

**HNRAO Observing Log**  
**40.673181 N – 80.437885 W**  
**EN90sq**



**Date: August 5, 2018**

**Object: Jupiter – Io-B**

**Observer: Unattended**

<b>Start - Time UT:</b>	<b>2145</b>	<b>Planetary K-index:</b>	<b>1</b>
<b>Jupiter Altitude (deg):</b>	<b>30.7</b>	<b>Jupiter Azimuth (deg):</b>	<b>155.6</b>
<b>Jupiter CML:</b>	<b>96.16</b>	<b>Jupiter Io Phase:</b>	<b>083.48</b>
<b>Jupiter RA (hr/min):</b>	<b>14:47</b>	<b>Jupiter Dec (hr/min):</b>	<b>-15:07</b>
<b>Hour Angle (hr/min):</b>	<b>-01:26</b>	<b>Polarization</b>	<b>RCP</b>
<b>Sun Altitude (deg):</b>	<b>29.1</b>	<b>Sun Azimuth (deg):</b>	<b>268.3</b>
<b>Sun RA (hr/min):</b>	<b>08:56</b>	<b>Sun Dec (hr/min):</b>	<b>17:19</b>

<b>End – Time UT:</b>	<b>2359</b>	<b>De:</b>	<b>-3.0</b>
<b>Jupiter Altitude (deg):</b>	<b>33.1</b>	<b>Jupiter Azimuth (deg):</b>	<b>193.9</b>
<b>Jupiter CML:</b>	<b>177.15</b>	<b>Jupiter Io Phase</b>	<b>102.36</b>
<b>Hour Angle (hr/min):</b>	<b>00:48</b>	<b>Duration (min):</b>	<b>214</b>
<b>Sun Altitude (deg):</b>	<b>04.1</b>	<b>Sun Azimuth (deg):</b>	<b>289.3</b>
<b>Max Frequency MHz</b>	<b>24</b>	<b>Min Frequency MHz</b>	<b>15</b>

**Observatory Configuration**

<b>Spectrograph Receiver</b>	<b>Antenna</b>	<b>Polarization</b>	<b>System Loss</b>	<b>Multicoupler</b>	<b>Multicoupler port</b>	<b>Calibrated</b>
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	TFD	RCP	-8.35 dB	#2 RCP	Port 2 +3dB	Twice daily
SDRPlay RSP2	TFD	LCP	-7.59 dB	#1 LCP	Port 2 +3dB	Twice daily
JOVE 1	TFD	RCP	-8.35 dB	#2 RCP	Port 3 +3 dB	04/20/2018
JOVE 1	TFD	LCP	-7.59 dB	#1 LCP	Port 3 +3 dB	04/20/2018
JOVE II	Jove dipoles	Linear	-3.12 dB	#3 Linear	Port 4 +3 dB	06/23/2018
SDRPlay RSP1	Experimental*					

JOVE dipoles phased @ 32 degrees for 2017-2018 season

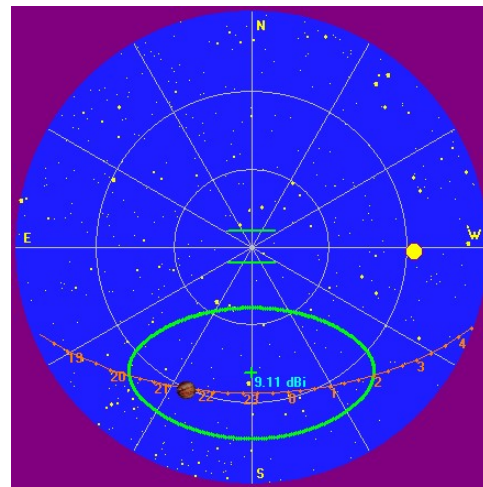
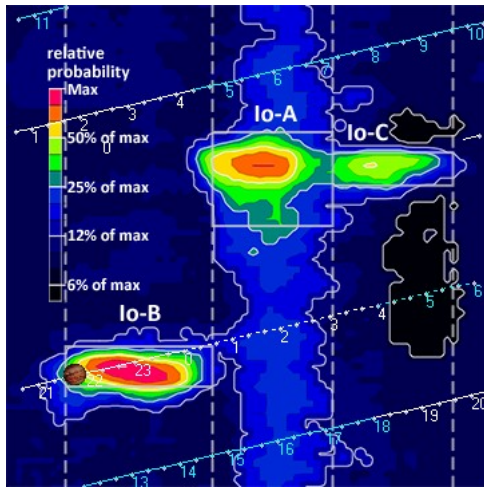
TFD array phased @ 35 degrees for 2017-2018 season

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

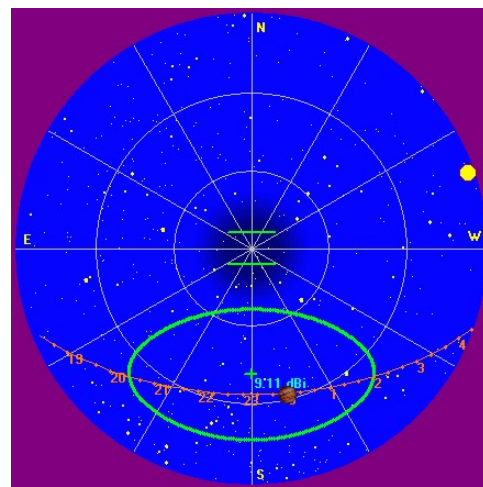
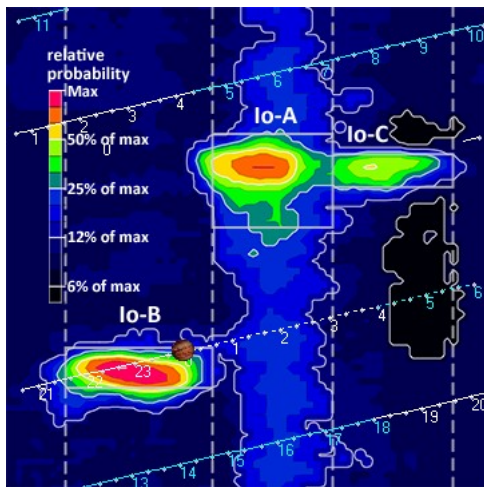
\* Used for testing and evaluating antenna systems

Software Radio Sky Spectrograph 2.8.50

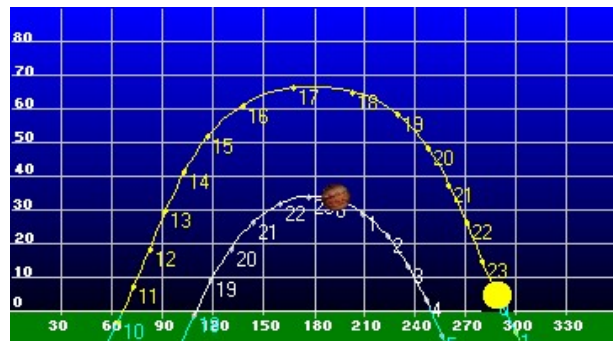
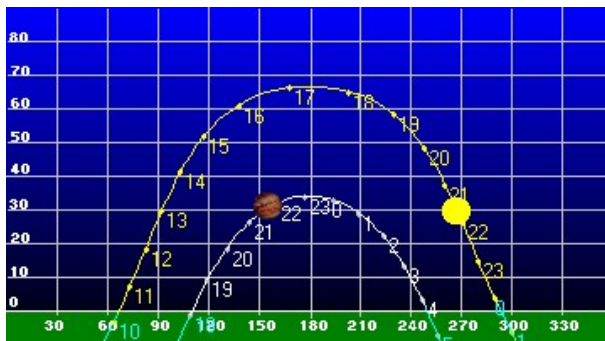
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**Beginning of Pass**



**End of Pass**



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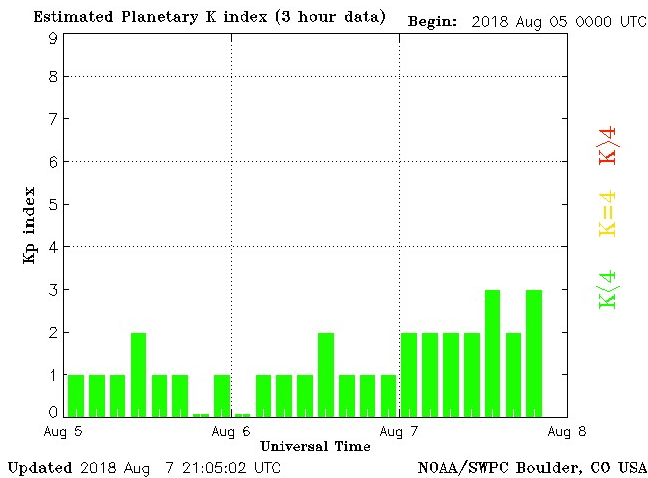


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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



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A very weak RCP Io-B storm. Storm observed with FSX-8S/TFD array, FSX-2/LWA array, SDRPlay RSP2/TFD array, experimental SDRPlay RSP1A/TFD array and Jove 2 receiver/Jove dual dipole array. Both L-bursts and S-bursts were seen. The results of the RSP1A/TFD array were weak and not worth posting. Emissions were present in all observing spectrographs.

Observing conditions were good but broadcast stations below 18 MHz were strong and created overload at the front end of the SDRPlay RSP2 spectrograph at the beginning. There was intermittent lightning seen in the spectrographs and SkyPipe charts.

There was considerable scintillation in the received emissions throughout the storm. L2 modulation lanes were evident from the start of observed omissions. There were also periods of L3 modulations. With a few exceptions, most emissions were at or near the GB as observed with the SDRPlay RSP2 spectrograph.

Some emission groups appear to have a very sharp leading edge.

There was lightning RFI on the SkyPipe trace, but the calibrated Jove 2 receiver/ liner Jove dual dipole array at 20.1 MHz indicated S-bursts more than 533 kK at 2327:40 UT. To differentiate between background RFI and S-bursts (verified with spectrograph data), the time below each SkyPipe chart (below) indicates the burst.

EOR

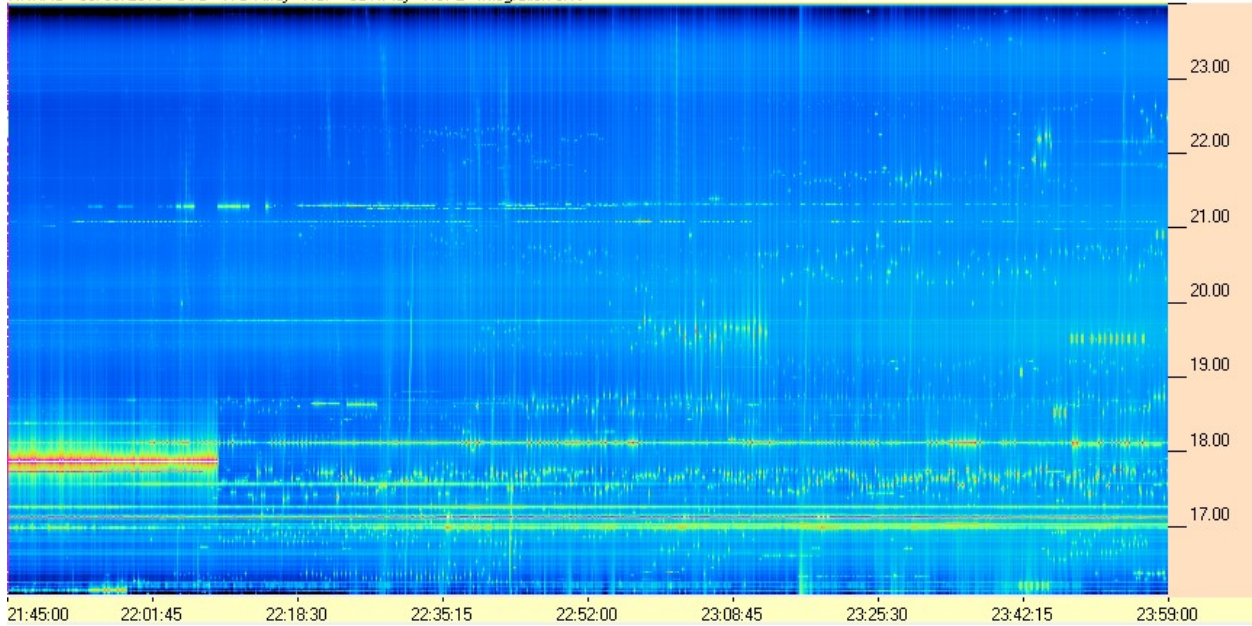


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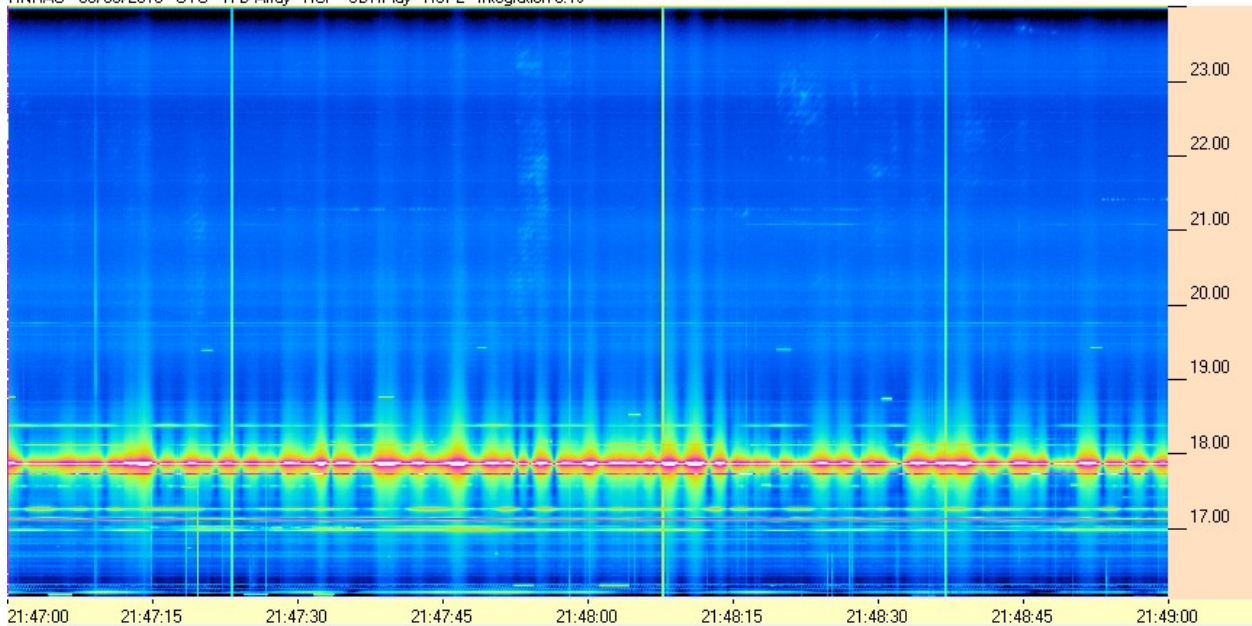


**SDRPlay RSP2 / TFD Array**

HNRAO - 08/05/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



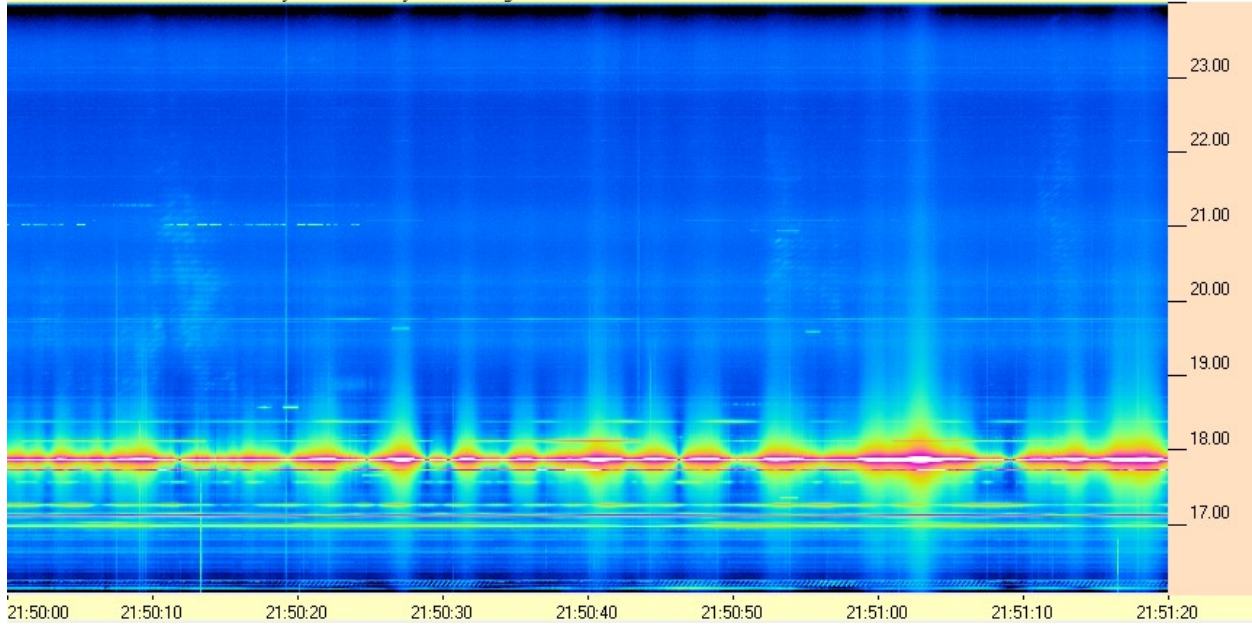
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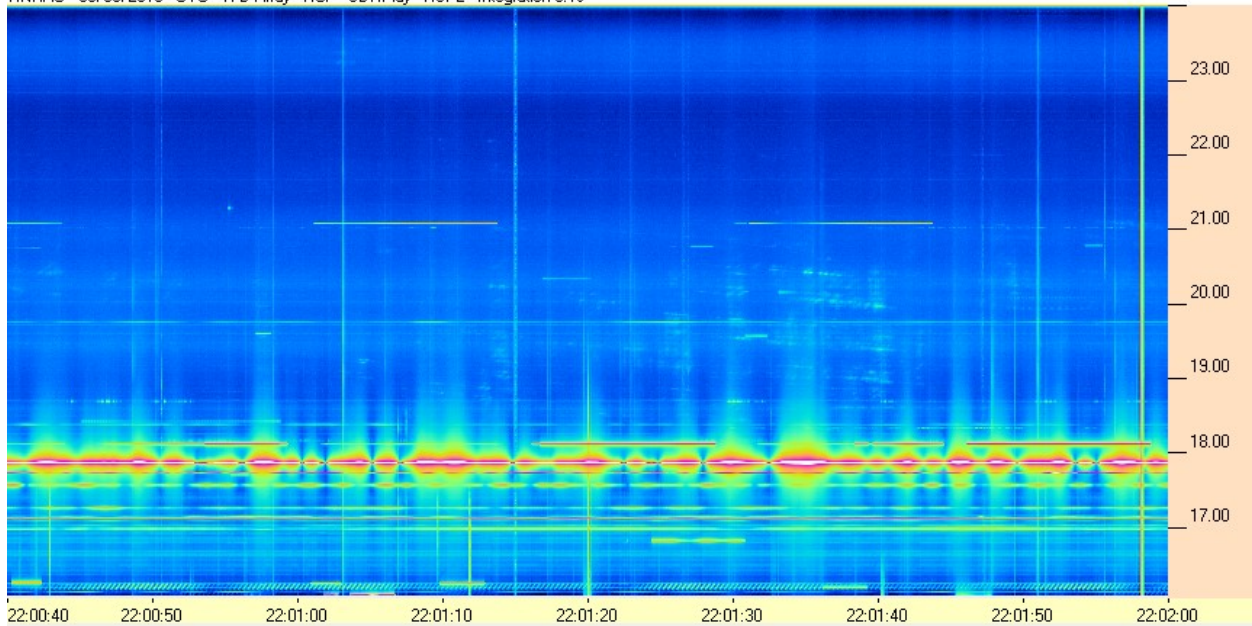
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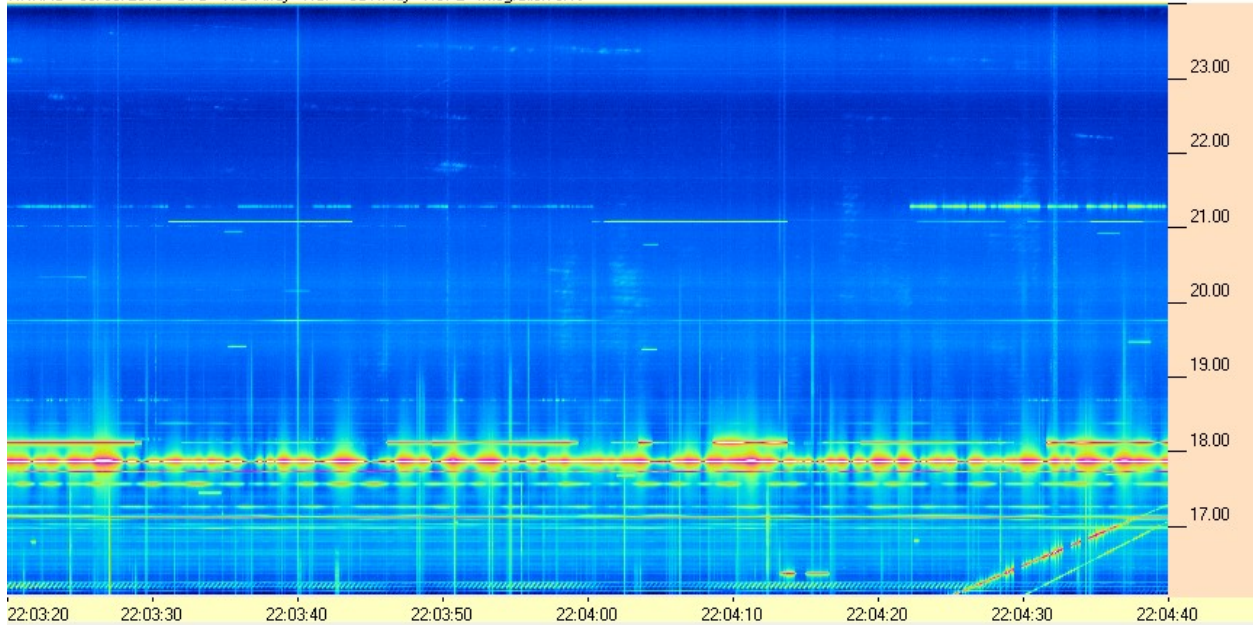




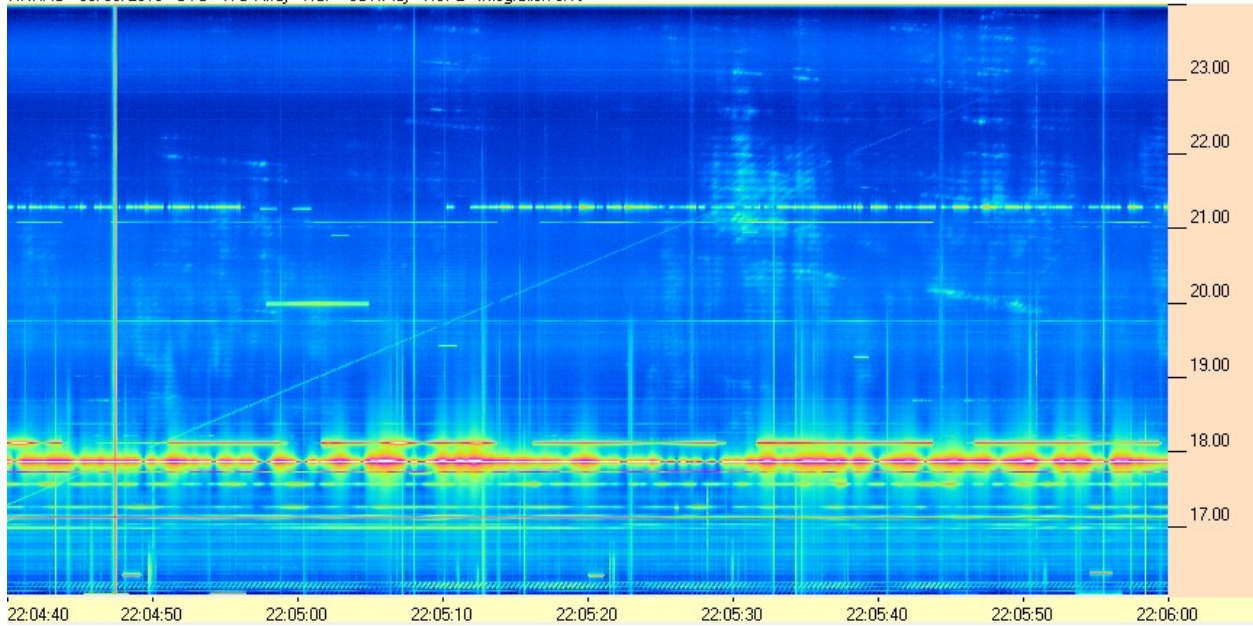
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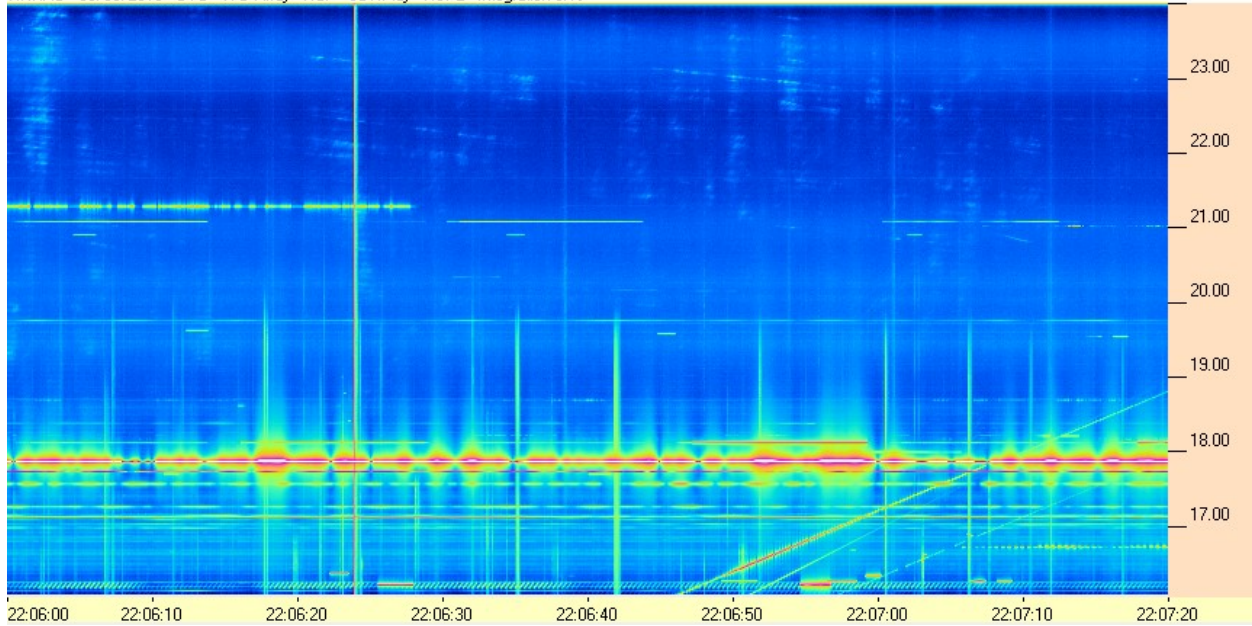
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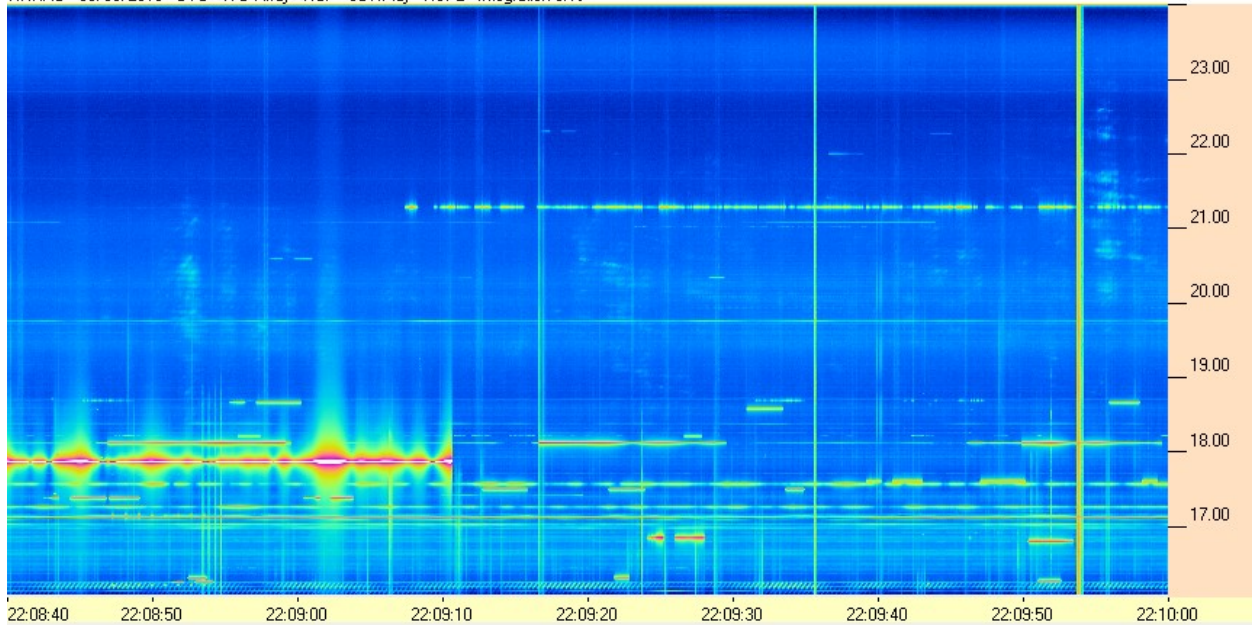
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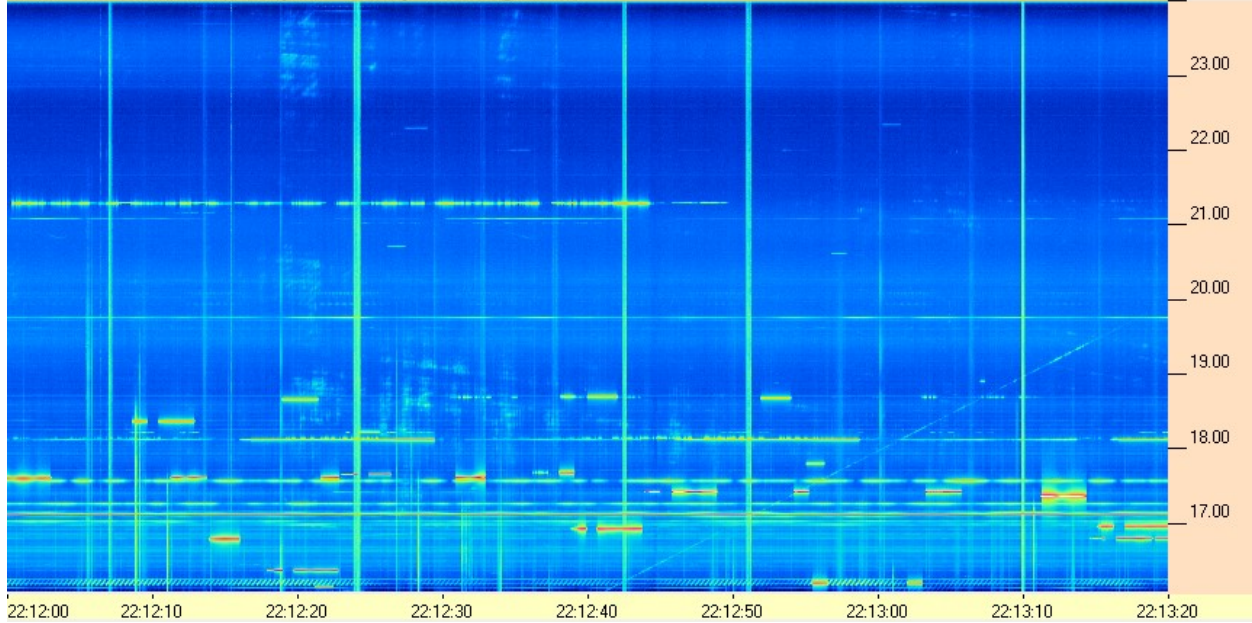




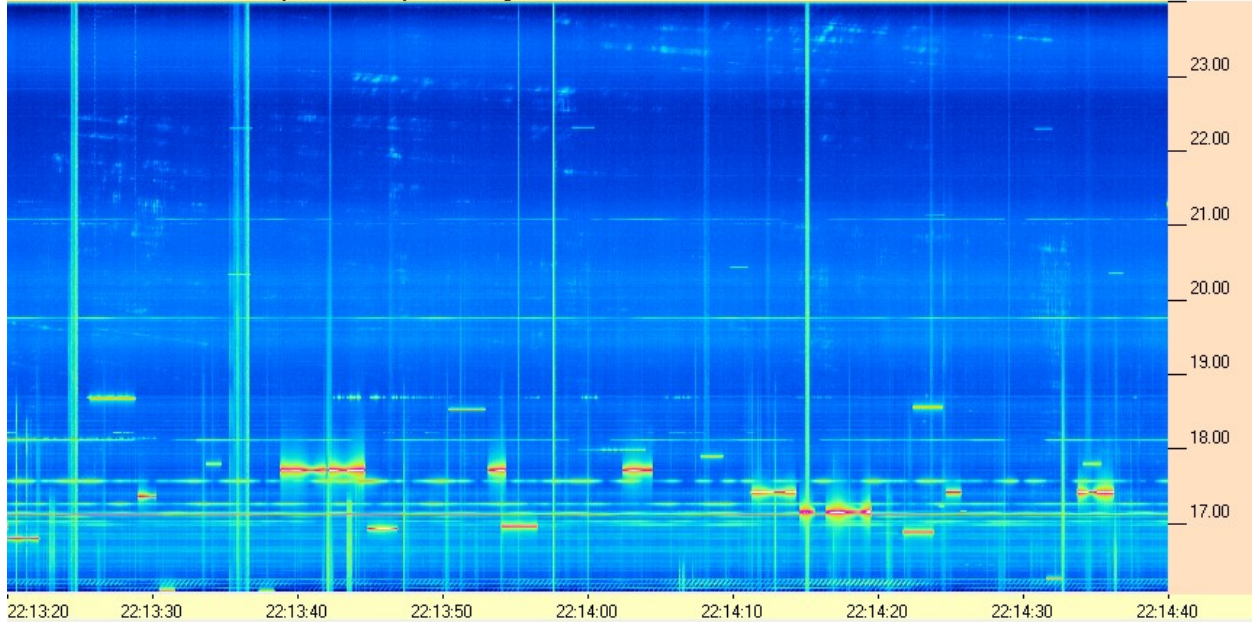
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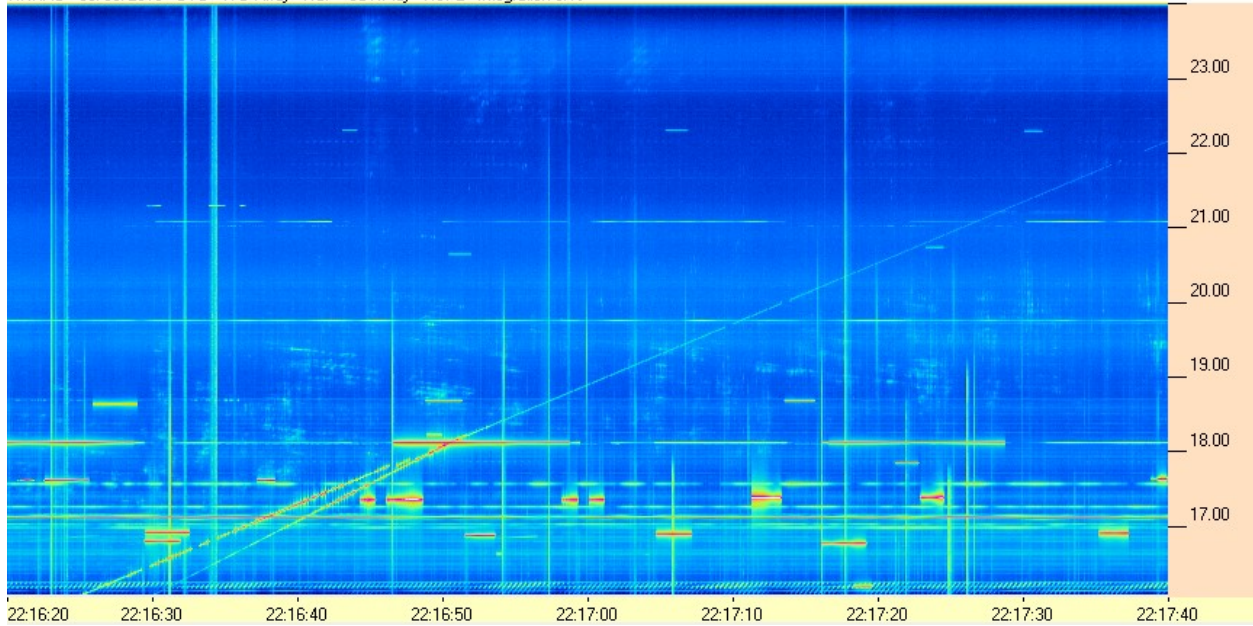
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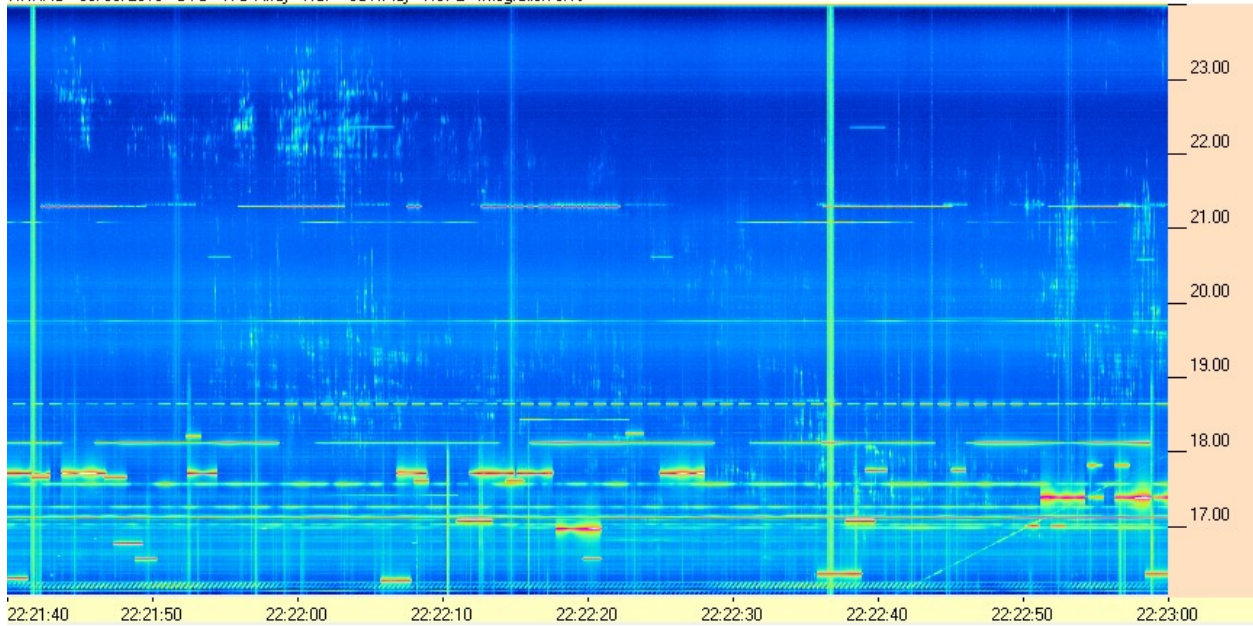
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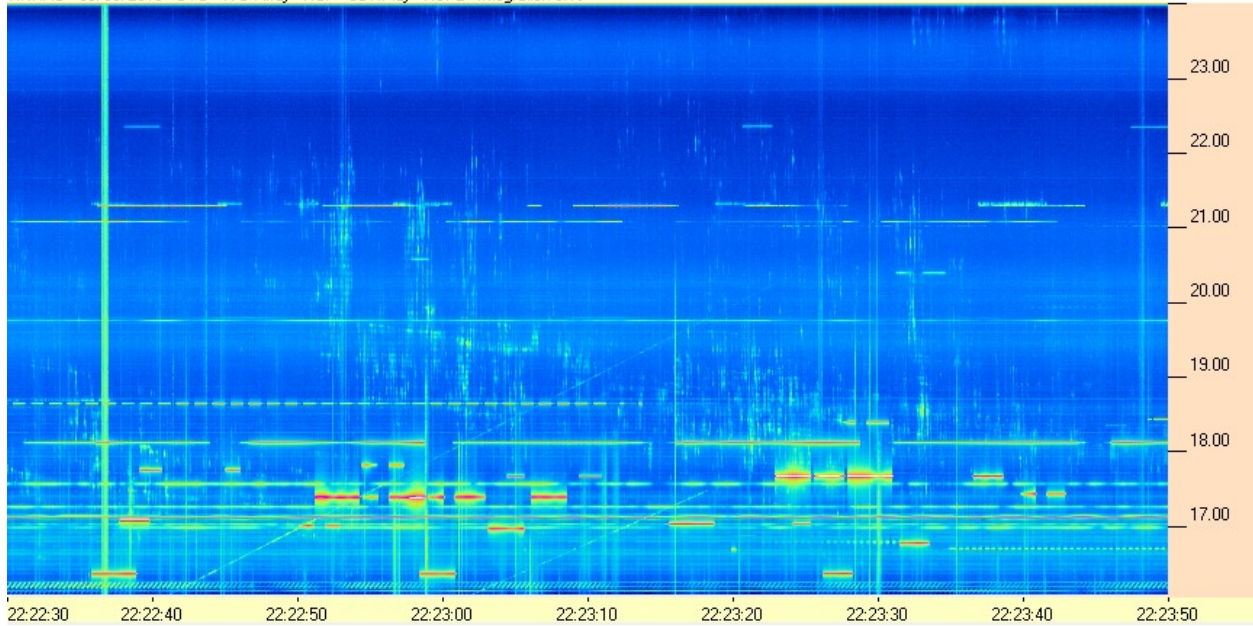




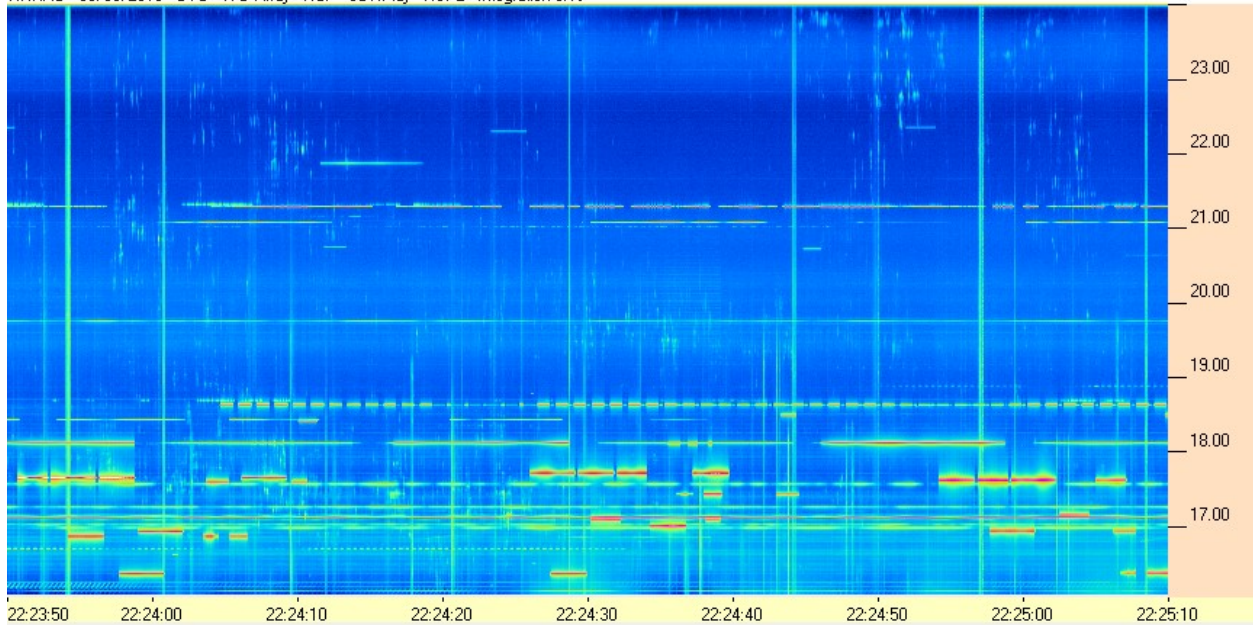
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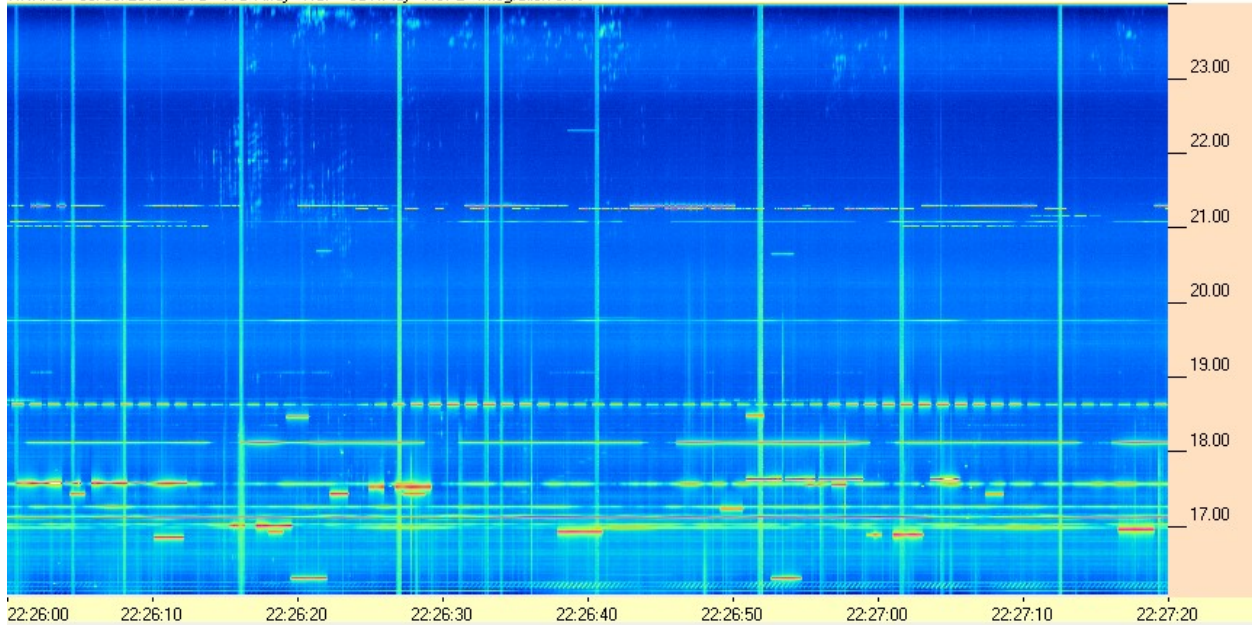
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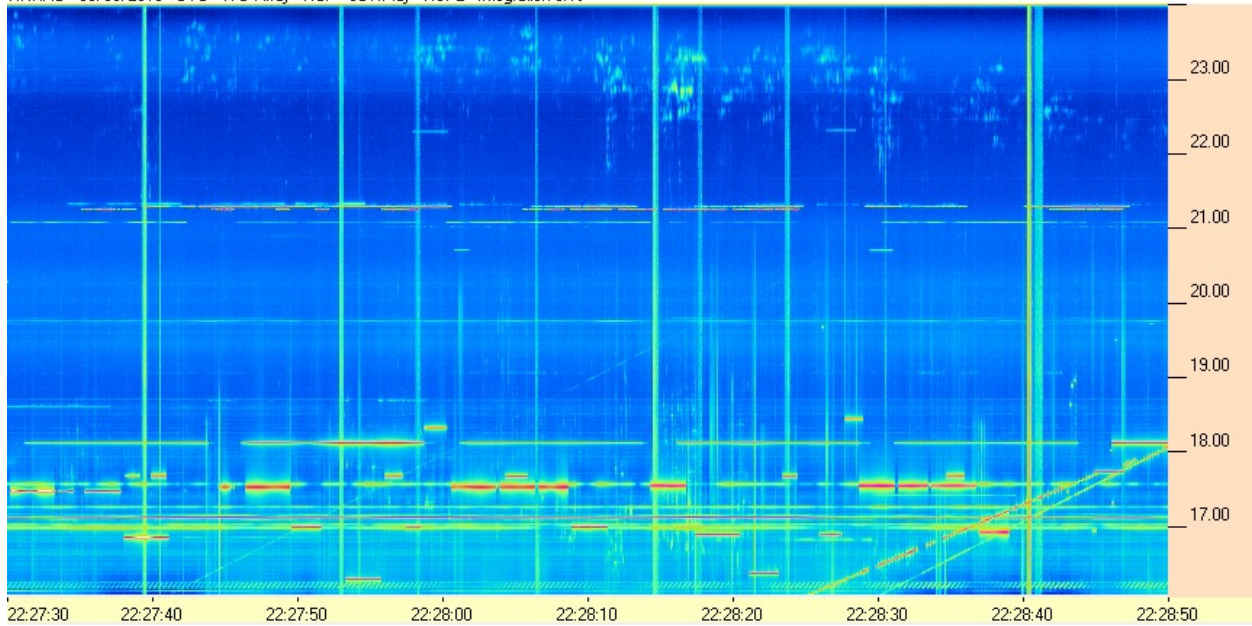
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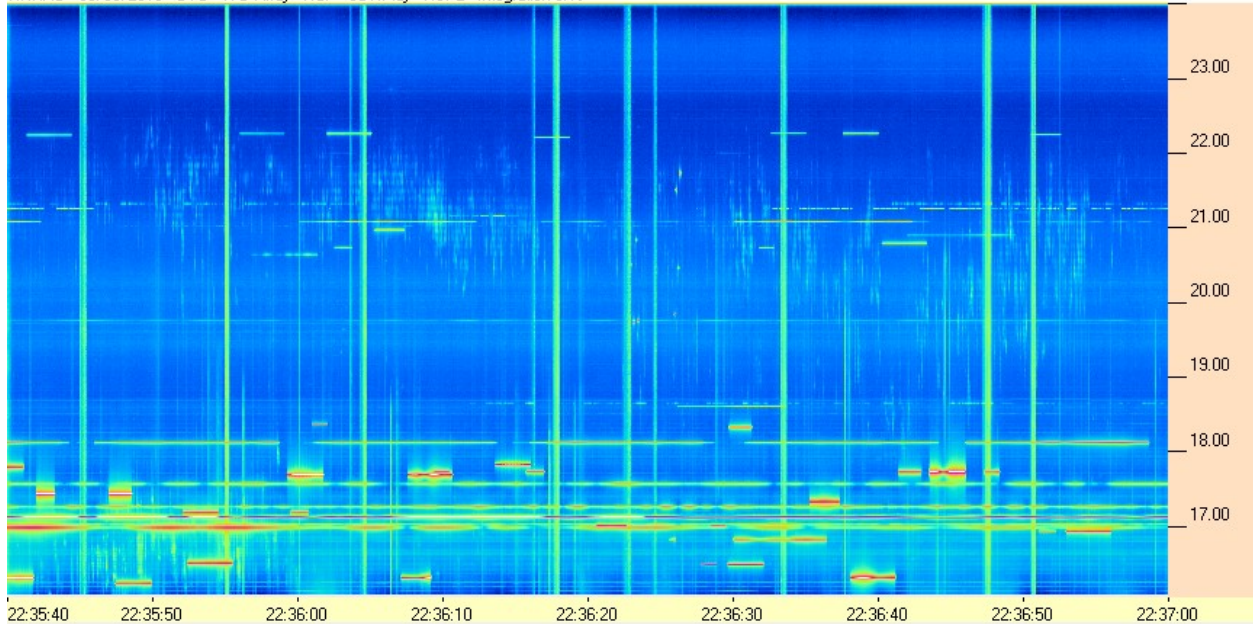




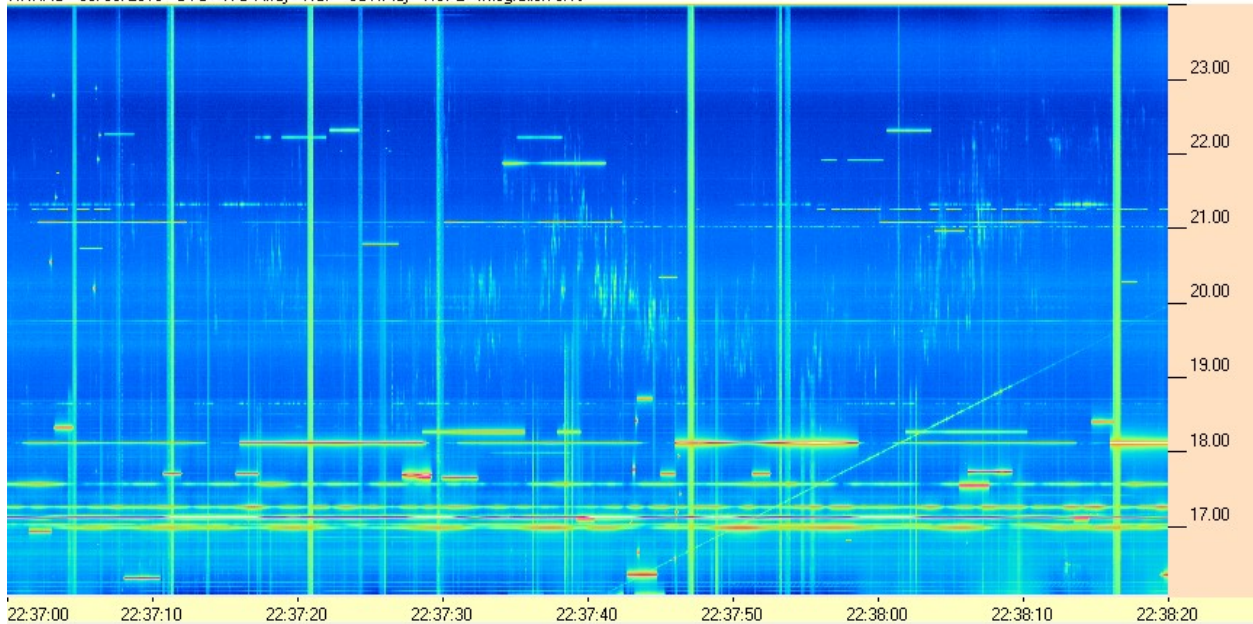
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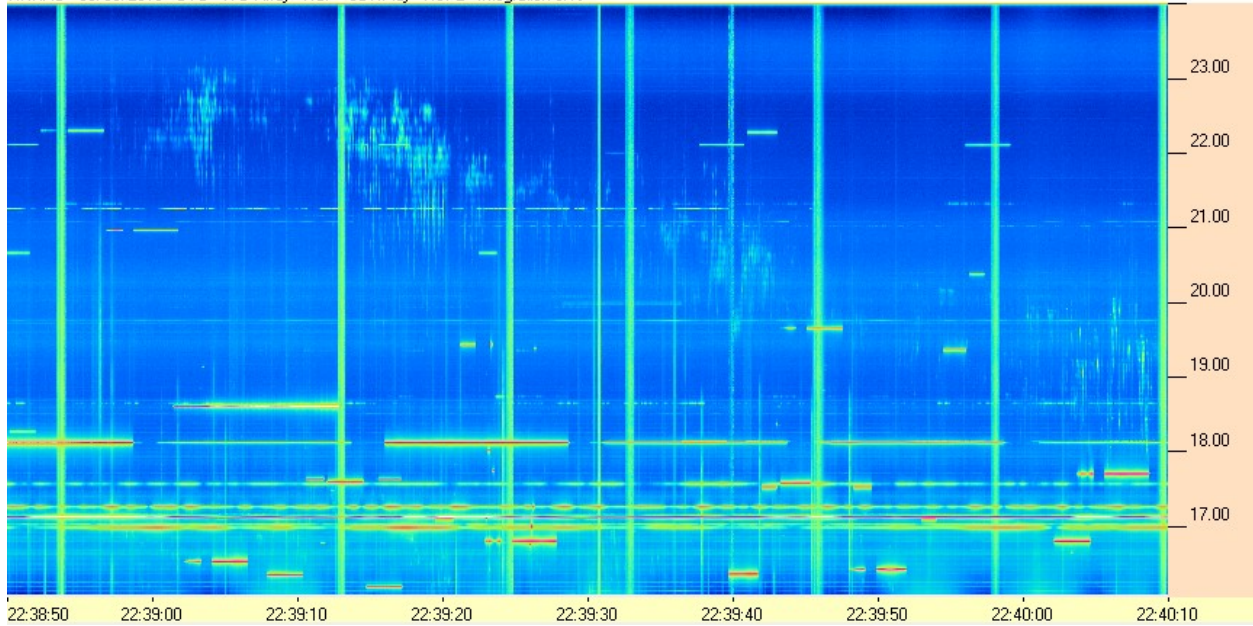
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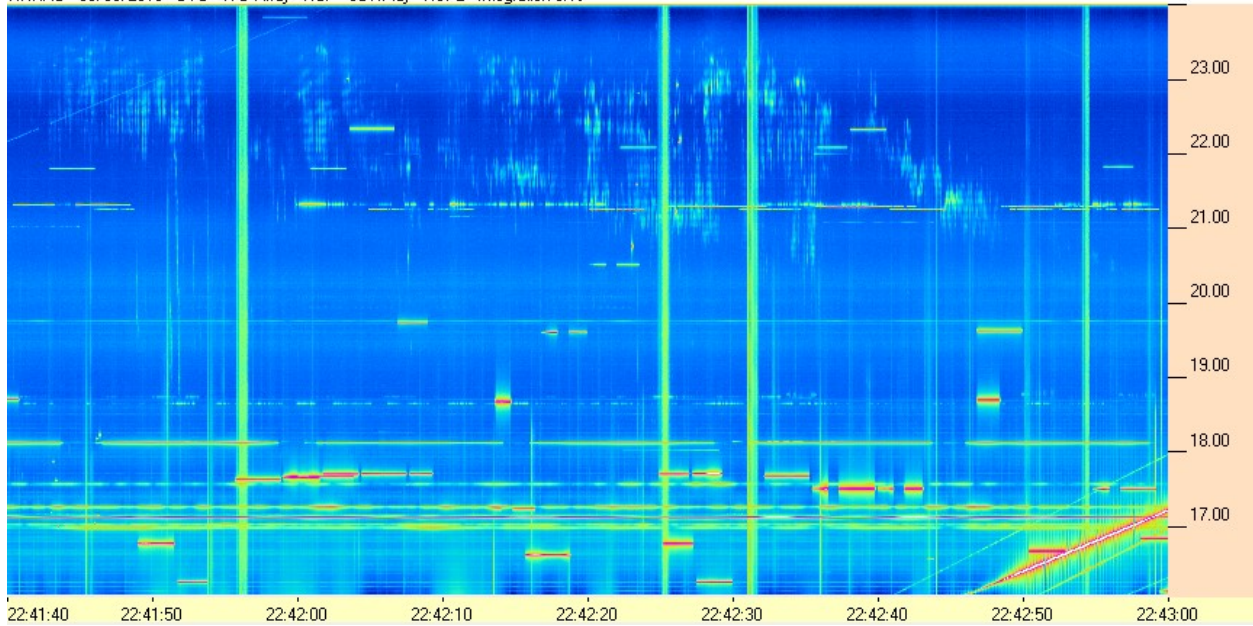
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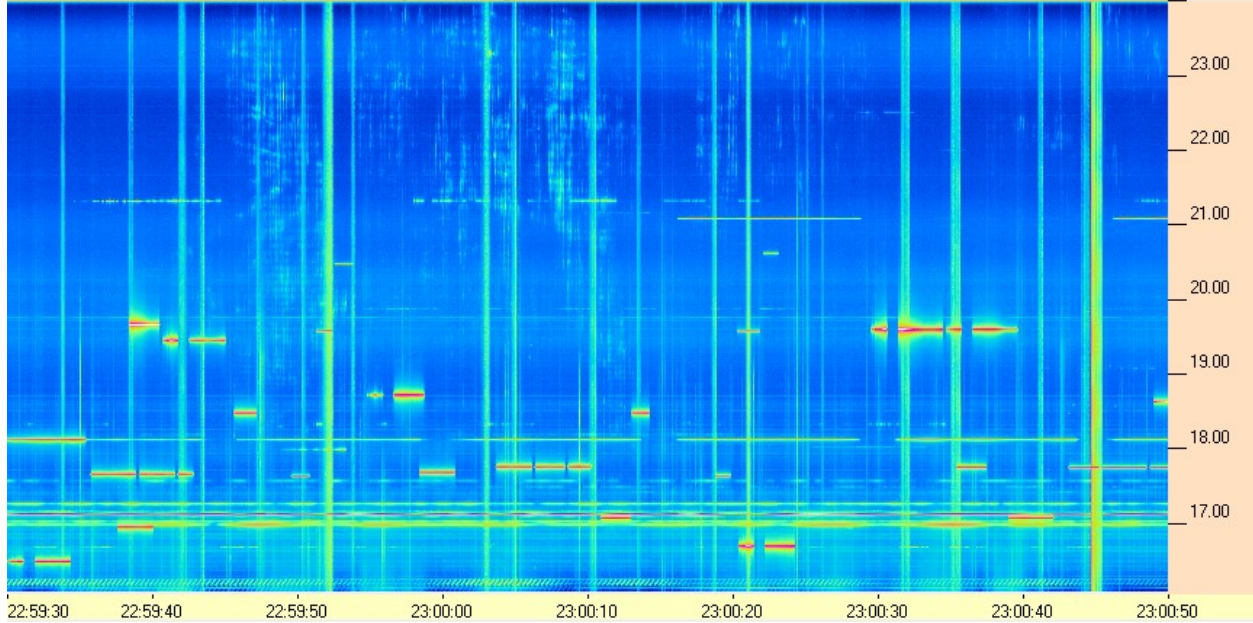




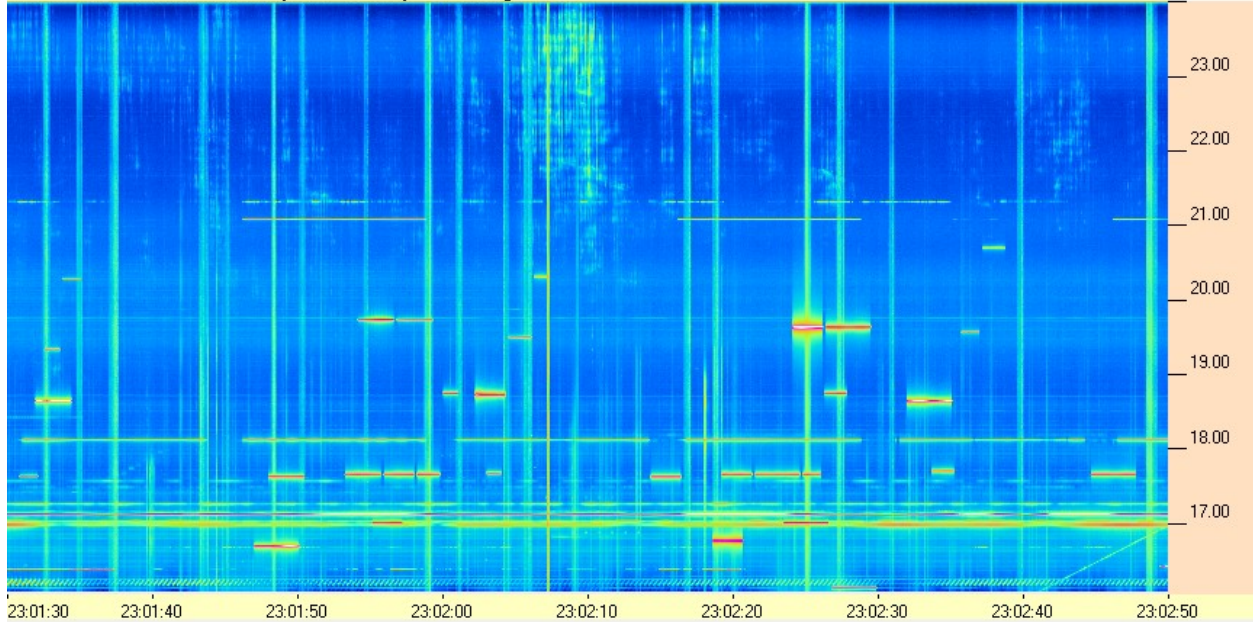
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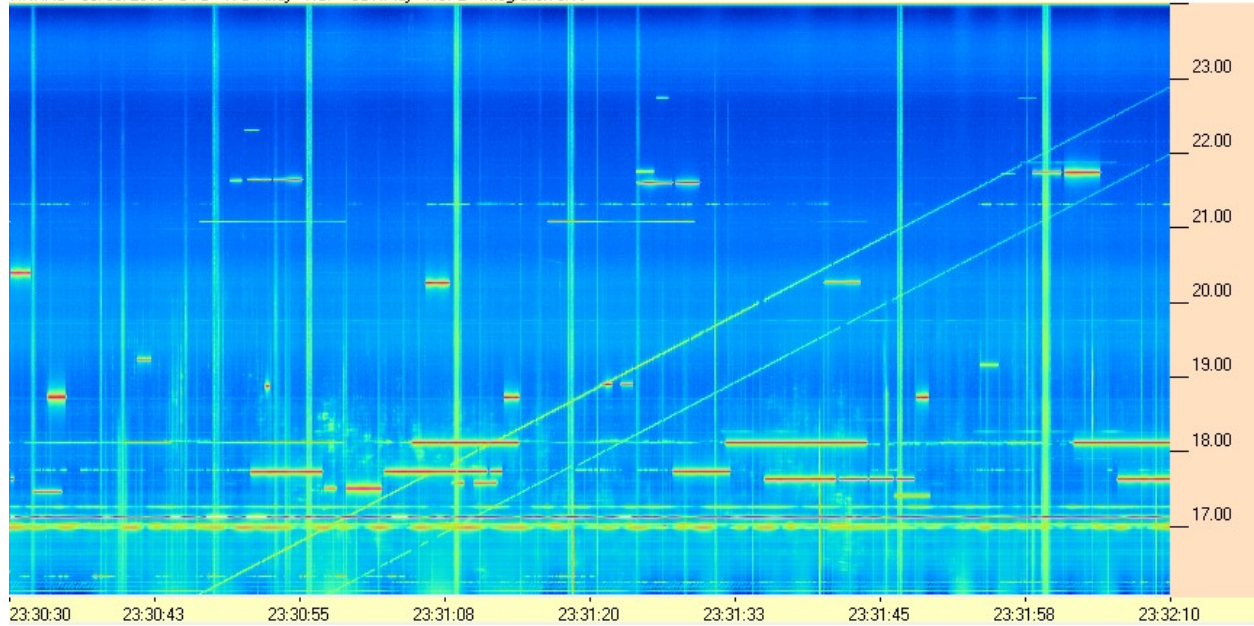
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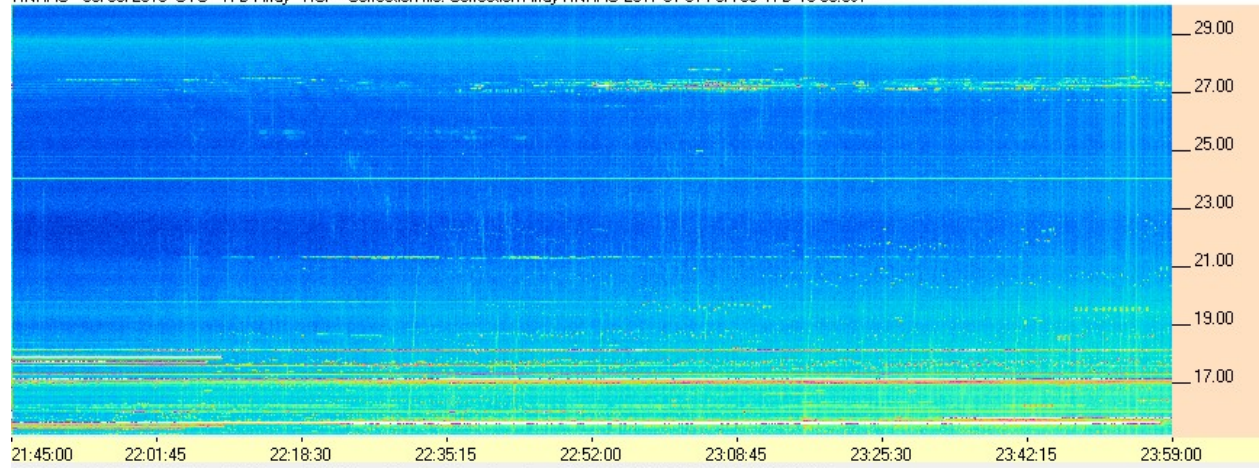


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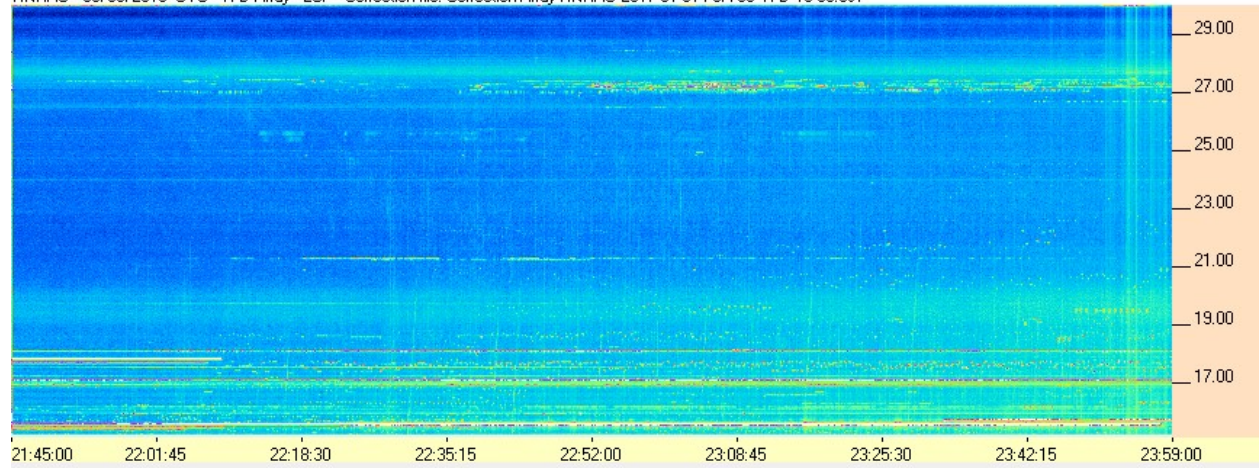


**FSX-8S / TFD Array**

HNRAO - 08/05/2018 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 08/05/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

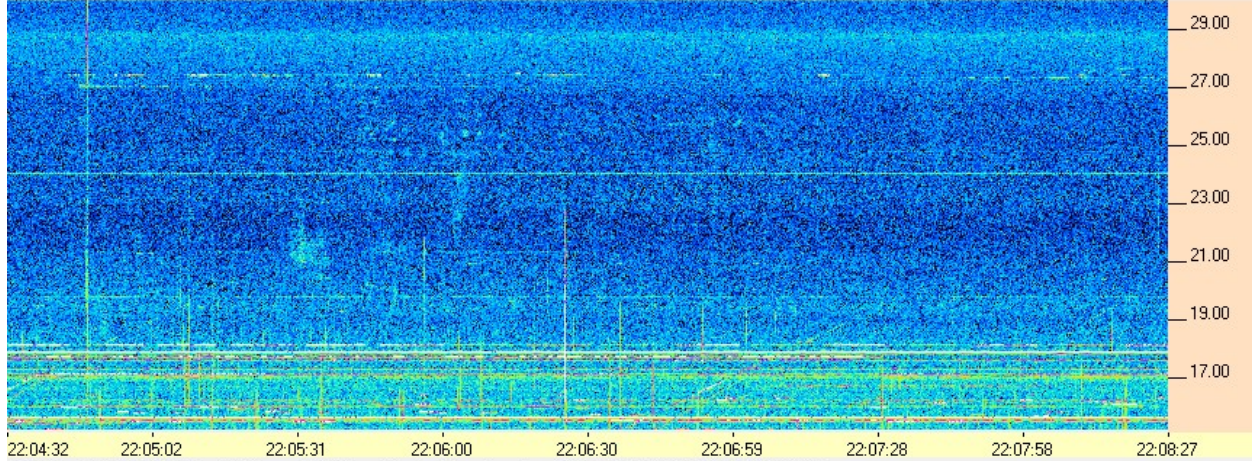




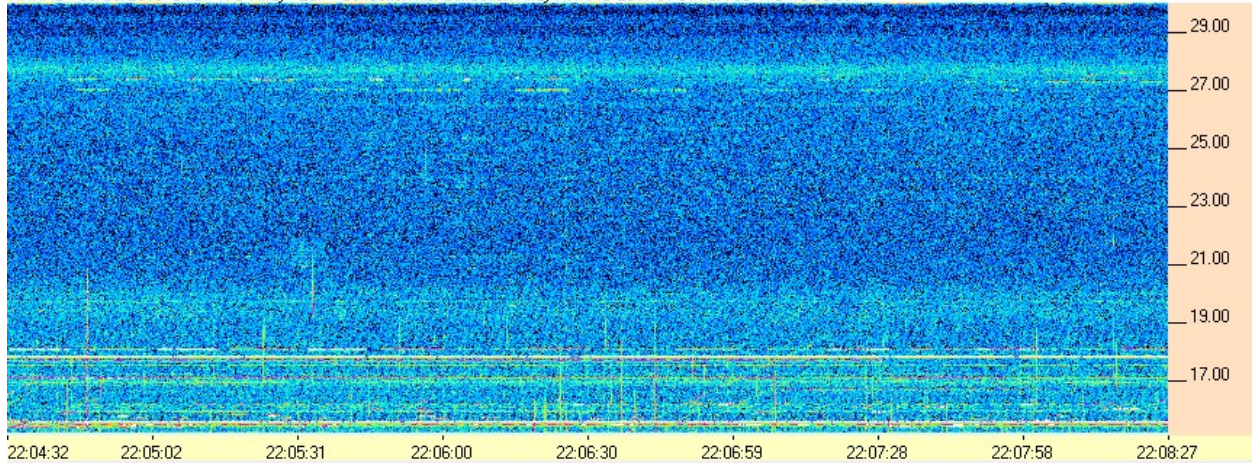
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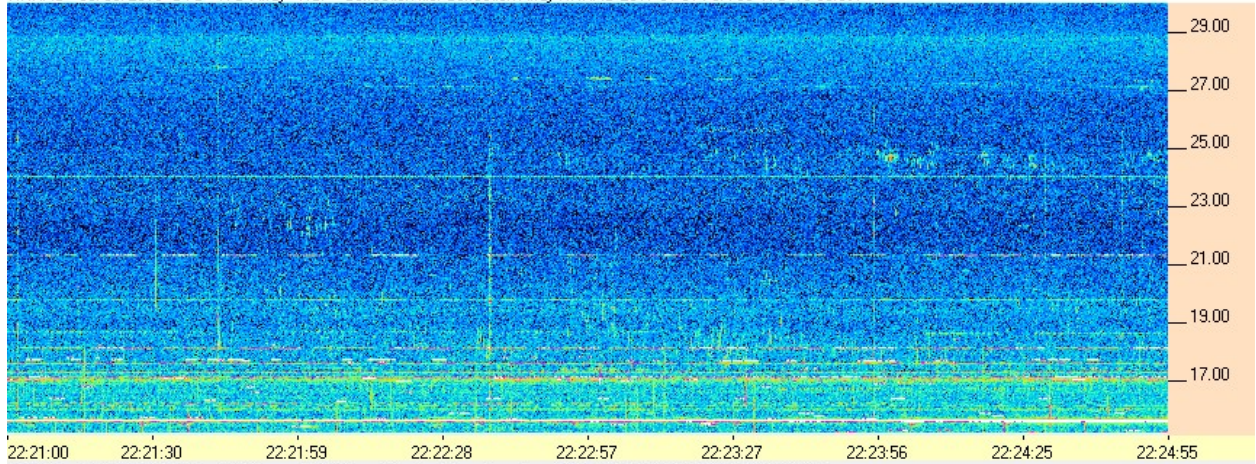




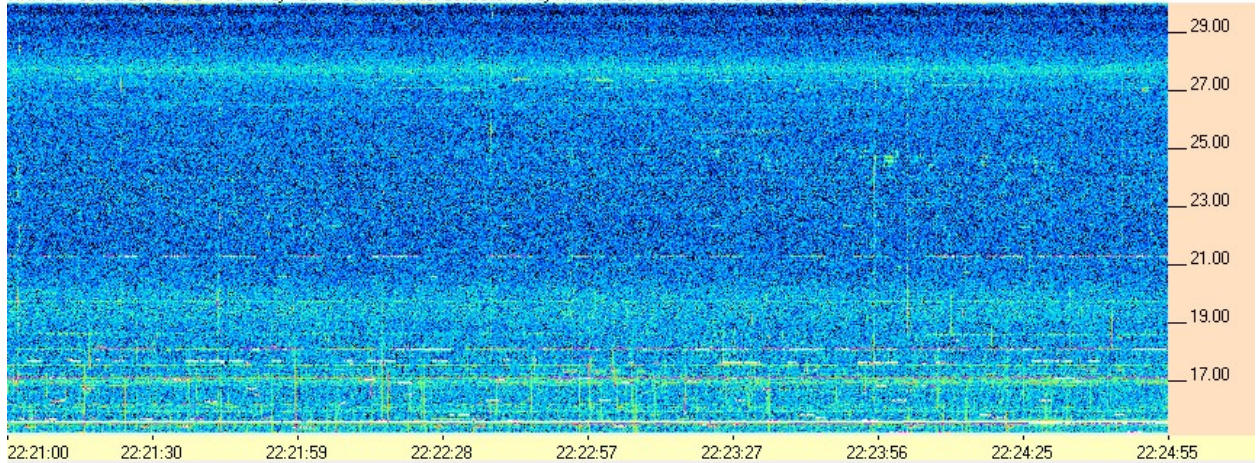
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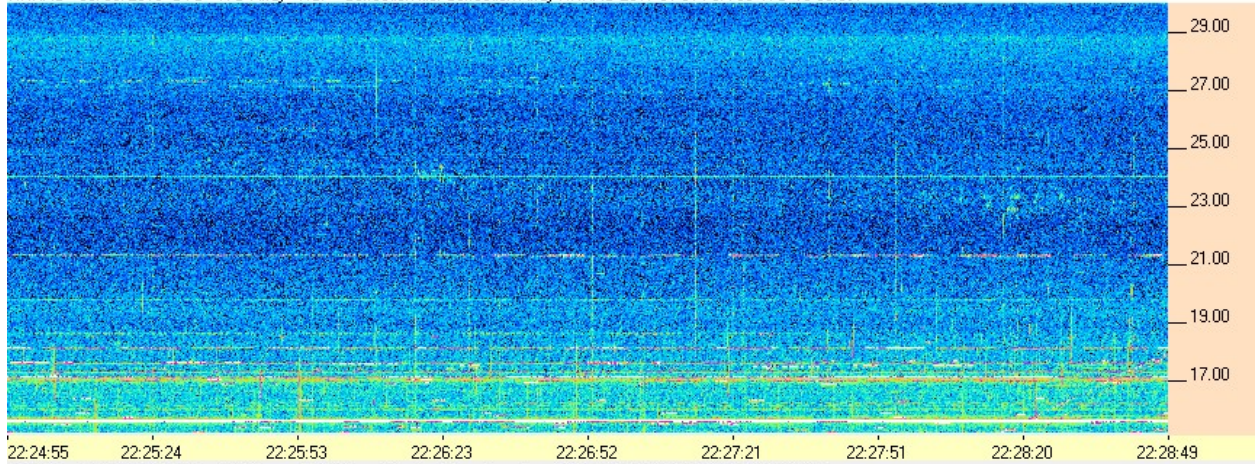




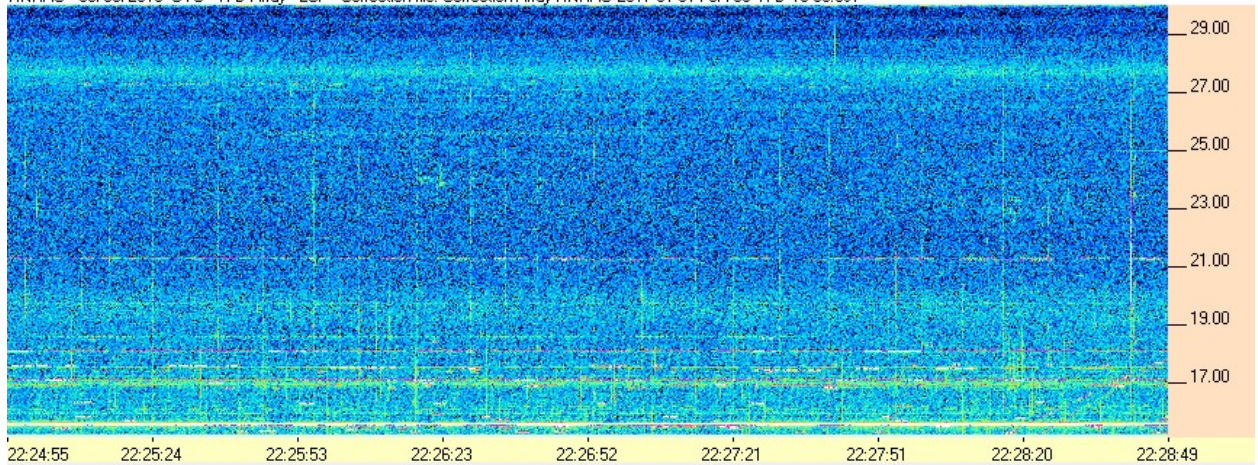
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HNRAO - 08/05/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

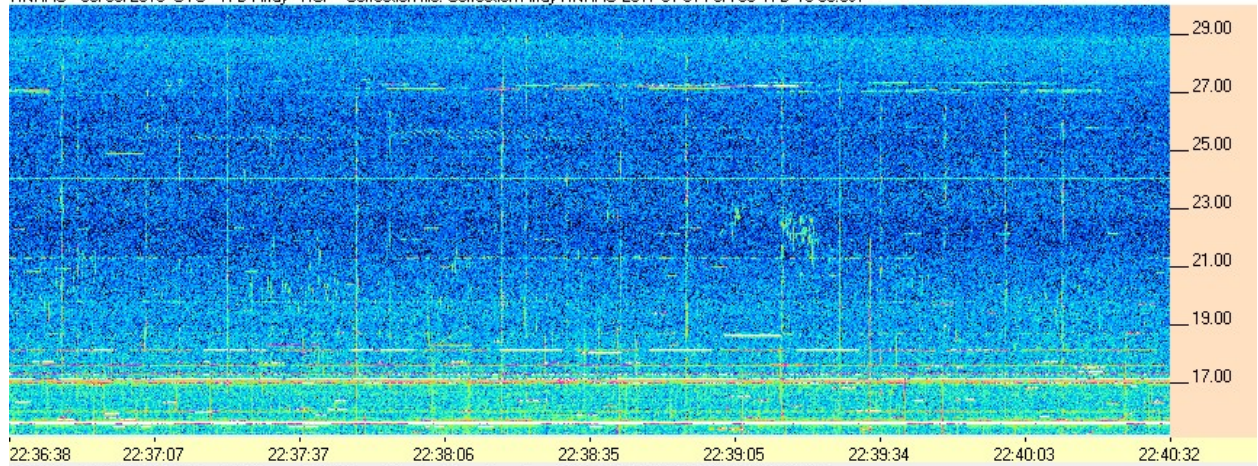




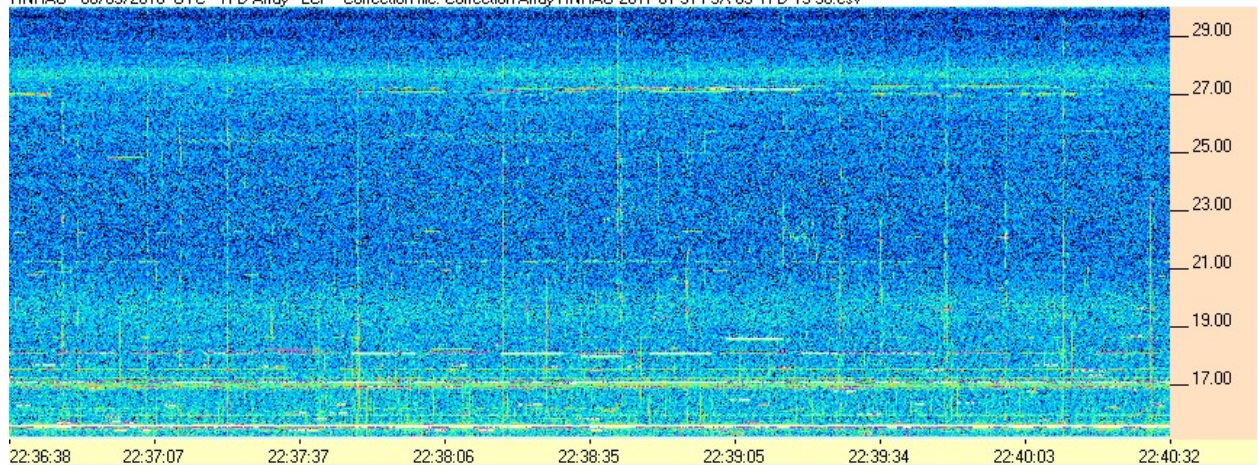
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HNRAO - 08/05/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

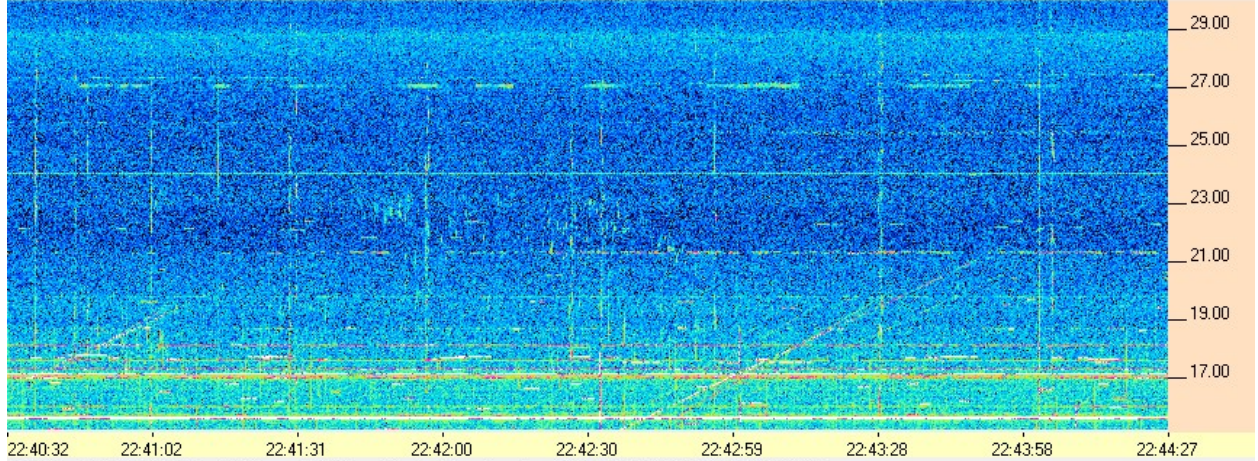




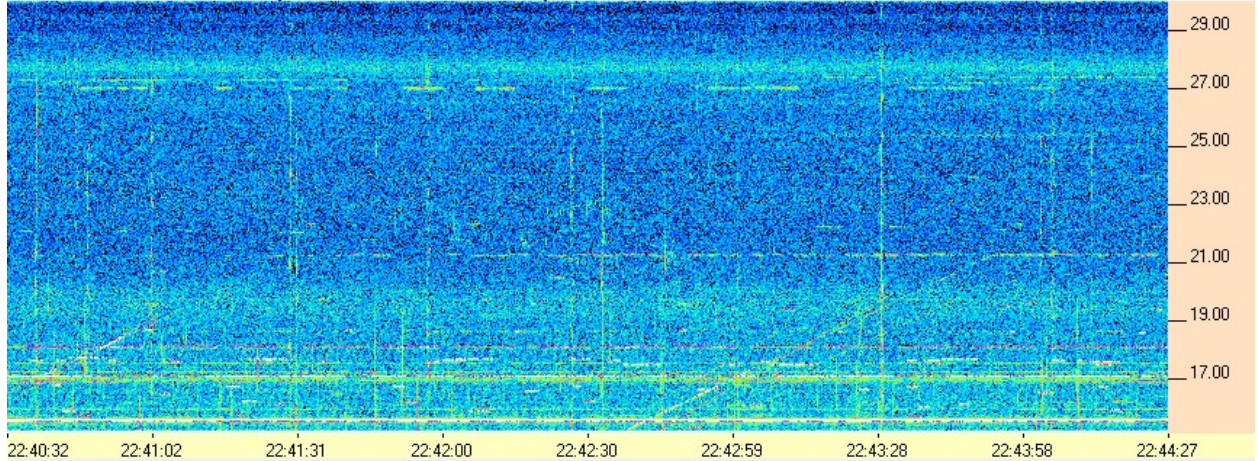
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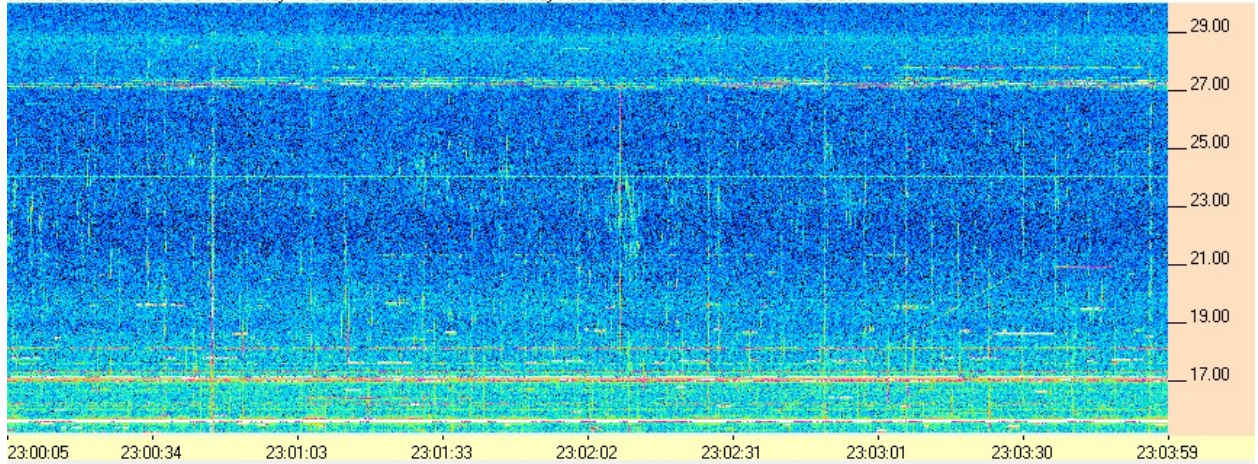




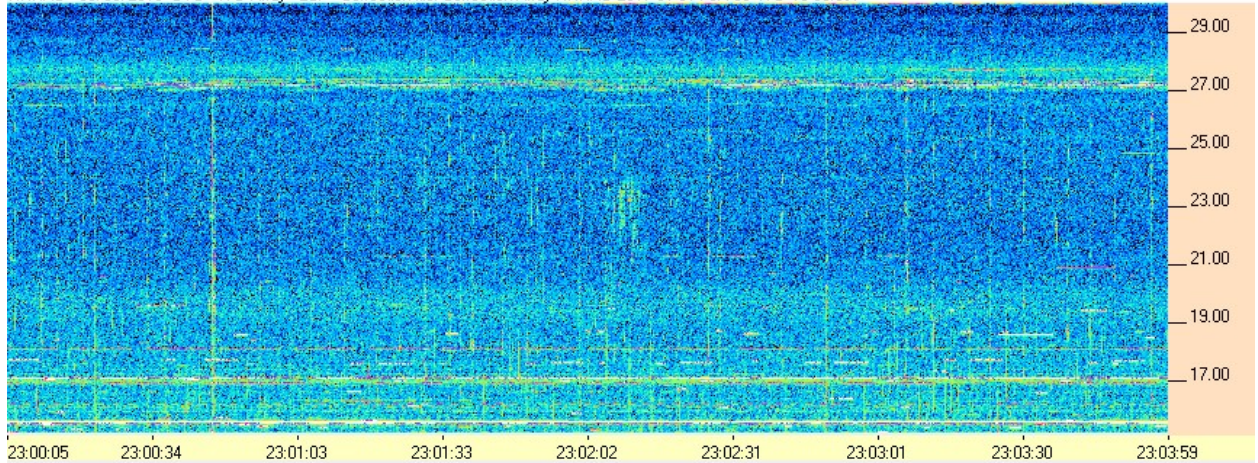
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HNRAO - 08/05/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



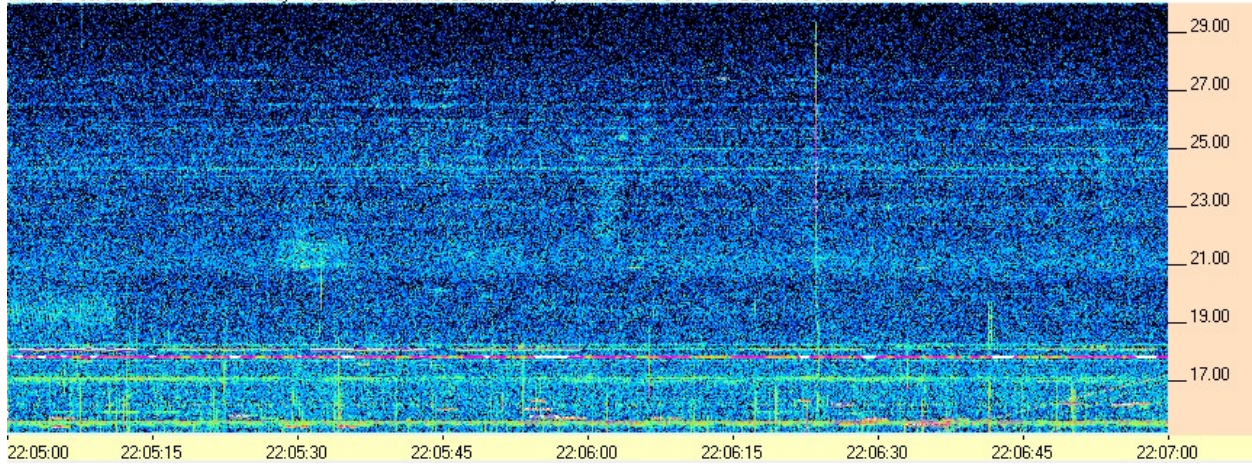


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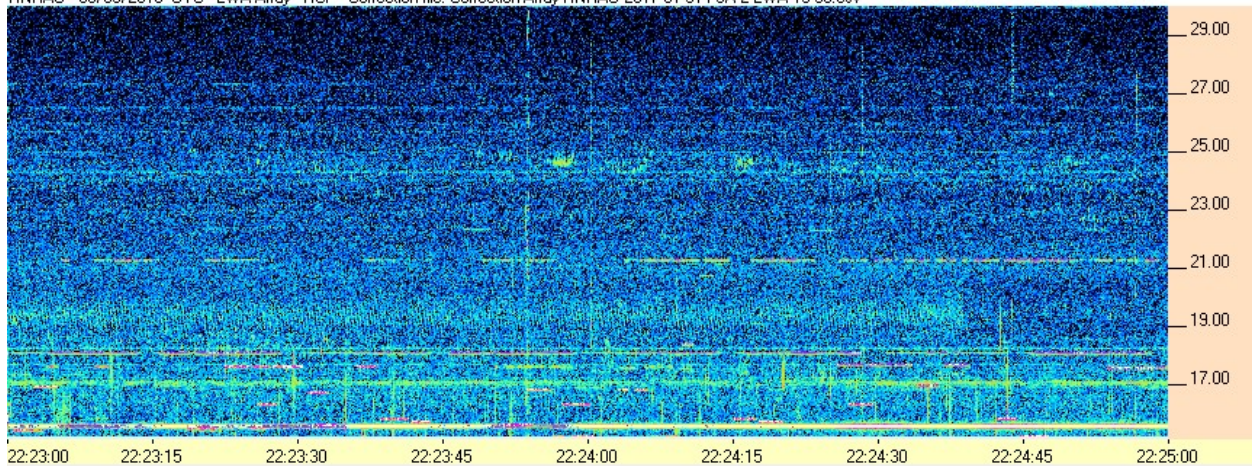


**FSX-2 / LWA Array**

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HNRAO - 08/05/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv

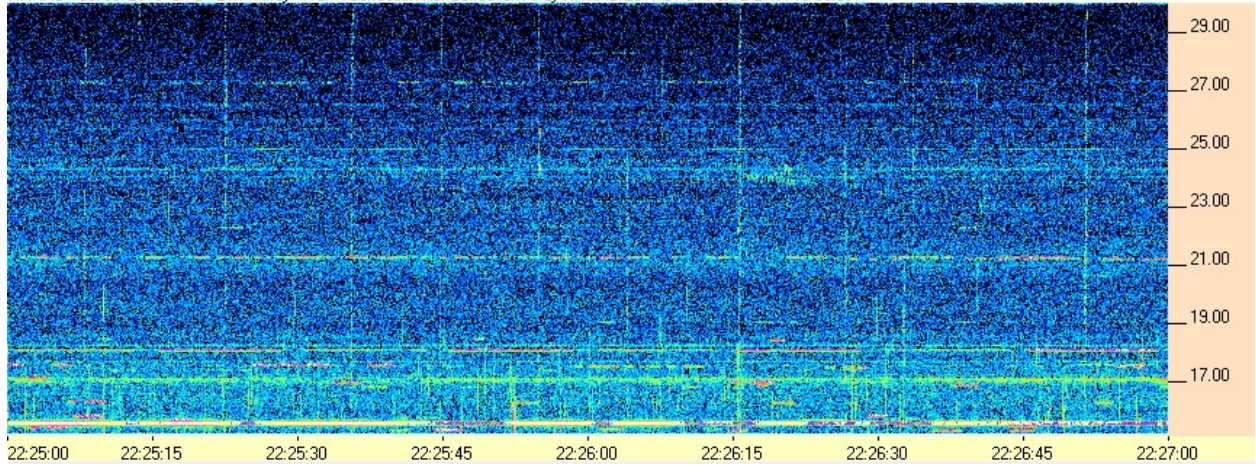




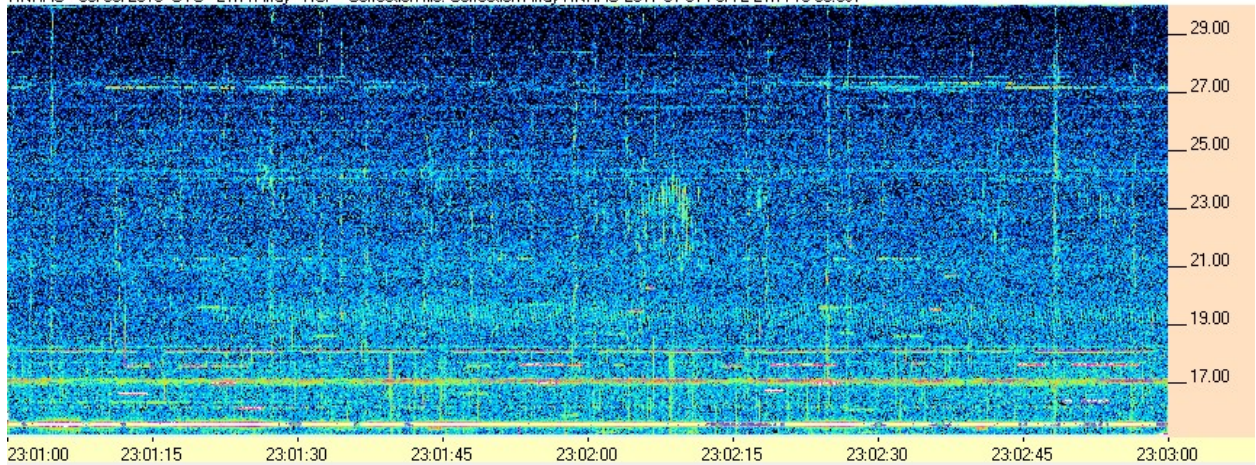
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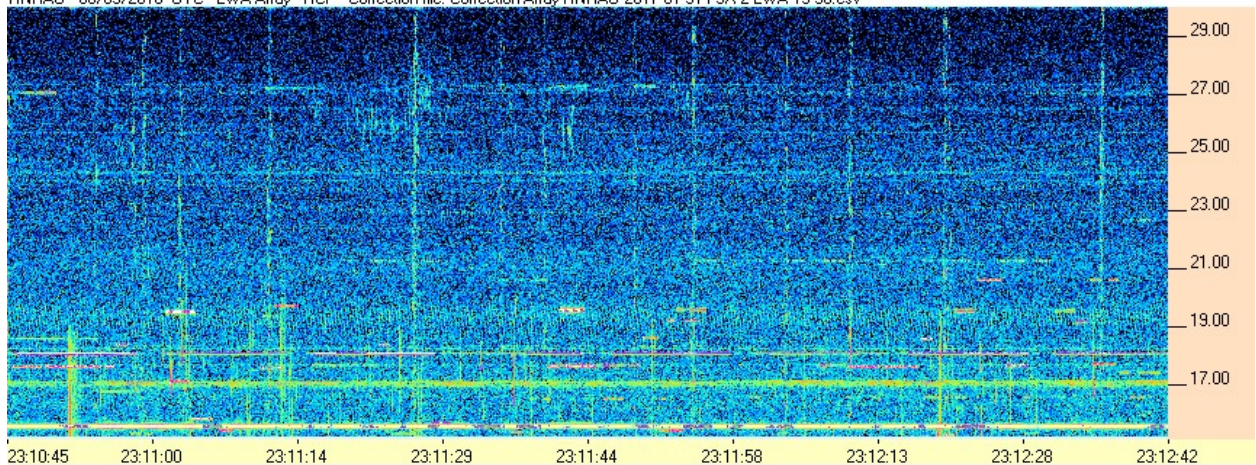
HNRAO - 08/05/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



HNRAO - 08/05/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



HNRAO - 08/05/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv

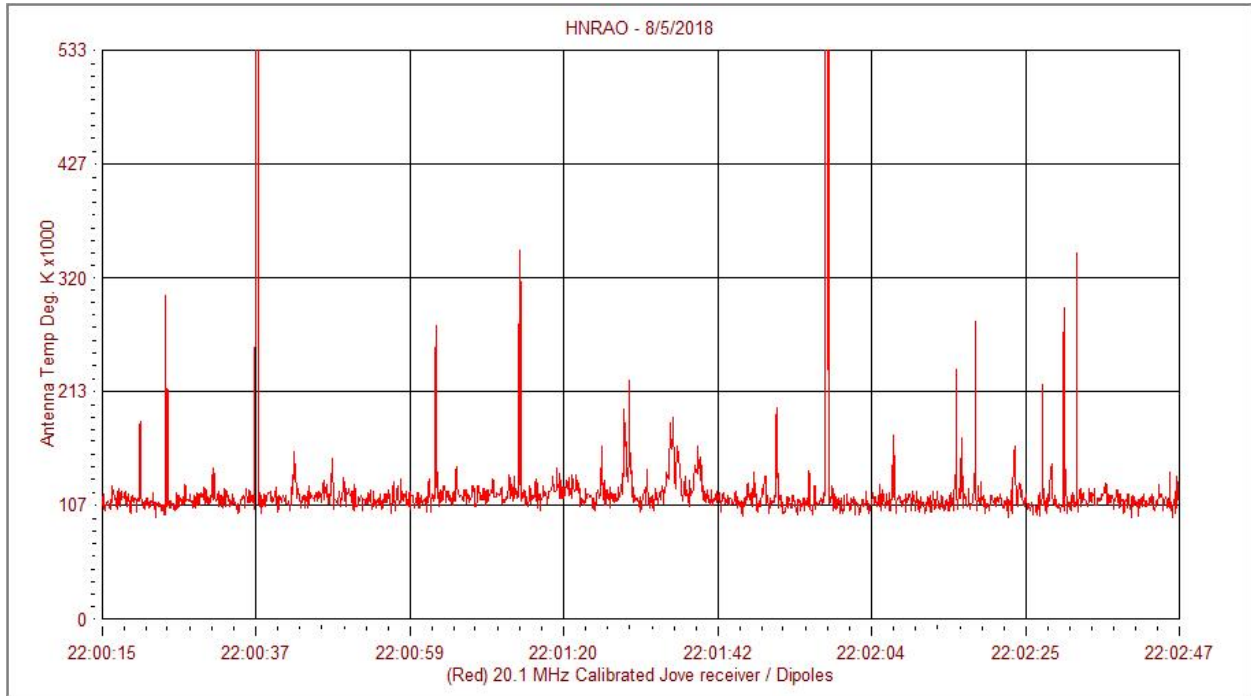




**HNRAO Observing Log**  
**40.673181 N – 80.437885 W**  
**EN90sq**

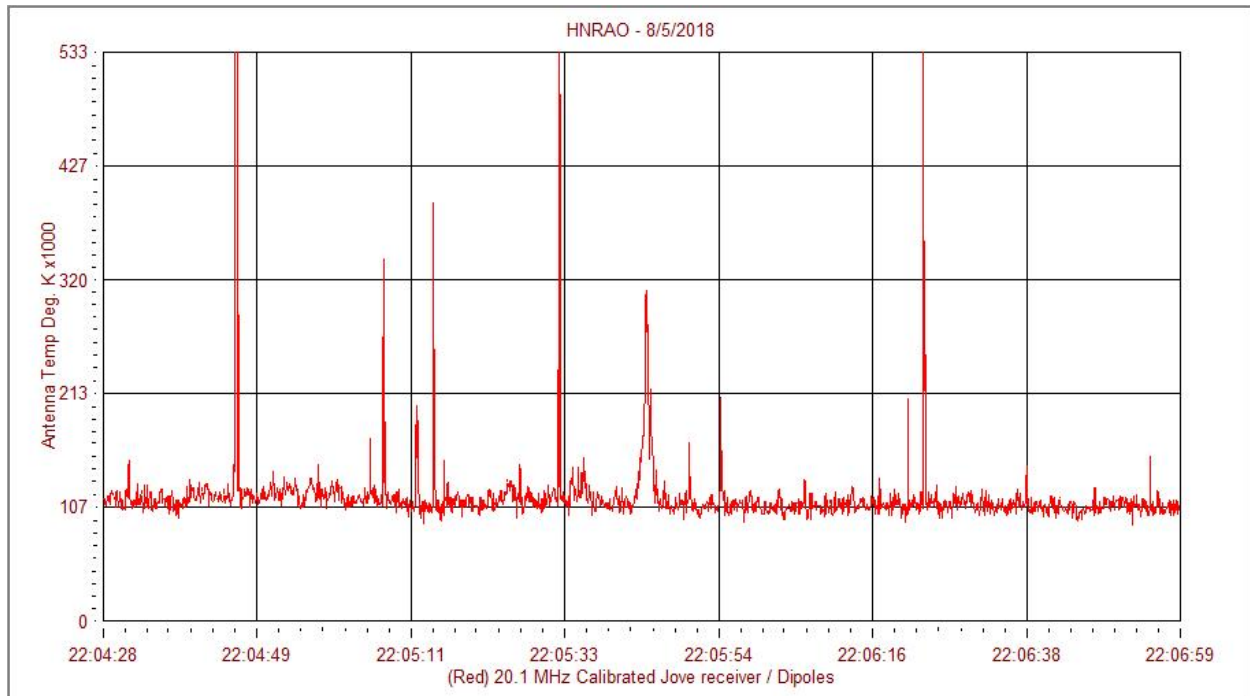


**Jove 2 receiver / Jove dual dipole array**



**2201:40**

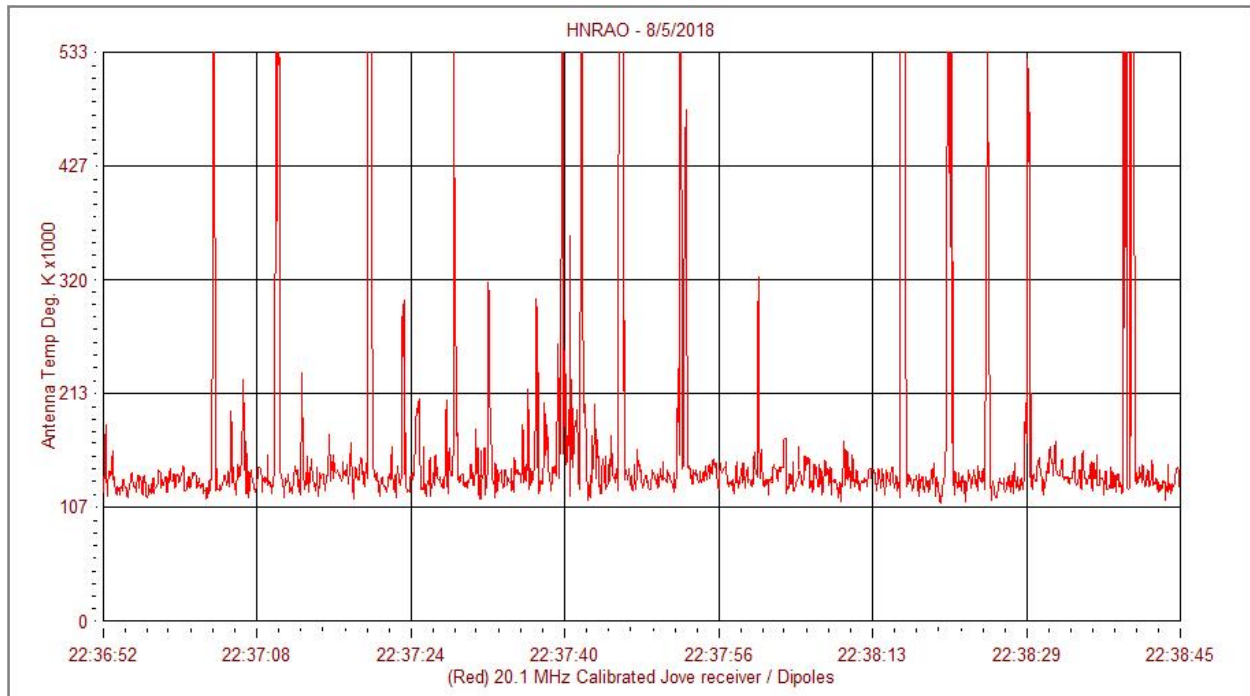
**HNRAO Observing Log**  
**40.673181 N – 80.437885 W**  
**EN90sq**



**2205:44**



**HNRAO Observing Log**  
**40.673181 N – 80.437885 W**  
**EN90sq**



**2237:40**