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May 19, 2025

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To: EDGES group

From: Alan E.E. Rogers

Subject: Analysis of EDGES-3 at the WA vs GHA 2023 day 285 to 2025 day 133

The installation of EDGES-3 on the 48.8 x 50.0 m ground plane at the WA was stabilized on day 285 of 2023 when plastic sections were installed between the antenna boxes to maintain a constant separation between the boxes. Prior to this installation the antenna s11 had to be measured frequently because the box separation would change with temperature and other environmental conditions. The description of the EDGES-3 is documented in

EDGES-3: Instrument Design and Commissioning by Rigel C. Cappallo et al. in preparation

The settings for this analysis which includes a limit on the sun's elevation of -30 degrees are:

beam file azelq_box_perf_48_2e-2.txt with Guzman map
calibration file specal_316test.txt
antenna s11 file s11ant286.csv
acqplot parms -dgha 2 -rfi 2.1 -maxrmsf 200 -maxfm 2000 -sunlim -30 -site 1
edges3 parms -antaz 269 -nfit4 12 -aloss 0.01
longav parms -nfit 5 -fstart 60 -fstop 102 -sig 30 -tau 4 -lim 0.3

Table 1 below shows the results of 21-cm absorption grid search which are also plotted in Figure 1.

center MHz	SNR	amp K	width MHz	rms1 mK	rms2 mK	range MHz	tsky K	spectral index	ion abs.	GHA
79.3	12.6	0.70	20.9	64	55	60-102	4072	-2.85	1.65	00-04
79.1	15.8	0.55	20.9	51	34	60-102	1930	-2.89	1.00	04-08
78.5	31.9	0.67	20.9	58	22	60-102	1655	-2.90	1.19	08-12
78.9	34.8	0.71	20.6	74	22	60-102	1892	-2.89	1.57	12-16
80.5	34.1	0.51	18.3	82	20	60-102	2438	-2.88	1.35	16-20
79.3	16.1	0.63	20.9	88	38	60-102	4085	-2.85	1.97	20-24

Table 1. Results of 21-cm grid search for 4 hour blocks of GHA 2023 day 285 to 2025 day 133

A search for the result over all GHA with the limit of the sun more than 30 degrees below the horizon is shown in Figure 2 using the same 4 hour blocks used for the results in table 1 and a slightly better result can be obtained using 1 hour blocks because there some occasional solar emission contributions at the low at the low end of the band which can be more easily detected and filtered out by the rms threshold on the shorter time blocks. The rms threshold was set to 0.3 K for the 4 hour data blocks and 0.35 K for the one hour data blocks.

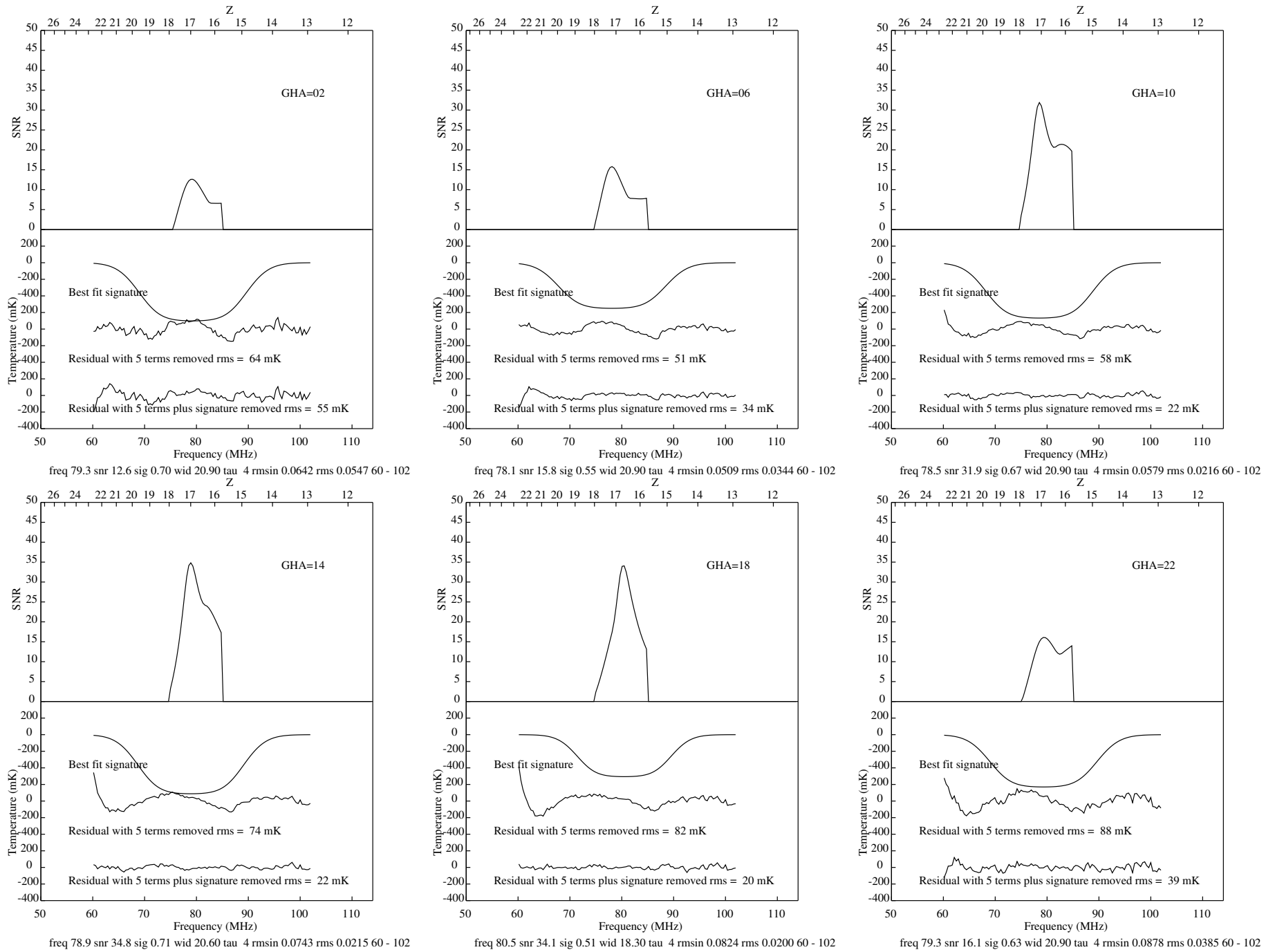
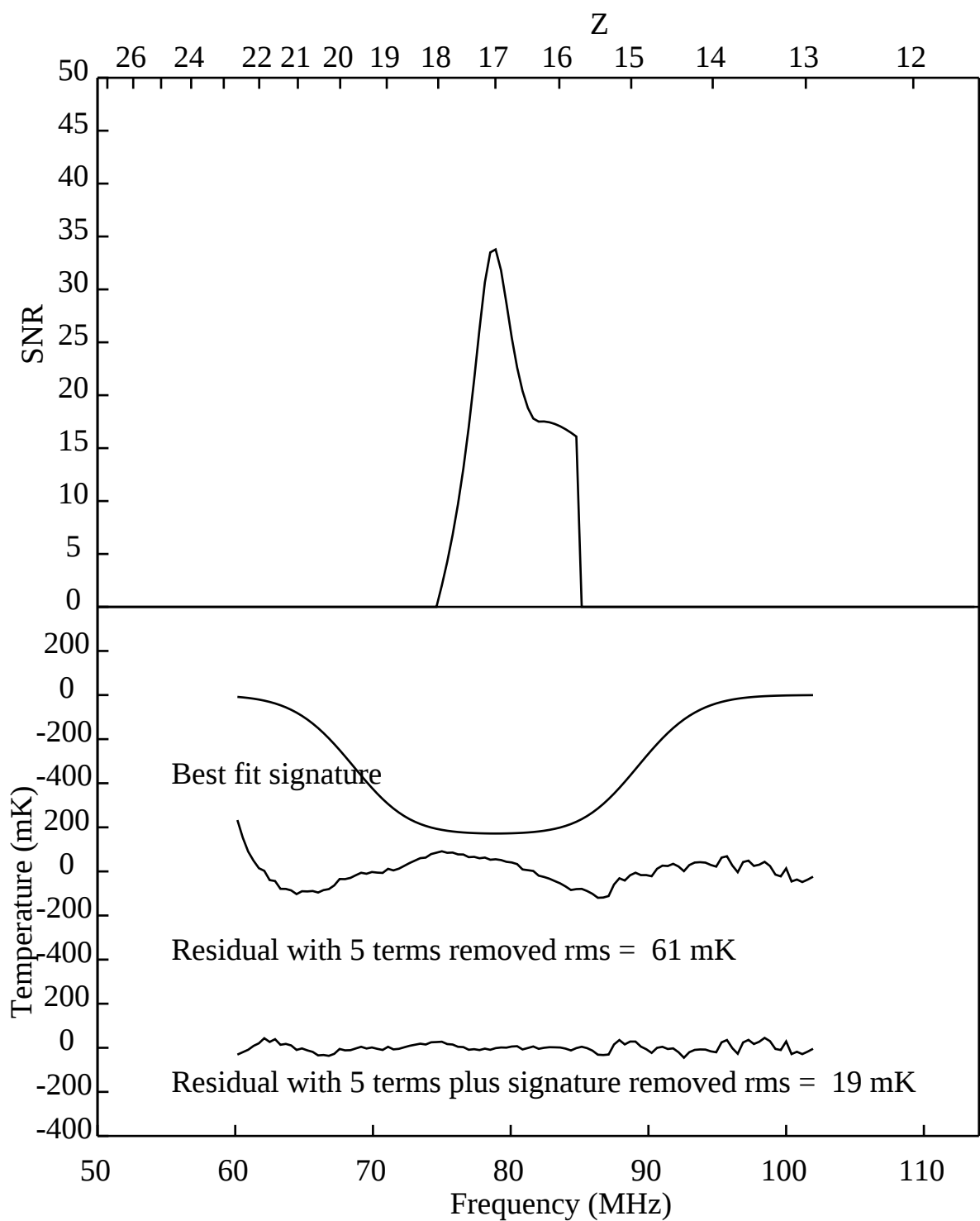


Figure 1. Absorption search plots for 4 hour bins centered at 2 6 10 hours GHA on the top row and 14 18 and 22 hours GHA on bottom row



freq 78.9 snr 33.8 sig 0.63 wid 20.90 tau 4 rmsin 0.0610 rms 0.0190 60 - 102

Figure 2. Absorption search plot for 2023 day 285 to 2025 day 133 in 4 hour blocks

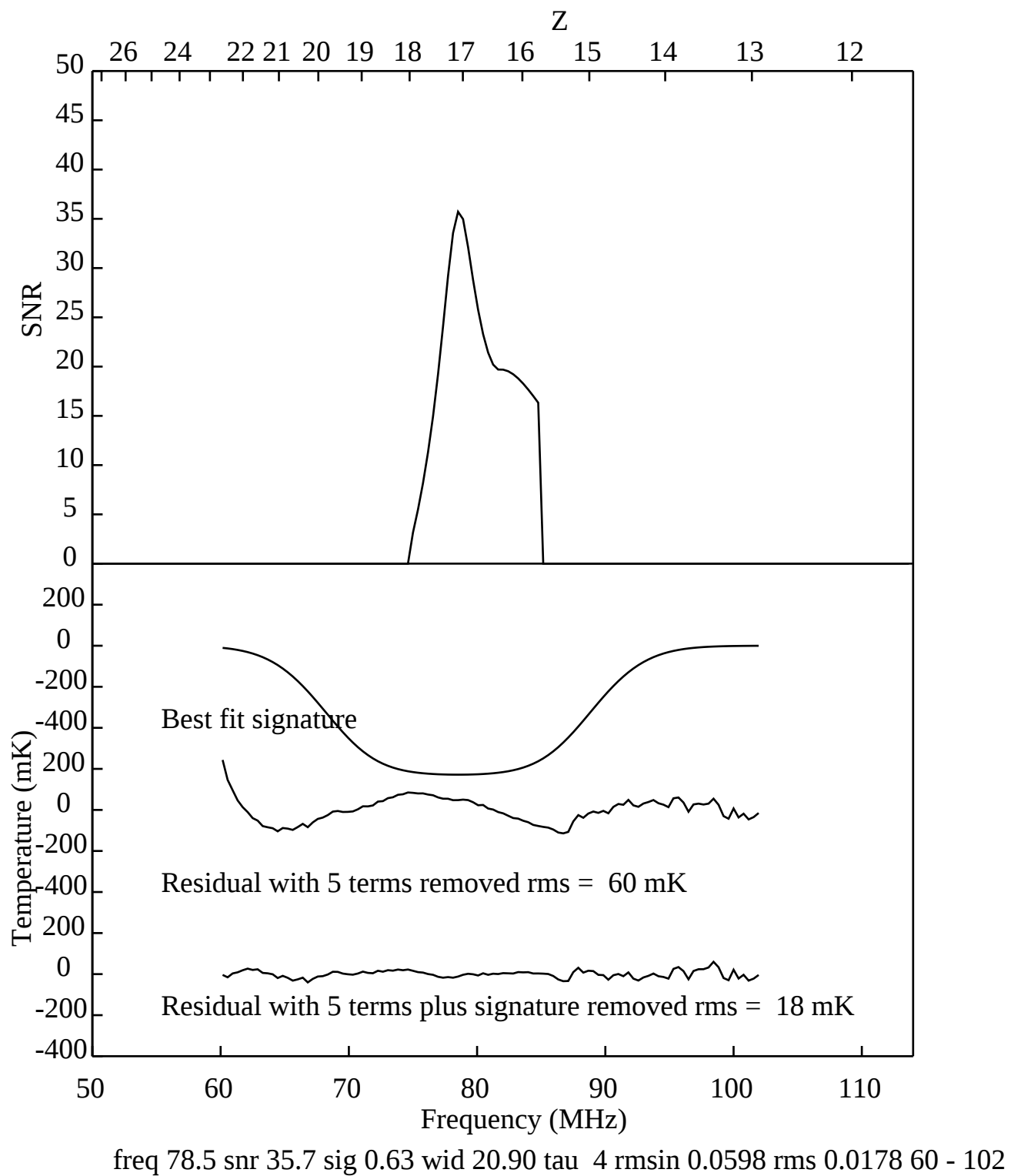


Figure 3. Absorption search plot for 2023 day 285 to 2025 day 133 in 1 hour blocks