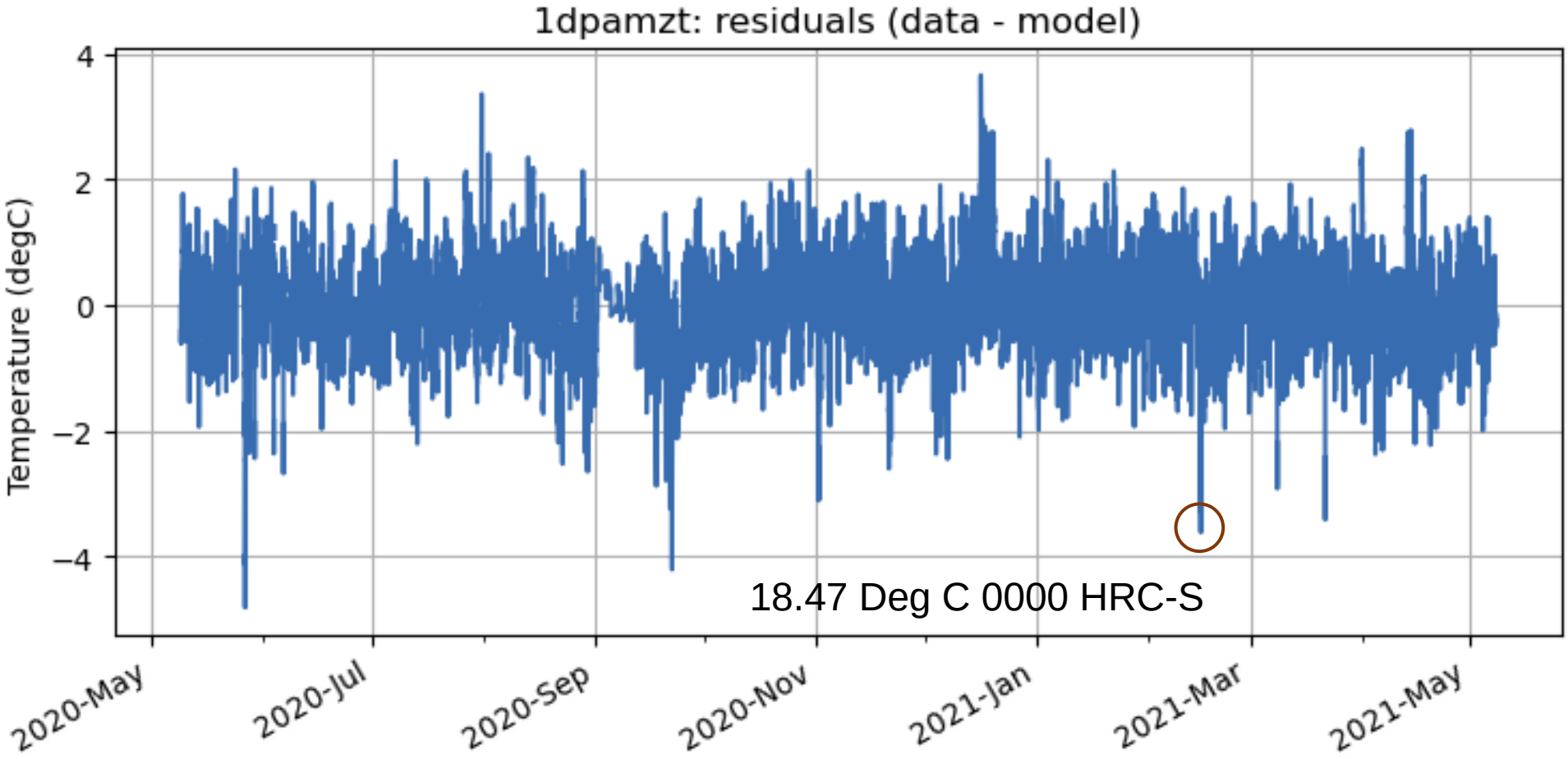
Oddities

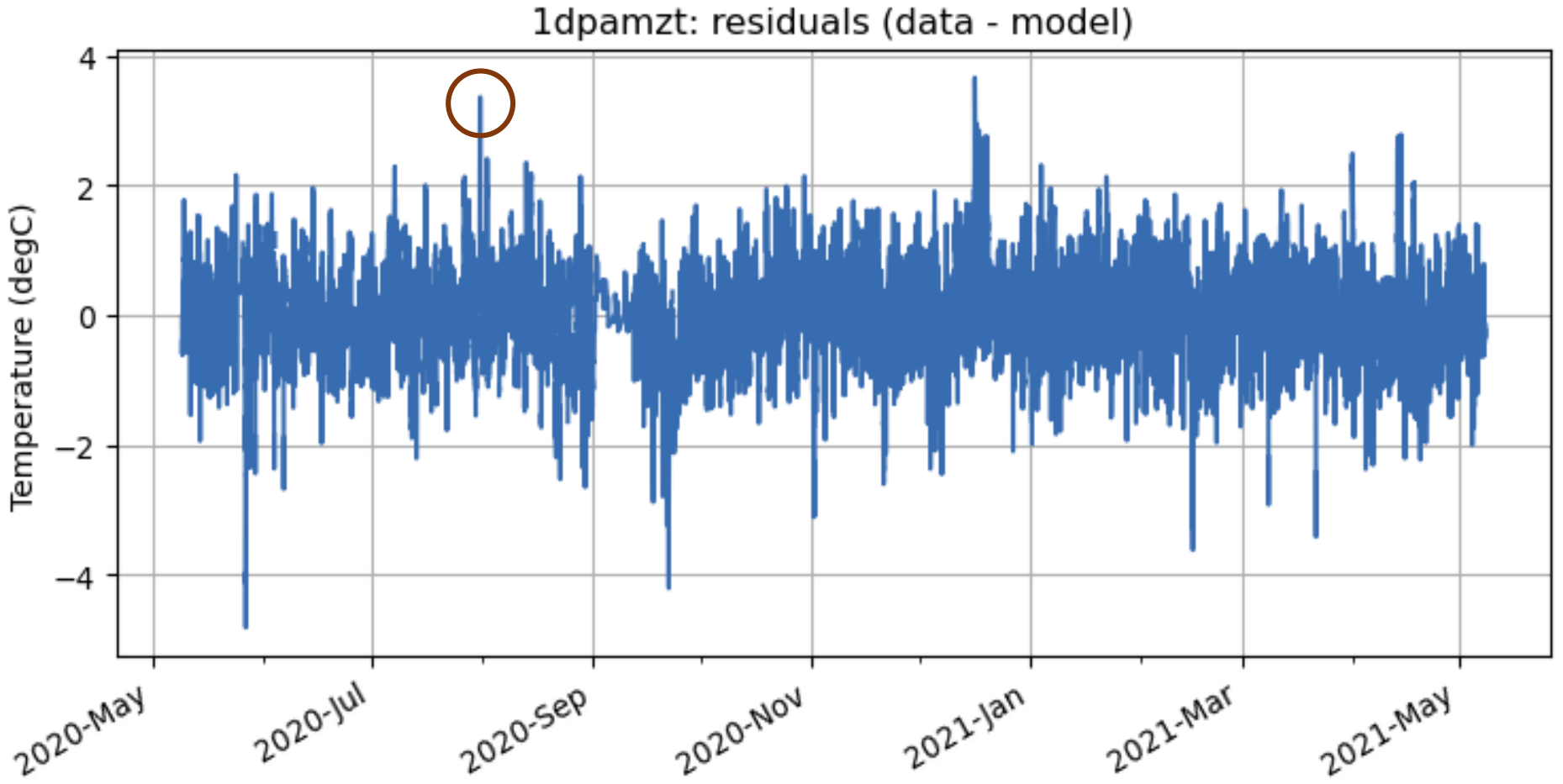


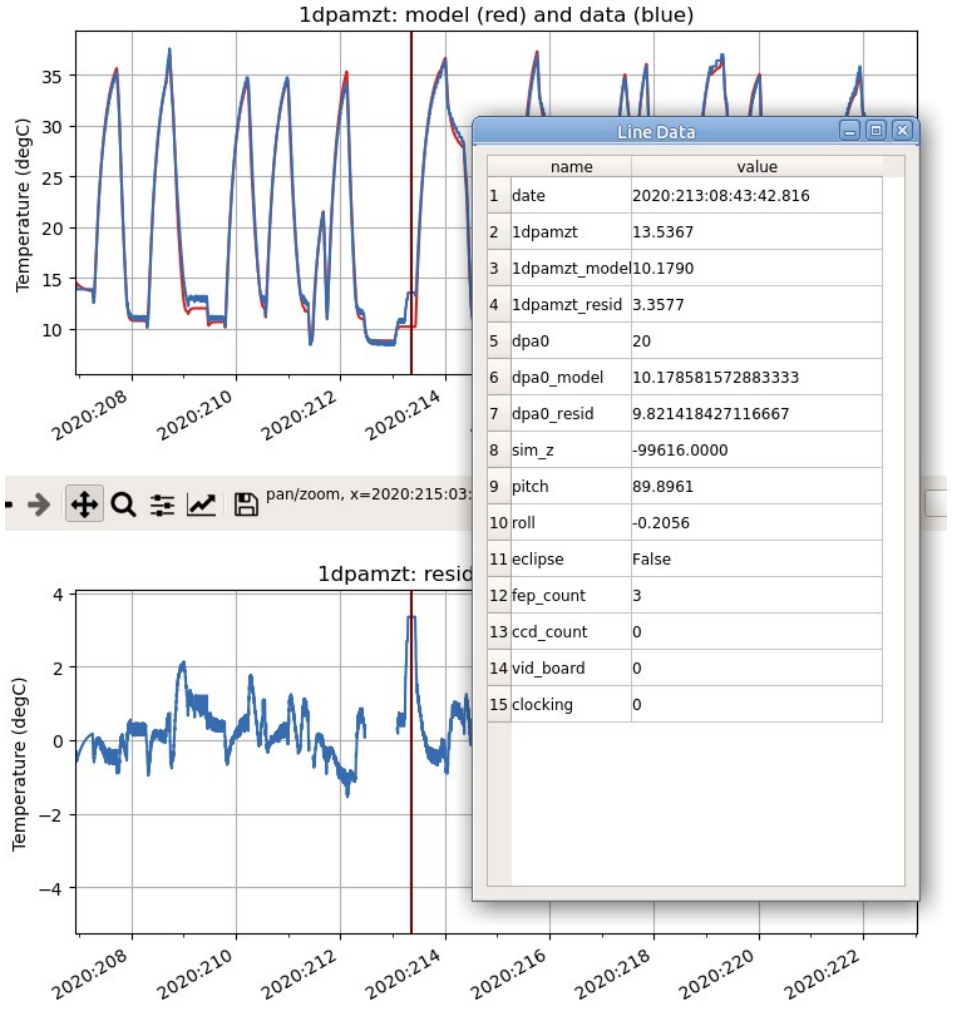
ONR of -85.5374?

High Slope Downline


1dpamzt: residuals (data - model)
Temperature (degC)
4
2
0
−2
−4
2020-May
2020-Jul
2020-Sep
2020-Nov
2021-Jan
2021-Mar
2021-May
1DPAMZT = 20.97 deg C


1dpamzt: residuals (data - model)
Temperature (degC)
4
2
0
−2
−4
2020-May
2020-Jul
2020-Sep
2020-Nov
2021-Jan
2021-Mar
2021-May
18.47 Deg C 0000 HRC-S

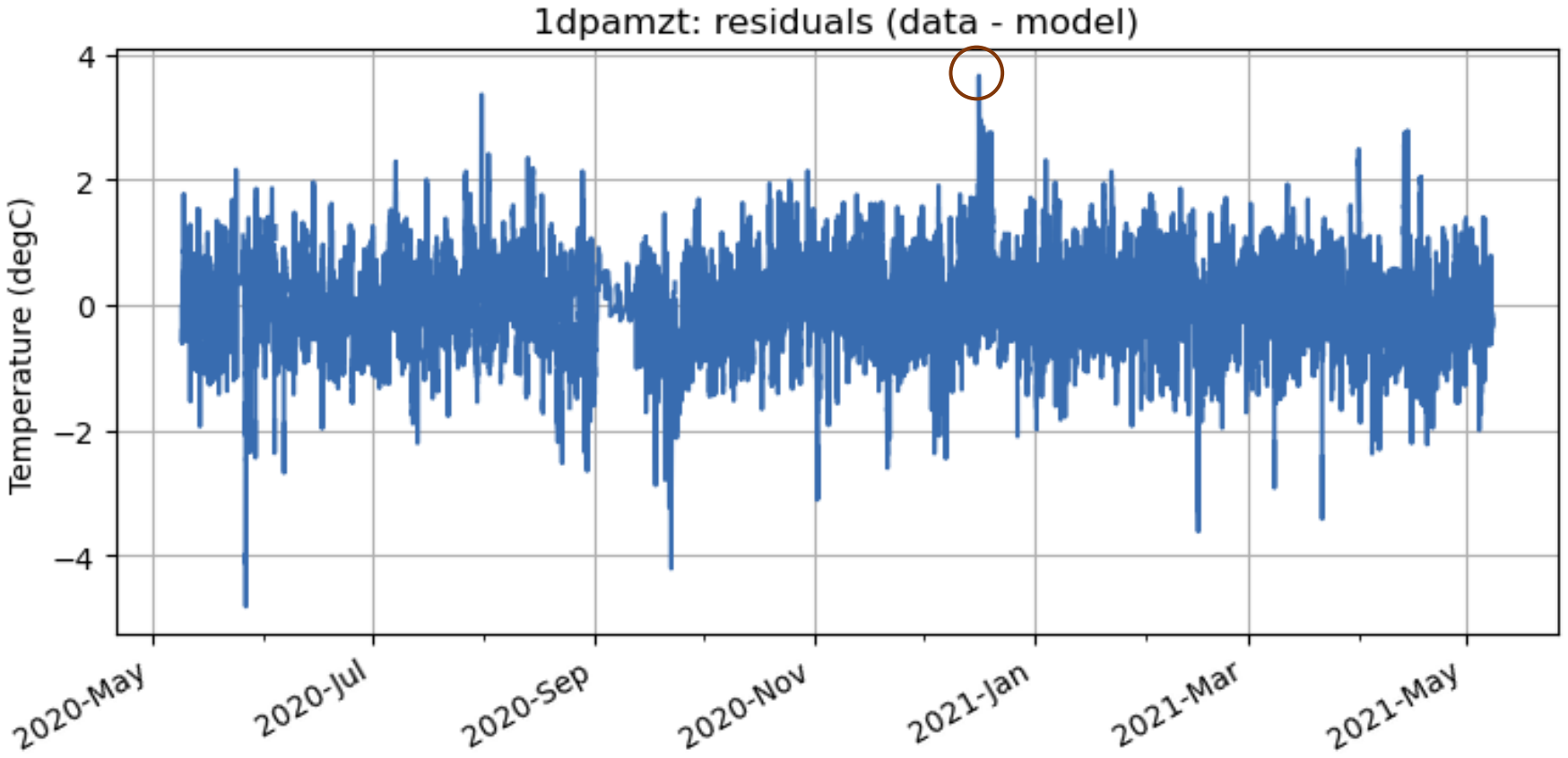

1dpamzt: residuals (data - model)
Temperature (degC)
4
2
0
−2
−4
2020-May
2020-Jul
2020-Sep
2020-Nov
2021-Jan
2021-Mar
2021-May

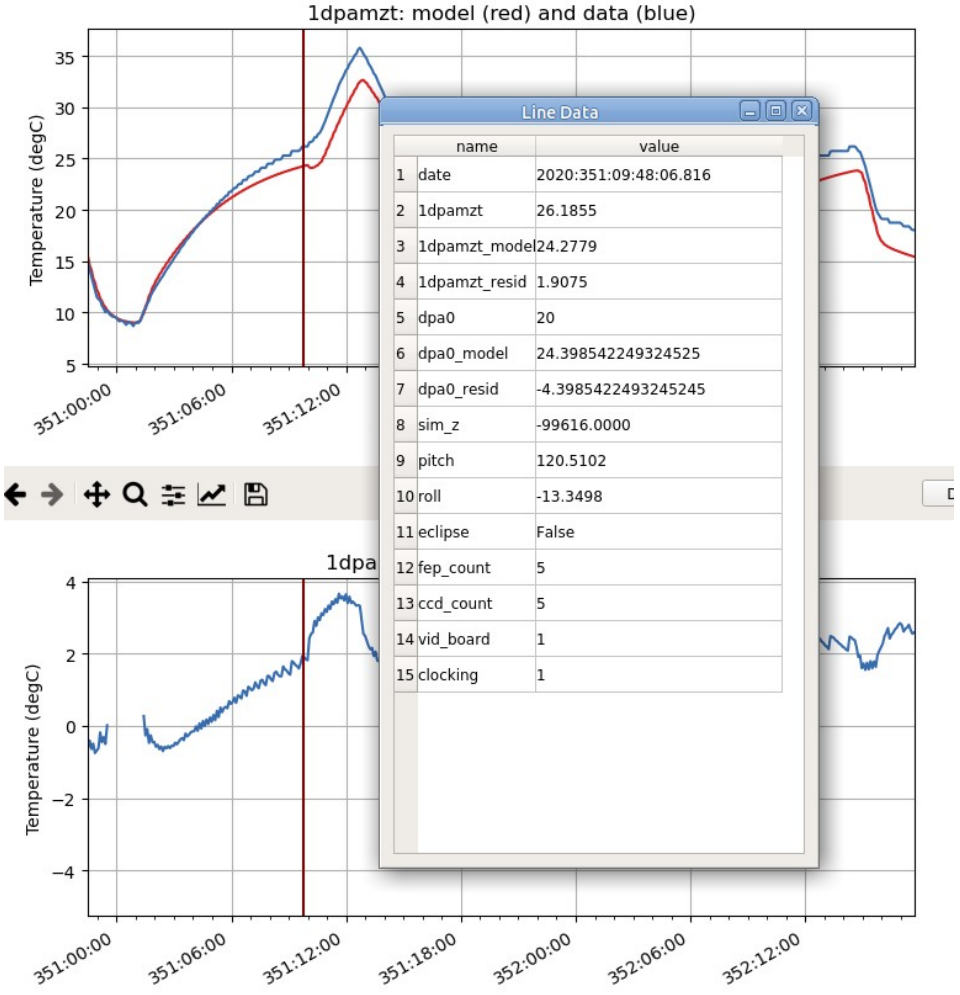


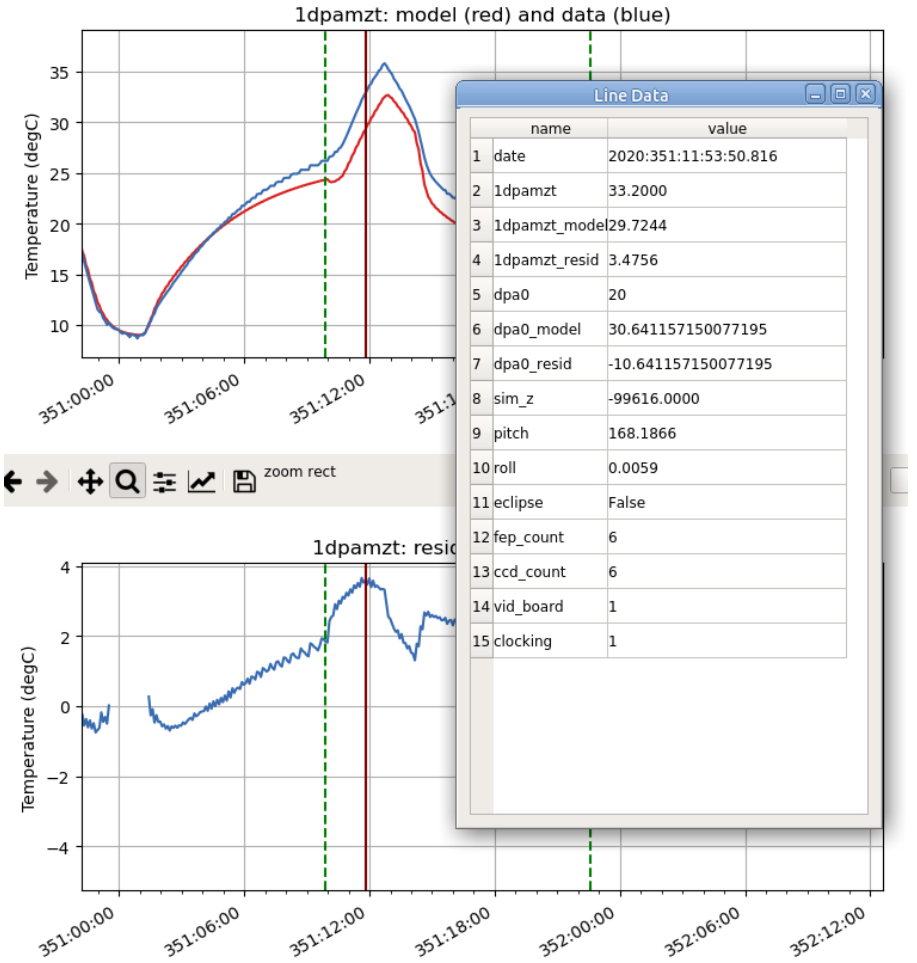
Line Data

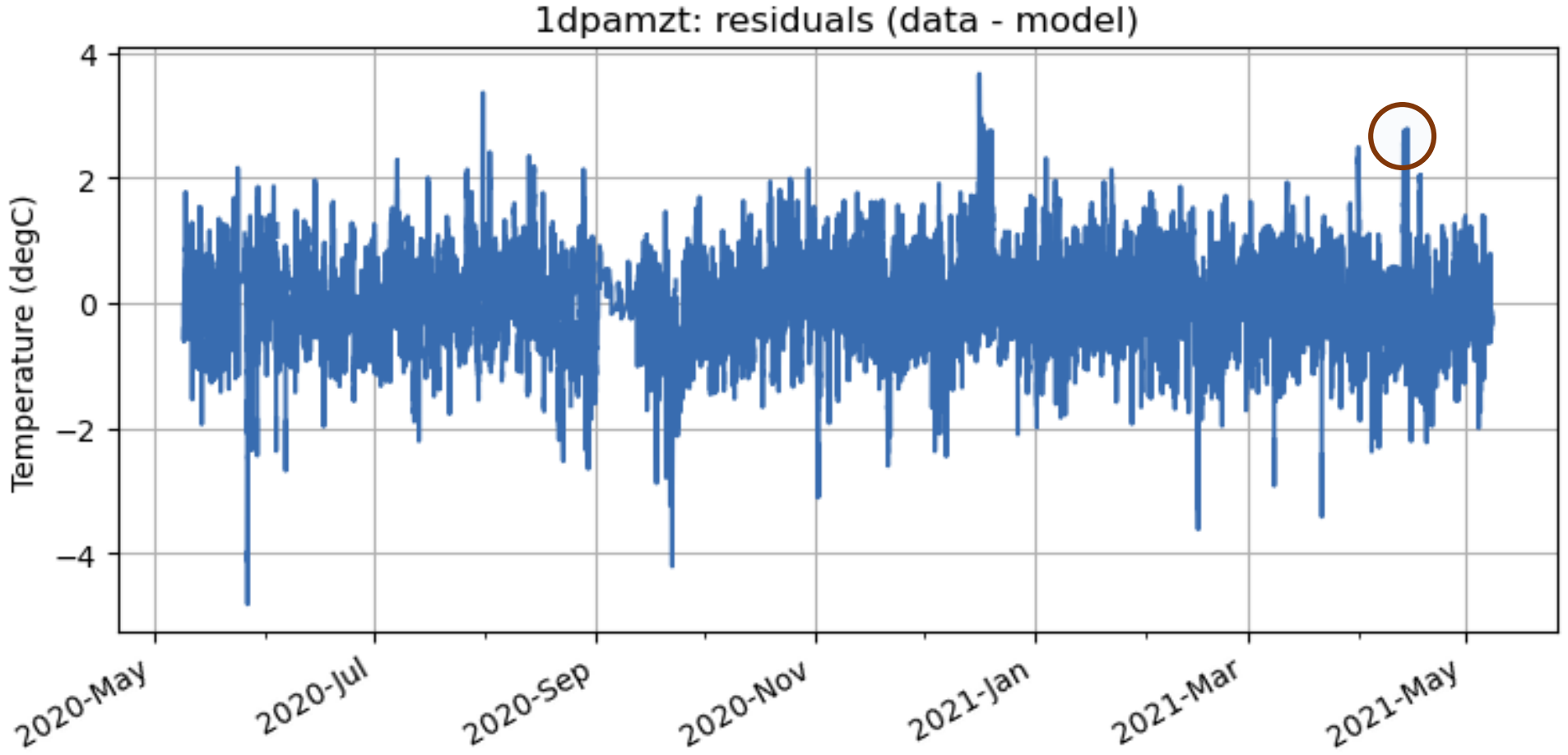
	name	value
1	date	2020:213:08:43:42.816
2	1dpamzt	13.5367
3	1dpamzt_model	10.1790
4	1dpamzt_resid	3.3577
5	dpa0	20
6	dpa0_model	10.178581572883333
7	dpa0_resid	9.821418427116667
8	sim_z	-99616.0000
9	pitch	89.8961
10	roll	-0.2056
11	eclipse	False
12	fep_count	3
13	ccd_count	0
14	vid_board	0
15	clocking	0

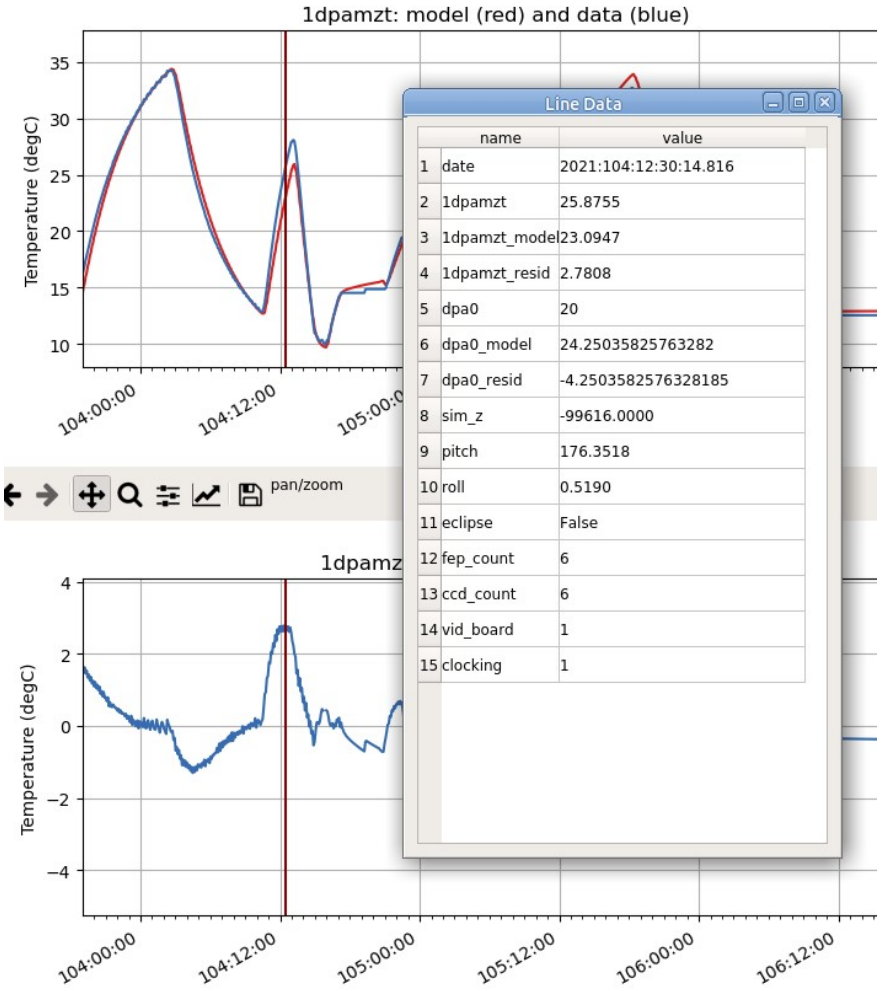
1DPAMZT = 13.5 deg C
HRC-S
3000


1dpamzt: residuals (data - model)
Temperature (degC)
4
2
0
−2
−4
2020-May
2020-Jul
2020-Sep
2020-Nov
2021-Jan
2021-Mar
2021-May


1dpamzt: model (red) and data (blue)
Temperature (degC)
351:00:00
351:06:00
351:12:00
Line Data
name
value
1 date 2020:351:09:48:06.816
2 1dpamzt 26.1855
3 1dpamzt_model 24.2779
4 1dpamzt_resid 1.9075
5 dpa0 20
6 dpa0_model 24.398542249324525
7 dpa0_resid -4.3985422493245245
8 sim_z -99616.0000
9 pitch 120.5102
10 roll -13.3498
11 eclipse False
12 fep_count 5
13 ccd_count 5
14 vid_board 1
15 clocking 1
1dpa
Temperature (degC)
351:00:00
351:06:00
351:12:00
351:18:00
352:00:00
352:06:00
352:12:00


1dpamzt: model (red) and data (blue)
Temperature (degC)
351:00:00
351:06:00
351:12:00
Line Data
name
value
1 date 2020:351:11:53:50.816
2 1dpamzt 33.2000
3 1dpamzt_model 29.7244
4 1dpamzt_resid 3.4756
5 dpa0 20
6 dpa0_model 30.641157150077195
7 dpa0_resid -10.641157150077195
8 sim_z -99616.0000
9 pitch 168.1866
10 roll 0.0059
11 eclipse False
12 fep_count 6
13 ccd_count 6
14 vid_board 1
15 clocking 1
zoom rect
1dpamzt: resi
Temperature (degC)
351:00:00
351:06:00
351:12:00
351:18:00
352:00:00
352:06:00
352:12:00


1dpamzt: residuals (data - model)
Temperature (degC)
4
2
0
−2
−4
2020-May
2020-Jul
2020-Sep
2020-Nov
2021-Jan
2021-Mar
2021-May



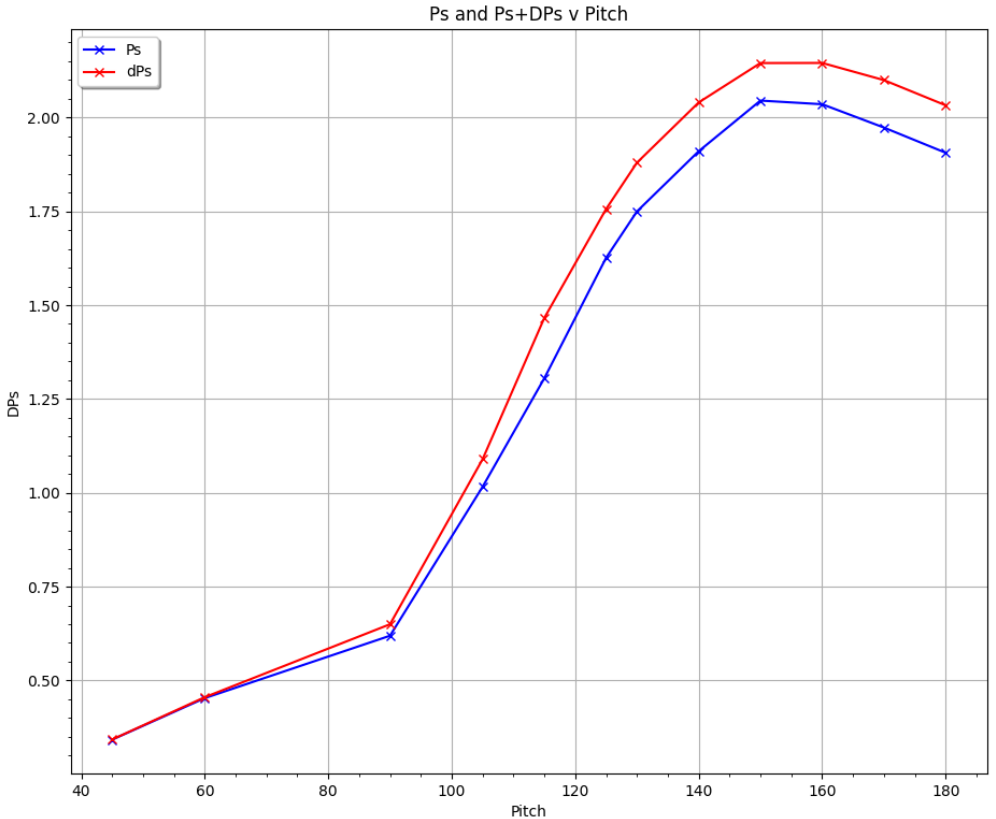
Line Data

	name	value
1	date	2021:104:12:30:14.816
2	1dpamzt	25.8755
3	1dpamzt_model	23.0947
4	1dpamzt_resid	2.7808
5	dpa0	20
6	dpa0_model	24.25035825763282
7	dpa0_resid	-4.2503582576328185
8	sim_z	-99616.0000
9	pitch	176.3518
10	roll	0.5190
11	eclipse	False
12	fep_count	6
13	ccd_count	6
14	vid_board	1
15	clocking	1

Upline Error

25.87 deg C

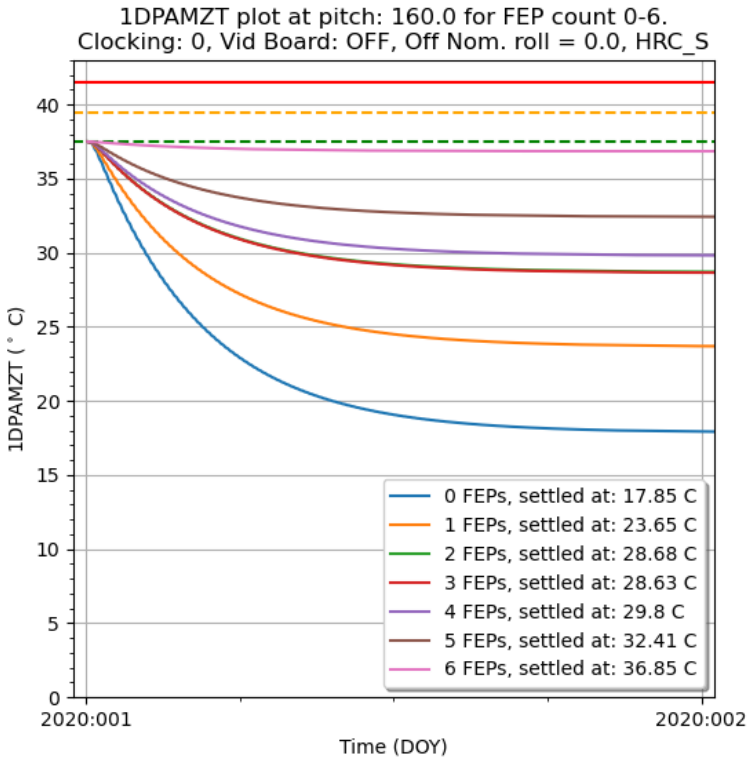
P and dP Plot

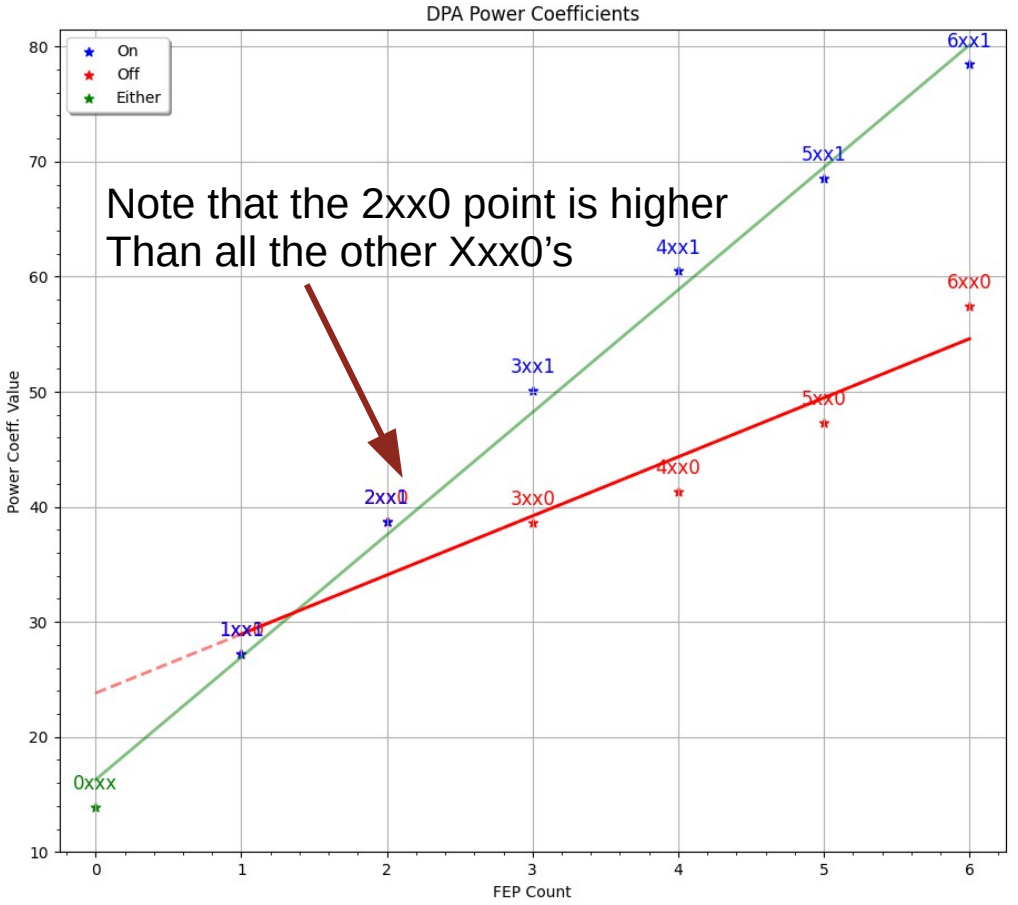


This results in a Good Fit

Production: 2xx0 and 3xx0 Close To The Same Value

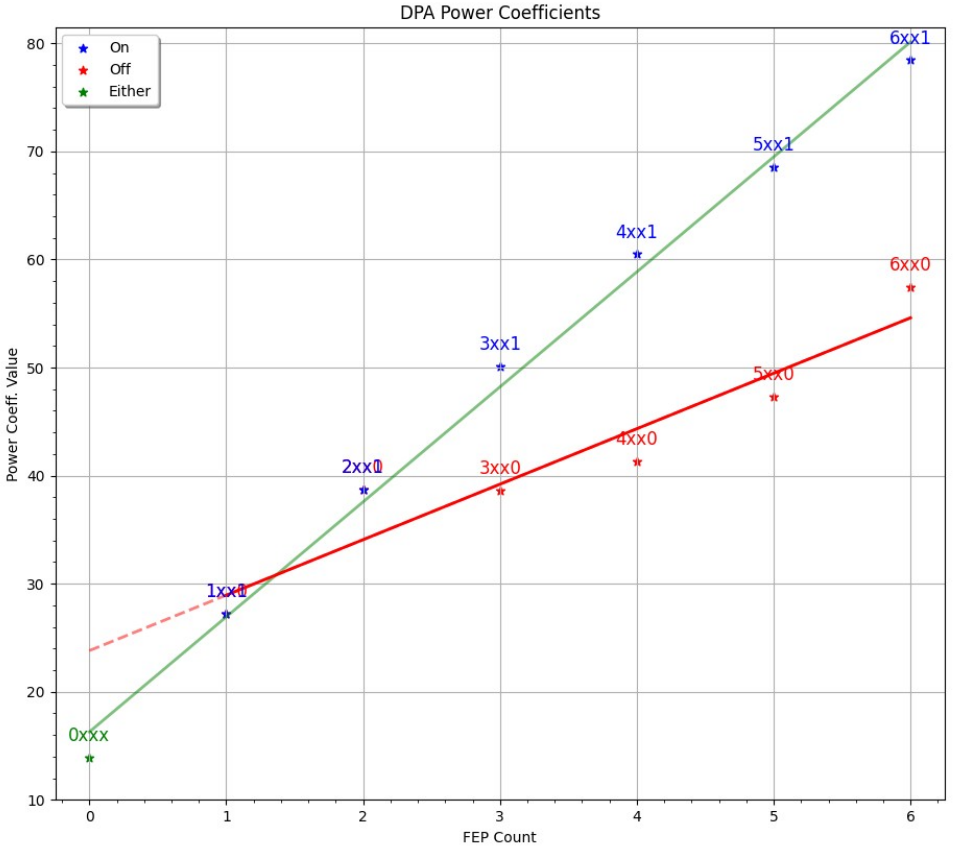
Trace for 2xx0 under the 3xx0 trace



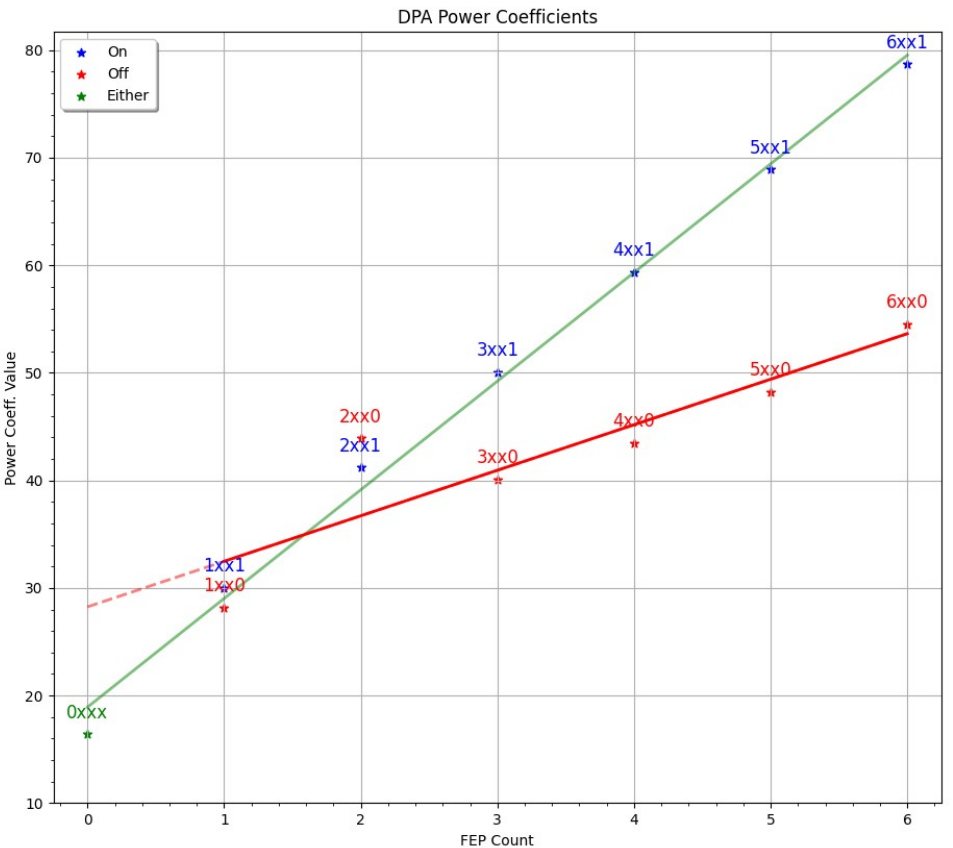


After Fitting All Xxx0's

Production:



Re-Fit:



Why is 2XX0 off the line in both cases?

Adjusting 2xx0

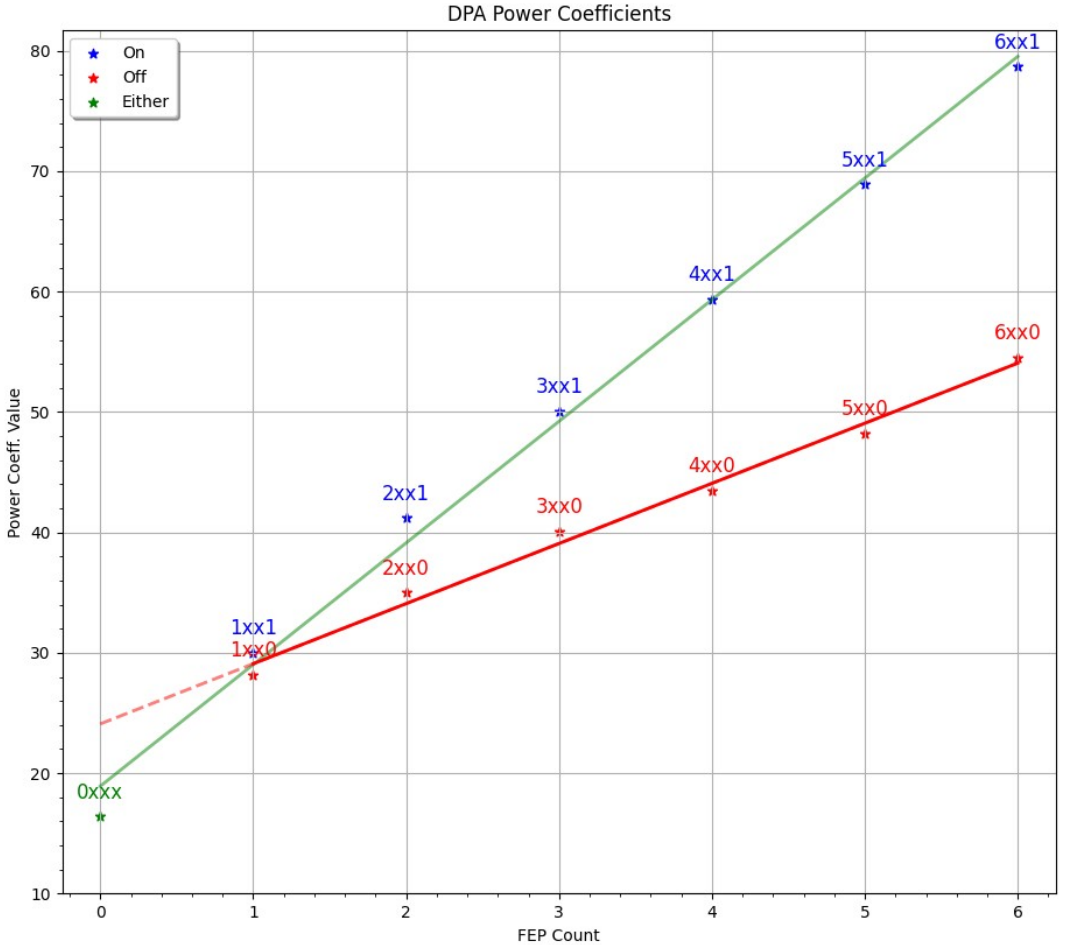
Not a lot of data for fitting 2xxx. Since 2019:001 there have been:

Number of 3 CHIP Observations:	1448
Number of 4 CHIP Observations:	922
Number of 5 CHIP Observations:	866
Number of 6 CHIP Observations:	902

Total of 3,4,5, and 6 chips obs:	4138

Total number of 2 Chip obs: 76

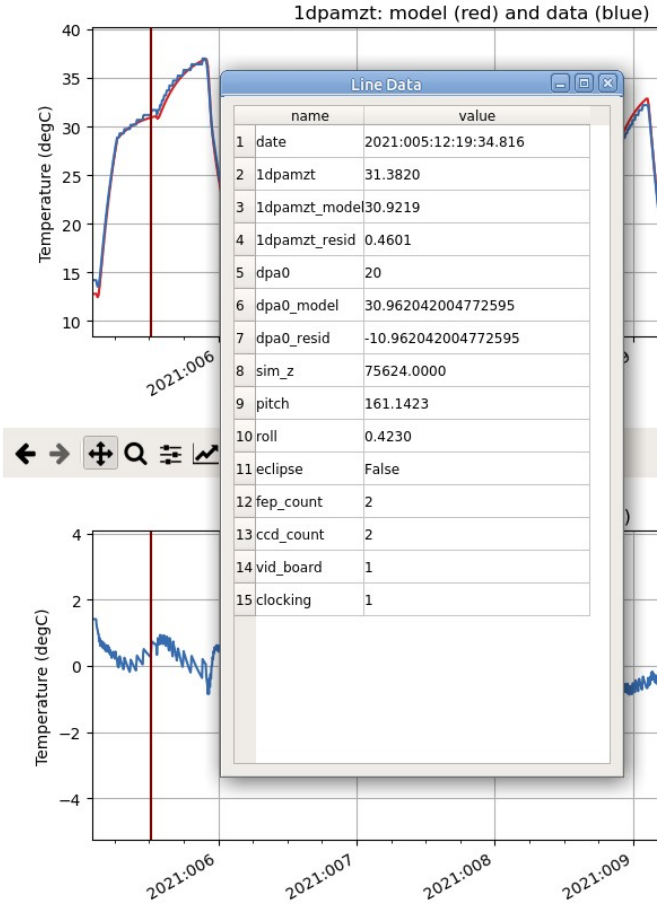
Hand Set 2xx0

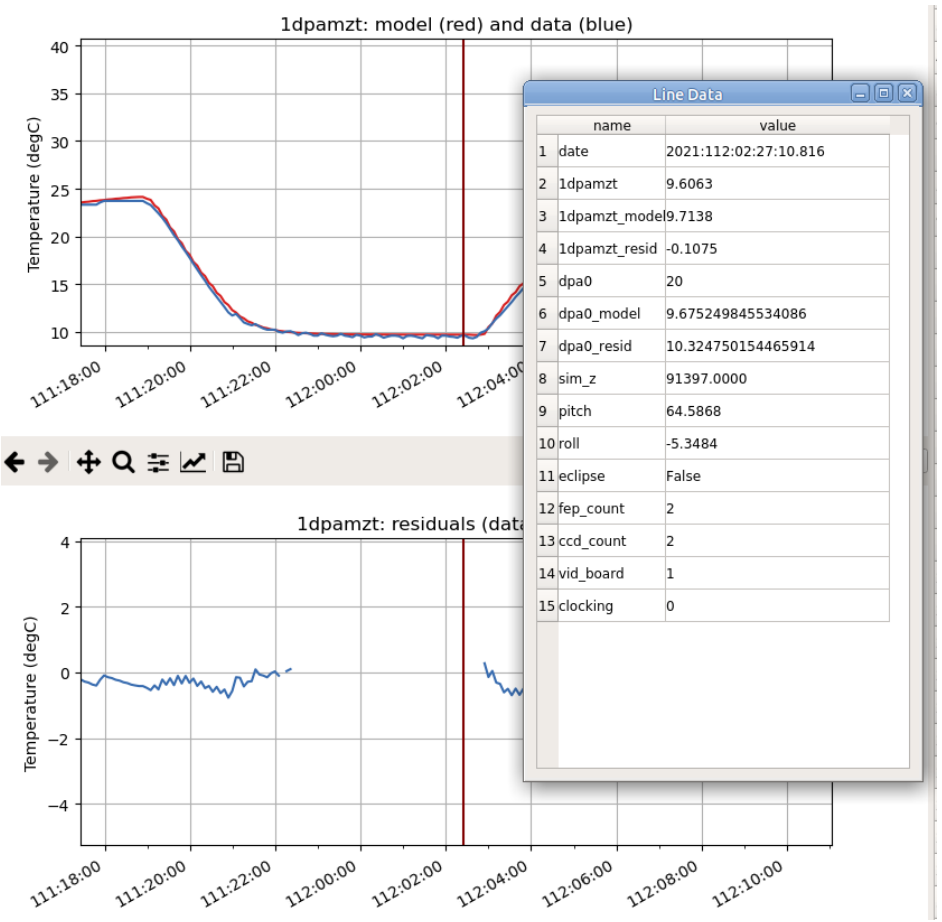


No Effect on the fit

So little time is spent at 2xx0

No Effect On The Fit





Conclusion

2021 1DPAMZT Calibration complete

Over-predictions eliminated

Easier time for Mission Planning

2xx0 set to a more reasonable value
- allows better FEP On/Off analysis

https://github.com/acisops/dpa_check/pull/30/files