

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: June 16, 2020

Object: Jupiter – Io-A

Observer: Unattended

Start - Time UT:	0827:52	Planetary K-index:	
Jupiter Altitude (deg):	26.7	Jupiter Azimuth (deg):	194.6
Jupiter CML:	183.1	Jupiter Io Phase:	236.78
Jupiter RA (hr/min):	19:51	Jupiter Dec (hr/min):	-21:17
Hour Angle (hr/min):	00:56	Polarization	RCP
Sun Altitude (deg):	-11.8	Sun Azimuth (deg):	044.6
Sun RA (hr/min):	05:33	Sun Dec (hr/min):	23:18

End – Time UT:	0947:52		
Jupiter Altitude (deg):	20.4	Jupiter Azimuth (deg):	213.8
Jupiter CML:	231.47	Jupiter Io Phase	248.07
Hour Angle (hr/min):	02:16	Duration (min):	80
Sun Altitude (deg):	00.1	Sun Azimuth (deg):	058.6
Max Frequency MHz		Min Frequency MHz	15
J/S Angular Separation	147.8	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

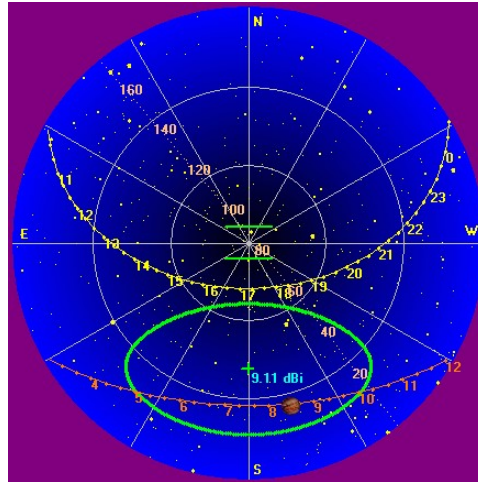
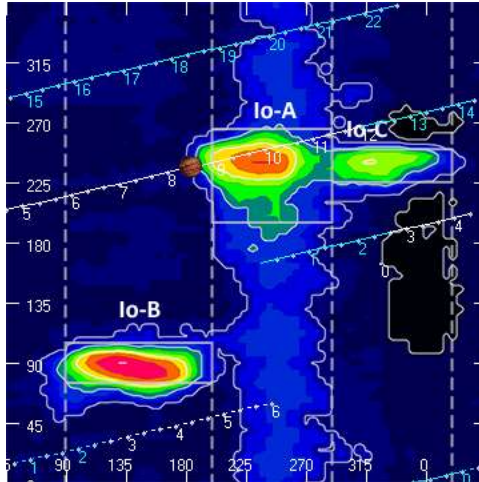
Radio Sky Spectrograph software version 2.9.30

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

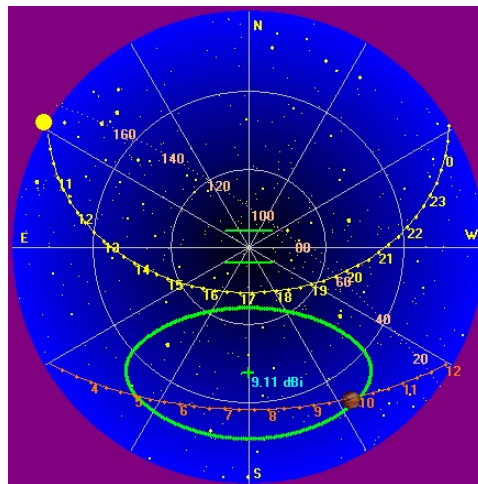
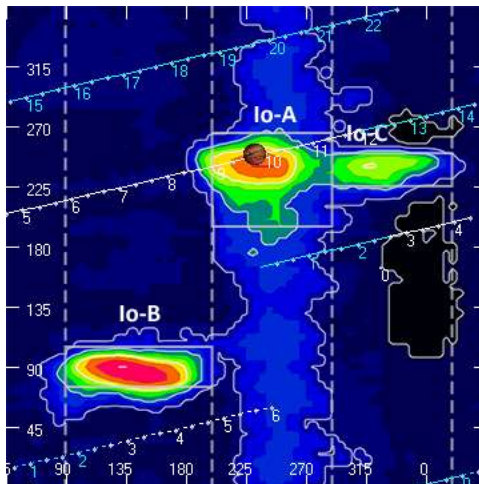
Network Time Server GpsNtp-Pi, Reeve Engineering

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

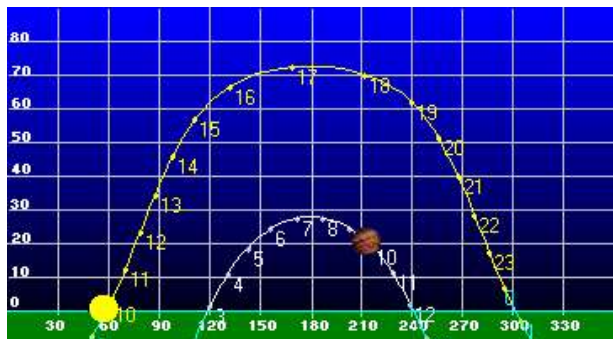
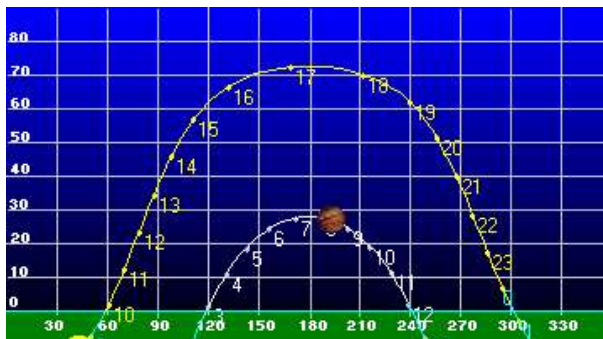
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Beginning of Pass



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	

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RCP Io-A storm with positive drift modulation lanes and negative slope (L4) modulation lanes. This storm was observed with both the FSX-8S and SDRPlay RSP2/RCP spectrographs. There were long periods of no discernable emissions which may be attributed to interplanetary or ionospheric fading. Several of the L4 modulation lanes were observed to span several MHz from beginning to end. RFI between 20.5 MHz and 19 MHz prohibited some measurements.

First sign of emissions were at 0827:52 UT with visible modulation lanes at 16 MHz. These emissions were on the order of +3 dB above GB. At 0835 UT, a much stronger grouping of L-bursts were observed centered around 18 MHz with a bandwidth of approx. 1 MHz and substantially more energetic than the vast majority of the L-bursts during this storm. At 0843:30 UT there were stronger L4 modulation lanes, 3-6 dB above GB. These were from 16 MHz to 19.5 MHz followed by fading, then another group at 0844 UT. There were no more significant, +3-6 dB above GB between 16 MHz and 18.5 MHz lasting about 25 seconds. Starting at 0852:40 UT, there was a cluster of L4 modulation lanes with a bandwidth of from 16 MHz to 23 MHz. This group had several strong bursts within the modulation lanes at 0853:17 UT. This group lasted from 0852:40 UT through 0854 UT and stands as one of the largest clusters of L-burst, L4 modulation lanes in this storm. 0902:35 UT, another cluster of, brief, but stronger L-bursts from 16 MHz-23 MHz with the strong bursts centered between 17.5 MHz and 19 MHz. Another strong group within the bandwidth of this group were seen between 21.5 MHz and 22.5 MHz. There were no more notable L-bursts for the remainder of this storm. It was dominated by brief, weak L-bursts/L4 modulation lanes interspaced with large time periods of fading.

This Io-A storm can be summed up as having weak L-bursts and clearly defined L4 modulation lanes. Nothing noteworthy to report.

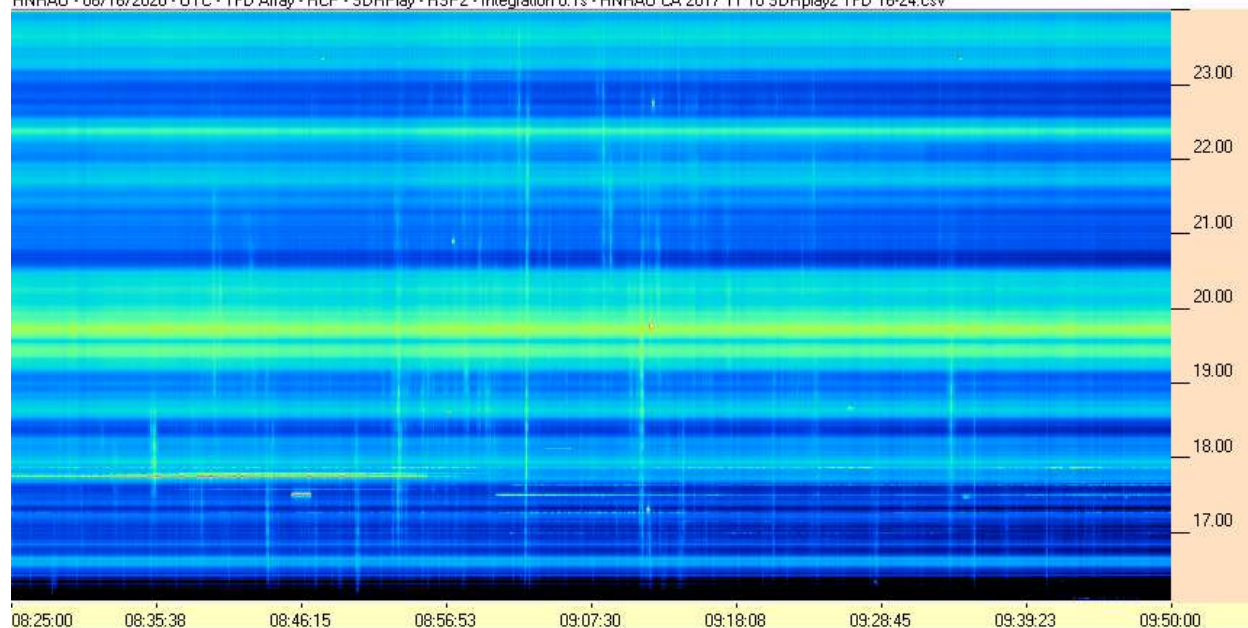
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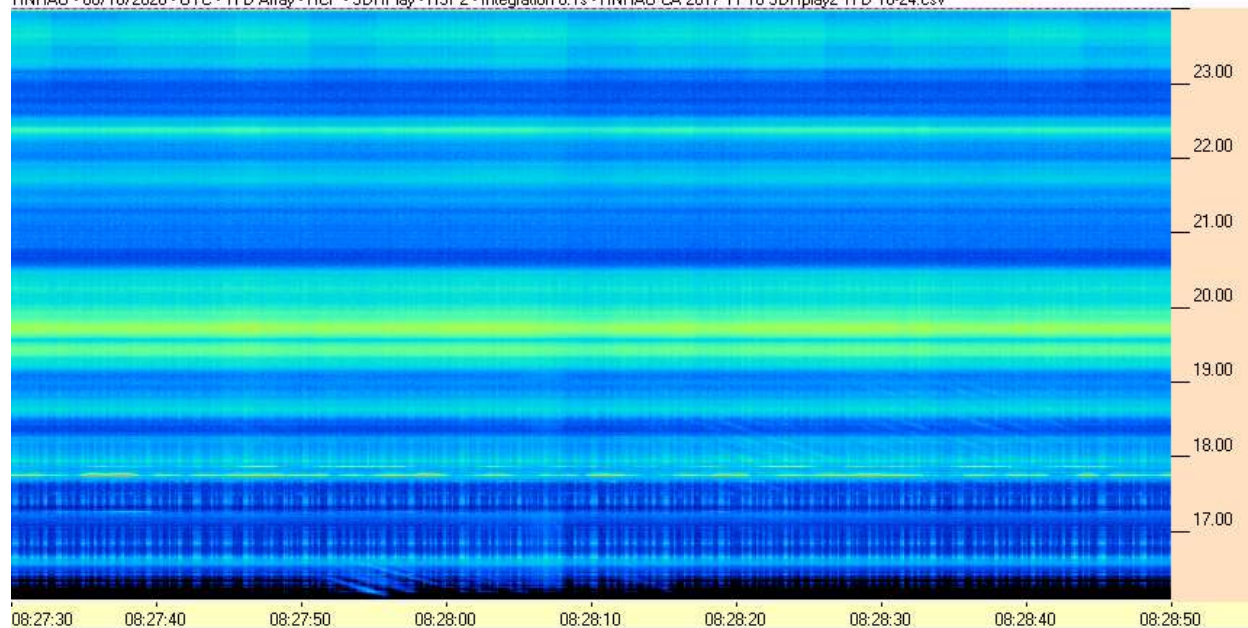


SDRPlay RSP2/RCP / TFD Array

HNRAO - 06/16/2020 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



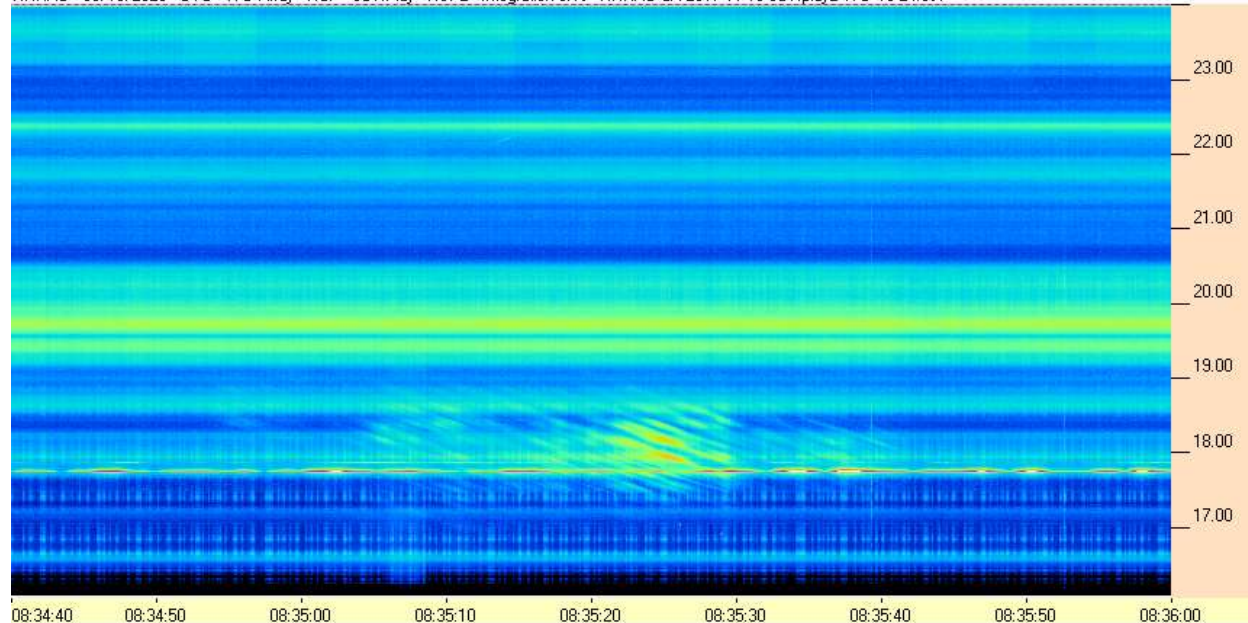
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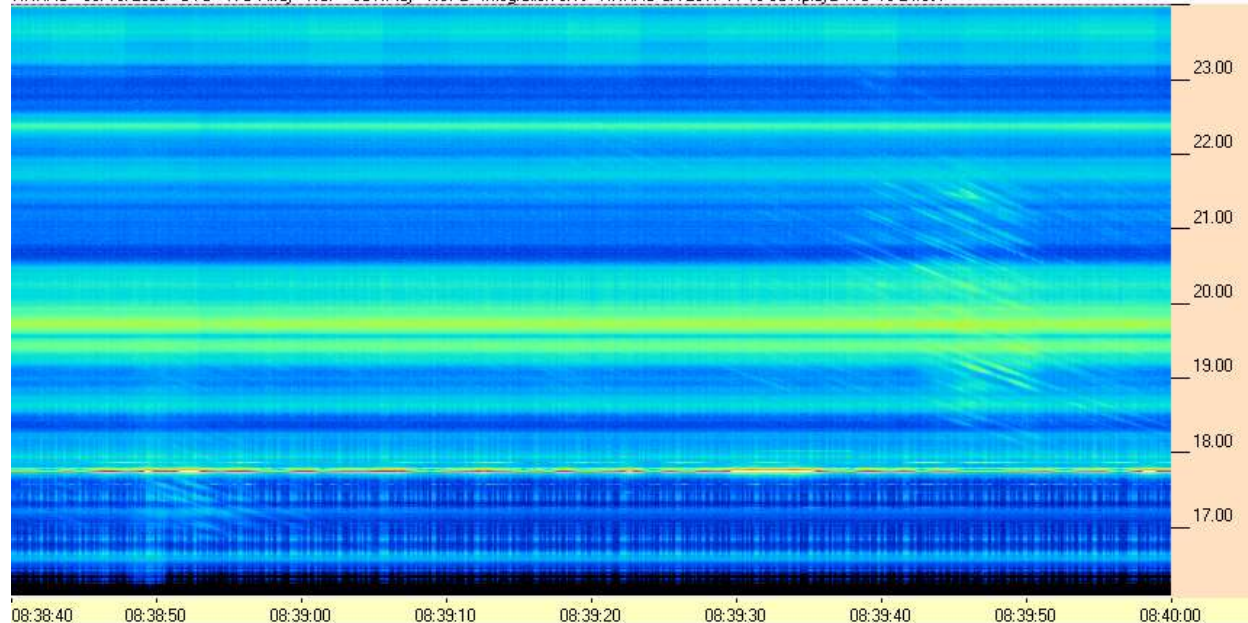
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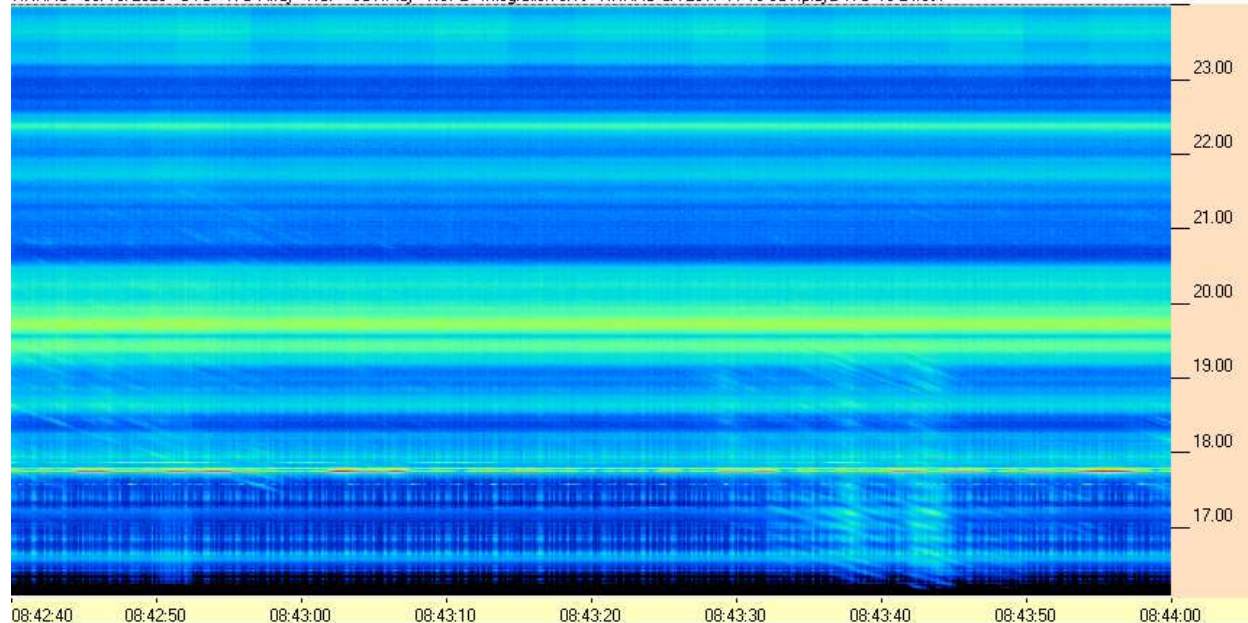
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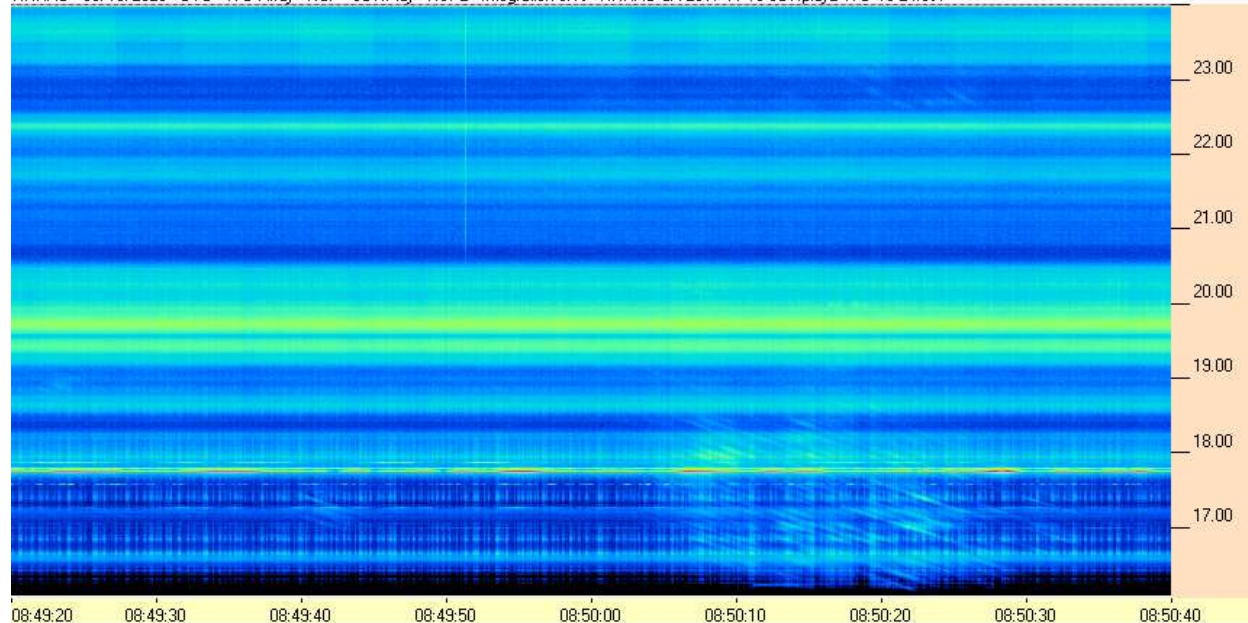
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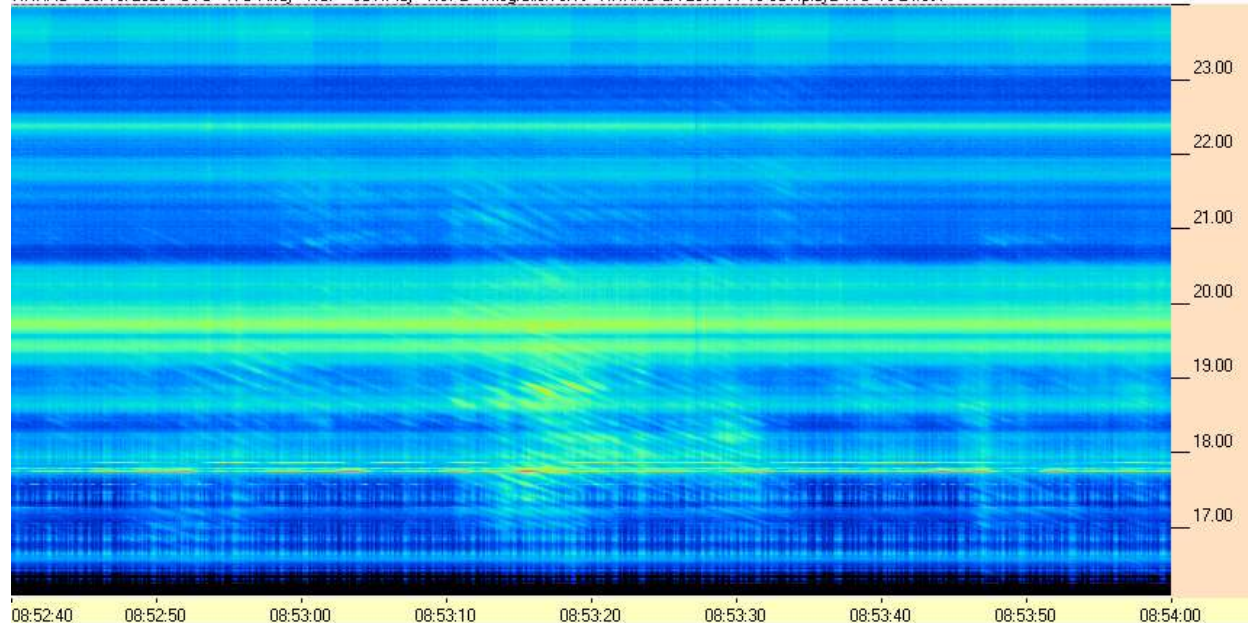
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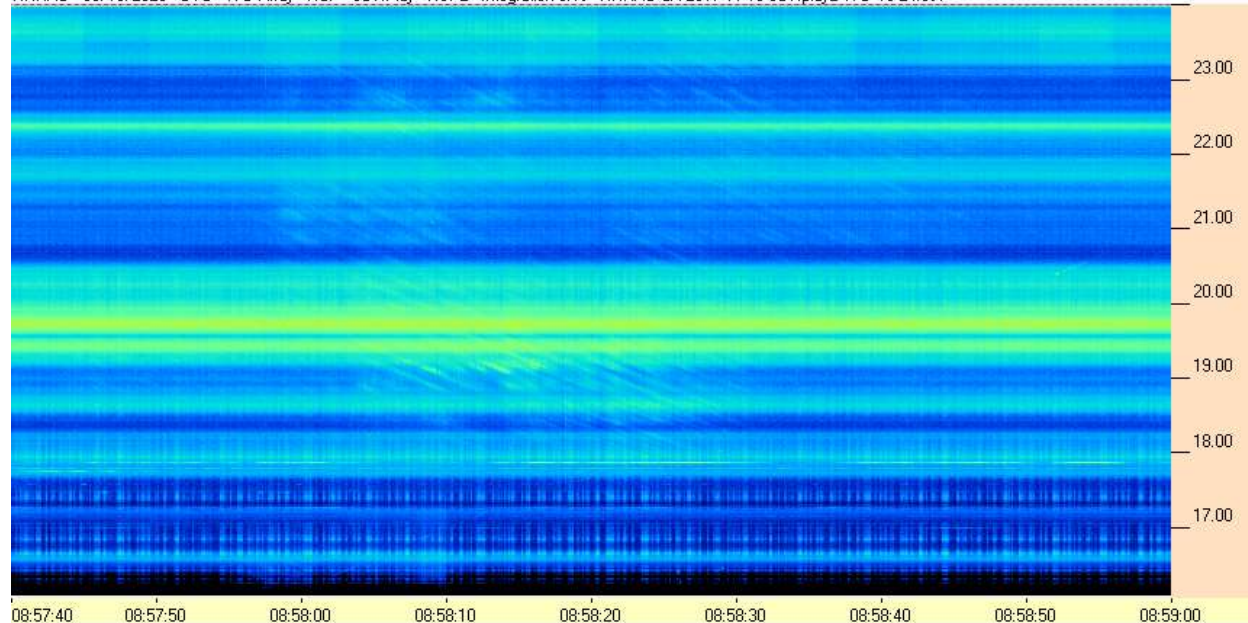
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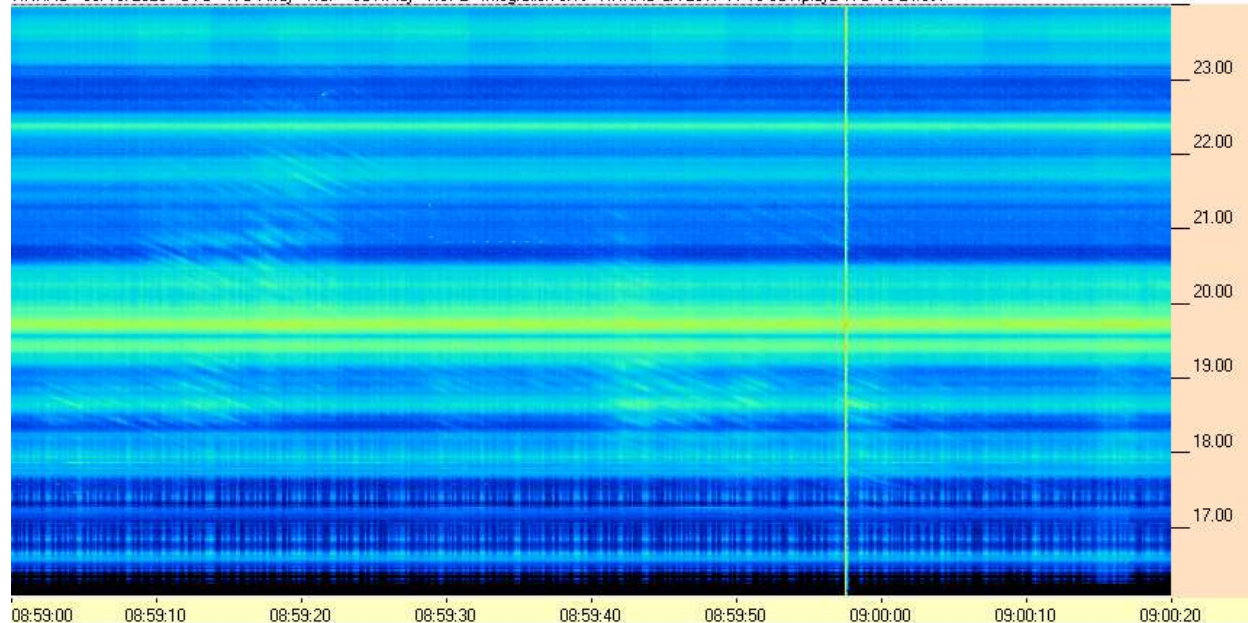
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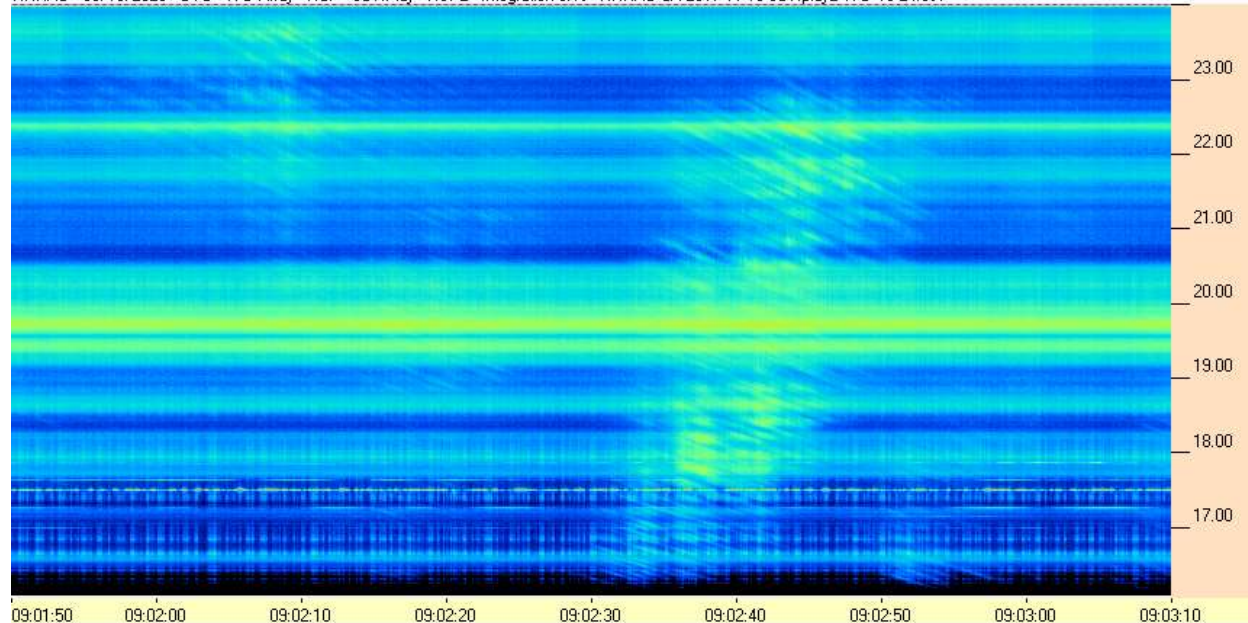
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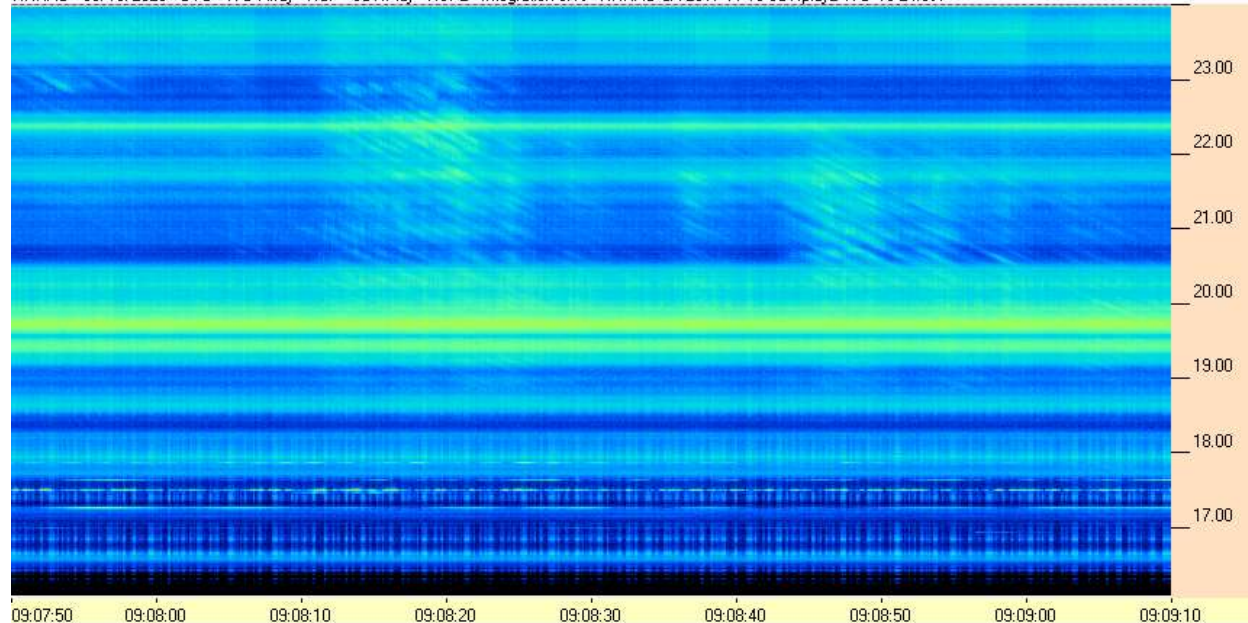
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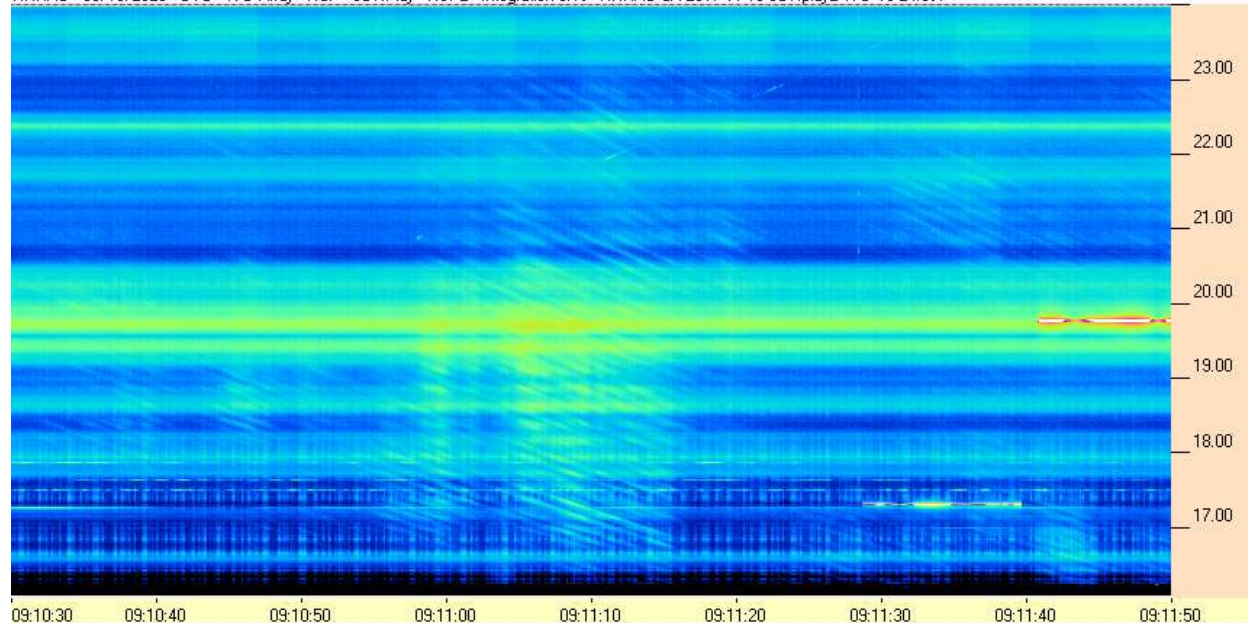
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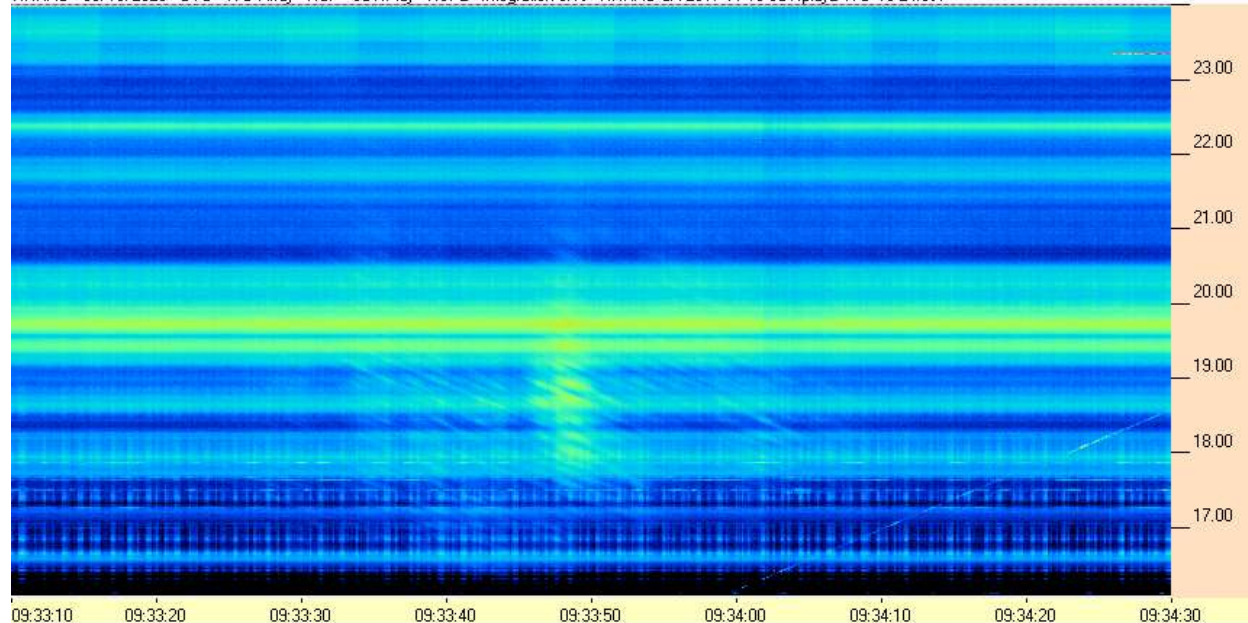


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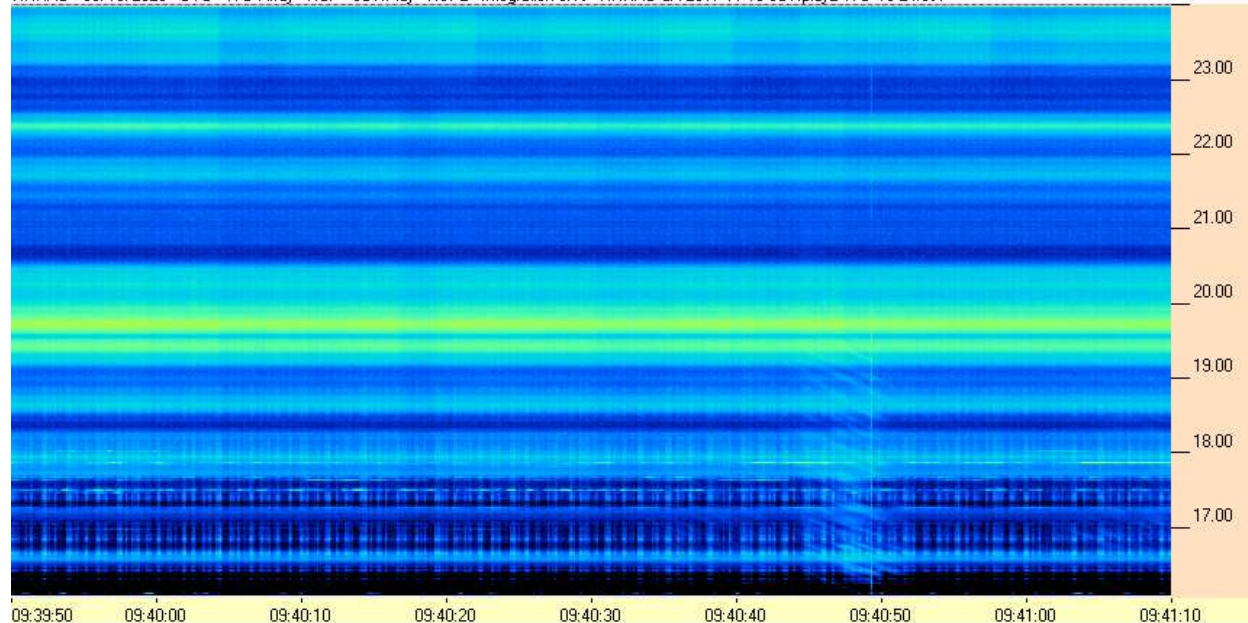
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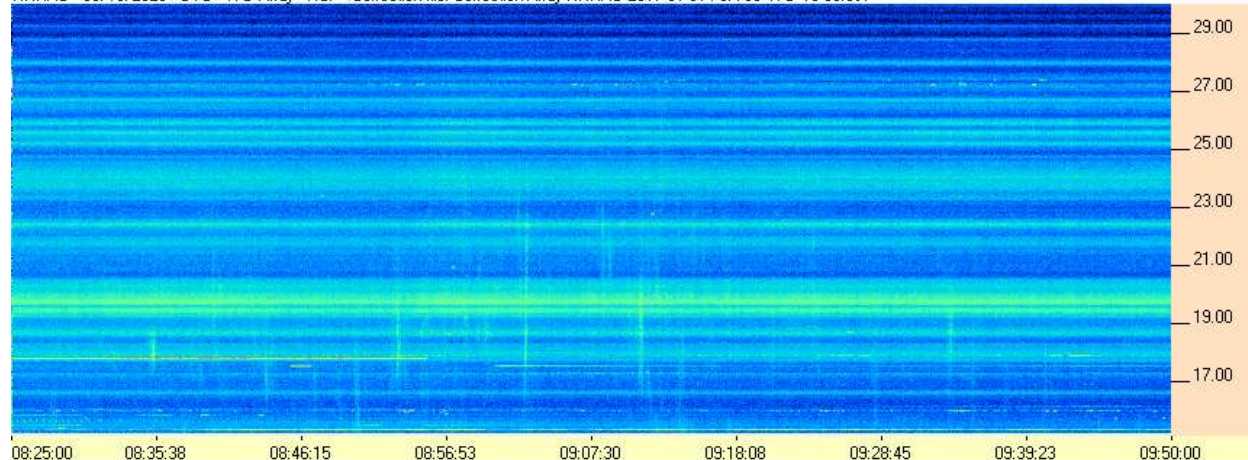


FSX-8S / TFD Array

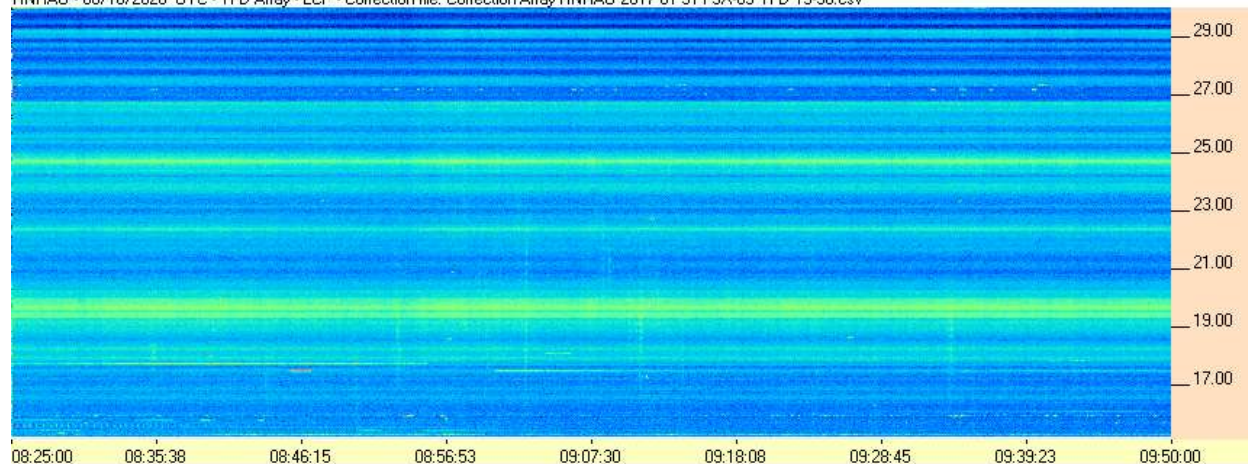
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HNRAO - 06/16/2020 - UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 06/16/2020 - UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

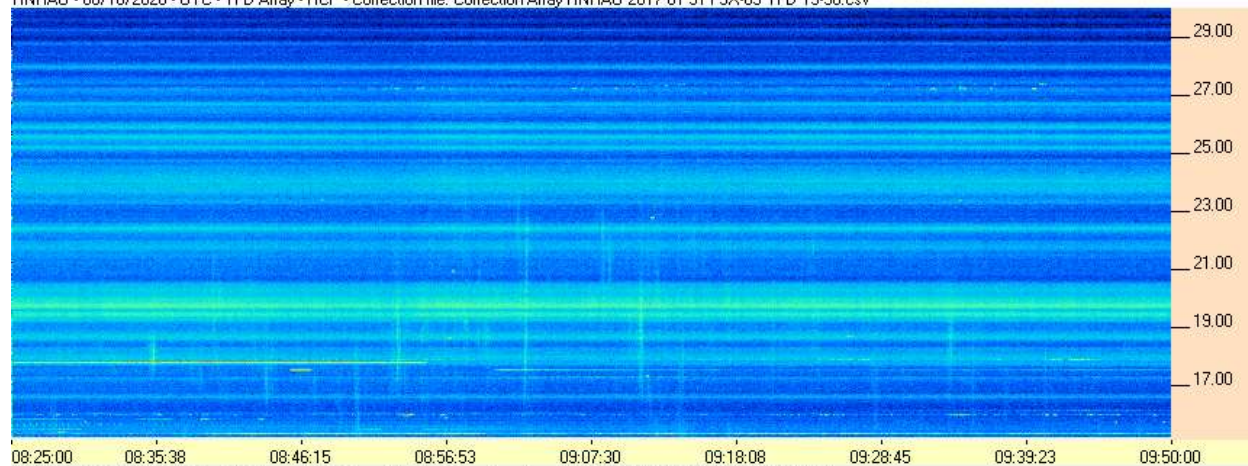


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FSX 8-S / TFD Array

HNRAO - 06/16/2020 - UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 06/16/2020 - UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

