

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: July 3, 2020

Object: Jupiter – Io-B

Observer: Unattended

Start - Time UT:	0415	Planetary K-index:	1
Jupiter Altitude (deg):	21.4	Jupiter Azimuth (deg):	149.4
Jupiter CML:	71.71	Jupiter Io Phase:	063.25
Jupiter RA (hr/min):	19:43	Jupiter Dec (hr/min):	-21.39
Hour Angle (hr/min):	-02:03	Polarization	RCP
Sun Altitude (deg):	-24.6	Sun Azimuth (deg):	344.1
Sun RA (hr/min):	06:43	Sun Dec (hr/min):	23:05

End – Time UT:	0730		
Jupiter Altitude (deg):	25.4	Jupiter Azimuth (deg):	198.7
Jupiter CML:	189.61	Jupiter Io Phase	090.78
Hour Angle (hr/min):	01:13	Duration (min):	195
Sun Altitude (deg):	-19.2	Sun Azimuth (deg):	032.1
Max Frequency MHz	24	Min Frequency MHz	16
J/S Angular Separation	165.8	De:	-1.2

Observatory Configuration

Spectrograph Receiver	Antenna	Polarization	System Loss	Multicoupler	Multicoupler port	Calibrated
FSX-8S	TFD	RCP LCP	-8.35 dB -7.59 dB	#2 RCP #1 LCP	Port 1 +10dB Port 1 +10dB	Twice daily Twice daily
FSX-2	LWA	RCP/LCP manual select		N/A	N/A	N/A
SDRPlay RSP2 #1	TFD	RCP	-8.35 dB	#2 RCP	Port 2 +3dB	Twice daily
SDRPlay RSP2 #2	TFD	LCP	-7.59 dB	#1 LCP	Port 2 +3dB	Twice daily
JOVE II HNRAO #2	Jove dipoles	Linear	-3.66 dB	#3 Linear	Port 4 +3 dB	Offline

Radio JOVE dipoles phased @ 32 degrees for 2020-2021 season

Typinski AN-TFD-24-4 array phased @ 35 degrees for 2020-2021 season

Four LWA antenna array phased @ 35 degrees and orientation for observation: 45 degrees

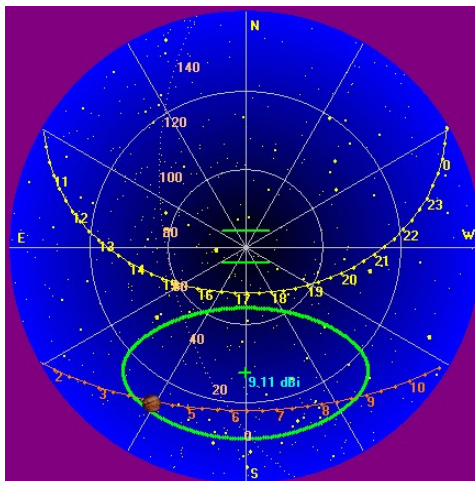
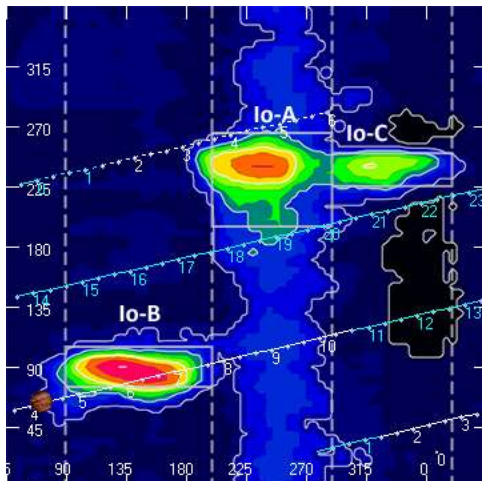
Radio Sky Spectrograph software version 2.9.30

Radio-SkyPipe software version 2.7.33 Radio-Jupiter Pro software version 3.8.2

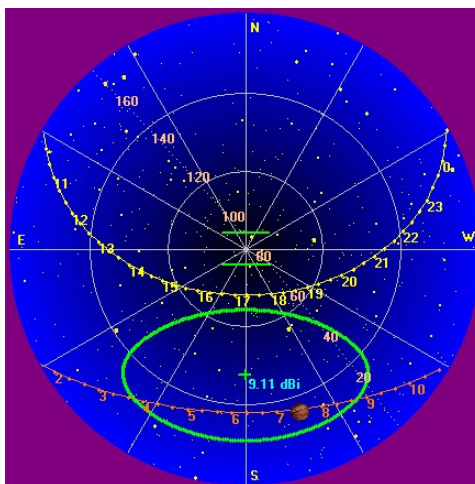
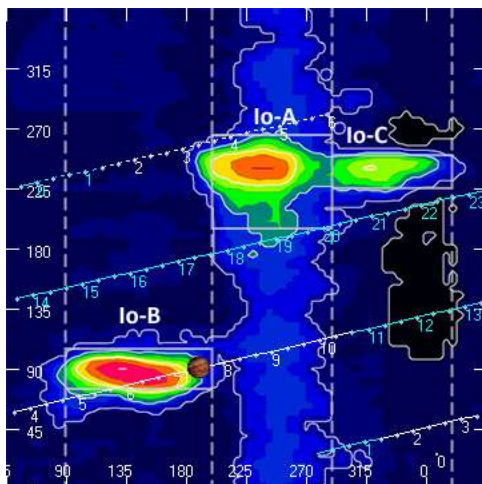
Network Time Server GpsNtp-Pi, Reeve Engineering

All times are synced with a local GPS locked NTP server.

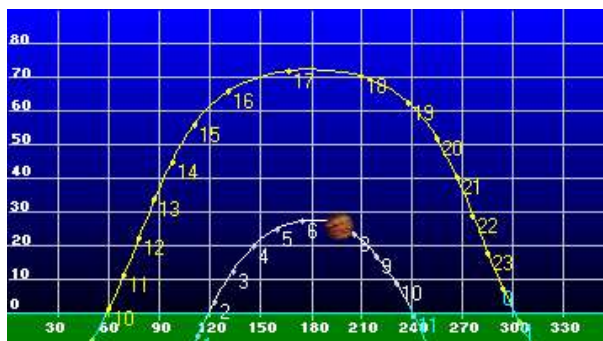
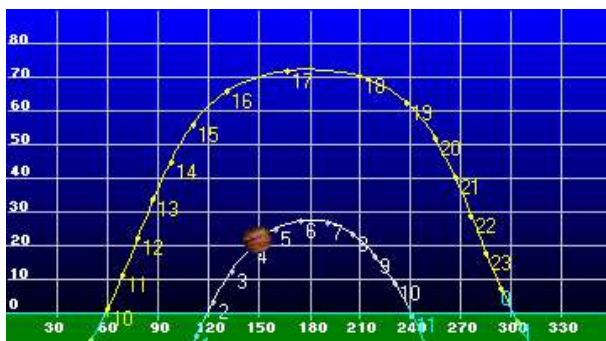
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Beginning of Pass

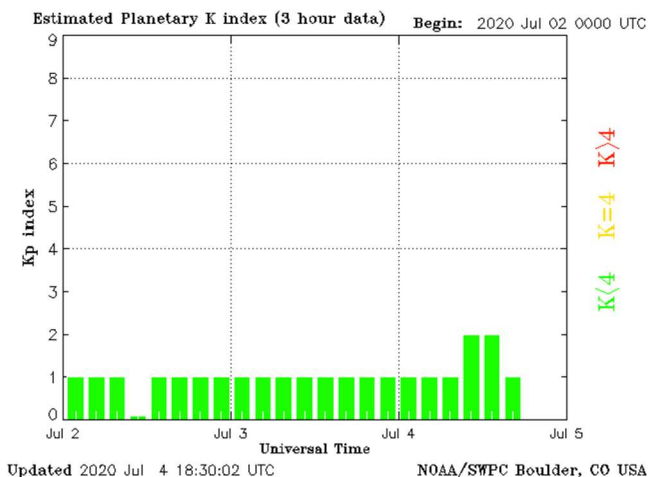
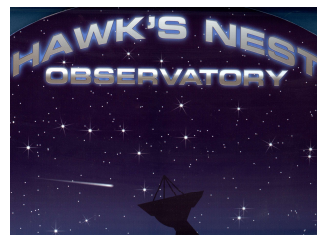


End of Pass



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MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360	38	RH	Late	
Io-C	(300-20)	(225-260)	36	RH&LH	Late	Also called "third source"
non-Io-C	300-360	0-360	32	RH&LH	Late	Voyager info

<https://www.radiosky.com/jupmodes.html>

Modulation Lanes Designations*	
L - Burst	S-Burst
L1 – No lanes	S1 – No lanes
L2 - Positive slope	S2 – Positive slope
L3 - Cross hatched	S3 – Cross hatched
L4 – Negative slope	S4 – Negative slope
*Modulation Lanes in the Dynamic Spectra of Jovian L-bursts, J.J. Riihimaa, Astron. & Astrophys. 4, 1970	

Lightning at the beginning of the pass. Unknown RFI band from 19.3 MHz to 20.3 MHz. Another band from 23.2 MHz to 23.7 MHz.

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First indication of L-burst emission was at 0418 UT identifiable as, slightly above GB, positive slope L2 modulation lanes between 17 MHz and 18 MHz. There were no other signs of emission until another very weak, and brief group of L-burst, L2 modulation lanes at 18.3 MHz. There were no more signs of emissions until 0448:20 UT when a period of very weak L2 modulation lanes were observed between 20 MHz and 24 MHz.

At 1515:35 UT, L-burst intensity rose to several dB above GB in what might be described as an N-event like structure centered around 21 MHz. At 0520:25 UT, centered at 18 MHz, another N-event like structure with “oscillations” was observed. This structure started at 0520:25 UT and subsided at 0521:50 UT. At 0531:45 UT, much stronger emissions began at 22 MHz. Some of the bursts saturated the receiver. S-bursts are seen in the slight “dip” in emissions at 0532:40 UT.

There were no further emissions until 0546:05 UT when a group of S-bursts, between 16 MHz and 17 MHz were observed. At this point, S-bursts became the dominant emission type. At 0548:35 UT, S-bursts, between 16 MHz and 17 MHz were clearly identified.

As has been observed in other storms, the S-burst emissions, at times, oscillate, such as the group between 0549:51 UT and 0550 UT, and again between 0535:55 UT and 0550:47 UT. S-burst emissions are drifting higher in frequency by 0606 UT and are now between 17 MHz and 19 MHz. There are also S2 modulation lanes visible.

A very energetic group of S-bursts are seen at 0609 UT and lasting until 0610 UT. This group spanned from 16 MHz to nearly 18 MHz. Another very energetic group of S-bursts were visible between 16 MHz and 18 MHz at 0623:30 UT.

Until this point in the storm, the S-bursts have been relatively narrow banded, that is, 1-2 MHz in bandwidth. At 0626:40 UT, this changed, and the next groups of S-bursts were 6 MHz in bandwidth. More well defined S2 modulation lanes at 0641:35 UT. The clearest and well defined S2 modulation lanes were seen between 0645:55 UT and 0646:45 UT. This group of S-bursts were 2 MHz in bandwidth centered at 17 MHz.

Showing no drift in doing so, the S-bursts were suddenly observed centered about 22 MHz at 0652:25 UT. Worth noting in this group, the upside down “V” at 0652:43 UT. The remainder of the storm consists of groupings of weak S-bursts will, in some cases, well defined S2 modulation lanes.

To sum up this storm, RCP L-bursts at the start, followed by RCP S-bursts, at times very energetic. I would say some of the clearest and well defined S2 modulation lanes I’ve ever observed.

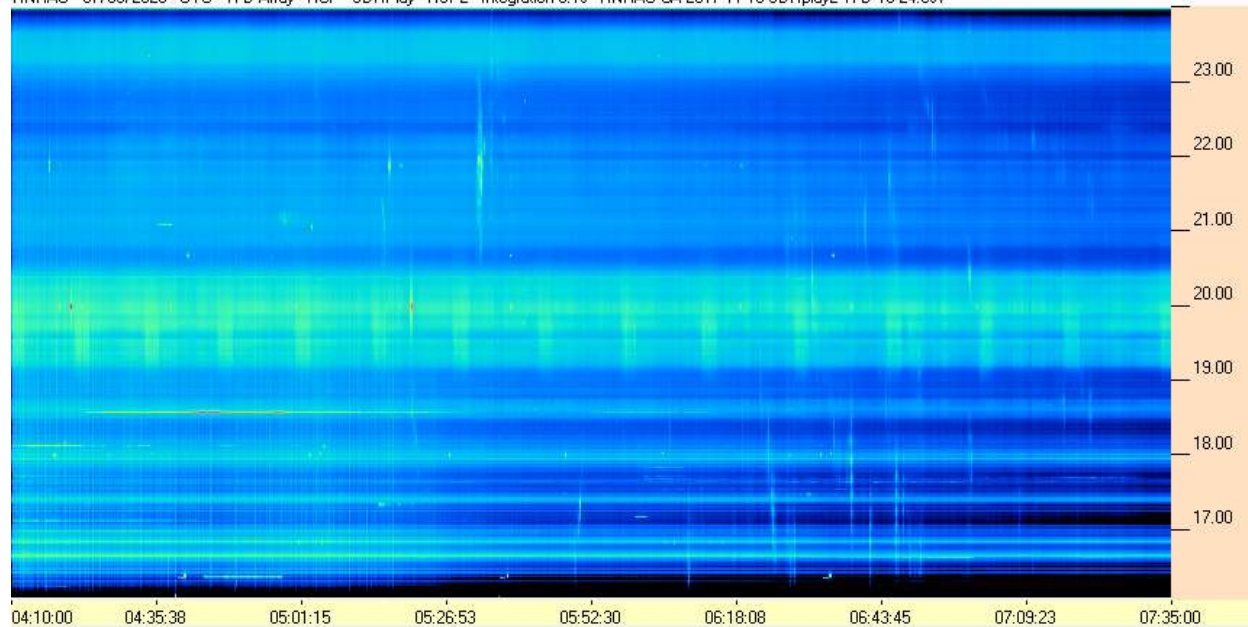
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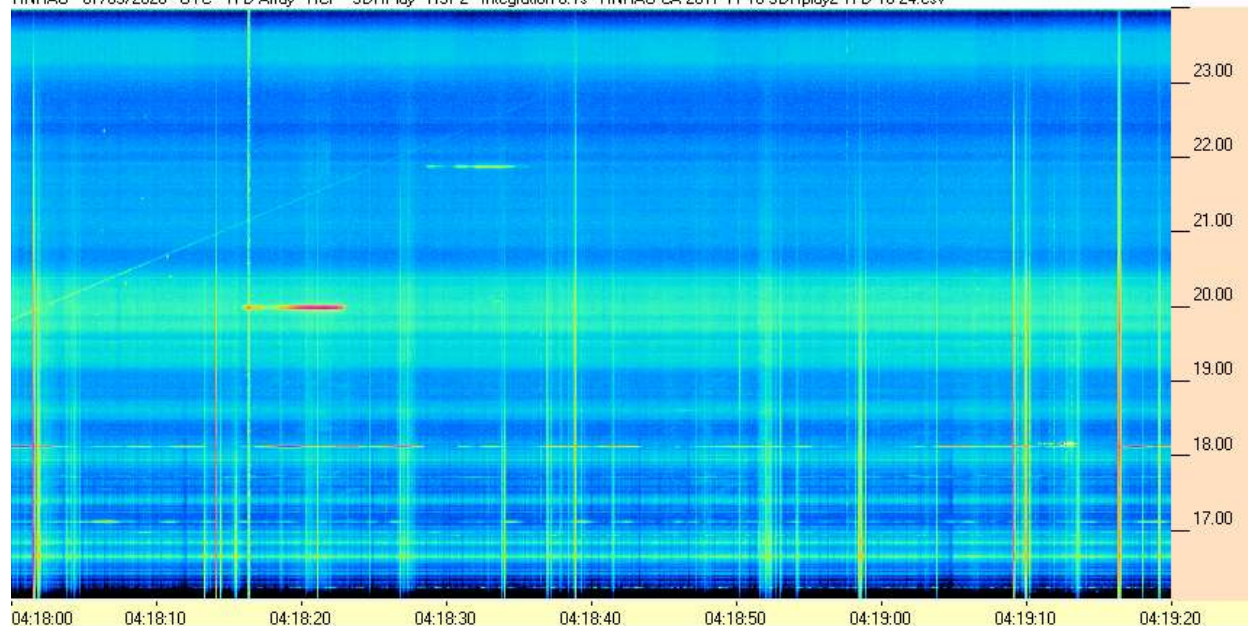


SDRPlay RSP2/RCP / TFD Array

HNRAO - 07/03/2020 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



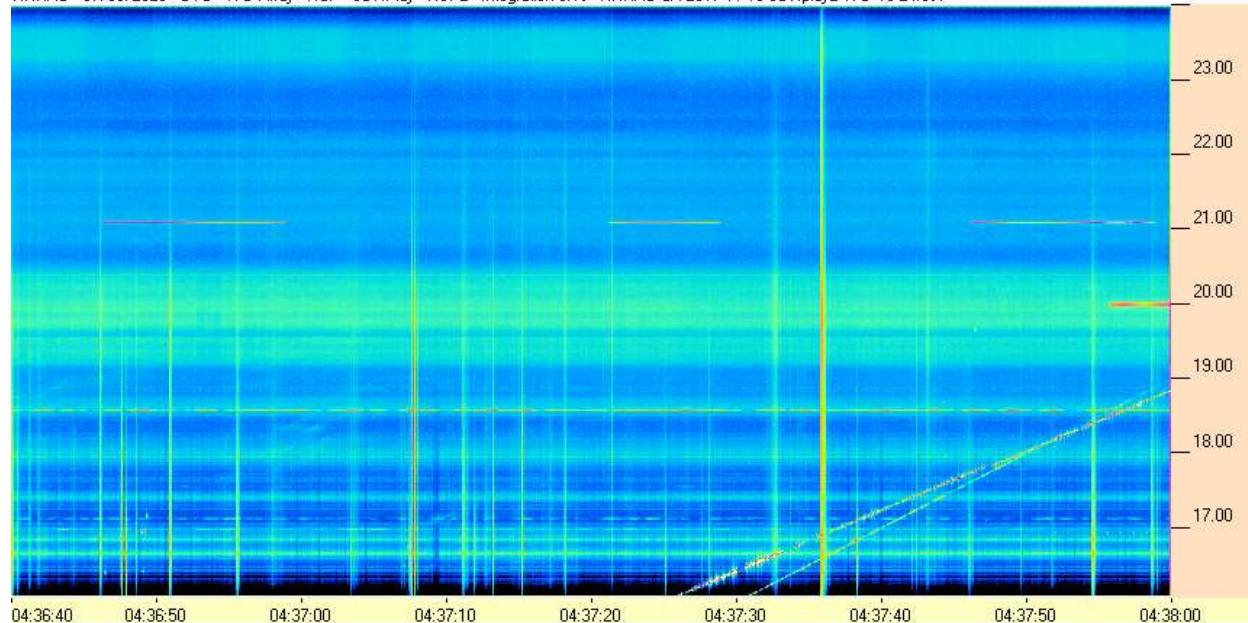
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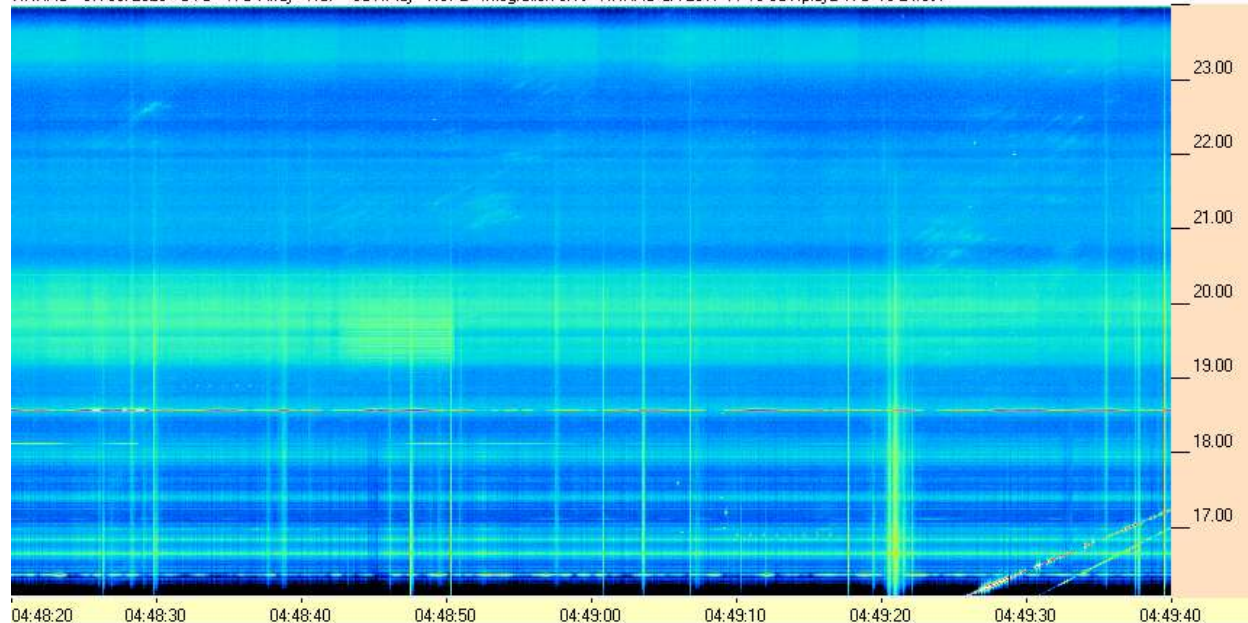
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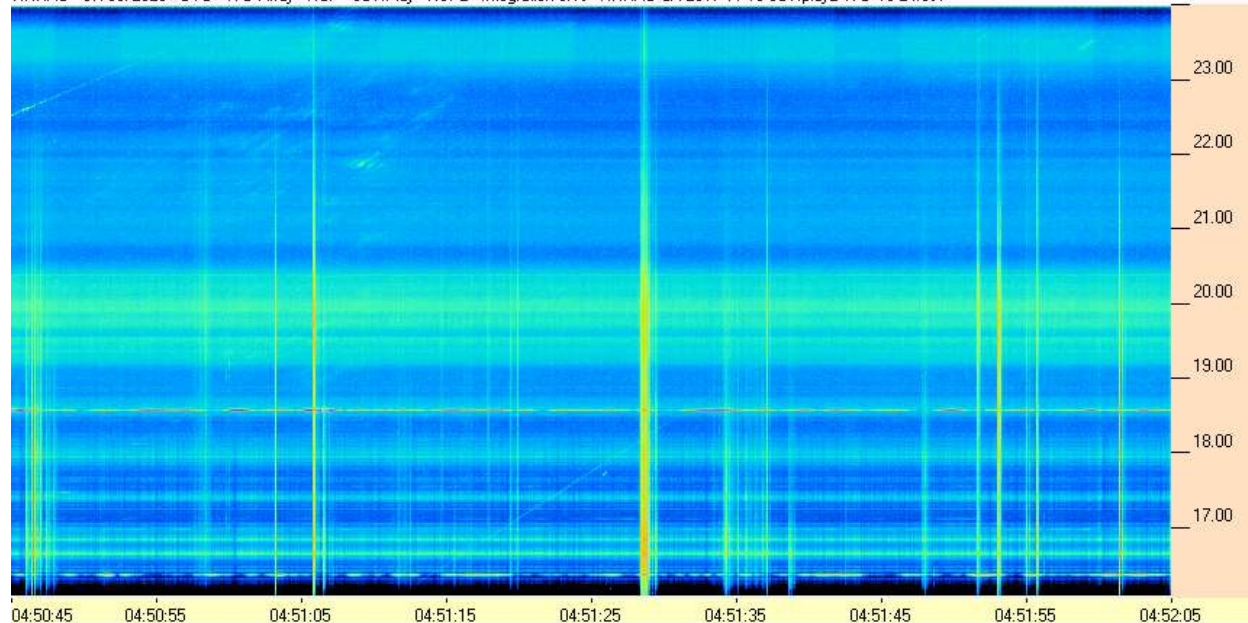
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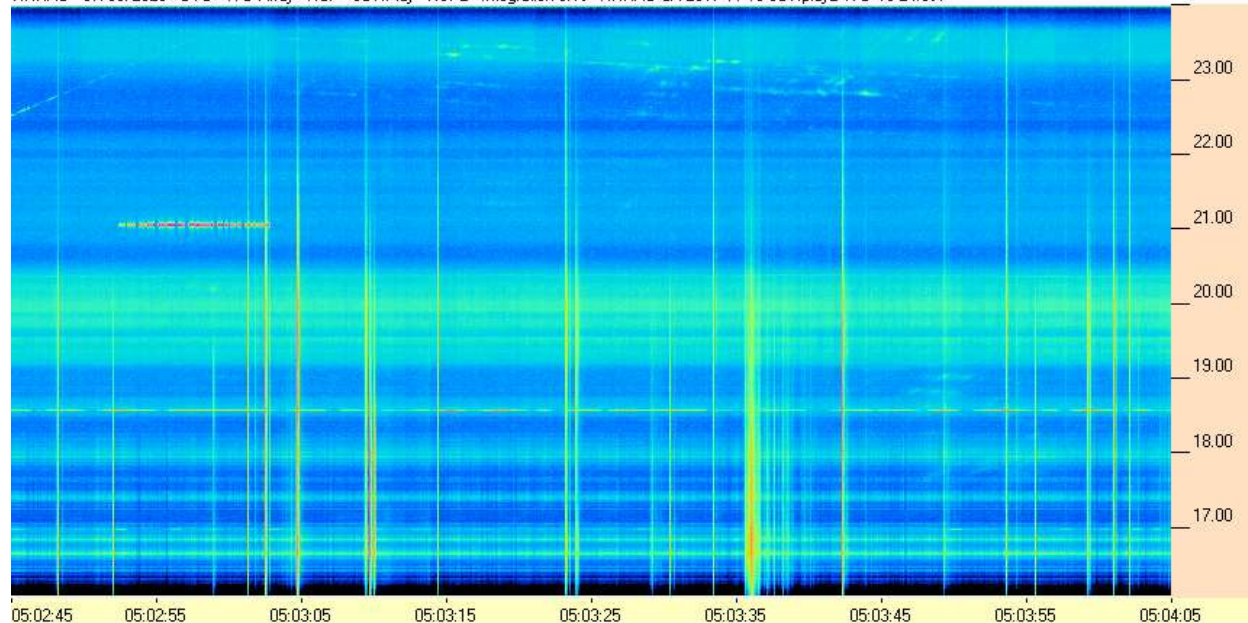
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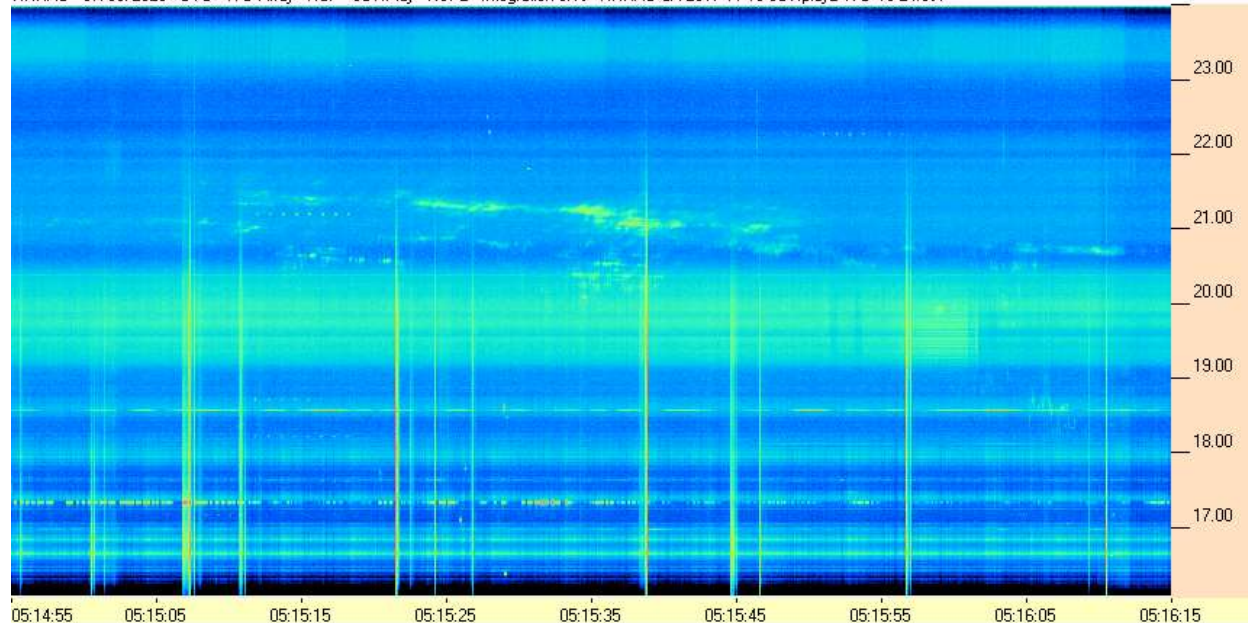
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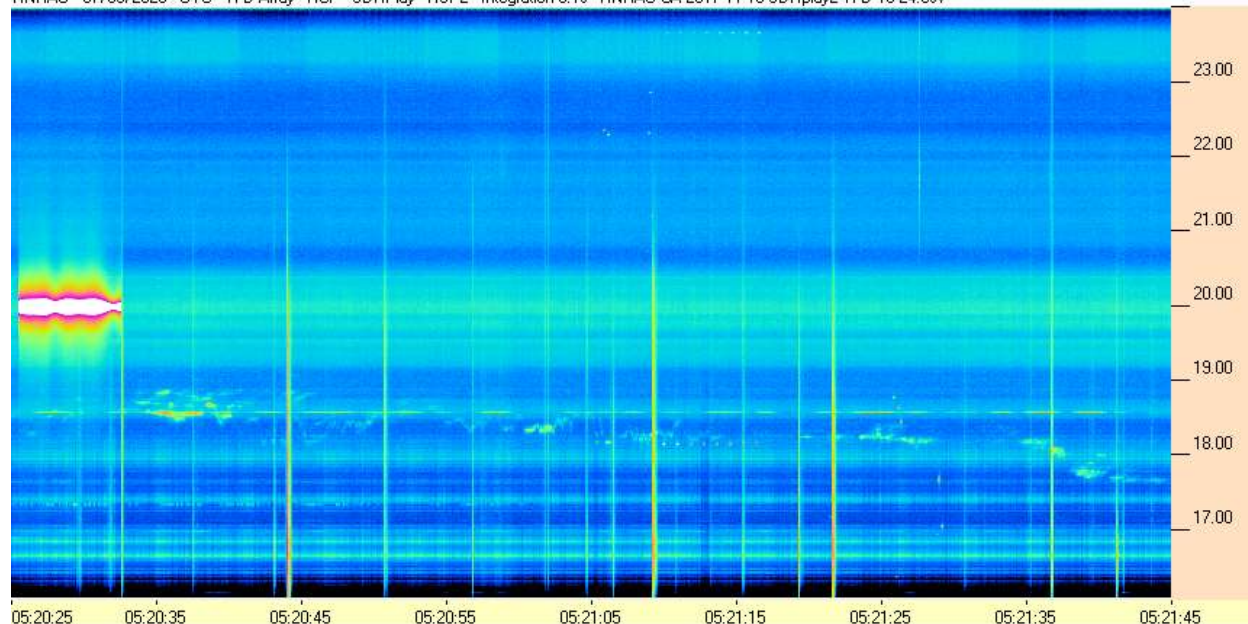
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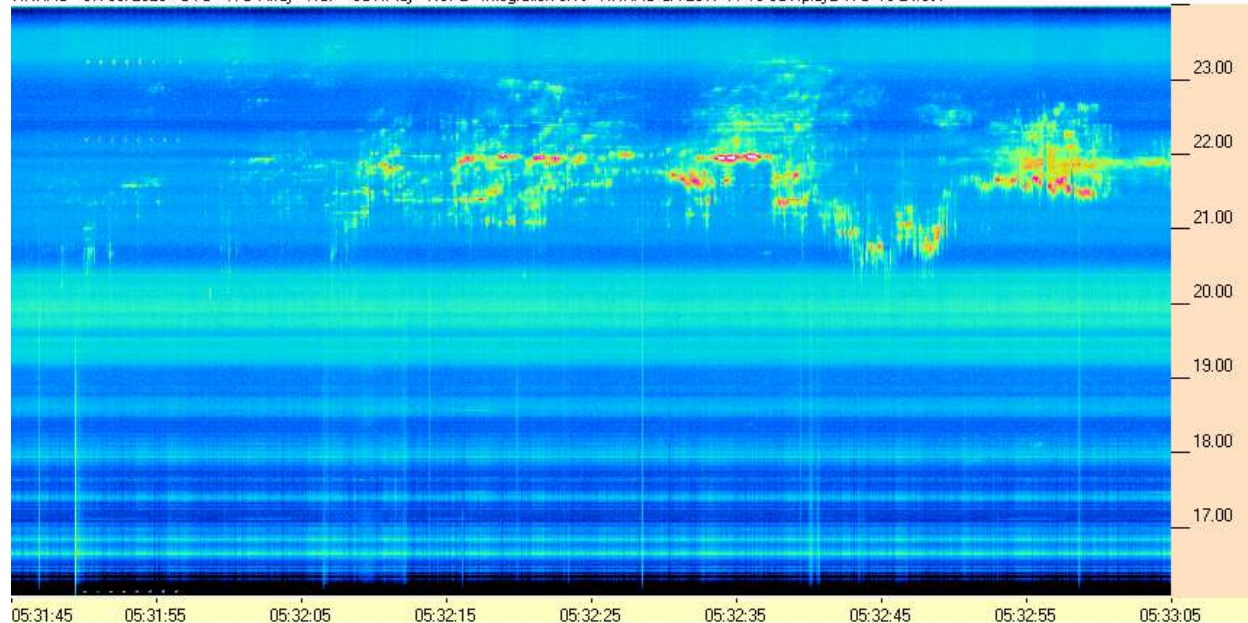
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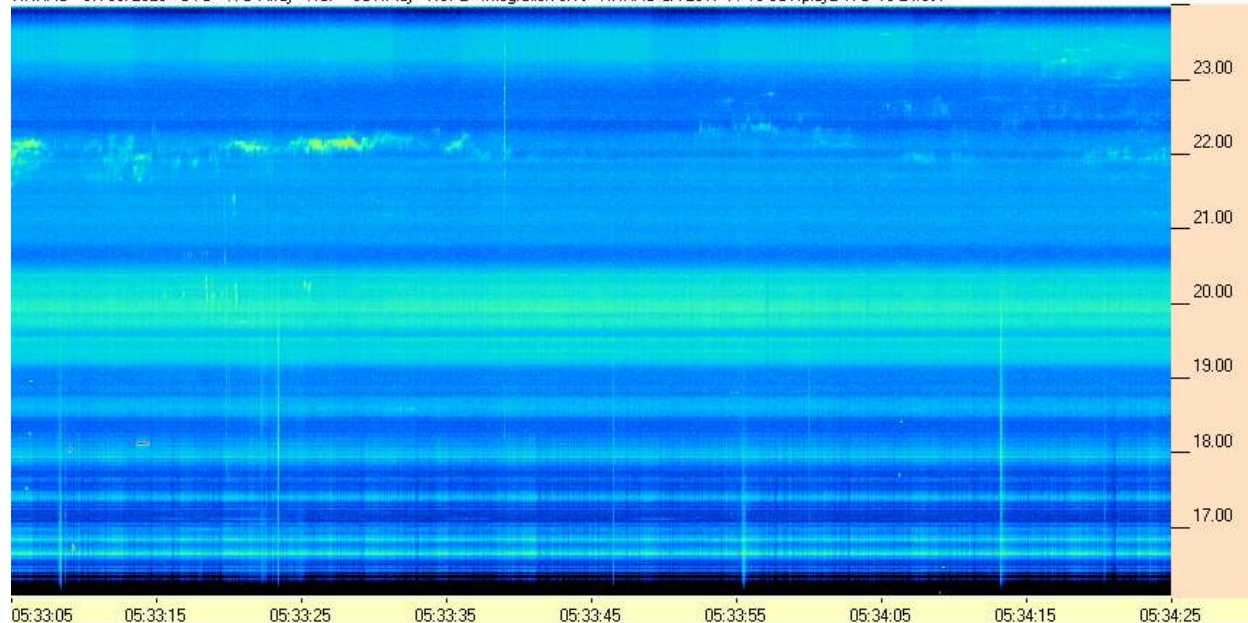
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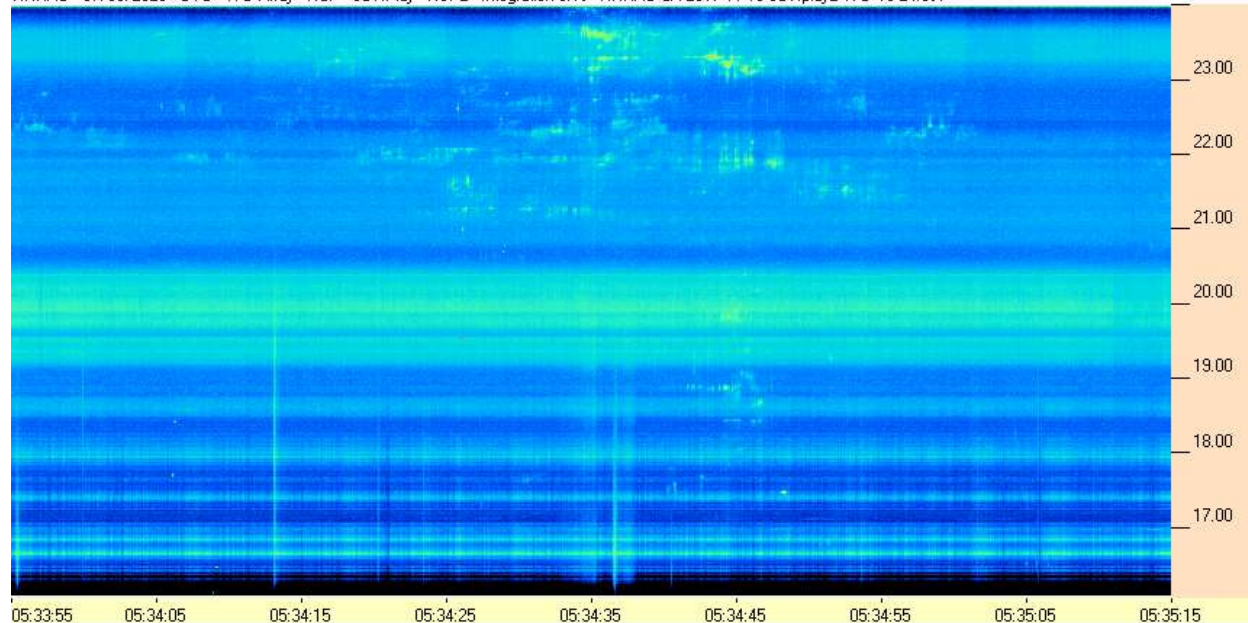
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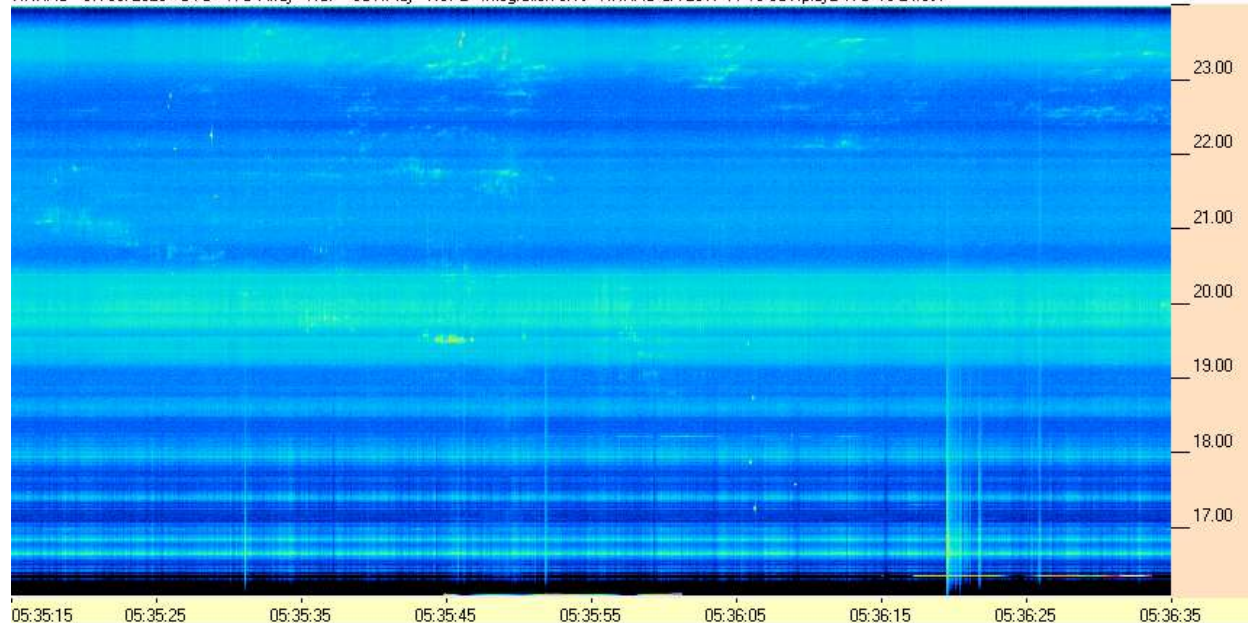
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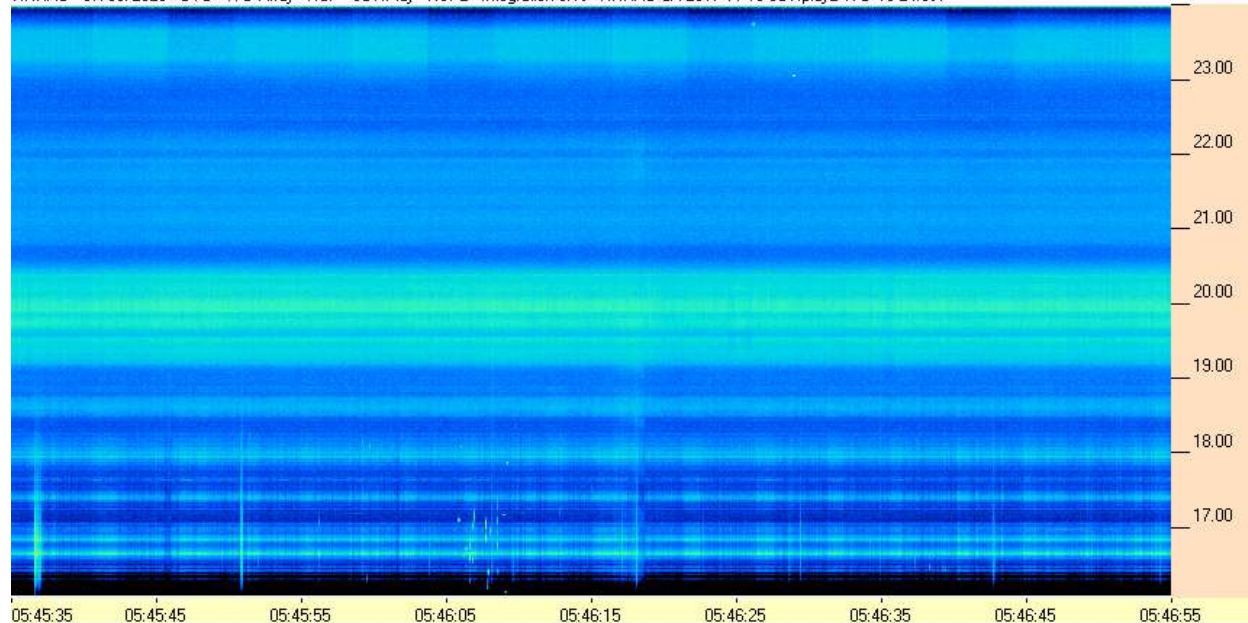
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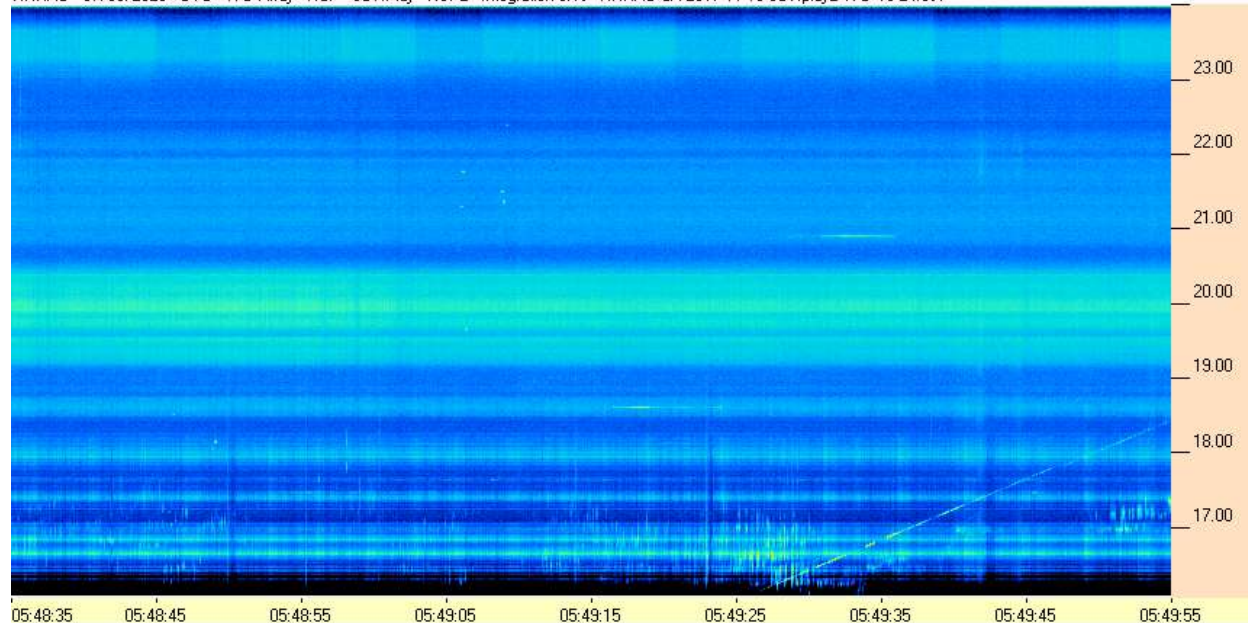
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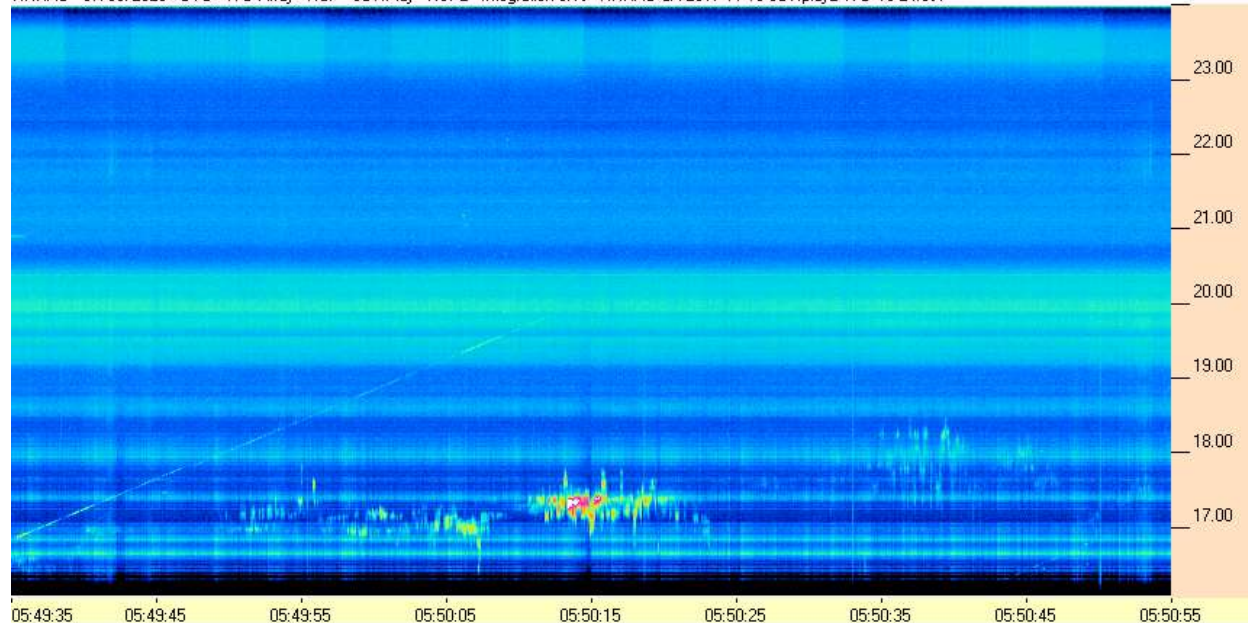
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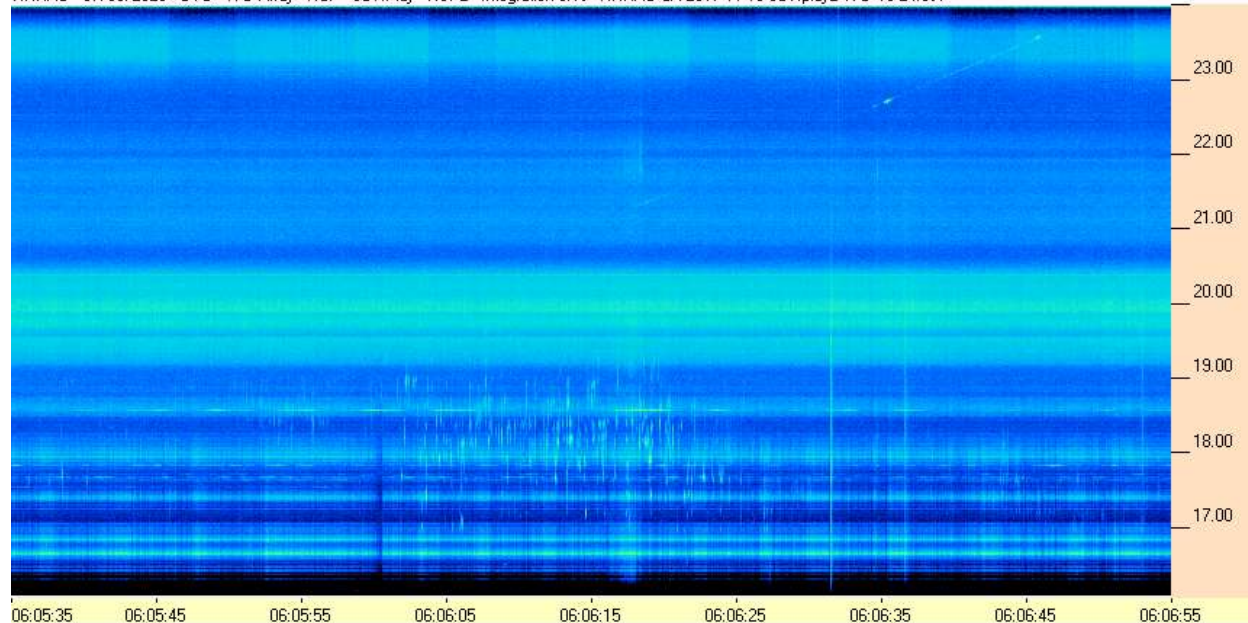
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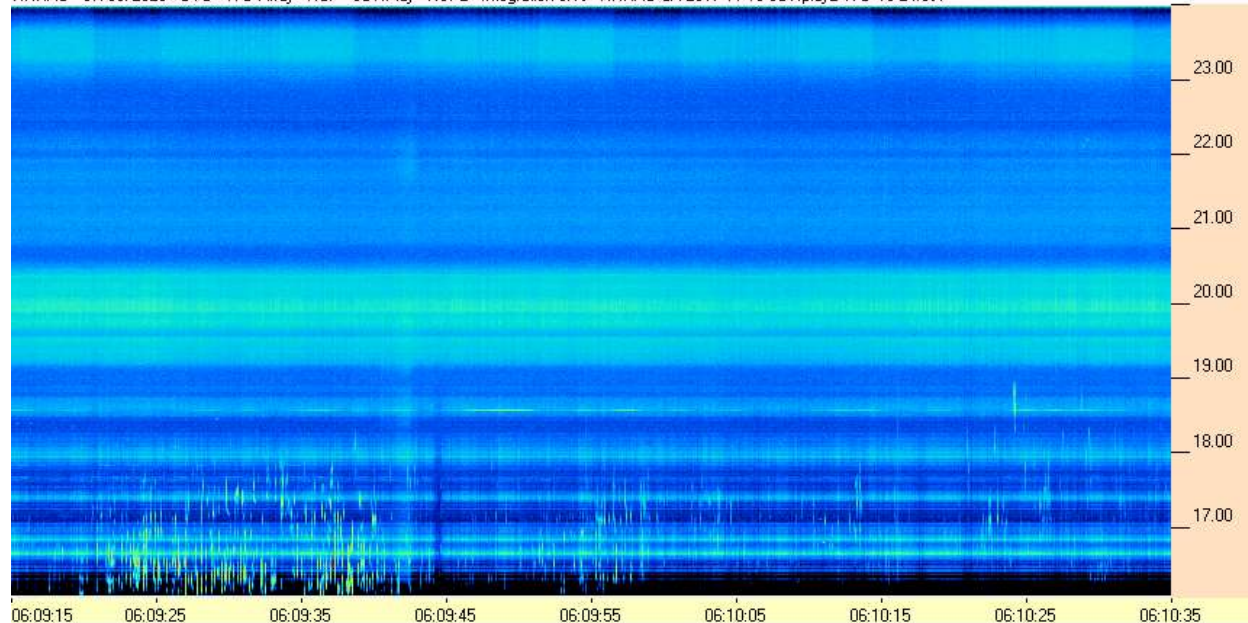
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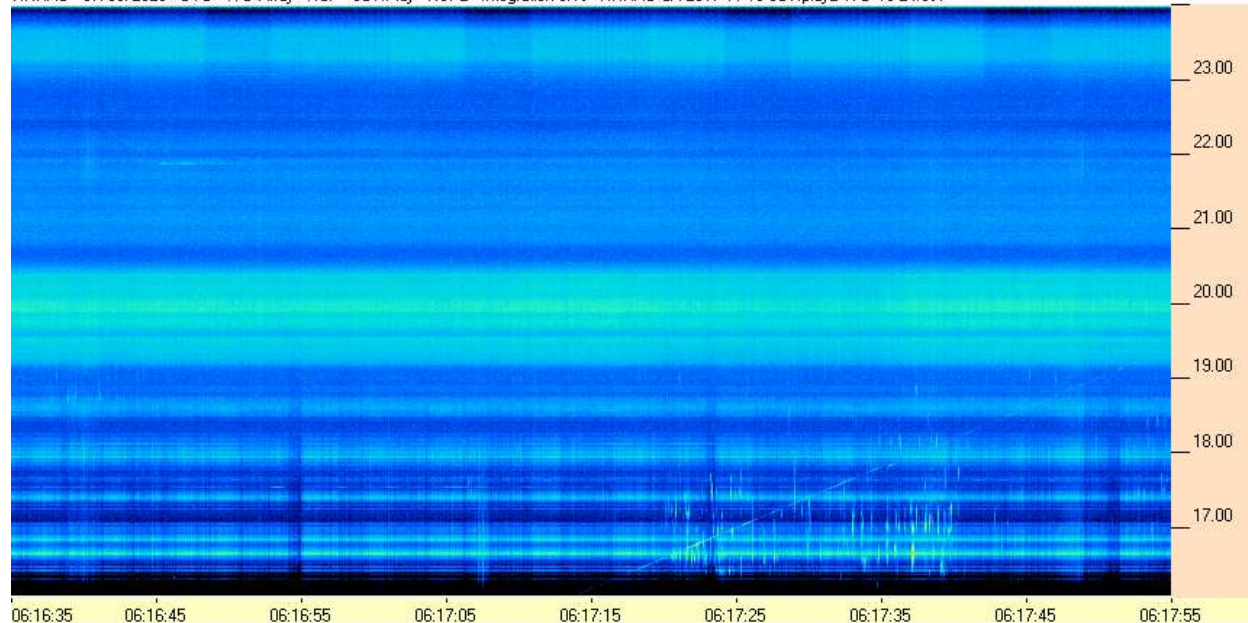
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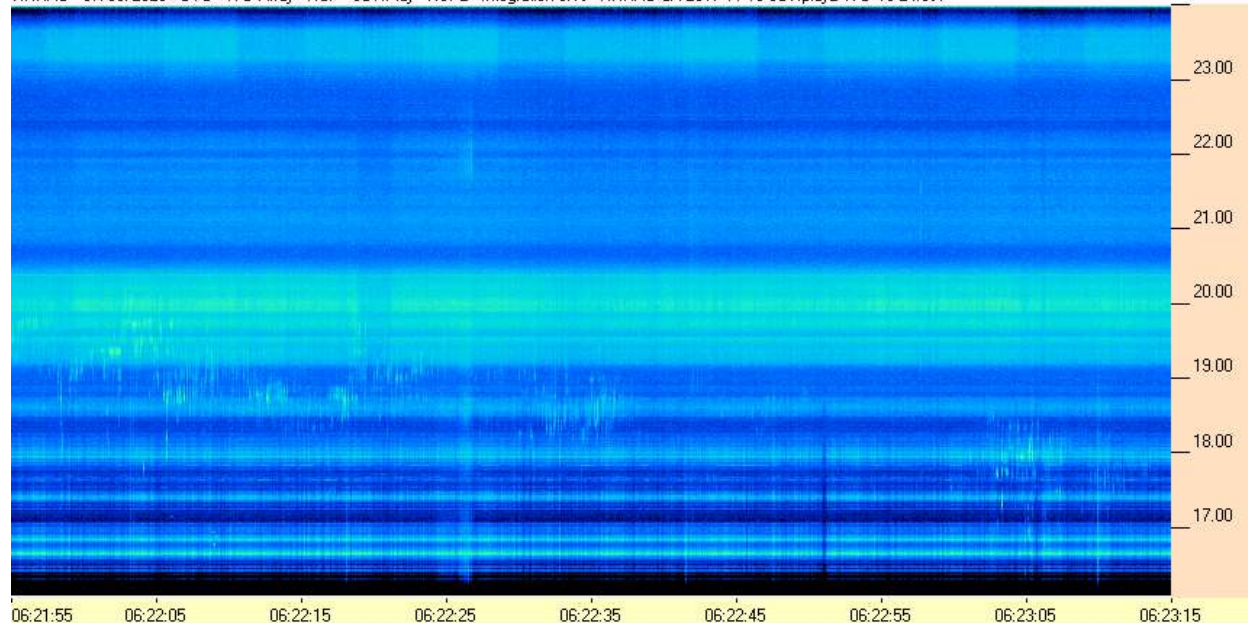
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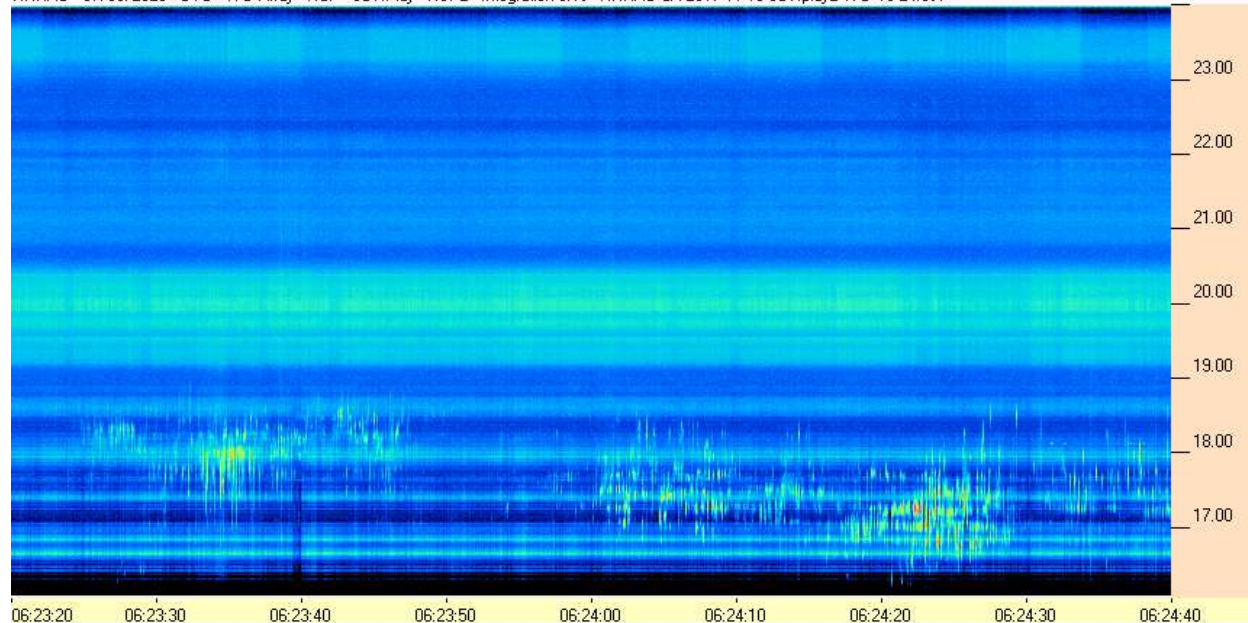
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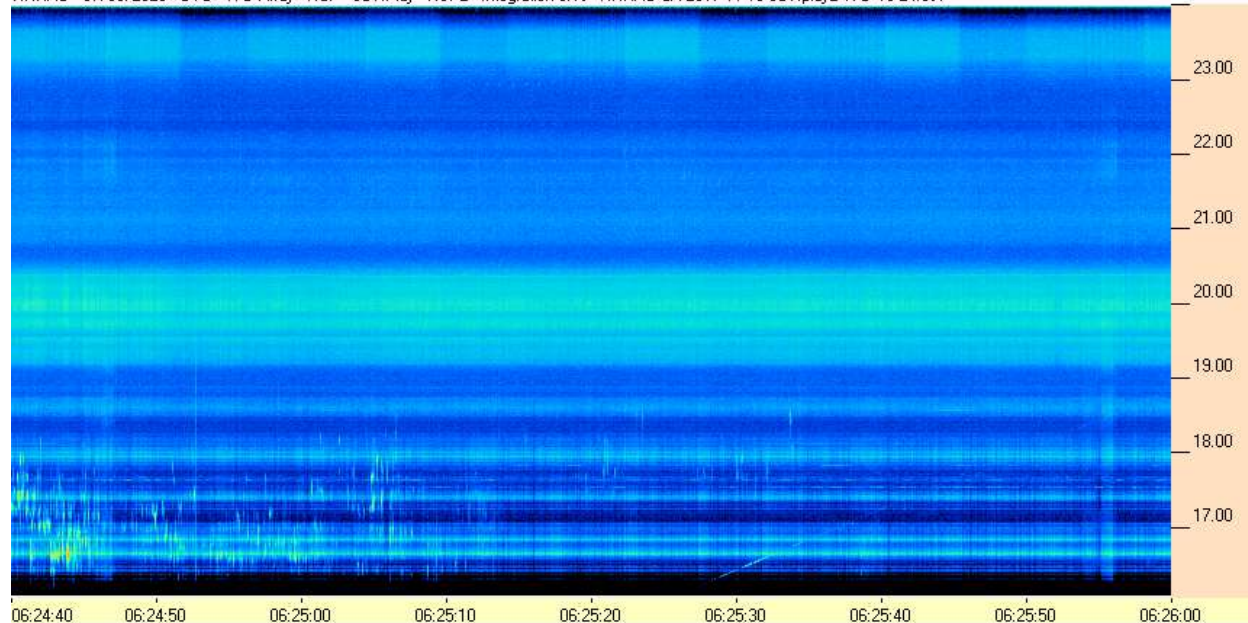
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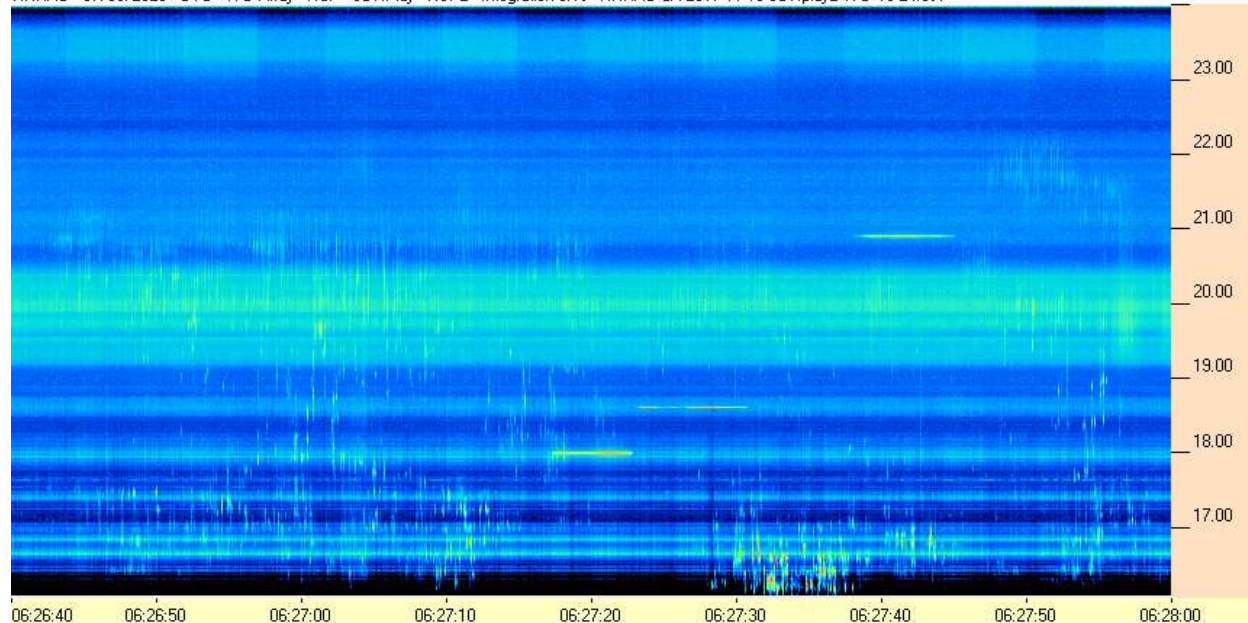
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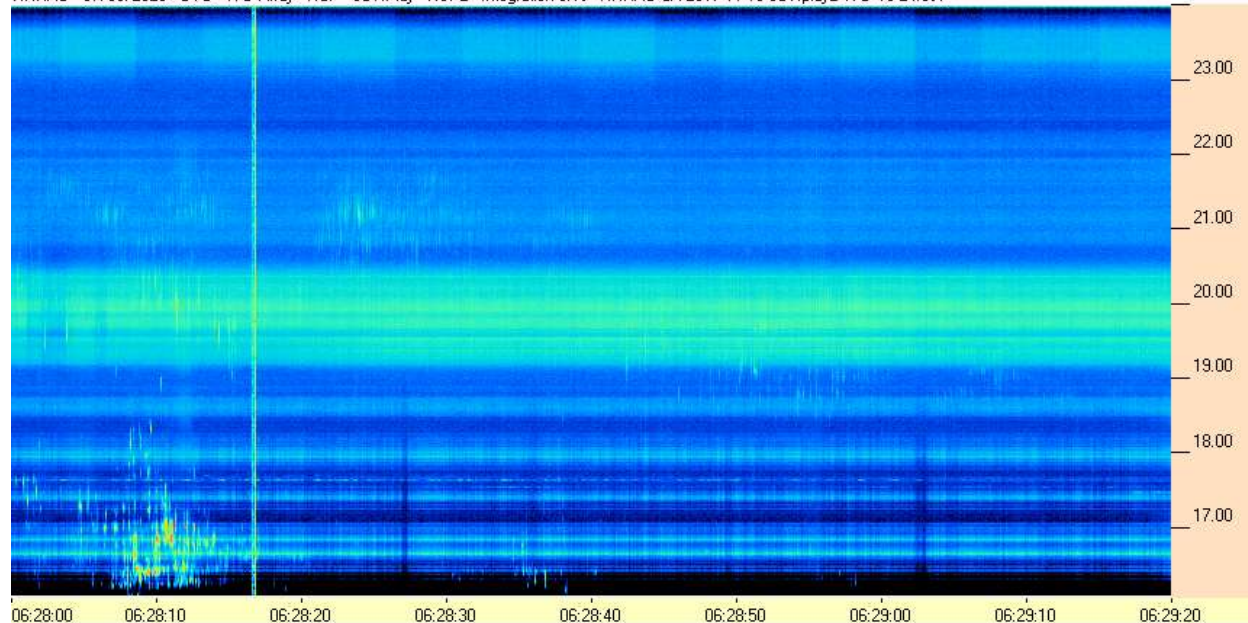
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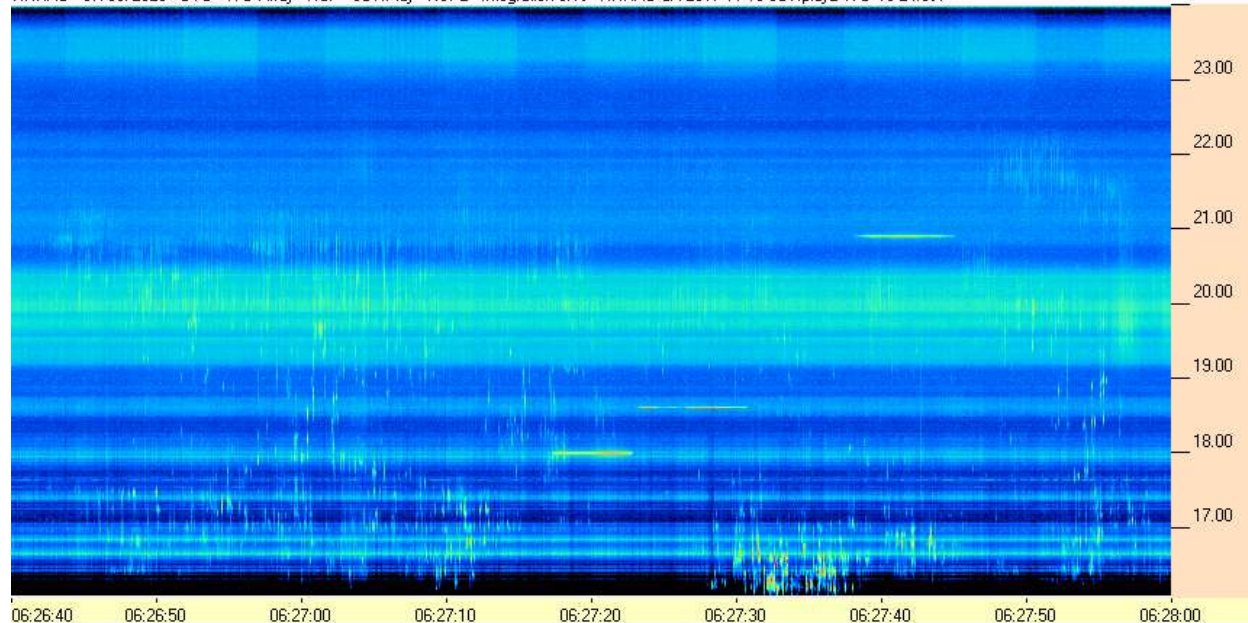
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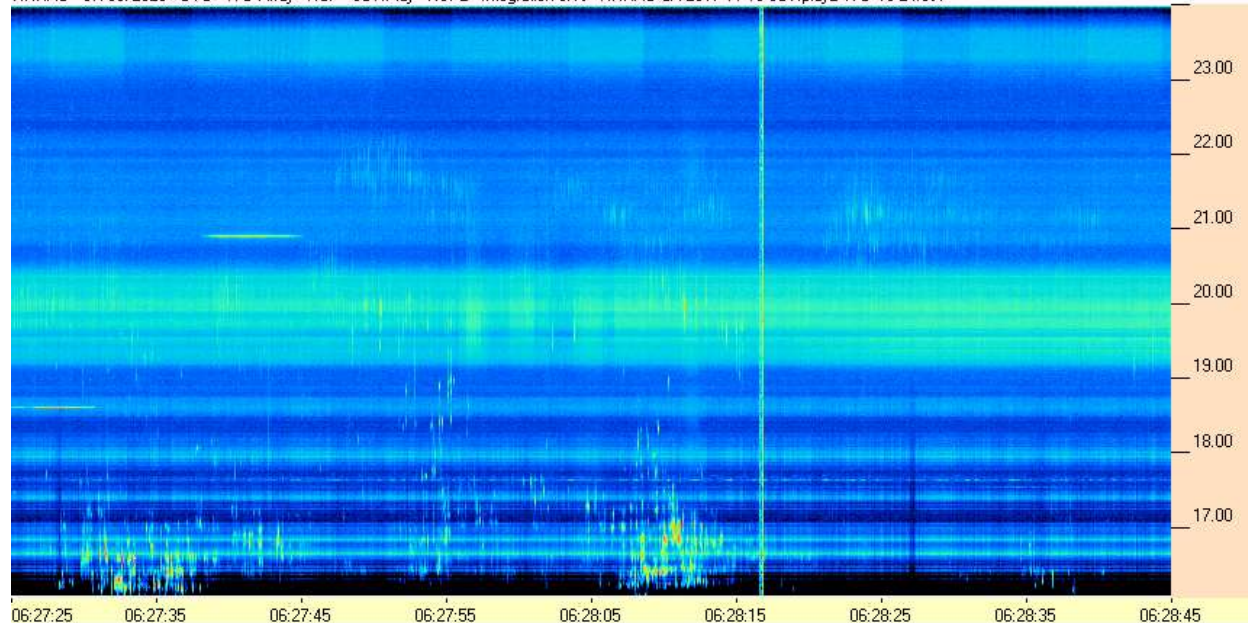
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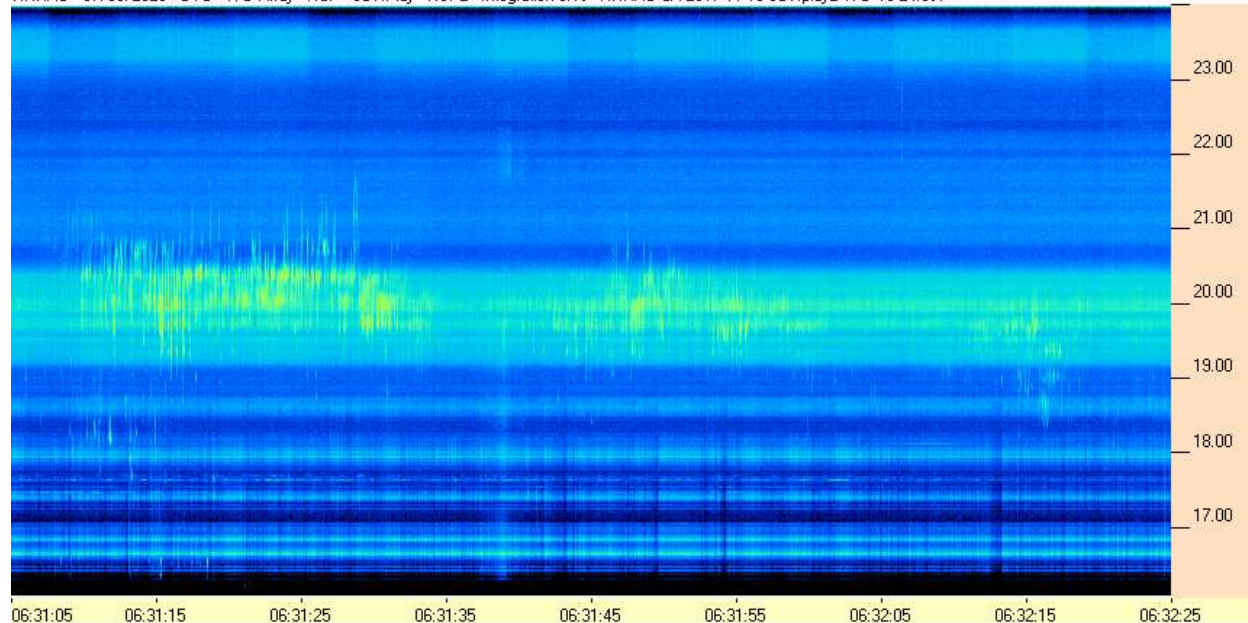
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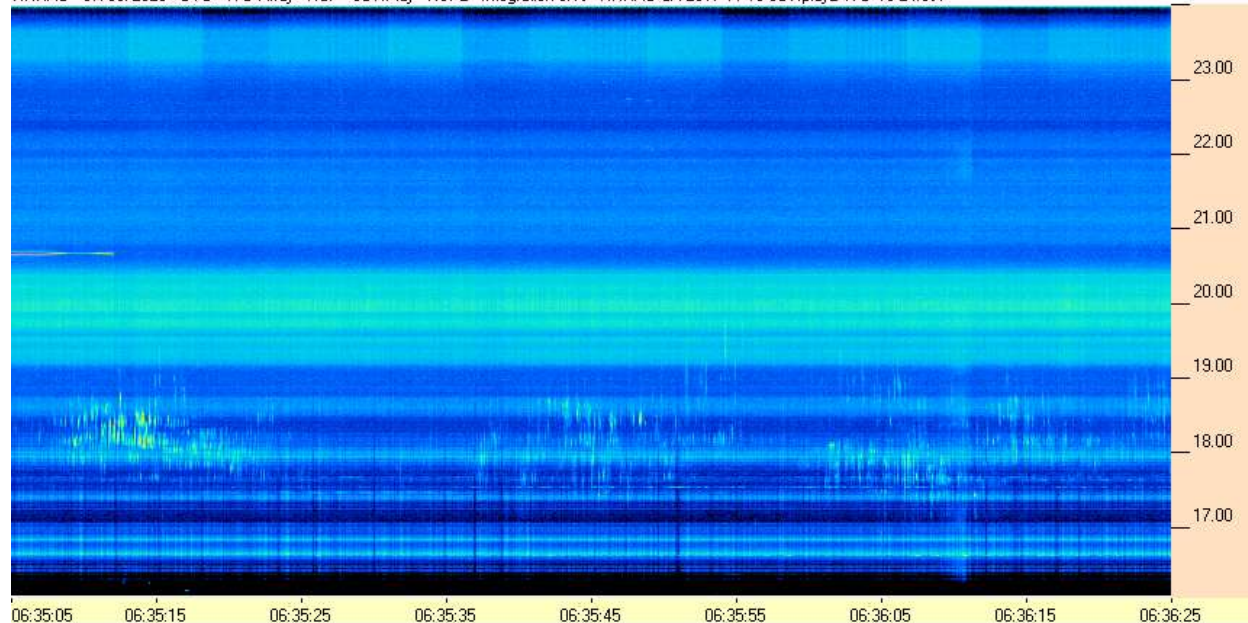
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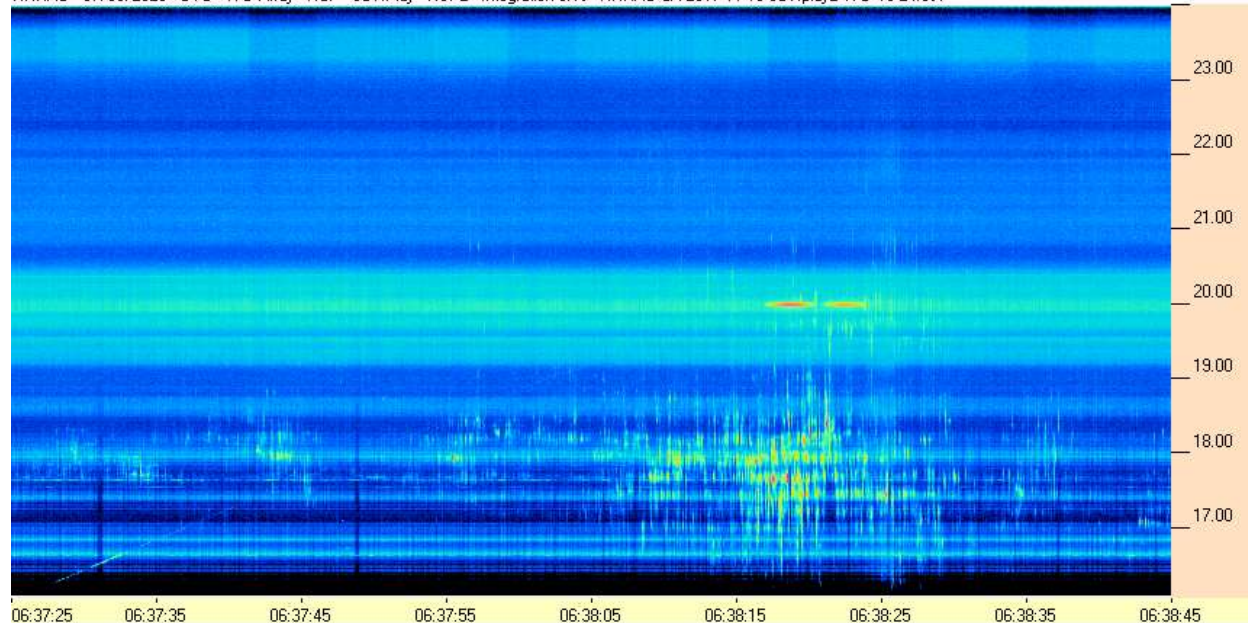
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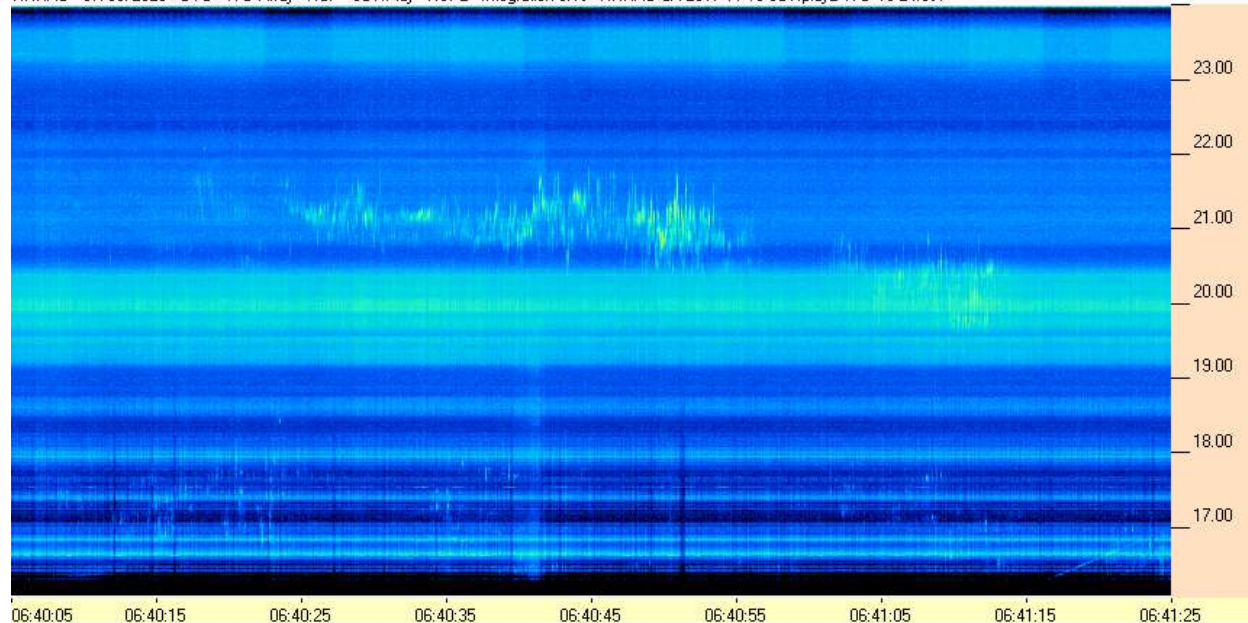
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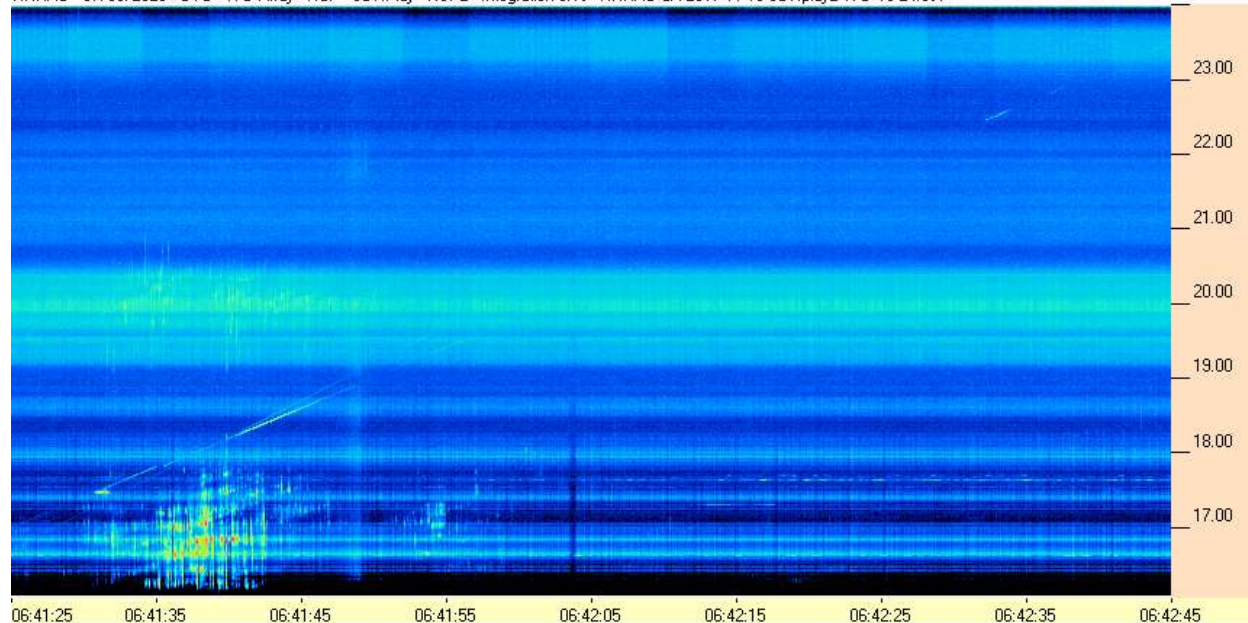
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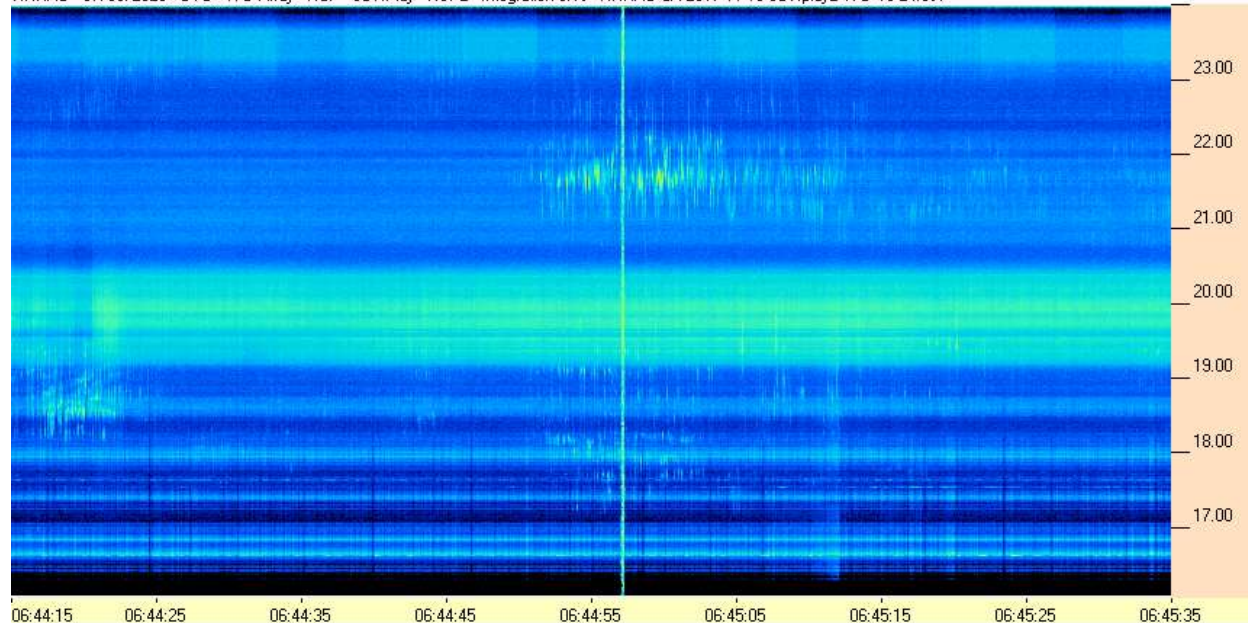
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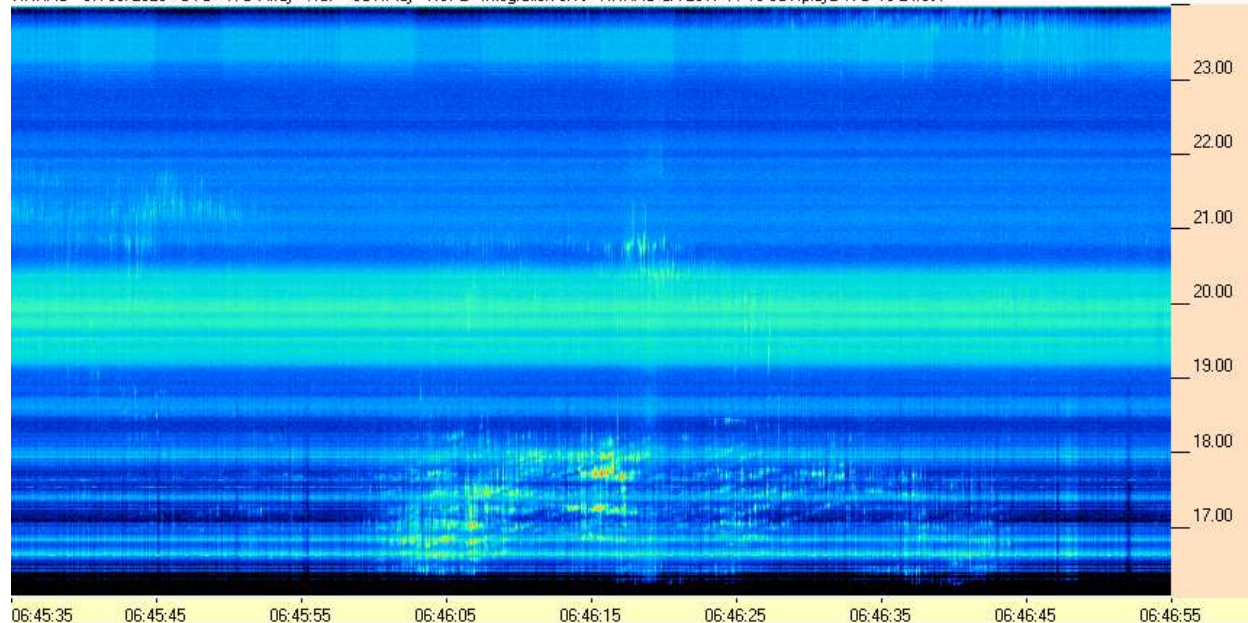
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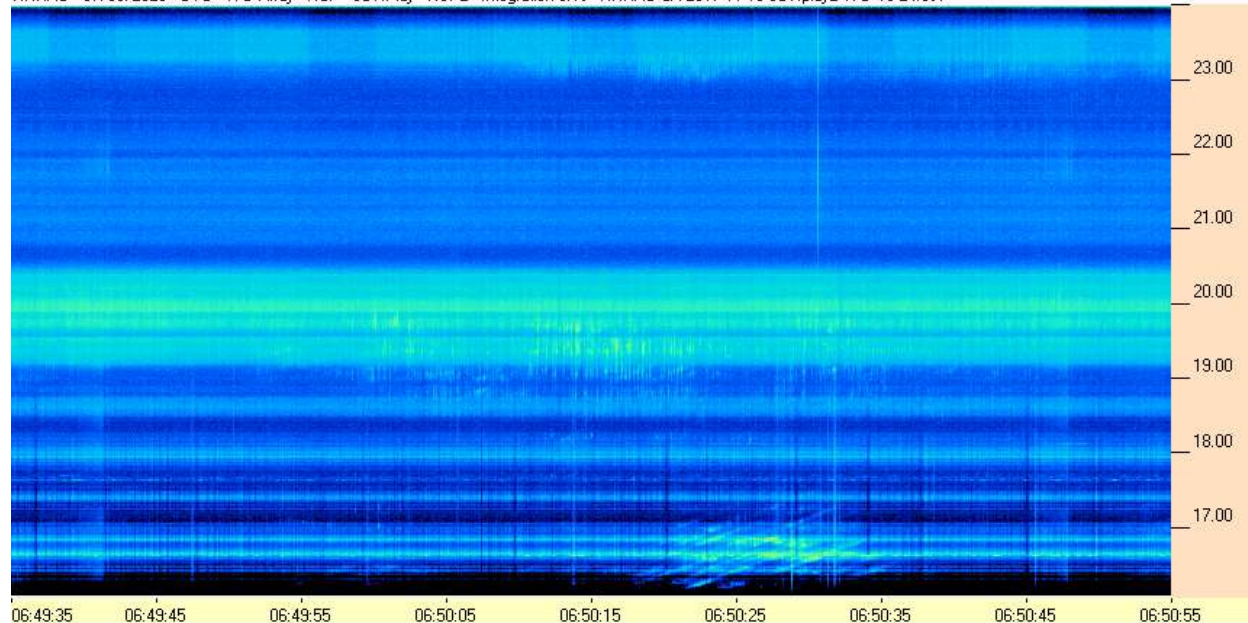
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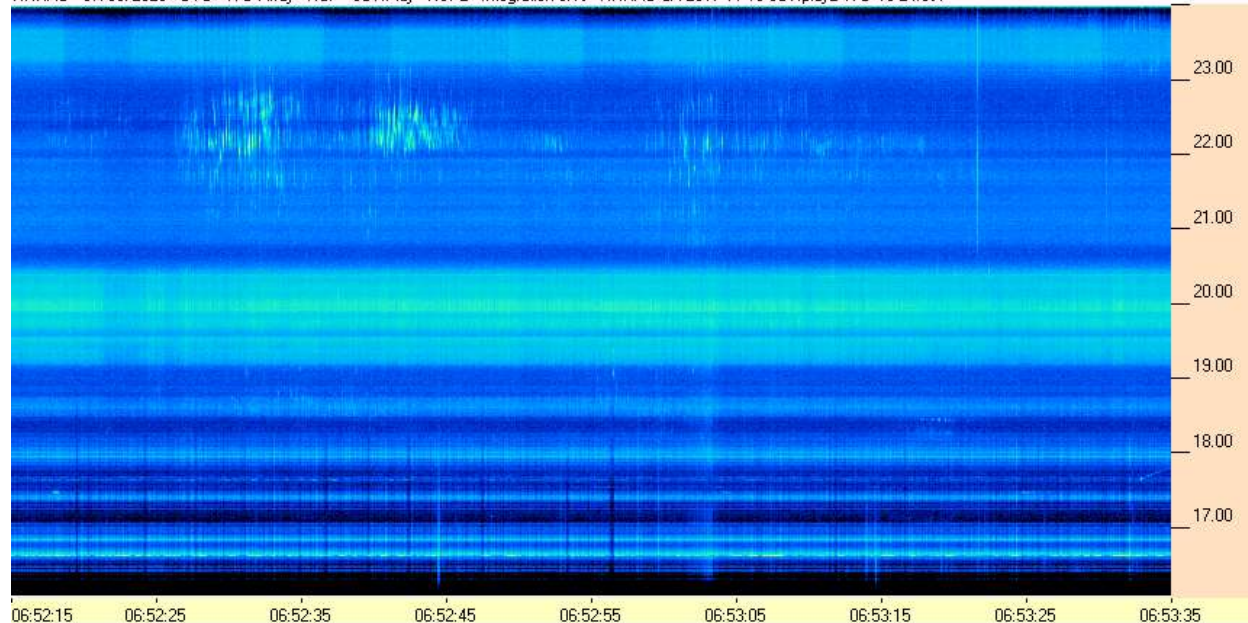
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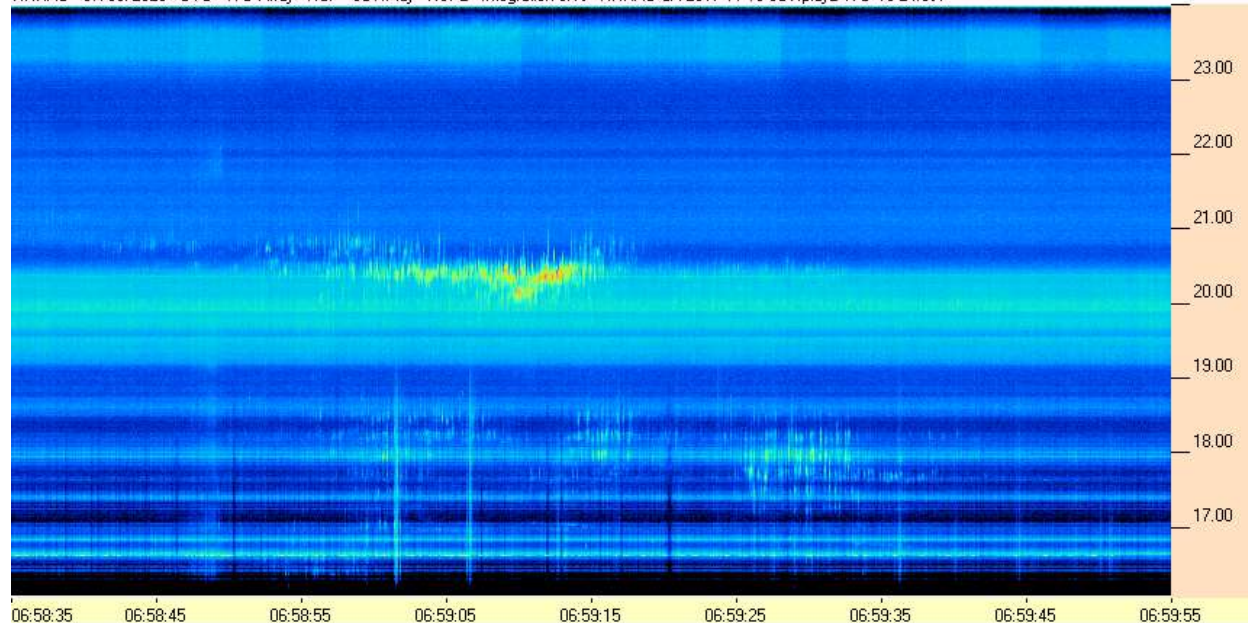
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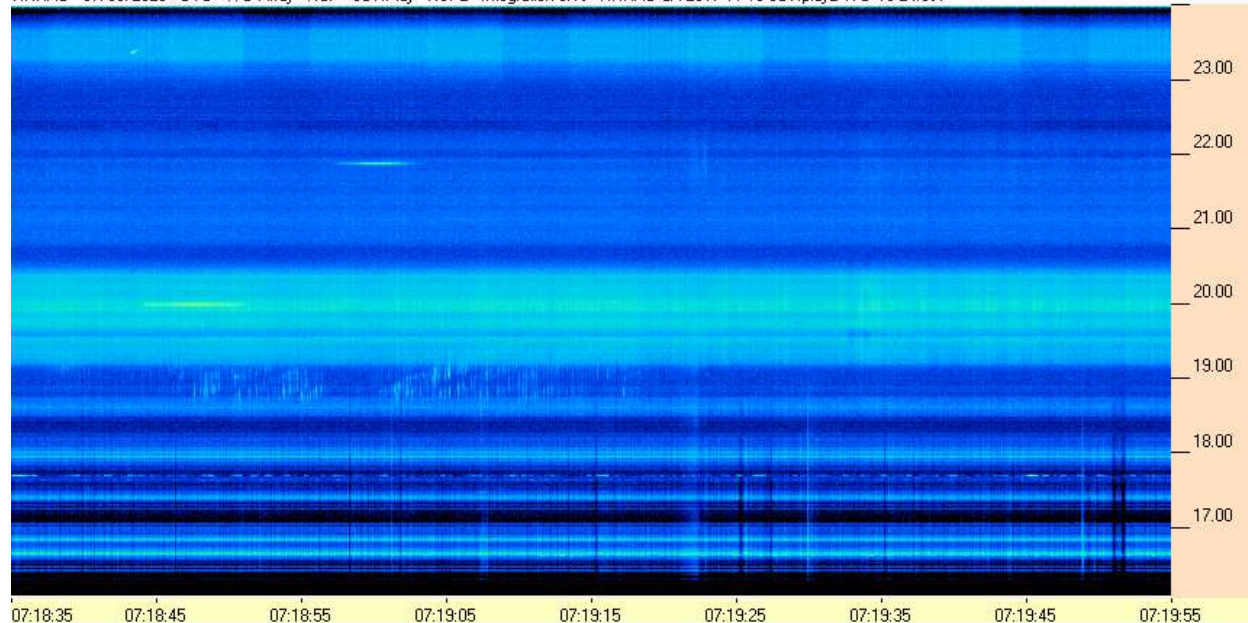
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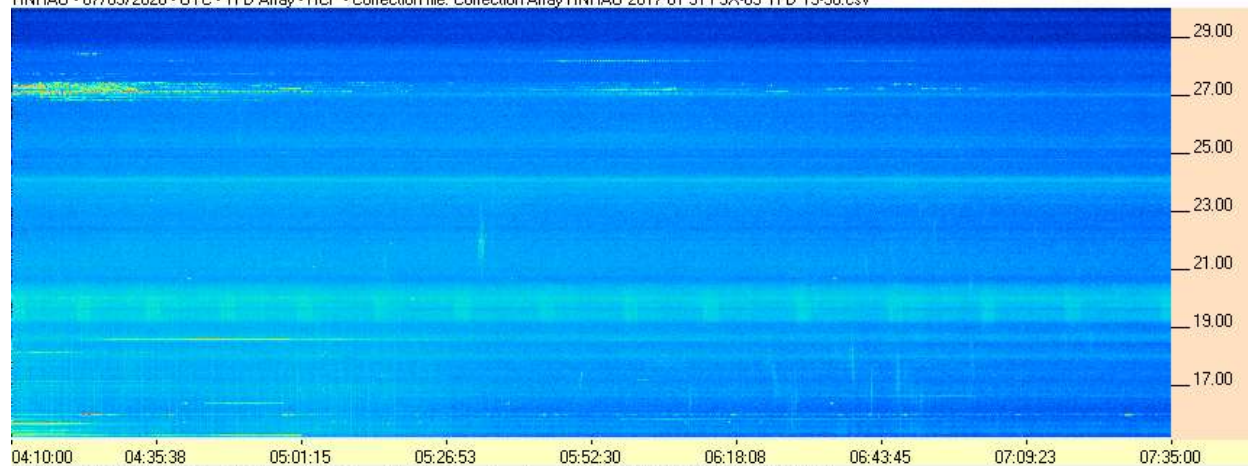


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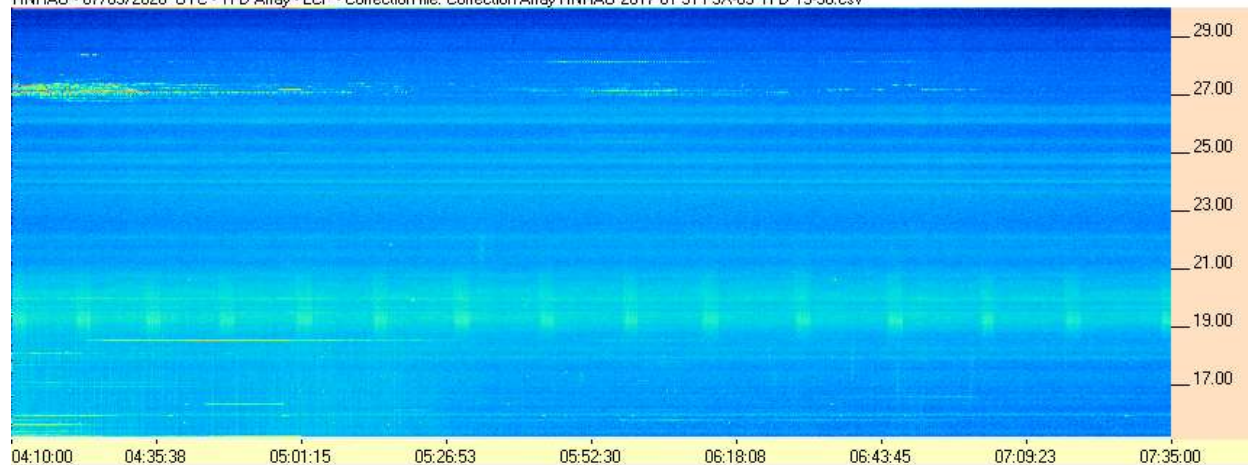


FSX-8S / TFD Array

HNRAO - 07/03/2020 - UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 07/03/2020 - UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



FSX-2 / LWA Array

HNRAO - 07/03/2020 - UTC - LWA Array - RCP - Correction file: CorrectionArray HNRAO 2017 01 31 FSX-2 LWA 15-30.csv

